REPORT OF THE 2019/2020 INTERNATIONAL CENSUS OF GREENLAND WHITE-FRONTED GEESE

by

GREENLAND WHITE-FRONTED GOOSE STUDY

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SUMMARY

The global population of Greenland White-fronted Geese in spring 2020 comprised 21509 individuals, up very slightly on the 21466 (0.2%) on the previous year; 10418 were counted in Ireland and 11091 in Britain. Numbers at Wexford, SE Ireland, increased by 876 birds (11.8%) to 8312, but numbers wintering on Islay fell again by 861 (12.7%) to 5910. Reproductive success among Irish flocks was a little better after summer 2019 than in the previous year in Ireland (10.8%), but exceptionally good in Britain (19.5%). We also report slightly adjusted reproductive success data from Coll in 2018/2019.

This report presents the results of the surveys of the Greenland White-fronted Goose on the wintering grounds in winter 2019/2020, combining counts from all the British resorts (coordinated by the Greenland White-fronted Goose Study) and those in Ireland (co-ordinated by the National Parks and Wildlife Service). The international coordinated count in spring 2020 found a combined global total of 21509 Greenland White-fronted Geese, very slightly up by 0.2% (43 birds) on the previous world population estimate of 21466 in spring 2019.

Covid-19 limited count coverage in **Ireland** in March 2020, but thanks to outstanding coverage in other months, it was possible to generate an estimated total of 10418 birds in spring 2020, comprised of 8312 at Wexford (compared to 7436 in spring 2019) and 2106 from the rest of Ireland (encouragingly up on 1899 in spring 2019). As a result, missing spring counts had to be substituted for more flocks than would be the case in normal years, but coverage was still excellent throughout the rest of the winter. Missing spring counts were substituted for 18 Irish regular wintering resorts, which, because these included those in the Wexford area, amounted to 96.6% of the Irish total. Complete censuses of all known Greenland White-fronted Goose wintering haunts in **Britain** found a total 11091 in spring 2020, compared with 12131 in spring 2019, comprising 21 counted in England, 28 in Wales, 5910 on Islay (compared to 6771 last season) and 5132 in the rest of Scotland (compared with 5332 last season). Spring coverage in Britain was more or less complete, although counts were missing from the specified count period from seven resorts, all were substituted with counts undertaken very close to the defined international count dates, amounting to 2.2% of the British total.

Among **Irish** wintering geese, the percentage young among aged flocks after the 2019 breeding season was 10.8% (based on 5058 aged individuals) compared to 6.9% last season. Mean brood size among the Irish flocks was 3.07 (n = 137) compared to 2.80 last season. There were 10.8% young among 4466 aged at Wexford (encouragingly up on 6.9% last year), where the mean brood size was 3.14 (compared to 2.92 last season) based on 115 broods. Elsewhere in Ireland, reproductive success was also better than in recent years at 11.5% based on an excellent sample size (n = 592), with mean brood size 2.68 (n = 22). The proportion of young in aged samples from **British** wintering geese was exceptionally high following the 2019 breeding season, with an average percentage young of 19.5% (n = 6967 aged, compared to 11.1% last season; this value is slightly adjusted in this report for one incorrectly submitted count from last season). Mean brood size was 2.70 (n = 122 broods, compared to 2.67 last season). There were 20.7% young among samples on Islay, (n = 2608, better than 12.3% last year and the highest level since 2010 - there have only been six years when the percentage young on Islay have exceeded 20% back to 1962 when records began) where the mean brood size was 2.83 (n = 48 compared to 2.80 last year).

INTRODUCTION

The 2019/2020 survey represents the 38th annual census of Greenland White-fronted Geese co-ordinated 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 and Wildlife Service. Table 1 shows the most recent six 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.

Table 1. Spring population census totals for Greenland White-fronted Geese, 2015-2020.

	Spring 2015	Spring 2016	Spring 2017	Spring 2018	Spring 2019	Spring 2020
Wexford	7984	6421	7047	7637	7436	8312
Rest of Ireland	2282	2172	1912	1950	1899	2106
Islay	3995	5183	6141	5319	6771	5910
Rest of Britain	4593	5103	5456	5379	5360	5181
Population total	**18854**	**18879**	**20556**	**20285**	**21466**	**21509**

AUTUMN ARRIVAL PATTERNS IN AUTUMN 2019

A very early bird was reported on 24 September 2019 via BTO BirdTrack from Druridge Pools, Northumbria. Much goose activity was reported by local observers around Kentra Moss through the night of 28 and 29 September, with many Pink-footed Geese passing through during daylight hours the following day. Distant sightings of geese thought to be Greenland White-fronted Geese culminated in 56 flying directly over Pete Dale's house at 15:26 on the afternoon of 29th, numbers that remained at that level through all of October. A single bird turned up at the Ythan Estuary, Aberdeenshire on 30 September. Malcolm Ogilvie had reports of 130 Greenland White-fronted Geese flying down Loch Indaal on Islay around 30 September/1 October, although very few were seen on Islay in the following week. Bill Neill also suspects he had a gaggle passing over Askernish around the same time. A Greenland White-fronted Goose was reported from Udale Bay, Highland on 4 October, the same day two were reported from Loch of Skene, Aberdeenshire, which remained there until at least January, one of them until 11 April. Pete Dale also witnessed Greenland White-fronted Geese passing over Tobermory, Mull on 10 October heading for Calve Island after dark and six birds arrived back at Loch Lomond on 11 October. John Bowler saw his first Greenland White-fronted Geese on Tiree on 12 October with 140 flying SE. Six were back at Endrick Mouth, Loch Lomond during the WeBS count there on 15 October. Brian Henderson had his first 43 birds back on 20 October and on the Oa Peninsula on Islay, Dave Wood had 150 arrive together on 21 October, followed by another 80 on 24 October. There were no major reports of autumn movements over the Uists, but four birds passed south over Brevig on the SW end of Barra on 25 October and single juvenile the same day remained associating with Greylag Geese on the southern end of Barra and on adjacent parts of Vatersay from 3 November until at least 14 April. On 27 October, a singleton turned up well off course at Killen on the Black Isle, Highland, eight returned to Loch Ordais on Lewis, the first birds returned to Lismore and 40 were back at the Loons RSPB Reserve on Orkney, with other singles at Udale Bay, Highland and at Slimbridge WWT Reserve in Gloucestershire. Sixteen flew south over Treshnish Wood, NW Mull on 29 October and a lone juvenile that turned up on Berneray on the Borve Machair remained there until at least the end of January. The first eight birds were not seen on the Dyfi until 8 November.

At Wexford, the first birds were reported on 30 September, but the first big arrival of 700 came over 19/20 October, including 10-15 collared individuals. Numbers built over the following days reaching 4473 on the morning of 28 October, on the day following the 50th anniversary of the existence of the Wexford Slob Wildfowl Reserve.

At Hvanneyri, western Iceland, the first snow of year fell on the night of 23/24 October, although there had been sub-zero daily temperatures for a couple of days before then. The result was all fields were white and all water frozen by 24 October, by which time all the geese had gone. Nevertheless, Mummi

(Guðmundur Guðmundsson) still saw 66 Greenland White-fronted Geese that day at Brautarholt, to the NW of Hvanneyri including two collars Y1C and Y2C, birds previously caught at Hvanneyri.

