

Экологія	Беркут	16	Вип. 2	2007	195 - 204
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MIDWINTER WATERBIRD COUNTS IN ARMENIA. RESULTS FOR 2003–2007

V.Yu. Ananian, M.G. Ghasabyan, K.E. Aghababayan,
M.G. Maregasparyan, V.Sh. Hakobyan

Abstract. Midwinter waterbird counts have been conducted in Armenia during 2003–2007 in the Ararat Plain's natural and man-made wetlands and at the Lake Sevan. Total number of counted waterbirds in various years comprised from 9166 to 24956. Forty five species of waterbirds occur in the country in winter, with most numerous found to be the Eurasian Coot, followed by Mallard, Pygmy Cormorant, Armenian Gull, Common and Red-crested Pochards, Pallas's Gull, Tufted Duck, Black-headed Gull, White Stork, Common Teal, Northern Shoveler, Gadwall and others. Compared with other counted sites in Armenia, Lake Sevan supported significantly more wintering waterbirds in most years. There is little data exist from Armenia to outline a trend for a particular species or a group of species, but all wetlands surveyed are found to be under the high degree of human disturbance in various ways such as inappropriate management, habitat change and destruction, excessive fishery, hunting.

Keywords: Armenia, wintering, waterbird, number, wetlands, Ararat Plain, Lake Sevan.

Address: V.Yu. Ananian, 179 Bashinjaghian Street, Apt. 23, 0078, Yerevan, Armenia;
e-mail: vasil.ananian@gmail.com.

Среднезимние учеты водоплавающих и околоводных птиц Армении. Результаты за 2003–2007 гг. - В.Ю. Анянян, М.Г. Касабян, К.Э. Агабабян, М.Г. Марегаспарян, В.Ш. Акопян. - Беркут. 16 (2) 2007. - В середине января 2003–2007 гг. в Армении проводилась перепись водоплавающих и околоводных птиц. Учетами были охвачены искусственные и естественные водноболотные угодья Араратской равнины и бассейна оз. Севан. Общая численность учтенных птиц по годам варьировала от 9 166 до 24 956 особей. На зимовках в Армении встречено 45 видов водоплавающих и околоводных птиц. Среди них наиболее многочисленными (в порядке убывания) оказались: лысуха, крякva, малый баклан, армянская чайка, красноглавая чернеть, красноносый нырок, черноголовый хохотун, хохлатая чернеть, озерная чайка, белый аист, чирок-свистунок, широконоска, серая утка и др. В сравнении с другими водноболотными угодьями Армении, оз. Севан поддерживало значительно большее количество зимующих птиц. Пока не имеется достаточно данных для определения тенденций численности зимующих птиц для отдельных видов или групп. Для всех обследованных водноболотных угодий была отмечена высокая степень воздействия на них различных антропогенных факторов, таких как нерациональное природопользование, изменение и разрушение местообитаний, чрезмерное рыболовство, охота.

INTRODUCTION

Since 2003 Armenia joined the International Waterbird Census (IWC) project run by Wetlands International and during 2003–2007 the country participated in midwinter waterbird counts as branch of IWC in Western Palearctic and Southwest Asia (Gilissen et al., 2002; Solokha, 2006). Armenia as part of Caucasus lies on an overlap of Black Sea – Mediterranean and East African-West Asian major bird flyways. This is reflected in relatively strong passage of migratory birds, including waterbirds, evident both during spring and autumn migration in the region. However, of all Caucasian states Armenia is least represented with large wetlands and waterbodies with favorable

stopover sites for migratory waterbirds. The main country's waterbodies include Akhuryan and Arax rivers with numerous tributaries of the latter, lakes Sevan and Arpi, Armash and other fish farming ponds in the Ararat Plain, and large water reservoirs widely distributed across the country, such as Akhuryan, Aparan, Spandaryan, Tolors and others.

