

REPUBLIC OF SERBIA
AUTONOMOUS PROVINCE OF VOJVODINA
PROVINCIAL SECRETARIAT FOR URBAN PLANNING AND ENVIRONMENTAL PROTECTION
PROVINCIAL INSTITUTE FOR NATURE CONSERVATION

LANDSCAPE OF EXCEPTIONAL FEATURES
«KARAŠ-NERA»

Novi Sad, 2017.

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Тел: 021/489-6301
Факс: 021/661-6252

LANDSCAPE OF EXCEPTIONAL FEATURES
«KARAŠ-NERA»

ISBN 978-86-80182-03-2

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PRINTED BY
SAJNOS, Novi Sad, www.sajnos.co.rs

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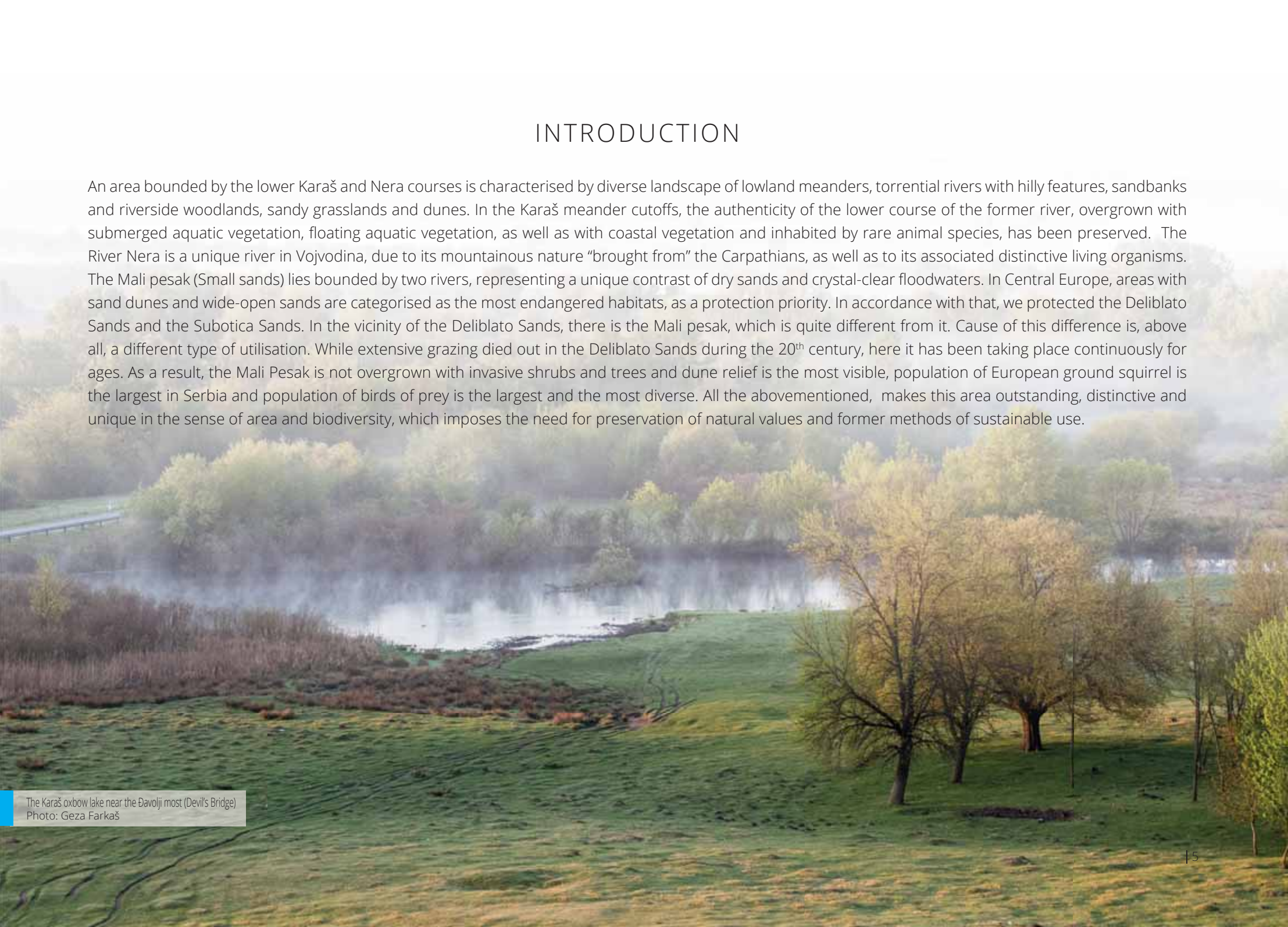
The Karaš oxbow lakes in the spring
Photo: Geza Farkaš

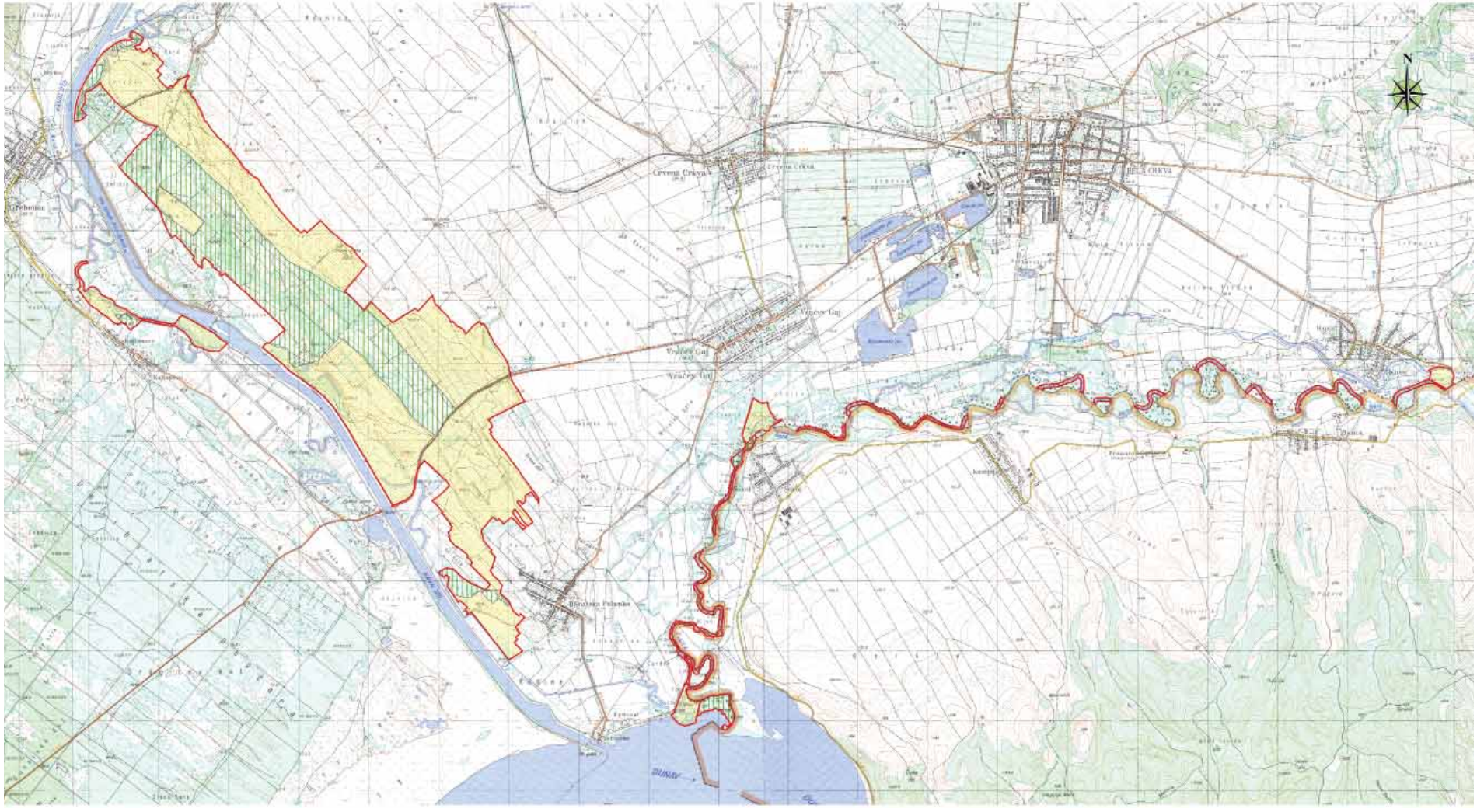
INTRODUCTION

An area bounded by the lower Karaš and Nera courses is characterised by diverse landscape of lowland meanders, torrential rivers with hilly features, sandbanks and riverside woodlands, sandy grasslands and dunes. In the Karaš meander cutoffs, the authenticity of the lower course of the former river, overgrown with submerged aquatic vegetation, floating aquatic vegetation, as well as with coastal vegetation and inhabited by rare animal species, has been preserved. The River Nera is a unique river in Vojvodina, due to its mountainous nature "brought from" the Carpathians, as well as to its associated distinctive living organisms. The Mali pesak (Small sands) lies bounded by two rivers, representing a unique contrast of dry sands and crystal-clear floodwaters. In Central Europe, areas with sand dunes and wide-open sands are categorised as the most endangered habitats, as a protection priority. In accordance with that, we protected the Deliblato Sands and the Subotica Sands. In the vicinity of the Deliblato Sands, there is the Mali pesak, which is quite different from it. Cause of this difference is, above all, a different type of utilisation. While extensive grazing died out in the Deliblato Sands during the 20th century, here it has been taking place continuously for ages. As a result, the Mali Pesak is not overgrown with invasive shrubs and trees and dune relief is the most visible, population of European ground squirrel is the largest in Serbia and population of birds of prey is the largest and the most diverse. All the abovementioned, makes this area outstanding, distinctive and unique in the sense of area and biodiversity, which imposes the need for preservation of natural values and former methods of sustainable use.



The Karaš oxbow lake near the Đavolji most (Devil's Bridge)
Photo: Geza Farkaš

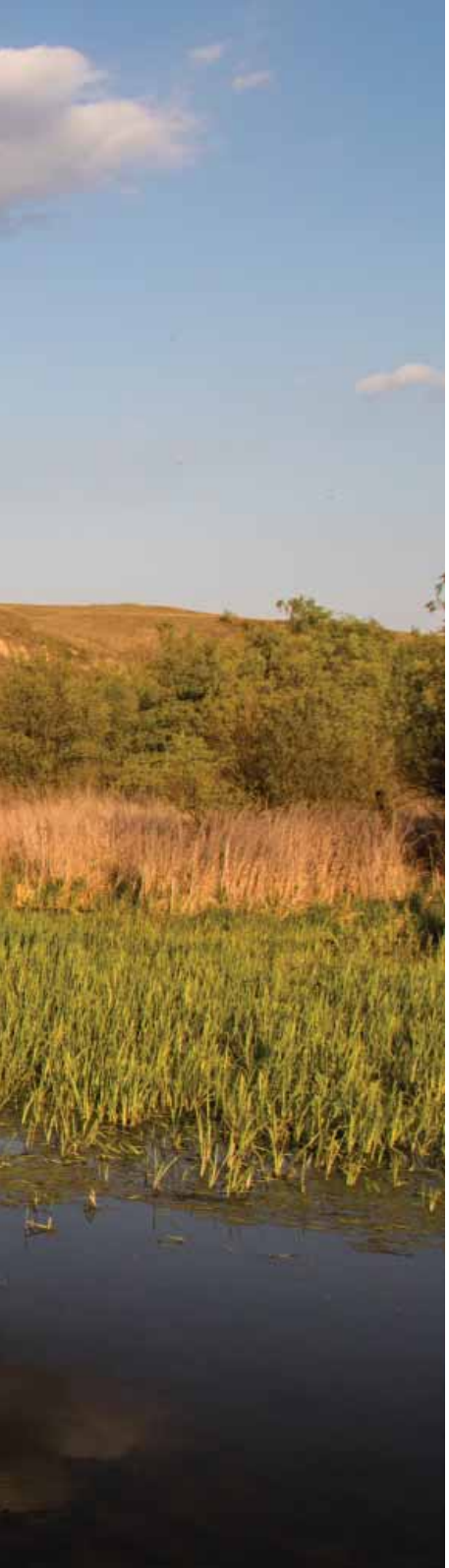
The Karaš oxbow lake in the autumn
Photo: Geza Farkaš



▲ Landscape of exceptional features „KARAŠ-NERA"
OVERVIEW MAP

Source: Provincial Institute for Nature Conservation

The Karaš in the spring
Photo: Geza Farkaš



KARAŠ

The Karaš rises on the north side of the Semenic Mountain in Romania, northeast of the city of Anina. The Karaš enters into Serbia near the village of Kuštilj, flowing between the Vršac Mountains in the north and loessial soil in the south.