SPRING 2020 DEPARTURE PATTERNS

After a miserable period of low pressure systems and storms tracking across the Atlantic, towards the latter part of March things settled down a little for the passage of geese to Iceland from Ireland and Britain. Despite this, there were few early signs of departure, until 34 at Loch nam Fiethean and c.135 off Aird an Runair, both Balranald, North Uist and two at Loch na Reivil, Hougharry (all reported via BirdTrack) on 25 March and later 64 flying north off Rubha Ardvule during three hours of sea-watching the same day (Outer Hebrides Birds). Geese began to move after this, with 25 passing over Barra on 27 March, 55 flew north at Ardivachar on 28 March, 95 over The Range on South Uist 29 March, with 96 at Scolpaig, North Uist 3 April and 43 during a sea watch at Ardvule on 4 April. John Bowler watched his first departures leaving Tiree NW on 29 March, from where most of his birds departed 8-10 April, with the last 12 stragglers seen 10 April. Birds had largely left Stranraer in the first days of April, the last being 14 seen on 3 April. The Claish/Kentra Moss flock retained its full complement until the evening flight of 4 April, when Andrew Dacre counted 76 departing Kentra that evening, but he and Pete Dale witnessed only 22 departing the roost on the following morning flight next day. These numbers persisted until the morning of 9 April, when 22 came off the roost in the morning flight, but none returned that evening. Geese were largely gone from Lismore on 9 April, although four persisted until 16 April. Five were reported at Papa Westray, Orkney on 14 April and two and six on 17 April. Last reports were of four at Claddach, Kirkibost on 18 April.

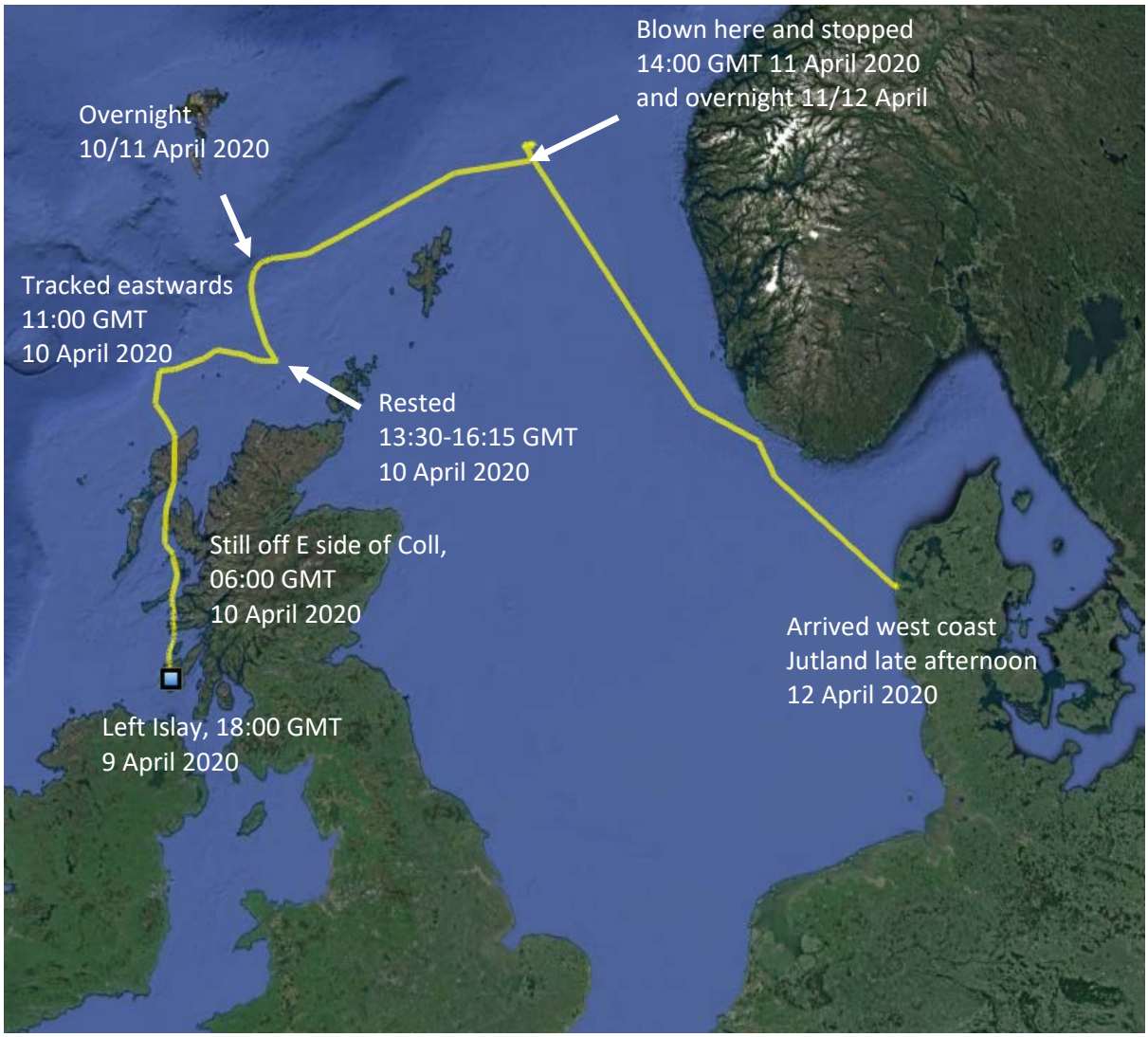
The first reports from Iceland were from Þorberg Ólafsson on 23 March who lives at Hvammar, situated under the Eyjarfjallajökull glacier in southern Iceland (63°34'N 19°52'W), where he witnessed a steady stream of White-fronted Geese moving past his farm westwards from 23 March onwards and Alex Máni had six White-fronted Geese in eastern Flói on 23 March. Mummi reported 130 back at Hvanneyri on 30 March.

We often fail to understand the severity of the experiences that some geese endure on their way to and from their breeding areas. So many of the satellite tracks show the birds making faultless headway across the sea from the winter quarters to Iceland and back, but as we well know, weather conditions in this part of the Atlantic are unpredictable and can be unforgiving for geese, many of whom may also have their own "off-days" when deciding to cross the seas. It is therefore always exciting if sometimes distressing to see the "story behind the story" when we have the opportunity to see the causes for Greenland White-fronted Geese sometimes appearing all of a sudden, well off their normal flight routes, as illustrated by the tracks from tagged geese in the account that follows.

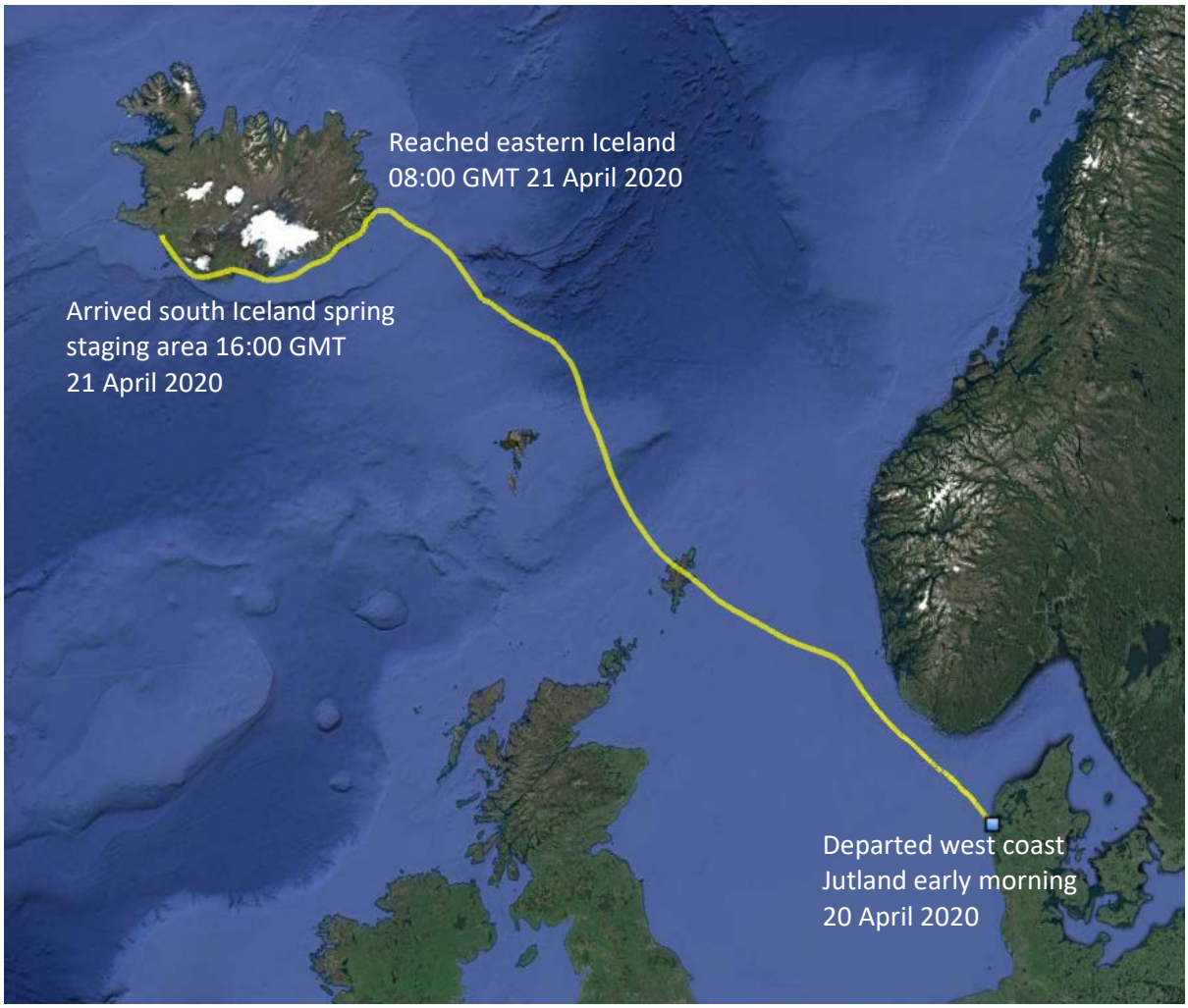
XY was an adult female caught by WWT on 27 February 2019 on Ronnachmore, a farm on Islay that supports many Greenland White-fronted Geese in winter; she and another adult female XZ were caught in the same catch and fitted with grey Ornitela collars kindly funded by Professor Cao Lei of the Chinese Academy of Sciences in Beijing, China. These neck collars incorporate solar panels to maintain battery supply to an embedded device that determines the position of the collar via the satellite based global positioning system (GPS) at regular intervals, stores the coordinates to its on-board memory and sends this information via the mobile telephone system to us, when within the coverage of these networks, so we can see where the geese are throughout the annual cycle.

