

SUSTAINABLE NATURAL LANDSCAPE MANAGEMENT IN THE ROMANIAN CARPATHIANS

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Abstract. The Romanian Carpathians cover about 910 km between the country's northern border (the Tisa valley) and the Danube Defile (Svinița), representing about 43 % of the whole chain. Referring to the national territory, they occupy 69,872 km² (27.8% of Romania's surface-area). The Romanian Carpathians represents a unique and dynamic environment, whose biggest asset is the great variety of natural landscape which is, nowadays, subject to environmental challenges related to land abandonment, habitat conversion and fragmentation, biodiversity loss, deforestation, pollution, overexploitation of natural resources, waste management etc. In order to protect the natural environment in the Romanian Carpathians, 22 major protected areas (8 natural parks, 12 national parks and 2 geoparks) totaling approximately 1 million hectares, as well as some 600 reserves and natural monuments totaling 50,000 hectares, were declared. The paper aims to analyze the main sustainable management measures for protecting and preserving natural landscape within Romanian Carpathians by means of environmental legislation, declaration of areas with ecological and landscape value as protected areas, urban plans requirements, forest management plans etc.

Keywords: landscape management, conservative framework, protected areas, Romanian Carpathians

1. Introduction

The Carpathian Mountains are the largest, longest and most twisted and fragmented mountain chain in Europe, overlaying eight countries: Czech Republic, Slovakia, Poland, Hungary, Ukraine, Romania, Serbia and Austria. The Romanian Carpathian Chain (over 43% of the entire Carpathian area) covers a surface of 69,872 km² and a length of 900 km. Its average height is 1,136 m, reaching an absolute altitude of 2,544 m in Moldoveanu Peak (Southern Carpathians) [3]; [5]; [16].

As an expression of both geographical diversity and local evolution of human-environment relations over time, the Romanian Carpathians mirrors unique and rich natural landscapes whose main traits are typical for this area through the preservation of the longest volcanic range in Europe having over 2,000 mineral springs, with rich biodiversity, a great number of large carnivores (about 8000 brown bears, 4000 wolves and 3000 lynx), a large area covered with forests and semi-natural areas (about 73%) with expanded areas of virgin forests (200,000 ha out of a total area of 220,000 ha), 1/3 of Europe's flora with over 200 endemic species etc.

The Carpathian Mountains's natural capital is of European and global significance, by hosting ecosystem benefits such as food and fibre and providing growing opportunities for tourism and recreation, flood protection and carbon sequestration

2. Conceptual and methodological framework

The environmental issues affecting European modern society are primarily related to landscape degradation, biodiversity loss and climate change, entailing an integrated assessment and management. Landscape management means action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonies changes which are brought about by social, economic and environmental processes [8]. The global importance of mountain regions was primary stressed in 1992 by the United Nations Conference on Environment and Development, held in Rio de Janeiro and the term sustainable mountain development appeared firstly in Agenda 21 (Chapter 13): Managing fragile ecosystems: Sustainable

mountain development. The large-scale recognition of the importance of mountains was further underlined by the designation of the year 2002 as the International Year of Mountains (IYM) by the General Assembly of the United Nations.

The Carpathian Convention [15] recommends as key measures aimed at the protection and sustainable development of the Carpathians the following: policies aiming at conservation, restoration and sustainable use of biological and landscape diversity of the Carpathians, integration of the objective of conservation and sustainable use of biological and landscape diversity into sectoral policies, participation of regional and local authorities and other stakeholders, international cooperation, pursuing policies of spatial planning etc., also seen as general obligation for each signatory party.

The Technical Report Mountain Areas in Europe: Analysis of mountain areas in EU member states, acceding and other European countries (2004) proposes as national policies and instruments for mountain protection in Europe [13]. The natural landscape management could be tackled by means of various methods, mostly related to landscape planning, joint policies and programmes etc. Some countries deal with landscape management concept based on strategic approach (community-business-government partnerships), thus stressing the need to increase non-government sector involvement [1]; [6]. When referring to natural landscape conservation, the focus is on the specific regions delineated and managed as protected areas [9] but when discussing the urban areas and their surroundings within mountain areas, the focal point is given by the concepts extracted from the urban planning documents such as green-yellow belts, greenways etc. [7].

