

STUDIES OF RED-NECKED PHALAROPES: SUMMARY REPORT

Ian Bainbridge and Mike Peacock

INTRODUCTION

Throughout the period of the expedition, data were collected on Red-necked Phalaropes (*Phalaropus lobatus*), which were the only waders encountered commonly in the area. The purpose of the study was to investigate aspects of their habitat use and breeding biology, to enable comparison with their use of habitats on the RSPB reserve on Fetlar in Shetland, where the main remaining colony of the species is found in Britain.

Previous studies on Red-necked Phalarope habitat requirements on Shetland (Yates 1983) suggested that phalaropes there were associated specifically with fen conditions produced historically by local peat cutting, and changing populations on the site were associated with the cessation of this activity. Management recommendations were produced suggesting that phalaropes required a combination of open water, emergent vegetation, wet marsh (dominated by moss species) and dry marsh for a suitable nesting area. The studies in Greenland were intended to investigate whether similar requirements applied there, or whether a wider range of habitats was used, to assist in future management decisions for phalaropes on Fetlar.

DATA COLLECTION

During the course of the expedition, data were collected on nesting phalaropes as often as possible. Nesting locations of the birds was determined by their activity, especially when small young were present, as the male (the sex which attends the young) alarm-calls in a characteristic way. At nesting locations, chicks were located wherever possible, weighed and measured as an indicator of age, and ringed.

Immediately around the location where phalaropes were found botanical information was collected. Systematic quadrat recording of plant species and abundance was undertaken in each of the main vegetation types around the nest or chicks. The relative areas of each of the habitat types was also estimated. Photographic records were taken of all locations. What follows is a general account of the habitats recorded. Preparation of detailed descriptions of each site and further analysis of these data is currently underway.

At each nest location, pH of the water in the pools was measured using Universal indicator paper. At a number of locations, as time allowed, invertebrates were sampled by activity traps and sweep netting, to identify the common invertebrates present in the phalarope pools. These are currently being identified.

RESULTS

In total, 18 nesting areas were found, and habitat information recorded from them. Twenty-two phalaropes were caught, 20 chicks or juveniles and two adults, between 11 July and 3 August. These exhibited considerable asynchrony, with newly hatched chicks being found between 11 and 28 July, and large chicks approaching adult weights between 24 July and 3 August. Ringing details of the phalaropes caught are shown in Table 5.

Table 5. *Ringing and biometric data of Red-necked Phalaropes caught at Isungia, west Greenland 1992*

Ring No.	age	wing(mm)	bill(mm)	head(mm)	tarsus(mm)	weight(g)
<i>(11.07.92: brood of four: west of camp 1)</i>						
8230712	1	-	11.2	-	-	7.1
8230713	1	-	11.3	-	-	7.5
8230714	1	-	10.6	-	-	8.1
8230715	1	-	11.0	-	-	8.7
<i>(14.07.92: two adults, presumed pair; camp 2)</i>						
8230720	4(M)	110	-	43.1	24.4	31.6
8230721	4(F)	114	-	44.1	22.3	38.1
<i>(16.07.92: brood of four: camp 2)</i>						
8230732	1	-	-	25.4	20.3	7.1
8230733	1	-	-	24.7	19.2	6.3
8230734	1	-	-	25.3	19.8	6.3
8230735	1	-	-	26.6	19.8	6.8
<i>(24.07.92: two pulli from different broods: east of camp 3)</i>						
8230777	1	-	8.8	22.6	19.7	5.0
8230778	1	78	17.2	39.4	21.4	27.0
<i>(28.07.92: brood of three: near Sugarloaf mt.)</i>						
8230791	1	-	9.0	22.6	18.8	4.0
8230792	1	-	9.8	23.6	17.9	5.0
8230793	1	-	9.0	24.0	18.6	4.0
<i>(01.08.92: six chicks from unknown broods: Sandflugtdalen)</i>						
8163251	3j	108	19.5	41.8	20.0	29.5
8163252	1j	87	18.0	41.6	20.4	31.6
8163253	1j	87	18.3	41.2	21.8	32.5
8163254	1j	94	18.7	41.8	20.7	38.0
8163255	1j	75	17.0	38.7	19.1	31.0
8163256	1j	76	17.3	38.5	20.4	27.0
<i>(03.08.92: one chick: nr. Orkendalen radio mast)</i>						
8163257	1j	86	18.4	39.3	20.6	27.5

Key: age codes:

- 1 - pullus
- 3 - recently fledged juvenile
- 4 - adult

HABITAT AROUND NEST LOCATIONS

As in the sites on Fetlar, the habitat around phalarope nest locations in Greenland differentiated into four main types; open water (some with sparse emergent *Hippuris*), emergent *Carex* stands (in Greenland of *Carex saxatilis*, on Fetlar, *Carex rostrata*), wet marsh with very high covers of moss species forming a carpet through which sparse vascular plants grew, and drier vegetation surrounding the marsh communities, characteristic of the surrounding area, and not forming part of the immediate hydrological entity of the marsh.

a) open water

The open water associated with the phalarope nesting locations exhibited far greater variation than the sites on Fetlar. At one extreme, two sites had no areas of open standing water within 100 m of the recorded location, being associated with very small areas of relatively fast-flowing streams. At the other extreme, a number of sites were in the peripheral marshes of large water bodies in excess of a hundred hectares.