Information from both birds showed them setting off from Islay around 18:00 (all following times are GMT) on the afternoon of 9 April 2020, moving incredibly slowly up the west coast of Scotland and resting off the SW coast of Skye around 07:00 next morning. They headed off towards Iceland, crossing Lewis, before turning eastwards at around 11:00, having hit a warm front stopping them moving onwards. They rested between 13:30 and 16:15, 75 km north of Cape Wrath, before heading 125 km towards Iceland again, only to find their way blocked by the front, causing them to rest on the sea overnight. Next morning, they started at just before 07:00, but were again confronted with the frontal system to their north, which they followed to east, until they finally rested and spent the night 130 km NE of Unst, the northernmost island of the Shetlands. For whatever reason, it looked like they

had had enough spending the best part of two days getting nowhere, so next morning around 07:00 they set off this time SE and headed straight in to the west coast of Jutland in Denmark, with the benefit of light tail winds, which they eventually reached late afternoon on 12 April.



Although an annual visitor, especially to west coast Jutland, it is certainly not every day there is the chance to see Greenland White-fronted Geese in Denmark, so not surprisingly, Tony Fox jumped into his car and went across to see the two collared females and their unmarked companion during their sojourn in west Jutland winter cereal fields (image below).



The birds set off early on 20 April in fine still high pressure weather, retracing their previous route past the coast of Norway, heading out over the Shetland Isles, arriving in east Iceland next morning. After readjusting their positions, following the south coast, they arrived at their spring staging area either side of Þjórsá river estuary commuting between Fljótshólar on the west side and Brautartunga to the east the afternoon of 21 April. As we write this in early November, XY is back on Islay, commuting between the farms of Ronnachmore, Gartbreck and Laggan that constitute her home range.

COUNTS IN BRITAIN 2019/2020

Thanks to the selfless dedication of our enthusiastic counters, excellent coverage of Greenland White-fronted Goose flocks was achieved in winter 2019/2020. Thanks to the British Trust for Ornithology (and especially Neil Calbrade) for access to the BirdTrack database (organised by BTO with project partners Royal Society for the Protection of Birds, BirdWatch Ireland, Scottish Ornithologists Club, Welsh Ornithologists' Society and BirdLife International) and the Wetland Bird Survey (WeBS, organised by BTO with project partners RSPB and JNCC in association with WWT). Although these data sources add little numerically to our regular basic monitoring, the observations and counts from non-regular sites and during migration periods have been invaluable.

As far as possible, we provide maximum monthly counts from all the regular wintering sites, together with the census period totals (Table 2). Counts from elsewhere in Scotland and England (*i.e.* irregular sites) are listed in Table 3. As usual to provide an overview of trends, autumn and spring count totals since 1982/1983 in Britain are depicted in Figure 1. Note that two birds reported from Belgium during the autumn period are not included in the totals here and they were not seen again in spring.

Table 2. Summary counts of Greenland White-fronted Geese in Britain 2019/2020

Shaded values are estimates for sites where no counts were received for the precise period of the international census periods

SITE NAME	SEP	OCT	NOV	AUTUMN CENSUS	DEC	JAN	FEB	MAR	SPRING CENSUS	APR
ORKNEY										
Loons		65	78	83	83	65	69	74	71	
Papa Westray				6	6					
North Ronaldsay										2
CAITHNESS										
Westfield			113	112	112	80	100	150	150	36
Loch of Mey		135	185	185	130	119	128	154	154	
WESTERN ISLES										
Barvas/Shawbost, Lewis		8		45					45	
Benbecula			1			7				
Berneray, North Uist		1	1	1	1	1				
North Uist						1				
Kilpheder/Askernish, South Uist				12	12	12	12	5	12	
Loch Bee/Kilaulay, South Uist			83	125	125	123	53		123	
Barra			1			1				1
INNER HEBRIDES										
Loch Chalium Chille, Skye				4			4	4	4	
Broadford/Pabay, Skye			6	6					6	
LOCHABER/NORTH ARGYLL										
Muck/Eigg										
Loch Shiel/Claish Moss	56	56	76	76	76	76	76	76	76	
Lorn:Balure/Bacaldine			0	28		28			28	
Lorn: Appin			15	15	15		15	15	15	
Lismore		107	120	120	78	27	114	105	109	100
Tiree		67	714	750		741	722		855	
Coll			161	228		142	116		150	
Assapol, Mull				0						
Fidden Mull			25	25					25	
SOUTH ARGYLL										
Colonsay/Oronsay				126					126	
Jura: Loch a'Cnhuic Bhric			0	0					0	
Jura: Lowlandman's Bay			0	0	0	0		0	0	
Danna/Kiells/Ulva			217	194		119	115		186	
Moine Mhor			5	5	4	4	4		4	
Rhunahaorine			330	341		708	545		447	
Machrihanish			1500	1737					1576	
Clachan			121	86			108		135	
Gigha				157					133	
Glenbarr				0					57	0
Isle of Bute			122	122	122	115		148	148	
Endrick Mouth, Loch Lomond			204	185	57	190	171	236	186	
ISLAY			5959	6325		6595		6426	5910	
DUMFRIES & GALLOWAY										
Loch Ken			175	167	167		140	125	125	
Stranraer		155	174	187	187	177	187	186	186	14
WALES										
Dyfi Estuary			20	21	21	30	21		21	
Cors Ddyga, Cefni valley, Anglesey			19	19	19	18	15	7	7	
ENGLAND										
Grindon Lough										
OTHER IRREGULAR SITES										
England combined		0	4	4	7	37	38	27	21	14
Scotland combined		3	11	0	4	11	42	12	0	5
Wales combined		0	39	40	40	65	57	15	28	0
Belgium (not included in GB totals)				(2)						
TOTALS				**11497**					**11091**	
Rest of GB less Islay				5172					5181	
Rest of Scotland less Islay				5128					5132	
England				4					21	
Wales				40					28	

Table 3. Summary counts of Greenland White-fronted Geese at irregular used sites in Britain 2018/19

