



Review paper

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PROTECTED GEOHERITAGE SITES AS A TOURISTIC VALUE OF SREM

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Abstract: In the area of the smallest region of Autonomous Province of Vojvodina, which is, excluding Fruška gora, of very uniform geological structure, there is a significant number of geoheritage sites of different protection rank. The most of them are Natural Monuments, some individually protected, some protected as part of a larger entirety (National Park “Fruška gora”). There are two Special Nature Reserves and one Landscape of Exceptional Features. Except their significant importance for science and education, wishing to emphasize touristic value that these attractive objects of nature have, taking into account their number, we have segregated only those who are protected or in the protection procedure. Depending on the protection rank, they are mainly complementary touristic values, rarely interesting to broader spectrum of tourists. With development of appropriate programs (an example of “Lesend” in Indija) and necessary investments, these natural objects could become an equal part of Srem rich touristic offer.

Key words: geoheritage, Srem, tourism

Introduction

In the most southern part of Pannonian Plain (Čvoro and Golubović, 2001) stretches Srem, the smallest and the most wooded part of AP Vojvodina. In the direction of parallel, with total length of 100 km and width that ranges from about 20 km on direction Lačarak - Susak, up to about 40 km on the border with the Republic of Croatia and the direction Obrež - Beška, it is of elongated, irregular form, bounded by the river Danube as natural border in the north and the east and by the river Sava as natural border to the south. Western, artificial border of region, is at the same time border between the Republic of Serbia and the Republic of Croatia, but also border which divides natural region of Srem on Croatian (eastern Slavonia) and Vojvodina region (Sekulović, 2011).

Administratively, Srem District consists of 7 municipalities: Indija, Irig, Pećinci, Ruma, Sremska Mitrovica, Stara Pazova and Šid (Source: Municipalities and Regions in the Republic of Serbia, 2012). Although geographically on the territory of Srem, by administrative division municipalities at the northern foot of Fruška gora are excluded - Beočin, Petrovaradin and Sremski Karlovci

(Južnobački district), as well as those in the region's east - Zemun and New Belgrade (City of Belgrade). At the same time, by the latest change of borders (July 1955), a part of Mačva devolved administratively to Srem. In this paper, which percieve geoheritage sites in the area of Srem, geographic region of Srem was taken into consideration, more precisely its Serbian part – Vojvodina's Srem, who as such consists of 12 municipalities with total surface area of around 4,000 km² and in which according to the latest Census live of about 800 000 inhabitants. (Table 1)

Table 1. Municipalities in geographic region of Srem

Municipality	Administrative district	Population	Area (km ²)
Beočin	Južnobački district	15 630	186
Zemun	The City of Belgrade	166 292	150
Indija	Sremski district	47 204	385
Irig	Sremski district	10 717	230
Novi Beograd	The City of Belgrade	212 104	41
Petrovaradin	Južnobački district	33 733	89
Pećinci	Sremski district	19 675	489
Ruma	Sremski district	54 141	582
Sremski Karlovci	Južnobački district	8 722	51
Sremska Mitrovica	Sremski district	79 773	762
Stara Pazova	Sremski district	65 508	351
Šid	Sremski district	34 035	687
Total		747 534	4003

Source: 2011 Census of Population, Households and Dwellings in the Republic of Serbia, first results

Geoheritage of Srem

Excluding Fruška gora which represents a sort of petrological mosaic, geological structure of Srem is very uniform. The Sava river banks are dominated by river sediments, from Zemun toward Fruška gora dominates loess, while lacustrine and marine sediments (older sediments) lay down below quaternary cover (Sekulović, 2011). In such an area there is a significant number of geoheritage sites. The most of them are in the rank of Nature Monuments and some are as such individually protected by law. There are two Nature Reserves, one Landscape of Exceptional Features, as well as the top ranking protected natural area - The National Park (until 1991. geoheritage objects were protected only as the nature monuments, and today it is possible to place them under protection as any other kind of current seven protected natural areas) (Figure 1) (Table 2).

