

UDC 598.2:574.58 (477.7)

THE AMOUNT AND DISTRIBUTION OF THE RED DATA BOOK BIRD WETLAND SPECIES IN THE AZOV-BLACK SEA REGION OF UKRAINE ACCORDING TO THE RESULTS OF AUGUST COUNTS 2004–2015

J. I. Chernichko, V. A. Kostiusyn, S. V. Vinokurova

*Schmalhausen Institute of Zoology, NAS of Ukraine,
vul. B. Khmelnytskogo, 15, Kyiv, 01030 Ukraine
j.chernichko@gmail.com*

The Amount and Distribution of the Red Data Book Bird Wetland Species in the Azov-Black Sea Region of Ukraine According to the Results of August Counts 2004–2015. Chernichko, J. I., Kostiusyn, V. A., Vinokurova, S. V. — In the period from 2004 to 2015, in the Azov-Black Sea region of Ukraine and the adjacent territories five simultaneous August Counts covered all key coastal wetlands were conducted. They were primarily aimed at studying the abundance and spatial distribution of local water birds fauna, since that time there was hardly any migrations. In total 5.5 million birds of 133 species were counted during five August Counts. Forty species of them are included in the 3rd edition of the Red Data Book (RDB) of Ukraine, 35 of which are ecologically related to wetlands. The total amount of RDB birds was 179.5 thousand individuals, or 3.26 % of the total number of counted birds. Amount of birds varied from count to count between 21 and about 55 thousands of birds. In total 80 wetlands were covered by surveys, and in 73 of them (91.3 %), at least one time RDB species were recorded, that indicates the importance of the Azov-Black Sea coast for maintaining both local and migratory RDB birds. In five of the most valuable wetlands the percentage of counted birds from the total average value for all birds ranged from 5.3 % to 16.7 %, cumulatively making up 49.3 %. These are the following sites — Eastern Sivash, Lower part of the Ukrainian Danube Delta, Central Syvash, Kinburnskyi Peninsula, Lebedyni Islands.
Key words: Ukraine, Azov-Black Sea coast, water birds, August Counts.

Introduction

In 2004 the Regional Ornithological Monitoring Program was launched, within which the August synchronous surveys of the wetlands of the Azov-Black Sea region of Ukraine were organized. Bird counts in August were conducted for several reasons. First, the nesting season was already ended and pre-migratory birds concentrations began to form, although migration had not started yet, except for some species. Second, hunting season, which leads to significant changes in the spatial distribution of birds in the wetlands, is not opened yet in Ukraine that time. The combination of these conditions allows quantitative assessment of the local avifauna, as well as the importance of particular wetlands for bird species.

In total, five synchronous August Counts were conducted — in 2004, 2006, 2009, 2012 and 2015 (Bulletin ROM, 2005, 2008, 2010, 2014, 2016). The coverage of the wetlands by the years was quite different, primarily, depending on the availability of funding (mainly, surveys were conducted by ornithologists on a volunteer basis). At the same time, it should be noted that counts were based mostly on a network of professional

ornithologists working in strict nature reserves, national parks, local universities and research institutes. Despite a certain irregularity in conducting surveys in particular wetlands, the data on the amount and distribution of bird species collected over a large area provide with valuable information for assessing the significance of the wetlands of the Azov-Black Sea coast for their protection.

Aim of this publication is to analyze data of August Counts on water bird species included in Red Data Book (RDB) of Ukraine, many of which are also priority species for Bern and Bonn Conventions, AEWA and some other international agreements.

Material and methods

August Counts partially covered other regions of the country, as well as the territories of other countries, primarily the Azov Sea region of Russia. The coverage of the wetlands of the Azov-Black Sea coast of Ukraine by the years was as follows: 2004 — 64 sites, 2006 — 38, 2009 — 43, 2012 — 25, 2015 — 39, or 80 different sites in total (fig. 1).

The regularity of the wetlands surveys, because of the objective reasons, was quite low. Only 25 % of the sites (20 of 80) were examined during 4–5 counts. The rest of the sites were counted only in 1–3 times. Thus, the share of the sites surveyed only once was over 37 %. The vast majority of sites counted 2–3 times, were surveyed at different intervals of time, while synchronous surveys were held with intervals of 2–3 years.

A total of 5.5 million individuals of 133 species of birds were counted during the 5 August Counts. 40 species of which are included in the 3rd edition of the Red Book of Ukraine, among which 35 are ecologically associated with wetlands (table 1). The total number of counted Red Book's birds was 179.5 thousand individuals, or 3.26 % of the total number of registered birds. The minimum number of birds per count was about 21 thousand individuals; the maximum number was about 55 thousands individuals.

Results and discussion

As it was mentioned above — 80 wetlands were surveyed for the whole period of counts 2004–2015, and in 73 of them (91.3 %) at least one of the counts recorded RDB bird species, which indicates the high importance of the Azov-Black Sea coast in maintaining both local and migratory populations of protected bird species.

