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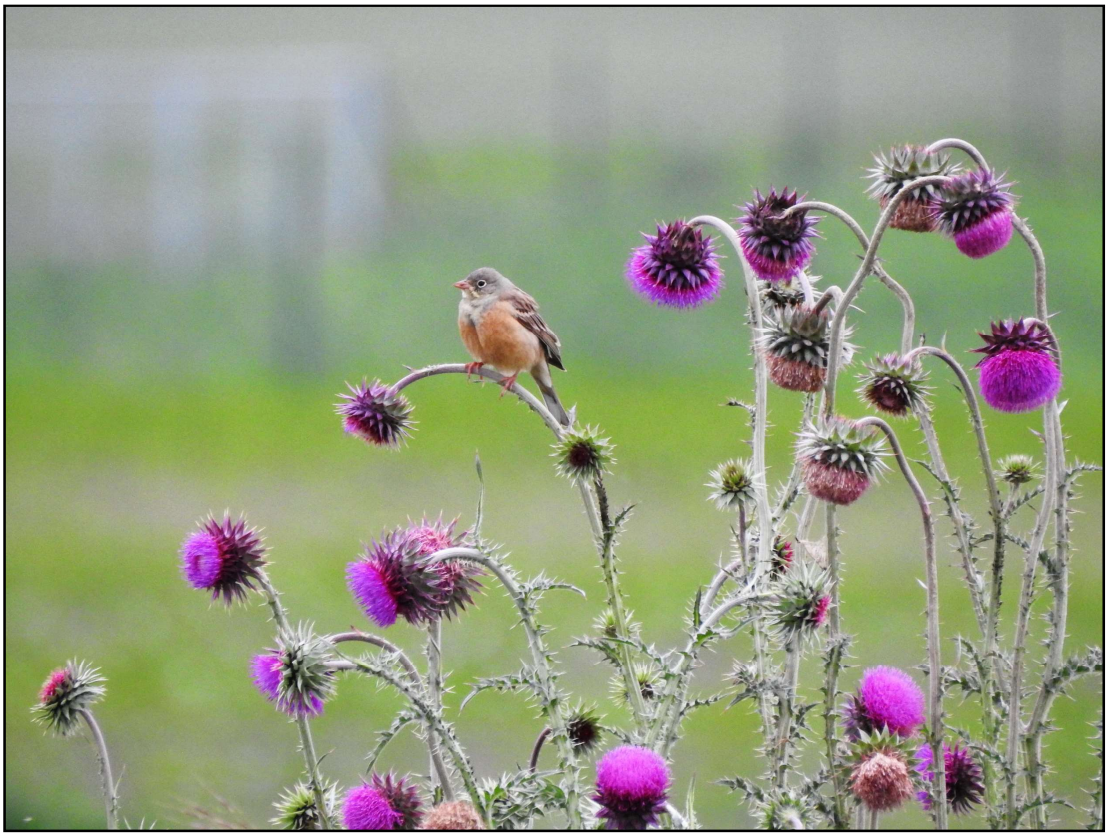
BIRD PROTECTION AND STUDY SOCIETY OF SERBIA



Long-term conservation of key biodiversity sites in Serbia – evaluation and designation of a new national network of Important Bird and Biodiversity Areas

- PROJECT REPORT -

Project:
Long-term conservation of key biodiversity sites in Serbia – evaluation and designation of a new national network of Important Bird and Biodiversity Areas

Project ID:
23302-B; The Rufford Small Grants Foundation

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LIST OF ACRONIMS

BPSSS – Bird Protection and Study Society of Serbia
BLI – BirdLife International
CSO(s) – Civil Society Organisation(s)
IBA(s) – Important Bird Area(s)
IWC – International Waterbird Cenzus
NGO – Non-governmental organisation
RSG – Rufford Small Grants

BACKGROUND

Important Bird Areas (IBA) programme

Important Bird and Biodiversity Areas represent a network of sites that are significant for the long-term viability of naturally occurring bird populations and other forms of biodiversity. It is an effective tool for long term protection of ecologically valuable areas, where nature conservation CSOs have a leading role in collecting, processing and presenting relevant scientific data to various stakeholders and general public. The IBA programme was developed by BirdLife International, a leading NGO in bird conservation worldwide. This concept has been developed and applied for over 30 years, with considerable effort being devoted to refining and agreeing a set of simple but robust criteria that can be applied worldwide. BirdLife Partners have, to date, identified and documented more than 12,000 sites in over 200 countries and territories worldwide, as well as is the marine environment. When complete, the global network will likely to comprise around 15,000 IBAs covering some 10 million km 2 (7% of the world's land surface).

The IBA network may be considered the minimum essential to ensure the survival of many of these species across their ranges and throughout their life cycles. Because some places are much richer in biodiversity than others, conserving a relatively modest network of sites is a cost-effective and efficient way of ensuring the survival of a large number of species. These sites provide nature conservation practitioners with a focus for conservation action, planning, and advocacy. IBAs are large enough to safeguard a viable population of a species, group of species, or entire avian community during at least part of its life-cycle, but are small enough to be conserved in their entirety.

IBA programme in Serbia

Previous IBA programme in Serbia was conducted within the period 2008-2009, when 42 sites were identified as IBAs, covering 1.259.624 ha, or 14,25% of the territory of Serbia (Puzović 2009). For this revision Serbia was eligible to use A (global) and B (European) designation criteria. Data used for this revision originate from the period 2003-2008.

The majority of the populations of birds which are conservation priorities in Serbia are located within the network of IBAs. These sites sustain high levels of species, habitat and landscape diversity. They are vital for long-term protection of resident and migrant bird species and therefore represent priorities in nature conservation in Serbia. Significant research of distribution, population sizes and trends of species which represent conservation priorities has been conducted in Serbia during the past decade. Special attention was given to priority habitats and ecosystems as well as numerous poorly researched areas, especially during the implementation of RSG projects "Survey and conservation of ecologically valuable limestone gorges in Serbia" and "Conservation of biodiversity through designation and promotion of new IBAs in Serbia". This data provided insight into current conservation status of priority bird species and threats which affect their populations, which differs significantly from data from the last revision of IBAs conducted from 2003-2008. Further research and analysis of collected and previously compiled data relevant to population dynamics of key species for conservation and associated threatening factors was therefore critical in order to assess the effectiveness of the existing IBA network for bird and biodiversity conservation and eventually

define borders of new IBA sites, as well as revise existing sites. Therefore, in 2017 the project team concluded that it was the right time to undertake a new revision process of the Important Bird Areas network in Serbia.

METHODOLOGY

Project site

The majority of field research conducted within this project was in sites in Southern and eastern Serbia, which showed potential for their designation as new IBAs. These sites were chosen thanks to data which was collected during previous ornithological work. This data gave insight into presence (or absence) of key species for conservation and for the IBA process and therefore further, more detailed research was needed in order to obtain adequate population estimates which were used for official designation of each site. Main habitat types which are represented in these sites are heterogeneous agricultural land, broad-leaved forests, natural grasslands (lowland and mountainous pastures), transitional woodland shrub and bare rock habitats, such as cliffs and gorges.

