

## AN EVALUATION OF THE WINTERING OF THE WHITE-TAILED EAGLE (AVES: *Haliaeetus albicilla*) POPULATION IN THE DANUBE DELTA BIOSPHERE RESERVE AND ITS SURROUNDINGS DURING 2016 – 2018 (ROMANIA)

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**Abstract.** The number of White-tailed Eagles (*Haliaeetus albicilla* Linnaeus 1758) wintering in the Danube Delta Biosphere Reserve (D. D. B. R.) was investigated in the period 2016 - 2018. In the period between October through March of each year we recorded a total of 312 individuals. Of these, 67% were adult birds, 17% juveniles and 16 % immature. The wintering WtE densities were calculated for the year 2016 as having a value of 0.015 individuals/km<sup>2</sup>, for 2017 to 0.022 i/km<sup>2</sup> and for 2018 to 0.015 i/km<sup>2</sup>. In 2017 we recorded 132 individuals, out of which more than a half (55%) were recorded in the Șontea - Fortuna Complex, followed by the Gorgova - Uzlina Complex, with 31%. Razim - Sinoe, Dunavăț - Dranov, Matița - Merhei and Roșu - Puiu Complex each have no more than 6% of the recorded individuals. The WtE densities recorded during the synchronous counting of 2017 were 0.247 i/km<sup>2</sup> for Șontea - Fortuna, 0.139 i/km<sup>2</sup> for Gorgova - Uzlina, 0.026 i/km<sup>2</sup> for Matița - Merhei, 0.016 i/km<sup>2</sup> for Dunavăț - Dranov, 0,015 i/km<sup>2</sup> for Razim - Sinoe and 0,007 i/km<sup>2</sup> for Roșu - Puiu. The sedentary wintering individuals corroborated with the northern population of individuals wintering in the Danube Delta highlights the importance of Danube Delta ecosystems in the annual movements of the species.

**Keywords:** wintering, *Haliaeetus albicilla*, White-tailed Eagle, D. D. B. R.

**Rezumat. Evaluarea efectivelor de codalb (Aves: *Haliaeetus albicilla*) care au iernat în Rezevația Biosferei Delta Dunării și zonele limitrofe în perioada 2016 – 2018 (România).** În cursul cercetărilor de iarnă din perioada 2016 - 2018, în Rezerfația Biosferei Delta Dunării (R. B. D. D.) și zona limitrofă, s-au urmărit numărul codalbilor (*Haliaeetus albicilla* Linnaeus 1758) care iernau în acest teritoriu. În lunile octombrie – martie s-au înregistrat în total 312 indivizi, din care 67% adulți, 17% juvenili și 16% subadulți. Densitatea codalbilor a fost calculată în 2016 la 0,015 indivizi/km<sup>2</sup>, în 2017 la 0.022 indivizi/km<sup>2</sup> iar în 2018 la 0,015 indivizi/km<sup>2</sup>. În 2017, au fost observați 132 de indivizi de codalb, din aceștia mai mult de jumătate s-au aflat în complexul Șontea - Fortuna cu 55%, urmat de complexul Gorgova - Uzlina cu 31%, iar restul complexelor în Razim - Sinoe, Dunavăț - Dranov, Matița - Merhei și Roșu - Puiu nu depășesc nici unul 6%. Distribuția densității codalbilor pe km<sup>2</sup> cu ocazia recensământului sincron din 2017 în complexul Șontea-Fortuna a fost 0.247 indivizi/km<sup>2</sup>, urmat de Gorgova - Uzlina cu 0.139, Matița - Merhei cu 0.026, Dunavăț - Dranov cu 0.016, Razim - Sinoe cu 0.015 indivizi/km<sup>2</sup> și Roșu - Puiu cu 0.007 indivizi/km<sup>2</sup>. Iernarea populației sedentare și aglomerările efectivelor nordice subliniază importanța ecosistemelor deltaice în deplasările perianuale ale speciei studiate.

**Cuvinte cheie:** iernare, *Haliaeetus albicilla*, codalb, R. B. D. D.

### INTRODUCTION

According to the literature, in Europe White-Tailed Eagle is considered a partially migratory species (the northern population), while in Romania it is classified as a breeding species, as well as winter visitor and transit species.