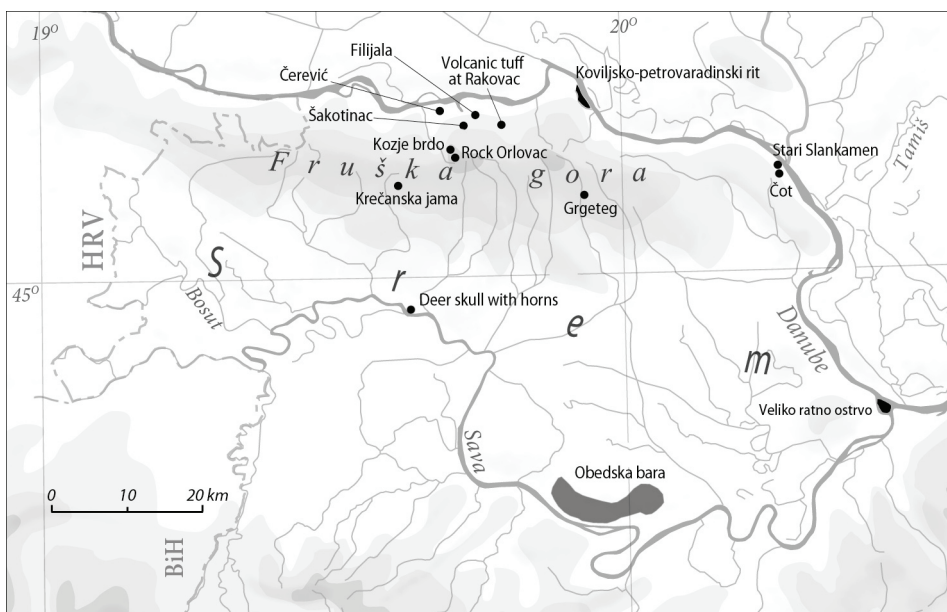


Figure 1. Protected geoheritage sites in Srem (Milivojević M.)

Source: www.zzps.rs/page.php?id=77

Table 2. Protected geoheritage sites in Srem

Geoheritage sites	Статус заштите	Municipality	The act of proclamation	Area of protection (ha)	Manager
Loess section "Stari Slankamen"	Natural Monument	Indija	1975.	/	Tourist organization of the Municipality of Indija
Loess section "Čot"	Natural Monument	Indija	In the process of protection, 2011.	/	Tourist organization of the Municipality of Indija (proposed)
Stratigraphic section "Filijala"	Natural Monument	Beočin	In the process of protection, 2011	/	Lafarge BFC d.o.o. Beočin (proposed)
Obedska bara	Special Nature Reserve	Pećinci, Ruma	Decree on the protection of Special Nature Reserve "Obedska bara" („Official Gazette of RS", no. 56/1994, 5/2008)	9820	Public Company "Vojvodinašume", Petrovaradin
Koviljsko-Petrovaradinski rit	Special Nature Reserve	S.Karlovc, Indija, N.Sad, Titel	Decree on the protection of "Koviljsko-Petrovaradinski rit" („Official Gazette of RS, no. 27/1998, 91/2006, 81/2008, 44/2011)	5895	Public Company "Vojvodinašume", Forest holding Novi sad
Veliko ratno ostrvo	Landscape of Outstanding Features	Zemun	2005.	211,38	Public Utility Company "Zelenilo"
Protected objects of the "Fruška Gora" National park	/	Petrovaradin, S.Karlovc, Beočin, Irig, Indija, Šid, S.Mitrovica, B.Palanka	Law on National Parks ("Official Gazette of RS", no. 39/1993, 44/1993)	25 393	Public Company "National Park Fruška gora", S.Kamenica
The fossil remains of giant deer skull with horns	Natural Monument	Sremska Mitrovica	1973.	/	The Museum of Srem, Sremska Mitrovica

Source: The Registrar of The Institute for Nature Conservation of Serbia (2013), The Studies on protection

Srem loess plateau

Srem loess plateau stretches from Vukovar, in the west, to Zemun (Batajnica) to the southeast, where it widens into Zemun loess plateau (Jovanovic and Zvizdić, 2009), which extends around Zemun, in direction east-west, between alluvial plains of Sava and the Danube river, presenting solitary loess plateau of small surface and maximum height in the eastern part - 115 m (steep slopes on the banks of the Danube) (Bukurov, 1953). Loess-paleosol horizons of Sremska loess plateau of great height (Zemun loess plateau >30 m, Batajnica >40m, the most Čot >50m) have been formed by the dominant local winds respectively by blowing and accumulating material that originates mostly from Danube alluvial plain (Jovanovic and Zvizdić, 2009).

