National Park Durmitor and surrounding area
By Snežana Dragićević

Brief description of the protected area

The Durmitor massif and Tara river represent the most majestic natural phenomena in Montenegro, the Balkans peninsula and even broader. They have become widely known for the grandiose Canyon of the Tara river which is near Obzir 1300 m deep, therefore the second deepest and longest in the world after the Colorado, as well as for one of the highest peaks in Montenegro – the Bobotov Kuk summit at 2,523 m. The natural treasury of this region, due to its authenticity and uniqueness, has been protected at the national (the National Park of Durmitor) and international level (the Tara river was registered as an ecological reserve for the World's biosphere – therefore protected by international convention M&B UNESCO and the National Park of Durmitor together with the canyon of the Tara river was declared one of the World Natural and Cultural Heritages of UNESCO - criteria N (ii), (iii) i (iv)). The Tara has been recognized as the queen of European rivers, rightfully named the "the jewel of Europe".

Mount Durmitor and its wider surrounding is endowed by rare and wild beauties, a very specific hydrography, unique relief features, vertical and horizontal distribution and jaggedness of a great many natural elements, as well as extremely bountiful flora and fauna. It is the only one of the national parks in Montenegro that has received double international recognition and protection. What adds a special value to the Park are *the zones under a special regime of management* (3), out of which 2 have been afforded *a strict regime of protection* (the Tara river canyon and the Crna Poda forest reserve). Magnificent canyons of the Tara and Piva rivers and their numerous tributaries, 18 glacial lakes – "mountain eyes", distinct hydrological, geomorphologic, geological and speleological phenomena, the richness of flora and fauna and biodiversity in whole, with an exceptional concentration of such a quantity and quality of numerous endemic, relic, rare, protected and other extremely important species, make the Durmitor massif an extraordinary natural wealth.

Borders: the area of Durmitor is bordered by the Tara river canyon from the north and north-west, the valleys of Piva, Komarnica and Bukovica from the west and southwest while the southwest side is of Bukovica river upstream towards the mouth of Tušinja river and the road section Donja Bukovica-Vrazje Lake, Njegovuđa and Đurđevića Tara. Position of the National Park "Durmitor" in bio-geographic sense belongs to southern Dinaric arc area and is located in the northern region of Montenegro.

National Park „Durmitor" covers the territory of 5 municipalities: Žabljak, Mojkovac, Pljevlja,Plužine and Šavnik. The surface is of 33.895ha.

Present legal background (national, international legislation, laws…)

National:

The massif of Mount Durmitor has been afforded statutory protection since 1952, together with other Montenegrin national parks – Biogradska Gora and Lovćen. 1983. the list is amended with NP Skadar Lake.

For the NP Durmitor, the umbrella law is the Law on national parks ("Official Gazette", no. 47/91) which among the other issues precisely defines the borders of the park.

The changes and amendments of this Law are in procedure. The Ministry of tourism and environmental protection is in charge. The Law on protection of nature and Resoulution on protection of some plant and animal species ("Official Gazette" no. 76/06 from December 12, 2006) apply on this protected natural object.

NP Durmitor has its Spatial plan of special purpose area ("Official Gazette" no. 20/97). Program of protection and development (2005 – 2010) was also prepared for Durmitor.
International:

Tara river basin was enlisted in the network of objects of biosphere within the scope of the UNESCO Program Man and Biosphere (MAB) on the January 17, 1977.

National Park "Durmitor" with the part of Tara canyon was added to the Lost of world natural heritage in 1980.

Species richness and threats

Note: *For this presentation, literature data for the plants, fungus and animals aggregates for which the data exist are given. For many aggregates recent data do not exist.*

Mosses

In the NP "Durmitor", mosses are widely spread. They populate various natural and anthropogenic habitats. Natural and usual habitats of various types of moss and their communes are peat-bogs (Barno Lake and others), wet meadows, forests – in particular wet billets, trees, branches, soil, then wet rocks and cracks, stones, wet scree, rivers and their shores, waterfalls, sources and waterfalls. Also, the moss are found on house roofs, walls, pavements, monuments, around traffic lines and various other urban habitats. T Flora moss of NP "Durmitor" counts 254 taxons (226 mosses and 28 hepatics), which is almost half of the total

