International Annual Bewick's Swan Age Count, 5-6 December 2015

Dear observers,

As was announced to you in early November, we organise the 34th Annual Bewick's Swan Age Count this coming weekend, 5-6 December 2015. We kindly invite you to participate. The age count will be held in the Baltic Republics (Estonia, Latvia & Lithuania), Poland, Germany, Denmark, The Netherlands, Belgium, France and the United Kingdom. Moreover, we will ask colleagues from Greece to join in and count the flocks that recently came to winter in the Evros Delta.

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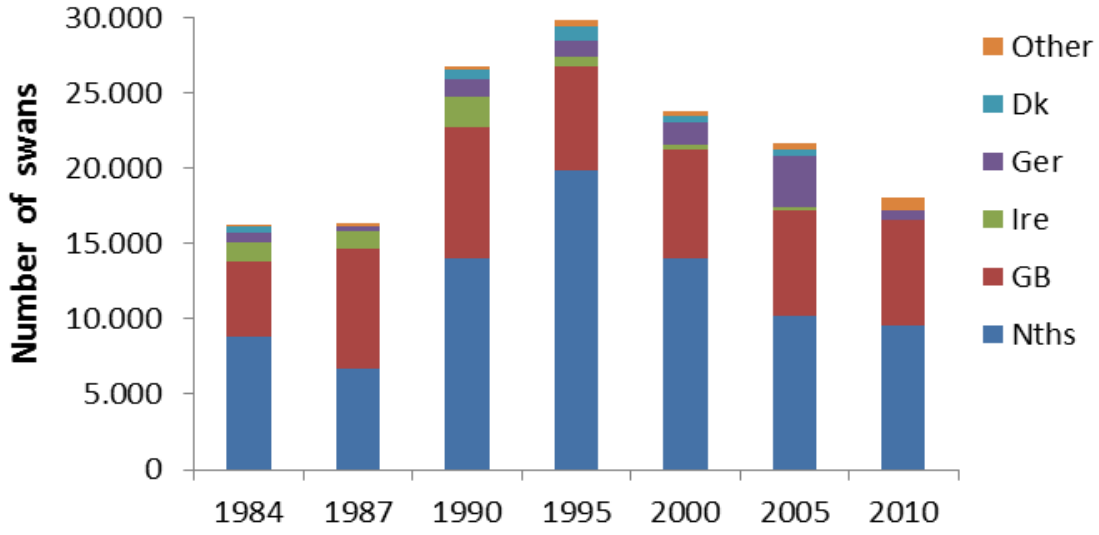
Monitoring a vulnerable arctic swan species

For conservation purposes, we monitor the NW-European population of Bewick's Swans in detail. This is important because the population of this arctic breeding species is historically small, and current trend analyses show that the population is in strong decline. In fact the population is down from 30,000 birds in 1995 to perhaps less than 20,000 now (Rees & Beekman, British Birds 2010, Beekman et al. *in prep*.). Recent information shows that Bewick's Swan numbers show an increase in southern parts of Europe (to 400 birds in the Camargue in France and more than 4,000 birds in the Evros Delta in Greece). Perhaps we are currently witnessing a partial shift in the winter distribution of this species, but a serious decline in numbers of the population is evident.



Bewick's Swan population trend, 1984-2010 (Beekman et al , *in prep*.)

