

Figure 4

STATHCLYDE REGION ARGYLL AND BUTE DISTRICT

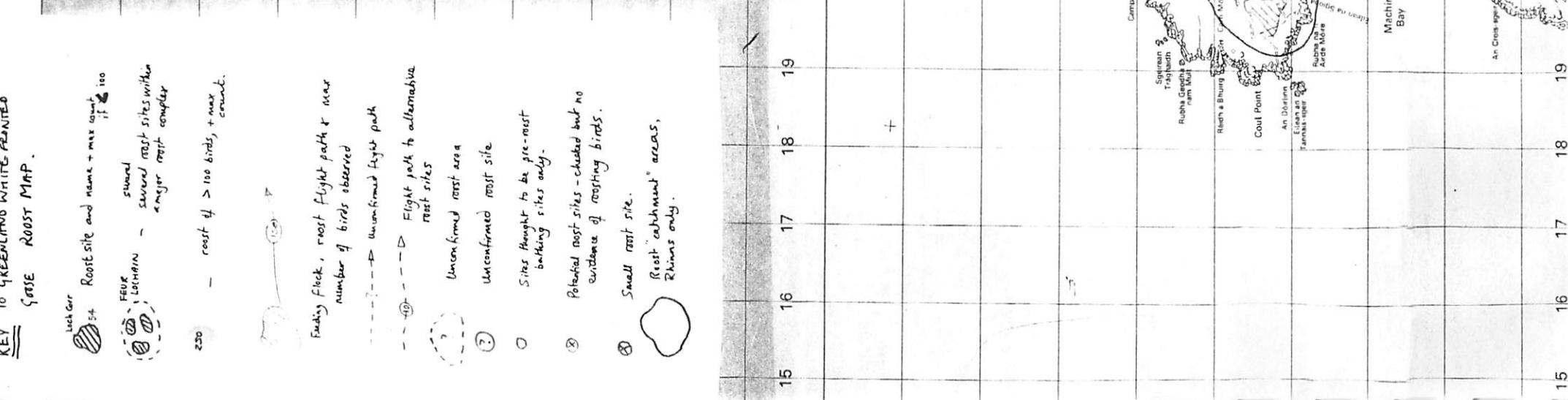
Magnetic North

Scale 1:50,000

20 21 22 23 24 25 26 27 28

KEY TO GREENLAND WHITE-FRONTED
GOOSE ROOST MAP.

- Lick Carr 54 Roost site and name + max count if > 100
- FEAR Lochan - several roost sites within major roost complex
- 230 - roost if > 100 birds, + max count.
- Fishing flock, roost flight path & near number of birds observed
- Unconfirmed flight path
- Flight path to alternative roost sites
- Unconfirmed roost area
- Unconfirmed roost site
- Sites thought to be pre-roost bathing sites only.
- Potential roost sites - checked but no evidence of roosting birds.
- Small roost site.
- Roost "abandonment" areas, Rhins only.