	SEP	OCT	NOV	AUTUMN CENSUS	DEC	JAN	FEB	MAR	SPRING CENSUS	APR
Scotland										
Loch of Brow, Shetland Islands								1		
Unst, Shetland Islands										1
Fair Isle										1
Embo, Dornoch, Highland			1							
Golspie, Highland								2		
Udale Bay, Highland						1				
Loch Eye, Highland							11			
Kildrummie, Highland						1				
Rattray Head, Aberdeenshire						2		2		
Loch of Strathbeg		1	1			1				
Ythan Estuary	1									1
Loch of Skene		2			2	2	1			1
Alford, Aberdeenshire						1				
Montrose Basin, Angus					1					
Vane Farm RSPB Reserve					1					
The Wilderness, Fife							1			
Lethams Pools, Fife						2				
Skinflats Lagoons/Carronshore, Falkirk						1	1	1		1
Cormiston, South Lanark			1							
Carnwath, South Lanark							1			
Fail Loch, South Ayrshire							27			
Maybole, South Ayrshire			8							
New Cumnock, East Ayrshire								6		
England										
Woodhorn Flashes, Northumberland						2				
Prestwick Carr/Dinnington/Big Waters, Northumberland							9	9	9	
Cresswell Pond, Northumberland						1				
Backworth, Northumberland							1			
Linton Pond, Northumberland							2			
Warren Mill, Northumberland							1			
Old Hartley, Northumberland								1		
Gosforth Park, Northumberland							1	1	1	1
Staveley Nature Reserve, North Yorkshire							1			
Aldcliffe/Heaton Marsh, Lancs							5	5	5	5
Little Singleton, Lancs							1			
Piling, Lancs						3	1	1	1	
Burscough Moss, Lancs							2	2		
Banks Marsh, Lancs			2	2	2		2	3	3	3
Redesmere, Cheshire					3	3				
Mere Farm Quarry, Chelford, Cheshire							3			5
Slimbridge, Gloucestershire			2	2	2	3	2	2	2	
Wapole St Peter, Norfolk						3				
Buckenham Marshes, RSPB, Norfolk						5				
Yare Valley (Marlingford to Bawburgh), Norfolk						2				
Wissey, Norfolk							5			
Pulborough Brooks, Sussex						2	2	2		
Abberton Reservoir, Essex						13				
Arundel WWT, Sussex								1		
Wales										
Hen Borth, Cemlyn Bay, Anglesey						2				
Gann Estuary, Dale/Marloes Mere, Pembrokeshire						7				
Trefin, Pembrokeshire						1				
Llyn Llywenan, Anglesey							7	7		
Alaw Estuary, Anglesey							7			
Llyn Alaw, Anglesey							6			
Flint Sands, Dee Estuary								1		
WWT Llanelli							1			
Belgium										
Stalhille				2	2					
TOTALS										
Scotland		**3**	**11**	**0**	**4**	**11**	**42**	**12**	**0**	**5**
England		**0**	**4**	**4**	**7**	**37**	**38**	**27**	**21**	**14**
Wales		**0**	**0**	**0**	**0**	**11**	**21**	**8**	**0**	**0**
Belgium		**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**

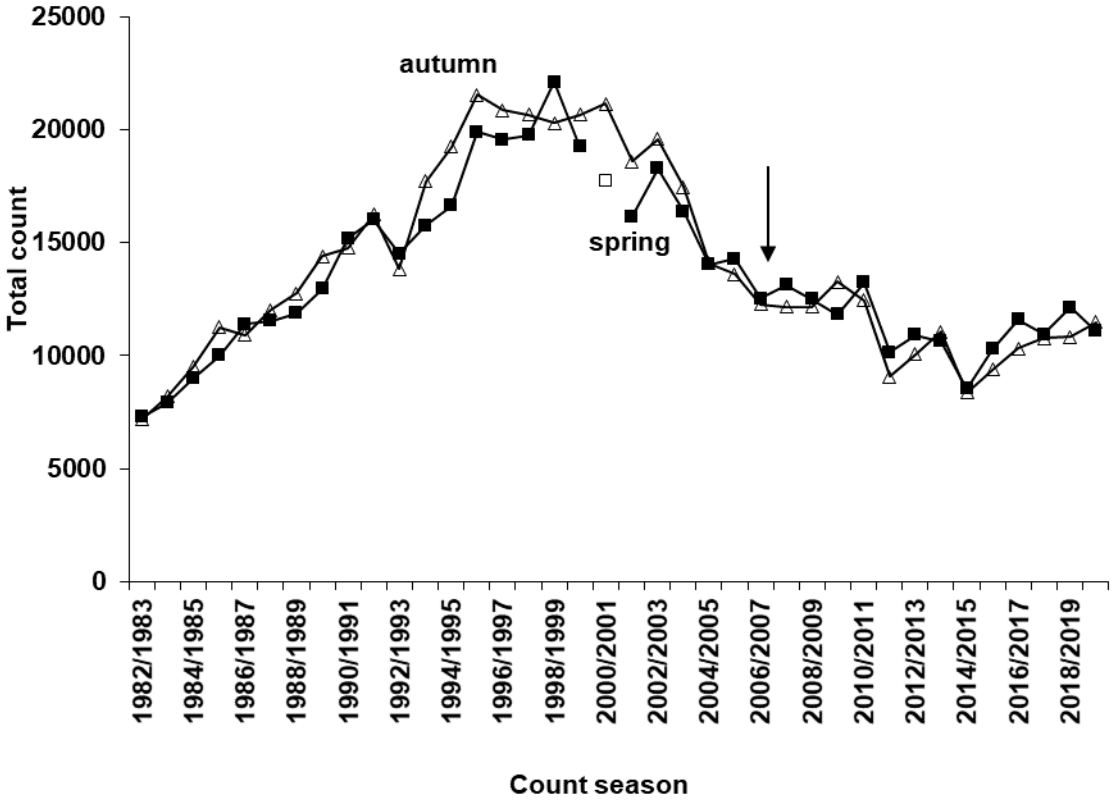


Figure 1. Counts of Greenland White-fronted Geese in Britain, 1982/1983-2019/2020, showing autumn (open triangles) and spring (filled squares) census results for each season. The value for spring 2001 (unfilled square) was missing on account of the outbreak of Foot and Mouth Disease that year and was therefore estimated from previous counts. Vertical arrow indicates the start of the hunting ban in Iceland in autumn 2006.

Following standard procedure, we place most credence on the spring count of the all monthly counts as an effective indication of overall population size because this tends to be when the geese are most aggregated and therefore most easily counted at all the resorts. Milder autumn weather in Iceland has resulted in geese remaining very late in Iceland in some recent years (although not in 2019) and delayed straggling arrivals to the winter quarters, which are always complicated by geese resorting to traditional remote peatland habitats in the early season, compounding our ability to count them. Nevertheless, given the harshness of the Icelandic winter we remain confident that there is no possibility of birds remaining there throughout the winter.

The remaining regularly used site on Orkney at The Loons held a maximum of 83 birds in autumn with over 70 remaining to the spring, which represented a slight increase over the 50-54 birds in 2018/2019. Following a depressing reduction of the combined Caithness flocks to number c.250 birds last winter, it was encouraging to witness in excess of 300 in 2019/2020, although again, despite the large numbers, the geese proved difficult to locate this winter. Although early arrivals were reported, the small Lewis flock proved impossible to locate in winter 2019/20, while the Kilpheder/Askernish flock hung on with just 12 individuals compared to 11 geese last year; the Loch Bee flock was just slightly down to 125 birds compared to 130 birds in 2018/19. As we highlighted last winter, the two flocks on Skye give

continued cause for concern, they again proved difficult to find, not least because of their incredibly low numbers, which make them both hard to locate in a large landscape and multiple potential feeding areas: four in the north of the island and maximum of six at Broadford. At Loch Shiel, 76 remained throughout the winter, which was a slight improvement on the 71 persisting later in the season in the previous winter. Combined numbers at Appin and Lorn continued to just break 40 during winter 2019/2020, a slight fall on the previous winter, while Lismore wintering numbers remained stable. Numbers counted on Tiree struggled to exceed 750 for much of the winter, but when the spring count came it, the total came to 855 which was just one more than the spring 2019 count. On Coll, the spring count was 22 down on the previous year at 150 geese, although it is hard to credit that during the later 1990s, Coll supported well over 1000 Greenland White-fronted Geese in many years.

