The importance of the western Caspian coast for migrating and wintering waders

A.O. Shubin

Shubin, A.O. 1998. The importance of the western Caspian coast for migrating and wintering waders. *International Wader Studies* 10: 403-412.

Between 1981-91, 44 migrating and 28 wintering species of waders were recorded on the western Caspian coast. On wetlands in the northern part of the Agrakhan Peninsula more than 5,000 waders were counted in late October in one place, the majority of which were Dunlin *Calidris alpina*. On the 4 km sandy beach in the southern part of the Agrakhan Peninsula about 5,000 waders can occur at any one time in autumn, with Sanderling *Calidris alba* (48%) and Dunlin most abundant. In April-May up to 1,000 waders gather here, including over 600 Terek Sandpipers *Xenus cinereus*. In some years, on the 4 km sandy beach at the Samur river mouth, about 500 Sanderlings and 500 Little Stints *Calidris minuta* may gather in August. Over 200 Wood Sandpipers *Tringa glareola* and 200 Common Snipe *Gallinago gallinago* also stop here on a 90 ha empty fishery pond. On wetlands at Kirov Bay about 30,000 waders accumulate in August, with Black-tailed Godwit *Limosa limosa* (40%), Curlew Sandpiper *Calidris ferruginea* (19%) and Kentish Plover *Charadrius alexandrinus* (12%) being most abundant. Other regions of the western Caspian coast are largely unsuitable for waders: the coast to the north of the Agrakhan Peninsula is completely covered by reeds and all of the southern coast suffers from many human activities. Moreover, current sea-level changes and coastal erosion have led to the disappearance of the beach flats. Winter concentrations of waders in Kirov Bay are now apparently the largest in the Caspian Sea. In 1984-86 about 7,000 Redshank *Tringa totanus*, 4,000 Dunlin and 2,000 Black-tailed Godwit were counted there. Numbers of wintering Avocet *Recurvirostra avosetta* and Curlew *Numenius arquata* decreased between 1967 and 1986, but the number of Black-tailed Godwits increased markedly.

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Шубин, А. О. 1998. Значение западного побережья Каспийского моря для мигрирующих и зимующих куликов. *International Wader Studies* 10: 403-412.

В период с 1981 по 1991 г. было зарегистрировано 44 мигрирующих и 28 зимующих видов куликов на западном побережье Каспия. В водно-болотных угодьях в северной части Аграханского п-ва было учтено в одном месте свыше 5,000 куликов в конце октября, в большинстве чернозобики *Calidris alpina*. На песчаном пляже длиной 4 км в южной части Аграханского п-ва около 5,000 куликов могут встречаться одновременно в любое время осенью, при этом самыми обильными бывают песчанка *Calidris alba* (48%) и чернозобик. В апреле-мае здесь собираются до 1,000 куликов, в том числе свыше 600 мородунок *Xenus cinereus*. В отдельные годы на четырехкилометровном песчаном пляже в устье р. Самур в августе могут собираться около 500 песчанок и 500 куликов-воробьев *Calidris minuta*. Здесь останавливаются также свыше 200 фифи *Tringa glareola* и 200 обыкновенных бекасов *Gallinago gallinago* на осушенном рыбоводческом пруду площадью 90 га. В водно-болотных угодьях в заливе Кирова около 30,000 куликов концентрируются в августе, и самыми многочисленными среди них бывают большой веретенник *Limosa limosa* (40%), краснозобик *Calidris ferruginea* (19%) и морской зуек *Charadrius alexandrinus* (12%). Другие районы западного побережья Каспия по большей части непригодны для куликов: побережье моря к северу от Аграханского п-ва все покрыто зарослями тростника и все южное побережье страдает от многих антропогенных действий. Более того, современные изменения уровня моря вместе с абразией берега привели к исчезновению прибрежных отмелей. Зимние скопления куликов в заливе Кирова теперь, по-видимому, самые крупные в бассейне Каспийского моря. В 1984-86 гг. там было учтено около 7,000 травников *Tringa totanus*, 4,000 чернозобиков и 2,000 больших веретенников. Численность зимующих шилоклювок *Recurvirostra avosetta* и больших кроншнепов *Numenius arquata* снизилась между 1967 и 1986 гг., тогда как заметно возросло количество больших веретенников.

