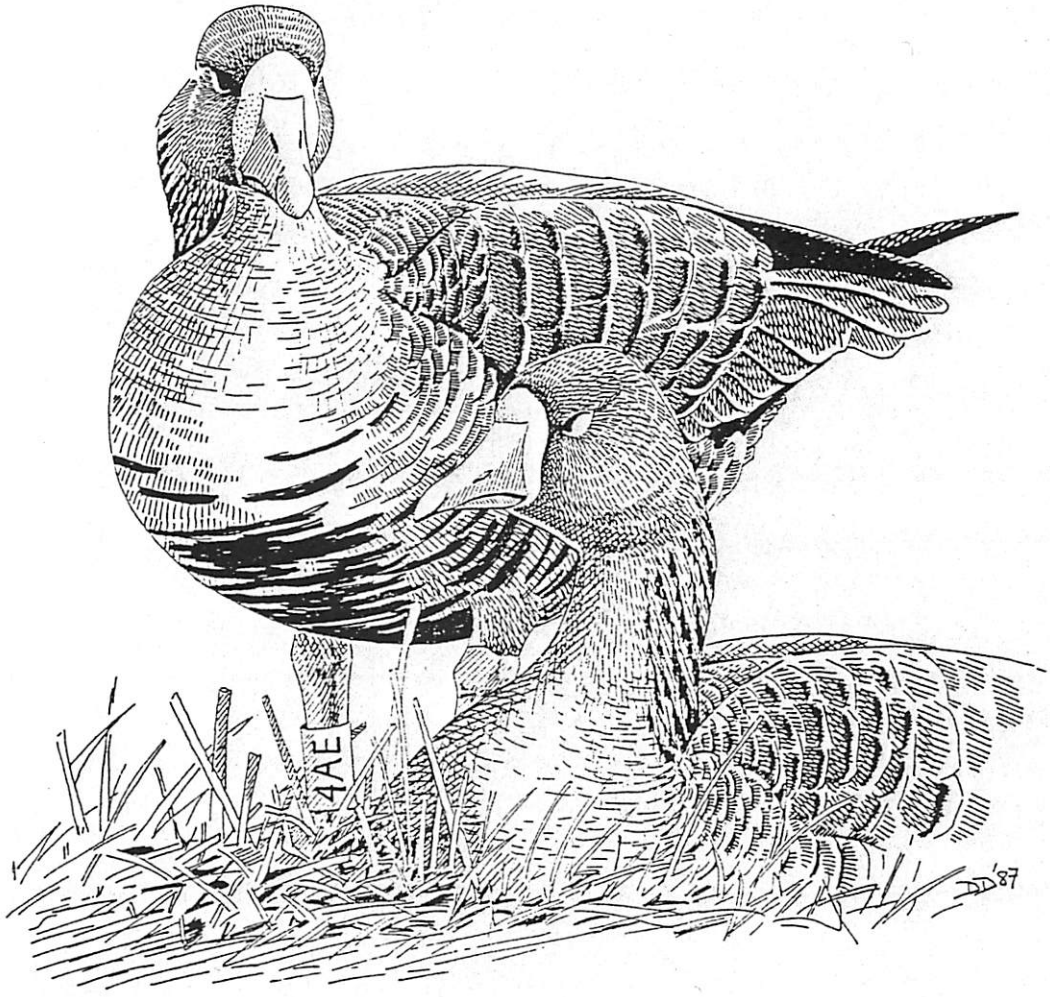
GREENLAND WHITEFRONTED GEESE IN IRELAND 1989-90



The Office of Public Works

National Parks & Wildlife Service

GREENLAND WHITE-FRONTED GEESE

IN IRELAND 1989-90

A PROGRESS REPORT

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THE OFFICE OF PUBLIC WORKS

NATIONAL PARKS & WILDLIFE SERVICE

1991

GREENLAND WHITE-FRONTED GEESE IN IRELAND 1989-90.

SUMMARY

The mean count of Greenland White-fronted Geese in Wexford has decreased by about 1000, from 10,064 in 1988-89 to 9102 in 1989-90. A total of 432 geese were recorded shot between 1 November and 31 December in Co. Wexford; the shooting moratorium continued elsewhere in Ireland. The count total for the Rest of Ireland population segment has declined by >10%. Overall the British and Irish total has shown no increase over the previous winter despite an above-average breeding season.

CENSUS DATES

International censuses were held on 2-6 December and 31 March - 4 April. A midwinter count took place on 10-14 February (Ireland only).

There were five monthly counts in Wexford. As usual, same-day counts were arranged at the major sites in Wexford and in Islay.

WEXFORD

The differences between same-day counts of White-fronts in Wexford are small (range 1.0-3.1%), and we feel confident of the quality of the present counting technique which uses three observers to cover the North & South Slobs and Cahore at the same time. Numbers at Wexford last winter have decreased since 1988-89 (Tables 1 & 3).

What is the significance of this drop in numbers? Fig. 1. shows that the maximum winter count has risen steadily since the shooting moratorium was first introduced in autumn 1982. The 1988-89 winter was an exception to the general trend, with unusually high numbers in Wexford.

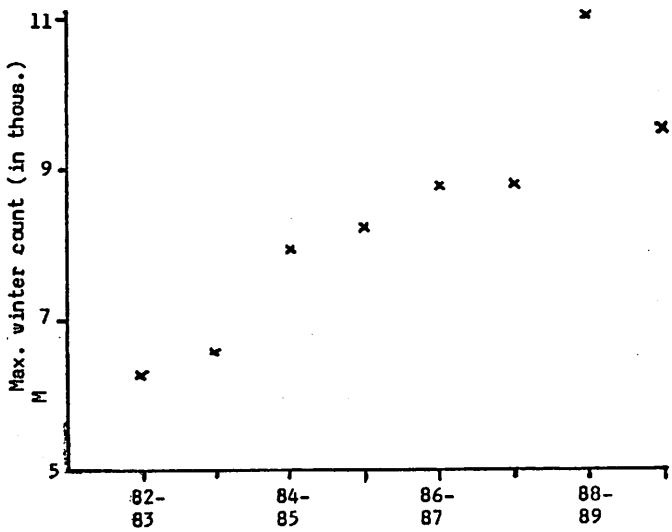

Fig. 1. Maximum winter count of White-fronted geese in Wexford, 1982-83 to 1989-90.