Peak numbers on Colonsay/Oronsay were up at 126 counted in March, but those on Kiells/Danna/Ulva fell from 234 in spring 2019 to 186 this year. No birds were seen again for the second winter running at Lowlandman's Bay on Jura last winter but after only two-three Greenland White-fronted Geese wintered at Moine Mhor in 2018/2019, they were joined by two further birds in autumn 2019, although only four remained to the spring count period (you can check the peak count yourselves on page 15).

Combined numbers on the Mull of Kintyre were down by around 7% after a modest drop in the previous year, which is somewhat unexpected given the relatively high proportions of young among the Kintyre flocks following a good breeding year in summer 2019. Isle of Bute numbers were slightly up on 130 in spring 2019 at 148, while the Loch Lomond flock slipped back from 200 in spring 2019 to 186 in 2020. As on Kintyre, after a very successful breeding season with good numbers of young among the flocks, it was perplexing to see the Islay spring count had fallen by nearly 13% from that in spring of 2019 to number just 5910, yet numbers at Stranraer were very similar to the preceding year, although Loch Ken numbers fell back a little from 167 in autumn to 125 during the spring count.

News was better from the Dyfi Estuary in mid-Wales, where 30 were witnessed in mid-winter, although numbers held at 21 geese for the majority of the season, a welcome if very modest increase on the maximum of 17 in spring 2019. Although there were no reports again from Grindon Lough in Northumberland during the winter, a group of nine Greenland White-fronted Geese was regularly reported from the Prestwick Carr, Dinnington and Big Waters Reserve area in late winter, as well as singletons and doubles elsewhere in the county.

Despite the constraints imposed upon us all by Covid-19, we achieved strikingly good coverage in spring 2020. Inevitably, we failed to obtain counts of geese at a very few resorts, but only substituted missing counts for Barvas on Lewis using counts from the previous winter, where the geese could not be found (but were likely present). At six other sites with missing counts from dates during the spring count period, numbers were substituted based on counts obtained at other times during this winter, which totalled 243 geese (2.2% of the spring 2020 total, shaded in grey in Table 2).

Balancing all of the individual losses and gains at the flock level, it was disheartening to see an ultimate overall decline in numbers counted in Britain by 8.6%, especially given the extremely good levels of breeding success among all the sampled flocks, with the British total falling from 12131 to 11091 in spring 2020, largely due to the difference in spring counts on Islay between years. Although we witnessed several flocks where the percentage of young were up compared to many recent years, numbers were still similar or even fewer than those counted last year, which can only mean a higher mortality rate, or more likely geese moving between sites. We are very keen to track such movements, which is why we are so keen that you look for and read the codes on collared birds, as these are a means of tracking individual bird movements that describe flock connectivity. We hope also that as information comes in from the gps/gsm logging devices, which we are fitting to the collars of geese in many places throughout the winter quarters, these will also show us how often the geese move between winter quarters, both within and between winters.

COUNTS IN IRELAND 2019/2020

Excellent count coverage was achieved throughout Ireland in the 2019/2020 season, especially at the more important Irish sites, until the substantial limitations imposed by the Covid-19 epidemic which affected the March counts (Table 4).

Unfortunately, count coverage at the extremely important Loughs Foyle and Swilly sites was one area that suffered from the lack of a spring count, but the substituted autumn count of 871 was a welcome increase there over the 604 from last spring. Numbers at Dunfanaghy fell just below 100 for the spring 2020 count, down on 129 from the previous spring, but as always this flock seems to fragment and be difficult to count, so the maximum winter count of 130 was not that different to the peak count in winter 2018/2019 (129). The little flock at Sheskinmore, which has been the centre of much research and management focus over many decades showed an encouraging increase from 16-18 during winter 2018/2019 to 29 in spring 2020. This flock numbered over 600 geese in recent times, before Bord na Mona peat cutting disturbed them from feeding sites, especially at Lough McHugh, numbers of geese that seem barely credible now. In those days the geese foraged widely on adjacent bogs, despite aggregating around Sheskinmore Lough, so it is likely that changes in management has affected feeding throughout the catchment which the geese formerly used. However, after a prolonged period of forty years of continued decline, it is cheering to see a little recovery in the numbers of this charismatic flock. The group of Greenland White-fronted Geese on the Pettigo plateau remained at 45-50 geese in spring 2020 as the previous year, although a count of 79 in November hinted at potentially larger numbers in the vicinity, but these upland birds are difficult to count, especially when cold weather pushes them off the blanket bogs, although these birds could have passed on elsewhere later in the season.

Numbers remained consistently above 100 throughout much of the winter at Lough Macnean, but alas regular count coverage throughout the winter failed to locate geese using Bunduff, Caledon and Lough Oughter confirming their abandonment reported in earlier years. The low numbers at Lough Conn also cheeringly increased from 21 in spring 2019 to 35 in spring 2020 and numbers seem to be maintained at Carrowmore (17-20 birds in winter 2019/2020). Numbers at Errif and Derrycraff were variable and difficult to find, but the maximum 90 count was also a welcome increase on 61 in the previous winter. Twenty-nine birds located in Connemara also represents a very welcome confirmation that Greenland White-fronted Geese continue to winter in this part of Ireland.

In County Galway, numbers remained consistent in winter 2019/2020 in relation to previous years at Rostaff and Killower (83) and Lower Lough Corrib (20), but despite a report of 63 geese in January, numbers alas fell slightly at the locally important Rahasane Turlough.

Numbers at the now tiny flock at Tullagher increased from nine in spring 2019 to 16 in spring 2020 and the North County Clare group numbered 63 in the autumn 2019 census although only 31 were detected in the last count of February 2020, down on the 43 counted in spring 2019. In the Shannon catchment, counts from Lough Gara, River Suck and Little Brosna were all slightly down on previous years, but all are healthy flocks with multiple feeding areas numbering over 100 individuals. Numbers at Midland Lakes hit 280 in November 2019, but at least 185 remained into February 2020, which was the same numbers as counted in the previous winter.

The spring 2020 count from Wexford was cancelled because of the restrictions because of Covid-19, but the February count had been a good one as was substituted on the understanding that there is relatively little interchange of geese with other resorts between then and the March date. The February 2020 count found 8312, 8190 on the North Slob, 84 on the South Slob and 38 at Cahore, with none at Tacumshin. This was a very pleasing increase over the spring 2019 count of 7436.

Because of Covid-19, missing spring counts necessitated the substitution of counts from dates as close as possible to the spring international count period, mostly February or March. Unfortunately, because these sites included the Wexford and Loughs Foyle/Swilly complex, these substitutions constitute 96.6% of the spring total (shaded in Table 4), but were unavoidable under the circumstances. However, we are confident that inclusions of these counts make relatively little difference to the true totals likely present at all of these resorts.

