

Wintering Populations of Swans in Iran

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Abstract: Usually, fewer than 2,000 swans of three species, Mute Swan *Cygnus olor*, Whooper Swan *C. cygnus* and Bewick's Swan *C. columbianus bewickii*, migrate to the wetlands of northern Iran during autumn and winter every year. Most of these birds spend the winter in the wetlands of the south Caspian region and northwestern Iran, in the provinces of Gilan, Mazandaran, Golestan, Ardabil, West Azarbaijan and East Azarbaijan. Numbers of all three species fluctuate widely from year to year, and are dependent on the severity of the weather, with very large numbers of Mute and Whooper Swans arriving in severe winters. This paper examines the mid-winter counts of swans in Iran during the ten-year period 1997–2006, and identifies internationally important sites that have supported more than 1% of the regional populations.

Keywords: Swans, population, wintering, influenza, H5N1, Iran, mid-winter.

سالیانه حدود ۲۰۰۰ قو از سه گونه گنگ، فریادکش و کوچک در پاییز و زمستان به تالاب‌های شمال ایران مهاجرت می‌کنند. اکثر این پرندگان زمستان را در مناطق تالابی جنوب خزر (استان‌های گیلان، مازندران، گلستان) و شمال غربی ایران (استان‌های اردبیل، آذربایجان غربی و شرقی) سپری می‌کنند. در این مقاله آمار سرشماری زمستانی قوها در ایران در یک دوره ده ساله طی ۲۰۰۶–۱۹۹۷ بررسی شده است و مناطق مهم زمستان گذران این گونه‌ها مشخص شده‌اند. میزان جمعیت این سه گونه در ایران طی سالیان مورد بررسی بسیار متغیر بوده و میزان آن به طور عمده به شدت سرمای زمستان وابسته می‌باشد، به نحوی که در زمستان‌های بسیار سرد تعداد بسیار زیادی قوی گنگ و قوی فریادکش به این مناطق مهاجرت می‌کنند.

INTRODUCTION

All three Palearctic species of swans, the Mute Swan *Cygnus olor*, Whooper Swan *C. cygnus* and Tundra Swan *C. columbianus*, are regular winter visitors to Iran. The Mute Swan is a bird of temperate latitudes with a somewhat fragmented distribution across Europe and Asia. In western Eurasia, it breeds widely in western and central Europe, and more locally in southeast Europe, the Black Sea and Caspian regions, and central Asia. In winter, it occurs south to the Mediterranean Sea and the southern shores of the Caspian Sea. Mute Swans occur in a variety of lowland freshwater habitats including marshes, lakes, lagoons, estuaries, rivers and canals (Scott & Rose 1996). In eastern Europe and western Asia, the species

breeds mostly in the taiga zone. Most breeding populations tend to migrate relatively short distances except when displaced by cold weather (Carboneras 1992). There are three main groups of Mute Swans in western Eurasia: a northwest and central European population, a Black Sea population, and a West-central Asian/Caspian population. Birds breeding in the Caspian region and central Asia show only limited migratory movements. The greater part of the large population breeding in the Volga Delta remains throughout the year within the limits of the Caspian Sea and lakes adjoining it. Most young birds from this population winter in the warm waters along the west coast of the Caspian Sea (Scott & Rose 1996). The West-central Asian/Caspian population is currently estimated at about 250,000 individuals and is

reported to be increasing (Wetlands International 2006).

The Whooper Swan breeds widely at northern latitudes of Europe and Asia between 55° and 70° N, and winters south to western Europe, the Black Sea, the Caspian Sea, central China and Japan. The birds breed around northern pools and shallow freshwater lakes, in peatlands, and occasionally along slow-flowing rivers and sheltered coasts; they spend the winter on freshwater lakes and marshes, and sometimes on low agricultural land generally not far from the coast (Scott & Rose 1996). Four populations of the Whooper Swan are recognised in western Eurasia. One of these breeds in western and central Siberia and winters in the Caspian region and central Asia. This population is currently estimated at about 20,000 individuals and is reported to be decreasing (Wetlands International 2006). During severe winters, large numbers of Whooper Swans from this population reach the south Caspian lowlands in northern Iran.

The Tundra Swan is a high-Arctic species with a circumpolar distribution, breeding in Alaska, northern Canada and Arctic Russia, and wintering south to the USA, northwest Europe, the Caspian Sea, China and Japan. It breeds in the vicinity of shallow lakes and pools on the Arctic tundra, and winters on shallow freshwater lakes, marshes, flooded grasslands or agricultural fields, often in coastal regions (Scott & Rose 1996). Three subspecies have been described: *C. c. columbianus* (Whistling Swan) in North America, *C. c. bewickii* (Bewick's Swan) in western Eurasia, and *C. c. jankowski* in eastern Asia. The west Eurasian form *bewickii* breeds in Arctic Russia and winters mostly in northwest Europe, but there is a small population of about 1,000 individuals that winters in the Caspian region and Turkey (Wetlands International 2006). A steady reduction in the size of this wintering population may reflect a concomitant reduction in an isolated or relict breeding population in northern Siberia, possibly on an island in the Arctic Ocean. This is of particular interest because the breeding population of Bewick's Swan in northeast European Russia has increased in size since the 1980s (Carboneras 1992).