Stephanie Warren* collated regional autumn counts for 1988 and 1989. While the autumn 1988 count in the Rest of Ireland increased in line with the total population, numbers in Wexford increased and in Britain declined, suggesting an exceptionally large-scale immigration of geese from Britain into Wexford. (Fig. 2).

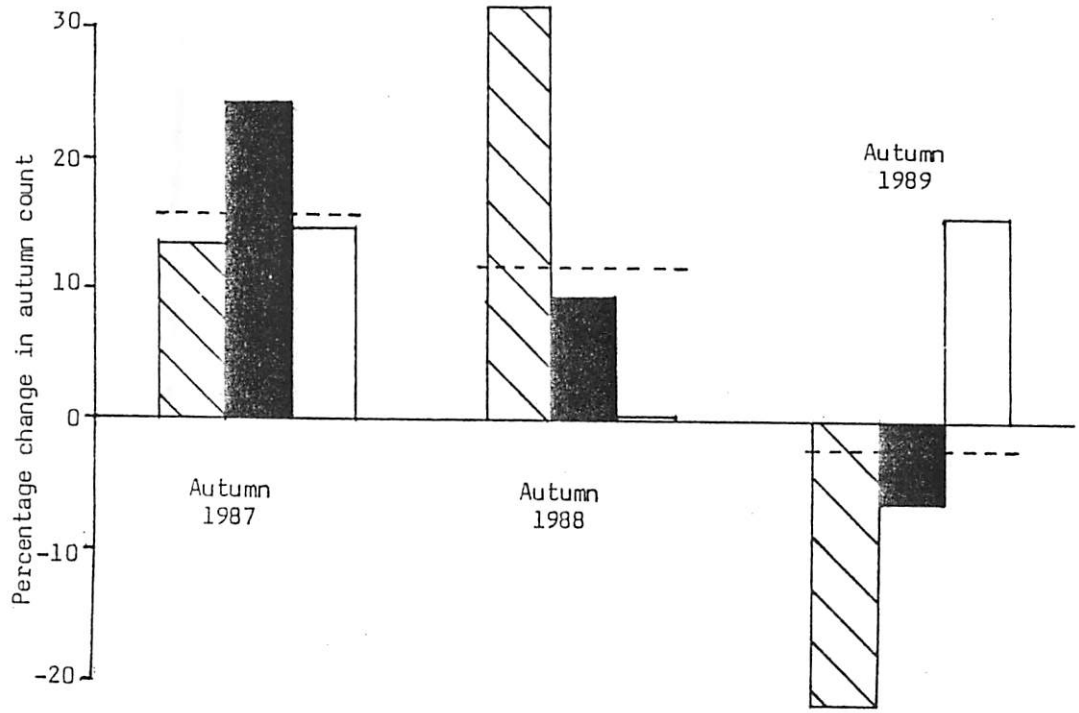

Fig 2. Percentage change in autumn count of Wexford (hatched), Rest of Ireland (filled) and British (blank) totals for previous autumn, relative to % change in total population (dotted line).

The three population segments showed a more typical pattern in autumn 1987, when population trends were similar throughout the range. The pattern in autumn 1989 again differed, with an increase in numbers in Britain at the expense of geese in Wexford and the Rest of Ireland. The annual trends in different parts of the range parallel changes in the movement of collared geese

*Stephanie Warren has just completed an analysis of count and resighting information on contract to the National Prks and Wildlife Service, while based at the Wildfowl and Wetlands Trust in Slimbridge, U.K. and supervised by Dr. A. Fox.

marked in Wexford. Rates of immigration into Wexford were particularly high and emigration low in 1988-89; in 1989/90 this pattern was reversed. Most known-age movers were in their second and third winters, at an age when families first broke up and young birds started to pair.

Reasons for the annual variation in movement patterns between Britain and Ireland are speculative at the moment.

Two independent lines of evidence, from counts and from observations of marked geese indicate similar between-winter movement patterns between Britain and Ireland. But counts show a greater degree of between site movements than the comparatively site-faithful picture revealed by the resighting information. One factor to bear in mind is that the trapping programme selectively catches larger families over stubbles, so that the marked birds may not be representative of the whole flock. A second point is that since the majority of marked birds were first caught in Wexford, the results again are unrepresentative of movements within the total population. Fortunately a new marking programme using neck-collars has been initiated on Islay this winter which should give a broader perspective on these aspects of the study.

REST OF IRELAND

Coverage & numerical trends.

The Rest of Ireland total between 1988-89 and 1989-90 declined by 7 and 12% for the autumn and spring census figures respectively (Tables 2 & 3).

Obtaining good coverage is undoubtedly a problem. With count frequency reduced to three counts per winter, it is apparently difficult to maintain up-to-date information on the feeding-sites used by Whitefronts. This problem is most marked on improved grassland where site use varies through time with grass quality. Large flocks which split into several feeding groups are also posing coverage problems as they increase in size. Nevertheless the estimated proportion of the census total (7%) is no higher than in other recent winters and coverage problems cannot adequately explain the decline in 1989-90.

Neither is the decline consistent with the pattern of disturbance pressures experienced by individual flocks. Many of the flock declines were unexpected in that those affected were on large ranges where numbers had been increasing most rapidly.

Another possible explanation, suggested by Stephanie Warren's analyses, is that the increase in numbers in Scotland last winter was at the expense of the Rest of Ireland flocks as well as those in Wexford. This is what appeared to have happened to both segments of the Irish population when they also declined in 1986-87. The case to be made that the decline in the Rest of Ireland is a part of the same pattern is not as strong as the evidence in the Wexford case, since counting errors are larger and there is no complementary evidence from marked geese.

Conservation measures for small flocks.

Greenland White-fronted Goose flocks pose unusual conservation problems because of their pattern of winter dispersion. A site containing more than 270 Whitefronts would currently be of international importance using the conventional 1% criterion. However there are very few sites which regularly hold this number of geese. Many would fail to qualify either on grounds other than numerical ones or using national/regional criteria. These criteria fail to protect many of the smaller flocks and some flocks still using traditional habitats; so a supplementary conservation strategy is required for them.

As a start we drew up management proposals in 1989 for the ten Whitefront flocks that seemed the most immediately threatened. Although some flocks' ranges had been so substantially fragmented and modified that their future seemed irretrievably bleak, on close inspection of several flocks a worthwhile improvement in range conditions seemed attainable by agreement with landowners. While a great deal depends on the good will of the landowner and has to be left to his discretion, most plans so far have agreed in principle to 1) the maintenance of vegetation in a suitable condition for geese, 2) avoidance of deliberate geese scaring, 3) access for WS staff and 4) a caretaker role for the landowner.

