Distribution within the USSR of Bewick's Swans *Cygnus columbianus bewickii* marked in Britain

EILEEN C. REES

Between 1967 and 1989, 1,511 individual Bewick's Swans wintering in Britain were marked with plastic leg-rings and, in some years, yellow dye on the tail and wing-tips, in order to determine their migratory sites and breeding areas within the USSR. Sightings and recoveries of marked Bewick's Swans indicated that birds wintering at Slimbridge, Gloucestershire, GB and at Welney, Norfolk, GB migrate along the Baltic coast, traverse Karelia and Vologda on a broad front, and follow the north coast of the USSR to their breeding grounds. Two birds were recovered well outside this range; one in Perm, on the western side of the Ural mountains, and the other in Astrakhan. Of 68 reports of marked birds from the USSR, 36 (52.9%) were from Estonia and 9 (13.2%) were from the Pechora region. The group of Slimbridge-marked birds in the Pechora part of the breeding range suggests that these birds may perhaps form a sub-population that winters in Britain, although the results could also reflect regional differences in accessibility for human observers or a high density of Bewick's Swans breeding in the area.

The Bewick's Swan, *Cygnus columbianus bewickii* is a wholly migratory species that breeds on the arctic tundra of the Soviet Union. Two main populations occur; swans that breed on the western tundra migrate to NW Europe to winter whilst swans from the eastern parts of the breeding range migrate to wintering areas in China, Japan and Korea (Ogilvie 1972a, Kondratiev & Kistchinski 1984). The degree of overlap between the two populations has not yet been established. The distribution of the western population in winter has been monitored closely in recent years to identify areas of importance for the species; 64% of the swans were concentrated on just 40 sites (Monval & Pirot 1989), but the passage of swans through the USSR in spring and autumn has not been considered in such detail.

Since 1967 Bewick's Swans caught in Britain have been marked with plastic leg rings, each engraved with a unique letter or number code which can be read at distances of up to 300m (Ogilvie 1972b). Reports of ringed birds are used to determine the breeding grounds, migratory routes and changes in the wintering sites used by individual birds. Evans (1982) made a preliminary analysis of the movements of Bewick's Swans ringed at Slimbridge, Gloucestershire, concentrating mainly upon reports received from the Netherlands, Germany and Denmark. This paper considers sightings and recoveries of ringed birds from the Soviet Union with a view to identifying migratory sites close to the breeding grounds. The distribution of British-marked swans in the breeding range is reported for the first time and the question of whether sub-groups occur within the population is addressed.

Methods

Between the 1967-68 and 1988-89 winters (inclusive) 1,511 different Bewick's Swans were ringed at Wildfowl & Wetlands Trust centres; 1,321 at Slimbridge, Gloucester; 144 at Welney, Norfolk; 39 at Caerlaverock, Dumfriesshire; and 7 at Martin Mere, Lancashire. Each bird was marked with a 35mm high plastic leg ring, engraved with an alphabetical or numerical code, on one leg and a smaller metal ring, issued by the British Trust for Ornithology upon the other leg. A further 57 individuals caught prior to the 1967-68 season were allocated metal rings only. Most of the swans were caught in large traps or "swan-pipes", as described by Evans (1982). Swans caught at Slimbridge were also marked with yellow picric dye on the primaries and tail-feathers between 1970-73, 1976-79 and in January 1987, to attract the

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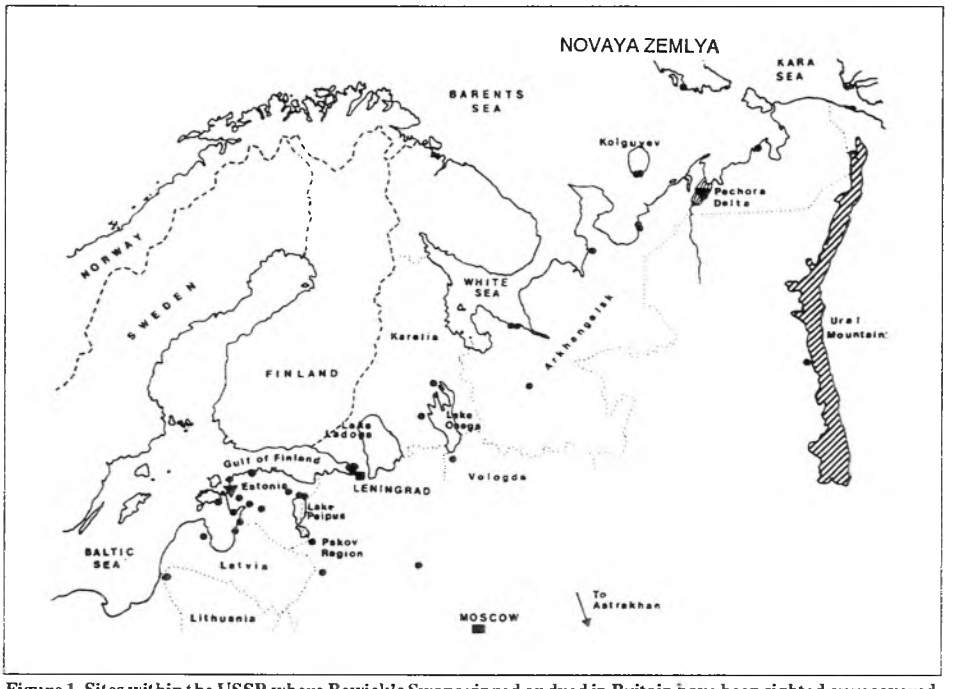

