

# Identifying gaps in conservation and habitat management - Natura 2000 site Târnovu Mare-Latorița

Emil MARINESCU<sup>1,\*</sup>, Dragoș ȘTEFĂNESCU<sup>2</sup>, Daniel RĂDUȚOIU<sup>2</sup>

<sup>1</sup> Geography Department, Faculty of Sciences, University of Craiova, 13 A I Cuza Street, 200252 Craiova

<sup>2</sup> Biology Department, Faculty of Horticulture, University of Craiova, 13 A I Cuza Street, 200252 Craiova

\* Corresponding author: [emilrnsc@yahoo.com](mailto:emilrnsc@yahoo.com)

Received on 05-01-2021, reviewed on 26-06-2021, accepted on 30-10-2021

## Abstract

The study aims to identify the main gaps in conservation and proposes objectives in the management of protected areas. The physical characteristics of the protected area, the land use, the identification of current pressures and future threats are analyzed. Geomorphological and geological analysis is the component that highlights the correlations between relief and the distribution of habitat types. Among the features that make it unique in the Carpathian landscape, the protected area consists of a very rugged calcareous ridge with calcareous rocky slopes and chasmophytic vegetation, alpine calcareous grass-lands and a habitat of community interest consisting of forests with *Larix decidua* (the largest larch area in the Romanian Carpathians). The site is also home to a viable population of large carnivores (*Ursus arctos*, *Canis lupus*, *Lynx lynx*).

The main current pressures that are also mostly identified as future threats to the site are intensive grazing, the extension of access roads, poaching, creating of conditions for invasive species, reduction of habitat connectivity due to anthropogenic causes, antagonism with domestic animals, and off-road driving of the motor vehicles.

Future threats are anticipated due to growing forestry activities, with a negative impact especially by complete deforestation, which is favoured by the restitution in integrum of forests to the private domain without any conditionality for those that lie within the protected natural areas.

Intensive grazing leads to grassland degradation (impoverishment in species, changes in plant association). Among the proposed conservation measures, we mention: strict control of grazing livestock and grazing period, payment of compensation for private forests with high conservation value, limitation of buildings and access roads in the high areas.

**Keywords:** *protected areas, Natura 2000 network, habitats of community interest, conservation, habitat management, large carnivores, Larix decidua, invasive species, Târnovu Mare, Latorița*

## Rezumat. Identificarea lacunelor în conservare și managementul habitatelor în situl Natura 2000 Târnovu Mare - Latorița

Studiul urmărește să identifice principalele lacune în conservare și propune obiective în managementul ariilor protejate. Sunt analizate caracteristicile fizice ale ariei protejate, modul de utilizare a terenurilor, identificarea presiunilor actuale și amenințărilor viitoare. Analiza geomorfologică și geologică este componenta ce evidențiază corelațiile între relief și distribuția tipurilor de habitate. Între caracteristicile care îi conferă unicitate în peisajul carpatic, aria protejată are în componență o creastă calcaroasă foarte accidentată având ca principale habitate de interes comunitar versanți calcaroși cu vegetație chasmofilă, pajiști alpine calcaroase și păduri cu *Larix decidua* (cel mai extins arboret de zadă din Carpații României). Situl adăpostește o populație viabilă de carnivore mari (*Ursus arctos*, *Canis lupus*, *Lynx lynx*).

Principalele presiuni actuale care sunt identificate în mare majoritate și ca amenințări viitoare la adresa sitului sunt pășunatul intensiv, extinderea drumurilor de acces, braconajul, crearea de condiții pentru apariția speciilor invazive, reducerea conectivității de habitat din cauze antropice, antagonismul cu animalele domestice, conducerea vehiculelor în afara drumurilor.

Amenințări viitoare sunt anticipate datorită activităților silvice în creștere, cu un impact negativ mai ales prin tăierile rase de arbori, favorizate de restituirea integrală a pădurilor către domeniul privat fără nicio condiționalitate pentru cele aflate în cadrul ariilor naturale protejate. Pășunatul intensiv are ca rezultat degradarea pajiștilor (ruderizarea și sărăcirea în specii, modificări la nivel de asociație vegetală).

Între măsurile de conservare propuse se află: controlul strict al efectivelor de animale care pășunează și a perioadei de pășunat, plata compensațiilor pentru pădurile private cu valoare ridicată de conservare, limitarea construcțiilor și a drumurilor de acces în zona înaltă.

**Cuvinte-cheie:** *arii protejate, rețeaua Natura 2000, habitate de interes comunitar, conservare, managementul habitatului, carnivore mari, Larix decidua, specii invazive, Târnovu Mare, Latorița*

## Introduction

The European ecological network Natura 2000 has its main purpose to maintain the favorable conservation status of certain species and types of natural habitats, in accordance with the European directives. The Birds Directive (79/409/EEC, 2009/147/EC) and the Habitats Directive (92/43/EEC) set the objective of establishing a European nature conservation network NATURA 2000

([ec.europa.eu/environment/nature/natura2000](http://ec.europa.eu/environment/nature/natura2000) and [www.natura.org](http://www.natura.org)), initially consisted of special avifauna protection areas (SPAs) under the Birds Directive and sites of Community interest (SCIs) under the Habitats Directive (Primack et al., 2008).

Currently, in Romania, there has been established the status of protected natural area of community interest for a number of 610 Natura 2000 sites, of which: 462 sites of community importance (SCIs) and 148 special avifauna protection areas (SPAs). Natura 2000 sites occupy about 25,4% of Romania's surface.

Although this percentage is high, studies on the effectiveness of conservation in the protected areas in Romania have highlighted the problems they are currently facing (Ioja et al., 2010; Knorn et al., 2012; Kuemmerle et al., 2009; Marinescu et al., 2013; Pătroescu et al., 2006; Young et al., 2007).

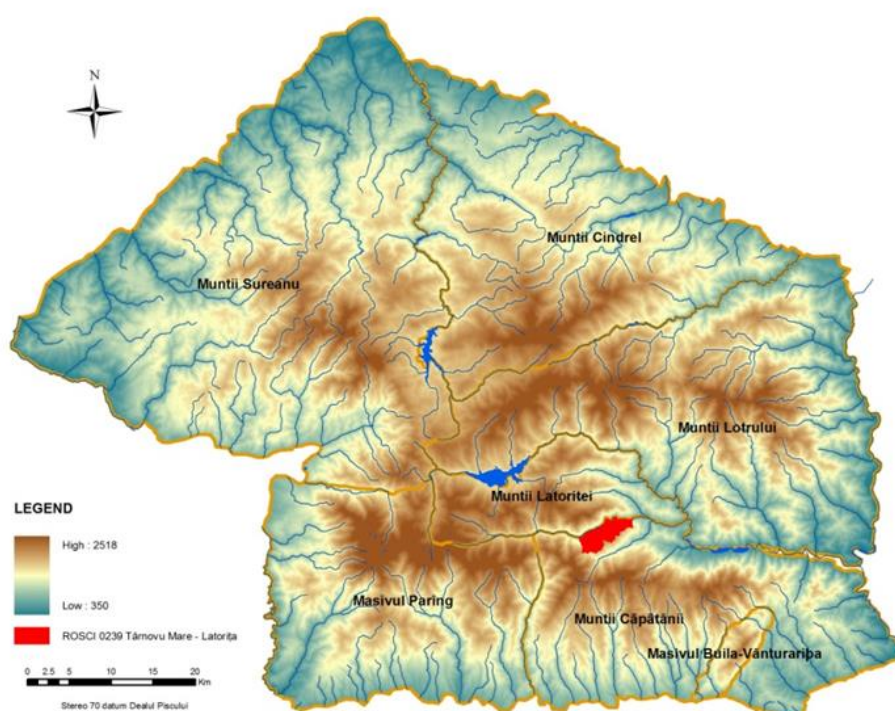
Within the Romanian Carpathians, sites of community importance cover the largest area (120 sites, 42.42% of the surface of the Romanian Carpathians), followed by the special avifauna protection areas (31 sites, 30.13%), 9 natural parks (23.60%), 12 national parks (19.72%), and various nature reserves and nature monuments (3.11%).

