BIODIVERSITY STUDY OF THE INDUSTRIAL COMPLEX "ELIXIR PRAHOVO" – INDUSTRIJA HEMIJSKIH PROIZVODA D.O.O. PRAHOVO"

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The study of the impact zone biodiversity of the Industrial Complex "Eliksir Prahovo" – Industrija hemijskih proizvoda d.o.o. Prahovo" (hereinafter "Study") was conducted on the basis of the Offer for the preparation of the subject study (no. 01-428 of 29 February 2024) submitted by the Institute for Biological Research "Siniša Stanković" (hereinafter "Institute" and accepted by "Eliksir Prahovo" – Industrija hemijskih proizvoda d.o.o. Prahovo (hereinafter "Investor"), on 29 February 2024.

The study was supplemented based on the comments submitted by the Investor, and according to the offer for revision of Study no. 01-520 from 11.06.2024.

On this occasion, we would like to thank our colleagues from IHP "Elixir" Prahovo for the exceptional and professional cooperation during the realization of the study in question.

We also thank colleagues who provided constructive comments regarding nearby protected areas in Romania.

Director

Mirjana Mihailović, PhD, Scientific Advisor

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INTRODUCTION

Biodiversity study of the Industrial Complex "Eliksir Prahovo"– Chemical Products Industry d.o.o. Prahovo“ (hereinafter referred to as the “Study”) impact zone, where the construction of the Plant for Energy Utilization of Waste and Landfill for Non-hazardous Waste is planned (second amendment to the Detailed Regulation Plan for the Chemical Industry in Prahovo , Official Gazette of the Municipality of Negotin, no. 17-22).

According to the Convention on Biological Diversity (CDB), adopted at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, biodiversity is defined as "variability among living organisms, including but not limited to terrestrial, marine and other aquatic ecosystems they are part of which; this includes diversity within species, between species and between ecosystems".

Sustainable development, as a long-term concept, ensures that the interests of environmental protection are aligned with economic and social development. Conservation of natural values implies their use under conditions and in a way that ensures the preservation of the value of biodiversity, geodiversity, protected natural resources and landscapes.

The basic factors of biodiversity degradation are defined by the abbreviation of the English word HIPPO, which is derived from the initial letters of the words: Habitat alteration/H); Invasive species/ I); Pollution/ P); Population growth/ P) and Overexploitation/O). Habitat alteration occurs due to the accelerated development of agriculture and forestry, strong urbanization, industrialization and tourism in a certain area.

The study is based on available data on the state of the environment available at the Institute for Biological Research "Siniša Stanković", National Institute of the Republic of Serbia, University of Belgrade, published data, as well as field research conducted during 2023.

PROJECT AREA

The project area includes the spatial units of the Danube and riparian habitats in the direct impact zone of the Industrial Complex "Eliksir Prahovo" – Industrija hemijskih proizvoda d.o.o. Prahovo", which includes the Plant for Energy Utilization of Waste and Landfills of Non-Hazardous Waste, whose construction is planned on cadastral parcels 1420/1, 1420/4, 1491/1, 1541/1, 1541/2, 1552, 5824/1, 6513/1, 6513/2 C.M. Prahovo and cadastral parcels 2300/1 (part), 1491/l (part), 1541/1 (part) C.M. Prahovo. The project area also includes the surrounding zone with potential impacts, with an area of 20 km2. – Figure 1 (from km 857 to km 862), downstream of HPP Đerdap 2 (Figure 1):

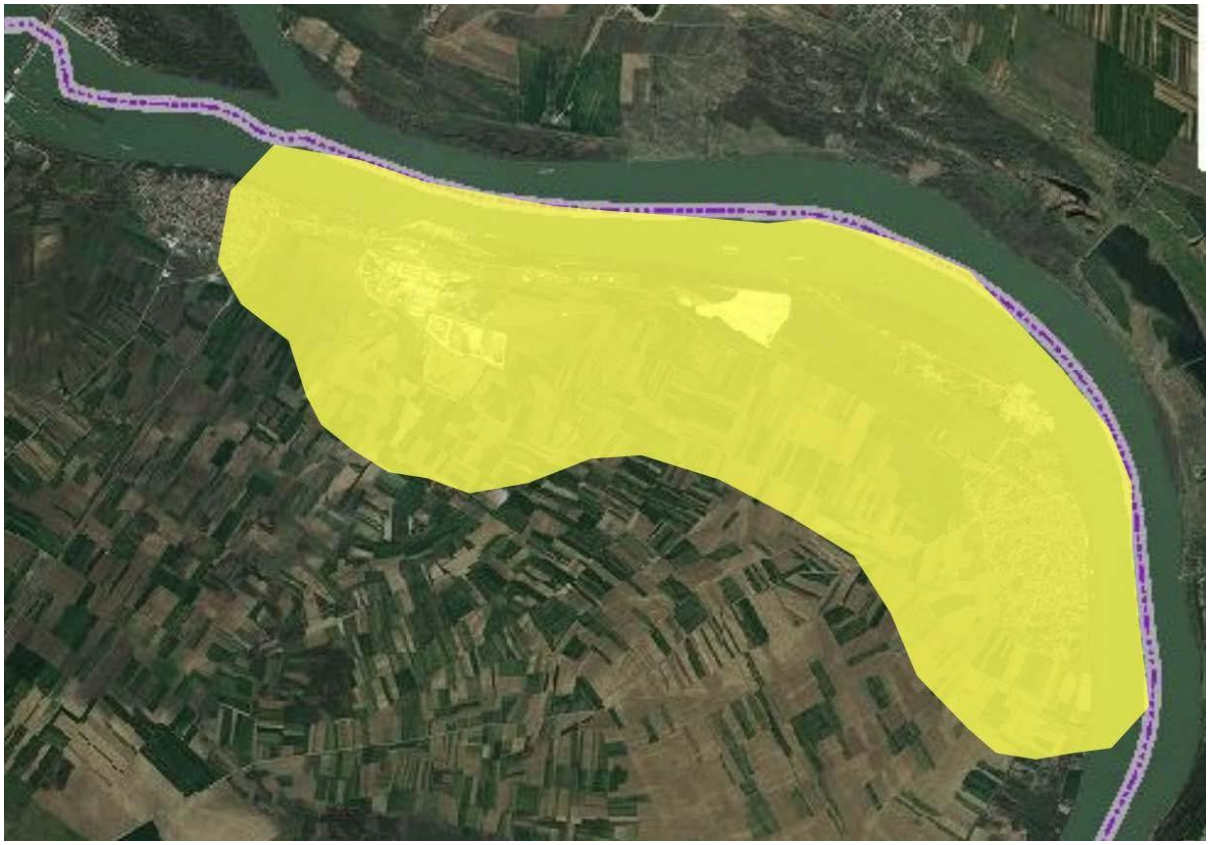

Figure 1 Research area

CHARACTERISTICS OF THE PROJECT AREA

Ecosystems of a given area can be classified in different ways, one of them being the classification based on habitat characteristics. The European Union, within the framework of CORINA (CoORdination Information Environment) program initiated the development of databases for the inventory and classification of ecosystems of the Palearctic area. Davies, Moss & Hill (2004) formed EUNIS (European Union Nature Information System) integrated database, which groups European ecosystems into 9 basic types (ecosystems of marine habitats, coastal habitats, freshwater habitats, wetland and peat habitats, rocky habitats; into agrarian, grassland, shrub and forest ecosystems). The EUNIS classification is compatible with other classifications, including national ones. The goal of forming this system is precisely to create a reference database on species, habitats and areas that forms the basis of the Birds Directive and the Habitats Directive for the NATURA 2000 network and its similar EMERALD network of the Bern Convention, and is also used in the development of indicators (EEA Core Set and others) and the creation of reports on the state of the environment. These directives represent the legal framework on which environmental protection policy in the European Union is based. The Ramsar Convention on Wetlands of International Importance aims to preserve and sustainably use Ramsar sites, which are of particular importance as waterfowl habitats. This Convention was adopted in the Iranian city of Ramsar in 1971, entered into force in 1975, and almost 90% of the members of the United Nations are signatories.

According to the morphological characteristics of the terrain, the settlement of Prahovo is located on the alluvial plane of the right bank of the Danube River, at an average of 48-58 masl, within the plain part of the municipality of Negotin.

The project area and the immediate surroundings represent the right part of the valley side of the Danube, which in this sector passes through a wide, almost completely horizontal alluvial plane. The Danube is in the zone of interest hydrologically under the strong influence of the operation regime of the hydropower plant "Djerdap 2", and in a short time, significant changes in flow parameters – rate, flow, as well as river level are often recorded.

According to the geological structure, the base of the terrain consists of Pliocene sediments, which occur at depths of over 30 m in the facies of sands, small pebbles, clays and weakly binding sandstones.

Hydrogeological properties of the terrain are a consequence of the geological structure of the terrain, lithological composition and morphology of the area. The Danube is part of the trans-European navigation system Rhine-Main-Danube, (3505 km), which is the most important European navigation highway. Its source is on the southeastern slopes of Swartzwald (Black Forest) and consists of two smaller rivers Breg (47.6 km), which springs at 1,078 m and Brigah (42.7 km) which springs at 926 m above sea level. They connect near the city of Donaueshingen at 678 m above sea level, and further flow under the common name of the Danube, the largest tributary of the Black Sea. As the Danube further flows, the altitude of its riverbed decreases, as well as the heights of the cities through which it flows and on whose banks are located: Linz, Vienna, Bratislava, Budapest, Novi Sad, Belgrade, Kladovo, Vidin, etc. The Danube basin includes more than 19 countries, 14 of which are signatories to the Convention for the Protection of the Danube River (ICPDR), in Sofia in 1994. In addition to the Danube, the basin includes other major European rivers Sava, Tisa, Drava and Prut, as well as some smaller ones such as the In, Vah, Velika Morava and Siret. The drainage area of the Danube is also

influenced by two large mountain ranges of the Alps and the Carpathians.

Negotin is located in a plain surrounded by mountain ranges (Miroč, Crni Vrh and Deli Jovan) and open space on the east and south sides of the area. Due to the warmest summers and the harshest winters, Negotinska Krajina is the most continental area of eastern Serbia. The mean maximum temperature is in July (28.5°C) and the mean minimum temperature is in January (-4.5°C). The period with temperatures higher than 5°C, lasts 8.5 months, which affects and defines vegetation period. Also, the characteristic of this area is a warmer autumn than spring by about 2°C (Figure 2). In the winter period, the west and northwest winds are most often blowing. Since it comes across the Homolje Mountains, it always appears as a cold wind and brings sudden and heavy rainfall.

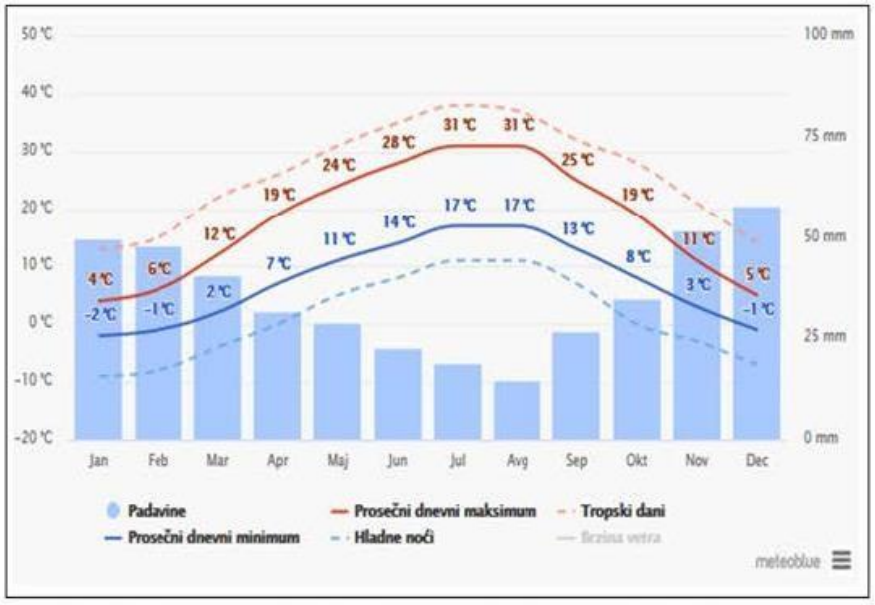

Figure 2 Average temperatures and precipitation – Prahovo
(Source: Meteoblue climate diagrams - www.meteoblue.com)

The vegetation of the area is represented by the absolute dominance of the Moesian forest of the gray pedunculate (Quercetum pedunculiflorae moesiacum). In addition to pedunculate stands, it should be pointed out as a separate specificity and depression known as Negotinsko blato. Negotin mud was drained in the period before the Second World War, around 1930–1935 (Lutovac, 1959). At the end of the 19th and the beginning of the 20th century, this vast swamp area was inhabited by numerous waterfowl, and among the fish, Pančić was the first to notice the presence of the Carpathian endemic species *Umbra crameri* Walbaum, 1792 (Sekulić et al., 1998). Finally, in the ponds west of Prahovo, in the Balta Gruja pond on the Romanian side along the Danube, as well as in the shallows of the Danube, there are plant species of the genus *Sparganium* L., which are caterpillar-feeding plants of the aquatic species *Nymphula nitidula* (Hufnagel, 1767). Anthropogenic pressure has almost completely eradicated the peduncle, and the area is now dominated by arable land.
The municipality of Negotin is rich in fertile agricultural land. About 65% of the total territory of the municipality is under agricultural areas, whose structure is extremely dominated by arable land, pastures and areas under

vineyards and orchards. Benefits for amelioration contribute to the possible effectuation of production. A significant characteristic of the area is viticulture, i.e. wine production. From the second half of the 19th to the middle of the 20th century, viticulture and winemaking was one of the main activities of the population, due to extremely favorable climatic conditions and characteristics (number of sunny days, pedological characteristics), quality grape varieties, good knowledge of the production process and favorable geographical location.
Prahovo is an industrial settlement northeast of Negotin. The area of the settlement is 1,957 hectares, and it is located at 44° 17' 32" north latitude and 22° 35' 34" east longitude. The port of Prahovo is located 4 km downstream from the Djerdap II Hydroelectric Power Plant and the international border crossing Kusjak, and is also the last exit port on the territory of Serbia on the Danube.

FLORISTIC CHARACTERISTICS OF THE AREA

FLORISTIC-PHYTOCENOLOGICAL CHARACTERIZATION OF THE AREA

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INTRODUCTION

Eastern Serbia is a significant center of floristic and vegetation diversity, as indicated by numerous researchers (Mišić et al., 1978; Mišić, 1979, 1981; Gajić, 1985; Stevanović et al., 1986; Ranđelović et al., 2007; Karadžić, 2017, 2018; Kojić et al., 1998; Čarni et al., 2009).

It belongs to the Mesian biogeographical province with elements of the Pannonian and Dacian (Carpathian) provinces (Stevanovic, 1999). Due to the influence of different biogeographical provinces, this area is extremely diverse.

The great heterogeneity of environmental conditions (diverse topography, climate, hydrology, geology and soil) contributes to the diversification of flora and vegetation in this region.

The studied area (Danube riparian zone on the territory of the villages of Prahovo, Radujevac and Kusjak) is located in the eastern Serbia and territorially belongs to the municipality of Negotin, which has a central position in the geographical region of Negotin Krajina.

The relief of the municipality of Negotin is predominantly of the hilly-mountain type, where slightly undulating hills rise to the west into the range of Deli Jovan and Veliki Greben, and to the east they cross into the plains of the Wallachian-Pontic Plain. This geographic position provides a very specific climate of Negotin. Due to warm summers and harsh winters, Negotin Krajina can be characterized as the most continental area of eastern Serbia, with pronounced temperature amplitudes during the year (in the winter period, temperatures in

Negotin Krajina drop to -30°C , and in the summer they rise to +40°C). A period with a temperature above 15°C lasts 148 days. The Negotin region has the largest number of clear days in Serbia, while snow in this area is retained for an average of 50 days in the lower and 60 days in the higher regions. The maximum precipitation is at the end of spring, and the minimum precipitation is in August, with an average annual precipitation of 637 mm. The Danube is the most important watercourse in the territory of the municipality.

A significant part of the Municipality belongs to the protection zone of HPP "Đerdap 2", within which special natural units are distinguished:

- Nature Reserve "Bukovo" - is located on the hill of the same name, not far from the town of Negotin, and is represented by the landscape unit of the forest park (inverse beech communities growing at altitudes lower than 200 m, atypical of beech, and oak forest communities);
- Forest Park "Bratujevački lipar" - located between Negotin and the village of Rečka, characterized by the dominance of linden trees (*Tilia* sp.) and
- The landscape of the whole with preserved and rare flora and fauna "The confluence of Timok and the Danube".

METHODOLOGY

The research of flora and vegetation of the area covered by the Terms of Reference for the preparation of the biodiversity study was carried out by the transect method and the inventory of plant species determined according to the keys of the flora of Serbia (Josifović, 1972-1977). Surveys of aquatic macrophytes, i.e. aquatic vegetation, were also performed by the transect method. The field survey covered only the late autumn aspect of vegetation (first half of November 2023). Below, a detailed list of recorded species is presented (Tables 1 and 2). Table 2, which refers to the course of the Danube near Radujevac, contains a list of aquatic macrophytes recorded in 2023. Table 3 shows the aquatic macrophytes downstream, at the Kusjak site. Additional research on flora and vegetation by seasonal dynamics would be desirable, in order to obtain more accurate and complete results.

RESULTS

The Danube River with its ecosystems represents an international ecological corridor. The forest vegetation of the Danube riparian zone in the area of Prahovo and Radujevac belongs to the connection of willow and poplar flood forests (Salicion albae Soó (1930) 1940), whose development is conditioned by constant humidification with flood or groundwater.

Floristic research in the area of the Prahovo settlement and the riparian zone of the Danube indicates the presence of indigenous and introduced plant species as a result of habitat conditions (proximity to the Danube River) on the one hand, but also the influence of the antropogenic factor on the other. In the settlement itself, ruderal flora is present: *Erigeron annuus* (L.) Pers., *Ambrosia artemisiifolia* L., *Artemisia vulgaris* L., *Capsella bursa pastoris* L., *Chenopodium album* L., *Polygonum aviculare* L., *Plantago lanceolata* L., *Urtica dioica* L., etc., while in the vicinity there are agricultural areas, which is understandable given the traditional character of this area.