Figure 1. Sites within the USSR where Bewick's Swans ringed or dyed in Britain have been sighted or recovered. ● = 1 swan; ▼ = 5+ swans.

attention of observers at other sites, thereby increasing the chances of birds being identified within the Soviet Union. Rings recovered from dead birds and sightings of marked Bewick's Swans in the field were reported from the USSR either by the observer or by the Moscow Ringing Centre.

Results

Between 1967 and 1988 38 Bewick's Swans marked at Slimbridge and one marked at Welney were identified within the Soviet Union. Twenty five of the records were ring recoveries and 14 were swans seen in the field. One individual (BTO ring Z29433) was reported on two occasions - it was first seen at Matsalu Bay with a yellow-tailed mate and three yellow-tailed cygnets on 14 April 1977 (only one family was marked in this way during 1977) and was found dead at the same site in April 1983, having spent the 1982-83 winter at Slimbridge. A further 29 swans with yellow-dyed tail and wing-tips but whose rings were not read were also sighted; 22 in Estonia and 7 in the breeding range. These birds were all known to have spent the previous winter at Slimbridge since the dyed feathers are replaced during the annual summer moult, but the identity of the individuals was not ascertained.

The distribution of the 29 yellow-dyed swans and the 39 birds identified by ring number is illustrated in Figure 1. A high proportion of the marked birds were reported in Estonia (36 individuals, 52.9% of all marked birds recorded in the USSR), compared with just one ringed bird reported from Latvia and two from Lithuania. Matsalu Bay in western Estonia, a site of international importance for Bewick's Swans where some 2,000 individuals have been counted during spring migration in recent years (V. Paakspuu pers. comm.) yielded more records of Slimbridge-marked birds than any other site in the USSR - at least 18 unidentified dyed birds and five known individuals were seen on the reserve. (Fig. 2.) The earliest arrival date in the Baltic States for swans known to have spent the previous winter in the British Isles was 18 April, with dyed birds being seen at Matsalu Bay as late as 5 May. This agrees with the observation that Bewick's Swan migration through Estonia usually occurs between mid April and the first week in May (V. Paakspuu, pers. comm.).

Nine marked Bewick's Swans were reported between the Baltic States and the breeding range, including three in the Finnish Bay/Primorsk region near Leningrad (Fig 1). Between 8-10

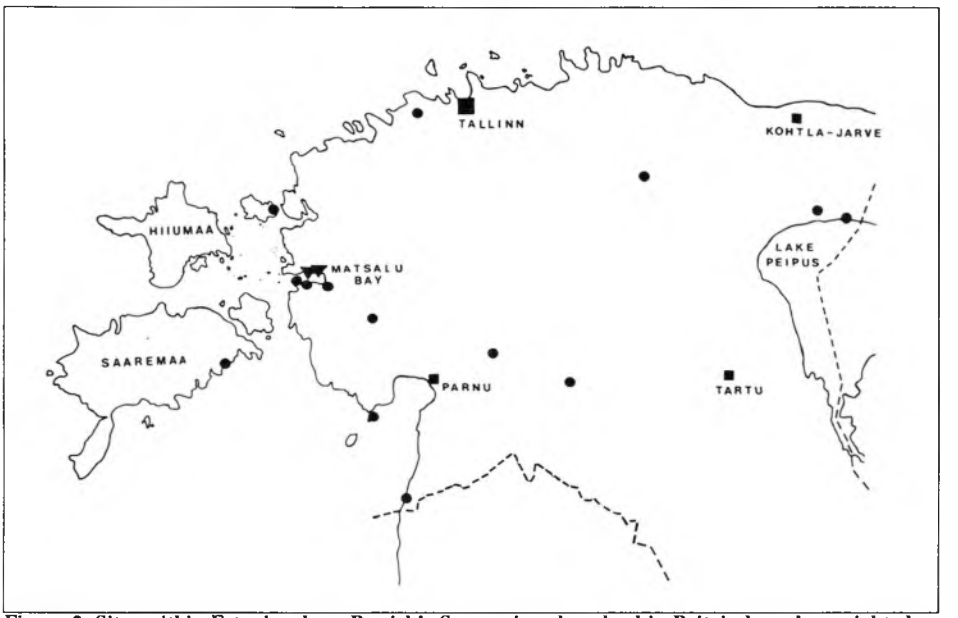

Figure 2. Sites within Estonia where Bewick's Swans ringed or dyed in Britain have been sighted or recovered. ● = 1 swan; ▼ = 5+ swans.