Figure 1. Prime habitats for Rock Partridge in E Serbia

Figure 2. Natural grasslands and pastures in SW Serbia

Second part of field research was conducted in IBAs which showed a significant lack of current data, necessary for production of valid and up to date population estimates of breeding bird species or wintering/migrating birds. The majority of these sites were situated in Northern (Vojvodina Province) and Western Serbia and mainly consist of heterogeneous agricultural land, broad-leaved and mixed forests and various types of water courses and bodies.

Field surveys

Field research was organized in several stages, in order to cover the full scope of bird diversity in selected sites, and was carried out for the purpose of acquiring precise estimates of population sizes for breeding and migrating/wintering bird species, each triggering its own respective IBA criteria. The majority of fieldwork was dedicated for gathering data about breeding bird species in potentially new IBA sites and was organized in form of expeditions, each lasting from 4-7 days, respectively. Shorter expedition, lasting from 2-4 days were carried out in already established IBAs which showed lack of quantitative data necessary for current population estimates (e.g. IBA Deliblato sands). Data about migrating/wintering populations was gathered within the framework of the International Waterbird Count (IWC) which Bird Protection and Study Society of Serbia

(BPSSS) has methodically been carrying out for the last 10 years. A total of 136 days was dedicated for conducting field research during 2018 and 2019.

Research related to acquiring current data relevant to distribution and abundance of key breeding species for conservation according to the IBA criteria was conducted through completion of predefined linear transects (Figure 3), which were set in suitable habitats for target species, mainly passerine species. Presence of each individual bird was recorded within 50m distance bands on both sides of the transect line which enabled us to calculate densities. The total length of each transect line was 3 km. In addition, point counts, suitable for various groups of birds such as woodpeckers, owls and birds of prey, were also conducted.

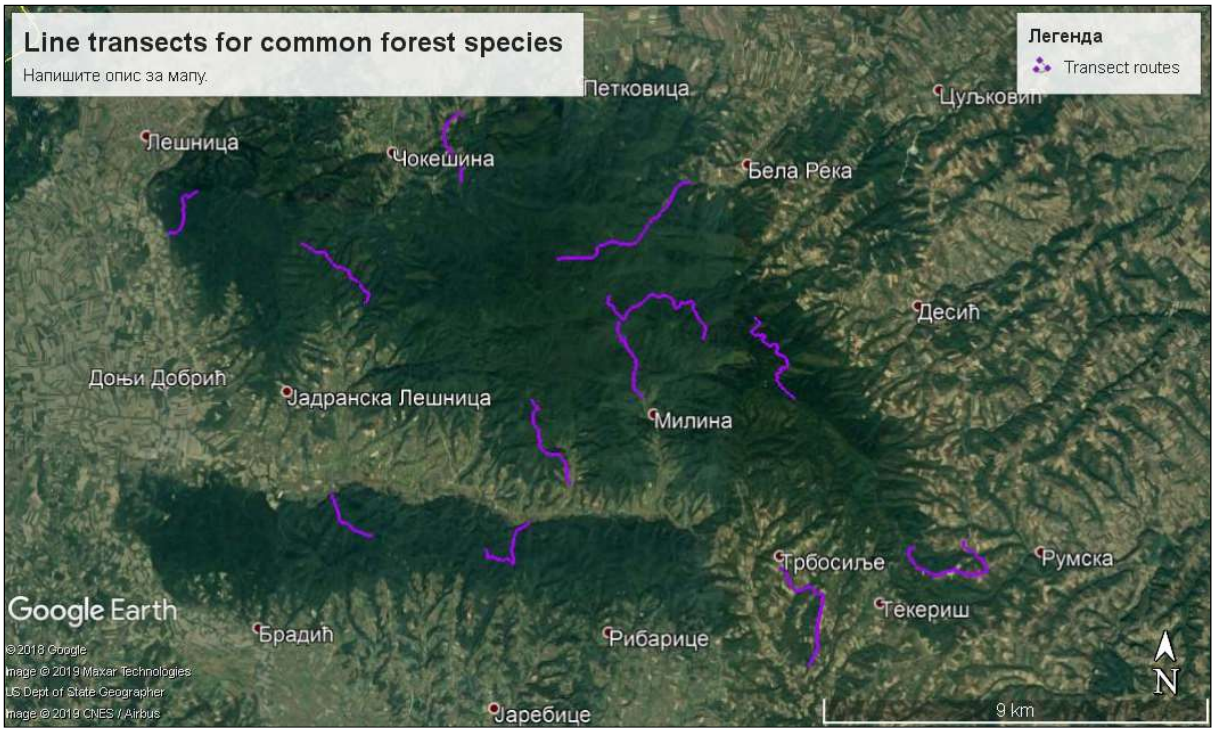

Figure 3. Example of linear transects used for common forest passerine species

For woodpeckers, surveys were conducted on predefined routes, up to 5km in length. Points for sound reproduction were placed from 200-300 m apart from one another, depending of the target species, from which recorded sounds of woodpeckers were played from speakers for one minute. After this, presence of each bird was recorded within the timeframe of two minutes before moving on to the next point. The direction and average distance of recorded birds from each point was also noted, which is important for eliminating overlapping records.

For owls, surveys were also conducted along predefined routes, with minimum length of individual route being 6 km. The optimal number of points for counting vocalizing birds was 10, with 6 points being the minimum. The distance between each point was on average 1 km (from 500-1300 m depending on the species in question and landscape configuration. The minimum distance between different routes was no less than 3-4 km.

For hens as well, surveys were carried out following 5km long predefined routes in suitable habitats for these species. Three species from this group were surveyed – Rock Partridge, Capercaillie and Hazell Grouse. Points for sound reproduction were placed from 200-2500 m apart from one another, from which recorded sounds of the target species were played from speakers for one minute. For Hazell Grouse and Capercaillie game whistles which imitate the calling of the species were used. After this, presence of each bird was recorded within the timeframe of two minutes before moving on to the next point. The direction and average distance of recorded birds from each point was also noted, which is important for eliminating overlapping records. For Capercaillie, additional research for determining the abundance of this species in a certain area by recording signs of presence, such as tracks in the snow and excrement was carried out in April 2018.