Number of bird species of various conservation categories of the 3rd edition of the Red Data Book of Ukraine (2009), amount of birds and its ratio is shown in table 1.

Pelecanus onocrotalus was the most numerous among the RDB bird species according to aggregate count data, reaching 24.06 % of the total birds number, *Recurvirostra avosetta* — 18.92 % and *Somateria mollissima* — 6.08 %. Figure 2 shows species the amount of which exceeded 1 % of the total number of counted birds.

Complete information on the number of all 40 species, both by year and in total, as well as on their percentage from the total counts data of various categories of Red Data Book is presented in table 2.

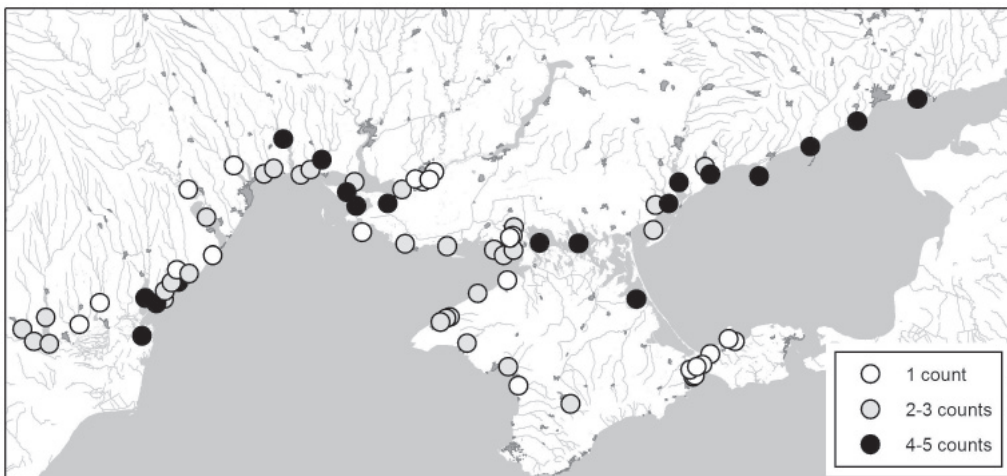


Fig. 1. Number of August Counts in the different wetlands of Azov-Black Sea coast of Ukraine.

Table 1. Number of wetland bird species of different Red Data Book categories, amount of birds and its ratio recorded during August Counts 2004–2015

Red Data Book categories*	Species number	Amount of birds, ind.	Percentage, %
Endangered (E)	13	71,600	39.90
Vulnerable (V)	10	40,230	22.42
Rare (R)	11	67,574	37.66
Not evaluated (NE)	1	46	0.03

* 3rd edition of Red Data Book of Ukraine includes the following categories: Extinct, Extinct in Wild, Endangered (could extinct in nature without conservation measures), Vulnerable (because of decreasing could be included soon in E), Rare (more safety than E and V, but also has negative tendency), Not Evaluated (possibly belong to E, V or R), Not Enough Known (not enough data to classify them).

Analysis of the importance of particular wetlands for the RDB wetland species could be carried out using a variety of approaches that reflect different aspects of the wetlands value. For this publication were selected only a few of the possible options, considering as sufficient for the purposes of this article.

The first approach is an assessment of the importance of wetlands for birds of various conservation categories of the Red Book of Ukraine (table 3). Twenty-three wetlands of 63 (36.5 %) were found as the most valuable for the support of Endangered species (13). Eastern Sivash is significant for almost half of them, including *Pelecanus onocrotalus*, *Phalacrocorax pygmaeus*, *Tringa stagnatilis*, *Numenius arquata*, *Numenius phaeopus*, *Larus ichthyaetus*.

The number of wetlands that support a high number of Vulnerable species was 25 out of 73 (34.2%). Only 12 wetlands from the 25 mentioned above were important for both Vulnerable and Endangered species. The Tendrivska Bay was the most important for six Vulnerable species: *Platalea leucorodia*, *Plegadis falcinellus*, *Somateria mollissima*, *Mergus serrator*, *Charadrius alexandrinus* and *Haematopus ostralegus*. The Kinburn Peninsula was not inferior in number of species besides species mentioned above, this site was important

