

**REPORT
OF THE 2009/2010
INTERNATIONAL CENSUS OF
GREENLAND WHITE-FRONTED GEESE**

by

GREENLAND WHITE-FRONTED GOOSE STUDY



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SUMMARY

We report complete survey results for Greenland White-fronted Geese throughout the wintering grounds in spring 2010. This combines 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). No counts were available from Norway where very small numbers may winter. Combining all spring 2010 counts gave a global total of 22,844 Greenland White-fronted Geese, down by 1.4% (318 birds) on the last world population estimate of 23,162 in spring 2009, which in turn had been little changed from the 23,208 estimated in spring 2008.

Excellent coverage was achieved in Ireland in spring 2010 with 8,381 at Wexford (compared to 8,034 in spring 2009), combined with 2,622 (2,623 last year) from the rest of Ireland. Spring counts were substituted for those missing from seven regular wintering resorts in Ireland, contributing just 6.9% of the Irish total. Census of all known Greenland White-fronted Goose wintering haunts in Britain found totals of 13,269 birds in autumn 2009 and 11,841 in spring 2010 (compared with 12,159 and 12,505 in autumn 2008 and spring 2009). The 2009/2010 totals comprised nine and 14 birds reported in England, 59 and 75 in Wales, 7,079 and 5,744 on Islay (compared with 6,783 and 6,429 respectively last season) and 6,122 and 6,008 in the rest of Scotland in autumn and spring respectively. Coverage in Britain was almost complete, all resorts were counted at least once in the season, including the Small Isles (not covered in many recent years), where six were seen in November. Spring counts were missing from the count period from eight resorts, substituted with counts undertaken very close to the defined dates, amounting to 3.0% and 5.1% of the British totals in autumn and spring, respectively.

Breeding success amongst the British resorts was again slightly up on the previous year at 12.9% young ($n = 6,412$ aged), compared to 10.7% last year; mean brood size was 3.1 ($n = 128$ broods). The mean breeding success rate included 14.7% on Islay, below the average of 15.2% for 1962-2008 inclusive, but better than the 11.1% during 1992-2008. Mean brood size on Islay was 3.6 ($n=33$). Overall, mean percentage young amongst flocks sampled was 12.9% ($n=6,412$) and encouragingly the percentage of young was again higher than 10% at several sites, including Caithness, Tiree, Mull, Colonsay, Lismore, Lorn, Keills, Loch Ken, Stranraer, Endrick Mouth and Machrihanish. As a result, the autumn count was 1,100 greater than in 2008, although the low numbers counted on Islay in spring 2010 meant that the spring total, which we tend to use as the measure of annual population change, was 664 birds fewer than in spring 2009. Although winter 2009/2010 was one of the coldest of recent years, it seems unlikely that there were 2,400 fewer geese in Britain in spring 2010 compared to autumn 2009. We therefore suggest that the spring 2010 count may actually underestimate the true numbers present, and we cannot rule out a modest recovery in numbers in 2009/2010 over the previous year.

In Ireland, the percentage young amongst aged flocks in 2009/2010 was 9.2% ($n = 4,804$ aged individuals), but this was heavily biased by the 9.1% amongst 4,340 aged at Wexford, where the mean brood size was 3.1 ($n = 115$ broods). Elsewhere in Ireland, reproductive success was 10.1% ($n = 464$), mean brood size was 2.2 ($n=24$).

Although the reproductive success in summer 2009 gives cause for hope, the lack of clear recovery in the population gives continued cause for concern for the population. The flyway management plan for the population is being finalised at present, and research proposals currently being developed will hopefully make significant contributions to safeguarding the population in the future.

Note this report updates and replaces that issued in September 2010 because of extra counts received after collation and circulation of that report.

INTRODUCTION

The 2009/2010 survey was the twenty-eighth 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 total census data available to the present, although counts from Ireland are missing from 2005 and 2007. Unfortunately, we have no counts from southern Norway, where very small numbers may winter, but otherwise the spring 2010 count represents a full survey of all known winter haunts for this population, only the fourth such count since spring 2000.

Table 1. Spring population census totals for Greenland White-fronted Geese, 2005-2010. At the time of compilation, collation of count coverage for the rest of Ireland from spring 2005 and 2007 was incomplete, hence global population totals cannot be estimated in these years.

	Spring 2005	Spring 2006	Spring 2007	Spring 2008	Spring 2009	Spring 2010
<i>Wexford</i>	7707	7892	9713	7536	8034	8381
<i>Rest of Ireland</i>	-	2716	-	2559	2623	2622
<i>Islay</i>	7152	7111	6025	7086	6429	5744
<i>Rest of Britain</i>	6878	7176	6428	6027	6076	6097
<i>Population total</i>	?	24895	?	23208	23162	22844

ARRIVAL/DEPARTURE DATES IN BRITAIN

Eric Bignal saw five geese at Ballinaby on Islay on 29 September and Nigel Dudley reported that some Dyfi geese were back on 4 October 2009. At Loch Ken, Arthur Thirlwell reported the first arrivals on 14 October (3 with 400+ Greylags), rising to 71 by 31 October and 130 by 11 November, although flooding in the Ken Valley displaced them for a while, 136 returning on 24 November. Bob McMillan saw eight back at Kilmuir in Northern Skye on 18 October and Bill Neill reported 38 flying south over Askenish, South Uist the next day, when Stan Laybourne reported nine adults back at Loch of Mey, with the Westfield flock first appearing on 24 October (31 birds).

As usual there were substantial movements over the Western Isles and Brian Rabbitts was kind enough to summarise the information as follows: c.120 Greenland White-fronted Geese flew south over Loch Druidibeg on 15 October at 15.10 and 50 went south over Drimdsdale at 15.30 hours, whilst on North Uist, 29 flew over Langass, 35 over Carinish (13.40 hours) and 67 over Baleshare, all passing southwards. On 19 October Whooper Swans, Barnacle Geese, Pink-feet and Greenland White-fronts were all seen on the move over the islands - White-fronts mainly after midday including 38 over Askernish at 15.15 hours and flocks of 46 & 60+ over Drimdsdale between 16.00 and 17.00 that afternoon. Another 100+ flew south over Drimdsdale at 18.05 hours. Next day, Whooper Swans, Barnacles and Greenland White-fronts were reported on the move again along the west side of the islands. On South Uist on 1 November, 70 flew south at Carnan at 14.00 hours. The last movements of the autumn were 33 flying south over Carinish at 12.45 hours and the same later over Drimdsdale on 16 November.

Geese were fidgety from mid-March 2010 onwards, 31 departed over South Uist on 30 March and 100 over Benbecula and 74 over North Uist on 9 April (John Kemp). On the other hand, we also had reports of relatively late departures from Ardnacloch, Appin on 10/11 April (Mike Gear), 35 heading north over Back of Keppoch, Arisaig on 11 April (Stephen MacDonald per Bob McMillan) and Islay late on 12 April (John Armitage). Surprisingly, there were still six Greenland White-fronted Geese near Trumpan Church, Waternish, northern Skye on 25 April (S. Midgley per Bob McMillan).

Again Brian Rabbitts was able to supply considerable detail about the spring migration in the Western Isles. The first reports of movements were five flying north at Ardivachar during the afternoon of 7 March, with 60 flying NW offshore from Howmore at 10.30 hours on 2 April (with 130 geese further out to sea heading in the same direction presumably also White-fronts), with seven on the ground at Loch Mor and 22 flying NW there in the afternoon. On 9 April, c.200 flew north over Balemore (in three skeins between 10.20 and 10.40 in the morning), followed by a mixed flock of 10 Whooper Swans and 10 White-fronts at 11.05 hours, with 50 north in the early morning over Carinish and 70+ flew north over Baleshare at 12.30 hours. Next day 85 flew north off Ardivachar at 07.30 hours, and on 12 April, 35 and later 70 flew over Loch Sandray on North Uist. These were followed by 115 north near Loch Paible at 12.50 hours on 13 April and three north at Aird an Runair on 6 May. A flock of between 11 and 18 were present at Eochair between 7 and 23 April and there were 11 still in the vicinity of Loch Bee on 7 April and 16 on 23 April, with at least one until 2 May.

BRITISH COUNT TOTALS

All known regular wintering sites were covered by GWGS together with counts carried out by Scottish National Heritage. Again this year, no data have been incorporated from the WeBS database, as these counts were not available at the time of report writing, but they normally only contribute a few birds from elsewhere in Britain away from those counted at the regular wintering haunts. As might have been expected from the reasonable production of young in summer 2009, the autumn count exceeded that of the preceding year by over 1,100 birds, but the spring count was 664 lower than spring 2009, perhaps partly due to a low count on Islay. Although winter 2009/2010 was one of the coldest of recent years, it seems unlikely that there were 2,400 fewer geese in Britain in spring 2010 compared to autumn 2009. We therefore suggest that the spring 2010 count may actually underestimate the true numbers present, and we cannot rule out a modest recovery in numbers in 2009/2010 over the previous year.

