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Wintering swans in Krasnodar Province, Southwestern Russia

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Abstract

This article presents the results of swan counts undertaken in Krasnodar Province, SW Russia from 2003–2016, for the International Waterbird Census (IWC) programme coordinated by Wetlands International. Distribution and numbers of Mute Swans (*Cynus olor*), Whooper Swans (*C. cygnus*) and Bewick’s Swans (*C. columbianus bewickii*) are listed and discussed. Local Mute and Whooper Swan wintering populations were numerous and had positive trends over 2003–2016, whereas Bewick’s Swan numbers were low and fluctuating.

Introduction

Three species of swans are commonly found in Russia: the Mute Swan *Cygnus olor* (Gm.), Whooper Swan *Cygnus cygnus* (L.) and Bewick’s Swan *Cygnus columbianus bewickii* (Yarr.). In Krasnodar Province, the Mute Swan is a breeding species and occurs throughout the year, whereas the Whooper and Bewick’s Swans only appear on migration and during winter. The hunting of swans is illegal throughout Russia, except for Mute Swans in the Astrakhan Region. Bewick’s Swans are included in the Red Data Book of the Russian Federation (2001).

Most Russian wetlands normally freeze by January and thus are not suitable for wintering waterbirds. However, extensive parts of the Sea of Azov and Black Sea coasts and also inland waterbodies of Krasnodar Province often remain ice-free and therefore provide important winter quarters for swans and other waterbirds, especially in mild winters. Since 2003, mid-winter waterbird counts have been conducted regularly in the region, as part of the International Waterbird Census (IWC) (Solokha 2006). This article presents the results of the mid-January swan surveys made in Krasnodar Province under the IWCs from 2003 until 2016, except for three missing seasons of 2007–2009.

Materials and methods

The IWC is a site-based counting scheme for monitoring waterbird numbers. It is a so-called look-see survey whereby observers visit a site and make a count of every waterbird species present (Bibby *et al.* 1992, Delany 2005). We used ground and boat surveys to count swans and other waterbirds during several days in January each year. Extensive wetlands and a lack of experts and trained volunteers meant that we were unable to conduct counts simultaneously at all sites in the region. Nevertheless, we tried to visit the sites in as short a time as possible, particularly in recent years, and most counts were performed between 10–25 January. We used binoculars and spotting scopes with 20–60 X magnification for observations. Swans were counted mainly one-by-one, but in the case of large congregations (*e.g.* at Taman Bay) also as groups of ten individuals.

The coverage of IWC in Krasnodar Province varied, being dependent mostly on the condition of the wetlands (frozen or not), but also on available time and funds. Altogether, 37 sites were counted at least once with high coverage (27 sites) in 2004 (Table 1).

The standard customised software Excel and Access were used to collate and summarise the data, and a

Table 1. Summary results from mid-winter counts of swans in Krasnodar Province since 2003.

| Years & time of counts | No. of sites covered | Location | No. of sites with swans | Total no. of swans | No. of identified species |
|------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------|-------------------------|--------------------|--------------------------------|
| 2003: 18–28.01 | 20 | Azov & Black Sea coasts, lakes & reservoirs | 9 | 3,485 | M: 2,677 W: 808 B: 0 |
| 2004: 21.01–04.02 | 27 | Azov & Black Sea coasts | 12 | 1,818 | M: 1,429 W: 389 B: 0 |
| 2005: 13.01–05.02 | 15 | Azov & Black Sea coasts | 9 | 2,127 | M: 1,535 W: 575 B: 0 |
| 2006: 03–21.01 | 19 | Azov & Black Sea coasts | 13 | 5,275 | M: 3,147 W: 383 B: 0 |
| 2007–2009: No counts | | | | | |
| 2010: 16–29.01 Cold winter; many wetlands frozen. Poor coverage due to lack of funds | 8 | Azov & Black Sea coasts | 3 | 2,155 | M: 418 W: 762 B: 0 |
| 2011: 15–31.01 Poor coverage due to lack of funds | 12 | Azov & Black Sea coasts | 6 | 3,594 | M: 1,790 W: 1,804 B: 0 |
| 2012: 20–25.01 Late counts. Extreme cold; freezing waterbodies | 5 | Azov Sea coast | 5 | 825 | M: 529 W: 296 B: 0 |
| 2013: 14–28.01 | 18 | Azov & Black Sea coast & reservoirs | 11 | 6,297 | M: 3,440 W: 1,782 B: 139 |
| 2014: 12–23.01 | 14 | Azov & Black Sea coasts, lakes & reservoirs | 11 | 7,164 | M: 3,889 W: 2,560 B: 91 |
| 2015: 14–24.01 | 15 | Azov & Black Sea coasts, lakes & reservoirs | 12 | 7,509 | M: 6,994 W: 427 B: 2 |
| 2016: 13–24.01 | 20 | Azov & Black Sea coasts, lakes & reservoirs | 13 | 7,009 | M: 5,718 W: 793 B: 39 |

free program DIVA–GIS was used for mapping and spatial presentation. Trends in the numbers of Mute Swans and Whooper Swans wintering within Krasnodar Province over the period 2003 to 2016 were analysed using program TRIM 3.53 (Pannekoek & van Strien 2005).

