

Final report

Evaluation of suitable sites for European bison in Oriental Carpathians' Protected Areas

Location

The project is located in Romania, in the North-Eastern part of the country (The Oriental Carpathians).

The national and natural parks in the North-East of Romanian Carpathians: Calimani National Park, Ceahlau National Park, Cheile Bicazului-Hasmas National Park, Muntii Rodnei National Park and Muntii Maramuresului Natural Park, all above parks being placed in near proximity of Vanatori Neamt Natural Park (VNNP).

The latitude and longitude of the project's location is between 47°03'10" and 47°18'20" N and 26°04'20" and 26°22'32" E.

Project aims

The main contribution of this project will be the identification of the suitable habitats for bison reintroduction within the VNNP area (at local level) and the identification of two proper protected areas for establishing new bison reserves in Oriental Carpathians (at regional level).

The identification of optimal habitats will represent the guarantee of the future development of free herd of VNNP, but also will assure the success of future bison reintroduction programmes in Oriental Carpathians as is stated in the *Conservation Strategy and Action Plan for Romania* developed within the RSG 1.

Description of the project

The overall goal of this project is the restoration of the bison to Romanian Carpathians which is critical for the success of re-establishment program for this species in all Carpathian Mountains (Polish, Slovak and Ukrainian Carpathians).

The public awareness during the project is an important factor in spreading information about the importance of this species for Carpathians forest habitats but also for local communities.

The long lasting contribution to nature conservation of this project

The main contribution of this project will be the identification of the suitable habitats for bison reintroduction within the Vanatori Neamt Natural Park area (at local level) and the identification of two proper protected areas for establishing new bison reserves in Oriental Carpathians (at regional level).

The identification of optimal habitats will represent the guarantee of the future development of free herd of VNNP, but also will assure the success of future bison reintroduction programs in Oriental Carpathians as is stated in the 'Conservation strategy and action plan for Romania' developed within the RSG 1.

The public awareness during the project will be an important factor in spreading information about the importance of this species for Carpathians forest habitats but also for local communities.

The experience achieved by VNNP and Ecosilvex 2000 during the implementation of bison reintroduction program will be shared to the representatives of the protected areas administration, local communities and stakeholders.

The activities performed under this final report are related by period between August 2008 – June 2009.

Activities performed within this project

1. Assessment of suitable bison reintroduction habitats in VNNP.

Based on this assessment, in 2009, the first bison group will be released in the most suitable area determined in accordance with methodology provided at the RSG 1.

In the area of bison reintroduction was conducted several studies such us:

- comparison of ground vegetation microstructure in Chitele region,
- application of biocenotic indexes in biotic monitoring, effects of a grazing system for a mountain pasture,
- an influence of temperature upon metabolic activity of soils in four different tree stands,
- Browse and ground flora supply in selected tree stands.

Comparison of ground vegetation microstructure in Chitele region

The main aim of this study was to determine the spatial structure of ground vegetation at selected three sites within VNNP: beech stand, spruce stand and a pasture. A square plot (of 900m² area) was randomly chosen within every site. Vegetation cover types were assigned within the plot, respectively to principal plant species dominance (synusias) covering at least 1m² areas. To compare differences in microstructure, three spatial parameters were used: SHEI, Contagion and EDI. Plots differed in cover types but the multispecies cover type constituted matrix of ground vegetation in all three plots. Ground vegetation cover in the beech stand was similar in plant composition to that in the spruce stand. All three spatial parameters taken into account in this study show different results. The most appropriate index showing spatial structure of ground vegetation in this study seems to be the EDI. EDI shows, that beech stand includes the densest network of edges. Within the studied plot in comparison to the other sites. Indices used in spatial analyses do not always present real spatial structure and should be examined with reference to the plots studied. The moderate logging might have created the most variable conditions and therefore higher variability of the spatial ground vegetation cover. Diversity of spatial pattern at the smallest scale like ground vegetation can probably cause species richness

Table . List of plant species in the patches within the plots. Beech stand patches essentially include plant species occurring in the spruce stand.

	Beech stand		Spruce stand	Pasture			
	Multisp	Juncus	Multisp.	Multisp	Juncus	Urticas	Cirsiums
<i>Achillea millefolium</i>				+			
<i>Alchemilla</i> sp.				+			
<i>Bellis perennis</i>				+	+		
<i>Carex</i> sp.	+		+				
<i>Cirsium vulgare</i>							+
<i>Crepis capillaris</i>				+	+		
<i>Daphne mezereum</i>	+	+	+				
<i>Dentaria bulbifera</i>			+				
<i>Dryopteris carthusiana</i>	+	+	+				
<i>Erigeron annuus</i>		+					
<i>Euphrasia stricta</i>				+			
<i>Fragaria vesca</i>	+	+	+				
<i>Galium odoratum</i>	+		+				
<i>Geranium</i> sp.			+				
<i>Juncus</i> sp.		+			+		
<i>Oxalis acetosella</i>		+	+				
Poaceae	+		+	+		+	+
<i>Potentilla anserina</i>				+	+		
<i>Prunella vulgaris</i>				+			
<i>Rubus</i> sp.	+	+	+				
<i>Rumex acetosella</i>		+	+			+	
<i>Stellaria palustris</i>				+			
<i>Trifolium arvense</i>				+	+		
<i>Urtica dioica</i>		+				+	
Seedlings:							
<i>Abies alba</i>	+	+	+				
<i>Fagus sylvatica</i>	+	+	+				
<i>Picea abies</i>	+		+				

Application of biocenotic indexes in biotic monitoring

The paper presents a review of biocenotic indexes, the most often used in the faunistic works. Such indexes are especially useful for the biotic monitoring within the protected areas. Some of them have an analytic, some a synthetic character. Descriptions and formulas of following indexes were presented: index of species density, dominance index, diversity indexes, frequency/constancy of occurrence index, index of species co-occurrence (Agrell index), index of the species composition similarity, Renkonen index of similarity, index of the ecological significance.