Predominantly mountainous relief and strong continental climate contribute to harsh winter conditions and by mid winter all major reservoirs, situated mostly in highlands, normally freeze. The streams of Akhuryan and Arax rivers run along the border with Turkey and Azerbaijan and are entirely controlled by military forces, thus closed for unlimited access. Therefore, initially, during identification



Midwinter waterbird count sites in Armenia during 2003–2007.

Места среднезимних учетов водоплавающих и околоводных птиц в Армении в 2003–2007.

of regular midwinter waterbird census sites in Armenia our selection fell upon Lake Sevan basin and wetlands in the Ararat Plain – Armash fish farm and Metsamor river system (Fig.).

METHODS

Route and point counts were carried out on variable dates in Januarys 2003–2007, field trip dates depended on weather and road conditions. Sites were surveyed by car and on foot. At Metsamor river system a count from boat was initially applied, but results did not prove to be satisfactory and the number of counted birds was twice as low compared with the foot count approach made at the same date and the

same site. Equipment used included 20–60 \times spotting scopes and 10 \times binoculars, standard field guides and specifically designed count forms. Counting procedures lasted throughout daytimes provided with sufficient visibility.

At Lake Sevan the counts were conducted from accessible vantage points along the entire shoreline (c. 200 km), covering the observable through optic off-shore area of the lake c. 1 km wide. At Armash fish farm and Metsamor river system we undertook partial counts, covering however main habitats of the territories and involving c. 1300 ha and almost 7000 ha respectively. Central coordinates of the count sites are provided in the text in degrees.

SITES DESCRIPTION

Lake Sevan (40.32° N; 45.35° E) is the largest freshwater lake in Caucasus, situated at elevation of c.1900 m a.s.l. among general mountain-steppe landscape and surrounded by mountain ranges. Twenty eight rivers flow into Sevan, with only one, Hrazdan, outflowing. The territory of the lake with water surface of c.1250 sq km and a narrow belt of adjacent lands up to highway around the lake encompass Sevan National Park (150 100 ha) (Khanjyan, 2004) and is classified as Ramsar Site (Jenderedjian et al., 1999) and IBA (Wilson, 2000). Littoral forest of the lake is of man-made origin and densely overgrown with sea buckthorn (*Hippophae rhamnoides*). Patchy



stands of poplar (*Populus* sp.) and pine (*Pinus* sp.) plantations are encountered along the entire shoreline. More or less extensive marginal stands of reeds (*Phragmites* sp.), providing shelter for waterbirds are scarce and found only in limited parts of western, southern and south-eastern shores of the lake. In winter peripheral part of the Sevan is being covered with ice and not uncommonly by February the lake freezes completely. The entire lake basin, particularly its western and southern shores is heavily populated with people, and despite its status the National Park is suffering from intensive land use – construction of summer resorts, grazing and year-round fishing. The latter activity, being nearly the sole source of income for many local communities, is particularly threatening. Numerous fishermen cooperatives equipped with 4–6 motorized boats each are evenly spread along the entire shoreline and are active from dawn to dusk, thus virtually no part of Sevan is free of human disturbance. This naturally affects migrant and wintering waterbirds, preventing their concentration and stay at the lake for extended periods. Although hunting in the area is prohibited, cases of poaching are frequently reported.

Armash fish farm (39.76° N; 44.77° E) is situated in the Ararat Plain at the border with Turkey, Iran and Azerbaijan enclave of Nakhichevan. The farm occupies part of original saline semideserts of Arax river's northern bank at c.800 m asl. It originally consisted of 21 large (c. 60 ha) and smaller (c. 15 ha) ponds, and is crossed with numerous channels. Total water surface of the farm was c. 1500 ha. Ponds and channels are fringed with reeds and intermittent tamarisk (*Tamarix* sp.) and host various aquatic vegetation. At present some of the ponds are less actively managed and are overgrown with reeds, providing ideal refuge for breeding and migrating birds. Surrounding areas of semi-genuine landscape are covered with camel's thorn (*Alhagi* sp.) and halophytes. The ponds are fed by artesian springs and the water from Arax delivered through canals. Although the farm is privately owned and currently consists of smaller number of ponds, it was classified as IBA due to the high diversity

of local avifauna (Wilson, 2000). Severe winters in the Arax valley with not infrequent temperature drops down to –30°C result in freezing of the 90 % of entire area, while open water at Armash remains available only near artesian springs and in channels, hence places of potential waterbird congregations are rather limited. Despite the farm's decreased general management in winter, disturbance at this season is still the case due to the existing high pressure by hunters and poachers, not infrequently out of hunting season.

