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BIRDS OF POMORIE LAKE

BASELINE FIELD SURVEY REPORT

LIFE19 NAT/BG/000804 LIFE FOR POMORIE LAGOON



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Contents

Summary	5
INTRODUCTION	6
General description of the site	6
Project summary	6
Current condition of the site	7
Activities undertaken	8
Objectives of the study	8
CONSERVATION MEASURES	9
ORGANISATION AND METHODS OF WORK	10
Study design	10
Period of the study	13
Methodology used for the current survey	13
Survey equipment	13
RESULTS	13
Summary of survey effort	13
Data summary	13
Abundance (sightings per visit) by species	17
Results of breeding bird surveys	41
References:	66
Annex: Data collection worksheet	67

List of figures and tables:

Figure 1: Division of Pomorie Lake into sub-areas based on habitat type (salinity and depth)	11
Figure 2: Monitoring route and vantage points	12
Figure 3: Example of drone footage	12
Figure 4: Total number of species observed per visit	14
Figure 5: Total number of individuals registered per visit	15
Figure 6: Observations of <i>Calidris minuta</i> per visit	18
Figure 7: Observations of <i>Charadrius alexandrinus</i> per visit	19
Figure 8: Observations of <i>Calidris alpina</i> per visit	20
Figure 9: Observations of <i>Calidris pugnax</i> per visit	21
Figure 10: Observations of <i>Charadrius dubius</i> per visit	21
Figure 11: Observations of <i>Tringa totanus</i> per visit	22
Figure 12: Observations of <i>Limosa limosa</i> per visit	22
Figure 13: Observations of <i>Recurvirostra avosetta</i> per visit	23
Figure 14: Bird species observed during migration by their largest number	24
Figure 15: Observations of <i>Tadorna tadorna</i> per visit	32

Figure 16: Observations of <i>Tringa totanus</i> per visit.....	33
Figure 17: Observations of <i>Calidris minuta</i> per visit	33
Figure 18: Observations of <i>Recurvirostra avosetta</i> per visit	34
Figure 19: Observations of <i>Charadrius alexandrinus</i> per visit	34
Figure 20: Observations of <i>Fulica atra</i> per visit	35
Figure 21: Observations of <i>Calidris alpina</i> per visit.....	35
Figure 22: Bird species registered during winter period by their largest number	36
Figure 23: Jackal in Pomorie Lake.....	41
Figure 24: Locations of the nests and colonies by species.....	42
Figure 25: Drone image of the Sandwich terns' colony	44
Figure 26: Locations of <i>Thalasseus sandvicensis</i> pairs/colonies at Pomorie Lake	45
Figure 27: Observations of <i>Thalasseus sandvicensis</i> per visit	45
Figure 28: Drone image of the <i>Sterna hirundo</i> colony	48
Figure 29: Location of registered <i>Sterna hirundo</i> pairs/colonies at Pomorie Lake	49
Figure 30: Observations of <i>Sterna hirundo</i> per visit.....	49
Figure 31: Location of the registered <i>Sternula albifrons</i> pairs at Pomorie Lake.....	51
Figure 32: Observations of <i>Sternula albifrons</i> per visit	51
Figure 33: Artificially constructed nesting sites at Pomorie Lake occupied by Pied Avocets	52
Figure 34: Locations of the registered <i>Recurvirostra avosetta</i> pairs at Pomorie Lake	53
Figure 35: Observations of <i>Recurvirostra avosetta</i> per visit	54
Figure 36: Black-winged stilt with chicks at Pomorie Lake.....	55
Figure 37: Locations of the registered <i>Himantopus himantopus</i> pairs at Pomorie Lake	55
Figure 38: Observations of <i>Himantopus himantopus</i> per visit.....	56
Figure 39: Kentish plovers with chicks at Pomorie Lake	57
Figure 40: Locations of the <i>Charadrius alexandrinus</i> pairs registered at Pomorie Lake.....	57
Figure 41: Observations of <i>Charadrius alexandrinus</i> per visit	58
Figure 42: Location of the registered <i>Tadorna tadorna</i> pairs at Pomorie Lake	59
Figure 43: Observations of <i>Tadorna tadorna</i> per visit	59
Figure 44: Mute swan with chicks at Pomorie Lake	60
Figure 45: Nest of Coot at Pomorie Lake.....	61
Figure 46: All registered nests and locations of probable breeders	61
 Table 1: Species observed at the site by their maximum number per visit	15
Table 2: Species registered during migration period (number per visit)	25
Table 3: Species registered in wintering period	37
Table 4: Breeding codes according to Checklist of Birds of Pomorie Lake.....	40
Table 5: Bird species registered on Pomorie Lake during nesting period and their breeding status codes	40
Table 6: Observations of Sandwich terns ringed as chicks in the colony.....	46
Table 7: Observations of Sandwich terns ringed in other locations abroad	47
Table 8: Observed Common terns with colour rings during monitoring	50
Table 9: International conservation status of the registered species, subject of this survey	62

Summary

This Report presents summarized baseline information of bird populations based on conducted surveys in the area of Pomorie Lake for the period September 2020 – September 2021, comprising line transects, vantage point transects and aerial drone surveys. The survey was made in the frame of the project LIFE19 NAT/BG/00804 LIFE FOR POMORIE LAGOON. During this period have been completed 25 monitoring visits to the lagoon as each visit was carried out in appropriate weather conditions. The number of visits per season is as follows: 16 visits during migration period, both autumn and spring, and 9 visits during wintering period. A study of bird nests was also conducted during nesting period – May and June, in terms of conducting line transect surveys and registering pairs and nests. Breeding bird survey was complemented by drone survey for more accurate estimation of number of nests in colonies. Estimated breeding pairs of target species are presented. For the whole monitoring period there have been observed 119 bird species in total. These included the target species for the project – Shelduck; Sandwich, Little and Common tern; Pied avocet; Black-winged Stilt; Little stint; Dunlin; Ruff; Redshank; Black-tailed godwit; Little ringed and Kentish plover. Two new species for the site were recorded – Little bustard (*Tetrax tetrax*) and Great knot (*Calidris tenuirostris*) with latter being first observation for Bulgaria. The greatest species diversity was observed in April which coincides with the period of spring migration – 60 species registered. The species with the highest number observed is Coot (7 626 ind.) during the winter period while several pairs (2-3) nest in the lake, too. The highest number of observed individuals in total in the lake was observed in February – 13 710 individuals from 41 species and this coincides with the wintering period. Number of breeding pairs and success for target species was assessed as stable (Common and Little tern, Kentish plover) or low (Avocet, Sandwich tern, Black-winged stilt).

INTRODUCTION

Population dynamics are a key indicator of the impact on nature, and are used for assessing the efficacy of conservation and rehabilitation activities and waterbird populations are linked to the status and health of wetlands and their habitats.

Waterbirds are well-known indicators of the quality of aquatic environments. If a given site regularly holds 1% or more of the flyway population of a given species, we can conclude that this area is important for this population/species (Heath et al., 2000). A flyway is a flight path used in bird migration and a flyway population is the number of individuals of a given species included in a given flyway area. The 1% criterion is used to qualify an area as a wetland of international importance under the Ramsar Convention on Wetlands and by the European Union to identify Special Protection Areas (SPAs) under the Birds Directive. It is also used by BirdLife International for identifying Important Bird Areas (IBAs) in wetlands worldwide.

General description of the site

Pomorie Wetland Complex (Pomorie Lake) is part of the Burgas Lake Complex. The size of the lagoon is 760 ha and it is recognized as national protected area (Protected Site), Natura 2000 sites (Special Protection Area BG0000152 Pomoriysko ezero, Special Area of Conservation BG0000620 Pomorie), Ramsar site and Important Bird Area. The major part of the site is a shallow coastal hyper-saline lagoon connected to the Black Sea by an artificial canal. Other associated wetland types are estuaries (River Akheloy), salt marshes, sand dunes, reed beds, salt pans, large inlets, etc. The wetland has been designated as Ramsar site mainly for its uniqueness, as one of the two coastal hyper-saline lagoons in the Black Sea region of Bulgaria converted into salinas, but it is also of high importance for the region's biodiversity. It supports many nationally and internationally red-listed plant and animal species – more than 273 bird species have been recorded, including three globally threatened ones, and some that are adapted to the hyper-saline conditions. Situated along second most important flyaway in Europe – Via Pontica – the lagoon is an important stopover site for migratory birds and especially Charadriiformes as shallow basins substitute missing tidal zone in the Black Sea. It offers suitable conditions for wintering of Shelducks, Mute swans, Coots and other species of ducks and for breeding of several species of shorebirds and terns. The site is supporting the largest Sandwich tern colony on the Balkans and is second most important breeding site for Kentish plover (*Charadrius alexandrinus*), Common tern (*Sterna hirundo*), Little tern (*Sternula albifrons*), Gull-billed tern (*Gelochelidon nilotica*), Pied avocet (*Recurvirostra avosetta*) and Black-winged stilt (*Himantopus himantopus*) in Bulgaria. Saline conditions define importance for conservation of Caucasian dwarf goby (*Knipowitschia caucasica*) population in Bulgaria. It is the biggest locality for Bulgarian Red Data Book-listed plant Sword-leaf dogbane (*Trichomitum venetum*) and dragonfly Dark spreadwings (*Lestes macrostigma*). The site hosts 12 habitat types listed in annex I of EU Habitats Directive 92/43/EEC including priority like 1150* Coastal lagoons and 1530* Pannonic salt steppes and salt marshes and is one of the two biggest locations of European glasswort (*Salicornia europaea*) in Bulgaria.

Project summary

LIFE19 NAT/BG/000804 Conservation of Pomorie Lake coastal lagoon project is funded by LIFE program of the EU and combines M-Pomorie Salinas Ltd, Green Balkans NGO, Bulgarian Biodiversity Foundation and biological station Tour du Valat (France). The project targets conservation of the priority habitat Coastal lagoons (1150*) and a group of bird species, listed in Annex 1 of the EU Birds Directive (Avocet,

Little, Sandwich, and Common terns) in Pomorie Lake. Main objectives include: restoration of functional infrastructure for water management in Pomorie Lake to secure the lagoon against flood and limit the pollution, and to sustain traditional salt production; long-term improvement of priority habitat 1150* Coastal lagoon in SAC Pomorie; improved breeding sites for target bird species and restored importance of the site for migratory Charadriiformes.

To achieve these objectives following actions are planned:

- to establish a functional infrastructure for water management in Pomorie Lake to secure the lagoon against flood and limit the pollution, and to sustain traditional salt production by complete rehabilitation of 5340 m bypass channels and 6460 m dykes. They play a significant role in managing the water levels and quality of the Pomorie Lake, thus affecting the status of the lagoon;
- to improve the breeding sites for priority bird species by the construction of one new wooden platform (36 m²) and restoration of existing islets' (250 m²). Best practices from previous LIFE projects will be used;
- monitoring of the project activities' impact on coastal habitats;
- monitoring of dragonfly assemblages as an indicator of the change of water quality;
- monitoring of the project activities' impact on priority bird species;
- monitoring of the socio-economic impact and ecosystem services;
- developing Project Communication Strategy and Dissemination pack – website and Facebook page, info-boards and Layman's report
- networking & replication.

Current condition of the site

Pomorie Lagoon has undergone some changes in the past decade: heavy rains and floods in 2014/15 have led to blocking of protective bypass channels that drain surface fresh water and prevent its inflow into the lagoon. Mud and undesired vegetation blocked the channels and significantly decreased their capacity and protection functions. The compromised infrastructure has caused ineffective water circulation. The average salinity of water in the lagoon in December 2010 (after the reconstruction in GEF project) was 30.98‰ while in May 2019 it is 12.58‰. Decreased salinity has led to the development of macrophytes, which are the main nutrition basis for Anatidae and a shift in bird species composition (from Charadriiformes to Anatidae) during migration and winter. In addition, the degradation of 1150* is also evident by the increased microalgae growth in more than 33% of the habitat's area in 2019. This is a result of increased eutrophication due to the inflow of polluted surface and underground waters from the adjacent lands.

The low salt production and the infrastructure damages from the floods resulted in limited opportunities for important investments in maintenance activities by the M-Pomorie Salinas Ltd. In 2021 it was the first year when the Salinas have not operated and circulation of water was completely stopped from spring. During the period of the study it was witnessed how saltpans progressively drained by evaporation and since May these basins (Saltpans – North and West) have been completely dry. Areas Honyat and Malak Geren dried out respectively from beginning of August and September. Precipitation during the autumn and winter was relatively high compared to previous years and exceeded 300 mm in total. Rainfall in spring has also been higher than previous 5 years and that in combination with the non-operating Salinas has led to higher water level of the lagoon. Available breeding habitat for nesting of terns and shorebirds was limited in surface. In addition, flooding of

ambankments and smaller saltpans was observed leading to two failed incubations by these species. Presence of predators was also documented by both tracks and observations of stray dogs, jackals and foxes.

Activities undertaken

Green Balkans' experts conducted an ecological survey investigating the bird communities in the Pomorie Lake, to inform and assess the implementation of the project activities. This report sets out baseline survey results for wintering, migrating and nesting birds in the lagoon. It is presenting results from implementation of Action D.2 Monitoring of the impact of the project activities on priority bird species during first project year. Field surveys were undertaken between September 2020 and September 2021, comprising 'look-see' methodology, vantage point surveys, patrolling of the dikes and shores and drone surveys. Surveys were designed to record the numbers and species composition of wintering, migrating and nesting birds in the lake.

Point transect surveys were undertaken between September 2020 to April 2021 and from July 2021 to September 2021, at a frequency of one visit every two weeks (except when stated otherwise). There were 25 survey visits in total.

Complete tour of dikes and shores on foot for registration of nests was undertaken in the period May-June 2021. A total of 16 200 meters of dikes and shores have been surveyed.

Drone surveys are an important part of the study of terns' colonies and identifying nesting birds in places inaccessible by walking.

The objective of these surveys was to identify species using the area of Pomorie Lake, investigate the presence of key species indicating the potential ecological status of Pomorie Lake. The results obtained in the course of these environmental surveys are necessary for the achieving the objectives of the project.

Objectives of the study

The main goals of the monitoring of the ecosystem in Pomorie Lake are:

- Determining the state of the populations of the characteristic for the lagoon bird species and the target species for the project within the protected area;
- Establishing trends in the lagoon ecosystem;
- Comparison of the indicators for the condition of the populations of the target bird species with the data from the hydrochemical monitoring and the monitoring of the water level of the lake in order to improve the condition of the lake ecosystem.

CONSERVATION MEASURES

Protected Areas Act (PAA): Ministry of Environment and Water. 1998. The Act regulates the establishment and maintenance of a national network of protected areas, determines the institutions responsible for the general management, monitoring and security coverage of the protected areas, and lists the rights and obligations of the physical persons and legal entities in this regard. Section 6: Protected Sites, Article 33.

Biodiversity Act: Ministry of Environment and Water. 2002. The Act regulates the conservation of biodiversity and establishment and maintenance of a national ecological network that consists of protected areas under PAA, NATURA 2000 sites (Sites of Community Importance and Special Protection Areas), Ramsar sites. determines the institutions responsible for the general management, monitoring and security coverage of the protected areas, and lists the rights and obligations of the physical and juridical persons in this regard. Section 2: National Ecological Network, Article 3-19.

Designation of Pomorie Lake as Protected Site: State Gazette, Ordinance RD-31 of MOEW, 23 January 2001.

Designation of Pomorie Lake as Ramsar Site: Site 1229 on 24 September 2002.

Designation of Pomorie Lake as Special Protection Area: State Gazette, Ordinance RD-78 of MOEW, 9 February 2009

Designation of Pomorie Lake as Special Area of Conservation: State Gazette, Ordinance RD-1030 of MOEW, 17 December 2020

Further Classifications: Designated Important Bird Area in 1997 by BirdLife International.

Management Plan: Currently there is no approved management plan for the site. Intergrated Management Plan for SCI Pomorie, SPA Pomoriysko ezero, Ramsar Site Pomorie Wetland Complex and Protected Site Pomoriysko ezero was developed in the period 2008-2010 by Green Balkans NGO but it was not approved by Ministry of Environment and Water. Designated Protected Site as of January 23, 2001.

Implemented conservation measures: Green Balkans NGO has been implementing a long-term conservation program for Pomorie Lake since 1996 including restoration of breeding habitat for birds; restoring hydrological regime; marking the protected area complex; installing information boards; cleaning illegal dumping sites; developing management plan for the site; creating visitor centre and conducting public awareness and environmental education campaigns. As part of this program, numerous conservation projects have been implemented, with a total amount of more than EUR 1 mln. Main donors included BTCV, Bulgarian-Swiss Biodiversity Conservation Program, GEF/World Bank, Operative Program "Environment 2007-2013"; LIFE+; British-Bulgarian Society; hundreds of volunteers and others. Breeding habitat for water birds was restored in the form of islets, wooden platforms, rafts and nextboxes in the lake for nesting of Sandwich tern (*Thalasseus sandvicensis*), Pied avocet (*Recurvirostra avosetta*), Common tern (*Sterna hirundo*), Little tern (*Sternula albifrons*), Gull-billed tern (*Gelochelidon nilotica*), Mediterranean gull (*Larus melanocephalus*) and Shelduck (*Tadorna tadorna*). Considerable achievement is the restoration of the numbers of Sandwich terns. In the beginning of the program there have been only 6 nesting pairs. In 2001 the numbers of nesting pairs reached 450 continuously growing to 1300 and 1500 pairs in 2006-2009 and above 2500 pairs after 2013.

ORGANISATION AND METHODS OF WORK

The aim of the scientific survey is establishing baseline values of birds at the site with emphasis on water birds and set indicator species for the project. The monitoring of birds will be implemented throughout the project duration and will be used for assessment of results from conservation actions for restoration of breeding habitat for birds and hydrological regime of the lagoon. In addition hydrochemical monitoring is conducted for parameters like salinity, pH and oxygen contents in number of stations that cover all sub-areas of the wetland.

Study design

Special attention in this report is given to the species defined as 'waterfowl'. The Ramsar Convention defines 'waterfowl' as species of birds that are 'ecologically dependent upon wetlands' and has defined 'waterbird' as being synonymous with 'waterfowl' for the purposes of the application of the Convention. However, since the second edition of Waterfowl Population Estimates, 'waterfowl' have been defined more precisely as all species of the following European families: Ducks, Geese and Swans (Anatidae); Rails, Crakes and allies (Rallidae); Gulls, Terns and Skimmers (Laridae); Herons and Egrets (Ardeidae); Sandpipers and allies (Scolopacidae); Plovers (Charadriidae); Cormorants (Phalacrocoracidae); Grebes (Podicipedidae); Ibises and Spoonbills (Threskiornithidae); Cranes (Gruidae); Coursers and Pratincoles (Glareolidae); Storks (Ciconiidae); Stilts and Avocets (Recurvirostridae); Thick-knees (Burhinidae); Oystercatchers (Haematopodidae); Pelicans (Pelecanidae); Flamingos (Phoenicopteridae); Loons or Divers (Gaviidae).

Subject of the study are also all species which are resident at the site all year round, species which migrate to Pomorie Lake and are present only in the winter months, and late migrants which are preparing to leave to spend the winter elsewhere. The international conservation status of the birds recorded is indicated within the report in *Table 9*.

The following species have been identified as indicator species for the project during winter and migration:

- Little stint (*Calidris minuta*) – target number is 50 ind. during migration;
- Dunlin (*Calidris alpina*) – target number is 300 ind. during migration;
- Ruff (*Calidris pugnax*) – target number is 100 ind. during migration;
- Kentish plover (*Charadrius alexandrinus*) – target number is 25 ind. during migration;
- Little ringed plover (*Charadrius dubius*) – target number is 25 ind. during migration;
- Redshank (*Tringa totanus*) – target number is 60 ind. during migration and winter;
- Shelduck (*Tadorna tadorna*) – target number is 250 ind. during winter;
- Black-tailed godwit (*Limosa limosa*) – target number is 70 ind. during migration.

Nesting birds include:

- Sandwich tern (*Thalasseus sandvicensis*) – target number is 1300 – 2000 breeding pairs;
- Common tern (*Sterna hirundo*) – target number is 60 – 100 breeding pairs;
- Little tern (*Sternula albifrons*) – target number is 10 – 20 breeding pairs;
- Pied avocet (*Recurvirostra avosetta*) – target number is 60 – 100 breeding pairs;
- Kentish plover (*Charadrius alexandrinus*) – target number is 5 – 20 breeding pairs;
- Black-winged stilt (*Himantopus himantopus*) – target number is 40 – 80 breeding pairs.

To achieve this aim, the following steps were implemented:

- Complete a desk study establishing the number and location of important habitats for birds, and bird species records;

- Undertake field surveys to produce a list of bird species encountered;
- Describe the communities of birds' present, how they use habitat types present within the Field Study Area and their conservation/legislative status.

Counting waterbirds on large open water areas, like coastal lagoons and lakes, is challenging. Different methods have been developed to conduct census of birds in these open-water environments. Depending on the local conditions, there are three main census methods: counting from the ground, from the air, or boats. Ground counts (so called 'look-see' methodology) are the simplest and most common form of census and it is the method used for this survey. It is made from the ground, on foot, but also cars are involved. The site has been covered systematically, usually by walking the same route on each visit and stopping every few hundred meters to scan with binoculars and/or a telescope to count the birds.

The site has been divided up into sub-areas that are visible from the chosen vantage points without overlap of areas counted and without missing any part of the site. Areas were divided mainly by habitat type defined by salinity and depth. These were called as follows: Marine area; Main Lake; Honyat; Malak geren; Saltpants – north; Saltpants – west and are shown on *Figure 1*.



Figure 1: Division of Pomorie Lake into sub-areas based on habitat type (salinity and depth)

Counts have been made by scanning flocks of waterbirds (usually comprising several species) with a telescope Swarovski ATX 30-70x95 and binoculars MINOX 8x40 when appropriate counting each species one-by-one, or in 'blocks' for bigger numbers. To avoid extreme weather conditions (thick fog, heavy rain or gale force winds), because such conditions reduce counting efficiency, the visits have been postponed until conditions are more favorable. Route for surveys and vantage points are shown in *Figure 2*.

For waterbirds in particular, drones overcome challenges associated with surveying locations not accessible on foot and represent a useful addition to standard survey methods. During the current study in Pomorie Lake a drone was used to determine the number of the Sandwich terns' colony and the species nesting in the reedbeds. The drone surveys were conducted in May and June 2021, and we

used DJI Mavic 2 Enterprise drone. The video and still images have been collected for follow-up counts back in the office (*Figure 3*)

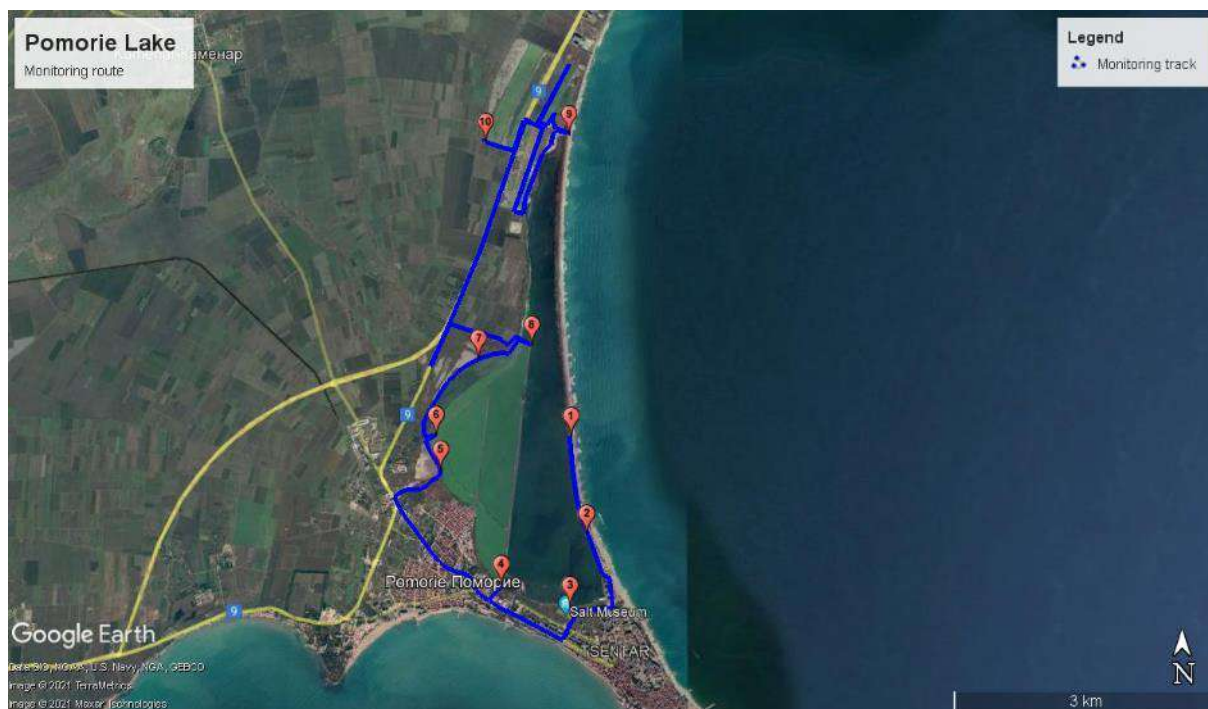


Figure 2: Monitoring route and vantage points



Figure 3: Example of drone footage

Period of the study

The survey was performed by ornithologists of Green Balkans NGO (Dimitar Popov – project manager and Galina Meshkova – biodiversity expert) in the period September 2020 – September 2021. The area was visited once every two weeks, and observations were performed in the daytime. Daily duration of the observations was not less than 6 hours. For the monitoring of the nesting bird species the area was visited three times per month with full tour on foot of the coast and suitable nesting sites made twice to lower possible disturbance.

