

WATERBIRDS OF BOURGAS WETLANDS

RESULTS AND EVALUATION OF THE MONTHLY
WATERBIRD MONITORING 1996 - 2002

Milko Dimitrov, Tanyo Michev, Lyubomir Profirov, Konstantin Nyagolov



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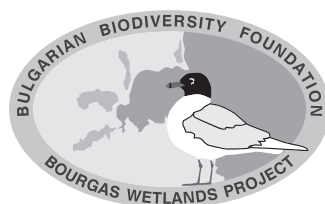
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WATERBIRD MONITORING 1996 - 2002

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Results and Evaluation of the Monthly
Waterbird Monitoring 1996 - 2002

Milko Dimitrov, Tanyo Michev, Lyubomir Profirov, Konstantin Nyagolov

We dedicate this book to Alexandur Prostov (1926 – 2000), born in Bourgas, who was one of the first to draw the attention of the Bulgarian public to the exceptional richness and diversity of the wildlife and especially the birds of Bourgas Lakes

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Bourgas, 31 January 2005

The authors

Glossary & Abbreviations

- Ad. - Adult
Ankhialsko ezero – *see* Pomoriysko Ezero
BAS – Bulgarian Academy of Sciences
BNHM – Bourgas Natural History Museum
Bourgas Lakes = Borgaski Ezera
Bourgas Wetlands – all natural and artificial waterbodies with stagnant waters around the town of Bourgas and Pomorie
Bourgas Salinas - *see* Atanasovsko Ezero
Bourgaski ezera – the four lakes around the town of Bourgas and Pomorie (Pomoriysko, Atanasovsko, Vaya, Mandrensko)
Bourgaski solnitsi - *see* Atanasovsko Ezero
Bourgaski Zaliv– Bourgas Bay
Bourgasko Ezero = Vaya
br. p. – breeding pair
br. ps. - breeding pairs
Bourgaski Zaliv – a bay between Pomorie and Sozopol
BSC – Black Sea Coast
BSPB – Bulgarian Society for the Protection of Birds
BSBCP – Bulgarian–Swiss Biodiversity Conservation Programme
BWC – Bourgas Wetland Complex
c. - about
CLGE – Central Laboratory of General Ecology
Dolno Ezerovo – a part of the town of Bourgas, situated in the north bank of Ezero Vaya
Ezero - lake
FGB – Federation “Green Balkans”
FLB – Foundation “Le Balkan - Bulgaria”
Gorno Ezerovo – a part of the town of Bourgas, situated in the south bank of Ezero Vaya
Imm. - Immature
Izgrev – a wrong name of Atanasovsko Ezero
Komloushka Lowland = Koumluka (Turkish word with the meaning of place with a sand) - *see* Komloushka Nizina
Lake Atanasovsko - *see* Atanasovsko Ezero
Lake Bourgas – *see* Ezero Vaya
Lake Pomoriysko – *see* Pomoriysko Ezero
LC – Lake Complex
LCs – Lake Complexes
Mandrensko Lake - *see* Mandrensko Ezero
Max - Maximum
MC - Marsh Complex
Min. - Minimum
MoEW – Ministry of Environment and Waters
NBSC – North Black Sea Coast (from Romanian border to Cape Emine)
Oil Refinery ‘Neftochim’ - *see* LUKoil-Neftochim
Ostrov - Island
Ostrov Sveti Ivan – an island in front of the town of Sozopol
Ostrov Sveti Petur – a very small island in front of the town of Sozopol
Ostrov Sveta Anastasiya – an island in Bourgaski Zaliv
Pomorie – a small town, situated 20 km to the north of Bourgas
Pomorie Salinas – *see* Pomoriysko Ezero
RDB of Bulgaria - Red Data Book of People’s Republic of Bulgaria (Botev, Peshev, 1985)
Reservoir Mandra – *see* Mandrensko Ezero
Ribarnitsi Vaya – fishponds, part of the Complex Ezero Vaya
RIOSW – Regional Inspectorate for Environment and Waters
Reka - River
Sarafovo – a part of the town of Bourgas, situated 5 km to the north of town
SBg – South Bulgaria
SBSC – South Black Sea Coast (from Cape Emine to the Turkish border)
Yazovir Mandra– *see* Mandrensko Ezero
Zaliv – Bay



1. Introduction

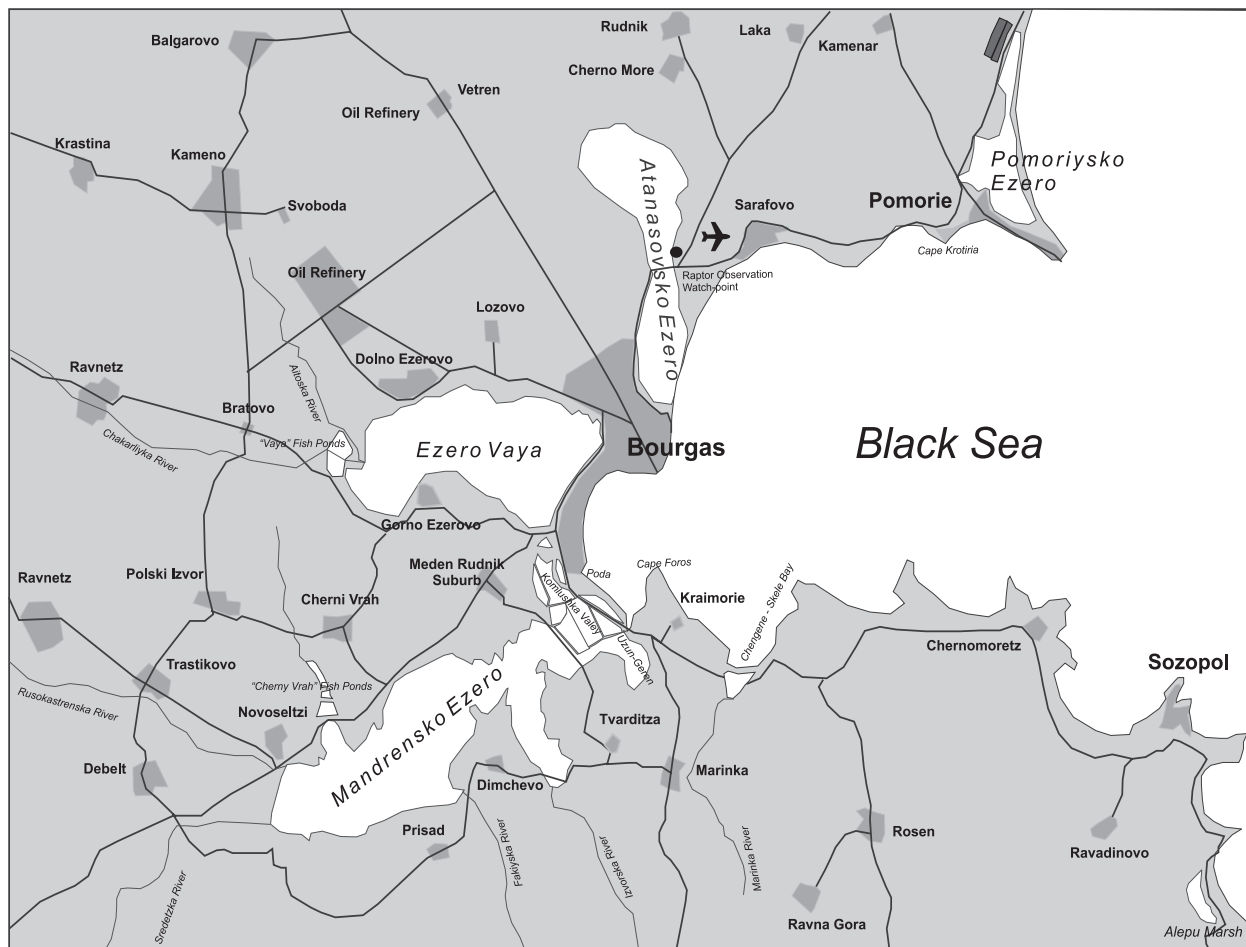
The complex of wetlands around the town of Bourgas (**Map 1**) is of great importance for the breeding, migrating and wintering waterbirds, several of which are rare and endangered species. The main factor determining this region's significant biodiversity is its specific biogeographical position. Almost all the birds from Eastern Europe and especially those from the Danube Delta, cross the area around Bourgas twice a year. A significant part of their populations overwinters there.

A number of scientific papers devoted to the avifauna of Bourgas wetlands have been published. The more important of them are: Reiser (1894); Georgiev (1976); Darakchiev & Nankinov (1978, 1979); Groessler (1967); Michev et al. (1981); Michev & Simeonov (1981); Koenigstedt & Langbehn (1986); Michev & Profirov (1986, 2003); Nankinov (1977, 1992, 1992a); Nankinov & Darakchiev (1980, 1981, 1982, 1983); Profirov (1981, 1987); Prostov (1964); Roberts (1980a, 1980b, 1981), Michev, Profirov, Dimitrov, Nyagolov (1999, 2004), and others.

In 1992, a team led by Ass. Prof. Dr. Bozhidar Ivanov carried out a systematic monitoring of waterbirds in the Bourgas region based on monthly counts, but the results are not yet published (B. Ivanov - pers. comm.).

The present survey is the second attempt at a year-round monitoring of waterbirds in BWC based on field counts carried out every 15 days from 15 November till 15 March, and monthly - during the rest of the year. This project was carried out within the framework of Bulgarian-Swiss Biodiversity Conservation Programme from January 1996 till December 2002.

The monitoring of wetlands and waterbirds is one of the national priorities that every country is obliged to carry out under the stipulations of two international conventions: the Ramsar and the Bonn ones. This monitoring is the tool for following up the state of national populations of breeding species of birds as well as the changes in the popula-



Map 1. Map of the Study Area

tions of Western Palearctic migrating and wintering species. Till now similar round-the-year monitoring in Bulgaria has been organized for Sreburna by Paspaleva & Michev (1968), for Atanasovsko by Roberts (1981), and recently for the wetlands in Sofia plain for the period 1992-2002 on a base of monthly surveys (Nankinov et al., 2004).

The data we have collected by carrying out the monitoring twice a month (once a month during the breeding period) in the course of 6 consecutive years (1996-2002) allowed us to fulfil one of the main goals of the Project 'Bourgaz Wetlands' – to prove the international importance of the four Bourgaz Lakes as places for waterbirds concentrations according to the Ramsar Convention's 1-% criterion for the numbers of certain species. These data have also been compared with the results obtained during the periodic monitoring carried out by the British ornithologist John Lawton Roberts for 1975 and 1976 at Atanasovsko. The data have also been used for the description of four of the areas included in the 'Directory of Azov-Black Sea Coastal Wetlands' published in 2003 as well as for drawing up the document 'Strategy for Waterbird Monitoring in the Black Sea Region' published in the same year.

The information presented in the book can serve as a basis for comparing waterbirds' numbers and species composition in BWC with those in other wetland complexes in Bulgaria, the Black Sea Region, the Mediterranean and the Western Palearctic.

Based on the information gathered during this monitoring, the Bulgarian-Swiss Biodiversity Conservation Programme together with the Bulgarian Society for the Protection of Birds submitted in 2002 proposals on three new sites to be designated as wetlands of international importance. These are Pomoriysko, Vaya (Bourgasko) and Protected Site 'Poda' with Zaliv Foros. Another proposal, for extending the area of the Ramsar Site 'Atanasovsko Ezero', was prepared and submitted along with the former one. The Ramsar Bureau approved all these four areas in February 2003.

Results from the monitoring were reported by the authors of this book at several international events. The first of them was the International Wader Study Group Special Conference, Cape Town, 8-12 August

1998 (Michev et al., 1998). Another part of the results was presented at the First MedWet Conference in Thessaloniki Greece in April 1998 (Michev & Profirov, 1998) and at the Second MedWet Conference held in Valencia, Spain in 2000 (Profirov & Michev, 2000). The accumulated information regarding the wintering and migration of the White-headed Duck in the area of BWC was presented at a workshop held in Porto Lagos, Greece in March 2000 (Dimitrov et al., 2000). Data on waders were reported at a workshop held on September 25 through 28, 2003 in Cadiz, Spain (Dimitrov et al., 2003). The key species of waterbirds and the four Bourgaz Lakes as sites of their concentration were also presented at the world conference 'Waterbirds around the World' that took place in April 2004 in Edinburgh, UK (Profirov et al., 2004). The results of species composition and numbers of wintering geese in 1996-2002 were presented at the 8th Annual Meeting of the Goose Specialist Group, Odessa, Ukraine (Dimitrov et al., 2004).

The information on the globally threatened species was used in working out the Action Plans for making these species popular with the broad public in the country and for laying down conservation measures.

It is beyond doubt that the information so far amassed on the dynamics of waterbirds numbers during breeding, migration and wintering in the richest from ornithological point of view region of the country will be used for determining in a more precise way the population status of the birds as well as for the new edition of Bulgaria's Red Book.

The main goal of the ornithological monitoring of BWC was to follow up the dynamics of waterbirds' numbers in one of the most important wetland complexes in Bulgaria and the whole of the Balkan Peninsula. The readers will have to judge for themselves to what extent we have succeeded in achieving this goal after they open this book.

We are grateful to all volunteers, organisations and institutions for their generous support and co-operation. We hope that this book will provide yet another piece of evidence of the international importance of Bourgaz Wetlands and thereby facilitate the ever ongoing efforts to preserve the entire wetland complex – not least the millions of migratory waterbirds that so much depend on this area for their entire existence.

2. Materials and Methods

This book deals with 154 species of waterbirds (with the exception of some Passerines whose life cycle is related with the wetlands and one species with unclear status).

The whole period of the present study was divided into three parts. The first sub-period of the waterbirds monitoring at BWC was carried out from 15 January 1996 till 20 March 1997; the second one spanned the period 15 September 1998 - 15 December 1999; while the third sub-period lasted from 1 January 2000 till 31 December 2002. Occasional observations conducted outside the study proper have also been included. All data were collated in order to form a single 'average' year. In this, let's call it a hypothetical year, the average numbers from all maximum values for different years and for each individual species were taken together to form the pattern of the species dynamics. In order to further clarify this picture, our hypothetical year starts with the spring migration (March, April and May – on the figures marked with light gray), followed by the breeding season (June and July – on the figures marked with black), the autumn migration (August, September, October and November – on the figures marked with dark gray) and the winter (December, January and February – on the figures marked with white). An exception of this rule was made for the birds of the Order Charadriiformes, for which the 'autumn migration' starts as early as in July. Specific dates for the beginning and the middle of each month are given, for example '1 May' or '15 May', although actual counts have been performed on some other dates, say one to three days before or after the indicated date depending on technical and financial circumstances.

The monitoring covered all natural and some selected artificial wetlands in Bourgas Wetland region, with a total area of c. 9,200 ha. These wetlands are listed below (north to south):

- Pomoriysko Ezero, including the lake itself, the Saltpans around it, an offshore strip of the continental shelf and the Estuary of Reka Akheloy (with a small reservoir), further in the text referred to as Complex Pomoriysko Ezero;
- Atanasovsko Ezero (North and South parts) with all saltpans, canals, clay pits, freshwater bodies and offshore strip of the continental shelf, further in the text referred to as Complex Atanasovsko Ezero;

- Ezero Vaya with the abandoned Vaya Fishponds in the western part of the lake, further in the text referred to as Complex Ezero Vaya;
- Mandrensko Ezero with the following wetlands (all of them referred to further in the text as Complex Mandrensko Ezero);
- Zaliv Foros (the part of Bourgaski Zaliv in front of Poda Lagoon);
- Lowland 'Komloushka Nizina' with oxidation pools and sand pits;
- Cherny Vrukh Fishponds;
- Poda Lagoon;
- Ouzoun Geren (the only part of the former Mandrensko Ezero left in its natural state);
- Zaliv Chengene Skele with a small marsh;
- Estuary of Reka Izvorska;
- Estuary of Reka Fakiyska.

In a number of cases, all these wetland sites are mentioned separately. For the sake of brevity the lakes are referred to further in the text as Pomoriysko or Pomoriysko Ezero, Atanasovsko or Atanasovsko Ezero, Vaya or Ezero Vaya, Mandrensko or Mandrensko Ezero. In such a case, one should understand the given lake itself, without adjacent parts as see shore, fishponds, pits, river estuaries, etc. When these wetlands are also taken into consideration, then they are given as Complex Pomoriysko Ezero, Complex Atanasovsko Ezero, etc.

Each individual count at any of the monitored wetlands involved about 300-km ride on a car. During winter months the mileage was close to 420 km. 'Kowa' scopes and 'Nikon' 10 x 50 binoculars were used for the field observations, these having been carried out from regular watch-points, selected and tested during the 25 years of mid-winter censuses in this region.

During the course of the study three flights with an aeroplane 'Gavron' and a helicopter K-26 were undertaken in order to count birds breeding in colonies in the reed beds of lakes and to obtain the exact positions of all breeding localities. The first of these flights was made in November 1996 for the purpose of inspecting and taking photographs of the current

state of wetlands around Bourgas. The flight on 3 July 1999 was carried out with a helicopter K-26 of the company 'Air Lyubiana' with its seat in the village of Gorno Ezerovo. The flight took place from 9.55 to 10.55 a.m. During the flight at a height of 100 m to 200 m the shoreline of the lakes Atanasovsko, Vaya, Poda, Ouzoun Geren and Mandrensko was inspected and we determined the species composition and the number of breeding birds in the breeding colonies we found.

On 16 July 2000, a flight with the same helicopter was made between 9.15 and 10.15 a.m. When over the Lakes Atanasovsko, Vaya, and Pomoriysko we flew at a height of 200-300 m, while over Poda the flight was at a height of 100-80 m and up to 800 m over the Bourgaski Zaliv. We followed the shoreline of Vaya, Atanasovsko Ezero, Pomoriysko Ezero, and the Poda, Ouzoun Geren and Chengene Skele Marsh Protected Sites.

The lists of the observed species were arranged according to the scientific nomenclature of Snow & Perrins (1998). English names are according to Beaman & Madge (1998). For some species we have applied the Svensson & Grant (1999) method for assigning English common names of birds adapted to international use and their full scientific names in brackets. Some species, subject to special research like the White Pelican, the White Stork, the Black Stork and the Common Crane, are described in detail but the respective references are given in the text. For the Eurasian Spoonbill, the Pygmy Cormorant, the White-headed Duck, and the Ruddy Shelduck special surveys were carried out during the period of this study. Some of the results were published separately, while some are included in this book.

During the process of data analyses in this book, we use the term 'Regular Species'. This is each waterbird species with average numbers (from the 6 years of survey) equal or greater than one.

The hydrological data are given according to Ivanov et al. (1964) and Profirov & Michev (2003).

In order to determine the 1-% Ramsar threshold we have applied the criteria developed by Wetlands International (2002).

Bulgarian toponyms are given with their original Bulgarian names: Mandrensko Ezero (not Lake Mandra), Bourgaski Zaliv (not Bay of Bourgas), Ostrov Sveti Ivan (not St. Ivan Island) etc. They have been transcribed into English after Danchev et al. (1989). Exceptions from this rule are made for the names of wetlands, which have been firmly established in the English language for quite a long time already, like 'The Danube', etc.

For every species, the text begins with a heading about its status. It is given according to the categories adopted in 'The Status of Birds in Britain and Ireland' (BOU, 1971) with two additional categories - 'Very rare' and 'Rare'. The status is shown in the table below:

<i>Very rare</i>	Occurring or breeding once in a great while, at intervals of at least 10 years (where reliable data exist)
<i>Rare</i>	Occurring or breeding less frequently than every year
<i>Scarce</i>	Less than 10 birds occurring or pairs breeding annually
<i>Uncommon</i>	Between 10 and 99 birds occurring or pairs breeding annually
<i>Fairly common</i>	Between 100 and 999 birds occurring or pairs breeding annually
<i>Common</i>	Between 1,000 and 9,999 birds occurring or pairs breeding annually
<i>Abundant</i>	More than 10,000 birds occurring or pairs breeding annually

The heading 'Status' is followed by the heading 'Numbers'. It contains data on the maximum values of a given species for the entire period of the study, in two ways:

- By seasons;
- By the four lakes of BWC.

Numbers are given in individuals (not in breeding pairs).

The heading 'Breeding' contains information on breeding numbers collected during field observations carried out for a longer time than the period of this monitoring. This information includes also data from literature, from unpublished personal data of the authors as well as verbal communications with other colleagues of ours. Some data about breeding terns and waders were kindly supplied by the Federation 'Green Balkans' for Pomoriysko Ezero and by Mr. Kiril Bedev for oxidation pools in Complex Mandrensko Ezero. We have used data from the Conservation Centre Poda's reports and information contained in collected materials (specimens collected in the area of BWC and exhibited in Bourgas Natural History Museum).

The text for every species finishes with the heading 'Species Dynamics' where the information is arranged by seasons.

3. A Brief Physical Characteristics of the Wetlands Around Bourgas

The wetlands around Bourgas (lakes, marshes, river estuaries, lagoons, limans, strips of the sea shelf, reservoirs, fishponds, pits, etc.) are located in Eastern Bulgaria, west of the Bourgaski Zaliv (*Map 2*) and in the immediate vicinity to the city of Bourgas (population 200,000). Their total surface area is about 9,200 ha.

The average value of the annual precipitation in Bourgas region is between 520 and 580 mm. The annual average temperature is between 12°C and 13°C. The region is among the places with the

mildest winter in Bulgaria. The average temperature in January varies between 1.5°C and 2.5°C. On the average only 20 days during the winter season are with negative temperatures. During prolonged spells of cold weather the recorded absolute min temperatures fall down to -21°C to -22°C. Under such conditions all lakes (incl. Salinas) freeze.

Meteorological data on Bourgas area, taken from Sarafovo Airport Weather Forecast Station, are given on *Table 1*.



Satellite: X-SAR
Date: 08 Oct. 1994 / 09:06:37
Latitude: N 42.63
Longitude: E 27.32

1. Oil Refinery 'Lukoil Neftochim'
2. Airport
3. Atanasovsko Ezero
4. Ezero Vaya
5. Mandrensko Ezero
6. Petroleum Port
7. Port of Bourgas

Map 2. Satellite View to Bourgas Lakes with their Surroundings (only a part of Yazovir Mandra is visible)

Table 1. Meteorological Data for Atanasovsko Ezero, January - December (data from Bourgas Airport Meteorological Station)

INDEX/MONTH	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
Average monthly temperature °C	1.8	3.2	6.5	10.6	14.4	19.7	22.8	22.8	18.3	13.2	7.1	2.4	
Average max temperature °C	6.5	8.7	12.3	16.5	19.7	24.7	28.2	28.1	24.7	19.5	13.2	6.7	
Average min temperature °C	-2.2	-2.1	2.3	5.8	8.9	14.6	18.3	18.7	13.2	8.6	3.4	-0.5	
Average from the absolute max t °C	13.9	18.1	21.2	25.7	28.8	31.4	33.3	33.1	30.3	29.5	21.1	15.2	
Average from the absolute min t °C	-10.1	-9.5	-3.3	1.33	2.8	9.2	13.3	11.4	6.9	0.6	-4.8	-8.8	
Absolute min t °C	-13.3	-14.4	-6.5	0.1	1.4	5.9	11.5	10.3	5.4	-4.2	-8.6	-12.3	
Absolute max t °C	14.9	23.3	24	28.4	31.7	34.9	37.7	33.9	33.1	33.4	24.2	18	
Aver. monthly humidity %	82	80	79	77	77	75	71	70	72	74	79	82	77
Aver. monthly rainfall (5 year) mm	4.1	14.3	19.5	44.8	47.9	56.3	62.1	11.1	22.6	63.7	57.6	39.8	
Aver. monthly rainfall (15 year) mm	42.3	34.8	35.2	44.2	36.9	41.9	29.3	24.4	28.8	27.5	47.7	36.2	35.6
24-hour max rainfall mm	104	71.1	95.8	100.2	96.5	91.7	66.6	83.9	139	70.5	85.1	67	52.5
Aver. n. of days with rainfall	8	8	10	13	14	11	8	6	7	9	12	11	
Aver. n. of days with snow cover	5	4	2	0	0	0	0	0	0	0	0	2	
Aver. n. of days with rainfall >1 mm	6.1	5.8	4.8	6.2	6.6	5.7	4.3	3.1	3.1	4.6	6.2	6.4	62.9
Aver. n. of days with rainfall >10 mm	1.1	0.9	0.8	1	1.1	1.3	1	0.9	0.7	1.2	1.8	1.4	13.2
Aver. n. of days with rainfall >15 mm	0.5	0.3	0.3	0.4	0.7	0.6	0.5	0.4	0.5	0.6	0.9	0.8	6.5
Aver. n. of days with rainfall >25 mm	0.1	0.1	0.1	0.1	0.2	0.4	0.2	0.2	0.2	0.2	0.3	0.3	2.4
Number of days with clear skies	4.5	3.8	4.5	4.9	6.4	10.3	16.4	16.2	9.5	6	4.9	4.9	
Number of cloudy days	19.5	20.4	21.5	16.6	9.3	5.6	3.4	3.7	9.2	15.8	19.7	19.8	
Average	5.8	5.7	5.6	5.1	4.2	3.6	2.8	2.7	2.9	3.9	5	5.4	4.4
Number of days with thunder storms	0.1	0.4	0.3	1.4	4.9	7.2	5.7	3.5	1.5	0.6	0.1	0.1	

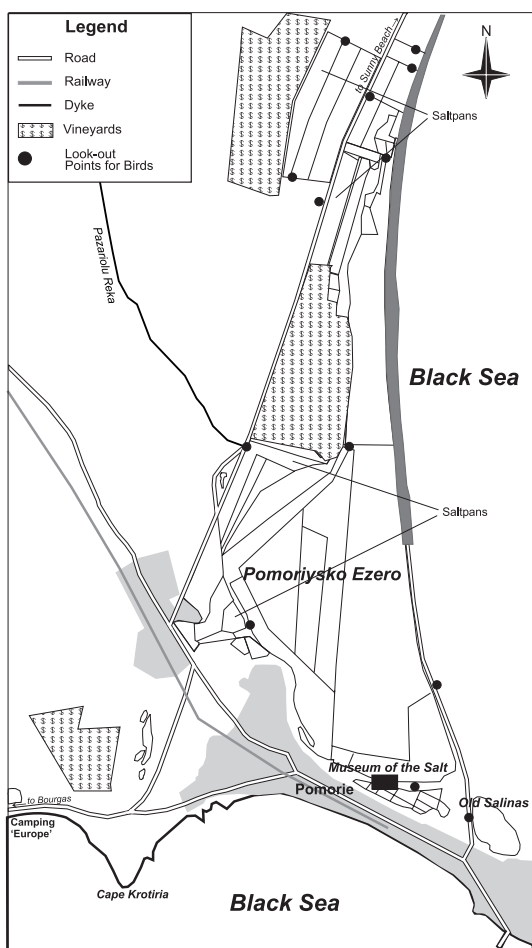
3.1. Complex Pomoriysko Ezero

Description of site: co-ordinates 42°35'N, 27°37'E; UTM grid NH 51. On the South Black Sea coast (**Map 3**), next to the town of Pomorie (population 19,000) with an area of 850 ha, 760 of them protected. Elevation 0 m above sea level. Ramsar Wetland Types A, E, J, 5, 6, and 9. A hyper-saline lake situated near the coastline, divided into two parts by the Bourgas-Varna road. The western part has been turned into new salt-pans; the eastern part is divided into two by a dike. This is an important hyper-saline coastal lagoon, declared as a protected area. Pomorie Salinas Ltd. extracts salt, and medical mud for the nearby situated health resort. Pollution has affected the fishing, the mud and the birds that forage in the lake and salterns. Salt production is changing the character of the area and this necessitates appropriate management of the area, as it has a diverse avifauna, particularly during the breeding season and migration. CORINE Biotope

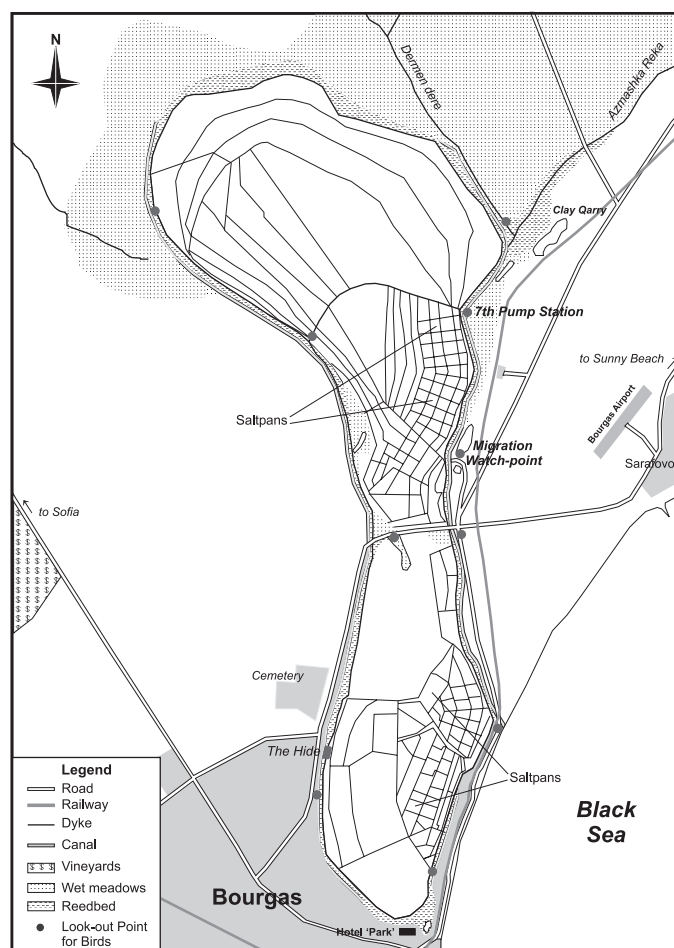
Habitat Classification Type 15: Coastal and halophytic communities - salt marshes, salt steppes, salt scrub; Type 23: Standing brackish and salt water; and Type 53: Water fringe vegetation.

Land tenure and land use: The government owns part of the protected area and part of it is private property, managed by Pomorie Salinas Ltd. and a co-operative of private owners. The whole area is surrounded by land plots that are either private or municipal property. The site is managed for salt production. Evaporation takes place over the entire area and within its limits there are no human activities at all. The surrounding agricultural land is cultivated, mostly under vineyards; there are also wine & brandy production facilities. The town of Pomorie is rather close to the site.

Special floristic values: Several species listed in the RDB of Bulgaria occur there, including *Trachomitum venetum* (the largest Bulgarian population), *Lactuca tatarica* and *Artemisia maritima*.



Map 3. Complex Pomoriysko Ezero



Map 4. Complex Atanasovsko Ezero

Fauna: Relatively well studied. Mammals: Only three species of large mammals occur in the protected site and the adjacent areas: fox, weasel and wild boar. Birds: 255 species have been recorded, 118 of which are waterbirds. The lake is of international importance for a number of migrating and wintering birds, especially for *Phalacrocorax pygmeus*, *Cygnus olor*, *Tadorna tadorna*, *Recurvirostra avosetta*, and *Sterna sandvicensis*. The lake ranks first by importance in Bulgaria for *Sterna sandvicensis* and second for *Recurvirostra avosetta* and *Himantopus himantopus*, breeding there. Amphibians and Reptiles: five species of amphibians and five of reptiles have been found at the lake. Two of the latter, *Ophisaurus apodus* and *Elaphe longissima*, are on the RDB of Bulgaria list of threatened species. Fishes: three species have been recorded: *Knipowitschia caucasica*, *Gasterosteus aculeatus* and *Atherina boyeri*, all of them listed in the RDB of Bulgaria.

Conservation measures taken: Pomoriysko has been assigned the status of protected site (760.8 ha) since January 2001; it has been designated as an IBA Site of national importance since 1997 and a CORINE Site No. 78 in the Bulgarian CORINE list. In 2002, it has been declared a Ramsar site (under No. 1229) with an area of 814 ha, which includes also the

Estuary of Reka Akheloy. A Management Plan of this Ramsar site has been in a process of elaboration.

Research facilities, public awareness and education: Green Balkans Federation and Pomorie Municipality have developed a conservation education programme. International camps for students are regularly organised in autumn for the purpose of carrying out various management activities at the lake. The outcome of these activities are several artificial islands built there, which attract up to 450 pairs of *Sterna sandvicensis*. In 2002, a 'Museum of the Salt' was opened with the financial support from the EU PHARE Programme's project "All about the Salt". A number of brochures, postcards and posters devoted to Pomoriysko have been published in the last few years.

3.2. Complex Atanasovsko Ezero

Description of site: co-ordinates 42°34'N, 27°28'E; UTM grid NH 30, 31, 41. On the Black Sea coast, close to Bourgaski zaliv (Map 4) and the city of Bourgas (population 200,000). 1,690 ha (lake area), 1,002.3 ha (reserve), 900 ha (buffer zone). Elevation 0 to -1.5

m below sea level (**Map 4**). Ramsar Site No. 292 (1,404 ha) Ramsar Wetland Types A, E, J, Ts, 5, 6, 7, and 9.

Atanasovsko Ezero is a hyper-saline water body near the coast, divided into two parts by the Bourgas-Varna road (E 87). The northern part reminds an estuary and has been a nature reserve since 1980. The southern part forms a buffer zone of the reserve, and there is also a buffer zone around the other parts of the reserve. Both parts of the lake are Salinas since 1906. Small freshwater marshes and a system of canals overgrown with marsh vegetation surround the lake. The fresh water from the catchment's area collects in a circular canal in November-April and flows into the Black Sea. The eastern part of the canal supplies the salt pans with seawater from Bourgaski Zaliv during May-October. Thus, the water in the canal is fresh for the first half of the year, and saline for the second half. According to the CORINE Biotope Habitat Types classification, the lake belongs to Type 15: Coastal and halophytic communities – salt marshes, salt steppes, salt scrubs, salt forests (12% of the total area), Type 23: Standing brackish and salt water (80%); and Type 53: Water fringe vegetation (8%).

Land tenure and land use: The reserve is exclusive governmental property and is managed by the MoEW. Plots of land, either private or Bourgas Municipality's property surround it. The lake is used as Salinas since the beginning of 20th century.

Special floristic values: More than 233 species of higher plants are found, of them *Salicornia herbacea*, *Salicornia europaea*, *Sueda maritima*, *Phragmites australis*, *Typha angustifolia*, *Vicia campetris* and *Artemisia maritima* dominate the vascular plants. The following species listed in the RDB of Bulgaria have been recorded for the lake and its surroundings: *Parapholis incurva*, *Gypsophila trichotoma*, *Silene euxina*, *Halimione pedunculata*, *Halimione portulacoides*, *Petrosimonia brachiata* and *Sueda heterophylla*.

Fauna: Relatively well studied. Mammals: 33 mammal species have been recorded at Atanasovsko Ezero. Three species - *Suncus etruscus*, *Microtus guentheri* and *Spermophilus citellus* - are of particular interest from the point of view of protection of species diversity. Four species of larger mammals reside in the reserve and adjacent areas: *Vulpes vulpes*, *Mustela nivalis*, *Canis aureus* and *Sus scrofa*. Birds: Here bird populations are the richest and best studied in Bulgaria: 318 species have been recorded, of them 138 are waterbirds. Results from the long-term studies of autumn migration have shown that Atanasovsko Ezero ranks first in Europe by the migration of *Pelecanus crispus*, *Pelecanus onocrotalus*, *Circus aeruginosus* and *Falco vespertinus*,

and holds the second place by the migration of *Aquila pomarina*. The peak numbers of birds migrating over Atanasovsko in autumn 1979 and 1994 were estimated at up to 60,000 raptors and up to 240,000 pelicans, storks and cranes. These birds come from the eastern half of the European continent. Atanasovsko is the site with the highest species diversity of birds in Bulgaria, and the site with the highest number of bird species listed in the RDB of Bulgaria. The lake is important for holding the highest breeding numbers in Bulgaria of *Recurvirostra avo-setta*, *Himantopus himantopus*, *Sterna albifrons* and *Sterna hirundo*. It is a unique breeding site in Bulgaria for *Larus melanocephala*, *Larus genei*, *Gelochelidon nilotica* and *Sterna sandvicensis*. The site also records the highest numbers in Europe of migratory species such as *Pelecanus onocrotalus*, *Pelecanus crispus*, *Circus aeruginosus* and *Falco vespertinus*. It holds the highest mid-winter numbers of *Tadorna tadorna* in Bulgaria. Fishes: 16 species have been recorded, four of them listed in the RDB of Bulgaria. Amphibians and Reptiles: seven amphibian and eight reptile species occur there. Two of the latter, *Ophisaurus apodus* and *Elaphe longissima*, are on the RDB of Bulgaria threatened species list.

Conservation measures taken: The northern part of the lake has been designated as a nature reserve (Official Gazette, No. 70/1980) under the following conditions: "all activities that disturb the original character of nature in the reserve are prohibited, with the exception of excavation of curative mud in the north-eastern part of the lake". In 1999, the conservation status of the northern part of the lake was changed to "managed reserve" according to the new Protected Areas Act (Official Gazette, No. 99/1999), with some activities permitted until the management plan is approved. The southern part of Atanasovsko Ezero, together with a belt of c. 200-m around its northern section, has been designated as a buffer zone (Official Gazette, No. 85/1981). The reserve was designated as a Ramsar site on 28 November 1984, under No. 292, enlarged to 1,404 ha in 2002; Important Bird Area since 1989; Globally Important Bird Area since 1997; CORINE Site No. 77 in the Bulgarian CORINE list; protected area of international importance (Official Gazette, No. 97/1993). In 2003, the MoEW adopted the Reserve Management Plan (Official Gazette, No. 110/2003).

The Ministry of Health has designated Atanasovsko Ezero as a place with significant supplies of curative mud. Included in the "Zone A", under conditions of very strict management.

Research facilities, public awareness and education: A Field Station of the Central Laboratory for General Ecology of the Bulgarian Academy of

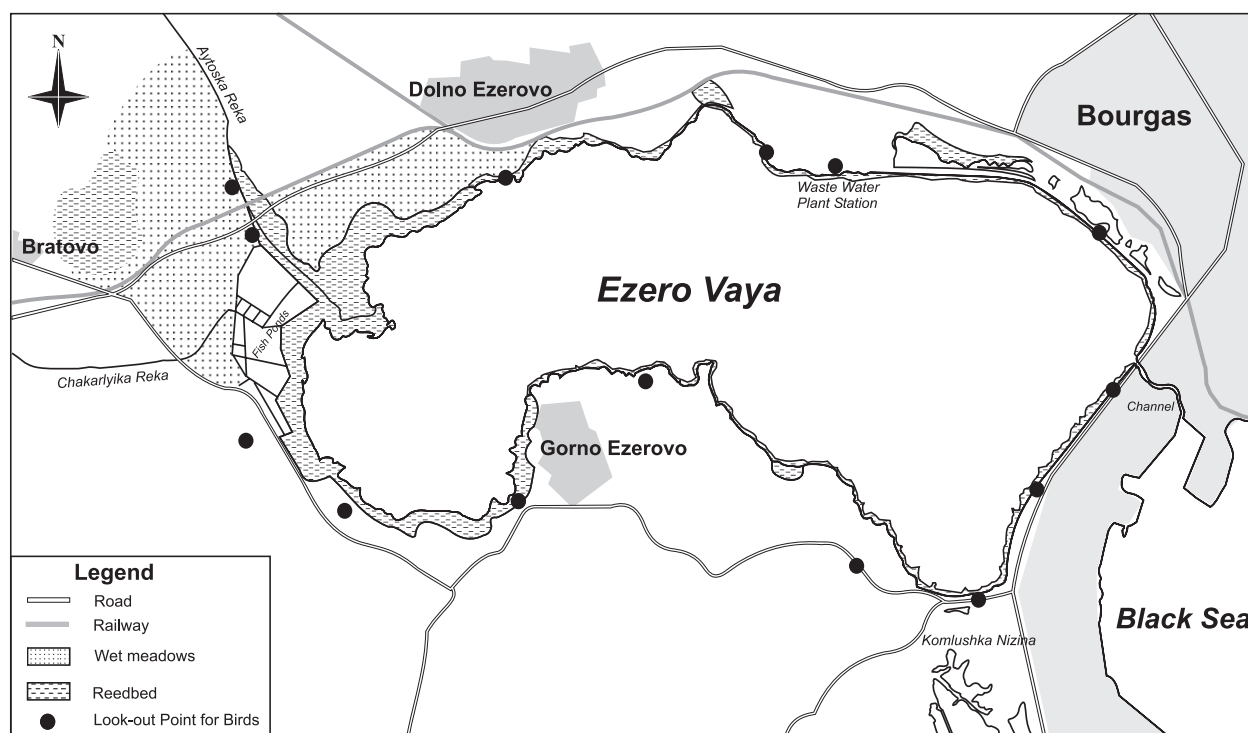
Sciences has been established there since 1978 as well as facilities to track out the migration of soaring birds. A hide managed by RIOSW-Bourgas was opened in 2001 in the south part of the lake. Nature conservation education has been developed by the Central Laboratory for General Ecology and BSBCP, both bodies organising regular autumn students' work camps devoted to management activities in the lake, identification and counting of soaring birds, etc.

3.3. Complex Ezero Vaya

Description of site: co-ordinates 42°30'N, 27°25'E, UTM grid: NH 20, 30. On the Black Sea coast, west of the city of Bourgas (**Map 5**). Situated between Atanasovsko Ezero and Mandrensko Ezero and known also as Vaya. Area 2,800 ha, of which 379 ha are protected (Protected Site 'Vaya'). 0.1-0.2 m above sea level. Ramsar Wetland Types F, O, Ts, 1. The largest Bulgarian Black Sea coastal lake, an open firth (liman) of Pleistocene origin. The lake volume is c. 20 million m³. Shallow lake of insignificant overall depth of 0.5-1.2 m reaching 1.8 m in few places in the middle of the lake, 9.6 km long with a max width of 4.7 km, narrowing to c. 2.3 km in the midway of its length. The rocky north and south coasts are more elevated than the east and west ones. The westernmost part of the lake has been transformed into fishponds since 1970s. The bottom of the lake is almost completely uniform, filled and levelled with liquid grey-

black mud, intermixed with large, rough pieces of detritus. The thickness of the mud is significant, reaching 17 m in the central parts of the lake. The catchment's area (1,050 km²) includes the valleys of three rivers: Aytoska (32 km), Chakarliyska (25 km) and Sanar-dere (12 km), all of them flowing into the westernmost part of the lake. The water level varies from year to year, as well as from season to season, with average annual fluctuation of c. 40-60 cm. Water salinity changes seasonally, reaching max of 200 mg/l Cl⁻ in August/early September. The alkalinity is on the average 5.45-6.70 mgekv/l; pH is 8.9-9.5. Occasionally, in summer and by the beginning of autumn a significant O₂ deficit is recorded. The temperature of the lake waters undergoes substantial seasonal fluctuations (up to 32° C). In most winters the lake is frozen for a period of five to 10 days, in some years even longer. Associations of *Phragmites australis*, *Typha angustifolia* and *Typha latifolia* occupy considerable area by its western and north-western shores. On the lake shores there are swampy meadows and halophytic plant communities dominated by *Puccinellia convoluta*, meso-xerothermic grasslands dominated by *Poa bulbosa*, *Lolium perenne* as well as arable lands (Bondev, 1991). Despite the insignificant depth of the lake, there is no submerged vegetation apart from patches of *Potamogeton pectinatus* L. in the northern, western and eastern parts of the lake. A total of 91 higher plant species have so far been recorded.

Land tenure and land use: The Lake is exclusive governmental property; the fishponds at the western



Map 5. Complex Ezero Vaya

shore are private. Protected Site 'Vaya' is situated on the land of Dolno Ezerovo and Gorno Ezerovo villages, District of Bourgas. The protected area includes governmentally owned lands – a total of 195 ha, as well as an aquatic area of 184 ha, which is a governmental property, too. The main activities in and around the lake are fishing, angling, sand extraction, farming - agriculture and stockbreeding on the adjacent fields. In the past regularly stocked with fish, nowadays this activity was carried out only once, in 1999, and resulted in a significant increase of fish-eating bird species.

Special floristic value: The following plant species of those listed in the RDB of Bulgaria have been recorded at Vaya *Saline euxina*, *Polycnemum heuffelii*, *Acanthus spinosus*, *Heptoptera triquetra*, *Erodium hoefftianum*, *Halimione portulacoides*, *Halimione pedunculata*, *Gypsophyllia trichotoma*, *Phalaris tuberosa* and *Saccharum ravennae*.

Fauna: Because of the shallowness and uniformity of the lake bottom both benthic and planktonic communities are uniform with certain species having developed massively. Mammals: The mammal fauna is not well studied. *Lutra lutra* is listed in the RDB of Bulgaria. Birds: 262 species recorded; of them 108 are waterbirds. Eight species are globally threatened: *Phalacrocorax pygmeus*, *Pelecanus crispus*, *Branta ruficollis*, *Aythya nyroca*, *Oxyura leucocephala*, *Milvus milvus*, *Falco naumanni* and *Crex crex*. 148 species are on the SPEC list, 67 species are included in the RDB of Bulgaria. Vaya is an important staging site for the birds migrating along the Black Sea coast. It is a site of international importance for wintering waterfowl, regularly supporting 60,000 -100,000 birds. The lake is especially important as wintering grounds for several globally threatened species: *Phalacrocorax pygmeus*, *Pelecanus crispus* (more than 450 birds regularly recorded), *Branta ruficollis* and *Oxyura leucocephala*, the latter with over 2,000 birds recorded regularly in recent years. The lake provides important wintering grounds for *Anser albifrons*, *Branta ruficollis*, *Aythya ferina* and *Aythya fuligula*. It is a breeding site for *Aythya nyroca* and *Anas strepera*. Until 1970s, a large colony of breeding *Phalacrocorax pygmeus*, *Platalea leucorodia*, *Plegadis falcinellus* and herons existed in the reed-beds at the lake's western shore. Vaya is the most important of the lakes around Bourgas as a foraging site for the migrating *Pelecanus onocrotalus*, wintering *Pelecanus crispus* and *Oxyura leucocephala*. It is a 'bottle-neck' area for a number of migrating raptors and soaring waterbirds: *Pelecanus onocrotalus*, *Pelecanus crispus*, *Ciconia ciconia*, and *Ciconia nigra*. The Amphibian and Reptile fauna is not well studied. Two species listed in the RDB of Bulgaria

have been recorded there: *Elaphe longissima* and *Ophisaurus apodus*. Fishes: Until 1970s, the fish fauna consisted of 35 species, mostly of marine origin. Subsequently, with the changes in the hydrological conditions and water quality, the majority of the marine species disappeared. 11 fish species were recorded in 1999-2000 under BSBCP's Bourgas Wetland Project. One of these species, *Anguilla anguilla*, is on the RDB of Bulgaria extinct species list. *Neogobius fluviatilis* is listed under the Bern Convention and is on the 2000 IUCN Red List. Invertebrates: Ivanov et al. (1964) reported over 60 invertebrate species.

Conservation measures taken: An area of 75 ha in the western part of Vaya was designated as a protected site in 1973. In 1997, by a Decree of the MoEW, the protected site has been enlarged to a total of 379 ha (Official Gazette No. 122/1997). Vaya has been an Important Bird Area since 1989 and a Globally Important Bird Area since 1997; a CORINE Site No. 76 in the Bulgarian CORINE list. In 2002, Vaya (incl. the protected area) was declared a Ramsar Site under No. 1230 (2,900 ha). A Management Plan has been prepared by BSBCP. Artificial platforms to attract pelicans to breed have been built in the reed-beds of the Protected Site (BSBCP).

Conservation measures proposed: The artificial platforms should continue to be managed with the aim of attracting pelicans to breed (BSBCP). It is necessary to have the reed-bed managed (especially in the western part of the lake). The canal connecting the lake with Black Sea should be restored as soon as possible.

Research facilities, public awareness and education: An observation hide for waterbirds has been built in the Protected Site 'Vaya'. A bird observation point and a boat quay on the bank of the lake at Dolno Ezerovo village have been erected recently.

3.4. Complex Mandrensko Ezero

Description of site: co-ordinates 42°25'N, 27°24'E; UTM grid: NH 30, NG 29, 39, 49. On the Black Sea coast, some 3 km south of the town of Bourgas, close to Bourgaski zaliv (**Map 6**). The southernmost of the Bourgas Lakes, turned into a reservoir since 1963. In the past, in the southwestern part of the lake (most probably in squares NG 3094, 3095, 3194, and 3195 on **Map 7**), there had been a large reed bed with a pelican-breeding colony. Nowadays all this area is on the bottom of Reservoir Mandrensko. It is encompassing 2,522 ha, of which 2,270 ha are unprotected area of the lake (1,400 ha of them being an open

water area) and 251.7 ha protected (Poda Site, 100.7 ha; the Estuary of Reka Izvorska, 151 ha; Ouzoun Geren, 210 ha, a total of 461.7 ha). Not far to the south of the complex is the protected site Chengene Skele Marsh with an area of 160 ha. Poda was declared a Ramsar site under No. 1,228 (307 ha). Ramsar Wetland Types: A, D, E, F, J, 1, 6, 7, and 8.

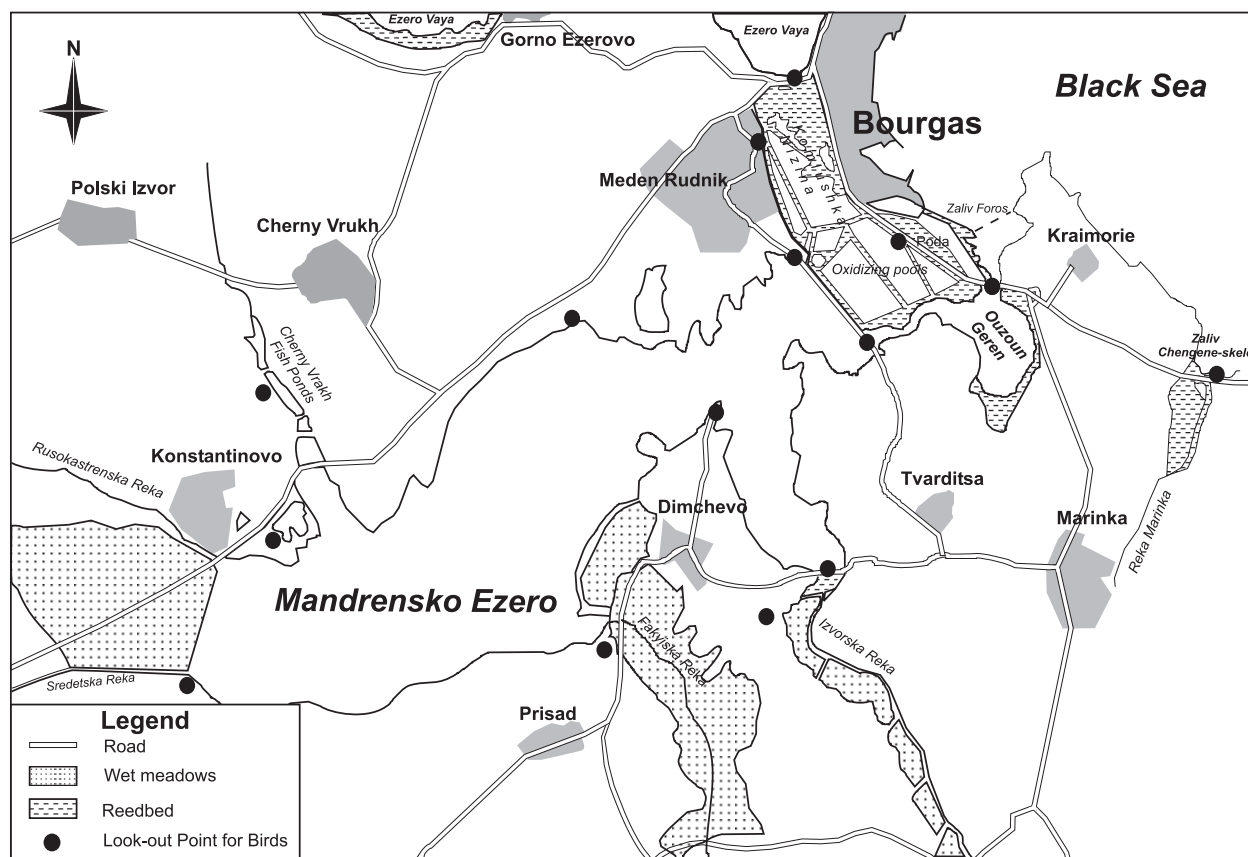
Scarce patches of *Phragmites australis*, *Typha angustifolia*, and *Typha latifolia* cover the edges of Mandrensko Ezero; on its northwestern and eastern parts mesophytic meadows have spread dominated by *Festuca pratensis* and *Poa sylvicola*; halophytic grass communities dominated by *Puccinellia convoluta*; scrubs dominated by *Paliurus spina-christi* with occasional mud-flats. Trees and bushes (mainly *Carpinus orientalis*) grow on the slopes of the river's valley mixed sparsely with Mediterranean floral elements like *Colutea arborescens* (Bondev, 1991) and *Acer campestre* (Bondev, 1991). Poda Lagoon is overgrown mainly with *Phragmites australis* and *Typha sp.* Communities of *Bolboschoenus maritimus*, *Juncus maritimus*, *Artemisia santonicum* are often mixed with *Phragmites australis* and *Typha sp.*

Land tenure and land use: The Lake is exclusive governmental property. The main activities practised there are fishing, angling, sand extraction; farming, drawing water for irrigation of arable lands. On the

south shore grow forests of mainly *Quercus pedunculiflora* and *Quercus robur*, *Salicornia europaea* is the typical plant, while on the sand strip grows *Leymis racemosus*. Ouzoun Geren: The greater part of the shore is occupied by *Phragmites australis* and *Typha sp.* An Oak (*Quercus sp.*) forest stands on the hilly west shore. Chengene Skele Marsh: The Estuary of Reka Marinka has extensive reed bed areas (*Phragmites australis*), and patches of *Typha angustifolia* and *Schoenoplectus lacustris*. The water of the bay is shallow (10-30 cm). In the past regularly stocked with fish, nowadays this activity was carried out only once, in 1999. This has resulted in a significant increase of the fish-eating bird species.

Special floristic value: Of the species of the RDB of Bulgaria, *Silene euxina* and *Gypsophila trichotoma* have been recorded.

Fauna: Mammals: *Martes martes* and *Lutra lutra* are included in the RDB of Bulgaria. Poda is one of the very few places in Bulgaria where *Suncus etruscus* has been found. Birds: 270 species have been recorded in this wetland complex, 124 of which are waterbirds. 127 species are of European Conservation Concern (SPEC categories). Nine globally threatened species have also been recorded: *Phalacrocorax pygmeus*, *Pelecanus crispus*, *Branta ruficollis*, *Aythya nyroca*, *Oxyura leucocephala*, *Mil-*

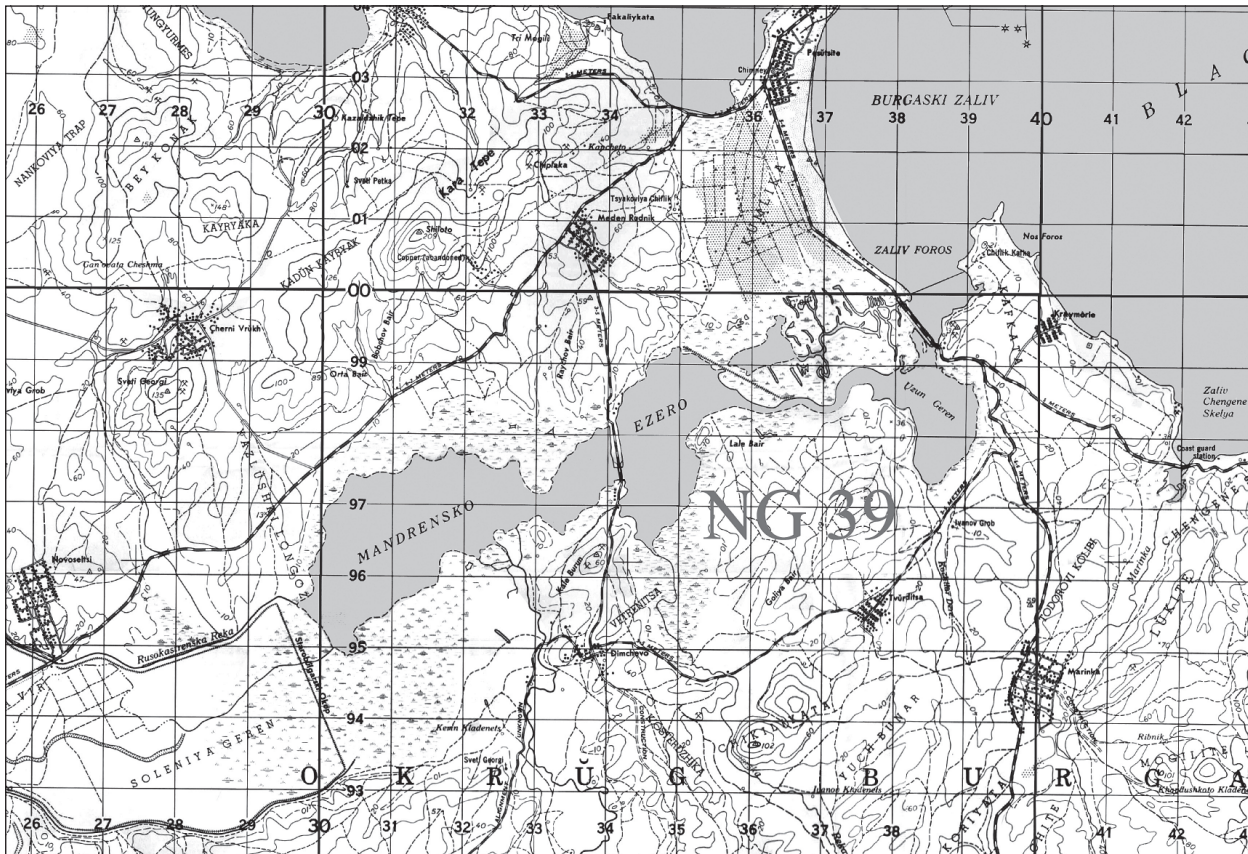


Map 6. Complex Mandrensko Ezero

vus milvus, *Falco naumanni*, *Crex crex* and *Numenius tenuirostris*. The wetlands of Complex Mandrensko Ezero are of international importance for the migrating and wintering waterfowl, supporting 80,000-100,000 wintering birds. Reservoir Mandra is very important as a wintering habitat for the globally threatened *Phalacrocorax pygmeus*, *Pelecanus crispus*, *Branta ruficollis* and *Oxyura leucocephala* as well as for *Cygnus cygnus*, *Anser albifrons*, *Aythya ferina* and *Aythya fuligula*. The Complex is a breeding locality for *Aythya nyroca* and *Anas strepera*. Mandrensko was *Pelecanus onocrotalus* last breeding haunt in Bulgaria. After the lake was transformed into a reservoir, the increased water level has flooded their nesting grounds and the species stopped breeding in the country. Poda is important for the breeding of *Platalea leucorodia*, *Plegadis falcinellus* and a number of heron species. Zaliv Chengene Skele is one of the very few places in the country where *Numenius tenuirostris* was recorded, and is of importance for some wading species on migration. Chengene Skele Marsh is important as a roosting and feeding place for *Phalacrocorax pygmeus* and *Plegadis falcinellus*. Complex Mandrensko Ezero is a "bottle-neck" area for a number of migrating soaring birds (*Pelecanus onocrotalus*, *Pelecanus crispus*, *Ciconia ciconia*, *Ciconia nigra*, etc.). Potential Ramsar site. Amphibians and Reptiles: four species included

in the RDB of Bulgaria: *Pelobates syriacus*, *Ophisaurus apodus*, *Elaphe longissima* and *Elaphe quatuorlineata sauromates*. Fishes: In 1999-2000, 24 fish species were recorded in the Mandrensko Ezero–Ouzoun Geren – Poda area during surveys carried out for BSBCP's Bourgas Wetland Project. Of these, four species are put on the lists of the RDB of Bulgaria, five are listed under the Bern Convention and four are on the 1996 IUCN Red List; one species is included in Directive 92/43 of the Council of Europe. The populations of *Chalcalburnus chalcoides*, *Vimba vimba* and *Neogobius fluviatilis* are of conservation priority. In Chengene Skele, *Pungitius platygaster* and *Proterorhinus marmoratus* need protection measures. Invertebrates: over 60 invertebrate species are listed by Ivanov et al. (1964).

Conservation measures taken: MoEW closed down the landfill for municipal wastes at the north-eastern end of the lake. The LUKoil-Neftochim petrochemical works has taken measures to prevent leakage of oil products from its pipelines. The Protected Site 'Poda' is managed by BSPB: boundaries are marked and the control there is executed jointly with RIOSW-Bourgas; illegally settled agricultural areas and hunting hides have been removed; concrete barriers have been put in place to reduce illegal entry into the protected area; educational excursions are conducted there; a Management plan



Map 7. Former Mandrensko Ezero (a map 1:50 000, 1941)

for the protected site has been approved by the MoEW. Artificial islands have also been constructed to attract birds to breed and stage there; the protected area is monitored. Poda (Zaliv Fors incl.) has been declared recently a Ramsar Site, under No. 1228. The Estuary of Reka Izvorska has been declared as protected site with area of 151 ha. The Chengene Skele, situated south of Mandrensko Ezero has been also declared as a protected site with an area of 160 ha.

Conservation measures proposed: Mandrensko Ezero proper to be declared a Ramsar site, as it meets the criteria of Ramsar Bureau.

Research facilities, public awareness and education: Under the BSBCP, a Nature Conservation Centre 'Poda' has been built within the limits of the protected area. It is managed by the Bulgarian Society for the Protection of Birds (BSPB); a watchtower has been erected.



4. Species Accounts

During the time the study was carried out, data on 153 species of waterbirds found there have been collected. Each of these species is discussed briefly together with the main wetland areas where they have been recorded. A large amount of data on the species' dynamics is presented as charts, along with their trends. The total numbers recorded for each individual lake are given in **App. 1**. Charts showing most of the species as well as tables containing data on the top ten most numerous species in each one of the lakes are presented in the main body of the text. Thus for instance, the most numerous species for the lakes Pomoriysko and Atanasovsko is the Coot, while for the lakes Mandrensko and Vaya this is the White-fronted Goose. For the entire BWC the most numerous species is the White-fronted Goose (on the average 45,545 birds) followed by the Pochard (on the average 14,387 birds), followed by the Coot (on the average 12,000 birds), etc.

Species, whose numbers exceed the 1-% Ramsar criterion have also been indicated. On the basis of this criterion it has been found that all four lakes meet the requirements for wetlands of international importance and – with the exception of Mandrensko – have already been designated as such.

Information on all of the above-mentioned species is given below in a standard way.

4.1. Red-throated Diver – *Gavia stellata*

Very rare migrant and winter visitor found mainly on the coastal waters of the Black Sea. First recorded for Bulgaria by Prostov (1964) on 12 March 1959, on Mandrensko. During the survey an adult in winter plumage was observed on 16 April 1996 in the Black Sea off the shore at Pomoriysko; another on 1 August 1996, at the same place. Outside the period of survey, an individual was seen during the mid-winter counts of 1994, at Complex Mandrensko Ezero (Michev & Profirov, 2003). The highest number was reported by Nankinov (1981), with 17 on 31 December 1974 in the Bay at Pomorie.

4.2. Black-throated Diver – *Gavia arctica*

Uncommon spring migrant and winter visitor, rare autumn migrant and summer visitor.

Numbers: The max totals per seasons for the study period were:

Winter	13	Spring	76*
Summer	0	Autumn	13

*Outside the period of the survey max 90 at Pomorie (Nankinov, 1984).

The max totals per lakes for the study period were:

Pomoriysko	76	March	1999
Atanasovsko	5	November	2002
Vaya	0	–	–
Mandrensko	1	December	1998

The average number of the species in BWC was highest in spring (max 13 at Complex Pomoriysko Ezero).

Species Dynamics: The spring migration starts in the first half of February and is most noticeable in March. The favourite place of concentration in this season is the feeding area offshore at Pomoriysko, where max 76 were seen on 1 March 1999. A single bird was registered on Mandrensko on 15 April 1996. The number of spring migrants decreases gradually in April and May, with max 19 in April 1999, on Pomoriysko. The last spring migrants leave Bourgaski Zaliv soon after mid-May. In **summer**, single non-breeding birds were observed off the Black Sea shore during a number of separate visits outside the dates of the monitoring scheme. In **autumn**, Black-throated Divers arrive from Scandinavia and the Baltic, the first birds appearing by the end of September/beginning of October with a peak in numbers in November. Earlier sightings of autumn migrants are given by Robel et al. (1978) for the beginning of September. The favourite place of concentration is the offshore area at Pomoriysko, with max 13 on 15 November 2002. In **winter**, the max site counts were made in February, with 13 in 2000 offshore at Pomoriysko, and five on 15 December 2002 offshore at Atanasovsko. The Black-throated Diver's wintering population in Bulgaria has registered a slight increase for the past three or so decades. The max mid-winter numbers (58 in 1993) in Bulgaria during the mid-winter counts 1977-2001 had been recorded at the neighbouring Tsarevo-Sinemorets coast (Michev & Profirov, 2003).

4.3. Great Northern Diver – *Gavia immer*

Very rare winter visitor. We have made no records. Bauer & Glutz (1966) were the first to find the species in Bulgaria, though their data are unspecified. The first specific country record came from an off-shore observation at Pomoriysko made on 6 January 1969 (Johnson & Hafner, 1970). The second record made in the area under study was of five birds reported by Nankinov (1975, 1981) and observed off the Pomorie coast. It is possible to observe Great Northern Divers in other seasons as well.

4.4. Little Grebe – *Tachybaptus ruficollis*

Uncommon to fairly common resident, breeder.

Numbers: The max totals per seasons for the study period were:

Winter	154	Spring	54
Summer	35	Autumn	219

The max totals per lakes for the study period were:

Pomoriysko	58	November	1999
Atanasovsko	89	November	1999
Vaya	22	December	2001
Mandrensko	155	November	2001

The average number of Little Grebes at BWC was highest in October (**Fig. 1**). Complex Mandrensko Ezero ranks first with 83% of the species' total number.

Breeding: Recorded by Prostov (1964) as breeding for Mandrensko and Vaya, in recent times the Little Grebe has become a breeding species for all four lakes of the complex, though relatively rare. In the period 1970-1980 over 30 pairs bred regularly on Vaya Fishponds. Between four and six pairs bred at Poda in the period 1991-1997, in the whole BWC: 20 – 25 pairs.

Species Dynamics: In spring, the number of Little Grebes at BWC starts to increase from mid-February

onwards. The migration is most intensive in March and lasts until the end of April. The favourite place for concentration in this season is Ouzoun Geren, with max 54 on 15 March 1997. Outside the period of the survey, 77 were counted on 26 March 1995 at Zaliv Foros and Poda. Little Grebes in the region are most numerous during **autumn** passage. Noticeable movements take place from August onwards. The migration is most intensive in October and November and lasts until December. The max total autumn number of 219 was observed in early November 1999, when the max survey totals were obtained, too. After November, the number of **wintering** Little Grebes decreases, reaching its lowest values in February. The species mid-winter numbers have been decreasing all over the country, the decline being particularly apparent in the wetlands of the SBSC (Michev & Profirov, 2003).

4.5. Great Crested Grebe – *Podiceps cristatus*

Fairly common passage migrant, rare breeder and common winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	5,541	Spring	184
Summer	26	Autumn	523

The max totals per lakes for the study period were:

Pomoriysko	193	December	1998
Atanasovsko	74	January	1997
Vaya	540	January	1997
Mandrensko	5,104	December	1998

The average number of Great Crested Grebes in BWC was highest in December (**Fig. 2**). Complex Mandrensko Ezero ranks first with 85% of the species' total number.

Breeding: During 1980s over 50 pairs bred regularly on Vaya Fishponds, dropping to c. 10 in the early 1990s. For the period of this survey, up to ten pairs on

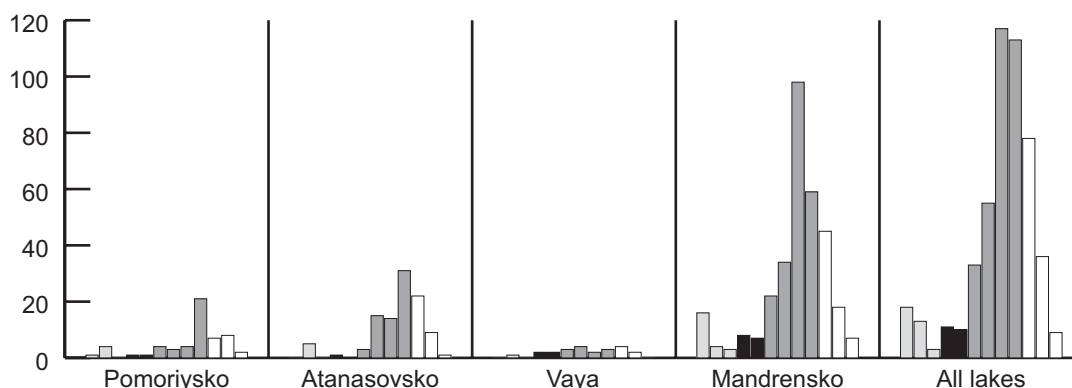


Fig. 1. *Tachybaptus ruficollis*

SPECIES ACCOUNTS

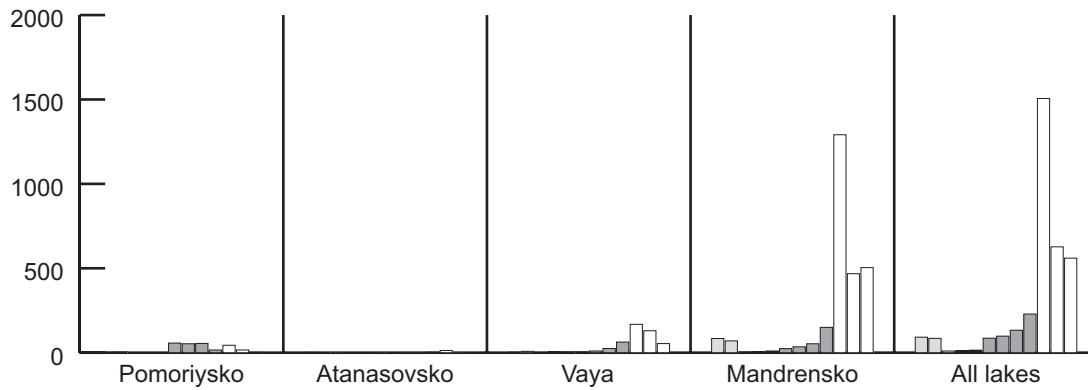


Fig. 2. *Podiceps cristatus*

Vaya (western part of the lake), two on Mandrensko (at the locality 'Batatsite'), two on Ouzoun Geren, two on Cherny Vrukh Fishponds, and three or four on the Estuary of Reka Fakiyska.

Pomoriysko	54	April	1999
Atanasovsko	1	September	2002
Vaya	0	–	–
Mandrensko	2	September	2000

Species Dynamics: In **spring**, most of the birds start leaving for their breeding grounds as early as in January. This continues until mid-February. Later the number of the birds decreases on average by a factor of six. In some years, the birds remain until rather later (Mandrensko and the Zaliv Foros supported 172 and 187 birds respectively until the middle of April in 1999 and 2002).

Summering birds in small numbers occur regularly on all lakes of the BWC (max 53 on 23 June 2000 at Poda, outside the dates of the monitoring). The first autumn build-up is registered as early as the end of July/beginning of August with the birds initially concentrating in the bay off Pomorie and Zaliv Foros and in lesser numbers on the lakes Mandrensko, Vaya and Komloushka Nizina. The number of **autumn** migrants increases gradually from August onwards and migration becomes most intensive in October and November when reaches its max values. For the period of the study the average August-November numbers is 86-229 birds. In December, the number of **wintering** birds increases considerably with absolute max of 5,541 reached in December 1998. After the middle/end of December the number of wintering birds in January and February goes sharply down and the birds leave for their breeding grounds. The most numerous concentrations have been observed at Complex Mandrensko Ezero (Michev & Profirov, 2003).

4.6. Red-necked Grebe – *Podiceps grisegena*

Uncommon in spring, scarce in autumn and winter, rare in summer.

Numbers: The max totals per seasons for the study period were:

Winter	12	Spring	54
Summer	0	Autumn	7

The max totals per lakes for the study period were:

The average number of Red-necked Grebes in BWC was highest in April (max 11 at Complex Pomoriysko Ezero).

Breeding: Common on Mandrensko in 1930 (Harrison & Pateff, 1933), where most probably had bred. During the breeding season the species was registered by Prostov (1964) near lakes Mandrensko and Vaya (on 17 May 1956 a nest with an egg, on 5 July 1960 two young birds). A breeding pair was also found at Poda on 5 July 1966 (Georgiev, 1976). After this season, there were no more observations of breeding on Mandrensko. Three to five pairs had regularly bred on Vaya until the end of 1980s. During the present survey breeding was not found.

