Implementing an international mountain convention

An approach for the delimitation of the Carpathian Convention area

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ABBREVIATIONS

AC:	Alpine Convention
ANPA:	Agenzia Nazionale per la Protezione dell'Ambiente / National Environmental Protection Agency
Art.:	Article
a.s.l.:	above sea level
CC:	Carpathian Convention
CERI:	Carpathian Ecoregion Initiative
Chap.:	Chapter
COM:	European Commission
CORINE:	Coordination of Information on the Environment
CR:	Comprehensive Report
CZ:	Czech Republic
DEM:	Digital Elevation Model
DEWA:	Division of Early Warning and Assessment
DMEER:	Digital Map of European Ecological Regions
EEA:	European Environment Agency
EC:	Europen Community
EAGGF:	European Agricultural Guidance and Guarantee Fund
EEC:	European Economic Community
EG:	Europäische Gemeinschaften (European Communities)
ERDF:	European Regional Development Fund
ESF:	European Social Fund
ETC/NC:	European Topic Centre for Nature Conservation
EU:	European Union
EURAC:	European Academy Bolzano
EUROSTAT:	Statistical Office of the European Communities
FAO:	Food and Agriculture Organization of the United Nations
FFH-Directive:	Fauna, Flora and Habitats Directive
FIFG:	Financial Instrument for Fisheries Guidance
Fig.:	Figure
GRID:	Global Resource Information Database
HU:	Hungary
ISCC:	Interim Secretary of the Carpathian Convention
KEO:	Carpathian Environmental Outlook
LAU:	Local Administrative Units (level 1 and 2, former NUTS level 4 and 5)
LFA:	Less-favoured area (delimitation)
Nordregio:	Nordic Centre for Spatial Development
NP:	National Proposal (area)
NP-EU:	National Proposal (without Serbia & Montenegro and Ukraine)
NR-MA:	Mountain Area as delimited by Nordregio (Report 2004/1)
NUTS:	Nomenclature of territorial units for statistics (Statistical Regions of Europe)
PELCOM:	Pan European Landcover Monitoring project
PL:	Poland

RO:	Romania
SK:	Slovak Republic
S&M:	Serbia & Montenegro
Tab.:	Table
UA:	Ukraine
UN:	United Nations
UNEP:	United Nations Environment Program
WCMC:	World Conservation Monitoring Center
WFD:	Water Framework Directive
WWF:	Word Wildlife Fund

PREFACE

UNEP

The Conference of Plenipotentiaries for the Adoption and Signature of the Carpathian Convention (Kyiv, Ukraine, 20 and 22 May 2003) requested the United Nations Environment Programme – Regional Office for Europe (UNEP-ROE) as the interim secretariat of the Carpathian Convention to prepare a comprehensive report and proposal on the scope of application of the Carpathian Convention, for consideration by the Conference of the Parties at its first session. HE Mr. Altero Matteoli, Minister of the Environment and Territory of Italy, addressed the signing ceremony of the Carpathian Convention, and offered the continuous support by Italy to the Carpathian Convention process, including scientific backstopping by EURAC, to resolve the challenge of defining the geographical scope of application of the Carpathian Convention.

In May 2004, the first Ad Hoc Expert Meeting of the Carpathian Convention in Bolzano welcomed the scientific support capacities offered by EURAC, and recommended a further strengthening of cooperation between the Carpathian Convention and its interim secretariat, as well as with EURAC. In October 2004, the cooperation between UNEP and EURAC was cast into a Memorandum of Cooperation, including scientific, logistical and communication support. Consequently, EURAC hosted two expert meetings in Bolzano followed by the Preparatory Meeting for the first Meeting of the Conference of the Parties of the Carpathian Convention in December 2005, were the draft report “Implementing an international mountain Convention: An approach for the delimitation of the Carpathian Convention area” was presented for a final reading. In the name of all of us, let me express our gratefulness to the Italian Ministry of Environment and Territory and EURAC for their support, cooperation and expertise.

I would like to thank the Carpathian Convention Focal Points for their continuous cooperation and inputs, such as the inspiring discussions on a holistic and integrated approach, reflecting the main goals and principles of the Convention and relevant EU policies and directives. I hope and expect that the present report will facilitate decision-making on the Article 1 of the Carpathian Convention at the first meeting of the COP, to be held in the course of the year 2006. In the meantime, we can already felicitate ourselves that the in-depth analysis on the scope produced valuable scientific material and considerable spin-offs, greatly contributing to related processes such as the Carpathian Environment Outlook (KEO). Furthermore, as new initiatives of cooperation for the protection and sustainable development of mountains are taking shape in other mountain regions of the world, many eyes will look at the present report as the first comprehensive scientific analysis for delimiting a specific mountain area, constituting an important contribution to the Mountain Partnership by EURAC as an international centre of competence for mountain research.

Frits Schlingemann
Director and Regional Representative
UNEP – Regional Office for Europe

Ministero dell'Ambiente e della Tutela del Territorio

ITALIAN MINISTRY OF ENVIRONMENT AND TERRITORY

The Italian Ministry for the Environment and Protection of Territory and the Italian Government showed a constant effort in supporting initiatives for the protection and the promotion of sustainable development in mountain areas. These activities date back to the International Year of Mountains and the proceedings with the Johannesburg Summit for Sustainable Development in 2002. In this occasion the International Partnership for the Sustainable Development of Mountain Regions was launched. At that time, Italy held the presidency of the Alpine Convention and was particularly involved in the promotion of initiatives for the implementation of Chapter 13 of Agenda 21 and in the negotiation process of the Carpathian Convention.

By its support from the beginning of the implementation of the Carpathian Convention, Italy intended to make it possible also for other mountain regions worldwide to benefit from the transboundary cooperation pattern developed in the Alpine Convention. This is one of the most important outcomes of this wider interest of Italy for the sustainable development of mountain areas. On the 23rd of May 2003 in Kiev, in occasion of the signature of the Carpathian Convention, the Italian Ministry for the Environment and Protection of Territory committed itself to support the operative activities of the Convention and the development of specific projects necessary for the implementation of the Convention.

One of the fundamental requirements of an international convention is the clear determination of the geographical scope of application in order to guarantee the precise implementation of its objectives. According to this requirement, the Ministry for the Environment supported and funded the present study on the delimitation of the Carpathian Convention. The study has been conducted by the European Academy of Bolzano under the coordination of UNEP.

The significant results of the work, as you can appreciate in the pages of this publication, constitute a valid basis for discussion and encouragement for the Parties of the Carpathian Convention which are now involved in the process of determining the geographical scope of application of the Convention.

With my best wishes for a succesfully and rapid solution of this important matter.

Dott. Corrado Clini
Director-General
Ministry of Environment and Territory – Directorate for Environmental Research and Development

EUROPEAN ACADEMY OF BOLZANO

Since its establishment, the European Academy in Bozen/Bolzano has been promoting research projects with a focus on mountain areas. Indeed, Bozen's location in the middle of the Alps and at the junction between the German and the Latin cultural areas provides a privileged setting with all the right preconditions. Special emphasis is placed on applied research concerning mountain-related issues; that is to say on a scientific approach conducive to the solution of problems that tangibly affect mountain regions.

For many years now, the Academy has been supporting the goals of the Convention on the Protection of the Alps (Alpine Convention) and in that context, it has served as an advisor to the Italian Ministry of Environment and Territory. Moreover, Bozen hosts a section of the permanent Alpine Convention Secretariat. The Academy takes great pride in being involved in the enactment of the Carpathian Convention, in particular in the definition of its geographic scope of application.

The experience with the Alpine Convention shows how important it is to have a common transnationally agreed process in place in order to define the geographic scope of a convention. The more intensive and constructive the search for a common approach, the easier it is to find common strategies to implement the contents of the convention from the very start. This strengthens trust among the participating countries, setting important preconditions for a successful implementation of the convention.

The Academy is aware that its contribution will represent an 'external' perspective. The Academy's first and greatest concern however is not the precise delimitation of the geographic boundaries of the Convention, but rather the opportunity to contribute to this process in a constructive way and to identify a common transnational approach to define the Convention's scope. This external viewpoint will allow neutral, technical aspects to flow into the discourse, irrespective of political constraints.

I am not aware of any other Convention whose geographic scope has been set on the basis of technical documentation studied in such a comprehensive and transnational way. Undoubtedly this research project has entered unknown territory and explores a novel, unprecedented way of drafting an international convention. For this reason the Carpathian Convention can serve as an example for future conventions.

On behalf of the entire Academy and its staff in particular, I wish to thank Dr. Fritz Schlingemann and Dr. Harald Egerer (UNEP) for their invaluable help in establishing this cooperation. Let me also thank the members of the ad-hoc expert committees who met regularly in Bozen. This was an ideal opportunity for the Academy's staff to share and exchange experiences and to develop new partnerships.

I wish the Carpathian Convention great success, and I hope opportunities will arise for a close and productive cooperation with the Alpine Convention.

Dr. Stephan Ortner
Director – European Academy Bolzano

1 INTRODUCTION

At the initiative of the Ukraine and following a negotiation process serviced by the United Nations Environment Programme – Regional Office for Europe (UNEP-ROE), the Carpathian Convention (CC) was signed by the seven participating Carpathian countries in the year 2003 in Kiev. According to Art. 1 of the Framework Convention, the perimeter of application for this convention will be defined during a conference of the parties. To date, the participating states have not reached an agreement on the scope of application of the CC (as of December 2005). UNEP commissioned the European Academy of Bolzano (EURAC-Research) (Annex I) to develop an approach for a transparent delimitation of the convention perimeter, based on homogenous criteria.

1.1 THE CARPATHIAN MOUNTAINS

The Carpathians, a mountain range in the southeastern part of Central Europe, cover about 210,000 km² (= area of the Carpathian Ecoregion). Spreading widely toward the north and south, they extend in an arc for ca. 1,450 kilometres from Bratislava in the Slovak Republic to the Iron Gate in the valley where the Danube breaks through near Orşova in Romania (Encarta Encyclopedia, 1999; Fig. 1).

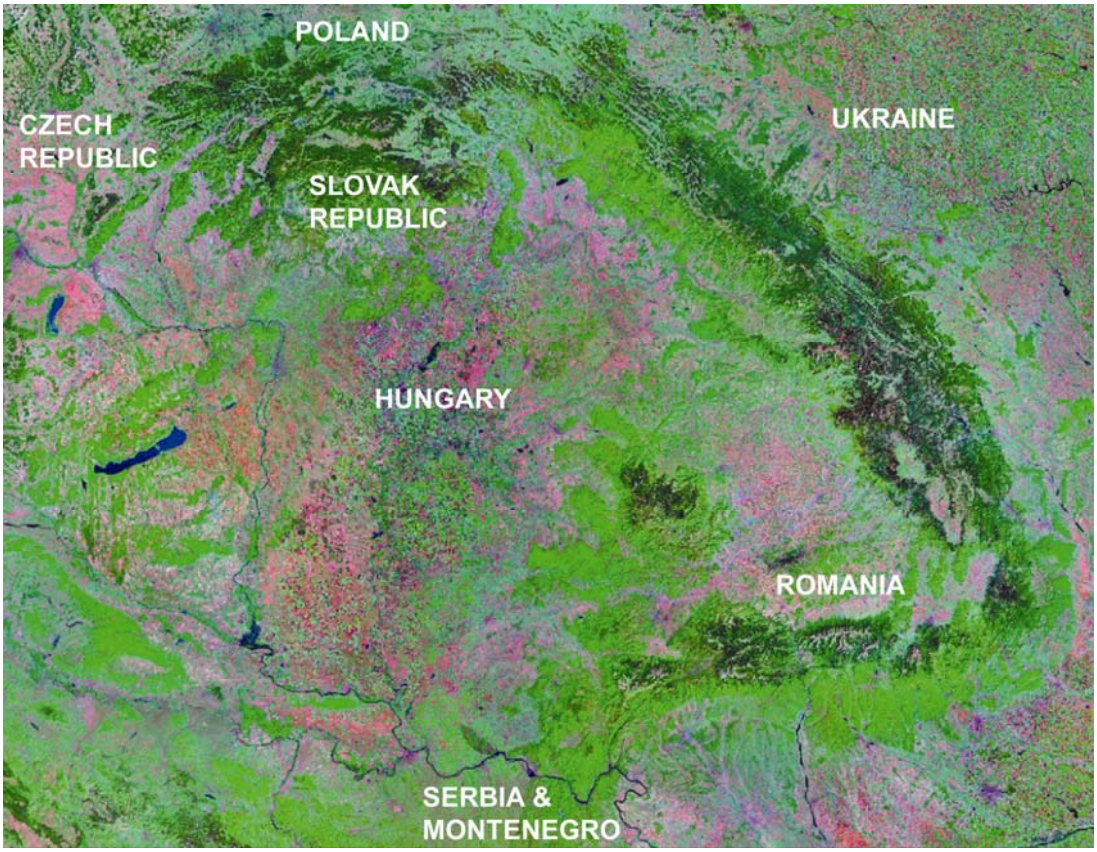


Fig. 1: *The Carpathian mountains from space (Alpine Network for Protected Areas, 2004).*

The width of the mountain range fluctuates between 50 to 150 kilometres. The region is currently home to an estimated 17 million people (CERI, 2001). It has a remarkable natural and cultural heritage and represents a unique ecosystem with an exceptionally high biological diversity. A considerable number of endangered species, particularly megafauna (brown bear, wolf, lynx etc.), and close to 4,000 endangered plant species, can be found in the Carpathians; they account for 30% of the total European flora (ISCC, 2004). Culturally, the Carpathians are steeped in old traditions and are home to numerous different nationalities and ethnic groups (CERI, 2005). Numerous sites in the Carpathians are part of the World Heritage (culture/nature) (e.g. Caves of Aggtelek Karst and Slovak Karst in the Slovak Republic, Monastery of Horezu in Romania; United Nations Educational, Scientific and Cultural Organization/UNESCO, 2005). The Carpathians also represent an important recreational area with other famous sites like the Apuseni caves, ski resorts (e.g. in the Polish and Slovak Republic Tatra Mountains), and the traditional cultural landscape which is usually well maintained in this area (Reif et al., 2003).

1.2 AIM AND STRUCTURE OF THE REPORT

It is an aim of this study to contribute to the discussion on the methodology for a transparent and homogeneous delimitation of the scope of application of the Framework Convention for the Protection and Sustainable Development of the Carpathians (CC). Rather than the actual delimitation itself, it is a possible method that stands in the foreground. In this context the main objectives of the convention constitute a central aspect.

Chapter 2 outlines the contents of the present book by describing the approach and methodology of this study. Furthermore the study area is presented on which data collection and analyses were concentrated. Chapter 3, on the other hand, discusses the intentions and contents of the CC. Important information pertaining to the CC is presented which is necessary to understand the analyses and conclusion. This includes an overview on the international cooperation and networking that led to this Convention. Existing delimitations of the Carpathian mountains are illustrated in Chapter 4. For this scope several approaches for the delineation of the Carpathians are presented reflecting different goals and differing methods.

Chapter 5 is dedicated to transnational approaches for the delimitation of mountain areas. The chapter focuses on thematic aspects and criteria that are valid throughout the Carpathians. Starting from the goals of the CC and referring to international political and legal instruments the chapter shows how these goals are assigned a spatial reference. Chapter 6 analyzes the existing delimitations of the Carpathians, the National Proposals and the Carpathian Ecoregion. The proposals are investigated by means of different criteria in order to point out strenghts and potential weaknesses. A step-by-step method on how it would be possible to delimit the convention area is introduced in Chapter 7. The proposed approach is based on transnational, homogeneous criteria valid throughout the Carpathians.

2 APPROACH AND METHODOLOGY OF THE STUDY

The following chapter serves as an overview of the contents of the present book. It briefly presents the objectives of the work and the approach chosen. The overview also outlines the study area on which data collection and analyses were concentrated.

2.1 OBJECTIVE OF THE STUDY

The aim of this study is to present a transnational and transparent approach for a homogeneous delimitation of the scope of application of the CC. With this in mind an approach was chosen which set the goals of the convention before the background of the social, economical, and ecological situation of the Carpathians. It integrates relevant EU policies and brings them into a transparent relationship to the area. The development of this approach is also the outcome of several expert meetings[1], where a flexible and transparent methodological approach was finally agreed upon. The approach devised by EURAC-Research was then confirmed by the recommandations made at the "*12th Meeting of the Environment Ministers of the Visegrad Group States"*,[2] where the ministers agreed to follow a holistic and integrated (multi-criteria) approach. The approach should reflect both the main goals and principles of the Carpathian Convention and relevant EU policies and directives (e.g. Natura 2000, Water Framework Directive).[3]

In discussing the existing delimitation proposals (i.e. National Proposals, Chap. 4.3.1 and Carpathian Ecoregion, Chap. 4.2.1) and possible approaches to the task, it became apparent that even more than the actual delimitation of the convention area itself, the exchange of opinions about a mutual procedure is of central importance. This facilitates to build mutual trust and a common point of view of the development strategy necessary for the Carpathians. Only in this way can a mutual platform be created on which the goals prescribed in the convention can be realised.

The authors of this study are aware that it represents a "view from outside" of the issue. The goal is not, therefore, to present a final delimitation of the convention area, but rather it should offer a constructive contribution in the discussion between the contract states. The contents of the study are to be considered as constructive suggestions for possible solutions. The central matter of concern for the authors is therefore to provide the most comprehensive overview of possible approaches for the delimitation.

2.2 THE APPROACH

The scope of application of the CC must delimited in such a way as to promote a successful implementation of the convention. The proposed perimeter must facilitate sustainable development

[1] "2nd Ad hoc Expert Meeting" 11-12 Oct 2004; "3rd ad Hoc Expert Meeting" 6-8 Apr 2005.
[2] Białowieża, Poland, Jun 6-7, 2005.
[3] Egerer, 13 Jun 2005.

in the Carpathian mountains, as well as protect natural treasures. Furthermore, the perimeter finally approved must be acceptable for all envolved parties, and comprehensible for the local population.

The research questions derived from these considerations is: What criteria can be derived from the CC-objectives as input for the delimitation process, and how can they be brought into spatial relationship with the specific local situation in the Carpathians? A further challenge consisted in finding comparable and transnational data material with which these criteria can be illustrated.

The approach for the delimitation of the CC (Fig. 2) is based on the character and the main concern of the CC, from which, in turn, the main goals and principles are derived. In a second step, these goals are to be further developed in order to assign them a spatial dimension. To this end the basic laws and recommendations of the EU, and other international conventions are examined in relationship to the main themes of the CC (mountain laws, water framework directives, and so forth), in order to obtain valid spatial criteria.

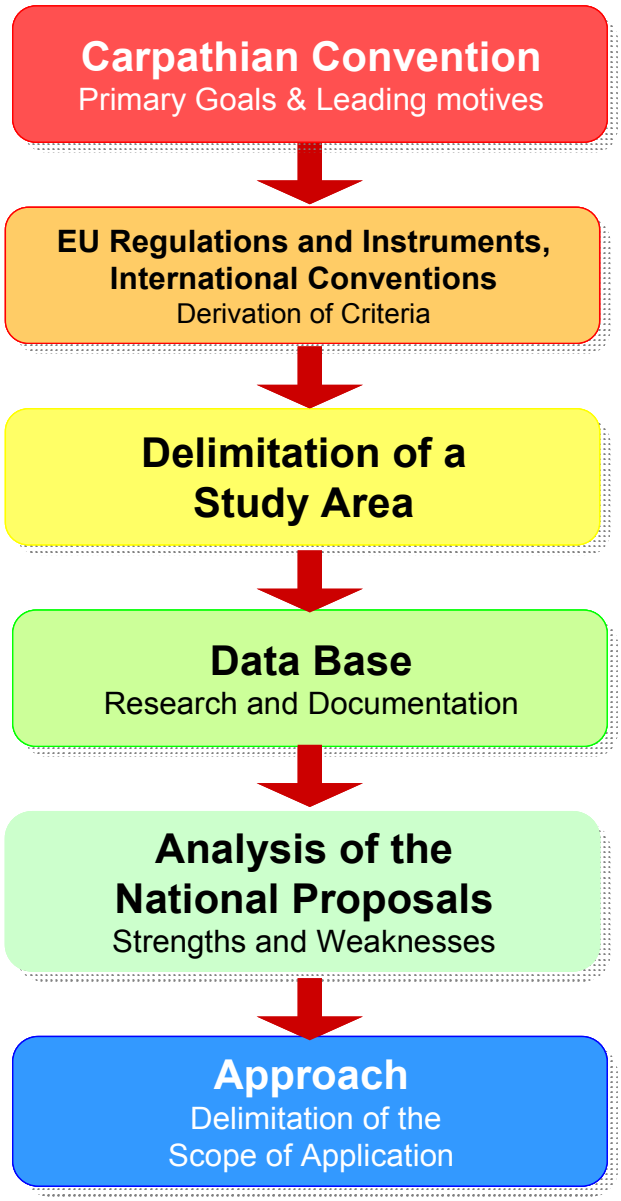


Fig. 2: *Overview of the steps for an approach delimiting the CC.*

By using international conventions and European legal instruments to derive the spatial criteria, synergies between the implementation of the CC and the implementation of other measures can be created. A further aim of this research was the detailed representation of the territory in order to capture the local characteristics, which in mountain areas are particularly pronounced. The information necessary for this distinction had to be collected at LAU level 2 (municipalities; former NUTS level 5) whereever possible. This level forms a central factor in the area of local sustainable development (structural aid, Agenda 21, and so forth).

The essential aspects of the Convention (e.g. mountain area, structurally weak areas, protected areas, river basins) are given a spatial dimension by means of the Geographic Information System (GIS). These aspects, then, are used in comparing the discussed delimitation approaches, National Proposals (NP) (Chap. 4.3.1) and Carpathian Ecoregion (Chap. 4.2.1), and in the analysis of their strengths and weaknesses.

In the last step, a course of action is developed, which features a step-by-step approach to delimit the CC, based on transnational criteria. In the last fine-tuning, local characteristics are added, for the exact definition of the perimeters.

2.3 THE STUDY AREA

In coordination with the UNEP-ROE, a study area was established on which data collection and analyses were concentrated. The study area represents the reference area for the present study ("widest area to study"), where the interactions between mountain ranges and their forelands are to be studied (Fig. 3). Such a delimitation is necessary to keep the temporal and financial costs for the collection and analysis of the data within an appropriate scale. The delimitation of the study area is to be effected after consideration of the technical and organizational parameters. Consequently, all features of this area, within or crossing the border, were collected for evaluation purposes.

In agreement with the contracting authority and the experts of the Member States, the chosen study area was based on the Carpathian Ecoregion (Chap. 4.2.1). The Ecoregion comprises not only the actual mountain area of the Carpathians, but also a part of the forelands. It currently represents the largest delimitation under discussion.

As apposed to the Ecoregion, the study area does not cover Austria, which is not part of the Carpathian Convention, but it does cover a part of Serbia & Montenegro. From the geographical point of view diverging opinions exist on the southern boundaries of the Carpathian mountains (see Chap. 4.1). In fact some geographers assert that the Carpathians only extend north of the Danube, others that they extend further south for 100–200 km. In the case of Serbia & Montenegro the NP has been defined as study area. The study area deviates from the Ecoregion in the northeastern region, as well. In the Carpathian Ecoregion the mountain massifs (Minor Carpathians, Inovec Mountains, Lower Hornad Region) close to the actual Carpathian Range form islands or peninsulas, while they are integrated within the study area. The study area defined in this manner has a surface area of 210,256 km^2.

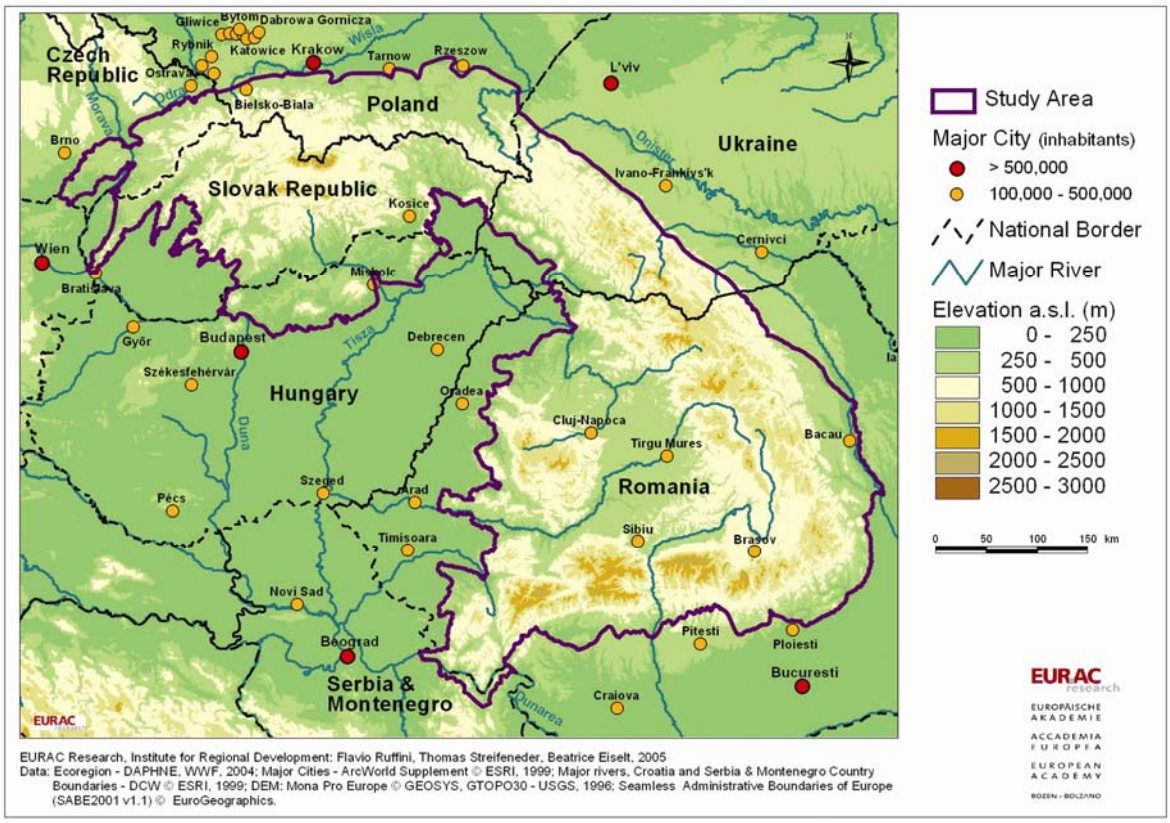


Fig. 3: *In order to limite data collection and analyses, a study area as "widest area to study" was chosen.*

3 THE FRAMEWORK CONVENTION OF THE CARPATHIANS

This chapter provides an overview of the origins of the Convention and its contents. It also shows the international cooperation and networking that led to this Convention.

3.1 BACKGROUND AND OBJECTIVES

"The Carpathians are a unique natural treasure of great beauty and ecological value […] and a major economic, cultural, recreational and living environment in the heart of Europe" (EURAC-Research, 2004). Until now the impacts of human activities have not severely disrupted the region's environmental processes and its ecological coherence. Despite its immense value, the Carpathians are currently facing many threats, which put the mountain ecosystem under various types of pressure (e.g. infrastructure projects). Transition and structural changes now underway in the Carpathian countries affect the relation between Carpathian inhabitants and their environment in many ways (Carpathian Ecoregion Initiative, 2005)

For mountain areas in general, and especially for those bordering with other states, a close transnational cooperation at the regional level is essential. An intensive exchange with other regions can reduce isolation and provide new impulses to social and economic development. This is the only way mountain areas can assert their positions and take advantage of their prospects, in spite of the disadvantages of remote and sometimes rugged locations. Cooperation and common action programs – in particular, regional legal instruments of trans-boundary cooperation – represent effective tools for the sustainable development of a mountain region (Euromontana, 2005; Buza & Turnock, 2004).

At the *5th Ministerial Conference "Environment for Europe"* in Kiev, Ukraine, in May 2003, the Carpathian Countries adopted and signed the Framework Convention on the Protection and Sustainable Development of the Carpathians (further details: Annex 3). This international agreement has been signed by the seven participating countries: Czech Republic (CZ), Hungary (HU), Poland (PL), Romania (RO), Serbia & Montenegro (S&M), Slovak Republic (SK), Ukraine (UA). The CC provides a "framework of cooperation" outlining general objectives and principles of the cooperation. Hence, it does not assign any specific duties to its parties. It includes general provisions concerning the thematic areas of cooperation (Chap. 3.1), which can be further specified through decisions of a future "Conference of the Parties", as well as future protocols. Any party will be able to propose protocols to the convention. The ratification process has progressed quite far in the signatory states. With the deposition of the instrument of the ratification by Hungary on the 6th Oct 2005 after Slovak Republic, Czech Republic and Ukraine the CC entered into force on the 4th Jan 2006.

The general objectives and principles of the Framework Convention include the protection and sustainable development of the Carpathians (Art. 2, CC)[4]. This article of the convention provides

[4] Online: http://www.carpathianconvention.org, 15 Mar 2005.

different principles for the implementation of these goals, which are to be especially taken into consideration while putting these measures into action:

- Foresight and cautionary principle;
- Costs-by-cause principle;
- Involvement and participation of the public;
- Interborder cooperation;
- Integrative planning approaches and land use management;
- Program based approaches;
- Ecosystem based approaches.

Appropriate measures should be devised for the following relevant fields (Art. 3 to 13; CC):

- Integrated land resource management;
- Conservation and sustainable use of biological and landscape diversity;
- Cultural heritage and traditional knowledge;
- Spatial planning;
- Sustainable and integrated water/river basin management;
- Sustainable agriculture and forestry;
- Sustainable transport and infrastructure;
- Sustainable tourism;
- Industry and energy;
- Environmental assessment/information system, monitoring and early warning;
- Awareness, cultivation, education and public participation.

The fact that all these issues are included in one integrated strategy shows the comprehensive approach on which the Convention is based. The central aspects of the CC can be reassumed as followed:

- Mountain issues are a central aspect of the CC, refrence to this aspect is made in almost all thematic topics, hence, aspects relative to the Carpathian mountain area constitute an important issue;
- The convention adresses, not only the protection but also the sustainable development of the region, and follows an integrated approach to land resources management.

Moreover, the CC (Art. 12) anticipates the need for a unified information system to help the evaluation of these objectives. An example for such an information system could be the Alpine Observatory and Information System (SOIA)[5] for the Alpine Convention (AC). Another model represents the Geo Data Portal[6], which was initiated in 2000 by UNEP. Similar systems or common databases which provide information on available data would be very useful. An important initiative, related to the development of a database with detailed overview on available environmental indicators, was presented during the 1st Carpathian Environment Outlook (KEO) meeting[7] by the Hungarian delegation.[8] Especially in the discussion on which further indicators are to be integrated – be it within the delimitating process or for the KEO report – such information should be of a determining nature.

3.2 SCOPE OF APPLICATION

The Convention applies to “the Carpathian region”, to be defined by the Conference of the Parties (Art. 1).[9] Consequently, this “*purposefully vague spatial definition*” (Fall & Egerer, 2004) led to complex considerations, pointing to problematic aspects of defining such a region. Currently, two

[5] Online: http://www.soia.int/preAC/home.de.htm, 12 Dec 2005.
[6] Online: http://geodata.grid.unep.ch, 20 Feb 2005.
[7] Zakopane/Poland, 11-13 Apr 2005.
[8] Contact: István Pomazi: pomazi@mail.kvvm.hu.
[9] Egerer, 13 Jun 2005.

well discussed delimitation proposals exist (Proposal of the Signatory States [NP] Chap. 4.3.1 and Ecoregion Chap. 4.2.1), but neither proposal has found mutual acceptance from all Member States. A commonly accepted definition of the scope of application of the convention, though, is of importance to its ratification and implementation.

Due to different interpretations of the meaning “Carpathian Region” as referred to in art. 1 of the Framework Convention, Romania signed the Carpathian Convention on May 22, 2003, with the following reservation: “The Government of Romania considers the term “Carpathian region” in article 1, paragraph 1 of the Framework Convention for the Protection and Sustainable Development of the Carpathians as designating the Carpathian mountain area, which is defined, on the territory of Romania, in accordance with physico-geographical and biological criteria, as well as with socio-economic criteria related to a reduced land use potential and to the relationship of the local population with specific physical environmental features, and also in conformity with the criteria of the European Community regarding the delimitation of alpine bio-geographical regions, based on the Council Directive 92/43/EEC (Habitats Directive) on the conservation of natural habitats and of wild fauna and flora” (Geoana, 2003). On the other hand, the Hungarian position systematically called for a “scientific” definition of the area (Egerer & Fall, 2004).

The process of a spatial definition of the area undertaken by the Convention is characterised by the difficulty in defining biophysical and political ideals, as well as finding a compromise between them and socioeconomic considerations. In January 2003, a first map was generated by UNEP/ DEWA/GRID-Geneva several months before the Convention was signed. As a result of comments on it, a second map reflected substantial changes. In order to integrate further modifications of the updated national designations, a third map has been published (Fall & Egerer, 2004).

The interaction of different realities, views, and necessities shapes the delineation process in a complex manner. This poses a great challenge. These complex dynamics are furthered by intensive discussions and additions on part of the participating Member States.

These discussions on different approaches to the delimitation of the Carpathians are certainly reasonable and comprehensible, in fact, mountains are defined by local perception and this perception might be different from region to region. Therefore, further sections will give an overview of national and international mountain delimitations, aiming to provide a sound scientific basis and decision instrument for defining a future scope of application of the CC.

4 THE CARPATHIANS: EXISTING DELIMITATIONS

Several approaches for the delineation of the Carpathians do exist and are presented in this chapter. Among them are approaches with a geographical back ground, as well as approaches based on environmental protection factors. These individual approaches pursued different goals and used differing methods. The Carpathian States have also presented their own proposals for the national delimitation of the CC.

4.1 THE CARPATHIANS DELIMITED BY THE CONVENTION COUNTRIES

Several Carpathian countries have developed physical delimitations of the Carpathian region. Though the central part is common to all these delimitations, they differ from each other in the outskirts. The largest differences between the approaches are found with respect to the Transylvanian Plateau and parts of the Carpathians in Serbia & Montenegro.

An established delimitation was devised by Jerzy Kondracki (1998), a Polish geographer (Fig. 4). The large scale map of 1:2 million is regarded by many as a good description of the Carpathians. This delimitation covers the Transylvanian Plateau but does not contain S&M.

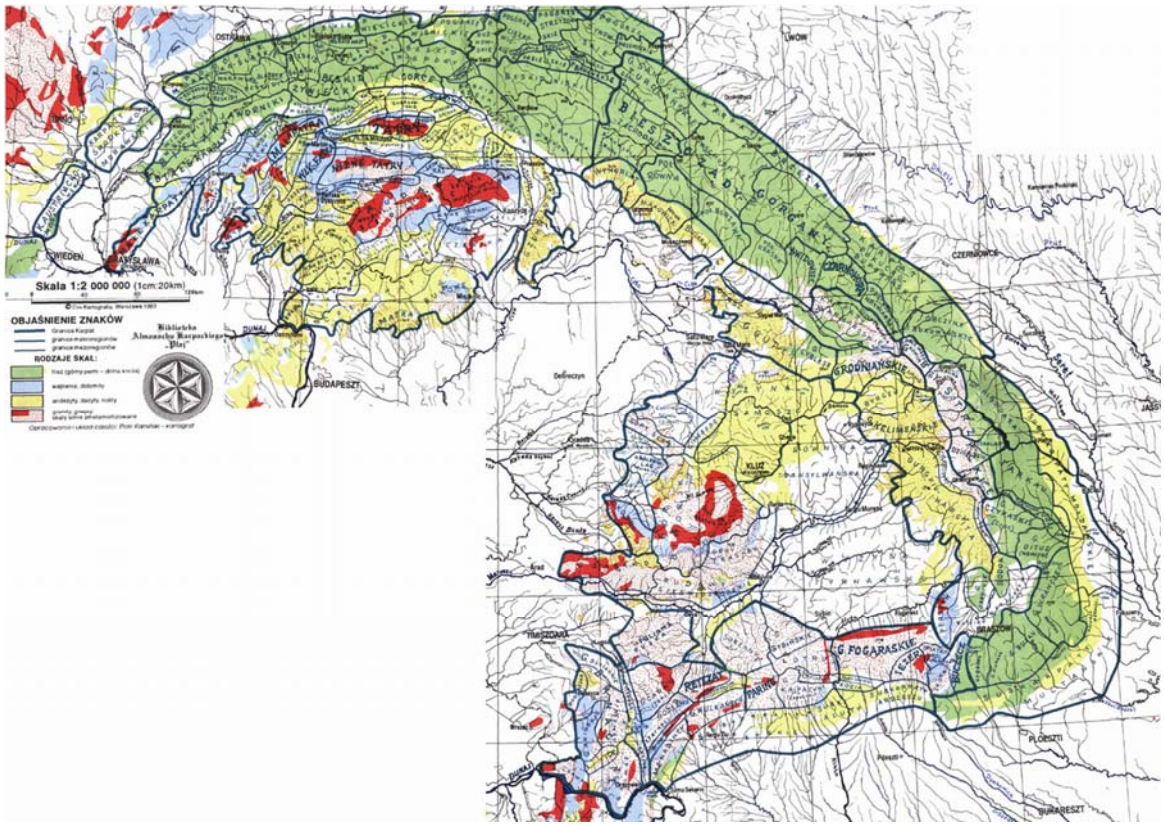


Fig. 4: *Geografical delineation of the Carpathians by Jerzy Kondracki (1998).*

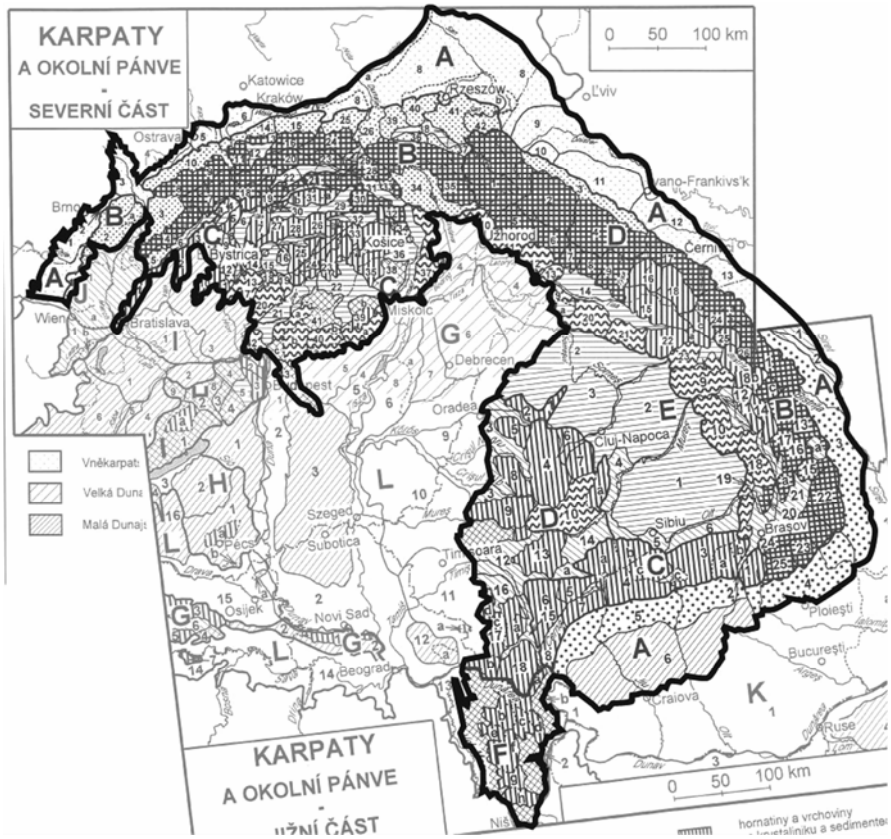


Fig. 5: *Delineation of the Carpathians by the Czech School.*

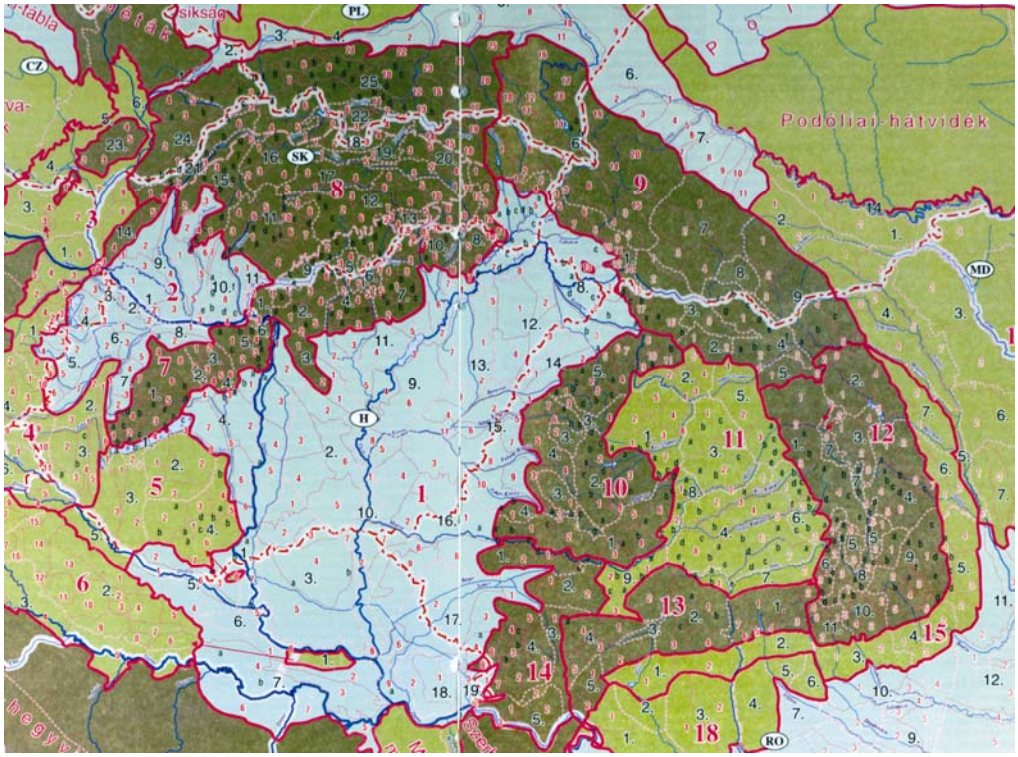


Fig. 6: *Hungarian delineation of Carpat-Pannonia based on a physico-geographical approach (1996; Pannonian Encyclopaedia, 2000).*

A map elaborated by the so called Czech School (Fig. 5) is based on geological criteria. While including the Transylvanian Plateau it also reaches further into S&M and PL. The Carpat-Pannionian region based on physical-geographical (landscape) criteria was depicted in a map by Hungarian geographers (1996) (Fig. 6). This approach does not include the Transylvanian Plateau and extends far into Slovak territory.

4.2 ECOLOGICAL DELIMITATIONS

4.2.1 The Carpathian Ecoregion

The Carpathian Ecoregion (Fig. 7) has been defined by the Carpathian Ecoregion Initiative (CERI). This Initiative was created in 1999 from the platform of WWF's Global 200 Ecoregion Programme to take a complex, multidisciplinary Ecoregional approach to conservation of the Carpathian mountain range, consistent with the WWF methodology for Ecoregion management (WWF, 2000).

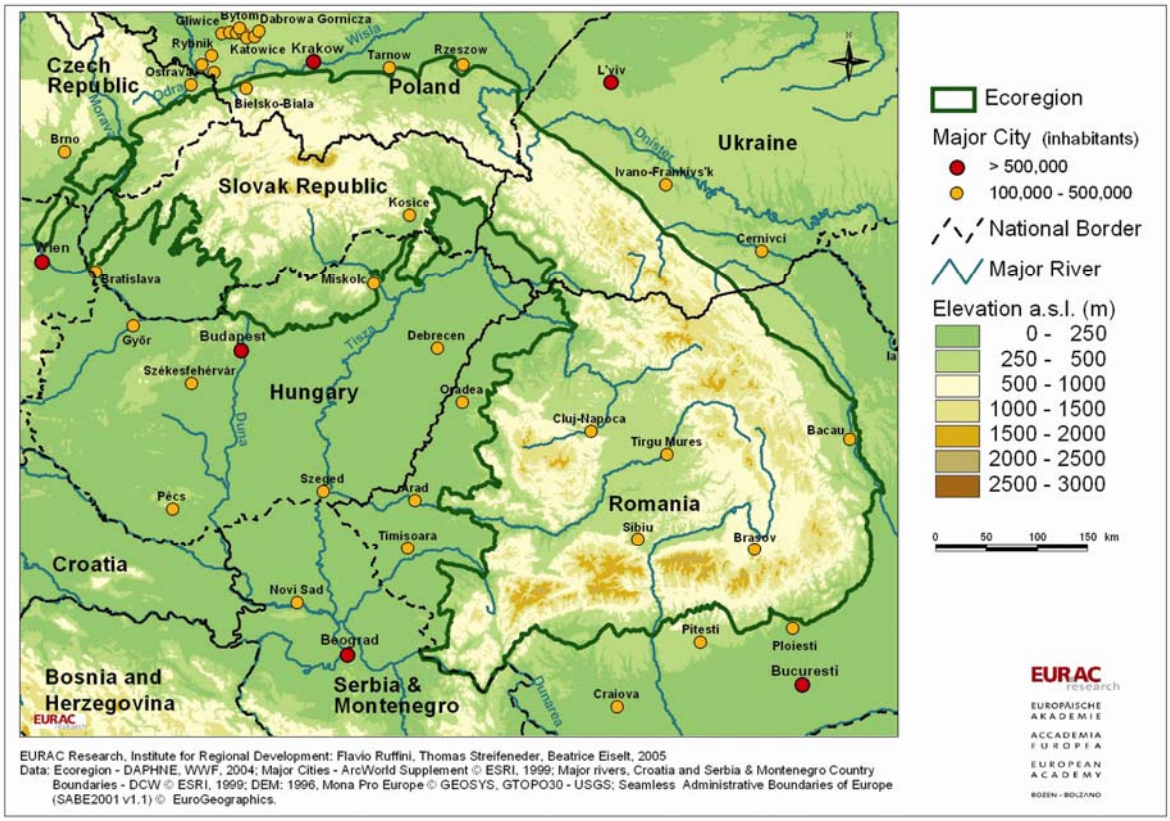


Fig. 7: *The Carpathian Ecoregion represents one of the proposals for the delineation of the Convention currently under discussion. It includes the Transylvanian plateau within its limits.*

The CERI is an international partnership promoting conservation of nature throughout the globally important Carpathian Mountains, while supporting local economy and culture for the lasting benefit of the people living in the heart of Europe. This initiative aims at implementing measures across the

entire unit of the Carpathian Ecoregion, uniting people, development, and conservation efforts across political and social boundaries. Facilitated by the WWF Danube-Carpathian Programme, more than 50 organizations from seven countries have been collaborating to transfer this vision into reality (WWF/CERI, 2001). The Ecoregion covers about 210,000 km^2 and is based on ecological and geo-morphological criteria.