Before canalling, the River Karaš stood out for its major sinuosity (meandering), particularly in the most downstream course, from the Đavolji most (Devil's Bridge) to the confluence, where it flowed through its own and the Danube alluvium. In this part, the Karaš possesses majority of features of a lowland river.

The highest water levels and the most frequent floods occur at the end of winter and in the springtime, due to snowmelt in the upper part of the basin, as well as to spring rains.

Construction of the Main Canal DTD Novi Bečej-Banatska Palanka enabled the regulation of the lower course of the River Karaš. Exactly for that reason, the Karaš in this protected area is represented by its residual water, so called oxbow lakes. The largest and the most beautiful oxbow lake is located on the right side of the DTD Canal and several smaller ones are on the left side, in the vicinity of "sandy cliffs" of the Mali Pesak.

Bog Bulrush (*Scirpus mucronatus*) has been definitely discovered in Serbia, only on the banks of the Zvornik Lake. It has the status of critically endangered species. In one of the smaller bogs, upstream of the Đavolji most, between the DTD Canal and the Mrtvi Karaš meanders, below the cutoffs, five specimens of this rare species have been identified, which represents its second discovery in the territory of Serbia.

Strictly protected species of orchid- Marsh Helleborine (*Epipactis palustris*), used to be prevailing in the lowland forest belt, particularly in Vojvodina and nowadays, it has become very rare, due to destruction of its natural habitats. Near old meanders of the Mrtvi Karaš**,** in the vicinity of Kajtasovo ("Zeleni Dvor" (Green Palace) locality), in a depression overgrown with Purple moor grass (Molina caerulea), there are 54 specimens of Marsh Helleborine that have been identified. In the herbarium of Theodor Soska, in the Institute for Nature Conservation of Vojvodina Province, there are two specimens of this species, that were collected on 16 June 1943 in Kajtasovo, within the community of Purple moor grass (Molinietum), which indicates that might be the same locality in question. In addition to Marsh Helleborine, other discovered species also included Early-Marsh Orchids (Dactylorhiza incarnata subsp. incarnata), which mainly appears in reed beds and wet, waterlogged meadows of the lowland area.

The most prevalent types of habitats along the Karaš are Pannonic sands, Pannonic sand steppes, which are more or less degraded, forest stands of Black locust, including scattered occurrences of groves of White willow (*Salix alba*) and poplar (*Populus sp.*), shrubbery of Grey willow (*Salix cinerea*), Purple Osier Willow (*Salix purpurea*), hygrophilous willow (*Salix sp.*) and

Indigo Bush, or eutrophic standing waters, coastal communities of medium high and high halophytes and annual amphibian coastal communities.

Entomofauna of the old riverbed of the Karaš is not particularly distinctive in comparison with other major rivers. The old Karaš is a slow-flowing lowland river. Since it has been cut off by newly dug canal, the Karaš is rich in aquatic habitats with meanders and overflowing ponds. These wet habitats are overgrown with floating, submerged and coastal vegetation, which is a precondition for development of a large number of aquatic insects, in particular dragonflies (Odonata). Here, one can find species typical of slow-flowing waters and accumulations, such as *Aeshna isosceles* and *Crocothemis erythraea*, which the River Nera completely lacks. Discovery of *Ophiogomphus cecilia,* protected species in Serbia, is very important. The surrounding area of the Karaš oxbow lakes was the location where Large Copper Butterfly (*Lycaena dispar*) was found, which is an indicator of the level of preservation of wetland habitats.

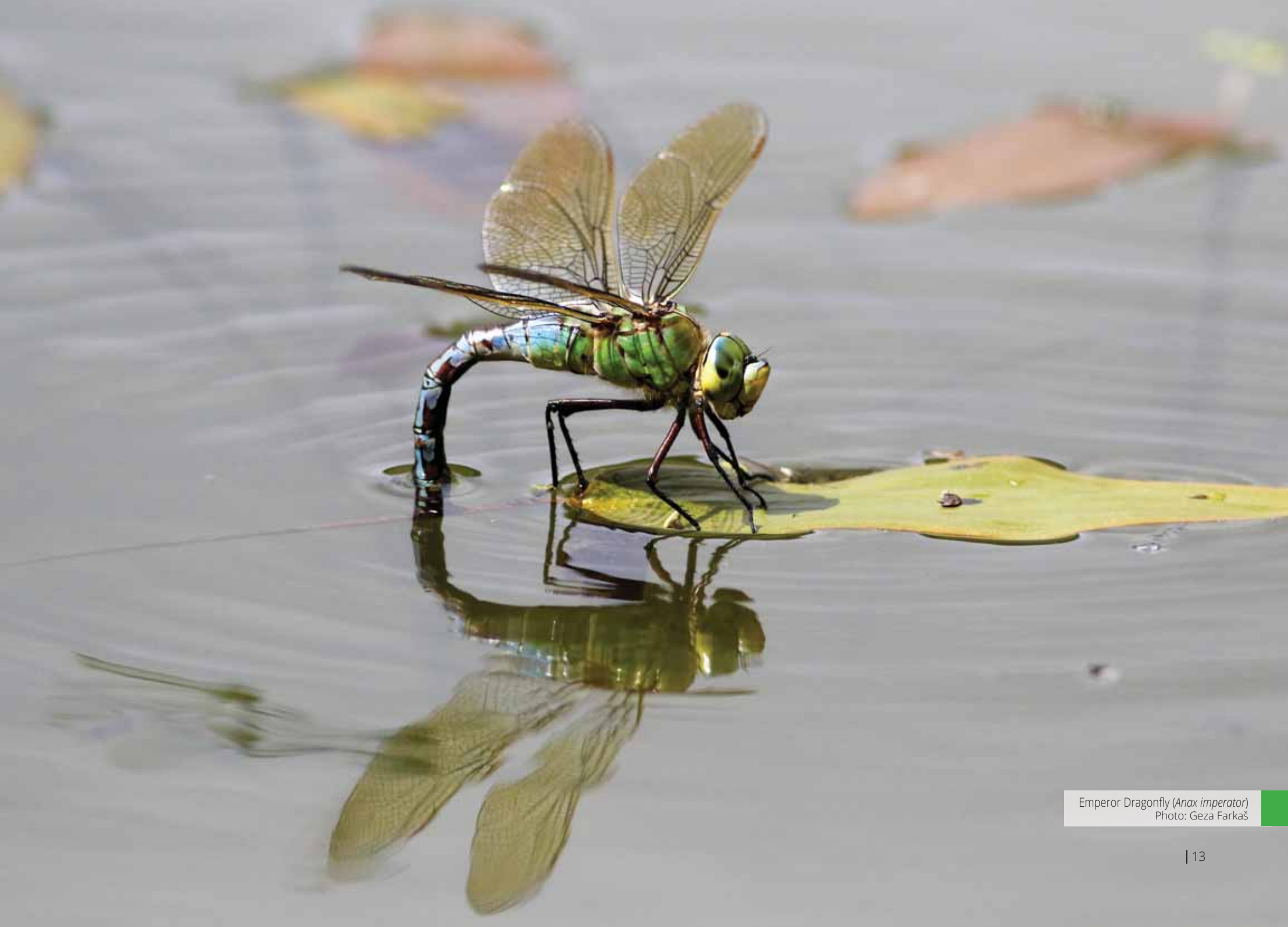
Aquatic and wet habitats in the Karaš meanders and around them are suitable for all types of amphibians, among whom three types of family *Ranidae* dominate*, as follows*: Edible frog (*Pelophylax kl. esculenta*), Pool frog (*Pelophylax lessonae*) and Marsh frog (*Pelophylax ridibundus*). Due to the vicinity of wetlands to sandy, grassland and forest habitats, one can also find here species of frogs dependent on these mosaics, such as Common Spadefoot (*Pelobates fuscus*), European tree frog (*Hyla arborea*) and Agile frog (*Rana dalmatina)*. Here also live reptiles related to water, above all, European pond turtle (*Emys orbicularis*) and grass snake (*Natrix natrix*).

Armlets and oxbow lakes have been created by cutting off the Karaš. In their vicinity, there is one of the most important aquatic and wetland habitats in Serbia, the Ramsar site of the Labudovo okno. Innumerable nesting, migratory and wintering populations of birds of the Labudovo okno in suitable seasons "overflow" to the Karaš armlets, where rare duck species nest, such as Gadwall (*Anas strepera*) and Ferruginous Duck (*Aythya nyroca*), and almost all species of herons (Ardeidae), terns (Sternidae) and cormorants (Phalacrocoracidae) feed.

In the great oxbow lake, on the right side of the Karaš, live Eurasian otter (*Lutra lutra*) and muskrat (*Ondatra zibethica*).

The Karaš oxbow lake below the Mali pesak ▶
Photo: Geza Farkaš

The Karaš in the dawn
Photo: Mladen Matrinović



Emperor Dragonfly (*Anax imperator*)
Photo: Geza Farkaš

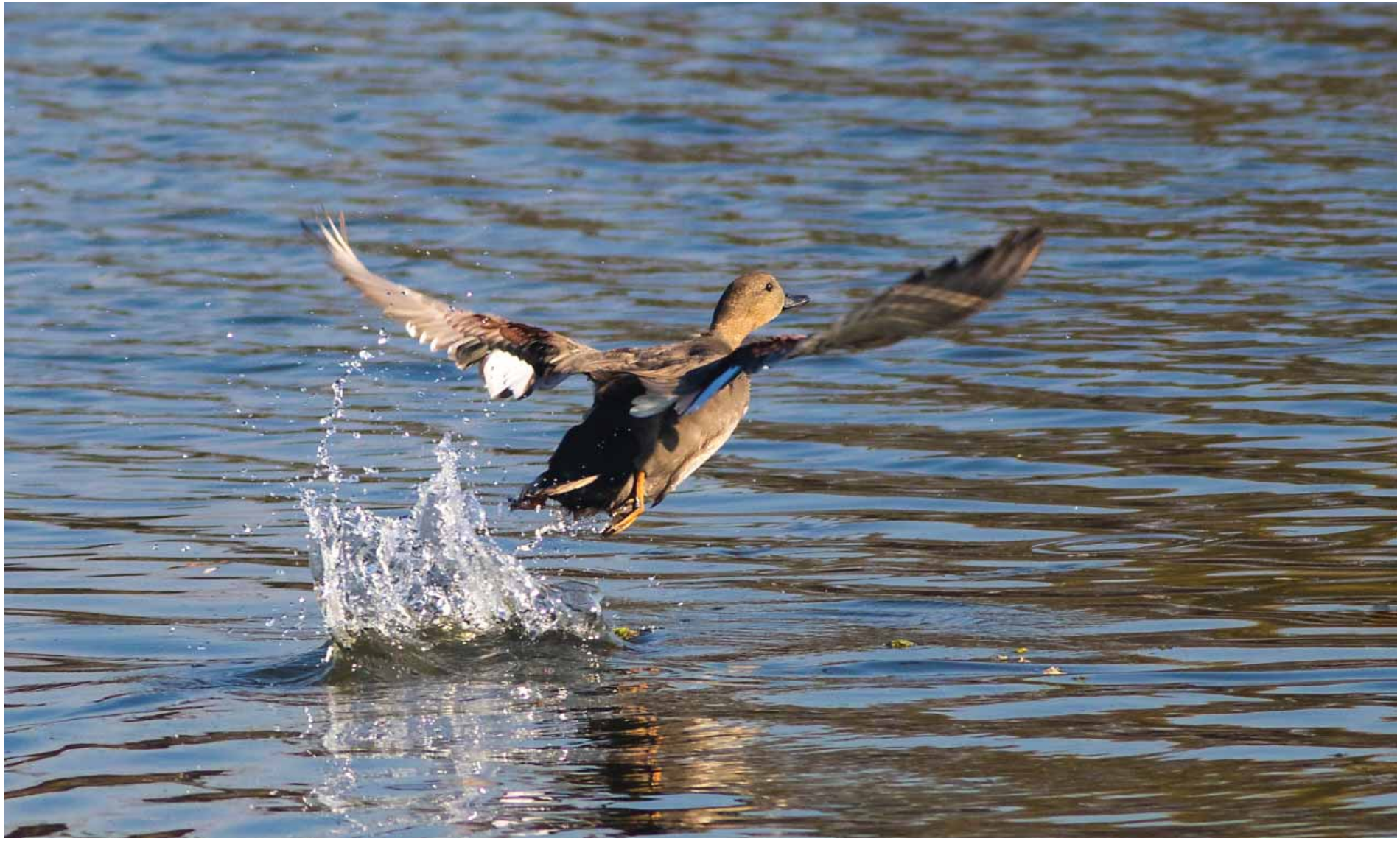
▲ Cardinal (*Argynnis pandora*)
Photo: Geza Farkaš