b) emergent vegetation

The emergent vegetation generally comprised very few species of plants. It was principally *Carex saxatilis*, which is very similar in form and stature to the *Carex rostrata* found in the mires on Fetlar, being 20 - 40 cm tall, and retaining almost no litter volume. In many sites, the *Carex* formed a peripheral band around the water body of 1 - 20 m wide, with a median percentage cover of 55% (range 15 - 80%), but in small stream sites, formed intimate association with the running water areas and was in places restricted to almost linear areas of 5 - 50 cm width. In some water bodies *Hippuris vulgaris* formed a sparse emergent band in deeper water than the *Carex*, usually in water depths of up to 30 cm, and occasionally associated with *Potamogeton* spp., *Myriophyllum spicatum* or *Sparganium hyperboreum*. Associated with the *Carex* were small amounts of *Eriophorum angustifolium*, *Calamagrostis langsdorfii*, *Menyanthes trifoliata* and *Potentilla palustris*, though none of these were present in all locations, and species more associated with the wet marsh communities. In one location, *Eriophorum angustifolium* formed the dominant plant, with 30% cover, and in another *E. angustifolium* and *Calamagrostis langsdorfii* formed a co-dominant emergent association, in a site with only 5% open water.

c) wet marsh

In most locations, the emergent vegetation graded into wet marsh, formed over a peat layer and with a very high moss cover. In shallow water depths, the moss cover formed tussocks or hummocks, up to 25 cm tall and 30 cm diameter, usually of *Sphagnum* spp., in which a number of associated vascular plant species occurred. Commonly, these were *Carex rariflora*, *Salix arctophila*, *Polygonum viviparum*, *Equisetum arvense* and *Ranunculus lapponicus*. These hummocks graded into a complete moss carpet away from the open water, with *Betula nana*, *Salix glauca* (in prostrate form), *Luzula multiflora*, *Pedicularis* spp. and other species usually representative of drier ground appearing in the sward. At the edge of the basin, in most locations, this wet marsh graded into the vegetation characteristic of the surrounding dry ground. The area of wet marsh varied considerably, due to variations in the topography of the different sites. In some locations it was almost absent, with a sharp boundary between emergent vegetation and drier ground, in others, it formed extensive areas, up to several hectares on shallow wet slopes adjacent to the water bodies.

d) other habitat types

In a few locations, other habitat types were present which were judged to be used by phalaropes, from the alarming behaviour of the males. In one site, *Salix glauca* scrub of up to 1.5 m tall formed an area of 10 - 15 m diameter around the outflow of one of the water bodies, and was apparently used as cover by the chicks of that brood. The *Salix* was immediately adjacent to a typical area of emergent vegetation dominated by *Carex saxatilis*. This site also had areas at the outflow dominated by *Calamagrostis langsdorfii*, which formed a tall fen at the outflows of several of the lakes, and appeared to be used as cover by phalarope chicks on two occasions, though this generally had no open water beneath it.

pH

The pH of all the water bodies varied little; it was between pH 6 and 7 in all locations.

HABITAT USE BY PHALAROPES

One phalarope nest was located, in wet/dry marsh, in a tussock of *Calamagrostis* over a *Sphagnum* carpet, associated with *Salix arctophila* and *Vaccinium uliginosum microphyllum*, an indicator of drier ground.

In all cases, chicks were found either in emergent vegetation or on the edge of the open water bodies. With one exception, the small chicks were located in emergent vegetation, usually in *Carex saxatilis* stands: one brood was found in the open water edge of Saningassoq at Camp 2, having emerged from a small feeder stream nearby. Larger chicks were found in emergent vegetation, or feeding along the edges of the water bodies, even where there was an abrupt edge to the lake onto dry ground. Chicks of all ages were seen feeding swimming, and there was no evidence of wet marsh moss carpets being used as feeding locations.

On most occasions, adult birds were located feeding on the edges of open water bodies, usually spinning and picking invertebrates from the water surface or in the water column. Mosquito larvae may have formed a large part of this diet. Birds associated with chicks were located in emergent vegetation, and seen feeding in shallow water in these areas. Again, there was no evidence of adult phalaropes using drier locations for feeding.

BOTANICAL NOTES

Ian Bainbridge

Introduction

In the course of the expedition's work, botanical information was collected in two ways. Firstly, as part of the habitat studies on Red-necked Phalarope breeding ecology, systematic quadrat recording of plant species and abundance was undertaken in a number of the mires where phalaropes were present. The details of this are presented elsewhere in this report (p.23).

Secondly, general notes were maintained of the vascular plant species encountered during the daily work on white-fronts and phalaropes. These notes are presented here as a systematic list, following the order and nomenclature of Böcher *et al.* (1968). As time was limited, and the main purpose of the expedition was not botanical, this does not purport to be a full or exhaustive list of the vascular plants of the area; it is more a compilation of casual observations. Undoubtedly, critical groups and monocotyledones are under-represented, as many observations were collected in passing and time was not spent collecting exhaustive lists of all the flora present in the area.

Pteridophytes

Huperzia selago. Infrequent component of the dwarf shrub heath communities.

Lycopodium dubium (annotinum). Only found at the eastern tip of Saningassoq Lake.

Equisetum arvense. Frequent component of dwarf shrub heaths, bogs and solifluction areas.