This basic approach is sufficiently flexible to address the differing problems of a number of smaller flocks and we hope to formulate conservation options for some additional flocks in 1990/91.

BREEDING SUCCESS

Estimates of breeding success are presented in Table 4. Overall White-fronts had an above-average breeding season in 1989, but the normal pattern (where the percentage of young birds is higher in Wexford than elsewhere in Ireland or Scotland) was reversed. The flock in Wexford contained 15.9% young (mean brood size 3.47) whilst the productivity (pooled aged counts) elsewhere in Ireland was 16% (mean brood size 2.68). In Britain flocks contained 19.3% young on average (mean brood size 2.82).

LAND ACQUISITION

Progress has been made in the past twelve months in the purchase of sites by the Wildlife Service used by Greenland Whitefronts. The agreement to purchase an 84 ha. extension to the Wexford Wildfowl Reserve, with 50% costs provided by the EC, has been concluded.

Parts of two internationally-important raised bogs, used as feeding sites by Whitefronts, have been purchased. 112 ha. of Garriskil bog, Co. Westmeath were acquired and a management agreement reached over part of the rest of the site. A further acquisition of 94 ha. at Ballykenny/Fisherstown, Co. Longford is used by the Kilglass/Castleforbes flock.

Then in August 1990 the Wildlife Service negotiated an agreement with Bord na Mona to purchase 21 bogland sites. Many of these are small parcels of land in East Galway and Roscommon but two are also of considerable significance for Whitefront conservation. The first, 112 ha of All Saint's bog, Co. Offaly, is strategically placed north of the Little Brosna to be an important refuge and feeding site for a flock of over 500 geese. The site is of outstanding conservation interest quite aside from its importance to Whitefronts. However the State do not own the entire bog and one section is being actively exploited.

The second is a blanket bog site of 500 ha on the headwaters of the Easkey River, Co. Sligo. Extensive feeding flats are used by small numbers (20-30) of geese, which retreat to L. Conn in severe weather. Numbers on L. Conn have increased steadily since 1982/83, but so far with no corresponding increase on the Easky River bog.

A small part (31 ha) of Lough Lurgeen bog, used occasionally by the Glenamaddy, Co. Galway flock has been transferred from Bord na Mona.

It is worth noting that the sites referred to only represent the first stage in the acquisition process. In none of the examples above has the complete site been bought, so that site protection is far from assured.

SEASONAL HABITAT USE

Most goose species feed on energy-rich foods such as seeds and plant storage organs when they first arrive on their wintering grounds and the most digestible and proteinaceous leaves in spring. In Ireland Whitefront flocks show the small general seasonal pattern but choose a wide range of habitats in which to feed. We have recorded geese feeding in bog, marsh, salt-marsh, callows, rough grassland, arable and root crops and improved grassland. However, individual flocks vary widely in the suite of habitats they use and tend to use the same habitats from year to year. Obviously choice is partly dictated by availability and tradition. Because of the problems that often arise when geese move onto farmland, we decided to take a closer look at the factors influencing habitat use.

Greenland Whitefronts regularly used two feeding techniques in winter; probing for underground plant storage organs and grazing grasses. Although other techniques were used, they were only of temporary and local importance. Geese probed most frequently in the wettest habitats, where the excavation of below-ground vegetation was easiest, and grazed most frequently in the driest habitats.

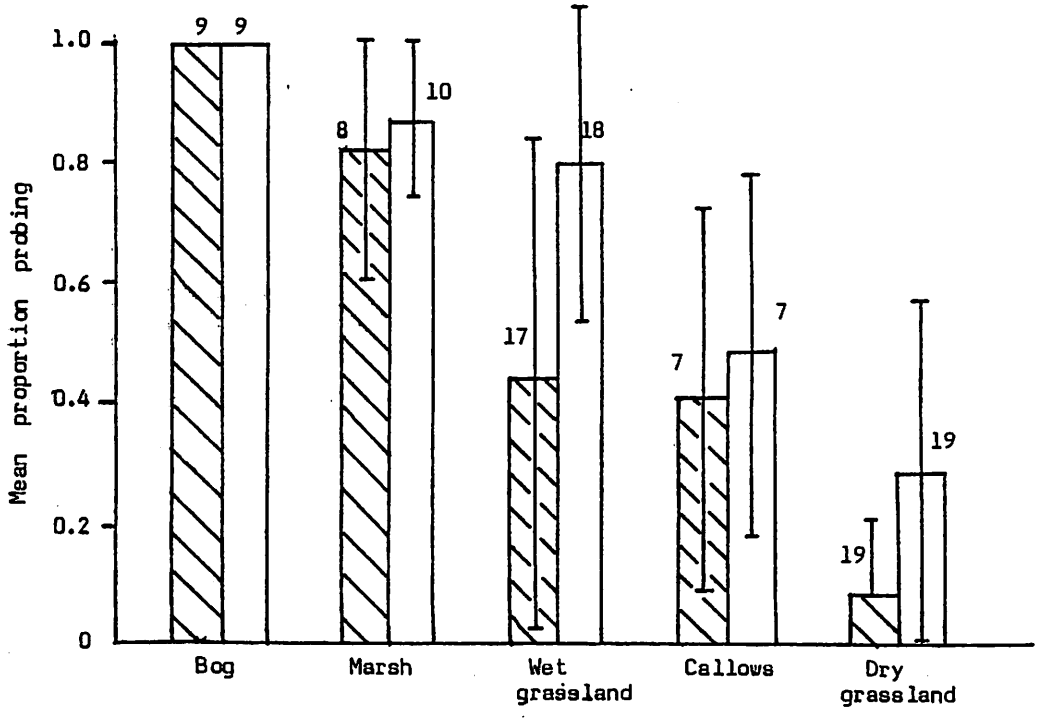

Fig. 3. Proportions of social classes of Greenland White-fronted Geese (mean ±s.d.) probing on different habitats. Families, hatched columns; non-breeders, open columns. Figures denote sample sizes.

