

BIRD FAUNA AND THE CONSERVATION STATUS OF SOME RESERVOIRS IN THE MIDDLE BASIN OF THE BÂRLAD RIVER (ROMANIA)

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Abstract. Our study presents data on the diversity of bird species recorded in the perimeter of four reservoirs from the middle basin of the Bârlad River: Motoșeni on the Zeletin River, Pereschiv on the Pereschiv River, Cuibul Vulturilor on the Tutova River and Râpa Albastră on the Simila River. Except for the Pereschiv reservoir, the others are part of ROSPA0159 Lakes around Măscurei, respectively, ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoșului. We collected our data during three periods of field monitoring activity (2006 – 2012, 2018 – 2019, and 2022 – 2023). We identified 162 bird species, 90 as breeding species in the area, and we present quantitative data for the observed bird species, too. The bird species related to the aquatic ecosystem are dominant in terms of diversity and population all time during the year. We notice the relevance of this territory as a migration stopover point for the bird fauna in eastern Romania. We mention *Tadorna ferruginea* as breeding species and the constant presence of adult and juvenile birds of *Haliaeetus albicilla* during the breeding season on the Pereschiv reservoir. We recorded 42 bird species from the Annex 1 of the Birds' Directive and 43 appearing in the Annex 2 of the same directive. We found 27 bird species included in the Romanian Red Book of Vertebrates, 4 as critically endangered species and 6 as endangered species in our country. We assess the proposal to include the Pereschiv reservoir in the Natura 2000 network, through location and ornithological significance in the area related to the Motoșeni reservoir.

Keywords: bird fauna, trends, reservoirs, Bârlad River basin, Natura 2000 network.

Rezumat. Ornitofauna și statutul de conservare al unor lacuri de acumulare din bazinul mijlociu al râului Bârlad (România). Studiul nostru prezintă informații privind diversitatea avifaunei inventariate în perimetrul a patru lacuri de acumulare din bazinul mijlociu al Bârladului: Motoșeni (pe cursul Zeletinului), Pereschiv (pe cursul Pereschivului). Exceptând acumularea Pereschiv, celelalte acumulări fac parte din ROSPA0159 Lacurile din jurul Măscurei, respectiv, ROSPA0167 Râul Bârlad între Zorleni și Gura Gârbăvoșului. Cuibul Vulturilor (pe cursul Tutovei) și Râpa Albastră (pe cursul Similei). Datele au fost adunate în timpul a trei perioade de monitorizare (2006 - 2012, 2018 - 2019 și 2022 - 2023). Am identificat 162 de specii de păsări, 90 fiind specii clocitoare în zonă; prezentăm și date cantitative pentru speciile inventariate. Speciile de păsări caracteristice ecosistemului acvatic sunt dominante prin diversitate și populații de-a lungul întregului an. Subliniem importanța acestui teritoriu ca loc de popas pe durata migrației păsărilor în estul României. Menționăm prezența clocitoare a speciei *Tadorna ferruginea*, dar și apariția constantă prin indivizi adulți și juvenili a speciei *Haliaeetus albicilla* în timpul perioadei de reproducere pe acumularea Pereschiv. Am înregistrat prezența a 42 de specii de păsări incluse în Anexa 1 a Directivei Păsări, Birds' Directive, precum și 43 de specii care apar în Anexa 2 a aceleiași directive. Am întâlnit 27 de specii de păsări incluse în Cartea Roșie a Vertebratelor din România, 4 fiind specii critic periclitare, iar 6 specii periclitare în țara noastră. Subliniem necesitatea clarificării statutului de protecție al acumulării Râpa Albastră. Argumentăm propunerea de a include acumularea Pereschiv în rețeaua Natura 2000 atât prin poziția geografică, dar și prin importanța ornitologică în zona circumscrisă acumulării Motoșeni.

Cuvinte cheie: avifaună, tendințe, acumulări, bazinul râului Bârlad, rețeaua Natura 2000.

INTRODUCTION

The investigated sites are reservoirs developed as hydro-technical arrangements in the middle basin of the Bârlad River (Fig. 1), along four tributaries located in the Vaslui and Bacău Counties, in the central part of Colinele Tutovei's area: Motoșeni on the Zeletin rivulet (tributary of Berheci River), Pereschiv on the Pereschiv River, Cuibul Vulturilor on the Tutova River and Râpa Albastră on the Simila River. The main purpose of these reservoirs is the control of the flooding phenomenon and the protection of the surrounding localities, and their utility as a support for the fisheries' activity and as a source for irrigation in agriculture. These tributaries on the right side and even the Bârlad River present a significant oscillation of the water levels from the flooding phenomenon to very low flows, and their narrow valleys crossing areas a flat plateau-plain with medium high hills on the edges (BADEA & DUMITRESCU, 1985). The Motoșeni reservoir covers about 57 hectares (ha), while the Cuibul Vulturilor reservoir has a surface about 593 ha, both being part of ROSPA0159 Lakes around Măscurei. The Râpa Albastră reservoir covers 245 ha and present a confusing protection status: it appears as a part of ROSPA0159 Lakes around Măscurei in the general description of the site, but it is missing from the site official map while it appears marked on the map of the ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoșului, one unnamed reservoir being mentioned in the official description of this site. The Pereschiv reservoir has a surface about 130 ha and does not have a protection status. The territory of the ROSPA0159 Lakes around Măscurei covers 1139 ha, including the two mentioned reservoirs, various small ponds between them and one sector of Zeletin rivulet's meadow, with the geographic coordinates 46.0054194 northern latitude and 27.0064805 eastern longitude. The territory of ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoșului has a total surface about 2478.80 hectares, including the large Râpa Albastră reservoir, some small ponds and a sector of Bârlad River, with the geographic coordinates 46.206750 northern latitude and 27.669630 eastern longitude. Both areas represent sites of community importance (SCI), too, sheltering species protected through the Habitats' Directive (***, 92/43/EEC).



Figure 1. The location of the investigated area on the territory of Romania – yellow triangle; the red marks represent the limits of ROSPA0159 Lakes around Măscurei, respectively, ROSPA0167 Bârlad River between Zorleni and Gura Gâlbăvoșului (Sources: Satellite image, March 2024, Google Earth).

