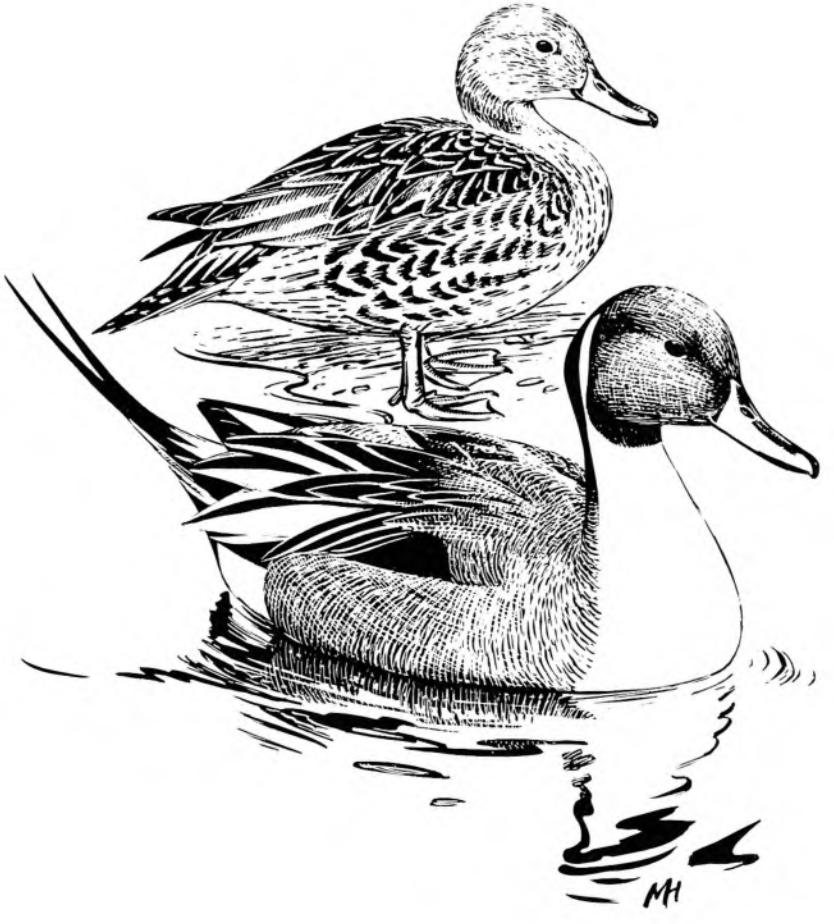
PROGRESS REPORTS



Bewick's and Whooper Swans *Cygnus columbianus bewickii* and *C. cygnus*: the 1992-93 season

JONATHAN M. BOWLER, LINDA BUTLER and EILEEN C. REES

The first Bewick's Swans of the winter arrived early, with a singleton at Welney and eight birds at Martin Mere on 8 October, followed by a single swan at Slimbridge on 13 October. Thereafter, the build-up in numbers was slow throughout October and November, with large influxes not occurring until the end of December. The weather was generally mild during autumn and early winter, which did not encourage a rapid westerly movement of birds from the continental mainland. Mass migration of Whooper Swans did occur early, however, with a large influx from Iceland in late October and early November resulting in high autumn counts at Caerlaverock, Martin Mere and Welney.

The number of Whooper Swans wintering at Wildfowl & Wetlands Trust reserves continues to rise. The 856 Whooper Swans present at Welney during a cold snap on 28 February was both a new reserve record and the largest concentration ever recorded in England, whilst 666 Whooper Swans at Martin Mere on 23 December was the highest number ever counted at that site. Counts of Bewick's Swans were also comparatively high on the Trust's reserves, despite low numbers of cygnets this winter, with 5100 recorded on the Ouse Washes as a whole on 16 February (including 2004 at the Welney refuge), 764 at Martin Mere on 4 February and 329 at Slimbridge, also on 4 February. These high numbers are the rewards of intensive reserve management, benefitting the birds by providing safe, undisturbed roosts with adjacent grazing nearby and supplementary feeds of grain and potatoes.

The proportion of cygnets recorded at Welney, Martin Mere and Slimbridge indicated that the breeding season had been a poor one for Bewick's Swans, with only 3-5% juveniles in the population. The Whooper Swans fared better with estimates ranging from 13-14% in the herds at Welney and Martin Mere, whilst 9.1% juveniles were found among 173 Whooper Swans counted at Caerlaverock on 21 December.

