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WORKING DOCUMENT:
FULL PLAN

GREENLAND WHITE-FRONTED GOOSE

Anser albifrons flavirostris

INTERNATIONAL CONSERVATION PLAN

Prepared for the

NATIONAL PARKS AND WILDLIFE SERVICE
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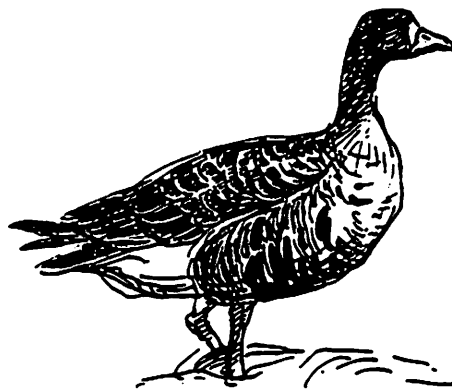
and the

INTERNATIONAL WATERFOWL AND WETLANDS RESEARCH BUREAU

by

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**"Pinngortitaaq pinngitsoorsinnaanagu piilu
isumalluutigalugit inuugatta uumassusillit
ataqatigiinnerannik ilisimanninnissarput
pisariaqarluinnarpoq. Imatut oqaannarsinnaavugut
pinngortitamik uumasuinillu paaqqinnikkumanerput
pissuteqanngimmat alutorinninnermik
aliannaarsaarniarnermillu, kisiannili inuuniarnermik."**

"For a people dependent on nature and its bounty,
ecological awareness is a simple *necessity of life*. In
other words, for us, the protection of nature and its
fauna is not a fashionable, romantic notion - but quite
simply a matter of survival."

Lars Emil Johansen
Premier of Greenland, 1991

"The wildlife of today is not ours to dispose of as we
please. We have it in trust. We must account for it to
those who come after."

King George VI

GREENLAND WHITE-FRONTED GOOSE INTERNATIONAL CONSERVATION PLAN

Contents

INTRODUCTION

PART 1 - DESCRIPTION

Chapter 1.1 Geographical Range

- 1.1.1 Geographic range
- 1.1.2 Summary description

Chapter 1.2 Species information

- 1.2.1 Taxonomy
- 1.2.2 Morphology
- 1.2.3 Population size and distribution
 - 1.2.3.1 Age and sex structures (not included in this plan)
 - 1.2.3.2 Range and movement
 - 1.2.3.3 Population structure
 - 1.2.3.4 Census techniques
- 1.2.4 Population dynamics
 - 1.2.4.1 Productivity
 - 1.2.4.2 Adult survival and mortality
 - 1.2.4.3 Behavioural observations
- 1.2.5 Diet
 - 1.2.5.1 Vegetation community selection
 - 1.2.5.2 Vegetation utilization (faecal analysis)
- 1.2.6 Cultural
 - 1.2.6.1 History of human perception/utilisation
 - 1.2.6.2 Current status of human perception/utilisation
 - 1.2.6.3 Past management in nature conservation

Chapter 1.3 Environmental information

- 1.3.1 Physical
 - 1.3.1.1 Climate
 - 1.3.1.2 Hydrology
 - 1.3.1.3 Geology/Geomorphology
 - 1.3.1.4 Soils and substrates
- 1.3.2 Biological
- 1.3.3 Cultural
 - 1.3.3.1 Archeology

- 1.3.3.2 Land use
 - 1.3.3.2.1 Past land use
 - 1.3.3.2.2 Present land use (not included in this plan)
 - 1.3.3.2.3 Land tenure systems

Chapter 1.4 Ecological relationships and implications for conservation [not included in this plan]

Chapter 1.5 Bibliography

PART 2 - EVALUATION

Chapter 2.1 Conservation status of the Greenland White-fronted Goose population and its habitats

2.1.1 Habitats

- 2.1.1.1 Historic interest
- 2.1.1.2 Present status of habitats

2.1.2 Population

- 2.1.2.1 Historic interest
- 2.1.2.2 Present day

Chapter 2.2 Evaluation

2.2.1 Criterion for evaluation

- 2.2.1.1 Naturalness
- 2.2.1.2 Rarity (population size)
- 2.2.1.3 Fragility
- 2.2.1.4 Typicalness
- 2.2.1.5 Recorded history
- 2.2.1.6 Relationship to national/international populations
- 2.2.1.7 Potential value
- 2.2.1.8 Intrinsic appeal

2.2.2 Identification/confirmation of important features

2.2.3 The population in wider perspective and implications for conservation [not included in this plan]

2.2.4 Specified limits

2.2.5 Ideal objectives

Chapter 2.3 Factors influencing management

2.3.1 Natural trends

- 2.3.2 **Anthropogenic trends**
 - 2.3.2.1 **Greenland**
 - 2.3.2.2 **Iceland**
 - 2.3.2.3 **Great Britain**
 - 2.3.2.4 **Northern Ireland**
 - 2.3.2.5 **Republic of Ireland**
- 2.3.3 **External factors**
- 2.3.4 **Obligations**
 - 2.3.4.1 **Relevant international legislation**
 - 2.3.4.2 **Relevant national legislation**
 - 2.3.4.3 **Other relevant obligations**
- 2.3.5 **Legal constraints**
- 2.3.6 **Conservation constraints**
 - 2.3.6.1 **Greenland**
 - 2.3.6.2 **Iceland**
 - 2.3.6.3 **Great Britain**
 - 2.3.6.4 **Northern Ireland**
 - 2.3.6.5 **Republic of Ireland**
- 2.3.7 **Impact assessment**

Chapter 2.4 Operational objectives and options

- 2.4.1 **Rationale**

PART 3 PRESCRIPTION

[Sections 3.1.1 - 3.3.2 are not yet included in this plan]

Chapter 3.1 Projects

- 3.1.1 **Project register and descriptions**
- 3.1.2 **Project groups**

Chapter 3.2 Work schedule

- 3.2.1 **Work programme**
- 3.2.2 **Annual work programme**

Chapter 3.3 Control

- 3.3.1 **Project recording system**
- 3.3.2 **Progress reports**
- 3.3.3 **Plan review**
 - 3.3.3.1. **Introduction**
 - 3.3.3.2. **Annual review**
 - 3.3.3.3. **Three year review**
 - 3.3.3.4. **Emergency review**

INTRODUCTION

Why do we need management plans for conservation?

Management planning for conservation is a relatively new practise, although the basic precepts are obvious and underlie much site-based conservation over the postwar decades.

The ideal is that all sites managed for nature conservation should have a management plan, the main purpose of which is to clearly state the target objectives and priorities for conservation. This ensures that there is continuity and stability of management i.e. those processes which maintain and enhance the nature conservation interest. Without an effective management plan, sites, and the fauna and flora they contain, are vulnerable to inconsistent management which can result in a waste of resources and, worse, in the loss of the special interest of the site.

Preparing a plan requires relevant information to be assembled and appraised. Once a full understanding of the sites present conservation status has been gained, the site-manager can then determine what must be done to maintain or enhance the important features of the site. This in turn leads to specific prescriptions to attain these objectives.

In comparison to the body of experience gained in developing management plans for sites, the concept of species or population conservation plans is more recent. There have been some notable examples of the development of 'Action Plans' for a range of bird species. Because of their economic and social importance, international plans were developed in the 1970s for several populations of North American Waterfowl. Notable plans include those for Pacific coast Brant *Branta bernicla* (Pacific Waterfowl Flyway Council 1978) and Greater Snow Geese *Anser caerulescens atlanticus* (CWS/FWS/AFC 1981). A coherent framework for such plans was developed by the North American Waterfowl Management Plan (1986) which presents a rationale for international co-operation between Canada, USA and Mexico in the conservation of waterfowl and their wetland habitat.

Such recovery or conservation plans are not restricted to waterfowl however, and other initiatives are underway in a variety of countries and for a wide range of migratory birds (e.g. Howe 1991; Boere 1991; Salathe 1991; Goriup & Schulz 1991).

Why use this format for conservation plans?

The format of the current Greenland White-fronted Goose international management plan follows the Countryside Management System (CMS) developed by the former Nature Conservancy Council. Although originally devised for site management plans (NCC 1991), it has been modified to more species-related relevance during the preparation of this plan.

There are considerable advantages in standardising the structure and format of plans. Standard headings provide the framework for

preparing plans and guide the less experienced in their preparation.

The standard format also helps to ensure that:

- the subject of the plan (whether species or site) is properly described;
- the importance of the species or site is assessed against recognised standards;
- clear objectives of conservation are laid down;
- relevant work is prescribed, planned and executed; and
- the effects of the work are carefully monitored.

Such details are as important for small, simple sites as for large international bird populations, if the value for conservation of each is to be maintained, and ever scarce resources used to best effect. The logical structure of the plan results in a clear statement as to what actions are being proposed or carried out and why. This is important as a statement to all with an interest in the species or site, as well as for future wildlife managers.

The plan is structured in three parts:

Part 1 gives the descriptive background necessary to justify the plan's actions. It covers areas such as population size and distribution, population dynamics, relevant environmental information such as background on past and present land-uses within the range, diet and habitat selection, and information on the past and present history of human perception, utilisation and nature conservation. Where appropriate, many sections present information broken down for each Range State separately.

Because of the range of material presented in Part 1 it is difficult to maintain a strict logical sequence of chapters and sections. It is rather to be regarded as a data-base to be quarried for information which supports later prescriptions. The structured format allows easy access to specific areas of information.

Part 2 then evaluates this background against a range of criteria. The requirement to address the evaluation criteria (e.g. naturalness, rarity, fragility, potential value etc.), results in a clear understanding of the justification for co-operation. Deriving from this evaluation are a set of ideal objectives. These may not necessarily be achievable, but are a clear statement of the ideal that the parties to the plan wish to achieve.

Following this statement of the ideal is an outline of the various constraints or opportunities that will either hinder or help in their achievement. These cover, for each of the Range States, the various management constraints such as resources for statutory conservation, existing policies for conservation and wildlife management, anthropogenic impacts - such as shooting and habitat loss, as well as a range of other factors. On the positive side is a description of the various relevant obligations under national and international law.

