

D.A. Shaw

The past and current status of the Greenland White-fronted Goose in Ireland and Britain

By R. F. Ruttledge and M. A. Ogilvie

Introduction

The Greenland White-fronted Goose *Anser albifrons flavirostris* breeds in West Greenland and winters exclusively in Ireland and Britain. Numbering no more than 15,000 individuals it is one of the rarest goose subspecies in the world. There is good evidence that it has declined in parts of its range in recent decades and it was this that stimulated our survey, the results of which are presented here.

The status of the goose in Ireland during the period 1946-56 was reviewed by Ruttledge and Hall Watt (1958). They estimated the wintering population to be in the range 8,850-11,200. In Britain, in the period 1946-61, the wintering numbers were thought to be in the range 2,500-4,500 (Atkinson-Willes 1963). Knowledge gained since then suggests that both surveys underestimated the true picture, through lack of knowledge of some sites, and paucity of information from others. We believe that there were probably several thousand more geese in both countries at that time, with an Irish total of 12,700-17,300 and a British total of 4,800-5,800 (see later and Table 1). Thus the overall population in the 1950s lay between 17,500 and 23,000.

About 1960, RFR became aware that numbers were decreasing in Ireland and had done so since the period covered by Ruttledge and Hall Watt, and that some former haunts had been deserted. He issued a circular which confirmed his findings. Replies to a further circular in 1973-74 gave evidence that a further marked decrease had taken place. From this information and from RFR's own intensive explorations it became clear that there had been a steep decline in numbers, particularly in certain areas, such as the Shannon valley, and in the counties of Galway, Mayo and Roscommon. Information from British haunts at this time suggested that apart from the total desertion of one important Welsh site rather little change was taking

Irish Birds 1:293-363, 1979.

place, but no systematic counts were gathered. The need for a combined Irish and British survey of the goose gradually became apparent.

The aims of this survey, carried out over the last few years, have been to investigate the present status and distribution of this goose in Ireland and Britain; to compare numbers with those in former times; to quantify the population in each haunt, thus assessing the latter's overall as well as regional importance; to describe the haunts and habitats; to discover, where possible, the reasons for any decrease; and to consider what steps should be taken to conserve the population.

The very scattered nature of the bird's distribution in winter, and the remoteness of many of its haunts, spread over much of Ireland, and west and north Britain, has posed considerable problems in carrying out this survey. Counts carried out simultaneously at all haunts, as achieved for some other goose populations in Ireland and Britain, are not possible. The only attempt at this was in January 1967 when a number of the more important Irish haunts were counted from the air. The addition of ground counts from elsewhere in Ireland and Britain, though from various times during the winter, produced a total of about 14,000 (Cabot 1967). However the omission of some very important Irish and British haunts from the



Plate 24: *White-fronted Geese and Bewick's Swans at the North Slob, Wexford.*
Photo: Richard T. Mills

survey means that a freak high count in the same winter numbers.

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survey means that this total is certainly too low, while the inclusion of a freak high count from one Scottish haunt, which subsequent counts the same winter showed to be only temporary, distorted the British numbers.

We have had to rely, therefore, on more laboriously accumulated knowledge. At some haunts it has been possible to carry out very regular counts, from the ground or the air, while at others a single count in a winter is all that could be obtained. At a few haunts we had to make do with impressions and rough estimates. At the end of the day we are still not able to put forward a really accurate total for the number of geese in the population in any one year, or even a single total of any kind. However we believe that the figures we have arrived at represent the most accurate assessment of the population that it is possible to have without a disproportionate expenditure of money and effort.

It should be borne in mind that, except for the sites with larger populations, the haunts of this goose require to be carefully sought for and are often found in remote areas or, in Scotland, on offshore islands, some of them uninhabited. These small haunts normally hold populations of well under 100 birds, yet taken together make an important contribution to the overall total as well as to the range. There is also the complication, mainly in Ireland, where there is a 'complex' of haunts within which the geese move about using alternative sites. Careful investigation has been needed to clarify such situations and while we feel confident that our knowledge of the status and distribution in both Ireland and Scotland is more complete than it has ever been, it is not claimed that every problem has been satisfactorily solved. Indeed in one or two of the Irish 'complexes' some remain unsolved; in others there must needs be conjecture. Similarly, in Scotland, some island haunts have been looked at perhaps once in ten years and we have no real idea, even now, of their true status.

One measure of the thoroughness of our survey is that a great deal more information has come to light since Ruttledge and Hall Watt and Atkinson-Willes wrote their works. Through force of circumstances at the time many areas had to be shown by Ruttledge and Hall Watt as containing unknown numbers of geese as they were not searched in sufficient detail. In Scotland, too, some extra sites have been found and much better counts obtained. The greater local interest in wildlife in both countries has produced information which was not formerly available in anything like reliable form.

In carrying out this survey, RFR has visited nearly all the known sites for the goose, including the deserted haunts, in recent years, many of them annually and repeatedly. In addition he has circularised birdwatchers, landowners and other interested people,



Slob, Wexford.
Richard T. Mills

seeking further information. O. J. Merne has supplemented the investigation by his work as the former Warden of the North Slob Refuge, Co. Wexford, and by repeated aerial surveys of the River Shannon and Suck Valleys, and several other areas, under the auspices of the Forest and Wildlife Service.

In Britain, MAO relied firstly on the extensive wildfowl count files kept by the Wildfowl Trust, together with published information in local bird reports. He has also visited most of the major haunts, a number of them annually over many years, and has sought extra details from birdwatchers, landowners and others.

RFR is responsible for the sections on Ireland, MAO for those on Britain.

Past History

Ireland

From a study of the information available for the last century it is clear that this goose was numerous and widespread throughout the boglands and marshes of Ireland (Ussher and Warren 1900). Extensive drainage of their habitat commenced between 1845-55 (T. Cronin, pers. comm.) which resulted in the geese being forced gradually to leave many of their habitual haunts. It is perhaps fortunate that about this time the Wexford Slobbs were reclaimed from Wexford Harbour, and by the beginning of the present century the White-fronts began to use this area. By 1925 numbers were rapidly increasing there (Kennedy *et al* 1954) and it quickly became the most important haunt for them, which it remains to this day. It seems reasonable to postulate that with the loss of so much habitat through the country as a result of drainage the geese discovered and moved to the Wexford Slobbs, and so produced the gradual build up in numbers there. This left the rest of the population in scattered haunts throughout the country plus a few more densely populated areas. It was this pattern of distribution which was recorded by Ruttledge and Hall Watt (1958).

Britain

In Britain the past history of the Greenland White-front is difficult to disentangle from that of the European race *Anser a. albifrons* which also occurs there. The former was not described as a separate race until 1948 (Dalgety and Scott 1948), and remarks allowing the determination of the race before this date are rare in published accounts.

The status and distribution of the White-front in Scotland, in the last half of the nineteenth century and the first part of the twentieth, was comprehensively reviewed by Berry (1939). During this period it

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was found in nearly all the areas where it occurs today, with Islay reported as the principal haunt as long ago as 1892. In the Outer Hebrides it was rare until the 1890s when it increased markedly, but elsewhere virtually no changes in status were reported, nor the desertion of any haunts. The former large numbers of White-fronts appearing around the Firth of Tay in eastern Scotland in the 1930s are mentioned as being smaller and paler than west coast birds, and with pink not yellow bills, and can now safely be ascribed to the European race.

Such helpful and diagnostic descriptions seem not to occur in English or Welsh accounts. Wintering flocks of White-fronts were known in the nineteenth and early twentieth centuries from North Wales, Cheshire, Lancashire and Westmorland, some of which may have been Greenland White-fronts, though the three first-named areas are within the recent range of the European race. There are few comments on changes in status until Atkinson-Willes (1963), which has been used as a baseline for this survey in Britain.

Total numbers

Table 1 gives the counts or estimated ranges for each haunt or group of haunts for the 1950s and for the 1970s. The figures in the first column are taken from Rutledge and Hall Watt (1958) for Ireland, and from Atkinson-Willes (1963) for Britain, with additions where more recent knowledge allows us to be certain that those earlier surveys had missed birds and haunts. These additions are indicated in the table. The figures in the second column, for the 1970s, present the results of our current survey. Some of these, as indicated, are the means of counts made at the site in the last five winters, while others have to remain estimated ranges.

The column totals show that the overall population has fallen from a range of 17,500-23,000 in the 1950s to 14,300-16,600 in the 1970s. Taking the means of each range this represents a decline of about 24% in roughly 20 years. Looking at the countries separately the picture is more revealing. The Irish population has declined very sharply, from 12,700-17,300 to no more than 7,800-9,300, or by approximately 50% based on the means. The British population has actually increased, from 4,800-5,900 to 6,500-7,300, or by about 13%. This has taken place entirely in Scotland as the numbers of geese wintering in England and Wales has dropped from about 700 to no more than 40. It should be noted that taking the highest count for a site in any year, or the upper limit of a range of numbers, effectively ignores the possibility of movement between sites during a winter. Thus, total numbers may be exaggerated somewhat. However, comparison between the two periods are still valid.

When looking at the serious decline that has taken place in Ireland

it must be emphasised that while numbers on the Wexford Slobs have held up well, this fact may have tended to obscure the drastic reductions elsewhere. There is evidence that no less than 29 sites have been entirely deserted, plus a further two since just before the 1940s, while decreases have been recorded at another 33 haunts. Some of the decreases have been disturbingly large, as in the River Shannon between Athlone and Portumna where it has been in the region of 500 birds, while in the various haunts of Co. Clare, the decline has been from an estimated 500-800 to the present 350.

The serious declines in Britain have been confined to the south of the range, Tregaron Bog in Wales, from 450 to nil, and Morecambe Bay from about 100 to nil, but only these two sites have apparently been deserted altogether. Decreases have been noted at three other haunts. On the credit side, however, there have been increases at ten sites, including the apparent establishment of two during the 1960s.

It is tempting to assume, looking at the figures in Table 1, that the decrease in Ireland can be explained in part, at least, by a direct movement to Scotland. However two points must be made. Firstly the corresponding figures do not add up, with a decline in Ireland of about 7,000 and an increase in Scotland of about 2,000. Secondly a considerable part of the Scottish increase (c. 1,000) involves the largest haunt of Islay. However, a detailed examination of the available counts from there has revealed that until at least the mid-1960s not all the currently known haunts on the island were adequately searched. Thus we must contradict the suggestion by Hutchinson (1979) that the increase on Islay alone possibly corresponds to the Irish decrease.