Natura 2000 sites have the highest share in the Southern Carpathians (63% SCI and 34% SPA, respectively), while national parks and nature parks

have the best representation in the Western Carpathians (29% and 26%, respectively).

Within the Southern Carpathians, 162 protected natural areas were designated, out of which 135 protected areas of national interest: 6 national parks (Piatra Craiului, Cozia, Buila-Vânturarița, The Jiu Gorge, Retezat, Domogled-Valea Cernei), 3 natural parks (Bucegi, Grădiștea Muncelului-Cioclovina, Țara Hațegului Dinosaur Geopark) and 126 nature reserves and nature monuments. Protected natural areas of community interest comprise 27 Natura 2000 sites.

The Natura 2000 site Târnovu Mare - Latorița is located in the central-southern part of the Parâng-Cindrel mountain group (Figure 1) and has an area of 1,366 ha.



**Fig. 1: Location of the Natura 2000 site Târnovu Mare - Latorița in the central part of the Southern Carpathians**

The central geographical coordinates of the protected natural area are 45°21'59" N. and 23°53'25" E. The minimum altitude within the site is 683 m and the maximum altitude is reached at the top of Târnovu Mare (1,863 m).

Târnovu Mare - Latorița Natura 2000 site is located in the alpine biogeographical region (European Topic Center on Nature Protection and Biodiversity) together with nine other Natura 2000 sites from the Parâng-Cindrel mountain group (Figure 2).

The site is accessible from the national road 7 A, from where the road goes up on the Latoriței valley to the Petrimanu reservoir. The access points from Latorița valley are located in the southwest of Ciunget village, at the confluence of Latorița and Borogeană,

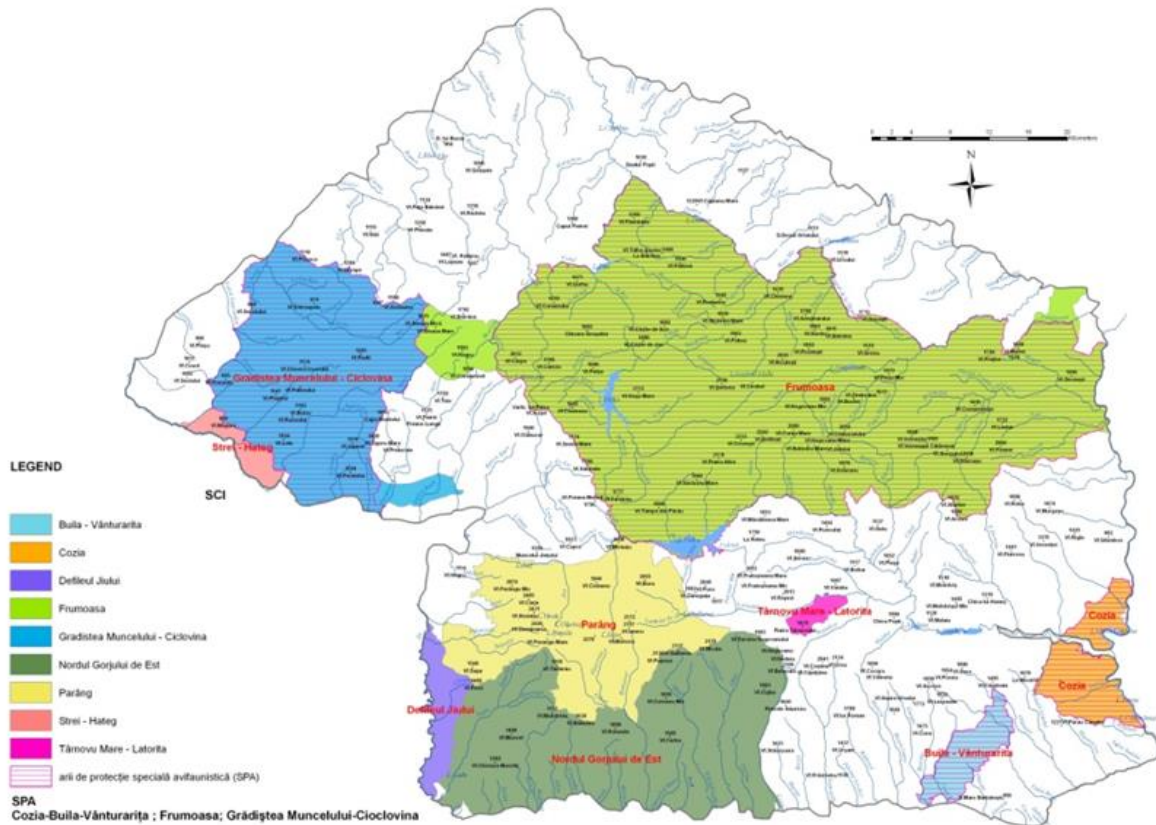
on the forest road that goes up to Gropița saddle. From the south, access to the site can be made on the Repedea valley following the roads that reach the Târnovu Mic and Târnovu Mare sheepfolds.

Among its biotic and abiotic characteristics that give it uniqueness in the Carpathian landscape, the Târnovu Mare-Latorița site consists of a very rugged calcareous ridge located at over 1700 m altitude with chasmophytic vegetation on limestone rocks (Natura 2000 code 8210) and a habitat of community interest consisting of *Larix decidua* forests (Natura 2000 code 9420).

These valuable ecosystems for biodiversity and genofund conservation are privately owned and managed. In order to achieve the objective of

favorable conservation within Natura 2000 sites, the European Commission has made available a compensation mechanism for restrictions on forest exploitation (eg. Measure 224 - Natura 2000 Payments in Rural Development Programs) which is, however, accessed differently by member states according to their priorities during each European financial year (Blondet et al., 2017; Sarvašová et al., 2019).

Romania has a delay in allocating these payments for the analyzed forest areas. Because Natura 2000 payments are made from different development funds, and allocations are proposed differently by each member state, there have been shortcomings in the effective conservation management. One proposal that will hopefully correct these dysfunctions is to set up a special fund for the Natura 2000 net.



**Fig. 2: Natura 2000 sites in the Parâng-Cindrel mountain group**

## Materials and discussions

Topographic maps at a scale of 1:25,000, geological maps at 1:200,000 and 1:50,000 and soil maps at a scale of 1:200,000 were used to analyze the relief potential. The Corine Landcover 2006 project was also used for land use, 1: 10,000 orthophotoplanes, Digital Globe satellite imagery, and field measurements with GPS (South Survey).

From a geological point of view, the studied area is occupied by Paleozoic magmatites represented by granitoids (Γ) (44.3%), Jurassic limestones (19%), tufa green rocks (21%), amphibolites (11.7%) and metablastic magmatites. (4%) (Figure 3). The underlying rock and surface formations are a pedogenetic factor which in its turn influences the vegetation in the site.