Srem loess plateau is recorded in The Inventory of Serbian Geoheritage Sites as object of geomorphological heritage - eolian relief. Many, of a large number of present and explored profiles, have an exceptional, primarily scientific and educational importance. Wanting to underline their tourist importance, and considering their number, we have singled out and analyzed next: Loess profile at Stari Slankamen, for decades the only protected, Loess profile “Čot” and Stratigraphic profile “Filijala”, for which were made Studies of protection in 2007 and 2006 and which are in the process of protection.

Table 3.: Open sections of Srem loess plateau

Section	Location	Protection status
Loess section “Stari Slankamen”	45°08'21" N 201548 E	Natural monument, protected for the first time in 1975.
Loess section “Čot”	45°07'57" N 20°15'48" E	In the process of protection, 2011.
Loess sections in Zemun (Sections in Batajnica)	44°55'28"N 20°19'11"E	The Study on protection is done, public inspection/access in 2013.
“Mišeluk”	45°13'51"N 19°51'22"E	/
“Surduk”	45°04'10"N 20°20'01"E	/
“Susek”	45°13'38"N 19°30'37"E	/
Stratigraphic section “Filijala”	45°12'15" 19°44'10"	In the process of protection, 2011.
“The Irig brickyard”	45°05'29"N 19°23'30"E	/
“The Petrovaradin brickyard”	45°13'19"N 19°53'57"E	/
Loess section of Ruma brickyard	45°00'46"N 19°51'14"E	The Study on protection is done, 2011.

Source: Zvizdić and Jovanović, 2009; The Registrar of The Institute for Nature Conservation of Serbia (2013)

Natural Monument "Loess section at Stari Slankamen"

On the road from Indjija to Stari Slankamen, between Novi and Stari Slankamen, a valuable neo-tectonic activity site is located. The first protected loess section in Serbia, and the former Yugoslavia as well (1975) (Study 2007).

Since the end of the nineteenth century, numerous domestic and foreign scientists have investigated this section (in 1870. Volf, 1910. Gorjanović and Kramberger; 1926. Cvijic, 1951. Markovic and Marjanovic...), which indicates its exceptional importance. On this 210 m long and 30 m high loess section there are five loess horizons notable, of which the upper two horizontal, and bottom three are inclined toward the south at an angle of 8 degrees. Loess horizons alternate with horizons of peleosol (Study 2007). This extremely discordant position of older parties in basement and younger ones superimposed, indicates their non-continuous deposition (Group of authors, 2007). Based on this comparable section, protected area of category III (of local importance), continuous monitoring of the development of the loess layers for a period of about 800.000 years is possible, which is extreme rarity (Study 2007).

Indija Municipality, whose tourist organization manages this natural monument, is rapidly evolving and is one of the most organized municipalities in Serbia. With many other tourist attractions - the Danube, the ruins of a fortress from the middle ages, a monument to The Great battle against the Turks (Slankamen battle in 1691), The Church of the Presentation of the Holy Virgin in 1756 (cultural heritage of great importance), spa "Dr. Borivoje Gnjatić", marina for boats, and at only 20 km distance is a historic town Sremski Karlovci. The section itself presents a great touristic potential of the municipality and there are ideas to include it, with other representative sections, include it in the schedule of mandatory tours for primary and secondary schools in Serbia. The target group that would visit this superb natural value certainly is not large. It consists of pupils, students and researchers, who have visited this site for decades. They are coming from all over the world, even from China, country of the most representative parties of loess.

As many other loess sections located next to the Danube, this section is also endangered by actions of anthropogenic factor. Some cottages are built on the plateau, a disposal of garbage is present and processes of erosion and denudation are a serious threat (Study 2007).

Loess section “Čot”

Opposite the confluence of Tisa and Danube, in Indija municipality, there is an object of geologic heritage - a loess section “Čot”. It is about 90 m in a length, of about 35 m in a height and it stretches in the direction of SE-NW (Study 2007). It is an exemplary open loess section with 10 clearly defined paleosoil sequences accessible to the direct study, which provides the opportunity for continuous monitoring of the development of loess and fossil horizons to almost a million years. Marković et al. (2002) called it one of the most complete paleoclimatic archives of Europe for the period of last 850,000 years. Therefore, it has great scientific and educational importance, especially for paleogeography, paleontology, geomorphology and sedimentology (Study 2007).