Species Dynamics: Spring migration begins early, in February-March, until the beginning of April and passes rather unnoticeably. The earliest observations were made at Poda in February 2003 – with a single bird seen twice, while the latest observation was in Pomoriyski Zaliv (54 birds on 1 April 1999). The dispersal of the birds that breed to the north of the area of Black Sea begins as early as in June. The earliest observation was of two birds at Pomorie, on 30 July 1999. This place is one of the favoured for moulting of the Red-necked Grebes. The migration lasts until the end of October, the species being presented in comparatively low numbers (max seven in 2000); this is an underestimation as the main concentration areas are the bays, which were not well covered. In winter, the species is relatively rare: one on Poda on 27 December 1995, seven on Ouzoun Geren in January 1999 (Kiril Bedev, pers. comm.), and max 12 on 1 December 1999 in Pomoriyski Zaliv. During the 1977-2001 mid-winter counts the species was recorded more often at the wetlands on the SBSC, where the highest winter numbers of nine birds for the country were observed in 1981 at Mandrensko (Michev & Profirov, 2003).

4.7. (Horned) Slavonian Grebe – *Podiceps auritus*

Rare migrant and winter visitor. It is assumed that the species was first proved for Bulgaria by Kumerloeve (1957), with a single observation made on 26 January 1942 in the harbour of Bourgas. During wintering we found it twice: in December 1999 on Pomoriysko and in December 2002 on Poda. Max numbers for Bulgaria (34 in 1985) during the mid-winter counts 1977-2001 were recorded on the neighbouring Dalyana-Vlas Coast (Michev & Profirov, 2003).

4.8. Black-necked Grebe – *Podiceps nigricollis*

Fairly common to common passage and winter visitor, scarce summer visitor.

Numbers: The max totals per seasons for the study period were:

Winter	1,010	Spring	1,135
Summer	2	Autumn	526

The max totals per lakes for the study period were:

Pomoriysko	335	September	2001
Atanasovsko	250	October	1998
Vaya	640	April	2002
Mandrensko	501	March	2001

The average number of Black-necked Grebes was highest in April (**Fig. 3**). Vaya ranks first with 51% of the species' total numbers in BWC.

Breeding: Patev (1950) assumes the Black-necked Grebe breeds in large numbers at Pomoriysko, but this has never been proved. At the time of his studies, Prostov (1964) saw the species breeding in small numbers on Mandrensko and Vaya. Simeonov et al. (1990) report individual pairs breeding regularly in the wetlands around Bourgas but their data are unspecified. During our survey not a sin-

gle breeding pair was recorded on Bourgas Lakes despite the species regular presence there in May. In 2003, a breeding pair was found on the LUKoil Neftochim oxidizing pools near Komloushka Nizina (a pair with four young) on 3 July 2003 (Kiril Bedev, pers. comm.).

Species Dynamics: In spring, from the end of February/beginning of March onwards the wintering Black-necked Grebes start to leave the area and move to their breeding grounds in the north. At the same time, their number at Bourgas Wetlands and off the Black Sea shore increases as the birds wintering south of the region start coming in. The peak concentration of the migrants is in mid-April, when the max total of 1,135 was observed in 1999. Spring migration is most intensive from mid-March to early April. Later, the number of remaining birds rapidly drops. The migration lasts until the end of April, in some years later into May. Very small number of **summering** Black-necked Grebes were seen, with a June record of two in 2001, on Pomoriysko. The mid-July record of 80 in 1996, on Atanasovsko, was most probably of earlier autumn arrivals.

In **autumn**, the first migrants appear at lakes and offshore waters by the end of July/early August. Until mid-August their number remains small. Then gradually increases in September, peaking with 526 in October 1998. These birds form the main part of the **wintering** population in the area, with max 972 recorded in mid-January counts of 1997. It seems likely that the February counts are underestimated, because the lakes are frozen in most of the cases in this month. Under such conditions the wintering Black-necked Grebes move to the bays and off the seashore, where coverage was not good. Almost the entire mid-winter population used to concentrate in the sea off the Bulgarian BSC. During the mid-winter counts the highest numbers (an average of 288 and max 913 in 1995) were recorded on Mandrensko Ezero (Michev & Profirov, 2003).

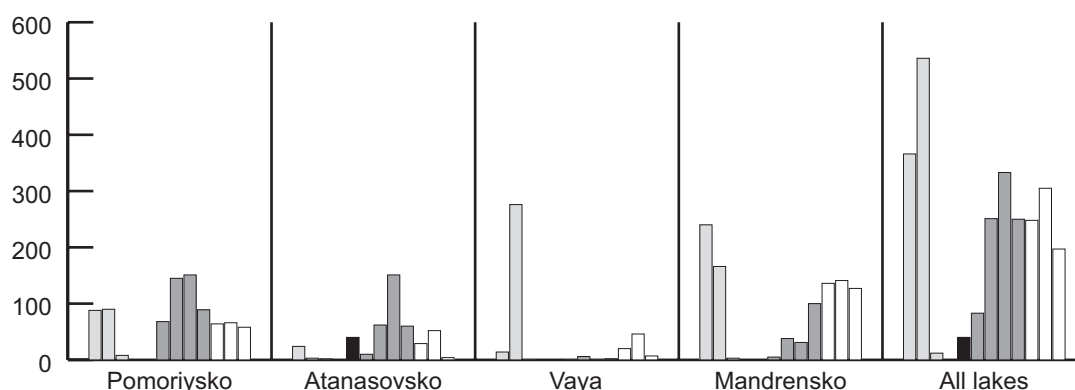


Fig. 3. *Podiceps nigricollis*

4.9. Yelkouan Shearwater – *Puffinus yelkouan*

Rare to abundant passage, summer and winter visitor; wandering. Previously considered as *Puffinus puffinus yelkouan*, regarded recently as a separate species (*Puffinus yelkouan*). First described for the region of Bourgas by Balat (1962). After 1970s, flocks of thousands passing along the western Black Sea coast have been recorded, some reaching 20,000 (Van Impe, 1969; 1975). According to Robel (1974) a number of flocks has been counted in the period 14-20 July 1971 offshore between Nessebar and Cape Kaliakra (some flocks consisting of up to 13,500 individuals), the total number of birds for this period being 37,000. Nankinov (1993, 2001a) reports 'a massive invasion taking place from the Mediterranean into the Black Sea from February until the end of October, with a peak through 'June-September' but with unspecified numbers. We recorded over 2,500 birds in Bourgaski Zaliv from 10 to 15 May 2003, outside the survey period. According to Michev & Profirov (2003) the species had been observed only twice during the mid-winter surveys 1977-2001.

4.10. (Northern) Gannet – *Morus bassanus*

Vagrant. Few observations reported. Vurbanov (1912) had the first country record, with a bird at Bourgas. Subsequent records, both of single birds were reported by Koenigstedt & Robel (1978) on 10 August 1969 at the resort of Sunny Beach, and by Kiril Bedev (pers. comm.) on 8 August 1995, on Ouzoun Geren.

4.11. (Great) Cormorant – *Phalacrocorax carbo*

Common to abundant resident, fairly common breeder.

Numbers: The max totals per seasons for the study period were:

Winter	16,564	Spring	2,337
Summer	1,600	Autumn	5,147

The max totals per lakes for the study period were:

Pomoriysko	1,026	September	1996
Atanasovsko	300	February	1997
Vaya	7,750	February	1999
Mandrensko	11,052	December	1998

The average number of Cormorants was highest in December (**Fig. 4**). Complex Mandrensko Ezero ranks first with 58% of the species' total number in BWC.

The 1-% Ramsar criterion amounts to 1,450 birds. During the period of the survey, the species average numbers exceed this criterion at Complexes Mandrensko Ezero and Ezero Vaya.

Breeding: Reiser (1894) and Harrison, Pateff (1933) observed breeding on the coast south of Bourgas. Prostov (1964) describes the species as 'relatively rare' in the breeding season, with small colonies (up to seven nests at Mandrensko and near Cape Atiya). Breeding was confirmed for Mandrensko by Georgiev (1976) who observed a colony of 50 pairs nesting on Canada Poplars in 1969. This colony existed until 1970 (Simeonov et al., 1990). A small breeding colony on trees west of the Estuary of Reka Marinka survived until 1970s. The breeding colony on pylons at Vaya (with 24 nests) was first discovered by members of the Cambridge 'Ruffs' Expedition to Bulgaria, in May 1985. During the survey the breeding Cormorants formed four colonies at the Wetlands of Bourgas, most of them on pylons. In 1998 a small breeding colony (12 nests) was found on the poplars on the north shore of Mandrensko Lake. Since 1999, after some of the pylons in Vaya were broken, some birds moved to Poda, where they started to form a new breeding colony, again on old pylons. Further disturbance of the pylons in Vaya resulted in more birds of the breeding population moving to Komloushka Nizina and LUKoil-Neftochim oxidizing pools. The number of breeding pairs in studied period is shown on **Table 2**.

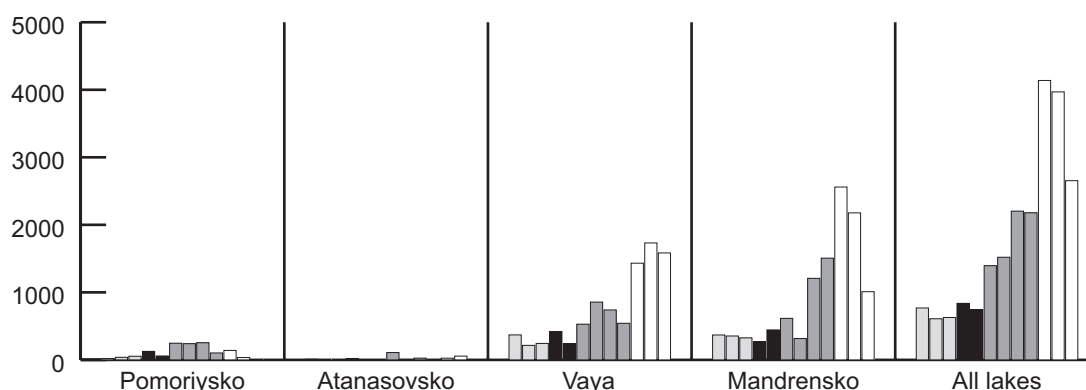


Fig. 4. *Phalacrocorax carbo*

Table 2. Number of Breeding Cormorants (in pairs) during 1985-2002

Wetland/Year	1985	1986-95	1996	1997	1998	1999	2000	2001	2002
Vaya	24	36-173	190	89	289	312	148	112	105
Poda Lagoon*	0	0	0	0	21	154	216	292	260
Komloushka* Nizina	0	0	0	0	0	3	34	140	180
Mandrensko	0	0	0	0	12	46	0	0	0
Total	24	36-173	190	89	322	515	398	544	469

*Anton Kovachev supplied the data on Poda Lagoon and Kiril Bedev – on Komloushka Nizina.

Species Dynamics: Cormorants stay all the year round at the Wetlands of Bourgas. Most of the Cormorants wintering on there start leaving the area and move north from the beginning till mid-February. The numbers decrease significantly in March. At Bourgas Lakes breeding begins by mid-February/beginning of March. Depending on the breeding success, the number of Cormorants in **summer** varies in different years, with max of 1,600 in June 1999. In **autumn**, from the beginning of August, the number starts to grow with the migrants arriving from the north, with max total in August–November being up to 5,147 birds. From mid-November onwards the numbers increase again, and in most of the years of the survey the **wintering** population peaked in January with max of 16,564 in mid-January of 1998. In 2002 and 2003, the number of birds wintering dropped significantly because of overfishing in Mandrensko and Vaya – down to 51 in mid-January 2002. The highest numbers at all lakes of the BWC has been recorded in December, January and February (max 16,564/1997). The wintering birds feed in Mandrensko, Vaya, Ouzoun Geren, and in the sea bays, and roost in trees on the southern slopes of Mandrensko, not far from the 'Debelt' metal factory, as well as on wooden posts in Pomoriysko, on the remains of the pylons in Vaya, on LUKoil Neftochim oxidizing pools and on the canal at Poda. In the 1970s, Johnson & Biber (1971) observed there only 200 in December. Since 1996, the average winter number on Mandrensko has exceeded twice the 1-% and on Vaya the number remained on average 851 (Michev & Profirov, 2003).

4.12. (European) Shag – *Phalacrocorax aristotelis*

Rare autumn and winter visitor.

Breeding: European Shag breeds outside the surveyed area, on the sea cliffs of the Northern Bulgarian Black Sea Coast.

Numbers: Recorded by us only with two **autumn** observations: eight on 1 November 1996 offshore at Pomoriysko, and one in September 2002, offshore at Atanasovsko. Single birds have been observed south of the study area, near Kraymorie (Vatev, 1983), and a flock of 110-150 by Robel et al. (1978) in September 1968, at towns of Obzor and Sozopol.

Species Dynamics: After the breeding season the number increases, some birds having arrived from the Crimean Peninsula. In **autumn**, their number starts to increase because of feeding birds moving from the north down the coast. Only a few birds remain in **winter** in the region of Bourgas Lakes and Tsarevo-Sinemorets sector of the SBSC, with the highest record of 10 in 1988 (Michev & Profirov, 2003).

4.13. Pygmy Cormorant – *Phalacrocorax pygmeus*

Fairly common to common passage, common to abundant wintering, rare breeder.

Numbers: The max totals per seasons for the study period were:

Winter	10,592	Spring	2,862
Summer	16	Autumn	2,008

The max totals per lakes for the study period were:

Pomoriysko	425	September	2002
Atanasovsko	586	December	1999
Vaya	7,323	December	1999
Mandrensko	3,235	February	1999

The average number of Pygmy Cormorants in the region is highest in December (**Fig. 5**). Vaya ranks first place with 68% from the species' total number in BWC.

The 1-% Ramsar criterion is 400 birds. During the period of survey the species numbers exceeded this criterion at Vaya (in four consecutive years) and Mandrensko (in three consecutive years).

Breeding: Prostov (1964) has recorded Pygmy Cormorant in winter and spring only. Recorded by us in a mixed breeding colony on poplar trees with Cormorants and Grey Herons at the north bank of Mandrensko in 1960s, which colony remained there until 1970. During the period 1973-1975 we found c. 200 pairs in the reed-bed at the western end of Vaya. This is the highest ever record of breeding Pygmy Cormorants in the region. At that time, the species was breeding at Mandrensko (Georgiev, 1976), but with unspecified numbers. Our aerial sur-

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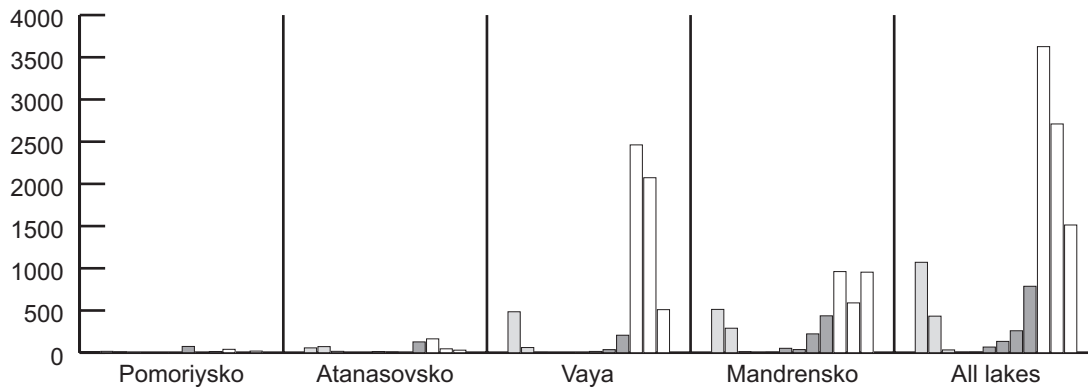


Fig. 5. *Phalacrocorax pygmeus*

vey in late 1980s recorded a breeding colony in the reed-bed to the south-east of Dolno Ezerovo village, with c. 200 pairs. Between 15-40 pairs bred in the reed-bed of Poda and on small acacia trees in Komloushka Nizina until 1992. In 1992, the majority of these trees were burned and the colony ceased to exist. A small breeding colony (c.10) of Pygmy's was recorded during the aerial survey in 1996, again in Komloushka Nizina, this time in the reed-beds. Since then, Pygmy Cormorants have not bred in the area. The disappearance of the species from Komloushka Nizina was due to changes ensuing from the destruction and pollution of the water bodies as well as the intensification of human activities in the area. The number of breeding pairs in 1973-2002 period are given in **Table 3**.

Species Dynamics: In **spring**, the majority of the wintering Pygmy Cormorants starts leaving the region from the beginning/mid-February for their breeding grounds in the north. In March, their number decreases significantly. In colder weather quite a number of Pygmy Cormorants remains in March and even in April. Thus, 2,862 were counted in March and 1,371 in April, 1999. The migration continues until the end of April. In **summer**, their numbers vary in different years (max 16 in June 1999). In **autumn**, from the beginning of August onwards, the numbers start to build up on account of migrants arriving from the Danube Delta. The highest monthly totals for the period August to November was 147-2,008 birds. From the beginning/mid-November the number of Pygmy Cormorants increases significantly, and in most years of the survey the **wintering** population

peaked in December/January, reaching max 10,592 in December 1999. SBSC has been the most important wintering area for the Pygmy Cormorants during the last few years. The species' wintering population in Bulgaria has been increasing since 1982. During 1997-2001 mid-winter surveys the average total increased from 315 in 1977-1996 to 8,500, with max of 13,095 in 2000 (Michev & Profirov, 2003). The species is most numerous from November to March, when the peak numbers are reached. Vaya and Mandrensko retain the largest winter concentrations.



Table 3. Number of Breeding Pygmy Cormorants (in pairs) in BWC during 1973-2002

Wetland/Year	1960s	1973-1975	1979-1982	1988-1990	1991-1992	1993-1996	1997-2002
Vaya	-	c. 200	80-100	c. 200	0	-	0
Poda	-	15-20	15-20	15-20	20-30	0	0
Komloushka	-	+	+	c. 30-40	30-40	c. 10	0
Mandrensko	c. 40	+	0	0	0	0	0
Total	>40	>215	>105	>250	c. 60	10	0

Several simultaneous winter counts were run by our monitoring team with the help of birdwatchers, manning a number of watch-points at the four Bourgas Lakes. Double counts (when they occurred) were taken into account. The results showed a significant increase of the wintering population of Pygmy Cormorants in the region since 1998. The wintering birds leave the roost between 6.30 – 9.20 a.m., with most of them departing between 6.35-8.00 a.m. The largest single flock consisted of up to 2,500 birds.

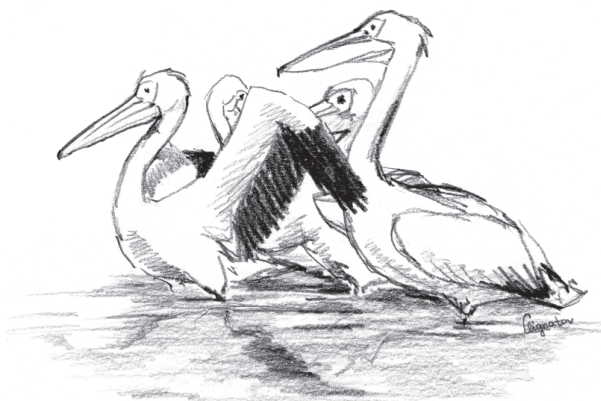
4.14. (Great) White Pelican – *Pelecanus onocrotalus*

Common spring to abundant autumn migrant, common summer and uncommon wintering.

Numbers: The max totals per seasons for the study period was:

Winter	37	Spring	2,376
Summer	3,150	Autumn	10,032

During the period of survey the highest species numbers were:



Pomoriysko	90	September	1998
Atanasovsko	6,000	September	1999
Vaya	5,480	August	1999
Mandrensko	1,018	April	2002

The average number of White Pelicans in the region was highest in September (**Fig. 6**). Vaya ranks first with 63% of the species' total number in BWC.

Breeding: In the first half of 20th century White Pelicans bred in a large colony at Mandrensko (Drensky, 1930). Patev (1950) mentions about 100 pairs there. Data of birds seen during the breeding seasons in that period were supplied by Harrison (1933), with about 300 on Mandrensko. Prostov (1964) reports the species having bred there until about 1944. According to Arabadzhiev (1974), the breeding colony remained until 1958, when a few scores of pairs had still bred. Building of dikes and constructing of a dam in 1960s destroyed the colonies at Mandrensko and White Pelicans ceased to breed there.

Species Dynamics: In **spring**, the first White Pelicans arrive at Bourgas Lakes in the beginning of March, but the larger flocks start coming from the middle of the month onwards. The migration is most intensive in April, with max 2,376 in 1999, and continues in May (max 2,000 in 2001). The number of **summering** birds did not exceed 200 until recently. In some cases, as in 1999, exceptionally high numbers of 3,150 in June and 2,850 in July stayed mostly on Vaya and Atanasovsko; this being due to stocking these two lakes with fish several years ago. According to Crivelli et al. (1991) the peak of the **autumn** migration is in mid-September, when the max number in a single day was c. 8,000. Our data confirm these records. The total number of autumn migrants exceeds 20,000 birds. First flocks start to arrive from the beginning of August onwards, and their numbers increase during September. At that time, pelicans concentrate mainly on Vaya and to a lesser degree on Atanasovsko and Mandrensko. The majority of migrating flocks leave the surveyed area

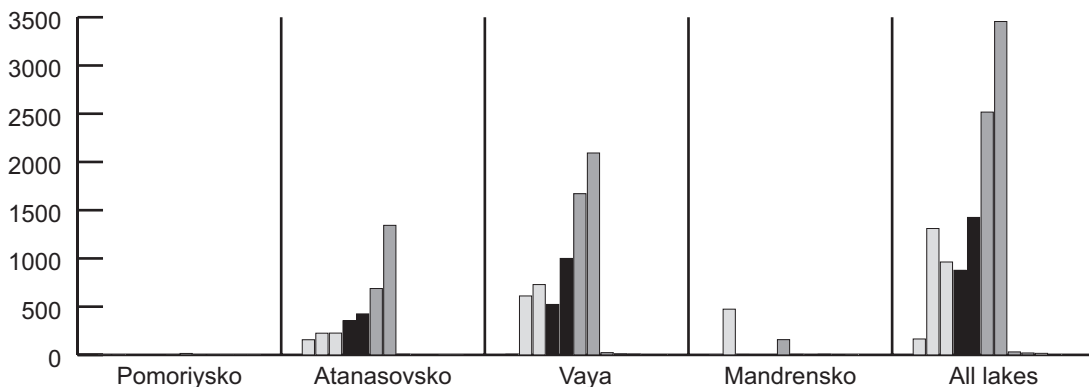


Fig. 6. *Pelecanus onocrotalus*

to their wintering grounds in Africa by the end of September. In September 1999, outside the dates of the monitoring, we obtained a peak autumn record of 13,500, and up to 23,000 outside the survey period in 2003. The migration continues in October and November. A small number of single birds or small groups **winter** regularly mainly on Vaya, with max 37 on 15 December 2000. Max mid-winter number in Bulgaria was recorded at Mandrensko – 69 in 1988 (Michev & Profirov, 2003).

4.15. Dalmatian Pelican – *Pelecanus crispus*

Uncommon to fairly common migrant uncommon summer and fairly common winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	647	Spring	118
Summer	48	Autumn	109

The max totals per lakes for the study period were:

Pomoriysko	8	November	2001
Atanasovsko	381	December	1999
Vaya	323	January	1999
Mandrensko	503	December	2001

The average number of Dalmatian Pelicans in the region was highest in December (**Fig. 7**). Atanasovsko ranks first with 38% of the species' total number in BWC.

The 1-% Ramsar criterion is 30 birds. During the period of survey the species numbers regularly exceeded this criterion for Atanasovsko, Vaya and Mandrensko.

Breeding: Simeonov et al. (1990) report the species as breeding in the past at Mandrensko (see Map 7).

Species Dynamics: In **spring**, from the end of February the wintering Dalmatian Pelicans start

to leave the region. The migration continues until the end of March with the numbers gradually decreasing. The max February counts reached 311 in 1997, while March counts peaked with 118 in 1999. In April and May, Dalmatian Pelicans were present in the surveyed area, with max 40 in April 1999. Non-breeding and young birds occur regularly in **summer**, with max 48 in June 2002, at Atanasovsko. In **autumn**, the first Dalmatians start arriving from the beginning/mid-August onwards and gradually increase in numbers until the end of November, building up the wintering population. During the survey we obtained the max August data of 43 in 2002; September, 61 in 1996; October, 57 in 2001; and November, 126 in 2002. From the beginning to mid-November the number of Dalmatians begins to increase noticeably, reaching a peak of the **wintering** birds in December (max 639 in 1999) and January. The max total of 647 was recorded in January 1999, outside of the survey dates. Wintering Dalmatian Pelicans concentrate predominantly on Atanasovsko, Vaya and Mandrensko. They use Vaya and Mandrensko to forage, while for roosting they prefer the dikes of Atanasovsko. Data collected during the survey indicate that the numbers of wintering Dalmatian Pelicans in the region has increased significantly compared to previous periods. According to Michev & Profirov (2003) there is a long-term trend towards continuous increase of the mid-winter numbers of Dalmatian Pelican in Bulgaria.

4.16. (Great) Bittern – *Botaurus stellaris*

Scarce spring and autumn, uncommon winter visitor, scarce breeder.

Numbers: The max totals per seasons for the study period were:

Winter	14	Spring	3
Summer	1	Autumn	1

The max totals per lakes for the study period were:

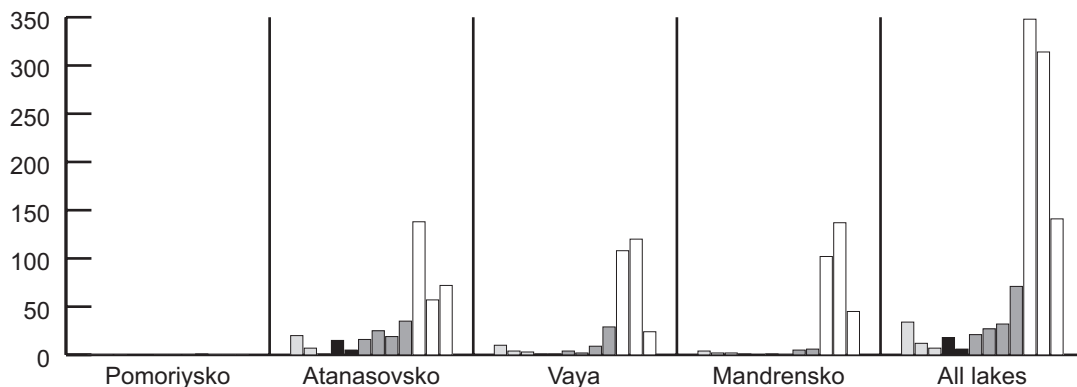


Fig. 7. *Pelecanus crispus*

Pomoriysko	1	December	2002
Atanasovsko	2	December	1998
Vaya	10	January	1999
Mandrensko	9	December	1998

The average number of Great Bitterns was highest in December (max five).

Breeding: Breeding of the species in the region is beyond doubt, though no nests have been found so far. Probably the number of breeding pairs does not exceed three or four. In the past, Harrison (1933) reports a booming male at Mandrensko, on 14 May. Prostov (1964) reports the species as very rare breeder at Mandrensko and Vaya. One was observed in June 1995, at Ouzoun Geren and two by the end of May 1992 at the western part of Vaya (Kiril Bedev, pers. comm.). Might breed at Poda.

Species Dynamics: The local breeding population is augmented by birds arriving from north of the range, which makes it rather difficult to define the periods of migration more precisely. The 1996-2002 survey data showed that in **spring** the Great Bitterns wintering here start to leave the area and their number decreases from the beginning/mid-February onwards. The migration continues until the end of April. We have a May record of one bird on 15 May 2001, at Atanasovsko. **Summer** records are: one on 1 June 1999 at Poda, one on 15 June 2001, at Vaya and a mid-July observation of one at Vaya in 1996, the last one hinting at possible breeding. First **autumn** migrant was recorded at Poda, on 15 September 1996. The number of **wintering** birds increases from the end of November/beginning of December onwards, reaching a December max total of 14 in 1998, when the majority of birds came from Mandrensko (Komloushka Nizina and the oxidizing pools). Another high number of 12 were recorded during mid-January counts, 10 of them at Vaya. The wintering Great Bitterns concentrate around the point where the warm water from the municipal wastewater treatment plant flows into the lake, as well as amidst the reed-beds in the western part of the lake. Cherny Vrukh Fishponds is another favorite wintering place. The max mid-winter number in Bulgaria was recorded at Complex Mandrensko Ezero and Vaya (Michev & Profirov, 2003).

4.17. Little Bittern – *Ixobrychus minutus*

Scarce migrant and uncommon breeder.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	8
Summer	15	Autumn	8

During surveyed period the highest species numbers were:

Pomoriysko	1	July	1996
Atanasovsko	5	June	2001
Vaya	10	June	2001
Mandrensko	5	July	1996

The average number of Little Bitterns in BWC was highest in July (max 13). The numbers of Little Bitterns was certainly underestimated, because of the bird's secretive behaviour.

Breeding: Prostov (1964) and Georgiev (1976) report the Little Bittern as a common breeding species around Bourgas. Estimated breeding pairs for the period of survey are: 25-30 at the by-pass canal of Atanasovsko; c. 15 at LUKoil-Neftochim oxidizing pools and Ouzoun Geren (Kiril Bedev, pers. comm.), c. 10 in Komloushka Nizina, min 30 at Vaya, min 20-30 at Mandrensko (the estuaries of Fakiyska, Izvorska included); a few at Pomoriysko.

Species Dynamics: In **spring**, the first Little Bitterns arrive from the second half of March onwards, with the earliest record reported by Prostov (1964) on 11 March. The migration increases by the end of April/first half of May when it is the most intensive, and lasts until the end of the month. In **summer**, July numbers increase (max 14 in 1996) because of the arrival of young birds. In **autumn**, the number of Little Bitterns begins to decrease from mid-August onwards, and the majority of birds leave the area in the first half of September. The migration lasts until the end of September. Generally, the species migration is not very noticeable. There are no records of **wintering** birds but judging by a few separate observations recorded in other parts of Bulgaria (Simeonov et al., 1990), it is likely that they are found in BWC as well.

4.18. (Black-crowned) Night Heron – *Nycticorax nycticorax*

Uncommon summer visitor and breeder, scarce to uncommon wintering.

Numbers: The max totals per season for the period of the survey was:

Winter	85	Spring	342
Summer	69	Autumn	202

During surveyed period the highest species numbers were:

Pomoriysko	8	September	1998
Atanasovsko	20	July	1999
Vaya	230	April	2000
Mandrensko	275	April	2002

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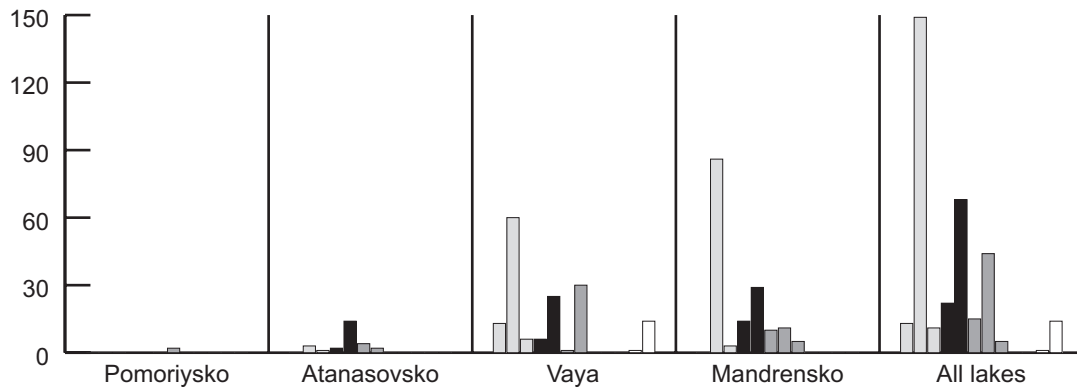


Fig. 8. *Nycticorax nycticorax*

The average number of Night Herons was highest in April (Fig. 8). The Complex Mandrensko Ezero ranks first with 58% of the species' total number in BWC.

Breeding: Reported as breeding in the coastal wetlands in the past (Reiser, 1894; Patev, 1950). Night Heron bred at Mandrensko in a mixed heron colony until 1968 with more than 50 pairs on a floating reed islet. More than 100 bred on dry poplars trees at Komlushka together with Gray Herons until mid-70s. During the 1996-2002 survey, 20-30 pairs were regularly counted at Poda, and 15-30 pairs in the reed-bed of northern Vaya near Dolno Ezerovo in a mixed heron colony. At Poda and Vaya the species breeds in mixed colonies with Squacco Herons as well as with Purple Heron, Glossy Ibis and Spoonbill. The number of breeding pairs in the period of 1970-2002 is shown on Table 4.

Species Dynamics: In spring, Night Herons start to arrive from mid-March onwards. The earliest record is reported by Prostov (1964), on 5 March 1952. The migration is most intensive between end of March/mid-April, reaching max 342 on 15 April 2002. After mid-April, the migration slows down, but a small number of birds pass until mid-May. In summer, the number of birds starts to increase at the end of June/beginning of July on account of the young birds hatched the same spring. In June/August, flocks of Night Herons of mixed age can be found at all the wetlands around Bourgas, except Pomoriysko, with max totals of 69 in July 1999. Autumn migration begins from mid-August onwards, and is most intensive in September, when birds breeding to the north

of the region start to come in, with max of 202 recorded in 1999. The favourite roost in this period is the reed-beds in the western part of Vaya. Outside the dates of the survey 60 were observed on 18 September 1995, at Poda. The migration lasts until the end of October, but odd birds may be seen until mid-November. **Wintering** Night Herons were recorded in two of the survey years at Vaya, with max 85 in mid-February 2002. The birds stayed in the reed-beds of the canal connecting Vaya with the Black Sea. Night Heron was a rare wintering species during the period of the 1977-2001 mid-winter survey (Michev & Profirov, 2003).



Table 4. Number of breeding Night Herons (in pairs) in BWC during 1980-2002

Wetland/Year	Until 70s	1988-1991	1995	1996	1997- 1998	1999	2000	2001	2002
Vaya	c. 30	c. 30	c. 30	c. 30	c. 30	min 15	min 20	min 20	min 20
Poda	?	?	29	30	30	min 25	min 20	20	23
Ouzoun Geren	>100	0	0	0	0	0	0	0	0
Komloushka	>100	20-25	0	0	0	0	0	0	0
Total	>230	>50	c. 59	c. 60	c. 60	>40	>40	>40	>43

4.19. Squacco Heron – *Ardeola ralloides*

Uncommon to fairly common migrant and summer visitor, uncommon breeder.

Numbers: The max totals per season for the period of the survey were:

Winter	0	Spring	30
Summer	85	Autumn	126

During surveyed period the highest species numbers were:

Pomoriysko	6	May	1999
Atanasovsko	17	August	1999
Vaya	81	August	1996
Mandrensko	45	August	1996

The average number of Squacco Herons was highest in July (**Fig. 9**). Vaya ranks first with 75% of the species' total number in BWC.

Breeding: Squacco Heron is reported as breeding at Mandrensko by Prostov (1964), with a small colony of four pairs in 1956. This author assumed the species was breeding at Vaya too. Breeding at Mandrensko was later confirmed by Georgiev (1976) for the period of 1962-1970. Since 1997 Squacco Heron ceased to breed at Komloushka Nizina. In the reedbeds of the north-western part of Vaya near Dolno Ezerovo, 25-30 pairs breed regularly in a mixed colo-

ny of Little Egret, Night and Grey Heron. The species breeding numbers is shown on **Table 5**.

Species Dynamics: In **spring**, Squacco Herons arrive by the end of March/beginning of April. The migration increases in April and becomes most intensive in the first half of May, reaching max total of 30 during the mid-May counts of 1999. Then the number of migrants drops, but a small number still migrates until the end of May. In **summer**, from early July until early August the number of Squacco Herons at BWC increases again, mainly at Vaya and Mandrensko, on account of dispersing young birds hatched that same spring. We recorded max 124 in August 1996. The majority of birds in this period came from Vaya, and less from Mandrensko. In **autumn**, the migration begins from mid-August onwards, and becomes most intensive around mid-September. By the end of September the majority of Squacco Herons have left the region. In small numbers they migrate until mid/second half of October, when the migration is over. Squacco Heron occurs on migration singly, or in small groups of up to ten birds. No **wintering** records have been made during the period of survey.

4.20. Cattle Egret – *Bubulcus ibis*

Sporadically wandering species for Bourgas Wetlands.

Numbers: Most of the observations have so far been made in spring and summer. Recorded by Jordans (1940) with three to five at Mandrensko in May 1938. Boev (1962) reports a group of eight between 1 and 5 June 1953, at Atanasovsko. The species was not re-

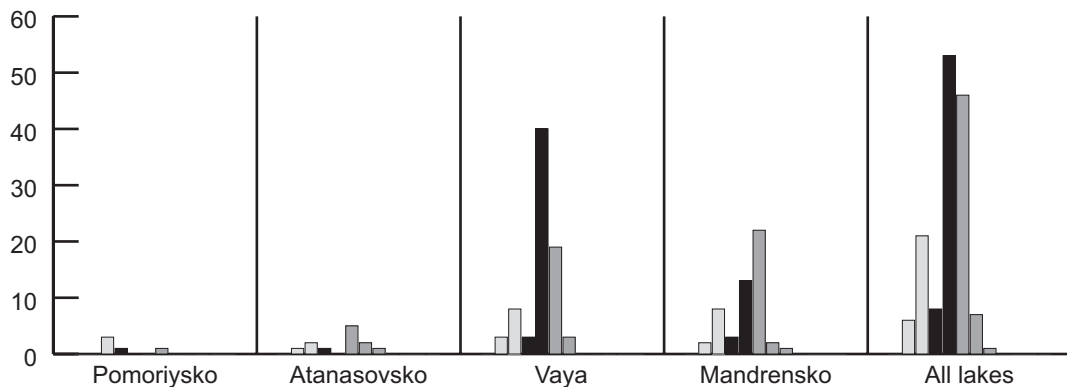


Fig. 9. *Ardeola ralloides*

Table 5. Number of breeding Squacco Herons (in pairs) in BWC during 1980-2002

Wetland	Until 70s	80s	1994-1996	1997 – 1998	1999	2000	2001	2002
Vaya	+	>50	30	30	35	30	30	30
Poda	0	0	0	2	2	6	5	9
Komloushka	?	c. 50	c.30	0	0	0	0	0
Mandrensko	>100	0	0	0	0	0	0	0
Total	>100	>100	>60	>32	>37	>36	>35	>39

corded between 1961 and 1980 (Simeonov et al., 1990). We observed one on 24 May 1994 and one on 26 May 1995, both records made near the former Vaya Fishponds. During the period of survey one was recorded in May-June 1997 and one on 15 June 2000, at Vaya. Outside the survey period one was seen on 5 May 2003 at Ouzoun Geren, and two on 7 May there the same year (I. Dimchev, V. Vasilev – pers. comm.).

4.21. (Western) Reef Egret – *Egretta gularis*

Vagrant. Dimorphic species considered by some authors as a conspecific with Little Egret (*Egretta garzetta*). The first and only record for the country up to now came from Poda with a single bird on 1 June 1999 (Profirov, 1999) and same bird on 3 June 1999 (Georgiewa, 1999). The bird was the dark phase of the eastern race, *Egretta g. schistacea* (immat.). We suppose the bird was of wild origin, most probably a vagrant from the eastern range of the species (Red Sea and Persian Gulf coasts). On a few occasions vagrant Reef Egrets have reached neighbouring former Yugoslavia and Greece. A number of records from Central Europe are considered escapes from parks in Austria and Germany.

4.22. Little Egret – *Egretta garzetta*

Uncommon to fairly common summer visitor, uncommon breeder and rare wintering bird.

Numbers: The max totals per season for the period of the survey were:

Winter	4	Spring	153
Summer	525	Autumn	583

During surveyed period the highest species numbers were:

Pomoriysko	233	August	2001
Atanasovsko	297	July	1996
Vaya	112	September	1996
Mandrensko	182	July	1996

The average number of Little Egret was highest in July and August (**Fig. 10**). Complex Atanasovsko Ezero ranks first with 54% of the species' total number in BWC.

The 1-% Ramsar criterion is 580 birds. During the period of survey the species numbers exceeded this criterion for the entire BWC in July 1996 and August 1999.

Breeding: Prostov (1964) describes the species as breeding relatively often at Mandrensko and Vaya, with a colony of up to six pairs. Between 1981 and 1985, c. 30 pairs bred in the mixed colony at Ouzoun Geren. After burning the reed-beds in 1985, the colony moved to Poda. Since 1997, Little Egret has disappeared as breeding in Komloushka Nizina (c. 30 br. pairs in 1996). Nowadays the species breeds in the reed-bed of Poda (65-70 pairs together with Night, Squacco, and Grey Herons and Spoonbills). Another mixed colony of c. 25 pairs was formed in the reed-bed of north-western parts of Vaya near Dolno Ezerovo (with Night, Squacco, and Grey Heron). The species breeding numbers is shown on **Table 6**.

Species Dynamics: In **spring**, the first Little Egrets arrive by mid-March. Then the number of migrants rapidly increases until the end of the month, reaching max of 153 in early April of the year 2000. The main migration continues in April and lasts until mid-May, when max of 143 was recorded in 1999. Since the local Little Egrets start to breed in the first half of May, some of the migrants recorded after that, until the end of the month, are possibly birds breeding further north of Bourgas Wetlands. During spring migration Little Egrets do not form large flocks and arrive in small groups up to a few scores. After the breeding season is over, from the end of June/beginning of July onwards the number of Little Egrets increases again on account of dispersal of young birds. During this period the greater part of the local population and the young birds move from Poda and Vaya to Atanasovsko and Pomoriysko, where they find suitable feeding grounds and form concentrations,

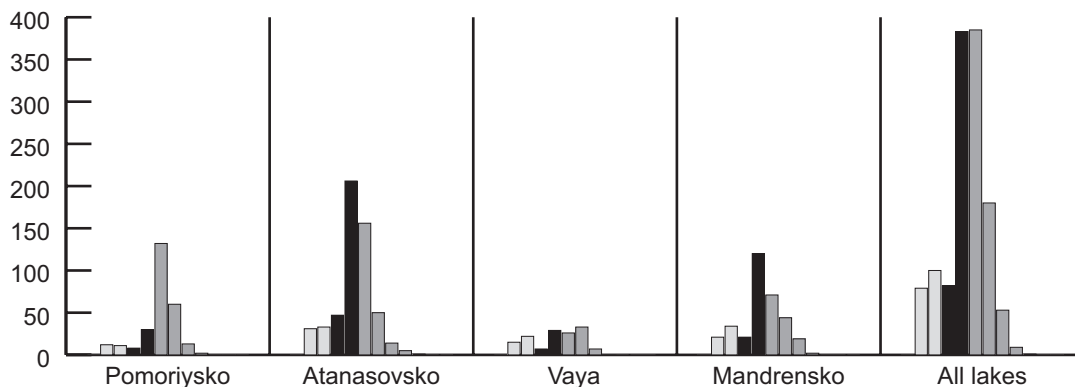


Fig. 10. *Egretta garzetta*

Table 6. Number of breeding Little Egrets (in pairs) in BWC during 1979-2002

Wetland/Year	1979-1982	1981-1985	1986-1990	1991-1994	1995	1996	1998	1999	2000	2001	2002
Vaya	40	30	c. 30	c. 35	c. 35	c. 35	c. 35	40	40	40	41
Poda	0	0	c. 30	50-60	72	c. 70	c. 70	c. 40	c. 40	40	c. 70
Ouzoun Geren	+	c. 30	0	0	0	0	0	0	0	0	0
Komloushka	-	?	c. 45-50	c. 30	c. 20	c. 30	0	0	0	0	0
Mandrensko	0	0	0	0	0	0	0	0	0	0	0
Total	40	c. 60	c. 105-110	>120	c. 127	c. 135	c. 105	>80	>80	>80	>111

with up to 233 on 1 August 2001 on Pomoriysko, and 294 on 30 July 1999 at Atanasovsko.

Georgiev (1976) reports up to 350 at Atanasovsko, on 5 August 1967. The species' numbers is highest from mid-July until the end of the first week of August. In some years its number in the beginning of August is higher than in July, following the dispersal of young birds. In mid-August the numbers decreases noticeably, then go down gradually until the migration is over by the end of October. In some years, in the beginning of September a second wave of arriving birds that have bred further north in the region is observed (156 birds on 1 September 1996 at Pomorie, and 112 birds at Vaya; on 29 September 1996, 106 at Poda). Single birds continue to migrate until mid-November, some staying even into December.

Wintering of individual birds around Bourgas is reported by Prostov (1964) for December. During the period of 1996-2002 we had five December records of one bird at each of the Atanasovsko, Vaya, Pomoriysko and Mandrensko, and max of three on 1 December 1996, at Atanasovsko. The only January record was of a single bird on 20 January 2003, at Ouzoun Geren. Outside the dates of the survey one was recorded on 7 December 1995, in Poda. Rare until 1996, the species was a more frequent and regular winter visitor between 1997 and 2001, with max total of 18 in 2000 (Michev & Profirov, 2003).

4.23. (Great) Egret – *Egretta alba*

Uncommon to fairly common migrant and winter visitor, rare breeder.

Numbers: The max totals per seasons for the study period were:

Winter	877	Spring	63
Summer	4	Autumn	140

The max totals per lakes for the study period were:

Pomoriysko	25	December	1998
Atanasovsko	125	November	2001
Vaya	687	December	2001
Mandrensko	446	February	1997

The average number of Great Egrets was highest in January (**Fig. 11**). Complex Ezero Vaya ranks first with 56% of the species' total number in BWC.

The 1-% Ramsar criterion is 470 birds. During the period of survey, the species numbers exceeded this criterion for Vaya in January 2000 and December 2001.

Breeding: BWC is one of the few known breeding localities of Great Egret in Bulgaria. Reiser (1894) mentions it as breeding at Mandrensko Ezero. Then Harrison, Pateff (1933) give the species as not breeding in Bulgaria. Jordans (1940), Balat (1962), Doncev (1963) and Hubalek (1978) report on observations made during the breeding season. Prostov (1964) gives the Great Egret as breeding at Vaya (a nest found on 7 June 1957), but he did not find it breeding in the period 1946-1956. Since then and until the time this survey was carried out, breeding has not been reported for the region. A bird was seen on 6 May 1960 at Vaya (Mountfort & Ferguson-Lees, 1961) and Michev (1985) reports a pair seen at Vaya on 18 June 1979. During the 1996-2002 survey a pair bred in 1996 at the reed-beds of Vaya Fishponds, and another pair had supposedly bred at Atanasovsko in 2004.

Species Dynamics: In **spring**, the numbers of the Great Egret population wintering in the area decreases as the birds start to leave for their breeding grounds to the north from mid-February onwards. In colder winters they leave at a later time – by the end of February/beginning of March. By mid-March, the number of remaining Great Egrets falls significantly and the max total in 1999 was 63. A small number of migrants and non-breeding birds have regularly been recorded at BWC during April (max 20 in 1999) and May (max five in 1996). **Summer** records came from two years of the survey, with up to four in June 1999 at Mandrensko and Atanasovsko and two in July 1996, at Vaya. In **autumn**, the first arrivals from the north (the region of the Sea of Azov and the Danube Delta) appear from the beginning of August onwards at Pomoriysko, Atanasovsko, Poda, Ouzoun Geren and the Estuary of Reka Izvorska. Then the number of migrating birds starts to increase gradually reaching max total of 47 during the mid-October 1996. The number of migrants at Vaya increases, too. In No-

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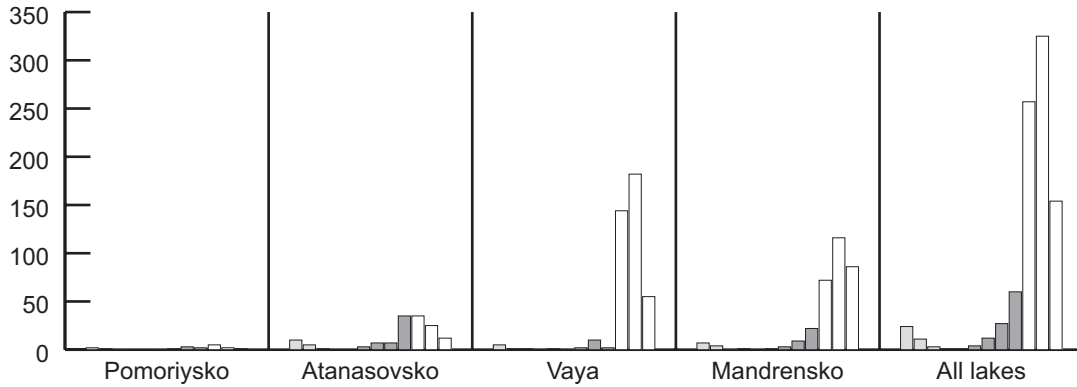


Fig. 11. *Egretta alba*

ember the number of Great Egrets is still low, though twice as high on the average; these birds start to form the local wintering population. November counts yielded 37 at Poda in 2000 and 125 in 2001 at Atanasovsko. In **winter**, depending on the weather conditions in different years of the survey, the December-February numbers fluctuated, with the average highest in January. Thus, in colder weather we noticed max December total of 790 in 2001, 877 in January 2000, and 644 in February 1997. In milder winters, the numbers is low, for instance the max 68 in December 2002. When the lakes froze, the greater part of the wintering population concentrated at Vaya, along the banks of Reka Aytoska near its estuary. In the period 1977-1996, the Great Egret was fairly common wintering species with average total numbers of 201, and max total of 622 in 1996. In the period 1997-2001, a significant increase of the species' winter population was registered, with the average total numbers reaching 974 and max total of 1,217 in 1997 (Michev & Profirov, 2003).

4.24. Grey Heron – *Ardea cinerea*

Fairly common migrant, wintering and breeder.

Numbers: The max totals per seasons for the study period were:

Winter	236	Spring	195
Summer	113	Autumn	212

The max totals per lakes for the study period were:

Pomoriysko	85	April	1999
Atanasovsko	72	March	2001
Vaya	100	December	2001
Mandrensko	107	October	2000

The average number of Grey Herons was highest in September and October (**Fig. 12**). Complex Mandrensko Ezero ranks first with 63% of the species' total number in BWC.

Breeding: In the past had bred in all the Bourgas Lakes, but Atanasovsko (Patev, 1950; Prostov, 1964). Between 1996-2002 Great Herons form large mixed colony at Poda (55-70 pairs), and a smaller one in the western part of Vaya reed-bed (near Dolno Ezerovo village). A few pairs breed at Ouzoun Geren, the Estuary of Izvorska, at Cherny Vrukh Fishponds as well as in the reed-bed of the central-north and south-west Vaya. In 1980s, some ten pairs bred regularly in the reed-bed in the north-west end of Atanasovsko and few pairs might still be breeding there. Grey Herons breeding season starts in the first half of March, and the young birds show up from mid-April onwards.

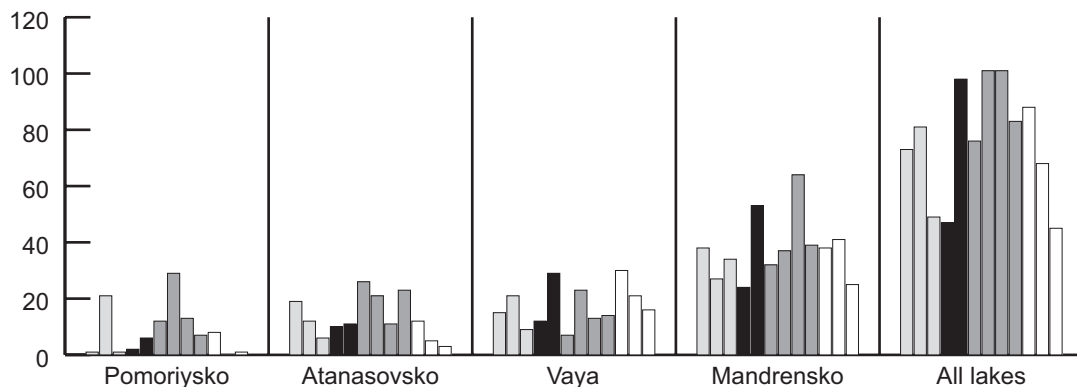


Fig. 12. *Ardea cinerea*

Table 7. Number of breeding Grey Herons (in pairs) in BWC during 1981-2002

Wetland/Year	1981-85	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Vaya	> 30	25-30	c. 25	c. 30	c. 25	c. 30	c. 30	c. 30	c. 30	c. 30	c. 30	c. 30	c. 30
Poda	0	35-40	35-40	35-40	35-40	57	55-60	>30	>30	>30	>40	43	50
Ouzoun Geren	c. 40	c. 5	3	3	3	c. 5	c. 5	3	1	1	2	2	3
Komloushka	0	c. 10	c. 10	c. 10	15	14	c. 10	0	0	0	0	0	0
Oxidizing Pools	0	0	0	0	0	0	0	0	0	0	0	0	6
Total	> 70	70-85	73-78	78-83	78-83	106	100-105	> 63	> 61	> 61	> 72	75	> 89

Breeding season is prolonged and young birds keep on coming over until the end of July. In 1970s, there was a Grey Herons' breeding colony of up to 67 pairs on poplars in Komloushka Nizina, in front of the military unit 'Kapcheto' (Michev & Petrov, 1984). This colony existed until 1980 when the last poplar trees dried and fell down. In the 1970s, Grey Herons bred in mixed colony in the reed-bed of Ouzoun Geren (35 pairs in 1975, and 21 pairs in 1976) and at Western Vaya, near the fishponds. This colony existed until 1984. There had been a colony on the north shore of Mandrensko between 1960-1970. At Vaya, 10-15 pairs formed a colony near Dolno Ezerovo and another 15, at the westernmost part of the lake in the last years. In 2002, Grey Herons started to breed for the first time at 'LUKoil-Neftochim' oxidizing pools, forming a small colony of six pairs near Pool No. 2, which grew up to 18 in 2003 (Kiril Bedev, pers. comm.). The species breeding numbers in BWC is shown on **Table 7**.

Species Dynamics: In **spring**, the first Grey Herons arrive in the end of February, singly, in small groups or in flocks of up to several scores. The migration intensifies in March, reaching max of 140 in 1999. While local breeders start nesting in the first half of March, the number of migrants increases in the second half of March and April, with birds breeding further north. We obtained a max spring total of 195 during mid-April 1999. In some years, a late migration was observed with a total of 106 in May 2002 (93 of them at Mandrensko). In **summer**, from mid-June onwards, after the first young birds have arrived, the numbers of Grey Herons increases, reaching max of 113 in June 1996 and July 1999. The number of birds in these months was underestimated – actually it was higher, as some young birds disperse around the nearby smaller water bodies. The number of Grey Herons remains high in August, after some of the young that have hatched later join the adults, with max reaching 110 in August 1999. **Autumn** migration begins from mid-August onwards, when the numbers of local population falls because of birds leaving the breeding sites in BWC for their wintering grounds to the south. A second wave is recorded in October, with the numbers increasing after the birds from the northern breeding haunts have arrived. Most of these birds form the local winter population. In some years, the birds from the north arrive earlier, as was the case

with 190 seen on 18 September 1995 at Poda. The migration continues in November with the numbers increasing up to 212 in 2001. The migration lasts until the end of the same month. In **winter**, depending on weather, the number of Grey Herons may increase when the water bodies freeze and the birds wintering further north move southwards into the region of BWC where they had concentrated in November 2001. In January and February, the number of Grey Herons gradually falls, as some of the birds begin to move northwards, reaching max of 141 in 1997 and of 80 in 2002. Some of the local breeders probably winter in BWC. During 1977 through 1996 this was a fairly common wintering species with average total number of 155, max total of 422 in 1996. The wintering population in Bulgaria has been on the increase since 1995. From 1997 to 2001 this trend has continued and the average total numbers reached 672, with max 1,072 in 1999 (Michev & Profirov, 2003).

4.25. Purple Heron – *Ardea purpurea*

Uncommon migrant and breeder; very rare winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	0*	Spring	87
Summer	15	Autumn	13

*The only **winter** record was from Mandrensko, outside the survey period, with one seen on 15 January 1984.

During surveyed period the highest species numbers were:

Pomoriysko	9	April	2002
Atanasovsko	75	April	2002
Vaya	12	July	1999
Mandrensko	12	April	2001

The average number of Purple Herons is highest in April (**Fig. 13**). Complex Atanasovsko Ezero held max average number, with 67% of the species' total numbers in BWC.

Breeding: Reiser (1894) and Harrison (1933) report observations made during the breeding season in the

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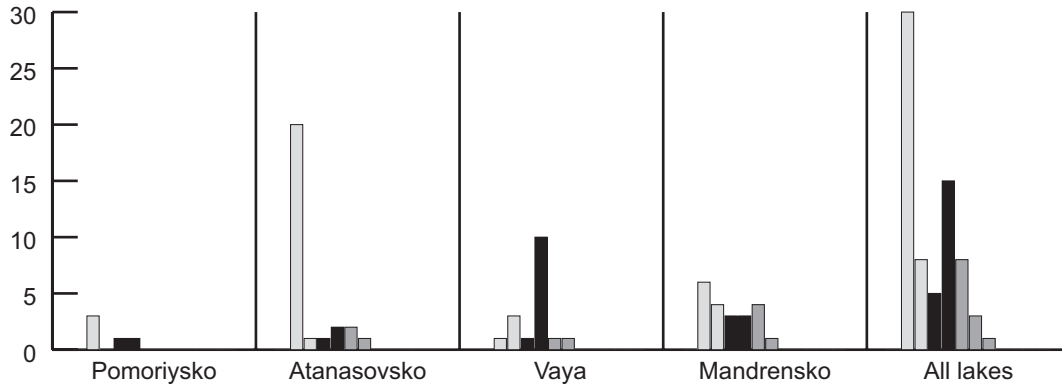


Fig. 13. *Ardea purpurea*

region. Patev (1950) gives the species as breeding in the wetlands along the Black Sea. Prostov (1964) reports Purple Heron as breeding in all Bourgas Lakes, with the exception of Atanasovsko.

During 1996-2002, Purple Herons form separate colonies at Poda, on both sides of the mixed colony. Nests in sparse low-numbered pure colonies or on the periphery of the large mixed colonies of Herons, Glossy Ibises and Spoonbills. Though rarely, single pairs breed in the reed-bed of Vaya near Dolno Ezerovo and by the Estuary of Reka Izvorska. In the 1970s, Purple Herons bred in mixed colony in the reed-bed of Vaya (near the fishponds) and remained there until the present day. Up to five pairs bred in the reedbed of the north-west part of Atanasovsko in the 1980s. The Purple Herons' breeding season starts in mid-April, and the first young birds emerge in early June. The breeding season continues until mid-July, then until early August the young birds leave the nests and disperse around the colonies, at Ouzoun Geren, Cherny Vrukh Fishponds, Vaya, Mandrensko, rarely at Pomoriysko. In 2003, Purple Herons (one pair) started to breed at LUKoil-Neftochim's oxidizing pools (Kiril Bedev, pers. comm.). Data on breeding pairs in BWC by years are given in **Table 8**.

Species Dynamics: In **spring**, the first Purple Herons arrive in BWC in mid-March (first record of one on 15 March 1996, at Atanasovsko) singly, in small groups or in flocks of up to 30. Then the migration expands and becomes most intensive in the first half of April, reaching max of 87 during the mid-April of 2002. After mid-April, the number of migrants gradu-

ally falls and migration continues until mid-May. A small number of Purple Herons passes until the end of the month. In **summer**, from mid-July to early August, the number of birds was usually underestimated, as some of the young birds disperse in the nearby small water bodies where counts were not carried out. **Autumn** migration begins from mid-August onwards, and the majority of birds leave BWC in September. In this season, they do not form significant flocks and their numbers are rather low compared to the spring migration. Outside the dates of the survey, 46 were counted on 18 September 1995 at Poda. The migration subsides in October and is almost over by the end of the same month with the latest sighting of two on 15 October 1998. After that, Purple Herons disappear entirely from BWC. The latest record is reported by Georgiev (1976), with a bird seen on 11 November 1964. The only **winter** record came from Mandrensko, outside the dates of the survey, of one bird seen on 15 January 1984. This is the only winter observation known so far for the country.



Table 8. Number of breeding Purple Herons (in pairs) in BWC during 1981-2002

Wetland/Year	1981-1985	1991-1994	1995	1996	1997	1998	1999	2000	2001	2002
Atanasovsko	c. 5	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3
Vaya	c. 5	c. 5	c. 5	c. 5	c. 5	3-5	3-5	3-5	3-5	3-5
Poda	0	0	16	18-20	16	15	10	15	10	18
Ouzoun Geren	c. 10	0	0	0	0	0	0	0	0	0
Total	c. 20	c. 7	c. 23	c. 25	> 23	> 20	> 15	> 20	> 15	> 23

4.26. Yellow-billed Stork – *Mycteria ibis*

Vagrant. An imm. in second calendar year was recorded on 24 June 2002 (Ragyov et al., 2003), at Atanasovsko. The bird stayed there until 16 July 2002. This is the first record of the species for Bulgaria. The authors assumed the bird was of wild origin.

4.27. Black Stork – *Ciconia nigra*

Common migrant.

Numbers: Isolated data on **spring** migration showed that only a small portion of all Black Storks passes over BWC in this season. Apparently, it is necessary to carry out a special survey on this species. The first Black Storks pass over from 15 March onwards, forming pure flocks or mixed with White Storks. In the mild winter of 2002, the first two spring arrivals were recorded on 15 February. The migration becomes most intensive in mid-April. From the end of April onwards, the number of migrants drops and the max May record was of 7 in mid-May 1996. On 1 May 1996, seven birds fed in the pans by the Estuary of Reka Fakiyska. In **summer**, during June and July, we recorded up to three birds. In **autumn**, migration starts from mid-August onwards and increases in September, when it becomes most intensive. We observed max of 131 during the mid-September 1999, at Vaya. The migration slows down in October and by the middle of the same month it is over with a few birds passing occasionally until the end of October. Cherny Vrukh Fishponds and Atanasovsko are the main places for feeding and roosting during migration.

Detailed data on the Black Stork migration over Bourgaski zaliv are given by Simeonov et al. (1989). According to them the autumn migration lasts from mid-August to mid-October, peaking on 18 September. The max numbers of migrants is c. 3,000. Considerable concentrations of migrating flocks has been recorded over Bourgas Lakes; then the flocks take to Strandzha Mountain and cross the border with Turkey not far from the town of Malko Turnovo.

4.28. White Stork – *Ciconia ciconia*

Abundant migrant, scarce breeder and rare wintering species.

Numbers: This species was not a subject to this survey. Detailed data on the migration of the White Stork in the region of Bourgaski zaliv is published by Simeonov et al. (1989).

Species Dynamics: In **spring**, the first flocks arrive in the first half of March, and in early April the local breeding birds occupy their nests. Spring migration

of birds breeding north of Bulgaria continues until the second half of April. During the present study, the following numbers were recorded: Atanasovsko – 2,000 in March 2002; Vaya – 553 in April 1996; Mandrensko – 2,425 in April 1999. Outside the dates of the survey 4,600 were counted on 19 March 1995, over Poda. Young storks leave the nests in the beginning of July and can be seen in all suitable biotopes in the region of Bourgas Lakes. **Autumn** migration starts in the beginning of August and lasts until the end of September, with a peak on 28 August. The number of migrating birds exceeds 230,000. A large part of these birds roosts in the studied area. Data collected during this study showed 4,600 in August 1996, at Pomoriysko. Outside the survey 20,000 passed on 27 August 2003 over Poda. Very few White Storks, mostly young or wounded birds, have been recorded as **wintering** in BWC – one in 1994, one in 1996 and one in 2000.

4.29. Glossy Ibis – *Plegadis falcinellus*

Uncommon to fairly common migrant and rare breeder.

Numbers: The max totals per seasons for the study period were:

Winter	1	Spring	183
Summer	71	Autumn	316

The max totals per lakes for the study period were:

Pomoriysko	20	May	2000
Atanasovsko	230	August	1999
Vaya	151	April	1996
Mandrensko	67	August	1999

The average number of Glossy Ibis was highest in April (**Fig. 14**). Both Complex Atanasovsko Ezero and Vaya rank first with 47 % of the species' total numbers in BWC.

Breeding: Vurbanov (1934) was the first who reported the species as breeding at Mandrensko, though he did not specify numbers. Jordans (1940) and Mountfort & Ferguson-Lees (1961) give records from the breeding season. Prostov (1964) describes breeding colonies in the south-west part of Mandrensko and western Vaya of up to 80-100 pairs in 1945-1947, reduced to 10-20 in 1960-1964. Breeding at these sites confirmed by Georgiev (1976) for the period of 1962-1970. The number of breeding pairs had been as follows: in 1967 – c. 200; in 1973 – c. 100; in 1974 – 15 (Cramp & Simmons, 1977); in 1977 – 181 (Botev & Peshev, 1985). After the reedbed of Ouzoun Geren was burned in 1973, the breeding colony settled in the reedbed at the western shore of Vaya. A few years later the colony re-settled at Poda, where it still exists. 25-30 pairs bred regularly there until 1994. Then

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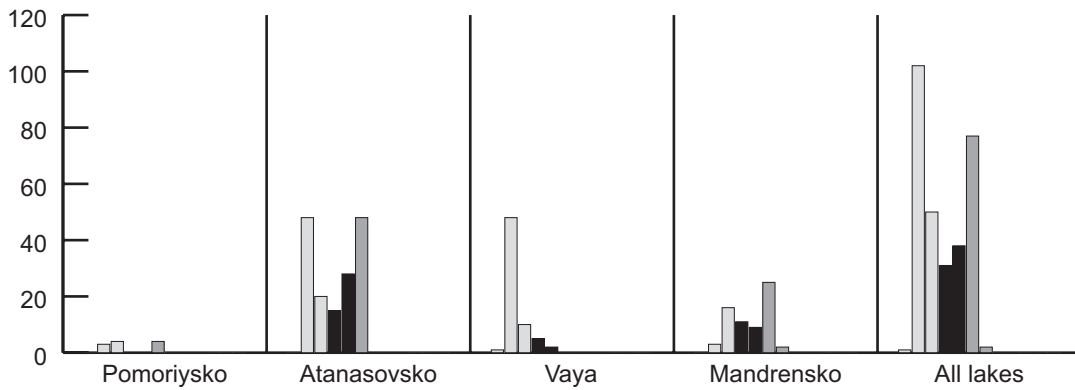


Fig. 14. *Plegadis falcinellus*

they stopped breeding for two years and in 1997, the breeding colony started anew. A small colony settled in mid-1980s in the reedbeds of Vaya, to the south-east of Dolno Ezerovo. It was destroyed after the adjacent shore area was developed. At Mandrensko, the Glossy Ibis bred in a mixed heron colony on a floating reed islet until 1969. In recent times, the only breeding site at Bourgas Wetlands is Poda, where the Ibises form a mixed colony, most often with Little Egrets. At Poda, the breeding season used to start in different times during the years of survey, depending on when the Glossy Ibises arrived. Thus, the beginning of the breeding season varies from as early as in the second half of May, till as late as in the end of April/beginning of May and sometimes even from mid-May onwards. This results in the young birds leaving the nests at different times. The species breeding numbers is shown on **Table 9**.

Species Dynamics: In **spring**, Glossy Ibis starts arriving from the first week of March onwards, usually in flocks of several scores to about a few hundreds. The migration is most intensive until the second half of April, when max total of 183 was reached during the mid-April 1996, 151 of them at Vaya. The migration continues in May, with max of 55 in 1996. The number falls in the second half of the month. In **summer**, from early July onwards the number of Glossy Ibis increases after the first young birds leave the nests, reaching max of 113 in June 1999 and in July 1996. Glossy Ibis feeds in the freshwater shallows of Ouzoun Geren, the west part of Vaya, at Atanasovsko, the Estuary of Reka Izvorska and in Poda. **Autumn** migration begins from mid-August onwards.

During that time, the birds breeding to the north of Bulgaria pass over or roost in the region of the Lakes staying mostly in the shallow waters of Atanasovsko, Poda and Cherny Vrukh Fishponds. During the mid-August 1999 we obtained the highest record of 316 birds, of these 230 at Atanasovsko. The migration lasts until the first days of September, but odd migrants can be seen regularly until the end of the month. The latest four birds were seen on 1 October 1996, at Cherny Vrukh Fishponds. **Winter** records of Glossy Ibis in BWC are a rare exception. Dontschev (1980) reports two on 4 December 1977, at Vaya. We saw one on 15 February 1997 at Ouzoun Geren, possibly an early spring arrival.



Table 9. Number of breeding Glossy Ibises (in pairs) in BWC during 1945-2002

Wetland/Year	1945-1947	1960-1964	1967	1973	1974	1977	1980-1985	1986-1994	1995-1996	1997	1998	1999	2000	2001	2002
Ouzoun Geren	0	0	c.50	c.50	15	c.20	c.30	0	0	0	0	0	0	0	0
Vaya	c.50	c.10	c.100	c.50	c.50	181	c.40	0	0	0	0	0	0	0	0
Poda	0	0	0	0	0	0	0	25-30	0	2-3	16	c.20	c.10	20	27
Total	c.100	c.20	c.150	c.100	65	201	c.70	25-30	0	2-3	16	c.20	c.10	20	27

4.30. (Eurasian) Spoonbill – *Platalea leucorodia*

Uncommon to fairly common migrant and uncommon breeder and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	30	Spring	93
Summer	106	Autumn	224

The max totals per lakes for the study period were:

Pomoriysko	52	September	1996
Atanasovsko	193	August	1999
Vaya	61	September	1996
Mandrensko	110	September	2000

The average number of Spoonbill was highest in August (**Fig. 15**). Complex Atanasovsko Ezero ranks first with 91% of the species' total numbers in BWC.

The 1-% Ramsar criterion is 120 birds. During the period of survey the species numbers exceeded this number in three years.

Breeding: There is no precise data on Spoonbill breeding at Mandrensko before 1960s. Single birds and small

groups of up to 20 had been observed in the area of survey during the breeding season at this time (Vurbanov, 1912; Harrison, 1933; Mountfort & Ferguson-Lees, 1961; Prostov, 1964). Since 1967 until 1982 the colony had been at Ouzoun Geren with exceptions in 1973 and 1974, when most of the breeding birds moved to the reedbeds in the west part of Vaya, after the reedbed at Ouzoun Geren was burnt out. After the new reeds grew up, the colony moved back to Ouzoun Geren. In 1982, after the extensive flood and the oil pollution of the area, the colony moved to Poda. From 1982 and until present time the numbers of the breeding population of Spoonbill fluctuated between 30 and 40 pairs. At Poda, the Spoonbills nest in mixed colony in the reedbeds which grow in brackish water. In 1995, they bred together with 72 pairs of Little Egret, 56 pairs of Grey Heron, 29 pairs of Night Heron, and 16 pairs of Purple Heron. Until 1995, the Spoonbills bred in a mixed colony together with 20-30 pairs of Glossy Ibis and, irregularly, with a small number of Pigmy Cormorants (until 1992). After the breeding season is over the birds start to disperse and leave the colony – from mid-July onwards. Data on breeding pairs by years are given in **Table 10**.

