WeBS

GSMP

Waterbirds in the UK 2022/23

The annual report of the Wetland Bird Survey and the Goose & Swan Monitoring Programme

BTO Birds Science People

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WATERBIRDS IN THE UK 2022/23

The Wetland Bird Survey (WeBS) is the principal scheme for monitoring the UK's wintering waterbird populations, providing an important indicator of their status and the health of wetlands. *Waterbirds in the UK 2022/23* is the 41st WeBS annual report and comprises this summary report and data at: www.bto.org/webs-reporting

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THE WeBS PARTNERSHIP

WeBS is a partnership jointly funded by BTO, RSPB and JNCC, with fieldwork conducted by volunteers and previous support from WWT.

The permanent members of the WeBS Steering Committee in 2022/23 were Teresa Frost (BTO), Dawn Balmer (BTO), James Pearce-Higgins (BTO), Anna Robinson (JNCC), Kirsi Peck (JNCC) and Simon Wotton (RSPB).

THE GSMP PARTNERSHIP

GSMP is a partnership, run by and jointly funded by BTO, JNCC and NatureScot with fieldwork conducted by both volunteer and professional surveyors.

The permanent members of the GSMP Steering Committee in 2022/23 were Teresa Frost (BTO), Neil Calbrade (BTO), Kirsi Peck (JNCC) and Jess Shaw (NatureScot).

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ACKNOWLEDGEMENTS

We are indebted to the time and skills of the thousands of WeBS and GSMP Counters who collected the data used in this report and to the invaluable efforts of the WeBS Local Organisers who are listed on the back cover.

The WeBS Local Organiser Advisory Committee (LOAC) (members listed on page 43) provided advice on behalf of Counters and Local Organisers. The BTO Information Systems team delivered essential technical assistance and continues to develop and provide assistance for WeBS Online and WeBS Report Online.

We are also grateful to the following for providing supplementary information, data inputting, proof-reading and particularly invaluable help in 2022/23: Deborah Newman, Royal Air Force Ornithological Society (RAFOS) and Chris Waltho. Grateful thanks to all and apologies to anyone who has been inadvertently missed.

Report content and production was by Teresa Frost, Neil Calbrade, Gillian Birtles and Ian Woodward. Analysis of the GSMP data was carried out by Alastair Feather (BTO).

This report is dedicated to the memory of Richard Hearn who, from 1993, spent most of his working life at WWT and was on the WeBS Steering Committee from 2006–2020 as well as leading on GSMP and was a driving force in international waterbird conservation.

The painting of the European White-fronted Goose used on the cover of this report is by Szabolcs Kókay. All other artists and photographers are acknowledged on the pages of this report.

This report was printed by Swallowtail Print, Norwich.

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Online Resources

More information, including site tables and trends for all regular WeBS species, is available online at: www.bto.org/webs-reporting

This summary report can be downloaded from the WeBS website at: www.bto.org/webs-publications

The online and summary outputs in conjunction constitute the report *Waterbirds in the UK 2022/23*

COOT BY RICHARD JACKSON/BTO

CITATION

Woodward, I.D., Calbrade, N.A., Birtles, G.A., Feather, A., Peck, K., Wotton, S.R., Shaw, J.M., Balmer, D.E. & Frost, T.M. 2024. *Waterbirds in the UK 2022/23: The Wetland Bird Survey and Goose & Swan Monitoring Programme*. BTO/RSPB/JNCC/NatureScot. Thetford.

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Waterbird headlines from the WeBS year

3,801 registered WeBS volunteers

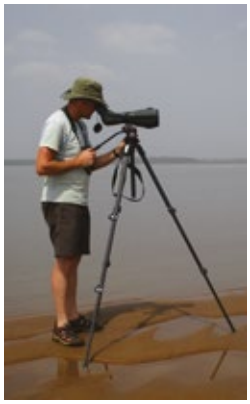
Just a small selection of notable stories from 2022/23.

See all the numbers and trends at: **www.bto.org/webs-reporting**

Welcome to the 41st Wetland Bird Survey (WeBS) report, *Waterbirds in the UK 2022/23*, which also includes results for the Goose and Swan Monitoring Programme (GSMP). This is the first report where BTO both organised the GSMP Icelandic-breeding Goose Census (IGC) and Age Assessments and analysed the results, with Alastair Feather joining the BTO GSMP analytical team (see pages 34–37). Another change for this reporting cycle is that the analytical lead baton was passed from the recently retired Graham Austin to Ian Woodward. Over the past 10 months, the WeBS Core and Low Tide analysis programs have been completely overhauled by Ian, moving from the statistical software SAS to the more widely used R, requiring the translation of thousands of lines of code and many hours of painstaking work to check that results are comparable. Any errors found in the new code were rectified when discrepancies were found during testing, except where it was the old code where the error lay.

In this report we particularly look at populations of waterbirds that breed to the north-east of the UK: from Norway, including the Svalbard archipelago, to the Russian Taimyr peninsular. The majority of our migratory wintering waterbirds travel wholly or partially from this region, mixing here with UK and Iceland/Greenland breeders. Situated as we are on the western edge of the wintering range for some of these populations, in Britain and Ireland we have often been first to experience changes in migratory behaviour. Table 4 on page 20 lists 32 species where there is evidence or consensus of short-stopping and/or short-staying. Of these 32 examples, 25 have negative UK long-term trends, and although many are also declining at a flyway level, it is likely that short-stopping is contributing the UK declines for most of them, as noted in many of the species accounts within this report.

Waterbird monitoring data is also important at a site level. Alongside our usual feature of a Low Tide Count survey, Alt Estuary (pages 38–39) we describe the standard analyses we use for investigating within site change from Core Count data on pages 32–33. Known as "sector plot analyses", it can certainly be revealing to take a deep dive into count unit level data within larger protected sites, identifying potential local issues that site managers can investigate further. As always, we are indebted to the thousands of volunteers who contribute to the WeBS and GSMP schemes, making all these analyses and results possible.



We are sorry to share the news that Richard Hearn of WWT died in February 2024. During his inspiring waterbird conservation and research career, Rich made a huge contribution to waterbird monitoring, including representing WWT for many years on the WeBS steering group and leading GSMP. An obituary will follow in the next *Waterbirds News*.

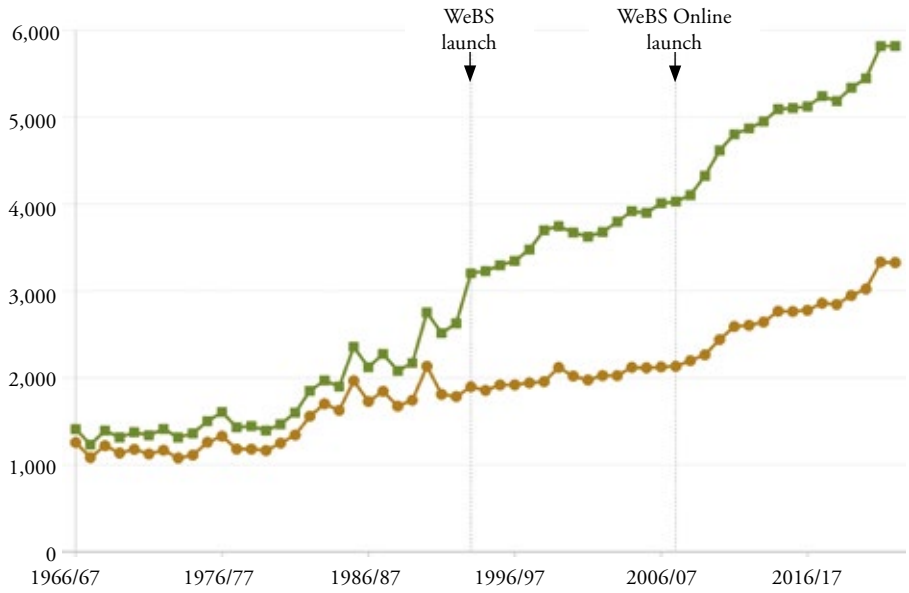
RIVER LANE GRAVEL PIT BY JOHN WELLS; GOLDENEYE BY NEIL CALBRADE/BTO; RICHARD HEARN BY CHAS HOLT

WeBS Core Counts 2022/23 – in numbers

Core Counts were carried out at 5,818 WeBS sectors (count units) at 3,325 sites from July 2022 to June 2023.

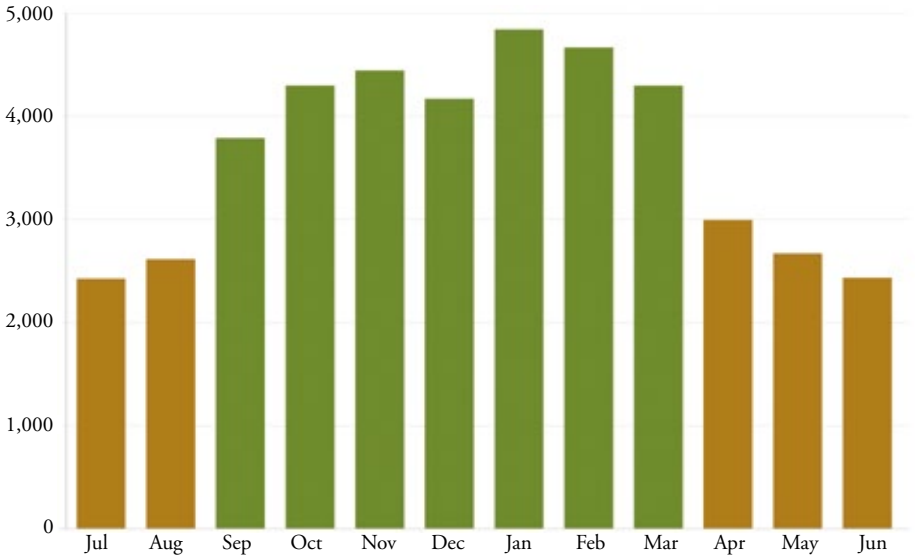
Not all Core Counts are linked to individual Counters in the WeBS Online database, but some are; 2,668 Counters named as the lead counter were associated with WeBS Core Count visits made in 2022/23. Including additional team members, the number of registered WeBS volunteers was 3,801.

There were 43,640 count visits, 70% in the core September–March period (green bars on lower graph).



▲ **Number of WeBS count sectors (green squares) and sites (gold circles) covered at least once annually 1966/67–2022/23.**

▼ **Number of WeBS Core Count visits in 2022/23 by month during the core winter period (green bars) and the rest of the year (gold bars).**



Core Count dates in 2022/23

2022	2023
17 July	22 January
14 August	19 February
11 September	12 March
9 October	23 April
13 November	21 May
11 December	18 June

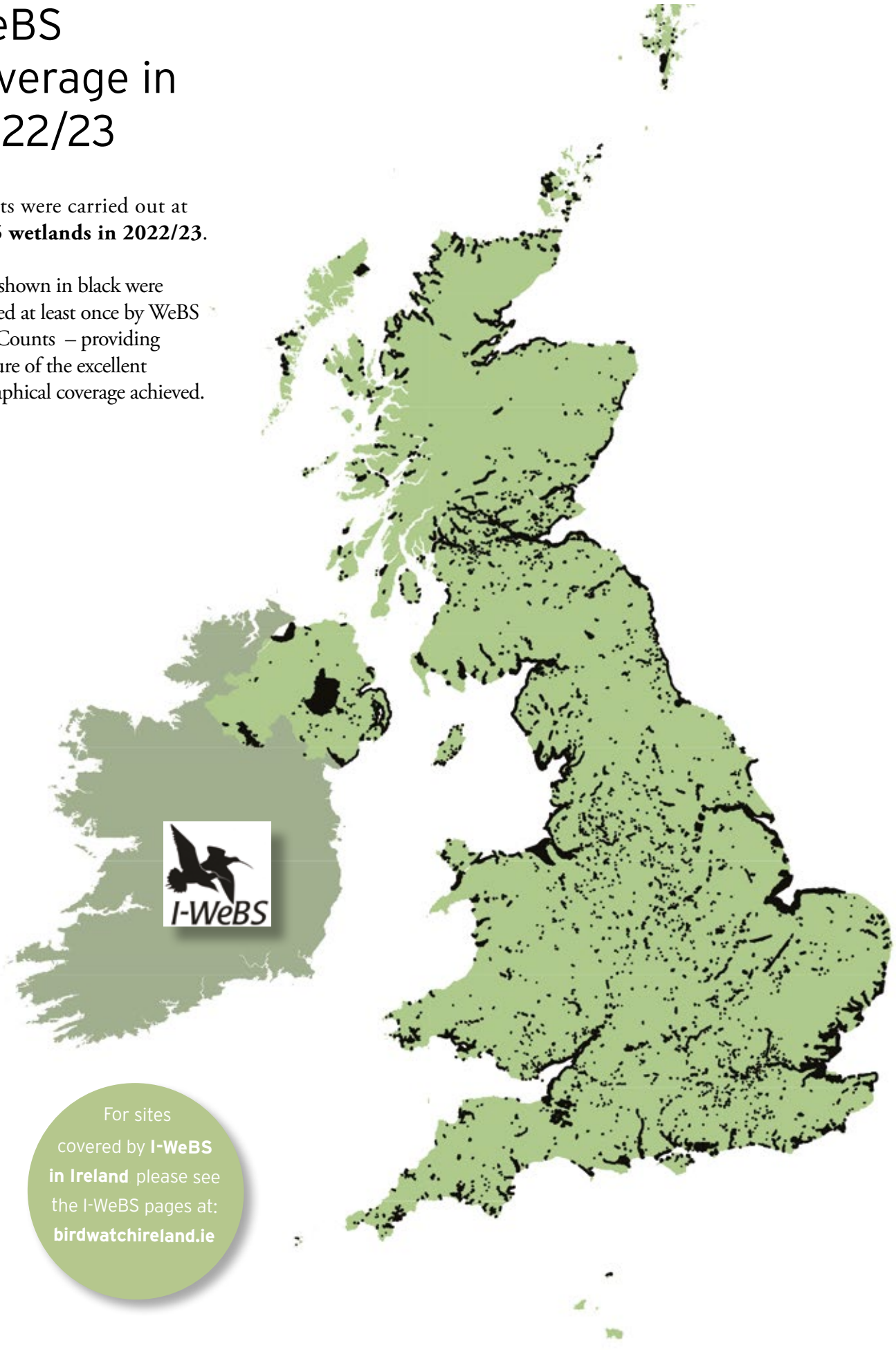
WATER RAIL BY SARAH KELMAN/BTO

A new high of 5,818 count sectors were visited for the WeBS Core Count scheme in 2022/23.

WeBS coverage in 2022/23

Counts were carried out at **3,325 wetlands in 2022/23**.

Areas shown in black were counted at least once by WeBS Core Counts – providing a picture of the excellent geographical coverage achieved.



For sites covered by **I-WeBS in Ireland** please see the I-WeBS pages at: **birdwatchireland.ie**

UK Low Tide Counts 2022/23

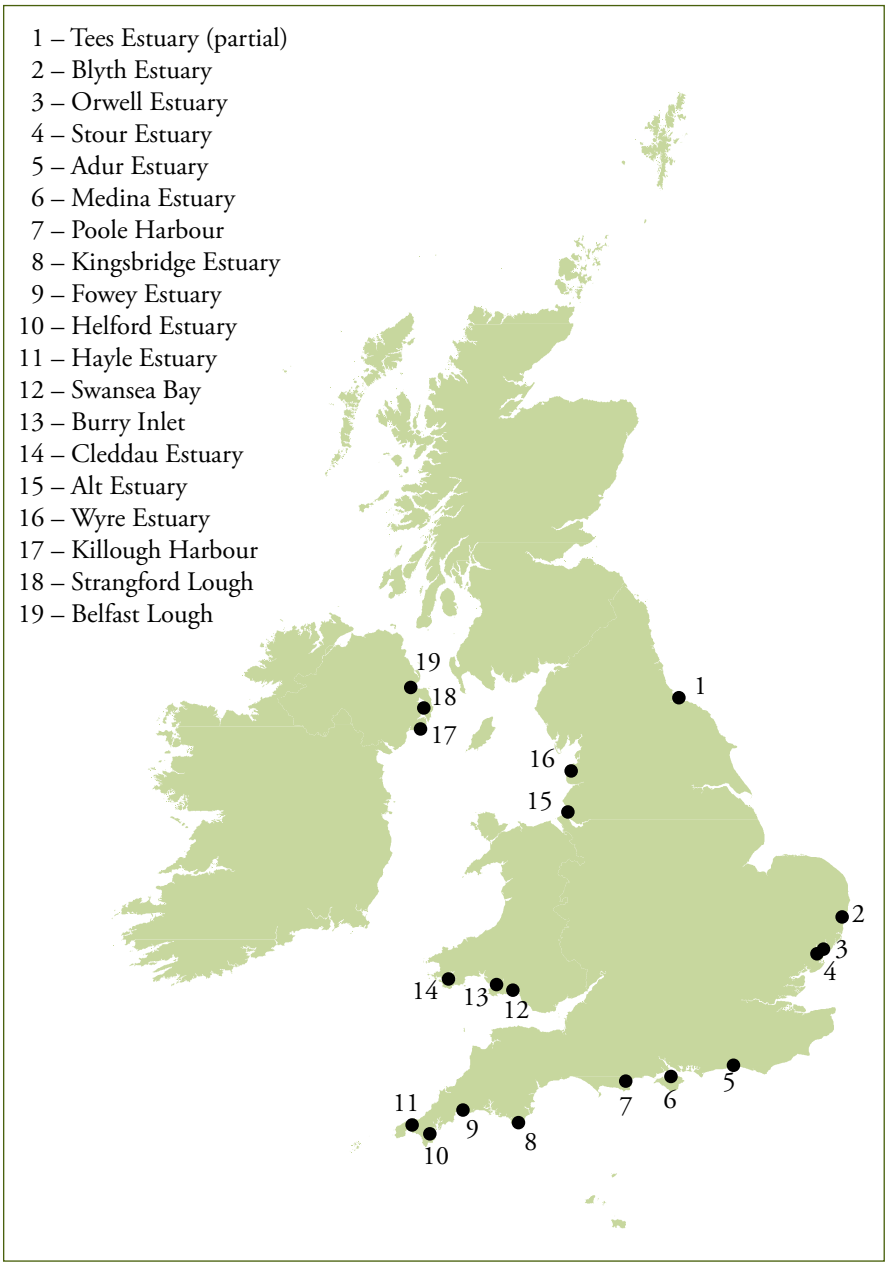
Nineteen UK estuaries were counted at low tide, generating important data about feeding areas.

The WeBS Low Tide Count scheme facilitates the collection of information about use of the UK's estuaries by waterbirds at low tide. The scheme has flourished since its inception in the winter of 1992/93, with all the major estuaries in the UK having been counted at least once since then. The scheme aims to monitor, assess and regularly update information on the relative importance of intertidal feeding areas of UK estuaries for wintering waterbirds, and in doing so complements information gathered on populations through the WeBS Core Counts.

Information collected at low tide represents an important contribution to the conservation of waterbirds, by providing supporting information for the management of UK Ramsar Sites and Special Protection Areas (SPAs), other site designations, and whole estuary conservation plans. Numbers of waterbirds present in predefined sectors are counted. Most individual estuaries are counted at low tide once every six years, although on some sites more frequent counts are undertaken.

Further information about WeBS Low Tide Counts is available online via **www.bto.org/websreporting-lowtide** including data summaries and dot density distribution maps for different estuaries and species. Dot density maps are now available for all species and years, including the facility to show any combination of site, species and year side by side for comparison. Presentation of WeBS low tide information typically takes two forms: (i) tabulated statistics of peak numbers and mean densities, and (ii) dot density maps to give a visual representation of species' foraging densities across a site. Dots do not represent the precise positions of birds; they are assigned to habitat components proportionally and placed randomly within those areas. No information about distribution of birds at a finer scale than the count sector level should be inferred. For all maps on the online reporting interface, one dot is equivalent to one bird.

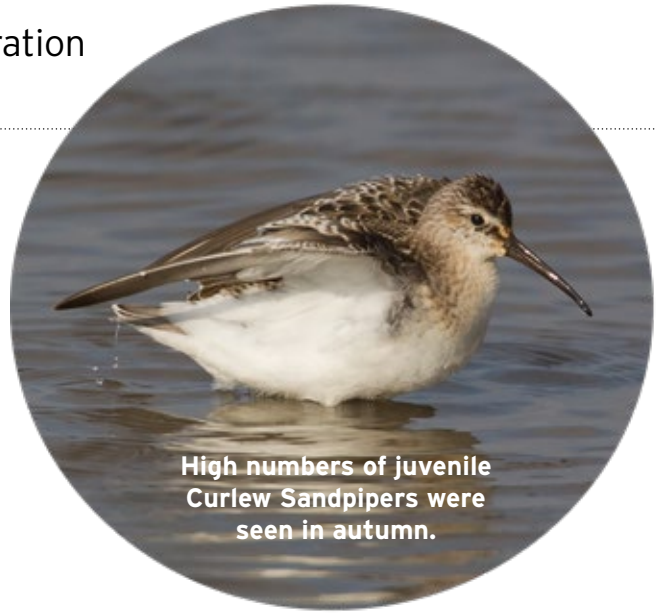
During 2022/23, complete WeBS Low Tide Counts were carried out at 18 estuaries, and on selected sectors on a further estuary. On several sites – Poole Harbour, Kingsbridge Estuary, Blyth Estuary, Wyre Estuary and Helford Estuary – Core Counts are carried out annually at low tide and data feed into both schemes, allowing assessment of distributional changes. No estuaries in Scotland were counted at low tide in 2022/23. Results from the counts on the Alt Estuary are presented on pages 38–39 of this report.



Estuaries counted as part of the WeBS Low Tide Count scheme in 2022/23.

2022/23: iciest counting conditions for a decade

Weather, phenology, productivity and migration context for 2022/23.



High numbers of juvenile Curlew Sandpipers were seen in autumn.

WeBS counts can be influenced by conditions around the count date, as dry, icy conditions concentrate some waterbirds on large wetlands, whereas flooding can cause dispersion to the wider countryside. It was the coldest December since 2010, although there was alternation between cold and mild conditions so that, overall, the winter was slightly milder and drier than average.

The December and January core count dates both coincided with freezing weather, resulting in the two highest average ice cover on sites recorded by WeBS counters since February 2012. Many sites throughout the UK were frozen in both months, but with December being slightly the more extensive; in both months a fifth of WeBS count sectors had ice cover of 90% or more and over two fifths had ice cover of at least 5%.

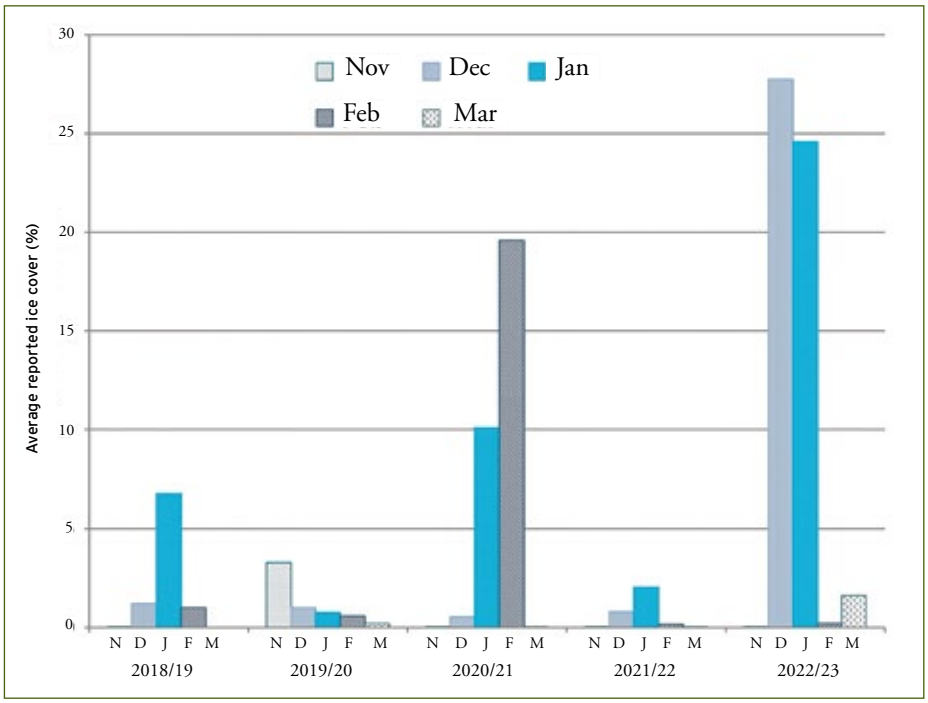
The winter was rather dry, particularly February; there were some high river flows and flooding from rainfall between the December and January count dates in some parts of the country, but generally flows were close to normal in most catchments for the winter period.