Woodsia ilvensis. Common in rock crevices and on shaded cliff faces.

Woodsia alpina. A few plants found in rock crevices, probably on the more calcareous rocks in the area.

Cystopteris fragilis. Frequent in rock crevices and on skeletal soils at cliff bases etc.

Spermatophytes: Gymnospermae

Juniperus communis alpina. An infrequent component of the drier dwarf shrub heath communities.

Spermatophytes: Angiospermae

Dicotyledones

Ranunculus confervoides. Found in small lakes above the Ravneklippen south of Søndre Strømfjord.

Ranunculus hyperboreus. Frequent in moss communities on pool margins and in drainage lines.

Ranunculus lapponicus. Common component of the drier parts of the marshes, usually in moss carpets.

Ranunculus pygmaeus. Found once in a mossy soak line in the hills to the north of Saningassoq Lake.

Ranunculus nivalis. Common in mossy, grassy soak areas and in some solifluction communities.

Dryas integrifolia. Often a dominant member of the drier heath communities, and in some loess-like solifluction zones, as well as fell fields at all altitudes.

Potentilla tridentata. Found twice on sloping bare rock as a crevice plant in full sun; on the rock slopes around the Ayatollah Rock, and on the southern slopes of the ridge south of Aujuitsup Tasia.

Potentilla egedii. Only found on seashore rocks on the south shore of Søndre Strømfjord.

Potentilla hookeriana. Common component of the drier heath communities and gravelly areas.

Potentilla nivea. Common on south facing drier slopes, gravel banks and sandy soils.

Sedum (Rhodiola) rosea. Found infrequently on damp rocks on north facing slopes, eg on the north side of the ridge south of Aujuitsup Tasia.

Sedum villosum. One large colony found on skeletal soils on the sloping rocks above Ayatollah Rock, Søndre Strømfjord.

Saxifraga nivalis. Frequently found on moist exposed rocks and low cliffs, especially those in partial shade; occasionally in sunnier locations with water seepage across skeletal soils on sloping rocks.

Saxifraga cernua. Common on skeletal soils and as a crevice plant on sloping rocks, generally at higher elevations.

Saxifraga caespitosa. Found infrequently; on moist sloping rocks at higher altitudes, and notably on solifluction soils and drier marsh ground to the west of Saningassoq.

Saxifraga tricuspidata. Common component of the drier dwarf shrub heath communities, especially on south facing slopes and broken soils of the higher ridges, as well as being a saxatile plant on the rocks exposed in the wetter heathlands.

Saxifraga paniculata. Uncommon, found on dry south facing cliffs and rock slopes above the Ayatollah Rock and above the southern icecap arm of Sandflugtdalen.

Saxifraga aizoides. Found only on the peaty loess-like soils around Støre Saltsø, associated with *Gentiana detonsa*.

Saxifraga oppositifolia. Only found in flower around the melting snow patches in the south-west corner of Aujuitsup Tasia, this species is a very early-flowering plant and may often have been overlooked elsewhere.

Chamaenerion latifolium. Widespread; forming clumps up to 50 cm across and 30 cm high on disturbed soils around Søndre Strømfjord; more procumbent and laxer forms were the commonest plant in much of the sandflats of Sandflugtdalen, where some white forms were found. Also present on the sand beaches of Saningassoq, and occasionally as a component of drier dwarf shrub heaths.

Myriophyllum spicatum. Found in one lake above Ayatollah Rock.

Hippuris vulgaris. A very common species in the smaller lakes, often forming an emergent community across large parts of the lake surfaces.

Papaver radicum. Found scattered throughout the study area; away from the icecap on higher ridges, particularly on north facing bare rocks as a saxatile plant. At the icecap it occurs within a metre of the ice in rock crevices, and also as a waterside plant in sandy riverine soils, around the lake east of Aujuitsup Tasia. Ripe seed heads were being eaten by snow buntings in this location.

Draba species: a difficult group, probably under-recorded.

Draba nivalis. A small, white flowered *Draba*, probably this species, was found not infrequently on dry sandy ground, particularly on south facing slopes.

Draba cinerea. A taller white *Draba*, on dry heaths and sandy soils around Søndre Strømfjord.

