The newsletter of the Goose & Swan Monitoring Programme

goose news

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Goose and swan monitoring in Ireland

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Latest results of GSMP surveys

WWT JNCC NatureScot
Scotland's Nature Agency
Buidheann Nàdair na h-Alba

Editorial

Welcome to the 20th edition of *GooseNews.*

This past year has been one that I doubt many of us will forget, and I sincerely hope that you, your family and friends are all well, with life starting to return to some form of 'normality' wherever you may be. The year has also seen many changes and for those of us working at WWT it has included a refocusing of our priorty work areas, which has particularly affected our long-term monitoring projects. As you'll read in the announcement on page 5, the 2021/22 season will be the last year in which WWT manages the Goose & Swan Monitoring Programme (GSMP) and this, *GooseNews* No. 20, will be the last edition of the GSMP newsletter that WWT publishes.

Thus I would like to take this opportunity to thank everyone who has supported the programme throughout the years. WWT has been involved in goose and swan monitoring for numerous decades and we have worked alongside many enthusiastic and dedicated people along the way, all of whom have contributed to the monitoring and conservation of goose and swan populations in the UK and beyond.

Our sincere thanks and appreciation goes to all the volunteer counters, local organisers, ring-readers and catch helpers; to all the census organisers, data gatherers and analysts; to all the goose and swan conservation groups, NGOs and country agencies; and to everyone else who has supported and advised us over the years.

I would personally like to thank the team I have worked with the closest for all their help and support, particularly since I took on the role of project manager for the GSMP: Richard Hearn, Carl Mitchell, Larry Griffin, Kane Brides, Robin Jones and Eileen Rees.

Although the management may be changing, the GSMP will continue and we will graciously pass the baton on as the programme moves into its next chapter in 2022.

With kind regards
Colette Hall

Photo: Aimee Mcintosh

Contents

Survey dates for 2021/22

Icelandic–breeding Goose Census (ICG)

The IGC national organiser is
Kane Brides (**kane.brides@wwt.org.uk**)

The coordinated census dates for autumn 2021 and spring 2022 are as follows:

Pink-footed Goose: 30/31 October, 27/28 November 2021 and 26/27 March 2022

Iceland Greylag Goose: 27/28 November 2021 and 26/27 March 2022

The above includes the revised dates for the three-yearly spring count, which was due to take place in 2021 but was postponed due to the Covid-19 pandemic. The aim of this count is to map the distribution of birds during this critical period in their life cycle, when they are accumulating body reserves for migration and breeding.

Ideally, all sites supporting Pink-footed Geese should be covered during the October and November counts, whilst those holding solely Iceland Greylag Geese need only be covered in November. Sites holding either species should be covered in March, where possible.

We would like to encourage all counters at sites within the winter range of Iceland Greylag Geese to also carry out a count during September if the site also supports British Greylag Geese. September counts are not strictly coordinated but ideally should be carried out during the middle of that month, although any counts made during September will be of value.

If you are unable to count on the above dates, please contact either your Local Organiser or Kane Brides, so that we may try to arrange cover of your site by another counter.

Greenland White-fronted Goose Census

The census is organised by the Greenland White-fronted Goose Study (**http://greenlandwhitefront.org**). Please contact the organiser Tony Fox (**tfo@bios.au.dk**) for further details about the census.

Count dates for the 2021/22 census are as follows:

Autumn and spring coordinated censuses: 11–15 December 2021 and 5–9 March 2022

We very much welcome counts from all other dates and times, but for the monthly counts we especially appreciate counts in the following periods:

20–24 November 2021, 8–12 January and 5–9 February 2022

Enter your IGC and age assessment records online

Counters taking part in the Icelandic-breeding Goose Census (IGC) or undertaking age assessments can enter data online using WWT's Waterbird Monitoring Online website.

You will need to register to use the system at **https://monitoring.wwt.org.uk/recording/**, where help pages are available to guide you through the process of registering and entering counts.

If you need any further information on how to use the website, please contact the GSMP Team at **monitoring@wwt.org.uk.**

Coordinated Whooper and Bewick's Swan age assessments

Three coordinated census dates are set each winter for age assessments of Whooper and Bewick's Swans. The coordinated dates for winter 2021/22 are as follows (or the nearest date possible, preferably within three days either side):

16 November, 14 December 2021 and 11 January 2022

Counts of both species can be made during each month. However, for Whoopers, please focus on January, and for Bewick's, please focus on December (to coordinate with the international assessment) and January. Assessments made at any other time during the autumn/winter are also welcome.

Photo: Alyn Walsh

Goose age assessments

Age assessments will continue during 2021/22 as usual. The survey periods vary between species and are shown below. If you are interested in helping with these surveys, please contact the GSMP Team at **monitoring@wwt.org.uk**.

Population	Period	Notes
Iceland Greylag Goose	Oct – mid Nov	care needed with age identification
British Greylag Goose	Aug – Sep	
Pink-footed Goose	mid Sep – mid Nov	
Bean Goose	Oct – Nov	
European White-fronted Goose	Oct – Jan	focus on Jan
Greenland White-fronted Goose	Oct – Jan	focus on Dec
Dark-bellied Brent Goose	Sep – Mar	focus on Oct – Nov
Light-bellied Brent Goose (both populations)	Sep – Mar	focus on Oct – Nov
Barnacle Goose (both populations)	Oct – Dec	focus on Oct – Nov

Find out more

Visit WWT's Waterbird Monitoring website at **https://monitoring.wwt.org.uk/our-work/goose-swan-monitoring-programme/** to find out more about the Goose & Swan Monitoring Programme (GSMP), including detailed survey results and all editions of *GooseNews*.
Details about all the GSMP surveys, including how to get involved, can be found on the website at **https://monitoring.wwt.org.uk/get-involved/**

Announcement

Looking forward to the future of goose and swan monitoring

March 2022 will see WWT hand over the reins in its management of the Goose & Swan Monitoring Programme (GSMP) as the current partnership agreement between WWT, JNCC and NatureScot comes to an end. JNCC and NatureScot are committed to continuing goose and swan monitoring and are currently in discussions to decide how to take the GSMP forward beyond March 2022. WWT remains fully supportive of the important work of the programme but has made the decision to concentrate its conservation activity for waterbirds and their wetland habitats in other areas.

What does this mean for the GSMP?

There will be no changes to the way in which the GSMP is managed until at least spring 2022. For the coming season, 2021/22, WWT will continue to coordinate the GSMP as usual, including the running of the Icelandic-breeding Goose Census, the Svalbard Barnacle Goose Census and many of the goose and swan age assessment surveys: data from these surveys should be submitted to WWT in the same way as they have in previous years (see page 4).

So what does the future hold for GSMP participants?

In the coming months, JNCC and NatureScot will announce what the future of the goose and swan monitoring programme will look like and how it will be organised. The UK hosts internationally important populations of wintering geese and swans and monitoring their fortunes remains vital. The intention is that the network of goose and swan counters, and the vast knowledge and experience that exists amongst all those of you who have contributed over the years, will continue to support the GSMP in its new phase. We will let you know more details of how this will work in practice once the way forward has been agreed.

The current GSMP website (**https://monitoring.wwt.org.uk/our-work/goose-swan-monitoring-programme/**) will still be up and running for some time to come, so any news will be added there as and when we know more.

JNCC's project manager for the GSMP, Dr Kirsi Peck, reflected on the forthcoming changes:

> JNCC has had a long and successful partnership with WWT on goose and swan monitoring. While we are sad to lose such a good and dedicated partner, we respect WWT's strategic change of emphasis on their wetland conservation priorities that has led to this change. Currently, JNCC are investigating how best to organise future goose and swan monitoring with the aim to have the new arrangements in place this coming spring for as seamless a transition as possible. Goose and swan monitoring data continues to be of great importance, for instance for conservation and policy purposes, and our priority is to ensure that the scheme continues. We really hope that all current contributors will continue on this journey with us.

WWT's Director of Conservation, Dr. James Robinson, wanted to offer his thanks to everyone who has made the GSMP so successful.

> The network of goose and swan counters has provided invaluable data that underpins so much conservation action for these birds across the UK and beyond. Its work must continue and it is your passion, knowledge and expertise that makes it so successful. I want to thank you for all those long hours spent in the field and for playing your key role in the monitoring of these special and important populations of migratory waterbirds. I also want to thank all my colleagues at WWT who have organised such a brilliant programme.