Review of the season at Trust Centres

Slimbridge

The first Bewick's Swan to visit the New Grounds was a lone bird named "Auberon" which arrived on the very early date of 13 October. It headed straight for a pen in the collection containing two captive Bewick's Swans, where it had spent much of the previous winter, and was joined by a further three wild birds on 22 October. The build-up in numbers at Slimbridge was exceptionally slow with just nine birds present on 31 October increasing to 40 on 10 November. Extensive flooding at the Walmore Common Ramsar site, some 10 km north of Slimbridge, following unusually heavy rain during November, lured away most of the small number of birds that had reached Slimbridge. Subsequent arrivals of new swans to Gloucestershire throughout November and into December went mostly to Walmore and not to Slimbridge, with numbers there increasing gradually from 17 on 15 November to 41 on 1 December. A 'swanfall' in early December resulted in numbers on the Common rising to 123 on 15 December and to a peak of 163 on 21 December.

Meanwhile at Slimbridge, 'Swan Lake' remained unusually quiet. A small group of 18 birds stayed to feed in the pools of the collection and roosted on the new South Lake dur-

ing the second half of November. In December, some of the Walmore birds returned to Slimbridge to make use of flooded pasture at the Moors, a traditional feeding site some 2 km to the south of the Centre, and numbers in the Slimbridge area crept up to 46 by 6 December. An adult Whooper Swan arrived on 6 December and spent four days with the Bewick's Swans before moving on.

Slimbridge also received some of the birds reaching Gloucestershire in early December; counts at the site reached a total of 69 on 15 December, but numbers then dropped as birds transferred to the flock at Walmore. Sub-zero temperatures at the end of December caused the floodwaters at Walmore to freeze, however, and most of the birds returned to Slimbridge on Christmas Eve. Some 201 Bewick's Swans were recorded at dusk at Slimbridge on 28 December, and none remained at Walmore Common. Numbers continued to rise into the New Year as the cold weather encouraged swans to move westwards from the continent; a total of 257 was recorded at midday on 7 January. A second adult Whooper Swan was identified amongst the Bewick's on this last date and remained a regular visitor to 'Swan Lake' for the rest of the winter. It arrived in poor condition, suffering from a broken leg, but made a rapid recovery following an injection of antibiotics during the swan-catch on 3 February.

The number of Bewick's Swans decreased at Slimbridge during January as heavy rain mid-month again produced extensive flooding at Walmore Common, with numbers there reaching 55 on 19 January and 160 on 28 January. The rate of water run-off from the Common was unusually rapid however; the floods had all but disappeared by 31 January and the swans moved away since they no longer had a safe roost. Not all of these birds returned to Slimbridge; some moved north up the Severn Vale to Ashleworth Ham, where up to 88 birds were present in early February, while others were identified by their leg rings in flocks along the River Wye near Hay-on-Wye.

Numbers at Slimbridge meanwhile continued to rise with the arrival of new birds in the area and a mid-day count on 26 January found 327 birds at the New Grounds. Roost counts were usually lower than this, however, with some 250 birds recorded in the Rushy Pen and the collection at dusk. The remainder were observed using the new South Lake, flying out to the fields at first light and returning after dark, proving difficult to count. There were few new arrivals in February and numbers remained stable at around 320 birds all month. A count of 329 birds on 4 February was the highest count of the winter, slightly up on the 322 recorded in the 1991-92 season. The onset of spring migration was later than normal, possibly due to cold weather in early March, and 324 birds were still present on 3 March. The first big departures occurred on the evening of 8 March under clear skies and a full moon. Numbers dropped to 242 on 9 March but remained high mid-month with 160 birds still present on 16 March. South-westerly 'tail' winds and clear evening skies encouraged further departures during the third week of March, with groups typically leaving Swan Lake at around 18.00 h. Some of these birds were observed later, calling noisily, flying northwards over Frampton and Fretherne, apparently following the course of the Gloucester-Sharpness canal. By 21 March numbers had dropped to 36 and just 6 Bewick's Swans remained on 23 March.

Sadly, a number of Bewick's Swans that visited Slimbridge regularly for many years were not recorded this season. Two of our oldest birds, "Lyre" and "Flue", were both at least 26 years old when they returned last winter, but were not observed during the 1992-93 winter. They therefore equal the longevity record set by "Prongy". Interestingly all three of these birds were female. Other old favourites such as "Kaka", "Standfast" and "Lorenz" also failed to appear. "Casino", who visited Slimbridge for her 22nd successive winter, is now the oldest swan known to be still alive.

