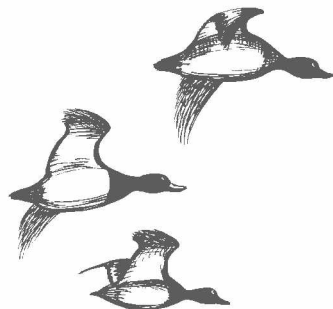


# The wintering waterfowl of Turkmenistan

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*Winter counts of waterfowl were carried out from 1972-1990 on the eastern shores of the Caspian Sea and on inland waterbodies of Turkmenistan. Local and regional population trends are described revealing a considerable decline in waterfowl numbers. This is thought to be due to a combination of the disastrous effects of human interference, a serious outbreak of botulism and a redistribution of birds wintering in the Caspian as a result of cold winters.*

**Keywords:** Asia, Wildfowl Counts, Population Size, Cold Weather, Botulism, Human Interference

High winter concentrations of ducks were found historically along the shores of the Caspian Sea and along the river valleys of the nearby lowlands (Blanford 1876, Karelin 1883, Zhitnikov 1910 Buxton 1921). In the 1950s and 1960s, the construction of large-scale irrigation systems, such as the Karakum Canal, took place in the Middle Asian plains resulting in the appearance of many new waterbodies. These developments, while being largely detrimental for the human population (through salinisation and the subsequent deterioration of agricultural land), have been beneficial for waterbird populations.

This paper represents the first overview of wintering waterfowl in the southeastern Caspian Sea, although data have been presented previously for discrete locations within the region (e.g. Vasil'ev 1977a, 1977b, Vasil'ev *et al.* 1984, Rustamov 1979, 1989, 1993, Rustamov & Khakiev 1978, Rustamov & Vasil'ev 1981, Karavayev 1988, Rustamov *et al.* 1990).

## Study Area and Methods

The numbers and distribution of birds wintering in the southeastern Caspian lowlands, and along the lower reaches of the Atrek River, have been studied since the 1930s. In more recent years, counts have been carried out in all major wintering areas of the region, from the eastern Caspian Sea to the Amudarya.

Sea bays and lagoons were surveyed from the air while the mainland waterbodies were surveyed from watch towers, cars and boats, as well as from the air. The sea was surveyed twice per winter in Novem-

ber and January while the inland waters were usually counted once per year in January (a small number of counts were carried out in late December or early February). Surveys covered an area of 7930 km<sup>2</sup> and 1800km of the Caspian shore (excluding Mangyshlak Bay), the Karakum Canal and the Amudarya.

## Results

### *Species composition, population size and trends*

Thirty-nine species of waterbird have been located in the study area during winter counts including Podicipediformes (five species), Pelecaniformes (White Pelican *Pelecanus onocrotalus*, Dalmatian Pelican *P. crispus*, Cormorant *Phalacrocorax carbo* and Pygmy Cormorant *P. pygmaeus*), Phoenicopteriformes (Greater Flamingo *Phoenicopterus roseus*), Anseriformes (Mute Swan *Cygnus olor*, Whooper Swan *C. cygnus*, Bewick's Swan *C. bewickii*, Red-breasted Goose *Branta ruficollis*, Greylag Goose *Anser anser*, Lesser White-fronted Goose *A. erythropus*, Ruddy Shelduck *Tadorna ferruginea*, Shelduck *T. tadorna*, Mallard *Anas platyrhynchos*, Teal *A. crecca*, Gadwall *A. strepera*, Wigeon *A. penelope*, Pintail *A. acuta*, Marbled Teal *A. angustirostris*, Garganey *A. querquedula*, Shoveler *A. clypeata*, Red-crested Pochard *Netta rufina*, Pochard *Aythya ferina*, Ferruginous Duck *A. nyroca*, Tufted Duck *A. fuligula*, Scaup *A. marila*, Goldeneye *Bucephala clangula*, Long-tailed Duck *Clangula hyemalis* and Velvet Scoter *Melanitta fusca* (on the Caspian shore only), White-headed Duck *Oxyura leucocephala*,

Smew *Mergus albellus*, Red-breasted Merganser *M. serrator* and Goosander *M. merganser*) and Rallidae (Coot *Fulica atra*).

A mean of 780,300 waterbirds wintered in the study area with a peak count of 1.3 million. Excluding Mangyshlak Bay, which held a mean of 54,500 birds, the eastern shore of the Caspian Sea and the lower reaches of the Atrek River held a mean of 380,600 birds (48.7% of the total count), the Karakum Canal, Tedzhen and Murghab Rivers a further 56,100 (7.2%), the Amudarya region 221,000 (28.3%) and the Sarykamish area 122,000 (15.7%). The maximum counts for these four regions were 634,000, 94,000, 368,000 and 204,000 respectively.