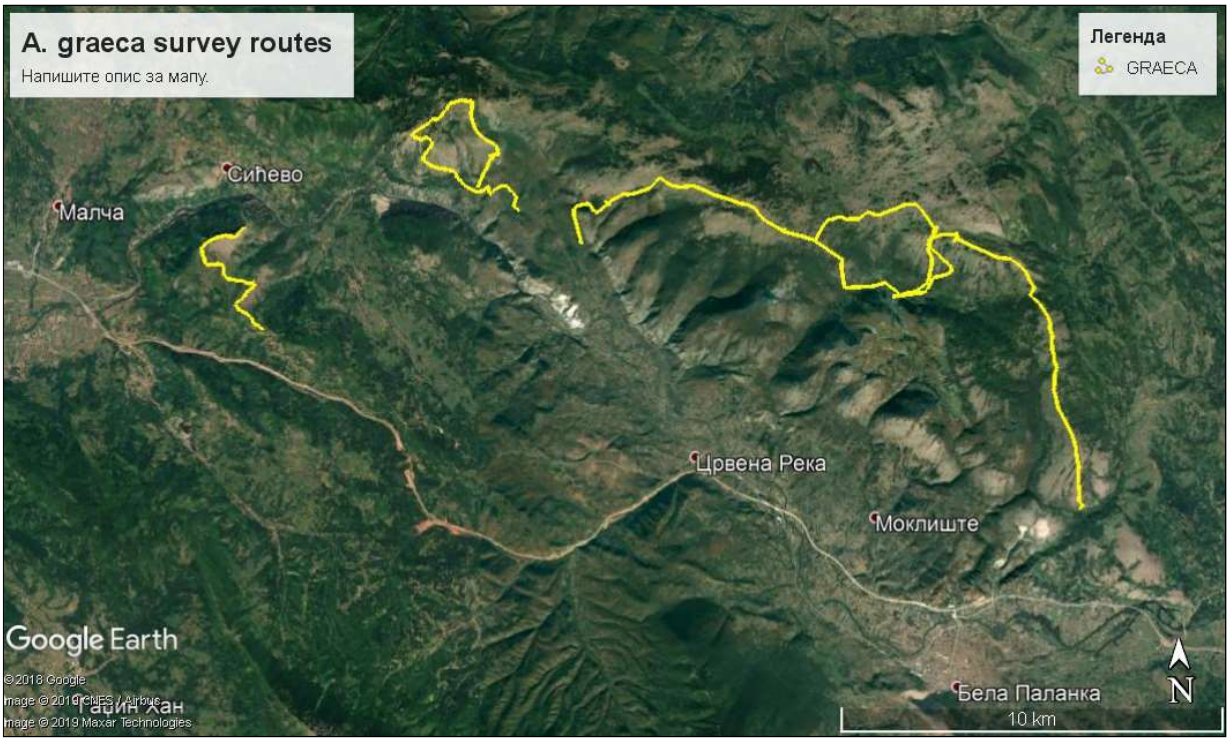

Figure 4. Example of survey routes for Rock Partridge in IBA Sićevačka klisura

During the preparatory phase of the project (November-December 2017) transects and point counts for all selected sites were drawn in Google Earth (Google 2019. Google Earth Pro 7.3.2.5776") and transferred into GPS devices. Six expeditions were organized in March, April and beginning of May for wild hens, owls and woodpeckers, while ten expeditions in May, June and first half of July were carried out for other groups of breeding bird species.

Data about migratory and wintering aggregations of wild bird species in selected IBAs were acquired during the conduction of the annual winter census for waterbirds (IWC; Wetlands International), which was conducted during January 2018 and 2019. The focus of our work for the purposes of this IBA revision were large water courses - the Danube, Sava, Drina, Tisa and Tamiš river, as well as natural and artificial water accumulations, such as fishponds. These waterbodies were surveyed in whole by boats and by foot, with the help of dozens of volunteers from the membership base of BPSSS.

Figure 5. IWC surveys by foot and boat on the Danube

Data analysis and development of nomination proposals

Data collected during field surveys was transferred from field forms and stored in the database of BPSSS, the BioRas portal. Additional data collected during previous research projects, as well as all available published data within the time period 2008-2019 (after the last revision) about key species for the IBA nomination process were also imported into the database and used for developing nomination proposals. All individual records from the database were extracted and imported first into Google Earth in order to get a clear view of the distribution of target species and suitable habitat, which was needed for delineation of borders for each proposed site.

Population sizes of target breeding species were calculated by extrapolation of data from conducted transects and point counts and the total surface of suitable habitats for each species (Bibby *et al* 1998, 2000). For wintering/migratory aggregations of target species total censuses were carried out. For colonial species, such as herons, cormorants etc., breeding population size was determined by counting occupied nests in the breeding colonies.

Once the population sizes of target species for selected sites were established, each species was assigned with the adequate nomination criteria. National population thresholds for Serbia, which trigger different IBA criteria, were acquired from BLI for A and B1 criteria. National population thresholds for B2, B3 and C criteria were calculated according to the BLI guidelines described in detail in Heath and Evans, eds (2000). It is important to note that the criteria used for this revision differs significantly from those used in the previous IBA revision process in terms of population thresholds, due to the changes in SPEC categories of numerous species (BirdLife 2017), making them ineligible for site nomination or significantly increasing their population thresholds.

Table 1. IBA nomination criteria

	Category	Criterion
A. Global	A1. Species of global conservation concern	The site is known or thought regularly to hold significant numbers of a globally threatened species [CR,EN, VU]
	A2. Restricted-range species	The site is known or thought regularly to hold significant component of a group of species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA)
	A3. Biome-restricted species	The site is known to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome
	A4. Globally important congregations	The site is known or thought to hold congregations of ≥1% of the global population of one or more species on a regular or predictable basis
B. European	B1. Congregations	i. The site is known or thought to hold ≥1% of a flyway or other distinct population of waterbird species
		ii. The site is known to hold ≥1% of a distinct population of a seabird species
		iii. The site is known or thought to hold ≥1% of a flyway or other distinct population of other congregatory species
		iv. The site is a 'bottleneck' site where over 5,000 storks, or over 3,000 raptors or cranes regularly pass on spring or autumn migration
	B2. Species with an unfavourable conservation status in Europe	The site is one of the 'n' most important in the country for a species with an unfavourable conservation status in Europe (SPEC1/2/3) and for which the site-protection approach is thought to be appropriate
	B3. Species with a favourable conservation status in Europe	The site is one of the 'n' most important in the country for a species with a favourable conservation status in Europe but concentrated in Europe (Non-SPEC^{E} [previously, SPEC4]) and for which the site-protection approach is thought to be appropriate
C. European Union	C1. Species of global conservation concern	The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.
	C2. Concentrations of a species threatened at the European Union level	The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (listed on Annex I and referred to in Article 4.1 of the EC Birds Directive).
	C3. Congregations of migratory species not threatened at the EU level	The site is known to regularly hold at least 1% of a flyway population of a migratory species not considered threatened at the EU level (as referred to in Article 4.2 of the EC Birds Directive) (not listed on Annex I).
	C4. Congregatory – large congregations	The site is known to regularly hold at least 20,000 migratory waterbirds and/or 10,000 pairs of migratory seabirds of one or more species.
	C5. Congregatory – bottleneck sites	The site is a 'bottleneck' site where at least 5,000 storks (Ciconiidae) and/or at least 3,000 raptors (Accipitriformes and Falconiformes) and/or 3,000 cranes (Gruidae) regularly pass on spring or autumn migration.
	C6. Species threatened at the European Union level	The site is one of the five most important in the European region (NUTS region) in question for a species or subspecies considered threatened in the European Union (i.e. listed in Annex I of the EC Birds Directive).