Methodology used for the current survey

The study of avifauna is based on at least two visits per month to the lake area by experienced ornithologists and collection of species' (nesting, migratory, wintering, resident) numbers using a telescope; detour of the coastline and dikes for registration of nesting birds during the nesting period – May and June; collecting information on numbers and nests with the help of a drone. For the bird monitoring we have implemented point counts from vantage points covering all subareas of the wetland and transect counts for nests. The counts were conducted in the period of September 2020 – September 2021, preferably in the good weather. Each count was performed by two people, one of which have been doing observations while the other was responsible for recording. Duration of each counting day was at least 6 hours. The collected data have been recorded in a notebook and later summed into standard data collection form separated by different subareas (see the *Annex* at the end of the document).

Survey equipment

The following survey equipment was mobilized and used for the present survey:

- Binocular MINOX 8x40
- Telescopes Opticron ES 80GA ED 20-60x80 and Swarovski ATX 30-70x95
- Drone DJI Mavic 2 Enterprise

RESULTS

Summary of survey effort

In total more than 40 days of field work were performed including 25 days for monitoring during migration and winter periods with the rest dedicated to monitoring breeding birds on foot and by drone. The total number of bird species registered during this particular survey period is 119. Of these, 94 species can be identified as waterbirds or wetland-dependent.

Data summary

Huge numbers of birds spend all or part of their life cycles in wetlands, which provide habitat and food sources for them to survive.

Waterbirds include:

- waterfowl such as ducks, geese and swans;
- grebes;
- pelicans;
- cormorants;
- ibises and spoonbills;
- egrets and herons;
- crakes, rails and waterhens;
- terns and gulls;

- shorebirds, which are also known as waders.

They fall into 3 main categories:

- **Colonial nesting waterbirds** require substantial floods to support large breeding events in floodplain wetlands. They include terns, egrets, ibises, pelicans, cormorants and herons.
- **Non-colonial waterbirds**, including resident shorebird species that generally don't congregate to breed but are still dependent on wetlands for nesting and feeding habitat in which to raise their young. They include waterfowl, grebes, crakes, rails and waterhens.
- **Migratory waterbirds**, such as migratory shorebirds, use a range of wetlands to rest, feed and breed during their annual long journeys between wetlands in Africa and their breeding sites in the northern Europe.

Other native bird species also depend on wetlands for all or part of the life cycle. These include warblers, passerine birds and birds of prey such as the Marsh harrier (*Circus aeruginosus*) and others, and they are also subject of this survey and included in the Report.

Diversity and abundance of bird species identified within the survey area was determined from the list of species observed. Peak counts of each species were recorded for all survey visits.

The emphasis is on species identified as indicator species for the project and also birds of conservation importance at Pomorie Lake - listed in Biodiversity Act and Red Data Book of Bulgaria, annex 1 of the EU Birds Directive, species covering the Ramsar criteria, etc.

Conducted surveys have revealed strong relation of the species composition and periods of migration/wintering/breeding (*Figure 4 and 5*)

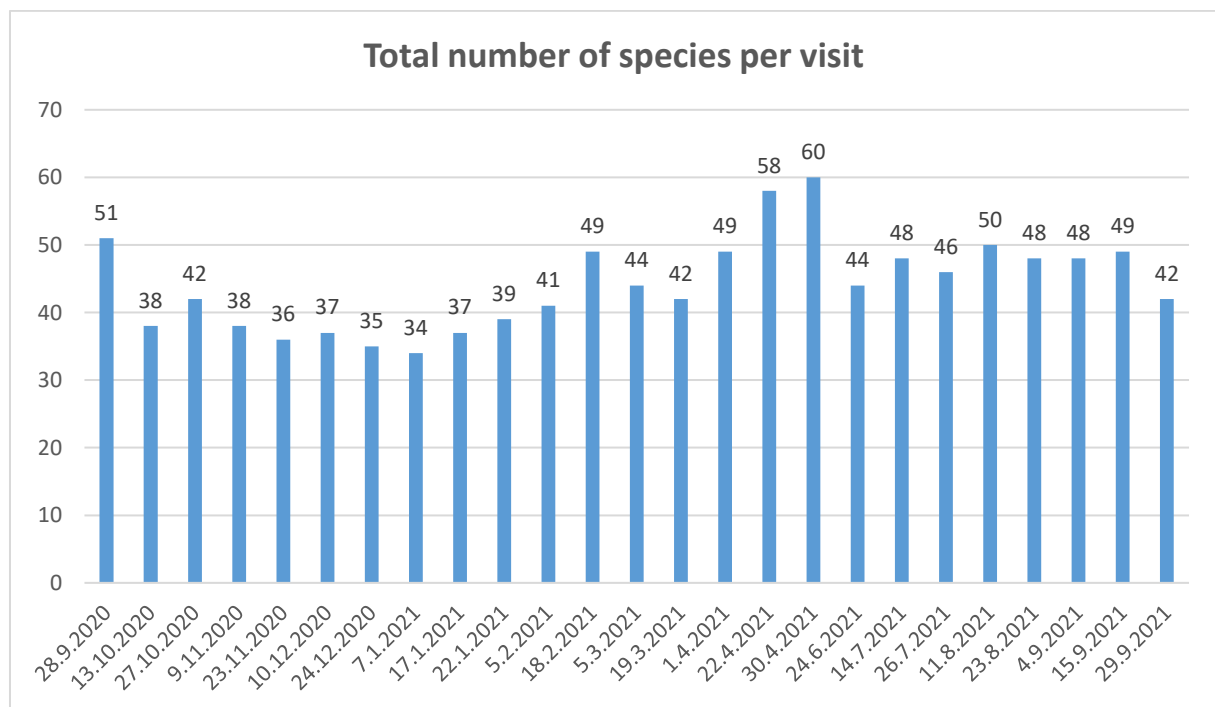


Figure 4: Total number of species observed per visit

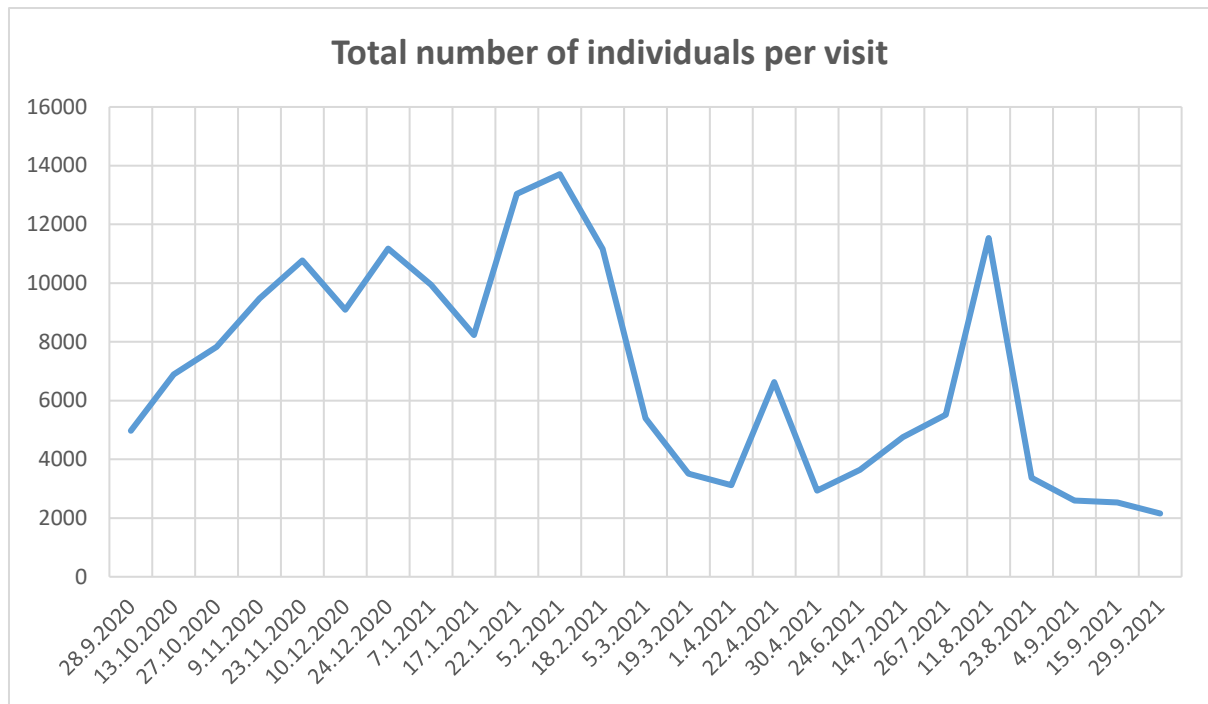


Figure 5: Total number of individuals registered per visit

Table 1: Species observed at the site by their maximum number per visit

No	English name	Latin name	Number	Period of observation
1	Black-throated loon	<i>Gavia arctica</i>	29	
2	Little grebe	<i>Tachybaptus ruficollis</i>	81	
3	Great crested grebe	<i>Podiceps cristatus</i>	49	
4	Red-necked grebe	<i>Podiceps grisegena</i>	9	
5	Horned grebe	<i>Podiceps auritus</i>	13	
6	Black-necked grebe	<i>Podiceps nigricollis</i>	167	
7	Yelkouan shearwater	<i>Puffinus yelkouan</i>	905	
8	Great cormorant	<i>Phalacrocorax carbo</i>	227	
9	Pygmy cormorant	<i>Microcarbo pygmeus</i>	658	
10	Great white pelican	<i>Pelecanus onocrotalus</i>	46	
11	Dalmatian pelican	<i>Pelecanus crispus</i>	8	
12	Eurasian bittern	<i>Botaurus stellaris</i>	1	
13	Squacco heron	<i>Ardeola ralloides</i>	3	
14	Little egret	<i>Egretta garzetta</i>	22	
15	Great egret	<i>Ardea alba</i>	20	
16	Grey heron	<i>Ardea cinerea</i>	55	
17	Purple heron	<i>Ardea purpurea</i>	1	
18	Black stork	<i>Ciconia nigra</i>	67	
19	White stork	<i>Ciconia ciconia</i>	7300	
20	Glossy ibis	<i>Plegadis falcinellus</i>	30	
21	Eurasian spoonbill	<i>Platalea leucorodia</i>	23	
22	Mute swan	<i>Cygnus olor</i>	215	
23	Greater flamingo	<i>Phoenicopterus roseus</i>	103	
24	Tundra swan	<i>Cygnus columbianus</i>	4	
25	Whooper swan	<i>Cygnus cygnus</i>	28	
26	Greater white-fronted goose	<i>Anser albifrons</i>	60	

27	Ruddy shelduck	<i>Tadorna ferruginea</i>	22	
28	Common shelduck	<i>Tadorna tadorna</i>	1454	
29	Eurasian wigeon	<i>Mareca penelope</i>	2067	
30	Gadwall	<i>Mareca strepera</i>	183	
31	Eurasian teal	<i>Anas crecca</i>	1366	
32	Mallard	<i>Anas platyrhynchos</i>	893	
33	Northern pintail	<i>Anas acuta</i>	104	
34	Garganey	<i>Spatula querquedula</i>	456	
35	Northern shoveler	<i>Spatula clypeata</i>	409	
36	Red-crested pochard	<i>Netta rufina</i>	11	
37	Common pochard	<i>Aythya ferina</i>	258	
38	Ferruginous duck	<i>Aythya nyroca</i>	24	
39	Tufted duck	<i>Aythya fuligula</i>	287	
40	Greater scaup	<i>Aythya marila</i>	2	
41	Common eider	<i>Somateria molissima</i>	2	
42	Common goldeneye	<i>Bucephala clangula</i>	4	
43	Smew	<i>Mergellus albellus</i>	4	
44	Red-breasted merganser	<i>Mergus serrator</i>	85	
45	European honey buzzard	<i>Pernis apivorus</i>	19	
46	Black kite	<i>Milvus migrans</i>	5	
47	White-tailed eagle	<i>Haliaeetus albicilla</i>	1	
48	Short-toed snake eagle	<i>Circaetus gallicus</i>	1	
49	Western marsh harrier	<i>Circus aeruginosus</i>	17	
50	Hen harrier	<i>Circus cyaneus</i>	25	
51	Northern goshawk	<i>Accipiter gentilis</i>	3	
52	Eurasian sparrowhawk	<i>Accipiter nisus</i>	17	
53	Common buzzard	<i>Buteo buteo</i>	228	
54	Long-legged buzzard	<i>Buteo rufinus</i>	1	
55	Rough-legged buzzard	<i>Buteo lagopus</i>	1	
56	Lesser spotted eagle	<i>Clanga pomarina</i>	1	
57	Booted eagle	<i>Hieraaetus pennatus</i>	4	
58	Osprey	<i>Pandion haliaetus</i>	2	
59	Common kestrel	<i>Falco tinnunculus</i>	4	
60	Merlin	<i>Falco columbarius</i>	1	
61	Peregrine falcon	<i>Falco peregrinus</i>	1	
62	Eurasian coot	<i>Fulica atra</i>	7626	
63	Common crane	<i>Grus grus</i>	10	
64	Little bustard	<i>Tetrax tetrax</i>	2	
65	Eurasian oystercatcher	<i>Haematopus ostralegus</i>	60	
66	Black-winged stilt	<i>Himantopus himantopus</i>	215	
67	Pied avoset	<i>Recurvirostra avosetta</i>	243	
68	Collared pratincole	<i>Glareola pratincola</i>	192	
69	Little ringed plover	<i>Charadrius dubius</i>	58	
70	Common ringed plover	<i>Charadrius hiaticula</i>	69	
71	Kentish plover	<i>Charadrius alexandrinus</i>	103	
72	Grey plover	<i>Pluvialis squatarola</i>	68	
73	Northern lapwing	<i>Vanellus vanellus</i>	180	
74	Red knot	<i>Calidris canutus</i>	9	
75	Sanderling	<i>Calidris alba</i>	18	
76	Little stint	<i>Calidris minuta</i>	528	
77	Temminck's stint	<i>Calidris temminckii</i>	7	

78	Curlew sandpiper	<i>Calidris ferruginea</i>	33	
79	Dunlin	<i>Calidris alpina</i>	2592	
80	Great knot	<i>Calidris tenuirostris</i>	1	
81	Broad-billed sandpiper	<i>Calidris falcinellus</i>	6	
82	Ruff	<i>Calidris pugnax</i>	512	
83	Common snipe	<i>Gallinago gallinago</i>	1	
84	Great snipe	<i>Gallinago media</i>	2	
85	Snipe sp.	<i>Gallinago sp.</i>	6	
86	Black-tailed godwit	<i>Limosa limosa</i>	144	
87	Bar-tailed godwit	<i>Limosa lapponica</i>	1	
88	Eurasian whimbrel	<i>Numenius phaeopus</i>	6	
89	Eurasian curlew	<i>Numenius arquata</i>	2	
90	Spotted redshank	<i>Tringa erythropus</i>	71	
91	Common redshank	<i>Tringa totanus</i>	109	
92	Marsh sandpiper	<i>Tringa stagnatilis</i>	95	
93	Common greenshank	<i>Tringa nebularia</i>	62	
94	Green sandpiper	<i>Tringa ochropus</i>	6	
95	Wood sandpiper	<i>Tringa glareola</i>	78	
96	Terek sandpiper	<i>Xenus cinereus</i>	1	
97	Common sandpiper	<i>Actitis hypoleucos</i>	34	
98	Ruddy turnstone	<i>Arenaria interpres</i>	48	
99	Parasitic jaeger	<i>Stercorarius parasiticus</i>	1	
100	Pallas's gull	<i>Ichthyaetus ichthyaetus</i>	1	
101	Mediterranean gull	<i>Ichthyaetus melanocephalus</i>	815	
102	Little gull	<i>Hydrocoloeus minutus</i>	593	
103	Black-headed gull	<i>Chroicocephalus ridibundus</i>	1103	
104	Slender-billed gull	<i>Chroicocephalus genei</i>	1	
105	Yellow-legged gull	<i>Larus michahellis</i>	223	
106	Caspian tern	<i>Hydroprogne caspia</i>	4	
107	Sandwich tern	<i>Thalasseus sandvicensis</i>	1747	
108	Common tern	<i>Sterna hirundo</i>	626	
109	Little tern	<i>Sternula albifrons</i>	100	
110	Whiskered tern	<i>Chlidonias hybridus</i>	1	
111	White-winged tern	<i>Chlidonias leucopterus</i>	8	
112	Short-eared owl	<i>Asio flammeus</i>	1	
113	Common kingfisher	<i>Alcedo atthis</i>	2	
114	Sand martin	<i>Riparia riparia</i>	238	

- spring migration – March 1st /May 15th
- autumn migration – June 15th /October 31st
- wintering – November 1st /February 28th
- waterbirds

Abundance (sightings per visit) by species

MIGRATION PERIOD

Pomorie Lake directly falls into the global flyway known as Via Pontica, which birds use to make seasonal flights to-and-from nesting and wintering grounds. According to *Checklist of Birds at Pomorie Lake*, 2010, there are 193 species recorded to use the area of the lake during this period. There are also data about four vagrant species (*Vanellus gregarius*, *Calidris tenuirostris*, *Phalaropus fulicarius*

and *Phalaropus tricolor*), thus the total number of the species that are registered in the lake area during migration period becomes 197. All this defines Pomorie Lake as an important stopover site for migratory birds such as waders, cormorants, pelicans, egrets and herons, terns and gulls. (see *Table 2*)

During the present study has been collected principally information on migratory species that use the lake area for feeding and resting and no special observations of the migration process in general were conducted. Although, data on migrating soaring flocks (storks, birds of prey) crossing the lake have been collected occasionally. There are 16 site visits carried out during migration period. The total number of species registered during this monitoring period is 94. One new species for the site and Bulgaria was observed during autumn migration – Great knot (*Calidris tenuirostris*). One bird was first observed by Nikolay Kolev on 2 September and it was later observed during regular monitoring on 15 September 2021 meaning the bird has spent almost 2 weeks at the site.

In recent years, many studies have been conducted on the change in the migration periods of many bird species. Many of these studies make a clear statistical link between the earlier start of migratory movements and climate change. During the present monitoring period in Pomorie Lake a significantly earlier start of the autumn migration was reported, which is expressed in the arrival in the lake area of typical autumn migrants at the end of June, such as the Black-tailed godwit (*Limosa limosa*) with 140 individuals registered on June 26.

As it's seen from the *Figure 14* and *Table 2* the most abundant species, in terms of largest number registered during this period, are: White stork (*Ciconia ciconia*) - 7300, Coot (*Fulica atra*) - 1978 and Sandwich tern (*Thalasseus sandvicensis*) - 1275.

INDICATOR SPECIES FOR THE PROJECT AND OTHER IMPORTANT SPECIES

Little stint (*Calidris minuta*)

This species is a full long-distance migrant that migrates overland on a broad front. It is also nomadic in parts of its wintering range (e.g. Bulgaria), moving as habitats flood or are overgrown. This species is gregarious outside of the breeding season and occurs in small groups in its winter range, often aggregating into larger flocks to roost at night. A typical migratory flock can be as large as 20-30 individuals and depends entirely on the ecological conditions of the habitat.

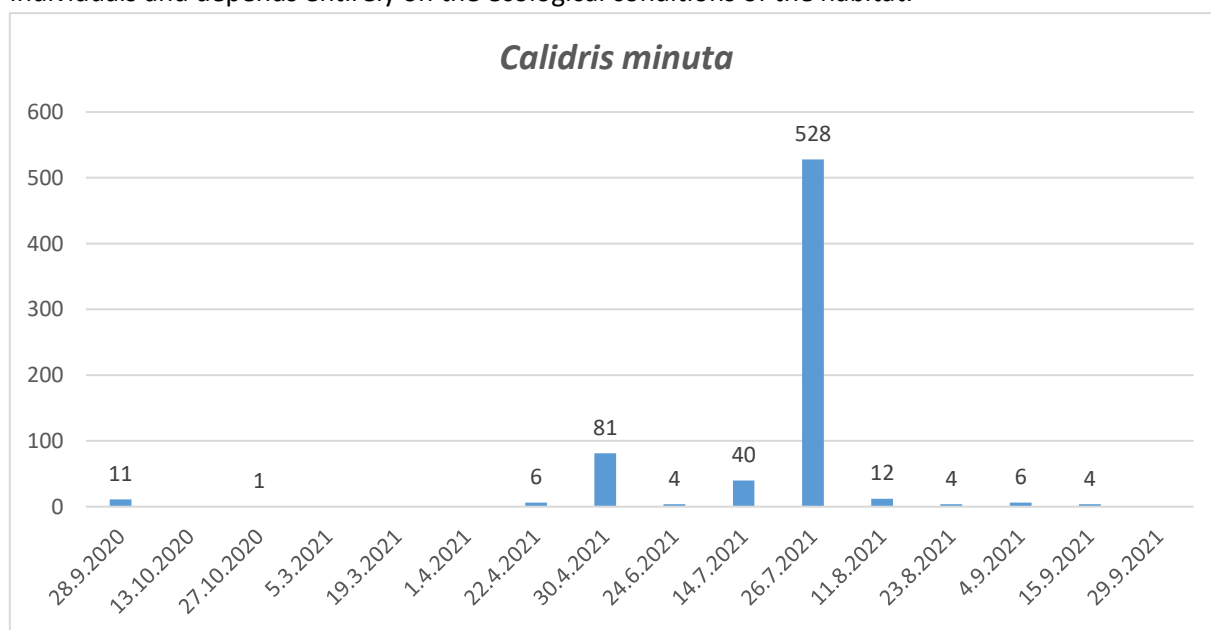


Figure 6: Observations of Calidris minuta per visit

In the *Checklist of birds of Pomorie Lake* this species is listed as Common spring and autumn migrant with highest numbers registered as follows – 1743 individuals on May 1st 2000 and 840 individuals on August 22nd 2009. The largest aggregation during current season in Pomorie Lake – 528 individuals, was observed during migration period, on July 26th, when in the basin where the flock was registered, the water level in the deepest part was 10 centimeters with extensive mudflat around.

Kentish plover (*Charadrius alexandrinus*)

Predominantly coastal species during all seasons, including migration period. It is uncommon on freshwater, even when migrating and occurs on inland habitats not far from the coast such as open flats near brackish or saline lakes, salt-pans and other, such as Pomorie Lake. The species is extremely sensitive to the hydrological regime of the habitats, on which its number in certain locations and periods depends.

In the *Checklist of birds of Pomorie Lake* this species is listed as Uncommon spring and autumn migrant with highest numbers registered respectively – 42 individuals on April 26th 2008 and 49 individuals on August 15th 1999. The highest number in Pomorie Lake during this season is registered on July 14th, which coincides with the period of start for autumn migration - 103 individuals.

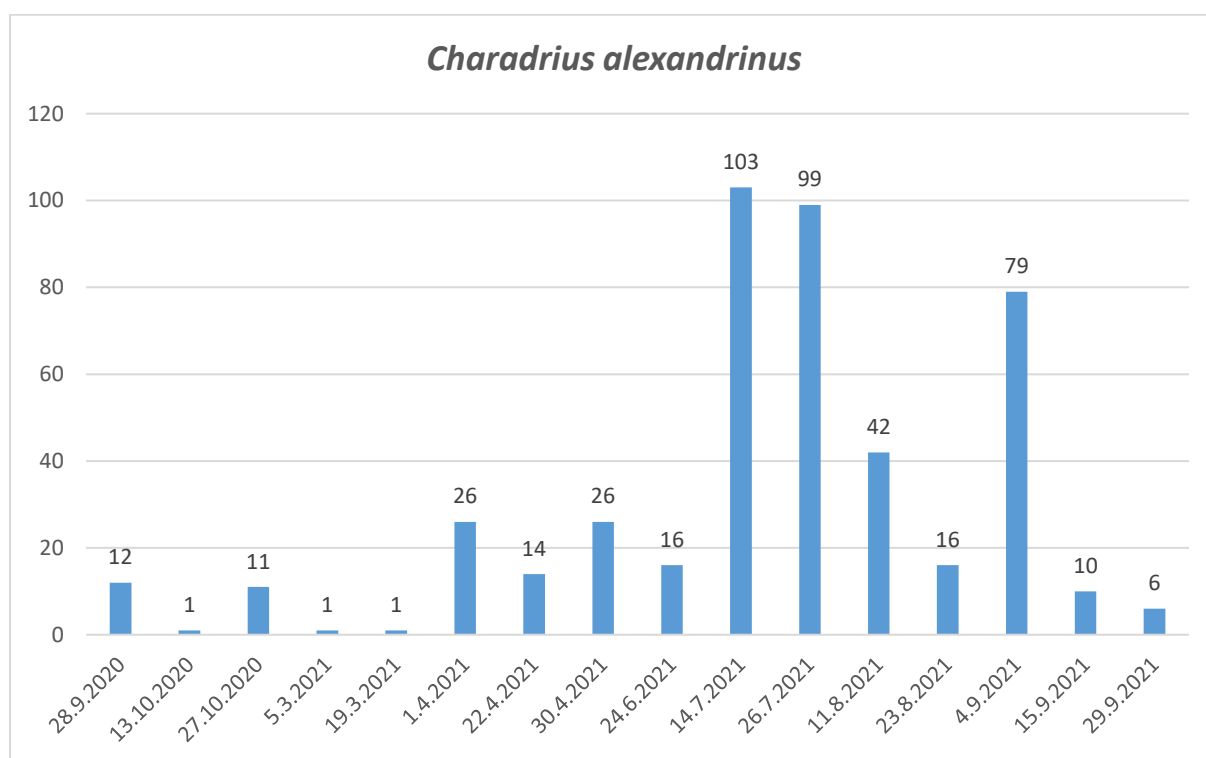


Figure 7: Observations of *Charadrius alexandrinus* per visit

Dunlin (*Calidris alpina*)

This species is a fully migratory circumpolar breeder with several sub-populations that employ a number of migration strategies, from short coastal flights to long, non-stop flights overland on a broad front. The sub-population that breeds in the Arctic and subarctic regions of Northern Europe and Asia migrates long distances to arrive in its Southeast Asia, Middle East and African wintering grounds from

late-July, returning again between March and early-April. In the non-breeding season this species is also frequent at wide variety of freshwater and brackish wetlands, including lagoons, muddy shores, flooded fields, salt-works, sandy coasts. The species is omnivorous during the non-breeding season, consuming mostly polychaete worms and small gastropods, as well as insects (dipteran flies and beetles), crustaceans, bivalves, plant matter and occasionally small fish, access to which it finds in shallow areas and spills.