- Draba aurea*. A widespread but minor component of dry dwarf shrub heaths and grass patches.
- Cochlearia groenlandica*. Only found on seashore rocks on the south shore of Søndre Strømfjord.
- Lesquerella arctica*. A few plants found in seed on the south facing slope of the second ridge north of Saningassoq, on open sandy soils and sandy scree.
- Braya purpurascens*. Found on the shores of Støre Saltsø on moist loess soils.
- Cardamine bellidifolia*. Found infrequently in the fellfield communities.
- Cardamine pratensis*. Common in the *Carex* fens, particularly those with very shallow standing water, and in solifluction areas with high moss cover.
- Arabis alpina*. A few plants found in grassier areas in the drier heaths.
- Arabis arenicola*. Widespread on the sand and gravel flats in Sandflugtdalen, as single plants in very sparse communities.
- Angelica archangelica*. Plants up to 1.5 m tall occurred in areas of *Salix glauca* scrub, especially near streamsides.
- Salix herbacea*. An uncommon plant, found in a few locations on high fellfield north of Saningassoq, and in lake shore draw-down zone muds in a few of the medium sized lakes.
- Salix arctophila*. A common species in the bogs and drier parts of the fens and marshes, where moss cover is complete.
- Salix glauca*. A very variable species; a common, even dominant, constituent in some of the dwarf shrub heaths, forming bushes of 15-20 cm high. Also common in the edges of marshes, both as procumbent bushes, and as erect shrubs up to 1.5 m. In one or two places, notably in the valley running north-east from Saningassoq, there are stands up to 2.5 m high, the largest of which covers almost 0.5 ha.
- Betula nana*. A common constituent of the dwarf shrub heaths, particularly on the north facing slopes with high moss cover, where it is the dominant shrub in places.
- Polygonum viviparum*. Common in the drier marshes, solifluction areas and herb slopes, even occurring in some areas with standing water.
- Rumex acetosella*. Found on the sandy shore at the east end of Saningassoq.
- Cerastium cerastoides*. Common on the lower ground herb fields and under dwarf shrub heath.
- Cerastium alpinum lanatum*. Widespread on herb fields and under dwarf shrub heath.
- Cerastium arcticum*. Widespread on herb fields and under dwarf shrub heath.
- Sagina intermedia*. Found occasionally on moist cliff ledges in short herb communities and small areas of bare ground.
- Stellaria longipes* agg. Found occasionally in dwarf shrub heath and bare ground at lower elevations.
- Honckenya peploides*. Found in blown sand on the south side of the river at Søndre Strømfjord.
- Melandrium triflorum*. Widespread in herbfields, in dwarf shrub heath and on broken ground, especially on south facing slopes.
- Melandrium affine*. Found in a few locations on damp slopes with open ground.

Viscaria alpina. Quite widespread, normally on south facing slopes in grass and bare ground communities. Occasionally on sandy soils in dwarf shrub heath.

Silene acaulis. Widespread, forming large cushions on broken ground and in fellfield communities, often totally covered in flowers.

Primula stricta. Found in a number of locations from grassy communities in the centre of Søndre Strømfjord to seepage slopes close to the icecap, and sandy soils on the shores of Saningassoq.

Armeria scabra. Scattered across the study area on sandy soils and solifluction areas, and as a riverbank plant.

Pyrola grandiflora. A common constituent of dwarf shrub heaths, more often the drier ones, and in rock crevices. Apparently absent from the lowest elevations immediately around Søndre Strømfjord.

Arctostaphylos uva-ursi. An occasional member of the drier dwarf shrub heath communities.

Cassiope tetragona. A common and sometimes dominant member of the wetter dwarf shrub heaths, especially on the north facing steeper slopes with high moss cover.

Ledum palustre. Often a dominant in the moister dwarf shrub heaths, on north facing slopes and areas with flowing water or high water table.

Rhododendron lapponicum. A widespread member of the drier dwarf shrub heaths, in full flower in early July, sometimes dominant on flatter south facing slopes.

Vaccinium vitis-idaea minus. A common constituent of the drier dwarf shrub heaths, never dominant, occasionally forming mats of up to 50 cm across, usually on hummocks of drier peat.

Vaccinium uliginosum microphyllum. Another common constituent of the drier dwarf shrub heaths, similar in abundance to the above.

Empetrum hermaphroditum. One of the more uncommon members of the dwarf shrub heaths, often in the slightly wetter areas.

Diapensia lapponica. Found only on two occasions; once on bare ground beside a small lake to the north of Søndre Strømfjord, once on high fellfield to the north of Saningassoq.

Gentiana detonsa. Found only around Støre Saltsø and another nearby small lake, on loess soils and in grazed wet fen habitats.

Gentiana tenella. Found in short soakline turf on the roadside beside Sugarloaf, and around Støre Saltsø and the adjacent lake, in association with *G. detonsa*.

Lomatogonium rotatum. Only found in sandy soils in Søndre Strømfjord airbase, between the 'Caribou Club' and the baseball pitch! Plants up to 25 cm tall, still to flower in early August.

Menyanthes trifoliata. A very common constituent of the smaller lakes and lochans, often forming large areas of emergent vegetation.

Pedicularis lapponica. A common constituent of the dwarf shrub heaths and grassy soak areas, not commonly on the drier ground, often in areas with high moss cover.

Pedicularis labradorica. Often found in the same communities as the previous species, though rather less common.

Pedicularis flammea. Widespread, though never common, a constituent of similar habitats to the above, though found also on drier heaths on sandy soils, such as the west end of Saningassoq.

Pedicularis lanata. Perhaps the rarest of the *Pedicularis* species found, like the other species a constituent of heaths and occasionally into marshy ground.

Pedicularis hirsuta. The commoner of the pink-flowered louseworts, widespread in heaths and marshy ground.

Bartsia alpina. Uncommon, found on streamsides north of Søndre Strømfjord, near the stores camp.

Euphrasia frigida. Widespread, on herb slopes, solifluction areas, sandy lake-sides and under the drier dwarf shrub heaths.

Pinguicula vulgaris. Widespread, with strong representation in some of the loess like soils on solifluction ground north of Camp 1, and also along the lake edge in the north east corner of Saningassoq.

Campanula gieseckiana. Widespread, both of the subspecies; *C.g.gieseckiana* and *C.g.groenlandica* were found. The latter was generally at lower elevations, often in disturbed or sandy soils, forming clumps up to 25 cm across and up to 25 cm tall. The nominate subspecies was generally found on higher ridges, particularly on south-facing slopes on drier open soils.