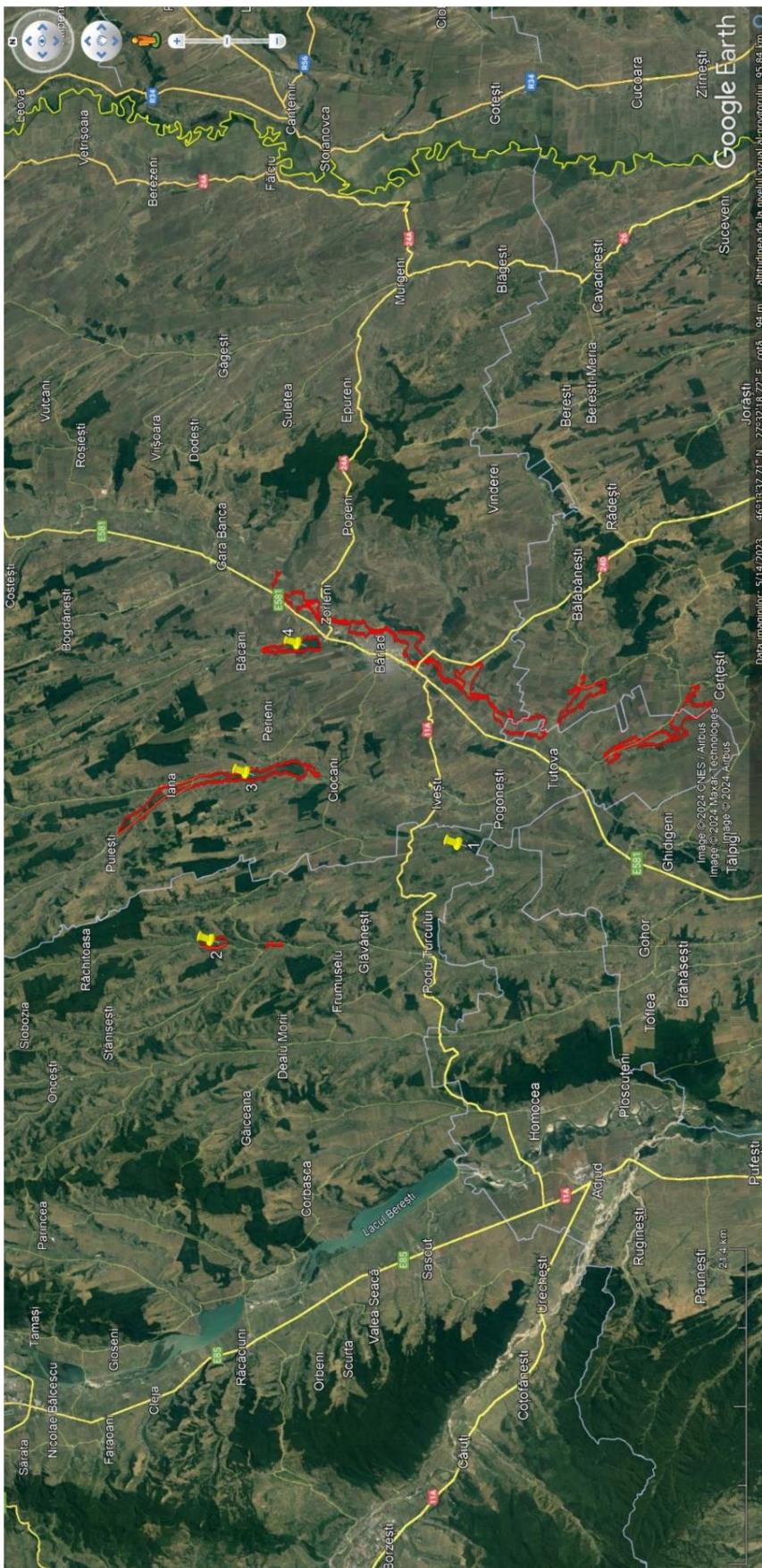


Figure 2. The investigated area on the official map of ROSPA0159 Lakes around Măscurei and ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului (marked with red lines), respectively, the investigated reservoirs marked with yellow thumbtack: 1. Perschiv; 2. Motoșeni and 3. Cuiubul Vulturilor (ROSPA0159 Lakes around Măscurei); 4. Râpa Albastră (an ambiguous protection status, appearing as part of ROSPA0159 Lakes around Măscurei, and ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului, too) (Sources: Satellite image, March 2024, Google Earth).

From Bârlad, access to the perimeter of the Natura 2000 sites and Pereschiv reservoir (Fig. 2) is possible on the European road E581, following the county road DJ243 (Cuibul Vulturilor) and DJ245 (Râpa Albastră), respectively, the national road DN 11A and a local road to Fichitești (Pereschiv), and the county road DJ241 to Motoșeni.

The climate of the middle basin of the Bârlad River is temperate-continental. The multiannual average defines the winters as long and cold, while the summers are hot and dry. In the last decade – in the context of the global climate change – winters became mild with a harsher sequence and freezing of water surfaces in middle January, while the ice-bed disappears in middle February, sometimes with a second strong, but short winter event in March. The average annual temperature is about 9.5 °C, while the average annual rainfalls are about 450 millimetres, but severe drought was a dominant phenomenon during the 15 years in the area, with annual rainfalls of about only 150 – 200 mm. The dominant winds come from the north and north-western directions during the wintering time, respectively from the south and south-eastern direction in summertime.

The territory of the middle basin of Bârlad River appears as a mosaic of habitats with a strong sylvesteppe structure (MITITELU, 1975). The grasslands with shrubs and bushes (*Sambucus nigra*, *Prunus spinosus*, *Rosa canina* etc.) respectively the open waters appear as dominant habitats along the four investigated reservoirs. The cultivated lands cover large surfaces on the western side of the Pereschiv and Cuibul Vulturilor reservoirs. A mixed deciduous forest is present on the eastern slope of Motoșeni reservoir, while a meadow forest with poplars, willows and osiers exists on the northern edge of this reservoir and the Pereschiv reservoir, too. The compact reed beds with sedges (*Carex* sp.), rushes (*Schoenoplectus lacustris* and *Juncus* sp.) represent a significant habitat only in the tail area of Cuibul Vulturilor and Pereschiv reservoirs. The reed beds can remain dry and lose their ecological value due to the oscillations of the water's level, especially along the sector from the entrance of Tutova River in the Cuibul Vulturilor reservoir, respectively, Simila River in the Râpa Albastră reservoir.

The aquatic fauna is rich, represented by invertebrates such as worms, crustaceans, molluscs, and various insect larvae, but also vertebrates such as various fish species (*Cyprinus carpio*, *Carassius gibelio*, *Alburnus alburnus*, *Scardinius erythrophthalmus*, *Cobitis taenia*, *Perca fluviatilis*, *Sander lucioperca* etc.). As amphibians, we notice the presence of *Pelophylax* kl. *esculentus*, *P. ridibundus*, *Bufo viridis*, *Triturus cristatus* and *Lissotriton vulgaris*, while from the reptile group, we found species such as *Lacerta agilis*, *L. viridis*, *Natrix natrix* and *N. tessellata*. Among mammals, we mention the ungulate species (*Capreolus capreolus*, *Sus scrofa*), carnivores (*Vulpes vulpes*, *Mustela putorius*), and rodents (*Spermophilus citellus*, *Arvicola terrestris*, *Apodemus agrarius*, *Microtus arvalis* etc.).

The first ornithological studies in the area were performed five to seven decades ago and include data related to the diversity, seasonal dynamic and distribution of bird fauna in various ecosystems on the territory of the Vaslui County. These were general ornithological studies regarding the area of the Moldovei Plateau (MÂNDRU, 1968) and Vaslui County (PAPADOPOL, 1975) or the perimeter of Colinele Tutovei (PAPADOPOL & RANG, 1972), recording about 200 bird species with 110 certainly breeding species in this territory. These are historical data, especially for the breeding bird species, allowing us to follow the long-term dynamic of the bird fauna in the area – between the breeding species mentioned as frequent and common by these authors, some species are rare or are missing in the area, and even in the country, nowadays. There are some recently ornithological studies related to the bird fauna from the basin of Bârlad River in terms of bird diversity in the woodland areas (GACHE & MÜLLER, 2010a; GACHE & MÜLLER, 2010b; GACHE & MÜLLER, 2011; GACHE & CHACHULA, 2013), along the upper sector of this hydrographic basin (GĂLUȘCĂ & GACHE, 2019), and in the perimeter of the aquatic ecosystems as Racova River valley (GACHE & IGNAT, 2015), Pușcași, Cuibul Vulturilor and Râpa Albastră reservoirs (IGNAT & GACHE, 2019). The ornithological importance of the area also results from their mentioning in various synthesis volumes (MUNTEANU et al., 2002; PAPP & FÂNTÂNĂ, 2008; BRÎNZAN, 2013).

Both special protection areas for birds - ROSPA0159 Lakes around Măscurei and ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului (designation through the H. G. no. 663/14.09.2016) – follow the protection of ornithological significant perimeters in the middle basin of Bârlad River. The first one shelters 17 protected bird species with significant breeding or migratory population, while the second one offers suitable conditions for 15 protected bird species during the breeding, migration and wintering time, as mentioned by the official standard forms, completed in September 2016 and updated in January 2017. None of these two Nature 2000 sites has an approved management plan, but some ministerial notes approve the objectives and minimum measures of conservation for both (***, MMAP Note no. 28537/12 October 2021).

METHODS AND PERIOD OF STUDY

For the present study, we analyse the collected field data through regular monitoring programmes (twice every month, except for the wintering time with one visit per month) on the bird fauna from the perimeter of four reservoirs located in the middle basin of the Bârlad River. Despite their close location, the access to these reservoirs is difficult since there are no main roads, and local roads are of low quality, becoming impassable during heavy rainfalls or snowfalls (Fig. 1). We visited the area of the Pereschiv reservoir during two periods of one year monitoring activity: November 2008 – October 2009, respectively, May 2022 – May 2023. We performed our field activity twice during the period for the Motoșeni reservoir, too: March – December 2015, respectively, May 2022 – May 2023. We collected ornithological

samples in the perimeter of the Cuibul Vulturilor and Râpa Albastră reservoirs during three different periods: 2009 – 2012, May 2018 – April 2019 and May 2022 – May 2023.

The monitoring of birds was done using the methods of transect and fixed points, using the same transects and fixed points during the whole period of study (SOR/Birdlife Romania & Grupul Milvus, 2020). The transects follow the eastern bank for the Cuibul Vulturilor and Râpa Albastră reservoirs, with three fixed points, the western and eastern banks on the Pereschiv reservoir, each with two fixed points, respectively, the western bank for the Motoșeni reservoir, with two fixed points. We must mention that the all four reservoirs present high slopes, so the visibility is very good and allows an easy ornithological monitoring of the whole valley.

We identified the birds through direct observation by means of binoculars (Pentax 10x42 DCF HRc, Olympus 8-16x40 and Nikon Akulon 8 – 24x) and telescope (HAKUBA 40x70, Swarowski 20 – 60x). We used the males' calling activity to identify and estimate the populations of passerines from the reed beds and woodlands, respectively, the hidden life bird species inside compact vegetation, the crepuscular and nocturne ones. We estimated the bird populations by counting each bird from the small groups and used a quantitative evaluation in band for the groups or flocks larger than 200 individuals. In the analysis of our results, we are using the SIBLEY & AHLQUIST taxonomic system (1995), as subsequently amended and supplemented (***. <http://avibase.bsc-eoc.org/>).