Introduction

Very large numbers of waders migrate along the western coast of the Caspian Sea, a proportion of which also overwinter in the southern Caspian region (Bogdanov 1879; Radde 1884; Satunin 1907; Vereschagin 1950; Tugarinov 1950; Grekov 1965; Zlotin 1963; Mustafaev 1972, 1974; Bondarev & Bondarev 1980; Mikheev 1985; Rezanov 1983; Shubin 1986, 1990, 1991a,b). Nevertheless, the number of waders that stopover in these areas still remains one of the least studied subjects. Information published before the 1980s is extremely scarce and almost exclusively concerns the numbers of wintering waders at the Kirov Bay, southern Azerbaijan (Tugarinov & Kozlova-Pushkareva 1938; Adolf *et al*. 1958; Spangenberg 1959; Dobrokhotov 1963; Oliger 1967; Mikheev & Orlov 1972). Up until now there have been no data on wader numbers at the places where they stop to feed during migration.

While studying the ecology and behaviour of migrating and wintering waders in areas with large concentrations, the author also conducted wader counts. These data were used as the basis for this paper.

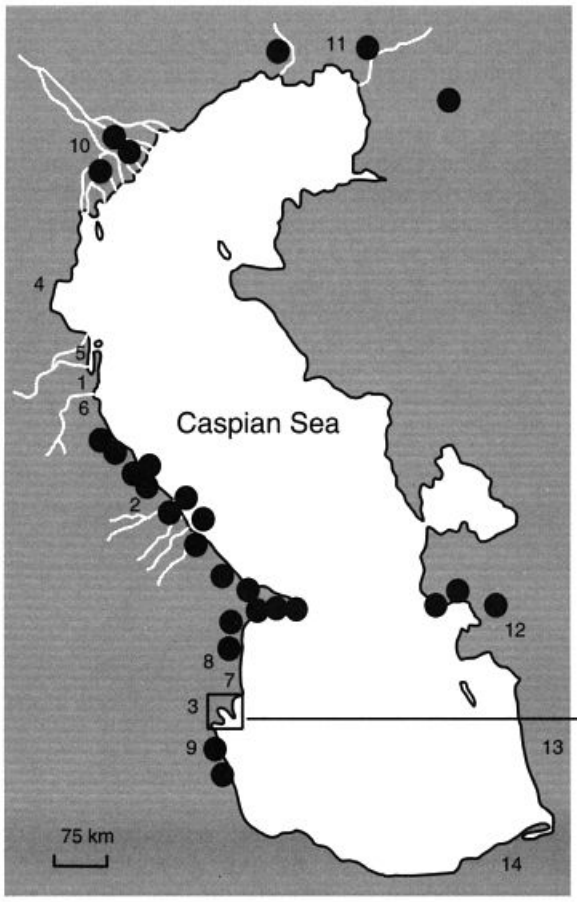
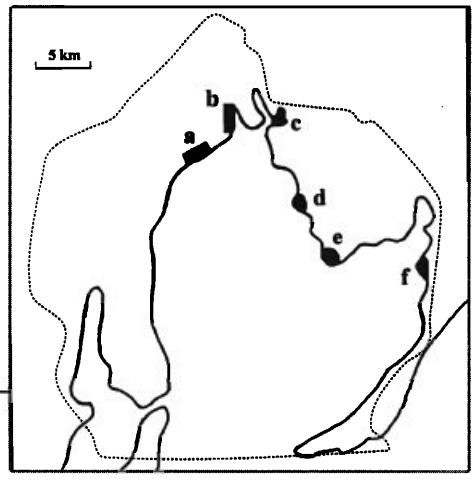


Figure 1. Main geographical names mentioned in the paper and the distribution of recreational establishments on the Caspian Coast ● (from Molchanova 1989). Named locations are :

1 - Agrakhan Peninsula, southern part;
2 - the Samur river mouth
3 - Kirov Bay, Kyzyl-Agach Nature Reserve:
4 - Kizlyar Bay;
5 - Agrakhan Peninsula, northern part;
6 - the Sulak river mouth;
7 - the surroundngs of Neftechala settlement;
8 - Shirvani steppe;
9 - Lenkoran coast;
10 - the Volga Delta
11 - North-Eastern Caspian coast with surroundings;
12 - Krasnovodsk Bay;
13 - Gasan-Kuli Nature Reserve;
14 - Miankaleh Peninsula;

Study areas

Most of the data were obtained during two to four week expeditions to various areas of the western Caspian coast during different times of the migration or wintering seasons. The main study areas (Figure 1) were: (1) the southern part of the Agrakhan Peninsula in the Novyi Terek river mouth, October-November 1983, April-May 1984



INSET: a - Kulagin area; **b** - Ivanovsky bank; **c** - Karakush mudflats; **d** - Kaban'ya spit; **e** - Lebiazh'ya spit; **f** - Krestovskaya spit. Dotted line indicates boundary of nature reserve.

and 1986, September-October 1985, August-September 1986; (2) the coasts in the Samur river mouth, where observations were conducted throughout the year (except mid-winter and mid-summer); (3) Kyzyl-Agach Nature Reserve in Kirov Bay, August 1984 and 1985, January-February 1981-1986. In these areas daily censuses were conducted on transects or control plots. Single visits were also made to other parts of the western Caspian coast: (4) to Kizliarsky Bay, (5) the northern part of the Agrakhan Peninsula, (6) the Sulak river mouth, and (7) the coasts near Neftechala settlement.