SPEC1 – European species of global conservation concern, i.e. classifi ed as Critically Endangered, Endangered, Vulnerable or Near Threatened at global level; SPEC2 – Species whose global population is concentrated in Europe, and which is classifi ed as Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened, Declining, Depleted or Rare at European level; SPEC3 – Species whose global population is not concentrated in Europe, but which is classifi ed as Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened, Declining, Depleted or Rare at European level; Non-SPEC^{E} - Species whose global population is concentrated in Europe, but whose European population status is currently considered to be Secure;

Population sizes of each target species in each of our selected sites were checked wheatear they meet the national thresholds according to the defined criteria. Depending on the nomination criteria meet, 5 or more sites which sustain the largest populations of a certain species were chosen and nominated accordingly. Borders of proposed IBAs were delineated first in Google Earth and in general we endeavoured to include as much suitable habitat as possible, according to the data of species distribution that was at our disposal and delineation recommendations developed by BLI (Heath and Evans 2000). Final, precise delineation of each proposed site was done in QGis software (QGIS Development Team, 2009. QGIS Geographic Information System. Open Source Geospatial Foundation. URL http://qgis.org).

A part from the ornithological component of the proposal and delineated borders for our selected sites, each proposal was accompanied by geographical data (administrative region of the country where the site is located, surface area of the site expressed in ha, central latitude and longitude coordinates, elevation etc.), data about habitats and land use, threats present and official protection status if applicable.

TIMEFRAME

Implementation of project activities started immediately upon received approval of the project by he Rufford Foundation. In total, the project lasted for 23 months, exceeding one month compared to the planned project proposal. This additional time was needed due to the sheer volume of data that needed to be analysed in accordance to the procedure for preparing official nomination proposals and later submission into the WBDB database, which took longer to complete than originally anticipated.

Table 2. Overview of implementation timeframe

Time frame		Activity 1: **Analysis of current status of existing IBAs and existing available data**	Activity 2: **Data collection/ Fieldwork**	Activity 3: **Data analysis/ Preparation of proposals for revised and new IBAs**	Activity 4: **Identification and analysis of major threatening factors for IBAs**	Activity 5: **Promotional activities**
2017	Oct					
	Nov					
	Dec					
2018	Jan					
	Feb					
	Mar					
	Apr					
	May					
	June					
	July					
	Aug					
	Sep					
	Nov					
	Dec					
2019	Jan					
	Feb					
	Mar					
	Apr					
	May					
	June					
	July					
	Aug			*** Importing data into the WBDB.**		

OVERVIEW OF THE RESULTS

A total of 74 selected sites meet some of the IBA criteria according to the data that we managed to compile and analyse for the purpose of this IBA revision. Of the total number of nominated sites, 32 were new sites, which were defined during the implementation of this project. 34 nominated sites represent existing IBA sites. For the majority of these sites borders were enlarged, while only in few cases existing borders were constricted. The remaining 10 nominated sites represent sites which were created by splitting 4 existing IBAs. Three sites of the current IBA network did not meet the required updated criteria and were not further considered for official nomination. Each nomination proposal contains data on population sizes and trends of key species for that site, types of habitat present, various geographical data and data on evaluated threats most dominant in each particular site.

This newly developed and officially proposed IBA network expands over 2.424.183 ha, covering 27,43% of the territory of Serbia. The current IBA network in force (from 2009) covers 14,25 %

(1.259.624 ha) of the country. This large increase can mainly be attributed to much more research efforts being invested within the period 2010 – 2019. During this period in general more methodical research was conducted throughout the country, aimed at an individual species, group of species or certain area, long-term monitoring schemes for certain were and still are implemented for certain priority species, nature reserves and other high nature value areas, mainly through implementation of conservation projects by the NGO sector. Additionally, the use of C criteria, which was not eligible for use in Serbia during the previous revision process, contributed to 6 sites in total being nominated solely by these criteria.

Data relevant for distribution and abundance of 114 species for IBA site nomination process was obtained during field research, while the total number of recorded bird species is 212.

Table 3. Summary list of proposed sites in Serbia for the IBA revision

Site name	Administrative region	Species used for site nomination	Season	Period of population estimate	Nomination criteria
Bečejski ribnjak	Vojvodina	*Ardea alba*	Br	2013	B3,C6
		Ardeola ralloides	Bv	2013	B2, C6
		Chlidonias hybrida	Pv	2013-2019	B1i
		Egretta garzetta	Bv	2010-2013	B3,C6
		Hydroprogne caspia	Pv	2013-2019	C6
		Ixobrychus minutus	Bv	2013-2019	B2, C6
		Locustella luscinioides	Bv	2013-2019	B3
		Luscinia svecica	Bv	2013-2019	C6
		Nycticorax nycticorax	Bv	2013	B2, C6
		Phalacrocorax pygmeus	Br	2011-2013	B2, C6
		Platalea leucorodia	Bv	2013-2019	B2, C6
		Porzana parva	Bv	2016-2019	C6
Bosutske šume	Vojvodina	*Ciconia nigra*	Bv	2017	B3, C6
		Dendrocopos medius	Br	2016-2019	B3, C6
		Ficedula albicollis	Bv	2016-2019	B3, C6
		Haliaeetus albicilla	Br	2014	B3, C6
		Milvus migrans	Bv	2008-2013	C6
		Picus canus	Br	2016-2019	B2, C6
		Picus viridis	Br	2016-2019	B3
		Poecile palustris	Br	2016-2019	B3
Carska bara	Vojvodina	*Ardea alba*	Br	2013	B3, C6
		Ardea purpurea	Bv	2008-2013	B2, C6
		Aythya nyroca	Bv	2019	A1, B2, C6
		Botaurus stellaris	Br	2013	C6
		Chlidonias hybrida	Pv	2013-2019	B1i
		Circus aeruginosus	Bv	2019	C6
		Ixobrychus minutus	Bv	2019	B2, C6
		Larus ridibundus	Pv	2013-2019	B1i
		Locustella luscinioides	Bv	2013-2019	B3
		Luscinia svecica	Bv	2010-2019	C6
		Phalacrocorax pygmeus	Br	2013	B2, C6
		Rallus aquaticus	Bv	2013-2019	B3
		Remiz pendulinus	Bv	2010-2019	B3
		Tachybaptus ruficollis	Bv	2019	B3

