



# *River bird survey on Danube in Serbia (1298-1433 river kilometer)*

WP T1/ACTIVITY A.T1.1

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## IMPRESSUM

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## I. SUMMARY

River bird survey was conducted during 2021 and 2022 on Danube river in Serbia (1298-1433 river kilometer) in order to monitor breeding populations of 7 species of river birds: Little ringed plover *Charadrius dubius*, Common Sandpiper *Actitis hypoleucos*, Common Tern *Sterna hirundo*, Little tern *Sternula albifrons*, Kingfisher *Alcedo atthis*, European Bee-eater *Merops apiaster* and Sand Martin *Riparia riparia*. Beside populations of selected species, monitoring of their habitats – river islets and steep river banks was conducted on a section of Danube. Additionally, observation of White tailed Eagle *Haliaeetus albicilla* and Black Stork *Ciconia nigra* were recorded. Breeding and non-breeding individuals of the selected species were recorded. In 2021, survey started on July 8th, and finished on July 22th due to high water level througho in the end of May and beginning of June, and second time in the first half of July. With a help of rangers from “Vojvodinašume” and Sportsko rekreativni centar „Tikvara“ public companies, small boats were used for survey of main river bed as well as main river backwaters (Mišvald, Hagla etc). Water level suitable for forming river islets was determined according to interviews with local rangers. Little ringed plover was found at 5 locations (11 breeding pairs) in 2021, and at 6 locations (7-8 breeding pairs) in 2022. Common sandpipers were recorded at many sites (103 locations in 2021 and 46 in 2022) during July, but without any breeding evidence. Unsuccessful attempt of one pair of Little terns was recorded on the islet near Staklara (vicinity of Aljmaš) in 2021. Common terns were recorded once, without any breeding evidence. In total, Kingfisher was found at 27 locations in 2021, and 46 locations in 2022, when the breeding population was estimated at 23-30 breeding pairs. Breeding of European bee-eater was recorded at 4 sites (population estimated to 14 pairs) in 2021, and only one site in 2022 (9-13 breeding pairs). Sand martin colonies were found at 5 locations, with population estimated to 273 breeding pairs in 2021, and 3 colonies with 350-420 breeding pairs were active in 2022. White tailed Eagle was widespread throughout the entire survey area (30 locations in 2021, 46 locations in 2022). Black stork observations were mainly recorded in the zone between Apatin and Vukovar (6 locations in 2021 and 10 locations in 2022). We estimated that there were no successful breeding of selected species on islets both in 2021 and 2022 within the survey area, at least during period of research.

## II. SAŽETAK

Попис речних птица спроведен је у току 2021 и 2022. године на Дунаву у Србији (1298-1433 км речног тока) са циљем праћења популације 7 врста птица које су означене као индикатори стања река: жалар слепић *Charadrius dubius*, полојка *Actitis hypoleucos*, мала чигра *Sternula albifrons*, обична чигра *Sterna hirundo*, водомар *Alcedo atthis*, пчеларица *Merops apiaster* и брегуница *Riparia riparia*. Поред мониторинга популација индикаторских врста, циљ је био извршити мониторинг гнездећих станишта – речних спрудова и обалних одсека на одабраном делу тока Дунава. Осим циљаних врста, на терену су прикупљени подаци о белорепану *Haliaeetus albicilla* и црној роди *Ciconia nigra*. На терену су поред гнездећих

бележене и негнездеће јединке. Због високог водостаја, попис је у 2021. започео тек од 8.7.2021. и завршен је 22.7.2021. У 2022. спроведена су два обиласака терена: први крајем маја и почетком јуна, а други у првој половини јула. Птице су посматране из чамца којима су управљали рибочувари из ЈП „Војводина шуме“ и ЈП Спортско рекреативни центар „Тиквара“. Пописиване су посматране јединке са српске и хрварске стране, али су обале у Србији прегледане детаљније. Осим главног тока Дунава, попис је спроведен и на већини великих рукаваца (Мишвалд, Хагла и др). На основу анкетања рибочувара на терену, добијене су информације о водостају приликом којих се појављују речни спрудови. Жалар слепић забележен је током 2021 (5 локалитета, 11 парова) и 2022 године (6 локалитета, 7-8 гнездећих парова). Полојка је забележена на великом броју локалитета (103 у 2021, 46 у 2022.) у јулу током обе године, али без индикација гнежђења. Обична чигра забележена је само једном у прелету, без индикација гнежђења. Забележен је један неуспешан покушај гнежђења мале чигре на спруду код Стакларе (близу Аљмаша). У 2021 години забележено је 27 посматрања водомара, док је у 2022. врста посматрана на 46 локалитета, а популација процењена на 23-30 гнездећих парова. Гнежђење пчеларица утврђено је на 4 локалитета у 2021 (14 парова), док се у 2022 гнездила на једном локалитету (9-13 гнездећих парова). Брегунице су се у 2021 гнездиле на 5 локалитета (укупна бројност процењена на 273 пара), док су у 2022 пронађене 3 колоније са укупно 350-420 гнездећих парова. Белорепан је посматран на целом истраживаном подручју (30 локалитета у 2021 и 45 у 2022), док су налази црне роде (6 локалитета у 2021. и 10 локалитета у 2022) концентрисани на подручју између Апатина и Вуковара. Процењено је да у 2021 и 2022 врсте које се гнезде на речним спрудовима на истраживаном подручју нису имале успешно гнежђење за време истраживања.