Also, research has shown that habitats characterized by high groundwater levels, periodic flooding and a large impact of the anthropogenic factor are suitable places for inhabiting introduced species (allochthonous) plant species. The most frequent allochthonous species are: *Ailanthus altissima* (Mill.) Swingle, *Amaranthus* sp.,

Amorpha fruticosa L., *Echinochloa crus-galli* (L.) Beauv, *Echinocystis lobata* (Michx.) Torr. & A.Gray, *Elodea nuttallii* (Planch.) H.St.John, *Erigeron annuus* (L.) Pers., *Erigeron canadensis* (L.) Cronquist, *Helianthus tuberosus* L., *Paspalum distichum* L., *Symphyotrichum × salignum* (Willd.) G.L.Nesom , *Vallisneria spiralis* L.

In the research zone Radujevac, Prahovo and Kusjak, among the recorded species (Tables 1, 2 and 3) living in the aquatic environment, *Salvinia natans* (L.) All. and *Trapa natans* L. are on the European Red List of vascular plants, as well as on the list of the Bern Convention. Also, according to the Rulebook on the designation and protection of strictly protected and protected wild species of plants, animals and fungi in the territory of the Republic of Serbia, *Trapa natans* L. is on the list of protected plant species.

In addition to the listed species (*Salvinia natans* (L.) All. and *Trapa natans* L.) on the European Red List of vascular plants in the research zone Prahovo are also *Berula erecta* (Huds.) Coville, *Lactuca serriola* L., *Lemna minor* L., *Lythrum salicaria* L., *Medicago arabica* (L.) Huds., *Mentha aquatica* L., *Mentha* pulegium L., *Persicaria lapathifolia* (L.) Delarbre, *Phragmites australis* (Cav.) Trin. ex Steud, *Ranunculus repens* L., *Ranunculus sceleratus* L., *Urtica dioica* L. and *Veronica beccabunga. while Ceratophyllum demersum* L., *Myriophyllum spicatum* L. and *Vallisneria spiralis* L., were recorded in the research zones Radujevac and Kusjak.

Among the recorded species, there are no endemic and strictly protected species at the research sites, as well as species covered by the Cites Convention. Habitats Directive and Decree on putting under control the use and trade of wild flora and fauna.

Table 1 List of plant species in the research zone – PRAHOVO (November 2023 – display of abbreviations is located in the text below the tables)

PLANT SPECIES	Protected plant species			
	According to national legislation	**Bern.**	**IUCN**	**IUCN EU27**
In the water				
Lemna minor L.			LC	LC
Elodea nuttallii (Planch.) H.St.John				
Riparian and littoral zone				
Alnus glutinosa (L.) Gaertn.				
Amorpha fruticosa L.				
Berula erecta (Huds.) Coville			LC	LC
Echinocystis lobata (Michx.) Torr. & A.Gray				
Inula britannica L.				
Iris sp.				
Juncus compressus Jacq.				
Lythrum salicaria L.			LC	LC
Medicago arabica (L.) Huds.			LC	LC
Mentha aquatica L.			LC	LC
Mentha pulegium L.			LC	LC
Nasturtium officinale W.T.Aiton AC				

PLANT SPECIES	Protected plant species			
	According to national legislation	Bern.	IUCN	IUCN EU27
Paspalum distichum L.				
Persicaria lapathifolia (L.) Delarbre			LC	LC
Phragmites australis (Cav.) Trin. ex Steud.			LC	LC
Potentilla reptans L.				
Ranunculus repens L.			LC	LC
Ranunculus sceleratus L.			LC	LC
Rorippa sylvestris (L.) Besser,				
Rumex crispus L.				
Rumex hydrolapathum Huds.				
Rumex obtusifolius L.				
Salix alba L.				
Stellaria media (L.) Will.				
Veronica beccabunga L.			LC	LC
Outside the riparian zone				
Amaranthus sp.				
Ambrosia artemisiifolia L.				
Argentina anserina (L.) Rydb.				
Artemisia annua L.				
Artemisia vulgaris L.				
Ballota nigra L.				
Capsella bursa-pastoris (L.) Medic				
Chenopodium album L.				
Convolvulus arvensis L.				
Echinochloa crus-galli (L.) Beauv				
Erigeron annuus (L.) Perce!				
Lactuca serriola L.			LC	LC
Plantago lanceolata L.				
Polygonum aviculare L.				
Solanum nigrum L.				
Sonchus asper (L.) Hill.				
Sonchus oleraceus L.				
Symphyotrichum × salignum (Willd.) G.L.Nesom				
Urtica dioica L.			LC	LC

Table 2. List of plant species in the research zone – RADUJEVAC (26.09.2023 – display of abbreviations is located in the text below the tables)

PLANT SPECIES	Protected plant species			
	According to national legislation	Bern	IUCN	IUCN EU27
In the water				
Trapa natans L.	*	I	NT	NT

Salvinia natans (L.) ALL	I	LC	LC
Cladophora sp.			
Myriophyllum spicatum L.		LC	LC
Ceratophyllum demersum L.		LC	LC
Vallisneria spiralis L.		LC	LC
Danube Riparian Zone			
Salix alba L.			
Amorpha fruticosa L.			
Echinocystis lobata (Michx.) Torr. & A. Gray			
Pers., *Erigeron canadensis* (L.) Cronquist			
Glycyrrhiza echinata L.			
Potentilla reptans L.			
Paspalum distichum L.			
Salix alba L.			
Symphyotrichum × salignum (Willd.) G.L.Nesom			
By road through the village			
Ailanthus altissima (Mill.) Swingle			
Helianthus tuberosus L.			

PLANT SPECIES

Solanum nigrum L.
Capsella bursa-pastoris (L.) Medik.
Chenopodium album L.
Convolvulus arvensis L.
Artemisia vulgaris L.
Arable land

Table 3 List of plant species in the research zone – KUSJAK (26/09/2023 – review of abbreviations is located in the text below the tables)

PLANT SPECIES	Protected plant species			
	According to national legislation	Bern	IUCN	IUCN EU27
In the water				
Ceratophyllum demersum L.			LC	LC
Cladophora sp.				
Elodea nuttallii (Planch.) H.St.John				
Myriophyllum spicatum L.			LC	LC
Salvinia natans (L.) ALL		I	LC	LC
Trapa natans L.	*	I	NT	NT
Vallisneria spiralis L.			LC	LC

Legend of Tables 1, 2 and 3: Protection under national legislation – Rulebook on the declaration and protection of strictly protected and protected wild species of plants, animals and fungi of the Republic of Serbia (5/2010-46, 47/2011-134, 32/2016- 59, 98/2016-97); Bern – protection under the Bern Convention - Convention on the Conservation of European Wild Flora and Fauna and Natural Habitats, Bern, 1979; IUCN – categorization of endangerment according to the International Union for Conservation of Nature (IUCN), Red List of Threatened Species: VU – vulnerable, NT – almost endangered, LC - last concern, i.e. in a lower degree of danger.

CONCLUSION

The vegetation of the study area is heterogeneous. The following stand out: typical water, riparian, ruderal and vegetation of arable surfaces.

The narrower zone where the construction is planned is located within the industrial zone, where plant communities of importance to conservation biology are not recorded.

In the case of the application of the best available technologies in the operation procedures of the plant in question, planned by the investor, no significant residual impact of the operational phase on the vegetation is expected, both locally and in the wider context.

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FAUNISTIC CHARACTERISTICS OF THE AREA

Biodiversity is biological diversity at the level of species, at the level of genes and landscapes. The diversity of the living world in a given area is often a reflection of the diversity of the soil on which their habitats are located. The presence of species characteristic of different types of landscapes in a relatively small geographical area indicates the richness of environmental conditions – climate, vegetation and substrate.

Serbia's biodiversity can be characterized as extremely valuable, compared to the biodiversity of surrounding countries and European countries. Serbia makes up less than 2% of the European mainland, and as many as 70% of the birds of Europe are registered in Serbia. Serbia's biodiversity is threatened by the same factors that threaten global biodiversity, namely habitat destruction, habitat changes, invasive species, over-exploitation of natural resources, but also climate change, which stands out as one of the significant factors, as well as environmental pollution.

Human activities at the global level, together with habitat degradation and fragmentation, have enabled the easy and rapid spread of allochthonous and invasive species. Allochthonous species are also called exotic or "foreign" species and represent species introduced into an environment where they were not previously found, while invasive species represent those species that, due to environmental conditions and the lack of natural enemies, begin to reproduce uncontrollably and occupy available ecological niches, with a negative impact on native, indigenous species.

ENTOMOFAUNA

BUTTERFLIES - LEPIDOPTERA

Prof. Predrag Jakšić, PhD

INTRODUCTION

The analysis of Lepidoptera fauna (Linnaeus, 1758) was made on the basis of data available from previous research.

The analysis covered the geographical area of the Danube right bank on the stretch from Kusjak, through Prahovo (the old name of Praovo), which is the central zone of analysis, downstream to Radujevac. In addition, the area south of the Danube, to Negotin, was processed as a wider zone of interest. This area is represented by a depression with an altitude of 46 – 53 m above sea level. This plain represents an abandoned meander of the Danube that once flowed next to Negotin (Ivanović, 1853; Lutovac, 1959). The analysis also covers the corresponding left bank of the Danube on the Romanian side.

Natural potential vegetation is represented by the absolute dominance of the Moesian forest of gray pedunculate (Quercetum pedunculiflorae moesiacum).

In the shallows of the Danube, as well as in the Balta Gruja pond on the Romanian side of the Danube, plant species of the genus *Sparganium* L. are widespread, which are caterpillar-feeding plants of the aquatic species *Nymphula nitidula* (Hufnagel, 1767). Unfortunately, there is no published data on the butterfly fauna of these specific habitats. Fellow lepidopterologists from Romania have published data on butterflies from the area that was later submerged, by building an artificial reservoir for the needs of HPP "Đerdap II", and these data now have no use value. Anthropogenic pressure has almost completely eradicated the peduncle and the area is dominated by arable land (Figure 3). This influence, accompanied by the chemization of agriculture, led to a significant impoverishment of the entomofauna.

Figure 3. Degraded areas of pedunculate forests (horizontal lines) and larger areas under vineyards (dotted areas), as depicted by Lutovac (1959).

HISTORY OF BUTTERFLY FAUNA EXPLORATION

As pointed out in the previous chapter, this is a very interesting area in Faunistic terms. Despite its undeniable potential, it remained almost completely unexplored. We found as the first published data the work of Bachmetjew (1909) who did a small study of the morphometric analysis of the harmful species of hawthorn butterfly - *Aporia crataegi ,* on the material collected for him in the vicinity of Negotin by professor from Negotin J. Stanojević. Zečević (1980) points out in the subtitle of his paper: ... "with special reference to the sites in Đerdap of D. Milanovac to Radujevac." However, a careful review of the work shows that there are no findings related to the Kusjak – Prahovo – Radujevac area (all findings relate exclusively to the Djerdap Gorge).

Rothschild (1912) also provided data for several species in the Djerdap Gorge (Kazan) in a study on butterflies of the Deliblato sandstone. Popescu-Gorj et al (1971) and later Popescu-Gorj et al (1975) summarized the results of numerous authors related to the fauna of Lepidoptera of the future reservoir "Porţile de Fier" for the needs of the hydroelectric power plant "Djerdap II". In the meantime, the lake was formed and HPP "Đerdap II" was built. These data refer to the area west of Kusjak and were of little use to us. However, the construction of HPP "Djerdap II" led to the drainage of Negotin mud, and this extremely important ecological unit remained almost completely unexplored. In the last few decades, only a few papers have been published that contain data for 1–2 species, exclusively for Negotin. There is also no published data relating to the Romanian side (Cerneti, Izvoarele, Balta Verde, Gruia).

METHODOLOGY

An overview of the identified species is given on the basis of existing literature data.

RESULTS

The following is a register of species recorded at sites of interest to this Project (Systematic order, nomenclature and species identification number according to Karsholt and Razowski, 1996) - Only very rare species, harmful species and species of protection interest are listed.

Order of Lepidoptera (Linnaeus, 1758)	
Fam. Sesiidae	
04136 *Chamaesphecia palustris* Kautz, 1927	König (1970): Eiserner Tor (= Djerdap Gorge, Kazan)
Fam. Cossidae	
04178 *Phragmataecia castaneae* (Hübner, 1790)	Zečević (1975): Negotin.
Fam. Crambidae	
06649 *Ostrinia nubilalis* (Hübner, 1796)	Zečevic (2002): the entire area.
Fam. Lasiocampidae	
Macrothylacia rubi (Linnaeus, 1758)	Zečevic (2002): the entire area.
Fam. Endromidae	
06784 *Endromis versicolora* (Linnaeus, 1758)	König (1970): Eiserner Tor (= Djerdap Gorge, Kazan)
06966 *Leptidea sinapis* (Linnaeus, 1758)	Jakšić (2019): Negotin.
06993 *Aporia crataegi* (Linnaeus, 1758)	Bachmetjew (1909): Negotin.
06997 *Pieris mannii* (Mayer, 1851)	König (1970): Eiserner Tor (= Djerdap Gorge, Kazan); Zečević (1967): Donji Milanovac – Kladovo.

Fam. Nymphalidae, Libytheinae	
07199 *Libythea celtis* (Laicharting, 1782)	Zečević (1976): Donji Milanovac, Kladovo, Negotin
Fam. Nymphalidae, Nymphalinae	
07431 *Hipparchia syriaca* (Staudinger, 1871)	Balaci (1998): Cerneti.
Fam. Geometridae	
07522 *Abraxas grossulariata* (Linnaeus, 1758)	Tomić (2002): Prahovo.
07540 *Macaria alternata* ([Denis & Schiffermüller], 1775	Tomić (2002): Negotin.
07637 *Ennomos quercaria* (Hübner, [1813])	Stojanović et al (2018): Negotin, Mihajlovac, Đalu Mare.
08299 *Entephria flavicinctata* (Hübner, [1813])	Zečević (1990): Đerdapska gorge, Pena, Ploče.
08551 *Eupithecia millefoliata* Rössler, 1866	Stojanović et al (2018): Negotin, Mihajlovac, Đalu Mare.
Fam. Notodontidae	
08689 *Thaumetopoea processionea* (Linnaeus, 1758)	Zečevic (2002): the entire area.
Fam. Noctuidae	
08798 *Cryphia fraudatricula* (Hübner, [1803])	Vasić (2002): Negotin.
08816 *Bryophila domestica* (Hufnagel, 1766)	Rakosy (1997): Turnu Severin.
08888 *Catocala nymphagoga* (Esper, [1787])	Rakosy (1997): Turnu Severin.
08897 *Minucia lunaris* ([Denis & Schiffermüller], 1775)	Vasić (2002): Negotin.
08933 *Lygephila viciae* (Hübner, [1822])	Vasić (2002): Negotin.
08973 *Euclidia triquetra* ([Denis & Schiffermüller], 1775), [Synonym *G.triquetra (*[Denis & Schiffermüller], 1775)]	Rakosy (1997): Turnu Severin.
09023 *Eutelia adulatrix* (Hübner, [1813])	Rakosy (1997): Turnu Severin.
09056 *Autographa gamma* (Linnaeus, 1758)	Zečević (2002): the entire area.
09081 *Trichoplusia ni* (Hübner, [1803])	Tomić (2002): Radujevac.
09140 *Eublemma sharpness* (Hübner, [1808])	Rakosy (1997): Turnu Severin.
09143 *Eublemma panonica* (Freyer, [1840])	Rakosy (1997): Turnu Severin.
09233 *Cucullia verbasci* (Linnaeus, 1758)	Zečević (2002): the entire area.
09370 *Helicoverpa armigera* (Hübner, [1808])	Zečević (2002): the entire area.
09505 *Phlogophora meticulosa* (Linnaeus, 1758)	Zečević (2002): the entire area.
09638 *Dasypolia templi* (Thunberg, 1792)	Zečević (1983): Đerdap gorge, Kazan.
09670 *Xylena vetusta* (Hübner, [1813])	Zečević (1993): Đerdap, Ploče
09734 *Crypsedra gemmea* (Treitschke, 1825)	Vasić (1954): Negotin.
09809 *Luperina rubella* (Duponchel, [1837])	Zečević (1976): Đerdap.
09867 *Globia sparganii* (Esper, 1790)	Zečević (1976): Đerdap.
10035 *Mythimna unipuncta* (Haworth, 1809)	Zečević (2002): the entire area.
10037 *Orthosia incerta* (Hufnagel, 1766)	Zečević (2002): the entire area.
10096 *Noctua pronuba* (Linnaeus, 1758)	Zečević (2002): the entire area.
10099 *Noctua comes* Hübner, [1813]	Rakosy (1997): Turnu Severin.
10178 *Eugnorisma depuncta* (Linnaeus, 1761)	König (1970): Eiserner Tor (= Djerdap Gorge, Kazan)
10199 *Xestia c-nigrum* (Linnaeus, 1758)	Zečević (2002): the entire area.
10238 *Peridroma saucia* (Hübner, [1808])	Zečević (2002): the entire area.
10279 *Euxoa tritici* (Linnaeus, 1761)	Zečević (1993), Zečević (2002): Negotin.

10351 *Agrotis segetum* ([Denis & Schiffermüller], 1775	Zečević (2002): the entire area.
10376 *Lymantria dispar* (Linnaeus, 1758)	Langhofer (1926): Negotinsko blato; Zečević (2002): the entire area.
10410 *Laelia coenosa* (Hübner, [1808])	König (1970): Eiserner Tor (= Djerdap Gorge, Kazan)
10422 *Meganola togatulalis* (Hübner, 1796)	Popescu-Gorj (1985): Ostrovu Mare.
10423 *Meganola strigula* ([Denis & Schiffermüller], 1775	Popescu-Gorj (1985): Ostrovu Mare.
10431 *Nola aerugula* (Hübner, 1793)	Popescu-Gorj (1985): Ostrovu Mare.
10570 *Hyphantria cunea* (Drury, 1773)	Zečević (2002): the entire area.

SPECIES AND AREAS OF INTEREST FOR PROTECTION

As we pointed out, the analyzed area is under-explored when it comes to representatives of the Lepidoptera order. But we can assume the presence of several NATURA 2000 species of butterflies based on the presence of habitats, the presence of feeding plants and the species of ants with which they interact with myrmecophilia. The results of this analysis are shown in Table 4. Field research is needed to prove this assessment.

Table 4 Assessment of the possibility of the existence of NATURA 2000 species of Lepidoptera in the area of Kusjak-Prahovo-Radujevac based on the representation of habitats, the presence of plants feeding caterpillars and ants the species entering with into myrmecophilia relations. (According to: Czekes et al, 2012; Josifović, 1970-77; Pančić, 1856; Petrov, 2006).