There are two sub-populations in Europe. First, the northern one, and second a southern one, from the Danube countries: Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Romania, Ukraine. The individuals of this population are breeding mainly on the Danube Valley and the Danube Delta Biosphere Reserve (D. D. B. R.). The WtE population from these countries is around 650 pairs, out of which approximately 200 breeds across the Danube River course (PROBST & GABORIK, 2012). In the D. D. B. R. the largest number of WtE individuals can be seen during the winter, when the local population is increased by the northern migratory birds, from Scandinavia, Belarus, Poland, Russia, etc. Regarding this, we have data from birds ringed from abroad, and recovered in D. D. B. R. (CĂTUNEANU, 1999; KISS, 2000; unpublished data). Data regarding the wintering areas of WtE are known from literature (CIOCHIA, 1971; CĂTUNEANU, 1973; KISS, 1971, 1973; KLEMM, 1973; MARINOV, 1993, 1997; POCORA & ION, 2005, 2006; POCORA, 2007). The observations cited in the literature usually mention no more than 10-12 observed individuals at once. Rarely some mention groups of 15 - 20 individuals of WtE, in the areas where waterfowls congregate. The maximum number of WtE during one observation was of 22 individuals in flight above the Letea forest on 27.11.2014 (POCORA, 2007, 2010). On the other hand, during a synchronous count in DDBR on 12.01.2014, 163 individuals were recorded (PROBST et al., 2014). In Bulgaria, between 2006 and 2012 the number of wintering individuals had large fluctuations, between 17 and 34 individuals (TODOROV et al., 2015). In Holland, between 2003 and 2010, in an area with the same habitat as D. D. B. R., but smaller in size, 15 – 26 individuals were regularly seen every winter, most of them being immature (RIJN et al., 2010). Between 2002 and 2017, autumn migration observations were carried out in Măcin Mountains. Here, the medium number of passing WtE was of 9.8 individuals (FÜLÖP et al., 2018). The same author mentions in autumn of 2012, in Greci, Văcăreni and Cerna areas, between 2 and 7 individuals (FÜLÖP et al., 2012). In the winters of 2008 and 2009, 12 individuals were seen feeding in the Zebil Lake area (ALEXE et al., 2011).

## MATERIAL AND METHODS

The WtE winter monitoring in D. D. B. R. was conducted between 2016 – 2018, in the month between October through March. Transect and fixed points methods were used (BIBBY et al., 2000). For the field trips we used different motorboats. The monitoring was carried out daily in the aforementioned period on three aquatic complexes: Șonțea - Fortuna, Uzlina - Gorgova and Razim - Sinoe. Other areas from D. D. B. R. and surroundings were occasionally visited. For our analysis we took in consideration only the data gathered during one day of synchronous monitoring in each month. The total number of individuals, age, place, activity and risk factors were recorded on a standard form. All the data was introduced in an electronic database. These were used to generate maps of the wintering WtE distribution in D. D. B. R. and surroundings. The maps were generated in QGIS software. For the WtE densities we used the following formula (KENNETH et al., 1981):  $D = N/A$ , where  $D$  = WtE density,  $N$  = number of recorded individuals,  $A$  = monitoring surface (D. D. R. B.).

## RESULTS AND DISCUSSION

Fig. 1 shows the WtE age repartition during wintering between 2016 -2018 in DDBR and its surroundings. During the 3 years of research, the total recorded number of WtE was of 312 individuals. 67 % of them were adults, 17% juvenile and 16 immature (Fig. 2).