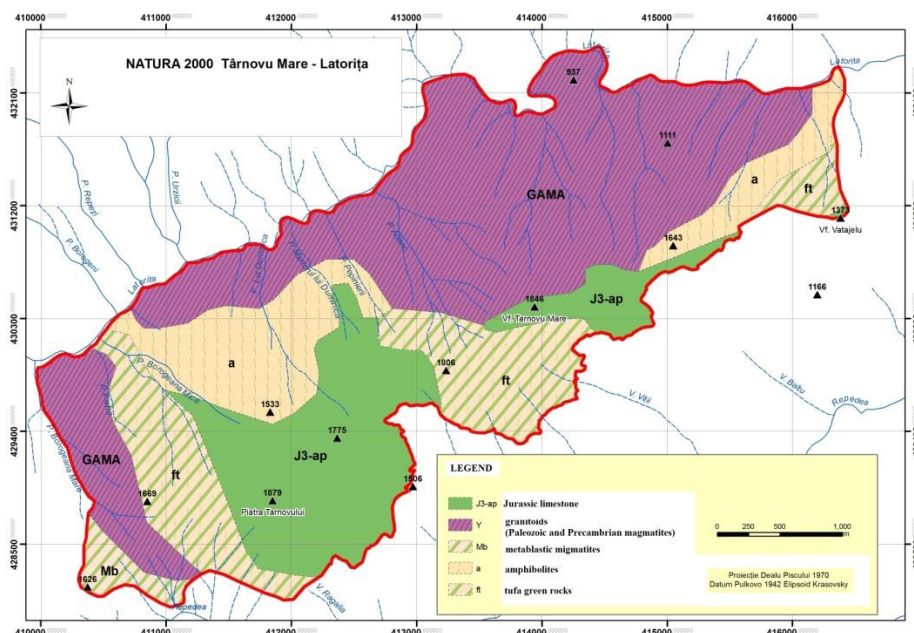
Morphometric and morphographic analysis is an important component of the geomorphological study

for the analyzed site, this being the starting point in highlighting problems related to the genesis, stages and dynamics of the evolution of the relief in the perimeter.

ArcView, ArcGIS, CorelDraw and Excel were used to represent and interpret morphometric features. The primary material is extracted from 1:25.000 topographic maps, satellite images and field observations. The number of value classes of the morphometric indicators are chosen depending on the specific morphometric characteristics that are to be highlighted and their values taking into account the significant jumps in the value chain (by using the "Classify - Natural Breaks" function in ArcGIS) and certain morphometric aspects that are considered important.

In order to obtain an easy interpretation, the toponyms and the hydrographic network were added to the morphometric maps.

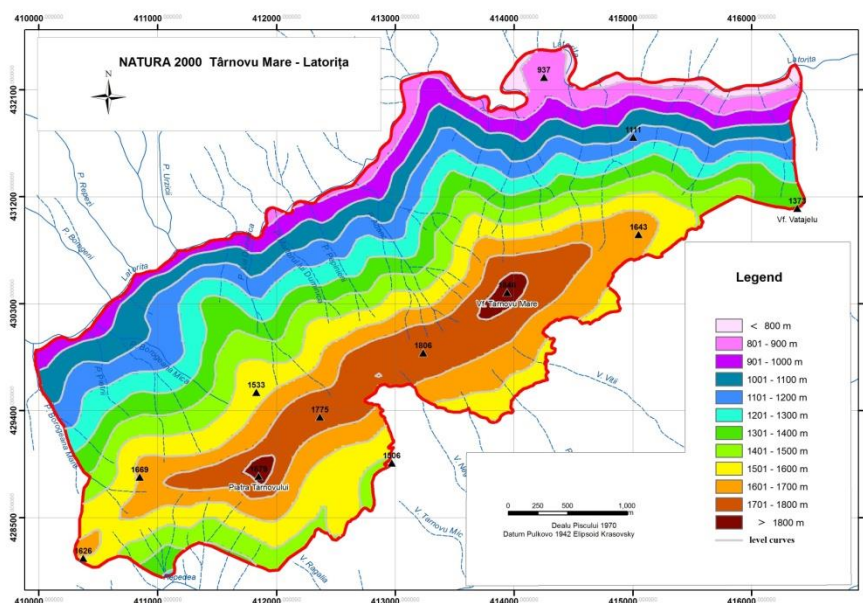




**Fig. 3: Geological map of the Natura 2000 site Târnovu Mare-Latorița**

The levelled layout of the protected area relief is revealed by the hypsometric map (Figure 4), where 12 classes are differentiated between the extreme altitudes of the studied area (683 m and 1879 m), with approximately equal shares. The maximum step

includes the highest peaks in the massif, Târnovu Mare (1,846 m) in the east and Piatra Târnovului (1,879 m) in the west. The average altitude within the site is 1,360 m.



**Fig. 4: Hypsometric map of Târnovu Mare-Latorița Natura 2000 site**

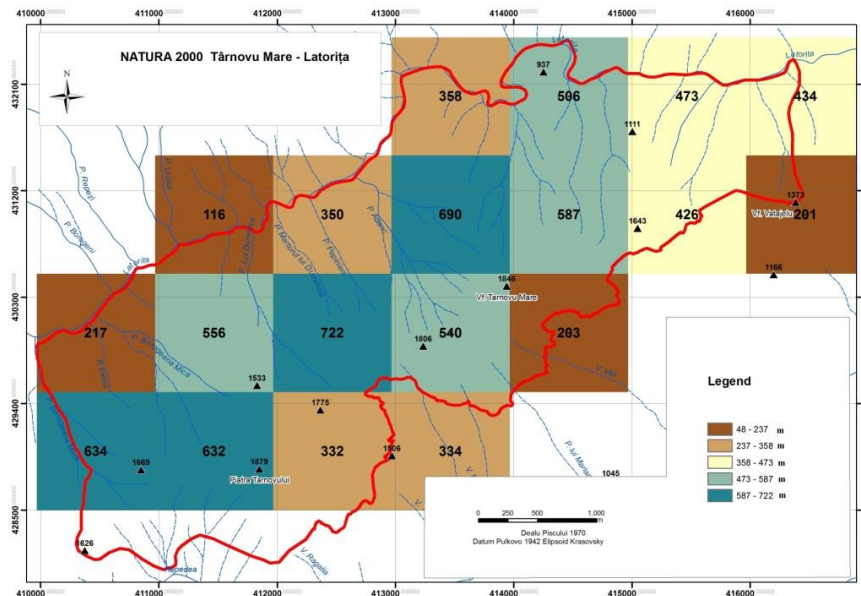
The depth of the relief fragmentation (relief energy) expresses the depth to which the vertical erosion has reached being conditioned by the general or local erosion base, and influenced by the lithological-structural conditions. The relief energy map shows the degree of deepening of the valley network from which the stage and its evolution can be deduced (valley generations, erosion intensity,

behavior of rocks to fluvial erosion, degree of adaptation of valleys to the structure).

The map of the depth of relief fragmentation (Figure 5) was made on the basis of the topographic maps at a scale of 1:25,000 using the method of cartograms by means of ArcGIS software. Taking into account the significant leaps in the range of values, there resulted five classes of values (48-227 m; 227-

356 m; 356-473 m; 473-587 m; 587-722 m). The highest relief energy is found in the area of the steep limestone within the central-western part of the site

(Piatra Târnovului), where habitat 8210 also appears (Calcareous rocky slopes with chasmophytic vegetation) (Figure 11).