MATERIALS AND METHODS

Information on the numbers of swans wintering in Iran has been taken from the results of the annual mid-winter waterbird counts undertaken by the Department of the Environment as part of the International Waterbird Census (IWC) co-ordinated by Wetlands International. These mid-winter (January) counts have been carried out in Iran in every winter since 1968 with the exception of 1978, 1979 and 1982. The data are stored in the Mid-winter Waterbird Census Database at the Department of the Environment in Tehran and in the IWC Database at Wetlands International in Wageningen, The Netherlands. Birds were counted using the Total Count Method during January of each year; counters were equipped with binoculars (8×30 or 10×40) and also in many cases with telescopes (20×60 telescopes). The importance of sites was assessed on the basis of the 1% criterion developed under the Convention on Wetlands (Ramsar Convention) for the identification of wetlands of international importance. This criterion (Criterion 6) states that "a wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies" (Wetlands International 2006). The 1% thresholds to be used in the application of Ramsar Criterion 6 for the regional populations of Mute Swan, Whooper Swan and Bewick's Swan are 2,500, 200 and 10 individuals respectively (Wetlands International 2006).

RESULTS AND DISCUSSION

The total number of swans wintering in Iran varies widely from year to year, as shown by the mid-winter counts from January 1968 to January 2006 (Fig. 1). In most years, the number of Mute Swans varies between 30 and 3,323, and that of Whooper Swans between 61 and 1,510, but during exceptionally cold winters, *e.g.* those of 1971/1972 and 2002/2003, much larger numbers can occur. In nine of the last ten years, the total number of swans wintering in Iran has averaged only 1,537 (range 264 to 5,286). However, an unprecedented influx of swans occurred in the winter of 2002/2003. Autumn 2002 saw the

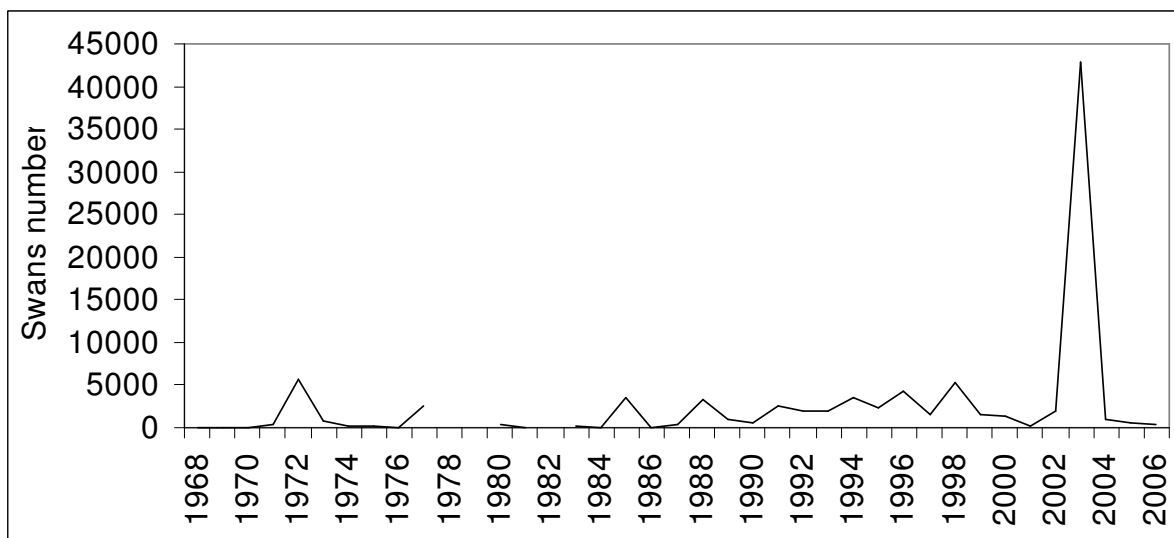


Figure 1. Numbers of swans wintering in Iran, 1968-2006.