RESULTS AND DISCUSSIONS

We notice that we used the collected data during the whole period of our study to establish the list of bird fauna for the investigated reservoirs. During the years, we identified 176 bird species (Table 1). We present quantitative data using the collected data during the late periods of study (2018 – 2019 and 2022 - 2023), and we used the previous data to assess the population's trends; the values for the bird population represent the minimum, respectively, the maximum number of counted birds or estimated population during a one-day visit in the perimeter of each reservoir.

As we can see (Table 1), the bird fauna has an unequal presence on the territory of the investigated reservoirs: for the Cuibul Vulturilor and Pereschiv reservoirs, we recorded similar values (145, respectively, 144 species), while we met 123 species in the perimeter of the Râpa Albastră reservoir and only 111 bird species on the Motoșeni reservoir. We cannot correlate the surface of the investigated reservoir with the diversity of the bird fauna. The existing habitats and the anthropogenic activities are the main factors that influence the diversity of the bird fauna in the area. We identified high diversity in the perimeter of the largest reservoir (Cuibul Vulturilor) that present open waters, significant compact reed beds, marshes and temporary flooding meadows, but also on the smaller Pereschiv reservoir with open waters, compact reed beds, and a humid meadow area on the tail perimeter, respectively, a flooding meadow forest prolonged along the valley. The human presence is high, but restricted especially in the area of the concrete dam, while the birds use to stay in the middle sector from the tail area on the both these reservoirs. The location of the Motoșeni reservoir is inside the village and the level of water presents significant oscillations from one year to other, but also, from one season to another during the year; a small meadow forest covers the tail area of this reservoir, but the reed beds form only a narrow strip in some sectors of the eastern and western shores. Usually, we observed the presence of sport fishermen only in the perimeter of the concrete dam. In the case of the Râpa Albastră reservoir, the suitable habitats as humid meadows and marshes cover only the northern edge (the lake's tail area) despite its surface, while the anthropogenic presence is significantly higher comparatively to the other sites. The sport fishing activity presents constant and high levels along the concrete dam and in the southern part of the lake; at the same time, we met large herds of sheep and goats on the perimeter of dry and humid meadows covering the tail area of this reservoir during every visit in the area.

Regarding the preference of bird species for the various habitats present in the investigated territory, we notice the presence of 104 bird species typical or related to the aquatic ecosystems and wetlands during the breeding season, migration or wintering time, representing 61.17% in the whole bird fauna from the investigated territory. The typical woodland bird species appear as complementary in this list as breeding species inside the meadow forest or as species that can use for feeding territory the humid and dry meadows, shrubs and cultivated lands surrounding the perimeter of reservoirs. As a rule, the passerine group presents a higher diversity – 59 species (33.52% of the recorded bird species), including 13 passerine species related to the aquatic ecosystems as nesting species (*Panurus biarmicus*, *Remiz pendulinus*, *Locustella luscinioides*, *Acrocephalus* sp. etc.) or as hunting territory (*Hirundo rustica*, *Delichon urbicum*). We notice the high diversity of the diurnal raptors group – 16 species; among them, only three species are related to the aquatic ecosystems – *Haliaeetus albicilla*, *Circus aeruginosus* and *Pandion haliaetus*, the other ones searching for food inside various open lands.

The Motoșeni reservoir and a small sector along the valley of the Zeletin rivulet represent the western sector (Bacău County) of the Nature 2000 site ROSPA0159 Lakes around Măscurei (Fig. 1). During our studies, we observed a significant change in the aquatic and wetland habitats in the area. Nowadays, the open waters have disappeared in the perimeter of the former fishery ponds, and the compact reed beds formed a thick dry, presenting thin stems and covering these areas. This situation represents an ecological loss due to the disappearance of the typical invertebrate and vertebrate fauna, including the bird species. At the same time, we see it as an economic loss: the fishery activity has stopped, and agriculture use is impossible for these surfaces. We met the bird fauna typical for the aquatic and wetland in the perimeter of the Motoșeni reservoir and a small pond located in the neighbourhood of the protected sector from the valley of the Zeletin rivulet. This pond is not part of the Nature 2000 site, but presents suitable habitats for bird species, like the open waters, compact reed beds and the meadow forest along the Zeletin rivulet in the western side.

Table 1. Bird fauna on the territory of the four reservoirs located in the middle basin of the Bârlad River: specific diversity, populations, trends and conservation status.

No.	Species	Pereșchiv			Motoșeni			Cuibul Vulturilor			Râpa Albastră			Protection status	
		Breeding (p)	Migration (i)	Wintering (i)	Breeding (p)	Migration (i)	Wintering (i)	Breeding (p)	Migration (i)	Wintering (i)	Breeding (p)	Migration (i)	Wintering (i)	Birds' Directive, Red Book	Trends
1.	<i>Phasianus colchicus</i> Linnaeus 1758	1-2	x	1-2	1-2	x	0-2	4-6	7-9	2-3	1-2	4-5	1-2	A2	0
2.	<i>Perdix perdix</i> Linnaeus 1758	2-3	x	8-15	-	x	-	3-4	4-5	4-5	2-3	15-18	8-10	A2	-1
3.	<i>Coturnix coturnix</i> Linnaeus 1758	-	-	-	-	-	-	2-3	5-7	-	1-2	4-5	-	A2	-1
4.	<i>Cygnus olor</i> Linnaeus 1758	1	2-5	-	0-1	2-4	2-3	5-6	51-181	68-107	-	26-40	3-15	A2	-1
5.	<i>Cygnus cygnus</i> Linnaeus 1758	-	0-1	-	-	-	-	-	1-13	0-11	-	-	-	A1	+1
6.	<i>Anser anser</i> Linnaeus 1758	-	0-17	0-3	-	-	-	-	-	0-31	-	-	-	A2	0
7.	<i>Anser albifrons</i> Scopoli 1769	-	10-174	0-78	-	-	0-3	-	51-237	0-3	-	4-28	5-65	A2	-1
8.	<i>Anser erythropus</i> Linnaeus 1758	-	0-1	-	-	-	-	-	-	-	-	-	-	A1, CE	+1
9.	<i>Anas platyrhynchos</i> Linnaeus 1758	2-3	230-1620	32-1500	1-3	139-355	67-214	20-25	312-2388	163-2190	3-6	108-2100	383-2079	A2	0
10.	<i>Anas acuta</i> Linnaeus 1758	-	0-2	-	-	-	-	-	0-6	-	-	0-6	-	A2	-1
11.	<i>Anas crecca</i> Linnaeus 1758	-	130-650	6-600	-	127-310	4-63	-	63-1300	72-900	-	63-700	142-340	A2	0
12.	<i>Mareca strepera</i> Linnaeus 1758	-	0-12	-	-	0-4	-	1-2?	8-32	-	-	2-10	-	A2	-1
13.	<i>Mareca penelope</i> Linnaeus 1758	-	16-54	-	-	0-6	-	-	38-130	5-53	-	18-97	4-33	A2	-1
14.	<i>Spatula querquedula</i> Linnaeus 1758	0-1?	90-225	-	0-1?	1-3	-	-	48-2000	-	-	28-62	-	A2	-1
15.	<i>Spatula clypeata</i> Linnaeus 1758	-	10-53	0-8	-	-	-	-	2-45	-	-	7-43	-	A2	0
16.	<i>Tadorna tadorna</i> Linnaeus 1758	-	-	-	-	-	-	-	0-6	0-2	-	-	0-3	-	+1
17.	<i>Tadorna ferruginea</i> Pallas 1764	0-1?	0-2	-	-	-	-	0-1?	0-2	-	1	2-9	-	A1, CE	+1
18.	<i>Aythya fuligula</i> Linnaeus 1758	-	0-2	-	-	-	-	-	4-16	-	-	2-6	0-37	A2	-1
19.	<i>Aythya farina</i> Linnaeus 1758	-	39-213	-	-	-	-	3-10?	14-200	0-30	1-20?	8-22	0-160	A2	-1
20.	<i>Aythya nyroca</i> Güldenstädt 1770	-	8-23	-	-	-	-	1-3?	4-27	-	0-7?	1-10	-	A1, V	-1
21.	<i>Bucephala clangula</i> Linnaeus 1758	-	-	-	-	-	-	-	-	0-1	-	0-21	-	A2	0
22.	<i>Mergus merganser</i> Linnaeus 1758	-	-	-	-	-	-	-	0-2	0-1	-	0-2	-	A2	0