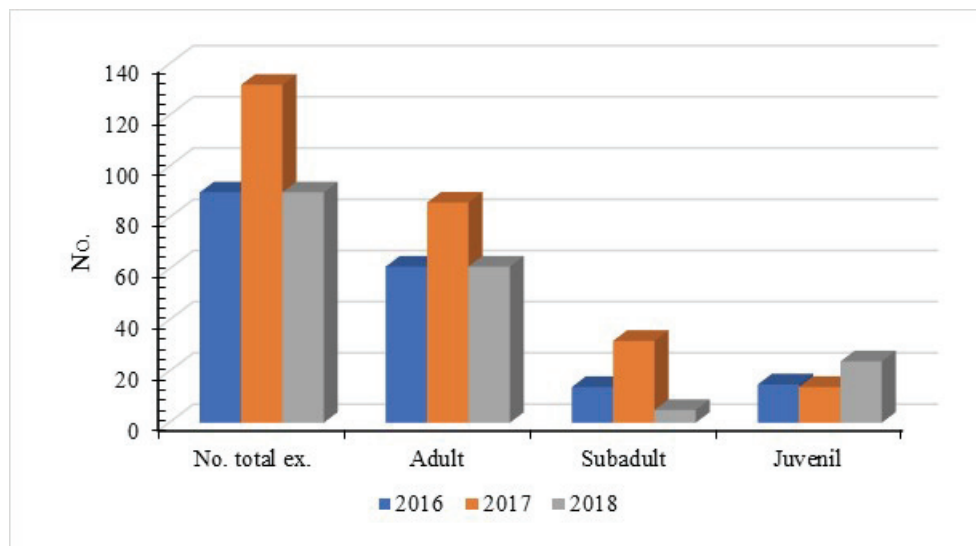


Figure 1. WtE - *Haliaeetus albicilla* age repartition investigated during 2016 – 2018 in D. D. B. R. and surroundings.

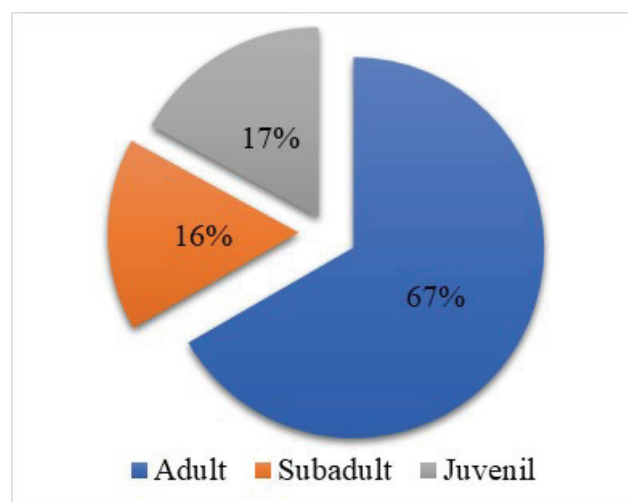


Figure 2. Wintering WtE - *Haliaeetus albicilla* age ratio during 2016 – 2018 in D. D. B. R. and surroundings.

The analysis regarding the age of WtE that wintered in D. D. B. R. and its surroundings shows that over half of the individuals were adults. The vagrant character of young WtEs is well known from literature, and was also documented by satellite tracking in a project initiated by I. N. C. D. D. D Tulcea (unp. data). Thus one can expect a higher proportion of young birds. However, we presume that the remarkable high longevity of the species lead to the change in age ratio, thus adult birds having the highest percent. In 2016 the density of WtE in D. D. B. R. was of 0.015 individuals/km<sup>2</sup>. In 2017 the density reached 0.022 i/km<sup>2</sup>, while in 2018 - 0.015 i/ km<sup>2</sup>. Regarding aquatic complexes, during synchronous counting of 2017, when we recorded 132 individuals in total, more than a half (55 %) were recorded in Șontea-Fortuna complex, followed by Gorgova-Uzlina with 31%, while each of the Razim-Sinoie, Dunavăț-Dranov, Matița-Merhei și Roșu-Puiu complexes had under 6%. The highest density was recorded in the Șontea-Fortuna complex, with 0. 247 individuals/km<sup>2</sup>, followed by Gorgova-Uzlina with 0.139 i/km<sup>2</sup>, Matița-Merhei - 0.026 i/km<sup>2</sup>, Dunavăț-Dranov - 0.016 i/km<sup>2</sup>, Razim-Sinoie - 0.015 i/km<sup>2</sup> and Roșu-Puiu - 0.007 i/km<sup>2</sup>.

Figs. 3 and 4 show that the concentrations of more than 4 individuals of WtE are localized in the areas with large water surfaces: Lumina, Văcaru, Lunga, Fortuna, Meșterul, Alb, Nebunu, Parcheș, Dranov, Sinoie-Sud Lakes, Murighiol Pond, Musura Gulf, Holbina, Sf. Gheorghe Branch, Dunărea Veche (Tulcea) and the Iancina Cape. One hypothesis is that during the winter these areas sustain large gatherings of waterfowls, which are part of the WtE prey.

