

GREENLAND WHITE-FRONTED GOOSE STUDY

Report of the 1992 Expedition to Isungua, West Greenland

Greenland White-fronted Goose Study
Aberystwyth 1993

Editors
Gordon Wright & Carl Mitchell

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please cite as:

Wright, G. & Mitchell, Carl (1993)
Greenland White-fronted Goose Study
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INTRODUCTION

Gordon Wright

The Greenland White-fronted Goose *Anser albifrons flavirostris* breeds in west Greenland and winters in Britain and Ireland (Salomonsen 1950). The population fell from 17,500-23,000 in the 1950s to 14,300-16,600 in the late 1970s (Ruttledge and Ogilvie 1979) and is currently estimated to be 26,700 as of November 1979 (Warren 1990). Due to its scattered wintering distribution and low productivity, this sub-species remains threatened in western Europe and there is a need to model population processes in order to provide a firm basis for conservation management (Warren *et al.* 1992b). A key element of our understanding of population processes is to have uniquely marked individuals. White-fronts have been successfully caught on the wintering grounds using cannon-nets. This expedition provided an opportunity to catch and mark white-fronts during the summer moult on the breeding grounds.

I found myself organising this expedition by accident really; it was all Tony Fox's fault. Tony floated the idea, recruited several members and then had to pull out because his desk at Slimbridge needed him more than us. Leaderless, we drifted for a while, and so, lacking any other volunteers, I picked up the reins. We were short of time by then, but thanks to a lot of hard work, particularly from Lyndsey Kinnes we pulled it all together. Fortunately we had David Stroud and Alyn Walsh who had visited the area before, and our Danes were well equipped with *Gameldansk*; all the ingredients for a successful expedition were therefore in place, and so it happened.....

AIMS AND OBJECTIVES

This expedition was the latest in a series which began in 1979 with the setting up of the Greenland White-fronted Goose Study and an expedition to Eqaungmiut Nunât, west Greenland. There were follow-up expeditions in 1984 to Eqaungmiut Nunât and in 1989 to Isungua, north of Søndre Strømfjord, with supplementary visits to west Greenland in 1988 and 1991. The aims of this expedition were to return to the area studied in 1989, re-survey the goose population, and to try to catch and ring them. The primary objective was:

1. To mark with leg rings and neck collars as many Greenland White-fronted Geese (*Anser albifrons flavirostris*) as possible at Isungua, an area north of Søndre Strømfjord, west Greenland (67°00'N 50°30'W - see Figure 1), in order to:
 - a. Assess summer site loyalty on the breeding grounds through repeat surveys of the same study area.
 - b. Assess emigration/immigration rates at the wintering grounds in Ireland (e.g. Wexford Slobs) and western Scotland (e.g. Islay).

As planning progressed and individual participants expressed particular interests, secondary objectives were identified:

2. To carry out additional biological recording and field work on an opportunistic basis, including:
 - a. Botanical survey and sample collection.
 - b. Red-necked Phalarope (*Phalaropus lobatus*) breeding habitat survey.
 - c. Invertebrate survey and sample collection.
 - d. Ringing of other bird species.

Following a request for assistance from the Danish Polar Centre, a third objective was defined:

- To carry out an aerial survey of the area from Søndre Strømfjord northwards, in order to assess goose population size and distribution.

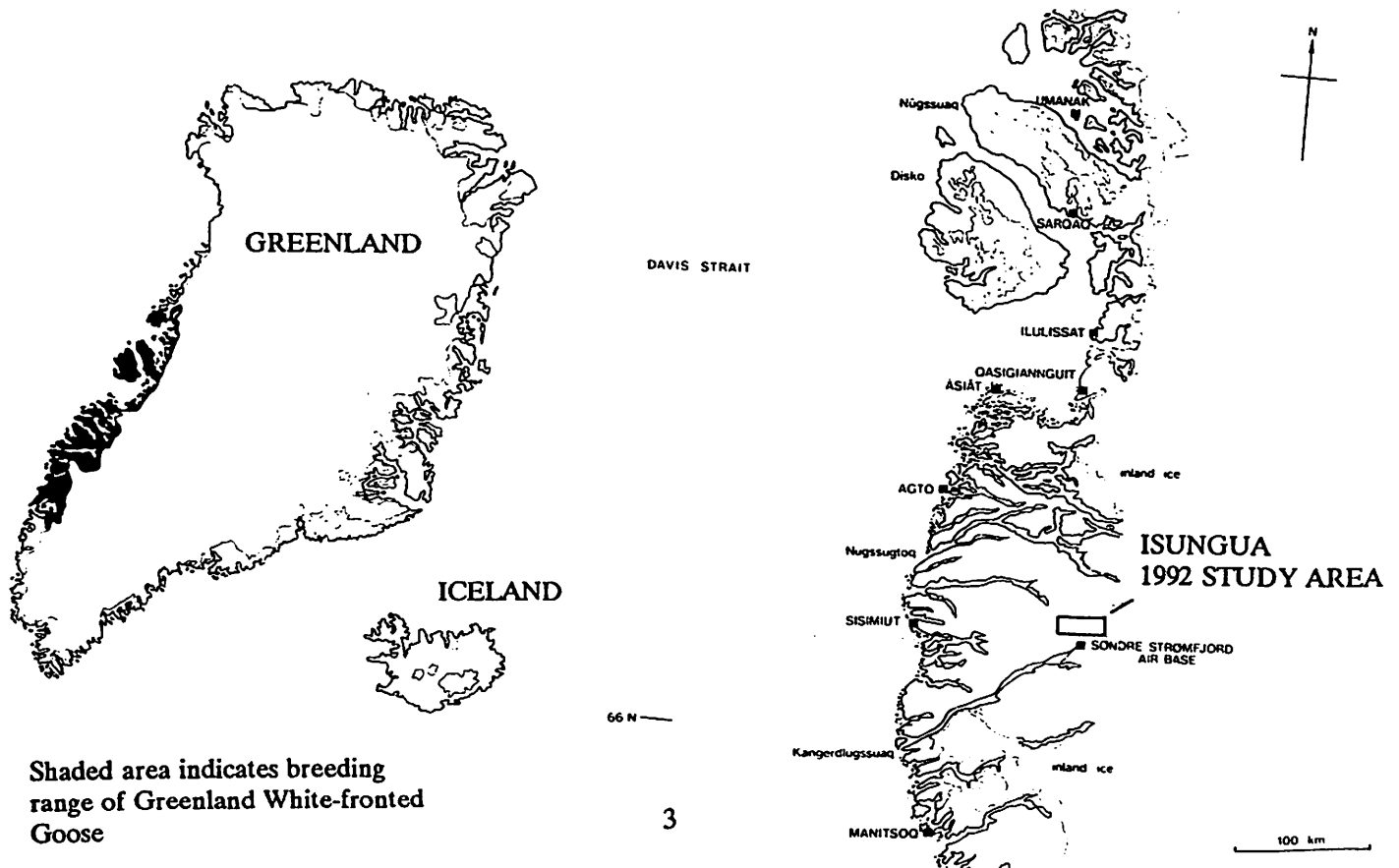
PERSONNEL AND TIMING

The expedition comprised the following personnel;

Gordon Wright	Scottish Natural Heritage, Loch Leven
Carl Mitchell	The Wildfowl & Wetlands Trust, Slimbridge
Lyndsey Kinnes	Scottish Natural Heritage, Edinburgh
Alyn Walsh	Wildlife Division, Wexford Slobs, Ireland
David Stroud	Joint Nature Conservation Committee, Peterborough
Ian Bainbridge	Royal Society for the Protection of Birds, Edinburgh
Mike Peacock	Royal Society for the Protection of Birds, Islay
Dave Beaumont	Paisley College, Glasgow
John Frikke	Esbjerg, Denmark
Inge Guldborg	Esbjerg, Denmark
Michael Clausen	Reserve Tipperne, Denmark

The British and Irish contingent (except David Stroud) flew to Copenhagen on 8 July, joined up with the Danes and flew to Søndre Strømfjord on 9 July, departing for the field that evening. David Stroud joined on the evening of 11 July. On 19 July, David Stroud, John Frikke and Inge Guldborg departed for Jacobshavn to carry out the aerial survey work, whilst the others remained in the field until 26 July. After sorting out our kit in Søndre Strømfjord, the expedition dispersed on 28 July, some returning via Copenhagen, others staying on to collect more data on breeding Red-necked Phalaropes and sightseeing around Søndre Strømfjord.

Figure 1. The west coast of Greenland showing the study area.



DIARY

Dave Beaumont and Gordon Wright

PREPARATION - 1992

February - Initial planning and team recruitment.
April - Detailed planning and gathering equipment.
May - Flights booked and rations purchased.
June - Rations packed and stores despatched.