Six species made up 94.6% of the total wintering flock of 780,300 individuals. The predominant species were Coot (on average 266,000 or 34% of total regional count), Red-crested Pochard (143,000 or 18.3%), Mallard (101,000 or 12.9%), Teal (88,000 or 11.3%), Tufted Duck (71,000 or 9.1%) and Pochard (70,000 or 9.0%). The proportion of Coot in the count is high both on the sea shore (20.5%) and inland (13.5%) as is the proportion of Red-crested Pochard (7.4 and 10.9% respectively). Mallard (0.7 and 12.2%) and Teal (0.8 and 10.5%) make up more of the waterfowl counts on inland waters whereas Tufted Duck (7.5 and 1.6%) and Pochard (7.5 and 1.5%) are represented more on the sea.

Variation in species composition occurs between sites. In the Kelif Lakes area, there was a mean of 13 or 14 species recorded with a maximum of 22 in 1976 and a minimum of eight in 1985. Coot and Mallard, as well as Teal, Pochard and Red-crested Pochard were the dominant species throughout. Between 1977 and 1988, there was a striking decrease in the numbers of Gadwall, Pintail and Scaup while Shoveler, Wigeon, Ruddy Shelduck, Ferruginous Duck, Red-breasted Merganser, Goosander and White-headed Duck became very scarce. At the same time, there was a pronounced increase in the numbers of Cormorant, Shelduck and Tufted Duck. Greylag Goose had a stable wintering population of around 1000 birds between 1968 and 1976 but, between 1977 and 1985, numbers dropped dramatically to less than 50 birds before recovering somewhat in recent years. Lesser White-fronted Geese were seen in small numbers in 1972, 1974, 1976 and 1986-88.

The Kelif Lakes area held more species than the Khauzkhan Reservoir where a mean of nine species was recorded. The maximum number of species at the Khauzkhan Reservoir was 15 in 1974 and 1976 while there was a minimum of only three in 1977. There were stable numbers of Mallard, Coot, Teal, Pochard and Red-crested Pochard throughout the study period. Red-crested Pochard occur annually, although they have decreased in number since 1977. Between 1977 and 1984, no Tufted Ducks were recorded at the reserve, but they have reappeared in recent years. Scaup, which were always less common than Tufted Ducks, have not been recorded at the Khauzkhan Reservoir since 1977. Other species of ducks occur rarely; for example, Smew, Red-breasted Merganser, Goosander and Goldeneye only appear in small numbers during the cold winter months. Greylag Geese were first recorded only occasionally, with 180 birds in 1976, but began to winter regularly from 1985 reaching a peak of 500 birds in 1988. Cormorants were not recorded on the Khauzkhan until 1977, but have become much more abundant in recent years with a mean of 110 birds present.

In the lower reaches of the Atrek and the nearby sea shore, the number of species recorded ranged from 14 to 25 (19 on average) while the number of birds varied between 11,000 and 165,000 (53,900 on average). Low water levels in the Atrek, a rise in sea level and a subsequent reduction in the amount of intertidal areas in this region has caused a reduction in the waterfowl population here. Dabbling ducks, mainly Teal, were most numerous but, since 1979, Coot have become the most widespread species. Pygmy Cormorant, Red-breasted Geese, Lesser White-fronted Geese, Marbled Duck, Ferruginous Duck and Shelduck have become very scarce while Cormorants have increased in number.

Whooper Swans, Mute Swans and Greater Flamingos occur sporadically on the inland waterbodies and winter mainly in the eastern Caspian. Mute Swans numbers increased from 28,400 birds in 1972 to 53,000 in 1985 while the numbers of Greater Flamingos increased from 10,700 in 1973-77 to 18,000 in 1980 (V.I. Vasil'ev pers. comm.). The main population of Greater Flamingo winters in the southeastern portion of Krasnovodsk Bay.