NATURA 2000 Lepidoptera species	**Plant and ant species**
01579 *Glyphipterix loricatella* (Treitschke, 1833)	*Iris x germanica*, L., 1753
07036 *Lycaena dispar* ([Haworth], 1802)	*Rumex hydrolapathum, R. crispus, R. obtusifolius*
07112 *Phengaris arion* (Linnaeus, 1758)	*Thymus sp., Myrmica sabuleti, M. scabrinodis*
07113 *Phengaris teleius* (Bergsträsser, 1779)	*Sanguisorba officinalis, Myrmica sabuleti, M. rubra, M. scabrinodis*

The degradation of pedunculate forests as a natural potential vegetation also degraded the indigenous fauna of Lepidoptera. A significant indigenous complex of natural habitats is the so-called "Negotinsko blato" (Negotin mud), which was also destroyed by drainage of the terrain in the 1930s and which was definitely destroyed by the construction of HPP "Đerdap II". The opportunity was missed to scientifically process the indigenous flora, vegetation and fauna of the area. Modest faunal studies of butterfly fauna show the absolute dominance of species related to anthropogenic activities – agriculture and viticulture. These species are for the most part harmful, as shown in Table 5.

Table 5 Examples of species that Carter (1984) labeled as pests in agriculture, viticulture and forestry in Europe that are present in the analyzed area.

06649 *Ostrinia nubilalis* (Hübner, 1796)
06993 *Aporia crataegi* (Linnaeus, 1758)
08689 *Thaumetopoea processionea* (Linnaeus, 1758)
09056 *Autographa gamma* (Linnaeus, 1758)
09233 *Cucullia verbasci* (Linnaeus, 1758)
09370 *Helicoverpa armigera* (Hübner, [1808])
09505 *Phlogophora meticulosa* (Linnaeus, 1758)
10035 *Mythimna unipuncta* (Haworth, 1809)

10037 *Orthosia incerta* (Hufnagel, 1766)
10096 *Noctua pronuba* (Linnaeus, 1758)
10199 *Xestia c-nigrum* (Linnaeus, 1758)
10238 *Peridroma saucia* (Hübner, [1808])
10279 *Euxoa tritici* (Linnaeus, 1761)
10351 *Agrotis segetum* ([Denis & Schiffermüller],
10376 *Lymantria dispar* (Linnaeus, 1758)
10570 *Hyphantria cunea* (Drury, 1773)

By analyzing the identified species, we see that there are no species of interest for protection, both in domestic and in international lists.

When the issue is the protection of the area, the analyzed area from Kusjak to Radujevac, and in the south to Negotin, is not covered by the current documents – as Internationally Significant Plant Areas – IPA Areas (Important Plant Areas), Internationally Significant Bird Areas - IBA Areas *(Important Bird Areas)*, Selected Butterfly Societies – PBA Areas *(Prime Butterfly Areas),* EMERALD *(Emerald Network of Areas of Special Conservation Interest – AsCI)* area, nor is it affected by the Carpathian Convention (Carpathian Area).

On the other hand, on national lists, the area from Kladovo to Radujevac is one of the elements of ecological networks in Serbia (Official Gazette of RS, 102/2010).

CONCLUSION

The analyzed area between Kusjak, Prahovo, Radujevac and in the south to Negotin represents a depression that is shaped by the meander of the Danube. By eradicating the Mesian forest of gray pedunculate and draining the floodplain of the pond and wetlands, natural potential vegetation was permanently destroyed, and with it the accompanying fauna. The area is dominated by anthropogenic communities of arable land (pastures, fields, orchards, vineyards) and communities of gray pedunculate are reduced to minor "islands". Current vegetation, flora and fauna are of secondary origin and are of no interest for protection.

The planned works will not lead to additional environmental damage, including the fauna of butterflies.

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DRAGONFLIES AND DAMSELFLIES - ODONATA

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INTRODUCTION

The final part of the Danube flow through Serbia is almost completely unexplored in terms of knowledge of the fauna of dragonflies and damselflies (Odonata). The only publicly available data date from the end of the 19th or the beginning of the 20th century, and include information on the then presence of four species in the area of Negotinski rit (Adamović, 1949).

This study was conducted on the basis of previous research conducted in 2023. The aforementioned studies were carried out in the period when the activity of Odonata was reduced to a minimum movement of larvae living in water. Therefore, this report is based solely on the assessment of the potential composition of the fauna and the possible presence of species of special importance for nature protection.

RESULTS

Data on the presence of four species in the Negotisna Rit collected by the gymnasium professor Kosta Marić 100 or more years ago are the only information on the local Odonata fauna available to us (Table 6). The accuracy of the topographic data is not satisfactory, the time distance and the fact that this area was completely altered after the construction of HPP Đerdap, made the probability of survival of at least one of the known species (*Somatochlora flavomaculata* (Vander Linden, 1825)) to be minimized.

Table 6 List of species that have been recorded so far in the area of interest for the implementation of the study.

Type	Locality	Legator	Source
Lestes virens (Charpentier, 1825)	Negotinski rit	Kosta Marić	Adamović, 1949
Ischnura elegans (Vander Linden, 1820)	Negotinski rit	Kosta Marić	Adamović, 1949
Somatochlora flavomaculata (Vander Linden, 1825)	Negotinski rit	Kosta Maricć	Adamović, 1949
Orthetrum brunneum (Fonscolombe, 1837)	Negotinski rit	Kosta Marić	Adamović, 1949

The potential Odonata fauna of the Danube bank could include a relatively large number of species that inhabit freshwater habitats along the banks of large rivers in the region (ponds, puddles, canals...).

The variability of the water level of the Danube makes these habitats extremely variable in terms of the quality of living conditions of Odonata. Their larvae spend the entire period of development in water and in order to survive, they need to avoid completely drying out, destroying the substrate or vegetation they use to hide. Therefore, these types of insects whose adults are highly mobile, without specific information on the composition of the species community, habitat integrity and types of microhabitats, which are collected systematically and continuously, do not represent satisfactory indicators of the state of the environment. In contrast, species whose larvae live in the waters of large rivers can be very useful in assessing the status and integrity of ecosystems. Such species are often included in lists of species of international importance.

The Danube River in its middle and lower course is a typical habitat for the *Stylurus flavipes* species (Charpentier, 1825) (Boudot & Dyatlova, 2015) and it was recorded at the Radujevac site (847 km of the Danube, 2013), as well as Grocka, the confluence of the Velika Morava, Golubac, Kalafat, Kozloduy. Oluulul. Larvae of this species hide in substrates of a finer structure, with a relatively large share of organic matter, in slower parts of large river flows (Dijkstra & Lewington, 2006). Therefore, it is very likely that the presence of this species can at least be expected locally along the banks of the Danube in the Kusjak, Prahovo and Radujevac areas. Adults fly in the summer. Since they are very active flyers, it is easiest to observe them at the moment of protrusion from the larval sheath when they are stationary for a while. Mass emergence from the sheaths takes place on the river bank, at the end of June and the beginning of July, so this period is ideal for monitoring. *S. flavipes* is included in Annex IV of the EU Habitats Directive and has the status of a protected species in the Republic of Serbia (Rulebook on the designation and protection of strictly protected and protected wild species of plants, animals and fungi (Official Gazette of RS, 5/2010, 47/2011, 32/2016, 98/2016)).

CONCLUSION

Considering the location and scope of the construction of the plant in question, no significant negative impact on the Odonata fauna is expected . Construction activities will be carried out in an industrial zone where no habitats of importance to this group of organisms are detected.

In the case of the application of the best available technologies in the operation procedures of the plant in question, which the investor planned, no significant residual impact of the operational phase on the Odonata fauna is expected.

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LONGHORN BEETLES - COLEOPTERA: CERAMBYCIDAE

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INTRODUCTION

The Cerambycidae (longhorn beetles) family is the most diverse group of beetles (Coleoptera) with a cosmopolitan distribution. It is a very numerous family, with over 35,000 described species, more than half of which originate from the eastern hemisphere. Longhorn beetles belong to the category of saproxylic species that are at least part of their lives dependent on a living, dead or decaying tree, whether they feed on it, use it to lay eggs or live in it. They are also associated with living trees and complete vegetation, they are present in almost all ecosystems and represented in all trophic categories, they represent a key link in the circulation of matter in ecosystems, some species are successfully used in the biological fight against various pests, some have the ability to perform a pollination function, they are characterized by close ecological connection with other organisms in different microhabitats. Due to all of the above, these species are very good indicators of the state of the ecosystem, as well as its vulnerability, and therefore play an important role in assessing the state of biodiversity of an area (Maeto et al., 2002; Nieto & Alexander, 2010).

The tradition of collecting longhorn beetles in Serbia is very long and its beginnings date back to the middle of the 19th century (Ilić and Ćurčić, 2015). However, this group is still insufficiently explored in many parts of our country, which is also the case with eastern Serbia, and therefore our target site – Prahovo and its surroundings. In this part of Serbia, the fauna of longhorn beetles was more systematically studied only within the Djerdap National Park (Ilic et al., 2013).

METHODOLOGY

The study is based on literature data for the sites of Negotin and its surroundings (Adamović, 1965; Košanin, 1904; Ilić and Ćurčić, 2015; Pavićević et al., 2015; PIL and Stanković, 2006).

RESULTS

The area of research around Prahovo, eastern Serbia, is insufficiently explored in terms of longhorn beetle fauna and there is almost no literature data. A list of species recorded by various authors in the vicinity of Prahovo, at the site that is seen through the literature as Negotin with the environment, is given in Table 7. Some of the species in this Table are species of national and international importance listed in: IUCN Red List of Threatened Species (Global and Regional – European), Directive on the Protection of Natural Habitats and Wild Fauna and Flora - Annexes II and IV (Habitats Directive), Convention on the Conservation of European Wild Flora and Fauna and Natural Habitats (Bern Convention) and Rulebook on the Proclamation and Protection of Strictly Protected and Protected Wild Species of Plants, Animals and Fungi of the Republic of Serbia.

Table 7. List of longhorn beetles recorded in the vicinity of Prahovo – literature data

Type	Authors					Degree of species protection
	1	2	3	4	5	
Cortodera holosericea	-	+	-	-	+	Protected species*
C. villosa	-	+	-	-	+	Protected species*
Strangalia bifasciata	-	+	-	-	-	
Plagionotus arcuatus	-	+	-	+	+	LC
Isotomus speciosus	-	+	-	+	+	LC
Parmena pubescens hirsuta	-	+	-	-	-	
P. pubescens	-	-	-	-	+	
P. pubescens pilosa	-	-	-	+	-	
Dorcadion pedestre	-	+	-	-	-	
Neodorcadium bilineatum	-	+	+	+	+	
Exocentrus adspersus	-	+	+	+	+	
Clytus arcuatus	+	-	-	-	-	
Cerambyx cerdo cerdo	-	-	+	+	+	Strictly protected species*, NT – Europe; VU – World**; Annex II and Annex IV of the Directive on habitats***, Annex I and Annex II of the Bern Convention****
Stenurella bifasciata	-	-	-	+	+	LC
Agapanthia violacea	-	-	-	-	+	

[1] Košanin, 1904; [2] Adamović, 1965; [3] Pil and Stankovic, 2006; [4] Ilić and Ćurčić, 2015; [5] Pavićević et al., 2015

*Rulebook on the designation and protection of strictly protected and protected wild species of plants, animals and fungi of the Republic of Serbia (5/2010-46, 47/2011-134, 32/2016-59, 98/2016-97); ** IUCN Red List of Endangered Species: VU – Vulnerable, NT – Almost Endangered, LC - Last Concern, i.e. in a lower degree of danger; ** * Habitats Directive - Habitat Directive 92/43/EEC; **** Bern Convention - Convention on the Conservation of European Wild Flora and Fauna and Natural Habitats, Bern, 1979.

CONCLUSION

As stated in the BUTTERFLIES section (LEPIDOPTERA Linnaeus, 1758), the space between Kusjak, Prahovo, Radujevac and in the south to Negotin represents a depression that is shaped by the meander of the Danube. This depression is dominated by arable land, while sometimes lush forests of gray pedunculate, as well as other natural vegetation, are almost completely degraded. In this way, the primary habitats of many insect species have been destroyed, including the longhorn beetle species listed in the text.

Additional impacts on these insects as a result of the construction and operation of the facilities in question are not expected.

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AQUATIC ECOSYSTEMS OF THE AREA

PHYTOBENTHOS – SILICATE ALGAE

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INTRODUCTION

Silicate algae play a key role in the functioning of aquatic ecosystems, as they are primary producers and participate in the circulation of nutrients. In addition to their ecological importance, they are widely used as indicators of water quality through changes in composition and abundance. In order to develop the Study, the biodiversity of silicate algae based on benthic samples from the lower Danube in Serbia is presented.

The data are based on the results of several years of research (period 2018-2023) within the Department of Hydroecology and Water Protection, Institute for Biological Research "Siniša Stanković" National Iinstitute of the Republic of Serbia, University of Belgrade.

METHODOLOGY

Silicate algae were sampled according to SRPS EN 13946 (2015). At each site, five stones from the stream were collected and the sample was taken by scraping the stone and rinsing fouling from an area of 10 cm^2. The material was transferred to the packaging and fixed with formaldehyde to a final concentration of 4%. In cases where no stone substrate was available, material was collected from other submerged surfaces (wood or artificial substrates). In the laboratory, the samples were cleaned of organic matter by the hot acid method and permanent preparations of silicate algae were prepared (Taylor et al. 2007).

Identification was done using the Carl Zeiss Axio Lab.A1 microscope at 1000 x magnification and algological taxonomic literature (Krammer & Lange-Bertalot 1986, 1988, 2004, 2011; Lange-Bertalot 1993, 2001; Levkov et al. 2013, 2016; Krammer 1997 a, 1997 b, 2000, 2002, 2003; Lange-Bertalot et al. 2017). The percentage share of each taxon in the community was determined on the basis of 400 silicate algae valves counted (SRPS EN 14407 2015).

RESULTS

Data on the diversity of silicate algae in the Danube sector for the purposes of the Study are based on the analysis of benthic samples collected from 2018 to 2023 at the Kusjak and Radujevac sites and in 2023 at the Prahovo site.

The results of the identification of silicate algae in the examined part of the Danube course indicate the presence of a total of 136 taxa within 48 genera. The most common samples were *Amphora pediculus, Bacillaria paxillifera, Cocconeis euglypta, Craticula subminuscula*, *Navicula antonii*, *N. capitatoradiata*, *N. cryptotenella*, *N. recens*,

N. rostellata, *N. tripunctata*, *Nitzschia amphibia*, *N. inconspicua*, *N. palea*, *Rhoicosphaenia abbreviata, Tabularia fasciculata* and *Ulnaria ulna*. Among the most abundant silicate algae in the samples were species that prefer habitats with increased nutrient concentrations, as well as increased saprobities (Lecointe et al. 1993): *A. pediculus*, *B. paxillifera, Melosira varians, Navicula cryptotenella, N. recens, N. rostellata, Nitzschia dissipata, N. inconspicua* and *Sellaphora nigri*. Also, *B.paxillifera , N. recens and N. inconspicua* are often found in large numbers in waters with increased electrolyte content. Analysis of silicate algae samples revealed the presence of allochthonous species *of Diadesmis confervacea* at all investigated sites *and Capartogramma crucicula* (Vasiljević et al. 2023) at the Radujevac site.

Taxa of silicate algae in the Danube at the sites covered by the Study

Taxon/ Locality	**Kusjak**	**Prahovo**	**Radujevac**
Achnanthidium eutrophilum (Lange-Bert.) Lange-Bert.	+	/	/
Achnanthidium exiguum (Grunow) Czarn.	+	/	+
Achnanthidium minutissimum (Kütz.) Czarn.	+	/	/
Achnanthidium pyrenaicum (Hust.) H.Kobayasi	+	/	+
Actinocyclus normanii (W.Greg. ex Greville) Hust.	+	/	+
Amphora copulata (Kütz.) Schoeman & R.E.M.Archibald	+	/	+
Amphora inariensis Krammer	+	/	+
Amphora ovalis (Kütz.) Kützing	+	/	+
Amphora pediculus (Kütz.) Grunow	+	+	+
Aulacoseira granulata (Ehrenb.) Simonsen	/	/	+
Bacillaria paxillifera (O.F.Müll.) T.Marsson	+	+	+
Caloneis lancettula (Schulz) Lange-Bert. & Witkowski	/	/	+
Caloneis permagna (Bailey) Cleve	+	/	/
Capartogramma crucicula (Grunow) R.Ross	/	/	+
Cocconeis pediculus Ehrenb.	+	+	+
Cocconeis placenta Ehrenb.	/	/	+
Cocconeis euglypta Ehrenb.	+	+	+
Craticula accomoda (Hust.) D.G.Mann	+	/	/
Craticula subminuscula (Manguin) C.E.Wetzel & L.Ector	+	/	+
Ctenophora pulchella (Ralfs ex Kütz.) Williams et Round	+	/	+
Cyclotella meneghiniana Kütz.	+	/	+
Cymatopleura solea (Bréb.) W.Sm.	+	/	+
Cymatopleura solea var. *apiculata* (W.Sm.) Ralfs	+	/	/
Cymbella compacta Østrup	+	/	+
Cymbella lanceolata (C.Agardh) C.Agardh	+	/	+
Cymbella neolanceolata W. Silva	+	/	+
Cymbella tumida (Bréb.) Van Heurck	+	/	+
Diadesmis confervacea Kütz.	+	+	+

Taxon/ Locality	Kusjak	Prahovo	Radujevac
Diatoma moniliformis Kütz.	/	/	+
Diatoma vulgaris Bory	+	+	+
Diatoma vulgaris Bory var. *linearis* Grunow and Van Heurck	+	/	+
Encyonema caespitosum Kütz.	+	/	/
Encyonema leibleinii (C.Agardh) W.J.Silva, R.Jahn, T.A.Veiga Ludwig & M.Menezes	+	/	+
Encyonema prostratum (Berkeley) Kütz.	+	/	+
Eolimna minima (Grunow) Lange-Bert.	/	/	+
Fallacia pygmaea (Kütz.) Stickle & D.G.Mann	+	/	/
Fragilaria acus (Kütz.) Lange-Bert.	/	/	+
Fragilaria capucina Desmazieres	/	/	+
Fragilaria vaucheriae (Kütz.) Petersen.	+	/	/
Frustulia vulgaris (Thwaites) De Toni	/	/	+
Geissleria decussis (Østrup) Lange-Bert. & Metzeltine	+	/	/
Geissleria sp. Lange-Bert. & Metzeltine	+	/	/
Gomphonema augur Ehrenb.	+	/	+
Gomphonema italicum Kütz.	+	/	+
Gomphonema lagenula Kütz.	+	/	/
Gomphonema olivaceum (Horn) Bréb.	+	/	+
Gomphonema parvulum (Kütz.) Kütz.	+	+	+
Gomphonema pumilum var. *rigidum* E.Reichardt & Lange-Bert.	/	/	+
Gomphosphenia lingulatiformis (Lange-Bert. & E.Reichardt) Lange-Bert.	+	/	/
Gyrosigma attenuatum (Kütz.) Rabenhorst	+	/	/
Gyrosigma kuetzingii (Grunow) Cleve	+	/	+
Gyrosigma sciotoense (Sullivant) Cleve	+	/	/
Halamphora montana (Krasske) Levkov	/	+	+
Halamphora veneta (Kütz.) Levkov	+	+	+
Hantzschia amphioxys (Ehr.) Grunow	/	/	+
Hippodonta capitata (Ehrenb.) Lange-Bert., Metzeltin & Witkowski	+	/	+
Iconella robusta (Ehrenb.) Ruck & Nakov	/	/	+
Karayevia clevei (Grunow) Bukhtiyarova	+	/	/
Karayevia ploenensis (Hust.) Bukhtiyarova	+	/	/
Lemnicola exigua (Grunow) Kulikovskiy, Witkowski & Plinski	+	/	+
Lemnicola hungarica (Grunow) Round & Basson	+	/	+
Luticola goeppertiana (Bleisch) D.G.Mann	+	/	/
Luticola nivalis (Ehrenb.) D.G. Mann	+	/	/
Mayamaea permitis (Hust.) K.Bruder & Medlin	+	/	+