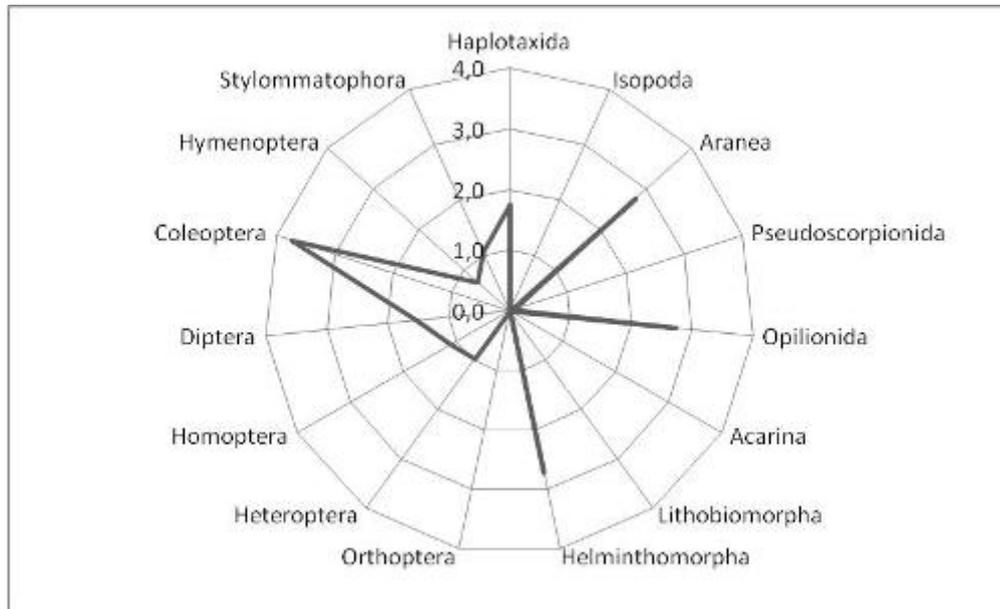


Fig. The example of radar plots applied in graphic visualization of dominance structures in an invertebrate community. Logarithm scale $\ln(x+1)$ was used.

Effects of a grazing system for a mountain pasture

The main aim of this study was to assess the effectiveness of management at a pasture situated in Romanian Carpathians. This assessment was based mainly on determination of a standing crop and structure of vegetation after the grazing season. The structure of plant cover reflected irregular utilisation of vegetation at the pasture. A mean height of plants at the pasture equalled 80mm, however it ranged within wide limits ($SD \pm 90$). Using the calibration curve we assessed the mean dry mass of plants as 173.2 g/m^2 . We conclude that studied pasture was not managed efficiently. We assessed that only about 35% of a total dry mass of plants at the pasture could be effectively grazed by sheep. Appropriate farming practices should be applied there to prevent the overgrazing and undesirable changes in plant phenology.

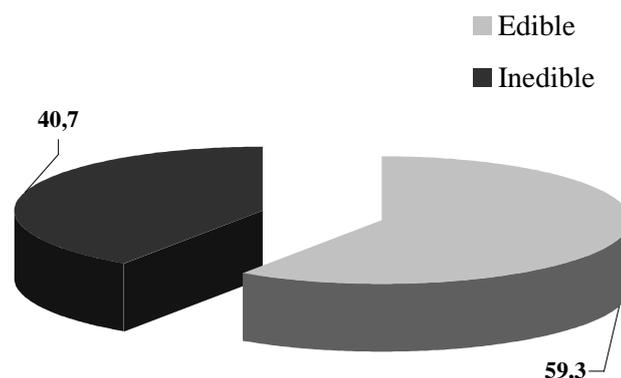


Fig. Proportion of edible and inedible (dry stems, inedible plant species) fractions of vegetation at the analysed pasture after the grazing season.

An influence of temperature upon metabolic activity of soils in four different tree stands

The aim of this study was to determine the level of respirometric metabolism of soils in four studied types of tree stands at VNNP in Romania, and to find out whether there are differences in the level of metabolism in various ambient temperatures. The experiment was carried out in 12°C and 22°C i.e.

temperatures naturally occurring during vegetative season in tree stands typical for this region: spruce – beech, hornbeam – oak, beech – fir, and oak. Metabolism rate of the soil was measured with a volumetric respirometer. Obtained data were recalculated to dry mass. In 22°C the level of soil metabolism was always higher than in +12°C, and was statistically different for all sampled soils, however differences were not equal. The lowest soil activity was in the spruce – beech stand, and the highest in hornbeam – oak stand. How far those differences are significant, is reflected by the value of Van't Hoff indicator Q_{10} . For soils from the oak and spruce – beech stands it exceeds 2.0 while for remaining stands it is equal to 1.5. This indicates that various tree stands of VNNP will react in a different way to climatic changes.

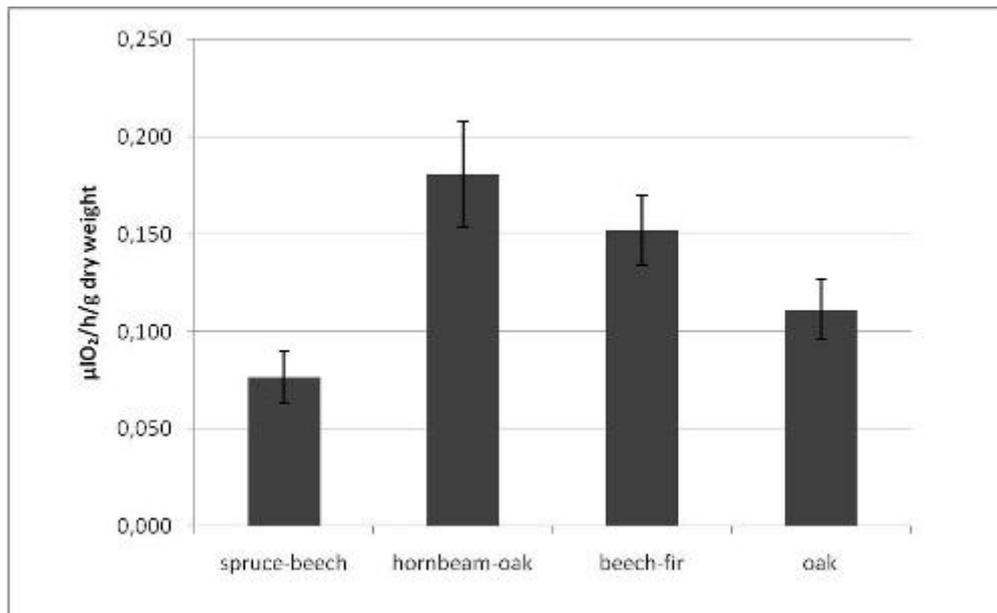


Fig. Oxygen consumption by the 1 g of dry mass of a soil in 12°C. All differences among sites are significant. Test Anova; $p < 0.05$.