TABLE 1: Numbers of Greenland White-fronted Geese in Ireland and Britain, in the 1950s and in the 1970s

Current Irish Sites	1950s	1970s	Reasons for decrease
1. Downpatrick marshes	150	50-60	Drainage
2. Lough Macnean and complex	150-200	c. 150	
3. Castle Forbes	500†	200-250	Unknown. Formerly considerable shooting. Probable effects of severe weather January 1963
4. Lough Kinale, River Inny flats	100	15-20	Drainage
5. Lough Iron and complex	500	200	Drainage. Bog 'skinning'
6. River Inny mouth	150-400	50	Drainage. Heavy shooting pressure especially in severe weather, January 1963
7. Lake Farm, Lough Ennell	200-300	40-120	Reason unknown

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8. Inchenagh, Lou
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 10. North and Sout
 11. River Shannon, Athlone to Portumna
 12. Little Brosna R
 13. Lough Funshin Muckanagh (
 14. Kilcolman Bog
 15. The two sanctu Co. Kerry
 16. Aughinish Is./C Is.
 17. Co. Clare com
 18. Rahasane turlo Creganna m
 19. Lough Corrib
 20. Moorlands SE Recess
 21. Moorlands east Ballyconneel
 22. Maam valley
 23. Altore Lake
 24. Glenamaddy t
 25. Erriff Valley
 26. Derrycraff Riv
 27. 'Bog of Erris'
 28. The Mullet
 29. NW Sligo and Conn
 30. Temple House
 31. Lough Gara
 32. Inishbeg, Loug

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Current Irish Sites	1950s	1970s	Reasons for decrease
8. Inchenagh, Lough Ree	100+†	25	Bog 'skinning'; constant shooting disturbance; quarry workings
9. 'The Curragh' and complex	50-150†	24-40	Drainage. Shooting
10. North and South Slobs	4,000-6,000	5,000-6,000	
11. River Shannon, Athlone to Portumna	600	200-250	Bog 'skinning'. Shooting disturbance
12. Little Brosna River	400	150-170	Bog 'skinning'; shooting disturbance
13. Lough Funshinagh, Muckanagh callows	300*	125	Some bog 'skinning'; drainage; afforestation
14. Kilcolman Bog	30-50	0-10	Shooting pressure in 1950s but since then reasons unknown
15. The two sanctuaries in Co. Kerry	Unknown possibly 120-140	120-130	
16. Aughinish Is./Greenish Is.	30-90†	50	Reason for early decrease unknown; recently industrial development
17. Co. Clare complex	500-800†	250-300	Shooting. One haunt criss-crossed by wire fencing
18. Rahasane turlough and Creganna marsh	125-300	80-115	Drainage. Shooting
19. Lough Corrib	100-200†	50-100	Drainage
20. Moorlands SE of Recess	150-160†	c. 80	Before and during 1950s considerable shooting; severe winter 1962-63 greatly reduced numbers. No reason known for further very recent decrease
21. Moorlands east of Ballyconneely	175†	50-100	No reason evident
22. Maam valley	20-30†	10-25	
23. Altore Lake	100+	30-40	Drainage
24. Glenamaddy turlough	150-200	c. 40	Unknown
25. Erriff Valley	50-100†	10-25	Unknown
26. Derrycraff River valley	100-150	35-40	No obvious reason
27. 'Bog of Erris'	200-400	c. 200	Bog 'skinning'; afforestation
28. The Mullet	150-200	c. 40	Birds from Site 27 constantly overflowed on to the Mullet. With decrease in site 27 this is no longer the case.
29. NW Sligo and Lough Conn	'considerable'†	40-50	General disturbance
30. Temple House Lake	c. 20	c. 20	
31. Lough Gara	c. 500†	175-220	Local mechanised peat cutting
32. Inishbeg, Lough Arrow	c. 50†	Few	Unknown

Current Irish Sites	1950s	1970s	Reasons for decrease	Deserted Irish Sites
33. Bunduff	100	c. 20	Shooting. Nowadays general disturbance.	O. Bermingham turl
34. Drumharlow Lake	c. 50†	c. 50		P. Gleninagh
35. Moors W & NW of Lough Derg; Brownhall complex	c. 130†	c. 130		Q. Carragoon Loug Brackloon turlou
36. Sheskinmore Lake and complex	'Marked decrease since c. 1960†	60-70	No definite reason, but see 36a	R. Moors SE of Lo S. Lough Deen, Blo bog and Lough
36a SE of Ardara	50-200	50-60	Chief area afforested	T. Bogs near Brick
36b SE of Maas	25-50	25-30		U. Bogs south of Glinn
37 Lough Sallagh and Barnesmore lakes	c. 50†	c. 50		V. Cummer bog
38. Moors NE of Fintown	Unknown but said to have temporarily decreased	c. 30	Unknown	W. River Moy valle
39. New Lake. Dunfanaghy	c. 50†	c. 30	Shooting.	Y. Lough Key
40. Grange complex	250 (late 1960s.† previous numbers unknown)	c. 160	General disturbance	Z. Lough Veagh ar
41. Killeter	50-100†		Unknown	■ North of Lough ◀ Cuan, Ventry H
<i>Total</i>	<u>10,500-14,500</u>	<u>7,800-9,300</u>		<i>Total:</i>

Deserted Irish Sites	1950s	Reason for desertion	Total Ireland
A. Moors Coleraine-Limavady	Unknown	Man's encroachment	British Sites
B. Moors of North Antrim	Unknown	Man's encroachment	Orkney
C. -C3. Co. Westmeath	c. 200-300 between them	Drainage	Caithness
D. Marshes bordering Lough Ree	150+	Heavy shooting pressure.	Loch Eye
E. River Barrow near Athy	25-50, rarely 70, up to 1955	Drainage	Outer Hebrides
F. River Suir	Up to 200	Unknown	Skye
G. Inish-Cull	Up to 200	Drainage and shooting	Small Isles
H. Killorglin marshes	50	Drainage	Loch Shiel
I. River Feale Estuary	80-100	Drainage	Tiree and Coll
J. Doonbeg Marshes	Variable	Unknown	Lismore Island
J1 Fields between Port and Dromore houses	c. 50	Unknown	Benderloch
J2. Corofin callows	(c. 50)	Feeding area criss-crossed with fencing	Colonsay
K. Moors north of Spiddal	Up to 200*	Turbary; roads constructed in bogs; widespread afforestation.	Islay
L. Carrowbrowne callows	50-100	Constant shooting, then drainage	Rhunaharine
M. Cloonkeen turlough	c. 150	Drainage	Machrihanish
N. Killower (turlough)	Uncertain, probably birds from M.	Drainage	Endrick Mouth
			Bute
			Stranraer
			Bladnoch and Wigto
			Loch Ken
			Morecambe Bay
			Anglesey

for decrease	Deserted Irish Sites	1950s	Reason for desertion
Nowadays disturbance.	O. Bermingham turlough	c. 150 (see site M, possibly the same population)	Drainage
	P. Gleninagh	c. 50†	Unknown
	Q. Carragoon Lough and Brackloon turlough	100†	Drainage
ite reason, but see	R. Moors SE of Louisburgh	50	Drainage; afforestation
	S. Lough Deen, Bloomfield bog and Lough Carra	50	Disturbance, turbary, drainage
ea afforested	T. Bogs near Brickeens	c. 50†	Turbary, afforestation
	U. Bogs south of Lough Glinn	Probably less than 50†	Turbary
	V. Cummer bog	80-120†	Very extensive turbary.
	W. River Moy valley	400	Mid-century decrease, attributable to heavy shooting. Finally drainage.
	Y. Lough Key	Less than 50†	Afforestation
disturbance	Z. Lough Veagh area	200-300†	No reason but following severe winter 1962-63 a very marked decrease; no recovery; eventual desertion.
	■ North of Lough Feagh	30†	Afforestation
	◀ Cuan, Ventry Harbour	50+†	Erection of wire fencing

Total: 2,200-2,800

for desertion		1950s	1970s
ncroachment	<i>Total Ireland</i>	12,700-17,300	7,800-9-300
ncroachment	<i>British Sites</i>		
e	Orkney	25	27*
shooting pressure.	Caithness	10-100	502*
e	Loch Eye	30-40	60*
m	Outer Hebrides	c. 370	c. 200
e and shooting	Skye	20	?
e	Small Isles	20	?
e	Loch Shiel	30-100	c. 250
vn	Tiree and Coll	50-150	200-600
vn	Lismore Island	30-40	50
	Benderloch	25-75†	?
	Colonsay	10-100	10-40
area criss-crossed	Islay	2,500-3,000†	3,700*
icing	Rhunaharine	150	580*
; roads constructed	Machrihanish	400	360*
; widespread	Endrick Mouth	10	110*
ation.	Bute	0	20-40
at shooting, then	Stranraer	0	280*
e	Bladnoch and Wigtown	20	c. 50
ge	Loch Ken	400-500	250*
ge	Morecambe Bay	100	0
	Anglesey	?0	0

	1950s	1970s
Dyfi	100-150	45*
Tregaron Bog	450-500	0
<i>Total Britain</i>	4,750-5,870	6,500-7,300 [†]
<i>Total</i>	17,500-23,000	14,300-16,600

†=additional or amended figures, cf Ruttledge and Hall Watt (1958) and Atkinson-Willes (1963).

*=means of highest (usually only) annual count at site, 1974-75 to 1978-79.

1. The total for Britain for the 1970s comprises the highest and lowest annual count in the period 1974-75 to 1978-9, using all available counts, plus estimates for uncounted sites. The estimates amount to about 500 birds in each case.

Brackets around sites J1, J2 and O indicate that the decrease has been treated under another site and the figures are excluded from the totals.

Population dynamics

The standard measurements for investigating the dynamics of a bird population are a long series of at least annual totals together with detailed information on the annual productivity. In the case of the Greenland White-front we have to make do without any annual censuses and with production information gathered at just two haunts, albeit the two most important and holding up to 60% of the population.

Age counts of the percentage of young birds in the population and the mean brood size have been gathered on Islay since the early 1960s, firstly by H. Boyd, subsequently by MAO. On the Wexford Slobbs such information, generally based on much larger samples than on Islay, has been collected regularly since 1968-69 by O. J. Merne. The percentage of young and mean brood size for both sites since 1968-69 are set out in Table 2.

TABLE 2
Production figures from Wexford Slobbs and Islay, 1968-69 to 1978-79

Season	Wexford		Islay	
	% young	brood size	% young	brood size
1968-69	32.8	4.1	16.2	1.5
1969-70	35.4	3.9	9.3	2.0
1970-71	15.5	3.7	12.5	2.8
1971-72	14.8	3.4	7.4	2.0
1972-73	12.7	3.8	4.6	2.2
1973-74	20.5	3.7	15.1	2.8
1974-75	17.7	3.6	18.4	2.9
1975-76	25.6	3.8	21.4	3.2
1976-77	19.6	3.9	20.8	3.4
1977-78	12.2	3.5	10.2	3.1
1978-79	13.2	2.9	9.7	2.9
Means	20.2	3.6	13.2	2.6

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Islay	
young	brood size
2	1.5
3	2.0
5	2.8
4	2.0
6	2.2
1	2.8
4	2.9
4	3.2
8	3.4
2	3.1
7	2.9
2	2.6

The perhaps surprising discrepancy between the figures for any one year from the two sites can be explained at least in part by the discovery through ringing that birds from different parts of the breeding range generally winter in separate parts of the wintering area. The Wexford Slobs birds come from more northerly parts of West Greenland than do those wintering in Scotland (Salomonsen 1967). Thus they may experience very different weather and other conditions affecting their production of young.

The mean percentage of young birds brought to the wintering grounds each autumn even at the better site of Wexford is rather low. Taking an average of the figures from the two sites, weighted according to the highest count there each winter (data from O. J. Merne, pers. comm. and MAO, own counts), the average proportion of young in the autumn population has been 17.8 and the mean brood size 3.3. This represents a recruitment of some 2,650 birds per year, and an average of 810 successful breeding pairs, out of a population taken as 15,000.

This level of production is low for a goose population and may be compared with the other subspecies of the White-front. The European race has on average 34% young in the autumn, with a brood size of 2.6, while the two North American subspecies produce on average 37.0 and 37.5% young with brood sizes of 2.2 and 2.5 (figures from Ogilvie 1978). The high brood size recorded for the Greenland birds means that an exceptionally low proportion of mature adults breed successfully in any year, probably under 20% (Owen 1978).

The generally low number of young brought into the population each year and the absence, at least since 1969-70, of any really good breeding seasons must obviously prevent the population from increasing rapidly even when given the chance. At present it appears that annual mortality is equal to and in some years exceeds recruitment, thus directly contributing to the decrease that has been occurring at least in Ireland. It is of interest that if Islay is typical of the rest of Scotland then an even lower recruitment has not apparently prevented the slight increase there. However there is evidence that shooting pressure, and therefore mortality, is lower in Scotland than in Ireland (see next section).

