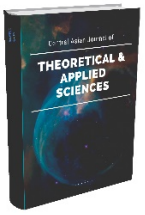

CENTRAL ASIAN JOURNAL OF THEORETICAL AND APPLIED SCIENCES

Volume: 02 Issue: 12 | Dec 2021 ISSN: 2660-5317

Wintering of Rare Birds of the Water Bodies of the Lower Current of Zarafshan

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Received 30th Oct 2021, Accepted 29th Nov 2021, Online 8th Dec 2021

Annotation: *The article covers the features of the distribution, number and distribution of wintering rare birds in the lower reaches of the Zarafshan River and the reservoirs of the adjacent regions. As a result of observations, in 2020-2021 13 species of rare birds wintering was studied. On the territory of the study, a Pygmy Cormorant Phalacrocorax pygmaeus and the Mute Swan Cygnus olor were recorded in some water bodies in the maximum number (9/10). In winter, birds that took water and water in the abandoned lakes than in the waterfowl showed a lot and diversity.*

Keywords: *Rare birds, wintering, lower reaches of the river Zarafshan, reservoir, Red Book, IUCN*

Introduction

In the central regions of Uzbekistan, winters are mild, in some years frosts and snow cover are absent in all, while in others there are frosts, snow falls and water bodies freeze, but most often for a short time - one or two weeks. In the studied territories, the number of days with snow cover is less than 10, and in some places there is practically no snow cover. In the regions described, rare birds winter regularly and only in the most severe winters part of the water bodies is covered with ice, and thus they become unsuitable for wintering.

For wintering, waterfowl use both natural and artificial reservoirs. In places with a large concentration of waterfowl, there are also predators - the white-tailed eagle and the long-tailed eagle. Natural reservoirs are represented by rivers and lakes. There are quite a few rivers along with the Amu Darya, Zarafshan and their tributaries, especially in the regions of Bukhara and Navoi regions. Rivers and large canals (Amu-Bukhara and Amu-Karakul) are characterized by a fast current, the absence of quiet backwaters with thickets of emergent vegetation and, in general, conditions favorable for the wintering of waterfowl. Therefore, the importance of rivers and canals for the wintering of waterfowl in the study area is insignificant.

In turn, artificial reservoirs - reservoirs, discharge and filtration lakes, which have arisen as a result of the organization of irrigated agriculture, are of great importance.

Reservoirs - serve for temporary storage of water used for irrigation of fields. Tudakul, Kuyimazar and Shurkul are such reservoirs - in depth - Kuyimazar 28 m, Tudakul 15 m and Shurkul 7 m. The

hydrological regime is characterized by flow, sharp fluctuations in water level, poverty of flora and fauna. In most of the reservoirs, there are almost no reserves of aquatic plants, which, as you know, are widely used in the diet of many water birds. The main type of plant food they eat in winter are those arising after the withering away of algae. The stock of animal feed is also small. The predominance of secondary aquatic animals in the autumn season significantly changes the winter feeding conditions. Insects that have completed development fly away, and the forms that remain in the larval stage, with the onset of cold weather, migrate to the bottom of the reservoir and become inaccessible to birds. Currently, the Tudakul reservoir and its ponds are rich in fish, and therefore the concentration of fish-eating birds is observed here.

Discharge lake - consists of flushing water from the collector-drainage system. In the Bukhara region, such lakes are Denzizkul, Kara-kyr, Ayakagitma, Zamanbaba, Khadicha, Zikri, Devkhan and Kumsultan. Shallower, as a rule, no more than 2-5 m. Only Devkhana and Ayakagitma are deeper (15-30 m) than the rest. There is no drainage, in winter and spring the water level rises, due to evaporation and lack of inflow in summer, the water level drops significantly. Greater abundance of plant and animal organisms. The lakes are rich in plant food. Here, uruti, pondweed, and charovy algae usually develop, in the coastal parts - reed, cattail, and saltwort. All these plants make up a large proportion of the food ration of many waterfowl. In terms of animal feed reserves, waste lakes differ little from reservoirs, and their hydrofauna is also poor.

Filtration lakes - formed as a result of an increase in the level of groundwater when filling reservoirs and canals with water. At the Tudakul reservoir, the formed lake is Chuchkakhona, and along the Amu-Bukhara canal there are several small lakes. Plants and animals found in filtration reservoirs are similar to those in waste lakes.