Family parties preferentially grazed and other social groups (non-breeders) preferentially probed. Families maintained higher levels of grazing than non-breeders within the same flock in three ways; (1) by grazing more within the same habitat (Fig. 3), (2) by using nearby dry grassland more frequently, (3) by altering habitat use according to the social composition of the flock. The Glenamaddy flock in Co. Galway, for instance, used dry grasslands significantly more frequently in years when the proportion of juveniles was high; in years with few juveniles they fed mainly in callows along the lake shore. Large flocks split into a number of feeding groups which collectively used a wider range of habitats. As a result they showed a wider social divergence in habitat use than small flocks. Social differences in feeding technique and habitat use were common in autumn (Oct-Nov) and winter (Dec-Feb) but disappeared in spring, when all geese preferred good grassland. We suggested two possible explanations for the social feeding preferences. Firstly, if probing was a comparatively difficult feeding skill to learn, juveniles might fare better by grazing until they developed competence at it. Secondly, because parents spend more time on the look-out for predators than do adults without young and therefore have less time to feed, they might be better able to make up lost feeding time by grazing rather than by probing. Certainly intake rates when grazing can be increased by pecking faster but it seems reasonable to suppose that there is less flexibility to increase intake rates of probed material because of the difficulties in extracting and handling food.

A second way in which habitat use was related to social status was through competition. Since families are socially dominant to paired or single geese, families are able to successfully compete for limited supplies of preferred foods. Thus both the proportion of young birds and mean brood size were higher on stubbles and root crops and in cannon-net catches than on neighbouring grass fields in Wexford. Family parties, despite their preference for grazing, also apparently fed competitively on marsh in autumn. By and large though competition did not have a major impact on habitat selection.

Patterns of habitat use were modified in many flocks by disturbance pressures. We found a site's use was related to its disturbance index (a measure of disturbance pressure calculated from 200 - A/R, where A is the area of the feeding site in ha. and R is the mean number of disturbances per hour; Fig 4). On smaller feeding ranges (Fig 4 (c)), heavy use is made of the best available option relative to use of the best sites on larger ranges (Fig. 4 (a) & (b)).

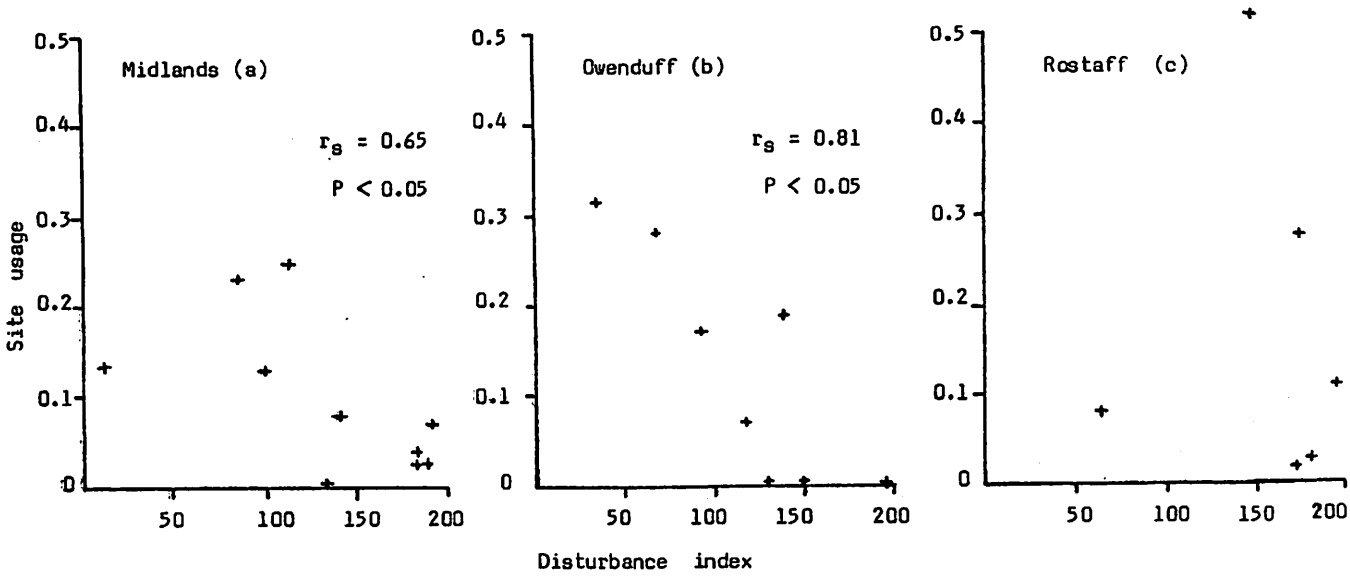

Fig. 4. Use of feeding sites in relation to site disturbance pressures for flocks of Greenland Whitefronts at (a) Midland lakes, Co. Westmeath; (b) Owenduff, Co. Mayo; (c) Rostaff, Co. Galway. Site use was calculated as the mean proportion of the total flock present per visit, 1982-83 to 1987-88. Coefficients (r_s) are Spearman rank correlations.

Whitefront flocks were frequently restricted in their choice of habitat because of disturbance pressures dictating site choice. Restrictions to normal patterns were most marked in the smallest flock.

An increased use of intensively-managed grassland has been recorded in several flocks during the survey, with a concomitant reduction in the variety of feeding patterns used by geese. Habitat moves within feeding sites were not preceded by alteration of traditional feeding habits, suggesting that such moves simply reflected a feeding preference (Fig.5.)

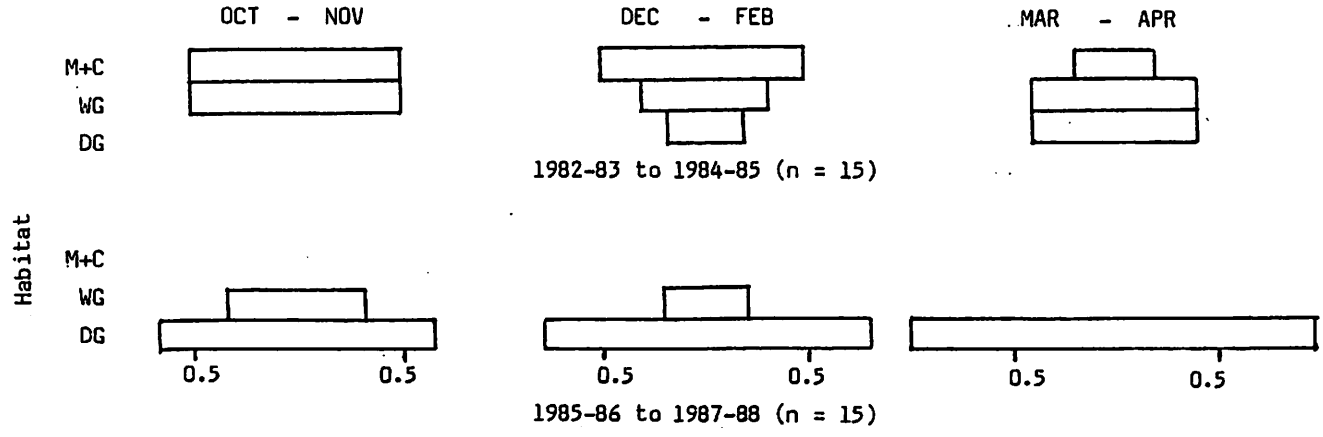

Fig. 5. Changes in seasonal habitat use in marsh (M), callows (C), wet grassland (WG) and dry grassland (DG) by feeding Greenland White-fronted Geese, Ballyeighter L., Co. Clare, between 1982-83 and 1987-88. The width of the boxes represents the mean proportion of the flock recorded in each habitat.