In the *Checklist of birds of Pomorie Lake* this species is listed as Common spring and autumn migrant with highest numbers of 464 and 400 individuals respectively in April 20th 2008 and November 29th 2006. The highest number registered for this species during current migration period is 483 individuals on March 19th.

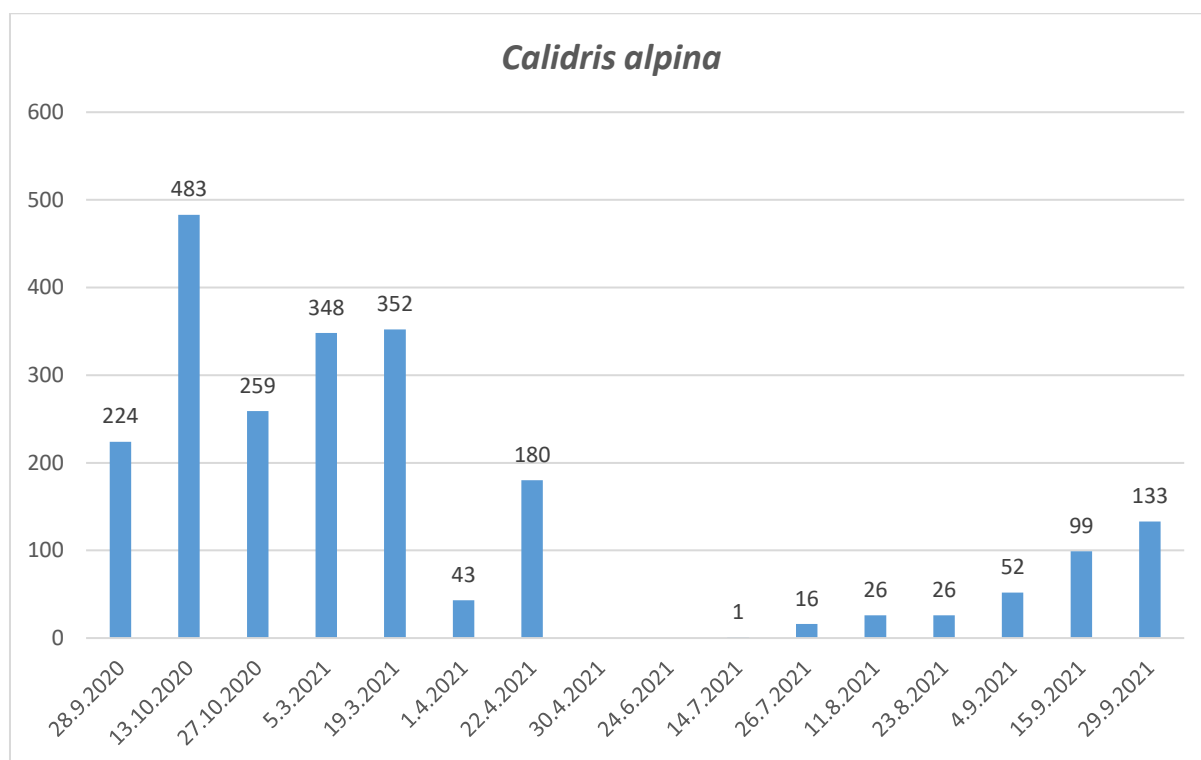


Figure 8: Observations of *Calidris alpina* per visit

Ruff (*Calidris pugnax*)

Another very characteristic species for coastal lagoons and salt marshes during migration is Ruff. Suitable foraging habitats include littoral belts, deltas, coastal saltmarshes, and other. During the non-breeding season, the species occupies the muddy margins of brackish, saline and alkaline lakes, ponds, usually roosting at night in the shallow waters of lake shores. Outside of the breeding season its diet is varied, including small crustaceans, spiders, small molluscs, annelid worms, frogs and small fish, which the species finds in the shallow areas of its habitats. This species is fully migratory and the bulk of the population winters in sub-Saharan Africa, and the coastal lagoons like Pomorie Lake represent an important stopover for resting and feeding which is a key factor for successful migration.

The highest number of this species according to *Checklist of birds of Pomorie Lake* is registered during spring migration - 1240 individuals on September 8th 2006. During current migration period the highest number registered is 512 individuals, observed during spring migration on April 30th.

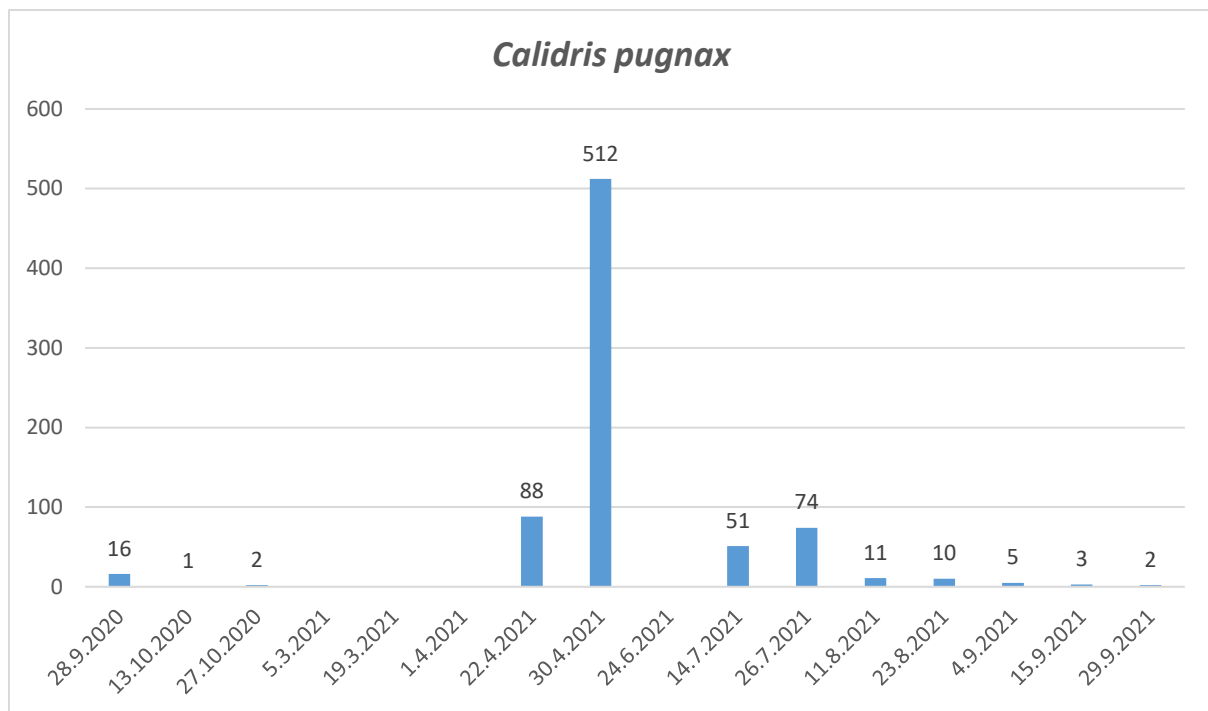


Figure 9: Observations of *Calidris pugnax* per visit

Little ringed plover (*Charadrius dubius*)

This species is fully migratory in much of its range. This species is mainly solitary throughout the non-breeding season and on migration, occasionally occurring in flocks of not more than 10 individuals. In the *Checklist of birds of Pomorie Lake* this species is listed as Rare spring and autumn migrant with highest numbers of 21 individuals on September 1st 2001 during autumn migration. The highest number recorded in 2021 migration period is during autumn migration – 58 individuals on July 26th.

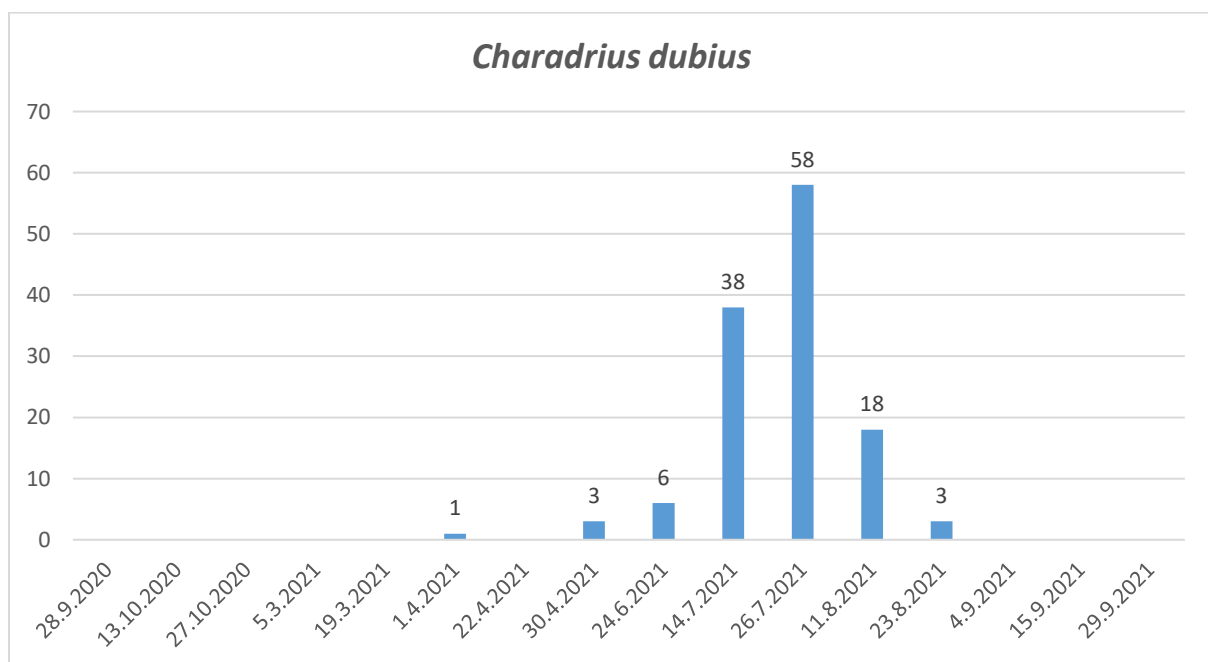


Figure 10: Observations of *Charadrius dubius* per visit

Redshank (*Tringa totanus*)

Most populations of this species are fully migratory and travel on a broad front over land and along coasts. In the *Checklist of birds of Pomorie Lake* this species is listed as Common spring and autumn migrant with highest numbers of 1200 individuals on October 10th 1989. The highest number recorded in 2021 migration period is during autumn migration – 109 individuals on September 4th.

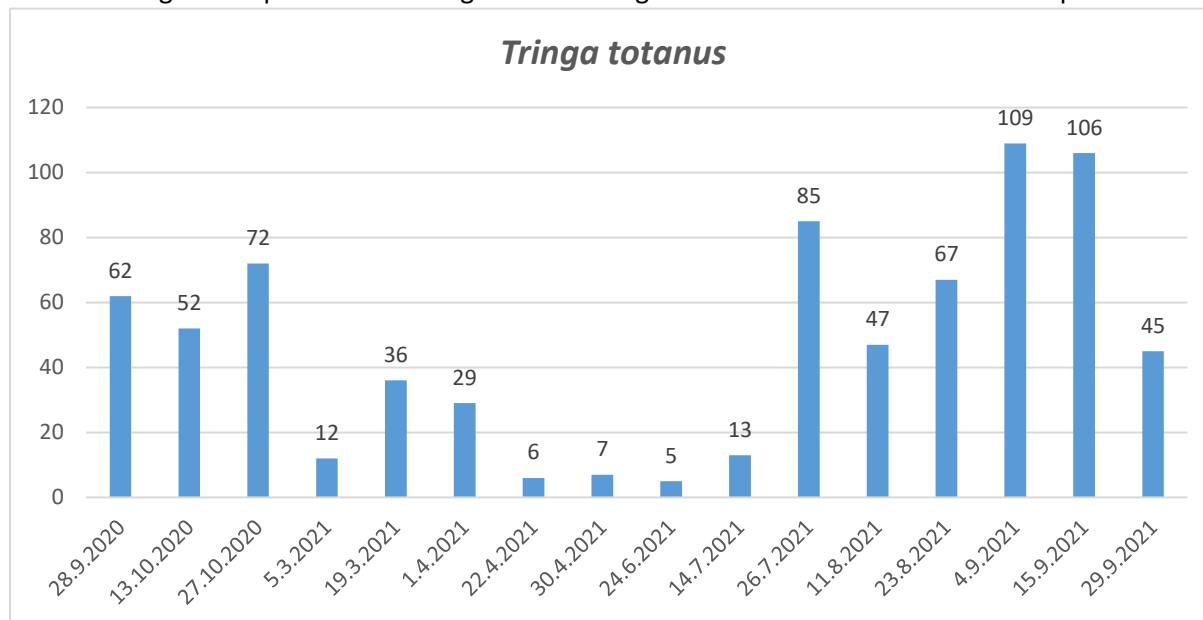


Figure 11: Observations of *Tringa totanus* per visit

Black-tailed godwit (*Limosa limosa*)

In its non-breeding range the species inhabits brackish habitats - mud flats and salt-water lagoons. In the *Checklist of birds of Pomorie Lake* this species is listed as Common spring and autumn migrant with highest numbers of 700 individuals on April 19th 2006. The highest number recorded in 2021 migration period is during autumn migration – 144 individuals on August 11th.

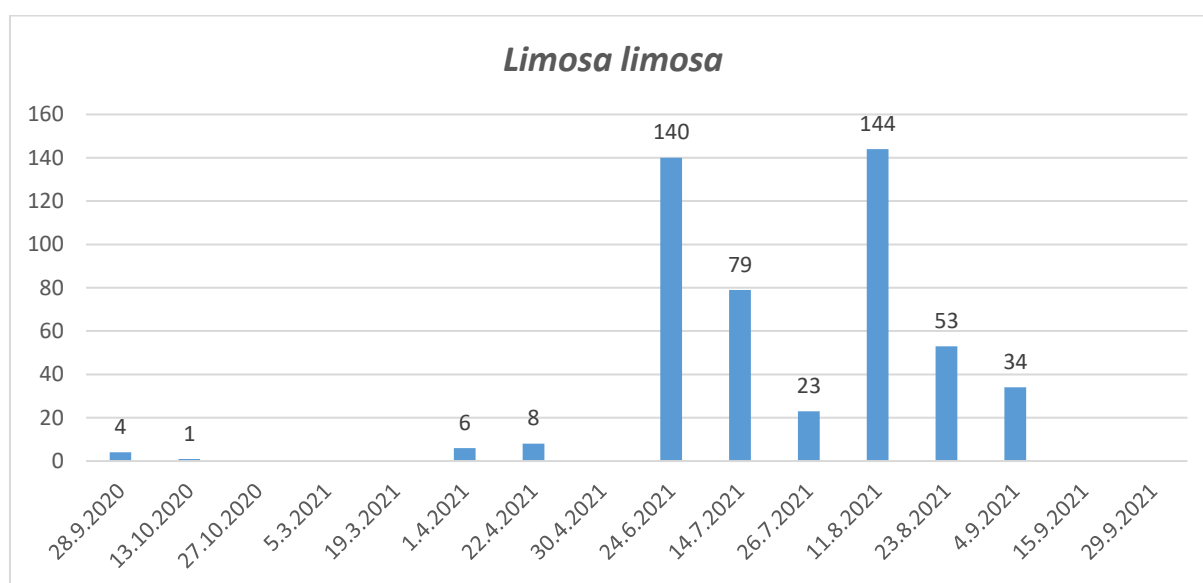


Figure 12: Observations of *Limosa limosa* per visit

Pied avocet (*Recurvirostra avoseta*)

Northern populations migrate south between August and October and return to the breeding grounds between March and May, staging on route in large numbers at certain sites. Outside of the breeding season the species inhabits coastal and inland saline lakes and mudflats, lagoons, salt pans and rarely occurs on inland freshwater lakes and rivers. The species is threatened in Europe by human disturbance and deteriorated hydrological condition of the habitats.

In the *Checklist of birds of Pomorie Lake* this species is listed as Common spring and autumn migrant with highest numbers of 1500 individuals on August 12th 1966. The highest number recorded this season for the species is during spring migration - 243 individuals on June 24th.

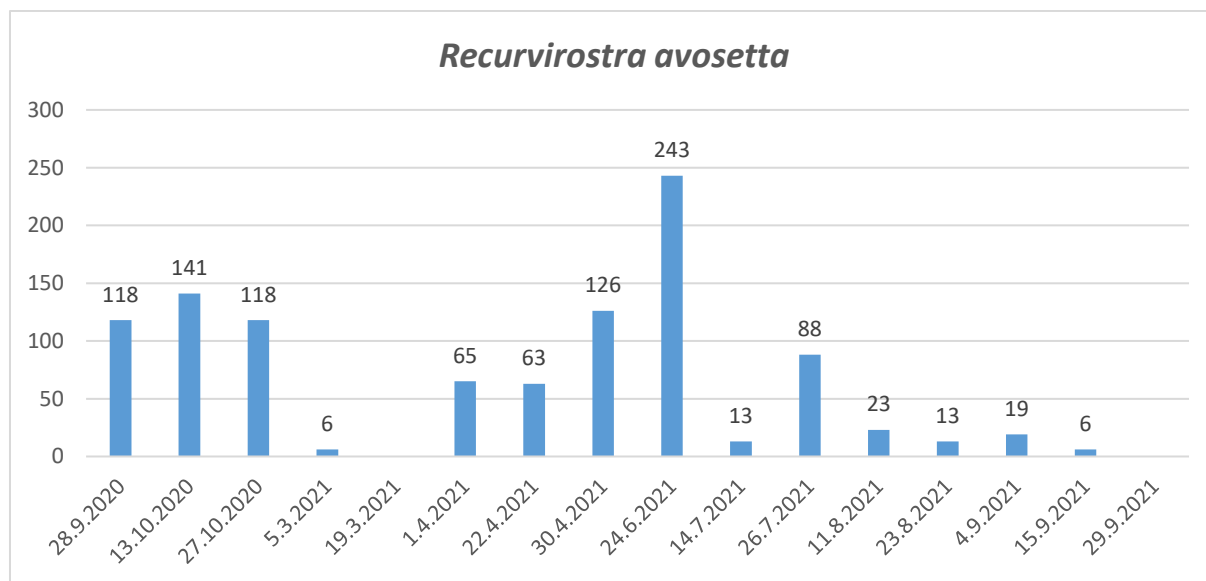
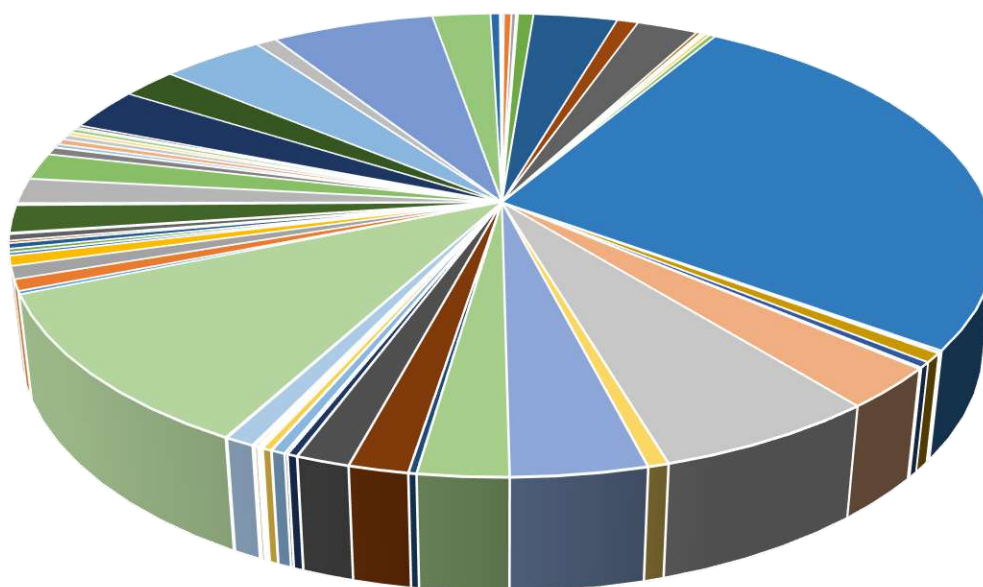


Figure 13: Observations of *Recurvirostra avosetta* per visit

Migrating bird species by largest number



- | | | |
|-------------------------|--------------------------|------------------------|
| ■ Gavia arctica | ■ Tachybaptus ruficollis | ■ Podiceps cristatus |
| ■ Podiceps grisegena | ■ Podiceps auritus | ■ Podiceps nigricollis |
| ■ Puffinus yelkouan | ■ Phalacrocorax carbo | ■ Microcarbo pygmeus |
| ■ Pelecanus onocrotalus | ■ Pelecanus crispus | ■ Botaurus stellaris |
| ■ Ardeola ralloides | ■ Egretta garzetta | ■ Ardea alba |
| ■ Ardea cinerea | ■ Ardea purpurea | ■ Ciconia nigra |
| ■ Ciconia ciconia | ■ Plegadis falcinellus | ■ Platalea leucorodia |
| ■ Cygnus olor | ■ Phoenicopterus roseus | ■ Cygnus cygnus |
| ■ Tadorna ferruginea | ■ Tadorna tadorna | ■ Mareca penelope |
| ■ Mareca strepera | ■ Anas crecca | ■ Anas platyrhynchos |
| ■ Anas acuta | ■ Spatula querquedula | ■ Spatula clypeata |
| ■ Netta rufina | ■ Aythya ferina | ■ Aythya nyroca |
| ■ Aythya fuligula | ■ Aythya marila | ■ Somateria molissima |
| ■ Mergus serrator | ■ Pernis apivorus | ■ Milvus migrans |
| ■ Haliaeetus albicilla | ■ Circus gallicus | ■ Circus aeruginosus |
| ■ Circus cyaneus | ■ Accipiter gentilis | ■ Accipiter nisus |

Figure 14: Bird species observed during migration by their largest number

Table 2: Species registered during migration period (number per visit)

Видове	28.9. 2020	13.10. 2020	27.10. 2020	5.3.2 021	19.3. 2021	1.4.2 021	22.4. 2021	30.4. 2021	24.6. 2021	14.7. 2021	26.7. 2021	11.8. 2021	23.8. 2021	4.9.2 021	15.9. 2021	29.9. 2021
<i>Gavia arctica</i>	3	0	17	0	15	16	16	22	1	1	0	0	0	0	0	0
<i>Tachybaptus ruficollis</i>	16	20	27	41	44	32	0	1	0	0	0	4	6	1	49	81
<i>Podiceps cristatus</i>	32	49	39	17	12	32	21	15	1	18	5	4	8	2	13	12
<i>Podiceps grisegena</i>	9	0	7	0	0	1	0	0	0	0	3	0	2	0	2	0
<i>Podiceps auritus</i>	0	0	0	2	1	13	0	0	0	0	0	0	0	0	0	0
<i>Podiceps nigricollis</i>	5	11	21	52	167	80	17	7	0	0	0	0	0	0	1	0
<i>Puffinus yelkouan</i>	0	0	0	0	0	3	905	281	0	0	0	0	0	0	0	0
<i>Phalacrocorax carbo</i>	114	227	41	43	25	63	44	76	117	153	103	86	80	42	88	5
<i>Microcarbo pygmeus</i>	49	99	107	186	243	658	97	43	6	22	42	51	68	65	46	45
<i>Pelecanus onocrotalus</i>	46	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
<i>Pelecanus crispus</i>	4	3	1	0	0	0	2	4	0	3	2	0	0	0	0	8
<i>Botaurus stellaris</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>Ardeola ralloides</i>	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
<i>Egretta garzetta</i>	16	0	0	0	0	1	12	22	14	16	8	9	12	15	6	1

