RESEARCH ON HIGH CONSERVATION VALUE FORESTS OF VLADEASA MOUNTAINS TO ESTABLISH PROTECTION MEASURES

Burescu Laviniu Ioan Nuțu*

* University of Oradea, Faculty of Environmental Protection, Gen.Magheru st., no.26, 410048, Oradea, Romania

Abstract
The aim of the research undertaken in Vladeasa Mountains was to determine high conservation values and the forests embedding such values. Following the field research and the review of the scientific material, the results present the high conservation value(HCV) of the Remeti Forest District i.e. Forest Unit I Boceasa, within Bihor County territory.
These values are as follows: 55 endangered, endemic and relict plant species (i.e. HCV 1.2., HCV 1.3.), 38 species of endangered and threatened animals (HCV 1.2, HCV 1.3.), and 256 rare, threatened and endangered ecosystems (HCV 3, HCV 4).

Key words: forests, high conservation values.

INTRODUCTION

Among terrestrial ecosystems, the forests, as many as there have been still saved, preserve an important part of land biodiversity and eco-diversity. For a long time the Earth has felt an urgent need to protect the forests embedding the highest diversity in order to avoid its loss.

Of particular importance for biodiversity conservation and forest eco-diversity on our continent were the Ministerial Conferences on the Protection of Forests in Europe, namely the first conference held in Strasbourg (1990), the second conference held in Helsinki (1993), the third conference held in Lisbon (1998), and the fourth conference held in Vienna (2003).

In this context there occurred special concerns on forest certification and the conservation of bio- and eco-diversity i.e. see Abrudan (2001), Abrudan et al. (2009), Biriş (2004), Biriş and Veen (2005), Bogdan et al. (2009), Giurgiu (2001), Ioraş and Abrudan (2007), Jennings et al. (2003), Nicolaescu (2000), Radu et al. (2004), Stăncioiu et al. (2008), Stăncioiu et al. (2010), Vlad et al. (1997).

In Romania, in 2004-2005, a practical guide on identifying forest containing such species and ecosystems was developed in order to be used in the forests certification proceedings.

1. National toolkit on the identification and management of high conservation value forests (HCVF)

Through the cooperation of WWF Romania and IKEA, in 2004 it was published a "Practical toolkit on identifying high conservation value forests" The project coordinators from WWF Romania were Erika Stanciu, Maria Mihul, George Dinicu and the elaboration committee was formed by: Oliviu Iorgu, Ioan Abrudan, Iovu Biriş, Marian Drăgoi, Mihai Dragoş, Nicolae Doniţă, Liviu Filip, Ferko Jenö, Tamas Papp, Mihaela Păucă-Comănescu, Attila Sandor, Luminiţa Tănăsie, and Victoria Tatole. The group included biologists and foresters from educational and research institutions, representatives of some NGOs active in this field, and representatives of forest production units.

The main feature of this toolkit is highlighting the high conservation value (HCV) identified throughout Romania's forests and explaining to domestic users, the identification and delineation related concepts, terminology, and procedure in the case of the forests embedding such values and which are to be declared and managed as high conservation value forests (HCVF). The toolkit contains also recommendations on the management and monitoring of these HCV forests.

The toolkit developed for Romania contains 3 chapters as follows: 1.Introduction; 2. Definition of elevated conservation values 3. Management and monitoring of high conservation values forests (HCVF). As preamble, an index of 16 major laws was included in the toolkit; the index set the framework for defining the high conservation values in Romania and explains the main terms used in the toolkit.

The introduction in the toolkit briefly defines the six high conservation values, it shows the way VRC for Romania were set and the thresholds imposed, enumerates the toolkit beneficiaries and presents practical ways the toolkit may be used in identifying HCVF. It is about the following stakeholders: the managers who must ensure the management of the certificated forests, the forests certifiers, the land management actors, and the purchasers of forest products.

