

ASSESSMENT OF THE ORNITHOFAUNA BIODIVERSITY OF TERRESTRIAL, FOREST AND AQUATIC HABITATS FROM "SNAGOV FOREST" AND "SNAGOV LAKE" RESERVATIONS

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INTRODUCTION

Birds in Snagov lake area have been studied relatively little. In this article we present actual distribution of birds fauna from wetland Snagov and forest Snagov region.

History of research in the Snagov

Studies on ornithofauna ecoregion Snagov (lake and forests) are few, the only museum collections in natural history museums in the country. Reference work for this area is the study published by Papadopol in 1980 and is a long-term study conducted on 25 years (between 1954 and 1979), the composition and dynamics are treated birds found in the area of Snagov Lake. Here are the 163 species identified in the area of Snagov Lake, including 104 breeding. Of the species observed, 42 species are migratory, 57 are summer visitors and 33 are exclusive of transit birds. Also, 21 species are identified as winter guests with fluctuations number from one year to another.

The paper also comment on how the construction and location of nests, Papadopol (1980) identifies 12 categories: (1) nests on the branches, the trunk side, (2) nests constructed and placed in natural cavities, (3) nests placed in trunks and thick branches, (4) nests installed in some older or abandoned, (5) nests placed on the ground, (6) nests built high sides, (7) floating and semi-floating nests built on water, (8) nests built on swamp land, (9) nests on the stems of reeds, (10) the abandoned nests of crows and magpies, (11) nests located on buildings and other structures, and (12) artificial nests.

Petrescu published studies (1999, 2005) and Adam (2007) are cited only six bird species RNLS Snagov area: *Ardea purpurea*, *Limosa limosa*, *Acrocephalus arundinaceus*, *Sylvia atricapilla*, *Emberiza citrinella* and *Streptopelia decaocto*, but studies do not directly birds found in the area.

MATERIALS AND METHODS

Inventory and study of bird species were performed using classical methods established in the literature. Inventory methods used were:

a. linear paths rating (transect method);

b. method of fixed points.

Evaluation of linear routes (transect method) was used in open areas for small bird census and consists of several routes with a length of 1 km, noting species observed and the number of individuals / species.

Fixed point method was used to census birds small or large and has been applied both in the forest and in the open. The observation points are arranged in a rectangular grid, where the distance between the points is 250 meters and can vary as appropriate (the conformation of the zones). At each point are spent five minutes with visual observation and listening vocalization or woodpecker birds.

Ornithofauna for counting observation point are shown in the above table (Table 2). Also, the map (Figure 1) shows the distribution of observation stations on the perimeter of the lake and forest, to cover a wide spectrum of habitats and ecological niches available so that inventory to bring a more realistic image of the ornithofaunistic diversity and composition of the area.

RESULTS AND DISCUSSION

During mapping studies was identified 104 bird species RNLS Snagov area. This indicates a decrease in the number of species compared to the period when the study was published by Papadopol (1980), it identifies 163 species (Table 3). However, this is not surprising, given the urban development of the area, the action more intense anthropogenic factors (eg. road traffic, motor boat, invasive species), and the emergence of new factors (eg. chemical pollutants, global warming).

The greatest diversity of species recorded in riparian habitats in the forest clearings and glades rare (P3, P5, P8, P11) (Figure 2), these areas provide trophic resources for both predator species and birds granivores or insectivores. Also, these habitats provide most refuges and nesting areas. The lowest number of species was recorded in areas with strong human impact, within sites and the main wharf.

Table 1. Stations chosen for conducting observations or starting ornithofaunistic transects

No.	Name	Coordinate GPS	Type of habitat
1	P1	44°42'34.1280" N; 26° 10' 8.4000" E	shore jetty with concrete and submerged aquatic vegetation and emerged
2	P2	44° 43' 16.2480" N; 26°11' 25.6092" E	Solid oak forest with small clearings from place to place
3	P3	44° 43' 12.2232" N; 26° 11' 9.8520" E	eco-tone fringe habitat with forest, concrete pier with shore shore and submerged aquatic vegetation unchanged and emerged
4	P4	44° 43' 4.2960" N; 26°11'18.7764" E	beech and oak forest, grassland habitat, forest fringe and young trees with low height (maximum 4-5 m)
5	P5	44° 44' 19.5576" N; 26°12' 32.5512" E	habitat and submerged aquatic vegetation emerged, crops and small meadow; strong anthropic area
6	P6	44° 43' 49.2744" N; 26° 10' 21.2232" E	mal concrete area with little aquatic vegetation
7	P7	44° 43' 35.0040" N; 26° 09' 37.4220" E	forest fringe lakeside undeveloped shore aquatic vegetation
8	P8	44° 43' 37.6428" N; 26° 09' 20.6100" E	forest fringe
9	P9	44°42'11.55"N; 26° 9'35.20"E	forest fringe the lake; undeveloped shore with rich aquatic vegetation
10	P10	44°43'18.25"N; 26°11'9.51"E	forest fringe the lake; undeveloped shore with rich aquatic vegetation
11	P11	44°41'46.10"N; 26°10'53.94"E	forest fringe; Oak and beech forest mixed with numerous clearings, meadows and ponds temporary
12	Lac 1	44°41'48.76"N; 26°08'53.97" E	observations offshore boat
13	Lac 2	44°42'12.51"N; 26°09'47.32"E	observations offshore boat
14	Lac 3	44°42'42.20"N; 26°09'59.72"E	observations offshore boat
15	Lac 4	44°43'29.72"N; 26°10'42.22"E	observations offshore boat