15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

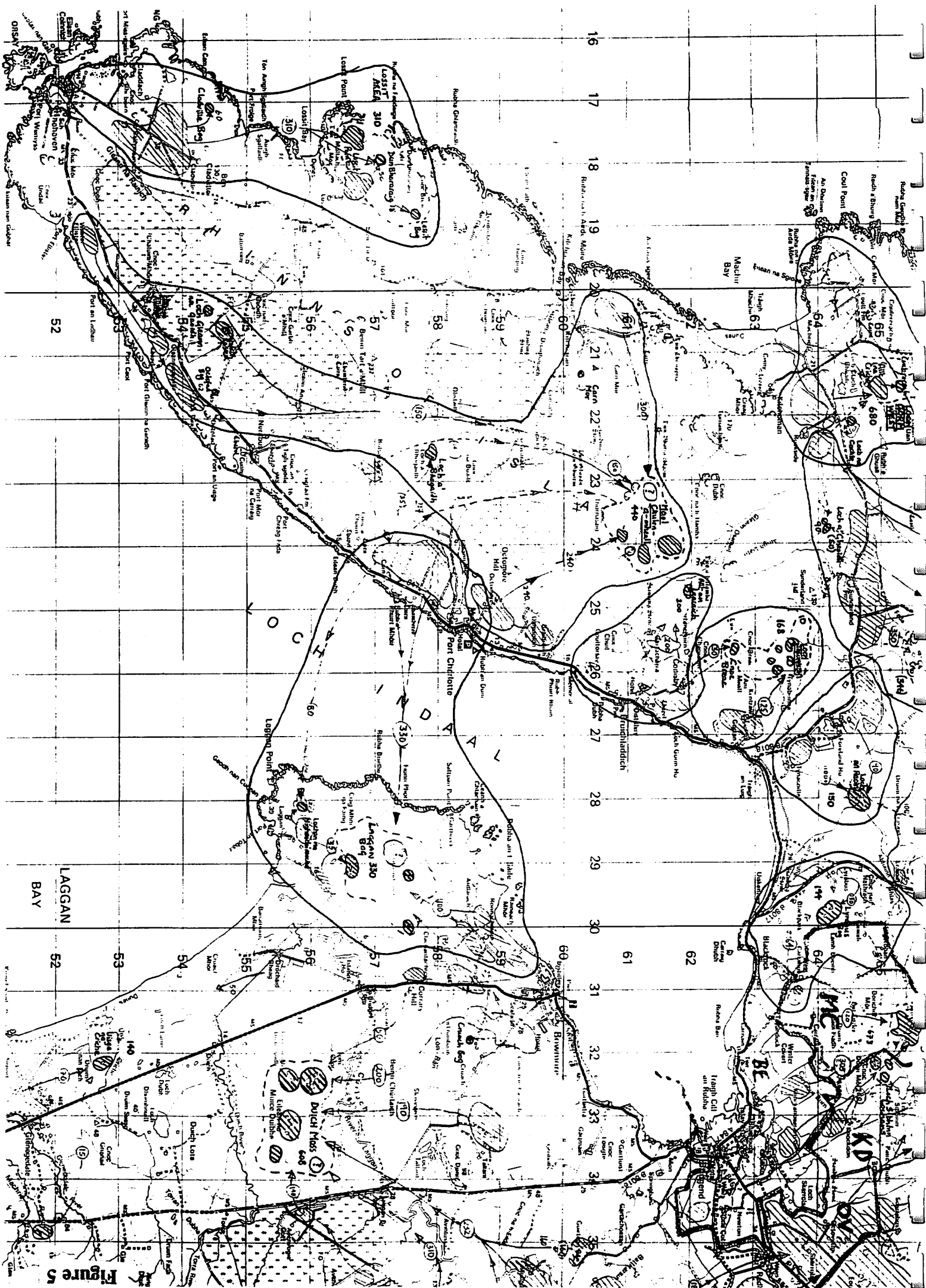