Goose and swan monitoring in Ireland

Brian Burke

Ireland is wet, it's grassy, and it's well-placed to welcome migrants escaping the cold winters from places like Iceland, Greenland and even eastern Canada. As a result, Ireland hosts large proportions of the flyway populations of many goose and swan species on everything from our remote offshore islands, the best and 'worst' of our agricultural land, and our rugby pitches and urban parks too. Our key sites for geese and swans are undoubtedly Lough Swilly in the north, Dundalk Bay on the east coast, and Wexford Harbour and Slobs in the southeast, where you'll find thousands of individuals of multiple species and the bulk of the Irish populations of Greenland White-fronted, Iceland Greylag, Pink-footed and Light-bellied Brent Geese, and Whooper and Bewick's Swans. But otherwise, as a rule of thumb, you'll find Barnacle Geese in the northwest, White-fronted Geese in the midlands, Iceland Greylag and Pink-footed Geese in the east, Brent Geese dotted around the entire coast, feral Canada Geese in a small area in the north-midlands and a scattering of Irish Greylags across the country.

As you might expect there is plenty of overlap with the species (though less so with populations) in the UK, and coordinated monitoring on both sides of the Irish Sea is standard fare. But there are differences too. Our national waterbird monitoring scheme the Irish Wetland Bird Survey (I-WeBS) in the Republic of Ireland complements WeBS in Northern Ireland and the rest of the UK, but I don't need to tell you it misses

Photo: Brian Burke

a lot of geese and swans! So, as is the case elsewhere, more targeted work is needed. Some of this is done through the I-WeBS office, coordinated by BirdWatch Ireland under contract to the National Parks and Wildlife Service (NPWS), but other counts are led by species-specific study groups, with I-WeBS contributing records where we can.

Greenland White-fronted Geese

Around 40% of the Greenland White-fronted Goose population winters in Ireland, mostly on the reclaimed Slobs in Wexford in the southeast (*c.* 6,000 individuals), with a thousand or so in the next biggest flock around Lough Swilly in Donegal at the opposite end of the country. The remaining couple of thousand birds are split into around 20 flocks, spread across lakes and flooded rivers in the midlands and west, with important concentrations at key spots along the River Shannon, its lakes and tributaries. Annual monitoring of White-fronted Geese in Ireland is organised by Alyn Walsh and NPWS and was driven over many decades by John Wilson, David Norriss and Oscar Merne, all under the umbrella of the Greenland White-fronted Goose Study (GWGS) and working in tandem with the legendary Tony Fox amongst other international colleagues.

Regular annual monitoring began in winter 1982/83 (9,098 geese in 33 flocks in Ireland) and charted the rise in number (but loss of range) of the species until 1998/99 (13,575 geese in 27 flocks), after which there

was a rapid and unexpected decline. Thankfully there have been signs of recovery since the recent low of 10,266 White-fronted Geese in Ireland in spring 2015. Counts are organised monthly from October to March, with emphasis on autumn/November and spring/March counts, the latter of which is used for renewed annual population estimates alongside counts from Scotland and elsewhere. Long-term collaborations between NPWS, the GWGS, the University of Exeter, WWT and Mitch Weegman and colleagues in North America continue to shed light on the population dynamics and fitness implications of individual behaviours of Greenland White-fronted Geese in an Irish and international context. Perhaps the most startling finding in recent years has been that their largest wintering flock in Wexford has acted as a cryptic population sink over the last thirty years (Weegman *et al*. 2015), allowing numbers there to remain relatively stable as other flocks declined and disappeared. All of the high-level scientific publications in recent years are even more impressive when you realise just how hard it is to get close enough to an Irish White-fronted Goose to read a neck collar to begin with!

Light-bellied Brent Geese

The Irish Brent Goose Research Group (IBGRG) has more recent origins, having officially formed in 2000, by members from various organisations and institutions still driving the group today, including Kendrew Colhoun, Kerry Mackie, Stuart Bearhop, Graham McElwaine and Gerry Murphy. Almost all of the East Canadian High Arctic population winters in Ireland and is distributed around the entire Irish coast by mid-winter. A census count is therefore carried out each October, when the vast majority of birds first arrive into Strangford Lough in Northern Ireland, where they feed for a few days before redistributing elsewhere. From the point of view of achieving accurate census counts, not to mention establishing age ratios and ring-reading, they're by far our most cooperative goose! In contrast to the White-fronted Geese, who flush at the first sight of a human hundreds of metres away, the Brent Geese are often found happily feeding on playing pitches, housing estate greens, golf courses and parks in Dublin and other urban areas. This certainly takes the stress out of ring-reading, to the point that you feel guilty driving by a flock without getting your scope or bins out. And with more than 5,000 Brent from this population ringed to date, you're unlikely to find a flock without at least a couple of marked individuals. The IBGRG and the University of Exeter continue to put this ringing (and tracking) data to good use, with a conveyor-belt of research coming out on every aspect of the species, including the physiological processes underpinning their life-history trade-offs and choices, the likely effect of the North Atlantic Oscillation on key demographic factors, and the social networks of the geese themselves and the implications for foraging success.

Numbers-wise they're doing well, with over 35,000 individuals in recent winters (almost double the population of 20 years ago). Increased pressure to build more houses in the suburbs of Dublin is resulting in the loss of some favoured feeding sites around the city, however, and causing them to fly further inland from the bay in search of suitable feeding in the latter half of the winter. Despite the medium-term benefits in terms of fertilisation and grass growth, their presence and the resultant 'field signs' they leave behind means they get a mixed response from sports clubs!

Greenland Barnacle Geese

Our Greenland Barnacle Goose population numbered over 16,000 birds in recent years and are monitored on internationally coordinated census dates every five years or so. Given that they predominantly use headlands and offshore islands in the west, the census relies on aerial counts carried out by NPWS. David Cabot has been monitoring and ringing

Photo: Brian Burke

Photo: Otto de Vries

individuals on the Inishkea Islands (go to the very west of Ireland and keep going!) for over 50 years now, with long-term help from Alyn Walsh, and recent research collaborations with University College Dublin, University of Exeter (seeing a theme here?) and Kendrew Colhoun have given us more of an insight into the movements and population dynamics of this population in an Irish context in the last few years.

Greylag Geese

Our Iceland Greylag Goose population is modest in comparison to that in Britain and didn't experience the same rapid growth in numbers seen in Scotland and elsewhere in recent decades. At present we host around 2,000 Icelandic birds each winter, predominantly at Lough Swilly in Donegal, with two regular flocks on the east coast and one in Waterford in the south. This represents a decline of around 42% since the early 2000s, mirroring the flyway-level trend. Annual census counts are coordinated through the I-WeBS office, at the same time as those elsewhere as part of the Icelandic-breeding Goose Census (IGC).

The Irish Greylag Goose population is certainly increasing however, having seemingly doubled in the last ten years, and with around 26 flocks identified and numbering 3,500– 4,000 individuals. Most of these have stemmed from localised releases by gun clubs, but there are still some questions to be answered over others, and in recent years we've stepped up our efforts to monitor their numbers more closely, with the help of NPWS regional staff. Lough Swilly in Donegal, one of Ireland's most important waterbird sites, hosts the largest numbers of both the Iceland and Irish populations of Greylags, necessitating a late-summer count and a bit of subtraction after the November census dates. Most of the recent increases in Irish Greylags have been west of the River Shannon. We haven't experienced the same 'takeover' by Greylag Geese that has been seen in Britain and they're still a minor part of our breeding waterbird fauna.

Canada Geese

We have a small population of breeding Canada Geese, largely confined to the north-midlands (Leitrim, Cavan) and Donegal. They haven't showed the same signs of conquering Ireland in the way that they have in Scotland, England and Wales, so for the time being we're able to keep tabs on them through I-WeBS.

Pink-footed Geese

We monitor our Pinkfeet through annual census counts on IGC dates, organised by the I-WeBS Office. They only occur at around five sites consistently, all important sites for other goose species, but small family groups and individuals are showing up across a much wider spread of sites each year. They were recorded at 42 sites across the country in the period 2017/18 to 2019/20, but only ten of those held Pinkfeet in two of the three winters. Numbers at Lough Swilly and Dundalk Bay have numbered up to 300 birds by mid-winter in recent years, with only individuals and small family groups elsewhere.

Whooper and Bewick's Swans

The International Swan Census (ISC) in the Republic of Ireland is coordinated by myself and the I-WeBS team, and in Northern Ireland by the Irish Whooper Swan Study Group (IWSSG), headed by Graham McElwaine. The IWSSG continue this valuable monitoring work between censuses by collating age assessments and brood sizes from a large proportion of the Irish-wintering population every January, helping to 'fill in the blanks' between the five-yearly international censuses.

Though our Bewick's Swan population is officially monitored through the ISC, realistically it is monitored by the NPWS staff in Wexford where, sadly, our last remaining group of up to 15 birds remain.