With a clear idea of these constraints, 'operational objectives'

are identified, which may be a step back from the ideal, but will be on the same road. The careful separation of the ideal, from the constraints, and from the realisable operational objectives is important. It allows reassessment of the plan targets in the light of any future change in constraints.

The third part of the plan develops the necessary prescriptions to implement the operational objectives, and the identification of work programmes and project recording systems. To a major extent these need to be developed individually in each Range State according to their own conservation management systems. The objective of the plan is to provide an common international outline, which will then be implemented in more detail by a series of national plans.

In effect, the international plan is a road map to a destination: it will be for each country to use it to navigate themselves towards the goal, and clearly some countries may take longer to make this journey than others. However, at least all will now be travelling in the same direction!

Why do we need an international plan for Greenland Whitefronts?

For some years, those involved in Greenland White-fronted Goose conservation have promoted the need for a conservation plan for the population as a whole. This would address the various problems and opportunities facing the population at an international scale and would facilitate co-operation between the four nations (Greenland/Denmark, Iceland, Ireland and the United Kingdom) responsible for the well-being of this small population.

The first steps in this direction were taken at the 1990 Montreux meeting of the parties to the Ramsar Convention. A meeting of representatives of the four Range States was held to discuss co-operation under Article 5 of the Ramsar Convention (which encourages international co-ordination in the conservation of wetlands and their fauna).

An outcome of this meeting was that the Republic of Ireland agreed to be host to a further meeting of Range States at Wexford, Ireland in March 1992. Ireland further agreed to sponsor an international conservation plan, and contracted IWRB to co-ordinate the meeting and develop the plan, which has been prepared by the UK Joint Nature Conservation Committee.

Consultation

This draft plan has been developed following extensive consultation with interested parties throughout the range of the Greenland White-fronted Goose. The following have all contributed to the draft plan:

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REFERENCES

- Boere, G.C. (1991). The Bonn Convention and the conservation of migratory birds. In: Salathe, T. (Ed.) *Conserving migratory birds*. ICBP Technical Publication No. 12. Cambridge. Pp. 345-360.
- Canadian Wildlife Service, US Fish and Wildlife Service, & Atlantic Flyway Council, Technical Section (1981). *A Greater Snow Goose management plan*.
- Goriup, P.D. & Schulz, H. (1991). Conservation management of the White-stork: an international need and opportunity. In: Salathe, T. (Ed.) *Conserving migratory birds*. ICBP Technical Publication No. 12. Cambridge. Pp. 97-127.
- Howe, M.A. (1991). Federal research on the conservation of migratory nongame birds in the United States. In: Salathe, T. (Ed.) *Conserving migratory birds*. ICBP Technical Publication No. 12. Cambridge. Pp. 225-257.
- Nature Conservancy Council (1991). *Site management plans for nature conservation: a working guide*. Nature Conservancy Council, Peterborough.
- Pacific Waterfowl Flyway Council, Technical Committee (1978). *Management Plan, Pacific coast Brant*.
- Salathe, T. (1991). Forward plan for the ICBP Migratory Birds Programme 1991-1994 (West Palearctic-African Flyways). In: Salathe, T. (Ed.) *Conserving migratory birds*. ICBP Technical Publication No. 12. Cambridge. Pp. 383-393.
- US Fish and Wildlife Service, & Canadian Wildlife Service (1986). *North American Waterfowl Management Plan: a strategy for cooperation*.

Glossary

In this plan the term goose or geese refers to the Greenland White-fronted Goose or Geese unless otherwise stated.

| | |
|------------------|---------------------------------------------------------------------------------------------------------------|
| ASI | Area of Scientific Interest (Ireland) |
| ASSI | Area of Special Scientific Interest (Northern Ireland) |
| CAP | Common Agricultural Policy (EEC) |
| CCW | Countryside Council for Wales |
| CITES | Convention on the International Trade in Endangered Species |
| CMS | Countryside Management System |
| EC | European Commission |
| EEC | European Economic Community |
| EN | English Nature |
| ESA | Environmentally Sensitive Area (UK and Ireland) |
| FACE | |
| GB | Great Britain (England, Scotland and Wales) |
| GWGS | Greenland White-fronted Goose Study |
| IUCN | International Union for the Conservation of Nature |
| IWC | Irish Wildbird Conservancy |
| IWRB | International Waterfowl and Wetlands Research Bureau |
| JNCC | Joint Nature Conservation Committee (UK) |
| NARGC | National Association of Regional Game Councils (Ireland) |
| NCA | Nature Conservation Act (Iceland) |
| NCC | Nature Conservancy Council (GB) or Nature Conservation Council (Iceland) |
| NCCS | Nature Conservancy Council for Scotland |
| NCR | Nature Conservation Review site (GB) |
| NNR | National Nature Reserve (GB) |
| NR | Nature Reserve (Iceland) |
| NPWS | National Parks and Wildlife Service (Ireland) |
| PPRS | Project Planning and Recording System |
| pRamsar | proposed site for listing under Ramsar Convention |
| pSPA | proposed Special Protection Area under EEC Birds Directive |
| pSSSI | proposed Site of Special Scientific Interest (GB) |
| Range State this | A state within the range of a defined species (in instance within the range of Greenland White-fronted Geese) |
| Ramsar site | site listed under the Ramsar Convention |
| RSPB | Royal Society for the Protection of Birds (UK) |
| SI | Skotveidifelag Islands (Icelandic Shooting Society) |
| SNH | Scottish Natural Heritage |
| SPA | Special Protection Area under EEC Birds Directive |
| SSI | Site of Scientific Interest (Iceland) |
| SSSI | Site of Special Scientific Interest (GB) |
| UK | United Kingdom (England, Scotland, Wales & Northern Ireland) |
| WWT | Wildfowl and Wetlands Trust (UK) |

PART 1

DESCRIPTION

PART 1. DESCRIPTION

The description is a summary statement in which important aspects of the population and its ecology are clearly set out. The description is succinct and references are given to other source material as appropriate. The description aims to convey to wildlife managers, present and future, a picture of the population at the time the plan is compiled. Sections should be revised and updated as more information becomes available.

Chapter 1.1. Geographical Range

This chapter relates the population to its geographic setting.

Section 1.1.1 Geographic range

White-fronted Geese *Anser albifrons* have a circumpolar distribution and a wide geographical range in both summer and winter.

The world range of the subspecies *Anser albifrons flavirostris* is limited to Greenland, Iceland, Britain and the island of Ireland (Figure 1.1.1.1).

Occasional stragglers occur in the eastern states of North America (references in Fox & Stroud 1981; National Parks & Wildlife Service unpublished; Reed pers. comm.), but its normal wintering area is entirely within the western Palearctic.

REFERENCES

- Fox, A.D. & Stroud, D.A. (1981). The life history and ecology of the Greenland White-fronted Goose. In: Fox, A.D. & Stroud, D.A. (1981). *The Report of the 1979 Greenland White-fronted Goose Study Expedition to Eqaungmiut Nunaat, West Greenland*. GWGS, Aberystwyth. Pp. 148-155.

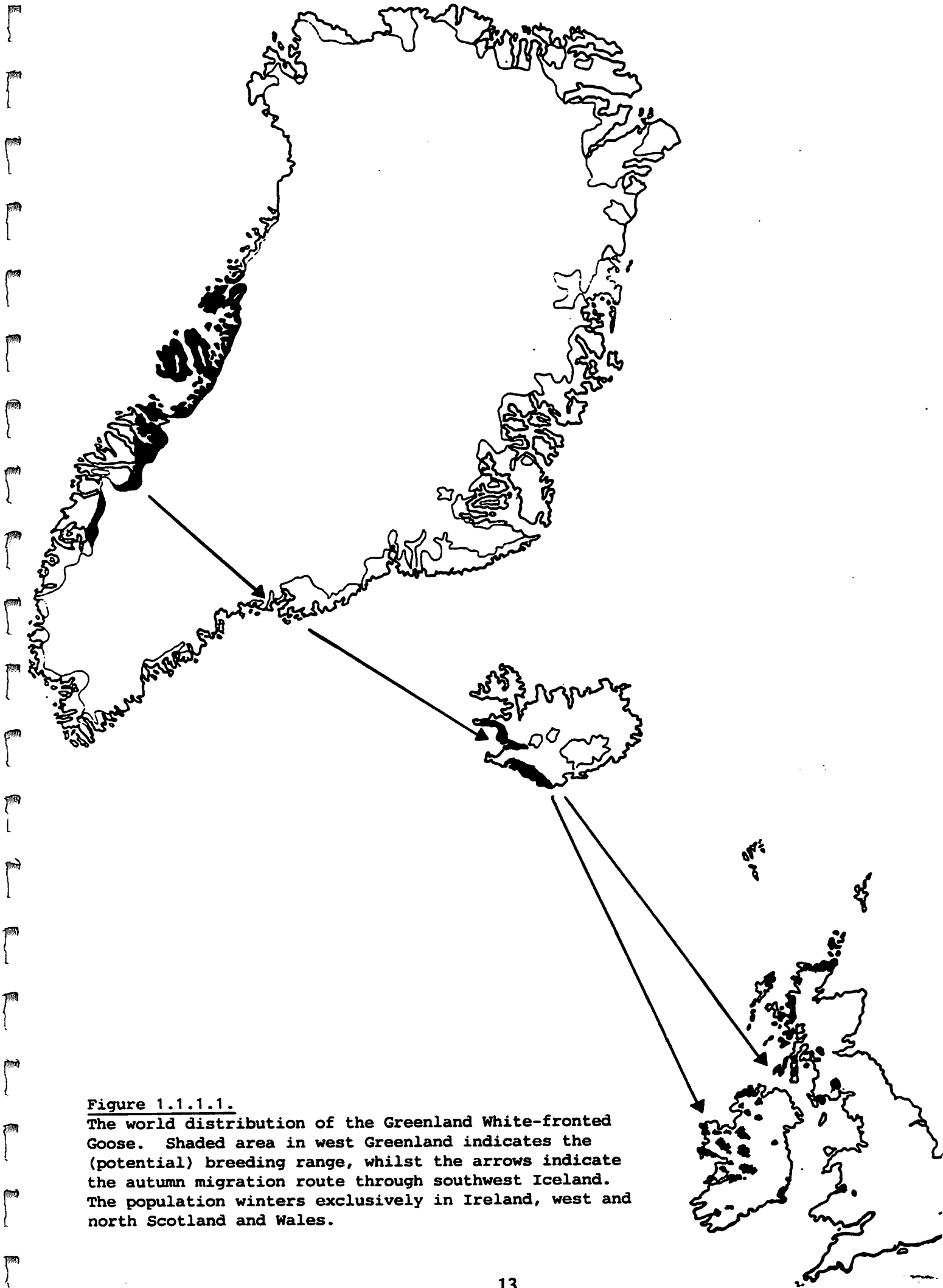


Figure 1.1.1.1.
The world distribution of the Greenland White-fronted Goose. Shaded area in west Greenland indicates the (potential) breeding range, whilst the arrows indicate the autumn migration route through southwest Iceland. The population winters exclusively in Ireland, west and north Scotland and Wales.