A road along the Danube River from Stari Slankamen leads to the Section. The whole area is a popular weekend resort and at the base, as well as on the hill of the Section a large number of cottages were built. It all endangers the Section since it causes erosion and denudation, as well as the accumulation of garbage and it makes it difficult for researches to access. That is why in 2007 a protection of this section was proposed on the surface of 0.36 ha in II degree of protection (Study 2007). This protected object presents a complementary tourist value and is not the only one around. In the close vicinity there are some more significant sites of geo and cultural heritage - loess section at Stari Slankamen, loess section Surduk, the remains of the fortress from Roman times, a source of salt water Slanača. In 2010, on the initiative of Dr. Slobodan B. Marković, Indija municipality, whose Touristic organization was proposed as a manager by the Study (2007), started the “Lesland” project, which aims to highlight the importance of the loess sections and the necessity for their protection. Conceived as a future Geopark - “Lesland” would be an area where geodiversity, biodiversity and cultural-historical heritage overlap, and would include loess sections from Titel hill over the loess sections of Srem loess plateau (“Stari Slankamen”, “Čot”), to Zemun loess plateau in the south (“Kapela” Batajnica and “Široka staza” Zemun) (www.pzzp.rs/page.php?id=77).

Stratigraphic section “Filijala” in Beočin

On the northern slopes of Fruška gora, area of Beočin municipality, on the area of now more than 50 hectares, since 1938. lasts the mining of cementstone. During a ravine excavation on exploitation revir Severno polje (one of the three revirs of deposit “Filijala”), a very important section of about 70-80 m in height was discovered, with a total of 7 levels of different heights. The first level (lowermost) has the height of 15 m. It belongs, along with the next five, to the

Pannonian whose development in this profile is fully trackable. The upper half of the sixth level partly consists of sand pier that constitute seventh level, and at the section top segments of deluvial-proluvial sediments and sloping loess were established. The site is easily accessible from existing roads (paved road Beočin - Monastery Beočin, railway Petrovaradin – Beočin, local highway from Ilok to Petrovaradin and the Danube river (Protection Study, 2006).

It is an exemplary section, which serves as a benchmark when it comes to the study of the Neogene, because of its most complete development. More important is the fact that here was established ferruginous layer of small thickness, which represents the boundary horizon between the Pannonian and Pontian sediments and is abundant with fossil fauna. Fossils are abundant Pannonian and Pontus levels where a valuable paleontological artifact was discovered - a fragment of the lower jaw with a tooth of Mastodon *Anancun arvenensis* (Protection Study, 2006).

Because of the great educational and scientific importance, geologists often visit this object of historical-geological and palaeontological heritage of Neogene. Further exploitation of cementstone on the section and its immediate surrounding was prohibited and II degree of protection was proposed. Its implementation is a responsibility of cement factory Lafarge BFC.

Special Nature Reserve “Obedska bara”

Special Nature Reserve “Obedska bara” is located in the southeastern Srem, in the municipality of Pećinci and to a lesser extent in the municipality of Ruma. It is a remarkable example of a remnant of the former meander of the river Sava, which ran that way in the Atlantic phase of the Holocene. It has 13.5 km in a length and 750 m in a width. The depth of the riverbed is 12 m, while the size varies due to constant siltation and overgrowth with vegetation. A variation of the amount of water in the pond is present, because except by the Sava river it is fed by ground and surface waters. Water has permanent presency only in the pools- circular or ellipsoidal indentations, of which the permanent ones have their names (Group of authors, 2004).

The richness of biodiversity, ecosystems and species, is the main value of this natural area. Ornithofauna is of special importance with 220 bird species, of which 142 species are nesting (Group of authors, 2004). It also abounds with cultural and historical values. Buffer zone includes the settlements: Ašanja, Grabovci, Trim and Ogar. The biggest attraction of Ašanja, from the perspective of tourism, is the Orthodox Church of Saint Archangel Gabriel from in 1838.

Attractions of Grabovac are the hunting grounds Kupinik, Obedska Bara and Karakuša, as well as the Orthodox Church of Saint George from the beginning of the eighteenth century. The most attractive site is Kupinovo with the oldest Orthodox Church in Vojvodina (Saint Luke from 1456), the Orthodox Church of Mother Angeline, the ruins of the Orthodox Church of Saint Trinity from 1810, and the remains of fortress Kupinik from the fourteenth century. In the area of Kupinovo there is also a thermo-mineral artesian spring with sulphurous water at 39°C. In a village Obrež an Orthodox Church of Saint Nicholas from 1749 is located, and in a village Ogar an Orthodox Church from 1747 dedicated to the same saint (Krajić, 2011).