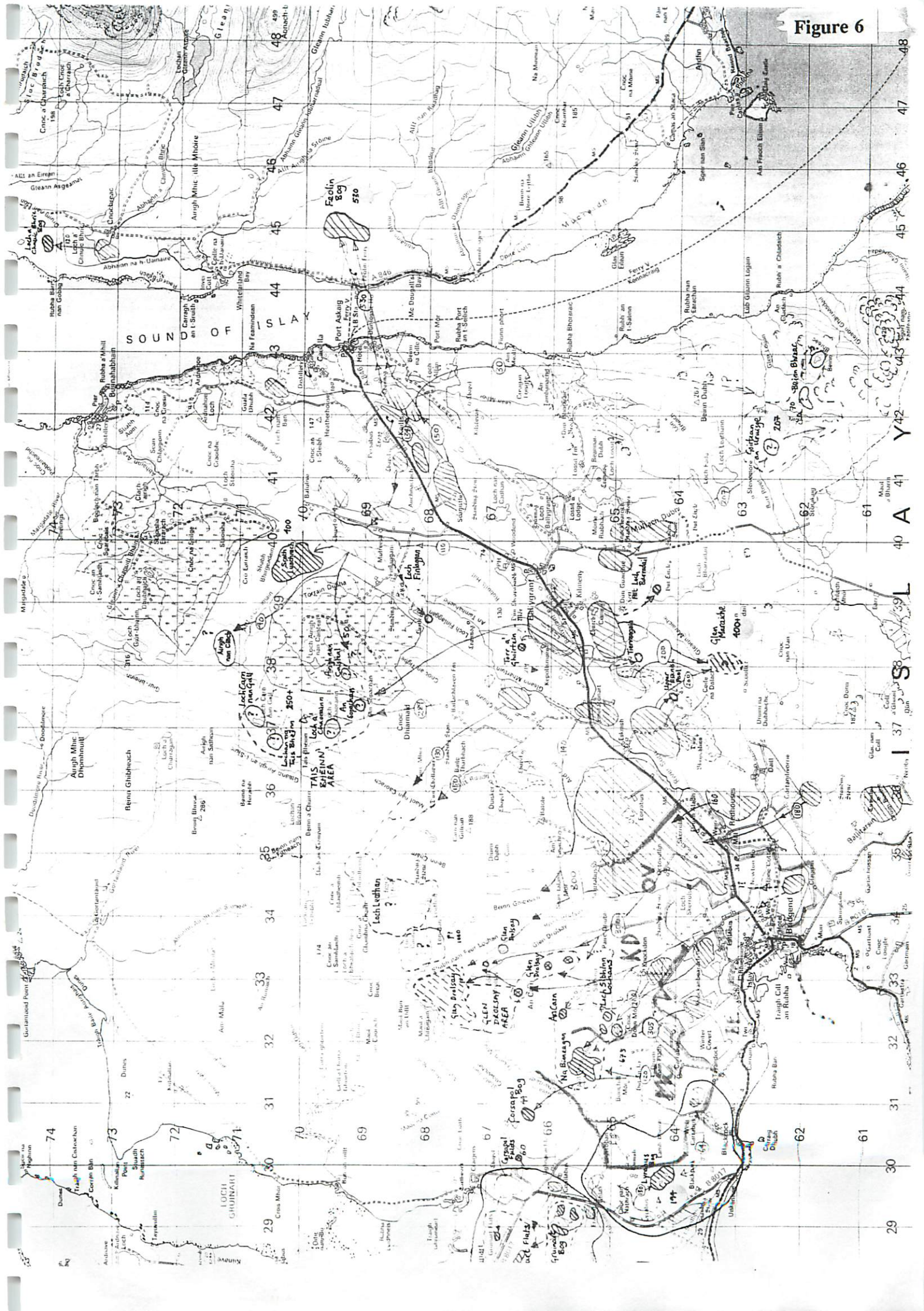
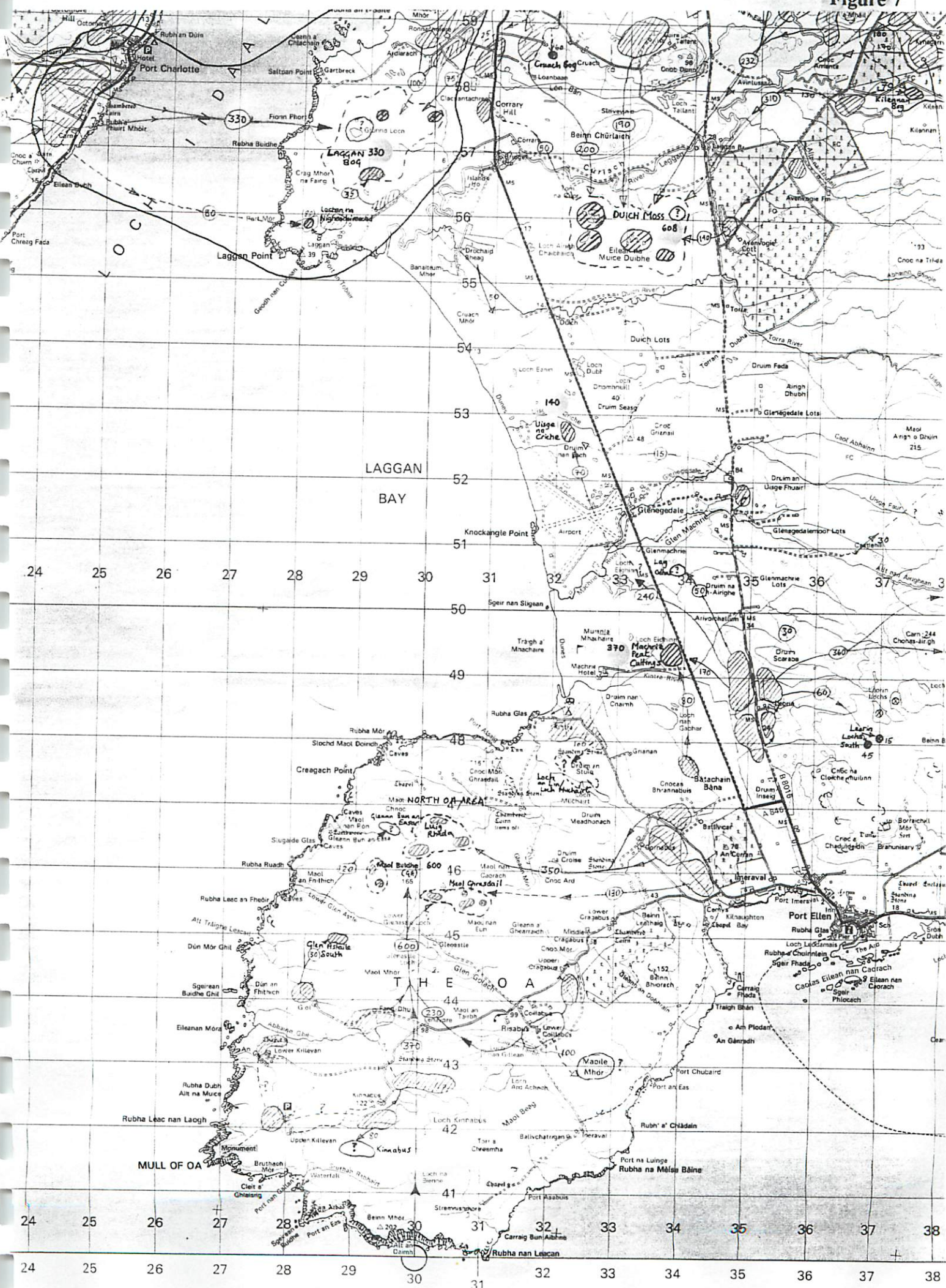