The largest number of WtE recorded during a synchronous count was 38 individuals, on 23.11.2017.

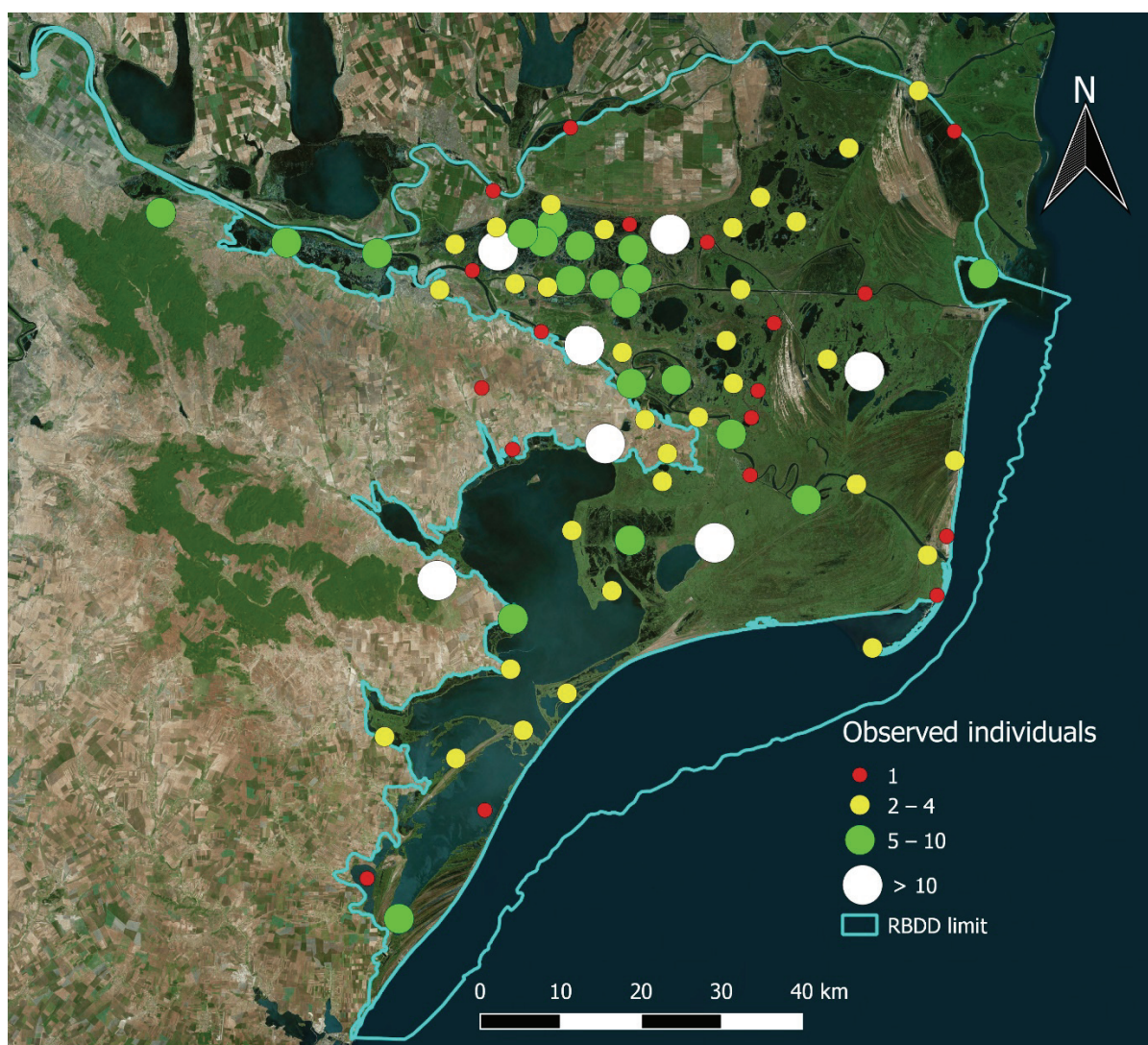


Figure 3. General distribution of White-Tailed Eagle – *Haliaeetus albicilla* during winter in D. D. B. R. and its surroundings (original).