THE EXPEDITION - JULY 1992

8th - The British and Irish contingents depart Glasgow and London and meet up in Copenhagen for a few beers in the sun, a huge Italian meal, and an overnight stay with Danish hosts.

9th - To Copenhagen airport where we met the Danish contingent and flew to Søndre Strømfjord. On arrival we were met by drizzle, mosquitos and Aksel Reenburg. We collected our freight and sorted out all the kit, purchased bread, fuel and *Myg Oli* (mosquito repellent), and packed our already bulging rucksacks with the first four days food. To our great good fortune we had all our stores transported up the escarpment by Aksel and his jeep; a very hair-raising experience it was too! On the plateau we established a stores dump, loaded our packs and hiked into the study area.

We set up Camp 1 on a morainic knoll, in a sheltered spot - ideal for mosquitos. The water supply was a shallow pond which was very fertile, and dark coloured cups helped conceal the protein supplement in every mouthful. The surrounding countryside was reminiscent of parts of Scotland, with rolling hills interspersed with a myriad of lakes, pools and bogs, and high, snow-draped peaks as a distant backdrop. After a gathering of minds to plan the activities for the next few days, we had our first meal of curry, then a wee dram, and slept the sleep of the just. The mosquitos were terrible.

10th - Woke to steady rain and indescribable mosquitos - Dave killed 52 in one slap - on Mike! Two teams set out to reccé for geese, creeping and crawling, trying to see them first, but only two geese were found. The rest of the team were employed as pack mules, returning to the stores dump and backpacking in with the goose catching and ringing gear and more food. It was a great relief to be met after returning from a long hard walk with a brew and a *Gameldansk*; the weariness evaporated.

11th - Woke to a better morning, with the wind keeping the mossies under control, but some people suffering from reaction to yesterdays bites - Lyndsey's eyes almost closed and Gordon's hands and fingers were badly swollen. Two teams went out again on reccé. John found 40 geese but, unfortunately, they had been spooked. However, Alyn had found a flock that looked promising. The rest of the team remained around camp, preparing catching gear and looking at phalaropes. David Stroud arrived in the evening accompanied by Aksel, fresh bread and more *Gameldansk*.

12th - Our first goose catching day - the reason we had come all this way - and a bit of tension in the air as we faced the big showdown. We loaded up with catching gear and trekked out across the bogs and over the ridges. We devised a cunning plan to outwit the geese and Alyn, Mike, Dave and Gordon headed out high and wide to encircle them, whilst the others came in from a valley below. On gaining high ground overlooking the goose loch, our team found it empty, but then sighted the geese running away like whippets - they had been spooked again!

We watched them run up to a higher loch, swim across it and run again, heading higher still. Leaving Mike to signal their movements, we ran down the hillside to join the team approaching from below, and intercepted them before the running geese could see their approach. Running after the geese, concealed from view we found them settling on a high level loch, though still very wary. Cunning plan mark 2 was devised, and, leaving Ian, John and Inge to guard the outflow, we split into two teams, Alyn leading a wide circling move to the right whilst Gordon went to the left. After an hour and a half of running and crawling Alan and Gordon met and the encirclement was complete, so a whistle was blown and amazingly, everything went according to plan. The skyline became adorned with people at regular intervals, all disturbing the peace, and the geese responded impeccably by swimming quietly into the middle of the loch.

The netting team of Ian, Mike, Michael and Dave swung into action like a well-oiled machine and the catching pen and wings were erected, whilst the geese were held on the loch by the others. When the nets were set, everyone backed off and Carl and David launched themselves in their small inflatable boats. Carl had acquired them as old stock for a tenner down the market; he was seen off! Ever so gently they paddled towards the geese, with just the occasional pirouette, pushing the geese towards the nets. Again it went like clockwork, and gradually the geese were driven to the shore. Hesitating at first, then with a rush, they ran, were confined by the netted corral and entered the catching pen - just like watching "*one man and his dog*". It had worked after all - we had caught 39 white-fronts and one Barnacle Goose.

Ringling and processing proceeded swiftly to minimise stress to the birds on what was a very warm day. The birds were released, the gear was packed, and it was a weary team that trekked back to camp, but the success of the catch kept everyone's spirits high, and we had a wee dram to celebrate.

13th - After yesterday's exertions we had a slow start, and prepared to move camp. Broke camp at lunchtime for a two hour trek to Camp 2, a lovely site beside Saningassoq with a steady, cool breeze to ward off some of the mosquitos and a pair of Great Northern Divers nesting nearby.

14th - Two teams went out to reccé the new area, enjoying fantastic scenery and bright, cloudless skies. A few geese were found in small parties, and Carl and Dave had lunch beneath a trig point in the middle of nowhere. As it gradually dawned on them that trig points were not particularly common in Greenland, a closer inspection confirmed it as a large, female Gyrfalcon! Mike was fortunate to find two muskox fighting - they were not thought to inhabit this area. Alyn and Gordon trekked back into Søndre Strømfjord to post mail and top up our stores. After a visit to Aksels, they returned loaded with food, fuel, *Myg Oli* and the odd bit of refreshment.

15th - Our second attempt to catch geese brought us back to earth after our initial success. Having re-located eight geese without spooking them, they managed to vanish whilst we encircled them, so it was a long frustrating day with nothing to show for the effort. On their return to camp Mike, Dave and Gordon went for a swim to drive the blues away, and emerged fresher but noticeably bluer from the icy water. *Gameldansk* soon restored the circulation, and although everyone was very disappointed - and it showed - it was bitterly cold that night so there were no mosquitos and we were all able to sit out in peace, talking and drinking, in the evening light.

16th - A slow start after yesterday's exertions. We broke camp at lunchtime and trekked further east along the lake side to Camp 3, another beautiful spot where we watched muskox on the opposite shore, and found frost on the tents the following morning.

17th - An early start for a long day's goose catching. Learning from our earlier failure, we took great care in moving into position. The first flock of geese were on a long, narrow loch,

entailing a very long move to get beyond them. We made it eventually, finding the 34 geese asleep on the shore, and fortunately they headed out onto open water when the whistle was blown. They were very wary and difficult to catch, constantly turning to challenge the boats, and making life very difficult for the boatmen. Several escaped but we managed to catch 13, and after a second try, caught a further five.

After processing the geese we moved to the adjacent loch where we found a new flock, including a family party. We quickly surrounded them - too quickly for Michael who either fell asleep or ran to the wrong lake. Unfortunately, the other geese became aggressive towards the goslings, so, reluctantly, we allowed them to escape past our boats. Again the geese were wary and challenging, but we caught five more to add to the total, plus a Mallard. Ian found one tiny specimen of a single-flowered harebell, 900km south of its supposed range.

18th - A late start after yesterday's work, and we decided to split the group to make the most of the available man-power. Alyn went off with the catching team to two small flocks in relatively compact sites. Three geese were caught on the first loch - small, steep sided and easy to surround - including a leg-ringed bird (F01) - caught three years earlier nearby, by David.

The next lake was easier to surround, but the 18 geese disappeared into thin air - again. After almost treading on them, they were spooked from their hidey holes amongst the dwarf birch, and after a half hour of wild goose chasing, seven were caught. They included a family party of five goslings which, it transpired, were too small to ring.

Meanwhile, Lyndsey and Gordon headed out well to the north-east on a long-range reccé, finding scattered small groups of geese, including two broods of Canadas, but no large flocks of white-fronts. That evening a caribou and a muskox came within a few yards of the camp whilst Lyndsey hid (from the muskox), the coward (Lyndsey, not the muskox).

19th - The aerial survey team, comprising David, John and Inge, departed today, backpacking into Søndre Strømfjord to meet their aircraft. Ian, Mike, Michael and Dave also backpacked in, to top-up on stores, but found the place closed (being a Sunday) and were rescued by Aksel and Adele Reenburg. Unfortunately(!) they were forced to overnight in Søndre Strømfjord, and had to team up with the aerial survey team and the Reenburgs for what was a lively evening.

Lyndsey and Gordon (still working!), continued further eastwards, searching many apparently suitable sites, but found only four white-fronts. On the return journey passing through a narrow valley, Lyndsey suddenly threw Gordon to the ground (all in the cause of science) - there below were 30 geese. Weary after an arduous trek, they had stumbled on geese when least expecting it. They were completely exposed to view on an open hillside, but they had not been seen, crawling for a long way, very slowly, until out of sight, and managed to escape without spooking the geese.