Current state of the western Caspian Coast

Currently, the western Caspian coast suffers from intense human influence, as it is well devoloped economically and supports a number of recreation areas (Figure 1). The least damaged northern part of the western Caspian coast, extending north from the Agrakhan Peninsula to Kizlyar Bay and further to the Volga Delta is almost completely overgrown with reeds and thus is unsuitable for waders. Thus, suitable conditions for these birds only occur in several protected areas on the middle and southern parts of the western Caspian coast, *i.e.* the Agrakhan and Samur Nature Sanctuaries and the Kyzyl-Agach Nature Reserve in the Kirov Bay.

Most of the western Caspian coast to the south of the Agrakhan Peninsula is dominated by sandy beaches, which are being reduced drastically due to intense coastal erosion caused by the continuous advance of the Caspian Sea. Vast mudflats and shallow waters, which are preferred by waders, are found at the Agrakhan Peninsula and in Kirov Bay. At the Agrakhan Peninsula they stretch for *c.*10 km along the coastline of the northern part of the Peninsula. A small coastal area in the Novyi Terek river mouth on the southern part of this Peninsula also turned out to be favourable for waders, due to its rather high habitat diversity: numerous sandy spits, mudflats in the bays and river mouth and a marshy area of coastal lowland. In Kirov Bay conditions favourable for waders are found in several restricted areas, mostly in the northern and western parts of the Bay: the Karakush lake mudflats, the Kaban'ya, Lebiazh'ya, Krestovskaya mudflats and in the Kulagin area (Figure 1). The Samur river delta is rather unfavourable for waders as the sandy beaches there are rather narrow; however, some fresh-water waders use the muddy bottoms of drained fish ponds. Obviously, Kirov Bay and the Agrakhan Peninsula are currently the only places on the western Caspian coast which are suitable stopover sites for large numbers of migrant and wintering waders.

Results and Discussion

The list and status of wader species

On the western Caspian coast we recorded a total of 44 wader species. The most diverse wader fauna is found during the migration period (Table 1): 41 species were recorded during autumn migration, and 40 species during spring migration. The list of species is almost the same as that observed at the end of the 19th to the first half of the 20th century (Bogdanov 1879; Radde 1884; Satunin 1907; Vereschagin 1950; Tugarinov 1950). The only species recorded then, that we did not record were Cream-coloured Courser *Cursorius cursor*, Slender-billed Curlew *Numenius tenuirostris* and Pacific Golden Plover *Pluvialis fulva*. There has been the occasional record of Grey Phalarope *Phalaropus fulicarius* at the Samur river delta (Mikheev 1985) but this species was not observed anywhere during our studies. Our records of Red-wattled Lapwing *Lobivanellus indicus* (Polozov *et al.* 1990), Broad-billed Sandpiper *Limicola falcinellus*, and Knot *Calidris canutus* (Shubin 1986) were the first for the western Caspian coast.

In winter we recorded 28 wader species; the most diverse fauna (which included all the recorded species) was found at Kirov Bay (Kyzyl-Agach Nature Reserve). Others have recorded several more species at Kirov Bay in the winter: Dotterel *Charadrius morinellus*, Terek Sandpiper *Xenus cinereus*, Red-necked Phalarope *Phalaropus lobatus*, Turnstone *Arenaria interpres*, Ruff *Philomachus pugnax*, Temminck's Stint *Calidris temminckii* and Sanderling *Calidris alba* (Satunin 1907; Tugarinov & Kozlova-Pushkareva 1938; Oliger 1967; Mustafayev 1972, 1974; Rezanov 1983). In other regions of the western Caspian coast, the wader fauna is much less diverse: nine wintering species are known for the Lenkoran' coasts (Mustafayev 1972), five for the Shirvani steppes (Zlotin 1963) and 13 for the Samur river delta (V.T. Butiev & E.A. Lebedeva pers. comm.). At the Agrakhan Peninsula in 1975 waders were not recorded in winter at all (A.V. Mikheev pers. comm.).