▲ Small hawker dragonfly (Aeshna isoceles) – an eye
Photo: Geza Farkaš

Small hawker dragonfly (*Aeshna isoceles*)
Photo: Geza Farkaš

Eurasian wigeon (*Anas penelope*)
Photo: Geza Farkaš

Grass snake (*Natrix natrix*)
Photo: Geza Farkaš



▲ Gadwall (*Anas strepera*)
Photo: Geza Farkaš

▲ European green toad (*Pseudepidalea viridis*)
Photo: Geza Farkaš

▲ European tree frog (*Hyla arborea*)
Photo: Geza Farkaš

▲ Yellow Water-lily (*Nuphar lutea*)
Photo: Geza Farkaš

Common Spadefoot (*Pelobates fuscus*)
Photo: Geza Farkaš

Agile frog (*Rana dalmatina*)
Photo: Geza Farkaš

▲ Wild boar (*Sus scrofa*)
Photo: Geza Farkaš

▲ Edible frog (*Rana esculenta*)
Photo: Geza Farkaš



▲ Southern Festoon (*Zerynthia polyxena*)
Photo: Geza Farkaš

Southern Festoon (*Zerynthia polyxena*) ▲
Photo: Geza Farkaš

▲ Scarlet dragonfly (*Crocothemis erythraea*)
Photo: Geza Farkaš

▲ Great reed warbler (*Acrocephalus arundinaceus*)
Photo: Geza Farkaš

European pond turtle (*Emys orbicularis*)
Photo: Geza Farkaš

▲ Tench (*Tinca tinca*)
Photo: Geza Farkaš

Northern pike (*Esox lucius*)
Photo: Geza Farkaš

Muskrat (*Ondatra zibethica*)
Photo: Geza Farkaš

Least weasel (*Mustela nivalis*)
Photo: Geza Farkaš

▲ Bog orchid (*Anacamptis palustris*)
Photo: Geza Farkaš

▲ Marsh Helleborine (*Epipactis palustris*)
Photo: Dragiša Savić

▲ Early Marsh orchid (*Dactylorhiza incarnata*)
Photo: Geza Farkaš

▲ Early Marsh orchid (*Dactylorhiza incarnata*)
Photo: Geza Farkaš

Ferruginous Duck (*Aythya nyroca*)
Photo: Geza Farkaš

Common cuckoo (*Cuculus canorus*)
Photo: Geza Farkaš

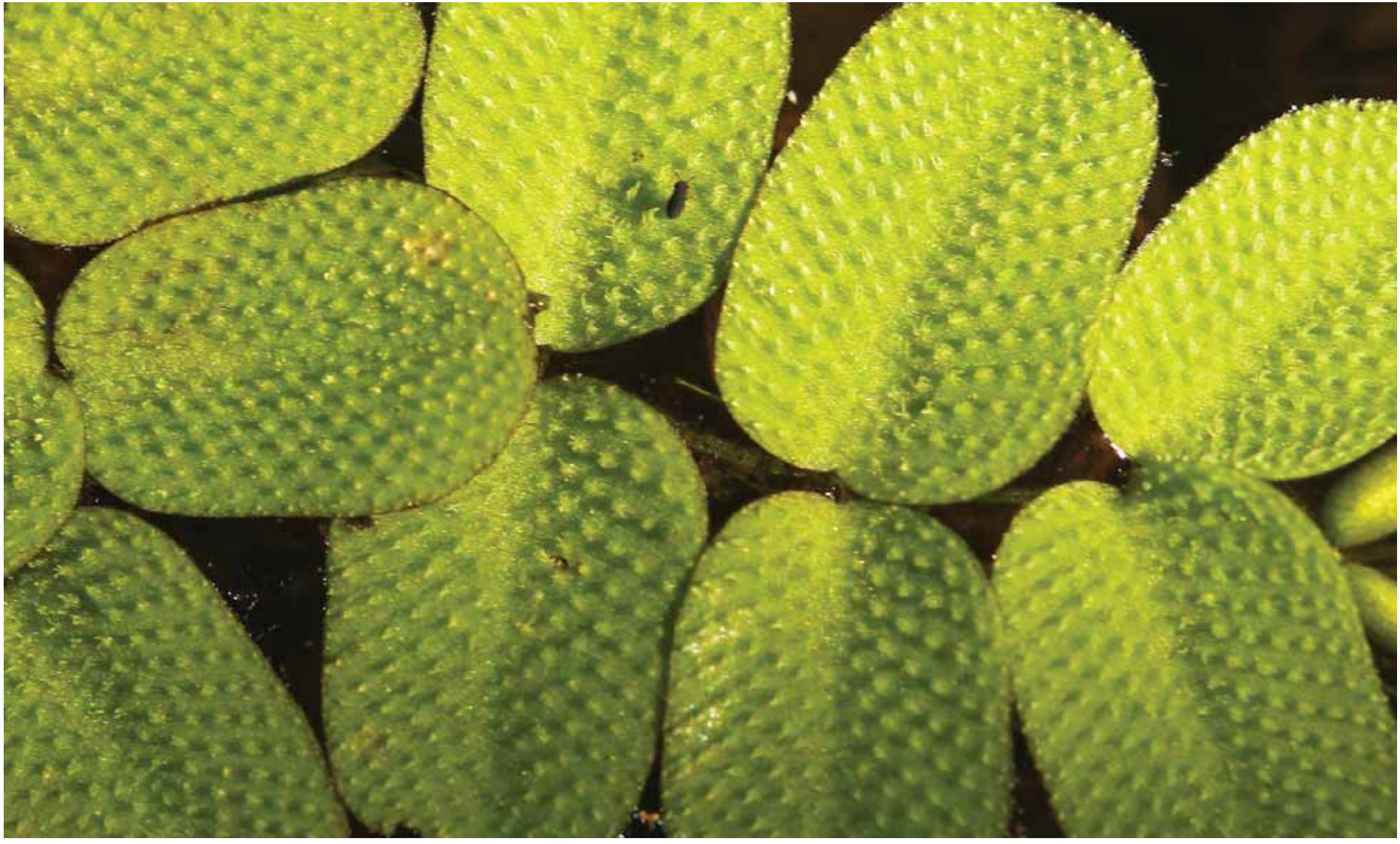
▲ Little grebe (*Tachybaptus ruficollis*)
Photo: Geza Farkaš

▲ White-tailed eagle (*Haliaeetus albicilla*)
Photo: Geza Farkaš

Grey heron (*Ardea cinerea*)
Photo: Geza Farkaš

▲ Savi's warbler (*Locustella luscinioides*)
Photo: Geza Farkaš

▲ Purple heron (*Ardea purpurea*)
Photo: Geza Farkaš



▲ Floating fern (*Salvinia natans*)
Photo: Geza Farkaš

▲ Common pochard (*Aythya ferina*)
Photo: Mladen Mitrinović

▲ Eurasian penduline tit (*Remiz pendulinus*)
Photo: Geza Farkaš

Great White Egret (*Ardea alba*)
Photo: Geza Farkaš

The Mali pesak– grange from the air
Photo: Geza Farkaš

MALI PESAK

„Great" Mali pesak

The largest unit of the landscape of exceptional features "Karaš - Nera" is the Mali pesak" (Small sands). It got its name due to the vicinity to the Deliblato Sands – "Veliki pesak" (Great sands), in comparison with which it is smaller and separated by the Karaš riverbed.

The Mali pesak spreads westwards from Bela Crkva, in the northwest-southeast direction. It is intersected by two roads-Kovin-Bela Crkva in the south and Grebenac-Jasenovo in the north. Along the west rim of the Mali pesak, runs the DTD Canal which flows into the Danube near Banatska Palanka. Within the spatial unit of the Mali pesak, there are the Karaš oxbow lakes on the left side of the DTD Canal.

The Mali pesak is made of eolian sand. Morphological forms-above all, dune relief in the Mali pesak is different from the relief found in the Deliblato Sands, by length and height, as well as by a dominant direction (southeast-northwest). In the Mali pesak, dunes are 3-5 m high, they are slightly protruding and mostly vaulted.

Although these dunes are lower than the Deliblato ones, they are more noticeable and conspicuous. They are covered only with low-growing grass, so that their form is not "disguised" by bushes or trees and it becomes clearly exposed.

The Mali pesak begins adjacent to the Danube near Banatska Palanka, where it continues north-westward as lense-shaped, straight along the left Karaš bank, until the bend by means of which this river changes its course in the northeast direction. The Mali pesak is around 10 m long and 1 m wide. The dunes of Mali pesak are oriented in the southeast-northwest direction, in the same manner as in the Deliblato Sands. The Mali pesak constitutes a part of the Banat peščara (Banat sands), which the Karaš separated with its valley, making a separate unit. The Mali pesak was created by accumulation activity of the Danube and by spreading of the material brought in that manner by blowing of the Košava wind.

Cutting of the Karaš and washing off of surface waters from the Mali pesak, created high declivities towards the Karaš alluvial plain. Considering already flattened and uniform landscape, these slopes seem like genuine cliffs and therefore represent one of the most extreme relief forms of Vojvodina.

As typical steppe and sand species, the following species grow in the Mali pesak, such as: Pheasant's eye (*Adonis vernalis*) and Southern globethistle (*Echinops ritro* subsp. *ruthenicus*). Apart from being rare, endangered and protected species, they also give a clear visual trait to entire area- Pheasant's eye with its striking yellow flowers in the early spring and Southern globethistle, with its tall and prickly, violet-blue inflorescence.

The only certainly designated site of rare sedge species (*Fimbristylis bisumbellata*) in Serbia, is the surrounding area of Banatska Palanka, more precisely, in the area of the Krivaja, between the bog and high cutoffs, on wet treads along the field road. In the territory of Serbia, it has a status of critically endangered species. It occurs in large number of specimens (several thousands), in a relatively small surface area of around 0.5 ha.

The Mali pesak
Photo: Geza Farkaš

In the same locality, several specimens of the Marsh dandelion (*Taraxacum palustre*) have been identified. Distribution of this species in Serbia is still insufficiently known, and irrespective of the data for Mitrovac on the Tara and the Stol in Central Serbia, it is mainly restricted to Vojvodina. Majority of data is outdated or they rely on outdated sources, therefore this is the only certainly designated habitat of this species in Serbia, for the time being.

The category of the most endangered and valuable types of habitats in the area of natural good, includes the type of habitat called *Shiny Bugseed* (*Corispermum nitidum*) *sands*, typical of the moving sand area, of which only few remained in the territory of Serbia, due to the tendency of sand binding by men and due to expansion of invasive species, in particular Black locust. This type of habitat exists only below cutoffs, in the area of the Krivaja near Banatska Palanka, in a surface area of one are.