3. Results

The authors aimed at assessing and identifying the best management measures in terms of natural landscape protection in the Romanian Carpathians based on the main environmental stressors. Therefore, the first step was to identify the major human impact categories in the study-area (settlements expansion, over-grazing, deforestation, mining activities and unsustainable tourism) based on storing, querying, and processing different available geographic information and spatial data such as: census data and scientific references in terms of population, settlements, cattle, forest cover, mining exploitations, tourist activities as well as cartographic data (topographic maps and satellite

images). Based on the above mentioned outcomes and on the already existent practices, the authors were able to categorize and analyse the major natural landscape measures able to preserve the natural landscape of the Romanian Carpathians in line with their characteristic features: *environmental legislation, scientific research projects, preservation measures, management of protected areas, urban planning and forest management plans.*

Legislative framework. The Romanian legislation, standing up for landscape management includes a large number of organic laws applied to the environmental factors' level or protected areas and a wide range of legislative initiatives as a result of the legitimization of the proposals and suggestions made at the European level before and after the EU accession by transposing chapter 22 from the Community Acquis in the national legislation and the EU Treaties and Agreements, as well. There can also be added the ratification of International Conventions and Conferences by means of different laws, decrees and government decisions, Provisions of the conventions related to the Carpathian Mountains that Romania has signed (e.g. Carpathian Convention, Biodiversity Convention) as well as Carpathian Convention projects (Carpathian Environment Outlook – KEO, Carpathian Network of Protected Areas – CNPA, Sustainable Agriculture and Rural Development in Mountains (SARD-M) – Carpathians etc.) and joint strategies and policies such as The Carpathian EcoRegion Initiative (CERI) aimed at the integrated conservation of the whole natural and cultural heritage and the sustainable development of this region. But, the diversity of legislative documents and the lack application tools determine an important environmental conflict in terms of laws versus their efficiency to reducing or minimizing the impacts of human activity, both on the natural environment and on humanity itself.

Scientific framework have an important role in garnering human and financial resources to undertake nationally and internationally research projects in integrated landscape science, to improve understanding of how ecosystems function and provide decision support tools for landscape managers. The already existent different financial instruments will play an important role in building research capability to influence both policy development and management.

Some of the financial instruments for assessing landscape management in the Romanian Carpathians are PHARE CBC projects (Apuseni Natural Park - in cooperation with Hungary), LIFE projects (Piatra Craiului Mountains - 2 projects,

Domogled – Valea Cernei National Park, Vrancea Mountains, Retezat Mountains, Iron Gates Natural Park), GEF Medium Size Projects (UNDP) in Maramureş Mountains, World Bank Project - Biodiversity Conservation Management (Piatra Craiului Mountains, Retezat Mountains, Vânători Neamţ Natural Park) etc.

Over 1999-2000 period, with GEF support, the first national and natural park administrations were established and management plans developed and partly implemented for Retezat National Park, Piatra Craiului National Park as well as Vânători Neamţ Natural Park. The GEF support continued and some financial resources were allocated by the National Forest Administration and other institutions, for the establishment of management teams for most of the national and natural parks. Significant support for protection activities has been financed through EU and various governmental and private funds, including the Dutch MATRA programme.

An ongoing WWF programme supported by the MAVA Foundation has been providing significant training and support for protected area professionals in Romania and other parts of the Carpathian Mountains. Hence, Romania should join the Financial Framework adopted for the European Union (2007-2013) by improving its capacity of absorbing the EU funds for two of the three community objectives: convergence and regional territorial cooperation.

Under the convergence objective co-funded by European Regional Development Fund (ERDF) and the Cohesion Fund (CF), Romania could access structural funds by means of 7 Operational Programmes for transport, environment, competitiveness, human resources, regional, technical assistance and administrative capacity. For landscape conservation in the Romanian Carpathians, the most used financial tool is the Operational Programme Environment (SOP ENV) which has as main objective to improve the living standards and the environment, focusing on meeting the European legislation in this respect. Therefore, in 2007, in the Romanian Carpathians, 10 projects were financed out of 15 submitted ideas and in 2010, 9 project proposals were submitted.