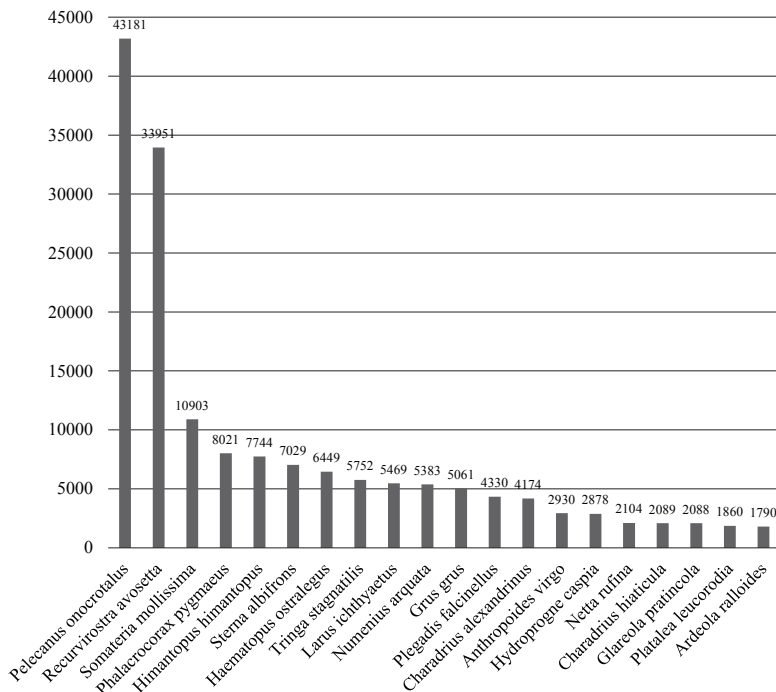


Fig. 2. The most numerous RDB birds species, recorded during August Counts 2004–2015.

Table 2. Species composition and amount of the RDB bird species, recorded during August Counts 2004–2015 years in Azov-Black Sea region of Ukraine

No.	Species	Categories of RDB*	2004	2006	2009	2012	2015	Sum	%	Number of Wetlands	Key wetlands****
			E	R	V	R	V	R	V		
1.	<i>Pelecanus onocrotalus</i>	E	14928	2990	13544	5882	5837	43181	24,06	48	Lower part of the Ukrainian Danube Delta — 26.4 %, Eastern Syvash — 24.9 %, Kagul Lake — 10.6 %, Tendrivska Bay — 10.5 %
2.	<i>Pelecanus crispus</i>	E	142	22	150	122	37	473	0,26	15	Lower part of the Ukrainian Danube Delta — 70.6 %, Dnistrovskiy Lyman — 14.2 %
3.	<i>Phalacrocorax pygmaeus</i>	E	2374	154	4592	500	401	8021	4,47	24	Lower part of the Ukrainian Danube Delta — 67.2 %, Dniipro Delta — 5.9 %, and Kardashynskiy Lyman — 5.9 %
4.	<i>Ardeola ralloides</i>	R	932	105	303	407	43	1790	1,00	23	Lower part of the Ukrainian Danube Delta — 58.6 %, Dnistrovskiy Lyman — 11.06 %
5.	<i>Platalea leucorodia</i>	V	838	273	336	265	148	1860	1,04	28	Lower part of the Ukrainian Danube Delta — 31.1 %, Eastern Syvash — 25.4 %, Central Syvash — 12.7 %, Dnistrovskiy Lyman — 10.43 %
6.	<i>Plegadis falcinellus</i>	V	2088	878	563	198	603	4330	2,41	39	Eastern Syvash — 25.4 %, Central Syvash — 23.3 %, Sasyk Reservoir — 9.5 %
7.	<i>Ciconia nigra</i>	R	44	9	22			75	0,04	9	Kytai Lake — 41.3 %, Berdynska Spit — 16.7 %, Molochnyi Lyman — 10.7 %, Dzharlygachskiy Bay — 10.7 %
8.	<i>Tadorna ferruginea</i>	V	17	41	487	69	128	742	0,41	13	Central Syvash — 64.6 %, Kryva Spit — 12.3 %, Molochnyi Lyman — 9.0 %, Utiutskiy Lyman — 9.0 %
9.	<i>Anas strepera</i>	R	1045	6669	518	3172	1910	13314	7,42	23	Lower part of the Ukrainian Danube Delta — 84.0 %
10.	<i>Netta rufina</i>	R	1910	58	29		107	2104	1,17	21	Eastern Syvash — 52.9 %, Lebedyni Islands — 31.5 %
11.	<i>Aythya nyroca</i>	V	745	24	103	46	25	943	0,53	23	Katlabug Lake — 25.9 %, Kartal Lake — 18.8 %, Kugurlui Lake — 12.7 %
12.	<i>Bucephala clangula</i>	R	4	8	2	10	8	32	0,02	5	Lower part of the Ukrainian Danube Delta — 10.9 %
13.	<i>Somateria mollissima</i>	V	3600	4145	1560	497	1101	10903	6,08	7	Kinburnskiy Peninsula — 77.4 %, Tendrivska Bay — 16.6 %
14.	<i>Oxyura leucocephala</i>	E				2		2	<0,01	1	Biruchiy Island
15.	<i>Mergus serrator</i>	V	54	9	1	4	1	69	0,04	8	Tendrivska Bay — 33.3 %, Lebedyni Islands — 26.1 %
16.	<i>Circus cyaneus**</i>	R	4			1	3	8	0,00	4	Western Syvash — 50.0 %
17.	<i>Circus pygargus**</i>	V	3			60	69	132	0,07	25	Central Syvash — 20.5 %, Molochnyi Lyman — 9.8 %, Kryva Spit — 9.8 %, Eastern Syvash — 8.3 %, Alibei Lyman — 8.3 %
18.	<i>Buteorufinus**</i>	R	6					6	<0,01	1	Western Syvash