20th - Carl went off on a solo reccé, and found two small flocks, whilst Lyndsey and Gordon returned with news of Lyndsey's geese. The stores party had still not returned from Søndre Strømfjord, but the aerial survey team flew over the camp and dropped a loaf of fresh bread with a message tied to it. It took us some time to find but the bread was worth it, and the message explained that Mike had developed gout, was seeing a doctor at the airfield, and the lads were giving him moral support. They turned up that night, loaded with plenty of food, and with a bottle of *Jim Beam*, complete with ice cubes, neither of which lasted too long.

21st - We set off early to catch the geese Lyndsey had located, involving a long, wide encircling move, but in beautiful bright and breezy conditions. Fortunately they had not moved, but we unavoidably spooked another flock of geese as we surrounded the lake. The operation

went smoothly with Michael and Dave in the boats. We caught 15 white-fronts and 10 Canada Geese - the first to be ringed in Greenland. The area carried a large population of caribou, and appeared to be a calving ground judging by the abundance of young calves. Fresh garlic mushrooms followed by beefburgers and *Gameldansk* (what else!), formed the basis for a gourmet meal that evening, all wrapped up against the cold and thankfully free from mosquitos.

22nd - Off to locate the geese Carl had found, and the first catch of 16 included the brood of white-fronts which had been caught four days earlier but had proved too small to ring. By now they had grown considerably, and were duly ringed and released. Moving to the next lake, we devised our normal cunning plan, but the right wing found themselves unable to progress since they were completely exposed to view. So when the whistle was blown and only half the lake was surrounded, there followed a frantic, exhausting run from each side to cover the gap. However, it worked and we surrounded 12 geese, all of which were very wary and not keen on the net. The lake was the largest we had surrounded and almost circular. After the first drive in the boats we managed to push all 12 geese into the netted corral. Unfortunately, most managed to double back onto the water and only two were caught. A second drive proved fruitless on such a large lake, with the birds now even more reluctant to head for the nets. A final rush to the shore as the geese broke onto the land, and again doubled back, caused one boat to be holed, the other blew away in the wind (to be retrieved later), and Dave and Carl were soaked. So ended our goose catching. A total of 108 white-fronts caught, 90 of which were newly ringed.

There followed a long and very pleasant walk back, in the beautiful evening sunshine, and a close encounter of the muskox kind. All the pressure off, so a relaxed evening with hot chocolate, mints and photographs.

23rd - Our first day off; sleeping, eating, washing and planning the last few days. The keener players went off ringing little brown birds and a couple of Ptarmigan, and looking at phalarope habitat.

24th - Off to the ice cap for a spot of sight-seeing. Lyndsey and Gordon walked for 14 hours to get there and back, but it was well worth it. The ice was booming and crashing and the whole atmosphere was quite spectacular. Alyn and Carl walked to the Søndre Strømfjord road (to Beaver Mt.) whilst the others continued phalaroping in the sun.

25th - Sports day. The '*Saningassoq prunestone-spitting championship*' was won by Mike, entirely on merit, despite fierce competition from all nationalities. The '*Isungua boatman-of-the-year*' award went to Carl after an intense and sometimes acrimonious competition involving slalom, limbo and distance sections of a particularly arduous course, not made any easier by the actions of a minority in the crowd of spectators, and a few unsporting competitors. The '*west Greenland combined badminton and frisbee games*' were unavoidably cancelled due to injuries sustained during practice.

26th - Broke camp, tidied up, and walked out to the road where we were picked up by Aksel and transported to Søndre Strømfjord. After cleaning ourselves up, we hosted Aksel and his family to an expedition dinner (thank goodness for credit cards with extraordinary credit limits), after which two nameless team members distinguished themselves in a particularly entertaining way. Much post-expedition discussions long into the early hours...

27th - Sorting gear, packing up, eating real food and waiting to go home.

28th - The expedition disbanded amid emotional farewells. Everyone went their separate ways, some staying in Greenland for an extra week of phalaroping and sightseeing (IB, MP, AW & DB), the others flying home via Copenhagen (GW, LK, DS, IG, JF & CM). And so it ended.

GOOSE RINGING REPORT

Carl Mitchell & Alyn Walsh

SUMMARY

Ninety Greenland White-fronted Geese (*Anser albifrons flavirostris*) were newly ringed during the expedition and a further five were caught which had been previously ringed in the same area in 1989. Ten Canada Geese (*Branta canadensis canadensis*) were also caught, the first to be ringed in Greenland, and one Barnacle Goose (*Branta leucopsis*). A summary of ringing and biometric details are given of all geese caught.

CATCHING METHODS

Details of methods and equipment used in catching white-fronts are given at length elsewhere (e.g. Belman 1981) and only a brief summary appears here. Descriptions of the routes and logistics of individual catches on this expedition are briefly described under the daily log (see *Diary* p.4).

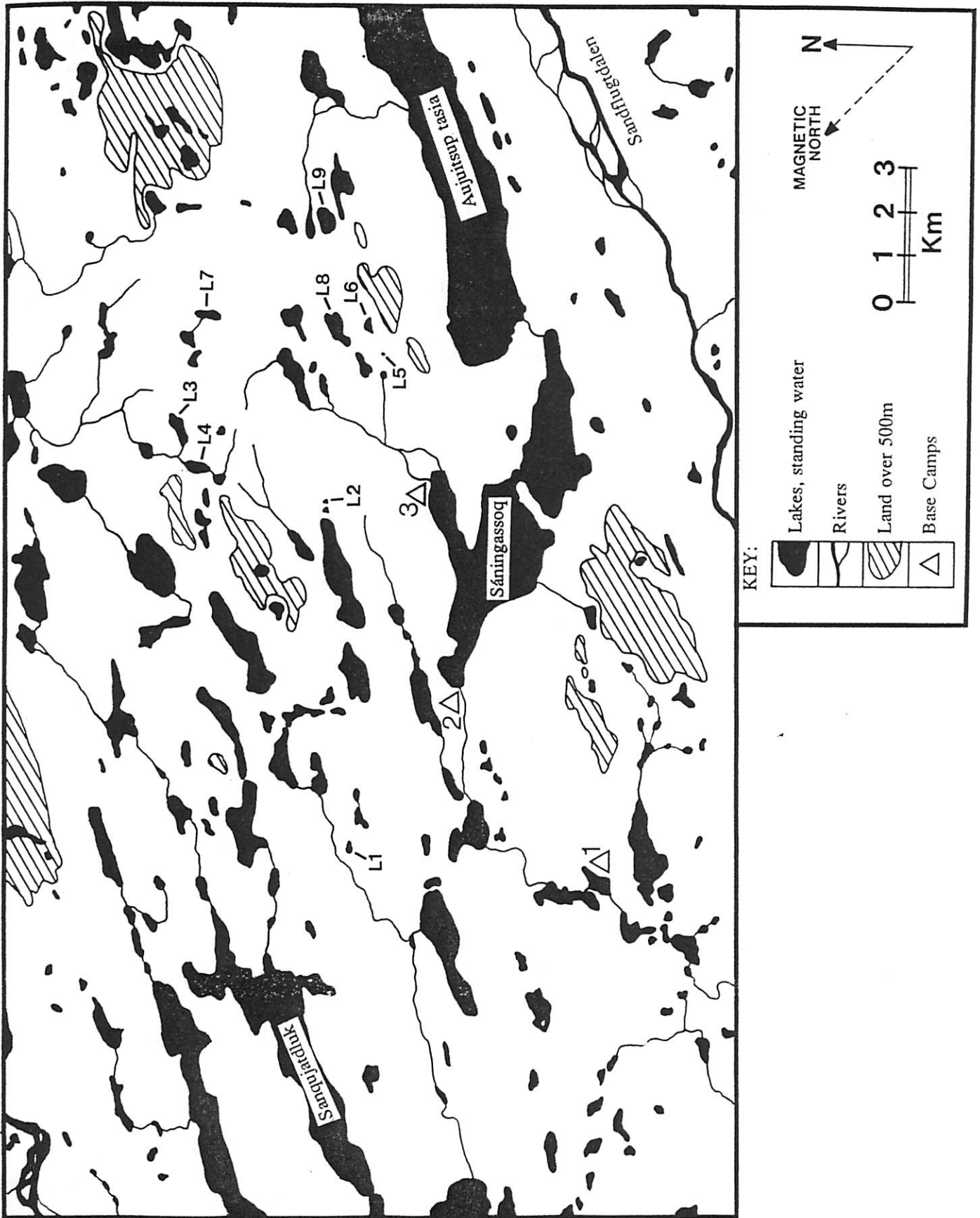
In fully grown white-fronts, like all arctic breeding geese, the primary and secondary wing feathers are moulted simultaneously each summer and the birds become flightless for approximately 3 to 4 weeks. Non-breeding birds and immatures moult their flight feathers approximately 2 to 4 weeks before parental geese. Geese can be successfully caught during the flightless period, when they can be herded overland or on water.