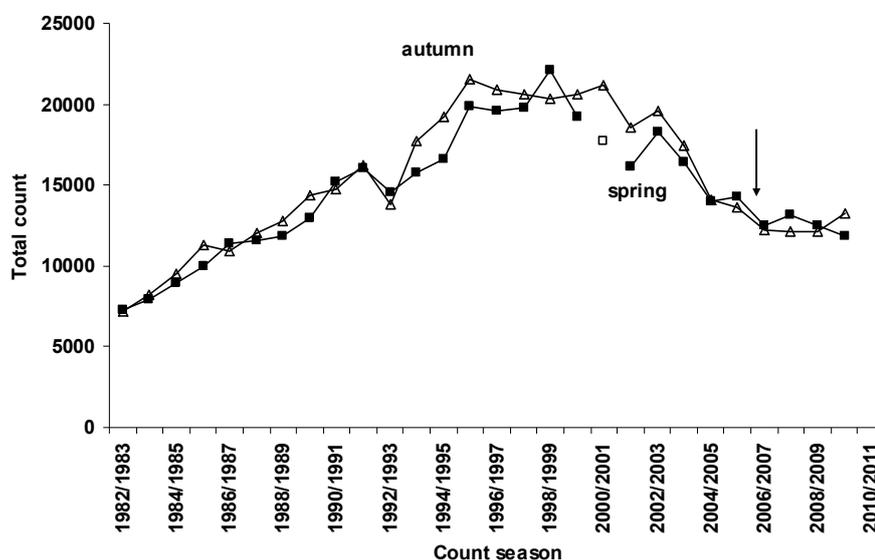


Figure 1. Counts of Greenland White-fronted Geese in Britain, 1982/1983-2009/2010, showing autumn (open triangles) and spring (filled squares) census results for each season. The value for spring 2001 (unfilled square) was missing on account of the outbreak of Foot and Mouth Disease that year and was therefore estimated from previous counts. Vertical arrow indicates start of hunting ban in Iceland in autumn 2006.

COUNTS IN BRITAIN

A full breakdown of the count totals giving the maximum counts per month and the census period totals is presented on the next page. Despite reports of Greenland White-fronted Geese from Hoy, Stronsay and South Ronaldsay, The Loons remains the only regular wintering flock on Orkney, where numbers were slightly reduced on those last winter, peaking at 64 individuals. Numbers in both Caithness flocks were both c.30 geese down on last year's spring census counts, although the spring census lost 20 birds on the autumn count amongst the Loch of Mey flock. It was extremely cheering to see the Lewis flock almost doubled to 46 birds after New Year in 2010! Greenland White-fronted Geese in the Askernish/Kilpheder area of South Uist continue to dwindle, with no more than 14 birds throughout the entire winter, in contrast to the Loch Bee flock which was slightly up on last year, peaking at 123, but frequently difficult to locate. It is far from clear what the situation might be currently on the Western Isles, as increasing numbers are turning up in small groups at formerly occupied sites, such as on North Uist and Benbecula, so perhaps part of the explanation may be that geese are moving more widely between feeding areas, making them more difficult to keep tabs on. Perhaps the Uists deserve a little more attention to fully understand the exchange between sites there within winters and the potential reasons for these changes.

Spring census counts everywhere were generally slightly down on the same time last year, but it was encouraging to see combined numbers at Eriska, Benderloch, Appin and Lismore return to 449 compared with the very low count of 315 last season. Seven birds were reported at Assapol on Mull after an absence for some years and the nearby Fidden flock held it's own with 29-31 present throughout most of the season. The Assapol flock will be subject to further attention under the small sites project mentioned later in this report. Tiree held more than 100 fewer birds than the same time last season, but Coll showed a modest increase on the previous spring count. Although numbers were almost identical at Machrihanish in the two successive springs, overall there were almost 200 fewer birds counted on Kintyre in spring 2010, where generally the geese are using an increasing number of wintering resorts compared to previous years. Interestingly, the autumn count at all Kintyre sites combined was also 300 greater than in spring 2010. Breeding success at Rhunahaorine was conspicuously lower than amongst many flocks this year, which might have contributed to the decline there. Note that, on Islay and Kintyre outside the international census dates, counts are aimed at assessing field use rather than gaining accurate site totals, so some limited double counting may be involved in these monthly maxima. Malcolm Ogilvie and others relocated 8-11 Greenland White-fronted Geese near Lowlandman's Bay on Jura for the first time in many years, and over 100 geese were regularly seen on the improved pastures around Loch a'Chnuic Bhrìc where they formerly commuted to feed from Islay in former years of greater abundance. Islay returned a very low spring count (5,744, the lowest spring count since 1986), despite the fact that monthly counts were generally higher this season than the previous year (easily exceeding 6,000 into March, but falling again for the spring census count). Bute held 210 Greenland White-fronted Geese in spring 2010 close to the autumn count in 2009. Whilst the Endrick Mouth flock at Loch Lomond remained around 200 individuals throughout much of the winter, only 65 were seen during the count there, when the flock is normally easy to locate together, a fact which will also have contributed to a low overall Scottish total. Loch Ken and Stranraer held slightly elevated numbers compared to the previous years, the Dyfi flock was unchanged and the Northumberland flock showed a modest increase to 12 individuals.

Several observers found the geese difficult to find because the snow and low temperatures affected their distribution and habitat use. However, despite the fact that winter 2009/2010 was one of the coldest of recent years, it seems unlikely that there were 2,400 fewer geese in Britain in spring 2010 compared to autumn 2009. The spring Islay count was 1300 down on autumn 2009 and the combined Kintyre total 300 down over the same period, so the spring 2010 count have missed some of the true numbers present. We cannot therefore rule out a slight recovery in numbers in 2009/2010 over the previous year, especially given the improved reproductive success of summer 2009 (see below).

BRITISH GREENLAND WHITE-FRONTED GOOSE CENSUS 2009/2010
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										
Loch of Stenness			1							
North Walls Hoy					1					
Stronsay					3					
Loons			60	46	46	56	63	64	64	32
South Ronaldsay							4			
CAITHNESS										
Westfield	31	130	140	140	125	140	140	140	140	95
Loch of Mey	56	136	170	170				149	149	
Loch of Winless										
NE SCOTLAND										
Loch Garten, Strathspey			2							
Loch of Strathbeg	2	1								
WESTERN ISLES										
Barvas/Shawbost, Lewis			8	19	19		37	46	46	
Balranald, North Uist							19			115
Kilpheder/Askernish, South Uist			12	12	12		10	14	10	
Loch Bee/Kilaulay, South Uist					52	123	104	78+	123	16
Nunton, Benbecula			8	17	17		20	20	20	7
INNER HEBRIDES										
Loch Chalium Chille, Skye	8	24	22	22	22	19	19	21	21	
Broadford, Skye		26	27	27	27			28	28	
Plockton, Lochalsh										
LOCHABER/NORTH ARGYLL										
Muck/Eigg			6	6					6	
Loch Shiel/Claish Moss				35		35			35	
Lorn: Eriska/Benderloch				244		35			244	
Lorn: Appin			64	68	68	47	61	75	75	68
Lismore	14	300	250	225	162	275	300	320	320	290
Tiree		775	769		787	769			861	
Coll		261	392		263	284			294	
Fidden, Mull	6	31	28		28	8	27	29	29	29
Assapol, Mull								7	7	6
SOUTH ARGYLL										
Colonsay/Oronsay			122	133	88	100	112		105	22
Jura: Loch a'Chnuic Bhric				100		106		106	100	
Jura: Lowlandman's Bay			11	11		11		8	8	
Danna/Kiells/Ulva			195	240		189	214		192	
Moine Mhor	14	16	18			15	15		15	
Rhunahaorine		877	761		800	679	1017	872	621	757
Machrihanish	859	1594	1319	2069	1572	1680	2180	1363		
Clachan		158	100	133	146	182	181	153	153	44
Gigha	109	106	520	242	337	245	245	245	245	106
Glenbarr		67	0	66	38	102	65	19	19	0
Isle of Bute	64	143	163	163	153	215	210	210	210	
Endrick Mouth, Loch Lomond	40	140	197	196	145	160	200	65	65	
ISLAY	1751	6624	7079	7262	6434	6539	6234	5744	5744	3720
DUMFRIES & GALLOWAY										
Loch Ken	72	137	190	180	119	117	186	186	186	81
Stranraer	65	129	125	125	164	131	254	254	254	124
WALES										
Dyfi Estuary	59	59	59	59	59	59	59	59	59	27
Marloes Mere								16	16	
ENGLAND										
Lancashire Mosses					12	2				
Grindon Lough, Northumberland	1	11	9	9	9	14	12	12	12	
OTHER IRREGULAR SITES										
Woodhorn, Northumberland							4			
Slimbridge, Gloucestershire								2	2	
TOTALS	3151	12233	13269	12230	11973	12636	11723	11841	11841	5539
Rest of GB less Islay	1400	5609	6190	4968	5539	6097	5489	6097	6097	1819
Rest of Scotland less Islay			6122					6008	6008	
England			9					14	14	
Wales			59					75	75	

COUNTS FROM IRELAND

Thanks to even greater improvements to coverage in Ireland, we can report counts from many of the flocks in far greater detail than ever before, due to the magnificent efforts of the count network there. Thanks again to the National Parks and Wildlife Service Rangers and other observers in the Republic, supplemented by the count network and RSPB staff in Northern Ireland, for providing us with these counts to enable a robust estimate of total population numbers for the Greenland White-fronted Geese this year, including good coverage throughout the winter from many resorts.

The full breakdown is shown in the table of Irish counts shown on the next page. For seven sites (Lough Conn, Bog of Erris, Errif & Derrycraff, Lower Lough Corrib, Rahasane Turlough, River Suck and Midland Lakes) counts were substituted from counts outside the International Spring Census period dates. Only two of these, the flocks frequenting the River Suck Valley and the Midland Lakes complex, hold substantial numbers, so these estimates only contribute 6.9% of the total Irish population, therefore deviations in these estimates from the real numbers present will make relatively little overall difference to the population totals. No Greenland White-fronted Geese were reported from the flock resorts at Bunduff, Lower Lough Derg, Fergus and Shannon Estuaries, Kilcolman, Doo Lough, Inny Valley and the Blasket Islands, all of which were considered to have ceased to hold regular numbers before winter 2008/2009. At Caledon, 18 birds arrived in early November (including 7 or 8 juveniles) when surface flooding attracted them back to their old haunts. Unfortunately, the water tables receded and numbers dwindled to 5 later and none stayed for the winter. Eleanor Mayes, Karl Partridge & Joe Shannon wrote an excellent account of the recent decline of this flock (that not so long ago numbered over 100 geese, see the excellent article in *Irish Birds* 8: 497-506), which highlighted the need for repairs to sluices to retain water in the wet meadows most favoured by this flock in former times. This winter, the Caledon Estate seems very keen to do some restorative work on the water levels in the meadows, so things may be looking up for this site. Without such favourable management, this flock looks worryingly near to joining the list of abandoned Irish White-fronted Goose resorts. Meanwhile, the two flocks that winter at Drumharlow Lough and Loughs Kilglass and Castleforbes both sadly have proved a challenge to locate again this winter and it seems possible that these flocks are worryingly drifting towards joining the status of abandoned sites in Ireland.

