

Breeding Whooper Swans *Cygnus cygnus* in the Baltic states, 1973–2013: result of a re-colonisation

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Abstract

A review of the literature on Whooper Swans *Cygnus cygnus* breeding in the Baltic states indicates that the swans are recolonising areas where they once bred historically. In recent years, the number of breeding birds has increased from two pairs in 1973 to 600–670 pairs in 2013, though the growth rate has slowed in Latvia, and maybe also in Estonia and Lithuania. There was a clear latitudinal difference in the choice of breeding habitats: in Estonia, the Whooper Swans preferred bogs, lakes and coastal waters, while the vast majority of all pairs in Latvia and Lithuania were found in fish-pond complexes and wetlands associated with beaver dams.

Key words: breeding habitat, fish-pond complexes, latitudinal differences, population increase.

Intense year-round persecution through hunting, trapping and egg collection had a major adverse impact on Whooper Swans *Cygnus cygnus* in Europe until the early 20th century (Brusewitz 1971). Regional and national breeding populations became extinct or were pushed close to extinction in many countries, except in Iceland and Russia (Cramp & Simmons 1977). The Whooper Swan was exterminated as a breeding species in Greenland and the Faroe Islands in the early 18th century

(Winge 1898; Salomonsen 1963) and in south Sweden in the 1840s (Wallengren 1849). Legal protection of the Whooper Swan throughout Europe has halted and reversed the decline, and numbers of breeding pairs in the Northwest Mainland Europe population have increased since the 1950s (Lammi 1983; Svensson *et al.* 1999).

The Whooper Swan started to regain former breeding grounds, sometimes aided by releases and escapes, during the second

half of the 20th century (Svensson *et al.* 1999). The southward expansion of the breeding range eventually attracted interest into the question of whether the species was colonising new areas or re-colonising historical breeding grounds. This question became topical in the Baltic states (Estonia, Latvia and Lithuania) as the swans started breeding in these three countries. Bauer & Glutz von Blotzheim (1968) stated that there was no evidence for the species breeding historically in East Prussia (*i.e.* in southern Lithuania, Kaliningrad and northeast Poland), but gave no data for other parts of the Baltic region. The Whooper Swan has bred regularly in Latvia and Lithuania since 1973 (Lipsbergs 2000; Švažas *et al.* 1997) and in Estonia since 1979 (Luigujõe *et al.* 2002), but whether or not the species re-colonised a former breeding area was still an open question.

In this paper we therefore review published information on the incidence of Whooper Swans breeding in the Baltic states, with a view to assessing whether the Whooper Swan is recolonising its historic breeding range in these countries. National reports from Estonia, Latvia and Lithuania on Whooper Swans breeding in the Baltic states in recent years (Nedzinskas 1980; Švažas 2001; Luigujõe *et al.* 2002; Boiko & Kampe-Persson 2010) are also reviewed and up-dated to 2013, for a preliminary assessment of the current status of Whooper Swans breeding in the region. Similarities and differences between the three countries in the swans' distribution and choice of breeding habitats are also described.

Material and Methods

We made a thorough literature search for records of Whooper Swans breeding in the Baltic states before 1973. The search focussed on books and articles about the bird fauna of this part of Europe published in the 18th, 19th and 20th centuries, but also included a few biographies by Balt-German authors and all published drawings and descriptions by Johann Christoph Brotze (1742–1823); travel reports were not included in the search. Additionally, recent publications providing national estimates of the number of Whooper Swans breeding in Estonia, Latvia and Lithuania from the 1970s onwards were reviewed, along with unpublished records for 2013, to assess the development of the breeding populations in the Baltic states since the late 20th century. Ten estimates each for Estonia and Latvia and eight for Lithuania were available for the period 1973–2013, although none were based on a nation-wide survey. Population estimates were available for all three countries in only two years, in 1973 and 2013.