onset of harsh climatic conditions in Russia, an increasingly rare phenomenon in recent years, and this exceptionally cold weather caused large numbers of swans to winter much further south than normal. Over 42,800 swans were counted in Iran, mostly in the south Caspian region but with some birds reaching wetlands in west and central Iran including the Aras River, Aslandooz Dam and Dasht-e Moghan in Ardabil, Kanibarazan, Gharagol, Yousef Kandi, Garros and Soldoz marshes in West Azarbaijan, Gharegheshlagh marsh in East Azarbaijan, Zaribar (Zarivar) Lake in Kordestan, Hashilan Marsh in Kermanshah, Hanna Dam in Isfahan, Gandoman Marsh in Chaharmahal and Bakhtiari, Bishe Dalan in Lorestan, and Kaftar Lake in Fars. This abundance of swans was marvellous to see in many wetlands where the loud bugling of Whooper Swans shattered the prevailing silence. Swans in such unusual numbers became a regular feature on local and national television. The traditional tenet of the local people, a belief that the presence of swans brings good fortune, ensured that the birds were protected at many sites. Furthermore, Game Guards were appointed at the most important sites to prevent the hunting of swans, and this had the additional benefit of providing protection for ducks and other waterbirds.

Tables 1–3 give the mid-winter counts of Mute Swan, Whooper Swan and Bewick's Swan in Iran during the ten-year period 1997–2006. Bewick's Swans occurred most frequently in wetlands in the Lake Uromiyeh basin in

West Azarbaijan province, northwestern Iran, while Mute and Whooper Swans occurred mainly in wetlands adjacent to the Caspian Sea in Gilan, Mazandaran and Golestan provinces. One of the most important sites for both Mute Swans and Whooper Swans was the Anzali Mordab Complex, a vast wetland area incorporating several protected areas and wildlife refuges (Selkeh, Siakeshim, Chokam and Sorkhankol) in the southwest Caspian region. Important wintering sites for swans in the southeast Caspian region included Miankaleh Wildlife Refuge and Gorgan Bay, as well as Gomishan Marsh.

Mute Swan

During the six winters from 1997 to 2002, the total number of Mute Swans wintering in Iran varied between 78 and 4,488, and averaged 1,010 (Table 1). However, a total of 16,023 were recorded in the January Waterbird Counts in the very severe winter of 2003. Numbers in the following three years were exceptionally low, with only 87 being recorded in 2004, 141 in 2005 and 30 in 2006 (Fig. 2). Although this species occurs predominantly in the north of Iran, it is sometimes present in small numbers at wetlands in central or southern Iran, *e.g.* Gavekhoni marsh (32°17'N, 52°55'E), Zayandehrud Dam (32°44'N, 50°43'E), Lakes Bakhtegan and Tashk (29°34'N, 53°37'E), Choghakhor Marsh (31°55'N, 50°50'E), Hamoun Lake (31°21'N, 61°16'E), Hoor-e-

Bamdej (31°18'N, 48°39'E), and Bondoun marsh (31°50'N, 49°47'E).

Mute Swans were recorded at a total of 37 sites during the period 1997–2006, mostly in the south Caspian lowlands but also at a few sites in northwest, southwest and central Iran. No sites have regularly supported more than 1% of the flyway population (2,500 birds), but in the extremely severe winter of 2002/03, the Anzali Mordab Complex held over 3% of the total population (7,874 birds), confirming this site as an extremely important hard weather refuge for the Mute Swan. Other hard weather refuges supporting over 0.5% of the population in January 2003 included Lavandavil Marsh and Abbas Abad Abbandan in Gilan, and Gomishan Marsh in Golestan. The wetlands of Miankaleh Wildlife Refuge and Gorgan Bay in Mazandaran regularly support substantial numbers of Mute Swans, with over 2,400 present in January 1998, but held only 515 in the hard winter of 2002/03.

Whooper Swan

The total number of Whooper Swans wintering in Iran also fluctuates widely from year to year, ranging from 185 to 1,235 during the period 1997 to 2002, and averaging 823 (Table 2). However, a very high total of 26,431 were recorded during the waterbird census in January 2003. This count exceeds the current population estimate of 20,000 by a considerable margin and suggests either that the official population estimate is much too low or that the numbers in Iran in January 2003 were overestimated. In any event, it is likely that almost the entire West and Central Asian population of Whooper Swans was present in Iran during that very

severe winter. It is quite possible that the official population estimate is too low as there have been many gaps in the coverage of the mid-winter waterbirds counts in southwest Asia, and many birds might have been missed by the counts in previous years. However, it is also likely that there was some over-estimation of numbers in Gilan Province, where 25,483 of