Taxon/ Locality	Kusjak	Prahovo	Radujevac
Melosira varians C.Agardh	+	/	+
Navicula antonii Lange-Bert. & Rumrich	+	/	+
Navicula capitatoradiata Germain	+	/	+
Navicula caterva Hohn & Hellermann	+	/	+
Navicula cryptocephala Kütz.	+	/	+
Navicula cryptotenella Lange-Bert.	+	+	+
Navicula erifuga Lange-Bert.	+	+	+
Navicula germainii Wallace	+	/	+
Navicula gregaria Donkin	+	/	+
Navicula lanceolata (Ag.) Ehrenb.	+	/	+
Navicula menisculus Schumann	/	/	+
Navicula novaesiberica Lange-Bert.	+	/	/
Navicula recens (Lange-Bert.) Lange-Bert.	+	+	+
Navicula reichardtiana Lange-Bert.	+	+	+
Navicula reinhardtii (Grunow) Grunow	+	/	/
Navicula rostellata Kütz.	+	+	+
Navicula salinarum Grunow	+	/	/
Navicula simulata Manguin	+	/	/
Navicula tripunctata (O.F. Mueller) Bory	+	+	+
Navicula trivialis Lange-Bert.	/	+	+
Navicula upsaliensis (Grunow) Peragallo	/	/	+
Navicula vandamii Schoeman & R.E.M.Archibald	+	/	+
Navicula veneta Kütz.	+	+	+
Navicula wendlingii Lange-Bert. Hofmann & Van de Vijver	/	/	+
Nitzschia palea (Kütz.) W.Sm.	/	/	+
Nitzschia amphibia Grunow	+	/	+
Nitzschia bryophila Hust.	/	+	/
Nitzschia clausii Hantzsch	+	/	/
Nitzschia dissipata (Kütz.) Grunow	+	/	+
Nitzschia filiformis (W.M.Sm.) Van Heurck	+	/	+
Nitzschia filiformis var. *conferta* (Richter) Lange-Bert.	+	/	/
Nitzschia fonticola (Grunow) Grunow	+	/	+
Nitzschia frustulum (Kütz.) Grunow	+	/	/
Nitzschia heufleriana Grunow	/	/	+
Nitzschia inconspicua Grunow	+	+	+
Nitzschia intermedia Hantzsch	+	/	+

Taxon/ Locality	Kusjak	Prahovo	Radujevac
Nitzschia microcephala Grunow	+	/	/
Nitzschia palea (Kütz.) W.Sm.	+	/	+
Nitzschia recta Hantzsch	+	+	+
Nitzschia soratensis Morales & Vis	+	/	+
Placoneis anglica (Ralfs) E.J.Cox	/	/	+
Placoneis pseudanglica (Ralfs) E.J.Cox	/	/	+
Planothidium delicatulum (Kütz.) Round & Bukhtiyarova	+	/	/
Planothidium dubium (Grunow) Round & Bukhtiyarova	+	/	+
Planothidium frequentissimum (Lange-Bert.) Lange-Bert.	+	/	+
Planothidium incuriatum C.E.Wetzel, Van de Vijver et Ector	/	/	+
Planothidium lanceolatum (Bréb. ex Kütz.) Lange-Bert.	/	+	+
Planothidium rostratoholarcticum Lange-Bert. et Bak	+	/	+
Planothidium rostratum (Østrup) Lange-Bert.	+	/	/
Pleurosira laevis (Ehrenb.) Compère	+	/	+
Pseudostaurosira brevistriata (Grun.) Williams & Round	+	/	/
Pseudostaurosira parasitica (W.Sm.) E.Morales	+	/	+
Reimeria sinuata (W.Greg.) Kociolek & Stoermer	/	+	/
Reimeria uniseriata Sala, Guerrero & Ferrario	+	+	+
Rhoicosphenia abbreviata (C.Agardh) Lange-Bert.	+	+	+
Rhopalodia gibba (EHR.) O.F.Müll.	/	/	+
Sellaphora nigri (De Not.) C.E.Wetzel et Ector	+	+	+
Sellaphora pupula (Kütz.) Mereschkovsky	+	+	+
Sellaphora saugerresii (Desm.) C.E.Wetzel & D.G. Mann	+	/	/
Sellaphora seminulum (Grunow) Mann	+	/	+
Sellaphora sp. C. Mereschkowsky	/	/	+
Stauroneis smithii Grunow	/	/	+
Staurosira binodis (Ehrenb.) Lange-Bert.	+	/	+
Staurosira construens Ehrenb.	+	/	/
Surirella angusta Kütz.	+	/	+
Surirella brebissonii var. *kuetzingii* Krammer & Lange-Bert.	/	/	+
Surirella minuta Bréb. ex Kütz.	/	/	+
Surirella robusta Ehrenb.	+	/	+
Tabularia fasciculata (C.Agardh) Williams & Round	+	/	+
Tryblionella levidensis W.Sm.	/	/	+
Ulnaria acus (Kütz.) Aboal	+	/	+
Ulnaria ulna (Nitzsch) Compère	+	+	+

(+ taxon present; / taxon not recorded).

CONCLUSION

The results of the identification of silicate algae in the examined part of the Danube course indicate the presence of a total of 136 taxa within 48 genera.

No significant impacts of the construction and operation of the plant on the benthic algae are expected.

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MACROINVERTEBRATES

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INTRODUCTION

The hydrobiological Study within the project is based on data from previous surveys of the area. The research aims to determine the state of the aquatic ecosystem and determine biodiversity in the area under the influence of dams on the Danube (HPP "Đerdap 1" and HPP "Đerdap 2") at a location in the Prahovo zone. The study includes the research of the Danube in the sector from Kusjak (863 km) to Radujevac (851 km), on a total of 3 sites.

Sampling sites - hydrobiological surveys

The Danube	Kusjak (rkm 863)
The Danube	Prahovo (rkm 861)
The Danube	Radujevac (rkm 851)

The analysis is based on data collected during the research in the period 2019-2023.

METHODOLOGY

Samples were collected in the field using various techniques adapted to the characteristics of habitats on large lowland rivers. Samples of aquatic macroinvertebrates were collected by hand-held benthic net with mesh diameter of 250 µm in the riparian zone (up to 1.5 m deep) from all present microhabitats - MHS technique (Multi-Habitat Sampling), by lifting the material off the surface with legs twitch - K&S technique (Kick & Sweep Sampling), and benthic dredge and Van Veen grab, with an area of 270 cm^2. By dredging, the samples were collected by dragging the net along the bottom of the river in the length of about 10 m with 3 transects along the cross section of the river. Under conditions where feasible, samples were also collected by diving.

In addition to collecting biological material, in the field were collected data defining the habitat characteristics of a watercourse: geographical coordinates, altitude (m), substrate type, flow, distance from the bank, depth, as well as data on the visible anthropogenic impact on the habitat.

Sorting and determination of organisms were performed using the Nikon SMZ800N binocular magnifier (10-80x magnification), and the ZEISS Axio Lab.A1 microscope (1000x magnification). Identification of organisms carried out to the species level, and where this was not possible to the lowest possible taxonomic level, using

the following literature: Altermatt et al. (2019), Andersen (2013), Bole (1969), Dobson (2013), Edington & Hildrew (1995), Eggers & Martens (2001), Elliot et al. (1988), Glöer (2002, 2022), Glöer & Meier-Brook (2003), Lellak (1980), Killeen et al. (2004), Korniushin (2004), Moller Pillot (1984a, b), Nilsson (1996a, b), Pescador et al. (1995), Pfleger (2000), Sladeček & Košel (1984), Timm (2009), Vallenduuk and Moller Pillot (2007), van Haaren & Soors (2013) and Wiederholm (1983).

RESULTS

A total of 109 taxa within 14 taxonomic-ecological groups were recorded at the examined sites of the Danube. The most diverse benthic groups are Diptera with 30 recorded species, of which as many as 25 belong to the Chironomidae family and Oligochaeta with 26 recorded taxa. In addition to these groups, a great variety was also recorded in the Crustacea and Gastropoda groups with 15 and 14 recorded taxa.

According to the ecological classification of taxa in relation to saprobial valence (Moog, 2002), β- and α-mesosaprobic taxa are the most represented, with a percentage of 31.74% and 24.55%, while polysaprobic and oligosaprobic organisms were recorded with as much as 8.68% each. The high proportion of α- and β-mesosaprobic organisms in the total community indicates the presence of moderate organic pollution.

The Danube, as part of the Southern Invasive Corridor of Europe (Essl & Rabitsch, 2004), is one of the most interesting areas for monitoring and spreading aquatic allochthonous species. The paths of expansion in Serbia go further along its main tributaries Sava, Tisza and Morava. The natural areas of allochthonous species that inhabited the aquatic ecosystems of Serbia are the Ponto-Caspian region, East Asia and North America.
Allochthonous invasive species were recorded within the groups of Oligochaeta (*Branchiura sowerbyi* Beddard, 1892), Polychaeata (*Hypania invalida* (Grube, 1860) and *Manayunkia caspica* Annenkova, 1929), Gastropoda (*Clathrocaspia knipowitschii* (Makarov, 1938)), Bivalvia (*Corbicula fluminea* Müller, 1774, *Dreissena bugensis* Andrusov, 1897 and *Dreissena polymorpha* Pallas , 1771) and Crustacea (*Chelicorophium robustum* (G.O. Sars, 1895), *Corophium curvispinum* Sars, 1895, *Corophium robustum* G.O. Sars, 1895, *Corophium sowinskyi* Martynov, 1924, *Dikerogammarus haemobaphes* (Eichwald, 1841), *Dikerogammarus villosus* Sowinsky , 1894, *Echinogammarus ischnus* Stebbing, 1899, *Faxonius limosus* (Rafinesque, 1817), *Limnomysis benedeni* Czerniavsky, 1882, *Jaera istri* Veuille, 1979 and *Paramysis (Serrapalpisis) lacustris* (Czerniavsky, 1882)).

In addition to allochthonous species, species of great importance in terms of protection and conservation were also recorded in the investigated area. At the Prahovo site, in addition to the snail species *T. danubialis* and *T. fluviatilis* , the species *T. transversalis* was also recorded, which according to the latest research is classified as endangered species in Serbia and will be included in the first edition of the Red Book for the territory of Serbia (unpublished data).

Macroinvertebrate taxa recorded

List of macroinvertebrate taxa
Cnidaria
Hydra sp.
Nematode
Nematoda Gen. sp.
Turbellaria
Dugesia lugubris (Schmidt, 1861)

List of macroinvertebrate taxa
Planaria torva (O. F. Müller in 1774)
Oligochaeta
Aulophorus furcatus (Oken, 1815)
Branchiura sowerbyi Beddard, 1892*
Chaetogaster diaphanus (Gruithuisen, 1828)
Embolocephalus velutinus (Grube, 1879)
Enchytraeidae Gen. sp.
Enchytraeus sp.
Henlea ventriculosa (d 'Udekem, 1854)
Limnodrilus claparedeanus Ratzel, 1868
Limnodrilus hoffmeisteri Claparede, 1862
Limnodrilus udekemianus Claparède, 1862
Nais barbata Müller, 1774
Nais bretscheri Michaelsen, 1899
Nais communis Piguet, 1906
Nais elinguis Müller, 1773
Nais pardalis Piguet, 1906
Nais sp.
Ophidonais serpentina (Müller, 1773)
Paranais frici Hrabe, 1941
Potamothrix hammoniensis (Michaelsen, 1901)
Potamothrix vejdovskyi (Hrabe, 1941)
Pristina aequiseta Bourne, 1891
Psammoryctides albicola (Michaelsen, 1901)
Slavina Appendiculate (D'udekem, 1855)
Stylaria lacustris (Linnaeus, 1767)
Stylodrilus heringianus Claparede, 1862
Vejdovskyella comata (Vejdovský, 1884)
Polychaeta
Hypania invalida (Grube, 1860)*
Manayunkia caspica Annenkova, 1929*
Bivalvia
Corbicula fluminea Müller, 1774*
Dreissena bugensis Andrusov, 1897*
Dreissena polymorpha Pallas, 1771*
Pisidium sp.
Gastropoda
Acroloxus lacustris (Linnæus, 1758)
Bithyniidae Gen. sp.
Clathrocaspia knipowitschii (Makarov, 1938)*

List of macroinvertebrate taxa
Esperiana esperi (Férussac, 1823)
Holandriana holandrii (C. Pfeiffer, 1828)
Microcolpia daudebartii (Prevost, 1821)
Physella acuta Draparnaud, 1805
Radix auricularia (Linnæus, 1758)
Succineidae Gen. SP.
Theodoxus danubialis (Pfeiffer, 1828)
Theodoxus fluviatilis Linnaeus, 1758
Theodoxus transversalis (C. Pfeiffer, 1828)
Valvata piscinalis (O. F. Müller, 1774)
Viviparus acerosus (Bourguignat, 1862)
Crustacea
Chelicorophium robustum (G.O. Sars, 1895)*
Corophium curvispinum Sars, 1895*
Corophium robustum G.O. Sars, 1895*
Corophium sowinskyi Martynov, 1924*
Corophium sp.*
Dikerogammarus haemobaphes (Eichwald, 1841)*
Dikerogammarus sp.*
Dikerogammarus villosus Sowinsky, 1894*
Echinogammarus ischnus Stebbing, 1899*
Faxonius limosus (Rafinesque, 1817)*
Gammaridae
Gammarus sp.
Limnomysis benedeni Czerniavsky, 1882*
Jaera istri Veuille, 1979*
Paramysis (Serrapalpisis) lacustris (Czerniavsky, 1882)*
Ephemeroptera
Caenis robusta Eaton, 1884
Cloeon dipterum (Linnaeus, 1761)
Trichoptera
Cyrnus trimaculatus (Curtis, 1834)
Hydroptila sp.
Hydropsyche bulgaromanorum Malicky, 1977
Hydropsyche contubernalis McLachlan, 1865
Hydropsyche sp.
Holocentropus stagnalis (Albarda, 1874)
Molanna angustata Curtis, 1834
Polycentropus flavomaculatus (Pictet, 1834)
Odonata

List of macroinvertebrate taxa
Gomphus vulgatissimus (Linnaeus, 1758)
Ischnura elegans (Vander Linden, 1820)
Pyrrhosoma nymphula (Sulzer, 1776)
Coleoptera
Halochares sp.
Diptera
Ceratopogonidae Gen. sp.
Eleophila sp.
Helius sp.
Rhagionidae Gen. sp.
Tipula lateralis (Meigen, 1804)
Chironomidae
Ablabesmyia longistila Fittkau, 1962
Cladopelma gr. *viridulum*
Cladotanytarsus sp.
Chironomus anthracinus Zetterstedt, 1860
Chironomus gr. *plumosus*
Chironomus spp.
Cricotopus bicinctus (Meigen 1818)
Cricotopus gr. *sylvestris*
Cricotopus sp.
Cryptochironomus sp.
Dicrotendipes nervosus (Staeger 1839)
Glyptotendipes pallens (Meigen, 1804)
Fleuria lacustris Kieffer, 1924
Orthocladinae
Paracladius sp.
Paratanytarsus dissimilis agg.
Paratanytarsus sp.
Polypedilum albicorne (Meigen 1838)
Polypedilum nubeculosum (Meigen 1804)
Polypedilum gr. *scalaenum*
Polypedilum sp.
Procladius spp.
Rheotanytarsus sp.
Tanypus kraatzi (Kieffer 1912)
Tanytarsus spp.

* allochthonous species

CONCLUSION

A total of 109 taxa were recorded at the examined sites of the Danube in the zone of planned construction.

No significant impacts of the construction and operation of the plant on the macroinvertebrate fauna are expected.

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FISH

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INTRODUCTION

The hydrological and ecological characteristics of the Danube River have changed significantly after the construction of the dams "Đerdap 1" and "Đerdap 2". The longitudinal continuity of the Danube River has been interrupted, which has a significant impact on the qualitative and quantitative composition of ichthyofauna in the formed reservoirs, as well as the course of the river downstream of the dam (Lenhardt et al., 2019). The resulting changes in living conditions and the modification of the biotope itself have led to a significant reduction in the populations of certain fish species, especially migratory ones, which have cut off the upstream spawn migration routes. The reconstruction of the Danube near the Sip and Kusjak prevented upstream and downstream migrations of fish, which migrated to their breeding and wintering areas upstream in Đerdap or downstream in the area of Radujevac and the mouth of Timok for spawning, nutrition and wintering (Janković and Jovičić, 1994). Anadromous migrations of Black Sea fish from the Acipenseridae family to their breeding grounds in the Djerdap Gorge and upstream are also disabled, reducing the presence of these species to only 17.4 km of the Serbian waters downstream from the HPP "Đerdap 2" to the state border with Bulgaria at the confluence of the Timok and the Danube. The new conditions enabled a faster spread of allochthonous fish species, which have a negative effect on indigenous species (Lenhardt et al., 2019). The Danube between the two dams, due to the backwater, has the characteristics of a reservoir. According to the surveys conducted during 2009-2012 (Smederevac-Lalić, 2013), in the part of the second Đerdap reservoir, the mass share of babushka is dominant, followed by perch, rock perch, pike, carp, catfish and thistle. Below the second Djerdap dam, the dominant species in mass share are: vimba bream, barbel, perch, white bream, Prussian carp and black-eyed bream.