Campanula uniflora. Found in two areas, in flower around the end of July. Both were at high elevations, one on the high ridges north of camp 3, where it was a constituent of open fellfield. The other area was the high ridges of the triangle of ground between the two arms of the icecap at the head of Sandflugtdalen, where it grew on grassy moist slopes and on peat tussocks in short dwarf shrub heath.

Erigeron compositus. Widespread, on open broken south-facing slopes, on sandy soils.

Antennaria ekmaniana. A few plants found in open sandy soils on south-facing ridges north of Saningassoq.

Antennaria canescens. A larger species, probably this species, was found on sandy short dwarf shrub heath at the west end of Saningassoq.

Artemisia borealis. Common at the lower elevations, especially on disturbed ground; also on south facing dry, broken and rocky slopes and as a ledge plant on sunny cliffs.

Arnica alpina angustifolia. Commonly found on drier heath slopes and grassy areas, from low elevations around Søndre Strømfjord to close by the icecap.

Taraxacum lacerum (= *groenlandicum*). Common in lower elevations, especially around Søndre Strømfjord, on disturbed ground and sandy soils. Smaller plants also found may have been *T. umbrinum*, but were not critically examined.

Monocotyledones

Tofieldia pusilla. Common on moist soils in solifluction areas, and on the edge of lakes and standing waters. Also found on moist fellfield.

Tofieldia coccinea. Only found on one high ridge fellfield north of Saningassoq, in the same locality as *Campanula uniflora*.

Juncus arcticus. Found on the lake margins and small pools at the north east corner of Saningassoq.

Luzula arctica. Minor component of the north facing moister dwarf shrub heaths, often dominated by *Cassiope tetragona*.

Luzula spicata. Present in the sandier heath communities.

Luzula multiflora. Occasional component of the drier marsh habitats with high moss cover.

- Eriophorum scheuchzeri*. Widespread in soak lines and bog margins, sometimes dominant in the community.
- Eriophorum angustifolium*. A common constituent of marshes and soaklines, all the multi-headed *Eriophorum* were considered this species.
- Eleocharis acicularis*. Occasionally found in marginal vegetation on small pool edges.
- Kobresia myosuroides*. Occasionally found on open dry ground in and under dwarf shrub heaths.
- Kobresia simpliciuscula*. Found in soak line and solifluction marsh northeast of Camp 1.
- Carex nardina*. Found on sandy dry soils, often near ridge tops.
- Carex microglochin*. Found once in drier marsh area with high moss cover.
- Carex maritima*. Present in the sand flats in Sandflugtdalen.
- Carex bigelowii*. Common in heaths and herb slopes.
- Carex rariflora*. A constant component of the drier marsh facies, very often where moss cover is at 100%.
- Carex saxatilis*. Ever present on lake margins, forming emergent swamps reminiscent of *C.rostrata* swamps in Scotland. Sometimes in extensive monoculture stands.
- Festuca brachyphylla*. Frequent in the drier heath communities and open ground on sandy soils.
- Festuca vivipara*. Found on a few occasions in moist herb communities, eg the n.e.corner of Saningassoq.
- Poa glauca*. Frequent on dry herb fields, sandy soils.
- Poa alpina*. Moister herb fields and heaths.
- Puccinellia deschampsoides*. On loess-like soils around Støre Saltsø.
- Calamagrostis purpurascens*. Frequent on dry soils on ridges and in drier dwarf shrub heaths.
- Calamagrostis langsdorfii*. Present on the margins of many of the marshes, often where the loch overflows ran, often associated with *Salix glauca* scrub.
- Elymus arenarius*. Sandy soils around Søndre Strømfjord and in the lower parts of the valleys.
- Potamogeton filiformis*. Present in several of the smaller lakes.
- Potamogeton gramineus*. In a few small lakes, notably above Ayatollah Rock.
- Potamogeton alpinus*. Found washed up on the shoreline of Saningassoq.
- Triglochin palustre*. Found in soaklines and streamsides, especially around the north east corner of Saningassoq.
- Sparganium hyperboreum*. Found in a couple of lakes above Ravneklippen and Ayatollah Rock.

SYSTEMATIC BIRD LIST

Michael Clausen and Ian Bainbridge

INTRODUCTION

Ornithological records were collected in the course of the expedition's work. During the month a total of nineteen bird species was recorded. This account gives general information on those species not detailed elsewhere in the report.

SPECIES ACCOUNTS

Red-throated Diver *Gavia stellata*

One breeding pair was seen on the lake immediately to the north of Camp 1, nesting on a small island.

Great Northern Diver *Gavia immer*

One pair nested on the island to the west end of Saningassoq, and three to five additional individuals were seen on other large lakes in the area. The pair on Saningassoq may have failed due to high wind and waves.

Greenland White-fronted Goose *Anser albifrons flavirostris*

This species is covered elsewhere in the report.

Barnacle Goose *Branta leucopsis*

One bird was caught with the first catch of white-fronts. Normally an East Greenland species, this is considered to be a chance record.

Canada Goose *Branta canadensis*

Ten birds were caught and marked, moulting with a white-front flock on Lake 7. One pair was seen on a lake north of Saningassoq, with five goslings.