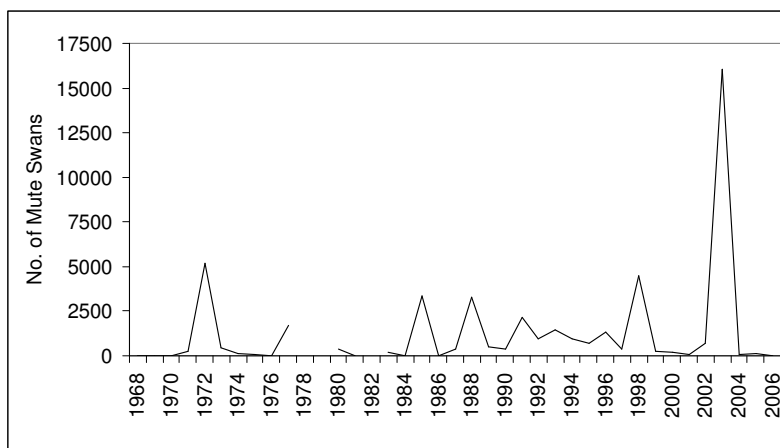


Figure 2. Numbers of Mute Swans wintering in Iran, 1968-2006.

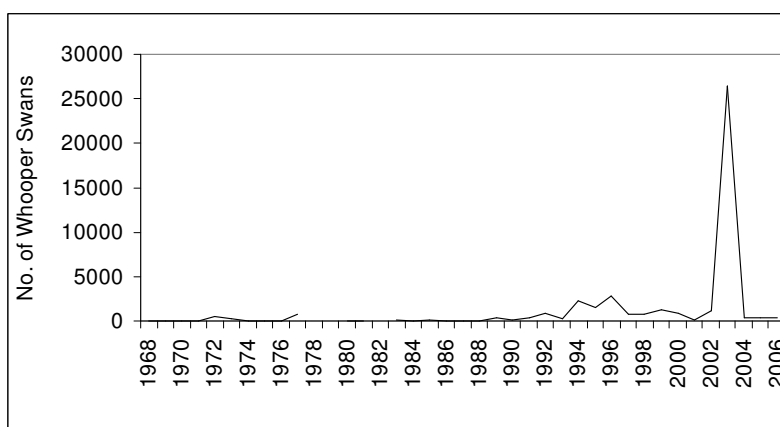


Figure 3. Numbers of Whooper Swans wintering in Iran, 1968-2006.



Figure 4. Numbers of Bewick's Swans wintering in Iran, 1968-2006.

the 26,431 Whooper Swans were recorded. Over-estimation might have occurred at Lavandavil marsh, Paen Rudposht Ab-bandan and some parts of Anzali Mordab Complex such as Selkeh Wildlife Refuge and Hossein Bakandeh Ab-bandan where very high counts of 3,766, 2,700, 4,800 and 3,500 were reported, respectively. These are all small wetlands, and it seems unlikely that they could have held such huge numbers of swans. It is also possible that some double-counting occurred, especially in the Anzali Mordab Complex and Lavandavil marsh, as flocks of swans moved from one site to another in response to disturbance from poaching. The distance between many of the sites in Gilan is less than 5 km.

After the very high count of Whooper Swans in 2003, numbers were lower than normal in the following three years, with only 384 in 2004, 368 in 2005 and 351 in 2006 (Fig. 3). Like the Mute Swan, the Whooper Swan occurs predominantly in the south Caspian region, but in some years a few birds migrate to central or southern Iran and appear in locations such as Band Alikhan (35°30'N, 51°00'E), Bisheh Dalan (33°45'N, 48°40'E), Allah Akbar Basin (32°00'N, 48°00'E), Choghakhor (31°55'N, 50°50'E), Hamoun Lake (31°21'N, 61°16'E), Kaftar Lake (30°30'N, 52°48'E), Shadegan Marsh (30°39'N, 48°30'E) and Lakes Bakhtegan and Tashk (29°34'N, 53°37'E). Most of the regular wintering sites in Iran are protected.

Whooper Swans were recorded at 49 sites during the ten years 1997–2006, mostly in the south Caspian region, but also at a number of sites in northwestern Iran and at several sites in central and southwestern Iran. The Anzali Mordab Complex and Amirkelayeh Wildlife Refuge in Gilan were the most important sites for this species, regularly holding 1% of the flyway population (200 birds), but wetlands of the Aras River and Dashte Moghan in northern Ardabil also exceeded the 1% threshold on several occasions. The Anzali Mordab Complex was an extremely important hard weather refuge for this species during the severe winter of 2002/2003, holding almost 15,000 birds. Other important sites in the winter of

2002/2003 included Lavandavil Marsh, Abbas Abad Ab-bandan, Paen Rudposht Ab-bandan and Bujagh National Park in Gilan, and Hanna Dam in Isfahan.