Most within-site moves to good grassland have occurred on smaller feeding ranges (involving four out of eighteen flocks in 1982 compared with eight in 1989). Large ranges on the other hand, where extensive areas of semi-natural habitats are still used by geese (such as on the Little Brosna and R. Suck callows) have had little agricultural intensification because of the costs of large-scale drainage projects, and little change in habitat use has occurred.

The increased importance of farmland feeding has also resulted from flocks finding new sites outside their traditional feeding areas. Many of the flocks which traditionally fed on western blanket bogs have now moved to farmland in neighbouring lowlands. In these circumstances comparative disturbance index values of feeding sites rather than feeding preferences, determine habitat use (Fig. 4). During the survey the use of any new farmland sites by bogland flocks has been initiated prior to a significant increase in disturbance pressures on bogland sites. Thus a deterioration of bogland sites does not appear to have prompted changes in feeding habitat. However once farmland feeding is established, a deterioration in the attractiveness of bog sites relative to farmland sites will hasten habitat changes.

Greenland White-fronted Geese show a particularly varied pattern of feeding on traditional habitats in Ireland. This variety is only likely to be maintained in the absence of within-site grassland intensification and when the disturbance index of feeding sites compares favourably with the disturbance index of alternative farmland feeding areas.

TRAPPING AND RESIGHTING PROGRAMME

Analysis of database.

Editorial procedures have held up the publication of the 'Winter site fidelity' paper summarised in last year's report which will now be circulated in 1991.

The report of a more recent and extensive analysis on aspects of Whitefront social organisation by the Wildfowl and Wetlands Trust has been drafted. We will relay Stephanie Warren's findings when published.

1989-90 season.

Fifty-eight Whitefronts were caught and neck banded in Wexford last winter and a further twelve at Sheskinmore, Co. Donegal. The smaller than usual numbers caught last winter in Wexford were due to a number of unfortunate losses of trapping plots on areas of uncut barley. The problem was exacerbated by a recent decline in the area of spring-sown cereals, so that alternative sites were hard to find at short notice. Table 5 lists neck-band and leg-ring codes used to date. Records of marked geese in Irish flocks up to 1989-90 are presented in Table 6.

Belly bars.

In several species of birds individual plumage variability is known to be related to social status. In Golden Plover, for instance, birds with an extensive dark breast patch had a higher social rank, were paired to darker-than-average mates, had access to better feeding grounds and bred more successfully than birds with small dark breast patches.

Greenland White-fronted Goose Study (GWGS) have been collecting data on the extent of belly barring in Greenland Whitefronts to examine its functional significance. They have suggested we do the same by scoring belly barring in marked geese, using the criteria in Fig. 6, each winter. An additional column in the resighting sheets has been added for belly bar scores.

TYPE I: These birds have less than 20% of the feathers of the breast and belly tipped dark. Single black feathers may occur but with few, if any, transerve bars.

TYPE II: Between 20 and 40% of the breast and belly is covered with black, arranged in bars and patches. The impresion given is of heavy dark flecking on the light background. The black of the belly never reaches as far as the vent.

TYPE III: These birds have a roughly equal proportion of dark and light feathers (40 to 60%). The dark areas form thick transverse bars which extend well up on both sides of the bird. Dark feathers also frequently extend to near the vent.

TYPE IV: These birds are predominately dark (60 to 80%) with black flecking reaching the vent.

TYPE V: Birds with more than 80% of the breast and belly covered with black feathers and may show no pale plumage at all.