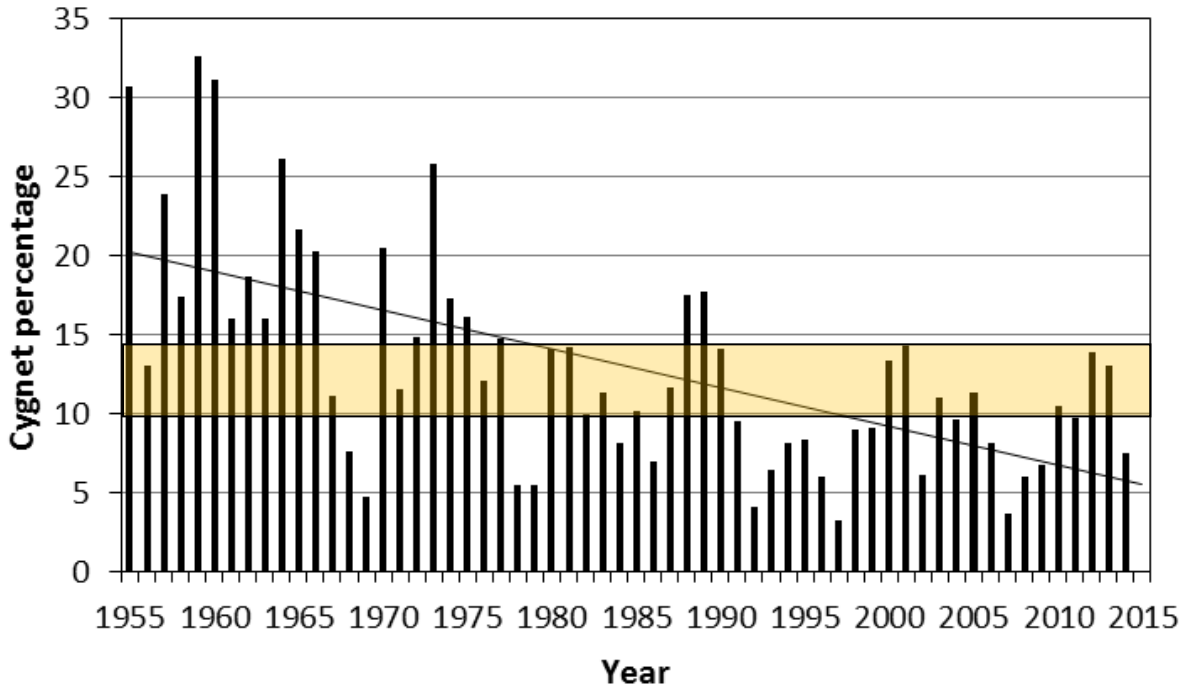
The results of the International Bewick's and Whooper Swan population Census held in January 2015 are currently being collected and will be used to further analyse the most recent trends in distribution and numbers.

The purpose of age counts

Every five years we monitor population size, and each year after the birds have arrived to the wintering grounds in W-Europe, we monitor breeding success. This is ongoing since 1982 and shows that there is strong variation in the number of cygnets raised each year, as well as in the number of successful breeding pairs.

Age counts are an important tool to understand fluctuations in population size. Together with data on mortality (by means of ring studies), we are able to make a population model and relate fluctuations with e.g. weather conditions in the Arctic breeding grounds, food conditions on stop-over sites etc.

Breeding success over the past 15 year has been very poor, on average ca. 7% juvenile birds in the population. As a result – with an adult mortality loss of 12% per year- the population size has on average declined by 5% each year. Not only low breeding success accounts for the decline in numbers. Bewick's Swans are still being hunted at a high level, given the fact that some 30% of birds captured and X-rayed in the UK carry gunshot in their bodies (Newth *et al*., Biological Conservation 2011).



Negative trend in annual breeding success (% cygnets) in Bewick's Swans, 1955-2013. The orange bar indicates overall annual mortality. (Beekman & Nolet, *in prep*.).

Conservation action

The NW-European population of Bewick's Swans is relatively small and thus vulnerable. Fortunately, the population is among the best-monitored waterbird populations, as population size is monitored every five years and breeding success is monitored on an annual basis. The results of this long-term monitoring programme are currently being analysed and have been presented at the Fifth International Swan Symposium in Maryland, USA, in February 2014. The conclusions will be used to help the implementation of the AEWA Bewick's Swan Action Plan. Meanwhile, it is important that monitoring of population size, breeding success and survival rates continues, so that we can come to a population model that will help understand which factors drive the population. Continued monitoring of population trends and demographic parameters is considered an essential priority to help protect the species.