The only published figure of annual mortality for the Greenland White-front is 34%, and was based on ringing recoveries (Boyd 1962). This method of calculating mortality has since been shown as liable to give considerable over-estimates when compared with techniques based on censusing. The figure of around 20% per annum proposed by Owen (1978) seems more reasonable in the light of the production figures now available.

Reasons for the decline in numbers

Factors which are adversely affecting the geese appear to be different in different parts of the range. At the risk of a little repetition we will therefore consider the countries separately.

Ireland

Some of the causes and reasons given for the decrease are fairly obvious, others rather more obscure. In a number of cases the reasons for decrease or desertion of a particular site are given under the section accounting for each site, and briefly in Table 1.

Drainage of marshes, lake and riverside flats and consequent loss of feeding ground has been one of the most serious factors affecting the population.

The inevitable development of bog lands by Bord na Mona (the Turf Development Board), which has become increasingly necessary due to the energy crisis, has and continues to have a disastrous effect in many areas. In the Shannon valley for instance the feeding places of the geese were the riverside callows (and still are to a lesser extent) whence the birds flew to adjacent high bog on which they would rest or to which they would resort if disturbed at their feeding grounds. These bogs are no longer available to them and a marked decrease in the numbers of geese has resulted.

The 'skinning' of the bogs continues widespread and is a cause of more and more habitat being lost to the geese. Moreover the birds are deprived of food such as the much-favoured roots of the cotton grass *Eriophorum angustifolium* and other foods obtainable in the bogs.

Afforestation of moorland, bogland and marshy bog valleys has naturally driven the birds from their former habitat. This has been especially noticeable in counties Donegal and Mayo and in Connemara, Co. Galway.

The development for turbarry of some bogs by local people, both by draining in order to enable them to dig out more turf, and also by locally owned machinery has driven the geese from these places. This has taken place especially in counties Mayo, Roscommon and Sligo.

Nowadays goose shooting as such, except in a very few cases, is not taken seriously, but of course birds are shot when opportunity offers.

Numbers were seriously reduced in several important haunts as a result of the very severe winter of 1962-63. During January 1963 there was terrible slaughter by car loads of shooters especially from large towns. Large numbers were shot that were too weak to rise from the ground or water. In addition many died of starvation. In at least two major haunts it is reliably stated that numbers never recovered their former strength, and this has been found to be true. In

another locality i one morning. It winters in the pa must be borne in tremendous incre cars were availat used and several especially in Co. bog or marsh, ri the haunts. In a w population was c 1960s and as a have never reco

While geese disturbance by tourists, in sea *gallinago*) has l entirely, and giv resting places. T Instances are l where callows ha enclosures. This feeding sites. Thi adopted.

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TABLE 3: Su

Decline	
Shooting	
Unknown	
Drainage	
Bog 'skinning'	
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another locality it was stated that a party of tourists shot 40 birds in one morning. It could be argued that there were often similarly hard winters in the past, and that numbers did not fall so drastically. It must be borne in mind that after the Second World War there was a tremendous increase in the number of people using firearms, and that cars were available for travel to known goose haunts. Rifles too were used and several haunts are known to have been deserted as a result especially in Co. Clare. While the geese felt safe out at a distance on a bog or marsh, rifle fire could reach them and caused them to desert the haunts. In a wide area in Co. Roscommon the White-fronted Goose population was decimated partly by shooting by tourists in the early 1960s and as a result of the severe frost of January 1963; numbers have never recovered (S. Hales Pakenham Mahon, *in litt*).

While geese are not the primary objective, the constant disturbance by shooting over goose ground by parties, especially tourists, in search of other game (duck and Snipe *Gallinago gallinago*) has had the effect of driving the geese away almost entirely, and gives them little time for feeding and relaxing at their resting places. This has been particularly the case in Co. Clare.

Instances are known in Co. Clare and in the Shannon River valley where callows have been criss-crossed with wire fencing to form small enclosures. This has upset the geese and caused them to desert the feeding sites. This is a cause for concern should the practice be widely adopted.

No doubt the primary cause of the decrease in numbers of Irish Greenland White-fronted Geese is the loss of habitat. Table 3 provides a summary of the main causes together with the number of haunts affected by each.

TABLE 3: Summary of reasons for desertion and decline in Irish sites

Decline			
Shooting	13*	Afforestation	3
Unknown	13	General disturbance	3
Drainage	9	Industrial disturbance	2
Bog 'skinning'	6	Turbary	1
Severe weather January 1963	4	Wire fencing across feeding grounds	1
Desertion			
Drainage	13	Shooting	4*
Afforestation	5	Unknown	4
General disturbance	5	Severe weather in winter 1972-73	1
Turbary	5	Wire fencing across feeding grounds	1

* includes disturbance from shooting in general, not necessarily with White-fronted Geese as the main quarry.

In both lists some sites have been affected by more than one cause.

Scotland

With just three sites showing declines (omitting one or two very minor sites which may or may not still hold birds) there is no single reason for all the declines. That on Orkney has been attributed to a combination of moorland reclamation and increased shooting disturbance; in the Outer Hebrides no obvious reason has come to light, except perhaps some increase in general disturbance from farming and military activities; at Loch Ken there has been a considerable increase in the number of Greylag Geese *Anser anser* and it is thought that their presence, and the increased shooting that has resulted, have been deleterious to the White-fronts.

England

The disappearance of White-fronts from their Lancashire haunt has not been explained.

Wales

The disappearance of the large wintering flock from Tregaron Bog was caused primarily by the severe conditions of the 1962-63 winter, and secondarily by the heavy shooting and disturbance which these birds are thought to have suffered in the areas they dispersed to. The latter factors are also thought to be the reason why the small flock on the Dyfi continues to decline.

Overall

Of the factors considered here, habitat loss, for whatever reason, appears to be the single most important one. It has been very serious in parts of Ireland, though much less so in Britain. Shooting and shooting disturbance have led directly to decreases, though only in a few localised instances. They become more serious, of course, where habitat destruction reduces the areas in which the birds are safe. There may be a direct connection here with the suggested excess of annual mortality over recruitment in recent years, as the birds are driven from their first choice habitat and get shot more into the bargain.

It is worth considering here why the loss of bog habitat is having such a severe effect in Ireland, while the geese in Scotland have ceased to rely on bogs to anything like the same extent. With the notable exception of the Wexford Slob, bogs form an essential part of the habitat required by the geese over most of Ireland, yet are used extensively at only a minority of British haunts.

There seems no doubt that bogs and moorland are the natural habitat of the Greenland White-fronted Goose, and that such areas

traditionally provide resting places and are invariably, in various kinds of geese, of great advantage, in that they are available to the birds to their bog habitats, which are vulnerable to shooting and hidden away from the public.

It is here that the decline is apparent. In Ireland, the side callows are being lost and as a result the birds are being lost. In these circumstances, the reason thus remains a mystery.

In Britain, the loss of extensive farmland on which shooting has happened, the geese sometimes to a large extent, any more remote areas they still use because of farmland nearby.

Examples of the loss of full details can be seen at Castle Forbes, where the extensive nearby bog, the Little Brosna, on days of shooting and much shot at Portumna have been a measure to their retreat in safety. The bog has been deserted and the adjacent bogs have been lost.

At the Wexford Slob, no bog nearby, the intensive agriculture has led to the loss of the sanctuary and the birds are being lost.

Conservation

Effective conservation of the White-fronted Goose. Two governments, the British and the Irish, have a common interest in the conservation of the White-fronted Goose.

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traditionally provided all the birds' needs in terms of food, day-time resting places and night-time roosts — the latter often, though not invariably, involving a pool or large water body. Like most other kinds of geese in Ireland and Britain, the White-fronts have taken advantage, in recent times, of the relatively plentiful food supplies available to them on farmland, where this has been reasonably close to their bog haunts. However in doing so they become much more vulnerable to shooting and other human disturbance than when hidden away on often remote and inaccessible bogs.

It is here that the differences between Ireland and Britain become apparent. In Ireland, suitable agricultural land, pastures and river-side callows are relatively small in the areas adjoining bog haunts and as a result the geese are very prone to being shot and disturbed. In these circumstances they retreat to the safety of the bog, which thus remains an essential part of the haunt.

In Britain, the geese at several haunts have been able to move on to extensive farmland areas which furthermore form part of large estates on which shooting is strictly controlled. In every case where this has happened, the geese can move, when disturbed, on to other fields or sometimes to adjacent water without the necessity to seek security in any more remote area. It is perhaps relevant that in haunts where they still use bogs, for example Loch Shiel, there are no larger areas of farmland nearby.

Examples of the value of bogs to geese in Ireland are many, and full details can be found in the site accounts. We would just instance Castle Forbes, Co. Longford, where the geese fly out temporarily to extensive nearby bogs when a shoot is taking place on the estate, and the Little Brosna population which retreats to nearby Redwood Bog on days of shoots. On the other side of the coin, the very vulnerable and much shot over River Shannon callows between Athlone and Portumna have lost 50% of their former population due in great measure to there being no longer adjacent bogs to which the geese can retreat in safety, while the lower callows in the River Suck valley have been deserted entirely by the geese since the recent development of adjacent bogs by Bord na Mona.

At the Wexford Slobs, the only major site in Ireland where there is no bog nearby, the shooting regime is such that if there is a shoot or intensive agricultural disturbance on one slob the birds can cross the harbour to the other. The harbour itself also forms a considerable sanctuary and roost.

Conservation and future prospects

Effective conservation must start with adequate protection laws. Two governments are involved in the wintering range, the Irish and the British; a considerable proportion of the population spends some

time in both spring and autumn in Iceland; and the whole of the population breeds in West Greenland, currently the concern of Denmark, though likely to become independent quite soon. The governments of Ireland, Britain and Denmark have recently received a spur to action by the agreement of the EEC Directive on Bird Conservation which lists the Greenland White-front in Annex 1. This means that the governments are responsible for taking measures to look after the goose and, in particular, its habitat. European countries have hitherto shown little inclination to act in concert over bird protection; the EEC Directive is an obvious step towards that ideal goal. Their performances to date will therefore be considered separately.

Ireland

There is an open season for the Greenland White-fronted Goose in Ireland from 1st October to 31st January. Until the 1978-79 season the opening date was 1st September. Up to the introduction of the 1976 Wildlife Act an extension was permitted on the South Slob (Wexford) until the end of February. This concession ceased with the Act and the closing date for all Ireland is now therefore 31st January.

At present the only measures for conservation of this subspecies in Ireland are the reserve on the North Slob, Co. Wexford and the prohibition of shooting at ten other sites.

There is a small local sanctuary area in Co. Roscommon near Ballygar which is open to threats of various kinds.

The North Slob reserve consists of about 150 hectares out of the total area of about 1,000 hectares of mixed pasture and cultivated ground. In addition the geese feed on the South Slob, an area also of about 1,000 hectares. The North Slob reserve is divided into two areas managed jointly by the Forest and Wildlife Service of the Department of Fisheries and Forestry and the Irish Wildbird Conservancy. There is a full time Warden whose duties include making regular counts, assessing adult/juvenile ratios, recording kills at shoots and generally supervising the care of the geese. Very important has been the study of the food preferences and land management in accordance.

Shooting is prohibited in ten of the sites by Ministerial order under the Wildlife Act, 1976. Full details will be found under the relative site accounts — Lough Iron (site 5), Lake Farm (Dysart Goose Sanctuary) (site 7), Lough Funshinagh, Muckanagh and Cloonloughnan turlough (site 13), Clare (site 17 — Islandavanna area), Lough Conn (site 29), Lough Gara (site 31), the Kerry sanctuaries (site 15), Blanket Nook (site 40).