<i>Ardea alba</i>	4	5	3	8	20	19	0	5	4	2	1	0	0	2	0	5
<i>Ardea cinerea</i>	28	46	41	35	32	29	4	7	20	29	12	16	32	25	22	23
<i>Ardea purpurea</i>	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0
<i>Ciconia nigra</i>	0	0	0	0	0	0	27	0	2	4	4	1	1	2	0	67
<i>Ciconia ciconia</i>	0	0	0	0	0	0	2808	0	2	0	0	7300	0	0	0	0
<i>Plegadis falcinellus</i>	0	0	0	0	0	0	6	28	0	30	10	6	2	0	0	0
<i>Platalea leucorodia</i>	23	0	2	6	2	0	2	4	1	1	0	3	0	0	0	0
<i>Cygnus olor</i>	33	98	174	77	64	61	50	35	9	9	12	12	22	18	11	16
<i>Phoenicopterus roseus</i>	88	0	103	12	11	0	0	0	0	0	0	0	0	7	4	28
<i>Cygnus cygnus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Tadorna ferruginea</i>	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
<i>Tadorna tadorna</i>	219	145	18	784	871	739	346	272	77	70	14	20	29	4	0	0
<i>Mareca penelope</i>	10	270	1713	376	144	100	22	2	0	0	0	0	0	0	0	14
<i>Mareca strepera</i>	0	0	4	159	74	95	88	46	40	6	76	0	3	0	6	0
<i>Anas crecca</i>	842	1038	670	183	95	54	18	9	0	0	0	0	557	736	214	360
<i>Anas platyrhynchos</i>	332	689	526	197	95	52	13	41	134	155	204	447	221	228	326	175
<i>Anas acuta</i>	29	29	35	54	62	35	0	0	0	0	0	0	0	0	0	8

<i>Spatula querquedula</i>	0	0	0	0	60	22	30	21	13	9	0	456	0	0	2	0
<i>Spatula clypeata</i>	2	65	40	409	319	254	29	2	0	0	0	0	0	0	0	40
<i>Netta rufina</i>	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
<i>Aythya ferina</i>	0	0	0	46	79	34	0	0	7	1	0	1	4	0	8	0
<i>Aythya nyroca</i>	0	0	0	0	1	0	24	12	0	0	0	0	0	0	0	0
<i>Aythya fuligula</i>	0	0	0	109	54	0	0	0	0	0	0	1	0	0	0	0
<i>Aythya marila</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Somateria molissima</i>	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mergus serrator</i>	0	0	1	49	53	73	0	0	0	0	0	0	0	0	0	0
<i>Pernis apivorus</i>	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	16
<i>Milvus migrans</i>	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
<i>Haliaeetus albicilla</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Circaetus gallicus</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Circus aeruginosus</i>	4	5	7	6	7	13	5	2	3	3	2	4	3	16	9	6
<i>Circus cyaneus</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	25	0	0
<i>Accipiter gentilis</i>	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Accipiter nisus</i>	3	17	1	1	1	1	2	0	0	1	0	0	0	0	1	4
<i>Buteo buteo</i>	0	0	52	32	0	0	228	0	0	0	0	0	0	0	0	0

<i>Hieraaetus pennatus</i>	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
<i>Pandion haliaetus</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0
<i>Falco tinnunculus</i>	0	1	0	1	0	2	4	3	2	2	0	2	0	0	0	2
<i>Falco columbarius</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Fulica atra</i>	692	1123	2981	1978	434	270	67	58	15	28	32	81	101	0	23	13
<i>Haematopus ostralegus</i>	4	3	2	1	8	4	3	10	2	20	60	33	25	22	14	13
<i>Himantopus himantopus</i>	0	0	1	0	1	14	98	118	131	215	128	93	13	13	2	0
<i>Recurvirostra avosetta</i>	118	141	118	6		65	63	126	243	13	88	23	13	19	6	
<i>Glareola pratincola</i>	0	0	0	0	0	0	43	16	32	183	192	36	14	12	51	0
<i>Charadrius dubius</i>	0	0	0	0	0	1	0	3	6	38	58	18	3	0	0	0
<i>Charadrius hiaticula</i>	23	13	2	0	0	1	2	40	0	0	0	1	8	69	59	30
<i>Charadrius alexandrinus</i>	12	1	11	1	1	26	14	26	16	103	99	42	16	79	10	6
<i>Pluvialis squatarola</i>	21	21	24	47	25	29	4	11	0	1	0	13	12	12	11	6
<i>Vanellus vanellus</i>	0	0	1	1	30	3	3	4	5	87	102	29	63	6	79	122

<i>Calidris canutus</i>	0	0	0	1	0	0	0	9	0	0	0	0	0	0	0	0
<i>Calidris alba</i>	18	0	0	0	0	0	0	0	0	0	0	4	0	2	8	3
<i>Calidris minuta</i>	11		1				6	81	4	40	528	12	4	6	4	
<i>Calidris temminckii</i>	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
<i>Calidris ferruginea</i>	2	0	0	0	0	0	33	20	0	1	19	0	0	5	2	0
<i>Calidris alpina</i>	224	483	259	348	352	43	180			1	16	26	26	52	99	133
<i>Calidris tenuirostris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Calidris falcinellus</i>	0	0	0	0	0	0	0	0	0	0	0	0	4	6	1	0
<i>Calidris pugnax</i>	16	1	2				88	512		51	74	11	10	5	3	2
<i>Gallinago gallinago</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>Gallinago media</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
<i>Limosa limosa</i>	4	1	0	0	0	6	8	0	140	79	23	144	53	34	0	0
<i>Limosa lapponica</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
<i>Numenius phaeopus</i>	0	0	0	0	0	0	0	6	0	1	0	1	2	2	1	0
<i>Numenius arquata</i>	2	1	0	0	0	1	0	0	0	2	0	1	1	2	2	1
<i>Tringa erythropus</i>	3	4	0	0	0	0	45	71	37	19	58	3	12	2	8	0
<i>Tringa totanus</i>	62	52	72	12	36	29	6	7	5	13	85	47	67	109	106	45

<i>Tringa stagnatilis</i>	10	0	0	0	0	1	5	2	0	23	95	14	47	37	8	8
<i>Tringa nebularia</i>	6	8	12	0	6	9	62	35	3	19	43	45	40	37	35	24
<i>Tringa ochropus</i>	0	1	0	0	1	1	0	0	1	0	6	0	0	0	0	0
<i>Tringa glareola</i>	0	0	0	0	0	0	0	0	3	30	78	22	28	11	9	0
<i>Xenus cinereus</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>Actitis hypoleucos</i>	0	0	0	0	0	0	0	1	3	20	34	17	3	0	0	0
<i>Arenaria interpres</i>	0	0	0	1	1	0	0	4	0	0	5	48	15	14	12	0
<i>Stercorarius parasiticus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Ichthyaetus melanocephalus</i>	243	815	401	0	0	0	14	0	5	43	318	135	105	48	53	31
<i>Hydrocoloeus minutus</i>	16	0	3	0	0	0	0	1	7	91	593	60	20	2	0	0
<i>Chroicocephalus ridibundus</i>	1103	655	172	4	5	8	26	3	174	694	665	407	432	317	225	136
<i>Chroicocephalus genei</i>	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
<i>Larus michahellis</i>	95	109	104	103	30	23	67	65	56	526	201	223	193	14	55	19
<i>Hydroprogne caspia</i>	3	0	0	0	0	0	0	0	0	0	0	0	0	2	1	4
<i>Thalasseus sandvicensis</i>	363	644	18	3	31	90	917	590	1747	1367	752	1275	784	331	819	639

<i>Sterna hirundo</i>	8	0	0	0	0	0	2	13	448	447	626	225	204	134	17	1
<i>Sternula albifrons</i>	0	0	0	0	0	0	31	100	97	64	31	23	5	5	0	0
<i>Chlidonias hybridus</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>Chlidonias leucopterus</i>	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
<i>Asio flammeus</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Alcedo atthis</i>	1	0	0	1	0	2	0	0	0	0	2	1	0	0	2	1
<i>Riparia riparia</i>	0	0	0	0	0	0	2	10	0	0	0	0	0	0	0	0

WINTERING PERIOD

Over 80 species of birds are registered during winter period in Pomorie Lake, either resident, on passage to more southerly areas or to spend the entire winter here. They seek out the relatively undisturbed wetland areas for ice-free feeding conditions and for safe roosting opportunities. In some cases, significant proportions of the biogeographic populations of water birds overwinter here (e.g. Common shelduck and Mute swan both cover Ramsar 1% criteria). 9 visits were conducted during wintering period.

As it's seen from Figure 20 and Table 3, the most abundant species (n of individuals per visit) were as follows: Coot (*Fulica atra*) – 7626 individuals, Dunlin (*Calidris alpina*) – 2592 individuals, Eurasian wigeon (*Mareca penelope*) – 2067 individuals, Eurasian teal (*Anas crecca*) – 1366 individuals, Shelduck (*Tadorna tadorna*) – 1454 individuals. One new species for the site was recorded during the winter period – two individuals of Little bustard (*Tetrax tetrax*) were observed on 18 February 2021.

INDICATOR SPECIES FOR THE PROJECT AND OTHER IMPORTANT SPECIES

Common shelduck (*Tadorna tadorna*)

The species shows preference for saline habitats and muddy or sandy estuaries in coastal regions, and occurs inland on saline and brackish lakes. Its largest concentrations in Bulgaria have been registered during the winter in the lakes Pomoriysko and Atanasovsko, and in the Southern Black Sea coast its total numbers being 2 081 at average, with a maximum of 4 224 (Michev, Profirov, 2003). During 2021 winter period the species is registered in the lake with highest number of 1454 individuals on February 5th.

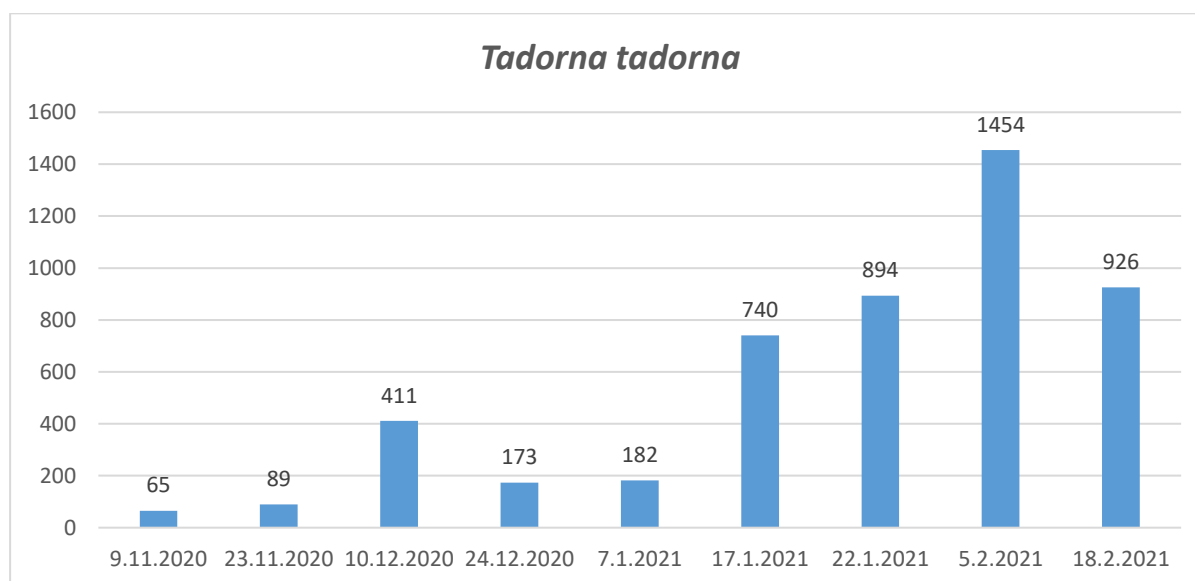


Figure 15: Observations of *Tadorna tadorna* per visit

Redshank (*Tringa totanus*)

During the winter the species is largely coastal, occupying rocky, muddy and sandy beaches, saltmarshes, tidal mudflats, saline and freshwater coastal lagoons. During the non-breeding season the species feeds on insects, spiders and annelid worms, as well as molluscs, crustaceans and occasionally small fish which are abundant in Pomorie Lake. According to Checklist of birds of Pomorie

Lake the highest number for the species registered in the lagoon during winter period is 42 individuals on January 15th 2000. During 2021 winter period the species is registered in the lake with highest number of 68 individuals on February 5th.

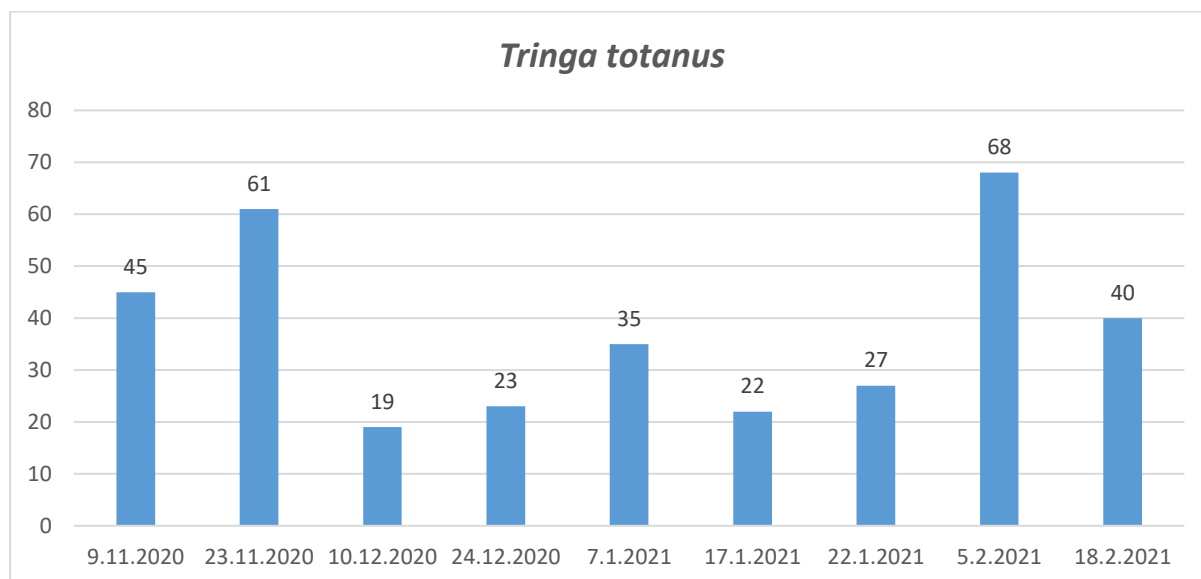


Figure 16: Observations of *Tringa totanus* per visit

Little stint (*Calidris minuta*)

The species is strongly dependent from water level in its habitats for feeding and roosting, that's why it is considered as indicator species for the hydrological condition of Pomorie Lake. According to *Checklist of birds of Pomorie Lake* the highest number for the species registered in the lagoon during winter period is 300 individuals on January 15th 1994. During 2021 winter period the species is registered in the lake with highest number of 12 individuals on December 24th.

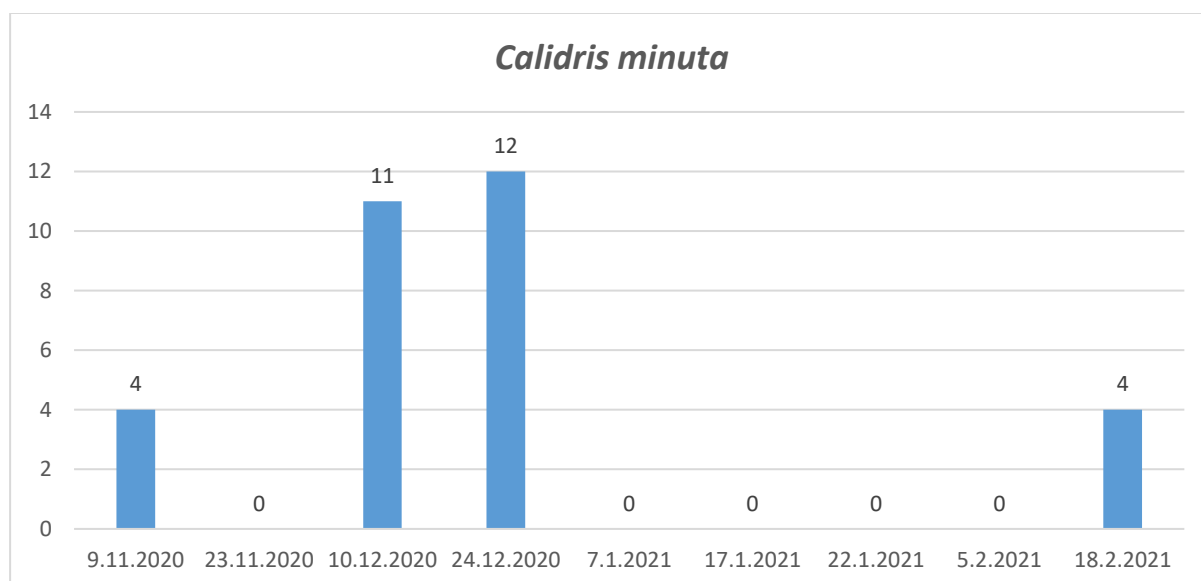


Figure 17: Observations of *Calidris minuta* per visit

Pied avocet (*Recurvirostra avoseta*)

One of the species entirely linked to salty wetlands. It finds its food in the shallow areas of the habitats, which makes it notably sensitive to the water level and the hydrological regime of wetlands. It is the reason to be considered as a key species for the project.

In the *Checklist of birds of Pomorie Lake* the species is listed as Rare winter visitor with the highest number of 79 individuals recorded on January 6th 2010. During 2020/21 winter period the species is registered in the lake with highest number 177 individuals on November 23rd.

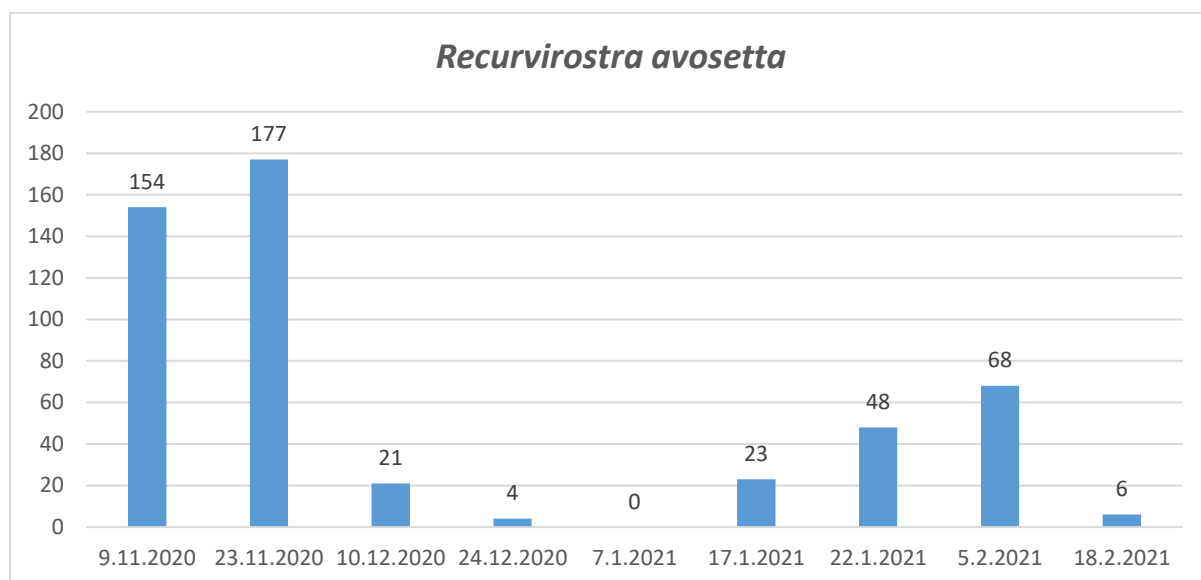


Figure 18: Observations of *Recurvirostra avosetta* per visit

Kentish plover (*Charadrius alexandrinus*)

As species strongly dependent on saltwater wetlands Kentish plover is considered indicator for the status of lake's ecosystem. It finds its food in shallow and muddy areas of the lake and thus its presence and number are indicative of the hydrological regime.

In the *Checklist of birds of Pomorie Lake* the species is listed as Very rare winter visitor with 2 individuals recorded on February 18th 2002. During the current winter period the species is registered in the lake with highest number of 17 individuals on December 24th.

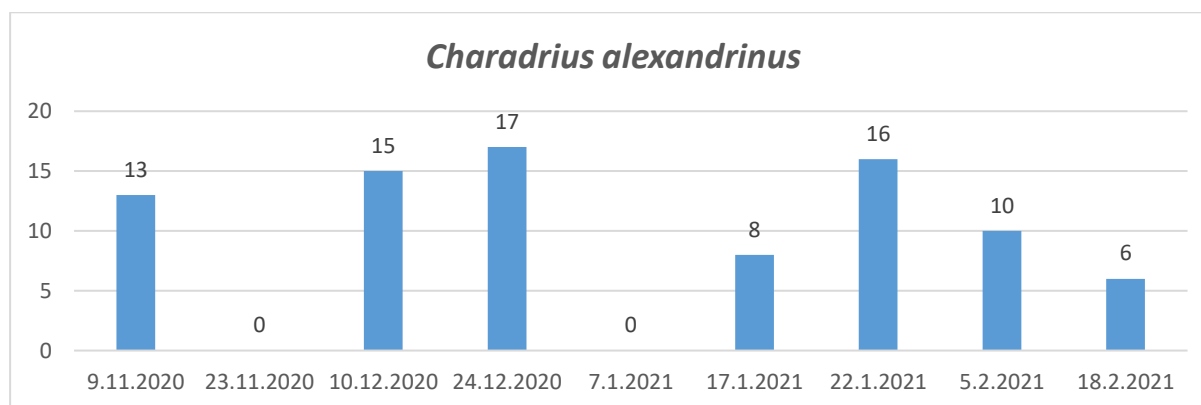


Figure 19: Observations of *Charadrius alexandrinus* per visit

Eurasian coot (*Fulica atra*)

Usually the most abundant species during winter period at Pomorie Lake. As such, its numbers during the winter period are also considered in this report. Its numbers usually varies within certain limits, depending on the meteorological conditions, and the highest numbers are reported in extremely cold conditions, when the birds are looking for ice-free water areas, such as those found in saltwater wetlands and specifically in Pomorie Lake.

According to *Checklist of birds of Pomorie Lake* the highest registered number for the species during wintering period is 18135 individuals on January 15th 1982. During the current winter period the species is registered in the lake with highest number of 7626 individuals on February 5th.

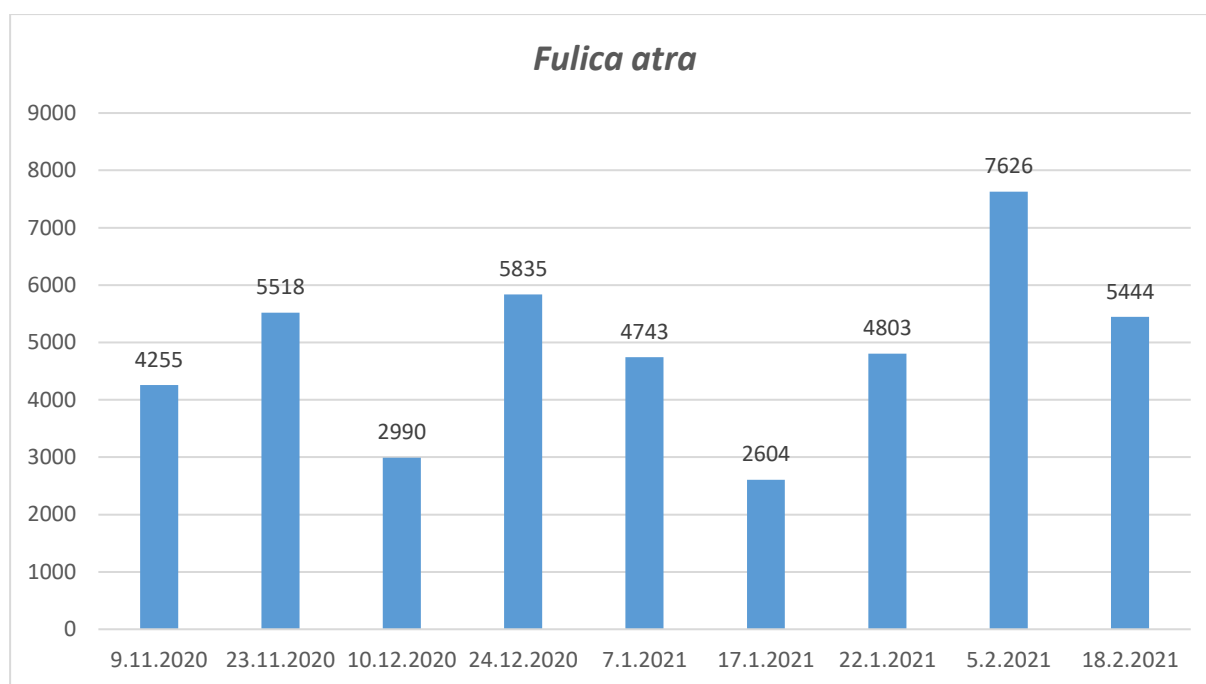


Figure 20: Observations of *Fulica atra* per visit

Dunlin (*Calidris alpina*)

This is another species that depends entirely on shallow and muddy habitats for feeding and roosting and thus provides data on hydrological status of the wetlands it inhabits, such as Pomorie Lake.