Results of the 2014 age counts

In December 2014, 10,500 Bewick's Swans were aged, a very good response, so a great thank you to all volunteer and professional observers! Flocks were checked for cygnet percentages and brood sizes. The sample size was very good, some 60-70% of the current population was checked. Unfortunately the average cygnet percentage was rather poor at 7.5%, by far not enough to compensate for average annual mortality, which is estimated at about 12% (WWT). In late January 2015 we were also able to make an age count in the Evros Delta in Greece, with a good sample size of 1,900 Bewick's Swans. These birds are feeding on inundated rice fields on the Turkish side of the river Evros and showed a similar percentage of juvenile swans as Bewick's in NW-Europe, namely 9,7%. These figures can however not simply be added to those from the NW-European winter population, as we are not yet 100% sure about the origin of the birds in Greece and Turkey. In the table below you will find the results per country.

Country	Total number of swans checked	Number of adult birds	Number of cygnets	Cygnet percentage
Estonia	0	-	-	-
Latvia	0	-	-	-
Lithuania	0	-	-	-
Poland	0	-	-	-
Denmark	0	-	-	-
Germany	3602	3197	405	11,2
Netherlands	7049	6728	321	4,6
Belgium	401	335	66	16,5
France	18	14	4	22,2
UK	433	366	67	15,5
Total NW-Europe	**11503**	**10640**	**863**	**7,5**
Greece & Turkey	1902	1718	184	9,7
Total SE-Europe	**1902**	**1718**	**184**	**9,7**

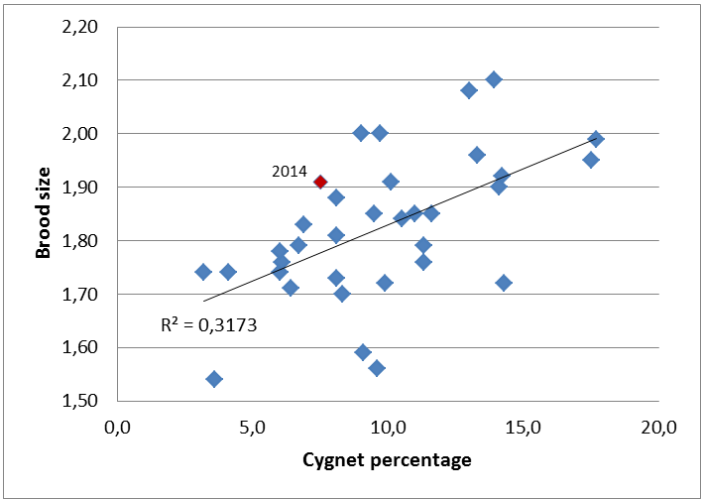
Of 268 successful pairs and 513 cygnets observed, the number of cygnets that they raised (brood size) was determined. So this was done for nearly 60% of all cygnets (total 863), a figure that is already better than in 2013 (40%). We hope to improve this figure in the near future and we need your help. Please take some time to determine brood size, also if flocks are large!

Brood size is an important demographic parameter, needed to calculate the number of successful breeding pairs each year. The annual number of successful pairs tells us more precisely what processes take place in the arctic breeding range in Russia and at stop-over sites during spring migration.

Average brood size was 1.91 cygnets / family. 76,5% of the pairs just raised 1 or 2 cygnets. Pairs with 3 and 4 cygnets comprised 22,0% of all swan families and only 4 broods of 5 cygnets were observed. We estimate that only some 600-650 pairs have bred successfully in 2014, much less than in 2013 when we estimated the number of succesful pairs at 1,100!

For comparison, in Greece we counted 102 broods in January 2015. Brood size ranged from 1-4 cygnets with an average of 1.80 cygnets per successful pair, rather similar to brood sizes in NW-Europe. The age count results from Greece and Turkey do not differ very much from those in NW-Europe. This could mean that birds in the Evros Delta originate from the same breeding range as the NW-European Bewick's Swans, as was also confirmed by three observations of neck collars in earlier years, but it is too early to draw final conclusions about the origin of the Evros Bewick's Swan winter flock.

As we can see below, annual variation in brood size is rather strong and has a significant correlation with overall breeding success or cygnet percentage. In years with very poor breeding success, average brood sizes are around 1,5-1,6 cygnets per successful pair. In such years, even broods with 4 cygnets are rare. In years with good breeding success, brood sizes can be as high as 2,0-2,1 cygnets per successful pair. In such years you may be lucky to encounter a brood of 5, 6 or even 7 cygnets!