### III FIELDWORK METHODS

#### A. – Survey area description

River bird survey was conducted on a section of Danube river from 1298 to 1433 river kilometer (Bačka Palanka to Batina, Figure 1). Beside the main river course, few of the large river backwaters (Mišvald, Hagla, etc) that were accessible by boat, were also visited. Survey area includes Gornje podunavlje and Karađorđevo Special natural reserves and Tikvara Nature park. In 2021, both Serbian and Croatian sides of the river were covered by observation, although data from the Serbian side were more detailed. In second year of fieldwork, eastern side of river and large river backwaters were investigated carefully for breeding sites of Kingfishers, Sand martins and European bee-eaters nests, while data on those species observed on Croatian side of river were scarce, since detailed observation was not possible, due to state border access restriction.

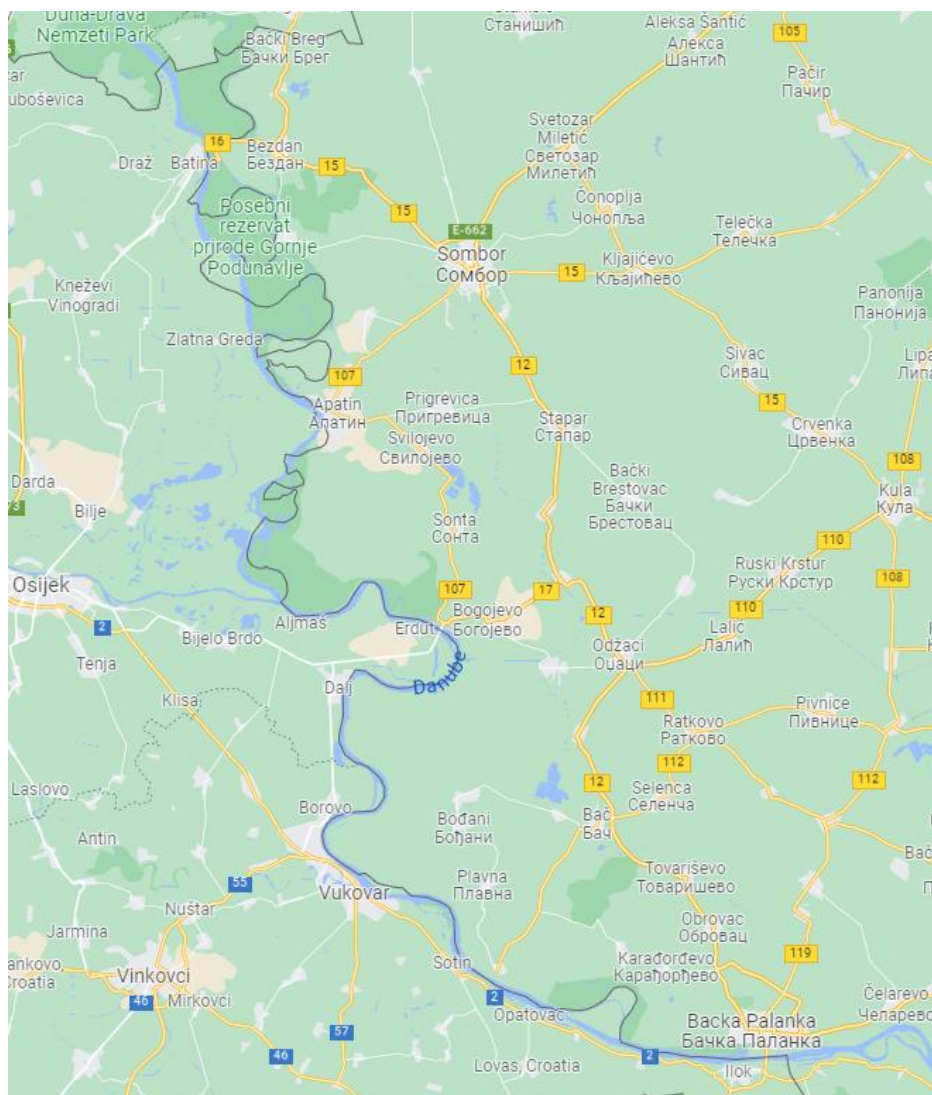


Figure 1. Survey are (<https://www.google.com/maps>)

## B - Fieldwork methods description

The main goal of the survey was to monitor seven bird species which are indicators of river dynamics: Little ringed Plover, Common Sandpiper, Little Tern, Common Tern, Kingfisher, European Bee-eater and Sand Martin. Beside those species, data on White tailed Eagle and Black Stork were collected. Both breeding and nonbreeding individuals were recorded.

In 2021, six day of fieldwork took place between July 8<sup>th</sup> and July 22<sup>th</sup>. According to recommended methodology, river bird survey should be carried 10 days after high water level, which was not possible in 2021 because of high water level during the entire breeding season (except in April and shortly at the beginning of June). However, fieldwork was conducted during the period when species that nests on sand islet had the highest probability to start breeding.