Figure 5

Figure 6



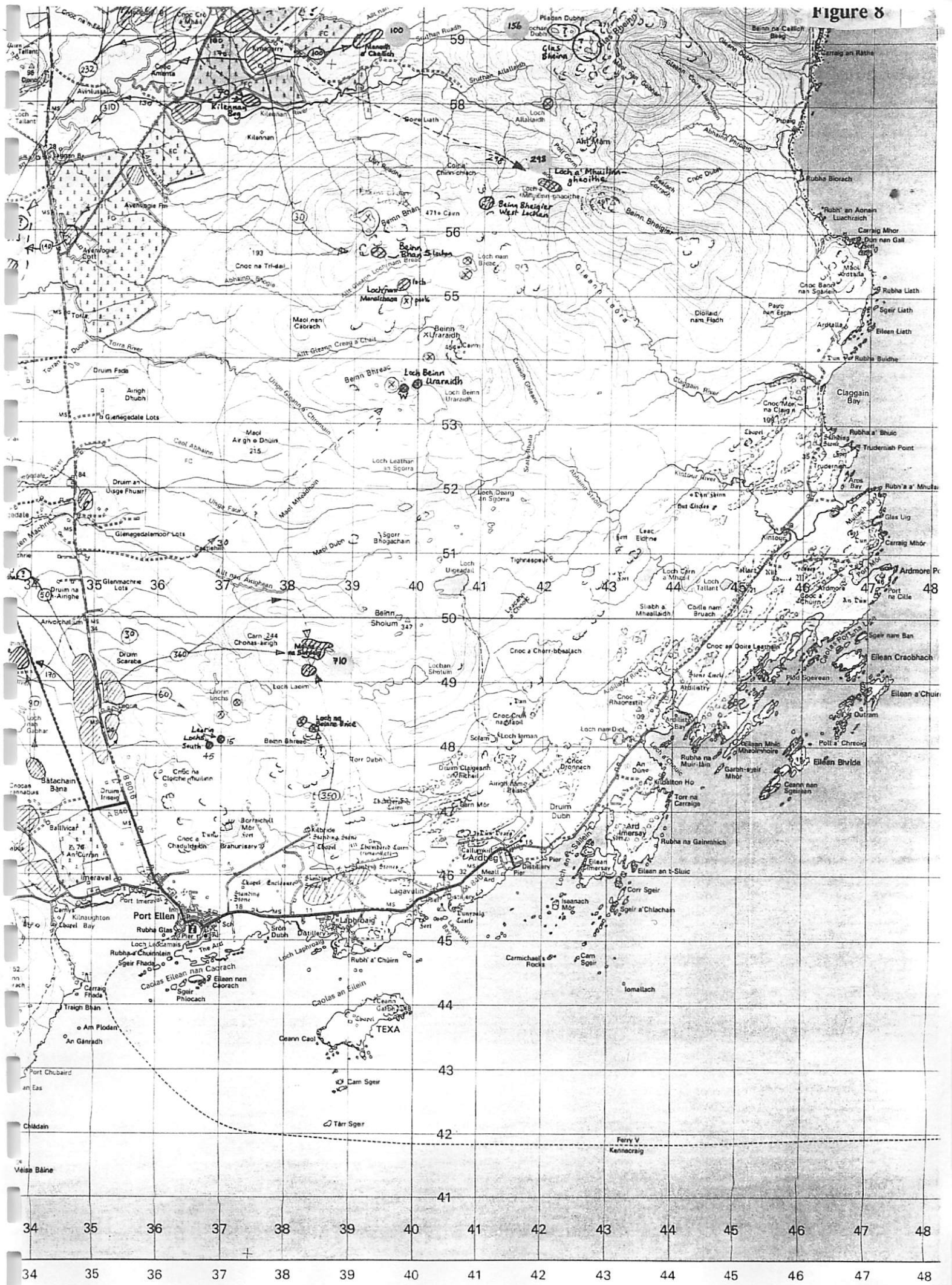


The figures in blue along this side of the map are EASTINGS and must be quoted first when giving a grid reference

20'

15'

10'



34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

41 42 43 44 45 46 47 48

42 43 44 45 46 47 48

43 44 45 46 47 48

44 45 46 47 48

45 46 47 48

46 47 48

47 48

48

within the Loch Gorm 10 km sq, however, it was not possible to cover all areas twice monthly, resulting in island-wide variation in observer effort.

For all sightings the following details were recorded:

- 1) date and time
- 2) field number
- 3) flock size
- 4) habitat
- 5) patch (if different from dominant habitat within field)
- 6) presence/absence, type and number of stock within the field
- 7) whether the bird was paired
- 8) whether the bird had any juveniles associating with it
- 9) the identity of any other ringed birds a) closely associated with it or b) in the same flock
- 10) the type of observation ie. whether bird located a) during an area count or b) as a random observation.