The toolkit emphasizes that HCVF presents not only forests from protected areas but also forests which not contained in the areas afore mentioned and which must be managed as to preserve over time their high conservation values.

Defining High Conservation Values contained in Chapter 2 is made by presenting for each HCV by general discussion, through study cases, the reasoning for the conservation needed, steps in defining the values by gathering information and setting the threshold above which one can talk of VRC and both the preliminary assessment and comprehensive evaluation of the presence of HCV in a forest.

Each of the six HCV groups and their subgroups are thoroughly discussed and then presented in a summary in tables containing: HCV definition, thresholds above which the forest becomes HCV, recommendations on their identification and establishment, and recommendations on the management and monitoring of forests embedding such HCV.

MATERIAL AND METHODS

2. Identifying and defining high conservation value forests (HCVF)

Once established the high conservation values specific for the country for which the toolkit is developed, one proceeds to the identification and delineation of forests embedding these values (HCVF sites).

HCVF identification involves scrutiny of all the information on the possible existence within a forest management unit of one or more high conservation value categories. It is primarily about landscape units, scientific papers containing: species' inventories or habitats; biocenoses' inventories and descriptions: statistics on forest resource needs of the local communities strictly dependent on the former; cultural sites requiring forest protection, etc.

There also important both the descriptions and cartographic materials available. If no such information available, one can develop studies to reveal the presence of high conservation value categories and the forests containing such values.

For an accurate identification and delineation of high conservation value forests (HCVF), it is necessary to unroll consultation process among the two broad categories of organizations and individuals, namely:
- Government agencies, public bodies, research establishments, environmental and cultural NGOs;
- Local communities and individuals who use the afforested areas.

Consultation can be carried out made by means of direct contact with people or organizations that can provide information or through committees including representatives of all stakeholders (in the latter case, the cost of such kind of consultation being higher though).

The general toolkit does not contain proposals for action but only some basic ideas. The toolkit recommends that the forest management plan includes measures to ensure explicitly the preservation or enhancement of those HCVF features that contribute to the conservation of the values to be protected.

3. Landscape units where research were performed

Within the research conducted in the Forest District Remeti we performed research on 21 landscape units as this is a district containing a high number of areas constituting HCVF forests and which embeds a large number of rare, relict, threatened or endangered ecosystems (see Table 1 bellow).

Landscape units where research was performed.

Forest District	Production Unit	Parcels
Remeti	I Boceasa	9D, 17C, 40B, 64B, 65, 69B, 76B, 80B, 80C, 83C, 84E, 95B, 104C, 130E, 140A, 141A, 141B, 141C, 142A, 142B, 149B

RESULTS AND DISCUSSION

4. Vladeasa Mountains high conservation values

According to the Criterion 6.2 B (624), during certification "areas of regional importance in terms of biodiversity will be identified, mapped and protected from mining or other operations that may affect the site." This means that not only high conservation values listed in the "Practical toolkit on identifying high conservation value forests" should be considered in determining the areas of regional importance in terms of biodiversity but also other biodiversity elements which are important at regional level, even if they are not listed in the toolkit.

In our previous research (Burescu 2011, 2012) throughout Vladeasa Mountains, we considered also some species of rare, relict, endemic, vulnerable, threatened, endangered and regionally specific plants, animals and ecosystems which were not included in the toolkit.

4.1. Rare, threatened, endangered, complex forest ecosystems, glades of trees on rocks and/or scree (HCV3) and ecosystems that provide basic services of nature in critical situations (HCV 4) in Vladeasa Mountains

1. HCV 1.2, 1.3 Forests that are habitats for endemic, relict, rare, vulnerable and endangered species (spruce forests and beech forests).

2. HCV 3 (B4). Forest ecosystems specific to higher altitude - ecosystems of spruce tree stands with *Soldanella*, some of which being virgin (1136). Such ecosystems were identified in the Forestry Production Unit (FPU) I Boceasa, parcels, 9D, 76B, 130E, 140A.