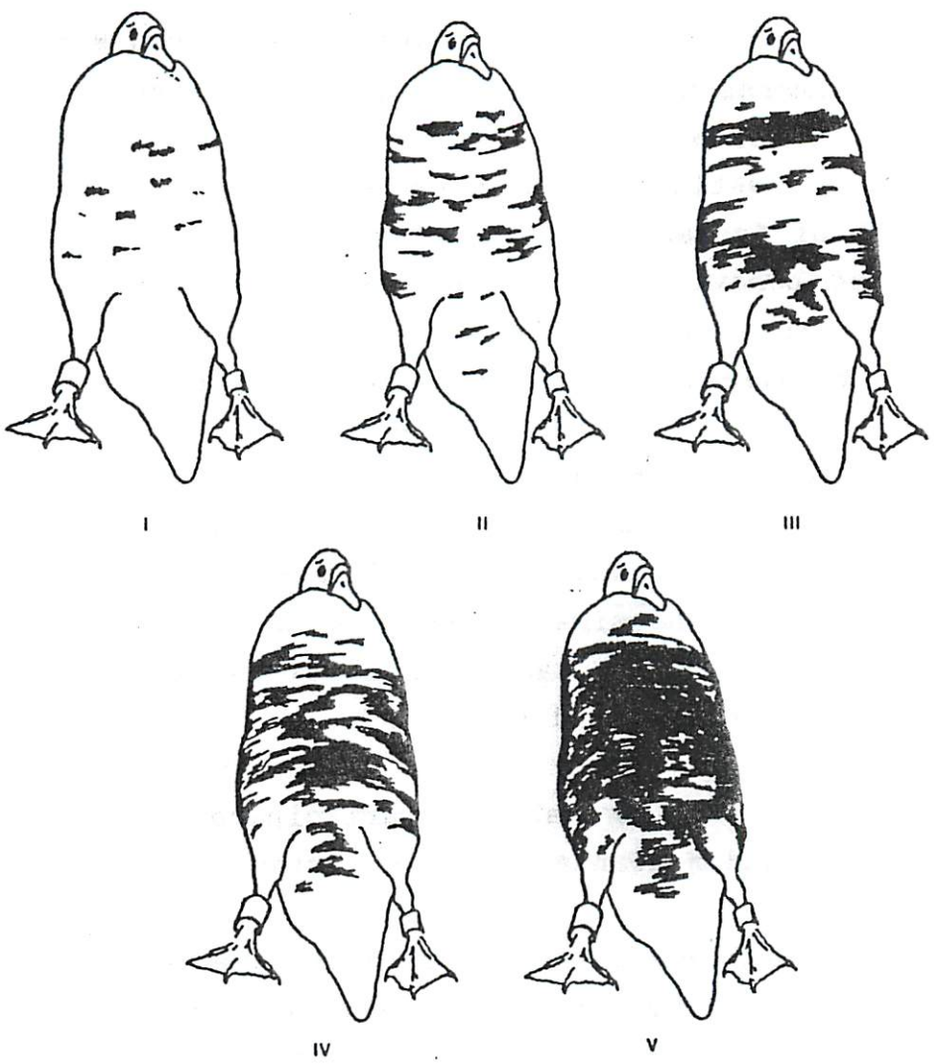

Figure 6. Character states used in the scoring of belly barring in Greenland White-fronted Geese. From the Report of the 1979 Expedition to Equalungmuit Nunat, West Greenland (GWGS).

Wildfowl and Wetlands Trust Expedition to Southern Iceland 9th April-9th May 1990.

A. WALSH

TEAM MEMBERS:

Hugh Boyd C.W.S.	Nigel Jarrett W.W.T.
Olufur Einarsson	Alyn Walsh W.S.
Tony Fox W.W.T.	Stephanie Warren W.W.T.
Johann Oli Hilmarsson	Einar Porleifsson

The Wildfowl and Wetlands Trust have been conducting survey work in the South of Iceland investigating the spring distribution, abundance and behaviour of Pink-footed Geese since 1989. In addition to this work, they have organised censuses of Whitefronts to discover which areas are favoured.

The southern lowlands are used by many thousands of Whitefronts en route to their breeding areas in Western Greenland. The area presents an ideal opportunity for studies relating to condition upon arrival (using abdominal profiles as a field index), turn-over in numbers of birds staging, and site fidelity in marked individuals from the Wexford flock.

As a member of the WS, I was able to participate in an expedition by the Wildfowl and Wetlands Trust in spring 1990.

The aims and objectives of the expedition were to:

1) Record the timing of migrations of four species of waterfowl using the southern Iceland lowlands in spring. This also involved the determination of the degree of geographical and ecological overlap by recording habitat use.
2) To determine habitat and food selection by intensive study at a few sites, to describe grazing pressure and net above ground primary production from one coastal and one inland site important for the various populations and to simulate the effects of grazing.

3) To describe the patterns of flock break-up and determine changes in body condition using a field score of abdominal profile. This work included an examination of patterns of site use by following marked birds.

4) To compile activity budgets for each of the four species to examine differences in feeding strategies.

The 2 study areas were in the lowlands of the SW. Both lowlands sites comprise immproved agricultural land and extensive wetlands. They are extremely flat and protected on the coastline by black dune slacks backed by a mountainous ridge along the northern fringe.

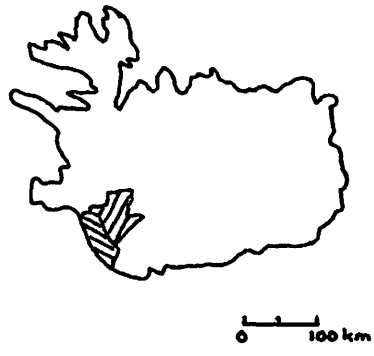

Fig. 7. Location of study areas in Iceland.

Our first week in Iceland was hampered by heavy snow falls and low temperatures, restricting our movements northwards. We therefore concentrated our efforts along the coastal sites and waited for the weather to improve. We attempted to census the entire southern lowlands used by Greenland White-fronted Geese for comparisons with previous work.

DEPARTURE

Departure from Wexford in 1990 was late (21st-24th April). A sudden influx of Whitefronts in both our study areas was registered on the 21st, peaking on the 23rd - 24th. Flight time from Wexford was estimated at 17 hours.

Many birds were observed to continue their migration, apparently without staging for long periods. Groups landed briefly to rest or feed but shortly continued westward. This behaviour was very noticeable during the 23rd -24th April.

CENSUS

A total of five co-ordinated counts were made in the southern site and four in the northern one. Initially low numbers of Whitefronts were present in the southern site with none recorded in the north. Peak numbers in excess of 6000 were recorded on the 24th April. The majority of Whooper swans, Greylags and White-fronted Geese were confined to habitats on the coastal fringe. By contrast the Pink-foot had a more inland distribution, despite the poor conditions and lack of exposed vegetation.

The majority of Whitefronts gathered in the potato fields and "brown" hayfields. Elsewhere numbers fluctuated with birds in constant movement from one feeding site to another. The geese tended to stage along the coastal fringe whilst low temperatures and deep snow remained further inland. During the latter half of April and early May birds moved inland following a gradual thaw, and were seen feeding in the natural wetlands of Landeyjar.

In between survey dates each team conducted an intensive study of field use by geese and swans along a driven transect. This was done at approximately the same time every day. It became apparent that geese initially feed on spilt grain and waste potatoes. They gradually moved onto hayfields, which showed signs of spring growth from about 16th April onwards.

RESIGHTING

One of the most rewarding aspects of the fieldwork was to find and successfully read the Wexford or Greenland-banded Whitefronts.

Thirty-five Whitefronts bands were read in the southern lowlands in addition to 49 Whooper swan and 11 Pink-footed geese leg bands. Some banded Whitefronts were seen more than once, either in the same district or in different townlands on the same day. A family group ringed in western Greenland in 1989 (2CE, F01, F02, F04, F05) were seen at Vodmulastadir which lies only 5kms from Svanvatn where the juvenile F07 was shot on the 22/10/89 on on autumn migration from W. Greenland to Islay. A further 19 Whitefront bands were read on the west coast at Hranneyri, bringing the expedition total to 54 bands. Two whitefronts which were observed in the southern lowlands were subsequently seen an Hranneyri (OPK and 9MK).

PROFILES

Data was collected daily on abdominal profile indices; where possible we also noted the social status of individuals. We found a steady increase in female and male Greylag profiles but the degree of turn-over in the Whitefronts and difficulty in separating the sexes in the field made it difficult to base any firm conclusions on such a small data base.