Whooper Swans may defend a new territory for one or two summers and not breed until the third or fourth year (Haapanen & Hautala 1991). This gives rise to two different estimates of breeding population size, namely: “territorial pairs” (occupying a site) and “nesting pairs” (those specifically with a nest). Throughout, estimates presented here refer to the number of pairs recorded with a nest during the national surveys in the Baltic states.

Whooper Swan breeding habitats in the Baltic states were grouped into five main

categories: fish-ponds (including multi-purpose ponds), bogs, lakes, beaver dams and coastal water bodies (for further descriptions of the different habitats, see Luigujõe *et al.* 2002; Boiko & Kampe-Persson 2010). Breeding habitats of lesser importance included flooded gravel pit workings, flooded meadows, drainage ditches and rivers. Habitat data were recorded for all nesting sites found in Estonia in 1979–2000, in Latvia in 2000–2013 and in Lithuania in 2008–2013.

Mean annual increases in the number of nesting pairs were calculated using the estimates at the beginning and end of the given time period. When the annual count estimate was given as an interval, the mid-point of the interval was used in calculating the rate of increase in numbers over time.

Results

Historic records

When the Whooper Swan ceased to breed in the Baltic states is not known. The species still bred in Lithuania in the 16th century; the Statutes of Lithuania (originally known as the Statutes of the Grand Duchy of Lithuania), which consisted of three legal codes published in 1529, 1566 and 1588, stipulated a penalty or a fine for destroying a Whooper Swan nest (the documents mention “swan”, but the species was identified by Nedzinskas 1980). Without specifying the species swans were reported to breed in the western parts of Estonia and Latvia in the late 18th and early 19th centuries, locally in large numbers (Fischer 1778, 1791; Beseke 1792; Brotze 1996). Descriptions and colour plates show that

the Mute Swan *Cygnus olor* was a well-known breeding species (Fischer 1778, 1791; Meyer 1815) but from the descriptions some of the breeding pairs might have been Whooper Swans (Fischer 1778, 1791). Later, the Whooper Swan appears to have bred at Lake Pape in southwest Latvia in the mid 19th century (Löwis 1893), probably at Lake Lubāns in eastern Latvia in the 19th century (Lamsters 1932), very likely at Lake Tāši in western Latvia in 1944 (Tauriņš & Vilks 1949) and certainly in the Nemunas River delta in Lithuania in 1965, 1967 and 1968 (Nedzinskas 1980).

Recent breeding numbers and distribution

More recently, four Whooper Swan nest sites were found in Latvia during the 1970s, with the first located in the western part of the country in 1973 (Baumanis 1975, 1980). Subsequent estimates of the number of breeding pairs indicate a steady increase in the Latvian population from 1979 onwards: 10–20 pairs in 1984, 20–30 in 1993, 50–100 in 1998, *c.* 150 in 2004, 170–200 in 2006, *c.* 200 in 2007, *c.* 260 in 2009 and *c.* 320 in 2013 (Priednieks *et al.* 1994; Strazds *et al.* 1994; Latvian Ornithological Society 1999; Boiko 2005, 2008, Boiko & Kampe-Persson 2010, and D. Boiko, unpubl. data).

The development of the breeding population in Lithuania differed markedly from that in Latvia. Despite Whooper Swans recommencing breeding in Lithuania in 1973, the same year as in Latvia, there was still only one breeding pair in the country 14 years later in 1987 (Butkauskas *et al.* 2012). During the following decade, the species started to breed in a number of fishponds,

inland lakes and peat-lands (Švažas *et al.* 1997, Jusys *et al.* 1999, Stratford 1999) but the total breeding population still numbered < 10 pairs (Švažas *et al.* 1997). It reached 15 pairs during the following three years (Švažas 2001). The main increase in the size of the Lithuanian breeding population took place after the turn of the millennium, from 15–20 pairs in 2001 to at least 30 pairs in 2007, at least 70 pairs in 2010 and 130–150 pairs in 2013 (Morkūnas *et al.* 2010, J. Morkūnas, unpubl. data).