A total of 398 individual Bewick's Swans was recorded at Slimbridge, indicating that the turn-over during the winter was lower than usual. Only 15 (3.8%) were juveniles, which suggests that 1992 was an exceptionally poor breeding season. The mean brood size was also low, at 1.88 cygnets per family. The proportion of new birds at the site was an average figure; 206 (53.8%) of the adults and yearlings had been recorded at Slimbridge in previous years.

Three swans that had been ringed at Martin Mere appeared during the course of the winter; one was a yearling and two were third winter birds including "Bowler", who had returned for a second consecutive season at Slimbridge. One of the 330 Bewick's Swans marked with neck-collars in the Russian arctic in 1992 appeared briefly on 1 January; a

second neck-collared bird, marked in the Netherlands in 1991-92, appeared on 5 January and remained until 17 March. A further 57 swans ringed at Slimbridge were not seen at the site during 1992-93 but were reported elsewhere. These included 24 at Welney, seven at Martin Mere (of which three had been seen earlier at Welney), one in Kent, two in Ireland, 22 in the Netherlands, one in Denmark, two in Germany and one in Estonia.

Welney

A single Whooper Swan and a single Bewick's Swan both reached the Welney reserve on 8 October, an early arrival date for the Bewick's Swan but not for the Whooper. The Whooper Swan flock built-up rapidy during the first half of the month, and 235 birds were counted on 16 October, the highest number ever recorded so early in the season at Welney. Bewick's Swan counts were much lower at this stage, with only 92 birds present on 16 October, but 320 Whoopers and 640 Bewick's Swans were recorded by the end of the month.

Heavy rainfall in late summer and early autumn resulted in extensive flooding over the entire length of the washes; no land was visible for much of the winter. There were very few ridges or islands available as roosting sites, and it was difficult or impossible for the birds to feed on the washes since the water was so deep. The birds mainly sought shelter from the banks and willow trees overnight. The surrounding arable land was also very wet and, although the sugar beet crops had been lifted, the remains had not been ploughed into the ground, which provided a good food supply for the swans throughout the winter season.

The swans continued arriving at Welney in early November, and the mid-monthly count on 16 November found 1972 Bewick's and 637 Whooper Swans, an exceptionally high Whooper Swan total for the time of year. Count conditions were not favourable as the flood had dispersed swans over a wide area. A survey of swans feeding in the fields and in front of the observatory was made on 19 November. Of 625 Whooper Swans sighted 82 (13.1%) were cygnets, whilst just 34 (5.2%) of 655 Bewick's Swans were juveniles. Of 37 Whooper Swan families recorded, one was of six cygnets, one of five cygnets and three of four cygnets (mean brood size was 2.2 cygnets). Mean brood size for the 21 Bewick's Swans families was just 1.6 cygnets per family; there were two families with three cygnets, nine with two cygnets and 10 had one cygnet. The largest Bewick's Swan family recorded at Welney during the winter had 4 cygnets.

Several of the Whooper Swans had been recorded at Welney in previous years, including "Cod" who was first ringed at Welney in 1984 and re-ringed in Iceland in 1991. "Nordic", originally ringed at Skagafjordur, Iceland as a cygnet in 1988, and recaptured at Myvatnssveit, Iceland in summer 1992 (together with her family) returned for her fifth consecutive winter at Welney together with an Icelandic-ringed mate named "Flaxen" and one cygnet. A number of Bewick's Swans originally ringed at other Trust Centres were identified at Welney before proceeding to Slimbridge or Martin Mere. Indeed, "Tibby" (with her mate "Tiswas"), and also "Mockbeggar", appeared to be regular commuters between Slimbridge and Welney; they were seen at Slimbridge in late October to early November, transferred to Welney in mid November, and returned to Slimbridge again in mid winter. Several Bewick's Swans originally ringed at Welney continued their allegiance to the site, including "Frappe" (with his unringed mate "Frisson") "Fort" and "Pantile", who have all been wintering at Welney since the 1979-80 season.