CONTINENTAL CONDITIONS

UK waterbird numbers in winter can be influenced by continental conditions, particularly around the Baltic. European air temperatures for the winter were on average milder than normal, except for cold conditions in December in northern Europe. The Baltic ice season was mild in terms of ice extent, and the maximum sea ice extent was reached later than normal, in mid-March.

ARCTIC BREEDING SEASON

Good summer productivity can increase the number of passage and wintering juvenile wildfowl and waders in the UK. The observed nesting success in summer 2022 at the Taimyr research station in northern Russia was high, thanks to high abundance of lemmings and consequently low predation by Arctic Foxes.



Average WeBS sector ice cover for 2018/19 – 2022/23, as reported by Counters for the months November–March. Note that in 2020/21 proportionally more counts than normal were in Scotland.

SOURCES

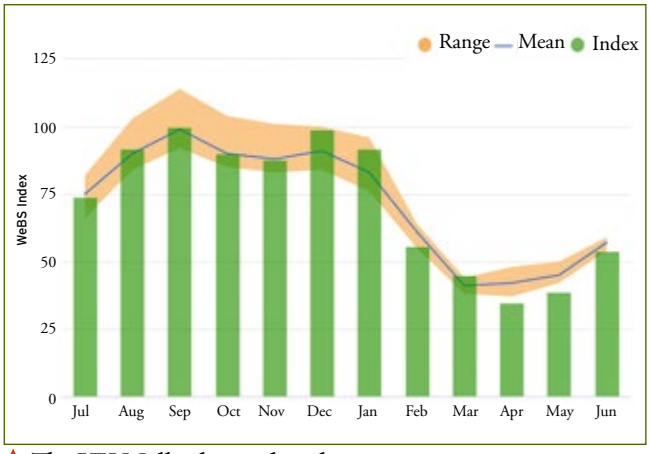
Climate summaries from: **metoffice.gov.uk, en.ilmatieteenlaitos.fi** and **climate.copernicus.eu/surface-air-temperature-maps**

Hydrological summaries from: **nrfa.ceh.ac.uk**

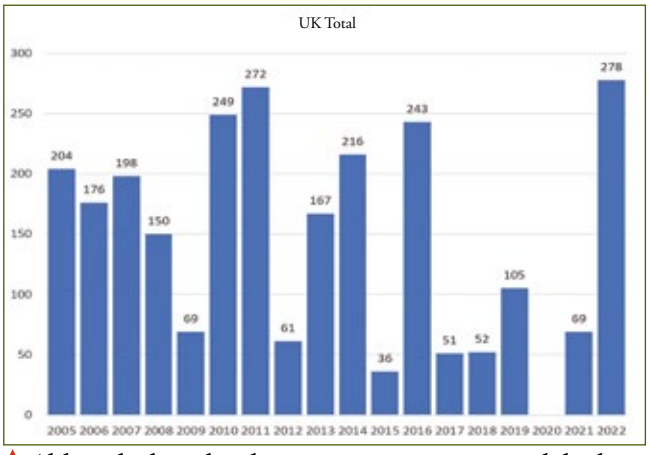
Arctic breeding from: **www.arcticbirds.net**

Mallard counts were higher in December and January, coinciding with freezing conditions.

▲ **WeBS sites counted between Thursday 8 and Wednesday 14 December 2022 with recorded ice cover of 5% or more.**



▲ **The UK Mallard month index was near recent averages in most months but above average in December and January, perhaps due to the freezing conditions concentrating birds on larger waterbodies.**
Green bars = 2022/23; blue line/orange hatched area = previous five-year mean/range.



▲ **Although also related to survey timing, years with high numbers of Curlew Sandpipers on WeBS Counts usually indicate good breeding years in the Arctic. September 2022 had the highest total in recent years. Age breakdowns were received from one Counter for three locations, and all 15 birds aged were juveniles.**

CURLEW SANDPIPER BY LIZ CUTTING/BTO; MALLARD BY EDMUND FELLOWES/BTO

National trends

A concise summary of how the UK's most familiar waterbirds fared in 2022/23.

Indices and smoothed indices are plotted in the WeBS Report Online for all waterbird species with sufficient data for the UK, Great Britain, Wales, Scotland, England and Northern Ireland. Annual species indices, smoothed indices, and 25- and 10- year trends are available under an Open Government Licence from **www.bto.org/webs-annual-report** as a spreadsheet download. Population trends are published as Official Statistics, and have been produced to the high professional standards set out in the Code of Practice for Official Statistics.

Table 1 contains 25- and 10-year trends for the most abundant waterbird species for the UK and Table 2 contains the equivalent trends for Scotland, Northern Ireland, England and Wales.

Uncertainty due to low numbers and incomplete coverage means some species are not included in Tables 1 and 2 but are available online, to be used with caution. For further detail, please refer to the WeBS Report Online and spreadsheet download.

The production process of compiling these statistics has been overhauled in the past year. Some previous minor errors and discrepancies in calculating completeness for the modelling have been corrected, and the smoothing algorithm implementation has been updated. The impact on the final percentage change figures is minor for most species.

A data error has been corrected for the Icelandic Greylag Goose index calculation. The 10-year trend is -41% and the 25-year trend is -22% (for comparison, the reported figures in the 2021/22 report were -3% and -15% respectively).

GEESE & SWANS

The Mute Swan index decreased in 2022/23 and, apart from 2013/14, was the lowest value since 2000/01; the overall trend is more stable at -2% for 10 years, but the recent low point could be indicative of avian flu mortality. Non-native Canada Goose (10-year trend +28%) and Egyptian Goose (10-year trend +82%) both saw record high indices in 2022/23.

There is a split in the fortunes of migratory populations, with Dark-bellied Brent Goose, Icelandic Greylag Goose, Greenland White-fronted Goose, European White-fronted Goose and Bewick's Swan exhibiting declines over both 25- and 10-year time periods, contrasting with increasing Canadian Light-bellied Brent Goose, Svalbard Barnacle Goose, Pink-footed Goose and Whooper Swan.

DUCKS

Compared to the previous year, the latest index values increased in 2022/23 for the dabbling duck species, with a record high for Shoveler and the highest value since 2011/12 for Gadwall (25-year trend +70%) and highest since 2006/07 for Pintail (25-year trend -18%).

The diving ducks in Table 1 all show declining trends over both 10- and 25-year time periods. Tufted Duck (10-year trend -15%) is now well past its peak, and the latest index was the lowest since 1985/86; as is Red-breasted Merganser (10-year trend -24%) which had its lowest index value since 1983/84. Non-Shetland Eider (10-year trend -26%) and Pochard (10-year trend -43%) both had record low index values for 2022/23.

WADERS

Increases continued for Avocet (10-year trend +33%) and Black-tailed Godwit (10-year trend +19%) both of which recorded their highest ever index values in 2022/23. Trends for Knot (25-year trend +1%; 10-year trend -3%) are stable, after the latest index value fell slightly compared with the previous year.

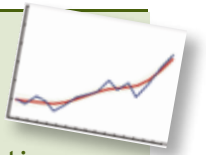
2022/23 was a good year for open coast waders. Increases in index values for 2022/23 helped stabilise the 10-year trend for Ringed Plover (10-year trend +2%), Dunlin (10-year trend +6%), Purple Sandpiper (10-year trend +2%) and Redshank (10-year trend +3%), which had all had negative 10-year trends in the previous 2021/22 report. However, the 25-year trends for these species are all still showing declines between -15% and -46%. Curlew (10-year trend -20%), also continue its decline, with its lowest index for 41 years.

OTHER WATERBIRDS

The 2022/23 index was higher than the 2021/22 index for five of the six other waterbird species in Table 1, with the exception being Moorhen (10-year trend -8%). Little Egret (10-year trend +60%) and Cormorant (10-year trend +31%) again had record high indices in 2022/23.

For all trend graphs see the online report:

www.bto.org/webs-reporting



OYSTERCATCHER BY LIZ CUTTING/BTO

Table 1 Population trends of non-breeding waterbirds in the UK.

Species/population	25-year trend (1996/97-2021/22)	10-year trend (2011/12-2021/22)	Species/population	25-year trend (1996/97-2021/22)	10-year trend (2011/12-2021/22)
▲ Dark-bellied Brent Goose	-16	-6	▲ Scaup	-68	-53
▲ Svalbard Light-b. Brent Goose	25	-27	n/a Eider*	-31	-26
▼ Canadian Light-b. Brent Goose	81	5	▼ Goldeneye	-54	-24
n/a Canada Goose	73	28	▬ Goosander	-28	-2
n/a Naturalised Barnacle Goose	235	37	▬ Red-breasted Merganser	-46	-24
▬ Greenland Barnacle Goose	47	-10	▬ Little Grebe	38	14
▬ Svalbard Barnacle Goose	63	4	▬ Great Crested Grebe	-19	-2
n/a British/Irish Greylag Goose	200	21	▲ Little Egret	933	60
▼ Icelandic Greylag Goose	-22	-41	▼ Cormorant	52	31
▲ Pink-footed Goose	92	43	▬ Moorhen	-14	-8
▼ Greenland White-fronted Goose	-50	-7	▬ Coot	-26	-23
▬ European White-fronted Goose	-75	-40	▬ Oystercatcher	-21	-9
n/a Mute Swan	11	-2	▲ Avocet	234	33
▼ Bewick's Swan	-96	-91	▼ Lapwing	-46	-10
▲ Whooper Swan	203	19	▼ Golden Plover	-21	3
n/a Egyptian Goose	550	82	▼ Grey Plover	-35	-7
▬ Shelduck	-26	0	▬ Ringed Plover	-46	2
n/a Mandarin	176	45	▼ Curlew	-32	-20
▲ Shoveler	63	39	▲ Bar-tailed Godwit	-37	-29
▲ Gadwall	70	3	▲ Black-tailed Godwit	138	19
▬ Wigeon	-11	-5	▬ Turnstone	-21	-1
▼ Mallard	-33	-18	▬ Knot	1	-3
▬ Pintail	-18	22	▲ Sanderling	47	18
▲ Teal	11	-4	▬ Dunlin	-34	6
▼ Pochard	-74	-43	▼ Purple Sandpiper	-15	2
▼ Tufted Duck	-15	-15	▬ Redshank	-19	3

Trends are % changes of smoothed population index values for the most abundant waterbirds in the UK. *Eider trends exclude birds on Shetland (of *faeroeensis* race).

The longer term smoothed trend refers to the 25-year period 1996/97 to 2021/22. The shorter term smoothed trend refers to the 10-year period 2011/12 to 2021/22. Note, it is customary to truncate the final year when reporting smoothed trends, so whilst data from 2022/23 have been used in creating the smoothed index values, the trend period assessed and reported is until 2021/22.

Preceding each species is an indication of flyway population trend, based on: Nagy, S. & Langendoen, T. 2022. *Report on the Conservation Status of Migratory Waterbirds in the Agreement Area, Eighth Edition*. Wetlands Int., NL. ▲ increasing, ▼ decreasing, ▬ stable, n/a not applicable as population is non-native (Canada Goose, Egyptian Goose, Mandarin) or non-migratory (Mute Swan, British/Irish Greylag Goose, Naturalised Barnacle Goose and Eider*).

Trends use WeBS data except for Pink-footed Goose, Greenland White-fronted Goose, Icelandic Greylag Goose, Greenland Barnacle Goose, Svalbard Barnacle Goose and Canadian Light-bellied Brent Goose, for which dedicated censuses are undertaken (see pages 35–37). The Icelandic-breeding Goose census include birds residing in other countries at the time of the census.

Oystercatcher down 9% since 2011/12

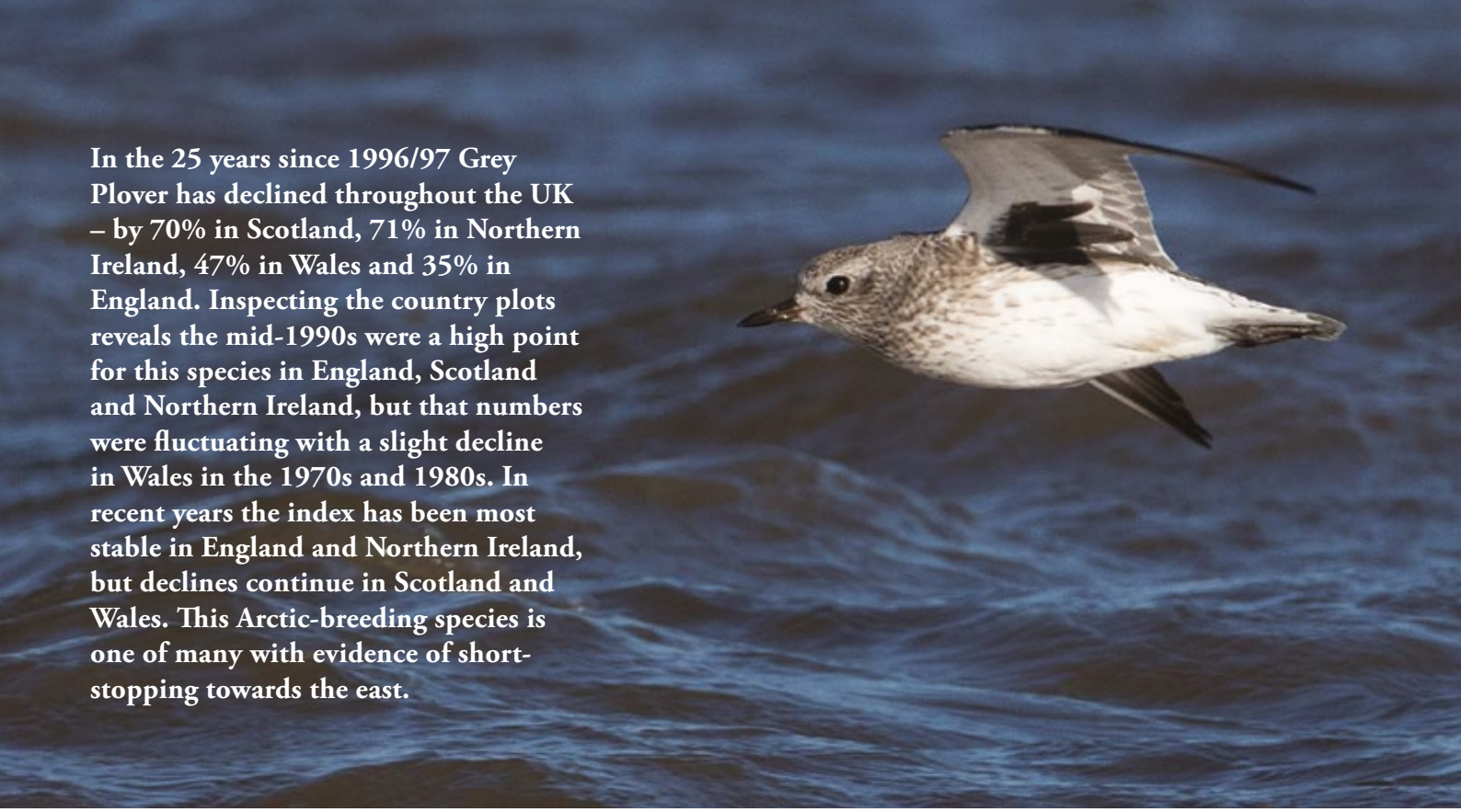
Table 2 Population trends of non-breeding waterbirds in the constituent countries.

Species/population	Scotland		Northern Ireland		England		Wales	
	25-year trend (1996/97-2021/22)	10-year trend (2011/12-2021/22)	25-year trend (1996/97-2021/22)	10-year trend (2011/12-2021/22)	25-year trend (1996/97-2021/22)	10-year trend (2011/12-2021/22)	25-year trend (1996/97-2021/22)	10-year trend (2011/12-2021/22)
Dark-bellied Brent Goose					-16	-6	-55	-39
Svalbard Light-bellied Brent Goose	259	5			22	-29		
Canadian Light-bellied Brent Goose	2,040	106	58	0	9,700	104	3,200	57
Canada Goose	518	57	-37	-39	60	26	223	37
Naturalised Barnacle Goose			96	-8	216	26		215
Greenland Barnacle Goose	47	-10						
Svalbard Barnacle Goose	59	1			62	3		
British/Irish Greylag Goose	367	95		-11	188	17	92	51
Icelandic Greylag Goose	-22	-41						
Pink-footed Goose	85	25			72	-6		
Greenland White-fronted Goose	-50	-8						-28
European White-fronted Goose					-79	-36		
Mute Swan	8	-3	-30	44	16	-5	44	-11
Bewick's Swan					-95	-88		
Whooper Swan	51	-17	72	1	300	20	250	14
Egyptian Goose					550	82		
Shelduck	-10	8	-9	-9	-29	1	-10	-8
Mandarin					138	43		
Shoveler	-49	11	-27	28	75	39	-1	-18
Gadwall	72	35	10	15	64	0	262	52
Wigeon	-17	10	-42	18	-7	-6	4	1
Mallard	-42	-16	-27	-12	-33	-20	-23	-2
Pintail	1	10	140	29	-26	19	11	32
Teal	7	8	57	18	11	-9	15	13
Pochard	-84	-52	-86	-60	-67	-35	-88	-65
Tufted Duck	-18	-14	-77	-37	13	-12	26	-10
Scaup	-50	-37	-79	-74	-95	-90	-89	-15
Eider*	-38	-32	144	12	-50	-28	67	139
Goldeneye	-33	-3	-90	-71	-41	-22	-58	-37
Goosander	-14	13			-38	-9	148	35
Red-breasted Merganser	-42	-11	-29	4	-51	-38	-60	-28
Little Grebe	113	48	18	65	28	3	62	25
Great Crested Grebe	-37	-6	-57	12	-7	-2	8	-16
Little Egret		2,125		389	755	47	1,660	96
Cormorant	-17	20	32	39	67	33	43	16
Moorhen	11	41	-23	4	-17	-13	-6	28
Coot	-53	-18	-41	49	-22	-25	-36	-22
Oystercatcher	-44	-27	-33	-22	-22	-6	3	-5
Avocet					254	38		
Lapwing	-63	4	-67	-24	-42	-8	-16	-20
Golden Plover	-36	22	-66	-13	-9	7	92	15
Grey Plover	-70	-36	-71	-11	-35	-6	-47	-41
Ringed Plover	-24	15	-39	-3	-50	-7	-43	-15
Curlew	-29	-16	-38	-20	-33	-21	-33	-18
Bar-tailed Godwit	-50	-33	-19	-14	-35	-28	-45	-59
Black-tailed Godwit	467	292	554	60	131	20	189	-16
Turnstone	-35	-11	-34	-26	-17	3	26	34
Knot	-48	-35	-58	16	7	-2	-7	-40
Sanderling	185	39	2,100	340	43	14	-51	-26
Dunlin	-30	31	-38	73	-33	4	-54	-26
Purple Sandpiper	27	-14	-52	0	-26	7		
Redshank	-22	8	-26	3	-16	2	31	10

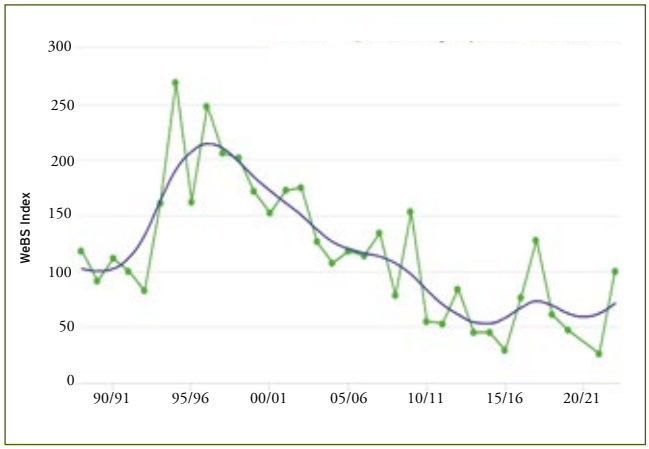
Trends are % changes of smoothed population index values for the most abundant waterbirds in the UK; note these may only be present in small numbers in some countries.
*Eider trends exclude birds on Shetland (of *faeroeensis* race).

The longer term smoothed trend refers to the 25-year period 1996/97 to 2021/22. The shorter term smoothed trend refers to the 10-year period 2011/12 to 2021/22. Note, it is customary to truncate the final year when reporting smoothed trends, so whilst data from 2022/23 have been used in creating the smoothed index values, the trend period assessed and reported is until 2021/22.

Trends use WeBS data except for Pink-footed Goose, Greenland White-fronted Goose, Icelandic Greylag Goose, Greenland Barnacle Goose, Svalbard Barnacle Goose and Canadian Light-bellied Brent Goose, for which dedicated censuses are undertaken (see pages 35–37).

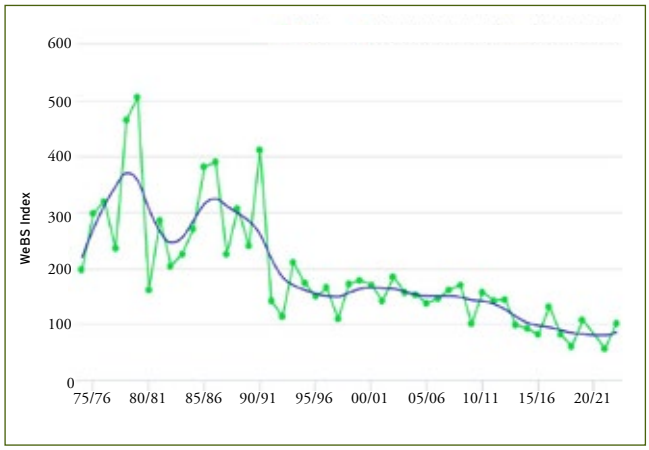


In the 25 years since 1996/97 Grey Plover has declined throughout the UK – by 70% in Scotland, 71% in Northern Ireland, 47% in Wales and 35% in England. Inspecting the country plots reveals the mid-1990s were a high point for this species in England, Scotland and Northern Ireland, but that numbers were fluctuating with a slight decline in Wales in the 1970s and 1980s. In recent years the index has been most stable in England and Northern Ireland, but declines continue in Scotland and Wales. This Arctic-breeding species is one of many with evidence of short-stopping towards the east.

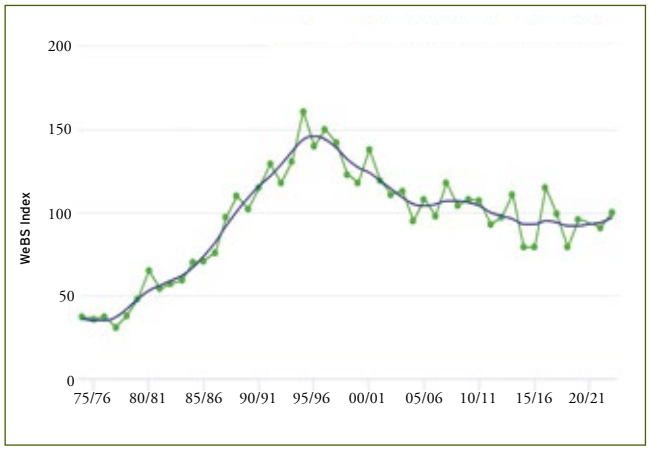


▲ **WeBS trend for Grey Plover in Northern Ireland.**
Green dots = annual index; blue line = smoothed trend.