		Circus cyaneus	Wv	2013-2019	B2, C6
Cemerno	Sumadija and Western Serbia	*Strix uralensis*	Br	2015-2019	C6
Deliblatska peščara	Vojvodina	*Caprimulgus europaeus*	Bv	2019	C6
		Lanius collurio	Bv	2019	B2, C6
		Streptopelia turtur	Bv	2016-2019	A1, B2
		Sylvia nisoria	Bv	2013-2019	B3, C6
Dobrić-Nišava	Southern and Eastern Serbia	*Emberiza melanocephala*	Bv	2016-2019	A3
Donje Podrinje	Sumadija and Western Serbia	*Alcedo atthis*	Br	2019	B2, C6
		Riparia riparia	Bv	2008-2013	B2
		Sterna hirundo	Bv	2016-2017	C6
		Sternula albifrons	Bv	2016-2017	C6
Donje Pomoravlje	Southern and Eastern Serbia	*Alcedo atthis*	Br	2013-2019	B2, C6
		Sterna hirundo	Bv	2008-2013	C6
Dukat	Southern and Eastern Serbia	*Ficedula semitorquata*	Bv	2013-2019	B2,C6
Đerdap	Southern and Eastern Serbia	*Aquila chrysaetos*	Br	2008-2013	C6
		Circaetus gallicus	Bv	2008-2013	C6
		Clanga pomarina	Bv	2008-2013	C6
		Dendrocopos leucotos	Br	2016-2019	C6
		Dryocopus martius	Br	2016-2019	C6
		Erithacus rubecula	Bv	2016-2019	B3
		Falco peregrinus	Br	2013-2019	C6
		Ficedula albicollis	Bv	2016-2019	B3, C6
		Hieraaetus pennatus	Bv	2010-2011	C6
		Mergellus albellus	Wv	2013-2019	B1i, C6
		Pernis apivorus	Bv	2008-2013	C6
		Picus canus	Br	2016-2019	B2, C6
		Poecile palustris	Br	2016-2019	B3
		Strix uralensis	Br	2016-2019	C6
		Sylvia atricapilla	Bv	2016-2019	B3
		Turdus merula	Bv	2016-2019	B3
		Turdus philomelos	Bv	2016-2019	B3
Fruška Gora	Vojvodina	*Coccothraustes coccothraustes*	Bv	2013-2019	B3
		Dendrocopos medius	Br	2016-2019	B3, C6
		Luscinia megarhynchos	Bv	2010-2019	B3
		Picus viridis	Br	2016-2019	B3
		Strix aluco	Br	2013-2019	B3
		Hieraaetus pennatus	Bv	2016-2019	C6
Goč - Željin	Šumadija and Western Serbia	*Strix aluco*	Br	2011-2016	B3
Golija	Šumadija and Western Serbia	*Aegolius funereus*	Br	2019	C6
		Bonasa bonasia	Br	2016-2017	C6
		Dendrocopos leucotos	Br	2016-2019	C6
		Dryocopus martius	Br	2016-2019	C6
		Erithacus rubecula	Bv	2010-2019	B3
		Strix uralensis	Br	2013-2019	C6
		Sylvia atricapilla	Bv	2010-2019	B3
		Turdus merula	Bv	2013-2019	B3
		Turdus philomelos	Bv	2010-2019	B3
Gornja Mostonga	Vojvodina	*Acrocephalus melanopogon*	Bv	2019	C6

		Circus cyaneus	Wv	2009-2013	B2, C6
		Falco tinnunculus	Bv	2010-2019	B2
		Grus grus	Pv	2010-2019	B1i, B3
		Lanius minor	Bv	2019	C6
Gornje Podunavlje	Vojvodina	*Ciconia nigra*	Bv	2014	B3, C6
		Ficedula albicollis	Bv	2010-2014	B3, C6
		Haliaeetus albicilla	Br	2014	B3, C6
		Milvus migrans	Bv	2013-2019	C6
		Nycticorax nycticorax	Bv	2013	B2, C6
		Oriolus oriolus	Bv	2010-2019	B3
Gornje Pomoravlje	Šumadija and Western Serbia	*Alcedo atthis*	Br	2010-2019	B2, C6
		Riparia riparia	Bv	2017-2019	B2
		Sterna hirundo	Bv	2016-2019	C6
Gornje Potamišje	Vojvodina	*Ardea purpurea*	Bv	2010-2019	B2, C6
		Ardeola ralloides	Bv	2010-2019	B2, C6
		Aythya nyroca	Bv	2019	A1, B2, C6
		Ciconia ciconia	Bv	2010-2019	C6
		Nycticorax nycticorax	Bv	2010-2019	B2, C6
		Remiz pendulinus	Bv	2013-2019	B3
Gornje Potisje	Vojvodina	*Alcedo atthis*	Br	2019	B2, C6
		Riparia riparia	Bv	2008-2013	B2
		Milvus migrans	Bv	2010-2019	C6
Gornji Visok I Vidlič	Southern and Eastern Serbia	*Buteo rufinus*	Bv	2008-2013	C6
		Circaetus gallicus	Bv	2017-2019	C6
		Crex crex	Bv	2019	C6
		Dendrocopos leucotos	Bv	2010-2013	C6
		Ficedula semitorquata	Bv	2017	B2, C6
		Lanius collurio	Bv	2019	B2, C6
		Monticola saxatilis	Bv	2010-2019	B2
		Prunella collaris	Bv	2010	A3
		Tetrao urogallus	Br	2014	C6
Homolje	Southern and Eastern Serbia	*Dendrocopos leucotos*	Br	2016-2019	C6
		Dryocopus martius	Br	2016-2019	C6
		Ficedula albicollis	Bv	2016-2019	B3, C6
		Ficedula parva	Bv	2010-2019	C6
		Picus canus	Br	2016-2019	B2, C6
		Poecile palustris	Br	2016-2019	B3
		Strix uralensis	Br	2016-2019	C6
Ozren-Jadovnik	Šumadija and Western Serbia	*Aegypius monachus*	Nv	2019	A1, C1
		Alectoris graeca	Br	2013-2019	A3, C6
		Crex crex	Bv	2013-2019	C6
		Gyps fulvus	Br	2017	C6
		Aquila chrysaetos	Br	2013-2019	C6
Jegrička	Vojvodina	*Ardea purpurea*	Bv	2008-2013	B2, C6
		Aythya nyroca	Bv	2013-2019	A1, B2, C6
		Botaurus stellaris	Br	2013	C6
		Circus aeruginosus	Bv	2008-2013	C6
		Falco cherrug	Br	2019	A1, B2, C1, C6
		Ixobrychus minutus	Bv	2008-2013	B2, C6
		Locustella luscinioides	Bv	2013-2019	B3
		Rallus aquaticus	Bv	2013-2019	B3