Species Dynamics: In **spring**, Spoonbills arrive in the first half of March. The migration is most intensive between second half of March and mid-April and

Table 10. Number of breeding Spoonbills (in pairs) in BWC during 1967-2002

Wetland/Year	1967	1968	1972	1973	1974	1975	1976	1977-1981	1982-1985
Poda	0	0	0	0	0	0	0	0	c. 35
Ouzoun Geren	31	10	30	10	0	35	28	c. 30	0
Vaya	0	0	0	c. 20	36	?	?	0	0
Total	31	10	30	c. 30	36	35	>28	c. 30	c. 35

Wetland/Year	1991-1994	1995	1996	1997	1998	1999	2000	2001	2002
Poda	30-35	37	32	33	34	>30	>30	32	30
Ouzoun Geren	0	0	0	0	0	0	0	0	0
Vaya	0	0	0	0	0	0	0	0	0
Total	30-35	37	32	33	34	>30	>30	32	30

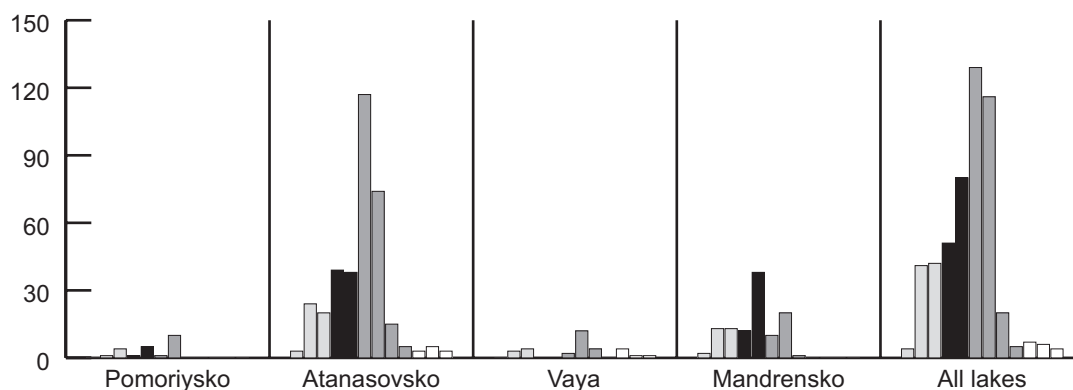


Fig. 15. *Platalea leucorodia*

continues until the end of April with max 93 in April 1999, with 87 of them at Atanasovsko. Since the middle/end of June young birds start to disperse, the numbers reaching max of 91 during the mid-June 1999. Max mid-July numbers was 106 (72 at Poda and 37 at Atanasovsko) in 1996. After mid-July, the number of the young birds leaving the colony goes up, with max 224 on 1 August 1999. In **autumn**, they start to leave the area from the second half of August onwards, and the migration is very intensive until mid-September (180 on 1 September 1996). By mid-October, most of the birds have left the area but the migration continues in November, too. Spoonbill has been regularly seen to **winter**, especially in mild winters. In most of the years of this survey, four to 30 birds have been recorded during December-February, mostly at Atanasovsko and Vaya. During migration the Spoonbills feed in the rich of mud salty basins of Atanasovsko, as well as in Vaya and in Cherny Vrukh Fishponds. Rarely the birds feed in certain parts of Mandrensko, especially in Cherny Vrukh Fishponds. At Atanasovsko Spoonbills feed mainly on crustaceans (however, further research is needed). During the breeding season some of the birds feed in the open brackish water in and around the Poda colony. Research carried out on the fish fauna in 1995 and 1996 (L. Pekhlivanov, in litt.) showed that the commonest and most numerous fish species in Poda are *Gasterosteus aculeatus* and *Gambusia affinis holbrooki*. During the mid-winter surveys there was only a single observation of a bird in 1994 at Atanasovsko (Michev & Profirov, 2003).

4.31. (Greater) Flamingo – *Phoenicopterus ruber*

Vagrant. First recorded for the country by Khristovich (1892) with a bird seen in 1880 near Chernomoretz, south of Bourgas. Other observations of Flamingo are reported for Atanasovsko by Botev & Peshev (1985) – a group of six on 20 December 1962; Johnson & Biber (1971) – one on 20 December 1970; Vatev (1983) – one ad. on 3 September 1981; Nankinov & Darakchiev (1981) – one juv. bird between 26 September 1981 and January 1982; P. Arsov (in litt.) –

three on 20 September 1984. Nankinov & Kirilov (1992) report unusually high numbers of this vagrant species, having seen a flock of 300 birds in May 1975, in the same lake. According to Handrinos & Akriotis (1997) the species had been observed in neighbouring Greece until 1983 ‘...as single birds or very small flocks...’. During the present survey Flamingo was recorded several times: a young bird was seen on 21 September 1999 and on 10 November 2001 in Atanasovsko, and three birds – between 4 and 18 September 2001, at Zaliv Foros (Kovachev, 2001).

4.32. Mute Swan – *Cygnus olor*

Resident, uncommon to fairly common migrant and fairly common to common wintering and scarce breeder.

Numbers: The max totals per seasons for the study period were:

Winter	1,386	Spring	879
Summer	51	Autumn	128

During surveyed period the highest species numbers were:

Pomoriysko	1,190	December	2002
Atanasovsko	768	January	1999
Vaya	128	January	1997
Mandrensko	228	December	2002

The average number of Mute Swans was highest in December (**Fig. 16**). Complex Atanasovsko Ezero ranks first with 55 % of the species' total numbers in BWC.

The 1-% Ramsar criterion is 450 birds. The species numbers exceeded the criterion for Atanasovsko and Pomoriysko, each of them for two years.

Breeding: In the past, Mandrensko used to hold a numerous breeding population of Mute Swan (Khristovich, 1890; Reiser, 1894). By the end of 1940s the species ceased to breed there (Patev, 1950) and was

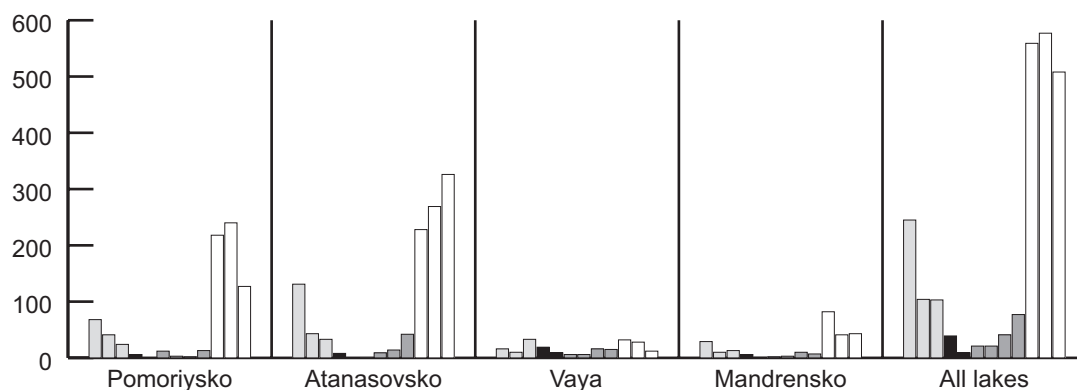


Fig. 16. *Cygnus olor*

not found as breeding by Prostov (1964) and Georgiev (1976). During the 1996-2002 survey we found Mute Swans breeding at wetlands around Mandrensko: at Poda, one breeding pair in 1999 and 2000 (Anton Kovachev, in litt.); Estuary of Reka Izvorska – one pair; Cherny Vrukh Fishponds – one pair; Vaya – two pairs in 2002; at LUKoil-Neftochim oxidizing pools – one pair, and at a small reservoir near village of Bratovo – one pair until 1994 (Kiril Bedev, pers. comm.); at the Estuary of Reka Akheloy – one pair.

Species Dynamics: In **spring**, most of the wintering birds start to leave the area from early February onwards. Their numbers rapidly decreases until mid-February. After that, the migration slows down and the number of birds remains unchanged during March, then gradually decreases again in April. If weather becomes colder, the number of birds may fluctuate. Thus, during mid-March 1996, the number of Mute Swans increased to 879. In April and May counts we obtained 62-162 birds. In June, max of 51 was counted in 1996 and the only July count was of 18 in 1999. In **autumn**, the birds from the northern breeding haunts appear in BWC from the beginning of August onwards, but the numbers remain low until mid-November. After that, the number of Mute Swans arriving from the north rapidly increases and the birds form the **wintering** population (between 876 and 1,386). Outside the dates of the surveys 1,190 were counted in January 2003 on Pomoriysko and 240 on Vaya, these being the highest numbers recorded for these wetlands. The max number (1,110 in 1997) during the mid-winter survey 1977-2001 was recorded at Complex Pomoriysko Ezero (Michev & Profirov, 2003). In recent years, considerable increase in Mute Swan numbers has been recorded during wintering and migration.

4.33. Tundra Swan – *Cygnus columbianus*

Uncommon winter visitor, rare spring migrant.

Numbers: Koenigstedt & Robel (1978) give the first record for the country of a single bird seen on 30

January 1978 at Dourankoulashko Ezero. Robel & Willems (1984) were the first to record the species for the Bourgas region – with three adults seen on Atanasovsko, on 9 April 1980.

The max totals per seasons for the study period were:

Winter	84	Spring	10
Summer	0	Autumn	1

The max totals per lakes for the study period were:

Pomoriysko	0	–	–
Atanasovsko	10	March	1996
Vaya	10	February	1999
Mandrensko	80	February	1997

The average number was highest in February (**Fig. 17**). Complex Mandrensko Ezero ranks first with 83% of the species' total number in BWC.

Species Dynamics: Prostov (1964) did not record the species at the time he carried out his studies. Nowadays Tundra Swan is a regular **wintering** species in BWC. Tundra Swans arrive in the beginning of December, but in colder weather they appear earlier. Thus, a bird was recorded on 15 November 2000 in a group of 19 Whooper Swans on the cornfields west of Mandrensko. The number of wintering birds varied in different years of the survey, but the species was most numerous in February, with max of 84 in 1997. By the end of February, the majority of Tundra Swans have already left. Ten birds on Atanasovsko on 15 March 1996 were the only March record. The latest **spring** record was made by Robel & Willems (1984) with three adults seen at Atanasovsko on 9 April 1980. Tundra Swans concentrate in the flooded agricultural fields near the Estuary of Reka Fakiyska, often staying in mixed flocks with Whooper Swans. A smaller number was recorded at the Estuary of Reka Izvorska, Atanasovsko and Vaya. Outside the dates of the survey a flock of four adults and six young birds was seen on 12 Feb-

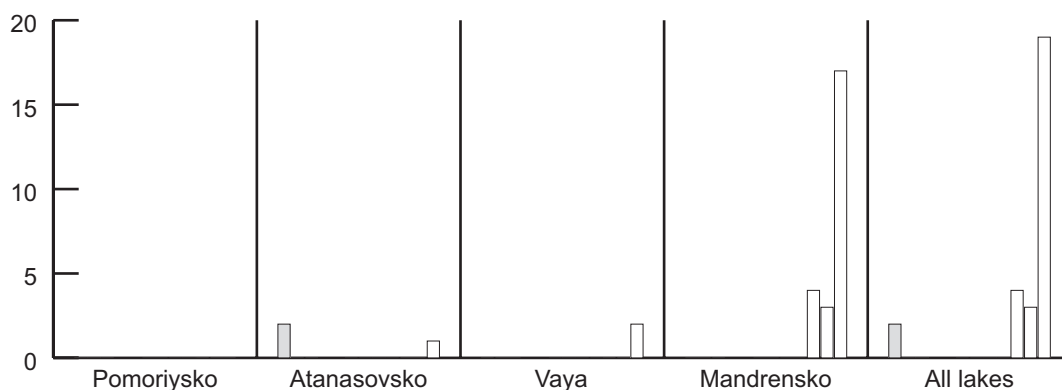


Fig. 17. *Cygnus columbianus*

ruary 1989 at Zaliv Foros. The species shows a clear trend of increasing its wintering population in BWC. Max numbers (25 in 1994) during the mid-winter counts were recorded at Complex Mandrensko Ezero (Michev & Profirov, 2003).

4.34. Whooper Swan – *Cygnus cygnus*

Uncommon to fairly common winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	417	Spring	16
Summer	0	Autumn	19

The max totals per lakes for the study period were:

Pomoriysko	10	March	1996
Atanasovsko	30	February	1997
Vaya	41	January	1999
Mandrensko	362	February	1997

The average number of Whooper Swans was highest in January and February (**Fig. 18**). Complex Mandrensko Ezero ranks first with 81% of the species' total number in BWC.

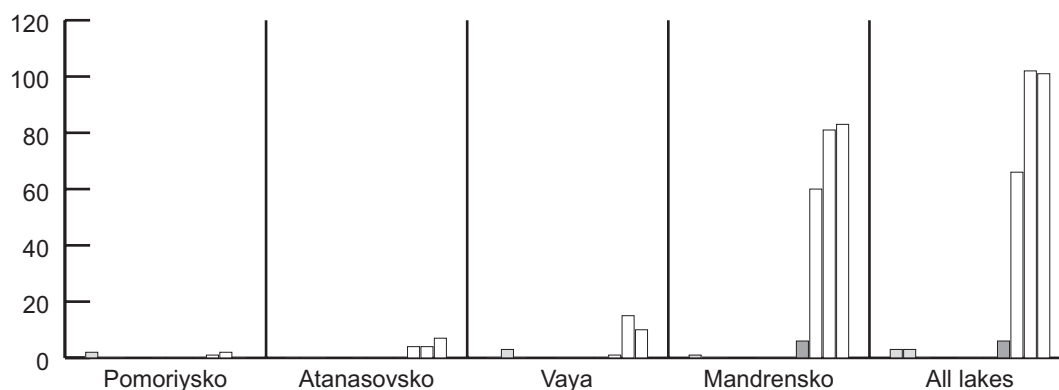
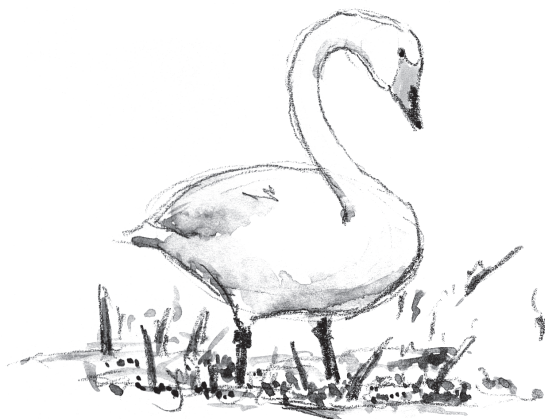


Fig. 18. *Cygnus cygnus*

The 1-% Ramsar criterion is 170 birds. During the period of survey the species numbers exceeded the criterion during two of the survey years for Mandrensko.

Species Dynamics: The first Whooper Swans arrive in the beginning of November. The number of arrivals increases from mid-November onwards. In mild winters, we recorded from seven to 36 birds during the December-February period, while in colder ones, between 215 and 417. Outside the dates of the survey c. 1,000 were seen at the Estuary of Reka Fakiyska, in January 2003. The main places for concentration in winter are the cornfields around the estuary of this river, at Complex Mandrensko Ezero. The highest concentrations at Atanasovsko were reported by Sakakhyan (1990) with 42 birds in January 1987. From 1997 through 2001, the average total numbers were 477 with max of 1,107 in 1997 (Michev & Profirov, 2003).

4.35. Bean Goose – *Anser fabalis*

Rare winter visitor. Reiser (1894) reports a flock of 16 on 11 October 1891 at Vaya. Described by Prostov (1964) as rare on migration, recorded three times between 1951 and 1954, all by the end of November and in December (in groups of five to six birds). Five were reported by Michev et al. (2004), seen at Atanasovsko on 22 March 1987. The three birds we observed in January 1993 were in flocks of Greater White-fronted Geese. In some years the numbers of Bean Goose may be higher. According to Michev & Profirov (2003) it was a rare wintering species with an average total numbers of two and max of 18 in 1982.

4.36. (Greater) White-fronted Goose – *Anser albifrons*

Abundant migrant and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	119,186	Spring	3,570
Summer	5	Autumn	300

The max totals per lakes for the study period were:

Pomoriysko	224	December	2001
Atanasovsko	16,010	January	2000
Vaya	74,208	February	2000
Mandrensko	61,150	January	1997

The average number of White-fronted Geese in BWC was highest in January (**Fig. 19**). Complex Mandrensko Ezero ranks first with 48% of the species' total number in BWC.

The 1-% Ramsar criterion is 5,300 birds. During the period of survey the species numbers exceeded the criterion regularly for Vaya and Mandrensko and in two of the years, for Atanasovsko.

Species Dynamics: A strong trend towards an increase of the species' **wintering** population in this region has become apparent in recent times. The first flocks arrive in mid-October (the earliest 300 arrivals were recorded on 15 October 2000 at Vaya). During most of the mid-November counts we had very few records of seven or less birds. The number of White-fronted Geese arriving in December varied in different years of the survey depending on the weather conditions but in colder weather it increased significantly from mid-December onwards, reaching max 19,426 during December 2001. In mild Decembers, the number of geese started to grow from the end of the month/beginning of January and rapidly increased thereafter. Thus, a very high number of 105,877 were recorded in early January 1997, with max numbers of 119,186 during the mid-January counts of the year 2000. In most of the years of the survey, the number of White-fronted Geese remained high in February (except in the milder 2001 and 2002, between 420 and 698 birds). **Spring** migration starts at the beginning of February. In milder winters, most of the birds have left the Bourgas Lakes

by mid-February, while in colder weather their numbers remain high in February until the end of the month. In some years of the survey a small number remained until the end of April (max 3,570 in 1996). A few, recorded in May and June were most probably injured birds.

4.37. Lesser White-fronted Goose – *Anser erythropus*

Rare to scarce migrant and winter visitor.

Data on Lesser White-fronted Goose for the BWC are rather scarce. Mountfort & Ferguson-Lees (1961) saw a few pairs on 29 and 31 May 1960 at Vaya, probably belated weak or injured birds. Prostov (1964) reports the species as regular on migration in BWC but with numbers unspecified. Reported as heard several times in flocks of White-fronted Geese during the 1977 and 1978 mid-winter counts at Bourgas (Michev et al., 1983); one on 7 October 1979 at Atanasovsko (Pavel Simeonov, in litt.). During the 1996-2002 survey the only record was of a bird seen on 3 January 1997 in a flock of Greater White-fronted Geese roosting on the frozen north-western part of Atanasovsko. Another one was observed outside the dates of the survey on 29 March 2003 among 19 Greater White-fronted Geese feeding on the south shore of Vaya. Quite little is still known about the migration and sojourn of Lesser White-fronted Goose in the study area, so that further research is needed. Prostov (1964) gives the dates of the **spring** passage from the second half of February until the end of March. He gives also the dates of arrival in autumn between 19 and 22 November; the species is present in December, rare in January. Our assumption is that single birds from the populations wintering south of Bulgaria can be seen in late March, and even later – in the beginning of April. A very rare **wintering** goose, recorded only occasionally for the period of 1977-2001 mid-winter counts in Bulgaria (Michev & Profirov, 2003).

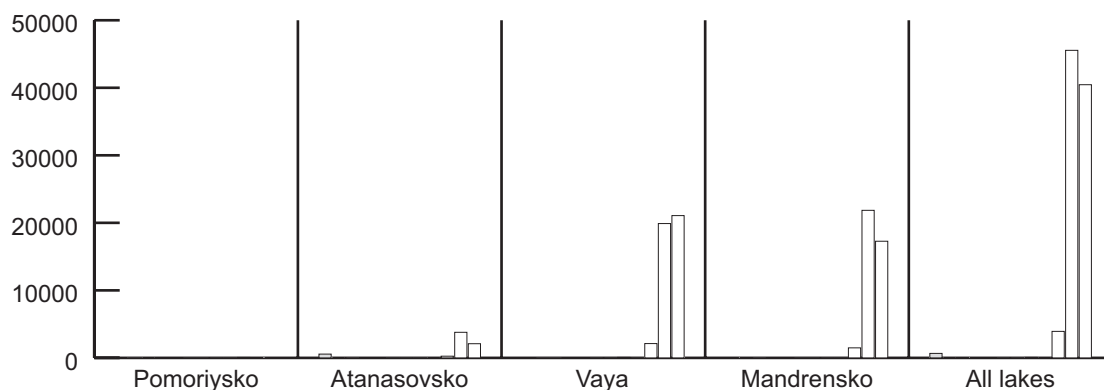


Fig. 19. *Anser albifrons*

4.38. Greylag Goose – *Anser anser*

Uncommon to fairly common migrant and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	393	Spring	56
Summer	0	Autumn	0

The max totals per lakes for the study period were:

Pomoriysko	1	January	1999
Atanasovsko	64	February	1997
Vaya	58	January	1997
Mandrensko	311	January	1997

The average number of Greylag Geese was highest in January (**Fig. 20**). Complex Mandrensko Ezero ranks first with 64% of the species' total number in BWC.

Breeding: Until the beginning of 1950s they were still breeding in the Black Sea coastal marshes and lakes (Harrison, 1933; Jordans, 1940; Patev, 1950; Arabadzhiev, 1965). Until the end of 1960s it had bred in Bourgasko (Prostov, 1964; Georgiev, 1976) and Mandrensko (Prostov, 1964; Paspaleva-Antonova, 1967). A pair bred at Vaya 1999.

Species Dynamics: Greylag Geese arrive in December and are most numerous in January. Pateff (1948) reports five on 22 July on Pomoriysko. Other records are from Poda, 25 on 31 December 1996 (BSBP, 2002); LUKoil Neftochim oxidizing pools, 47 in January 2002 (Kiril Bedev – pers. comm.); Atanasovsko, 64 on 2 February 1997; and 350 on 22 March 1987 on the same lake outside the dates of the survey (Michev et al., 1999).

4.39. Snow Goose – *Anser caerulescens*

Very rare winter visitor. A bird seen in November 1991 (Nankinov, 1997) at Atanasovsko was the only record for the area under study. During both peri-

ods of the mid-winter survey the Snow Goose had been a very rare wintering species, reported in Bulgaria only once during the 25 years: two birds on 22 January 1979 in the vicinity of Dourankou-lashko Ezero (Michev et al., 1983).

4.40. Barnacle Goose – *Branta leucopsis*

Very rare winter visitor. Rare wintering species, recorded for Bulgaria only three times (Michev & Profirov, 2003). Within the survey period a bird was seen on 21 January 2000 at Atanasovsko and this is so far the only record for the study.

4.41. Brent Goose – *Branta bernicla*

Rare wintering species. So far there are a few winter sightings of the species in the country. Within the survey period a single bird was observed on 27 November 1999 in the western part of Mandrensko, this being so far the first record for the area under study.

4.42. Red-breasted Goose – *Branta ruficollis*

Fairly common to common winter visitor and scarce migrant.

Numbers: The max totals per seasons for the study period were:

Winter	23,738	Spring	4
Summer	0	Autumn	0

The max totals per lakes for the study period were:

Pomoriysko	3	January	2002
Atanasovsko	1,200	February	1997
Vaya	6,450	January	1997
Mandrensko	16,870	January	1997

The average number of Red-breasted Geese was highest in January (**Fig. 21**). Complex Mandrensko Ezero ranks first with 71% of the species' total number in BWC.

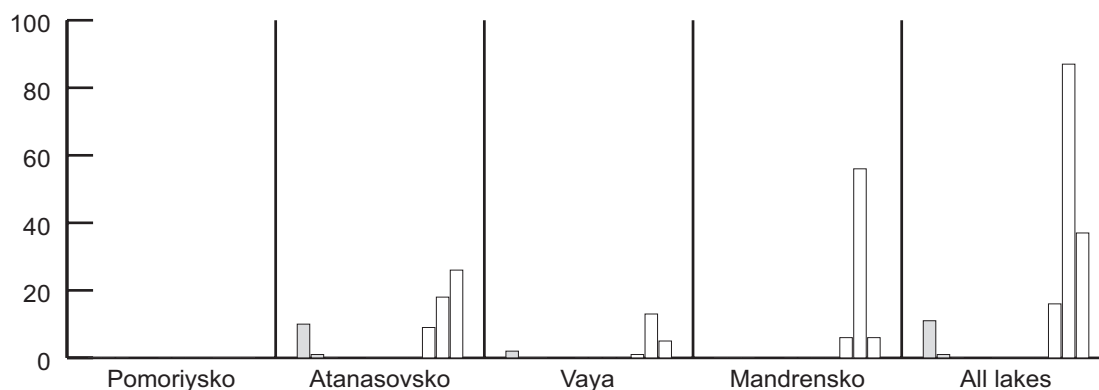


Fig. 20. *Anser anser*

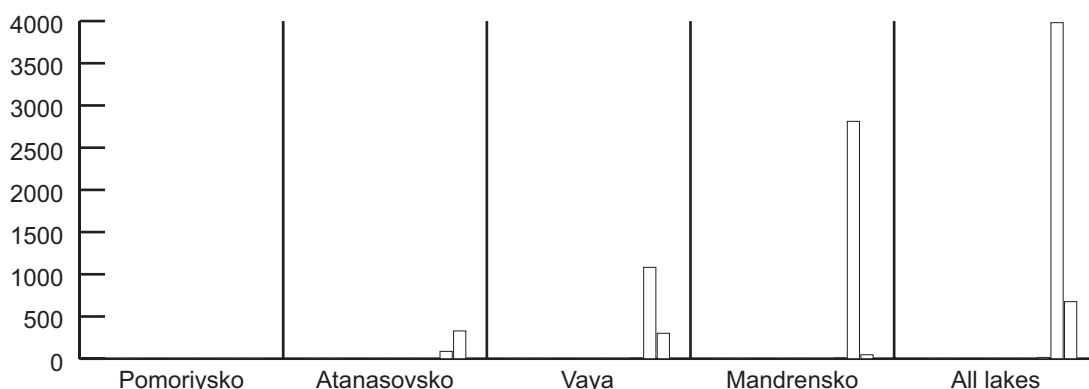


Fig. 21. *Branta ruficollis*

The 1-% Ramsar criterion is 880 birds. During the period of survey the species numbers exceeded the criterion regularly for Mandrensko and Vaya and in one year, for Atanasovsko.

Species Dynamics: Numbers in the survey area remained low until 1980s, with the highest record of 200 at Atanasovsko (Georgiev, 1976). Being rather rare in the not so distant past, the Red-breasted Goose has become a regular winter visitor of the studied area in recent times. Since the regular monitoring started in 1996, in mild winters we observed max of 430 birds. In colder winters the numbers was between 2,115 (1996) and max of 23,738 during the mid-January counts of 1997, this being the highest ever record for the area. From late January onwards, the Red-breasted Goose starts to leave the area. The species was most numerous at Mandrensko and Vaya, less so at Atanasovsko. The geese feed in the winter-wheat fields around Bourgas. A small number of them remain there until the end of March (up to four on 15 March 1996).

4.43. Ruddy Shelduck – *Tadorna ferruginea*

Uncommon spring and autumn migrant, scarce winter visitor and rare breeder.

Numbers: The max totals per seasons for the study period were:

Winter	5	Spring	29
Summer	35	Autumn	15

The max totals per lakes for the study period were:

Pomoriysko	5	October	2000
Atanasovsko	33	June	2000
Vaya	25	May	2000
Mandrensko	7	June	1999

The average number of Ruddy Shelduck was highest in June (Fig. 22). Complex Atanasovsko Ezero ranks first with 87% of the species' total numbers in BWC.

Breeding: Vurbanov (1912) had observed the species at Atanasovsko, Chengene Skele and Mandrensko. Later, he comformed that the species was breeding in the forests around Mandrensko (Vurbanov, 1935). Data on breeding are given also by Reiser (1894) and Jordans (1940). Pateff (1948) assumes the Ruddy Shelduck had bred at Pomoriysko in the 1940s, Arabadzhiev (1965) reports breeding at Pomoriysko as well as at Atanasovsko. He saw Ruddy Shelduck during the breeding season at the lower courses of Reka Fakiyska and Sredetska in Complex Mandrensko Ezero. Data on breeding are given by Patev (1950). The species was mentioned by Boev (1961) as a rare breeder in the forests around Mandrensko, at Atanasovsko, Poda, and on Ostrov Sveta Anastasiya in Bourgaski Zaliv. Breeding at Vaya is reported by Boev (1958). The Ruddy Shelduck was found by Prostov (1964) to breed in a tree hole near Prasad on the southern shore of Mandrensko on 17 May 1951 and on 3 June 1953 near Trustikovo. There were six pairs in Bourgas region recorded for the period of survey (Kiril



SPECIES ACCOUNTS

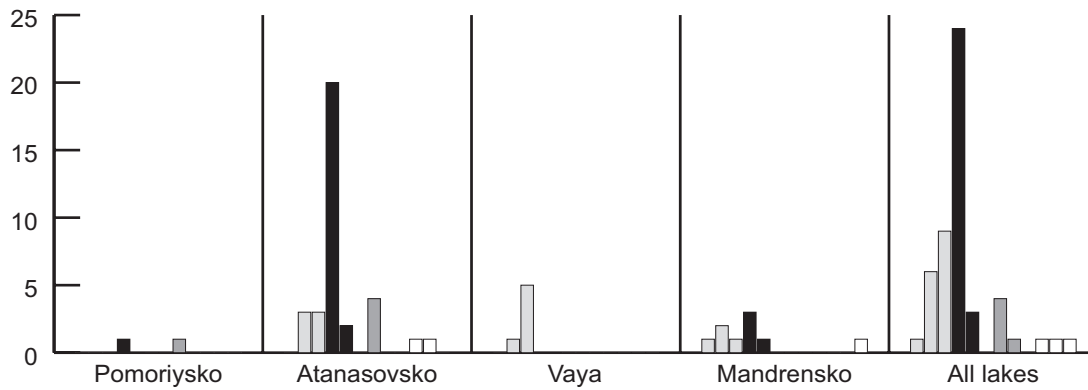


Fig. 22. *Tadorna ferruginea*

Bedev, pers. comm.). Extending the network of small pools has encouraged the breeding of this species.

Species Dynamics: In **spring**, the breeding Ruddy Shelducks start arriving from the first half of February onwards (the earliest observation was made on 15 February 2001 at Mandrensko). The migration increases in March. The species was recorded mostly at the quarries on the north shore of Mandrensko as well as at Cherny Vrukh Fishponds, Atanasovsko, Vaya and Pomoriysko. In **summer**, after rearing up the young in June the birds gather in flocks of up to 40 ind: thus, on 1 June 1996, 30 birds were counted at Atanasovsko; on 15 June 2000, 33 at the same lake. One was seen at LUKoil-Neftochim oxidizing pools in June 2002 (Kiril Bedev, pers. comm.). In July their number decreases. The **autumn** migration is most evident in September with max 15 on 15 September 2000 at Atanasovsko, and continues in October and November (five seen in 2000 at Pomoriysko). Atanasovsko is the favorite place for gathering after the breeding season is over and during migration as well. In some years single birds or small groups of them remain for the **winter** in the area and can be observed in December (five at Atanasovsko in 1999); January (four at Atanasovsko in 1997) and February (one in 1997). During the mid-winter counts Michev & Profirov (2003) recorded the species three times.

4.44. (Common) Shelduck – *Tadorna tadorna*

Common migrant and wintering species, scarce to uncommon breeder.

Numbers: The max totals per seasons for the study period were:

Winter	3,559	Spring	2,360
Summer	535	Autumn	2,230

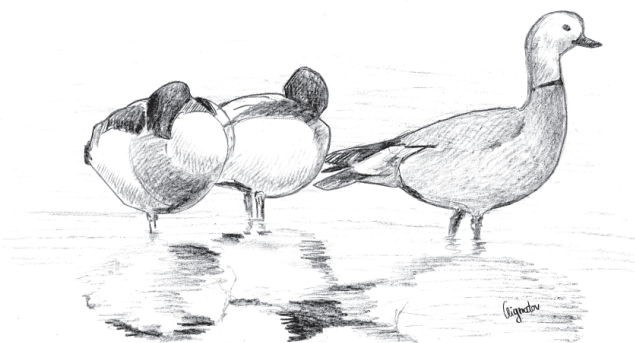
The max totals per lakes for the study period were:

Pomoriysko	632	March	1996
Atanasovsko	2,763	January	1997
Vaya	575	December	1999
Mandrensko	641	December	1998

The average numbers of Shelduck was highest in December (**Fig. 23**). Complex Atanasovsko Ezero ranks first with 70% of the species' total numbers in BWC.

The 1-% Ramsar criterion is 750 birds. During the period of survey the species numbers exceeded regularly the criterion for Atanasovsko.

Breeding: The Shelduck breeds mainly on the dikes of Atanasovsko and more rarely at Pomoriysko and at Poda. According to Nankinov and Darakchiev (1977a), the species breeds rarely in the reed-beds of Atanasovsko. In the past, Vurbanov (1912, 1935) describes the species as 'familiar to everyone', resident and breeding mostly on the NW shores of Atanasovsko. Georgiev (1976) reports 12 pairs at Atanasovsko. Pateff (1948) was the first to prove breeding at Pomoriysko, where he observed three pairs in the 1940s. Prostov (1964) mentions the Shelduck as becoming rare breeding species in BWC. He reports a single breeding pair found in the forest not far from Gorno Ezerovo in 1953 and 1956 as well as another one at Mandrensko, near Novoseltsi, and third one at Atanasovsko in 1959. At present 1-3 pairs found regularly to breed at Atanasovsko, three at Poda, one



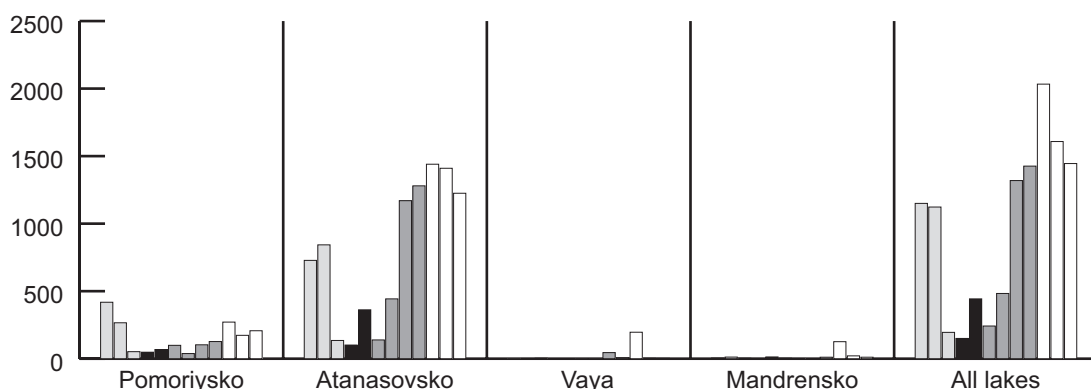


Fig. 23. *Tadorna tadorna*

at Mandrensko, and up to three at Pomoriysko. Two pairs bred regularly at LUKoil-Neftochim oxidizing pools in 1990-2002 (Kiril Bedev, pers. comm.).

Species Dynamics: **Spring** migration is most prominent in March (max 1835 in 1996) but frequently, depending on weather conditions, the numbers increase again in April (thus, 2,360 were recorded during mid-April 1996), on account of birds arriving from the southern wintering grounds. Most of the birds leave the area by the second half of April, their number falling to max total of 318 in May 2001. In **summer**, the June counts yielded max of 202, the higher number being mostly due to non-breeding birds. From the beginning of July until the end of the month there was a noticeable increase in numbers (max 535 birds in 1996), as Shelducks from the northern breeding grounds started to arrive. They have here their primary moult, mainly at Atanasovsko but some of them moult at Pomoriysko. During this stage, Shelducks concentrate predominantly on the saltpan dikes of Atanasovsko and Pomoriysko. After the primary moult is over the number of Shelducks decreases along with their starting to dis-

perse until mid-August, then the **autumn** build-up begins. The autumn migration gradually intensifies during the months that follow, reaching max of 1,031 in September 1996. The migration of birds coming from NE rapidly increases from the beginning of October and lasts until the end of November, reaching 2,038 in October 1996 and 2,230 in November 1999. These birds form the local **wintering** population of Shelducks with a peak in December with max of 3,559 in 1998. The wintering population decreases in January but still remains high, with max of 3,377 observed during the mid-winter counts of 1997. Most of the Bulgarian wintering population concentrates at Atanasovsko and a far smaller number at Pomoriysko. The max number during the mid-winter surveys (4,141 in 1982) was recorded at Atanasovsko (Michev & Profirov, 2003).

4.45. (Eurasian) Wigeon – *Anas penelope*

Fairly common migrant and common wintering species, probably very rare summering bird.

Numbers: The max totals per seasons for the study period were:

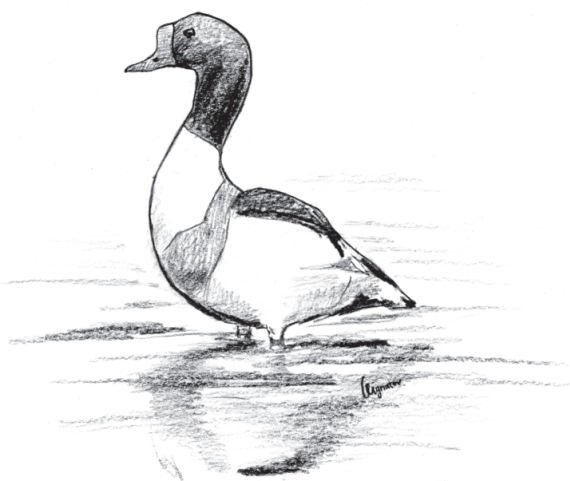
Winter	8,688	Spring	621
Summer	0	Autumn	500

The max totals per lakes for the study period were:

Pomoriysko	1,008	December	1998
Atanasovsko	4,150	December	1998
Vaya	530	December	1999
Mandrensko	3,530	December	1998

The average number of Wigeons was highest in December (**Fig. 24**). Complex Atanasovsko Ezero ranks first with 55% of the species' total numbers in BWC.

The 1-% Ramsar criterion is 3,000 birds. During the period of survey the species numbers exceeded this criterion in two years of the survey for Atanasovsko, and in one year for Mandrensko.



SPECIES ACCOUNTS

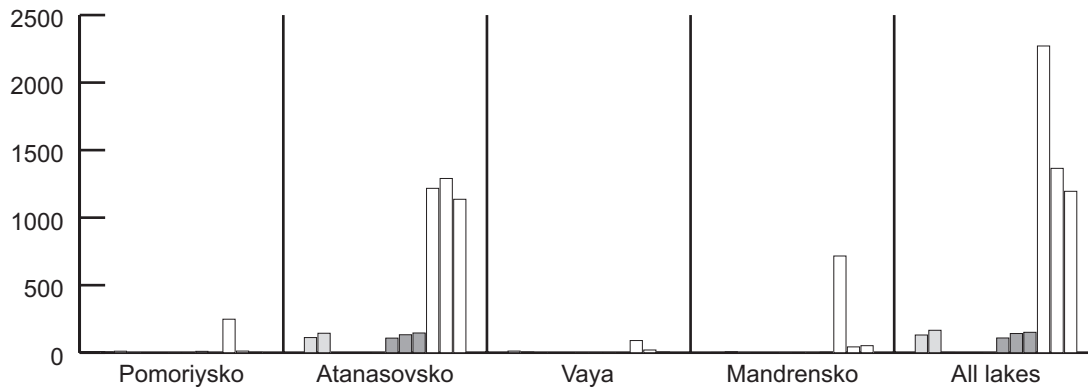


Fig. 24. *Anas penelope*

Species Dynamics: Wigeons wintering in BWC start to move to the north from early February onwards, and most of them have left the area by the middle of the month. In colder weather, as was the case in 1999, their numbers remained high (a total of 1,185) until the second half of February. **Spring** migration continues in March and April with numbers significantly decreasing to about a hundred in most of the years of the survey. 1996 was exceptional year with relatively high spring numbers, when a total of 621 was recorded in March and 612, in April. Only a few birds remain in the region during most of the May counts of the survey, with max of six recorded in 1999, at Atanasovsko. We did not have any **summer** records.

The **autumn** build-up starts to form from the end of August/beginning of September, reaching max of 500 during the mid-September 1998, but usually is rather less during that month. In October and November, the number of Wigeon arriving in BWC gradually increases with some fluctuations, until in 2000 they reached max. monthly totals of 301 and 255 respectively. In the second half of November, significant increase of Wigeons **wintering** takes place until mid-December, when the max of 8,688 was observed in 1998, with over 4,000 of them at Atanasovsko, c. 3,500 at Mandrensko and 1,000 at Pomoriysko. Atanasovsko Ezero, where the highest number was 6,020 in January 1976 (Roberts, 1978) held the greater part of the Bulgarian wintering population. In January and February, the number of wintering Wigeons increases, with max of 3,007 in 1999. The vast majority of the wintering Wigeons concentrates at Atanasovsko, where the availability of *Zostera* underwater 'meadows' in the north-western part of the lake makes this wetland a favourable feeding grounds during that season. The nearby coastal waters of the small Black Sea bays between Sarafovo and Pomorie are the second most important feeding site at that time of the year. According to Michev & Profirov (2003) the highest mid-winter concentrations in Bulgaria had been recorded at wetlands on the SBSC.

4.46. Gadwall – *Anas strepera*

Uncommon spring and scarce autumn migrant, uncommon winter visitor, and scarce breeder.

Numbers: The max totals per seasons for the study period were:

Winter	246	Spring	50
Summer	39	Autumn	68

The max totals per lakes for the study period were:

Pomoriysko	142	December	1998
Atanasovsko	74	December	1998
Vaya	19	February	2002
Mandrensko	32	March	1996

The average number of Gadwalls was highest in December (**Fig. 25**). Complex Pomoriysko Ezero ranks first with 49% of the species' total numbers in BWC. Georgiev (1976) reports the Gadwall as being the second most numerous species in BWC after Mallard but the species number has noticeably decreased recently.

Breeding: Jordans (1940) describes Gadwall as a quite numerous breeding species at this time at Mandrensko and Vaya, but since 1948 a marked decrease has been recorded, and the species has become relatively rare breeder (Prostov, 1964). Dontshev (1967) reports unspecified number of pairs during the breeding season at Vaya in 1960, at Atanasovsko and Mandrensko in May 1962. Georgiev (1976) gives seven pairs in BWC. Roberts (1981) reports five pairs for Atanasovsko in 1977. In recent times, the Gadwall has started to breed at Mandrensko (3-4 pairs), Atanasovsko (3-4 pairs) and Vaya (2-3 pairs). The number of birds during the breeding season shows that perhaps the numbers of the breeding pairs in BWC is greater.

Species Dynamics: In **spring**, a build-up of Gadwall migration can be noticed from the beginning

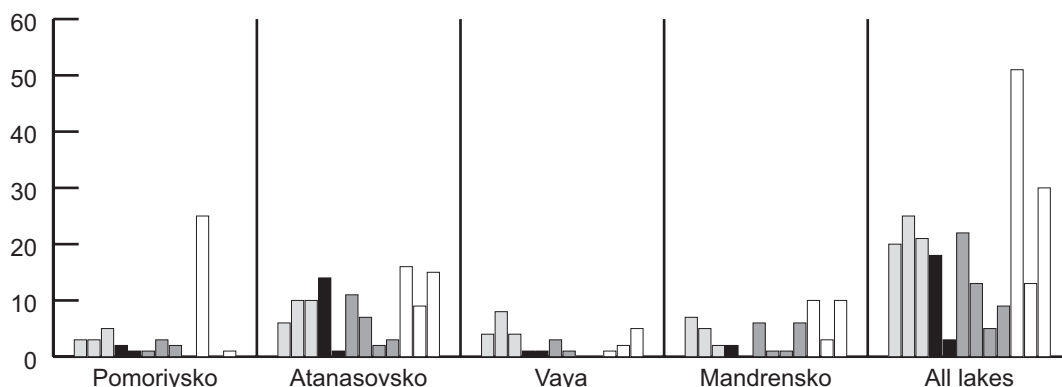


Fig. 25. *Anas strepera*

of February onwards with a peak in the middle of the month, reaching max of 67 in 2000, 58 of them at Atanasovsko. The migration continues during March (max 50 on 15 March 1996, 32 of them on Zaliv Foros). Outside the dates of the survey max 180 were counted in mid-March 1993, at the same place. In most of the years, a second migration wave has been recorded in April, with max of 50 in mid-April 1999, probably due to the birds arriving from the south but breeding farther north in Bulgaria. After mid-April, Gadwalls are mainly locally breeding birds mixed with some non-breeders. A small number has been recorded in **summer**, with max of six in July 1999. Max record was 68 in early August 1999. The number of **autumn** migrants arriving from the north increases from the beginning of November onwards. The migration is heaviest by the very end of November/beginning of December, when the highest survey count of 246 was recorded on 1 December 1998, of them 142 from Pomoriysko and 72 from Atanasovsko. These birds form the basis of the local **wintering** population, whose number in most of the years of the survey was falling to 2-13 in January, with the exception of 57 in 2000, mainly at Atanasovsko. During 1997-2001 the Gadwall population wintering in Bulgaria had remained stable with some fluctuations in certain years. The highest mid-winter concentration of the species has moved from SBSC to SBg (Michev & Profirov, 2003).

4.47. Teal – *Anas crecca*

Fairly common spring to common autumn migrant and winter visitor; very rare breeder.

Numbers: The max totals per seasons for the study period were:

Winter	8,870	Spring	859
Summer	6	Autumn	5,060

The max totals per lakes for the study period were:

Pomoriysko	630	December	1998
Atanasovsko	7,310	December	1999
Vaya	850	December	1999
Mandrensko	3,700	December	1998

The average number of Teal was highest in December (**Fig. 26**). Complex Atanasovsko Ezero ranks first place with 63% of the species' total numbers in BWC.

Breeding: Nankinov & Darakchiev (1977b) report Teal as breeding at Atanasovsko. On 18 May 1978 they found three nests with young hatched. So far this is the only evidence for the species breeding at Bourgas Wetlands.

Species Dynamics: Depending on weather conditions, the **spring** migration of Teal starts from the beginning/mid-February onwards, the wintering population simultaneously and rapidly decreasing with the majority of birds having left by mid-March (**Fig. 26**). The highest early March count of 859 in 1999 dropped to 215 during the mid-March counts. The remaining birds leave the wetlands soon after the beginning of April, but some hundred may stay until middle/end of the month, when the migration is over. Teals are rare in **summer**; most probably late spring migrants or non-breeding birds. We had two summer records: a group of 23 on 15 May 2000 at Pomoriysko, and another one of six in June 2002. First **autumn** migrants arrive at the very end of July, with the earliest 121 in our survey recorded on 30 July 1999, at Pomoriysko. The numbers increase from the beginning of September and reached 517 during the mid-September 1998. Autumn arrivals increase gradually in the course of the consequent months, when the migration is most intensive, reaching max of 5,060 in November 1999. The arrival of birds from the north continues in December, when the largest **wintering** concentrations were found (8,870 birds in 1999). When most of the lakes are frozen in winter, the number of wintering Teal fluctuates. Under such circumstances, the majority of birds moves south returning soon after the lakes are free from ice. Places with the biggest winter concentrations are Atanasovsko, Zaliv

SPECIES ACCOUNTS

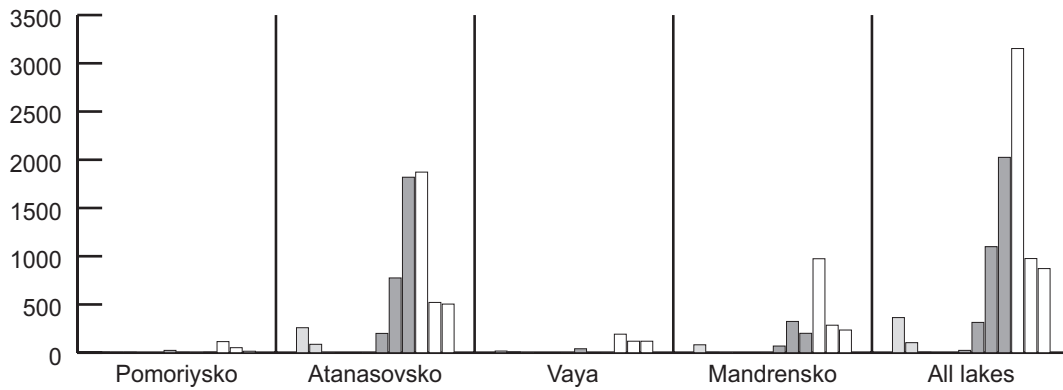


Fig. 26. *Anas crecca*

Foros and Ouzoun Geren. From the second half of December onwards, the number of wintering Teal decreases gradually.

4.48. Mallard – *Anas platyrhynchos*

Resident, fairly common to common spring and autumn migrant, common to abundant winter visitor and uncommon breeder.

Numbers: The max totals per seasons for the study period were:

inter	34,459	Spring	3,126
Summer	940	Autumn	5,618

The max totals per lakes for the study period were:

Pomoriysko	880	December	1998
Atanasovsko	7,936	December	1998
Vaya	13,760	December	1998
Mandrensko	11,883	December	1998

The average number of Mallards was highest in December (Fig. 27). Complex Atanasovsko Ezero ranks first with 41% of the species' total numbers in BWC.

Breeding: Mallards breed in all the wetlands around Bourgas. After Mandrensko was transformed into a

reservoir, the local breeding population decreased significantly. Georgiev (1976) reports seven nests found around Bourgas. Recently, the estimated pairs numbered c. 70, though the actual numbers could have been higher: up to 30 at Atanasovsko (max 35 pairs in 1976, Michev et al., 1999), about 20 at Vaya and 20 at Mandrensko (5-7 at Poda, four at LUKoil-Neftochim oxidizing pools) and 5-7 at Pomoriysko.

Species Dynamics: In **spring**, the number of wintering Mallard starts to decrease gradually from mid-January onwards. The migration is most intensive from the beginning to mid-February, and by the second half/end of March most of the birds have left. Subsequently, we counted max March totals of 3,126 in 1999, which dropped to 418 in April. In May we had from 30 to 173 birds, which provided the basis for estimating the amount of breeding pairs. The number of Mallards increases in **summer**, reaching max 940 in June 2000. The increase was due to the arrival of birds that nest in suitable habitats outside the region of the survey as well as to the replenishment with young birds from the local breeding population. In June, Mallard concentrate during eclipse mainly at Atanasovsko, on the dikes. In July, Mallards disperse for the primary moult, and their number at the wetlands was reduced down to max of 332 in 1999. From the end of July/beginning of August a rapid increase of Mallard **autumn** numbers takes place, building up to max 2,036 in 1999. In

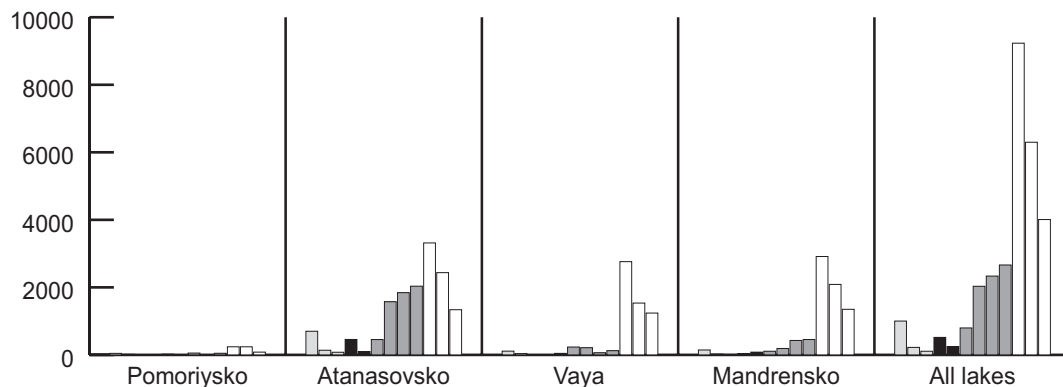


Fig. 27. *Anas platyrhynchos*

September and November, the Mallard arriving from the north gradually increase in number, reaching max 5,618 in November 1998. The largest concentrations in this period were at Atanasovsko (1,690 – 5,273), where they feed mainly in the salt marshes of the lake complex, while the dikes are their favourite roosting place during daytime. The arriving of **wintering** Mallard continues throughout December, reaching a peak by mid-month, with max record of 34,459 in 1998, this being the max totals for the survey as well. The birds arriving in December form the main wintering population of Mallards in BWC, while some of the earlier arrivals pass over on their way to the Mediterranean wintering grounds, south of the region. In January and February, the number of Mallards falls to 9,081 in 1999. In severe winters, Mallards move to the south (the Mediterranean), and return as soon as the lakes become free from ice. In such circumstances the number of wintering Mallard fluctuates. The wintering population of Mallard in the region is perhaps higher, as the bays and the shore of the Black Sea in front of the lakes were not well covered by our survey. The total autumn migration numbers exceeds many times the species' numbers during the spring migration. According to Delany et al. (1999), the Mallard numbers in the Black Sea/East Mediterranean region had declined between 1987 and 1996. Since then, this trend has continued and the average total numbers in Bulgaria has dropped to average 75,200 with max total of 151,300 in 1997 (Michev & Profirov, 2003).

4.49. (Northern) Pintail – *Anas acuta*

Uncommon to common spring and late autumn migrant and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	1,209	Spring	414
Summer	2	Autumn	131

The max totals per lakes for the study period were:

Pomoriysko	80	April	1999
Atanasovsko	1,168	December	2000
Vaya	44	January	1997
Mandrensko	25	April	1999

The average number of Pintails was highest in December (**Fig. 28**). Complex Atanasovsko Ezero ranks first place with 97% of the species' total numbers in BWC.

Breeding: Breeding Pintail in BWC were not registered during the survey. We found 3-5 pairs breeding regularly in the northern parts of Atanasovsko in 1974 –1977. According to Nankinov et al. (1997) individual pairs have bred irregularly at Atanasovsko. Four pairs stayed in May 1999 at Atanasovsko where they most probably bred, though this was not confirmed. Pintail probably continue to breed in very small numbers in some years – a few pairs at most – at Atanasovsko. The species was also seen during the breeding season at Pomoriysko by Jaschhof (1990), but without breeding evidence.

Species Dynamics: In **spring**, the number of Pintail decreases continually from early February onwards, but often fluctuates during that month as the birds from southern wintering grounds arrive at the same time. From mid-March until the end of the month the majority of the birds leave the region in a rather short time, with highest record of 411 in March 1997. The migration continues in April, and in some years the numbers during that month remain high or even increase on account of the wave of late arrivals from the south in the second half of March. Up to 300 were recorded during the early April 1999. By the end of April, most Pintail have left the studied area. We had only two **summer** records, with one on 5 June 2002 at Pomoriysko, and one on 1 July 1999 at Atanasovsko (most probably young or non-breeding birds). **Autumn** migration begins from mid-August onwards, but the 10 recorded on 15 August 1996 at Pomoriysko were the earliest arrivals within the period of the survey. The September record of 130 in 1999 was the highest for this month. In October-November, the number of migrants gradually increases

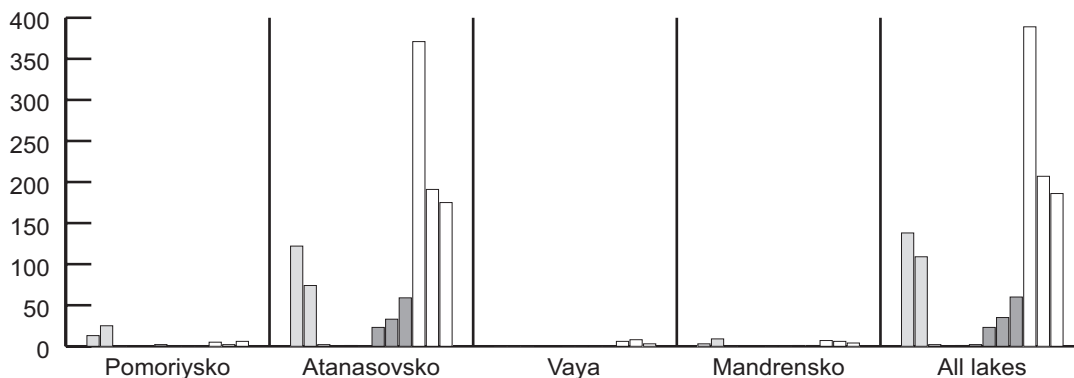


Fig. 28. *Anas acuta*

but they are still in relatively small numbers. Max counts during these months yielded 131 birds. The migration is most intensive from the end of November/beginning of December onwards. The number of autumn arrivals rapidly increases, reaching a peak in mid-December with max **winter** totals of 1,209 obtained in 1999 when 1,168 came from Atanasovsko. The majority of these birds form the basis of the Pintail wintering population at Bourgas Wetlands. Winter distribution is fluctuating, depending on weather. Under more severe conditions, most often in January, the birds move to the south and come back after the wetlands are free from ice when up to 421 were seen on 1 February 2000. Pintails are most numerous at Atanasovsko. Dontschev (1980) reports a rather high number of wintering Pintail at Bourgas Wetlands in the 1980s, c. 1,500 in November 1974 at Mandrensko; 2,060 at Atanasovsko in December 1977; and 2,000 off the shore at Sarafovo in the same month. Generally, the spring migration involves more birds than the autumn one, a fact that indicates the species uses different migration routes. Max numbers during the 1977-1996 mid-winter survey had been recorded at Atanasovsko: 4,107 in 1977 (Michev & Profirov, 2003).

4.50. Garganey – *Anas querquedula*

Fairly common spring and autumn migrant, rare breeder and probably very rare winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	1,384
Summer	149	Autumn	2,340

The max totals per lakes for the study period were:

Pomoriysko	168	April	2002
Atanasovsko	2,185	August	1999
Vaya	234	May	1996
Mandrensko	1,112	April	2002

The average number of Garganey was highest in April and August (**Fig. 29**). Complex Atanasovsko Ezero ranks first with 79% of the species' total numbers in BWC.

Breeding: Garganey is a rare breeding species for BWC. Prostov (1964) describes the species as breeding relatively seldom during the period of his study – he found one nest only, on 22 May 1953 at Vaya, and a female with ducklings in July 1960, at the same place. Dontschev (1967) saw Garganey in pairs and in small flocks during the breeding season at Atanasovsko, but without evidence of breeding. During 1996-2002 survey we found one nest with eggs at Cherny Vrukh Fishponds in 2001 (at a distance of c. 20 m from the shore), and a pair with ducklings in the northeastern part of Atanasovsko near the Estuary of Reka Azmashka in 1999 and 2002.

Species Dynamics: In **spring**, from the second half of February onwards the Garganeys arrive in small groups. The number of migrants increases throughout March and the migration becomes most intensive between the second half of March and the first week/middle of April, with a peak of max 1,384 on 15 April 2002. From mid-April onwards the number of Garganey gradually falls to 399 in the early May of 1996. Less than hundred were recorded during all of the mid-May counts of the survey. The migration lasts until the end of May/the beginning of June. Spring data from Mandrensko correspond well to data of Dontschev (1980). We had a peak of 1,112 in April 2002 at the same lake. In most **summers**, Garganeys were present in small numbers or absent altogether, but in mid-June 1996 and 1999 up to 93 birds were recorded. The majority of the Garganeys observed in June that stayed in groups rather than by pairs, made us assume they were non-breeding first-year birds; nevertheless, some of the pairs might have been breeding. From early July onwards the **autumn** numbers start to grow. The migration is most intensive during the second half of July/beginning of August, with a peak of max survey total of

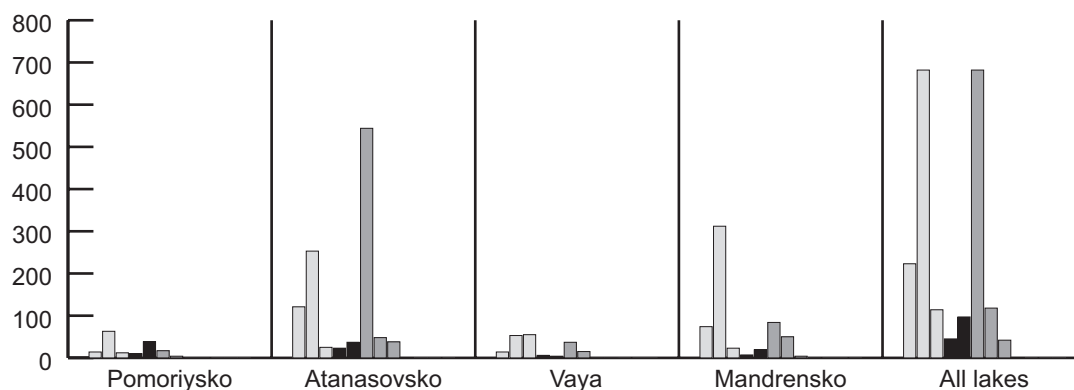


Fig. 29. *Anas querquedula*

2,340 during the early August 1999. The numbers of arrivals decreases from mid-August onwards, falling to max 241 on 15 September 1996. By the end of September the majority of the Garganey has already left, after that the migration is slowing down, reaching the max 166 in October 1996. The last three birds were seen on 15 November 1998 at Atanasovsko. No **wintering** Garganey were recorded by us. In the past, Garganey used to winter 'in very small number' in comparison to other duck species (Prostov, 1964).

4.51. (Northern) Shoveler – *Anas clypeata*

Fairly common to common migrant, common winter visitor and scarce breeder.

Numbers: The max totals per seasons for the study period were:

Winter	6,922	Spring	2,314
Summer	5	Autumn	4,190

The max totals per lakes for the study period were:

Pomoriysko	188	April	1996
Atanasovsko	2,550	September	1996
Vaya	6,802	February	1999
Mandrensko	3,459	December	1998

The average number of Shovelers was highest in December (**Fig. 30**). Complex Ezero Vaya ranks first with 58% of the species' total number in BWC.

The 1-% Ramsar criterion is 4,500 birds. During the period of survey the species numbers exceeded this criterion in a single year for Vaya.

Breeding: Breeding Shovelers are reported for Atanasovsko, from five to 11 pairs (Darakhiev & Nankinov, 1978; Roberts, 1980a, 1981). We found max six regularly breeding at Atanasovsko between 1974 and 1979. Possibly breeding at Vaya (Roberts, 1980a).

Breeding of Shovelers was not proved during the 1996-2002 survey.

Species Dynamics: During **spring** migration, Shovelers start to leave the area from the end of February/ beginning of March onwards at the same time at which Shovelers from southern wintering grounds start to arrive. The migration peaks in the second half of March/ beginning of April, with max 2,314 in early April 1996. After mid-April, the number of Shovelers falls down and by the end of April most of the birds have left the area. Up to 50 were recorded during May counts, these possibly being late migrants or non-breeding first-year birds.

Summering Shovelers are rare in BWC and are usually in small numbers. We had up to five in June and one in July 1999, probably late migrants. In **autumn**, Shovelers appear in the first half of August, reaching a peak of 94 in mid-August 1996. From mid-August onwards the number of autumn arrivals increases rapidly, reaching a max September total of 2,250 in 1996 and 4,080 in November same year. In this period, Shovelers gathered mostly on Atanasovsko, where their complete moult into breeding plumage takes place. An extremely high number is reported by Nankinov (1980) with max of 35,000 at Vaya, in late October/ early November 1974. According to our estimates in milder years c. 7,000 Shovelers **winter** in BWC. During the survey the number of arrivals increases until early December, with a peak of 5,847 in 1999. In milder winters the species number on the lakes around Bourgas increases considerably (up to 13,000 ind in January 1976 at Vaya – Roberts, 1978). The numbers of the wintering population may fluctuate during subsequent winter months, depending on the weather conditions and the state of the lakes. When the lakes are frozen, the majority of birds move to the south, and return after the wetlands are free from ice. We obtained max January data of 3,389 and max February of 6,922 in 1999, the latter being the highest survey count. These data coincide to a great extent with the records of Dontschev (1980) and Roberts (1978, 1981) in the 1980s. Shovelers are found mainly at

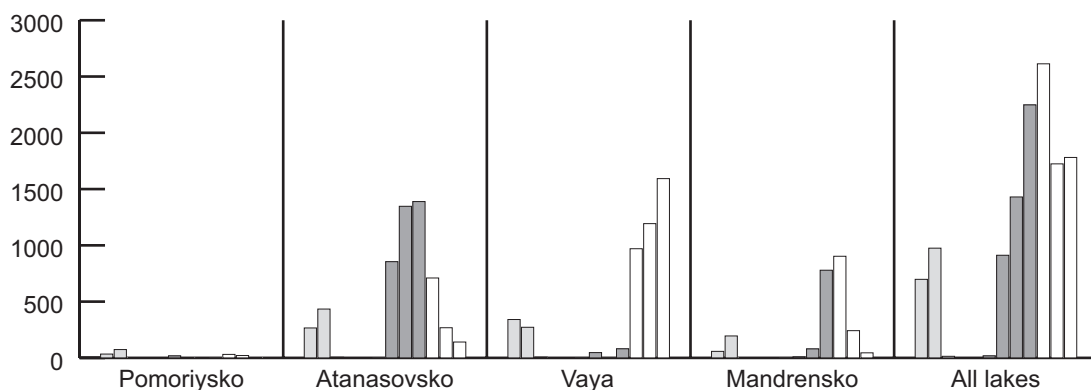


Fig. 30. *Anas clypeata*

Vaya, Komloushka Nizina, Poda, west Mandrensko, and Atanasovsko, where the muddy bottom and rich food make these wetlands favourite places for their concentration in winter. Atanasovsko is the main place of concentration during migration. Autumn migration is more impressive than the spring one. The max numbers during the mid-winter counts had been recorded at Vaya, 7,878 in 1988 (Michev & Profirov, 2003).

4.52. Marbled Duck – *Marmaronetta angustirostris*

Very rare visitor. Marbled Duck was not recorded in the survey period. Three earlier observations from the Bourgas region are reported in literature, all of them made at Atanasovsko: one on 7 November 1985 (Sakhakyan, 1990), on 28 March 1982 (Nankinov, 1992) and one on 3 December 1993 seen by M. Waterhouse (Nankinov et al., 1997).

4.53. Red-crested Pochard – *Netta rufina*

Scarce uncommon migrant and winter visitor.

Numbers: The max totals per season for the period of the survey were:

Winter	67	Spring	60
Summer	0	Autumn	2

The max totals per lakes for the study period were:

Pomoriysko	37	December	2001
Atanasovsko	20	January	1999
Vaya	0	–	–
Mandrensko	60	March	1999

The average number of Red-crested Pochard was highest in December (**Fig. 31**). Complex Mandrensko Ezero ranks first with 76% of the species' total number in BWC.

Breeding: Breeding of the Red-crested Pochard in BWC has not been proved. Boev (1951) reports a

male shot during summer of 1946 at Mandrensko, and he assumes the species was probably breeding there. Pairs seen during the breeding season were reported by Prostov (1964, for Vaya), Nankinov & Darakchiev (1977a) for Atanasovsko, and Roberts (1980a) for Mandrensko.

Species Dynamics: Spring migration starts from the second half of February onwards and is most intensive throughout March. We obtained max of 60 during early March 1999, all at Ouzoun Geren. The migration continues in April with the numbers falling to max of 19 during the mid-April 1999. By the end of April the Red-crested Pochards have left the area. **Summering** birds were not found during the survey. In **autumn**, the Red-crested Pochards are rare (max two in November 2000). The first migrants arrive in small flocks or singly by the end of August and this continues until the end of November. Autumn migration is not well pronounced. 30 were counted on 27 November 1999 at Zaliv Foros but since Kumerloev (1957) had reported 700 in early November 1941 on Bourgaski Zaliv, such a high number has never been recorded until recently. In **winter**, the species is reported 'abundant' at Bourgas in the past (Vurbanov, 1912). Nowadays the Red-crested Pochards winter in small numbers in quiet places off the Black Sea shore, at Pomoriysko, Atanasovsko, and rarely at LUKoil-Neftochim oxidizing pools. The species' number increases in the beginning of December, reaching a max survey total of 67 in 1998. January-February records were stable with max 20 in 1997 and 1999 respectively.

4.54. (Common) Pochard – *Aythya ferina*

Fairly common to common spring and abundant autumn migrant, common to abundant winter visitor, and uncommon breeder.

Numbers: The most numerous diving duck in BWC during migrations and wintering. The max totals per seasons for the study period were:

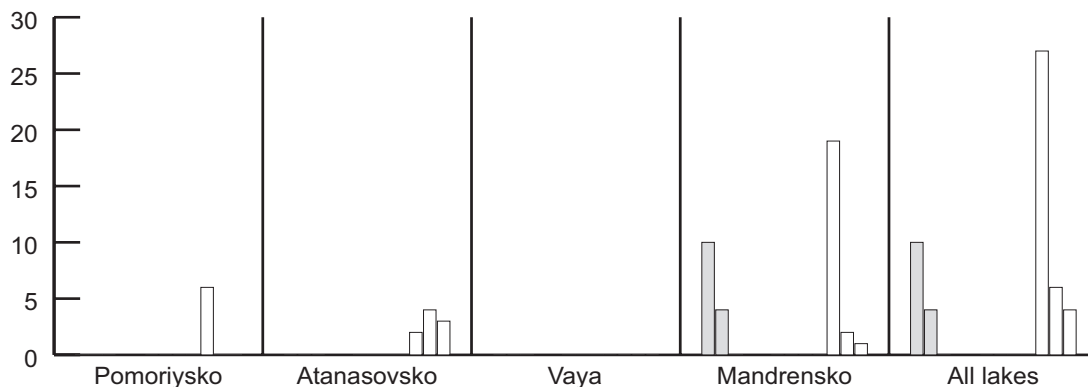


Fig. 31. *Netta rufina*

Winter	30,029	Spring	4,815
Summer	567	Autumn	15,898

The max totals per lakes for the study period were:

Pomoriysko	4,912	December	1998
Atanasovsko	3,085	January	1999
Vaya	16,800	December	1999
Mandrensko	13,170	December	1997

The average number of Pochard was highest in December (**Fig. 32**). Complex Ezero Vaya ranks first with 72% of the species' total number in BWC.

The 1-% Ramsar criterion is 10,000 birds. During the period of survey the species numbers regularly exceeded the criterion for Vaya and in one year for Mandrensko.

Breeding: Until this survey, breeding of Pochard in BWC was proved for Mandrensko by Hubalek (1978), and for Vaya on 18 June 1979 by Botev & Peshev (1985). The estimated breeding population for the survey period is c. 50 pairs. Between 1991 and 1996 five to eight pairs of Pochard bred regularly at Poda. At least five to six pairs bred at Poda during 1999-2000, eight in 2001 and 11 in 2002 (Anton Kovachev, in litt.). At Ouzoun Geren and the nearby LUKoil-Neftochim oxidizing pools, 14 to 28 (max 28 in 2001) pairs regularly bred in the period 1988-2002 (Kiril Bedev, in litt.). At Vaya, five to 10 pairs were found to breed regularly during the survey.

Species Dynamics: In **spring**, from mid-February onwards the number of wintering Pochards starts to decrease considerably as the birds start to leave for their breeding grounds in the north, falling to max 4,815 in the mid-March 1996. The number continues to decrease in April, reaching max 434 in mid-April 2002. The majority of Pochards leaves by the end of April, while migration is still on. In May, there were between 89 and 221 birds, mainly at Vaya and Mandrensko, the majority of these staying in scattered groups, most probably of non-breeding first-year birds.

A small number of pairs was recorded during this period, some of them probably breeding. In **summer**, up to 197 were recorded in June, mainly non-breeding birds as well as birds from the local breeding population. The July counts, which yielded between 271 and 567, showed an increase in the numbers of Pochards, mainly due to arriving males that moult there. During August, there is an **autumn** build-up in numbers starting mainly at Mandrensko and Vaya, with the birds continuing to arrive for moulting. The August counts provided max of 1,912 in 1996, when 1,248 were at Mandrensko and the rest, at Vaya. The number increases from the end of August/beginning of September onwards, as young birds and females start to arrive in the region. A rapid increase in the number of Pochards was noted from early to mid-October, reaching a peak of 15,898 during the mid-November of 1998. Nankinov (1980) reports extremely high max autumn number of 45,000 birds at Vaya in late October/early November 1974. The highest **winter** concentrations were found in early December, when the max survey count of an impressive 30,029 was recorded in 1998. The highest December count of 37,000 was reported by Johnson & Biber (1971) for Vaya. The number of wintering Pochards fluctuates depending on weather conditions and the state of the lakes. When the lakes freeze, the majority of birds move to the sea in the coastal waters or move farther south until the wetlands are free from ice. From the beginning of December onwards the number of wintering Pochards starts gradually to decrease to 12,590 in February 2002. The max number (16,720 in 1993) during the mid-winter survey has been recorded at Complex Mandrensko Ezero (Michev & Profirov, 2003).

4.55. Ferruginous Duck – *Aythya nyroca*

Rare spring and autumn migrant, scarce winter visitor and breeder.

Numbers: The max totals per seasons for the study period were:

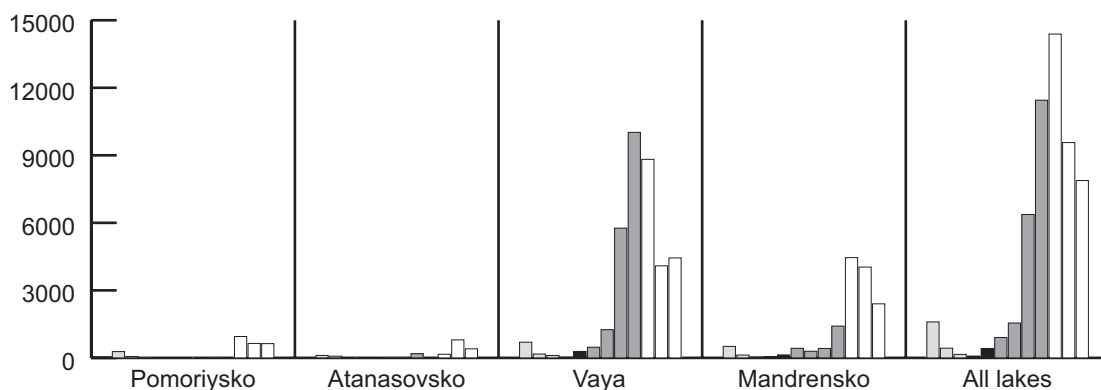


Fig. 32. *Aythya ferina*

Winter	9	Spring	6*
Summer	3	Autumn	111

*Outside the survey max 42 in March 2003, on Cherny Vrukh Fishponds

The max totals per lakes for the study period were:

Pomoriysko	0	–	–
Atanasovsko	3	April	2002
Vaya	6	August	2001
Mandrensko	111	October	1996

The average number of Ferruginous Ducks was highest in October (max 37). Complex Mandrensko Ezero ranks first with 95% of the species' total number in BWC.