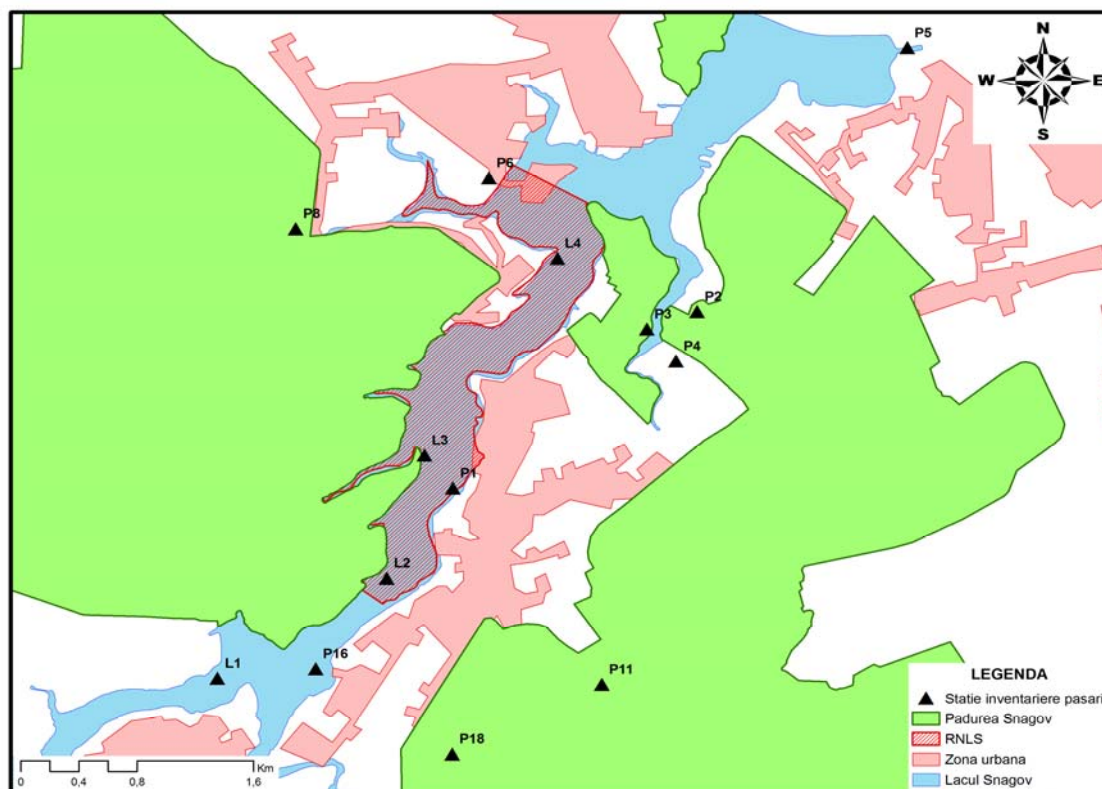


Figure 1. Inventory spatial distribution of stations for birds in the Snagov Lake

Table 2. Species of birds identified in ANPL Snagov and stations where they were reported

Name	POI 1	POI 2	POI 3	POI 4	POI 5	POI 6	POI 7	POI 8	POI 11	PR OFI L 1	PR OFI L 2	PR OFI L 3	PR OFI L 4	POI 15
<i>Accipiter brevipes</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Accipiter gentilis</i>	-	-	X	-	-	-	-	X	X	-	-	-	-	X
<i>Accipiter nissus</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	X
<i>Acrocephalus arundinaceus</i>	-	-	-	-	-	-	-	-	-	-	-	-	X	-
<i>Acrocephalus palustris</i>	-	X	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aegithalos caudatus</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Alcedo atthis ispida</i>	-	-	X	-	-	-	-	-	-	-	-	-	-	X
<i>Anas platyrhynchos</i>	X	-	X	-	X	-	-	X	-	-	-	-	-	-
<i>Anas querquedula</i>	-	-	-	-	X	-	-	-	-	-	-	-	-	-
<i>Apus apus</i>	-	-	-	-	-	X	-	-	-	-	-	-	-	-
<i>Aquila pomarina</i>	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Ardea cinerea</i>	-	-	-	-	X	-	-	-	-	X	X	X	-	-
<i>Ardea purpurea</i>	-	-	-	-	X	-	-	-	-	-	-	-	-	-
<i>Ardeola ralloides</i>	X	-	-	X	-	-	-	-	-	X	X	-	X	X
<i>Asio otus</i>	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Athene noctua</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Aythya nyroca</i>	-	-	X	-	X	-	-	X	-	-	-	-	-	-
<i>Botaurus stellaris</i>	X	-	-	X	X	-	-	-	-	-	-	-	-	-
<i>Buteo buteo</i>	-	-	X	-	-	-	-	X	X	-	-	-	-	-
<i>Carduelis carduelis</i>	-	-	X	-	X	-	-	X	X	-	-	-	-	-
<i>Certhia familiaris</i>	-	-	X	-	-	-	-	-	-	-	-	-	-	-
<i>Chlidonias hybridus</i>	-	-	-	-	X	-	-	-	-	-	X	X	X	X
<i>Chlidonias niger</i>	-	-	X	-	X	-	-	X	-	-	X	X	-	-
<i>Ciconia ciconia</i>	-	-	-	X	-	-	-	-	-	-	-	-	-	-
<i>Circus aeruginosus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	X
<i>Coccothraustes coccothraustes</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Columba oenas</i>	-	-	X	X	-	X	-	-	X	-	-	-	-	-
<i>Columba palumbus</i>	-	X	X	X	X	X	-	-	X	-	-	-	-	-
<i>Coracias garrulus</i>	-	-	-	-	-	-	-	X	X	-	-	-	-	-
<i>Corvus corax</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Corvus cornix</i>	X	X	X	-	X	-	-	X	X	-	X	-	-	X
<i>Corvus frugilegus</i>	-	X	X	-	X	-	-	X	X	-	X	-	-	-
<i>Corvus monedula</i>	-	X	X	-	-	X	-	X	X	-	-	-	-	-
<i>Coturnix coturnix</i>	-	-	-	-	-	X	-	X	-	-	-	-	-	-
<i>Crex crex</i>	-	-	X	-	X	X	-	X	-	-	-	-	-	-
<i>Cuculus canorus</i>	-	X	X	X	-	-	-	X	-	-	-	-	-	-
<i>Delichon urbica</i>	-	-	X	-	X	X	-	X	X	-	-	-	-	-
<i>Dendrocopos leucotus</i>	-	-	X	X	-	-	-	-	X	-	-	-	-	-
<i>Dendrocopos major pinetorum</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Dendrocopos medius</i>	-	-	-	-	-	-	-	X	X	-	-	-	-	-
<i>Dendrocopos minor</i>	-	-	X	X	-	X	-	X	X	-	-	-	-	X
<i>Dendrocopos syriacus</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Dryocopus martius</i>	-	-	-	-	-	X	-	X	X	-	-	-	-	-
<i>Egretta alba</i>	-	-	-	-	X	-	-	-	-	X	X	X	-	-
<i>Egretta garzetta</i>	X	-	-	X	X	-	-	-	-	X	X	X	-	-
<i>Emberiza citrinella</i>	-	-	-	-	-	X	-	-	-	-	-	-	-	-