		Tachybaptus ruficollis	Bv	2019	B3
Jerma	Southern and Eastern Serbia	*Falco peregrinus*	Br	2013-2019	C6
		Pyrrhocorax graculus	Br	2013-2019	A3
Južna Bačka	Vojvodina	*Falco cherrug*	Br	2019	A1, B2, C1, C6
Južni Banat	Vojvodina	*Anthus campestris*	Bv	2013-2019	C6
		Calandrella brachydactyla	Bv	2016-2019	C6
		Falco cherrug	Br	2019	A1, B2, C1, C6
		Falco tinnunculus	Bv	2017-2019	B2
		Himantopus himantopus	Bv	2010-2019	C6
		Anthus campestris	Bv	2013-2019	C6
Karađorđevo	Vojvodina	*Haliaeetus albicilla*	Br	2014	B3, C6
Ključko Podunavlje	Southern and Eastern Serbia	*Aythya ferina*	Wv	2013-2019	A1, B2
		Mergellus albellus	Wv	2013-2019	C6
		Phalacrocorax pygmeus	Wv	2019	B1i, C2
Kopaonik	Šumadija and Western Serbia	*Aegolius funereus*	Br	2014	C6
		Alectoris graeca	Br	2016-2018	A3, C6
		Glaucidium passerinum	Br	2014	C6
		Monticola saxatilis	Bv	2008-2013	B2
		Picoides tridactylus	Br	2010-2014	C6
Koviljski rit	Vojvodina	*Ciconia nigra*	Bv	2014	B3, C6
		Egretta garzetta	Bv	2013-2014	B3, C6
		Haliaeetus albicilla	Br	2014	B3, C6
Kučaj-Beljanica	Southern and Eastern Serbia	*Caprimulgus europaeus*	Bv	2016-2017	C6
		Dendrocopos leucotos	Br	2015-2019	C6
		Dryocopus martius	Br	2013-2019	C6
		Erithacus rubecula	Bv	2016-2019	B3
		Falco peregrinus	Br	2013-2019	C6
		Ficedula albicollis	Bv	2016-2019	B3, C6
		Ficedula parva	Bv	2010-2019	C6
		Poecile palustris	Br	2016-2019	B3
		Sylvia atricapilla	Bv	2016-2019	B3
		Tichodroma muraria	Unknown	2008-2015	A3
		Turdus merula	Bv	2013-2019	B3
		Turdus philomelos	Bv	2016-2019	B3
Labudovo okno	Vojvodina, Southern and Eastern Serbia	*Anser albifrons*	Wv	2013-2019	B1i, C3, C4
		Anser anser	Wv	2013-2019	B1i, C3, C4
		Ardeola ralloides	Bv	2012-2013	B2, C6
		Aythya ferina	Wv	2013-2019	A1, B2
		Aythya nyroca	Pv	2010-2019	B1i
		Branta ruficollis	Wv	2013-2019	C6
		Bucephala clangula	Wv	2013-2019	B1i
		Clanga clanga	Wv	2013-2019	A1
		Egretta garzetta	Bv	2011-2013	B3, C6
		Gavia arctica	Wv	2019	C6
		Gavia stellata	Wv	2019	C6
		Hydroprogne caspia	Pv	2013-2019	C6
		Mergellus albellus	Wv	2013-2019	A4, B1i, C2, C6
		Phalacrocorax pygmeus	Pv	2013	B2, C6
		Phalacrocorax pygmeus	Wv	2019	B1i, C2

		Plegadis falcinellus	Bv	2008-2013	C6
		Riparia riparia	Bv	2019	B2
Leskovačko polje	Southern and Eastern Serbia	*Perdix perdix*	Br	2016-2019	B2
Mala Vrbica	Southern and Eastern Serbia	*Aythya ferina*	Wv	2013-2019	A1, B2
		Mergellus albellus	Wv	2013-2019	C6
		Phalacrocorax pygmeus	Br	2013	B2, C6
		Phalacrocorax pygmeus	Wv	2019	B1i, C2
Mokra Gora	Šumadija and Western Serbia	*Aegolius funereus*	Br	2017	C6
		Bonasa bonasia	Br	2016-2017	C6
		Glaucidium passerinum	Br	2017	C6
		Picoides tridactylus	Br	2010-2019	C6
		Prunella collaris	Bv	2008-2013	A3
		Tetrao urogallus	Br	2017	C6
Mučanj	Šumadija and Western Serbia	*Gyps fulvus*	Br	2019	C6
Obedska bara	Vojvodina, Belgrade	*Ciconia nigra*	Bv	2014	B3, C6
		Clanga pomarina	Bv	2015-2019	C6
		Dendrocopos medius	Br	2016-2019	B3, C6
		Egretta garzetta	Bv	2013-2017	B3, C6
		Milvus migrans	Bv	2015-2019	C6
		Nycticorax nycticorax	Bv	2013	B2, C6
		Phalacrocorax pygmeus	Br	2019	B2,C6
		Plegadis falcinellus	Bv	2019	C6
		Tachybaptus ruficollis	Bv	2019	B3
		Oriolus oriolus	Bv	2010-2019	B3
Okanj I Rusanda	Vojvodina	*Anthus campestris*	Bv	2013-2019	C6
		Ciconia ciconia	Bv	2015	C6
		Circus cyaneus	Wv	2010-2019	B2, C6
		Falco cherrug	Br	2019	A1, B2, C1, C6
		Falco tinnunculus	Bv	2017-2019	B2
		Falco vespertinus	Bv	2017-2019	C6
		Grus grus	Pv	2010-2019	B1i, B3
		Larus ridibundus	Wv	2013-2019	B1i
		Luscinia svecica	Bv	2015-2019	C6
		Recurvirostra avosetta	Bv	2010-2019	C6
		Coracias garrulus	Bv	2016-2019	C6
Pašnjaci velike droplje	Vovodina	*Acrocephalus melanopogon*	Bv	2013-2019	C6
		Anser albifrons	Wv	2013-2019	B1i
		Anthus campestris	Bv	2015-2019	C6
		Aquila heliaca	Br	2019	A1, A3
		Ardea alba	Br	2019	B3, C6
		Asio flammeus	Bv	2013-2019	C6
		Burhinus oedicnemus	Bv	2008-2013	C6
		Circus aeruginosus	Bv	2019	C6
		Circus cyaneus	Wv	2017-2019	B2, C6
		Circus pygargus	Bv	2017-2019	C6
		Falco tinnunculus	Bv	2017-2019	B2
		Falco vespertinus	Bv	2009-2014	C6
		Falco vespertinus	Pv	2013-2019	B1iii, C2