Overall, most other resorts showed mixed trends, 11 flocks showed increases on last spring, mostly small gains, but Rahasane Turlough increased from 56 to 71 birds, the little flock in North County Clare (perched on the edge of extinction) increased from 10 to 42, the Lough Gara flock increased from 84 to 148 and the Suck River flock from 150 to 280. Nevertheless, some southern flocks showed declines, including the normally robust Little Brosna flock (242 to 201) and even the Lough Foyle/Swilly flock fell from 1,107 last spring to 1,038 in spring 2010. The Pettigo flock numbered 47-66 for most of the winter, but only 24 were to be found in the spring census.

The spring 2010 count from Wexford was 8,381, the highest of the winter 2009/2010, which may suggest a modest influx towards the end of the winter after counts of 7,500 to just over 8,000 until February. This influx could in part explain the low Islay count in spring, which was substantially below numbers registered there throughout much of the winter. This potential discrepancy confirms thoughts last year, which suggests potentially rapid shifts in large numbers of geese underlines the need for close collaboration regarding the counts at different resorts, the need for coordination of count coverage, especially during the International Census periods, and for increased ringing effort on Islay.

Together with a contribution of 2,622 from the rest of Ireland, this Wexford spring total gives an overall global total of 22,844 Greenland White-fronted Geese, down from 23,162 in the last overall total count undertaken in spring 2009 (see Figure 2 below).

IRISH GREENLAND WHITE-FRONTED GOOSE CENSUS 2009/2010

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
DONEGAL										
1.Loughs Foyle & Swilly			656	973	973		950	1038	1038	
2.Dunfanaghy			36	36	36		28	133	133	
3.Sheskinmore lough			28	28	28	31		33	33	
4.Pettigo			50	60	60	47	66	24	24	
NORTH CENTRAL										
5.Bunduff										
6.Lough Macnean			51	48	48	72		75	75	
7.Lough Oughter			0	19	19	15	15	15	15	
8.Caledon			18	18	5	0	0	0	0	
33.Stabannon				30		30		16	16	
34.Kilcoole Marshes										
MAYO										
9.Lough Conn			40	51	51	0	0	0	51	
10.Bog of Erris				40					40	
Mullet			10					18		
Carrowmore				0					0	
Owenduff			5		22			0		
MAYO/GALWAY UPLANDS										
11.Errif & Derrycraff			0	39	0	0	39		39	
12.Connemara				31	31	28		26	26	
GALWAY LOWLANDS										
13.Rostaff & Killower			3	40	40			53	53	
14.Lower Lough Corrib			40	40	10	50	32	0	32	
15.Rahasane turlough				60	60	60	71	0	71	
CLARE/LIMERICK										
16.Tullagher			22	22	22	22	22	22	22	
17.North County Clare				42	42			42	42	
18.Lower Lough Derg				0					0	
19.Fergus & Shannon Estuaries				0					0	
SHANNON HEADWATERS										
20.Lough Gara				148	148			148	148	
21.Drumharlow Lough				0					0	
22.Loughs Kilglass & Castleforbes				0					0	
MIDDLE & LOWER SHANNON										
24.North Lough Ree				10	10			10	10	
25.River Suck			80	280	280	138	60	35	280	
26.Little Brosna				220	220			201	201	
MIDLANDS										
23.Midland Lakes			208	260	260	253		150	253	
27.River Nore			9	9	9	9	9	9	9	
SOUTH WEST										
28.Kilcolman				0					0	
29.Doo Lough										
30.Killarney Valley				11	11			11	11	
31.Inny Valley										
32.Blasket Islands										
WEXFORD										
			7493	7477	7477	7943	8047	8381	8381	
TOTALS										
	0	8749		9992	9862	8698	9339	10440	11003	0
Ireland without Wexford				2515					2622	

Sites in bold italics indicates resorts where geese have not been seen for at least 5 years and are considered abandoned

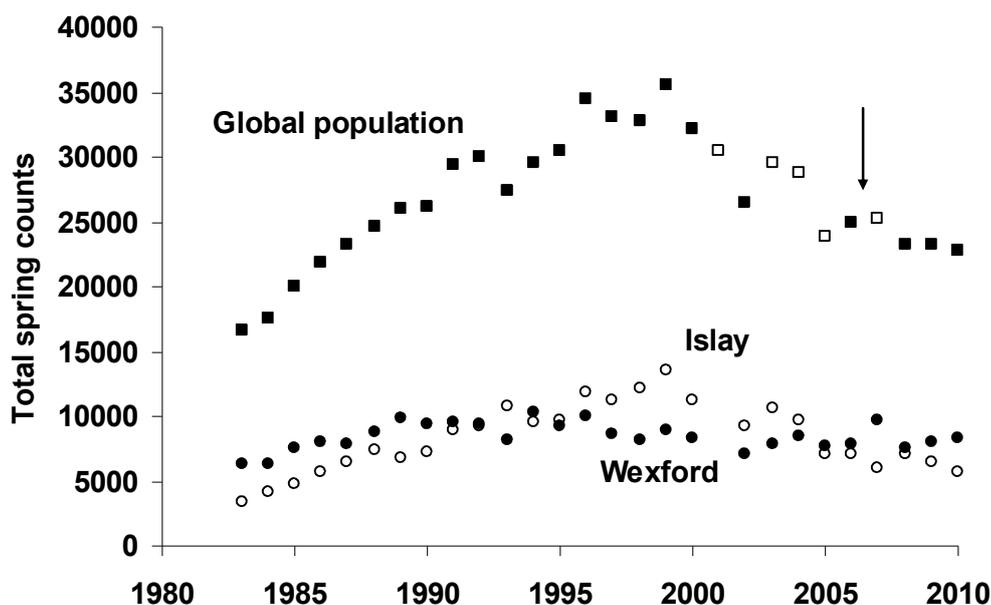


Figure 2. Combined global spring counts of Greenland White-fronted Geese from Britain and Ireland, 1983-2010, showing actual count totals (filled squares) and those estimated using modelled values for the missing “rest of Ireland” totals in some recent years (open squares). These values were calculated on the basis of the relationships between the “rest of Ireland” counts and combined Wexford and British values in previous years of full coverage. Values for spring 2001 (unfilled square) were missing on account of the outbreak of Foot and Mouth Disease that year and were therefore also estimated from previous counts. The arrow indicates the point where hunting in Iceland was stopped in autumn 2006. Spring counts for Islay (open circles) and Wexford (closed circles) are also shown.

AGE RATIOS IN BRITAIN

Enormous thanks to all of you who were kind enough to take the time and trouble to assess the percentage young and brood sizes in flocks of White-fronted Geese. We achieved outstanding coverage in 2009/2010 and are happy to report a slight improvement in overall production compared to recent years. Overall production was 12.9% among the aged samples (Table 2) compared with 10.7% last season, but again there was considerable variance between wintering sites. It was gratifying to see that flocks in Caithness, Tiree, Mull, Colonsay (where the numbers of young were very high, 30 juveniles amongst 88 aged), Lismore, Lorn, Kiells, Machrihanish, Islay, Loch Ken, Stranraer and Endrick Mouth all broke 10% young in their flocks during 2009/2010, which represents a return to earlier more normal levels of reproductive success for those flocks. Intriguingly, although the Machrihanish flock bred well, the nearby Rhunahaorine flock had less than 9% young among its numbers and the Clachan flock had no young amongst 133 aged in the field. Production of young on Islay was extraordinarily good by comparison with recent years (14.7% compared with 13.1% average during 1982-2008, and 10.3% during 1996-2008 when production of young has been so low generally). Overall, groups in the rest of Britain contained 11.5% young (compared with 12.7% average during 1982-2008 and up on 9.9% last year). Mean brood size was 3.1 (see Table 2) based on 128 families sampled from a restricted number of sites. The average values were 3.6 on Islay and 2.9 elsewhere (much as last season), again showing that Greenland White-fronted Geese continue to return with large families, even when the proportions of young vary a great deal, suggesting that it is the number of bird reproducing successfully that make the difference. Certainly there was widespread evidence of greater proportions of young amongst the winter flocks in Britain (back to levels during the 1980s and early 1990s), which makes it difficult to see why there were not greater numbers overall this winter.

Table 2. Summary of age ratio determinations and brood sizes for Greenland White-fronted Geese wintering in Britain 2009/2010.

SITE	% YOUNG	SAMPLE	MEAN BROOD SIZE	SAMPLE
South Ronldsay, Orkney	50.00	4	2.00	1
Loch of Mey, Caithness	12.94	170	2.75	8
Westfield, Caithness	10.66	122	2.17	6
Loch Urrahag, Lewis	0	19		
Nunton, Benbecula	0	20		
Loch Bee, South Uist	0	8		
Kilpheder, South Uist	0	14		
Loch Chaluim Chille, Skye	0	8		
Tiree	11.94	536	2.29	28
Fidden, Mull	16.13	31	2.00	1
Assapol, Mull	0	6		
Colonsay	34.09	88	3.75	8
Lismore	15.38	52		
Lorn	11.76	68	2.67	3
Keills	13.51	37		
Moine Mhor	0	18		
Rhunahaorine, Kintyre ¹	8.84	792	2.89	9
Machrihanish, Kintyre ¹	12.48	537	3.46	13
Clachan, Kintyre ¹	0	133		
Islay ¹	14.69	2899	3.55	33
Lowlandman's Bay, Jura ¹	0	11		
Bute	7.44	215		
Loch Ken	18.26	137	3.13	8
Stranraer	15.32	222	3.40	34
Endrick Mouth	13.40	194		
Grindon	0	12		
Dyfi Estuary	6.78	59	4.00	1
Britain, excl. Islay	11.47%	3513	2.87	95
OVERALL	12.93%	6412	3.05	128

¹Details from Islay and Kintyre courtesy of Dr Malcolm Ogilvie

After the low productivity of the preceding nine years, there has been a very slight recovery in young amongst the flocks, both on Islay and elsewhere in Britain (see Figure 3). Proportions of young in the samples taken by Dr Malcolm Ogilvie on Islay previously have shown large between year fluctuations, but have generally been consistently low (and well below the long term average of 15.2% from 1962-2008 inclusive) since 1999. These data closely follow the patterns in sampled proportions of young taken from other flocks from the British wintering resorts, although generally, these are lower than those from Islay.