Weather conditions

Weather conditions were rather different each winter. Figure 1 shows variation in the daily average temperature for the town of Krasnodar over the last five IWC seasons. A steady decline in temperatures to below 0°C causes the wetlands to freeze and most of

the waterbirds then depart. This was most evident in the last ten days of January 2012, whereas the opposite situation occurred in 2013 when, after a cold December, steady warming in mid-January resulted in the ice melting on inland waterbodies and shallow coastal waters. The unusually warm weather permitted huge populations of waterbirds to stay along the sea shores and on reservoirs until the end of the winter. January 2015 and January 2016 were both rather cold at the start of the month, and wetlands in the northern part of Krasnodar Province froze, but warm weather in mid-month resulted in partial melting of ice at these wetland sites.

Results

Mute Swan. This species was found every winter, and was recorded at 20 different sites over the period 2003–2016 (Figure 2). The number of wetlands where Mute Swans occurred varied from three sites in 2010 to 12 sites in 2004, 2006, 2015 and 2016. Total numbers counted ranged from 481 individuals in 2010 to 6,994 in 2015, with a mean of $2,875 \pm 624$ birds per year. High numbers of Mute Swans (4,313 birds) were counted at Taman Bay in 2016. Taman Bay was also the one site where Mute Swans were found every year. In some years, Mute Swans gathered in considerable numbers at three other sites: the Primor-Akhtar wetlands (peak count of 3,304 in 2015), the Anapa wetlands (898 birds in 2013) and the Kuban-Protoka wetlands (656 birds in 2005).

The overall trend for Mute Swans in Krasnodar Province (TRIM: modelled slope \pm s.e. = 1.101 ± 0.029 ; imputed slope \pm s.e. = 1.083 ± 0.030) indicated a “moderate increase” status since 2003 ($P < 0.01$; see Figure 3).

Whooper Swan. This species was found in Krasnodar Province during each of the IWC counts, and was recorded at a total of 14 sites over the period 2003–2016 (Figure 4). The number of wetlands where Whooper Swans occurred varied from two sites in 2005 and 2010 to ten sites in 2016. Total numbers

counted ranged from 296 birds in 2012 to 2,560 birds in 2014, with a mean of 962 ± 225 birds counted per year. The largest number of Whooper Swans (1,597 birds) was counted at Taman Bay in 2011, and Whooper Swans were seen at Taman Bay in every year of the study. Varnava Reservoir was also regularly used by Whooper Swans in mid-winter, and in most years the highest counts were recorded at this site, peaking at 648 birds in 2014.

The overall trend for Whooper Swans in Krasnodar Province (TRIM: modelled slope \pm s.e. = 1.079 ± 0.025 ; imputed slope \pm s.e. = 1.061 ± 0.044) indicated a “moderate increase” ($P < 0.01$) or “uncertain” trend status (see Figure 3).

Bewick's Swan. This species was first found in the region in January–February 2008, when 2–5 birds were seen at Kerch Strait and the neighbouring portion of Taman Bay (Mnatsekanov 2008). We recorded this species every January from 2013 onwards, and between 2013–2016 its numbers varied from two (in 2015) to 139 (in 2013) (Table 2). Bewick's Swans occurred at three sites (Figure 5): Varnava Reservoir (which had the high number of birds, with 101 counted in 2013), Taman Bay (reaching 57 birds in 2014) and Krasnodar Reservoir (only in 2013, when 18 birds were seen at the site).



Photo: Liz Gent / WWT

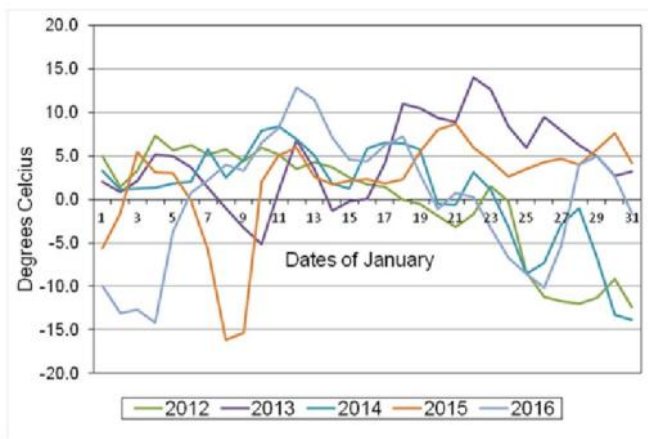


Figure 1. Mean daily temperatures for the town of Krasnodar in January, each year from 2012 to 2016 (based on the counts at 13 and 11 sites respectively).