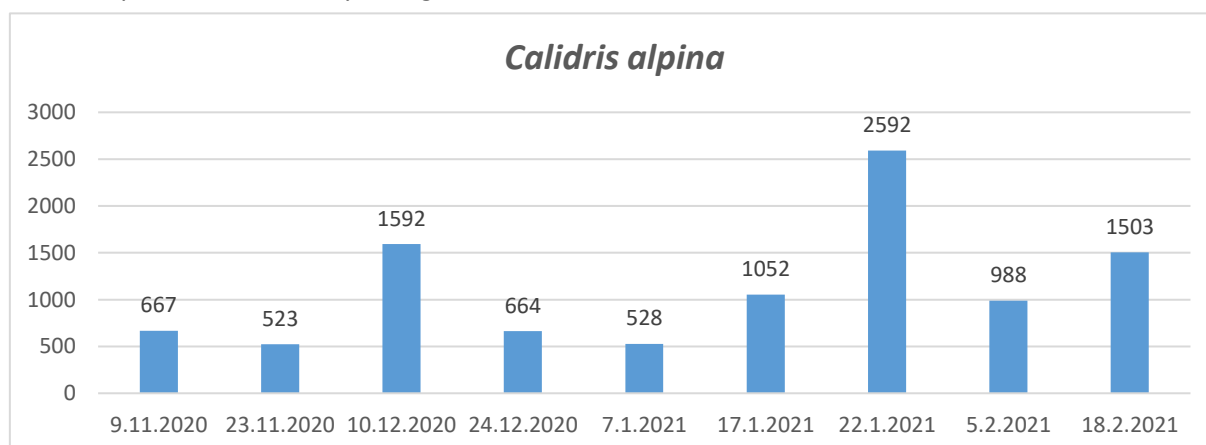


Figure 21: Observations of *Calidris alpina* per visit

In the *Checklist of birds of Pomorie Lake* the species is listed as Fairly common winter visitor with highest number of 838 individuals registered on December 1st 1999. During the current winter period the species is registered in Pomorie Lake with the highest number of 2592 individuals on January 22nd.

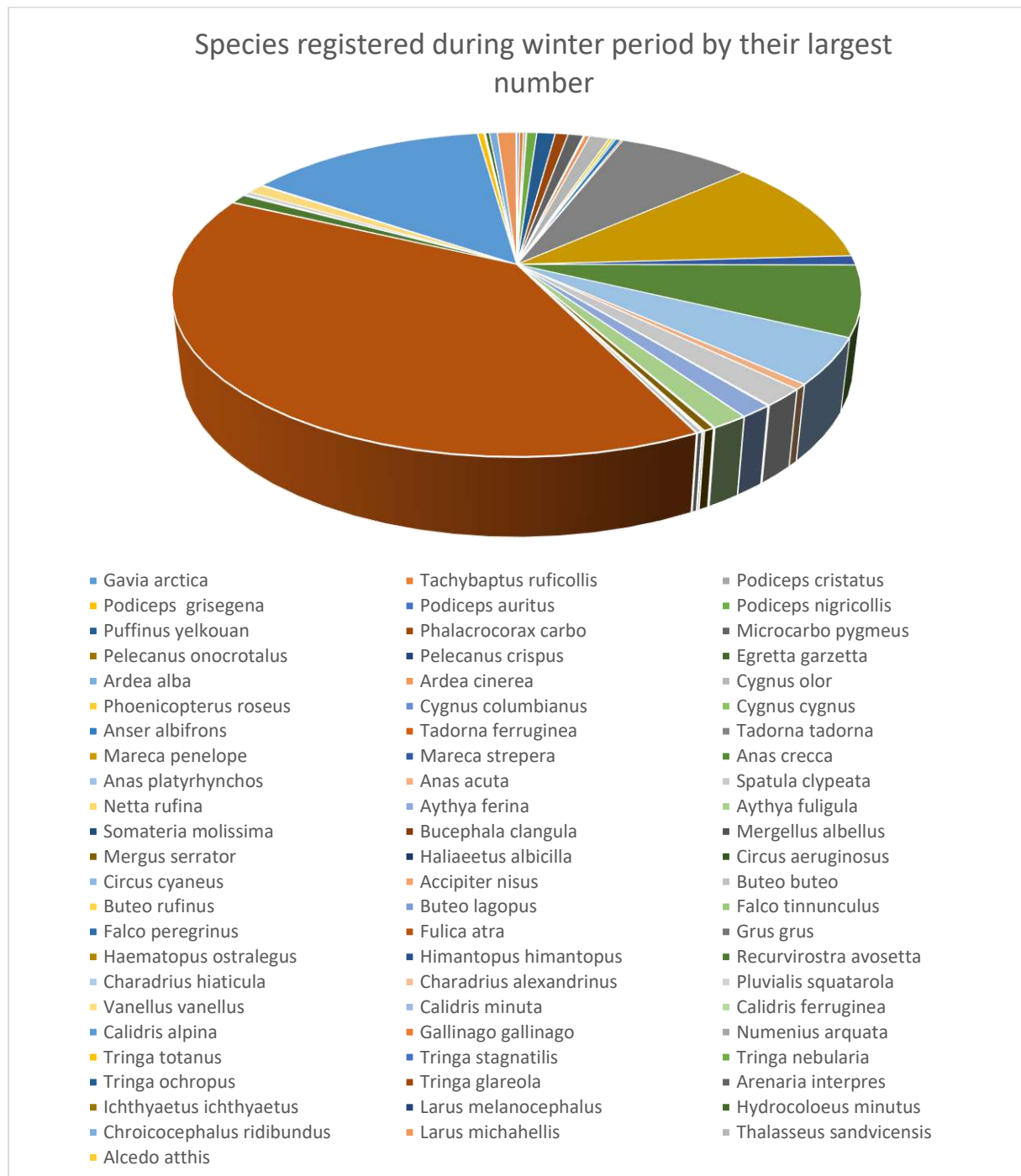


Figure 22: Bird species registered during winter period by their largest number

Table 3: Species registered during wintering period

Species	9.11.2020	23.11.2020	10.12.2020	24.12.2020	7.1.2021	17.1.2021	22.1.2021	5.2.2021	18.2.2021
<i>Gavia arctica</i>	8	28	1	13	2	0	2	29	5
<i>Tachybaptus ruficollis</i>	36	37	28	0	27	25	38	45	38
<i>Podiceps cristatus</i>	16	4	9	3	4	4	8	15	26
<i>Podiceps grisegena</i>	3	0	0	0	0	0	0	0	0
<i>Podiceps auritus</i>	0	0	5	0	0	1	0	0	1
<i>Podiceps nigricollis</i>	11	10	45	25	55	48	50	111	92
<i>Puffinus yelkouan</i>	0	0	0	0	0	0	0	0	200
<i>Phalacrocorax carbo</i>	38	86	32	3	38	52	140	23	20
<i>Microcarbo pygmeus</i>	167	102	55	29	113	64	33	78	85
<i>Pelecanus onocrotalus</i>	0	0	0	0	4	0	0	0	0
<i>Pelecanus crispus</i>	6	0	0	0	0	0	1	0	0
<i>Egretta garzetta</i>	0	0	0	0	1	0	0	0	0
<i>Ardea alba</i>	1	0	3	5	6	2	3	4	9
<i>Ardea cinerea</i>	37	55	33	53	39	49	35	27	28
<i>Cygnus olor</i>	175	215	195	55	156	166	161	185	154
<i>Phoenicopiterus roseus</i>	5	2	1	23	5	0	27	39	1
<i>Cygnus columbianus</i>	0	0	0	4	0	0	0	0	0
<i>Cygnus cygnus</i>	0	0	0	4	0	0	0	28	0
<i>Anser albifrons</i>	0	0	0	0	0	0	60	0	0
<i>Tadorna ferruginea</i>	22	0	0	0	0	0	0	0	2
<i>Tadorna tadorna</i>	65	89	411	173	182	740	894	1454	926
<i>Anas penelope</i>	1695	1792	1998	2067	1373	1214	1552	581	744
<i>Mareca strepera</i>	0	4	8	26	41	74	105	81	183
<i>Anas crecca</i>	698	879	512	1184	1366	855	679	410	278
<i>Anas platyrhynchos</i>	893	691	684	675	667	625	884	707	344
<i>Anas acuta</i>	23	63	22	0	56	38	30	104	53
<i>Spatula clypeata</i>	81	37	91	24	119	304	157	346	279
<i>Netta rufina</i>	0	2	0	0	0	0	2	0	11
<i>Aythya ferina</i>	0	14	0	7	54	26	258	104	71
<i>Aythya fuligula</i>	0	12	0	0	28	72	27	138	287
<i>Somateria molissima</i>	0	0	0	0	0	0	0	0	2

<i>Bucephala clangula</i>	0	0	0	0	0	0	0	4	2
<i>Mergellus albellus</i>	0	0	0	0	0	4	0	1	2
<i>Mergus serrator</i>	30	69	53	45	43	52	31	79	85
<i>Haliaeetus albicilla</i>	0	0	0	0	0	0	0	0	1
<i>Circus aeruginosus</i>	6	17	10	15	11	12	14	7	17
<i>Circus cyaneus</i>	1	1	2	1	0	1	1	0	0
<i>Accipiter nisus</i>	0	0	1	0	0	1	0	0	1
<i>Buteo buteo</i>	1	43	2	19	5	2	2	6	3
<i>Buteo rufinus</i>	0	1	0	0	0	0	0	0	0
<i>Buteo lagopus</i>	0	0	0	0	1	0	0	0	0
<i>Falco tinnunculus</i>	0	1	2	1	0	0	0	0	0
<i>Falco peregrinus</i>	0	1	0	0	0	0	0	0	0
<i>Fulica atra</i>	4255	5518	2990	5835	4743	2604	4803	7626	5444
<i>Grus grus</i>	0	10	0	0	0	0	0	0	0
<i>Haematopus ostralegus</i>	0	0	0	0	1	1	0	1	0
<i>Himantopus himantopus</i>	0	1	1	1	0	0	0	0	0
<i>Recurvirostra avosetta</i>	154	177	21	4	0	23	48	68	6
<i>Charadrius hiaticula</i>	6	0	3	7	0	6	5	5	2
<i>Charadrius alexandrinus</i>	13	0	15	17	0	8	16	10	6
<i>Pluvialis squatarola</i>	30	19	21	26	20	13	67	68	33
<i>Vanellus vanellus</i>	180	0	0	0	23	0	0	85	3
<i>Calidris minuta</i>	4	0	11	12	0	0	0	0	4
<i>Calidris ferruginea</i>	8	0	0	0	0	0	0	0	0
<i>Calidris alpina</i>	667	523	1592	664	528	1052	2592	988	1503
<i>Gallinago gallinago</i>	0	0	0	0	0	0	0	0	1
<i>Numenius arquata</i>	1	0	0	0	0	0	0	0	1
<i>Tringa totanus</i>	45	61	19	23	35	22	27	68	40
<i>Tringa stagnatilis</i>	0	1	0	0	0	0	0	0	0
<i>Tringa nebularia</i>	7	0	1	0	0	3	4	0	3
<i>Tringa ochropus</i>	0	0	0	1	4	0	5	1	0
<i>Tringa glareola</i>	0	0	0	1	0	0	0	0	0
<i>Arenaria interpres</i>	2	0	0	0	1	0	0	1	0
<i>Ichthyaetus ichthyaetus</i>	0	0	0	0	0	0	0	0	1

<i>Ichthyaetus melanocephalus</i>	0	0	0	1	0	0	0	0	0
<i>Hydrocoloeus minutus</i>	0	0	0	0	0	0	42	0	0
<i>Chroicocephalus ridibundus</i>	50	87	26	0	3	8	2	70	27
<i>Larus michahellis</i>	35	117	186	129	189	51	204	91	113
<i>Thalasseus sandvicensis</i>	0	5	1	0	0	0	0	6	3
<i>Alcedo atthis</i>	1	0	1	0	0	0	0	2	0

BREEDING PERIOD

The following breeding codes for bird species, according to *Checklist for Birds of Pomorie Lake*, are used in this Report:

Table 4 Breeding codes according to Checklist of Birds of Pomorie Lake

Code	Definition
Very rare	Breeding at intervals of at least 10 years (where reliable data exists)
Rare	Breeding less than annually
Scarce	Less than 10 pairs breeding annually
Uncommon	Between 10 and 99 pairs breeding annually
Fairly common	Between 100 and 999 pairs breeding annually
Common	Between 1000 and 9999 pairs breeding annually
Abundant	More than 10000 pairs breeding annually

According to *Checklist of birds of Pomorie Lake*, 2010, the number of species registered to nest in the lake's area is 57. According to updated data from Green Balkans experts collected during the regular monitoring of the lake, this number has been complemented to 64. The table below presents the species nesting in the area of the lake and its adjacent parts, and their breeding status codes.

Table 5: Bird species registered in Pomorie Lake during nesting period and their breeding status codes

Species	Breeding status code	Species	Breeding status code
<i>Tachybaptus ruficollis</i>	Occasional breeder	<i>Alauda arvensis</i>	Scarce breeder
<i>Ixobrychus minutus</i>	Scarce breeder	<i>Hirundo rustica</i>	Regular breeder
<i>Ciconia ciconia</i>	Rare breeder	<i>Delichon urbicum</i>	Scarce breeder
<i>Cygnus olor</i>	Scarce breeder	<i>Motacilla flava</i>	Scarce breeder
<i>Tadorna tadorna</i>	Scarce breeder	<i>Erithacus rubecula</i>	Scarce breeder
<i>Mareca strepera</i>	Scarce breeder	<i>Luscinia megarhynchos</i>	Uncommon breeder
<i>Anas platyrhynchos</i>	Uncommon breeder	<i>Oenanthe oenanthe</i>	Scarce breeder
<i>Circus aeruginosus</i>	Scarce breeder	<i>Turdus merula</i>	Scarce breeder
<i>Falco tinnunculus</i>	Scarce breeder	<i>Cettia cetti</i>	Uncommon breeder
<i>Perdix perdix</i>	Scarce breeder	<i>Locustella luscinioides</i>	Uncommon breeder
<i>Coturnix coturnix</i>	Scarce breeder	<i>Acrocephalus palustris</i>	Scarce breeder
<i>Rallus aquaticus</i>	Scarce breeder	<i>Acrocephalus scirpaceus</i>	Uncommon breeder
<i>Gallinula chloropus</i>	Uncommon breeder	<i>Acrocephalus arundinaceus</i>	Uncommon breeder
<i>Fulica atra</i>	Scarce breeder	<i>Hippolais pallida</i>	Scarce breeder
<i>Himantopus himantopus</i>	Common breeder	<i>Sylvia communis</i>	Scarce breeder
<i>Recurvirostra avosetta</i>	Common breeder	<i>Panurus biarmicus</i>	Scarce breeder
<i>Glareola pratincola</i>	Rare breeder	<i>Parus major</i>	Scarce breeder
<i>Charadrius dubius</i>	Rare breeder	<i>Oriolus oriolus</i>	Scarce breeder
<i>Charadrius alexandrinus</i>	Fairly common breeder	<i>Lanius collurio</i>	Scarce breeder
<i>Vanellus vanellus</i>	Scarce breeder	<i>Pica pica</i>	Uncommon breeder
<i>Larus melanocephalus</i>	Rare breeder	<i>Corvus monedula</i>	Scarce breeder
<i>Chroicocephalus ridibundus</i>	Rare breeder	<i>Corvus corone cornix</i>	Scarce breeder
<i>Larus michahellis</i>	Scarce breeder	<i>Sturnus vulgaris</i>	Scarce breeder
<i>Gelochelidon nilotica</i>	Rare breeder	<i>Passer domesticus</i>	Fairly common breeder
<i>Thalasseus sandvicensis</i>	Fairly common breeder	<i>Passer hispaniolensis</i>	Uncommon breeder

<i>Sterna hirundo</i>	Fairly common breeder	<i>Passer montanus</i>	Scarce breeder
<i>Sternula albifrons</i>	Uncommon breeder	<i>Carduelis chloris</i>	Scarce breeder
<i>Tyto alba</i>	Scarce breeder	<i>Carduelis carduelis</i>	Scarce breeder
<i>Athene noctua</i>	Scarce breeder	<i>Emberiza schoeniclus</i>	Scarce breeder
<i>Alcedo atthis</i>	Scarce breeder	<i>Emberiza melanocephala</i>	Scarce breeder
<i>Upupa epops</i>	Scarce breeder	<i>Miliaria calandra</i>	Scarce breeder
<i>Galerida cristata</i>	Scarce breeder		

Results of breeding bird surveys

Habitat loss is a primary factor for species decline in many regions globally. Water-level management is widespread and illustrates how contemporary climate can interact directly and indirectly with numerous biological and abiotic factors to influence nesting success of bird species. As the coastline of Pomorie Lake shifts with deterioration of the hydrological conditions, important breeding sites for colonial and semi-colonial nesting waterbirds are disappearing. In many recent studies flooding has been a leading cause of nest failure for a variety of species, especially those that nest on the ground. As a result, eggs or chicks can get wet and cold enough that they die, even if the nest stays intact.

Food availability also affects the reproductive success of animal populations. However, food availability includes both prey abundance and its accessibility, which are regulated by different environmental processes. Deteriorated hydrological conditions in Pomorie Lake hinder the access of the nesting species to food resources and at the same time change its abundance thus becoming the reason for low nesting success.

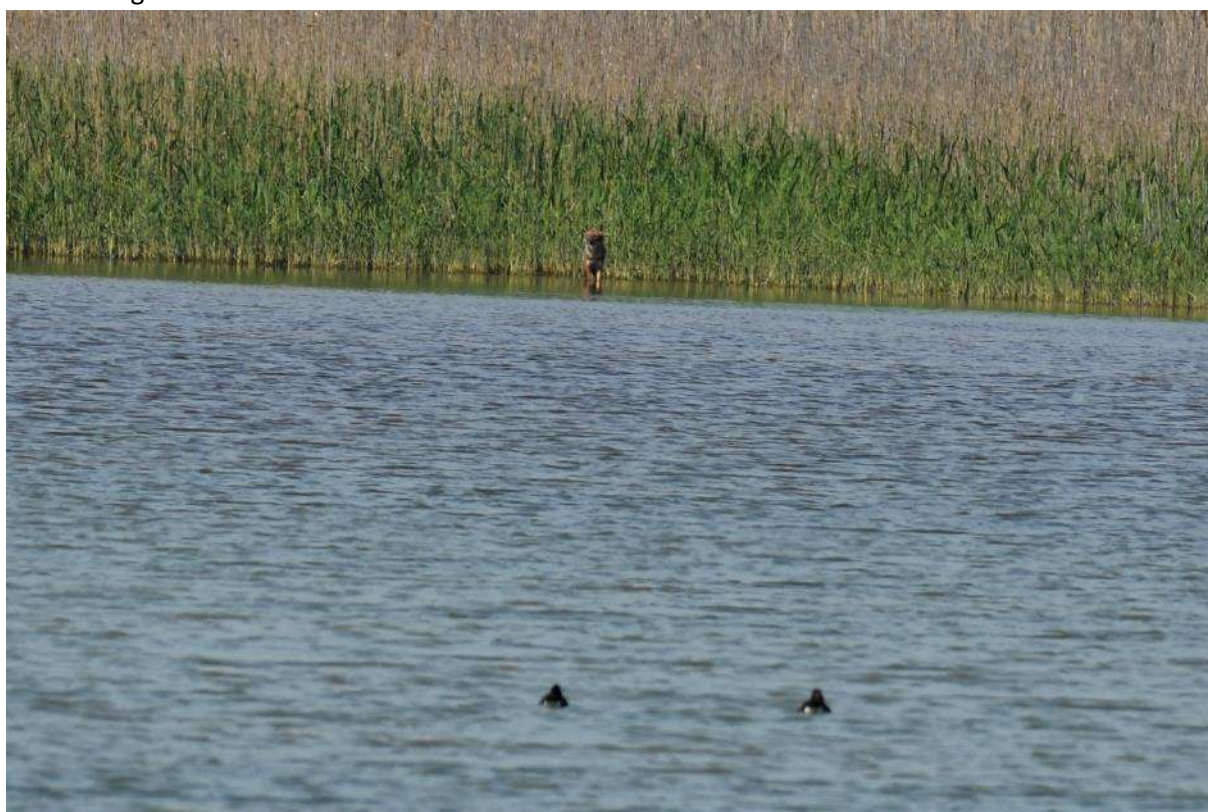


Figure 23: Jackal in Pomorie Lake

Colonial breeding in birds provides protection from predators and may be particularly important when birds have to cope with an invasive predator. However, the impact of invasive predators is serious and may be the reason for low nesting success. Terrestrial predators - jackals, foxes, stray dogs and cats -

have been considered as serious problem in the Pomorie Lake area for years given the close vicinity of wetland to the town. Use of dikes and embankments as a nesting ground by colonial waterbirds has been a well-documented ecological trap. That's why major part of the Green Balkans NGO's activities through the years included the restoration and creation of artificial islands and platforms in order to prevent or minimize this impact on the ground nesting bird species.

The 2021 season for nesting populations of waterbirds at Pomorie Lake can be considered as not successful, with low number of nests and pairs registered. According to information from colleagues studying nesting success in other wetlands (saline lagoon Atanasovsko Lake situated close by providing identical habitat and being the most important breeding site for Pied avocet and Common tern in Bulgaria), the situation is similar there as well. One of the hypotheses about the reasons for this is the relatively cold spring and cool June with considerable rainfall concentrated in short time, which reflects the arrival of the birds and the start of nesting. For many species the survival rate of nests is influenced by laying date and nesting period (laying versus incubation) (José Javier Cuervo, 2005). All this shows us the many challenges that nesting bird populations face and how delicate the balance of conditions necessary for a successful nesting season is.

During 2021 nesting period we located a total of 1661 nests of 8 bird species: Sandwich, Common and Little tern; Pied avocet; Black-winged stilt; Mute swan; Coot; Marsh harrier.

The locations of the nests and colonies by species are shown on a map (Fig. 24).

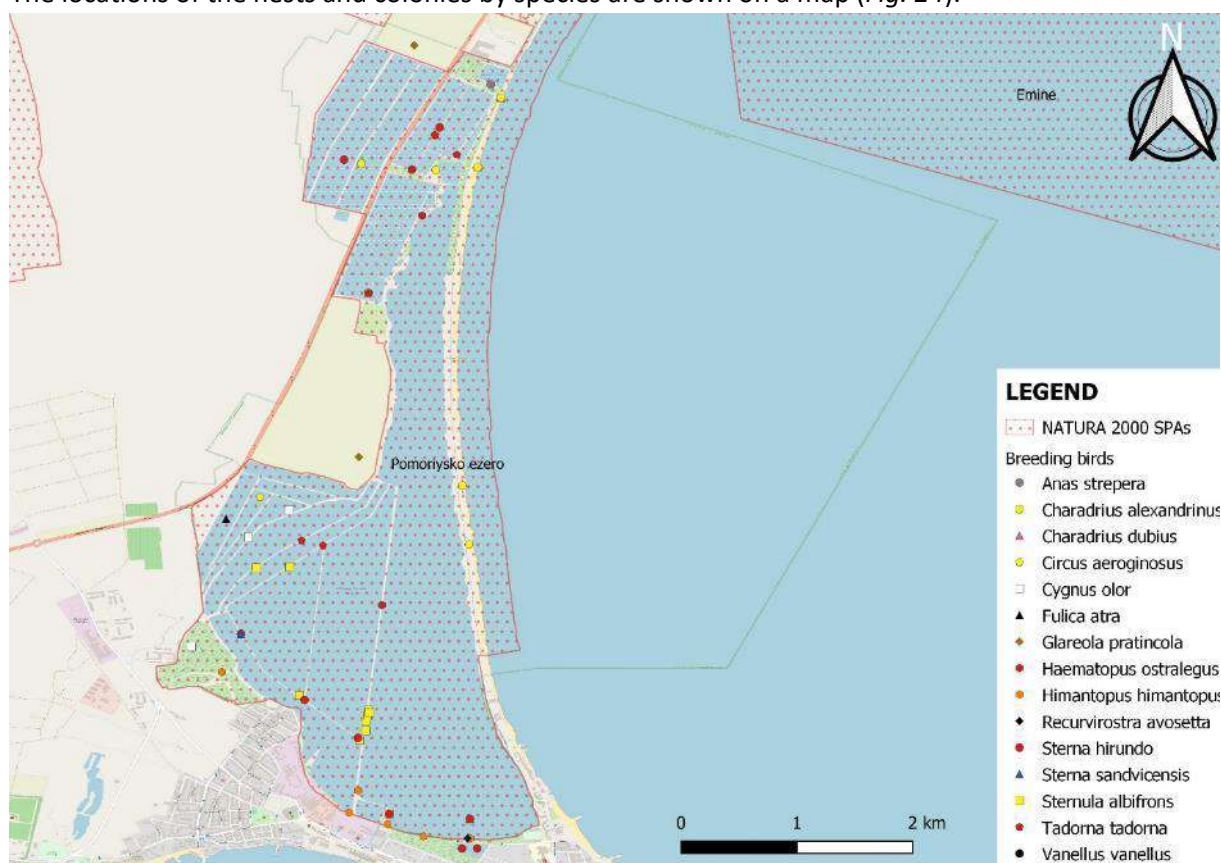


Figure 24: Locations of the nests and colonies by species

During the survey, we documented 1747 pairs of 15 bird species at the lagoon. For 10 (67 %) species breeding at the site was confirmed by observed chicks – those were the eight species whose nests were detected plus Kentish plover and Shelduck. Other 5 (33 %) species were probable breeders based on behavioral observations – territorial pairs and juveniles. These included Gadwall, Little ringed

plover, Oystercatcher, Lapwing and Collared pratincole. Most of the nests were initiated in the period May – early June by laying eggs without successful incubation. Due to an unexpected cooling trend during first part of the breeding season (May-early June) second egg laying and hatching was observed in many bird species nesting in Pomorie Lake. Flooding of selected breeding sites was observed for Pied avocets, Black-winged stilts that are usually the first to arrive. Additionally earlier arrival of Common terns and following interspecific competition being won by that species led to further failures for Pied avocets abandoning occupied safe breeding sites on wooden platforms. Further arrival of Sandwich terns and limited space of their favourite habitat – existing small islet – led to attempt to occupy wooden platforms in beginning of June and chasing away Common terns and Pied avocets. It should be added that number of Pied avocets arriving in spring was overall lower compared to previous years with same trend observed at nearby Atanasovsko Lake. Most shorebirds in recent years are facing negative trends and further surveys probably reveal where those bottleneck areas are and where these birds are lost along the flyway.