<i>Falco subbuteo</i>	-	-	-	-	-	X	-	-	X	-	-	-	X	X
<i>Falco tinnunculus</i>	-	-	-	-	-	X	-	X	X	-	-	-	-	X
<i>Ficedula parva</i>	-	X	-	-	-	X	-	X	X	-	-	X	-	-
<i>Fringilla coelebs</i>	-	X	X	X	-	X	-	-	X	-	X	-	-	X
<i>Fulica atra</i>	X	-	X	-	X	-	-	X	-	X	-	X	X	X
<i>Gallinula chloropus</i>	X	-	X	-	X	-	-	X	-	X	-	X	-	X
<i>Garrulus glandarius</i>	-	X	X	-	X	X	-	-	X	-	-	-	-	X
<i>Hirundo rustica</i>	-	-	X	-	X	X	-	X	X	-	X	X	X	-
<i>Ixobrychis minutus</i>	X	-	-	X	X	-	-	-	-	X	X	-	-	X
<i>Lanius collurio</i>	-	-	X	-	-	X	-	X	X	-	-	-	-	-
<i>Lanius senator</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Larus argentatus</i>	-	-	-	-	X	-	-	-	-	X	X	X	X	-
<i>Larus minutus</i>	-	-	-	-	X	-	-	-	-	-	X	-	X	-
<i>Larus ridibundus</i>	-	-	-	-	X	-	-	-	-	X	X	-	X	-
<i>Luscinia megarhynchos</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Motacilla alba</i>	-	-	X	-	-	-	-	-	-	-	-	-	-	-
<i>Motacilla flava flavissima</i>	-	-	X	-	-	-	-	-	-	-	-	-	-	-
<i>Nycticorax nycticorax</i>	X	-	-	X	X	-	-	-	-	-	-	X	-	-
<i>Oriolus oriolus</i>	-	-	X	-	-	-	-	X	X	-	-	-	-	-
<i>Parus ater</i>	-	-	X	-	-	-	-	-	-	-	-	-	X	X
<i>Parus coeruleus</i>	-	-	X	-	-	X	-	-	X	-	-	-	X	-
<i>Parus major</i>	-	-	X	-	-	X	-	X	X	-	-	-	X	X
<i>Passer domesticus</i>	-	X	X	-	X	X	-	X	X	-	-	X	-	-
<i>Passer montanus</i>	-	X	X	-	X	X	-	X	X	-	-	X	-	X
<i>Perdix perdix</i>	-	-	-	-	-	X	-	X	-	-	-	-	-	-
<i>Phalacrocorax carbo</i>	-	-	-	X	-	-	-	-	-	-	-	X	-	-
<i>Phasianus colchicus</i>	-	-	X	X	-	X	-	-	-	-	-	-	-	-
<i>Phoenicurus ochruros</i>	-	-	X	-	-	-	-	-	-	-	-	-	-	-
<i>Phylloscopus trochilus</i>	-	X	X	-	-	-	-	-	-	-	-	-	-	-
<i>Pica pica</i>	X	X	X	-	X	X	-	X	X	-	-	X	-	X
<i>Picus canus</i>	-	-	-	-	-	X	-	-	X	-	-	-	-	-
<i>Picus viridis</i>	-	-	-	-	-	X	-	-	X	-	-	-	-	-
<i>Podiceps cristatus</i>	-	-	-	-	X	X	-	-	-	-	-	-	X	-
<i>Pyrrhula pyrrhula</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Rallus aquaticus</i>	-	-	-	-	X	-	-	-	-	-	-	X	-	-
<i>Remiz pendulinus</i>	-	-	X	-	-	-	-	-	-	-	-	-	-	-
<i>Riparia riparia</i>	-	-	-	-	-	X	-	-	-	-	-	-	-	-
<i>Sitta europaea</i>	-	-	X	-	-	-	-	X	-	-	-	-	-	-
<i>Sterna hirundo</i>	X	-	-	-	X	-	-	-	-	-	X	X	X	X
<i>Streptopelia decaocto</i>	-	-	X	-	X	-	-	-	-	-	-	-	-	-
<i>Streptopelia turtur</i>	-	X	X	-	X	X	-	-	X	-	-	-	-	-
<i>Strix aluco</i>	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Sturnus vulgaris</i>	-	X	X	X	-	-	-	-	X	-	-	-	-	-
<i>Sylvia atricapilla</i>	-	-	X	-	-	-	-	-	-	-	-	-	-	X
<i>Turdus iliacus</i>	-	-	-	-	-	X	-	-	-	-	-	-	-	-
<i>Turdus merula</i>	-	-	X	X	-	X	-	X	X	-	X	-	-	X
<i>Turdus viscivorus</i>	-	-	X	-	-	-	-	-	-	-	-	-	-	-
<i>Upupa epops</i>	-	X	X	X	-	-	-	X	X	-	-	-	-	-

Table 3. Comparison between the results Papadopol (1980) and the situation observed during field inventories

Scientific Name	Papadopol	Inventory	Scientific Name	Papadopol	Inventory
<i>Acanthis flammea</i>	-	x	<i>Fulica atra</i>	x	x
<i>Acanthis cannabina</i>	x	-	<i>Galerida cristata</i>	x	x
<i>Accipiter brevipes</i>	-	x	<i>Gallinago gallinago</i>	x	-
<i>Accipiter gentilis</i>	x	x	<i>Gallinago media</i>	x	-
<i>Accipiter nisus</i>	x	x	<i>Gallinula chloropus</i>	x	x
<i>Acrocephalus arundinaceus</i>	x	x	<i>Garrulus glandarius</i>	x	x
<i>Acrocephalus palustris</i>	-	x	<i>Gavia arctica</i>	x	-
<i>Acrocephalus schoenobaenus</i>	x	-	<i>Hieraaetus pennatus</i>	x	-
<i>Acrocephalus scirpaceus</i>	x	-	<i>Hippolais icterina</i>	x	-
<i>Aegithalos caudatus</i>	x	x	<i>Hippolais pallida elacica</i>	x	-
<i>Alauda arvensis cantarella</i>	x	-	<i>Hirundo rustica</i>	x	x
<i>Alcedo atthis</i>	x	x	<i>Ixobrychus minutus</i>	x	x
<i>Anas clypeata</i>	x	-	<i>Jynx torquilla</i>	x	-
<i>Anas crecca</i>	x	-	<i>Lanius collurio</i>	x	x
<i>Anas penelope</i>	x	-	<i>Lanius minor</i>	x	-
<i>Anas platyrhynchos</i>	x	x	<i>Lanius excubitor</i>	x	-
<i>Anas querquedula</i>	x	x	<i>Lanius senator</i>	-	x
<i>Anser albifrons</i>	x	-	<i>Larus argentatus</i>	x	x
<i>Anthus campestris</i>	x	-	<i>Larus canus</i>	x	-
<i>Anthus pratensis</i>	x	-	<i>Larus minutus</i>	x	x
<i>Apus apus</i>	x	x	<i>Larus ridibundus</i>	x	x
<i>Aquila pomarina</i>	x	x	<i>Loxia curvirostra</i>	x	-
<i>Ardea cinerea</i>	x	x	<i>Limosa limosa</i>	x	-
<i>Ardea purpurea</i>	x	x	<i>Luscinia luscinia</i>	x	-
<i>Ardeola ralloides</i>	x	x	<i>Motacilla cinerea</i>	x	-
<i>Asio otus</i>	x	x	<i>Motacilla flava flavissima</i>	x	x
<i>Athene noctua</i>	x	x	<i>Muscicapa striata</i>	x	-
<i>Aythya nyroca</i>	x	x	<i>Nycticorax nycticorax</i>	x	x
<i>Aythya ferina</i>	x	-	<i>Oriolus oriolus</i>	x	x
<i>Aythya fuligula</i>	x	-	<i>Otus scops</i>	x	-
<i>Bombicilla garrulous</i>	x	-	<i>Pandion haliaetus</i>	x	-
<i>Botaurus stellaris</i>	x	x	<i>Panurus biarmicus russicus</i>	x	-
<i>Bubo bubo</i>	x	-	<i>Parus ater</i>	x	x
<i>Buteo buteo</i>	x	x	<i>Parus coeruleus</i>	x	x
<i>Buteo lagopus</i>	x	-	<i>Parus major</i>	x	x
<i>Caprimulgus europaeus meridionalis</i>	x	-	<i>Passer domesticus</i>	x	x
<i>Carduelis carduelis</i>	x	x	<i>Passer hispaniolensis</i>	-	x
<i>Carduelis spinus</i>	x	x	<i>Passer montanus</i>	x	x
<i>Certhia familiaris</i>	x	x	<i>Perdix perdix</i>	x	x
<i>Charadrius dubius curonicus</i>	x	-	<i>Phalacrocorax carbo</i>	-	x
<i>Chlidonias hybridus</i>	x	x	<i>Phasianus colchicus</i>	x	x
<i>Chlidonias niger</i>	x	x	<i>Philomachus pugnax</i>	x	-
<i>Ciconia ciconia</i>	x	x	<i>Phoenicurus ochruros</i>	x	x
<i>Ciconia nigra</i>	x	-	<i>Phoenicurus phoenicurus</i>	x	-
<i>Circus aeruginosus</i>	x	x	<i>Phylloscopus trochilus</i>	x	x
<i>Circus cyaneus</i>	x	-	<i>Phylloscopus collybita</i>	x	-
<i>Coccothraustes coccothraustes</i>	x	x	<i>Phylloscopus sibilatrix</i>	x	-
<i>Columba livia</i>	-	x	<i>Pica pica</i>	x	x
<i>Columba oenas</i>	x	x	<i>Picus canus</i>	x	x
<i>Columba palumbus</i>	x	x	<i>Picus viridis</i>	x	x
<i>Coracias garrulus</i>	x	x	<i>Pluvialis apricaria alifrons</i>	x	-
<i>Corvus corax</i>	x	x	<i>Podiceps cristatus</i>	x	x
<i>Corvus cornix</i>	-	x	<i>Podiceps ruficollis</i>	x	-
<i>Corvus corone sardonius</i>	x	x	<i>Podiceps nigricollis</i>	x	-
<i>Corvus frugilegus</i>	x	x	<i>Porzana porzana</i>	x	-
<i>Corvus monedula</i>	x	x	<i>Porzana parva</i>	x	-