The swans fed on fields close to the reserve throughout November and December, the main food supply being the remains of the sugar beet harvest, although some birds also used the set-aside land. Flock sizes were impressive, with 1000 swans frequently recorded, and occasionally over 3000 swans counted in one field. The dawn count on 14 December found 3467 Bewick's and 467 Whooper Swans on the Welney reserve, which contributed to estimates of 4492 Bewick's and 710 Whooper Swans for the whole of the Ouse Washes. A count of 830 Whooper Swans on the Welney lagoon on 25 December, however, was a new record for the site. Thus, despite the extensive flooding, most of the swans in the area returned to Welney at dusk. An additional floodlight enabled visitors to see large numbers of swans using the shelter of the "South Finger Bank" to roost.

The birds dispersed further afield over the flooded washes early in the New Year. The dawn count on 18 January found 565 Whoopers and 1769 Bewick's Swans at

Welney, with many birds roosting further south on the RSPB section of the Ouse Washes, and a number also transferred to the Nene Washes. Two birds marked with neck-collars that had been seen at Welney earlier in the season were now identified on the Nene. A period of prolonged dry weather eventually caused the water levels to fall, and by the end of the month there was more land visible on the reserve than at any time since the end of September. Ridges and islands were now available to the birds for resting and preening, and shallow water provided excellent roosting areas along the length of the reserve. By the end of January, counts at Welney had risen again to 770 Whooper Swans and 2067 Bewick's Swans. The Bewick's were still mostly feeding in the fields during the day, although their flock sizes were now much smaller and they were dispersed over a wider area. A greater proportion of the Whooper Swans remained in front of the observatory throughout the day, where they fed on potatoes distributed along the edge of the lagoon.

On 14 February four Bewick's Swans were found dead on arable land some 2 miles from the reserve; preliminary examination indicated that they had not collided with powerlines or been shot. Poisoning by seed dressing was suspected, but there was no evidence for this on the field on which the birds were recovered. The bodies have been taken away by MAFF for further analysis. Two swans were also shot illegally during the winter, and these birds have been taken into care. Consultations with representatives from the National Grid Company resulted in them agreeing to mark the earth wire with bird deflectors where National Grid cables cross the northern end of the reserve.

Counts of 816 Whooper Swans and 2004 Bewick's Swans were made on the Welney reserve on 16 February. Whooper Swan numbers increased towards the end of the month, and the season's maximum count of 856 was made on 28 February, a new record both for the Ouse Washes and for England. Mild weather in February encouraged Bewick's Swans to start their spring migration; birds that had wintered at Slimbridge and Martin Mere alighted at Welney before continuing their eastward journey, and Bewick's Swan counts at Welney fell to 697 by the end of the month. By 15 March only 83 Bewick's Swans remained at Welney; Whooper Swan counts also dropped to 532 on 15 March and 460 on 23 March. The small number of Bewick's Swans grazed on freshly sprouting winter wheat during the day, whilst the remaining Whoopers continued feeding on potatoes provided on the main lagoon. Clear evening skies during the last week of March encouraged most of the remaining swans to leave, and by 29 March just 80 Whooper Swans and 18 Bewick's remained on the reserve.

A total of 129 Bewick's Swans was identified in the Welney area during the winter; 30 had been marked in the Russian arctic (with blue leg-rings and neck-collars), ten in the Netherlands (of which nine had neck-collars and one had leg-rings only), 39 at Slimbridge, 33 at Martin Mere, 16 at Welney and one at Caerlaverock. Some 65 Whooper Swans were also identified by ring number during the season; 41 had been ringed in Iceland, 14 at Caerlaverock, nine at Welney and one at Martin Mere.

Martin Mere

The first eight Whooper Swans of the season arrived at Martin Mere on 7 October, later than in 1991-92, but numbers built-up steadily to 155 by 15 October, 201 on 17 October, 348 on 21 October and 413 by the end of the month - exceptionally large figures for so early in the winter. Two Bewick's Swans alighted on Sunleys on 8 October, an early date, but the subsequent increase in the Bewick's Swan flock was much slower than for the Whoopers, with only 44 present by 21 October and 174 by the end of the month. There were several ringed birds amongst the early arrivals, including one of the Bewick's Swans that had been marked with neck-collars in Russia last summer, which reached Martin Mere on 16 October and remained for the rest of the winter. A yellow-legged Bewick's Swan also arrived with a mate and three cygnets on 14 November. Most of the Bewick's Swans flew to feed in the fields at first light, and the Whooper Swans also left the reserve after the 08:00 h distribution of grain every morning. It was thought that intensive shooting over Ashtons (where the shooting rights had recently been sold to a 25-gun syndicate) was perhaps discouraging the birds from remaining on the Mere. The swans were reported feeding at Hundred End on the Ribble Marshes during the day, and also at stubble fields on the nearby Estates, but returned to Martin Mere to roost.