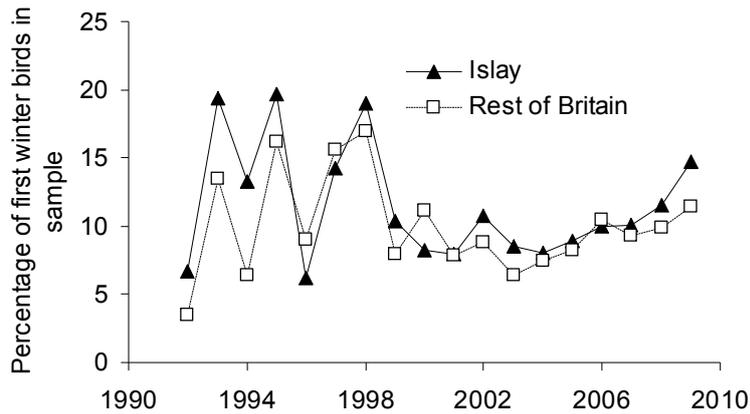


Figure 3. Proportions of young amongst samples of Greenland White-fronted Geese in Britain, 1992-2009, showing data from Islay (based on samples of between 2610 and 6540, solid triangles) and those combined from all other wintering resorts (665-4410, open squares).

There have been no long term changes in mean brood size over the same period, except for conspicuous increases in 1995 and 1998 (both years of high productivity). Again, brood sizes elsewhere have been consistently lower than those on Islay since 1992 (Figure 4).

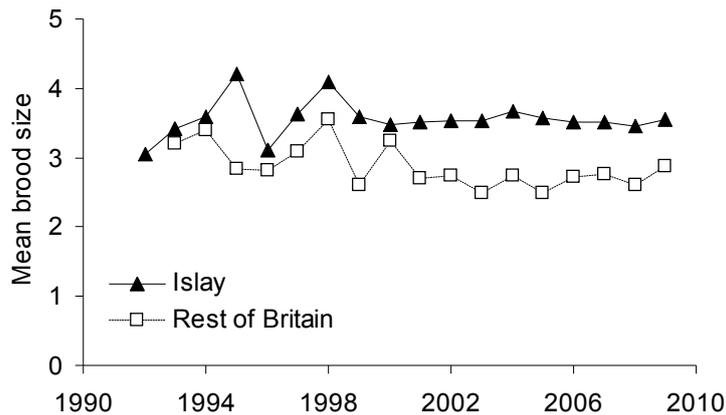


Figure 4. Mean brood size amongst samples of Greenland White-fronted Geese in Britain, 1992-2009, showing data from Islay (based on samples of between 33 and 185, solid triangles) and those combined from all other wintering resorts (31-189, open squares).

AGE RATIOS FROM IRELAND

The age ratios sampled (see Table 3) suggested relatively elevated production away from Wexford, with 10.1% amongst 464 birds aged down country, but with variable production from the relatively few flocks sampled. This was a very welcome recovery towards levels of former times and a considerable improvement on 5.4% from samples drawn in winter 2008/2009 from down country flocks. The overall proportion of young in Ireland was 9.2% (n = 4,804), including the proportion of young at Wexford which was 9.1% (compared to 10% last year) amongst 4,340 aged, with a mean brood size of 3.1 (n = 115, compared to 3.3 last year), not too dissimilar to values from Britain (see above).

Table 3. Summary of age ratio determinations and brood sizes for Greenland White-fronted Geese wintering in Ireland 2009/2010.

SITE	% YOUNG	SAMPLE	MEAN BROOD SIZE	SAMPLE
Sheskinmore	0	31		
Lough Macnean	59.38	32		
Owenduff, Co. Mayo	60.00	5	3.00	1
Rostaff and Killower, Galway	15.15	33		
River Suck, Shannon	0	35		
Little Brosna, Shannon	0	62		
Midland Lakes	7.69	208		0
Pettigo	6.90	58		
Wexford	9.12	4340	3.09	115
Ireland, excl. Wexford	10.13%	464	2.18	24
OVERALL	9.22%	4804	3.01	126

OTHER NEWS

What causes between-winter shifts in wintering sites amongst Greenland White-fronted Geese?

Wexford Slobs have held 25-40% of the world wintering population of Greenland White-fronted Geese since the 1950s. Thanks to the amazing efforts of Alyn Walsh and the huge resighting team, we know from geese caught and marked there with collars that 85% of geese seen in successive years return to the same wintering site. But what about the 15% that move? Why do they do it and when? Wexford wintering numbers now are not as high as in the mid 1990s, reflecting the overall trend in total population size. At Wexford, geese are restricted to feeding on relatively few (<100) large fields where they can be highly aggressive to each other, with large family parties dominating access to the best food patches. If food availability remains the same, we might expect the population would approach a level where food could potentially limit the geese the site could support as numbers increase. As this limit is approached, the food intake and body condition of individuals would be affected, especially those birds that are low in the 'pecking order'. Such individuals may consider staying at Wexford in increasingly crowded conditions, or balance this with the risks and benefits of moving to winter elsewhere. If this were the case, we would expect to see more individuals emigrating from Wexford as numbers (and therefore goose density) increased at this wintering site.

Marked geese tend to shift winter site most frequently after pairing (normally at age 2–3 years), which takes place away from the wintering grounds, so therefore may involve individuals that winter at different sites. The proportion of young geese in the flocks at Wexford has declined in recent years, perhaps linked to weather conditions on the summering grounds affecting breeding success, so emigration rates potentially could instead simply reflect the relative numbers of young geese pairing and changing to the wintering site of their partner rather than any density-dependent effect. For this reason, a group of students examined the resighting histories of Greenland White-fronted Geese marked at Wexford to test if either (1) winter dispersal rate amongst the Wexford population was density-dependent (*i.e.* geese move away with increasing overall numbers) or (2) winter dispersal rate simply reflected the recruitment of young (*i.e.* geese move away in proportion to the number of young

produced). In the case of (1), we predicted that annual winter dispersal rate would be positively correlated with overall numbers at Wexford and for (2) we predicted that the emigration rate from Wexford would simply be positively correlated with the annual numbers of young at this site.

Results showed that emigration varied significantly between years, but this variation was not linked to winter numbers at all, that is, geese were not simply moving because of the increase in overall numbers causing some type of ‘crowding’ effect that made movement to other wintering sites more attractive (see Marchi, C., Sanz, I.F., Blot, E., Hansen, J., Walsh, A.J., Frederiksen, M. & Fox, A.D., 2010. Between-winter emigration rates linked to reproductive output in site-faithful Greenland White-fronted Geese. *Ibis* 152: 410–413 for full details). Rather, the probability of a bird emigrating was correlated with the numbers of young at Wexford in the winter following its hatch. We think that this is because geese permanently shift wintering site most when they pair, when one or other of the pair may have to change wintering site to accommodate that of its new mate. We found a strong effect of age on emigration rate, with highest emigration rates in the three years following capture when pairing is most frequent, whereas adults generally showed very low probabilities of moving winter sites between years. The reductions in emigration rates in very recent years can be explained by the dramatic fall in the production of young. It was always thought that the two numerically most important sites for this population (Islay and Wexford Slobs) have provided a source of recruits dispersing to other winter quarters. These two sites tend to host geese with higher reproductive success than do sites elsewhere and wintering sites with the lowest proportion of young have shown the greatest rates of decline. Hence, at least in the 1980s, when emigration rates were much higher than now, Wexford (and perhaps Islay as well) may have functioned as ‘sources’ for other ‘sink’ wintering flocks to bolster their numbers and show increases above those supported by their intrinsic rate of increase from recruits of young birds alone. Unfortunately, we lack marked birds from other winter flocks to confirm true exchange rates, but if this is the case, clearly the reduced emigration rates from Wexford in recent years is yet another population consequence of current low reproductive output in the Greenland White-fronted Goose as a whole and may contribute to declines at other wintering sites.

Satellite tracking of Greenland White-fronted Geese from Wexford

Last winter, Sue Sheaffer and Rich Malecki of the Livingston Ripley Waterfowl Conservancy of Litchfield, Connecticut in the eastern United States travelled to Wexford to collaborate with the National Parks and Wildlife Service to deploy satellite GPS transmitters on the Greenland White-fronted Geese that Alyn Walsh catches every winter as part of the long term monitoring project there. The team successfully deployed four transmitters during winter 2009/2010, and all four set off for Iceland in spring 2010. Unfortunately, the signals from two of the geese were lost, but the other two continue to transmit to the present and have given incredibly fine-grained information about their whereabouts throughout the annual cycle.