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Although some of these sanctuaries were made as far back as 1970, they were designated for the conservation of wildfowl in general, though each happened to contain a White-fronted Goose population. Apart from the North Slob Reserve only Lake Farm (Dysart Goose Sanctuary) and the Kerry sanctuaries have been appointed, in 1976, expressly for the protection of the White-fronted Goose population.

Some subsidiary sanctuaries are essential to provide suitable bogland and pasture land habitats, so much of which has already been lost to the geese and continues to be whittled away. Bogland, much of which has already been lost to the geese is very important habitat. Bog cotton has been noticed by RFR as the favourite food in many bogland haunts. Mention of it is made in several site accounts. This emphasises the importance of conservation of bogland, especially in areas of country where the geese greatly depend on this habitat where there is a lack of grassland and callows as alternative feeding ground.

The type of habitats required are blanket bogland on which the geese can feed, rest and resort to when disturbed from riverside flats, callows and fertilised pasture land. This last form of terrain is increasingly attractive feeding-ground, but such places leave the birds very vulnerable to their being shot, so that large areas of open bogland where the birds are far less easily approached are essential for their safety. Any sanctuary should provide suitable waters on which the birds can roost in safety.

Irish goose haunts being so widely scattered are often in the form of a 'complex' so that selection of sanctuaries must be of necessity be carefully thought out. In the scattered haunts numbers are often so small that conservation at them would be impossible. It seems therefore that selection should be made from haunts of international importance, perhaps even in suitable cases from those of slightly lesser importance. The safety of the geese should be made absolutely secure and wardens of integrity selected.

Britain

At present the Greenland White-front may be shot in Britain from 1st September to 31st January inland, with an extension to 20th February below high water mark. This closing date has been in effect since the 1930s.

Revision of the country's Bird Protection Acts is due and a recommendation made jointly by bird protection bodies and wildfowlers is that the White-fronted Goose is given full protection in Scotland. Possible confusion with the European race effectively prevents this being possible in England and Wales too. At the

remaining Welsh haunt, the Dyfi estuary, local wildfowlers and conservationists are trying to see what extra voluntary measures can be instituted.

No other measures are contemplated in Britain though discussions at a local level have been taking place to see what can be done to arrest the decline of the flock at Loch Ken. Protection from shooting will clearly help here but other action may be needed to reduce disturbance from shooting of other geese in the area.

Iceland

Substantial numbers of Greenland White-fronts visit Iceland in both spring and especially autumn, usually from about late April to mid-May, and from mid-September to mid- to late October. Their usual resort is on the west coast. The shooting season in Iceland opens in the third week of August and closes on March 15th so the geese are potentially vulnerable throughout their autumn visit. However in 1974 it was reported that there were only 600 waterfowl hunters in the whole of Iceland (Lampio 1974) and Gardarsson (pers. comm.) further informs us that goose shooting is not a traditional sport in Iceland and is practised by very few people. The area of largely wet grassland that the geese use is not threatened by any change nor have conflicts with farmers been reported. The situation in Iceland thus looks reasonably secure.

Greenland

The White-front is fully protected in Greenland during the breeding season but it appears that it may be shot in the autumn, before it leaves on migration, though not in spring. When substantial numbers were being ringed there in the 1950s, 7% were recovered from shooting in West Greenland compared with 16% overseas (Salomonsen 1970). Traditionally the local inhabitants used to collect eggs and take goslings and while these activities are now banned, enforcement may not be too effective. There are no sanctuaries or reserves covering any of its breeding range.

Recommendations for the future

We believe that it is essential for this rare goose subspecies to be given complete protection throughout its range, to be followed by active management of its more important wintering haunts. We also agree with Owen (1978) that there is an urgent need to investigate both the breeding biology and spring ecology to seek explanations for the very low annual productivity.

While we have shown that habitat loss, particularly in Ireland, and

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not shooting, is the principal cause for the decline in numbers, the mere fact of a reduction in suitable areas concentrates the birds into the remaining ones so making them ever more vulnerable to shooting and to disturbance. The very scattered nature of the goose's distribution makes the creation of a sufficient number of reserves to safeguard a reasonable proportion of the population in its existing range extremely difficult and expensive.

The level of production, as we have shown, is rather low for a goose population, especially of one subject to shooting, and compares very unfavourably with other races of White-fronted Goose. The small population size and poor production rate make the Greenland White-front quite unsuitable to be treated as a quarry species. Only two geese recognised as distinct species or subspecies, the Hawaiian Goose *Branta sandvicensis* and the Aleutian race of the Canada Goose *B. canadensis leucopareia*, have lower numbers and both are the subject of very active and intensive conservation programmes.

Limitations on numbers and breeding success may well be affected as much by conditions away from the wintering grounds as on them. Here a number of factors could be operating, including shortage of nest sites, disturbance or more direct losses to man on the breeding grounds, and the amount of spring feeding available in Iceland. Investigating and then perhaps changing any of these will take a lot of time and money. Meanwhile a much easier, quicker, positive step is possible by banning shooting.

Even if the production rate of young remained at the same size as at present, halving the mortality from the present estimated 20% per annum would allow numbers to rise slowly to around 25,000 which we would regard as a desirable minimum size to provide a buffer against adverse winters. Even if this increase were not realised, complete protection would ensure that the geese would not again suffer the additional mortality imposed by shooting in a hard winter, and could well allow many of the smaller flocks to continue to survive in the restricted habitat remaining to them.

Site Accounts

The name of each known site is given together with the 10 km square number for Irish sites and the four figure grid reference for British sites. The current population follows the name of each site. Those sites which hold more than 1% of the total population (150 birds) are of recognised international importance and are listed as such.

Tables of numbers over a period of years are included for those sites where there has been a fairly good series of counts. Most of these are British sites as the shortage of manpower in Ireland has

precluded systematic counts at more than a few locations. This shortage of manpower also explains the exclusion of detailed accounts of the small wandering parties of geese which occur scattered throughout many moorland areas in west and north-west Ireland, particularly where bog cotton occurs.

Throughout the accounts the abbreviation R & HW has been used for references to Rutledge and Hall Watt (1958) and A-W (1963) for references to Atkinson-Willes (1963).

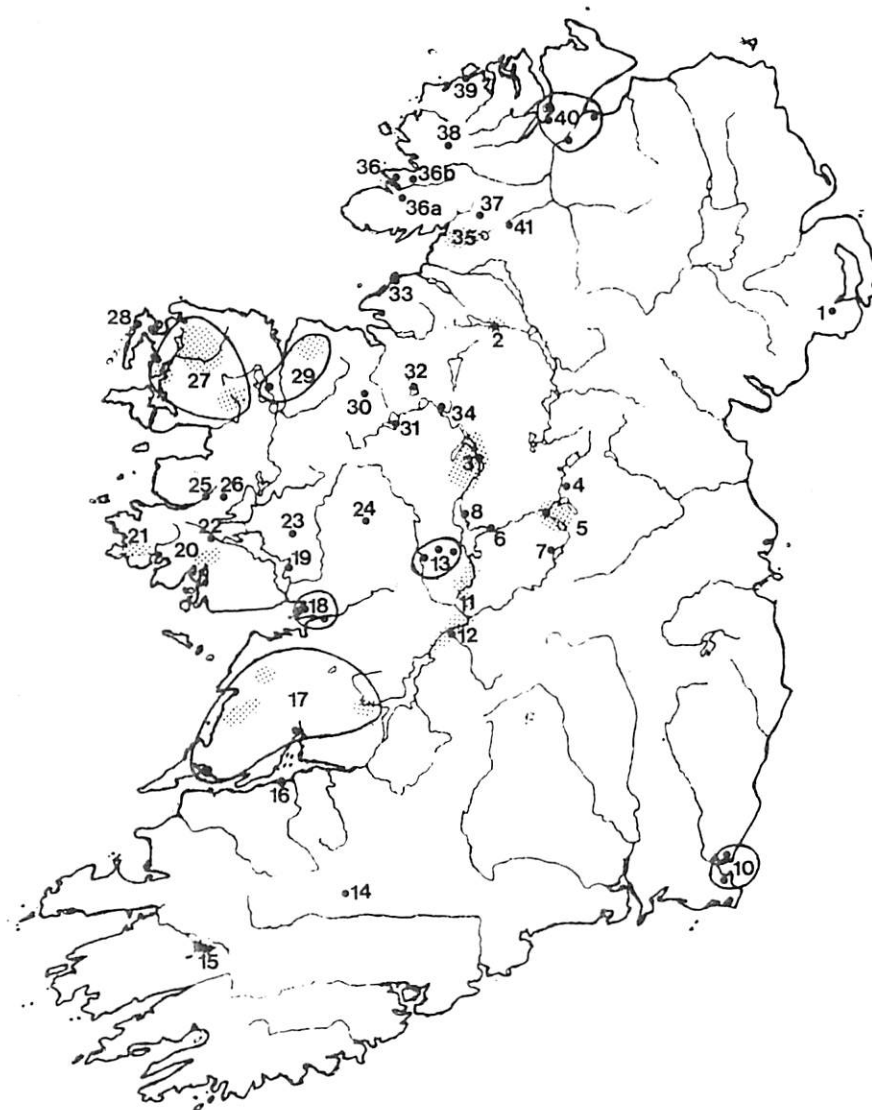


Fig. 1. Location of Greenland White-fronted Goose sites in Ireland

Current Irish Si

1. Downpatrick n
2. Lough McNear
3. Castle Forbes,
4. Lough Kinale,
5. Lough Iron and
6. River Inny mo
7. Lake Farm, Lc
8. Inchenagh, Lou
9. 'The Curragh',
10. North and Sou
11. River Shannon,
12. Little Brosna R
13. Lough Funshin:
14. Kilcolman Bog
15. Doo Lough/Tu
sanctuary, Co.
16. Aughinish Islar
17. Co. Clare.
18. Rahasane turlo
19. Lough Corrib,
20. Moorlands SE
21. Moorlands eas
22. Maam Valley,
23. Altore Lake, C
24. Glenamaddy tu
25. Erriff Valley, C
26. Derrycraff Riv
27. 'Bog of Erris',
28. The Mullet, Co
29. NW Co. Sligo
30. Temple House
31. Lough Gara, C
32. Inishbeg, Loug
33. Bunduff, Co. S
34. Drumharlow L
35. Moors west an
36. Sheskinmore L
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37. Lough Sallagh
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Current Irish Sites

1. Downpatrick marshes, Co. Down.
2. Lough McNeen Lower and complex, Co. Fermanagh.
3. Castle Forbes, Co. Longford, and complex.
4. Lough Kinale, River Inny flats and Lough Bane, Co. Longford.
5. Lough Iron and complex, Co. Westmeath.
6. River Inny mouth, Co. Longford.
7. Lake Farm, Lough Ennell, Co. Westmeath.
8. Inchenagh, Lough Ree, Co. Longford.
9. 'The Curragh', near Ballacolla and complex, Co. Leix.
10. North and South Slobs and Wexford Harbour, Co. Wexford.
11. River Shannon, Athlone to Portumna.
12. Little Brosna River, Cos. Offaly/Tipperary.
13. Lough Funshinagh, Co. Roscommon and callows at Muckanagh, Co. Galway.
14. Kilcolman Bog, near Buttevant, Co. Cork.
15. Doo Lough/Tullaha sanctuary, Co. Kerry; Derrycunihy/Galavally sanctuary, Co. Kerry.
16. Aughinish Island/Greenish Island, Co. Limerick.
17. Co. Clare.
18. Rahasane turlough and Creganna marsh, Co. Galway.
19. Lough Corrib, Cos. Galway/Mayo.
20. Moorlands SE of Recess, Co. Galway.
21. Moorlands east of Ballyconneely, Co. Galway.
22. Maam Valley, Co. Galway.
23. Altore Lake, Co. Galway.
24. Glenamaddy turlough, Co. Galway.
25. Erriff Valley, Co. Mayo.
26. Derrycraff River valley, Co. Mayo.
27. 'Bog of Erris', NW Co Mayo.
28. The Mullet, Co. Mayo.
29. NW Co. Sligo and Lough Conn, Co. Mayo.
30. Temple House Lake, Co. Sligo.
31. Lough Gara, Co. Sligo.
32. Inishbeg, Lough Arrow, Co. Sligo.
33. Bunduff, Co. Sligo.
34. Drumharlow Lake, Co. Roscommon.
35. Moors west and NW of Lough Derg; Brownhall, Co. Donegal.
36. Sheskinmore Lough, Co. Donegal, and possible complex as follows— 36a SE of Ardara; 36b SE of Maas.
37. Lough Sallagh and Barnesmore lakes, Co. Donegal.
38. Moors NE of Fintown, Co. Donegal.
39. New Lake, Dunfanaghy, Co. Donegal.
40. Grange, Co. Tyrone, and complex.
41. Killeter, Co. Tyrone.