Browse and ground flora supply in selected tree stands

Browse and ground flora supply were estimated in vegetation season at VNNP, Romania. Compared were forest stands along a vertical transect at the elevation of 900 m above sea level, typical forest associations for the lower part of Romanian Carpathians situated at 600 m a.s.l., and two stands of a mature Carpathian beechwood at elevations of 600 and 900 m a.s.l. Higher standing crop of ground flora and browse was generally recorded in stands that are natural for the site (e.g. fir – beech, beech), than in artificially planted stands (e.g. spruce, larch). Carpathian beechwood at 900 m a.s.l. had lower supply of browse comparing to the stand at 600 m a.s.l. (9.9 vs. 26.6 g dry mass per sq. m) but the standing crop of ground flora was much higher there (47.8 vs. 26.7 g dry mass per sq. m). Considering that a large proportion of ground vegetation there consisted of brambles, the higher located stand should have also better nutritional conditions for large herbivores in winter time. Carrying capacity of this forest, just for the duration of summer season, was estimated for 5 European bison per 100 ha.

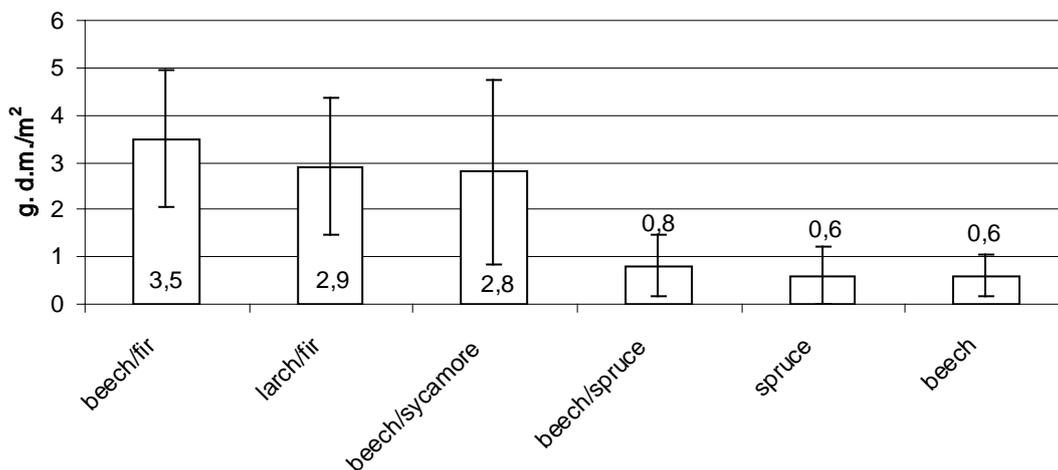


Fig. Browse supply in stands along the transect at 900 m a.s.l

As well, for Vanatori Neamt NP were achieved studies for estimation of plant biomass and chemical composition of vegetation within planned bison reintroduction area.

Considering the dominating age class (a timber stand) at the site of planned enclosure, estimates of potential natural food resources for the bison were focused on ground flora. According to earlier estimates of browse in Carpathian beechwood – its winter standing crop in timber stand has only a marginal importance (1.3 - 11.0 kg dry wt ha⁻¹) for overall value of food resources for large herbivores.

Available winter standing crop of ground flora within enclosure area was estimated for about 140 kg of dry wt ha⁻¹. This figure is higher than estimates for several upland sites in southern and central Poland (60 – 80 kg dry wt ha⁻¹), however in beechwood of Bieszczady Mountains, recorded were values up to 280 kg dry wt ha⁻¹, with blackberry alone having winter biomass of up to 150 kg dry wt ha⁻¹.

The major issue than is an accurate estimate of winter resources of blackberry (*Rubus hirtus*) leaves that are the most valuable winter food for ruminants in Carpathian beechwood. Due to uncontrolled presence of domestic stock within the area of enclosure such estimate is impossible before building up the outer fence.

Summer standing crop ranged between about 550 kg dry wt ha⁻¹ in dry mixed stand to 3300 kg dry wt ha⁻¹ in the moist alderwood, with about 3100 kg dry wt ha⁻¹ at open pasture and 520 – 580 kg dry wt ha⁻¹ in moist and fresh mixed forest. To obtain a total value of standing crop for the area of enclosure, necessary is to calculate the weighted sum of biomass values for every identified habitat type.

Values of summer ground flora supply obtained for mixed forest stands at VNNP (520 - 580 kg dry wt ha⁻¹) are higher than ground flora biomass recorded in beechwood stands in Polish Bieszczady Mountains (65 – 440 kg dry wt ha⁻¹ - differences resulted from various canopy closure), however the pasture vegetation, which can be an effect of earlier overgrazing, had much lower biomass (3120 kg dry wt ha⁻¹) than reported for Bieszczady meadows (4200 – 9900 kg dry wt ha⁻¹).

Percentages of major chemical components found in plants from Vanatori are similar to average values reported for forest vegetation in literature however it has to be remembered, that apart from seasonal or geographical changes, major differences in chemical composition are connected with presence or absence of particular plant species.

Range at:	Crude ash % dry wt	Crude protein % dry wt	Ether extract % dry wt	Crude fiber % dry wt	N-free extract % dry wt
Vanatori N.P.	1.7-4.8	8.6-13.1	0.8-2.4	26.3-31.5	39.3-49.75
Reference values	2.7 - 5.2	10.5-12.5	3.6-4.8	20.9-23.9	52.5-59.8

2. Evaluation of protected areas from Oriental Carpathians.

The national and natural parks in Romanian Carpathians provide the largest potential area for free-ranging bison population, covering over 1,000,000 ha from Romanian Carpathians. The distribution of these protected areas allows establishing green corridors between parks and suitable condition for further development in freedom. Distances between neighboring parks usually do not exceed several tens of kilometres, and the percentage of forested area within those parks varies between 52.8% to over 95%.

This chapter is intended to assess The suitability analysis of protected areas in north-eastern part of the Romanian Carpathians as potential home ranges for European bison 6 national and natural parks of north-eastern Romanian Carpathians as potential home ranges for European bison: Calimani National Park, Ceahlau National Park, Cheile Bicazului-Hasmas National Park, Rodnei Mountains National Park Maramures Mountains Natural Park, Vanatori Neamt Natural Park.