<i>Coturnix coturnix</i>	x	x	<i>Pyrrhula pyrrhula</i>	x	x
<i>Crex crex</i>	x	x	<i>Rallus aquaticus</i>	x	x
<i>Cuculus canorus</i>	x	x	<i>Remiz pendulinus</i>	-	x
<i>Cygnus olor</i>	-	x	<i>Regulus regulus</i>	x	-
<i>Cygnus cygnus</i>	x	-	<i>Regulus ignicapillus</i>	x	-
<i>Delichon urbica</i>	x	x	<i>Riparia riparia</i>	x	x
<i>Dendrocopos leucotos</i>	-	x	<i>Scolopax rusticola</i>	x	-
<i>Dendrocopos major</i>	x	x	<i>Sitta europaea</i>	x	x
<i>Dendrocopos medius</i>	x	x	<i>Sterna hirundo</i>	-	x
<i>Dendrocopos minor</i>	x	x	<i>Streptopelia decaocto</i>	x	x
<i>Dendrocopos syriacus</i>	x	x	<i>Streptopelia turtur</i>	x	x
<i>Dryocopus martius</i>	x	x	<i>Strix aluco</i>	x	x
<i>Egretta alba</i>	-	x	<i>Sturnus vulgaris</i>	x	x
<i>Egretta garzetta</i>	x	x	<i>Sylvia atricapilla</i>	x	x
<i>Emberiza citrinella</i>	x	x	<i>Sylvia communis</i>	x	-
<i>Emberiza calandra</i>	x	-	<i>Sylvia curruca</i>	x	-
<i>Emberiza hortulana</i>	x	-	<i>Tringa nebularia</i>	x	-
<i>Emberiza schoeniclus</i>	x	-	<i>Tringa ochropus</i>	x	-
<i>Erithacus rubecula</i>	x	x	<i>Tringa glareola</i>	x	-
<i>Falco subbuteo</i>	x	x	<i>Tringa hypoleucos</i>	x	-
<i>Falco tinnunculus</i>	x	x	<i>Troglodytes troglodytes</i>	x	x
<i>Falco vespertinus</i>	x	-	<i>Turdus iliacus</i>	x	x
<i>Falco naumanni</i>	x	-	<i>Turdus merula</i>	x	x
<i>Ficedula albicollis</i>	x	-	<i>Turdus pilaris</i>	x	-
<i>Ficedula hypoleuca</i>	x	-	<i>Turdus torquatus</i>	x	-
<i>Ficedula parva</i>	x	x	<i>Turdus viscivorus</i>	x	x
<i>Fringilla coelebs</i>	x	x	<i>Upupa epops</i>	x	x
<i>Fringilla montifringilla</i>	x	x	<i>Vanellus vanellus</i>	x	-

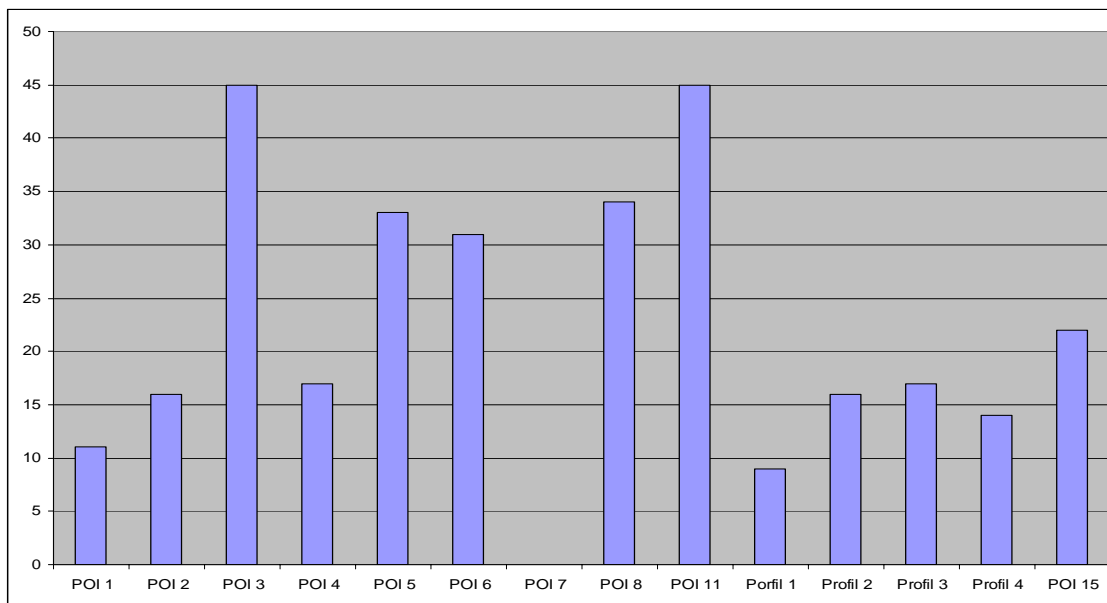


Figure 2. Number of bird species identified in each of the observation stations

The species most frequently observed were those without apparent habitat preferences and a high degree of adaptability to environmental conditions (*Delichon urbica*, *Hirundo rustica*, *Fulica atra*, *Columba palumbus*, *Corvus cornix*, *Passer montanus*, *Passer domesticus*). Species of high conservation importance (eg *Botaurus stellaris*, *Ixobrychis minutus*, *Accipiter nissus*, *Accipiter brevipes*,

Dendrocopos ssp, *Aquila pomarina*, *Ardea purpurea*, *Ardeola ralloides*, *Crex crex*, *Nycticorax nycticorax*) were observed only in the lake and forest habitat very less affected by human activities such as side arms of the lake covered with lush aquatic vegetation or Snagov Forest. Birds of prey are more common in the massive forest because there are no trees just tall enough, needed these species for nesting. The

remaining habitats of these species are present only for feeding, penetrating even semi -natural areas such as lawns, gardens or crops.