bryophyte registered on the territory of Montenegro. (Dragićević and Veljić, 2006). Certain number of mosses is registered only in this area (*Riccardia latifrons*, *Jungermannia leiantha*, *Plagiochilla porelloides*, *Lepidozia reptans*, *Ptilidium ciliare*, *P. pulcherrimum*, *Sphagnum centrale*, *S. squarrosum*, *S. subnitens* and others). A significant peat-bog area is located in the Park around the Barno Lake (habitat of *Sphagnum moss*). *Buxbaumia viridis* is also among registered taxons. It is on the Red list of mosses of Europe (ECCN, 1994). Typical habitats of this moss are conifer woods which are increasingly under the negative anthropogenic pressure. However, flora of mosses of both water and terrestrial ecosystems is more and more under the pressure of man. By the New Law on protection of nature, 10 taxons (types of *Sphagnum*, *Homalia webbiana* (Mont.) Schimp., *Hypnum fertile* Sendtn., *Neckera pennata* Hedw., *Orthotrichum patens* Bruch ex Brid. families) are on the protected list.

Wood cuts and lakes' drying activities cause negative impacts on brioflora of the respective area.

Linches

Linches are one of poorly explored groups of organisms on the territory of Montenegro. According to the literature data on this territory (Montenegro) 248 linches were registered so far. In the period 1996-1998, in the scope of the project "Floristic and vegetation explorations of Durmitor" lichenological explorations of a great part of NP Durmitor were executed. For the territory of the Park, 127 types of lichens were registered.

Although this figure presents almost a half of the total number of lichenological taxons registered in Montenegro, further explorations are necessary in order to complete the overview of the diversity and distribution of this group of organisms in the area of National Park Durmitor.

Fungus

Till now, 300 types of macro-mycetes which is half of the total number found on the territory of Montenegro. Presence of large number of species listed in the Red Lists of Europe and of international importance have been found in the Park.

In the surrounding of the Crno Lake the locus classicus, *Gyromitra macknightii Harmaja kind* is registered. Beside the large number of data, the ark area is insufficiently mycologically explored, in particular some parts. Therefore this number does not even approximately reflect the real diversity of myco-fund. Among macro-mycete of the Park, 20 types of macro-mycete endangered in Europe and enlisted on the Red List of Europe (ING 1993), having the global importance are present. Those species are of classified in four categories reflecting the level of the jeopardy and necessary level of protection which should be provided.

Entomo-fauna-insects

Previous explorations of entomo-fauna in the territory of NP Durmitor showed great presence of enormous number of species from almost all known European insects families. So, on a relatively small area such as the National Park, relatively high degree of diversity of this group of animals is registered. This fact further attracts the attention of a number of local and international entomologists continuing researches showing that there is a great wealth of the insects world in this area.

We are listing only the most important out of a great number of the researched species: Tipulidae (mosqitoes) - 49 species, Trichoptera - 95 species, Heterocera (Bombyces et Sphinges) - l60 species, Tortricoidea – 87 species, Heteroptera - l38 species, Noctuidae – 260 species, Neuorptera – 62 species, Scolytidae- 46 species, Collembola -75 species, Drosophillidae - 34 species, Pyralidae – 77 species, Syrphidae – 201 species(3 vare described as new for the science), Culicidae – 12 species. In the territory of NP Durmitor 6 kinds of insects are directly protected. They are: red forest ant *Formica rufa* L.; beetles *Lucanus cervus* L.(horn-bug) and *Oryctes nasicornis* L.(rhomb); butterflies: *Papilio machaon* L. (swallow's tail), *Papilio podalirius* L. and *Parnassius apollo* L. (Apolon's butterfly). Previous researches of entomo-fauna showed the need for protection of several endangered species. Main causes if insects endangering of this park are the following: fires, losses of habitats due to urbanization and collecting of insects for commercial purposes.

Ihtio-fauna

Ihtio-fauna of the NP "Durmitor" has not been well researched although there are 18 high-mount lakes. Although all the lakes were stocked with fish, there are no available data on the types of introduced species and in which lake. Additional assessments recored 4 fish species. There are no recent data on the situation in some lakes. In the part of Tara river, belonging to the NP Durmitor, 8 fish species are registered: barbel *(Barbus barbus),* bleak *(Alburnoides bipunctatus)* and chub *(Leuciscus cephalus)*, but those species were not confirmed by the later researches. In total, 10 fish species live on Durmitor while none of them is autochthonous in Durmitor lakes. General jeopardy of fish species comes from the excessive uncontrolled fishing and hunting by forbidden means. Although the majority of species is interesting for sport fishing, special protection measures are not needed. Stipulated legal provisions are sufficient if they are being implemented. Protection during the time of spawning is regulated by the Law on fresh-water fishing prescribing bans for some species and prescribed hunting quantities. In the chapter on hunting fauna, only two lakes are foreseen for further exploitation (Crno and Vražje). All other lakes are open for fishing during the whole year. Fishing on those lakes will create conditions for renovation of the natural communes and return of some vanished species such as triton.