The generic description of **Metsamor river system** (40.08° N; 44.26° E) implies an area in the Arax valley at c.830 m a.s.l., that includes parts of Arax's tributaries – Hrazdan, Kasakh, Metsamor and Sevjur rivers' courses with waterlogs and marshes, several small fish farms and extensive network of channels. The area is heavily populated and lacking natural homogeneity. Original clayey and partially saline semidesert landscape here these days almost completely ruined by constructions and agriculture fields, densely scattered throughout the area. Remaining badlands, rivers' and channels' banks are overgrown with reeds, sedge (*Carex* sp), rush (*Juncus* sp), cattail (*Typha* sp) and semidesert vegetation. Willow (*Salix* sp) and poplar trees are frequently encountered near human habitations, ponds and channels. Warm vaporizing waters of Metsamor and Sevjur, fed by artesian springs and underground watercourses, never freeze, and their flooded banks in some places throughout winter support short green vegetation, hosting feeding ducks, rails and waders. Although rivers and channels here are quite polluted, most of them are rich in submerged aquatic vegetation. Human presence and disturbance in the area is permanent, while hunting and poaching pressure is one of the highest in Armenia.

Khorvirap marshes (39.90° N; 44.57° E) is the area of c. 350 ha, situated c. 20 km north-west of Armash fish farm, covered with dense stands of reeds and separated from surrounding arable fields by drainage channels. We surveyed Khorvirap site in 2004, but the entire area was frozen and produced poor results. On



Table 1

RESULTS AND DISCUSSION

Midwinter waterbird counts at Lake Sevan during 2003–2007
Среднезимние учеты на оз. Севан в 2003–2007 гг.

Taxa	2003	2004	2005	2006	2007
<i>Tachybaptus ruficollis</i>	–	17	8	–	3
<i>Podiceps cristatus</i>	14	81	5	70	1
<i>P. nigricollis</i>	75	30	21	51	171
<i>Podicipedidae</i> spp.	100	–	–	–	–
<i>Phalacrocorax carbo</i>	2	–	–	–	–
<i>Ardea cinerea</i>	9	27	3	22	2
<i>A. alba</i>	8	–	–	33	–
<i>Cygnus olor</i>	21	1	–	–	–
<i>C. cygnus</i>	138	–	4	8	–
<i>C. columbianus</i>	35	6	11	–	3
<i>Cygnus</i> sp.	31	35	94	–	–
<i>Tadorna ferruginea</i>	1	–	–	–	21
<i>T. tadorna</i>	20	–	–	12	3
<i>Anas strepera</i>	30	15	2	680	20
<i>A. penelope</i>	6	–	–	1	–
<i>A. platyrhynchos</i>	1351	1268	179	1180	834
<i>A. clypeata</i>	26	137	46	830	28
<i>A. acuta</i>	–	–	–	102	–
<i>A. crecca</i>	36	1	32	815	55
<i>Netta rufina</i>	1337	4	12	570	1509
<i>Aythya ferina</i>	714	1	1350	1100	88
<i>A. nyroca</i>	–	–	–	1	–
<i>A. fuligula</i>	815	65	192	840	521
<i>Bucephala clangula</i>	94	27	41	–	4
<i>Mergus albellus</i>	186	7	5	60	13
<i>M. merganser</i>	159	–	6	55	–
<i>Anatinae</i> spp.	6000	23	1696	4500	–
<i>Rallus aquaticus</i>	–	–	–	–	1
<i>Gallinula chloropus</i>	–	3	4	–	–
<i>Fulica atra</i>	4038	706	4046	5500	4348
<i>Gallinago gallinago</i>	1	–	8	–	–
<i>Tringa ochropus</i>	3	16	8	8	–
<i>Larus armenicus</i>	2283	2471	63	290	150
<i>L. ichthyaetus</i>	1337	1227	114	95	394
<i>L. ridibundus</i>	30	–	–	2	71
<i>Hydrocoloeus minutus</i>	–	31	51	–	–
<i>Larus</i> sp.	1040	1150	–	–	–
Total	19940	7349	8001	16825	8240

following years the site was omitted from subsequent counts.