KEY SPECIES FOR THE PROJECT

Sandwich tern (*Thalasseus sandvicensis*)

The Sandwich tern (*Thalasseus sandvicensis*) is a species that inhabits wetlands - seas, lakes, dams, rivers and more. The world population is estimated at about 490,000 - 640,000 individuals (Wetlands International 2015). The European population numbers 79,900 - 148,000 couples, which is equivalent to 160,000 - 295,000 sexually mature individuals (BirdLife International 2015).

In the IUCN list, the species is in the Least Concern category, it is included in Annex II of the Berne Convention, in Annex II of the Bonn Convention, European Conservation Status: SPEC 2, in Annex I in the Birds Directive. In Bulgaria it is listed in the category "endangered species", included in Annexes II and III of the BDA.

In the 1970s and 1980s, the species bred along the entire Black Sea coast and after then it is recorded only during migration or was not found at all. An increase was registered in the 1980s in Atanasovsko Lake. Nowadays, the species breeds mainly on Pomorie Lake. The number varies from several hundred to few thousand pairs, depending on the condition of the breeding grounds. In 2013 breeding birds reach 2,400 pairs in Pomorie Lake, a consequence of long-term efforts of Green Balkans: building artificial islands suitable for nesting and reducing disturbance.

The species is highly susceptible to destruction of breeding grounds, egg robbery, terrestrial predators, high water levels, illegal construction, tourism, sports and fishing.



Figure 25: Drone image of the Sandwich terns' colony

During the current year there were 1094 pairs registered at the site. Those were main colony of 944 pairs on the existing small islet in front of the Salt Museum (*Fig. 24*). In the beginning of June further approximately 150 pairs were observed on wooden platforms in Western part of the lagoon but these were abandoned a week later. That makes breeding population as **944 breeding pairs in 2021**. The data were collected through direct observations and with the help of a drone, the images of which were subsequently analyzed. In general, the nesting success of the species this season, based on data collected for previous years during regular monitoring of the lake from Green Balkans' experts and data in *Checklist for birds in Pomorie Lake*, can be considered as low.



Figure 26: Locations of *Thalasseus sandvicensis* pairs/colonies at Pomorie Lake

As can be seen from the diagram below, the species begins its migration to Pomorie Lake in March-April. Egg-laying usually begins at the end of May.

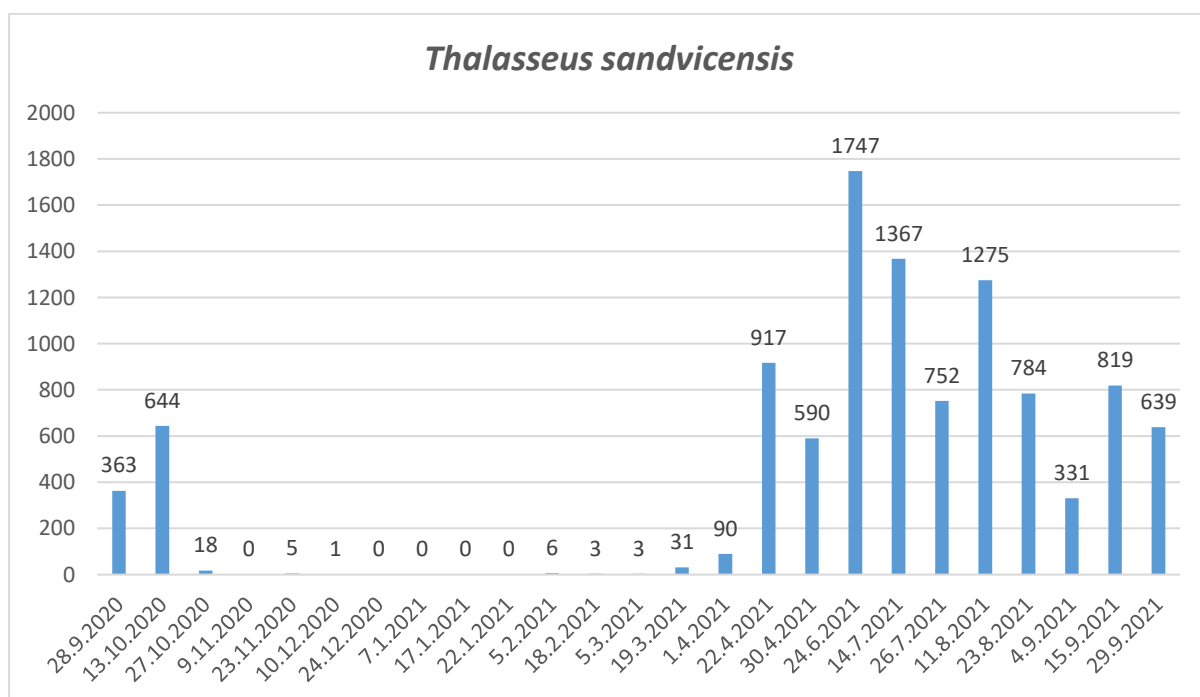


Figure 27: Observations of *Thalasseus sandvicensis* per visit

During the regular monitoring Sandwich terns ringed as chicks in the colony have been observed. These are presented in *Table 6*.

Table 6 Observations of Sandwich terns ringed as chicks in the colony

Date ringed	Ring code	Autumn 2020	Spring 2021	Breeding 2021	Autumn 2021
23.6.2010	CAB		15.4.2021		
23.6.2010	CAD			29.5.2021	23.9.2021
23.6.2010	CAT			29.5.2021	
23.6.2010	CBN		1.4.2021		
6.7.2011	CCP		22.4.2021	7.5.2021	
6.7.2011	CDV		22.4.2021	2.5.2021	6.8.2021; 24.8.2021
6.7.2011	CDZ		17.4.2021		
6.7.2011	CHZ			4.6.2021	10-11.8.2021; 20.8.2021
6.7.2011	CJJ			29.5.2021	
6.7.2011	CJK				24.9.2021; 25.9.2021
6.7.2011	CKK		28.3.2021		
6.7.2011	CNT		16.4.2021	2.5.2021; 15.5.2021	
26.6.2012	CPD		22.4.2021	8.5.2021: male - copulating	
26.6.2012	CPH			29.5.2021	
26.6.2012	CPK			2.5.2021; 7- 8.5.2021; 29.5.2021	1.9.2021; 4.9.2021
26.6.2012	CSN			3.5.2021	22.6.2021; 24.6.2021
5.7.2013	CVD		17.4.2021		24.6.2021; 27.6.2021
26.6.2012	CAN				15.9.2021
26.6.2012	CAD			29.5.2021	10.8.2021
26.6.2012	CBF				4.9.2021; 10.9.2021; 12- 13.9.2021; 15.9.2021; 27.9.2021
26.6.2012	CBK			29.5.2021	
5.7.2013	CDZ			29.5.2021	
26.6.2012	CNB	13.10.2020		3.5.2021	26.7.2021; 11.8.2021; 12.9.2021; 25.9.2021; 28.9.2021; 3.10.2021
26.6.2012	CNH	7.9.2020; 22.9.2020; 29.9.2020; 4.10.2020; 13.10.2020			5.9.2021; 29.9.2021; 6.10.2021; 12.10.2021; 15.10.2021; 21.10.2021.
26.6.2012	CJA				10.8.2021; 1.9.2021

26.6.2012	CJN		19.3.2021		
26.6.2012	CPD			11.6.2021	19.8.2021; 24.8.2021; 12- 13.9.2021; 15.9.2021

Additionally, during the monitoring several Sandwich terns ringed in other locations abroad have been observed at Pomorie Lagoon. These are presented in *Table 7*.

Table 7 Observations of Sandwich terns ringed in other locations abroad

Date observed	Ring	Date ringed	Location of ringing
7.9.2020	K47	6.4.2020	Atlit Salt-Pans, Israel
4.10.2020	K47	6.4.2020	Atlit Salt-Pans, Israel
27.5.2021	ITP	29.4.2009	Salina Di Comacchio, Ferrara, Italy
29.5.2021	ITP	29.4.2009	Salina Di Comacchio, Ferrara, Italy
10.8.2021	K32	6.4.2020	Atlit Salt-Pans, Israel
15.8.2021	K32	6.4.2020	Atlit Salt-Pans, Israel
16.8.2021	K32	6.4.2020	Atlit Salt-Pans, Israel
24.9.2021	K31	6.4.2020	Atlit Salt-Pans, Israel
24.9.2021	K44	6.4.2020	Atlit Salt-Pans, Israel
27.9.2021	K47	6.4.2020	Atlit Salt-Pans, Israel

Common tern (*Sterna hirundo*)

The Common tern (*Sterna hirundo*) is in the Least Concern category in the IUCN list. The species breeds between April and June in solitary pairs or colonially in groups of up to several thousand pairs, laying eggs on the ground in habitats inaccessible to predators - islands and coastal sand spits. There are isolated nesting sites along the Black Sea coast (mainly around Burgas), along the Danube, Maritsa, Arda, Struma and Ogosta rivers. In Bulgaria it is numerous in Pomorie Lake, Atanasovsko Lake and Poda Protected Area, where it nests on artificial islands and platforms built especially for this purpose.

The species is a strongly migratory coastal seabird. It winters further south, being found along the coast of Africa (excluding northern Africa), returning to the breeding grounds in April as it is seen from the diagram below. The main threats to the species are the drying of wetlands, water pollution, disturbance during the breeding season, urbanization of nesting sites.

During the current monitoring period that was the second most numerous species following the Sandwich tern and 438 pairs were detected. This is almost threefold increase in number of breeding pairs in the site. Many of these though were unsuccessful. In late May and early June 141 pairs have been recorded – 64 of these were nesting on wooden platforms in saltpans and Southwestern part of the lagoon. With drying out of saltpans that platform was abandoned while the rest were occupied shortly by Sandwich terns that have chased away the Common terns. 74 pairs were nesting in the saltpans of the Salt Museum – 42 on an islet and 32 along dikes. Heavy rains in June have caused flooding of nests and many of these were abandoned. In July number of pairs in the Salt Museum saltpans has decreased to approx. 50 pairs. In beginning of July another colony was detected on an islet formed



Figure 28: Drone image of the Common terns' colony

from eroded dikes and thanks to drone survey 292 pairs were counted there mixed with approx. 40 pairs of Little Tern (See Fig. 27). Thus, **breeding pairs in 2021 are estimated as 342**. In mid-August visit to the large colony on the islet revealed breeding success was quite with many abandoned nests and eggs (at least 50%). That was probably caused by predators. These late (second or third) broods were observed as late as in 15 September with hatchlings aged about 10-12 days. Initial nest loss is the common reason for late nesting, which is kind of a compensation measure for the species. Although typically singlebrooded, Common tern pairs occasionally attempt to raise a second brood (Hay 1984). Later egg laying and hatching can also be linked to the colder start of the nesting season. In general, the nesting success of the species this season, based on data collected for previous years during regular monitoring of the lake from Green Balkans' experts and data in *Checklist for birds in Pomorie Lake*, can be considered as stable – low breeding success was compensated with much higher number of pairs.

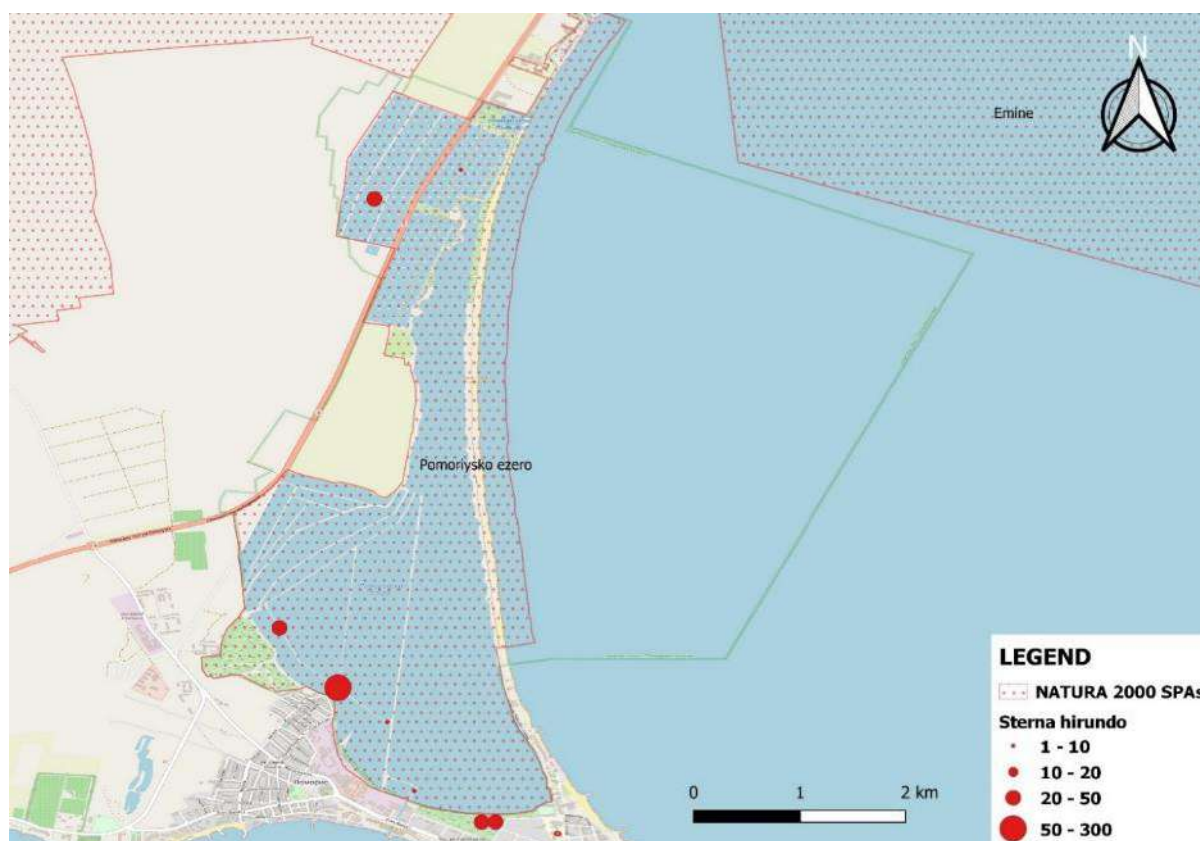


Figure 29: Location of registered *Sterna hirundo* pairs/colonies at Pomorie Lake

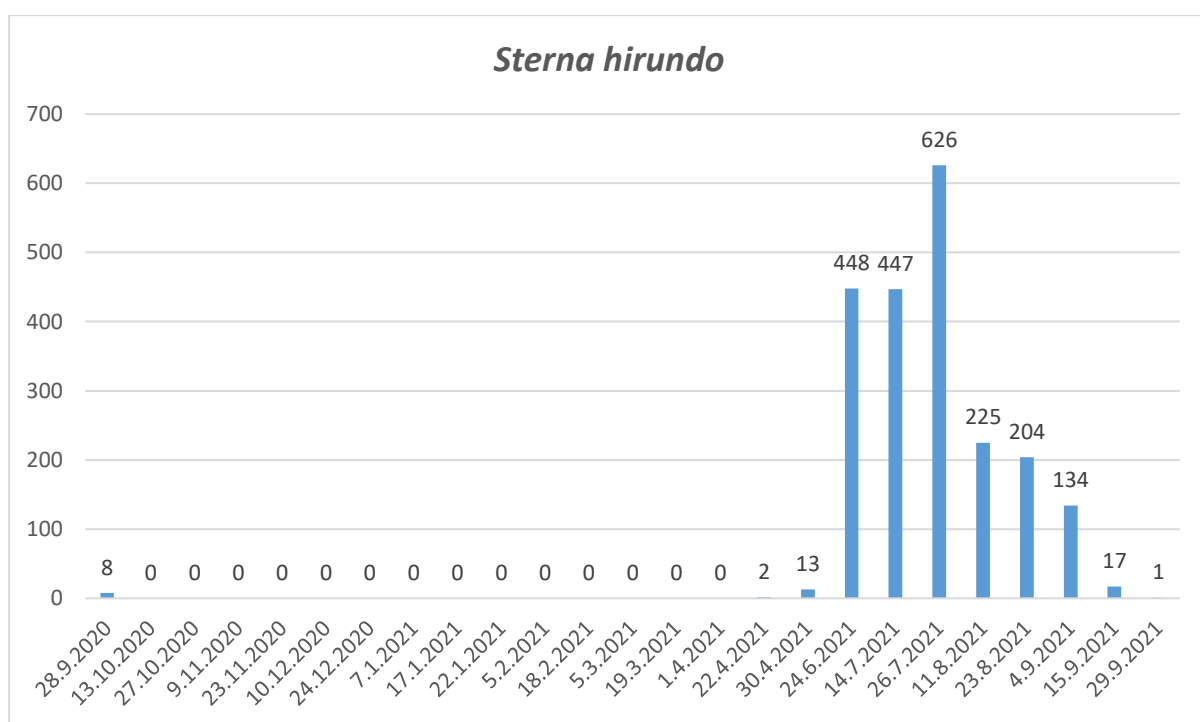


Figure 30: Observations of *Sterna hirundo* per visit

During the monitoring Common terns with colour rings have been observed. These were originating from Bulgaria, Israel, Poland and Hungary. Information about ringing details was not received for all of them. Available information is presented in *Table 8*.

Table 8 Observed Common terns with colour rings during monitoring

Date observed	Ring	Date ringed	Location of ringing
3.5.2021	BAD	7.7.2015	Atanasovsko Lake, Bulgaria
8.5.2021	BZC		
15.5.2021	BZC		
29.5.2021	GZU	10.5.2020	Atlit Salt-Pans, Israel
5.6.2021	BAK		
7.7.2021	IZX	26.4.2015	Atlit Salt-Pans, Israel
14.7.2020	GWE	8.4.2019	Atlit Salt-Pans, Israel
11.8.2021	BAH		
20.8.2021	GWE	8.4.2019	Atlit Salt-Pans, Israel
20.8.2021	GAE		
3.9.2021	IPZ	23.4.2018	Atlit Salt-Pans, Israel
3.9.2021	BNC		
12.9.2021	23Y	10.6.2015	Zbiornik Jezirsko, Glinno, Gm. Warta, Lodzkie, Poland
12.9.2021	T60	17.7.2017	Poroszló (Tisza-tó), Heves, Hungary
12.9.2021	G89	29.4.2018	Atlit Salt-Pans, Israel

Little tern (*Sternula albifrons*)

In Bulgaria the species is found in the wetlands around Bourgas, including Pomorie Lake, Lakes Shabla and Durankulak and on the Danube coast - the swamps of the island of Belene and the Tsibar marsh. During migration it can be observed in other places, mainly along the Black Sea coast. The species winters in Africa. Spring migration is in April-May, and autumn - in August-September as it's seen from the diagram below.

The species is in the Least Concern category in the IUCN list. According to the Bulgarian legislation the species is in the category Endangered.

This is a strongly migratory coastal seabird, which usually fishes in very shallow water only a few centimeters deep, what conditions does Pomorie Lake offer. It breeds between May and July in solitary pairs or small monospecific groups usually of 1-15 pairs (rarely over 40 pairs). Breeding often get timed to coincide with peak fish abundance.

The species breeds on barren or sparsely vegetated beaches, islands and spits of sand, saltmarshes, salt pans etc.

As it's seen from the diagram below the species arrives to the nesting grounds in late April with a pronounced peak in late April – June, and departs in late August.

During the current monitoring period 61 pairs have been registered (See Fig. 29) breeding along internal dikes. In the end of May, 19 pairs were observed in single pairs or groups of 2 and max. 5 nests. The unstable weather in June probably caused failure in breeding for most of these. In the beginning of July higher number of pairs was observed – 42 – on an islet formed by eroded dikes together with almost 300 pairs of Common terns. Later inspection in mid-August though has revealed that many of the nests were abandoned but that was valid to smaller extent for the Little terns – probably about 30% were lost. **Breeding pairs for 2021 was estimated as between 40 and 50.** In general, the nesting success of the species this season, based on data collected for previous years during regular monitoring

of the lake from Green Balkans' experts and data provided in *Checklist for birds in Pomorie Lake*, can be considered as stable.

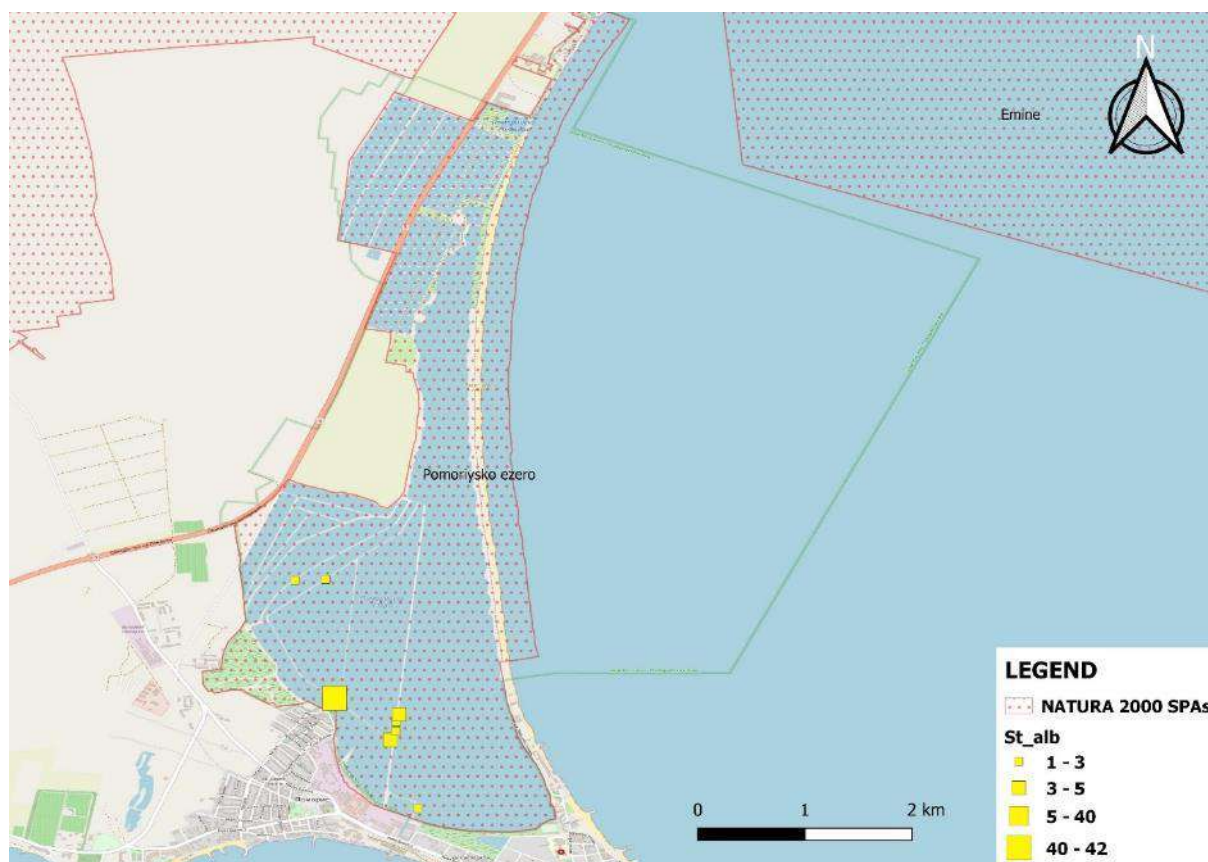


Figure 31: Location of the registered *Sternula albifrons* pairs at Pomorie Lake

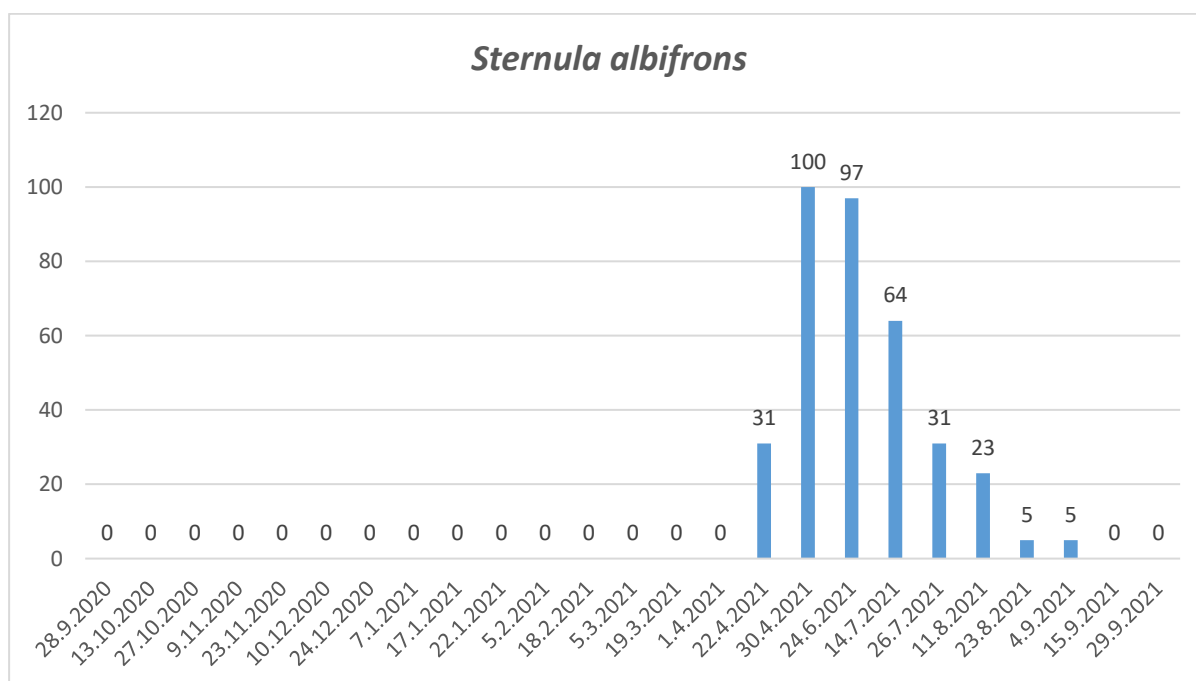


Figure 32: Observations of *Sternula albifrons* per visit

Pied avocet (*Recurvirostra avosetta*)

In Bulgaria it is found mainly in wetlands along the Black Sea coast - Pomorie Lake, Atanasovsko Lake, Poda Protected Area, Shabla Tuzla and other. Winters in the Mediterranean and Africa. Spring migration is usually in March-April, and autumn - in August-October as it's seen from the diagram below.