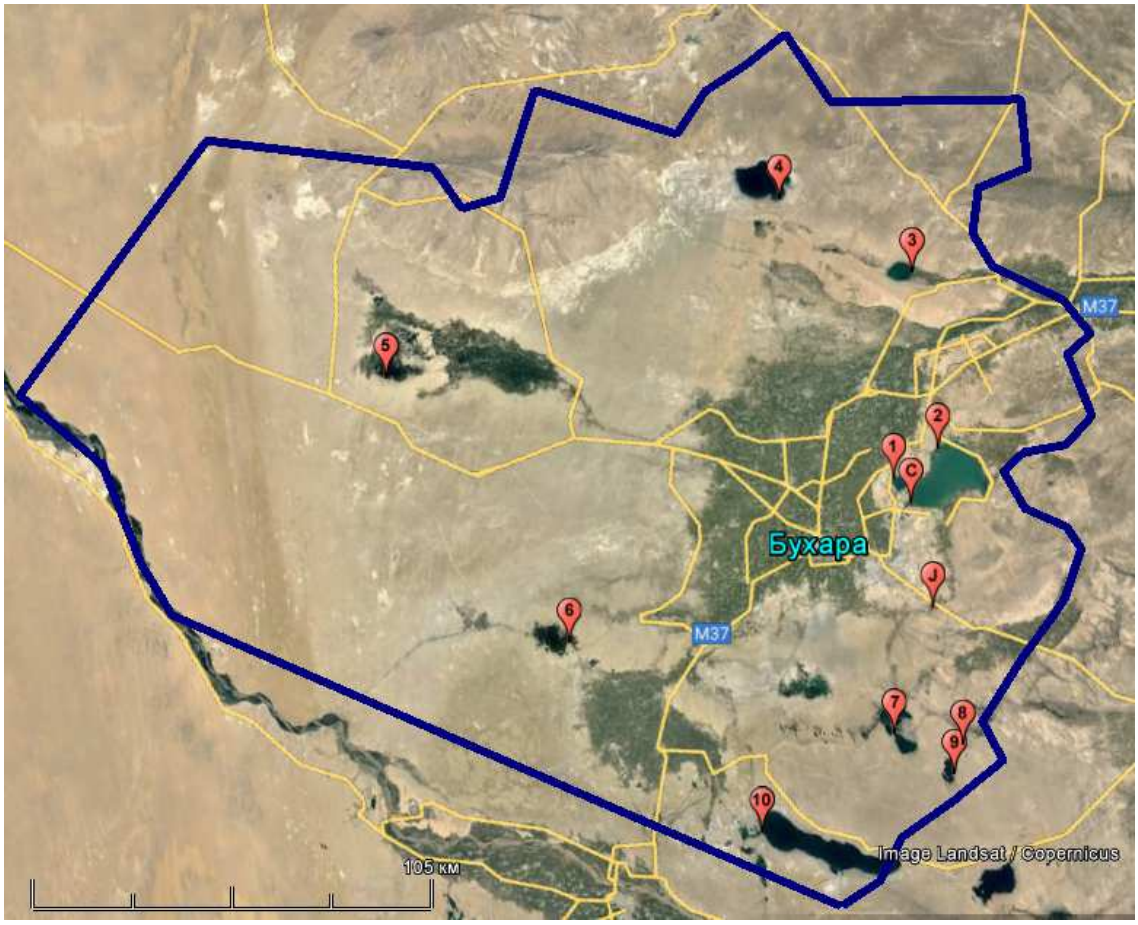
Fish stocks in the lakes have declined sharply in the past decade as a result of rapid growth in fishing and poaching. Salinity, sanitary-ecological state and water quality of waste lakes are deteriorating from year to year, which leads to a sharp decrease in the reproduction and development of fish. Only in collectors is the species diversity and abundance of non-commercial fish higher than in lakes.

Materials and methods. The research was carried out in the winter seasons of 2020-2021 on the basis of ornithological observations in the reservoirs of the lower reaches of the Zarafshan River and its limits, including the Tudakul, Kuyimazar and Shurkul reservoirs, Dengizkul, Kara-kyr, Ayakagitma, Zamanbaba, Khadich, Zekra and Devkhan lakes. For research, we used the generally accepted ornithological and ecological methods: stationary, route, visual observation and questionnaire (Fig. 1).

The geographic coordinates of the survey points were determined using the Garming E-Trex navigator. As a cartographic basis for plotting research points, we used the schemes of habitats, overnight stays and places of concentration of wintering birds, we used satellite images provided by the "Google Earth" program.