19.	<i>Haliaeetus albicilla</i>	R		15	10	25	0.01	7	Lower part of the Ukrainian Danube Delta — 64.0 %, Kinburnskiy Peninsula — 12.0 %, Tendrivska Bay — 8.0 %.		
20.	<i>Falco cherrug</i> **	V		4	2	6	<0.01	4	Central Syvash — 33.3%, Utiutskiy Lyman — 33.3%, Burnas Lyman — 16.6 %, Molochnyi Lyman — 16.6 %		
21.	<i>Falco peregrinus</i> **	R		2		2	<0.01	2	Central Syvash — 50 %, Symfypol'skiy Reservoir — 50.0 %.		
22.	<i>Grus grus</i>	R	526	1792	1050	5061	2.82	8	Central Syvash — 91.6 %		
23.	<i>Anthropoides virgo</i>	E	816	176	991	2930	1.63	4	Central Syvash — 66.8 %, Dzharlygach Lake (Crimea) — 32.5 %		
24.	<i>Otis tarda</i>	E	4		4		<0.01	1	Achi Lake (Crimea)		
25.	<i>Burhinus oedicnemus</i>	NE	15	13	9	4	0.03	11	Central Syvash — 21.7 %, Eastern Syvash — 15.2 %, Albei Lyman — 13.0 %, Kuialnytskiy Lyman — 13.0 %, Utiutskiy Lyman — 8.7 %, Tendrivska Bay — 8.7 %.		
26.	<i>Charadrius hiaticula</i>	R	377	89	133	845	645	2089	1.16	28	Utiutskiy Lyman — 46.0 %, Kryva Spit — 15.1 %, Shagany Lyman — 10.9 %.
27.	<i>Charadrius alexandrinus</i>	V	1505	1398	674	414	183	4174	2.33	34	Eastern Syvash — 33.6 %, Central Syvash — 15.8 %, Tendrivska Bay — 14.3 %, Kinburnskiy Peninsula — 11.4 %
28.	<i>Himantopus himantopus</i>	V	1665	2114	1455	382	2128	7744	4.32	51	Central Syvash — 35.8 %
29.	<i>Recurvirostra avosetta</i>	R	7893	9075	6013	3357	7613	33951	18.92	40	Eastern Syvash — 32.4 %, Central Syvash — 21.8 %, Utiutskiy Lyman — 19.6 %, Molochnyi Lyman — 11.7 %
30.	<i>Haematopus ostralegus</i>	V	1472	1176	1205	1720	876	6449	3.59	40	Molochnyi Lyman — 35.8 %, Eastern Syvash — 14.1 %
31.	<i>Tringa stagnatilis</i>	E	2463	2322	570	282	115	5752	3.21	23	Eastern Syvash — 47.6 %, Central Syvash — 32.3 %
32.	<i>Gallinago media</i>	E	3	1		11		15	0.01	5	Sasyk Reservoir — 53.3 %, Tylygulykiy Lyman — 20.0 %, Lower part of the Ukrainian Danube Delta — 13.3 %
33.	<i>Numenius tenuirostris</i> ***	E	12					12	0.01	3	Lower part of the Ukrainian Danube Delta — 8.3 %, Sasyk Reservoir — 50.0. Dzhamtsheyskiy Lyman — 41.7 %
34.	<i>Numenius arquata</i>	E	2169	841	1082	734	557	5383	3.00	39	Eastern Syvash — 30.6 %, Tendrivska Bay — 11.1 %, Molochnyi Lyman — 11.1 %
35.	<i>Numenius phaeopus</i>	E	118	61	93	12	27	311	0.17	21	Central Syvash — 23.2%, Tendrivska Bay — 14.8 %, Eastern Syvash — 13.2 %, Tylygulykiy Lyman — 11.3 %
36.	<i>Glareola pratincola</i>	R	1048	281	512	178	69	2088	1.16	22	Eastern Syvash — 35.5 %, Central Syvash — 33.2 %.
37.	<i>Glareola nordmanni</i>	E				2		2	<0.01	1	Western Syvash
38.	<i>Larus ichthyæus</i>	E	1419	2202	526	364	958	5469	3.05	26	Kryva Spit — 7 4.6 %
39.	<i>Hydroprogne caspia</i>	V	1725	615	245	151	142	2878	1.60	31	Eastern Syvash — 61.8 %, Lebedyni Islands — 11.3 %, Lower part of the Ukrainian Danube Delta — 9.8 %
40.	<i>Sterna albifrons</i>	R	2803	778	1136	883	1429	7029	3.92	33	Eastern Syvash — 41.5 %, Utiutskiy Lyman — 13.1 %, Molochnyi Lyman — 11.6 %
	Total		54,812	38,441	37,831	21143	27,223	179,450	100	73	