You can see the tracks taken by the birds on the Livingston Ripley Waterfowl Conservancy website (<http://www.lrwc.net/greenland.html> and scroll down to the bottom of the page for GoogleEarth maps). The summary map is shown below (Figure 5): the bird 98652 arrived in Iceland on 10 April, spent some time in the southern lowlands there, before moving to its final staging area in the west in Mýrar on 17 April. There it remained until 8 May, crossing the east coast of Greenland later the same evening. Late afternoon next day it descended down off the ice cap into west Greenland, arriving at Svartenhuk Peninsula at 20.00 hours on 9 May. Perhaps finding snow conditions not to its liking, it flew down to Ubekendt Ejland, a large island to the south where it stayed until 24 May when it returned to Svartenhuk, where it remained the rest of the summer. 98653 arrived in south east Iceland at 21.00 hours on 9 April, and made its way stopping in the southern lowlands to arrive at Hvanneyri in western Iceland 17.00 hours on 11 April. There it stayed until 8 May, departing that night, but

turning back over the sea to stop on Snæsfellnes peninsula until 22.00 hours on 10 May. After leaving Iceland the goose rested on the sea for nearly 24 hours, eventually continuing at 06.00 hours on 12 May. The slow progress suggests something was wrong and this suspicion continued, as the bird made the east Greenland coast at 14.00 hours on 12 May, but took a very long and unusually southward track over the ice cap, arriving on the west coast at 15.00 hours on 15 May, well south of the normal range of the geese there. Bird 98653 started making its way northwards up the west coast of Greenland, passing Kangerlussuaq on 4 June and arriving in Sarqaq dalen on the southern side of the Nussuaq peninsula at 15.00 hours on 6 June. The bird has since spent the rest of the summer in Sarqaq dalen and the huge central valley system of Nussuaq, both areas well known for their high concentrations of White-fronted Geese in summer. Both transmitters were still functioning at the end of September 2010 when this account was written, by which time, both individuals were safely back in western Iceland very close to their respective spring staging areas.

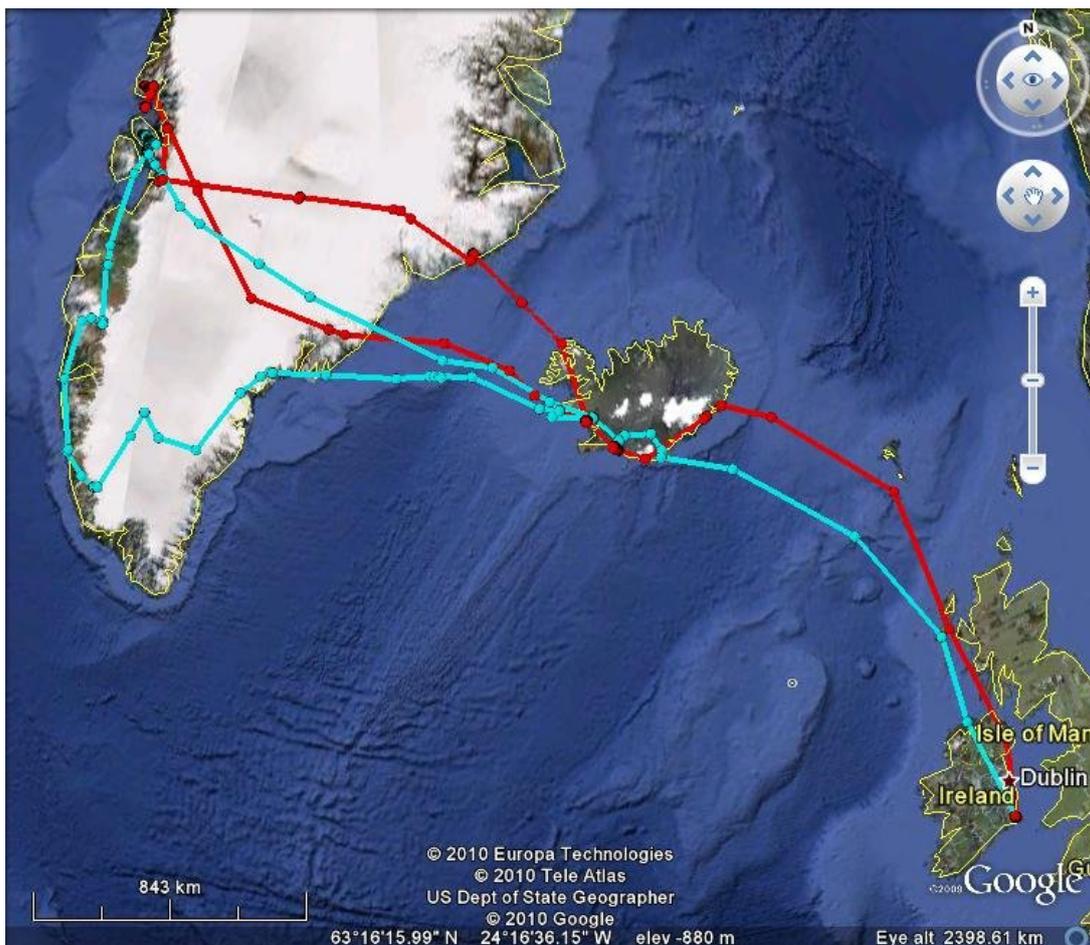


Figure 5. Positions of GPS satellite tagged Greenland White-fronted Geese marked at Wexford Slobs in winter 2009/2010 until 19 September 2010, by which time both individuals were back in Iceland. The red trace represents 98652 and the light blue 98653. Data courtesy of the Livingstone Ripley Waterfowl Conservancy website referred to in the text.

Satellite tracking of Greenland White-fronted Geese from Loch Ken

On 31 March 2010, the Wildfowl & Wetlands Trust caught seven Greenland White-fronted Geese on the eastern shore of Loch Ken at Waterside House just north of Crossmichael in Dumfries and Galloway. With the help of Karl Munday (National Trust for Scotland), Margaret and Arthur

Thirlwell and Keith Kirk, orange collars V9C, V0C and V1D to V5D were fitted. The late afternoon catch came on the back of a few tense days of near misses, with obscure disturbance events often persuading the birds to walk out of the catch area or just not to land in the field at all. One bird managed to extract itself from under the edge of the net and looked somewhat bewildered before making good its escape, but otherwise it was a good catch as it included two young birds the first we have caught at Loch Ken. These were a male and female collared V3D and V4D respectively, with slightly lower weights than the adults caught at 2.5 and 2.3kg; the adults (four males and one female) weighing 2.8 to 3.0kg. Some days later the two juvenile birds were identified as the brood of V9C and his unringed partner (no doubt the escapee!).

As part of an ongoing long-term collaborative project (between Wildfowl & Wetlands Trust, National Trust for Scotland, Royal Society for the Protection of Birds, Scottish Natural Heritage and Scottish Environmental Protection Agency) attempting to further identify the winter foraging and roosting sites of this small sub-population, its migration routes and breeding sites, three adult males were fitted with 40g ARGOS GPS satellite tags (LC4 units from Microwave Telemetry Inc). This group of birds has been the subject of previous satellite tracking when four birds were fitted with solar GPS tags in 2008. This time the tags were lighter and had a finite battery which meant that they could be fitted with an elasticated harness lower down the back (not between the wings) with the unit buried in the feathers. It was hoped that this would make the tags less cumbersome to the birds and easier to shed in the longer-term. The disadvantage compared to the solar tags was that the limited power available was predicted to allow only one GPS fix at 10:00 GMT every day for a year, with data uploads to the ARGOS satellite network (and hence the WWT website) every 10 days. The birds fitted with the tags included V9C (tag 33204), V0C (32947) and V1D (33203). Unfortunately, considering we hoped at least one bird would return with its tag the following winter to Loch Ken, after all the effort and preparation tag 33203 did not work from the outset and so we only had two tags functional as the birds prepared to migrate to Iceland.



Male V0C was at Loch Ken until at least 10:00 on 11 April and was in the southern lowlands of Iceland by 13 April, approximately 30 miles east of Vík (see Figure 6). By 14 April he had moved west and remained in the agricultural lowlands close to Hvalsöllum until 6 May, feeding within the ash fall zone in the shadow of the active volcano, Eyjafjallajökull. By 7 May he was further northwest in the Selfoss area and by 8 May was on the east coast of Greenland, taking a fairly southerly route across a narrower part of the icecap heading straight to a summering area 40 miles southeast of Kangerlussuaq. The bird moved about within a local area close to this initial location before the tag ceased to function on 21 May.

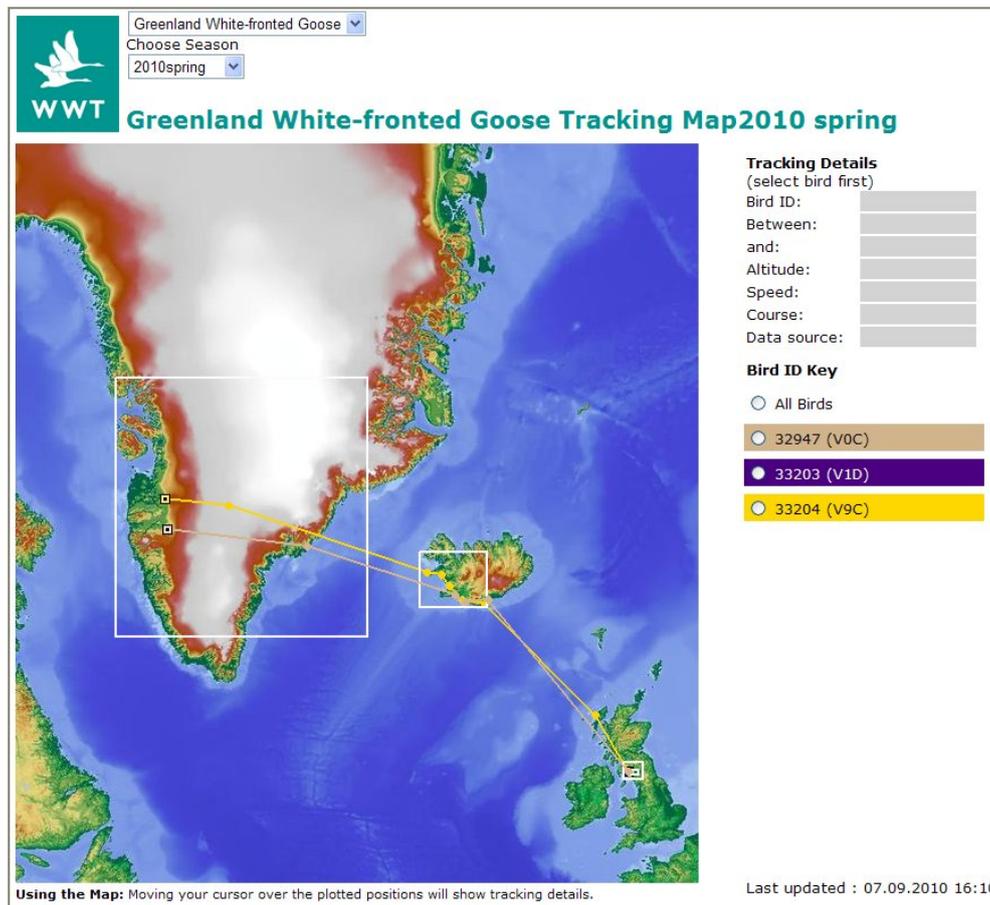


Figure 6. Spring migration tracks of GPS satellite tagged Greenland White-fronted Geese marked at Loch Ken in winter 2009/2010