Hunting and science tourism have the longest tradition. In 1874. Obedska Bara was for administratively protected as a hunting reservation of the Austro-Hungarian Monarchy. Later it was a royal hunting ground of Karadorđević dynasty, then Federal hunting ground, and at present, because of its status, hunting is permitted only in “Matijevica”, an isolated hunting ground. There is a constant numerous visiting by researchers, particularly ornithologists and bird lovers (Group of authors, 2004). “Birds observation program” is implemented with an expert guide, on the particularly set watchtowers and observation benches. In the warmer months of the year excursion tourism is carried out through five organized walking tours, but certainly the most massive is fishing tourism, especially on weekend days (www.srpobedskabara.com).

Obedska Bara is in The Inventory of Serbian Geoheritage Sites, in 2005 it was declared an Important Plant Area in Central and Eastern Europe, in 1989 an Important Bird Area in Europe, from 1977 it is Ramsar Area (Wetlands of International Importance), it is potentially Emerald area, and is on the preliminary list for the Biosphere Reservation (MAB - The Man and the Biosphere Programme, UNESCO) and the world's natural heritage (The Preliminary List of the UNESCO World Heritage) (Group of authors, 2007). Three-tier protection regime is implemented. Manager of Protected natural area is Public Company “Vojvodinašume” which manages with reserve via its branch Forest holding "Sremska Mitrovica".

Special Nature Reserve “Koviljsko - Petrovaradinski rit”

This important object of geomorphological and hydrological heritage is located on the territory of Srem only with its smaller part, Petrovaradinski rit. Located on the right bank of the Danube, in his inundation area, Petrovaradinski rit is in the area of two municipalities - Sremski Karlovci and Indija, while larger transdanubean part of the reserve, Koviljski rit, belongs to the municipalities of Novi Sad and Titel. Except of being significantly more spacious, Bačka's part of

the reserve is also more attractive and orderly. Together, they represent one of the two conserved large marshy complex (the other is Special Nature Reserve “Gornje Podunavlje”), with distinct landscape values (Group of authors, 2004).

In unprotected, flood zone, this complex made up of oxbow lakes and branches of the Danube with river islands between them is facing floodwaters in the fall and the spring. At high water, flooding directly and completely covers marsh, and low water gradually goes through Karlovački dunavac (Protection Study, 2010). Flood regime is very important because it affects directly the occurrence of certain phytocenoses, ichthyofauna and game. Numerous natural (siltation, deposition of sediments) and anthropogenic processes (reclamation, cutting forests, plantations of Euro-American poplar) adversely affect wildlife of the Reserve, changing the water regime (Group of authors, 2004).

Petrovaradinski rit has a very favorable tourist and geographical position. Danube (Corridor VII) and the embankment of the Belgrade - Novi Sad railroad track form its borders. Corridor X passes in the vicinity (Highway E75). It is planned to become a center of tourism, sport and recreation in the future. The Study on protection from 2010 mentions some potential forms of tourism: scientific, educational, excursion, recreational and eco - tourism. It is necessary to build up resting and recreational spots and in accordance with the specifics of this fragile ecosystem, to emphasize education and ecotourism. Today's tourist attendance is low, largely spontaneous and one-day (vacationers from surrounding villages, mostly fishermen). The basic aspect of the use of the reservation is dominated by fishing (46 fish species) and to a lesser extent hunting (about 200 bird species) (Group of authors, 2004). Development of the Reserve affects the development of the surrounding villages, who could directly use its natural values (fishing, reed, herbs) (Protection Study, 2010). Nearest environment (Petrovaradin and Sremski Karlovci) is rich in monuments of history and culture that could greatly complement the tourist offer which won't be limited only to natural resources of Marsh and strict profile of visitors.