Breeding: Rather widely spread as breeding until Patev's (1950) study. Data on breeding Ferruginous Duck in BWC are given by Prostov (1964). Georgiev (1976) reports a breeding pair at Mandrensko on 9 July 1964. Between 1974 and 1984 max to 30 pairs bred regularly at Vaya Fishponds. Nankinov (1985) gives the species as breeding in 1980s and 1990s for Vaya. The number of breeding pairs slumped to 1-3 pairs recently after the fishponds were abandoned. Kovachev (in litt.) supposed there was one breeding pair at Poda in 2001. For the time being the numbers of the Ferruginous Ducks in Bulgaria during the breeding season amounts to about 150-210 pairs (Petkov et al., 2003). In the region, the species breeds at Poda (one pair in 1993), at Atanasovsko (one pair in 1996), and at Cherny Vrukh Fishponds (three to five pairs).

Species Dynamics: In **spring**, the Ferruginous Ducks arrive in the first half of February with max of nine seen during the mid-February counts of 1997 at Mandrensko. The migration builds up in March, reaching a peak of 42 in March 2003 at Cherny Vrukh Fishponds. The max spring number was recorded at Atanasovsko with 26 in March 1976 (Michev et al., 1999). From the beginning of April, the intensity of the migration diminishes (max of four in 1999) and lasts until the end of the month. The max May counts of three pairs in 2001 at Vaya and five at Poda/Ouzoun Geren in 2002, were birds from the local breeding population. One to six regularly seen in May-June at Vaya and Mandrensko. During **summer**, in most of the August counts 2-6 birds were recorded, mainly moulting males. The **autumn** migration begins from the end of August onwards and is most intensive by the end of September/beginning of October. We obtained a max September record of 20 during early September 1996, at Cherny Vrukh Fishponds, with a peak of the highest survey totals of 111 (of these 104 at Cherny Vrukh Fishponds) during the early October of the same year. From mid-October onwards the number of autumn Ferruginous Ducks decreases

gradually, a process that continues until the second half of November (max 11 in 1996). Larger flocks were found by Dontschev (1980) on 10 November 1970 at Atanasovsko – c. 50 and on 24 August 1978, at Vaya – c. 40. In the past, the Ferruginous Ducks were reported as numerous in Bourgas region during **winter** (Radakoff, 1879). We had 12 outside the dates of the survey, on 6 December 1992 at Poda. The highest mid-winter numbers was recorded at Complex Mandrensko Ezero, with nine in 1985 (Michev & Profirov, 2003). In 2001, 27 were recorded at LUKoil-Neftochim oxidizing pools (Kiril Bedev, pers. comm.).

4.56. Tufted Duck – *Aythya fuligula*

Uncommon to common spring and autumn migrant, common winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	11,037	Spring	2,880
Summer	19	Autumn	3,075

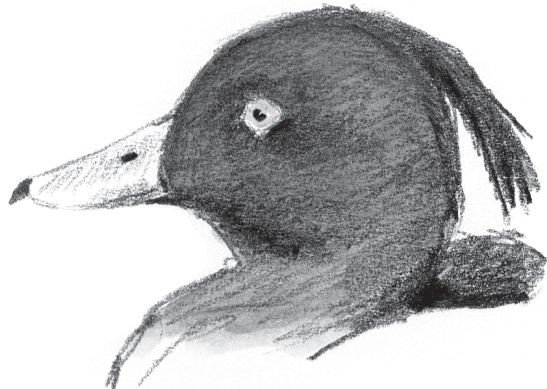
The max totals per lakes for the study period were:

Pomoriysko	4,500	February	1997
Atanasovsko	800	February	1999
Vaya	6,825	February	2000
Mandrensko	4,733	January	1997

The average number of Tufted Ducks was highest in February (**Fig. 33**). Complex Ezero Vaya ranks first with 57% of the species' total number in BWC.

The 1-% Ramsar criterion is 7,000 birds. During the period of survey the species numbers did not exceed the criterion (but did so regularly for the entire wetland complex).

Species Dynamics: In **spring**, the wintering population in Bourgas area starts to decrease from mid-February onwards. By the end of February the majority of



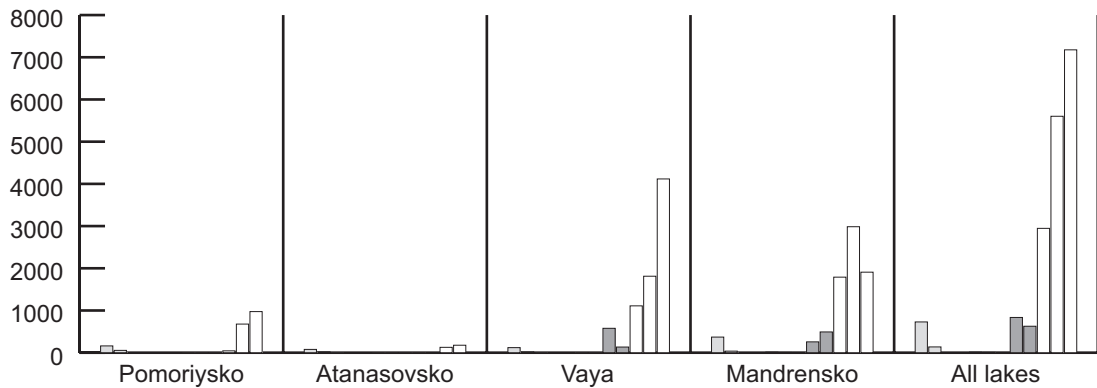


Fig. 33. *Aythya fuligula*

birds have left the region. The migration continues in March and lasts until the end of April. A few birds may remain there in May when nine were counted in 1996. In some years we found Tufted Ducks **summering** in the area with up to 19 in 1996 at Mandrensko. Single males were regularly found during the breeding season at LUKoil-Neftochim oxidizing pools, probably ready to breed. The first concentrations in **autumn** start forming from the beginning of October onwards, but the number remains relatively low until the end of November. Then a rapid increase of the **wintering** population is noticed with a peak in February, reaching max of 11,037 in 1997. Outside the dates of the survey max 12,800 during the mid-winter counts of 1993 at Zaliv Foros. Tufted Duck visits BWC most often in winter and is considerably less numerous during migration. Places for greater concentrations are the freshwater Mandrensko and Vaya. The max numbers during the mid-winter counts (15,803 in 1992) have been recorded at Vaya (Michev & Profirov, 2003).

4.57. (Greater) Scaup – *Aythya marila*

Scarce winter visitor. An adult male was recorded at Pomoriysko on 20 February 1997. Outside the dates of the survey 114 were observed on 16 February 1989 at Atanasovsko, three on 15 January 2003 there again, and five on 10 January 1993 at Poda. On 19 February 2003, three birds were seen at Poda by Anton Kovachev (pers. comm.). Nankinov & Darakchiev (1977a) report a May record of a pair, seen at Atanasovsko in 1978. The max numbers (100 in 1994) during the 1977-2001 mid-winter survey was recorded at Mandrensko (Michev & Profirov, 2003).

4.58. (Common) Eider – *Somateria mollissima*

Rare migrant, summer and winter visitor. A bird was seen on 1 June 2000 at Poda. Up to three stayed off the Poda shore in the summer and autumn of 2001. A bird was recorded on 11 April 2002 offshore at Pomorie. Outside the dates of the survey we had a few observations of Eiders, all of them at Poda: two on 19 February 1995, three on 19 March 1995, and three

on 18 August 1995. The species was recorded during the 1977-1996 mid-winter counts at Pomoriysko and Mandrensko (Michev & Profirov, 2003).

4.59. Long-tailed Duck – *Clangula hyemalis*

Scarce winter visitor. Seen for the first time in Bulgaria by J. Roberts and D. Nankinov (Nankinov et al., 1980) in April 1976, offshore near Shkorpilovtsi (District of Varna). Later the same year John Roberts observed six adults off the shore at Pomorie on 1 December 1976. The next record for the study area was of a couple seen at Poda (Nankinov et al., 1980). There was an unusual observation of this species at Pomoriysko on 1 August 2000 reported by Davies (2002). During this survey we made a few **winter** observations: one on 20 February 1997, one on 15 January 2002, and one on 15 January 2003 – all of them at Poda. According to Nankinov et al. (1997), the biggest wintering flock in Bulgaria numbered 58 birds seen on 12 February 1989 in Bourgaski Zaliv. During the 1977-2001 mid-winter survey 11 were recorded in 1981, off the Black Sea coast at Mandrensko.

4.60. Common Scoter – *Melanitta nigra*

Rare autumn and winter visitor. A few records: a male adult seen on 13 January 1997 during the mid-winter count in Zaliv Foros; 12 observed on 25 February 1997; three on 4 April 1997; four on 7 November 1999, all at the last site (BSPB, 2000). The max number per season for the period of the survey was two in winter and four in the autumn. The highest number during the mid-winter counts had been recorded at Mandrensko, 25 in 1980 (Michev & Profirov, 2003).

4.61. Velvet Scoter – *Melanitta fusca*

Rare winter visitor. The max number per season for the period of the survey was two in winter and 12 in the spring. A pair was recorded on 13 January 1997 in Zaliv Foros, at Poda and another 12 birds in March 2002 there again. Outside the dates of the survey max of 46 was recorded on 12 February 1989 in Zaliv Foros.

4.62. (Common) Goldeneye – *Bucephala clangula*

Scarce to uncommon spring migrant and uncommon winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	52	Spring	20
Summer	0	Autumn	5

The max totals per lakes for the study period were:

Pomoriysko	3	February	2002
Atanasovsko	12	March	1996
Vaya	4	January	1997
Mandrensko	52	January	2002

The average number of Common Goldeneye was highest in January (**Fig. 34**). Complex Mandrensko Ezero ranks first with 52% of the species' total number in BWC.

Species Dynamics: The wintering Common Goldeneyes start to decrease in number from mid-February onwards, the **migration** being over by the end of March. Single birds may stay in the area until early April. In **autumn**, the first birds arrive in November but one was seen earlier, on 15 September 2002. In **winter**, the number peaks in mid-January, with max

of 52 observed in 2002. After that, the wintering population decreases, its number falling to 35 on 15 February 1997, and 20 on 15 March 1999. Outside the dates of the survey max 68 on 17 January 1993 in Zaliv Foros. The majority of the birds leave the area by the end of March. According to Michev & Profirov (2003) Mandrensko is the second main wintering grounds for this species in Bulgaria.

4.63. Smew – *Mergus albellus*

Scarce to uncommon spring migrant, uncommon to fairly common winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	490	Spring	15
Summer	0	Autumn	1

The max totals per lakes for the study period were:

Pomoriysko	17	January	1997
Atanasovsko	19	February	2000
Vaya	85	January	2002
Mandrensko	442	January	1997

The average number of Smew was highest in January (**Fig. 35**). Complex Mandrensko Ezero ranks first with 76% of the species' total number in BWC.

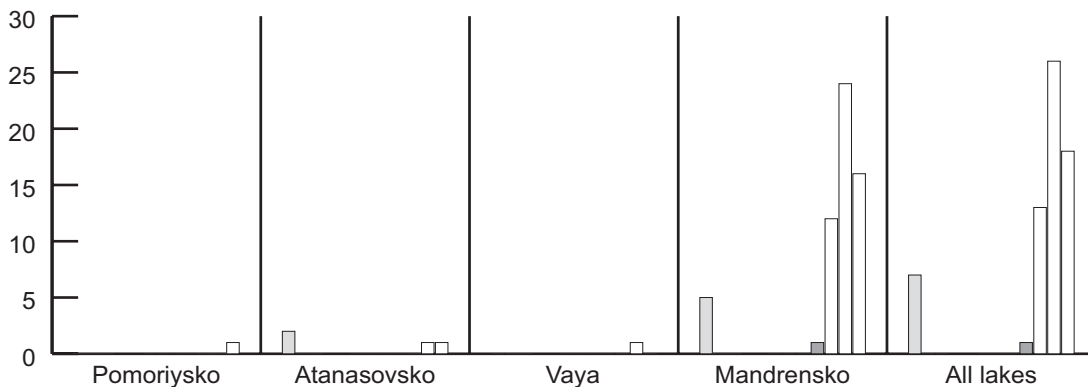


Fig. 34. *Bucephala clangula*

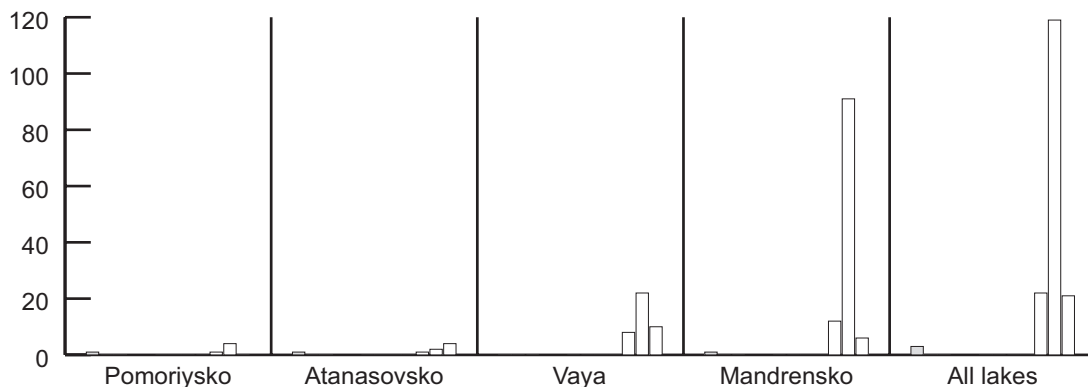


Fig. 35. *Mergus albellus*



Pomoriysko	171	December	1998
Atanasovsko	145	January	1997
Vaya	0*	–	–
Mandrensko	60	March	1996

*Outside the dates of the survey max 34 on 19 January 1994 (Bob Scott, pers. comm.).

The average number of Red-breasted Merganser was highest in December (**Fig. 36**). Complex Pomoriysko Ezero ranks first with 77% of the species' total numbers in BWC.

The 1-% Ramsar criterion is 350 birds. During the period of survey the species' numbers exceeded this criterion in a single year only, for Mandrensko.

Species Dynamics: In **spring**, the Smews that have wintered in BWC start to leave from the beginning of February onwards and the majority of them have left by the end of March. Single birds may stay until early April. Smew is very rare in **autumn**, recorded only once – a single bird on 15 September 2002. In **winter**, the first Smews arrive in the beginning of December, their numbers gradually increasing to max of 490 on 15 January 1997. After mid-January, the number of wintering birds decreases, dropping to max of 41 on 15 February 1997. The species' most favoured places for wintering are Vaya, Zaliv Foros and Ouzoun Geren. The max numbers during the mid-winter counts 1977-2001 were recorded at Mandrensko (Michev & Profirov, 2003).

Species Dynamics: In **spring**, the Red-breasted Mergansers wintering in Bourgaski Zaliv begin to leave the area for their breeding haunts from the second half of January onwards. The max February data we obtained were 43 birds in 2000 and max 60 birds in March 1996. By the end of March, the majority of them have left the studied area. The last five were recorded on 15 April 1996, at Atanasovsko. Single birds can still be seen in May. We had a single **summer** record of two on 1 June 2001. In **autumn**, the first migrants start arriving from mid-September onwards and gradually increase in number during October (max 14 in 1998) and November (max 73 in 1996). The number of arrivals increases in December, reaching a max **winter** record of 181 on 15 December 1998. The species' number remains stable until mid-January (max 159 in 1997), then begins to decrease dropping to 43 on 15 February 2000.

4.64. Red-breasted Merganser – *Mergus serrator*

Scarce to uncommon migrant, uncommon to fairly common winter visitor, rare to scarce summer visitor.

Numbers: The max totals per seasons for the study period were:

Winter	181	Spring	60
Summer	2	Autumn	73

4.65. Goosander – *Mergus merganser*

Rare winter visitor. Recorded a few times only, mostly in January. Max of 11 was observed at Ouzoun Geren on 15 January 1997. The only December record of two was made at Vaya on 15 December 2002. Outside the dates of the survey 13 were recorded between 27 December 1996 and 4 January 1997 at Ouzoun Geren, nine on 18 February 2003, at Vaya.

The max totals per lakes for the study period were:

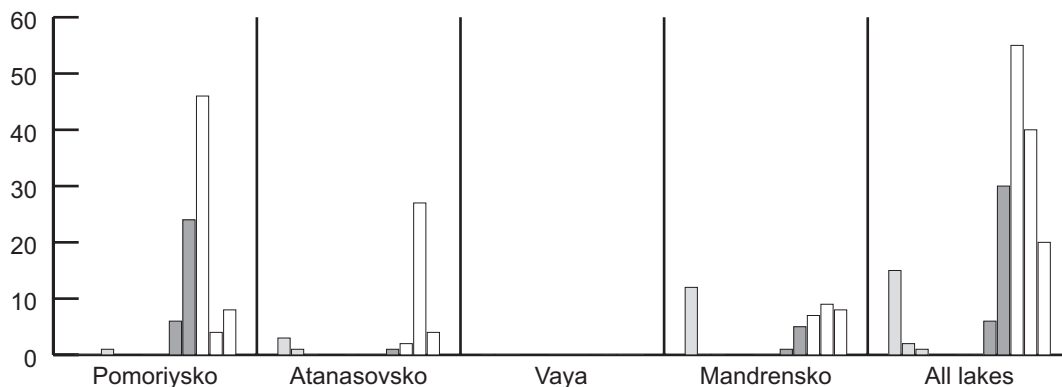


Fig. 36. *Mergus serrator*

4.66. White-headed Duck – *Oxyura leucocephala*

Common spring and fairly common autumn migrant, fairly common to common winter visitor.

Numbers: According to Vurbanov (1912) the species used to be quite numerous on Atanasovsko in the past. The max totals per seasons for the study period were:

Winter	1,367	Spring	2,260
Summer	0	Autumn	501

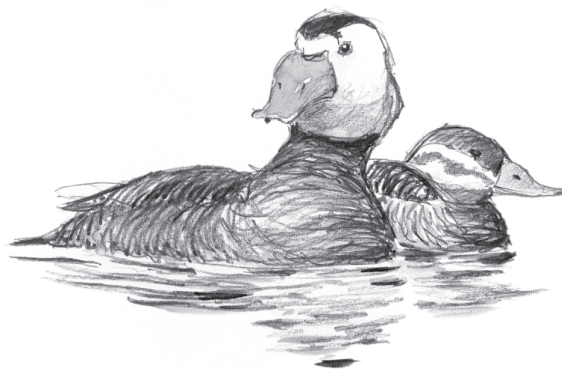
The max totals per lakes for the study period were:

Pomoriysko	2	December	1996
Atanasovsko	8	December	2001
Vaya	2,260	March	1999
Mandrensko	435	January	1999

The average number of White-headed Duck in BWC was highest in March and December (**Fig. 37**). Complex Ezero Vaya ranks first with 89% of the species' total number in BWC.

The 1-% Ramsar criterion is 75 birds. During the period of survey the species' numbers exceeded regularly this criterion for Vaya and Mandrensko.

Species Dynamics: In **spring**, the number of White-headed Ducks begins to build up from mid-February onwards. The migration intensifies in March, when the max record was obtained on 20 March 1999. The number of migrants drops rapidly during the second half of March and by the end of the month most of them have left Bourgas region. Few birds may stay until early April. There was a May record of a single bird at Atanasovsko (probably odd or injured) recorded on 17 May 1996 (Michev et al., 1999). In **autumn**, White-headed Ducks arrive at Vaya in the beginning of November, reaching max of 501 during the mid-November counts of 2000. These birds form the core of the **wintering** population. The number of arrivals increases in December and January, reaching a peak of 1,367 in 1999. In February, max of 822 were observed in the mid-February 2001. After that, the number



increases again with the start of the reverse migration. In some years, the winter population may decrease rapidly after the lakes have frozen. In such cases the birds move south reaching Lake Vistonida in Greece. This link was proved by carrying out simultaneous counts and observations by teams of Bourgas Wetlands and Greek ornithologists. Max numbers during the mid-winter counts 1977-2001 were recorded at Vaya: 785 in 2001 (Michev & Profirov, 2003). Apparently, the species prefers to winter at Vaya and Ouzoun Geren (where it had been recorded in large numbers in previous winters), than in other wetlands of the complex. During the last several years its number during the spring migration has increased.

4.67. Water Rail – *Rallus aquaticus*

Scarce to uncommon resident and breeder.

Numbers: The max totals per season for the period of the survey were:

Winter	14	Spring	17
Summer	10	Autumn	12

The max totals per lakes for the study period were:

Pomoriysko	1	July	1999
Atanasovsko	17	April	1996
Vaya	3	June	1999
Mandrensko	9	January	1997

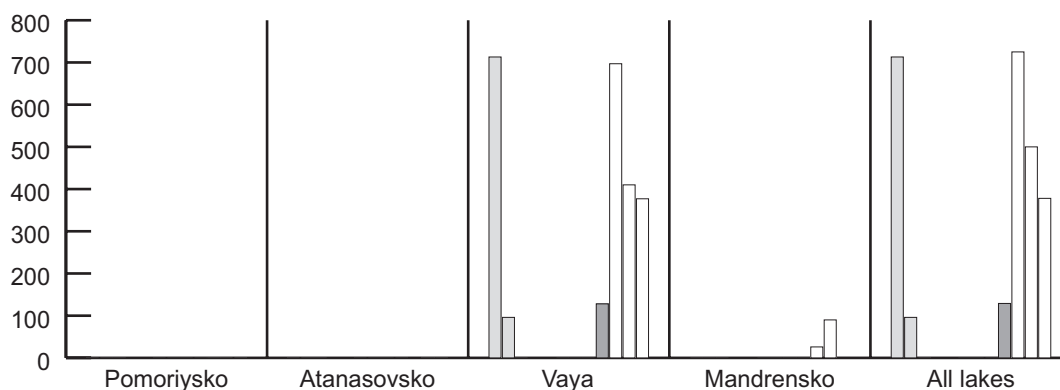


Fig. 37. *Oxyura leucocephala*

The average number of Water Rail in BWC was highest during spring migration (max 4) but the species seems to have been underestimated because of its secretive behaviour.

Breeding: Reported as breeding at Vaya and Mandrensko by Prostov (1964), and for Atanasovsko by Mountfort & Fergusson-Lees (1961) and Roberts (1981). During the survey Water Rails were breeding in all of the Bourgas Wetlands with a total of 30 to 50 pairs.

Species Dynamics: Water Rails are present all the year round in BWC. **Spring** migration is most intensive in March-April. Max 10 (heard) in mid-March 2000 and max 17 on 15 April 1996, at Atanasovsko. In **summer**, 7-10 regularly heard during June and July. In **autumn**, 9-12 birds regularly were observed during the August–November period. Water Rails **winter** in all of the Bourgas Wetlands, with max 6-14 regularly recorded during December, January and February. Atanasovsko held the max winter numbers during the survey. Most probably, the majority of wintering Water Rails are from the local breeding population but some come from the areas to the north of the region. During 1977-2001 mid-winter counts the species was most numerous at wetlands on the SBSC (Michev & Profirov, 2003).

4.68. Spotted Crake – *Porzana porzana*

Scarce to uncommon migrant and breeder, rarely wintering in the wetlands around Bourgas. A bird (dead) recorded on 3 January 1997 near the by-pass canal of Atanasovsko, and one at Poda on 2 October 1999 (BSPB, 2002). According to Simeonov et al. (1989), the Spotted Crake breeds at Atanasovsko, Vaya and Mandrensko.

4.69. Little Crake – *Porzana parva*

Scarce migrant, probably scarce breeder. Reported by Prostov (1964) with one seen on 12 June 1954 at Mandrensko, and Roberts (1981) with three in May 1976, at Atanasovsko. Few records were made during this survey: four on **spring** migration, on 15 April 1996 at Atanasovsko, and twice in **autumn** – one on 15 September at Poda, one on 15 October 2000, and max 6 on 21 September (Michev et al, 2004) at Atanasovsko.

4.70. Baillon's Crake – *Porzana pusilla*

Scarce migrant and probably scarce breeder.

Numbers: Prostov (1964) reports three records for Bourgas region. The methods applied in this survey did not allow collecting relevant data on the species.

Breeding: Prostov (1964) suggests the Baillon's Crake is a rare breeder in wetlands around Bourgas.

One was seen at Vaya Fish Ponds in mid-April 1992. One found dead in mistnet at Atanasovsko in 1982 (K. Bedev, in litt.)

Species Dynamics: According to Dontschev (1980) migration along the Black Sea coast takes place between March-April and September-October.

4.71. (Common) Moorhen – *Gallinula chloropus*

Common resident and breeder.

Numbers: The max totals per seasons for the study period were:

Winter	136	Spring	48
Summer	23	Autumn	290

The max totals per lakes for the study period were:

Pomoriysko	4	January	1997
Atanasovsko	120	January	2000
Vaya	31	November	2002
Mandrensko	289	August	2000

The average number of Moorhen in BWC was highest in winter (max 90). Complex Mandrensko Ezero ranks first with 86% of the species' total number in BWC.

Breeding: The Moorhen breeds in all the wetlands around Bourgas. Estimated breeding pairs for the period of the survey are c. 30 pairs at Atanasovsko, 9 at Vaya, 3-5 at Poda.

Species Dynamics: In **spring**, the number of Moorhen increases from the second half of March onwards, on account of arriving migrants; reached max of 61 during the mid-April counts of 1996. The number of arrivals drops during the second half of April, and the migration is over by the end of the month. In **summer**, the max was 23 in July 1999. In **autumn**, the number of Moorhen starts to increase from late July, reaching max of 290 during the early August counts of 2000, the majority of them seen at the estuary of Reka Fakiyska. 40-50 were regularly seen in September-November. Moorhens **winter** regularly in the area with max 136 in January 2000. Atanasovsko held the largest winter concentrations of the species with the highest average numbers in Bulgaria during 1977-2001 mid-winter counts (Michev & Profirov, 2003).

4.72. (Eurasian) Coot – *Fulica atra*

Resident, common migrant and uncommon to fairly common breeder, common to abundant in winter.

Numbers: The max totals per seasons for the study period were:

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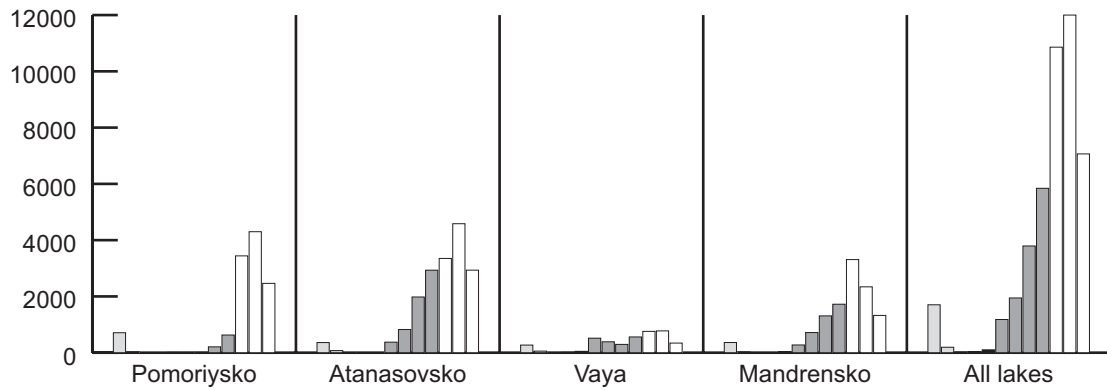


Fig. 38. *Fulica atra*

Winter	26,889	Spring	4,993
Summer	112	Autumn	12,490

The max totals per lakes for the study period were:

Pomoriysko	10,394	January	1999
Atanasovsko	11,200	January	1999
Vaya	2,433	January	1997
Mandrensko	8,587	December	1998

The average number of Coots in BWC was highest in December (Fig. 38). Complex Atanasovsko Ezero and Pomoriysko rank first, both with 35% of the species' total numbers.

Breeding: The Coot breeds in all the wetlands around Bourgas, up to five pairs at Poda (1991-1996). The total of the breeding population at all Bourgas Lakes is estimated at c. 50 – 60 pairs.

Species Dynamics: In **spring**, from mid-February the Coots start to leave the area rapidly, moving to the north. Their numbers decrease manifold from 4,655 during the early March 1999 to 1,855 during the mid-March of the same year. The majority of Coot breeding in the north leave the area by the end of April. The max **summer** counts were 112, in July 1999. In **autumn**, from the second half of July, the Coots build up in number, and we had max of 2,909 during the early-August counts of 1999, the majority of them at Atanasovsko. Then, their number increases gradually, forming the basis of the local wintering population. Up to 12,490 were recorded during the September-November 1998. The number of arriving Coots in **winter** continues to increase in December, reaching max of 26,889 during the early December counts of 1996. From the second half of December, the number of wintering birds begins to decrease steadily, reaching a max January record of 23,526 in 1999 and max February of 17,738 during the mid-February counts of 2000. The highest winter number for the area is given by Johnson & Biber (1971) with 56,500 counted on 20 December 1970 at Vaya. According to Michev & Profirov during

1977-1996 mid-winter counts, the wetland supporting the highest winter numbers in Bulgaria was Pomoriysko with an average of 4,636 and max of 18,135 birds in 1982.

4.73. (Common) Crane – *Grus grus*

Uncommon migrant, rare winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	3	Spring	110*
Summer	0	Autumn	9

* Outside the survey period: 1,000-3,000 in the fields north and northwest of Dolno Ezerovo during the spring migration (1972-74).

The 1-% Ramsar criterion is four birds. During the period of survey the species numbers exceeded the criterion once for Pomoriysko, and twice for Mandrensko.

Species Dynamics: Regular migrant in the past (Prostov, 1964; Simeonov et al., 1989). The number of Cranes has rapidly decreased since the end of 1980s. Data on the species' migration covering that period were published by Simeonov et al. (1989). The highest autumn number was recorded in 1979 with 4,181 birds. During the survey max **spring** numbers of 110 was recorded at Pomoriysko on 15 March 2002; nine at Mandrensko on the same date, then 19 in March 2002 at Atanasovsko. In **winter**, three were observed at Atanasovsko on 15 December 1996, one on 15 December 1996 at Pomoriysko, and three (two ad and one juv) in December 2001 in the fields by the estuary of Reka Fakiyska.

4.74. Demoiselle Crane – *Anthropoides virgo*

Status unclear. A bird caught near Bourgas had been transferred to Sofia Zoo, where it lived till 10 January 1904 (Botev & Peshev, 1985). Mentioned by Prostov (1964) as rare during migration in Bourgas region,

with a group of 12 observed on 20 October 1958 and another eight, on 19 March 1959. Furthermore, the species was recorded by Robel et al. (1978): three birds on 8 August 1969 at Atanasovsko. The record of 12 Demoiselle Cranes seen on 20 October 1982 at Pomorie (Botev & Peshev, 1985) is the last known observation for the area under study.

4.75. (Eurasian) Oystercatcher – *Haematopus ostralegus*

Scarce to uncommon spring and autumn migrant, very rare wintering and scarce breeder.

Numbers: The max totals per seasons for the study period were:

Winter	1	Spring	14
Summer	25	Autumn	49

The max totals per lakes for the study period were:

Pomoriysko	34	August	2001
Atanasovsko	38*	August	2000
Vaya	0	–	–
Mandrensko	23	July	1996

*Outside the dates of the survey max 130 were counted on 15-27 July 1988 in the southern part of Atanasovsko.

The average number of Oystercatchers in BWC was highest during autumn migration (max 37). Complex Pomoriysko Ezero ranks first with 51% of the species' total numbers in BWC.

Breeding: Data collected during breeding season, but without direct evidence of breeding at Bourgas Lakes are supplied by Harrison (1933), Mountfort & Fergusson-Lees (1961), Boev (1962), Prostov (1964) and Groesler (1967). The first record of breeding on Bulgarian Black Sea coast was made on 14 May 1977 (Roberts, 1980b), at Atanasovsko. The species bred at Poda with two pairs in 1987 (Boev, 1991). In 1996-2002 one or two pairs regularly bred at Pomoriysko; one breeding pair in 2002 and 2003 at LUKoil-Neftochim oxidizing pools (Kiril Bedev, pers. comm.), 1-2 pairs regularly at Atanasovsko.

Species Dynamics: In **spring**, Oystercatchers arrive in the first week of March, singly or in pairs. In mid-March up to four were observed at Poda in 2001. Their aggregate number was the same in 1996, from observations carried out at Atanasovsko and Poda. Then, the arriving birds' number increases and migration becomes most intensive from the last week of March until the first half of April. We obtained max mid-April numbers of 14 in 1996. Roberts (1980b) gives a max spring numbers at Atanasovsko with 34 birds on 24 March 1977 and 22 on 12 May the same

year. At Pomoriysko, the max of six birds was taken on 15 May 2000. Max **summer** count was 14 in June 1999, all of them being local breeders. In **autumn**, the migration starts from mid-July and is most intensive until mid-August, with 49 in 2000. From the last week of August the number of birds drops and max for September was four birds at Pomoriysko. The migration is over by mid-October. According to Nankinov et al. (1997) the Oystercatcher does not winter in Bulgaria, but our survey data showed that the species **winters** irregularly in small numbers. A bird stayed between 15 November and 15 December 2000 at Poda/Ouzoun Geren; two were seen on 2 February 2002 at Poda; and one, at Pomoriysko on 1 December 2001. Outside the dates of the survey wintering was recorded on the sea shore at Poda, with a bird seen on 13 February 1993; a second observation was made on 9 February 1995. Max winter count was three on 19 February 1995, at Poda. Michev & Profirov (2003) describe Oystercatcher as a very rare wintering species, recorded only once (two birds in 1994, at Pomorie) during the 25 years of the survey.

4.76. Black-winged Stilt – *Himantopus himantopus*

Uncommon to fairly common spring and autumn migrant, uncommon breeder and very rare wintering.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	285
Summer	298	Autumn	511

The max totals per lakes for the study period were:

Pomoriysko	142	August	1996
Atanasovsko	424	August	2000
Vaya	26	April	1996
Mandrensko	47	May	2001

The average number of Black-winged Stilt in BWC was highest in August (**Fig. 39**). Complex Atanasovsko Ezero ranks first with 72% of the species' total numbers in BWC.

The 1-% Ramsar criterion of 340 birds was exceeded for Atanasovsko in a single year during the period of survey.

Breeding: Reported in the past as breeding for Atanasovsko and rather rare at Vaya and Mandrensko (Jordans, 1940; Prostov, 1964). 90 pairs had bred on Atanasovsko in 1977. A small breeding colony with 12 pairs found at the Estuary of Reka Aytoska in May 1964 (Botev & Peshev, 1985). The breeding number at some wetlands around Bourgas in recent times is given on **Table 11**.

SPECIES ACCOUNTS

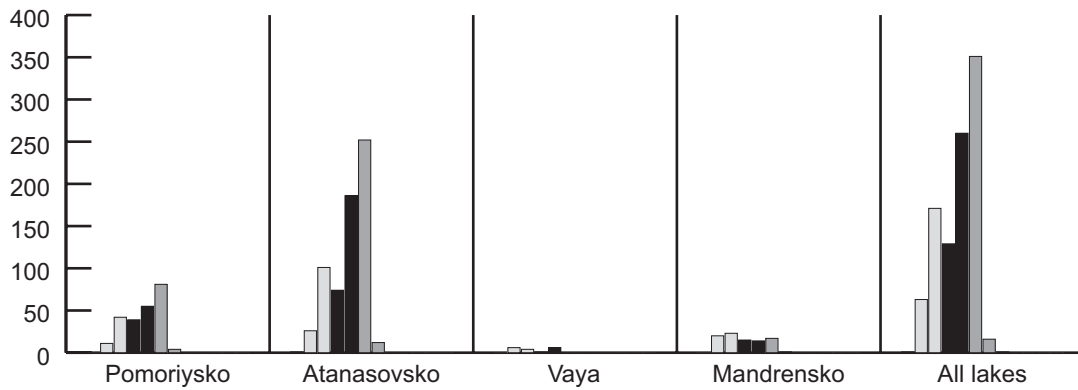


Fig. 39. *Himantopus himantopus*

Table 11. Number of breeding Black-winged Stilt (in pairs) in BWC during 1991-2002

Wetland/Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Pomoriysko	11	9	10	12	14	10	9	9	5	12	19	20
Atanasovsko	73	61	52	63	71	94	76	53	42	39	41	31
Poda	18	16	14	12	12	25	26	13	4	8	8	29
Ouzoun Geren	0	6	0	0	0	0	0	0	0	27	0	0
Oxidizing pools	0	0	0	0	0	0	0	0	+	+	17	27
Total	102	92	76	87	97	129	111	75	51	59	85	107

Species Dynamics: In **spring**, the Black-winged Stilt arrive in the first decade of March. The migration increases considerably from the beginning of April and is most intensive in the second half of the month until beginning of May. Our max spring data was 285 on 1 May 1999, 213 of them on Atanasovsko. The **breeding** season starts from mid-April, but is rather stretched and continues until mid-June. **Autumn** build-up becomes noticeable from mid-July onwards, and the migration is most intensive from the end of July until second half of August. We obtained our max July counts of 476 on 31 July 1999 (302 of them on Atanasovsko), and 511 on 15 August 2000 (424 of them on Atanasovsko). The migration decreases significantly from the end of August/beginning of September, and our latest record was one on 19 October 2003, on Atanasovsko. Late migrants remain into November (Roberts, 1981). Black-winged Stilt is very rare **wintering** species in Bourgas Wetlands, recorded once during the mid-winter survey 1977-2000 with a single on 14 January 1979, at Mandrensko (Michev & Profirov, 2003).

4.77. (Pied) Avocet – *Recurvirostra avosetta*

Fairly common spring to common autumn migrant, fairly common winter visitor and breeder.

Numbers: The max totals per seasons for the study period were:

Winter	520	Spring	1,812
Summer	1,772	Autumn	4,492

The max numbers per lakes for the study period were:

Pomoriysko	993	August	1999
Atanasovsko	4,490	September	2001
Vaya	0	–	–
Mandrensko	16	May	1996

The average number of Avocet in BWC was highest in August (**Fig. 40**). Complex Atanasovsko Ezero ranks first with 89% of the species' total numbers in BWC.

The 1-% Ramsar criterion is 470 birds, regularly exceeding for Atanasovsko.

Breeding: In 1960, the breeding population at Atanasovsko consisted of 500 to 750 birds, at Vaya there were 25 birds breeding (Mountfort & Fergusson-Lees, 1961). These authors thought the species was breeding at Pomoriysko and Mandrensko (25 and 12 birds respectively). Prostov (1964) describes Avocet as breeding at Atanasovsko, rarely at Mandrensko and Vaya. The breeding population was gradually increasing in the 1970s. The annual fluctuation in Bulgarian population in the 1970s ranged between 760 and 2,200 pairs, of these 700-2,000 pairs at Atanasovsko (Nankinov & Darakchiev, 1978). The last breeding pair at Vaya was recorded in 1986. Nowadays the Avocet breeds at Atanasovsko (the most important breeding site in Bulgaria), Pomoriysko and Poda. Breeding was also proved for the LUKoil-Neftochim oxidizing pools with four pairs in 2003 (Kiril Bedev, pers. comm.). Breeding dynamics is shown on **Table 12**.

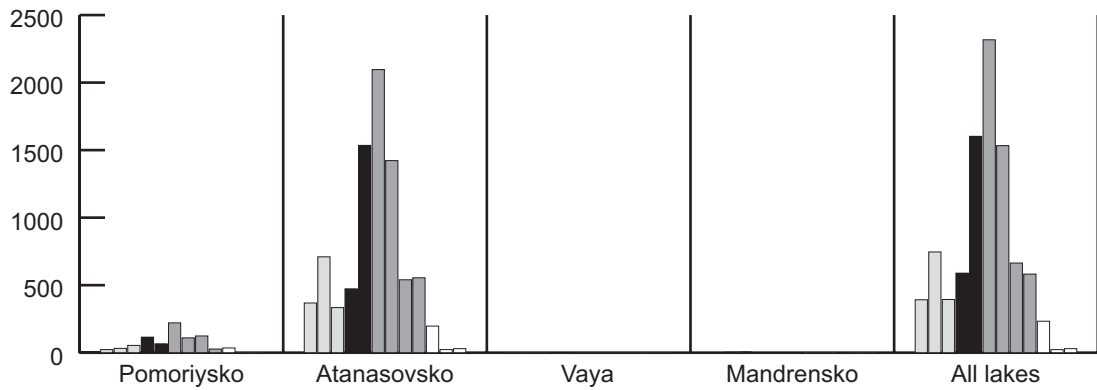


Fig. 40. *Recurvirostra avosetta*

Table 12. Number of breeding Avocet (in pairs) in BWC during 1964-2002

Wetland/Year	1964	1968	1972	1975	1976	1977	1978	1979	1980	1993	1994
Pomoriysko	Few	Few	Few	Few	Few	Few	Few	10	Few	18	19
Atanasovsko	> 200	148	700	2,000	?	600	1,037	?	373	494	712
Poda	0	0	0	0	20	0	0	0	0	36	28
Vaya	Few	Few	Few	Few	0	0	0	0	0	0	0
Mandrensko	Few	Few	Few	Few	0	0	0	0	0	0	0
Oxidizing pools	0	0	0	0	0	0	0	0	0	0	0
Total	>200	> 148	>700	>2,000	20	600	1,037	10	373	548	759

Wetland/Year	1995	1996	1997	1998	1999	2000	2001	2002
Pomoriysko	21	30	39	46	34	64	60	31
Atanasovsko	545	440	450	412	433	264	97	189
Poda	15	5	?	?	0	0	7	10
Vaya	0	0	0	0	0	0	0	0
Mandrensko	0	0	0	0	0	0	0	0
Oxidizing pools	0	0	0	0	0	0	2	2
Total	>581	475	489	458	477	328	166	232

Species Dynamics: In mid-19th century, the species was quite common for the Bulgarian Black Sea coast (Khristovich, 1890). Vurbanov (1912, 1934) describes the Avocet as a fairly numerous amongst the migratory birds and almost resident for Atanasovsko. He reports that the species was not familiar to local hunters until the spring of 1909, when it became abundant and began breeding at Atanasovsko. In **spring**, the Avocet starts to arrive from the first half of February onwards. Numbers increases in March (max 832 in 2001) and becomes most prominent in April, with max 1,812 in 1999 (Nankinov, 1997 reports 22,600 birds in 1-4 April 1976). The migration continues until mid-April, when the local breeding population remains in the studied area. In **summer**, number increases from the second half of May and beginning of June, with max of 1,198 in 1999. The **autumn** build-up becomes noticeable from mid-July and increases in August-September, reaching 4,492 in 2001. Nankinov (1980) gives unusually high max numbers of 47,500 at Atanasovsko observed on 31 October 1974. The migration is over by mid-December. It is worthy mentioning that the species dynamics at both Sali-

nas of Atanasovsko and Pomoriysko are quite similar. In **winter**, a small number remains mainly at Atanasovsko with max of 114 in January 2001. The max numbers during the mid-winter counts 1977-2001 were recorded at Atanasovsko (Michev & Profirov, 2003).



4.78. Stone Curlew – *Burhinus oedicnemus*

Scarce migrant and rare breeder.

Breeding: According to Prostov (1964) the Stone Curlew breeds very rarely in Bourgas region (he saw a nest on 13 May 1956 to the west of Atanasovsko). We found the species nesting at Atanasovsko in 1972. It has regularly bred in the fields to the north-east of this lake since 1991. Current survey data indicate that the Stone Curlew is rare in other parts of Bourgas region – one breeding pair near village of Pirne (K. Bedev – pers. comm.) and four pairs near Kameno.

Species Dynamics: In **spring**, Stone Curlews arrive in early April. According to Prostov (1964), the **autumn** passage takes place between 15 September and 17 October. Migrating birds appear from July onwards (Nankinov et al., 1997). The latest bird to remain in the area was recorded by Prostov (1964) on 8 November 1946. Additional data were reported by Nankinov & Dalakchieva (2001).

4.79. Collared Pratincole – *Glareola pratincola*

Uncommon spring and autumn migrant, rare breeder.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	16
Summer	78	Autumn	30

The max totals per lakes for the study period were:

Pomoriysko	61	June	2002
Atanasovsko	30	August	2002
Vaya	0	–	–
Mandrensko	3*	August	1996

*Outside of the survey 43 were counted at Poda, on 7 July 1993.

The average number of Collared Pratincole was highest in June (max 22). Complex Pomoriysko Ezero ranks first with 68% of the species' total numbers in BWC.

Breeding: Harrison (1933) recorded 20 on 13 May 1932 at Atanasovsko. Patev (1950) reports the species as breeding on the coast, while Prostov (1964) recorded a single bird only during the breeding season (31 May 1956) at Atanasovsko. Consequent records were made by Mountfort & Fergusson-Lees (1961) with four seen on 1-3 June 1960, more than four at Mandrensko, and five at Vaya. Koenigstedt & Harrison (1933) have 12 seen at Atanasovsko on 15 June 1972. First breeding of five in 1971, ten in 1972, four in 1974, c. 20 in 1976 and 4 in 1977 (Botev, Peshev, 1985). Roberts (1980b) reports the

species breeding at Vaya in 1976 (numbers unknown), and one nest and four pairs in 1977; at Atanasovsko eight nests in 1976 and three nests in 1977. According to Nankinov et al. (1997) the breeding population fluctuates greatly from year to year with an annual average from 50 to 150 br. pairs. (at Atanasovsko and the surrounding areas there had been 29 pairs in 1978, 36 in 1979, 28 in 1980, seven in 1981 and 34 in 1981). Between 1984 and 1986 three to five pairs bred regularly at Pomoriysko. In 1988, we found max of 130 nests at Atanasovsko. At present, the breeding population is 15-20 pairs at Atanasovsko, 12 at the LUKoil-Neftochim oxidizing pools (Kiril Bedev, pers. comm.) and up to five (irregularly) at Pomoriysko.

Species Dynamics: In **spring**, first Collared Pratincoles arrive in mid-April. They are most numerous at Atanasovsko, where the majority of the local breeding population is concentrated. Migrants are found until June. The max of 78 was recorded on 1 June 2002. In **autumn**, there is an increase in the numbers because of birds arriving from Romania and northern Black Sea coastal areas, with max of 30 at Atanasovsko in August 2002. During autumn migration families with young birds were seen regularly at Cherny Vrukh Fishponds and on the dikes between Ouzoun Geren and LUKoil-Neftochim oxidizing pools; up to 10 regularly in the cultivated fields by the estuary of Reka Fakiyska. Nankinov et al. (1997) report a high number of c. 600 on 16 August 1972, seen over the Komloushka Nizina. Such numbers have not been confirmed since. The last birds leave the Bourgas Wetlands by mid-October.

4.80. Black-winged Pratincole – *Glareola nordmanni*

Rare migrant and possible breeder. **Spring** data are given by Michev et al. (2004), with two on 4 May 1984, in a flock of 15 Collared Pratincoles. The birds reported by Ernst (1978) on 28 March 1974 at Mandrensko have been assumed to belong to this species (Nankinov et al., 1997). Paspaleva-Antonova (1965) gives records from the breeding season with pairs observed on 30 May 1964 at Vaya. Nankinov et al. (1997) state the Black-winged Pratincole **breeds** at Atanasovsko (three pairs in a mixed colony with 23 pairs of Collared Pratincoles, on 18–19 May 1978), this being the only published information on the species breeding in the area. **Autumn** observations of singles on 25 and 28 August 1978 were reported for Atanasovsko (Nankinov et al., 1997). Birds migrating along the Bulgarian Black Sea coast probably have come from populations breeding in the Danube Delta, South Ukraine and Crimea (Nankinov et al., 1997). During the present survey, we did not observe any Black-winged Pratincole in Bourgas region.

4.81. Little Ringed Plover – *Charadrius dubius*

Uncommon migrant and breeder, rare wintering.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	12
Summer	18	Autumn	48

The max totals per lakes for the study period were:

Pomoriysko	21	September	2001
Atanasovsko	14	September	1998
Vaya	2	July	1996
Mandrensko	35	August	1996

The average number was highest in August (max 21).

Breeding: Prostov (1964) describes the Little Ringed Plover as a common breeding species in the shore zone of Atanasovsko and Poda in the past. Roberts (1980b) had found no breeding birds at Atanasovsko during 1975-1977 period and a very few at Bourgas Wetlands as a whole. During the present survey the Little Ringed Plover was found to breed regularly on the sand strips between the Black Sea and the lakes of Atanasovsko and Pomoriysko as well as at Poda (six pairs), the estuary of Reka Fakiyska and Cherny Vrukh Fishponds (2-5 pairs). A pair was found to breed on the southeastern shore of Vaya, near a sandpit. In recent times, the Little Ringed Plover has started to breed at the LUKoil-Neftochim oxidizing pools with two pairs in 2002 and 2003 (Kiril Bedev, pers. comm.). The breeding begins from the second half of April onwards and lasts until early July.

Species Dynamics: Spring migration starts in the first week of March and continues until mid-May. The earliest observations were of two birds on 13 March 2000 at Atanasovsko. Max of 12 was recorded at Pomoriysko in May 1999. Nankinov et al. (1997) give the max spring data on Atanasovsko with 33 observed in April 1976. Max to 18 were seen in **summer** during June and July, the majority at Poda, Atanasovsko and Pomoriysko. The **autumn** build-up starts in mid-July, while migration becomes most intensive in August till the end of the first week of September. The highest aggregate number was 37 in August 1996, when 35 were observed at Poda. The max autumn concentration of 94 (end of August 1978) are reported by Nankinov et al. (1997) for Atanasovsko. The migration continues until the end of October with max of 21 at Poda and Atanasovsko by the middle of the same month. **Wintering** Little Ringed Plovers were not found during the survey. The max numbers (43 in 1977) during the mid-winter survey 1977-2001 was recorded at Atanasovsko (Michev & Profirov, 2003).

4.82. (Common) Ringed Plover – *Charadrius hiaticula*

Uncommon passage migrant, scarce summer and very rare winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	4	Spring	30
Summer	11	Autumn	50

The max totals per lakes for the study period were:

Pomoriysko	30	May	2000
Atanasovsko	50	September	1998
Vaya	1	August	1996
Mandrensko	9	October	1996

The average number of Ringed Plover in BWC was highest on autumn migration (max 20). Complex Atanasovsko Ezero ranks first with 65% of the species' total numbers in BWC.

Species Dynamics: In **spring**, the Ringed Plovers arrive after the first week of March but their number remains rather low until the end of April. The number of migrants increases in May, with max 30 in 2000 at Pomoriysko. A smaller number of Ringed Plovers was observed at Atanasovsko, Poda and Chengene Skele. The migration lasts until the end of May, and in general, the species is not numerous during this period. Two subspecies of Ringed Plover visit the studied area during migration – *Ch. hiaticula tundrae* and *Ch. hiaticula hiaticula* (Prostov, 1964). According to Nankinov et al. (1997) birds belonging to the two subspecies cross Bulgaria at one and the same time. In our opinion the periods of passage of the subspecies have to be identified more clearly. Non-breeding **summering** birds were found in two of the years of the survey, with max of 11 seen in June 2000, at Atanasovsko. In **autumn**, Ringed Plovers arrive after the beginning of August, gradually increasing in numbers until the end of the month. The migration is most intensive during the first half of September, reaching max aggregate count of 50 in 1998. Last two sightings were recorded on 15 November 2001, at Atanasovsko. The migration lasts until the end of November (Roberts, 1980b). Nankinov et al. (1997) report a high autumn concentration of 300 *tundrae* seen on 2 September 1973, at Pomoriysko. Ringed Plovers **winter** irregularly in the studied area. Four birds, observed on 15 December 2000 at Pomoriysko, were the only winter record. Ringed Plovers were very rare during the mid-winter survey 1977-2001, recorded only once at Pomoriysko with two birds in 1985 (Michev & Profirov, 2003).

4.83. Kentish Plover – *Charadrius alexandrinus*

Uncommon migrant and breeder.

Numbers: The species number seems to have been underestimated. The max totals per seasons for the study period were:

Winter	2	Spring	25
Summer	66	Autumn	73

The max totals per lakes for the study period were:

Pomoriysko	49	August	1999
Atanasovsko	72	August	1996
Vaya	0	–	–
Mandrensko	2	April	2000

The average number of Kentish Plover in BWC was highest in June (**Fig. 41**). Both complexes Pomoriysko and Atanasovsko Ezero rank first with 50% of the species' total numbers in BWC.

Breeding. The species' breeding is extended, starting by mid-April but some of the pairs continue to breed until the end of July and even the beginning of August. In 1977, 48 pairs were recorded by Roberts (1980b). Kentish Plover bred at Atanasovsko between 1978 and 1981 with 141 to 252 pairs (Nankinov et al., 1997). One pair was found at LUKoil-Neftochim oxidizing pools in 2003 (Kiril Bedev, pers. comm.). The number of pairs breeding in BWC is shown on **Table 13**.

Species Dynamics: Spring migration starts from the beginning of March and intensifies after the mid-



dle of the month. The majority of birds arrive in April and the passage continues until early May. The spring data were obtained at Atanasovsko, with max of 234 for March and April (Roberts, 1980b) for Atanasovsko. In **summer**, max 66 was counted in June 1999. The **autumn** passage starts after the mid-July, reaching a peak in August (max 73 in 1996). Roberts (1980b) gives September concentrations of up to 673 at Atanasovsko, an indication that the number of migrants has decreased in recent years. The migration becomes most intensive by mid-September, then the number of Kentish Plovers falls. The last six were noticed in October 2001 at Atanasovsko. The migration lasts until mid-November. Kentish Plovers **winter** in small number at Atanasovsko, Pomoriysko and Poda, mainly on the lakes' shores. Max of two was recorded on 18 February 2002 at Pomoriysko. During the mid-winter survey 1977-2001 Atanasovsko held the species' highest number with 11 in 1977 and 13 in 1990 (Michev & Profirov, 2003).

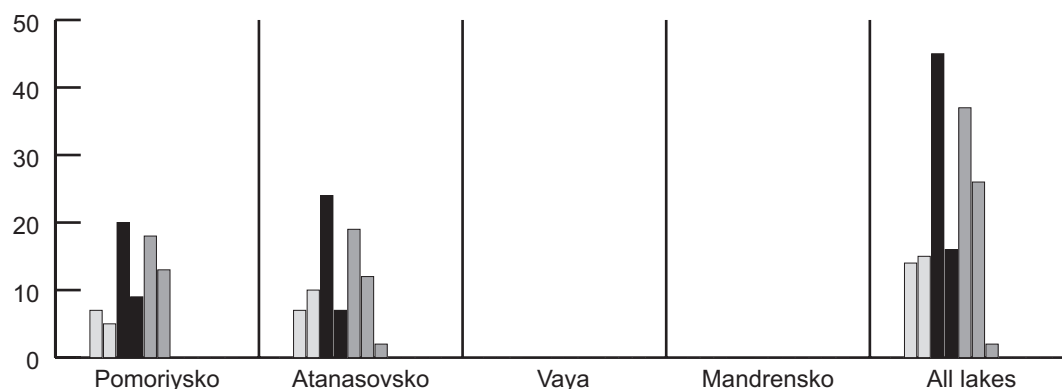


Fig. 41. *Charadrius alexandrinus*

Table 13. Number of breeding Kentish Plovers (in pairs) in BWC during 1991-2002

Wetland/Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Pomoriysko	14	21	8	14	11	13	9	7	11	15	c. 10	6
Atanasovsko	89	93	82	61	80	22	41	27	17	36	c. 10	7
Poda	2	2	1	1	2	2	2	2	0	0	2	0
Total	105	116	91	76	93	37	52	36	28	51	c. 22	13

4.84. Greater Sand Plover – *Charadrius leschenaultii*

Vagrant. Most probably the birds found in Bulgaria belong to ssp. *columbinus*, breeding in Turkey and in western parts of the Middle East (Snow & Perrins, 1998). A single bird in breeding plumage was observed on 16 May 2000, near 7th pump station at Atanasovsko. So far this is the only certain record for Bulgaria. Roberts (1980b) reports 'a single bird, belonging almost certainly to this species', which he had seen together with the Italian ornithologist A. Rinaldi at Atanasovsko on 31 March 1975. However, this observation remains doubtful (Roberts, in litt.), despite Nankinov et al. (1997) accepting the record.

4.85. Caspian Plover – *Charadrius asiaticus*

Vagrant. A single bird in breeding plumage seen twice on 31 August 1983 near 7th pump station at Atanasovsko (Nankinov et al., 1997) so far remains the only record for Bulgaria.

4.86. (Eurasian) Dotterel – *Charadrius morinellus*

Very rare migrant and wintering. Few observations are known for the BWC in the last 50 years. Prostov (1964) reported a group of six on 21 October 1958, at Poda. Georgiev (1976) and Roberts (1980b) did not see the species during 1970s. A bird was reported by Michev et al. (2004), at Atanasovsko on 29 April 1985. According to Nankinov et al. (1997), Dotterels pass over Bulgaria on the coast from the beginning of September until April, singly or in flocks of max 25. Outside the dates of the survey a young bird was observed on 26 August 2003 at Atanasovsko (Hakan Soderberg, pers. comm.).

4.87. (European) Golden Plover – *Pluvialis apricaria*

Fairly common spring and uncommon autumn migrant, very rare summering and wintering species.

Numbers: The max totals per seasons for the study period were:

Winter	23	Spring	c. 1000
Summer	0	Autumn	37

The max totals per lakes for the study period were:

Pomoriysko	0	–	–
Atanasovsko	98	March	2003
Vaya	0	–	–
Mandrensko	1,000	March	2003

Species Dynamics: A monotypic species with breeding plumage varying widely. This is the reason for regarding variations as different races in the past:

'southern' (*apricaria*) and 'northern' (*altifrons*). In **spring**, Golden Plovers arrive after the end of February. The migration becomes most intensive by the very end of February/first days of March. We obtained max 1,000 on 1 March 2003, at Mandrensko. The birds fed in the wet fields behind the western dike of Mandrensko (near the estuary of Reka Rousokastrenska) in a mixed scattered flock with hundreds of migrating Lapwings. Max of 98 was observed in March 2003 at Atanasovsko, in the fields west of the lake (Kiril Bedev, pers. comm.). The migration continues in small numbers until the end of May, often with interruptions of varying length. Roberts (1980b) reported an influx of 120 in mid-May at Atanasovsko. The only record for Vaya was reported by Mountfort & Ferguson-Lees (1961) with a single bird seen on 30 May 1960 and for Pomoriysko, by Georgiev (1976) with max of 15 on 17 May 1962. During the survey no **summering** Golden Plovers were found. **Autumn** passage starts from the beginning of September onwards. The number increases in October and remains high until mid-November, when max 37 were seen at Atanasovsko in 1998. Roberts (1980b) reported 90 in October 1976, at the same lake. In **winter**, small number of birds was recorded with six on 1 February 2000 at Poda, 16 on 12 January 2003 at Mandrensko, and 23 on 20 February 2003 in the fields west of Atanasovsko (Kiril Bedev, pers. comm.).

4.88. Grey Plover – *Pluvialis squatarola*

Uncommon spring and autumn migrant, very rare summer and fairly common winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	159	Spring	22
Summer	2	Autumn	37

The max totals per lakes for the study period were:

Pomoriysko	41	January	2001
Atanasovsko	149	January	1999
Vaya	0	–	–
Mandrensko	7	January	1997

The average number of Grey Plover in BWC was highest in January (**Fig. 42**). Complex Atanasovsko Ezero ranks first with 70% of the species' total numbers in BWC.

Species Dynamics: In **spring**, the first wave of Grey Plovers wintering on the European coast of the Mediterranean arrive by the end of February/beginning of March with max of 17 in 1999. The number of migrants remains high until mid-March, and then decreases noticeably in April. A second

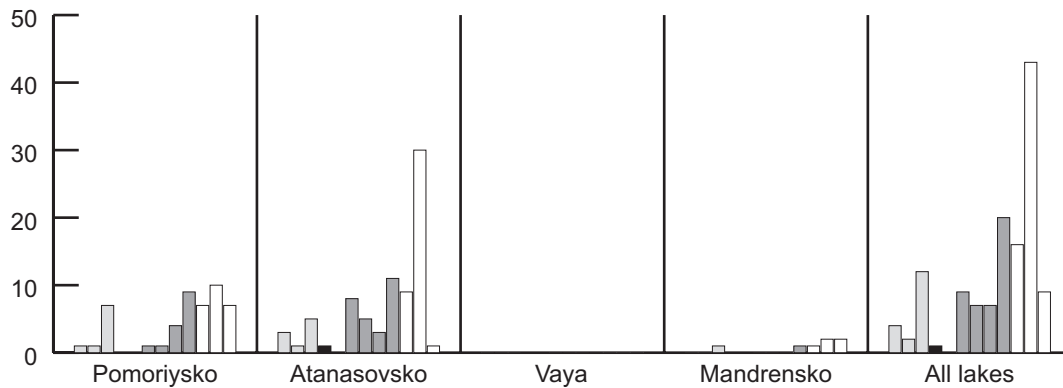


Fig. 42. *Pluvialis squatarola*

wave of arriving Grey Plovers was noticed from early May onwards, with a peak in mid-late May, with 22 birds observed on 15 May 2000. Migrants are more numerous during the second wave, which can be explained with the birds arriving from African coast where they normally spend the winter. Most of the birds have left the area by the end of May. In **summer**, a small number of non-breeding and wandering birds was recorded in June. **Autumn** passage starts from the beginning of August onwards and, with some fluctuations, remains stable until mid-October. After that, the number of migrants rapidly increases until mid-November, reaching a peak during this survey with 37 in 1999. The migration lasts until the end of November. Nankinov et al. (1997) report November concentrations of 100 to 421 at Atanasovsko for the period of 1978-1981. The Grey Plover is a regularly **wintering** species for Atanasovsko, Pomoriysko, Poda and Chengene Skele Marsh. The max winter record of 159 was obtained in January 1999 (149 of them at Atanasovsko), which was the highest survey count. A small number was registered at Poda with max of seven on 1 January 1996. The max numbers during the mid-winter 1977-2001 survey was registered at Atanasovsko with 149 (Michev & Profirov, 2003).

4.89. Spur-winged Lapwing – *Vanellus spinosus*

Vagrant. The only two records for the country came from the area under study: three birds (a single and a pair) at Mandrensko near Poda on 7 May 1960 (Hanzak, 1962) and one seen on 14 September 1990 at the southern part of Atanasovsko (Michev et al., 1999).

4.90. Sociable Lapwing – *Vanellus gregarius*

Vagrant. Buchvarov (1984) reports two birds (shot in Bulgaria) but gives no specific data on the date or place. The first undoubted record for the country came from Pomoriysko, with one seen on 24 May 1985 by the members of Cambridge 'Ruff' Expedition (Bruce Martin, in litt.).

4.91. White-tailed Lapwing – *Vanellus leucurus*

Very rare migrant. Recorded three times in the area under study: one on 13 May 1997 at Poda (Georgiev, 1997), one on 22 April 2002 and one on 1 May 2001 at Atanasovsko (K. Popov, pers. comm.). The species has expanded its breeding range to the south-west of the Volga Delta in Russia, recently being found to breed in Romania (Kiss & Szabo, 2000). Further observations and breeding in Bulgaria are to be expected.

4.92. (Northern) Lapwing – *Vanellus vanellus*

Uncommon to common spring and autumn migrant, uncommon breeder and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	625	Spring	133
Summer	152	Autumn	840

The max totals per lakes for the study period were:

Pomoriysko	54	June	1999
Atanasovsko	840	November	2002
Vaya	200	September	2000
Mandrensko	221	February	2002

The average number of Lapwing in BWC was highest in November (**Fig. 43**). Complex Atanasovsko Ezero ranks first with 68% of the species' total numbers in BWC.

Breeding: The number of nests differs from the number of birds seen during the period, which probably is due to the poor coverage of the nesting grounds and to the presence of non-breeding birds. Given as frequently breeding in the wet meadows around Bourgas (no specific data) by Prostov (1964). Nankinov et al. (1997) report from 33 to 59 pairs for the period of 1974-1982 at Atanasovsko. Until 1990s, the Northern Lapwing had bred at Vaya with 25-35 pairs. Re-

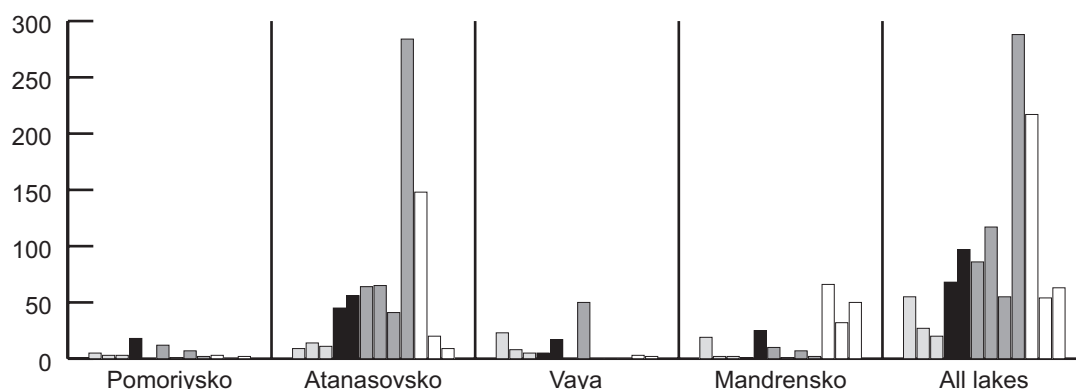


Fig. 43. *Vanellus vanellus*

cently up to 30 pairs were found at Atanasovsko and up to three at LUKoil-Neftochim oxidizing pools (Kiril Bedev, pers. comm.).

Species Dynamics: Depending on winter conditions, the **spring** migration begins from early – mid-February onwards. The peak count was 221 in mid-February 2002. The migration is most intensive until mid-March. During that time, the arriving Lapwings occupy mainly the wet meadows west of Mandrensko. In much smaller numbers they stay at Atanasovsko and Pomoriysko. Then the number gradually falls until second half of April, when the local breeders have started breeding. Nankinov et al. (1997) give the highest spring concentrations at Atanasovsko with 1,020 observed on 4 April 1976. The first **autumn** build-ups were noted from mid June – end of July, when the number of the Lapwing in the area, primarily at Atanasovsko and Pomoriysko increases due to birds arriving from the north (max aggregate count of 152 in June 1999) and young from the local breeding population. The number of autumn migrants increases in August and September, reaching max of 373 in September 2000. In most October counts we noticed a decline in the number of migrants. A second migration wave was recorded from the beginning of November onwards, when max 1,100 birds were observed on 19 November 2002. Our autumn counts coincided to a great extent with those of Roberts (1980b) for the end of 1970s but Nankinov et al. (1997) report rather high concentrations of 7,570 in November 1979, at Atanasovsko. The migration continues until mid-December when max of 625 was obtained in 1998. Then the number of **wintering** Lapwings decreases faster or more slowly, depending on weather and feeding conditions with max of 307 in January 1999. Nankinov et al. (1997) give the highest winter concentrations with 1,462 on 3-6 December 1980 at Atanasovsko. The max number (845 in 1986) during the mid-winter survey 1977-2001 had been recorded at Atanasovsko (Michev & Profirov, 2003).

4.93. (Red) Knot – *Calidris canutus*

Rare to very rare migrant, summering and wintering species. First recorded in Bulgaria by Robel et al. (1974), with a dead bird found at Atanasovsko on 2 August 1966, then two seen on 7 September 1968 at the same lake. Further observations came from Atanasovsko, with three on 31 August 1972 (Mueller et al., 1975), one on 16 May 1981, one on 15 June 1991, three on 15 October 1998 (Nankinov, 2003) and one on 14 January 1982 (Michev et al., 1999); Mandrensko, with one on 12 August 1972 (Koenigstedt & Robel, 1978) and one on 28 July 1974 (Ernst, 1978); Pomoriysko, with a flock of 15 on 1 March 1981 (Prange, 1988), one on 6 September 1986 and sightings on 13-14 August 1994, 11-13 August 1995 and 18 May 1996 (Nankinov, 2003). During the survey, Knots were regularly observed at Poda, with max eight on 15 January 2003. A rare wintering species, recorded twice during mid-winter survey in BWC with four in 1992 on the shore at Kraymorie-Chernomorets and one in 1987 at Atanasovsko (Michev & Profirov, 2003).

4.94. Sanderling – *Calidris alba*

Scarce to uncommon migrant and summer visitor, uncommon to fairly common winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	78	Spring	36
Summer	0	Autumn	20

The max totals per lakes for the study period were:

Pomoriysko	20	August	2001
Atanasovsko	75	December	1996
Vaya	0	–	–
Mandrensko	35	May	2001

The average number of Sanderling in BWC was highest in winter (max three).

Species Dynamics: Spring counts showed the Sanderlings arrive at Bourgas seacoast from the beginning of March onwards. The number of arrivals increases in May, with max 36 recorded at Poda in 2001. Birds arriving in April are most probably from the South European wintering population, while in May their numbers increase on account of birds that have wintered in Africa. A max spring concentration of 170 (mid-May 1978) is reported by Nankinov et al. (1997) for Atanasovsko. As most of the Sanderlings are likely to be seen on the coastal sand strips, which were not well covered during the survey, the real number of Sanderlings is likely to be higher. Non-breeding birds and late migrants may be found in **summer**. First **autumn** migrants appeared by the end of July/beginning of August. Most of the birds in this season were seen on the coastal strip of Pomoriysko with max of 20 in August 2001 and at Poda, with max 22 in September 1998. The migration lasts until the end of November. The autumn number is supposed to be higher, as many of the migrants were overlooked by us during the counts. The Sanderling is a regular **wintering** species on the coast, spending the time there between early December and the end of February. The peak winter observation was 78 on 1 December 2001, the majority of them at Atanasovsko. At Poda, max winter count was seven on 7 January 1997. The max number in Bulgaria during the mid-winter survey of 1977-2001 had been recorded at Mandrensko with 40 in 1989 (Michev & Profirov, 2003).

4.95. Little Stint – *Calidris minuta*

Fairly common spring migrant, fairly common to common autumn passage and uncommon to fairly common summer and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	30	Spring	3,316
Summer	168	Autumn	920

The max totals per lakes for the study period were:

Pomoriysko	1,743	May	2000
Atanasovsko	1,530	May	2000
Vaya	30	May	2000
Mandrensko	76	August	2000

The average number of Little Stint in BWC was highest in May (**Fig. 44**). Complex Atanasovsko Ezero ranks first with 54% of the species' total numbers in BWC.

Species Dynamics: First **spring** migrants arrive from the second week of March onwards. In May, their number increases considerably at Atanasovsko and Pomoriysko, when the highest aggregate spring count reached 3,316 in mid-May 2000, with max site counts 1,530 and 1,743 respectively. In 2002, after the 4th of the LUKoil-Neftochim oxidizing pools was dried up, some 200 to 250 Little Stints started to appear there, too. Apart from these, Nankinov et al. (1997) give a max spring record of Little Stint of 5,176 on 21 May 1979 at Atanasovsko. After mid-May, the number of migrants decreases and the passage lasts until mid-June, when a considerably smaller number from 25 to 168 was counted at Pomoriysko and Atanasovsko, and five at Poda. Non-breeding and wandering birds stayed in all of the Bourgas Wetlands in **summer**, with a max July count of 52 in 1996. In **autumn**, Little Stints start to increase in numbers from the beginning of August, with peak of 920 in early September 1996. From mid-September onwards their number gradually decreases and the November totals were down to 30. Nankinov et al. (1997) report high November concentrations of c. 1,700 in 1979 and 1981. Little Stints regularly **winter** in small numbers mainly at Atanasovsko, Pomoriysko and Poda. The max December totals were 30 in 2001 and max January, two in 1999 at Atanasovsko. Five birds were observed on 15 December 1995 at Poda. The max numbers (1,130 in 1978) during the mid-winter survey 1977-2001 had been recorded at Atanasovsko (Michev & Profirov, 2003).

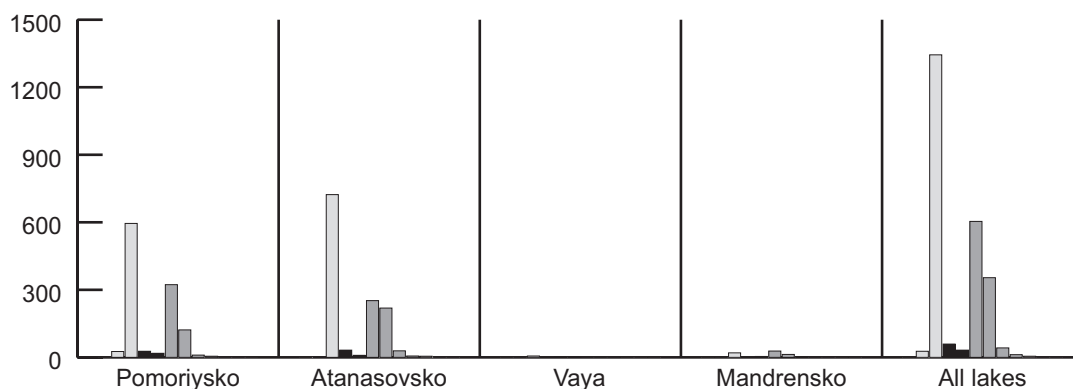


Fig. 44. *Calidris minuta*

4.96. Temminck’s Stint – *Calidris temminckii*

Scarce migrant and summer visitor, very rare wintering.