4.2.2 The bio-geographical regions of Europe

The bio-geographical regions of Europe (Fig. 8) were developed for Directorate General Environment to serve both the Habitats Directive (92/43/EEC) of the EU and the Emerald network under the Bern Convention[10] (EEA, 2002). This means that proposed sites for the Habitat Directive are evaluated within each of the bio-geographical regions, according to the criteria specified in the directive. This map is also an important document for the Bern Convention as the Standing Committee of the Convention decided to develop the Emerald network in accordance with the Natura 2000 network of the Habitats Directive.

The mapping procedure is based on an interpretation of the digital 'Map of Natural Vegetation of the Member Countries of the EU and of the Council of Europe' (scale 1:3,000,000) and on the digital *'Map of Natural Vegetation of Europe'* – Bohn, Gollub and Hettwer, 2000 (scale 1:2,500,000) (Noirfalise, 1987). Original natural vegetation map units are allocated to one bio-geographical region. Azonal units are attributed to the neighbouring bio-geographical region, and the smaller islands scattered within a major bio-geographical region are allocated to the adjacent region. In a final step the map was generalised, and some modifications of the borders were introduced, based on the recommendations of some of the Member States.

4.2.3 The European ecological regions

The Digital Map of European Ecological Regions (DMEER) was developed by the EEA (Fig. 9) and harmonized with the Ecological Regions of WWF. The European Topic Centre on Nature Protection and Biodiversity is the legal owner of this information. DMEER delineates and describes ecologically distinct areas in Europe, based on updated knowledge of climatic, topographic, and geobotanical European data, alongside judgment of expert opinions of several European nature related institutions and the WWF (EEA, 2005).

The map of ecological regions in Europe attempts to depict the extent of areas with relatively homogeneous ecological conditions, within which comparisons and assessments of different expressions of biodiversity are meaningful (Painho et al, 1996). Sources of information for this map are:

- The Map of Natural Vegetation of Europe, Bohn, U. 1994. This map represents the final results of an international project with the objective to generate a map outlining the natural vegetation of Europe at a scale of 1:2.5 million;
- The Map of European Land Classification: Bunce, R G H, 1995 A European Land Classification, Institute of Terrestrial Ecology, Merlewood. WWF Terrestrial Ecoregions Map[11].

[10] Convention on the Conservation of European Wildlife and Natural Habitats, Bern, 1979.
[11] http://www.panda.org, 10 Jun 2005.

	Biogeographic region	Main threats to biodiversity
	Arctic region	Climate change may change conditions for plant and animal communities Ozone depletion
	Boreal region	Intensive forestry practices Exploitation for hydroelectric power Freshwater acidification
	Atlantic region	High degree of habitat fragmentation by transport and urban infrastructures Intensive agriculture Eutrophication with massive algal blooms Invasive alien species
	Continental	High degree of habitat fragmentation by transport and urban infrastructures Industry and mining Atmospheric pollution Intensive agriculture Intensive use of rivers
	Alpine (Alps, Pyrenees, Carpathians, Dinaric Alps, Balkans and Rhodopes, Scandes, Urals and Caucasia).	Climate change may change conditions for plant and animal communities Transport infrastructures Tourism Dams
	Pannonian	Intensification of agriculture Drainage of wetlands Irrigation combined with evaporation leads to salinisation and alkalisation Eutrophication of large lakes Mining industry with heavy metals pollution of some rivers
	Mediterranean	The world's most important tourism destination High pressures from urbanisation in coastal areas Intensification of agriculture in plains, land-abandonment in mid-mountains Desertification in some areas Invasive alien species
	Macaronesian (includes Azores, Madeira, Canaries islands)	Invasive alien species Tourism Forest fires and uncontrolled tree-felling Intensification of agriculture with large greenhouses
	Steppic	Intensification of agriculture, e.g. abandonment of nomadic pastoral activities Desertification Large mining and industrial settlements, with pollution problems
	Black Sea	Intensification of agriculture: irrigation, salinisation Waterlogging Tourism
	Anatolian	Intensification of agriculture : conversion of steppes into arable lands, irrigation, drainage of wetlands, overgrazing Building of dams

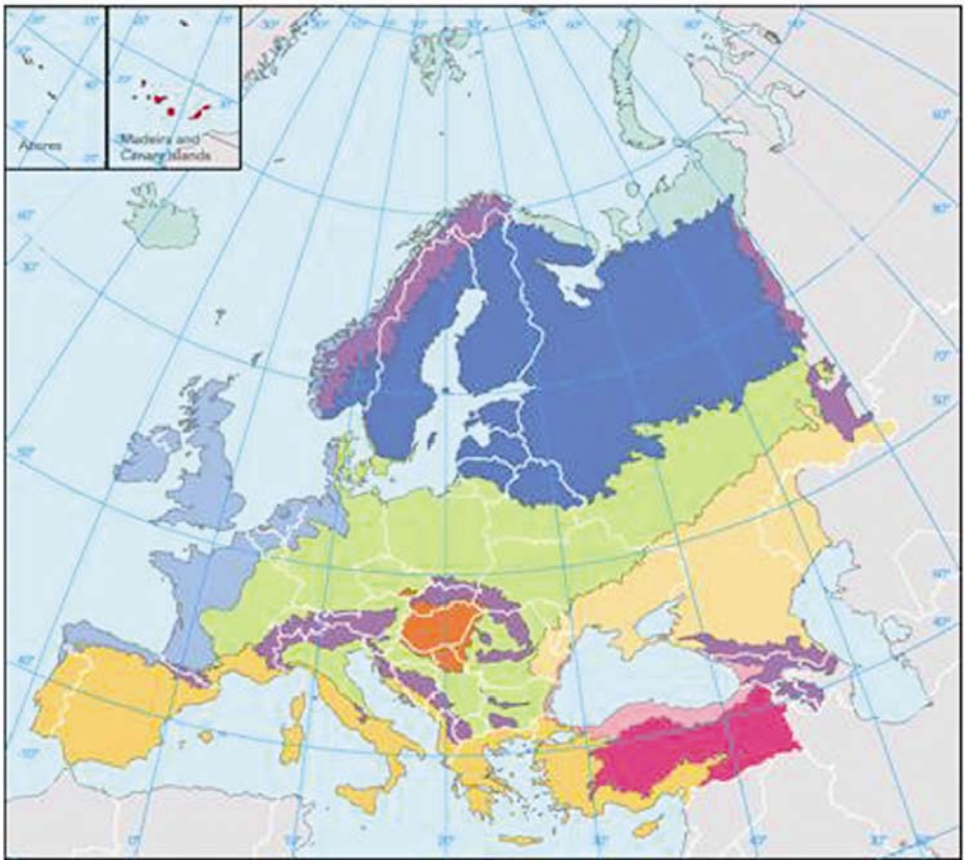


Fig. 8: *The bio-geographic regions as defined within the framework of the Habitats Directive (92/43/EEC) and for the EMERALD Network set up under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) (2001).*

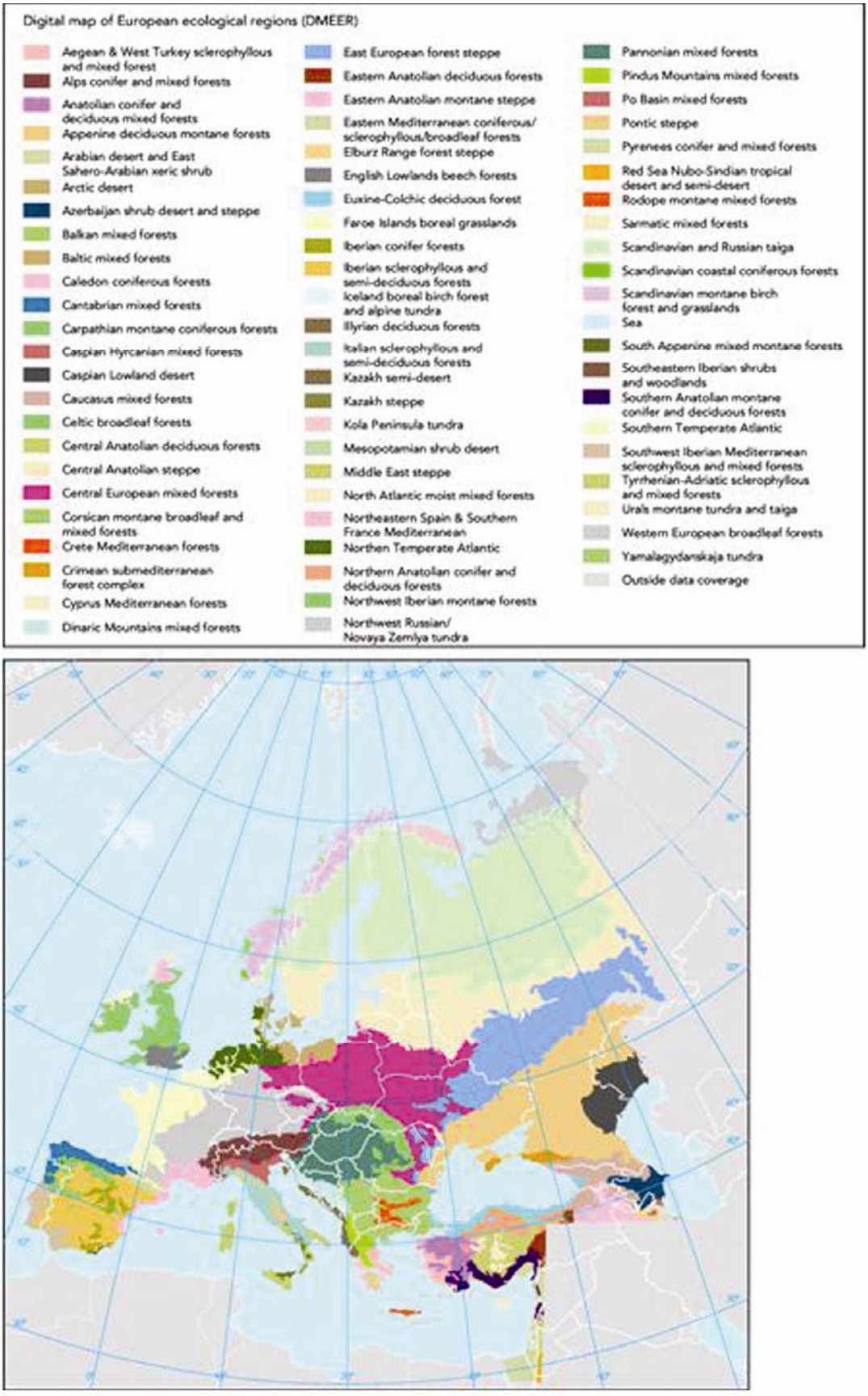


Fig. 9: *Map of European Ecological Regions, version 2000 Jun (The European Topic Centre on Nature Protection and Biodiversity, 2000).*

To derive ecological gradients, and understand patterns of ecology, a cluster analysis was performed. As a result of the cluster analysis 6 experimental DMEER maps were produced, ranging from 46 to 183 DMEER classes, each one representing a different aggregation level. Based on the intermediate maps, biogeography experts interactively decided, for each location, which level of the dendrogram, would reflect the ecological characteristics of the corresponding location. Subsequently, the agreement between EEA, ETC/NC, and WWF for generating compatible maps of ecological regions in Europe, by EEA and by WWF, required a common ground for DMEER lines and units on the WWF map, and the acceptance of WWF units on DMEER (EEA, 2005).

4.3 NATIONAL DELIMITATIONS OF THE CARPATHIANS

4.3.1 National Proposals for the scope of application

The national delimitations of the CC are based upon information provided by the focal points of the Carpathian Countries to UNEP.[12] These official "National Proposals" were partially determined in the context of internal national consultations. However, a final proposal of these "national delimitations" will have to be approved by the Ministries of the Environment.[13]

4.3.1.1 Czech Republic

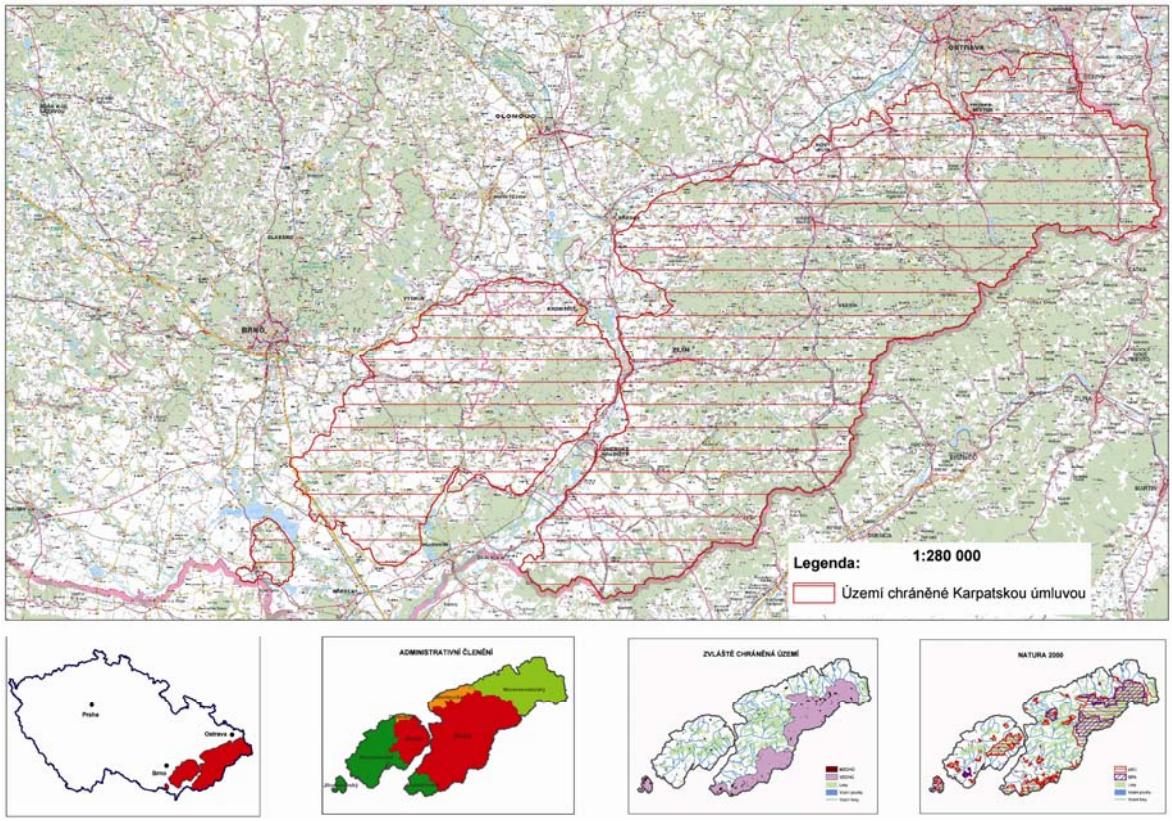


Fig. 10: *The NP of the Czech Republic (Updated version: Egerer, 21 Nov 2005).*

[12] Submitted to EURAC-Research in December 2004 (UNEP, CD-Rom, 2004).
[13] Egerer, 10 Nov 2004, 24 Jan 2005.

According to the information provided by the national focal point the Czech delimitation is based on geomorphological criteria: "*The Czech scientific delineation of the Carpathians*" corresponds to the "national delimitation" of the Carpathians (Fig. 10).[14] The following criteria were adhered to in this context: *"(…) is a geomorphologic division of the Czech Republic, thus characterising the Carpathians as an orographic unit with two basic features – the Carpathians and Carpathian outskirts (lowlands-tectonic depressions)"*.[15]

4.3.1.2 Hungary

The Hungarian delineation of the Carpathian-Pannonian region (Fig. 11) was compiled by Hungarian geographers based on physico-geographical (landscape) criteria (Fig. 6).[16] The Hungarian researchers followed a geographical landscape approach, using a system of landscape hierarchy (macro, meso, micro landscapes etc.) and a classical delimitation approach of mountain, hill, and plain areas. No administrative borders were used in this delimitation approach.[17]

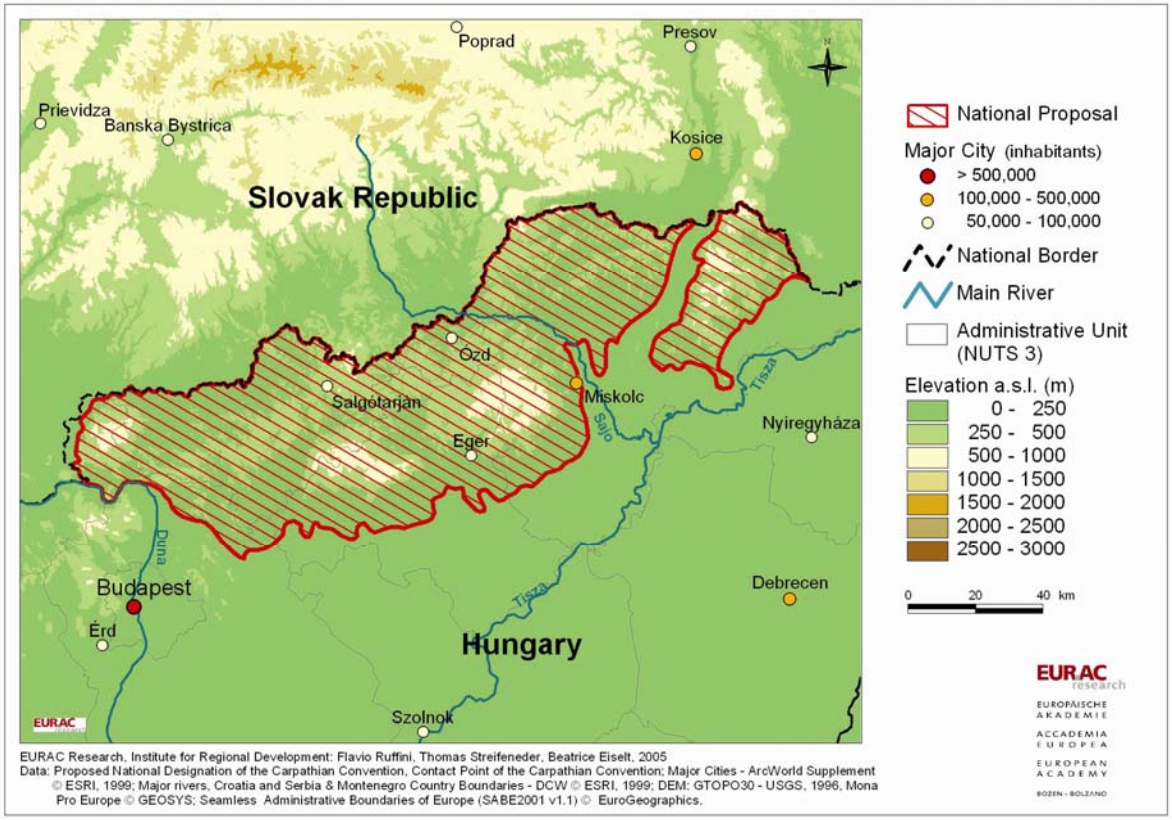


Fig. 11: *The Hungarian NP for the CC (Pomázi, 2004).*

[14] Postulka, 15 Oct 2004.
[15] Postulka, 20 Dec 2004.
[16] Pomázi, Sept 2004.
[17] Pomázi, 2 Feb 2005.

4.3.1.3 Poland

In contrast to other NPs the Polish NP considers administrative borders. The delimitation of the Polish NP is described in detail as follows: *"Polish areas proposed to the scope of the CC are areas which belong to the functional area referred to as "Green Carpathians",*[18] *and they correspond to administrative borders" (Fig. 12). The counties within the "Green Carpathians" are located mostly above 300 metres above see level primarily inside the Carpathians borders. The Polish administration is structured on three levels: voivodship, county (district) and community. Consequently, our delimitation is primarily based on the middle level of the administrative division"*.[19]

Fig. 12: *The NP of Poland (Zbigniew, 12 Oct 2004).*

4.3.1.4 Romania

In the framework of a first delimitation of the Carpathians, Romania applied criteria similar to Council regulation (EC) No 1257/1999 (Rey, 2005a; Romanian Government, 2002), which were integrated in the national mountain law of 2004 (Chap. 4.3.2.2). According to the information provided by the Romanian focal point this area also represents the alpine bio-geographical zone for Romania as defined by Natura 2000 regulations (UNEP, 2004). It encompasses approx. 69,000 km^2 (that is approx. 29% of Romania); the population numbers approx. 3.1 million with 7 cities over 40,000 inhabitants.[20] This first proposal for the delimitation was then modified, slightly extended, and com-

[18] The "Green Carpathians" are part of the Eastern Carpathians (Hutsul Alps" and "Low Beskids").
[19] Haczek, 31 Jan 2005.
[20] Baz, 17 Feb 2003.

pleted.[21] The effective delimitation of the Romanian NP compromises aspects such as geology, vegetation, climate and topography[22] (Fig. 13).

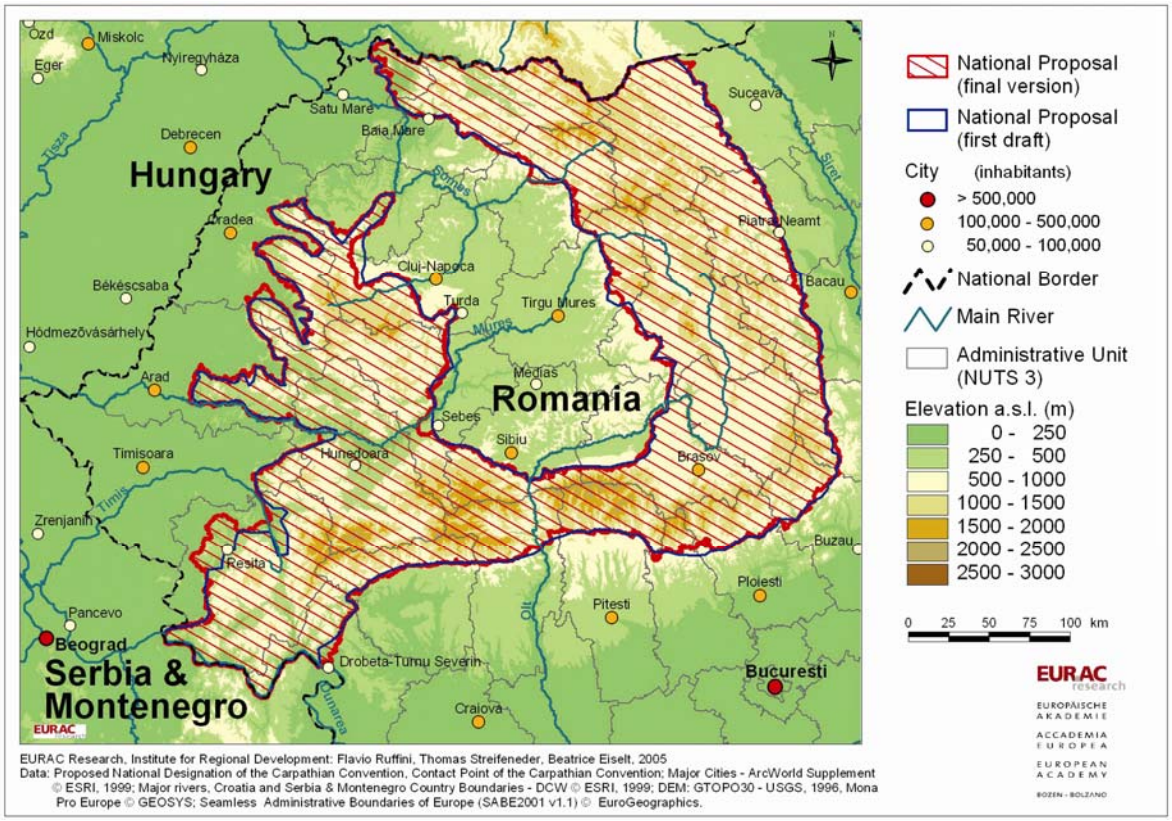


Fig. 13: *The National Proposal of Romania (Maxim, 2004). There are only slight differences between the first draft and the final version. Larger modifications are found almost solely in the western part.*

4.3.1.5 Serbia & Montenegro

According to the description of S&M´s territory of the CC, the delimitation of the NP is similar to the area covered by the Djerdap National Park. In detail, the NP compromises the following area:

- "The entire part of Danube called Djerdap (from the Golubac region and the Golubac municipality to the Hydroelectric Plant Djerdap I) will be included in the Carpathian Mountain Region;
- The entire territory of the Djerdap National Park will be included in the Carpathian Mountain Region;
- The proposed territory will correspond to the territory of the National Park with some extension of its borders (not national borders of the national park but borders of the Serbian Carpathians). We proposed this extension to secure one integral territory". [23]

Risojevic[24] summarizes that *"[…] we use only natural criteria: borders of National Park, Djerdap gorge, geological diversity and biodiversity criteria"*.

[21] Maxim, 21 Dec 2004.
[22] Maxim, 11 Jun 2004.
[23] Risojevic, 28 Mar 2005.

According to this data, 0.35% (732 km²) of the Carpathians is located in S&M (Fig. 14; UNEP, 2004). 0.72% of the area of S&M is within the Carpathian region, and 87% of the Carpathian Djerdap region is protected national park territory (UNEP, 2004).

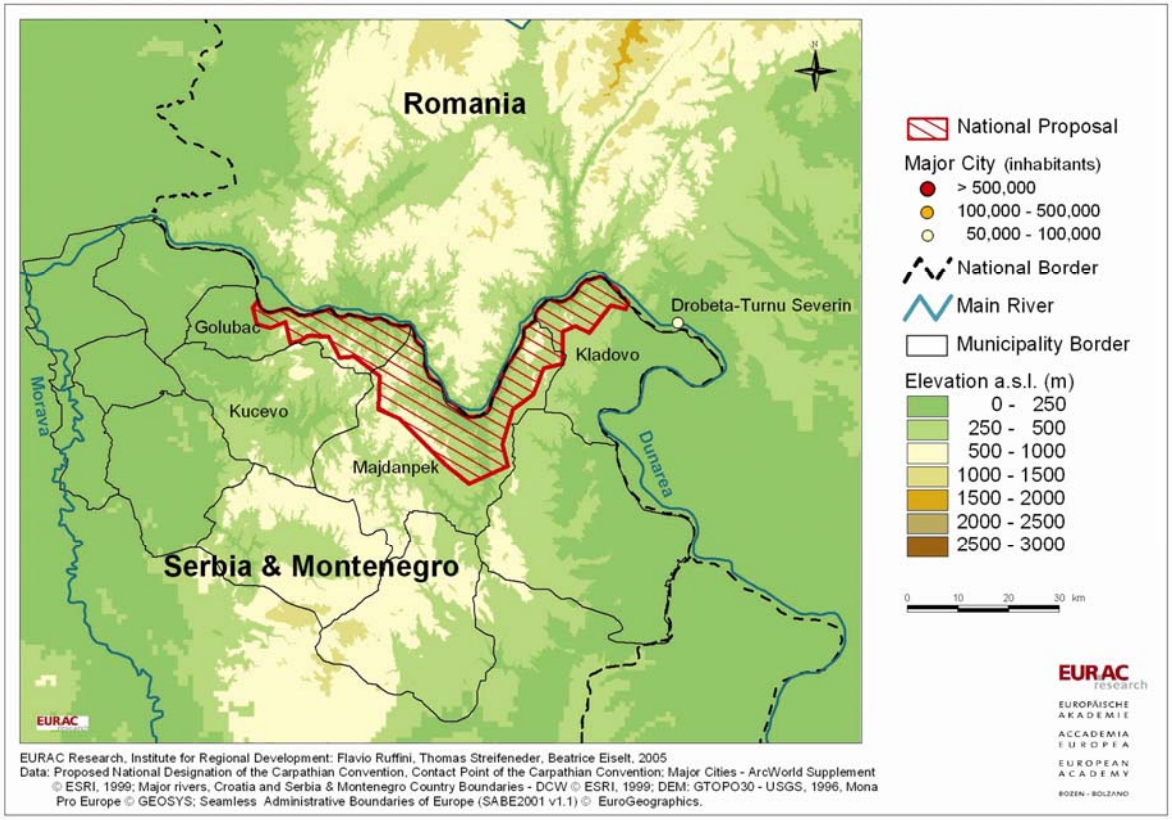


Fig. 14: *The NP of Serbia & Montenegro (UNEP, 2004).*

4.3.1.6 Slovak Republic

The national delimitation has also been successively elaborated and completed in the Slovak Republic. A first proposal for the delimitation of the CC was provided by UNEP (2004) (Fig. 15). In September 2005 the Slovak Republic presented a new proposal for the scope of application (Fig. 16).[25] This second NP is the result of the Joint Statement followed by the 12th Meeting of the Environment Ministers of the Visegrad Group States (Bialowieza, Poland, 6-7 Jun 2005). With this delimitation the Slovak Republic follows the holistic and integrated approach more strongly, reflecting the main goals and principles of the Convention and relevant EU policies and directives. In contrast to the first delimitation this proposal considers administrative borders. The new NP is slightly more extended and less fragmented than the first NP (Fig. 17). This approach shows large similarities to the courses of action pursued by Eurac-Research and proposed in Chap. 7. Therefore, is it not surprising, that the delimitation proposal of the Slovak Republic largely corresponds with the proposal in this study.

[24] Risojevic, 28 Mar 2005.
[25] Egerer, 13 Sept 2005.

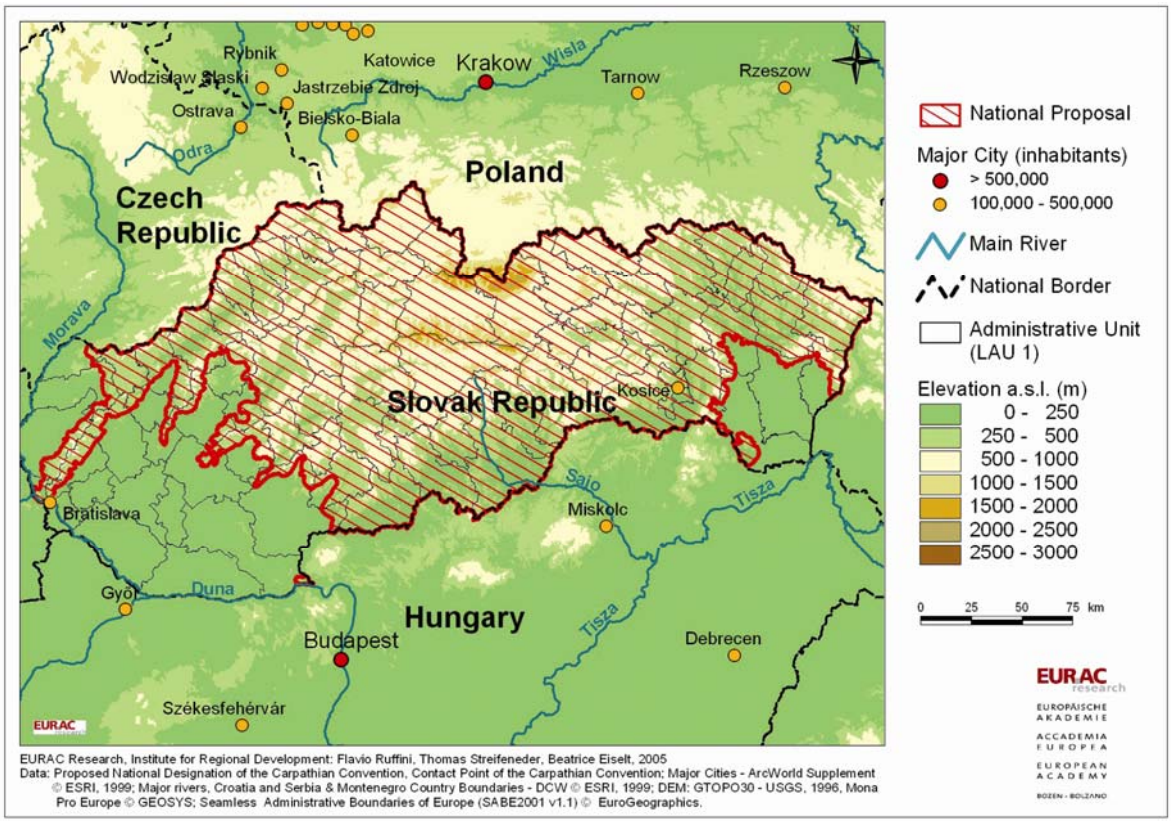


Fig. 15: *The former NP of the Slovak Republic (UNEP, 2004).*

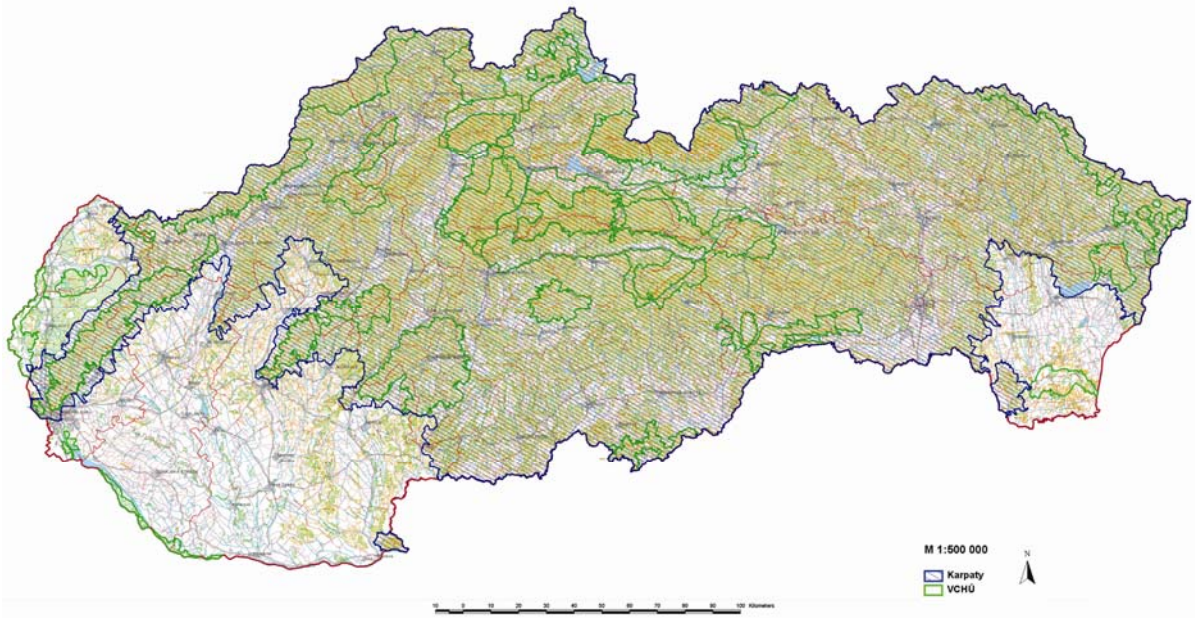


Fig. 16: *The actual NP of Slovak Republic (UNEP, 2005).*

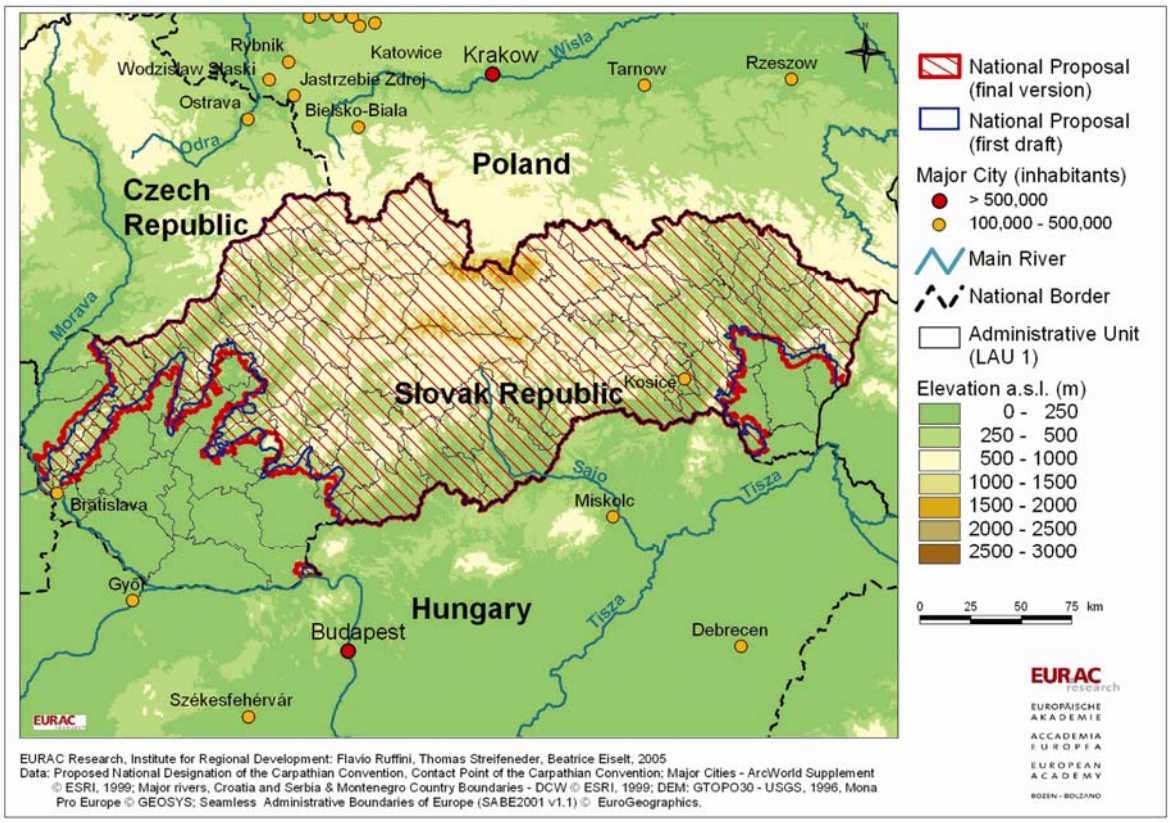


Fig. 17: *Comparison between the first and the final NP for the Slovak Republic.*

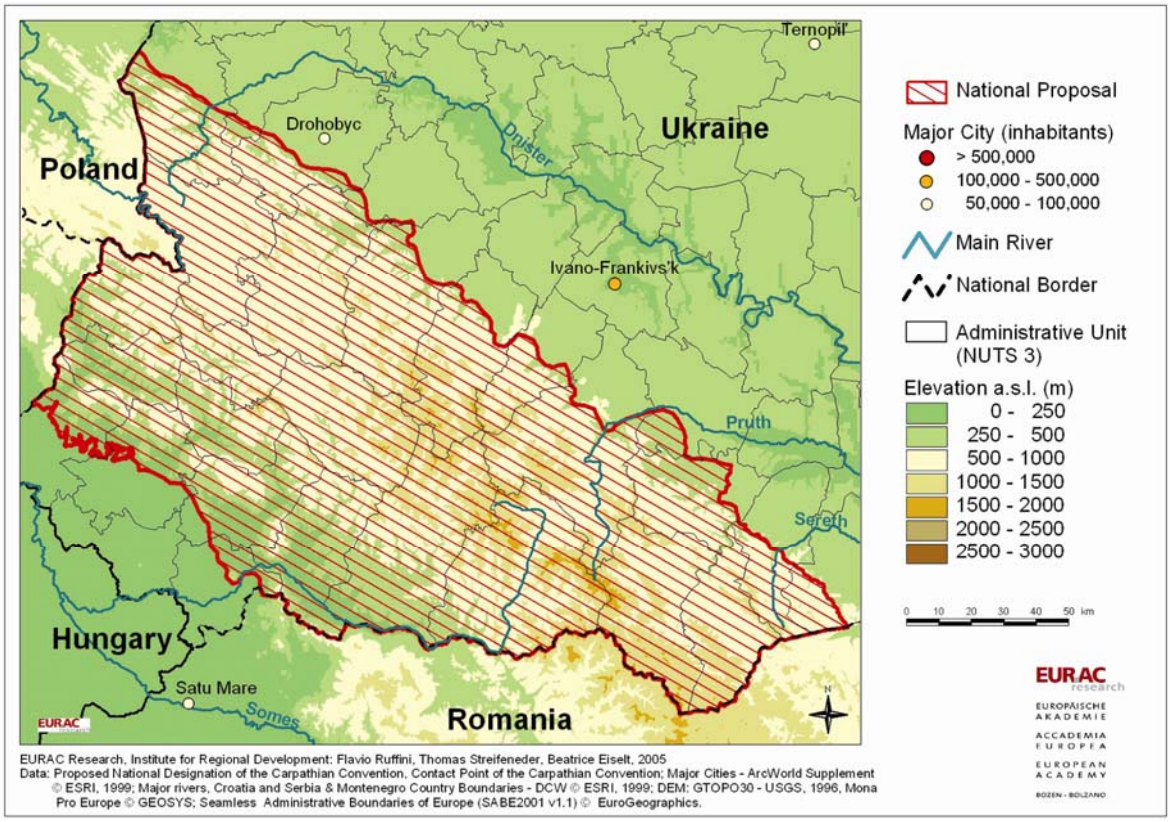


Fig. 18: *The NP of Ukraine (georeferenced information; UNEP, 2004).*

4.3.1.7 Ukraine

Information on the Ukrainian NP was provided by UNEP (2004) and consisted of georeferenced data (Fig. 18) and two maps illustrating the NP in different scales (Fig. 19). Besides the delimitation of the Carpathians in the Ukraine, the maps give useful information about the location of settlements and the distribution of protected areas.

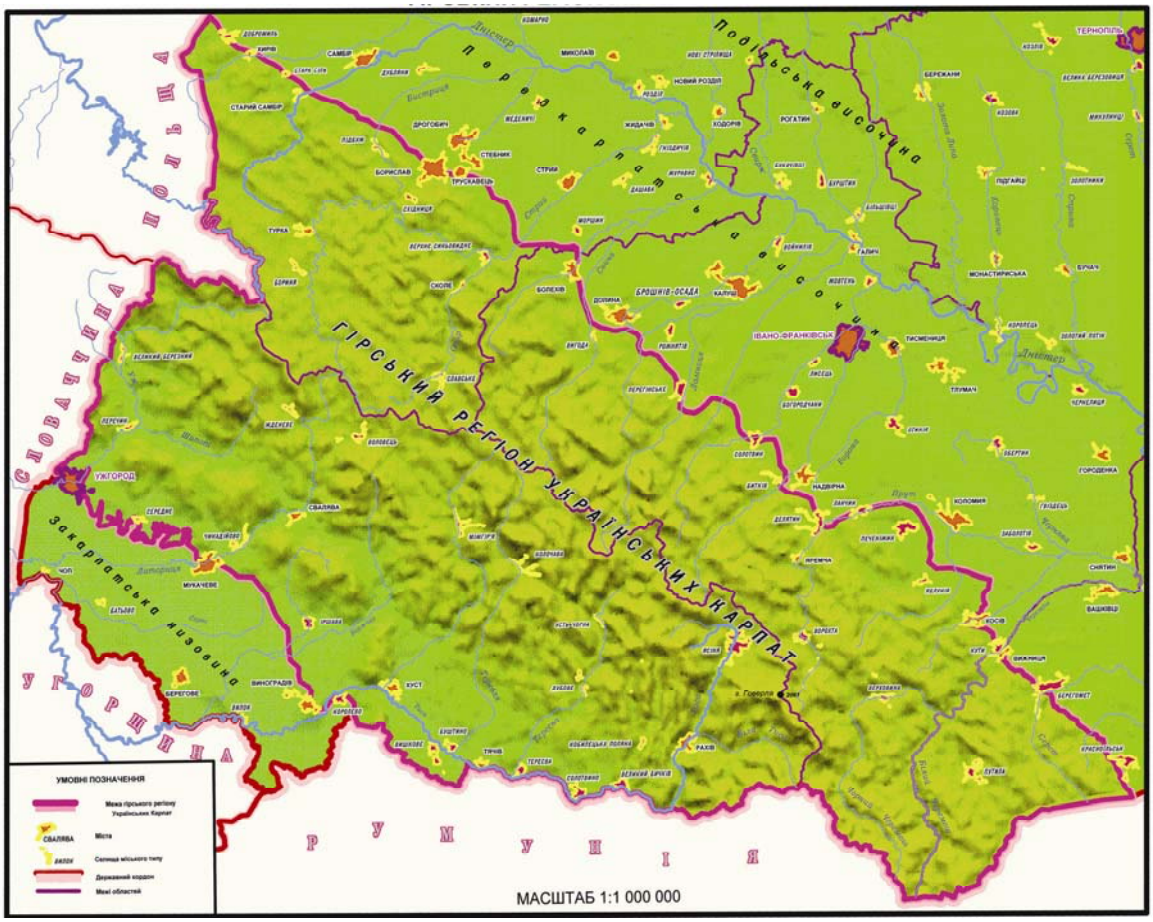


Fig. 19: *The NP of Ukraine as illustrated by the Ukrainian government on the scale of 1:1 million (UNEP, 2004).*

4.3.1.8 The National Proposals – a concluding overview

The actually proposed national areas for the CC extend to a total of 161,805 km² (Fig. 20). The area ranges from 44.35° to 50.04° northern latitude and between 16.58° and 26.72° longitude. According to the National Proposal for the delimitation of the CC, Romania has by far the largest proportion of the overall CC area. With 69,872 km² the Romanian CC area is nearly twice as large as that of the Slovak Republic, the member state with the second largest total area. With less than 1% und approx. 760 km^2 Serbia & Montenegro, holds the smallest part of the Carpathians.