Initially, the Whooper Swan population increased rapidly in Estonia, from one breeding pair in 1979 to at least five pairs three years later (Luigujõe *et al.* 2002). As no breeding was recorded in the years 1984–1986 and 1993–1994, Luigujõe *et al.* (2002) assumed that the development of the Estonian breeding population probably took place in waves. Available estimates of the number of breeding pairs might therefore give a slightly biased picture of the true development: about five pairs in 1982, 1991 and 1992, 10–20 pairs in 1997, 20–30 in 2000, 40–60 in 2002, 70–100 in 2009 and 150–200 in 2012 and 2013 (Lilleleht & Leibak 1993; Rees *et al.* 1997; Lõhmus *et al.* 1998; Luigujõe *et al.* 2002; Elts *et al.* 2003, 2009; Leho Luigujõe, *in litt.*).

Thus by 2013, the breeding population of Whooper Swans in the Baltic states was estimated to number 600–670 pairs in total: 150–200 pairs in Estonia, *c.* 320 pairs in Latvia and 130–150 pairs in Lithuania. The development to reach these numbers differed markedly among the three countries. From just 2 pairs recorded in 1973, the mean annual increase in the number of nesting pairs in the Baltic states during the period

1973–2013 therefore was 15.5%. The corresponding increase rates for each of the countries were 16.4% in Estonia (for the period 1979–2013), 15.5% in Latvia and 13.1% in Lithuania. The current rate of increase, expressed as the mean annual increase in the number of nesting pairs during the last “decade” (exact period within brackets), differ markedly among the countries: 12.5% in Estonia (2002–2012), 8.8% in Latvia (2004–2013) and 18.9% in Lithuania (2001–2013). In parts of Lithuania that were surveyed every year during the period 2008–2013, an even higher growth rate was recorded, though the year-to-year rate has declined, as it has in Latvia (Table 1).

In Latvia, the first pair of Whooper Swans bred in the western part of the country (Baumanis 1975), and this area has remained a stronghold for the species within Latvia (Boiko & Kampe-Persson 2010), supporting 87% of 278 sites where breeding

Table 1. Number of nesting pairs in parts of Lithuania that were surveyed annually and in the whole of Latvia in the years 2008–2013. Increase (%) in the number of nesting pairs from the year before is given in brackets.

Year	Lithuania	Latvia
2008	29	220 (10.0)
2009	45 (55.2)	260 (11.8)
2010	67 (48.9)	272 (4.6)
2011	79 (17.9)	294 (8.1)
2012	89 (12.7)	304 (3.4)
2013	101 (13.5)	320 (5.3)

was confirmed during the years 2000–2013, with 58% of pairs found in the districts of Liepāja, Talsi and Kuldīga. In Estonia and Lithuania, on the other hand, the Whooper Swan breeding sites are more widely dispersed across the country (Luigujõe *et al.* 2002; Kurlavičius 2006). The highest breeding densities in Lithuania are associated with the location of fish-ponds (Fig. 1) and a low rate of urbanisation. Apparently, it is mere chance that the species did not start to breed in other parts of Latvia much earlier.

All but a few Whooper Swan pairs in the Baltic states breed on small waters but the choice of habitats differs markedly among the countries (Fig. 1). The vast majority of all pairs in Latvia and Lithuania were found in fish-pond complexes and wetlands associated with beaver dams, whereas these habitats were rarely used in Estonia. Instead,

the swans in Estonia preferred bogs, lakes and coastal water bodies. The choice of breeding habitat in Estonia today is quite similar to that in 2000 (L. Luigujõe, pers. comm.). The proportion of the sites situated at man-made waters was 21% in Estonia, 75% in Latvia and 78% in Lithuania.