48.	<i>Circus aeruginosus</i> Linnaeus 1758	0-1?	1-3	-	0-1	1-3	-	1-2	1-4	-	0-1?	1-2	-	AI	+1
49.	<i>Circus pygargus</i> Linnaeus 1758	-	-	-	-	-	-	-	-	-	-	0-1	-	AI, E	-1
50.	<i>Circus cyaneus</i> Linnaeus 1766	-	-	-	-	0-2	-	-	-	-	-	0-1	-	AI	0
51.	<i>Pandion haliaetus</i> Linnaeus 1758	-	0-1	-	-	-	-	-	-	-	-	0-2	-	AI, V	0
52.	<i>Falco peregrinus</i> Tunstall 1771	-	-	0-2	-	-	-	-	-	-	-	-	-	AI, E	-1
53.	<i>Falco columbarius</i> Linnaeus 1758	-	-	0-2	-	-	-	-	-	-	-	-	-	AI	-1
54.	<i>Falco vespertinus</i> Linnaeus 1766	0-2?	2-7	-	-	-	-	-	-	-	-	-	-	AI, V	-1
55.	<i>Falco Subbuteo</i> Linnaeus 1758	0-1?	0-3	-	-	-	-	-	0-1	-	-	0-1	-	-	0
56.	<i>Falco tinnunculus</i> Linnaeus 1758	1-2	2-10	-	-	-	-	-	0-1	-	-	0-1	-	-	+1
57.	<i>Grus grus</i> Linnaeus 1758	-	-	-	-	-	-	-	0-1	-	-	-	-	AI, V	-1
58.	<i>Rallus aquaticus</i> Linnaeus 1758	-	-	-	-	-	-	0-1?	1-2	-	-	-	-	A2	-1
59.	<i>Crex crex</i> Linnaeus 1758	2-4	x	-	0-1?	x	-	1-2	x	-	1-2?	-	x	AI, V	-1
60.	<i>Gallinula chloropus</i> Linnaeus 1758	3-4	x	-	5-6	x	-	4-5	7-13	-	2-3	-	3-7	-	+1
61.	<i>Fulica atra</i> Linnaeus 1758	4-6	8-14	-	2-4	6-13	-	20-25	118-710	-	1-20?	-	122-327	A2	-1
62.	<i>Pluvialis squatarola</i> Linnaeus 1758	-	-	-	-	-	-	-	0-1	-	-	-	-	A2	-1
63.	<i>Arenaria interpres</i> Linnaeus 1758	-	0-4	-	-	-	-	-	-	-	-	-	-	-	-1
64.	<i>Calidris falcinellus</i> Pontoppidan 1763	-	0-23	-	-	-	-	-	-	-	-	-	-	-	0
65.	<i>Calidris pugnax</i> Linnaeus 1758	-	2-12	-	-	0-8	-	-	15-510	-	-	-	11-37	AI, A2	+1
66.	<i>Calidris alpine</i> Linnaeus 1758	-	-	-	-	-	-	-	32-68	-	-	-	13-38	-	0
67.	<i>Calidris minuta</i> Leister 1812	-	-	-	-	0-33	-	-	0-14	-	-	-	12-87	-	0
68.	<i>Calidris temminckii</i> Leslier 1812	-	0-12	-	-	0-52	-	-	2-52	-	-	-	14-42	-	0
69.	<i>Gallinago gallinago</i> Linnaeus 1758	-	0-46	-	-	7-12	-	-	3-430	-	-	-	5-70	A2	+1
70.	<i>Gallinago media</i> Latham 1787	-	0-5	-	-	-	-	-	0-8	-	-	-	-	AI	+1
71.	<i>Lymnocyptes minimus</i> Brunnich 1764	-	0-8	-	-	2-15	-	-	12-50	-	-	-	7-13	A2	+1

95.	<i>Chlidonias hybrid</i> Pallas 1811	0-1	2-5	-	-	72-210	-	4-28	2-63	-	2-35	31-214	-	A1	-1
96.	<i>Sterna hirundo</i> Linnaeus 1758	0-2	2-9	-	0-2?	0-2	-	1-3	2-4	-	-	2-12	-	A1	-1
97.	<i>Podiceps cristatus</i> Linnaeus 1758	1-3	4-10	-	5-7	7-13	0-1	17-20	25-48	-	0-5	10-80	-	-	-1
98.	<i>Podiceps griseogen</i> Boddaert 1783	-	0-4	-	-	-	-	-	0-1	-	0-1	0-4	-	-	-1
99.	<i>Podiceps nigricollis</i> Brehm 1831	-	-	-	-	-	-	-	0-2	-	0-2	0-18	-	-	-1
100.	<i>Tachybaptus ruficollis</i> Pallas 1764	-	-	-	-	-	-	-	0-4	-	0-1	0-13	-	-	-1
101.	<i>Columba oenas</i> Linnaeus 1758	-	-	-	1-2	1-4	-	-	-	-	-	-	-	A2	0
102.	<i>Columba palumbus</i> Linnaeus 1758	2-3	8-10	-	3-4	5-13	-	-	1-4	-	-	16-24	-	A2	+1
103.	<i>Streptopelia turtur</i> Linnaeus 1758	1-2	3-7	-	2-3	3-7	-	2-4	6-18	-	-	2-16	-	A2, V	-1
104.	<i>Streptopelia decaocto</i> Frisvaldszky 1838	6-8	36-98	19-36	10-11	15-41	8-19	1-4	4-12	6-10	0-1	3-5	2-4	A2	0
105.	<i>Cuculus canorus</i> Linnaeus 1758	2-4	6-8	-	2-3	7-10	-	5-6	7-9	-	2-3	3-4	-	-	0
106.	<i>Athene noctua</i> Scopoli 1769	3-4	x	1-2	4-6	x	1-2	2-4	x	x	-	-	-	-	0
107.	<i>Asio otus</i> Linnaeus 1758	-	-	-	1-2	x	x	-	-	-	1	x	x	-	0
108.	<i>Otus scops</i> Linnaeus 1758	0-1	x	-	-	-	-	0-1?	0-2	x	-	-	-	-	0
109.	<i>Alcedo athis</i> Linnaeus 1758	-	-	-	-	-	-	-	0-1	-	-	-	-	A1	-1
110.	<i>Coracias garrulous</i> Linnaeus 1758	-	0-1	-	-	-	-	-	-	-	-	-	-	A1	-1
111.	<i>Merops apiaster</i> Linnaeus 1758	2-10	12-49	-	0-3	8-12	-	0-4	2-43	-	-	3-22	-	-	0
112.	<i>Upupa epops</i> Linnaeus 1758	1-2	2-22	-	2-3	1-4	-	1	1-4	-	1-2	2-4	-	-, V	0
113.	<i>Picus canus</i> Gmelin 1788	-	-	-	0-1	x	0-1	-	-	-	-	-	-	A1	0
114.	<i>Picus viridis</i> Linnaeus 1758	1-2	x	0-4	1-2	x	0-1	-	-	-	-	-	-	-	0
115.	<i>Dendrocopos major</i> Linnaeus 1758	0-1	x	0-1	1-3	x	1-2	-	-	-	-	-	-	-	0
116.	<i>Dendrocopos syriacus</i> Hemprich & Ehrenberg 1833	1-3	x	1-2	2-4	x	1-3	1-2	2-3	2-3	0-1	1-2	1-2	A1	0
117.	<i>Oriolus oriolus</i> Linnaeus 1758	1-2	2-4	-	3-5	4-18	-	1-2	3-5	-	1-2	2-3	-	-	0
118.	<i>Lanius collurio</i> Linnaeus 1758	2-3	4-35	-	0-1	1-5	-	7-10	8-11	-	2-3	5-7	-	A1	+1