In the year 2000 a total of approximately 17.43 million people lived in the sector proposed by the signatory states, most of them in Romania and the Slovak Republic (Tab. 1). These two countries together, account for approx. 50% of the total population living within the proposed CC borders.

The population specifications, though, can only be seen as a rough quantitative indicator. In S&M for example, the proposed CC delimitation corresponds to the borders of the Djerdab National Park. The population numbers, however, refer to the municipality level.

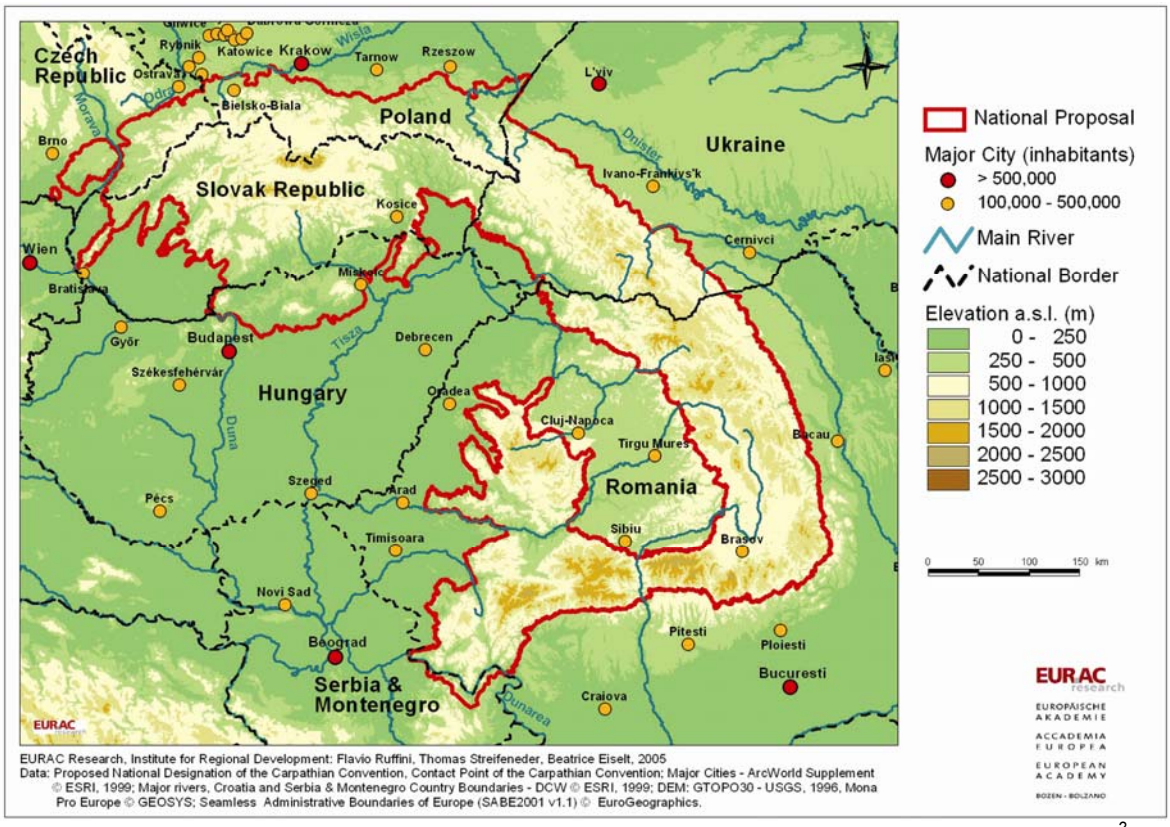


Fig. 20: *The national delimitation of the Carpathians. The NP comprises an area of almost 162,000 km². Almost half of this (70,000 km²) lies within Rumanian borders.*

Tab. 1: *Distribution of inhabitants and area according to the NP. The data also contains the population numbers of communities that lie only partially within the NP.*[26]

Country	National Proposals			
	Area (km²)	Proportion of total area (%)	Inhabitants in millions	Proportion of total population (%)
CZ	7,124	4	1.46	8.4
HU	9,626	6	1.77	10.2
PL	17,263	11	3.47	19.9
RO	69,872	43	4.87	27.9
SK	35,050	22	3.80	21.8
S&M	761	<1	0.06	0.4
UA	22,109	14	1.98	11.4
Total	**161,805**	**100**	**17.41**	**100**

Sources: Data on inhabitants: Czech Statistical Office, Hungarian Central Statistical Office, Central Statistical Office of Poland, National Institute of Statistics of Romania, Statistical Office of the Slovak Republic, Serbia & Montenegro Statistical Office, Informational-Analitical Agency (StateAnalitInform) of Ukraine.

[26] Population numbers are based on different years: CZ and HU: 2001; PL and S&M: 2002; RO and SK: 2003; UA: 2004.

Tab. 2: *Altitude classes and proportion of the NP compared with the Alpine Convention (Digital Elevation Model: DEM – Mona Pro Europe © GEOSYS).*

Altitude class (m a.s.l.)	Proportion of the overall proposed national areas in the Carpathians (%)	Proportion of the overall area of the Alpine Convention (%)
0 – 250	10	2
250 – 500	27	10
500 – 1,000	44	30
1,000 – 1,500	16	23
1,500 – 2,000	3	16
2,000 – 2,500	<1	12
2,500 – 3,000	<1	6

The comparison of the Carpathian altitude classes (according to the area of the National Proposals) to those of the Alps (according to the area of the AC) evidences significant differences. In the Carpathian Range the area below 1,000 m a.s.l. covers nearly twice as much (81%) of the total area than in the Alps (42%) (Tab. 2). Consequently, in the Alps the area above 1,000 m a.s.l. is considerably larger (58%) than in the Carpathians (19%).

Tab. 3: *Slope classes and proportion of the NP compared with the Alpine Convention (Digital Elevation Model: DEM – Mona Pro Europe © GEOSYS).*

Slope class (°)	Proportion of the overall proposed national areas in the Carpathians (%)	Proportion of the overall area of the Alpine Convention (%)
0 – 4	20	13
4 – 8	23	8
8 – 10	11	5
10 – 12	9	5
12 – 20	25	22
> 20	12	47

On the one side, the proportion of lower slope classes in the Carpathians is significantly higher than in the Alps (Tab. 3). On the other side, the proportion of steeply sloped area of over 20° is by far lower compared to the Alps. Hence, the Carpathians represent a mountain range with comparably few steep areas and relatively more mild inclinations.

4.3.2 Mountain laws of the Carpathian Countries

There is a mutual relationship between the chosen delimitation criteria and the applied policy. Most countries have not adopted mountain-specific laws, preferring to focus on the protection and development of mountain regions through their existing sectoral, mountain-related laws. In many cases, based on criteria to individuate disadvantaged areas, an agricultural delimitation is adapted to improve rural development or environment. These predominantly sectoral approaches are focused on mountain agriculture (e.g. Hungary, based on Council regulation (EC) No 1257/1999, Czech Republic, and Slovak Republic). Only Romania and Ukraine have enacted legal instruments

focusing specifically on mountain areas elaborating explicit mountain laws[27]. Interestingly, in Poland a Mountain Act was in effect only between 1986 and 1989. It serves as good reference to understand approaches to mountain areas in Poland (Nordregio, 2004).

4.3.2.1 The Polish Mountain Bill ("Mountain Act")

The Council Ministers approved a bill on January 21, 1985, which was well received by farmers, but it was in effect for only five years (until the end of 1989) (Kuzniar, 2004.) Subsequently, the previously used criteria were integrated in the delimitation of less-favoured areas based on Council regulation (EC) No 1257/1999. According to this bill, the Central, Regional, and Communal Administration had to accelerate the development of social and economic infrastructure in villages and municipalities, where over 50% of agricultural land was located on slopes of more than 12 degrees and at an altitude of at least 300-350 m a.s.l.

4.3.2.2 The Romanian Mountain Law

A first draft of the Romanian Mountain Law was presented in 1994, based on the criteria adhered to in Switzerland, Italy, France, and Austria. This delimitation was revised applying the Council regulation (EC) No 1257/1999.[28] The delimitation of mountain areas was approved in the law of 2004 (Official Journal of Romania, 2004) by common order of the Ministry of Agriculture, Forests and Rural Development (No 328, 18 May, 2004; Ministry of Administration and Internal Affairs, No 321, 05.08.2004), according to the delimitation criteria specified in the Government Decision No 949/2002 (Rey, 2004; Romanian Government, 2002).

This delimitation defines mountain areas up to the level of cities, towns, and communities, or the component villages. The criteria specified in the Government Decision No 949/2002 are based on limitations for land use and on higher costs required. More specifically the following criteria have been determined:

- Particularly difficult climatic conditions determined by altitudes over 600 m a.s.l. and reflected in a shorter growing season;
- The presence, at lower altitudes, of slopes of more than 20 degrees across the majority of the agricultural land, as these slopes are too steep for regular agricultural equipment;
- A combination of the factors described above, each of which have less significant effects individually, as opposed to the combination of the two factors – elevation and slope – that results in an equivalent disadvantage (Romanian Government, 2002).

4.3.2.3 The Ukrainian Law on the Status of Mountains and Human Settlements

The Law on the Status of Mountains and Human Settlements of 1995 seeks to protect the material security of vulnerable mountain populations by ensuring the social and economic development of mountain settlements and improving the living conditions. It envisages special privileges for citizens living in mountain settlements, such as better labour conditions and wages or pensions of 20 percent higher than the country average (Villeneuve et al., 2002). The law calls for provision of sub-

[27] As some other countries like France, Georgia, Italy, Switzerland.

[28] According to Rey (2005a), the Council Regulation "[…] *has been more rigorous, applying the severe criteria of the EC Resolution* […]" and […] "*led to a great shrinkage of the mountain area, starting from the altitude of 600 meters." "For the Romanian Carpathians this is already too much, because the climate is harsher, of excessive continental type, and therefore the vegetation periods are also shorter*" (Rey, 2005b).

sidies and loans from the central government, as well as technical and financial assistance for agricultural, social, industrial, and social infrastructure development (development of public transport, roads and telecommunication and broadcasting facilities). Unfortunately, adverse economic conditions have so far precluded the implementation (Lynch & Maggio, 2000).

4.3.3 Romanian orographic units

The map of relief units (Posea, 1975) gives an orographic and geological overview of the southern Carpathian Region (Fig. 21). This overview provides a clear delineation between the Carpathian Mountains, the Sub-Carpathians, and the Transylvanian Tableland. The regions designated as Mountain Areas by Posea differ clearly from the “Intra-Carpathian Depressions”.

A comparison of the Romanian national delineation proposal according to Fig. 13 with the orographic map of Posea in Fig. 21 exhibits extensive conformities. This allows the conclusion that the Romanian proposal is strongly oriented towards orographic units.[29] However, it is not clear on which technical basis the orographic units were integrated or excluded.

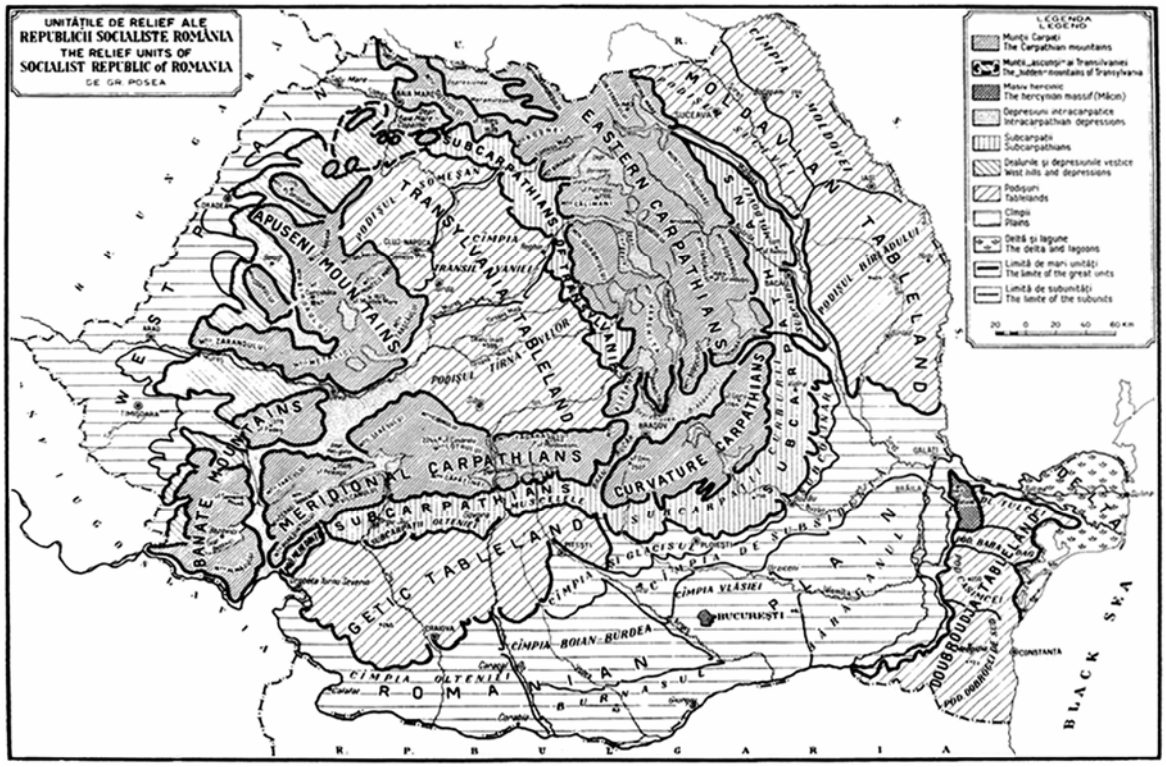


Fig. 21: *Units of relief in the Romanian part of the Carpathians by Posea (1975). A comparison with the Rumanian NP shows that is strongly influenced by geological and orographic units.*

[29] This conclusion is in line with the declarations of the Romanian delegation.

5 BASICS FOR A TRANSNATIONAL DELIMITATION

The presented national or environmental delimitation proposals for the CC have, so far, not found mutual acceptance among the signatory states. This chapter will therefore focus on thematic aspects and criteria that are valid throughout the Carpathians. In it, the goals of the Convention play a central roll. By means of appropriate criteria, these goals are assigned a spatial reference. The criteria refer to international political and legal instruments.

5.1 INTRODUCTION

According to Article III-220 of the proposed European Constitution, mountain areas, being disadvantaged, will be granted special attention regarding economic, social, and territorial cohesion. Topographic and climatic conditions make mountains strongly vulnerable, and many mountain regions are politically and economically marginalised, isolated, and rapidly changing (Price, 2004).

The definition of mountain areas for political purposes is an interactive process in which delineation criteria and policy content influence each other (Nordregio, 2004). According to a given regional context, comparable areas may be classified as part of, or alternatively excluded from mountain areas (Dax & Hovorka, 2004a). Albeit, the partial justification based on the statement that mountains are defined by local perception, a (global) overview of mountains in a geographical context is not facilitated (Kapos et al, 2001).

Cross-border cooperation has become an important fact of regional development (Süli-Zakar, 1999), and attention on mountains has more and more stepped into the national and international limelight (e.g. International Year of the Mountains 2002). Consequently and as confirmed by the CC, transnational delimitations of mountain ranges are actually very relevant. Further similar conventions may come into being (e.g. Balkan-mountains, Pyrenees and Anden-mountains), a reality which shows how necessary it is to collaborate on resolving problems of international character.

5.2 PRINCIPLES OF THE CARPATHIAN CONVENTION: STARTING POINT FOR THE DELIMITATION

A reciprocal interaction prevails between the convention and the target area. On one side, the idiosyncrasies of the area influence the contents and intentions of the convention; on the other, in the future it is the convention that should steer the development of the region. These interactions are to be considered in the delimitation of the target area. The convention conforms itself to a mountain region. This is characterised, on one hand, by the given natural landscapes and ecological potentials, and on the other, it is living space and economic area for 16 to 18 million people of differing language and cultural backgrounds (CERI, 2001). The intention of the convention is to develop a transnational approach to the sustainable development of this mountain region and the protection of its natural heritage (Art. 2), while taking into account the quality of life of the affected population and strengthening the local market and community.

The mountain area of the Carpathians plays a central roll in the delineation of the convention area. Based on the previous consideration the definition of the Carpathian mountain area in a strict sense constitutes a central element within the future definition of the scope of application. As the Carpathian Region extends over the territory of seven countries, transnational mountain delimitations constitute the relevant information source for the methodological approach. These main goals of the convention influence the geography of the convention area.

The goals derived from the convention must be given a spatial relationship. This step is implemented by means of criteria that can be derived from thematically related, international instruments. Especially legal norms and instruments of the EU, respectively internationally binding conventions were investigated for potentially usable delimitation criteria. To fulfil the mandate of finding a transborder and homogenous method for delimiting the Carpathian area, exclusively those aspects are under consideration, which represent the Carpathians as a whole, transnational mountain range. Besides the special demand on data availability, this presents a great challenge in processing all this data.

5.3 DEFINING THE MOUNTAIN AREA

The objective to delimitate mountains in an international framework is a fairly recent issue. A groundbreaking study in this field has been devised by Kapos et al. (2000). Most recently it was further developed for the European Commission (COM) in the study on “Mountain Areas in Europe” (Nordregio, 2004). Apart from these and other scientific studies (e.g. Tappeiner et al., 2004) within the framework of international mountain research programs which devise new transnational mountain delimitations, other mountain conventions (e.g. the AC) were considered for this issue.

Numerous definitions of what constitutes a mountain area have been proposed, but mountains are extremely diverse landforms, and it has proved difficult to achieve consistency in description and analysis (Kapos et al, 2001). Delimitations of mountain areas have been made for several purposes, using different approaches and criteria, such as elevation, volume, relief, and inclination, as well as spacing and continuity. In fact, in all spatial geographical definitions there is no objective and value-free solution. To summarize mountain delimitation, two main approaches could be identified (Bätzing, 1997):

- physical or natural-spatial arrangement definition;
- economic-political definition.

Delineations based on topographic criteria or soil characteristics have progressively been used in a spatial context for rural or regional development, mainly regarding agricultural policy (sectoral approach) (e.g. Poland, Czech Republic, Hungary, Slovak Republic). This approach is impacted in certain countries by the Council Regulation (EC) No 1257/1999 (“Less-Favoured Areas”). Explicit regulations for mountain areas as a uniform approach for the development of an entire region have only been passed in a few countries and areas (e.g. France, Italy, and Romania).

Generally accepted and binding definitions of mountain areas do not exist. This is true for the scientific community as well as for policy makers and administration. The demands made by the three disciplines are too different. In this context, the contested nature of defining politicised spatial entities along biophysical lines must be highlighted (Fall & Egerer, 2004).

Two examples from the Alps illustrate the differing approaches to the delimitation of a mountain area within a state. In the German Alps (Bavaria), for example, the delimitation of the AC differs clearly from the delimitation presented in the Regional Development Plan (“Landesentwicklungs-

plan/LEP") (Fig. 22). The reason for this discrepancy in Bavaria is a transnational approach within the AC on the one side, and the significance of national aspects within the Regional Development Plan (Erholungslandschaft Alpen/Recreational Area Alps) on the other side. As outlined in the LEP, 101 municipalities covering 5,400 km² pertain to the Alps, while the AC contains more than twice as many: 295 municipalities with a total area of 11,147 km² are part of the convention.

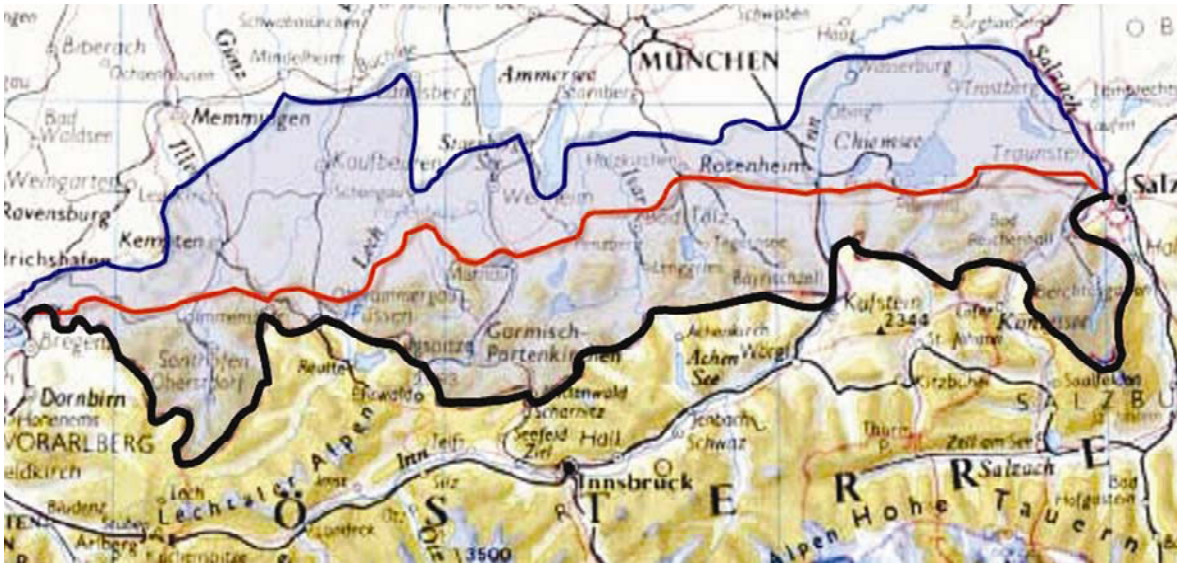


Fig. 22: *Differences regarding delineations of the German Alps (LEP=red line; AC=blue line; border GE/AT=black line) reflect various objectives (Wessely & Güthler, 2004).*

A further delineation of the Bavarian Alps was undertaken in the context of the ESDP – European Spatial Development Perspective[30] for the programme "Alpine Space – Interreg III B" (Chap. 5.3.1.2, Fig. 25). The delimitation was carried out according to governmental districts and included a total of 840 municipalities (Wessely & Güthler, 2004).

Another example represents the situation in Lombardy, in the Italian Alps. There too, the mountain region is delineated in different forms depending on the purpose. In certain regions there exist four partially differing approaches for the definition of mountain areas, not counting the delimitation of the AC:

- National Mountain Law (Art. 1 of law No 991/52, later modified with law No 657/57);
- Regional Mountain Law (Chap. 5.3.1.3);
- National Union of Mountain Municipalities and Mountain Communities (Unione Nazionale Comuni Comunità Enti Montani, UNCEM);
- ISTAT (Istituto Nazionale di Statistica) (National Statistical Office – Italy).

[30] Online: http://europa.eu.int/scadplus/leg/en/lvb/g24401.htm, 8 Mar 2005.

5.3.1 Mountain delimitations in the Alps

5.3.1.1 The application area of the Alpine Convention

The CC tries to pick up the idea of the AC and to implement it in a new way. These results in several parallels between the conventions, and a comparison to the approach pursued within the AC follows naturally. Each state proceeded according to administrative, political, functional, and geomorphological criteria in a different manner. Furthermore, they named their convention area at differing administrative levels (Bundesgesetzblatt der Republik Österreich Nr. 477 vom 21.07.1995, Annex 1). While Austria, Switzerland, and Germany listed each single municipality assigned to the AC, Italy proposed whole provinces, and France whole departments or counties.

A small-scale, overview map was attached to the convention area catalogue. The map does not facilitate the exact localization of the delimitation (Fig. 23). Especially for the Italian Alpine range it is hardly possible to define the exact application area of the AC as the cartographic delimitation does not run along the borders of these provinces but is intersected by them. Therefore, the municipalities of the application area could not be allocated in an exact manner.

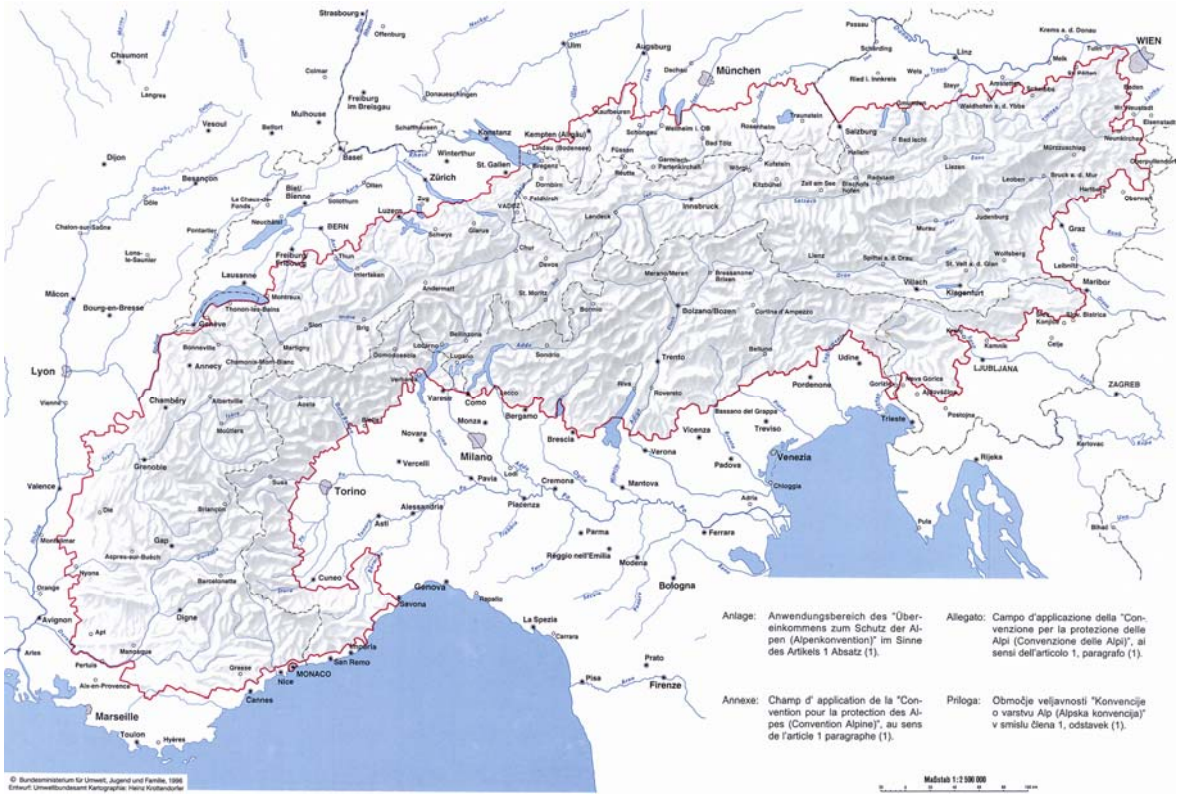


Fig. 23: *The perimeter of the Alpine Convention in the sense of Art. 2, §1. This map at a scale of 1:2.5 million does not allow a clear determination of the convention area at the municipality level.*

These discrepancies lead to misunderstandings in the implementation of the convention. They became evident to the working group for "Environmental Goals and Indicators" in the course of preparing their status report on the Alps, as well as to the Board of Inspectors in their work. The latter have been commissioned by the contracting parties to monitor the implementation of the conven-

tion and to compile a periodical report. It further becomes evident that, especially in the implementation of a convention, the unambiguous delimitation of the perimeter of the application area is of great importance. The Local Administrative Units (LAU) of level 2 lend themselves to this purpose quite naturally. For this reason, the attempt was undertaken in spring of 2004 to define the delineation at the municipality level (LAU 2) based on the national proposals (EURAC, 2004) (Fig. 24).

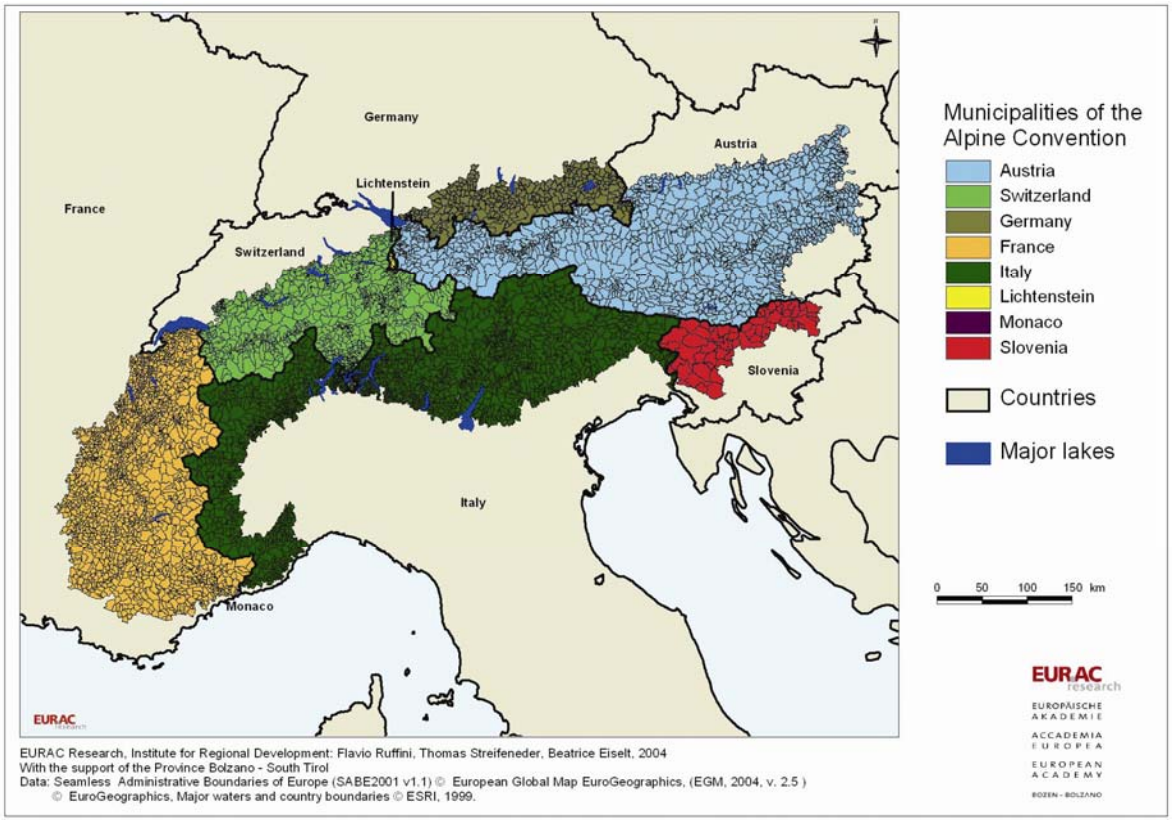


Fig. 24: *The delimitation of the AC at municipality level devised by Ruffini et al. (2004) in the framework of a study by the working group for "Environmental Goals and Indicators" of the AC.*

5.3.1.2 Transnational delimitations of the Alpine region

The transnational working groups, such as ALPE-ADRIA,[31] ARGE Alp[32] and COTRAO[33] (Tab. 4), chose another approach. These working groups do not pursue goals concerning exclusively mountain regions, they also integrate the surrounding territories in their approach. Their delimitation approaches reach further than the actual mountain areas and also far beyond the Alpine Range. The delimitation follows administrative-political units at the NUTS 2 and NUTS 3 level. Thereby, the administrative units can remain intact and economical networks can be taken into account. For example, the greater regions of Lombardy, Bavaria, and Rhone Alp are included in the Alpine Region.

[31] Online: http://www.alpeadria.org, 10 Jun 2005.
[32] Online: http://www.argealp.org/ueber_uns.shtml, 10 Jun 2005.
[33] Online: http://www.geneve.ch/DicoTrans/LettreC/cotrao.asp, 10 Jun 2005.

Tab. 4: *Overview of the regional working groups in the Alpine Range.*

Working Group	Location	Name	Participating Administrative Units	Data of creation	Area (km^2)
ALPE-ADRIA	Eastern Alps	Working Group ALPE-Adria	*Hungary:* Baranya, Györ-Moson-Sopron, Somogy, Vas, Zala; *Austria:* Burgenland, Kärnten, Oberösterreich, Steiermark; *Germany:* Bayern; *Italy:* Friuli-Venezia Giulia, Lombardei, Trentino-Alto Adige Veneto; *Switzerland:* Ticino; *Croatia;* *Slovenia.*	20.11.1978	306,000
ARGE-Alp	Central Alps	Working Group Alpine Countries	*Germany:* Bayern; *Switzerland:* Graubünden, St. Gallen, Ticino; *Italy:* Lombardia, Provincia Autonoma di Bolzano – Alto Adige, Provincia Autonoma di Trento; *Austria:* Salzburg, Tirol, Vorarlberg.	12.10.1972	142,000
COTRAO	Western Alps	Western Alpine Working Community	*France*: Rhône-Alpes, Provence-Alpes-Côte d'Azur; *Italy*: Piemonte, Valle d'Aosta, Liguria for certain projects; *Switzerland*: Valais, Genève, Vaud.	02.04.1982	118,000

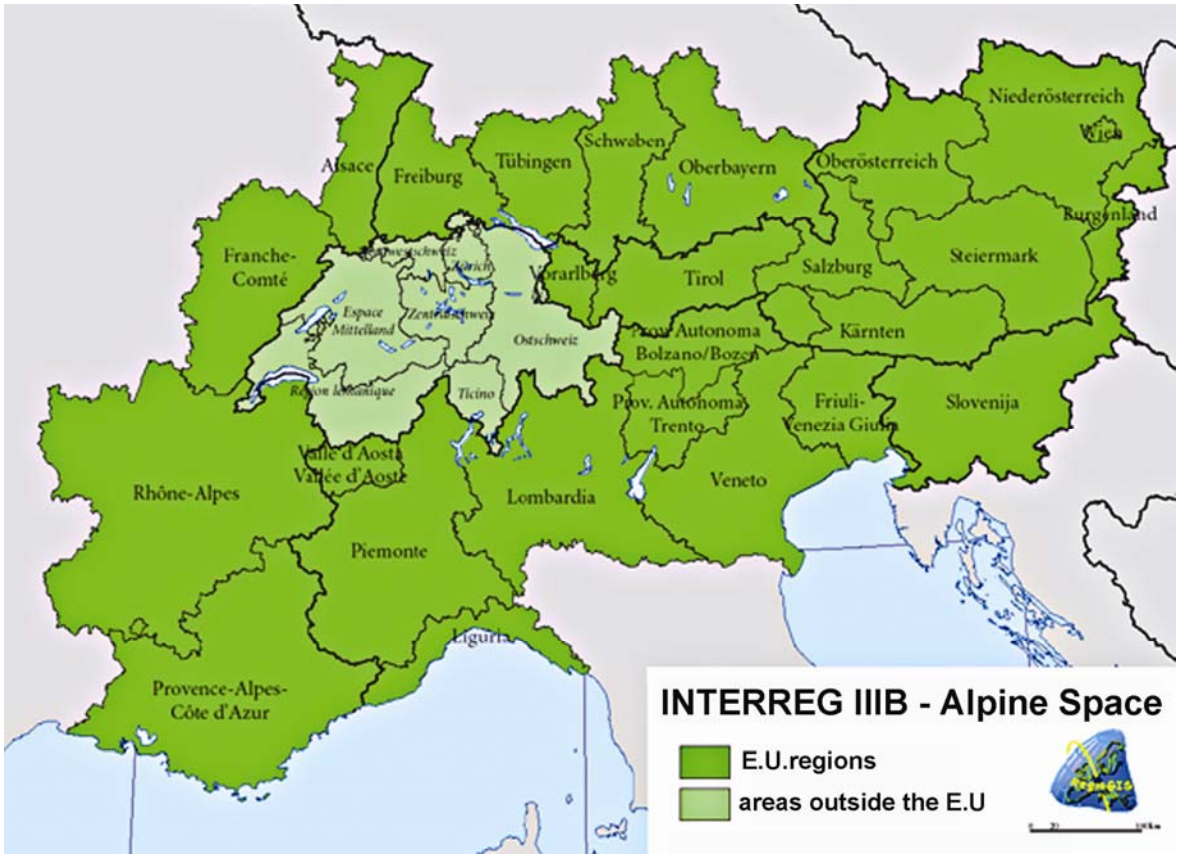


Fig. 25: *The cooperation area of the Alpine Space Community Initiative. The area is composed of NUTS 2 units and describes a greater Alpine area of 450,000 km^2.*

A similar approach concerning the whole Alpine bow was chosen by the Alpine Space Interreg III Programme.[34] It is a community initiative which aims to stimulate interregional co-operation in the EU between 2000 and 2006. It is financed under the European Regional Development Fund (ERDF). The Alpine Space Program represents an important transnational European co-operation area (Fig. 25). It covers the entire Alps, including the foothills, the lowlands, and coastal regions surrounding the Alps (on the basis of NUTS 2 units) and comprises the mountainous area in the geographical sense as well as the surrounding foothills and lowlands, a small part of the Mediterranean coastal area, parts of the great river valleys of Danube, Po, Adige, Rhône and Rhine[35]. The mountainous "core area" is spatially inseparably linked with the surrounding "peri-alpine belt", containing some of the most attractive European metropolitan areas.

5.3.1.3 The Mountain Law of Lombardy/Italy

As recommended by Price et al. (2004), beside geographical criteria like elevation and slope, future mountain laws should include economic and social criteria, too. This originates from a stronger focus on social and economic cohesion within EU Policies. The relative law of the Region of Lombardy in Italy is considered by EURAC-Research as a good example for a detailed mountain regulation and shall be presented in the following. In addition to elevation and slope, this law includes demographic, economic, and socioeconomic criteria. Based on the assumption that the statistical data situation on LAU levels 1 and 2 in the Carpathian Countries has become more accessible, this mountain law may represent a possible approach for a future delineation of the Carpathian region.

The Lombardian regional law[36] classifies municipalities into three classes of “disadvantage”, according to exactly defined criteria and calculations (Tab. 5). To each municipality a number of points is attributed according to the encountered conditions. Finally, the level of disadvantage of each municipality is defined according to the total number of assigned points. A municipality may be ranged as “mildly disadvantaged“, “medium/average disadvantaged“ or “severely disadvantaged“. Based on this classification, the Lombardian area can be divided into three zones.

Examples of criteria used by other states within mountain laws (FAO, 2002)

France – 1985 Act (Sects. 3 and 4):

- Altitude and the presence of steep slopes indicating significant handicaps are the general criteria used to describe a mountain area;
- The country's various mountain ranges are specifically identified and, to some extent, come under different regimes.

Italy – 1971 Act, amended in 1990:

- Initially, altitude (600 m), adjusted according to socio-economic factors, was the main criterion;
- The 1990 amendment removed the definition criteria, which practically implied a confirmation of previously identified mountain areas (Maglia & Santoloci, 1998).

Switzerland – 1998 Ordinance on Cadastral Surveys (Sect. 2):

- Mountain regions are defined on the basis of three criteria which are, in declining order of importance, climate, transport links and topography.

[34] Online: http://www.alpinespace.org, 10 Jun 2005.
[35] Online: http://www.alpinespace.org/area.html, 15 Mar 2006.
[36] No 10/1998 “Disposizioni per la valorizzazione, lo sviluppo e la tutela del territorio montano in attuazione della legge 97/1994“.

Tab. 5: *Criteria of the regional mountain law of Lombardy/Italy.*

Criteria	Description
Territory	<= 10 km², > 10 km² and >= 40 km², > 40 km².
Inhabitants	> 3,000, 500 and <= 3,000, <= 500.
Depopulation	>= 0, < 0 and >= -5%, < -5%.
Slope	Plane areas (slope < 9°) > 20% of total surface, Plane areas < 20% of total surface and areas less or non-usable (slope > 30°) < 50% of total surface, Plane areas < 20% of total surface and areas less or non-usable > 50%.
Elevation of communal territory	60% of total surface at level < 600 m, < 60% of total surface level < 600 m and < 60% at level > 900 m, > 60% of total surface at level > 600 m.
Accessibility[37]	Total distance <= 45 km, Total distance > 45 km and <= 80 km, Total distance > 80 km.
Overnight stays at tourist accommodations	> 50,000, > 5,000 and <= 50,000, <= 5,000.
Extra-agricultural activities[38]	> 95%, > 85% and <= 95%, <= 85%.
Elevation of the main communal city	<= 450 m a.s.l., > 450 m and <= 800 m a.s.l..

5.3.2 Transnational mountain delimitations

The mountain delimitations “Mountain areas of the world” and “Mountain areas in Europe” represent the most important and accepted transnational approaches. They are based on mountain policies which have been implemented in order to propagate the overall economic development of a region (Nordregio, 2004; Dax & Hovorka, 2004a).

5.3.2.1 Mountain areas of the world

In 2000, the UNEP World Conservation Monitoring Centre (WCMC) was able to make major progress in defining mountains at an international level. Kapos et al. (2000) elaborated a global typology of mountain classes. In this approach all areas above 2,500 m are considered mountain areas, and for territories between 1,000 m and 2,500 m criteria concerning altitude and slope are combined. For areas between 300 and 999 m an additional criterion based on local elevation range

[37] Total distance between the main city of the municipality and the main city of the province measured along the transport net and the distance between the main city of the municipality and the first level transport system on regional and international level (net of highways).

[38] Percentage of employees in sectors outside agriculture to the total percentage of employees.

has been introduced. The approach is based on the principle of increasing threshold on rough topography with decreasing altitude (Tab. 6).

Tab. 6: *Classes of mountain areas according to Kapos et al (2000).*

Elevation class (m a.s.l.)	Additional criteria
> 2,500	
1,500 – 2,499	slope > 2°
1,000 – 1,499	slope > 5° or local elevation range of 300 m or more is classified as mountain
300 – 999	local elevation range 300 m and above

These criteria were developed iteratively by scientists, policy-makers, and mountaineers and have proven as broadly acceptable to a wide range of international organizations and to the scientific community (Nordregio, 2004). However, this model required further adaptation in respect to its application in a European context (Dax & Hovorka, 2004a), as outlined in the following chapter.

5.3.2.2 Mountain areas in Europe

In order to promote mountain policies in a European wide context, it is necessary to find a common ground for the definition of mountainous areas and to establish commonly accepted spatial delimittations. Of major importance in this context is the work commissioned by the European Commission - Directorate General Regional Policy, titled “Mountain areas in Europe”, developed by the Nordic Centre for Spatial Development (Nordregio; 2004).[39]

A large number of national definitions were consulted, many of which were established in the context of agricultural policies, and in some countries as an instrument for regional policies. From a methodological perspective it was therefore mandatory to develop an individual methodological approach beyond existing classifications for agriculturally less-favoured areas (Dax & Hovorka, 2004a).

This delimitation of mountain areas by Nordregio (Nordregio Mountain Area = NR-MA) has been developed in order to compile the statistical and geographical information necessary to describe and analyze these areas and to evaluate measures and policies implemented by national governments and the EU. For this purpose, it was necessary to develop a definition of mountain areas that can be applied throughout the study area, even if national definitions vary considerably from country to country. For this reason several parameter combinations were tested empirically, to obtain one combination of parameters that best describes the delimitation of mountain areas, as perceived and evaluated by national experts. Three main integrations to the approach of WCMC-UNEP were explored and led to the criteria presented in Tab. 7:

- Integration of an indicator of climatic constraints, in order to take into account that mountain-like conditions can be found at lower altitudes in higher latitudes;
- Evaluating of standard deviations at local elevation rather than local elevation ranges, in order to take into account not only altitudinal amplitude, but also the shape of the landscape;
- Finding an appropriate way to include areas below 300 m with mountain characteristics, as found particularly in the Mediterranean and in Northern Europe.

[39] This geo-morphological delimitation of European mountain areas, translated into municipality borders, was kindly provided by the EC, Directorate-General Policy (September, 2004). This copy did not include data for Ukraine and Serbia & Montenegro.