The main method of ornithological survey of the above-mentioned water bodies, including the adjacent coastal area and water area, was visual observation using BPC binoculars (16x50 and LUXUN telescope (25-75x70). The species of birds was determined visually in accordance with the field guide of birds "Collins Bird Guide" (L. Svensson, 2009), "Birds of East Asia" (M. Brazil, 2010) and photographs taken with a Nikon P900 digital camera.

We used data on the status of rare birds on a national and international scale from the Red Book of the Republic of Uzbekistan and threat categories on the IUCN Red List in 2021. http://www.birdlife.org.



Rice. 1. Map of the lower course of the river. Zarafshan - bird counting points

1 Kuyimazar; 2 Tudakul; 3 Shurkul; 4 Ayakagitma; 5 Kara-kir;
6 Zamanbaba; 7 Xadicha; 8 Zikri; 9 Devxana; 10 Dengizkul;
C Chuchkaxana; J Ecocenter Jeyran.

Results and Discussions

For two years, observations were carried out in almost all water bodies and important data were obtained. General data on the species and number of waterfowl and near-water rare birds wintering on the surveyed reservoirs of the lower reaches of the Zarafshan are given in Tables 1, 2. In total, more than 15,000 rare birds were wintering on these reservoirs.

It should be emphasized that the most numerous in wintering are 2 species - the cormorant and the mute swan. They make up 9/10 of all rare wintering birds in the studied territories (Tables 1, 2).

Table 1.Rare wintering birds and the number of waste and filtration lakes in the lower reaches of the Zarafshan 2020/2021.

№	Bird species	Waste lakes								Filter-ration-new lakes		In total
		Dengizkul	Kara-kir	Ayakagitma	Xadicha	Zamanbaba	Zekri	Devxana	Kumsultan*	Chuchkaxana	Lakes Ecocenter Jeyran	
1.	*Pelecanus onocrotalus*	2		2								4
2.	*Pelecanus crispus*	1	8							2		11
3.	*Phalacrocorax pygmaeus*	6	54			10104			40			10204
4.	*Anser erythropus*		4			2						6
5.	*Cygnus olor*	1051	1023	892	88	194	41	1	32		7	3329
6.	*Cygnus cygnus*	3	11	24		2						40
7.	*Cygnus bewickii*		2	16								18
8.	*Aythya nyroca*		5	2			4			2	3	16
9.	*Oxyura leucocephala*	123	14		41		26					204
10.	*Marmaronetta angustirostris*		3			2						5
11.	*Haliaeetus leucoryphus*		1	1		1						3
12.	*Haliaeetus albicilla*	14	15	5	2	4	1	1	2	1	1	46
13.	*Larus ichthyaetus*	4	6	2	2	6	1	2		1	1	25
In total		**1204**	**1146**	**944**	**133**	**10315**	**73**	**4**	**74**	**6**	**12**	**14911**

** - data from a survey of hunters.*

Table 2. The number of rare wintering birds in the reservoirs of the lower reaches of the Zarafshan in 2020/2021

№	Type of birds	Tudakul	Kuyimazar	Shurkul	Total
1.	*Pelecanus onocrotalus*	3			3
2.	*Pelecanus crispus*	4			4
3.	*Phalacrocorax pygmaeus*	6			6
4.	*Cygnus olor*	296	18		314
5.	*Aythya nyroca*	8			8
6.	*Oxyura leucocephala*	2			2
7.	*Haliaeetus albicilla*	6	1	2	9
8.	*Larus ichthyaetus*	21	1		22
In total		**346**	**20**	**2**	**368**

Depending on the characteristics of different water bodies, the species composition of rare birds wintering on them and the specific gravity of each species are quite different, which is clearly seen from Tables 1

and 2. The absolute majority of rare wintering birds live on waste and seepage waters: 14911 birds fall to their share (97, 6%)

Thus, the uneven distribution of birds between these two types of water bodies is associated not only with the smaller area of the surveyed reservoirs, but also with their poorer food supply and previously noted less favorable conditions for wintering birds.

In addition, the salinity of these 2 types of water bodies affects their freezing depending on the temperature and differs significantly from each other.

The daily air temperature in the winter of 2020/2021 in the second decade of November, the temperature dropped to -150C and almost the entire surface of the reservoir, small and large lakes were covered with ice. Waterfowl migrated to deeper and more unfrozen parts of water bodies. For example, in Lake Kara-kyr (Big Kara-kyr), also Tudakul and Kuyimazar.