		Grus grus	Pv	2016-2019	A4, B1i, B3, C2, C5
		Himantopus himantopus	Bv	2010-2019	C6
		Lanius minor	Bv	2008-2013	C6
		Otis tarda	Br	2014	C6
		Platalea leucorodia	Bv	2017	B2, C6
		Rallus aquaticus	Bv	2010-2019	B3
		Recurvirostra avosetta	Bv	2010-2013	C6
		Botaurus stellaris	Br	2013-2019	C6
		Coracias garrulus	Bv	2016-2019	C6
Pčinja	Southern and Eastern Serbia	*Ficedula semitorquata*	Bv	2013-2019	B2, C6
		Oenanthe hispanica	Bv	2012-2013	A3
Pešter	Šumadija and Western Serbia	*Circaetus gallicus*	Bv	2017-2019	C6
		Circus pygargus	Bv	2017-2019	C6
		Crex crex	Bv	2017-2019	C6
		Lanius collurio	Bv	2017-2019	B2, C6
		Pyrrhocorax graculus	Br	2013-2019	A3
Pirotsko polje	Southern and Eastern Serbia	*Accipiter brevipes*	Bv	2018-2019	A3, C6
		Bubo bubo	Br	2016	B2, C6
Preševska kotlina-Rujen	Southern and Eastern Serbia	*Circus pygargus*	Bv	2017-2019	C6
		Emberiza melanocephala	Bv	2013-2019	A3
		Melanocorypha calandra	Bv	2014-2019	C6
		Oenanthe hispanica	Bv	2012	A3
		Perdix perdix	Br	2013-2019	B2
		Streptopelia turtur	Bv	2016-2019	A1, B2
Prokletije	Kosovo and Metohija	*Alectoris graeca*	Br	2008-2013	A3, C6
		Bonasa bonasia	Br	2016-2017	C6
		Monticola saxatilis	Bv	2008-2013	B2
		Montifringilla nivalis	Br	2008-2013	A3
		Picoides tridactylus	Br	2010-2019	C6
		Prunella collaris	Bv	2019	A3
		Pyrrhocorax graculus	Br	1998	A3
		Pyrrhocorax pyrrhocorax	Br	1996	C6
		Tetrao urogallus	Br	2014	C6
		Tichodroma muraria	Unknown	2008-2013	A3
Pusta reka	Southern and Eastern Serbia	*Luscinia megarhynchos*	Bv	2016-2019	B3
		Perdix perdix	Br	2016-2019	B2
Slano Kopovo	Vojvodina	*Anser albifrons*	Wv	2013-2019	B1i
		Anser erythropus	Pv	2013-2019	C6
		Branta ruficollis	PV	2013-2019	C6
		Falco cherrug	Br	2019	A1, B2, C1, C6
		Grus grus	Pv	2010-2019	A4, B1i, B3, C2, C5
		Luscinia svecica	Bv	2014-2019	C6
		Coracias garrulus	Bv	2016-2019	C6
Slatine srednjeg Banata	Vojvodina	*Anthus campestris*	Bv	2015-2019	C6
		Ciconia ciconia	Bv	2015	C6
		Falco cherrug	Br	2019	A1, B2, C1, C6
		Falco vespertinus	Bv	2010-2019	C6
		Falco vespertinus	Pv	2013-2019	B1iii, C2

		Lanius minor	Bv	2019	C6
		Coracias garrulus	Bv	2016-2019	C6
Sokobanjska kotlina	Southern and Eastern Serbia	*Bubo bubo*	Br	2017	B2, C6
Srebrno jezero-Golubac		*Anser albifrons*	Wv	2013-2019	B1i
		Anser anser	Wv	2013-2019	B1i, C3, C4
		Aythya ferina	Wv	2013-2019	A1, B2
		Branta ruficollis	Wv	2013-2019	C6
		Bucephala clangula	Wv	2013-2019	B1i
		Gavia arctica	Wv	2019	C6
		Gavia stellata	Wv	2019	C6
		Mergellus albellus	Wv	2013-2019	B1i, C2, C6
Srednja Bačka	Vojvodina	*Falco cherrug*	Br	2019	A1, B2, C1, C6
Srednje Potamišje	Vojvodina	*Acrocephalus melanopogon*	Bv	2016-2019	C6
		Anser anser	Pv	2013-2019	B1i
		Ardea alba	Br	2010-2013	B3, C6
		Ardea purpurea	Bv	2008-2013	B2, C6
		Ardeola ralloides	Bv	2010-2013	B2, C6
		Aythya nyroca	Bv	2019	A1, B2, C6
		Botaurus stellaris	Br	2010-2013	C6
		Chlidonias hybrida	Bv	2013-2019	B3, C6
		Ciconia ciconia	Bv	2015	C6
		Clanga clanga	Wv	2013-2019	A1
		Egretta garzetta	Bv	2011-2013	B3, C6
		Himantopus himantopus	Bv	2013-2019	C6
		Ixobrychus minutus	Bv	2013-2019	B2, C6
		Locustella luscinioides	Bv	2013-2019	B3
		Luscinia svecica	Bv	2013-2019	C6
		Nycticorax nycticorax	Bv	2010-2013	B2, C6
		Platalea leucorodia	Bv	2010-2013	B2, C6
		Platalea leucorodia	Pv	2013-2019	C2
		Plegadis falcinellus	Bv	2009-2013	C6
		Rallus aquaticus	Bv	2013-2019	B3
		Remiz pendulinus	Bv	2013-2019	B3
		Tachybaptus ruficollis	Bv	2019	B3
Srpski Miletić	Vojvodina	*Platalea leucorodia*	Bv	2017	B2, C6
Stara planina	Southern and Eastern Serbia	*Caprimulgus europaeus*	Bv	2013-2019	C6
		Coccothraustes coccothraustes	Bv	2013-2019	B3
		Dendrocopos medius	Br	2010-2019	B3, C6
		Emberiza hortulana	Bv	2010-2019	C6
		Emberiza melanocephala	Bv	2013-2019	A3
		Erithacus rubecula	Bv	2016-2019	B3
		Ficedula semitorquata	Bv	2016	B2, C6
		Lanius collurio	Bv	2010-2019	B2, C6
		Lullula arborea	Bv	2010-2019	C6
		Luscinia megarhynchos	Bv	2010-2019	B3
		Poecile lugubris	Br	2010-2019	B3
		Picus viridis	Br	2012-2019	B3
		Poecile palustris	Br	2010-2019	B3
		Streptopelia turtur	Bv	2016-2019	A1, B2
		Sylvia atricapilla	Bv	2010-2019	B3