Tab. 7: *Criteria of the NR-MA (Nordregio, 2004).*

Class (elevation in m)	Additional criteria
> 2,500	
1,500 – 2,499	standard deviation > 50 m for cardinal points and/or local elevation range > 300 m within 7 km radius and/or maximum slope with cardinal points > 2°
1,000 – 1,499	standard deviation > 50 m for cardinal points and/or local elevation range > 300 m within 7 km radius and/or maximum slope with cardinal points > 5°
300 – 999	standard deviation > 50 m for cardinal points and/or local elevation range > 300 m within 7 km radius
0 – 299	standard deviation > 50 m for cardinal points
Climatic constraints	temperature contrast index >= 0.25

5.3.3 Conclusions and implications for the Carpathian delimitation

The analysis of transnational mountain laws allows the conclusion that the Nordregio mountain area best meets the requirements of a transnational delimitation and is consequently the concern of this study (Chap. 5.3.2.2). This approach integrates elevation and slope with other criteria, which are relevant to the definition of mountain regions (e.g. climate conditions). Furthermore, this approach has the advantage of being fairly free of national interests. Fig. 26 shows the Carpathian mountain region according to the approach for the NR-MA and its translation into mountain municipalities[40].

The analysis of the delimitation approaches shows that the criteria, elevation and slope, play a central roll in defining mountain areas. In contrast, the conceptual understanding of “mountains” within working groups and conventions turns out less precise. Main emphasis is focused on a mountain region which reaches further than the mountain area in a strict sense. As a consequence, in such conventions or regional cooperations, attention is given mostly to the “mountains as a region” (AC, Arge ALP).

Altitude and slope combine to generate environmental gradients and “high energy” unstable environments (Kapos et al, 2000). Altitude (low temperatures) and steep slopes are important aspects for the delineation not only of mountain areas, but also for less-favoured agricultural areas. These parameters are, in fact, relevant for determining various degrees of difficulty and are relevant criteria for promoting agriculture. Elevation and slope are the most important factors for spatial development of mountain regions (impact on natural hazards risk and vegetation periods), thus determining types of use in mountainous areas.

Characteristic for many regions in the Carpathians is a rapid transition from low to high slope gradients (Fig. 27). This applies particularly to specific sites in the Tatra Mountains and the southern Carpathians near the city of Brasov/Romania. Besides these areas, high slope degrees are found in large parts of the southern Green Carpathians, in the north of the eastern Carpathians, and in the Apuseni Mountains. Lowlands and valley floors, which represent favourable areas to human settlement with only slight inclinations, are located in the foothills of the Carpathians, such as the Outer Western Carpathians and the Transylvanian Plateau. To give a more vivid impression of Carpathian topography, Fig. 28 depicts the Carpathians using the hill shade mode.

[40] The necessary data for the whole project area, except for Ukraine and Serbia & Montenegro is available. For Ukraine and Serbia & Montenegro the NR-MA delimitation was simulated by taking only the physical criteria.

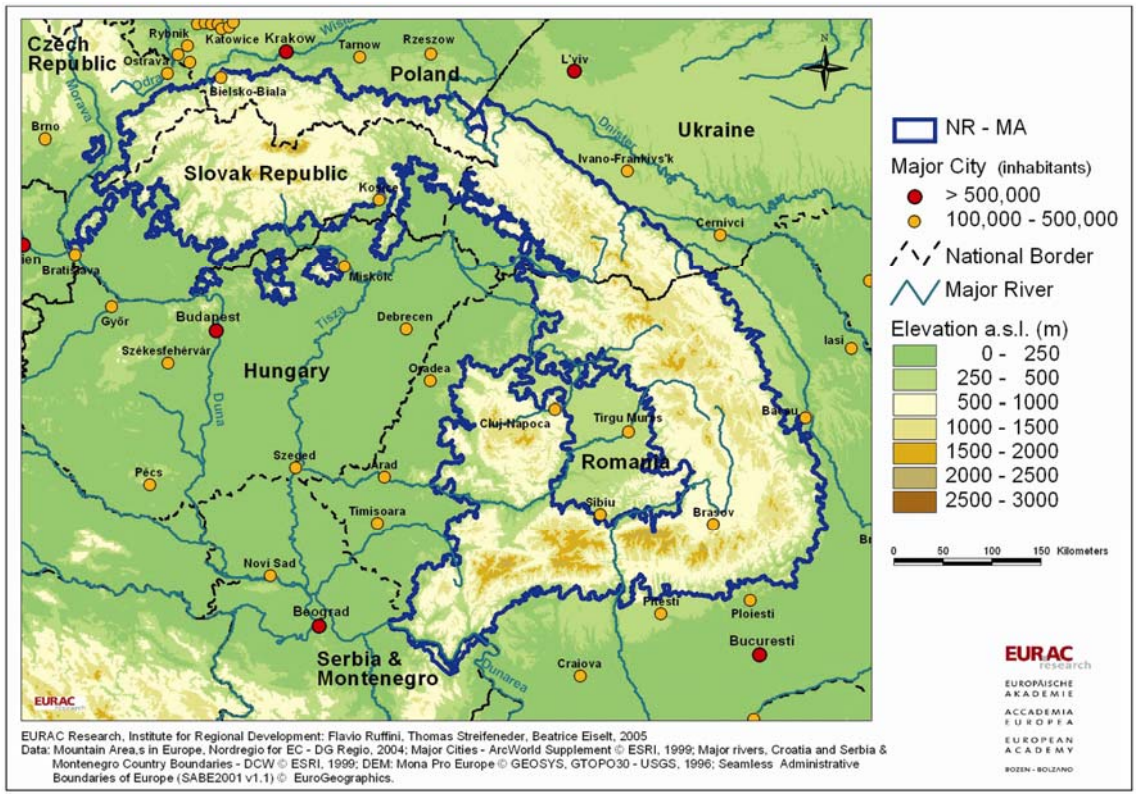


Fig. 26: *Carpathians according to European typology of mountain classes by Nordregio (2004). According to this delimitation, the Transylvanian Plateau is not counted as mountain area. In the northern part, islands are separated from the core area.*

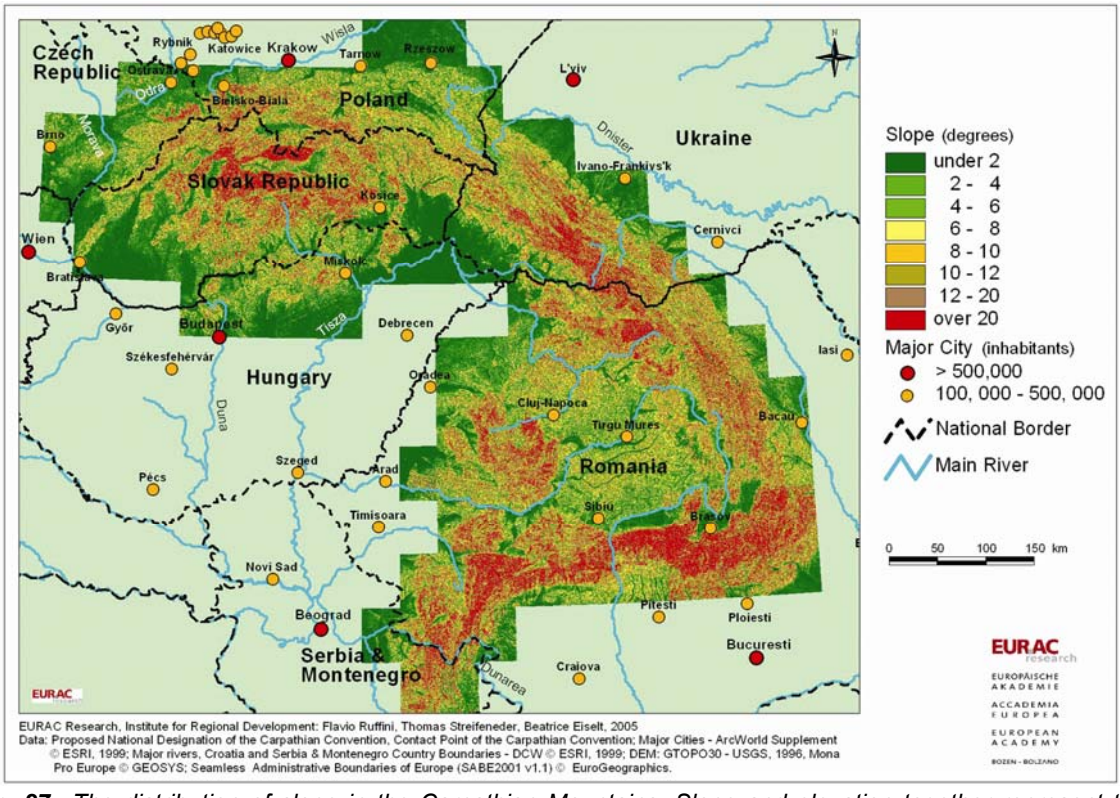


Fig. 27: *The distribution of slope in the Carpathian Mountains. Slope and elevation together represent the main criteria for the definition of mountain areas.*

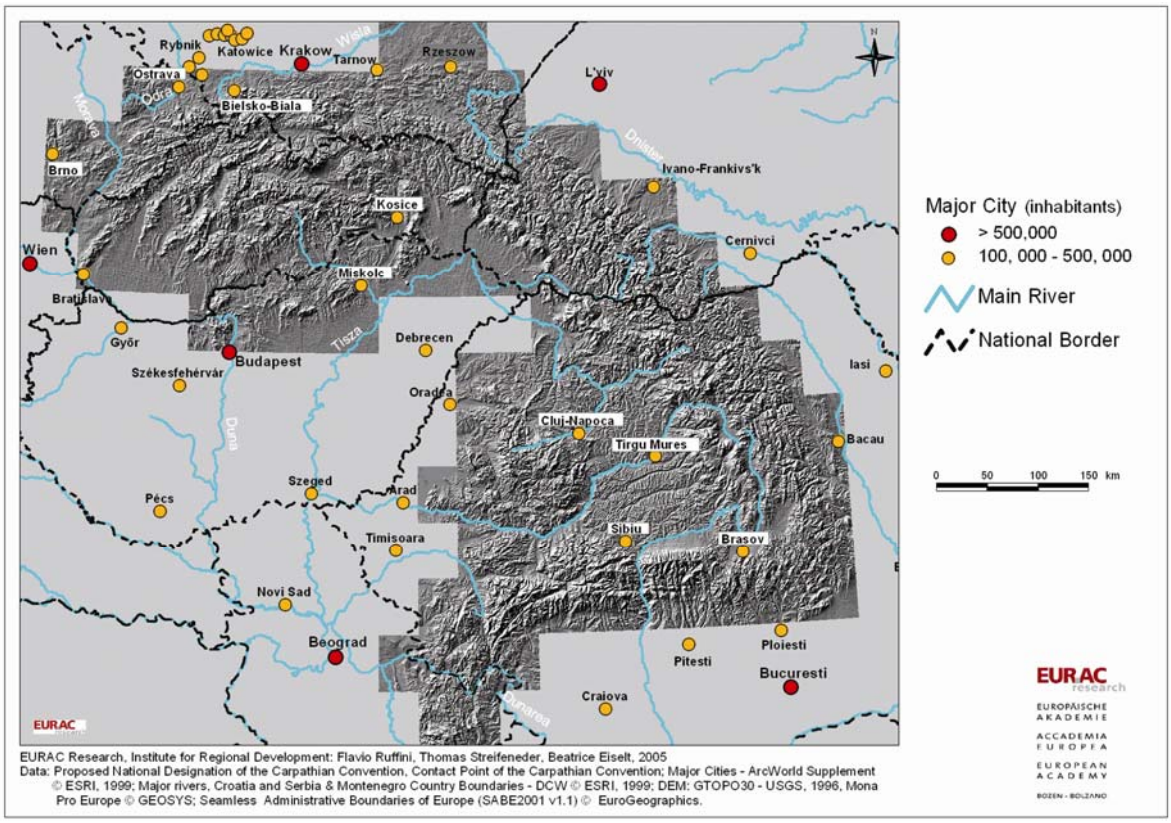


Fig. 28: *The "hill shade" display illustrates the surface structure of the Carpathians.*

5.4 NATURE PROTECTION

5.4.1 Basic strategies

The Carpathians own a natural heritage of European relevance. They contain one of the least disturbed ecosystems in Europe and vast tracks of primeval mountain forests (Alpine Network of Protected Areas/ANPA, 2004). It is therefore not surprising that the protection of this rich ecological diversity of this region acts as a guiding theme for the convention (preamble of the CC).

The Carpathians are more than a valuable nature reserve. They are also living space, an economy market, and a recreational area. Nature preservation is not the only concern and will inevitably conflict with other interests. Within the discussion on sustainability, it is necessary to confront nature conservation with other forms of land use.

Two basic approaches to nature protection can be distinguished. The integrative nature protection strategy understands the preservation of the a-biotical and biotical resources to be of basic importance to the whole landscape region. In this strategy nature protection tries to integrate all its sub-goals into the currently predominating land uses. In the ideal case, nature protection becomes a temporally and spatially comprehensive basic principle of every action relevant to nature (Arge Alp, 2000).

Until now, nature conservancy has preferred the other approach, the segregative strategy. It is based on the strict separation of the space into production area and nature preserves. The power to place areas of special natural value under protection (national parks, nature reserves) is the most important tool under this strategy. The segregative strategy lends itself there, where it is of vital im-

portance to protect valuable natural spaces, unusual living conditions, and exceptional natural elements.

For an effective protection of natural resources, both strategies represent important starting points for the search of solutions. Which of the strategies is appropriate depends on the goals set for nature protection. Integrative approaches are to be forced there, where wide area solutions are needed for the development of used land. In certain cases, but certainly not inevitably, one will resort to the segregative strategy and the definition of protected areas in order to preserve certain outstanding sections of territory.

5.4.2 Nature protection in the Carpathians

The protection of biodiversity in the territories of the European Union also belongs to the priorities of European nature protection policy, as well as the improvement of its state of preservation. These concerns were also expressed in the 6th Environmental Action Program of the EC, "Environment 2010: Our future, our choice". The guiding theme chosen for the priority area "Nature and Biodiversity" is to protect and, where necessary, restore the structure and functioning of natural systems and halt the loss of biodiversity (EG, 2001). An important key to the successful actions in this field lies, in the opinion of the European Union, in the full implementation of the existing environmental regulations in the Member States.

Fauna-Flora-Habitat-Directive

In 1992 the directive, 92/43/EEC, the "Fauna-Flora-Habitat-Directive" (FFH) was adopted by the EU. This directive aims at the conservation of biological diversity in the Member States. As its most important measure, the FFH-Directive provides for the establishment of the ecological network, Natura 2000. Natura 2000 is a functional, cohesive network of especially valuable natural landscapes, for which specific protection requirements have been determined. The bird sanctuaries according to 79/409/EEC are also a part of the NATURA-2000-Net.

Furthermore, the habitat directive seizes on the intentions of earlier adopted international conventions which were also signed by the EU. Because they were so insufficiently legally binding, these conventions were hardly ever really implemented, until the FFH Directive came into effect (Gellermann, 2001):

- Bern Convention on the conservation of European wildlife and natural habitats, 1979;
- Bonn Convention on the conservation of migratory species of wild animals, 1979.

These conventions play an essential roll for nature protection, especially outside the EU and candidate countries. Of particular interest here are the Emerald Sites from the Bern Convention, which are also defined as a coherent network.

Most of the areas proposed by the countries for the implementation of Natura 2000 had already been placed under protection according to their respective national legislation (national parks, nature parks, nature reserves, etc.). Under the guidelines of the FFH-directive, these areas possess a comparably minimum-quality standard of protection even if they feature differing characteristics and have different goals to fulfil.

Ramsar Convention and Convention on Biological Diversity

The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.[41] Aspects of the Ramsar Convention have also been incorporated in the FFH-Directives.

Finally, the Convention on Biological Diversity, Rio de Janeiro, Brasilia, 1992, plays a central roll. This convention was also signed by the EU. The agreement on biological diversity follows three main goals (German Clearing-House Mechanism, 2000):

- Conservation of biological diversity;
- Sustainable use of its components, i.e. usage which does not pose a long-term threat to biological diversity;
- Just distribution of advantages won from the use of genetic resources.

Protected areas

National protected areas are an important reference for evaluating of natural areas, as these are officialy recognised by the countries. But countries apply various categories of protection, and even in protected areas with the same designation, differing quality levels of protection can be found (Oszlányi, 2004). Therefore the protection status of protected areas is not always comparable.

The protection of the outstanding natural value of the Carpathians is one of the main objectives of the CC. Consequentely the identification and location of existing protected areas are of great relevance within the delimitation process. According to ANPA (2004) there are four large-scale protected area types in the Carpathians which encompass in total 2.6 million ha (Tab. 8):

- National Parks;
- Natural Parks/National Nature Parks;
- Protected Landscape Areas;
- Landscape Parks/Regional Landscape Parks.

Shadow lists

Next to the officially protected areas, there are also areas of special value to nature protection which have not, to date, been placed under protection. Such areas important for nature conservation are often recorded and documented by Non-Governmental-Organisations in so called “shadow” lists. These organisations consider the areas registered in these lists are of fundamental importance for nature conservation. They represent at the same time the deficiencies of the actual nature conservation policies. In the Carpathians such a shadow list has been made by WWF/CERI where “areas important for biodiversity” have been defined (WWF/CERI, 2001).

Another similar initiative is represented by the International Bird Areas (IBA) defined by Birdlife International. Birdlife International is a global alliance of conservation organizations working together for the world's most important bird areas. Thus these areas represent an important reference for nature protection. Although the IBA list is not legally binding, it contains key guidelines for an effective bird protection program and is of great importance to European ornithological conservation. IBAs have been defined according to the following criteria:

[41] Online: http:\\www.ramsar.org, 21 Feb 2005.

- They hold significant numbers of one or more globally threatened species;
- They are one of a set of sites that together hold a suite of restricted-range species or biome-restricted species;
- They have exceptionally large numbers of migratory or congregatory species.

The IBA inventory enables the European Commission to assess the implementation of the bird protection directives according to expert criteria. The European Court of Justice approved that, lacking equivalent alternatives, this list is a suitable assessment instrument (Order C-3/96; European Court of Justice).

Extensively cultivated landscapes

To preserve biodiversity in the Carpathians over the long run, the protection of high priority natural areas alone is not sufficient. On the used areas located between these areas, nature protection measures are to be stronger integrated directly into the land use practised there. To this purpose, especially the extensively cultivated landscapes are to be considered. Besides the nature protection function, these spaces inhere great historical, cultural, and market value. In many cultural landscapes the integrative approach is appropriate where a close collaboration with agriculture and forestry is to be sought. Extensively used landscapes can figure as buffer zones as well as "bridges" between nature protection areas. This aspect has been specifically pointed out in the CC (Art. 4 of the CC).

Paule (2005) evidences large forest areas in the Carpathian region: The forest land in the Slovak Republic is about 1.94 million hectares, out of which 90% belongs to the Carpathians. In the Polish Carpathians, forest covers about 480,000 ha, in the Ukrainian Carpathians about 1,500,000 ha and in Romania approximately 5,500,000 ha belong to the Carpathians mountain range. This means that the Carpathian forests cover about 90,000 km² in total. This is approximately half of the Carpathians.

Besides the large quantity of forests, the Carpathians are home to Western and Central Europe's last and largest populations of virgin forests, with fragments of natural mountain beech forest amounting to some 20,000 ha (Turnock, 2002). Important forest areas are located in areas characterised by relief and structure unsuitable for agriculture, but fulfil vitally important functions in soil and water protection (BioForum, 2004).

5.4.3 Conclusions and implications for the Carpathian delimitation

The high value placed on nature protection in the CC is already made obvious in the official title of this convention. The large surface protected areas play a prominent roll, in that they offer adequate space for natural dynamics. In the following those aspects where Carpathianwide data was available will be discussed.

The different protected areas are important starting points. Their ecological importance was acknowledged by government authorities at the time they were placed under protection. Therefore, they form the most important spatial expression of the respective national nature and landscape protection strategies. Therefore the areas of the Natura 2000 network, the areas of the Emerald network and the areas protected by national law represent the most important references for a Carpathian-wide nature conservation strategy. Also Ramsar sites, if not already integrated in the Natura 2000 network, constitute an important reference. Though numerous Ramsar sites have

been designated by the Carpathian countries, only few of them lay within the study area (Tab. 9). The most important area is situated in the Czech Republic, covering 11,500 ha. As for this aspect only point data is available, it has not been considered in the final delimitation proposal based on area-data.

According to the analysis of the inventory made within the framework of the CERI (WWF/CERI, 2001), 27,216 km² of protected areas, with an extent of at least 1,000 ha each (total area = 27,863 km²), are found in the study area, while the Alpine Network of Protected Areas gives 26,352 km^2 (Alpine Network of Protected Areas, 2004) (Tab. 8; Fig. 29). This is 13% of the study area, while 16% (or 26,446 km²) of the National Proposals are covered by protected areas with an extent of at least 1,000 ha. According to this data set 36% of the protected areas in the Carpathian Ecoregion are national parks.

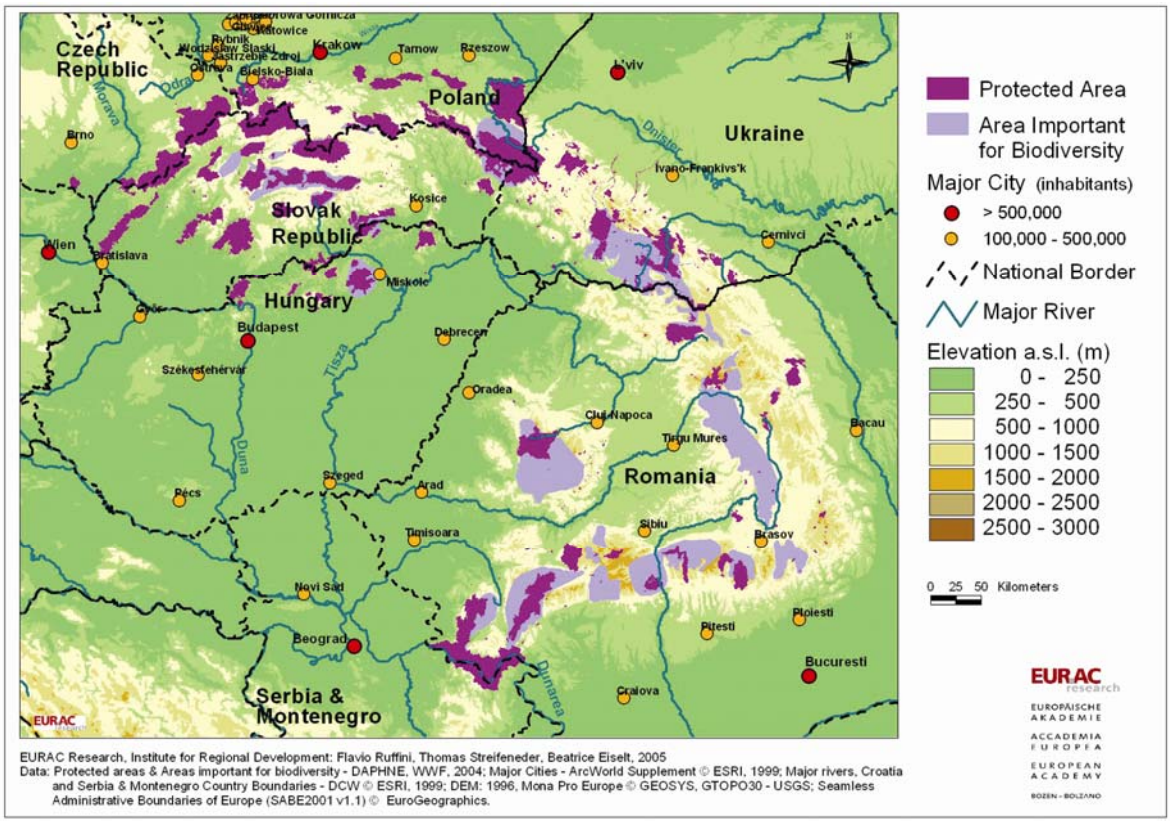


Fig. 29: *Protected areas and areas important for biodiversity.*

Beside this net of recognised high priority conservation areas, there are further areas important for biodiversity. These areas, identified in the inventory taken within the framework of the CERI (WWF/ CERI, 2001), were integrated in the network of protected areas (Fig. 29). The areas important for biodiversity altogether cover 33,433 km². Only roughly $^1/_3$ of these areas have official legal protection status as national protected area.

Important bird areas have been designated in all the countries of to the Carpathian Convention. The highest density of IBA in the area designated for the CC by the NP can be found in the Slovak Republic, where more then 50% of IBA are located (Tab. 10). Therefore attention should be paid to these important areas for nature conservation when implementing the Carpathian Convention. To this end a comprehensive discussion should take place in the countries, in order to decide how these areas could be integrated in the Carpathian-wide nature protection strategy.

Tab. 8: *Large-Scale Protected Area Types in the Carpathians (Alpine Network for Protected Areas, 2004)*.*

Country	National Parks	Nature Parks/ National Nature Parks	Protected Landscape Areas	Landscape Parks/ Regional Landscape Parks	Area (ha)	Total
CZ	0	0	3	0	195,610	3
HU*	3	0	7	0	161,113	10
PL	6	0	0	12	525,321	18
RO	10	5	0	0	597,308	15
SK	9	0	11	0	787,942	20
S&M	1	0	0	0	63,608	1
UA*	0	7	0	9	304,392	16
Total	**29**	**12**	**21**	**21**	**2,635,294**	**83**

* Not including 7 Nature Conservation Areas in Hungary and 3 protected areas of high protective legal status in Ukraine, which could not be integrated in the present categories.

Tab. 9: *Overview of the number and total area of the Ramsar regions in the Carpathian countries.*

Country	Total N° of areas in the country	N° of which lie within the Carpathian Ecoregion (N°)	Area (ha)	Ha of which lie within the Carpathian Ecoregion (ha)
CZ	11	1	43,432	11,500
HU	23	2	177,228	2,151
PL	9	0	90,455	0
RO	2	0	664,586	0
SK	13	5	38,943	2,326
S&M	5	0	40,837	0
UA	33	1	744,651	29

Tab. 10: *Overview of the IBA in the contract states of the CC (Birdlife International, 2005).*[42]

Country	Total N° of areas in the country	Thereof in the study area	Area (ha)	There of in the study area (ha)
CZ	16	3	627,853	125,380
HU	43	7	1,466,244	308,800
PL	81	4	2,966,277	204,194
RO	44	13	655,727	126,049
SK	32	22	1,216,737	1,150,898
S&M	40	n.a.	101,500	n.a.
UA	141	3	2,486,864	222,107

In order to integrate cultural landscapes into the strategy of nature protection (integrative approach) and to preserve the huge forest areas, large area forests and extensively used agricultural lands should be considered. An important indicator in this context is the extent of “major forest”. To properly consider large area forests, a definition of the EEA was used. It defines a forest as “large

[42] Online: http://www.birdlife.net/worldwide/national/index.html, 21 Feb 2005.

area forests", if it measures at least 600 km^2.[43] This size marked the top 25% of the largest forest areas at EU level according to CLC90, 250 m – v.6/1999 (EEA, 2004).

Large parts of the Carpathians are covered with forest (Fig. 30). 68% of the Carpathians within the National Proposal is forest area. In comparison, the forestry area of the Alps (approx. 76,000 km²) is 43% of the total area (CIPRA, 2001). Particularly steep rocky slopes and high plateaus are covered with forest. The timberline increases from 1,500 m a.s.l. in the western Carpathians up to 1,700 m in the Green and Eastern Carpathians. In the Southern Carpathians, the timberline is located between 1,800 and 1,900 m. At lower altitudes spruce and beech grow, whereas in higher areas larch and fir dominate. Mixed forests are composed of Fagus sylvatica, Abies alba, Picea abies, and Acer pseudoplatanus (Reif et al., 2003b).

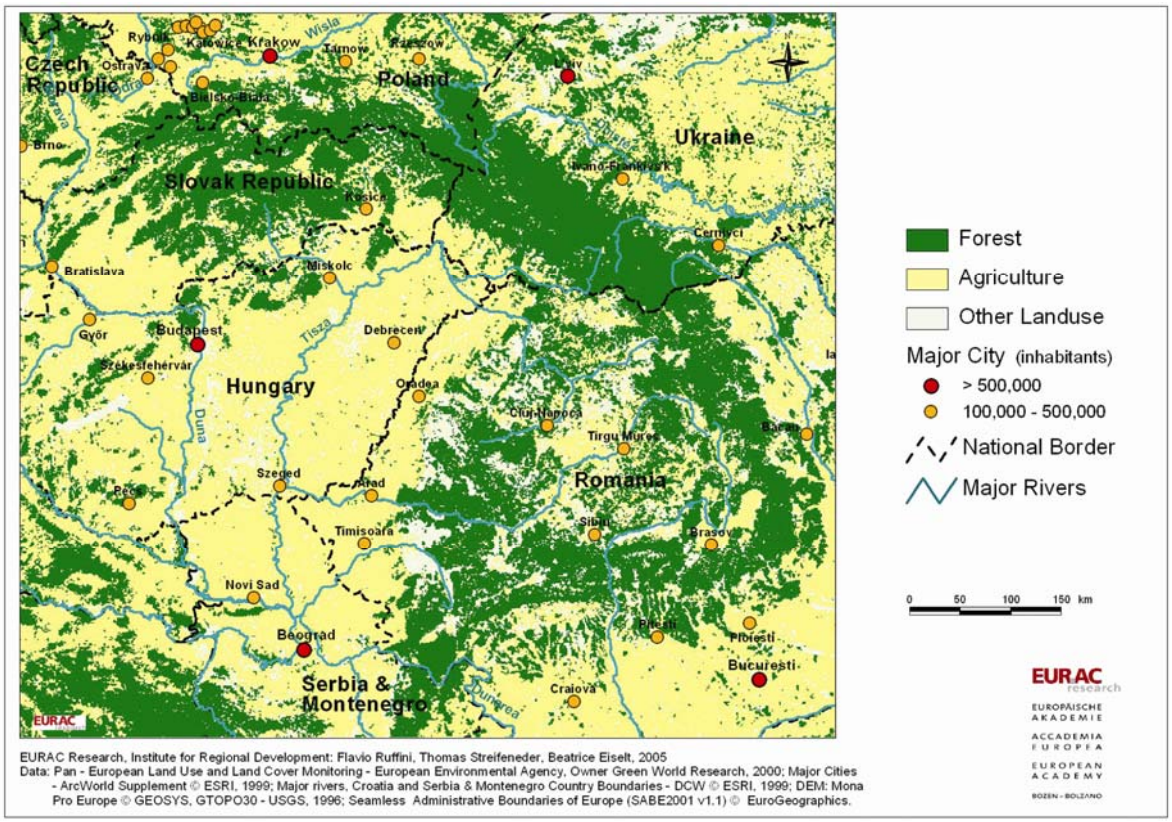


Fig. 30: *Distribution of forest in the Carpathians. Almost 70% of the Carpathians (NP) are covered by forest. The Ukrainian Carpathians are especially rich in forests.*

The forest areas become more and more fragmented starting from the centre of the Carpathians outwards, where other land uses become more prevalent. While in the Northern and Southern Carpathians major forests are intercepted by other land uses and natural conditions, the Green Carpathians in Ukraine are comprised of a vast connected area of forests, which end at the southern border and differ clearly with the situation in Romania.

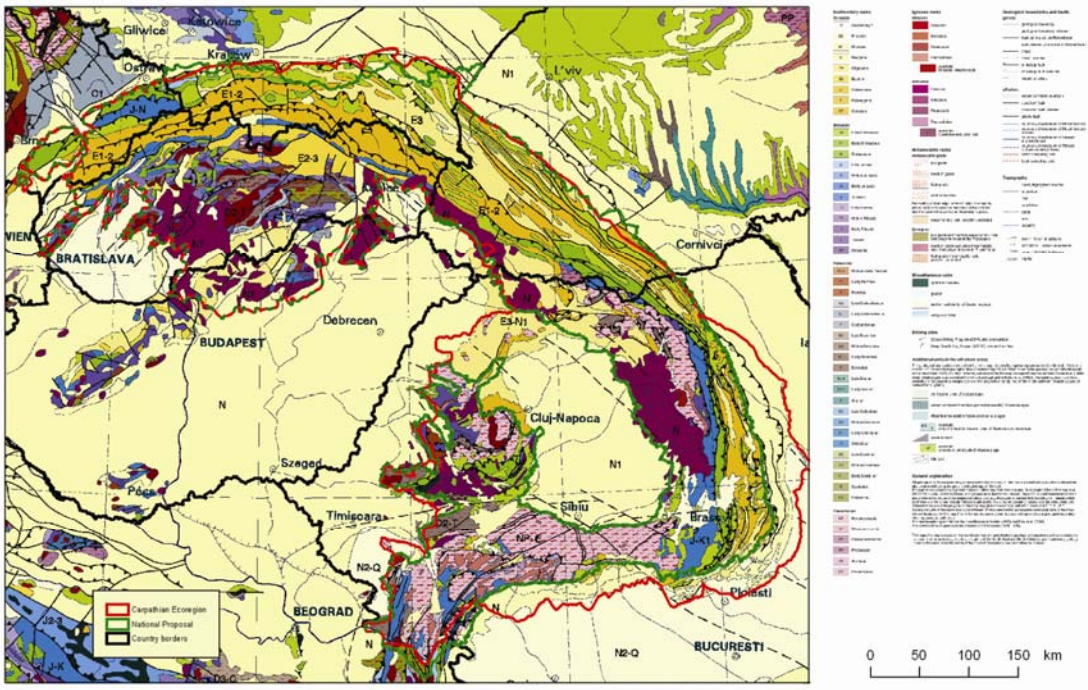
[43] Online: http://dataservice.eea.eu.int/dataservice/other/xmap41a4/howdone.asp, 10 Oct 2004.

5.5 NATURAL LANDSCAPE ASPECTS: GEOLOGY AND OROGRAPHY

Geological and orographic information is a central basis with which to describe mountain regions, because it defines the essential formation and structures of mountain chains and valleys. Especially the combination of this information can facilitate a transparent definition of the mountain region.

5.5.1 Geology

The Carpathian mountain chain consists of several orographically and geologically distinctive groups (e.g. Fig. 21). Geological processes influence landscape forms and diversity and therefore represent a relevant element of the geo-ecosystem.



EURAC Research, Institute for Regional Development: Flavio Ruffini, Thomas Streifeneder, Beatrice Eiselt, 2005
Data: Asch, K. (2005): 1 : 5 Million International Geological Map of Europe and Adjacent Areas - unpublished draft. BGR (Hannover); Proposed National Designation of the Carpathian Convention, Contact Points of the Carpathian Convention, 2004; Ecoregion, DAPHNE, WWF, 2004; Croatia and Serbia & Montenegro Country Boundaries - DCW © ESRI, 1999; Seamless Administrative Boundaries of Europe (SABE2001 v1.1) © EuroGeographics.

Fig. 31: *Geologic structures in the Carpathian region. A comparison with the NP of Romania, for example, (Fig. 17) shows that partly the countries use geological structures to orient themselves for delineating the convention area.*

The Carpathians, which extend in a geologic system of parallel structural ranges, are part of the Alpine-Himalayan chain (Fig. 31). They were formed relatively recently, only about 35 million years ago in the Tertiary Alpine orogeny. The contours of the Carpathians were formed in the first half of the Miocene epoch. Zoning is characteristic for the Carpathian Mountains. For the major part, the Carpathian mountain chain is 35-40 km wide, and generally comprised of three distinct bands, with Flysch sediments on the outside (outer Flysch), young crystalline massifs in the center (central

crystalline), and in some, volcanic intrusions on the inner side (inner volcanic). Thus, the Carpathians are divided into three parts: the Western (settled by Slovaks, Poles, Czechs, and Hungarians), Eastern (settled by Ukrainians) and Southern Carpathians (settled by Romanians) (Carpathian Heritage Society, 2005; Encyclopedia of Ukraine, 2005).

5.5.2 Orography

Orography shows relief forms as perceived by an observer in the field. This aspect therefore constitutes an important and interesting basis for the representation of complex natural phenomena. Orographic maps describe geomorphological aspects in an integrated way. These maps are the result of in-depth studies of spatial characteristics which are then classified based on specific criteria. The main parameters are geology (Fig. 31), elevation (e.g. Fig. 26), slope (Fig. 27), exposure (Fig. 28) and hydrology (Fig. 36).

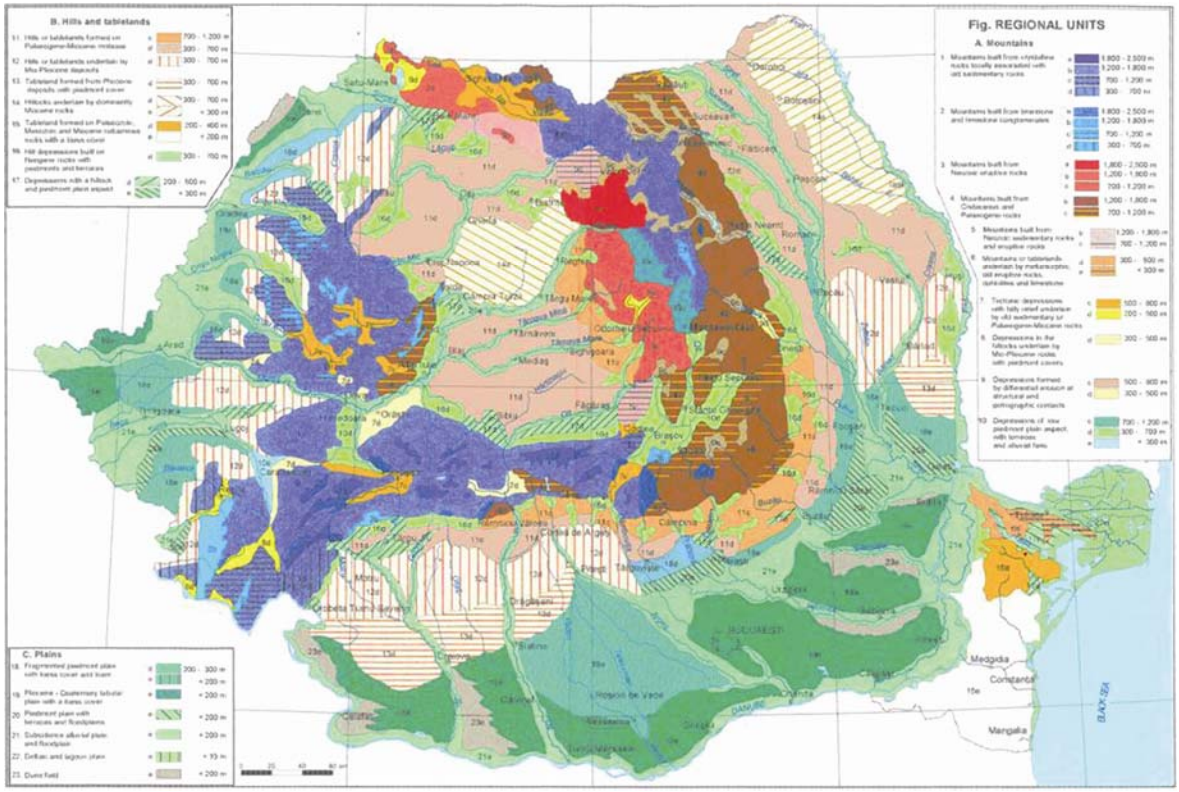


Fig. 32: *Orographic map for Romania with the Carpathian Mountains in the centre (Maxim/Egerer, 11 Aug 2005).*

In the Romanian delimitation proposal orography constitutes the main element. To test the informative value of such a basis for a transnational delimitation, a comparison of the Romanian orographic units with selected delimitations is presented in Chap. 5.5.3. The Romanian orographic map does not provide detailed information on the parameters used for classifying the orographic units. It is not possible to analyse the criteria used to distinguish mountain area from foothills, and conse-

quently their inclusion or exclusion from the Carpathian mountains. A major problem of this research was related to the fact that information on orographic units was not available for the whole Carpathian region.

The question must be addressed which orographic units should be assigned to such a mountain convention area, and what additional information is necessary to better understand this aspect. Besides nature protection, sustainable development of a mountain region is a main theme of the convention. Therefore it is important to consider also the relationship between mountain area and foothills. The mountain forelands fulfill important functional duties for the mountain regions (jobs, schools, etc.). They are often more densely populated, which facilitates strong interrelations with the mountain area (Dax & Hovorka, 2004a).

5.5.3 Conclusions

A review of the international directives and conventions showed that the aggregated information, represented in orographic maps, is usually evaluated by the single criteria (elevation, exposure, etc.). As various examples demonstrate (Chap. 5.3) geology, as a parameter for empirical mountain delimitation, is generally not of central importance. In fact mountain laws rarely use this criterion. Similar conclusions are produced by a review of relevant mountain laws, such as those introduced in Chapters 5.3.2.

Tab. 11: *Orographic factors and their consideration in this study.*

Orographic factor	Source	Criteria/details
Elevation	Digital Elevation Model: Mona Pro Europe © GEOSYS	Accuracy: 3 arc-second (Fig. 26)
Slope	Digital Elevation Model: Mona Pro Europe © GEOSYS	Accuracy: 3 arc-second (Fig. 27)
Exposition	Digital Elevation Model: Mona Pro Europe © GEOSYS	Accuracy: 3 arc-second (Fig. 28)
Geology	Asch, K. (2003): International Geological Map of Europe and Adjacent Areas	Scale 1: 5 million (Fig. 31)
Elevation, slope	NR-MA (Nordregio, 2004)	See Tab. 7

Such an approach is essentially founded in the different goals of the mountain area delimitations. They mainly serve to counterbalance the disadvantages stemming from challenging natural conditions that effect the socio-economical development. The definition of precise thresholds is rather useful in this context. These are more easily defined using the basic parameters, such as elevation and slope. In this study orography has been represented through it's basic parameters, mainly geology, elevation and slope. The table above (Tab. 11) gives an overview where this information has been used.

Nevertheless the aggregated orographic data, if available for the whole study area, is of great importance. For a homogeneous delimitation, though, it is a prerequisit that the classification criteria for the orographic units are comparable. Furthermore this information constitutes important reference data, that can help to validate a proposed delimitation.

5.6 RIVER BASIN MANAGEMENT

5.6.1 Basic principles

A further central environmental goal of the convention is river basin management (Art. 6 of the CC). This aspect is essential to the assurance of water quality, and therefore to the conservation of water ecosystems. In additon, a central mission of the holistic management of mountain watersheds is protection against natural catastrophes and minimizing the risks of landslides, mudslides, and flooding (Swiss Agency for the Environment, Forests and Landscape/FAO, 2002).

Relevant for the management of watersheds at the European level is the Water Framework Directive (WFD) (Directive 2000/60/EC; EC, 2000) of 2000. The main objective of the directive is to steer European water resource (surface and ground water) usage in a sustainable direction. Article 4 sets two important goals. Firstly, deterioration of the condition of any waters in the Union is to be prevented. Secondly, the condition of all community waters is to be brought up to par by the year 2015. To this end, the directive requires the Member States to create and implement management plans for all river basins. Flood risk management plans are also a relevant element of integrated river basin management. In the framework of a future European Action Program on flood risk management, there should be a strong linkage with the WFD.

5.6.2 River basin management and delimitation of the convention area

The WFD subdivides the inland waters of Europe into river basin districts. They form the strategic starting point for all river basin planning and management activities. This acknowledges that physical and hydrological borders apply in the management of river basins, and not political or administrative borders.

Tab. 12: *Characterisation of surface water body types within the river basin units according to Annex II of the WFD (EC, 2000).*

	Descriptors	**Classification**
System A	Altitude typology	High: > 800 m; mid-altitude: 200 to 800 m; lowland: < 200 m;
	Size typology based on catchment area	Small: 10-100 km^2; medium: > 100-1,000 km^2; Large: > 1,000-10,000 km^2; very large: > 10,000 km^2;
	Geology	Calcarreous, siliceous; organic;
System B	Obligatory factors	Altitude, latitude, longitude, geology, size;
	Optional factors	Distance from river source, energy of flow, mean water width, mean water depth, etc.

According to Art. 5 and index II of the WFD (EC, 2000), the river basin districts are to be investigated, evaluated, and classified (Tab. 12) in regards to their ecological characteristics. Map A in index IX of the directive assigns the water courses to certain Ecoregions according to their sources. In this manner, a Carpathian Ecoregion was identified (Fig. 33).

Art. 6 of the directive asks the EU Member States to create a catalogue of all areas of a river basin unit that enjoy special protection according to specific community legislation, or which have need of such protection, within 4 years. The catalogue should be comprised of the protection area types listed in index IV, § 1 (Natura 2000 bird sanctuaries, bathing areas according to 76/160/EWG,

drinking water protection areas according to Art. 7 of the WFD, etc.) (Bund/Länder Arbeitsgemeinschaft Wasser, 2002).