southern and south-eastern shores were covered with a belt of broken ice conglomerations

Besides for general census, our winter surveys produced observations of some rare, uncommon and largely overlooked species for Armenia, such as Mute (*Cygnus olor*) and Bewick's (*C. columbianus bewickii*) Swans, Greater White-fronted Goose (*Anser albifrons*), Eurasian Wigeon (*Anas penelope*), Common Goldeneye (*Bucephala clangula*), Smew (*Mergus albellus*), Mew (*Larus canus*), 'Baltic' (*L. fuscus*) and Little (*Hydrocoloeus minutus*) Gulls. In the counts are featured Globally Threatened Dalmatian Pelican (*Pelecanus crispus*), Ferruginous Duck (*Aythya nyroca*), Black-tailed Godwit (*Limosa limosa*) (IUCN, 2007) and species with limited distribution in Western Palearctic – Armenian (*L. armenicus*) and Pallas' (*L. ichthyaetus*) Gulls.

In 2003 and 2004 Lake Sevan was free of ice with only littoral zone and some inland shallow pools and ponds partially or completely frozen, while in 2005–2007 the lake's marginal parts, particularly along its more shallow south-western,



Table 2

Midwinter waterbird counts at Armash Fish Farm in 2003–2007
Среднезимние учеты на рыбхозе Армаш в 2003–2007 гг.

c. 15–300 m wide, depending on the lake's depth at this sites. Weather conditions on all visits were sufficient and had no influence on counting procedures. The count data for the five years period is presented in Table 1.

On visiting Armash fish farm in 2003 the ponds were frozen more than usually, but in subsequent years situation was similar to the site's description outlined above. Weather conditions were variable with thin fog on some visits, but this had not affected the counts. The count data for the five years period from Armash is presented in Table 2.

Metsamor river system was in overall more frozen in 2003. During the visits in subsequent years ice cover here was similar to that at Armash fish farm and in the Ararat Plain in general during the same years, although availability of open water was more extensive due to the warm currents of the areas' main rivers. Because of the warm waters, on calm days fogs are common at this part of the country; hence extra visits to the site were performed on better days as deemed necessary. The count data for the five years period from Metsamor river system is presented in Table 3.