Table 4. Summary counts of Greenland White-fronted Geese in Ireland 2019/2020

shaded values are estimates for sites where no counts were received for the precise period of the international census periods

	OCT	NOV	AUTUMN CENSUS	DEC	JAN	FEB	MAR	SPRING CENSUS	APR
DONEGAL									
Loughs Foyle & Swilly	560	871	871	700+		15	214	871	
Dunfanaghy	63	112	98	98	130		65	98	
Sheskinmore Lough	13	19	22	22	22	13	29	29	22
Unshagh Lough						10		10	
Pettigo	60	79	10	10	41		47	47	
NORTH CENTRAL									
Bunduff	0	0	0	0	0	0	0	0	0
Lough Macnean		94	103	103	103	107	111	111	
Caledon	0	0	0	0	0	0	0	0	0
Lough Oughter	0	0	0	0	0	0	0	0	0
Stabannon	21		21			20	20	20	
MAYO									
Lough Conn			36	30	36	35		35	
Bog of Erris									
a. Mullet									
b. Carrowmore			20	20			17	17	
c. Owenduff									
MAYO/GALWAY UPLANDS									
Errif & Derrycraff		90	90	52	33	53		90	
Connemara			29					29	
GALWAY LOWLANDS									
Rostaff & Killower			81	81			83	83	
Lower Lough Corrib			20			20		20	
Rahasane turlough	29	48	48	32	63	43		43	
CLARE/LIMERICK									
Tullagher		16	16	16	16	1		16	
North County Clare			63		63	31		31	
SHANNON HEADWATERS									
Lough Gara			120	0	120	70		120	
MIDDLE & LOWER SHANNON									
River Suck		141	141		151	65	126	126	
Little Brosna		126	126	56		125		125	
MIDLANDS									
Midland lakes	251	280	280			185		185	
SOUTH WEST									
Killarney valley									
SOUTH EAST									
Wexford North Slob	4473	4680	6601	6601	7704	8190		8190	
Wexford South Slob		903	11	11	0	84		84	
Tacumshin		0	60	60	0	0		0	
Cahore		14	0	0	65	38		38	
COUNT TOTALS			**8867**					**10418**	
Ireland without Wexford			2195					2106	
Wexford			6672					8312	

INTERNATIONAL TOTALS

The Wexford total of 8312 added to the rest of Ireland total of 2106 gives an Irish total of 10418, while adding 5910 counted on Islay to the 5181 counted in the rest of Britain gives 11091 (Tables 1, 2 and 3). The grand total for the global population of Greenland White-fronted Geese therefore stood at 21509 in spring 2020, very close to the 21466 counted in the previous spring of 2019, happily sustained well above the low counts in spring 2015 (18854) and 2016 (18879, Figure 2).

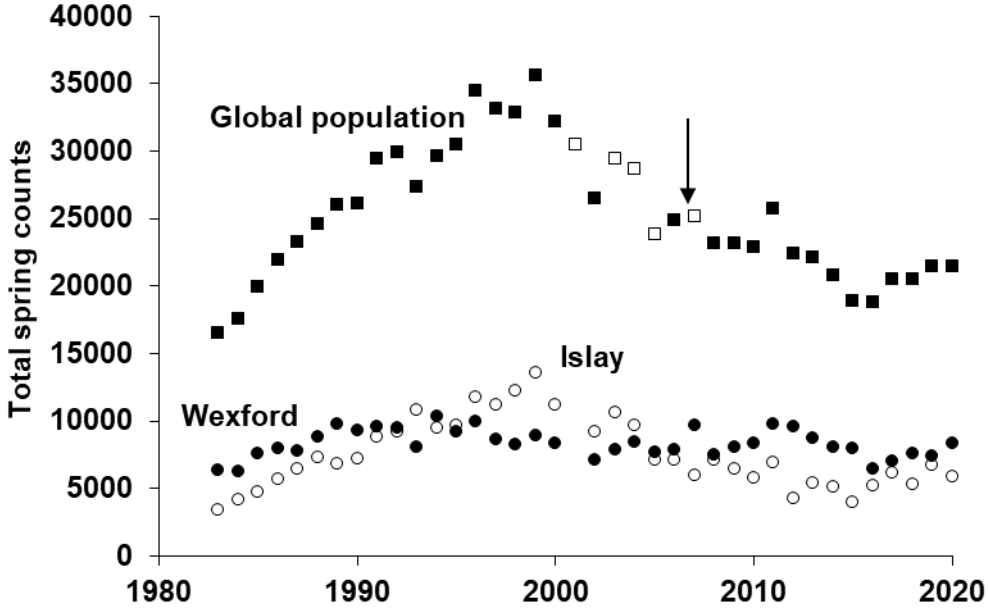


Figure 2. Spring counts of Greenland White-fronted Geese from Wexford Slobs and Islay and the global population count, 1983-2020. Values for the total population size are missing in some years when complete coverage could not be achieved (open squares, for which estimated counts based on previous counts have been substituted). Values for spring 2001 were missing on account of the outbreak of Foot and Mouth Disease that year and were therefore also estimated from previous counts. The arrow marks the point at which autumn hunting in Iceland was stopped in 2006.

AGE RATIOS IN BRITAIN

A crucial element to understanding the population dynamics of Greenland White-fronted Geese is to gather information on breeding success, because by comparing this with what we know about survival, we can interpret the reasons for declines or increases in the population as a whole. Reports of collars are vital to enable us to assess changes in annual survival, a parameter that has been stable since the early 1980s. However, as important are the determinations of age ratios in the different winter flocks which tell us about declines in reproductive success. These data have, in recent years, convinced us that the reason behind the continued decline we have seen in the population as a whole since the late 1990s is poor reproductive output in the population as a whole, which in many recent years has fallen short of producing the numbers of young necessary just to replace the annual number of birds dying (see below). This is why we are so dependent on the goodwill of the count network to age geese in the field, as these results are vital to our understanding of the population dynamics of this population. With this in mind, we are once again deeply indebted to the count network for taking the time and trouble to report age ratios and brood size data from the different flocks. In 2019/2020, the counters did us proud again (see Table 5) securing such data from many flocks and a huge ultimate sample of birds, so many thanks to all who contributed these data.

Table 5. Summary of age ratio determinations and brood sizes for Greenland White-fronted Geese wintering in Britain 2019/2020.

SITE NAME	% YOUNG	SAMPLE AGED	MEAN BROOD SIZE	FAMILIES SAMPLED
Loons, Orkney	26.67	75	2.00	10
Loch of Mey, Caithness	5.19	154		
Westfield, Caithness	11.82	110	3.25	4
Kentra Moss	35.00	40		
Tiree	16.63	487	2.25	36
Coll	43.28	67		
Appin	0	43		
Mull, Fidden	0	6		
Moine Mhor	0	5		
Clachan[1]	19.70	132		
Rhunahaorine, Kintyre[1]	20.53	1203	3.00	7
Machrihanish, Kintyre[1]	17.81	1454	3.60	10
Islay[1]	20.71	2608	2.83	48
Bute	7.27	110		
Loch Ken	15.38	156	3.50	6
Stranraer	27.16	162		
Endrick Mouth	34.33	134		
Dyfi Estuary	9.52	21	2.00	1
Britain, excluding Islay	18.83	4359	2.62	74
OVERALL	19.53	6967	2.70	122

[1]Details from Jura, Islay and Kintyre courtesy of Dr Malcolm Ogilvie, with support from Luke Ozsanlav-Harris

Reproductive success among British wintering flocks of Greenland White-fronted Geese was exceptionally high after the 2019 breeding season (see Table 5), with an average percentage young of 19.5% (n = 6967 aged, compared to the revised 11.1% last season), mean brood size was 2.70 (n = 122 broods, compared to 2.67 last season). This included 20.7% on Islay, (better than 12.3% last year and the highest level since 2010, there have only been six years when the percentage young on Islay have exceeded 20% back to 1962 when records began (see Figure 3); after 2019, the mean brood size on Islay was 2.83 (n = 48 compared to 2.80 last year).