119.	<i>Lanius minor</i> Gmelin 1788	0-1	6-18	-	-	-	-	0-2	1-2	1-4	-	0-1?	2-4	-	A1	-1
120.	<i>Lanius excubitor</i> Linnaeus 1758	-	2-5	0-2	1-3	1-2	-	-	1-2	1-4	0-1	-	1-2	0-1	-	0
121.	<i>Pica pica</i> Linnaeus 1758	1-2	8-20	7-8	3-7	2-7	-	-	2-7	8-16	1-3	-	8-24	2-5	A2	0
122.	<i>Garrulus glandarius</i> Linnaeus 1758	0-1	6-26	2-4	2-5	1-3	1-2	1-3	1-3	-	1-2	-	-	-	A2	0
123.	<i>Colaptes monedula</i> Linnaeus 1758	0-1	8-32	9-12	4-8	2-6	1-3	2-6	2-6	0-4	0-2	-	0-6	0-3	A2	0
124.	<i>Corvus frugilegus</i> Linnaeus 1758	-	20-48	34-56	-	-	-	-	-	10-22	8-19	-	52-392	70-211	A2	0
125.	<i>Corvus cornix</i> Linnaeus 1758	-	26-65	12-22	27-48	19-26	-	-	19-26	1-4	5-9	-	34-58	4-7	-	+1
126.	<i>Corvus corax</i> Linnaeus 1758	-	2-6	0-2	4-26	1-4	-	-	1-4	2-6	1-3	-	0-1	-	5,E	+1
127.	<i>Poecile palustris</i> Linnaeus 1758	1-2	1-5	2-4	2-7	3-6	3-5	2-7	3-6	-	-	-	-	-	-	0
128.	<i>Parus major</i> Linnaeus 1758	3-5	18-34	12-22	7-31	13-34	10-12	7-10	7-10	8-12	10-16	-	6-8	4-7	-	0
129.	<i>Cyanistes coeruleus</i> Linnaeus 1758	1-3	7-11	5-9	4-5	7-10	3-5	4-5	7-10	-	-	-	-	-	-	0
130.	<i>Remiz pendulinus</i> Linnaeus 1758	1-2?	3-6	-	3-5	-	1-3?	3-5	-	-	-	1-2?	2-5	-	-	0
131.	<i>Panurus biarmicus</i> Linnaeus 1758	3-4	12-37	-	11-18	-	2-3	11-18	-	7-15	-	1-3	5-11	-	-	+1
132.	<i>Galerida cristata</i> Linnaeus 1758	1-2	14-38	6-14	3-7	4-9	0-1	3-7	4-9	8-22	5-17	1-2	5-7	7-11	-	0
133.	<i>Alauda arvensis</i> Linnaeus 1758	1-2	32-100	-	5-14	-	0-1	5-14	-	12-15	-	2-3	8-11	-	-	-1
134.	<i>Hirundo rustica</i> Linnaeus 1758	x	32-195	-	92-310	-	x	92-310	-	47-310	-	3-4	210-600	-	-	-1
135.	<i>Delichon urbicum</i> Linnaeus 1758	x	32-114	-	16-73	-	x	16-73	-	190-540	-	10-12	32-400	-	-	-1
136.	<i>Riparia riparia</i> Linnaeus 1758	10-18	27-188	-	11-42	-	-	11-42	-	41-71	-	10-12	18-60	-	-	0
137.	<i>Locustella luscinioides</i> Savi 1824	1-2	5-8	-	x	-	2-3	x	-	8-12	-	5-6	15-18	-	-	-1
138.	<i>Acrocephalus arundinaceus</i> Linnaeus 1758	7-8	x	-	x	-	12-15	x	-	15-35	-	10-12	27-32	-	-	-1
139.	<i>Acrocephalus scirpaceus</i> Hermann 1804	2-3	x	-	x	-	4-5	x	-	12-16	-	3-5	12-15	-	-	-1
140.	<i>Acrocephalus schoenobaenus</i> Linnaeus 1758	0-2	x	-	x	-	1-2	x	-	8-12	-	1-2	5-8	-	-	-1
141.	<i>Hippolais icterina</i> Vieillot 1817	-	2-12	-	-	-	-	-	-	-	-	-	-	-	-	0
142.	<i>Sylvia atricapilla</i> Linnaeus 1758	1-3	4-21	-	8-15	-	4-6	8-15	-	5-6	-	0-1?	2-3	-	-	0

143.	<i>Sylvia borin</i> Boddaert 1783	0-1	2-5	-	-	2-6	-	0-1?	1-3	-	1-2	1-4	-	-	0
144.	<i>Curruca communis</i> Latham 1787	2-4	3-8	-	-	3-7	-	5-6	7-9	-	1-3	2-5	-	-	0
145.	<i>Curruca curruca</i> Linnaeus 1758	0-1	3-5	-	-	2-4	-	1-2	2-3	-	0-1	0-2	-	-	0
146.	<i>Ficedula hypoleuca</i> Pallas 1784	-	0-4	-	-	-	-	-	-	-	-	-	-	-	0
147.	<i>Ficedula parva</i> Bechstein 1792	-	2-10	-	-	-	-	-	0-2	-	-	-	-	-	0
148.	<i>Oenanthe oenanthe</i> Linnaeus 1758	1-2	9-26	-	0-1	1-3	-	1-2	3-7	-	0-1	2-4	-	-	+1
149.	<i>Phoenicurus phoenicurus</i> Linnaeus 1758	0-1	0-3	-	-	-	-	-	-	-	-	-	-	-	0
150.	<i>Phoenicurus ochruros</i> Gmelin 1774	1-2	1-5	-	2-4	2-6	-	4-5	6-11	-	1-2	3-5	-	-	+1
151.	<i>Saxicola rubetra</i> Linnaeus 1758	0-2	12-49	-	0-1	1-4	-	1-3	5-12	-	1-2	3-7	-	-	0
152.	<i>Saxicola rubicola</i> Linnaeus 1766	0-1	8-44	-	0-1	1-3	-	0-1	2-4	-	0-1	1-2	-	-	0
153.	<i>Luscinia luscinia</i> Linnaeus 1758	1-2	x	-	2-3	x	-	0-1	2-4	-	-	-	-	-	0
154.	<i>Luscinia megarhynchos</i> Brehm 1831	2-3	x	-	3-4	x	-	1-2	2-3	-	-	-	-	-	0
155.	<i>Turdus merula</i> Linnaeus 1758	0-1	2-15	1-3	4-6	4-18	1-4	12-15	8-19	3-7	1-2	3-5	-	A2	0
156.	<i>Turdus iliacus</i> Linnaeus 1766	-	10-22	0-12	-	-	-	-	-	-	-	-	-	A2	-1
157.	<i>Turdus viscivorus</i> Linnaeus 1758	-	8-34	0-28	-	-	-	-	-	-	-	-	-	A2	-1
158.	<i>Turdus philomelos</i> Brehm 1831	0-1	2-13	-	2-3	5-11	-	1-2	1-3	-	0-1	1-3	-	A2	0
159.	<i>Turdus pilaris</i> Linnaeus 1758	-	18-28	0-52	-	7-21	3-38	-	14-32	7-18	-	21-70	-	A2	-1
160.	<i>Sitta europaea</i> Linnaeus 1758	1-2	8-14	3-12	2-3	10-18	4-7	-	-	-	-	-	-	-	0
161.	<i>Sturnus vulgaris</i> Linnaeus 1758	8-10	80-132	0-18	11-15	83-270	0-31	35-22	382-1500	0-18	3-7	180-1450	0-7	A2	+1
162.	<i>Passer domesticus</i> Linnaeus 1758	x	108-170	69-98	x	72-116	48-62	45-47	16-83	32-78	15-18	21-48	27-51	-	+1
163.	<i>Passer montanus</i> Linnaeus 1758	x	12-46	18-24	x	8-22	12-39	6-8	8-21	8-14	4-5	7-15	4-18	-	-1
164.	<i>Motacilla alba</i> Linnaeus 1758	1-3	10-16	-	2-4	9-14	-	2-3	4-18	-	1-2	5-14	-	-	0
165.	<i>Motacilla flava</i> Linnaeus 1758	2-3	12-24	-	1-2	3-7	-	5-6	8-14	-	2-3	7-11	-	-	0
166.	<i>Anthus trivialis</i> Linnaeus 1758	0-1	1-4	-	1-3	2-7	-	-	-	-	-	-	-	-	0

167.	<i>Anthus campestris</i> Linnaeus 1758	1-2	2-7	-	0-1	1-4	-	3-4	10-13	-	1-2	5-8	-	AI	-1
168.	<i>Fringilla coelebs</i> Linnaeus 1758	1-2	16-54	4-10	7-10	17-38	7-13	15-17	18-21	32-64	7-10	11-14	5-18	-	0
169.	<i>Spinus spinus</i> Linnaeus 1758	-	8-18	3-11	-	2-9	2-7	-	-	-	-	-	-	-	0
170.	<i>Chloris chloris</i> Linnaeus 1758	3-5	4-9	-	6-8	14-21	-	7-8	11-23	-	1-3	4-7	-	-	+1
171.	<i>Carduelis carduelis</i> Linnaeus 1758	5-7	42-87	28-40	8-11	17-62	12-33	4-5	12-49	15-32	5-6	6-8	6-15	-	0
172.	<i>Linaria cannabina</i> Linnaeus 1758	0-2	12-28	0-2	3-5	11-22	0-3	1-2	9-11	4-9	1-3	12-18	2-11	-	+1
173.	<i>Acanthis flammea</i> Linnaeus 1758	-	2-6	0-6	-	-	-	-	-	-	-	-	-	-	-1
174.	<i>Emberiza calandra</i> Linnaeus 1758	3-4	8-36	-	1-2	2-5	-	15-19	12-26	-	1-2	3-8	-	-	+1
175.	<i>Emberiza schoeniclus</i> Linnaeus 1758	2-3	10-18	0-4	2-4	3-8	0-5	4-7	16-23	5-8	1-3	12-18	2-4	-	-1
176.	<i>Emberiza citrinella</i> Linnaeus 1758	0-2	8-17	5-11	2-5	10-21	11-32	1-2	2-8	6-11	1-2	4-11	2-16	-	0

Legend: p – pairs, i – individuals, x – not estimated population; ? – possible or irregular breeding species; Bird's Directive – AI – species mentioned in Annex 1 (as species that need special conservative measures), A2 – species included in Annex 2 (as hunting species respecting the national legislation and the principle of not jeopardise the population); Red Book – Romanian Red Book of Vertebrates; CE – critical endangered species, P – endangered species, V – vulnerable species; Trends: 0 – constant, -1 – negative, +1 – positive.