With inclusion on the IBA list in 1989. (IBA - Important Bird Areas in Europe) foundations of legal protection of this wetland were set. However, the ideas of the necessity of the protection has occurred in 1970 (Stankovic, 2005) when the site on Kozjak was declared scientific-research reserve (Group of authors, 2004). Twenty years later the Previous Protection was declared and in 1998. the Government of the Republic of Serbia adopted the Regulation on the Protection of Koviljsko - Petrovaradinski rit as a Special Nature Reserve. It is now on the list of Important Plant Areas (IPA) and on the list of protected areas dependent on water and important for the Danube basin of the International Commission

for the Protection of the Danube River (ICPDR - International Commission for the Protection of the Danube River). According to national legislation it is protected area of category I - Natural Resource of Great Importance; according to IUCN Category IV - Habitat and Species Management Area (Protection Study, 2010). The development of the Spatial Plan for Special Purpose Areas Special Nature Reserve “Koviljsko – Petrovaradinski rit” began in 2008, and Petrovaradinski rit was also included in the Spatial Plan for Special Purpose Areas of Fruska Gora up to 2022.

On a total reservation area of 5895 ha, the three-tier protection regime is represented. In the area of Petrovaradinski rit, sites “Majur” and “Karlovački dunavac” are in the protection regime II, while the rest of it is in the protection regime III. The manager is Public Company “Vojvodinašume”, based in Petrovaradin.

Landscape of Exceptional Features "Veliko and Malo ratno ostrvo"

At the confluence of the Sava and Danube rivers, territorially belonging to municipality of Zemun, two river islands are located. Two parts of geoheritage site protected for its outstanding landscape values. They were formed, first as an underwater reef, by sedimentation of transported material at the confluence of two rivers at an obtuse angle (Study 2002). They "emerged" during the sixteenth century (www.virtuelnimuzejdunava.rs). The area covering both islands is under protection (167.90.56 ha), as well as the water surrounding the islands in diameter of 50 m from the edge of the so-called low navigation level of the Danube (elevation 70.10 m) (Study 2002).

In the past, Veliko ratno ostrvo represented a natural torus of Danube fish, but because of the processes of water-logging and natural succession number of species spawning here was reduced. Ornithofauna is rich and diverse, while other types of fauna are not present in significant number of species, both because of the isolation of the area, as well as the still insufficient research (Study 2002). Generated values are not significant either from the standpoint of numbers or from the standpoint of values.

Veliko ratno ostrvo has been the subject of numerous plans treating it differently - in 1924. the “General Plan for the City of Belgrade” proposed forming of gulf and connecting the islands to Zemun coast with construction of parks and facilities for sports and recreation; in 1948. the “Plan of New Belgrade” also proposed a major complex for sports and recreation with the construction of a bridge to Zemun and forming of lake; in 1972 the “General urban plan of

Belgrade” retains the idea of a destination for mass recreation, “Staged Plan - Program of socio-economic and spatial development and construction of Belgrade for the period from 1976. to 1985.” sees the potential water supply source, besides its recreational function (Study 2002).

In the year of 1984. begins the legislative protection of this natural area, when the Republic Institute for the Protection of Nature in collaboration with the Institute for Protection of Cultural Heritage (as a response to the initiative of the Department for Planning and Development of Belgrade to turn the island into a source of water) have sent a request to the Assembly of Zemun municipality to declare Great War Island as a “landscape of the special natural features and beauty”. Although the proposal was not approved, the expert opinion was endorsed and a “Decision on previous protection of the Great War Island” was passed, by which a part of the Island was protected as a Special Nature Reserve with an area of 17.43,49 ha and a protection zone with coverage of the entire island. Since 2005. “Veliko and malo ratno ostrvo” are protected as a Landscape of Exceptional Features, with a total area of 211.38 ha (www.virtuelnimuzejdunava.rs). It is protected area of Category III - a Significant Natural Resource, and according to the International IUCN Classification of Category IV - Habitat and Species Management Area. Veliko ratno ostrvo is also on the list of Important Bird Areas (IBA) and it is a part of Emerald network (European network of protected natural areas) (Study 2002). Study on Protection (2002) identified three protection zones:

- Nature protection zone (with the character of Spetial Nature Reserve): Malo ratno ostrvo; Coastal part of Veliko ratno ostrvo; forest complex, wet areas around the malo ratno ostrvo and around I and II protection degree on Veliko ratno ostrvo
- Recreation zone: Internal parts of BRI, arable and meadow areas; Part of foreland on the Dunavac partially occupied by illegal construction
- Tourism zone: Lido Beach with planned expansion and water surface around it; public pier to the Belgrade district;

with associated protection regimes: a sanitary protection zone, water supply sources, water management facilities, hunting reservation and fishing reservation.