Bewick's Swan

The number of Bewick's Swans wintering in Iran in recent years has been very low, averaging only 17 during the period 1997–2006 and reaching a maximum of 63 in the hard winter of 2002/2003 (Table 3). These numbers are well below the exceptionally high counts of 170–320 during the period 1993–1996 but comparable with counts in the 1970s, when numbers never exceeded 70 (Fig. 4). The only record of Bewick's Swans in Iran during the period 1978–1988 was a count of three birds in January 1985. However, 63 birds were reported in 1989, followed by 40–86 birds in 1990–1992, and exceptionally high counts of 276, 320, 171 and 226 in 1993–1996. In general, the species is usually found at wetlands in the Lake Uromiyeh basin, West Azarbaijan, in northwestern Iran, although it also occurs occasionally in the south Caspian region. Most of the birds recorded during the period 1993–1996 were observed on the south coast of Lake Uromiyeh and in adjacent wetlands, *e.g.* Nowruzlu Dam, Garros marsh, Yadegarlu Lake, Dorgeh Sangi marsh and Ghareh Gheshlagh marsh in West Azarbaijan, but some birds were also observed in Boralan marsh and along the Aras River, also in West Azarbaijan.

Bewick's Swans were recorded at 11 sites during the period 1997–2006, seven in West Azarbaijan and one each in Gilan, Golestan, Mazandaran and Khuzestan. However, only two sites held birds on more than one occasion, Nouruzlu Dam and Soldooz in West Azarbaijan. The 1% threshold of 10 birds was equalled or exceeded at six sites: Amirkelayeh Wildlife Refuge in Gilan, and Garros Marsh, Gharagol Marsh, Kanibarazan, Nouruzlu Dam and Soldooz, all in West Azarbaijan. At three of these sites, Garros Marsh, Gharagol Marsh and Kanibarazan, Bewick's Swans appeared only during the severe winter of 2002/2003.

Wintering population of swans in Iran- *H. Amini & M.E. Sehhatisabet*

Table 1. Mid-winter counts of Mute Swan *Cygnus olor* in Iran. Sites which have held 1% or more of the flyway population on at least one occasion are highlighted in bold. WR=Wildlife Refuge, NP= National Park, PA= Protected Area, and NC= No Count.

Province	Site Name	N	E	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Aver. incl. 2003	Aver. excl. 2003	No. recds. at least 1%
West Azarbaijan	Boralan, Aras River & Dam	394200	443400	0	0	0	0	0	23	0	0	18	0	4,1	4,6	0
West Azarbaijan	Kanibarazan	365900	454600	0	NC	0	0	0	0	24	0	0	0	2,7	0,0	0
West Azarbaijan	Shur Gol(Hassanlu), Yadegarlu & Dorgeh Sangy marshes	370237	453455	0	0	0	0	0	2	0	0	0	0	0,2	0,2	0
West Azarbaijan	Soldoos marsh	370237	453455	NC	NC	NC	NC	NC	0	5	14	9	0	5,6	5,8	0
Ardabil	Aras River, Aslandooz Dam & Dasht-e Moghan plain	392700	472212	0	60	0	0	NC	0	12	NC	NC	0	10,3	10,0	0
Ardabil	Shorabil	381010	481920	NC	NC	0	0	7	2	0	0	NC	NC	1,5	1,8	0
Gilan	Abbas Abad Ab-bandan	382127	485057	0	NC	NC	NC	0	0	1370	0	0	0	195,7	0,0	0
Gilan	Lavandavil WR	382143	485108	2	0	0	0	0	0	1510	0	0	0	151,2	0,2	0
Gilan	Caspian Sea Coast: Anzali-Astara	374903	485842	0	2	0	0	0	0	0	0	0	0	0,2	0,2	0
Gilan	Anzali Mordab complex	372359	492957	206	928	58	50	5	63	7874	21	4	0	920,9	148,3	1
Gilan	Bujagh NP	372748	495610	0	8	2	9	0	106	550	0	0	1	67,6	14,0	0
Gilan	Barkoosara Ab-bandan	371554	500807	NC	NC	0	0	0	0	3	0	0	0	0,4	0,0	0
Gilan	Caspian Sea Coast: Langarud-Ramsar	371417	501535	0	NC	NC	NC	NC	7	0	0	0	0	1,2	1,4	0
Gilan	Amirkelayeh WR	372057	501157	140	510	25	43	0	40	940	0	0	2	170,0	84,4	0
Gilan	Paen Rudposht Ab-bandan	372110	500848	NC	34	4	15	0	40	290	0	0	0	42,6	11,6	0
Mazandaran	Anarmarz Ab-bandan	364200	525018	0	5	NC	0	0	0	0	0	0	0	0,6	0,6	0
Mazandaran	Caspian Sea Coast: Ashur-Khazar Abad	365418	540100	NC	NC	22	0	10	11	50	0	0	0	11,6	6,1	0
Mazandaran	Caspian Sea Coast: Babolsar-Khazar Abad	364459	525255	1	75	0	0	2	0	0	0	0	0	7,8	8,7	0
Mazandaran	Caspian Sea Coast: Chalus-Babolsar	364030	512718	1	0	0	0	0	0	1	0	0	0	0,2	0,1	0
Mazandaran	Miankaleh WR, Gorgan Bay & Lapoo Zaghmarz Ab-bandan	365200	533400	0	2421	157	10	15	6	515	0	1	0	312,5	290,0	0
Mazandaran	Mistan Ab-bandan	364030	524930	0	50	NC	0	0	0	130	0	0	0	20,0	6,3	0
Mazandaran	Sayed Mahaleh Ab-bandan	364239	530056	NC	30	0	0	0	0	0	0	0	0	3,3	3,8	0
Mazandaran	Zarinkola Ab-bandan	364323	525817	0	100	0	7	0	0	205	0	0	0	31,2	11,9	0
Mazandaran	Fereydoon Kenar, Ezbaran & Sorkhrud Damgah	364000	522730	0	20	0	0	5	10	33	0	0	0	6,8	3,9	0
Golestan	Abgasht Fishpond	372149	542957	0	1	0	NC	0	0	0	0	0	0	0,1	0,1	0
Golestan	Gomishan marsh	371019	540304	0	180	0	0	19	51	1295	51	24	19	163,9	38,2	0
Golestan	Sooficam Ab-bandan	371854	542410	NC	NC	NC	NC	NC	0	78	0	0	0	15,6	0,0	0
Golestan	Shur Lake	371940	543805	NC	NC	NC	NC	0	275	1100	0	61	0	239,3	67,2	0
Golestan	Ala Gol, Aji Gol & Ulma Gol marshes	372016	543508	0	58	12	0	0	63	25	0	24	8	19,0	18,3	0
North Khorasan	Atrak River	371400	581000	5	0	0	NC	NC	NC	0	NC	0	0	0,8	1,0	0