The last 17.4 km of the Danube flow through Serbia, downstream of the Djerdap 2 dam, represents the only remaining natural breeding ground for the Black Sea herring (*Alosa immaculata*) in Serbia (Lazarević et al., 2010; Babić-Mladenović et al., 2010), while in the past some specimens migrated for spawning to the Danube and to Budapest (1650 rkm) (Janković et al., 1995). The Black Sea herring is classified as a vulnerable species (VU) according to the IUCN classification (http://www.iucnredlist.org) with a stagnant trend to a shrinking population. It is also on the lists of the Bern Convention (Appendix III), Natura 2000 and the EU Habitats Protection Directive.

The construction of dams also had an impact on the number of populations of economically less valued fish species, as well as allochthonous fish species. Some of the introduced fish species have established sustainable populations along the Serbian part of the Danube course, and others only in the limited areas of the "Đerdap 2" reservoir and below it (e.g. the black-striped pipefish - *Syngnathus abaster*), as well as in the littoral areas of the Danube and its standing waters (e.g. Chinese sleeper - Perccottus glenii) (Lenhardt et al., 2019). Most of the benthic biotope in the Djerdap reservoirs was inhabited by very numerous populations of different types of goby. In addition to the negative effects of allochthonous species, positive effects can be stated, for example, the importance of goby in the diet of economically valued fish species, such as catfish (*Silurus glanis*).

Locations of interest for the needs of the project are located directly below the HPP "Đerdap 2" dam. This part of the stream belongs to the fishing area "Danube". This area extends to the territories of the municipalities of Kladovo, Negotin and Bor, and includes the fishing waters of the Danube River with tributaries from the border of the Djerdap National Park 940 rkm to the Timok mouth 845 rkm. The "Danube" area is used for commercial and recreational fishing.

METHODOLOGY

For the purpose of developing the Biodiversity Study within the project area, information from relevant literature sources was taken and new field data was collected (November 2023)
Data on the diversity of fish fauna in this sector are available from the Joint Danube Survey (August 2019, JDS4), data from the users of the Danube fishing area (Annual Management Program of the Danube Fishing Area for 2023 and Amendments to the Danube Fishing Area Management Program (2017-2026)), as well as data from the preliminary review of the fauna conducted for the purposes of this project study (Prahovo site, November 2023, Figure 4). A review of all available data provides a reliable view of the expected ichthyofauna in the investigated area.

During field surveys in 2023, fish fishing was carried out using standard reversible stunning equipment, ELT62II GI HONDA GCV160, 230/400 V, 11.9/7 .4A DC power and 360 Hz frequency. Sampling was carried out by electro fishing on a transect 1000m long on the stretch below the HPP "Djerdap 2" dam (site coordinates: N 44.295332; E 22.590351).

Fishing for specimens was carried out in accordance with the permit of the Ministry of Environmental Protection of the Republic of Serbia (license for fishing for scientific research purposes and electrical fishing no. 324-04-186/2022-04 dated 2 March 2023). Identification of individuals up to the species level was performed in the field (Kottelat and Freyhof, 2007; Simonović, 2001). The individuals were not intentionally sacrificed, nor were additional experimental and laboratory analyses performed outside the field locations. For each species, the protection status was checked according to national and European laws and recommendations.

Figure 4. Sampling of fish by electro fishing at the Prahovo site, November 2023.

RESULTS

During the surveys conducted in November 2023 in the Danube sector near Prahovo (site coordinates: N 44.295332; E 22.590351, 861. rkm) due to weather conditions, i.e., high water level in November and difficult

sampling, only 6 fish species were recorded. Data on the diversity of fish fauna in this sector are available from the Joint Danube Survey (August 2019, JDS4), where a total of 35 species were recorded. According to the data from the report of SE"Srbijašume" (2022), a total of 73 species were detected in the examined area. The composition of the fish community of the fishing waters of the "Danube" area is presented on the basis of the existing literature and field data collected for the purposes of this study.

FIELD RESEARCH 2019 (JDS4)

In the Danube flow sector of interest to the project, the fish community was surveyed during the 2019 Joint Danube Survey (JDS4), at Radujevac (N 44.27547; E 22.67703) and Timok mouth (N 44.232111; E 22.678861), located downstream of Prahovo.

List of fish species at the Radujevac and Timok mouth sites in 2019:

Family	**Latin name of the species**	**Serbian name of the species**	**Radujevac**	**Timok mouth**
ACHEILOGNATHIDAE	*Rhodeus amarus*	European bitterling	+	
CENTRARCHIDAE	*Lepomis gibbosus*	Pumpkinseed	+	
COBITIDAE	*Cobitis elongatoides*	Danubian loach	+	
	Cobitis taenia	Spined loach		+
CYPRINIDAE	*Carassius gibelio*	Prussian carp	+	
	Cyprinus carpio	Common carp	+	+
GOBIIDAE	*Neogobius fluviatilis*	Monkey goby	+	+
	Babka gymnotrachelus	Racer goby	+	
	Neogobius melanostomus	Round goby	+	+
	Ponticola kessleri	Bighead goby	+	+
GOBIONIDAE	*Gobio Gobio*	Gudgeon	+	
	Pseudorasbora parva	Stone mooroko	+	
	Romanogobio kessleri	Kessler's gudgeon	+	
	Romanogobio vladykovi	Danube whitefin gudgeon	+	
ICTALURIDAE	*Ameiurus nebulosus*	Brown bullhead	+	
LEUCISCIDAE	*Abramis Brama*	Common bream	+	+
	Ballerus sapa	White-eye bream	+	
	Alburnus alburnus	Common bleak	+	+
	Aspius aspius	Asp	+	
	Ballerus ballerus	Zope	+	
	Blicca bijoerkna flash	White bream	+	
	Chondrostoma nasus	Common nase	+	+
	Leuciscus idus	Ide	+	+
	Pelecus cultratus	Sichel	+	
	Rutilus rutilus	Roach	+	+
	Scardinius erythrophthalmus	Common rudd	+	
	Squalius cephalus	Chub	+	
	Vimba vimba	Vimba bream	+	
PERCIDAE	*Gymnocephalus cernua*	Ruffe	+	
	Perca fluviatilis	European perch	+	+
	Sander lucioperca	Pike perch	+	+

Family	Latin name of the species	Serbian name of the species	Radujevac	Timok estuary
SILURIDAE	*Silurus glanis*	Wels catfish	+	+
SYNGNATHIDAE	*Syngnathus abaster*	Black-striped pipefish	+	
XENOCYPRIDIDAE	*Hypophthalmichthys molitrix*	Silver carp	+	+

DATA ON FISH FAUNA IN THE DANUBE FISHING AREA

Data from the Annual Management Program of FA "Danube" for 2023 and Amendments to the Management Program of FA "Danube" (2017-2026) were collected during field research in 2016, 2017 and 2020 and supplemented with data from the literature.

List of fish species in the fishing waters of the fishing area "Danube" (Srbijašume, 2022):

Family	Latin name of the species	Serbian name of the species
ACHEILOGNATHIDAE	*Rhodeus amarus*	European bitterling
ACIPENSERIDAE	*Acipenser gueldenstaedtii*	Danube (Russian) sturgeon
	Acipenser nudiventris	Bastard sturgeon
	Acipenser ruthenus	Sterlet
	Acipenser stellatus	Starry sturgeon
	Acipenser sturio	Atlantic sturgeon
	Huso huso	Beluga sturgeon
ANGUILLIDAE	*Anguilla anguilla*	European eel
CLUPEIDAE	*Alosa immaculata*	Pontic shad
	Alosa tanaica	Black sea shad
CENTRACHIDAE	*Lepomis gibbosus*	Pumpkinseed
COBITIDAE	*Cobitis elongata*	Balkan loach
	Cobitis elongatoides	Danubian loach
	Misgurnus fossilis	Weatherfish
	Sabanejewia balcanica	Balkan spined loach
COTTIDAE	*Cottus gobio*	European bullhead
CYPRINIDAE	*Barbus balcanicus*	Danube barbel
	Barbus barbus	Common barbel
	Carassius carassius	Crucian carp
	Carassius gibelio	Prussian carp
	Cyprinus carpio	Common carp
GASTEROSTERIDAE	*Gasterosteus aculeatus*	Three-spined stickleback
GOBIIDAE	*Babka gymnotrachelus*	Racer goby
	Neogobius fluviatilis	Monkey goby
	Neogobius melanostomus	Round goby
	Ponticola kessleri	Kesler’s goby
	Proterorhinus semilunaris	Western tuberose goby
GOBIONIDAE	*Gobio Gobio*	Gudgeon
	Gobio obtusirostris	Balkan gudgeon
	Romanogobio albipinnatus	White-finned gudgeon
	Romanogobio kessleri	Kessler's gudgeon
	Romanogobio uranoscopus	Danubian longbarbel gudgeon
LEUCISCIDAE	*Aspius aspius*	Asp
	Abramis Brama	Freshwater bream
	Alburnoides bipunctatus	Schneider
	Alburnus alburnus	Common bleak

Family	Latin name of the species	Serbian name of the species
	Alburnus chalcoides	Danube bleak
	Ballerus ballerus	Zope
	Ballerus sapa	White-eye bream
	Blicca bijoerkna flash	White bream
	Chondrostoma nasus	Common nase
	Leucaspius delineatus	Sunbleak
	Leuciscus idus	Ide
	Leuciscus leuciscus	Common dace
	Pelecus cultratus	Sichel
	Phoxinus phoxinus	Common minnow
	Pseudorasbora parva	Stone moroko
	Rutilus rutilus	Common roach
	Scardinius erythrophthalmus	Common rudd
	Squalius cephalus	Chub
	Vimba vimba	Vimba bream
LOTIDAE	*Lota lota*	Burbot
ESOCIDAE	*Esox lucius*	Northern pike
ICTALURIDAE	*Ameiurus sp.*	Bullhead catfish
NEMACHEILIDAE	*Barbatula barbatula*	Stone loach
PERCIDAE	*Gymnocephalus balloons*	Ballon's ruffe
	Gymnocephalus cernua	Ruffe
	Gymnocephalus schraetser	Stripped ruffe
	Perca fluviatilis	European perch
	Sander lucioperca	Pikeperch
	Sander volgensis	Volga pikeperch
	Zingel pole	Perca zingel
	Zingel zingel	Zingel
SALMONIDAE	*Salmo trutta*	Brown trout
	Oncorhynchus mykiss	Rainbow trout
SILURIDAE	*Silurus glanis*	Wels catfish
SYNGNATHIDAE	*Syngnathus abaster*	Black-striped pipefish
ODONTOBUTIDAE	*Perccottus glenii*	Chinese sleeper
TINCIDAE	*Tinca tinca*	Tench
UMBRIDAE	*Umbra kramer*	European mudminnow
XENOCYPRIDIDAE	*Ctenopharyngodon idella*	Grass carp
	Hypophthalmichthys molitrix	Silver carp
	Hypophthalmichthys nobilis	Bighead carp

The document "Supplement to FA Danube 2021" available on the website of the user of the Danube fishing area, Srbijašume, for the site below the HPP "Đerdap 2" dam (N 44.28008580, E 22.64023439) shows data on the composition of fish fauna based on the survey conducted in 2020. Out of a total of 9 registered species, eight species are under protection (carp, asp, blue bream, common nase, perch, Volga pikeperch and catfish).

List of species registered at the site below the HPP "Đerdap 2" dam in 2020:

Family	Latin name of the species	Serbian name of the species
CYPRINIDAE	*Cyprinus carpio*	Common carp
LEUCISCIDAE	*Alburnus alburnus*	Common bleak
	Aspius aspius	Asp
	Ballerus ballerus	Blue bream

	Chondrostoma nasus	Common nase
	Vimba vimba	Vimba bream
PERCIDAE	*Sander lucioperca*	Pikeperch
	Sander volgensis	Volga pikeperch
SILURIDAE	*Silurus glanis*	Wels catfish

FIELD RESEARCH 2023 .

Due to high water levels and unfavorable sampling conditions, only 6 fish species were recorded at the Prahovo site, two of which are protected (asp and common nase, Figure 5).

List of species recorded at the Prahovo site in 2023:

Family	**Latin name of the species**	**Serbian name of the species**
CYPRINIDAE	*Carassius gibelio*	Prussian carp
LEUCISCIDAE	*Alburnus alburnus*	Common bleak
	Aspius aspius	Asp
	Chondrostoma nasus	Common nase
	Rutilus rutilus	Common roach
SYNGNATHIDAE	*Syngnathus abaster*	Black-striped pipefish

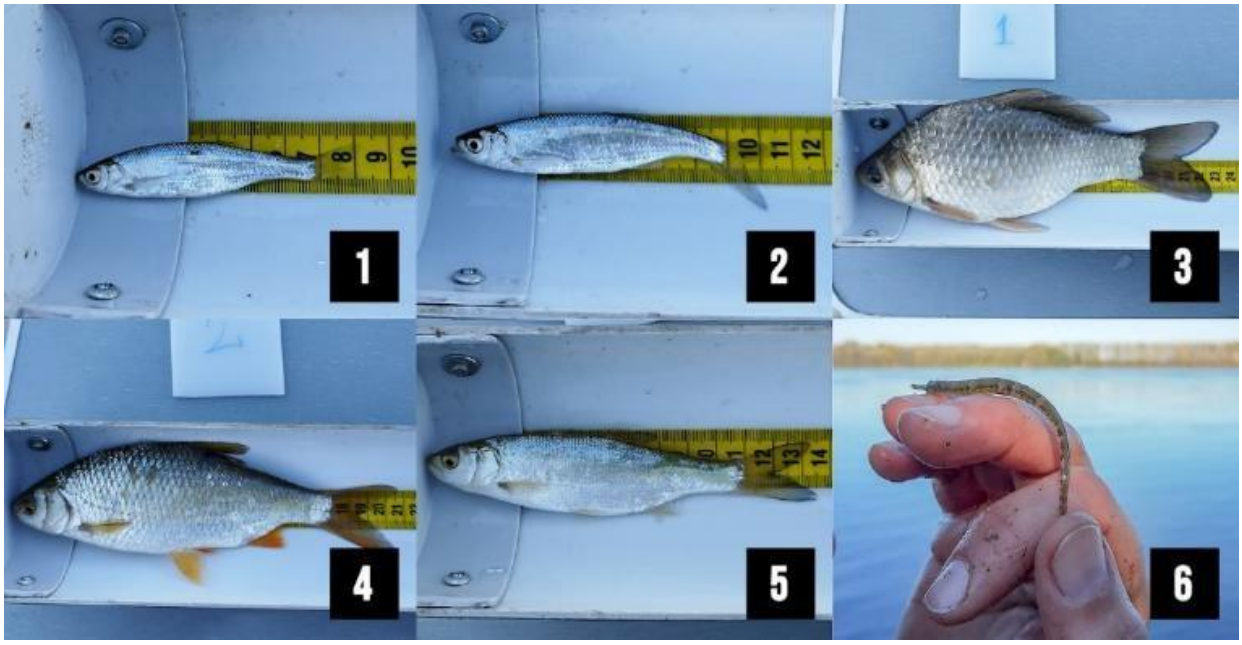

Figure 5 Overview of the species identified at the Prahovo site in 2023: 1) common nase, 2) common bleak, 3) Prussian carp, 4) common roach, 5) asp, 6) black-striped pipefish.

According to the data obtained from field research and literature review, in the fishing waters of the fishing Area "Danube", a high diversity of fish fauna was ascertained. Fishing waters of the Fishing area "Danube" is inhabited by 74 fish species from 23 families (Table 8). This fauna is characterized by a high level of indigenousness, 62 species are indigenous (83.78%), and 12 species are allochthonous.

Table 8. List of registered fish species based on literature and field data in the Danube sector below the dam Đerdap 2. Protection status according to national and international legislation (Official Gazette of the Republic of Serbia 5/2010, 47/2011, 32/2016, 98/2016; NATURA 2000; Bern Convention (1979); IUCN (2020)) : - literature (historical) data SZ - strictly protected, Z - protected, IUCN – Red list of endangered species, VU – vulnerable species, LC - "low risk" species, ** - strictly protected species, * - protected species, # - allochthonous species.