* See note to table 1; ** — species which are in RDB, but not related to wetlands; *** — information on this species was submitted by highly qualified ornithologists, but photo, proving it is absent; **** — wetlands in which the maximum amount of each species is recorded and its percentage of the total amount of birds of this species

Table 3. The significance of the most valuable wetlands for the protection of bird species of various Red Data Book categories (in table are presented only those wetlands where the total number of species of different categories was 5 and more)

No.	Wetlands	Endangered	Vulnerable	Rare	Not evaluated*
1	Eastern Syvash	6	6	7	1
2	Central Syvash	5	6	7	1
3	Lower part of the Ukrainian Danube Delta	5	4	5	
4	Kinburnskiy Peninsula	6	6	9	
5	Tendrivska Bay	4	6	9	1
6	Utlitskiy Lyman (shallow-water part)	2	5	7	1
7	Utlitskiy Lyman (deep-water part)	1	2	8	
8	Western Syvash	1	3	2	
9	Kryva Spit	1	3	2	
10	Bilosaraiska Spit	0	1	4	
11	Lebedyni Islands	0	2	3	
12	Dnistrovskiy Lyman	2	2	1	
13	Alibei Lyman	2	1	1	1

* *Burhinus oedicnemus* is only species belong this category.

for *Aythya nyroca* and *Hydroprogne caspia*, and Eastern Syvash — for *Himantopus himantopus*.

Comparing the peculiarities of distribution of the two mentioned above categories of the Red Book species, we could see some differences in the stability of wetlands selection, where the largest concentrations of protected species were periodically counted. The frequency of the repeated registration of maximum bird amount calculated for all species, was 6.8 for Endangered species and 11.3 for vulnerable ones. This means that the Vulnerable species were more conservative in choosing places for concentration in August than the Endangered, with a much smaller total number of registered individuals of the first category (table 1).

The distribution of birds classified as Rare also showed a high degree of conservatism, the average frequency of repeated registrations of significant bird numbers was 10.4. At 25 sites (out of 59 wetlands where species of this category were registered), the number of

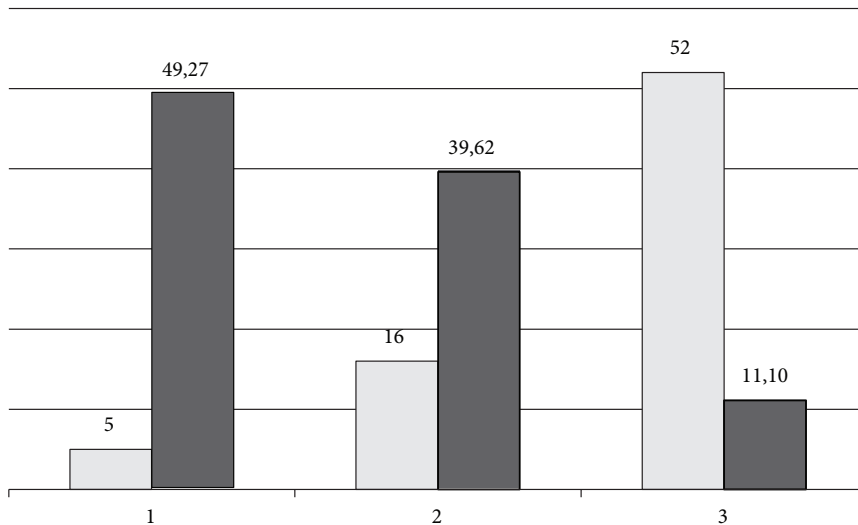


Fig. 3. Number of wetlands and percentage of birds in them from an average amount of all species (light columns — number of wetlands; dark columns — %): 1 — wetlands with amount of birds between 5 % and 16 %; 2 — 1 %–5 %; 3 — < 1 %.

Table 4. Characteristics of the wetlands of the Azov-Black Sea region of Ukraine in terms of species diversity and the amount of RDB birds