In addition, for all counts of White-fronts made throughout the winter the number of birds checked for rings ("ring-checks") was recorded. Ring-checks act as "negative sightings" - sightings of unringed birds (or ringed birds with a different combination to the one in question) which confirm the absence of a ringed bird on that particular count. Thus, for example, whilst there were only 10 sightings of the neck-collared bird 5PK over the 1991-92 winter, all in the Kepolls/Esknish area, there were approximately 105,000 ring-checks which confirmed the absence of 5PK from elsewhere on the island.

The ring-check total can be calculated on a field by field basis, to provide a weighting for observer effort which can be used in the determination of home-range use by ringed birds.

Abdominal profiles were not recorded (it is hoped to do this over the whole 1992-93 winter). Any records for which the ring was not read with certainty have been discarded from analyses.

Home Range Determination

For analysis of home ranges all sightings of ringed birds were allocated a six-figure grid reference corresponding to the centre of the field in which the bird was recorded. (In the coming winter it is hoped to record the actual 6-fig reference of every sighting within the main study areas.) Home ranges and areas will be determined using the methodology of Kenward (1987). Due to the small number of sightings of ringed birds outwith the Gorm 10 km sq, only the number of sightings of each bird in each farm area have been presented in the results. It is hoped to increase the number of sightings of these birds over the coming winter to enable more detailed home range determination.

Radio-telemetry

Two birds were caught on 20th February at Rockside. These birds, a pair, carried their transmitters for two weeks before they managed to pull them off. The transmitters were mounted dorsally on the tail feathers with the (vertical) ground plane antenna attached. This winter we propose to attach the transmitters ventrally to the tail feathers, and remove the ground plane antenna before application. This may reduce the birds' awareness of the transmitters, leading to their carrying the transmitters for longer. Other methods of mounting have been considered, but their lack of success on other geese, or the degree of inconvenience caused to the birds, has ruled out their use.

Radio fixes were made at least twice a day, and three times a night for seven nights to assess roost use. Night fixes were made in the early evening, at approximately midnight, and before dawn, to assess whether the birds stayed at their roosts throughout the night.

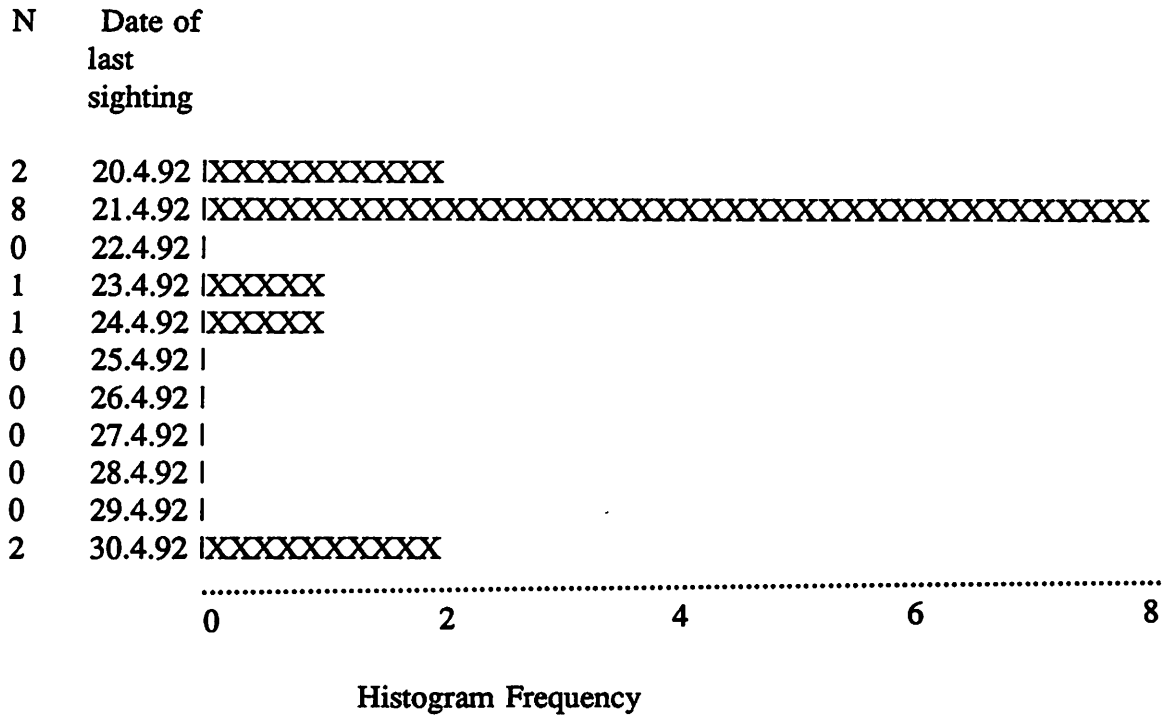
2.3 RESULTS & DISCUSSION

Over the course of the winter a total of 76 ringed birds were seen:

| | |
|----------------------------|----|
| Neck-collared in Ireland | 32 |
| Neck-collared on Islay | 19 |
| Neck-collared in Greenland | 7 |
| Leg-ringed in Greenland | 18 |
| TOTAL | 76 |