▲ **WeBS trend for Grey Plover in Scotland.**
Green dots = annual index; red dots = sparse data; blue line = smoothed trend.



▲ **WeBS trend for Grey Plover in Wales.**
Green dots = annual index; red dots = sparse data; blue line = smoothed trend.



▲ **WeBS trend for Grey Plover in England.**
Green dots = annual index; blue line = smoothed trend.

GREY PLOVER BY LIZ CUTTING/BTO

Largest waterbird aggregations

The UK's wetlands support millions of waterbirds each winter.

WeBS site totals indicate which sites support the largest aggregations of waterbirds each year. Understanding precisely how many individual birds use a site is clearly very difficult to ascertain from counts alone, as many sites are used by migrants on passage and consequently there can be high turnover rates.

Table 3 lists the Principal Sites for non-breeding waterbirds. The totals are the summed counted maxima for each species during the course of the WeBS year (missing counts are not imputed; supplementary counts are included). Sites with a five-year average of 20,000+ waterbirds are listed. Non-native species (*e.g.* Canada Goose and Mandarin) have been excluded from the totals. Although an important component of a site's waterbird fauna, gulls and terns are also excluded, since the recording of them during WeBS Counts is optional.

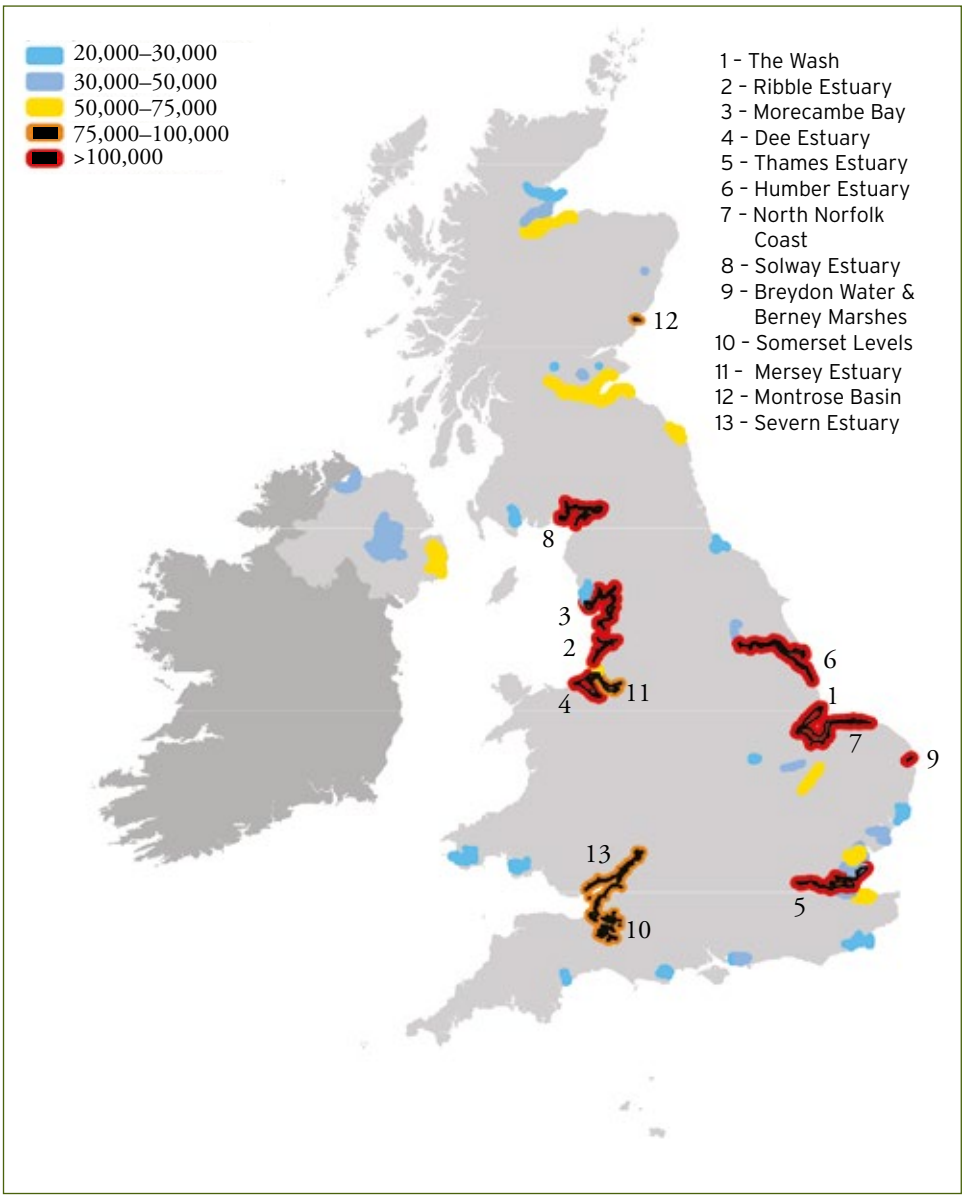
In addition to Table 3, it is possible to view the totals for all WeBS sites via the WeBS Online Report 'Site Totals' tab. In the interactive table of sites, non-native species, gulls and terns and supplementary counts can be included or omitted as desired by the user. By default only the major sites with over 1,000 birds are listed, but the filter can be changed to all sites in a county or country. Selecting a site will show the species for which that site holds more than the national or international importance thresholds.

IMPORTANT NOTE

Some monthly surveys in 2020 and 2021 were affected by COVID-19 restrictions. As a result, this may have depressed site-species peaks, and in turn, the site waterbirds aggregation total for the 2019/20 and 2020/21 years, and hence the five-year mean for certain sites in Table 3. The site-species peak for each site is available on the WeBS Report Online. If the species peak for a given site has typically been from a month affected by COVID-19 restrictions during 2019/20 or 2020/21, the month of the peak is bracketed online. Furthermore, the peak count value itself has been bracketed to indicate that it would be expected to have been higher had complete counts been available from the months affected by the COVID-19 restrictions and may in turn have affected (generally depressing) the five-year mean. See page 41 for more information.

SITE FOCUS

The number of sites with a five-year average in excess of 100,000 birds remained at nine. In 2022/23, 49 sites again had a five-year average in excess of 20,000 birds, the same as in 2021/22. The Tees Estuary has now exceeded 20,000 birds, while WWT Martin Mere has dropped off the list due to lower numbers of Pink-footed Geese being counted on the site than in recent years.



▲ **Sites with a five-year average of 20,000+ waterbirds. Sites above 75,000 birds listed.**

Table 3 Principal Sites for non-breeding waterbirds in the UK.

Site	2018/19	2019/20	2020/21	2021/22	2022/23	5-year mean
The Wash	417,911	401,679	431,763	405,730	458,466	423,109
Ribble Estuary	238,264	202,867	247,075	228,704	173,730	218,128
Morecambe Bay	207,608	151,175	144,034	168,114	187,972	171,780
Dee Estuary (England and Wales)	150,498	145,220	169,894	166,457	158,140	158,041
Thames Estuary	160,934	173,072	126,557	120,106	125,252	141,184
Humber Estuary	141,794	115,997	129,758	171,403	122,602	136,310
North Norfolk Coast	107,972	148,879	153,657	124,203	133,752	133,692
Solway Estuary	132,381	132,251	128,377	132,628	118,085	128,744
Breydon Water and Berney Marshes	97,263	141,204	125,987	123,105	31,272	103,766
Somerset Levels	117,214	99,120	90,413	72,417	81,572	92,147
Mersey Estuary	85,817	72,612	77,098	82,741	128,898	89,433
Montrose Basin	94,422	87,695	96,899	93,048	70,816	88,576
Severn Estuary	85,544	64,866	66,589	84,153	82,056	76,641
Blackwater Estuary	80,767	93,723	60,631	71,731	63,781	74,126
Forth Estuary	71,850	79,057	84,147	65,083	66,842	73,395
Swale Estuary	73,273	66,897	65,279	89,865	69,225	72,907
Inner Moray and Beauly Firths	67,755	81,475	65,413	44,699	57,608	63,390
Ouse Washes	95,068	39,722	49,829	64,266	50,572	59,891
Strangford Lough	65,649	59,653	52,168	62,877	58,859	59,841
Alt Estuary	65,201	67,167	67,794	41,370	42,686	56,843
Lindisfarne	49,041	72,542	69,773	46,372	46,242	56,794
Crouch-Roach Estuary	34,091	59,332	53,413	42,748	52,550	48,426
Medway Estuary	43,544	43,327	45,285	42,485	53,612	45,650
Stour Estuary	53,091	38,119	34,512	42,877	40,237	41,767
Abberton Reservoir	45,478	37,601	46,987	38,264	36,796	41,025
Loughs Neagh and Beg	52,644	46,257	34,883	32,390	33,424	39,919
Cromarty Firth	39,037	38,769	41,077	35,812	38,611	38,661
Nene Washes	31,918	39,728	47,929	37,596	34,993	38,432
Loch Leven	44,622	39,016	29,524	33,270	40,297	37,345
Chichester Harbour	39,062	33,658	33,134	36,941	38,432	36,245
Hamford Water	42,136	41,233	32,412	32,304	23,342	34,285
Lower Derwent Ings	29,023	34,493	35,914	31,165	36,514	33,421
Loch of Skene	57,377	25,113	17,159	20,406	44,553	32,921
Dengie Flats	43,932	36,487	16,521	18,206	39,177	30,864
Lough Foyle	36,477	29,991	26,665	27,565	32,569	30,653
Burry Inlet	38,110	18,208	31,347	29,061	22,345	27,814
Dornoch Firth	29,920	25,712	27,385	23,834	24,805	26,331
Langstone Harbour	24,324	26,132	22,906	26,428	30,404	26,038
Alde Estuary	22,393	30,416	16,876	29,176	28,185	25,409
Poole Harbour	25,697	27,797	22,131	25,037	23,827	24,897
Rutland Water	24,937	25,213	23,042	26,142	24,071	24,681
Wigtown Bay	26,828	16,421	31,170	21,338	25,087	24,168
Dungeness and Rye Bay	28,540	23,818	16,367	27,125	22,406	23,651
Cleddau Estuary	24,836	21,931	26,236	22,979	21,679	23,532
Carsebreck and Rhynd Lochs	26,576	27,571	19,930	26,075	13,503	22,731
Duddon Estuary	23,218	29,474	19,062	17,840	22,705	22,459
The Wilderness - Ladybank	19, 108	16,634	29,158	22,849	15,703	20,690
Tees Estuary	21,421	18,187	19,523	20,246	22,895	20,454
Exe Estuary	21,626	19,484	20,171	18,774	20,622	20,135

- Totals are the sum of species maxima during the WeBS year at each site, using data from all months. **This summary does not account for missed visits or reduced coverage, from COVID-19 restrictions or otherwise.**
- Some totals may differ slightly from those published in previous annual WeBS reports due to late or amended data.
- Non-native species (such as Canada Goose and Mandarin), are excluded, as are gulls and terns due to incomplete coverage.
- A more comprehensive table showing all sites is available online via: **www.bto.org/webs-reporting-site-totals**

Travellers from the north and north-east

A look at UK waterbird connections with Svalbard, Scandinavia, the countries around the Baltic Sea and Russia.

By **Teresa Frost** BTO

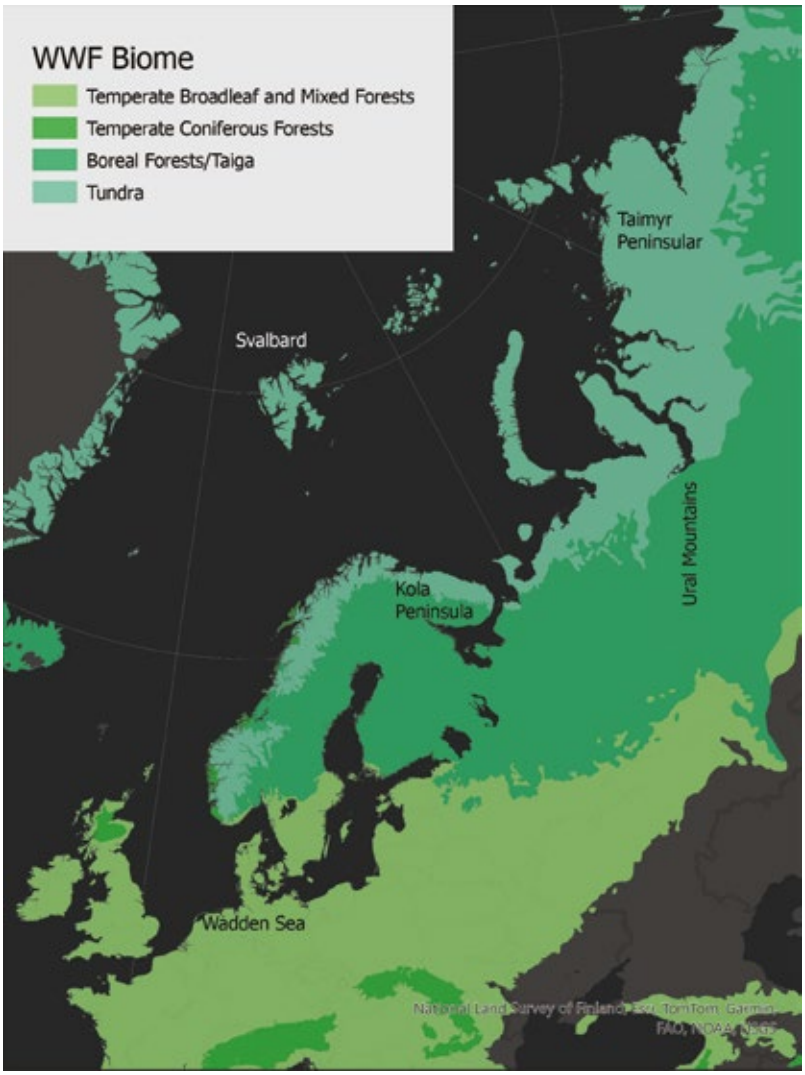
When numbers start dwindling on your WeBS site as spring arrives, there's a good chance that a proportion of the birds you have been dutifully tallying all winter long, have headed across the North Sea towards breeding grounds in northern Europe and the Arctic. They do so to take advantage of long summer days, when ice melts providing ideal nesting sites close to nutrient-rich waters supporting abundant invertebrate life for feeding chicks; less competition for resources compared with temperate regions; and relatively low density of predators.

Taiga, or Boreal Forest, has a subarctic climate and is characterised by spruce, pines, birch and larches interspersed with boggy wetlands and open areas. Common Scoter, Goldeneye, Wigeon, Golden Plover, Green Sandpiper, Red-throated Diver and Taiga Bean Goose are among the waterbirds that breed in this bioregion.

More temperate areas south of the Taiga are favoured by species which breed in the UK as well as migrating east, such as Coot, Shoveler, Pintail, Lapwing, Common Snipe and Black-headed Gull. Norwegian and Danish coasts are favoured by birds that also breed around UK coasts, such as Oystercatcher and Ringed Plover.

In the far north, tree growth is hindered, and Taiga turns to Tundra. The open habitats here are used by some species that use Taiga habitats as well, but other species or sub-species specialise in the high Arctic. Waders are particularly dependent on Tundra habitats, including such species as Bar-tailed Godwit, Grey Plover, Sanderling and also geese and swans such as European White-fronted Goose and Tundra Bean Goose.

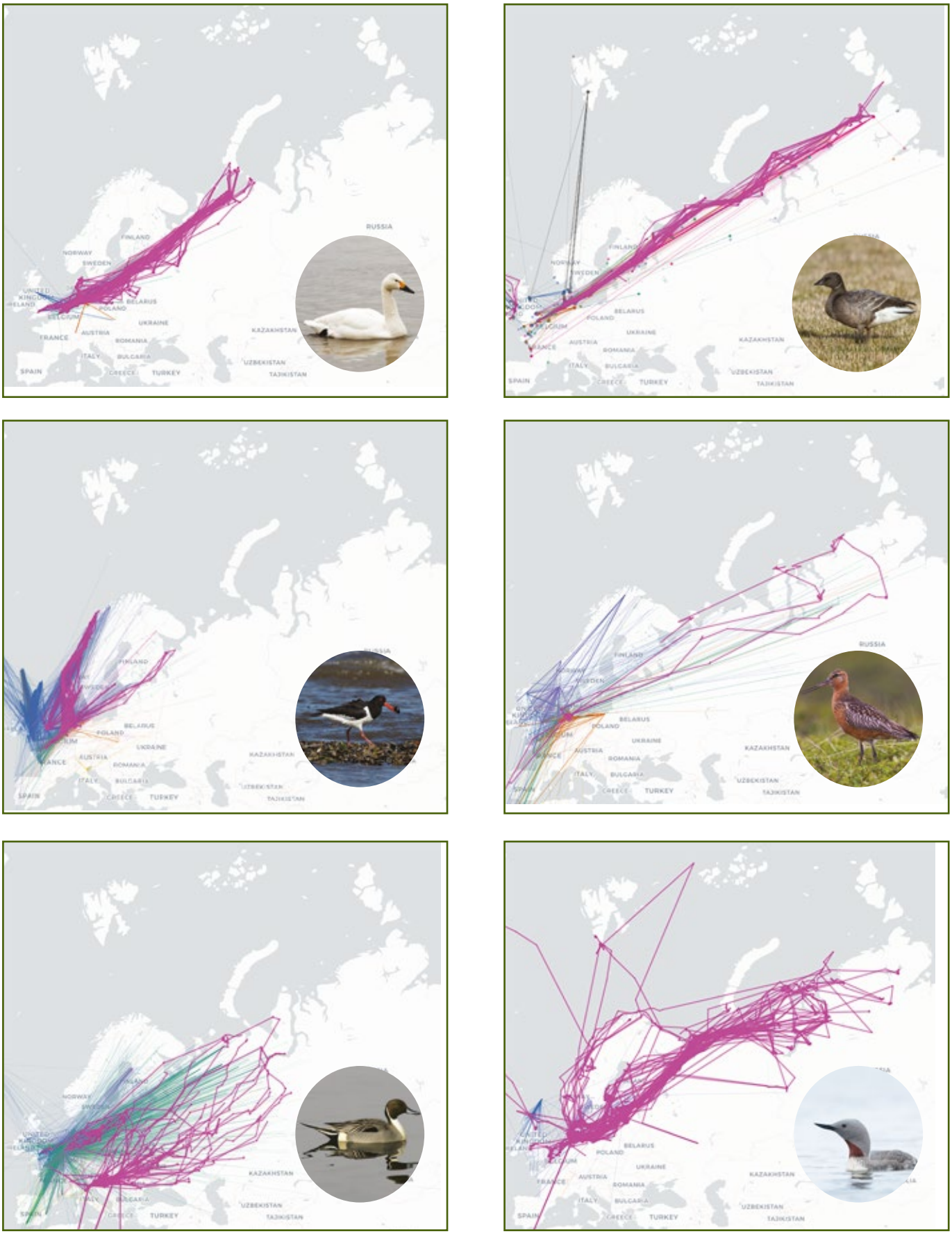
Although many species breed over large areas of suitable habitat, circumpolar in some cases, others are more constrained in the region used. For example, Bewick's Swan that winter in north-west Europe breed between the Kola Peninsula and Ural Mountains in Russia. The Light-bellied Brent Geese that winter at Lindisfarne head north to breed on Svalbard, whereas Dark-bellied Brent Geese that winter in south-east England and the Wadden Sea breed in the northeast, on the Taimyr Peninsula.



▲ **Map of waterbird migration and breeding areas to the north-east of the UK. WWF biome data from Olson *et al.* 2001.**

In the past, knowledge of migration routes has relied on ringing recoveries, which made it difficult to study the breeding range of populations that use remote areas. Tracking technology has unlocked many of these secrets in recent years, but even for species as familiar as a Mallard, we have much to learn about the proportions of our winter birds that breed in different countries and regions.

As it is difficult to monitor in remote areas during the breeding season, monitoring the winter populations in the UK and other parts of west Europe and Africa through WeBS and the International Waterbird Census is vital for assessing the fortunes of migrant waterbirds of northern Europe and the Arctic.



BEWICK'S SWAN AND PINTAIL BY EDMUND FELLOWES/BTO; BAR-TAILED GODWIT BY ANDREAS TREPTE, CC BY-SA 2.5 VIA WIKIMEDIA COMMONS; RED-THROATED DIVER BY SARAH KELMAN/BTO; OYSTERCATCHER BY LIZ CUTTING/BTO; BRENT GOOSE BY JOHN HARDING/BTO

▲ **Tracking data (purple) and ringing recoveries (other colours) for a selection of waterbird species where all or some of UK wintering birds travel north or north-east to breed. Top: Tundra breeding Bewick's Swan (left) and Svalbard Light-bellied Brent Goose and Dark-bellied Brent Goose (right). Middle: coastal breeding Oystercatcher (left) and Tundra breeding Bar-tailed Godwit (right). Bottom: Taiga and temperate breeding Pintail (left) and Taiga and Tundra bog breeding Red-throated Diver (right).**
For tracking data sources please see the *Bird Migration Atlas* (Spina *et al.*)

Short-stopping and short-staying

A closer look at the terminolgy and phenomena.

By **Teresa Frost** BTO

Situated as we are, at the edge of the flyway of many migratory waterbird populations, it is impossible to discuss trends in wintering waterbirds in the UK without soon referring to shifts in the flyway winter ranges and habits of many species in response to environmental change.

Some species, such as Grey Plover, hold winter territories or are site faithful on an individual basis to their regular winter resorts; whereas for others such as Lapwing, individuals can be more nomadic in their habits and quickly respond to adverse weather conditions by moving.

But even in species that are site faithful, shifts in migratory behaviour can happen generationally. A study of Black-tailed Godwit found that, with warming temperatures, there has been increased juvenile settlement of previously less favoured wintering sites in the UK compared to the traditional sites in Iberia (Nightingale 2023). This contributes to the increasing UK trend for this Icelandic-breeding population, and is a rare case where UK numbers of a waterbird are probably being increased by "short-stopping" – the idea that the centre of the wintering population is stopping short of its original destination.

SHORT-STOPPING

First mentioned in the scientific literature in two papers on Canada Geese in North America in 1967, the evidence for short-stopping for many winter waterbird migrants is growing. For birds travelling from or via the north and north-east of the UK, short-stopping can sometimes mean the east coast of the UK rather than the west coast or the island of Ireland, or countries to the north-east of us, such as the Netherlands, Denmark or further east.

Elmberg *et al*. (2014) advocate distinguishing between 'winter full short-stopping', where the species/population ceases using an area entirely and uses a new area instead, and 'winter partial short-stopping' where the extent of the winter range may be unchanged, but more birds remain closer to the breeding area than was previously the case. Here in the UK, we tend to mean winter partial short-stopping when discussing short-stopping, but there are some cases where sites have ceased to be used almost completely, such as the East Anglian wintering sites of Taiga Bean Goose.

Terminology guide

Short-stopping: not migrating as far as before at the population level, particularly in autumn migration, so that the winter distribution is closer to the breeding distribution. Occasionally used more broadly for other range shifts, including changes in breeding range.

Short-staying: delayed autumn migration and/or advanced spring migration at the population level, so that the time spent in the wintering area is less than before.

SHORT-STAYING

The short-staying effect can be misinterpreted as, or confounded with, short-stopping. In cases like WeBS trends, for example, which are defined as measuring the average number of birds over the whole of the winter, and not the peak number present in the winter it can be difficult to know whether a decline is caused by population change, short-stopping, short-staying, or a mixture.

CAUSES OF SHORT-STOPPING AND SHORT-STAYING

Climate-change related factors seem to be the biggest cause of short-stopping, particularly for species able to take advantage of areas that were previously inhospitable due to freezing. This may be aided by the creation of new habitats or reserves in the flyway that increase suitable habitat closer to the breeding areas, so that birds do not need to migrate as far (Burton *et al*. 2023).