In 2022, a selected part of the Danube river was visited twice (seven days): between May 23<sup>rd</sup> and June 3<sup>rd</sup> and July 12<sup>th</sup> and July 14<sup>th</sup>. The main goal of the first visit was mapping of Kingfisher, European Bee-eater and Sand Martin nesting sites. Second visits were conducted 10 to 15 days after high water levels (according to recommended methodology) in order to record species that nests on sand islets: Little ringed Plover, Common Sandpiper, Little Tern and Common Tern. Suitable water level was estimated according to information derived from the local fish rangers.

Birds were observed from the boat with the help of rangers from “Vojvodinašume” and “Sportsko rekreativni centar Tikvara” Public enterprises. Exact locations of observed individuals and their suitable habitats were recorded with GPS devices. Dimension and vegetation on potential nesting sites, such as river islets and steep river banks (sand or loes) were described briefly. Larger river islands, with developed forest as well as stony structures for river course control were not considered suitable nesting sites for selected species. Steep slopes outside of direct river influence were not covered by survey. Smaller steep river banks (less than 10 m long and 1.5 m high) were recorded and described only if potential nests of selected key species were present. Very large sand islets were surveyed on foot if complete coverage was impossible by observation from boat. For all observations, we choose one of 16 breeding codes which describes the strongest evidence of breeding on location. For every record, we counted observed individuals and estimated number of breeding pairs (if there was indication of breeding). In the case of Sand Martin and European bee-eater colonies, beside counting of observed individuals, we separately estimated the number of nest burrows and breeding pairs. If presumably non-breeding individuals were observed outside of potential breeding sites, we skipped specific habitat description. All confirmed, probable and possible breeding sites were photographed. Water level was recorded at nearest control station (Bezdan, Apatin, Bogojevo and Bačka Palanka).

Table 1. Fieldwork days at survey area in 2021 and 2022. <i>Табела 1. Обиласци истраживаног подручја у 2021. и 2022. години</i>		
Date <i>Датум</i>	Danube section <i>Део Дунава</i>	Observers <i>Посматрачи</i>
8.7.2021	1298. - 1308. km	Dimitrije Radišić
13.7.2021	1408. - 1433. km	Dimitrije Radišić
14.7.2021	1375. - 1408. km	Dimitrije Radišić
15.7.2021	1355. - 1375. km	Dimitrije Radišić
21.7.2021	1328. - 1355. km	Dimitrije Radišić
22.7.2021	1308. - 1328. km	Dimitrije Radišić
23.5.2022	1308. - 1356. km	Dimitrije Radišić, Nikola Veljković
24.5.2022	1298. - 1308. km	Dimitrije Radišić
25.5.2022	1433. - 1382. km	Dimitrije Radišić, Nikola Veljković, Miroslav Dudok
3.6.2022	1356. - 1382. km	Dimitrije Radišić
12.7.2022	1308-1363	Dimitrije Radišić
12.7.2022	1408 – 1433	Nikola Veljković, Miroslav Dudok
14.7.2022	1363 – 1408	Dimitrije Radišić

## B. Data analysis

Data gathered in 2021. were delivered to contracting authority in MS excel file and shp file with title: 2021\_05\_24\_river\_bird\_data\_tabele\_combined\_to\_experts\_review\_report\_dimitrije\_radisi c\_8.9.2021. Data gathered in 2022. are delivered in MS excel file and shp file with title: 2022\_river\_bird\_data\_tabele\_combined\_to\_experts\_review\_report\_dimitrije\_radisic\_17.7.2022.

Data on observation of breeding and non-breeding individuals were gathered and compiled in a uniform data table, according to instruction for all experts included in the project. Obligatory data for all records were: ID od the record, English name of species, Latin name of species, GPS point title, Date, Latitude (WG84), Longitude (WG84), Number of individuals, Number of breeding pairs, Highest atlas code, ID of habitat photo, Name of observer who recorded and identified species, County name and River name. Other recommended data were: River kilometer, Nearest settlement, Water conditions and Notes.

GPS locations were marked with numbers in case of individuals outside of their potential nesting sites, and with combination of letters and numbers in case of potential nesting sites on river islets and in steep river banks. Report includes photos of habitats on potential nesting sites. In a few cases, smaller stretches of steep river banks where Kingfishers were observed were marked only with numbers.



Data on river kilometers were later added according to the Map of Danube river traffic corridor (<http://www.plovput.rs/vesti/1/1047>). Names of river backwaters were used for column “River kilometer” in cases of observations recorded outside of the main river course. Names of the nearest settlements were checked via Google maps (<https://www.google.com/maps>). In column “Water condition” we entered the water level measured that day at the nearest control station ([http://www.hidmet.gov.rs/latin/prognoza/prognoza\\_voda.php](http://www.hidmet.gov.rs/latin/prognoza/prognoza_voda.php)) with the name of the control station. Additional comments of observed individual behaviours were added in column “Notes”.

## IV RESULTS AND EXPERT OPINION OF BREEDING SUCCESS

### A Report for survey in 2021

Survey on river birds on a section of Danube river between 1298 and 1433 river kilometers was successful in 2021. According to recommendation, visits should take place 10 days after high water levels. According to interviews with rangers, river islets appear when water level on Bezdan control station is around 200 cm, but their full size is revealed at water level beneath 100 cm. Water level lower than 200 was present on the Danube river only during the first 10 days of July ([http://www.hidmet.gov.rs/latin/prognoza/prognoza\\_voda.php](http://www.hidmet.gov.rs/latin/prognoza/prognoza_voda.php)), and it was higher during the whole breeding season.