Latin name of the species	EU Red list	EU-27 Red list	Bern Convention (Annexes)	Habitats Directive (Annexes)	Serbia
ACHEILOGNATHIDAE					
Rhodeus amarus/ European bitterling**	LC	LC	III	II	C3
ACIPENSERIDAE					
Φ Acipenser gueldenstaedtii / Danube (Russian) sturgeon	CR	CR		V	SZ
Φ A.nudiventris/fringebarbel sturgeon **	CR	CR		V	SZ
Φ A. stellatus / stary sturgeon **	CR	CR	III	V	SZ
Φ A. sturio /atlantic sturgeon **	CR	CR	II	II, IV	SZ
Φ A. ruthenus / sterlet *	VU	VU	III	V	Z
Φ Huso huso / beluga **	CR	CR	III	V	SZ
ANGUILLIDAE					
Φ Anguilla anguilla / European eel **	CR	CR			SZ
CENTRACHIDAE					
Lepomis gibbosus/ pumpkinseed #	LC				
CLUPEIDAE					
Φ Alosa immaculata / Pontic shad**	VU	EN	III	II, V	SZ
Φ Alosa tanaica/ Black sea shad**	LC			II, V	SZ
COBITIDAE					
Cobitis elongata / Balkan loach**	LC		III	II	SZ
Cobitis elongatoides / Danubian loach	LC	LC	III	II	SZ
Misgurnus fossilis /Weatherfish **	LC	LC	III	II	SZ
Sabanejewia balcanica / Balkan spined loach**	LC		III	II	SZ
COTTIDAE					
Cottus gobio/Bullhead **	LC			II	SZ
CYPRINIDAE					
Φ Carassius carassius / Crucian carp**	LC	LC			SZ
Barbus balcanicus / Danube barbel*	LC			V	
Barbus barbus / Common barbell*	LC	LC		V	Z
Carassius gibbelio / Prussian carp #	LC				
Cyprinus carpio / Common carp*	VU	VU			Z
ESOCIDAE					
Esox lucius / Northern pike*	LC	LC			Z
GADIDAE					
GASTEROSTERIDAE					
Gasterosteus aculeatus / Tri-spined stickleback	LC				
GOBIIDAE					
Φ Proterorhinus semilunaris / Western tuberose goby	LC				

Latin name of the species	EU Red list	EU 27 Red list	Bern Convention (Annexes)	Habitats Directive (Annexes)	Serbia
Babka gymnotrachelus / Racer goby	LC				
Neogobius fluviatilis / Monkey goby #	LC		III		
Neogobius melanostomus / Round goby #	LC				
Ponticola kessleri / Bighead goby	LC		III		
GOBIONIDAE					
Φ Romanogobio albipinnatus /White-finned gudgeon	LC		III	II	SZ
Romanogobio vladykovi **/** Danube whitefin gudgeon	LC				
Gobio gobio /Gudgeon	LC	LC			
Gobio obtusirostris / Balkan gudgeon	LC				
Φ Romanogobio uranoscopus / Danubian longbarbel gudgeon	LC			II	SZ
Romanogobio kessleri / Kessler's gudgeon	LC			II	SZ
Pseudorasbora parva / Stone mooroko #	LC				
ICTALURIDAE					
Ameiurus molasses/ Black bullhead #	LC				
LEUCISCIDAE					
Φ Alburnus chalcoides / Danube bleak	LC		III	II	
Φ Leucaspius delineatus / Sunbleak	LC		III		
Φ Leuciscus leuciscus / Common dace	LC	LC			
Abramis brama/ Freshwater bream*	LC	LC			Z
Alburnus alburnus/ Common bleak	LC	LC			
Alburnoides bipunctatus / Schneider*	LC		III		Z
Aspius aspius / Asp*	LC	LC	III	II, V	Z
Ballerus ballerus / Zope*	LC	LC	III		Z
Ballerus sapa / black-eyed bream*	LC	LC	III		Z
Blicca bjoerkna / White bream	LC	LC			
Chondrostoma nasus / Common nase*	LC	LC	III		Z
Leuciscus idus/ Ide*	LC	LC			Z
Pelecus cultratus / Sichel**	LC	LC	III	II,IV,V	SZ
Phoxinus phoxinus/ Common minnow	LC				
Rutilus rutilus / Common roach	LC	LC			
Scardinius erythrophthalmus/ Common rudd	LC	LC			
Squalius cephalus / Common chub*	LC	LC			Z
Vimba vimba/ Vimba bream*	LC	LC	III		Z
LOTIDAE					
Φ Lota lota / Burbot*	LC	LC			Z
NEMACHEILIDAE					
Barbatula barbatula / Stone loach	LC				
SALMONIDAE					
Φ Oncorhynchus mykiss / Rainbow trout	ND				

Latin name of the species	EU Red list	EU 27 Red list	Bern Convention (Annexes)	Habitats Directive (Annexes)	Serbia
Salmo trutta / brown trout *	LC				Z
ODONTOBUTIDAE					
Perccottus glenii / Chinese sleeper#	LC				
PERCIDAE					
Φ Gymnocephalus baloni / Danube ruffe	LC	LC	III	II-IV	SZ
Φ Gymnocephalus schraetser / Striped ruffe	LC	LC	III	II, V	Z
Φ *Zingel streber* / Danube streber**	LC	LC	III	II	SZ
Gymnocephalus cernua / Ruffe	LC	LC			
Perca fluviatilis/ European perch*	LC	LC			Z
Sander lucioperca/ Pikeperch*	LC	LC			Z
Sander volgensis/ Volga pikeperch*	LC	LC	III		Z
Zingel zingel / Zingel**	LC	LC	III	V	SZ
SILURIDAE					
Silurus glanis / Wels catfish*	LC	LC	III		Z
SYNGNATHIDAE					
Syngnathus abaster / Black-striped pipefish	LC		III		
TINCIDAE					
Tinca tinca / Tench**	LC	LC			SZ
UMBRIDAE					
Umbra krameri / European mud-minnow**	VU	VU	II	II	SZ
XENOCYPRIDIDAE					
Ctenopharyngodon idella/Grass carp #	LC				
Hypophthalmichthys molitrix / Silver carp #	NT				
Hypophthalmichthys nobilis/ Bighead carp #	DD				

PROTECTED FISH SPECIES ON THE PART OF THE DANUBE FLOW IN THE PROJECT AREA OF INTERES

In accordance with the Law on Nature Protection ("Official Gazette of RS", No. 36/09, 88/2010, 91/2010 - corr., 14/2016 and 95/2018 – and other law and 71/2021) and the Rulebook on the Proclamation and Protection of Strictly Protected and Protected Wild Species of Plants, Animals and Mushrooms ("Official Gazette of RS", no. 5/10, 47/11, 32/16 and 98/16) in the waters of the Danube fishing area, the presence of 25 strictly protected fish species was recorded, of particular importance are sturgeon species and herrings, which could be expected on the part of the Danube downstream of the Djerdap 2 dam. According to the current Rulebook on Protected Species, the project area is inhabited by a total of 46 protected (21) and strictly protected (25) species, accounting for 62% of fish fauna.

CONCLUSION

The negative effects on the fish fauna are mainly due to the impact of the HPP "Đerdap 1 and 2" dams, which prevent migration upstream and downstream, affect the flow regime and cause large oscillations in the water level, above, between and in the part of the flow downstream of the dams. These significant changes caused changes in the ichthyofauna of the Danube. Migratory fish species such as sterlet and barbel, which prefer

faster flow, migrated to the upstream part of the Danube, while species such as bream showed intensive growth in the newly formed reservoirs. It is known that in this region at the end of 20th century beluga roe used to produce one of the most prized caviar. Although, the belugas were harvested until recently, their presence has not been confirmed with certainty in the lower Danube for a long time. Overfishing, as well as the impact of the Djerdap hydroaccumulation on spawning, has caused a decreasing number of these species in the Danube.

The Danube sector downstream the dams has a rich fish fauna, with a large share of indigenous species (84%). During field research, 21 species were not recorded, but their presence can be expected in this part of the Danube based on literature data. However, the literature states that these waters are inhabited by species from the families Acipenseridae (sturgeon, six species) and Anguillidae (eel, one species), all of which are under protection, and whose certain finding has not been confirmed for a long period of time. Out of a total of 74 species listed in the text, which are expected to be found in this sector of the Danube, 21 species are protected and 25 are strictly protected.

The construction of the subject facility in the litteral zone, within the industrial zone, should not have a significant negative impact on fish fauna

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AMPHIBIANS AND REPTILES

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INTRODUCTION

The fauna of amphibians and reptiles of Serbia consists of 48 indigenous species, i.e. 22 species of amphibians (Amphibia) and 26 species of reptiles (Reptilia) (Urošević et al. 2022. The territory of Djerdap is inhabited by 13 species and 13 species of snakes (Vukov et al. 2013, Tomović et al. 2014, 2015a, 2015b, Crnobrnja-Isailović et al. 2015, Ljubisavljević et al. 2014, Krizmanić et al. 2015, Urošević 2018, Urošević et al. 2015, 2018, 2020, Golubović et al. 2017, 2019, Vučić et al. 2020).

METHODOLOGY

A combination of visual inspection and surveys using wetland and watercourse nets for adult animals and larvae was used to assess the diversity of amphibian species. Determination of the presence of reptile species was carried out by the method of visual trasect. Animals and their habitats were photographed, and their geographical position (latitude, longitude, altitude) was recorded by a handheld GPS device. In addition to recording active individuals of amphibians and reptiles, dead animals found in the field were also examined and data on the presence of species entered into the database. Local roads were checked to record individuals killed by motor vehicles.

RESULTS

List of species of amphibians and reptiles in the territory of Djerdap:

Protection status according to national and international legislation - Official Gazette of R. Serbia 5/2010, 47/2011, 32/2016, 98/2016; Protection under the Bern Convention (1979); IUCN – Red List of Endangered Species, VU – vulnerable species, LC - "low risk" species; CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora - international agreement between the governments of the member states, made at the initiative of IUCN in 1973, in Washington; In 2001, the Federal Republic of Yugoslavia ratified the CITES Convention ("Official Gazette of FRY – International Treaties" no. 11/2001), and in 2002 the Convention entered into force; the Habitats Directive (Council Directive 92/43/EEC).

Species	IUCN Category	National protection status	Habitats Directive	Bern Convention	CITES
Lissotriton vulgaris	LC	strictly protected	-	Appendix III	-
Salamandra salamandra	LC	strictly protected	-	Appendix III	-
Triturus cristatus	LC	strictly protected	Annex II, IV	Appendix II	-
Bombina bombina	LC	strictly protected	Annex II, IV	Appendix II	-
Bombina variegata	LC	strictly protected	Annex II, IV	Appendix II	-

Species	IUCN Category	National protection status	Habitats Directive	Bern Convention	CITES
Bufo bufo	LC	strictly protected	-	Appendix III	-
Bufotes viridis	LC	strictly protected	Annex IV	Appendix II	-
Hyla arborea	LC	strictly protected	Annex IV	Appendix II	-
Pelophylax ridibundus	LC	protected	Annex V	Appendix III	-
Pelophylax kl. *esculentus*	LC	protected	Annex V	Appendix III	-
Rana dalmatina	LC	strictly protected	Annex IV	Appendix II	-
Rana temporaria	LC	strictly protected	Annex V	Appendix III	-
Testudo hermanni	NT	protected	Annex II, IV	Appendix II	Appendix II
Emys orbicularis	NT	strictly protected	Annex II, IV	Appendix II	-
Darevskia praticola	NT	strictly protected	-	Appendix III	-
Lacerta viridis	LC	-	Annex IV	Appendix II	-
Podarcis tauricus	LC	strictly protected	Annex IV	Appendix II	-
Ablepharus kitaibelii	LC	strictly protected	Annex IV	Appendix II	-
Anguis colchica	NE	-	-	Appendix III	-
Natrix natrix	LC	strictly protected	-	Appendix III	-
Natrix tessellata	LC	strictly protected	Annex IV	Appendix II	-
Coronella austriaca	LC	strictly protected	Annex IV	Appendix II	-
Dolichophis caspius	LC	strictly protected	Annex IV	Appendix III	-
Zamenis longissimus	LC	strictly protected	Annex IV	Appendix II	-
Vipera ammodytes	LC	protected	Annex IV	Appendix II	-

CONCLUSION

Within the wider zone of planned works, 22 species of amphibians and 26 species of reptiles are recorded.

The impact of the construction of the facility on the fauna of amphibians and reptiles can be assessed as minimal, given that the works will be carried out in an industrial zone where no significant habitats for these groups of organisms are recorded, and that no significant infrastructure works on access roads are envisaged.

Bearing in mind the investor's commitment to use the best available technologies in the operational phase of the plant, which includes the application of all measures to prevent air, soil and water pollution, the application of advanced material disposal technologies, as well as measures to prevent accidents, no significant residual impacts on amphibians and reptiles are expected.

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BIRDS

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INTRODUCTION

The Danube River belongs to large river systems and represents a very complex, multi-dimensional, dynamic ecosystem of high ecological complexity and richness of biodiversity. This area has enabled the presence of a large number of representatives of ornithofauna due to its characteristics, relatively preserved wetland zones, preserved parts of indigenous flood forests, wetland and aquatic vegetation. The Danube is also an international environmental corridor. Along the lower course of the Danube, significant bird areas in Serbia (IBA) stand out. Important Bird Areas (IBA) such as: Dubovac – Ram, Đerdap Gorges, Mala Vrbica.

For the purpose of preparing a preliminary Study on Biodiversity within the Prahovo and Radujevac project area, available information taken from the eBird application and from adequate literature sources are included.

The protection status of recorded species is shown in Table 9, according to IUCN Red List, EU Red List, Bern Convention, Bonn Convention, CITES Convention, Birds Directive and national legislation for protected species.

According to national legislation (Rulebook on the proclamation and protection of strictly protected and protected species of plants, animals and fungi, Official Gazette of RS, 5/2010 and 47/2011), as many as 342 species of birds are subject to different degrees of protection, of which 307 species of birds are strictly protected ("Official Gazette of RS", 5/2010, 47/2011, 32/2016 and 98/2016).

Law on Ratification of the **Convention on the Conservation of European Wild Flora and Fauna and Natural Habitats** – "Official Gazette of RS – International Treaties", No. 102/07 (**Bern Convention** – Appendix I – SZ species of flora; **Appendix II** – SZ wild species of fauna; Appendix III – Z species of fauna; reserve – species for which the Republic of Serbia expresses reservations in relation to the text of the Convention; **Res. 6** (1998) – Resolution 6. Standing Committee of the Bern Convention – Species requiring special habitat protection measures, **Res. 6 Nova** (2011) – Revised Annex 1 to Resolution 6. Standing Committee of the Bern Convention – new species requiring special habitat protection measures).

Law on Ratification of the **Convention on the Conservation of Migratory Species of Wild Animals** – "Official Gazette of RS – International Treaties", No. 102/07 (**Bonn Convention** – **Annex I – endangered migratory species**; **Annex II – migratory species to be the subject of the Agreement;** reserve – species for which the Republic of Serbia expresses reservations in relation to the text of the Convention).

Law on Ratification of the **Convention on the International Trade in Endangered Species of Wild Fauna and** Flora – "Official Gazette of RS – International Treaties", No. 11/01 (**CITES Convention**– **Annex I** – species threatened with extinction and affected or likely to be affected by traffic; **Annex II** – species not currently threatened with extinction, but may threaten the extent to which the trade of individuals of this species is not subject to strict regulations and the species that must be subject to regulations in order to establish effective traffic control

of individuals of certain species referred to in this Annex**; Annex III** – species identified by any of the Parties as subject to regulation within their jurisdiction, in order to prevent or restrict exploitation, as well as those whose turnover can be controlled only in cooperation with other Parties).

Directive on the conservation of natural habitats and of wild flora and fauna – CouncilDirective – 92/43/EEC (Habitats Directive – Annex II – animal and plant species of common interest whose conservation requires the designation of specially protected areas; Annex IV – animal and plant species of common interest in need of strict protection; Annex V – animal and plant species of common interest, due to their taking from nature and exploitation, management measures can be applied).

Wild Bird Conservation Directive – Directive 2009/147/EC (**Birds Directive** – **Annex I** – Species with special conservation measures; **Annex II/A** – Species that may be hunted in accordance with national legislation, in the areas covered by the Directive; Annex **II/B** – Species that may be hunted in accordance with national legislation, in those Member States in relation to which it is specified; **Annex III/A** – Species that may be sold, held, transported and offered for sale, if killed or caught in accordance with the law or otherwise lawfully obtained; **Annex III/B** – Species that may be sold, held, transported and offered for sale, if killed or caught in accordance with the law or otherwise lawfully obtained, for which Member States may impose some restrictions on their territory and for which the Commission will conduct a study on its biological and geographical status).

RESULTS

There is not much recorded literature data, nor data in the eBird application database on the presence of protected and strictly protected bird species for the investigated area. The findings of the nesting of the European roller and the findings of the Spanish sparrow are highlighted.

According to the Rulebook on the Proclamation and Protection of Strictly Protected and Protected Wild Species of Plants, Animals and Fungi, 43 bird species have been recorded or are expected to be present in the zone of Prahovo and Radujevac.

Table 9. List of birds, based on eBird application data and literature data
Protection status according to national and international legislation - Official Gazette of R. Serbia 5/2010, 47/2011, 32/2016, 98/2016; Protection under the Bern Convention (1979); IUCN – Red List of Endangered Species, VU – vulnerable species, LC - "low risk" species; CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora - international agreement between the governments of the member states, made at the initiative of IUCN in 1973, in Washington; In 2001, the Federal Republic of Yugoslavia ratified the CITES Convention ("Official Gazette of FRY – International Treaties" no. 11/2001), and in 2002 the Convention entered into force; the Habitats Directive (Council Directive 92/43/EEC).

Scientific name	Native name	Protection status in national legislation	IUCN world red list status	IUCN status on the European Red List	Bern Convention	Bonn Convention	CITES convention	HABITAT/ EU Birds Directive
Anas platyrhynchos	Wild duck	*L	LC	LC	III	II		II/A, III/A
Phasianus colchicus	Common pheasant	*L	LC	LC	III			II/A, III/A

Scientific name	Native name	Protection status in national legislation	IUCN world red list status	IUCN status on the European Red List	Bern Convention	Bonn Convention	CITES convention	HABITAT/ EU Birds Directive
Columba livia	Rock pigeon		LC	LC				
Streptopelia decaoccto	Eurasian collared dove	*L	LC	LC	I			II/B
Streptopelia turtur	European turtle dove.	*L	- Vous.	- Vous.	III	II	III	II/B
Ciconia ciconia	White stork	SZ	LC	LC	II	II		I
Ardea cinerea	Grey Heron	*L	LC	LC	III			
Ardea alba	Great egret	SZ	LC	LC	II	II	III	I
Egretta garzetta	Little egret	SZ	LC	LC	II		III	I
Microcarbo pygmeus	Pygmy cormorant	SZ	LC	LC	II	II		I
Phalacrocorax carbo	Great cormorant	*L	LC	LC	III			
Chricocephalus ridibundus	Black-headed gull	Z	LC	LC	III			II/B
Larus cachinnans	Caspian Gull	Z	LC	LC	III			II/B
Sterna hirundo	Common tern	SZ	LC	LC	II	II		I
Chlidonias hybrida	Whistered tern	SZ	LC	LC	II			I
Athene noctua	Little owl	SZ	LC	LC	II		II	
Otus scops	Eurasian scops owl	SZ	LC	LC	II		II	
Haliaetus albicilla	White-tailed eagle	SZ	LC	LC	III	I, II	I	I
Circus aeruginosus	Western marsh harrier	SZ	LC	LC	II	I, II	I	I
Accipiter nisus	Eurasian sparrowhawk.	SZ	LC	LC	II	II	II	
Buteo buteo	Common buzzard	SZ	LC	LC	II	II	II	
Alcedo atthis	Common kingfisher.	SZ	LC	LC	II			I
Merops apiaster	European bee-eater	SZ	LC	LC	II	II		
Coracias garrulus	European roller	SZ	LC	LC	II	II		I
Upupa epops	Eurasian hoopoe	SZ	LC	LC	II			
Falco tinnunculus	Common kestrel	SZ	LC	LC	II	II	II	
Falco subbuteo	Eurasian hobby	SZ	LC	LC	II	II	II	
Lanius collurio	Red-backed shrike	SZ	LC	LC	II			I
Pica pica	Common magpie.	Z	LC	LC				II/B
Corvus cornix	Hooded crow	*L	LC	LC	III			II
Garrulus glandarius	Eurasian jay	*L	LC	LC				II/B
Parus major	Great tit	SZ	LC	LC	II			
Cyanistes caeruleus	Eurasian blue tit	SZ	LC	LC	II			
Riparia riparia	Sand martin	SZ	LC	LC	II			

Scientific name	Native name	Protection status in national legislation	IUCN world red list status	IUCN status on the European Red List	Bern Convention	Bonn Convention	CITES convention	HABITAT/ EU Birds Directive
Hirundo rustica	Barn swallow	SZ	LC	LC	II			
Sturnus vulgaris	Common starling	Z	LC	LC				II/B
Turdus merula	Common blackbird	SZ	LC	LC	III	II		II/B
Turdus pilaris	Fieldfare	SZ	LC	LC	III	II		II/B
Erithacus rubecula	European robin	SZ	LC	LC	II	II		
Passer domesticus	House sparrow	Z	LC	LC	III			
Passer montanus	Eurasian tree sparrow	Z	LC	LC	II			
Passer hispaniolensis	Spanish sparrow	SZ	LC	LC	III			
Motacilla alba	White wagtail	SZ	LC	LC	II			

CONCLUSION

The diversity of bird species and their habitats in the area of the lower course of the Danube basin is significant and a large number of endangered and protected species (43 species) are recorded, as well as habitats, primarily wet, which are significant from the aspect of biodiversity protection.
The fauna of birds in the wider area of the subject works has historically been negatively affected by all forms of habitat degradation, followed by harassment and pollution. First of all, the impact refers to the nesting period. Birds are also susceptible to disturbance during other times of the year. Smaller species of birds, primarily songbirds and woodpeckers, may lose part of their habitat when performing work in the area in question.