Families with the highest number of species observed in the field were Picidae (8 species), Ardeidae (8 species), Corvidae (6 species) and Accipitridae (6 species) (Figure 8). The average number of species in the Family of 2.4 ± 1.9 , with a minimum of 1 and a maximum of 8 species are of a single species group. The large number of birds of prey (11 species) reflects the existence of a trophic resource -rich area that large populations of lizards, snakes and rodents, the main source of food for these animals. Also, an important contribution to the composition of the area ornithofaunistic bring opportunistic species (Corvidae), reflecting strong anthropogenic interference in urban areas and farmland.

Order with the largest contribution to the composition of the area is ornithofaunistic Order Passeriformes (42%, 38 species) (Figure 4). Along with Woodpeckers (Piciformes, 9%, 8 species), Snagov Forest ornithofaunistic houses almost half of the diversity of the area.

Breeding habitat, Snagov Forest fulfills this role for more than half of all bird species in the area (Passeriformes, Piciformes, Falconiformes, Strigiformes). Also seabirds represent a significant percentage of the number of species in the lake (Pelecaniformes 10%, 9 species, Gruiformes 4%, Ciconiiformes 1%, 1 species, Anseriformes 2%, 2 species) (Figure 4). They inhabit water surfaces available exclusively on Snagov Lake, where they feed and build nests to incubate the clutch.

In terms of the phenological phases, most species are sedentary Snagov Lake area (53 %, 57 species), finding optimal survival here throughout the year, while 43 % are migratory (46 species), spending only summer here, because the installation of winter to go to warmer climates. A single species (*Phalacrocorax carbo* - Cormorant sea) has a adventitious presence in the area, probably resting during travel from one habitat to another, and three species are winter visitors (*Fringilla montifringilla*, *Accipiter nisus*, *Parus ater*). Latter species refuge in the cold of mountain and down the hills and plains, where the climate is mild and there are many opportunities for feeding.

Of the 104 bird species inventoried in the area of Snagov Lake Nature Reserve, 26 are included in Annex I of the Birds Directive (25%), 7 are included in Annex II/1 of the same directive (7%), and 16 are included in Appendix II/2. 55 bird species have a defined conservation status (53%) are considered common species. Overall, 91 species not present significant threats (LC), 2 are nearly threatened (NT) and 10 were not evaluated (according to IUCN Red List). Local inventory made after we identified 41 common bird species in the area (39 %), 25 rare species (24%), 30 species vulnerable to human activity carried out in the area (29%), which could become threatened or could leave the area if the pressures are reduced or terminated and 8 threatened species (8%). The latter are affected mainly due to the expansion of human activity on the lake shores to build from; therefore houses, wharves and jetties, and the loss of vegetation in riparian habitats curtain.

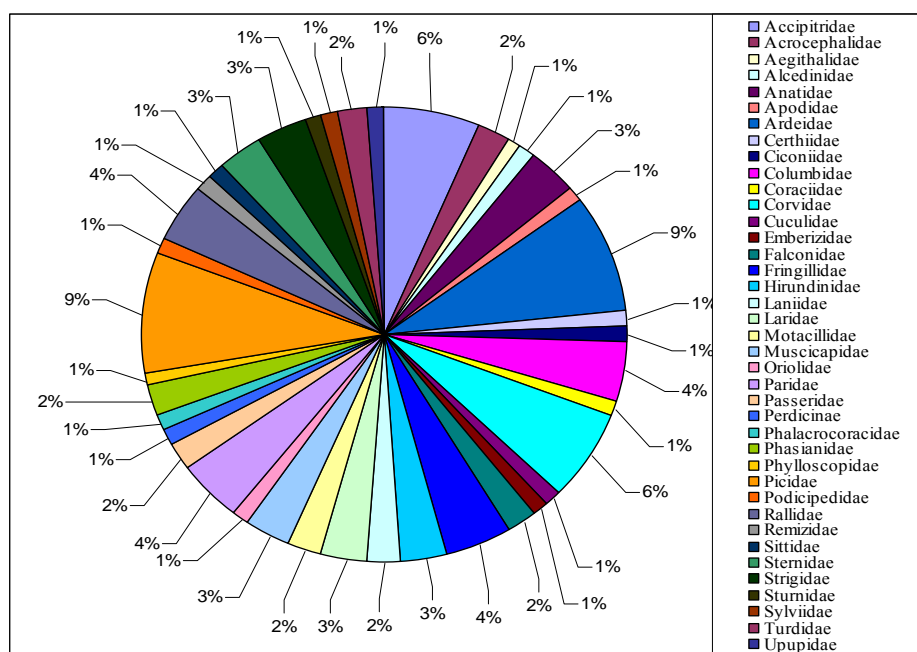


Figure 3. Contribution bird species and family composition Snagov area ornithofaunistic