Habitat and food choice

Of 90% of all swan flocks the habitat/food type was recorded. Bewick's Swans show a high variation in habitat / food choice, also between years. They prefer aquatic, submerged vegetation, but when these are depleted later in autumn, they often switch to arable land and (flooded) meadows. Bewick's Swans can be rather opportunistic in their food choice, closely following continuous changes in land use and subsidized crops, as well as variable weather conditions.

In 2014, some 60% of the birds were encountered on aquatic vegetation (*Chara*, *Potamogeton* etc.), a high percentage, which was mainly caused by very large flocks on the Dutch Border Lakes, totalling ca. 4,500 Bewick's Swans. The remaining 30% of all Bewick's swans were seen feeding on crop left-overs on arable fields and 10% on grassland. Most of the birds on crops were actually on maize stubble (21%) and on sugar beet, potatoes and oilseed rape, energy-rich sources on which they can easily replenish the body reserves after autumn migration. A further 10% were feeding on grassland in December 2014. Snow cover was not an issue in habitat choice, because temperatures were well above 0°C.

Annual variation in food choice is nicely illustrated when comparing December 2012, 2013 and 2014. In 2014, the proportion of Bewick's Swans feeding on submerged aquatic vegetation was three times the proportion in that habitat in 2013, whereas the proportion of birds feeding on maize in December 2014 decreased strongly as compared to the previous year.

FOOD CHOICE	**2012**		**2013**		**2014**	
	number	percentage	number	percentage	number	percentage
aquatic vegetation	4859	45	2303	22	6134	59
maize stubble	2781	26	5208	50	2143	21
sugar beet etc	2531	23	2561	25	1050	10
grassland	682	6	244	2	1046	10
TOTAL	**10853**		**10316**		**10373**	