The future

The future looks as secure as it can be for some species but more uncertain for others, with shifting weather patterns and longer-term changes in climate looming as threats at a large scale, and afforestation and urbanisation putting pressure on flocks at a local level. Though we haven't experienced the same degree of agricultural conflict as the goose-dominated regions of northern Britain, increasing numbers of Iceland Whooper Swans and Irish Greylag Geese here mean it's something we have to be conscious of. Many of our goose populations have been closely studied for several decades through marking schemes and in-depth scientific research, and those research groups show no signs of slowing down! With a bit of luck and a lot of hard work we can hopefully give some of our other geese, swans and wildfowl similar attention in the near future.

Reference

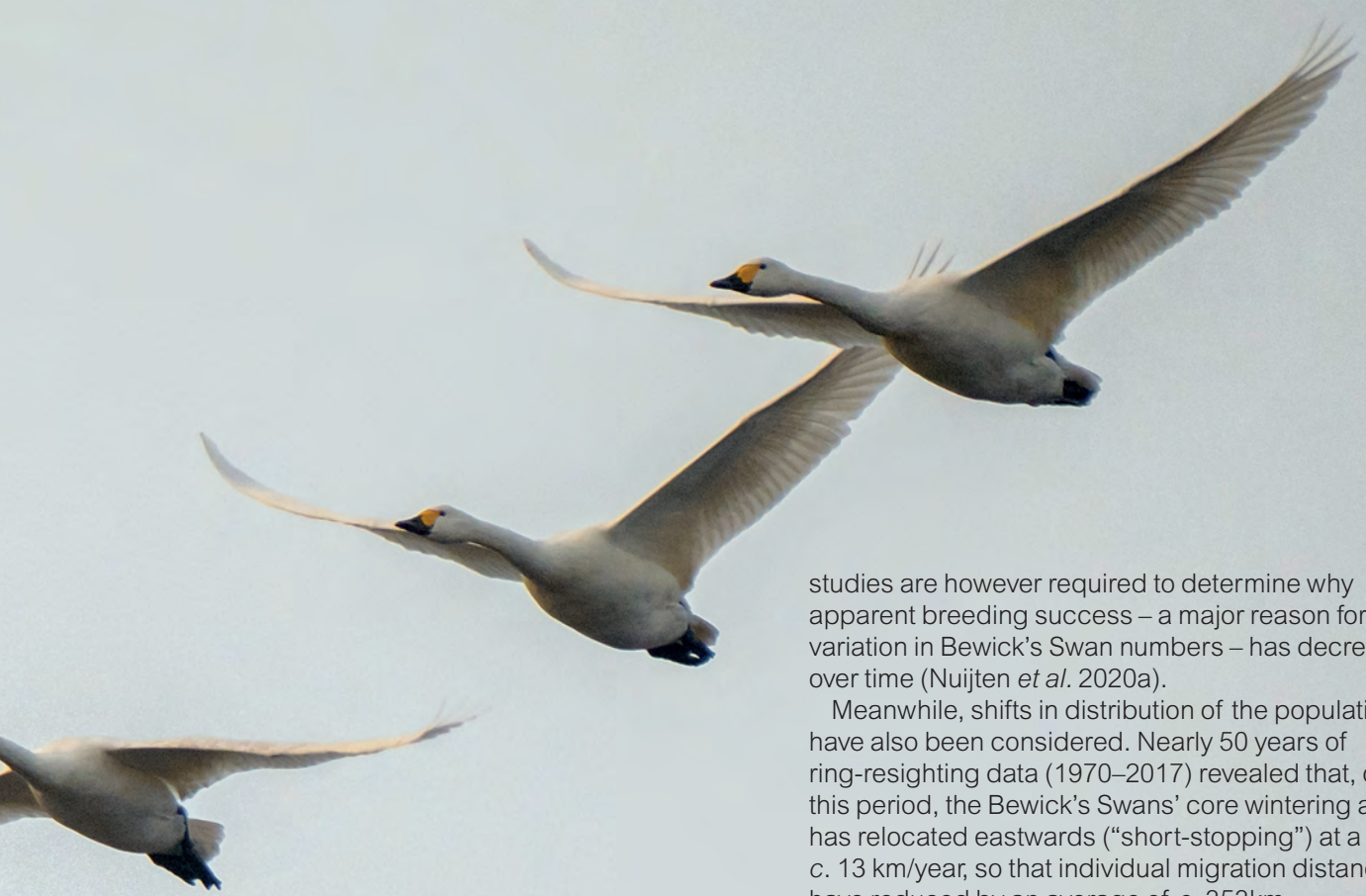
Weegman, M.D., S. Bearhop, A.D. Fox, G.M. Hilton, A.J. Walsh, J.L. McDonald & D.J. Hodgson. 2015. Integrated population modelling reveals a perceived source to be a cryptic sink. *Journal of Animal Ecology* 852: 467–475.

NW European Bewick's Swan – a changing population

Eileen Rees

During the second half of the 20th century, the swans and geese of the Northern Hemisphere increased markedly in numbers, as a combination of species protection measures and intensification of agriculture (which enhanced the food resources) improved conditions for the birds (Fox *et al.* 2010, 2016). Yet whilst most other populations have continued to grow, the NW European Bewick's Swans and a few other populations of conservation concern (notably the Greenland White-fronted Geese and Taiga Bean Geese) have started to decline. In the case of the Bewick's Swans, numbers peaked at 29,000 birds in the mid-1990s, before dropping steadily to 18,100 individuals in 2010, with only a slight recovery to 20,000 birds in 2015 (Beekman *et al.* 2019).

Photo: Ben Cherry/WWT



The rate of decline during the early 21st century was of such concern that a meeting of Bewick's Swan researchers and conservationists from across the flyway was convened in St Petersburg in 2009 to address the issue. An International Single Species Action Plan (ISSAP) for the NW European Bewick's Swans, developed from information gained during the workshop, was adopted by the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) in May 2012 (Nagy *et al*. 2012) and the priority actions within the ISSAP formed the basis for research and conservation initiatives throughout the range. In addition to taking forward measures to reduce mortality (*e.g.* addressing illegal hunting and reducing collision with infrastructure), collaborative analyses were also undertaken, as these are crucial for determining the reasons underlying changes in population size and distribution. These studies revealed that, although mean survival rates were higher in the 1980s than in the 2010s (Wood *et al.* 2018), survival varies much less between years in comparison with recruitment to the population, and that a combination of annual breeding success (measured as the proportion of cygnets recorded in the population each winter) along with adult survival best explained the long-term trends in population size described by internationally-coordinated counts (Nuijten *et al.* 2020a). There was also a significant association between juvenile survival (which increased during the period of population growth) and water levels at Lake Peipsi (a key autumn staging site on the Estonia/Russia border), which was thought to be attributable to greater availability of aquatic macrophytes for swans on autumn migration in years with higher water levels (Nuijten *et al*. 2020a). Further studies are however required to determine why apparent breeding success – a major reason for the variation in Bewick's Swan numbers – has decreased over time (Nuijten *et al.* 2020a).

Meanwhile, shifts in distribution of the population have also been considered. Nearly 50 years of ring-resighting data (1970–2017) revealed that, over this period, the Bewick's Swans' core wintering area has relocated eastwards ("short-stopping") at a rate of *c*. 13 km/year, so that individual migration distances have reduced by an average of *c*. 353km. Concurrently, the time spent at the wintering grounds also lessened ("short-staying"), by *c.* 38 days since 1989, although individuals were consistent in their migratory timing in winter, indicating a generational change in migration schedules (Nuijten *et al.* 2020b). In contrast, there was evidence for individual plasticity (*i.e.* individuals decreasing their migration distances over their life-time) in short-stopping, as well as for a generational shift. The changes appeared to be attributable to winter weather conditions, with the swans tending to locate to areas where mean air temperatures are *c.* 5.5°C (Nuijten *et al.* 2020b).

Elsewhere, detailed studies of Bewick's Swans' use of the Ouse Washes in the UK – internationally important for Bewick's but in the western part of their range – found no evidence that changes in food resources had influenced the swans' use of the washes and surrounding fens; inter-annual variation in the area cultivated for agricultural crops (which form the main part of the swans' diet) did not result in changes in the peak numbers of swans occurring at the site. Moreover, a comparison of behavioural and body condition data recorded in the 1970s and in the 2010s indicated that the food available at the site remains sufficient for the birds to gain and maintain good body condition throughout winter, without needing to increase their foraging effort (Wood *et al.* 2019). Although food availability in the western part of the wintering range does not seem to be driving population change, nonetheless the overall outcome is that an increasing proportion of the population is remaining in the eastern part of the wintering range. Germany is now important not only as a stopover area but in providing wintering sites for the birds (Augst *et al.* 2019), raising its role in conserving Bewick's Swans in the NW European flyway.