The regional territorial cooperation objective, mainly financed by the European Regional Development Fund (ERDF), is aimed at supporting the harmonious and balanced integration of the EU territory by stimulating cooperation in regions of high importance by means of cross-border cooperation programmes, transnational cooperation programmes (South East Europe) and interregional cooperation programmes (INTERREG IVC,

ESPO 2013 etc.). One of the most important projects developed in the Carpathian Chain was EU INTERREG IIIB CADSES “Carpathian Project” which contributed to the enhancement of the sustainable development of the Carpathian region based on its rich natural and cultural heritage covering the contents of the Carpathian Convention. Other important financial tools for the sustainable management of the natural landscape in the Carpathian region are conferred by the projects developed in the framework of the Carpathian EcoRegion Initiative-CERI (Development of a Carpathian Ecological Network: Strengthening the Capacities of the Carpathian EcoRegion Initiative (CERI) in Supporting the Implementation of the Carpathian Convention; World of Carpathians – Awareness Raising about the Carpathian Biodiversity etc.).

Conservative framework is shaped to shelter and preserve a wide variety of rare plants and animals, exceptional landforms, fossiliferous points and different geological sites based on different management objectives and measures according to each protected area’s particularities. The most efficient way of natural landscape protection is the declaration and sustainable management of the protected areas, achieved in Romania especially after the fall of the communist period (1990) when one can notice a considerable increase especially in terms of natural/national parks versus natural reserves (Figure 1).

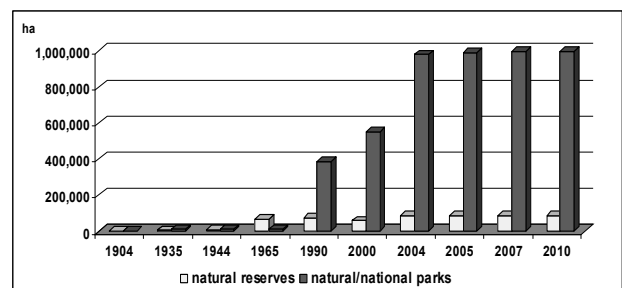


Figure 1. Protected areas dynamics in the Romanian Carpathians

The first major preoccupations on the protection of natural landscape in the Romanian Carpathians are related to the Decree no. 7/1990, when 12 National Parks were established, followed by a decade of lower involvement of the authorities in this issue, until 2000 when, by means of Law no. 5/2000, the first official list of protected areas was approved.

The year 2003 was other important milestone in the natural landscape protection of the Romanian Carpathians when the focus was on defining the limits, the inner zonation and the administration

patterns for the management of the protected areas (Decree no. 552/2003 and Government Decision no. 230/2003). This process had continued between 2004 and 2007 based on the provisions of the Government Decisions no. 2151/2004, 1581/2004 and 1143/2007, when more protected areas have been established covering a surface of over 450,000 hectares. After the EU accession (2007), Romania had to reach a 17% protected surface of the national territory (from 7% as it has previously been) by means of other important conservative tools, such as “Natura 2000” European Network (273 Sites of Community Interest - 3,291,854.6 ha and 108 Special Protected Areas - 2,988,713.6 ha). Based on the above mentioned legislative measures and on their natural assets, Romanian Carpathians are displaying the highest degree of protected areas in Romania is located in the mountain area distributed as follows: 47.8% in the Southern Carpathians, 34.83% in the Eastern Carpathians and 17.37% in the Banat and Apuseni Carpathians.

Romania is preserving a wide variety of landscapes little altered by human activity. Protecting them is a must not only to save the valuable vegetal associations and plant species, but also to ensure sustainable development in order to offer future generations equal opportunities with the present generation. Currently, nature protection devolves largely on the Romanian Academy’s Commission for the Protection of the Monuments of Nature established in 1950.

Nowadays the Romanian Carpathian Chain holds 22 major protected areas (8 natural parks, 12 national parks and 2 geoparks) covering approximately 1 million hectares and more than 600 reserves and natural monuments totalling over 50,000 hectares [2]; [4] (Figure 2). Among these protected areas, Slatioara Secular Forest is the oldest Romanian natural reserve established in 1904, having a 400 ha surface and Retezat National Park is the first national park, established in 1935.