Some of these birds were members of family/sibling groups or pairs, which meant that only 57 individuals/groups could be considered independent for range analysis etc. Of this total, it appears that only two birds were autumn stagers (excluding possible mortality): K16 and 5CE apparently left Islay in December to winter elsewhere. Their disappearance from the Loch Gorm area coincided with a reduction of c.500 birds in this area. Observer effort before December was low, so any "staging" birds which might have moved on before this time would probably not have been detected. In the spring there was no evidence of an influx of birds from Ireland prior to onward migration to Iceland (which, it has been suggested, may have occurred in previous years). However, some Islay individuals left their winter home ranges and moved further north within the island in late April prior to departure (eg. 3CM, 7XA and 0PU). It appears that the north-west part of the island around Loch Gorm acts as a short-term staging area for northward-bound birds. Most of the birds whose mid-winter ranges centred on Loch Gorm left during the period 21-25 April (median date of last sighting 21st April, see Figure 9 below), yet total numbers in the Rockside/Coul/Sunderland areas remained undepleted until a week later, evidently due to influxes from further south - as evidenced by the above ring sightings. The main departure on 21-22 April (see Figure 9) coincided (typically) with a weather window of clear skies and south-easterly winds.

Figure 9. Latest dates of sightings of ringed Greenland White-fronted Geese seen on daily transects of the Loch Gorm area, late April 1992.



Median 21st April, N = 14

Preliminary cluster analysis split the birds up into groups which made sense to the eye, but which were less detailed than hoped due to the small number of sightings away from the Loch Gorm study area. Consequently, for this report I have simply presented the number of sightings of each bird in each count area. However, more detailed analyses will be possible for ringed birds within the 10 km sq study area.

Most home ranges were centred on one farm/flock unit, but some birds moved more widely (eg. T01 and the 2-HC 8-some). Range changes between autumn and late winter may be related to the availability of stubble and arable feeding sites - these appear to be favoured in late autumn prior to the birds moving onto grass in the new year.

The total numbers of ring sightings of each ringed bird or group in each farm area over the 1991-92 winter are presented below in Table 4, with group codes for pairs/sibling groups/family parties in Table 5.

Table 4. Total number of sightings of collared or ringed Greenland White-fronted Geese in each "farm area", Islay, winter 1991-92.

Collars

| <u>C-code</u> ¹ | <u>Farm Area</u> | <u>Total no. of sightings</u> | |
|----------------------------|------------------|-------------------------------|-----------------------------------|
| 0CC | Kentraw | 9 | |
| 0C | Bruichladdich | 5 | |
| 0CC | Conisby | 11 | |
| 0CC | Foreland | 1 | |
| 0CC | Sunderland | 1 | |
| 0KJ | Balymeanach | 2 | |
| 0KJ | Cladville | 1 | |
| 0MJ | Octovullin | 4 | |
| 0MJ | Eorrabus | 1 | |
| 0MP | Eorrabus | 5 | |
| 0MP | Octovullin | 3 | |
| 0PU | Ballivicar | 2 | |
| 0PU | Sunderland | 1 | |
| 1PU | Kilmeny | 3 | |
| 1PU | Esknish | 1 | |
| 2CE | Kepolls | 5 | |
| 2CE | Kilmeny | 1 | |
| 2HA-4 | Sunderland | 20 | |
| 2HA-4 | Aoradh | 11 | |
| 2HC-8 | Sunderland | 43 | |
| 2HC-8 | Rockside | 13 | |
| 2HC-8 | Aoradh | 6 | autumn stubble-feeding |
| 2HH* | Coul | 5 | (+ radio transmitter for 2 weeks) |
| 2HH* | Rockside | 2 | |
| 2HH-2 | Rockside | 30 | (+ radio transmitter for 2 weeks) |
| 2HH-2 | Coul | 7 | |
| 3CA | Eorrabus | 1 | |
| 3CA | Esknish | 1 | |

(Table 4 cont.)