The number of Whooper Swans at Martin

Mere continued rising in November, with dawn counts of 573 on 19 November and 624 on 27 November, before decreasing sightly to 465 on 3 December. Low Bewick's Swan counts reflected the slow movement of these birds to Britain from the continent, however; 262 were present on 4 November, 397 on 13 November and only 274 on 3 December, including nine (5.1%) cygnets in 175 birds age-checked on that day. These included one family of four cygnets, two of two cygnets and one of one cygnet. Of 311 Whooper Swans whose ages were determined on 13 November, 44 (14.1%) were cygnets, with a mean brood size of 3.1 cygnets per family. Surveys of the surrounding area indicated that most of the swans in the region were roosting at Martin Mere throughout November. Only two (species not determined) were seen at Longton Marsh on the Ribble Estuary on 15 November. The swans continued frequenting the stubble fields on the Estates during the day, where they fed mainly on sprouting barley, but also used new leys and waste potatoes following the harvest on other nearby farmland.

The dawn counts found good numbers of Whooper Swans roosting at Martin Mere throughout December, with 586 present on 10 December, 515 on 15 December, and peaking at 666 during a period of cold weather on 23 December - a new record for the site. Bewick's Swan counts also crept up to 411 in mid-month and 450 on 23 December. Most of the birds had been roosting on Sunleys and Vinsons early in the season, but they transferred to the Mere from December onwards. Only very small numbers of swans remained on the Mere during the day, but around 100 Bewick's and 200-300 Whoopers attended the morning and evening distribution of grain. Some 346 swans (mostly Bewick's, but including 20-30 Whoopers) were seen feeding at Hesketh-In-Marsh, and a further 17 were recorded at Longton Marsh, on 13 December. It is not certain whether these birds were from the Martin Mere flock.

Bewick's Swan numbers improved briefly with the cold weather at the end of the year, and 530 were recorded with 662 Whoopers on 1 January. Numbers then declined again, with 379 counted at dawn on 7 January, and 297 during the day on 15 January including 274 at Hesketh Bank. The Bewick's Swans returned to Martin Mere towards the end of January, however; dawn counts found 615 on the refuge on 19 January, 728 on 26 January and numbers peaked at 764 on 4 February, the maximum count of the winter. The arrival of the Bewick's Swan "Mekkins" on 11 February, a regular visitor to the site since 1984, indicated that there was indeed some movement of birds into the area at this time. Whooper Swan numbers remained at between 500-550 throughout January then rose slightly to 597 on 4 February. Up to 100 Bewick's Swans and 300 Whooper Swans were seen on the Mere during the day for most of January and early February.

The onset of Bewick's Swan spring migration started slightly earlier this year at Martin Mere. Swans of both species spent more time on the Mere during the day in mid-February; 200-300 Bewick's Swans were seen on the Mere, and also on pasture opposite the Centre buildings on 14-15 February. Numbers then declined to 170 on 18 February, and only 18 Bewick's Swans remained on 20 February. Over 550 Whooper Swans were still at the site in early March but they, too, started to move away mid-month. Whooper Swan counts decreased gradually to 504 on 7 March, 441 on 11 March, 314 on 13 March, and 266 remained with 2 Bewick's Swans on 18 March. By 29 March only five Whooper Swans were left at the site.

A total of 116 Whooper Swans was identified by ring number at Martin Mere this winter, including 28 originally ringed in Iceland, 15 ringed at Caerlaverock, and 73 ringed at Martin Mere (of which 14 had been marked at the site in previous years). Some 192 Bewick's Swans were also identified: five adult birds marked with neck-collars and one cygnet marked with a leg-ring in Russia, seven swans ringed at Slimbridge, one of the seven swans ringed at Martin Mere in January 1987, 150 marked at Martin Mere in 1990-91 to 1991-92, and 28 ringed at Martin Mere for the first time this winter. A further 82 Bewick's Swans ringed at Martin Mere were observed wintering elsewhere, including "Mr Magoo", who was ringed at Slimbridge as a cygnet in 1980 and reringed at Martin Mere in 1991. This winter he was seen at Welney. A second Slimbridge-ringed bird, named "Womble", a regular visitor to Martin Mere since the 1985-86 winter, was sighted in the Netherlands this season.