Province	Site Name	N	E	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Aver. incl. 2003	Aver. excl. 2003	No. recds. at least 1%
Tehran	Band Ali Khan complex	350000	513000	0	0	0	NC	15	0	NC	0	0	0	1,9	1,9	0
Hamadan	Ghareh Chay River	344000	481500	0	3	0	NC	NC	NC	0	0	0	0	0,4	0,5	0
Chaharmahal & Bakhtiary	Choghakhor marsh	315500	505500	NC	0	0	25	0	0	0	0	0	0	2,8	3,1	0
Chaharmahal & Bakhtiary	Gandoman marsh	315100	510600	NC	NC	0	0	0	0	12	0	0	0	1,5	0,0	0
Khuzestan	Um-Al-Dobes	314504	481404	NC	3	NC	NC	NC	NC	NC	0	0	0	0,8	0,8	0
Khuzestan	Shadegan Marsh PA	303900	483000	0	0	0	0	0	3	0	0	0	0	0,3	0,3	0
Esfahan	Zayandehrud Dam	324418	504318	NC	NC	0	NC	0	0	1	1	0	0	0,3	0,2	0
TOTAL				355	4488	280	159	78	702	16023	87	141	30	2234,3	702,2	

Table 2. Mid-winter river counts of Whooper Swan *Cygnus cygnus* in Iran. Sites which have held 1% or more of the flyway population on at least one occasion are highlighted in bold. WR=Wildlife Refuge, NP= National Park, PA= Protected Area, and NC= No Count.

