CURRENT STATUS OF BIRD SPECIES IN ANNEX 1 OF THE BIRDS DIRECTIVE FOR WHICH SPECIAL PROTECTION AREAS HAVE BEEN DESIGNATED ON THE TERRITORY OF THE DANUBE DELTA BIOSPHERE RESERVE

MIHAI MARINOV*, ALEXANDRU DOROȘENCU, VASILE ALEXE, LUCIAN-EUGEN BOLBOACĂ, JANOS BOTOND KISS

Danube Delta Biosphere Reserve (DDBR) overlaps over two Special Protected Areas, with 89 species in Annex 1 of the Birds Directive. The number of many bird species in the Danube Delta varied widely over the last decades, most often due to the anthropogenic factor, directly (persecution, hunting) and/or indirectly (habitat changes). In the present paper we investigated the conservation status of these species, according to IUCN standards. We also analyzed the conservation measures for these species through action plans. Thus, one species is Critically Endangered, six species are Endangered, 12 are Vulnerable, 29 are Near Threatened, eight species Least Concern and in 33 species the conservation status is unknown (Data Deficient). 37 species (42%) do not have any Action Plan, while for the rest, except one species, these were not implemented. However, comparing the current situation with the previous classifications (year 2000) of bird species in the DDBR, we find a clear improvement in the conservation status of most bird species of Community interest whose status could be assessed.

Keywords: birds, Danube Delta, ROSPA0031, Natura 2000, conservation.

INTRODUCTION

The main purpose of the European Natura 2000 network is to find solutions to enable environmentally friendly economic activities while protecting biodiversity, not to prohibit human activities, free movement of persons or limit the right to property. Natura 2000 sites offer the opportunity to carry out ecotourism activities, sustainable grazing and mowing, the development of organic agriculture, sustainable forest management, which increases the value of local products, the development of traditional crafts, contributing to rural development. Between 2006–2015, in accordance with Romania's alignment with the environmental policies of the European Union, Natura 2000 sites of Community interest (SPAs and SCIs – 2011a, b; 2016; Natura 2000 database) were designated at the national level, based on the knowledge on the existence of some habitats and wild species of community interest whose conservation requires the designation of special conservation areas. In the final part

of the designation process were analyzed the sufficiency of the set of newly proposed Special Protected Areas, in terms of quantity and quality both in relation to the designated special avifauna protection areas (SPA) so far and the Important Bird Areas (Papp & Fântână, 2008). At European level, these species are included in Annex 1 of the Birds Directive (for SPAs – Special Protection Areas for Birds) and in Annex 2 of the Habitats Directive (last amendment for the two directives in 2013 following Croatia's accession to the EU) – for SCIs (1979 and 1992 with subsequent amendments). At national level, these species are included in GEO no. 57/2007 – 2007 (as subsequently amended), Annex 3 (plant and animal species of Community interest whose conservation requires the designation of special conservation areas). Regarding birds only, the first site is ROSPA0031 Danube Delta and Razim Complex, with an area of 512,820 ha, which includes the river delta for the Stepic bioregion and the river-maritime one which includes the Razim-Sinoe complex for the Pontic bioregion.

The site dataform includes a number of 89 species (Table 1) which are found in Annex I of the Birds Directive (1979). These are species that are regularly found in the perimeter of the site in certain numbers and represent scientific criteria in the designation of the ROSPA0031 site. The second Natura 2000 site in the Danube Delta is ROSPA0076 Black Sea (surface of 140,143 ha) which includes only partially the perimeter of RBDD, the coastal area (in the Pontic bioregion). The site data form includes a number of 18 species that are found in Annex I of the Birds Directive. These are species that are regularly found in the perimeter of the site in certain numbers and represent scientific criteria in the designation of the ROSPA0076 site. Currently, another study is being carried out (2019–2021) where research is being conducted to find out the numbers and distribution of birds in ROSPA0031.

MATERIAL AND METHODS

The study area is represented by the entire surface of the DDBR and ROSPA0031 (Fig. 1) but also the immediately adjacent areas. The compilation, processing, analysis and evaluation of the conservation status were performed between October – November 2017 and used data are collected between 2000–2017.