1. Downpatrick Marshes (J44) Co. Down 50-60.

There was a gradual rise from three birds in 1876 to 152 in December 1956 (R & HW).

In February 1959 220 were counted. In December 1964 after drainage had taken place about 200 were counted but the average for the early 1960s was considered to be 130 to 140. Numbers then fell drastically to a fairly static 65 to 95 birds, though 250 were counted in December 1968. Only 50-60 were present in winters 1975-76 to 1977-78.



n Ireland

The area was primarily marshland until drained about 1964. Since then the greatly reduced number of geese make use of any of the higher ground that does not become flooded and where there is growth of reasonably young grass. Although 80-100 ha of the marsh have recently been reflooded numbers of geese have not increased.

In the early part of the winter the geese tend to go to the nearby Quoile estuary, and to lower Strangford Lough.

There are three main roosting places, used depending upon the water level being suitable: the Quoile River (J44) estuary about 3km from its entry into Strangford Lough; a flood area about 1½ km north east of Ballydugan House (J44); an area just south of the last and this is the normal roost when the other two are lacking sufficient water.

Local wildfowling clubs have placed a voluntary ban on the shooting of this goose.

2. Lough MacNean Lower (H13) and complex, Co. Fermanagh c. 150

International importance

Lough MacNean Lower is the headquarters of a complex which includes a number of haunts in the Lough Erne basin. The geese move about considerably

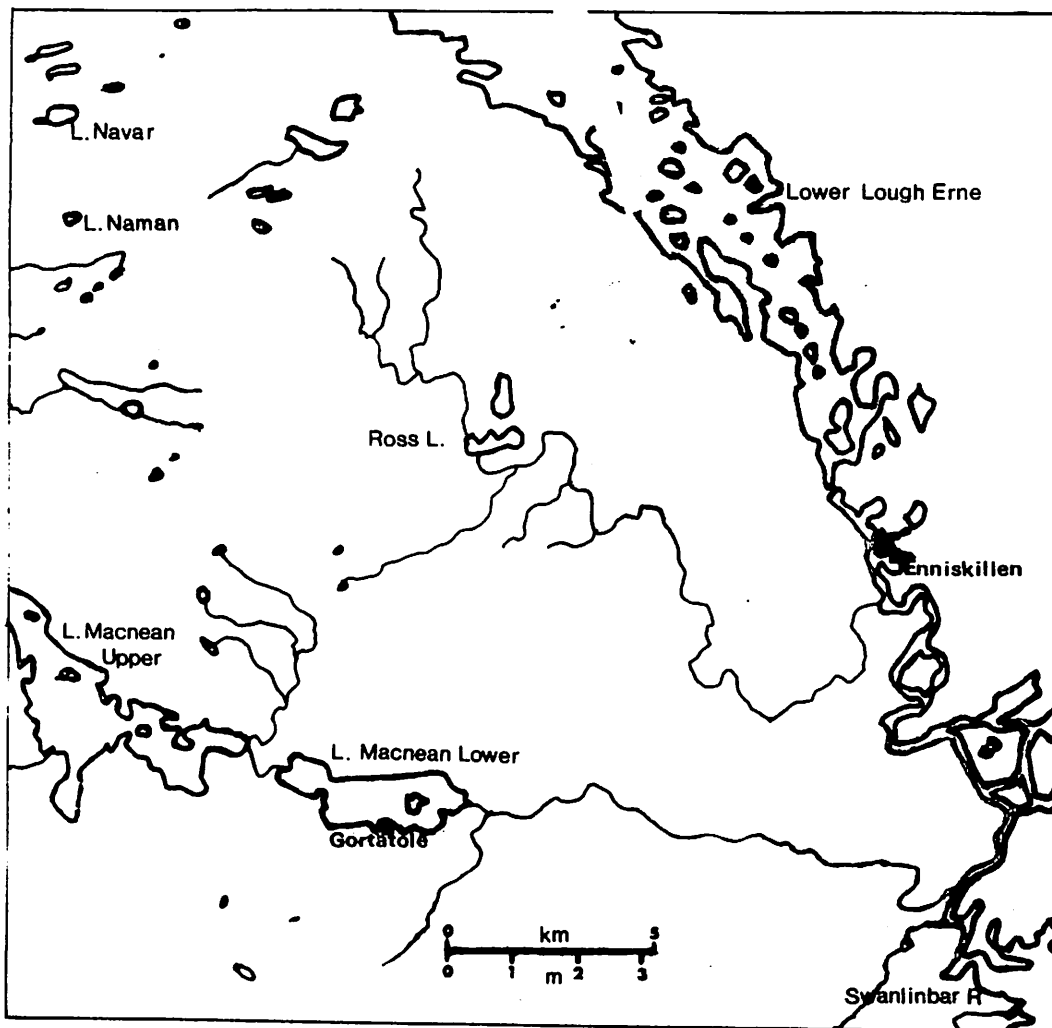


Fig. 2. Lough MacNean Lower and complex, Co. Fermanagh.

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though always most faithful to the grassy lakeside flats at Gortahole and areas adjacent at Lough MacNea Lower. It is difficult to get an accurate overall count which includes the subsidiary haunts.

The population, at 100, was probably rather understated by R & HW as the extent of the complex was not then fully known and there could have been birds in haunts other than Lough MacNea Lower.

In 1950 as many as 200 were occasionally present in winter at Lough MacNea Lower. By about 1954 the total for the whole complex was put at c. 200 birds. Numbers fell drastically for reasons unknown, and there were as few as 60-90 birds by the end of the 1960s. In 1967 the complex was considered to hold about 100 birds. The numbers then increased and since 1972 have stood at c. 160 in the entire complex.

On the shores and islands of both Upper and Lower Lough Erne c. 50 are seen irregularly. The vicinity of the Swanlinbar River mouth (H23) is favoured by up to 50 birds at times. Parties also wander into the moorlands around Loughs Navar, Naman (HO5) and Ross Lough (H14).

There is a certain amount of shooting by local gunners especially at Lough MacNea Lower, but not enough to make the geese change their haunts or to reduce their numbers (G. E. Luke *in litt.*) but it must cause some disturbance.

No obvious threat to habitat is suspected.

3. Castle Forbes (NO8) and complex. Co. Longford c. 200-250

International importance

Although a haunt of long standing it was unknown to R & HW.

Up to the early 1970s access to Castle Forbes estate was restricted so very few people were aware of the presence of an important population of White-fronted Geese in the estate. At that time no shooting was permitted.

Information gleaned from a reliable local source indicates that there were about 500 geese there, and at times more, previous to and during the 1950s. Since those years the geese decreased considerably for reasons unknown, but possibly because of considerable shooting activity outside the estate and the effects of severe weather in January 1963.

In 1977 there were about 200, sometimes up to 300, using the fields in the estate. Another reliable source spoke of the many geese that formerly were to be found on the Camlin River callows, birds which were considered to be the Castle Forbes flock. Numbers had greatly decreased and by 1977 were about 200 at best. Since then repeated visits have clarified the present situation.

In February 1975 the estate became a syndicated Pheasant *Phasianus colchicus* shoot, goose shooting being excluded. The geese frequented in particular two very large well-fertilised grass fields and to some extent two others. On days of shooting the geese at once leave the estate and either fly to the Camlin River or more usually to the large bogs to the west of Lough Forbes, normally returning within a day or two.

Without doubt the shooting disturbance has had its effect, causing the geese, according to the estate workmen, to be present less constantly than before, but that when present up to 200 can be seen. More time is clearly spent by the birds on the Camlin River callows and especially on the large bogs. In 1975-76 there were frequently c. 200 present and occasionally c. 300.

In the severe weather of January and February 1979 the geese were on the Castle Forbes fields more constantly than during the previous two winters presumably because the bogs to the west were hard frozen. Estimates of c. 200 and c. 150 were reported on various dates and 162 were counted in February.

The complex in this area can be outlined on the basis of observation and following the geese.

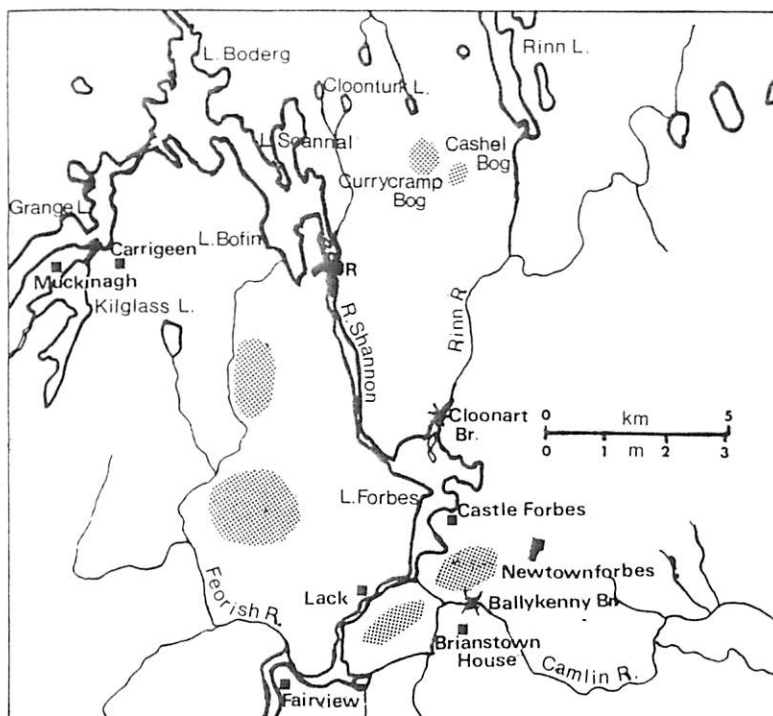


Fig. 3. Castle Forbes, Co. Longford and complex. Bogs are stippled.

Up to about 80 of the Castle Forbes population regularly frequent marshy fields close to Cloonart Bridge (NO8). These at times join up with the birds at Castle Forbes. The Castle Forbes birds frequently feed on the callows alongside the Camlin River from near Ballykenny Bridge (NO7) to near Brianstown House (NO7), the vicinity of the latter being particularly favoured. A bog between the Camlin River and Castle Forbes is used for resting or as a retreat when disturbed. Part of the population wanders to callows at Fairview (NO7) and near Lack (NO7), also to Currycramp bog area (see later).