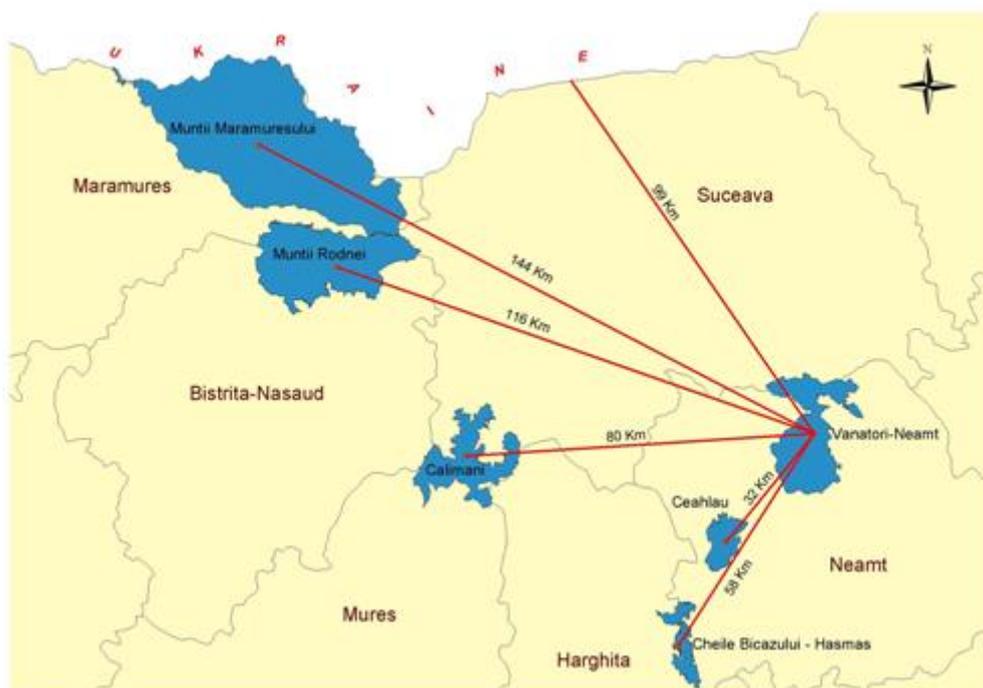


Table. The area and proportion of forests within north-eastern Carpathian protected areas in Romania

No.	Park's name	Total area Hectares	Forested area	
			ha	%
1	Calimani National Park	24041	15871,6	66,0%
2	Ceahlau National Park	8396	7672	91,4%
3	Cheile Bicazului-Hasmas National Park	6575	6256,3	95,2%
4	Maramures Mountains Natural Park	148850	79900	53,7%
5	Rodnei Mountains National Park	46399	27792,9	59,9%
6	Vanatori Neamt Nature Park	30818	26322,6	85,4%
TOTAL		265079	163815,4	75,27%

Undoubtedly, Romanian Carpathians represent an optimal area for breeding of European bison in freedom due of high variety of habitats and ecosystems and the considerable number of protected areas, being potential refuges for future bison herds.

From the analysed protected areas and due to isolation of some parks by anthropogenic barriers and their sub-optimal habitat for this species, only two groups of parks can be seriously considered as suitable for bison introduction: Calimani NP and Maramures Mountains NP.

Furthermore, for the suitable areas for bison introduction (Calimani NP and Maramures Mountains NP) was used the Corine Land Cover 2000 classification in order to know for sure types of lands within that regions.