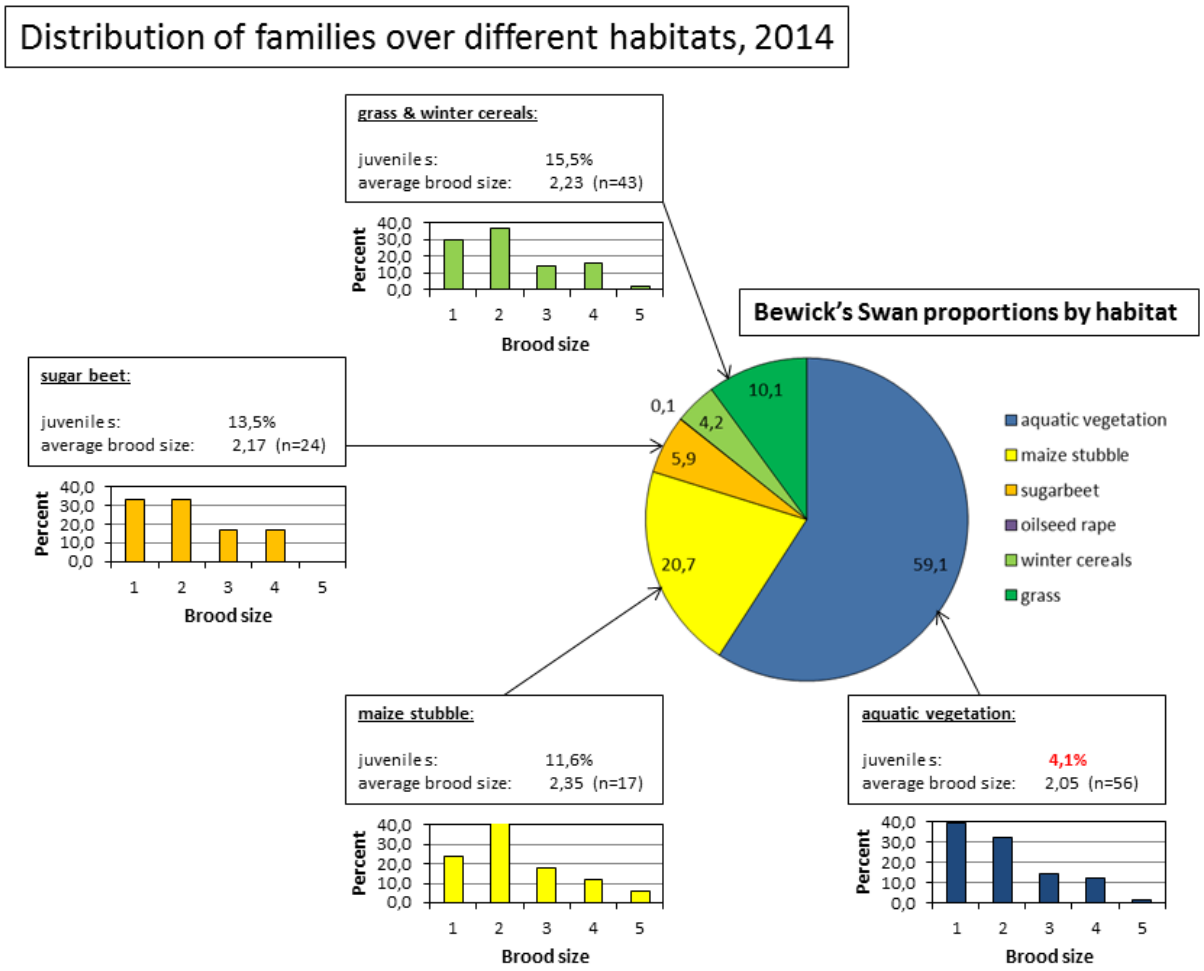
Food choice is clearly determined by the swans' preference, but also by availability of e.g. crop left-overs, which in turn are determined by date of ploughing by farmers and by arrival date of the swans themselves. In mild years, farmers may plough early and swans may arrive late, so that they have difficulty finding crop left-overs. Similarly, for submerged vegetation, Bewick's Swans may find pondweeds and stonewort depleted by other herbivorous waterfowl such as Mute Swans, Coot etc when they arrive to their winter quarters in late November.

Uneven distribution of cygnets and brood sizes over habitat types?

The cygnet percentage in different habitats can be highly variable. Especially in aquatic habitats with stonewort Chara spec., the proportion of young birds is usually extremely low. We believe this has a morphological or physiological background, since Chara plants have a silica skeleton which makes out nearly half of the plants biomass. Therefore, swans have to ingest twice as much food to aquire their energy intake and this large amount of plant biomass may be too much for young swans whose stomach is not completely developed yet. It must be noted that studies of Bewick's Swans feeding on on pondweed Potamogeton show that initially swan families do feed there, but they leave well before this food source is depleted. This may have to do with competitive behaviour between swans snd the fact that it becomes difficult for families to defend food sources that become more and more patchy.