White-fronted Geese have been caught in Greenland using netted corrals and small inflatable boats on three previous occasions since 1979, but are notoriously shy birds that run across open tundra and scree if disturbed. The catching technique employed is, briefly: A small flock is located grazing close to a lake which is surrounded by all members of the catching team on a given signal. A netted catching pen with 1.5m high walls is erected at the lake outflow with 'wings' of netting up to 50m long to corral the flock into the pen. Two inflatable boats are used to gently herd the flock towards the pen. Once the birds have walked out of the water into the mouth of the corral, all members of the catching team walk the flock into the pen.

Once caught, a member of the team entered the pen and aged and sexed each bird, passing it on to a handler for ringing and processing. Each adult and yearling white-front was fitted with a metal ring provided by Copenhagen Museum, a white 16mm (internal diameter) plastic ring engraved with three alpha-numeric characters and an orange 55mm (i.d.) plastic collar engraved with the same characters. Goslings were not fitted with collars but were fitted with a metal ring and a two letter white plastic ring. Once ringed, measurements of the total head length and total tarsus length were taken using callipers, and the length of the newly moulted wing (flattened and straightened chord) was recorded using a rule. Each bird was then weighed to the nearest 25g using a Salter balance and a note of the amount of black belly bars (see Stroud 1981 Figure D12.2) was taken. Finally a photograph of the belly of each bird was taken. A note was made if a female showed signs of a newly feathered belly - indicating a brood patch and thus evidence of breeding - and if eggs had passed through the cloaca.

Collars, plastic leg rings and metal rings were also available for any Canada Geese that were caught. Unfortunately the collars proved to be too large and were only used on 5 birds (see below).

Figure 2. Isungua showing the location of the lakes mentioned in the text



RESULTS

Greenland White-fronted Geese

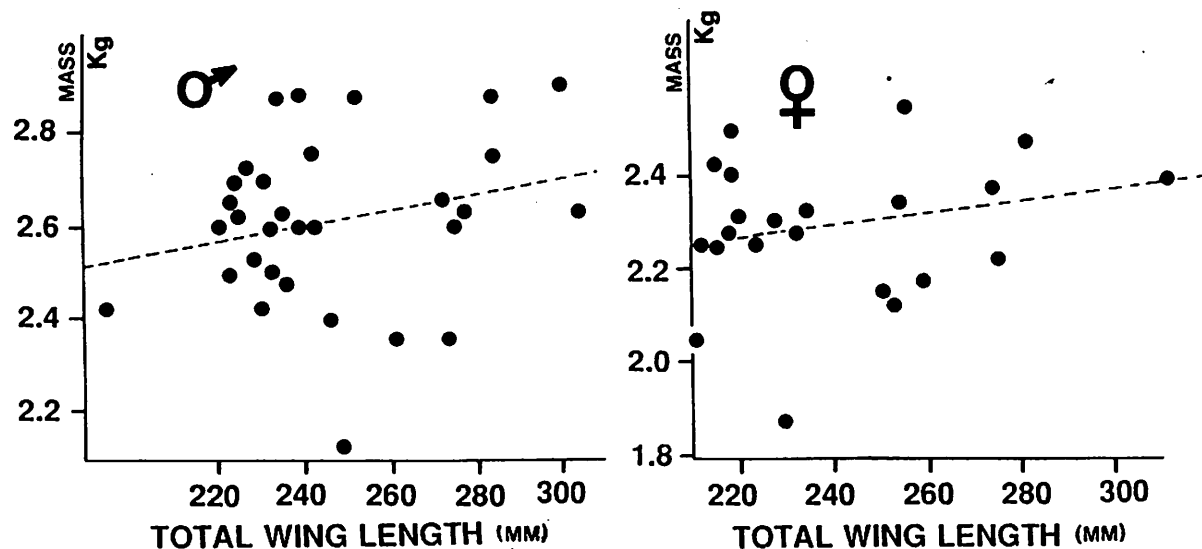
Nine lakes were located on reccés that held geese in a suitable situation for catching (see Figure 2). Two successful drives were attempted on Lake 3, after several birds doubled back past the boats on the first drive, making 10 catching attempts in all (Table 1). Eight moulting adult geese were located on Lake 2 but upon getting into position to surround the lake it was evident that they had been disturbed - they were not located once the lake was surrounded. Surprisingly few birds were able to fly - the timing of the catching attempts was perfect although this may have been a late year because spring was apparently delayed. In all, 162 birds were surrounded and 108 (67%) of these were caught. Most of the birds that were not caught were surrounded and encouraged towards the keeping net by the inflatable boats but either doubled back past the boats or dived under water.

Ninety geese were newly ringed and five were caught that had been originally ringed in the area in 1989 (see Tables 1, 3 & 4). Five goslings caught on Lake 6 were considered too small to ring (mean weight = 520g) and were released. However, four of these were subsequently caught five days later when they were able to be fitted with both a metal ring and a two letter plastic ring (mean weight = 725g). A summary of ringing details and biometric data is shown in Tables 1, 2 and 3. Figure 3 shows the relationship between wing length and body mass found during this expedition. It is generally thought that little mass is lost during primary moult (e.g. Owen & Ogilvie 1979, Ankey 1979) - i.e. geese rely very little, if at all, on catabolism of body tissue to obtain nutrients for feather growth. The data presented here consists of a small sample size and precludes attaching significance to any positive relationship shown. Future expeditions could investigate this relationship more fully.

Figure 3. Mass of Greenland White-fronted Geese in relation to newly moulted total wing length.

Fitted regression lines:

Male $y = 2229.6 + 1.54x$, $r^2 = 0.048$, $P = 0.234$ not sig.: Female $y = 1984.2 + 1.26x$, $r^2 = 0.05$, $P = 0.315$ not sig.



12 females were considered to have laid eggs although only one showed a brood patch. COD caught on 22 July on Lake 8 was considered to have been the adult female of the brood of four goslings also caught on that lake. Observations on the wintering grounds may confirm this relationship.

Table 1. Details of Greenland White-fronted Geese caught at Isungua, west Greenland, 1992.