DISCUSSION

In 1990 the unusually late thaw and deep snow cover deprived the Whitefronts of traditional wetland feeding sites. Instead they depended on a coastal fringe of agricultural farmland which was just emerging from winter dormancy. The majority of Whitefront flocks passed through the lowlands during the latter half of April. Departure from the wintering grounds took place over a short period. As a result approx. 7000 Whitefronts were recorded in the lowlands with smaller flocks scattered along the west coast. Skeins of Whitefronts were observed following the southern coastline and continuing westward while other smaller groups landed briefly at Fljotsholar, remained for 1 - 2 hours and then continued west.

The general conditions of Whitefronts upon arrival in Iceland (using the abdominal profiles) suggested that they may have lost two index points on the journey. Fortunately fresh grass growth coincided with the main arrival, enabling them to replenish their fat reserves in a relatively short period.

The value of observing marked individual geese was to highlight the necessity to protect or manage key areas in Iceland. Already through the two co-operative marking schemes and recovery of shot geese in Iceland specific areas are now known to be a importance for staging whitefronts. These areas may play a significance role in the success or failure of breeding adults.

ACKNOWLEDGEMENTS

Our grateful appreciation to all who have contributed to the counts and the resighting of marked birds.

D. Allen, P. Behan, R.J. Bleakley, J. Byrne, D. Cabot, J. Carroll, T. Carruthers, P. Cosgrove, D. Cotton, E. Doran, T. Durkan, M.J. Feehan, J. Flynn, P. Foley, J. Gatins, J. Greene, M.J. Hackett, B. Haran, S. Heery, J. Hennigan, G. Higgins, J.J. Higgins, K. Kane, L. Lenihan, R. Lundy, H. McCann, M.P. McDonnell, D.J. McLoughlin, D. McMahon, O. Merne, E.A. Meskil, M. Miller, A. Molloy, J. Moore, P. Morgan, P. O'Connell, T. O'Connell, B. O'Connor, T. O'Donoghue, D. O'Higgins, P. O'Leary, M. O'Sullivan, P. O'Sullivan, P.J. O'Sullivan, A. Prins, M. Ridgway, D. Silke, P. Smiddy, K. Stanfield, M. Sweeney, R. Tottenham, P. Vaughan, P.B. Waldron, E. Wallace, A. Walsh and P.J. Warner.

Many thanks also to the many observers who supplied information on counts and marked geese in Britain. We are also particularly grateful to Stephanie Warren for the analysis of the resighting database, to Tony Fox for the supervision of this contract and maintainance of the database and to Myrfyn Owen and David Stroud for their overall support of the project.

David Daly provided the cover illustration.

Table 1. Counts of geese in Co. Wexford 1989/90.

Date	Wexford Slobs	Cahore	Other	Total
4/12/89	8,238	0	0	8,238
	8,045	0	0	8,045
17/1/90	9,368	115	23	9,506
	9,188	115	23	9,326
12/2/90	8,348	284	0	8,632
	8,612	284	0	8,896
12/3/90	8,435	1104	0	9,539
	8,103	1104	0	9,207
31/3/90	8,552	779	0	9,331
	8,458	779	0	9,237

Mean of higher figure from replicate counts: 9,102.

Table 2. Summary of peak monthly counts and censuses, West and Midlands of Ireland - 1989/90.

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Donegal-Derry						
Foyle & Swilly	287	187		209		318
Dunfanaghy		249				200+
Sheskinmore		165		92	52	48
Pettigo		170		182		
North Central						
Bunduff	4	0	5	0	5	0
Lr.L.Macnean	62	66			(77)	
L. Oughter	0			59		0
Caledon		[67]				[72]
Stabannon		18		22		26
Mayo-Galway						
L.Conn & Ox Mnts.	101+					181
N.W. Mayo	130			121+		104
Errif & Derrycraff	74			82		46
Connemara bogs	[134]					[134]
East Galway						
Rostaff & Killower		203		149		149
Lr.L. Corrib	21	79	74	62		68
Rahasane		0	62	82		79
Clare-Limerick						
Tullagher	66	47		49		61
N.Clare	42+	40+		52		55
Lr.L.Derg	19	0		0		0
Fergus & Shannon		21		9	11	0

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Shannon Head						
L. Gara		176		0	514+	410+
L.Drumharlow		43		74	75	
Ls.Kilglass & Forbes	(100)	46		41		123
Midlands						
Midland Lakes		(180)		300+		229+
Middle & Lower Shannon						
Inny & L.Ree		[84]				[84]
R. Suck		222+		180		263+
L. Brosna	515	423		486		410
South Midlands						
R. Nore	30	35	57	56	56	56
South West						
Ballycotton		110		17	14	0
Kilcolman		2	2	2	2	2
Doo Lough	30	22	23	22	17	17
Killarney	33	34	31	32	32	15
Inny Valley	0				0	
Dingle	0	9		0		0
R. Feale		3				
TOTAL		4040				3793

A space indicates no coverage, a plus sign after a count denotes a minimum figure and round brackets an approximate count. Square brackets indicate no count, or no count received, for the winter and that counts from 1988/89 have been used. Counts used for the autumn and spring censuses have been underlined.

Table 3. Autumn & Spring census total 1986/87 to 1989/90. British data for Tables 3 & 4 from GWGS (1990).

	1986/87		1987/88		1988/89		1989/90	
	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring
Wexford	7,033	7,780	7,988	8,781	10,510	9,799	8,238	9,331
Rest of Ireland	3,185	4,106	3,952	4,249	4,328	4,315	4,040	3,793
Britain*	10,911	11,395	12,515	11,864	12,503	11,823	14,434	12,984
TOTAL	21,129	23,281	24,445	24,894	27,341	25,937	26,712	26,108

*Minor adjustments have been made to the British totals for winters 1986/87 to 1988/89 inclusive as additional counts were received.

Table 4. Age counts and frequency distribution of brood sizes for Wexford, Rest of Ireland & Britain, 1989/90.

Date & Location	Total Aged	% Juvs.	Mean Brood Size (n)	Brood Size 1	2	3	4	5	6	7	8
Wexford 18/1/90	6,715	15.9	3.47(182)	13	42	39	46	27	8	7	0
Rest of Ireland	2,345	16.0	2.68(95)	17	33	22	11	10	2	0	0
Britain	10,451	19.3	2.82(479)	99	124	125	67	31	25	8	0

TABLE 5: Neck-band and leg-ring sequences used on Greenland White-fronted Geese by summer 1989.