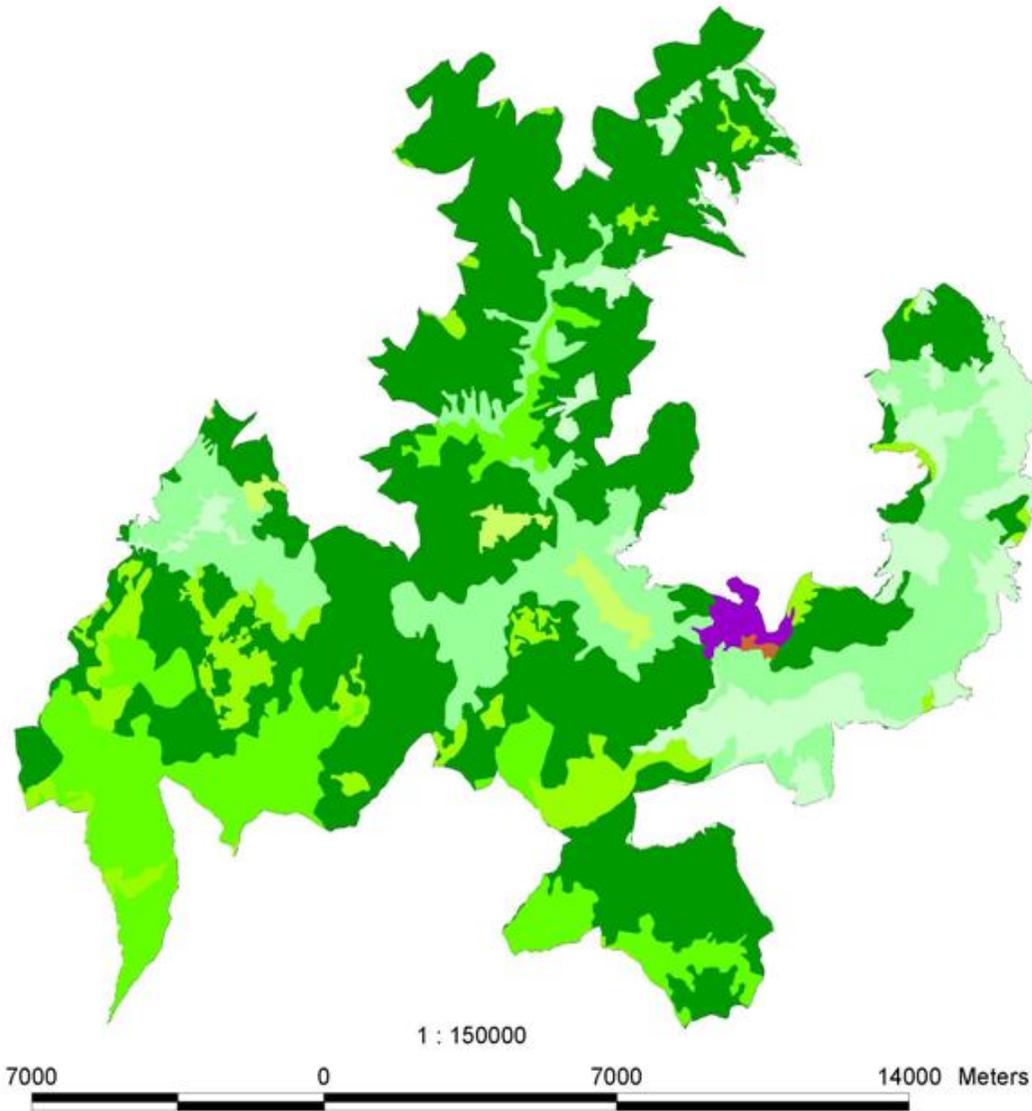
Corine Land Cover 2000

The inventory of land cover changes is necessary for the analysis of trends, causes and consequences of natural and anthropogenic processes, impact assessment, maintenance of ecological stability and its observation in decision-making processes. The change detection process and the mapping of the land cover changes is carried out by means of image comparison, using computer assisted image interpretation tools.

According to Corine Land Cover 2000, were identified and classified 4 types of land use areas: artificial surfaces (1), agricultural areas (2), forest and semi natural areas (3), wetlands (4) and water bodies (5).

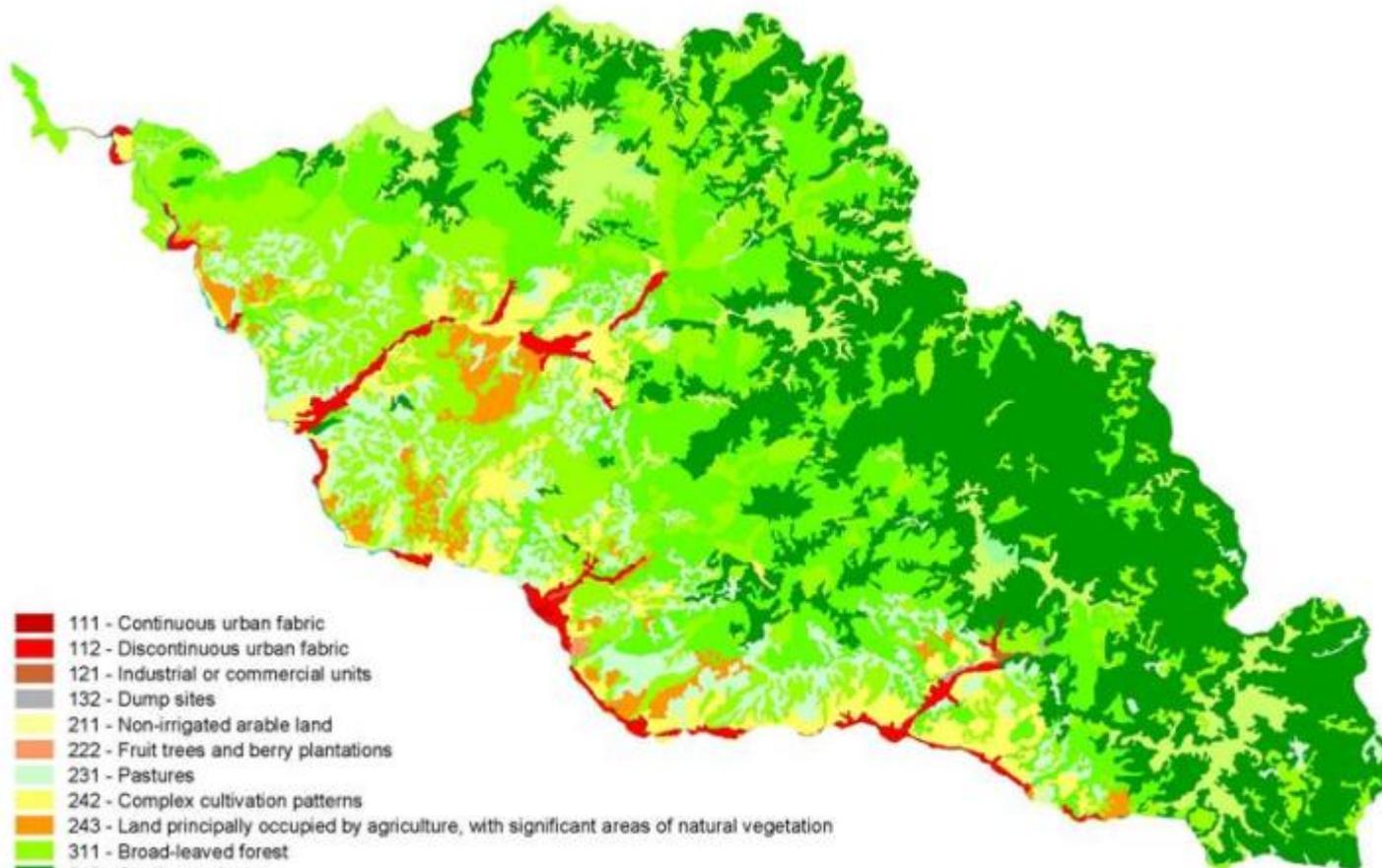
Code Level 3	Label Level1	Label Level 3
111	Artificial surfaces	Continuous urban fabric
112	Artificial surfaces	Discontinuous urban fabric
121	Artificial surfaces	Industrial or commercial units
122	Artificial surfaces	Road and rail networks and associated land
123	Artificial surfaces	Port areas
124	Artificial surfaces	Airports
131	Artificial surfaces	Mineral extraction sites
132	Artificial surfaces	Dump sites
133	Artificial surfaces	Construction sites
141	Artificial surfaces	Green urban areas
142	Artificial surfaces	Sport and leisure facilities
211	Agricultural areas	Non-irrigated arable land
212	Agricultural areas	Permanently irrigated land
213	Agricultural areas	Rice fields
221	Agricultural areas	Vineyards
222	Agricultural areas	Fruit trees and berry plantations
223	Agricultural areas	Olive groves
231	Agricultural areas	Pastures
241	Agricultural areas	Annual crops associated with permanent crops
242	Agricultural areas	Complex cultivation patterns
243	Agricultural areas	Land principally occupied by agriculture, with significant areas of natural vegetation
244	Agricultural areas	Agro-forestry areas
311	Forest and semi natural areas	Broad-leaved forest
312	Forest and semi natural areas	Coniferous forest
313	Forest and semi natural areas	Mixed forest
321	Forest and semi natural areas	Natural grasslands
322	Forest and semi natural areas	Moors and heathland
323	Forest and semi natural areas	Sclerophyllous vegetation
324	Forest and semi natural areas	Transitional woodland-shrub
331	Forest and semi natural areas	Beaches, dunes, sands
332	Forest and semi natural areas	Bare rocks
333	Forest and semi natural areas	Sparsely vegetated areas
334	Forest and semi natural areas	Burnt areas
335	Forest and semi natural areas	Glaciers and perpetual snow
411	Wetlands	Inland marshes
412	Wetlands	Peat bogs
421	Wetlands	Salt marshes
422	Wetlands	Salines
423	Wetlands	Intertidal flats
511	Water bodies	Water courses
512	Water bodies	Water bodies
521	Water bodies	Coastal lagoons
522	Water bodies	Estuaries
523	Water bodies	Sea and ocean