Ring Number	Spp	Date	Lake	A/S	Coll	Win	Mass	Tar	Sku	BB	Winter sightings	
276001	GWF	12JUL	1	4	M	1XX	221	2600	89	122	4	
276002	GWF	12JUL	1	4	F	2XX	229	1875	86	117	3	
276003	GWF	12JUL	1	4	F	3XX	254	2350	91	119	1	Kintyre and Islay
276004	GWF	12JUL	1	5	F	4XX	210	1975	84	114	1	Islay, Scotland
276005	GWF	12JUL	1	5	F	5XX	212	1975	84	114	2	
276006	GWF	12JUL	1	4	F	6XX	210	2050	84	121	5	
276007	GWF	12JUL	1	5	M	7XX	208	2075	86	115	0+	Stranraer
276008	GWF	12JUL	1	4	M	8XX	242	2600	93	121	5	
276009	GWF	12JUL	1	4	M	9XX	233	2500	97	121	3	Islay, Scotland
276010	GWF	12JUL	1	5	M	0XX	203	2050	79	114	1	
276011	GWF	12JUL	1	4	M	A1Y	233	2600	97	119	4	Kintyre, Scotland
276012	GWF	12JUL	1	4	M	A2Y	239	2600	94	120	5	Islay, Scotland
276013	GWF	12JUL	1	5	M	A3Y	204	2150	83	114	1	Islay, Scotland
276014	GWF	12JUL	1	4	M	A4Y	236	2475	92	118	4	Islay, Scotland
276015	GWF	12JUL	1	4	M	A5Y	242	2675	96	116	2	Islay, Scotland
276016	GWF	12JUL	1	4	M	A6Y	235	2625	95	106	5	Kintyre, Scotland
276017	GWF	12JUL	1	5	F	A7Y	236	2325	89	116	1	South Uist, Scotland
276018	GWF	12JUL	1	4	M	A8Y	224	2650	96	124	5	
276019	GWF	12JUL	1	5	M	A9Y	226	2450	91	121	0	Islay, Scotland
276020	GWF	12JUL	1	5	M	A0Y	223	2450	94	118	1	
276021	GWF	12JUL	1	5	M	A1V	252	2300	92	122	1	Islay, Scotland
276022	GWF	12JUL	1	4	F	A2V	215	2425	89	118	4	Kintyre, Scotland
276023	GWF	12JUL	1	5	M	A3V	249	2525	89	122	0+	shot Ferjukot, Iceland
276024	GWF	12JUL	1	4	M	A4V	248	2125		115	3	
276025	GWF	12JUL	1	4	M	A5V	230	2425	99	123	3	Islay, Scotland
276026	GWF	12JUL	1	7	F	A6V	208	2175	89	117	3	
276027	GWF	12JUL	1	5	M	A7V	225	2475	93	123	3+	
276028	GWF	12JUL	1	4	M	A8V	225	2700	94	121	3	Kintyre, Scotland
276029	GWF	12JUL	1	4	F	A9V	227	2300	86	117	4	
276030	GWF	12JUL	1	4	F	A0V	217	2275	88	119	4	Coll, Scotland
276031	GWF	12JUL	1	5	M	A1X	229	2525	91	117	1	
276032	GWF	12JUL	1	4	M	A2X	234	2875	95	122	5++	Islay, Scotland
276033	GWF	12JUL	1	4	M	A3X	225	2625	91	114	4	
276034	GWF	12JUL	1	4	M	A4X	242	2750	95	119	3+	
276035	GWF	12JUL	1	4	F	A5X	223	2250	87	102	3	
276036	GWF	12JUL	1	7	M	A6X	237	2525	84	108	2	shot Ferjukot, Iceland
276037	GWF	12JUL	1	5	M	A7X	241	2465	97	112	2	Islay, Scotland
276038	GWF	12JUL	1	4	F	A8X	214	2250	91	107	3	
276039	BAR	12JUL	1	4	F			1900				
276040	GWF	17JUL	3	4	M	A9X					2	
276041	GWF	17JUL	3	4	F	A0X					3	Kintyre, Scotland
276042	GWF	17JUL	3	4	M	A2S					3	Kintyre, Scotland
276043	GWF	17JUL	3	4	F	A3S	219	2300	94	104	3	Kintyre, Scotland
276044	GWF	17JUL	3	4	M	A4S					2	Kintyre, Scotland
276045	GWF	17JUL	3	4	M	A5S	246	2400	99	119	5	Kintyre, Scotland
276046	GWF	17JUL	3	4	F	A6S					3	Kintyre, Scotland
276047	GWF	17JUL	3	4	F	A7S					4	Kintyre, Scotland
276048	GWF	17JUL	3	4	F	A8S					4	Kintyre, Scotland
276049	GWF	17JUL	3	4	F	A9S					4	
276050	GWF	17JUL	3	5	F	C1J	246	2375	101	119	1	Wexford, Eire
276051	GWF	17JUL	3	4	M	C2J					4	
276052	GWF	17JUL	3	4	F	C3J	232	2275	98	117	5	Kintyre, Scotland
276053	GWF	17JUL	3	4	F	C4J	212	2250	98	115	4	Kintyre, Scotland
276054	GWF	17JUL	3	4	M	C5J	231	2700	102	118	4	Kintyre, Scotland
276055	GWF	17JUL	3	4	M	C6J					3	Kintyre, Scotland
276056	GWF	17JUL	3	4	M	C7J	240	2875	109	124	4	
276057	GWF	17JUL	3	4	M	C8J	228	2525	102	118	3	
276058	GWF	17JUL	4	4	F	C9J	219	2500	98	121	2	Kintyre, Scotland
276059	GWF	17JUL	4	5	F	C0J	216	2175	98	114	2	Wexford, Eire
276060	GWF	17JUL	4	4	F	C1L	218	2400	98	117	4	Kintyre, Scotland
276061	GWF	17JUL	4	4	M	C2L	223	2500	101	126	4	Kintyre, Scotland
276062	GWF	18JUL	5	4	M	C3L	277	2625	103	123	3	shot Vatnsholl, Iceland
276063	GWF	18JUL	3	4	F	C4L	259	2175	98	119		Islay, Scotland
276064	GWF	18JUL	6	4	M	C5L	275	2600	102	123	4	Islay, Scotland
276065	GWF	21JUL	7	4	M	C6L	295	2475	87	111	4.5	Islay, Scotland
276066	GWF	21JUL	7	5	M	C7L	276	2650	94	123	2	
276067	GWF	21JUL	7	4	M	C8L	227	2725	92	126	3	
276068	GWF	21JUL	7	4	F	C9L	282	2475	88	108	4	Islay, Scotland
276069	GWF	21JUL	7	5	F	C0L	282	2125	86	104	2	

Ring Number	Spp	Date	Lake	A/S	Coll	Win	Mass	Tar	Sku	BB	Winter sightings	
276070	GWF	21JUL	7	4	M	C10	284	2875	92	111	3.5	Islay, Scotland
276071	GWF	21JUL	7	4	F	C20	274	2375	86	104	3	
276072	GWF	21JUL	7	5	M	C30	265	2400	97	111	1	Loch Ken, Scotland
276073	GWF	21JUL	7	4	M	C40	304	2625	94	112	4	Islay, Scotland
276074	GWF	21JUL	7	4	F	C50	252	2125	85	101	4	Islay, Scotland
276075	GWF	21JUL	7	4	M	C60	273	2350	85	108	4	Wexford, Eire
276076	GWF	21JUL	7	4	M	C70	300	2900	93	113	4	Islay, Scotland
276077	GWF	21JUL	7	7	F	C80	252	2425	93	106	2.5	Wexford, Eire
276078	CAN	21JUL	7	4	F	G01	278	3150	98	111		
276079	CAN	21JUL	7	4	F	G02	318	3500	102	122		
276080	CAN	21JUL	7	4	M	G03	270	3250	104.5	120		
276081	CAN	21JUL	7	4	M	G04	288	3700	105	126		
276082	CAN	21JUL	7	4	M	G05	264	3500	100	122		
276083	CAN	21JUL	7	4	M	G06	296	2625	106	124		shot Labrador, Canada
276084	CAN	21JUL	7	4	M	G07	250	4150	110	135		
276085	CAN	21JUL	7	4	M	G09	283	3175	102	114		shot Labrador, Canada
276086	CAN	21JUL	7	4	M	G08	282	3600	103	113		
276087	CAN	21JUL	7	4	F	G10	294	3650	97.5	114		shot Labrador, Canada
276088	GWF	22JUL	8	3	F	*8B		775				GOSLING
276089	GWF	22JUL	8	3	F	*8C		675				GOSLING
276090	GWF	22JUL	8	3	M	*8D		675				GOSLING
276091	GWF	22JUL	8	3	M	*8F		775				GOSLING
276092	GWF	22JUL	8	4	F	C00	250	2150	87	109	3	Islay, Scotland
276093	GWF	22JUL	8	5	M	D1C	318	2425	91	109	3	Islay, Scotland
276094	GWF	22JUL	8	4	M	D2C	284	2750	92	117	2.5	Islay, Scotland
276095	GWF	22JUL	8	4	M	D3C	195	2425	91	109	2.5	Islay, Scotland
276096	GWF	22JUL	8	5	M	D4C					1	
276097	GWF	22JUL	8	4	M	D5C	252	2875	97	113	3.5	
276098	GWF	22JUL	8	4	F	D6C	234	2325	85	107	2.5	
276099	GWF	22JUL	8	5	F	D7C	287	2025	81	106		Islay, Scotland
276100	GWF	22JUL	9	5	F	D8C	305	2300	89	119	1	Wexford, Eire
274851	GWF	22JUL	9	4	M	D9C	261	2350	89	106	3	Islay, Scotland

RETRAPS/CONTROLS

Ring Number	Spp	Date	Lake	A/S	Coll	Win	Mass	Tar	Sku	BB	Winter sightings	
278812	GWF	12JUL	1	4	M	2CC	272	2650	91	121	3	Loch Ken, Scotland
278824	GWF	18JUL	5	4	F	F01	275	2225	97	113	2	Islay, Scotland
278819	GWF	21JUL	7	4	F	9CC	256	2550	86	107	2	Islay, Scotland
-----	GWF	22JUL	8	4	F	8CC	204	2325	86	108	3.5	Islay, Scotland
278820	GWF	22JUL	8	4	F	C9D	312	2400	88	109	3	WAS OCC. Islay.

Key:

- Ring Number metal ring number - issued by Copenhagen Museum
- Spp GWF = Greenland white-fronted Goose
- CAN = Canada Goose
- BAR = Barnacle Goose
- Date Date of ringing (1992)
- Lake See Figure 2 for locations of lakes
- A/S Age code; 3 = gosling, 5 = yearling, 7 = 2nd year, 4 = adult
- Sex code; M = male, F = female
- Coll alphanumeric code engraved on collar and plastic leg ring
- Win length of maximum wing chord (mm)
- Mass mass of bird (g)
- Tar length of tarsus (mm)
- Sku length of total head and bill (mm)
- BB belly bar scoring (see Stroud 1981 Figure D12.2)
- Winter sightings principal winter sighting locations (see Sightings & Recoveries p.17). A complete dataset of sightings is held by GWGS, c/o Dr Tony Fox, Wildlife Ecology, NERI, Kalø, DK-8410 Rønde, Denmark.