Discussion

The review suggests that Baltic states were once a part of the historical breeding range of the Whooper Swan, but it seems that the species started to disappear from these countries before it was recognised as being separate from the Mute Swan. Both species were persecuted and disappeared from the region at around the same time, with local populations of wild Mute Swans hunted to extinction in the Baltic states during the 18th–19th centuries (Ivanauskas 1959). The Whooper Swan might have survived as a

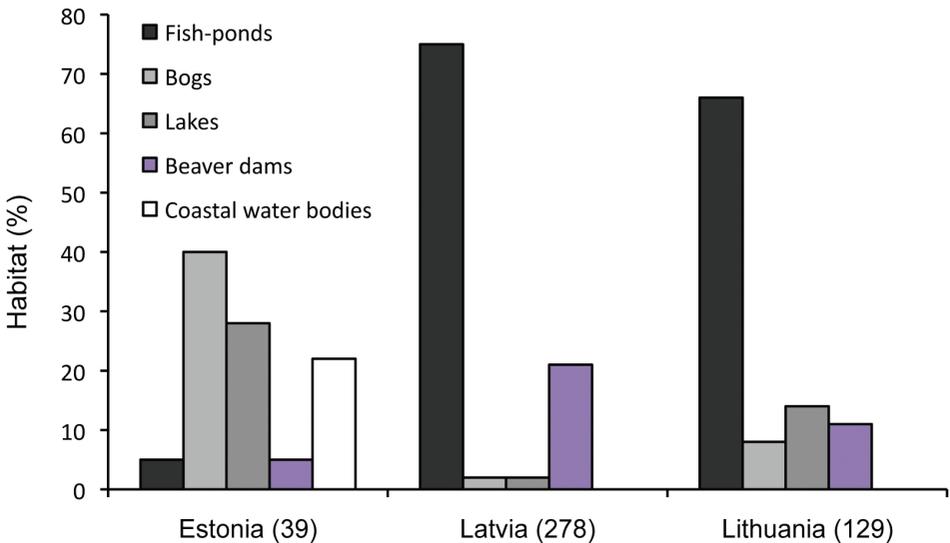


Figure 1. Nesting habitats recorded for Whooper Swans in Estonia (in 2000), Latvia (in 2013) and Lithuania (in 2013). Sample sizes are given within brackets in each case.

breeding species in a few inaccessible areas after the Mute Swan disappeared, but most likely the two species became extinct in the region at about the same time.

The Whooper Swan breeds on small water bodies in a wide range of habitats (Rees *et al.* 1997; Brazil 2003) but, around the Baltic Sea, they show large difference in habitat selection between countries. They are found mostly on small lakes with lush vegetation or in peat-lands and mesotrophic areas, especially in wet mires of the aapa fen type, in northern Sweden (Nilsson *et al.* 1998), Finland (Haapanen *et al.* 1977) and northwest Russia (Bianki 1981). The Whooper Swans show a strong preference for natural habitats, often nesting on small water bodies surrounded by forest in mid and southern Sweden (Holmgren & Karlsson 1982; Svensson *et al.* 1999) and also in Estonia (Luigujõe *et al.* 2002). In Latvia, Lithuania, Belarus, Poland and Germany, on the other hand, they mostly breed in fish-ponds or other small man-made water bodies (Vintchevski & Yasevitch 2003; Sikora *et al.* 2012; Axel Degen, pers. comm.; and this study). Small natural water bodies in Latvia and Lithuania are usually heavily overgrown and are therefore unsuitable for Whooper Swans. These water bodies have partly been replaced by artificial ponds and, in areas with intense agriculture, large fish-pond complexes provide the only wetland habitat suitable for breeding (Švažas & Stanevičius 2000). Fish-pond complexes provide good breeding and feeding conditions for Whooper Swans because they are extensive, comparatively shallow (depth of 1–2 m), fringed with scrub outgrowth of varying width, are subject to low human