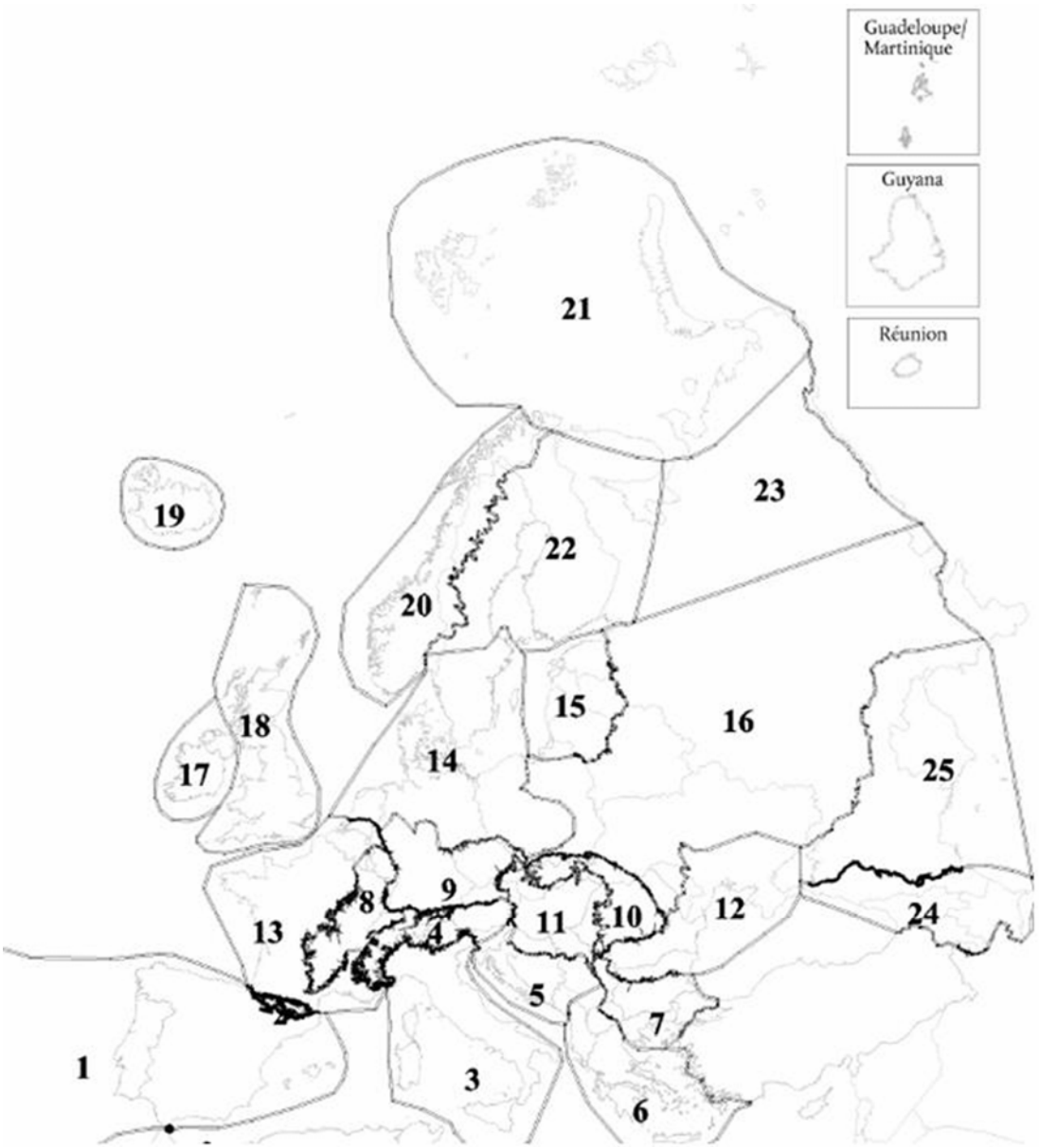


Fig. 33: *Subdivision into Ecoregions according to Map A, index IX of the WFD. The Carpathian Ecoregion is marked with the number 10.*

The Carpathian Range is drained by four large rivers: Oder, Wisla, Dnister, and Danube (Fig. 34). In the northern Carpathians the southern and southwestern facing slopes are drained by the Danube, as is the Romanian part of the Carpathians. The Oder, Wisla, and Dnister drain comparatively small parts of the northern region (Czech Republic, Poland, Serbia & Montenegro, Slovak Republic, Ukraine) (Tab. 13).

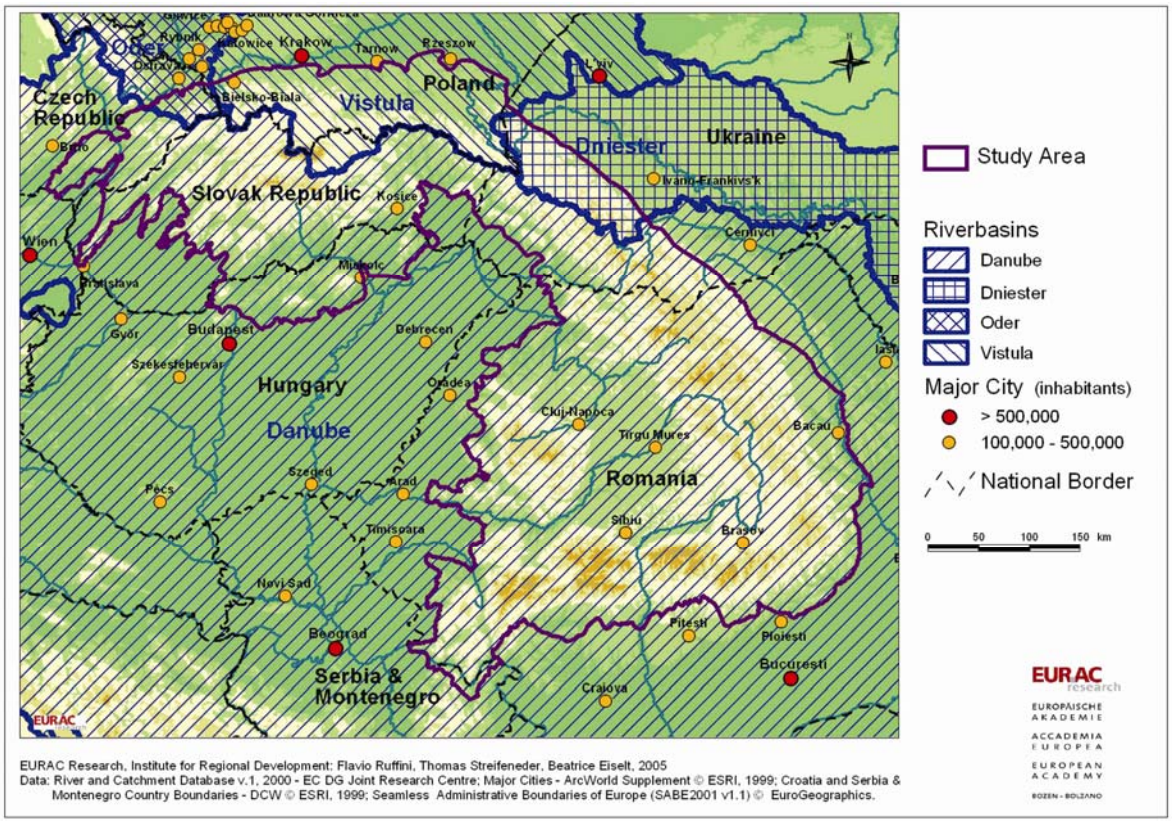


Fig. 34: *The Carpathians lie in the drainage area of the four river basins, Oder, Vistula, Dniester and Danube. The Danube drains by far the largest area of the Carpathians.*

Tab. 13: *Overview of the subdivision of the Carpathians into river basins and their characteristics.*

River	Total drainage area (km^2)	Drainage area within the Carpathians (Study area) (km^2)	Proportion of the total Study area (%)	Affected Carpathian countries	Estuary
Danube	817,000	180,095	85.7	All Carpathian Countries	Black Sea
Vistula	194,000	21,054	10.0	Poland, Slovak Republic, Ukraine	Baltic See
Oder	125,000	1,772	0.8	Czech Republik, Poland	Baltic Sea
Dniester	76,860	7,336	3.5	Ukraine	Black Sea

5.6.3 Conclusions

Without doubt, river basin districts form an essential tool with which the impact relationships between mountains and forelands can be expressed. They are especially valuable for delimitations in interaction with other information (topographical models, orographic maps, geology, land use, etc.). First, one must analyse to what extent the named interactions influence the delimitation of the convention area. Then it must be decided which river basin order should be selected for these analyses. This can be illustrated by the example of an extreme case. From the point of view of river basin management, it can be plausible to take the whole river basin district according to WDF into account, from the Carpathians to the estuary region. Such an approach, which considers the entire

watershed, has been called for by the WWF for modern river basin management (Thies, 2004). For the implementation of a transnational mountain convention, such an approach does not seem to promise much. At the most, these aspects can be considered in the form of concrete implementation measures for the CC and in agreement with other directives.

Interrelations are to be considered so far, as they can be influenced by measures implemented in the Carpathians. Consequently, within the delimitation of the convention area, a category of river basins must be considered, which best reflects the small structured conditions of the mountain region.

Fig. 35 and Fig. 36 show the subdivision into watershed types of the second and third Strahler order, which were worked out for the European Commission by Vogt et al. (2003) while developing the River and Catchment Database. Although this is a comparatively finely structured delimitation, these areas are still of widely differing sizes and extend to differing distances into the forelands.

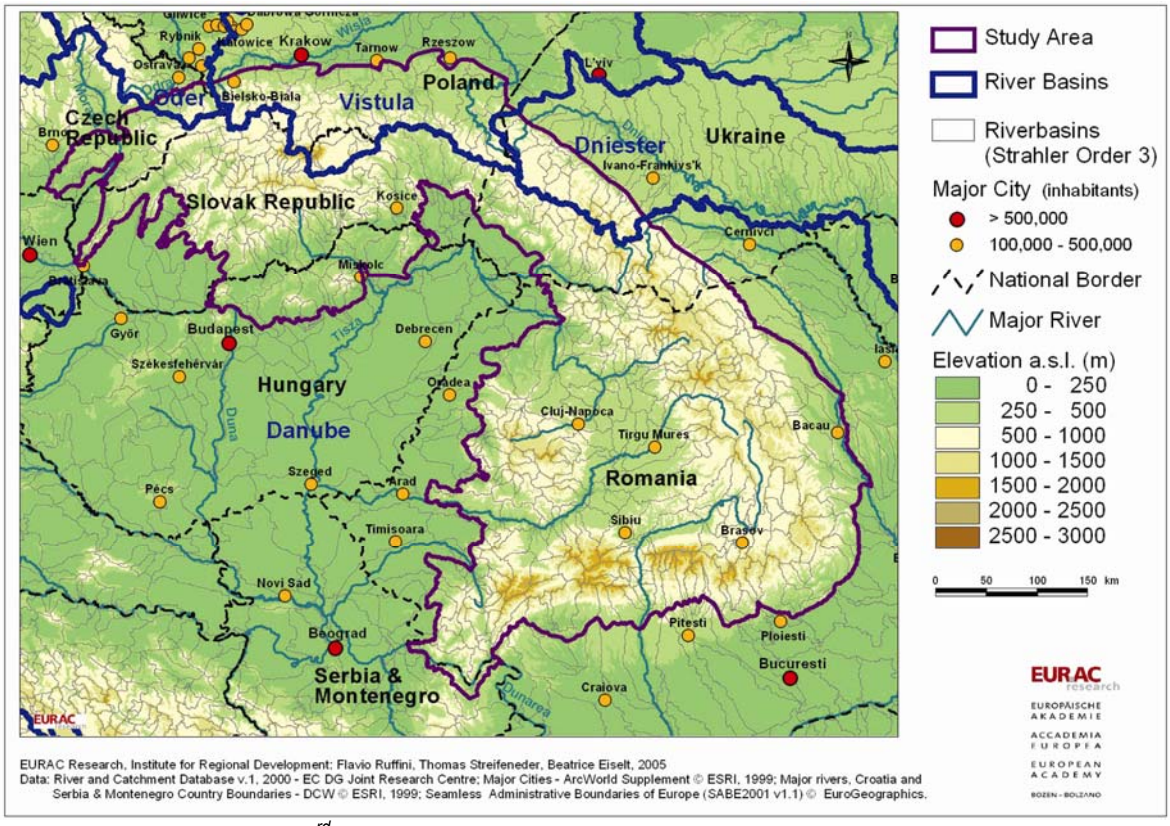


Fig. 35: *Watersheds of the 3rd order, according to the approach of the CCM River and Catchment Database (Vogt et al., 2003). It is clearly visible that the borders of the river basin extend far into the forelands.*

Detailed knowledge about the implementation of the WFD is of great value, if watersheds are to be included in the delimitation approach. Including these aspects allows to create important synergies with the actions related to the WFD. This study will refer to the second category delimited by Vogt et al. (2003).

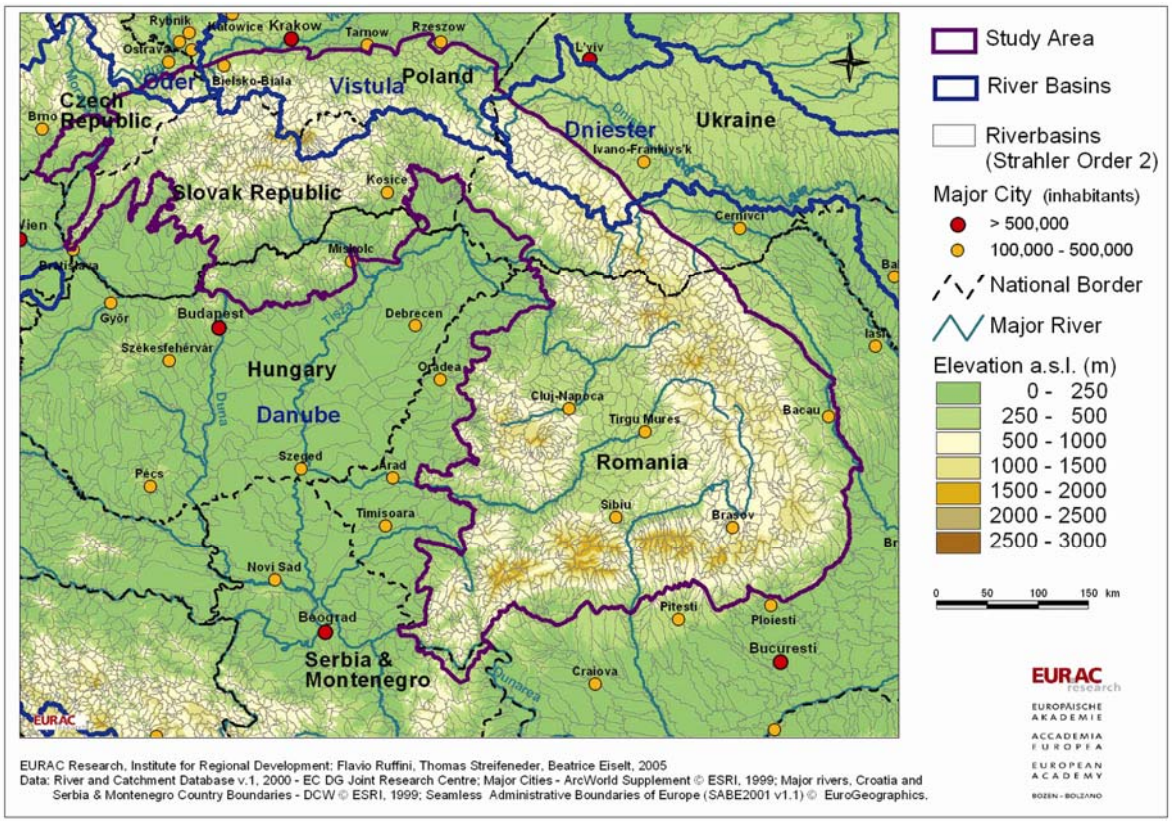


Fig. 36: *Water catchment areas of the second order according to the approach of the CCM River and Catchment Database.*

5.7 RURAL DEVELOPMENT

In the mountains economic and social land use occurs before the background of fragile ecosystems. This limits the potential for economic development. A tendency towards marginalization is often the result unless special policies are not put into place against it (Dax & Hovorka, 2004b). This means that there are many difficulties to overcome on the way to a sustainable development of mountain regions. Some of these problems are a result of the special environmental conditions and the socio-economic structure generally found in mountain regions. Other problems are due to the mostly sectoral direction of the traditional economic policies. Again, other problems are often based on changes in the organizational culture of an expanded socio-economic environment, which, today is more closely related to global processes.

For a successful regional development in mountain regions, the consideration of the multiple relationships between the single sectors is therefore a crucial factor. The implementation of a sustainable development concept aims especially at improving the living standard of the inhabitants, as well as securing a continually high environmental quality (Dax & Hovorka, 2003).

Sustainable development is a central concern within the CC. It is one of the two main objectives of the CC (Art. 2). Special emphasis on this aspect is drawn in art. 6, 7, 8, and 9. However, the integration of the sustainability aspect is relevant for all sectors and a goal for the whole territory (cross-section character). *"Regions are the natural basis for practical implementation of sustainable development. They are the cornerstones of the edifice of sustainable development (...). Regional sustainable development is a precondition to achieve sustainable development on a global level"*

(Kneucker, 1998). The regional level enjoys an increasing relevance in achieving sustainable development. Hence, activities and projects dedicated to regional sustainable development can play a determining role for the sustainable development of a whole region like the Carpathians.

5.7.1 International framework guidelines

The cutback on infrastructural and economical disparities between the centers and the peripheral regions is a main concern of regional politics. The sustainable, socially just, environmentally responsible, and economically sound design of these efforts is a special challenge. Examples from other nations show that providing a balance between the periphery and centers cannot be achieved through creating infrastructures alone (Giuliani et al., 2003). The disparities remain often in spite of new infrastructures which sometimes create new problem fields. New and well tailored solutions must therefore be continually sought for regional development, which are not solely concentrated on infrastructure investments.

With the Agenda 2000 the policy for rural development was elevated in status as the second pillar of the GAP next to the further reformation of market policy (first pillar) (COM, 2004). Furthermore, on July 5, 2005, the European Commission adopted EU strategic guidelines for rural development for the period, 2007 to 2010. This strategy should help to achieve a stronger cohesion between the different regions within the European Union and comparatively equal living standard for the inhabitants. The rural market will be stimulated, the function that agriculture performs for the landscape and environment (provision of public goods), as well as for the development of rural areas will be recognised and supported.

The central feature of the Agenda 2000 is the increasing effectiveness of the Structural Funds. The EU regional policy is actually based on four Structural Funds.[44] For the period 2000 – 2006 the EU Policy has defined three priority objectives for the structural funds. Objective 1 and 2 are relevant, while objective 3 has no defined spatial connotation, and is therefore not directly relatable to the definition of the scope of application. Almost all regions in the Carpathian Countries of CZ, HU, PL and SK represent areas eligible under objective 1. Objective 1 and objective 2 areas have been defined at NUTS level 2 and 3. With the priority objectives and relative indicators, the EU possesses an important tool within the regional policy. In order to integrate this approach into the delimitation process, these indicators must be made available, adapted on a more detailed scale (from NUTS 2 to LAU 1 / 2), and the thresholds adapted to the local economic reality.

Furthermore, Council regulation (EC) No 1257/1999[45] ("Less-Favoured Areas"/LFA) (EC, 1999), financed by the European Agricultural Guidance and Guarantee Fund (EAGGF), is a comprehensive ordinance to support rural development (Fig. 40, Chap. 5.7.4). The main reason for the LFA directive was to identify areas that should receive subsidies due to limitations on agricultural productivity. The aim is sustainable resource management. Agricultural land use and the rural community should be maintained, as well as the settlement, and land use management systems should

[44] The European Regional Development Fund (ERDF), for infrastructures and investments, generating jobs and small and medium enterprises, the European Social Fund (ESF) for training, social integration and employment, the European Agricultural Guidance and Guarantee Fund (EAGGF, Orientation section) for rural development, and aid to farms, and the Financial Instrument for Fisheries Guidance (FIFG) for the adaptation of the fisheries sector (Online http://europa.eu.int/comm/ regional_policy/funds/prord/sf_en.htm, 7 May 2005).

[45] The Directive 75/268/EEC on agriculture in mountain areas and in less-favoured areas was the first policy document addressing mountains at a supra-national scale. The Directive was incorporated into the new Regulation 797/85, modified under Regulation 950/97, and under Agenda 2000 consolidated in articles 13-20 of Regulation 1257/99.

be sustained (University of Aberdeen, 2004). The framework of LFA is adapted primarily at the national level according to different priorities and national policy objectives.

Substantially similar to the previous definitions, article 18, par. 1 of the latter regulation defines mountains as follows: "*Mountain areas shall be those characterised by a considerable extent of limitations of the possibilities for land use and an appreciable increase in the cost of working it, due:*

- *To, very difficult climatic conditions as a result of altitude, which in turn may substantially shorten the growing season;*
- *At a lower elevation, to the characteristics of the area with slopes that are too steep for the use of machinery or require the use of very expensive special equipment, or;*
- *To a combination of these two factors, where the combination of both factors substantially increases the handicap*" (EC, 1999).

The Lisbon strategy represents another key strategy for rural development, which was adopted in March 2000. After several years of a period of lethargy, the European Commission announced on February 2, 2005, the new start of the Lisbon Strategy. It aims to make the EU the most dynamic and competitive economy by 2010. With the help of this strategy, more economical growth should be achieved in the European Union. It is the goal to improve the living standard in an environmentally and socially responsible manner. To evaluate the implementation of the Lisbon strategy, the European Commission has drawn up a new statistical methodology with a list of 14 structural indicators (Tab. 14).

Tab. 14: *Short list of structural indicators applied within the Lisbon strategy[46] (EUROSTAT, 2005).*

Gross domestic product (GDP) per capita	Business investment
Labour productivity	At risk-of-poverty rate[1)]
Employment rate[1)]	Long-term unemployment rate[1)]
Employment rate of older workers[1)]	Dispersion of regional employment rates[1)]
Educational attainment (20-24) [1)]	Greenhouse gas emissions
Research and Development expenditure	Energy intensity of the economy
Comparative price levels	Volume of freight transport

[1)] Indicators disaggregated by gender.

These indicators may represent a good tool for the structural description of regions. Relative data should be made available. These indicators are especially important in the compilation of the report on the condition of the Carpathians (KEO-Report) and in monitoring the effects of implemented measures.

5.7.2 Measuring rurality on a large scale

The rural landscape is a key element for the sustainable development of the Carpathian region. First, though, it must be defined which areas are to be classified as rural. Rural zones are closely associated with their resident population. Population density is an important determinant of rural areas (Fig. 37). Based on this criterion, statements about the rurality of a given area may be made. A simple definition of rural areas was developed by the OECD and permits international comparisons of rural conditions and trends. At the local level (LAU 2), communities are regarded as

[46] Online: http://epp.eurostat.cec.eu.int, 17 Jul 2005.

rural if they have a population density below 150 inhabitants per square kilometer (Institut für Agrarentwicklung in Mittel- und Osteuropa/IAMO, 2004).[47] Based on this definition of the OECD, the COM (1997) then defined rural regions as follows:

- Predominantly rural regions, where over 50% of the population lives in rural communities;
- Significantly rural regions with 15 to 50% of the population living in rural communities;
- Predominantly urban regions with less than 15% of the population living in rural communities.

The OECD believes that this three-part typology "[…] *is useful insofar as it can help reveal diversity in rural areas, rural development options and opportunities, and ensure real territorial differences in policy analysis*" (OECD, 1994).

The notion of rurality can, however, also be linked to the landscape. Such an approach is connected with the residential and tourism functions of "the countryside", which are complementary to agricultural production. In addition, low population density regions are very frequently also areas of great natural value. Various recent studies have attempted to formalise the notions of rural area and rural development and different indicators for the identification of structurally weak rural regions have been defined. The indicators, GDP, employment rate by sectors, and population parameters are especially significant.[48]

5.7.3 Rural development in the Carpathians

It has been found that a sectoral orientation of economic policy would not contribute to the achievement of sustainable development in mountain regions. In rural regions it is not enough to encourage a single business sector without considering the whole region. There are areas where aspects of regional development should be individuated in order to devise relative strategies to prevent negative trends.

According to the classification based on population density from COM (Chap. 5.7.2), wide areas of the Carpathians are predominantly rural regions. Considering the Carpathians as a whole, only a few municipalities are not classified as rural. The consequence for the delimitation is that in case of doubt, it would be reasonable to include most of these rural areas in the CC.

Despite the high value of rural areas in the countries of Eastern Europe (potential of human and land resources, forests, tourism possibilities), in the last decades rural areas in Eastern Europe showed an economic decrease and a strong underdevelopment (as e.g. in Romania; Heidelbach, 2002). By concentrating infrastructure expenditure in cities, the gap becomes larger and larger between peripheral rural areas on the one hand, and urban centers on the other. The lack of relative policies worsened the situation in the transition period. While rural municipalities are disappearing, the young and skilled work force is migrating to the urban areas. Land abandonment is increasing while the urban areas are growing (Heidelbach, 2002; Moise, 2003).

The rural areas of the Carpathians are generally characterised by a broad contrast between the north-western part, with sound economic conditions, and the southeastern part, where heavy unemployment is the result of mine closures (Fig. 37). These processes generate different development threats and pressures regarding forest pollution and use (Buza & Turnock, 2004).[49] Because

[47] Online: http://europa.eu.int/comm/agriculture/capreform/rdguidelines/maps_en.pdf, 5 Sept 2004.

[48] Directorate-General VI has published a report on rural development, incorporating numerous variables relating to rurality Online: http://europa.eu.int/comm/agriculture/envir/report/en/rur_en/box3.htm, 10 Sept 2004.

[49] Due to data availability the reference year varies between 2001 and 2004. The population data refer to: PL: 2002, RO: 2003, S&M: 2002, SK: 2003, CZ: 2001, UA: 2004, HU: 2001.

of insufficient data, it was only possible to perform a situation analysis during the course of this study. The population distribution shows a concentration of inhabitants in the communities in the wide valleys, in the plains, and especially in the northern part of the Carpathians. Generally, the Southeastern Carpathians are less densely populated than the Western and Northern Carpathians.

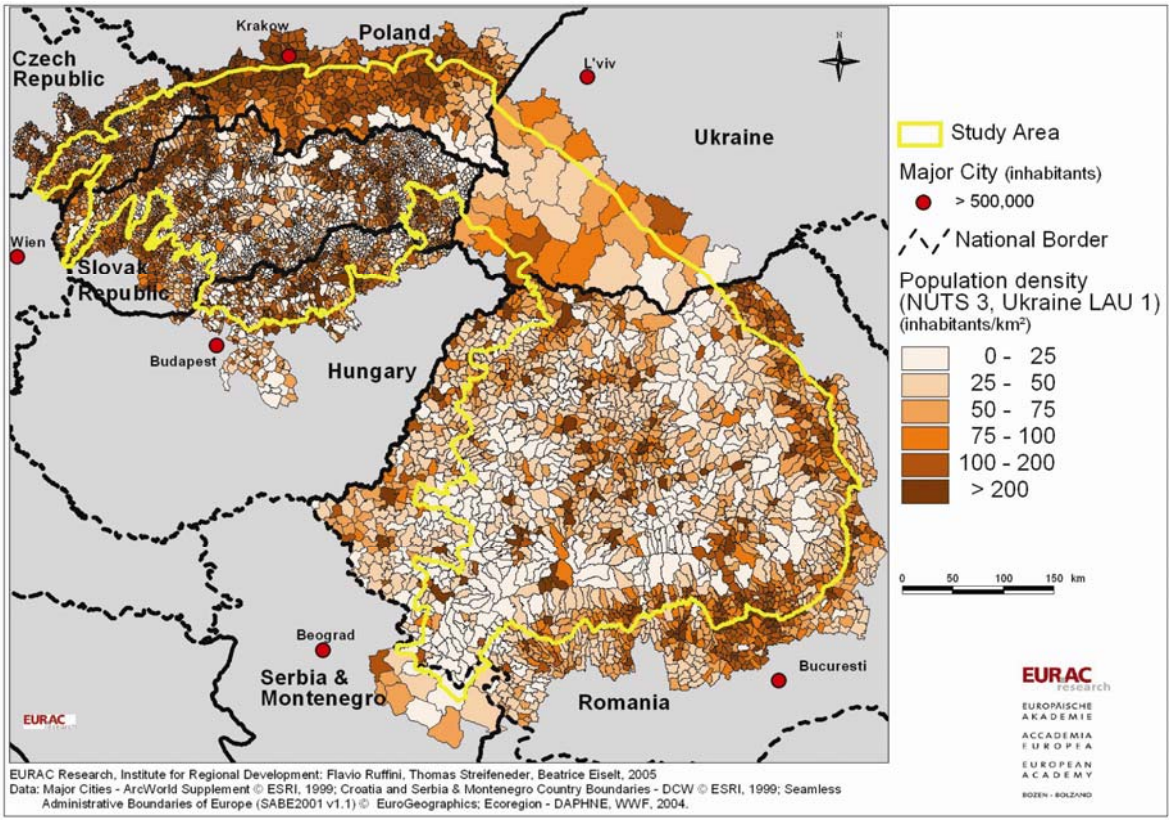


Fig. 37: *Population density on municipality level (UA: LAU 1[50]) to identify structurally weak regions.*

A balanced development of the countryside, which accounts for 80% of the area of Europe, is closely linked to the future of agriculture. Changes in agricultural structures bring profound socio-cultural changes in mountain communities, putting decentralised settlement of mountain areas at risk. Hence, agriculture plays a central role in social life in rural areas. "[…] *an enhancement of regional incomes through productivity gains in agriculture is crucially important for regional development*. […] *their well-being depends considerably on the profitability of farming* […]." (Heidelbach, 2002). Article 7 of the CC is dedicated to the issue of sustainable agriculture and forestry, but also directly or indirectly influences other thematic areas and articles of the CC. In particular articles 3 (land resources management) and 4 (biological and landscape diversity) are concerned. To generally illustrate the agricultural situation within the Carpathian Region, Fig. 38 illustrates the distribution of agricultural areas using CORINE Land Cover (The European Topic Centre on Terrestrial Environment, 2000) and PELCOM data (Green World Research, 2000).

[50] Therefore, the rougher Ukrainian data is not entirely comparable with that of the rest of the Carpathians.

In order to analyze the Carpathian agricultural and forestry situation in detail, further data for the whole Carpathian range at the LAU 2-level would be very useful (Gios & Raffaelli, 2002):

- The rate of persons employed in agriculture (number of persons employed in agriculture / all employed persons);
- Number of farms;
- Farm size and socio-economic farming type (number of part-time and full-time farms);
- Detailed land cover information (area in ha of utilised agricultural area, grassland, arable land etc.);
- Livestock (number of cattle, pigs, sheep and goats).

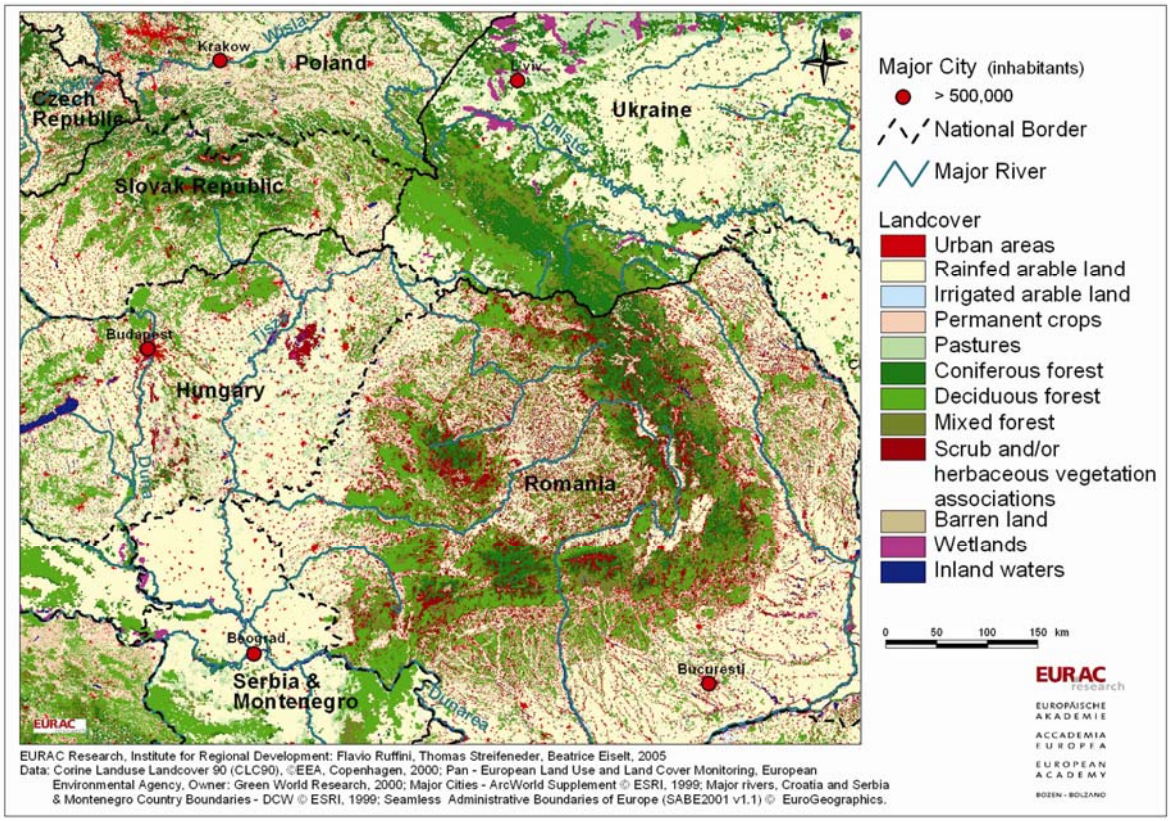


Fig. 38: *Land use and land cover in the Carpathians (CORINE Land Cover 90, PELCOM).*

Due to rich resources (oil, coal, gold, silver etc.), mining and industry activities have a long tradition. Nonetheless, mining activities in many parts of the Carpathians has ceased to a large extent. The declining economy in many industrial areas and its consequences for the local inhabitants (e.g. high unemployment rate) further confirms the socio-economic relevance of this theme for the region. In addition, pollution threats have become evident during the last decades of the 20th century (CERI, 2001).

These considerations point out the important role industry plays in the Carpathians. The distribution of industrial sites is therefore important, from the socio-economic point of view, as well as from the ecological stand point. Furthermore, this issue is explicitly addressed in art. 10 of the CC, in order to promote and introduce cleaner production technologies and to reduce adverse impacts of mineral exploitation.

The inclusion of industrial sites located within or bordering the identified mountain area (Chap. 5.3), in the sustainability concept of the CC, is therefore an important step. Apart EU Policies addressing industry within the framework of regional development there are also several EU directives and regulations addressing industry issues in an environmental framework.[51] Fig. 39 gives an overview and industrial distribution in the Carpathians. Due to natural conditions, the industrial sites and mining activities are mostly concentrated in the foothills, greater inner valleys, and the Transylvanian Plateau.

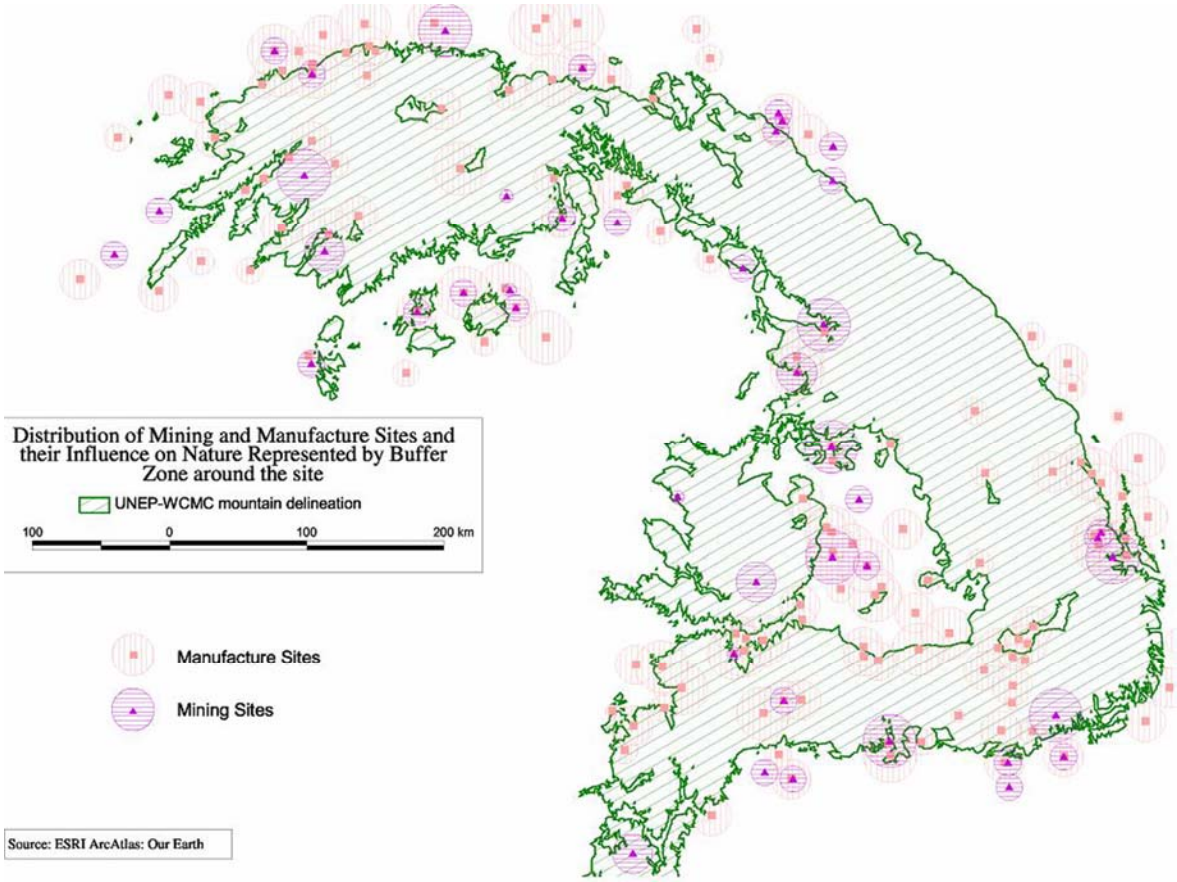


Fig. 39: *Distribution of mining and industrial sites in the Carpathians.*

5.7.4 Conclusions

To identify areas with particular regard for regional sustainable development the LFA regulation is well suitable. Because the objective of this regulation is not only to maintain farming in the LFAs, but also to support income (e.g. France, Finland), compensate income differences between LFA & the remaining territory (France, Germany, Greece), maintain population density (Greece), preserve rural livelihoods (Spain), contribute to specific functions of LFAs (Austria, base for tourism; Finland, impact on arctic landscape) (University of Aberdeen, 2004). Hence, this regulation covers a wide

[51] For example Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants; Commission communication of 4 May 2001 "The Clean Air for Europe (CAFE) Programme: Towards a Thematic Strategy for Air Quality".

range of issues related to regional sustainable development. Furthermore, there is a high coincidence of LFAs with a high incidence of natural farming and low intensity farming systems, as well as extensive-farming and small-scale farming, which are all under threat of marginalisation. The LFA regulation is therefore a good tool for the identification of mountain areas with structural disadvantages, as well as those of special natural value. It can be generally said, that the compensation for LFA is an important contribution to the preservation of the economic, employment, and living space in rural regions and especially in mountain areas (Hovorka, 2002).

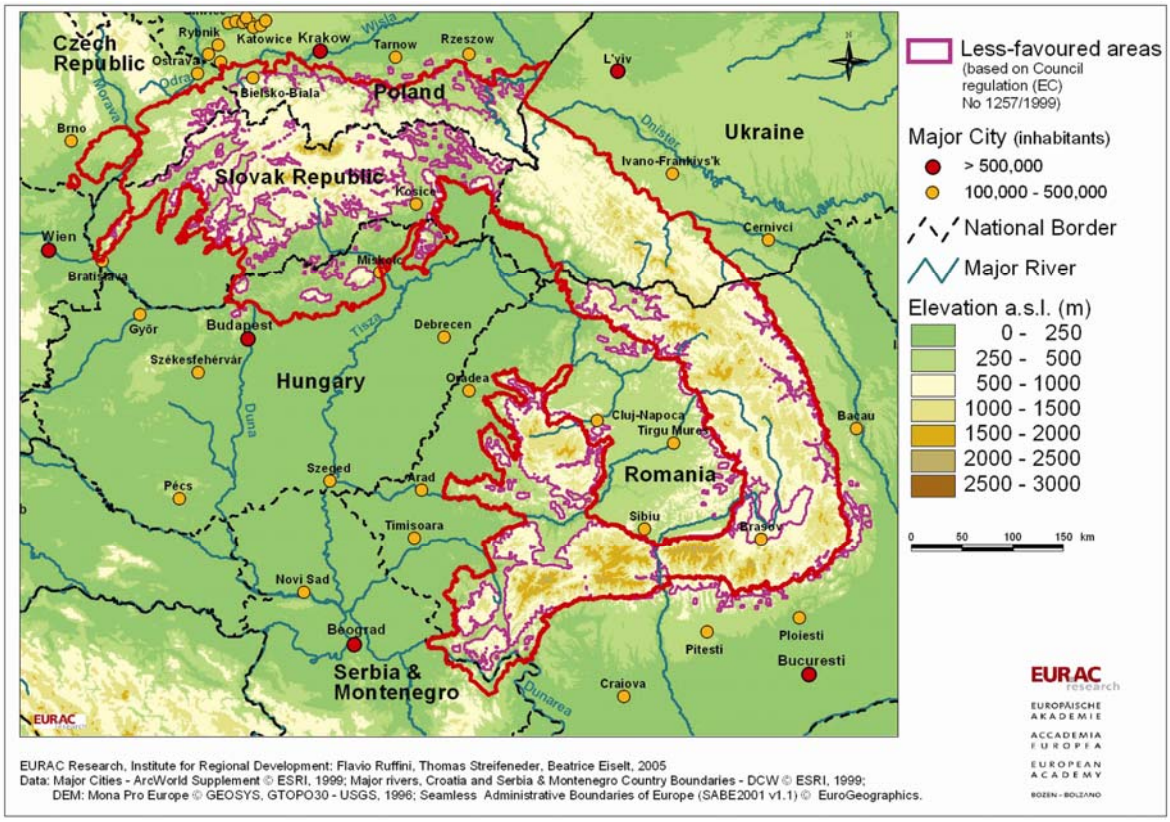


Fig. 40: *Less-favoured mountainous areas in the Carpathians based on Council regulation (EC) No 1257/1999. No data available for Ukraine and Serbia & Montenegro.*

The areas eligible for LFA support have been classified by national authorities according to the EU framework regulations (Fig. 40). Due to the high variation in climate and production situations between the different European regions (North/South) thresholds applied vary considerably between the Member States, and even between regions. Based on this definition, less-favoured mountain areas have also been defined for similar reasons in the new EU Member States. For the consequently defined areas, appropriate policies and measures should be developed. Due to the exclusive validity of this directive for the EU and acceding countries, relative borders for S&M as well as the Ukraine cannot be shown.

Tab. 15: *Criteria for definition of mountain area inspired by Council regulation (EC) No 1257/1999 (Price, 2004; Nordregio, 2004).*

Country	Minimum Elevation	Other criteria
PL	350 m	or slopes > 12° for at least 50% of agricultural used area in a municipality
RO	600 m	also if slopes > 20°
SK	600 m	also above 500 m if slopes > 7° or average slope > 12°
CZ	700 m	--
HU	600 m	or 400 m if average slope > 10% or average slope > 20°

5.8 ASPECTS OF FUNCTIONALITY AND IMPLEMENTATION OF THE CARPATHIAN CONVENTION

In a further step after the preliminary delimitation and under guidance of the scientific criteria outlined in the previous chapters, aspects are to be incorporated which will enable the implementation and long-term functioning of the convention. In determining the definitive convention perimeter, the following aspects, among others, are to be considered:

- Avoidance of fragmentation;
- Delimitation along administrative units;
- Inclusion of functional contexts and local distinctive features.

A strongly fragmented delimitation makes it difficult to recognize the spaces in which the CC is to be implemented. Creating islands and fragments also hamper the operative implementation of an efficient spatial planning and land resources management, as stipulated in articles 3 and 5 of the convention. A compact delimitation without the formation of islands allows a better implementation of spatially effective measures. The delimitation along defined administrative units simplifies the integration of political decisions and their subsequent measures. This allows the administrative unit to coordinate and implement relative measures.

The municipality level is the most detailed administrative level generally involved in territorial management. It is addressed by several EU initiatives and it is the most detailed level at which statistical information is regularly collected. The need to distinguish between different realities calls for the most detailed information available. Such information makes it possible to address the specific needs of an area, be it for economic development, or for specific initiatives (e.g. EU “Less-Favoured Areas”, Objective 1, 2, 3).

Finally there are also local aspects to bear in mind. It can be reasonable to include a certain area in the established scope of application, although it is not actually a part of the Carpathian Mountains. This is especially the case when its geomorphological/geological conditions, ecological aspects (protected areas, river basin management), and regional economic relationships (e.g. cooperation between national park municipalities) have strong functional cohesions. This could be important for the implementation of the convention. Without doubt, these adaptations should apply only to local functional relationships and must be restricted to the local level.

6 ANALYSIS OF EXISTING DELIMITATIONS

This Chapter analyses the two most important proposals for the delimitation of the convention area which are in discussion: The areas recommended by the states themselves (National Proposals; Chap. 4.3.1), and the Carpathian Ecoregion (Chap. 4.2.1). These proposals are analysed by means of the criteria presented in Chapter 5. It is the goal to point out their strengths and potential weaknesses.