In order to assess the conservation status, a comparison was made with the results of the evaluations of the studied species between 1980–2017. For bird evaluations, in the areas where road access is possible, the trips were made by cars. Boats were used to investigate the aquatic areas. Most of the areas were investigated with the help of boats with small draft (approx. 20 cm) equipped with outboard engines of 6–15 hp.

Drones were also used for bird assessments in some known areas (*e.g*. for pelicans on Hrecisca and Buhaiova Lakes) or in areas where we had information on the existence of colonies (L. Argintiu, the area near the western shore of Razim and Goloviţa Lakes). The drone tested and used (technology described in UAS-BIRDD

project) was TuffWing Fixed Wing Aerial Mapping Drones (http://www.tuffwing.com/). Camera used: Samsung NX5000 (28Mp). The georeferenced images obtained with the help of drones were merged into a mosaic image and the pelicans were counted in ArcGis 3.1 (Marinov *et al*., 2017).

The conservation status was assessed according to IUCN criteria (***, www.iucnredlist.org). In many cases, the resulting conservation status did not correspond to the regional (Oţel *et al*., 2000) or national (Botnariuc & Tatole, eds., 2005) frameworks. In general, the expert-judgment method was used in very few cases, when insufficient data did not allow a clear demarcation between the Least Concern (LC) and Near Threatened (NT) categories.

Table 1

The bird species for which ROSPA0031 Danube Delta and Razim-Sinoe Complex was designated (http://ibis.biodiversity.ro/ - Natura 2000 online database)

No.	Species	No.	Species	No.	Species
1	*Alcedo atthis*	31	*Dendrocopos medius*	61	*Luscinia svecica*
2	*Accipiter brevipes*	32	*Dendrocopos syriacus*	62	*Melanocorypha calandra*
3	*Acrocephalus melanopogon*	33	*Dryocopus martius*	63	*Mergus albellus*
4	*Anser erythropus*	34	*Egretta alba*	64	*Milvus migrans*
5	*Anthus campestris*	35	*Egretta garzetta*	65	*Numenius tenuirostris*
6	*Aquila clanga*	36	*Emberiza hortulana*	66	*Nycticorax nycticorax*
7	*Aquila heliaca*	37	*Falco cherrug*	67	*Oenanthe pleschanka*
8	*Aquila pomarina*	38	*Falco columbarius*	68	*Oxyura leucocephala*
9	*Ardea purpurea*	39	*Falco naumanni*	69	*Pandion haliaetus*
10	*Ardeola ralloides*	40	*Falco peregrinus*	70	*Pelecanus crispus*
11	*Asio flammeus*	41	*Falco vespertinus*	71	*Pelecanus onocrotalus*
12	*Aythya nyroca*	42	*Ficedula albicollis*	72	*Phalacrocorax pygmeus*
13	*Botaurus stellaris*	43	*Ficedula parva*	73	*Phalaropus lobatus*
14	*Branta ruficollis*	44	*Gallinago media*	74	*Philomachus pugnax*
15	*Burhinus oedicnemus*	45	*Gavia arctica*	75	*Picus canus*
16	*Buteo rufinus*	46	*Gavia stellata*	76	*Platalea leucorodia*
17	*Charadrius alexandrinus*	47	*Gelochelidon nilotica*	77	*Plegadis falcinellus*
18	*Charadrius morinellus*	48	*Glareola pratincola*	78	*Pluvialis apricaria*
19	*Chlidonias hybridus*	49	*Grus grus*	79	*Porzana parva*
20	*Chlidonias niger*	50	*Haliaeetus albicilla*	80	*Porzana porzana*
21	*Ciconia ciconia*	51	*Hieraaetus pennatus*	81	*Porzana pusilla*
22	*Ciconia nigra*	52	*Himantopus himantopus*	82	*Puffinus yelkouan*
23	*Circaetus gallicus*	53	*Ixobrychus minutus*	83	*Recurvirostra avosetta*
24	*Circus aeruginosus*	54	*Lanius collurio*	84	*Sterna albifrons*
25	*Circus cyaneus*	55	*Lanius minor*	85	*Sterna caspia*
26	*Circus macrourus*	56	*Larus genei*	86	*Sterna hirundo*
27	*Circus pygargus*	57	*Larus melanocephalus*	87	*Sterna sandvicensis*
28	*Coracias garrulus*	58	*Larus minutus*	88	*Sylvia nisoria*
29	*Cygnus bewickii*	59	*Limosa lapponica*	89	*Xenus cinereus*
30	*Cygnus cygnus*	60	*Lullula arborea*		