Species Dynamics: In **spring**, Temminck’s Stints arrive from the end of March/beginning of April onwards. The species is very rare during spring and autumn passage, present in very small numbers at Atanasovsko, Pomoriysko, Poda and Komloushka Nizina. The max total came from Komloushka Nizina with three seen on 17 May 1996. **Summering** birds were not seen. We had a few **autumn** observations with up to two birds at Pomoriysko and two at Poda. These figures, though insufficient, point out to August-September as the period of the season passage. Outside the dates of the survey two were observed on 8 September 1996 at Poda. Nankinov et al. (1997) report a max concentration of 695 in late August 1978 along with a September max of 170 in 1990 (Nankinov, 2001b) at Atanasovsko. There were no **winter** records during this survey. Nankinov et al. (1997) report a flock of 25 seen on 8 December 1980 at Atanasovsko, which is the only winter record for the area under study.

4.97. Pectoral Sandpiper – *Calidris melanotos*

Vagrant. A single bird, seen on 20 September 2001 at the Complex Mandrensko Ezero (Ouzoun Geren) was reported by Davies (2002). This is the only known record for the country.

4.98. Sharp-tailed Sandpiper – *Calidris acuminata*

Vagrant. The observation of a single young bird on 22 September 2000 at Poda (Bob Scott, in litt.) is the first record for the country. A second observation was made on 9 September 2003 at the same place (Bob Scott, in litt.).

4.99. Curlew Sandpiper – *Calidris ferruginea*

Fairly common to common spring and autumn passage migrant and uncommon summer visitor.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	7,088
Summer	220	Autumn	1,389

The max totals per lakes for the study period were:

Pomoriysko	4,480	May	2000
Atanasovsko	2,420	May	2000
Vaya	180	May	2000
Mandrensko	55	May	2001

The average number of Curlew Sandpiper was highest in May (**Fig. 45**). Complex Atanasovsko Ezero ranks first with 53% of the species’ total numbers in BWC.

Species Dynamics: In **spring**, the first Curlew Sandpipers arrive in early April, their numbers remaining low until the end of the month. From the end of April/beginning of May the number of arrivals increases and the migration is most prominent in mid-May. The vast majority of the birds land on Pomoriysko and Atanasovsko, forming large concentrations. At Pomoriysko, Curlew Sandpipers favour the salt pans located near the main road Bourgas to Varna, as well as the basins of the New Saltworks. Max of 4,480 was registered at Pomoriysko and 2,420 at Atanasovsko in mid-May 2000. This data formed the highest total number of 7,088 for the region. After the LUKoil-Neftochim oxidizing pools dried up in 2002, the Curlew Sandpiper also started to appear there during migration. After mid-May, the number of migrants decreases rapidly and the migration is over by the end of the month. In June the max total was 220 in 1996, all of them staying throughout the **summer**. **Autumn** migration starts in mid-July, the first arrivals being juveniles. Then, in August the number of birds increases. The peak dates vary slightly from year to year but in general the majority of migrants pass in August and September. The mid-August counts provided max of

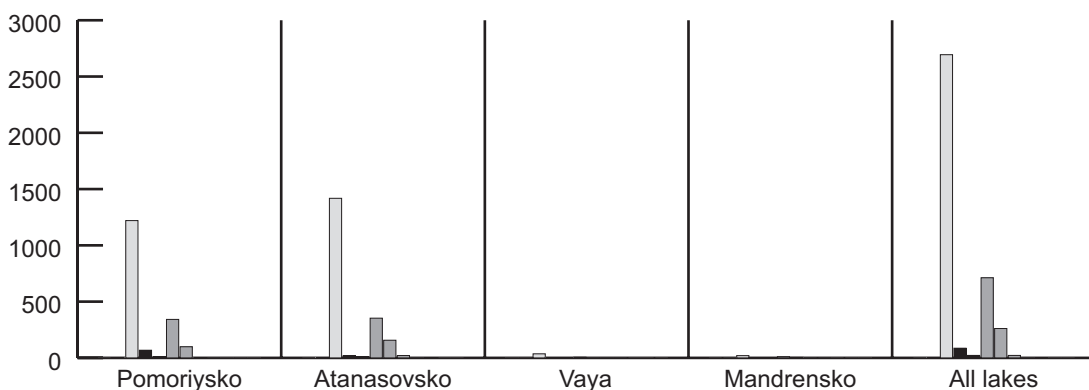


Fig. 45. *Calidris ferruginea*

Pomoriysko	838	December	1999
Atanasovsko	1,750	November	1996
Vaya	70	November	2001
Mandrensko	94	February	2001



1,389 in 1999. In all September counts of the survey, the number of migrants was lower than in August with max of 513 on 1 September 1996. Nankinov et al. (1997) give a max count at Atanasovsko of 5,922 in late August of 1978. At the beginning of October, the number of Curlew Sandpiper decreases with max mid-October total of 78 in 1996 at Atanasovsko. In August 2002, 80 were observed at LU-Koil-Neftochim oxidizing pools (Kiril Bedev, pers. comm.). There were no other sightings during all November counts nor records of **wintering** birds. Nankinov et al. (1997) describe Curlew Sandpiper as a rare wintering species in Bulgaria with max of 900 in December 1980 at Atanasovsko but this information seems doubtful.

4.100. Dunlin – *Calidris alpina*

Fairly common to common autumn passage migrant, uncommon to fairly common winter visitor and uncommon spring passage migrant.

Numbers: The max totals per seasons for the study period were:

Winter	722	Spring	730
Summer	139	Autumn	2,000

The max totals per lakes for the study period were:

The average number of Dunlin was highest in November (**Fig. 46**). Complex Atanasovsko Ezero ranks first with 87% of the species' total numbers in BWC.

Species Dynamics: In **spring**, the number of Dunlins increases after mid-March and migration is most intensive from the end of March until mid-April, with 730 birds in April 2000. In some years, the number of arrivals starts to increase earlier, from the beginning of March. From the second half of April onwards, the number of birds decreases gradually to 397 birds in May 2000. Migrants were found in June, with max of of 139 in 1999. Unusually high April numbers of 6,900 are given by Nankinov et al. (1977) for 4 April 1976 at Atanasovsko, which differ significantly from all other relevant data. Small numbers (up to 6-7 of non-breeders) **summer** regularly in July. In **autumn**, after early August, the number of arrivals increases, but they do not reach large numbers until the end of October. The number peaked with 202 in August 1999, 356 in September 2000, and 266 in October 1996. Significant increases were noted usually in November, with a peak of 2,000 in mid-November 1996. The majority of birds came from Atanasovsko, while the rest were from Pomoriysko and Poda. The migration continues until mid-December and, depending on the weather conditions, varied in different years of the survey. In most of the years the numbers of **wintering** Dunlins started to decrease from December onwards. The highest January and February counts reached 620 in 2000 and 720 in 1997 respectively. Roberts (1980b) reports max of 1,082 in mid-December 1976 at Atanasovsko. Since then, the number of wintering Dunlins tended to decrease. A wintering bird shot by Prostov (1964) has been identified as *C. a. schinzii*. This is the only finding of this subspecies in Bulgaria. The max number of Dunlin (430 in 2000) in Bulgaria during the mid-winter survey 1977-2001 had been recorded at Complex Pomoriysko Ezero (Michev & Profirov, 2003).

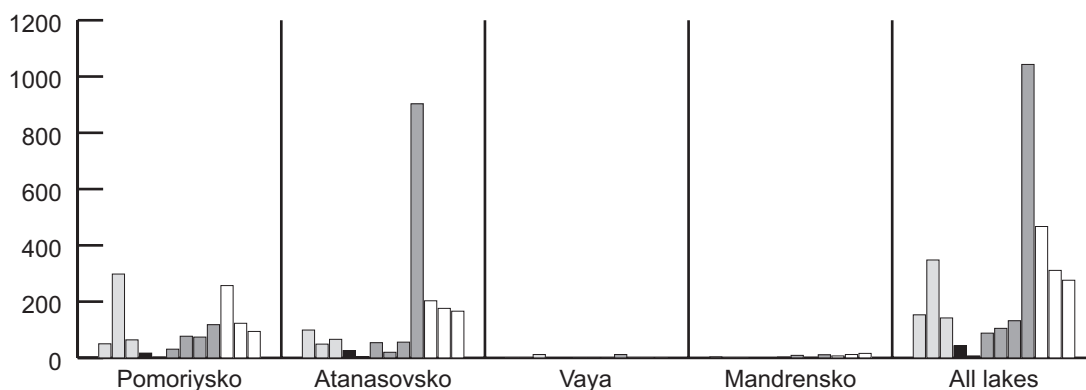


Fig. 46. *Calidris alpina*

4.101. Broad-billed Sandpiper – *Limicola falcinellus*

Uncommon autumn and spring migrant, rare summering and very rare wintering species.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	2
Summer	7	Autumn	40*

* Outside the dates of the survey 100 were observed at Atanasovsko on 29 August 2003 (Hakan Soderberg, pers. comm.).

The max totals per lakes for the study period were:

Pomoriysko	7	July	1996
Atanasovsko	36	August	1996
Vaya	0	–	–
Mandrensko	40	September	1998

The average number of Broad-billed Sandpiper in BWC is highest in August.

Species Dynamics: **Spring** passage is between April and the end of May, most intensive until mid-May. We had a small number of spring migrants: two birds in mid-May 2002 and 2003, at Atanasovsko. Roberts (1980b) gives the max spring number of 12 in mid-May for Atanasovsko. There are no June records, as Broad-billed Sandpiper is rarely found in **summer**, with a total of 10 recorded in the last 30 years of the 20th century (Nankinov et al., 1997). After the breeding season is over, birds start dispersing fairly early, with the first **autumn** seven seen on 15 July 1996 at Pomoriysko. **Autumn** passage is most intensive between mid-August/first week of September. Most of the authors have recorded concentrations of 50 to 70 birds during that time of the autumn migration (Prostov, 1964; Roberts, 1980b, 1981; Nankinov, 1985). During the survey max 40 were seen at Poda in mid-August 1998. After part of the LUKoil-Neftochim oxidizing pools dried up in 2002, the Broad-billed Sandpipers started to appear there too during migration: three were observed in 2002 (Kiril Bedev, pers. comm.). Nankinov et al. (1997) report a total of 415 (such a great number seems rather unlikely) in 2-7 September 1973 at Pomoriysko. The number of migrants decrease by mid-September, when max of two were recorded at Poda and one bird was seen at each Pomoriysko and Atanasovsko. Broad-billed Sandpipers leave the area by the end of September, but odd migrants could still be found in October and November. The time of migration and the species' numbers fluctuates in different years depending on weather conditions during the breeding season but the autumn migration is definitely more prominent. During autumn

migration the Broad-billed Sandpipers are rarely found mixed with other species of waders. According to Nankinov et al. (1997) there has been one January record of **wintering** Broad-billed Sandpiper on the Bulgarian Black Sea coast.

4.102. Buff-breasted Sandpiper – *Tryngites subruficollis*

Vagrant. Two were observed at the flooded area near the estuary of Reka Azmashka, Atanasovsko, on 8 May 2001 (Michev et al., 2004). It is quite possible that the species had reached Bulgaria via the Atlantic (and Europe) or had come from the northeast crossing a large part of Asia. The presence of two birds together in spring is perhaps more indicative of their coming from the northeast. This was the second observation for Bulgaria after the one, made at Dourankoulak on 24 August 1972 (Kneis, 1974), and the first one recorded in spring.

4.103. Ruff – *Philomachus pugnax*

Uncommon to fairly common spring and autumn passage migrant; scarce summer and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	40	Spring	2,422
Summer	614	Autumn	2,046

The max totals per lakes for the study period were:

Pomoriysko	1,240	April	2000
Atanasovsko	2,000	September	1999
Vaya	300	April	2002
Mandrensko	300	April	1996

The average number of Ruff in BWC was highest in May (**Fig. 47**). Complex Atanasovsko Ezero ranks first with 75% of the species' total numbers in BWC.

Species Dynamics: **Spring** migration starts by the end of February/beginning of March and lasts until the end of May/early June. The earliest two birds were observed on 1 February 2002 at Poda. Until the end of March, Ruffs do not gather in significant numbers, then, from the beginning of April onwards their number starts to increase, reaching max survey totals of 1,975 in mid-April 2000. Depending on the weather conditions the number in April and May fluctuated in different years of the survey. During the mid-May counts of 2001 the peak numbers were 2,422, the majority of these at Atanasovsko. The highest season record at Pomoriysko was 1,240 in mid-April 2000. After part of the LUKoil-Neftochim oxidizing pools dried up in 2002 Ruffs also started to arrive there during migration, with max 120 in the beginning of April 2002 (Kiril

SPECIES ACCOUNTS

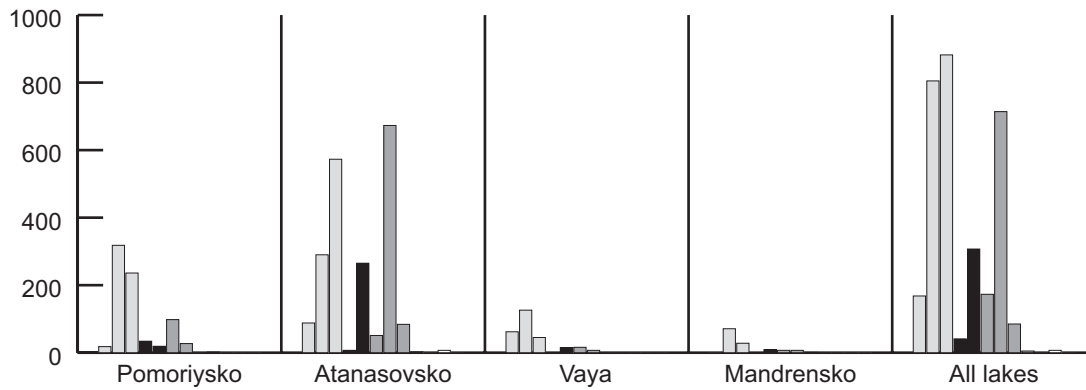


Fig. 47. *Philomachus pugnax*

Bedev, pers. comm.). Passage slows down in the second half of May and by the end of the month the majority of birds have left the area. Nankinov et al. (1997) give a peak spring record of 9,940 on 4 April 1976, at Atanasovsko. Migrants were found in early June at all wetlands around Bourgas. Small numbers of non-breeding birds remain throughout the **summer**, mainly at Atanasovsko, Pomoriysko and Poda, with a max 42 in mid-June 1999. **Autumn** migration starts from mid-July onwards. After August the number gradually increases (fluctuations noted in 1996) with a September peak of 2,046 in 1999. After early October, the number of Ruffs drops and the peak count was 375 in 1996. We had few November records of late migrants, with eight at Pomoriysko and the same number at Atanasovsko in 1996 and 1998 respectively. There were no December observations during the survey. Max numbers (200 in 1986) during mid-winter counts 1977-2001 had been recorded in the Complex Mandrensko Ezero (Michev & Profirov, 2003).

4.104. Jack Snipe – *Lymnocyptes minimus*

Scarce spring and autumn migrant, scarce winter visitor. It is possible the species occurs in greater numbers, but because of its secretive behaviour, it may have been overlooked.

Numbers: Spring passage is between 5 March and 22 April, reaching max of 10 birds in mid-March, at Atanasovsko (Roberts, 1980b). Max survey record was three on 20 March 1998, at Atanasovsko. The **autumn** migration is very much extended, starting in August and lasting until the end of November. One bird was seen in early October 1999, at Poda (BSPB, 2002). The latest observation is given by Georgiev (1976), on 11 November 1964. Apparently, the species' autumn number is very low. The Jack Snipe had regularly **wintered** in the past (Vurbanov, 1912) at the wetlands around Bourgas. The latest studies indicate it is much rarer now. Roberts (1980b) had one winter record in January, with one seen at Atanasovsko.

4.105. (Common) Snipe – *Gallinago gallinago*

Uncommon to fairly common during spring passage, uncommon autumn migrant and winter visitor. It seems likely that these birds are much more numerous during winter, as their secretive behaviour means they can easily be overlooked.

Numbers: The max totals per seasons for the study period were:

Winter	49	Spring	123
Summer	4	Autumn	390

The max totals per lakes for the study period were:

Pomoriysko	3	December	2002
Atanasovsko	123	March	1997
Vaya	25	September	2000
Mandrensko	369	October	1998

The average number of Snipe in was highest in October (**Fig. 48**). Complex Mandrensko Ezero ranks first with 75% of the species' total number in BWC.

Species Dynamics: In **spring**, depending on the weather conditions, the migration starts as early as the beginning of February, with max arrivals of 38 in 1999. But in most years of the survey it took place from the end of February/beginning of March onwards. Peak counts of 123 were reached in mid-March of 1997, all of them at Atanasovsko. At LUKoil-Neftochim oxidizing pools 5-6 Snipes seen during migration (Kiril Bedev, pers. comm.). From the end of March the number of migrants decreases and the passage is over by the end of April. One bird seen at Atanasovsko and one at Pomoriysko in mid-May 2001 hinted at possible **breeding**. There were no June records. In **autumn**, migration starts after mid-July, with the first four seen at Atanasovsko and Poda, in 1996. In August, we had very small numbers in all the wetlands, with max of six at Atanasovsko in 2000 and one at Poda in 2001. Then the number of migrants increases, with a peak record of 145 in mid-Septem-

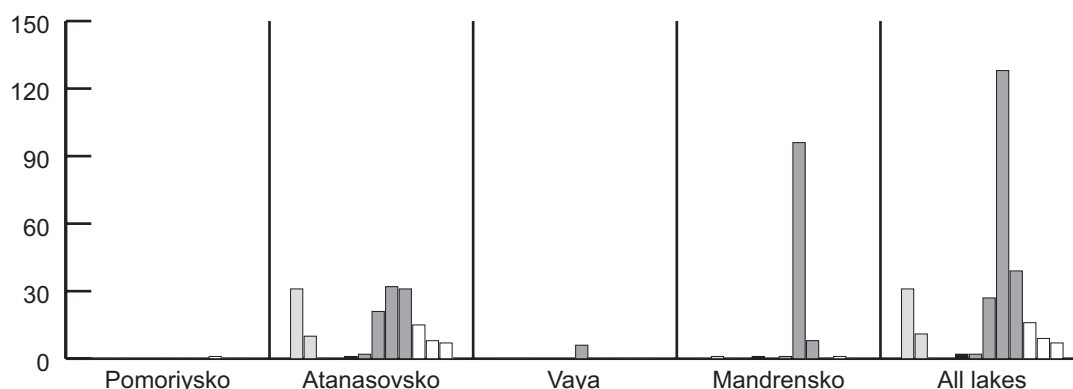


Fig. 48. *Gallinago gallinago*

ber 2000, when the majority of birds (114) were counted at Atanasovsko, 25 at Vaya and six at Poda. The number of autumn migrants fluctuated often with rapid changes. In some years of the survey the passage was more prominent in September, while in others, the peak was in October. The highest autumn number of 390, in mid-October 1998, was split in two with 369 on the flooded arable lands by the Estuary of Reka Rousokastrenska, and the rest remaining at Atanasovsko Ezero. Counts in November showed max of 115 in 1998, with 105 of them at Atanasovsko, and the remainder 10 at Poda. At LUKoil-Neftochim oxidizing pools up to 5-6 were seen during migration. The peak autumn record at Vaya is given by Roberts (1980b), with 209 noted by the end of November 1976. After the end of November the number of Snipes decreases sharply. **Winter** counts in December, January and February peaked with 49 birds. Max numbers (130 in 1987) in Bulgaria during the mid-winter survey 1977-2001 had been recorded at Atanasovsko (Michev & Profirov, 2003).

4.106. Great Snipe – *Gallinago media*

Very rare spring migrant and winter visitor.

Numbers and Species Dynamics: Nankinov et al. (1997) give the spring migration from the end of February to early May. Roberts (1980b) concludes that the species has been in decline since 1970, having one **spring** record of a single bird at Atanasovsko, in April. During the survey two were seen on 8 May 2002 at Atanasovsko. A single bird recorded on 29 July 1999 at Atanasovsko indicates that the **autumn** migration starts from the end of July onwards. According to Nankinov et al. (1997), the autumn migration lasts until November. The Great Snipe was a rare **wintering** species in the past (Prostov, 1964), but no records have been reported in recent times.

4.107. (Eurasian) Woodcock – *Scolopax rusticola*

Scarce migrant and winter visitor. Woodcock is rarely found in the area. During the survey we did not obtain

any **spring** records. In **autumn**, 11 were seen on 16 October 2002 at Atanasovsko and seven on the next day at Ouzoun Geren (Asen Ignatov, pers. comm.). Outside the dates of the survey, c. 60 were seen west of Atanasovsko, in October 1982 (Kiril Bedev, pers. comm.) and one at Poda, on 26 October 1995. The **winter** records came from the estuary of Reka Akheloy, with one on 13 December 2002 and two at Pomoriysko, on the same date. During the mid-winter survey (1977-2001) one bird was seen at Sarafovo and one on Kraymorie-Chernomorets sector of the SBSC, both in January 1996 (Michev & Profirov, 2003).

4.108. Black-tailed Godwit – *Limosa limosa*

Uncommon to common passage migrant and uncommon summer and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	25	Spring	906
Summer	602	Autumn	1,210

The max totals per lakes for the study period were:

Pomoriysko	500	April	2000
Atanasovsko	1,210	August	2001
Vaya	200	March	2000
Mandrensko	93	August	1999

The average number of Black-tailed Godwit was highest in August (**Fig. 49**). Complex Atanasovsko Ezero ranks first with 94% of the species' total numbers in BWC.

Species Dynamics: **Spring** migration starts in the first half of February and the passage is most intensive between mid-March and the first week of April reaching a peak of 906 in early April 2000. The total number of migrating birds has been assumed to be at least 2000. From the first week of April the number falls with the birds leaving for their breeding grounds. The first autumn migrants arrive early in the sea-

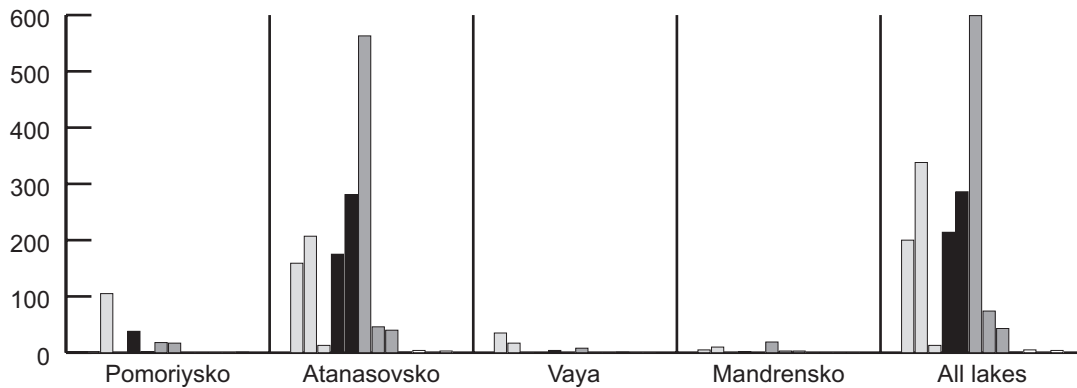


Fig. 49. *Limosa limosa*

son, and in some years they become quite common as early as from 10 June. The majority of birds in this month were found at Atanasovsko and in smaller number, at Pomoriysko. **Autumn** migration begins to intensify after mid-July, when they appear again at the salty wetlands, reaching 457 in 1996. The number of autumn migrants increase in early August, peaking with 1,210 in 2001, at Atanasovsko. Max 237 was seen at Poda on 13 August 1998 (BSPB, 2002). From mid-August, their number gradually decreases. Peak September and October data were 150 and 101 in 1996 and 2001 respectively. The migration continues into November, with less than 10 observed in most years of the survey. After the LUKoil-Neftochim Oxidizing pools dried up, Black-tailed Godwit started to appear there too during migration - 20 to 30 were seen in 2002 (Kiril Bedev, pers. comm.). Black-tailed Godwits regularly **winter**, with max December record of 25 in 1996, and max in January of two in 2000.

4.109. Bar-tailed Godwit – *Limosa lapponica*

Rare migrant, summer and winter visitor.

Numbers: The max totals per seasons for the study period were:

Pomoriysko	0	–	–
Atanasovsko	5	October	2001
Vaya	0	–	–
Mandrensko	2	October	2001

The first record for Bulgaria was made by Prostov (1955) at Poda, with a **spring** observation of one on 21 March 1940. A sighting was reported for Atanasovsko on 25 April 1980 (Nankinov et al. (1997). A bird was caught in a mist net at Atanasovsko in early April 1989 (Kiril Bedev, pers. comm.). A **summer** observation was made by Groessler (1967) on 12 June 1962 at Atanasovsko. We had three **autumn** records of Bar-tailed Godwits: two at Poda on 1 September 1996; five at Atanasovsko and two at Poda on 1 October 2001 giving max aggregate count of seven.

Outside the dates of the survey we had four at Poda on 29 September 1993. Roberts (1980b) reported single birds a few times during passage with max four between 27 September and 21 October 1976 at Atanasovsko as well as in August. We had five on 6 October 2001 at Atanasovsko. Johnson & Hafner (1970) saw one in January 1970 at Vaya, which is the only **winter** record. Bar-tailed Godwit was not recorded during the mid-winter survey 1977–2001 in Bulgaria (Michev & Profirov, 2003).

4.110. Whimbrel – *Numenius phaeopus*

Scarce to uncommon migrant and winter visitor, rare summering.

Numbers: The max totals per seasons for the study period were:

Winter	14	Spring	4
Summer	1	Autumn	5

The highest numbers during counts at the four wetlands were

Pomoriysko	2	August	2000
Atanasovsko	5	September	1998
Vaya	14	January	1997
Mandrensko	4	July	1996

Species Dynamics: Given as regular spring and passage migrant by Harrison & Pateff (1933). Whimbrel was not given for Bourgas area by Prostov (1964). Until 1970s data was scarce (Robel et al., 1972, 1978). Later the species had been seen regularly, singly or in small numbers, mainly at Atanasovsko and Pomoriysko. **Spring** migration starts from the beginning of March onwards with a max of of four at Vaya in March 1997. The a max of seasonal number was 18 at Atanasovsko, observed on 20 April 1997 (Nankinov et al., 2003). The migration lasts until the end of May. In **autumn**, Whimbrels appear again from the beginning of July, with the earliest arrival on 1 July 1999 at Poda. A max of autumn counts were

four on 15 July 1996 at Poda and eight on 13 August 1995 at the same place, outside the dates of the survey. During the peak passage a max of of 30 birds were seen on 20 July 1993 at Pomoriysko (Nankinov et al., 2003). Passage lasts until the end of September with five at Atanasovsko in 1998. A max of September count was reported for Pomoriysko of 20 on 2 September 1996 (Nankinov et al., 2003). The latest observation was made by Nankinov et al. (2003) with two at Atanasovsko on 2 October 1993. We expect that Whimbrel may also be found in November too.

Wintering Whimbrel was registered in January and February with a max of of 14 on 15 January 1997 at Vaya; two on 24 January 2003 at Chengene Skele Marsh. Earlier winter sightings with three records of single birds in December 1976 at Atanasovsko, and a single at Poda in January 1980, were reported by Roberts (1980b). During the 25 years of the mid-winter survey Whimbrel has been a very rare wintering species, recorded only twice (Michev & Profirov, 2003).

4.111. Slender-billed Curlew – *Numenius tenuirostris*

Rare migrant, summer and winter visitor.

Numbers: Reiser (1894) reports a flock up to 80 on 1 and 2 July 1890, seen to fly over Mandrensko. Slender-billed Curlew was an infrequent visitor to Bulgaria (Molineux, 1930) and was a regular spring and autumn passage migrant (Harrison & Pateff, 1933). Between 1946 and 1956 the species was very rare on passage, with flocks of 4-7 on 22 March 1951, 19 September 1958, 21 October 1958 and 15 December 1961 (Prostov, 1964). One specimen, shot at Poda, is kept in BNHM. Nankinov (1989) reports a mist-netted and ringed bird at Atanasovsko, on 21 September 1981. A report on 48 Slender-billed Curlews observed at Atanasovsko' western part on 5 April 1986 (Nankinov, 1991) remains doubtful. Several groups of 2-3 birds were recorded at Atanasovsko on 28 April and 2 May 1986 by P. Yankov and L. Rose (Nankinov, 1991). Nankinov et al. (1998, 1999) report 4-9 birds in mid-April 1996 seen at Atanasovsko and one on 18-19 May. Single birds

were reported for Atanasovsko seen on 18 October 1993 and on 4 June 1996 by Ignartov (1994). Surprisingly, Nankinov et al. (2003) conclude the number of Slender-billed Curlews has been slowly increasing in Bulgaria between 1993 and 2002, giving a total of 178 birds seen at that time! Our only record made during the 1996-2002 survey was of a single bird observed at Atanasovsko on 6 June 1996. During the mid-winter survey 1977-2001 the Slender-billed Curlew was seen twice: two on Kraymorie-Chernomorets sector of the SBSC and one at the western part of Atanasovsko on 15 January 1993 (Michev & Profirov, 2003).

4.112. (Eurasian) Curlew – *Numenius arquata*

Uncommon passage and winter visitor, scarce summer visitor.

Numbers: The max totals per seasons for the study period were:

Winter	88	Spring	86
Summer	8	Autumn	70

The max totals per lakes for the study period were:

Pomoriysko	9	January	1997
Atanasovsko	79	April	1999
Vaya	7	December	1999
Mandrensko	43	January	1999

The average number of Curlew in BWC was highest in April (**Fig. 50**). Complex Atanasovsko Ezero ranks first with 94% of the species' total numbers in BWC.

Species Dynamics: **Spring** migration starts from early/mid-February onwards. During the period of study we had a March peak of 71 in 1999, and an April max of 86 in 1999. The majority of birds in this season came from Atanasovsko. Over 40 were observed in the wet fields of Vaya west of Dolno Ezerovo in March 2001, outside the dates of the monitoring. After the second half of April, the number of migrants decreases to three in 1999. **Summering** birds were recorded

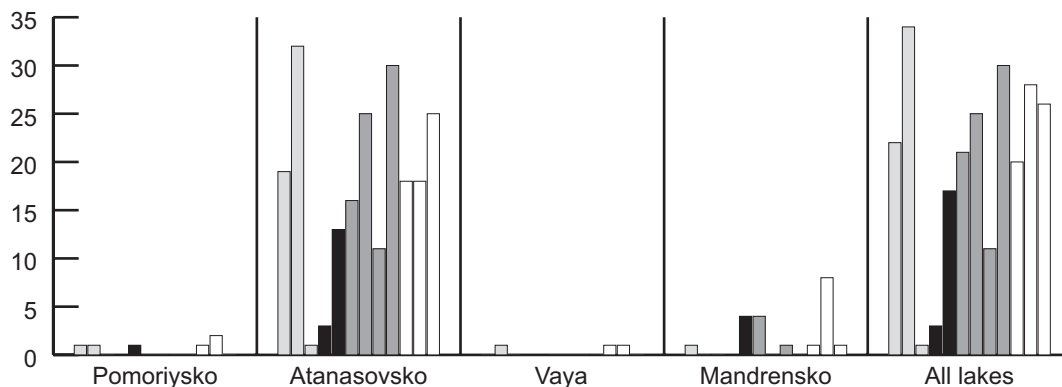


Fig. 50. *Numenius arquata*

in June 1996 (three) and in 1999 (eight), both at Atanasovsko; on 26 June 1995 a flock of 70 flew over Poda, another 40 on 5 July and 52 landed at Poda on 10 July 1995. The first **autumn** arrivals appeared in the beginning of July, peaking with 25 in 1996. After mid-July, the number of migrants started to increase until mid-December, with the following highest data: 38 in August 1996; 53 in September 1999; 22 in October 1996; 70 in November 1996; 43 in December 1999. Nankinov et al. (1997) give higher autumn numbers for Atanasovsko with max August of 140 in 1978 and max November of 248 in 1979. **Wintering** Curlews are regularly seen at all Bourgas wetlands, with survey numbers up to 88 birds (peaked in mid-January 1999). The highest winter record of 156 is given by Roberts (1980b) for Atanasovsko, in 1976. Max numbers (111 in 1982) in Bulgaria during the mid-winter survey 1977-2001 has been recorded at Atanasovsko (Michev & Profirov, 2003).

4.113. Spotted Redshank – *Tringa erythropus*

Uncommon to fairly common passage migrant and summer visitor, scarce wintering bird.

Numbers: The max totals per seasons for the study period were:

Winter	6	Spring	244
Summer	104	Autumn	698

The max totals per lakes for the study period were:

Pomoriysko	219	July	1999
Atanasovsko	478	July	1999
Vaya	80	September	1999
Mandrensko	22	September	1998

The average number of Spotted Redshank was highest in July (**Fig. 51**). Complex Atanasovsko Ezero ranks first with 76% of the species' total numbers in BWC.

Species Dynamics: In milder seasons the **spring** migration starts by the end of February/beginning of

March, the earliest record being of one on 28 February 1978 (Roberts 1980b). Another early record was of one on 1 March 1999 at Atanasovsko, but they are not usually seen until mid-March. The number starts to increase from the end of March/early April onwards, with noticeable fluctuations in some years, and peaked with 244 in early May 1999. After the first week of May the number of Spotted Redshank start to decrease gradually, reaching a peak of 92 in the mid-May 2000. The passage lasts until the second half of the same month. Our data coincides to a great extent with that of Roberts (1980b), who gives a max spring record of 365 in April 1977. The highest Mandrensko record of 133 on 1 May 1975 was reported by Nankinov et al. (1997). The **autumn** passage starts earlier, from the beginning/mid-June onwards. After mid-June there is a noticeable increase, with a peak of 698 during the early July of 1999. From the first half of July the number of migrants starts to decrease, with max 105 in September the same year. It lasts until the second half of November, with max of five in 1999. Roberts (1980b) reports September and October influxes of 103 and 145 respectively seen at Atanasovsko. In two of the years of the survey we recorded **wintering** with max of three in January 1997 and a sighting of a single bird in February 2001. Roberts (1980b) reports a sighting of one in December at Atanasovsko. A rare wintering species, recorded few times during the mid-winter survey of 1977-2001 (Michev & Profirov, 2003).

4.114. (Common) Redshank – *Tringa totanus*

Uncommon to fairly common spring and fairly common to common autumn passage, uncommon winter visitor and rare breeder.

Numbers: The max totals per seasons for the study period were:

Winter	89	Spring	378
Summer	511	Autumn	3,248

The max totals per lakes for the study period were:

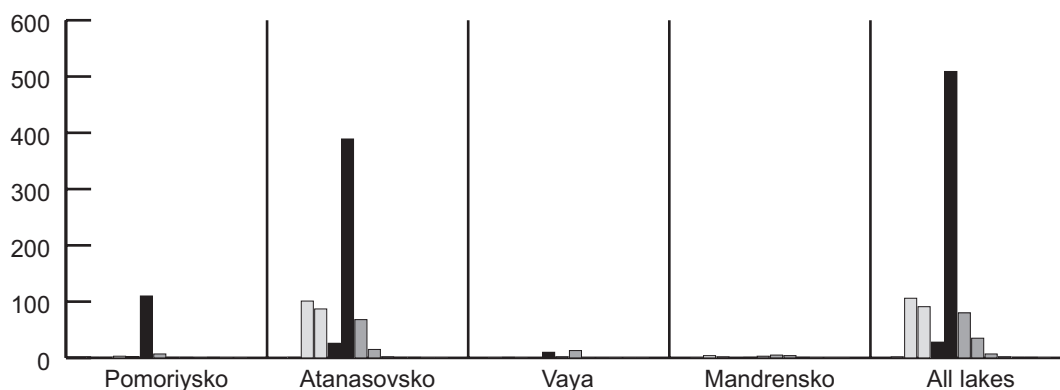


Fig. 51. *Tringa erythropus*

Pomoriysko	931	August	1999
Atanasovsko	2,391	July	1999
Vaya	100	September	1999
Mandrensko	93	August	1999

The average number of Redshank was highest in July (**Fig. 52**). Complex Atanasovsko Ezero ranks first with 83% of the species' total numbers in BWC.

Breeding: Patev (1950) reports the species has bred in relatively high numbers on the Black Sea coast at the time of his study. Since the beginning of 1960s a sudden decrease was noticed. Prostov (1964) mentions nests (in small, but unspecified number) found at Atanasovsko in 1953, 1956 and 1957. We found a breeding pair at Atanasovsko in 1976. Roberts (1980b) reports two pairs nesting in 1977. Nankinov et al. (1997) gives a pair in 1978 at Atanasovsko as well as late brood observed in July and in late August 1978, same lake.

Species Dynamics: Spring migration starts usually in mid-February with a noticeable increase at the end of February/early March. After that, until the end of March, the migration is most intensive with peak numbers of 378 obtained on 15 March 1999. It is possible that the number of Common Redshank is two or three times greater in this period. Roberts' (1980b) data shows Common Redshank as having reached a peak at the same period. From the beginning of April the migration increases rapidly, reaching a peak record of 131 in April 1999. The highest Poda record was 86 on 15 March 1997. The migration lasts until the end of April/early May, but some birds stay regularly at the wetlands throughout May (max four observed in 2001). **Autumn** migration is more prominent, in contrast to that in spring. The build-up starts from early June and increases by mid-June with a max data of 511 obtained on 15 June 1999. A late-June increase had been noticed by Roberts (1980b), with max of 1,548 on 19-20 June 1977 at Atanasovsko. The highest July count reached 3,248 on 1 July 1999. August and September records

were 1,112 and 1,769 respectively, in 1996. Roberts (1980b) gives max early September count of 6,574 in 1976, at Atanasovsko and October record of 3,616, the same year. The migration continues until mid-December, with a peak of 89 in 1998. The highest Poda autumn record is reported by Georgiev (1976) with c. 200 on 26 November 1963. Nankinov et al. (1997) report that hundreds and thousands of Common Redshank had **wintered** at the Black Sea coastal wetlands, but we found only small groups and single birds wintering. Our max January records were 60 in 1997.

4.115. Marsh Sandpiper – *Tringa stagnatilis*

Uncommon to fairly common autumn and scarce to uncommon spring passage migrant.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	99
Summer	24	Autumn	634

The max totals per lakes for the study period were:

Pomoriysko	600	September	1999
Vaya	7	September	1999
Atanasovsko	270	August	1996
Mandrensko	25	August	1999

The average number of Marsh Sandpiper in the surveyed area was highest in August-September (**Fig. 53**). Complexes Pomoriysko and Atanasovsko Ezero rank first with 87% of the species' total numbers in BWC.

The 1-% Ramsar criterion is 370 birds. During the period of survey the species numbers exceeded the criterion in a single year only, at Pomoriysko.

Species Dynamics: In **spring** the first birds arrive at Atanasovsko in early March, with max of two in

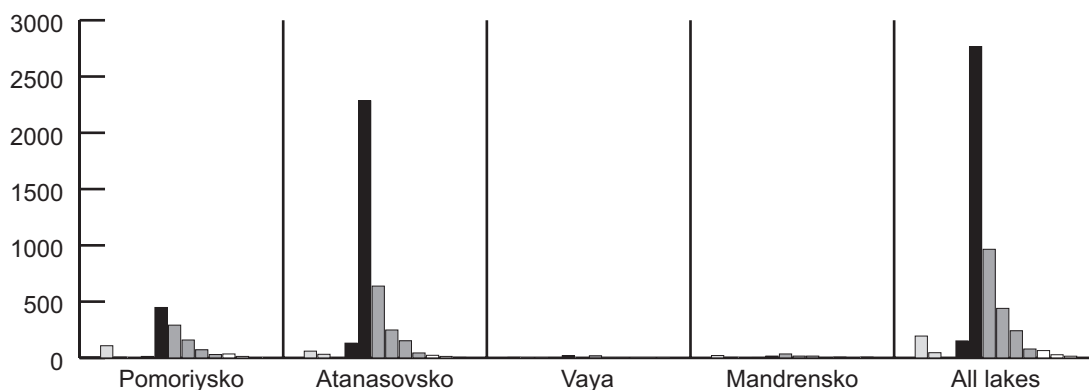


Fig. 52. *Tringa totanus*

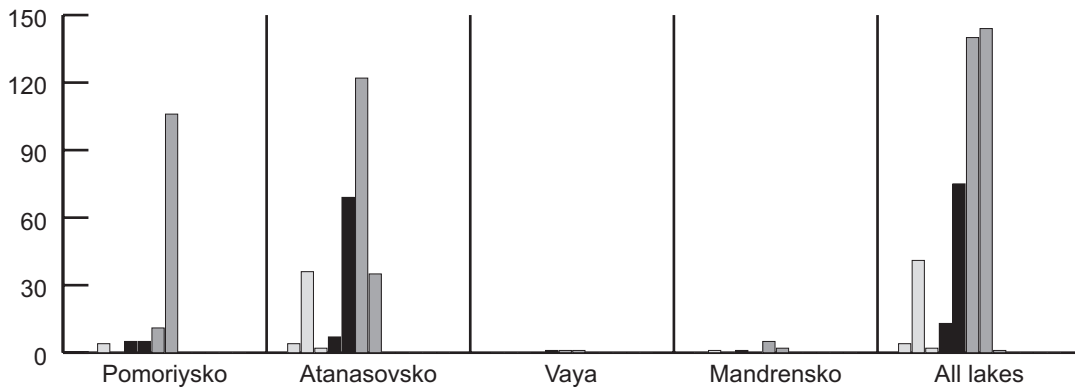


Fig. 53. *Tringa stagnatilis*

mid-March 2001. The number remains low until the end of the month. An increase takes place from the beginning of April, with a peak of 34 in April 1999. The majority of birds were observed at Atanasovsko and far fewer, at Pomoriysko and Poda. Roberts (1980b) gives max 152 in early April 1977. From mid-April the passage starts to diminish but birds are still quite numerous late in the month. Spring migration lasts until mid-May, when max of six was obtained in 1999. In **summer**, an early-June build-up was noted in the beginning of the month with max of 24 in 1999, but birds were present throughout the month. Georgiev (1976) records the highest build-up in late June with 130-150 in 1967. In July, the number of **autumn** migrants increases, with a peak of 140 in mid-July 1996. The coverage in some years was not good for July, so the number is probably higher in that month. Georgiev (1976) has a record of c. 400-500 in July 1967. The migration is most intensive after the beginning of August, reaching a peak of 279 in mid-August 1996 survey. The influx of 634 in mid-September 1999 was highest record, with the majority of birds coming from Pomoriysko. Single birds still remain during October, when the migration comes to an end late in the month, with latest observation of two made on 15 October 1996. Georgiev (1976) gives the latest record of a single bird seen on 24 October 1967.



4.116. (Common) Greenshank – *Tringa nebularia*

Scarce to uncommon spring and uncommon to fairly common autumn passage migrant, scarce summer and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	164
Summer	24	Autumn	167

The max totals per lakes for the study period were:

Pomoriysko	100	April	2000
Atanasovsko	165	October	1996
Vaya	38	April	2000
Mandrensko	11	April	2000

The average number of Common Greenshank was highest in October (**Fig. 54**). Complex Atanasovsko Ezero ranks first with 98% of the species' total numbers in BWC.

Species Dynamics: Our survey data showed in **spring** the Common Greenshanks arrive in the first week of March, when it is present in small numbers (max of five in 1997). At the end of March/beginning of April, the number increases, reaching a peak with spring max of 162 on 1 April 2000, when the majority of birds were at Pomoriysko. Fluctuations are possible: Roberts' (1980b) spring peak is in late April with max of 92 on 29 April 1977. Nankinov et al. (1997) give a highest number of 910 for 4 April 1976 at Atanasovsko and an early May record of 100 in 1975. After the first week of May the migration rapidly decreases, with the highest aggregate May record of 25 in 1999, the birds coming from Atanasovsko and Pomoriysko. In **summer**, non breeding birds regularly occurred, with max record of 24 on 1 June 1996, at Atanasovsko. In **autumn**, the build-up was noted at the beginning of July. Common Greenshank were present in small numbers in July, August and September. Passage is most intensive in mid-to-late

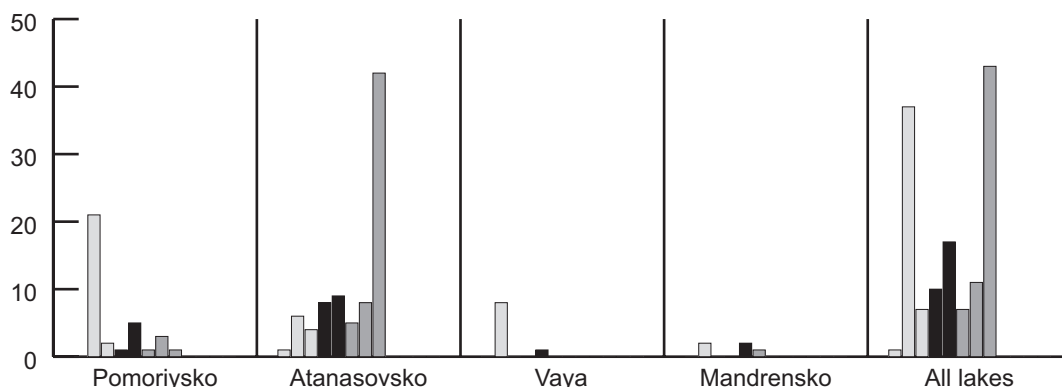


Fig. 54. *Tringa nebularia*

September, with max of 167 on 1 October 1996; of these 165 were recorded at Atanasovsko. From the beginning of October, the number of migrating birds starts to fall and the migration continues in November. During this survey we did not obtain **winter** records, but Roberts (1980b) reported a few in December and January of 1976-1978, at Atanasovsko.

4.117. Green Sandpiper – *Tringa ochropus*

Scarce to uncommon spring and uncommon autumn passage migrant, scarce summer and uncommon winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	17	Spring	10
Summer	17	Autumn	22

The max totals per lakes for the study period were:

Pomoriysko	4	December	2000
Atanasovsko	18	September	1999
Vaya	6	December	1999
Mandrensko	18	August	1999

The average number of Green Sandpiper in BWC was highest in July (max 9).

Species Dynamics: In **spring** migration begins by mid-February, and is most intensive in the end of March/beginning of April (six birds in March 2000 and April 1999). In May and June small numbers of Green Sandpiper were present at Atanasovsko and Vaya, with max five birds. The **autumn** build-up in numbers begins from mid-July. The majority of birds passed in August and September (max 20 in 1999), with some birds (up to 10) regularly remaining until the end of November. **Wintering** of a few birds was recorded, with max 17 in December 1996, taken at Cherny Vrukh Fishponds. December increase of wintering Green Sandpipers is recorded also by Roberts (1980b). During the mid-winter 1977-2001 survey the species

was observed mainly at Atanasovsko with max of eight in 1994 (Michev & Profirov, 2003).

4.118. Wood Sandpiper – *Tringa glareola*

Uncommon spring and fairly common autumn migrant, scarce summer visitor and very rare wintering.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	465
Summer	112	Autumn	230

The max totals per lakes for the study period were:

Pomoriysko	300	May	1999
Atanasovsko	70	August	2000
Vaya	83	May	1999
Mandrensko	44	July	1996

The average number of Wood Sandpiper was highest in May (**Fig. 55**). Complex Pomoriysko Ezero ranks first with 55% of the species' total numbers in BWC.

Species Dynamics: The first **spring** migrants arrive from mid-March, but in some years earlier in the month. Until mid-April, the number of birds remains low, then the passage gradually increases and becomes most prominent in May. In mid-May the number of migrants peaked with 465, when the majority of birds came from Pomoriysko (300), Vaya (83) and Atanasovsko (50). The period of migration's highest intensity has shifted in May instead of April, as was at the time before 1970s (Prostov, 1964; Roberts, 1980b). The migration lasts until the end of May/beginning of June, with highest aggregate June record of 56 on 1 June 1999. The **autumn** build-up begins from mid-June onwards, reaching 112 in mid-July 1996. The number remains high during August (with max of 105 in 1996), and peaked with 230 in early September 2001. Then the migration thins out but lasts until the end of October. October peak data of

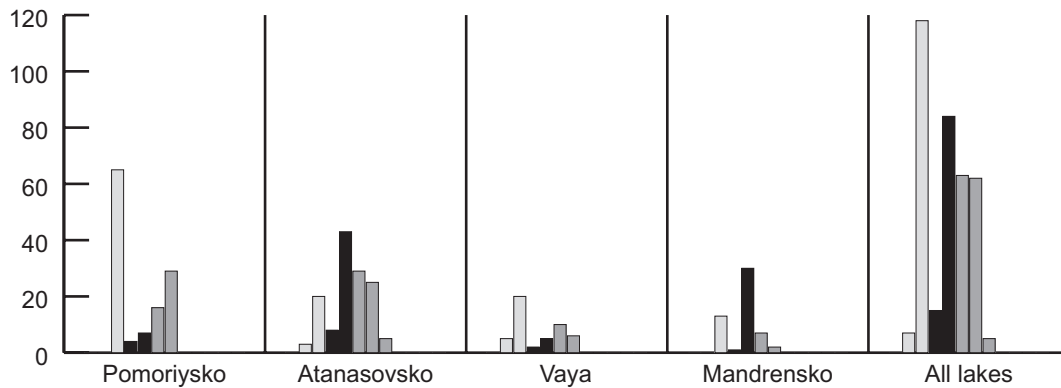


Fig. 55. *Tringa glareola*

20 were obtained in 1996. In some years, migrants can be seen even in November, with a single bird recorded in 1998. **Wintering** were not recorded during the survey. Nankinov (1998) gives the only information proving the species is present in this season – a single bird observed on 11 February 1988 at Atanasovsko.

4.119. Terek Sandpiper – *Xenus cinereus*

Rare migrant. Observed a few times during the surveyed period: one on 1 September 1996 at Poda, one on 1 August 2002 at Pomoriysko. Single birds were seen at Atanasovsko on 8 September and 23 September 2002 (Michev et al., 2004). Further observations were reported by Nankinov et al. (1997) for Atanasovsko: on 21 May 1979, 25 April 1980, 3 August 1982, 13 August 1983; we saw one bird on 13 May 1996 at Poda; two were seen in August 1998 at Atanasovsko (Kiril Bedev, pers. comm.).

4.120. Common Sandpiper – *Actitis hypoleucos*

Scarce spring and scarce to uncommon autumn migrant, rare summer and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	1	Spring	9
Summer	6	Autumn	14

The max totals per lakes for the study period were:

Pomoriysko	10	August	1999
Atanasovsko	8	May	1999
Vaya	4	May	1999
Mandrensko	9	August	2000

The average number of Common Sandpiper in BWC was highest on autumn migration.

Species Dynamics: The first **spring** migrants appear in mid-March. The migration increases from the

beginning of April and is most intensive in the second half of April/beginning of May. We obtained highest April record of four in 1999 and 2000, while the peak of nine was on 1 May 1996. From the beginning of May the migration drops and lasts until end of the month. Common Sandpiper are seen until the beginning of June, with total of six recorded on 1 June 1999. The **autumn** build-up starts from the beginning of July, and migration lasts until mid/end-October. The passage is most intensive in August, peaking with total of 12 in August 1996, with majority at Mandrensko. The highest September and October data, eight and two respectively, were obtained in 1996. During the period of the survey we had a few **winter** records, all of them of single birds: on 12 December 1996 at Atanasovsko and Pomoriysko; on 1 December 1997 at Atanasovsko, and on 15 February 1997, there again.

4.121. (Ruddy) Turnstone – *Arenaria interpres*

Uncommon summer visitor and scarce autumn migrant, rare wintering visitor.

Numbers: The max totals per seasons for the study period were:

Winter	1	Spring	12
Summer	3	Autumn	34

The max totals per lakes for the study period were:

Pomoriysko	34	August	1999
Atanasovsko	12	May	1996
Vaya	0	–	–
Mandrensko	4	May	2002

The average number of Turnstone in BWC was highest on autumn migration.

Species Dynamics: In **spring** the Turnstone appear at Pomoriysko, Atanasovsko and Poda from mid-April. The migration is most intensive in May, with a peak of 12 in mid-May 1996 at Atanasovsko, and of

11 on 16 May 1996 at Poda. The passage continues until the beginning of June, with a record of three on 1 June 1999, and in some years even later. Nankinov et al. (1997) report the highest record of 64 for Atanasovsko on 21 May 1979. In **autumn**, the first migrants after the breeding season arrive in the very end of July/beginning of August, with max 11 in 2001 at Pomoriysko. The migration lasts until the end of October, in some years to mid-November. Our highest September and October records were of five in 1998 and two in 2001. High concentrations of 300 on 3 September 1973 at Pomoriysko and of 139 on 13 November 1981 at Atanasovsko, were reported by Nankinov et al. (1997). **Wintering** was recorded twice: one in December 1999 at Pomoriysko and two on 14 December 1999. Rare wintering species with only three records during the period of the mid-winter 1977-2001 (Michev & Profirov, 2003).

4.122. Red-necked Phalarope – *Phalaropus lobatus*

Uncommon migrant.

Numbers: The max totals per seasons for the study period were:

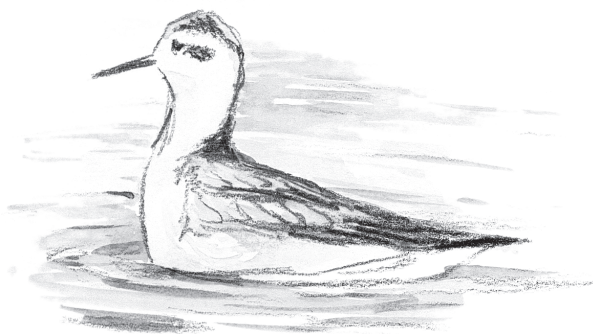
Winter	0	Spring	1
Summer	0	Autumn	48

The max totals per lakes for the study period were:

Pomoriysko	48	September	2001
Atanasovsko	21	September	1999
Vaya	0	–	–
Mandrensko	7	September	2000

The average number of Red-necked Phalarope in BWC was highest on autumn migration (max 7).

Species Dynamics: Most records come from Atanasovsko and Pomoriysko, fewer of them are from



Poda. In **spring**, Red-necked Phalarope appears on the salinas in the beginning/mid May. One was seen at Pomoriysko on 15 May 2000. Nankinov et al. (1997) give max of 21 in May 1979, at Atanasovsko. There are no June and July records but may be expected. In **autumn**, a build up occurs around the end of the first week of August, with max 11 in mid-August 1999. The migration is most intensive in September and lasts until the end of the month/beginning of October. Peak numbers were 48 birds, recorded on 29 August 2001 at Pomoriysko (T. Bowley, pers. comm.). We had other high numbers of 21 on 1 September 1999, and 23 outside the dates of the survey in September 1993, both made at Atanasovsko. After the 4th LUKoil-Neftochim oxidizing pool dried up, Red-necked Phalarope began to occur there during migration, with two birds observed on 15 May 2003 (Kiril Bedev, pers. comm.).

4.123. (Grey) Red Phalarope – *Phalaropus fulicarius*

Vagrant. The only sign that the species might have been seen in Bulgaria is the record of Roberts (1980a) – a bird seen on 22 October 1976 at Atanasovsko, but he doubts if it were a Red-necked or Grey Phalarope. In the author's next paper (Roberts, 1980b) this record is not included.

4.124. Pomarine Skua – *Stercorarius pomarinus*

Rare occasional autumn, summer and winter visitor. Pomarine Skua was first reported for Bulgaria within the area of the study by Probstov's (1955, 1964): a young female was shot near Sozopol on 3 December 1952. Koenigstedt & Robel (1978) saw two imm on 7 August 1971 south of Nessebar. During this survey we observed one imm on 24 September 2002 at Pomoriysko. One at Poda on 21 October 1994 (BSBCP, 2000).

4.125. Arctic Skua – *Stercorarius parasiticus*

Scarce to uncommon spring, summer and autumn visitor.

Numbers: The max totals per seasons for the study period were:

Winter		Spring	1
Summer	0*	Autumn	49

*Outside the dates of the survey period 1 on 17 June 1971 at Mandrensko (Dontschev, 1984).

The max totals per lakes for the study period were:

Pomoriysko	39	August	1999
Atanasovsko	10	August	1999
Vaya	0	–	–
Mandrensko	0	–	–

The average number of Arctic Skua in BWC was highest on autumn migration (max 25).

Described by Boetticher (1927) for the Bulgarian Black Sea coast, without exact data on numbers and locations. Patev (1950) reports one observed on 18 May 1940 at Poda. Georgiev (1976) has a record of one on 15 August 1964, at Atanasovsko. Further records of Arctic Skua, found on the coast, are given by Robel et al. (1978) with two seen on 27 September 1976 at Atanasovsko, Koenigstedt & Robel (1979), Grempe (1981) and Ernst (1983). Dontschev (1984) records singles on 17 June 1971 at Mandrensko, 20 July 1969 and 14 October 1978 at Atanasovsko. Our max count was 39 on 1 August 1999 at Pomoriysko, and 10 at Atanasovsko, on the same day. Another 14 were recorded at Poda on 21 October 1994 (BSPB, 2002).

4.126. Long-tailed Skua – *Stercorarius longicaudus*

Very rare summer and autumn visitor. Wandering at open sea and along the coasts outside the breeding season. A single Long-tailed Skua observed on 1 August 1999 at Pomoriysko together with 39 feeding Arctic Skuas was the only record during this survey.

4.127. Great Skua – *Catharacta skua*

Rare summer and autumn visitor, mainly off the coast. First recorded for Bulgaria by Dittberner & Fiebig (1986). Further observation of three seen a few times between October and November 1986 come from Bourgaski Zaliv, 1-5 km off the coast (Nankinov et al., 1990). The same authors report three on 17 July 1988 at Atanasovsko. Great Skua was not recorded during the present survey.

4.128. Pallas's Gull – *Larus ichthyæetus*

Rare spring and autumn and scarce winter visitor. Most of the survey records of Pallas's Gull were

taken in winter. We had two on Vaya on 15 January 2000, one on 1 January 2001 (with a plastic ring) and two on 15 January 2002, at the same place. An adult in breeding plumage was observed outside the survey period, in March 2003, on Vaya and at the LUKoil-Neftochim oxidizing pools (Kiril Bedev, pers. comm.). Three birds, between 6-12 September 1988 at Pomoriysko and five on 18 April 1993 at Atanasovsko were reported by Nankinov (1989, 2000).

4.129. (Mongolian) Relict Gull – *Larus relictus*

Vagrant. A bird ringed in Kazakhstan was found at Bourgas on 25 March 1978 (Nankinov, 1989, 2001).

4.130. Mediterranean Gull – *Larus melanocephalus*

Uncommon spring and fairly common to common autumn migrant, rare breeder and winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	1	Spring	154
Summer	260	Autumn	4,374

The max totals per lakes for the study period were:

Pomoriysko	2,600	August	1999
Atanasovsko	3,410	August	2001
Vaya	30	March	1999
Mandrensko	1,500	December	1996

The average number of Mediterranean Gull in BWC was highest in August (**Fig. 56**). Complex Atanasovsko Ezero ranks first with 62% of the species' total numbers in BWC.

Breeding: Assumed as breeding on Pomoriysko by Patev (1950). Prostov (1964) was the first to report the species as breeding for the area under study

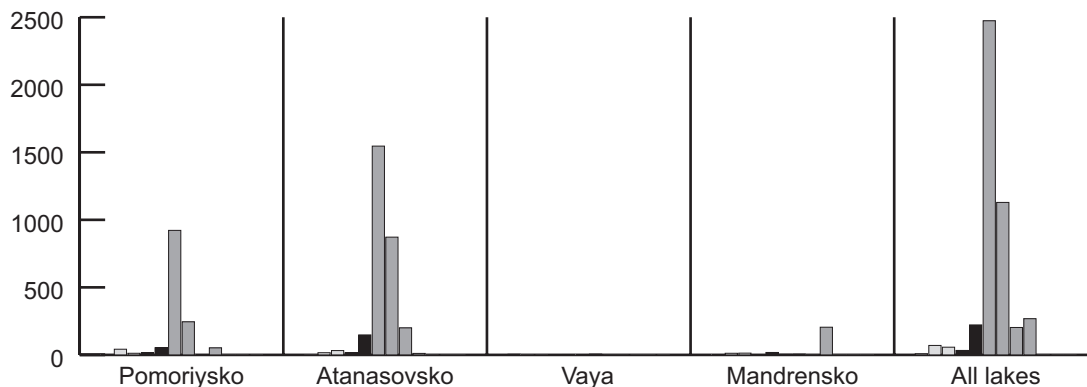


Fig. 56. *Larus melanocephalus*

Table 14. Number of breeding Mediterranean Gulls (in pairs) in BWC during 1953-2002

Wetland/Year	1953	1956	1974	1983	1984	1987	1988	1993	1994	1995	1996	1997	1998-2002
Atanasovsko	4	6	4	10	200	1	50	1	62	35	6	1	-
Vaya	7	0	0	0	0	0	0	0	0	0	0	0	0
Total	11	6	4	10	200	1	50	1	62	35	6	1	0

with a colony of seven nests found at Vaya’s western part and with four at Atanasovsko, both in 1953. Another six nests were found by the same author in 1956, again at Atanasovsko. There is no evidence of breeding in the 1960s. Data on breeding of 1970s are reported by Uhlig (1988), of four pairs found at Atanasovsko in 1974. Eight to 10 pairs were reported for Atanasovsko in 1983 by Kantardjiev & Bedev (1984). Nankinov (1993) reports 200 in 1984 and only one in 1987. We found 50 nests on 18 June 1988 on an embankment dyke at Atanasovsko. The number of breeding pairs between 1993 and 2002 at Atanasovsko was as follows: one in 1993; 62 in 1994; 35 in 1995; six in 1996; one in 1997; none in 1998-2002. All nests found in this period were situated on the artificially made islands on Atanasovsko, while the only nest in 1997 was on an embankment dyke at the same lake. Mediterranean Gull usually nests in mixed colonies. In 1988 the 50 nests were in a mixed colony of *Sterna hirundo* – 48 nests and *Recurvirostra avosetta* – 28 nests. In the period 1993-1997 the species bred together with *Sterna hirundo*, *Sterna sandvicensis* and a few pairs of *Recurvirostra avosetta*. Attempts for breeding were recorded at Pomoriysko, in 2000-2002. The number of breeding pairs for the period of 1953-2002 is shown on **Table 14**.

Species Dynamics: In **spring**, Mediterranean Gulls arrive in the first half of March, with max of 30 on 15 March at Vaya. After mid-March the migration increases, reaching a peak in mid-April with max data of 154 obtained in 1999. After that, the number of migrants drops to max of 95, recorded on 15 May 2002, the majority coming from Atanasovsko. The migration lasts until the end of May. In **summer**,

the 74 birds, seen on 15 June 1999 were the highest record. From mid-June the number gradually increases. The **autumn** build-up reached max of 260 during the mid-July 1999. Then the number of migrants started to increase rapidly peaking with max of 4,374 on 1 August 1999. From the first week of August the number of autumn migrants falls to 2,037 on 15 September 1999. After that the migration thins down and we obtained max November data 580 in 1998. The migration lasts until the end of November, but an influx of 1,500 was seen on 1 December 1996 at Poda. Single **wintering** birds were registered in January and February at Pomoriysko, Atanasovsko and Poda.

4.131. Little Gull – *Larus minutus*

Common spring and fairly common to common autumn migrant, uncommon summer and uncommon winter visitor.

Numbers: The max totals per seasons for the study period were:

Winter	38	Spring	173
Summer	302	Autumn	1,530

The max totals per lakes for the study period were:

Pomoriysko	1,020	August	1999
Atanasovsko	1,200	July	2000
Vaya	750	October	1996
Mandrensko	160	November	2001

The average number of Little Gull in BWC was highest in September (**Fig. 57**). Complex Atanasovsko

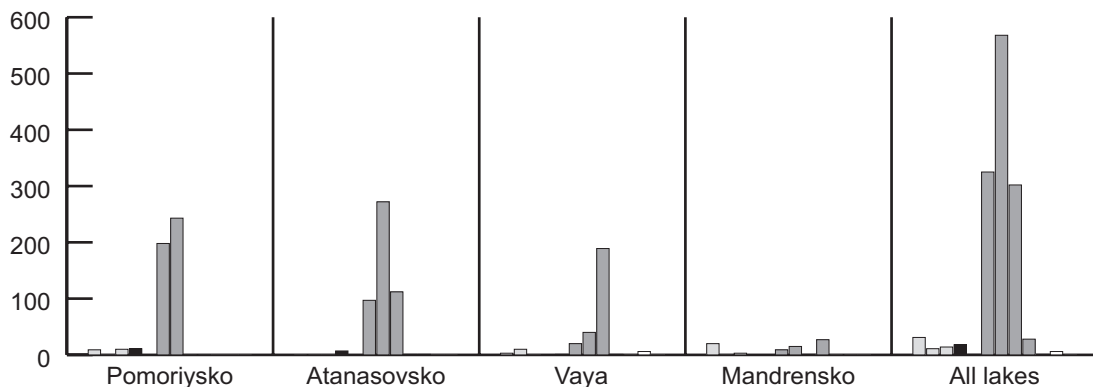


Fig. 57. *Larus minutus*

Ezero ranks first with 68% of the species' total numbers in BWC.

The 1-% Ramsar criterion is 1,000 birds. During the period of survey the species numbers exceeded the criterion in one year only, at Atanasovsko.

Species Dynamics: In **spring**, migrants appear on the wetlands of Bourgas and off the Black Sea coast in the first decade of March. The passage is most intensive in March and first week of April. Main migration wave passes over in a very short time (max 173 on 15 March 1999), when 120 came from the Complex Mandrensko Ezero and 53 from offshore at Pomorie. April observations peaked with 51 on Vaya. Georgiev (1976) reported max of over 1,000, on 2 April 1966. In May few birds remained in the area (42 on Pomoriysko on 15 May 2001). **Summering** birds were regularly found, with max of 302 in early June 2001, mostly at Vaya. The **autumn** migration starts with small concentrations (1,088 in mid-August 1999) and reaches its peak in mid-September (1,530 birds in 2002). The number decreases in October, but in some years it still remained high (1,048 in 1996, mostly on Vaya and Atanasovsko). Only a few birds stay until the end of November, but an influx of 163 was recorded in 2001, off the shore at Poda. Single birds were seen in December: three on Atanasovsko and one at Poda in 1998. Maximum autumn record is given by Roberts (1981), with 3,740 in September 1976, on Atanasovsko. Extremely high concentration of 11,000 on Atanasovsko was reported by Nankinov (1996), with no dates specified. However, such a large number was not considered likely by our study. The **winter** records yielded 37 on Vaya and one at Poda, in mid-January 1997. Roberts (1981) reports max of 60 in February 1976 on Atanasovsko.

4.132. Black-headed Gull – *Larus ridibundus*

Common in all the seasons, but not a breeder.

Numbers: The max totals per seasons for the study period were:

Winter	3,523	Spring	4,117
Summer	666	Autumn	10,635

The max totals per lakes for the study period were:

Pomoriysko	1,402	August	1999
Atanasovsko	8,560	August	1996
Vaya	1,802	December	2001
Mandrensko	3,225	March	1999

The average number of Black-headed Gull was highest in August (**Fig. 58**). Complex Atanasovsko Ezero ranks first with 70% of the species' total numbers in BWC.

Breeding: Prostov (1964) reports a small breeding colony (10-12 nests) in 1950 in the south-east part of Atanasovsko, reduced to six nests in 1951. A small breeding colony in the swamps near Chernomoretz in 1954. Since then Black-headed Gulls have not been found as breeding in the area.

Species Dynamics: The most numerous of all Gull species at Bourgas Wetlands. Found throughout the year. In **spring**, the number of Black-headed Gulls increases from the second half of February onwards, reaching max of 4,117 on 15 March 1999. After that the number dropped to 1,539 in mid-April 1996 and 1,030 in May the same year. In **summer** imm Black-headed Gulls are found in all wetlands around Bourgas, with max June record of 666 in 1999, when the majority of birds came from Atanasovsko. From the second half of June the build-up of **autumn** arrivals starts, reaching max of 5,143 on 15 July 1996, then peaking with 10,635 in mid-August same year. These birds moult in the area, Atanasovsko being their most favourite place. November highest record of 3,170 was obtained in 2001. From December the number of **wintering** gulls begins to increase, reaching max in January (3,523 birds in 2000). The max number (11,338 in 1985) during the 1977-2001 mid-winter survey had been recorded at Mandrensko (Michev & Profirov, 2003).

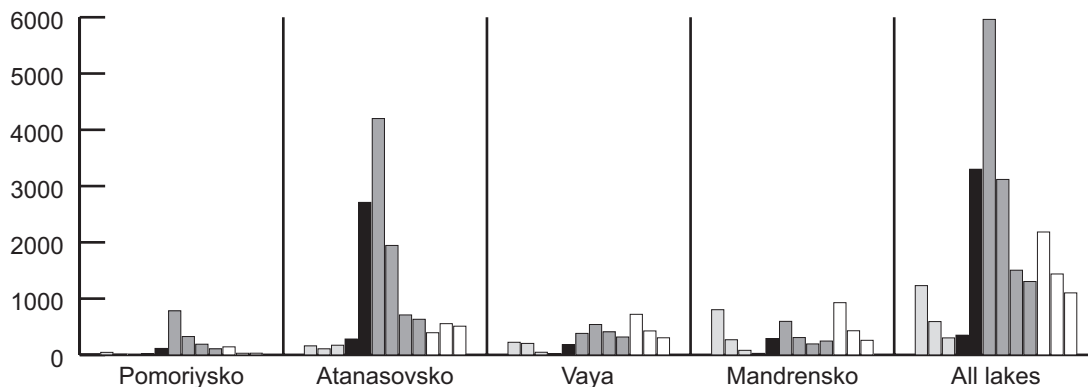


Fig. 58. *Larus ridibundus*

4.133. Slender-billed Gull – *Larus genei*

Scarce to uncommon spring and uncommon to fairly common autumn migrant, scarce to uncommon winter visitor and rare breeder.

Numbers: The max totals per seasons for the study period were:

Winter	94	Spring	39
Summer	27	Autumn	750

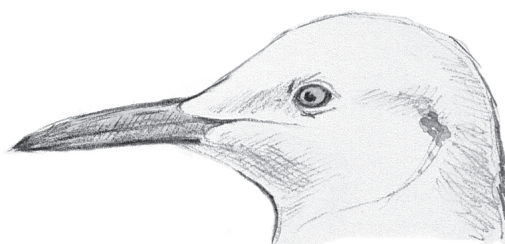
The max totals per lakes for the study period were:

Pomoriysko	165	October	2001
Atanasovsko	745	August	1996
Vaya	1	September	1999
Mandrensko	75	October	2000

The average number of Slender-billed Gull was highest in October (**Fig. 59**). Complex Atanasovsko Ezero ranks first with 89% of the species' total numbers in BWC.

Breeding: Regular breeding in the past (Boetticher, 1927). Unsuccessful attempt for breeding was observed by K. Popov, K. Bedev and V. Bojinov on 11 June 1995, at Atanasovsko (Nankinov et al., 1996).

Species Dynamics: In **spring**, Slender-billed Gulls begin to increase in numbers from mid-February onwards. The migration is more prominent in the second half of March with 39 on 1 April 1999. After that, the number of migrants decreases and migration continues until mid-April. Non-breeding birds were found regularly in **summer**, with a max June record of 27 in early June 1999. The **autumn** migration has two waves. The first build up becomes noticeable by mid-July, when max of 148 was recorded in 1996. The number of arrivals increases in August, max total count of 750 was reached during the mid-August counts of 1996. The migration is most intensive in the first half of October, when max of 282 was observed during the mid-October



ber counts of 2001. Then the number of birds decreases gradually to 131, on 15 November 2000. The migration lasts until the end of November. The species regularly **winter** in the area, with max 94 in January 1997. The max number during the 1977-2001 mid-winter surveys (100 in 1977) had been recorded at Atanasovsko (Michev & Profirov, 2003).

4.134. Ring-billed Gull – *Larus delawarensis*

Vagrant. An adult bird was observed by P. Yankov (Nankinov et al., 1997) on 28 February 1992, at Mandrensko (Estuary of Reka Izvorska).

4.135. (Mew) Common Gull – *Larus canus*

Fairly common winter visitor, scarce spring migrant and very rare summer visitor.

Numbers: The max totals per seasons for the study period were:

Winter	250*	Spring	2
Summer	1	Autumn	9

* Outside the dates of the survey period max of 1,015 birds were counted in January 1993 on Mandrensko (Michev & Profirov, 2003).