6.1 BASIC ASPECTS OF THE ANALYSIS

At the moment, essentially two delimitation approaches are under discussion for determining the perimeter of the convention's application area (as of Jun 2005):

a) National Proposals (Chap. 4.3.1);
b) Carpathian Ecoregion (Chap. 4.2.1).

Without doubt the National Proposals drafted by the signatory states themselves are the most important references for the delimitation of the Carpathians. They have as yet found insufficient acceptance. Similar holds true for the Carpathian Ecoregion, which was drafted by DAPHNE-WWF (WWF/CERI, 2001). It delimits the Carpathian space much more inclusively, and stands as the furthest reaching solution. The comparative analysis of NP and Carpathian Ecoregion serves to detect similarities and differences in the two approaches.

The analysis is carried out for the study area (Chap. 2.3) using the criteria presented in Chapter 5. These criteria originate from higher-ranking institutions and are therefore fairly neutral on government issues. This analysis was carried out with only those criteria for which an appropriate transnational data base was provided or available. This enables the most transparent and neutral analysis possible.

6.2 MOUNTAIN DELIMITATIONS

How much of the Carpathian mountain area is really contained in the existing NP and Carpathian Ecoregion? For this scope NR-MA (Chap. 5.3.2.2) was compared to the Carpathian Ecoregion and to the NP (Fig. 41). This highlights the most obvious differences and possibilities for optimisation.

Due to the unavailability of municipality borders the Ukranian Carpathian mountain range was identified using physical data. On the contrary, the situation in S&M is more complex. South of the Danube, the range merges into the Balkans. Opinions differ greatly on where the border between these two ranges lies (e.g. Iron Gate or even 150 to 200 km more southwards). Based on these uncertainties in definition, the only area to be considered and analysed in S&M is that of the NP (Chap. 4.3.1).

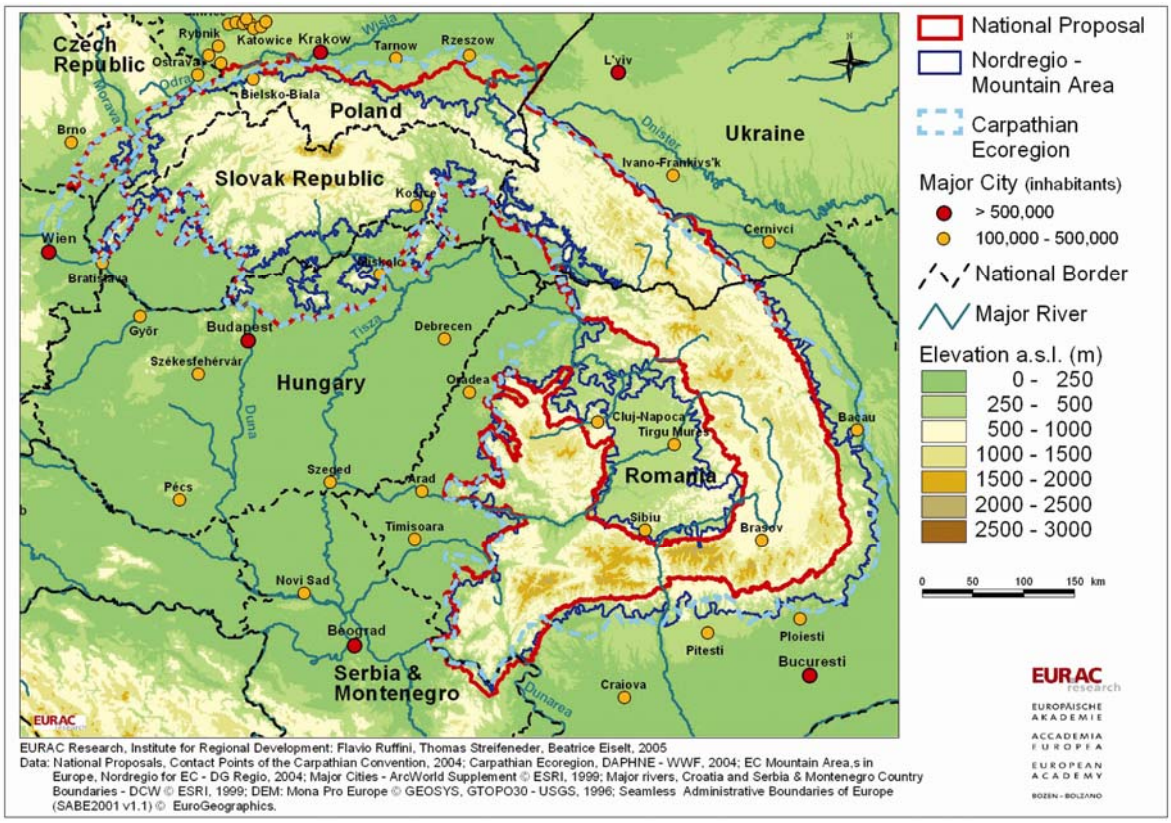


Fig. 41: *Confrontation of National Proposals, Nordregio Mountain Area and Carpathian Ecoregion.*

The Carpathian Ecoregion fully contains the mountain region as defined by NR-MA. It even reaches in some places far beyond and also includes the Transylvanian Plateau. This is especially true for the southeastern and northern parts of the Carpathian region.

The comparatively more narrowly defined NP also encompasses, to a great extent, the mountain area defined in the NR-MA. The NR-MA incorporates more area, though, in the south and less in the north than the NP. Major discrepancies to the NP apply above all to the Romanian Sub-carpathians (Fig. 31) and the Polish Carpathians. The analysis in detail:

- NP and Ecoregion delimitation are more expansive than the NR-MA delimitation; the Ecoregion delimitation turns out to be the furthest reaching.
- Poland: The NR-MA is the narrowest delimitation. While the Ecoregion is generally more widespread than the NP, there are certain areas, e.g. along the Ukrainian border and in the northwestern parts, where the NP was found to be more extensive than the Ecoregion.
- Czech Republic, Slovak Republic, and Hungary: The NP and Ecoregion delimitations are identical and vaster than the NR-MA.
- Ukraine: NP-, Carpathian Ecoregion- and NR-MA delimitation were found to be very similar. However, in the west the NR-MA is narrower than the other delimitations.
- Romania: The NP is generally more restricted than the NR-MA and Ecoregion. In particularly this pertains to the southeastern part. The Ecoregion is generally the furthest reaching delimitation and includes the Transylvanian Plateau.

Area size

Regarding their area size, the statistical comparison between the NP and the Ecoregion, as well as the NR-MA, is quite informative (Tab. 16, Fig. 42). The total area covered by the NP and the NR-

MA delimitation was found to be basically the same (approx. 161,000 km^2). However, the area is distributed unevenly between the countries. When comparing the area of the different delimitations by country, the greatest portion always lies in Romania, which is followed by the Slovak Republic with the second largest area. The smallest area lies in Serbia & Montenegro, which is less than 1% of the whole area of the national proposals.

Tab. 16: *Comparison of the NR-MA with the NP and Ecoregion by area and country.*

Country	NR-MA[1)]		NP			Ecoregion		
	km²	%	km²	Percentage per country	Difference to NR-MA (%)	km²	Percentage per country	Difference to NR-MA (%)
CZ	4,019	3	7,124	4	177	7,236	4	180
HU	2,708	2	9,626	6	355	9,626	5	355
PL	12,000	7	17,263	11	144	19,638	9	164
RO	90,410	56	69,872	43	77	115,427	55	128
SK	30,989	19	35,050	22	113	35,050	17	113
UA	21,655	13	22,109	14	102	21,523	10	99
Total	**161,781**	**100**	**161,044**	100	**100**	**208,500**	100	**129**
S&M			761	>1				
Total			**161,805**					

[1)] For the Ukraine, simulation by physical data; for Serbia & Montenegro, data not available.

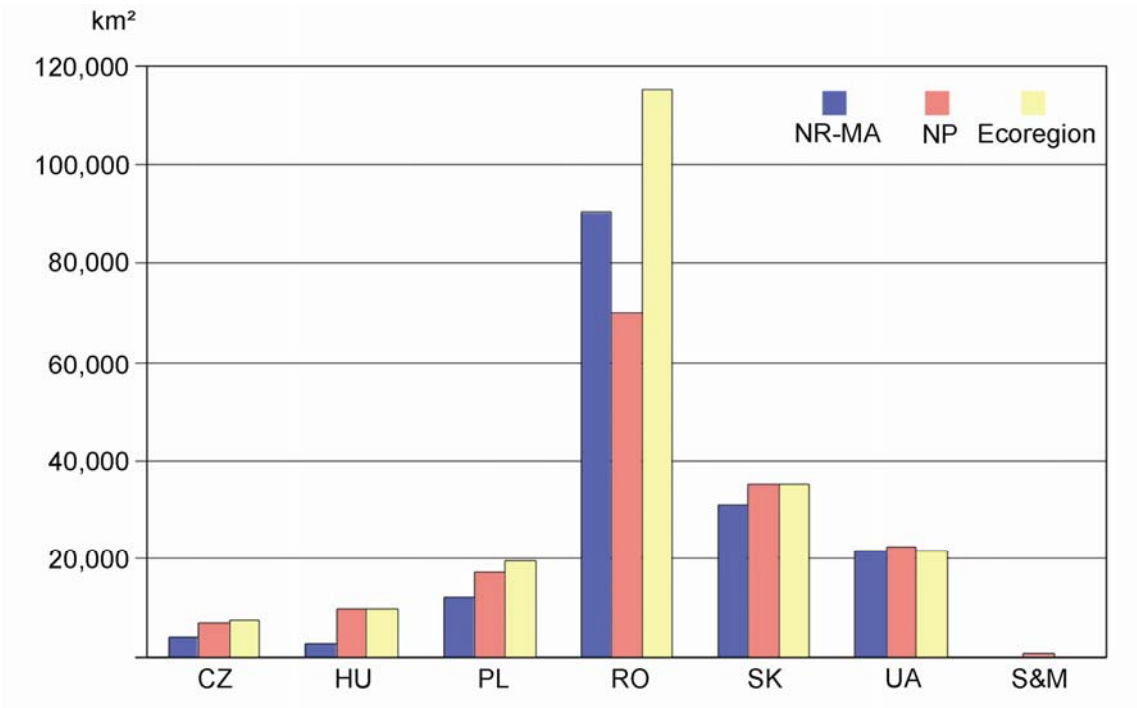


Fig. 42: *Comparison of NR-MA (reference variable) with National Proposals and Ecoregion by area and country. NR-MA: for the Ukraine, simulation by physical data; for S&M, data not available.*

The NR-MA delineation is usually narrower than the NP. The greatest difference is shown in Hungary where the NR-MA delimitation is significantly smaller than the NP. Only in Romania is the delimitation of NR-MA vaster, although it does not include the Transylvanian Plateau. The NR-MA includes territory at lower elevations, only if very steep.

The Ecoregion delimitation is quite similar to the NP in all the countries, except Romania, where the area differs significantly (NP: ca. 70,000 km²; Ecoregion: ca. 115,000 with Transylvanian Plateau). For Poland the Ecoregion is only slightly larger. As the Carpathian Ecoregion drafted by the WWF does not include the territory south of the Danube, no proportion is can be calculated for Serbia & Montenegro.

Elevation distribution

The NR-MA and the NP have a similar elevation distribution. The NR-MA shows a slightly lower percentage of areas below 250 m a.s.l. and a slightly higher percentage of territory between 500 m and 1,000 m. In fact, in this approach territory below 300 meters is included only if very steep. All three delimitations show the highest percentage of territory between 500 and 1,000 m (Fig. 43, Tab. 17), though this is most evident for the NR-MA and the Ecoregion. Below 500 m the Ecoregion delimitation has a relatively high proportion of territory as it includes the Transylvanian Plateau and the outskirts or larger extensions in the southeast and in Poland.

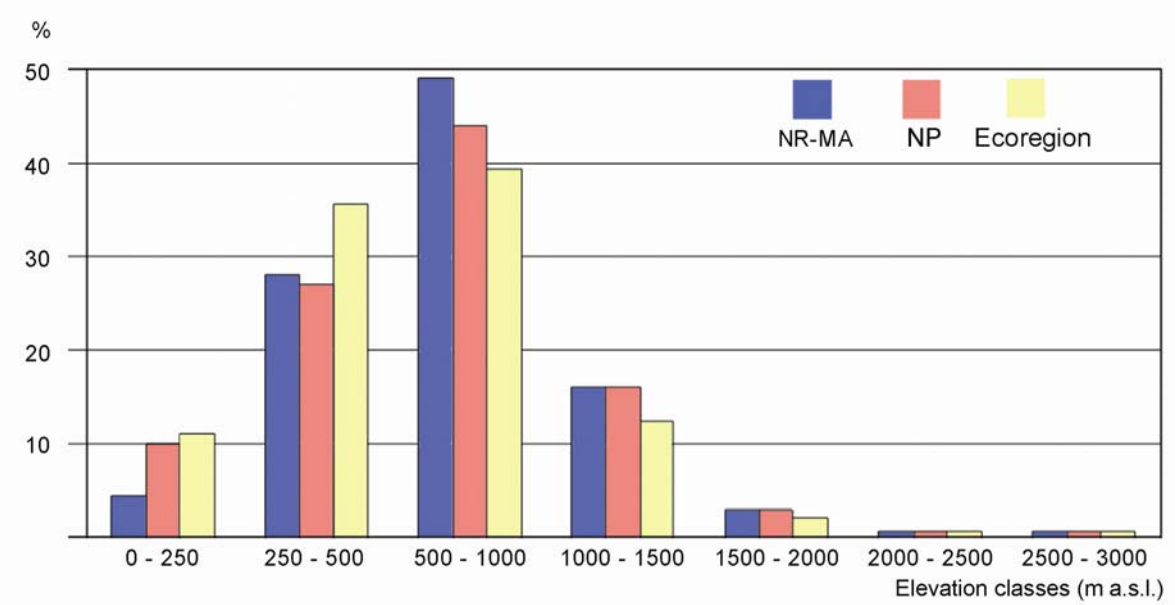


Fig. 43: *Comparison of NR-MA (reference variable) with NP and Ecoregion by the relative distribution of elevation*[52].

[52] NR-MA: For the Ukraine, simulation by physical data; for Serbia & Montenegro, data not available.

Tab. 17: *Comparison of NR-MA (reference variable) with NP and Ecoregion by elevation classes.*

Elevation class	NR-MA*)		NP			Ecoregion		
m a.s.l.	km²	%	km²	%	Difference to NR-MA (%)	km²	%	Difference to NR-MA (%)
0 – 250	6,283	4	15,566	10	+ 148	22,936	11	+ 265
250 – 500	45,839	28	44,032	27	- 4	74,275	36	+ 62
500 – 1,000	78,797	49	71,966	44	- 9	81,072	39	+ 3
1,000 – 1,500	25,367	16	25,454	16	0	25,497	12	+ 1
1,500 – 2,000	4,241	3	4,266	3	+ 1	4,267	2	+ 1
2,000 – 2,500	515	<1	521	>1	+ 1	521	<1	+ 1
2,500 – 3,000	1	<1	<1	>1	0	1	<1	0
Total	**161,043***	**100**	**161,805**	**100**	**< + 1**	**208,569**	**100**	**+ 30**

*) For the Ukraine, simulation by physical data; for Serbia & Montenegro, data not available.

6.3 ECOLOGICALLY IMPORTANT AREAS

How far do the considered delimitation proposals incorporate the aspects of nature protection? Existing cartographical information and studies serve as the basis of these analyses (studies of the Ecoregion Initiative, land use map – CORINE Land Cover, PELCOM) (Chap. 4.2.1, Chap. 5.7.3). Based on this information, primary quantitative analyses can be carried out. Qualitative conclusions are possible only to a limited extent, because information on the status of land use intensity and on the conflict potential between nature protection and land use was not available in the necessary volume. Within the framework of this study, it was not possible to carry out empirical studies on the ecological situation of the different areas.

The delimitation proposals are compared first with the distribution of protected areas and the areas of high biological value. This allows the evaluation of which protected areas and areas important for biodiversity are located within the different delimitations. In a second step the extent of extensively used landscapes are analysed for the different delimitation proposals.

The analysis shows that the Ecoregion drafted by DAPHNE-WWF encompasses all significant protected areas and high biodiversity areas, as does the study area. Alone the area of S&M is not considered in the Ecoregion. The analysis of the NP shows that, here too, most of the protected areas and areas important for biodiversity are included (Fig. 44). Here and there, though, possibilities show up where the delimitation could be optimised, because there are acknowledged protected areas and areas important for biodiversity lying outside the national delimitation proposals, and other such areas that are cut up by them (examples see circles in Fig. 44).

More in detail, in the northern regions of the Carpathians in Polish territory, parts of single protected areas lie outside the existing delimitation proposal (Fig. 45). They are all landscape parks in the central part of the Polish Carpathians. From west to east they are:

- Wisnicko-Lipnicki Park Krajobrazowy;
- Ciezkowicko-Roznowski Park Krajobrazowy;
- Park Krajobrazowy Pasma Brzanki;
- Czarnorzecko-Strzygowski Park Krajobrazowy;
- Park Krajobrazowy Pogorza Przemyskiego.

In general, landscape parks are granted a lower level of protection than areas under nature protection. They are, though, particularly important in the conservation of outstanding cultural landscapes and they are an important basis for tourism development.

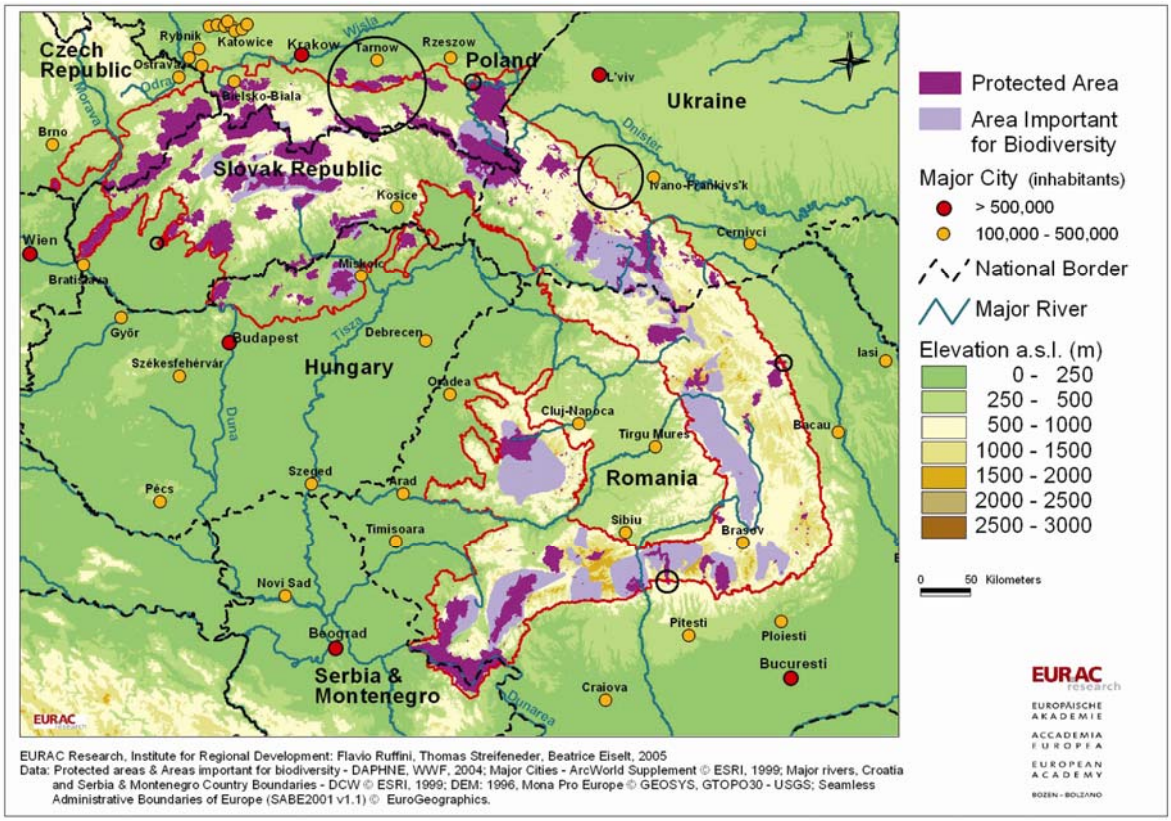


Fig. 44: *Protected areas and areas important for biodiversity.*

In the Ukrainian Carpathians the protected areas, Rika Svica z pritokoju Mizunkoju and Ricka Limnicja, lie partially outside the NP. Both protected areas are situated in valleys and have a very elongated shape. Very probably they were put under protection as part of a watercourse protection project. The lower part of these protected areas is also not considered in the Ecoregion (Fig. 46). Two further protected areas, Sadzavskij and Turova Daca, situated close to these parks are completely outside the NP.

In Serbia & Montenegro (Fig. 47), the NP follows rather closely the border of the Djerdab National Park. On the other hand this National Park lies completely outside the area of the Ecoregion. The reason for this lies in the fact that the studies for the Ecoregion did not consider the territory of Serbia & Montenegro.

In Romania there are also several environmentally important areas of which small parts located outside the NP (Fig. 47). In the Czech Republic only smaller environmentally important areas are situated outside the NP (Fig. 48). More specifically minor parts of the protected areas, Bile Karpaty and Palava, are not encompassed within the NP.

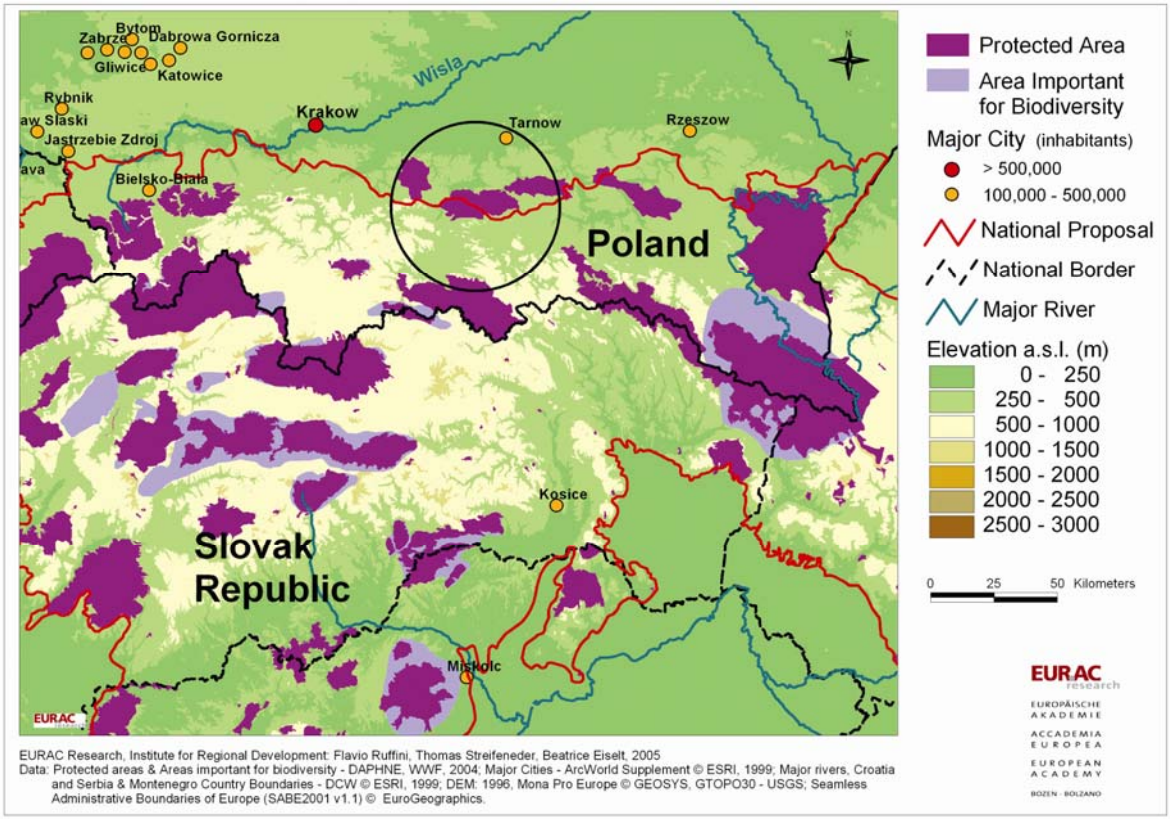


Fig. 45: *Protected areas and areas important for biodiversity – Poland.*

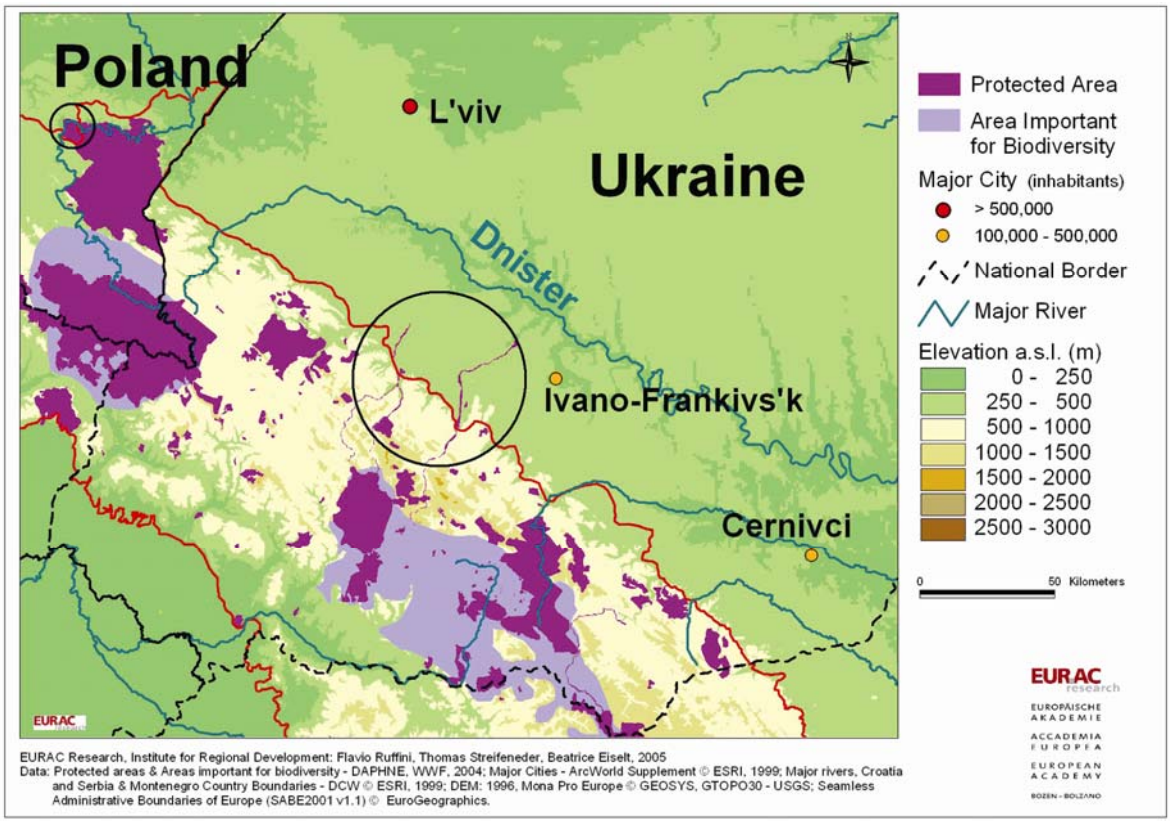


Fig. 46: *Protected areas and areas important for biodiversity – Ukraine.*

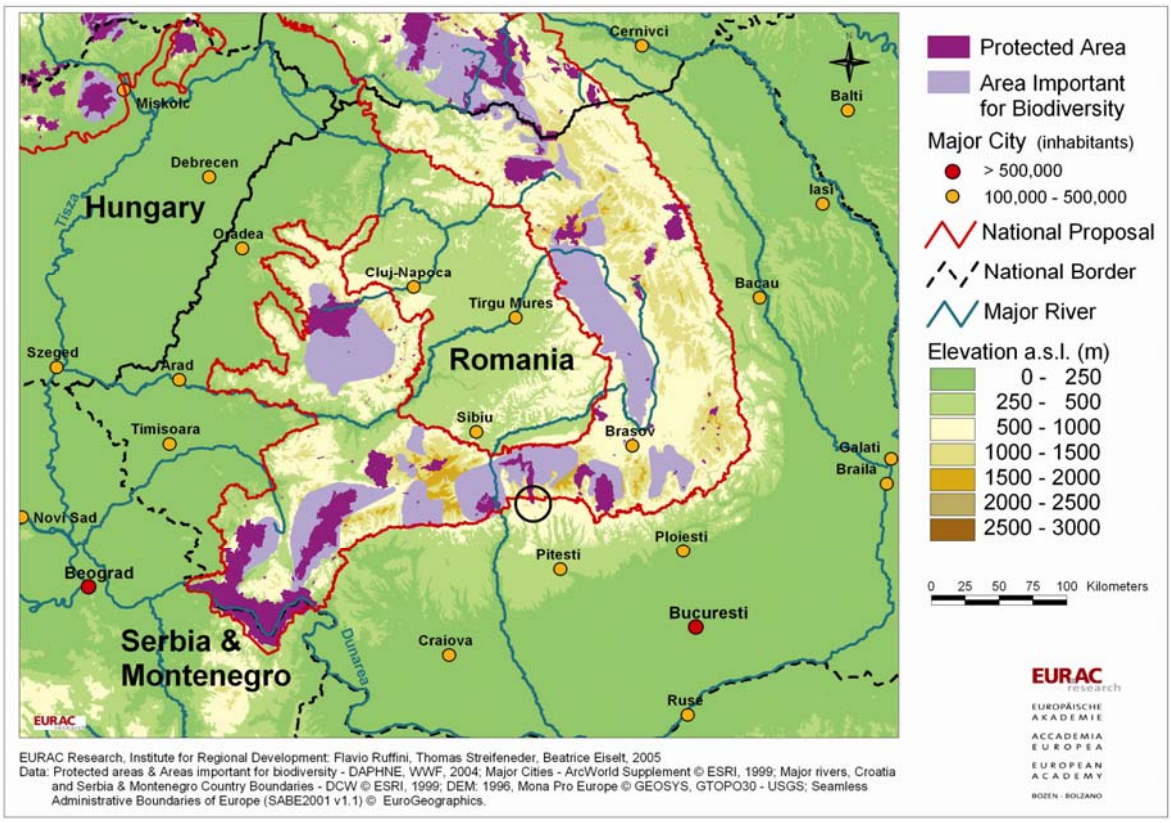


Fig. 47: *Protected areas and areas important for biodiversity – Romania and Serbia & Montenegro.*

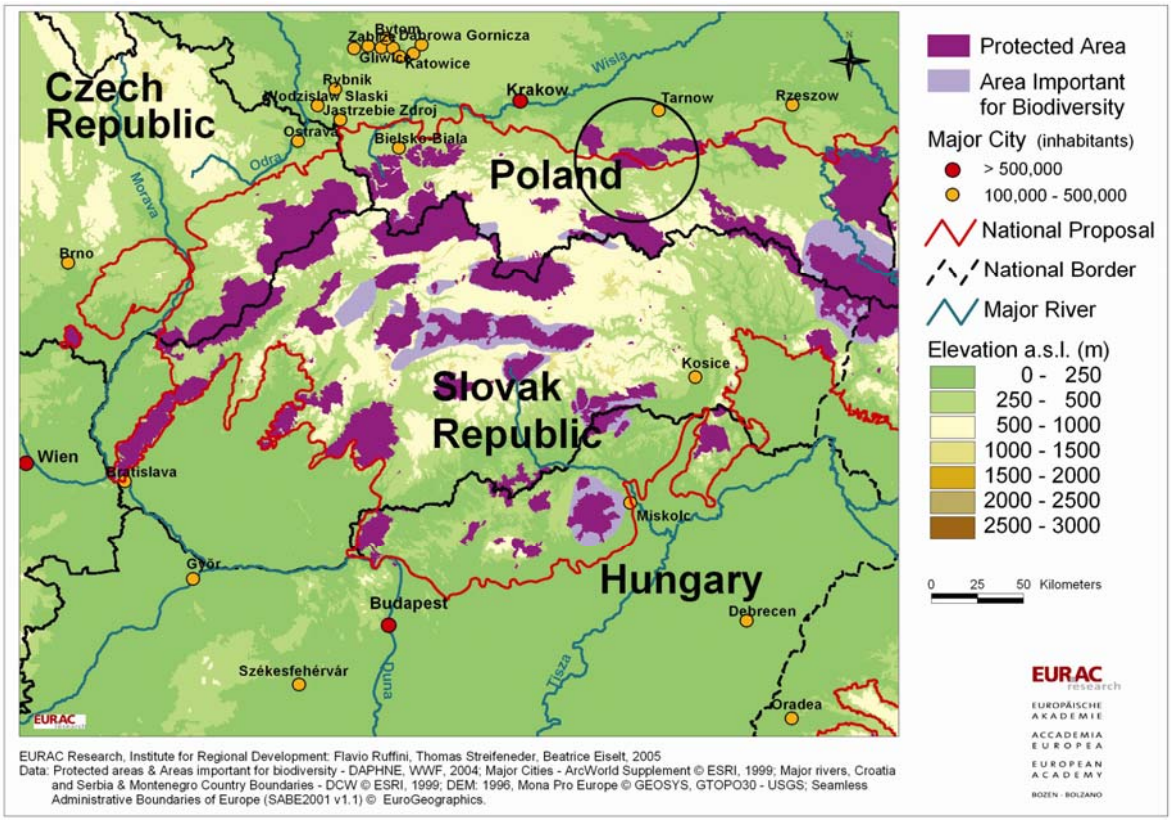


Fig. 48: *Protected areas and areas important for biodiversity – Czech Republic and Slovak Republic.*

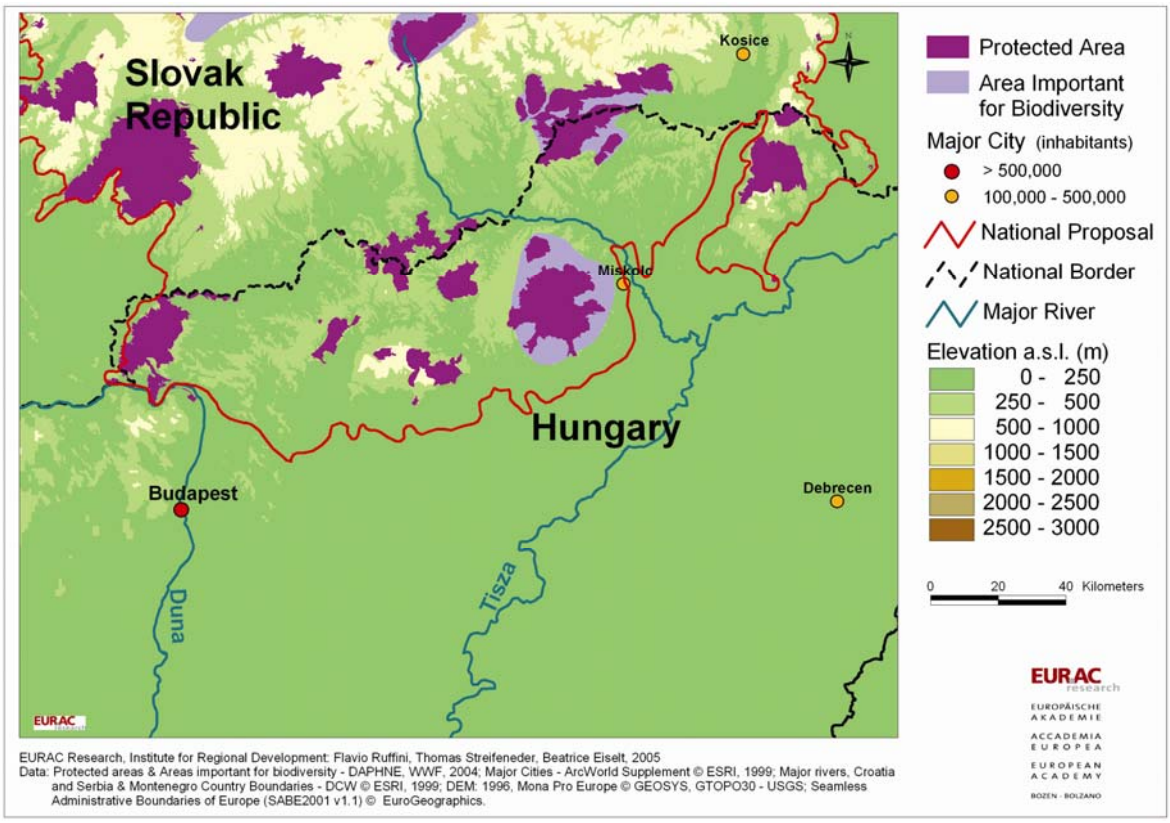


Fig. 49: *Protected areas and areas important for biodiversity – Hungary.*

In the Slovak Republic and Hungary (Fig. 49) only minor parts of protected areas lie outside the NP. Presumably the differences in the four countries are due to different cartographic sources. In any case, it is of great advantage to verify the exact position of these areas while determining the delimitation.

The second important analysis is related to the extent of extensively used landscapes, in this context forest cover and agricultural ares have been examined. Where available, Corine Land Cover data has been used, while in the Ukraine and in Serbia & Montenegro PELCOM data has been used.

Within the Ecoregion, forests cover 105,445 km^2 (51%), while in the NP they cover 95,657 km^2 (but 59%!) and in the studyarea 106,183 km^2 (51%) (Tab. 18; Fig. 50). The greater part of the forest is comprised of deciduous trees, 49% within the Ecoregion, and 45% of the area within the NP 49% of the total forest area in the study area.

The proportional differences in the size of utilised agricultural areas are somewhat less. While 70,935 km^2 (34%) within the study area are used for agriculture, in the Ecoregion the area is almost identical with a total of 70,052 km^2 (34%). Within the NP 44,428 km^2 (27%) are agricultural areas. The source of this difference is related to the larger extension of the Ecoregion into the lowlands and the integration of the Transylvanian Plateau. Fig. 51 shows the share of these basic land cover classes for the study area by country. It can be seen quite clearly that Ukraine is the country with the highest share of forest land (91%), while the Czech Republic is the country with the highest share of agricultural area (57%), closely followed by Hungary (52%).

Tab. 18: *Absolute and relative area of forest and agricultural land for all countries (Corine and PELCOM data).*

Land cover	NP			Ecoregion			Study Area		
	km²	%	% total of Carpathian area	km²	%	% total of Carpathian area	km²	%	% total of Carpathian area
Coniferous	28,747	30.05	17.79	29,108	27.60	13.85	29,130	27.43	13.85
Deciduous	43,251	45.21	26.75	51,799	49.12	24.74	52,493	49.44	24.97
Mixed	23,658	24.73	14.62	24,538	23.27	11.67	24,560	23.13	11.68
Forest	**95,657**	**100.00**	**59.16**	**105,445**	**100.00**	**50.26**	**106,183**	**100**	**50.50**
Pastures	4,703	10.59	2.92	5,951	8.50	2.74	6,022	8.49	2.86
Rain-fed arable land	21,600	48.62	13.36	34,311	48.98	16.35	35,063	49.43	16.67
Irrigated arable land	0	0	0	1	0.01	0.01	1	0.01	0.01
Permanent crops	18,124	40.79	11.20	29,789	42.52	14.29	29,849	42.08	14.19
Agriculture	**44,428**	**100.00**	**27.48**	**70,052**	**100.00**	**33.39**	**70,935**	**100**	**33.73**
Carpathians	**161,805**			**208,500**			**210,256**		

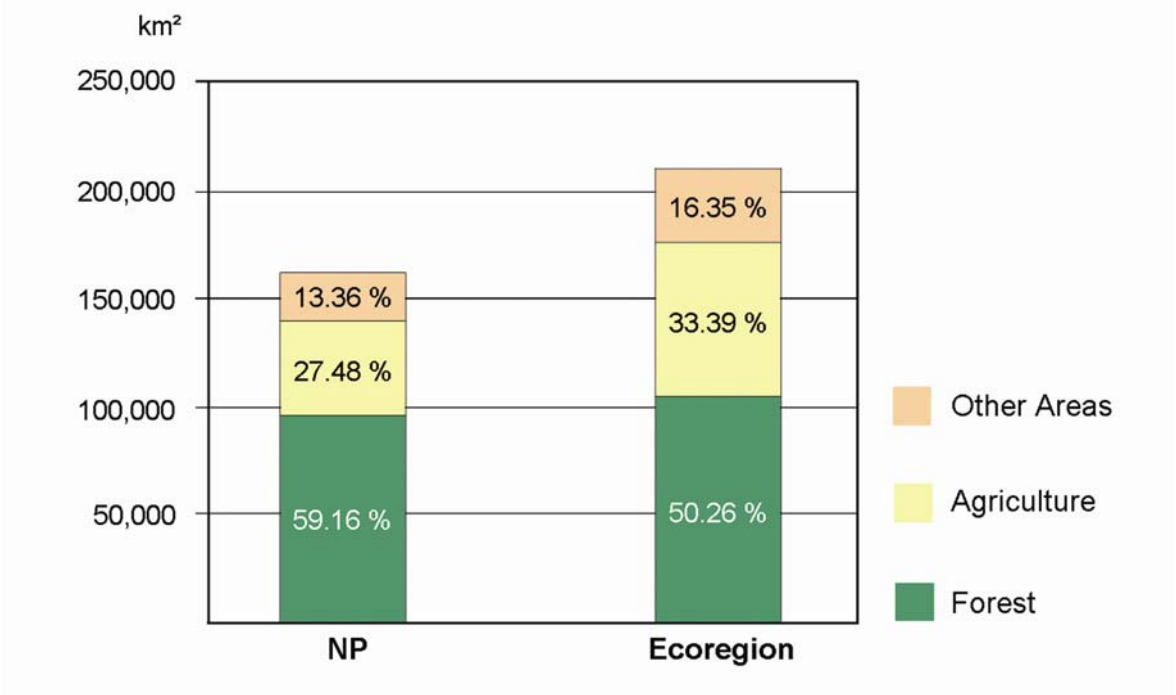


Fig. 50: *Importance of forest and agricultural areas within NP and Ecoregion.*

In a further step it is investigated, in how far large contiguous and extensively used areas within the study area were considered in the delimitation proposals, as these are of special importance for large carnivores. In this context extensive forest areas with a contiguous area of > 600 km² (Chap. 5.4.2) are of special interest (EEA, 2004). To present the situation of the forest areas, data from the

CORINE land cover Program is used for most counties. The Ukraine and S&M are exceptions because this data is not available. For these countries data from the PELCOM Project are used. This means that the results of the analysis for these two countries are not fully comparable to those of the other countries. This is due to the different scales used by these two data sources (Corine Land cover 1:250,000, PELCOM 1:1,100,000) and therefore the different level of detail. Furthermore, PELCOM data was collected in the period of 1996 to 1999, while the CLC90 data was collected mostly during the early nineties. At the same time, subsequent to political changes, a very dynamical alteration of agricultural structures took place. At the moment no other course of action is possible.

The analysis (Fig. 52) shows that there are two large area forests in the southeast and southwest of Romania situated within the study area but not fully considered in the NP. It should be noted that the major forest areas in the southeast are situated within the delimitations of the NR-MA and the Ecoregion.