The two very extensive bogs in square NO8, west of Lough Forbes, already alluded to, are of vital importance to the geese for resting and feeding and as a retreat, the more so nowadays on days of shooting in Castle Forbes. Each of these bogs holds at least 60-70 geese; a flock of 40-60 uses grass fields at Muckenagh, beside Grange Lake (M98) and is almost certainly part of the Castle Forbes population; these and/or birds from Currycramp bog also frequent callows at Carrigeen, beside Kilglass Lake, when these are not unduly flooded.

Currycramp bog (NO8/9), Co. Leitrim, in which bog cotton is prevalent, is an important haunt in this complex, with a fairly constant population of about 60 geese. This flock is inclined to disperse, some birds frequenting adjacent Cashel bog, some at times, particularly in spring, feeding on the callows along the River Rinn (N18). Birds here could equally well come from Castle Forbes also as small parties and quite frequently 40 or more geese are seen flying between the Currycramp bog area and Castle Forbes and vice versa. There are several other smaller haunts in the vicinity of Currycramp bog which are visited by parties from there.

There are roosts on Lough Forbes, Grange Lake, Lough Rinn (R19), Clonturk Lake (NO9) and Lough Scannal (NO9). The whole population seldom, if ever, uses the same roost at the same time; that at Lough Forbes is the main one.

The only conservation measure is the voluntary restraint on shooting geese in Castle Forbes. There is no guarantee that this would continue should the syndicate change hands. Some local shooting takes place within the complex.

In November 1979 Bord na Mona withdrew its plans for the development of the

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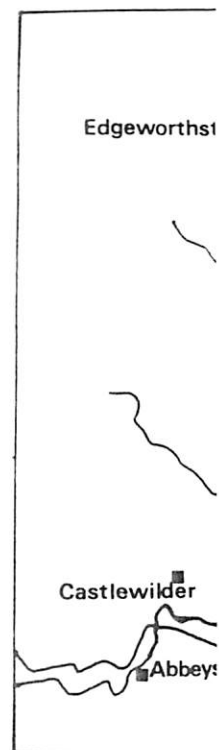
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bogs beside the Camlin River and deferred development of Currycramp and Cashel bogs indefinitely. The two large bogs west of Lough Forbes are to be developed immediately.

4. Lough Kinale. River Inny flats and Lough Bane (N47) Co. Longford. 15-20.

In the 1940s 100 or more used this area. Subsequent drainage resulted in a fall in numbers so that in recent years only 15-20 birds are to be found there.

Rough low-lying pasture. No conservation measures or further threats are envisaged.

5. Lough Iron (N36) and complex, Co. Westmeath 200, sometimes up to 300.

International importance

This is one of the most important White-fronted Goose areas in Ireland. Lough Iron has been known since the 1930s as the headquarters of a complex which included haunts at Bracklin (N55), Coolamber (N37), Cromlyn (N36), Glen Lough (N26), River Inny callows near Castlewilder (N26) and those (N47) south of Finnea, Lough Derravarragh (N46) and the then unspoilt bogs north-west of it, and Lough Owel (L36). The total population of the complex in the 1940s and 1950s was given as up to 500 (R & HW), but further investigation showed it as substantially higher. The subsidiary haunts named above each held variable numbers of from 25 to 150 according to conditions. In the 1960s callows, riverside flats and marshes at the following were drained and consequently lost to the geese: Bracklin, Coolamber, Cromlyn, Castlewilder, flats south of Finnea. The bogs near Lough Derravarragh were to a large extent developed by Bord na Mona. The chief roosting place then was Lough Iron, used by about 200 birds. Glen Lough and Lough Kinale (near Finnea) were also roosting places.

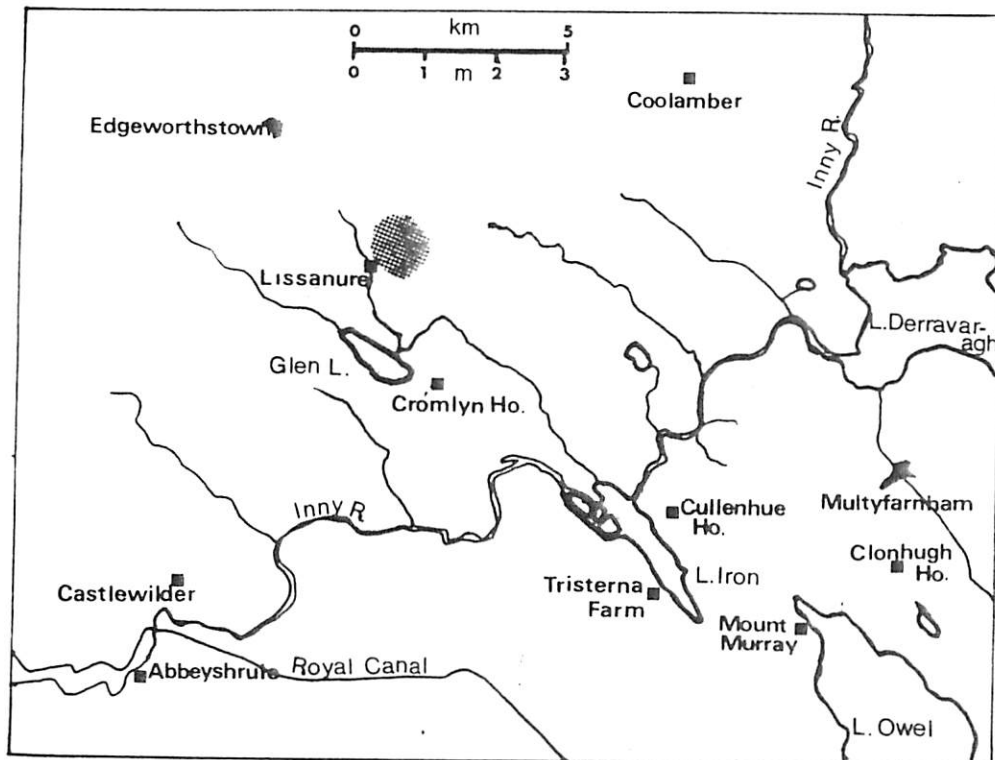


Fig. 4. Lough Iron and complex, Co. Westmeath.

The population in this complex has dropped from over 500 to c. 250.

There is much movement within the complex, especially between Lough Iron and Lough Owel (see below), and between Glen Lough, the large bog to the north of it, and the Derravarragh area where bogs still remain unworked by Bord na Mona.

Lough Iron and its surrounding pastures still remain the headquarters of the complex. The lake is the chief roosting place though Glen Lough is also used. Tristerna, a large farm on the west side of the lake, has been well managed and the pastures regularly fertilised since 1965. This was very beneficial to the geese and a fairly regular population of about 200 built up there. The birds also fed in fields on the east side of the lake. Unaccountably the birds almost entirely deserted Tristerna from winter 1976-77 and now favour an area of rough pasture at the south end of the lake where there was an average of 144 birds in 1977-78 (49 counts) and 120-130 in 1978-79 (60 counts) with maxima of 200 and 180 in each year.

As formerly, the geese continue to feed in large pasture fields on the east side of the lake, SE of Cullenhue House. If disturbed in either place they fly onto Lough Iron, where they also roost.

Lough Iron itself is a Forest and Wildlife Service sanctuary but most of the adjacent feeding grounds of the geese are not included in the sanctuary area. However it is hoped that the sanctuary area will be extended to include the important feeding grounds just south of the lake. Already the Forest and Wildlife Service has fertilised these grounds and is providing improved management. The resident warden provided most of the above counts. Shooting of the geese does not occur.

At Lough Owel, Mount Murray farm (N36) is a much favoured subsidiary feeding ground where 100-150 are found regularly until ploughing takes place in February and March. Early in the winter the birds feed on the stubble fields. At times up to 60 birds feed in fields at Clonhugh across the lake but no other site around the lake is resorted to.

Numbers are now fairly static but are lower than they were up to about 1947. In 1970 c. 300 were seen; in 1976 c. 150 and in 1977, 175 were counted. In the winter 1976-77 the population was put at 150-200, figures rather above normal. The geese do not roost on the lake but flight regularly to roost on Lough Iron which is within sight of Mount Murray.

There is no obvious threat to the site. The birds are not shot. No conservation measures are in force.

Glen Lough (N26) and its vicinity is almost certainly used by birds of the Lough Iron complex. Up to 150 can be found there but numbers are very variable.

The geese feed on rather broken rough pasture on the north side of the lake, and feed and rest on high red bog just west of the lake, and on the high bog 3 km north of the lake at Lissanure, on the last mostly from late morning to late afternoon. The birds flight to and from the lake, roosting on Glen Lough and possibly on Lough Iron beside which they also feed.

There is no protection. Afforestation or Bord na Mona development of the bog west of the lake could pose a threat.

The bog at Lissanure is scheduled for development in due course.

6. River Inny mouth (N15) Co. Longford c. 50.

R & HW found 150-400, the average being 220-230. Numbers at the main haunt near the River Inny mouth varied as there were several places nearby used by the geese, including the riverside flats (no longer used) between Castlecove and Ballymahon (50-150), Gurteen bog, just north of the Inny mouth with 180-300 and grassy promontories at Arnee Point and near Saints Island (N05) with 100-150. Movement took place between all these places. The main haunt near the River Inny mouth was an extensive area of callows, rushy marsh and flooded ground, now drained.

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is the main haunt nearby used by the geese at Castlecove and the bog with 180-300 (counts) with 100-150. The geese on the River Inny are fed on ground, now

The numbers using the area began to decrease in the early 1950s due to increased hunting pressure and the commencement of drainage. The main reason for the near desertion of the area was the extensive drainage of the marshes and callows in the late 1950s. The remaining birds then became concentrated in the few areas remaining and hunting pressure became more intense. Numbers were further decreased by the severe weather of January 1963 when many were slaughtered and others died of starvation. Thereafter numbers never recovered.

The drained area near the river mouth is now a well-fertilized pasture plateau with some shallow pools.

A few birds, sometimes up to 30, came irregularly in the 1960s; then about 1970 c. 20 started to use it regularly and since then numbers have gradually increased to that, since 1975 at least, the regular population is about 50; in 1976-77 it reached 60. The geese roost on Lough Ree.

The owner of the largest area of pasture land does not permit the geese to be shot. Otherwise there are no conservation measures.

There is always the possibility that Gurteen Bog, still used by the geese, might be developed or afforested.

7. Lake Farm, Lough Ennell (N34) Co. Westmeath 40-120.

Lough Ennell is a highly eutrophic limestone lake with good pasture land adjoining on its west side. Lake Farm is particularly well managed pasture. On this farm a 35 hectare field has been a goose haunt for many years. In the early 1950s, 300 birds still used the field for feeding. By 1954 an unexplained decrease had been noticed; the normal wintering flock is now c. 40 though more are present early in the winter and again after the shooting season ends, when 120 or more are to be found. On 4th April 1977 just over 140 were counted, the largest number seen for many years. The field had been refertilized earlier in the winter.

The Lake Farm birds also feed in fields in adjacent Kilcooley House farm and have done so for many years. They roost on Lough Ennell.

These two farms, now named Dysart Goose Sanctuary, were made the subject of a non-shooting Order in 1976, but not Lough Ennell itself; there is much disturbance from shooting at the lake which disperses the geese, to where is unknown, but probably to fairly distant bogs.

No threat to the geese is envisaged, but the owner of Lake Farm, who was tremendously interested in the welfare of the birds, died in 1978. While farming of the estate will continue as before, the future is rather uncertain.