3. HCV 3 (A1). Forest ecosystems specific to humid areas, ecosystems of spruce tree stands with *Leucanthemum waldsteinii* (1227). Such ecosystems were identified and described by us in the Forest District Remeti, Forestry Production Unit (FPU) I Boceasa, parcels 80B, 95B, 141B, 149B.

4. HCV 3 (A2). Complexes of forest ecosystems, forests glades and peat swamps - ecosystems with spruce forests and glades of spruce trees (*Picea abies*) with *Sphagnum sp.*, *Polytrichum sp.*, some of which being virgin (1268). Such ecosystems were identified and described by us in the Forest District Remeti, Forestry Production Unit (FPU) I Boceasa, parcels 64B, 69B, 141A.

5. HCV 3 (A3). Complexes forest ecosystems, glades of spruce and beech on rocks or siliceous scree, some of which being virgin. Such ecosystems were identified and described by us in the Forest District Remeti, Forestry Production Unit (FPU) I Boceasa, parcels 40B, 65, 80C, 141A, 141C, 142A, 142B.

4.2. Vladeasa Mountains forests containing high conservation values (HCVF) selected to be included in the areas to be protected according to forest certification provisions

The Table 2 hereunder presents data on high conservation value forests contained by the Forest District Remeti, Forestry Production Unit (FPU) I Boceasa.

From the Table 2 below it appears that due to the nature of the forests contained in this forestry production unit it is proposed that the entire conservation area (10% of the aforested area) be set as protected area, containing HCVF 3 with special protection functions i.e. forests conceived for the protection of rare species of fauna (Category 1.5i) and old, secular, virgin and quasi-virgin forests of great value (Category 1.5j). Some of the landscape units provide critical services to protect a reservoir (Category 1.1b).

Table 1

Landscape units proposed to be established as woods with high preservation value (HCVF) from Remeti forest district. FPU I Boceasa (surface FPU I Boceasa = 4899 ha)

FPU	Parcel	Surface Ha	Ecosystem type	Belonging to one of forests with high conservation values - HCVF (by indicating surface – Ha – and functional zoning)				
				HCVF 1-1	HCVF 1-2,1-3	HCVF 3	HCVF 4-1	HCVF 4-2
Forest district Remeti								
HCVF 10%, protected area (FPU IV Vida)								
I	9D	6.5	1136			6.5(1-5j)	6.5	6.5
I	64B	8.7	1268		8.7	8.7(1-5j)		
I	69B	2.8	1268		2.8	2.8(1-5j, 3f)		
I	76B	8.0	1136		8.0	8.0(1-5j)	8.0	8.0
I	80C	9.2	1256		9.2	9.2(1-5j, 2c, 3f)		
I	83C	55.2	1237		55.2	55.2(1-5j, 5i)	55.2	
I	84E	19.0	1136		19.0 (1-5i)	19.0		19.0
I	95B	34.5	1218		34.5	34.5(1-5j, 5i)		
I	104C	19.0	1136		19.0	19.0(1-5j, 5i)		19.0
I	130E	6.9	1136		6.9	6.9(1-5j)		6.9
I	140A	62.9	1136		62.9	62.9(1-5j, 5i)		62.9
I	141A	20.7	2344		20.7	20.7(1-5j, 5i, 2a)		20.7
I	141B	9.7	1237		9.7	9.7(1-5j, 5i, 2a)		9.7
I	142B	18.7	2237		18.7	18.7(1-5j, 5i, 2a)		18.7
I	149B	13.0	1218		13.0	13.0(1-5j, 5i, 2a)		13.0
I	6B	5.4	1237			5.4(1-5j)	5.4	5.4
I	8B	12.4	1136			12.4(1-5j)	12.4	12.4
I	10C	7.3	1136			7.3(1-5j)	7.3	7.3
I	11E	5.5	1136			5.5(1-5j)	5.5	5.5
I	40B	33.0	2316		33.0(1-5i)	33.0	33.0	
I	56C	3.1	1136		3.1	3.1(1-5j)		
FPU	Parcel	Surface Ha	Ecosystem type	Belonging to one of forests with high conservation values - HCVF (by indicating surface – Ha – and functional zoning)				
				HCVF 1-1	HCVF 1-2,1-3	HCVF 3	HCVF 4-1	HCVF 4-2
I	57C	3.5	1136		3.5	3.5(1-5j)		
I	65	29.1	1237		29.1 (1-5i)	29.1		29.1
I	80B	14.8	1218		14.8	14.8(1-5j)		