In the insect fauna of steppe habitats, according to the number, the most dominant are beetles (Coleoptera), true flies (Diptera), butterflies (Lepidoptera), true bugs (Heteroptera) and ants (Formicidae). In drier places, with predominant sand habitats, the most prevalent are species with longer extremities adapted for digging. With the shift towards steppe habitats, more bulkier forms of more chunkier body and rounded wing-cases of vivid colours, become dominant.

Diversity of the butterfly fauna is illustrated by the presence of species from the Red List, as well as by their picturesque names. Some of their names in Serbian language denote colours (*plavac*=Gossamer-winged butterfly (Lycaenidae), *prelivac*=Freyer's purple emperor (Apatura metis), *sedefica*= Queen of Spain Fritillary (Issoria lathonia)), other denote shapes (*pegavac*=Duke of Burgundy (Hamearis lucina), *pirgavac*=Grizzled skipper (Pyrgus malvae), *makazar*= Lethrus apterus), while the third denote their feeding habits (*kupusar*=Cabbage butterfly (Pieris brassicae), *šafranovac*=Clouded Yellow (Colias croceus), *kupinov repkar*=Green hairstreak (Callophrys rubi)).

Insects and other arthropods are vital in sand binding. Algae and fungi inhabit the remains of eaten plant material. They then create a suitable wetter ground-level microclimate for germination of particular plants. Insect frass produces humus at the plant base. Predaceous species of ants and ant-lions leave the remains of the prey in their underground caverns, which also contributes to the soil enrichment with organic matter.

The Mali pesak, made of sand and grass in its entirety, is an important habitat for two rare species of insects, one of which lives in sand, while the other lives in grass. "Charming" funnels on a sand cover are in fact "ominous" traps, on the bottom of which lurk the ant-lion larvae *(Myrmeleon formicarius)*. Unlike the predaceous larvae, adult insects are of delicate constitution, that reminds of the Odonata and they are nocturnal predators. In the late summer, dry grass swarms with large number of Common Cone-headed Grasshoppers *(Acrida ungarica)*. Their antennae- whose colour gradually turns from green into yellow – perfectly mimic the grass leaves with dried tips. Numerous populations of these two species make the Mali pesak area of particular importance for preservation of entomofauna, within national or international scope.

Microclimate specificity and preservation of the habitat enable the presence of Balkan wall lizard (*Podarcis tauricus)* and Caspian whipsnake *(Dolichophis caspius)*.

The Mali pesak -sheep
Photo: Geza Farkaš

The most important value aspect of ornithological fauna of this area, are the birds of prey. They are mostly related to the Mali pesak, where one can also find the largest and the most dense population of European ground squirrel in Serbia, and one of the largest in the Pannonian Plain. European ground squirrels, big rodents which are active by day, represent a particularly convenient prey for birds of prey. In addition, this area is located at the juncture of migratory paths and in the vicinity of other relevant areas, aquatic habitats along the Danube and the mosaic of forests, shrubland and grassland vegetation in the Deliblato Sands. In total, there are 20 species of diurnal birds of prey recorded, which is more than in any other locality of this size in Serbia. Among them, particularly distinctive are the species which are very rare in Serbia, such Booted eagle (*Hieraaetus pennatus*), Lesser spotted eagle (*Aquila pomarina*), Eastern imperial eagle (*Aquila heliaca*) and Saker falcon (*Falco cherrug*), as well as species which are rare in Vojvodina, due to bio-geographical reasons, such as Short-toed snake eagle (Circaetus *gallicus*) and Long-legged buzzard (*Buteo rufinus*). The Mali pesak is the only place in Vojvodina where one can regularly see Booted eagle (*Hieraaetus pennatus*), which probably nests in the nearby wooded hills. Moreover, here one can also regularly see Short-toed snake eagle (*Circaetus gallicus*), which indicates the significance of this area for the nesting population in this part of Banat. Long-legged buzzard (*Buteo rufinus*) is frequently found hunting in the territory of the Mali pesak, which represents one of the most important localities for this species in Vojvodina.

Loessial and sand cutoffs are vital for nesting of Sand martin (*Riparia riparia*) and European bee-eater (*Merops apiaster*), as well as Northern wheatear (*Oenanthe oenanthe*). In addition, Common kestrel (*Falco tinnunculus*) also nests here, as well as Little owl (*Athene noctua*), Common starling (*Sturnus vulgaris*) and true sparrow (*Passer sp.*).

Preserved steppe meadows of the Mali pesak represent one of the most significant grassland habitat complexes in Vojvodina, inhabited by European ground squirrel (*Spermophilus citellus*). Along the border areas of steppe meadows, mounds of Lesser mole-rat (*Spalax leucodon*) have been recorded. While European ground squirrel eats green materials from the ground surface, Lesser mole-rat eats underground parts of plants. Additionally, digging activity of Lesser mole-rats is more evident and it has a multiple importance in soil biology.

Dune relief is specific to the entire area of the Banat sands, as well as to the Mali pesak, for that matter. Moreover, here is more noticeable than in any other place, since this is the only place where grazing is more intensive. Therefore, the vegetation is low and grassy, without many trees or bushes, so it does not block the view of relief, as it does in the greater part of the Deliblato Sands. Consequently, the Mali pesak has the most prominent dunes in Serbia, which represents a major landscape and aesthetic value of this area.

At the same time, steep loessial cutoffs and chasms, as well as the old Karaš meanders which are "leaned" on them, constitute the landscape values.

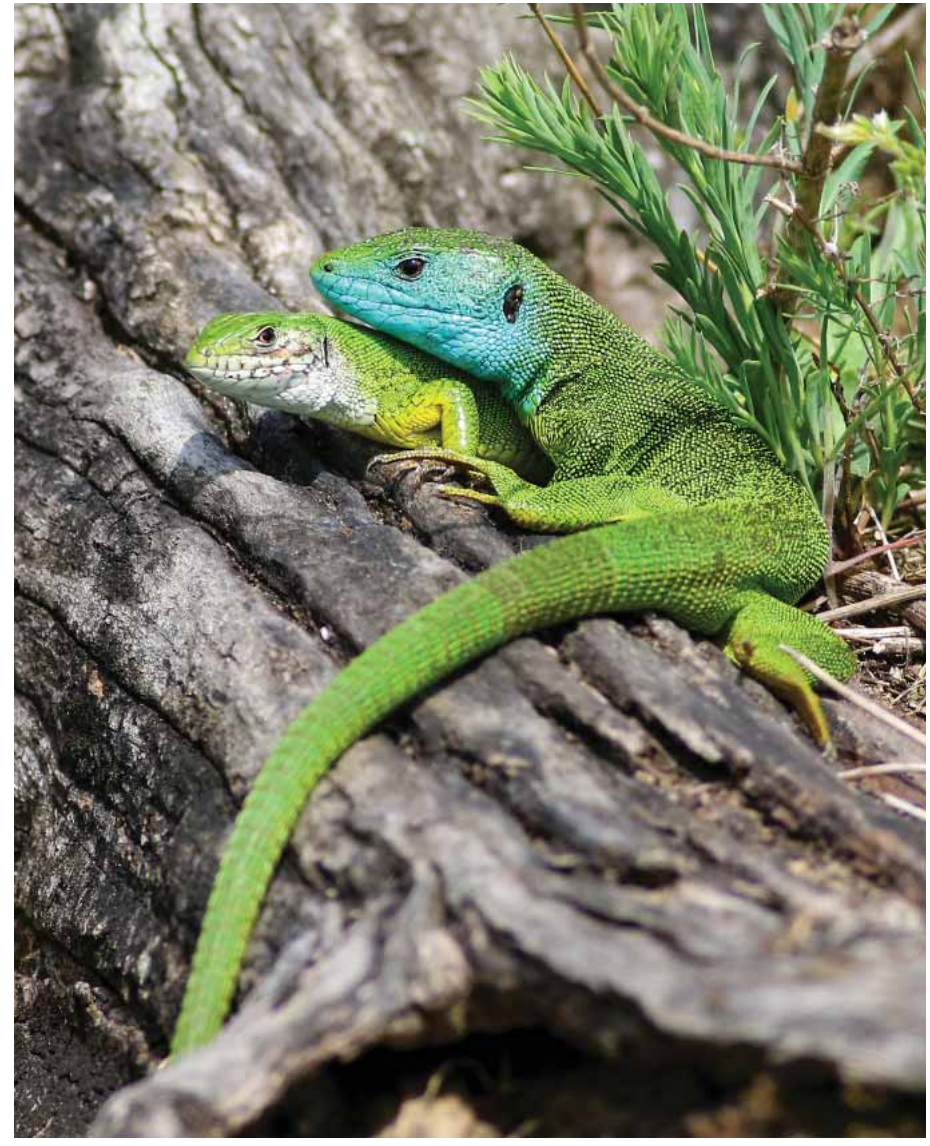
Unlike the predominantly tilled land of Vojvodina, sandy soil, being unsuitable for cultivation, has always been used for livestock grazing. That is what shaped the appearance of the Mali pesak, which has been a pasture for centuries. This area, which is secluded and "wild" today, used to be very close to one of the most important civilisation centres of South Banat, during the Middle Ages. The archaeological site of Grad (City) gives evidence of that. Although it used to be near a larger settlement, it is believed that the Mali pesak was a pasture, even then, so that grazing is not only the ecologically most favourable method of utilisation of area, but it is also the oldest and the most permanent.