Continuous monitoring of river birds in Serbia does not exist. Thus, data from 2021. could not be compared with previous data. Survey conducted in 2021. and 2022. is an important step toward establishing proper river bird monitoring in the country.

Data base included in this report consists of 181 records on observation of breeding and non-breeding individuals of selected bird species (Figure 2) during 2021. Survey results on population size and breeding success in 2021. are summarized and present by selected species in this chapter of report.



Figure 2. All records on selected species in 2021

### Little ringed Plover *Charadrius dubius*

Little ringed Plovers were recorded on 5 islets (Figure 3) and the total breeding population in 2021 was estimated at 11 pairs. All breeding sites were near Bački Monoštor, Apatin, Aljmaš and Erdut, between 1375 and 1418 river kilometers. It's possible that species bred on suitable sites downstream, but water level increased rapidly after July 14th and completely covered suitable islets. Pairs and small groups of individuals that sometimes displayed disturbed behaviour were observed on suitable sand or rarely muddy islets. Islets with potential breeding pairs were without vegetation or sparsely vegetated with pioneer plants or very young willow bushes, while older trees were rarely present on small patches of islets. It was estimated that during survey period Little ringed Plovers were not breeding successfully on selected section of Danube river

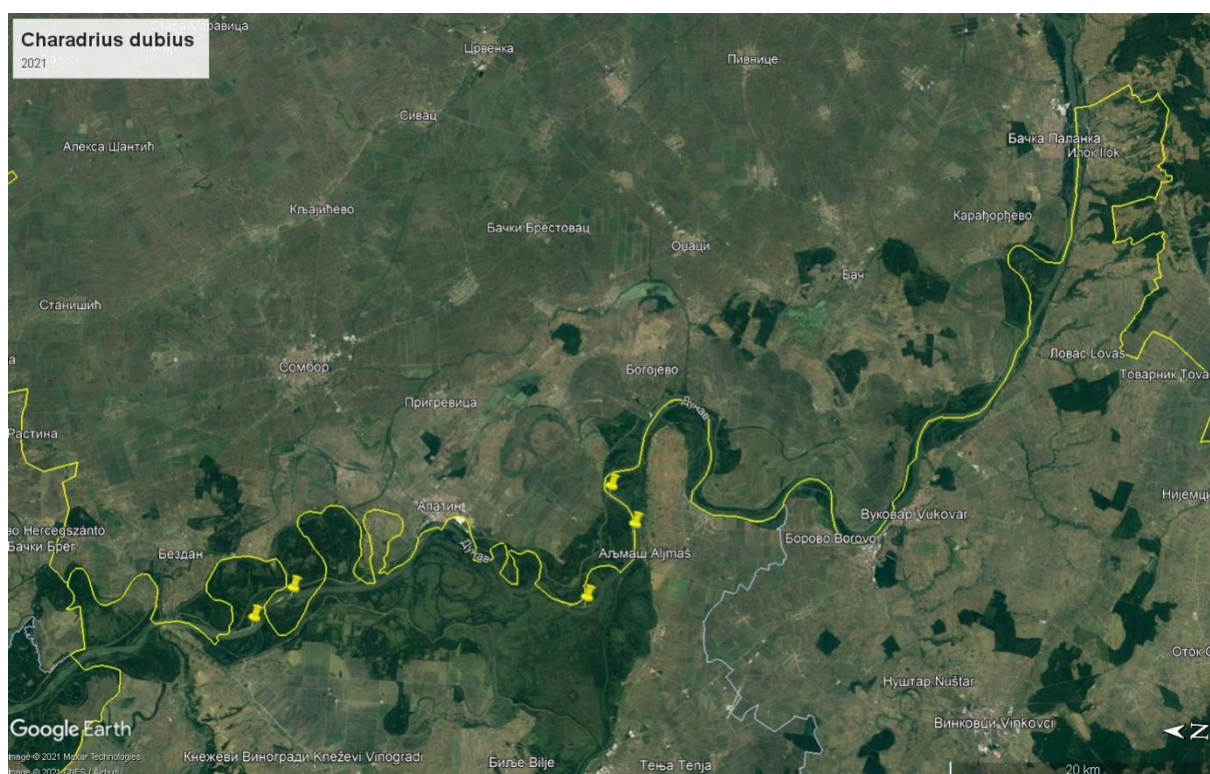


Figure 3. Records of Little ringed Plover in 2021

### Common Sandpiper *Actitis hypoleucos*

Common sandpiper was recorded at 103 locations (Figure 4), but without indication of breeding. Solitary individuals and occasionally small groups were observed. Small groups were found on river islets near Bezdán and Apatin. Species was distributed quite uniformly throughout the survey area, which indicates migration and dispersal movements. It is estimated that the Common sandpipers were not breeding at survey area in 2021.