FIND OUT MORE

Burton, N.H.K., Daunt, F., Kober, K., Humphreys, E.M. & Frost, T.M. 2023. Impacts of Climate Change on Seabirds and Waterbirds in the UK and Ireland. *MCCIP Science Review 2023.*

Elmberg, J., Hessel, R., Fox, A.D. & Dalby, L. 2014. Interpreting seasonal range shifts in migratory birds: a critical assessment of 'short-stopping' and a suggested terminology. *Journal of Ornithology* **155**: 571–589.

Nightingale, J. 2023. *Juvenile settlement as a driver of population responses to environmental change in a migratory shorebird*. PhD thesis, University of Aveiro, Portugal.

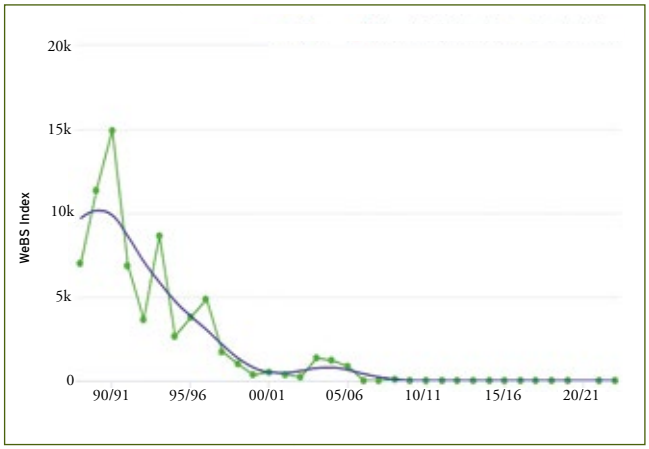
Olson, D.M., Dinerstein, E., Wikramanayake, E.D., Burgess, N.D., Powell, G.V.N., Underwood, E.C., D'Amico, J.A., Itoua, I., Strand, H.E., Morrison, J.C., Loucks, C.J., Allnutt, T.F., Ricketts, T.H., Kura, Y., Lamoreux, J.F., Wettengel, W.W., Hedao, P., Kassem, K.R. 2001. Terrestrial ecoregions of the world: a new map of life on Earth. *Bioscience* **51**: 933–938.

Spina, F., Baillie, S.R., Bairlein, F, Fiedler, W. & Thorup, K. (Eds). 2022. *The Eurasian African Bird Migration Atlas*. **https://migrationatlas.org**. EURING/CMS.

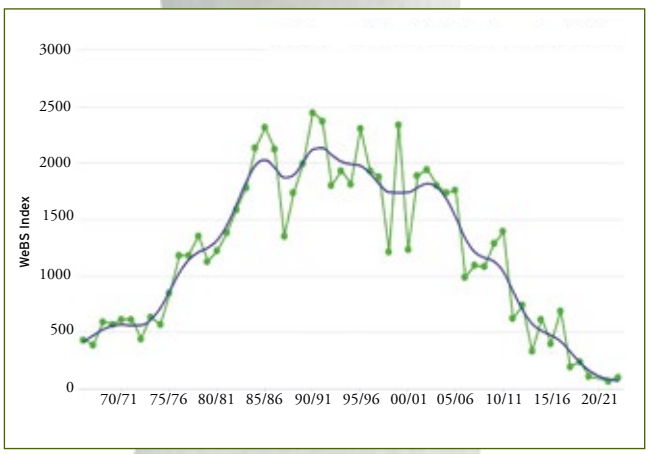
Bewick's Swan Case Study

A large database of resightings of Bewick's Swans with leg rings and neck bands enabled a deep dive into both short-stopping and short-staying in this species (Nuijten *et al. 2020*). For short-stopping, there was evidence that individuals decreased their migration distances over their lifetime as well as a generational shift. For short-staying though, individuals were consistent in their migration timing, and the short-staying effect was from a generational shift in migratory schedules. The overall effect is for the population to arrive later from the breeding grounds, stay further east (largely on the continent, rather than the UK and Ireland), and leave earlier.

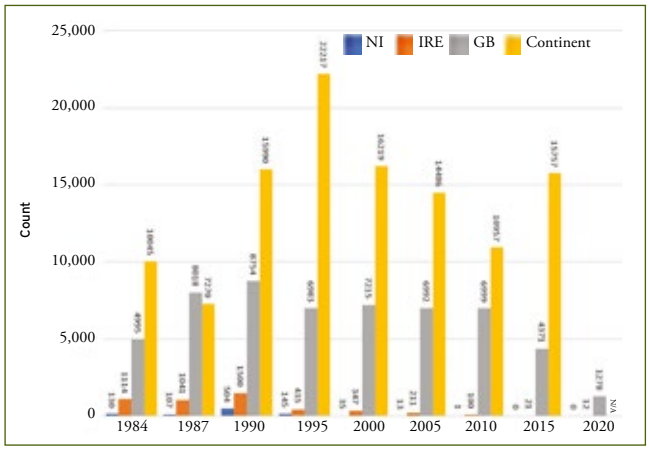
Short-stopping reduces the peak number of birds wintering in the UK, while short-staying additionally reduces the average number of birds over the winter period as a whole. This is likely to contribute to differences between the WeBS trend and GSMP/International Swan Census estimate of change over time. Over the 25 year period 1994/95–2019/20, the WeBS UK index based on seven months declined by 95%, whereas the census declined by 82% between January 1995 and January 2020.



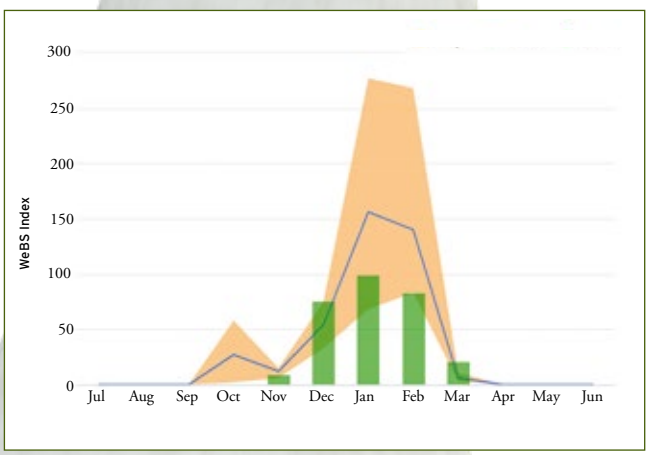
▲ **WeBS trend for Bewick's Swan in Northern Ireland.**
Green dots = annual index; blue line = smoothed trend.



▲ **WeBS trend for Bewick's Swan in Great Britain.**
Green dots = annual index; blue line = smoothed trend.



▲ **Totals for Bewick's Swan from the periodic International Swan Census.**



▲ **Monthly indices for Bewick's Swan in the UK.**
Green bars = 2022/23; blue line/orange hatched area = previous five-year mean/range.

BEWICK'S SWAN BY NEIL CALBRADE

Table 4 Evidence of short-stopping and short-staying in waterbirds.

Species	UK 25-year trend[9]	Flyway population trend[6]	Published evidence for short-stopping/short-staying
Dark-bellied Brent Goose	-	INC?	Generally accepted in the UK, but evidence rarely presented[2]
Taiga Bean Goose	(- -)	INC?	Generally accepted in the UK, but evidence rarely presented[2]
Icelandic Greylag Goose	-	DEC	Generally accepted in the UK, but evidence rarely presented[2]
European White-fronted Goose	- - -	STA	Generally accepted in the UK, but evidence rarely presented[2] Farmland species: non-statistically significant shift NE[8]
Bewick's Swan	- - -	DEC	Eastward shift 353 km from 1970–2017; time spent at wintering grounds reduced by 38 days since 1989[7] Farmland species: non-statistically significant shift NE[8]
Shelduck	-	STA	Shallow water species: shift NE in warm/wet but NE shift mid 90s-mid 00s not sustained[8]
Shoveler	+++	INC	Shallow water species: shift NE in warm/wet but NE shift mid 90s-mid 00s not sustained[8]
Gadwall	+++	INC	Shallow water species: shift NE in warm/wet but NE shift mid 90s-mid 00s not sustained[8]
Wigeon	-	STA	Shallow water species: shift NE in warm/wet but NE shift mid 90s-mid 00s not sustained[8]
Mallard	- -	DEC	Shallow water species: shift NE in warm/wet but NE shift mid 90s-mid 00s not sustained[8]
Pintail	-	STA/INC	Shallow water species: shift NE in warm/wet but NE shift mid 90s-mid 00s not sustained[8]
Teal	+	INC	Shallow water species: shift NE in warm/wet but NE shift mid 90s-mid 00s not sustained[8]
Pochard	- - -	DEC	Deep water species: NE shift in European distribution[8]
Tufted Duck	-	DEC?	Deep water species: NE shift in European distribution[8] Between early 80s and late 00s decreased by 103,500 birds in SW Europe, increased 82,400 in NE[3]
Scaup	- - -	INC	Between late 80s and mid 10s decreased in UK, Ireland & Netherlands and increased in countries to the east and north[5]
Goldeneye	- - -	DEC	Deep water species: NE shift in European distribution[8]. Between early 80s and late 00s decreased by 12,000 birds in SW Europe, increased 26,700 in NE[3]
Smew	(- - -)	STA?	Deep water species: NE shift in European distribution[8]
Goosander	- -	STA/INC	Deep water species: NE shift in European distribution[8] Between early 80s and late 00s decreased by 48,500 birds in SW Europe, increased 11,100 in NE[3]
Red-breasted Merganser	- -	STA/DEC?	Deep water species: NE shift in European distribution[8]
Great Crested Grebe	-	STA	Deep water species: NE shift in European distribution[8]
Grey Heron	(+)	STA/DEC	Shallow water species: shift NE in warm/wet but NE shift mid 90s-mid 00s not sustained[8]
Cormorant	+ + +	DEC (*carbo* NW Europe) INC (*sinensis* N/C Europe)	Deep water species: NE shift in European distribution[8]
Coot	- -	DEC/STA	Deep water species: NE shift in European distribution[8]
Oystercatcher	-	STA/DEC	Decreased wintering in SW Britain in mild winters[1]. UK centroid moved 38km ENE[4]
Grey Plover	- -	DEC	Decreased wintering in SW Britain in mild winters[1]. UK centroid moved 115km NNE[4]
Ringed Plover	- -	INC/STA (*hiaticula* N Europe) STA (*tundrae* NE Europe) STA (*psammodromus* Iceland)	Decreased wintering in SW Britain in mild winters[1]
Curlew	- -	DEC/STA	UK centroid moved 119km NE[4]
Bar-tailed Godwit	- -	INC (*lapponica*) DEC (*taymyrensis*)	Decreased wintering in SW Britain in mild winters[1]. UK centroid moved 89km E[4]
Knot	|	STA (*islandica* Greenland) DEC (*canutus* Siberia)	Decreased wintering in SW Britain in mild winters[1] UK centroid moved 77km E[4]
Sanderling	++	INC	Decreased wintering in SW Britain in mild winters[1]
Dunlin	- -	DEC (*schinzii* UK) STA (*alpina* NE Europe) DEC (*schinzii* Baltic) STA (*schinzii* Iceland) STA? (*arctica* Greenland)	Decreased wintering in SW Britain in mild winters[1]. UK centroid moved 75km NNE[4]
Redshank	-	STA (*robusta* Iceland) DEC (*totanus* UK) DEC (*totanus* C Europe)	Decreased wintering in SW Britain in mild winters[1]. UK centroid moved 30km NW[4]

- - - decline of 50% or more
- - decline of 25% or more
- decline of 10% or more over 25 years
DEC decline

+ + + increase of 50% or more
+ + increase of 25% or more
+ increase of 10% or more over 25 years
INC increase

( ) indicates UK trend considered less robust
| decline or increase less than 10%
STA stable

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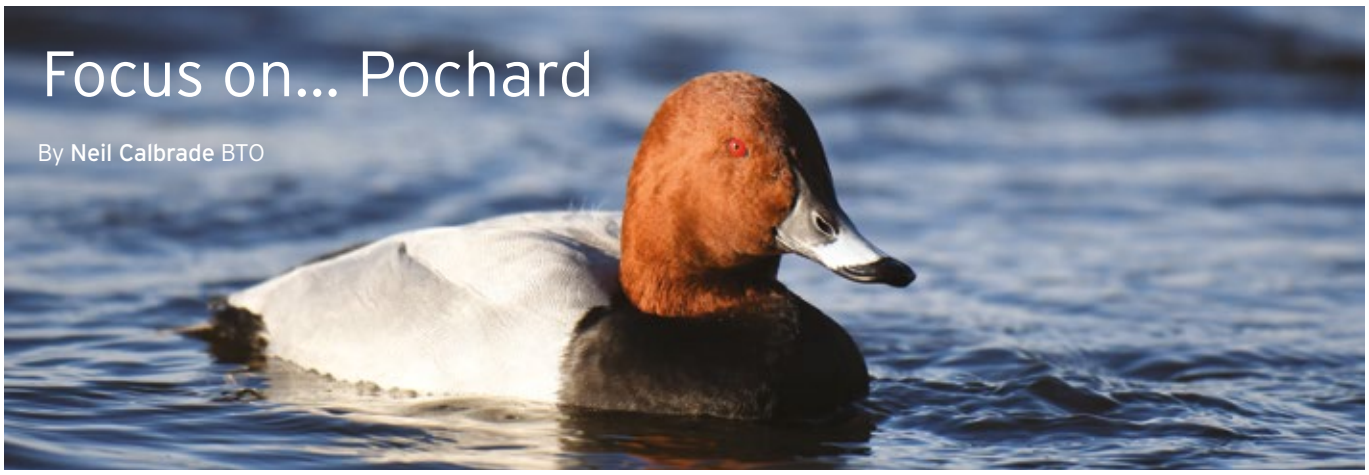
9. See Table 1 (Page 11)

MIXED *AYTHYA* DUCK FLOCK BY NEIL CALBRADE



Focus on... Pochard

By Neil Calbrade BTO

Pochard are found throughout Europe, breeding primarily in the steppe regions of Fennoscandia and Siberia, and wintering further south and west. In the UK, they are a familiar species with WeBS Counters, with the most recent GB wintering population estimate being 23,000 birds (Frost *et al.* 2019), with around 773 pairs staying to breed (Eaton *et al.* 2023).

The decline of Pochard in the UK since the early 1990s has concerned conservationists, with a -74% decrease since 1996/97 and a 21% range contraction in the UK between the *1981–84 Winter Atlas* and *Bird Atlas 2007–11* (Balmer *et al.* 2013). This has led to the species being Red listed in the UK Birds of Conservation Concern. Globally, Pochard is classed as Vulnerable on the IUCN Red List of Threatened Species.

Loughs Neagh and Beg remains the top site in the UK for Pochard with a five-year average of 4,880 birds, but peak numbers here have fallen, with a peak of just 2,535 in 2022/23 compared with a historical high of 40,876 in 1990/91. Aside from Loughs Neagh and Beg, only two other sites – Abberton Reservoir and Ouse Washes still hold internationally important numbers, with a further 14 sites holding nationally important numbers.

In Europe, male and female Pochard undergo different migrations, with females wintering further south, so undertaking longer migrations, which could result in a higher mortality rate (Brides *et al.* 2017). In Britain, the wintering Pochard population is about 70% males and 30% females, but this ratio varies with latitude from about 8:1 in the north of Scotland to 3:2 in southern England (Owen & Dix 1986).

Numbers of several other waterbird species (such as Wigeon and some seaduck species) that winter in western Europe are genuinely declining, linked to falling reproductive success and sex ratios. This is making it increasingly important to be able to differentiate between shifts in distribution and genuine declines in population size (Fox 2019).

FIND OUT MORE

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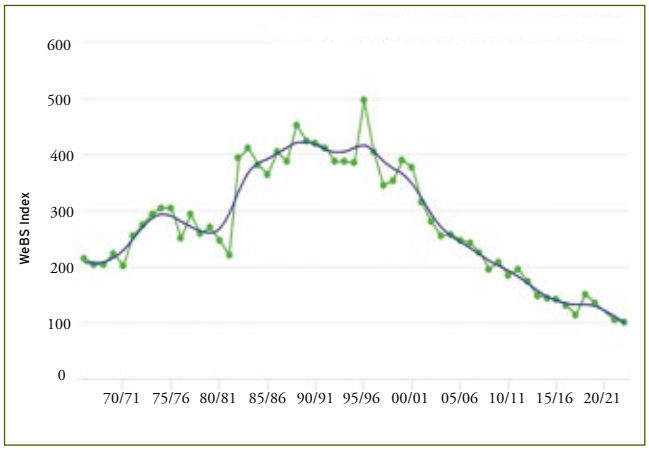
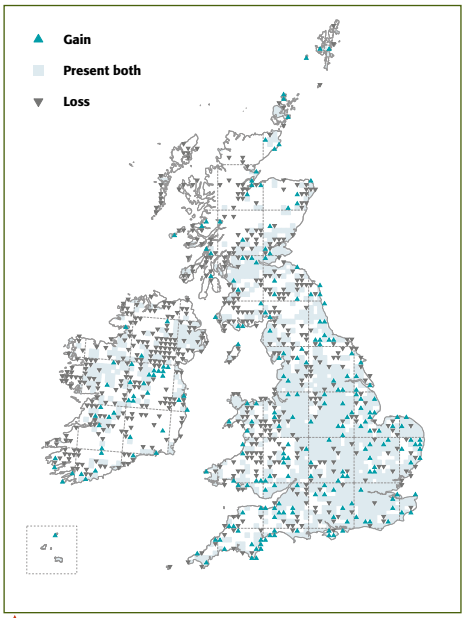


▲ **WeBS trend for Pochard in the UK.**
Green dots = annual index; blue line = smoothed trend.



▲ **Winter distibution change map from *Bird Atlas 2007–11* showing range contraction since the *1981–84 Winter Atlas*.**

POCHARD BY NEIL CALBRADE

Focus on... Tundra Bean Goose

By Neil Calbrade BTO

Until as recently as 2017, Bean Geese were treated as a single species *Anser fabalis,* with two distinct races, *Anser fabalis rossicus* and *Anser fabalis fabalis*, but these races are now widely treated as separate species – Tundra Bean Goose *Anser serrirostris* and Taiga Bean Goose *Anser fabalis*.

Taiga Bean Geese currently winter at two traditional sites in the UK, and are monitored as part of the Goose & Swan Monitoring Programme (GSMP) (page 36) whereas Tundra Bean Geese don't have any regular wintering sites in the UK, and single birds or small groups may turn up in goose flocks almost anywhere and are monitored by WeBS.

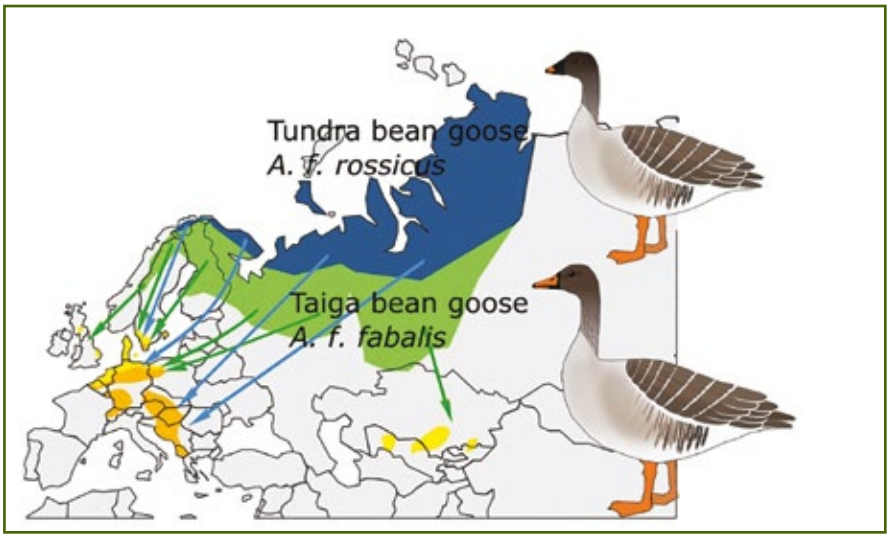
There are two races of Tundra Bean Geese. Birds of the race *rossicus* that winter in western and central Europe, and southwest Asia, have a more westerly distribution than those of the *serrirostris* race, breeding on tundra of northern Russia and northwest Siberia. Whereas birds of the *serrirostris* race breed on the tundra of northeast Siberia, and winter in eastern China, Korea, and Japan.

After breeding, birds initially gather in moulting areas relatively close to (and sometimes north of) breeding grounds before migrating west to traditional wintering grounds in NW Europe, reaching continental Europe as early as September (Heinicke 2010), though birds rarely appear in Britain before early January, perhaps also spending part of early winter in Denmark (Snow & Perrins 1998).

Although globally, Tundra Bean Geese (c700,000) hugely outnumber Taiga Bean Geese (c55,000), Tundra Bean Geese are far less numerous and widespread in the UK, and numbers wintering here vary massively between years, usually associated with cold weather on the continent.

The largest WeBS count on record of Tundra Bean Geese came from Breydon Water & Berney Marshes where 116 were counted in 2016/17, though usually, fewer than 50 birds are counted across the country.

In most winters, counts of Tundra Bean Geese, come from only a handful of sites, and in 2022/23, only one site – Loch Spiggie – had a double figure count, when 12 birds were present in December 2022. Away from Shetland, Tundra Bean Geese, were counted at only six other sites in the UK that winter.



Breeding and wintering distributions of the two species of Bean Geese in Europe. From Honka *et al.* (2017).

FIND OUT MORE

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TUNDRA BEAN GEESE BY GRAHAM CATLEY/BTO

Channel crossing Coot

Coot are much more migratory than many people realise, with winter numbers swelled by migrants from the continent.

By **Gill Birtles** BTO

Coot can be often overlooked when we visit our wetland sites – from when they are young scraggy chicks, a far cry from their regal adult form, to when they reach adulthood and their dark silhouette often merges into the background, making it easy to quickly glance over as we search for more charismatic species. It could be said that Coot were historically overlooked in monitoring terms too, only being added to those standard species monitored by the WeBS predecessor scheme National Wildfowl/Waterfowl Counts in 1982/83.

When looking at the graphs on the WeBS Report Online, it may seem that changes in their numbers aren't anything to worry about, with a peak in the 2000/01, then slowly declining to their 1985/86 levels. However, there has been a 26% decline in the UK winter population since 1996/97. Decreases in the UK wintering Coot populations may be a sign of overall population decline (Austin *et al.* 2014), so consideration should be given to the composition of our Coot population.

The UK's Coot population is made up of both resident and migratory Coot populations. When we think of migratory species which visit our shores in the winter, we think of the likes of Pink-footed Geese and Bar-tailed Godwits (see page 27), not the humble Coot. However, breeding Coot from across western and southern Europe, including France, the Netherlands, Germany and Denmark travel across to the UK to spend their winters in our milder climate, returning in February/March. Therefore, short-stopping has to be considered when looking at the trends of recent years.

It is also estimated that the rate of the decline of the European population of Coot is likely to approach 30% over 21 years (which equates to three generations) (BirdLife International 2015) due to many threats such as hunting (Evans & Day 2002), lead poisoning (Mondain-Monval *et al.* 2001), habitat degradation and loss from changing wetland management practices (Grishanov *et al.* 2006).

The distances that Coot have been known to travel can be quite surprising. A Coot that was ringed in Kensington Gardens, London, in 2017 where it was last seen in January 2021, was then spotted in St. Petersburg, Russia, in April 2021, just three months later. It was then seen again in London in March 2022, showing that it had completed a round trip of 4,000 km!