| <u>C-code</u> ¹ | <u>Farm Area</u> | <u>Total no. of sightings</u> | |
|----------------------------|------------------|-------------------------------|-----------------------------------|
| 3CK | Ronnachmore | 4 | |
| 3CM | Bruichladdich | 10 | |
| 3CM | Rockside | 4 | pre-spring migration |
| 3CM | Coul | 2 | pre-spring emigration |
| 3HA | Sunderland | 26 | |
| 3HA | Aoradh | 7 | |
| 3HH* | Rockside | 3 | (+ radio transmitter for 2 weeks) |
| 3HH* | Coul | 2 | |
| 3UY | Tallant | 4 | |
| 3UY | Gartmain | 2 | |
| 3XE | Kilchiaran | 2 | |
| 3XE | Octomore | 2 | |
| 4HC* | Sunderland | 5 | |
| 4HC-2 | Sunderland | 68 | |
| 4HC-2 | Aoradh | 2 | autumn stubble-feeding |
| 4RT | Bridgend | 2 | |
| 4RT | Mid Carrabus | 1 | |
| 4RT | Octovullin | 1 | |
| 5CA* | Rockside | 1 | |
| 5CA-2 | Rockside | 28 | |
| 5CA-2 | Sunderland | 7 | |
| 5CA-2 | Coul | 2 | |
| 5CE | Aoradh | 2 | autumn staging |
| 5CP* | Coul | 1 | |
| 5CP* | Rockside | 1 | |
| 5CP-2* | Rockside | 1 | |

(Table 4 cont.)

| <u>C-code</u> ¹ | <u>Farm Area</u> | <u>Total no. of sightings</u> | |
|----------------------------|------------------|-------------------------------|-----------------------|
| 5CP-3 | Rockside | 33 | |
| 5CP-3 | Coul | 2 | |
| 5CP-3 | Ronnachmore | 1 | |
| 5CP-3 | Sunderland | 1 | |
| 5HA* | Aoradh | 1 | |
| 5ME | Leorin | 2 | |
| 5PK | Kepolls | 5 | |
| 5PK | Esknish | 3 | |
| 5PK | Eorrabus | 1 | |
| 5PK | Kilmeny | 1 | |
| 6CA* | Rockside | 2 | |
| 6HA* | Sunderland | 1 | |
| 6JK | Leorin | 4 | |
| 6TC | Ballivicar | 2 | |
| 7CJ* | Rockside | 2 | |
| 7CM | Finlaggan | 3 | |
| 7CM | Mulreesh | 2 | |
| 7HC-4 | Bruichladdich | 11 | |
| 7HC-4 | Kentraw | 8 | |
| 7HC-4 | Conisby | 4 | |
| 7ME | Bridgend | 1 | |
| 7ME | Octovullin | 1 | |
| 7UE | Tallant | 3 | |
| 7UE | Gartmain | 1 | |
| 7XA | Kentraw | 5 | |
| 7XA | Octomore | 4 | |
| 7XA | Bruichladdich | 1 | |
| 7XA | Coul | 1 | pre-spring emigration |
| 7XA | Sunderland | 1 | |

(Table 4 cont.)

| <u>C-code</u> ¹ | <u>Farm Area</u> | <u>Total no. of sightings</u> | |
|----------------------------|------------------|-------------------------------|------------------------|
| 8CC | Foreland | 10 | |
| 8CC | Sunderland | 8 | |
| 8CC | Kentraw | 1 | |
| 8CF | Coul | 1 | |
| 8MM | Grulinbeg | 11 | |
| 8MM | Sunderland | 3 | |
| 8MM | Rockside | 2 | |
| 8MM | Aoradh | 1 | autumn stubble-feeding |
| 8PM | Ballinaby | 10 | |
| 8PM | Leek | 1 | |
| 8RP | Giol | 2 | neck collar missing |
| 8RP | Kinnabus | 1 | |
| 9CA | Corrary | 1 | |
| 9CA | Island House | 1 | |
| 9CC | Kentraw | 15 | |
| 9CC | Bruichladdich | 3 | |
| 9CC | Conisby | 1 | |
| 9JM | Aoradh | 3 | |
| 9JM | Corsapol | 1 | |
| 9PP | Ballivicar | 8 | |

Notes: ¹ Group codes (eg. 2HC-8, 5CP-3) are explained below

* Asterisks indicate birds/groups which were normally members of larger groups (see group code lists below)

Leg rings only

| <u>R-code¹</u> | <u>Area</u> | <u>Total no. of sightings</u> | |
|---------------------------|-------------------|-------------------------------|----------------|
| A19? | Avenvogie | 1 | darvic missing |
| A19? | Cluanach | 1 | |
| A24 | Avenvogie | 3 | |
| A24 | Cluanach | 2 | |
| A24 | Ceannacroic | 1 | |
| A26 | Laphroaig | 2 | |
| A26 | Leorin | 1 | |
| A92 | Eorrabus | 1 | |
| F01-2 | Kepolls | 6 | |
| F01-2 | Kilmeny | 1 | |
| F04 | Mid Carrabus | 2 | |
| F04 | Bridgend | 1 | |
| K02-2 | Ballimartin | 2 | |
| K07 | Kepolls | 7 | |
| K15 | Knockdon | 5 | |
| K15 | Octovullin | 1 | |
| K16 | Rockside | 4 | autumn staging |
| K23 | Leorin | 2 | |
| K34 | Leorin | 3 | |
| K36 | Mid Carrabus | 8 | |
| K36 | Uisge an t-Suidhe | 2 | |
| K50 | Bunnahabhain | 2 | |
| K50 | Kiells | 1 | |
| K51 | Kepolls | 5 | |
| K77 | Uisge an t-Suidhe | 3 | |
| K77 | Lyrabus | 1 | |

(Table 4 cont.)