Numbers of waders at stopover sites during migration

The area where the largest numbers of waders concentrate during migration along the western Caspian Coast is Kirov Bay (Kyzyl-Agach Nature Reserve, Azerbaijan). Autumn numbers recorded in the surveyed parts of the reserve are shown in Table 2. Only species for which more than 20 individuals were recorded in at least one study season are included. Bird counts were rounded as follows: 11 to 50 to the nearest five, 50 to 1,000 to the nearest ten, more than 1,000 to the nearest 100. The areas surveyed were Karakush (1,500x300 m), Kaban'ya spit (250x250 m) and the Kulagin area (2,000x200 m). The sum of the maximum number estimated for each species was 14,000 birds. As we surveyed about one half of the area suitable for waders, the total number of birds that stopover in the reserve is probably at least twice as high, *i.e.* about 28,000 waders.

Fairly large numbers of foraging waders were also recorded at the Agrakhan Peninsula. The main area where they concentrated was situated on the northern part of the Peninsula: in an area 1,500 x 200 m in size. From a single point on the shore, 5,000 Dunlin *Calidris alpina*, 53 Redshank *Tringa totanus*, 50 Grey Plover *Pluvialis squatarola* and two Kentish Plover *Charadrius alexandrinus* were counted.

On the regularly surveyed 4 km of coastline on the southern part of Agrakhan Peninsula (the Novyi Terek river mouth), up to 1,000 birds were censused during spring migration and in autumn up to 5,000 waders were recorded during a single count (Table 3).

In the Samur river delta waders use small, sandy, coastal spits and the mudflats of drained fish

Table 1. The list and relative abundance of waders on the western coast of the Caspian Sea during the non-breeding period 1981-1990.

Species	Autumn	Spring	Wintering*
Stone Curlew *Burhinus oedicnemus*	R	R	-
Grey Plover *Pluvialis squatarola*	C	C	C
Golden Plover *Pluvialis apricaria*	R	R	E
Ringed Plover *Charadrius hiaticula*	C	R	R
Little Ringed Plover *Charadrius dubius*	C	C	R
Greater Sandplover *Charadrius leschenaultii*	R	-	-
Caspian Plover *Charadrius asiaticus*	R	-	-
Kentish Plover *Charadrius alexandrinus*	A/C	R	R
Dotterel *Charadrius morinellus*	E	E	-
Sociable Plover *Chettusia gregaria*	R	R	-
Lapwing *Vanellus vanellus*	A	A	C
White-tailed Plover *Chettusia leucura*	-	R	E
Red-wattled Lapwing *Vanellus indicus*	E	-	-
Black-winged Stilt *Himantopus himantopus*	C	C	E
Avocet *Recurvirostra avosetta*	C	R	C
Oystercatcher *Haematopus ostralegus*	R	R	E
Green Sandpiper *Tringa ochropus*	C	A	R
Wood Sandpiper *Tringa glareola*	A	R	-
Greenshank *Tringa nebularia*	C	R	E
Redshank *Tringa totanus*	C	R	A
Spotted Redshank *Tringa erythropus*	R	R	E
Marsh Sandpiper *Tringa stagnatilis*	C	R	E
Common Sandpiper *Actitis hypoleucos*	A	A	E
Terek Sandpiper *Xenus cinereus*	C	C	-
Red-necked Phalarope *Phalaropus lobatus*	C	R	-
Turnstone *Arenaria interpres*	C	R	-
Ruff *Philomachus pugnax*	C	A	E
Little Stint *Calidris minuta*	A	R	E
Temminck's Stint *Calidris temminckii*	R	R	-
Curlew Sandpiper *Calidris ferruginea*	A	R	E
Dunlin *Calidris alpina*	A	A	A
Sanderling *Calidris alba*	A	R	-
Knot *Calidris canutus*	E	-	-
Broad-billed Sandpiper *Limicola falcinellus*	R	R	-
Jack Snipe *Lymnocryptes minimus*	R	R	E
Great Snipe *Gallinago media*	R	R	E
Common Snipe *Gallinago gallinago*	A	C	C
Woodcock *Scolopax rusticola*	R	R	E
Curlew *Numenius arquata*	C	C	C/R
Whimbrel *Numenius phaeopus*	C	R	C/R
Black-tailed Godwit *Limosa limosa*	A	C	A
Bar-tailed Godwit *Limosa lapponica*	R	R	-
Collared Pratincole *Glareola pratincola*	R	R	-
Black-winged Pratincole *Glareola nordmanni*	R	R	-

A - abundant; C - common; R - rare; E - single birds * - data mostly from the Kyzyl-Agach Nature Reserve.