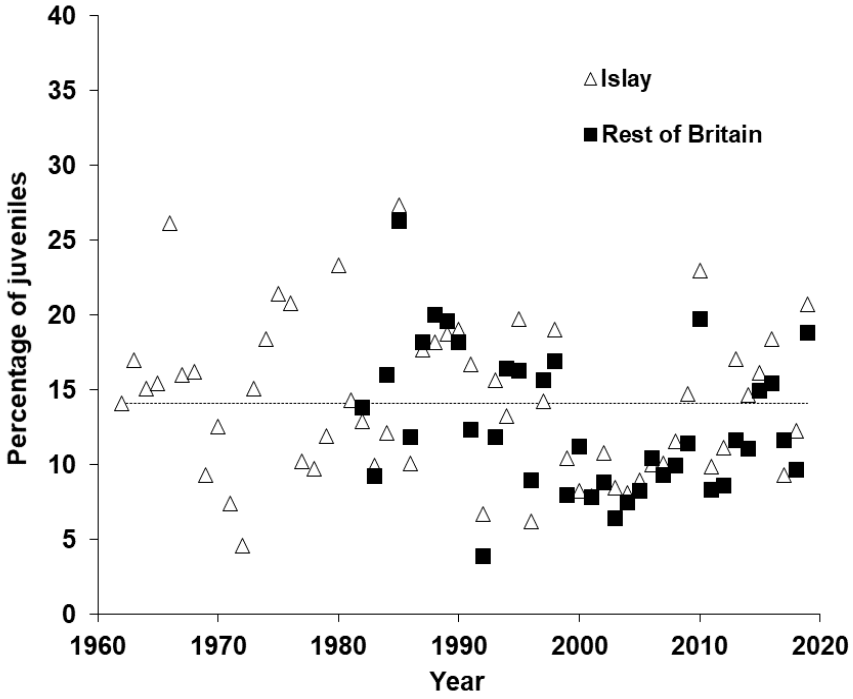


Figure 3. Age ratios sampled among Greenland White-fronted Geese at Islay 1962-2019 (open triangles) and compiled from other sites in Scotland and Wales combined, 1983-2019 (solid squares). The horizontal dotted line indicates the average percentage young among samples from Islay for 1962-2019.

The last five Greenland White-fronted Geese with Canada Geese at Moine Mhor, Argyll. It is hard to believe that this little flock that has hung on numbering less than 20 birds since 2008 regularly numbered 60-80 in the 1980s peaking at 132 birds! Photo by Ian Francis

We also need to report a minor error in the report from last year. It was erroneously reported that there were 37 young among 107 Greenland White-fronted Geese aged on Coll in winter 2018/2019, when in fact there were only 10 first winter birds in the sample of 117. We reproduce below the revised values and the effects on the British data in Table 6 below.

Table 6. Summary of revised age ratio determinations and brood sizes for Greenland White-fronted Geese wintering in Britain 2018/2019, incorporating the amended corrected data from Coll. Note that there were no changes to brood size determinations, so they are not reproduced here.

SITE NAME	% YOUNG	SAMPLE AGED
Loch of Mey, Caithness	19.64	56
Westfield, Caithness	8.87	124
Loch of Strathbeg	33.33	6
Barvas, Lewis	17.78	45
Kilpheder, South Uist	0.00	11
Kilmuir, Skye	14.29	7
Tiree	7.62	643
Coll	8.54	117
Appin	0.00	17
Lismore	8.33	24
Mull, Fidden	16.00	25
Moine Mhor	0.00	2
Colonsay	18.99	79
Clachan	14.88	121
Glenbarr	0.00	36
Rhunahaorine, Kintyre	12.60	365
Machrihanish, Kintyre	5.06	553
Islay	12.28	3551
Bute	10.83	120
Loch Ken	8.33	120
Stranraer	18.89	180
Endrick Mouth	6.98	215
Dyfi Estuary	0.00	17
Britain, excl. Islay	9.61	2883
OVERALL	11.08	6434

Greenland White-fronted Geese at Meikle Finnery, Loch Lomond. Photo by Ian Francis

AGE RATIOS IN IRELAND

The percentage young among aged flocks of Greenland White-fronted Geese wintering in Ireland after the 2019 breeding season was 10.8% (based on 5058 aged individuals, Table 7) compared to 6.9% last season. Mean brood size among the Irish flocks was 3.07 (n = 137) compared to 2.80 last season. This included 10.8% young among 4466 aged at Wexford (encouragingly up on 6.9% last year), where the mean brood size was 3.14 (compared to 2.92 last season) based on 115 broods. Although it is very encouraging to see an increase in the proportions of young among flocks wintering at Wexford, this increase after the summer of 2019 was not as spectacular as in Scotland and this level of annual recruitment still falls below the average back to when age ratios were first done and much lower than prior to the mid-1990s (in 1970, see Figure 4). Elsewhere in Ireland, reproductive success was also better than in recent years with 11.5% based on an excellent sample size (n = 592), with mean brood size 2.68 (n = 22). Samples from Lough Conn, Connemara and Tullagher, although modest in size, all exceeded 30% young, which is extremely unusual for recent years. While Scottish flocks seem to have returned from the breeding grounds in recent years with numbers of young that suggest reasonable reproductive success in some years since 2008 (Figure 3), percentage young among Irish flocks and especially at Wexford have remained doggedly below average since the mid-1990s (Figure 4). This could undoubtedly have contributed to the dramatic declines in some Irish flocks in recent years and potentially to the extinction of others.

Table 7. Summary of age ratio determinations and brood sizes for Greenland White-fronted Geese wintering in Ireland 2017/2018.

SITE NAME	% YOUNG	SAMPLE AGED	MEAN BROOD SIZE	FAMILIES SAMPLED
Sheskinmore, Donegal	0	22		
Pettigo, Donegal	0	25		
Lough Macnean			1.83	6
Lough Conn, Mayo	37.14	35	2.60	5
Carrowmore, Bog of Erris	5.00	20	1.00	1
Errif & Derrycraff	14.44	90	3.25	4
Connemara	40.00	20		
Tullagher	37.50	16		
Little Brosna	1.25	80		
Midland Lakes	9.15	284	3.50	6
Wexford	10.75	4466	3.14	115
Ireland, excl. Wexford	11.49	592	2.68	22
OVERALL	10.83	5058	3.07	137

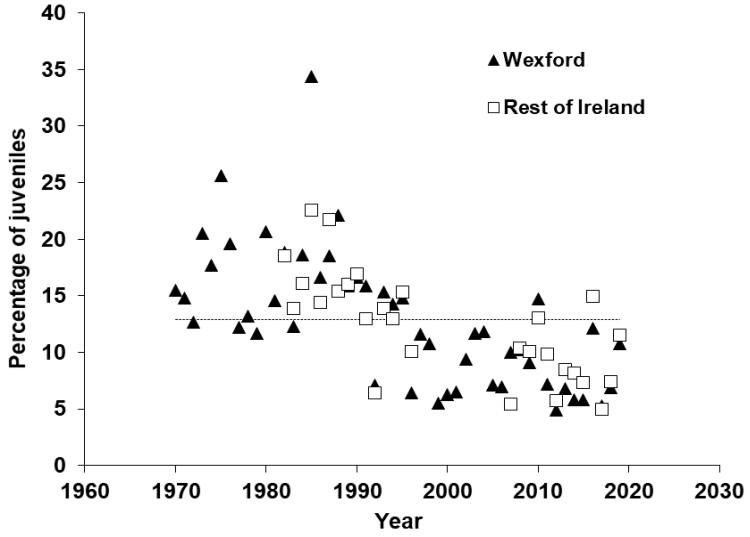
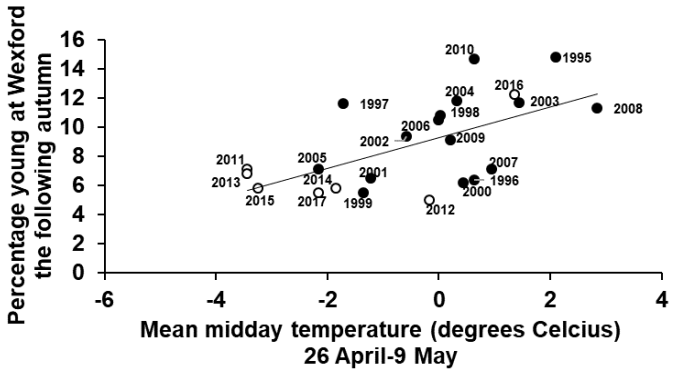


Figure 4. Age ratios sampled among Greenland White-fronted Geese at Wexford 1970-2019 and compiled from other sites elsewhere in Ireland for years in which there exist sufficient data. The horizontal dotted line indicates the average percentage young among samples from Wexford for 1970-2019.