Taxa	2003	2004	2005	2006	2007
<i>Tachybaptus ruficollis</i>	2	18	4	70	2
<i>Podiceps cristatus</i>	–	43	–	41	–
<i>Pelecanus crispus</i>	–	–	–	7	–
<i>Phalacrocorax pygmeus</i>	710	1995	1100	950	30
<i>Ph. carbo</i>	12	–	11	65	5
<i>Egretta garzetta</i>	–	10	8	–	–
<i>Ardea cinerea</i>	80	212	71	43	15
<i>A. alba</i>	78	393	102	183	–
<i>Nycticorax nycticorax</i>	–	–	4	–	–
<i>Botaurus stellaris</i>	5	3	3	5	1
<i>Ciconia ciconia</i>	29	1102	4	151	–
<i>Cygnus cygnus</i>	35	43	4	37	–
<i>C. columbianus</i>	–	70	14	–	–
<i>Anser albifrons</i>	–	180	–	–	–
<i>A. anser</i>	–	5	–	–	–
<i>Anser sp.</i>	–	–	–	–	2
<i>Tadorna ferruginea</i>	–	–	6	7	2
<i>T. tadorna</i>	–	1	–	2	–
<i>Anas strepera</i>	12	136	–	200	–
<i>A. penelope</i>	2	4	–	–	–
<i>A. platyrhynchos</i>	94	371	46	370	–
<i>A. clypeata</i>	57	177	8	190	2
<i>A. acuta</i>	19	156	–	2	–
<i>A. crecca</i>	46	361	151	150	7
<i>Netta rufina</i>	15	–	–	1	–
<i>Aythya ferina</i>	–	804	85	515	1
<i>A. nyroca</i>	2	1	–	68	–
<i>A. fuligula</i>	–	91	–	16	–
<i>Bucephala clangula</i>	–	3	–	–	–
<i>Mergus albellus</i>	43	5	7	18	1
<i>M. merganser</i>	1	1	–	–	–
<i>Anatinae spp.</i>	35	27	–	–	–
<i>Rallus aquaticus</i>	1	3	11	6	–
<i>Gallinula chloropus</i>	5	14	21	77	2
<i>Fulica atra</i>	12	1715	–	950	10
<i>Gallinago gallinago</i>	–	7	–	20	–
<i>Limosa limosa</i>	–	2	–	–	–
<i>Tringa totanus</i>	20	68	–	–	–
<i>T. ochropus</i>	–	3	1	15	–
<i>Larus canus</i>	–	2	2	–	–
<i>L. armenicus</i>	139	57	–	15	–
<i>L. fuscus</i>	–	1	–	–	–
<i>L. ichthyaetus</i>	76	30	20	20	1
<i>L. ridibundus</i>	26	1497	–	–	–
<i>Larus sp.</i>	–	4	–	–	–
Total	1556	9615	1683	4194	81



Midwinter waterbird counts at Metsamor River System during 2003–2007

Среднезимние учеты на речной системе Мецамор

Taxa	2003	2004	2005	2006	2007
<i>Tachybaptus ruficollis</i>	141	85	66	131	78
<i>Podiceps cristatus</i>	–	–	–	57	–
<i>Phalacrocorax pygmeus</i>	416	370	167	420	115
<i>Ph. carbo</i>	6	3	–	80	25
<i>Ardea cinerea</i>	11	2	–	12	7
<i>A. alba</i>	4	3	3	–	–
<i>Botaurus stellaris</i>	1	–	1	–	–
<i>Ciconia ciconia</i>	11	2	134	260	415
<i>Anas platyrhynchos</i>	102	2	–	720	–
<i>A. clypeata</i>	1	–	–	–	–
<i>A. crecca</i>	41	7	–	230	20
<i>Netta rufina</i>	1	–	–	31	–
<i>Aythya ferina</i>	–	9	–	78	–
<i>A. fuligula</i>	–	2	–	–	–
<i>Mergus albellus</i>	–	–	–	3	–
<i>Rallus aquaticus</i>	2	–	–	–	1
<i>Gallinula chloropus</i>	33	62	15	150	17
<i>Fulica atra</i>	264	341	90	1200	95
<i>Gallinago gallinago</i>	31	8	20	250	20
<i>Tringa totanus</i>	7	–	–	75	1
<i>T. ochropus</i>	64	27	5	83	14
<i>Larus armenicus</i>	–	2	8	54	6
<i>L. ichthyaetus</i>	–	–	5	42	24
<i>L. ridibundus</i>	20	408	19	61	7
Total	1156	1333	533	3937	845

Khorvirap site in 2004 was largely frozen as elsewhere in the Ararat Plain. We held one count here, but ended up with poor results compared to the other sites. The results for Khorvirap 2004 count are shown in the Table 4.

Our counts represent the first midwinter waterbird surveys in Armenia since late 1980s. Armenian Institute of Zoology has held winter counts at Arax valley within the Ararat Plain in 1967 and 1969 (Margaryan, 1975), and at Lake Sevan during 1965–1969 (Airumyan et al., 1975) and 1986–1988. The latter data is said to exist in unpublished form (M. Ghasabyan comm.), but we were unable to locate that.

Table 3 Average percentage for selected groups of birds presented in Margaryan (1975) and Airumyan et al. (1975) and obtained by methods similar to ours are compared below with our own results in Tables 5 and 6.