ponds. Usually, their numbers there are rather low and increase only when the most favourable conditions occur. The largest numbers of waders are observed in August and in the first half of September. On the regularly surveyed 4 km coastline only Sanderling *Calidris alba* and Little Stint *Calidris minuta* can be considered abundant: their numbers varied a great deal, usually not exceeding several tens, but in some years reaching 500 birds a day (Sanderling in September 1978, A.V. Mikheev, pers. comm.; Little Stint in August and September 1988, V.T. Butiev & E.A. Lebedeva, pers. comm.). At one of the two drained fish ponds (0.9 km^2) quite large feeding concentrations of Common Snipe *Gallinago gallinago* and Wood Sandpiper *Tringa glareola* were observed in the first half of September - more than 200 birds a day for each species (V.T. Butiev & E.A. Lebedeva, pers. comm.). Numbers of Black-winged Stilt *Himantopus himantopus*, Green Sandpiper *Tringa ochropus*, Greenshank *Tringa nebularia*, Marsh Sandpiper *Tringa stagnatilis*, Common Sandpiper *Actitis hypoleucos*, Terek Sandpiper *Xenus cinereus*, Curlew Sandpiper *Calidris ferruginea*, Dunlin

Table 2. Maximum numbers of waders present at any one time on the surveyed areas of the Kirov Bay (Kyzyl-Agach Nature Reserve) during autumn migration in 1984-1985.

Species	Karakush mudflats 4-20 August 1984	Karakush mudflats 7-24 August 1985	Kaban'ya spit 4 August 1984	Kulagin locality 14 August 1985
Grey Plover	30	50	-	25
Ringed Plover	100	200	-	8
Kentish Plover	550	1,500	-	9
Black-winged Stilt	400	350	15	60
Avocet	120	300	130	-
Redshank	100	10	200	30
Marsh Sandpiper	300	300	200	15
Red-necked Phalarope	200	20	-	-
Ruff	220	360	-	30
Little Stint	350	200	-	-
Curlew Sandpiper	720	1,100	2	1,500
Dunlin	530	80	70	-
Broad-billed Sandpiper	6	130	-	-
Curlew	-	45	250	-
Whimbrel	20	300	-	-
Black-tailed Godwit	5,000	400	450	200
Other species	40	45	20	6
Total	**8,686**	**5,390**	**1,337**	**1,883**

Table 3. Maximum numbers of waders recorded in periods in spring and in autumn on a fixed 4 km route on the beach on the southern part of the Agrakhan Peninsula (the Novyi Terek river mouth).

Species	Spring		Autumn			
	1	2	3	4	5	6
Grey Plover	10	80	40	-	260	180
Little Ringed Plover	45	6	15	-	-	-
Kentish Plover	45	30	10	-	8	-
Black-winged Stilt	80	25	-	-	-	-
Oystercatcher	20	40	20	-	5	-
Greenshank	2	55	6	-	70	-
Common Sandpiper	2	25	15	-	1	-
Redshank	100	90	190	-	540	30
Terek Sandpiper	640	310	6	-	-	-
Turnstone	-	2	40	-	20	-
Little Stint	1	30	45	-	30	-
Curlew Sandpiper	-	-	7	-	580	-
Dunlin	100	10	6	-	1,100	1,400
Sanderling	8	160	1,500	380	2,800	15
Common Snipe	-	-	-	-	20	15
Curlew	-	1	2	-	2	25
Whimbrel	-	35	-	-	-	-
Black-tailed Godwit	-	6	3	-	40	35
Bar-tailed Godwit	3	25	60	-	40	-
Other species	55	30	90	-	5	2
Total	**1,111**	**950**	**2,054**	**380**	**5,521**	**1,702**

1 - 9 to 24 April 1984; 2 - 27 April to 10 May 1986; 3 - 7 to 22 August 1986; 4 - 17 to 30 September 1986; 5 - 22 September to 4 October 1985; 6 - 19 October to 4 November 1983. Numbers approximated as in Table 2.

Calidris alpina, and Black-tailed Godwit *Limosa limosa* did not exceed 30-50 birds at any one time, and other waders were rare (not more than 10-20 birds). Thus, in some years up to 2,000 waders can be found at any one time in autumn at the Samur river delta.

Numbers of wintering waders

In winter, as in migration periods, Kirov Bay is the main area of wader concentrations. Wintering numbers of these birds are shown in Table 4.

The data in Table 4 demonstrate that numbers of wintering waders fluctuate noticeably from year to year; the most marked fluctuations are in numbers of Redshank and Black-tailed Godwit on the Karakush mudflats. In the Kulagin area in 1984-1986, numbers of Curlew *Numenius arquata* and Black-tailed Godwit appeared to decline, although these differences were not statistically significant.

In addition, Whimbrel *Numenius phaeopus* was common there in winter 1981/1982, but since 1983 it has become extremely rare. Lapwing *Vanellus vanellus* wintered regularly and, in contrast to other wader species, were also recorded in the semidesert parts of the Kyzyl-Agach Nature Reserve: near the Karakush mudflats about 40 birds overwintered in 1984, and about 20 birds overwintered in 1985 on an area of c. 6 km² in the Kulagin area which covered 12 km² up to 10 Lapwings overwintered in 1982/1983 and 1983/1984, 20 birds in 1985 and from 20 to 60 birds in 1986. Some waders were also recorded in small numbers in the swampy parts of semi-deserts near fresh-water canals (Table 5).