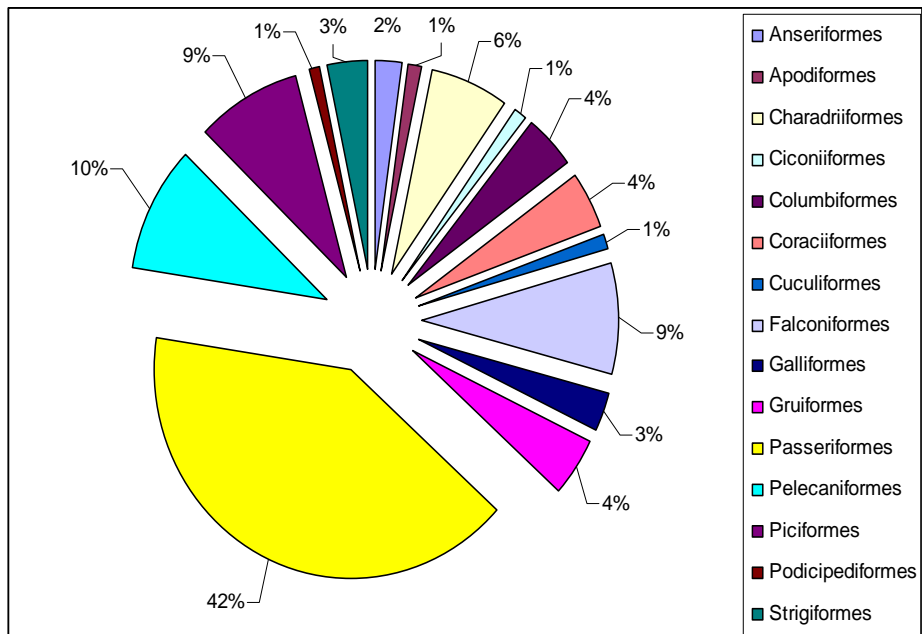


Figure 4. Contribution bird orders ornithofaunistic composition Snagov area

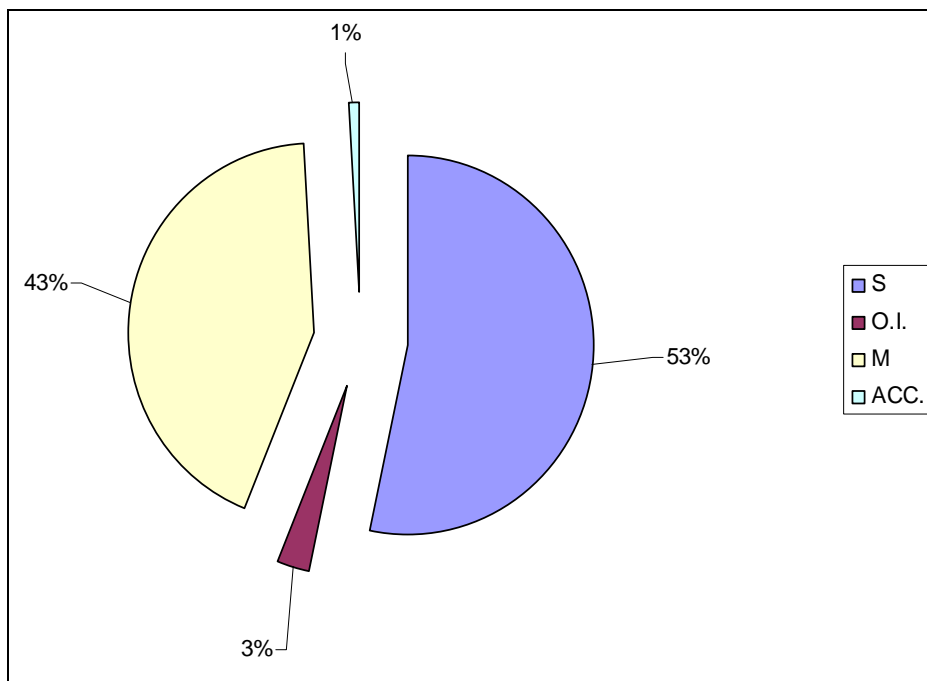


Figure 5. Phases phenological RNLS and birds in the vicinity

Table 4. Phenological phases of bird species inventoried in the Snagov Lake

Scientific Name	Fenologic Phase *	Scientific Name	Fenologic Phase *
<i>Acanthis flammea</i>	S	<i>Falco subbuteo</i>	S
<i>Accipiter brevipes</i>	S	<i>Falco tinnunculus</i>	S
<i>Accipiter gentilis</i>	S	<i>Ficedula parva</i>	M
<i>Accipiter nisus</i>	S, O.I.	<i>Fringilla coelebs</i>	S
<i>Acrocephalus arundinaceus</i>	M	<i>Fringilla montifringilla</i>	O.I.
<i>Acrocephalus palustris</i>	M	<i>Fulica atra</i>	S
<i>Aegithalos caudatus</i>	M	<i>Galerida cristata</i>	S, M
<i>Alcedo atthis</i>	S	<i>Gallinula chloropus</i>	M
<i>Anas platyrhynchos</i>	S	<i>Garrulus glandarius</i>	S
<i>Anas querquedula</i>	M	<i>Hirundo rustica</i>	M
<i>Apus apus</i>	M	<i>Ixobrychus minutus</i>	M
<i>Aquila pomarina</i>	M	<i>Lanius collurio</i>	M
<i>Ardea cinerea</i>	M	<i>Lanius senator</i>	M
<i>Ardea purpurea</i>	M	<i>Larus argentatus</i>	S
<i>Ardeola ralloides</i>	M	<i>Larus minutus</i>	S
<i>Asio otus</i>	S	<i>Larus ridibundus</i>	S, M
<i>Athene noctua</i>	S	<i>Luscinia megarhynchos</i>	M
<i>Aythya nyroca</i>	M	<i>Motacilla alba</i>	M
<i>Botaurus stellaris</i>	M	<i>Motacilla flava flavissima</i>	M
<i>Buteo buteo</i>	M	<i>Nycticorax nycticorax</i>	M
<i>Carduelis carduelis</i>	S	<i>Oriolus oriolus</i>	M
<i>Carduelis spinus</i>	S	<i>Parus ater</i>	S, O.I.
<i>Certhia familiaris</i>	S	<i>Parus coeruleus</i>	S
<i>Chlidonias hybridus</i>	M	<i>Parus major</i>	S
<i>Chlidonias niger</i>	M	<i>Passer domesticus</i>	S
<i>Ciconia ciconia</i>	M	<i>Passer hispaniolensis</i>	S
<i>Circus aeruginosus</i>	M	<i>Passer montanus</i>	S
<i>Coccothraustes coccothraustes</i>	S	<i>Perdix perdix</i>	S
<i>Columba livia</i>	S	<i>Phalacrocorax carbo</i>	ACC.
<i>Columba oenas</i>	M	<i>Phasianus colchicus</i>	S
<i>Columba palumbus</i>	M	<i>Phoenicurus ochruros</i>	M, S
<i>Coracias garrulus</i>	M	<i>Phylloscopus trochilus</i>	M
<i>Corvus corax</i>	S	<i>Pica pica</i>	S
<i>Corvus cornix</i>	S	<i>Picus canus</i>	S
<i>Corvus corone sardonius</i>	S	<i>Picus viridis</i>	S
<i>Corvus frugilegus</i>	S	<i>Podiceps cristatus</i>	S
<i>Corvus monedula</i>	S	<i>Pyrrhula pyrrhula</i>	S
<i>Coturnix coturnix</i>	M	<i>Rallus aquaticus</i>	S
<i>Crex crex</i>	M	<i>Remiz pendulinus</i>	S
<i>Cuculus canorus</i>	M	<i>Riparia riparia</i>	M
<i>Cygnus olor</i>	M	<i>Sitta europaea</i>	S
<i>Delichon urbica</i>	M	<i>Sterna hirundo</i>	M
<i>Dendrocopos leucotos</i>	S	<i>Streptopelia decaocto</i>	S
<i>Dendrocopos major</i>	S	<i>Streptopelia turtur</i>	M
<i>Dendrocopos medius</i>	S	<i>Strix aluco</i>	S
<i>Dendrocopos minor</i>	S	<i>Sturnus vulgaris</i>	M
<i>Dendrocopos syriacus</i>	S	<i>Sylvia atricapilla</i>	M
<i>Dryocopus martius</i>	S	<i>Troglodytes troglodytes</i>	S
<i>Egretta alba</i>	M	<i>Turdus iliacus</i>	S
<i>Egretta garzetta</i>	M	<i>Turdus merula</i>	S
<i>Emberiza citrinella</i>	S	<i>Turdus viscivorus</i>	S
<i>Erithacus rubecula</i>	S	<i>Upupa epops</i>	M

* Phenological phase: S - Sedentary; M - Migration; O.I. - Winter Away; ACC. - Accidentally.