Considering the impacts during construction, and bearing in mind that no significant infrastructure works are required on access roads, as well as that the facility is being built in the already existing industrial zone, potential additional pressures can be characterized as low intensity, and the impact as negligible.

Bearing in mind the investor's commitment to use the best available technologies in the operational phase of the plant, which includes the application of all measures to prevent air, soil and water pollution, the application of advanced material disposal technologies, as well as measures to prevent accidents, no significant residual impacts are expected.

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MAMMALS

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INTRODUCTION

The territory of Serbia is considered to be very rich when it comes to mammalian fauna. So far, the presence of 101 species has been recorded (Savic et al. 1995, Temple and Terry, 2007).

According to national legislation (Rulebook on the proclamation and protection of strictly protected and protected species of plants, animals and fungi, Official Gazette of RS, 5/2010 and 47/2011), as many as 81 species (80%), out of the total fauna of mammals, are characterized as strictly protected or protected species. In addition to national legislation, the protection of 65 species (65%) is additionally regulated by various international acts ratified by our country.

The area of Carpathian Serbia, which also includes Negotinska Krajina, i.e. the researched area, is characterized by a high diversity of mammal fauna (Savic et al. 1995.

METHODOLOGY

Available literature data were used for the purpose of the preliminary Biodiversity Study of the project area. Given their mobility, as well as the relatively large daily range of activities of individual species, it was necessary to take into account the wider zone of the project area when creating a potential list of mammals.

RESULTS

Based on literature data, it can be expected that the study area and its immediate surroundings are inhabited by 38 mammal species (Milenković et al. 2000; Mitchell-Jones et al. 1999; Paunović et al., 2001; Paunović et al., 2008; Paunović and Milenković, 1996; Petrov, 1992; Savić et al., 1995). A list of all expected species (excluding bats), as well as their status under national and international legislation is given in Table 10.

According to national legislation (Official Gazette of RS no. 5/2010, Official Gazette of RS, no. 9/2012) 5 species are strictly protected and 21 species are protected. In addition, Serbia has ratified several international conventions and agreements that further regulate the protection of flora and fauna in Serbia.

CONCLUSION

The area of interest and its immediate surroundings is inhabited by 38 species, according to national legislation (Official Gazette of RS no. Official Gazette of RS, no. 9/2012) 5 species of which are strictly protected and 21 species are protected.
As in the cases of the previous components of biological diversity, and considering the impacts during construction, and bearing in mind that no significant infrastructure works are required on access roads, as well

as that the facility is built in the already existing industrial zone, potential additional pressures can be characterized as low intensity, and the impact as negligible.

Table 10. List of mammalian species based on literature data, conservation status and legislation.

Latin name of the species	Serbian name of the species	National legislation	Habitats Directive	Bern.	IUCN (global status)	CITES
Erinaceus roumanicus	northern white-breasted hedgehog	Z			LC	
Sorex araneus	common shrew	Z		III	LC	
Sorex minutus	Eurasian pygmy shrew	Z		III	LC	
Neomys fodiens	Eurasian water shrew	SZ		III	LC	
Neomys anomalus	Mediterranean water shrew	Z		III	LC	
Crocidura suaveolens	lesser white-toothed shrew	Z		III	LC	
Talpa europaea	European mole.	Z			LC	
Lepus europaeus	European hare	Z(L)		III	LC	
Sciurus vulgaris	Red squirrel	Z(L)		III	LC	
Arvicola amphibius	European water vole	Z			LC	
Myodes glareolus	bank vole				LC	
Microtus arvalis	common vole				LC	
Microtus subterraneus	European pine vole				LC	
Ondatra Cradle	muskrat				LC	
Myocastor coypus	nutria				LC	
Apodemus flavicollis	yellow-necked mouse				LC	
Apodemus sylvaticus	wood mouse				LC	
Apodemus uralensis	Ural field mouse	Z			LC	
Rattus rattus	black rat				LC	
Rattus norvegicus.	brown rat				LC	
Mus musculus	house mouse				LC	
Mus spicilegus	steppe mouse				LC	
Muscardinus avellanarius	hazel dormouse	SZ	IV	III	LC	
Canis lupus.	wolf	Z(L)*	II, IV, V	II, Res 6	LC	II
Canis aureus	golden jackal	Z(L)	V		LC	
Vulpes vulpes	red fox	Z(L)			LC	
Nyctereutes procyonoides	common raccoon dog				LC	
Mustela nivalis	least weasel	Z		III	LC	
Mustela putorius	European polecat	Z	V	III	LC	
Vormel peregusna	marbled polecat	SZ	II, IV	II, Res 6	VU	
Martes martes	European pine marten.	Z(L)	V	III	LC	
Martes foina	beech marten	Z(L)		III	LC	
Meles meles	European badger	Z(L)		III	LC	
Lutra lutra	Eurasian otter	SZ	II, IV	II, Res 6	NT	II

Lynx lynx	Eurasian lynx	SZ	II, IV	III, Res 6	LC	II
Felis silvestris	European wildcat	Z(L)**	IV	II	LC	II
Sus scrofa	wild boar	Z(L)			LC	
Capreolus capreolus	roe deer	Z(L)			LC	

Rulebook on the Proclamation and Protection of Strictly Protected and Protected Wild Species of Plants, Animals and Fungi (Official Gazette of R. Serbia 5/2010, 47/2011, 32/2016, 98/2016): SZ – strictly protected, Z – protected, Z(L)– a species whose protection is regulated by the Law on Hunting (Official Gazette of RS, no. 2012

*); *- protected species (except in certain parts of Vojvodina where it has the status of a strictly protected species);-**protected species (except in Vojvodina where it has the status of a strictly protected species); IUCN – Red list of endangered species, VU- vulnerable, NT- potentially endangered, LC- small concern

The investor's determination is to use the best available technologies in the operational phase of the plant, which includes the application of all measures to prevent air, soil and water pollution, the application of advanced material disposal technologies, as well as measures to prevent accidents, no significant residual impacts on mammalian fauna are expected.

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BATS - CHIROPTERA

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INTRODUCTION

Bats are the second most numerous group of mammals in the world, right after rodents. Over 1450 species have been described so far (Simmons & Cirranello 2022), and bats constitute over 20% of all mammalian species. Bats are primarily nocturnal animals that rely on echolocation for hunting and spatial orientation, and they are the only mammals capable of active flight. In Europe, they utilize a wide range of roosts – natural and man-made underground and overground roosts such as caves, mines, buildings etc., while some species roost in trees (Dietz & Kiefer 2016). All European bat species feed on insects and other arthropods. They employ various hunting strategies, such as catching prey in open spaces (e.g., *Nyctalus noctula*), near the edge of vegetation (some species from the genus *Myotis*), from the ground (e.g., *Myotis myotis*), from the surface of water (e.g., *Myotis daubentonii*), or using a wing membrane (e.g., *Rhinolophus ferrumequinum*) (Dietz et al. 2009). Due to fluctuations in insect abundance (food availability) throughout the year, bats in temperate regions have a complex annual cycle. In spring (usually during May), females form maternity colonies in summer roosts where parturition occurs during June and early July. Females leave maternity roosts at the end of August and beginning of September, which is followed by mating and swarming activities in transitory roosts before hibernation. Depending on weather conditions, bats move to winter roosts during October and November, where they hibernate until spring when temperatures rise (Dietz et al. 2009). Very often, individuals of the same species use different roosts during winter and summer, with the use of several transitory roosts during spring and autumn. Bats are sensitive to environmental changes, especially anthropogenic alterations of habitats and roosts.
At the territory of Serbia, the presence of 31 bat species has been confirmed so far, indicating a high diversity of this group of mammals in our country (Paunović et al. 2020)."

METHODOLOGY

Short field survey of bat fauna at locality Prahovo (coordinates 44.295332, 22.590351) was conducted using passive acoustic monitoring. During the night of 9/10.11.2023 four AudioMoth v.1.2.0 passive detectors (Open Acoustic Devices; Hill et al. 2019) were deployed. The detectors were positioned so that the microphones were facing the water surface. AudioMoth detectors were programmed to continuously record throughout the night (from sunset to sunrise) at a sampling frequency of 256 kHz and with high microphone sensitivity. The recordings were later processed (cut into 15-second files) and filtered in Kaleidoscope Pro v5.6.0c software (Wildlife Acoustics Inc., USA), and detailed analysis of the recordings was performed using BatSound v4.03 software (Petterson Elektronik). Echolocation signals were identified to the species level where possible, and to the genus level (e.g., *Myotis* sp.) or sono-group level (e.g., *Pipistrellus kuhlii* / *P. nathusii*) where reliable species differentiation based solely on echolocation signals was not possible, and where species-specific social calls are needed to be recorded as well.
It is important to point out that this period of the year is not optimal for bat fauna research, considering that bats enter the hibernation (period of winter inactivity) during this period, and their activity is reduced (or ceases entirely). Also, during the night when survey was done, it was raining and the temperature dropped to only 6 degrees Celsius, further causing very low bat activity at the locality.

RESULTS

Very low bat activity was recorded, which was expected bearing in mind season and weather conditions during the fieldwork. Only several bat passes were recorded. Due to small number of recordings and overlaping in signal morphology and frequency in echolocation calls of various species, unambiguous identification to species level was not possible, and recordings were identifiec to genus level or as a sono-group:

- *Miniopterus schreibersii / Pipistrellus pipistrellus / P. pygmaeus*
- *Myotis* sp.
- *Pipistrellus kuhlii / P. nathusii*

Several recordings were identified as sono-group *Miniopterus schreibersii / Pipistrellus pipistrellus / P. pygmaeus*. Recorded echolocation calls were likely from *Miniopterus schreibersii*, but based on recorded data it was not possible to identify them with certainty. In the immediate vicinity of the investigated locality, there are no suitable roosts for M. schreibersii, as this species utilizes underground roosts such as caves and mines (Dietz & Kiefer 2016). However, this species is a regional migrant (regularly travelling 100 km between winter and summer roosts), and large colonies of this species are know in the wider ares, such as Sokolovica cave near Blederija, Canetova cave and Dudićeva cave in the canyon of the Zamna river (Paunović et al. 2020, personal data).

Several recordings contained calls from some species from genus *Myotis*. It is not possible to distinguish most of species from this genus just based on echolocation. Bering in mind surrounding habitat and that acoustic detectors were mounted with microphones facing towards water surface, there is a possibility that recorded species was *Myotis daubentonii*. However, for unambiguous confirmation of its presence, it is necessary to either trap bats, or to observe them foraging above water surface, as individuals of this species have very distinctive flight pattern.

Third recorded group of echolocation calls was classified as sono-group *Pipistrellus kuhlii / Pipistrellus nathusii*. Echolocation calls of these two species overlap, and their certain identification is possible only with presece of social calls on recording (social calls are frequently recorded during mating period, in late summer and early autumn). There is a high possibility that those calls belong to *Pipistrellus kuhlii*, which is the most common bat species in human settlements (Paunović et al 2020, personal data), but we cannot exclude presence of *Pipistrellus nathusii* (Table 11).

Table 11 List of bat species most likely to be present in the investigated area, their protection status in international and national legislation (annex numbers are shown for the respective agreements/conventions) and global and national IUCN categories

Species Latin name	Speciescommon name	National legislation	Habitat Directiv	Bern Convention	IUCN Global	IUCN National
Myotis daubentonii	Daubenton's bat	SP	IV	II	LC	LC
Pipistrellus kuhlii	Kuhl's Pipistrelle	SP	IV	II	LC	LC
Miniopterus schreibersii	Schreiber's bent-winged bat	SP	II, IV	II	VU	LC

SP – strictly protected species; IUCN categories: LC – least concern; VU - vulnerable

CONCLUSION

The exploration of the Prahovo zone was carried out only on one field visit during 2023. On this occasion, a small number of bat species and low activity were recorded, although the wider region is one of the most diverse in Serbia in terms of the bat fauna richness (Paunović et al 2020, personal data).

Further research is desirable, with the aim of collecting reliable data.

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Potential cross-border impacts on biodiversity

The area in question is located on the tripoint of Serbia, Romania and Bulgaria. The Danube is the border between Serbia and Romania, while the Timok River demarcates Serbia and Bulgaria.

Bearing in mind the position of the zone in which the works are planned, it is necessary to consider the potential negative impacts of the construction and operation of the plant on the biodiversity of nearby areas of neighbouring countries, especially those identified as significant and protected. In particular, the impact on ecological connectivity was considered.

Four NATURA 2000 areas in Romania have been identified in the surrounding areas (Blahnița – ROSPA0011 and Gruia - Gârla Mare – ROSPA0046), , Dunărea la Gârla Mare - Maglavit – ROSAC0299 and Jiana– ROSAC0306) , two in Bulgaria (Timok – BG0000525 and Novo selo – BG0000631) and one Ramsar site in Romania (Blahnița – ROSMS0013). In the following text, we will briefly consider the values of this area and the potential impacts from the aspect of biodiversity.

In the wider area, at a distance of over 62 km, there is also the "Domogle-Valea Cherni" National Park in Romania, as well as the Deleina NATURA 2000 area in Bulgaria, which is about 33 km away from Prahovo by air distance. Considering the distance of these areas and the type of plant that is the subject of this report, the mentioned protected goods will not be considered, as impacts on biodiversity are unlikely (Figure 6).

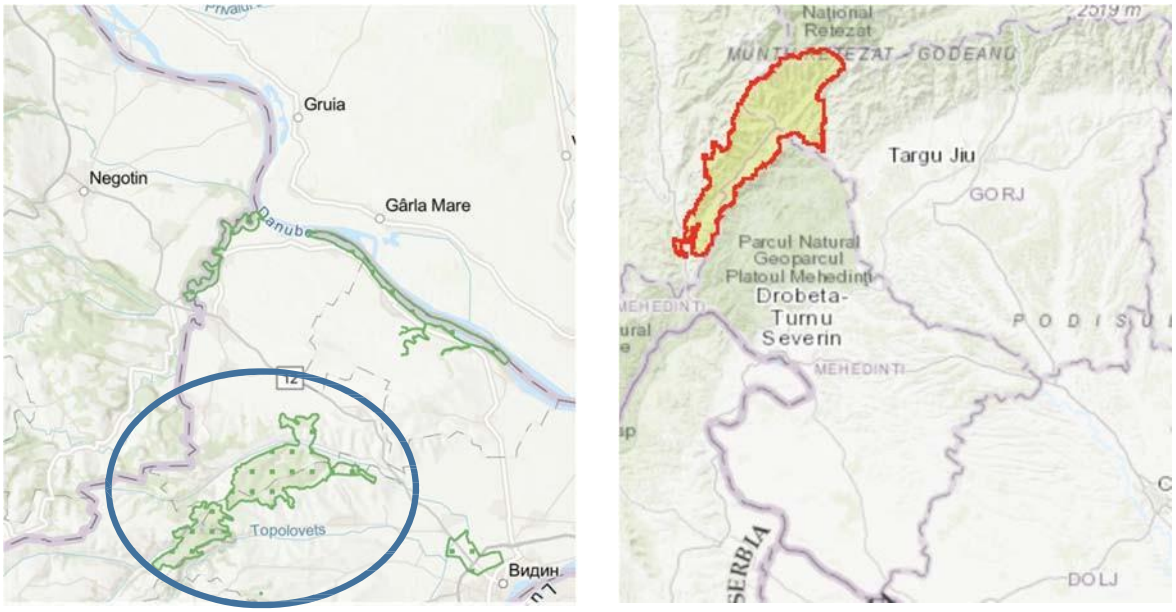

Figure 6 Position of DELEINA NATURA 2000 SITES in Bulgaria (left) and "Domogle-Valea Cherni" of the National Park in Romania (right)

Natura 2000 area Gruia - Gârla Mare – ROSPA0046, Romania

Gruia - Gârla Mare (22.815564 °N 44.180572 °E) is located in Romania, along the left bank of the Danube (Figure 7).

This area is distant as the crow flies, at the closest point, about 4,530 m from the plots that are the subject of consideration for the construction of buildings.

The area has been protected since 2007 (Government Decision No. 1284). It has an area of 2,963.9 ha and is an important area for birds – IBA area and is an integral part of the European ecological network Natura 2000 (code ROSPA0046). Location encompasses the floodplain of the Danube and has lakes, river habitats, wetlands, peatlands, meadows, wet forests, cultivated arable land, vineyards and orchards, which provide conditions for feeding and life of birds. Over 111 species are recorded in this zone, of which 80 species nest here (*Aythya nyroca, Falco cherrug, Phalacrocorax pygmaeus, Nycticorax nycticorax, Ardea purpurea, Egretta garzetta, Ardeola ralloides, Haliaeetus albicilla, Botaurus stellaris)*. Pursuant to Article 4 of Directive 2009/147/EC and Annex II of Directive 92/43/EEC in the Gruia - Gârla Mare area 16 bird species are under protection (source: https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=rospa0046).