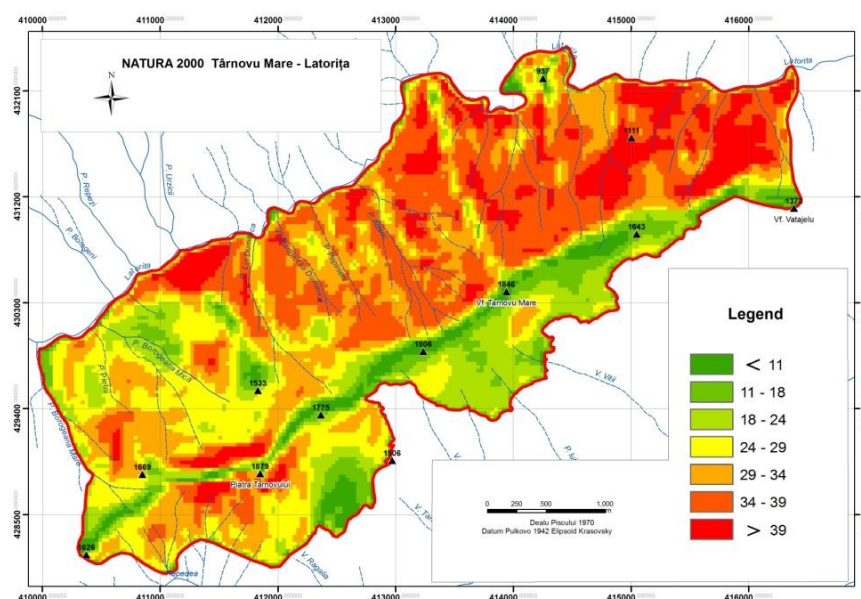


**Fig. 5: Relief energy map of Târnovu Mare-Latorița Natura 2000 site**

Slope controls the dynamics and evolution of geomorphological processes, being an indicator of the conditions in which the current relief modelling takes place and determining the dominance and the intensity of certain categories of processes: mass displacements (sudden or slow), meandering, linear erosion, areolar erosion etc. The amount of solar radiation received by areas with the same orientation also depends on the slope.

Based on the significant leaps in the value chain and the main morphographic aspects (highlighting the leveling surfaces, interfluvies, slopes, steep

areas), there are seven classes of values for declivity (Figure 6):  $\leq 110$ ; 11-180; 18-240; 24-290; 29-340; 34-390; over 390. Summarizing, there are 14% areas with slopes  $\leq 180$ , 16.3% slopes between 18-390 and 69.7% slopes greater than 390) - a percentage that indicates the dominance of the steep area on the northern slope of the site. Soil falls into the category of factors that condition the type of vegetation, the frequency and intensity of morphogenetic processes. Soil texture and structure, water storage capacity, permeability, and porosity influence erosion processes.



**Fig. 6: Slope map of Târnovu Mare-Latorița Natura 2000 site**

The largest share is held by acidic brown soils under the habitats 9410 Acidophilous *Picea* forests on the mountain to alpine leves (*Vaccinio-Piceetea*) and 9420 Alpine *Larix decidua* forests, followed by brown ferilluvial (or podzolic) soils, lithosols on the glacia at the base of the walls from Cheile Latoriței), rock (Piatra Târnovului) and rendzine (under the limestone meadows between Târnovu Mic and Târnovu Mare) (Figure 7).

The land use map, based on the Corine Landcover, includes six landscape classes (Figure 8): three forest types and three non-forest types (meadows, rock, subalpine bushes). The forest area occupies 1,066 ha (78%) and the non-forest lands have a share of 22%. Among the forest areas, the largest share is occupied by coniferous forests with 586 ha (*Picea abies*, *Abies alba*, *Larix decidua*) (54.9%), followed by mixed forests (*Fagus sylvatica*, *Acer pseudoplatanus* with *Picea abies* / *Larix decidua* / *Abies alba*) (23.3%), deciduous forests (*Fagus sylvatica*, *Fraxinus ornus*, *Betula pendula*) (21.7%) and soft deciduous species (*Alnus incana*, *Salix caprea*) (0.1%).

The forests with high conservation value (PVRC) within the protected area cover 591 ha (functional type I - "forests with special nature protection functions") of which 141,1 ha represent the European larch forest (*Larix decidua*) that dominates the habitat Nature 2000 - 9420 (Figure 10).

Although the legal framework for the status of nature reserve is assigned only for 7.1 ha of forest (Pădurea Latorița reserve - L.5 / 2000), the rest of the forest area up to 591 ha has a similar status from the point of view of the forest regime (Amenajament silvic Voineasa, UP I Rudăreasa, UP II Latorița), and part of

this surface is included in the category of virgin and quasi-virgin forests in Romania (Giurgiu et al., 2001).

The category of virgin forests includes forests formed only under the action of natural factors in which biological processes occur without any direct or indirect influence from man. The term quasi-virgin forests indicate virgin forests slightly modified by man through occasional tree felling or grazing, interventions that did not significantly change their composition and their primary structure (Order of the Minister of Environment and Forests, 2012).

Virgin and quasi-virgin forests within the protected area are ecosystems with relatively high stability and a high capacity for self-regeneration due to natural factors, but can be substantially affected by anthropogenic activities that cause changes in ecosystem structure and processes (grazing in the forest, extraction of wood material, air pollution). The role of virgin forests in biodiversity conservation is essential. In addition to the large number of woody and grassy species (including various Balkan and sub-Mediterranean elements, but also some endemics), one can find great intraspecific diversity, manifested as a pronounced polymorphism of tree species, by the presence of subspecies, varieties, and forms with great adaptive valences.

Forest genetics research has shown that virgin forests in the Romanian Carpathians are a valuable gene pool for *Picea abies*, *Abies alba*, *Larix decidua*, *Fagus sylvatica*, *Quercus petraea*. In addition, virgin forests are the refuge of large endangered carnivorous mammals in Europe (bear, wolf, lynx) and are home to a large number of birds (about 156 species) and invertebrates of great scientific interest (Giurgiu et al., 2001).