Herpetofauna

Only Durmitor NP has better explored fauna of reptiles and amphibians. The research is related primarily to fauna composition, bio-geographic features and some elements of phenology. This area id a unique area of herpeto-fauna, in particular neotenia phenomenon and presence of relict and endemic forms. The important part of the overall knowledge of herpetofauna, the most important one related to preservation of amphibians and reptiles - their ecology is only fragmentary known. On the territory of the Park, by Resolution of protection of rare, endemic, and endangered plant and animal species (official Gazette no. 36/82) 5 amphibian and 8 reptiles species. The Respolution from 2006 covers almost all registered species in the NP Durmitor. 27 species were registered which is almost half of amphibians and reptiles in Montenegro. That number itself shows the wealth of herpetofauna of a reltively small geographic area. None of existing strict reserves on Durmitor is afforded the status because of amphibians and reptiles although some species have optimal conditions for survival such as *Triturus alpestris, T. vulgaris, Rana temporaria and Vipera berus bosniensis* in Barno Lake and its surrounding. Two most important species of this fauna are definitely representatives of the ancient group of lizards from the sub-family *Archacolacerta: Lacerta (A.) mosorensis* and *L. (A.) oxycephala* which should be afforded strict reserves. The reserve of mosor rock lizard of does not have to be compact but could be of island character in order to cover the most powerful populations. The most endangered population is along the Zminje Lake due to it exists only along the lake shore, which is already traditional target of all visitors and therefore easily available to collectors. Beside the mentioned, the rarest types of herpetofauna exist in this area such as blue lizard (*Lacerta oxycephala*), terrapin (*Emys orbicularis*) and Greek frog (*Rana graeca).* Zminičko Lake has to be urgently establishe as the strict reserve for survival of endemic zminic triton (*Triturus alpestris serdarus*), which is greatly endangered because in the summer of 2007 fish has been observed in the Lake. For that reason, main causes of endangering the herpetofauna are of anthropogenic nature with direct and indirect negative impacts on biological diversity. Uncontrolled collection, loss of habitats and introduction of allochtonic species (stocking the lake caused disappearance of *Triturus sp.*) are just a part of causes of endangering the herpetofauna.

Ornithofauna

According to recent researches, 127 bird species has been recorded on the Durmitor, within borders of the National Park Durmitor and Tara canyon, out of which 112 are nesting bird species. Compared to the 163 species named by Vasić, Marinkovič Vizi (1990), 40 species has not been observed. The most recent researches discovered 9 new species for the National Park. So the number of species on the Durmitor massif has increased to 172 species, with more that 125 nesting birds, or former nesting birds, what makes a remarkable number, and makes the area especially valuable. *Crex crex, Podiceps nigricollis*

have not been found during contemporary researches though it is possible that they nest randomly in this area.

Changes in bird fauna created by human activities in period of 100 years, both directly or indirectly, by degrading of habitats, can be determined based on the comparison of the historical data and data gathered through recent researches. Changes created by human influence are best reflected in gradual disappearance of species related to water and forest habitats. Increased men presence (tourism) and wood exploitation caused disappearance of couple of species. So, *Bucephala clangula* is not nesting on Durmitor's lakes for more that 50 years. Crno jezero, which is the largest lake, now does not have a single nesting bird related to water habitats. Besides, *Tetrao tetrix* is not nesting on Durmitor already for 40 years, which once could be found on the banks of the Tara and Komarnica canyon. Beside these, *Gypaetus barbatus* and *Pyrrhocorax pyrrhocorax* have also disappeared. Endangered nesting bird species existing today in the area of Durmitor are related to compact and huge forest complexes such as *Tetrao urogallus, Aegolius funereus, Picoides tridaotylus, Parus monatus.* By destroying woods on all the Lake area new habitats have been created where the specialized species have been replaced by eurivalent and synathropic species. By this anthropogenic activities resulted in ostensible increase in diversity of orhithofauna, but at the same time some of the autochthonous population were reduced.