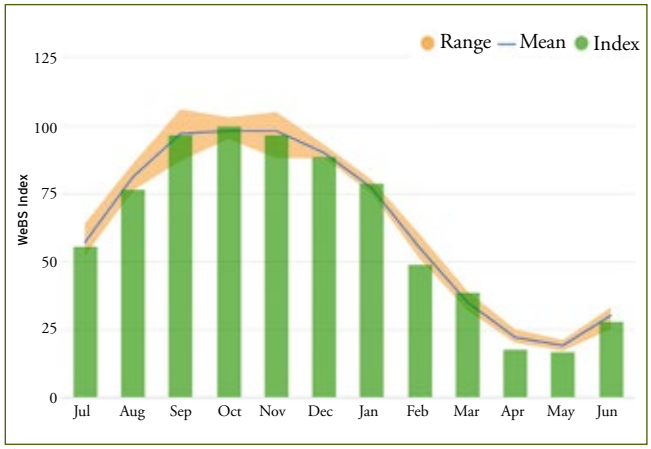
Coot favour shallow waterbodies due to their bottom feeding strategy of seizing plant material and returning to the surface to eat it. This means that they can occur in a wide range of habitats including: eutrophic and mesotrophic lakes, pools, ponds, reservoirs, barrages, gravel-pits, canals, drainage ditches, dykes, rivers and estuaries, as well as open marshes, freshwater meadows, flood-lands, freshwater and saline lagoons, salt-pans, and sewage ponds. They can be a gregarious species in the winter (Taylor & van Perlo 1998) but their numbers can vary greatly from site to site, from 7,692 counted at Abberton Reservoir, Essex, in 2022/23 to just two seen at Swineshaw Reservoir, Derbyshire in the same year. Therefore, it is worth looking for Coot at any site and worth setting up new sites which cover our smaller waterbodies so that we can continue to increase our understanding of where our Coot populations spend their time.

Table 5 Nationally important WeBS sites for Coot.

Site	2018/19	2019/20	2020/21	2021/22	2022/23	Month	5-year mean
Abberton Reservoir	7,125	6,262	12,816	4,613	7,692	Jan	7,702
Loughs Neagh and Beg	7,324	4,622	5,817	5,035	4,933	Nov	5,546
Loch Leven†	5,708	4,300	1,812	(2,375)	3,763	Sep	3,896
Chew Valley Lake	4,140	4,440	3,790	2,670	4,060	Oct	3,820
Hanningfield Reservoir	1,498	3,017	2,942	2,152	4,778	Sep	2,877
Rutland Water	2,573	3,159	2,525	3,105	2,254	Oct	2,723
Aqualate Mere	1,483	3,366	3,414	2,413	2,926	Nov	2,720
Thames Estuary	(2,361)	2,217	(2,266)	3,605	2,021	Jan	2,614
Grafham Water	1,904	1,355	2,305	2,053	3,771	Nov	2,224
Lee Valley Gravel Pits	1,976	2,476	1,996	1,642	2,512	Feb	2,120
Upper Lough Erne	1,082	813	832	1,005	770	Jan	900

• Annual peaks and month in 2022/23 when recorded are shown. Brackets indicate incomplete coverage. Five-year mean is for period 2018/19 to 2022/23.
† = Counts include supplementary data.

WeBS trend for Coot in the UK
Green dots = annual index; blue line = smoothed trend.



Monthly indices for Coot in the UK.
Green bars = 2022/23; blue line/orange hatched area = previous five-year mean/range.

FIND OUT MORE

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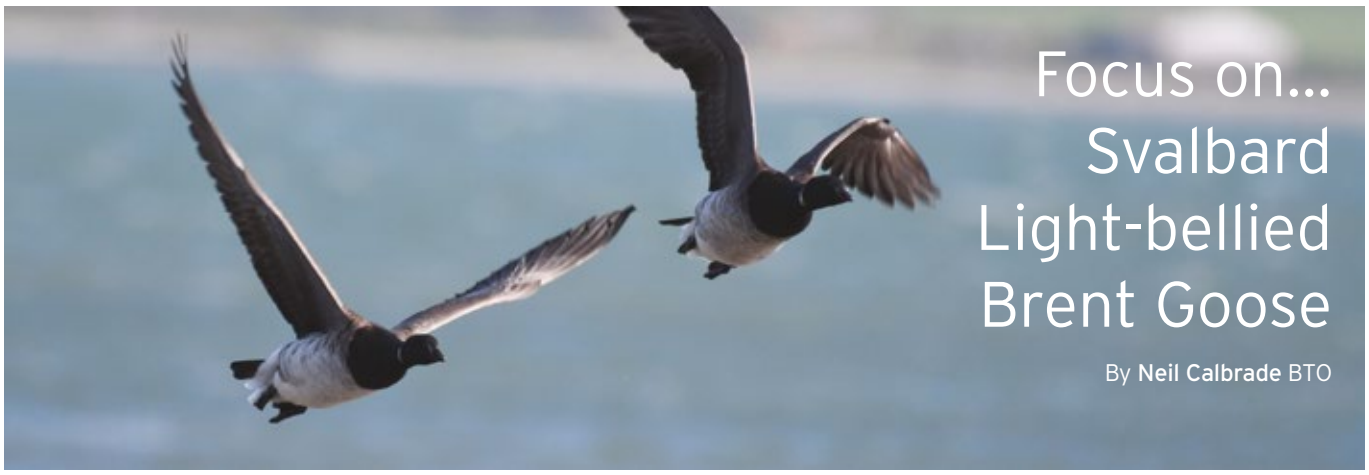
COOT BY NEIL CALBRADE



Focus on... Svalbard Light-bellied Brent Goose

By **Neil Calbrade** BTO

Two populations of Light-bellied Brent Goose are found in Britain and Ireland: the Canadian Light-bellied Brent Goose occurs primarily in Ireland and north-west England, and the Svalbard Light-bellied Brent Goose breeds on Svalbard and north-east Greenland and winters in the UK primarily at Lindisfarne, Northumberland.

The Svalbard population of the Light-bellied Brent Goose is the smallest discrete migratory goose population in the world. Traditionally, the main wintering sites were in Denmark, but Lindisfarne has become increasingly important. The earliest record in WeBS from here in 1960/61 had a peak of 945 birds, and by the mid 1980s a peak of 3,000 birds was recorded. The highest peak count in WeBS comes from 2010/11 when 5,612 birds were present, presumably due to severe weather in Denmark.

As shown by the monthly indices, the peak count in the UK occurs in October, and birds have been arriving at their wintering sites increasingly early, with a corresponding decrease in the use of the previous main autumn staging area in the Danish Wadden Sea (Denny *et al.* 2004).

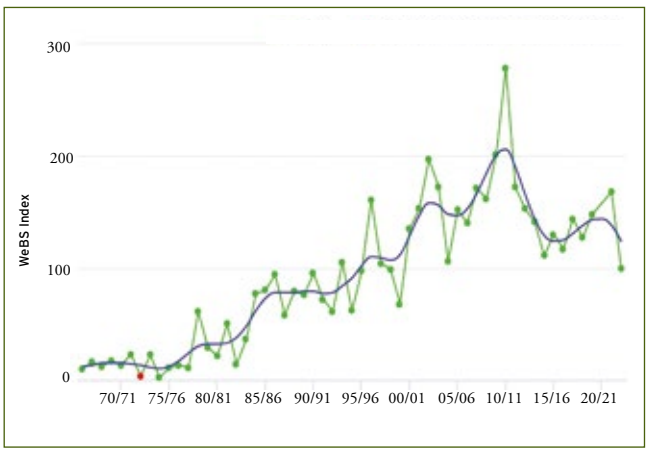
While birds arrive early in the autumn, birds also leave the UK early in the winter, and move from their wintering sites to spring staging areas in Denmark. At this time the whole population is found in Denmark. Evidence suggests that many may stop over at non-breeding sites in Svalbard before moving to the breeding areas (Denny *et al.* 2004), where they arrive at their nesting sites toward the end of May or in early June.

Svalbard Light-bellied Brent Geese undertake the longest unbroken migration of any European goose. Post-breeding and non-breeding birds moult on their breeding grounds in the high Arctic, that are further north than those of any other goose population, before migrating direct to Denmark or England.

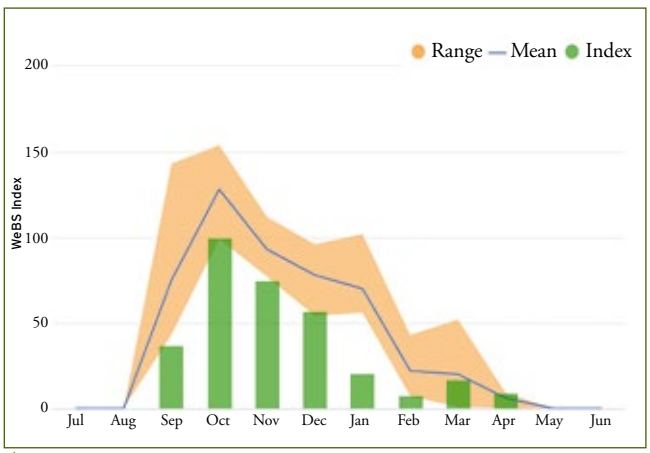
In 2022/23, the Lindisfarne peak was the lowest since 2016/17 with 2,850 birds. Away from Lindisfarne, small groups were seen at other sites, predominantly on the east coast with 142 in the Inner Moray and Beauly Firths being the highest count. Eight further sites recorded double figure counts, in the early part of the winter.

FIND OUT MORE

Denny, M.J.H., Clausen, P., Percival, S.M., Anderson, G.Q.A., Koffiberg, K. & Robinson, J.A. 2004. Light-bellied Brent Goose *Branta bernicla hrota* (East Atlantic population) in Svalbard, Greenland, Franz Josef Land, Norway, Denmark, the Netherlands and Britain 1960/61 – 2000/01. Waterbird Review Series, The Wildfowl & Wetlands Trust/Joint Nature Conservation Committee, Slimbridge.



▲ **WeBS trend for Svalbard Light-bellied Brent Goose in the UK.**
Green dots = annual index; red dots = sparse data; blue line = smoothed trend.



▲ **Monthly indices for Svalbard Light-bellied Brent Geese in the UK.**
Green bars = 2022/23; blue line/orange hatched area = previous five-year mean/range.

LIGHT-BELLIED BRENT GEESE BY NEIL CALBRADE

Focus on... Bar-tailed Godwit

By **Gill Birtles** BTO

The wintering population of Bar-tailed Godwits in Britain is estimated at 50,000 birds, which is mainly made up of two separate populations that migrate to the UK – *lapponica* from Fennoscandia and *taymyrensis* from central Siberia (Frost *et al*. 2019).

Bar-tailed Godwits have the longest known non-stop migratory flight of any bird, with birds breeding in Alaska travelling to their wintering grounds in Australia and New Zealand in a single flight.

It is estimated that two-thirds of the UK over-wintering Bar-tailed Godwits gather on The Wash in eastern England, where in the 2022/23 WeBS year, the peak count was 18,996 birds. The Wash is a rich habitat, providing a large amount of molluscs, crustaceans and worms below the mud's surface, which the birds probe during low tides, before gathering in tight flocks to roost at high tide (WWRG, 2024). It can therefore take great skill and concentration to count these flocks during WeBS Core Counts, especially as their confusion species, Black-tailed Godwit, also gather in large numbers on The Wash, with over 16,000 counted in 2022/23.

Many of the UK's other rich estuarine habitats host Bar-tailed Godwits, including the Thames Estuary, which held a lower, but still impressive 4,160 birds in 2022/23, peaking in February. The peak months for Bar-tailed Godwits in the UK varies from site to site, but generally it occurs in the midwinter months of December, January and February.

However, some sites have peak counts at other times of the year, such as the Severn Estuary in April and Lough Foyle in October. This is because the UK plays a role as a pit stop for migrating Bar-tailed Godwits when travelling to and from their breeding grounds in Fennoscandia and Siberia, using the East Atlantic Flyway (WWRG 2024).

Therefore, migrating birds can be seen in both the spring and late summer/early autumn, which is a good example of how year-round counting at WeBS sites (and not only focusing on the winter core period) can provide very valuable data for both national and international monitoring.

FIND OUT MORE

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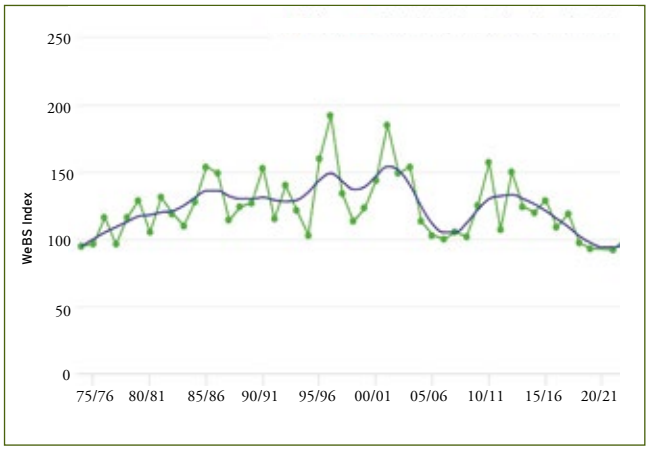
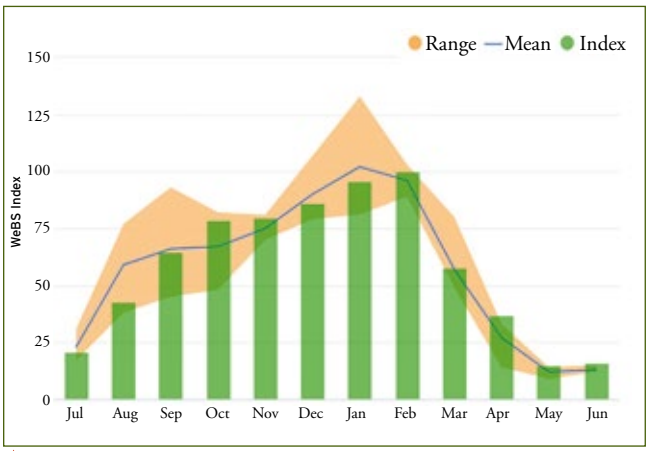


WeBS trend for Bar-tailed Godwit in the UK.
Green dots = annual index; blue line = smoothed trend.



Monthly indices for Bar-tailed Godwit in the UK.
Green bars = 2022/23; blue line/orange hatched area = previous five-year mean/range.

BAR-TAILED GODWIT BY NEIL CALBRADE

Focus on... Smew

By Neil Calbrade BTO

Smew are one of the more attractive winter wildfowl visitors to the UK, the drakes, or to give them their old British name, 'White Nuns', being particularly striking and sought after.

Smew begin arriving in the UK during October, though most birds don't arrive until at least December. However, birds can arrive at any time in response to freezing conditions on their Continental wintering areas. Numbers peak here in February and birds begin to leave again by the middle of March, though occasional birds may remain until late April.

Numbers of Smew wintering in the UK have fallen sharply in recent years with a decline of 84% since 1996/97, and along with similar diving duck or 'deep-water' species, Scaup and Goldeneye, there have been recent increases in wintering numbers in Sweden over the same period (Burton *et al.* 2020).

Most Smew are now found in the UK during periods of icy weather on the Continent, when the thousands of birds wintering in the Netherlands are driven west or south. However, milder winters have meant that fewer birds have had to move this far. The species undertakes only a relatively short-distance migration from its breeding grounds of Fennoscandia and Russia to western Europe.

Many wetland sites are designated as Special Protection Areas (SPAs) due to their importance for waterbird species. However, the added importance of this network for species whose distributions are changing, such as Smew was highlighted by Pavón-Jordán *et al.* (2015), even though this species itself is only a feature of a relatively small number of sites.

Traditionally, London reservoirs and gravel pits have held the largest counts, with peaks of over 100 birds at Brent Reservoir back in the 1950s and over 50 birds at Wraysbury Gravel Pits in the 1990s. Dungeness and Rye Bay also held over 50 birds in the 1990s, but in recent years, very few, if any, Smew have wintered at any of these sites.

In 2022/23, Smew were recorded at 48 WeBS sites, though only one site, Rutland Water, recorded a double figure count, with 12 in February, highlighting the decline of this species.

FIND OUT MORE

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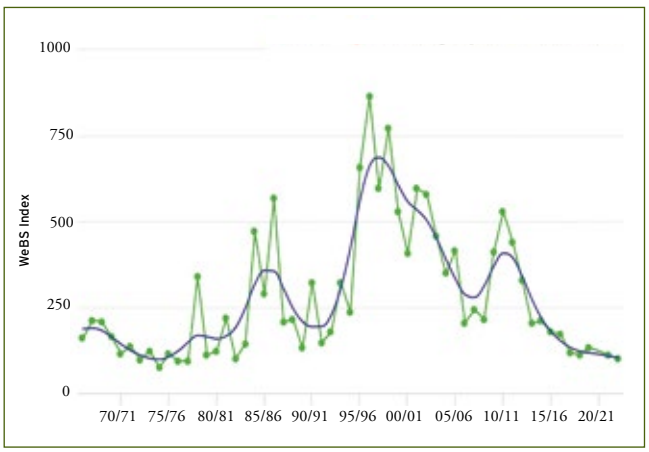
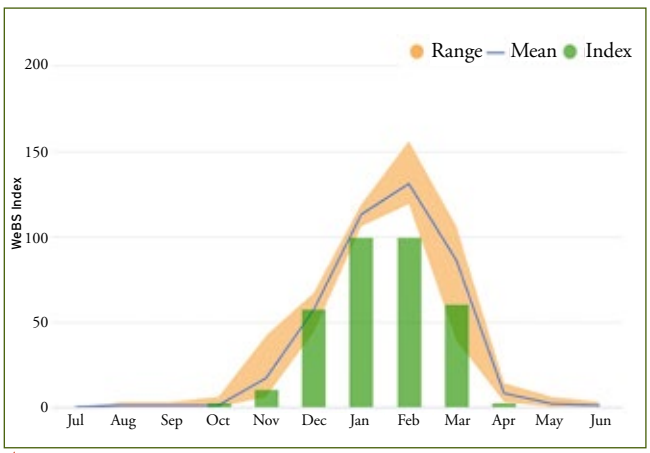


▲ **WeBS trend for Smew in the UK.**
Green dots = annual index; red dots = sparse data; blue line = smoothed trend.



▲ **Monthly indices for Smew in the UK.**
Green bars = 2022/23; blue line/orange hatched area = previous five-year mean/range.

SMEW BY SARAH KELLMAN/BTO

Focus on... European White-fronted Goose

By Neil Calbrade BTO

Two distinctive subspecies of White-fronted Goose winter in Britain and Ireland. The 'European' *albifrons* subspecies occurs mainly in southern England, and the 'Greenland' *flavirostris* subspecies occurs predominantly in Ireland and western and northern Scotland, and there is little range overlap between the two. As with Tundra Bean Goose, this subspecies is monitored by WeBS.

European White-fronted Geese breed in northern Russia, and spend much of their migration period at stopover sites, though large areas of agricultural land have been abandoned here since 1991, which has led to succession toward more wooded habitats, especially in northern regions where conditions make agriculture much more challenging. This process has contributed to a southward shift by migratory European White-fronted Geese, as stopover sites in northern Russia became progressively less suitable (Grishenko *et al.* 2019). Over the 25-year period from 1996/97, numbers of European White-fronted Geese have declined by 75% in the UK, as birds short-stop on the near Continent, rather than continue across to our shores, in response to milder winters.

In recent winters where influxes have occurred, such as 2011/12, 2016/17 and 2020/21, these have coincided with extended periods of colder weather on the Continent forcing birds to move further west, and as with similar species, may result in peak counts later in the winter than many species. The equivalent trend for the Netherlands shows a consistent increase over the same period (Hornman *et al.* 2022).

There are 19 sites in the UK that are nationally important for this species based on the most recent five-year average, nine of which are due to particularly high counts in 2020/21. In 2022/23, only Middle Yare Marshes, Heigham Holmes, Swale Estuary, Severn Estuary, North Norfolk Coast, North Warren and Thorpeness Mere, Alde Estuary, Humber Estuary, Thames Estuary and Loch of Brow held more than the national threshold (21 birds) for this species.

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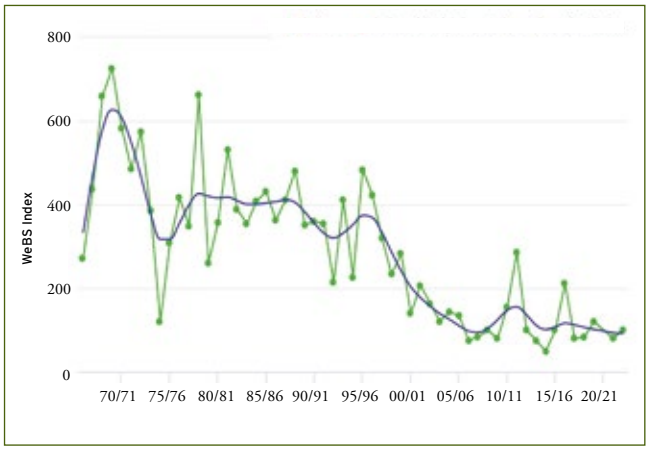
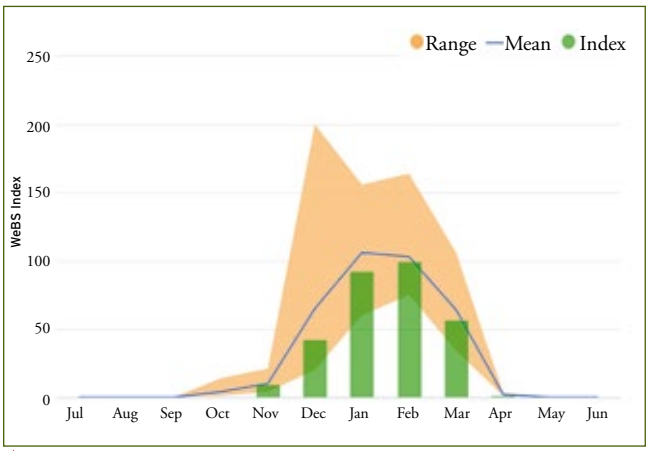


▲ **WeBS trend for European White-fronted Goose in the UK.** Green dots = annual index; blue line = smoothed trend.



▲ **Monthly indices for European White-fronted Goose in the UK.** Green bars = 2022/23; blue line/orange hatched area = previous five-year mean/range.