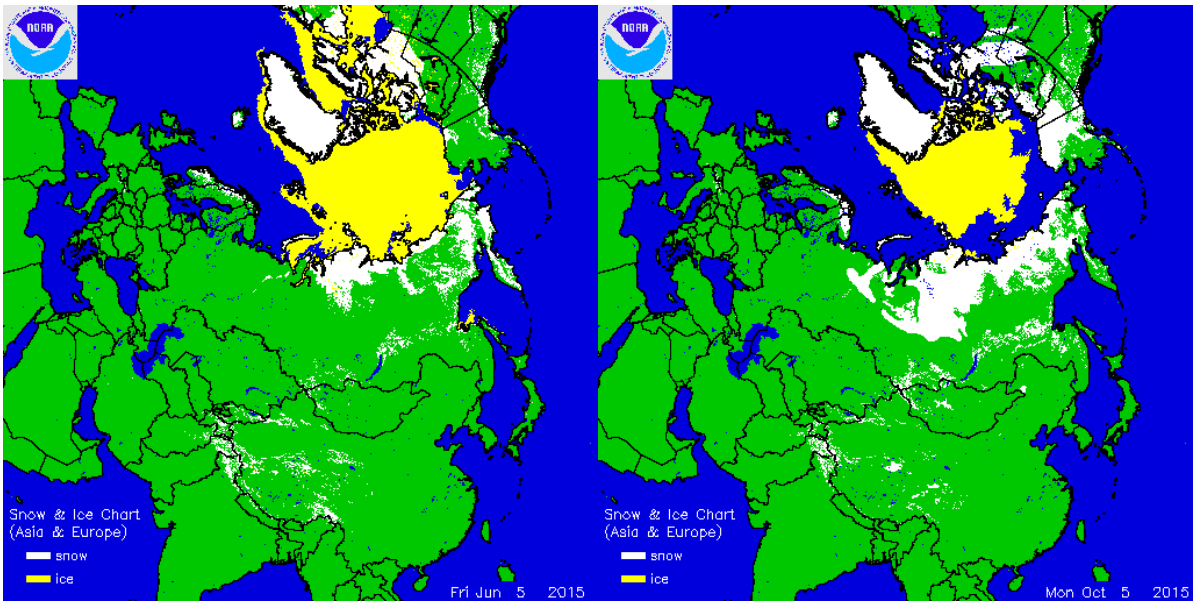
Cygnet percentages on arable field with crop left-overs do probably not differ significantly from percentages on winter wheat or on grassland, although this has tob e tested.

If we look at the relative distribution of brood sizes in different habitats, then it seems that in aquatic habitats there are more small families with only one or two cygnets, and larger families are more scarce. For other habitats/food types, we see differences, but these are probably not significant, given (too) small sample sizes.



Breeding success in 2015, a sneak preview

Winter 2014-2015 was again mild throughout Europe. Many Bewick's Swans stayed in Germany during the winter, instead of migrating further tot their traditional wintering areas in the Netherlands and UK. Satellite images showed us that spring was very early in the Baltic region too. In mid-March the Finnish Gulf was free of ice and in early May, the White Sea was snow and ice-free too. We suppose Bewick's Swans were able to migrate northwards rather early, but they then were probably held up by snow conditions in the tundra. Only around the 5th of June the Pechora Delta in Russia became free of snow and ice. Those are rather normal dates for the onset of egg-laying in Bewick's Swans. However, having to wait for 1-2 weeks in the White Sea or on the tundra with scarce food availability may have had an adverse effect on stored body reserves. We do not know how strong this effect has been, but we hope to find this out soon. First winter snowcover in the tundra came not until 5 October, so cygnets probably had enough time to fledge and prepare for autumn migration to the southwest.



Autumn migration and current weather conditions

The breeding range along the coasts of the Barentz Sea started to become snow covered in the second week of October. The first Bewick's returned to the Netherlands in early October. By October 18th, some 400 birds were seen in Lauwersmeer, in the northern part of the Netherlands. Thereafter, numbers increased only very slowly and cygnets proportions remained very low in the Netherlands. Also in the Baltic region and in Germany, flocks had rather few cygnets. In Germany, birds are mainly feeding on maize stubble, but also other sources are being used. In the Netherlands we have only small flocks on land and about 3,000 Bewick's Swans feeding on Chara in the Border Lakes, with few families. Therefore, it is important to count as many flocks as possible, of all different sizes and in an wide range of habitats. Especially small flocks often consist of family-parties with young and are easily overlooked.

Temperatures were slowly dropping mid-November, but they are now again rising to above-average. We know that many many birds are still in Germany and even further northeast. We do not expect more Bewick's to move to The Netherlands and UK soon. Therefore, observers in Germany and Poland are especially encouraged to go out and find lots of Bewick's Swan flocks. Please take notice not only of the number of cygnets in flocks, but also take some time, if possible, to record brood sizes.

We wish you lots of success this coming weekend or later a bit later if neccessary. Thank you in advance for your efforts, which we highly appreciate. We look forward to the reports of your field trips, either the coming weekend or in the days around the weekend. Please send your results to the addresses below.

With all best wishes,

Jan Beekman & Wim Tijsen

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BEWICK'S SWAN

Cygnus bewicki, Yarr.