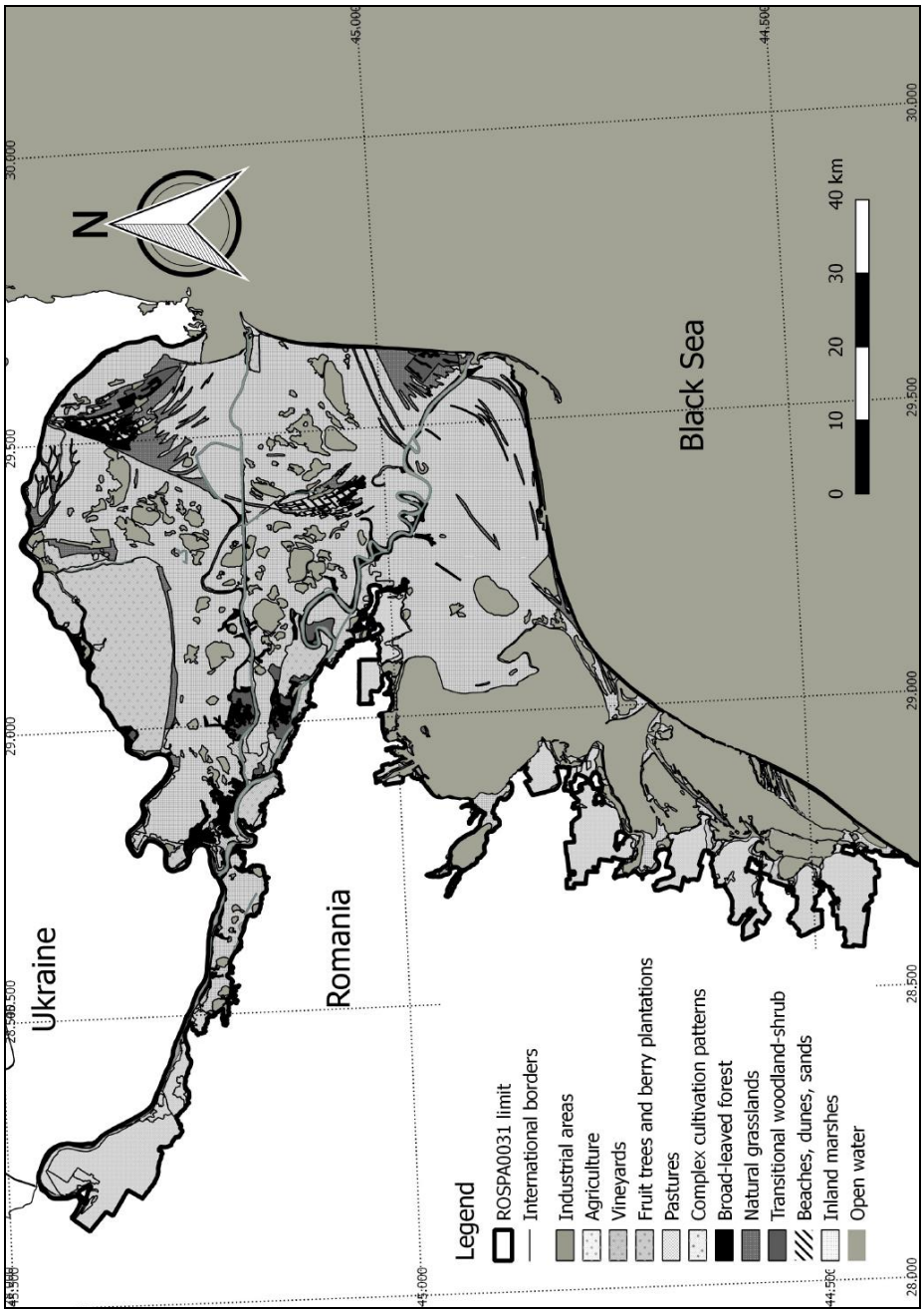

Fig. 1. ROSPA0031 – Danube Delta and Razim-Sinoe Complex limits (Romania).