FPU	Parcel	Surface Ha	Ecosystem type	Belonging to one of forests with high conservation values - HCVF (by indicating surface – Ha – and functional zoning)				
				HCVF 1-1	HCVF 1-2,1-3	HCVF 3	HCVF 4-1	HCVF 4-2
I	81C	18.3	1136			18.3(1-5j)		
I	82C	9.6	1136			9.6(1-5j)		
I	90B	4.7	1136			4.7(1-5j)		
I	98C	4.0	1136			4.0(1-5j)		
I	117E	6.8	1136			6.8(1-5j)		
I	133D	7.6	1136			7.6(1-5j)		
I	142A	17.3	2344		17.3	17.3(1-5j, 1c)	17.3	
I	158B	21.0	1256			21.0(1-5j)		
I	159D	18.2	1136			18.2(1-5j)		
I	160C	8.7	1256			8.7(1-5j)		
I	160D	12.7	1136			12.7(1-5j)		
I	17C	5.2	2344			5.2 (1-1c, 2a)		5.2
I	141C	0.7	1237		0.7	0.7 (1-3f, 2a)		0.7
	Total = 543.7 ha							

5. Discussion

The topic proposed for scientific research aimed both to reveal high conservation value (HCVF) existing in the forest throughout Vladeasa Mountains and to follow a practical purpose i.e. to select the most representative forests embedding such value namely high conservation value forests (HCVF) to be included in forest certification proceedings in order to preserve and enhance biodiversity.

To achieve the research goals, it was necessary to deploy a large documentation work in the scientific literature on the plants, animals, and ecosystems existing in the two mountain massifs which differ in terms of their climate, geology, geomorphology and ecosystems. A special emphasis was put on the flora and fauna species that require special protection in terms of preserving biodiversity – i.e. rare, threatened, and endangered species found on the edge of extinction unless their habitat is preserved; we intended also to highlight the types of ecosystems which makes their habitat and those that are characteristic for the territory by means of their biodiversity, scarcity or danger of being lost through poor forestry management.

It was required a technical documentation on the forests in the region the types of ecosystems constituting these forests, their preservation status, in order to select in a first phase those forests in the region which may contain high conservation values and which, through certification, later on be totally protected or managed in order to preserve their diversity.

Based on this documentation afore mentioned one was able to identify high conservation values that require specific care to prevent the decreases in the diversity of species and ecosystems within the area studied.

In the case of Vladeasa Mountains these values are as follows:
- 55 rare, threatened, endangered, endemic, relict plant species (HCV 1.2 , 1.3);
- 38 rare, threatened, endangered, endemic, relict animals species (HCV 1.2, 1.3);
- 5 rare, threatened, endangered ecosystems or ecosystems incorporating plants, animals as well as species concentrations which are critical for the former survival (HCV 3 and HCV 4);

Through extensive field research in the selected forests identified as potential carriers of high conservation value, one gathered a scientific material from which by means of thorough analysis one could establish ecosystems containing high conservation values within the region and which through their

355

state less modified by forest management are able ensure the HCV preservation in the future.

As for Vladeasa Mountains – Forest District Remeti there is provided table with the high conservation value forests selected after conducting field research and running their ecological analysis in terms of biodiversity, both with the identification of the category the forests belong to and their functional zoning performed by means of forest management works. The management units (plots or subplots contained and their surface, respectively) are recorded in the table so as to be catalogued by the two categories of certification envisaged to be protected – i.e. by 5% as protected area, and 5% of the surface as conservation area by means of sustainable management conservation.