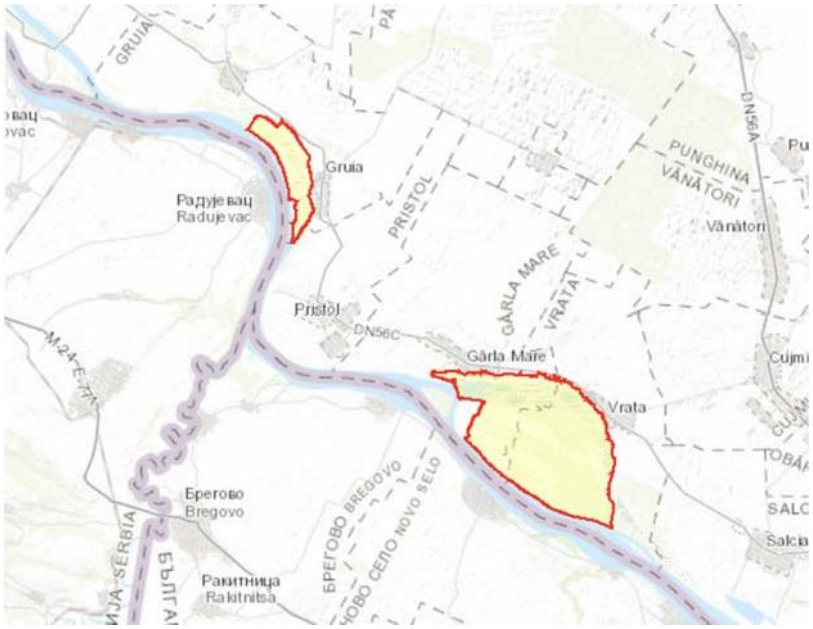

Figure 7. Natura 2000 area Gruia - Gârla Mare – ROSPA0046, Romania

Natura 2000 area Blahnița – ROSPA0011, Romania

The Natura 2000 area of Blahnița (area code ROSPA0011) is located in Romania, along the left bank of the Danube, upstream of the subject area (Figure 8).

This protected area is a little over 920 meters as the crow flies, at the closest point, from the area where construction is planned.

The area has been protected since 2007 (Government Decision no. 1284/2007), covers an area of 44,003.3 ha and is protected, above all, as an area important for birds.

According to the official review of Natura 2000 sites in Romania, completed in 2022 (https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSPA0011), 114 significant bird species are recorded in the area.

According to the same source, the following data are recorded: a) number of species from Annex 1 of the Birds Directive: 18, b) number of other migratory species, listed in the annexes to the Convention on Migratory Species (Bon): 88, c) number of globally endangered species: 5. The site is particularly important for nesting populations of the following species: *Botaurus stellaris, Yxobrychus minutus, Nycticorak nycticorak, Ardeola ralloides, Ardea purpurea, Egretta alba, E. garzetta* and *Aythya nyroca,* but also as a wetland birds wintering area.

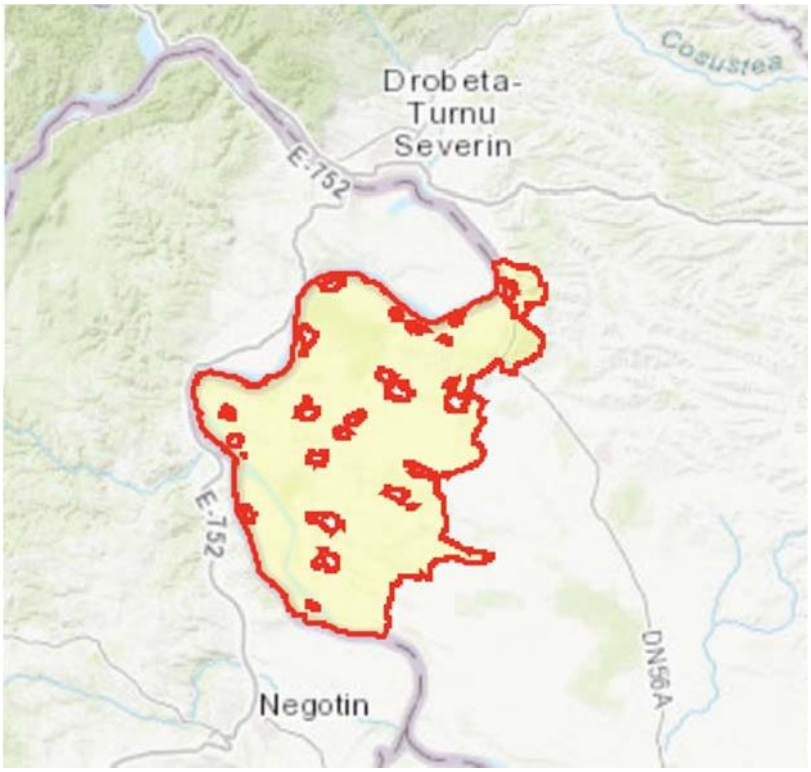

Fig 8. Natura 2000 area Blahnița – ROSPA0011, Romania

Ramsar site Blahnița – ROSMS0013, Romania

The Ramsar site Blahnița (site designation ROSMS0013) is located in Romania, in the same position as the Natura 2000 site Blahnița (Figure 9). The area has been protected since 2013. It covers an area of 45,286 ha and is protected, first of all, as an area important for birds, while

the marshy part of the area occupies an area of 5,600 ha.

As in the previous case, this protected area is a little over 920 meters as the crow flies, at the closest point, from the area where construction is planned.

According to the data of the official review of Ramsar sites (https://rsis.ramsar.org/RISapp/files/RISrep/RO2110RIS.pdf), 21 important species of animals are recorded in the area.
According to the same source, 16 bird species are recorded from Annex 1 of the Birds Directive, among which 8 species are listed in the Annexes of the Convention on Migratory Species (Bonn). The locality is particularly important for breeding populations of the following species: Nycticorak nycticorak, Phalacrocorax pygmeus, Coracias garrulous, Aythya nyroca, *Egretta garzetta* and Ixobrychus minutus, but due to the presence of 2 nature reserves - Stramina forest and Bugnet forest.

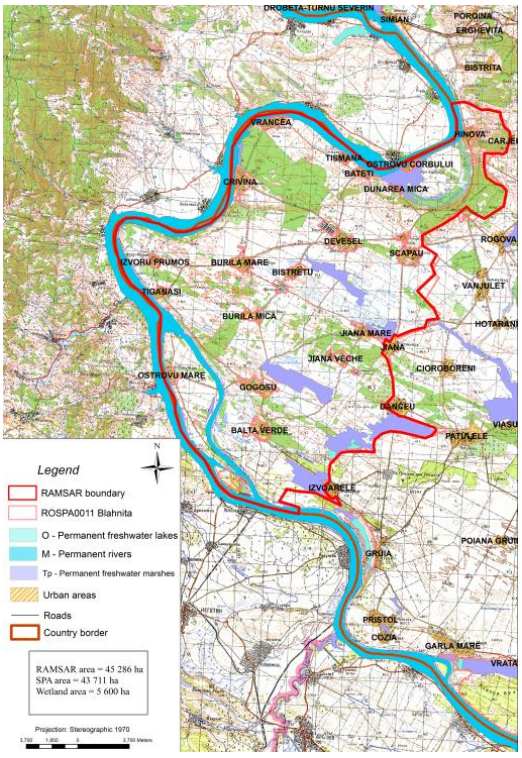

Figure 9. Blahnița Ramsar site - ROSMS0013
(Source: https://rsis.ramsar.org/RISapp/files/51734082/pictures/RO2110map.pdf)

Natura 2000 area Jiana – ROSAC0306, Romania

Natura 2000 area Jiana (area code ROSAC0306) is located in Romania, along the left bank of the Danube, in the zone of the subject area (Figure 10).

This protected area is over 900 meters as the crow flies, at the closest point, from the area where construction is planned.

The area has been protected since 2022 (Government Decision No. 685/2022), covers an area of 13,256.3 ha and is protected, first of all, as an area important for habitat conservation.

According to the data of the official survey of Natura 2000 sites in Romania, which was completed in 2022 (https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSAC0306), 8 significant animal species are recorded in the area.

Among the protected species are 2 species of invertebrates (*Lucanus cervus, Morimus apser funereus*), 2 species of amphibians (*Bombina bombina, Triturus dobrogicus*), 2 species of reptiles (*Emys orbicularis, Testudo hermanni*) and 2 species of mammals (*Lutra lutra, Spermophilus citellus*).

According to the same source, data are recorded that the Jiana site is of special importance for habitats: 91M0 - Balkan-Pannonian forests of Turkey oak and sessile oak (6% of the site area), 91I0* - European-Siberian forest steppe vegetation with oak (*Quercus* spp.) (0.6% of the site area) and 92A0 – white willow and white poplar forests (0.4% of the site area).

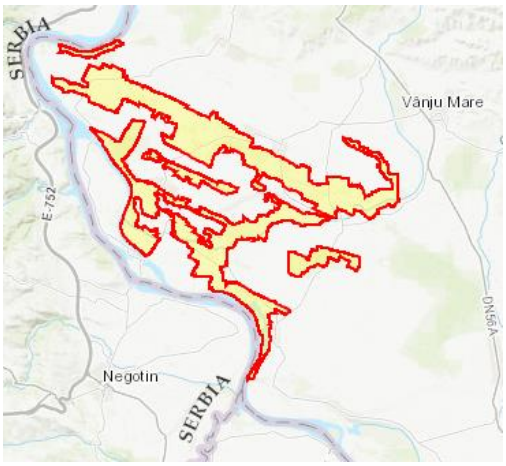

Figure 10. Natura 2000 area Jiana – ROSAC0306

Natura 2000 area Dunărea la Gârla Mare - Maglavit – ROSAC0299, Romania

The Natura 2000 area Dunărea la Gârla Mare - Maglavit (area code ROSAC0299) is located in Romania, along the left bank of the Danube, downstream of the subject area (Figure 11).

This protected area is a little over 12 kilometers as the crow flies, at the closest point, from the area where construction is planned.

The area has been protected since 2011 (Government Decision No. 2387/2011), it covers an area of 9487.6 ha and is protected, first of all, as an area important for habitat conservation. It belongs to the continental biogeographical region.

According to the data of the official review of Natura 2000 sites in Romania, which were completed in 2022 (https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSAC0299), 8 protected species and 1 type of protected habitat according to the Framework Directive on habitats (Habitat Directive) were recorded.

Among the protected species are 3 species of fish (*Rhodeus amarus, Romanogobio kesslerii, Romanogobio vladykovi*), 2 species of amphibians (*Bombina bombina, Triturus dobrogicus*), 1 species of reptile (*Emys orbicularis*) and 2 species of mammals (*Lutra lutra, Spermophilus citellus*).

Habitats of importance for protection are white willow (*Salix alba*) and white poplar (*Populus alba*) forests (code 92A0).

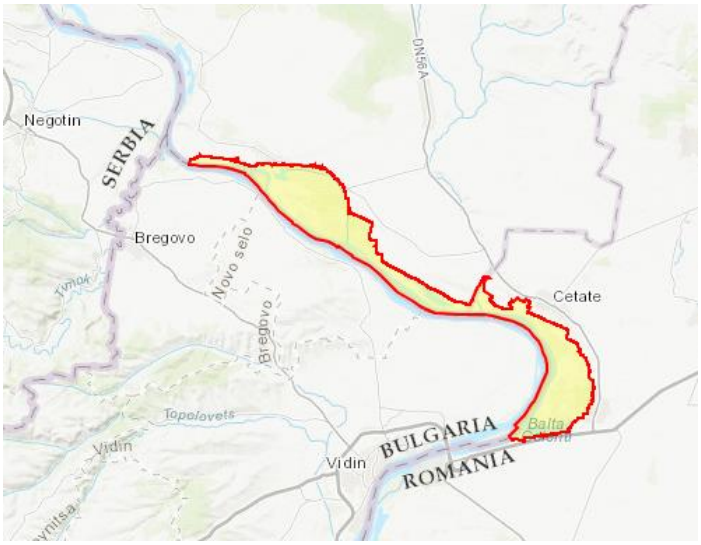

Figure 11. Natura 2000 area Dunărea la Gârla Mare - Maglavit – ROSAC0299

Natura 2000 area Timok – BG0000525, Bulgaria

Natura 2000 Timok area (area code BG0000525), is distant over 9 km from the subject construction area, and is located in the lower part of the Timok river basin, which represents the natural border of Serbia and Bulgaria (Figure 9), has a total area of 457.65 ha, was declared in 2007th (SG 21/2007), while border corrections were made in 2021 2023rd as an area of importance according to the Habitats Directive (92/43/EEC), primarily for the protection of five significant habitat types (State Gazette of Bulgaria 42/2023): 2340 – Pannonian land dunes (28.38 ha), 3270 – Rivers dominated by fine fractions of sediment and along the vegetation banks of *Chenopodion rubri* pp and *Bidentio* (12.42 ha), 6210 – Semi-natural dry areas under grasses and shrub vegetation on limestone surfaces of *Festuco-Brometalia* (especially important for orchids, with an area of 3.76 ha), 91E0 – alluvial forests with species of *Alnus glutinosa* and *Fraxinus excelsior* (*Alno- Padion, Alnion incanae, Salicion albae* – an area of 7.89 ha) and Peripheral (riparian) mixed forests along large rivers with species of *Quercus robur, Ulmus laevis, U. minor* and *Fraxinus excelsior* (*Ulmenion minoris*, with an area of 1.52 ha).

The area is also important for the protection of two species of insects – the Alpine longhorn beetle *Rosalia alpina* and the European stag beetle *Lucanus* cervus (Coleoptera), seven species of fish, two species of amphibians and reptiles each, then the species of Romanian hamster *Mesocricetus newtoni*, and the greater horseshoe bat *Rhinolophus ferrumequinum*.

The area is significant for birds, but precise data on identified species are not available.

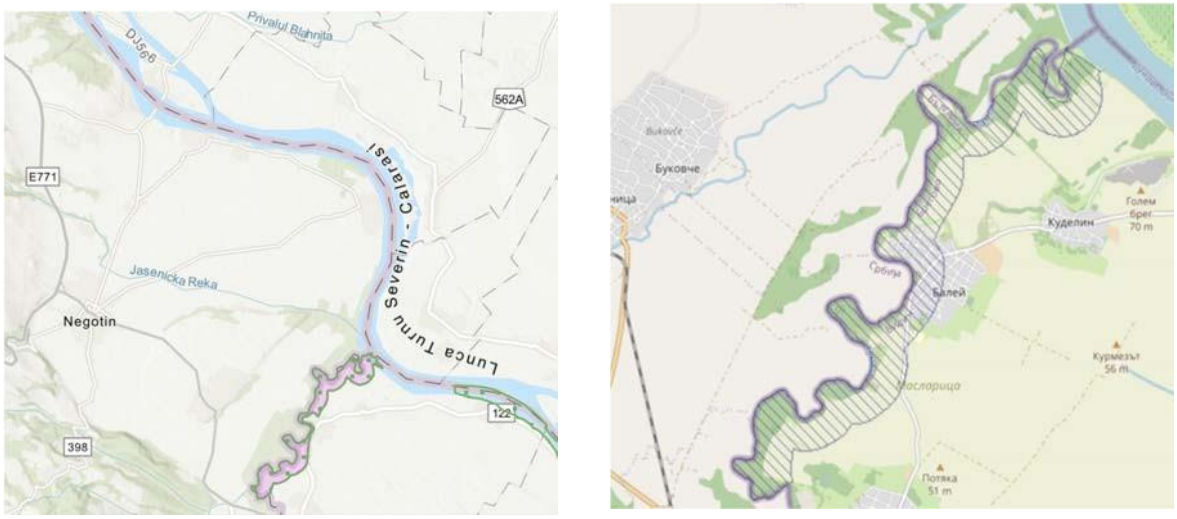

Figure 12: Natura 2000 area Timok – BG0000525, Bulgaria

Natura 2000 area Novo selo – BG0000631, Bulgaria

Natura 2000 area Novo selo (area code BG0000631) is located along the right bank of the Danube, downstream from the mouth of the Timok, i.e. from the border of Serbia and Bulgaria (Figure 13).

The protected area is a little over 16 km as the crow flies, at the closest point, from the area where construction is planned.

The site was declared a part of the Natura 2000 network in Bulgaria in 2010 (SG 96/2010), and in 2021 the borders were corrected (SG 67/2021), covering an area of 814.1 ha.

According to the official information system of the Bulgarian Environment Agency (https://natura2000.egov.bg/EsriBg.Natura.Public.Web.App/Home/ProtectedSite?code=BG0000631&siteTyp e= HabitatDirective), the area is of particular importance for migratory fish species.

The area is important for the protection of the freshwater thick shelled river mussel, *Unio* crassus, as well as 13 species of fish and Eurasian otter (*Lutra lutra*).

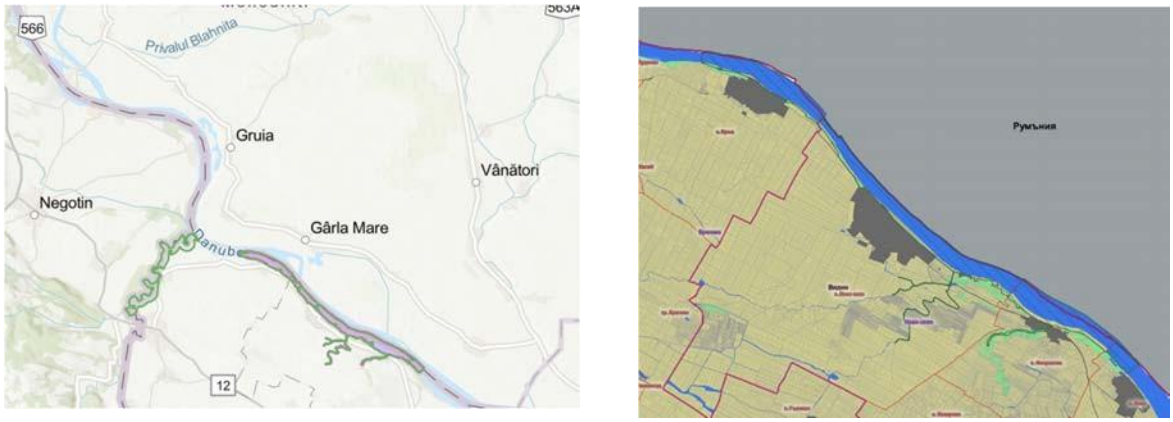

Figure 13: Natura 2000 area Novo selo – BG0000631, Bulgaria

Assessment of potential cross-border impacts

Residual (after the application of the best available technologies and measures) cross-border impacts of the construction and operation of the plant in question can be characterized as negligible.

This refers to areas protected from the aspect of preserving biodiversity, new species and important habitats, as well as preserving ecological connectivity - ecological corridors.

The expected intensity of works on the construction of the plant does not include activities that cause impacts over a longer distance, as well as in the downstream sector of the Danube, i.e. impacts are expected locally, in an industrial zone that is not significant from the aspect of biological diversity.

As previously noted, the investor's commitment is to use the best available technologies in the operational phase of the plant. This approach encompasses the planning and implementation of measures to prevent air, soil and water pollution, the application of advanced material disposal technologies, as well as measures to prevent accidents. Accordingly, cross-border residual impacts on biodiversity are not expected.

Regarding the impacts on habitat connectivity, i.e. the establishment and functionality of ecological corridors, we point out that the construction is carried out within the spatial scope on areas that are not under autochthonous vegetation, do not represent significant habitats, and additional impacts on ecological corridors are not expected.

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