In the first ten days of December and January, the weather became colder, as in November, most of the water surface was covered with ice and the ice did not melt for a long time. At that time, most of the birds lived on the collectors, and some remained (swans), thus, due to inexperience, young birds (mute swans, first years) died of hunger and cold on the lakes Kara-Kyr and Ayakagitma. At the same time, the number of birds of prey (white-tailed eagle) has noticeably increased (Fig. 1). In the second half of January, the ice began to melt, but very few young individuals remained in the swan flock, only 3.3% of mute swans.

Rice. 1. White-tailed eagle Haliaeetus albicilla and waterfowl birds on the lake. Kara-kyr. December 25, 2020

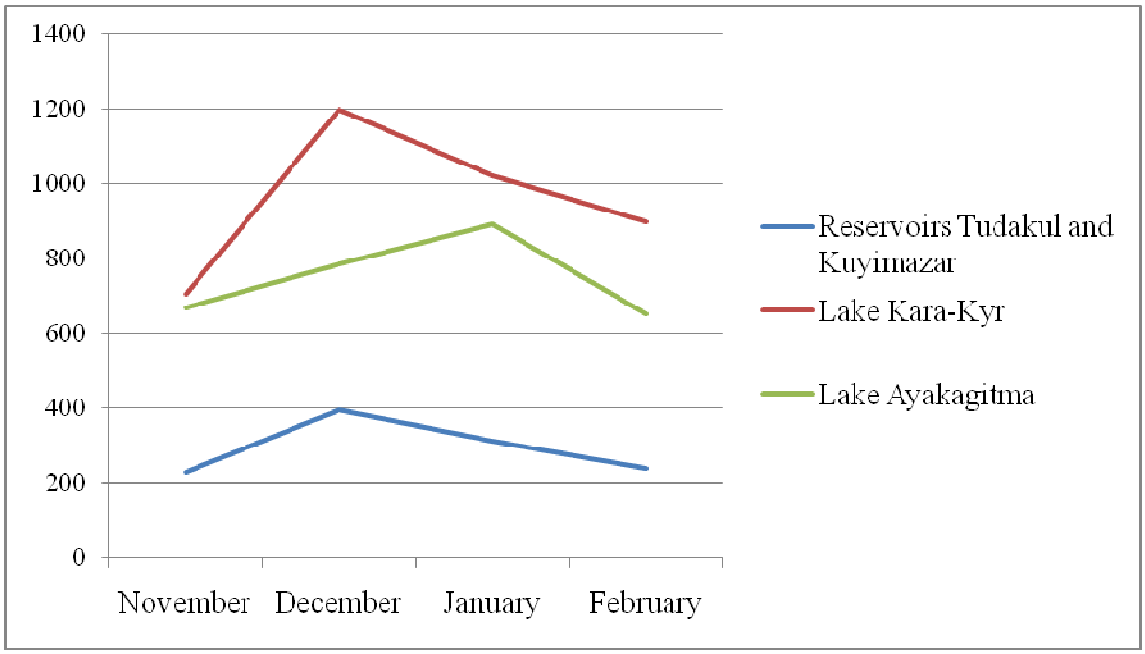
Last winter, we did not observe the pink pelican Pelecanus onocrotalus in the studied reservoir, and in 2020/2021 we met a small number of pink Pelecanus onocrotalus and Dalmatian pelicans Pelecanus crispus. This is primarily due to the general increase in the number in the region, which has been observed in recent years in the process of migration, and some of the pelicans remain to winter (Fig. 2).

Rice. 2. Pink pelican Pelecanus onocrotalus on the lake. Ayakagitma. February 21, 2021

Thus, the specific gravity of the cormorant Phalacrocorax pygmaeus on Lake Zamanbaba and its sources - the Central Bukhara collectors - is higher (99%) than in general for all water bodies.

A small number of small white-fronted goose Anser erythropus was observed on lakes Kara-kyr and Zamanbaba, together with white-fronted goose Anser albifrons and gray Anser anser.

Since the 80-90s of the last century, swans (Cygnus olor, C. cygnus) began to winter in our region, but the number of individuals was small [10]. In the last 2 winters, the growth of wintering mute swans has noticeably increased. The number of mutees in different types of water bodies fluctuates from the beginning to the end of winter. In the winter season 2020-2021, until December, the number of mute swans increased, and from January to the end of February it began to decline. On reservoirs, 2-3 times less than on lakes (Fig. 3).



Rice. 3. Dynamics of the abundance of the mute swan Cygnus olor in the winter seasons of 2020/2021 in the water bodies of the lower reaches of the Zarafshan.