Mallard *Anas platyrhynchos conboschas*

Mallard were common and widespread on the lakes in the area, with flocks of up to 20 to 25 birds found on occasion. Only one brood was located in the study area (a hen and five ducklings). One moulting drake was caught on Lake 4.

Long-tailed Duck *Clangula hyemalis*

Common on many of the lakes in excess of about 1 ha. One nest with eggs was found at the west end of Saningassoq, but there was no evidence of successful breeding in the study area in 1992.

Gyr Falcon *Falco rusticolus*

A white female and a grey male were seen around a previously known eyrie site near the icecap.

Peregrine *Falco peregrinus*

Peregrines were commonly encountered throughout the study area, with an estimated five to seven breeding pairs. At least two of the nests encountered were in the process of raising chicks.

Ptarmigan *Lagopus mutus*

Ptarmigan were widespread throughout the higher elevations of the study area, and were notably associated with the willow scrub north east of Saningassoq. Several birds were encountered immediately adjacent to the ice cap. Five birds were caught and ringed in a small valley north of Saningassoq two of which were subsequently recovered, shot together on 5 November 1992 at the ice cap, Sandflugstdalen near Søndre Strømfjord (approximately 10km south-east of the place of ringing).

Ringed Plover *Charadrius hiaticula*

Two birds were seen in the vicinity of Søndre Strømfjord golf course, on open sands and gravels, and three further birds were found in Sandflugtdalen, a little way west of the icecap river.

Red-necked Phalarope *Phalaropus lobatus*

Common throughout the study area on small lakes and marshes, this species is dealt with elsewhere in this report. 22 birds were ringed (see Table 4).

Iceland Gull *Larus glaucooides*

A maximum of 22 birds was seen on the local dump at Søndre Strømfjord, with a few birds being encountered in the environs of the fjord.

Glaucous Gull *Larus hyperboreus*

A maximum of four to six birds was found on the dump at Søndre Strømfjord, with one or two birds encountered on the fjord itself.

Wheatear *Oenanthe oenanthe*

Probably the least common of the small passerines, the species was widespread but infrequently encountered on the higher ridges and drier areas, and around rocky areas near the icecap. Five birds were ringed.

Raven *Corvus corax*

Common and widespread throughout the study area, nesting on cliff faces and ridge sides, this species was also encountered in some numbers near the local dump.

(Greenland) Redpoll *Carduelis flammea rostrata*.

Perhaps the commonest of the small passerines, redpolls were encountered in almost any location with low willow scrub, nesting in the willow bushes. The species appeared rather commoner at lower elevations and around Søndre Strømfjord, with rather smaller numbers closer to the icecap, though the species was found feeding on high fell-fields with other passerines. 37 birds were ringed.

Lapland Bunting *Calcarius lapponicus*

Very common in the study area, and away from willow scrub the lapland Bunting was undoubtedly the commonest breeding bird. Breeding pairs were encountered throughout the dwarf shrub heaths, and many nests and young juveniles were found in the early part of the expedition. Towards the end of July moulting flocks were found, often associated with willow scrub, but still widespread across the whole area. 58 birds were ringed.

Snow Bunting *Plectrophenax nivalis*

This species has a disjunct distribution in this part of Greenland; birds are commonly found around the habitation of Søndre Strømfjord, and also on high ridges and close to the ice cap, but were generally absent from the middle elevations. Six birds were ringed.

WEATHER

Carl Mitchell

The climate of west Greenland shows a strong west-east, maritime-continental gradient running across the unglaciated coastal regions. The study area, Isungua, just north of Søndre Strømfjord, being close to the ice cap, experiences a continental climate typified by high summer temperatures, low rainfall and low relative humidity. Slight cloud cover can occur, particularly near the ice cap.

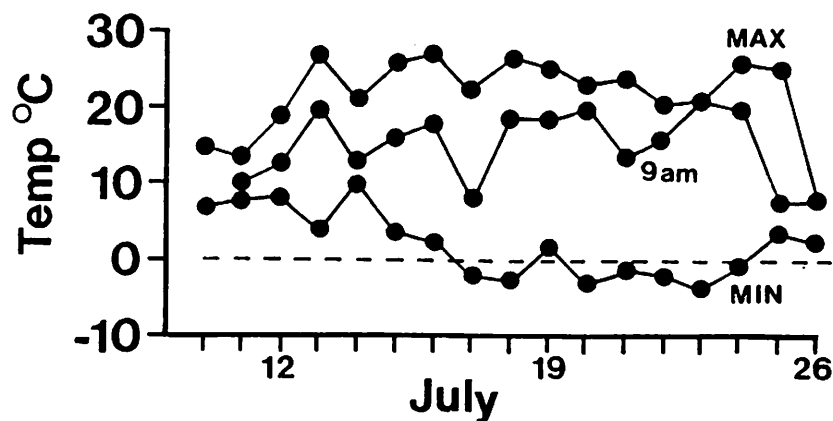
Located less than one degree above the Arctic Circle the study area experienced 24 hours daylight per day throughout the period. Towards the end of July however the period 12am through 4am was noticeably cooler and as the sun dipped below the surrounding hills the duration of twilight increased.

Basic notes of weather conditions were made each morning at approximately 9am local time (12 noon GMT) between 10-26 July. The maximum and minimum temperature for the previous 24hrs was recorded, the temperature at that time, then the thermometer was re-set. Figure 8 shows the fluctuations in temperatures through the 17 day goose-catching period.