Caerlaverock

The first four Whooper Swans arrived at Caerlaverock, our most northerly refuge, on

the early date of 23 September. These included three birds which had been ringed at the site in the previous winter. There were no more arrivals during the month but numbers increased rapidly during the second week of October rising from 17 on 11 October to 76 by 18 October. Birds continued to arrive *en masse* during the third week of the month and by 25 October a roost count revealed 155 birds at the Centre, an unusually large number for so early in the season. The birds then spread out to feed at neighbouring sites during the mild, wet weather of November and early December, including Comlongon Mains, Kirkblain, Powhillon and Longbridgemuir. Birds were recorded roosting on flooded fields at nearby mid-Locherwoods. On some nights, however, the bulk of the birds returned to Caerlaverock to make use of the secure roost sites afforded by the Centre. Further roost counts revealed that numbers continued to creep up, reaching 200 on 17 November, out of at least 294 birds known to be in the area. This proved to be the highest count of the winter, pleasingly up on the maximum count of 171 recorded in the previous winter but still below the record of 218 in November 1988. During the colder weather in December the swans returned to Caerlaverock on a more regular basis, with around 150 birds there making full use of the grain provided and reaching a peak of 173 during the day on 21 December. A further 45 birds spent the latter half of the month feeding at Brow Well and roosting nearby at Priestside Bank. The proportion of cygnets recorded on the latter date was 9.1% indicating that the Caerlaverock birds, at least, had had a fairly poor breeding year, well down on the 14.6% recorded in 1991-92 but also much lower than the 13-14% recorded this season at Welney and Martin Mere .

Numbers at the Centre remained at around 150 for most of January, although up to 100 birds occasionally roosted nearby on Dorbinis pond at mid-Locherwoods. In early February a small influx caused totals to rise slightly reaching 175 on 3 February and 189 on 13 February. The swans remained faithful to the reserve during late February and the first week of March with around 150-170 birds present most days. Up to 90 birds were present in the Crichton Farm/Islesteps area throughout this period, but this flock, together with a smaller group which roosted on the Lochar mudflats remained largely separate from the Caerlaverock herd. Interestingly the proportion of cygnets in the Crichton flock (13.9%) was higher than that recorded at Caerlaverock and more in line with figures from Welney and Martin Mere.

Numbers dropped gradually during the second week of March from 163 on 8 March to 153 on 11 March. The first major departure did not occur until 21 March, when the prevailing wind switched from the north to a southwesterly, and numbers dropped overnight from 148 to 109 on 22 March. Just 73 birds remained on 27 March but a small influx of new birds caused numbers to rise slightly, reaching 86 on 28 March, before the final departures.

The Whooper Swans at Caerlaverock are noted for a high level of winter site fidelity. Of 141 ringed birds to appear at the site just nine had not originally been ringed at Caerlaverock. Of these one had been ringed at Martin Mere, one at Welney and seven in Iceland. Of the Icelandic-ringed birds five came from Skjalftavatn and two from Skagafjordur, both sites in Northern Iceland. A further 48 were newly ringed at the centre during the winter. Forty swans ringed at Caerlaverock in previous years but not seen at the site during 1991-92, were reported elsewhere during the winter. These included one in a flock nearby in Dumfries, seven at other sites in Scotland, ten at Martin Mere, nine at Welney, ten in Ireland, two in Iceland and one in Denmark.

A migratory link between Caerlaverock and Ireland was highlighted this winter by the observation of seven Caerlaverock-ringed birds at the traditional arrival points of Loughs Swilly and Foyle on the north coast of Ireland, before proceeding to Caerlaverock later in the winter. Credit for this discovery must go to the valiant team of Jim Wells and Graham McElwaine who managed to read over 200 different Whooper Swan leg-rings in Ireland during the 1992-93 winter.

Bewick's Swans now only visit Caerlaverock in small numbers, although regular counts were made of up to 77 birds in the early 1980s. The first three arrived this season on 19 November but had disappeared by the next day. Odd birds were seen flying over the area in December, and up to two birds visited the Folly Pond on several dates, but no birds stayed to winter with the Whooper Swan flock. Following a slight increase in numbers recorded during the 1991-92 winter, when up to 23 birds were seen at Caerlaverock, it was hoped that this small Russian swan would

visit the site more frequently. Caerlaverock lies at the northern edge of the wintering range of this species in Britain, however, and its occurrence on the reserve remains irregular.