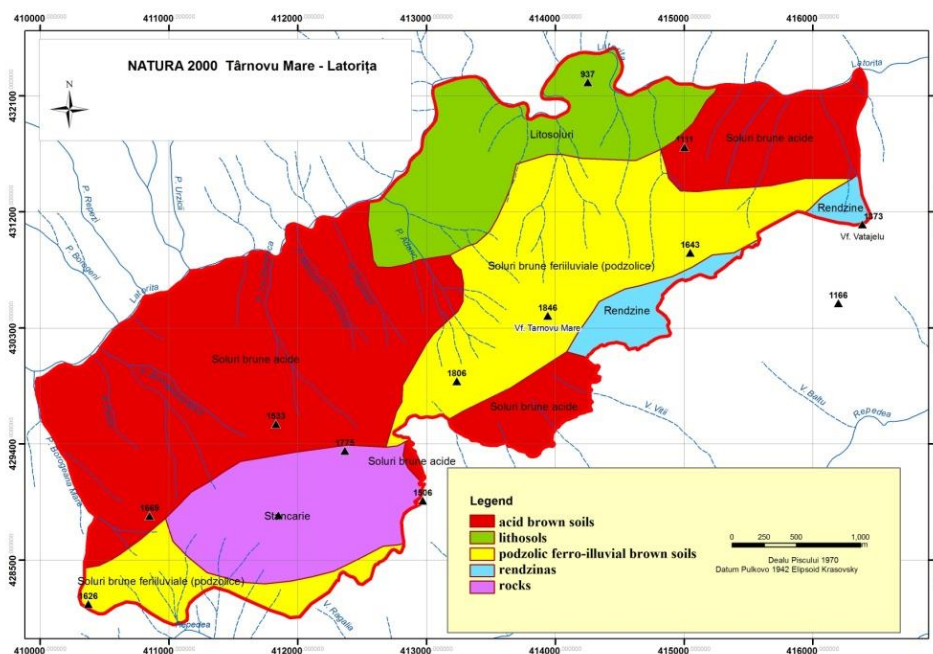
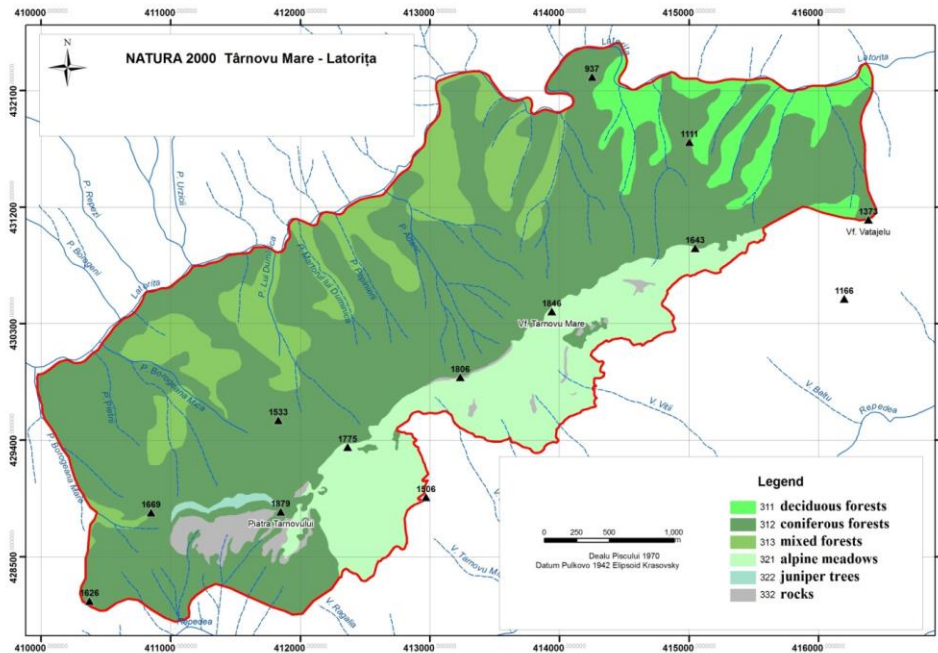


Fig. 7: Soil map of Târnovu Mare-Latorița Natura 2000 site

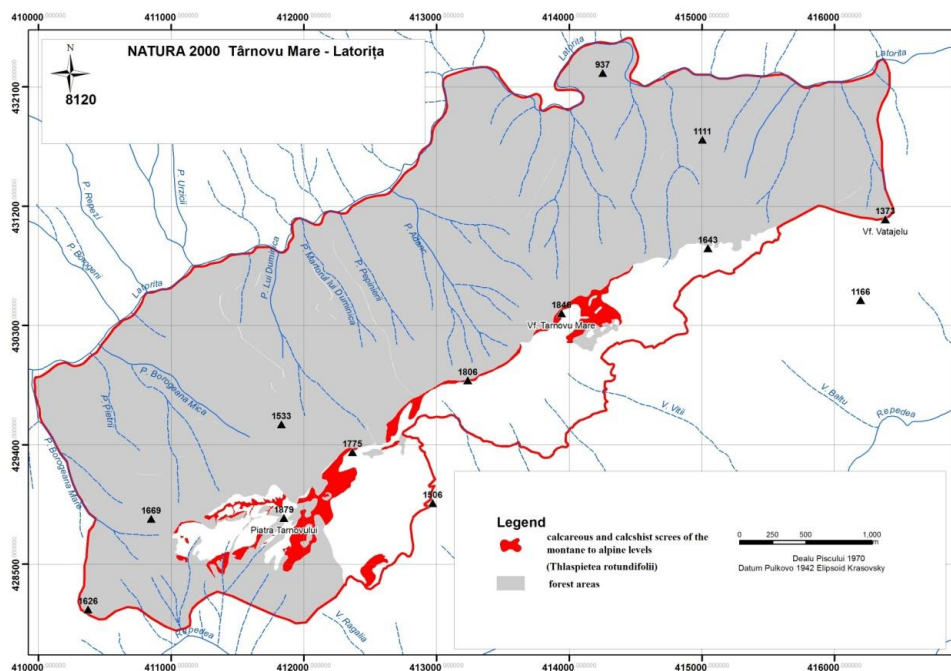




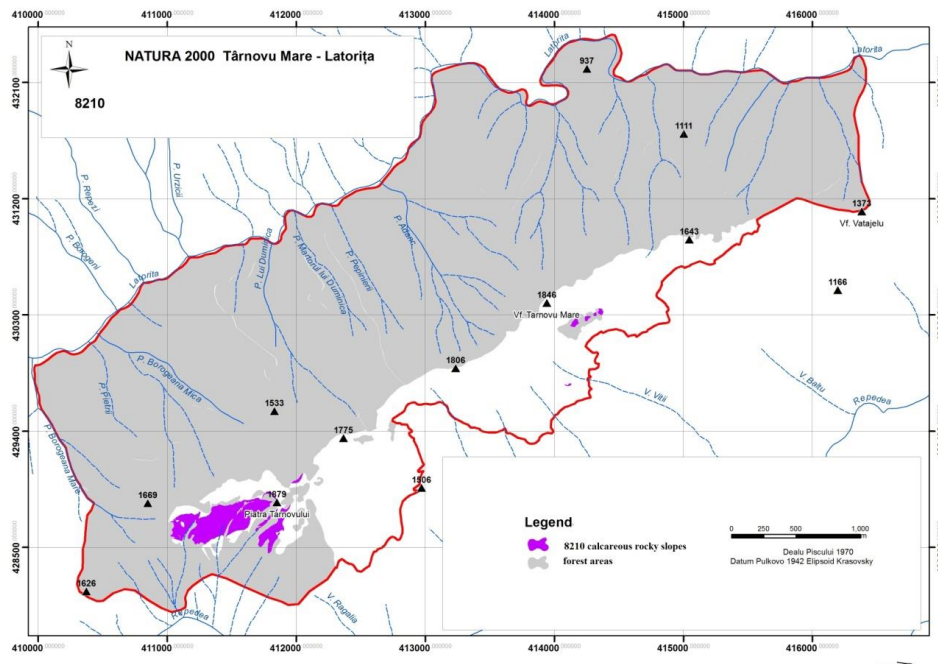
**Fig. 8: Land use map of Târnovu Mare-Latorița Natura 2000 site**

Following the elaboration of the scientific basis comprising the habitats and species of community interest, initially, in 2007, 10 types of habitats of community interest were designated in the protected area: 8120 Calcareous and calchist screen of the montane to alpine levels (*Thlaspietia rotundifolia*) (Figure 9), 8210 Calcareous rocky slopes with chasmophytic vegetation (Figure 10-11), 9420 Alpine *Larix decidua* forests (Figure 12-13), 6170 Alpine and subalpine calcareous grasslands, 6210 Semi-natural

dry grasslands and scrubland facies on calcareous substrates (*FestucoBrometalia*), 6430 Hydrophilous tall herb fringe communities, 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetia*), 3220 Alpine rivers and the herbaceous vegetation along their banks, 3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos*, 4060 Alpine and Boreal heaths (Standard Dataform ROSCI 0239). The data form did not initially include species of community interest.