Table 2. Summary of Greenland White-fronted Geese catches at Isungua, west Greenland in July 1992

Date	Lake (1)	Surrounded	Caught	Newly ringed	retraps (2)	repeats (3)	flew	retrap collars	repeat collars	notes
12 July	1	41	39	38	1		2	2CC		+ 1 Barnacle Goose
15 July	2	8	0							
17 July	3	34	13	13			1			
17 July	3	(34)	7	5		2			A5S,C3J	(2nd drive)
17 July	4	14	6	4		2			A3S,C1J	+ 1 Mallard
18 July	5	4	3	2	1			F01		
18 July	6	9	7	1		1	1		C3L	found 1 long dead gosling
21 July	7	21	15	13	1	1		9CC	C5J	+ 10 Canada Geese
22 July	8	21	16	12	2	2		8CC,0CC	C3L,C4L	
22 July	9	12	2	2						
Total		162	108	90	5	8	4			

notes:

- 1 See Figure 2
- 2 Retrap - originally ringed at Isungua in 1989
- 3 Repeats - originally ringed on this expedition, caught again

Table 3. Summary statistics of biometric data from Greenland White-fronted Geese caught at Isungua, west Greenland in July 1992

MEASUREMENT	AGE/SEX	MEAN	STANDARD ERROR	RANGE	SAMPLE SIZE
WING (mm)	AD ♀	240.1	5.87	210-312	22
	AD ♂	247.8	4.57	195-304	33
	YR ♀	249.2	13.24	210-305	8
	YR ♂	239.9	9.05	203-318	13
WEIGHT (g)	AD ♀	2286	32.9	1875-2550	22
	AD ♂	2607	30.6	2125-2900	33
	YR ♀	2159	56.8	1975-2375	8
	YR ♂	2380	51.0	2050-2650	13
TARSUS (mm)	AD ♀	90.4	1.10	84-98	22
	AD ♂	95.1	0.90	85-109	32
	YR ♀	89.0	2.49	81-101	8
	YR ♂	90.5	1.45	79-97	13
SKULL (mm)	AD ♀	112.3	1.40	101-121	22
	AD ♂	117.5	0.98	106-126	33
	YR ♀	113.3	1.95	104-119	8
	YR ♂	117.0	1.36	109-123	13

Key: AD = Adult (age code 4)

YR = Yearling (age code 5)

Canada Geese

Ten Canada Geese were caught on Lake 7 on 21 July (Figure 2). All were aged as adults. A family of two adults and three well-grown young were seen on Lake 4 but these were not located later, indicating that Canada Geese are breeding in the area. However, it is possible that failed breeding birds or yearlings may undertake a moult migration from northern Canadian islands (e.g. Baffin Island). Three of the ringed geese may have been yearlings but inexperience on the part of CM in determining birds in their second year precluded confirming this. Two of the females caught were considered to have laid eggs although it is not possible to tell if this had occurred in 1992 and that they had subsequently failed, or that they had laid in previous years - neither had brood patches.

It is indicated elsewhere (e.g. Palmer 1976) that Richardson's Canada Goose (*Branta canadensis hutchinsii*) have bred in west Greenland. However, a quick check of the size, plumage and biometrics taken from the 10 birds caught here indicate that they are probably of the nominate race *B.c.canadensis*. The weights of the geese caught were, on average, 1kg heavier than those published for Richardson's (Palmer 1976). The geese had a long, thin neck and a comparatively long head and bill, and showed uniformly pale brown belly feathers - quite unlike the smaller Richardson's. *B.c.candensis* breed in north-east Canada and southern Baffin Island, migrate south through the maritime provinces of Canada and winter in coastal areas from Newfoundland to the Pea Island Wildlife refuge in North Carolina, U.S.A.

The number of Canada Geese breeding and moulting in west Greenland has increased in the last decade (Ole Bennike *in litt*). Recently, a Canada Goose marked with a yellow neck collar on the Atlantic Flyway of east U.S.A. was seen on south-west Svartenhuk, west Greenland (71°35'N, 55°48'W). Unfortunately the observer was unable to read the engraved characters. CM has contacted various groups working on Canada Geese in eastern USA (principally through Richard Maleki, USFWS) in an attempt to generate sightings of these 10 birds on their wintering quarters. It is hoped establish from which population they originate and their migratory routes.

One adult female Barnacle Goose *Branta leucopsis* was caught on Lake 1 on 12 July, presumably from the east Greenland population. Interestingly, it had not started to undertake its wing moult and could fly, although it made no attempt to do so during the drive. One adult male Mallard *Anas platyrhynchos conboschas* was caught during a white-front round up on Lake 4 on 17 July.

Ageing Greenland White-fronted Geese as two years old

Known plumage and bare part characteristics were used to age the white-fronts caught. The five goslings were small and still down-covered but even at fledging goslings are easily identified by the presence of notched tail feathers, mottled/buffy breast feathers with an absence of black belly bars, black toe nails and a black bill nail. Yearlings still retain black toe nails and a black bill nail and some birds retain buffy breast feathers with poorly developed black belly bars. These can readily be separated from older birds which show white/pale toe nails, white bill nail, uniform grey belly feathers and generally more developed belly bars (see Stroud 1981 for a summary).

Three birds, however, presented intermediate ageing characteristics between yearling and adult (A6V, A6X and C8D). Each showed toe nails and bill nails with some retained black lines or small diffuse black areas but each had an apparent 'adult' type belly - although none had a belly score greater than 3. The belly feathers appeared fresher and smaller than an adults. A6X, the only male, showed an intermediate size penis (between juvenile and adult, although penis size is variable), and the two females were considered not to have laid eggs by the tightness of the ventral tract - Greenland White-fronted Geese can breed in their third year (Warren *et al.* 1992b). Birds C8J and C2D, both males, also exhibited some of these characteristics but were

not considered as obvious as the three mentioned above.

It is the opinion of CM that these intermediate characteristics may be indicative of birds born two summers previously. Now that there is a sample of marked birds in the area north of Søndre Strømfjord it would be of interest to check goslings and yearlings caught in 1992 in future years to check the validity of these characteristics.

Table 4. Ringing details and sightings of the five re-trapped Greenland White-fronted Geese originally caught in the same area in 1989.

<i>F01 (leg band only)</i>					
Date	Mate	Parents	Siblings	close by	place
24.7.89					Isungua, w.Greenland (First ringed)
3.12.89	2CE		F02/F04/F05		Kepolls, Kilmeny, Islay, Scotland
7.12.89	2CE		F02/F04/F05		Kepollsmore, Islay, Scotland
4.01.90	2CE		F02/F04/F05		Knochlearach, Islay, Scotland
28.04.90	2CE		F02/F04/F05		Volmulastadir, S.W. ICELAND
18.12.90	2CE		F02/F04		Kilmeny, Islay, Scotland
1.3.91	2CE		F02/F04		Kepollsmore, Islay, Scotland
<i>0CC</i>					
Date	Mate	Parents	Siblings	close by	place
24.7.89					Isungua, west Greenland (First ringed)
3.11.89				1CE/3CE	Kentraw, Islay, Scotland
2.12.89				1CE	Kentraw, Islay, Scotland
2.01.90				1CE	Octovad, Islay, Scotland
11.02.90	UNR				Conisby, Rhinns, Islay, Scotland
1.04.90				9CC	Kentraw, Islay, Scotland
1.12.90				9CC	Conisby, Islay, Scotland
13.12.90	UNR			9CC	Kentraw, Islay, Scotland
24.12.90	UNR			9CC	Conisby, Islay, Scotland
10.1.91	UNR			9CC	nr Foreland House, Islay, Scotland
<i>2CC</i>					
Date	Mate	Parents	Siblings	close by	place
20.7.89					Isungua, west Greenland (First ringed)
14.02.90	UNR				Parton, Loch Ken, Scotland
22.03.90	UNR				Cogarth, Loch, Ken, Scotland
3.04.90	UNR				Mains of Ducrae, Loch Ken, Scotland
3.04.90				3KT/4KT	Cogarth, Loch Ken, Galloway, Scotland
19.01.91					Mains of Ducrae, Loch Ken, Scotland
24.11.91					Mains of Ducrae, Loch Ken, Scotland
1.12.91				4KY	Mains of Ducrae, Loch Ken, Scotland
<i>8CC</i>					
Date	Mate	Parents	Siblings	close by	place
24.7.89					Isungua, west Greenland (First ringed)
20.11.89					Sunderland, Gorm, Islay, Scotland
25.03.91					Tynacollie, Islay, Scotland
<i>9CC</i>					
Date	Mate	Parents	Siblings	close by	place
24.7.89					Isungua, west Greenland (First ringed)
24.10.89	UNR				Rockside, Gorm, Islay, Scotland
3.11.89				0CC	Kentraw, Islay, Scotland
1.04.90					Kentraw, Islay, Scotland
1.12.90				0CC	Conisby, Islay, Scotland
13.12.90				0CC	Kentraw, Islay, Scotland
24.12.90	UNR			0CC	Conisby, Islay, Scotland
10.1.91	UNR			0CC	nr Foreland House, Islay, Scotland

RECOVERIES AND SIGHTINGS

Mike Peacock & Carl Mitchell

INTRODUCTION

The movements and migrations of Greenland White-fronted Geese are well established (e.g. Kampp *et al.* 1988, Warren *et al.* 1992a) but information on the timing of movements, determining movements between wintering sites, and improved survival estimates can be gained through marking individuals on the breeding grounds.