In the Table 5 under our data we disregarded 131 counted *Mergini* and 2444 unidentified ducks, which might include *A. platyrhynchos*, *A. crecca* and/or *Aythya* species. *Mergini* are not listed in the species account in Airumyan et al. (1975), except for the occasional migrant individuals of Velvet Scoter *Melanitta fusca*, which is completely extirpated in the country since then. Nevertheless, total count results differ significantly. Overall, our counts produced on average 47,5 % more waterbirds at Lake Sevan and 36,9 % more in the Ararat Plain. Although, this is likely due to the difference in inten-

sity and character of counting procedures applied, rather than the actual increase in number of waterbirds wintering in these areas. In fact, based on anecdotal and secondary information solicited the overall number of waterbirds at Lake Sevan at present is probably lower than in late 1960s. It is already advocated by Margaryan (1975), that the number of wintering waterbirds in Armenia significantly decreased during 1925–1975. The same is partially applied to the Ararat Plain (see Table 6), although it must be stressed that Armash and most other fish farms in the area were established only from 1970s onwards.



Table 4

Apparently, creation of artificial ponds in the Ararat Plain in recent decades provided favorable conditions for waterbirds and may play some role as wintering habitat for them. It is known, that Arax River and adjacent wetlands in neutral zone along the national border and in thinly populated neighboring parts of Turkey and Iran hold significantly higher number of wintering waterbirds (Margaryan, 1975). These areas are rich in extensive suitable habitats with permanent and nonfreezing marshes with some green vegetation present throughout year. Not least important is the more secure status of the area, controlled by military forces. The detrimental effect of usual human disturbance is clearly evident from the total country results obtained in 2006, when there was put a partial ban on fishing at Lake Sevan basin and complete bird hunting ban in view of avian influenza concerns. In that year we totally counted 24956 waterbirds vs. 22652, 18801 and 10217 in preceding years respectively and 9166 in 2007. In 2006 birds at all count sites were unusually unafraid, allowed closer approach and kept more in open, which influenced high count results in that year. Annual species total numbers for the whole country are shown in Table 7.

Midwinter waterbird count at Khorvirap Marshes in 2004
Среднезимний учет на болотах Хорвирап

Taxa	2004
<i>Tachybaptus ruficollis</i>	2
<i>Phalacrocorax pygmeus</i>	170
<i>Ardea cinerea</i>	31
<i>A. alba</i>	15
<i>Ciconia ciconia</i>	70
<i>Anas strepera</i>	3
<i>A. platyrhynchos</i>	16
<i>A. clypeata</i>	7
<i>A. crecca</i>	43
<i>Rallus aquaticus</i>	2
<i>Gallinula chloropus</i>	21
<i>Fulica atra</i>	13
<i>Tringa ochropus</i>	2
<i>Larus armenicus</i>	29
<i>L. ridibundus</i>	80
Total	504

The annual totals for waterbirds compared between Lake Sevan and Ararat Plain (Armarsh and Metsamor sites combined) for the former

Table 5

Average species composition (in %) of counted waterbird groups wintering at Lake Sevan compared based on 1965–1969 and 2003–2007 surveys

Средний видовой состав (в %) учтенных птиц на оз. Севан в 1965–1969 и 2003–2007 гг.

Taxa	Airumyan et al. (1975), 1965–1969	This study, 2003–2007
<i>Fulica atra</i>	33,6	47,2
Scolopacidae et Charadriidae	24,3	0,1
<i>Larus armenicus</i>	2,3	13,3
Podicipedidae	14,7	1,6
<i>Tadorna ferruginea</i>	0,7	0,1
<i>Anas platyrhynchos</i>	18,1	12,2
<i>A. crecca</i> *	3,0	2,4
Aythini	3,3	23,1

* Airumyan et al. (1975) mention a mutual Russian name describing both *Anas crecca* and *Anas querquedula* together. The latter species is not found in Armenia in winter, hence probably only the former species is involved in their counts.