Islands are under the responsibility of several legal entities: Public water management company “Srbijavode” - “Danube” (water surfaces and islands); Public utility company “Belgrade Waterworks and Sewerage” (sanitary protection of I rank); Federal Office for the maintenance of inland waterways (managing of international waterway), Harbor-Master’s Office “Beograd” (inland navigation and arranging banks); Fish Farm “Beograd” (fishing area) and

State Enterprise Office space “Zemun” (lease) (Study 2002). The Public Utility Company “Zelenilo Belgrade” is the Manager.

Protected sites in the National Park “Fruška Gora”

In the southern part of the Pannonian Plain, surrounded by the alluvial plain of the Danube in the north and east, and the loess plateau from the south and west, rises up a low (539 m - Crveni Čot) isolated mountain Fruška gora, mostly built of sedimentary rocks and crystalline schists, with the presence of volcanic formations (Bukurov, 1951). Mild relief line (created during abrasion and fluvial erosion, which continues to this day), mild climate, rich underground and surface hydrography (185 sources, 42 of watercourses, 13 reservoirs) (Vidić, 2007), diverse flora and fauna, as well as rich cultural heritage (archaeological sites, ruins of fortresses, shrines) are this mountains main characteristics (Documentation foundation, 2003). In 1948. it was named the Peoples picnic site, in 1955, “Javorova gudura” and “Papratski do”, two of the oldest forests, were proclaimed natural rarities and in 1960. the Assembly of the People's Republic of Serbia adopted the Law to designate the Fruška gora for the national park, the first one in Serbia (“Official Gazette” of the People's Republic of Serbia no. 53/60).

Geological and paleontological, almost two centuries long researches, resulted in a multitude of found fossils on the basis of which it is possible to reconstruct the period until of about 200 million years ago. The largest number of found fossils are shells, snails and similar marine animals, because the Fruška gora was the island of the Pannonian Sea for considerable period of time. At several locations, were found fossils of mammoth remains, giant deer, bison and other large mammals that inhabited this area in the Quaternary were found (www.npfruskagora.co.rs/prirodne-vrednosti/geografija-i-geologija.html).

Previously mentioned sectiones “Stari Slankamen”, “Čot” and “Filijala”, individually protected by law, are included within the scope of the Spatial plan of special purpose area of Fruška Gora until 2022. All objects in the entire area of Fruška gora under the coverage of National park are protected by regulatory regimes. In the protection regime I are: paleontological site “Grgeteg”, paleontological site of Orlovački, Dobri and Čerević creek, paleontological site “Papradić” and rock “Orlovac”. In the protection regime II are: paleontological site “Šakotinac”, paleontological site “Krečanske jame”, petrological site “Kozje brdo” and volcanic tuff at Rakovac (“Galerija”). Studies on protection for these sites are in preparation (www.pzzp.rs/page.php?id=77). Marković et al (2001) identified also trachyte quarries “Kišnjeva glava” and “Srebro”, unique karst

underground form in Vojvodina - Grgurevac cave, canyon of creek Almaš, Vrdnica mine, loess section "Ciglana" in Ruma, loess section in Surduk, including two ex situ objects: Collection of Cretaceous marine fossils from Čerević and Geological Collection of Institute for Nature Conservation of Vojvodina Province. A number of other geological-paleontological, geomorphological and hydrological sites were singled out (Čerević creek waterfall, waterfall Šakotinac, Dumbovac waterfall, sites Laka staza, Janda, Jazak, Erdelj, Paragovo...) (Gavrilović et al. 2008; www.pzzp.rs/page.php?id=77), of which some have yet to be evaluated.

Fruška gora has an excellent geographic and tourist - functional position. Pan-European Corridors 7 (Danube) and 10 (E -75) passes through here and give this area international importance and transit feature. Also, an international cycling route *EuroVelo 6* passes through the Park. It connects the Atlantic and the Black Sea and is one of in total 14 that connect Europe (www.eurovelo.com/en/cycling-in/serbia). Geological and geomorphological sites of Fruška gora are located in length of only 78 m. This means that they can be easily and quickly bypassed. They should only be appropriately marked with adequate tours for all people interested in these natural resources, providing opportunities for extended organized stay. Currently, sites arranged for tourist visits are Grgeteg, Grgurevac cave and rock Orlovac (www.pzzp.rs/page.php?id=77).