**Fig. 9: Habitat distribution map : 8120 Calcareous and calcareous screen of the mountain to alpine levels (*Thlaspietia rotundifolia*) within Târnovu Mare-Latorița Natura 2000 site**



**Fig. 10: Habitat distribution map: 8210 Calcareous rocky slopes with chasmophytic vegetation within Târnovu Mare-Latorița Natura 2000 site**

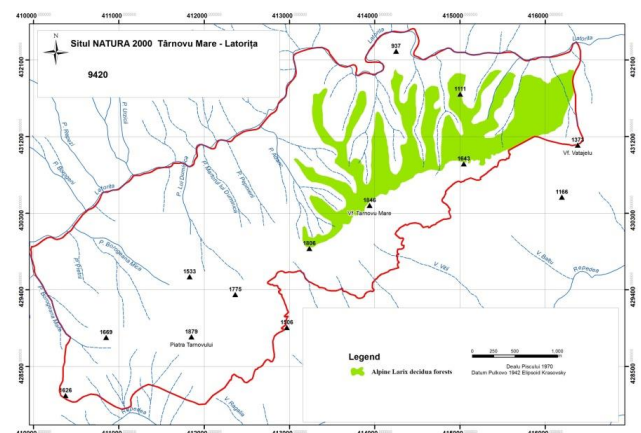


**Fig. 11: Calcareous rocky slopes with chasmophytic vegetation**

During field research (2014-2019), our research team of biologists and geographers identified three new habitats: 3230 Alpine rivers and their ligneous vegetation with *Myricaria germanica*, 9180\* Tilio - Acerion forests of slopes, screes and ravines, 6520 Mountain hay meadows. We also reported the certain presence of the three large carnivores (*Ursus arctos*, *Canis lupus*, *Lynx lynx*) and a viable population of chamois (*Rupicapra rupicapra*) (Piatra Târnovului area). There are a number of short comings: maintaining these populations viable in the long run in small reserves (Shafer, 1995) and establishing an optimal threshold of animal populations correlated with the minimum size of reserve (Shaffer, 1981). From this perspective, it is necessary that the Târnovu Mare - Latorița site be connected by corridor

habitats with the neighboring protected areas, especially with the national park and the Natura 2000 site Buila-Vânturarița (4,186 ha) which would ensure in the future a cumulative area more than 7000 ha, sufficient for the sustainable conservation of these species of fauna.

Habitat 6430, where *Ligularia sibirica* species have been identified, is another habitat of Community interest that is representative for the protected natural area. It includes Hydrophilous tall herb fringe communities in which we identified species as: *Ligularia sibirica*, *Lysima-chia vulgaris*, *Stachys sylvatica*, *Adenostyles alliariae*, *Valeriana officinalis*, *Telekia speciosa*, *Petasites albus* etc. (Răduțoiu, Marinescu, 2014).



**Fig. 12: Habitat distribution map: 9420 Alpine Larix decidua forests within Târnovu Mare-Latorița Natura 2000 site**





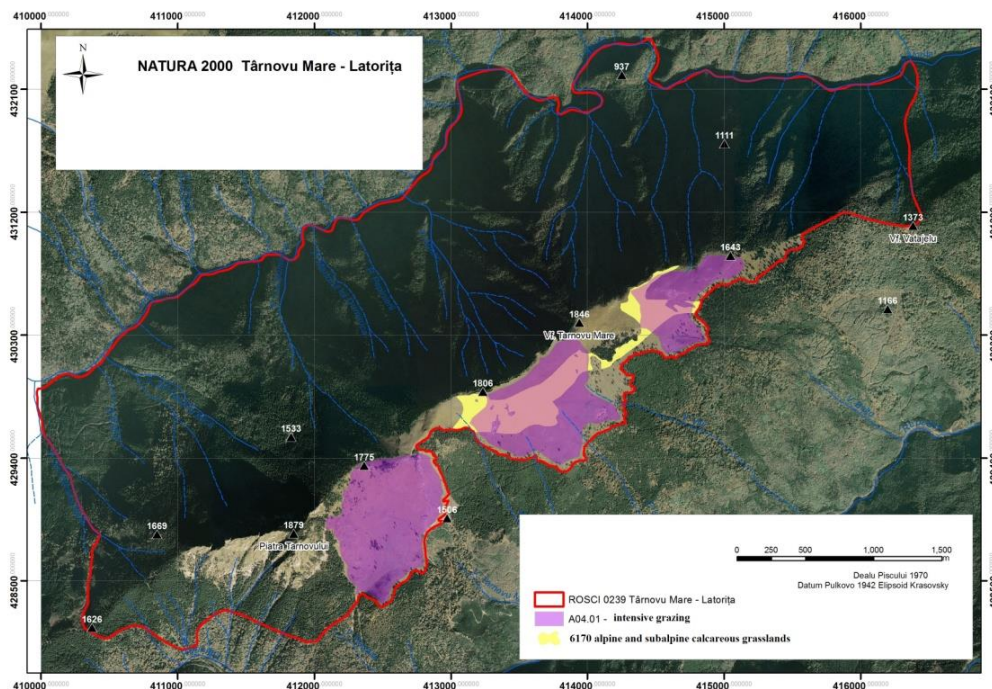
**Fig. 13: Larix decidua forests in Târnovu Mare-Latorița Natura 2000 site**

Given the specificity of the protected area, we recommend the application of the concept of "forestry

close to nature" which can ensure a sustainable conservation of forests as a whole and their biodiversity by applying principles of "good practices". The concept has been applied in some parts of Europe since the 19<sup>th</sup> century (Gayer, 1878; Biolley, 1920, 1980) and today Pro Silva Europe Association, which involves foresters concerned about the future of Europe's forests, promotes this concept.

The concept is based on the analysis of the dynamics of the natural forest and involves:

- promoting and returning to compositions of trees based on native species;
- creation of diversified forest structures to permanently ensure all the functions of the forest;
- taking advantages of forest regeneration and self-regulation capacity, to a greater extent, through the appropriate management of natural ecosystem processes, in order to ensure forest stability and the economic efficiency of forest management ([www.prosilvaeurope.org](http://www.prosilvaeurope.org)).



**Fig. 14: Map of intensive pasture superimposed over habitat 6170 Alpine and subalpine calcareous grasslands within Târnovu Mare-Latorița Natura 2000 site**