It is now well known that the more northerly breeding Greenland White-fronted Geese winter in more southerly locations (e.g. Wexford, Fox *et al.* 1983). We therefore expected more 1992-ringed white-fronts to winter in Scotland. Previous GWGS expeditions to west Greenland revealed through sightings and recoveries that non-breeding white-fronts moulting together disperse widely through the winter range. It was interesting to speculate the timing and geographical spread of winter sightings and recoveries from the 1992-ringed birds.

RECOVERIES AND SIGHTINGS

Of the 95 white-fronts caught in Isungua in 1992 five have been reported shot in Iceland (Figure 4) and a further 59 have been seen on the wintering quarters (Figures 5 and 6). Of the birds caught four were goslings marked only with white leg rings and one adult (leg ring F01) was caught and released without a collar, thus of those white-fronts marked with collars and known to be alive (i.e. excluding those shot in Iceland) the proportion seen during the winter was 65% (59/90).

Figure 5 reveals that winter sightings are indeed concentrated in Islay, Kintyre, and Galloway (west Scotland) and at Wexford (south Ireland), with single records from South Uist and Mull (west Scotland). The pattern of sightings of birds ringed at Isungua is broadly similar to those found by the ringing expedition of 1989 to the same area (A.D.Fox *in litt.*). The expeditions to Eqaqungmiut Nunât in 1979 and 1984 caught and ringed 96 and 89 white-fronts respectively in an area c.100km north of Isungua - the pattern of recoveries and sightings from these birds showed a wide dispersal throughout their winter range, but again were mainly concentrated on Islay and adjacent islands and mainland (Belman 1981).

ICELAND

C2D was reported shot at Skidbakki, southern Iceland (63°36'N 20°15'W) on 27 September and C3L was shot close by at Vatnsholl (63°36'N 20°13'W) three weeks later. C7L was reported shot on 3 October at Holt, Alftaver (63°22'N 18°25'W). A6X and A3V were reported shot together at Ferjukot (64°36'N 21°43'W) on 10 October 1992 - presumably a pair - both had been ringed in the first catch at Lake 1. The distribution of recoveries is shown in Figure 4. No sightings by birdwatchers of 1992-ringed birds were reported during the autumn staging period from Iceland.

Figure 4. *Locations of five Greenland White-fronted Geese ringed in Isungua, west Greenland in 1992 and shot during autumn migration in Iceland.*



ISLAY

During the 1992/93 winter season WWT were contracted to further their investigations into Greenland White-fronted Goose habitat and roost choice on Islay. A full time fieldworker was employed to monitor goose flocks and this facilitated searches for ringed geese. MP is resident at the RSPB Gruinart reserve and was joined for short periods by expedition members. The increased observer effort on Islay clearly revealed more marked geese than from more remote locations where geese are not so well watched (e.g. central Ireland). However, it is fortunate that the two principal wintering areas (Islay and Wexford) are afforded dedicated ring readers since the number of geese wintering there necessitates detailed monitoring.

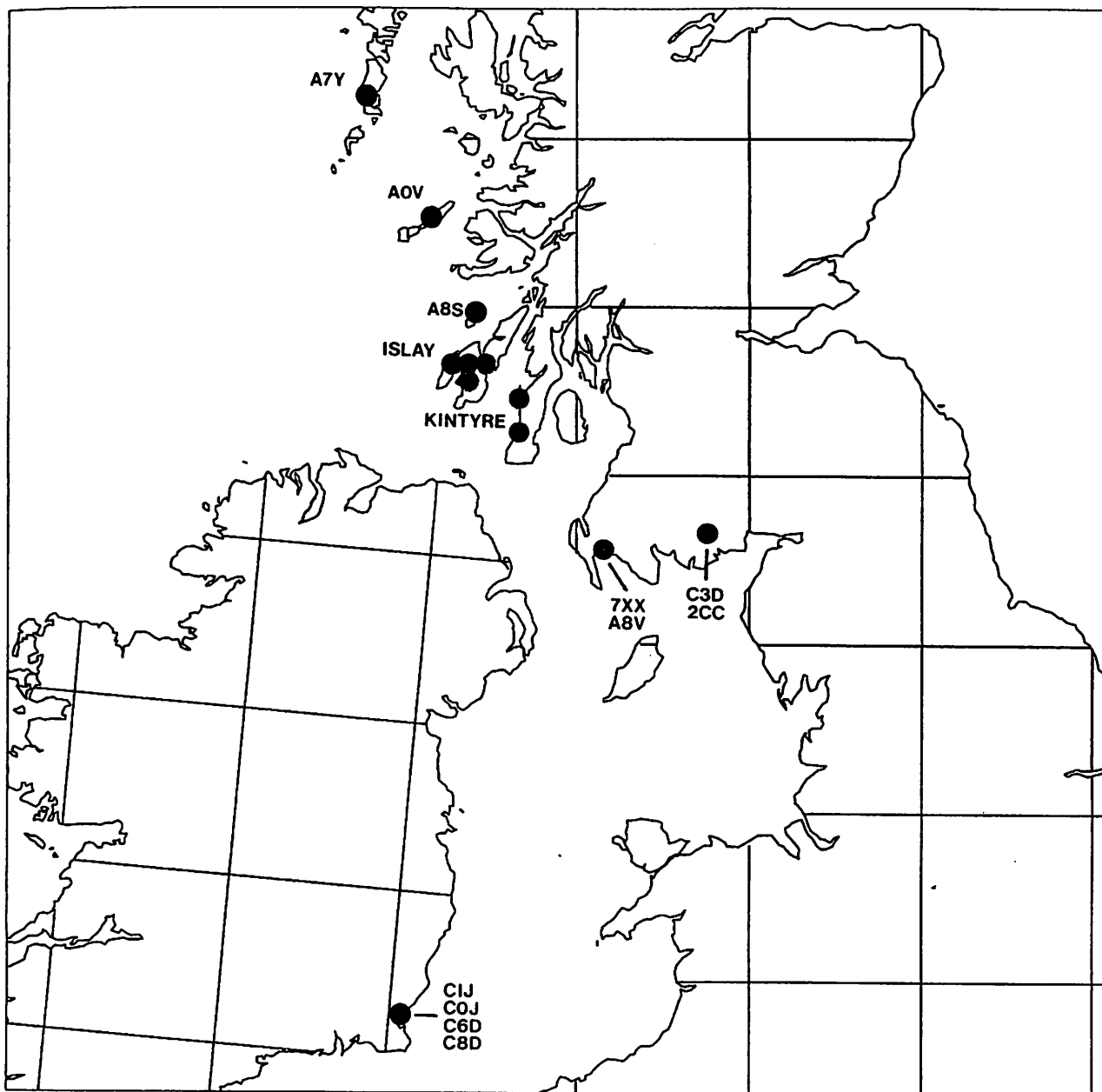
In total, 29 of the 1992-ringed white-fronts were recorded on Islay accounting for a half of all sightings (Figure 6). The number of sightings per bird ranged from just once (e.g. A2X seen only on 27 October) through to 85 times (e.g. A2Y seen between 7 October and 20 April) reflecting a very few autumn passage birds stopping off briefly at Islay, to long staying residents in well watched areas of the island. Many of the sightings were of birds using only a small part of one farm - for example, A2Y was seen on 83 occasions between 30 October and 20 April at Sunderland Farm, and had only been recorded at one other site (Aoradh, 4km north-east) during October. Similarly, 3XX after having spent a few days on Kintyre remained at Sunderland Farm between 4 November and 22 April - being recorded on 63 occasions.

The choice of, and fidelity to, feeding and roosting sites is being investigated currently and preliminary results (McKay 1992) confirm the remarkable attachment white-fronts have for particular sites.

KINTYRE

Ten ringed white-fronts were found at Laggan Valley, Machrihanish (A2V, A8V, A0X, A4S, A5S, A7S, A8S, C3J, C6J and 3XX) and a further ten were located 25km further north at Tayinloan, Rhunahaorine (A1Y, A6Y, A2S, A3S, A6S, C4J, C5J, C9J, C1L and C2L). Together these accounted for 34% of all the winter sightings.