The species is in the Least Concern category in the IUCN list. According to the Bulgarian legislation the species is in the category Endangered. It is listed on Annex I of the EU Birds Directive and Annex II of the Bern Convention.

It breeds from April to August in large colonies usually of between 10 and 70 pairs, as it is observed also in Pomorie Lake. The species breeds in flat open areas with islands, ridges, spits or margins of bare sand, clay or mud and sparse short vegetation including saltpans, coastal lagoons such as Pomorie Lake. The most important characteristics of breeding habitats appear to be water levels which gradually decline over the summer to expose additional feeding areas, and high salt concentrations that prevent the development of excessive emergent and shoreline vegetation (Johnsgard et al. 1981). The nest is a scrape that may be positioned in a variety of sites including on bare sand, dried mud,

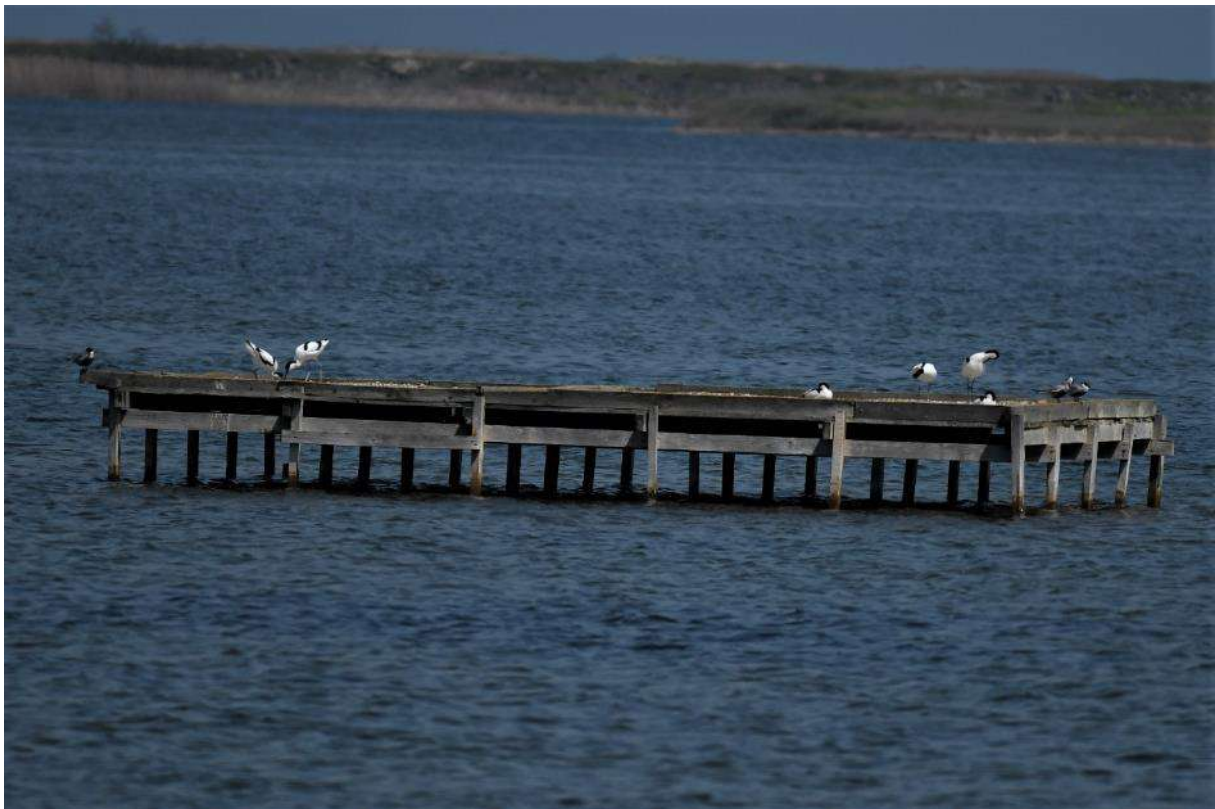


Figure 33: Artificially constructed nesting sites at Pomorie Lake occupied by Pied Avocets

short grass, dead vegetation and built-up mounds of debris. Artificially constructed nesting sites in coastal locations such as islands or rafts covered with sparse vegetation are considered successful in attracting breeding pairs and increasing breeding success of this species and these are measures provided at Pomorie Lake also.

During the current monitoring period there **were 36 pairs registered** (see Fig. 32). It should be noted low number of pairs in May when only 21 were found in the site – that being probably the lowest number for that time of the year. 8 of these that attempted to nest on wooden platforms were soon

chased away by Common terns that subsequently were replaced by Sandwich terns before these also abandoned them. Main breeding area was the Sandwich tern colony islet and Salinas of Salt Museum. Those experienced the adverse weather conditions (low temperatures and heavy rains) that caused mass failure due to flooding of dikes. In general, the nesting success of the species this season, based on data collected for previous years during regular monitoring of the lake from Green Balkans' experts and data provided in *Checklist for birds in Pomorie Lake*, can be considered as extremely low, as no nests have been registered on the inner dikes of the lake, which are usually main nesting habitat of the species. The reason for this, based on the literature about the species, can be indicated the water level and the problems with the hydrological regime of the lake including decreased salinity. These are problems set as target to be addressed through the activities of this project and the monitoring of the nesting success of the species (as well as of the other species set as indicators) will illustrate the success of the measures.

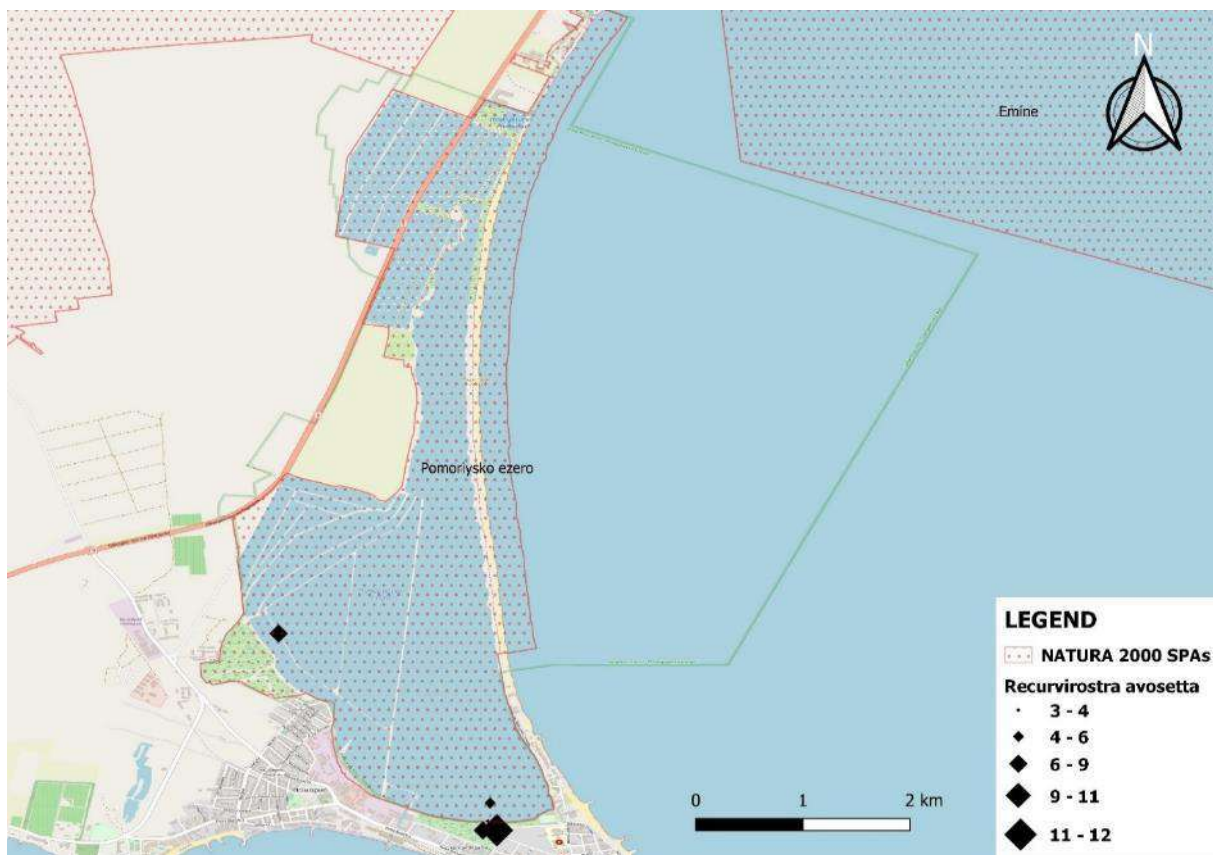


Figure 34: Locations of registered *Recurvirostra avosetta* pairs at Pomorie Lake

As it's seen from the diagram the Pomorie Lake is one of the most important feeding grounds for the species with more than 200 specimens feeding during the migration and nesting period. Also the number of the birds finding refuge in the lake during the cold winter months is very high.

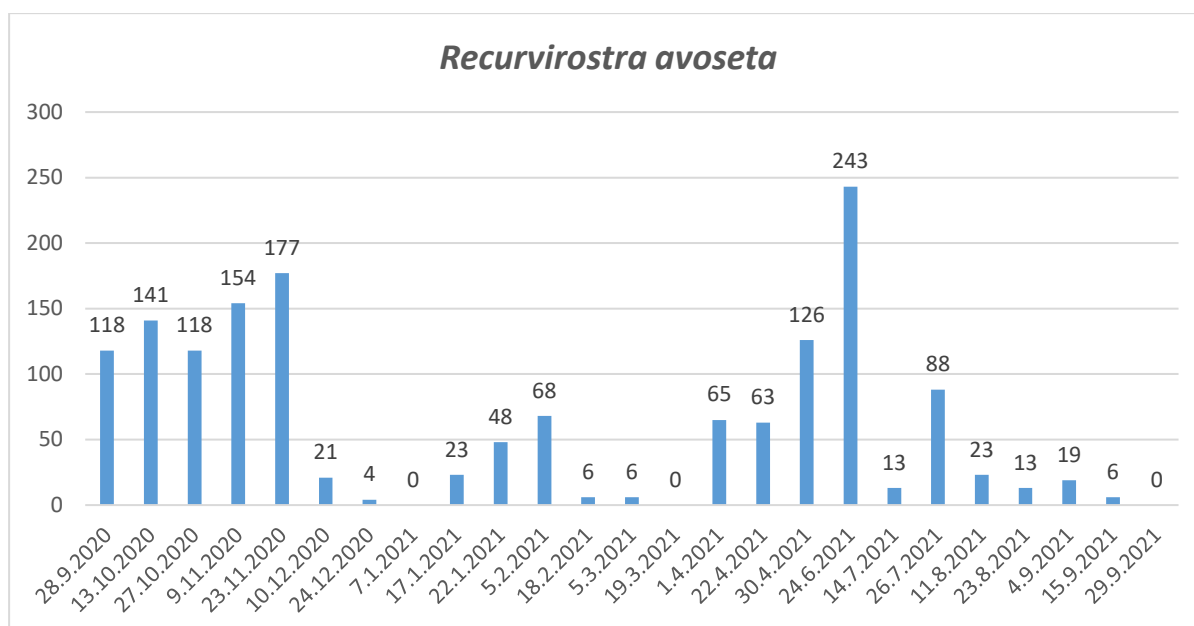


Figure 35: Observations of *Recurvirostra avosetta* per visit

Black-winged stilt (*Himantopus himantopus*)

In Bulgaria it is found in the wetlands along the Black Sea coast, especially in the salty Pomorie and Atanasovsko Lakes, the Thracian lowlands, the wetlands along the Danube and others.

The species is in the Least Concern category in the IUCN list. According to the Bulgarian legislation the species is in the category Endangered. Protected by EU Birds Directive and 4 other international agreements – Annex I and II of Bern Convention, Annex II of Bonn Convention, Annex II of the Convention on Migratory Species of Wild Animals.

European populations of this species make long-distance migratory movements, travelling southwards to their wintering grounds between August and November and returning to their breeding areas between March and April. As it is seen from the diagram below there is a clear peak in the number of the species on Pomorie Lake in July and it is abundant in the area of the lake in the period April-August. An interesting phenomenon is the observation of an individual in the lake during the winter months.

The species usually breeds solitarily or in loose colonies of 2-50. The species typically breeds in shallow freshwater and brackish wetlands with sand, mud or clay substrates and open margins, islets or spits near water level. Suitable habitats include marshes and swamps, shallow lake edges, riverbeds, flooded fields, but also breed around more saline environments such as coastal lagoons and salt pans. Outside of the breeding season the species occupies the shores of large inland waterbodies and estuarine or coastal habitats, coastal lagoons. The nest is a depression or shallow scrape positioned on hard ground near water on a hummock or amongst grass. Alternatively, the nest may be a more elaborate platform of vegetation constructed on a floating mass of aquatic vegetation. The species nests singly or in loose colonies, showing a preference for open areas close to foraging sites with good all-round (360 degree) visibility.

During the current monitoring period there **were 26 pairs registered** (see Fig. 35) in the site. This number is low and success was further decreased as most nests seem to have suffered from predation by stray dogs and others. In general, the nesting success of the species this season, based on data

collected for previous years during regular monitoring of the lake from Green Balkans' experts and data provided in *Checklist for birds in Pomorie Lake*, can be considered as low.



Figure 36: Black-winged stilt with chicks at Pomorie Lake



Figure 37: Locations of the registered *Himantopus himantopus* pairs at Pomorie Lake

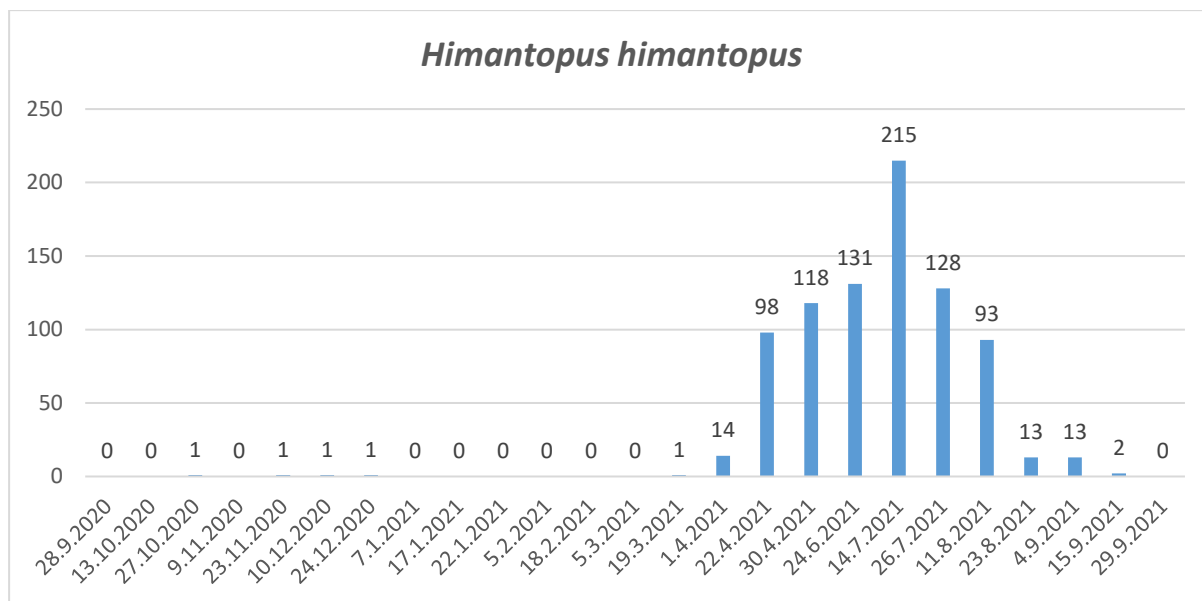


Figure 38: Observations of *Himantopus himantopus* per visit

Kentish plover (*Charadrius alexandrinus*)

In Bulgaria it is found around the Pomorie and Atanasovsko Lakes, Poda Protected Area, Shablenska Tuzla, Durankulak Lake and their adjacent beaches. According to the Bulgarian legislation the species is in the category Critically Endangered. The species is in the Least Concern category in the IUCN list and is listed in Annex I of the EU Birds Directive and Annex II of the Bern Convention.

Most inland and northern coastal populations of the species, such as considered, are fully migratory and have distinct separate breeding and wintering ranges (del Hoyo et al. 1996). The species occupies its breeding grounds chiefly from March to October, with the southward migration peaking in September.

As it is seen from the diagram below there is pronounced peak in the species' abundance in July with more than 100 individuals registered. It is also seen that the species is present during the winter period - individuals from the northern habitats of the species finding feeding habitats and refuge in the Pomorie Lake.

The species nests solitarily or in loose semi-colonial groups, usually in densities of 0.5 to 20 pairs per hectare (exceptionally up to 100 pairs per hectare), and sometimes in association with other species.

During all seasons the species is predominantly coastal and is usually found on sand, silt or dry mud surfaces. It is uncommon on freshwater, even when migrating (Hayman et al. 1986). Typical habitats include sandy, pebbly or muddy shores, dunes, coastal lagoons, coastal marshes, etc. The nest is a shallow scrape positioned near water on bare earth or in sparse vegetation, often on slightly raised ground and partly sheltered by plants or near conspicuous objects such as grass clumps or shrubs. The species nests in semi-colonial groups, with nests spaced between 2 and 5 m.

The species is threatened by the disturbance of coastal habitats (e.g. tourists trampling nests and disturbing roosts on beaches). One of the serious threats to the species is the deterioration of the hydrological regime of the species' habitats. It is also threatened by the degradation and loss of wetland habitat through environmental pollution, urbanisation.



Figure 39: Kentish plovers with chicks at Pomorie Lake

During the current monitoring period there were 12 pairs registered (see Fig. 38) in the site. Most of these (7 pairs) were in the salt pans where chicks were also observed and the rest were recorded along the sand spit separating the lagoon from the sea. In general, the nesting success of the species this season, based on data collected for previous years during regular monitoring of the lake from Green Balkans' experts and data in *Checklist for birds in Pomorie Lake*, can be considered as stable.

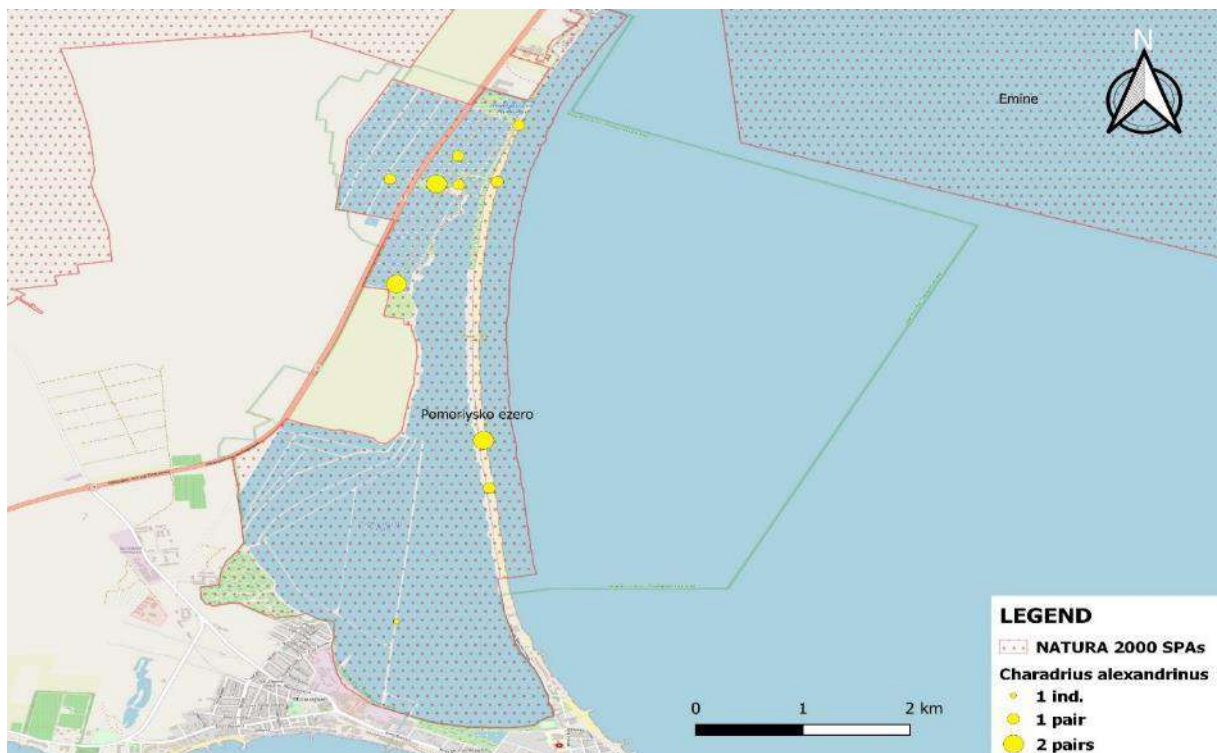


Figure 40: Locations of *Charadrius alexandrinus* pairs registered at Pomorie Lake

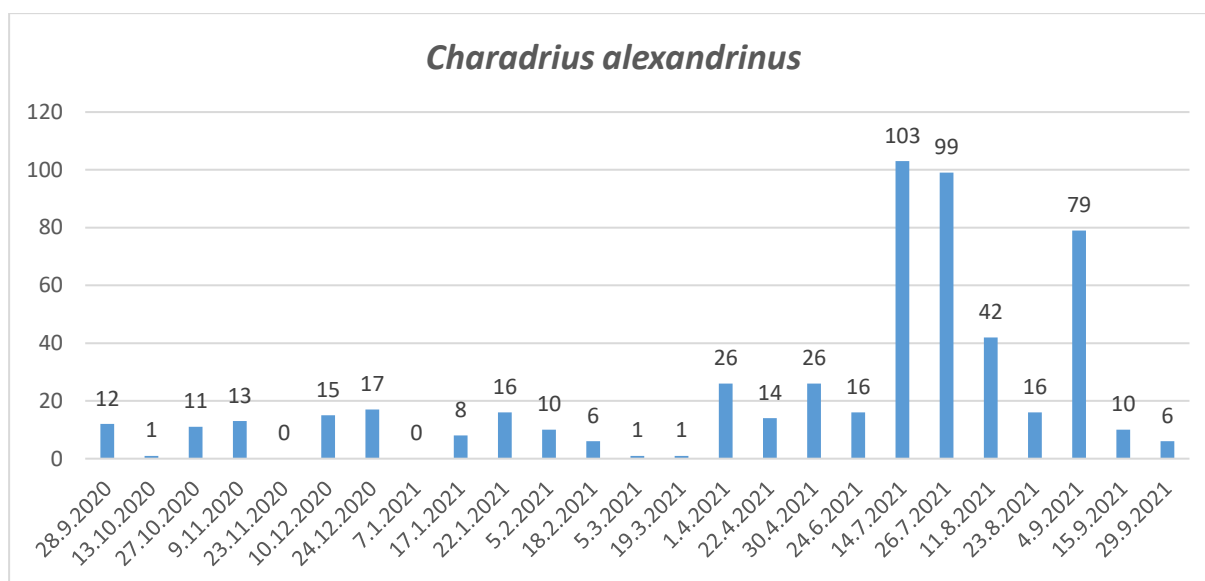


Figure 41: Observations of *Charadrius alexandrinus* per visit

Shelduck (*Tadorna tadorna*)

In Bulgaria it is found mainly in the lakes around Bourgas including Pomorie Lake, Varna-Beloslav Lake, Shabla and Durankulak Lakes.