Province	Site Name	N	E	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Aver. incl. 2003	Aver. excl. 2003	No. recds. at least 1%
West Azarbaijan	Gopy Lake	365600	455200	0	0	0	NC	NC	NC	0	21	0	0	3,0	3,5	0
West Azarbaijan	Kanibarazan marsh	365900	454600	0	NC	0	0	0	0	0	23	53	82	17,6	19,8	0
West Azarbaijan	Miandoab (Nowruzlu) Dam	365200	461400	0	46	0	0	NC	0	0	0	0	0	5,1	5,8	0
West Azarbaijan	Shur Gol (Hassanlu), Yadegarlu & Dorgeh Sangy marshes	370237	453455	255	17	30	0	9	34	0	0	0	127	47,2	52,4	1
West Azarbaijan	Soldoos marsh	370237	453455	NC	NC	NC	NC	NC	0	0	88	211	3	60,4	75,5	1
West Azarbaijan	Uromiyeh Lake	374642	451914	0	64	8	0	46	75	48	50	35	62	38,8	37,8	0
West Azarbaijan	Boralan, Aras River & Dam	394200	443400	12	5	0	0	10	0	0	0	0	0	2,7	3,0	0
East Azarbaijan	Aras River: Khoda Afarin-Jolfa	385600	453800	NC	NC	NC	80	NC	0	0	25	5	0	18,3	22,0	0
Ardabil	Shorabil	381010	481920	NC	NC	0	0	0	12	0	0	NC	NC	2,0	2,4	0
Ardabil	Aras River, Aslandooz Dam & Dashte Moghan	392700	472212	300	339	121	107	NC	57	343	0	NC	48	164,4	138,9	3
Gilan	Caspian Sea Coast: Hashtpar-Anzali	373547	490926	0	0	0	0	0	0	17	0	0	0	1,7	0,0	0
Gilan	Caspian Sea Coast: Anzali-Langarud	372653	494645	0	NC	115	0	0	0	0	0	0	0	12,8	14,4	0
Gilan	Abbas Abad Ab-bandan	382127	485057	0	NC	NC	NC	0	0	1850	0	0	0	264,3	0,0	1
Gilan	Lavandavil WR	382143	485108	0	0	0	0	0	0	3766	0	0	0	376,6	0,0	1
Gilan	Anzali Mordab complex	372359	492957	83	28	715	246	31	389	14695	108	49	3	1634,7	183,6	4
Gilan	Bujagh NP	372748	495610	0	0	1	23	0	14	700	0	0	0	73,8	4,2	1
Gilan	Amirkelayeh WR	372057	501157	15	143	197	225	4	220	1750	0	0	0	255,4	89,3	3
Gilan	Chaf Ab-bandan	371632	501252	NC	NC	NC	NC	NC	9	0	0	0	0	1,8	2,3	0
Gilan	Barkoosara Ab-bandan	371554	500807,1	NC	NC	4	0	0	1	5	0	0	0	1,3	0,7	0

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Province	Site Name	N	E	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Aver. incl. 2003	Aver. excl. 2003	No. recds. at least 1%
Gilan	Kohneh Rudposht Ab-bandan	371912	500543	NC	NC	NC	NC	NC	64	0	0	0	0	12,8	16,0	0
Gilan	Lalehrud Ab-bandan	371150	501639	NC	NC	NC	NC	NC	2	0	0	0	0	0,4	0,5	0
Gilan	Paeen Rudposht Ab-bandan	372110	500848	NC	11	16	116	0	213	2700	0	0	0	339,6	44,5	2
Gilan	Manjil Dam	364436	492150	0	NC	NC	NC	0	43	0	0	0	0	6,1	7,2	0
Mazandaran	Caspian Sea Coast: Babolsar-Khazar Abad	364459	525255	0	7	0	0	0	0	0	0	0	0	0,7	0,8	0
Mazandaran	Caspian Sea Coast: Ashur-Khazar Abad	365418	540100	NC	NC	0	0	0	0	30	0	0	0	3,8	0,0	0
Mazandaran	Mistan Ab-bandan	364030	524930	0	0	NC	0	0	0	120	0	0	0	13,3	0,0	0
Mazandaran	Fereydoon Kenar, Ezbaran & Sorkhrud Damgah	364000	522730	38	19	15	0	3	10	5	4	0	10	10,4	11,0	0
Mazandaran	Miankaleh WR, Gorgan Bay & Lapoo Zaghmarz Ab-bandan	365200	533400	8	17	0	0	0	0	22	0	0	13	6,0	4,2	0
Mazandaran	Anarmarz Ab-bandan	364200	525018	0	3	NC	0	0	0	0	0	0	0	0,3	0,4	0
Mazandaran	Zarinkola Ab-bandan	364323	525817	2	0	0	0	0	0	0	0	5	0	0,7	0,8	0
Mazandaran	Baghertangeh Ab-bandan	364200	524130	NC	NC	NC	NC	NC	NC	NC	NC	NC	2	2,0	2,0	0
Golestan	Voshmgir (Gorgan) Dam	371228	544141	0	1	0	0	0	0	0	0	0	0	0,1	0,1	0
Golestan	Shur Lake	371940	543805	NC	NC	NC	NC	0	0	0	3	0	0	0,5	0,6	0
Golestan	Gomishan marsh	371019	540304	0	0	0	25	52	0	0	52	2	0	13,1	14,6	0
Golestan	Shaheed Madani fishpond	374409	543416	0	0	0	NC	NC	0	1	0	0	0	0,1	0,0	0
Golestan	Ala Gol, Aji Gol & Ulma Gol marshes	372016	543508	0	60	11	27	0	0	0	3	0	0	10,1	11,2	0
Tehran	Band Ali Khan complex	350000	513000	0	0	0	NC	30	0	NC	0	0	0	3,8	3,8	0
Tehran	Latian Dam	354738	514105	NC	0	0	0	0	0	0	0	0	1	0,1	0,1	0
Kordestan	Zaribar (Marivan) Lake	353113	460627	0	0	0	0	0	22	19	0	5	0	4,6	3,0	0
Kermanshah	Hashilan & Khezr-e Zنده marshes	345129	465114	0	0	0	0	0	0	13	0	0	0	1,3	0,0	0
Kermanshah	Sirvan River (Paveh)	350745	461229	NC	NC	NC	NC	NC	NC	12	NC	NC	NC	12,0		0
Chaharmahal & Bakhtiary	Choghakhor marsh	315500	505500	NC	0	0	6	0	0	0	0	0	0	0,7	0,8	0
Lorestan	Beesheh Dalan	334500	484001	0	0	0	NC	NC	NC	22	NC	NC	NC	5,5	0,0	0
Esfahan	Hanna Dam	311300	514431	NC	NC	0	0	0	0	295	0	0	0	36,9	0,0	1
Fars	Kaftar Lake	303400	524700	11	NC	0	0	0	0	18	7	0	0	4,0	2,3	0
Fars	Parishan Lake	293100	514800	0	0	0	0	0	0	0	0	3	0	0,3	0,3	0
Khuzestan	Alah Akbar Basin	313707	481402	0	0	NC	NC	NC	9	NC	0	0	NC	1,8	1,8	0
Khuzestan	Miangaran marsh	315200	495300	0	0	2	NC	0	0	0	0	0	0	0,2	0,3	0
Khuzestan	Shadegan Marsh PA	303900	483000	0	0	0	0	0	2	0	0	0	0	0,2	0,2	0
TOTAL				724	760	1235	855	185	1176	26431	384	368	351	3246,9	670,9	