The max totals per lakes for the study period were:

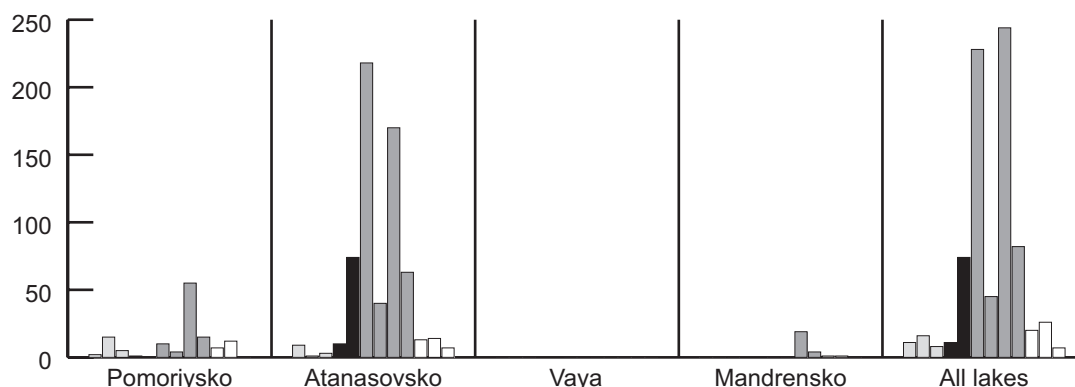


Fig. 59. *Larus genei*

Pomoriysko	6**	December	2001
Atanasovsko	250	February	1997
Vaya	22	January	2002
Mandrensko	48	January	1996

**Outside the dates of the monitoring scheme 40 birds were observed in mid-September 2001 on Pomoriysko (Kiril Bedev, pers. comm.)

The average number of Common Gull in BWC was highest in winter (max 43).

Species Dynamics: Rare in **spring**, recorded twice during the survey: one bird on 20 March 1997 at Atanasovsko and two on Poda on 15 April 2000. A single bird at Poda on 2 June 1999 was the only **summer** observation. **Autumn** records were four on Atanasovsko on 1 September 1999 and six on Poda on 15 September the same year. At least 40 were observed in mid-September 2001 on Pomoriysko (Kiril Bedev, pers. comm.). In **winter**, the first birds arrive from the beginning of December onwards, with max 17 on 15 December 2000 (10 on Mandrensko, six on Pomoriysko and one on Vaya). The number of wintering birds increases in January (max 70 in 1996 on Pomoriysko), reaching its max 250 on 1 February 1997, on Atanasovsko. The wintering birds leave by mid-February.

4.136. Lesser Black-backed Gull – *Larus fuscus*

Scarce migrant and winter visitor, rare summer visitor.

Numbers: **Spring** records came from Atanasovsko and Poda with one, on 15 April 2000. One was observed on 15 May 2002, on Pomoriysko. In the past seen many in the Bourgas Bay on 14 May (Harrison, Pateff, 1933). The only **summer** record was a single bird on 15 June 2001, on Pomoriysko. In **autumn**, a single, wandering bird was recorded on 1 October 1996 on Zaliv Foros. The max **winter** record of two was obtained on January 2000, on Vaya. The max number (six in 1977) in Bulgaria during the 1977-2001 mid-winter survey has been seen on Atanasovsko (Michev & Profirov, 2003).

4.137. Herring Gull – *Larus argentatus*

Rare migrant and wintering species. A few records have been made. Single birds often seen in flocks together with *Larus cachinnans*.

4.138. Yellow-legged Gull – *Larus cachinnans*

Resident, common in autumn and winter, and fairly common during the other seasons.

Numbers: The max totals per seasons for the study period were:

Winter	3,363	Spring	741
Summer	857	Autumn	2,911

The max totals per lakes for the study period were:

Pomoriysko	830	August	2001
Atanasovsko	1,130	September	2001
Vaya	2,800	November	1998
Mandrensko	2,105	November	2001

The average number of Yellow-legged Gull was highest in November and January (**Fig. 60**). Complex Ezero Vaya ranks first with 52% of the species' total number in BWC.

Breeding: Breeds on roofs in the towns around Bourgas Lakes (estimated 250 pairs) as well as on Ostrov Sveta Anastasiya, Ostrov Sveti Ivan and Ostrov Sveti Petur in Bourgaski Zaliv.

Species Dynamics: In **spring**, the Yellow-legged Gulls start to decrease from mid-February onwards. Their number fell to max of 562 in mid-March 2002, when the breeding season starts. In **summer**, starting in the first half of June their number increases with appearance of the young birds and yielded max of 857 in 2000. In **autumn**, the build-up becomes noticeable after mid-July. The migration is most intensive in August, when 2,046 were recorded in 1996. Then the

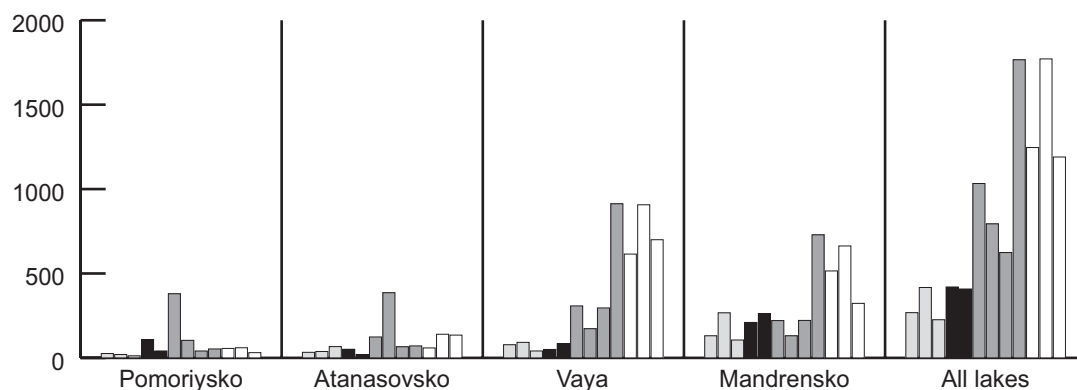


Fig. 60. *Larus cachinnans*

number in September and October drops to 1,520 in 2001 and of 848 in 1996. From late October/beginning of November their number increases significantly due to the birds arriving from the north. Yellow-legged Gulls **wintering** reached max of 3,363 during the mid-January 1997. In February, their number remains high until the second half of the month, with max of 2,818 in 1999. The max number (29,146 in 1986) in Bulgaria during the 1977-2001 mid-winter survey has been recorded at Mandrensko (Michev & Profirov, 2003).

4.139. Great Black-backed Gull – *Larus marinus*

Rare autumn and winter visitor. Reported by Radakoff (1879) as wintering in Bourgas region. Observed only in autumn-winter period: a single bird on 14 October 1971 at Atanasovsko (Roberts, 1981), and for the Black Sea coast (Nankinov & Darakchiev, 1983). Single birds have been seen on 11 October 1999 and on 13 May 2003 at Atanasovsko. Between 1977 and 2001 a rare wintering species, recorded seven times on the SBSC (Michev & Profirov, 2003).

4.140. (Black-legged) Kittiwake – *Rissa tridactyla*

Vagrant. Outside the dates of the survey period: three on 29 August 1985, were the first record of this species for Bourgas Wetlands, on Atanasovsko (Michev et al., 1999). A bird seen on 11 June 2001 is the second record for Bourgas area (Davies, 2002).

4.141. Gull-billed Tern – *Sterna nilotica*

Scarce spring to uncommon autumn migrant, scarce breeder.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	38
Summer	5	Autumn	87

The max totals per lakes for the study period were:

Pomoriysko	33	April	2000
Atanasovsko	82	September	1999
Vaya	4	August	2002
Mandrensko	28	August	1996

The average number of Gull-billed Tern was highest in August and September (**Fig. 61**). Complex Atanasovsko Ezero ranks first with 88% of the species' total numbers in BWC.

Breeding: Breeds at Atanasovsko. Prostov (1957) first reports the species breeding at Atanasovsko with a colony of 22 nests in south-west part of the lake. The number of breeding pairs for the period 1956-2002 are given on **Table 15**, based on the data supplied by Prostov (1964), Nankinov & Darakchiev (1980a), Botev & Peshev (1985) as well as our own records. The breeding numbers in individual years fluctuates, dropping down sharply after 1982.

Species Dynamics: In **spring**, the first Gull-billed Terns arrive after the second half of March with max 38 in April 2000. The migration continues until mid-April, when the breeding season begins. The **autumn** build-up becomes noticeable from late July/early August. It is most intensive in the second half of August with max 87 birds on 1 September 1999. An other important wetland site in this season is the Cherny Vrukh Fishponds, where 28 (21 of them juv.) were seen on 1 August 1996. After that, the number of migrants decreases rapidly, but single birds were recorded until the end of October. It is possible to find migrants in November, too.

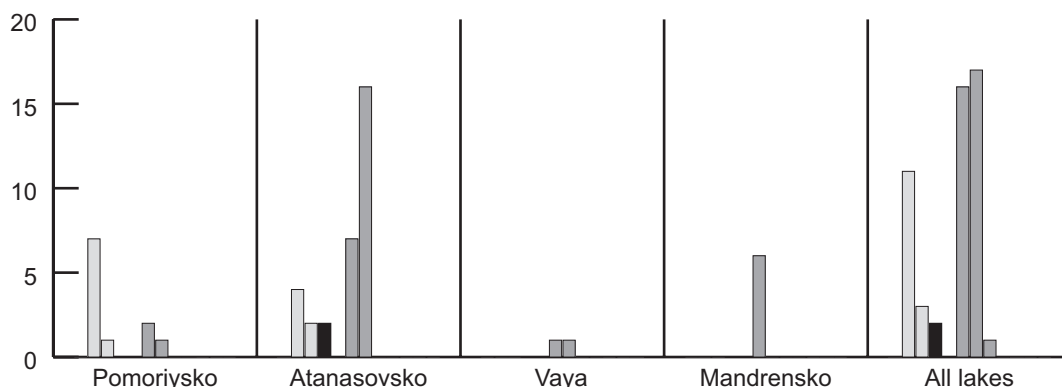


Fig. 61. *Sterna nilotica*

Table 15. Numbers of breeding Gull-billed Terns (in pairs) in BWC during 1956-2002

Wetland/Year	1956	1962	1971	1972	1973	1974	1977	1979	1981-82	1988-93	1994	1995	1996	1997-2002
Atanasovsko	22	10	25	34	22	15	36	65	40-50	5	8	7	6	0

4.142. Caspian Tern – *Sterna caspia*

Scarce spring and autumn migrant, rare in summer.

Numbers: The max totals per seasons for the study period were:

Winter	1	Spring	10
Summer	1	Autumn	23

The max totals per lakes for the study period were:

Pomoriysko	9	April	1999
Atanasovsko	25	September	1998
Vaya	2	April	2002
Mandrensko	23	September	2002

The average number of Caspian Tern in BWC is highest during the autumn passage (max 8).

Species Dynamics: A small number of migrants found in **spring**. The migration starts from mid-March onwards (Roberts, 1981 reports the earliest three seen at Atanasovsko), and becomes most intensive around the beginning of April (max 10 in 1999, nine of them at Pomoriysko). Five birds were recorded in mid-April 2002 at Poda. The latest record was of one bird on 15 May 1999 at the Estuary of Reka Fakiyska. The only **summer** record was of one adult, seen on 15 July 1996 at Poda, which might have been an early autumn arrival. In **autumn**, the first migrants appear in the beginning of August, then the number of arriving birds increases reaching max of three at Poda during the mid-August 1996. The migration becomes most intensive in the beginning to mid-September, with max 25 on 21 September 1998 at Atanasovsko and 23 on 15 September 2002 at the LU-Koil-Neftochim oxidation pools (Kiril Bedev, pers. comm.). Outside the dates of survey max of 23 were counted at Poda on 19 September 1995. Caspian Terns often fly to Mandrensko where they feed and can often be seen feeding their chicks there. Caspian Terns use the LUKoil-Neftochim oxidizing pools and Poda as resting places during this period. After

mid-September, the number of migrants falls. The latest observation of two birds was made at Poda on 15 October 1998, but belated migrants could also be seen later on. **Wintering** Caspian Terns are rare in the area with the only record of one outside the dates of the period of survey (4 January 1985) at Atanasovsko.

4.143. Sandwich Tern – *Sterna sandvicensis*

Fairly common spring and autumn migrant and rare to fairly common breeder.

Numbers: The max totals per seasons for the study period were:

Winter	1	Spring	1,836
Summer	1,126	Autumn	1,742

The max totals per lakes for the study period were:

Pomoriysko	1,807	April	1999
Atanasovsko	407	June	1999
Vaya	12	September	1999
Mandrensko	300	August	1999

The average number of Sandwich Tern was highest in April (**Fig. 62**). Complex Pomoriysko Ezero ranks first with 89% of the species' total numbers in BWC.

The 1-% Ramsar criterion is 590 birds. During the period of survey the species numbers regularly exceeded this criterion (in the course of 4 years) for Pomoriysko.

Breeding: Simeonov (1986) was the first to prove breeding beyond doubt, at Atanasovsko. In recent years, the species nests in relatively greater numbers thanks to the artificial platforms created in Atanasovsko and Pomoriysko. The number of breeding pairs for the period of 1984-2002 is shown on **Table 16**, derived from the data published by Simeonov (1986), Enev (1996), Nankinov et al. (1997), as well as from our breeding survey data.

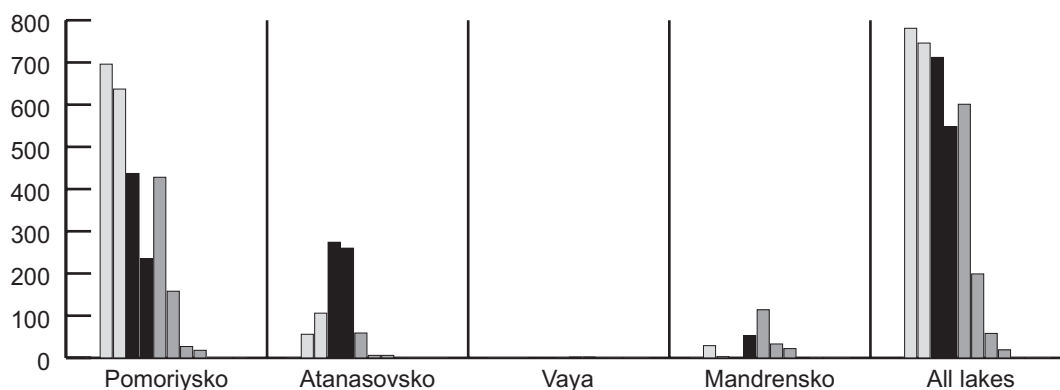


Fig. 62. *Sterna sandvicensis*

Table 16. Numbers of breeding Sandwich Terns (in pairs) in BWC during 1984-2002

Wetland/Year	1984	1985	1986-1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Pomoriysko	0	0	0	0	0	0	0	0	5	176	287	400	450
Atanasovsko North	12	?	?	1,200	1,149	772	360	298	173	142	113	79	51
Atanasovsko South	0	0	0	0	120	0	0	0	0	0	0	0	0
Total	12	?	?	1,200	1,269	772	360	298	178	318	400	479	501

Species Dynamics: In **spring**, the first Sandwich Terns arrive in mid-March (the earliest eight to arrive were observed on 15 March 2001 at Pomoriysko). The number of migrants increases rapidly from the end of March until mid-April, reaching max of 1,836 on 15 April 1999. After that, the number of arrivals gradually decreases, falling to max of 1,361 during the mid-May counts of 2000. In **summer**, particularly in June and July, the number of Sandwich Terns fluctuates, depending on number of the breeding pairs. The **autumn** migration starts from the beginning of August onwards. During this season, the Sandwich Terns disperse in all wetlands around Bourgas as well on the shore. The migration is most intensive until the second half of August, with max 1,742 in 1999. Then the number of migrants decreases gradually to max of 610 in September and 96 in October 2001. The migration continues through November (max of seven on 15 November 1998) and December. Sandwich Terns **winter** seldom in the area, one was seen on 20 January 2003 (outside the dates of survey period) at Mandrensko. Dontschev (1984) reports sightings in January as does Michev et al. (2000), at Atanasovsko. Not recorded during the 1977-2001 mid-winter survey.



4.144. Common Tern – *Sterna hirundo*

Fairly common passage migrant and uncommon to fairly common breeder.

Numbers: The max totals per seasons for the study period were:

Winter	1	Spring	597
Summer	1,038	Autumn	640

The max totals per lakes for the study period were:

Pomoriysko	490	September	2001
Atanasovsko	764	June	1999
Vaya	287	August	1996
Mandrensko	340	June	2002

The average number of Common Tern was highest in July (**Fig. 63**). Complex Atanasovsko Ezero ranks first with 65% of the species' total numbers in BWC.

Breeding: Assumed as breeding on Pomoriysko (Patev, 1950). Given as breeding to BWC by Prostov (1964). The Common Tern is the most numerous breeding tern in BWC. Nowadays it breeds on all wetlands in the area of survey. Georgiev (1976) reports 86 nests he found on Atanasovsko and Pomoriysko. Until 1995 it has also bred on Ouzoun Geren (25-30 pairs regularly), then – on the breeding platforms in the LUKoil-Neftochim oxidizing pools with 220 pairs in 2003, and 10 more on the dikes (Kiril Bedev, pers. comm.). The number of breeding birds is shown on **Table 17**, derived from the data published by Georgiev (1976), Nankinov et al. (1997), Michev et al. (2004), and from our breeding survey data.

Species Dynamics: In **spring**, the first birds arrive in the end of March. The migration starts to increase from beginning of April onwards but the number of the birds is still low. The majority of birds arrive from the end of April to mid-May, with max 597 in 1996. In **summer**, the number increases on account of the young birds that arrive in the area. Depending on the breeding success, their number in June fluctuated in different years of the survey, reaching max of 1,038 in 1999, most of which were seen at Atanasovsko. After breeding season is over

SPECIES ACCOUNTS

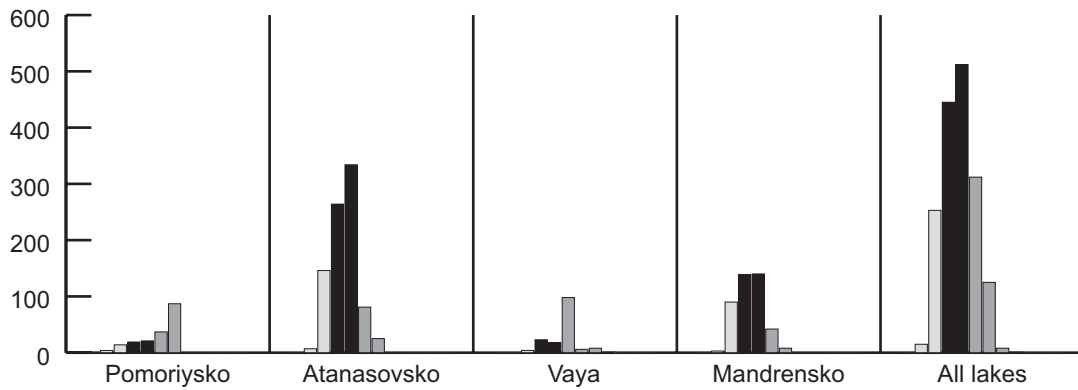


Fig. 63. *Sterna hirundo*

Table 17. Numbers of breeding Common Terns (in pairs) in BWC during 1973-2002

Wetland/Year	1962-1970	1988-1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Pomoriysko	c. 50	c. 30	c. 30	c. 30	c. 30	c. 30	c. 30	c. 30	c. 30	c. 30	c. 30	19	15	17
Atanasovsko	c. 40	c. 400	c. 500	c. 450	311	830	114	58	280	170	210	163	142	70
Poda	49	70	65	70	67	65	72	86	c. 100	120	150	140	71	51
Ouzoun Geren		c. 30	c. 30	c. 30	c. 30	c. 30	c. 30	0	0	0	0	0	0	0
Oxidizing pools	0	0	0	0	0	1	c. 85	c. 85	c. 85	120	190	200	180	200
Total	139	530	625	580	438	955	331	259	495	440	580	522	408	338

the Common Terns begin moulting in July, staying on the dikes and sandy areas of Atanasovsko and Pomoriysko. Early-July counts yielded max of 764 in 1999. **Autumn** migration sets out from the end of July onwards. The number of migrants gradually decreases in August, falling to 60 in early September. There was an exception in 2001, when 520 were counted on 1 September, most of them on Pomoriysko. The migration continues until the end of November. However, single birds could be seen even in mid-December (1 on 15 December 2001, on Vaya).

4.145. Arctic Tern – *Sterna paradisaea*

Arctic Terns were reported in groups of tens in the autumn of 1984 by Nitsche (1986). Nankinov et al. (1997) did not accept this observation. A single bird was seen on Pomoriysko on 14 September 2001 during the survey period, which is the first definite record for Bulgaria (Bent Soerensen, in litt.). Second record for Bulgaria came also from Pomoriysko, with one on 24 September 2002 and a third one on 14th, 17th and 19th September 2004 at same place (Alban Viscont, in litt.).

4.146. Little Tern – *Sterna albifrons*

Uncommon spring and autumn passage migrant, uncommon breeder.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	78
Summer	103	Autumn	162

The max totals per lakes for the study period were:

Pomoriysko	142	August	2001
Atanasovsko	132	August	2002
Vaya	7	August	1996
Mandrensko	53	August	1996

The average number of Little Tern was highest in August (**Fig. 64**). Complex Atanasovsko Ezero ranks first with 42% of the species' total numbers in BWC.

Breeding: Given as breeding on Atanasovsko by Patev (1950). Prostov (1964) reports the species is frequently breeding at Atanasovsko and Mandrensko. Georgiev (1976) reports Pomoriysko as the main breeding area (29 nests found). In 1996-2002 was breeding on Atanasovsko, Pomoriysko and Poda. In 2003, Little Tern started to breed for the first time at LUKoil-Neftochim oxidizing pools, with 22 pairs (Kiril Bedev, pers. comm.). The number of breeding pairs is shown on **Table 18**, derived from data published by Georgiev (1976), Nankinov et al. (1997), Michev et al. (2004) and by our breeding survey data.

Species Dynamics: In **spring**, the first Little Terns arrive in mid-April. The migration becomes most intensive from late April to mid-May, reaching max of 78 on 15 May 1996. Then the breeding season starts but migrants continue to arrive until early June, with

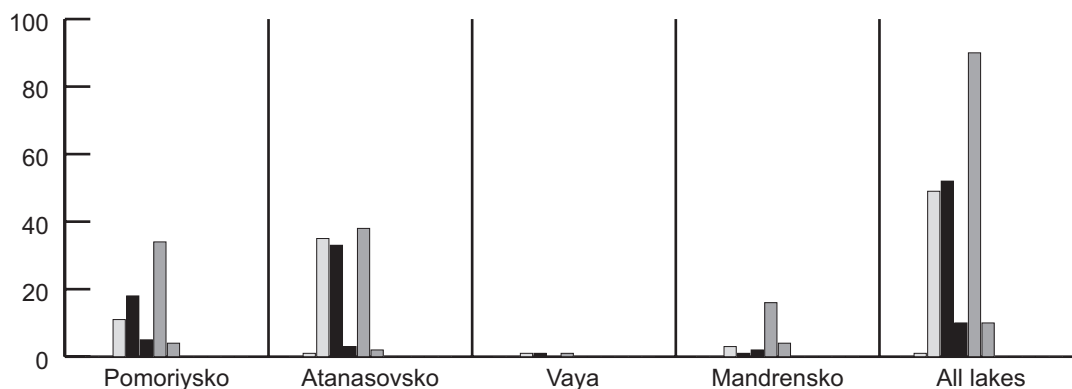


Fig. 64. *Sterna albifrons*

Table 18. Numbers of breeding Little Terns (in pairs) in BWC during 1973-2002

Wetland	1962-70	1975	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Pomoriysko	29	?	?	?	?	?	?	?	?	?	?	?	55	40
Atanasovsko	79	?	60	34	158	18	34	35	37	40	2	34	5	8
Poda	0	0	21	14	44	8	6	0	35	?	2	22	20	12
Total	29	79	81	14	78	166	24	69	72	>40	4	56	80	60

max 103 birds in 1999. Most likely, July counts provide underestimated number, as at that time the Little Terns have already left the breeding colonies in search for food. The **autumn** build-up becomes noticeable from the second half of July onwards, when Little Terns gathered in groups – max 162 in mid-August 2002. The migration is most intensive in the second half of August until early September. A small number migrates in October, with the latest observation reported by Pateff (1948) with one seen on 31 October 1931.

4.147. Whiskered Tern – *Chlidonias hybridus*

Uncommon spring to fairly common autumn passage migrant.

Numbers: The max totals per seasons for the study period were:

Winter	0	Spring	73
Summer	41	Autumn	233

The max totals per lakes for the study period were:

Pomoriysko	11	July	1999
Atanasovsko	70	May	2002
Vaya	162	August	2002
Mandrensko	120	August	1996

The average number of Whiskered Tern was highest in August (**Fig. 65**). Complex Ezero Vaya ranks first with 41% of the species' total number in BWC.

Breeding: Whiskered Tern was regularly seen during the breeding season in all the years of this study. A max July total of 41 (30 of them on Atanasovsko) was recorded but breeding was not proved. It is pos-

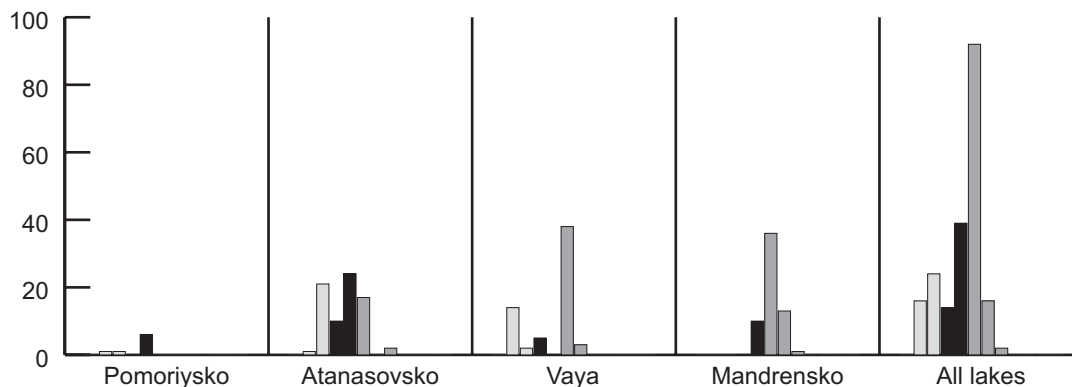


Fig. 65. *Chlidonias hybridus*

sible that these birds were non-breeding or immature, or else some of them may have been breeding in neighbouring wetland areas. Balat (1962) gives data on observations he made during the breeding season at Atanasovsko, Mountfort & Fergusson-Lees (1961) and Groessler (1967) report similar observations at Vaya.

Species Dynamics: In **spring**, the first Whiskered Terns appear in mid-March but the number of migrants remains low until the first half of April. In mild winters some birds arrive earlier. Thus, two birds observed on 18 February 1996 on Poda were the earliest migrants. From the beginning of April, onwards the number of arrivals increases, reaching a max April total of 65, on Vaya. The migration is most intensive in May, peaking with a total of 73 in mid-May 2002, the majority of them on Atanasovsko. After that migration thins down but migrants are regularly recorded in June. In **autumn**, groups of Whiskered Terns arrive after mid-July and migration becomes most intensive from late-July until the second half of August. Max of of 233 was recorded during the mid-August counts of 2002, 162 of them on Vaya. Another significant number of 120 was noticed on Mandrensko in August 1996. The number of Whiskered Terns decreases to 40 in September 2000, on Poda. The migration continues until mid-October with a few birds were still observed by the end of the month.

4.148. Black Tern – *Chlidonias niger*

Uncommon spring and fairly common autumn migrant, scarce summer visitor and very rare wintering species.

Numbers: The max totals per seasons for the study period were:

Winter	2	Spring	183
Summer	20	Autumn	1,115

The max totals per lakes for the study period were:

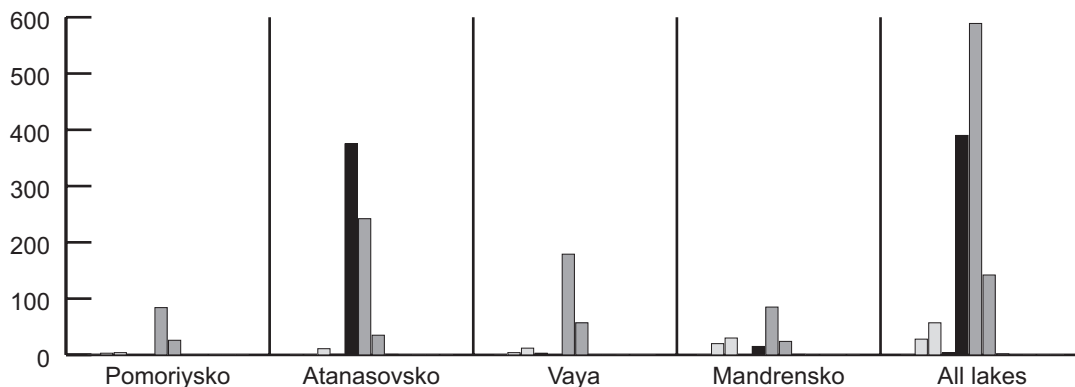


Fig. 66. *Chlidonias niger*

Pomoriysko	312	August	1999
Atanasovsko	620	July	1996
Vaya	470	August	2001
Mandrensko	335	August	1996

The average number of Black Tern was at its highest in August (**Fig. 66**). Complex Atanasovsko Ezero ranks first with 64% of the species' total numbers in BWC.

Breeding: Prostov (1964) gives the Black Terns as breeding at Atanasovsko, with a small colony of 20-25 nests as well as at Vaya (2 nests in 1956). Since then breeding has not been found. Patev (1950) assumes Black Terns bred on Pomoriysko, but this has never been proved.

Species Dynamics: In **spring**, the birds arrive from the first week of April onwards. The migration becomes most intensive from mid-April till mid-May with max 183 in 2001. The migration thins down in the second half of May and lasts until the end of the month. In **summer**, non-breeding birds wander regularly in the area, with up to 20 in June 2001, mostly on Vaya and Mandrensko. Post breeding wanderings become noticeable after mid-July, with max 650 in 1996. **Autumn** migration starts to intensify from late July to mid-August, peaking with 1,115 during the early-August counts of 2002 (Robel et al., 1978 report flocks from 5,000 to 7,000 birds). After the second half of August the number of migrants starts to decrease, dropping to 157 in mid-September 2000. By the end of September the majority of birds have left, but a small numbers of them still migrates in October (max six in 1998). The latest record of a single bird was made in mid-November 2000, on Vaya. The only **winter** record during the survey was two observed in mid-January 2001 on Vaya. This observation supplied the only data on wintering during the 25-years of mid-winter survey in Bulgaria (Michev & Profirov, 2003).

4.149. (Black) White-winged Tern – *Chlidonias leucopterus*

Uncommon spring and autumn passage migrant and scarce summer visitor.

continues with interruptions until the end of August. A small number of migrants was recorded till mid-September. We did not obtain any October records but according to Dontschev (1984) migration continues until mid-October.

Numbers: The max totals per seasons for the study period were:

Winter	–	Spring	672
Summer	2	Autumn	110

The max totals per lakes for the study period were:

Pomoriysko	30	May	2001
Atanasovsko	60	May	2000
Vaya	231	April	1999
Mandrensko	640	May	2001

The average number of White-winged Tern was highest in May (**Fig. 67**). Complex Mandrensko Ezero ranks first with 77% of the species' total number in BWC.

Breeding: Until now breeding of White-winged Terns at Bourgas Wetlands has not been proved. Patev (1950) assumes that the species probably breeds on Pomoriysko, but this has never been proved.

Species Dynamics: In **spring**, White-winged Terns arrive from the first decade of April onwards. The number of migrants reached max 231 in mid-April 1999. The migration becomes most intensive during the first half of May, reaching max 672 during the mid-May 2001. Then the number of spring migrants starts to decrease. The majority of the birds have already left the area by the end of May. Mandrensko and Vaya are the most favourable wetlands visited by White-winged Terns on spring migration. The **autumn** build-up becomes noticeable since mid-July, with max of of 47 recorded in 1996, on Pomoriysko and Poda. Then migration starts to increase, reaching max 110 in early-August 2002. The migration

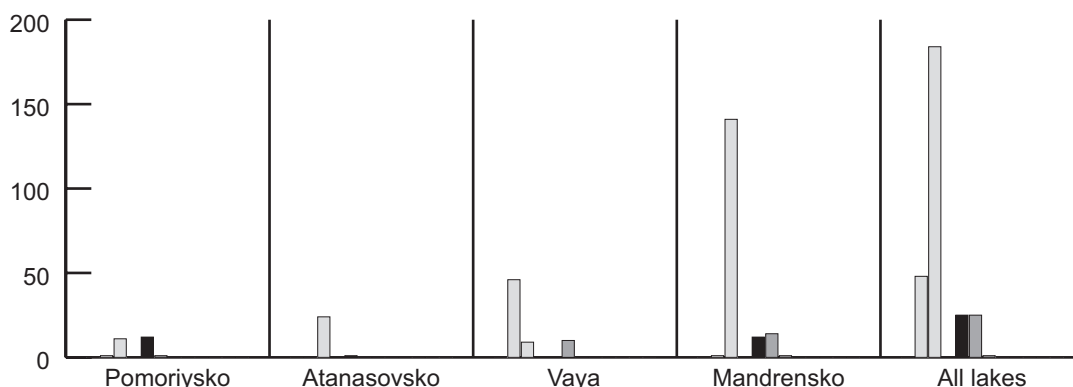


Fig. 67. *Chlidonias leucopterus*

5. Additional Species

5.1. Species Found in the Neighboring Regions

5.1.1. (Common) Guillemot – *Uria aalge*

Vagrant. A bird in non-breeding plumage recorded on 5 June 1966 at the seaside resort Sunny Beach (Koenigstedt & Robel, 1978) is the only evidence on record from the Bulgarian Black Sea Coast.

5.1.2. Laughing Gull – *Larus atricilla*

Vagrant. One year old bird in winter plumage on 31 July 2000 was reported by N. Tododrov and K. Bedev for Pomoriysko (Nankinov, 2003a).

5.2. Species of Escaped or Feral Origin

5.2.1. Black Swan – *Cygnus atratus*

Nankinov (1992) reports one bird on 10 October 1988 near 7th Pump Station at Atanasovsko. Definitely an escaped bird.

5.2.2. Canada Goose – *Branta canadensis*

Lyubomir Profirov observed one bird on 27 October 1980 on Atanasovsko, probably a stray bird from the feral populations introduced in Western and North Europe (Michev et al., 1999).

5.3. Species with Unclear Status

5.3.1. Wilson's Phalarope – *Stegonopus tricolor*

Transatlantic vagrant to Europe. A moulting mail reported for Pomoriysko on 25-26 August 1922 (Nankinov, 1998a) remains doubtful.



6. General Review of the Species Composition

During the monitoring of waterbirds, we managed to estimate the number of all bird species of BWC, which amounts to 339 species (out of 412 for the whole country).

The present species account indicates that the total number of waterbirds species registered in BWC comes to 153. Four of these are found in the neighboring regions, or are either escaped, or of feral origin. Two species with unclear status have been omitted. Of the 149 species left, 123 have been established during the study period 1996-2000. As to the other 26 species, there are only published results by other authors. During the period of survey, 108 species have occurred more or less regularly (*App. 1, Table 5*).

During the six-year monitoring, we have recorded two new species for Bulgaria: *Egretta gularis* (Profirov, 1999), *Charadrius leschenaultii* (Profirov, 2000). Another new species, *Calidris acuminata* has been observed by Bob Scott.

6.1. Species Characteristic

Of the 153 species of Waterbirds found at present in BWC, six are residents, 48 are breeding summer visitors, 34 non-breeding summer visitors, 105 migrants, 92 winter visitors and 17 vagrants. This points out to Bourgas Lakes as having their highest waterbird species diversity during migration time. Second place is for the wintering period when the biggest numbers are registered. Large concentrations of geese, ducks, diving ducks, waders and etc. used to form throughout that period. During the breeding season, the species diversity of the lakes is relatively poor. Then, some of the rarest

species for the country, such as Spoonbill, Ruddy Shelduck, Sandwich and Gull-billed Terns, Avocet, Black-winged Stilt, Collared Pratincole, etc. could be seen.

For comparison, we shall point out that the number of all species, recorded at Shabla – Dourankoulak Wetland Complex is 273 (132 of them waterbird species). The number of all breeding species is 108 (33 of them are waterbird species).

Table 19 shows the average numbers of the top ten most numerous waterbird species in BWC during different months of the year. The data on this table allows making the conclusion that the numbers of all species has been highest in winter months - with the exception of the Black-headed Gull, which number is highest in August.

The data about top ten species of BWC in different lakes are presented graphically on *Fig. 68*.

On *Fig. 69* the greatest average monthly numbers of the top ten waterbird species in BWC are juxtaposed with the absolute max numbers registered during the whole studied period of six years.

As it could be seen the absolute total numbers exceed 2-6 times the average numbers, which is a proof for the relatively big potential of the Bourgas lakes during winter season. The exceed is largest with the Waterfowl species such as White-fronted Goose, Red-breasted Goose, Mallard and Common Pochard. Their maximum values together with those of the Coot exceed the Ramsar Criteria of 20,000 birds.

In *Table 20*, the lakes with the highest concentration of species are indicated as percentage of the aver-

Table 19. Bourgas Wetland Complex: Monthly Average Number of the Top Ten Waterbird Species in Descending Order of their Greatest Average Monthly Numbers

Species/Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Average Monthly Max	Absolute Monthly Max
<i>Anser albifrons</i>	666	8	1	2	0	0	0	75	2	3927	45545	40456	45545	119186
<i>Aythya ferina</i>	1598	432	156	81	419	907	1549	6372	11448	14387	9566	7879	14387	30029
<i>Fulica atra</i>	1703	194	26	36	103	1180	1946	3793	5843	10859	12000	7065	12000	26889
<i>Anas platyrhynchos</i>	1002	222	108	518	247	798	2032	2334	2663	9232	6298	4009	9232	34459
<i>Aythya fuligula</i>	729	137	2	1	14	10	7	835	627	2946	5602	7176	7176	11037
<i>Larus ridibundus</i>	1231	592	302	350	3299	5962	3118	1505	1304	2184	1438	1102	5962	10635
<i>Phacrocorax carbo</i>	769	609	628	837	742	1395	1520	2203	2178	4138	3969	2654	4138	16564
<i>Branta ruficollis</i>	1	0	0	0	0	0	0	0	0	15	3981	676	3981	23738
<i>Phalacrocorax pygmeus</i>	1071	433	33	5	7	67	134	260	787	3626	2710	1513	3626	10592
<i>Anas crecca</i>	364	104	5	2	1	24	314	1099	2025	3153	976	872	3153	8870

GENERAL REVIEW OF THE SPECIES COMPOSITION

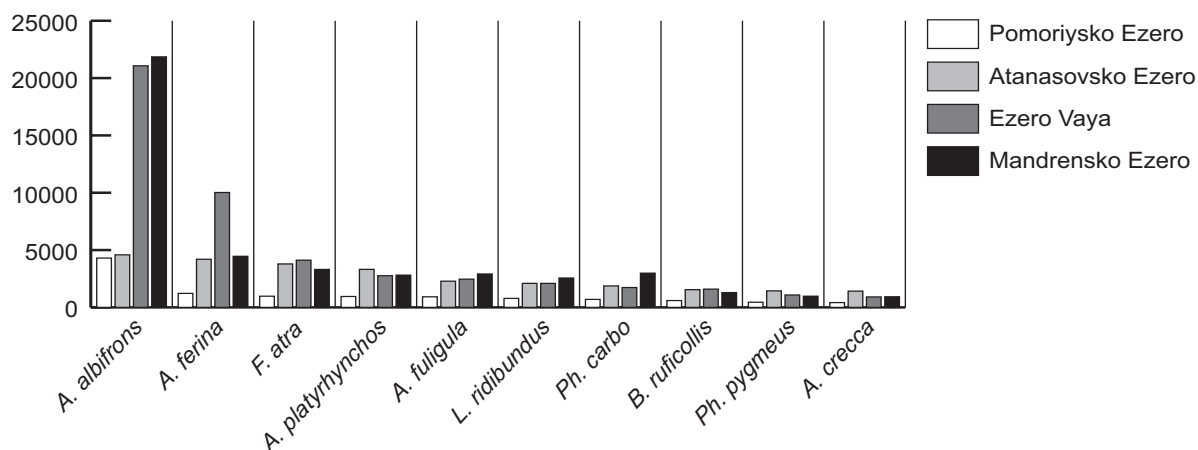


Fig. 68. The Top Ten (from left to right) waterbird Species of Different Lakes

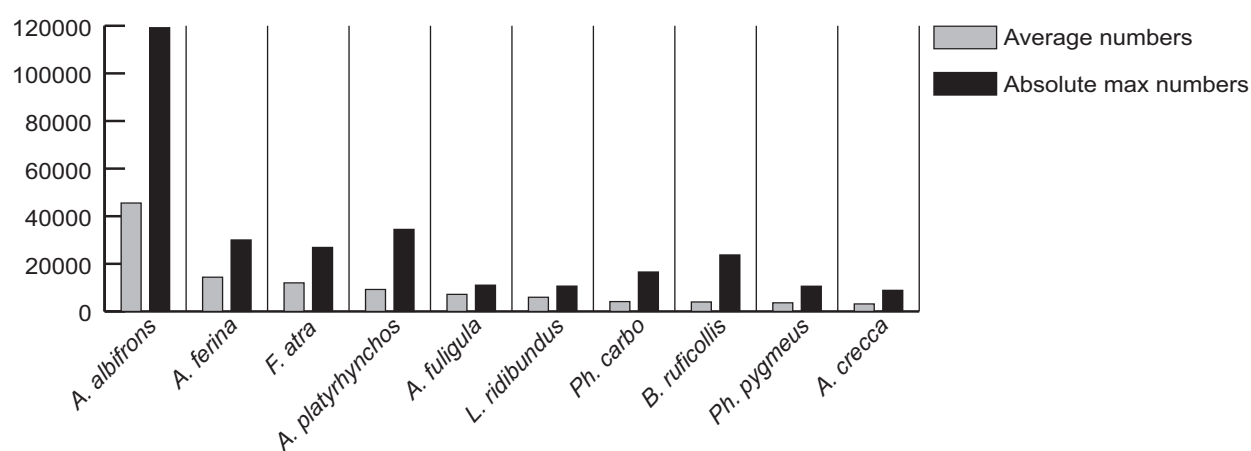


Fig. 69. Average and Absolute Max Numbers of Top Ten Waterbirds in BWC

Table 20. A Highest Species Concentration Rate (percentage of the average max species numbers at a given lake of the species' total numbers at BWC) of some Waterbird Species

Species	Lake	Concentration Rate (in %)	Species	Lake	Concentration Rate (in %)
<i>Tachybaptus ruficollis</i>	Mandrensko	84	<i>Oxyura leucocephala</i>	Vaya	89
<i>Podiceps cristatus</i>	Mandrensko	85	<i>Gallinula chloropus</i>	Mandrensko	86
<i>Podiceps nigricollis</i>	Vaya	51	<i>Fulica atra</i>	Atanasovsko / Pom.	35
<i>Phalacrocorax carbo</i>	Mandrensko	58	<i>Haematopus ostralegus</i>	Pomoriysko	51
<i>Phalacrocorax pygmeus</i>	Vaya	68	<i>Himantopus himantopus</i>	Atanasovsko	72
<i>Pelecanus onocrotalus</i>	Vaya	63	<i>Recurvirostra avosetta</i>	Atanasovsko	89
<i>Pelecanus crispus</i>	Atanasovsko	38	<i>Glareola pratincola</i>	Pomoriysko	68
<i>Nycticorax nycticorax</i>	Mandrensko	58	<i>Charadrius dubius</i>	Pomoriysko	52
<i>Ardeola ralloides</i>	Vaya	58	<i>Charadrius hiaticula</i>	Atanasovsko	65
<i>Egretta garzetta</i>	Atanasovsko	75	<i>Char. alexandrinus</i>	Atanasovsko / Pom.	50
<i>Egretta alba</i>	Vaya	54	<i>Pluvialis squatarola</i>	Atanasovsko	70
<i>Ardea cinerea</i>	Mandrensko	56	<i>Vanellus vanellus</i>	Atanasovsko	68
<i>Ardea purpurea</i>	Atanasovsko	63	<i>Calidris minuta</i>	Atanasovsko	54
<i>Plegadis falcinellus</i>	Atanasovsko/ Vaya	47	<i>Calidris ferruginea</i>	Atanasovsko	53
<i>Platalea leucorodia</i>	Atanasovsko	91	<i>Calidris alpina</i>	Atanasovsko	87
<i>Cygnus olor</i>	Atanasovsko	55	<i>Philomachus pugnax</i>	Atanasovsko	75
<i>Cygnus cygnus</i>	Mandrensko	81	<i>Gallinago gallinago</i>	Mandrensko	75
<i>Anser albifrons</i>	Mandrensko	48	<i>Limosa limosa</i>	Atanasovsko	94
<i>Anser anser</i>	Mandrensko	64	<i>Numenius arquata</i>	Atanasovsko	94
<i>Branta ruficollis</i>	Mandrensko	71	<i>Tringa erythropus</i>	Atanasovsko	76

Table 20. Continued

Species	Lake	Concentration Rate (in %)	Species	Lake	Concentration Rate (in %)
<i>Tadorna ferruginea</i>	Atanasovsko	87	<i>Tringa totanus</i>	Atanasovsko	83
<i>Tadorna tadorna</i>	Atanasovsko	70	<i>Tringa stagnatilis</i>	Atanasovsko	87
<i>Anas Penelope</i>	Atanasovsko	55	<i>Tringa nebularia</i>	Atanasovsko	98
<i>Anas strepera</i>	Pomoriysko	49	<i>Tringa glareola</i>	Pomoriysko	55
<i>Anas crecca</i>	Atanasovsko	63	<i>Larus melanocephalus</i>	Atanasovsko	62
<i>Anas platyrhynchos</i>	Atanasovsko	41	<i>Larus minutus</i>	Atanasovsko	68
<i>Anas acuta</i>	Atanasovsko	97	<i>Larus ridibundus</i>	Atanasovsko	70
<i>Anas querquedula</i>	Atanasovsko	79	<i>Larus genei</i>	Atanasovsko	89
<i>Anas clypeata</i>	Vaya	58	<i>Larus cachinnans</i>	Vaya	52
<i>Netta rufina</i>	Mandrensko	76	<i>Gelochelidon nilotica</i>	Atanasovsko	88
<i>Aythya ferina</i>	Vaya	72	<i>Sterna sandvicensis</i>	Pomoriysko	89
<i>Aythya nyroca</i>	Mandrensko	95	<i>Sterna hirundo</i>	Atanasovsko	65
<i>Aythya fuligula</i>	Vaya	57	<i>Sterna albifrons</i>	Atanasovsko	42
<i>Bucephala clangula</i>	Mandrensko	92	<i>Chlidonias hybridus</i>	Vaya	41
<i>Mergus albellus</i>	Mandrensko	76	<i>Chlidonias niger</i>	Atanasovsko	64
<i>Mergus serrator</i>	Pomoriysko	77	<i>Chlidonias leucopterus</i>	Mandrensko	77

age max species numbers (only species which form more significant concentrations have been included).

Species of the highest concentration rate are: *Anas acuta* (97% in Atanasovsko), *Aythya nyroca* (95% in Mandrensko), *Limosa limosa* and *Numenius arquata* (by 94% in Atanasovsko), *Bucephala clangula* (92% in Mandrensko), *Platalea leucorodia* (91% in Atanasovsko).

Also, as one may see, only for eight species the concentration rate is less than 50%: *Pelecanus crispus*, *Plegadis falcinellus*, *Anser albifrons*, *Anas strepera*, *Anas platyrhynchos*, *Fulica atra*, *Chlidonias hybridus*, *Sterna albifrons*.

Table 21 shows the number of species of the highest rate of concentration at a given lake.

As may be seen from **Table 21**, Atanasovsko maintains the greatest number of species (38) of the highest rate of concentration, followed by Mandrensko, etc.

The total numbers of waterbirds species established in different lake complexes during the study are as shown on **Table 22**.

Table 21. Rating of the individual Bourgas lakes according to the number of species of the highest Concentration Rate in Bourgas Wetland Complex

Lake	A Number of Species with Highest Concentration Rate in BWC
Atanasovsko	38
Mandrensko	17
Vaya	12
Pomoriysko	9

The max numbers (in ind) of individual species found at different lakes of the complex during the six years of the survey are shown on **Table 23**.

It can be seen that most of the bird species, which have exceeded the 1% Ramsar Criterion at least in one year, are the birds of Complex Atanasovsko Ezero, followed by Complex Mandrensko Ezero, etc.

An important feature of the wetlands is their species rarity. The most typical in this respect are Complex Mandrensko Ezero and Complex Atanasovsko Ezero.

Table 25 shows the ten most numerous waterbird species for the four lakes of the Bourgas Wetland Complex.

Table 25 indicates that each one of the four Bourgas lakes has its individual, characteristic waterbirds species composition. It could be concluded that out of 40 potential species (4 lakes X 10 species), approximately the half occurs at the lakes – 21 species. Not every species of this group could be found in all four top tens lists of the lakes. Five species could be found in the top tens of three lakes: *Anser*

Table 22. Total Number of Waterbird Species and Number of Breeding Waterbirds Species at Different Bourgas Lakes and Ropotamo Region

Wetland	Total Number	% from the total Number of Waterbird Species	Total Number of Breeding Species	% of Breeding Waterbirds Species from the Total Number of Breeding Species
Complex Pomoriysko Ezero	118	77.1	16	31.4
Complex Atanasovsko Ezero	138	90.2	32	62.7
Complex Ezero Vaya	108	70.6	27	52.9
Poda Lagoon	121	79.1	25	49.0
Complex Mandrensko Ezero	124	81.0	27	49.8
Total Number of Waterbird Species	153	100	51	100
Ropotamo Wetland Complex*	108	70.6	28	54.9

*Data for Ropotamo Wetlands (Alepu, Arkoutino, Stomoplo and the sea in front of them), connected ecologically with Bourgas Lakes are given for comparison.

Table 23. Max numbers (in ind) of individual species found at different lakes of the BWC during the survey (the numbers that exceed 1% are shaded) (to be continued)

Species	1% Ramsar Criterion 2002	Complex Pomoriysko Ezero	Complex Atanasovsko Ezero	Complex Ezero Vaya	Complex Mandrensko Ezero	All Lakes Max counts
<i>Gavia stellata</i>		1	1	0	0	1
<i>Gavia arctica</i>		76	5	0	1	76
<i>Tachybaptus ruficollis</i>	3,400	58	89	22	155	219
<i>Podiceps cristatus</i>	10,000	193	74	540	5,104	5,541
<i>Podiceps grisegena</i>	1,000	54	1	0	2	54
<i>Podiceps nigricollis</i>	2,800	335	250	640	501	1,135
<i>Phalacrocorax carbo</i>	1,450	1,026	650	7,750	11,052	16,564
<i>Phalacrocorax aristotelis</i>	300	8	0	0	0	8
<i>Phalacrocorax pygmeus</i>	400	425	586	7,323	3,235	10,592
<i>Pelecanus onocrotalus</i>		90	6,000	5,480	1,018	10,032
<i>Pelecanus crispus</i>	30	8	381	323	503	647
<i>Botaurus stellaris</i>	900	1	2	10	9	14
<i>Ixobrychus minutus</i>	2,200	1	5	10	5	15
<i>Nycticorax nycticorax</i>	1,200	8	20	230	275	342
<i>Ardeola ralloides</i>	600	6	17	81	45	126
<i>Egretta garzetta</i>	580	233	297	112	182	583
<i>Egretta alba</i>	470	25	125	687	446	877
<i>Ardea cinerea</i>	2,200	85	72	100	107	236
<i>Ardea purpurea</i>	2,200	9	75	12	12	87
<i>Ciconia nigra</i>		50	8	107	53	131
<i>Ciconia ciconia</i>		4,600	2,000	553	2,425	5,289
<i>Plegadis falcinellus</i>	530	20	230	151	67	316
<i>Platalea leucorodia</i>	120	52	193	61	110	224
<i>Phoenicopterus ruber</i>		0	1	0	1	1
<i>Cygnus olor</i>	450	990	768	128	228	1,986
<i>Cygnus columbianus</i>		0	10	10	80	84
<i>Cygnus cygnus</i>	170	10	30	41	362	417
<i>Anser albifrons</i>	5,300	224	16,010	79,608	61,150	119,186
<i>Anser erythropus</i>	110	0	1	0	0	1
<i>Anser anser</i>	850	1	64	58	311	393
<i>Branta ruficollis</i>	880	2	1,200	6,450	16,870	23,738
<i>Tadorna ferruginea</i>	200	5	33	25	7	35
<i>Tadorna tadorna</i>	750	632	2,743	575	641	3,559
<i>Anas penelope</i>	3,000	1,008	4,150	530	3,530	8,688

Table 23. Continued

Species	1% Ramsar Criterion 2002	Complex Pomoriysko Ezero	Complex Atanasovsko Ezero	Complex Ezero Vaya	Complex Mandrensko Ezero	All Lakes Max counts
<i>Anas strepera</i>	1,100	142	74	19	32	246
<i>Anas crecca</i>	10,600	630	7,310	850	3,700	8,870
<i>Anas platyrhynchos</i>	20,000	880	7,936	13,760	11,883	34,459
<i>Anas acuta</i>	10,000	80	1,168	44	25	1,209
<i>Anas querquedula</i>	20,000	168	2,185	234	1112	2,340
<i>Anas clypeata</i>	4,500	188	2,550	6,802	3,459	6,922
<i>Netta rufina</i>	320	37	20	0	60	67
<i>Aythya ferina</i>	10,000	4,912	3,085	16,800	13,170	30,029
<i>Aythya nyroca</i>	530	0	3	6	111	111
<i>Aythya fuligula</i>	7,000	4,500	800	6,825	4,733	11,037
<i>Aythya marila</i>	1,500	1	3	0	0	3
<i>Clangula hyemalis</i>		0	0	0	1	1
<i>Melanitta nigra</i>		2	0	0	4	4
<i>Melanitta fusca</i>	15	0	0	0	12	12
<i>Bucephala clangula</i>	200	3	12	4	52	52
<i>Mergus albellus</i>	350	17	19	85	442	490
<i>Mergus serrator</i>	500	171	145	0	60	181
<i>Mergus merganser</i>	100	0	0	2	11	11
<i>Oxyura leucocephala</i>	75	2	8	2,260	435	2,260
<i>Rallus aquaticus</i>		1	17	3	9	17
<i>Porzana porzana</i>		0	1	0	0	1
<i>Porzana parva</i>		0	4	0	1	4
<i>Gallinula chloropus</i>	20,000	4	120	31	289	290
<i>Fulica atra</i>	20,000	10,394	11,200	2,433	8,587	26,889
<i>Grus grus</i>	4	100	19	0	14	119
<i>Haematopus ostralegus</i>	1,500	34	38	0	23	49
<i>Himantopus himantopus</i>	340	142	424	26	47	511
<i>Recurvirostra avosetta</i>	470	993	4,490	0	16	4,490
<i>Glareola pratincola</i>	240	61	30	0	3	78
<i>Charadrius dubius</i>		21	14	2	35	48
<i>Charadrius hiaticula</i>		30	50	1	9	50
<i>Charadrius alexandrinus</i>	410	49	72	0	2	73
<i>Pluvialis squatarola</i>		41	149	0	7	159
<i>Pluvialis apricaria</i>		0	37	0	6	37
<i>Vanellus vanellus</i>	20,000	54	1,100	200	221	1,100
<i>Calidris alba</i>		20	75	0	35	78
<i>Calidris minuta</i>	2,000	1743	1,530	30	76	3,316
<i>Calidris temminckii</i>	600	1	1	0	3	3
<i>Calidris ferruginea</i>		4,480	2,420	180	55	7,088
<i>Calidris alpina</i>	3,000	838	1,810	70	94	2,060
<i>Limicola falcinellus</i>		7	36	0	2	36
<i>Philomachus pugnax</i>		1240	2,000	300	300	2,422
<i>Gallinago gallinago</i>		3	123	25	369	390
<i>Limosa limosa</i>	1,300	500	1,210	200	93	1,210
<i>Limosa lapponica</i>		0	5	0	2	7
<i>Numenius phaeopus</i>		2	5	14	4	14
<i>Numenius tenuirostris</i>	1	0	1	0	0	1
<i>Numenius arquata</i>		9	79	7	43	88
<i>Tringa erythropus</i>		219	478	80	22	698
<i>Tringa totanus</i>		931	2,391	100	93	3,248
<i>Tringa stagnatilis</i>	370	600	270	7	25	634
<i>Tringa nebularia</i>		100	176	38	11	178
<i>Tringa ochropus</i>		3	18	6	18	22

Table 23. Continued

Species	1% Ramsar Criterion 2002	Complex Pomoriysko Ezero	Complex Atanasovsko Ezero	Complex Ezero Vaya	Complex Mandrensko Ezero	All Lakes Max counts
<i>Tringa glareola</i>		300	70	83	44	465
<i>Xenus cinereus</i>		1	1	0	1	1
<i>Actitis hypoleucos</i>		10	8	4	9	14
<i>Arenaria interpres</i>		34	12	0	4	34
<i>Phalaropus lobatus</i>		48	21	0	4	48
<i>Stercorarius parasiticus</i>		39	10	0	0	49
<i>Larus melanocephalus</i>	8,400	2,600	3,410	35	1,500	4,374
<i>Larus minutus</i>	1,000	1,020	2,430	750	160	2,430
<i>Larus ridibundus</i>	15,000	1,402	7,307	1,802	3,225	9,732
<i>Larus genei</i>	1,800	165	630	15	75	635
<i>Larus canus</i>	10,000	6	250	22	130	250
<i>Larus fuscus</i>		1	1	2	1	2
<i>Larus cachinnans</i>	10,000	830	1,130	2,800	2,105	3,422
<i>Gelochelidon nilotica</i>	270	33	82	4	28	87
<i>Sterna caspia</i>		9	2	3	14	17
<i>Sterna sandvicensis</i>	590	1807	407	12	300	1,836
<i>Sterna hirundo</i>	6,000	490	764	287	340	1,038
<i>Sterna albifrons</i>	960	142	132	7	53	162
<i>Chlidonias hybridus</i>	1,000	11	70	162	120	233
<i>Chlidonias niger</i>	2,000	312	620	470	335	1,115
<i>Chlidonias leucopterus</i>		30	60	231	640	672
Total Numbers		13,664	39,918	94,811	109,270	189,067
Total Species		96	103	78	101	108
Total Species covering Ramsar Criterion - 1 %		7	12	9	11	23

* With bold are given species which exceed 1% Ramsar Criterion

Table 24. Additional (Rare) Waterbird Species for the Individual Bourgas Wetlands

Species	Complex Pomoriysko Ezero	Complex Atanasovsko Ezero	Complex Ezero Vaya	Complex Mandrensko Ezero
<i>Podiceps auritus</i>				1
<i>Bubulcus ibis</i>			2	
<i>Egretta gullaris</i>				1
<i>Mycteria ibis</i>		1		
<i>Branta leucopsis</i>		1		
<i>Branta bernicla</i>				1
<i>Somateria mollissima</i>				3
<i>Burhinus oedicnemus</i>		1		
<i>Charadrius leschenaultii</i>		1		
<i>Vanellus leucurus</i>		1		1
<i>Calidris canutus</i>				7
<i>Calidris acuminatus</i>				1
<i>Tryngites subruficollis</i>		2		
<i>Gallinago media</i>		1		
<i>Stercorarius pomarinus</i>	1			
<i>Stercorarius longicaudus</i>	1			
<i>Sterna paradisaea</i>	1			
<i>Larus ichthyaetus</i>			3	
<i>Larus marinus</i>				1
Total	3	7	2	8

Table 25. The Top Ten Waterbirds for the Four Lakes of the Bourgas Wetland Complex

Complex Pomoriysko Ezero	Complex Atanasovsko Ezero	Complex Ezero Vaya	Complex Mandrensko Ezero
1. <i>Fulica atra</i>	1. <i>Fulica atra</i>	1. <i>Anser albifrons</i>	1. <i>Anser albifrons</i>
2. <i>Calidris ferruginea</i>	2. <i>Larus ridibundus</i>	2. <i>Aythya ferina</i>	2. <i>Aythya ferina</i>
3. <i>Aythya fuligula</i>	3. <i>Anser albifrons</i>	3. <i>Aythya fuligula</i>	3. <i>Fulica atra</i>
4. <i>Aythya ferina</i>	4. <i>Anas platyrhynchos</i>	4. <i>Anas platyrhynchos</i>	4. <i>Aythya fuligula</i>
5. <i>Larus melanocephalus</i>	5. <i>Tringa totanus</i>	5. <i>Phalacrocorax pygmeus</i>	5. <i>Anas platyrhynchos</i>
6. <i>Larus ridibundus</i>	6. <i>Recurvirostra avosetta</i>	6. <i>Pelecanus onocrotalus</i>	6. <i>Branta ruficollis</i>
7. <i>Sterna sandvicensis</i>	7. <i>Anas crecca</i>	7. <i>Phalacrocorax carbo</i>	7. <i>Phalacrocorax carbo</i>
8. <i>Calidris minuta</i>	8. <i>Larus melanocephalus</i>	8. <i>Anas clypeata</i>	8. <i>Podiceps cristatus</i>
9. <i>Tringa totanus</i>	9. <i>Tadorna tadorna</i>	9. <i>Branta ruficollis</i>	9. <i>Anas crecca</i>
10. <i>Tadorna tadorna</i>	10. <i>Calidris ferruginea</i>	10. <i>Larus cachinnans</i>	10. <i>Phalacrocorax pygmeus</i>

albifrons, *Anas platyrhynchos*, *Aythya ferina*, *Aythya fuligula*, *Fulica atra*. These are also the most numerous waterbirds encountered at BWC. Nine species are found at two lakes and seven – only at one lake. It is exactly these seven species that determine the specifics of each one of the lakes.

Vaya and Mandrensko (both being freshwater bodies) have the greatest number of species in common (7), followed by Pomoriysko and Atanasovsko (two hyper saline water bodies transformed into salterns for scores of years) (6).

The number of common for two water bodies water-bird species is shown in **Table 26**.

6.2. Monthly and Seasonal Characteristic

The numbers of waterbird species and species richness are not similar during the different months of the year. It is a well known fact that the Bourgas Lakes are situated on the second migratory route in Western Palearctic “Via Pontica”. That is why the spring and autumn months are especially rich in all bird species, including waterbirds. During the winter, these lakes shelter a great amount of geese, ducks, and coot. Some of them (Red-breasted Goose) come even from the Eastern Palearctic.

The waterbirds’ overall numbers (**Fig. 70**, the columns) at Bourgas Lake Complex has been highest in Janu-

Table 26. A number of common waterbird species by two water bodies in Bourgas Wetland Complex

Wetland/Wetland	Complex Pomoriysko Ezero	Complex Atanasovsko Ezero	Complex Ezero Vaya	Complex Mandrensko Ezero
Complex Pomoriysko Ezero	X	6	2	3
Complex Atanasovsko Ezero	6	X	2	3
Complex Ezero Vaya	2	2	X	7
Complex Mandrensko Ezero	3	4	7	X

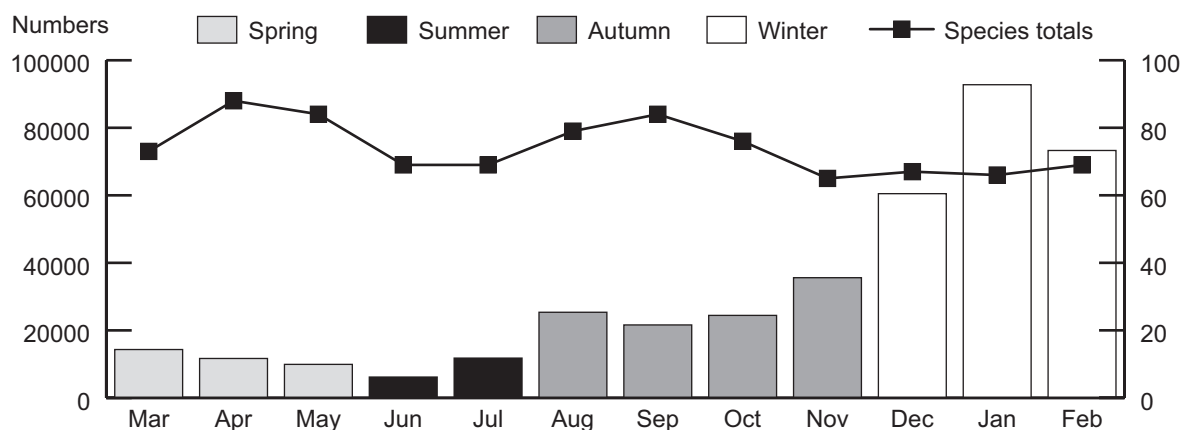


Fig. 70. Average Total Numbers and Species Number Dynamic of Waterbirds in BWC (1996-2002)

ary and lowest, in June. The species diversity (**Fig. 70**, the line) has been greatest in April and lowest in November and January, when there is a great amount of waterbirds with very low number of species.

The waterbirds' numbers at Bourgas Lake Complex has exceeded 20,000 birds during the period August-February in most of the years of the survey.

Usually in Bourgas Lakes the most numerous are the waterbirds in January and February, when the total numbers amounts about 32,000 birds monthly with a peak of 186,448 (January 1997).

During the different months the role individual lakes play is not equivalent in terms of bird concentration. This can be seen on the next **Fig. 71**.

Fig. 71 clearly shows that of all the lakes during the March-September period, Atanasovsko has the highest total numbers of waterbirds. In October, the numbers at Atanasovsko and Vaya are almost equal and in November through to February, the highest total numbers go to Vaya and Mandrensko.

In other words, the greatest concentrations of Waterbirds in Bourgas Lakes are registered during winter

months (December – February) in the freshwater basins of Vaya and Mandrensko.

The total waterbird numbers in the lakes is characterized by some fluctuations during the different seasons of the year. As a whole, the numbers in Bourgas Lakes is highest during winter, followed by the autumn, the spring and summer (**Fig. 72**). This applies to all individual wetlands with the exception of Atanasovsko. There a highest total numbers is recorded in the autumn, when it is used for overnigting or roosting by many thousand of soaring birds as pelicans, storks and other migrants.

The lowest total waterbird numbers in all lakes is in the summer.

6.3. Annual Fluctuations

The abundant information on the total numbers of the waterbirds species, gathered during the study, allows us for the first time to track back the variations in these numbers for each year (the sum of 12 monthly numbers) presented in **Fig 73**.

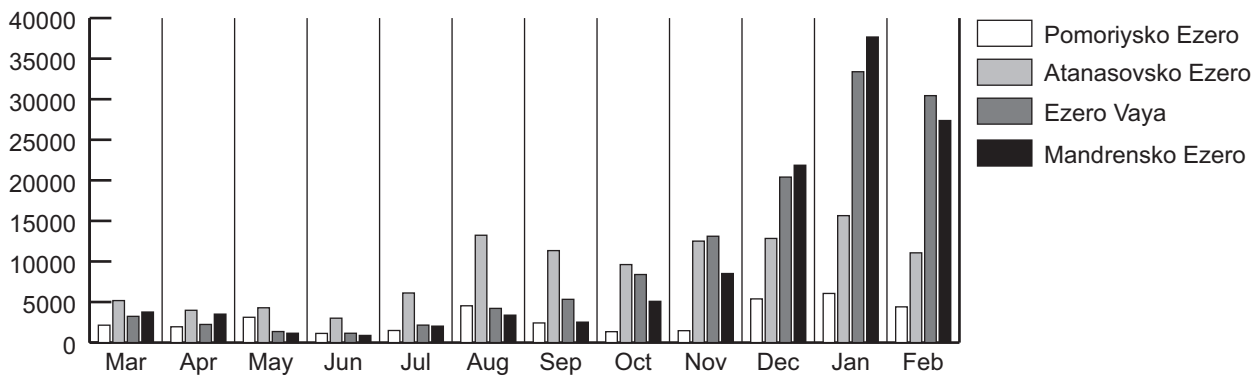


Fig. 71. Average Monthly Numbers of all Waterbirds in Different Bourgas Lakes

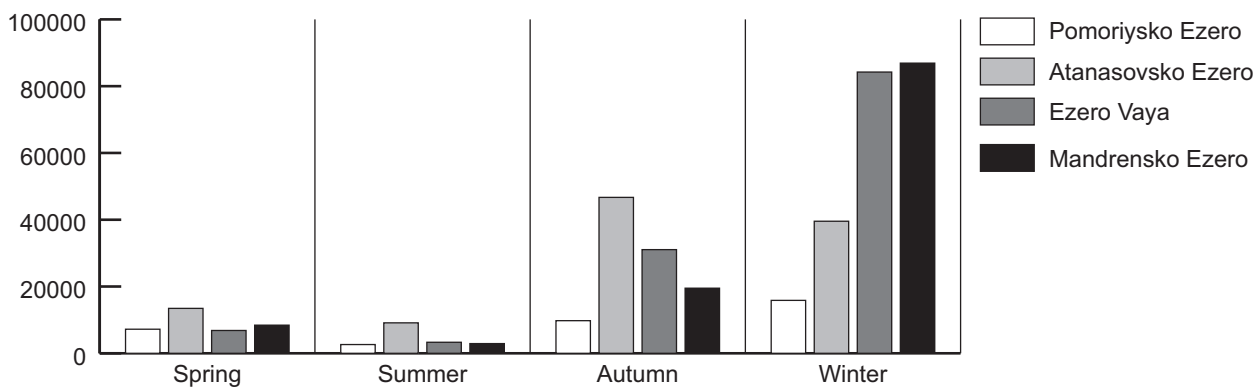


Fig. 72. Average Seasonal Numbers of all Waterbirds in Different Bourgas Lakes

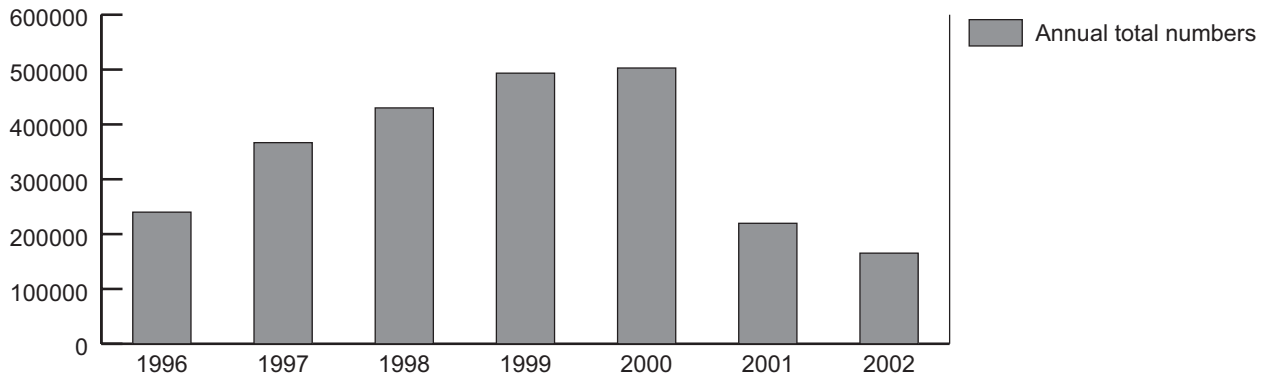


Fig. 73. Annual Fluctuations of Total Waterbird Numbers in Bourgas Wetland Complex

The figure indicates that the yearly numbers of the waterbirds species in Bourgas Lakes varies from 165,000 to 502,847 birds or average of 324,000 per annum. Having in mind that the total area of Bourgas lakes is 9,200 ha then the average annual density of the waterbirds comes to 35.2 birds per hectare. This numbers could not be compared to other wetlands in the country because of the lack of data.

The highest total annual waterbird numbers in Bourgas Lakes is recorded in the year 2000 – 502,900 birds. If to this number are added the migrating twice a year soaring pelicans and storks (about 250,000), then the total amount of waterbirds of Bourgas wetlands will be rich about a million. This great amount of waterbirds is a valuable natural resource, which is often underestimated and neglected.

Based on the abundant information on the species composition and numbers structure of the avifauna of Bourgas Lakes as well as their role in the breeding, seasonal and feeding migrations and wintering, their narrow “specification” could be determined in some of the designated aspects.

For instance, the Complex Pomoriysko Ezero has been the favourable place for breeding of waders and terns; for overwintering of gulls throughout the year; and for wintering of Coot, Mute Swan and Tufted Duck.

The Complex Atanasovsko Ezero has been the favourable place for breeding of ducks, waders and terns; for overwintering of gulls throughout the year; for overwintering of White pelicans, Storks and Cranes during migration; for feeding of Spoonbills, Glossy Ibises, Little Egrets; and for wintering of Dalmatian Pelicans, Shelducks, and Pintails.