Meanwhile, assessing changes in the Bewick's

Photo: Ben Cherry/WWT

Swan population in summer is more challenging, as the birds are spread across the vast expanse of the Russian tundra where relatively few people occur. Aerial surveys undertaken by Russian ornithologists for an update of the *European Breeding Bird Atlas* (EBBA2) were valuable for assessing whether there was a major change in the swans' summer distribution, and reassuringly, there was little overall change in the Bewick's Swans' breeding distribution since EBBA1 during the 1980s. Key summer haunts were still located in areas such as the Bolvanskaya, Korovinskaya and Khaypudyrskaya bays, the Nenetskiy zapovednik, the Velt River basin, south Yugorsky Peninsula, Vaygach Island and southern Novaya Zemlya. Whether there has been an eastward shift in breeding densities in these areas, which may influence numbers following different migratory flyways, however, remains unclear (Rees & Rozenfeld 2020), particularly as swans in eastern European Russia, which congregate in Baydaratskaya Bay, appear to migrate on a broad front (Rozenfeld *et al.* 2019).

Information gained in recent years under the auspices of the Bewick's Swan Action Plan were presented during a workshop within the 6th International Swan Symposium (6th ISS), hosted by the University of Life Sciences, Tartu, Estonia in October 2018. In addition to the papers listed below, others were included in the proceedings of the 6th ISS, published as a Special Issue of the *Wildfowl* journal (*Wildfowl* Special issue 5). With the ten-year review of the AEWA ISSAP scheduled for 2022, plans are now underway to update the assessment of the current status of the population in a meeting due to be held in winter 2021/22, which will include considering the results of the January 2020 swan census. This will serve to inform the review process, and to determine whether a new ISSAP is needed for the species in due course.

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Goose counting at Loch Leven

Simon Richie

Hello, I am the NatureScot Loch Leven National Nature Reserve (NNR) Officer. My journey in goose monitoring starts almost a decade ago. I was lucky enough to have been brought up in Montrose, a small coastal town in northeast Scotland. Montrose is famed for its large tidal basin which boasts a large arrival of Pink-footed Geese in the autumn. This was no-doubt paramount in establishing my interest in Pink-footed Geese.

I completed my first Icelandic-breeding Goose Census (IGC) at Montrose Basin in November 2013 when I was 17 years old. I was studying Countryside Management at Scotland's Rural College and I was a very keen birder. I had always enjoyed watching the arrival of Pink-footed Geese to Montrose Basin and I wanted to get involved with the official counts. Thankfully, Anna Cowie, the Scottish Wildlife Trust Ranger, invited me to help with a count and I have never looked back.

I have extremely fond memories of contributing to counts at Montrose Basin. One count I was involved with was the record breaking count in 2015 of 85,632 Pink-footed Geese. It was truly staggering! That record has now been trumped as the official record is now at around 90,000 birds, truly amazing! It is remarkable to think that in a single count, you can have up to 20% of the Pink-footed Goose world population!

I have had some extremely memorable moments while monitoring geese. I was lucky enough to feature on BBC's Autumnwatch in 2019 and take Michaela Strachan out on a 'Wild Goose Chase' with my good friend Gus Routledge. We were talking about the joys

Photo: Simon Richie

Photo: Simon Richie

of watching geese and the thrill of spotting potential vagrants in amongst the flocks. To my amazement, during filming we spotted a Blue-phase Snow Goose. That was my first ever Snow Goose and it certainly isn't a memory that I will forget anytime soon.

Fast forward eight years from my first IGC and I have now completed census counts on a number of NNRs in Scotland, and I am blessed to now work full time at NatureScot's Loch Leven NNR where I coordinate the wildfowl counts on the reserve.

Loch Leven NNR is located in the county of Perth and Kinross, midway between Edinburgh and Perth in central-east Scotland. The loch is surrounded by gently rolling hills and agricultural land. It is Scotland's largest lowland loch and it is the most productive inland freshwater body in Europe. The Loch itself is 1,300 hectares and encompasses five Islands which are home to an assemblage of breeding wildfowl and Loch Leven Castle. The NNR is 1,824 hectares which, along with the loch, includes narrow strips of associated wetlands and woodlands.

Loch Leven is designated as a Site of Special Scientific Interest, Special Protection Area, NNR and Ramsar site. It is managed by NatureScot in collaboration with RSPB who manage Vane Farm on the southeast shore of the loch. We have a small population of breeding geese, around 100 pairs of Greylag and 30 pairs of Barnacle Geese, which nest alongside our internationally important numbers of breeding duck. Loch Leven also boasts good numbers of wintering Pink-footed Geese and Whooper Swans.

Loch Leven, on average, supports around 15–20,000 wintering Pink-footed Geese at peak: the record count was of 28,500 birds in March 2004. We have count data from the site going back to 1967 and the number of wintering Pink-footed Geese has

increased from an average peak of 7,000 to 15,000 birds at present. Interestingly, it seems that the loch had its highest average mean count between 2004–2008. Even with the current increase in the overall population, it looks like the wintering numbers on the loch have stayed fairly stable in the last 15–20 years with no real increase or decrease.

The site is monitored by conducting monthly goose counts throughout the winter. Once a month between October and March we complete a count at dawn (including on the official IGC dates). NatureScot counters cover the northern half of the loch and RSPB counters cover the southern half. We have counters at five different points around the loch and each counter will count the geese in their section. The geese are counted as they fly overhead or via a ground count if they decide not to leave the roost. Both Pink-footed Geese and Greylag Geese are counted.

Our numbers tend to peak in October and decrease throughout the winter months as birds head further south to winter in England. On average, we see around 15,000 birds in October 5,000 birds in mid-winter and this picks up to 6,000–7,000 in March/April as birds stop off during their migration northwards to breeding grounds in Iceland and Eastern Greenland.

The geese seem to have mini-roosts around the loch; each roost can have up to 5,000 birds or more. The roosts do move around, and it is a gamble as to how many geese you can have at your particular count section. In terms of active management, we sail out a flock of 50–70 sheep to St Serfs Island (which has the largest number of nesting geese and ducks) in late summer. These sheep will then graze the grass down for a few months to maintain it at a suitable level for winter goose grazing and spring breeding.

It's not only about geese, however. Loch Leven is an important wintering site for up to 850 Whooper and 1,200 Mute Swans, which makes for a magical sight.

It is an absolute joy to monitor the geese at Loch Leven. There is no greater sight than seeing and hearing your first skeins of Pink-footed Geese in early September. It's magic watching those numbers build up from a few hundred to tens of thousands in the space of a few weeks!

It feels great knowing that these birds are doing relatively well and their population is increasing. As always there is more we can do to understand and further conserve these birds. If you are interested in geese in any capacity then I would urge anyone to get involved with goose monitoring. It is an extremely satisfying feeling to complete counts and obtain valuable data from your sites. The counts are extremely important in understanding how numbers are fluctuating and where birds are moving.

I look forward to the return of the 'goose season' each year. Following nature's calendar and waking up at dawn with the geese is something that I look forward to. Waking up at 05:30 in the morning when it is -5°c outside to monitor geese isn't an idea of fun for many people, but for me, I wouldn't have it any other way.

Photo: NatureScot

The Goose & Swan Monitoring Programme

Colette Hall, GSMP Project Manager 2017– present

GooseNews readers will likely know why surveys of most goose and swan species in the UK are undertaken separately to those of other waterbirds. But just to recap. Initially, geese and swans were covered by the Wildfowl Counts scheme that started in the late 1940s. However, it was soon realised that daytime counts at wetland sites missed a notable proportion of the wintering geese and swans; hence, other survey methods needed to be devised. Through the years that followed, various surveys were established to monitor those goose and swan populations that could not effectively be monitored by the Wildfowl Counts (now the Wetland Bird Survey; WeBS).

Most of the goose and swan surveys are designed to estimate the size of the wintering population and, where possible, it's breeding success. Whilst some of the surveys are annual, the resources required by others (such as a light aircraft) mean a complete population census is undertaken every three to five years: in the latter case, during the years between the censuses counts are usually undertaken at key sites only (such as for the Greenland Barnacle Goose) or through WeBS (such as for Whooper and Bewick's Swans).

Though surveys of geese and swans had been running for many decades, a partnership between JNCC and WWT, and later NatureScot (formerly Scottish Natural Heritage), was established in the early 2000s that was designed to bring together all the knowledge and data collected in order to report on the status of the populations in the UK. And thus the Goose & Swan Monitoring Programme (GSMP) was founded, its purpose being 'to research and monitor the population status and demographic parameters of native geese and migratory swans in the UK'. However, the GSMP has become more than just a national scheme. Many of its constituent surveys are undertaken across the birds' wintering ranges *i.e.* at the international scale. Having an understanding of the status of these populations across their respective flyways is essential if the UK wants to ensure that its goose and swan populations are properly protected and managed, and that conservation action is based on sound data and science.