GREENLAND	WEXFORD				
A01-25	1-5AA	1-OKK	1-OPP	1-OUC	6-OMC
A27-29	1-OJA	1-OKM	1-OPR	1-OUE	5-OMF
K01-07	1-OJC	1-OKP	1-OPT	1-OUF	9-OMT
K10-17	1-OJE	1-OKR	1-OPU	1-OUJ	1-OMR
K20-27	1-OJF	1-OKT	1-ORA	1-OUK	1-OMU
K30-37	1-OJJ	1-OKU	1-ORC	1-OUM	1-OMY
K40-47	1-OJK	1-OKY	1-ORE	1-OUP	1-OCY
K50-55	1-OJM	1-2MA	1-ORJ	1-OUR	1-6CU
K60-66	1-OJP	1-OME	1-ORK	1-OUT	
K70-77	1-OJR	1-OMJ	1-ORM	1-OUU	
T01-07	1-OJT	1-4MK	1-ORP	1-OUY	
T20-27	1-OJY	1-OPC	1-ORT	REST OF IRELAND	
T30-33	1-OKA	1-OPE	1-ORU	3-OMA	8-OCU
F01-07	1-KOC	1-OPF	1-OTA	1-5MC	1-9CM
1-OCA	1-OKE	1-OPJ	1-OTC	1-OMM	
1-OCC	1-OKF	1-OPK	1-OTE	1-OMP	
1-6CE	1-OKJ	1-OPM	1-OUA	1-8MT	

TABLE 6: Records of marked geese in Irish flocks up to 1989-90.

Foyle and Swilly:

1986-97: A minimum of 2 neck-collars (2 unread)

1987-88: 2 neck-collars (8JE, 4JM)

1989-90: 1 neck-collar 7 (?K)A, seen March. D.McL.

Sheskinmore:

1985-86: 2 neck-collars (3JT, 9JP)

1987-88: 14 geese trapped and marked 30/10/87 (1-OMM, 1-4MP); one additional neck-collar (7TE) and one, possibly, two leg-bands (unread). 1-OMM and 1-4MP remained at Sheskinmore and its environs for the duration of the season.

1988-89: 14 geese caught 26/10/88 and 10/11/88 (5-OMP, 1-8MT); eight additional neck-collars (1MM, 2MM, 4MM, 5MM, 8MM, 9MM, 1MP, 1 unread) and one leg-band (unread). 6-OMP and 1-8MT remained at Sheskinmore for the remainder of the season.

1989-90: 12 geese caught 6/12/89 (8-OCU, 1-9CM). 8CU, ICM and 3CM stayed at Sheskinmore for the rest of the season.
4MT associating with 7MT, 8MT,} seen March & April
8MM, unpaired. J.H.,D.N. }
1MP associating with 4MM, 9MM,} present all winter.
8MP, paired to UNR. J.H.,D.N.}

Lr.L. Macnean:

1987-88: 1 neck-collar (5MC)

1988-89: 1 neck collar (unread)

1989-90: 1 neck collar (unread)

Caledon:

1986-87: 1 leg-band (unread)

Stabannon:

1987-88: 1 neck-collar (unread)

W.Bog of Erris:

1985-86: 3 leg-bands (A10, K07, K56).

1986-87: 3 leg-bands (A10, K56, 1 unread)

1987-88: 3 leg-bands (A10, K56, 1 unread)

1988-89: 2 leg-bands, 1 neck-collar (A10, K56, 2RM)

1989-90: A10 paired to K56, no young B.H.
K07 unpaired, 3 young present all winter B.H.

Rostaff & Killower:

1988-89: 1 neck-collar (2PT)

1989-90: 1CC associating with 2UNR, present all winter.
J.J.H.,J.W.

Clare River:

1985-86: 1 neck-collar (8KC)

Carran & Turkenagh:

1985-86: 5 neck-collars (4RJ, 4 unread)

L. Gara:

1985-86: 1 neck-collar, 1, possibly 2 leg-bands (unread).

1986-87: 2 neck-collars, (unread)

1989-90: 5CY paired to 1MR, no young, seen December to April,
B.W., J.W.

Kilglass & L. Forbes:

1987-88: 1 neck-collar (9PM)

1989-90: 8MJ, paired to UNR, no young
2UJ, associating with 4UNR adults. Seen December to April, D.N., J.W.
1PU, seen April. J.W.

Midland lakes:

1986-87: 13 geese trapped and marked (3-OMA, 1-5MC): one additional leg-band (unread).

1987-88: 1 neck-collar (4KM)

1989-90: 2 leg-bands (unread) seen from mid February to April.

Glenamaddy & R. Suck:

1985-86: 3 neck-collars, (3AA, 3JT, 9JR), 1 leg-band (unread)

1986-87: 7 neck-collars (3JT, 9JP, 5 unread)

1987-88: 9 neck-collars, (7RK, 8RM, 2RP, 4RT, ?RU, 3PC, 6PJ, 4PU, 4RJ), 2 leg-bands, (K07, one unread)

1988-89: 4 neck-collars (9JP, 3JT, 4PU, 7RK)

1989-90: 1 leg-band (unread).

L. Brosna & Up. L. Derg:

1985-86: 8+ neck-collars (9KT, 4KU, 8KR, 6KY, 4RJ, 7RK, 8RM, ?RP)

1986-87: 9+ neck-collars, (4RJ, 7RK, 8RM, 6 unread). 2 leg-bands (2 unread)

1987-88: 9 neck-collars, (8KR, 4KU, 1PP, 4RT, 5 unread), 1 leg-band (unread).

1988-89: 1 leg-band (unread).

1989-90: 4KU
A71, paired to UNR, 6 young }
A75, paired to UNR, 5 young } Seen mid-March
K or A33, associating with 9UNR} J.W., M.F.

R. Nore:

1988-89: 5 neck-collars (5ME, 8ME, 3MJ, 4MJ, 7UY)

1989-90: 8ME associating with 4MJ, 7UY, present December to April. J.W.,J.C.

Ballycotton:

1989-90: 8UP, paired to 6UM, present December, P.S.

Kilcolman:

1985-86: 4 leg-bands (T11, T26, T27, ??8)

1986-87: 8 neck-collars, (1MA, 6-8MA, OMA, 1MC, 3-4MC), 1 leg-band (T26).

1987-88: 1 leg-band (unread)

1988-89: 1 leg-band (unread)

1989-90: T26, paired to UNR, present all winter, P.B.,S.B.,M.R.

Observers

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