The Complex Ezero Vaya has been the favourable place for breeding of Cormorants and some heron's species; for feeding of White Pelicans during migration and of Dalmatian Pelicans during winter; for overwintering of White fronted and Red-breasted Geese during winter.

The Complex Mandrensko Ezero has been the favourable place for breeding of Cormorants, herons, Spoonbills, Glossy Ibises (Poda Lagoon); for feeding of herons, storks, swans, diving ducks (the Cherny Vrukh Fishponds, the estuaries of Izvorska and Fakiyaska); for wintering of Tundra and Whooper Swans (the Estuary of Reka Fakiyaska and the areas with winter wheat north of Mandrensko); for wintering of gulls and waders (Zaliv Chengene Skele); for overwintering during winter of White fronted and Red-breasted Geese (Mandrensko).

6.4. Long-term Changes

On the basis of data on the avifauna of Bourgas area published by Radakoff (1879), Reiser (1894), Vurbakov (1912, 1934, 1935), Prostov (1964), Georgiev (1976), Roberts (1980a, 1980b, 1981) and the information collected during the present study it became possible to track down the trends and changes in waterbirds' species composition and numbers in the region of Bourgas Lakes as well as the changes in their spatial distribution. It has been possible to track these changes since 1890, when the famous Austrian ornithologist Otmar Reiser visited Bulgaria for the first time. All in all, he had traveled three times to almost all parts of the country. In his valuable book “Materialien zu einer Ornis balcanica” there is a rather detailed description of Bourgas Lakes and their avifauna. A similar comparison on the base of Reiser (1894) has been made for Sreburna Biosphere Reserve by Kambourova (2004).

The following changes have taken place during this relatively long stretch of time in Bourgas Lakes:

- Species that do not breed in BWC anymore (at least for the last 10 years there has been no record of their breeding):

<i>Podiceps grisegena</i>	<i>Tringa totanus</i>
<i>Phalacrocorax pygmeus</i>	<i>Anas crecca</i>

Pelecanus crispus
Pelecanus onocrotalus
Anas clypeata
Anas acuta

● Species that have bred irregularly in the period 1890-2004:

Egretta alba
Anser anser
Larus melanocephala

● Species, which have undergone a manifold decrease in their breeding numbers:

Aythya nyroca
Charadrius alexandrinus

● Species, which have undergone great fluctuations in their breeding numbers:

Recurvirostra avosetta

● Species that do not occur anymore in the region of Bourgas Lakes (there has been no record of them for at least 10 years) during migration or winter:

Anthropoides virgo

Netta rufina
Larus ridibundus
Chlidonias niger

● Species, which have undergone great fluctuations in their numbers during migration or wintering:

Oxyura leucocephala

● Species, which have undergone a manifold decrease in their numbers during migration and wintering:

Anser erythropus *Gallinago media*
Grus grus *Numenius tenuirostris*

● Species, which have undergone a manifold increase in their numbers during migration and wintering:

Phalacrocorax carbo *Cygnus columbianus*
Phalacrocorax pygmeus *Cygnus cygnus*
(since 1998)
Pelecanus onocrotalus *Anser albifrons*
Pelecanus crispus *Branta ruficollis*
Egretta alba *Mergus albellus*
Cygnus olor *Clangula hyemalis*

● Species of unspecified status:

Porzana porzana *Porzana pusilla*
Porzana parva

On the next **Table 27** all these changes are summarized as follows:

Table 27. Long-term changes in bird composition of Bourgas lakes according to Reiser (1894) and present study

INCREASE: 37 SPECIES

Tachybaptus ruficollis
Podiceps cristatus
Podiceps nigricollis
Phalacrocorax carbo
Phalacrocorax pygmeus
Pelecanus onocrotalus
Pelecanus crispus
Nycticorax nycticorax
Egretta alba
Ardea purpurea
Plegadis falcinellus
Platalea leucorodia
Cygnus olor
Cygnus columbianus
Cygnus cygnus
Anser albifrons
Anser anser
Branta ruficollis
Tadorna ferruginea
Anas penelope
Anas querquedula
Anas clypeata
Aythya ferina
Aythya fuligula

STABLE: 54 SPECIES

Podiceps grisegena
Phalacrocorax aristotelis
Botaurus stellaris
Ixobrychus minutus
Ardeola ralloides
Egretta garzetta
Ardea cinerea
Ciconia nigra
Ciconia ciconia
Phoenicopterus ruber
Anser erythropus
Tadorna tadorna
Anas strepera
Anas crecca
Anas platyrhynchos
Netta rufina
Aythya marila
Clangula hyemalis
Melanitta nigra
Melanitta fusca
Bucephala clangula
Mergus albellus
Mergus merganser
Oxyura leucocephala

Haematopus ostralegus
Limicola falcinellus
Gallinago gallinago
Limosa limosa
Limosa lapponica
Numenius phaeopus
Numenius tenuirostris
Tringa erythropus
Tringa ochropus
Tringa glareola
Xenus cinereus
Actitis hypoleucos
Arenaria interpres
Larus fuscus
Gelochelidon nilotica
Sterna caspia
Chlidonias hybridus

DECREASE: 14 SPECIES

Anas acuta
Aythya nyroca
Grus grus
Calidris ferruginea
Calidris alpina
Philomachus pugnax

Table 27. Continued

INCREASE: 37 SPECIES	STABLE: 54 SPECIES	DECREASE: 14 SPECIES
<i>Mergus serrator</i>	<i>Rallus aquaticus</i>	<i>Numenius arquata</i>
<i>Gallinula chloropus</i>	<i>Porzana porzana</i>	<i>Tringa totanus</i>
<i>Fulica atra</i>	<i>Porzana parva</i>	<i>Larus melanocephalus</i>
<i>Himantopus himantopus</i>	<i>Glareola pratincta</i>	<i>Larus minutus</i>
<i>Tringa stagnatilis</i>	<i>Charadrius dubius</i>	<i>Larus ridibundus</i>
<i>Tringa nebularia</i>	<i>Charadrius hiaticula</i>	<i>Larus genei</i>
<i>Phalaropus lobatus</i>	<i>Charadrius alexandrinus</i>	<i>Sterna sandvicensis</i>
<i>Stercorarius parasiticus</i>	<i>Pluvialis squatarola</i>	<i>Chlidonias leucopterus</i>
<i>Larus canus</i>	<i>Pluvialis apricaria</i>	
<i>Larus cachinnans</i>	<i>Vanellus vanellus</i>	
<i>Sterna hirundo</i>	<i>Calidris alba</i>	
<i>Sterna albifrons</i>	<i>Calidris minuta</i>	
<i>Chlidonias niger</i>	<i>Calidris temminckii</i>	

Along with the long-term changes in the Waterbirds species diversity, significant changes in the numbers have also been observed. Unfortunately, these are not documented well enough to determine the size of the variations. The only certain thing is that there has been a great decrease in the numbers of ducks, diving ducks, geese and other Waterfowl species. Probably this has come as a result of the significant changes in the limnological and hydrological parameters of the Bourgas Lakes as well as the huge anthropogenic Impact on these species in Bulgaria and neighboring countries.

For 110 years significant changes have occurred in the morphometry and the natural water regime of Bourgas Lakes. Two of these (Pomoriysko and Atanasovsko) have been turned into Salinas and one (Mandrensko), into a reservoir. Only Vayahas been left without any significant morphological changes, but, unfortunately it has been highly polluted with various petrol products, dumped into its waters from the sixties until the eighties of the last century. Almost at the same time, artificial wetlands of various kinds start to appear in the studied region: small reservoirs, sand quarries, fish ponds, oxidizing pools for petrol products and a good number of canals.

Another important base for comparisons has been the publication of Prostov (1964), which covers a 15-year period. His results are related to the species

established on the territory of the ex- Bourgas district including the three Bourgas Lakes plus the Ropotamo region. In the following **Table 28** we have compared the numbers of the different groups of bird species, registered by Prostov (1964) to the corresponding data reported in the current study (the bird species established in Pomoriysko are not included since this author did not give any data on the region).

As indicated in the table, for a 40-years period the total numbers of bird species have increased by 22.1% and the numbers of breeding species, by 20.2%. There is an increase in the numbers of Waterbirds species as well: the total numbers have jumped by 23.1% and the numbers of breeding species, by 15.6%. These species are: *Platalea leucorodia*, *Cygnus olor*, *Anas crecca*, *Anas acuta*, *Anas clypeata*, *Aythya ferina*, *Porzana parva*, *Haematopus ostralegus*, *Glareola pratincta*, *Larus genei*, and *Sterna sandvicensis*.

Along with the indicated increase, it has been determined that there are seven species that have disappeared as breeding, and three of these are Waterbirds: *Podiceps nigricollis*, *Larus ridibundus*, *Chlidonias niger*. The number of new species established during migration and wintering is **34**. To a great extent this has happened on account of the intense research of tens of biologists during every season of the year, the use of the newest models of optics and especially of telescopes, the availability of the best of European

Table 28. Comparison between different groups of bird species according to Prostov (1964) and present study

Source	Total Number of Waterbird Species	% of Waterbird Species from the Total Number of all Species	Number of Breeding Waterbird Species	% of Number of Breeding Waterbird Species from all Species	Total Number of all Species	Number of all Breeding Species
Prostov (1964)	113	42.0	40	33.1	269	130
Present study	147	42.6	51	31.3	345	163

Bird Guides and, the last but not least, of the experience gained by the observations of rare and hard for identification species in Bulgaria and abroad.

The species established for the first time in Bourgas Lakes since Prostov (1964) are:

Gavia immer
Podiceps auritus
Morus bassanus
Phalacrocorax aristotelis
Egretta gularis
Mycteria ibis
Cygnus columbianus
Cygnus atratus
Anser caerulescens
Branta canadensis
Branta leucopsis
Branta bernicla
Marmaronetta angustirostris
Melanitta fusca
Melanitta nigra
Somateria mollissima
Clangula hyemalis

Calidris acuminata
Tryngites subruficollis
Numenius phaeopus
Xenus cinereus
Phalaropus fulicarius
Phalaropus lobatus
Phalaropus tricolor
Glareola nordmanni
Charadrius leschenaultii
Charadrius asiaticus
Vanellus gregarius
Vanellus leucurus
Calidris canutus
Calidris melanotos
Stercorarius longicaudus
Catharacta skua
Larus ichthyaetus
Larus glaucoides
Larus relictus
Larus delawarensis
Rissa tridactyla
Sterna paradisaea
Sterna caspia
Uria aalge



7. Ornithological Assessment of Individual Wetlands

Michev & Profirov (2003) give detailed data about the mid-winter numbers of waterbirds at all Bourgas Lakes for the period 1977-2001 but without data on the breeding season, migration and wintering the picture of these most important for the birds Bulgarian wetlands remains incomplete.

Each of the Bourgas Lakes has its own specific characteristics that affect the numbers and species composition of its avifauna. Lakes will be considered in consecutive order from north to south.

7.1. Complex Pomoriysko Ezero

7.1.1. Species Characteristic

255 species of birds have been recorded for Pomoriysko (Profirov et al., 2002). Of these, 118 species of waterbirds have been found during the period of the monitoring but only 85 occur more or less regularly there. (*App. 1, Table 1*). Of the 85, only the Dalmatian Pelican and the Pygmy Cormorant are globally threatened species. In some years the Red-breasted Goose, the Ferruginous Duck, the White-headed Duck and Slender-billed Curlew have been present. *Table 29* shows the ten most numerous species along with their numbers in different months of the year.

During the time of the survey, the 1-% Ramsar criterion has been exceeded: with regard to the Mute Swan only in January 1997 and December 2000; regarding the Sandwich Tern this criterion has been exceeded

during the spring and autumn migration as well as during the breeding season for three years.

Based on the results obtained, it has become possible to show that among the four Bourgas Lakes the Pomoriysko one has been characterized by the lowest numbers of waterbirds and the least species diversity.

7.1.2. Seasonal Characteristic

As a whole, the overall numbers of waterbirds at Pomoriysko is greatest during winter months (especially in January) and the species diversity – in April–May and August–September (*Fig. 74*).

The total numbers of waterbirds at Pomoriysko Ezero has not exceeded 20,000 ind during the period of this survey.

7.2. Complex Atanasovsko Ezero

7.2.1. Species Characteristic

According to Michev et al., (2004) the number of bird species at Atanasovsko is 317. The Snow Goose, established by Nankinov (1997) has been added to the list, thus raising the number to 318 species. Of these, 138 waterbirds have been recorded during the survey but only 94 species occur there more or less regularly (*App. 1, Table 2*). Of these 138, the Dalmatian Pelican, the Pygmy Cormorant, the Marbled Duck, the Ferruginous Duck, the Lesser White-fronted Goose, the Red-breasted

Table 29. Complex Pomoriysko Ezero: The Top Ten Waterbird Species in Descending Order by their Greatest Average Monthly Numbers (the max values are in bold)

Species/Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Average Monthly Max	Absolute Monthly Max
<i>Fulica atra</i>	710	33	4	7	15	13	17	209	628	3441	4300	2464	4300	10394
<i>Calidris ferruginea</i>	0	1	1220	68	9	342	99	2	0	0	0	0	1220	4480
<i>Aythya fuligula</i>	161	55	1	0	0	2	0	0	0	44	678	974	974	4500
<i>Aythya ferina</i>	280	61	0	0	0	5	3	0	5	950	643	634	950	4912
<i>Larus melanocephalus</i>	3	42	12	15	53	922	245	3	52	0	0	0	922	2600
<i>Larus ridibundus</i>	45	12	2	20	115	783	326	190	108	143	29	30	783	1402
<i>Sterna sandvicensis</i>	1	696	637	437	235	428	158	27	18	0	0	0	696	1807
<i>Calidris minuta</i>	0	26	595	27	18	323	122	10	5	0	0	0	595	1743
<i>Tringa totanus</i>	108	9	1	13	448	291	159	72	30	35	13	3	448	931
<i>Tadorna tadorna</i>	418	266	52	48	68	99	38	103	127	271	173	207	418	632

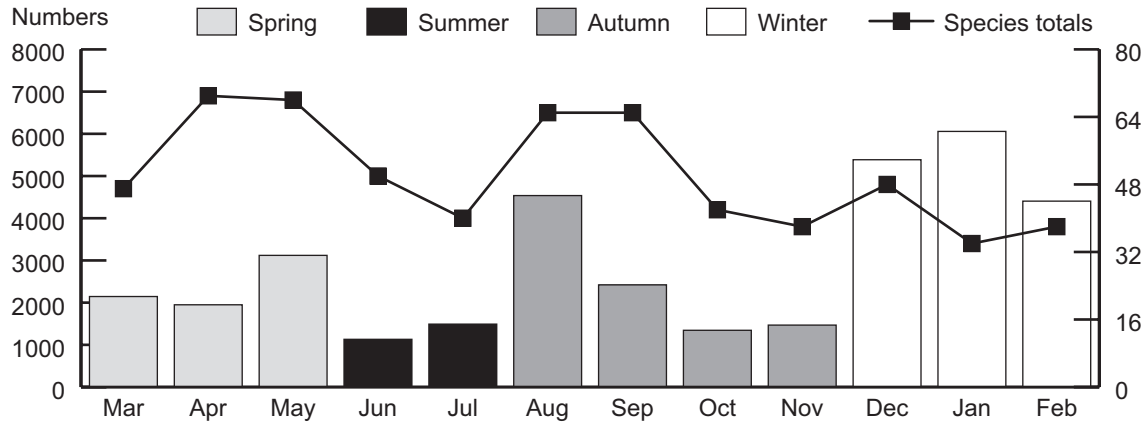


Fig. 74. Average Total Numbers and Species Number Dynamic of Waterbirds in Pomoriysko (1996 - 2002)

Goose, the White-headed Duck, the Black-winged Pratincole, the Great Snipe and the Slender-billed Curlew are Globally Threatened Species. The 10 most numerous species along with their numbers during different months of the year have been entered in **Table 30**.

breeding season and migrations. In individual years, this criterion has been exceeded by the White-fronted Goose, the Red-breasted Goose and the Black-winged Stilt.

During the period of survey the 1-% Ramsar criterion has been regularly exceeded with regard to the Dalmatian Pelican in winter, the Spoonbill during autumn migration, the Common Shelduck in winter, the Avocet during the

7.2.2. Seasonal Characteristic

The overall numbers of waterbirds at Atanasovsko is highest in winter months (December and especially January) and lowest, in June. Species diversity is greatest in April and September (**Fig. 75**).

Table 30. Complex Atanasovsko Ezero: The Top Ten Waterbird Species in Descending Order by their Greatest Average Monthly Numbers (the max values are in bold)

Species/Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Average Monthly Max	Absolute Monthly Max
<i>Fulica atra</i>	360	74	3	2	0	375	825	1980	2932	3350	4584	2934	4584	11200
<i>Larus ridibundus</i>	160	108	172	282	2710	4200	1945	710	633	394	555	510	4200	8560
<i>Anser albifrons</i>	562	3	0	0	0	0	0	0	2	252	3789	2100	3789	16010
<i>Anas platyrhynchos</i>	700	138	78	457	99	455	1575	1843	2035	3316	2436	1338	3316	7936
<i>Tringa totanus</i>	60	32	1	131	2284	638	248	152	44	23	13	5	2284	2391
<i>Recurvirostra avosetta</i>	368	710	334	473	1535	2096	1422	540	555	197	23	30	2096	4490
<i>Anas crecca</i>	259	87	0	1	1	0	200	775	1819	1872	521	504	1872	7310
<i>Larus melanocephalus</i>	0	16	32	17	148	1546	872	200	11	0	0	0	1546	3410
<i>Tadorna tadorna</i>	728	843	135	101	362	139	443	1170	1280	1440	1410	1225	1440	2763
<i>Calidris ferruginea</i>	0	1	1418	18	12	353	157	21	0	2	0	0	1418	2420

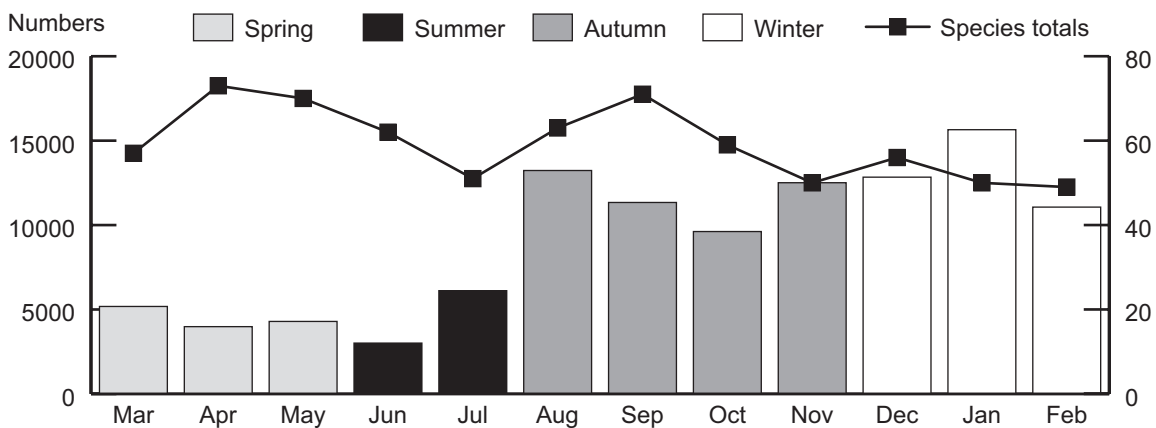


Fig. 75. Average Total Numbers and Species Number Dynamic of waterbirds in Atanasovsko (1996 - 2002)

Waterbirds' total December and January numbers at Atanasovsko exceeded 20,000 birds in some of the survey.

7.2.3. Short-term Changes

Atanasovsko is the best studied among all Bourgas lakes. Data about its avifauna have been available since the second half of 19th century (Reiser, 1894; Vurbanov, 1912; Harrison, 1933; Jordans, 1940; Patev, 1950). Since the second half of the last century, there has been a great amount of scientific papers, but only Roberts (1981) gives relatively full and comprehensive picture of species composition and numbers of birds in this lake. That's why his publication has been chosen for following up the short-term changes in its avifauna (**App. 2**).

During the first period (1976 - 1977), 96 waterbirds species were established, as for the second period (1996 – 2002), the number of species has risen to 112. A hundred of the species have shown a change in their numbers. A total of 50 species have increased in numbers, 28 species have remained stable and 22 species have shown a decrease in their numbers. As a whole, these changes are most probably closely related to the variations in conditions during wintering. During the last few years, the winters have been milder compared to the winters back in 1976. The total numbers of waterbirds species for both periods exceeds almost twice the established criteria for international importance of 20,000 species. The max total numbers for the first period (39,928) were recorded in September. The most numerous species were gulls, terns and waders. During the present survey, similar max numbers of 39,918 birds were established in January, consisting mainly of ducks, geese, swans and coots. Throughout the second period, the numbers of species like Dalmatian Pelican, Pygmy Cormorant, Red-breasted Goose were a lot higher, exceeding many times the Ramsar importance criteria. These changes in the numbers of the waterbirds indicate that during the last few years Atanasovsko has gained a great importance for the wintering birds, compared to the past.

Table 31. Complex Ezero Vaya: The Top Ten Waterbird Species in Descending Order by their Greatest Average Monthly Numbers (the max values are in bold)

Species/Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Average Monthly Max	Absolute Monthly Max
<i>Anser albifrons</i>	51	0	0	0	0	0	0	75	0	2121	19895	21072	21072	79608
<i>Aythya ferina</i>	698	171	105	30	287	474	1252	5765	10020	8821	4089	4441	10020	16800
<i>Aythya fuligula</i>	120	24	0	0	1	0	0	578	134	1110	1812	4117	4117	6825
<i>Anas platyrhynchos</i>	111	38	7	10	45	233	213	63	125	2762	1535	1239	2762	13760
<i>Phalacrocorax pygmeus</i>	485	61	4	1	1	0	15	36	207	2462	2073	510	2462	7323
<i>Pelecanus onocrotalus</i>	7	611	729	523	1000	1671	2093	23	11	8	4	1	2093	5480
<i>Phalacrocorax carbo</i>	370	215	244	420	240	529	856	740	542	1432	1732	1584	1732	7750
<i>Anas clypeata</i>	341	272	7	1	1	0	47	0	81	970	1193	1593	1593	6802
<i>Branta ruficollis</i>	0	0	0	0	0	0	0	0	0	7	1082	301	1082	6450
<i>Larus cachinnans</i>	78	92	41	50	84	308	173	296	913	615	907	700	913	2800

7.3. Complex Ezero Vaya

7.3.1. Species Characteristic

Dimitrov (2004) reports 262 species of birds to have been found at Vaya so far. Of them 108 waterbirds have been recorded during this survey but only 72 occur more or less regularly (**App. 1, Table 3**). The Dalmatian Pelican, the Pygmy Cormorant, the Red-breasted Goose, the Ferruginous Duck, the White-headed Duck and the Lesser White-fronted Goose are Globally Threatened Species. The top ten most numerous species along with their numbers in different months of the year are shown in **Table 31**.

During this survey the Dalmatian Pelican, the Pygmy Cormorant, the White - fronted Goose, the Pochard, and the White-headed duck have regularly exceeded the 1-% Ramsar criterion in winter. In certain years, the criterion has been exceeded by the Great White Egret, the Red-breasted Goose and the Shoveler.

7.3.2. Seasonal Characteristic

The overall numbers of waterbirds at Vaya has been highest in winter (January and February) and lowest, in June. The species diversity has been greatest in April and September (**Fig. 76**).

During December-February period in most of the years of this survey the waterbirds' overall numbers at Vaya has exceeded 20,000 birds.

7.4. Complex Mandrensko Ezero

7.4.1. Species Characteristic

Michev & Profirov (2003a) report 270 bird species recorded so far at Complex Mandrensko Ezero. Of these, 124 species of waterbirds have been recorded during

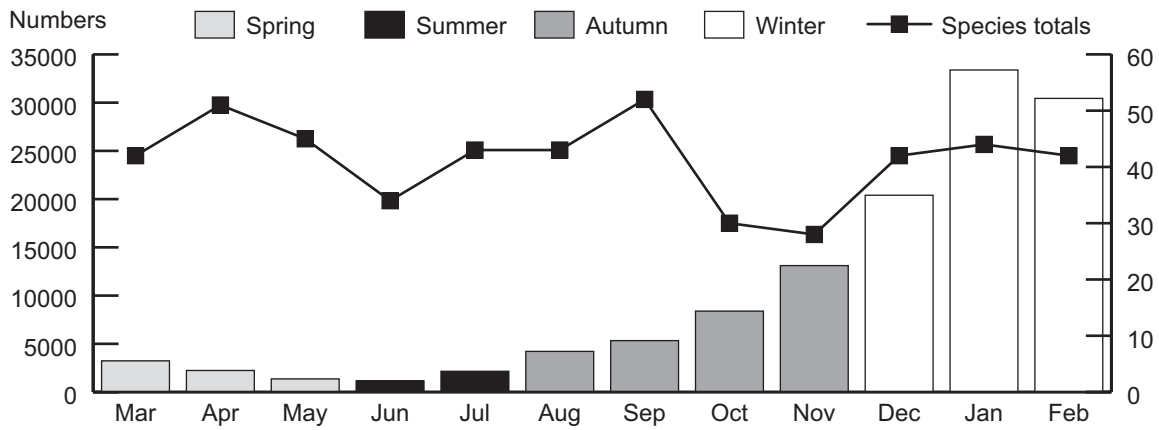


Fig. 76. Average Total Numbers and Species Number Dynamic of Waterbirds in Complex Ezero Vaya (1996-2002)

the period of survey but only 92 occur more or less regularly (**App. 1, Table 4**). Out of the latter number, the Dalmatian Pelican, the Pygmy Cormorant, the Red-breasted Goose, the Ferruginous Duck, the White-headed Duck and the Great Snipe are Globally Threatened Species. The Slender-billed Curlew has been found only once in Zaliv Chengene Skele in the immediate vicinity to the Lake Complex (Michev & Profirov, 2003).

The top ten most numerous species along with their greatest average numbers in different months of the year are shown in **Table 32**.

During the period of the survey the 1-% Ramsar criterion has been regularly exceeded in winter by the Dalmatian Pelican, the Cormorant, the Pygmy Cormorant, the White-fronted Goose, the Red-breasted

Table 32. Complex Mandrensko Ezero: The Top Ten Waterbird Species in Descending Order by their Greatest Average Monthly Numbers (the max values are in bold)

Species/Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Average Monthly Max	Absolute Monthly Max
<i>Anser albifrons</i>	39	5	0	0	0	0	0	0	0	1486	21852	17276	21852	61150
<i>Aythya ferina</i>	511	127	46	51	132	428	295	420	1413	4455	4035	2402	4455	13170
<i>Fulica atra</i>	362	30	10	10	40	275	716	1309	1723	3310	2341	1325	3310	8587
<i>Aythya fuligula</i>	370	37	1	1	14	8	7	257	492	1790	2985	1908	2985	4733
<i>Anas platyrhynchos</i>	146	26	15	40	81	108	190	427	455	2914	2087	1350	2914	11883
<i>Branta ruficollis</i>	0	0	0	0	0	0	0	0	0	8	2812	47	2812	16870
<i>Phalacrocorax carbo</i>	369	354	326	271	444	615	316	1208	1507	2560	2177	1010	2560	11052
<i>Podiceps cristatus</i>	84	70	6	6	10	24	35	53	150	1291	468	504	1291	5104
<i>Anas crecca</i>	82	4	0	0	0	0	69	324	201	974	285	235	974	3700
<i>Phalacrocorax pygmeus</i>	513	290	13	3	6	52	37	223	437	961	590	954	961	3235

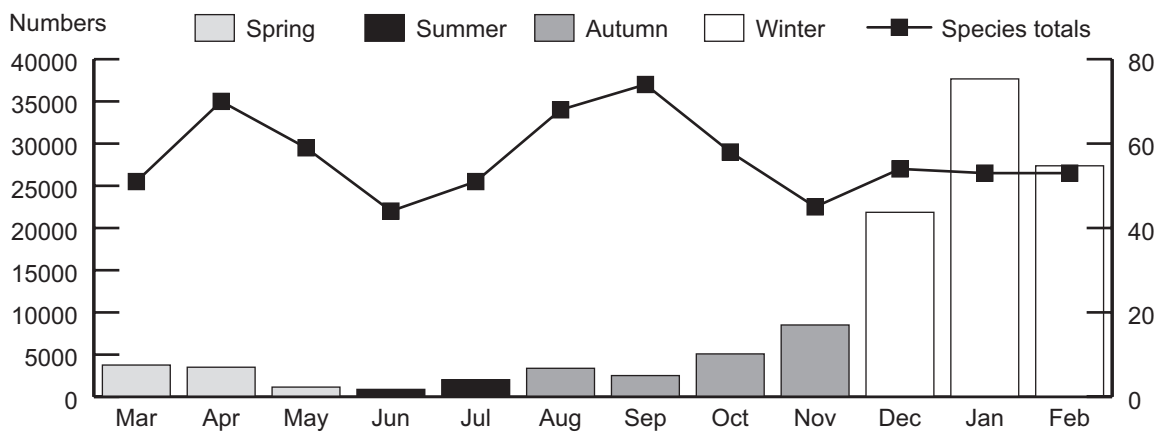


Fig. 77. Average Total Numbers and Species Number Dynamic of Waterbirds in Complex Mandrensko Ezero (1996-2002)

Goose and the White-headed Duck. In certain years of the survey, the Whooper Swan and the Pochard have also exceeded this criterion.

7.4.2. Seasonal Characteristic

The waterbirds' overall numbers at Complex Mandrensko Ezero has been highest in January and low-

est, in June. The species diversity has been greatest in April and September (**Fig. 77**).

The waterbirds' numbers at Mandrensko Ezero has exceeded 20,000 birds during December-February in most of the years of the survey.



8. Priorities for Monitoring and Importance of Bourgas Lakes for Waterbird Conservation

8.1. Priorities for Monitoring

The priorities for monitoring of the seaside wetlands of the seven Black sea countries are determined by Chernichko & Kostyushin (2003). They represent the importance of every single species as well as the national priorities for monitoring during breeding, migration and wintering periods, distributed among the countries. In the following **Table 33** these priorities are compared for the whole Bulgarian Black Sea coast and the Bourgas Wetlands.

8.2. Importance of Bourgas Lakes for Waterbird Conservation

The conservation status of the 153 species of Waterbirds, as established in the Bourgas Lakes:

- 50 species have been assigned a 'National Nature Conservation Status' according to the Red Book of Bulgaria. They are grouped as follows:

Category "Rare Species" – 16 species;
 Category "Extinct as Breeding" - 4 species;
 Category "Endangered Species" – 30 species.

- 74 species are with European nature conservation status:

Spec 1 - 8 species Spec 3 - 43 species;
 Spec 2 - 10 species Spec 4 - 13 species.

- From all 22 globally threatened species in Bulgaria (Yankov, 2002) 10 are waterbirds, that are encountered in BWC.

What is the importance and significance of Bourgas Lakes to the waterbirds as compared with other more or less significant wetlands in the rest of the country? **Table 34** gives an answer to this question.

Table 33. Importance of Waterbird Species for Monitoring in the Wetlands along Bulgarian Black Sea Coast and Bourgas Wetlands (according to Chernichko & Kostyushin, 2003) and present study (some very rare species have been not included from this table)

Abbreviations: B-breeding species, M-migrating species, W-wintering species; 1, 2, 3, 4 – level of priority (very high, high, average, low), which means the importance of the monitoring type for the country according to experts' evaluations.

Waterbirds Species along Bulgarian Black Sea Coast	Priority for the Bulgarian Black Sea Coast	Priority for the Bourgas Wetlands
Priority Breeding Species		
1. <i>Phalacrocorax pygmeus</i>	B1, M1, W1	B1, M1, W1
2. <i>Aythya nyroca</i>	B1, M1	B1, M1
3. <i>Plegadis falcinellus</i>	B1, M2	B1, M2
4. <i>Platalea leucorodia</i>	B1, M2	B1, M2
5. <i>Ciconia ciconia</i>	B2, M1	B2, M1
6. <i>Himantopus himantopus</i>	B2, M2	B1, M2
7. <i>Recurvirostra avosetta</i>	B2, M2	B1, M2, W1
8. <i>Glareola pratincola</i>	B2, M2	B2, M2
9. <i>Charadrius alexandrinus</i>	B2, M2	B1, M2
10. <i>Larus melanocephalus</i>	B2, M2	B1, M2, W3
11. <i>Sterna sandvicensis</i>	B2, M2	B1, M2
12. <i>Sterna albifrons</i>	B2, M2	B1, M2
13. <i>Tadorna ferruginea</i>	B2, M3	B2, M3
14. <i>Anas strepera</i>	B2, M3	B2, M3, W1
15. <i>Charadrius dubius</i>	B2, M3	B2, M3
16. <i>Gelochelidon nilotica</i>	B2, M3	B1, M2
17. <i>Sterna hirundo</i>	B2, M3	B2, M2

Table 33. Continued

Waterbirds Species along Bulgarian Black Sea Coast	Priority for the Bulgarian Black Sea Coast	Priority for the Bourgas Wetlands
18. <i>Tadorna tadorna</i>	B2, W2	B2, W1
19. <i>Botaurus stellaris</i>	B2, W3	B2, W1
20. <i>Ciconia nigra</i>	B3, M1	B3, M1
21. <i>Larus genei</i>	B3, M2, W3	B2, M2, W3
22. <i>Ardea purpurea</i>	B3, M3	B3, M3
23. <i>Porzana porzana</i>	B3, M3	B3, M3
24. <i>Porzana parva</i>	B3, M3	B3, M3
25. <i>Porzana pusilla</i>	B3, M3	B3, M3
26. <i>Tringa totanus</i>	B3, M3	B2, M2
27. <i>Egretta alba</i>	B3, W1	B2, W1
28. <i>Cygnus olor</i>	B3, W2	B3, W1
29. <i>Anser anser</i>	B3, W3	B4, W3
30. <i>Ixobrychus minutus</i>	B3	B3
31. <i>Anas platyrhynchos</i>	B4, M3, W2	B4, M3, W2
32. <i>Aythya ferina</i>	B4, M3, W2	B4, M3, W1
Priority Migrating Species		
33. <i>Pelecanus crispus</i>	M1, W1	M1, W1
34. <i>Anser erythropus</i>	M1, W1	M1, W2
35. <i>Branta ruficollis</i>	M1, W1	M1, W2
36. <i>Oxyura leucocephala</i>	M1, W1	M1, W1
37. <i>Numenius tenuirostris</i>	M1, W1	M1, W1
38. <i>Pelecanus onocrotalus</i>	M1	M1
39. <i>Gallinago media</i>	M1	M1
40. <i>Anas clypeata</i>	M2, W2	M2, W1
41. <i>Netta rufina</i>	M2, W2	M2, W1
42. <i>Vanellus vanellus</i>	M2, W2	B2, M2, W2
43. <i>Numenius arquata</i>	M2, W2	M2, W2
44. <i>Anas crecca</i>	M2, W3	M2, W3
45. <i>Anas querquedula</i>	M2	M2
46. <i>Marmaronetta angustirostris</i>	M2	M2
47. <i>Glareola nordmanni</i>	M2	M2
48. <i>Vanellus leucurus</i>	M2	M4
49. <i>Limicola falcinellus</i>	M2	M2
50. <i>Numenius phaeopus</i>	M2	M1, W1
51. <i>Tringa stagnatilis</i>	M2	M2
52. <i>Tringa nebularia</i>	M2	M2
53. <i>Tringa ochropus</i>	M2	M2
54. <i>Tringa glareola</i>	M2	M2
55. <i>Larus audouinii</i>	M2	M4
56. <i>Anser albifrons</i>	M3, W1	M3, W2
57. <i>Gavia arctica</i>	M3, W3	M3, W3
58. <i>Anas penelope</i>	M3, W3	M3, W1
59. <i>Mergus serrator</i>	M3, W3	M3, W3
60. <i>Calidris alpina</i>	M3, W3	M3, W2
61. <i>Anas acuta</i>	M3, W4	M3, W1
62. <i>Podiceps grisegena</i>	M3	M3
63. <i>Charadrius hiaticula</i>	M3	M2
64. <i>Charadrius morinellus</i>	M3	M4
65. <i>Pluvialis squatarola</i>	M3	M3
66. <i>Pluvialis apricaria</i>	M3	M3
67. <i>Calidris minuta</i>	M3	M3
68. <i>Calidris temminckii</i>	M3	M2
69. <i>Calidris ferruginea</i>	M3	M3
70. <i>Philomachus pugnax</i>	M3	M3

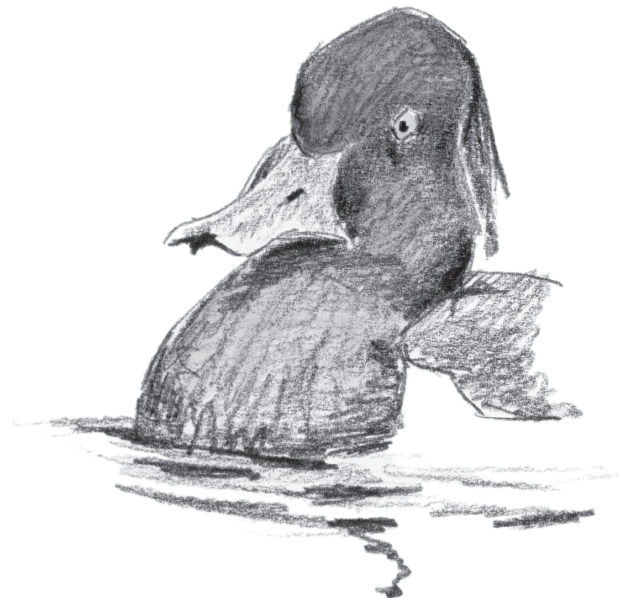
Table 33. Continued

Waterbirds Species along Bulgarian Black Sea Coast	Priority for the Bulgarian Black Sea Coast	Priority for the Bourgas Wetlands
71. <i>Gallinago gallinago</i>	M3	M3
72. <i>Limosa limosa</i>	M3	M3
73. <i>Tringa erythropus</i>	M3	M3
74. <i>Actitis hypoleucos</i>	M3	M3
75. <i>Arenaria interpres</i>	M3	M3
76. <i>Phalaropus lobatus</i>	M3	M2
77. <i>Sterna caspia</i>	M3	M3
78. <i>Chlidonias niger</i>	M3	M3
79. <i>Chlidonias leucopterus</i>	M3	M3
80. <i>Calidris alba</i>	M4, W4	M4, W4
81. <i>Gavia stellata</i>	M4	M4
82. <i>Phoenicopterus ruber</i>	M4	M3, W3
83. <i>Grus grus</i>	M4	M1
84. <i>Lymnocyptes minimus</i>	M4	M4
Priority Wintering Species		
85. <i>Cygnus columbianus</i>	W2	W1
86. <i>Cygnus cygnus</i>	W2	W1
87. <i>Aythya fuligula</i>	W2	W1
88. <i>Somateria mollissima</i>	W2	W2
89. <i>Melanitta nigra</i>	W2	W2
90. <i>Melanitta fusca</i>	W2	W2
91. <i>Mergus albellus</i>	W2	W2
92. <i>Fulica atra</i>	W2	W1
93. <i>Clangula hyemalis</i>	W3	W2
94. <i>Bucephala clangula</i>	W3	W3
95. <i>Larus ichthyaetus</i>	W3	W3
96. <i>Podiceps auritus</i>	W4	W4
97. <i>Anser fabalis</i>	W4	W4
98. <i>Branta leucopsis</i>	W4	W4
99. <i>Branta bernicla</i>	W4	W4
100. <i>Aythya marila</i>	W4	W4
Priority Monitoring Species for BWC only		
101. <i>Phalacrocorax carbo</i>		B2, M2, W3
102. <i>Ardeola ralloides</i>		B2, M3
103. <i>Haematopus ostralegus</i>		B2, M3
104. <i>Nycticorax nycticorax</i>		B2, M3
105. <i>Egretta garzetta</i>		B3, M3
106. <i>Gallinula chloropus</i>		B3, M3, W2
107. <i>Rallus aquaticus</i>		B3, M3, W3
108. <i>Podiceps cristatus</i>		B4, M4, W2
109. <i>Podiceps nigricollis</i>		B4, M3, W3
110. <i>Ardea cinerea</i>		B3, M3, W4
111. <i>Tachybaptus ruficollis</i>		B4, M4, W4
112. <i>Larus cachinnans</i>		B4, W3
113. <i>Larus ridibundus</i>		M2, W3
114. <i>Larus minutus</i>		M2, W4
115. <i>Xenus cinereus</i>		M3
116. <i>Chlidonias hybridus</i>		M3
117. <i>Limosa lapponica</i>		M4
118. <i>Stercorarius parasiticus</i>		M4
119. <i>Mergus merganser</i>		W2
120. <i>Phalacrocorax aristotelis</i>		W4
121. <i>Larus canus</i>		W4
122. <i>Larus fuscus</i>		W4

Table 34. The Place of Bourgas Lakes among the Most Important Wetlands in Bulgaria (only waterbirds have been taken into account)

Wetland	Total Species Numbers of Waterbirds	Number of Breeding Species	Number of Migrating and Wintering Species	Number of Globally Threatened Species	Number of Species exceeding 1% Level	Reference
Complex Pomoriysko Ezero	118	16	102	6	2	Profirov et al. (2002)
Complex Atanasovsko Ezero	138	32	106	10	7	Michev et al. (2004)
Complex Ezero Vaya	108	27	81	6	8	Dimitrov et al. (2004)
Poda and Zaliv Fors	121	25	96	7		Kovachev et al. (2003)
Complex Mandrensko Ezero	124	27	97	7	8	Profirov & Michev (2003)
Ropotamo WC	108	28	80	4	–	Dimitrov & Profirov (2002)
Complex Shablensko Ezero	124	28	96	4	6	Dereliev et al. (1997) and unpublished data
Complex Dourankoulashko Ezero	125	29	96	6	6	Dereliev et al. (1997a) and unpublished data
Complex Varnensko Ezero	84	20	64	4	2	Georgiev (2005) unpublished data
Complex Sreburna	84	42*	42	7	3	Michev et al. (1999)

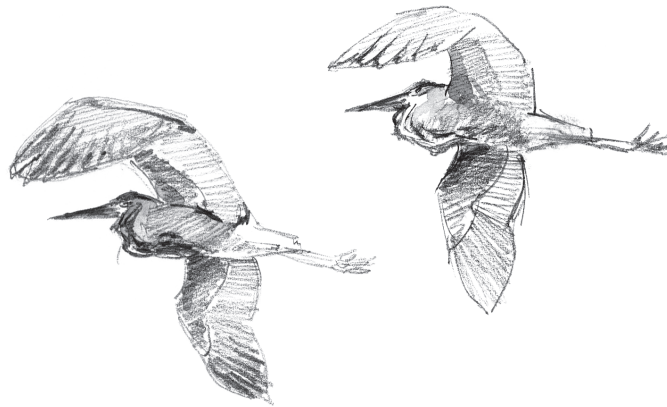
* Data supplied by Kambourova (2004).



9. Main Threats, Limiting Factors and Conservation Measures Taken for Globally Threatened Species

During the six years of the survey, the main threats and limiting factors for individual species of waterbirds at BWC and in different seasons have been established. Most these are due to the proximity of the wetlands to several industrial areas, the largest petrochemical plant in the Balkans a part of which is a system of several sedimentation and oxidation pools, the highly developed infrastructure, the substantial changes in the type of wetlands and their water condi-

tions, erecting protective dikes along the courses of rivers connected to them, the lack of protection and conservation activities, etc. All of the above has contributed more or less to the changes in numbers and species composition of the Lakes' avifauna. To a great extent, the threats that endanger individual species of Globally Threatened Waterbirds endanger also the rest of the waterbirds occurring in BWC, however abundant they may be for the time being.



9.1. Main Threats and Limiting Factors

They are given separately for the following five from the total 10 globally threatened species, typical for Bourgas Lakes.

9.1.1. Pygmy Cormorant – *Phalacrocorax pygmeus*

One of main threats for this species is the habitat degradation in Komloushka Nizina: the previous largest breeding site in Bourgas region. As a result of the development of the area (change in number and area of water bodies, sand-extraction, pollution) as well as repeatedly burning the reed beds in Ouzoun Geren and Komloushka Nizina, the last breeding colony in Bourgas Lakes (of c. 15-20 br. prs) was destroyed in 1992. For the same reasons, the breeding colony on Vaya was destroyed in the 1980s.

The illegal hunting is another important threat to the species abundance. A number of hunters go hunting out on days permitted by the law. There is no appropriate control around Vaya and Mandrensko. There

are but few occasions when Pygmy Cormorants have been shot: in Vaya, Cherny Vrukh Fishponds, Mandrensko, Ouzoun Geren and Komloushka Nizina.

The decrease of the fish-stock in Vaya and Mandrensko during the last 10 or so years, mainly because of overfishing, has probably been one of the main reasons for the disappearance of the breeding Pygmy Cormorants. Illegally set fisherman's nets in Vaya and Mandrensko are one of real threats.

9.1.2. Dalmatian Pelican – *Pelecanus crispus*

As a result of erecting dykes along the western edges of Mandrensko in the first half of the 20th century and its having been transformed into a reservoir in 1960s, some of the most spacious reed-beds in Bulgaria have disappeared along with the breeding colony of White and Dalmatian Pelicans there. Since those times, both species of pelicans have occurred at BWC only during migration and wintering.

On several occasions in 1970s and 1980s, Dalmatian Pelicans have been shot at Vaya Fishponds.

Rarely pelicans do get smeared in crude residues when on LUKoil-Neftochim oxidation pools or in other pools within the petrochemical plant proper.

Disturbing birds at roosting places in winter at Atanasovsko when the salterns' staff repairs the dykes in 2000 and 2001, or in Vaya by fishing luggers or sports boats is another negative factor moderately affecting waterbirds.

9.1.3. Red-breasted Goose – *Branta ruficollis*

During the open season for White-fronted Geese, many Red-breasted Geese are also killed, as it is very difficult to tell the Red-breasts from White fronts when both species fly together in a common flock.

Another factor of disturbance is the illegal hunting and fishing at places of roost.

Nowadays, one of the major potential threats for wintering birds is the possible loss of habitat as a result of changing the land ownership or land-use at wintering grounds.

9.1.4. White-headed Duck – *Oxyura leucocephala*

Illegally set fishing nets in Vaya and Mandrensko have been a serious threat to this species. The lack of appropriate control on hunting and fishing activities at Vaya and Mandrensko is another factor, which affects in a negative way the wintering and migrating populations. Disturbing birds at places of concentration in winter and during migration by fishing luggers and boats is another negative factor of moderate significance.

Some of the places where White-headed Ducks concentrate are still not protected.

9.1.5. Ferruginous Duck – *Aythya nyroca*

Abandoning Vaya and Cherny Vrukh Fishponds caused a loss of preferred habitats for breeding and concentration of the species.

Illegally set fishing nets in Ezero Vaya and Mandrensko Ezero are a very serious threat.

The lack of appropriate control on hunting and fishing activities at Vaya and Mandrensko is another factor affecting negatively the breeding, wintering and migrating populations.

9.2. Conservation Measures

As a result of the identification of the main threats for the Globally Threatened Species and their habitats in the region of Bourgas Lakes, the conservation measures listed below have been implemented:

- In the period 1996-2003, Management Plans for the reserve Atanasovsko Ezero and the Protected Site 'Poda' have been worked out and adopted by the MoEW. MoEW and BSPB respectively shall implement these Plans at both of the above areas;

- In the period 1999-2003, a Management Plan for the Ramsar Site 'Vaya' has been prepared and submitted to MoEW for approval;

- Between 2002 and 2003, a draft Management Plan for the Protected Site 'Pomoriysko Ezero' has been worked out. Funding has also been provided for a small GEF project on the Site sustainable protection;

- Pomoriysko Ezero has been declared Protected Area and the Protected Site 'Vaya' has been enlarged;

- In 2003, three new Ramsar Sites have been designated: Pomoriysko Ezero with an area of 814 ha, Ezero Vaya with an area of 2,900 ha and the Protected Site 'Poda' with Zaliv Foros with an area of 307 ha. An existing Ramsar Site 'Atanasovsko Ezero' has been enlarged to 1,404 ha;

- A new freshwater body at the North-eastern part of Atanasovsko has been established; it is used by many endangered and rare waterbirds, incl. vagrants as the Yellow-billed Stork (*Mycteria ibis*);

- Platforms for attracting pelicans to breed have been erected in Ezero Vaya

- Artificial islands providing nesting grounds for terns and avocets have been erected and regularly maintained in Atanasovsko Ezero, at Poda, at oxidation pools by Mandrensko and Pomoriysko Ezero;

- A new relatively big (surface of 1,600 m²) and stable islet from new design has been built in the middle of Atanasovsko Ezero;

- The lakes Vaya and Mandrensko have been stocked with fish twice;

- The channel connecting Vaya with the Black Sea has been cleaned and deepened twice;

Apart from the conservation measures mentioned above, more efforts are needed to ensure proper conservation of the exceptional biodiversity of the Bourgas lakes. One of the most urgent measures to be undertaken is to declare Mandrensko Ezero a Ramsar site. There is a plenty of evidence that the lake absolutely meets the relevant criteria. And the most important of all is the joint management of the lakes in respect of extracting the natural resources, developing the eco-tourism and conservation of their amazing biodiversity.

10. The Future of Bourgas Lakes

In order to formulate a forecast on the future of the Bourgas Lakes and their exceptionally rich avifauna we will make a short review of what have happened there during the past 100 years.

As was already mentioned above, one waterbird species has become extinct since the time of Reiser (1894) – *Anthropoides virgo*, 11 species do not breed anymore in the area of Bourgas Lakes and another eight species breed there irregularly. However, during the last 40 years the total numbers of the birds have increased by 22.1% and the numbers of the breeding species have increased by 20.2%. There is an increase in the waterbirds' numbers as well: their total numbers have increased by 23.1% and the numbers of the breeding species, by 15.7%. A couple of new waterbird species, mainly of American or Asian origin, have been recorded as vagrants or rare winter visitors. Based on this data and having in mind the general tendency towards polluting and draining of the wetlands, it could be assumed that 5 to 15 species will drop off the breeding avifauna of Bourgas lakes in the coming years. If the production of salt is discontinued in Atanasovsko and Pomoriysko, this number is going to be significantly higher.

Probably there will be more waterbirds species coming from America and Asia. Despite that, the migration and winter numbers of the waterbirds species in Bourgas Lakes are going to gradually decrease. Probably this will lead to a reduction or even suspension of the hunting activities in the Bourgas wetlands region.

Because of the global warming of climate more species which are currently wintering in southern regions will start to winter in Bourgas lakes. Thanks to the measures undertaken, the former breeding Pelican colony is going to be restored. This will most probably happen at Vaya. In its western part exists a large reed-bed, but there is a need for a small pond, which could be made with relatively little effort and funds.

In order to determine in time the unfavorable tendencies and negative factors that exert an impact on the populations of waterbirds, their monitoring will have to be implemented at least once a season. In conjunction with hydro-biological and ichthyologic monitoring it will help for better understanding the processes and phenomena that take place in these fragile and complicated ecosystems: the wetlands.

In future, the Bourgas Lakes will remain interesting to people in three main aspects. May be as the most important one we should mention the economical

because the lakes hide treasures and the possibility to exploit such deficit nature resources as fresh water, sea-salt, lye, fish, Brine Shrimp, waterfowl. With an eye on their conservation, the canals (incoming and outgoing) that link Pomoriysko, Atanasovsko and the Vaya with the Black Sea will be restored and kept in a way that the necessary exchange of seawater, fish, and so on with the lakes will become possible throughout the year. The river waters that flows into the lakes will be efficiently controlled by the administration of the Black Sea Basin.

No less important is the research, educational and tourist aspect, which will constantly extend and bring to those involved in it more and more income. The speaking here is about the growing interest Europe and the rest of the world is having in biodiversity, which is absolutely amazing in the region of Bourgas Lakes. In order to meet the constantly increasing tourist flow in the next few years, info and research centers will probably be founded at Vaya, Pomoriysko and Atanasovsko. The existing two independent salt-producing cycles in the last lake will be transformed into one and that will give more chances and space for the wildlife in its northern part. The surrounding canal of Atanasovsko will probably be turned into navigable for small vessels, which will carry birdwatchers and nature lovers.

And last but not least is the third aspect: the management of the Bourgas Lakes area. Its basis should be the fact that the lakes are an integral, complex, interrelated and very fragile ecological complex that requires an integrated management. In order to better know and manage the complex it is necessary to continue and extend the biological, ecological, ethological and monitoring observations carried out there. This also applies to visual observations on the migration of soaring birds, which will draw the attention of an increasing number of birdwatchers. The timely preparation, updating and implementation of the management plans for the individual lakes is of great importance as well, though for two of these (Pomoriysko and Mandrensko) management plans have not yet been prepared. Only through a rational, balanced and integrated management and conservation in all three aspects, the Bourgas Lakes will be preserved for the generations to come.

When reviewing the future of the lakes around Bourgas another aspect should also be taken into consideration. It is related to the rational exploitation of natural resources, the efficient conservation of the biodiversity and the modern management of all wet-

lands in Eastern Europe and mostly the Danube Delta, where the prevailing part of the migrating and wintering bird species of the Bourgas lakes have come from.

A significant role in the preservation of the birds of the BWC will also be played by the waterbirds' wintering areas in the African wetlands as well as the breeding grounds of some waders and especially the Red-breasted Geese in Siberia.

All that necessitates a wide international cooperation for the complete preservation of migratory routes and wintering and resting grounds of waterbirds. The

extension of the Ramsar sites system, the implementation of the Bonn Convention as well as the African–Eurasian Waterbird Agreement (AEWA) should guarantee the complete conservation of the wetlands in this part of the world.

All that makes the wide international cooperation for the complete preservation of migratory routes and wintering and resting grounds utterly necessary. The expansion of the R.S. system, the implementation of the B.C. as well as the AEWA should serve as a guarantee for the overall conservation of wetlands in this part of the world.



ÂÎ Ä ÎĒΡΆΕΆÈÒÀ ÌÒÈÖÈ ÍÀ ÁÓΘΆΑÑĒÈÒÀ ÂĒÀÆÍÈ ÇÌ Í È

Đàçöèòàòè è ìòáíéà íà ìàñá÷íèÿ ìííèòíðèíá íà âî ä îĒρáéáèòà ìòèòè (1996-2002)
Ìèèí Àèìèòðíá, Õáíρ Ìè÷áá, Ēρáíìèð Ìðíòèðíá, Ēííñòàíòèí Ìÿáí èí â

(Đàç ò á)

Á èíèáàòà ñà ìðááñòàááíè ðàçöèòàòèòà ìò 6 áíáè-
ðáí áæáíáñá÷áí ìííèòíðèíá íà áíáíĒρáéáèòà ìòè-
òè áúá àèàæíèòà çííè ìéí èí Áóðáñ (áçáðà, áèàòà,
ðàçèèáè, óñòèÿ, ìðñèè èðáéáðáæèÿ, ðèáàðíèòè,
ÿçíáèðè è äð.). Õà ñà ðàç ìííè áæáíè à Ēçòí÷íà Áúè-
áðèÿ, ìí çàíááíòí èðáéáðáæèá íà ÁóðáñĒèèÿ çà-
èèà á íáíñðááñòàáíá áèèçíñò áí äð. Áóðáñ ñ íà-
ñááíèá ìéíèí 200,000 æèòáèè. Íáúàòà ìéí ìà
áèàæíèòà çííè á ìéíèí 9,200 ñà (**Ēàðòà 1**).

Á óáííáòà ÷áñò ìà èíèáàòà á íáðáááí èðáòúè ìðáá-
èáá íà áíèÿíòí çíá÷áíèá, èíáòí òíçè èííèááñ èíà
çà ìèððèòáúèòà, çèíòááúè è áíáçááúè áíáíĒρ-
áéáè ìòèòè. Ìñííáíèÿ òáèòíð, èíèòí ìðáááèÿ áí-
èÿíòí áèíèíáè÷íí ðàçííáðáçèà íà òíçè ðáéíí, á
ñíáòèòè÷íòí ìó áèíááíðáðáññèí ìííèááíèá. Ìí÷è
áñè÷èè ìòèòè ìò Ēçòí÷íà Ááðííà è íáé-áá÷á ìò Ááè-
òàòà íà ð. Áóíáá ìðáñè÷áò òáðèòíðèÿòà íà Áóðáñ-
èòà áèàæíè çííè ááá ìúòè á áí áèíáòà. Áí èÿíà ÷áñò
ìò òáçè ìòèòè ìñòááòò á òÿò çà çèíòááíá.

Ìííèòíðèíáúò ìà áèàæíèòà çííè è áíáíĒρáéáèòà
ìòèòè á ìæáò ìáòèííáèíèòà ìðèíðèòáòè, èíèòí áñÿ-
èà ñòðáíà ñèáááà áà ìðèèááà èáòí çááúèæáíèÿ ìí
ááá ìáæáóíáðíáíè èííááíòèè - ðáíñáðñèàòà è Áíí-
ñèàòà. Õíé á ìòèè÷íí ñðááñòáí çà ìðíñèááÿááíá íà-
òèííáèíèòà ìííòèáòèè íà áíáçááúèòà ìòèòè, à òá-
èà ñúíí è íà ìðííáíèòà á ìííòèáòèèòà íà ìèððè-
òáúèòà è çèíòááúèòà áèáíáá ìòèòè ìò Çàíááíá Ìá-
èááðèòèèá. Áí ìííáíòà ìíáíááí òáèíáíáèðáí ìí-
íèòíðèíá ñ áæáíáñá÷íè íááè ðááíèÿ á ìðááíèçèðáí
çà ðáçáðááòà Ñðááúðíá ìò Paspaleva & Michev
(1968), çà Àòáíáñíáñèíòí áçáðí ìò Roberts (1976) è
íáíñèááúè çà áèàæíèòà çííè á Ñíòèèñèíòí ìíèá
çà ìáðèíá 1992-2002 (Nankinov et al., 2004).

Á ñèááááúàòà ÷áñò “ìàðáðèáèè è ìáòíáè” ñà ìíèñ-
áàò ìá÷èíèòà, ìáñòàòà, ìáðèíáèòà è áðáíáòðááíá-
òí íà ñúáèðáíá íà èíòíðíáòèÿòà. Ááííèòà çà Áóð-
áñĒèèòà áçáðà ñà ñúáèðáíè ìðááèíí ááá ìúòè ìá-
ñá÷íí (ááèí ìúò á ìáñáòà ìí áðáíá íà áíáçááíá) á
ìðíáúèæáíèá íà 6 áíáèíè (1996-2002), Ñ ìííúòà
íà òáçè ááííè á áíèáçáíá ìáæáóíáðíáíáòà
çíá÷ííò ìà ÷áòèòèòà ÁóðáñĒèè áçáðà èáòí ìáñòà
çà èííóáíòðáòèè íà áíáíĒρáéáè ìòèòè ìí ðáíñáð-

ñèèÿ èðèòáðèè çà 1-% çíá÷ííò ìà ÷èñááíñòòà
íà ìðáááèáíè áèáíáá. Ñúáðáíèòà ááííè ñà èç-
ííèçááíè è çà ìíèñáíèáòí ìà ÷áòèòèòà ìáñòà á ðú-
èíáíáñòáíòí íà Áçíáñèí÷áðíííðñèèòà èðáéáðáæ-
íè áèàæíè çííè, ìóáèèèóááíè ìðáç 2003 á, èáèòí è
ìðè ìíááíòíáèàòà íà áíèóíáíá “Ñòðáòááèÿ çà ìí-
íèòíðèíá íà áíáíĒρáéáè ìòèòè á ÷áðíííðñèèÿ ðá-
áèíí” (Chernichko & Kostyushin, 2003).

Ìííèòíðèíáúò ìà áíáíĒρáéáèòà ìòèòè á Áóðáñ-
èèòà áçáðà á ðáçááèáí ìà òðè ìáðèíá – ìúðáèÿò -
ìò 15 ÿíóáðè 1996 á. áí 20 ìáðò 1997 á, áòðèÿò -
ìò 15 ñáíòáíáðè 1998 á. áí 15 ááèáíáðè 1999 á. è
òðáòèÿò – ìò 1 ÿíóáðè 2000 á. áí 31 ááèáíáðè 2002
á Õÿóíòí ìáíðíÿíá á ñáúðçáíí íáé-áá÷á ñ òè-
íáíñíáèòà áúçííæííñòè ìðáç ðáçèè÷èòà áòáíè ìò
èçíúéíáíèáòí íà ìðíáèòà “ÁóðáñĒèè áèàæíè çííè”

Ì óááèíè íááè ðááíèÿ ñà áèè ð÷áíè è èçáúí ìí-
ñí÷áíèòà ìáðèíáè ìà èçñèááááíá. Ìò áñè÷èè ñúá-
ðáíè ááííè á ñòíðèòðáíá ááíá òèííòáòè÷íá “ñðáá-
íá” áíáèíá. Á íáÿ ñðááíáòà ÷èñááíñòò ìò áñè÷èè
ìáèñèíáèíè ÷èñááíñòòè çà ðáçèè÷èòà áíáèíè ìðè
ðáçèè÷èòà áèáíáá ìáðáèòáðèçèðáò ñíáòèòè÷íáòà
áèíáíèèá íà ñúíòááòíèÿ áèá. Ñ óáè èçÿñíÿááíá íà
òáçè èáðòèíá, íáðáòà òèííòáòè÷íá áíáèíá çáíí÷áá
ñ ìðíèáòíáòà ìèáðáòèÿ (ìáðò, áíðèè, ìáé -
ìóááèÿçáíè ìà òèáòèòèòà á ñááòèí ñèáí), ñèááááíá
ìò áíáçáíáè ìáðèíá (ðíè è ðèè - ìóááèÿçáíè ìà
òèáòèòèòà á ÷áðíí), áñáííá ìèáðáòèÿ (áááòñ, ñáí-
òáíáðè, ìèòííáðè è ííáíáðè - ìóááèÿçáíè ìà
òèáòèòèòà á òúíí ñèáí) è çááúððáá ñúñ çèíòááíá
(ááèáíáðè, ÿíóáðè è óááðóáðè - ìóááèÿçáíè ìà
òèáòèòèòà á áÿèí). Ēçèèð÷áíèá ìò òíáá ìðááèèí á
íáíðáááíí ìðè áúæáíñáèðòíáèòà ìòèòè, çà èíèòí
áñáííáòà ìèáðáòèÿ çáíí÷áá ìí-ðáíí - ìúá ìðáç ðèè.

Ñòíèíñòèòà çà ÷èñááíñòòà ìà áèáíááòà ñà ìòíáíáíè
áèíááè èúí ìúðáí èèè 15-òí ÷èñèí íà ìáñáòà, íáçááè-
ñèí ìò òíáá, ÷á èííèðáòíáòà ááòà íà ìííèòíðèíáá ìíæá
áá á áèèá ìò 1 áí 3 áíè ìí-ðáíí èèè ìí-èúñíí.

Ìííèòíðèíáúò ìáòáúà áñè÷èè áñòáñòááíè è ìÿ-
èíè ìíááðáíè èçèóñòááíè áíáíáíè á ðáéííá íà Áóð-
áñĒèèòà áèàæíè çííè.

Ìò÷:àòóó ìà àñè÷:èè àèàæíè çííè íèíèí Áóððàñ àèèþ÷:àà ìàðððóó ìò íèíèí 300 km, à ìðàç çèìàòà - 420 km. Çà ìððààèÿíà ìà àèàíàèÿ è èíèè÷:àñòàáí ñúñòàà ìà ìòèòèòà ñà èçííèççààíè àèííèè “Nikon” 10 x 50 è çðèòàèíà òðóàà “Kowa”. Á ìðàáðíÿààíàò ñà èçííèççààíè è ìííàñòàí òí ìàáèþàòàèíè ìóíèòí àà çà ìííèòíðèíà, ìíàáðàíè è èçííèççààíè ìí àðàíà ìà ñðàà ìíç:èííòí ìðàáðíÿààíà ìò 1977 ã. ìàñàí.

Ìí àðàíà ìà èçñèààààíàòí òðè ìíèàòà ñúñ ñàíí-èàò “Gavron” è òàèèèííòàð K-26 áÿòà ìñúòàñòàáíè ñ òàè àà ñà ìòàíÿò àíàççàíàèòà èíèííèè ìà ìòèòèòà à òðúñòèèíàèòà ìàñèàè ìà àçàðòàòà, èàèòí è àà ñà òóí÷:íè òÿòíòí ìðíñòðàíñòàáíí ðàçíðàààèèàíèà.

Ìðè ñúñòààÿÿíà è ìíððàèàáíà ìà ñíèñúòèòà ñ ìàá-èþààààíèòà àèàíàà ìòèòè à èçííèççààíà ìííàíè-èàòòðàòà ìà Snow & Perrins (1998). Áíàèèññèòà ìàèíàííàíàíèÿ ñà àààáíè ìí Beaman & Madge (1998). Çà ìÿèíè àèàíàà à èçííèççààí ìíðíàà ìà Svensson & Grant (1999) çà ìððààèÿíà ìà àíàèèñ-èèòà ìííóèÿðíè èíàíà, ìðèàòè çà ìàæàóíàðíàíà òííòðààà è òàóíèòà ìúèíè èíàíà à ñèíàè. ìÿèíè àèàíàà, ìààèò ìà ñíàòèàèíè èçñèàààíèÿ ìí àðà-ìà ìà àñàíàíàòà ìèàðàòèÿ à ìàðèíàà ìðààè ìàñòí-ÿúíòí ìðíò÷:àáíà (ðíçíàèÿò ìàèèèàí, àáèèÿò è ÷:àð-ìèÿò ìúðèàè è ìàèèííààíèÿò æàðàà), à èíèàòà ñà àààáíè ñàíí ñ èðàòèè àáèàæèè. Çà èííàòàðèàòà, ìàèèèÿ èíðíðàí, ÷:àðàáíèÿ àíàú÷, òðúíííàøà-òàòà ìðàííèòà ìðàç 1996-2002 ã. ñà ìðíààáíè ìò-àáèíè èçñèàààáíèÿ. ìÿèíè ìò ðàçóèòàòèòà ñà ìóá-èèèóááíè ñàííñòíÿòàèíí.

Òèàðíèíàè÷:íèòà àáííè çà àçàðòàòà ñà ìí Ivanov et al. (1964) è Profirov & Michev (2003).

Ìððàààèÿíàòí ìà 1-% ìðàà ìà ìàæàóíàðíàíà çíà÷:èíñò ìí Ðàíàððñèàòà èííàáíòèÿ à ìí Wetlands International (2002).

Áúèààðñèèòà èíàíà ìà àèàæíèòà çííè ñà èçíèñàíè ìà èàòèíèòà ñúàèàíí Danchev et al. (1989).

Ñèàà àèàààòà “ìàòàðèàèè è ìàòíàè” à àààáíà èðàò-èà òèçè÷:àñèà òàðàèòàðèñòèèà ìà ÷:àòèòèòà Áóððàñ-èè àçàðà. Òÿ à à ñèàáíèÿ ðàà: ìíèñàíèà ìà ìÿñòí òí, ñíàñòàáííñò ìà çàíÿòà è èçííèççààíà, òèíðèñòè÷:íà ñòíèííò, òàóíà, ìðàáíðèàòè ìàðèè çà ìíàççàíà, òèàñíàíèÿ çà èçñèàáíàòàðèñòèà ðàáíòà, ðíèÿ ìà ìá-ùàñòàáíàòà èíòíðèèðàííñò è ìàðàçíàáíèà.

Àèàààòà “Ìðààèèà ìà ìðààèíèòà àèàíàà” àèèþ÷:àà 153 àèàà àí à ìèþàèè ìòèòè (àáç àðààèèè è ìíè-ìè àèàíàà ìòèòè, ÷:èòí æèçíàí òèèúè ñúíí à ñàúð-çàí òÿñíí ñ àí ààòà). Òàèñòóò çà àñàèè àèà çàíí÷:àà ñ ðòàðèèà çà ìàáíàèÿ ñòàòóñ, èíèòí à àààáí ìí èà-òàáíðèèòà ìðèàòè à “The Status of Birds in Britain and Ireland” (BOU, 1971) ñ ààà àííúèíèòàèíè èàòà-àíðèè - “Ìííàí ðÿáúé” è “Ðÿáúé”.

Ñèààààòàòà ðòàðèèà “÷:èñèàííñò” àèèþ÷:àà àáí-ìè ìò ìàèñèìàèíèòà ñòíèííòè ìí ñàçííè çà àñÿ-èí àçàðí, òñòàííàáíè ìðàç ìàðèíàà ìà èçñèààà-íà. ÷:èñèàííñòòà à ìííí÷:àíà à èíàèàèè, à ìà à ñíàççàíàè àáíèèè.

Ðòàðèèàòà “Áí àçàáíà” ñúàúðæà èíòíðíàòèÿ çà àíàç-àíààòà ÷:èñèàííñò, òñòàííàáíà ìðàççàí àèíèòà ìà èç-ñèàààáíà è à ìÿèíè ñèò÷:àè çà ìí-àúèúá ìàðèíà. Òàçè èíòíðíàòèÿ àèèþ÷:àà ñúíí àáííè ìò èèòàðà-òòàòà, ìò ìàíóáèèèóááíè èè÷:íè àáííè ìà ààòíðèòà, à òàèà ñúíí è òñòíè ñúíàúàíèÿ ìà ìðíèòíèíçè ìò Áúèààðèÿ è ÷:óæàèíà. ìÿèíè àáííè çà àíàççààúèòà ðèàáðèè è àúæàííàèòòíàè ìòèòè ìè áÿòà ìðàáíñ-òààáíè èþàáçíí ìò Òàààðàòèÿ “Çàèàíè Ààèèàíè” çà ìííðèèññèòí ìàçàðí è ìò Èèðèè Ààààà çà ìèèñè-òàèíèòà àçàðà ìà “Èóè Ìéè”. Èçííèççààíè ñà ñúíí è àíèèààè ìà ìðèðíàíçàùèòèÿ òáíóúð Ìíàà, èàèòí è àáííè ìò ìðèðíàíçàùèòèÿ ìóçàè Áóððàñ.

Òàèñòóò çà àñàèè àèà à ÷:àñòà “Àèíàìèèà ìà àèàí-ààòà” à ìðààñòààáí ìí ñàçííè.

Ìíèñàíèàòí ìà àèàíààòà à ìíñèàààáí ìò àèààà “Ìáú ìðààèèà ìà àèàíàíòí ðàçííàðàçèà ìà Áóð-æñèèòà àçàðà”. Ðàçóèòàòèòà ìíèàççàà ÷:à ìáúí 149 àèàà àíàíèþàèè ìòèòè ñà ìðààñòààáíè à ðàííà ìà àçàðòàòà ñ èçèèþ÷:àíèà ìà 4 àèàà, èíèòí ñà ìò ðàçàúàíèòè èèè ñ ìáòí÷:íàí ìðíèçòíà. ìòèòèòà ìà àçàðòàòà ñà ðàçíðàààèàíè ìí ñèàáíèÿ ìà÷:èí: ìíñòí-ÿííè - 17 àèàà, àíàççààùè èàòíè ìíñàòèòàèè - 23 àèàà, ìàáíàççààùè èàòíè ìíñàòèòàèè - 34 àèàà, 103 àèàà ìðíèàòíè ìèàðàíòè, 105 àñàííè ìèàðàíòè, 92 àèàà çèìòààùè è 22 àèàà ñèò÷:àèíè (àààðàíòè).

Á ðàçóèòàò ìà ìðíò÷:àáíàòí à òñòàííàáíí, ÷:à ìáúà-òà àíàèòíà ÷:èñèàííñò ìà àíàíèþàèèòà ìòèòè à Áóððàñèèòà àçàðà ñà ìðíàíÿ ìò 165,300 àí 500,000 àèç. èèè ñðàáíí 324,000 ìòèòè àíàèòíí. Èàòí ñà èìà ìðàààèà, ÷:à ìáúàòà ìèíù ìà Áóððàñèèòà àèàæ-ìè çííè à 9,200 ha, òí ñðàáíàòà àíàèòíà ìèúóííñò ìà àí à ìèþàèèòà ìòèòè à 35.2 ìòèòè/òàèòàð. Òàçè òèòðè ìà ìíàò àà áúààò ñðàáíàíè ñ àðòàè àèàæíè çííè à ñòðàíàòà ìðààè èèíà ìà àáííè.

Á Áóððàñèèòà àçàðà ìàè-ìííàí àíàíèþàèè ìòèòè çà àáíà àí àèíà ñà ìðàáðíàíè ìðàç 2000 ã - 502,900 àèç. Àèí èúí òÿò ìðèàààè è ðààù èòà ñà àíàíèþàèè ìòèòè, èíèòí ààà ìúòè ìðàç àíàèíàòà ìðàíèàààò ìðàç àèàæíèòà çííè íèíèí Áóððàñ, òí ìáúàòà àíàèòíà ÷:èñ-èàííñò ìà áúàà ìèí èí 1 ìèí àí à ìèþàèè ìòèòè. Òí-àà à òàúðàà òáíàí ìðèðíàáí ðàñóðñ, èíèòí àñà ìà ìà ìàíííààòàèíí àèàà ìíàòáíÿàáí è ìðàíàðàðàááí.