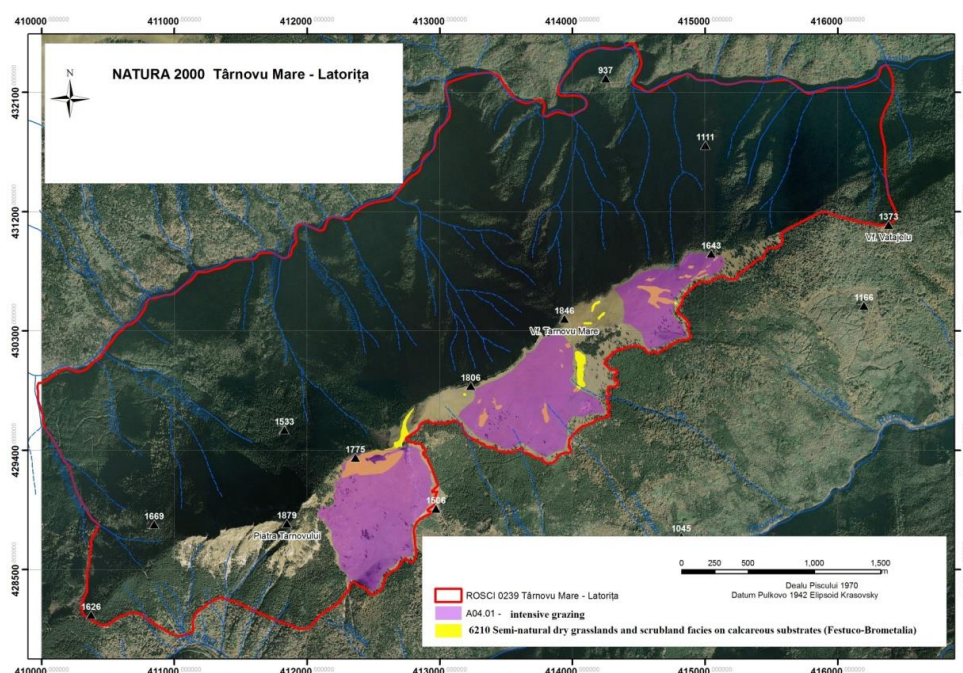
Alpine pasture is another type of habitat in the protected area that needs conservation measures. For the conservation of mountain grasslands, sets of ecological thresholds have been proposed to reflect the conservation value and to determine scientifically sound decisions (Cook et al., 2016; Dorrough et al., 2020). If we take into account the landscape criterion, we can use as landscape metrics the size of the patches and the isolation of the patches (Parkes et al., 2003).

The main current pressures on the two grassland habitats (Natura 2000 code 6170/6210) within this

protected area (figure 14-16), which are also future threats to the site, are: intensive grazing (fig. 17), extension of access roads, poaching, creation of conditions for invasive species (*Ailanthus altissima*, *Ambrosia artemisiifolia*), increasing of the areas occupied by *Rumex alpinus*, *Veratrum album* and *Urtica dioica*, reducing of the habitat connectivity due to anthropogenic causes, antagonism with domestic animals (stray dogs, high numbers of sheepfold dogs), off-road driving of the motor vehicles, storing household waste close to sheepfolds.

Within this protected area and in general in all Natura 2000 sites in Romania, it has not been possible to control and prohibit off-road activities and winter tourist trips with snow-mobiles. These activities have grown exponentially over the last 10 years with a strong negative impact on the flora and fauna of protected areas. If these two activities are relatively controlled in the national parks of Romania (12 national parks in the Romanian Carpathians), in the Natura 2000 sites the phenomenon is far from being

controlled. This is also due to the fact that many Natura 2000 sites, that do not have the status of national park or natural park, lost in 2016 the administrative structures by reorganizing the management of protected areas in Romania and the establishment of the National Agency for Protected Areas, a structure insufficiently developed to manage environmental issues in Natura 2000 sites (25.4% of Romania's surface).



**Fig. 15: Intensive grazing map superimposed over habitat 6210 *Seminatural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)* within the Natura 2000 site Târnovu Mare-Latorița**

Intensive grazing of sheep and cattle results in grassland degradation (impoverishment in species, changes in plant association). Replacing the grassland ecosystem by reducing the distribution areas of rare flora species is another future threat.

Another future threat is the replacement of the grassland ecosystem by reducing the distribution area of rare flora species (*Alyssum montanum*, *Silene vulgaris* subsp. *glareosa*, *Rumex scutatus*, *Kohlrauschia saxifraga*, *Silene saxifraga* subsp. *petraea*, *Athamanta turbith* subsp. *hungarica*) or glacial relicts (*Ligularia sibirica*) (Răduțoiu, Ștefănescu, 2014).

Taking into account the diagnoses and forecasts in the Tarnovu Mare-Latorița site, future threats are also anticipated, due to the forestry activities with a negative impact favoured by the illegal tree felling. The full restitution of forests to the private sector in the post-socialist period without any conditionality for forest areas that are situated in protected natural areas and socio-economic changes during the

transition period, decrease the effectiveness of the network of protected areas in Romania mainly in terms of capacity to protect biodiversity (Ioja et al., 2010; Knorn et al., 2012).

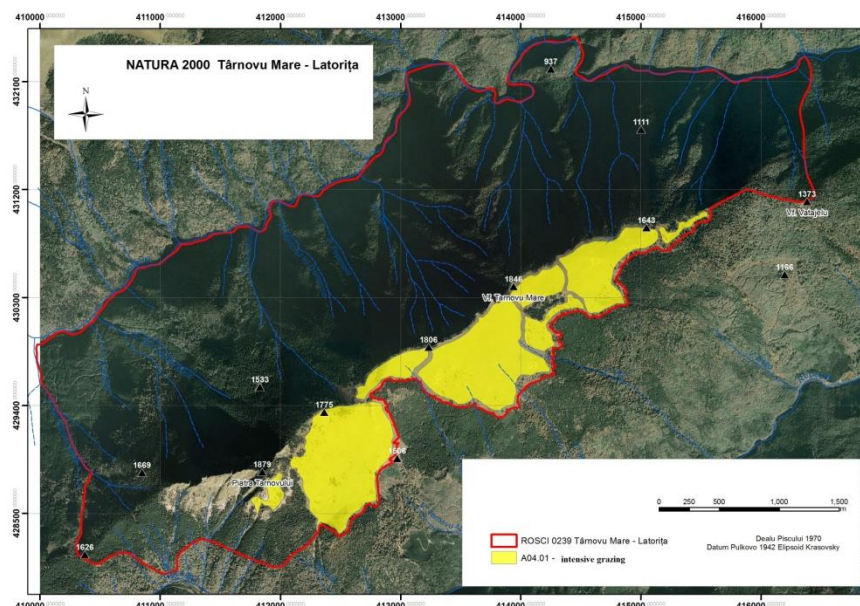


**Fig. 16: Pastoral buildings within Târnovu Mare – Latorița Natura 2000 site**



The trees of forestry interest in the protected area (*Picea abies*, *Larix decidua*, *Fagus sylvatica*), from the point of view of the conservation of genetic resources, have some particular biological properties, which constitute many advantages. For example, the size,

structure and natural regeneration capacity of trees are factors that prevent or do not favor a catastrophic elimination (windfalls, fungal or insect attacks) (Giurgiu, 1978).



**Fig. 17: Map of future threats (intensive grazing) within Târnovu Mare-Latorița Natura 2000 site**

## Conclusions

Târnovu Mare - Latorița site belongs to the European ecological network Natura 2000. Currently, at national level, this network includes 610 sites (462 SCI and 148 SPA) which occupy a share of approximately 25% of the national territory. The site has an area of 1,366 ha and includes 10 habitats of community interest, of which two habitats are a priority.

Among the features that give it uniqueness in the Carpathian landscape, the site Târnovu Mare-Latorița has a very rugged calcareous ridge located at over 1,700 m altitude with Calcareous rocky slopes with chasmophytic vegetation (Natura 2000 code 8210), Alpine and subalpine calcareous grasslands (Natura 2000 code 6170) and a habitat of community interest consisting of forests with *Larix decidua* (Natura 2000 code 9420), which through the occupied area (141.1 ha) and the particular biological properties of the trees, ensures the in situ conservation of forest genetic resources, which are of the greatest importance in the Romanian Carpathians.

The natural forests in the Latorița basin still offer a rich genetic resource. First of all, the genetic variability of the natural populations must be preserved, both for the species with exceptional magnitude of variability (spruce, pine) and for the

species with limited geographical distribution (larch, stone pine, juniper, knee-pine).