CALIMANI NATIONAL PARK



- 121 - Industrial or commercial units
- 131 - Mineral extraction sites
- 231 - Pastures
- 311 - Broad-leaved forest
- 312 - Coniferous forest
- 313 - Mixed forest
- 321 - Natural grasslands
- 322 - Moors and heathland
- 324 - Transitional woodland-shrub
- 333 - Sparsely vegetated areas

MARAMURESULUI MOUNTAINS NATURAL PARK

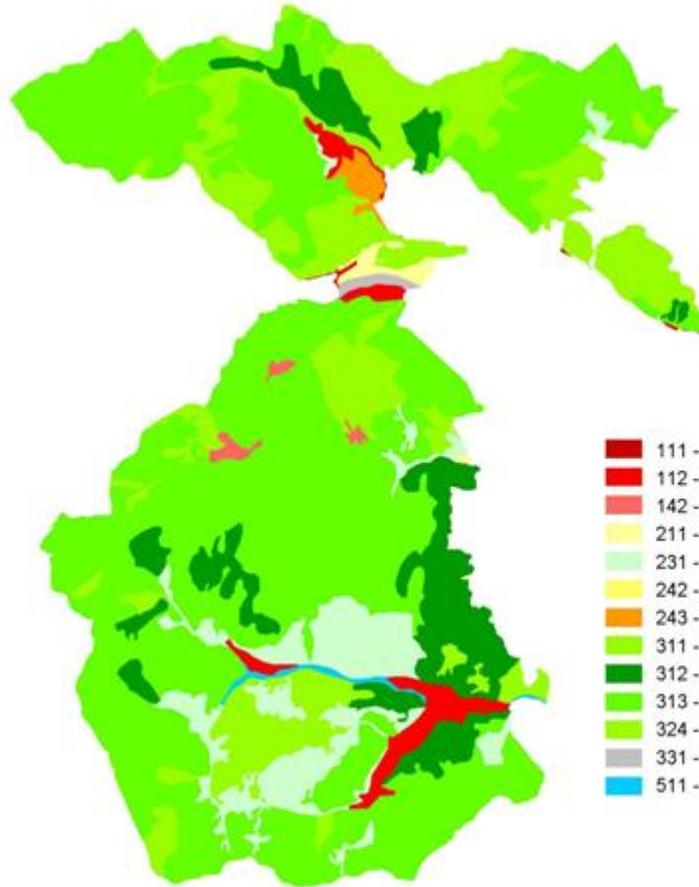


- 111 - Continuous urban fabric
- 112 - Discontinuous urban fabric
- 121 - Industrial or commercial units
- 132 - Dump sites
- 211 - Non-irrigated arable land
- 222 - Fruit trees and berry plantations
- 231 - Pastures
- 242 - Complex cultivation patterns
- 243 - Land principally occupied by agriculture, with significant areas of natural vegetation
- 311 - Broad-leaved forest
- 312 - Coniferous forest
- 313 - Mixed forest
- 321 - Natural grasslands
- 322 - Moors and heathland
- 324 - Transitional woodland-shrub
- 511 - Water courses

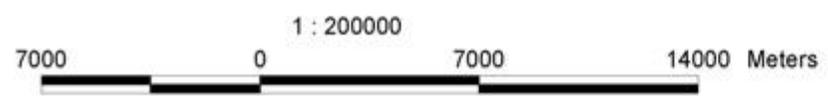
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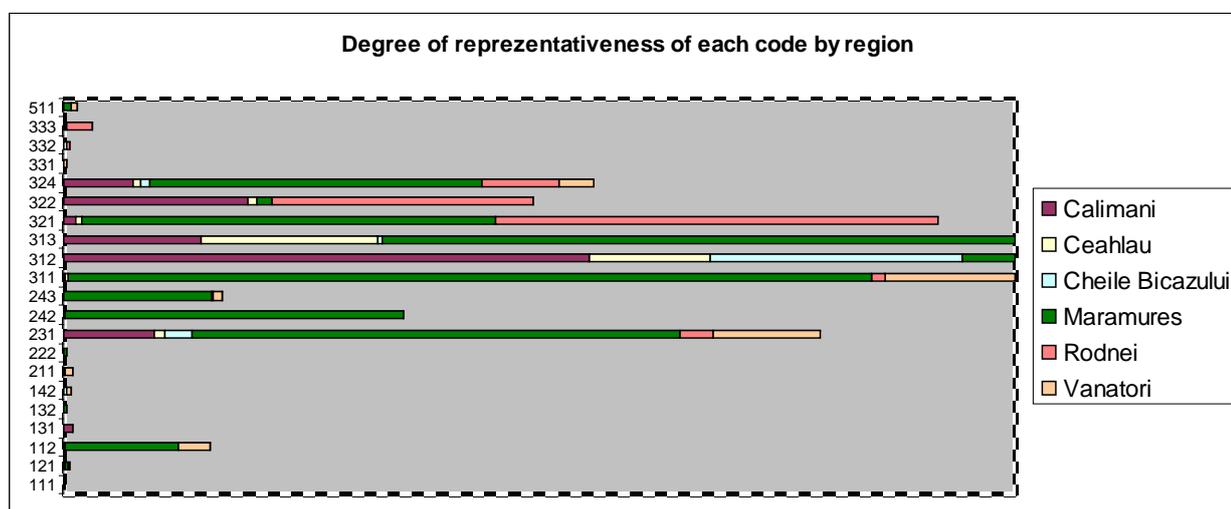
VANATORI NEAMT NATURAL PARK