Although WWT may coordinate the GSMP, a number of the surveys are organised by other organisations, some of which are based outside the UK. The GSMP gathers data from these different sources in order to report on the status of the UK's geese and swans. Without these collaborations and without the international component the success of the GSMP would be significantly reduced.

Likewise, the greatest strength of the GSMP and the surveys on which it reports, lies with the counter networks, the majority of which consist of volunteers. We fully recognise just how vital citizen scientists are to their success: without them, many of the surveys would not be possible. We are sincerely thankful to all the volunteers (some of whom have been taking part for decades!) for their time, effort and dedication.

I would also like to take this opportunity to thank all the survey organisers who have supported the programme over the years. I am extremely grateful for all their support and contributions. It has been a privilege to work alongside you all.

And so, I'll pass the floor over to a few of these organisers who have shared a few thoughts about the surveys that they coordinate.

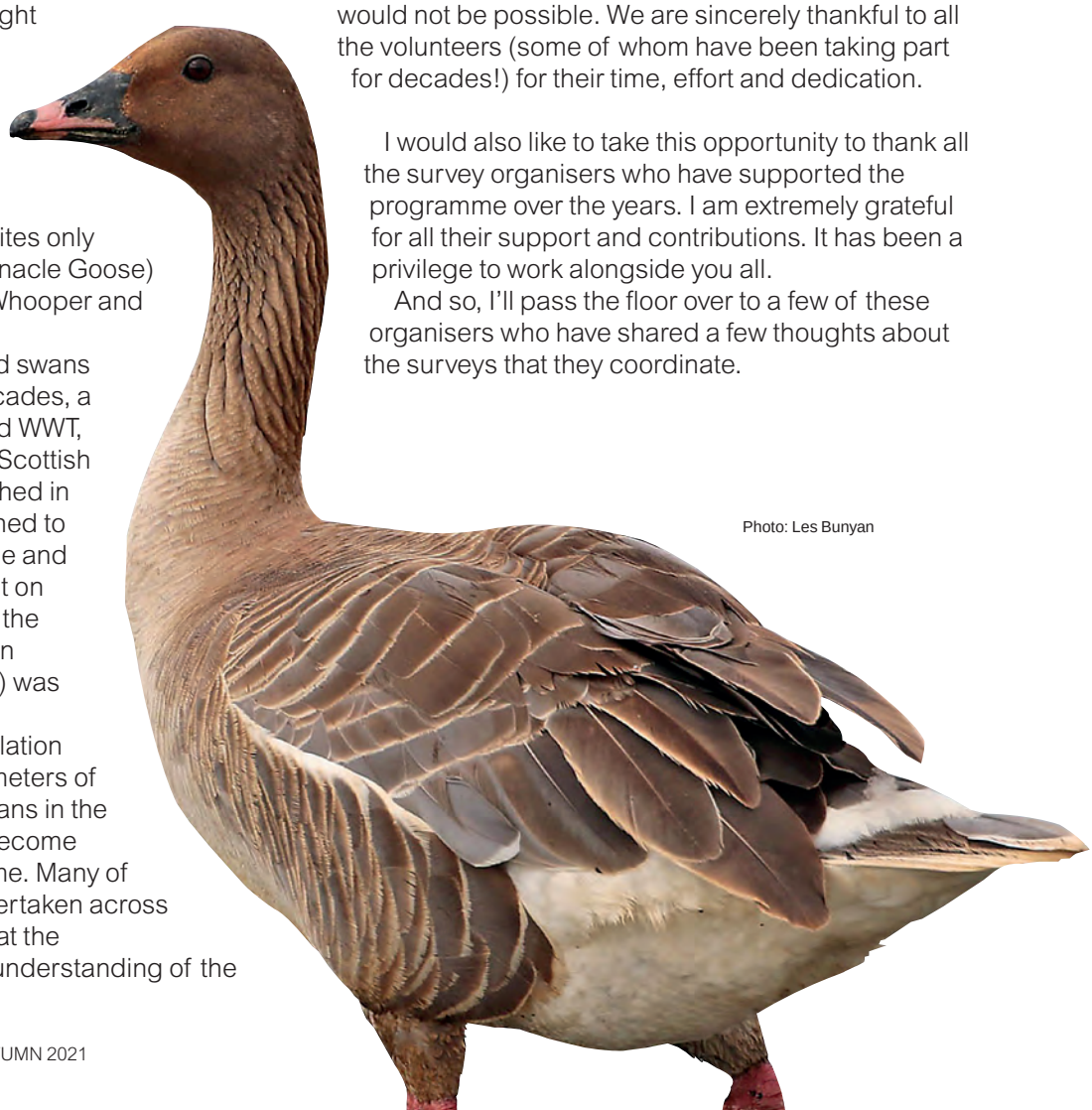

Photo: Les Bunyan

Icelandic-breeding Goose Census

The Icelandic-breeding Goose Census (IGC) monitors two migratory goose populations: the Greenland/Iceland Pink-footed Goose and the Iceland Greylag Goose. The IGC started in Britain in 1960 and expanded to include other countries across the flyway in the late 1990s/early 2000s. The census is organised by WWT, with partner organisations and counter networks including: Birdwatch Ireland and the Irish Wetland Bird Survey (I-WeBS) network, the Icelandic Institute of Natural History (IINH), the Norwegian Institute for Nature Research (NINA) and colleagues in the Faroe Islands, and the GSMP network of volunteer counters.

Kane Brides, IGC organiser 2017–present

I was first introduced to the IGC when I was a 13-year-old schoolboy helping with the winter goose counts at WWT Martin Mere in Lancashire. Chris Tomlinson (or Tommo), the then Reserve Manager, taught me how to count geese and I'd practice on the large flocks of Pinkfeet that winter on the reserve. Now, some 19 years later, I'm the census organiser, something that I never dreamt would be the case when I started counting all those years ago. I feel very fortunate to have got a behind the scenes glimpse into the world of goose monitoring and have seen the effort needed to gather and report on all the latest information.

Even though I've only been organising the census for a comparatively short time (having taken over from other prominent goose enthusiasts; see *GooseNews* 19: 10), the experience has led me to appreciate just how important collaboration across the whole wintering range is in ensuring we effectively monitor, manage and conserve our goose populations. Over the duration of the IGC there have, of course, been changes in the goose populations: the Pink-footed Geese have reached population levels of over half a million birds, increasing numbers of Iceland Greylag Geese are choosing not to migrate from Iceland and the distribution of both species has changed over time. In the future, factors such as climate change, goose management and land practices, and even simply the increasing number of geese will all potentially change things further. Therefore, if we wish to continue preserving our goose populations, the IGC needs to remain adaptable, monitoring must continue and collaboration across the flyway will be as important as ever.

My role has also enabled me to work with the many volunteer IGC counters and Local Organisers. They are the backbone of the census. Without them, our understanding about the goose populations would be significantly less. The experience and knowledge the counters offer is so important to the running of the scheme and I've had the pleasure of joining several counting teams in the field and seen first-hand their enthusiasm for monitoring geese.

Although nowadays my participation in the census mostly involves sitting in front of a computer screen, I still jump at the chance of being a stand-in counter, particularly if it's back home in Lancashire, as there is no other way I would rather spend a frosty cold morning than seeing large flocks of Pink-footed Geese take off as they leave their night-time roost. What a magical sight!

Kane Brides

Photo: Kane Brides

International Swan Census

The International Swan Census (ISC) monitors three migratory swan populations: the Iceland Whooper Swan, the Northwest European Bewick's Swan and the Northwest Mainland European Whooper Swan. It has been coordinated by the Wetlands International / IUCN SSC Swan Specialist Group (SSG) at *c.* five-year intervals since the late 20th century. In Britain, Ireland and Iceland, the census is coordinated by WWT. Partner organisations, individuals and counter networks involved have included: the Wetland Bird Survey (WeBS) and I-WeBS networks, BirdWatch Ireland, the Irish Whooper Swan Study Group, the National Parks and Wildlife Service (NPWS), IINH (organising the Icelandic Christmas Bird Count) and other colleagues in Iceland.

Eileen Rees, Chair of the SSG 1994–2001 and 2014–present

I've been involved in swan conservation in Europe, and indeed around the world, for over 40 years, including serving as Chair of the SSG, initially during the 1990s and then from 2014 onwards. The importance of continued monitoring of our swan populations was evident to me from the outset, for describing and understanding how the species are faring in a rapidly changing world. Data collected through censuses such as the ISC are vital not only for verifying total population estimates derived from less extensive counts but for ensuring that shifts in distribution are recorded and key sites identified. Systematic mid-January counts of all waterbirds at wetlands across Europe, made each year since 1967 (the International Waterbird Census; IWC), provide valuable information on trends in numbers and distribution at the population level, but the IWC's focus on regularly counted wetlands is less well-suited for determining total population sizes, particularly for species (*e.g.* many of the geese and swans) that disperse to feed on terrestrial habitats such as farmland outside the IWC network. Yet this information is crucial for identifying sites that meet criteria (*e.g.* regularly supporting 1% of the individuals in a population) for protection under national and international legislation.