At the Fourth International Session of the Man-Biosphere Programme (Paris, November 19–28, 1979), a proposal was made to the effect of having the Retezat National Park and the Pietrosu Mare (the Rodna Mountains) declared biosphere reserves. The proposal was accepted on January 10, 1980 when the above mentioned protected areas become Natural Parks Biosphere Reserves and included on the UNESCO World Heritage List. Iron Gates Natural Park and Maramures Mountains Natural Park are about to become the only triple-status protected areas in Romania by acceding the Biosphere Reserve and Transboundary Protected Areas (TBPA), besides the already existing Natural Park status.

Each country (is also the case of Romania) has promoted its own protected area categories but in order to avoid confusions related to their denomination and conservative objectives, IUCN has developed and defined six main international categories in order to assure a global standard for planning and management.

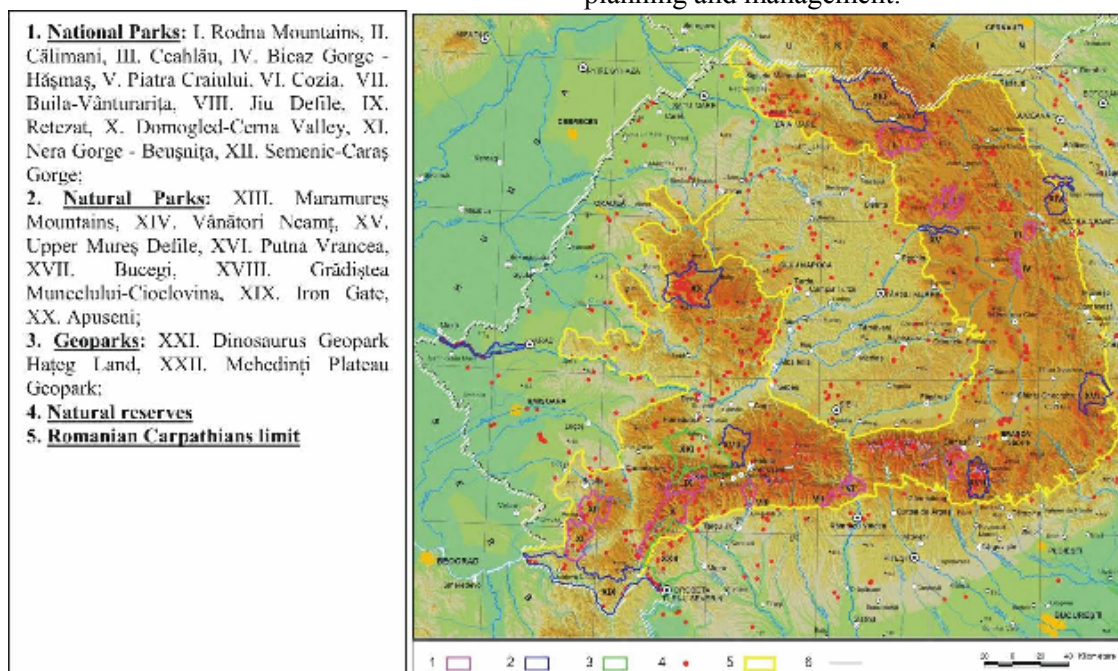


Figure 2. Protected areas in the Romanian Carpathians (2010)

IUCN classification is mainly based on the degree of human impact, only the first 5 categories have as main goal biodiversity conservation. In other words, the IUCN categories appeared as a compromise between conservation measures and the increasing resource demand of population. In the Romanian Carpathians, the natural protected areas correspond to I-V IUCN categories.

Their surface has increased over the last 8 years from 5% in 2000 to 17% in 2008, mainly as a consequence of Romania's EU accession, when the conservative measures should have been taken in accordance with Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) and Birds Directive (Council Directive 79/409/EEC on the conservation of wild birds).

The Scientific Reserve category corresponds to Ia - Strict Nature Reserve IUCN category which usually covers surfaces from several hectares (e.g. Piatra Rea Reserve in Rodna Mountains having 50 ha preserving among its main endangered species *Leontopodium alpinum*) to hundreds of hectares (e.g. Gemenele Reserve in Retezat National Park covering 1600 ha and conserving intact primeval forest).