Section 1.1.2 Summary description

The Greenland White-fronted Goose is the most morphologically distinct of all races of White-fronted Goose and has discrete breeding and wintering areas. It breeds in west Greenland, occurs on migration in Iceland and winters exclusively in Ireland, Scotland and Wales.

The world population declined from 17,500 - 23,000 in the 1950s to 14,300 - 16,600 in the late 1970s. Following conservation measures on the wintering grounds and in Greenland during the early 1980s, and several recent successful breeding seasons, the population in April 1991 was thought to number c. 29,400. However, the small world population, its limited range and low productivity, coupled with habitat loss and disturbance on wintering and staging areas, and its high site-fidelity, give continued concern for the long-term well-being of this population.

The range of the geese in winter and summer includes some of the least populated areas of Britain and Ireland and many inaccessible parts of west Greenland. Although basic information on numbers, distribution, ecology and behaviour was lacking for this race of goose in the late 1970s, more recent research has given an adequate understanding of distribution and abundance on the wintering grounds.

The conservation of this goose is the responsibility of the four countries (Greenland, Iceland, the Republic of Ireland and the United Kingdom) which support the population at different times of the year. As such there would be considerable benefits from greater international co-ordination concerning its conservation.

Chapter 1.2 Species information

Section 1.2.1 Taxonomy

The species' taxonomy is still debated, but it is widely agreed that there are five subspecies or races, each with a variable number of populations. Greenland White-fronted Geese *A. a. flavirostris* are the most morphologically distinct Whitefront race and have breeding and wintering areas discrete from other races.

Their evolutionary origin is unclear (Fox & Stroud 1981). During the last glaciation Whitefronts were forced southwards. Palearctic ancestral Whitefronts gave rise to *flavirostris* which survived the glaciation in the ice-free tundras of the southern North Sea and Ireland. After the glaciation they gradually moved north to their present restricted range in west Greenland (Johansen 1956). However, Ploeger (1968) considered that the slight morphological differences between *flavirostris* and *albifrons* point to a common origin and suggests that the present separation was caused by the use of different refuge areas in the North Sea.

Whatever the precise origins of *flavirostris* from the ancestral *Anser albifrons* stock, it is evident that they represent one of the earliest groups to split off, both on the basis of their morphological differences and their isolated breeding area. This is reflected by significant differences between *Anser albifrons* races in both summer and winter ecology (Fox et al. 1983).

The Greenland race was only taxonomically described as recently as 1948 (Dalgety & Scott 1948).

REFERENCES

- Dalgety, C.T. & Scott, P. (1948). A new race of the White-fronted Goose. *Bulletin of the British Ornithologists Club* 68: 109-121.
- Fox, A.D. & Stroud, D.A. (1981). The life history and ecology of the Greenland White-fronted Goose. In: Fox, A.D. & Stroud, D.A. (1981). *The Report of the 1979 Greenland White-fronted Goose Study Expedition to Egoalungmiut Nunaat, West Greenland*. GWGS, Aberystwyth. Pp. 148-155.
- Fox, A.D., Madsen, J. & Stroud, D.A. (1983). A review of the life history and ecology of the Greenland White-fronted Goose. *Dansk Ornitologisk Forenings Tidsskrift* 77: 43-55.
- Johansen, H. (1956). *Revision und entstehung der arktischen vogel fauna. Gaviae - Galli*. Kobenhavn, Munksgaard. 1-96.
- Ploeger, P.L. (1968). *Geographical differentiation of Arctic Anatidae as a result of isolation during the last glacial*. Leiden. E.J. Brill. 159pp.

Section 1.2.2 Morphology

Greenland White-fronted Geese are medium/large 'grey' geese.

Significant samples of weights of Greenland White-fronted Geese are only available from Islay (Stroud unpublished), Wexford (Mernin in Cramp & Simmons 1977; Wilson, Norriss & Walsh unpublished data) and from Egalummiut nunaat, an area of the breeding grounds in west Greenland (Belman 1981; Davies unpublished).

Adult geese measured on Islay were heavier than published weights of *A. a. albifrons* and *A. a. frontalis*, but lighter than those of *A. a. gambelli*. They fell within the ranges of the other weights of Greenland White-fronted Geese.

Examination of recent biometric data from Wexford and Islay (Fox *et al.* unpublished) has shown that there are very significant differences in weight between sexes and age classes. In both sexes, juveniles are lighter than older birds, and males are heavier than females.

Seasonal changes in weight were also examined with data pooled from all years. At Wexford, all adults generally increased body weight from October to April, although with a slight male decline in weight in February and March. The weight of adult females continued to increase through February to March/April. Juvenile weights generally rose from October to March, although a small sample of juvenile males declined in weight in March, whilst there was a slight decline in weight of juvenile females in November.

On Islay alone, there was no significant weight change shown by geese over the period December - February 1980/81, albeit that the sample was very small.

Other published biometric information is given by Cramp & Simmons (1977) and Belman (1981).

REFERENCES

- Belman, P.J. (1981). Ringing and recoveries of Greenland White-fronted Geese. In: Fox, A.D. & Stroud, D.A. (1981). *The Report of the 1979 Greenland White-fronted Goose Study Expedition to Egalungmiut Nunaat, West Greenland*. GWGS, Aberystwyth. Pp. 123-138.
- Cramp, S. & Simmons, K.E.L. (Eds.) (1977). *Birds of the Western Palearctic, Volume 1*. OUP, Oxford.

Section 1.2.3 Population size and distribution

The population has been well monitored for less than a decade. The first comprehensive collation of information on the wintering population (Ruttledge & Ogilvie 1979) estimated the population to have declined from between 17,500 - 23,000 birds in the late 1950s to about 14,300 - 16,600 in the late 1970s. The decline had not been uniform across the range, with an estimated 50% decline in Ireland (from 12,700 - 17,300 to 7,500 - 8,600). There had been earlier suggestions of regional declines in abundance also (Ruttledge 1973).

The first co-ordinated international count of the population in spring 1983 found 16,540 geese (Table 1.2.3.1). Since then there has been a progressive increase in overall numbers to a spring 1991 total of 29,400.

The increase of the population has not been uniform. In particular, numbers at the main population centres of Wexford and Islay have increased disproportionately, leading to an increasing concentration of the population in these two areas (Figure 1.2.3.1). At the same time as these increases, some of the smaller flocks have either declined, remained stable or only slowly increased. (Figure 1.2.3.4.5)

Greenland

The population breeds exclusively in low arctic areas of west Greenland from 63° - 72° N (Salomonsen 1950, 1967). In the late 1940s the geese became much more abundant towards the north of their range, possibly extending it in response to climatic amelioration (Salomonsen 1948). Recent sightings from the Thule area may suggest further expansion northwards (Best & Higgs 1990). Figure 1.2.3.2 indicates the best available information on the range extent derived from published sources and inferred also from aerial census information (Fox & Stroud unpublished).

Although there are records of migrant Greenland Whitefronts in east Greenland in spring and autumn (Stroud & Fox 1981; Alerstam *et al.* 1986), there are no breeding records from these areas.

There have been no extensive surveys of Whitefronts in Greenland due to the highly dispersed summering population and difficult terrain. In view of the consequent logistical difficulties, it is unlikely that it will ever be possible to monitor population numbers on the breeding grounds. The only available quantitative information is summarised in Table 1.2.3.2 and derives from a few expeditions which have undertaken ground survey and aerial survey flights in 1988 and 1989.

The general conclusions from these surveys are that in comparison with many other arctic breeding geese, Greenland Whitefronts are highly dispersed in summer, with the exception of a few areas where relatively dense concentrations occur (e.g. Naternaq and Aqaajarua-Sullorsuaq). Other relatively dense concentrations

occur on arrival in spring when large flocks gather in a few, traditional, early thawing lowlands. Flocks of families and non-breeders gather together in late summer although these generally do not exceed c. 30 birds.

Iceland

Greenland White-fronted Geese pass on migration through south and west Iceland in spring and autumn (Figure 1.1.1.1; Francis & Fox 1987; Fox et al. 1983; Gardarsson 1975, 1976). Until recently, distributional information was poor. Studies since 1986 have given a more detailed, although still incomplete, picture.

The southern staging area is largely agricultural land between Olfusa and Landeyjar (Sudurland). The western staging areas, in the Myrar - Snaefellsnes region (Vesturland), hold a higher proportion of semi-natural wetland habitat. Summary census information for these two areas is given in Table 1.2.3.3. It remains unclear to what extent there is turnover within each staging area and/or exchange of birds between staging areas within a season. Not all potential staging areas (e.g. Medalland in Vestur Skaftefellssysla) have been searched during recent censuses.