The first of the ISCs (undertaken for the "Dutch Bewick's Swan Project 1982–84") therefore called for additional counts of the species in winters 1983/84–1986/87, to obtain comprehensive coverage of areas where Bewick's Swans were known to occur across Europe, including relevant farmland feeding sites. These put the NW European Bewick's Swan population at *c.* 16–17,000 birds at that time.

Eileen Rees Photo: WWT

Shortly thereafter, in January 1986, the first internationally coordinated census of the Whooper Swans in Britain, Ireland and Iceland, counted a total of 16,700 individuals, representing the whole of the Icelandic-breeding population. Since the ISC commenced, it has mapped the very different fortunes of these two populations, with the former declining markedly following a period of population growth and the latter currently increasing into the 21st century. The consequences of their opposing successes are quite marked, with an AEWA International Single Species Action Plan developed for the Northwest European Bewick's Swans, whereas the Icelandic parliament has recently considered the possibility of issuing hunting permits for the Iceland Whooper Swan population.

Censuses of the NW Mainland European Whooper Swans were initiated in January 1995, with the 59,000 individuals estimated being markedly higher than population estimates derived from the IWCs at that time. This population has also increased substantially, to a total of 138,500 birds estimated from the January 2015 ISC.

The ISCs are heavily reliant on the National Count Coordinators of the range countries, who collate and submit the data to the census organisers not only on the numbers counted at each site but on the age composition of the flocks (% juveniles; brood sizes) and habitats used by the bird. We are immensely grateful to them, and to the many individuals who put in the extra effort to count Bewick's and Whooper Swans in the census years. The January 2020 census was extended to the Black Sea and Caspian regions, to get a better handle on the numbers and distribution of swan populations in this region, and most of the data are now in. We therefore are looking forward to analysing and publishing the results of the latest surveys, and to providing updated population size estimates, in 2021–2022.


Photo: Ernest Dusch

Throughout my previous and ongoing involvement with the ISC, I've been hugely aware of the importance of international collaboration for waterbird monitoring and species conservation. The ISC clearly would not be possible without the enthusiasm, dedication and hard work put in by many people across a range of countries, who are a joy to work with, and are fully aware that migratory swans (like other migratory species) are a collective responsibility. As such, the ISC provides not only valuable scientifically-based insights into the different swan populations, but forms a well-connected group of experts keen to ensure their viability. Despite the ongoing environmental changes, and the challenges facing particularly the Bewick's Swans in northwest Europe, I therefore remain optimistic that the migratory swans will continue to delight us, and also the next generations, for years to come.


Photo: Brian Burke

Taiga Bean Goose counts at key sites

Britain is on the western fringe of the Taiga Bean Goose's wintering range, with just two sites in the country used regularly by the geese: the Yare Valley, Norfolk (England) and the Slamannan Plateau, near Falkirk (Scotland). It is thought that, historically, Bean Geese were once more numerous in Britain, although confusion exists over whether early records were, in fact of Pink-footed Geese. Today, the two sites together support *c.* 200–250 geese. Regular counts are undertaken annually by the RSPB at the Yare, and the Bean Goose Action Group at Slamannan.

Angus Maciver, Bean Goose Monitoring Officer, Slamannan Plateau, 2006–present

Having lived in Newton Stewart, Dumfries & Galloway, in the mid-1970s I was aware that a wintering Taiga Bean Goose flock was present at that time in the Ken/Dee Marshes. This small flock was monitored by Donald Watson *et al*., but knowing it was a rare flock of birds I never ventured to see it.

Photo: Angus Maciver

Angus Maciver

Photo: Angus Mciver

I came to live in Falkirk in 1976 and when I became aware of a flock of Taiga Bean Geese being present in the Carron Valley and the Slamannan Plateau in about 1991, it gave me the opportunity to make monitoring this rare goose a winter task.

I teamed up with John Simpson in the early 1990's to gain knowledge and participate in monitoring the bean goose flock at Slamannan. John was instrumental in finding the flock at Slamannan and by 1989/90 he had established a field usage pattern used by the geese, which is still being used today. We began to work together on this task and write up annual reports until 2005 when work made it difficult for John to continue. I am indebted to John for passing on all of his field knowledge which has given me a sound basis for the continuing study of this flock.

The programme of monitoring the geese and their distribution is part of the Biodiversity Action Plan for both Falkirk and North Lanarkshire Council areas.

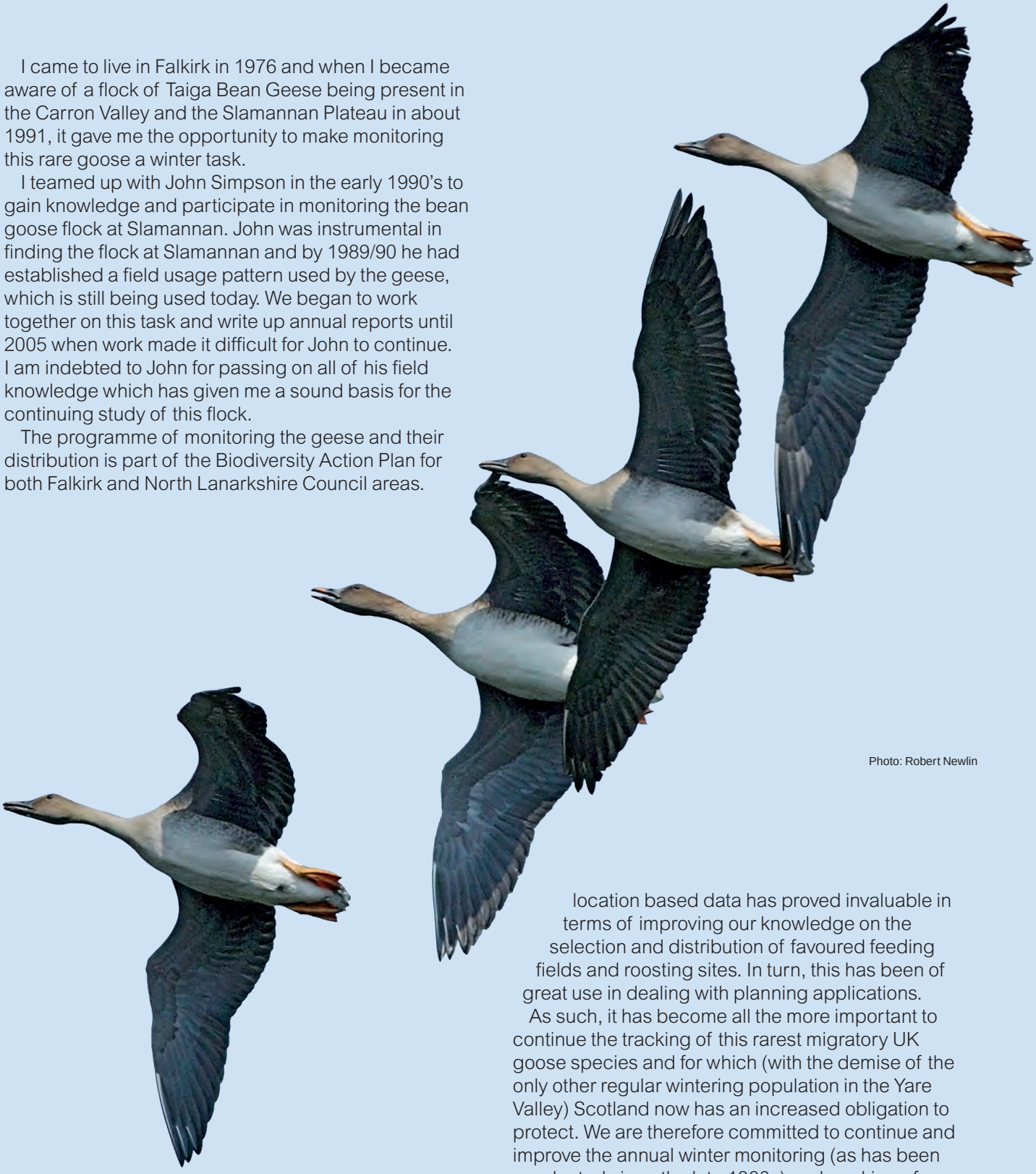

Photo: Robert Newlin

Since 2011, 18 birds from the population that winters on the Slamannan Plateau have been caught and fitted with tracking devices to improve our existing understanding of their feeding and roosting sites, make their previously unknown migration routes, staging areas and breeding quarters apparent and appraise us of the timing of their movements. Without the use of Global Positioning System (GPS) tags, none of this information about the daily and annual movements of individual birds would have been possible. During the wintering period when the birds are on the Slamannan Plateau, the detailed GPS location based data has proved invaluable in terms of improving our knowledge on the selection and distribution of favoured feeding fields and roosting sites. In turn, this has been of great use in dealing with planning applications.