Formerly this haunt was considered to have a population which interchanged with that of Lough Iron. Our researches show that the populations are discrete.

8. Inchenagh (M96) Lough Ree, Co. Longford c. 25.

This island has some fine pasture. About 1960-62 many more geese, totalling 100 or more could be seen on this and the nearby islands, Inchmacadermot and Ferrinch Island, all at the north end of Lough Ree. Inchmacadermot has become too overgrown and few birds now use Ferrinch Island. Formerly the geese used to fly in from the east, probably from the River Inny mouth (site 6) as a Snow Goose *Anser caerulescens*, which in December 1961 consorted with the White-fronted Geese there, used to come with the White-fronts to Inchenagh. Reasons for decrease are given as Bord na Mona development of two large and much favoured bogs in the vicinity, disturbance from constant duck shooting in the area all winter and the working of a quarry adjacent to extensive flats near Gallagher (M96) just east of Ferrinch Island, where the birds fed regularly. Decrease at the River Inny mouth may also have affected numbers at Inchenagh.

There is no conservation. On one day in January 1979 during severe weather one man shot eleven White-fronts on Inchenagh.

9. 'The Curragh' (S37) near Ballacolla, and complex, Co. Laois 24-40 rarely 60.

'The Curragh', as it is locally called, was formerly a considerable area of callows liable to flooding alongside the River Erkina south of Ballacolla. These callows were partially drained in the 1960s. Further drainage is not foreseen. The small and very mobile population moves among several sites in the complex, but an area of rough grazing at 'The Curragh' is the most favoured and regular haunt where they suffer least disturbance and are seldom shot at. Numbers have progressively declined, there being far fewer than 20 years ago. At times the geese are inexplicably absent for a considerable period.

Other haunts in this complex are not widely separated. They comprise the flats beside the River Nore (S28) near Borris-in-Ossory (R & HW) whence the birds at times fly high away northward. It may be that these are the ones that have for years frequented Lough Annaghmore (N31) rather irregularly. Callows liable to flooding beside the River Nore and known as 'the marsh' (S48) NE of Shanahoe provide good short sward, but disturbance from duck-shooting prevents the geese from being present regularly. Large well-fertilised pasture fields at Kilminfoyle farm (S38) and at nearby Loughabarra are favoured, but somewhat irregularly. During the severe weather in January 1963 shooting parties came here regularly during a week and took such a toll of the geese that their numbers have never since been the same.

Monaincha Bog (S18) just SE of Roscrea, Co. Tipperary, was formerly a haunt of 50-60 birds; they roosted at the Forked Lake in the bog. From the direction of their flight they were clearly of this complex. Now few geese come irregularly and do not remain long due to shooting. There is doubt as to where roosting takes place.

There are no conservation measures.

10. North and South Slobs and Wexford Harbour (TO2/T12/T01) Co. Wexford 5,000-6,000.

International importance

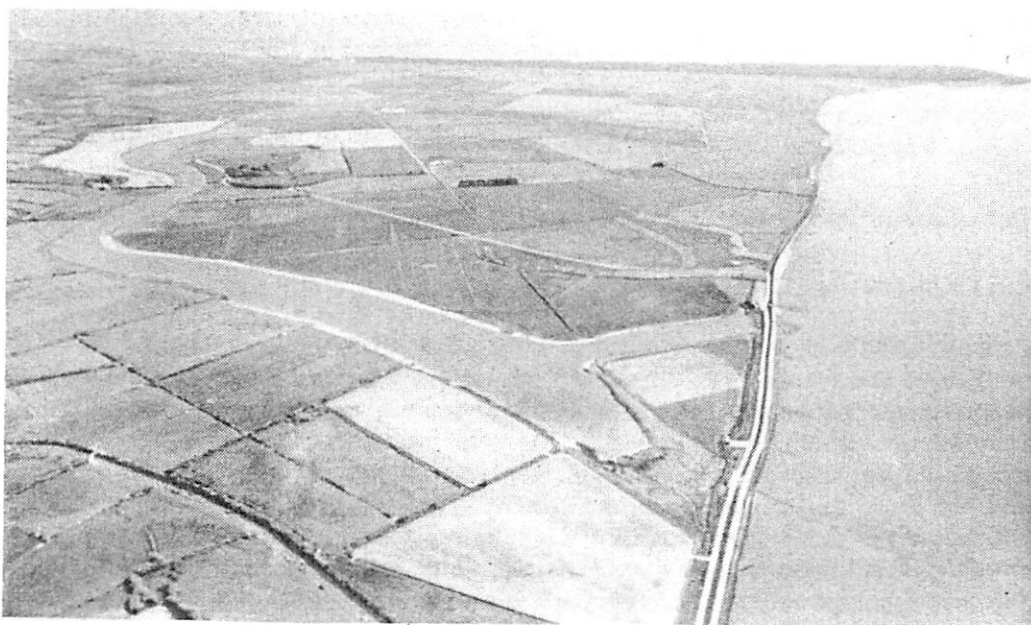


Plate 25: North Slob, Wexford. The reserves lie in the middle and far distance.

Photo: O. J. Merne

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The North and South Slob are treated as one unit because of the extensive movement between the two. Wexford Harbour is used for roosting.

The North Slob consists of some 1,000 hectares which were chiefly pasture until the end of the 1950s when some tillage was introduced. By 1957 a considerable acreage was under cereals. In the early 1960s, following a change in ownership, the Department of Fisheries and Forestry (or the Department of Lands as it was then) and the Irish Wildbird Conservancy jointly acquired by purchase and lease two areas totalling just under 150 hectares to be managed as refuges for the geese. A resident warden was appointed in 1968.

The South Slob, a little less extensive than the North, has 400 hectares of grass for grass-meal production and this is frequently closely cut leaving a short nutritious sward which is beneficial to the geese. Most of the rest is used for cereals (mainly barley and wheat) and up to 80 hectares have been planted with sugar-beet in recent years. White-fronted Geese were first noted on the Slob in or a little before 1910. They were considered scarce until 1925 but after that year there was a steady increase (F. O'Connor, *pers. comm*) and from 1936 to 1946 there was a progressive and marked increase (J. L. Nunn, *pers. comm.*) reaching the present strength of 35% to 45% of the world population about the latter date.

It seems very probable that the increase was due to the extensive loss of habitat throughout Ireland about that time resulting in displaced birds coming to the North Slob.

It may be that the strength of the population on the Slob is, even now, kept up to some extent by incursion of birds displaced from elsewhere; only a colour ringing programme can establish if this is so.

From about 1946 the Greenland White-fronted Goose outnumbered the Greylag Goose, *Anser anser*, which up to then had been far more numerous on the North Slob (J. L. Nunn, *pers. comm.*) While the Greylag gradually became scarce on the North Slob, the South Slob continued as its domain, White-fronts being relatively few on that Slob. Both Slob have now been monopolised by the White-front and the

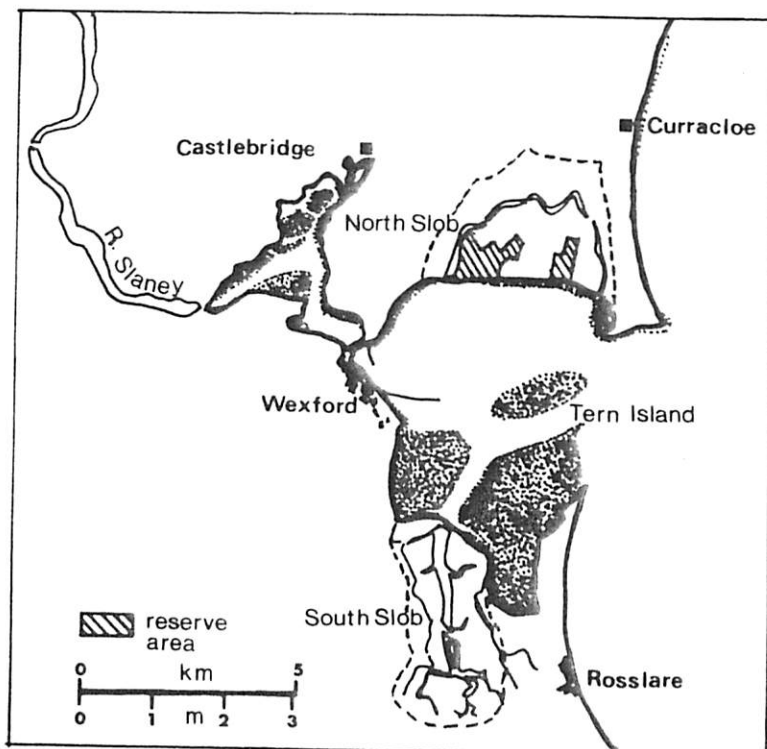


Fig. 5. North and South Slob and Wexford Harbour, Co. Wexford.

d far distance.
x: O. J. Merne

total population is relatively static apart from annual fluctuations due to the success or otherwise of breeding. In order to assess the value of counts on the Slobs over the years it is wise to break down those made into three periods:

(a) Prior to 1960 the counts were almost entirely based on estimates, and the total of 4,000-6,000 for the North Slob and 500 for the South Slob was based on very careful observations over the period 1946-56 (R & HW). These figures compare well with the present day ones. Many of the estimates and counts made by various people pre-1960 were for the North Slob only, the South Slob being neglected and certainly seldom covered on the same day.

(b) In 1966-67 and 1967-68 some carefully co-ordinated counts were made by teams in cars which were a great improvement on former less efficient methods.

These teams did however occasionally cause undue disturbance and movement of the geese giving rise to possible duplication or omission. We have the following counts for this era:

Winter	Peak numbers both Slobs	Month	Average
1966-67	6,942	end-November	5,545
1967-68	7,129	March	6,181

Counts were made monthly from November to March, both inclusive. Counts in April in each year have been excluded due to duplication of figures.

In the second of these winters there was a limited number of counts due to foot and mouth disease restrictions.

(c) Previous difficulties in accurate counting had been considerably overcome by 1968 and from then expert counts were made by the warden and his assistants each winter.

Winter	Peak number (both Slobs)	Month	Average
1968-69	6,244	December	5,048
1969-70	7,284	November	5,670
1970-71	6,825	January	6,155
1971-72	5,933	December	5,163
1972-73	5,565	November	5,006
1973-74	5,296	November	4,815
1974-75	5,800	December	5,142
1975-76	6,130	December	5,180
1976-77	6,815	December	5,433
1977-78	6,867	January	5,633
1978-79	6,098	January	5,015

Peaks and averages are for the period November to March inclusive.

The major roost is at Tern Island in Wexford Harbour and a nearby sand-bank is used, when exposed at neap tides.

Shooting on the Slobs, in the harbour and elsewhere adjacent to the Slobs has accounted for an annual kill estimated at close to 450 White-fronted Geese per annum since the winter of 1968-69. Shooting pressure has declined somewhat on the Slobs in consideration of the need to conserve the numbers of this goose, and since 1972-73 has been below average varying from 155 to 297 per winter on the Slobs alone. The refuge areas on the North Slob are very small in relation to the total acreage and there is always the possibility that changes in land use outside the refuges may make the North Slob unsuitable for White-fronted Geese.

11. River She

International

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In (b) the callows just south about 1970 f clear whether ha turlough

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11. River Shannon, Athlone to Portumna 200-250

International importance

In the 1940s and early 1950s there was a population of about 600 on the River Shannon callows between Athlone and Portumna, exclusive of those in the Little Brosna. Including the latter the total population was assessed as a result of many visits at 1,000 (R & HW).