 Table 1.2.3.3. Minimum use of Icelandic staging areas by Greenland White-fronted Geese.

| | | | |
|---------------------------------|-------------------|-------|----------------------|
| <u>Olfusa - Landeyjar</u> | | | |
| 1986 | 28 April - 2 May | 2,027 | Francis & Fox (1987) |
| | 27 - 30 September | 570 | GWGS (1988) |
| [1987/1988/1989/1990/1991] | | | |
| <u>Myrar - Snaefellsnes</u> | | | |
| 1986 | 2 May - 8 May | 1,438 | Francis & Fox (1987) |
| | 1 - 6 October | 1,785 | GWGS (1988) |
| [1987/1988/1989/1990/1991] | | | |

Scotland

In Scotland, the range of Greenland Whitefronts extends from the recently established flock at Sullom Voe, Shetland in the north, to sites in Galloway in the south-west. The distribution is principally northern and western. Sites are listed in Table 1.2.3.4.

Features of wintering sites are that they are scattered and highly traditional. The distributional range across the country is extensive but except for Islay, there are very few wintering sites and the geese are only locally abundant (flocks of hundreds) compared to most other goose species (c.f. Greylag *A. anser* and Pink-footed Geese *A. brachyrhynchus*) which occur in flocks of

several thousand and have total population sizes of more than 100,000.

Most Greenland Whitefronts are found on the island of Islay, Argyll. On this island, the sizes of individual flocks are generally similar to those at other British sites, despite the high total numbers on the island as a whole (Table 1.2.3.5). As outlined above, numbers on Islay have increased at a more rapid rate than other wintering sites. The proportion of the Scottish total on Islay has increased from 48.6% in autumn 1982 to 58.3% in spring 1991 in a progressive trend.

Other areas or sites holding relatively large numbers are found in Galloway, Kintyre, Coll, Tiree and Caithness.

Wales

In Wales, Greenland White-fronted Geese are highly localised, occurring at only two sites. The principal current site is at the Dyfi Estuary. Formerly internationally important numbers occurred on the adjacent Cors Fochno (Borth Bog) but in recent years the flock has occurred on saltmarsh and estuarine grassland areas. Very small numbers still occur in upland areas of Powys.

In the early 1960s up to 800 geese occurred at Cors Tregaron (Tregaron Bog), but this site was deserted following the severe winter of 1962/63. There are also historic records from Llanbrynmair Moors although these birds are almost certainly the Powys flock referred to above.

Fox & Stroud (1986) reviewed available information on the past and present status of Greenland Whitefronts in the Principality.

England

Prior to 1940, Greenland White-fronted Geese occurred at sites around Morecambe Bay in Lancashire and Cumbria (Ruttledge & Ogilvie 1979). However, this area is now deserted except for scattered individuals or family groups that sometimes occur with Pink-footed Geese in north-west England.

Greenland Whitefronts no longer regularly occur in England. A small number of vagrants occur in some years (Table 1.2.3.1).

Northern Ireland

A total of five sites are known from Northern Ireland. Two of these (Pettigo Plateau and Caledon) occur on the border with the Republic of Ireland and birds from all sites regularly occur on both sides of the international border.

The five regular sites (Table 1.2.3.6) are all small and none hold >100 birds since 1983. The trans-border nature of most of these flocks gives particular problems in terms of achieving regular census coverage.

There was previously a flock, now extinct at Downpatrick and possibly also at Strangford Lough (c.250). Ruttledge & Ogilvie (1979) also documented flock extinctions in the 1960s from the moors between Coleraine and Limavady, Co. Derry and the moors of north Antrim.

Republic of Ireland

The main concentration of birds is on farmland at Wexford Slobs where peak numbers of c. 10,000 have been found in some recent winters. Elsewhere in Ireland numbers are generally much smaller and individual flocks currently do not exceed 300-600 geese even in important areas such as the Little Brosna and Shannon complexes of sites (Ruttledge & Ogilvie 1979; Wilson & Norriss 1985; Norriss & Wilson 1986, 1987, 1988, 1989). Flocks are widely distributed and occur from Co. Kerry in the south to Donegal in the north. With the exception of Wexford and associated off-shoots (Cahore and Tacumshin), the distribution of the Irish flocks is essentially western and central, following the former distribution of blanket bogs and midland raised mires. There has been development of a new winter site at Cahore, some 20 km from Wexford in the mid 1980s. This followed the increase in numbers of the Wexford and intensive scaring on one part of the North Slob (Walsh unpublished). It has since declined in the absence of scaring.

Many of the smaller outlying flocks, particularly in the south of Ireland have declined in numbers giving the potential risk of a major contraction of range should these declines lead to flock extinctions. Figure 1.2.3.3 (and Table 1.2.3.7) give details of specific flocks.

A large proportion of flocks are small in size with a high proportion of the population held at only a few sites (Figure 1.2.3.4). These small flocks are predominantly on semi-natural or natural habitats. In terms of conservation of range, the role played by the smaller flocks is particularly important, although the sites holding large numbers are also important in the numeric sense.

Ruttledge & Ogilvie (1979) also documented a number of flock extinctions in Ireland, too numerous to list here, from a variety of causes.

REFERENCES

- Alerstam, T., Hjort, C., Hogstedt, G., Jonsson, P.E., Karlsson J. & Larsson, B. (1986). Spring migration of birds across the Greenland Inlandice. *Meddelelser om Gronland, Bioscience* 21: 1-38.
- Best, J.R. & Higgs, W.J. (1990). Bird population status changes in Thule district, North Greenland. *Dansk Ornitologisk Forenings Tidsskrift* 84: 159-165.

- Fox, A.D., Madsen, J. & Stroud, D.A. (1983). A review of the life history and ecology of the Greenland White-fronted Goose. *Dansk Ornitologisk Forenings Tidsskrift* 77: 43-55.
- Fox, A.D. & Stroud, D.A. (1986). The Greenland White-fronted Goose in Wales. *Nature in Wales (New Series)* 4: 20-27.
- Francis, I.S. & Fox, A.D. (1987). Spring migration of Greenland White-fronted Geese through Iceland. *Wildfowl* 38: 7-12.
- Gardarsson, A. (1975). *Islenskir votlendisfuglar*: 100-134. Rit Landverndar 4, Votlendi. [Icelandic Environment Union Publication No. 4, Wetlands]
- Gardarsson, A. (1976). Wetlands and waterfowl national reports: Iceland. In: Proc. International Conference on Wetlands and Waterfowl. Heiligenhafen. IWRB. Pp. 104-107.
- Norriss, D.W. & Wilson, H.J. (1986). *Greenland White-fronted Geese in Ireland 1985/86. A progress report.* Department of Tourism, Fisheries and Forestry. Forest and Wildlife Service, Dublin.
- Norriss, D.W. & Wilson, H.J. (1987). *Greenland White-fronted Geese in Ireland 1986/87.* Office of Public Works. Forest and Wildlife Service, Dublin.
- Norriss, D.W. & Wilson, H.J. (1988). *Greenland White-fronted Geese in Ireland 1987/88.* Office of Public Works. Forest and Wildlife Service, Dublin.
- Norriss, D.W. & Wilson, H.J. (1989). *Greenland White-fronted Geese in Ireland 1988/89.* Office of Public Works. Wildlife Service, Dublin.
- Ruttledge, R.F. (1973). Decrease in Greenland White-fronted Geese wintering in Ireland. *Irish Bird Report* 21: 61-62.
- Ruttledge, R.F. & Ogilvie, M.A. (1979). The past and current status of the Greenland White-fronted Goose in Ireland and Britain. *Irish Birds* 1: 293-363.
- Salomonsen, F. (1948). The distribution of birds and the recent climatic change in the North Atlantic area. *Dansk Ornitologisk Forenings Tidsskrift* 42: 85-99.
- Salomonsen, F. (1950). *Gronlands Fugle. The Birds of Greenland.* Kobenhavn; 609pp.
- Salomonsen, F. (1967). *Fuglene pa Gronland.* Rhodos, Kobenhaven; 342pp.
- Stroud, D.A. (1981). The distribution and abundance of Greenland White-fronted Geese (*Anser albifrons flavirostris*) in Egalungmiut Nunat. In: Fox, A.D. & Stroud, D.A. (1981). *The Report of the 1979 Greenland White-fronted Goose Study Expedition to Egalungmiut Nunaat, West Greenland.* GWGS, Aberystwyth. Pp. 51-62.
- Stroud, D.A. & Fox, A.D. (1981). The status of the Greenland White-fronted Goose in east Greenland. In: Fox, A.D. & Stroud, D.A. (1981). *The Report of the 1979 Greenland White-fronted Goose Study Expedition to Egalungmiut Nunaat, West Greenland.* GWGS, Aberystwyth. Pp. 146-147.
- Wilson, H.J. & Norriss, D.W. (1985). *The Greenland White-fronted Goose in Ireland 1982/83 to 1984/85. A report on its status, distribution and the impact of shooting.* Report of Forest & Wildlife Service, Department of Fisheries and Forestry, Dublin. 37pp.