As such, it has become all the more important to continue the tracking of this rarest migratory UK goose species and for which (with the demise of the only other regular wintering population in the Yare Valley) Scotland now has an increased obligation to protect. We are therefore committed to continue and improve the annual winter monitoring (as has been conducted since the late 1980s) and marking of individuals (as has been carried out since 2011) to enable us to continue to better understand their breeding success or lack of and threats to 'our' sub-population when not on the wintering grounds.

It was therefore really sad when WWT announced in autumn 2020 that they were ending much of their goose monitoring and making their two scientific officers, who have been instrumental in carrying out the catching and marking, and the tracking, redundant. However, as suggested, we are committed to continuing the good work, and hopeful that they can still be involved in their own right.

International Greenland Barnacle Goose Census

The population of Barnacle Geese that breeds in northeast Greenland (and now Iceland) mainly winters on islands off the north and west coasts of Scotland and Ireland, as well as a few mainland sites. The remoteness and inaccessibility of many of these islands, necessitates counts of geese to be carried out from the air. The first complete census in Scotland and Ireland was conducted in 1959 following some preliminary exercises in aerial survey techniques. The census in Scotland has been organised by WWT since it began, recently funded by NatureScot, and in Ireland by the NPWS. It involves a network of professional and volunteer counters.

Census organisers Carl Mitchell, 2003–2020 & Alyn Walsh, 1988–2020

"..In order to discover whether the use of an aircraft for making a census of the Barnacle Goose was practicable, the writers spent the period 11–24 February 1957 in searching parts of the mainland coast of the west of Scotland and most of the Inner and Outer Hebrides…The completeness of the 'cover' achieved was a pleasant surprise, in view of the potential hazards of flying in this area in winter…"

So began Hugh Boyd's account of the first attempt to census the number of Greenland Barnacle Geese wintering in Scotland.

The census was repeated in December 1959 and included Ireland, and has been carried out at roughly five year intervals to 2020. We have come a long way since the pioneering days of Hugh flying in an Auster high-winged monoplane. He thought that at least ten days was needed due to the limits of the plane, but in modern twin propeller planes, the authors have surveyed offshore islands in Scotland and Ireland in as few as four.

Photo: Carl Mitchell

Carl Mitchell and Colette Hall

Photo: Carl Mitchell

Alyn Walsh

Photo: Alyn Walsh

The population has increased from 5,670 birds in 1959 to a peak of 80,670 in winter 2012/13. Since then, NatureScot has been actively culling birds on Islay and, together with recent reduced annual breeding success, the population has decreased to 73,400 birds in March 2020. The census allows regular surveillance of distribution and the importance of individual sites, some of which are designated as Special Protected Areas (SPAs).

The overall distribution of the winter resorts is broadly similar to that in the late 1950s. Islay was, and is, the main winter location with number increasing from 1,150 to over 40,000 birds in the last 60 years. Notable "new" resorts with large numbers include Oronsay, Hoy (Orkney), Danna, Coll & Tiree and several sites in North Uist. These sites are examples of range expansion as the population has grown in number. In many areas the provision of palatable grasslands actively managed for sheep grazing has mimicked the natural saltmarsh that the geese would have once favoured. The population has also started to breed in Iceland, where up to 10,000 birds now spend the summer.

Aerial surveys require a strong stomach and keen navigation skills. Once a flock is sighted from the air, the pilot is instructed to tip the plane on its wing so that the observers can obtain an oblique photograph and visual estimate. Conditions can get 'bumpy' when flying up and over large sea stacks when the wind has unexpectedly increased in strength. However, surveying the west coast of Ireland and Scotland from the air is a secret joy – one of the best places to see these coastlines is from 150m in a light aircraft.

We would also like to express our thanks to the aerial surveyors who undertook the census before us, and those that have assisted us in recent years, and especially to the professional and volunteer counters who have undertaken ground counts in both countries since the late 1950s. Without their efforts the census would be far from complete.

Greenland White-fronted Goose Census

This census monitors the population of White-fronted Geese that breeds on the coastal fringe of west Greenland. The population is the smallest of the goose populations that predominately winter in Britain and Ireland, numbering *c.* 20,000 individuals. The census began in the early 1980s and is organised by the Greenland White-fronted Goose Study (GWGS) and involves networks of professional and volunteer observers.

Census organisers Tony Fox, 1981–present, Alyn Walsh, 1982–present, Ian Francis, 1994–present & David Norriss, 1982–present

It is hard to believe (for some of us oldies at least) that, as of the summer 2021, it had been 42 years since a rather naïve ragbag band of undergraduates from Aberystwyth University organized an expedition to Eqalummiut Nunaat in central west Greenland to study Greenland White-fronted Geese there. The motivation of the rather grandly named "Greenland White-fronted Goose Study" was to discover what was causing the dramatic declines in the population during the 1970s, manifest by the worrisome dip in the annual numbers wintering on the nearby Dyfi Estuary towards extinction. As is often the case, the intrepid expeditioners came back from their initial excursion to the Arctic little the wiser about the immediate causes of the declines. That would require a longer-term perspective, but the result was that we suddenly knew vastly more about the breeding biology and summer ecology of the population. It was painfully evident that no such single one-off project to one tiny part of the nesting areas could reveal all the answers, especially because at that time we knew so little about this extraordinary race of the circumpolar Greater White-fronted Goose. Back then, we knew almost nothing about their breeding range, when, where or even whether the entire population stopped off in Iceland during spring and autumn migration and whether they looped around the southern end of Greenland or climbed up over the massive Greenland Ice Cap to reach their breeding grounds on spring migration. Aerial and ground surveys in Greenland, intensive fieldwork in Iceland, tracking studies and effective liaison with flyway partners in range states have all long since resolved these mysteries and all this wealth of information has contributed to the effective conservation of the population. This has particularly been achieved by identifying key areas for breeding, staging and wintering concentrations of the geese and gaining their protection as Ramsar Wetlands of international importance or EU Special Protection Areas, as well as constructing the knowledge base for the development of an action plan for the sub-species (Stroud *et al*. 2012).

The 1979 expedition and a subsequent return visit in 1984 were successful at showing there were no obvious causes for the population decline operating on the breeding areas, but more importantly drew attention to the plight of the Greenland White-fronted

Photo: Aimee McIntosh

Ian Francis

Tony Fox

David Norriss

Photos: Greenland White-fronted Goose Study

Goose at other points in the annual cycle. In particular, it highlighted the over-exploitation by hunting that was occurring throughout the range, mortality from which failed to be balanced by the contemporary natural levels of reproductive success in the population. Thanks to lobbying by the Wildfowl Trust (now WWT) and GWGS at the time, this led to the protection from hunting on the winter quarters in Scotland and Ireland, effective from winter 1982/83. Comparing data from before and after the banning of hunting at Wexford, SE Ireland, suggested that levels of hunting there in the 1970s were likely additive to natural mortality. In other words, the geese that were shot annually were not part of a harvestable excess of birds in the population that would have died of other causes later anyway (Fox 2003). Consequently, the extra birds that survived as a result of the hunting ban added to the population total in subsequent years, which was a major contributor to the subsequent recovery and increase in population size that occurred through the 1980s and 1990s.

Another highly valuable outcome from the 1979 project was the collation of an inventory of regularly used wintering sites and the establishment of an annual census of these geese at all known sites, arguably one of the most significant outcomes of the entire process. The plastic leg-ringed birds marked in Greenland in 1979 enabled those individuals to be identified and followed on the wintering grounds and such sequential observations showed that birds were highly site-loyal in their use of sites within and between winters. Since the early 1980s, the National Parks and Wildlife Service (NPWS) has been annually catching and marking Greenland White-fronted Geese at Wexford Slobs (and latterly throughout the range in conjunction with others) so that today, more than 3,300 Greenland White-fronted Geese have been individually marked on the breeding areas, staging areas in Iceland and the majority on the winter quarters. Over 78,000 resightings of these geese, together with tracking data from birds tagged with GPS devices have all confirmed high levels of individual site loyalty to breeding, staging and wintering areas. This

confirmed the early results that had suggested high levels of winter site loyalty. This meant that regular surveillance of local numbers at all known wintering resorts could offer a highly reliable means of assessing annual population size, unlike, for instance, the Pink-footed Geese wintering in Britain, which move continuously through a network of geographically scattered sites (Fox *et al*. 1994). Initially coordinated by David Stroud in Britain by GWGS (see Stroud 1984) and in Ireland by John Wilson and David Norriss of the NPWS, starting in 1982/83, all known winter resorts were visited and counted at least twice each winter to establish annual population size (see Fox *et al*. 1998). GWGS has continued this tradition in Britain, latterly under the GSMP to the present day, generating data that has been responsible for confirming the most important wintering sites have been identified and are protected under domestic and international legislation and to support the implementation of the Action Plan for the population (Stroud *et al*. 2012).