The Park, which is under management of Public Company "Fruška Gora National Park" located in Sremska Kamenica, is represented by the following types of tourism: manifestation tourism (Fruška gora marathon, Branko's circle, Karlovac vintage, Dositej days, Pudar days, Ribic Melon days, Lime and Honey in Beočin...); balneological and health tourism (spa Vrdnik, mineral resource Slanača in Stari Slankamen), recreational and excursion tourism (numerous picnic spots, holiday resorts with a total of 20,000 houses) and cultural tourism (Sremski Karlovci, Sremska Kamenica, 16 monasteries, numerous cultural - historical monuments) (Group of authors, 2004). A vicinity of Novi Sad, Belgrade, Bačka Palanka, Indija, Šid, Sremska Mitrovica, Stara and Nova Pazova is of special importance for the touristic movement in National Park (Vidic, 2007).

Natural Monument *ex situ* "The fossil remains of the giant deer skull with horns"

Fiftyfive years ago, near the Srem village Martinci, at the confluence of Vrtiča and Sava rivers, a deer skull, which was identified to belong to the *Megaloceros*

giganteus - the giant deer was found in the mud. It is a species of the Pleistocene, which in Serbia and former Yugoslavia, according to the number of locations, is right behind the mammoth and the bison (Nedeljković, 2004). At The Museum of Srem, in Sremska Mitrovica, the original is kept, but the exhibited specimen in the permanent exhibition is a replica. There is another copy in the paleontological collection of Institute for Nature Conservation of Vojvodina Province in Novi Sad.

This species inhabited the broad valleys and grassy open areas and had a good tolerance on frequent climate fluctuations during the Middle and Upper Pleistocene. It lived in Europe and western Asia before 300.000-400.000 years ago and extincted about 10.000 years ago, at the beginning of the Holocene. This sample is assumed to originate from the upper layers of the early Pleistocene (125.000 to 10.000 years ago), and belongs to an adult male (Nedeljković, 2004).

Complete and well-preserved skulls of mammals from the Pleistocene are rare. In Serbia, fragments were found in multiple locations, mostly in caves and riverbeds. This specimen is significant because of the excellent preservation and as such has been declared a natural monument in 1973. The findings of these large mammals of the Pleistocene in the Srem region support the assumption that during the Palaeolithic here (assuming Fruška gora) were temporary human settlements of hunters-gatherers, which have not been found yet (Popović, 1969).

Speaking about the attractiveness of this palaeontological heritage site from the perspective of tourism, it is a complementary touristic value that with numerous, primarily archaeological artifacts and sites, presents the sight of Srem and ranks The Museum of srem among the most important institutions of its kind in Serbia.

Conclusion

Tourism is nowadays an inevitable aspect of protected areas development. But being an inherently sensitive category, the only form suitable for theirs tourism development is sustainable tourism - eco tourism, which requires the preparation of environmental impact assessments first, determining the limits of statutory protection regime and calculation of the carrying capacity. Concerning specific geoheritage sites, visits of researchers and students dominate. These sites are mostly “spots” in space, complementary touristic values, which neither require nor provide facilities of tourist-catering standards (stores, souvenir shops, restaurants, accommodation facilities ...) and are mainly the subject of a thematic

or specific interest's tourism. Exceptions are the Special Nature Reserves "Obedska bara" and "Petrovaradinski rit", Landscape of Exceptional Features "Veliko and malo ratno ostrvo" and objects that by their position are part of much wider and more attractive areas of the first National park in Serbia. They often represent a tourist destination in itself and manage to attract a numerous tourists who are not professionally bound to these natural phenomena values. On the other hand, the geoheritage sites protected as Natural monuments mostly present complementary tourist values, of interest only to the ones in profession. They are rarely tourist attractions by themselves, the basic touristic value. There are different examples in Serbia (eg. Đavolja Varoš, Resavska pećina), but only few. Srem loess sections (loess sections in general), no matter how important and rare they are, for the majority of tourists are still ordinary ground sections. Time will show whether the future Museum of loess (Lesend) in Indija will be able to amend and interest potential tourists in learning more about these valuable natural phenomena.

Srem is rich with local manifestations that reflect the values of natural and cultural heritage of the local communities and confirm its status as a true ecological destination. With adequate investments (improved access, stopping the degradation through prohibition and rehabilitation of the sites and their surroundings, the construction of recreational facilities and residences...) and more engagement of experts, these valuable natural sites, some potentially very attractive for a wider group of tourists, could be an equal part of the Srem rich touristic offer.

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