The site is also home to a viable population of large carnivores (*Ursus arctos*, *Canis lupus*, *Lynx lynx*) and chamois (*Rupicapra rupicapra*). The connectivity between the two Natura 2000 sites, Târnovu Mare - Latorița and Buila-Vânturarița, is required through a corridor habitat drawn on the interfluvium that connects them.

The main current pressures that will also stand for future threats to the site are: intensive grazing, widening of access roads, poaching, creating of conditions for invasive species (*Ailanthus altissima*, *Ambrosia artemisiifolia*) and increasing of the area occupied by *Rumex alpinus*, *Veratrum album* and *dioica*, reduction of habitat connectivity due to anthropogenic causes, antagonism with domestic animals (stray dogs, packs of dogs from the sheepfolds), off-road driving of motor vehicles, storage of household waste close to sheepfolds. Future threats are also anticipated due to the negative impact of forestry activities favoured by illegal logging, the complete restitution of forests to the private sector in the post-socialist period with no conditionality for forest areas that are situated in protected natural areas.

Another threat, due to strong insolation in the area of limestone cliffs and related to climate change



towards an arid one, is manifested through the high risk of fire outbreaks.

Among the proposed conservation measures are: strict control of livestock grazing careful management of grazing period, control of motor vehicle traffic including the installation of barriers on access roads to the alpine meadow, involvement of the local community in promoting mountain products as a better means of livelihood.

Effectiveness in terms of the conservation capacity of habitats, species and landscapes has two aspects, forest conservation and conservation effectiveness in the alpine area. If at first sight the conservation has the expected effect in the Latorița forest nature reserve (7.10 ha) and the mixed forests of larch, spruce and fir (that are included in forests with high conservation value, which in the protected area occupy 591 ha (functional type I) of which 141.1 ha represent European larch forest (*Larix decidua*), in terms of grazing, various other future threats arising from overgrazing and the development of a network of access roads on the southern slope of the protected area, the effective-ness is continuously declining.

## Acknowledgements

Financial support for this study was conducted under the project "Development Management Plan for Natura 2000 site ROSCI0239 Tarnovu Mare-Latorița" Project cofinanced by the European Regional Development Fund in the Sectoral Operational Programme "Environment" Priority Axis 4 - Implementation adequate management systems for nature protection.

## References

- Appleton, M., R., (2002), Procesul de elaborare a planurilor de management pentru arii protejate din România, RO-GE-44176 (in Romanian).
- Blondet, M., Koning, J., Borrass, L., Ferranti, F., Geitzenauer, M., Weiss, G., Turnhout, E., Winkel, G., (2017), Participation in the implementation of Natura 2000: a comparative study of six EU member states, *Land Use Policy*, 66, 346-355
- Cook, C.N., de Ble, K., Kelth, D.A., Addison, P.F.E., (2016), Decision triggers are a critical part of evidence-based conservation, *Biodiversity Conservation*, 195, 46-51
- Cogălniceanu, D., Cogălniceanu, G.C., (2010), An enlarged European Union challenges priority settings in conservation, *Biodiversity and Conservation*, 19, 1471-1483
- Dorrough, J., Watson, C., Martin, R., Smith, S., Eddy, D., Farago, L., (2010), Identifying and testing conservation decision thresholds in montane grasslands, *Ecological Indicators*, Elsevier, 118, 1-11.
- Gafta, D., Mountford, O., (2008), Manual de interpretare a habitatelor Natura 2000 din România, Risoprint Publishing House, Cluj-Napoca (in Romanian).
- Giurgiu, V., (1978), Conservarea pădurilor, Ceres Publishing House, Bucharest (in Romanian).
- Giurgiu, V. (eds.), (2001), Les forets vierges de Roumanie, ASBL Foret Wallonne, Belgique
- Ioja, C., Pătroescu, M., Rozyłowicz, L., Popescu, V.D., Vergheleț, M., Zotta, M.I., Felciuc, M., (2010), The efficacy of Romania's protected areas network in conserving biodiversity, *Biological Conservation*, 143, Elsevier Publishing
- Knorn, J., Kuemmerle, T., Radeloff, V., Szabo, A., Mîndrescu, M., Keeton, W., Abrudan, I., Griffiths, P., Gancz, V., Hostert, P., (2012), Forest restitution and protected area effectiveness in post-socialist Romania, *Biological Conservation*, 146, Elsevier Publishing
- Kuemmerle, T., Muller, D., Griffiths, P., Rusu, M., (2009), Land use change in Southern Romania after the collapse of socialism, *Regional Environmental Change*, 9,1-12
- Marinescu, E., Marinescu, I., Vlăduț, A., Marinescu, S. (2013), Forest Cover Change in the Parang-Cindrel Mountains of the Southern Carpathians, Romania, in Kozak, J. et al.(eds.), *The Carpathians: Integrating nature and society towards sustainability*, Springer, 225-238
- Parkers, D., Newell, G., Cheal, D., (2003), Assessing the quality of native vegetation: the habitat hectares approach, *Ecological Management and Restoration*, 4, 29-38
- Pătroescu, M., Dobre, R., Necșuliu, C., Ioja, C., Rozyłowicz, L., (2006), Impact assessment on the *Pinus nigra* banatica site by natural and an-tropic causes in the area of the Domogled - Valea Cernei National Park, in Pătroescu, M., Matache, M., (eds.), *Proceedings of 2nd Inter-national Conference on Environmental Research and Assessment*, București, 350-361.
- Primack, Rh. et al., (2008), Fundamentele conservării diversității biologice, AGIR Publishing, Bucharesti (in Romanian).
- Răduțoiu, D., Marinescu, E., (2014), Study of hygrophilous vegetation from Târnovu Mare-Latorița, Vâlcea – Romania, *Annals University of Craiova, Series Biology*, vol XIX (LV), Craiova
- Răduțoiu, D., Ștefănescu, D., (2014), Site of vascular flora Târnovu Mare-Latorița, Vâlcea – Romania, *Annals University of Craiova, Series Biology*, vol XIX (LV), Craiova
- Sarvašová, Z., Ali, T., Dordević, I., Lukmine D., Quiroga, S., Suárez, C., Hrib, M., Rondeux, J., Mantzanas, K.T., Franz, K., (2019), Natura 2000 payments for private forests owners in Rural Development Programmes 2007-2013 - a

- 
- comparative view, *Forest Policy and Economics*, 99, 123-135, Elsevier Publishing
- Shafer, C.L., (1995), Values and shortcomings of small reserves, *BioScience*, 45, 80-88
- Shaffer, M.L., (1981), Minimum population sizes for species conservation, *BioScience*, 31, 131-134
- Young, J., Ricards, C., Fischer, A., Halada, L., Kull, T., Tartes, U., Uzunov Y., Watt, A., (2007), Conflicts between biodiversity conservation and human activities in the Central and Eastern European countries, *Ambio*, 36, 545-550
- \* \* \*, (2007), Interpretation Manual of European Union Habitats, EC-DG Environment
- \* \* \*, (2014), Plan de management ROSCI0239 Târnovu Mare - Latorița, APM Vâlcea (in Romanian).
- \* \* \*, (2014), Amenajament silvic O.S. Voineasa, UP I, UP II Latorița (in Romanian).  
<http://www.ec.europa.eu/environment/nature/natura2000> European Commission. Environment. (accessed in October 2020).  
<http://www.prosilvaeurope.org> (accessed in October 2020).
- \*\*\* (2011), FSD Natura 2000, ROSCI0239 Târnovu Mare-Latorița, Agenția Națională pentru Protecția Mediului (in Romanian).  
<http://www.anpm.ro/biodiversitate> (accessed in October 2020).