Nowadays, we are reasonably confident that we know where all the winter Greenland White-fronted Geese regularly occur in Ireland and Britain and, thanks to a magnificent network of mainly volunteer observers it has been possible to maintain coverage of the vast majority of wintering sites in every single year, a very remarkable achievement. This annual perspective on population abundance is essential to our monitoring and management of the population. Back in 1979, we had little idea of the true extent of the winter distribution and abundance of the population. While we accept that a few Greenland White-fronted Geese may still winter undetected in remote bogs and wetlands in a very few locations in Scotland and Ireland, we are confident that we now know the vast majority of regular wintering sites used by the population. Likewise given the massive ornithological interest on the European continent and the frequency of reporting when vagrant Greenland White-fronted Geese do turn up there, we are very confident that there are no wintering areas outside the traditional wintering range that harbour this subspecies regularly. Such annual monitoring and knowledge is vital, because without a systematic annual assessment of the population abundance, we are unable to judge the conservation status of the population. That requires numbers to confirm whether the population is increasing, decreasing or is stable or fluctuating over a given time span. Without the help and assistance of the counter network, none of this would be possible and every single contributor plays a vital role in the process by contributing counts for each of the sites. Because conditions are never stable, circumstances are continuously in flux and it is essential to keep one step ahead of what might happen in the future to compromise the long-term survival of the population.

However, that is not all. As well as providing counts that enable us to judge whether the global population is changing or staying more or less the same, observers are also gracious enough to go out in all weathers to sample age ratios from among the wintering geese and to look for collars and other markings that distinguish individuals. Both these activities can be dull and challenging, especially in inclement weather and under trying circumstances, but for us they are almost equally important to counting. This information provides us with age ratios to infer reproductive success and ring readings that tell us which birds have survived and where they are wintering. Such information is vital to us to incorporate annual reproductive success into our population modelling. By knowing which birds are alive where and when, we can also generate survival estimates and quantify the degree of emigration and immigration between sites, equally essential to our population models to understand what drives population change, both locally and globally. In recent years, more and more organisations are contributing to the study of this unique population, including major contributions from WWT, the Universities of Missouri and Exeter, as well as the Chinese Academy of Sciences (who provide tracking devices) contributing research using telemetry and population modelling and most recently, BTO/RSPB telemetry studies of Anglesey marked birds. The application of such new techniques was inconceivable back in 1979 when we knew so very little about this mysterious population and has brought us huge leaps in our knowledge and understanding that directly contribute to the effective protection of this vulnerable group of geese.

However, it is also vital to remember that absolutely *none* of the research and conservation efforts that go into the safeguarding of this population would be possible without the core generation of long-term annual abundance, age ratio and resighting data, which makes the information coming from the counter network so vital towards maintaining the Greenland White-fronted Goose for future generations. For this massive contribution, now over four decades, we salute and thank you, our loyal counters, from the bottom of our hearts!

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Svalbard Barnacle Goose Census

The population of Barnacle Goose that breeds in the Svalbard Archipelago winters almost exclusively on the Solway Estuary and has been the focus of one of the world's longest running goose population studies: WWT has been monitoring these geese since the late 1950s. The census, organised by WWT, is currently carried out with the help of RSPB and a network of volunteer counters.

Photo: WWT

Larry Griffin

Larry Griffin, census organiser 1999–present

When I first arrived at Caerlaverock I was tasked not only with recording the leg-rings of as many Barnacle Geese as possible and assessing their body condition, pairing status, whether or not they had young and how many were on the fields and merses of the reserve each day, but also organising what, at that time, was a monthly census count of a handful of the key areas around the Solway where the geese fed and roosted.

It was quite a big deal at the time with most count sections typically being covered by WWT staff in Trust vehicles and often including visiting international researchers and other colleagues interested in the geese. Prior to this, as evidenced by the enticing dusty old dark blue diaries in hard-bound tomes on the high shelves of the Research Office, when the total population size was much smaller and the sites were even more limited, it was clear from the neat handwriting that the total number of geese was assessed by counting the flight lines from a few roosts; a method that seemed to work well until the population grew beyond about 10–15,000 birds.

How and when methods evolve for monitoring such a growing population over an increasing distribution rarely has hard and fast rules or clear break points as the birds are always one step ahead of our efforts and information for us is always imperfect, and we are often creatures of habit loath to change things. However, realisations do eventually dawn and during the late 1990s it became clear that the population had exceeded the predicted population limit for this flyway and that more geese than expected were present on the Solway. Thus, count methods needed to change and cover more areas, and WWT needed to ditch expectations about these birds and how many there should be.

Thus the system moved to more of a monthly approach based on counts of birds feeding in

Photo: Steve Nicholls/WWT

traditional feeding areas. An October count was good because it could give a picture of how many birds there were before they exhausted food supplies in the core areas and started moving into trickier to monitor, more peripheral areas of the range; but then again, as the climate has changed in the Arctic, so the birds can be late to leave Svalbard or worse still, they can stop off in Norway, as silage fields have become available in coastal areas there, and thus one year almost half the population did not arrive on the Solway until Bonfire Night! Thus, over time I have implemented more counts during the October arrival period, typically three or four, and also during April/May when weekly counts aim to capture the spring migration rate and depletion of numbers. This was instigated with an eye to the medium- and longer-term expectations of the effects of climate change and its Arctic amplification and its likely effects on autumn arrival and spring departure patterns. These data are banked, of course, but I don't know how long they will continue to be collected in future years with WWT's move away from GSMP. The shape and form of future monitoring for specific goose and swan flyway populations deeper into 2022 is as yet unclear.

What is remarkable is that it has been possible to draw more and more on the deep pool of voluntary citizen scientists that exists on both sides of the Solway. Likewise, it has been brilliant the way that RSPB staff have stepped up over the last 20 years or more to support the counts by checking their reserves and surrounding areas for geese at a specific time and date for what is a succession of nearly 450 counts now, with the baton of responsibility being passed from one person to the next as RSPB staff have moved on in terms of roles or in the case of Norman Holton, of course, when he sadly lost his battle with illness in 2016. These people have all been dedicated and brilliant advocates of the geese. Their numbers, with the ranks of staff at WWT Caerlaverock, have always been well supported by the volunteers and include key people, and one might almost use the perhaps overused word "legends" here, such as Mike Carrier, Bob Jones, Peter Williams and Marian and Dave Rochester. As the geese have shifted so has the support team, some needing to call it a day for personal reasons and with other good folk such as Clive Hartley, David and Hilary Hawker and Elizabeth Tindal covering different areas through time and others shifting their focus within count sections.

The hardest aspect of all to monitor, and the one that probably gets the least thanks, is checking a count section each week or month that is more than likely going to have zero geese; somewhat of a thankless task yet absolutely vital to our confidence in the data and as such, I would like to reserve special mention for David Charnock who has often had to endure a series of blanks on his route over the last five years or so. That is the "dark side" of monitoring and it is the one that makes me feel the most guilty, but it is hard to know when to call it a day on a count section as some have definitely been used by the geese for a winter or two but then fallen out of use. Thus some sections have later start months and earlier ends as it is well known that the geese have patterns of occupancy in certain areas but it is something that has to be constantly reviewed as these birds are especially dynamic. The flip side to the sections falling out of use is that it is also somewhat imprecise as to when random reports of geese in a new area might actually be a colonisation of such an area and thus need adding to the main monitoring route. This has happened for sections such as Powfoot to Gretna, Kirkcudbright to Wigtown and the Colvend to Rascarrel areas over the years.

I would also like to give Bob Jones special mention too, as without fuss, and often under conditions of tricky visibility he regularly has to wade through and make sense of more than 10,000 geese scattered across the great marsh areas and river bank muds on the Cumbrian side of the Solway, keeping calm in the face of disturbances from dog walkers and horse riders on the marshes, and charming little microlights overhead.

So as I start to turn my focus away from the Trust and the Caerlaverock reserve, albeit sticking by the geese, I would like to offer up tremendous thanks to all these good folk, and although yes there have been the occasional late call ups or issues due to unforeseen problems of cars not starting, colds or whatever, it is truly a testament to their amazing efforts that over the last 20 years and after nearly 450 counts, fewer than five counts have ever truly been cancelled and what is also amazing is that all of these folk, even those getting on in years, pretty much submit their counts digitally the day of the count; how things have changed…though I do still miss Mike Carrier's wonderful hand-written envelopes and accounts of his day!

Photo: Nevile Davis