No.	Wetlands	Number of counts	Min., ind.	Max., ind.	Average, ind.	Sum., ind.	%	Number of species
1	Kagul Lake	3	124	4182	1,653.33	4,960	2.76	9
2	Kartal Lake	3	80	529	232.67	698	0.39	8
3	Kugurlui Lake	3	0	424	154.67	464	0.26	9
4	Yalpuh Lake	3	0	115	55.67	167	0.09	8
5	Katlabuh Lake	1	673	673	673	673	0.37	4
6	Kytai Lake	1	46	46	46	46	0.03	3
7	Lower part of the Ukrainian Danube Delta (incl. Stentsovsko-Zhebriyanivsky Plavni)	5	397	8,416	5,284.8	26,424	14.72	25
8	Sasyk Reservoir	5	80	1,162	555.4	2,777	1.53	23
9	Malyi Sasyk Lyman	3	0	24	10	30	0.02	5
10	Dzhantsheiskiy Lyman	5	95	765	332	1,660	0.92	21
11	Shagany Lyman	2	166	1,313	739.5	1,479	0.82	16
12	Alibei Lyman	5	384	785	233.8	1,169	0.65	13
13	Karachaus Lake	2	86	86	43	86	0.05	9
14	Tuzlovska Spit	1	9	9	9	9	0.01	1
15	Burnas Lyman	2	150	209	179.5	359	0.20	9
16	Budatskyi Lyman	1	37	37	37	37	0.02	2
17	Dnister Lyman	3	106	438	321.33	964	0.54	12
18	Dnister and Turun-chuk rivers interfluvium	1	344	344	344	344	0.19	6
19	Khadybeiskiy Lyman	1	3	3	3	3	< 0.01	2
20	Kuyalnytskyi Lyman	3	120	477	301.67	905	0.50	10
21	Adzalytskyi (Grygorivskyi) Lyman	2	66	196	131	262	0.15	5
22	Tylygulskyi Lyman	4	9	285	176	704	0.39	15
23	Lake near Morske Village	2	0	18	9	18	0.01	2
24	Solonets-Tuzly Lakes	3	4	60	34	102	0.06	7
25	Berezanskyi Lyman	4	4	44	15.75	63	0.04	7
26	Dnipro Lyman	2	6	138	72	144	0.08	14
27	Dnipro Delta	3	31	501	192.33	577	0.32	6
28	Kardashynskyi Lyman	1	512	512	512	512	0.29	4
29	Golubev Lyman	1	20	20	20	20	< 0.01	1
30	Bile Lake	1	56	56	56	56	0.03	1
31	Ponds near Tsuriiu-pynsk City	1	36	36	36	36	0.02	1
32	Kinburnskyi Peninsula	5	922	5,210	2,443.8	12,219	6.81	26
33	Odygolski Lakes	4	83	169	127	508	0.28	8
34	Yagorlytskyi Bay	5	35	809	275.4	1,377	0.77	20
35	Tendrivskyi Bay	5	452	2,733	1,791.41	9,050	5.04	25
36	Ustrichne Lakes	1	20	20.00	20	20	0.01	1
37	Dzharylgachskyi Bay	3	584	1,081	775.67	2,327	1.30	13
38	Shyrokyi Bay	2	0	5	2.5	5	< 0.01	3
39	Aleksiiivka Bay	2	48	97	72.5	145	0.08	5
40	Perekopskyi Bay	2	907	1,045	976	1,952	1.09	9
41	Lebedyni Islands	1	2,416	2,416	2,416	2,416	1.35	19
42	Western Syvash	4	23	4,515	1,321.25	5,285	2.94	17
43	Shpindiyar Area	3	5	2,832	996.67	2,990	1.67	8
44	North Crimean Canal	1	40	40	40	40	0.02	3
45	Ponds near Stavky Village	1	1,782	1,782	1,782	1,782	0.99	2
46	Central Syvash	5	1,371	7,257	4,672.8	23,364	13.01	26
47	Eastern Syvash	5	1,369	18,456	7,609.8	38,049	21.19	27
48	Ali-Bay Area	1	32	32	32	32	0.02	4
49	Aktshe Lake	1	8	8	8	8	< 0.01	1
50	Astaninsky Plavni	1	162	162	162	162	0.09	4
51	Kuchuk-Adzhol Lake	1	126	126	126	126	0.07	4
52	Adzhol Lake	1	25	25	25	25	0.01	1

53	Pond near Yachmenne Village	1	51	51	51	51	0.03	4
54	Achi Lake	1	4	4	4	4	< 0.01	1
55	Frontove Reservoir	1	1	1	1	1	< 0.01	1
56	Simfyropolske Reservoir	2	1	4	2.5	5	< 0.01	2
57	Dzharylgach Lake (Crimea)	3	240	921	573.33	1,720	0.96	12
58	Yarylgach Lake (Crimea)	2	33	70	51.5	103	0.06	6
59	Panske Lake (Crimea)	2	0	4	2	4	< 0.01	3
60	Donuzlav Lake (Crimea)	3	11	20	11.33	34	0.02	6
61	Sasyk Lake (Crimea)	2	8	55	31.5	63	0.04	9
62	Kyzyl-Yar Lake (Crimea)	1	12	12	12	12	0.01	1
63	Bokalske Lake and Spit (Crimea)	1	396	396	396	396	0.22	4
64	Utliutskyi Lyman (deep-water part)	2	21	68	44.5	89	0.05	15
65	Bolhradskyi Syvashyk Lyman	3	315	784	517.67	1553	0.87	18
66	Utliutskyi Lyman (shallow-water part)	5	1,115	5,233	2,074.8	10,374	5.78	25
67	Korsak River Mouth	2	14	80	47	94	0.05	6
68	Molochnyi Lyman	5	174	3,874	1,695	8,475	4.72	21
69	Tubalskyi Lyman	4	8	291	113.25	453	0.25	6
70	Obytichna Spit	4	0	76	37.75	151	0.08	15
71	Berdianska Spit	4	51	254	147	588	0.33	17
72	Bilosaraiska Spit	5	58	350	166.4	832	0.46	16
73	Kryva Spit	5	527	2,223	1,380.8	6,904	3.85	16
TOTAL			21,123	54,832	45,518.13	179,536	100.00	40