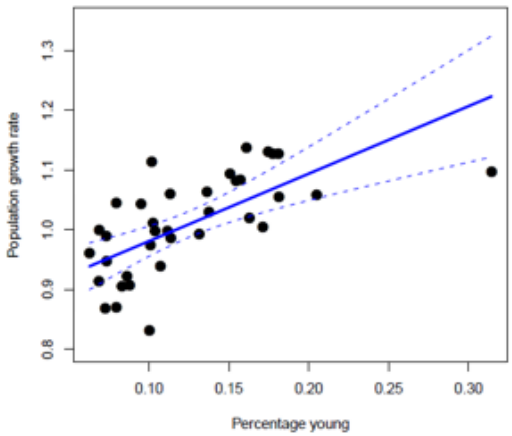
So why is it the case that the breeding success of the Irish birds in recent years has been so bad compared to those in Scotland? For one thing, from ringing recoveries going back to the 1940's, we know that Greenland White-fronted Geese are classic "leapfrog migrants", the birds that breed in the far north of the breeding range tend to winter in the extreme south of the wintering grounds (Salomonsen 1967, Fox et al. 1983). Although there are exceptions to this pattern, it seems likely therefore that the birds breeding in the north of range winter mainly in Ireland and especially at Wexford, whereas those wintering in Scotland tend to breed in the southern parts of the range in central west Greenland. Self-evidently, spring conditions at Uummanaq at 70°N (where mean May temperatures have been -1°C in the last five years) are likely to be much colder for the same time than at Kangerlussuag at 67°N (mean May temperatures above 3°C for the same years), given that subzero temperatures mean that geese cannot dig in the soil for nutritious underground overwintering roots and rhizomes which they favour in spring, nor are temperatures high enough to start green growth of grasses and sedges for them to graze during this critical time for females to restore depleted stores of fat and protein after spring migration for investment in eggs and incubation. The colder it is in the north when geese arrive (measured on Disko Island at 69°N below) the lower the percentage young the geese return with in the following autumn, so any effect of recent late spring is likely to affect Irish wintering birds more than Scottish ones.



Fox, A.D., Madsen, J. & Stroud, D.A. (1983) A review of the summer ecology of the Greenland White-fronted Goose (*Anser albifrons flavirostris*). *Dansk Ornitologisk Forenings Tidsskrift* 77: 43-55.
Salomonsen, F. 1967. Fuglene på Grønland. Rhodos, Copenhagen.

WHY WE ARE SO KEEN THAT YOU PROVIDE AGE RATIOS!

In the past year we have been able to show that the increase in the global Greenland White-fronted Goose population during the 1980s and 1990s was due almost entirely to annual recruitment (the proportion of young registered among flocks on the winter quarters). In the graph below, growth rate is the ratio of the global population size in one year to that in the next (based on your combined counts), which clearly increases with better breeding success (based on your age ratios).



Growth rate values above one are when the population is increasing (as in the 1980s and 1990s) those below are years since during the decline. Over the same period, estimates of annual survival (based on the counts and from your resightings of collared geese) have been constant, so even though there is some year-to-year variation survival, this has not driven the population downwards. Now that shooting is stopped in all countries throughout the range (following Wales and England changing the law finally last year), it is difficult to reduce sources of human caused mortality any more (although we still need to remove the accidental or illegal shooting of birds in Iceland in autumn which we know is still occurring). However, given we think that the breeding success has been to do with heavy snow in west Greenland in early spring, it is also difficult to know what to do to elevate breeding success in a way that enables the population to produce and return more young to the winter quarters than die each year.

The good news is that there has been less snow on the breeding grounds in late April and early May (when geese first arrive) during the last five years or so. As a result, breeding success has been very slightly better over this time, so overall numbers have begun, albeit agonisingly slowly, to stabilise and modestly increase. We are therefore excited to know what happens in the coming years and we look forward to receiving your news from your flock during the coming winter.

ACKNOWLEDGEMENTS

We are deeply appreciate the efforts of all our counters and others who censused Greenland White-fronted Geese, aged them and read ring markings throughout the last winter! It is not easy to be motivated to do this year after year, but without your careful and meticulous efforts, we would have no census, we could not report on breeding success and we would have no resightings upon which to base our research on survival, reproductive success, site loyalty and many other features of these amazing birds. So thank you so much for helping again this year!

In Britain, those people who have kindly contributed data and information during 2019/2020 include: Paula Baker, Dave and Pat Batty, Ellen Bird, John Bowler, Jack Brown, Rebecca Burton, George

Christie, Sue Clare, Nicci Cox, Steven Culley, Andrew Dacre, Pete Dale, Steve Duffield, Ian Fulton, Craig Gallagher, Larry Griffin, Robin Harvey, Ian Hawkins, Brian Henderson, David Holden, Aimee Hood, Ian Hopkins, James How, Richard Humpbridge, Hannah Imlach, David Jardine, Tracey Johnston, Ben Jones, Russell Jones, John Kemp, Tom Kistruck, Morven Laurie, Mary Legg, Alan Leitch, Stephen Longster, Sinclair Manson, Emma Martinelli, Paul Massey, Clive McKay, Rae McKenzie, Bob McMillan, Sam McNeill, Emma Martinelli, Carl Mitchell, Mark Mitchell, Brian Neath, Bill Neill, April Newton, Alex Nichol, Alison and Donald Omand, Malcolm and Carol Ogilvie, Luke Ozsanlav-Harris, Nicky Penford, Dave Pickett, Brian Rabbitts, Bryan Rains, Alan Reid, Robin Reid, Brian Ribbands, Nicola Richie, RSPB staff on Anglesey, Pete Skinner, Julian Smith, Andrew Stevenson, David and Judy Stroud, Ash-Lynn Tavener, Arthur Thirlwell, Niall Tierney, Rachel Tierney, Gareth Thomas, Danielle Tinker, Luke Wake, Lucy Ward, Joyce Watson, Catriona White, Benjy Wilcock, Emily Wilkins and Liam Woods.
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We are genuinely deeply sorry for anyone who has helped but we forgot to include in these lists, your contribution is valued and your omission is not intentional, just down to forgetfulness!

We gratefully acknowledge permission to use data from WeBS and BirdTrack kindly provided by BTO, with thanks to Neil Calbrade for so effortlessly providing this information. Data were provided by WeBS, a Partnership jointly funded by the British Trust for Ornithology, Royal Society for the Protection of Birds and Joint Nature Conservation Committee, in association with The Wildfowl & Wetlands Trust, with fieldwork conducted by volunteers. BirdTrack is organised by the BTO in a partnership with the RSPB, Birdwatch Ireland, the Scottish Ornithologists Club, Welsh Ornithological Society and BirdLife International.

As ever we are grateful to the continuing programme of research and surveillance carried out by the National Parks and Wildlife Service and the count network in Ireland, with thanks to John Wilson (who pioneered and instigated the study of White-fronted Geese in Ireland) Dave Tierney and Sean Kelly for their support. Thanks to SNH for site coverage throughout Argyll, especially to Tracey Johnston and Morven Laurie and all of the count teams on Islay and Kintyre and Islay for their kind help in preparing sections of the report. Special thanks as ever to Dr Malcolm Ogilvie for his extensive age ratios and for wise counsel at all times. The census is only possible thanks to the financial support of the Joint Nature Conservation Committee through a sub-contract from the Wildfowl and Wetlands Trust under their UK Goose and Swan Monitoring Programme, and we thank Colette Hall for her considerable help and support for the project. Please note that the annual "GooseNews" is available from the Wildfowl and Wetlands Trust website at this link:

https://monitoring.wwt.org.uk/wp-content/uploads/2020/10/GooseNews19.pdf.

…which includes exciting information on two current PhD studies on Greenland White-fronted Geese. Colette Hall sends her thanks from WWT for your continued support to monitoring of geese in the UK.

Although you will hopefully be aware of the count dates for the coming season from other sources, we would remind you that the international census periods to count Greenland White-fronted Geese in the coming season are: **12-16 December 2020 and 13-17 March 2021**, but we welcome all counts from any dates, but the other monthly counts especially during the period: **14-18 November 2020, 9-13 January 2021** and **6-10 February 2021.**