Up to the early 1950s the birds spent the day on the riverside callows, flying when disturbed or for other reasons to adjacent bogs. With increased shooting disturbance the geese became very wild and formed the habit of leaving the callows at daybreak and going to the vast bogs lying west of the river or even as far as Lough Derg or Lough Ree, returning at nightfall. These bogs to which the geese retreated have now been developed by Bord na Mona: that at Clonfert (M92) was of particular importance for resting and feeding. Its loss has greatly affected the numbers of geese using the callows. However, Mongan's Bog near Clonmacnoise (NO3) remains unworked and is regularly resorted to.

The geese frequent the several callows in separate populations (with of course some interchanging and fluctuations according to water levels). In the 1940s these could be divided as follows:

Athlone (often only 2 km outside the town) to Long Island	150
Cloonown (NO3) and Clonmacnoise	200
Shannon Harbour to Banagher (NO1)	150
Portumna area (M80)	100

Total: 600

Present day total: 200-250

In the 1960s random visits were sufficient to give evidence of a declining population. Since 1973 fairly regular counts have been made over the sections from Athlone to Shannon Bridge (a) and from Shannon Bridge to Portumna (b). Peak counts each winter 1976-77 are as follows:

	A	B
1973-74	121	163
1974-75	30*	199
1975-76	93*	160
1976-77	110	205

* One count only.

In section (a) the callows most frequented are those near Long Island, the large callow just south of Cloonown and the one near Clonmacnoise. The large callows east of the river opposite Cloonown and lying just south of Long Island that used to hold up to 100 birds are now criss-crossed with wire fencing and have been virtually deserted.

In (b) the haunts include Slevoy Bay, Lough Derg, and the callow east of it (M80), callows just north of Portumna bridge, Portland Island (c. 40, having decreased since about 1970 from c. 100), the callow east of Meeneen (M91) (25-30 birds, but it is not clear whether or not these are birds from the Little Brosna population) and the 20 ha turlough at Firville (M90) which holds c. 20 at times.

Previously the birds of section (a) would often roost on flood waters south of

Athlone, but with increased disturbance now apparently flight to the south end of Lough Ree. Those of section (b) use Slevoir Bay and the vicinity of the Silver Islands (M80) for roosting.

Shooting disturbance since the mid-1950s has become tremendous, especially in section (a), about 750 game licences having been issued in Athlone (*E. Levinge in litt.*). There is some goose shooting.

There are no conservation measures.

12. Little Brosna River (M91). Cos. Offaly/Tipperary 150-170.

International importance

The habitat consists of an extensive area of marshy ground with some drier areas of relatively good grass. The chief area frequented by the geese lies on both sides of the river just south of Newtown (M91). Much of the ground is subject to considerable shallow flooding; this does not greatly inconvenience the geese.

When first studied in some detail in the 1940s the population was about 400 birds. In the early 1950s, as a result of increased disturbance from shooting, numbers fluctuated more markedly. This disturbance caused the birds to move away to callows elsewhere alongside the River Shannon or to the large bogs then in the neighbourhood.

Even today it is an important haunt which the geese use regularly despite disturbance. Since the development of so many nearby bogs by Bord na Mona the birds are now confined to the use of Redwood bog (M91) as a resting place and a retreat when disturbed from the river callows. The bog is now not greatly used for

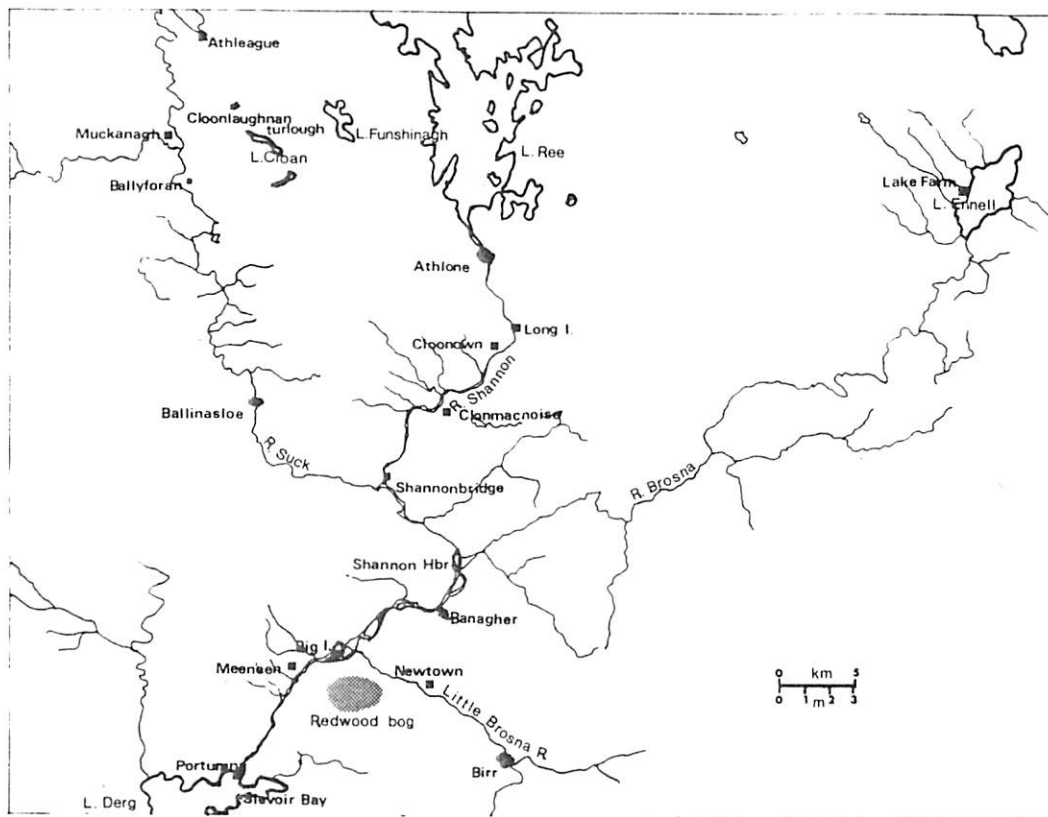


Fig. 6. Sites 7, 11, 12 and 13. Lough Ennell, Co. Westmeath; River Shannon, Athlone to Portumna; Little Brosna River, Cos. Offaly and Tipperary; Lough Funshinagh, Co. Roscommon and callows at Muckanagh, Co. Galway.

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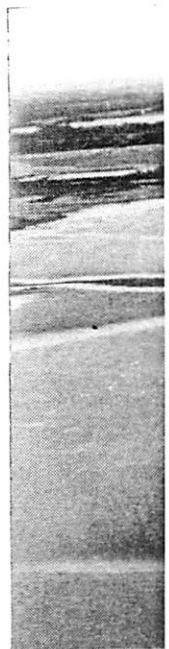


Plate 26:

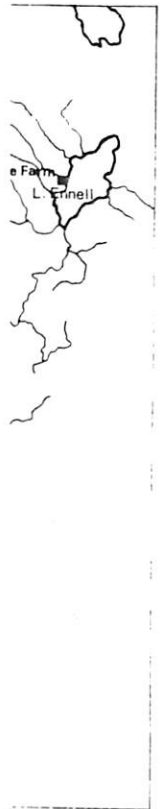
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Numbers in this haunt, having dropped so considerably since the 1940s, are now holding up fairly well. On days of intensive shooting numbers fluctuate considerably. When there is shooting along the Shannon valley additional birds are often driven into this haunt.

At times of migration in November and April considerable additional numbers come to the haunt for a few days, but many of those in November might well remain to winter, as they did formerly, if it were not for the extreme shooting disturbance in that month.

Big Island and Friar's Island (M91) at the confluence of the Little Brosna and Shannon Rivers are not used to the extent they were until the 1960s by a population from the Little Brosna. In the 1940s and 1950s up to 300 had been counted on the islands. A change in the habitat made the islands less suitable; few geese come there now and only irregularly. It is thought that those that occasionally come on to the callows just south of Shannon Harbour (NO1) are birds disturbed from the Little Brosna.

About 500 were counted south of Newtown (Little Brosna) on 3rd March 1963, 256 on 4th January 1967, 200 plus on 4th February 1970.

Since 1970 regular counting has given the following peak counts:

1970-71	266	1975-76	217
1971-72	340	1976-77	170
1972-73	570	1977-78	No count
1973-74	310	1978-79	176
1974-75	315		

The geese roost on flooded parts of the river valley or may go to the River Shannon, or even to Lough Derg.

It is unfortunate that the Forest and Wildlife Service despite continuing efforts have so far been unable to include within the area covered by a no-shooting Order



Plate 26: Little Brosna river running between flooded callows.

Photo: O. J. Merne

the area frequented by the geese, which lies just outside the boundary. An estimated 20 White-fronts are shot in the season.

Although so close to the River Shannon the population is conservative and, given the opportunity, confines itself to the Little Brosna callows. This haunt should be studied in conjunction with the River Shannon complex (site 11).

13. Lough Funshinagh (M95) Co. Roscommon, and callows at Muckanagh (M84) Co. Galway Peak number 125.

In years long previous to 1945 the callows along the River Suck from NW of Athleague (M85) to Muckanagh (M84) had a total population of up to 300. By the 1950s-1960s this had fallen to c. 100 (R & HW) consequent upon a whole series of resting and feeding grounds having become untenable. The bulk of the population then became concentrated at the Muckanagh callows and on the adjacent bog to the west of them. This bog was the only known resting place in the area. In 1977-78 Bord na Mona commenced work on it and in winter 1978-79 no geese used it. The disturbance on the bog, which overlooks the callows, may eventually drive the birds from these. The geese have not taken to the few remaining bogs in the Muckanagh area, all of which are to be worked by Bord na Mona.

In the winter 1978-79 the population on the callows peaked at 125 birds, but the geese fed there rather less regularly than formerly and were inclined to do so on areas farthest from the bog.

The callows are a Forest and Wildlife sanctuary as are nearby Cloonlaughnan turlough (M85) and Lough Funshinagh, all arising out of local enthusiasm. Cloonagh, beside the River Suck near Ballyforan (M84), is a local wildfowl sanctuary used to some extent by the geese.

Now that they are deprived of Muckanagh bog it seems that the focal point in winter 1978-79 was Lough Funshinagh. Up to 125 counted there were probably birds from Muckanagh as flights in that direction have been noted but no simultaneous count at the two places and at others used has been made.

Grassland bordering Cloonlaughnan turlough sanctuary is perhaps more favoured than previously, especially up to Christmas time; roosting takes place on the turlough. Other minor places are used by small parties.

There is some evidence of increased numbers (above what R & HW found) in the winters 1977-78 and 1978-79 since the sanctuaries were formed. This increase may derive from birds driven from the bogs both sides of the River Suck and the callows between Ballyforan and Shannonbridge (M92), Bord na Mona having moved into the bogs. The negligible numbers now found on those callows may be birds from the River Shannon (site 11).

A much favoured bog named Gowla (M74) was developed as a grass and sugar beet farm in the 1950s. Geese no longer come there due, it is said, to drainage, disturbance due to machinery and the fact that the grass is not of a kind favoured by the geese. The birds formerly using the place were evidently from the River Suck population.

At Lough Funshinagh the water level fluctuates so greatly and unpredictably that in some winters the place would not suit the geese. In winter 1978-79 the lake was very full and attractive, but in some years it is virtually dry. Lacking the right conditions and with the certainty that all the bogs are to be worked, it remains to be seen what the future holds for the goose population of the area.

Conservation measures are those sanctuaries mentioned.

14. Kilcolman Bog (R51) near Buttevant, Co. Cork Less than 10 irregularly

Early in the century a few visited the Fermoy district. At that time up to 50 were to be found in the marshes at Kilcolman, but numbers gradually declined, due, it is

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