RESULTS AND DISCUSSION

Between 1859 and 2012, more than 1,000 articles were published on the avifauna of the current territory of the DDBR, which provides an impressive volume of comparative data over time (Marinov, PhD thesis 2012, unpublished data). Some literary sources from the middle of the last century speak of impressive numbers of several species, of the order of hundreds and thousands of individuals or pairs (Linţia, 1955; Rosetti-Bălănescu, 1957 a,b; Andone *et al*., 1969). These populations are currently much smaller and will probably never recover to the level before the Danube Delta change. Thus, the numbers of many bird species in the Danube Delta have varied widely over the last decades, most often caused by the anthropogenic factor, directly (persecution, hunting) and/or indirectly (due to changes, reduction or destruction of habitats). We remind that at the end of the ’50s a campaign of “optimization” of ichthyophagous bird flocks was launched, which was maintained in the ’60s, which practically materialized itself in the slaughter of chicks of ichthyophagous and partially ichthyophagous bird species, the success of the action being proven by presentation of the cut legs of birds. After the end of the bird's nest destruction campaigns, a gradual recovery of the populations for most of the colonial waterbirds was noticed, although they were systematically shot further into the ponds. Even today, some birds are shot near the pond areas, although their owners have received impressive compensation, compensation granted without conducting scientific studies in accordance with the real situation. The positive dynamics of the populations of several bird species (mainly colonial waterbirds species) in the Danube Delta became evident especially after the declaration of the area as a Biosphere Reserve in 1990 (Marinov, 1995; Marinov & Hulea, 1996 a,b; Gogu-Bogdan, 1998; Munteanu, 1998; Munteanu *et al*., 2002; Platteuw *et al*., 2002, 2004, 2006). Moreover, the decision to ban hunting in the DDBR is another extremely favorable situation for increasing the conservation of ornithofauna of community interest (and not only) in the Danube Delta.

Of the 89 species of birds from Annex 1 of the Birds Directive for which Special Protected Areas have been designated on the territory of the Danube Delta Biosphere Reserve, one species is Critically Endangered, six species are Endangered, 12 are Vulnerable, 29 are Near Threatened, eight species Least Concern and in 33 species the conservation status is unknown (Data Deficient) (Fig. 2).

Of the 89 species in Annex 1 of the Birds Directive for which Special Protection Areas have been designated on the territory of DDBR, 37 species (42%) do not have any Action Plan (National, Regional, European or International). The other 52 species have different forms of Action Plans (single/multi-species action plans), the vast majority are not national and the Ministry of Environment has not adopted them and therefore no measures have been taken. Of the national ones, in RBDD partial measures have been taken for only one species, the Dalmatian Pelican (*Pelecanus crispus)*. Regarding the short-term trend (generally starting with the year 2003), 10% of the bird species of community interest show an increase in numbers, 16% decrease, 3% numerical fluctuations, 6% the trend is

stable, 53% the trend is unknown and 12% other categories for species with multiple (different migrating) populations (Fig. 3).

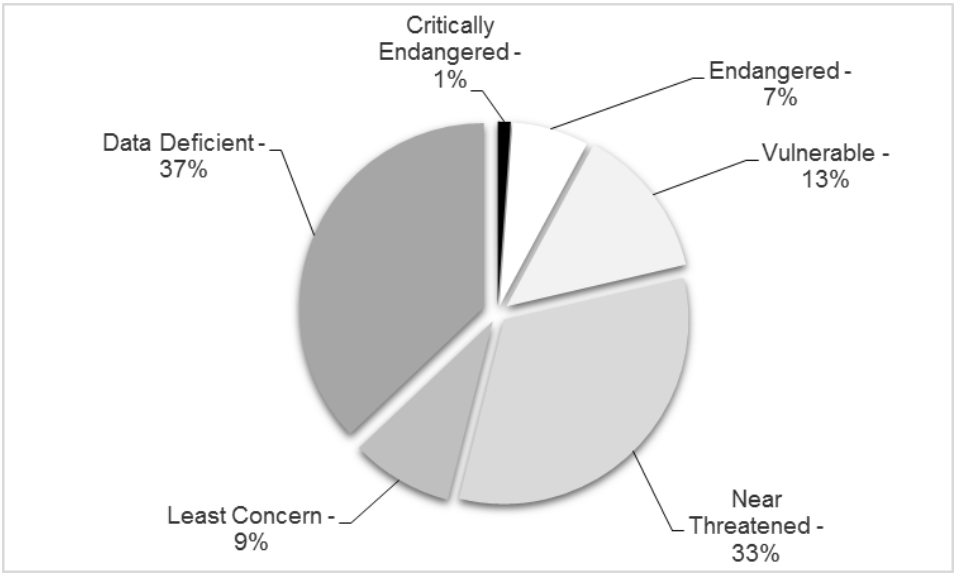

Fig. 2. Current state of conservation of bird species of Community interest in Annex 1 of the Birds Directive of the Danube Delta Biosphere Reserve.