Figure 4. Records of Common Sandpiper in 2021

#### Common Tern *Sterna hirundo*

One overflying individual was observed near Bačka Palanka (Figure 5). There was no indication that Common tern was breeding on river islets in 2021. Breeding of the species on river islets on Danube river has not been recorded during last decades (Puzović et al, 2015)

#### Little Tern *Sternula albifrons*

One pair of Little Tern was recorded on sandy river islet near Staklara (near Aljmaš, Figure 6). Two disturbed adult individuals were standing on the sand and attacked Whiskered terns that were hunting nearby. The male was seen with a small fish that was given to the female. Observed situation was probably an unsuccessful breeding attempt, since the islet was completely flooded the day after due to increased water level. Breeding of Little tern on river islets on surveyed section of Danube river has not been recorded during last decades (Puzović et al, 2015)

#### Kingfisher *Alcedo atthis*

Kingfishers were recorded at 27 locations (Figure 7) that could be considered breeding territories, although nesting burrows were not observed in most cases. Active nests (confirmed breeding) were not found, but adult individuals were observed in the vicinity of suitable steep river banks with potential burrows on a few occasions. Records were distributed relatively uniformly on Danube river main course and river backwater throughout the survey area. At the time of survey, most pairs have finished breeding season which is why many individuals were observed relatively far from suitable steep

river banks. Kingfisher census would be more effective earlier in the season, when river backwater (inaccessible during low water level) should be in focus of the research.



Figure 5. Record of Common Tern in 2021.

### European Bee-eater *Merops apiaster*

Four small colonies of European Bee-eaters were recorded (Figure 8), with a total population estimated at 14 breeding pairs. Three colonies were found in steep loes banks between Dalj and Vukovar, and one colony was located in sand bank of Hagla backwater. Solitary individuals were observed overflying on a few locations downstream from Dalj, where species was possibly breeding in higher banks further from the river and outside of its water direct influence (however, those individuals were not recorded in the database and their number was generally small). All recorded colonies were quite small, with few breeding pairs, although the number of older nest burrows was sometimes much larger (many of the nest burrows were inactive).

### Sand Martin *Riparia riparia*

Breeding was recorded on five steep river banks (Figure 9); among them, three colonies were larger than 100 pairs, and two consisted of less than 10 breeding pairs. Two colonies (140 and 145 nest burrows, or 130 and 120 breeding pairs, respectively) were found between 1372 and 1345 river kilometers, on the Serbian side of the river in sand banks. Some nest burrows were abandoned, newly fledged individuals were observed and part of the river bank with nest burrows had collapsed due to change in water level. One colony (20 breeding pairs, and larger number of abandoned nest burrows – cca 60) was found in loes bank on Croatian side at 1347 river kilometr.

Additionally, two small colonies with only few breeding pairs, where inactive nest burrows were prevalent, were found. Total population was estimated at cca 273 breeding pairs. It seems that the majority of breeding pairs had finished successfully breeding in the early part of season, while many attempts in the later phase were unsuccessful due to water level change in July.



Figure 6. Record of Little Tern in 2021.

### White tailed Eagle *Haliaeetus albicilla*

In total, 30 records of White tailed Eagle were collected. Records show relatively uniform distribution throughout the survey area (Figure 10). individuals of different ages were observed in flight or perching on trees near rivers. Some individuals were observed in the vicinity of documented nests (according to interviews with rangers). However, data on white tailed Eagle collected during this survey does not contribute significantly to general knowledge on species distribution and population size in Serbia since individuals of such highly mobile species were moving across whole area, which is well documented hotspot for White tailed eagles with largest breeding density in Serbia (Puzović et al, 2015)

### Crna roda *Ciconia nigra*

Black stork was observed at six locations (Figure 11). Observed individuals were in post breeding dispersion and they were usually found at feeding habitats (shallow river oxbows) or resting on trees. Survey area includes Gornje Podunavlje special nature reserve, which is a well documented hotspot for black stork in Serbia, with highest breeding density (Puzović et al, 2015).



Figure 7. Records of Kingfisher in 2021.



Figure 8. Records of Europea Bee-eaters in 2021.



Figure 9. Records of Sand Martin in 2021.



Figure 10. Record of White tailed Eagle in 2021.