		Sylvia nisoria	Bv	2010-2019	B3, C6
		Turdus merula	Bv	2010-2019	B3
		Turdus philomelos	Bv	2016-2019	B3
		Bubo bubo	Br	2016-2019	B2, C6
Stari Begej	Vojvodina	*Falco vespertinus*	Bv	2010-2015	C6
Subotička jezera I pustare	Vojvodina	*Acrocephalus melanopogon*	Bv	2013-2019	C6
		Ardea alba	Bv	2013-2017	B3, C6
		Ardea purpurea	Bv	2013-2017	B2, C6
		Ixobrychus minutus	Bv	2008-2013	B2, C6
		Ardeola ralloides	Bv	2013-2017	B2, C6
		Aythya nyroca	Bv	2008-2013	A1, B2, C6
		Botaurus stellaris	Br	2013	C6
		Burhinus oedicnemus	Bv	2008-2013	C6
		Caprimulgus europaeus	Bv	2019	C6
		Circus aeruginosus	Bv	2019	C6
		Falco vespertinus	Bv	2008-2013	C6
		Falco vespertinus	Pv	2013-2019	B1iii, C2
		Grus grus	Pv	2010-2019	A4, B1i, B3, C2, C5
		Lanius minor	Bv	2008-2013	C6
		Larus melanocephalus	Bv	2017-2019	C6
		Larus ridibundus	Pv	2013-2019	B1i
		Limosa limosa	Bv	2013-2019	B2
		Locustella luscinioides	Bv	2013-2019	B3
		Porzana parva	Bv	2013-2019	C6
		Rallus aquaticus	Bv	2013-2019	B3
		Coracias garrulus	Bv	2016-2019	C6
Suva planina	Southern and Eastern Serbia	*Monticola saxatilis*	Bv	2017-2019	B2
		Prunella collaris	Bv	2017-2019	A3
		Pyrrhocorax graculus	Br	2017-2019	A3
Svrljiške planine	Southern and Eastern Serbia	*Alectoris graeca*	Br	2016-2017	A3, C6
		Falco peregrinus	Br	2010-2019	C6
Svrljiško pobrđe	Southern and Eastern Serbia	*Bubo bubo*	Br	2016	B2, C6
		Crex crex	Bv	2016-2019	C6
		Emberiza hortulana	Bv	2016-2019	C6
		Lullula arborea	Bv	2016-2019	C6
		Sylvia nisoria	Bv	2016-2019	B3, C6
Šar-planina	Kosovo and Metohija	*Alectoris graeca*	Br	2008-2013	A3, C6
		Monticola saxatilis	Bv	2016	B2
		Montifringilla nivalis	Br	2008-2013	A3
		Prunella collaris	Bv	2016	A3
		Pyrrhocorax graculus	Br	2006-2016	A3
		Pyrrhocorax pyrrhocorax	Unknown	2008-2013	C6
		Tetrao urogallus	Br	2014	C6
		Tichodroma muraria	Unknown	2008-2013	A3
Šume zapadne Bačke	Vojvodina	*Ciconia nigra*	Bv	2017	B3, C6
		Circus cyaneus	Wv	2013-2019	B2, C6
Taložnik šećerane Kovin	Vojvodina	*Sterna hirundo*	Bv	2015-2019	C6
Tara	Šumadija and Western Serbia	*Aegolius funereus*	Br	2016	C6
		Aquila chrysaetos	Br	2017-2019	C6
		Bonasa bonasia	Br	2012-2019	C6

		Dryocopus martius	Br	2016-2019	C6
		Glaucidium passerinum	Br	2018	C6
		Picoides tridactylus	Br	2014-2019	C6
		Picus canus	Br	2019	B2, C6
		Strix uralensis	Br	2011-2019	C6
Timočko pobrđe	Southern and Eastern Serbia	*Emberiza hortulana*	Bv	2016-2019	C6
		Emberiza melanocephala	Bv	2016-2019	A3
		Lanius collurio	Bv	2015-2019	B2, C6
		Streptopelia turtur	Bv	2016-2019	A1, B2
		Sylvia nisoria	Bv	2015-2019	B3, C6
Titelski breg	Vojvodina	*Riparia riparia*	Bv	2008-2013	B2
Toplica	Southern and Eastern Serbia	*Emberiza hortulana*	Bv	2016-2019	C6
		Luscinia megarhynchos	Bv	2016-2019	B3
		Perdix perdix	Br	2016-2019	B2
		Picus viridis	Br	2016-2019	B3
		Streptopelia turtur	Bv	2016-2019	A1, B2
		Clanga pomarina	Bv	2016-2019	C6
Tupižnica and Beli Timok	Southern and Eastern Serbia	*Bubo bubo*	Br	2017	B2, C6
		Caprimulgus europaeus	Bv	2013-2019	C6
		Emberiza hortulana	Bv	2013-2019	C6
Ušće Save u Dunav	Beograd, Vojvodina	*Aythya ferina*	Wv	2013-2019	A1, B2
		Gavia arctica	Wv	2019	C6
		Gavia stellata	Wv	2019	C6
		Haliaeetus albicilla	Br	2019	B3, C6
		Larus ridibundus	Wv	2013-2019	B1i
		Phalacrocorax pygmeus	Wv	2012	B1i, C2
Uvac	Šumadija and Western Serbia	*Aegypius monachus*	Nv	2019	A1, C1
		Circus pygargus	Bv	2017-2019	C6
		Gyps fulvus	Br	2017	B1iii, C6
Valjevske planine	Šumadija and Western Serbia	*Aquila chrysaetos*	Br	2017-2019	C6
		Dendrocopos medius	Br	2016-2019	B3, C6
		Erithacus rubecula	Bv	2016-2019	B3
		Gyps fulvus	Br	2017	C6
		Pernis apivorus	Bv	2008-2013	C6
		Picus canus	Br	2016-2019	B2, C6
		Picus viridis	Br	2017-2019	B3
		Strix aluco	Br	2016-2019	B3
		Sylvia atricapilla	Bv	2016-2019	B3
		Turdus merula	Bv	2016-2019	B3
		Turdus philomelos	Bv	2016-2019	B3
Veliki Krš and Stol	Southern and Eastern Serbia	*Lullula arborea*	Bv	2016-2019	C6
Vlasina	Southern and Eastern Serbia	*Crex crex*	Bv	2015-2019	C6
		Ficedula semitorquata	Bv	2016-2019	B2, C6
Vršački ritovi	Vojvodina	*Anser albifrons*	Wv	2013-2019	B1i
		Anser anser	Wv	2013-2019	B1i
		Anthus campestris	Bv	2013-2019	C6
		Falco cherrug	Br	2019	A1, B2, C1, C6
		Falco tinnunculus	Bv	2016-2019	B2
		Lanius minor	Bv	2019	C6
Zasavica	Vojvodina	*Remiz pendulinus*	Bv	2012-2016	B3

		Tachybaptus ruficollis	Bv	2012-2016	B3
Zlatar	Šumadija and Western Serbia	*Aegolius funereus*	Br	2013	C6
		Bonasa bonasia	Br	2016-2017	C6
		Glaucidium passerinum	Br	2017	C6
		Picoides tridactylus	Br	2010-2019	C6
Zlatibor	Šumadija and Western Serbia	*Aquila chrysaetos*	Br	2017-2019	C6
		Circaetus gallicus	Bv	2017-2019	C6
		Lullula arborea	Bv	2010-2019	C6
		Glaucidium passerinum	Br	2019	C6

Br – breeding resident; Bv – breeding visitor; Pv – passage visitor; Wv – winter visitor; Nv – non-breeding visitor;

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