Table 5. Conservation status of international, European and local bird species invetariate

Scientific Name	Birds Directive	IUCN Red List*	Local conservation status (RNLS)**
<i>Acanthis flammea</i>	-	-	A
<i>Accipiter brevipes</i>	Annex I	LC	A
<i>Accipiter gentilis</i>	-	LC	VU
<i>Accipiter nisus</i>	-	LC	VU
<i>Acrocephalus arundinaceus</i>	-	LC	R
<i>Acrocephalus palustris</i>	-	LC	R
<i>Aegithalos caudatus</i>	-	LC	A
<i>Alcedo atthis</i>	Annex I	LC	A
<i>Anas platyrhynchos</i>	Annex II/1	LC	C
<i>Anas querquedula</i>	Annex II/1	LC	VU
<i>Apus apus</i>	-	LC	VU
<i>Aquila pomarina</i>	Annex I	LC	A
<i>Ardea cinerea</i>	-	LC	C
<i>Ardea purpurea</i>	Annex I	LC	VU
<i>Ardeola ralloides</i>	Annex I	LC	C
<i>Asio otus</i>	-	LC	VU
<i>Athene noctua</i>	-	LC	VU
<i>Aythya nyroca</i>	Annex I	NT	VU
<i>Botaurus stellaris</i>	Annex I	LC	VU
<i>Buteo buteo</i>	-	LC	C
<i>Carduelis carduelis</i>	-	LC	VU
<i>Carduelis spinus</i>	-	LC	VU
<i>Certhia familiaris</i>	-	LC	A
<i>Chlidonias hybridus</i>	Annex I	-	VU
<i>Chlidonias niger</i>	Annex I	LC	VU
<i>Ciconia ciconia</i>	Annex I	LC	C
<i>Circus aeruginosus</i>	Annex I	LC	VU
<i>Coccothraustes coccothraustes</i>	-	LC	R
<i>Columba livia</i>	Annex II/1	LC	C
<i>Columba oenas</i>	Annex II/2	LC	R
<i>Columba palumbus</i>	Annex II/1	LC	C
<i>Coracias garrulus</i>	Annex I	NT	VU
<i>Corvus corax</i>	-	LC	R
<i>Corvus cornix</i>	-	-	C
<i>Corvus corone sardonius</i>	-	-	R
<i>Corvus frugilegus</i>	Annex II/2	LC	C
<i>Corvus monedula</i>	Annex II/2	LC	C
<i>Coturnix coturnix</i>	Annex II/2	LC	VU
<i>Crex crex</i>	Annex I	LC	R
<i>Cuculus canorus</i>	-	LC	C
<i>Cygnus olor</i>	Annex II/2	LC	VU
<i>Delichon urbica</i>	-	-	R
<i>Dendrocopos leucotos</i>	Annex I	LC	C
<i>Dendrocopos major</i>	-	LC	C
<i>Dendrocopos medius</i>	Annex I	LC	C
<i>Dendrocopos minor</i>	-	LC	C
<i>Dendrocopos syriacus</i>	Annex I	LC	C
<i>Dryocopus martius</i>	Annex I	LC	A
<i>Egretta alba</i>	Annex I	-	VU
<i>Egretta garzetta</i>	Annex I	LC	VU
<i>Emberiza citrinella</i>	-	LC	R
<i>Erithacus rubecula</i>	-	LC	R
<i>Falco subbuteo</i>	-	LC	VU
<i>Falco tinnunculus</i>	-	LC	A
<i>Ficedula parva</i>	Annex I	LC	R
<i>Fringilla coelebs</i>	-	LC	C
<i>Fringilla montifringilla</i>	-	LC	R
<i>Fulica atra</i>	Annex II/1	LC	C
<i>Galerida cristata</i>	-	LC	C

<i>Gallinula chloropus</i>	Annex II/2	LC	VU
<i>Garrulus glandarius</i>	Annex II/2	LC	C
<i>Hirundo rustica</i>	-	LC	C
<i>Ixobrychus minutus</i>	Annex I	LC	C
<i>Lanius collurio</i>	Annex I	LC	C
<i>Lanius senator</i>	-	LC	R
<i>Larus argentatus</i>	Annex II/2	LC	C
<i>Larus minutus</i>	Annex I	LC	C
<i>Larus ridibundus</i>	Annex II/2	LC	C
<i>Luscinia megarhynchos</i>	-	LC	C
<i>Motacilla alba</i>	-	LC	VU
<i>Motacilla flava flavissima</i>	-	-	VU
<i>Nycticorax nycticorax</i>	Annex I	LC	C
<i>Oriolus oriolus</i>	-	LC	VU
<i>Parus ater</i>	-	LC	R
<i>Parus coeruleus</i>	-	-	C
<i>Parus major</i>	-	LC	C
<i>Passer domesticus</i>	-	LC	C
<i>Passer hispaniolensis</i>	-	LC	R
<i>Passer montanus</i>	-	LC	C
<i>Perdix perdix</i>	Annex II/1	LC	VU
<i>Phalacrocorax carbo</i>	-	LC	R
<i>Phasianus colchicus</i>	Annex II/1	LC	C
<i>Phoenicurus ochruros</i>	-	LC	R
<i>Phylloscopus trochilus</i>	-	LC	R
<i>Pica pica</i>	Annex II/2	LC	C
<i>Picus canus</i>	Annex I	LC	C
<i>Picus viridis</i>	-	LC	C
<i>Podiceps cristatus</i>	-	LC	C
<i>Pyrrhula pyrrhula</i>	-	LC	R
<i>Rallus aquaticus</i>	Annex II/2	LC	VU
<i>Remiz pendulinus</i>	-	LC	VU
<i>Riparia riparia</i>	-	LC	VU
<i>Sitta europaea</i>	-	-	C
<i>Sterna hirundo</i>	Annex I	LC	VU
<i>Streptopelia decaocto</i>	-	-	C
<i>Streptopelia turtur</i>	Annex II/2	LC	R
<i>Strix aluco</i>	-	LC	VU
<i>Sturnus vulgaris</i>	Annex II/2	LC	C
<i>Sylvia atricapilla</i>	-	LC	R
<i>Troglodytes troglodytes</i>	-	LC	R
<i>Turdus iliacus</i>	Annex II/2	LC	R
<i>Turdus merula</i>	Annex II/2	LC	C
<i>Turdus viscivorus</i>	Annex II/2	LC	R
<i>Upupa epops</i>	-	LC	R