Over the past 25-30 years, the waterbird

**Table 1. Waterfowl numbers throughout the wintering localities of the Caspian Sea-Amudarya region (1972-90).**

Wintering locality	Area/ length	No of species	Dominant species	Absolute numbers	%
Alexandrbai/Kazah bays	250km	21	A.ferina, N.rufina	35424	4.5
Shore between Adamtash & Karasengir capes	200km	22	A.fuligula, N.rufina	26152	3.3
Shore between Karasengir & Aksengir capes	85km	16	A.fuligula, N. rufina	6500	0.8
Shore between Aksengir & Yuzhnocheleken capes	110km	18	N.rufina, F. atra	9617	
Krasnovodsk Bay	1520km <sup>2</sup>	28	F.atra	182817	23.4
Yuzhnocheleken Bay	100km	20	F.atra	23100	3.0
Turkmen Bay	100km	19	F.atra	28594	3.7
Shore between the Okarem moorage & Gashankuli	80km	22	F.atra	16237	2.1
Ponds & floodplains along Atrek River	115km <sup>2</sup>	20	A.crecca, F.atra	52223	6.7
Kopetdag reservoir	39km <sup>2</sup>	12	F.atra, A.platyrrhynchos	3480	0.4
Kurtli reservoir	14km <sup>2</sup>	13	A.platyrrhynchos, F.atra	3351	0.4
Ashkhabad reservoir	3.3km <sup>2</sup>	13	A.platyrrhynchos, F.atra	644	0.1
Kulankyrlyan Lake	0.8km <sup>2</sup>	13	A.platyrrhynchos	10330	1.3
Soltandesht floodplain	75km <sup>2</sup>	12	N.rufina	3445	0.4
Karadzhaulak floodplain	31km <sup>2</sup>	7	A.platyrrhynchos	1482	0.2
Airykly floodplain	40km <sup>2</sup>	8	A.platyrrhynchos	1400	0.2
Khangui floodplain	25km <sup>2</sup>	9	A.ferina	778	0.1
Jarsai floodplain	120km <sup>2</sup>	19	A.platyrrhynchos	3085	0.4
Seirab floodplain	30km <sup>2</sup>	8	A.platyrrhynchos	283	0.04
Khauz Khan reservoir	270km <sup>2</sup>	21	A.platyrrhynchos	16737	2.1
Tedshen reservoir	42km <sup>2</sup>	18	A.platyrrhynchos	3581	0.5
Horhor reservoir	6km <sup>2</sup>	9	A.platyrrhynchos	1014	0.1
Syryazi reservoir	147km <sup>2</sup>	17	A.platyrrhynchos	1189	0.1
Kolkhoz bent & Iolotan reservoir	79km <sup>2</sup>	12	A.platyrrhynchos	1763	0.2
Gindukush reservoir	12km <sup>2</sup>	8	A.platyrrhynchos	479	0.1
Karakum canal	88km	19	A.platyrrhynchos	3025	0.4
Kelif lakes	93km <sup>2</sup>	27	F.atra, A.platyrrhynchos	45552	7.0
Amudarya from Chardzhou to the north	261km	13	A.crecca, A.platyrrhynchos	81009	10.4
Lake Tailak-Soltandag	144km <sup>2</sup>	17	F.atra	6553	0.8
Lake Dengiskul	750km <sup>2</sup>	16	F.atra	40297	5.2
Lake Tudakul	250km <sup>2</sup>	n/a*			
Lake Mahankul	200km <sup>2</sup>	n/a*			
Lake Kattashorkul	54km <sup>2</sup>	11	N.rufina	5173	0.7
Amudarya from Chardzhou to the south	314km	15	A.crecca	12037	1.5
Tuyamuyum-Sol- tansandzhar reservoir	750km <sup>2</sup>	10	A.platyrrhynchos, F.atra	2573	0.3
Amudarya from Tuyamuyum- Soltansandzhar to Nukus	110km	7	A.platyrrhynchos	12004	1.5
Amudarya from Nukus to the south	100km	n/a*			
Lake Khivin	130km <sup>2</sup>	7	F.atra, A.platyrrhynchos	4440	0.2
Lake Goikrlan	20km <sup>2</sup>	9	F.atra	560	0.1
Lake Kernai	60km <sup>2</sup>	9	A.platyrrhynchos	4800	0.6
Lake Sarykamish	2900km <sup>2</sup>	18	F.atra	122603	15.7
Total		33		780332	100

\*n/a=no counts available

population of the region has declined drastically, overall by around 50%. However, the rate of decline varies between regions. For example, in the Kelif Lakes waterbird numbers dropped by 93% from a mean of 124,900 in 1970-1976 to only 8600 in 1977-1988, while in the Khauz Khan Reser-

voir, a 73% decline, from 20,400 to 5500 birds, occurred. Waterbird numbers on the lower reaches of the Atrek River and the nearby shores of the Caspian decreased by 45% from 124,400 in the 1930s to 68,400 in 1977-1988. Changes in bird numbers are similar in the Ashgabad group of lakes, the

Khauzkan Reservoir and the Kelif Lakes (see Table 1).