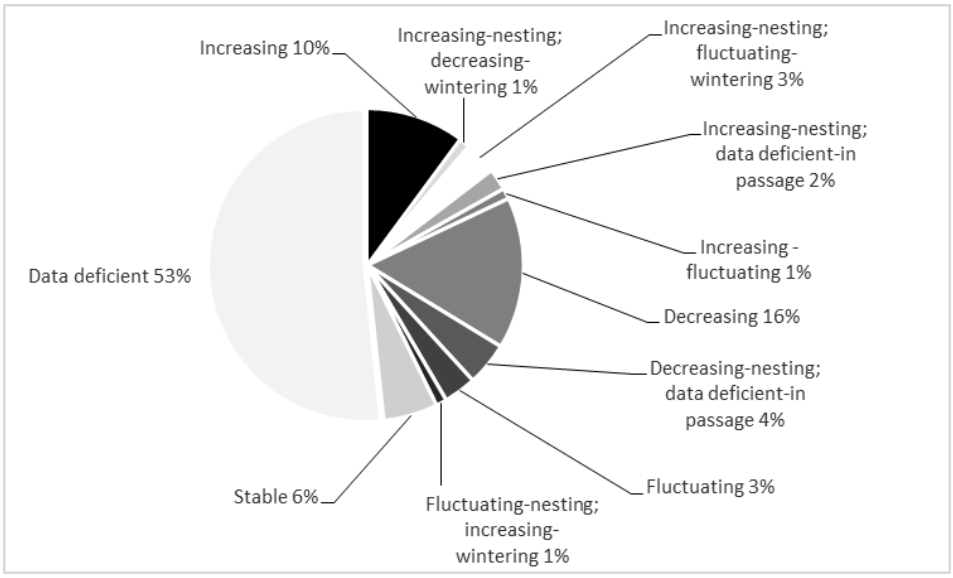

Fig. 3. Short term population trend status for Annex 1 of Birds Directive species in Danube Delta Biosphere Reserve.

Following the analysis of the conservation status in regard to the range (www.iucnredlist.org) of the species in Annex 1 of the Birds Directive for which Special Protection Areas have been designated on the territory of the DDBR, a species (1%) is Critically Endangered, two species (2%) are Endangered, six species (7%) are Vulnerable, five species (6%) are Near Threatened and 75 are of Least Concern - 84% (Fig. 4). Thus, in Fig. 4 are presented for comparison our RBDD ratings with those made by IUCN (www.iucnredlist.org) at the species world distribution area level. We notice large differences in some categories. The same species have a more unfavorable classification in the DDBR than the classification at the world distribution area level. Thus, in view of Natura 2000 obligations, increased efforts are required to conserve species with unfavorable conservation status.