As all the habitats suitable for waders were surveyed within the area, which was represented by the Kulagin area, Karakush mudflats and the Kaban'ya spit, we can extrapolate using maximum estimates for every species to estimate the total number of waders wintering at this area (Table 6). The number of Common Snipe is under-estimated, due to the inconspicuous behaviour of these birds. In the other parts of the western Caspian Coast, numbers of wintering waders were not large, and even in the vicinity of Kirov Bay at the Lenkoran' steppes, it did not exceed several birds per km of coastline (Table 7).

Table 4. Numbers of wintering waders at the Kyzyl-Agach Nature Reserve in January and February 1984 - 1986.

Species	1	2	3	4	5	6	7
Grey Plover	4	3.3	6 (0-5)	-	2.7 (0-13.8)	19.0 (6-58)	8.4 (5-22)
Kentish Plover	-	? (0-5)	-	-	3.3 (0-24)	-	? (0-11)
Lapwing	-	-	-	-	? (0-2.1)	3.3 (0-9)	4.3 (0-10)
Avocet	1	58.4 (0-243)	130	4.3	8.3 (0-57.2)	9.4 (0-42)	38.5 (6.2-88)
Redshank	4,000	5.7 (0-11)	2,500	14.0	52.8 (3.6-330)	83.0 (40-144)	75.0 (10-260)
Dunlin	52	125 (96-154)	560	-	224 (7-1,120)	401 (230-764)	513 (140-1040)
Common Snipe	8	? (0-4)	-	9.1	5.8 (0-17.5)	6.6 (0-19)	10.9 (2-20)
Curlew	-	2.0 (0-4)	-	0.6	38.5 (0-128.5)	14.2 (0-32)	8.0 (0-26)
Black-tailed Godwit	-	1,660 (900-2,000)	2	20.3	78.6 (0-293)	52 (6-129)	5.2 (0-36)

1 - Karakush mudflats (counts on 17 Jan. 1984; absolute numbers); **2** - Karakush mudflats (17 to 24 Jan. 1985; average data, range is shown in brackets); **3** - Kaban'ya spit (17 Jan. 1984; absolute numbers); **4** - Ivanovsky bank, 3.5 km (18 Jan. 1984; ind./km); **5** - Kulagin locality (19 Jan. to 2 Feb. 1984; average (ind./km) data, range is shown in brackets); **6** - Kulagin locality (27 Jan. to 1 Feb. 1985; average (ind./km) data, range is shown in brackets); **7** - Kulagin locality (25 Jan. to 2 Feb. 1986; average (ind./km) data, range is shown in brackets).

Long-term changes in numbers of wintering waders at the Kyzyl-Agach Nature Reserve

Although a number of publications with information on waders wintering in different years at the Kyzyl-Agach Nature Reserve have appeared, practically all these works give only general information on the relative abundance of wader species and include very sparse data on their numbers (Table 8). Before our studies, an attempt to estimate wintering numbers of waders was made at the reserve in January 1967 by Mikheev & Orlov (1972) who consider that they had censused about 70% of all the wintering birds. More than half of the waders counted were not identified specifically. These probably included the small species for which identification was difficult, as the surveys were made from motor-boats.

The data in Table 8 demonstrate the existence of large differences in the quantitative composition of wintering wader assemblages. However, only the information which enabled the analysis of changes in numbers was included. We should also mention that these data have to be interpreted with caution, as none of the scientists studied waders specifically. Therefore, the lack or absence of data on several species was probably because numbers were too small to be noticed during such studies, rather than being a real absence in winter. Moreover, some of the studies were made using the single route counts method, and as we have shown above, number of birds vary not only from year to year but also daily. These differences in number estimates are reflected in Table 8 : for example, the estimates of several authors vary even within a rather short time period (1951-1962). Nevertheless, these data can be used for to evaluate general numerical trends since the 1930s for some wader species.

Ringed Plover *Charadrius hiaticula*, which was the commonest wader in the 1930s, when flocks of up to 20 birds of this species were recorded, has become extremely rare. Avocet *Recurvirostra avosetta*

Table 5. Numbers of waders at the semi-desert areas in the vicinity of fresh-water canals (ind. per 1 km of a canal).