Slight precipitation was recorded during 10-12 July and later during 24-25 July - otherwise the general weather pattern was settled with large diurnal temperature fluctuations (e.g. 28°C on 18 July), but often clear, still and hot. Visibility was often good and the exceptional clarity of the air enabled the coastal mountains c.100km west to be clearly seen on many days. 'Night' time temperatures fell below freezing for the first time on 17 July. The minimum temperatures were clearly affected by cloud cover - the coldest 'nights' being associated with cloudless warm, dry days.

Winds were gentle to moderate on the few occasions experienced and were associated with air streams off the ice cap. Since they quite effectively kept mosquitos from settling they were certainly welcomed.

Figure 8. Maximum, minimum and air temperature at 9.00am local time - Isungua, n. of Søndre Strømfjord (10-26 July.)



EXPEDITION FOOD

Lyndsey Kinnes

RATIONS

Rations for the expedition were based on quantities used for the "*Hold With Hope*" expedition to east Greenland in 1989. The basic daily allowance per person was:

muesli (100g) or
tea bags (3),
milk powder (8 tsps),
dried fruit (60g),
chocolate bar (1),

porridge oats (60g) or
coffee (3 tsps),
sugar (4 tsps)
mixed nuts (60g)
muesli bar (0.5)

Quaker Harvest Crunch (100g)
hot chocolate (incl. milk) (30g)

jam, honey, marmalade, margarine, peanut butter, *Marmite*, cheese/cheese spread, *Tartex* (vegetarian paté)

savoury biscuits (½ pkt),

sweet biscuits (½ pkt)

soup powder (20g),
main meal (55g),
Smash (60g), or

dried vegetable (not every day) (15g)
pasta (100g), or
cous cous (100g), or

rice (120g), or
egg noodles (120g)

Extras, provided occasionally, included:

custard powder (milk included), apple flakes, beefburgers (foil packed), Frankfurters (foil packed), dried orange juice

Most of the food was bought in bulk from a cash-and-carry, and the dried foods were divided up and packaged in small plastic bags. They were combined in packs sufficient to cater for two people for two days, and these were packed together in larger bags containing two days rations for everyone. Each large bag was given a date to ensure variety throughout the expedition.

The jam, honey, peanut butter and *Marmite* were in large (1-2 kg) containers. Cheese, cheese spread, *Tartex* and margarine were in small (100-250g) packs. Chocolate bars, biscuits and muesli bars were kept in boxes for as long as possible, helping to prevent spoiling.

There were six varieties of soups (all vegetarian) produced by *Batchelors*. The main meals were produced by *McDougals* and there were 10 varieties including two vegetarian. We used instant meals made by *Hera foods* to cater for two vegetarians, and their ration packs were marked accordingly.

There is a well stocked shop in Søndre Strømfjord where we could buy extras, e.g. fresh bread which was a good alternative to biscuits, when we could get it.

Everyone brought duty-free alcohol of some description, mostly in plastic ½ litre bottles. *Gameldansk* ('Old Danish') was particularly popular, though it did seem to be associated with headaches the following morning!

LESSONS LEARNED

The vacuum-packed fresh Cheddar cheese kept well over the period of transportation and storage and was eaten within the first few days of the expedition. Tubes of *Primula* cheese spread and *Tartex* were popular. Beefburgers and Frankfurters provided variety and were especially good with fried *Boletus* mushrooms and garlic. Everyone enjoyed the muesli bars which were baked by friends of Dave Beaumont at the *Fulwellmill Bakery*. Dried fruit was good as a pudding when stewed with a little sugar.

The chocolate *Wispa* bars melted and lost their air-filled consistency. There was far too much jam, marmalade, honey and peanut butter. It would have been better to take small containers of spreads. Very few people used any sugar, and a small bag for each person for the whole trip would have been enough - alternatively calorie-free sweeteners could be used. The mixed nuts ration could be reduced to 50g per person per day.

The vegetarian meals, in particular, tended to be bland and main meals were livened up with *Tabasco* sauce, mustard and garlic. These items should be included in future expedition food packs. It would also be worth taking Parmesan cheese, tomato puree, a few dried herbs and some sauces.

COOKING

Almost all of our cooking was done on *Trangias*. We had no problems with the stoves, they were reasonably quick and good in strong winds, although they used more fuel if it was windy. We had expected to collect a drum of methylated spirit in Søndre Strømfjord, but this was not available, so we purchased 23 litres of *Borup* household spirit (ethanol), as fuel for the expedition. We found that it burned marginally slower, and hence took longer to cook food, than methylated spirit, the normal fuel for *Trangias*.

LOGISTICS

Gordon Wright

GETTING THERE

Air transport of personnel was by scheduled Scandinavian Air Services (SAS) flights, but because of the demand for places on the Copenhagen/Søndre Strømfjord route, the timing of the expedition was dictated by the availability of seats. Consequently, the expedition terminated slightly earlier than had been hoped, but in the event, this was not a critical factor. Return fares were £644 from Glasgow and London, and £435 from Copenhagen.