Within this protected area category, more access is permitted only to a small number of visitors and mainly for research or education purposes. Most of the large areas that qualify as wilderness areas in the Carpathian Mountains of Romania are included in national and natural parks. The 12 National Parks (300.000 ha), equivalent of the II - National Park IUCN category, aims at ecosystems' protection and recreation where the use of natural resources or any other human activities, except visitor access, is forbidden. Some of the alpine and subalpine pastures can be used by local communities for grazing to continue traditional activities and to contribute to the maintenance of some specific biodiversity situations.

However, areas ranging from a few thousand to 60 thousand hectares of forest landscapes are well preserved in these national parks with little or no human activity allowed. Within these core areas (150.000 ha), large tracks of old growth forests are still present. National Parks have three basic functions - scientific, socio-educational and economic - and they are divided into two sectors: a strictly protected zone and a protected zone.

The Monuments of Nature corresponds to III - Natural Monument IUCN category having among its main objectives the conservation of the outstanding natural features and their associated values. E.g. "12 Apostoli" - The 12 Apostles

(Călimani Mountains), "Zmeilor" - The Kite's Cave and "Focul Viu" - The living Fire Glacier (Bihor Mountains) etc.

The Nature Reserves correspond to IV - Habitat/Species Management Area IUCN category focusing on conservation by means of active management measures and having as main objective maintaining, preserving and renewing of species and habitats. The 10 Natural Parks (697.706 ha), correspond to V - Protected Landscape/Seascape IUCN category. Their main goal is related to landscape conservation maintaining a balance with the human activity by promoting and encouraging traditional activities and culture. Natural Parks are usually located in disadvantaged areas with socio-economical problems (border areas, isolated areas etc.) offering a sustainable alternative in keeping a balance between the natural environment and economic activities. The Ib - Wilderness Area and VI - Managed Resource Protected Area IUCN categories do not have any correspondence to the Romanian legislation in terms of nature protection.

The above mentioned IUCN categories are also overlapping with the **Natura 2000 Network** (SPAs - Special Protection Areas and SCIs - Sites of Community Importance) aiming to protect wildlife and its habitats, whose surface is not definitively established (Figure 3 and Table 2).

In this case, the national authority responsible for the protected areas in Romania is hardly starting the process (January, 2010) of handing out the Natura 2000 sites to different legal entities (NGOs, economic agencies, research institutes, local authorities etc.) in order to manage them.

The other IUCN protected areas categories from the Romanian Carpathians already have been taken into administration (National and Natural Parks, except for the Upper Mureş Defile Natural Park) or custody (natural monuments and natural reserves).

Protected areas' management plans are the main tool to guide the development and management of a protected area by improving the use of human and financial resources, communication with stakeholders and public, promoting monitoring and evaluation activities etc.

Among the 22 natural and national parks, only two (Retezat Mountains and Piatra Craiului National Parks) have the management plans agreed by the Ministry of Environment. The rest of them, except for the Mureş Defile, as a consequence of a legal vacuum (the authority, who gives the counsel for being approved by the ME, was just established in 2010), don't have the management plans approved.

Table 2. Natura 2000 sites in the Romanian Carpathians

Relief unit	Number		Surface (ha)		% of the national territory		% of the SCIs/SPAs in Romania	
	SCIs	SPAs	SCIs	SPAs	SCIs	SPAs	SCIs	SPAs
Eastern Carpathians	63	14	606,674	361,122	2.54	1.51	18.43	12.08
Southern Carpathians	22	6	822,675	320,267	3.45	1.34	24.99	10.72
Western Romanian Carpathians	33	6	455,476	356,624	1.91	1.50	13.84	11.93
TOTAL	118	26	1,884,825	1,038,013	7.91	4.35	57.26	34.73