Table 6

Average species composition (in %) of counted waterbirds wintering in Ararat Plain compared between Margaryan (1975) and 2003–2007 surveys

Средний видовой состав (в %) учтенных птиц на Араратской равнине в 1967 и 1969 гг. и 2003–2007 гг.

Taxa	Margaryan (1975), 1967 and 1969	This study, 2003–2007
Podicipedidae	0,3	2,9
Phalacrocoracidae	–	26,1
Pelecanidae	–	0,02
Ardeidae	0,4	5,1
Ciconiidae	–	8,6
Cygnus	–	0,8
Anser	6,0	0,7
Tadornini	0,4	0,08
Anatini	91,4	14,9
Aythyni	–	6,9
Mergini	0,1	0,3
Rallidae	0,3	20,2
Scolopacidae	1,1	2,9
Laridae	–	10,5

site produced 88 % of all waterbirds counted in Armenia in 2003, 78 % – in 2005, 67 % – in 2006, 90 % – in 2007, although only 40 % in 2004.

Normally on our surveys at Armash fish farm we frequently encountered cases, when a flock of waterbirds, scared by hunters, crossed the national border and fled towards Arax river out of the Armenian borders. On the opposite, on numerous instances we have observed flocks of Pygmy Cormorant, herons, White Stork (*Ciconia ciconia*) and other waterbirds returning to the fish farm in evening hours for feeding, as the area is doubtlessly rich in easily accessible fish. Likewise, such movements were observed at Metsamor River system. At the latter site numerous hunters patrolling along the channels and ponds at times were virtually ruining our counts by scaring birds. By word of fishermen at Lake Sevan, large waterbird congregations are allegedly found in the middle of the lake, these are, of course not detectable from the shore due to the long distance and haze. These circumstances have

strongly affected our count results in various years and should be considered prior to evaluation of trends in number of waterbirds wintering in Ararat Plain and Lake Sevan.

The data obtained in Armenia during 2003–2007 should be viewed as preliminary, as these are yet limited and incomplete to outline a trend for a particular species or a group of species on a local scale. Further incessant and consistent monitoring of the sites or at least some of them appears necessary. This would increasingly provide valuable input to the existing data both for Armenian and International Waterbird Census databases.

CONCLUDING REMARKS

1. Compared with neighboring countries Armenia holds little potential for significant number of wintering waterbirds due to the limited areas of open water resources in winter months.

2. Establishment of fish farming ponds and extensive net of canals in Ararat Plain since



Table 7

1970s provided additional areas and favorable wintering conditions for waterbirds in the Armenian territory proper.

3. Natural and man-made wetlands in the Ararat Plain are under the persistent pressure of human activities, while hunting and poaching cause significant threat for the area's migrant and wintering waterbirds.

4. Identification and establishment of sufficient territories free of hunting and other disturbance at Armash fish farm and Metsamor river system appear to be a necessary measure in preserving and maintaining waterbird resources of Armenia. The same measure would particularly apply for the Lake Sevan basin, where Sevan National Park continues to suffer from inappropriate management and lack of regulation of unfavorable human activities.

5. A relict population of Velvet Scoter used to inhabit Lake Sevan and it was reported to be a common breeder here up to late 1920s (Lyaister, Sosnin, 1942; Dahl, 1954; Dementyev, Gladkov, 1952). Since initiation of water discharge of the lake in 1930's for agricultural and other

Annual midwinter species totals for Armenia at all sites combined
Общая численность учтенных птиц на всех участках