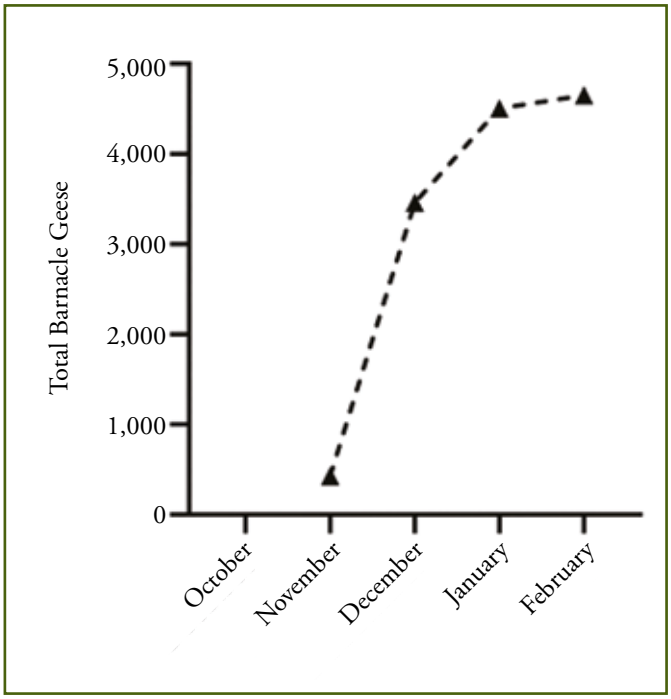
Avian flu mortality on the Solway in 2021/22

By **Teresa Frost** BTO

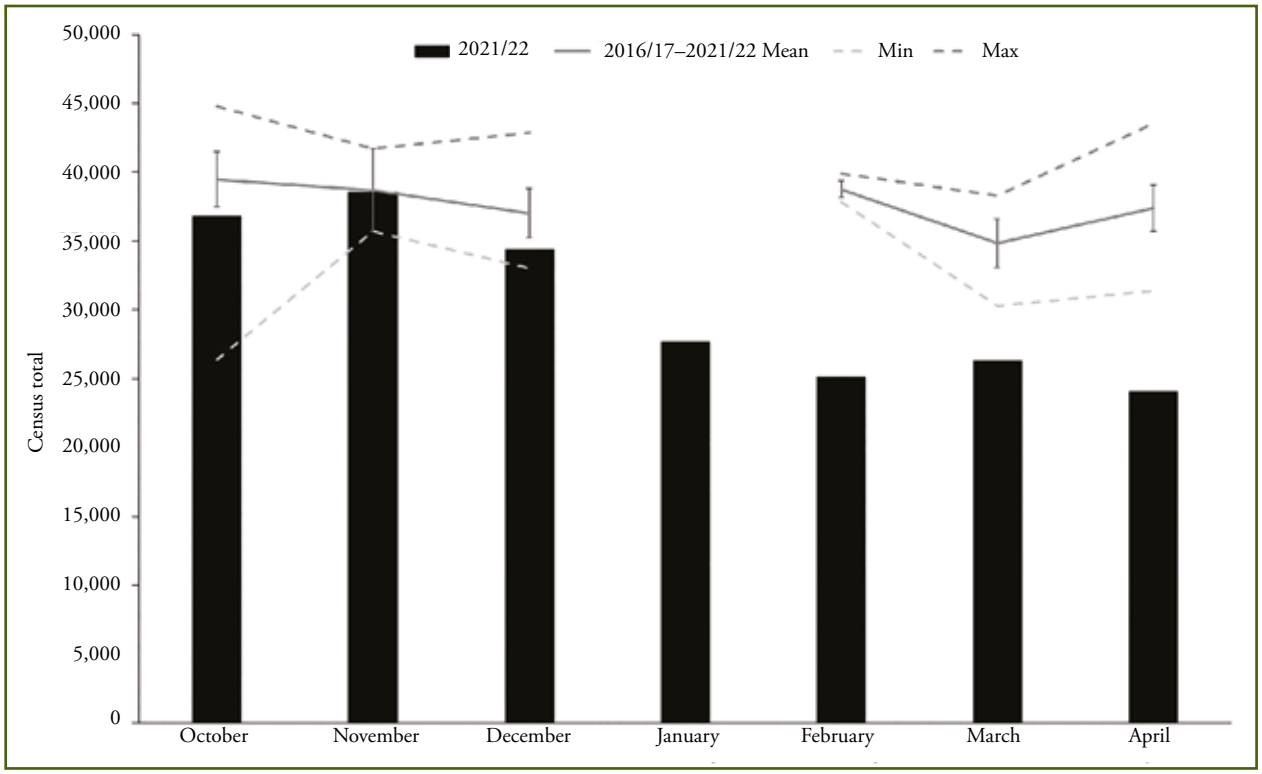
As previously reported in *Waterbirds in the UK 2021/22*, waterbirds, particularly Barnacle Geese, exhibited large mortality on the Solway Estuary in 2021/22, caused by highly pathogenic avian influenza (HPAI). A recently published paper by Ross *et al.* (2024) documents the event in greater detail, including the results of genetic testing of the virus present in the dead birds.

Barnacle Geese were relatively late to return to the Solway Estuary for winter in 2021, with arrivals from 10 October building to 33,138 birds on 13 October and 36,185 birds were counted on the Solway for the GSMP census in November. However, following mortality in midwinter, numbers in the spring were lower than expected, with estimated losses of the order of 30% of the population.

As the mortality event became apparent, carcass counts were collated by NatureScot from volunteers and organisations including RSPB, WWT, Natural England and ECO-LG Ltd. This revealed a peak in deaths in December 2021, mainly affecting Barnacle Geese, with 4,171 carcasses found over the winter, despite the challenges of searching challenging estuarine habitats for them. Forty-nine swan carcasses (Mute and Whooper) and 163 Pink-footed Goose carcasses were also found.



▲ **Cumulative Barnacle Goose mortalities recorded on the Solway for 2021/22, with a total of 4,171 carcasses found. CC-BY Ross *et al.* 2024.**



▲ **Total live Barnacle geese from the Solway Firth region for 2021/22 and comparison to counts from previous years. CC-BY Ross *et al.***

HPAI infection was first confirmed in the area in wild birds, with a positive result for a Barnacle Goose on 8 November 2021. Between then and 7 March 2022, 116 carcasses were tested for the virus, with 86 birds of nine species testing positive for the HPAI H5N1 strain.

GENETIC ANALYSIS

Detailed genetic analysis of HPAI from 24 Barnacle Goose, two Mute Swan, two Whooper Swan, two Pink-footed Goose, two Buzzard, one Kestrel and six samples from nearby poultry outbreaks was undertaken using whole-genome sequencing.

This showed that the HPAI strains in the region were closely related to those circulating globally. Most of the samples were clustered within one sub-lineage that came to be predominant in late 2021, but there were four samples collected near the beginning of the mass die-off that were derived from the H5N8 HPAI incursion into Europe in late 2020.

For the most part, the sequences showed similarity with other UK sequences from 2021/22, suggesting there was not a local genetic diversification that led to the Solway mass die-off event.

There had been little observed mortality in 2020/21, suggesting that the population was mostly naïve to H5 HPAI at the start of 2021/22.

EVIDENCE OF IMMUNITY IN 2022/23

A study on returning geese in 2022/2023 suggested partial immunity to H5 HPAI, possibly due to previous exposure. Blood samples were collected from 25 out of 27 Barnacle Geese shot under license on 6 March 2023. Among these birds, 18 (72%) showed positive antibody responses to a low-pathogenic strain of H5 avian influenza (H5 LPAI), indicating recent exposure to an H5 virus. However, when tested against contemporary H5N1 HPAI, only six out of the 25 birds (24%) showed cross-reactivity. Interestingly, 11 of the birds (44%) showed cross-reactivity against H5N8. Swabs taken from the birds did not show any positive signals for viral RNA, and post-mortem examinations did not reveal typical signs of infection associated with H5N1 HPAI.

Only two Barnacle Geese from the Solway tested positive for H5N1 in the 2022/23 season, suggesting some immunity had developed in the population. In contrast, Greenland Barnacle Geese in areas west and north-west of the Solway experienced increased goose mortality in 2022/23, contrasting with the patterns observed in the Solway Firth region.

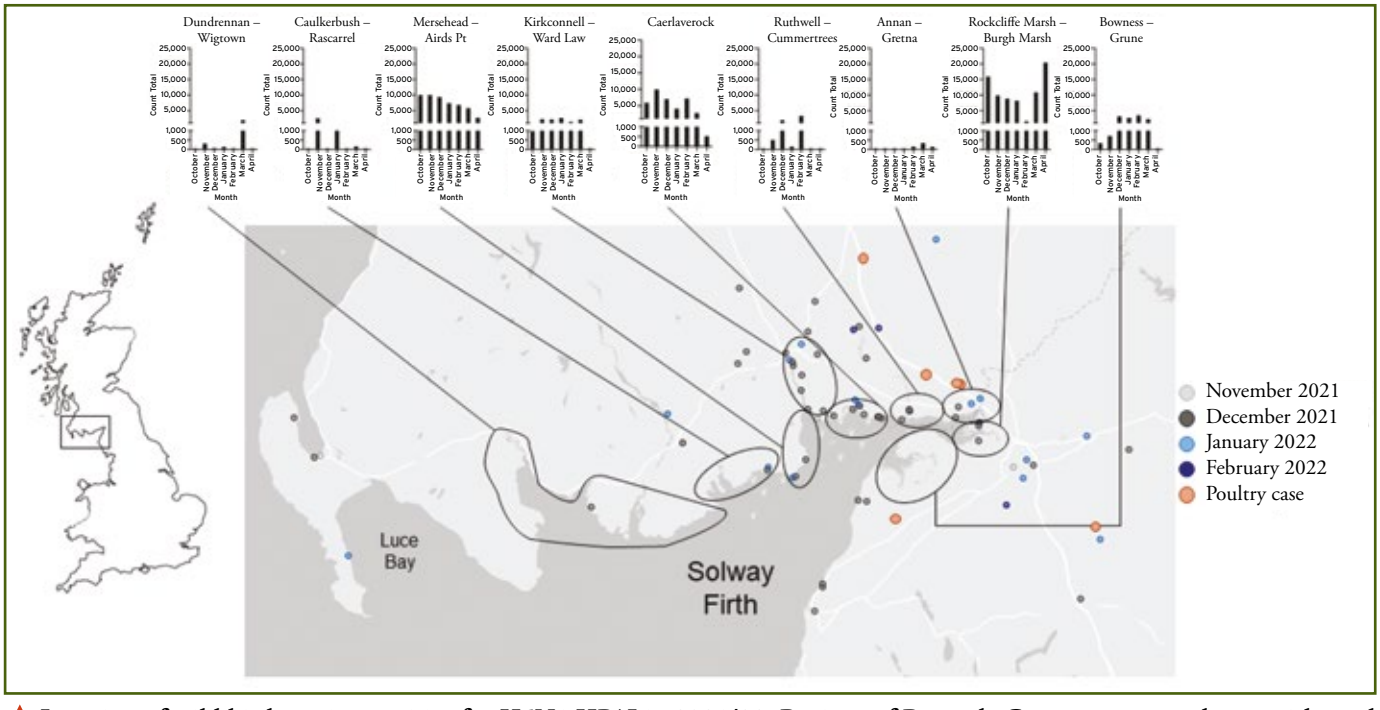
FUTURE SUSCEPTIBILITY

Along with other mass die-off events, the mortality on the Solway showed how transmissible the strain of HPAI circulating can be in dense aggregations of wild birds, particularly waterbirds. The genetic work done showed that host adaptation to Barnacle Geese was not necessary for the virus to spread, although this may change in future when there are fewer naïve hosts.

With the average lifespan of a Barnacle Goose being 14 years, the authors suggest it would be of interest to follow antibody responses annually and learn more about the role of age in susceptibility to incoming H5 HPAI.

FIND OUT MORE

Ross, C.S. *et al.* (15 co-authors). 2024. Genetic analysis of H5N1 High-Pathogenicity Avian Influenza virus following a mass mortality event in wild geese on the Solway Firth. *Pathogens* **2024:** 83.



▲ **Location of wild birds testing positive for H5N1 HPAI in 2021/22. Regions of Barnacle Geese counts are shown with total counts for each region over the winter of 2021/22. CC-BY Ross *et al.* 2024.**

Using WeBS data to investigate and target conservation actions at WeBS sites

Sector level data can be used to look at local level changes within sites.

By **Ian Woodward** BTO

The WeBS Report Online provides site managers, conservation organisations and members of the public with a number of options to assess which species and how many birds use a particular WeBS site. These include the 'Site Totals' tab, an option to choose a location on the 'Numbers & Trends' tab, and a tab reporting the results of the 'Low Tide Counts' that are also carried out periodically on most of the larger estuaries. For the more important wetland sites, those which have been designated as SPAs or Sites of Special Scientific Interest (SSSIs), the WeBS Alerts report is produced approximately every six years and is displayed as another tab on the WeBS Report Online. This report assesses the short-term, medium-term and long-term trend for the designated features of each SPA and SSSI (*i.e.* those species cited as occurring in important numbers on the site). Declines of over 25% prompt a 'Medium Alert' and declines of over 50% a 'High Alert'. Additional interpretation for SPAs compares the site trends for each species with regional and country level trends. Where site trends are worse than those for the region, it may mean that site-specific pressures are affecting the species.

These online tools help pinpoint species and sites for which remedial action might be required as well as highlighting those which are doing well. Identifying such site-specific pressures is a necessary first step before managers can put in place actions to reverse some of the declines at the site. However, further more detailed knowledge of a site will be needed to fully understand what the pressures are in order to come up with targeted actions. This will often come from local knowledge held by the people and organisations living and working within the SPA or SSSI.

Whilst the online report shows the results and species totals for the SPA or SSSI as a whole unit, one of the great strengths of WeBS is that data are collected by a network of Counters who submit data for individual sectors across each site. By analysing trends for individual sectors, we can assess whether declines or increases of a particular species are spread widely across a site or are concentrated within particular sectors. In the same way that WeBS Alerts can identify sites and species of potential concern, this 'Sector Plot Analysis' can help pinpoint areas of concern within the site. When combined with local knowledge, this provides an even more powerful tool for addressing site level declines.

Recently, through funding from the Northern Ireland Environment Agency (NIEA) and Natural England, 'Sector Plot Analysis' has been undertaken to investigate site trends on various loughs in Northern Ireland (Booth Jones *et al.* 2019; El Haddad *et al.* 2023), the Somerset Levels (Woodward & Austin 2022) and the Humber Estuary (Bowgen *et al.* 2023), with the Humber report being the fourth such report for that site.

Sector level data need to be interpreted with care. Consequently, to avoid potential misinterpretation, sector level results are not published routinely for all sites. Gaps in coverage can make interpretation difficult and the numbers of birds present are usually much smaller on most sectors than they are for the whole site; hence apparently large declines or increases on some sectors may be unimportant as they only involve a handful of individuals. At some sites, birds may move regularly between different sectors from

FIND OUT MORE

Booth Jones, K., Calbrade, N., Woodward, I. & Austin, G. 2019. *Analysis of waterbird population trends for Northern Ireland's sea loughs: assessing the potential impacts of aquaculture and disturbance. Part 1 – Strangford Lough and Carlingford Lough.* Research Report no. 719. British Trust for Ornithology, Thetford.

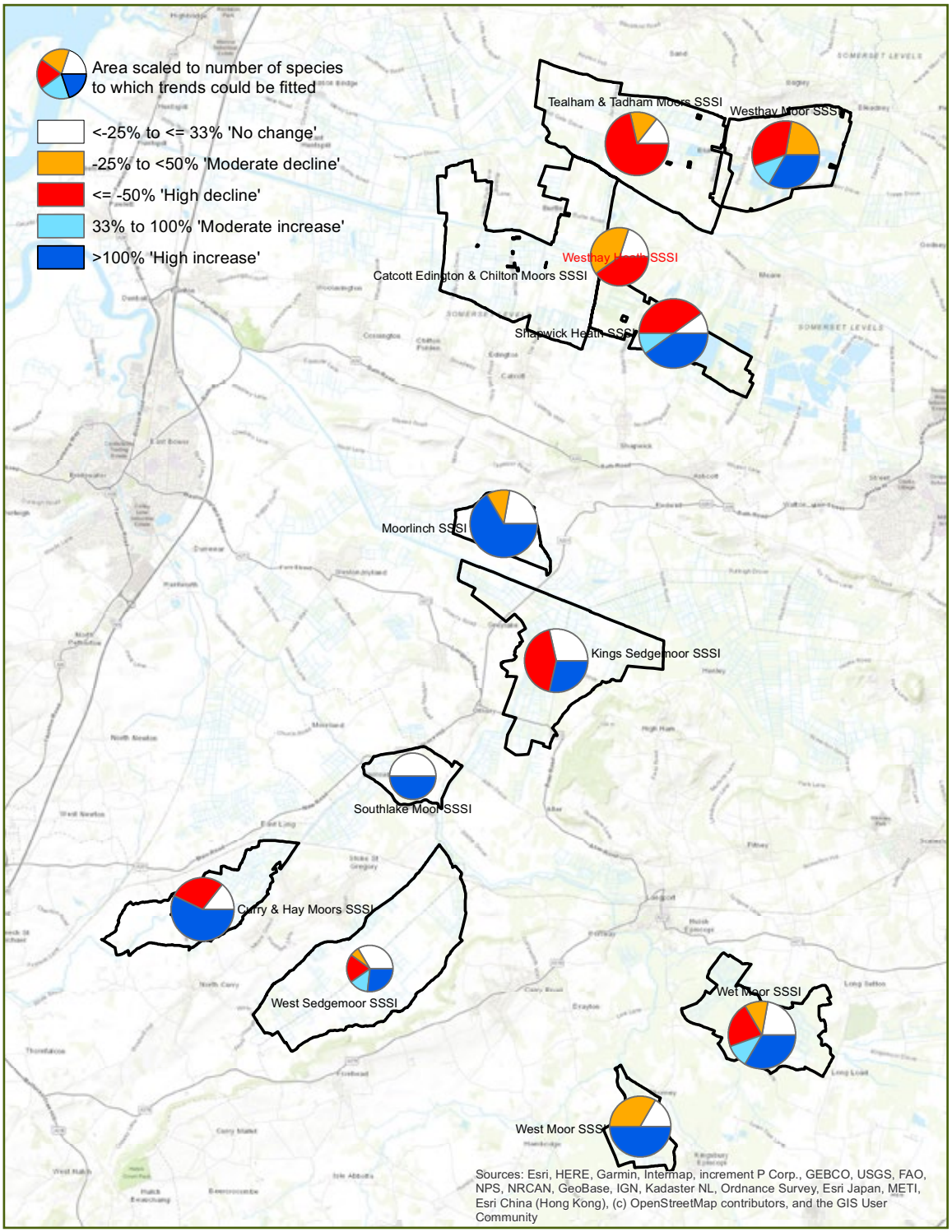
Bowgen, K.M., Austin, G.E., Wetherhill, A. & Woodward, I. 2023. *Analysis of Wetland Bird Survey (WeBS) data for the Humber Estuary SSSI, SAC, SPA and Ramsar site: fourth appraisal - sector level trends to winter 2021/22***.** Research Report no. 761. British Trust for Ornithology, Thetford.

El Haddad, H., Austin, G., Woodward, I. & Booth Jones, K. 2023. *Analysis of wintering waterbird population trends for the Lough Neagh and Lough Beg Special Protection Area (SPA).* Research Report no. 760. British Trust for Ornithology, Thetford.

Woodward, I. & Austin, G. 2022. *Analysis of waterbird population trends for the Somerset Levels & Moors SPA, its functionally linked land and the Bridgwater Bay coastal sites.* Research Report no. 747. British Trust for Ornithology, Thetford.

year to year, or even from day to day, and apparent changes in numbers from WeBS counts may simply reflect random variability which occurs by chance depending on where the birds happened to be when the counts took place.

The reports show trends for sectors (or grouped sectors in some cases), alongside several other graphical presentations of the data to enable readers to compare differences in abundance and trends for different species across the site as a whole. The reports also include interpretative text for each species and for the site as a whole. For the Somerset Levels & Moors SPA, for example, Tealham & Tadham Moors SSSI stands out as declines have occurred across almost all species, in contrast to most of the other parts of the SPA, where there have been a mixture of declines and increases. The consistent trend across all species on Tealham & Tadham Moors suggests that environmental conditions have worsened on this SSSI and that this will have driven or exacerbated the declines for some species. This example stands out and local site managers will hopefully already be aware of the issues affecting this SSSI, but in many other cases the trends are usually more nuanced and Sector Plot Analysis and interpretation will help unravel some of the complexities that will not be apparent from the site level trends on the WeBS Report Online.



▲ **Proportion of species by percentage change class over the long-term (1994/95–2018/19) from Woodward & Austin 2022.**

GSMP Surveys 2022/23

Censuses and age assessments of migratory goose and swan species are carried out in the UK.

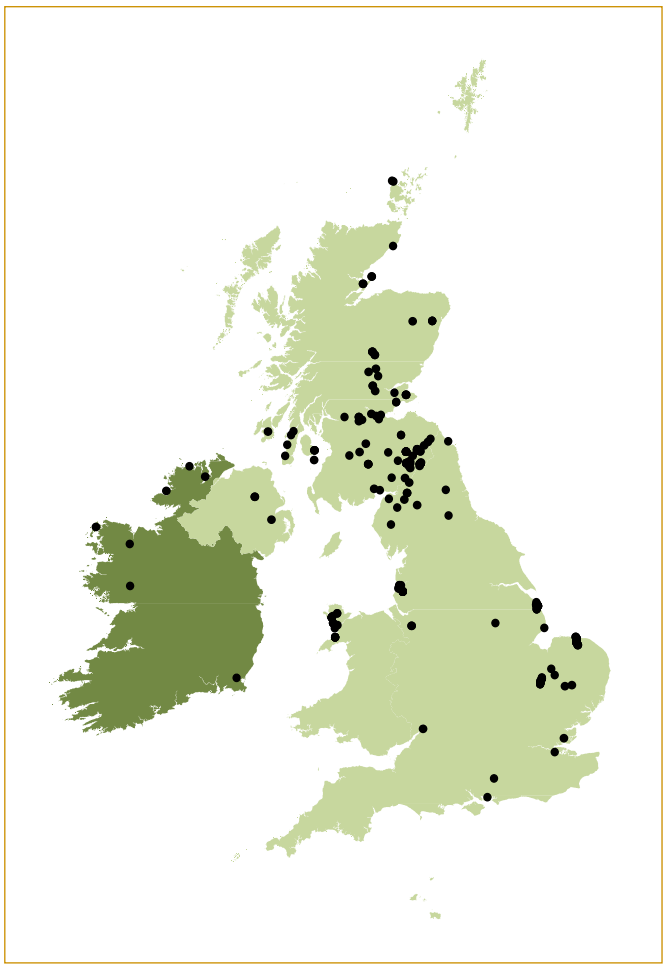
By **Neil Calbrade** & **Alastair Feather** BTO and **Jessica Shaw** NatureScot

GOOSE AND SWAN AGE ASSESSMENTS

Age assessments comprise two measures of annual breeding success (or productivity): the proportion of young (first-winter birds in non-breeding flocks), and the mean brood size (number of young produced by successful breeding pairs).

Table 6 shows the number of birds aged and the breeding success of goose and swan populations wintering in the UK, recorded during various surveys in 2022/23.

The timing of migration and post-juvenile moult differs between species, meaning that the time period in which data can be collected also varies between species. Plumage differences also vary between species and are more subtle for some species than others, meaning that a high level of experience is required by observers.



▲ **Locations from where age assessments of geese and swans were received in 2022/23.**

Table 6 Age assessments of geese and swans.

Population	Number aged	Percentage young (%)	Mean brood size (young per succesful pair)
Dark-bellied Brent Goose	4,375	18.51	2.11
Svalbard Light-bellied Brent Goose	-	-	-
Svalbard Barnacle Goose	11,261	18.4	3.9
Greenland Barnacle Goose	8,172	3.5	1.37
Taiga Bean Goose	91	9.9 (Slamannan)	1.3
Pink-footed Goose	11,047	25.94	0.83
Greenland White-fronted Goose	4,437 (GB) 4,311 (Ireland)	4.9 (GB) 2.5 (Ireland)	1.68 (GB) 2.7 (Ireland)
Bewick's Swan	488	19.26	1.44
Whooper Swan	6,861	14.97	2.04

LIGHT-BELLIED BRENT GEESE BY NEIL CALBRADE

ICELANDIC-BREEDING GOOSE CENSUS 2022/23

The Icelandic-breeding Goose Census (IGC) annually monitors two migratory goose populations: the Greenland/Iceland Pink-footed Goose and the Icelandic Greylag Goose, the results from which can be found in Table 7.

The 2022/23 IGC counts were the first to be organised by BTO, having previously been organised by WWT. As a result of this change, there were more gaps in coverage than in previous years, and so the total of estimates of potentially missed birds is also higher than in the past. However, the raw count of 360,669 Pink-footed Geese in October was only 451 birds less than in 2021/22, while the November total of 248,978 was 23,252 birds higher than the total in 2021/22, though there were no estimates available for November 2021.

Estimates were made for 16 core sites from where no counts were received in October, bringing the total to 443,048 which has been selected as the population estimate for Pink-footed Geese for 2022. This represents a 5.9% increase on the previous year (418,501 birds).

Counts exceeding 4,000 Pink-footed Geese were received from 48 sites in 2022/23, the highest counts being 42,970 at the Loch of Skene and 42,479 at Montrose Basin, both in October.