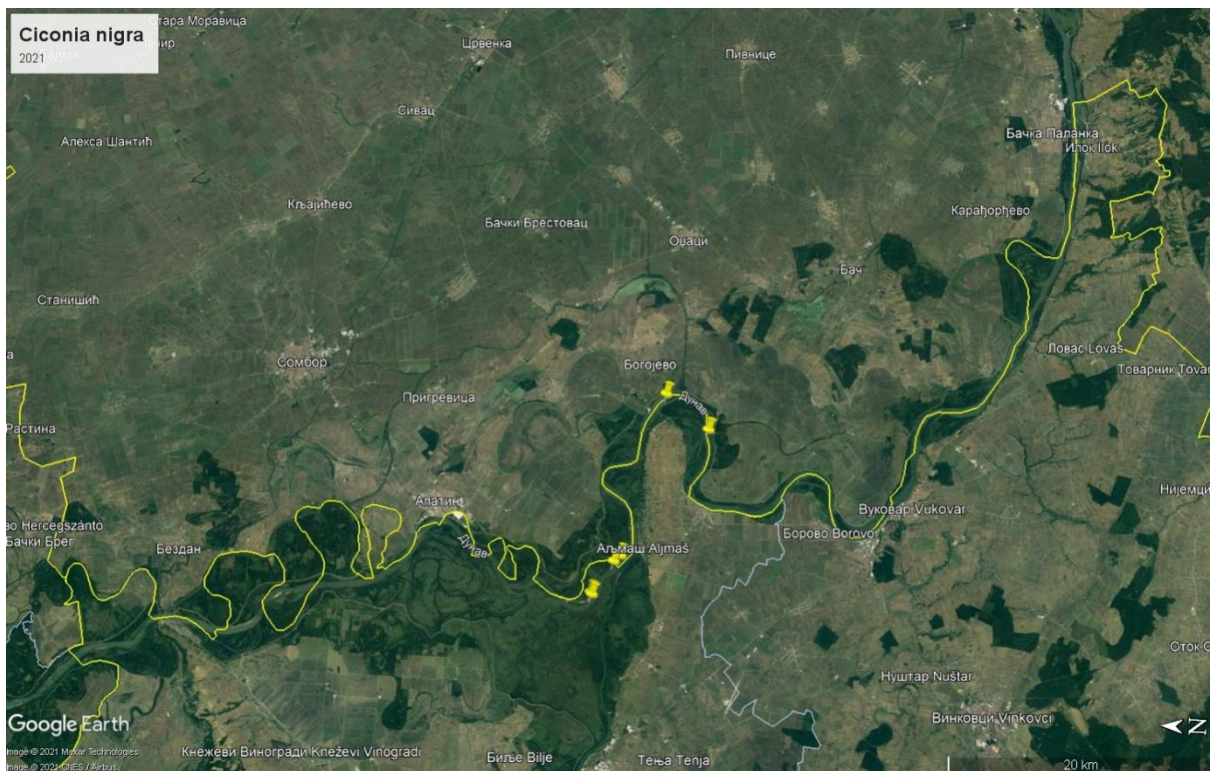


Figure 11. Records of Black Stork in 2021.

## B Report for the survey in 2022

Survey on river birds on Danube river between 1298 and 1433 river kilometers was successfully conducted in 2022. Beside main river course of Danube river, large river backwaters on eastern side of river (Mišvald, Hagla etc) were visited. Survey was conducted according recommended methodology: first visit took place at the end of May in order to collect data on distribution of Kingfisher, Sand Martin end European bee-eater; second visit was organized approximately 10 days after high water levels, when the possibility for breeding of Little ringed Plover, Common Sandpiper, Common and Little Tern on river islets is highest. Water level below 100 cm at Bezdan control station, when fully sized river islets emerge had been recorded in March, few days at the end of May and June (but with variation), and since the middle of July ([http://www.hidmet.gov.rs/latin/prognoza/prognoza\\_voda.php](http://www.hidmet.gov.rs/latin/prognoza/prognoza_voda.php))

Survey in 2022. was a continuation of a program started in 2021 and presents an important step toward establishing the monitoring of river bird populations in Serbia.

Database included in this report consists of 161 records for 2022 (Figure 12). All records in the database describe observations of breeding and non-breeding individuals of the selected species of river birds. In further text, we summarized and commented on the results of a survey conducted in 2022.



Figure 12. All records on selected species in 2022.

### Little ringed Plover *Charadrius dubius*

Little ringed plover was recorded on six river islands in 2022 (Figure 13). Total population is estimated at 7 or 8 breeding pairs. All potential breeding sites were formed upstream from 1345 river kilometr, while suitable islets were not found more downstream (yet, their presence during lower water level cant be excluded). Pairs or solitary individuals were observed, and disturbed behaviour of the adult individuals (which was the strongest evidence of breeding) was recorded at two sites. Potential breeding sites were sandy river islets without vegetation, or sparsely vegetated by pioneer plants. On two sites, potential breeding territories were found on sandy shores of larger, well forested river islands, sometimes connected to the river shore. For a year 2022, it is estimated that there were no successful breeding of Little ringed Plover by the end of survey period due to relatively high water level in first half of year. However, it is possible that few pairs had successful breeding after mid July. On two sites, Little ring plovers had been recorded in both years of survey, on three sites they were present only in 2021, and four new potential breeding sites were recorded in 2022.