Á Áóððàñèèòà àçàðà ìàè-ìííàí÷:èñèàíè ñà àíàíèþ-àèèòà ìòèòè ìðàç çèìèòà ìàñàòè - ÿíóàðè è òàà-òòàðè. Òíàààà òÿòíàòà ÷:èñèàííñò à ìèí èí 32,000 ìòèòè, èàòí ìàè-ìííàí à áúçèèçàèà ìà 186,448 (ÿíó-àðè 1997 ã), èí ìà òàíòèòàèíè àèàáíí à ìàíàðà è Àáÿ.

Α αεααααδὰ “Αύεαίνθδῖ-ιέ ἰθῖιαιέ ἀ ἰθῖεοἰοαοῖα-οὰ ἰὰ Αόδᾶαἡεὲοὰ ἀçáðà” ἀ εçáυðøáῖἰ ἡðᾶáἰαιέᾶ ἡ ἁáἰιέοᾶ ἰὰ Reiser (1894), Ἰðῖἡòἰᾶ (1964) ἔ Rob-erts (1981).

Εᾶçøéòᾶèèòᾶ, ἰῖέο-ᾶἰέ ἰἰ ἁðᾶἰᾶ ἰὰ εçἡεᾶᾶᾶἰᾶοἰ, ἡᾶ εçἰῖεçᾶἰέ ἔ çᾶ ðᾶçðᾶἰòᾶἰᾶ ἔ ἁέἰεἰᾶε-ἰᾶ ἰοᾶἰεᾶ ἰὰ Αόδᾶᾶἡεὲοὰ ἀçáðà, ἁέεþ-ᾶἰᾶ ἁ ἁεᾶᾶᾶδὰ “Ἰòᾶἰεᾶ ἰὰ ἰοᾶᾶεἰεὲοᾶ ἁεᾶᾶεἰέ çῖἰέ ἰò ἰθῖεòἰεἰ-ᾶε-ἰᾶ ἁεᾶᾶἰᾶ ðῖ-εᾶ”. Çᾶ ἁἡῖεᾶ ðᾶðèòἰðèῖ ἁ ἰᾶἰðᾶ-ᾶἰᾶ ἁεᾶἰᾶᾶ ἔ ἡᾶçῖἰᾶ ðᾶðᾶεòᾶðèἡòèèᾶ, ἔᾶòἰ 10-òᾶ ἰᾶε-ἰἰἰᾶἰ-εἡεᾶἰέ ἁεᾶἰᾶᾶ ἡᾶ ἁέεþ-ᾶἰᾶ ἁ ἡἰῖòᾶᾶò-ἰέ ðᾶᾶεèòè. Õᾶ ἡᾶ ἰᾶᾶᾶεἰᾶἰέ ἁ ἡεᾶᾶἰᾶòᾶ ἰᾶῦᾶ ðᾶᾶ-èèòᾶ, εῦᾶᾶòἰ ἁεᾶἰᾶᾶòᾶ ἡᾶ ἰἰᾶðᾶᾶἰέ ἁ ἰᾶἰᾶεῖ-ᾶᾶῦ ἰἰðῖᾶῦé ἰὰ òῖðἰᾶòᾶ ἰᾶεἡεἰᾶεἰᾶ ἡðᾶᾶἰ-ἰᾶ-ἡᾶ-ἰᾶ ἰ-εἡεᾶἰἡò ἔᾶèòἰ ἡεᾶᾶᾶ:

ðᾶ çᾶᾶεἡé ἁἰ ἁἰεῖῖᾶ ἡðᾶἰᾶἰ ἰò ðᾶçøἰἰἰòἰ εç-ἰῖεçᾶἰᾶ ἰὰ ἰðèðἰᾶἰεòᾶ ðᾶἡòðἡé, ἁòεᾶᾶἡἰἰòἰ ἰἰᾶçᾶἰᾶ ἰὰ ἁéἰεἰᾶε-ἰἰòἰ ðᾶçῖἰᾶἰᾶðᾶçéᾶ ἔ ἰἰ-ᾶᾶðἰἰòἰ òἰðᾶᾶéᾶἰéᾶ ἰᾶ:

- Õᾶεèῖò ἔἡἰεᾶἡἡ ἰὰ Αόδᾶᾶἡεὲοὰ ἁεᾶᾶεἰé çῖἰé;
- Ἀἡε-ἔε ἁεᾶᾶεἰé çῖἰé ἰò εçòἰ-ἰᾶòᾶ ἰἰεἰᾶεἰᾶ ἰὰ Ἀᾶðἰᾶ ἔ ἰᾶé-ᾶᾶ-ᾶ ἰὰ Ἀᾶèòᾶòᾶ ἰὰ ð. Ἀóἰᾶᾶ, ἰðéῦ-ᾶᾶòἰ éᾶᾶᾶ ἰðᾶἰᾶéᾶᾶᾶᾶᾶᾶᾶᾶ ἰò ðᾶᾶᾶ ἰò ἰεᾶðèðᾶῦèòᾶ ἔ çèἰòᾶᾶῦè ἰðèèè;
- ἰᾶἡòᾶòᾶ çᾶ çèἰòᾶᾶἰᾶ ἁ Ἀòðèèᾶ.

Ἀἡε-ἔἰ ðἰᾶᾶ ἰᾶεᾶᾶᾶ øèðἰéἰ ἰᾶᾶᾶòἰᾶðἰᾶἰἰ ἡῦò-ðòᾶἰé-ᾶἡòᾶἰ çᾶ òῖεἰἡòἰἰ ἰἰᾶçᾶἰᾶ ἰὰ ἰðᾶᾶòἰeòᾶ

Ἐἡἰεᾶἡἡ ἰἡἰðèéἡéἡἰ ἁçᾶðἰ		Ἐἡἰεᾶἡἡ Ἀòἰᾶἡἰᾶἡéἡἰ ἁçᾶðἰ		Ἐἡἰεᾶἡἡ Ἀóðᾶᾶἡéè ἁçᾶðᾶ	
1	<i>Fulica atra</i> 4300	1	<i>Fulica atra</i> 4584	1	<i>Anser albifrons</i> 45545
2	<i>Calidris ferruginea</i> 1220	2	<i>Larus ridibundus</i> 4200	2	<i>Aythya ferina</i> 14387
3	<i>Aythya fuligula</i> 974	3	<i>Anser albifrons</i> 3789	3	<i>Fulica atra</i> 12000
4	<i>Aythya ferina</i> 950	4	<i>Anas platyrhynchos</i> 3316	4	<i>A. platyrhynchos</i> 9232
5	<i>Larus melanocephalus</i> 922	5	<i>Tringa totanus</i> 2284	5	<i>Aythya fuligula</i> 7176
6	<i>Larus ridibundus</i> 783	6	<i>Recurvirostra avosetta</i> 2096	6	<i>Larus ridibundus</i> 5962
7	<i>Sterna sandvicensis</i> 696	7	<i>Anas crecca</i> 1872	7	<i>Branta ruficollis</i> 3981
8	<i>Calidris minuta</i> 595	8	<i>Larus melanocephalus</i> 1546	8	<i>Ph. carbo</i> 4138
9	<i>Tringa totanus</i> 448	9	<i>Tadorna tadorna</i> 1440	9	<i>Ph. pygmeus</i> 3626
10	<i>Tadorna tadorna</i> 418	10	<i>Calidris ferruginea</i> 1418	10	<i>Anas crecca</i> 3153
	Ἰᾶῦᾶ ἰ-εἡεᾶἰἡò 6057		Ἰᾶῦᾶ ἰ-εἡεᾶἰἡò 15649		Ἰᾶῦᾶ ἰ-εἡεᾶἰἡò 92758
	Ἰᾶῦ ἁðἰé ἁεᾶἰᾶᾶ 96		Ἰᾶῦ ἁðἰé ἁεᾶἰᾶᾶ 101		Ἰᾶῦ ἁðἰé ἁεᾶἰᾶᾶ 108

Ἐἡἰεᾶἡἡ Ἀçᾶðἰ Ἀᾶῖ		Ἐἡἰεᾶἡἡ ἰᾶἰðᾶἰἡéἡἰ ἁçᾶðἰ	
1	<i>Anser albifrons</i> 21072	1	<i>Anser albifrons</i> 21852
2	<i>Aythya ferina</i> 10020	2	<i>Aythya ferina</i> 4455
3	<i>Aythya fuligula</i> 4117	3	<i>Fulica atra</i> 3310
4	<i>Anas platyrhynchos</i> 2762	4	<i>Aythya fuligula</i> 2985
5	<i>Phalacrocorax pygmeus</i> 2462	5	<i>Anas platyrhynchos</i> 2914
6	<i>Pelecanus onocrotalus</i> 2093	6	<i>Branta ruficollis</i> 2812
7	<i>Phalacrocorax carbo</i> 1732	7	<i>Phalacrocorax carbo</i> 2560
8	<i>Anas clypeata</i> 1593	8	<i>Podiceps cristatus</i> 1291
9	<i>Branta ruficollis</i> 1082	9	<i>Anas crecca</i> 974
10	<i>Larus cachinnans</i> 913	10	<i>Phalacrocorax pygmeus</i> 961
	Ἰᾶῦᾶ ἰ-εἡεᾶἰἡò 33387		Ἰᾶῦᾶ ἰ-εἡεᾶἰἡò 37765
	Ἰᾶῦ ἁðἰé ἁεᾶἰᾶᾶ 78		Ἰᾶῦ ἁðἰé ἁεᾶἰᾶᾶ 102

Ἐἰεᾶᾶòᾶ ἰðἰᾶῦεᾶᾶᾶ ἡ ἁεᾶᾶᾶòᾶ “Ἰðèἰðèðᾶðè çᾶ ἰἰ-ἰéòἰðèἰᾶᾶ ἔ çἰᾶ-εἰἡò ἰὰ Αόδᾶᾶἡεὲòᾶ ἀçᾶðᾶ çᾶ ἰἰᾶçᾶἰᾶ ἰὰ ἁἰᾶἰεþᾶεᾶèòᾶ ἰðèèè; ἡἡἰᾶἰé çᾶἰεᾶ-òè”. Ἰἡἰᾶἰéòᾶ çᾶἰεᾶòè, èèἰèðèðᾶῦèòᾶ ðᾶèòἰðè ἔ ἰðᾶἰðèᾶðèòᾶ éἰἡἡᾶðᾶᾶòèἰἰé ἰᾶðèè èèè ðᾶèèᾶᾶ ἰᾶἰᾶðἰᾶèἰé çᾶ ἰ-ᾶἡò ἰò ἡᾶᾶðἰᾶἰ çᾶἡòðᾶøᾶἰéòᾶ ἁε-ᾶἰᾶᾶ ἡᾶ ἰðᾶᾶἡòᾶᾶἰé òé.

“Αῦᾶᾶῦᾶòἰ ἰὰ Αόδᾶᾶἡεὲòᾶ ἀçᾶðᾶ” ἁ ἡἡεᾶᾶἰᾶ-òᾶ 10-òᾶ ἁεᾶᾶᾶ, εῦᾶᾶòἰ ἁ ἁᾶðè ὑðèèè ἡᾶ ἰ-ᾶðòᾶ-ἰé ᾶᾶἰðᾶἰéἰéòᾶ ᾶῦᾶᾶῦè ἰðἰᾶἰé èᾶèòἰ ἁ ἀçᾶ-ðᾶòᾶ, ðᾶèᾶ ἔ ἁ ἰᾶἡᾶéῖᾶῦèòᾶ ᾶè ἁἰᾶἰeþᾶéᾶè ἰðè-èè. Ἰἡἡἰ-ᾶἰἰ ἁ, ἰ ᾶ ᾶῦᾶῦᾶòἰ ἰὰ Αόδᾶᾶἡεὲòᾶ ἀçᾶ-

ἰῦèèῦᾶ ἔ ἰᾶἡòᾶòᾶ çᾶ çèἰòᾶᾶἰᾶ ἔ ἡἰ-εᾶèᾶ ἰὰ ἁἰᾶἰ-εþᾶéᾶèòᾶ ἰðèèè.

Ἐçòῦéἰᾶòᾶ ἁ ἰᾶἰᾶðἰᾶèἰἡòòᾶ ἰò ἰᾶῖᾶῖᾶᾶἰᾶòἰ ἰὰ ἰᾶἰðᾶἰᾶἡéἰòἰ ἁçᾶðἰ çᾶ ðᾶἰᾶðἡéἰ ἰῖἡòἰ ἔ ἰò εç-ᾶἰòᾶῖᾶ ἰὰ ἰεᾶἰᾶᾶ çᾶ òἰðᾶᾶéᾶἰéᾶ ἰὰ ἰἡἰðèéἡ-éἰòἰ ἔ ἰᾶἰðᾶἰᾶἡéἰ ἁçᾶðἰ.

Ἐῦἰ éἰεᾶᾶòᾶ èἰᾶ 3 ἰðèéἰᾶἰéῖ. Ἰῦðᾶἰòἰ ἰðèéἰ-ᾶᾶἰéᾶ ἡῦᾶῦðᾶᾶ ἡðᾶἰéòᾶ ἰᾶἡᾶ-ἰἰ ἰ-εἡεᾶἰἡòè (ἰò 6 ἁἰᾶἰé) ἰὰ ἁἡε-ἔε òἡòᾶἰᾶᾶἰé ἁεᾶἰᾶᾶ ἁ 4-òᾶ Αóð-ᾶᾶἡéè ἀçᾶðᾶ ἰðᾶç ἡῦῦéῖ ἰᾶðèἰᾶ. Ἀ ἰðèéἰᾶἰéᾶ 2 ἁ ἰἰἰᾶἡòᾶἰᾶ ἡðᾶἰéòᾶἰéᾶ ðᾶᾶéèòᾶ çᾶ ᾶἰἰéòᾶ ἰᾶ

Roberts (1981) è íàñòíγùíòí òðíó÷àáíá. Á òðèéí-æáíèá 3 ñà áèèð÷áíè òí÷íè èííðàèíàòè íà íàé-èèð÷íàèòá òí÷èè òò 4-òá áçáðà íéííí Áóðãáñ, éíá-òí óèáñíγáà òííáí íàíèðáíáðí èí ááç òíííùòà íà áíáá÷è èèè òíííáðáðñèè èáðòè.

Éíòíðíàòèγòà, òðááñòáááíá á éíèáàòà, òíæá àà áúáá èçííèçááíá çà ñðááíáíèá òæáó ÷èñèáííò-òà è áèáíáèγ ñúñòáá íà áíáíèðáèèèòá òèèè á èí-íèáèñà íà Áóðãáñèèèòá áèáèíè çííè ñ áðóáè èíí-èáèñè á Áúèááðèγ, ñ ×áðíííðñèèγ ðááèíí è ñúñ Ñðááèçáíííðèáðí. Ááç ñúííáíèá íàòðóíáíèòá àáííè çà òðííáíèòá á ÷èñèáííòòà íà áíáíèðáè-èèòá òèèè òðáç ðáçíííæèòáèíèγ ñáçíí, òèáðáè-

γòà è çèíóááíáòí çà òíçè ðáéíí íà ñòðáíàòà ùá òíðáááèè è òí òí÷íí òðèðíáíçáùèòèèγ ñòáòóñ íà òèèèòá, éíáòí òíæá àà áúáá èçííèçááíí è çà íí-áíòí èçááíèá íà ×áðááíàòà éíèáá íà Áúèááðèγ.

Á çáèè ð÷áíèá èçèáçááíá ñáíγòà áèááí ááðííòò íà áñè÷èè áíáðíáíèèè, òðááíèçáèèè è éíñòèòóèè çà òγóíàòà íáíòáíèíá òíííù è ñúòðóáíè÷áñòáí.

Íááγááíá ñá, ÷á òáçè éíèáá ùá áííðèíáñá òùá òííáá÷á çà óááèè÷áááíá èçááñòííòòà íà Áóðãáñ-èèòá áçáðà ñðáá íàòèííáèíàòà è òæáóíáðíáíá òðè-ð íá òçáùèòá íáùííòò, çà òγóíòí òíáçááíá èáòí óíèèáèáí è çíá÷èíí áéíèíáè÷áí èííèáèñ.



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APPENDICES

Appendix 1. Monthly Averages of Waterbirds in the Bourgas Lakes

1.1. Monthly Average of Waterbirds at Complex Pomoriysko Ezero

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
1 <i>Gavia stellata</i>		0				0						0	1
2 <i>Gavia arctica</i>	13	5	1					1	5	2	1	4	76
3 <i>Tachybaptus ruficollis</i>	1	4	0	1	1	4	3	4	21	7	8	2	58
4 <i>Podiceps cristatus</i>	3	6	1	1		57	53	55	16	44	16	2	193
5 <i>Podiceps grisegena</i>		11	3			1	1	0		2			54
6 <i>Podiceps nigricollis</i>	88	90	8			68	145	151	89	64	66	58	335
7 <i>Phalacrocorax carbo</i>	20	38	54	126	58	247	240	254	103	140	35	4	1026
8 <i>Phalacrocorax aristotelis</i>							0		1				8
9 <i>Phalacrocorax pygmeus</i>	16	10	0	0		1	74	2	14	40	2	19	425
10 <i>Pelecanus onocrotalus</i>	0	0	3				15						90
11 <i>Pelecanus crispus</i>									1				8
12 <i>Botaurus stellaris</i>										0			1
13 <i>Ixobrychus minutus</i>					1								1
14 <i>Nycticorax nycticorax</i>							2						8
15 <i>Ardeola ralloides</i>		0	3	1			1						6
16 <i>Egretta garzetta</i>		12	11	14	30	132	60	13	2	0			233
17 <i>Egretta alba</i>	2	1	0			0	1	3	2	7	2	1	25
18 <i>Ardea cinerea</i>	1	21	1	2	6	12	29	13	7	9	0	1	85
19 <i>Ardea purpurea</i>		3	0	1	1		0	0					9
20 <i>Ciconia nigra</i>			0				12						50
21 <i>Ciconia ciconia</i>	127	5	0			1	1		0				760
22 <i>Plegadis falcinellus</i>		3	4			4	0						20
23 <i>Platalea leucorodia</i>		1	4	1	5	1	10						52
24 <i>Cygnus olor</i>	68	41	24	6		12	3	2	13	218	240	127	990
25 <i>Cygnus cygnus</i>	2									1	2		10
26 <i>Anser albifrons</i>	14		1	1					0	67	8	8	224
27 <i>Anser anser</i>											0		1
28 <i>Branta ruficollis</i>	0												2
29 <i>Tadorna ferruginea</i>		0		1				1					5
30 <i>Tadorna tadorna</i>	418	266	52	48	68	99	38	103	127	271	173	207	632
31 <i>Anas penelope</i>	6	11						10	0	248	12	3	1008
32 <i>Anas strepera</i>	3	3	5	3	1	1	3	2		25		1	142
33 <i>Anas crecca</i>	7	5	5	1		24	4		5	115	52	15	630
34 <i>Anas platyrhynchos</i>	45	19	8	12	23	1	54	1	48	240	240	82	880
35 <i>Anas acuta</i>	13	25	0	0		2				5	2	6	80
36 <i>Anas querquedula</i>	14	63	12	10	38	17	4						168
37 <i>Anas clypeata</i>	34	74	1	1		18	1	3		31	21	3	188
38 <i>Netta rufina</i>	0									6	0	0	37
39 <i>Aythya ferina</i>	280	61	0	0		5	3	0	5	950	643	634	4912
40 <i>Aythya fuligula</i>	161	55	1	0		2				44	678	974	4500
41 <i>Aythya marila</i>												0	1
42 <i>Melanitta nigra</i>												0	2
43 <i>Bucephala clangula</i>		0								0		1	3
44 <i>Mergus albellus</i>	1									1	4		17
45 <i>Mergus serrator</i>	0	0	1					6	24	46	4	8	171
46 <i>Oxyura leucocephala</i>										0	0		2
47 <i>Rallus aquaticus</i>		0		0	1		0					0	1
48 <i>Gallinula chloropus</i>		1			1								4

WATERBIRDS OF BOURGAS WETLANDS

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
49 <i>Fulica atra</i>	710	33	4	7	15	13	17	209	628	3441	4300	2464	10394
50 <i>Grus grus</i>	17												100
51 <i>Haematopus ostralegus</i>		3	1	2	1	19	1			0			34
52 <i>Himantopus himantopus</i>		11	42	46	55	81	4	0					142
53 <i>Recurvirostra avosetta</i>	23	32	54	115	66	221	110	124	27	35			993
54 <i>Glareola pratincola</i>		3	1	15									61
55 <i>Charadrius dubius</i>	0	1	3	1	2	6	9	1					21
56 <i>Charadrius hiaticula</i>	0	1	7			2	6	5		1			30
57 <i>Charadrius alexandrinus</i>	0	7	5	20	9	18	13					0	49
58 <i>Pluvialis squatarola</i>	1	1	7			1	1	4	9	7	10	7	41
59 <i>Vanellus vanellus</i>	5	3	3	18		12	1	7	2	3		2	54
60 <i>Calidris alba</i>		2	1			4	3			2	1	0	20
61 <i>Calidris minuta</i>		26	595	27	18	323	122	10	5				1743
62 <i>Calidris temminckii</i>			0			0							1
63 <i>Calidris ferruginea</i>		1	1220	68	9	342	99	2					4480
64 <i>Calidris alpina</i>	50	298	64	17	3	31	77	74	118	257	123	94	838
65 <i>Limicola falcinellus</i>					4	1	0						7
66 <i>Philomachus pugnax</i>	18	318	236	34	19	98	27	0	2				1240
67 <i>Gallinago gallinago</i>			0							1			3
68 <i>Limosa limosa</i>	2	105	0	38	2	18	17					1	500
69 <i>Numenius phaeopus</i>		0				0	0						2
70 <i>Numenius arquata</i>	1	1			1	0			0	1	2	0	9
71 <i>Tringa erythropus</i>	1	1	3	2	110	7	1	1		1			219
72 <i>Tringa totanus</i>	108	9	1	13	448	291	159	72	30	35	13	3	931
73 <i>Tringa stagnatilis</i>		4	0	5	5	11	106						600
74 <i>Tringa nebularia</i>		21	2	1	5	1	3	1					100
75 <i>Tringa ochropus</i>		1		1		0	1		0	2		0	4
76 <i>Tringa glareola</i>			65	4	7	16	29						300
77 <i>Xenus cinereus</i>						0							1
78 <i>Actitis hypoleucos</i>			1	1	1	3	0			0			10
79 <i>Arenaria interpres</i>			4			9	1	1	0	0			34
80 <i>Phalaropus lobatus</i>			0			1	13						48
81 <i>Stercorarius parasiticus</i>		0				8			0				39
82 <i>Larus melanocephalus</i>	3	42	12	15	53	922	245	3	52		0		2600
83 <i>Larus minutus</i>	9	0	10	11		198	243	0	0				1020
84 <i>Larus ridibundus</i>	45	12	2	20	115	783	326	190	108	143	29	30	1402
85 <i>Larus genei</i>	2	15	5	1		10	4	55	15	7	12		165
86 <i>Larus canus</i>										1			6
87 <i>Larus fuscus</i>			0				0						1
88 <i>Larus cachinnans</i>	26	20	12	109	41	380	104	41	53	56	60	31	830
89 <i>Gelochelidon nilotica</i>		7	1			2	1	0					33
90 <i>Sterna caspia</i>		2					0						9
91 <i>Sterna sandvicensis</i>	1	696	637	437	235	428	158	27	18	0			1807
92 <i>Sterna hirundo</i>		4	14	19	21	37	87						490
93 <i>Sterna albifrons</i>			11	18	5	34	4						142
94 <i>Chlidonias hybridus</i>		1	1		6	0							11
95 <i>Chlidonias niger</i>		3	4			84	26						312
96 <i>Chlidonias leucopterus</i>		1	11		12	1							30
Total Numbers	2145	1949	3120	1131	1491	4537	2421	1345	1468	5386	6057	4405	13664
Total Species	47	69	68	50	40	65	65	42	38	48	34	38	96

In **bold** are given the highest monthly average numbers. Value '0' refers to an average number less than 1

1.2. Monthly Average of Waterbirds at Complex Atanasovsko Ezero

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
1 <i>Gavia arctica</i>										1	0		5
2 <i>Tachybaptus ruficollis</i>	0	5		1		3	15	14	31	22	9	1	89
3 <i>Podiceps cristatus</i>	2	1					1			3	13	0	74
4 <i>Podiceps grisegena</i>		3											14
5 <i>Podiceps nigricollis</i>	24	3	2		40	10	62	151	60	29	52	4	250
6 <i>Phalacrocorax carbo</i>	10	2	4	21		4	109	1	26	6	25	56	650
7 <i>Phalacrocorax pygmeus</i>	57	72	16	1	1	14	8		128	164	46	30	586
8 <i>Pelecanus onocrotalus</i>	157	225	226	354	425	688	1343	7	1	3			6000
9 <i>Pelecanus crispus</i>	20	7	1	15	5	16	25	19	35	138	57	72	381
10 <i>Botaurus stellaris</i>	0	0	0							1	1	0	2
11 <i>Ixobrychus minutus</i>			1	0	3	1	0						5
12 <i>Nycticorax nycticorax</i>		3	1	2	14	4	2						20
13 <i>Ardeola ralloides</i>		1	2	1		5	1	1					17
14 <i>Egretta garzetta</i>		31	33	47	206	156	48	13	5	1			297
15 <i>Egretta alba</i>	10	5	1	0		3	6	6	35	35	25	12	125
16 <i>Ardea cinerea</i>	19	12	6	10	11	31	14	11	23	12	5	3	72
17 <i>Ardea purpurea</i>	0	20	1	1	2	2	1						75
18 <i>Ciconia nigra</i>		1		1			2	0					8
19 <i>Ciconia ciconia</i>	467	118	37	3	18	155	252						2000
20 <i>Plegadis falcinellus</i>		48	20	15	28	48							230
21 <i>Platalea leucorodia</i>	3	24	20	39	38	117	74	15	5	2	5	3	193
22 <i>Phoenicopterus ruber</i>							0						1
23 <i>Cygnus olor</i>	131	43	33	8			9	14	42	228	269	326	768
24 <i>Cygnus columbianus</i>	2									0		1	10
25 <i>Cygnus cygnus</i>									0	4	4	7	30
26 <i>Anser albifrons</i>	562	3		0					2	252	3789	2100	16010
27 <i>Anser erythropus</i>											0		1
28 <i>Anser anser</i>	10	1								9	18	26	64
29 <i>Branta ruficollis</i>	0									1	87	329	1200
30 <i>Tadorna ferruginea</i>	0	3	3	20	2	0	4			1	1		33
31 <i>Tadorna tadorna</i>	728	843	135	101	362	139	443	1170	1280	1440	1410	1225	2763
32 <i>Anas penelope</i>	112	144	1				108	133	146	1217	1290	1136	4150
33 <i>Anas strepera</i>	6	10	10	14	1	11	7	2	3	15	9	15	74
34 <i>Anas crecca</i>	259	87		1	1	0	200	775	1819	1872	521	504	7310
35 <i>Anas platyrhynchos</i>	700	138	78	457	99	455	1575	1843	2035	3316	2436	1338	7936
36 <i>Anas acuta</i>	122	74	2		1		23	33	59	371	191	175	1168
37 <i>Anas querquedula</i>	121	253	25	23	37	544	48	38	1				2185
38 <i>Anas clypeata</i>	266	434	6	1		0	855	1347	1389	710	268	141	2550
39 <i>Netta rufina</i>										2	4	3	20
40 <i>Aythya ferina</i>	110	74	5					188	10	160	800	403	3085
41 <i>Aythya nyroca</i>		1											3
42 <i>Aythya fuligula</i>	78	20						0		2	127	177	800
43 <i>Bucephala clangula</i>	2									0	1	1	12
44 <i>Mergus albellus</i>	1	0								1	2	4	19
45 <i>Mergus serrator</i>	3	1							1	2	27	4	116
46 <i>Oxyura leucocephala</i>			0						0	1			8
47 <i>Rallus aquaticus</i>	3	4	0	1	2	2	1	1	1	2	2	2	17
48 <i>Porzana porzana</i>											0		1
49 <i>Porzana parva</i>		1						0					4
50 <i>Gallinula chloropus</i>	5	16	4	1		4	7	7	4	23	28	7	120
51 <i>Fulica atra</i>	360	74	3	2		375	825	1980	2932	3350	4584	2934	11200
52 <i>Grus grus</i>	3							0		1			19
53 <i>Haematopus ostralegus</i>	0	2	3	4	4	14	3						38
54 <i>Himantopus himantopus</i>	1	26	101	74	186	252	12	0					424
55 <i>Recurvirostra avosetta</i>	368	710	334	473	1535	2096	1422	540	555	197	23	30	4490

WATERBIRDS OF BOURGAS WETLANDS

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
56 <i>Glareola pratincola</i>		3	11	7	4	13	5	1					30
57 <i>Charadrius dubius</i>	0	1	1			4	5	2					14
58 <i>Charadrius hiaticula</i>			3	3		1	13	6	0				50
59 <i>Charadrius alexandrinus</i>		7	10	24	7	19	12	2					72
60 <i>Pluvialis squatarola</i>	3	1	5	1		8	5	3	11	9	30	1	149
61 <i>Pluvialis apricaria</i>									8				37
62 <i>Vanellus vanellus</i>	9	14	11	45	56	64	65	41	284	148	20	9	840
63 <i>Calidris alba</i>			1				1		1	13		0	75
64 <i>Calidris minuta</i>		1	723	32	9	252	219	29	6	5	0		1530
65 <i>Calidris temminckii</i>			0										1
66 <i>Calidris ferruginea</i>		1	1418	18	12	353	157	21		2			2420
67 <i>Calidris alpina</i>	99	49	66	26	4	54	20	56	903	203	176	166	1750
68 <i>Limicola falcinellus</i>			0			7	0						36
69 <i>Philomachus pugnax</i>	88	290	573	7	265	51	673	84	3		7		2000
70 <i>Gallinago gallinago</i>	31	10	0		1	2	21	32	31	15	8	7	123
71 <i>Limosa limosa</i>	159	207	13	175	281	563	46	40	1	4	0	3	1210
72 <i>Limosa lapponica</i>								1					5
73 <i>Numenius phaeopus</i>							1						5
74 <i>Numenius tenuirostris</i>				0									1
75 <i>Numenius arquata</i>	19	32	1	3	13	16	25	11	30	18	18	25	79
76 <i>Tringa erythropus</i>	1	101	87	26	389	68	15	2	1	1	0	0	478
77 <i>Tringa totanus</i>	60	32	1	131	2284	638	248	152	44	23	13	5	2391
78 <i>Tringa stagnatilis</i>	4	36	2	7	69	122	35	0					270
79 <i>Tringa nebularia</i>	1	6	4	8	9	5	8	42					165
80 <i>Tringa ochropus</i>	1	1	1	1	3	2	5	1	1	1		0	18
81 <i>Tringa glareola</i>	0	3	20	8	43	29	25	5	0				70
82 <i>Xenus cinereus</i>							0						1
83 <i>Actitis hypoleucos</i>		1	4	1	2	2	1	1		0		0	8
84 <i>Arenaria interpres</i>			5	1									12
85 <i>Phalaropus lobatus</i>						3	4		0				21
86 <i>Stercorarius parasiticus</i>			0		1	2							10
87 <i>Larus melanocephalus</i>		16	32	17	148	1546	872	200	11		0	0	3410
88 <i>Larus minutus</i>			0	7		97	272	112	1	1			2430
89 <i>Larus ridibundus</i>	160	108	172	282	2710	4200	1945	710	633	394	555	510	8560
90 <i>Larus genei</i>	9	1	3	10	74	218	40	170	63	13	14	7	745
91 <i>Larus canus</i>	0						1				0	43	250
92 <i>Larus fuscus</i>		0											1
93 <i>Larus cachinnans</i>	33	38	67	51	20	124	386	66	71	59	140	135	1130
94 <i>Gelochelidon nilotica</i>		4	2	2		7	16	0					82
95 <i>Sterna caspia</i>							4						25
96 <i>Sterna sandvicensis</i>		56	106	274	260	59	6	6	0				407
97 <i>Sterna hirundo</i>		7	146	264	334	81	25						764
98 <i>Sterna albifrons</i>		1	35	33	3	38	2						132
99 <i>Chlidonias hybridus</i>		1	21	10	24	17		2					70
100 <i>Chlidonias niger</i>		0	11	1	375	242	35	1					620
101 <i>Chlidonias leucopterus</i>			24		1								60
Total Numbers	5179	3983	4292	3009	6114	13232	11339	9617	12508	12838	15649	11064	39918
Total Species	57	73	70	62	51	63	71	59	50	56	51	49	101

In **bold** are given the highest monthly average numbers. Value '0' refers to an average number less than 1

1.3. Monthly Average of Waterbirds at Complex Ezero Vaya

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
1 <i>Tachybaptus ruficollis</i>		1		2	2	3	4	2	3	4	2	0	22
2 <i>Podiceps cristatus</i>	3	8	2	6	5	5	10	25	63	168	130	54	540
3 <i>Podiceps nigricollis</i>	14	276					6		2	20	46	7	640
4 <i>Phalacrocorax carbo</i>	370	215	244	420	240	529	856	740	542	1432	1732	1584	7750
5 <i>Phalacrocorax pygmeus</i>	485	61	4	1	1		15	36	207	2462	2073	510	7323
6 <i>Pelecanus onocrotalus</i>	7	611	729	523	1000	1671	2093	23	11	8	4	1	5480
7 <i>Pelecanus crispus</i>	10	4	3	1	1	4	2	9	29	108	120	24	323
8 <i>Botaurus stellaris</i>					1					1	2	1	10
9 <i>Ixobrychus minutus</i>			2	2	5	1	0						10
10 <i>Nycticorax nycticorax</i>	13	60	6	6	25	1	30		0		1	14	230
11 <i>Ardeola ralloides</i>		3	8	3	40	19	3						81
12 <i>Egretta garzetta</i>		15	22	7	29	26	37	7		0		0	112
13 <i>Egretta alba</i>	5	1	1	0	1		2	10	2	143	182	55	687
14 <i>Ardea cinerea</i>	15	21	9	12	28	7	23	13	14	29	21	16	100
15 <i>Ardea purpurea</i>		1	3	1	8	1	1	0					8
16 <i>Ciconia nigra</i>		111	2				18	3				0	553
17 <i>Ciconia ciconia</i>	25	151					0	1					400
18 <i>Plegadis falcinellus</i>	1	48	10	5	2								151
19 <i>Platalea leucorodia</i>		3	4			2	12	4		3	1	1	61
20 <i>Cygnus olor</i>	16	10	33	19	9	6	6	16	15	32	28	12	128
21 <i>Cygnus columbianus</i>											0	2	10
22 <i>Cygnus cygnus</i>	0	3								1	15	10	41
23 <i>Anser albifrons</i>	51							75		2121	19895	21072	79608
24 <i>Anser anser</i>	2		0							1	13	5	58
25 <i>Branta ruficollis</i>										7	1082	301	6450
26 <i>Tadorna ferruginea</i>		1	5										25
27 <i>Tadorna tadorna</i>	0	2	4		1		0	45	8	196	4	3	575
28 <i>Anas penelope</i>	12	5	1						1	90	20	5	530
29 <i>Anas strepera</i>	4	8	4	1	1	3	1			1	2	5	19
30 <i>Anas crecca</i>	17	8					41	1		192	119	119	850
31 <i>Anas platyrhynchos</i>	111	38	7	10	45	233	213	63	125	2762	1535	1239	13760
32 <i>Anas acuta</i>								0	0	6	8	3	44
33 <i>Anas querquedula</i>	14	53	55	6	4	37	15						234
34 <i>Anas clypeata</i>	341	272	7	1	1		47		81	970	1193	1593	6802
35 <i>Aythya ferina</i>	698	171	105	30	287	474	1252	5765	10020	8821	4089	4441	16800
36 <i>Aythya nyroca</i>			1			1	1	1		1		0	6
37 <i>Aythya fuligula</i>	120	24	0		1			578	134	1110	1812	4117	6825
38 <i>Bucephala clangula</i>										0	1	0	4
39 <i>Mergus albellus</i>	0									8	22	10	85
40 <i>Mergus merganser</i>										0	0		2
41 <i>Oxyura leucocephala</i>	713	96							128	697	410	377	2260
42 <i>Rallus aquaticus</i>	1	0	0	1			1	0	1	1	1	0	3
43 <i>Gallinula chloropus</i>	0	2	1		9	8	2	6	8	4	7	7	31
44 <i>Fulica atra</i>	271	56	9	17	48	516	388	295	560	758	775	342	2433
45 <i>Himantopus himantopus</i>		6	4	1	6	0							26
46 <i>Charadrius dubius</i>					1								2
47 <i>Charadrius hiaticula</i>						0							1
48 <i>Vanellus vanellus</i>	23	8	5	5	17		50				3	2	200
49 <i>Calidris minuta</i>			6		2	1							30
50 <i>Calidris ferruginea</i>			36			6							180
51 <i>Calidris alpina</i>			12						12				70
52 <i>Philomachus pugnax</i>	62	126	45		15	16	7						300
53 <i>Gallinago gallinago</i>							6			0			25
54 <i>Limosa limosa</i>	35	17			4		8			1	0		200
55 <i>Numenius phaeopus</i>	1	0									2	0	14

WATERBIRDS OF BOURGAS WETLANDS

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
56 <i>Numenius arquata</i>	0	1				0				1	1		7
57 <i>Tringa erythropus</i>		1			10	2	13						80
58 <i>Tringa totanus</i>	5			4	18	2	18						100
59 <i>Tringa stagnatilis</i>		0			1	1	1						7
60 <i>Tringa nebularia</i>	0	8			1	0	0						38
61 <i>Tringa ochropus</i>			0		1	1	0			1		0	6
62 <i>Tringa glareola</i>		5	20	2	5	10	6						83
63 <i>Actitis hypoleucos</i>					1	1	1						4
64 <i>Larus melanocephalus</i>	5			1	3	2	6						35
65 <i>Larus minutus</i>	3	10			1	20	40	189	1		6		750
66 <i>Larus ridibundus</i>	224	204	47	23	183	382	540	410	318	721	426	304	1802
67 <i>Larus genei</i>	0					0							1
68 <i>Larus canus</i>										0	5	0	22
69 <i>Larus fuscus</i>											0		2
70 <i>Larus cachinnans</i>	78	92	41	50	84	308	173	296	913	615	907	700	2800
71 <i>Gelochelidon nilotica</i>						1	1						4
72 <i>Sterna caspia</i>		0											2
73 <i>Sterna sandvicensis</i>				1		0	2	2					12
74 <i>Sterna hirundo</i>		0	4	23	18	98	6	8	1	0			287
75 <i>Sterna albifrons</i>			1	1		1							7
76 <i>Chlidonias hybridus</i>	0	14	2	5		38	3						162
77 <i>Chlidonias niger</i>		4	12	3		179	57		0		0		470
78 <i>Chlidonias leucopterus</i>		46	9			10	0						231
Total Numbers	3235	2237	1362	1152	2154	4216	5332	8391	13109	20402	33387	30440	94811
Total Species	42	51	45	34	43	43	52	30	28	42	44	42	78

In **bold** are given the highest monthly average numbers. Value '0' refers to an average number less than 1

1.4. Monthly Average of Waterbirds at Complex Mandrensko Ezero

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
1 <i>Gavia arctica</i>										0			1
2 <i>Tachybaptus ruficollis</i>	16	4	3	8	7	22	34	98	59	45	18	7	155
3 <i>Podiceps cristatus</i>	84	70	6	6	10	24	35	53	150	1291	468	504	5104
4 <i>Podiceps grisegena</i>							0			0			2
5 <i>Podiceps nigricollis</i>	240	166	3			5	38	31	100	136	141	127	501
6 <i>Phalacrocorax carbo</i>	369	354	326	271	444	615	316	1208	1507	2560	2177	1010	11052
7 <i>Phalacrocorax pygmeus</i>	513	290	13	3	6	52	37	223	437	961	590	954	3235
8 <i>Pelecanus onocrotalus</i>	0	474	5			158	6	2	7	4		2	1018
9 <i>Pelecanus crispus</i>	4	2	2	1		1		5	6	102	137	45	503
10 <i>Botaurus stellaris</i>	0	1		0			0			3	1	1	9
11 <i>Ixobrychus minutus</i>			0	1	4	1	0						5
12 <i>Nycticorax nycticorax</i>		86	3	14	29	8	11	5			0		275
13 <i>Ardeola ralloides</i>		2	8	3	13	21	5	1					39
14 <i>Egretta garzetta</i>	0	21	34	21	120	65	42	18	2	0			182
15 <i>Egretta alba</i>	7	4	0	1		1	3	9	21	74	116	86	446
16 <i>Ardea cinerea</i>	38	27	34	24	53	32	37	64	37	39	41	25	107
17 <i>Ardea purpurea</i>		6	5	3	3	4	2	0					12
18 <i>Ciconia nigra</i>		11	2		1	0	1	3					53
19 <i>Ciconia ciconia</i>	1	827	11	71	50	166	213		0	0	0	0	2425
20 <i>Plegadis falcinellus</i>		3	16	11	9	25	2	1				0	67
21 <i>Platalea leucorodia</i>	2	13	13	12	38	12	20	1	0				110
22 <i>Phoenicopterus ruber</i>		0											1
23 <i>Cygnus olor</i>	29	10	13	6	1	2	3	10	7	82	41	43	228
24 <i>Cygnus columbianus</i>									0	5	3	17	80
25 <i>Cygnus cygnus</i>	1	0							6	64	81	83	362
26 <i>Anser albifrons</i>	39	5								1486	21852	17276	61150
27 <i>Anser anser</i>										6	56	6	311
28 <i>Branta ruficollis</i>										8	2812	47	16870
29 <i>Tadorna ferruginea</i>	1	2	1	3	1		0					1	7
30 <i>Tadorna tadorna</i>	5	12	4	2	13	4	2	1	11	126	21	11	641
31 <i>Anas penelope</i>	2	7					1		4	716	43	52	3530
32 <i>Anas strepera</i>	7	5	2	2		6	1	1	6	11	3	10	32
33 <i>Anas crecca</i>	82	4					69	324	201	974	285	235	3700
34 <i>Anas platyrhynchos</i>	146	26	15	40	81	108	190	427	455	2914	2087	1350	11883
35 <i>Anas acuta</i>	3	9						1	1	7	6	4	25
36 <i>Anas querquedula</i>	74	312	23	7	19	84	50	4					1112
37 <i>Anas clypeata</i>	58	195	1				10	80	779	903	242	45	3459
38 <i>Netta rufina</i>	10	4							0	19	2	1	60
39 <i>Aythya ferina</i>	511	127	46	51	132	428	295	420	1413	4455	4035	2402	13170
40 <i>Aythya nyroca</i>		1	1			1	4	35	3		1	2	111
41 <i>Aythya fuligula</i>	370	37	1	1	14	8	7	257	492	1790	2985	1908	4733
42 <i>Clangula hyemalis</i>											0	0	1
43 <i>Melanitta nigra</i>									1		0		4
44 <i>Melanitta fusca</i>	2										0	2	12
45 <i>Bucephala clangula</i>	5									12	24	16	52
46 <i>Mergus albellus</i>	1									12	91	6	442
47 <i>Mergus serrator</i>	12	0						1	5	7	9	8	60
48 <i>Mergus merganser</i>											2		11
49 <i>Oxyura leucocephala</i>		0								26	90	1	435
50 <i>Rallus aquaticus</i>	1	1	0	1	2	1	2	2	2	1	2	0	9
51 <i>Porzana porzana</i>								0					1
52 <i>Porzana parva</i>							0						1
53 <i>Gallinula chloropus</i>		5	3	2	4	77	14	10	6	1	2	3	289
54 <i>Fulica atra</i>	362	30	10	10	40	275	716	1309	1723	3310	2341	1325	8587
55 <i>Grus grus</i>	2							2					14

WATERBIRDS OF BOURGAS WETLANDS

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
56 <i>Haematopus ostralegus</i>	2	1	1	2	13	4	0		0	0		0	23
57 <i>Himantopus himantopus</i>		20	23	15	14	17	1						47
58 <i>Recurvirostra avosetta</i>	1	4	6	1	1	1	1			1			16
59 <i>Glareola pratincola</i>		1	0			1							3
60 <i>Charadrius dubius</i>	0	0	1	1	11	10	5	3					35
61 <i>Charadrius hiaticula</i>						1	1	2					9
62 <i>Charadrius alexandrinus</i>		0					0						2
63 <i>Pluvialis squatarola</i>			1			0	0	0	1	1	2	2	7
64 <i>Pluvialis apricaria</i>												1	6
65 <i>Vanellus vanellus</i>	19	2	2	1	25	10	1	7	2	66	32	50	221
66 <i>Calidris alba</i>			7			0		3		0	3		35
67 <i>Calidris minuta</i>			20		4	28	13	3					76
68 <i>Calidris temminckii</i>			1			0	0						3
69 <i>Calidris ferruginea</i>			20		1	11	5						55
70 <i>Calidris alpina</i>	4					3	9	2	11	7	12	16	94
71 <i>Limicola falcinellus</i>							0						2
72 <i>Philomachus pugnax</i>	0	71	28		9	7	7	1				0	300
73 <i>Gallinago gallinago</i>	0	1			1	0	1	96	8	0	1	0	369
74 <i>Limosa limosa</i>	5	10		2		19	3	3				0	93
75 <i>Limosa lapponica</i>								1					2
76 <i>Numenius phaeopus</i>					3								4
77 <i>Numenius arquata</i>	1	0			4	4		1		1	8	1	43
78 <i>Tringa erythropus</i>		4	2	0	1	3	5	4	1		0		22
79 <i>Tringa totanus</i>	21	5	1	4	16	35	16	16	4	7	2	7	93
80 <i>Tringa stagnatilis</i>		1		1		5	2	0					25
81 <i>Tringa nebularia</i>		2	0		2	1	0	0					11
82 <i>Tringa ochropus</i>	1	2			5	5	1	2	3	4	2	0	18
83 <i>Tringa glareola</i>			13	1	30	7	2						44
84 <i>Xenus cinereus</i>							0						1
85 <i>Actitis hypoleucos</i>	0	1	1		2	5	1			0			9
86 <i>Arenaria interpres</i>			1			0							4
87 <i>Phalaropus lobatus</i>						0	1						4
88 <i>Larus melanocephalus</i>	1	12	13	0	18	5	6		205	250			1500
89 <i>Larus minutus</i>	20		3			9	15	1	27	0	0		160
90 <i>Larus ridibundus</i>	803	269	81	27	291	596	308	195	246	928	429	259	3225
91 <i>Larus genei</i>		0				0	0	19	4	1	1		75
92 <i>Larus canus</i>		0		0			1			2	10	0	48
93 <i>Larus fuscus</i>		0						0					1
94 <i>Larus cachinnans</i>	131	267	106	210	263	221	131	222	729	515	663	323	2105
95 <i>Gelochelidon nilotica</i>		0				6	0						28
96 <i>Sterna caspia</i>		2	0		1	1	6	1					14
97 <i>Sterna sandvicensis</i>		29	3	1	53	114	33	22	1				300
98 <i>Sterna hirundo</i>		3	90	139	140	96	8						340
99 <i>Sterna albifrons</i>			3	1	2	16	4						53
100 <i>Chlidonias hybridus</i>		0			10	36	13	1					120
101 <i>Chlidonias niger</i>		20	30		15	85	24	1					335
102 <i>Chlidonias leucopterus</i>		1	141		12	14	1						640
Total Numbers	3766	3508	1153	882	2027	3381	2519	5086	8513	21861	37665	27371	109148
Total Species	51	70	59	44	51	68	74	59	45	54	53	53	102

In **bold** are given the highest monthly average numbers. Value '0' refers to an average number less than 1

1.5. Monthly Average of Waterbirds at Bourgas Wetland Complex

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
1 <i>Gavia stellata</i>		0				0						0	1
2 <i>Gavia arctica</i>	13	5	1					1	5	3	1	4	76
3 <i>Tachybaptus ruficollis</i>	18	13	3	11	10	33	55	117	113	78	36	9	219
4 <i>Podiceps cristatus</i>	92	85	10	13	15	86	98	133	229	1506	627	560	5541
5 <i>Podiceps griseogen</i>		14	3			1	1	0		2			54
6 <i>Podiceps nigricollis</i>	366	536	12		40	83	251	333	250	248	305	197	1135
7 <i>Phalacrocorax carbo</i>	769	609	628	837	742	1395	1520	2203	2178	4138	3969	2654	16564
8 <i>Phalacrocorax aristotelis</i>						0			1				8
9 <i>Phalacrocorax pygmeus</i>	1071	433	33	5	7	67	134	260	787	3626	2710	1513	10592
10 <i>Pelecanus onocrotalus</i>	165	1310	963	877	1425	2517	3456	31	20	16	4	2	10032
11 <i>Pelecanus crispus</i>	34	12	7	18	6	21	27	32	71	348	314	141	647
12 <i>Botaurus stellaris</i>	1	1	0	0	1		0			5	3	2	14
13 <i>Ixobrychus minutus</i>			3	4	13	3	1						15
14 <i>Nycticorax nycticorax</i>	13	149	11	22	68	13	44	5	0		1	14	342
15 <i>Ardeola ralloides</i>		6	21	8	53	46	9	1					124
16 <i>Egretta garzetta</i>	0	79	100	88	383	380	188	51	9	1		0	583
17 <i>Egretta alba</i>	24	11	3	1	1	4	11	27	59	258	325	154	877
18 <i>Ardea cinerea</i>	73	81	49	47	97	82	103	101	81	90	68	45	236
19 <i>Ardea purpurea</i>	0	30	8	5	13	7	4	1					87
20 <i>Ciconia nigra</i>		122	4	1	1	0	32	6				0	553
21 <i>Ciconia ciconia</i>	619	1101	49	74	68	322	466	1	0	0	0	0	3265
22 <i>Plegadis falcinellus</i>	1	102	50	31	38	77	2	1				0	316
23 <i>Platalea leucorodia</i>	4	41	42	51	80	131	116	20	5	5	6	4	224
24 <i>Phoenicopterus ruber</i>		0					0						1
25 <i>Cygnus olor</i>	245	104	103	39	9	21	21	41	77	559	577	508	1386
26 <i>Cygnus columbianus</i>	2								0	5	3	19	84
27 <i>Cygnus cygnus</i>	3	3							6	70	102	101	417
28 <i>Anser albifrons</i>	666	8	1	2				75	2	3927	45545	40456	119186
29 <i>Anser erythropus</i>											0		1
30 <i>Anser anser</i>	11	1	0							16	87	37	393
31 <i>Branta ruficollis</i>	1									15	3981	676	23738
32 <i>Tadorna ferruginea</i>	1	6	9	24	3	0	4	1		1	1	1	35
33 <i>Tadorna tadorna</i>	1150	1123	195	150	443	242	483	1319	1426	2033	1608	1445	3559
34 <i>Anas penelope</i>	131	166	2				109	142	151	2271	1365	1195	8688
35 <i>Anas strepera</i>	20	25	21	19	3	22	13	5	9	51	13	30	246
36 <i>Anas crecca</i>	364	104	5	2	1	24	314	1099	2025	3153	976	872	8870
37 <i>Anas platyrhynchos</i>	1002	222	108	518	247	798	2032	2334	2663	9232	6298	4009	34459
38 <i>Anas acuta</i>	138	109	2	0	1	2	23	35	60	389	207	186	1209
39 <i>Anas querquedula</i>	223	682	114	45	97	682	118	42	1				2340
40 <i>Anas clypeata</i>	698	975	14	2	1	18	912	1430	2248	2613	1724	1781	6922
41 <i>Netta rufina</i>	10	4							0	27	6	4	67
42 <i>Aythya ferina</i>	1598	432	156	81	419	907	1549	6372	11448	14387	9566	7879	30029
43 <i>Aythya nyroca</i>		2	2			2	5	37	3	1	1	2	111
44 <i>Aythya fuligula</i>	729	137	2	1	14	10	7	835	627	2946	5602	7176	11037
45 <i>Aythya marila</i>												0	1
46 <i>Clangula hyemalis</i>											0	0	1
47 <i>Melanitta nigra</i>									1		0	0	4
48 <i>Melanitta fusca</i>	2										0	2	12
49 <i>Bucephala clangula</i>	7	0								13	26	18	52
50 <i>Mergus albellus</i>	3	0								22	119	21	488
51 <i>Mergus serrator</i>	15	2	1					6	30	55	40	20	181
52 <i>Mergus merganser</i>										0	2		11
53 <i>Oxyura leucocephala</i>	713	96	0						129	725	500	378	2260
54 <i>Rallus aquaticus</i>	5	5	1	3	4	3	3	4	4	3	5	2	17
55 <i>Porzana porzana</i>								0			0		1

WATERBIRDS OF BOURGAS WETLANDS

Species / Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Absolute Maximum
56 <i>Porzana parva</i>		1				0	0						4
57 <i>Gallinula chloropus</i>	5	24	8	3	13	89	22	23	17	27	37	17	290
58 <i>Fulica atra</i>	1703	194	26	36	103	1180	1946	3793	5843	10859	12000	7065	26889
59 <i>Grus grus</i>	22							3		1			119
60 <i>Haematopus ostralegus</i>	2	6	5	7	17	37	4		0	0		0	49
61 <i>Himantopus himantopus</i>	1	63	171	136	260	351	16	1					511
62 <i>Recurvirostra avosetta</i>	392	746	394	589	1602	2317	1533	664	582	233	23	30	4490
63 <i>Glareola pratincola</i>		7	13	22	4	13	5	1					78
64 <i>Charadrius dubius</i>	1	3	6	2	14	19	19	6					37
65 <i>Charadrius hiaticula</i>	0	1	9	3		4	20	12	0	1			50
66 <i>Charadrius alexandrinus</i>	0	14	15	45	16	37	26	2				0	73
67 <i>Pluvialis squatarola</i>	4	2	12	1		9	7	7	20	16	43	9	159
68 <i>Pluvialis apricaria</i>									8			1	37
69 <i>Vanellus vanellus</i>	55	27	20	68	97	86	117	55	288	217	54	63	840
70 <i>Calidris alba</i>		2	8			4	4	3	1	15	4	1	78
71 <i>Calidris minuta</i>		27	1344	59	32	604	354	42	12	5	0		3316
72 <i>Calidris temminckii</i>			1			0	0						3
73 <i>Calidris ferruginea</i>		2	2694	86	22	712	261	22		2			7088
74 <i>Calidris alpina</i>	153	348	142	43	7	88	105	132	1043	467	311	276	2000
75 <i>Limicola falcinellus</i>			0		4	8	1						36
76 <i>Philomachus pugnax</i>	168	805	882	41	307	173	714	85	5		7	0	2422
77 <i>Gallinago gallinago</i>	31	11	0		2	2	27	128	39	16	9	7	390
78 <i>Limosa limosa</i>	200	338	13	214	286	599	74	43	1	5	0	4	1210
79 <i>Limosa lapponica</i>								2					7
80 <i>Numenius phaeopus</i>	1	0			3	0	1				2	0	14
81 <i>Numenius tenuirostris</i>				0									1
82 <i>Numenius arquata</i>	22	34	1	3	17	21	25	11	30	20	28	26	88
83 <i>Tringa erythropus</i>	2	106	91	28	509	80	35	7	2	1	1	0	698
84 <i>Tringa totanus</i>	194	46	2	151	2766	965	440	241	79	65	28	15	3248
85 <i>Tringa stagnatilis</i>	4	41	2	13	75	140	144	1					634
86 <i>Tringa nebularia</i>	1	37	7	10	17	7	11	43					167
87 <i>Tringa ochropus</i>	2	4	2	2	9	8	7	2	4	8	2	1	22
88 <i>Tringa glareola</i>	0	7	118	15	84	63	62	5	0				465
89 <i>Xenus cinereus</i>						0	0						1
90 <i>Actitis hypoleucos</i>	0	2	6	2	4	11	3	1		1		0	14
91 <i>Arenaria interpres</i>			10	1		10	1	1	0	0			34
92 <i>Phalaropus lobatus</i>			0			4	19		0				48
93 <i>Stercorarius parasiticus</i>		0	0		1	10			0				49
94 <i>Larus melanocephalus</i>	9	70	57	33	222	2474	1129	203	268	250	0	0	4374
95 <i>Larus minutus</i>	31	11	14	18	1216	325	568	302	28	1	6		2430
96 <i>Larus ridibundus</i>	1231	592	302	350	3299	5962	3118	1505	1304	2184	1438	1102	10635
97 <i>Larus genei</i>	11	16	8	11	74	228	45	244	82	20	26	7	750
98 <i>Larus canus</i>	0	0		0			2			3	14	43	250
99 <i>Larus fuscus</i>		0	0				0	0			0		2
100 <i>Larus cachinnans</i>	268	417	226	420	408	1033	794	624	1766	1246	1771	1190	3363
101 <i>Gelochelidon nilotica</i>		11	3	2		16	17	1					87
102 <i>Sterna caspia</i>		4	0		1	1	10	1					26
103 <i>Sterna sandvicensis</i>	1	781	746	712	548	601	199	58	19	0			1836
104 <i>Sterna hirundo</i>		15	253	445	512	312	125	8	1	0			1038
105 <i>Sterna albifrons</i>		1	49	52	10	90	10						162
106 <i>Chlidonias hybridus</i>	0	16	24	14	39	92	16	2					233
107 <i>Chlidonias niger</i>		28	57	4	390	589	142	2	0		0		1115
108 <i>Chlidonias leucopterus</i>		48	184		25	25	1						672
Total Numbers	14325	11677	9927	6174	11785	25365	21610	24437	35598	60488	92758	73281	186448
Total Species	73	88	84	69	69	79	84	77	65	67	67	69	108

In bold are given the highest monthly average numbers. Value '0' refers to an average number less than 1

Appendix 2. Comparison between Max Numbers of Waterbirds in Atanasovsko Ezero Given by Roberts (1978, 1981) and Present Study

Species	1976 - 1977		1996 - 2002			Trend
	Absolute Max	Month	Average Max	Month	Absolute Max	
1 <i>Gavia stellata</i>			0	Feb	1	
2 <i>Gavia arctica</i>			1	Dec	5	Increase
3 <i>Tachybaptus ruficollis</i>	9	Apr	31	Nov	89	Increase
4 <i>Podiceps cristatus</i>	25	Mar	13	Jan	74	Increase
5 <i>Podiceps grisegena</i>			3	Sep	1	
6 <i>Podiceps nigricollis</i>	23	Mar	151	Oct	250	Increase
7 <i>Phalacrocorax carbo</i>	39	Feb	109	Feb	650	Increase
8 <i>Phalacrocorax pygmeus</i>	226	Nov	164	Dec	586	Increase
9 <i>Pelecanus onocrotalus</i>	816	Sep	1343	Sep	6000	Increase
10 <i>Pelecanus crispus</i>	43	Sep	138	Dec	381	Increase
11 <i>Botaurus stellaris</i>	2	Jan	1	Dec-Jan	2	Stable
12 <i>Ixobrychus minutus</i>	7	May	3	Jun	5	Stable
13 <i>Nycticorax nycticorax</i>	3	Apr	14	Jul	20	Increase
14 <i>Ardeola ralloides</i>	15	May	5	Aug	17	Stable
15 <i>Egretta garzetta</i>	246	Sep	206	Jul	297	Stable
16 <i>Egretta alba</i>	14	Feb	35	Nov	125	Increase
17 <i>Ardea cinerea</i>	94	Sep	31	Mar	72	Stable
18 <i>Ardea purpurea</i>	24	Apr	20	Apr	75	Increase
19 <i>Mycteria ibis</i>				Jun-Jul	1	
20 <i>Ciconia nigra</i>	131	Sep	2	Sep	8	Decrease
21 <i>Ciconia ciconia</i>	4355	Apr	467	Mar	2000	Decrease
22 <i>Plegadis falcinellus</i>	164	Apr	48	Aug	230	Increase
23 <i>Platalea leucorodia</i>	60	Sep	117	Aug	193	Increase
24 <i>Phoenicopterus ruber</i>			0	Sep	1	
25 <i>Cygnus olor</i>	100	Jan	326	Jan	768	Increase
26 <i>Cygnus columbianus</i>			2	Mar	10	Increase
27 <i>Cygnus cygnus</i>	7	Jan	7	Feb	30	Increase
28 <i>Anser albifrons</i>	848	Oct	3789	Jan	16010	Increase
29 <i>Anser erythropus</i>			0	Jan	1	
30 <i>Anser anser</i>	24	Oct	26	Feb	64	Increase
31 <i>Branta leucopsis</i>				Jan	1	
32 <i>Branta ruficollis</i>	11	Nov	329	Feb	1200	Increase
33 <i>Tadorna ferruginea</i>	3	May	20	Jun	33	Increase
34 <i>Tadorna tadorna</i>	2496	Jan	1440	Jan	2763	Stable
35 <i>Anas penelope</i>	6020	Jan	1290	Dec	4150	Decrease
36 <i>Anas strepera</i>	68	Mar	15	Dec	74	Stable
37 <i>Anas crecca</i>	2191	Nov	1872	Dec	7310	Increase
38 <i>Anas platyrhynchos</i>	2162	Oct	3316	Dec	7936	Increase
39 <i>Anas acuta</i>	1850	Jan	371	Dec	1168	Decrease
40 <i>Anas querquedula</i>	641	Mar	544	Aug	2185	Increase
41 <i>Anas clypeata</i>	1311	Dec	1389	Sep	2550	Increase
42 <i>Netta rufina</i>	1	Jan	4	Jan	20	Increase
43 <i>Aythya ferina</i>	12	Jan	800	Jan	3085	Increase
44 <i>Aythya nyroca</i>	26	Mar	1	Apr	3	Decrease
45 <i>Aythya fuligula</i>	11	Mar	177	Feb	800	Increase
46 <i>Aythya marila</i>			0	Jan	3	
47 <i>Bucephala clangula</i>	2	Jan	2	Mar	12	Increase
48 <i>Mergus albellus</i>	1	Dec	4	Jan	33	Increase
49 <i>Mergus serrator</i>	46	Mar	27	Jan	145	Increase
50 <i>Oxyura leucocephala</i>			1		8	Increase
51 <i>Rallus aquaticus</i>	12	Mar	4	Jan	17	Stable
52 <i>Porzana porzana</i>	2	Oct	0	Jan	1	Stable
53 <i>Porzana parva</i>	3	May	1	Sep	4	Stable

WATERBIRDS OF BOURGAS WETLANDS

Species	1976 - 1977		1996 - 2002			Trend
	Absolute Max	Month	Average Max	Month	Absolute Max	
54 <i>Gallinula chloropus</i>	45	Apr	28	Jan	120	Increase
55 <i>Fulica atra</i>	12000	Feb	4584	Jan	11200	Stable
56 <i>Grus grus</i>	225	Mar	3		19	Decrease
57 <i>Haematopus ostralegus</i>	34	Mar	14	Aug	38	Stable
58 <i>Himantopus himantopus</i>	131	May	252	Aug	424	Increase
59 <i>Burhinus oedicephalus</i>	1	Oct		Jun	2	Stable
60 <i>Recurvirostra avosetta</i>	7570	Sep	2096	Sep	4490	Decrease
61 <i>Glareola pratincola</i>	40	Jun	13	Aug	30	Stable
62 <i>Charadrius dubius</i>	74	Sep	5	Sep	14	Decrease
63 <i>Charadrius hiaticula</i>	29	Oct	13	Sep	50	Increase
64 <i>Charadrius leschenaultii</i>				May	1	
65 <i>Charadrius alexandrinus</i>	673	Sep	24	Aug	72	Decrease
66 <i>Pluvialis squatarola</i>	76	Mar	30	Jan	149	Increase
67 <i>Pluvialis apricaria</i>	195	Feb	8	Nov	37	Decrease
68 <i>Vanelus leucurus</i>				Apr-May	1	
69 <i>Vanellus vanellus</i>	641	Mar	284	Nov	1100	Increase
70 <i>Calidris alba</i>	12	May	13	Dec	75	Increase
71 <i>Calidris minuta</i>	1609	May	723	May	1530	Stable
72 <i>Calidris temminckii</i>	4	Sep	0	May	1	Stable
73 <i>Calidris ferruginea</i>	3747	May	1418	May	2420	Decrease
74 <i>Calidris alpina</i>	2897	Nov	903	Nov	1810	Decrease
75 <i>Limicola falcinellus</i>	52	Sep	7	Aug	36	Stable
76 <i>Tryngites subruficollis</i>				May	2	
77 <i>Philomachus pugnax</i>	3559	Apr	673	Sep	2000	Decrease
78 <i>Lymnocyptes minimus</i>	10	Mar		Mar	3	Decrease
79 <i>Gallinago gallinago</i>	245	Apr	32	Mar	123	Decrease
80 <i>Gallinago media</i>	1	Apr		May	2	Stable
81 <i>Limosa limosa</i>	1018	Mar	563	Aug	1210	Stable
82 <i>Limosa lapponica</i>	3	Oct	1	Oct	5	Stable
83 <i>Numenius phaeopus</i>	12	Apr	1		5	Decrease
84 <i>Numenius tenuirostris</i>			0	Jan	1	
85 <i>Numenius arquata</i>	150	Oct	32	Apr	79	Decrease
86 <i>Tringa erythropus</i>	379	Apr	389	Jul	478	Increase
87 <i>Tringa totanus</i>	6574	Sep	2284	Jul	2391	Decrease
88 <i>Tringa stagnatilis</i>	152	Apr	122	Aug	270	Increase
89 <i>Tringa nebularia</i>	92	Apr	42	Oct	176	Increase
90 <i>Tringa ochropus</i>	11	Apr	5	Sep	18	Stable
91 <i>Tringa glareola</i>	90	Apr	43	Aug	70	Stable
92 <i>Xenus cinereus</i>			0	Sep	1	
93 <i>Actitis hypoleucos</i>	6	Sep	4		8	Stable
94 <i>Arenaria interpres</i>	7	May	5		12	Stable
95 <i>Phalaropus lobatus</i>	5	Sep	4	Sep	21	Increase
96 <i>Stercorarius pomarinus</i>				Jul	2	
97 <i>Stercorarius parasiticus</i>	2	Sep	2	Aug	10	Increase
98 <i>Larus melanocephalus</i>	4108	Sep	1546	Aug	3410	Decrease
99 <i>Larus minutus</i>	3740	Sep	272	Sep	2430	Decrease
100 <i>Larus ridibundus</i>	12559	Sep	4200	Aug	7307	Decrease
101 <i>Larus genei</i>	1386	Oct	218	Aug	630	Decrease
102 <i>Larus canus</i>	114	Mar	43	Feb	250	Increase
103 <i>Larus fuscus</i>	1	Apr	0	Sep	1	Stable
104 <i>Larus cachinnans</i>	340	Oct	386	Sep	1130	Increase
105 <i>Larus marinus</i>	1	Oct		May	1	Stable
106 <i>Gelochelidon nilotica</i>	80	May	16	Sep	82	Stable
107 <i>Sterna caspia</i>	3	Mar	2	Sep	4	Stable
108 <i>Sterna sandvicensis</i>	639	Oct	274	Jun	407	Decrease
109 <i>Sterna hirundo</i>	120	May	334	Jun	764	Increase

Species	1976 - 1977		1996 - 2002			Trend
	Absolute Max	Month	Average Max	Month	Absolute Max	
110 <i>Sterna albifrons</i>	60	May	38	Aug	132	Increase
111 <i>Chlidonias hybridus</i>	52	May	24	May	70	Stable
112 <i>Chlidonias niger</i>	64	Apr	375	Jul	620	Increase
113 <i>Chlidonias leucopterus</i>	231	May	24	May	60	Decrease
Total Numbers	39928	Sep	15649	Jan	39918	Stable
Total Species	97		100		113	

Appendix 3. GPS Guide to Bourgas Wetlands

If you are for the first time in Bourgas region and like to visit Bourgas wetlands without a guide, there will be a need only of GPS device. You should enter its settings and choose datum "WGS 84" and co-ordinates "MGRS". Then go to the option "Go to..." and enter some of the following key MGRS co-ordinates:

Complex Pomoriysko Ezero

Estuary of Reka Akheloy 35TNH52720 21519
 Pomoriysko 35TNH51319 18595
 Salt Museum 35TNH52003 12775

Complex Atanasovsko Ezero

Atanasovsko Ezero (road E 87) 35TNH39574 11146
 Garage 'Citroen' (road E 87) 35TNH38931 11274
 Hide (road E 87) 35TNH38689 08876
 Main Office of Black Sea Saltwork 35TNH40200 86072
 Migration Watch Point 35TNH40115 12000
 The Seventh Pump Station 35TNH40034 13624
 The New Water Body 35TNH40560 14435
 West Entrance into Reserve 35TNH39062 11085

Complex Ezero Vaya

Dolno Ezerovo Jetty 35TNH30128 06521
 Estuary of Reka Aytoska 35TNH27827 06252
 Ezero Vaya (road E 87) 35TNH36766 04358
 Gorno Ezerovo Watch Point 35TNH32499 04696
 Vaya Fishponds 35TNH27774 04277

Complex Mandrensko Ezero

Estuary of Reka Izvorska 35TNG36090 94399
 Estuary of Reka Fakiyska 35TNG32999 96795
 Ouzoun Geren 35TNG38812 98623
 Cherny Vrukh Fishponds 35TNG27629 96795
 Komloushka Nizina 35TNG35332 99972
 Mandrensko Ezero 35TNG36091 98928
 Nature Conservation
 Centre 'Poda' 35TNG38088 99191
 Nos Foros 35TNG39434 01041
 Protected Site 'Chengene Skele' 35TNG42044 97465
 Westermost Lake's Point at
 Novoseltsi 35TNG26316 94575
 Zaliv Foros 35TNG39011 99702

INDEX

The index contains the English names (including synonyms) and scientific names (in *italic*) of all waterbird species, mentioned in the text. The page numbers with a basic information about a given species are shown in **bold**.

The index contains also the Bulgarian names of all wetlands around Bourgas. The page numbers with a basic information about a given wetland are shown in **bold**.

All groups of names are given as one common list in alphabetical order.

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Milko Dimitrov was born in 1959 in the town of Bourgas, on the Southern Black Sea coast, where he has been a bird-watcher since childhood. After graduating in Biology and Chemistry at the University of Shoumen, he spent several years as a Research Associate in Lake Atanasovsko reserve.

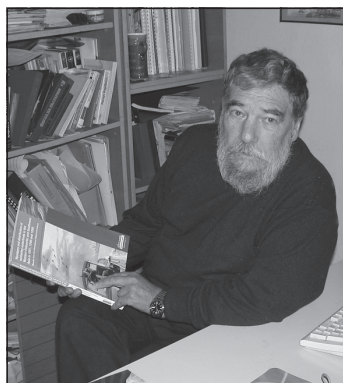
Since 1995 he has been on the staff of the Bulgarian-Swiss Biodiversity Programme as a Scientific Coordinator writing the Management Plans for the Wetlands of Ropotamo River and Lake Vaya.

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His interest in waterbirds has taken him to various wetlands throughout Europe, Russia, Mongolia, Israel and Southern Africa.

Milko Dimitrov is a founder member of the Bulgarian Society for the Protection of Birds and has established the first branch in Bulgaria. He is a member of the International Wader Study Group of Wetlands International/IUCN and a member of the Bulgarian Rarities Committee.

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Tanyo Michev was born in the town of Chirpan in 1939. He lives in Sofia and works as Associate Professor in the Central Laboratory for General Ecology at the Bulgarian Academy of Sciences. His main scientific interests are connected with research on rare and endangered bird species and potentialities for their conservation; migration of soaring birds; mid-winter distribution of waterbirds; wetlands.

He is an author and co-author of monographs and popular books, field guides, scientific papers, management plans, environmental impact assessments etc.

He is a founder member of the Bulgarian Society for the Protection of Birds and its first President during the period 1988-1983, one of founders of Bulgarian Ornithological Society, a member of the National Ramsar Committee and scientific director of the foundation 'Le Balkan-Bulgaria'.

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For the period 1985 – 1998 he works in the Ministry of Environment and Waters (MoEW) as an expert for conservation of flora, fauna and protected territories. As a National delegate he has participated in many international conferences of Ramsar, Bonn, CITES conventions.

Since 1983 he has taken an active part in carrying out national mid-winter counts as well as in organizing them through the MoEW regional inspectorates and several NGO's. He started his work as national coordinator of Ramsar Convention in 1988 and step down in 1998. He is familiar with wetlands and waterbirds of Asia, Australia, South Africa and North America.

Since 1983 he has introduced the fascination of Bourgas Wetlands to hundreds of foreign bird-watchers.

For the last six years Lyubomir Profirov was working as a regional coordinator of Bourgas Wetlands Project. He is also a founder member of the Bulgarian Society for the Protection of Birds, member of Green Balkan Federation and a national delegate of Bulgaria at Wetlands International.

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His interest in waterbirds has taken him to various wetlands throughout Europe, Russia, Mongolia, Israel and Southern Africa.

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