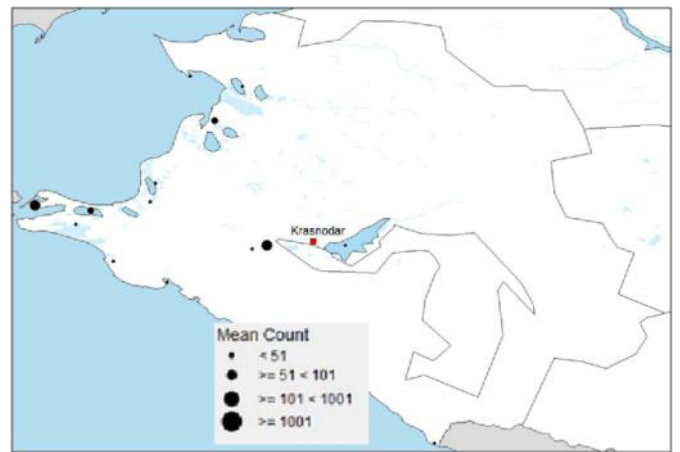


Figure 4. Distribution of Whooper Swans in Krasnodar Province in January 2003–2016 (black dots indicate mean count at each site).

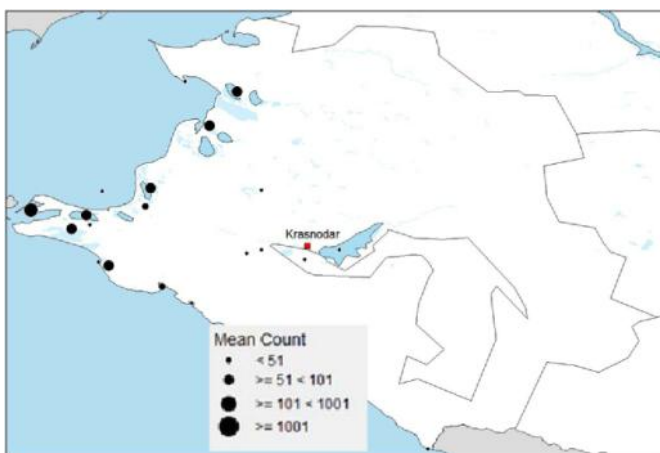


Figure 2. Distribution of Mute Swans in Krasnodar Province in January 2003–2016 (black dots indicate the mean count at each site).

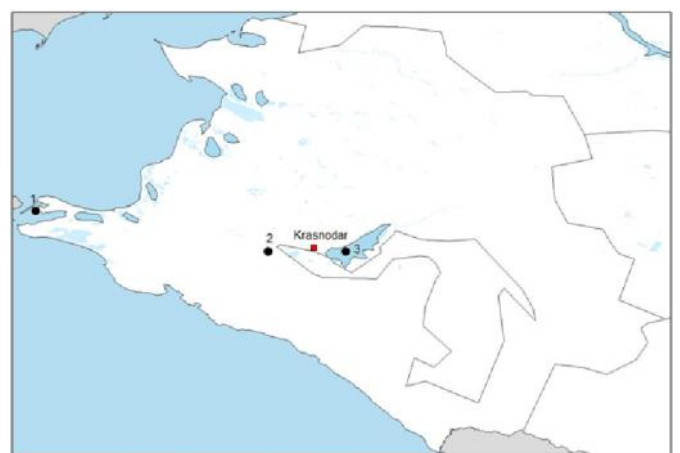


Figure 5. Distribution of Bewick's Swans in Krasnodar Province in January 2013–2016 (1 = Taman Bay, 2 = Varnava Reservoir, 3 = Krasnodar Reservoir) .

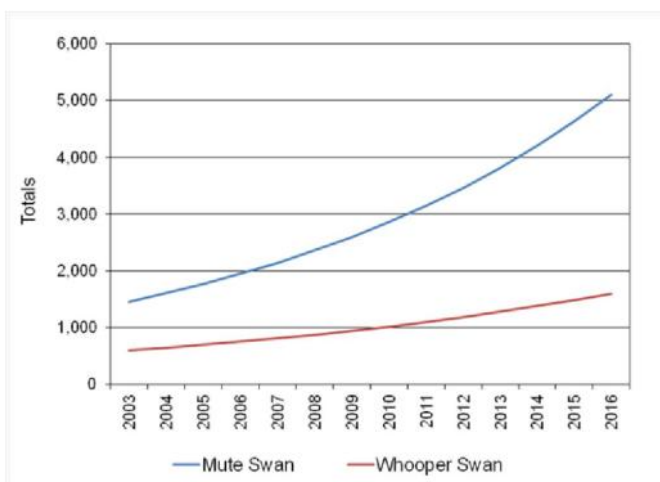


Figure 3. Trends in the number of Mute Swans and Whooper Swans wintering in Krasnodar Province during 2003–2016 .