Table 1.2.3.1. Summary of Greenland White-front population data

| | | Wexford | Rest of Northern Ireland | Rest of Northern Ireland | Islay | Rest of Scotland | England | Wales | Total |
|---------|--------|---------|-----------------------------|-----------------------------|-------|---------------------|---------|-------|--------|
| 1982/83 | Autumn | 4,913 | no count | no count | 3,501 | 3,582 | 33 | 73 | n/a |
| | Spring | 6,363 | 2,735 | 161 | 3,441 | 3,768 | 0 | 73 | 16,541 |
| 1983/84 | Autumn | 4,758 | 2,731 | 148 | 4,592 | 3,502 | 1 | 93 | 15,825 |
| | Spring | 6,267 | 3,184 | 160 | 4,198 | 3,646 | 4 | 78 | 17,537 |
| 1984/85 | Autumn | 6,097 | 2,910 | 120 | 5,256 | 4,148 | 10 | 76 | 18,617 |
| | Spring | 7,590 | 3,179 | 182 | 4,715 | 4,181 | 13 | 88 | 19,948 |
| 1985/86 | Autumn | 7,930 | 3,401 | 164 | 6,332 | 4,719 | 1 | 93 | 22,640 |
| | Spring | 7,940 | 3,786 | 142 | 5,669 | 4,255 | 0 | 98 | 21,890 |
| 1986/87 | Autumn | 7,033 | 3,020 | 165 | 6,126 | 4,701 | 3 | 81 | 21,129 |
| | Spring | 7,780 | 3,952 | 154 | 6,486 | 4,814 | 0 | 95 | 23,281 |
| 1987/88 | Autumn | 7,988 | 3,800 | 152 | 7,373 | 5,036 | 4 | 102 | 24,455 |
| | Spring | 8,781 | 4,249 | 0 | 7,314 | 4,422 | 1 | 127 | 24,894 |
| 1988/89 | Autumn | 10,510 | 4,216 | 112 | 7,588 | 4,810 | 0 | 105 | 27,341 |
| | Spring | 9,799 | 4,136 | 179 | 6,816 | 4,883 | 0 | 124 | 25,937 |
| 1989/90 | Autumn | 8,238 | 4,040 | 133 | 8,560 | 5,735 | 16 | 123 | 26,845 |
| | Spring | 9,331 | 3,793 | 149 | 7,209 | 5,681 | 1 | 93 | 26,257 |
| 1990/91 | Autumn | 8,072 | 4,165 | 110 | 8,297 | 6,293 | 2 | 170 | 27,109 |
| | Spring | 9,598 | 4,454 | 156 | 8,857 | 6,173 | 0 | 150 | 29,388 |

Table 1.2.3.2. Survey data on Greenland White-fronted Geese in Greenland.

| Region | Co-ordinates | Date | Area | Total Notes geese | Source |
|-----------------------------|-----------------|------------------|------------|----------------------------------------------------------|-----------------------------------------|
| Svartenhuk Halvo (Nunavik) | 71 45'N 54 5'W | August 1989 | | 649 516 non-breeders, 19 prs. + total 95 goslings | Ettrup & Thing (unpubl.): ground survey |
| | 71 35'N 55 30'W | Sept 10 1989 ??? | | 280 Single late season flock at Narsaq only | Bennike (1990): ground count only |
| Sarqaqadalen, Nugsuaq | 70 05'N 52 5'W | July 1965 | 25 kmsq | 35 15 adults, 20 goslings | Joensen & Preuss (1972): ground survey |
| Aqaajarua-Sullorsuaq, Disko | 69 40'N 52 W | July 1989 | 68 kmsq | 281 254 non-breeders, 5 prs. + total 17 goslings | Primer & Nielsen (1990) |
| Naternaq/Lersletten | 68 20'N 52 W | August 1988 | | 901 Estimate of c.6,000 for whole 1,500 kmsq Ramsar site | Fox & Stroud (1988): aerial survey |
| | | August 1989 | | 2,670 Revised estimate 2,670 for 1,500 kmsq Ramsar site | Fox/GWGS/WMT unpubl.: aerial survey |
| | 68 20'N 52 50'W | July 1990 | 45 kmsq | 923 Total counted in sample area | Fox et al. unpublished |
| Eqalummiut nunaa | 67 38'N 50 25'W | July 1979 | 750 kmsq | 390-440 300-340 non-breeders, 90-100 in families | Stroud (1981): ground survey |
| | 67 38'N 50 25'W | July 1984 | c700 kmsq | 341 | Davies/GWGS unpubl.: ground survey |
| | 67 38'N 50 25'W | August 1988 | | 287 | Fox & Stroud (1988): aerial survey |
| Ipiutarasup nuna/Ugssuit | 67 40'N 50 30'W | August 1988 | | 232 | Fox & Stroud (1988): aerial survey |
| Amitsuarsuk | 67 34'N 49 45'W | August 1988 | | 36 | Fox & Stroud (1988): aerial survey |
| Isungua, Sndr. Stromfjord | 67 7'N 50 30'W | August 1988 | 280 kmsq | 153 113 non-breeders, 40 in families, 28 young | Fox & Stroud (1988): ground survey |
| | 67 7'N 50 30'W | August 1989 | 280 kmsq | 221 34 in families, 24 young | Fox/WMT/GWGS unpubl.: ground survey |
| | 67 7'N 50 30'W | August 1989 | 570 kmsq | 232 | Fox/WMT/GWGS unpubl.: aerial survey |
| Angujartorfjup nuna | 66 45'N 50 30'W | August 1988 | | 283 7 non-breeders, 62 in families, 38 young | Fox & Stroud (1988): aerial survey |
| Nagsugtup Nuna | 67 20'N 51 W | August 1989 | 2,200 kmsq | 452 | Fox/WMT/GWGS unpubl.: aerial survey |

Table 1.2.3.4

Traditional Greenland White-fronted Goose sites in Scotland and Wales with principal sources of site-specific information. Ruttledge & Ogilvie (1979) and Owen *et al.* (1986) also give information on most sites, and much unpublished information is held by the Greenland White-fronted Goose Study on all sites.

| information | Principal published sources |
|-----------------------------------------|--------------------------------------------------------------------|
| NORTH-EAST SCOTLAND | |
| Shetland: Sullom Voe | Dale in GWGS (1990) |
| Orkney: Tankerness & Holm | |
| Orkney: Loons & Ibister | |
| Orkney: Stronsay | |
| Caithness: Westfield | Laybourne (1986); Fox & Laybourne (1985a,b); Laybourne & Fox 1988) |
| Caithness: Loch Heilen | as above |
| Caithness: Scarmclate | as above |
| Caithness: Wester | as above |
| Cromarty: Loch Eye | |
| Cromarty: Morrich More | |
| NORTH-WEST SCOTLAND | |
| Lewis: Barvas & Shawbost | Cunningham <u>et al.</u> (1990) |
| Benbecula: Nunton | Cunningham <u>et al.</u> (1990) |
| South Uist: Askernish | Cunningham <u>et al.</u> (1990) |
| South Uist: Loch Bee | Cunningham <u>et al.</u> (1990) |
| Skye: Snizort | |
| Skye: Broadford | |
| Gairloch: Loch Sguod | GWGS (1986) |
| Muck and Eigg | |
| NORTH ARGYLL | |
| Loch Sheil & Claish Moss | |
| Lismore | |
| Appin | |
| Eriska & Benderloch | |
| Tiree (whole island) | Fox <u>et al.</u> (1989) |
| Coll (whole island) | Fox <u>et al.</u> (1989) |
| Mull: Loch Poit na h-I, Fidden & Iona | |
| Mull: Loch Assapol | |
| SOUTH ARGYLL | |
| Colonsay & Oransay | Clarke & Clarke in GWGS (1990) |
| Danna | |
| Moine Mhor & Crinan | |
| Jura: Loch a'Chnuic Bhric | |
| Jura: Lowlandmans Bay & Loch a'Mhuilinn | |
| Rhunahaorine | Bignal (1988); Bignal in GWGS (1988) |
| Machrihanish | Bignal (1988); Bignal in GWGS (1988) |
| Isle of Bute | |

Loch Lomond: Endrick Mouth

ISLAY

Ogilvie (1983); Bignal
et al. (1989); Easterbee
et al. 1990; Easterbee
et al. in prep.

GALLOWAY

Loch Ken
Stranraer: West Freugh
Bladnoch Valley & Clugston Loch
Cree Valley & Moss of Cree

WALES

Dyfi Estuary (Ynyshir)

Fox & Stroud (1985);
Francis & Penford in
GWGS (1990)

Llyn Hir

Fox & Stroud (1985);
Francis & Penford in
GWGS (1990)

REFERENCES

- Bignal, E.M., Curtis, D.J., & Matthews, J. 1988. Islay, land types, bird habitats and nature conservation. Part 1. Land types and birds on Islay. *Nature Conservancy Council, Chief Scientist Directorate Report, No. 809, Part 1.*
- Bignal, S. (1988).
- Cunningham, W.A.J., Fox, A.D. & Stroud, D.A. (1990). Greenland White-fronted Geese in the Outer Hebrides. *Hebridean Naturalist* 10: 64-68.
- Easterbee, N., Bignal, E.M., & Stroud, D.A. (1990). *Co-ordinated Goose counting routes on the island of Islay, Argyll: second edition.* Nature Conservancy Council, Chief Scientist Directorate Report No. 1028.
- Easterbee, N. *et al.* (in prep.).
- Fox, A.D. & Laybourne, S. (1985a). Preliminary Report on Greenland White-fronted Goose roost and feeding sites in Caithness. GWGS/NCC Report, Inverness. 30pp.
- Fox, A.D. & Laybourne, S. (Eds.). (1985b). *Report of the Caithness Greenland White-fronted Goose Spring census 1985.* GWGS/NCC Report, Inverness. 35pp.
- Fox, A.D. & Stroud, D.A. (1986). The Greenland White-fronted Goose in Wales. *Nature in Wales (New Series)* 4: 20-27.
- Fox, A.D., Francis, I.S., & Stroud, D.A. (1989). Greenland White-fronted Geese on Coll and Tiree: numbers, distribution and conservation. Pp 129-142. In: Stroud, D.A. (Ed.). *Birds on Coll and Tiree: status, habitats and conservation.* Nature Conservancy Council/Scottish Ornithologists' Club, Edinburgh.
- Greenland White-fronted Goose Study (1986). *Greenland White-fronted Geese in Britain; 1985/86.* GWGS, Aberystwyth. 20pp. Greenland White-fronted Goose Study Research Report No. 5.
- Greenland White-fronted Goose Study (1990). *Greenland*

White-fronted Geese in Britain: 1987/88 - 1989/90.

Greenland White-fronted Goose Study Research Report No. 7.
Aberystwyth, Dyfed.

Laybourne, S. (1986). Greenland White-fronted Geese in Caithness.
Caithness Bird Report 1986: 36-41.