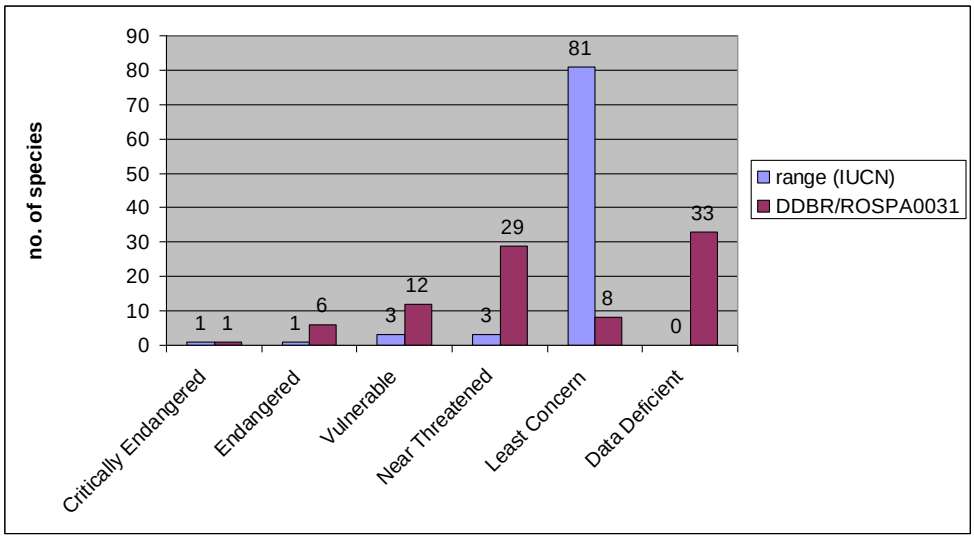

Fig. 4. Conservation status of species in Annex 1 of the Birds Directive of the Danube Delta Biosphere Reserve – comparison DDBR with the IUCN world population status.

Following the analysis of conservation status at European level (BirdLife International in www.iucnredlist.org) of the species from Annex 1 of the Birds Directive for which Special Protection Areas have been designated on the territory of DDBR, one species (1%) is critically endangered, four species (4%) are Endangered, two species (2%) are Vulnerable, five species (6%) are Near Threatened and 77 are Least Concern (87%) – (Fig. 5.) Thus, in Fig. 5 we present for comparison our DDBR conservation status evaluations with those made by BirdLife International (in www.iucnredlist.org) at European level. We also notice large differences in some categories, so the same species have a more unfavorable classification in the DDBR than the classification at European level.

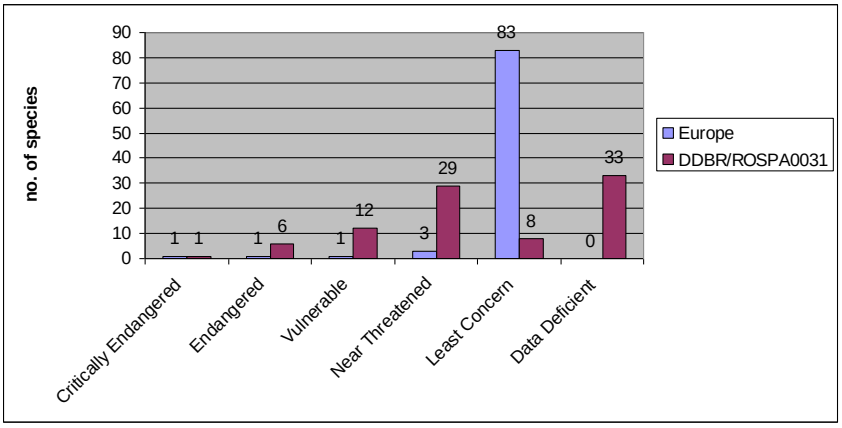

Fig. 5. Conservation status of species of birds of Community interest in Annex 1 of the Birds Directive of the Danube Delta Biosphere Reserve – comparison DDBR with the situation at European level (BirdLife International – www.iucnredlist.org).

Following the analysis of the conservation status at national level [Red Book of Vertebrates in Romania, Botnariuc & Tatole (eds., 2005)] of the species from Annex 1 of the Birds Directive for which Special Protection Areas have been designated on the territory of DDBR, 12 species (13%) are Critically Endangered, 15 species (17%) are Endangered, 21 species (24%) are Vulnerable and 41 species (46%) are not included (Fig. 6). Thus, in Fig. 6 are presented for comparison our classifications for DDBR with national ones (Botnariuc & Tatole eds., 2005). Many endangered species are not included in the Red Book and of those included, many are classified in more unfavorable categories at the national level compared to the situation in the DDBR.