During the breeding season, we identified 70 bird species as regularly nesting in the area, and other eight species as possible or irregular breeding species. We mention a mixed colony formed by grebes and terns in the perimeter of Motoșeni reservoir, including the black tern (*Chlidonias niger*) that became a rare breeding species in this part of Romania. We observed the breeding heron species (*Ixobrychus minutus*, *Egretta garzetta*, *Ardea alba*, *A. cinerea*, *A. purpurea*), duck species (*Anas platyrhynchos*, *Spatula querquedula*) and swan (*Cygnus olor*) on the pond's area. All the bird species related to the aquatic habitats present a small breeding population. We also notice the passage of the bird population between these two aquatic surfaces, especially when the water level oscillates. For example, the heron species use the tail area of the reservoir as feeding territory and the small pond's perimeter as a dormitory site.

The diversity of the bird fauna increases during the migration time (110 bird species) in the perimeter of the Motoșeni reservoir, especially in the fall migration, proving that this area serves as a stopover point for the migratory bird species. At the same time, we recorded a significant population of waterfowls and waders during autumn as during the spring migration. In winter, we identified only 41 bird species in this area, and the aquatic species were present during the mild winters or until the middle of December when the ice bed covers the surface of the reservoir and the small neighbourhood pond.

Regarding the dynamic of bird fauna during the years, we observed a slow increase in bird diversity during the second period of field monitoring; we recorded negative trends for most bird species in the Motoșeni reservoir perimeter.

Analysing the presence of the bird species included in Annex 1 to the Birds' Directive (***/79/409/EEC, updated as ***/2009/147/EC) and the ornithological data mentioned in the official standard form of ROSPA0159 Lakes around Măscurei (<https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSPA0159>), we notice the following aspects:

- the presence of 19 species from Annex 1 to the Birds' Directive in the area of the Motoșeni reservoir as migratory, breeding or wintering species in this territory;
- the absence of seven bird species mentioned in the official standard form of the site: *Aythya nyroca*, *Gavia arctica*, *Botaurus stellaris*, *Nycticorax nycticorax*, *Grus grus*, *Himantopus himantopus* and *Alcedo atthis*; this absence is due to the lack or insufficient surface occupied by the suitable habitats in the area;
- we met ten species appearing in the official standard form of the site: *Egretta garzetta*, *Ardea alba*, *A. purpurea*, *Ciconia ciconia*, *Circus aeruginosus*, *Chlidonias hybrida*, *Sterna hirundo*, *Dendrocygna syriacus*, *Lanius collurio* and *Lanius minor*;
- the presence of nine species included in Annex 1 to the Birds' Directive but missing from the official standard form of the site: *Plegadis falcinellus*, *Platalea leucorodia*, *Haliaeetus albicilla*, *Circaetus gallicus*, *Crex crex*, *Calidris pugnax*, *Tringa glareola*, *Picus canus* and *Anthus campestris*. We assess that the breeding or migratory presence of these species increases the conservative value of the western sector of this Nature 2000 site, so, a revision is necessary in order to update the standard form.

Moreover, none from the 28 bird species recorded during our studies in the area and mentioned in Annex 2 to the Bird's Directive appears in the official standard form of this site.

We had not observed significant changes in the structure and surface of the aquatic and wetland habitats in the perimeter of the Pereschiv reservoir during the years. The preservation of these habitats appears as maintaining a constant water level due to the fishery management of the area. Sports fishing represents the main human activity in the area, but the fishermen's presence covers the concrete dam perimeter and a sector of the western shore; they are missing from late October until middle May due to the difficult access in the rainy season and the fishing prohibition period. Occasionally, we met a small herd of sheep grazing on the humid meadow covering the north-eastern side of the reservoir.

We notice a number of bird species on the territory of this reservoir similar to the one recorded in the perimeter of the Cuibul Vulturilor reservoir, despite the significant difference in their surfaces: the last one is about five times bigger than the first one. As an explanation, we mention the highest diversity of suitable habitats for the typical aquatic and wetlands bird species, including reed beds, a humid meadow, a flooding meadow forest, and a sector with shrubs on the high eastern slope in the perimeter of the Pereschiv reservoir. We recorded a significant increase in the diversity of bird fauna (36.19%) in this area comparative with that identified during 2008 – 2009 (105 species), as the bird species related to the aquatic and wetlands' habitats present a higher diversity. Following the bird population trends, we notice constant values for the aquatic bird and heron species, respectively, an increasing for the wader species.

The taxonomic list of breeding bird fauna brings together 76 regular nesting species and other 13 as irregular or possible breeding species in this perimeter, juvenile birds being observed in late June or early July. As we see in Table 1, the aquatic and semiaquatic bird species are present with few pairs but their diversity is significant for this small reservoir. We cannot exclude the possible breeding presence of the ruddy shelduck (*Tadorna ferruginea*) as we observed one courtship display pair during spring and their constant presence during the 2002 breeding season. We did not notice ducklings, but we assume that the birds use to go out with their young into the open waters early in the morning or late in the afternoon, when the fishermen leave the area.

We notice the constant presence of adult and juvenile individuals of white-tailed eagle (*Haliaeetus albicilla*) resting in the trees from the tail perimeter of the Pereschiv reservoir. We had searched for their nest in the existing meadow forest; an old tree that can sustain a nest of this great eagle species is not present in the area. Moreover, the local community extracts osiers to manufacture various gardening props, and the extraction activity disturbs the fauna inside the meadow forest. We assume that one of the neighbourhood forests in the area (ROSCIO133 Bădeana Forest or

ROSCI0334 Buciumeni-Homocea Forest) shelters the nest of this white-tailed eagle pair and the birds use the perimeter of the four investigated reservoirs as a feeding territory. The distances between the two mentioned forests and these reservoirs from the middle basin of the Bârlad River fall within the daily flying distance of the white-tailed eagles to search food during the chicks' care in the nest (5 – 20 kilometres/km). The reproductive territory of one pair covers an area of about 52 – 413 square kilometres (BROWN & AMADON, 1968).

In the perimeter of the Pereschiv reservoir, we identified 142 bird species during the migration period. The aquatic species, as geese and duck species (for example, *Anser albifrons*, *Anas platyrhynchos*, *A. crecca*, *Spatula querquedula*, *Aythya ferina*), were present in groups of dozens and hundreds to thousands of individuals, while for the wader species we recorded flocks of dozens to hundreds of individuals (as dominant species, we mention *Tringa totanus* or *Vanellus vanellus*). We recorded larger migratory flocks in the spring than during the fall migration. In November, we observed some rare passage bird species for this territory as *Cygnus cygnus*, *Anser erythropus* or *Gavia arctica*. Bird diversity decreases during wintering time when we met only 46 bird species, the sedentary and partial migratory species being dominant. We notice the migratory presence of the diving duck species (*Aythya nyroca*, *A. ferina* and *A. fuligula*) that are missing in the perimeter of Motoșeni reservoir due to the unsuitable lower water level.

Usually, the ice bed covers the perimeter of this aquatic surface in late December until the first decade of February, so the aquatic bird population is present only during mild winters and the diversity of bird fauna is low along wintering time (46 species).

As mentioned in Table 1, the bird fauna from the Pereschiv reservoir includes 29 bird species that appear in Annex 1 to the Birds' Directive as species that need special conservation measures and management of their habitats in order to ensure their survival and the reproduction in their distribution range. Some of these species have small breeding population in the area. This aquatic perimeter represents an important stopover point during migration time and shelters species that were not recorded on the protected territory of the Motoșeni reservoir such as *Cygnus cygnus*, *Anser erythropus*, *Tadorna ferruginea*, *Ciconia nigra*, *Pandion haliaetus* and *Lanius minor*. During our studies, we observed 38 species mentioned in Annex 2 to the same directive, as species of hunting interest, without jeopardising conservation efforts in their European range. The richness of the present bird fauna, including these bird species with protection status and the geographic position of the Pereschiv reservoir in the neighbourhood, and between the eastern and western sectors of the ROSPA0159 Lakes around Măscurei, towards the Bârlad River valley, represent good reasons to include the perimeter of this reservoir in the protected Nature 2000 site.

The Cuibul Vulturilor reservoir and the Iana-Iezer ponds (Puiești, Vaslui County) form the eastern sector of the ROSPA0159 Lakes around Măscurei (Fig. 1). The habitats existing on the territory and in the neighbourhood of the Cuibul Vulturilor reservoir have undergone severe changes during the last fifteen years in the global climate changes dynamic, as we observed during our three periods of monitoring activity in the field. The long periods of severe drought and significant oscillation in the water level from one year to another are responsible for the disappearance of the humid meadow and marsh surfaces on the tail perimeter of this reservoir, becoming dry meadows. At the same time, the compact red beds extended and overrun the northern sector towards the Iana-Iezer ponds. Moreover, the agricultural practices on the cultivated lands covering the western slope of the valley and the torrential rainfalls increase the risk of silting and decrease the depth of waters in this reservoir.