Laybourne, S. & Fox, A.D. (1988). Greenland White-fronted Geese
in Caithness. *Scottish Birds* 15: 30-35.

Ogilvie, M.A. (1983). Wildfowl of Islay. *Proceedings of the
Royal Society of Edinburgh* 83B: 473-489.

Owen, M., Atkinson-Willes, G.L., & Salmon, D.G. 1986. *Wildfowl in
Great Britain*. 2nd ed. Cambridge, Cambridge University
Press.

Ruttledge, R.F. & Ogilvie, M.A. (1979). The past and current
status of the Greenland White-fronted Goose in Ireland and
Britain. *Irish Birds* 1: 293-363.

Table 1.2.3.5

Peak autumn/early winter counts of Greenland White-fronted Geese on Islay, Scotland. Counts are given by goose census areas (Easterbee et al. 1990). Area totals are much greater than the size of individual flocks present.

| AREA | 1981/82 | 1982/83 | 1983/84 | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 | 1990/91 |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Oa | 540 | 758 | 865 | 1,232 | 1,286 | 1,128 | 1,370 | 1,168 | 1,282 | 1,741 |
| Ardtalla | 0 | 0 | 0 | 95 | 0 | 27 | 0 | 240 | 287 | 291 |
| Gruinart | 322 | 114 | 415 | 884 | 633 | 70 | 899 | 1,085 | 1,050 | 1,150 |
| Gorm | 232 | 197 | 454 | 390 | 349 | 675 | 1,221 | 1,086 | 1,203 | 814 |
| Rhinns | 396 | 657 | 504 | 217 | 802 | 1,641 | 752 | 512 | 1,013 | 627 |
| Laggan | 527 | 444 | 646 | 777 | 1,005 | 740 | 701 | 1,171 | 925 | 1,471 |
| Glen | 475 | 174 | 350 | 340 | 60 | 345 | 525 | 641 | 412 | 628 |
| Kilmeny | 1,096 | 1,535 | 1,358 | 1,321 | 2,197 | 1,860 | 1,905 | 1,685 | 2,654 | 1,990 |
| TOTAL | 3,588 | 3,879 | 4,592 | 5,256 | 6,332 | 6,486 | 7,373 | 7,588 | 8,826 | 8,712 |

Total flocks

Median flock
size

Table 1.2.3.6. Counts of Greenland White-fronted Geese in Northern Ireland.

| | Spring 1983 | Autumn 1983 | Spring 1984 | Autumn 1984 | Spring 1985 | Autumn 1985 | Spring 1986 | Autumn 1986 | Spring 1987 | Autumn 1987 | Spring 1988 | Autumn 1988 | Spring 1989 | Autumn 1989 | Spring 1990 | Autumn 1990 | Spring 1991 |
|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Foyle & Swilly | 13 | 32 | 21 | 0 | 64 | 16 | 23 | nc | 90 | 0 | nc | nc | nc | nc | nc | nc | nc |
| Pettigo Plateau | 51 | 30 | 12 | 30 | 0 | nc | nc | 0 | nc | 0 | nc | nc | nc | nc | nc | nc | nc |
| Lough MacNea | 77 | 14 | 98 | 25 | 56 | 40+ | 46 | 60 | 62 | nc | 45+ | 60+ | 66 | 77 | 82 | 88 | 88 |
| Lough Erne | 0 | 0 | nc | 30 | nc | nc | nc | nc | nc | nc | 0 | 47 | nc | nc | nc | nc | nc |
| Caledon | 84 | 70 | 0 | 62 | 66 | 60 | 80 | 96 | 94 | nc | 67 | 72 | (67) | [72] | 28 | 68 | 68 |
| Total N. Ireland | 161 | 148 | 160 | 120 | 182 | 164 | 142 | 165 | 154 | 152 | 0 | 112 | 179 | 133 | 149 | 110 | 156 |

nc = no count available

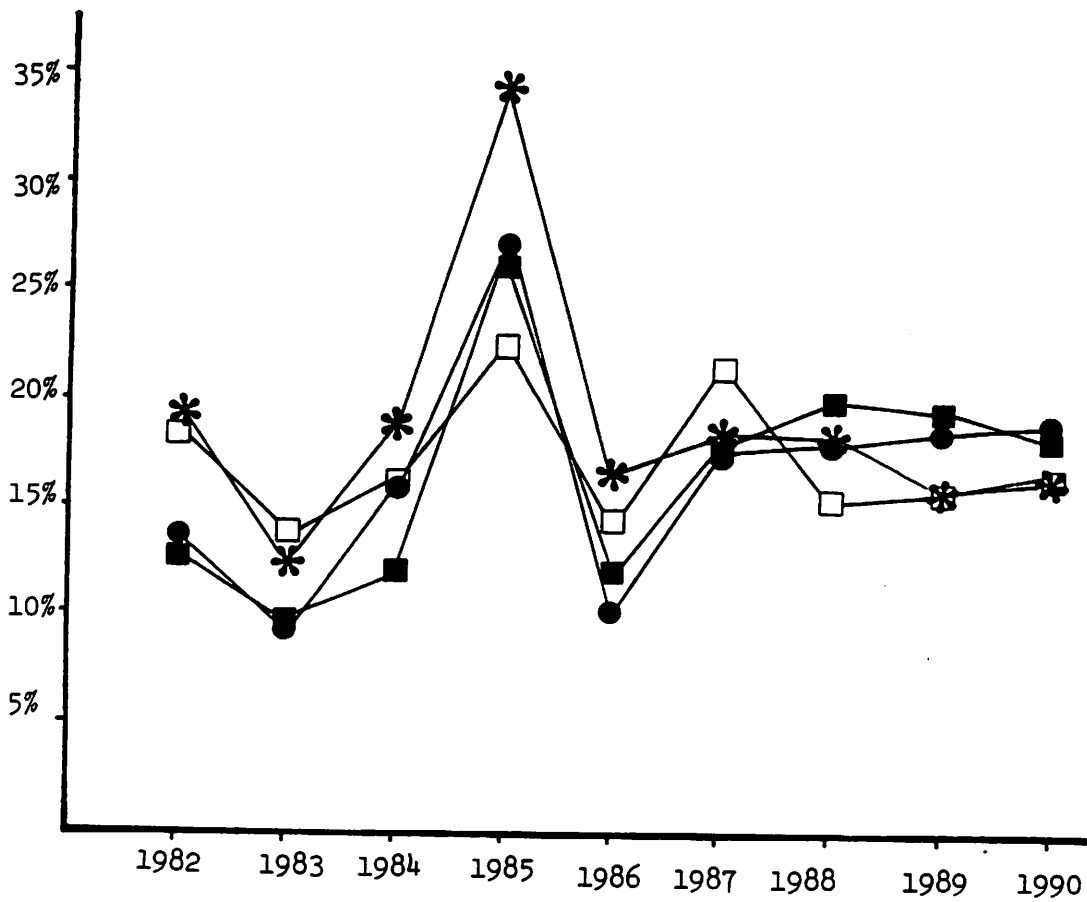


Figure 1.2.3.1. Annual productivity estimates (proportion of young in autumn flocks) for Greenland White-fronted Geese at Wexford (star), from the remainder of Ireland (open square), on Islay (circle) and from the remainder of Scotland (closed square), 1982-1990.

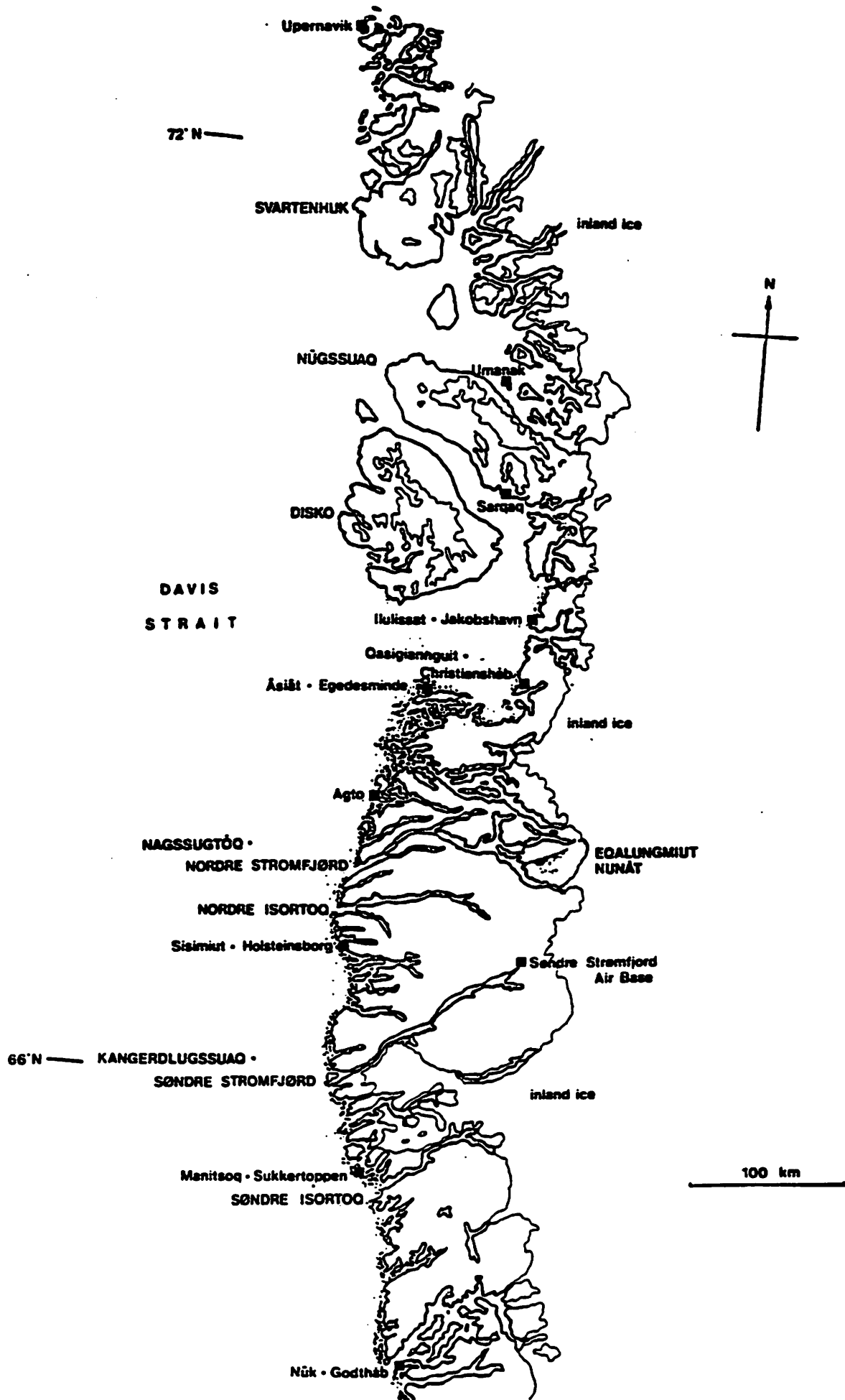


Figure 1.2.3.2. The breeding range of White-fronted Geese in Greenland based on the limited available information.