Table 3. Mid-winter counts of Bewick's Swan *Cygnus columbianus bewickii* in Iran. Sites which have held 1% or more of the flyway population on at least one occasion are highlighted in bold. WR=Wildlife Refuge and NC= No Count.

Province	Site Name	N	E	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Aver. incl. 2003	Aver. excl. 2003	No. recds. at least 1%
West Azarbaijan	Boralan, Aras River & Dam	394200	443400	5	0	0	0	0	0	0	0	0	0	0,5	0,6	0
West Azarbaijan	Garros marsh	370200	454600	0	0	0	0	NC	NC	12	NC	0	NC	2,0	0,0	1
West Azarbaijan	Ghareh Gol	365160	460466	NC	NC	NC	NC	NC	NC	10	NC	0	0	3,3	0,0	1
West Azarbaijan	Kanibarazan marsh	365900	454600	0	NC	0	0	0	0	30	0	0	0	3,3	0,0	1
West Azarbaijan	Yousef Kandi Dam	364300	454000	0	0	0	NC	NC	0	7	0	0	0	0,9	0,0	0
West Azarbaijan	Miandoab (Nowruzlu Dam)	365200	461400	2	0	0	50	NC	0	0	0	0	0	5,8	6,5	1
West Azarbaijan	Soldoos marsh	370237	453455	NC	NC	NC	NC	NC	0	4	23	0	0	5,4	5,8	1
Gilan	Amirkelayeh WR	372057	501157	0	10	0	0	0	0	0	0	0	0	1,0	1,1	1
Mazandaran	Miankaleh WR, Gorgan Bay & Lapoo Zaghmarz Ab-bandan	365200	533400	0	0	0	0	1	0	0	0	0	0	0,1	0,1	0
Golestan	Ala Gol, Aji Gol & Ulma Gol marshes	372016	543508	0	0	0	0	0	0	0	0	5	0	0,5	0,6	0
Khuzestan	Miangan marsh	315200	495300	0	0	0	NC	0	0	0	0	6	0	0,7	0,8	0
TOTAL				7	10	0	50	1	0	63	23	11	0	16,5	17,0	

An outbreak of disease in 2006

In the winter of 2005/06, most of the migrating swans arrived in the wetlands of northern Iran in late January and early February. In February and March, 305 swans were found dead in the Anzali Mordab Complex in Gilan, and a further 29 swans were found dead at five other sites in the same province: Amirkelayeh W.R. (16), Bujagh N.P. (7), Doustelat (4), Lavandavil W.R. (1) and Jokandan (1). This swan mortality was first noticed on 2 February, when a few dead birds were found in the Anzali Mordab Complex. About 90% of the dead swans were Whooper and the rest were Mute. The carcasses of the dead birds were collected hygienically and buried by staff of Gilan Provincial Office of the Department of the Environment and Iran Veterinary Organization (Anon. 2006). Tissue samples taken from the dead swans were sent to Reference Laboratory for Avian Influenza and Newcastle disease in Padova, Italy, for virological tests, and proved positive for highly pathogenic avian influenza virus subtype H5N1 (Iran Veterinary Organization 2006). Some mortality of swans was also recorded in Mazandaran and Golestan provinces, but the number of birds involved was very small.

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