disturbance levels, and food distributed for the fish is also taken by the birds (Boiko & Kampe-Persson 2010; J. Morkūnas, S. Švažas & R. Morkūnė, unpubl. data). The marked difference in habitat choice between Estonia and the other two Baltic states can partly be explained by a shortage of fish-ponds in Estonia. Due to the shorter growing season for vegetation, conditions for fish-farming, especially the growing of Common Carp *Cyprinus carpio*, are less favourable in Estonia compared to countries situated further south. The area used for fish-ponds is therefore much smaller in Estonia than in Latvia and Lithuania (530 ha, compared to 5,600 ha and > 10,500 ha, respectively; www.fao.org, www.zm.gov.lv, www.aquafima.eu). In contrast, with a Eurasian Beaver *Castor fiber* population of c. 20,000 individuals in Estonia (Glazko & Ulevičius 2011) there is no lack of beaver dams for the Whooper Swans to breed at in Estonia, and 5% of Estonian-breeding Whooper Swans nested at these sites (L. Luigujõe, *in litt*). The Eurasian Beaver populations in Latvia and Lithuania are even larger, numbering > 100,000 individuals and c. 120,000 individuals, respectively (Glazko & Ulevičius 2011), and their dams may create further breeding habitats for the swans in these countries.

Since the Whooper Swan began to increase in numbers and regain former breeding grounds in northwest Europe in the 1950s (Lammi 1983; Svensson *et al.* 1999) it has started to breed in Latvia, Lithuania and Poland in 1973 (Baumanis 1975; Nedzinskas 1980; Tomiałojc & Stawyrzyk 2003), in Estonia in 1979 (Luigujõe *et al.* 2002), in Germany in 1995 (Bauer & Woog

2008), in Belarus and Denmark in 2002 (Abramchuk *et al.* 2003; Grell *et al.* 2004) and in Hungary in 2005 (Szinai 2009). Mean annual rates of population increase ranging from 10.5–15.5% have been reported from most parts of this breeding range: in Finland 1950–1977 (Haapanen 1991), the Baltic states 1973–2013 (this study), northern Sweden 1975–1997 (Nilsson *et al.* 1998), mid and southern Sweden 1985–1997 (Axbrink 1999), and Poland 2007–2012 (Sikora *et al.* 2012).

Notwithstanding a substantial growth in the Northwest Mainland Europe population of Whooper Swans since the 1950s (Laubek *et al.* 1999), the number of breeding pairs in the countries of northwestern Europe is still increasing, though the growth rate might be slower than earlier, for instance in the core area of northern Sweden (Leif Nilsson, *in litt.*), in Latvia (this study), maybe also in Estonia and Lithuania (this study). The Latvian breeding population reached a period of marked increase much earlier than the other Baltic states, which may be one reason underlying the difference between countries in mean annual growth rate over the last decade, for instance if there is a shortage of suitable breeding sites in the core area of western Latvia. A marking programme from 2004 onwards, in which 672 cygnets from the core area were fitted with neck collars by 2012, has yielded only one case of dispersal abroad, however, a bird that bred in Lithuania (Dmitrijs Boiko, unpubl. data).

Axbrink (1999) suggests that the Swedish breeding population could reach 10,000 pairs, and the most recent estimate of the Swedish population is 5,400 pairs (Ottosson

et al. 2012). The Finnish breeding population, estimated at 5,000–7,000 pairs, is also still growing (Väisänen *et al.* 2011). Similarly, the Latvian breeding population will very likely continue to increase; given the availability of suitable breeding sites, especially in the eastern part of the country, the population has the potential to increase to 600 pairs (Boiko & Kampe-Persson 2010). Taking into account the current growth rate and the availability of suitable breeding sites, the Lithuanian population may reach 250–300 pairs in about ten years time. We therefore consider that programmes monitoring the numbers of breeding Whooper Swans should be maintained, ideally with future counts coordinated across the region, to provide further insights into the contribution made by breeding birds from different countries to the trends and distribution of Whooper Swans in the Northwest Mainland European population.

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