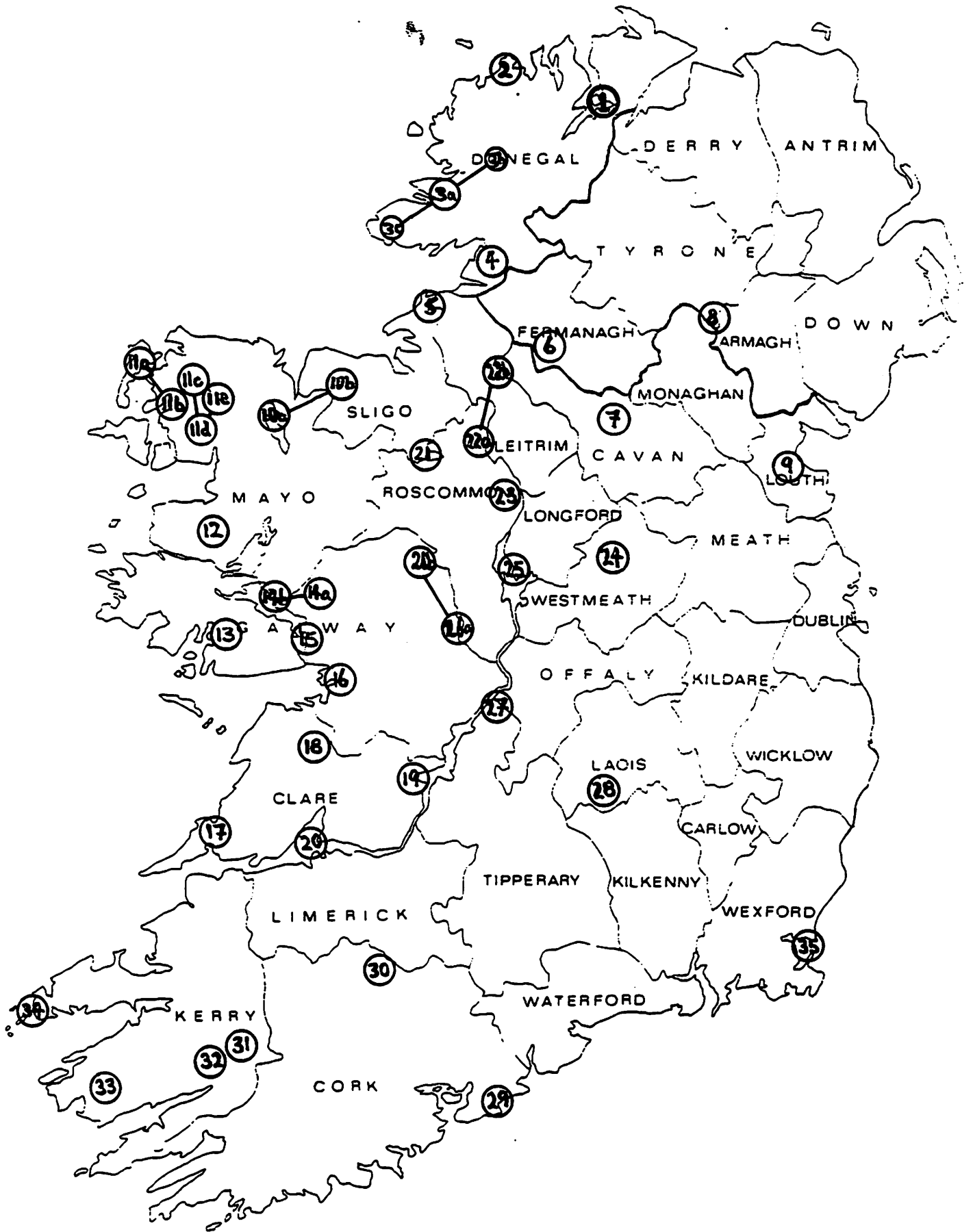


Figure 1.2.3.3. Location of Greenland White-fronted geese flocks in Ireland in 1991.

| <u>Donegal</u> | Map ref. | Major feeding habitats | No. known feeding sites | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site management |
|-----------------|----------|------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------|-------------------------------------|---------------------------------------------------------|
| Foyle & Swilly | 1 | NOP | 17 | Donegal 5. Inch Lough .. 23. Blanket Nook .. 20. River Foyle | 369 | Increase | Sheppard (1981) | Mgmt proposal to owners of most important feeding site. |
| Dunfanaghy | 2 | IR Machair | 8 | .. 18. Meenagoppoge bog .. 29. Dunfanaghy Lake .. 111. Glabber .. 115. L. Trusk | 249 | Increase | | |
| Sheskinmore | 3a | IJKMN | 19 | .. 51. West of Ardara/ Maas Rd. .. 106. Meenaguse .. 107. L. Nillan/ Tullynadobbin. .. 108. Lough Ananima. | 128 | Decline in mid 80's, now stable. | | Sheskinmore mgmt. plan contains GWF element |
| Barra bogs | 3b | I | 10 | .. 2. Lough Barra Bog .. 34. Gannivegil bog complex. | 21 | Decline | | |
| Glencolumbkille | 3c | IK | 9 | .. 105. Durlough .. 109. Loughs Unna & Unshagh. .. 110. Lough Nalughraman. | 23 | Decline | | |
| Pettigo plateau | 4 | IN | 38 | .. 12. Durnesh Lough .. 14. Dunragh Loughs .. 38. Lough Derg. | 224 | Increase | | |

Table 1.2.3.7.

Key to feeding habitats:-

I bog (blanket and raised)
 J marsh
 K wet pasture
 L flood meadow
 M dry pasture
 N reseeded pasture
 O stubbles
 P foot hills
 R salt marsh

Table 1.2.3.7. Details of specific flocks of Greenland White-fronted Geese in Ireland (for numbers of known feeding sites see figure 1.2.3.3.)

| <u>North Central</u> | Map ref. | Major feeding Habitats | No. known feeding sites. | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site management |
|----------------------|----------|------------------------|--------------------------|---------------------------|---------------------------------------|-------------------|-------------------------------------|----------------------------------------------------------------------|
| Bunduff | 5 | JKN | 4 | Sligo 28. Bunduff L. | 16 | Fluctuat- ing. | | |
| Lough Macnean | 6 | N | 4 | | 90 | Fluctuat- ing. | | Education by DOE warden at nearby outdoor pursuit centre. |
| Lough Oughter | 7 | N | 9 | Cavan 1. Lough Oughter | 63 | Stable | | |
| Caledon | 8 | KLN | 2 | | 75 | Fluctuat- ing. | | |
| Stabannan | 9 | N | 2 | | 29 | Stable | | Management agree- ment & refuge for fauna being negotiated. |

Mayo

| Map ref. | Major feeding Habitats | No. known feeding sites. | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site management |
|----------------------------|------------------------|--------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------|-------|-------------------------------------|---------------------------------------------------------------|
| L. Conn | 10a | LN | 6 | Mayo 7. Loughs Conn & Cullin Mayo 101.Owenboy | 167 | Increase | Management agreement at major feeding site since Autumn 1990. |
| Ox Mountains | 10b | I | 8 | Sligo 10a+b. Lough Easky bog west & east. | 32 | Stable | |
| N.W. Mayo & W.Bog of Erris | | | | | | | |
| Belmullet | 11a | JKLM | 4 | Mayo 5.Ininshkea Islands. Mayo 14.Inishglora Mayo 18.Termoncorragh Lake Mayo 116.Termoncorragh Machair | 157 | Increase | |
| Mount Jubilee | 11b | KR | 4 | | | | |
| Carrowmore | 11c | IKLN | 10 | Mayo 25.Carrow more lake. Mayo 102.Carrowmore Lake shore. Mayo 104. Slieve Fyagh. | | | |
| Owenduff | 11d | IJK | 20 | Mayo 8. Owenduff Mayo 97,2.Feeagh Mayo 98.Altaconey | | | |
| Altnabrocky | 11e | I | 8 | Mayo 127.Derry Upper | | | |

| Map ref. | Major feeding Habitats | No. known feeding sites. | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site management |
|-------------------------------------|------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------|-------------------------------------|-----------------|
| <u>S.Mayo & Galway Uplands.</u> | | | | | | | |
| R. Errif & Derrycraff 12 | I | 23 | Mayo 15b. Lough Mask (Fox Hill) Mayo 45. Sheeffry Hills Mayo 52. Derrycraff Mayo 95. Errif valley/ Derrycraff. Mayo 96. Lough Eighter | 145 | Decline | | |
| Connemara Clifden to Cloosh 13 | I | 43 | Galway 2. Errisbeg & Bogland North. Galway 109. Bealacooan Bog. Galway 162. Lettershinna bog complex. Galway 163. Ooria-Shannavara Bog complex. Galway 164. Leam Bog complex. Galway 165. L. Nagarrivhan | 134 | Increase | | |