Taxa	2003	2004	2005	2006	2007
1	2	3	4	5	6
<i>Tachybaptus ruficollis</i>	143	122	78	201	83
<i>Podiceps cristatus</i>	14	124	5	168	1
<i>P. nigricollis</i>	75	30	21	51	171
<i>Podicipedidae</i> spp.	100	–	–	–	–
<i>Pelecanus crispus</i>	–	–	–	7	–
<i>Phalacrocorax pygmeus</i>	1126	2535	1267	1370	145
<i>Ph. carbo</i>	20	3	11	145	30
<i>Egretta garzetta</i>	–	10	8	–	–
<i>Ardea cinerea</i>	100	272	74	77	24
<i>A. alba</i>	90	411	105	216	–
<i>Nycticorax nycticorax</i>	–	–	4	–	–
<i>Botaurus stellaris</i>	6	3	4	5	1
<i>Ciconia ciconia</i>	40	1174	138	411	415
<i>Cygnus olor</i>	21	1	–	–	–
<i>C. cygnus</i>	173	43	8	45	–
<i>C. columbianus</i>	35	76	25	–	3
<i>Cygnus</i> sp.	31	35	94	–	–
<i>Anser albifrons</i>	–	180	–	–	–
<i>A. anser</i>	–	5	–	–	–
<i>Anser</i> sp.	–	–	–	–	2
<i>Tadorna ferruginea</i>	1	–	6	7	23
<i>T. tadorna</i>	20	1	–	14	3
<i>Anas strepera</i>	42	154	2	880	20
<i>A. penelope</i>	8	4	–	1	–
<i>A. platyrhynchos</i>	1547	1657	225	2270	834
<i>A. clypeata</i>	84	321	54	1020	30
<i>A. acuta</i>	19	156	–	104	–
<i>A. crecca</i>	123	412	183	1195	82
<i>Netta rufina</i>	1353	4	12	602	1509
<i>Aythya ferina</i>	714	814	1435	1693	89
<i>A. nyroca</i>	2	1	–	69	–
<i>A. fuligula</i>	815	158	192	856	521
<i>Bucephala clangula</i>	94	30	41	–	4
<i>Mergus albellus</i>	229	12	12	81	14
<i>M. merganser</i>	160	1	6	55	–
<i>Anatinae</i> spp.	6035	50	1696	4500	–
<i>Rallus aquaticus</i>	3	5	11	6	2
<i>Gallinula chloropus</i>	38	100	40	227	19
<i>Fulica atra</i>	4314	2775	4136	7650	4453
<i>Gallinago gallinago</i>	32	15	28	270	20



needs, the original water level had eventually dropped for about 20 m. This resulted in drainage of smaller lakes in the Sevan basin, disappearance of extensive marshes and other wetlands and loss of breeding sites for a number of colonial and other waterbirds, including the Velvet Scoter (Dahl, 1950). There are no reports of the scoter from Lake Sevan basin for the recent decades, and the species has been lost for Armenian avifauna.

ACKNOWLEDGEMENTS

The IWC counts in Armenia during 2003–2007 were conducted by the Armenian Society for the Protection of Birds (ASPB) and in various years were generously funded by the Dutch Ministry of Agriculture and Food Quality, AEWA, and by BirdLife and NABU in 2007. Simon Delany, Aleksander Solokha and Ward Hagemeyer from Wetlands International initiated and continuously encouraged and supported our surveys, and commented on the draft of this paper. Dr. Nshan Margaryan helped with obtaining some references and participated in some of our counts. Levan Janoyan (Birds of Armenia Project) provided technical and transport support in 2003 and 2004. Hayk Harutyunyan, Eduard Ghasabyan, Veelen Minasyan, Simon Mnatsakanyan, Artak and Arthur Sargsyan helped conduct counts in various ways and years. Artak Zadoyan and Artavazd Tadevosyan kindly permitted our access to Armash fish farm. Martin Abelyan drove during all field trips and Luba Balyan helped to fix English of the text and locate a reference.

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End of the Table 7

1	2	3	4	5	6
<i>Limosa limosa</i>	–	2	–	–	–
<i>Tringa totanus</i>	27	68	–	75	1
<i>T. ochropus</i>	67	48	14	106	14
<i>Larus canus</i>	–	2	2	–	–
<i>L. armenicus</i>	2422	2559	71	359	156
<i>L. fuscus</i>	–	1	–	–	–
<i>L. ichthyaetus</i>	1413	1257	139	157	419
<i>L. ridibundus</i>	76	1985	19	63	78
<i>Hydrocoloeus minutus</i>	–	31	51	–	–
<i>Larus</i> sp.	1040	1154	–	–	–
Total	22 652	18 801	10 217	24 956	9 166

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