The species shows a preference for saline habitats and occurs inland on saline and brackish lakes.

The species nests underground in holes of foxes or badgers or digs them itself. Exceptionally nests in reeds. Lays 5-12 eggs, has one generation per year in the period March-August. Its diet consists predominantly of salt-water molluscs (e.g. *Hydrobia spp.*) as well as other aquatic invertebrates. After breeding (between July and October) the species moults and becomes flightless for 25-31 days, during which it is highly gregarious and may aggregate into large flocks of up to 100,000 individuals or more.

During previous years nest-boxes for Shelduck have been installed in dikes of Pomorie Lake. Eggshells were recorded once suggesting some of the boxes were used. This year some traces of down and feathers were also observed close to one of the boxes but no birds were found inside any of these.

The species is in the Least Concern category in the IUCN list. According to the Bulgarian legislation the species is in the category Vulnerable. Listed in CMS Appendix II and Bern Convention Appendix II.

In Europe the species is threatened mainly by habitat loss, poaching and disturbance during sensitive periods of breeding and moulting.

During the current monitoring period there were 12 pairs registered (see the Fig. 40) at the site. No nests were found but later during the breeding season several adults with 18 chicks were observed. In general, the nesting success of the species this season, based on data collected for previous years during regular monitoring of the lake from Green Balkans' experts and data provided in *Checklist for birds in Pomorie Lake*, can be considered as stable.

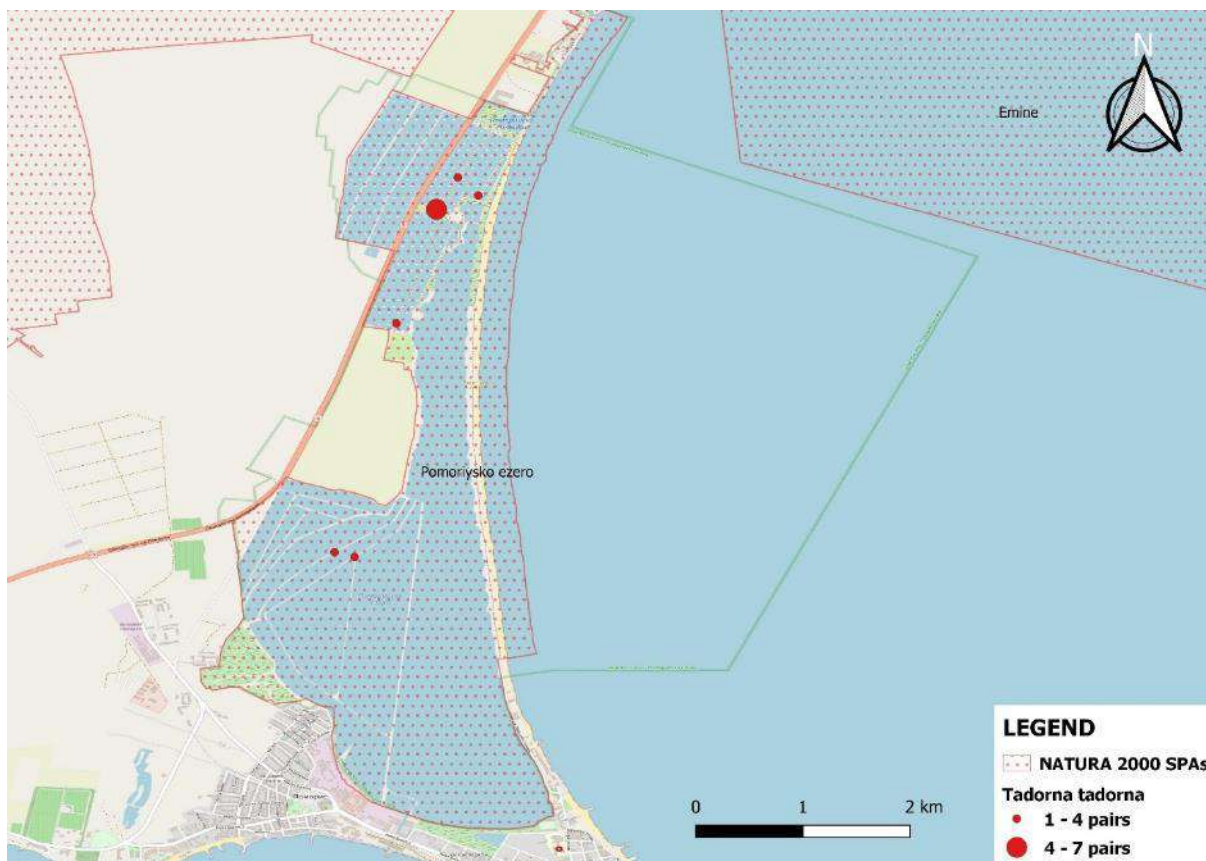


Figure 42: Location of registered *Tadorna tadorna* pairs at Pomorie Lake

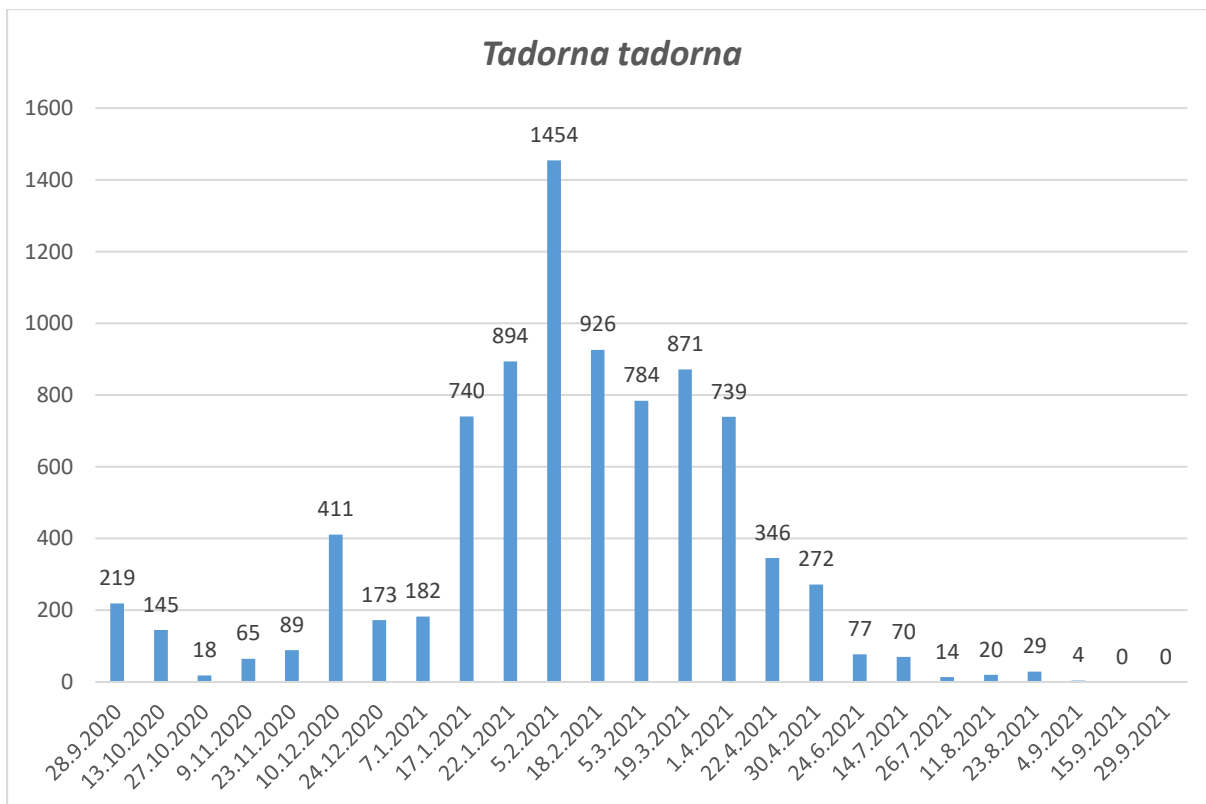


Figure 43: Observations of *Tadorna tadorna* per visit

Other species

During the current breeding bird surveys several other species of water birds have been observed to breed in the site.

Mute swan (*Cygnus olor*) is traditionally breeding at the site and in the current breeding season 4 pairs



Figure 44: Mute swan with chicks at Pomorie Lake

have been identified with respectively 4 nests. One of the nests was not successful as broken eggs and dead chick were found but all other three pairs managed to raise 7 chicks in total.

Gadwall (*Mareca strepera*) is other duck species that was breeding at the site. Two pairs were detected during the breeding season but no nests were found. That number is lower compared to previous years when as much as five pairs were recorded.

Coot (*Fulica atra*) is irregular breeder at Pomorie Lake. In the current season one nest was observed while at least one more pair was detected in the site.

Little ringed plover (*Charadrius dubius*) is also irregularly breeding at the site and 3 pairs were recorded this year but no nests were found.

Oystercatcher (*Haematopus ostralegus*) is not confirmed as breeding in the site despite a pair was observed 5 years ago displaying breeding behaviour. In the current season two pairs were detected to display breeding behaviour and alert calls. No nests were found.

Lapwing (*Vanellus vanellus*) was observed during past breeding seasons. This year one chick was observed in the salt pans and two pairs displayed breeding behaviour.

Marsh harrier (*Circus aeruginosus*) is a raptor that is regularly breeding at the site. This year thanks to the drone one nest was located and 5 eggs were counted in it.

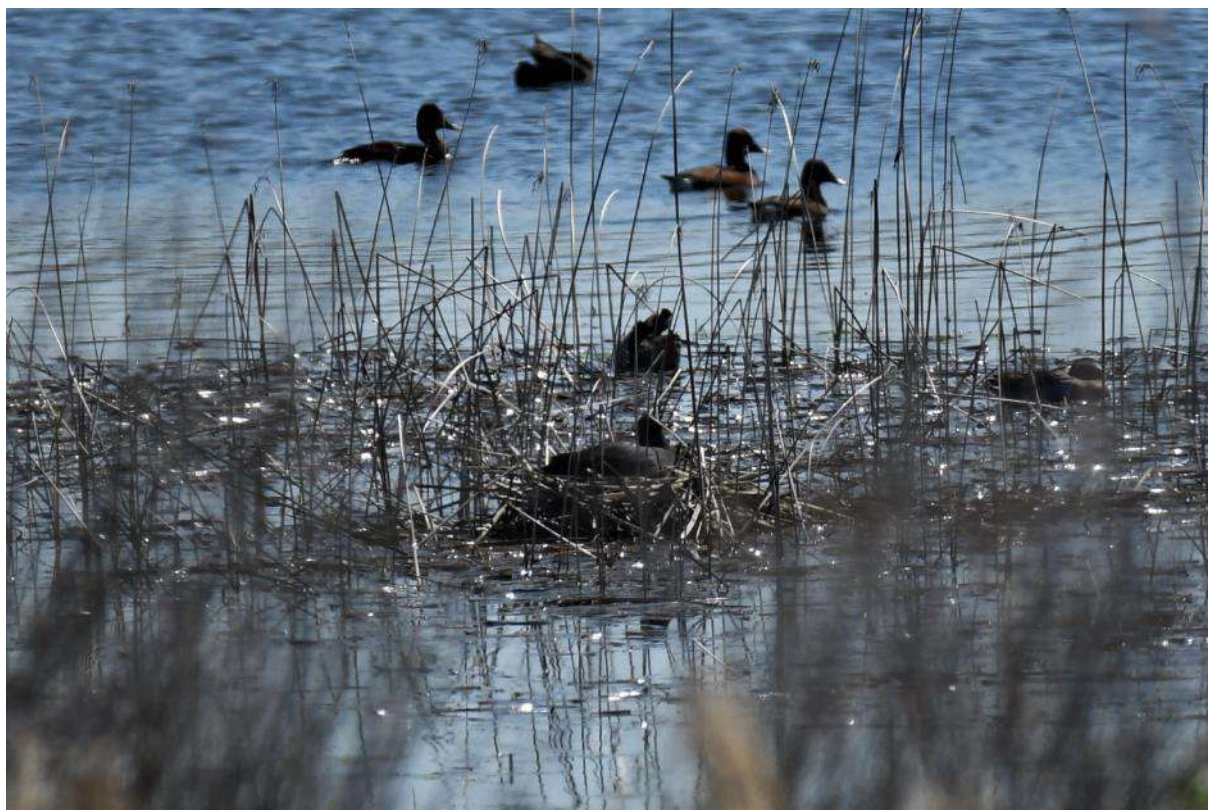


Figure 45: Nest of Coot at Pomorie Lake

Collared pratincole (*Glareola pratincola*) is irregular breeder in the vicinity of the lagoon depending on the crop rotation. This year there some sunflower and corn fields around the lagoon providing suitable habitat. In late breeding season many juveniles were observed suggesting colonies bred at the site. Estimated breeding pairs were at least 30.

All located nests and probable locations of these species are shown in Figure 46.

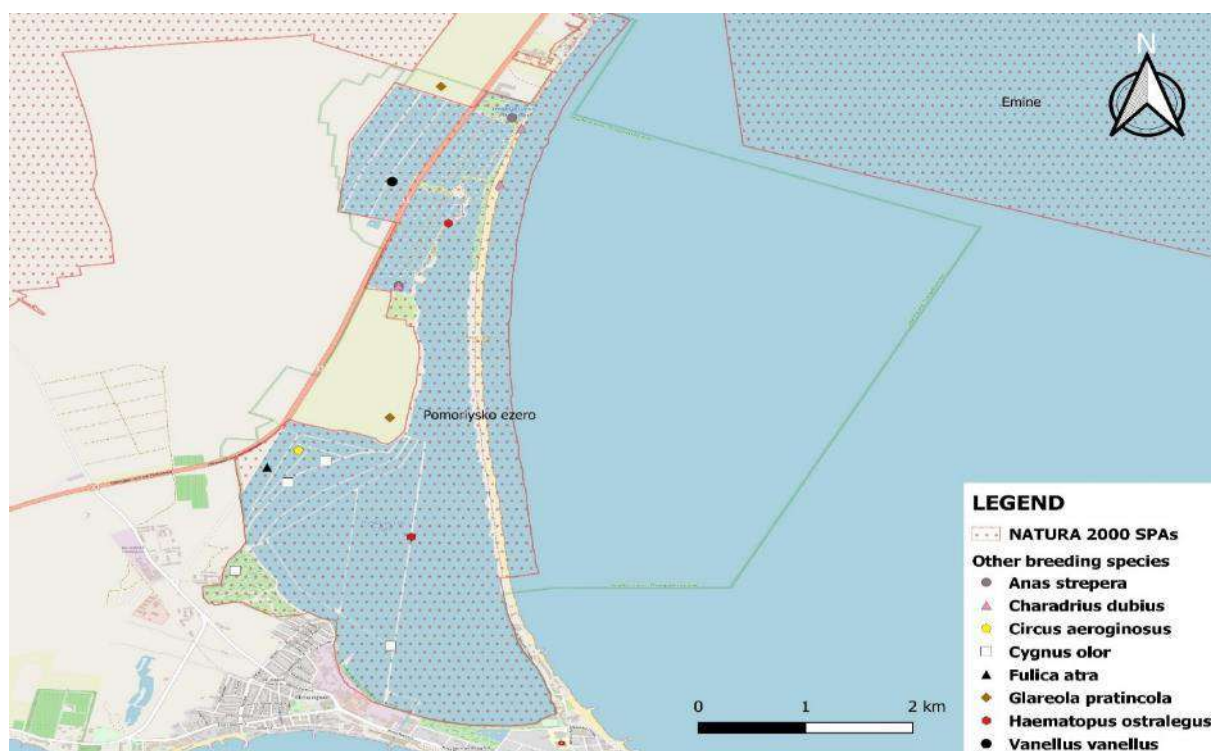


Figure 46: All registered nests and locations of probable breeders

Table 9: International conservation status of the registered species, subject of this survey

Species	IUCN	Birds Directive Annexes	Bern Directive Appendices	AEWA Annexes	Bonn Convention Annexes
<i>Gavia arctica</i>	LC	I	I	II	-
<i>Tachybaptus ruficollis</i>	LC	-	II	II	-
<i>Podiceps cristatus</i>	LC	-	III	II	-
<i>Podiceps grisegena</i>	LC	-	II	II	-
<i>Podiceps auritus</i>	VU	I	II	II	-
<i>Podiceps nigricollis</i>	LC	-	II	II	-
<i>Puffinus yelkouan</i>	LC	I	I	-	-
<i>Phalacrocorax carbo</i>	LC	-	III	II	-
<i>Microcarbo pygmeus</i>	LC	I	I	II	-
<i>Pelecanus onocrotalus</i>	LC	I	I	II	-
<i>Pelecanus crispus</i>	LC	I	I	II	I; II
<i>Botaurus stellaris</i>	LC	I	II	II	-
<i>Ardeola ralloides</i>	LC	I	I	II	-
<i>Egretta garzetta</i>	LC	I	I	II	-
<i>Ardea alba</i>	LC	I	I	II	II
<i>Ardea cinerea</i>	LC	-	III	II	-
<i>Ardea purpurea</i>	LC	I	I	II	-
<i>Ciconia nigra</i>	LC	I	I	II	II
<i>Ciconia ciconia</i>	LC	I	I	II	II
<i>Plegadis falcinellus</i>	LC	I	I	II	II
<i>Platalea leucorodia</i>	LC	I	I	II	II
<i>Cygnus olor</i>	LC	II	III	II	II
<i>Phoenicopiterus roseus</i>	LC	I	I	II	II
<i>Cygnus columbianus</i>	EN	I	I	II	II
<i>Cygnus cygnus</i>	LC	I	I	II	II
<i>Anser albifrons</i>	LC	II	III	II	II
<i>Tadorna ferruginea</i>	LC	I	I	II	II
<i>Tadorna tadorna</i>	LC	-	II	II	II
<i>Mareca penelope</i>	LC	II; III	III	II	II
<i>Mareca strepera</i>	LC	II	III	II	II

<i>Anas crecca</i>	LC	II; III	III	II	II
<i>Anas platyrhynchos</i>	LC	II; III	III	II	II
<i>Anas acuta</i>	LC	II; III	III	II	II
<i>Spatula querquedula</i>	LC	II	III	II	II
<i>Spatula clypeata</i>	LC	II; III	III	II	II
<i>Netta rufina</i>	LC	II	III	II	II
<i>Aythya ferina</i>	VU	II; III	III	II	II
<i>Aythya nyroca</i>	LC	I	I	II	I
<i>Aythya fuligula</i>	LC	II; III	III	II	II
<i>Aythya marila</i>	VU	II; III	III	II	II
<i>Somateria molissima</i>	VU	II; III	III	II	II
<i>Bucephala clangula</i>	LC	II	III	II	II
<i>Mergellus albellus</i>	LC	I	I	II	II
<i>Mergus serrator</i>	NT	II	III	II	II
<i>Pernis apivorus</i>	LC	I	I	-	I
<i>Milvus migrans</i>	LC	I	II	-	II
<i>Haliaeetus albicilla</i>	LC	I	I	-	I; II
<i>Circaetus gallicus</i>	LC	I	I	-	II
<i>Circus aeruginosus</i>	LC	I	I	-	II
<i>Circus cyaneus</i>	NT	I	I	-	II
<i>Accipiter gentilis</i>	LC	-	II	-	II
<i>Accipiter nisus</i>	LC	-	II	-	II
<i>Buteo buteo</i>	LC	-	II	-	II
<i>Buteo rufinus</i>	LC	I	I	-	II
<i>Buteo lagopus</i>	LC	-	II	-	II
<i>Hieraaetus pennatus</i>	LC	I	I	-	II
<i>Pandion haliaetus</i>	LC	I	I	-	II
<i>Falco tinnunculus</i>	LC	-	II	-	II
<i>Falco columbarius</i>	LC	I	I	-	II
<i>Falco peregrinus</i>	LC	I	I	-	II
<i>Fulica atra</i>	NT	II; III	III	II	-
<i>Grus grus</i>	LC	I	I	-	II
<i>Tetrax tetrax</i>	VU	I	I	-	-

<i>Haematopus ostralegus</i>	VU	II	III	II	-
<i>Himantopus himantopus</i>	LC	I	I	II	II
<i>Recurvirostra avosetta</i>	LC	I	I	II	II
<i>Glareola pratincola</i>	LC	I	I	II	II
<i>Charadrius dubius</i>	LC	-	II	II	II
<i>Charadrius hiaticula</i>	LC	-	II	II	II
<i>Charadrius alexandrinus</i>	LC	I	I	II	II
<i>Pluvialis squatarola</i>	LC	II	III	II	II
<i>Vanellus vanellus</i>	VU	II	III	II	II
<i>Calidris canutus</i>	LC	II	III	II	II
<i>Calidris alba</i>	LC	-	II	II	II
<i>Calidris minuta</i>	LC	-	II	II	II
<i>Calidris temminckii</i>	LC	-	II	II	II
<i>Calidris ferruginea</i>	VU	-	II	II	II
<i>Calidris alpina</i>	LC	-	II	II	II
<i>Calidris tenuirostris</i>	NE	-	-	-	II
<i>Calidris falcinellus</i>	LC	-	II	II	II
<i>Calidris pugnax</i>	LC	I; II	I	II	II
<i>Gallinago gallinago</i>	LC	II; III	III	II	II
<i>Gallinago media</i>	LC	I	I	II	II
<i>Limosa limosa</i>	VU	II	III	II	II
<i>Limosa lapponica</i>	LC	I; II	I	II	II
<i>Numenius phaeopus</i>	LC	II	III	II	II
<i>Numenius arquata</i>	VU	II	III	II	II
<i>Tringa erythropus</i>	LC	II	III	II	II
<i>Tringa totanus</i>	LC	II	III	II	II
<i>Tringa stagnatilis</i>	LC	-	II	II	II
<i>Tringa nebularia</i>	LC	II	III	II	II
<i>Tringa ochropus</i>	LC	-	II	II	II
<i>Tringa glareola</i>	LC	I	II	II	II
<i>Xenus cinereus</i>	LC	I	I	II	II
<i>Actitis hypoleucos</i>	LC	-	II	II	II
<i>Arenaria interpres</i>	LC	-	II	II	II

<i>Stercorarius parasiticus</i>	LC	-	III	-	-
<i>Ichthyhaetus ichthyaetus</i>	LC	-	III	II	-
<i>Ichthyhaetus melanocephalus</i>	LC	I	I	II	II
<i>Hydrocoloeus minutus</i>	NE	I	I	II	-
<i>Chroicocephalus ridibundus</i>	LC	II	III	II	-
<i>Chroicocephalus genei</i>	LC	I	I	II	II
<i>Larus michahellis</i>	LC	-	III	II	-
<i>Hydroprogne caspia</i>	LC	I	I	II	II
<i>Thalasseus sandvicensis</i>	LC	I	I	II	II
<i>Sterna hirundo</i>	LC	I	II	II	-
<i>Sternula albifrons</i>	LC	I	I	II	II
<i>Chlidonias hybrida</i>	LC	I	I	II	-
<i>Chlidonias leucopterus</i>	LC	-	II	II	II
<i>Asio flammeus</i>	LC	I	I	-	I
<i>Alcedo atthis</i>	VU	I	I	-	-
<i>Riparia riparia</i>	LC	-	II	-	-

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Annex: Data collection worksheet

Species/latin	Species/english	Migration	Marine area	Main lake	Brackish waters (Honyat)	Brackish waters (M. geren)	Salt pans North	Salt pans West	Total
<i>Gavia arctica</i>	Black-throated loon								0
<i>Gavia immer</i>	Common loon								0
<i>Tachybaptus ruficollis</i>	Little grebe								0
<i>Podiceps cristatus</i>	Great crested grebe								0
<i>Podiceps grisegena</i>	Red-necked grebe								0
<i>Podiceps auritus</i>	Horned grebe								0
<i>Podiceps nigricollis</i>	Black-necked grebe								0
<i>Calonectns diomedea</i>	Scopoli's shearwater								0
<i>Puffinus yelkouan</i>	Yelkouan shearwater								0
<i>Phalacrocorax carbo</i>	Great cormorant								0
<i>Gulosus aristotelis</i>	European shag								0
<i>Microcarbo pygmeus</i>	Pygmy cormorant								0
<i>Pelecanus onocrotalus</i>	Great white pelican								0
<i>Pelecanus crispus</i>	Dalmatian pelican								0
<i>Botaurus stellaris</i>	Eurasian bittern								0
<i>Ixobrychus minutus</i>	Little bittern								0
<i>Nycticorax nycticorax</i>	Black-crowned night heron								0
<i>Ardeola ralloides</i>	Squacco heron								0
<i>Egretta garzetta</i>	Little egret								0
<i>Egretta alba</i>	Great egret								0
<i>Ardea cinerea</i>	Grey heron								0
<i>Ardea purpurea</i>	Purple heron								0
<i>Ciconia nigra</i>	Black stork								0
<i>Ciconia ciconia</i>	White stork								0
<i>Plegadis falcinellus</i>	Glossy ibis								0