| Map ref. | Major feeding Habitats | No. known feeding sites. | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site management |
|-------------------------|------------------------|--------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------|---------------------------------------------------------------|
| <u>Galway Lowlands</u> | | | | | | | |
| Killower | 14a | JK | 5 | Galway 60. Blind-well turlough | 187 | Increase | D'Arcy ('83) |
| Rostaff | 146 | KMN | 6 | | | | |
| Lower L. Corrib | 15 | KN | 7 | | 105 | Increase | D'Arcy ('83) |
| Rahasane | 16 | KLN | 4 | Galway 6. Rahasane Turlough. Galway 63. Creganna Marsh. | 125 | Increase | Buckley ('82) |
| <u>Clare - Limerick</u> | | | | | | | |
| Tullagher | 17 | N | 9 | Clare 21. Tullagher Lough | 66 | Increase | Management agreement at major feeding site since autumn 1990. |
| North Clare | 18 | KN | 9 | Clare 4. Mullagh More & surrounds. Clare 10. Balleighter Loughs. Clare 39. Lough Aledaun. Clare 49. Carran Turlough. Clare 67. Inagh Estuary. Clare 79. Moyree River | 74 | Increase | |

| | Map ref. | Major feeding Habitats | No. known feeding sites. | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site manage |
|-------------------------------|-------------|---------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------|-------------------------------------------|-------------|
| Lower L.Derg | 19 | LM | 6 | L. Derg Clare 70.0'Grady Lough | 26 | Decline | | |
| Fergus & Shannon | 20 | KNR | 16 | Limerick 2.Aughimish- Askeaton. Clare 8. River Fergus Estuary. Clare 20. Shannon Airport Shore. | 21 | Decline | | |
| <u>Shannon headwaters.</u> | | | | | | | | |
| L. Gara | 21 | MN | 9 | Roscommon 17. Lough Gara. Roscommon 48.Callow Bog. Sligo 23. Lough Gara. | 605 | Increase | | |
| Drumharlow | 22a | KN | 10 | Roscommon 35. Lough Drumharlow. | 176 | Decline | | |
| North L. Allen | 22b | KL | 3 | | 0 | Extinct? | | |
| Kilglass & Castle- forbes. | 23 | KLN | 12 | Leitrim 21. Lough Rinn. Longford 2. L. Forbes & Castleforbes. Longford 20.Ballykenny Longford. 26.Fishers- town. Roscommon 28. Kilglass & Grange Loughs. Roscommon 36.L.Boderg & Bofin. | 240 | Increase | | |

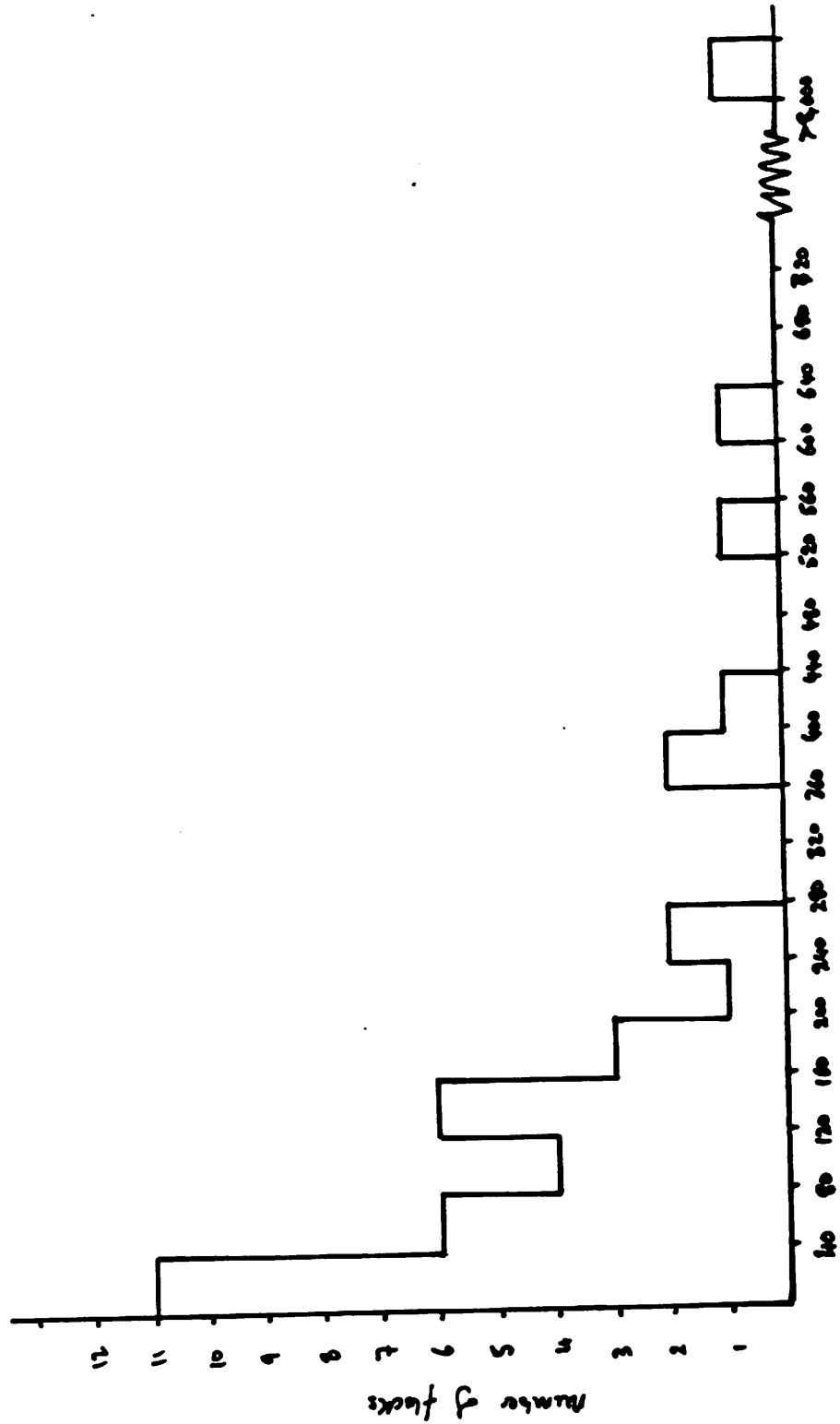
Midlands

| Map ref. | Major feeding Habitats | No. known feeding sites. | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site management |
|-----------------------|------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------|-------------------------------------|-----------------|
| 24 | KLN | 13 | Westmeath 5. L. Derravaragh. Westmeath 7. Lough Owel. WMeath 13.L. Ennel WMeath 15.L. Iron. | 375 | Stable | | |
| <u>Middle Shannon</u> | | | | | | | |
| 25 | KLM | 7 | Longford 4. Arnee Peint-R. Inny. Roscommon 5. L. Ree WMeath 8f. Innsmouth. | 125 | Increase | | |
| 26a | KLMN | 25 | Galway 41 & Roscommon 432 12. Cloonloughlin & Mount Talbot Callows. Galway 27 & Roscommon 7. Suck River, Bally- foran-Shannonbridge. Roscommon 4. Lough Funshinagh. Roscommon 16. Lough Crean Turlough. Offaly 6 & Roscommon 6 River Shannon Callows Offaly 6a. Mongan Beg. | 432 | Increase | | |

| | Map ref. | Major feeding Habitats | No. known feeding sites. | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site management |
|-----------------------------------|----------|------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------|-------------------------------------|----------------------------------------------------|
| Glenamaddy | 26b | LN | 3 | Galway 133. L. Lurgeen. | 88 | | | |
| Little Brosna | 27 | KLM | 18 | Galway 7, Offaly 6 & Tipperary 22. R. Shannon 1. Tipperary & Offaly 1. Little Brosna River. Offaly 38. All Saints Bog. Tipperary 1a. Redwood Bog. | 548 | Increase | Mayes ('91) | |
| <u>South Midlands.</u> R. Nore | 28 | N | 5 | Laois 1. Abbeyleix Woods. Laois 6 Curragh Laois 31a. Grantstown Woods | 66 | Stable | | |
| <u>South West</u> Ballycotton | 29 | P | 71 | | 110-2 | Recently established, fluctuating. | | |
| Kilcolman | 30 | N | 2 | Cork 29. Kilcolman Bog | 15 | Fluctuating | Ridgway & Hutchinson (1990) | |
| Doo Lough | 31 | KN | 2 | Kerry 73. Doo Lough | 30 | Decline | | Management plan proposed-difficulties with landown |

| | Map ref. | Major feeding Habitats | No. known feeding sites. | ASI's which are GWF | Flock Size (max count 88/89 to 90/91) | Trend | Source of site-specific information | Site management |
|---------------|----------|------------------------|--------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------|----------|-------------------------------------|-----------------------------------------------|
| Killarney | 32 | I | 13 | Kerry 9. Killarney valley. Kerry 21. Mangerton Mt . Kerry 69. Eirk Bog. | 40 | Decline | Anon. ('90) | Management plan proposed & parti. implemented |
| Inny Valley | 33 | I | 3 | | 3 | Extinct | | |
| Blasket Is. | 34 | KM | 5 | Kerry 15. Cloghrhead/Cove. | 31 | Extinct? | Brazier & Merne ('88) | Management plan proposed. |
| Wexford | | | | | | | | |
| Wexford Slobs | 35 | NOP | 5 | Wexford 6. Wexford Slobs & Harbour. Wexford 23. Tacumshin Lake. Wexford 38. Cahore Polders. | | Increase | Mayes ('91) | |

Figure 1.2.3.4. Flock size distribution of Irish Greenland Whitefront flocks.



Flock size: Maximum Count 88/89 - 90/91

Figure 1.2.3. 5. Overview of scattered wintering sites of Greenland White-fronted Geese in Ireland and the UK.