View of Karaš from the Little Sand
Photo: Geza Farkaš

Dung beetle (*Scarabaeus pius*)
Photo: Geza Farkaš

Common Cone-headed Grasshoppers (*Acrida ungarica*)
Photo: Geza Farkaš

▲ Ant-lion (*Myrmeleon formicarius*)
Photo: Geza Farkaš



▲ European Green Lizard (*Lacerta viridis*)
Photo: Geza Farkaš

▲ Common wall lizard (*Lacerta muralis*)
Photo: Geza Farkaš

▲ Red fox (*Vulpes vulpes*)
Photo: Geza Farkaš

Golden jackal (*Canis aureus*)
Photo: Geza Farkaš

Lesser mole-rat (*Nannospalax leucodon*)
Photo: Dragiša Savić

Pheasant's eye (*Adonis vernalis*)
Photo: Geza Farkaš

Green-winged orchid (*Anacamptis morio*)
Photo: Geza Farkaš

Green-winged orchid (*Anacamptis morio*)
Photo: Geza Farkaš

Bunchgrass (*Stipa borysthenica*)
Photo: Geza Farkaš

Bunchgrass (*Stipa borysthenica*)
Photo: Geza Farkaš

▲ Southern globethistle (*Echinops ritro subsp. ruthenicus*)
Photo: Geza Farkaš

▲ Sedge (*Fimbristylis bisumbellata*)
Photo: Geza Farkaš

Shiny Bugseed (*Corispermum nitidum*)
Photo: Geza Farkaš

▲ Shiny Bugseed (*Corispermum nitidum*)
Photo: Geza Farkaš

▲ Pink thistle (*Cirisium creticum*)
Photo: Geza Farkaš

Balkan wall lizard (*Podarcis taurica*)
Photo: Geza Farkaš

▲ Tawny pipit (*Anthus campestris*)
Photo: Geza Farkaš

▲ *Bassia laniflora*
Photo: Geza Farkaš

European bee-eater (*Merops apiaster*)
Photo: Geza Farkaš

▲ Crested lark (*Galerida cristata*)
Photo: Geza Farkaš

▲ Whinchat (*Saxicola rubetra*)
Photo: Geza Farkaš

Sand martin (*Riparia riparia*)
Photo: Geza Farkaš

▲ Corn bunting (*Miliaria calandra*)
Photo: Geza Farkaš

▲ Yellowhammer (*Emberiza citrinella*)
Photo: Geza Farkaš

Common buzzard (*Buteo buteo*)
Photo: Geza Farkaš

▲ Eastern imperial eagle (*Aquila heliaca*)
Photo: Geza Farkaš

Common kestrel (*Falco tinnunculus*)
Photo: Geza Farkaš

Long-legged buzzard (*Buteo rufinus*)
Photo: Geza Farkaš

▲ European ground squirrel (*Spermophilus citellus*)
Photo: Geza Farkaš

Saker falcon (*Falco cherrug*)
Photo: Geza Farkaš

▲ Saker falcon (*Falco cherrug*) – a feather
Photo: Geza Farkaš

▲ Northern wheatear (*Oenanthe oenanthe*)
Photo: Geza Farkaš

▲ Saker falcon (*Sturnus vulgaris*)
Photo: Geza Farkaš

▲ The little owl (*Athene noctua*)
Photo: Katarina Paunović

Common raven (*Corvus corax*)
Photo: Geza Farkaš

Red-footed falcon (*Falco vespertinus*)
Photo: Geza Farkaš

Hoopoe (*Upupa epops*)
Photo: Geza Farkaš

Confluence of the Nera and the Danube
Photo: Geza Farkaš

NERA

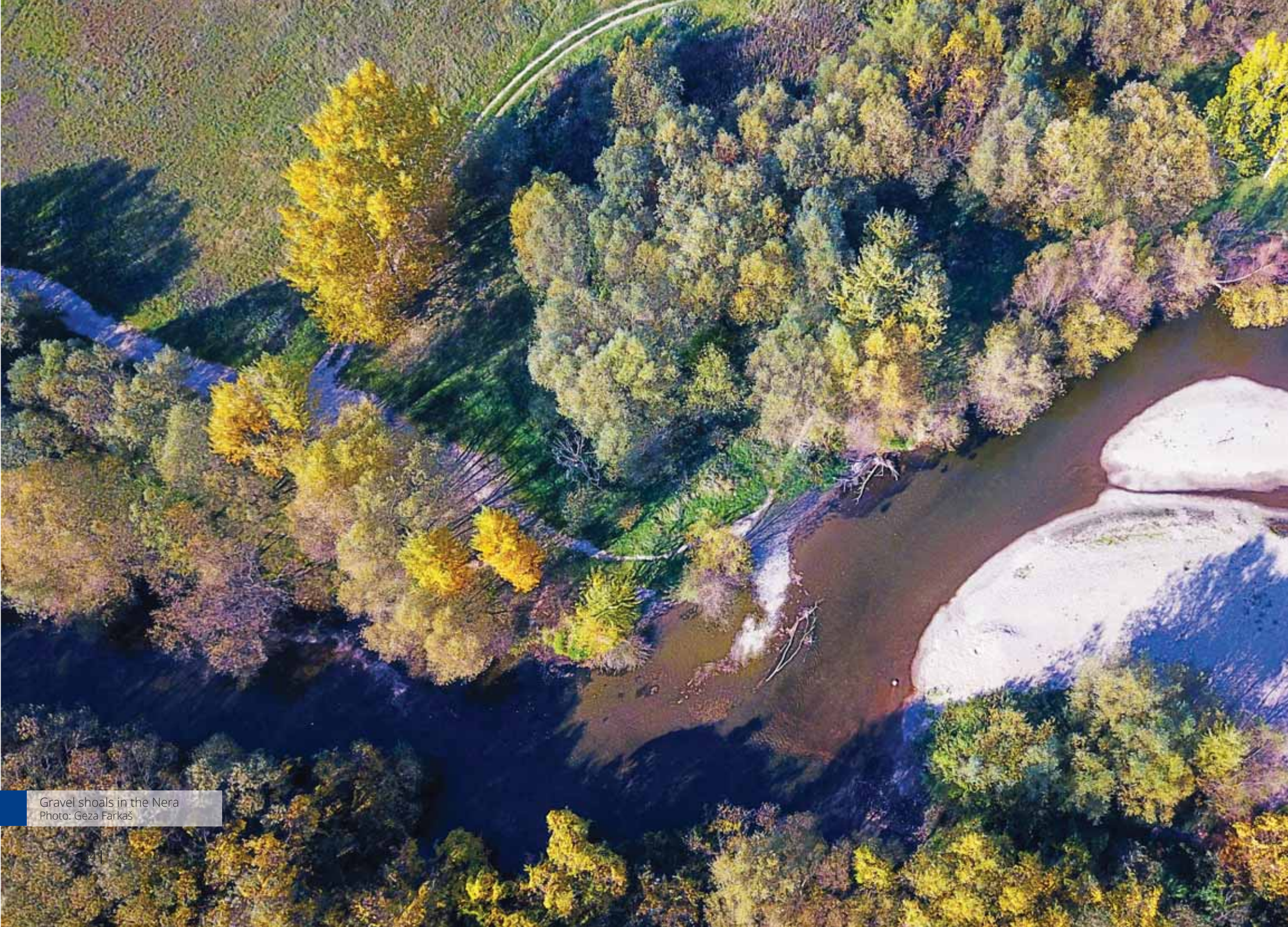
The “Nera” spatial unit occupies the Nera riverbed in Serbia, as well as a wider littoral zone with the three, most preserved localities: the confluence of the Nera and the Danube, part of the Nera riverbed and river islands nearby Vračev Gaj, around 4 km away from the confluence and a section of the River Nera, in the vicinity of Kusić. The access to the Nera is possible from villages of Kusić, Bela Crkva and Vračev Gaj. The access to the Nera confluence is the most possible by water, from the Danube or more precisely from the Labudovo okno.

The River Nera rises on the south side of the Semenic Mountain in Romania, near the city of Rešica and it is 124 km long. In our country, the Nera flows along the border as a lowland river for the next 27 kilometres, until the confluence. Nevertheless, although it flows through the plain in our country, this is the river with distinctive hilly features. That is indicated by its fast flow, pebble bottom and a view of the hills, through which this river flows until its very entry into Serbia. By the confluence, the Nera is between 20 and 40 metres wide. The riverbed is covered with pebble and for the better part of a year, the water is very clear and cold. The Nera is a torrential river, therefore extremely high flash flood waves occurrences are frequent. The highest water levels are reached in the second half of the spring, in April and May, when the Nera spills over and floods its surroundings, for a short period of time. Due to its torrential nature, the River Nera used to be regulated by the Jaruga Canal. Along the Jaruga route, there used to be 10 water terraces with 12 mills.

Relief forms typical of the Nera are river islands. Being a torrential river, the Nera also carries loads and large amounts of pebble. In the period of low water levels, these aits “emerge”, providing a visual pleasure for onlookers, important habitats for river organisms and resting places for swimmers.

During field explorations of flora in the territory of the River Nera confluence, carried out in June 2001, several specimens of the protected species of the Adder’s tongue fern (*Ophioglossum vulgatum*), were discovered. This species can be found in wet meadows, forests and grassland, particularly in the highland belt of Western, Central and Eastern Serbia, while it rarely occurs in lowlands. In addition to this discovery, based on previous findings, only three localities are known in the territory of Vojvodina.

Wetland Common alder (*Alnus glutinosa*) forests today exist in Vojvodina only by the River Nera and only in fragments, they are mainly endangered due to deforestation, since they have low economic value and they are therefore removed and replaced with more cost-effective species. The most prevalent types of habitats along the Nera are river watercourses with varying water levels, coastal communities of medium high and high halophytes, Common alder (*Alnus glutinosa*) forests and arable land. Sporadically, it is possible to find forests of Pedunculate oak (*Quercus robur*), Common hornbeam (*Carpinus betulus*) and Desert ash (*Fraxinus angustifolia*), Common alder and Desert ash groves, shrubberies of Almond willow (*Salix triandra*), Purple Osier Willow (*Salix purpurea*), hygrophilous willow (*Salix sp.*) and Indigo Bush shrubberies.



Gravel shoals in the Nera
Photo: Geza Farkaš

The River Nera is characterised by specific macroinvertebrate fauna. The river bed is rocky, so the noticeable fauna includes mayflies (Ephemeroptera) and caddisflies (Trichoptera), typical of fast-flowing stream waters. These are the species which developed methods of adhering to the surface and protection from being swept away by water current. There are many populations, since every single rock at the bottom of the river is "swamped" by these organisms. Further down the watercourse, the river gets more features of a lowland river and its rocky bottom is gradually substituted by small-granule substrate. The water is slow-flowing, which causes a gradual domination of species which are digging into the bottom (e.g. *Ecdyonurus, Heptagenia)* and water striders (Hemiptera, Gerridae), existing in almost all stagnant waters and calm armlets. Recorded mayflies, dominated by species which feed on detritus, even on algae, imply the preservation of coastal vegetation. The said vegetation is also crucial for majority of species of dragonflies (Odonata), to whom it provides conditions for mating and egg laying. Among the dragonflies (Odonata), *Calopteryx splendens* species is specific for being typical of large riverbeds. In the vicinity of the Nera, very common is the Cardinal *(Argynnis pandora)*, a type of butterfly from the Red List, whose larvae develop on violets.

Having in mind that the Nera is fast and cold, fish fauna also includes species typical of highland watercourses, such as: Schneider (*Alburnoides bipunctatus*) and Mediterranean barbell (*Barbus meridionalis*). Another species of transparent waters, registered over the last years, is Brown trout (Salmo trutta). Right at the confluence of the Danube, fish fauna is noticeably diverse and richer and it is typical of lowland rivers.

The only locality where one can find Horned viper (*Vipera ammodytes*) in Vojvodina is the surrounding area of the Kusić settlement. Discoveries of this species are very rare, so there is no need to worry and they are dependant on greenschists substrate in the Nera valley, that exists in Serbia and Romania. This is the place where the only discovery of Common frog (*Rana temporaria*) has been made, in the Jaruge locality.

River habitats are the most preserved along the River Nera, since the Karaš has been canalled. Dynamic and vibrant riverbed, sandbanks, aits, as well as steep, pebbly and muddy banks, make suitable conditions for the habitat of Common sandpiper (*Actitis hypoleucos*), Common kingfisher (*Alcedo atthis*) and wagtails (*Motacilla sp.*).

The River Nera is also inhabited by the Eurasian otter (*Lutra lutra*), whose recognisable traces and food remains can be often found on the sandbanks and banks.

Particularly valuable landscape unit includes the River Nera, with the floodplain. This is one of the rare remaining unregulated rivers in Vojvodina. It often changes its course and designs a dynamic landscape made of steep riverbanks, sandbanks, aits, meanders and lagoons.