It had been planned initially that the heavy freight, which weighed 360 Kg and comprised food, camping equipment and goose catching gear, would be sea-freighted to Greenland, but we missed the May deadline for having everything ready and resorted to air-freight. This was more expensive, but CM negotiated a discount with SAS, reducing the charge per kilo from £4.19 to £3.27, and also obtained a very favourable reading of the weighing scales. To further reduce freight costs, 80 Kg was taken through as hand baggage, thus the total freight costs were £850 for air freight (includes discounts), plus £45 for excess hand baggage.

The goose catching gear was left in Greenland, so there were no return freight charges - everything else being carried as normal airline baggage.

IN THE FIELD

On arrival in Søndre Strømfjord we collected our air-freight, purchased fuel and other supplies, and sorted out our kit. Lyndsey issued the first two days rations and we prepared to move into the field. We were extremely fortunate in having the support of Aksel Reenburg of *STATOIL*, Søndre Strømfjord, who transported our stores up the escarpment onto the plateau above the airfield; this saved us two days of hard labour.

At the top of the escarpment, we established a supply dump in a large tent, and proceeded to the first camp site. Five people returned to the supply dump on 10 July to collect the catching gear and rations for four more days, and Aksel carried in a full load when he walked in with David Stroud on 11 July. Thereafter, re-stocking with food and fuel was achieved by two people returning on 14 July from Camp 2, and four on 19 July from Camp 3. The weight of individual re-supply loads was 25 to 30kg.

When the expedition moved camp everyone carried their own kit plus a proportion of the communal gear. During the move from Camp 1 to 2, two people had to make a return journey to clear all the equipment, but on the move from Camp 2 to 3 everything was carried in a single move. During the return journeys to the supply dump the opportunity was taken to carry out rubbish and surplus gear.

The goose catching gear was not returned to camp after each catch but was cached strategically positioned for future catches, thus minimising the distance carried. The inflatable boats were carried back to camp each day since they were considered vulnerable to damage by arctic foxes (*Alopex lagopus*).

On completion of the goose catching, the nets were carried out and cached by the icecap track during a trek to see the ice. Thus during the final walk out, only one journey was necessary for everyone, and again we were saved a lot of hard work by Aksel who picked us and our gear up

on the track, saving a long walk back to Søndre Strømfjord.

FUTURE OPTIONS

The use of a helicopter to pre-position stores would save a lot of hard work and enable the team to concentrate on finding and catching geese. The assistance provided by Aksel went some way to minimising this, but with his departure imminent, future expeditions might not be so fortunate. Hire rates are expensive in Greenland - over £2,000 per hour for a light helicopter, if one is available - but it is an option worth consideration if the expedition can be more fully funded.

ACKNOWLEDGEMENTS

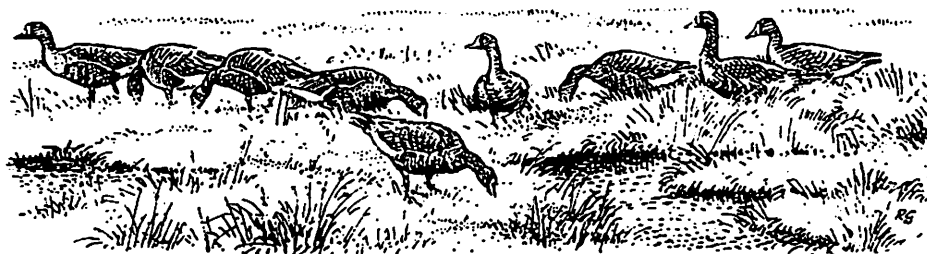
For financial support we wish to thank the Wildfowl and Wetlands Trust (WWT), the Ole Jensen Foundation, and the individual team members who raised funds and contributed from their own pockets.

WWT provided assistance in the production of this report. Koj Kampp of The Zoologisk Museum, Copenhagen kindly provided metal rings and forwarded recoveries. Plastic leg rings and collars were made by WWT and were funded by the Office of Public Works, Dublin. Nigel Jarrett at Slimbridge discussed, over several pints of beer, the race of Canada Geese caught.

Sightings of marked Greenland White-fronted Geese are co-ordinated by GWGS, c/o Tony Fox, Wildlife Ecology, NERI, Kalø, DK-8410 Rønne, Denmark. It is a pleasure to acknowledge those that forwarded sightings to him (in addition to individual expedition members who searched for marked birds in Scotland and Ireland): Dave Batty, Paul Boyer, Paul Collin, Ray Hawley, Ross Lilley, Mr & Mrs R Locken, Clive MacKay, Eddie Maguire, Ronald McDonald, John McOwat, Oscar Merne, Chris Murphy, Bill Neil, Dave Norriss, Malcolm Ogilvie, Myrfyn Owen, Mike Philipps, Eileen Rees, Steve Ridgill, Peter Rose, Arthur Tirwell and Jim Wells.

Amongst the many people who are owed our thanks for their contribution in all sorts of ways, there are a few individuals who deserve particular note. Tony Fox launched us on this venture and maintained his infectious and enthusiastic support after he had to withdraw from the expedition. We are grateful to the Danes, especially Hans Meltofte, who put us up in their homes in Copenhagen during stop-overs, and kept us entertained - particularly on the last night!

Finally, Aksel, Adele and Camilla Reenburg made us so welcome when we arrived in Greenland, not just with all the logistical help, but on a very personal level, opening their home to us and looking after us when we came down from the hill. It is difficult to over-state their contribution to the success and pleasure of our expedition.



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