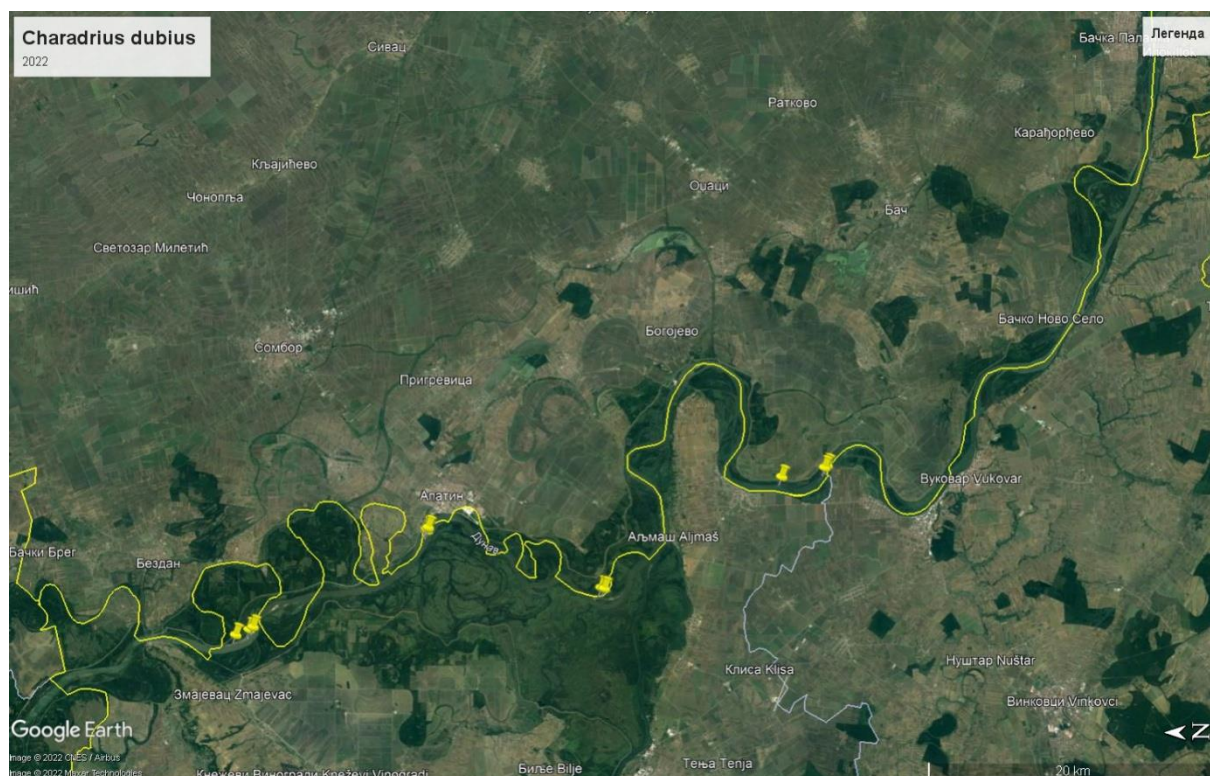


Figure 13. Records of Little ringed Plovers in 2022.

### Common Sandpiper *Actitis hypoleucos*

Common Sandpipers were recorded at 46 locations (Figure 14), but without indications of breeding. All records originate from July, when migration movements are regular in Serbia. Usually, solitary individuals were observed, while small groups (up to 10 individuals) were gathering on few sandy islets. Species was distributed quite uniformly throughout the survey area, which indicates migration and dispersal

movements. As for 2021, it is estimated that Common Sandpiper was not breeding on a selected part of Danube in 2022.



Figure 14. Records of Common Sandpiper in 2022.

#### Common Tern *Sterna hirundo*

Species was not recorded in 2022, although suitable river islets appeared on few locations by the end of June. Breeding of Common Tern on river islets on Danube river has not been recorded during last decades (Puzović et al, 2015)

#### Little Tern *Sternula albifrons*

Little tern was not recorded in 2022, although suitable river islets appeared on few locations by the end of June. Breeding of the species on river islets on Danube river has not been recorded during last decades (Puzović et al, 2015).

#### European Bee-eater *Merops apiaster*

Only one small colony was found (Hagla near Mladenovo), while solitary individuals or small groups were observed flying, but without indication of breeding. In 2022, a survey of western (Croatian) cost of river was not conducted by our team, so few breeding sites in loes bank near Dalj were potentially overlooked. In a colony that is formed in a steep sand river bank at Hagla , 58 nest burrows were counted; however only few of them were active, and total population on site was estimated at 9 to 13 (11) breeding pairs.



Figure 15. Records of European Bee-eaters in 2022.

### Kingfisher *Alcedo atthis*

Kingfisher was recorded at 35 locations (Figure 16), among which 26 were found during the first visit (23 to 25 breeding territories). Later observation (from July) probably included dispersing individuals, but presence of adult individuals at the end of May and the beginning of June has been considered as strong evidence of breeding territories. Active nest burrows were recorded in 7 cases. Newly fledged individuals were found at one location, pairs at three sites, while in the rest of cases only solitary adult individuals were observed. Kingfisher was distributed relatively uniformly on the main river course and river backwater, but highest density of records was found on sections between 1374 and 1378, and 1345 and 1350 river kilometers, as well as on Mišvald and Hagla. Smaller backwaters (where potentially significant number of pairs breeds) were inaccessible in most of 2022 due to low water level. Population was estimated at 23 to 30 breeding pairs. Location where kingfishers were observed in 2022 poorly matched the locations from 2021 (only 7 records were within 1 km radius from previous year observation). Due to the relatively late period when survey was conducted in 2021, it is impossible to conclude whether Kingfishers regularly change breeding sites on Danube, or individuals recorded in 2021. were largely observed outside of their breeding territories.



Figure 16. Records of Kingfisher 2022.