It is worth noting that in the course of research there were highlighted specific ecosystems as follows:
- Spruce tree forests specific to higher altitudes;
- Spruce tree forests and glades of spruce on peat swamps;
- Spruce tree forests specific to humid areas;
- Complex of forests and glades of beech trees on rocks and siliceous scree;
- Spruce tree forests and beech tree forests belonging to widespread ecosystem types of higher age and diversified structures where the biodiversity is greatest.

It is worth noticing that during this research one identified many ecosystems not affected by stands exploitation activities with virgin and quasi-virgin type composition and structure, and thus deserving protection as vestiges of old natural forests.

In addition to proposals for forests to be reserved for certification, proposals were made in terms of the forest management in the future. These proposals relate both to the protection of species with high conservation value and the ecological and protective management mode of stands that may become subject to forestry work designed to ensure the conservation of biodiversity they embed but also to preserve their ecological diversity i.e. the variety of ecosystems types specific for the region where the intervention is made.

In carrying out our research work we checked the applicability of the "National toolkit on the identification and management of high conservation value forests (HCVF)". The provisions of this guide were of great support, first of all to establish high conservation values of the territory studied, but also to

select the most representative high conservation value forests to be proposed for protection in the subsequent certification process.

The toolkit was really useful for choosing the measures for the conservation of bio- and ecodiversity.

Through the research conducted and results obtained one created a pattern for such research which should ensure the best selection of high conservation value forests to be protected by means of forest certification.

CONCLUSIONS

1. Through extensive documentation there were established the high conservation values (HCV) for the Vladeasa Mountains forests.

2. In the case of Vladeasa Mountains it is about 55 species of plants and 28 species of animals which are rare, threatened, endangered, endemic and relict, and 226 rare, threatened and endangered ecosystems containing plants and animals to be protected or temporary concentrations of species which are critical for the region, and for their survival as typical ecosystems.

3. By surveying forest management units there were selected afforested areas that could have contained concentrations of biodiversity or ecosystems typical for the region studied.

4. By means of field research of a part of the areas afore mentioned one chose the most representative in terms of high conservation values for Vladeasa Mountains. Of these, a part totalling 10% of the afforested area was designed to be fully protected in protected areas by prohibiting forestry interventions.

5. Through the research carried out one selected the most representative high conservation value forests, namely:

- In Vladeasa Mountains, 1,153.8 ha to be included in protected areas which are excluded from forestry interventions and 786.3 ha which are to be managed by special forestry management measures in order to preserve or enhance their biodiversity in conservation areas.

6. In the case the forests channelled towards biodiversity conservation through special forestry management interventions, related necessary measures were proposed.

REFERENCES

1. Abrudan I.V., 2001, *Aspecte privind certificarea pădurilor,* Revista Pădurilor, 8, 41 p., Bucureşti.
2. Abrudan I.V., Mihăilă E., Costăchescu D., Gurean D., 2009, *Forest vegetation management in Romania,* In: *Forest vegetation management in Europe: current practice and future requirements,*

Editors: Willoughby, I., Ballandier, Ph., Bentsen, N.S., McCarthy, N., Claridge, J., Cost Office, pp. 109-116, Brussels.

3. Biriş I.A., 2004, *Contributions of the foresters to biodiversity conservation in Romania.* In: Bioplatform – Romanian National Platform for Biodiversity, Editura Vergiliu, 130 p., Bucuresti.

4. Biris I.A., Veen P. (ed), 2005, *Virgin Forests In Romania: Inventory and Strategy for sustainable management and protection of virgin forests in Romania.* Project report. Bucharest. 50 p.