The spatial dispersion during the winter of WtE can be influenced by environmental conditions and anthropogenic factors like forestry exploitations or fishing camps. We consider, however, that during the winter extreme cold and powerful winds are the most important factors influencing the species spatial distribution.

When ice forms on the lakes and the waterfowls migrate southwards, the WtE follows them, only to return in the spring with its potential prey.



The Fig. 4 shows the distribution and the number of WtE recorded when hunting. Here also the largest gathering is in Șontea-Fortuna.

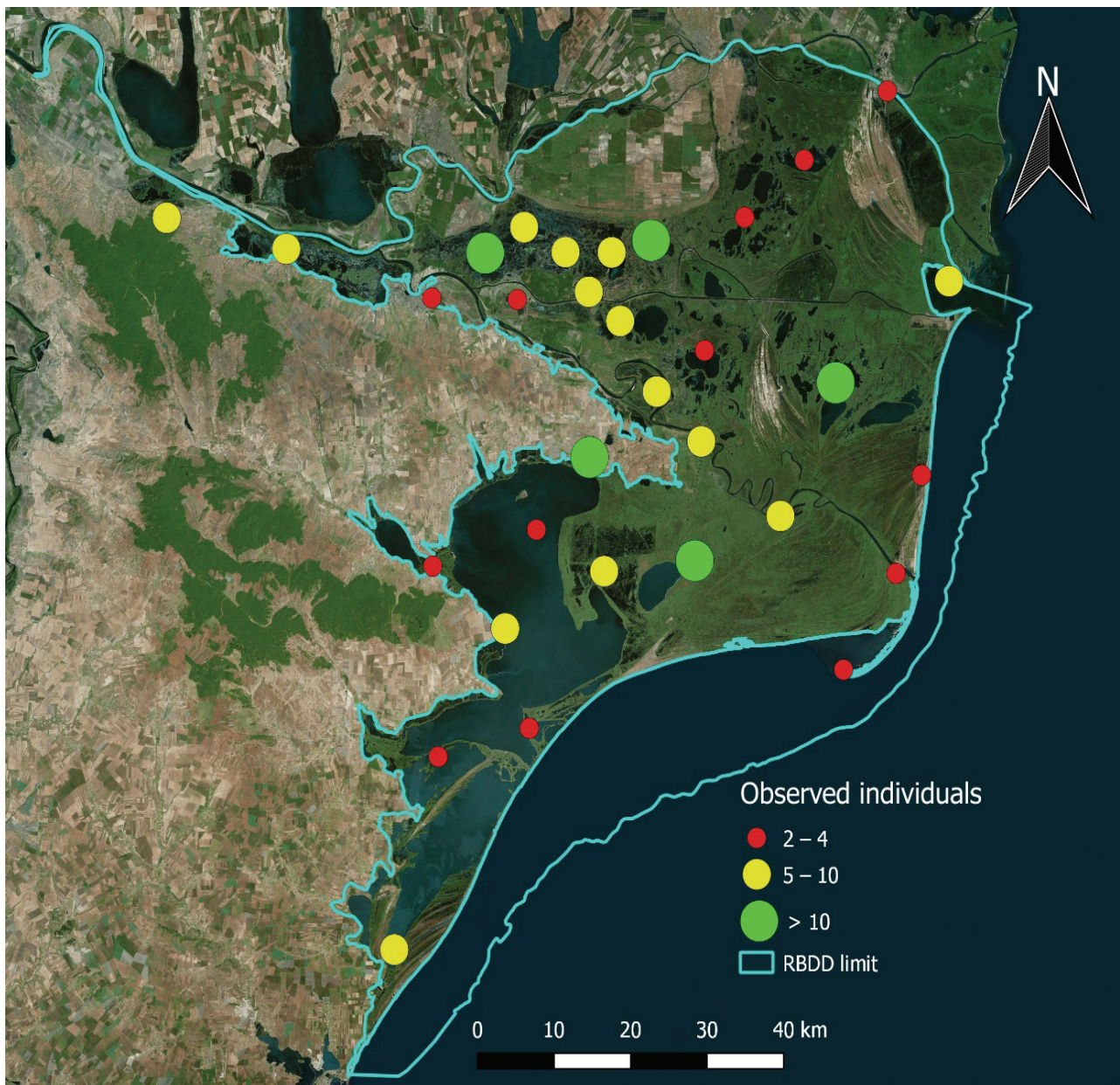


Figure 4. White-Tailed Eagle – *Haliaeetus albicilla* hunting areas during winter from D. D. B. R. and its surroundings (original).