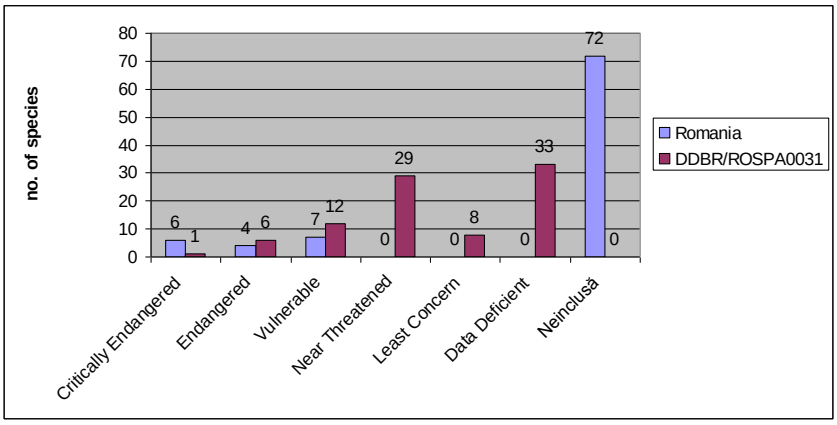

Fig. 6. Conservation status of bird species of community interest in Annex 1 of the Birds Directive from Danube Delta Biosphere Reserve – DDBR comparison with the national situation (Botnariuc & Tatole eds., 2005).

CONCLUSIONS

The numbers of many bird species in the Danube Delta have varied widely over the last decades, most often due to the anthropogenic factor, directly (persecution, hunting) and/or indirectly (habitat changes).

The positive dynamics of the populations of several bird species in the Danube Delta became evident especially after the designation of the area as a Biosphere Reserve in 1990 when the campaigns to reduce the number of birds stopped.

Furthermore, the decision to ban hunting in DDBR had a positive effect for increasing the conservation of bird fauna in the Danube Delta.

By comparing the current conservation status of birds assessed for DDBR with the range and European level assessed by IUCN, there are big differences in some categories: the same species have a more unfavorable classification in the DDBR compared to the more favorable conservation status for the whole species populations.

Comparing the current situation with the previous classifications (year 2000) of bird species in the DDBR, we find a clear improvement in the conservation status of most bird species of Community interest whose status could be assessed.

However, a number of disturbing anthropogenic factors (*e.g.* disturbance caused by tourism) or natural ones have intensified, thus requiring more conservation actions.

Acknowledgements. The authors wish to thank the Danube Delta National Institute for Research and Development – Ornithological, Hunting and Game Resources Team (G. Bucur, G. Băcescu, P. Cîrpăveche, A. Gal, A. Timofei) who contributed to field assessment and questioning respondents. Field and office work were conducted within the framework of several projects financed by the Romanian Ministry of Research (2000–2017), mainly by the Romanian National Research program Nucleus.

REFERENCES

ANDONE G., PAŞCOVSCHI S., ALMĂŞAN H., MANOLACHE L., 1969, *Contribuţii la cunoaşterea locurilor de iernare a păsărilor acvatice din Delta Dunării şi litoralul românesc al Mării Negre*. Studii şi Cercetări ICSP. Silv. Edit. Agro-Silvică, Bucureşti, **27** (1): 93–132.

GOGU-BOGDAN M., 1998, *Preliminary study in food composition of great cormorant during the breeding season in "Prundu cu păsări" colony from the Danube Delta Reserve*. Preliminary results. Analele Ştiinţifice ale Institutului Delta Dunării, **6** (1): 227–285.

LINŢIA D., 1955, *Păsările din R.P.R.* Edit. Acad. R.P.R. Bucureşti, 2.

MARINOV M., 1995, *Tendinţe actuale ale evoluţiei avifaunei din RBDD*. Analele Ştiinţifice ale Institutului Delta Dunării. ICPDD, Tulcea, România, **4** (1): 119–122.

MARINOV M., HULEA D., 1996a, *Dinamica avifaunei din R.B.D.D. în corelaţie cu principalii factori de mediu*. Analele Ştiinţifice ale Institutului Delta Dunării. ICPDD, Tulcea – România, **5** (1): 25–28.

MARINOV M., HULEA D., 1996b, *Dinamica coloniilor mixte de cormorani şi stârci din Delta Dunării, în perioada 1959–1995*. Analele Ştiinţifice ale Institutului Delta Dunării. ICPDD, Tulcea – România, **5** (1): 211–226.

MARINOV M., 2012, *Ornitofauna din Rezervaţia Biosferei Delta Dunării şi implicaţia acesteia în transmiterea virusului West Nile*. Teză de doctorat, Universitatea Bucureşti, Facultatea de Biologie.

MARINOV M., POGAN T., DOROȘENCU A., NICHERSU I., ALEXE V., TRIFANOV C., BOZAGIEVICI R., TOŠIĆ K., KISS J.B., 2017, *Monitoring the Great White Pelican*

(Pelecanus onocrotalus Linnaeus, 1758) breeding population using drones in 2016 – the Danube Delta (Romania). Scientific Annals of the Danube Delta Institute, **22**: 41–52.