Nera summer
Photo: Geza Farkaš

▲ Banded demoiselle (*Calopteryx splendens*)
Photo: Geza Farkaš

Mayfly
Photo: Geza Farkaš

Smooth snake (*Coronella austriaca*)
Photo: Geza Farkaš

▲ Common pond skater (*Gerris lacustris*)
Photo: Geza Farkaš

▲ Common rudd (*Scardinius erythrophthalmus*)
Photo: Geza Farkaš

▲ Greater horseshoe bat (*Rhinolophus ferrumequinum*)
Photo: Geza Farkaš

▲ Greater horseshoe bat (*Rhinolophus ferrumequinum*)
Photo: Geza Farkaš

Common rudd (*Scardinius erythrophthalmus*)
Photo: Geza Farkaš

Eurasian red squirrel (*Sciurus vulgaris*)
Photo: Geza Farkaš

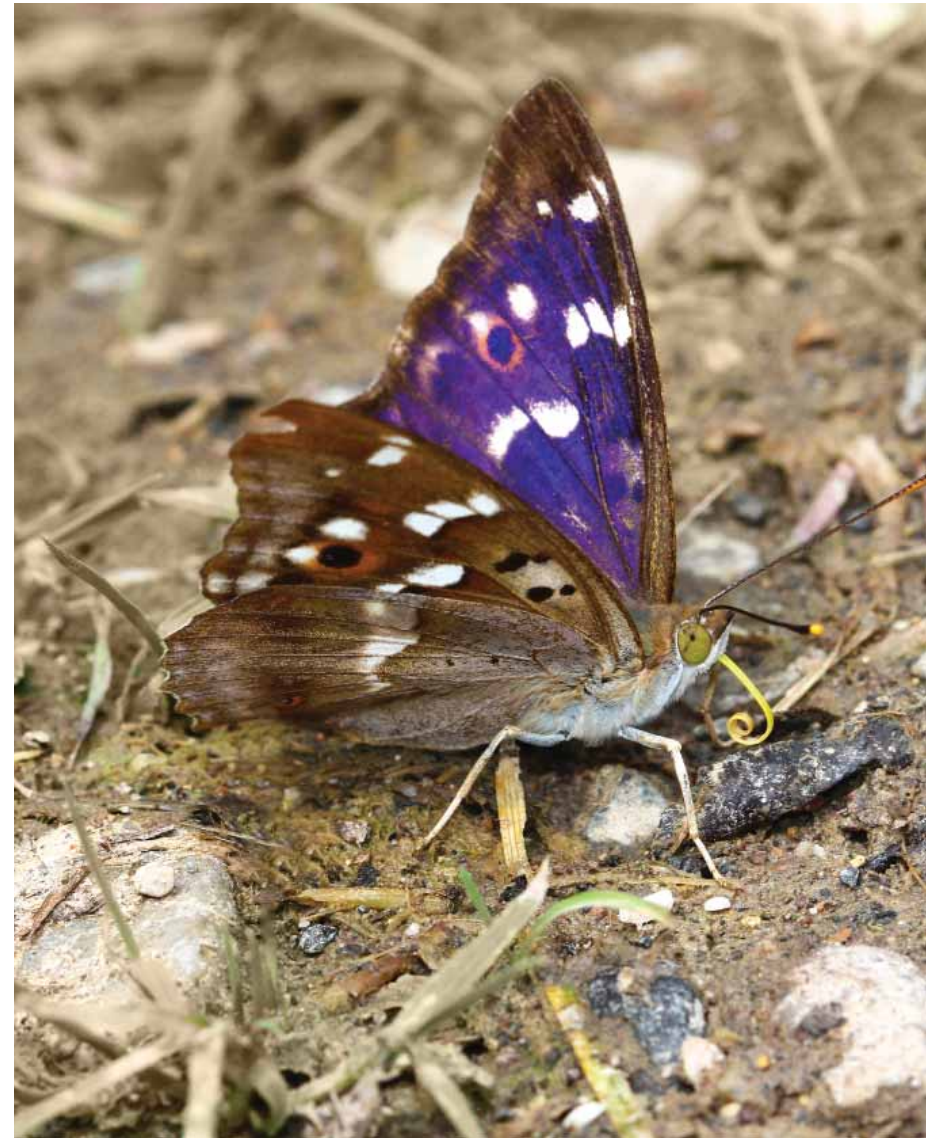
Western yellow wagtail (*Motacilla flava*)
Photo: Geza Farkaš

▲ Syrian woodpecker (*Dendrocopos syriacus*)
Photo: Geza Farkaš

▲ Common sandpiper (*Actitis hypoleucos*)
Photo: Geza Farkaš

Common kingfisher (*Alcedo atthis*)
Photo: Geza Farkaš

▲ White-legged damselfly (*Platycnemis pennipes*)
Photo: Geza Farkaš



▲ Lesser purple emperor (*Apatura ilia*)
Photo: Geza Farkaš

▲ Nightingales (*Luscinia megarhynchos*)
Photo: Geza Farkaš

▲ Common blackbird (*Turdus merula*)
Photo: Geza Farkaš

Shepherd with sheep and a dog
Photo: Geza Farkaš

KARAŠ-NERA AND PEOPLE

The beginning of botanical research of the area along the Karaš and the Nera, is associated with the work of Kitaibel and his friend and his patron Waldstein, who travelled through the Kingdom of Hungary, in the period from 1797 until 1817, examining flora, fauna, soil, minerals, rocks, mineral waters, geographical features and people's lifestyles. In the period from 31 May until 25 June 1800, they passed through the territory of today's Vojvodina, and on 19 June, on the road from Dubovac to Bela Crkva, through the bogs along the Danube, they recorded a very rare species today, that is *Cyperus pannonicus*. The records made for Bela Crkva state that the soil of the surrounding plain was very fertile and that population was engaged in agriculture, animal husbandry, viticulture and silk production. For the purpose of exploring the flora of Banat, this region was also visited by Austrian botanist Rochel, in the period from 1815 until 1835, who published the results of his findings in two of his works, titled "Plantae Banatus rariores" and "Botanical journey to Banat in 1835", at his own cost. Serving as a physician in Oravice, Polish botanist and entomologist Wierzbicki explored flora in the surrounding area of Banatska Palanka, Kajtasovo and Grebenac, in the period between 1839 and 1841. On 26 June 1839, in the surrounding area of Kajtasovo, he collected specimens of Dyer's greenweed, which was described as a new species and called after his colleague Johann Heuffel (*Cytisus heuffeli* or *Chamaecytisus heuffeli*). Heuffel spent 30 years exploring the flora of Banat within boundaries of that time that encompassed parts of today's Romania, Serbia and Hungary. The results were published after his death (1857) in a special monography in which specific localities were not indicated, for the most part, but in few places Bela Crkva, Vračev Gaj, Banatska Palanka, Grebenac and the surrounding area, were mentioned as finding sites. Heuffel's friend and founder of Serbian botany, Pančić visited the surrounding area of Banatska Palanka, which was proven by Sneezewort (*Achillea ptarmica*) specimen, kept in the Herbarium of the Institute of Botany and Botanical Garden "Jevremovac" in Belgrade. Not many people know that Sonklar, who was born in Bela Crkva and became widely known as one of the founders of scientific orography (even the mountaintop of the Austrian Alpes– Sonklarspitze was named after him), published an article, in 1870, about flora of the surrounding area of Bela Crkva ("From Banat"), in which he presented the data on a number of relevant species around Dupljaja, Grebenac and Banatska Palanka. At the proposal of a forestry inspector for Banat, botanist Soska went to the Deliblato Sands in 1943 and 1944, in order to explore its flora. During his explorations, he also analysed the surrounding area of Kajtasovo (the Herbarium of Theodor Soska, in the Institute for Nature Conservation of Vojvodina Province, Novi Sad).

Insect fauna was studied on several occasions. Explorations included insects of the Mali pesak, aquatic insects of the Nera, dragonflies of the Nera, true bugs of the Mali pesak and the Karaš, hemipteras of the Mali pesak. Ornithological research of the lower Karas and Nera courses, including the Mali pesak that they enclose, are rare and they are associated with explorations of the Deliblato Sands. The first paper on birds of the Mali pesak was published in 2010 and it indicates the exceptional value of this area for the birds of prey. The most important research concerning mammals pertains to four-year long monitoring of the European ground squirrel in the Mali pesak, including estimations of population density and size.

▲ The votive Cart from Dupljaja
Photo: National Museum in Belgrade

▲ The Mali pesak-Carcass pile
Photo: Geza Farkaš

▲ Shepherd with a dog
Photo: Geza Farkaš

▲ Grange in the Mali pesak
Photo: Geza Farkaš

In close proximity to the protected area, there is a significant archaeological site, where the famous *Kolica iz Dupljaje (Cart from Dupljaja)* was found. The votive cart from Dupljaja represents a relevant cultural object. The cart, drawn by waders and ducks, shows a human form in an upright position. This is a male with a duck head, dressed in women's clothing, for whom it is assumed to symbolise Apollo Delphinios. It dates back to the Bronze Age and it is associated with the cult of fertility and vegetation. Undeniably, birds and vegetation, that is, natural traits of this area, served as an inspiration for creation of *the Kolica iz Dupljaje,* one of the most important archaeological finds from these territories. Archaeologists and historians are well aware and respectful of this object, since the moment it has been found. Since recently, it has become known among the general public in Serbia. Namely, driving licences issued in the Republic of Serbia contain the very illustration of now already famous *Kolica iz Dupljaje*. A cultural aspect of the significance of protection is especially evident, bearing in mind that the *Kolica iz Dupljaje* was found in the very surrounding area of the Karaš and Mali pesak, as well as the fact that natural motifs directly inspired erstwhile creators of this artefact of extraordinary artistic and historic value. Protection of the landscape of exceptional features "Karaš -Nera" will provide preservation of unique environment where and on the basis of which, the said artefact was created and it will also enable better perception and interpretation of the *Kolica iz Dupljaje*, within the spatial and temporal context.

The finding site "Grad" (City), near the village of Dupljaja, is a large fortification built on a loess terrace, approximately 30 metres above the Karaš left bank and covering around 6 ha of surface area. It was protected from all sides by means of bulwark made of loess and wood, which was even more than 6 metres high in some places on the east side, as well as by means of dry moats around five metres deep. This is a crucial medieval site. The location where the *Kolica iz Dupljaje* was discovered, remained unknown. What dates back to the prehistoric times is only a handful of sherds of the Bronze Age pottery, mainly found beneath cultural layers in the Grad, together with medieval pottery, among which they ended up with the passage of time. To the Roman times belongs a trace of a wall, pulled out of its foundation; ancient pottery found at the surface of the site, dates back to the period between the 3rd and 4th century . It has not yet been determined when the Grad medieval fortification was built. It was undeniably abandoned at the beginning of the 8th century, as indicated by discovered Byzantine and Hungarian money. The oldest layer, which contains buried structures with domed ovens, might belong to the early 10th century, according to some sherds which can be traced back to Bulgaria, at the time of the Hungarian settlement in Bulgaria.

Animal husbandry has been a dominant method of utilisation of the area in the Karaš valley, for centuries and as such, it had impact on the people's lifestyle, their tradition and culture. Grassland habitats, which used to be more spacious, have had influence on development of animal husbandry, above all, of traditional grazing. This lifestyle also gave rise to some other cultural features and specific lifestyle "outdoors", which has not changed much since its introduction until now. Shepherds of the Mali pesak belong to the group of the last people in Vojvodina who live in so called wilderness, outside settlements and far from the greater part of the civilisation heritage. Despite all advantages and disadvantages of this lifestyle, this represents one socio-cultural feature of this area. Typical settlements, within the borders of this area, consist of shepherds' huts called "granges". They are truly picturesque, including their inhabitants, shepherds, dogs and cattle. They are usually in a poor condition, constructed by improvising and unequipped, in an infrastructural sense. Adjacent to them, there are some cattle pens and some wells, in exceptional cases. Many "granges" are abandoned and dilapidated and some of them serve as a temporary accommodation.

The informal tourist facility and so called grange Zeleni dvor, together with the old Karaš near Kajtasovo, functions by respecting and promoting nature and ecological principles. Its hosts and owners showed, even before the protection of this area, that their natural values were recognised and tailored to the requirements of vacation, recreation and tourism, as well as to the attempts "to get closer to nature", as in the cult eco-anarchist book titled "Walden", by Henry David Thoreau.

▲ One detail from the Zeleni dvor grange
Photo: Geza Farkaš

▲ One detail from the Zeleni dvor grange
Photo: Geza Farkaš

▲ The Mali pesak-a grange
Photo: Geza Farkaš

SETTLEMENTS CLOSE TO THE LANDSCAPE OF EXCEPTIONAL FEATURES «KARAŠ-NERA»

In the surrounding area of the protected area "Karaš-Nera", there are several settlements, as follows: Grebenac, Kajtasovo, Banatska Palanka and Dupljaja-near the Mali pesak and the Karaš, as well as Kusić, Bela Crkva, Vračev Gaj and Stara Palanka-near the Mali pesak and the Nera.

BELA CRKVA

Bela Crkva, small town in the very southeast of Vojvodina, like many other small towns of Vojvodina, used to pride itself on as many as four names. The official documents stated all four names: Fehértemplom (1355–1459), Weisskirchen (1717–1872), Biserica Albă and Bela Crkva, since 1918. These are all names of this town in Hungarian, German, Romanian and Serbian language, respectively. Founding of the town is attributed to Count Mercy, the first governor of Banat. During Maria Theresa's reign, Bela Crkva flourished as a result of resourcefulness and diligence of merchants, craftsmen and winegrowers. The first railway, in the territory of today's Serbia, was introduced in the Municipality of Bela Crkva itself and became operational in 1856. The most important facilities date back to the late 18th century and they were built in the Baroque style. Among the Baroque buildings, the most significant ones include Roman-Catholic and Orthodox church, municipal administration building, house of army and fire station. The physiognomy of the town is created by facilities built and reconstructed in the Vienna Secession style, which makes Bela Crkva distinctive. Much more nations used to live here, in this small town, and more languages used to be spoken, so that even today one can hear Serbian, Croatian, German, French, Hungarian, Italian, Jewish, Romanian, Roma, Czech, Ukrainian and Russian surnames. One of the most attractive events that Bela Crkva fosters even today is widely known Carnival of Flowers, which dates back to 1852. Bela Crkva Municipality covers the surface area of 353 km^2. It has 21, 500 ha of arable land. The rest of the land consists of meadows, pastures, vineyards, orchards, forests and other things. In the surrounding area of Bela Crkva, there are six larger and several smaller artificial lakes, created by gravel exploitation. Lakes make a solid basis for development of summer swimming and sports and recreational tourism, as well as sport fishing. In the town itself, there is the "Gradsko jezero" ("Town Lake"), which has a developed beach, a car camping site, a restaurant and bungalows. Near Vračev Gaj, there is the "Vračevgajsko jezero" (Vračev Gaj Lake), which is environmentally developed and suitable for camping.