During the years, the diversity bird fauna increased from 106 bird species (IGNAT & GACHE, 2019) to 145 bird species. The dynamic of the bird fauna on the territory of the Cuibul Vulturilor reservoir is significant for the whole middle basin of the Bârlad River due to its large surface and mosaic of suitable habitats for the aquatic and semiaquatic bird species. For the breeding season, the negative trends represent the rule for almost all recorded bird species. Many regular nesting species in the area became irregularly breeding due to water missing in the perimeter covered by compact reed beds. The drying of the red bed substrate causes loss of feeding resource, disrupting the metamorphosis of the aquatic insects and putting the nest of birds at risk of predators, increasing the access of various categories of predators. The migratory population of the aquatic bird species presents constant trends, and a slight increase for some wader species.

We recorded 58 regular breeding species and 17 irregular nesting species in the perimeter of the Cuibul Vulturilor reservoir. Numerous bird species find a suitable breeding habitat inside the red beds that cover the valley of the Tutova River upper of the entrance in this reservoir towards the Bogești village, but their diversity and pair number depend on the water level in the area. During the years with an average level of rainfalls and snowfalls, the appearance of marshes and larger or smaller aquatic surfaces inside the compact red bed allow for the nesting presence of aquatic species as swans, ducks and rails or heron species. When winter snowfalls and spring rainfalls are missing, the compact red bed area is drying; the birds occupy the strips of reed along the western shore and the humid area on the tail perimeter of the reservoir. For this reason, their diversity and breeding population decrease significantly. We notice the presence of a mixed breeding colony bringing grebes, terns, and gulls in the area from the tail of the reservoir; the nesting population varies significantly from one year to another. We mention the summer presence of the Dalmatian pelicans (*Pelecanus crispus*) in this perimeter; we assume they are immature birds wandering for feeding territories outside of the Danube Delta breeding colonies to escape from the pressure of the adult population.

The diversity of the bird fauna increases significantly during migration time, when we identified 139 bird species and we recorded flocks of tens to hundreds for the wader species (as dominant species: *Calidris pugnax*, *Gallinago gallinago*, *Limosa limosa*, *Tringa totanus* and *Vanellus vanellus*), respectively, hundreds to thousands of ducks (the dabbling species as *Anas platyrhynchos*, *A. crecca* and *Spatula querquedula* are dominant species). The first migratory

wader groups appear in late July, while ducks start their fall migration during August, while the spring migration begins in March for both groups. The Cuibul Vulturilor reservoir represents the best stopover area for significant passage populations in the middle basin of the Bârlad River, especially during the autumn migration when a large marsh perimeter appears in the sector from the tail area due to the withdrawal of water and decrease in its depth.

We only met 46 bird species during winter; usually, the aquatic bird population is missing during January, due to the ice bed covering the territory of reservoir. During the last two winters, a sector of about 25 – 30% from the area was free of ice bed all the time, sheltering at least 1000 aquatic birds.

In the perimeter and neighbourhood of Cuibul Vulturilor reservoir we recorded the highest diversity of the bird species mentioned in the annexes to the Bird Directive: 30 bird species included in Annex 1, respectively, 41 species that appear in Annex 2. We notice the breeding presence of 17 bird species from Annex 1, other ten appearing during migration time and three species being winter visitors in the area. Comparing our monitoring results to the data mentioned in the official standard form of the ROSPA0159 Lakes around Măscurei (<https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSPA0159>), we assess the following facts:

- for the last two periods of study, we cannot confirm the presence of three bird species mentioned in the official form: *Botaurus stellaris* (its presence is possible, being a very discreet species), *Grus grus* (is a very rare species in the area, with only one observation: one individual, 20 October 2012) and *Alcedo atthis* (the suitable habitat covers small surfaces along the eastern shore of the reservoir);
- we observed 14 bird species included in the official standard form of the site;
- we recorded the presence of 14 bird species from Annex 1 to the Birds' Directive that were not mentioned in the official standard form of the site: *Cygnus cygnus*, *Tadorna ferruginea*, *Gavia stellata*, *Microcarbo pygmaeus*, *Pelecanus crispus*, *Plegadis falcinellus*, *Haliaeetus albicilla*, *Crex crex*, *Calidris pugnax*, *Gallinago media*, *Tringa glareola*, *Recurvirostra avosetta*, *Hydrocoloeus minutus* and *Anthus campestris*. Out of these, there are some species present in the western sector of the site, too. For this reason, the revision of the official standard form is compulsory even more as some of these bird species appear in the Romanian red Book of Vertebrates and have become rare species in our country;
- during our study, we identified 41 bird species mentioned in the Annex 2 of the Birds' Directive; none appears in the official standard form of this site;
- the quantitative data are similar, with smaller values for some species (for example, *Aythya nyroca* or *Nycticorax nycticorax*); we explain this situation through the natural fluctuation due to the severe and prolonged drought phenomenon recorded in the area, influencing the water level and the surface occupied by various aquatic and wetland habitats.

The Râpa Albastră reservoir represents the second larger aquatic surface in the middle basin of the Bârlad River. The humid meadows and the paludous vegetation as sedge and rush species cover the tail perimeter of this reservoir; the strips of reed appear along the valley of Simila River upper of it entrance into the reservoir. The former marsh area changed in a humid grassland at the northern edge of reservoir, becoming dry during the last years' summer. The eastern and western shores present a high sector towards the concrete dam area, and a gentle beach aspect towards the tail perimeter. A young woodland covers the southern sector of the western slope, and cultivated lands with strips of shrubs are present on the northern part of it and along the western side of Simila valley. Sport fishing activity is present in the area of the concrete dam and along the southern sectors of the both long shores; moreover, we observed the fishing by boat in front of the dam. In the northern part of the reservoir, a private land owner developed a farming activity, including a large herd of sheep grazing on the tail perimeter of the reservoir and along the Simila valley. We notice the presence of five to ten dogs accompanying the herd. As we saw during our field monitoring, these activities have a constant character and high level in the area; for example, in August 2022, we counted 33 fishermen and two fishing boats in the area. All these factors influence the diversity and bird population.

Fifteen years ago, the Râpa Albastră reservoir represented the most important breeding perimeter in the middle basin of the Bârlad River, with 67 regular nesting species and significant breeding population. So far, on 5th June 2011, we identified a large mixed breeding colony in the perimeter of the marsh area from the northern edge of this reservoir. The whiskered tern (*Chlidonias hybrida*) was dominant, with 170 pairs, but all the breeding grebe species in Romania were present in this colony: one pair of red-necked grebe (*Podiceps grisegena*), 7 pairs of black-necked grebe (*P. nigricollis*), 9 pairs of little grebe (*Tachybaptus ruficollis*) and 25 pairs of crested grebe (*Podiceps cristatus*). Between their nests, we observed 7 pairs of ferruginous duck (*Aythya nyroca*) and 30 pairs of coot (*Fulica atra*). We don't know when this colony disappeared, but we failed to find it during the next two periods of monitoring activity in the area. We recorded 52 regular nesting species and other 16 irregular nesting species forming the present list of breeding bird fauna of this reservoir. In this perimeter, we certified the first nesting of the ruddy shelduck (*Tadorna ferruginea*) in the basin of Bârlad River, observing one pair with five ducklings on 15th June 2022, grazing on the western shore and taking away in the open waters at the moment of our arrival in the area. We assume that they built their nest in the perimeter of marshes area from the tail perimeter, where we observed the pair with mating display behaviour in early April 2023. Before, we met this species there only during spring migration.

During migration time, we observed 122 bird species; the autumn passage begins in the early August, while the spring migration starts in middle February. We counted thousands of individuals only for the mallard (*Anas platyrhynchos*), respectively dozens to hundreds of individuals for other aquatic and semiaquatic bird species. Usually, we met groups of bird on the northern edge of this reservoir. The diving aquatic bird species as the Arctic loon (*Gavia*

arctica), cormorants (*Phalacrocorax carbo* and *Microcarbo pygmaeus*), diving ducks (*Aythya* sp.), common merganser (*Mergus merganser*) and coot (*Fulica atra*) were present starting from late October and early November when the fishing activity stopped in the area with deep waters. Among the passage species, we mention some rare species for the basin of the Bârlad River, such as the *Pelecanus crispus*, *Ciconia nigra*, *Buteo rufinus* or *Pandion haliaetus*.

The winter presents a mild character in the area, and the ice bed covers about 90 – 95% from the aquatic surfaces in late January or early February. We identified only 35 bird species during the wintering time in this perimeter. Between the aquatic species, we met two dominant species: the mallard (*Anas platyrhynchos*) with 2100 – 400 individuals and common teal (*A. crecca*) with 140 – 340 individuals during the winter months.