As with V0C, male V9C was at Loch Ken until at least 10:00 on 11 April and initially appeared to follow a very similar migratory schedule to this bird and was possibly part of the same flock. Likewise in 2008 all four tracked geese appeared to have been part of the same migratory flock at least on leaving Loch Ken until midway across the Atlantic Ocean. V9C was on Lewis or passing over the Hebrides by 10:00 on 12 April (V0C's tag did not obtain a fix that day) and had arrived on the south coast of Iceland by 13 April, 20 miles east of Vík, moving to agricultural lowlands further west near Selfoss by 14 April and remaining there until 4 May. V9C moved northwest to Akranes area by 5 May, Rauðkollsstaðir by 6 May and finally departed via the peninsula just west of Ólafsvík on 7 May. By 8 May V9C was midway across the Greenland icecap, taking a more northerly route across to V0C, and was in its breeding area 60 miles north of Kangerlussuaq by 9 May. From that time onwards the bird remained in the area close to where it arrived although from May to June it began to exploit feeding opportunities at greater altitudes as the snow melt progressed. This bird was of great interest, as it was a known breeder; it was also interesting that when it departed Loch Ken, it

left the two collared young birds behind with a few other pairs and families - where they remained for another week or so. This bird was thus likely to have attempted to breed again and so the GPS fixes probably show the site of a successfully breeding Greenland White-fronted Goose from Loch Ken. The GPS fixes from these two birds fall within a c.100x100 mile area so far identified as the summering and breeding grounds of the Loch Ken birds. As this article is written, V9C has left the breeding grounds after 7 September, having arrived back in western Iceland by 9 September, visiting the area around Hvanneyri. We hope to see him and perhaps a new family back at Loch Ken soon.

Part-funding for the tags was kindly provided by the Sulwath Connections Heritage Lottery Fund via National Trust for Scotland.

Larry Griffin

White-fronted and Canada Geese in west Greenland, spring 2010

A number of different hypotheses have been suggested to explain the low reproductive success of Greenland White-fronted Geese in recent years. These range from climate change and weather factors, to competition with an expanding west Greenland breeding population of Canada Goose (*Branta canadensis* sub-species *interior*), elevated predation rates or disease and parasites. However, none of these factors seem to explain convincingly the reduction in breeding success and, in truth, little is known about the current situation in west Greenland during the early part of the breeding season. Although well monitored and subject to conservation actions and research programmes on the wintering and staging grounds, factors regulating reproductive success on the nesting areas are poorly understood. At the flyway management planning workshop in Islay, Scotland in February 2009, this was recognised as a serious knowledge gap. Because there has been little research undertaken on the breeding grounds since the first studies of expeditions in 1979 and 1984, it was agreed that some study of breeding biology was necessary to seek support or otherwise for the different hypotheses.

With this in mind, the Wildfowl & Wetlands Trust (WWT) and GWGS mounted a reconnaissance expedition to west Greenland during April to June 2010. Because Whitefronts are dispersed over large areas and virtually nothing is known about their ecology on arrival and during pre-breeding in spring, this was a pilot project to establish the feasibility of further in-depth studies to be undertaken in future years. This could include a PhD project, which is currently being planned, to be funded by WWT and Aarhus University.

The initial emphasis of the pilot work was to examine interactions with Canada Geese. Other factors are more complicated to investigate and would require substantially more resources over the longer term. The team went to Greenland to look at spring arrival, the degree of overlap between the two species and especially to see how they interact in space and time. The timing of arrival of Canada Geese (from the eastern North American flyway) was completely unknown, and knowledge of arrival dates of Whitefronts from Iceland was many years out of date. Given the substantial phenological changes shown by many species in recent decades, probably linked to climate change, it was clearly long overdue to gather data on arrival patterns for both species.

We arrived in Kangerlussuaq, west Greenland on 26 April. This airport provides a convenient entry point to the southern end of the White-fronted Goose breeding range, and the area in the immediate vicinity holds many breeding Canada Geese. By this date, much winter snow cover had disappeared and the thaw was well underway – conditions were already potentially suitable in some lowland areas for geese to find feeding (and nesting) sites. However, no geese were present. The first Whitefronts appeared on 1 and 2 May – just a few advanced breeding pairs, presumably the fittest individuals.

There was little more activity until 6–8 May, when more began to arrive, again apparently composed predominantly of breeding pairs, with larger groups of over 20 only evident from 8 May. This arrival timing is interesting, as it is essentially the same as arrival dates in 1979 and 1984. We had expected that birds might have arrived earlier, since departures from Britain and Ireland have advanced 10–14 days in the last 25 years. This implies that birds are staying longer on their Icelandic staging grounds rather than arriving earlier in breeding areas.

On arrival in 1979 in Eqaalummiut Nunaat, White-fronted Geese immediately settled on marshes along the glacial melt rivers that were the very first to thaw. These held below ground bulbils of the marsh arrow grass *Triglochin palustris* and the saltmarsh grass *Puccinellia phryganodes* which is eaten by arriving geese around much of the polar north. In 2010, the geese fed first in small groups in low-altitude marshes and were probably exploiting cottongrass *Eriophorum* species and mare's-tail *Hippuris vulgaris* in pools; such wetland features had been very important in 1979 and 1984 in Eqaalummiut Nunaat, 50 km further north, but were exploited a little after the glacial melt river wetlands. These resources had thawed earlier in May 2010 than had been the case in 1979, almost certainly allowing arriving females to accumulate nutrient stores for investment in clutches. Typically, the males stood guard, highly attentively, while females fed, in widely separated pairs. We witnessed exploratory flights by pairs and small groups to higher altitude areas. These were presumably birds checking potential breeding and foraging areas near to traditional nest sites.

In the first two weeks, we spent much time checking suitable marshes and watching for arriving geese (as 'visible migration'). We also expected a later wave of non-breeders to arrive, at some unknown stage. Although some skeins of moving birds were seen, most were small, and few large groups of presumed non-breeders had arrived by 9 May. Goose movement was in a range of directions, including frequently directly north-south, possibly involving birds reorienting themselves after having crossed the ice cap. By 9 May, we had counted an estimated 450 birds, within an effective survey range of 10–15 km. Two geese tagged with satellite transmitters earlier in the winter at Loch Ken, Scotland (by WWT) crossed the icecap on 8 May and one of those marked at Wexford, Ireland (by Susan Schaeffer of the Livingston Ripley Waterfowl Conservancy) crossed the ice cap between 22.00 hour on 8 May arriving at Svartenhuk in west Greenland by 20.00 hour next day.



Flying Greenland White-fronted Geese, Isunngua, west Greenland, May 2010. Photo Mitch Weegman.

In contrast, Canada Geese also arrived relatively late. On 2 May, three collared birds from Isunngua were still known to be present in Quebec, Canada. One lone Canada Goose was seen on 6 May but the main arrival did not occur until the middle of May. During the rest of May to mid-June, we began to survey lochs in areas where Whitefronts are known to breed. From 20 May, the more obvious migratory movements of Canada Geese had mainly ceased with some small skeins flying higher overhead from south to north. More often, smaller groups or pairs were moving west to east up the valleys of the study area presumably searching for new feeding sites as the thaw continued apace. With temperatures as high as the low twenties (centigrade) the near complete ice cover on nearly all of the study lakes receded to zero from mid- to late May, with ice only remaining on the more substantial water bodies. A few aggressive interactions were seen between pairs of Canada Geese establishing territories and nest sites on the lake shores on peninsulas, spits or islands mostly many hundreds of metres apart.



Flying Canada Goose, Isunngua, west Greenland, May 2010. Photo Huw Thomas.

During 10–23 May, Whitefront observations were largely of pairs or small groups (less than five individuals) in flight. Only on four occasions during this period were we able to observe Whitefront pairs. It appeared as if most Whitefronts were searching for suitable foraging and/or rest areas. The geese seemed anxious and were present for less than two hours at any given time, often flying after just ten minutes on the ground.