Mammal

First data on mammals from Durmitor are related to game species. According to ecologic conditions of habitats for main types of game, the territory of the National Park can be divided into 3 basic zones. First zone consists of Durmitor. In this zone chamois is the main game specie. Second zone comprises of valley of the river Tara and glen of the river Susica. On this area the main specie is also chamois. These are adjacent zones and depend on each other regarding the needs and requests of chamois and other species, especially big game. Third zone encompasses Tepacke forest and forest of the confluence of Mlinski brook. This zone also encompasses border area of the National Park "Durmitor". This zone is inhabited by doe as the main game specie. First and second zone covers 70% of the whole territory of the National Park, and the third the rest of the territory approximately 30%. The study base, made in 1980, for needs of the elaboration of a program for the National Park "Durmitor", deals with conditions of the game in period from 1980-1995, with its importance for the National Park and possibilities of its improvement. The study encompassed chamois (*Rupicapra rupicapra),* European Roe Deer (*Capreolus capreolus*), the Capercaillie (*Tetrao urogallus*), brown bear (*Ursus arctos*), wild boar (*Sus scrofa*), wolf (*Canic lupus*), black grouse (*Lyrurus tetrix*). Particularly interesting is renewal of the black grouse, which has almost completely disappeared not only from the Durmitor, but also from other mountains in Montenegro, most probably during the Second World War. All game in the National Park has permanent protection character.

Beside the game already mentioned, on the area of the NP Durmitor there is another 30 species of small and big mammals (total of 37). Those are representatives of *Insectivora* (8 species), *Chiroptera* (3), *Lagomorpha* (1), *Rodentia* (13), *Carnivora* (10) i *Artiodactyla* (2). It has been determined that existence of small mammal species is not endangered and that some of them are present in large numbers (for example *Lynx lynx, Ursus arctos*). On this area 2 endemic species from Balkans: *Dinaromys bogdanovi* - Balkan Snow Vole and *Nannospalax hercegovinensis* –blind mole rat of Hercegovina.

Mammals' fauna in the NP Durmitor is endangered in several ways. First of all by poaching. Peace in game habitats is not favorable. It has to be taken into consideration especially in the phase of breeding. All interventions in forests and visits to these locations should be harmonized with game's need for peace during their breeding. It is forbidden to bring in any types of allochthonous species regardless of the determination of ecological space. This is basic condition for all national parks, and especially for Durmitor.

Flora

Previous researches of Durmitor and surrounding canyons confirmed the presence of 1687 species of vascular plants. The estimation is that today even more than 1700 species live on Durmitor. Out of total number of registered plants, app. 900 species create high-mount flora of this massive, i.e. vascular flora populating the zones above 1500 altitude. In relation to other mountain massifs of the Balkans, only Prokletije and Sar planina have richer high-mount flora while the same has Pelister in Macedonia and Pind in Greece. In Durmitor area, 153 plant communes were registered up to gay. They are classified in 55 conjugations, 31 chains and 20 vegetation classes which is approximately 60% of the vegetation richness of Montenegro.

Together with the Tara canyon, Durmitor is one of the most important refugia of arctic-tertiary flora. Numerous endemic, relict and endemic-relict species are the best example. Endemic flora of Durmitor is made of 175 species which is more than 12% of the overall flora of this massive. 122 species belong to the high-mount endemisms which is even 77% of the total endemic flora of this massive and in comparison to the total high-mount endemic flora. Local Durmotor endemisms are: *Verbascum durmitoreum, Gentiana laevicalyx, Protoedraianthus glisicii, Protoedrainathus tarae, Daphne malyana, Biscutela laevigata* subsp. *montenegrina, Valeriana brauni-blanquetii, Hieracium neilreichi* subsp. *ranisavae, H. schenekii* subsp. *pseudoschenekii, H. blecicii* an others.

Fires, collection of medicinal herbs, legal and illegal construction o facilities, skiing places… are the most important causes of loosing the flora diversity of this National Park. The Development and Protection Plan also recognize the anthropogenic factors as the key factor of reduction i.e. the factor of negative impact on the living world and on natural assets in general. In the Durmitor area,

this factor is primarily manifested through negative impacts on forests as the most complex and important eco-systems, then on the state and quality of waters, soil, biodiversity, (collection, use and trade of commercially important biodiversity species), urbanization effects and exploitation of nature in general.