BANATSKA PALANKA/STARA PALANKA

As early as in the 17th century, the first settlement was built on the location of Stara Palanka, near the confluence of the Rivers Nera and the Danube. In the early 19th century, Palanka was a very important port town(Palanka was the term denoting settlement in the Middle Ages). The old name for Palanka-Horom-originally meant the temple of infidels enclosed by wall. Stara Palanka is a settlement with 13 households, situated on the bank of the Danube, from which a ferry carries to Ram on the opposite bank. Banatska Palanka is a settlement with around 900 inhabitants, which leans on the Mali pesak with its northern rim.

▲ Banatska Palanka
Photo: Geza Farkaš

▲ Vračev gaj- fog
Photo: Geza Farkaš

▲ Kajtasovo
Photo: Geza Farkaš

▲ Grebenac
Photo: Geza Farkaš

VRAČEV GAJ

An Orthodox church and a school have existed in this settlement, since 1778/79. Today, the school name is "Marko Stojanović" Primary School. The church was destroyed during revolutionary 1848 and the new one was built in 1848. A railway station was constructed in 1891, but due to the drawing of the state border with Romania, it does not exist today. Population is mainly engaged in agriculture, primary activities include animal husbandry and vegetable farming. Vračev Gaj is situated between the Mali pesak and the Nera.

KUSIĆ

Kusić is located nearby the River Nera and the state border with Romania itself, from which it is only 500 m away. As Kuzik, it was first mentioned in 1383 and 1384- as a property of the De Jank family in Krashovani community. The village of Kusić has its beach on the River Nera.

GREBENAC

Grebenac is located between the Deliblato Sands and meanders on the right Karaš bank. That is an old Vojvodinian settlement. Grebenac was mentioned for the first time in 1341 under the name Grebencz. The population of Grebenac is mainly engaged in agriculture. In the past, animal husbandry was being developed, in particular sheep-breeding. From the second half of the 19th century, began the accelerated development of cultivation. An Orthodox church, built in 1722, has a particular cultural and historic value. In it, one can find three icons, painted in 1764. Vasko Popa, one of the most frequently translated Yugoslav poets, was born in Grebenac.

DUPLJAJA

This village represents a crossroads between the Banat sands, the Mali pesak and the Karaš valley, which was particularly important in the past. It belongs to the group of old Vojvodinian settlements. The surrounding area of Dupljaja represents a significant archaeological site. The population is primarily engaged in agriculture. Dupljaja is an agricultural settlement, which is a consequence of favourable pedological cover.

KAJTASOVO

Kajtasovo is situated between the Deliblato Sands and meanders on the right Karaš bank. This is an old settlement, established during the great migrations of the Serbs. Under this name, it was first mentioned in 1690, and during its history, it has changed its name several times. There are many springs in it, but the most famous is the Čiklovanov izvor (Čiklovanov spring).

▲ Wild boar (*Sus scrofa*)
Photo: Geza Farkaš

▲ European hare (*Lepus europaeus*)
Photo: Geza Farkaš

▲ Harvest in the corn field
Photo: Geza Farkaš

▲ European roe deer (*Capreolus capreolus*)
Photo: Geza Farkaš

ACTIVITIES IN THE LANDSCAPE OF EXCEPTIONAL FEATURES “KARAŠ-NERA”

The main activities in this area include agriculture, in particular animal husbandry and field crop farming.

ANIMAL HUSBANDRY

While utilisation of pastures in the Deliblato Sands have been restricted for centuries, at the expense of forestry and hunting, in the Mali pesak, pastures have been used more intensely. Hence a large gap in natural values, although the essence is the same. Shepherds from Dupljaja, Grebenac, Kajtasovo and Banatska Palanka pasture their cattle, primarily their herds of sheep and cows. Most of their herds appear in pastures early in the spring and remain there until winter, until the snow covers the ground. Some shepherds stay in pastures throughout the whole year, even in the snow. Part of the cattle is put out to pasture in the morning and they are put back in the evening , while many herds of sheep sleep in pens in the pasture.

Grass cover is a natural resource and it is necessary to harmonise its utilisation with the nature conservation needs. If it is harmonised and controlled, grazing is a proper method of grass cover management and prevention of overgrowing with tall grass or bushes. Protection of natural values, above all, of species and habitats, as a required precondition implies the preservation of pastures, with their balanced and sustainable utilisation. In that manner, material basis for extensive animal husbandry and production of healthy food is enabled in the long run. The proximity of the protected area opens the possibility of better product placement, through development of tourism and creation of a “trademark”.

FIELD CROP FARMING

Land cultivation is restricted by sandy soil in the Mali pesak and high water levels along the Karaš and the Nera. Based on their purpose, fields in this area cover 53 ha, that is 4% of surface area. The predominant crops in this environment are grains, corn, sunflowers, sugar beet, soybeans and alfalfa.

VITICULTURE

Bela Crkva is the town located on a slightly elevated plain, which is predestined for vine growing, due to its geographical position. German immigrants took maximum advantage of that fact and they created an image of wine-growing area, where good grapes and equally good wines are successfully produced. Based on their purpose, vineyards and orchards in this area cover 89 ha, that is 6% of surface area. In the territory of the Mali pesak there used to be cooperative vineyards, but they are abandoned today. This is illustrated by cooperative facilities and remains of vineyard wires covered with grass. By means of spontaneous succession, old vineyards revived the traits of sandy grassland habitats, in which they were planted.

FORESTRY

Planned forest utilisation or rather cessation of uncontrolled deforestation, began in 1717, after the expulsion of the Turks from these territories. At the time of the Military Frontier, there were more forests than arable land in this area. Forests were exclusively state-owned. The first actual restriction and planned for-

Fisherman on the DTD Canal
Photo: Geza Farkaš

est utilisation, dates back to 1755, when cutting, acorn feeding in forests and forest tax were regulated. Until then, natural forests, in particular oak forests, were cleared and degraded, to a large extent. Nevertheless, their destruction and devastation continued, either by local population (cutting, acorn feeding, overgrazing) or due to large timber quotas to which military officers and staff of the Banat Military Frontier were entitled to, during the 18th and 19th century. During that period, border guards had the right to freely use construction wood and firewood, grazing and acorn feeding of cattle, throughout the whole year, which , on the one hand, indicates the distribution of oak forests at that time, while at the same time it implies causes of their devastation. During the 19th century, the maximum attention was paid to binding of so called flying sand of the Deliblato Sands, which was triggered by irrational and excessive utilisation of forest and pasture lands. Establishing of community forests and privatisation of forests, date back to the period of dissolution of the Military Frontier, at the end of the 19th century. Periods of the First and the Second World War, as well as the period of other armed conflicts, brought about the new phase of forest devastation.

Bearing in mind the fact that even today's, fragmented forests and groves are not regulated, therefore many naturally formed forest areas are regarded as meadows, pastures or arable land, it is questionable why the issue of uncontrolled cutting in this area has not been resolved. This is also confirmed by events from 2011, when illegal cutting was established in the Municipality of Bela Crkva, in several locations, in the Karaš and the Nera basin and in the Mali pesak, whereby pruned branches from the littoral zone were thrown into watercourses. A large number of smaller forest areas, mainly a private property, without accurate data on its composition, structure of the forest fund and records of felled trees, which can be obtained only for regulated forests, makes it impossible to analyse the structure of forest lands of the studied area.

Present state of forests might be improved by forest development and planned management. Planting of groups of edifiers and accompanying species, in accordance with the type of forest habitat, may enable establishing of "nucleuses" for revitalisation by natural seeding, which has already been recorded among devitalised cultures of the Austrian pine and Black locust, in central parts of the Deliblato Sands.

Frequent armed conflicts and turmoils, depicted in historical records of this area, left far-reaching consequences on forests and forest habitats. The state of current forest vegetation particularly reflects the occurrences over the last three centuries, during which Turkish, German, Romanian and Serbian administration succeeded one another, with different approaches to the use of natural resources and visions of development of this area. The whole alluvium area of the Karaš and the Nera, including the foothills of this border area today, was still covered with forests of oak, Black locust, Common hazel, Common hornbeam with Common ivy, during the 70s of the 18th century. During that period, oak forests were mostly spread over the south hillslopes along the Danube, as well as in the territory of so called Kusić and Požeženo- foreland company, along the Nera. In that area, in 1818, 5000 trees of oak were recorded as intended for cutting for purposes of shipbuilding. On the 3rd Military Mapping Survey of Austria-Hungary, it is obvious that during the late 19th century, forests disappeared from every soil on which it was possible to grow agricultural crops (vineyards, orchards and grains) and almost all periodically flooded areas were transformed into meadows and pastures.

HUNTING

In the protected area, there is a hunting ground "Nera", managed by the Hunting Association "Lovac" from Bela Crkva. The surface area of this hunting ground is 29,154.96 ha, out of which 26,000 ha is a hunting area, while 3,154.95 ha is a non-hunting area. The main species of bred game include European roe deer (*Capreolus capreolus*), Wild boar (*Sus scrofa*) and Cape hare (*Lepus capensis*). In addition to these species, other species hunted in the hunting ground "Nera", include Common quails, European turtle doves and Mallards, as well as foxes and jackals.