individual species was higher than their average number recorded in the region. The most important wetlands in this case were the following: Tendrivska Bay and Kinburn Peninsula (9 species in each site), Molochnyi Liman (8 species), Utlyukskyi Liman (shallow-water part), the Central and the Eastern Syvash and the Lebedyni Islands (7 species in each).

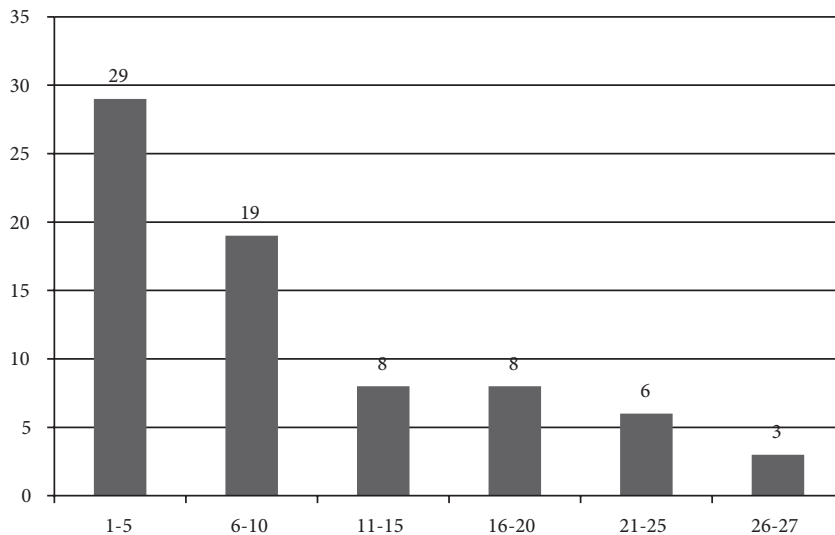


Fig. 4. Distribution of wetlands number depending on number of species in them (axis X — number of species, axis Y — number of wetlands).

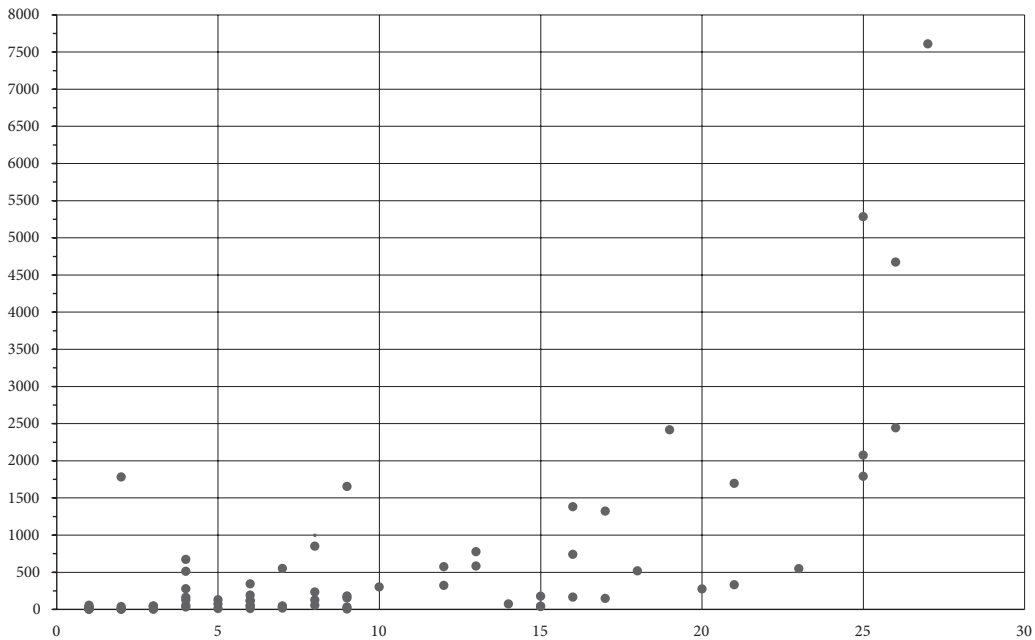


Fig. 5. Distribution of wetlands depending on species number (axis X) and average amount of birds in them (axis Y).