- 111 - Continuous urban fabric
- 112 - Discontinuous urban fabric
- 142 - Sport and leisure facilities
- 211 - Non-irrigated arable land
- 231 - Pastures
- 242 - Complex cultivation patterns
- 243 - Land principally occupied by agriculture, with significant areas of natural vegetation
- 311 - Broad-leaved forest
- 312 - Coniferous forest
- 313 - Mixed forest
- 324 - Transitional woodland-shrub
- 331 - Beaches, dunes, sands
- 511 - Water courses



Code/Surface (ha)	Calimani	Ceahlau	Cheile Bicazului	Maramures	Rodnei	Vanatori
111				36.3	0	0.2
121	26			83.5	14.4	
112		21.3	2.3	2,621.10		734.5
131	198.8		1.1			
132				67.60		
142			56.6			129.6
211				35.8		192.0
222				77		
231	2,110.70	238.8	607.5	11,295.30	756.1	2,499.6
242		4	35.8	7,799.40	7.9	3.3
243			13.2	3,423.90	34.4	181.5
311	29.2	79.9		18,559.10	318.6	5,494.3
312	12,167.70	2,784.70	5,816.60	43,402.70	20,110.20	2,997.7
313	3,190.50	4,062.90	107.2	28,252.60	7,234.80	17,609.7
321	278.6	132.1		9,563.80	10,242.00	
322	4,256.00	201.1		355.9	6,038.90	
324	1,613.90	179.6	211.4	7,663.50	1,782.80	795.0
331					0.00	86.7
332			81.6		76.40	
333	44	34.7			590.30	
511				181.4	0.00	116.9
Total	23,915,4	7739,1	6,933.30	133,418.90	47,206.80	30,840.9



By the way of conclusion, the areas for Calimani NP and Maramuresului Mountains NP represent realistic options to replicate the bison reintroduction from VNNP.

Obtained preliminary results reveals that for Calimani NP and VNNP that supply of ground flora is relatively low comparing to data from other parts of the Carpathians (Bieszczady, Beskidy) but it may result from overgrazing of the area by the livestock.

In case of Maramures Mountains Natural Parks, the results indicate a better situation in comparison with compared areas.

However, it should be taken into account, that due to a thick snow cover, bison access to ground flora in winter can be considerably limited, which may cause migration of animals to areas with lower snow and their subsequent overgrazing, or necessity to maintain supplemental feeding over the whole winter season. On the other hand, forests remains at present under considerable grazing pressure of he livestock. Therefore, after accession of Romania to the European Union since January 2007 it's expected reducing pressure of the grazing and a noticeable regeneration of ground flora can be expected, and actual standing crop of ground vegetation can be higher than estimated now.

3. Public awareness.

This component was oriented to two main target groups: the local communities in the area determined as the most suitable for bison reintroduction in freedom in VNNP and the local communities from the two selected protected areas (Calimani NP and Maramures Mountains NP) determined as possible reintroduction areas. The reason for this activity was to determine a positive feed back for the presence of free bison in theirs areas.

The differences between these two groups were reflected in the leaflets we produced within this RSG 2 grant. Taking into consideration that in the case of the first group there were done previous informational campaigns, the leaflet "Zimbrul între natura și spiritualitate" (in English: The European Bison between Nature and Spirituality) reflected the close interaction between the natural and cultural heritage.

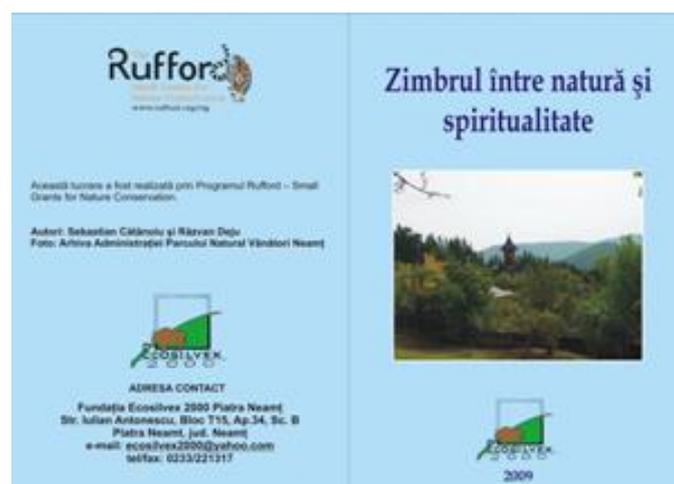


Image. The covers of leaflet 'The Bison between Nature and Spirituality'

In case of VNNP area, even the European bison disappeared around 200 years ago, it surprisingly survived as symbol especially in popular and religious wood carving pieces (gate's pillars, doors of the churches and monasteries, chairs etc). We consider that the spiritual recovery of these forgotten symbols will represent an important help in

our work of bison restitution in freedom. According to the legend, the establishment of the Moldavian state was done during a bison hunt in an area close to VNNP. This is the reason for the continuous presence of a bison head on the Romanian coat-of-arms. The leaflet offered us the opportunity to present the bison projected in spirituality, during time (prehistory, medieval period, etc). The leaflet allow the reader not only “to see” the bison but also “to understand” it. For this reason this leaflet represent a real further step in our bison awareness campaign and represent one of the first initiative in Romania regarding the spiritually recover of a species as a part of a reintroduction in freedom programme.

In case of the second group (the local communities from Calimani NP and Maramures Mountains NP), some basic elements regarding the presence of the free European bison were described in the leaflet “Zimbrul si comunitatile umane” (in English, The European Bison and Local Communities). It is well known that the relation between European bison and mankind is a reflection of the development of the human society. Once a source of food for the communities, than just a royal hunt, decimated during humans wars or strongly influenced by the lack of space due to economical development, the European bison is a symbol of what mankind is able to do (to destroy a species, but also to recover it). Taking into consideration the above mentioned, the leaflet presented the relation between bison and local communities during time, offering example from the whole Europe, but focused on Romanian examples and realities. In this leaflet, based on examples, we emphasized that the presence of free European bison represent an opportunity for the sustainable development for the local communities.