In the 1960s, waterfowl numbers in the region were estimated at 1.5-2 million birds. The first reduction in the waterfowl population occurred in 1969 followed by a more striking decline after 1977. This is not only due to extremely cold winters, but also to the disastrous effects of human interference and a serious outbreak of botulism. This situation mirrors the general decline in waterfowl numbers throughout the former Soviet Union (Krivenko *et al.* 1980, Sapetina & Priklonsky 1980).

### *Migration*

The climate and hydrology varies considerably over the large geographical region included in this study. The northern half of the region (north of 40°N latitude) experiences prolonged snow and ice cover, while the southern half has mild winters and, as a rule, lacks ice cover on waterbodies. The majority of the important wintering sites (30 out of 41) are found within the southern zone.

Waterfowl migrate to the wintering grounds in advance of, or parallel with, cold climatic fronts and, during this time, mass migration may be observed over very short periods. For example, on 5 December 1968, as cold fronts moved in over the northern parts of Uzbekistan and Turkmenistan, waterfowl numbers in the middle reaches of the Amudarya (see Table 1) began to build up and, by 10 December, huge numbers had arrived. An aerial survey on 12 December in the Denghiz Lake area (to the east of Chardzhev) recorded a colossal 574,800 individuals of which 404,000 (70.3%) were Coot, 74,100 (13%) Red-crested Pochard, 31,000 (5.4%) Tufted Duck and the rest Goosander and Mallard. However, by the end of December, the flock size had fallen by 90% to only 50,000 birds.

The same situation is observed at the coast. As temperatures fall and ice forms on the northern Caspian Sea, birds move into open water, mainly to Krasnovodsk Bay. At this time, birds may also move to the bay from the Sarykamish Lakes. This phenomenon of interchange is characteristic not only of the period when wintering flocks first gather (November), but also during periods of warm weather in January when birds move over short distances to the north. However, this movement does

not occur in cold (1968-69, 1971-72, 1976-77, 1984-85, 1990-91) or warm winters (1980-81, 1982-83, 1983-84, 1985-86, 1989-90) winters when the birds rarely visit the usual wintering grounds. In cold years, the waterfowl migrate further south to Iran and India, while in warm winters they remain in the northern Caspian, Aral or in the central Kazakhstan Lakes.

### *Rare and scarce species*

Of the 39 species of waterfowl recorded during the surveys, White Pelican, Dalmatian Pelican, Greater Flamingo, Red-breasted Goose, Bewick's Swan, Marbled Teal and White-headed Duck are included in the Red Data Book of Turkmenistan (Rustamov 1985).

White and Dalmatian Pelicans winter rarely throughout the whole study area while the Pygmy Cormorant is rarely recorded wintering or on migration. In December 1935-39, comparatively large flocks of up to 150 individuals used to be recorded on the lower reaches of the Atrak River (Isakov & Vorobiov 1940). More recent counts include 34 and 75 birds on the Sultandag Lake and Kelif Lakes respectively in February 1988 (Shernazarov & Nazarov 1990). Also in January 1980 and 1990, 12 and 45 individuals were counted in the middle Amudarya.

Bewick's Swans are observed extremely rarely along the Caspian Sea shore. There are only two reliable observations, the first in January 1939 (Dement'ev 1952) and the next in the winter of 1975-76 in the northern Cheleken Bay (Ataev *et al.* 1978).

At the end of the last century, some hundreds of Red-breasted Geese wintered along the lower reaches of the Atrak, with single flocks of up to 300-500 individuals (Zhitnikov 1900). These birds are now very unusual with five birds recorded in mid May 1985 on Sultandag Lake and two birds in February 1987 on the Kelif Lakes (Shirekov & Poslavski 1990).

Marbled Teal was the commonest duck species in the region prior to 1940. These birds wintered and nested along the Amudarya, Murghab, Tedzhen and Atrak Rivers. In 1932-39, the numbers in the lower reaches of the Atrak and nearby coast reached 17,000 (Laptev *et al.* 1934, Isakov & Vorobiov 1940). During the last two years, there have been only four observations of this species during the winter. However, a

concentration of 5000 individuals in January 1988 on the Dengizgul Lake warrants special mention.

## Discussion

The most important waterfowl wintering areas in the study area are the protected portion of Krasnovodsk Bay (23.4% of the total wintering flock), the Sarykamish Lake area (15.7%), the Amudarya flood plain from the coast to Chardzhev town (10.5%), the Kelif Lakes area (7%) and finally, the

lower reaches of the Atrek River (6.7%).

These areas are located on major waterfowl migration routes and hold winter accumulations of international importance. An integrated monitoring study for these sites and for the region as a whole is therefore essential in order to recommend conservation measures to safeguard the remaining waterfowl resource. This is especially so considering that most of the wintering populations of waterfowl in the region are decreasing, despite the fact that there are many recently created waterbodies.

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