The roosting places can be several kilometers away from hunting areas, but in general birds are searching for maximum efficiency in movements with minimum energy consumption. Fig. 5 shows the WtE roosting areas from D. D. B. R. and its surroundings (Letea Forest, Caraorman, Babadag - Enisala, Tichilești, Caraburun, Vadu and Păpădia and Rusca Forest Plantations). From the 8 identified roosting areas, 4 are within D. D. B. R., and 4 outside, in the continental area. These last 4 sites are situated between 1 and 5 km away from the D. D. B. R. limits. All these forests have tall mature trees that serve as roosting support for WtE only during winter. In all of the 8 sites there were regularly observed over 10 individuals. Isolated individuals can, of course, roost in other places in D. D. B. R., but we consider that these are the most important ones. The WtEs roost during night in these places, and in the morning search their prey both in the continental area, as well as in D. D. B. R. The largest number of recorded individuals during one visit in one of the roosting sites was 30, in Babadag – Enisala, on 19.12.2016.



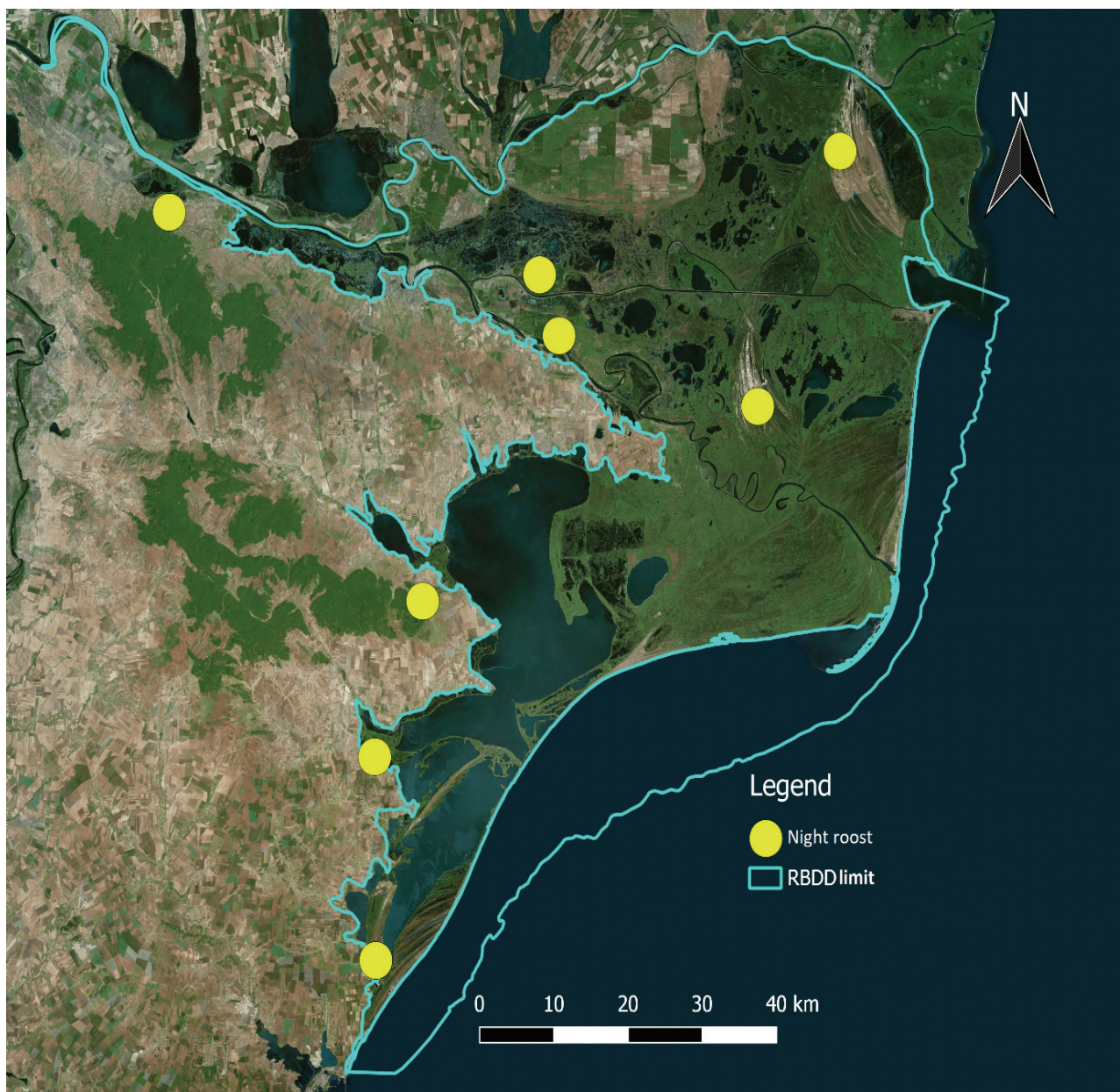


Figure 5. White-Tailed Eagle (*Haliaeetus albicilla*) roosting sites from D. D. B. R. and its surroundings (original).

The sedentary character of the Danube Delta WtE population and winter visitors from the northern population in the study areas can be explained by a rich food resource during cold season. The birds of prey follow flocks of waterfowls during their migration to those wetlands that are free from ice. Here, weakened, sick or injured birds, as well as their corpses, offers a rich food supply for the WtEs. Beside food availability, an important factor is the availability of good roosting places, with tall mature trees. Weather conditions, anthropogenic disturbances are some other actors that presumably influence both the prey (waterfowls) and the WtE distribution.

The WtE of populations wintering in D. D. B. R. has yearly fluctuations, thus these studies are a necessity in the context of the management of this species, as WtE is an indicator of the quality of biodiversity in Danube Delta Biosphere Reserve.