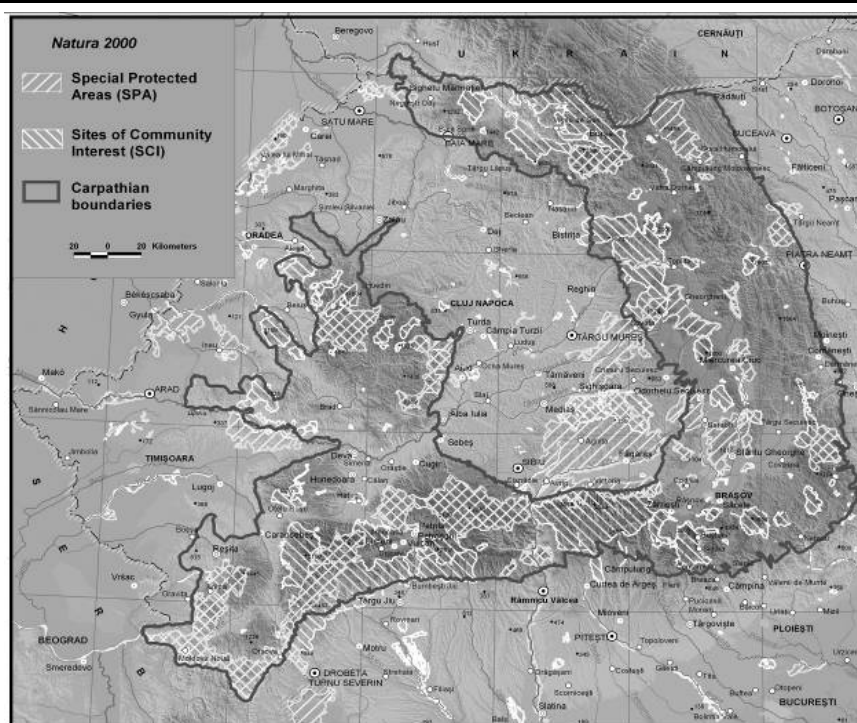


Figure 3. Natura 2000 sites in the Romanian Carpathians

Additionally, of a great importance is the support of the National Forest Administration for the 18 National and Natural Parks administrations (which are under its supervision) through enabling management contracts with Ministry of Environment and Forestry providing an minimum annual budget of 3 mil \$ (usually overrunned) and a financial support for about 300 employees (continuously decreasing within the economic crises context).

One of the most important issues in terms of protected areas' management is related to the conflict between the protected areas' managers and the land owners because of the lack of compensations offered for the latter in exchange of respecting the restrictions imposed by resources exploitation.

According to Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) evaluation, achieved by WWF in 2006, the main pressures and threatens of the national parks are

related to: wood exploitation, land use changes, poaching, hydropower works, and for the natural parks: land use changes, loss of traditional habits, wood exploitation, waste management and build-up areas.

Urban planning. Human activities within the protected areas can be managed and controlled by a consistent body of rules and laws in terms of landscape management operating in a sustainable framework. According to the provisions of Law no. 350/2001, the central and local public administration authorities are responsible for the territorial and urban planning activities. At National level, the Central Government (specialized authority is the Ministry for Transport, Construction and Tourism) establishes priority programmes, directives and sectorial policies. National Plan for Territorial Planning (PATN) is the most important legal document in terms of territorial planning. It has seven sections, out of which Section III – Protected areas, Law no.5/2000, which provides the protection

for natural built inheritance of national interest and Section V – Natural risk zones by landslides, inundations and earthquakes, Law no.575/2001 are the most important in terms of sustainable landscape management in the Romanian Carpathians. Zonal Territorial Planning Plans (PATZ) and County Territorial Planning Plans (PATJ) include provisions related to landscape protection, territorial cooperation, waste management etc.

At local level, Local Councils are responsible for the entire activity of Urban Planning carried on the administrative-territorial unit level, ensuring the compliance of the provisions of the National Territorial Planning documentation. These documents (Zonal Territorial Plan-PUZ, General Urban Plan-PUG and Detailed Urban Plan-PUD) ensure a balanced development between urban development and landscape protection. Therefore, urban planning documents include provisions aiming to reduce urban sprawl in terms of controlling new build-up spaces especially within protected areas, building green-yellow belts around cities, providing proper environmental facilities etc., and reduce its negative impact upon the natural landscape.