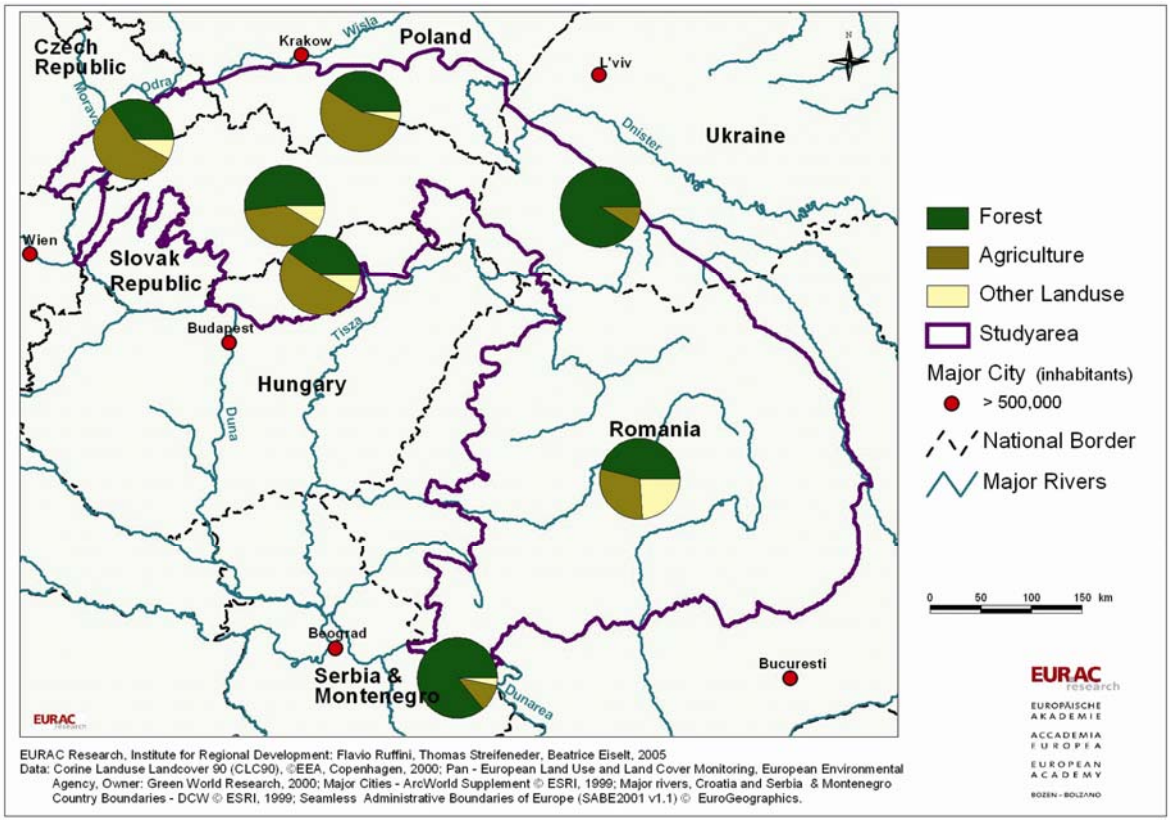


Fig. 51: *The share of forest and agriculture on land use in the Carpathian countries.*

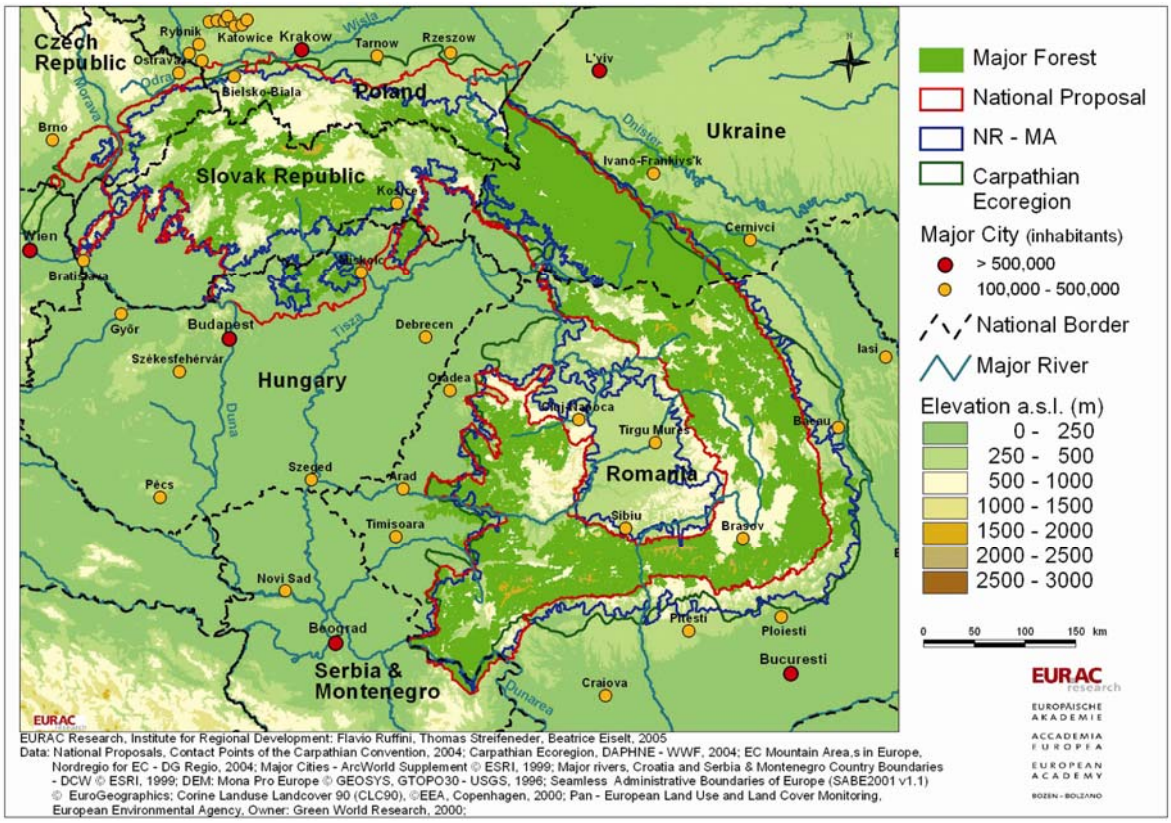


Fig. 52: *Major forests in the Carpathians.*

6.4 GEOLOGICAL ASPECTS

The geological map of the Carpathians (Chap. 5.5.1) forms a further transnationally available data source. This is especially important because different NP refer particularly to the geology of the area for their delimitations (Fig. 53). The Romanian proposition largely matches the small scale geological situation and excludes the Transylvanian Planes, characterised by Miocene deposits. The Getic Tableland on the southern declivity of Romania, characterised by neogenic sediments, is also excluded.

The Ukrainian proposal, too, strongly follows geological features. It factors out the forelands marked by cenozoic sedimentary rock. In the Hungarian and Slovakian part, foothills of the Carpathians are separated from the main range by valleys with neogene sediments. In Hungary this applies to the Màtra Mountains in the vicinity of the Rivers Ipel and Sajó. In the Slovak Republic, north of Bratislava (e.g. Minor Carpathians), individual Carpathian foothills are marked as mountains, forming islands separate from the greater delimitation area. In these countries the valleys along with the foothills are included in the NP. In the Czech Republic, as well, the geological conditions are quite recognizable in the delimitation. In this country the valley of the River Morava is not included in the NP. In Poland parts of the northern foothills were excluded. Through the much more spacious distribution, the Ecoregion encompasses wide areas characterised by cenozoic sediments. In the northern part of the Carpathians it even includes foothills that range all the way to Austria.

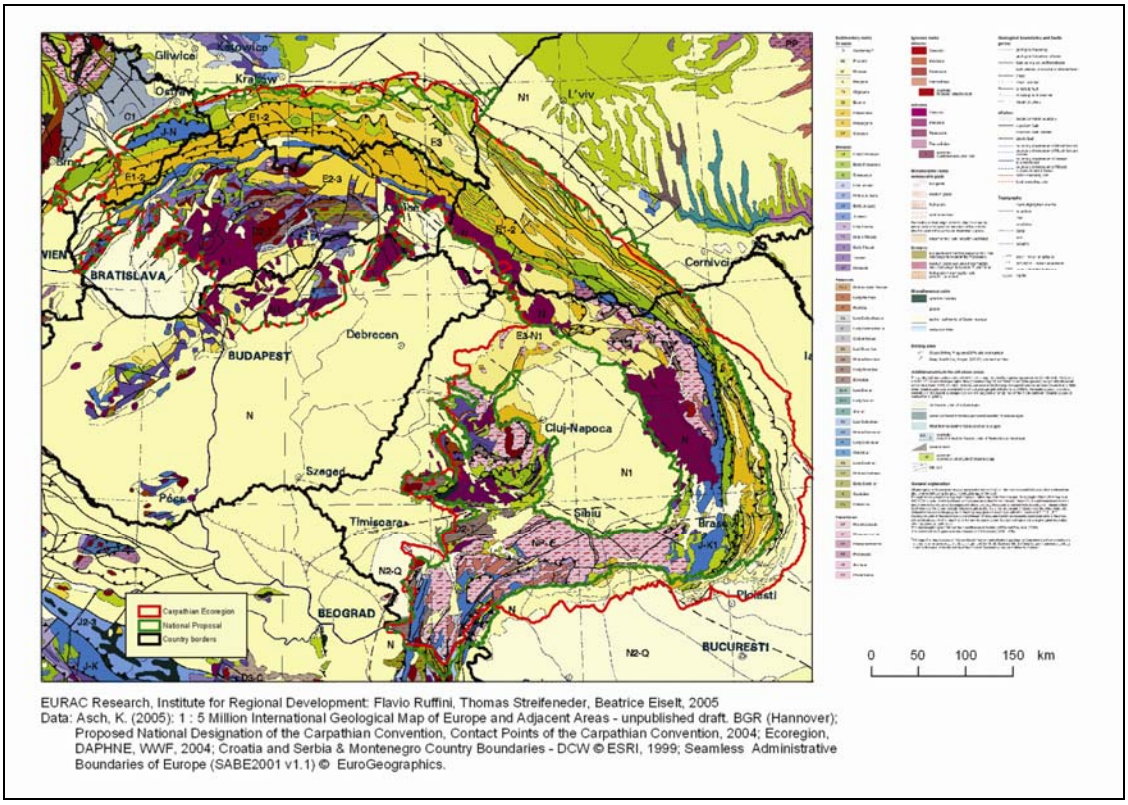


Fig. 53: *Track of the proposed delimitations to be analysed (NP= red; Ecoregion = green) set before the background of the geological situation.*

6.5 REGIONAL DEVELOPMENT

The LFA, as a reference variable for regional development (Chap. 5.7.1), encompasses a distinctly smaller and much more fragmented area (Fig. 54). It is therefore the narrowest delimitation of the Carpathians. This is also quantitatively expressed in the area sizes (Tab. 19).

Tab. 19: *Comparison of the LFA (reference variable) with the NP and the Ecoregion by area and country.*

Country	LFA		NP		Ecoregion	
	km²	%	km²	Difference to LFA (%)	km²	Difference to LFA (%)
CZ	384	<1	7,124	1,855	7,236	1,884
HU	1,534	2	9,626	628	9,626	628
PL	12,458	14	17,263	139	19,638	158
RO	54,664	62	69,872	128	115,427	211
SK	19,558	22	35,050	18	35,050	179
UA	----	----	22,109	----	21,523	----
Total	**88,598**	**100.0**	**161,044**	**182**	**208,500**	**235**
S&M			761			
Total			**161,805**			

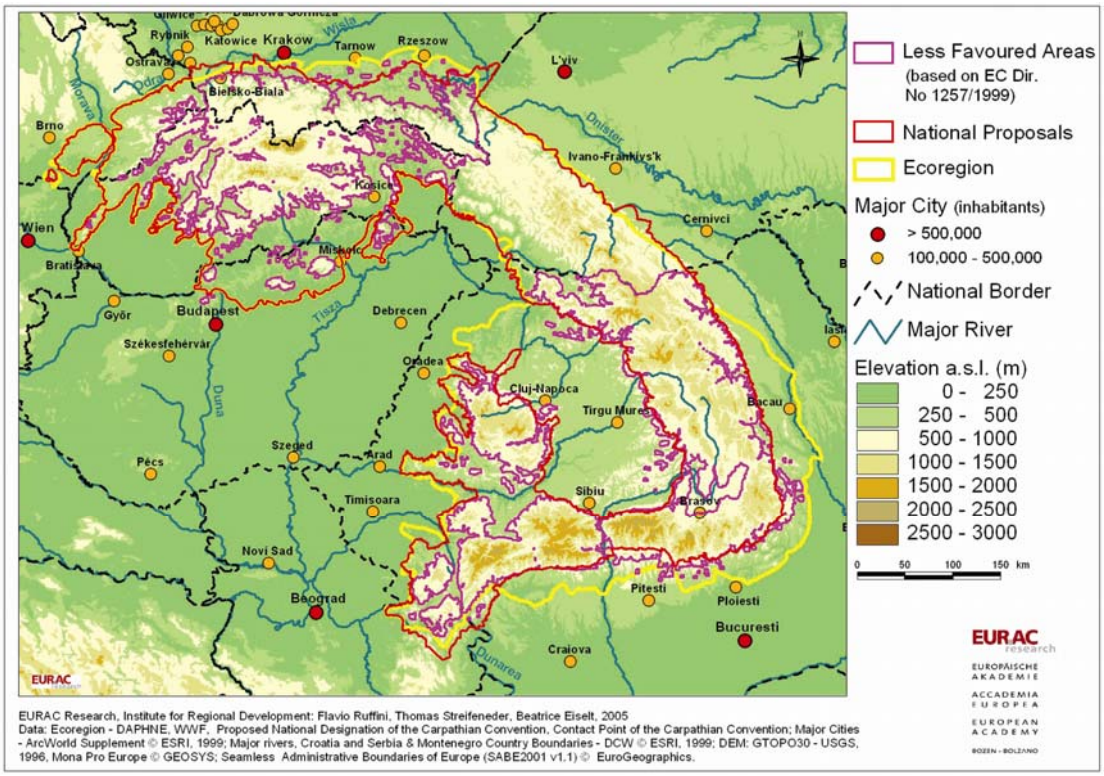


Fig. 54: *The less-favoured mountainous areas compared with the two reference areas NP and Ecoregion.*

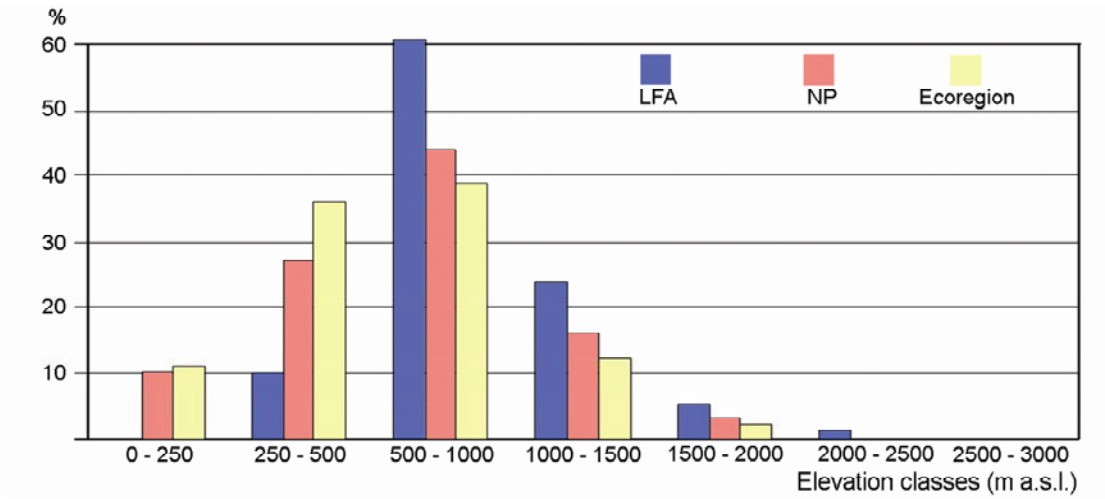


Fig. 55: *Distribution by elevation classes – LFA (reference variable) compared with NP and Ecoregion (without Ukraine and Serbia & Montenegro).*

The greatest differences show up in the Czech Republic and in Hungary, where the distinctly smaller LFA differs significantly from the NP and Ecoregion areas. The LFA, on the other hand, has a relatively high proportion of areas between 500 – 1,000 m, and between 1,000 – 1,500 m (Fig. 55). On the contrary, the portion of area below 500 m is rather small. This is due to the definition of the LFA which, for most countries, has an altitude limit equal or above 600 m in order to detect less-favoured agricultural areas.

7 DELIMITING THE CONVENTION AREA: A POSSIBLE APPROACH

This chapter describes a possible procedure for determining the scope of application of the CC by means of a transnational, homogenous approach. A four step approach is recommended, which is derived from the goals of the convention.

7.1 PRELIMINARY CONSIDERATIONS

The aim of this study is the recommendation of an approach for determining the perimeter of the CC. The procedure recommended here is based on an approach, which builds on transnational, homogenous criteria and which is derived from the goals of the convention. Only data available for the whole Carpathian region in a comparative form and quality was chosen for the approach introduced here. Therefore, not all criteria which would be useful for the delimitation of a mountain region could be considered.

It is not the intention of this study to recommend any specific area for the convention. The indicators and criteria used here are to be understood as examples. They serve to illustrate the described procedure. Of course, they can be augmented and amended according to necessity and availability. It includes the possibility of a flexible management of the perimeter for certain thematic focal points. This allows the member states to keep the option open, besides maintaining the main convention area, to extend the border for certain thematic questions. The authors are conscious of the fact that this can only be an outside view of the issue. It is neither intended nor possible to substitute for discussion within and between the states (Chap. 4.4). The study is therefore to be understood as a constructive contribution from a neutral position.

7.2 IMPORTANT PRINCIPLES FOR THE DELIMITATION OF THE CONVENTION AREA

The choice of the convention perimeter is of strategic importance for the implementation of the convention. It defines the area in which the signatory states are to implement their sustainability strategy which will be developed specifically for the Carpathians. For this reason the choice of an appropriate approach for the delimitation of the scope of application is of utmost significance. The process must serve to strengthen confidence of the signatory states, as well as of the Carpathian's local politicians, in the convention as a transnational instrument for sustainable development. The perimeter must therefore be defined in a way that is acceptable at the political level, and is comprehensible for the local inhabitants. At the same time, the perimeter must represent the Carpathian region in such a manner that the convention can really become effective. Within these sometimes conflicting interests, a solution must be found. Starting from these considerations, the approach should internalize the following principles in the definition of the Carpathian region:

- Accordance to the convention goals;
- Holistic and interdisciplinary approach;
- Transnational, homogenous (=comparative) delimitation approach;
- Transparency in the procedure.

Accordance to the convention goals

The goal of the convention is the sustainable development and protection of the Carpathian region (Chap. 3.1). The convention looks at the Carpathian area from a holistic perspective with all its characteristics, sensitivities, and potential for development, and derives from this perspective a common policy for the sustainable development of the region as a space for human habitation, nature protection, culture, business, and recreation. This also involves regional development factors that reach further than a strictly physical delimitation of the mountain area. Culture and economy (accessibility) of the Carpathian mountain regions, for example, are closely connected to their forelands. These basic goals of the CC are to be considered in the definition of its perimeter.

Holistic and interdisciplinary approach

Mountain policy is influenced by a multitude of political fields (agriculture, supply, infrastructure, environmental protection, etc.). In the individual states they are usually organized by sector. The concept of integrative mountain policy, however, demands a strongly interdisciplinary discussion and horizontal coordination between the sectors (Chap. 5.3). There exist only few examples, though, of integrated policies for the mountains and special mountain legislation (as e.g. in Switzerland, France, Italy, Romania, Ukraine and Bulgaria), and they are only starting to be implemented (Nordregio, 2004). The difficulty of such an integrated approach is that such a policy also needs a permanent and coordination between the activities in the single sectors. For this reason habitual paradigms will be broken up, and strictly delimited areas of sectoral politics will become transparent. An integrative policy for mountain areas already begins with the delimitation of the scope of application. The holistic understanding of the Carpathian region in the convention demands an integration of natural landscape features as well as socio-economic aspects in the delimitation approach. Those main topics are to be integrated which are suggested in the convention and for which it intends action strategies to be created.

First, the question is to be answered, which area is to be considered as mountain area. As far as natural landscape criteria go, elevation, slope angle, geology, orography, and water sheds play an important roll. Gradually, further relevant themes are to be integrated, always considering environmental protection aspects (protected areas) in the same measure as socio-economical (less favoured areas, sparsely inhabited peripheral areas, etc.) and administrative political aspects (administration units).

Transnational homogenous delimitation approach

A transnational homogenous approach is a basic intention of this work. Two approaches are possible to this end. The first would be a purely “topical homogeneity”. The Carpathian states agree on a delimitation with the help of transnational, common topical aspects. Only the choice of which topical delineation aspects are to be included takes place transnationally, while the countries establish the necessary criteria (indicators) of each topic themselves.

Above and beyond the “topical and contextually homogenous” approach defines homogenous criteria for the single topical aspects at the transnational level as well. To this purpose transnational, practical and at the same time spatially presentable criteria are to be derived, by which the central themes of the convention can be assigned a spatial dimension. In this study, integrative and homogenous criteria are understood as those parameters which are in agreement between the countries, or are at least comparable to one another. The criteria are built on internationally recognized regulations or on criteria already agreed upon by the signatory states. Especially the definitions of international institutions are adopted in this study. This approach is much more strongly

in accordance with the spirit of a transnational cooperation for the sustainable development of a region. For this reason, it has been made the basis for this study. A transnational approach is especially suitable for the first attempt at a possible convention perimeter. This way, a homogeneous core area is created, extending as far as possible. An approach based on transnational criteria avoids disparities in the treatment of different spaces and enables a generally accepted zoning assignment. For example a commonly agreed transnational mountain area could be defined with the e.g. NR-MA.

Transparency in the procedure

The delimitation procedure must really reflect the convention goals and their principles in a comprehensible and reproducible way. This is an important foundation on which the signatory and partner states can place their trust. Additionally this also strengthens the acceptance of the inhabitants of the convention area. A transparent procedure must advance in steps based on the afore mentioned principles. In a first draft the central area is to be defined with the assistance of Carpathian-wide homogenous criteria. By this method a first draft of the convention area is created in an approach determined jointly by the signatory states (top-down approach). Here it is the aim to determine where exactly the demarcation should run on a large scale. In a second step the necessary adjustments at the regional level are to be made (bottom-up approach).

7.3 THE PROPOSED PROCEDURE FOR THE DELIMITATION OF THE CONVENTION AREA

Based on these general principles a four-step procedure is proposed for the delimitation of the convention perimeter (Fig. 56):

a) Starting from the characteristics of the area and the goals of the convention

The convention is aimed at a certain mountain region. This area exhibits innate natural landscape sensitivities and conditions as well as regionally specific socio-cultural characteristics. The convention tries to pick up on these regional distinctions and to describe a framework for possible development in this region (Chap. 3.1).

b) Spatial implementation of the goals in the Carpathians

The main goals of the convention are to be connected to the Carpathian region by means of spatial criteria. The criteria themselves were derived from higher ranking European and other international directives (Chap. 5).

c) The rough draft delimitation of the area (Chap. 7.3.1)

In this first, concrete level a preliminary central area is to be defined. This area is delimited transnationally with the help of Carpathian-wide comparable criteria (“topical and contextual homogeneity”). Starting from the central goals of the convention, the area is gradually established .This level ensures that on the small scale the Carpathian region is comparatively defined for all signatory states.

d) Fine-tuning (Chap. 7.3.2)

In a further level the preliminary, rough-drafted convention area must be adapted to the local situation. This is especially necessary because, through the use of higher ranking criteria, the local features in the individual states cannot be adequately depicted. Therefore, the delimitation of the convention must take into account the thematic criteria (Chap. 5) analysed at a local scale.

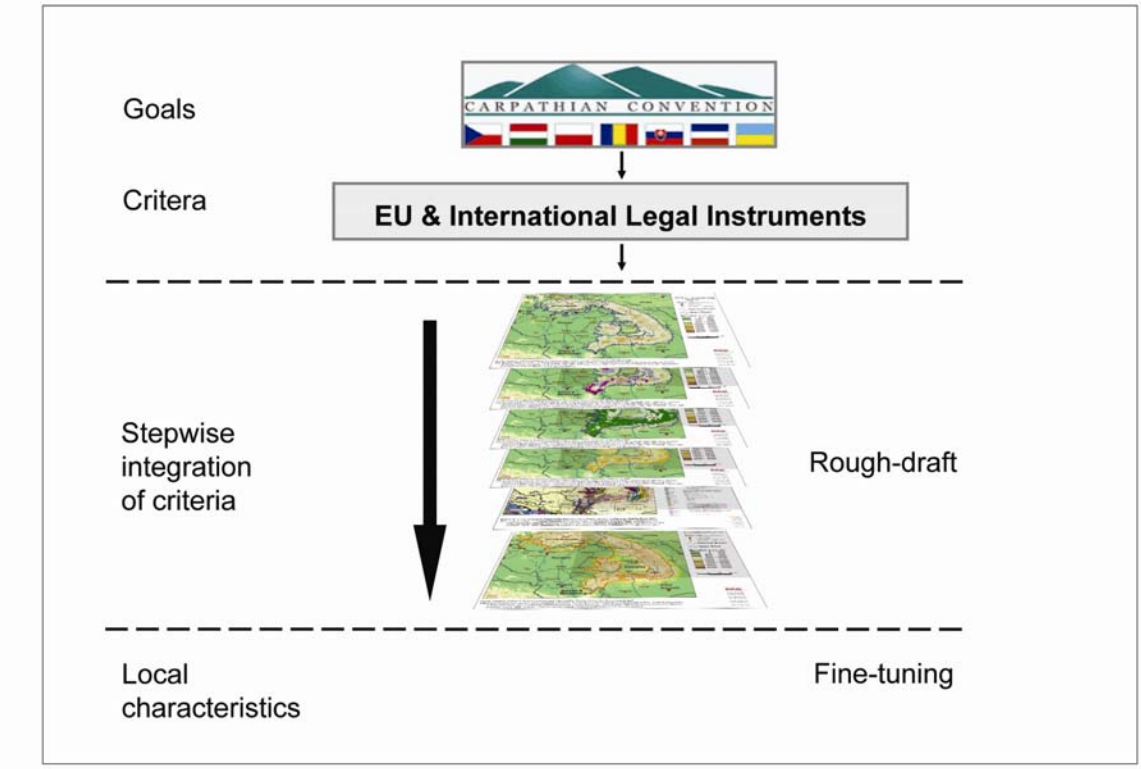


Fig. 56: *The proposed procedure starts from the Carpathian mountain area and from the goals of the convention. It is broken down into five main Steps.*

The two first steps of this procedure are part of the preparatory process. They have already been discussed in Chapters 3.1 and 5. A thorough discussion of these points already in this phase of the convention, especially in the Ad hoc Expert Group, can contribute greatly to the creation of a fertile ground for the common strategies in the implementation phase. The bandwidth of common measures can be sounded out, particularly in the discussions on the definition of the reference area. The actual spatial delimitation is concentrated on the last two steps. With these two steps the attempt is made to do justice to a Carpathian-wide approach, as well as to the necessity of a regional adaptation.

7.3.1 Level one: The rough draft delimitation of the area

This first level transnationally determines the central area on a small scale with the help of Carpathian-wide comparable criteria. These topics are derived from the goals of the convention (Chap. 3.1). To exemplify the procedure, only those topics are used in this study for which data material from throughout the Carpathians is available. Of course additional topics can be integrated or ones in use can be replaced by others. The topics considered in this study include:

- Determination of the mountain area;
- Aspects of nature protection;
- Extensive land use;
- Less-favoured areas;
- Prevention of fragmentation by means of natural landscape factors.

These topics are spatially and transnationally depicted for all states by means of criteria from transnational directives and international recommendations (Chap. 5). The delimitation itself is accomplished by means of the geographical information system (GIS). A layer is thereby created for each single topic. The single topic layers are connected to one another step by step according to their assigned priority. A first rough draft of the convention area finally emerges from this process

1) The first step for the delimitation of the convention perimeter is to define the Carpathian mountain area (Fig. 57). To delimit the mountain area in a transnational and uniform manner, the NR-MA is used in this study (Chap. 5.3.2.2). Unfortunately these basics are not available for the Ukraine and Serbia & Montenegro. Therefore, the delimitation for these countries was calculated by EURAC-Research using a digital elevation model (DEM) and the physical criteria (elevation, slope angle, etc.) used in the NR-MA.

   This mountain area forms the backbone of the convention area and is to be completely incurporated within the perimeter. Also those mountain areas are to be considered which reach beyond the limits of the study area, or border directly thereon. Isolated mountain areas outside the study area are to be discussed separately.

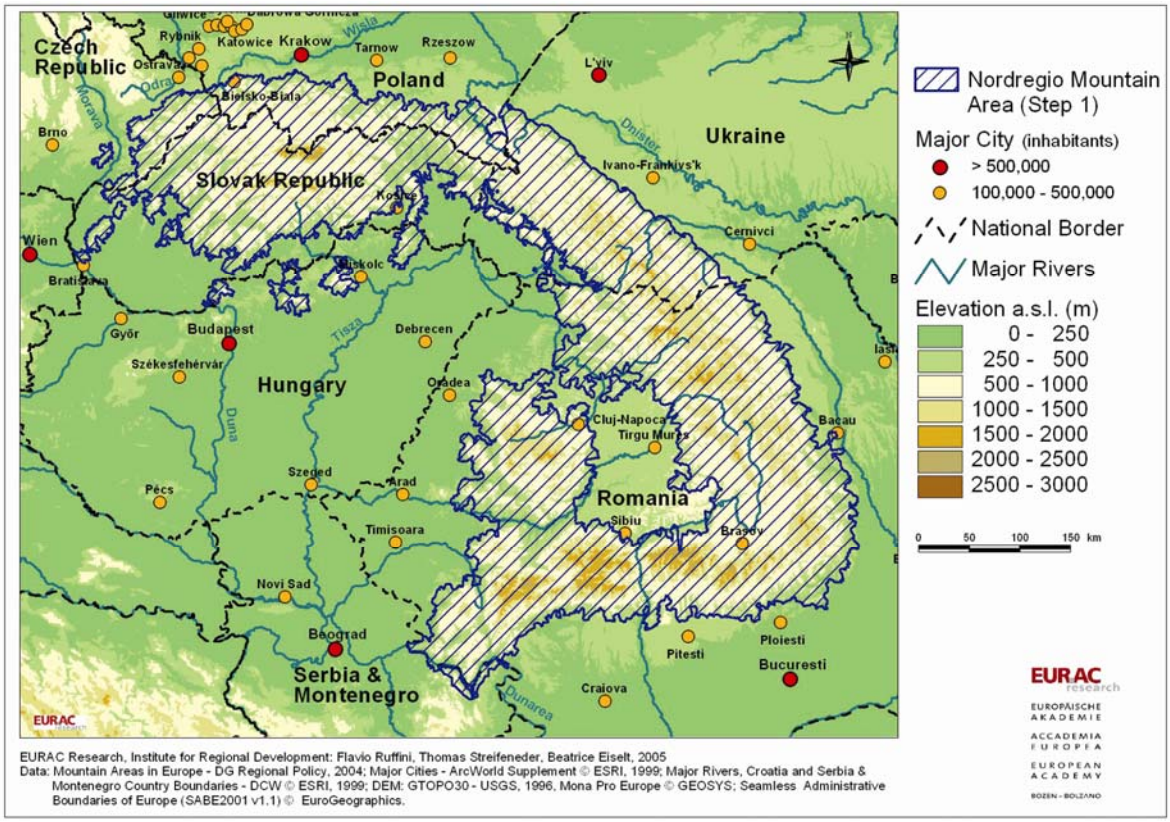


Fig. 57: *Step 1: The mountain area forms the backbone of the Carpathian region. It is determined by means of the standardised criteria of an internationally recognised Nordregio approach.*

2) In step 2 relevant and spatially representative aspects of environmental protection policy are addressed (Chap. 5.4.2), whereby the officially protected areas within the study area are considered first. Especially interesting for the delimitation are national protected areas, which reach

further than the mountain area defined in the first step, or border immediately on them. These areas are to be integrated in the convention perimeter. Large isolated protected areas, like the Palaver Environmental Protection Area (Man and Biosphere) in the Czech Republic, are to be considered and discussed on an individual basis. They can play an important roll especially in the elimination of fragmentation or in fine-tuning the delimitation.

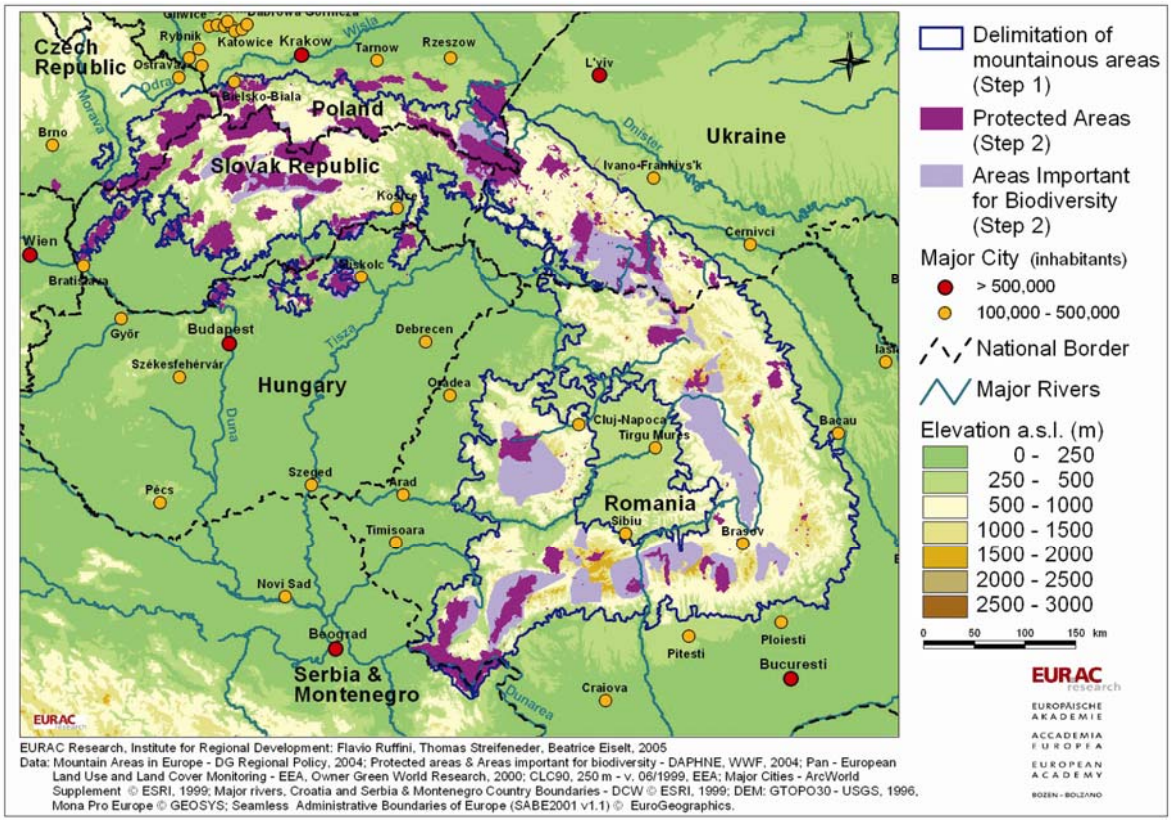


Fig. 58: *In step 2 the recommendation attained from step 1 is integrated with environmental protection aspects.*

Within the officially protected areas, the national parks are to be treated as special cases. Because of their size and significance they play an especially important roll in environmental protection. Beyond this, national parks represent an important factor for regional development in the affected communities (Broggi et al., 1999). Different examples can be cited here, in which environmental protection, agriculture, and tourism cooperate closely with each other (e.g. [nature] tourism, products from national park regions etc.) (CIPRA, 2002; Gündling, 2000) promoting sustainable development of the area. Especially national parks in mountain regions such partnerships are interesting approaches for implementing sustainable development policies at the local level. It is therefore recommended that communities which include parts of national parks should be fully incorporated in the convention area.

The areas declared by the WWF as having a high measure of biodiversity are a different issue. On the one hand from a technical point of view, it would be of great advantage that these areas be included. On the other hand, it must be considered that these areas possess no legally

binding protection status. A comparison shows though that all these areas with high biodiversity lie within the rough draft delimitation defined by step 1, with the exception of a small area in Hungary (Fig. 58). This area, though, will be integrated into the perimeter through the following steps.

3) In step 3 areas with semi-natural land cover and extensive land use are incorporated in the delimitation process (Fig. 59). These areas are especially interesting for environmental protection outside of officially protected areas, as well as for tourism. In the framework of this study the measurement “major forest areas” is used as a suitable indicator (Chap. 5.4.2). Furthermore, it would also be advantageous to incorporate exceptional, traditional culture landscapes as a further criterion. Unfortunately, it was not possible within the scope of this study.

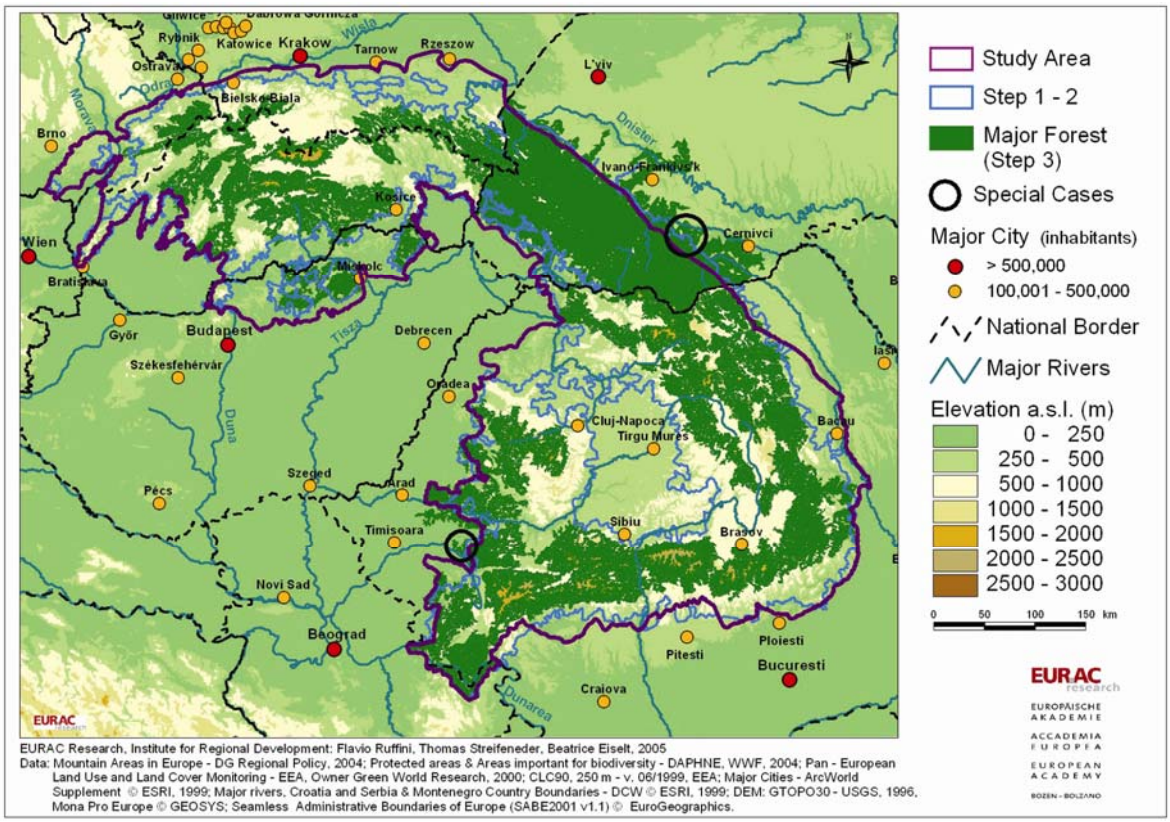


Fig. 59: *Step 3: In this step extensive land use aspects are integrated. To this end, the criterion “major forests” is used. Where the forest area extends beyond the study area (circles), detailed discussions should take place.*

In this step, the major forests which are situated within the study area are incorporated. Furthermore, as a matter of principal, all major forests are to be considered which reach beyond the study area (e.g. Ukraine). The decision to integrate these areas into the perimeter is to be considered from case to case using local and expertise criteria. This discussion is to be led under consideration of special natural landscape areas (forest structures, species habitat). In certain cases it can be important to completely integrate these forest landscapes to better

consider their functional relationships. The delimitation defined in step 2 is extended by the identified areas.

At this point also the distribution of river basins in the Carpathian region should be considered. Thereby and according to Chap. 5.6, river basins categories 3 and particularly 2 would meet best the small structured conditions in mountain regions. In order to integrate this aspect into the delimitation detailed information on the territory and the management strategies are necessary. Both where not available to an adequate extent within the framework of this study.

4) In step 4 it is investigated if structurally weak areas are considered in the present draft of the delimitation. In order to integrate structurally weak areas, this study uses the criteria, less-favoured mountain areas (LFA), defined in the Carpathian countries based on the Council Regulation (EC) No. 1257/1999 (Chap. 5.7.1). A comparison between the delimitation derived from the previous steps and the identified LFA shows that the LFA, for the most part, have already been integrated (Fig. 60). As yet unenclosed areas bordering directly on the mountain area should be included. The integration of further socio-economic data would be of advantage for the better understanding of the functional interrelationships, especially in the transitional areas (Tab. 14).

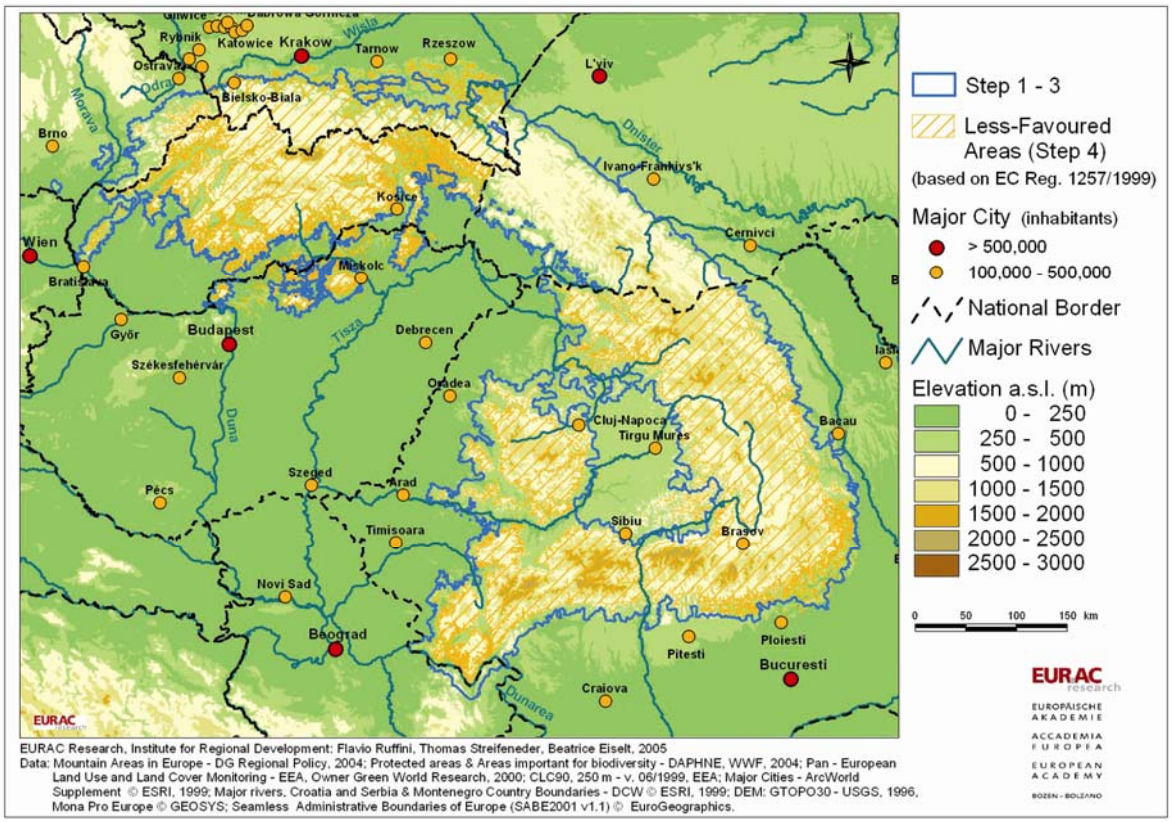
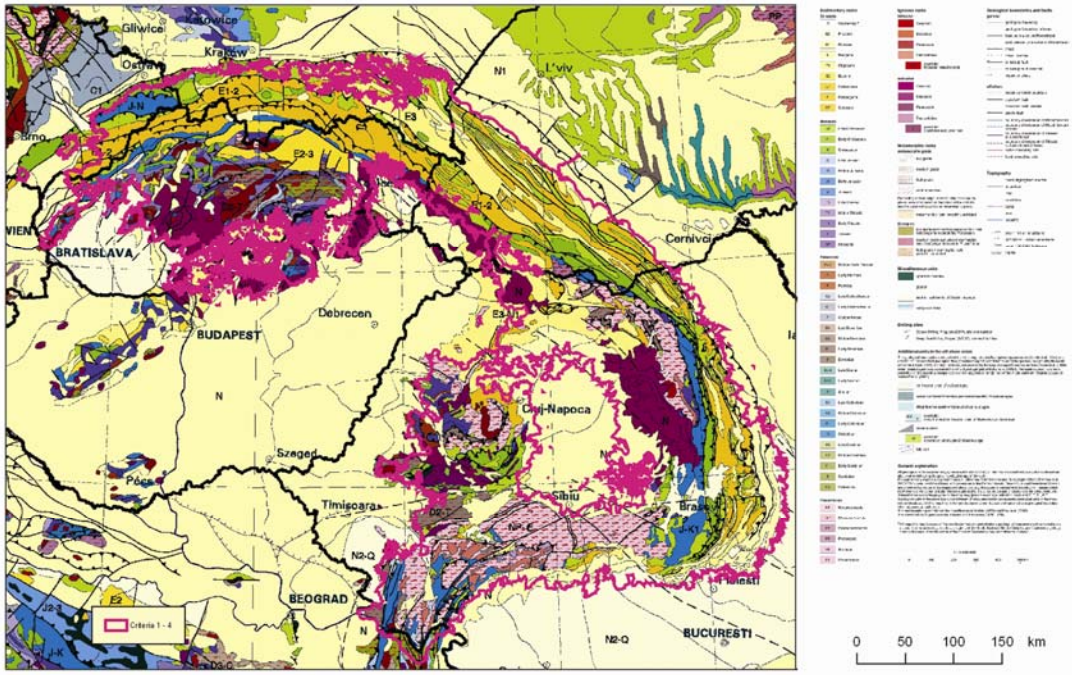


Fig. 60: *Step 4: Most of the areas defined by means of the LFA directives have already been taken into consideration by the previous steps.*

5) The purpose of step 5 is the elimination of any stronger fragmentation of the previously defined perimeter. The areas which remained isolated by the delimitation process and which are located within the study area are included in the perimeter as well as isolated areas of at least 2.5 km^2. Accumulations of “islands” in close proximity to the identified mountain area are also included.