Common milkweed (*Asclepias syriaca*)
Photo: Geza Farkaš

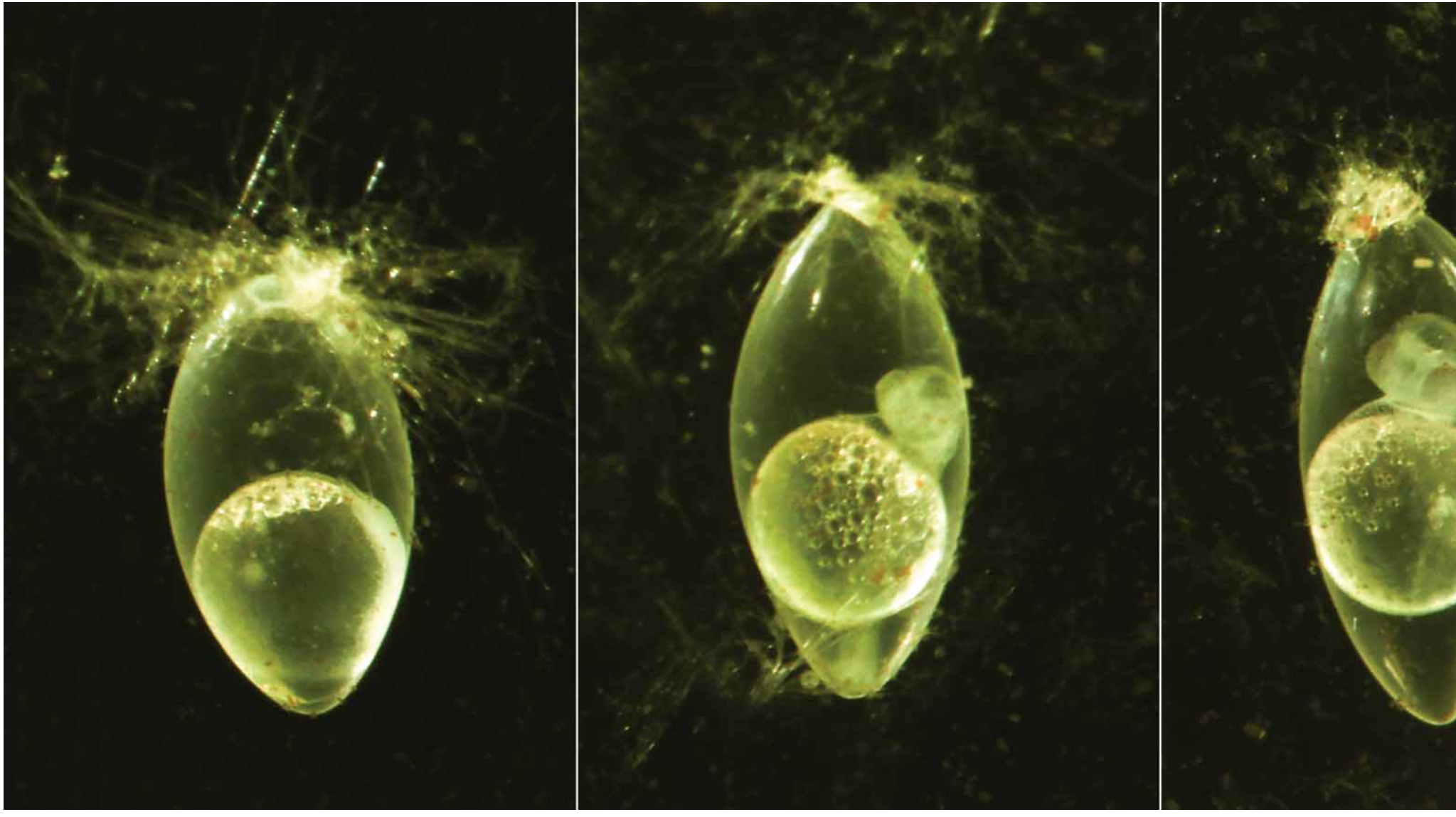
■ ENDANGERMENT OF NATURAL VALUES

Due to low fertility of sandy soil, ploughing of grassland habitats, as a factor of endangerment, is less present than in other grassland areas of Vojvodina. Since forests are not regulated and there is no control, illegal logging has occurred frequently, especially over the past years. Unregulated exploitation of gravel from the bottom of the Nera, represents one of the most negative factors affecting the terrain configuration modifications, riverbed deepening, bank erosion, disappearing habitats for numerous organic species and changes in environmental conditions. In close proximity to the protected area "Karaš-Nera", there are many holiday cottages and other facilities for secondary accommodation, which impair the common landscape values. Particularly adverse effect is the fact that there is also a low-voltage power line, which spreads across the Mali pesak, the locality inhabited by numerous birds of prey. This is extremely dangerous, above all, because of the frequency of bird strikes due to short circuit (electrocution). Two asphalt roads intersect the Mali pesak in east-west direction- the north road from Grebenac to Šušara and the south one leading to Bela Crkva. They destroy, impair and fragment natural habitats, disturb and endanger animal and plant species, which are destroyed with it. Also, they pollute the environment and disrupt landscape units and contribute to a larger number of people coming here. There are 25 invasive plant species that have been recorded, among which the most numerous are Common milkweed (*Asclepias syriaca*), Eastern daisy fleabane (*Erigeron annuus*), Ash-leaved maple (*Acer negundo*) and Black locust (*Robinia pseudacacia*). Spreading of allochthonous plant species also endangers the vegetation of floodplains, as well as forest and steppe vegetation of the Mali pesak. Allochthonous species of fish, which were found in this area, include Prussian carp (*Carassius gibelio*), Chinese sleeper (*Perccottus glenni*), Pumpkinseed (*Lepomis gibbosus*) and Stone moroko (*Pseudorasbora parva*). These species have an extremely adverse effect on autochthonous (domestic) species, since they feed on fish roe and fry, and there are in competitive relationships regarding food, habitat and reproduction. The greatest change in water regime in the lower Nera course occurred with appearance of the Đerdap accumulation and by slowing down of the flow, while as far as the Karaš is concerned, it occurred after the construction of the DTD Canal and sluice at Kajtasovo. The Karaš meanders are intersected and disconnected from the natural course. Both in the neighbouring Deliblato Sands, as well as here exists a constant danger of illegal sand mining. Wholes created as a result of sand mining become filled with municipal waste, soon after their digging. The River Nera, in the section near the Municipality of Bela Crkva, represents a direct recipient of all excess waters: surface, ground waters from settlements and surrounding agricultural land. Waste waters from Bela Crkva are also discharged in the River Nera, without their previous treatment. Although grazing is useful, overgrazing has been detected in some places, which impairs natural, above all floristic and vegetation features. Shepherd's dogs, cats and domestic pigs in granges are serious predators of smaller organisms, such as European ground squirrel, lizards and birds which nest on the ground.

■ PROTECTION OF NATURAL VALUES

Protection background

During the revision of the protection of the "Deliblato Sands", at the beginning of the 21st century, the importance of natural values of the Mali pesak was determined, but protection of this area was not implemented. The protection of the entire area, designated as the landscape of exceptional features "Karaš -Nera", in the period until the end of 2010, is based on commitment to protection in spatial plans. Protection legal basis is realised within the central area of ecological network No. 20, named the Deliblato Sands, which also includes areas around the Nera and the Karaš (Regulation on Environmental Network, "Official



▲ Spawning of Chinese sleeper (*Perccottus glenii*)
Photo: Geza Farkaš

European roller (*Coracias garrulus*)
Photo: Geza Farkaš

gazette of the RS, No. 102/2010), pointing out the Nera as the ecological corridor of international importance. Important initiatives for the protection of this area, were launched during the 21st century, by ecological association called "Aurora" from Bela Crkva and its charismatic leader Milan Belobabić. Assessment of this area was initiated by the Institute for Nature Conservation of Serbia, Novi Sad Department and continued and completed by their legal successor-the Institute for Nature Conservation of Vojvodina Province. Public debate on the protection of this area took place in Bela Crkva and it was the most dynamic discussion, as far back as one can remember, when it comes to nature conservation, including dozens of received objections and responses to them, in a productive and constructive discussion.

■ ACT ON PROTECTION

This area was officially protected by means of the Provincial Assembly Decision on Protection of the Landscape of Exceptional Features "Karaš-Nera", from 2015. The landscape of exceptional features "Karaš -Nera" covers the surface area of 1541.27 ha, of which 1289.0369 ha is state-owned, 170.7014 ha is a private property, while 81.53 ha is the surface area of the River Nera. In the territory of the landscape of exceptional features "Karaš -Nera", the second (II) level protection regime was established on the surface area of 984.36 ha, i.e. the third (III) level protection regime on the surface area of 556.92 ha. The second (II) level protection regime includes the majority of steppe-sandy habitats, where the sustainable utilisation by grazing is necessary for the preservation of natural values. At the same time, this protection regime encompasses the majority of oxbow lakes by the Karaš and three most important units in the Nera littoral zone, near Kusić, Vračev Gaj and at the mouth of the Danube. The third (III) level protection regime includes changed and impaired ecosystem, existing infrastructure and facilities, as well as the major part of the Nera riverbed in Serbia. The aforementioned protection regimes, as further elaborated in the said Decision, imply a complete set of measures which prohibit or restrict activities which may endanger the landscape of exceptional features "Karaš -Nera". Among them, it is important to emphasise control of construction, prohibition of destruction of grassland habitats, impairment of forests and various forms of pollution and disturbance. Also envisaged are so called measures of active protection, i.e. measures of conservation and improvement, aimed at improving the status of the habitat and species.

The protected area is managed by the Public Company "Directorate for Construction of the Municipality of Bela Crkva". At the moment of writing of this publication, the formal process of changing the status and name of the manager, is underway. The Provincial Secretariat in charge of environmental protection affairs, in cooperation with the Institute for Nature Conservation of Vojvodina Province, coordinates and directs the activities of the manager, while the control is conducted by the competent Provincial Inspection for Environmental Protection.

■ INTERNATIONAL IMPORTANCE

The confluence of the Rivers Nera and the Danube is the part of the Ramsar site of the Labudovo okno, which was entered into the List of Wetlands of International Importance for 2006.

It seems a little bit worn-out to hear cliches such as "nature knows no boundaries", including birds that fly freely around, as the best indicator of that. In case of relation between boundaries of this area and famous "bird's" IBA areas, it is not only true that nature knows no boundaries, but also birds are the reason

Power line in the Mali pesak
Photo: Geza Farkaš

for some “divisions”, although benign ones. Thereby, this protected area divided its values according to two important bird areas. The Mali pesak and the Karaš meanders are part of a larger bird habitat of international importance- the “Deliblato Sands” (Important Bird Area, IBA – RS016), while the confluence of the Rivers Nera and the Danube are part of a larger bird habitat of international importance- the “Labudovo okno” (Important Bird Area, IBA – RS033).

■ ACTIVITIES, GUIDELINES AND PROJECTS

The area of the Karaš, the Nera and the Mali pesak is located in the vicinity of the Deliblato Sands, on the border of the Pannonian Plain, between the Carpathians and the Danube, close to the valley of the River Morava-which is a corridor to the Balkans and the Mediterranean and the Đerdap Gorge-which is a corridor to the Romanian Plain. This area is the continuation of existing protected areas in Romania (the “Karaš Gorge-Semenic” National Park (“Semenic Semenic-Cheile Carașului” National Park), “the Nera Gorge- Beusnita “ National Park (“Cheile Nerei– Beusnita” National Park) and the “Iron Gates” National Park (“Porțile de Fier” National Park) and in Serbia (the Special Nature Reserve “ Deliblato Sands (SRP “Deliblatska peščara”), the Landscape of Exceptional Features “Vršac Mountains” (PIO “Vršačke planine”) and the “Đerdap” National Park (NP “Đerdap”). This outstanding position is an excellent starting point for numerous project activities.

The landscape of exceptional features “Karaš -Nera” consists of river banks, bogs and armlets, groves, loessial cutoffs and pastures on the sand. These diverse habitats and species related to them, require special measures of protection and management , both from the point of view of nature conservation, as well as because of the sustainable development needs. Defining an appropriate measure is especially important in case of regulation of grazing, since the absence of this activity causes unfavourable successions of plant communities. On the other hand, excessive use of grass cover may impair the delicate sandy habitat. Certain water localities, such as the beach near Rivača, oxbow lake near the “Zeleni Dvor” and part of the Nera banks, should be promoted and tailored to the needs of tourism and recreation, with maintaining the optimum capacity of presence of people. In the Mali pesak, in place where it is possible, it is necessary to carry out revitalisation of steppe-sandy pastures, which are transformed into arable land or vineyards. Landscapes of wide-open sands, which used to be powerful, vast and intimidating types of habitats in the Pannonian plain, are nowadays very rare and narrowed down. It is of utmost importance to conduct revitalisation and maintenance of wide-open sands, the first level of succession of sands, in small surfaces which are distributed in the mosaic-like pattern. In that manner, unique landscapes of exceptional features of wide-open sands will be preserved, since they are significant habitats for the sandy cover species, such as ant-lion *(Myrmeleon formicarius)* and Eurasian stone-curlew *(Burchinus oedicnemus)*. Invasive species, espacially the ones such as: Common milkweed (*Asclepias syriaca*), Tree of heaven (*Ailanthus altissima*), Indigo Bush (*Amorpha fruticosa),* Eastern daisy fleabane (*Erigeron annuus*), Ash-leaved maple (*Acer negundo*) and Black locust (*Robinia pseudacacia*), should be controlled and maximally destroyed, both in sandy, as well as in aquatic areas. Planting of autochthonous trees of oak, alder, ash, willow, silver poplar and black poplar, above all should be focused on already existing wooded areas and shrubbery.

For the purpose of improving natural values, it is important to plan the implementation of measures of active protection of rare and protected species. Measures of active protection of species, among other things, include the installation of insulating covers for existing low-voltage power lines, establishing of ecological bridges for overcoming the barriers and cleaning of habitats from the waste. Specific measures of active protection ,which have been implemented so far, primarily included removal of solid waste, putting up of cavities for the European roller, ringing, promotion and education.

DTD Canal
Photo: Geza Farkaš

The “amphitheatre” in the Mali Pesak
Photo: Geza Farkaš

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CIP - Каталогизација у публикацији
Библиотека Матице српске, Нови Сад