Red list species

Vascular plants
Campanula hercegovina
Daphne malyana
Adenophora lilifolia
Campanula abietina
Cerastium dinaricum
Cypripedium calceolus
Eryngium alpinum
Fritillaria montana
Geum bulgaricum
Narcissus angustifolius
Pulsatilla grandis

Bryophyta
Dicranum viride
Hamatocaulis vernicosus (*Drepanocladus*)
Buxbaumia viridis
Neckera pennata

Fungi
Phylloporus pelletieri

Birds
Lullula arborea
Pernis apivorus
Picus canus
Tetrao urogallus
Tringa glareola
Dryocopus martius
Melanocorypha calandra
Tachybaptus ruficollis
Tetrao tetrix
Tetrao urogallus
Tringa erythropus
Turdus viscivorus
Upupa epops

Aythya nyroca

Mammals
Ursus arctos
Lutra lutra
All *Chiroptere* species
Rupicapra rupicapra

Herpetofauna
Testudo hermanni
Emys orbicularis
Vipera ursinii
Elaphe longissima
Bombina variegate

Fish
Hucho hucho
Cottus gobio
Barbus meridionalis

Insects
Lucanus cervus
Cerambyx cerdo
Stephanopachys substriatus
Buprestis splendens

Habitats of Mt. Durmitor
According the Annex I of the Council Directive 92/43/EEC, Resolution No. 4 (1996) of the Standing Committee listing endangered natural habitat requiring specific conservation measures in the NP Durmitor, the following types of habitats are present
44.1 Riparian willow formations
37.2 Eutrophic humid grasslands
41.1 Beech forests
41.2 Oak-hornbeam forests
41.4 Mixed ravine and slope forests
42.242 Montenegrine spruce forest
42.5C South-eastern European Scots pine forests
34.3 Dense perennial grasslands and middle European steppes
42.7 High oro-mediterranean pine forests
35.11 Mat-grass swards
44.2 Boreo-alpine riparian galleries
44.3 Middle European stream ash-alder woods
54.12 Hard water springs
54.2 Rich fens
54.426 Peri-Danubian black-white-star sedge fens

54.5 Transition mires
65 Caves
42.62 Western Balkan *Pinus nigra* forests

Efficiency of the NP Durmitor for biodiversity conservation: zoning system, institutional framework, legal instruments, type of management, public participation, threats

Zoning

I zone with strict protection: wild forest of Mlinski spring (10ha), wild forest Crna poda (15.91ha), Barno jezero (5ha), watershed of Škrčko and Sušičko Lake with the principal purose for scientific researches, education, maintenance of natural development processes and viersity of genetic fund. Approval for conduction of the scientific researches is to be given by the National Park administration with the opinion of the Republic Institute for nature protection and consent of the Ministry of environmental protection and spatial planning. In special cases, activities on preventing the damages and diseases of plant and animal world could be approved with the prior consent of the Ministry of agriculture, forestry and water management.
The forest complexes of pine curve (*Pinus mugho* Turra) belong to the II zone.

Management team and employees of the NP

NP Durmitor is managed by the Management board. The director is the executive authority. He is responsible to the Management Board of the Public Enterprise NP of Montenegro and to the director of the Public Enterprise NP of Montenegro. Two representatives of the NP Durmitor are members of the Management Board of the PE NP of Montenegro. They are director and one of employees; their mandate of four years. The legal department (1 person) and experts department (2 persons) comprise the management of the NP Durmitor. There are also the secretary, accountant, seller in the souvenir shop, cleaning lady and approximately 40 field workers – guards and app. 10 seasonal workers working in the Park. The National Restaurant is in the ownership of the NP Durmitor; it is located on the shore of the Crno Lake. For the needs of this facility, the NP employs 10 seasonal workers.
Publishing activity

NP Durmitor used to publish rather popular magazine NP “Durmitor” - Soa nebeska. Actually, few issues were published till 1992 i.e. 1993 ever since a single issue was not printed. The Map of the NP was printed and other promotional tourism materials as postcards, posters, manuals, maps, billboards etc.

Natural collection of the National Park, library, laboratory

In its central in Zabljak, NP Durmitor has the exhibition area and Natural Collection. It has been active since 1980 and it has gathered a large number of visitors with its contents. The collection implies: geologic, botanic, entomologic, ichtiologic, herpetological, ornithological, mammalogical, ethnological and other material. The building of the NP Durmitor has a room designated for the presentation of video recordings and films about Durmitor and its natural assets.

Park does not have a library. Formally, it does exist and possesses a few books. Library contents used to be much more wealthy but the majority of the experts and other literature was burned during a fire.

Laboratory equipped by contemporary lab devices is located in the NP building. Firstly, the intention of this lab was the continuous monitoring of the environment on the whole territory of the Park. However, several attempts of operationalization of this lab were unsuccessful.

The role of the National Park would be to make those activities and manifestations permanent. In their scope the following activities could be organized: eco-exhibitions (photo, natural, arts etc.), ecological competitions (eco races, eco quiz etc.), slide shows, video material presentation, ecological food, then eco-lectures, eco-forums, eco-excursions, eco-symposiums etc.

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