Rice. 4. A flock of mute swan Cygnus olor and whooper C. cygnus on the lake. Kara-kyr.January 29, 2021

In the studied water bodies, the whooper swan Cygnus cygnus is not numerous; it hibernates together with the mute swan (Fig. 4). Sometimes 2-6 individuals swim separately from other species of swans, met on the lake. Ayakagitma.

In our opinion, the presence of the small swan Cygnus bewiskii on the lakes Kara-Kyr and Ayakagitma during the winter is of particular interest (Fig. 5). In recent years, the number of wintering individuals has noticeably increased on waste lakes. In our reservoirs, this is an extremely rare migrant and wintering bird [5].

A small number (2-8 individuals) of the white-eyed duck Aythya nyroca was observed in shallow reed lakes and fish ponds.

As a result of our observation, no more than 200 individuals of the White-headed Duck Oxyura leucocephala were recorded. In the month of October 2016 on the lake. Dengizkul recorded 8502 birds, and in December of the same year - 1937 individuals [6].

The marbled teal Marmaronetta angustirostris is usually a migratory bird in the investigated water body. A small number remains for the winter not every year. This winter, only on 2 lakes, we met 5 individuals.

Rice. 5. Small swan Cygnus bewickii on the lake. Ayakagitma. January 31, 2021

Long-tailed eagle Haliaeetus leucoryphus is found especially during migration, but single individuals are observed in winter as well. In the lower reaches of the Zarafshan, another species of white-tailed eagle, Haliaeetus albicilla, is found during the flight and overwinters in a sufficient number in lowland water bodies. In winter, this bird sometimes accumulates on islets or on the ice of large bodies of water. The number of eagles during the winter depends on waterfowl, such as the mallard, the red-nosed duck, the coot and even the mute swan. Birds of prey in the investigated reservoir feed mainly on dead waterfowl.

In most European countries, they have long been engaged in feeding birds in severe winters in order to preserve rare birds in the country and the world in general. South Bohemia has a good tradition of feeding wintering white-tailed eagles. Since 1974, winter dressing has been carried out regularly and annually in the protected area of Třebo. In one season - from mid-December to early March, eagles are fed 500 kg of fish [12].

In almost all water bodies, together with other species of gulls, a large number of the black-headed gull Larus ichthyaetus was observed. Only in the Tudakul reservoir we met about 20 birds, which are competitors in terms of nutrition for sea dove, black-headed gull, gull and herons.

Below is the number of rare bird species listed in the Red Book of the Republic of Uzbekistan and the IUCN Red List in the studied water bodies (tab 3). Dengizkul (2001), Tudakul and Kuyimazar (2020) are included in the list of wetlands of global importance protected by the Ramsar Convention.

Table 3 The total number and distribution of birds in the reservoirs of the lower reaches of the Zarafshan 2020-2021.

Name reservoir	Number of rare bird species			Status reservoir
	Common number of rare species	Listed in the Red Book Uzbekistan	Listed in the Red book IUCN	
Discharge and filtration lakes				
“Dengizkul”	8	8		IBA, Conv. Ramsar
“Black field”	12	11		IBA
“Ayakagitma”	9	7		IBA
“Khadija”	4	4		
“Zamanbaba”	8	8		
“Zecra”	5	5		IBA
“Devkhana”	3	3		
“Kumsultan” *	3	3		
“Pig”	4	4		
“ecocenter Jeyran”	4	4		IBA
Reservoirs				
Tudakul	8	8		IBA, Conv. Ramsar
Kuyimazar	3	3		
Shurkul	1	1		

Conclusion. On all surveyed artificial reservoirs, 13 species of rare birds, about 15 thousand individuals, winter. But the lake. Kumsultan, which is an artificial reservoir, remained unexplored. With the reduction of water areas, changes in the habitat of birds, the number of wintering rare species in the coming years will undoubtedly decrease. Rare birds often concentrate together with hunting and commercial waterfowl in more comfortable water bodies. As a result, there is a likelihood of the spread of infectious diseases or the spread of poaching in hunting farms. Due to the development of fish farming and the creation of new fish-breeding ponds, the number of fish-eating birds in water bodies has increased dramatically.

When collectors merge with lakes, the density of fish-eating birds becomes higher than in other parts.

To preserve and increase the species and quantitative composition of birds included not only in the IBA, it is recommended to protect the places of accumulation of birds and organize feeding work on cold winter days and bad weather.

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