May 1988 305 Bewick's Swans were observed (by the author) feeding and sleeping along the shore of Finnish Bay. Swans migrating through the area on 10 May arrived from the west, along the Gulf of Finland, then headed inland in a north-easterly direction towards the Karelian ASSR. Six birds were recovered between the Gulf of Finland and the breeding range: one from each of Shimozero, western Vologda; Nizhniy Bessovets, Shuya, Karelia; near Medvezh'yegorsk, Karelia; and at Plesetsk, Arkhangelsk; and two from the Severodvinsk area, Arkhangelsk. It is not known whether three further birds reported in Arkhangelsk; two at Volonga and the other at Nes, were still on migration or whether they had arrived at their breeding territories. A dyed bird seen near Volonga on Cheshskaya Bay was present from 18 to 27 April 1979, however, and presumably had not started to nest at this early date (Yu. Shchadilov and V. Orlov pers. comm.).

Of the total of 13 marked birds sighted in the breeding range nine were reported from the Pechora Delta region, including four dyed swans and five ringing recoveries: 13.2% of all records of marked swans received from the USSR (Fig. 1). The dyed birds were reported between 25 May and 1 June in the 1977 and 1978 seasons (Yu. Shchadilov and V. Orlov pers. comm.) and are thought to have reached their nest sites. One Slimbridge-marked Bewick's Swan was also sighted on the tundra at Varandey in the Nenetski Nats. Okrug; one at Yuzhniy Ostrov, Novaya Zemlya; and two at Bugrino, Kolguyev Island (Fig. 1).

Only five of the 68 ringed and dyed Bewick's Swans recorded in the USSR were seen outside the Baltic States, Karelia/Vologda and Arkhangelsk regions. Two of these birds were recovered in the Pskov area and one at Vyshniy-Volochek, Kalinin. The fourth individual was found near Krasnovishersk, Perm, on the western side of the Ural mountains, and the fifth was recovered some 1,100 kms south-east of Moscow at Cherny Yar in Astrakhan. Although these last two swans were originally ringed at Slimbridge they appear to have changed their migratory route and may have joined the small group of Bewick's Swans that winter near the Caspian Sea. Both were young unpaired birds at the time of their respective visits to Slimbridge - one was recorded as a yearling and the other was in its third winter when last seen in Britain.

Discussion

Reports of marked Bewick's Swans from the USSR indicate that the birds generally follow the Baltic coast-line during migration, although a number of birds were recorded further inland in Estonia. The high proportion of marked birds

seen in Estonia suggests that Estonian wetlands are important staging areas for the birds, but an organised survey with improved and unbiased coverage would be necessary to confirm the identity of the main sites used by swans migrating through the Baltic. Once the swans have passed the Baltic States comparatively little is known about the migration route to the breeding range. The Karelian ASSR provides not only the shortest route from the Gulf of Finland to the White Sea but also includes some 60,000 lakes which may provide suitable resting places for the swans. The three Karelian ringing recoveries were all obtained from different areas, which supports the view held by some Soviet ornithologists that Bewick's Swans may traverse Karelia on a broad front and do not concentrate at any one site (T. Chochlova pers. comm.), before following the north coast of the Soviet mainland to their nests. The cluster of Slimbridge-marked birds seen on the Pechora Delta may perhaps be due to a sub-population of Gloucestershire swans congregating in the Pechora region, although the results could merely reflect regional differences in accessibility of areas of the tundra for observers. Bianki and Shutova (1984) and Minyev (1991) indicate that there is a high concentration of birds nesting in this area but variation in breeding density alone would not account for the lack of ringed sightings from other parts of the the European breeding range also favoured by the swans, such as the Bolshezemelskaya tundra, the Senyakna basin of the Malozemelskaya tundra and the Yugor peninsula. Studies of Whooper Swans have shown that swans do not form discrete herds maintained throughout the year (Gardarsson 1991, Rees 1989), although there is some evidence for such groupings in Greenland White-fronted Geese (Owen *et al.* 1986).

Two ringed birds were reported outside the Baltic-Karelia-Arkhangelsk route to the breeding range; one in the Perm region and the other in Astrakhan, which suggests that there may be some interchange between the Bewick's Swan population that winters in NW Europe and the group that winters on the Caspian Sea. Other authors have shown a similar interchange between the eastern and western populations; Bewick's Swans marked with neck-collars on the eastern tundra mostly migrated to Japan but one was sighted on the Pechora Delta and another in Estonia (Kondratiev & Kishchinski 1984; Shchadilov & Orlov 1984). Both the Slimbridge-ringed birds that changed their migratory routes were recorded as sub-adults whilst wintering in Britain and it is possible that young swans are more likely to transfer to another wintering area. Further ringing of Bewick's Swans on the tundra, combined with further observations on the tundra of birds marked at their wintering sites, may determine the extent to which swan populations that follow separate migratory routes overlap in the breeding range.

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Eileen C. Rees, Wildfowl & Wetlands Trust, Slimbridge, Gloucestershire, GL2 7BT, England.