Arundel

Bewick's Swans are not regular visitors to the refuge at Arundel but birds from the flock that winter nearby on the meadows at Pulborough do occasionally fly in to roost, particularly during cold weather. The cold spell at the start of January tempted some to make use of secure roost sites on the reserve with 19 present on 1 January rising to 27 on 3 January, the maximum count of the winter.

Ringing

Ringing is a vital part of the Trust's long-term research programme for both the Icelandic-breeding Whooper Swans and the Russian Bewick's Swans. The identification of individual birds by the codes engraved on their leg-rings, enables us to investigate in detail their survivorship, lifetime reproductive success, winter site fidelity and choice of migratory sites. Such information leads to a greater understanding of population dynamics and habitat requirements, crucial to the successful conservation of a species. The use of neck-collars on Bewick's Swans ringed in the Lower Pechora area, in the extreme northeast of European Russia, over the last two summers has highlighted staging areas and migratory routes for the species that had previously gone undetected, with sightings coming from eleven European countries including Russia, Estonia, Lithuania, Finland, Sweden and France, as well as from more well-known sites in Germany, Denmark, the Netherlands, Britain and Ireland. A full knowledge of sites used by a species is needed to combat potential threats such as habitat destruction and illegal hunting. Although a protected species throughout its range the Bewick's Swan remains a target for many hunters and up to 40% of adult birds X-rayed at Slimbridge in recent winters have been found to contain gun-shot in their tissues.

Successful swan catches were held at Slimbridge, Martin Mere and Caerlaverock during the winter using the "swan-pipes" specifically constructed for ringing purposes at the three Centres. At Caerlaverock a catch of 102 Whooper Swans on 14 January included 46 newly-ringed birds. Two catches at Martin Mere held on 13 January and 21 February resulted in the processing of 75 Whooper Swans of which 59 were newly-ringed, and 80 Bewick's Swans of which 28 were newly-ringed. At Slimbridge a total of 46 Bewick's Swans was caught on 3 February of which five were ringed for the first time.

At all catches, biometric information was recorded including weight, tarsus length, skull and wing measurements. Blood samples were also taken from all the birds caught, both for genetic finger-printing to establish family relationships, and to determine the incidence of avian tuberculosis in wild swan populations.

International Research projects

Russia

In 1992 collaborative studies of the ecology of Bewick's Swans at their breeding grounds on the Russkiy Zavarot Peninsula (Nenetski State Game Reserve), lower Pechora River, entered their second successive summer. A total of 42 days, between 18 June and 11 August, was spent at the Khabuicka study site, first visited by scientists from The Wildfowl & Wetlands Trust in 1991. The team was again joined this year by Dr Y. Shchadilov (from the Russian Research Institute of Nature Conservation and Reserves, Moscow), Dr Y. Mineyev (Komi Science Centre, Ural Department of the Academy of Sciences, Syktyvkar) and Dr Y. Morozov (Institute of Endocrinology). In addition, collaboration this year included scientists from the University of Groningen, the Netherlands, and from the Ministry of the Environment, Denmark, who commenced fieldwork in the same area.

During the first phase of fieldwork (18 June-5 July) a total of 38 nests was located in the study area of which 25 were inspected. Mean clutch size was 4.1 eggs (n = 23) compared with 3.9 eggs (n = 26) in 1991. Nine pairs were identified by bill pattern as birds that had been seen at Khabuicka during the previous summer, including six pairs that had returned to the same nest as in 1991. In addition to noting clutch size and identifying the parent birds, egg and nest dimensions and nest coordinates were recorded at each nest site. Habitat quality was assessed in the swans' breeding territories by recording biomass and protein content of the vegetation, dis-

tance of the nest from water and size of the nearest pool. The last two variables are important as nest sites are located generally on dry ridges in the tundra, and on completion of hatching the family moves almost immediately to the nearest pool. Plant communities around each nest were mapped and a floral species list for the area was produced. Vegetation selected by the swans was identified by observing their grazing activities and by faecal analysis. Predation of eggs and newly hatched cygnets was monitored.