- * International conservation status (according to IUCN Red List): NE - Not evaluated; DD - Data deficiency; LC - Without Threats; NT - Near Threatened; VU - Vulnerable; EN - Endangered; CR - critically endangered; EW - Extinct in the wild; EX - Extinct; Local conservation
- ** Status: C - common; R - rare, but no significant threats; VU - vulnerable due to anthropogenic pressures in the area; A - threatened, due to human activities in the area

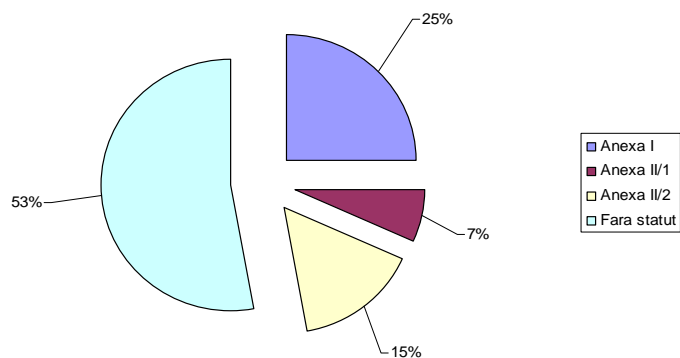


Fig. 1. Categories of conservation for birds Snagov area under the Birds Directive

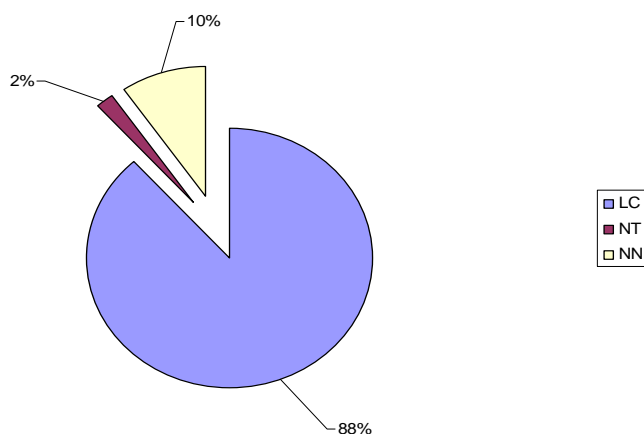


Fig. 2. Categories for species conservation Birds of Lake Snagov area, IUCN Red List

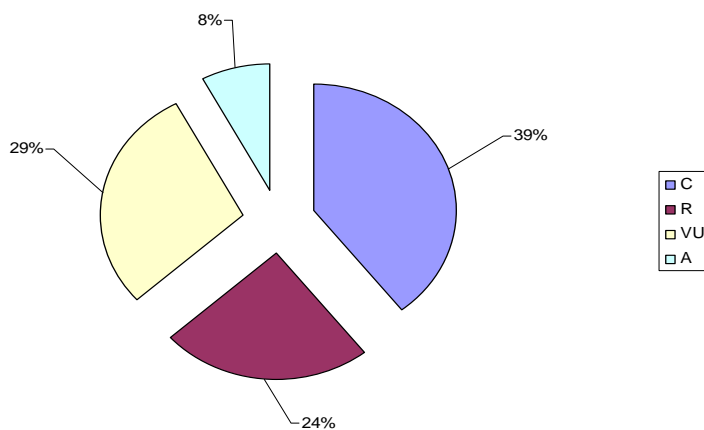


Fig. 8. Categories species of bird conservation for the perimeter of Lake Snagov, determined after inventory

Anthropogenic impact and recommendations for reducing it

The study area includes both natural habitats unaltered and seed -natural habitats (fields, orchards, gardens) or total anthropogenic (villages in the area of Snagov Lake). Although the lake and the shore are included RNLS and the forest is protected in a small

way by designating Snagov Forest Nature Reserve, the study area is marked by human presence and suffers from a high anthropogenic stress.

Loss of habitat is probably the main threat to the survival of bird populations as the main areas targeted are riparian habitats (shore areas), these lands having a high value for the construction of

houses or piers and jetties to exit the lake. However, these areas are havens for wildlife and nesting areas for birds in the area, so changing them means forcing birds found by other areas where habitats are favorable and are able to work. The main species affected by these measures are aquatic species that occupy only the water surface of Lake Snagov and shore areas (Anseriformes, Ciconiiformes, Gruiformes, etc.).

Burning or cutting reeds. Uncontrolled practiced this activity is another way of loss of habitat and put the same problems as in the construction. Also clearing reed curtain decrease trophic resources available habitat because these areas are mal breeding habitat for most species of invertebrates (molluscs, insects) and lower vertebrates (fish, frogs, snakes). A possible area of reeds along the bank continues with a width of at least 1 meter will provide protection for wildlife birds and nesting areas sufficient.

Loud noise caused by motorized boats, fireworks and loud music is a form of pollution (noise) and a source of stress for ornithofauna Lake Snagov. Stress caused by noise pollution can lead to degradation of the health of individuals and even death. Moreover, an environment zogomos announces strong anthropic area and remove bird populations who choose other available wetlands. Also noise sources during the breeding leads to birds leaving nests frightened, resulting in a low birth rate among the pups. Noise from the perimeter of the lake should be maintained at a level as low, close to the natural habitat (45-50 dB).

Uncontrolled deforestation. Cuts made by forest cantons are mainly old trees, the same trees are used by many species of birds for nesting. Living raptors nesting in tall trees just massive forest areas, while night raptors select old and hollow trees for nesting. Also, old trees are lodging places for different species of insect larvae, which in turn are the main food source for many forest insectivorous birds (Piciformes, some Passeriformes).

Reserve custodian should be read prior to making any cuts to ensure a balance between human activities and ecosystem regeneration power. The custodian holds the necessary information on priority habitats, protected species and their location.

Habitat pollution with chemicals and waste discharge affects ornithofauna area two ways. In the first case animals die as a result of direct action chemical substances (toxic heavy metals) on tissues and cells in the body. The second case is more serious because it involves the accumulation of toxic substances plant tissues and in animals, which then accumulates in the body superiors consumers, causing decreased immunity, disease and eventually death of the animal.

These contaminants are the most dangerous because the long term can cause the collapse of entire ecosystems. Also, it is intentional or accidental

pollution, in particular fish eating birds, fish are known as primary batteries toxic substance heavy metals.

To avoid such accidents and adverse effects, it is recommended to connect all households to public sewer system, using only organic fertilizers and avoid discharging any waste or substance into the lake.

CONCLUSIONS

26 of the 104 bird species inventoried in the area of Snagov Lake Nature Reserve, are included in Annex I of the Birds Directive, 7 are included in Annex II/1, and 16 are included in Appendix II/2.

Local inventory highlighted 41 common bird species in the area (39 %), 25 rare species (24%), 30 vulnerable species (29%) and 8 threatened species (8%).

ABSTRACT

The aim of the study was to assess the actual distribution of birds fauna from wetland Snagov and forest Snagov region. Inventory methods used were: linear paths rating (transect method), and the method of fixed points. During the field trips 104 bird species were identified.

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