It is worth mentioning that, after the end of the winter season, part of the number of the White-tailed Eagle that were in D. D. B. R. and in the adjacent areas did not leave the winter quarter, heading north to track the water birds returning to nesting areas. At the beginning of the spring period, massive agglomerations around the Sarinasuf pond were reported. Thus, on April 6, 2019 we observed 44 individuals (20 adults and 24 immatures), while on April 7, 2019 30 individuals (15 adults and 15 immatures) (Fig. 6). White-tailed Eagles focused on a bay, where fish banks gathered on shallow and warmer water, a fact indicated by the presence of other fish-eating birds – large cormorants and common pelicans. WtEs fished according to their usual behaviour, diving from the air, but also to their feet, walking in



the small water. After consuming their prey on the shores of the pond, the birds were scattered around the surrounding fields, in the absence of support trees, at distances of 600-800 m.

Due to the fact that this was the largest gathering of WtE from our own observations and in the literature (KISS, 1971; POCORA, 2010), we consider that migrating individuals heading northwards added to the D. D. B. R. wintering individuals, which stopped for a rich food supply.



Figure 6. White-tailed Eagle (*Haliaeetus albicilla*) observed on April 06, 2019 in the Sarinasuf pond (original).

## CONCLUSIONS

D. D. B. R. is an important area for wintering WtE, both for local birds, as well as for winter visitors that follows waterfowl flocks during their migration.

In the winter, gatherings over 10 individuals of WtE are located in Somova - Parcheș, Șontea - Fortuna, Matița - Merhei, Isac - Uzlița and Razim - Sinoie aquatic complexes, where their favourite prey, waterfowls, are also concentrated.

The close vicinity of forests with large mature trees used as roosting places is a key element for WtE concentrations.

At the beginning of spring season, the WtE population in D. D. B. R. appears to grow, as migrating individuals heading northwards adds to the local wintering population.

The WtE monitoring is essential for the species management, as it is a quality indicator for the biodiversity in D. D. B. R.

According to our estimates, the wintering population of WtE in each winter could be between 200 and 350 individuals.

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