Photo: Thomas Hinsche

Non-identified swans. We were unable to identify some swans to species level due to long distances, poor visibility (e.g. fog), or to the swan's head being hidden (e.g. under its wing). Non-identified swans were counted in 2005, 2006, 2010 and 2013–2016, mostly at the large Varnava Reservoir and at Taman Bay. The highest number of non-identified swans recorded was in 2006 (1,745 birds), of which most birds (840 individuals) were at Varnava Reservoir. We also counted 916 non-identified swans at Varnava Reservoir in 2013, and 900 swans were not identified at Taman Bay in 2010.

Overall, we found swans at 21 sites during 2003–2016. The total numbers varied from 825 in 2012 to 7,509 in 2015, with an average of $4,296 \pm 735$ individuals recorded. On comparing total swan counts made at individual sites, most swans (4,779 birds) were recorded at Taman Bay in 2016. Other important sites for all swans (i.e. with $\geq 1,000$ individuals recorded at least once) included the Primor–Akhtar wetlands (3,321 birds in 2015), Varnava Reservoir (1,060 birds in 2006) and the Anapa wetlands (1,018 birds in 2013). The Primor–Akhtar wetlands and Varnava Reservoir were frozen in some years, however, and apparently didn't have much importance for swans at these times. The broadest distribution of swans (across 13 sites) was recorded in 2006 and 2016 (see Table 1).

Discussion

The numbers of swans counted in Krasnodar Province varied from year to year, depending mostly on conditions at the sites (i.e. whether the water bodies were frozen) and, partially, on the availability of funds for undertaking the surveys. Fewest swans were counted in January 2012 (825 birds) and this can be explained by the fact that, firstly, the counts were relatively late (made from 20th January) in that year, and secondly, following a sharp drop in temperature, all of the wetlands quickly became frozen from 24th January onwards. Because of these extreme conditions we covered just five sites, some of them only partially. In January 2016, fog hampered counts at Taman Bay, and it seems that the swans were also underestimated at that key site in that year.

Mute Swans were the most numerous and broadly dispersed of the wintering swan species, whereas the Bewick's Swan was the rarest and least widespread swan species in Krasnodar Province. Nagy *et al.* (2014) estimated the Black Sea population of Mute Swans at 45,000 individuals and the N Europe & W Siberia/Black Sea & E Mediterranean Whooper Swan population at 14,000 individuals. The highest total counts of 6,994 Mute Swans and 2,560 Whooper Swans recorded during the IWCs therefore indicates that Krasnodar Province may hold up to 16% and 18%

Table 2. Bewick's Swan counts in Krasnodar Province during the IWCs: 2013–2016.

| Site name | 2013 | 2014 | 2015 | 2016 |
|---------------------|------------|-----------|----------|-----------|
| Taman Bay | 20 | 57 | 0 | 2 |
| Varnava Reservoir | 101 | 34 | 2 | 37 |
| Krasnodar Reservoir | 18 | 0 | 0 | 0 |
| Total | 139 | 91 | 2 | 39 |



Mute and Whooper Swans in Taman Bay (Photo: Alexander Solokha)

respectively of the relevant flyway populations. Defining the importance of Krasnodar Province for the Bewick's Swan flyway population is difficult because of uncertainty over the total numbers of this species wintering in the Black Sea – Mediterranean area. As shown in Figure 3, there appears to be positive trends numbers for both Mute and Whooper Swan wintering in Krasnodar Province, albeit this increase is more obvious for Mute Swans than it is for the Whoopers. At the flyway level, the trend estimates for the Mute and Whooper Swan populations are correspondently “Stable?” and “Increasing” (Nagy *et al.* 2014), though these analyses end in 2012.

Mild weather in January is a leading factor in supporting the mass wintering of swans in Krasnodar Province. Large natural and artificial wetlands provide them with a plenty of food. Additionally, swans seem to benefit from the good protection and low disturbance levels established in the Province following the closure of waterbird hunting season on 31st December. However, housing and other infrastructure development along the sea shores is causing the degradation of some important wetland habitats, including swan sites such as the Anapa wetlands and Taman Bay.

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Taman Bay in January (Photo: Alexander Solokha)