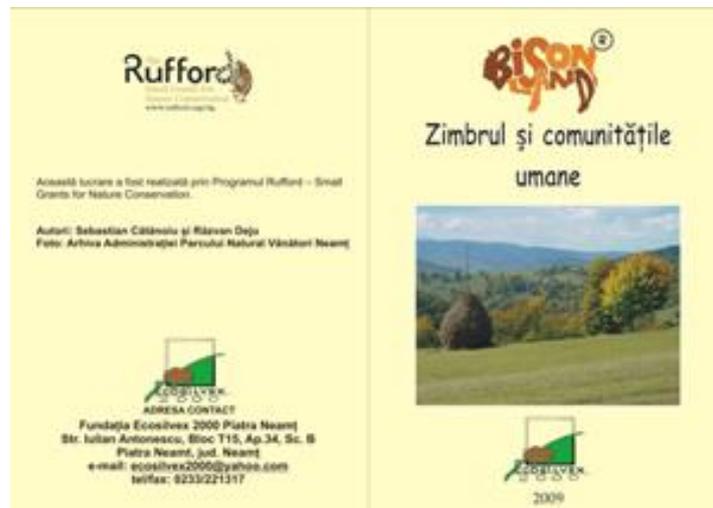


Image. The covers of leaflet 'The European Bison and Local Communities'

Even in this project our awareness campaign were dedicated mainly for 3 protected areas (VNNP, Calimani NP and Maramures Mountains NP) in 14 April 2009 we present our achievements regarding the actual Rufford project during a meeting involving another 10 Romanian National and Nature Parks. We were supported in this activity by the representatives from Calimani NP and Maramures Mountains NP which was previous involved in our activities regarding the project (see Sharing experience).

The reason was to raise the interest for European bison among the representatives of the other protected areas, in order to find future places for free bison.

The Maramures Mountains NP is on the Romanian-Ukrainian border; also Calimani NP and VNNP are very close to this border. The presence of a free bison herd, on the other side of the border, also in Carpathians, in Ukraine, determined us to organize on 6 May 2009 a meeting with Ukrainian representative coming from REPA in order to discuss a common approach regarding public awareness for free European bison. Within this meeting it was signed a Memorandum of Agreement between Romanian and Ukrainian team for a close European bison cooperation in Carpathians Mountains.

4. Sharing experience.

This activity was necessary not only for sharing experience but also to obtain information and support for the project activity. In order to fulfill these goals we organized 4 workshops (2 workshops at VNNP at the beginning and at the end of the project and other 2 workshops, one in Calimani NP and one in Maramuresului Mountains NP).

The first workshop, one day long, was organized in August 2008, in VNNP. In the first day were presented the goals and the activities of the project, also the calendar of the activities. It was appointed the required data, the modality to assess the suitable bison reintroduction habitats and everyone's implication. 10 persons participated at this workshop: members of VNNP, representatives of local environmental NGO's and representatives of schools from this area.

The second workshop was organized in December 2009 in Calimani NP. The Calimani Mountains was considered by our ancestors as a holy mountain; its cognomen was "The land beyond mist". The legend of the "White Bison" I strongly related with this area. Based on our methodology, Calimani NP was determined as one of the two protected areas the most suitable for future reintroduction of bison. The spiritual heritage related with the bison represents also a strong argument for bison reintroduction in this area. Analyzing the area we realized that the most suitable areas for establishing a new bison herds in semi free conditions, as a first step for a bison reintroduction programme, can be the Cosna Forest District. This forest district has some special characteristics: a large area - 20,000 ha, with a low human density, the settlements (Cosna commune with two small villages) are concentrated outside forest area, on lower altitude proper altitude for bison, it is neighbored only by forest, it is situated in one of the natural cloughs which getting over Oriental Carpathians from Moldavia to Transylvania, assuring in this way the future natural extension of free bison on the western slopes (Transylvania) and the eastern slopes (Moldavia) of the Oriental Carpathians. In the first day of the workshop were presented the methodology and the results of our assessment, also in the second part of the day some Power Point presentations regarding the bison, the reintroduction programme from Vanatori NP and the result of the assessment were done to the College no.1 from Vatra Dornei. In the second day, a field trip was done in Cosna area in order to check our conclusions and to find a proper place to fulfill the conditions required by the establishment of the facilities for a new semi free herd (fenced area, feeding facilities, water sources, access

road, accessibility during winter etc). The proper place to establish a fenced area for semi free herd is represented by the end of the forest road (2 km from Cosna, where a ranger house is situated). There were 10 participants at the workshop and field trip, 40 college scholarships at the presentation.

Based on our methodology Maramures Mountains NP was determined as one of the two protected areas the most suitable for future reintroduction of bison. Effectively this protected area is more suitable than Calimani NP. Despite the fact that the last written document about the hunting of a wild bison mentioned in 1853 the Borsa area, the most suitable area for establish a semi free herd is Vaser River valley. This is a long valley, around 50 km, where the access is possible only using the narrow forest railway (no roads for car, no human settlements). The two slopes are covered by dense forest; a great part of the area is below 1,000 m a.s.l.. The Vaser valley is situated between Prislop clough which assure another natural passing across the Oriental Carpathians and Tisa River valley. The Tisa is the only river (represent the border between Romania and Ukraine) which pass from East to West the Oriental Carpathians. From this point of view, the position of the Vaser valley represent also an opportunity for natural migration of free bison to Moldova and Trasylvania.

For these reasons, **the third workshop** was organised in December 2009 in the area of Maramures Mountains NP. In the first day, the above presentations were done to the German school from Viseul de Sus, in second part of the day were presented to the members of the Maramures Mountains NP, the methodology and the results of our assessment. The field trip was done in the second day, in the Vaser River Valley. The proper place to establish a fenced area for semi free herd is situated in the proximity of Faina forest railway station.

The fourth workshop, two days long, was organized in May 2009 at VNNP. In the first day we shared the final results of our work: assessment of suitable bison reintroduction habitats in VNNP, evaluation of protected areas from Oriental Carpathians and finding the most suitable areas for establishing the new bison herds in semi free conditions, the cooperation with the stuffs of the two protected areas, the public awareness activities. In the second day a trip was organized on the Cracau valley, Chitele area, in order to have a practical application about the assessment of reintroduction habitat. 10 persons participated at this workshop: members of VNNP, representatives of local environmental NGO's and representatives of schools from this area.