The second aspect of the analysis of the significance of particular wetlands is the assessment of their role for species nesting in the region, comparing to the transit species. The number of birds of local fauna, characterizes the local resource, and reflects the productivity of the wetlands, in contrast to transit migrants, whose dates of migration, and amount in August could depend on many factors, including weather. Beside this, it is necessary to take into account the peculiarity of migrants to concentrate along certain migration routes in the region. Apparently, the location of most transit species during migration strongly depends on the structure of the traditional flyway, and not just the quality of the wetland. For example, the maximum number of *Tringa stagnatilis* is usually recorded in the Syvash area, which is on the main migratory route of this species, but, another species — *Numenius phaeopus*, that flies along the Dnipro flyway, mainly is recorded on the wetlands located to the west Syvash — between Kinburnskyi Peninsula and Dzharylgachskyi Bay.

Analysis of this aspect of the importance of wetlands gave the following results: 18 wetlands proved to be valuable for maintaining the number of locally nesting RDB bird species. The Eastern Syvash (10 RDB species of local breeding avifauna), Central Syvash (8 species) and Delta of the river Danube (6 species) are the most significant among these sites. Speaking on local avifauna, it also should be noted, that more than 50 % of the *Pelecanus onocrotalus*, *Pelecanus crispus* and *Ardeola ralloides* were counted in the Lower part of the Ukrainian Danube Delta, and about 60 % of the *Tadorna ferruginea* were found in the Central Syvash (probably due to its close location to the Biosphere Reserve “Askania Nova”, where the long-term program of artificial breeding of this species was realized). 75 % of all registered *Larus ichthyaetus* were observed on the Kryva Spit, and more than 50 % of *Hydroprogne caspia* were at in the Eastern Sivash. Twenty five wetlands proved to be significant for RDB “transit” species. The most important for them are the Central and Eastern Sivash, as well as the Lower part of the Ukrainian Danube Delta and the Molochnyi Liman.

The third aspect of the analysis of wetland significance is the amount of all of protected bird species counted in them. As already indicated, in total in the Azov-Black Sea region

of Ukraine during five August counts were recorded 40 RDB species. Detail information on this is presented in table 4. Taking into account that the number of surveys in different wetlands varied, an average amount of birds was used to compare the significance of wetlands.

Out of 73 wetlands, where the RDB wetland bird species were counted, in the five most significant sites the share of birds varied from 5.31% to 16.72 % of average amount of all counted birds, and in sum — 49.27 % (fig. 3). In descending order of bird amount, these wetlands were the following: Eastern Syvash, Lower part of the Ukrainian Danube Delta, Central Syvash, Kinburnskyi Peninsula, Lebedyni Islands.

At 16 wetlands the percentage of the amount of RDB birds varied from 1.12 % to 4.56 %, and in sum — 39.62 %. The most significant in this category were the following sites (in descending order): Utiutskyi Lyman, Tendrivska Bay, Ponds near Stavky Village, Molochnyi Lyman, Kahul Lake, Kryva Spit, Western Syvash and others.

At remaining 52 wetlands percentage of amount of RDB birds varied between less than 0.01 % and 0.76 %, in sum — 11.10 %

Speaking about the total number of RDB species recorded in each wetland it can be noted that in almost 40 % of them there were only 1–5 species (fig. 4). Large number of species (> 20) was recorded only in 12 % of wetlands. In descending order, the wetlands with the largest number of species were ordered as follows: Eastern Syvash (27 species), Kinburnskyi Peninsula (26), Central Syvash (26), Tendrivska Bay (25), Utiutskyi Lyman (shallow part) (25), Lower part of the Ukrainian Danube Delta (25), Sasyk Reservoir (23), Dzhantsheyskyi Lyman (21), Molochnyi Lyman (21), Yagorlytskyi Bay (20).

The overall pattern of the distribution of the surveyed wetlands depending on the number of birds species and the average amount of counted birds is shown on fig. 5.

Conclusions

The value of the analyzed data of August Counts is, first of all, the scale of their collection. It is not often possible to estimate the location and amount of birds on a large number of water bodies at the same time. Even with varying degrees of coverage of wetlands by counts, phenological and weather specific of August in different years, which may affect the results of surveys, the results of counts clearly demonstrate that wetlands of the Azov-Black Sea coast of Ukraine are very valuable sites for support many local and migratory populations of RDB bird species. 40 species of protected birds from 87 included in the 3rd edition of the Red Book of Ukraine were recorded in the course of August Counts, moreover — nearly all RDB wetlands birds species were registered during them. For the most of those species, wetlands of the Azov-Black Sea region are key areas for their residence and its conservation in Ukraine. Of the 73 wetlands in the Azov-Black Sea region, where RDB bird species were registered, the most valuable sites are Eastern Syvash, Lower part of the Ukrainian Danube Delta, Central Syvash, Kinburnskyi Peninsula, Lebedyni Islands.

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Received 12 September 2017

Accepted 9 February 2018