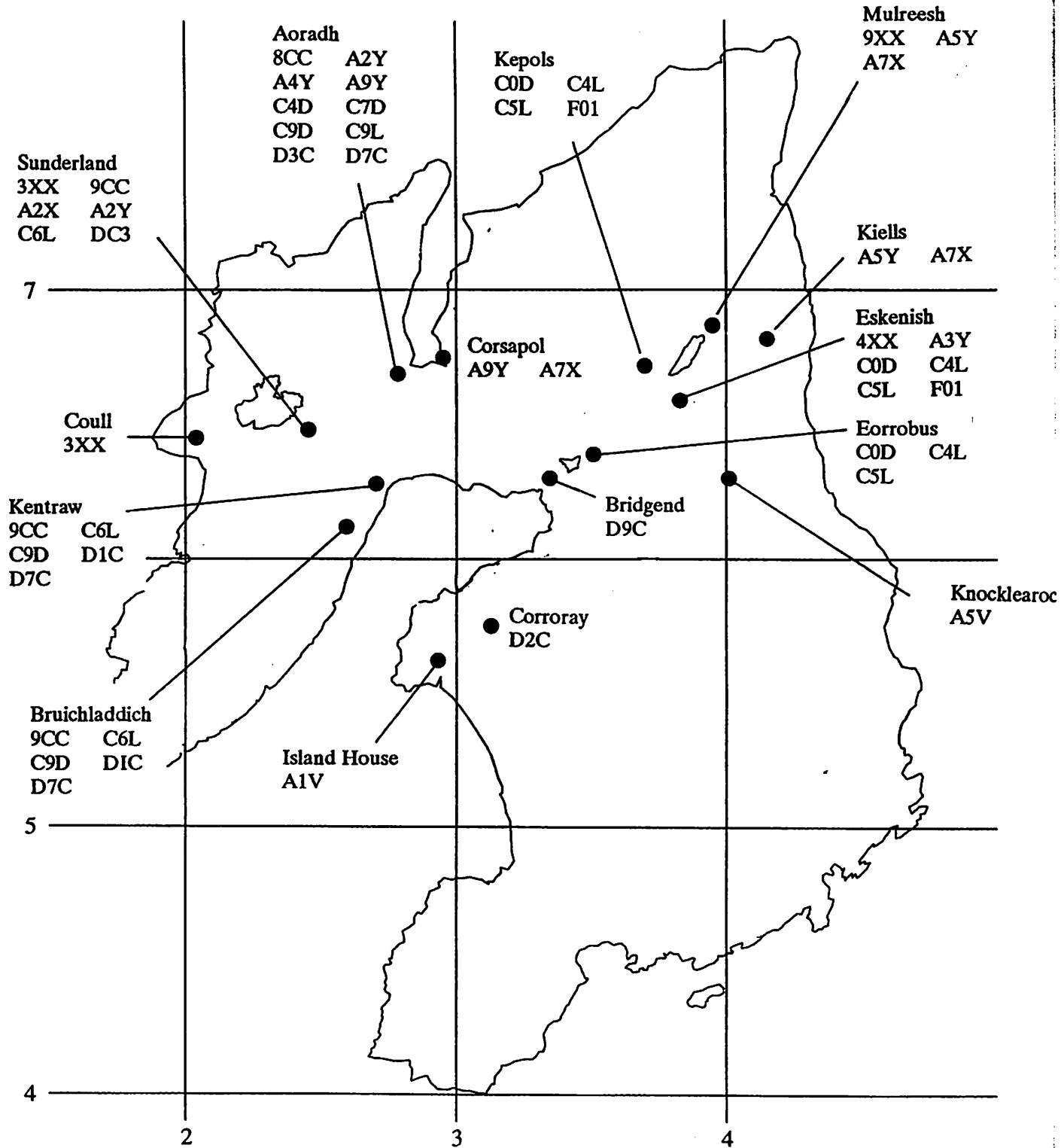
Figure 5. *Winter sightings of Greenland White-fronted Geese ringed in Isungua, west Greenland, 1992*



For details of birds seen on Islay and Kintyre please refer to figure 6 and text.



Figure 6. Winter sightings on Islay of Greenland White-fronted Geese ringed in Isungua, west Greenland, 1992



STRANRAER

7XX was seen on 14 December at West Feugh, near Stranraer. A8V moved from Machrihanish (27 October) to West Freugh, Stranraer (13 January)

LOCH KEN

The Mains of Ducrae, close to Loch Ken, Dumfries regularly supports about 250 white-fronts and in the 1992/93 winter C3D and 2CC were amongst them.

COLONSAY

A8S was seen on 15-20 October here before being located at Machrihanish on 26 October.

SOUTH UIST

There are two traditional flocks of white-fronts on the Uists and the Askernish flock of 42 included A7Y, seen for the first time on 8 December.

COLL

The regular Coll flock includes a small number of white-fronts ringed at Wexford and amongst the 300 wintering birds A0V was located.

WEXFORD

Alyn Walsh made daily observations of white-fronts at Wexford Slobs during the 1992/93 winter season. Many hundreds of white-fronts have been caught and ringed there using cannon nets and a sightings follow up programme is well developed. Only four 1992-ringed white-fronts were located at Wexford. C1J and C0J (both caught on 17 July on Lakes 3 and 4) were seen, but not together. C6D and C8D (both caught on Lake 7) were also seen but again not together.

MOVEMENTS BETWEEN WINTER SITES

There were four birds recorded at more than one principal winter location: 3XX moved from Machrihanish (25 October) to Islay (30 October and thereafter); A5S moved from Machrihanish (20-27 October) to Islay (10 December); A8S was recorded on Colonsay (15-20 October) then at Machrihanish (from 26 October); A8V moved from Machrihanish (27 October) to West Freugh, Stranraer (13 January). There were no movements recorded between Islay and Ireland.

These movements are reasonably well documented - white-fronts arriving at 'staging' sites before moving to traditional wintering destinations (Warren *et al.* 1992a).

WINTER DISTRIBUTION OF SIGHTINGS

Most 1992-ringed birds were recorded from Islay and Kintyre - but do these observations reflect real concentrations of the wintering *Isungua* population? If the number of sightings is expressed as a percentage of the peak winter count (from Fox 1993) for each site, the highest concentration

of Isungua birds was on South Uist (2.6%) although this represented one bird out of a very small flock; followed by Kintyre (1.5%), Stranraer (0.8%) and Loch Ken area (0.8%). Thus the apparent concentration on Islay is an artefact of the large winter population (9,600). The absence, or paucity of sightings from other Scottish sites is at least partly due to their having been searched less efficiently (compared with Islay) and partly due to the low numbers present. From the distribution of sightings it is not unreasonable to suggest that the Isungua population was distributed fairly evenly across the south-west Scotland wintering range with a much smaller proportion wintering in Ireland.

Belman (1981) showed the amount of winter dispersal shown by non-breeding white-fronts to be quite great. Initial results from 1992 ringing confirm this. The catch of 39 white-fronts on Lake 1 produced two recoveries in Iceland, 12 sightings from Islay, four from Kintyre, one from Stranraer, one from Coll, and one from South Uist - i.e. throughout the south-west Scotland winter range. Interestingly the catch of 22 white-fronts on Lakes 3 and 4 (next to each other) produced 12 sightings from Kintyre (54%), and two from Wexford, yet only one of these birds was seen on Islay (A5S which moved from Machrihanish in December).

Parties of associated non-breeding birds (perhaps extended families) were noted on Islay; 8CC, C4D, C7D, C9L and D3C (from catches on Lake 7 and 8) remained together throughout the winter, as did C9D, D1C and D7C (from Lake 8), and C0D, C4L and C5L although these last three were caught on different lakes (albeit only a few kilometres apart). Unfortunately the four goslings caught and marked with leg rings were not located on the wintering grounds. Three of the eight adults caught at the same time have also not been seen, thus the goslings (and parents) may have made it back to the wintering grounds but have simply not been found, or they may have been shot on migration.

CANADA GEESE

Of the 10 Canada Geese caught and ringed at Isungua three were recovered, shot together, at Sandy Island, Labrador, Canada (56°43'N 61°20'W) in November 1992 (Figure 7). These represent the first recoveries of Canada Geese ringed in Greenland. A line drawn directly across the Davis Strait between Isungua and Sandy Island could be extended to the north-east USA wintering quarters of the nominate race (*Branta canadensis canadensis*) between Newfoundland and North Carolina. Unfortunately no sightings of the remaining seven ringed Canada Geese have been reported to confirm their wintering destination.

Figure 7. Recovery location of three Canada Geese ringed at Isungua, west Greenland 1992