Forest management plans are documents used by foresters for a period of 10 years in order to ensure the sustainable development of the forests by dividing forest vegetation into functional groups, sub-groups and categories. Forest Management Plans strive to meet goals and objectives related to protecting natural resources, maintaining in balance the economic, ecological and social values of forested parcels, to preserving healthy forest ecosystems through active management, to increasing economic, environmental, and social benefits the property provides, to maintaining natural vegetation systems by addressing removal of noxious and invasive plant species etc. For the protection and sustainable management of the natural landscape within the Romanian Carpathians, the most important functional groups are [12]: forests meant to protect water (forests located along water streams), forests meant to protect the soil (all forest patches); forest meant to protect the damaging climatic and industrial factors (those located in the proximity of all urban centres and those located along transport lines); forest with recreation functions and forest with scientific functions within protected areas (Figure 4).

The Romanian Carpathians host the largest surface covered with forest not only in Romania but in Europe (about 500,000 ha), enclosing the last pristine forests (242,100 ha) out of which the widest

part is distributed within the existing protected areas (42.73%).

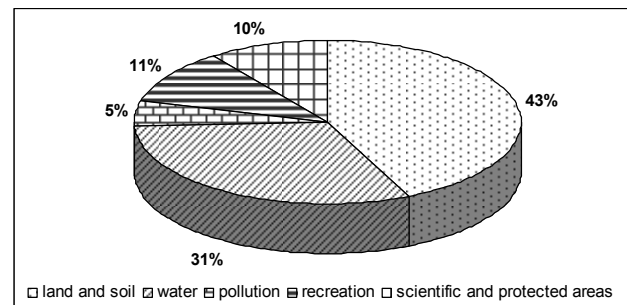


Figure 4. The main functional groups in the protection of natural landscape

This situation is granted by a concentration of high biodiversity and valuable landscapes with good legal protection offered by the complex of seven national/natural parks (Retezat, Domogled-Valea Cernei, Cheile Nerei-Beușnița, Semenic-Cheile Carașului, Valea Jiului, Porțile de Fier, Grădiștea Muncelului-Cioclovina) and two geoparks (Țara Hațegului and Platoul Mehedinți). This large complex of protected areas covers a large part of the last Intact Forest Landscape (IFL) on the European continent [14]. A study developed under the coordination of Greenpeace mapped the areas of forest landscape (larger than 500 sq. km) across the world with no or very low human disturbance. The last “green spot” of IFL on the European map (if Scandinavian countries and Russia are excluded), is located in Romania, in the south-western part of the Carpathians (Table 3). Almost 90% of the IFL is already included in the existing protected areas, but management measures are not yet adapted to support maintenance of their exceptional values. The IFL concept is not defined and accepted in the Romanian legislation or in the conservation management practices, although the exceptional and unique value of the area was confirmed through a study of the Romanian Ministry of Environment and Forestry. Human-induced pressures are high on this area, especially related to transportation and tourism infrastructure and forestry.

4. Discussions and conclusions

In the Romanian Carpathians, natural landscape protection is covered by a great number of strategies, action plans, programmes and projects which are partly put into practice.

Table 3. The area covered by pristine forests in the Romanian Carpathians

Geographical Unit	Area of old-growth forests		In existing protected areas	
	ha	%	ha	%
Eastern Carpathians	54,300	22.1	14,249	5.8
Southern Carpathians	151,200	61.3	20,481	8.3
Western Romanian Carpathians	36,600	14.8	42,730	17.3
Romanian Carpathians	242,100	98.2	42,730	17.3

Source: [10]

Preserving the natural capital is to be required in order assure the appropriate living conditions for its inhabitants, under the sustainable use of the renewable and non-renewable natural resources. For that matter, are to be taken into account public awareness and education programs, international cooperation and partnerships with other countries from the Carpathian area as well as national level strategic and policies in terms of: sustainable exploitation of mountain resources; improvement of forest management including forestations; involvement of the local authorities and protected

areas stuff in conserving the natural landscape features; control of the illegal deforestations and hunting especially within the protected areas; improving the actual legislation regarding the conservation of natural environment; improving the capacity of putting into practice the already existent laws, including partnerships with different national authorities; assuring an appropriate environmental infrastructure (water supply system, sewage system, gas supply etc.) in order to avoid waste water discharge, forest cutting etc.

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