### *Sand Martin Riparia riparia*

Breeding colonies were found in two steep river sand banks on the east side and on one location on the west side of the river. Beside the breeding colonies, small groups of flying individuals were recorded at two locations (Figure 17). Population in the colony located at 1371 river kilometers was estimated at 120-150 breeding pairs on the first visit (on June 6<sup>th</sup>), but part of the river bank had later collapsed which led to decrease of number breeding pairs (cca 50 on July 14<sup>th</sup>). Colony located on 1345 river kilometers was almost completely abandoned, with only 3 breeding pairs found on July 12<sup>th</sup>. In contrast, a large colony (cca 290 nest burrows and 230-260 breeding pairs) located in a nearby sand bank on the Croatian side of river (1347) was formed during 2022. Breeding in higher loes river banks was not confirmed in 2022. Total population that bred in banks on the east side of the river was estimated at 120-160 breeding pairs, which is a significant decline compared to the year 2021, especially due to the fact that 50-70% of nest burrows had been destroyed due to river bank collapse during breeding season. However, together with colonies on the Croatian side of the river, the total population is estimated to 350-420 breeding pairs, which presents increase compared to 2021. Remains of nest burrows found on Šarengradska ada show that a small colony was there in years previous to this survey.

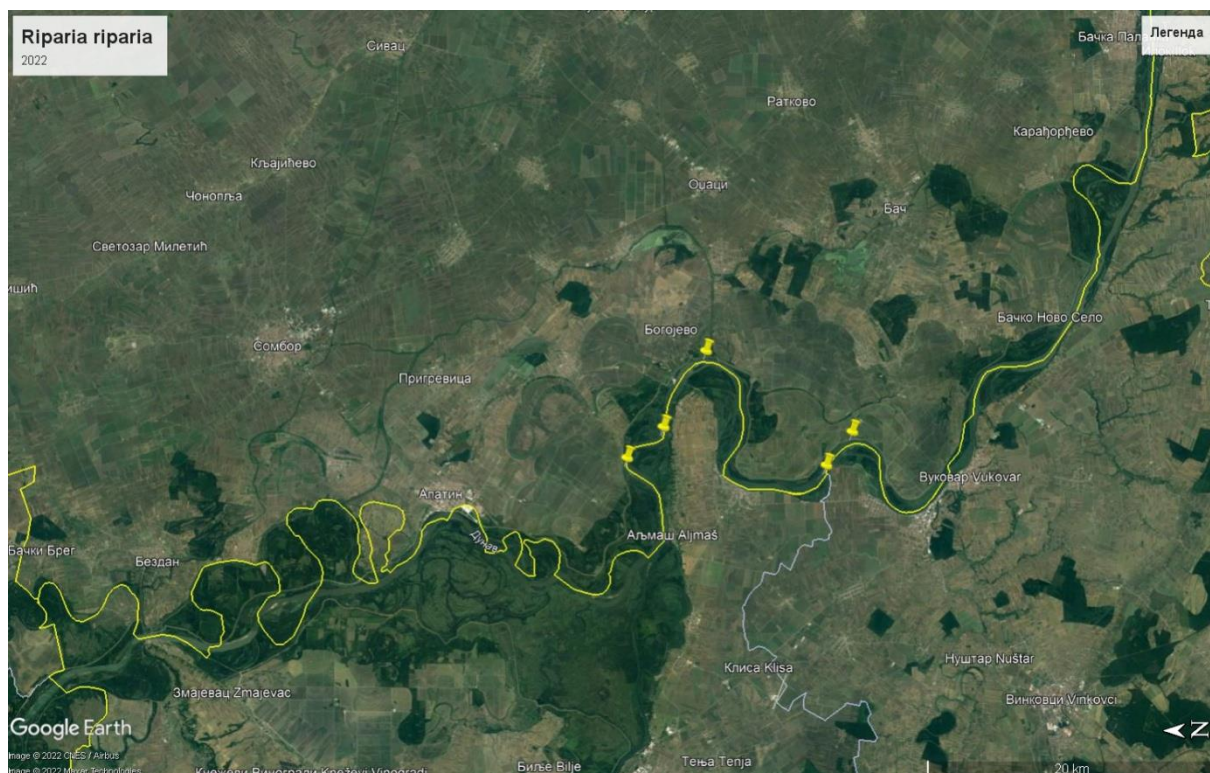


Figure 17. Records of Sand Martin in 2022.

### White tailed Eagle *Haliaeetus albicilla*

White tailed Eagle was recorded at 45 locations (Figure 18) which were relatively uniformly distributed throughout the survey area. However, the density of records was higher at the section between Apatin and Bogojеvo. Adult individuals were observed in most cases (37 observations), among which pairs were observed in 9 cases. Many of White tailed Eagle nest are documented previously within survey are, so data collected via this survey does not contribute significantly to general knowledge on species distribution and population size in Serbia. However, locations from 2021 and 2022 were matched in many cases, which indicates that fieldwork methodology used in this study could be useful for monitoring of white tailed Eagle distribution. Survey area is located within well documented Wite tailed Eagle hotspot with highest breeding density in Serbia (Puzović et al 2015)

### Black Stork *Ciconia nigra*

Black stork was found at 10 locations (Figure 19). Solitary individuals and (rarely) small groups were observed in flight of feeding on Danube coast or on shallow oxbows in flooded zone. All individuals were bserved between Apatin and Vukovar (as in 2021), but with highest density of observation on section between 1375 and 1386 river kilometr. Survey area includes Gornje Podunavlje special nature reserve, which is a well documented hotspot for black stork in Serbia, with highest breeding density (Puzović et al, 2015).



Figure 18. Records of White tailed Eagle in 2022.



Figure 19. Records of Black Stork in 2022.



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