A total of 83,915 Greylag Geese were counted during the November census. This figure was adjusted to account for the estimated number of British/Irish Greylag Geese likely to have been counted at sites during the census, resulting in an amended population estimate of 59,303 Icelandic Greylag Geese. This represents a 9.7% decline in the population compared with the previous year (65,693 birds).

Given the difficulties in carrying out age assessments of Icelandic Greylag Geese on their wintering grounds in Britain, no age assessments were carried out in the winter of 2022/23.

Table 7 IGC counts of Pink-footed and Greylag Geese.

Region/area	Pink-footed Goose						Greylag Goose		
	October 2022			November 2022			November 2022		
	Count	Sites	Estimates	Count	Sites	Estimates	Count	Sites	Adjustments
Iceland							25,382	1	0
Norway									
Faroe Islands				5	1	0	1,100	1	0
Ireland									
Shetland				8	6	0	5,452	6	-1,627
Orkney				1,571	4	0	45,977	4	-22,337
Caithness	0	0	1,338	1,606	14	0	1,213	17	-3
Highland									
Moray	42,632	7	17,696	41,605	6	16,371	650	6	0
Aberdeenshire	74,041	6	5,506	22,921	4	3,141	105	4	-29
Angus	53,154	2	0	11,380	2	0	81	2	-29
Perth and Central	25,809	7	10,605	8,430	10	0	506	10	-70
Fife	4,210	5	0	2,105	4	0	23	4	0
Lothian	7,444	10	0	12,695	7	0	345	7	-16
Argyll and Bute				0	3	0	995	3	0
Dumfries & Galloway	1,591	1	3,646	448	1	2,438	0	1	0
Scottish Borders	7,344	10	0	7,076	12	0	244	12	-62
Cumbria	6,234	4	0	8,105	5	0	288	5	-8
Northumberland	5,200	6	2,850	404	12	120	792	12	-67
Humberside	32,777	5	2,352	12,740	3	3,700	0	3	0
Lancs / Merseyside	49,348	9	18,942	28,980	7	24,962	572	8	-364
Norfolk	50,885	15	19,444	88,899	15	36,020	190	8	0
Raw total	**360,669**			**248,978**			**83,915**		
Estimated	82,379			86,752			0		
Adjustments	0			0			-24,612		
Total	**443,048**			**335,730**			**59,303**		

TAIGA BEAN GOOSE

Two flocks of Taiga Bean Geese winter in the UK and were monitored during the winter of 2022/23; on the Slammanan Plateau, Falkirk by Bean Goose Advisory Group and the Yare Valley, Norfolk by RSPB reserve wardens.

The peak count on the Slammanan Plateau was 218 birds, one bird more than in 2021/22. In December 2022, of 91 birds aged, the percentage of juveniles identified was considered to be 9.9%, slightly less than that recorded in winter 2021/2022 (11.3%) (Minshull *et al.* 2023).

The Yare Valley population has dwindled considerably over the last two decades, from 485 in 1990/91 to no confirmed records in 2022/23. This last year represents the lowest count ever conducted for the Yare Valley population. Away from the Yare Valley, a group of up to 12 birds were seen near St Benet's Abbey, Norfolk, in February 2023.

GREENLAND WHITE-FRONTED GOOSE

The 2022/2023 survey represents the 41st annual census of Greenland White-fronted Geese coordinated in Great Britain by the Greenland White-fronted Goose Study and in Northern Ireland and the Republic of Ireland co-ordinated by the National Parks & Wildlife Service. Table 8 shows the most recent five seasons of total census data available to the present based on the full survey of all known regular winter haunts for this population, broken down by totals for Wexford and the rest of Ireland, and from Islay and the rest of Britain.

The global population of Greenland White-fronted Geese in spring 2023 comprised 18,027 individuals, made up of 7,792 in Ireland and 10,235 in Britain, which amounts to no net increase over the precisely same previous world population estimate counted in spring 2022.

The percentage of young among wintering Greenland White-fronted Geese were the lowest on record due to a late spring and late snow lie on the west Greenland breeding areas. Reproductive success was extremely low of birds wintering in Ireland at 2.5% first winter birds, compared with 5.6% in 2021/22, and in Britain which was also far below the recent average with an overall percentage young of 4.9%.

SVALBARD BARNACLE GOOSE

Numbers of Svalbard Barnacle Geese on the Solway began to build during October and into early November, peaking at 30,958. Count totals then remained relatively stable through the winter until a further influx to the Solway in February of the birds that had probably been wintering at Budle Bay, Northumberland.

A GPS tagged 'marker' bird was within the group completing its migration from Budle Bay to the Solway in the first week of February, producing a winter peak of 33,992 birds on the Solway on 22 February. Numbers then progressively diminished until only 35 remained into late May, with 11 still present at the end of June, possibly representing a group of birds in poor health due to the continued presence of HPAI in the population which had been responsible for deaths earlier in the season.

Counts from Budle Bay were only possible before new year, with the peak count of 2,550 birds in early November.

Age assessments were carried out on the Solway during the winter, with 11,261 birds assessed, which is equivalent to 33% of population wintering there. The results revealed 18.36% young birds recorded amongst the flocks, and mean brood size of 2.43 goslings per successful pair. The percentage young in the population and large family sizes were the highest observed in 24 years of goose observations on the Solway, and perhaps represent, at least in part, a density-dependent response or nest site release mechanism/pair-bond break-up effect, following the large numbers of deaths in 2021/22 due to HPAI (Griffin 2023).

GREENLAND BARNACLE GOOSE

The latest Greenland Barnacle Goose census took place in February 2023, as the conventional combination of ground and aerial counts in Scotland and Ireland (coordinated by NatureScot and the National Parks and Wildlife Service respectively). While weather conditions made flying difficult, the overall coverage was thought to be good. The flyway total was 62,159 birds, which is a decline of 15.3% compared with the 73,391 birds counted during the previous census in March 2020. The 2023 total in Scotland was 48,332 birds, which is a decline of 16.8% compared with 58,135 birds in March 2020. Over half of the 2023 Scottish population (24,656 birds) was counted on Islay, the main wintering resort, with other significant numbers counted on the

Table 8 Greenland White-fronted Geese counts.

	Spring 2019	Spring 2020	Spring 2021	Spring 2022	Spring 2023
Wexford	7,436	8,312	6,262	5,361	5,531
Rest of Ireland	1,899	2,106	2,148	2,928	2,261
Islay	6,771	5,910	6,878	5,297	5,168
Rest of Britain	5,360	5,223	4,898	4,441	5,067
Population Total	**21,466**	**21,551**	**20,186**	**18,027**	**18,027**

BARNACLE GEESE BY EDMUND FELLOWES/BTO

traditional island sites of North Uist (8,737), Tiree & Coll (6,333), Colonsay & Oronsay (2,015) and South Walls (1,419).

Following the outbreak of HPAI H5N1 in Svalbard Barnacle Geese in October 2021, the disease appeared in Greenland birds in January 2022, with an estimated 2,700 geese dying in Ireland and Islay that winter. The following winter was much worse for the Islay population, with sick and dead birds seen from November 2022 and numbers increasing significantly the following month. Total mortality is unknown, but it could be that around 10,000 birds were lost over the two winters, predominantly on Islay. Breeding success of birds wintering on Islay was high before the outbreak at 16.9% young in 2021, but in 2022 had dropped to 3.5% young (compared with the 10 year mean of 7.9%) (Ogilvie 2023).

ACKNOWLEDGEMENTS

We are extremely grateful to the many IGC Local Organisers and counters, without whom the annual monitoring of Pink-footed and Icelandic Greylag Goose populations would not be possible.

The Greenland White-fronted Goose counts were provided by the Greenland White-fronted Goose Study Group. The Taiga Bean Goose counts were supplied by the Bean Goose Advisory Group. The Greenland Barnacle Goose Census was organised by NatureScot and National Parks & Wildlife Service. The Svalbard Barnacle Goose coounts were carried out under contract.

The 2022/23 GSMP counts were organised by BTO, in partnership with JNCC and NatureScot.

FIND OUT MORE

Fox, A., Francis, I., Walsh, A., Norriss, D. & Kelly, S. 2022. *Report of the 2022/23 international census of Greenland White-fronted Geese*. Greenland White-fronted Goose Study report.

Griffin, L. 2023. Svalbard Barnacle Goose distribution around the Solway Firth 2022–2023: Flock counts from the Solway Goose Managemant Scheme area. Final Report to BTO. Prepared by ECO-LG Ltd., Dumfries, Scotland. 34 pp.

Minshull, B.C., Maciver, A., Thomson, W. A., Griffin, L. & Mitchell, C. 2023. *Population and Distribution of the Taiga Bean Goose on the Slamannan Plateau, Winter 2022/2023*. Unpubl. Report to the Bean Goose Advisory Group.

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Alt Estuary at low tide

Low Tide Counts on UK estuaries have been carried out in the UK since 1992/93, with repeat visits to sites enabling a comparison of data between years.

The River Alt emerges as a creek on the shoreline of Liverpool Bay, between the Ribble and the Mersey Estuaries. The majority of the site is sandy in character, although somewhat muddier at the river mouth where there are also some artificial rocky areas. A large area of saltmarsh used to be present at the mouth of the Alt but has mostly been lost to land claim, principally in the early 19th century. The whole site is backed by one of the most important dune systems in the country, though much of the southern part has been lost to housing and docklands. The Alt Estuary, in combination with the Ribble Estuary to the north, is an SPA, however Seaforth is part of the North Wirral Foreshore SPA. Potential threats include dock expansions and increased recreational disturbance.

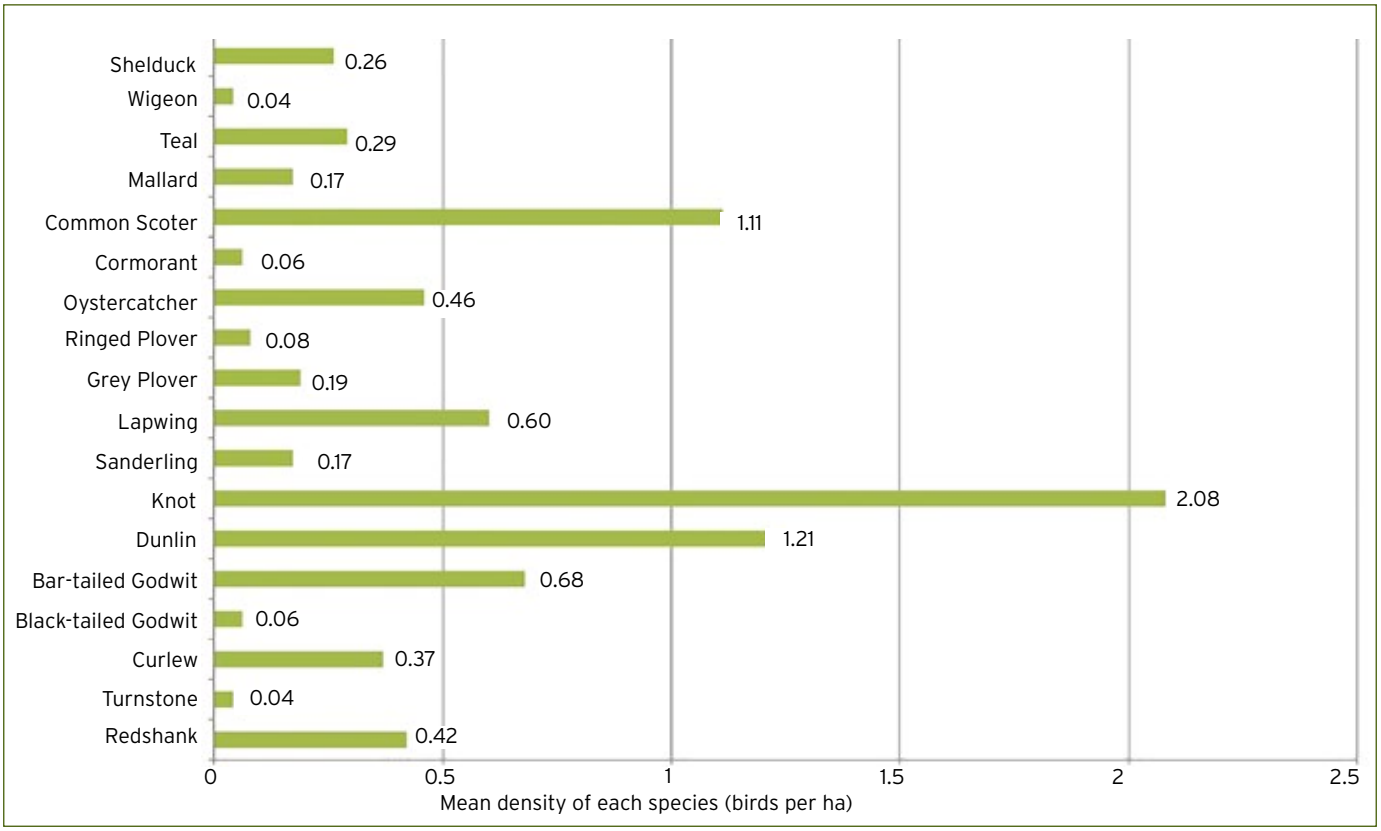
The distribution of two species are mapped on the opposite page: Shelduck and Bar-tailed Godwit distributions based on WeBS Low Tide Counts undertaken in 2022/23 are displayed for comparison with the respective distributions with the previous Low Tide Counts from 2014/15.

With a five-year average on Core Counts of 497 birds, Shelduck occur in nationally important numbers on the Alt Estuary. Numbers of Shelduck recorded on Core Counts has remained stable and this is reflected in the Low Tide Counts with a mean count of 231 in 2022/23, compared with 243 in 2014/15. The largest concentrations of Shelduck in both 2022/23 and 2014/15 was around Hightown, though in 2022/23, more birds were seen up towards Formby Point.

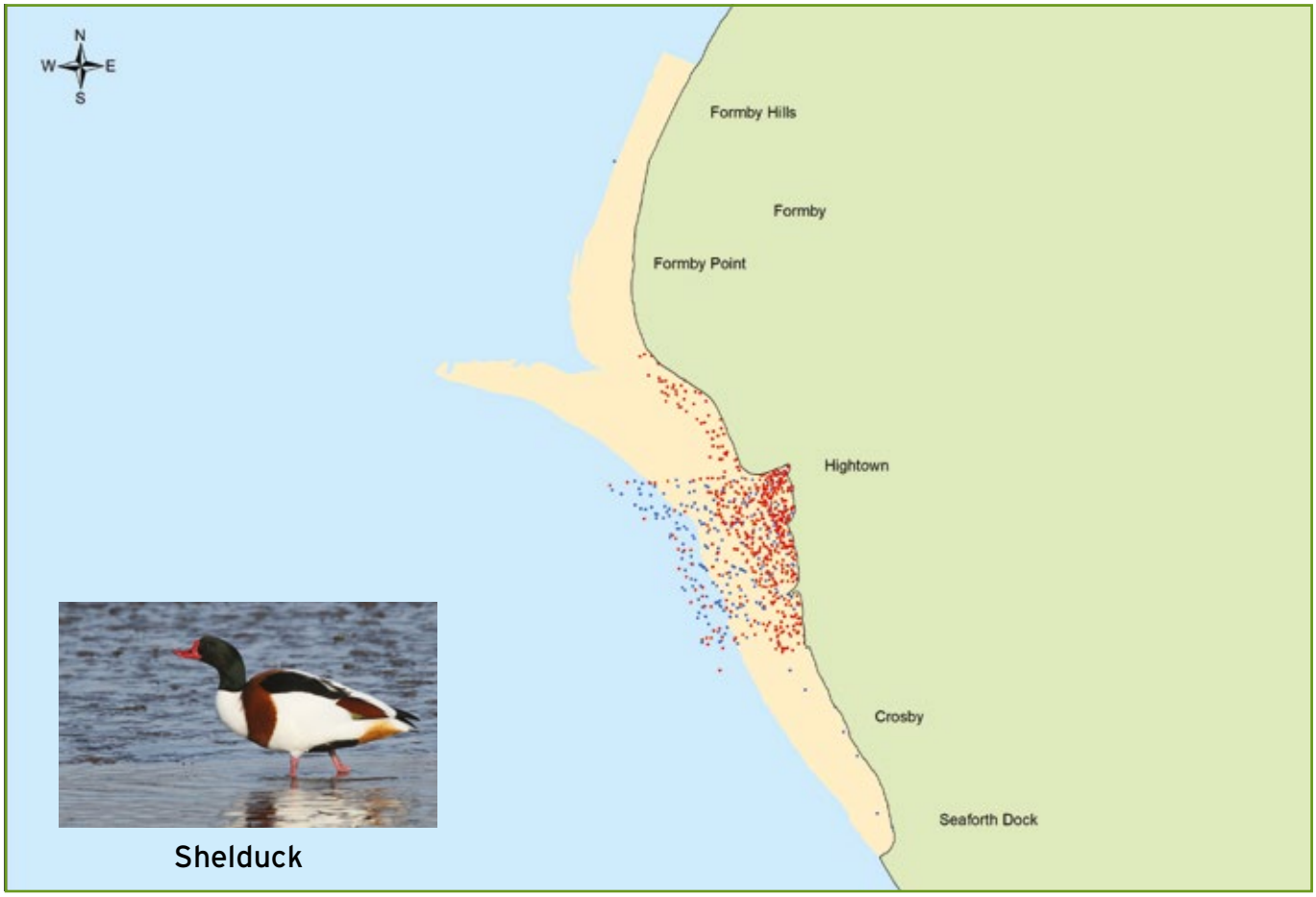
Bar-tailed Godwit occur in internationally important numbers on the Alt Estuary, though the Core Count peak of 1,635 in 2022/23 was the lowest for several years, as birds commute between here and the North Wirral Foreshore. The mean winter counts at low tide have reflected this with 804 (0.68 birds per ha) in 2022/23, compared with 1,500 (1.29 birds per ha) in 2014/15. In 2022/23, birds were mostly distributed between Hightown and Seaforth Docks, whereas in 2014/15, the majority of birds were off Formby Point.

GENERAL STATISTICS FOR THE ALT ESTUARY 2022/23

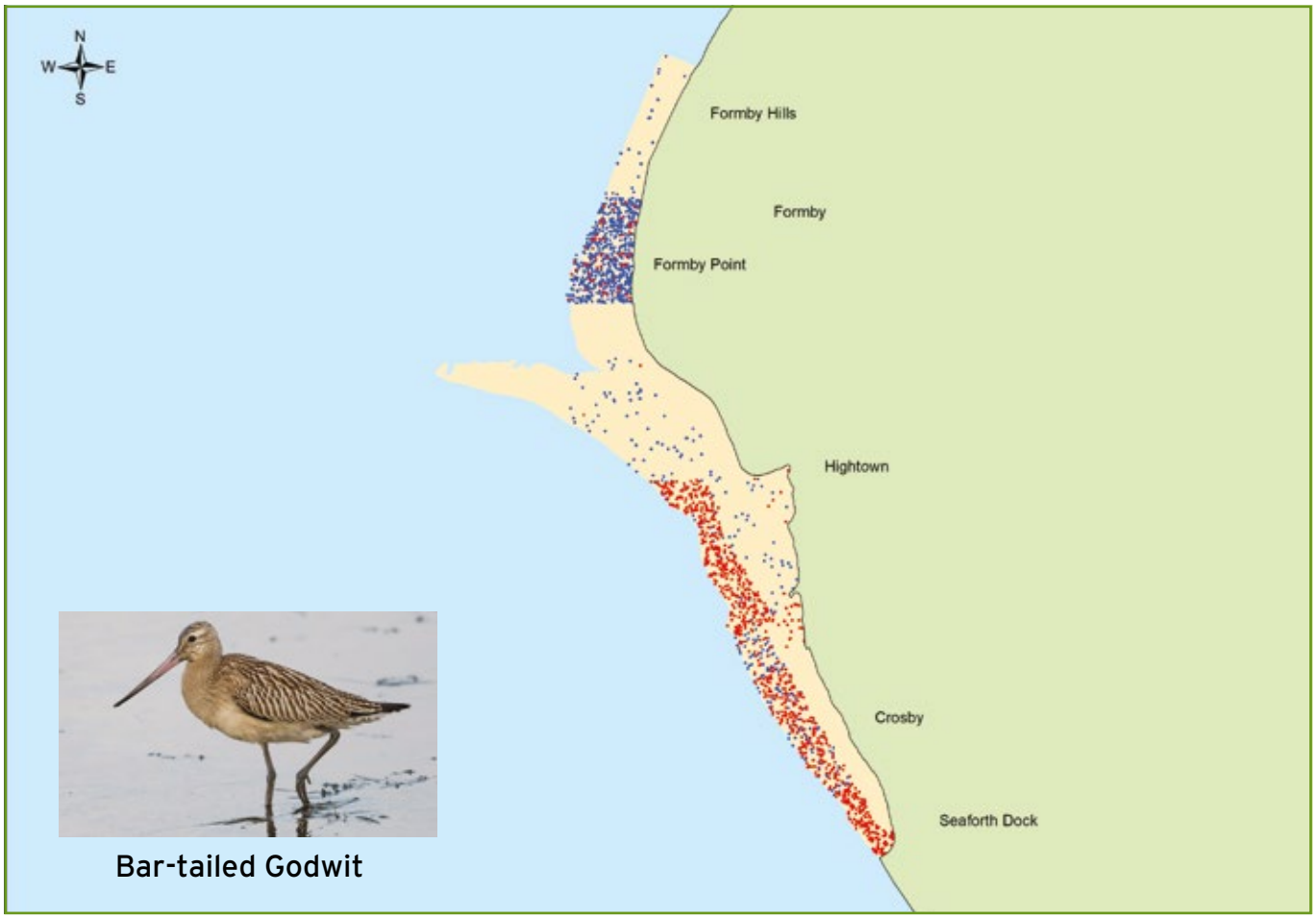
Area covered: 2,650 ha
Mean total birds: 7,649
Mean bird density: 2.89 birds per ha



▲ **Mean densities of waterbirds at low tide on the Alt Estuary in 2022/23.**



Shelduck



Bar-tailed Godwit

▲ **Low tide distribution of Shelduck and Bar-tailed Godwit on the Alt Estuary, for the winters of 2022/23 (red) and 2014/15 (blue).**

SHELDUCK BY JOHN DUNN/BTO AND BAR-TAILED GODWIT BY PHILIP CROFT/BTO

WeBS objectives, aims and methods

The Wetland Bird Survey (WeBS) monitors non-breeding waterbirds in the UK in order to provide the principal data on which the conservation of their populations is based. To this end, WeBS has three main objectives:

- to assess the size of non-breeding waterbird populations in the UK;
- to assess trends in their numbers and distribution; and
- to assess the importance of individual sites for waterbirds.

These results also form the basis for informed decision-making by conservation bodies, planners and developers, and contribute to the sustainable use and management of wetlands and their dependent waterbirds. The data and this annual WeBS report also fulfil some of the objectives of relevant international Conventions and Directives to which the UK is a signatory. WeBS also provides data to Wetlands International to assist their function of coordinating and reporting upon waterbird status at an international flyway scale.

WeBS continues the traditions of two long-running count schemes which formed the mainstay of UK waterbird monitoring since 1947.

WeBS Core Counts are carried out at a wide variety of wetlands. Coordinated, synchronous counts are advocated to prevent double-counting or birds being missed. Priority dates are recommended nationally, but due to differences in tidal regimes around the UK, counts take place at some estuaries on other dates in order to match the most suitable local conditions. Weather and counter availability also sometimes result in counts being undertaken on alternative dates.

In addition, WeBS Low Tide Counts are undertaken on selected estuaries with the aim of identifying key areas used during the low tide period, principally by feeding birds. It also identifies areas not otherwise noted for their importance from data collected during Core Counts which are normally conducted at, or close to, high tide.