Species	31 January 1982 4 km	28 January 1983 12 km
Grey Plover	-	0.1
Lapwing	1.0	0.4
Redshank	-	0.4
Curlew	-	0.6
Common Snipe	4.0	0.3

Table 6. Maximum number estimates for the most common waders wintering at the Kyzyl-Agach Nature Reserve in 1984-1986 (Kulagin area, Karakush mudflats and Kaban'ya spit).

Species	Number of birds
Grey Plover	60
Lapwing	100
Avocet	300
Redshank	7,000
Dunlin	4,000
Common Snipe	>100
Curlew	150
Black-tailed Godwit	2,000
Total	**13,710**

Table 7. Numbers (ind./km) of wintering waders in different places of the western Caspian Coast.

Species	Location 1	2	3
Golden Plover	-	2-4	-
Ringed Plover	-	2-4	-
Kentish Plover	-	3-6	-
Lapwing	0.9 (0-7.8)	-	2-5
Avocet	? (0-0.5)	4-5	-
Green Sandpiper	0.8 (0-2.5)	3-10	1
Redshank	? (0-0.5)	1-4	-
Sanderling	-	3-8	-
Dunlin	-	1	-
Jack Snipe	-	1-2	2
Woodcock	**	-	4
Common Snipe	0.8 (0-5.0)	-	27
Black-tailed Godwit	? (0-1.5)	3-10	-

1 - coast in the Samur river delta, our data; 2 - Lenkoran Coast (Mustafayev 1972); 3 - Saline marshes of Shirvani steppe (Zlotin 1963). ** - the species was recorded in forests.

Table 8. Long-term changes in numbers of wintering waders at the Kyzyl-Agach Nature Reserve.

Species	1[illegible]57 a	[illegible]56 b	1957-62 d	1963 e	1967 f	1981-86 g
Grey Plover	-	C/R	-	-	-	-	60
Ringed Plover	C	-	-	-	-	-	E
Lapwing	C	-	C/R	-	-	584	>100
Avocet	hundreds	-	thousands	500 (in 1958 10,000 in 1962)	+	1,073 (563)	300
Redshank	C	-	C/R	R	-	-	7,000
Dunlin	tens	-	-	1,000/2km	-	718 (280)	4,000
Common Snipe	+	-	R	-	2.7-8.3/km	120	>100
Curlew	tens	-	C/R	-	-	-	C/R
Whimbrel	-	R	-	-	-	-	C/R
Black-tailed Godwit	R	R	-	25/2km	-	21 (20)	2,000
Waders spp.	-	-	-	-	-	5,530 (2,700)	-

C - common; R - rare; E - single birds; + - species recorded, numbers not estimated; "-" - species not mentioned. **a** - Tugarunov & Kozlova-Pshkareva 1938; **b** - Spangenberg 1959; **c** - Adolf *et al.* 1958; **d** - Dobrokhotov 1963; **e** - Oliger 1967; **f** - Mikheev & Orlov 1972, figures in parentheses are data for the Kulagin area; **g** - our data.

was the only numerous wintering wader before the 1960s; an obvious decline occurred in the 1970-1980s. The numbers of Redshank, Dunlin, Common Snipe and Curlew were not high until the beginning of the 1960s and increased later. The largest numbers of Redshank were recorded in the 1980s. Numbers of wintering Dunlin and Common Snipe have remained relatively stable since the middle of the 1960s. Wintering Curlew were most numerous in the 1960s, but by the 1980s their numbers had decreased noticeably. Black-tailed Godwit, which wintered regularly but in small numbers before the late 1960s, became the most numerous wintering bird in 1980.

Overall, none of the wintering waders except Avocet were numerous before the late 1950s and their numbers started to increase from 1960s onwards. This may be linked to the stabilization of the water level in the Caspian Sea after continuous reduction which had started in the 1920s. As a result, the shallow coastal waters with mollusc shells in Kirov Bay turned into mudflats and the area suitable for waders increased. Since 1970, the water level have been rising again rapidly leading to new changes in the wintering wader assemblages. For example, the deepening of shallow coastal waters has deprived Avocets and Curlews of their favoured feeding areas.

Conclusion

The western Caspian coast evidently plays an important role as an area for migrating and wintering waders (Figure 2). This is determined both by the rich species diversity and the high numbers of many wader species. The large concentrations of Sanderling at the southern part of the Agrakhan Peninsula (up to 2,800 birds) have not been recorded elsewhere in the Caspian region. We should stress that the western Caspian coast is probably the main stopover in the region for Terek Sandpiper, Bar-tailed Godwit and Whimbrel, as these birds are extremely rare on the eastern coasts of the Caspian Sea (Radde & Walter 1889; Isakov & Vorobiev 1940; Dementiev 1952; Molodovsky 1963; Feeny *et al.* 1968; Karavaev & Belousov 1980), in the area to the north of the Caucasus (Oleinikov et al. 1973; Poslavsky 1978; Kazakov *et al.* 1981-1983; Gizzatulin &Tochiev 1989), and in the Crimea (Kostin 1983). The winter concentration of waders in Kirov Bay is probably the largest in the Caspian Sea region (Table 9).