5. Bogdan Ş., Bozga C., Lazăr G., Tudoran G.M., Stăncioiu P.T., 2009, *Habitate forestiere de interes comunitar incluse în proiectul LIFE 05 NAT/RO/000176. „Habitate prioritare alpine, subalpine şi forestiere din România” – Monitorizarea stării de onservare.* Editura Universităţii „Transilvania”, 74 p., Braşov.

6. Burescu L.I.N., 2011, *High conservation value forests (HCVF) from Vlădeasa Mountains,* Anal. Univ. Oradea, fascic. Prot. Med., vol. XVII, pp. 341-348, Oradea.

7. Burescu L.I.N., 2012, *Forests that are Located in / or Containing Rare, Threatened Endangered, Ecosistem from Vlădeasa Mountains – Western Carpathians,* International Symposium „Risk Factors for Environment and Food Safety”, November 2-3 Oradea, section 4 Forestry, pp. 10-22.

8. Giurgiu V., 2001, *Gospodărirea pădurilor virgine.* In*: Pădurile virgine din România,* Editura ASBL Forêt Wallone, pp. 93-110, Louvain la Neuve, Belgique.

9. Ioraş F., Abrudan I.V., 2007, *High Conservation Value Forest Identification and Management in Romania.* In: *Forest and sustainable development,* Editura Universităţii Transilvania din Braşov, pp. 649-658.

10. Jennings S., Nussbaum R., Judd N., Evans T., 2003, *The high conservation value forest toolkit,* Edition I, ProForest, Oxford OX 12 HZ, UK, 3:1-62.

11. Nicolescu N., 2000, *Certificarea pădurilor din România, între FSC şi PEF,* Revista pădurilor, 6: 41-45, Bucureşti.

12. Radu S., Bândiu C., Coandă C., Doniţă N., Biriş I.A., Teodorescu M.E., 2004, *Conservarea pădurilor virgine,* Edit. Geea, 51-57, Bucureşti.

13. Stanciu E., Mihul M., Dinicu G., Iorgu O., Abrudan I.V., Biriş I., Drăgoi M., Dragoş M., Doniţă N., Filip L., Ferko J., Tamàs P., Comănescu-Paucă M., Sandor A., Tănăsie L,., Tatole V., 2004, *Ghid practic pentru identificarea pădurilor cu valoare ridicată de conservare*, (Cooperare între WWF şi IKEA pentru proiecte în domeniul forestier, un parteneriat pentru promovarea unei silviculturi responsabile), Bucureşti.

14. Stăncioiu P.T., Lazăr G., Tuddoran G.M., Bogdan Ş., Predoiu G., Şofletea N., 2008, *Habitate forestiere de interes comunitar în proiectul LIFE 05 NAT/RO/000176. „Habitate prioritare alpine, subalpine şi forestiere din România” – Măsuri de gospodărire.* Editura Universităţii Transilvania din Braşov, 184 p.

15. Stăncioiu P.T., Abrudan I.V., Dutca I., 2010, *The Natura 2000 ecological network and forests in Romania: implication on management and administration.* In: *The International Forestry Review,* vol 12, pp. 106-113.

16. Vlad I., Chiriţă C., Doniţă N., Petrescu L., 1997, *Silvicultură pe baze ecosistemice,* Editura Academiei Române, 280 p., Bucureşti.

17. * * *, 1990, Rezoluţia Conferinţei Ministeriale privind protecţia pădurilor din Europa (MCPFE) FOREST EUROPE, Strasbourg 1990.

18. * * *, 1993, Rezoluţia Conferinţei Ministeriale privind protecţia pădurilor din Europa (MCPFE) FOREST EUROPE, Conferinţa de la Helsinki 1993.

19. * * *, 1998, Rezoluţia Conferinţei Ministeriale privind protecţia pădurilor din Europa (MCPFE) FOREST EUROPE, Conferinţa de la Lisabona 1998.

20. * * *, 2003, Rezoluţia Conferinţei Ministeriale privind protecţia pădurilor din Europa (MCPFE) FOREST EUROPE, Conferinţa de la Viena 2003.