In the perimeter of the Râpa Albastră reservoir, we observed 29 bird species included in Annex 1 and 32 bird species mentioned in Annex 2 to the Birds' Directive. The protection status of the Râpa Albastră reservoir is not clear. As we mentioned above, the reservoir is mentioned in the official documents of the ROSPA0159 Lakes around Măscurei, but it is missing from the official map of this site. At the same time, one unnamed reservoir appears in the description of the site in the official standard form of the ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului; the Râpa Albastră reservoir is present in the official map of this Nature 2000 site. Due to this confusing situation, we analyse our results by reporting the data according to both official standard forms.

When we compare our data to the official standard form of ROSPA0159 Lakes around Măscurei (<https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSPA0159>), we assess:

- we have not met three mentioned bird species: *Botaurus stellaris*, *Grus grus* and *Alcedo atthis*; the suitable habitats are missing or cover surfaces which are smaller than fifteen years ago;
- we identified 14 bird species that appear in the official standard form of the site; for some species, we notice the overestimation of quantitative data;
- 12 recorded bird species do not appear in official form of this site: *Tadorna ferruginea*, *Pelecanus crispus*, *Haliaeetus albicilla*, *Buteo rufinus*, *Circus pygargus*, *Pandion haliaetus*, *Crex crex*, *Calidris pugnax*, *Gallinago media*, *Tringa glareola*, *Recurvirostra avosetta* and *Anthus campestris*;
- none of the 32 identified bird species included in Annex 2 to the Birds' Directive are not present in the list of bird species included in the official standard form of this site.

Analysing our data against the official standard form of ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului (<https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSPA0167>), we see:

- six bird species are missing from our list: *Ixobrychus minutus*, *Circaetus gallicus*, *Circus cyaneus*, *Coracias garrulus*, *Alcedo atthis* and *Emberiza hortulana*. We assume the presence of these bird species in other parts of the site, but the suitable habitats are missing in the perimeter of this reservoir;
- we confirm the presence of seven species mentioned in the official list of the site and, except for a few situations (for example, *Chlidonias hybrida*), we recorded similar quantitative data during our study;
- we observed 19 bird species that appear in Annex 1 to the Birds' Directive that are missing in the list of species from the official standard form: *Tadorna ferruginea*, *Gavia arctica*, *Pelecanus crispus*, *Ardea alba*, *A. purpurea*, *Ciconia ciconia*, *Haliaeetus albicilla*, *Buteo rufinus*, *Circus pygargus*, *Pandion haliaetus*, *Crex crex*, *Calidris pugnax*, *Gallinago media*, *Tringa glareola*, *Recurvirostra avosetta*, *Himantopus himantopus*, *Sterna hirundo*, *Lanius minor* and *Anthus campestris*;
- only two species (*Anas platyrhynchos* and *Streptopelia turtur*) from the recorded 32 bird species mentioned in the Annex 2 of the Birds' Directive are present in the official standard form of this site.

During our ornithological studies in the perimeter of these four reservoirs from the middle basin of Bârlad River, we observed 29 bird species that appear in the Red Book of Vertebrates from Romania (BOTNARIUC & TATOLE, 2005). Between them, four are critically endangered bird species: *Anser erythropus* (met in the Pereschiv reservoir area), *Tadorna ferruginea* (missing in the perimeter of Motoșeni reservoir), *Pelecanus crispus* (met in the perimeter of Cuibul Vulturilor and Râpa Albastră reservoirs) and *Haliaeetus albicilla* (observed in the perimeter of all four reservoir). Seven bird species are endangered ones, appearing as irregular breeding species in the area (*Egretta garzetta*, *Ardea alba*, *A. purpurea* and *Himantopus himantopus*), as resident (*Corvus corax*), passage migratory species (*Circus pygargus*) or as winter visitor (*Falco peregrinus*). Other 18 species form the group of vulnerable species, being breeding or passage species in this territory.

CONCLUSIONS

The four investigated reservoirs – Motoșeni, Pereschiv, Cuibul Vulturilor and Râpa Albastră – from the middle basin of Bârlad River present significant importance as stopover areas during bird migration, in spring and autumn, but also during the breeding season, sheltering various rare and protected bird species that present small nesting population. In the context of global climate change, winters become mild in this region and aquatic birds are present with hundreds and thousands of individuals as wintering population in this perimeter.

During our field monitoring activity, we identified 176 bird species in the perimeter of the investigated reservoirs. The diversity of bird fauna increased during the last fifteen years. The typical bird species for the aquatic and wetlands habitats presents high diversity. In terms of population trends, 41.47% of the recorded bird species present stable population, while for 21.02% of the observed bird species we notice positive trends. We assess negative trends for the

population of 66 bird species (37.50%) in this area, especially due to habitat change. We notice the positive trends of raptor and wader species, respectively, negative trends for the herons, terns and grebes group. In the perimeter of these four reservoirs, we identified four critically endangered species, seven endangered bird species and 18 vulnerable bird species mentioned in the Red Book of Vertebrates from Romania.

The breeding population is small, but we recorded 81 regular nesting bird species in the area, while 14 bird species appear as irregular breeding species in the perimeter of these reservoirs. The diversity of breeding bird fauna increased during the years, but their population presents negative trends.

We met 176 bird species during the migration period, recording the highest population of waterfowl and wader species. During one-day field monitoring in the period of birds' migration, we counted 4000 – 7500 individuals representing aquatic bird species (ducks, geese, swans, coot, cormorants, gulls, terns, grebes and loons), up to 130 individuals of egrets and herons (Ardeidae), respectively, 150 – 310 white storks (*Ciconia ciconia*) and up to 3300 individuals representing wader species (Scolopacidae, Charadriidae, Recurvirostridae). We mention the 16 raptor species, appearing with small population during the migration time in this area.

Winters became mild during the last decade in this part of our country and, even when the aquatic surfaces freeze, small areas of open waters remains free (especially on the Cuibul Vulturilor and Râpa Albastră reservoirs). We identified 62 bird species during the wintering time in the perimeter of the four investigated reservoirs; among them, 18 species are related to the aquatic ecosystems. Their population varies from one month to another during the winter season; we recorded up to 5200 individuals in December and about 1600 during the coldest period, in middle January or early February.

Except for the Pereschiv reservoir without protection status, the other three reservoirs were included in the Nature 2000 network: the Motoșeni and Cuibul Vulturilor reservoirs are part of ROSPA0159 Lakes around Măscurei, while the Râpa Albastră reservoir presents a confusing status, being part of the same site in the official description, but appearing on the map of ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului; the official description of the last site mentions one unnamed reservoir. The official list of ROSPA0159 Lakes around Măscurei presents data for 17 bird species, while the list of ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului mentions 15 bird species. During our field monitoring activity, we met 46 bird species that appear in Annex 1 to the Birds Directive and only 23 of them (50%) are present in the official standard forms of one or both Nature 2000 sites: ROSPA0159 Lakes around Măscurei, respectively, ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului. We identified 44 bird species nominated in Annex 2 to the Birds Directive and only two of them (*Anas platyrhynchos* and *Streptopelia turtur*) appear in the list of bird fauna for the ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului, with incomplete data regarding the wintering time, but not the migration period.

The update of the official standard form represents a request in order to extent the list of bird species and to mention the current dynamic of quantitative data. Moreover, the status of the Râpa Albastră reservoir must be clarified, especially since are various wind farm projects developing in this region that need to complete adequate assessment studies.

Using our field monitoring data, we propose the inclusion of the Pereschiv reservoir as part of ROSPA0159 Lakes around Măscurei, being a natural extension between the Motoșeni and Cuibul Vulturilor reservoirs. At the same time, we propose the elimination of the Râpa Albastră reservoir from the official description of the site ROSPA0159 Lakes around Măscurei, and its nomination in the official standard form of ROSPA0167 Bârlad River between Zorleni and Gura Gârbăvoțului as it appears on the map of this site.

We mention natural phenomena and local community activities as the main risk factors for the bird fauna in the perimeter of the four investigated reservoirs from the middle basin of the Bârlad River. The prolonged and severe drought became a normal phenomenon in this part of Romania; snowfalls are missing or low, and we recorded five to eight weeks without rainfalls during spring, summer and autumn. The marsh areas and humid meadows disappeared or occupy a limited surface in the tail perimeter of the reservoirs. The water depth decreased everywhere and, in the perimeter of Motoșeni reservoir, we observed the water bloom phenomenon (excessive development of the submerged plants). The dry reed beds overrun the former marshes and humid meadow areas, especially in the northern edges of the Cuibul Vulturilor and Râpa Albastră reservoirs, respectively along the Tutova River and Simila River valleys.

Recreational fishing is highly present on all four reservoirs, but especially in the perimeter of the Râpa Albastră reservoir, where we met dozens of fishermen during every field visit, along the shores and using the boat in front of the concrete dam. Agriculture has a low impact in the reservoirs' perimeter. We met herds of sheep and goats grazing on the humid and dry meadows in the perimeter of the Râpa Albastră reservoir (as regular presence) and the Pereschiv reservoir (only five times during our monitoring activity).

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