The first active Canada Goose nest with one egg already present was found on 23 May. At this point, route counts following set transects around the study area covering groups of lakes at which birds have often been caught in previous years, were largely just finding pairs of Canada Geese or small feeding groups, sometimes with occasional Whitefronts. The Whitefronts, however, were highly unpredictable as to whether or not they used a specific feeding area from one day to the next, which made them difficult to locate and observe. One pair that did regularly turn up for a couple of

mornings, male bearing the collar J5F and female J3F, appeared to start a nesting attempt on a fairly steep tussocky hillside at the east end of one of the larger lakes in the area (Sanningasoq), about 35 m above the lake, although the nest was never completed. These birds were first ringed at a nearby lake on 14 July 2008 and were seen during the winter at Drumlemble, Kintyre, Scotland in 2008/09 but not in 2009/2010. On at least two occasions, single adult Whitefronts were seen with presumed family groups of yearlings, the dark nail and lack of belly bars of the young birds still being visible. On the rare occasions that Whitefronts were found feeding or resting with Canada Geese in a dispersed flock, detailed observations on the behaviour of the birds were collected over many hours. During these periods aggressive encounters were rare; however, these groups were probably mainly non-breeding birds. HT even witnessed a Canada Goose which joined a Whitefront that was feeding alone on 30 May, and which seemed to stand watch for the Whitefront for just under an hour – hardly an example of aggressive inter-specific interactions! Judging from the disturbance distances of lone Whitefronts or pairs of Whitefronts, compared to those in mixed flocks it appeared that the Canada Geese made the Whitefronts more tolerant and less flighty. The Whitefronts also appeared to spend more time with their heads down feeding rather than with their heads up alert, although this needs more analysis to control for whether or not the birds were breeders or non-breeders.



Canada Geese, Isunngua, west Greenland, May 2010. Photo Huw Thomas.

By the beginning of June, encounters with Whitefronts in the Isunngua study area were less frequent with only *c.*10–20 birds present. Copulation was seen on one occasion and nest building was again attempted, suggesting that nesting was likely to occur in the area, although no completed Whitefront nests were located. Detailed behavioural observations continued to be undertaken whenever geese were found. Although relatively few mixed flocks were recorded, competition for resources appeared negligible with, in most cases, Whitefronts and Canada Geese feeding side by side. Most Canada Geese had, by now, begun to nest with the majority of first eggs being laid on 28 May. Searches found 30 nests with a mean clutch size of 4.6 eggs. Most nests were within 2 m of the shore edge, about 1 m

above the water surface and at a median altitude of 362 m. The last observations and counts of geese were undertaken on 11 June.

The pilot year proved both revealing and frustrating. Much new information was gathered about the timing of arrivals of both Greenland White-fronted and Canada Geese, their spatial distribution and behaviour. In the case of the Canada Geese, this is the first time ever the breeding ecology and nesting biology has been studied in West Greenland. However, it is clear the Kangerlussuaq study area offers few Whitefronts for detailed studies and future fieldwork will need to be undertaken in an area with a higher density and numbers of this species.



Canada Goose nest, Isunngua, west Greenland, May 2010. Photo Huw Thomas.

Ian Francis, Mitch Weegman, Larry Griffin, Huw Thomas, Carl Mitchell and Tony Fox

Goose studies in Greenland: July 2010

In July 2010, a four strong team headed to the Isunngua region of western Greenland to study the behavioural ecology of breeding Greenland Whitefronts and the more newly arrived Canada Geese. The aim of this month long expedition was to compare earlier studies of the interaction of the two species undertaken by Jens Kristiansen and Nigel Jarrett in 1998 and 1999). The results will be written up by two third year Bangor University students as their dissertation project and we hope may be published as well.

A handy helicopter lift for our food, kit and thankfully ourselves (!) significantly increased our field time and enabled us to carry out an extensive census of the area on foot, scanning the vast majority of the lakes in our wider area. This area had been thoroughly counted in 2008 and 2009 and this year's work will give a further year's data to explore numbers and trends.

Overall, the census results were depressing. In our immediate study area, just one lake held Whitefronts (two families and four non-breeders including J0F – a male we had caught as an adult non-breeder in 2008, had been seen at Eorrabus, Islay in December 2008, was then retrapped with its young last year, but had not seemingly bred successfully this year). Although another two flocks of c.48 and 10 Whitefronts were found closer to the ice-cap, these numbers were tiny compared to the c.2,000 Canada Geese now in Isunngua. A couple of rainy days confined to camp also gave an opportunity to organize the count data collected in this area back to 1988 and so we hope to be able to produce some good indices of the change in numbers over the last 22 years.

The main goal of the expedition however, was to spend as much time as possible observing breeding and non-breeding geese and looking at the different types of interaction now occurring. We spend several days scanning moulting flocks and throughout the time we spent observing, we categorized activities into behaviours such as sleeping, feeding, drinking, walking and running, and postures such as the degree of alertness. We recorded the actions of each goose every five minutes. This will allow us to estimate activity budgets of the two species for comparison with Kristiansen & Jarrett's earlier studies.

In mid-July, we took four days out from behavioural observations to walk to the ice cap which proved a great opportunity to collect data on more distant lakes which are rarely visited by researchers. It is still unknown to which features of lakes the geese are attracted. Over the past 26 years lake data has been collected on various GWGS expeditions, covering aspects such as size, altitude, vegetation coverage and surrounding topography. We have now completed the dataset enough to analyze the results to hopefully assess what makes a lake attractive (or not!) to moulting geese, but more crucially to assess whether there has been a significant shift in the distribution of Whitefronts onto potentially less favourable lakes since the arrival of Canada Geese.

Throughout the month we also undertook an experiment to investigate the effects of grazing pressure on *Carex rariflora* – one of the main goose food plants in their moult period. Plots of 30 plants were tagged and individually coded with tiny tags. To ensure the test started off fairly, each plant was cut at the top of the sheath, to remove the leaf growth. The plots were then assigned a different length of time in which the leaves were allowed to regrow before being measured and cut once again. A control plot was also established where plants were not 'grazed' but regularly measured.

Once we had finished the behavioural observations we could move onto the lake shore to look at how the geese grazed the vegetation surrounding the lake. Transects were recorded at 90⁰ to the lake and data such as dropping densities, height of vegetation, and plant species were collected.

You can follow our data analysis progress on our wikisite, where we are also posting information on the resightings and recoveries of the two goose species ringed in Isunngua in recent years: <http://greenland2010.wikispaces.com/Recoveries+and+resightings>.

Rachel Stroud

International Action Plan

The development of an international action plan for Greenland White-fronted Geese under the African Eurasian Waterbirds Agreement continues with the most recent draft going to a meeting of the Birds Directive's 'Ornis' Committee in late November for formal EU approval. The plan has been useful in stimulating research (with this summer's work in Greenland reported elsewhere in this Newsletter being flagged as a priority). However, the effectiveness of any such conservation action plan is not so much the number of words or meetings it generates, but the effect actions have on the population status of the species concerned. To that end, the poor conservation status of Greenland population of the White-fronted Goose remains extremely worrying.

Perhaps one of the immediate outcomes from the plan process (and following from discussions at the Islay international workshop held in February 2009), was a focus on the fates of the smaller wintering flocks (of less than 50 birds). It has been recognised that the conservation of these groups are crucial to the maintenance of the current range of the population. As with hill-sheep 'hefted' to particular traditional upland ranges, these goose flocks maintain a cultural knowledge of particular roosts, alternative feeding areas and flight-paths. Monitoring shows that once such a small flock becomes extinct, the sites rarely attract new settling birds. This issue has been heavily emphasised in the Action Plan, and with SNH-funding, GWGS and WWT have been working to gain a better understanding of the issues facing many of the Scottish small flocks. An interim report of activities completed to date follows this section of the report.

The draft plan distils much knowledge on the status and threats to the population (available at: <http://gwfg-conservation.wikispaces.com/Draft+international+action+plan>). All the presentations to the Islay workshop are now also available on-line at <http://gwfg-conservation.wikispaces.com/Islay+international+workshop> and these may also be of interest for those unable to attend that meeting.

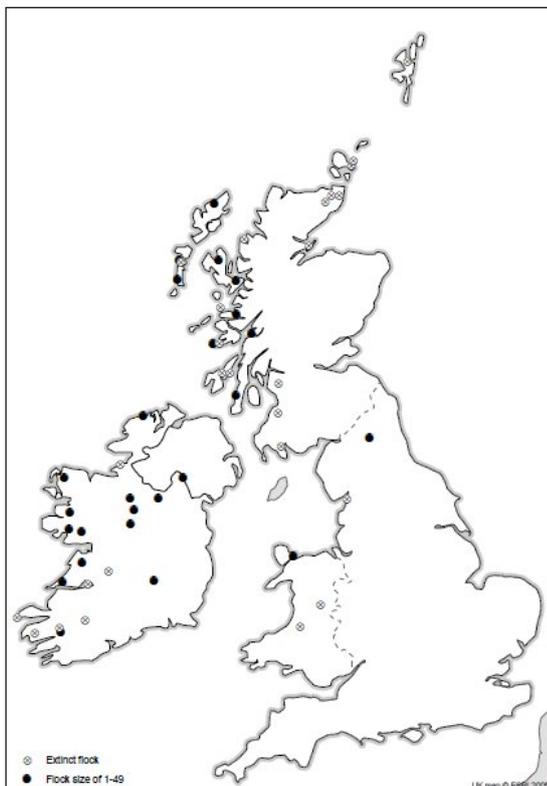


Figure 7. Map showing Greenland White-fronted Goose flocks most at risk of extinction (i.e. those of generally small, <50 individuals, size shown by solid symbols); also shown are sites recently abandoned as regular wintering resorts (encircled cross symbols).

David Stroud

Greenland White-fronted Geese: Land use and conservation at small wintering sites in Scotland

The winter range of the Greenland White-fronted Geese in Ireland and Britain consists of a few large aggregations and numerous sites with small numbers. Some of these “small sites” currently hold only a few tens of birds and all are extremely vulnerable; of 17 British sites holding fewer than 200 (11 with less than 50), eight are currently declining and extinctions have already occurred at a further nine sites over the last 26 years. Although large wintering groups of Greenland White-fronts may be protected through site designations and management schemes, small flocks are usually outwith such measures. Maintaining range and ensuring the safeguard of these small flocks was considered an urgent priority by an international flyway management conference in February 2009, and action to address this began with this project – which is being run jointly by GWGS, WWT and SNH (funded through the Species Action Framework).