MUNTEANU D., 1998, *The Status of Birds in Romania*. Romanian Ornithological Society, Cluj Napoca, 102 pp.

MUNTEANU D., 2005, *Păsări*. Pp.: 85–172. *In*: Botnariuc & Tatole (Eds.), *Cartea Roşie a vertebratelor din România.* Academia Română, Muzeul Naţional de Istorie Naturală "Grigore Antipa", București, 260 pp.

MUNTEANU D., PAPADOPOL A., WEBER P., 2002, *Atlasul păsărilor clocitoare din România*. Publicaţiile Societății Ornitologice Române, Cluj-Napoca, **16**. 2., 152 pp.

OŢEL V., CIOCÎRLAN V., FEDORCHENKO A., KISS J.B., MURARIU D., NIŢU E., RÁKOSY L., RUICĂNESCU A., SÁRKÁNY A., SÂRBU I., SZABÓ L., TÖRÖK Z., 2000, *Lista Roşie a speciilor de plante şi animale din Rezervaţia Biosferei Delta Dunării, România*. Edit. Aves, Odorheiu Secuiesc, 132 pp.

PAPP T., FÂNTÂNĂ C. (eds.), 2008, *Ariile de Importanță Avifaunistică din România – Important Bird Areas in Romania*. Publicație comună a Societății Ornitologice Române și a Asociației "Grupul Milvus", Târgu-Mureș, 319 pp.

PLATTEUW M., KISS J.B., SADOUL N., 2002, *Survey of colonial breeding birds in Romanian Danube Delta*. Analele Ştiinţifice. Scientific Annals. INCDDD – Tulcea. Edit. Tehnică, **8**: 151–153.

PLATTEUW M., KISS J.B., SADOUL N., ZHMUD M.Y., 2004, *Colonial Waterbirds and their habitat use in the Danube Delta*. RIZA Report 2004.002, 168 pp.

PLATTEUW M., KISS J.B., ZHMUD M.Y., SADOUL N., 2006, *Large colonial waterbirds in the Romanian and Ukrainian Danube Delta: a complete survey in 2001/2002.* Scientific Annals of the Danube Delta Institute. INCDDD, Tulcea - România. Edit. Dobrogea, Constanţa, **12**: 103–108.

ROSETTI-BĂLĂNESCU C., 1957a, *Păsările vînătorului. II. Păsări de apă*. Colecţia Vînătorul și Pescarul Sportiv, 24.

ROSETTI-BĂLĂNESCU C., 1957b. *Păsările vînătorului. III. Păsări de apă*. Colecţia Vînătorul și Pescarul Sportiv, 30.

*** 1979, The Birds Directive, The Directive 79/409/EEC in April 1979 as subsequently amended.

*** 1992, The Habitats Directive, the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, as subsequently amended.

*** 2007, Government emergency ordinance 57/2007 on the regime of protected natural areas, conservation of natural habitats, wild flora and fauna, as subsequently amended.

*** 2011a, Government Decision 971/2011 for the modification and completion of the Government Decision no. 1,284/2007 regarding the declaration of special avifauna protection areas as an integral part of the European ecological network Natura 2000 in Romania.

*** 2011b, Order of the Romanian Minister of Environment and Forests 2387/2011 for the modification of the Order of the Minister of Environment and Sustainable Development no. 1964/2007 on the establishment of the protected natural area regime of sites of community importance, as an integral part of the European ecological network Natura 2000 in Romania.

*** 2016, Government Decision 663/2016 on the establishment of the protected natural area regime and the declaration of special avifauna protection areas as an integral part of the European ecological network Natura 2000 in Romania (M.O. 743/2016).

*** Baza de date Natura 2000/Natura 2000 database (http://ibis.biodiversity.ro/).

*** UAS-BIRDD project - http://delta.aerocontrol.ro/

*** www.iucnredlist.org. The International Union for Conservation of Nature. The IUCN Red List of Threatened Species.

*** http://www.tuffwing.com/.

Received July 12, 2020

*Danube Delta National Institute for Research and Development, 165 Babadag Street, 820112, Tulcea, Romania
e-mail: mihai.marinov@ddni.ro