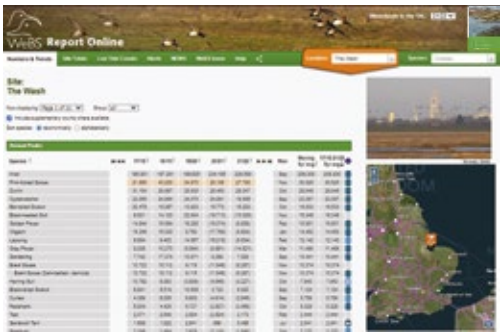
The success and growth of these count schemes reflects the enthusiasm and dedication of the several thousands of participating volunteer ornithologists. It is largely due to their efforts that waterbird monitoring in the UK is held in such high regard internationally.

Full details of WeBS field and analytical methodologies are available via the WeBS website: **www.bto.org/webs**

Waterbirds in the UK 2022/23 (comprising this summary report together with numbers and trends available from WeBS Report Online at **www.bto.org/webs-reporting**) presents the results of WeBS in 2022/23. Data from other national and local waterbird monitoring schemes, notably the BTO/JNCC/NatureScot Goose & Swan Monitoring Programme, are included where WeBS data alone are insufficient to fulfil specified aims. The annual WeBS report therefore provides a single, comprehensive source of information on waterbird status and distribution in the UK.

KNOT BY SARAH KELMAN/BTO

WeBS Report Online



Explore species trends, peak counts and more at:
www.bto.org/webs-reporting

This annual report, *Waterbirds in the UK 2022/23*, combines an extensive online data resource, WeBS Report Online, with this summarised written report.

The WeBS Report Online interface provides access to the latest tables of WeBS Core Count data at site and species level via the 'Numbers & Trends' and 'Site Totals' tabs, together with low tide summaries and distribution density maps for estuaries via the 'Low Tide Counts' tab. Results from the Non-Estuarine Waterbird Survey (NEWS) are in the 'NEWS' tab and WeBS Alerts in the 'Alerts' tab.

All analytical programs were rewritten from SAS to R to produce the statistics for this report (see page 10). As a result, the completeness flag has changed for some sites, including for earlier/historical data. In some cases, this has changed the five-year average count for species on a site, including for earlier periods.

COVID-19 restrictions in 2020 and 2021 had a large impact on data completeness at many sites. Normally the five-year mean of peaks calculated in the 'Numbers & Trends' section does not take the month of the peak into account. However, a special adaptation has been added, for the 2019/20 and 2020/21 years only, to allow for COVID-19 restrictions, so that if this could have impacted the peak, the count has been bracketed (see Waterbirds in the UK 2021/22 for more information). The usual rules with the calculation of the five-year average and completeness are then followed (full details available in the WeBS Survey Methods, Analysis and Presentation documentation).

In the 'Numbers & Trends' section, searching for a site of interest from the menu allows users to explore which species have ever been recorded at the site. Users can view and download the peak numbers of each species recorded at the site throughout the year, the five-year mean peak count and the month in which the peak count was recorded. The table can be sorted alphabetically or taxonomically by species or by the peak counts. By scrolling back through the years, contemporary counts and associated five-year averages can be compared with historical counts at the site.

In the Low Tide section, up to four interactive distribution density maps can be viewed simultaneously and maps can be viewed for all waterbird species recorded during the survey. Estuaries can be chosen from the Location menu and the survey year from the Low Tide Count year menu. Selecting a species will display a map with count sectors separated into intertidal, subtidal and non-tidal habitats and random dots indicating the count of birds in the sector.

The 'Site Totals' tab summarises waterbird aggregations at WeBS sites. The default view shows a table of sites with 1,000 or more birds and includes supplementary counts but excludes gulls and terns and non-native species, as is standard in the Principal Sites table (see page 14–15). Users can choose to view all sites, including those with fewer than 1,000 birds, for a county or country and optionally include gulls/terns, non-native species and supplementary counts. Selecting a site name brings up a list in the right-hand panel of species at the site where counts exceed national or international importance thresholds.

For those looking for information on a particular species (or biogeographic population) of waterbird, every species ever recorded by WeBS features on its own page, with every site where the species has been recorded listed. As well as offering the functionality to sort sites in tables either alphabetically, by annual peak, or by five-year average, the interface also allows the user to filter sites by country, county and/or habitat. Annual and monthly trend plots for the UK and constituent countries are shown (where applicable) and the data and plots downloaded. There are also links to other sources of web-based information. Supplementary counts can be included or excluded in the tables. For reference purposes, data from reports for previous years can be accessed by choosing the appropriate WeBS year from the 'Waterbirds in the UK' drop-down menu.

FIND OUT MUCH MORE

Access WeBS Report Online at: **www.bto.org/webs-reporting**

The Numbers & Trends section features species trends (for the UK and constituent countries) and site tables for all species (with facility to filter by country, county and habitat), alongside sections on NEWS, Low Tide Counts, Site Totals and WeBS Alerts. There is also a Help section containing tutorials, to help you make the most of the resource.

Uses of WeBS data 2022/23

219 WeBS Data Requests in 2022/23

With the UK host to internationally important numbers of wintering waterbirds, one of the principal aims of WeBS is to provide data to facilitate their conservation. Indeed, there have been many high-profile examples over the years in which WeBS data have proved to be fundamental in securing the protection of important wetland sites.

A summary of site-based WeBS information is presented on the WeBS Report Online and available for use with an Open Government Licence. Data at a finer level (both spatial and temporal) than the online portals are available in a user-friendly format through a bespoke WeBS Data Request. We recommend that WeBS-based information that is to be incorporated into site evaluation work, such as Environmental Impact Assessments (EIAs), should be sourced through a WeBS Data Request.

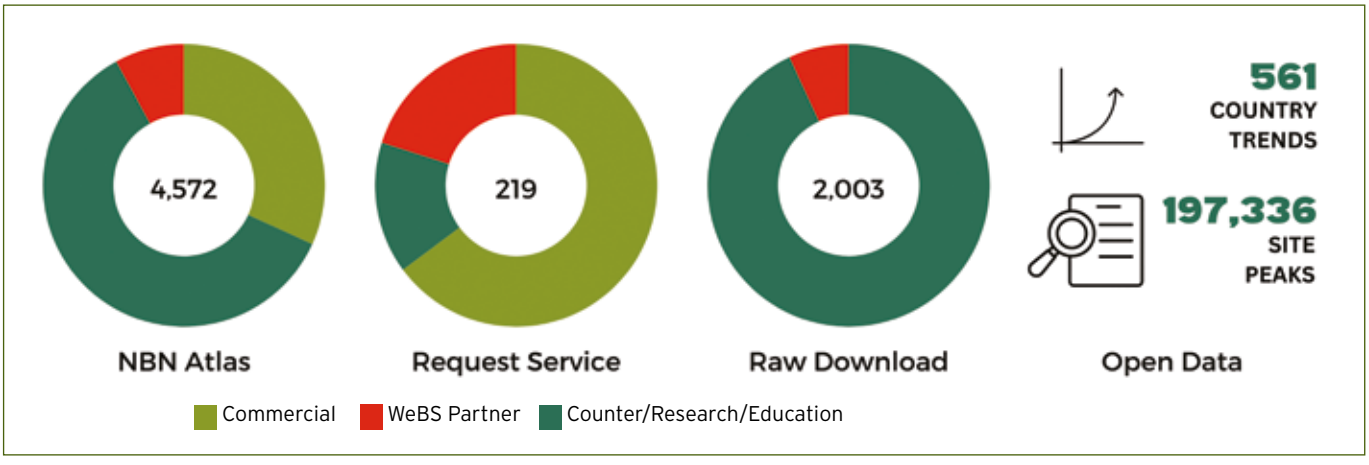
The graphic below shows the number of Data Requests to the WeBS office and downloads from online portals for the financial year April 2022-March 2023. Data users are from a range of stakeholder groups, including country conservation agencies, environmental consultancies, academic researchers and bird clubs.

The WeBS office serviced 142 Commercial, 44 Partner and 33 research/other bespoke Data Requests. In addition, there were 1,865 downloads of unprocessed count data from WeBS Online by Counters, organisers and county bird recorders and 138 downloads by WeBS partners in 2022/23.

Summarised WeBS species presence data is uploaded to the National Biodiversity Network (NBN) Atlas in an Open Government Licenced dataset with other BTO/JNCC/RSPB partnership schemes. Records from this dataset were downloaded 1,455 times in the year for commercial projects, 364 times for statutory projects and 2,753 times for education, research and other reasons. Data downloads of Open Government Licenced data of 561 country species trends and 197,336 site species annual peak data from the WeBS Report Online are also available for anyone to use for any purpose with WeBS acknowledged as the source, but usage of this portal is not tracked.

January WeBS data are supplied to Wetlands International for inclusion in the International Waterbird Census, and summaries are used in outputs such as waterbird population estimates and African-Eurasian Migratory Waterbird Agreement (AEWA) Conservation Status reports.

The WeBS Partnership is keen to encourage WeBS data use within environmental research. A number of scientific papers and reports that have used WeBS data in recent years are referenced within the pages of this annual report, and there is of course an extensive suite of other research questions relating to waterbird ecology and wider wetland management issues to which WeBS data would lend themselves, at both national and international scales.



▲ **WeBS data uses in 2022/23.**

WeBS DATA REQUESTS

More information about the WeBS Data Request Service is available from **www.bto.org/webs-data** where you can see coverage by WeBS of different sites, check data request charges, and view examples of the data that can be provided.

WeBS Local Organisers in 2022/23

Continued from back page

WALES

Anglesey	Ian Sims
Breconshire	Andrew King
Burry Inlet	Lyndon Jeffery (now Alan Seago)
Caernarfonshire	Rhion Pritchard
Caernarfonshire (Foryd Bay)	Simon Hugheston-Roberts
Carmarthenshire	Alan Seago
Ceredigion (incl Dyfi Estuary)	Russell Jones
Clwyd (coastal)	VACANT
Clwyd (inland)	VACANT
East Glamorgan	Daniel Jenkins-Jones
Gwent (excl Severn Estuary)	Al Venables (now Richard M Clarke)
Merioneth (estuaries)	Jim Dustow
Merioneth (other sites)	Jim Dustow
Montgomeryshire	Jane Kelsall (now VACANT)
Pembrokeshire	Annie Haycock
Radnorshire	Peter Jennings
Severn Estuary (Wales)	Al Venables (now Kevin Dupé)
West Glamorgan	Lyndon Jeffery (now VACANT)

NORTHERN IRELAND

Antrim (Larne Lough)	Doreen Hilditch
Antrim (other sites)	Adam McClure
Armagh (excl Loughs Neagh and Beg)	Stephen Hewitt
Belfast Lough	Shane Wolsey (now VACANT)
Down (Carlingford Lough)	Aiobheann Morrison
Down (Dundrum Bay)	Andrew Crory (now VACANT)
Down (other sites)	Kez Armstrong
Down (Outer Ards)	NIEA
Down (South Down Coast)	Kez Armstrong
Down (Strangford Lough)	Kerry Mackie
Fermanagh	Michael Stinson
Londonderry (Bann Estuary)	Dean Jones
Londonderry (Lough Foyle)	Matthew Tickner
Londonderry (other sites)	Claire Hassan
Loughs Neagh and Beg	NIEA
Tyrone (excl Loughs Neagh and Beg)	Ciara Laverty
Upper Lough Erne	NIEA

CHANNEL ISLANDS

Alderney	Alderney Wildlife Trust Ecologist
Guernsey Coast	Mary Simmons
Jersey (inland)	VACANT
Jersey Coast	Roger Noel

ISLE OF MAN

Isle of Man	David Kennett

We would be grateful for help organising WeBS in areas currently without a Local Organiser (marked **VACANT**). If you live in one of these areas and would be interested in taking on the role, please let us know. Email: **webs@bto.org**

In 2022/23, the WeBS Local Organiser Advisory Committee (WeBS LOAC) comprised Allan Brown, Eve Tigwell, Chris Gunn, Brian Moore, Bob Swann and Kerry Mackie. Many thanks to them for representing the wider LO network. Further information about the WeBS LOAC can be found at: **www.bto.org/webs/loac**

WeBS ONLINE REPORT

Further information, including site tables and trends for all the regular WeBS species, is available in the online report at: www.bto.org/webs-reporting

Selected further reading

Recent studies that have used WeBS data

Austin, G.E., Calbrade, N.A., Birtles, G.A., Peck, K., Wotton, S.R., Shaw, J.M., Balmer, D.E. & Frost, T.M. 2023. *Waterbirds in the UK 2021/22: The Wetland Bird Survey and Goose & Swan Monitoring Programme*. BTO/ RSPB/ JNCC. Thetford.

Agblonon G., Diallo A. Y., Gueye K., Citegetse G., Crowe O., Langendoen T. & van Roomen M. (eds.) 2023. *Simultaneous January 2023 waterbird census along the East Atlantic Flyway: National Reports*. Wadden Sea Flyway Initiative p/a Common Wadden Sea Secretariat, Wilhelmshaven, Germany, Wetlands International, Wageningen, The Netherlands, BirdLife International, Cambridge, United Kingdom.

Bowgen, K.M., Austin, G.E., Wetherhill, A. & Woodward, I. 2023. *Analysis of Wetland Bird Survey (WeBS) data for the Humber Estuary SSSI, SAC, SPA and Ramsar site: fourth appraisal - sector level trends to winter 2021/22*. Research Report no. 761. British Trust for Ornithology, Thetford.

Burke, B., Lewis, L.J., Fitzgerald, N., Frost, T., Austin, G. & Tierney, T.D. 2018. Estimates of waterbird numbers wintering in Ireland, 2011/12-2015/16. *Irish Birds* **41**: 1–12.

Burton, N.H.K., Daunt, F., Kober, K., Humphreys, E.M. & Frost, T.M. 2023. Impacts of Climate Change on Seabirds and Waterbirds in the UK and Ireland. *MCCIP Science Review 2023*.

El Haddad, H., Austin, G., Woodward, I. & Booth Jones, K. 2023. *Analysis of wintering waterbird population trends for the Lough Neagh and Lough Beg Special Protection Area (SPA)*. Research Report no. 760. British Trust for Ornithology, Thetford.

Frost, T.M. & Calbrade, N.A. (eds.). 2022. *Wetland Bird Survey News 2020/21 Special Edition*. BTO, RSPB and JNCC. British Trust for Ornithology, Thetford.

Frost, T.M., Austin, G.E., Hearn, R.D., McAvoy, S.G., Robinson, A.E., Stroud, D.A., Woodward, I.D. & Wotton, S.R. 2019. Population estimates of wintering waterbirds in Great Britain. *British Birds* **112**: 130–145.

Pearce-Higgins, J.W., Humphreys, E.M., Burton, N.H.K., Atkinson, P.W., Pollock, C., Clewley, G.D., Johnston, D.T., O'Hanlon, N.J., Balmer, D.E., Frost, T.M., Harris S.J. & Baker, H. 2023. *Highly pathogenic avian influenza in wild birds in the United Kingdom in 2022: impacts, planning for future outbreaks, and conservation and research priorities. Report on virtual workshops held in November 2022*. Research Report no. 752. British Trust for Ornithology, Thetford.

Ross, C.S. *et al.* (15 co-authors). 2024. Genetic analysis of H5N1 High-Pathogenicity Avian Influenza virus following a mass mortality event in wild geese on the Solway Firth. *Pathogens* **2024**(13): 83.

Scott, M.S., Humphries, G., Irwin, C., Peters-Grundy, R., Vilela, R., Southward, B. & Thompson, K. 2023. *Inshore Wintering Waterfowl in Moray Firth Special Protection Area - 2019/20 digital aerial surveys and comparative analyses of aerial and shore-based surveys*. NatureScot Research Report 1280.

Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D. & Win, I. 2021. The fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds* **114:** 723–747.

Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D. & Noble, D. 2020. Population estimates of birds in Great Britain and the United Kingdom. *British Birds* **113**: 69–104.

Woodward, I.D., Frost, T.M., Hammond, M.J. & Austin, G.E. 2019. *Wetland Bird Survey Alerts 2016/2017: Changes in numbers of wintering waterbirds in the Constituent Countries of the United Kingdom, Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Areas of Special Scientific Interest (ASSIs)*. BTO Research Report 721. BTO, Thetford.

SPECIAL THANKS

We wish to thank all surveyors and Local Organisers for making WeBS the success it is today. Unfortunately space does not permit all observers to be acknowledged individually, but we would especially like to credit the Local Organisers for their efforts.

WeBS Local Organisers in 2022/23

ENGLAND

Avon (excl Severn Estuary)	Rupert Higgins
Bedfordshire	Richard Bashford
Berkshire	Sean Murphy
Buckinghamshire (North)	Martin Routledge
Buckinghamshire (South)	VACANT
Cambridgeshire (incl Huntingdonshire)	Bruce Martin
Cambridgeshire (Nene Washes)	Charlie Kitchin
Cambridgeshire (Ouse Washes)	Paul Harrington
Cheshire (North)	Phil Hampson
Cheshire (South)	Paul Miller
Cleveland (excl Tees Estuary)	Chris Sharp
Cleveland (Tees Estuary)	Adam Jones
Cornwall (excl Tamar Complex)	Derek Julian
Cornwall (Tamar Complex)	Charles Nodder
Cotswold Water Park	VACANT
Cumbria (Duddon Estuary)	Colin Gay
Cumbria (excl estuaries)	Dave Shackleton
Cumbria (Irt/Mite/Esk Estuary)	Dave Shackleton
Dee Estuary	Colin Wells
Derbyshire	Phil Hampson
Devon (other sites)	Peter Reay
Devon (Exe Estuary)	Martin Overy
Devon (Taw/Torridge Estuary)	Chris Dee
Dorset (excl estuaries)	Nicola Hoar
Dorset (Poole Harbour)	Paul Morton
Dorset (Radipole and Lodmoor)	Stephen Hales
Dorset (The Fleet and Portland Harbour)	Steve Groves
Durham	Anne Donnelly
Essex (Crouch/Roach Estuaries and South Dengie)	Sean Murphy
Essex (Hamford Water)	Leon Woodrow
Essex (North Blackwater)	John Fell
Essex (other sites)	Anthony Harbott
Essex (South Blackwater & North Dengie)	Anthony Harbott
Gloucestershire	Michael Smart
Greater London (excl Thames Estuary)	VACANT
Greater Manchester	Tim Wilcox
Hampshire (Avon Valley)	John Clark
Hampshire (estuaries/coastal)	John Shillitoe (now Geoff Butler)
Hampshire (excl Avon Valley)	Keith Wills
Herefordshire	Chris Robinson
Hertfordshire	VACANT
Humber Estuary (inner South)	Keith Parker
Humber Estuary (mid South)	Barbara Moore (now Mike Pilsworth)
Humber Estuary (North)	Nick Cutts
Humber Estuary (outer South)	Owen Beaumont
Isle of Wight	Jim Baldwin
Kent (Dungeness area)	David Walker
Kent (East)	Maria Antonova (now Heather Mathieson)
Kent (Medway Estuary))	Bob Knight
Kent (Pegwell Bay)	Steffan Walton
Kent (Swale Estuary)	Brian Watmough
Kent (Thames Estuary – Hoo)	Murray Orchard
Kent (West)	VACANT
Lancashire (East Lancs and Fylde)	Stephen Dunstan (now David Jeffries)
Lancashire (North inland)	Peter Marsh
Lancashire (Ribble Estuary)	Ken Abram
Lancashire (River Lune)	Jean Roberts
Lancashire (West inland)	Phil Hampson
Lee Valley	Cath Patrick
Leicestershire and Rutland (excl Rutland Water)	Brian Moore
Leicestershire and Rutland (Rutland Water)	Tim Appleton
Lincolnshire (North inland)	Chris Gunn
Lincolnshire (South inland)	Bob Titman (now VACANT)
Merseyside (Alt Estuary)	Steve White
Merseyside (inland)	Phil Hampson
Merseyside (Mersey Estuary)	Dermot Smith
Morecambe Bay (North)	Mike Douglas
Morecambe Bay (South)	Jean Roberts
Norfolk (Breydon Water)	Anthony Bentley
Norfolk (excl estuaries)	Mark Clay
Norfolk (North Nofolk Coast)	Neil Lawton
Northamptonshire (excl Nene Valley)	VACANT
Northamptonshire (Nene Valley)	Steve Brayshaw
Northumberland (coastal)	Kathy Evans
Northumberland (inland)	Tim Daley
Northumberland (Lindisfarne)	Andrew Craggs
Nottinghamshire	Michael Hill
Oxfordshire (North)	Sandra Bletchly
Oxfordshire (South)	Ben Carpenter
Severn Estuary (England)	Harvey Rose
Shropshire	Martin George
Solway Estuary (inner South)	David Blackledge
Solway Estuary (outer South)	Dave Shackleton
Somerset (other sites)	Eve Tigwell
Somerset (Somerset Levels)	Eve Tigwell
Staffordshire	Scott Petrek
Suffolk (Alde Complex)	Ian Castle
Suffolk (Alton Water)	John Glazebrook
Suffolk (Blyth Estuary)	Will Russell
Suffolk (Deben Estuary)	Nick Mason
Suffolk (Orwell Estuary)	Mick Wright
Suffolk (other sites)	Alan Miller
Suffolk (Stour Estuary)	Rick Vonk
Surrey	Penny Williams
Sussex (Chichester Harbour)	Peter Hughes
Sussex (other sites)	Helen Crabtree & Dave Boddington
Thames Estuary (Foulness)	Chris Lewis
The Wash	Jim Scott
Warwickshire	Matthew Griffiths
West Midlands	VACANT
Wiltshire	Jenny Stunnell
Worcestershire	Chris North
Yorkshire (East and Scarborough)	Alan Burnham
Yorkshire (Harrogate and Yorkshire Dales)	VACANT (now Daniel Skeats)
Yorkshire (Huddersfield/Halifax area)	VACANT
Yorkshire (Leeds area)	Paul Morris
Yorkshire (South)	Grant Bigg
Yorkshire (Wakefield area)	Peter Smith

SCOTLAND

Aberdeenshire	Patrick Cook and Lynne McKenzie
Angus (excl Montrose Basin)	Jonathan Pattullo
Angus (Montrose Basin)	Anna Cowie
Argyll Mainland	Nigel Scriven
Arran	Jim Cassels
Ayrshire	Dave Grant
Badenoch and Strathspey	VACANT
Borders	Neil Stratton
Bute	Ian Hopkins
Caithness	Sinclair Manson
Central (excl Forth Estuary)	Neil Bielby
Clyde Estuary	John Clark
Dumfries and Galloway (Auchencairn and Orchardtown Bays)	Euan MacAlpine
Dumfries and Galloway (Fleet Bay)	Ian Bainbridge
Dumfries and Galloway (Loch Ryan)	Paul Collin
Dumfries and Galloway (other sites)	Andy Riches
Dumfries and Galloway (Rough Firth)	Andy Riches
Dumfries and Galloway (Wigtown Bay)	Paul Collin
Fife (excl estuaries)	Allan Brown
Fife (Tay and Eden Estuaries)	Paul Blackburn
Forth Estuary (inner)	Michael Bell
Forth Estuary (outer North)	VACANT
Forth (outer South)	Duncan Priddle
Glasgow/Renfrewshire/Lanarkshire	John Clark
Harris and Lewis	Yvonne Benting
Islay, Jura and Colonsay	David Wood
Isle of Cumbrae	VACANT
Lochaber	Kirstie & Callum Ross
Lothian (excl estuaries)	Shawn Waddoups
Lothian (Tyninghame Estuary)	Tara Sykes (now Duncan Priddle)
Moray and Nairn (inland)	David Law
Moray and Nairn (Lossie Estuary)	Bob Proctor
Moray Basin Coast	Bob Swann
Mull	Nigel Scriven
Orkney	Tom Wells
Perth and Kinross (excl Loch Leven)	Michael Bell
Perth and Kinross (Loch Leven)	Simon Ritchie (now Jeremy Squire)
Shetland	Rory Tallack
Skye and Lochalsh	Jonathan Jones
Solway Estuary (North)	Andy Riches
Sutherland (excl Moray Basin)	VACANT
Tiree and Coll	John Bowler
Uists and Benbecula	Yvonne Benting
West Inverness/Wester Ross	Andy Douse

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