   Small exclusions, or “holes” within the perimeter delimited in steps 1 to 4 are integrated. Natural landscape criteria, such as landscape units, geology (Fig. 61), and orography (Fig. 62, p. 100), serve as the main cartographical basis. They were used, for example, in the NP of Hungary (Chap. 4.3.1.2) and Romania (Chap. 4.3.1.4). It is not, however, the principle aim of this step to broaden the present delimitation.



EURAC Research, Institute for Regional Development: Flavio Ruffini, Thomas Streifeneder, Beatrice Eiselt, 2005
Data: Asch, K. (2005): 1 : 5 Million International Geological Map of Europe and Adjacent Areas - unpublished draft. BGR (Hannover); Proposed National Designation of the Carpathian Convention, Contact Points of the Carpathian Convention, 2004; Ecoregion, DAPHNE, WWF, 2004; Croatia and Serbia & Montenegro Country Boundaries - DCW © ESRI, 1999; Seamless Administrative Boundaries of Europe (SABE2001 v1.1) © EuroGeographics.

Fig. 61: *Step 5: The proposal resulting from steps 1 to 4 is broadened to include further natural aspects in order to eliminate fragmentation of the convention area.*

7.3.2 Level two: Fine-tuning

Within this delimitation level the transnationally defined convention area is adjusted to the local conditions and adapted to the administrative borders (Chap. 5.8). In this level the prerequisites for the efficient and effective implementation of the convention are to be set. To this end, economic and natural landscape features at a local scale are to be included in the delimitation.

At this level spatial interconnections between inner and outer Carpathians can be better considered. It is therefore appropriate that this delimitation step be carried out within each signatory state in collaboration with the subordinate administrative units. Adjusting the perimeter to the administrative borders also facilitates the implementation of the convention from the administrative-

technical point of view. The municipality level (LAU 2) seems to be best suited for local and regional projects in terms of sustainable development (e.g. Agenda 21). Municipalities also best reflect the small structured differences typical for mountain regions.

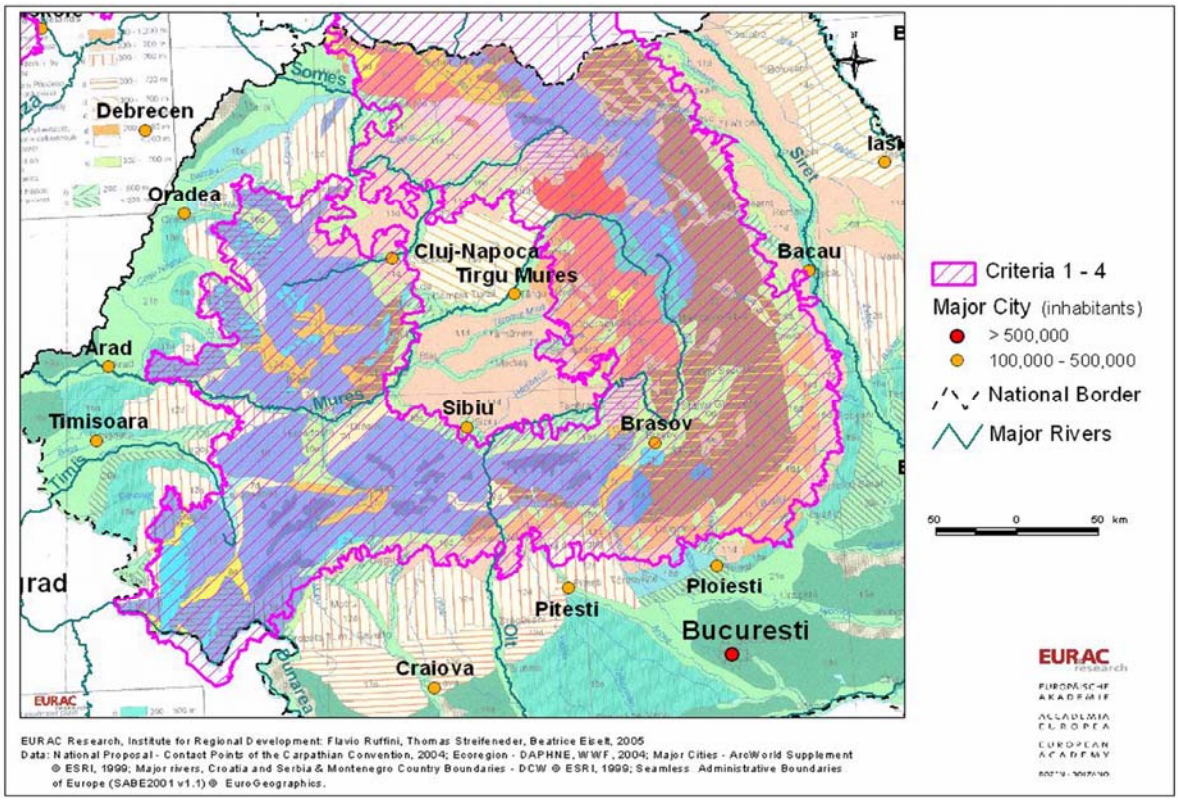


Fig. 62: *Step 5: Orography also represents an important basis for the delimitation of the convention perimeter. The map exemplifies this in the delimitation of the Romanian area.*

A delimitation based on a higher administrative level (NUTS 3 or LAU 1) would reach sometimes too far into the Carpathian forelands. The delimitation of the perimeter at the level of NUTS 3 or LAU 1 units is only practical where the greatest part of the municipalities (e.g. at least 75-80%) are included. If, though, only few municipalities of a higher NUTS or LAU level unit can be assigned to the convention area (e.g. less than 10% of the municipalities), then it should be discussed whether these NUTS 3 or LAU 1 units should be completely eliminated from the perimeter or not.

Threshold values are to be defined for converting the provisional convention perimeter into an administrative delimitation at the LAU 2 level. These threshold values define the proportion of the municipality territory to be situated within the delimitation previously defined for being incorporated in the final convention area. They are only relevant for municipalities which do not lie completely within the provisional convention perimeter. The threshold values can be differently established, or adapted to the local conditions of each country according to one of the following basic approaches:

- The municipalities through which the preliminary convention perimeter runs and of which a predetermined percentage of their area lies within the perimeter are to be integrated in the convention area. Regional distinctive features are to be decided upon case for case (e.g. large contiguous forests which would be subdivided by the border).

- For each municipality through which the preliminary border runs, it is examined which criterion could be decisive for inclusion within the perimeter. This enables a differentiated consideration and a qualitative evaluation. These municipalities will be integrated depending on the proportion of their area which meets one of the relevant criteria (e.g. proportion of a municipality which is under landscape protection). If several criteria are relevant for a municipality, then the fulfilment of only one is sufficient for inclusion in the convention area. Here too, local distinctive features such as large contiguous areas with high natural value are to be decided upon individually.

It must be considered that for the Ukrainian Carpathian area there is no data on municipality borders. For this part of the area the delimitation took place at the LAU 1 level. Because of their size, LAU 1 units are unsuited to depict the small structured characteristics of a mountain region. This hinders an optimal adjustment of the perimeter to the rough draft border. Consequently, some LAU 1 units reach relatively far into the forelands.

Approach A

In this approach a threshold value is to be defined which specifies what proportion of a municipality must lie within the perimeter in order to qualify for complete inclusion in the convention. Thereby, a uniform threshold valid throughout the Carpathians or simply a certain range can be defined. The latter allows the signatory states more leeway in accommodating local conditions.

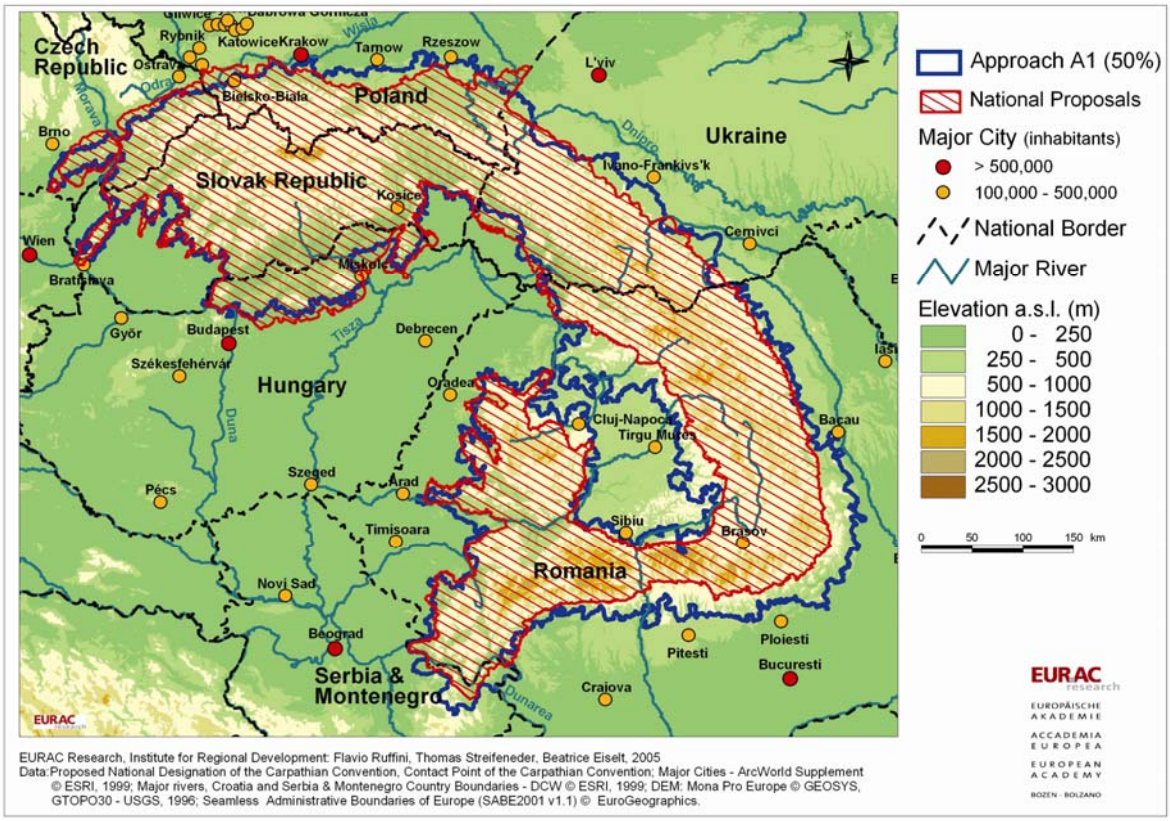


Fig. 63: *The convention perimeter using the approach described under A with a threshold value of 50%.*

As an example, the threshold values of 50% for approach A1 and 60% for A2 were defined for this study. Municipalities lying partially in national parks were already included in the perimeter in the first delimitation step. Both approaches are then to be checked for fragmentation and formation of islands. Fig. 63 shows the line the convention perimeter would take in the case of approach A1 and Fig. 64 that of A2. There are only slight differences related to single municipalities which are included or excluded.

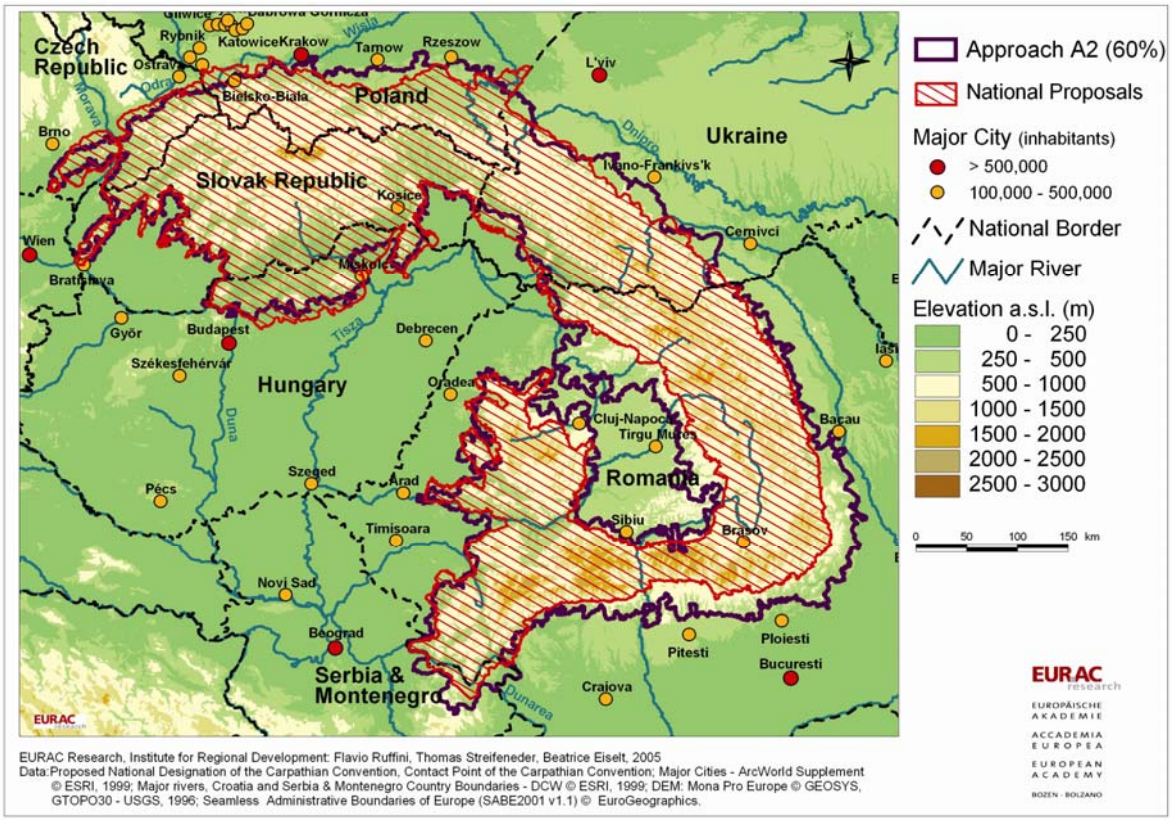


Fig. 64: *The convention perimeter using the approach described under A with a threshold value of 60%.*

Approach B

In this approach the proportion of the single municipalities that lies within the perimeter derived in Chap. 7.3.1 is not exclusively considered. Decisive for the definitive inclusion of a municipality within the perimeter is to what degree the selection criteria (nature protection, mountain area, LFA etc.) are effective in a municipality. Thereby, a threshold value is defined for each single criterion.

The values given in the following have an exemplary character. The authors are conscious of the fact that subjective assessments are the basis for the definition of these threshold values. Nevertheless, as a matter of principle, every country should rely on threshold values for the definitive delineation of the convention border. This makes it easier to keep the different steps transparent and, where necessary, to retrace them.

a) Mountain area

Based on the NR-MA (Chap. 5.3.2.2), all those municipalities are counted as convention area, where 50% of their territory is located within the mountain area.[53] This method is widely used in many delimitation approaches (among others, in almost all regional mountain area legislation in Italy).

b) Nature protection

- Municipalities with territory in national parks are completely included;
- For municipalities with territory in other protected areas a threshold value of 35% of a municipality's territory is defined;
- Furthermore, municipalities covered at least by 50% with large forests will be included.

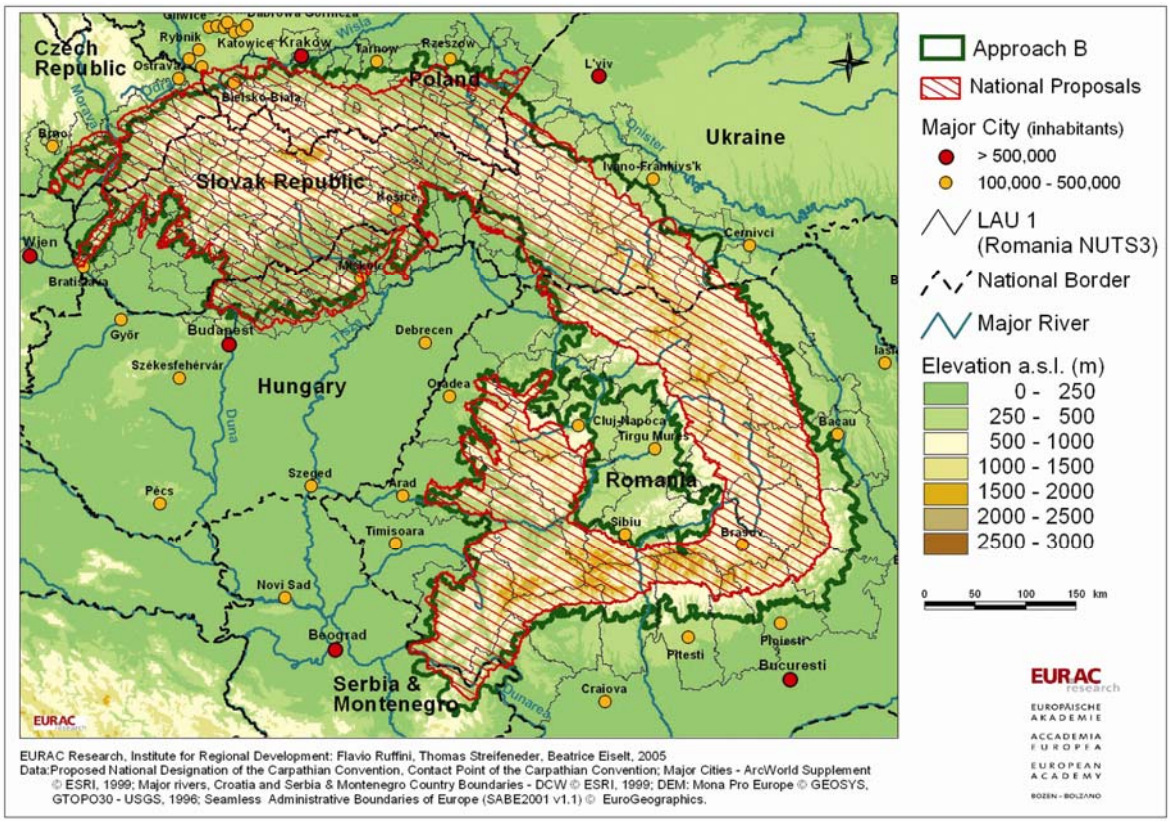


Fig. 65: *The convention perimeter using the approach described under B.*

In this approach too, the resulting perimeter is to be checked for fragmentation and formation of islands. To this end, all municipalities not already included and lying at least 60% within the perimeter defined in the rough draft are included in the rough draft.

Fig. 65 shows the results of this procedure. Approach B demands of the signatory states an ongoing adjustment and exchange of expertise. This facilitates discussions on implementation strategies already during the delimitation process.

[53] For the Ukraine only the physical criteria were used. In Serbia & Montenegro the study area was adopted for the southernmost extent of the border.

7.4 ANALYSIS OF THE RESULTS

In the framework of this study a four step procedure is shown which begins with the goals of the convention and delimits the Carpathians by means of transnational, uniform criteria. Based on the possible variations, the resulting exemplary convention perimeters (Fig. 66) are comparatively analysed and also compared to the existing NP. The main emphasis of the analysis is on the geographical characteristics of the delimitation proposals (area, number of municipalities, and area distribution in elevation classes). Already the graphic comparison (Fig. 66) shows that the different proposals differ clearly from the NP, but they are very similar to one another.

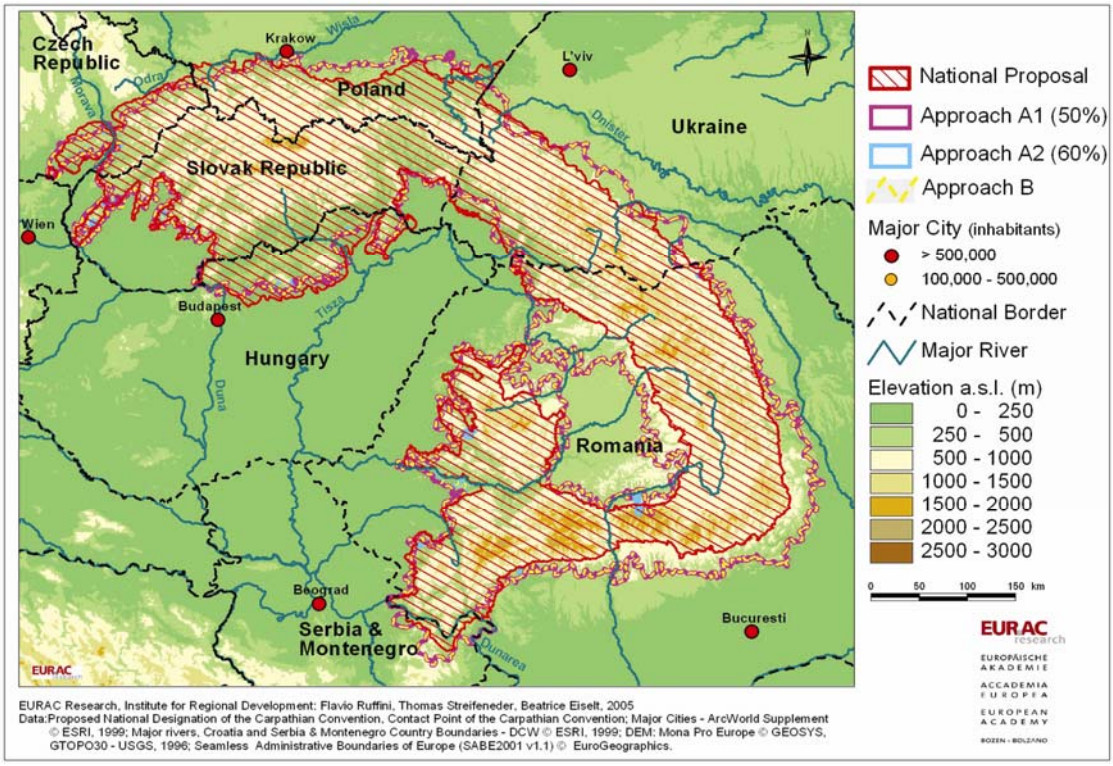


Fig. 66: *All approaches compared to the NP.*

The proposed delimitation resulting from approach A2 shows the least expansion with an area of 183,763 km^2 (Tab. 20). This is not surprising because it is based on the highest threshold value for the inclusion of municipalities into the perimeter during fine-tuning. The area resulting from approach A2 is approximately 1,000 km^2 smaller than that from approach A1, and 1,400 km^2 smaller than that from approach B. Expressed in percentage, though, this difference constitutes less than 1%. This small difference shows that the main characteristics of the convention area are already determined in the rough draft delimitation (Chap. 7.3.1).

In comparison to the NP, the derived delimitation proposals are approximately 14% larger. Whereby, the A2 proposal is larger than the NP by 21,957 km^2 and the B proposal by 22,900 km^2. No conclusions can be made about the effects of the Ukrainian delimitation, which is based on LAU level 1. Looking at the differences between the national proposals for the convention area and the perimeters derived here, one sees that the greatest relative increases can be found in Serbia &

Montenegro and Romania. In S&M this increase can especially be explained by the fact that the NP contains only the national park area and that the total area is very small. According to the approach followed here, every municipality affected by a national park is fully integrated into the perimeter, practically doubling the area. In absolute numbers the increase in Romania is greatest with 21,681 km² to 22,316 km², according to the approach is used. This is based on the fact that Romania did not include the foot hill area (Southern Subcarpathians) in spite of its elevation of up to 1200 m a.s.l. This becomes evident in a comparison between the NP and the orographic map (Fig. 62). These foothills are fully included in the proposals presented here. The areas proposed here for the Czech Republic and Hungary are somewhat smaller than in the NP.

Tab. 20: *The delimitation proposals according to area and country.*

Country	NP		Approach A1 (50%)		Approach A2 (60%)		Approach B	
	km²	%	km²	% of NP	km²	% of NP	km²	% of NP
CZ	7,124	4	6,005	-16	5,794	-19	5,873	-18
HU	9,626	6	7,789	-19	7,638	-21	7,701	-20
PL	17,263	11	18,514	7	18,380	6	18,380	6
RO	69,872	43	92,188	32	91,553	31	91,972	32
SK	35,050	22	35,395	1	35,129	0	35,511	1
S&M	761	< 1	2,084	174	2,084	174	2,084	174
UA	22,109	14	23,185	5	23,185	5	23,185	5
Total	**161,805**	**100**	**185,160**	**14**	**183,763**	**14**	**184,706**	**14**

Tab. 21: *Number of municipalities (LAU 2; UA: LAU 1) in the perimeter according to approach and country.*

Country	Number of municipalities within perimeter			
	National Proposal	Approach A1	Approach A2	Approach B
CZ	594	435	425	429
HU	475	373	368	370
PL	181	197	195	195
RO	655	927	919	925
SK	2,106	2,050	2,039	2,056
S&M	3	3	3	3
Total LAU 2	**4,014**	**3,985**	**3,949**	**3,978**
UA (LAU 1)*)	23	21	21	21
Total LAU 1 and 2	**4,037**	**4,006**	**3,970**	**3,999**

*) For the Ukraine no data on municipality borders was available. The number is based on regions (Rayons =LAU 1).

There are distinct differences between the NP and the proposals developed here in the number of affected municipalities (Tab. 21). In spite of the smaller size, the number of affected municipalities is highest in the NP. This can be explained by the differing average sizes of the municipalities in the Carpathian countries. The greatest difference in municipality numbers between the NP and the developed proposals can be found in CZ and HU, with fewer municipalities than in the NP, and in RO, with more municipalities than in the NP. The differences between the approaches themselves are very small.

The distribution of the convention area according to elevation classes (Tab. 22) does not show any big differences between the different approaches. In comparison to the NP, as well, the distribution is very similar. Just as in the NP, in all three approaches more than 80% of the designated convention area is lower than 1000 m. a.s.l., while, the proportion below 250m a.s.l. is only 9 to 10%. In absolute numbers, too, this lowest elevation level shows similar values in all three approaches as well as in the NP.

Tab. 22: *Comparison of approaches according to area and elevation class.*[54]

Elevation class	NP		Approach A1 (50%)		Approach A2 (60%)		Approach B	
a.s.l. (m)	km²	%	km²	%	km²	%	km²	%
0-250	15,565	10	16,794	9	16,078	9	16,516	9
250-500	44,032	27	58,695	32	58,155	32	58,525	32
500-1000	71,966	44	79,431	43	79,321	43	79,426	43
1000-1500	25,454	16	25,476	14	25,462	14	25,476	14
1500-2000	4,266	3	4,253	2	4,241	2	4,253	2
> 2000	522	<1	511	<1	505	<1	511	<1
Total	**161,805**	**100**	**185,160**	**100**	**183,762**	**100**	**184,707**	**100**

7.5 CONCLUDING REMARKS

The goal of this study is to present an approach for a transnational delimitation of the CC, based on homogenous criteria. This could represent a guideline for a common way to delimit the scope of application. The process developed started from the goals of the convention and resulted in a transnational and uniform approach. The area delimited consequently reflects essential goals of the convention, thereby fulfilling one of the most important prerequisites for the successful implementtation of the convention. The approach, however, is consciously kept “open and flexible”, and with further consultations the selected thematic aspects could be completed, for example with the structural indicators elaborated by EUROSTAT (2005, Tab. 14).

Furthermore, the project aims furthermore to develop one procedure among the many possible ones, which involves all the signatory states in the delimitation process. The process should intensify the discussion between the countries and increase the understanding for the differing local conditions, and it should help to create an atmosphere of trust between the countries. A good knowledge of the different situations in the Carpathian countries is an important precondition for an effective and efficient Carpathian-wide implementation of strategies and measures. This process may contribute to the endeavour of helping the development of mountain areas to find its way into public consciousness. In such a process mutual understanding for individual necessities is created and transnational approaches for solutions and projects are initiated - right from the beginning.

The example “Alpine Convention” underlines the importance of such a process. In the framework of the Alpine Convention, such a discussion was never held. The low level of understanding between the signatory states for the problems of the different Alpine regions is, among other things, one of the greatest difficulties for the successful implementation of the convention. Two of many possible ways to create such a homogeneous approach are presented in this study. In a first approach homogeneity can only refer to certain thematic aspects (e.g. mountain area, environmental pro-

[54] Mona ProEurope © GEOSYS, partly integrated with GTOPO distributed by the Land Processes Distributed Active Archive Center (LP DAAC). Online: http://lpdaac.usgs.gov, 10 Oct 2004.

tection, or river basins) defined by the CC and in common agreement of the Member States. Nevertheless, the interpretation, i.e. the exact definition by concrete indicators of these variables remains in the hands of the individual countries. This could be problematic, because the interpretations of each topic (e.g. mountain area) can differ strongly from country to country.

This becomes evident in the example of the delimitation of the Romanian Carpathian region (Fig. 67). Romania used the orographic map as the main criterion for its delimitation of the convention area, and therefore mainly based its approach on land forms. These land forms are defined by means of different variables (elevation, slope, geology, etc.) each based on selected criteria that differ from country to country. Consequently, there are different definitions of which orographic unit should be counted as mountain area or not. This leads to the incorporation or exclusion of certain areas in the Carpathian region. Based on these considerations, the criteria within each thematic aspect should also be commonly defined.

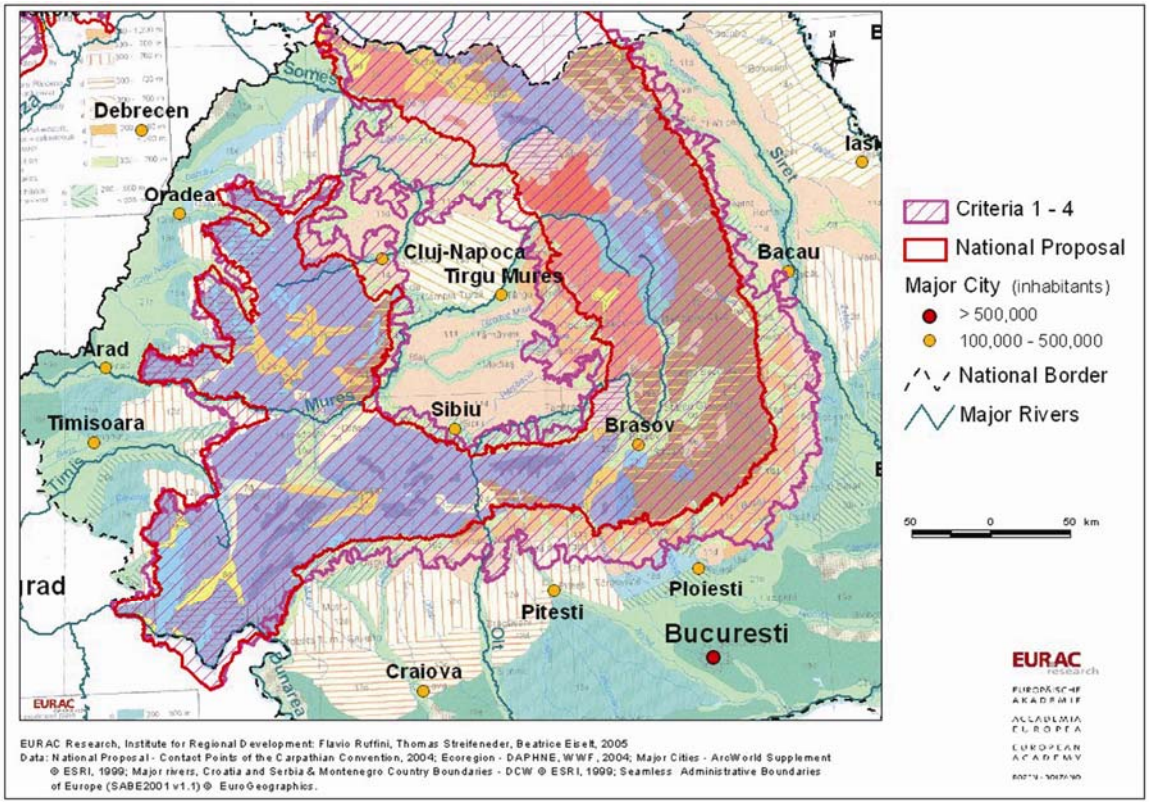


Fig. 67: *The delimitation approaches can be optimally based on orographic units as in the Romanian Carpathians. Due to differing definitions, they can encompass differing spaces. The NP of RO incorporates only orographic units, which are referred to as mountain areas. Hence the NP is a very narrowly defined delimitation approach, because foot hills (700-1,200 m a.s.l.) are excluded.*

The selection of the thematic aspects should therefore be defined in an integrated way (second approach). Applying landscape delimitation criteria, such as orographic units, alone, is insufficient to account for the collective aspect of the convention. Especially in the transition areas natural landscape features cannot sufficiently represent important interdependencies between the mountain area and the forelands. This can sometimes lead to minor discrepancies in the border areas. By taking the mountain area criteria of the NR-MA into consideration, though, these foothills are integrated. These interrelations are more thoroughly considered in an integrated approach which

also considers other aspects, such as socio-economy. However, the orographic map is well suited as a reference variable for the visualization of natural landscape criteria. Orographic units can thus be very useful for testing which landscape criteria should be integrated in the approach. A comparison of the delimitations with the orographic units shows a good correlation (Fig. 68). Such a transparent, holistic, and transnational comparative approach also ensures that the Carpathian region is similarly defined in all countries. This increases the convention's international credibility and simplifies its implementation. It also renders the approach more easily comprehensible for the public.

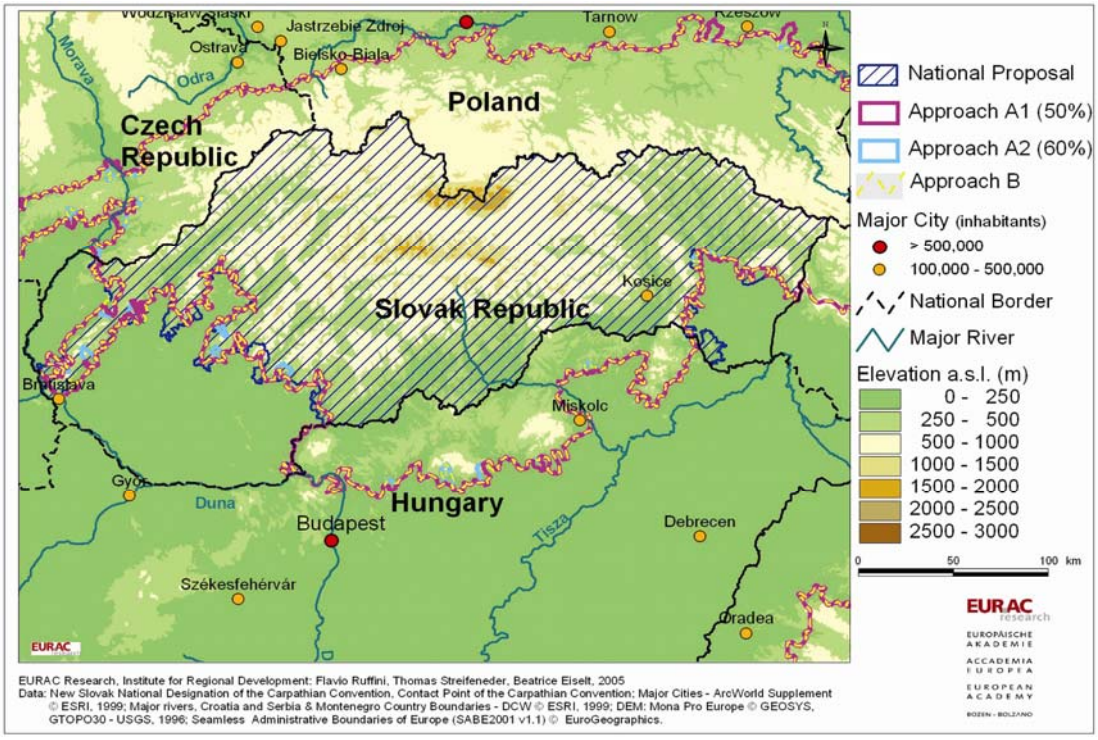


Fig. 68: *The new Slovakian NP (Sept 2005) compared to the delimitation proposals derived in this study.*

A further basis on which the results of the study can be tested is also the new NP presented by the Slovakian Republic in September of 2005 (Chap. 4.3.1.6). It is based on an approach similar to the one presented in this study. Small differences can be found in the west between the River Váh and the source area of the Radosinka (ca. 48 km^2), in the south-west on the lower reaches of the Stiavinca (ca. 88 km^2), in the east between the Ronyva-patal River, and in the source area of the Osva (ca. 170 km^2). The comparison of the delimitation resulting from the proposed approach B with the Slovakian NP shows an almost perfect agreement. This comparison confirms that the presented approach based on unified criteria leads to good results.

The approach developed is also a useful contribution to the delimitation of the area the Carpathian Environmental Outlook refers to. Finally, the approach represents a pilot project for the delimitation of a mountain convention area. Due to its transparency and the flexible integration of the main aspects of the CC and referring to international requirements it may be of help to other trans-border conventions as an adequate tool in defining their application areas. This becomes of real and pragmatic relevance, as the approach is also the result of a decision finding process involving seven countries with different expectations and differing cultural and historical backgrounds.

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ANNEX I: PROJECT STRUCTURE

The project “Scope of Application” represents a sub-project within the umbrella projects of the Cooperation for the Protection and Sustainable Development of the Carpathians (Fig. 69). These are moderated by UNEP-ROE (Regional Office Europe) and supported by the Italian Ministry of Environment and Territory. One focus of the umbrella project is the generation of proposals and approaches for the delineation of the area of the convention.

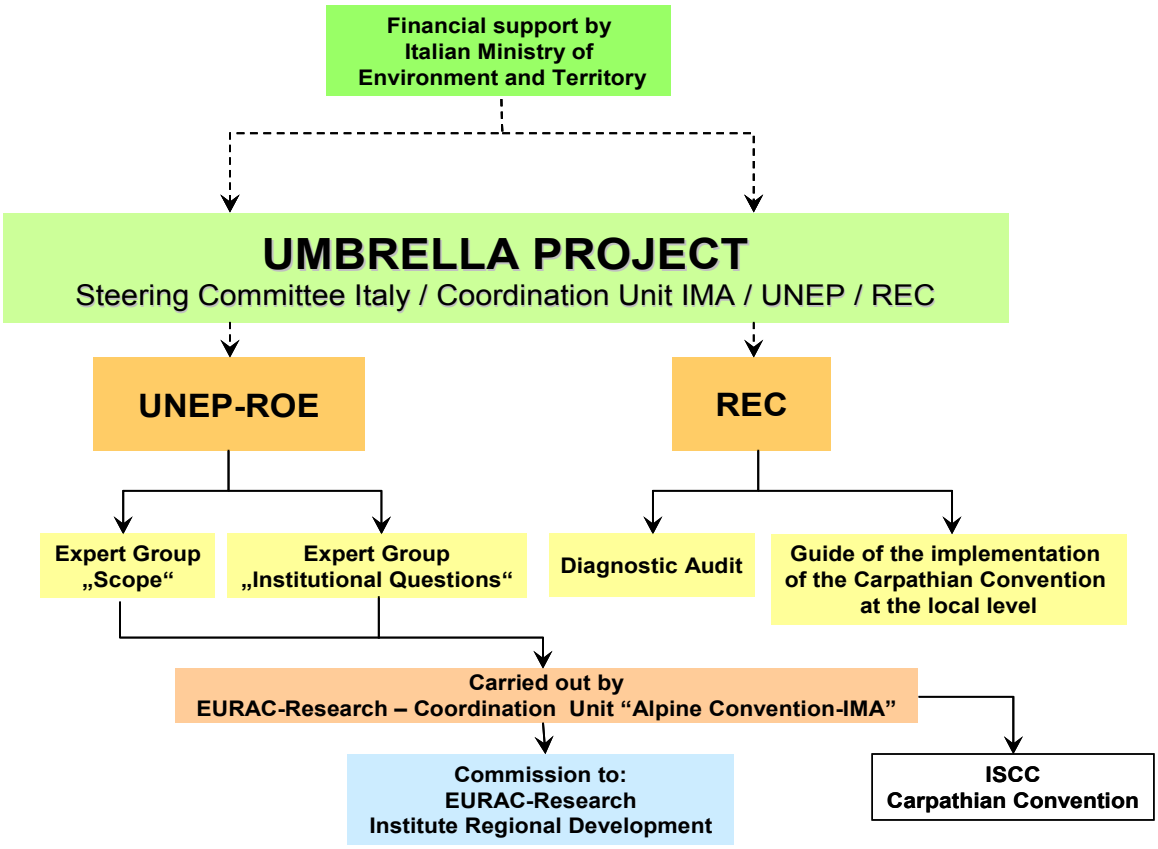

Fig. 69: *Project structure of the Carpathian Convention cooperation.*

ANNEX II: DEVELOPMENT OF THE CARPATHIAN CONVENTION

For mountain areas in general, and especially for those bordering with other states, a close transnational cooperation at the regional level is essential. An intensive exchange with other regions can reduce isolation and provide new impulses to social and economic development. This is the only way mountain areas can assert their positions and take advantage of their prospects, in spite of the disadvantages of remote and sometimes rugged locations. Cooperation and common action programs – in particular, regional legal instruments for trans-boundary cooperation – represent effective tools for the sustainable development of a mountain region (Euromontana, 2005; Buza & Turnock, 2004).

The Carpathian-Danube summit of April, 2001, in Bucharest and the resulting declaration can be regarded as the formal beginning of the history of the CC (Buza & Turnock, 2004). In 2001, UNEP-ROE was requested by the Government of Ukraine, to service a regional cooperation process, aiming at the protection and sustainable development of the Carpathians. Seven countries border to each other within this mountain range: Czech Republic, Hungary, Poland, Romania, Serbia & Montenegro, Slovak Republic and Ukraine (ISCC, 2004).

With the Alpine Convention, experience has already been gathered in international cooperation for the sustainable development of a whole mountain region. From this wealth of experience important impulses for the organisation of the CC can be won.

As a consequence UNEP-ROE promoted an Alpine-Carpathian partnership. This partnership was then initiated and launched in the United Nations (UN) International Year of the Mountains, in 2002, by the Ministry of Environment and Territory of Italy. The process was sustained by Austria, Liechtenstein, the Netherlands, and the WWF International.

At the *5th Ministerial Conference "Environment for Europe"* in Kiev, Ukraine, in May 2003, the Carpathian Countries adopted and signed the Framework Convention on the Protection and Sustainable Development of the Carpathians. "The Alpine Convention, serving as a model, has its first successor", stated Josef Pröll, Federal Minister for Agriculture, Forestry, Environment and Water Management of Austria (ISCC, 2004).

UNEP-ROE has been requested to act as the Interim Secretariat of the Carpathian Convention. On May 1st, 2004, the Office of UNEP Vienna - Interim Secretariat of the CC was opened. "With the opening of the UNEP Office in Vienna, a crucial and important element has been added to the UNEP family, whose primary task remains to inform and alert policy makers and the general public of global environmental trends and challenges, and to assist in translating these challenges into action on the ground. UNEP Vienna will help us to better collaborate with our sister agencies and partners in the region, and at the same time, assist in bringing the Carpathian and other important regional environmental agreements towards a successful implementation," said UNEP's Deputy Executive Director, Shafqat Kakakhel on the occasion of the opening of the UNEP Vienna office (ISCC, 2004).

In addition, UNEP Vienna will serve as UNEP's focal point for other Austrian-based international organisations, including the United Nations Industrial Development Organization (UNIDO), the Organization for Security and Co-operation in Europe (OSCE), the Secretariat of the International Commission for the Protection of the Danube River (ICPDR) and the Secretariat of the AC. This

Office will also facilitate UNEP's collaboration with the United Nations Development Programme (UNDP) - Office in Bratislava (Slovak Republic), and the Regional Environmental Centre (REC), in Szentendre (Hungary). The CC has so far received structural support and voluntary contributions by the Governments of Austria, the Czech Republic, Hungary, Switzerland, and the Slovak Republic (ISCC, 2004).

The Italian Ministry of Environment and Territory sponsors the Alpine-Carpathian cooperation and supports the work program of the CC. EURAC-Research is providing essential scientific support to the CC. On October 13, 2004, a collaboration agreement between UNEP-ROE and EURAC-Research was signed.

The Framework Convention on the Protection and Sustainable Development of the Carpathians is an international agreement, which has been adopted and signed by the seven participating countries. The CC provides a "framework of cooperation" outlining general objectives and principles of the cooperation. Hence, it does not assign any specific duties to its parties. It includes general provisions concerning the thematic areas of cooperation (Chap. 3.1), which can be further specified through decisions of a future "Conference of the Parties", as well as future protocols. Any party will be able to propose protocols to the convention.

The CC differs from the Alpine Convention in one important point: The financing of the convention. Contrary to the AC where the contributions are linked to the relative area and population, at the Conference of Plenipotentiaries (Kiev, May 2003), signatories decided to make a voluntary contribution to assist in meeting the core cost of the interim secretariat. Consequently the scope issue is not relevant for budgetary consideration.

To date, the Ukraine, Hungary, the Czech Republic, and Slovak Republic have ratified the Framework Convention, which entered into force in January 2006. In Poland too the ratification process stands shortly before completion (as of december 2005).[55]

Currently, substantive work is in progress on the thematic areas of the CC, which might qualify for the development of future protocols and/or programmatic or project based activities in support of the implementation of the Convention's work program. The First Intergovernmental Meeting of Signatories will be in 2006.

[55] Egerer, 28 Jul 2005.

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ANNEX IV: SELECTED MAPS