Acknowledgements

I am grateful to Prof. A.V. Mikheev, the founder and head of research on migration and wintering birds on the western Caspian coast, for his valuable advice and additional information. I would like to thank the colleagues who kindly supplied me with part of their unpublished data: V.T. Butiev, E.A. Lebedeva, A.B. Kostin, S.A. Polozov, and also E.A. Koblik and V.S. Freedman and the many students of Moscow Pedagogical State University, who took part in the collection of the data. This study was possible due to the great assistance of the Kyzyl-Agach Reserve staff and its Director, B.G. Mekhtiev, and the support of Daghestan State Game Inspection, particularly Yu.V. Pishvanov.

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Table 9. Numbers of abundant waders at the Caspian Sea wintering grounds.

Species	Wintering area 1	2	3	Total
Redshank	7,000	-	-	**7,000**
Dunlin	4,000	10,000	5,000	**19,000**
Black-tailed Godwit	2,000	-	4,000	**6,000**
Other species	1,000	1,000	3,000	**5,000**
Total	**14,000**	**11,000**	**12,000**	**37,000**

1 - Kirov Bay, our data; 2 - Krasnovodsk Bay (Vengerov 1973); 3 - Miankaleh Peninsula (Summers *et al.* 1987).

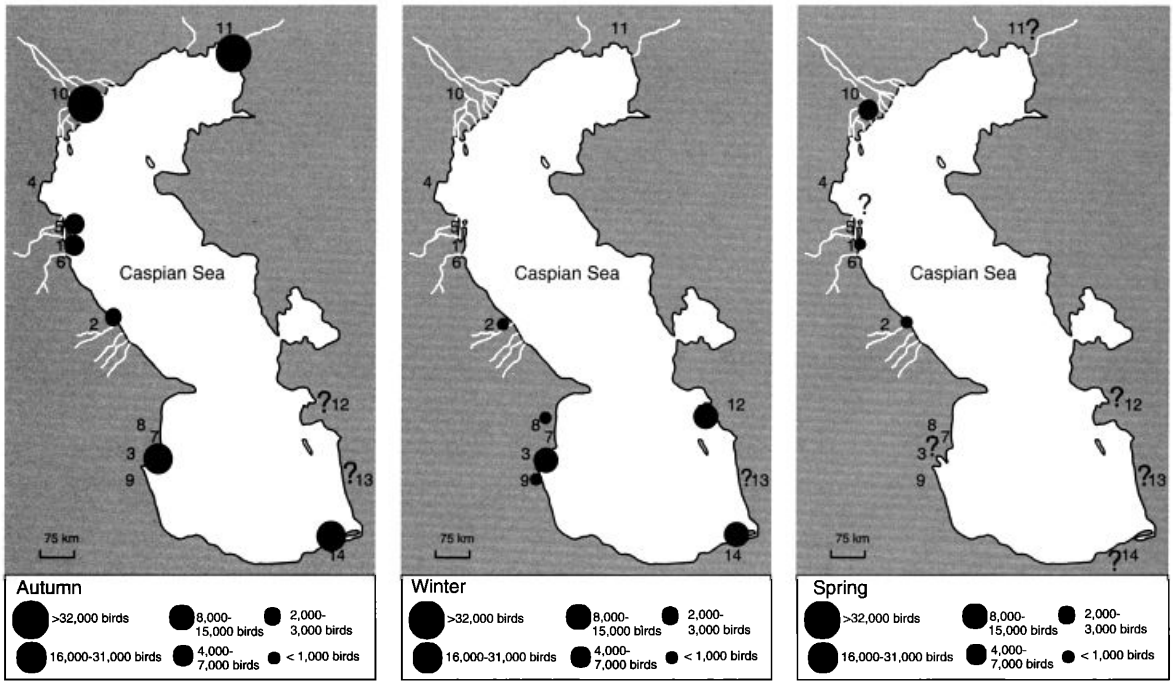

Figure 2. Distribution of currently known places of wader concentrations on the Caspian Coast. Geographical names as in Figure 1. Information sources: 1, 2, 3, 5 - the present paper; 10 - Matyushkin 1963; Rusanov *et al.* 1973; Bondarev & Bondarev 1980; Krivonosov 1980; Poslavsky 1980; 11 - Rusanov & Krivonosov 1990; 12 - Isakov & Vorobiev 1940; Vengerov 1973; 14 - Summers *et al.* 1987.

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