We are aiming to assemble all available information about numbers, habitats land use and conservation issues at wintering sites holding small numbers of birds and gather updated field information for top priority sites, in winters 2009/2010 and 2010/2011. A prioritised list of small sites for conservation action will be prepared, with actions tabulated for each, along with a timescale and estimated cost. The project will also look at wider issues relevant to the conservation of the geese at the suite of small sites and make recommendations to SNH, GWGS and the Scottish Goose Management Review Group.

During the 2009-10 winter, we focused on nine of the priority sites - Plockton Broadford (Skye), Skeabost (Skye), Loch Chaluum Chille (Skye), Westfield area (Caithness), Loch of Mey area, (Caithness), Loch Ken (Dumfries & Galloway), Stranraer (Dumfries & Galloway), Kilpheder (South Uist) and Nunton (Benbecula). If we have not already been in touch with counters for these areas, we will be soon, to finalise our reports.

At each site, we intend to assemble available information about the sites, including counts, age ratios and inter-site movements (much of this taken from GWGS files), map goose use, field and habitat types, conservation and other designations, any additional environmental/land-use change information and the types and nature of sources of disturbance relevant to goose use. Wherever possible, local land managers and goose counters will be interviewed for their experiences. A template for collecting current site information will be developed which can be used for historical and future information. All information so derived will be compiled into a detailed report. This coming winter (2010/2011), we will be looking at further sites and will make contact with local counters to ask for your help.

Ian Francis, Carl Mitchell, Larry Griffin

More on collars



As well as the geese captured for the deployment of satellite transmitters over the last year, there have been many more geese fitted with collars in 2009 and 2010. The expedition to Isunngua in summer 2009 captured 9 birds, including a retrap, J0F, caught in the same area in 2008, although only two of these were new collared birds. As Larry Griffin reported above, seven geese were cannon-netted at Loch Ken at the end of March prior to departure, all were fitted with the codes shown on the previous page.

In Ireland, 35 geese were newly marked with collars at Wexford, and 32 at Lough Swilly in February 2010. These are the very first caught in this part of Ireland, and we are very keen to follow the fortunes of these birds, their family relationships, reproductive success and survival to contrast with similar information that we have for many years from the marked sample at Wexford. It is vital that we inject samples of marked (i.e. collared) birds into the wintering population away from the Wexford Slobs, because although we have good estimates of the demographic parameters and emigration/immigration rates of geese caught at that site, our knowledge of these rates at other sites is non-existent. We must thank Andrew Speer for help in organising the Swilly catch and to John Russell for permission to catch on his land, as well as to Boyd Bryce, Christopher Ramsey and other helpers for their assistance on site.

To build up a pool of marked birds at other sites in both Britain and Ireland, we need to make a regular effort to catch and mark geese for at least three successive years and determine their family relationships and breeding success based on intense resighting efforts in subsequent years. This was a priority flagged up at the Islay workshop in February 2009, and Scottish Natural Heritage have provided the Greenland White-fronted Goose Study to attempt this on Tiree, Islay and in Caithness, unfortunately without success to date. Hence the presence of locally marked birds at Lough Swilly and Loch Ken in the presence of keen observers, willing to report resightings, is of key importance to understanding the population dynamics of Greenland White-fronted Geese.



And finally, some very good news from Wexford...

Wexford North Slob comprises about two thousand acres of flat farmland that were walled off from the sea in 1847, during the Irish famine that had begun in 1846. About five hundred acres now form the Wexford Wildfowl Reserve which is owned jointly by the National Parks and Wildlife Service and BirdWatch Ireland. Records show that large numbers of Greylag Geese were hunted there from early in the twentieth century, when the place was guarded and managed by gamekeepers. With the destruction of boglands and other habitats elsewhere in Ireland, Greenland White-fronted Goose numbers built up at the Wexford Sloblands from about the 1940s onwards. The site is now, of course, the single most important wintering site for the population in the world. Now the birds graze for most of their time on the North Slob and fly over the sea wall to roost on nearby tidal sandbanks each night. Greenland White-fronted Geese are now completely protected in Ireland and the National Nature Reserve at Wexford makes a very substantial contribution to the well-being of the total population.

After several years legal impasse, the good news from the Wexford Wildfowl Reserve is that the two hundred or so acres (nearly half of the total area of the Reserve and vital to the wintering geese) is no longer subject to inappropriate land management. The Reserve's neighbour, the Beggerin Estate, was sold early in 2010 and a legal issue that had prevented all farming for some years on this large section of the Reserve came to a close. During 2010 the thick mat of grass and weeds that had accumulated in the interim has been removed and the ground cultivated. The problem had been a real issue at the site which is one of Ireland's foremost National Nature Reserves, and the source of considerable concern for all involved during the period when the land could not be managed sympathetically for the geese. Next spring will see the establishment of permanent pasture which, like the rest of the Reserve, will be let to neighbouring farmers for hay, silage and grazing in the summer and made suitable and available to the geese, swans and other waterfowl for the winter.

*Dominic Berridge
Warden, Wexford Wildfowl Reserve.*

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With the population in such a state of flux, it is so important to keep up the effort counting Greenland White-fronted Geese and it is such a great pleasure to have the count network respond so well every year by providing counts, age ratios and ring resightings. A very sincere thanks to all of you again! For Britain during 2009/2010, these include: John Adair, Bob Adam, Vicky Anderson, David Barnden, Dave Batty, Pat Batty, Pete Berry, John Bowler, Julian Branscombe, D.M. Bryant, Roger Broad, George Christie, Paul Collin, Colin Corse, Ruth Cromie, Paul Daw, Tim Dean, Becks Denny, Keith Duncan, John Dye, Keith Fairclough, Ian Fisher, Michael Francis, Michael Frankis, Ian Fulton, Dominic Funnell, Mike Gear, Larry Griffin, Keith Hague, Nick Haycock, Dick Hewitt, Ian Hopkins, A. & E. Horner, Keith Hoey, Alan and Elaine Horner, Sandra Hutchinson, Dave Irving, Tim Jacobs, David Jardine, Tracey Johnston, Ben Jones, Martin Jones, Russell Jones, Wilma Kelly, John Kemp, Andy Knight, Morven Laurie, Stan Laybourne, Alan Leitch, Stephen Longster, Ruth Mathias, Dick Matson, Crystal Maw, Dennis McCullough, Stephen MacDonald, Marco McGinty, Alison MacLennan, Rae McKenzie, Bob McMillan, Leigh Marshall, Dick Matson, Eric Meek, Carl Mitchell, Margaret Morris, Brian Neath, Bill Neill, Malcolm Ogilvie, Ian Patterson, Mike Peacock, Brian Rabbitts, Bryan Rains, John Raymond, Alan Reid, Brian Ribbands, Andy Robinson, Dave Rogers, Chris Rollie, Malcolm Russell, Martin Scott, Dave Sexton, Stuart Shaw, Alan Simpson, Ian Sims, Dick Squires, Colin and Margaret Stead, Andrew Stevenson, David and Rachael Stroud, Paul Tarling, Arthur Thirlwell, James Towill, Andrew Upton, Jim Williams, Stuart Williams, Anna White, Catriona White, Hazel White and Fergus Younger.

For Ireland, these include: Wesley Atkinson, Penny Bartlett, Dominic Berridge, Helen Boland, Dermot Breen, Noel Bugler, Carl Byrne, Mark Byrne, Sue Callaghan, Helen Carthy, Cameron Clotworthy, Kendrew Colhoun, Pdraig Comerford, Jimi Conroy, Dick Coombes, William Cormacan, Niall Cribbon, Fionnbar Cross, Olivia Crowe, Eamon Doran, Pascal Dower, Dave Duggan, Maurice Eakin, Fiona Farrell, Triona Finnen, Leonard Floyd, Ciara Flynn, Ciaran Foley, Pat Foley, Katherine Freeman, Jenny Fuller, Joe Gatins, Emma Glanville, Jervis Good, Michael Hackett, Cathryn Hannon, Seamus Hassett, Stephen Heery, Gerry Higgins, John Higgins, Robert Holloway, Emmet Johnston, Stefan Jones, Elaine Keegan, Judit Kelemen, James Kilroy, Robert Lundy, Annette Lynch, David Lyons, Larry McDaid, Lee McDaid, David McDonagh, Maurice McDonnell, Graham McElwaine, Eoin McGreal, Frank McMahon, Dave McNamera, Emer Magee, Breffini Martin, John Matthews, Eleanor Mayes, Eamonn Meskell, Robbie Miller, Sue Moles, Jason Monaghan, Enda Mooney, Jim Moore, Jacinta Murphy, Tony Murray, David Norriss, Irene O'Brien, John O'Connor, Aonghus O'Donnell, Declan O'Donnell, Ger O'Donnell, Pdraig O'Donnell, Barry O'Donoghue, Tim O'Donoghue, Sylvia O'Hehir, Denis O'Higgins, Danny O'Keefe, Ciara O'Mahony, Michael O'Sullivan, Paddy O'Sullivan, Linda Patton, Brad Robson, Tim Roderick, Lorcan Scott, Joe Shannon, Ralph Sheppard, David Silke, Andrew Speer, Raymond Stephens, Denis Strong, Dave Suddaby, Val Swan, Rebecca Teesdale, Matthew Tickner, David Tierney, Pat Vaughan, Patrick Warner, Ross Watson, Lorna Whiteside and John Wilson,

As usual, we have made every effort to thank all those involved with the works presented here, but inevitably orchestrating the energies of so many people may mean we have unintentionally forgotten to name you for your contribution, for which we apologise.

We gratefully acknowledge the continuing programme of research and surveillance carried out by the National Parks and Wildlife Service and we are extremely grateful to the count network throughout Ireland for a magnificent effort in obtaining these numbers in time for this report. Thanks to SNH for coverage of sites in Argyll, especially Morven Laurie, Tracey Johnston and Margaret Morris, to the counter teams on Kintyre and Islay and to all the contributors for their kind help in preparing sections of the report. 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 Rich Hearn for his help as nominated WWT officer for the project.