The second phase of fieldwork (19 July-11 August) continued monitoring the progress of the pairs at the Khabuicka study site. Average brood size in late July was 2.8 cygnets, but by mid August it had dropped to 2.3 cygnets (n = 24). The diurnal activities of breeding pairs was recorded, both during the incubation period and after the young had hatched. The individual swans were caught in early August for ringing, to allow subsequent identification throughout their migratory range. Adult birds were fitted with blue leg-rings and blue neck-collars bearing four digit codes in white, in line with the International Protocol for neck collars. Cygnets were caught together with their parents and marked with yellow leg-rings only. Blood samples were taken from all birds for genetic fingerprinting analysis and biometric data were also recorded. A total of 60 swans was caught near Khabuicka in early August 1992: 20 adults and 40 cygnets. A further 310 mostly non-breeding Bewick's Swans were caught and marked amongst moulting flocks on the Gulf of Korovinskaia to the south of Khabuicka, together with two Whooper Swans and 24 Mute Swans, by Dutch and Danish scientists.

Plans are already under way for return visits to the Khabuicka study site in 1993. A team from The Wildfowl & Wetlands Trust will aim to monitor the behaviour of individual pairs upon their return to the breeding grounds in mid May. The expedition members will stay on the tundra until mid June in order to obtain final clutch size of the study birds for the third successive season. A second expedition is planned for late July and early August in order to determine hatching success, to catch and ring the broods, and to continue monitoring habitat quality.

Iceland

There were two expeditions to Iceland this year. In late April a team from The Wildfowl & Wetlands Trust visited sites in southwest Iceland used by Whooper Swans as staging areas prior to moving north to the breeding grounds. Behavioural work was conducted on the staging birds on different habitats, and the condition of individuals assessed by their abdominal profiles. Oli Einarsson visited the two main study sites in northern and eastern Iceland during May for the third summer of his PhD study on the breeding biology of Whooper Swans. A late spring at the highland study site in Jokuldalsheidi meant that the birds there were at least a week behind those in the lowland study site of Skagafjordur in terms of nest-building and egg-laying. A total of 58 nests was located at Skagafjordur, slightly up on last year and average clutch size was also up at 4.9 eggs per nest (n = 43). Breeding pairs were identified by a combination of leg-rings and bill patterns. The Whoopers show a high degree of fidelity to the nesting territory; most exciting was the discovery of a 1988-ringed cygnet nesting in a territory adjacent to that of its parents and the one in which it itself had been reared. A second team returned to Iceland in late July and with the help of Icelandic ringers caught 348 Whoopers Swans of which 271 were ringed for the first time.

We are grateful to the many people who reported their sightings of Bewick's and Whooper Swans during the winter, including R.G. Adam, P. Andersen-Harild, J. Arbon, M.T. Bayne, J.H. Beekman, H.H. Bergsma, C. Berrevoets, D. Blumel, A. Boele, G. Boomhouwer, T. Boulton, A. Bramhall, E.C. Brett, C. Butters, S. Carman, K. K. Chan, J. Cook, F. Cottaar, N. Crocker, G. Dahms, B. Davidson, A. Dawney, S. Deuzeman, L. Donnelly, A. Duncan, H. Eggers, A. Einarsson, O. Einarsson, O. Ekelof, I. English, F van Essen, G. Fenton, E. Flatters, A.D. Fox, I. Francis, J. Gatins, W. Grimm, A. Haack, T. Haitjema, B. Halterkin, R. and C. Hesketh, A .Hogg, H.J. van Huffelen, M. Hyslop, P.R. Jones, D.A. Jonkers, T. Kastepold, J. Kemp, J. Kirk, E. Klunder, S. Laybourne, C. Ligget, E. van der Linden, L. Loos, L. Luigujoe, L. Lysaght, G. McElwaine, E. Meek, O. Merne, P. Miller, C.R. Mitchell, M.S. Money, A. Mossop, I.C. Munro, J. Nap, J. Newland, O.K. Nielsen, R. Oosterhuis, M. Poot, J.

Quinn, D. Raes, P.S. Read, D. Revett, S.C. Richardson, D. Rigby, J. Roberts, A.Sapsford, A.J. Smith, J. Smith, D. Scott, Ph. Scott, W. Schott, F. Schulz, W. Shields, P. Shimmings, L. Street, F. Tadhunter, T. Talbot, O. Thorup, M. Tickner, C. Tomlinson, J. Turner, K. Twardus, W. Tysen, R. Ubels, K. and J. Verbeek, A. Walsh, D. Watson, P. Webster, B. Weyer, J. Wells, C. Wilson and H. Zwaagstra.

Jonathan M. Bowler and Eileen C. Rees, The Wildfowl & Wetlands Trust, Slimbridge, Gloucester, GL2 7BT.
Linda Butler, The Wildfowl & Wetlands Trust, Hundred Foot Bank, Nr. Wisbech, Cambridgeshire, PE14 7TN.