Leg rings only

| <u>R-code</u> ¹ | <u>Area</u> | <u>Total no. of sightings</u> | |
|----------------------------|----------------|-------------------------------|----------|
| T01 | Octomore | 2 | |
| T01 | Ronnachmore | 2 | |
| T01 | Ardlarach | 1 | |
| T01 | Clachantree | 1 | |
| T01 | Port Charlotte | 1 | |
| T17 | Octomore | 4 | |
| T17 | Bruichladdich | 1 | |
| ? | Eorrabus | 2 | 0MP/-MJ? |
| ? | Foreland | 2 | 4HC-2? |
| ? | Laggan | 1 | 9CA? |

Table 5. Group codes for Islay White-fronts, 1991-92.

Where groups of ringed birds were frequently closely associated with each other (ie. pairs, families or presumed sibling groups), the group of birds was given a "group code". The constituent members of each group are listed below, along with their group code. In order to achieve independence of data in analyses of ring sightings data, groups are treated as one 'goose unit'.

Collars

| C-code | Group code |
|--------|------------|
| 2HA | 2HA-4 |
| 4HA | " |
| 5HA | " |
| 8HA | " |
| 0HA | 2HC-8 |
| 0HC | " |
| 1HA | " |
| 1HC | " |
| 2HC | " |
| 5HC | " |
| 7HA | " |
| 9HA | " |
| 2HH | 2HH-2 |
| 3HH | " |
| 4HC | 4HC-2 |
| 6HA | " |
| 5CA | 5CA-2 |
| 6CA | " |
| 5CP | 5CP-2 |
| 7CP | " |
| 8CP | 8CP-3 |
| 7CJ | " |
| 8CF | " |
| 0HH | 7HC-4 |
| 6HC | " |
| 7HC | " |
| 8HC | " |

Normally part of 5CP-3 (see below)

These birds were ringed on 20th Feb, 1992, and carried radio transmitters for c.14 days

Leg rings only

R-code Group code

F01 F01-2
F02 "

K02 K02-2
K03 "

Radio-tagged birds

The two radio-tagged birds at Rockside were tracked for two weeks, during which time they occurred in a very small area, comprising only five fields. They roosted at the same bog roost site close to the feeding areas each night. It is hoped that more birds will be tagged in the coming winter so that the nocturnal movements of birds throughout a complete lunar cycle can be monitored. Visual detection of the two tagged birds was very high - over 90% of birds located by radio detection could have been detected easily by eye. However, this high detection rate partly reflects the "open" nature of the topography in the Rockside area which facilitates easy visual detection of ringed birds. It cannot be assumed that detection rate of ringed birds is equally high in those parts of the island which have an undulating topography.

3. COUNTS OF GEESE ON ISLAY

Regular counts of White-fronts were made on whole-island transects, and on farm area transects (sub-divisions of the larger whole island transects), comprising a total of over 3,800 "flock counts". The counts are presented in Tables 6-13 below based on the eight main island count transect routes used in NCC/SNH Islay goose counts.

3.1 Whole island transects

The results from my counts and those on SNH/WWT goose count days are shown together in the tables. The SNH/WWT counts were carried out on one day by a several observers. It was not always possible for me to complete a whole transect in one day, so my counts may have included some overlap. Even so, my counts were generally higher than those made on whole island transects - probably because I was concentrating on recording only one species.

3.2 Means of farm area counts

The mean counts by farm area provide an average value for goose usage of each farm area based on a series of counts, and may give a more accurate estimate of this as compared to the island-wide SNH/WWT goose counts. In most cases the count average is as high as, or higher than, the goose count average, reflecting the greater amount of time available to me to find flocks of geese which undoubtedly use land features in order to remain out of sight of roads and tracks. By summing these averages one obtains an estimate of the average population size for the whole island. This total of 10676.2 birds is 673.2 (6%) higher than the highest day count (of 10,003) obtained on SNH/WWT island-wide counts over the 1991-92 winter.

These counts will form the basis of comparisons of goose usage between different parts of the island, particularly with reference to availability of feeding habitats, and possible competition with Barnacle Geese (see section 3. Habitat-use below).

3.3 Age ratios

Whenever possible the number of juveniles in each flock was counted in order to identify regional or habitat-based variations in flock age-structure. Geographical variations have been presented on a farm area basis. The total number of juveniles (*Juvs*) identified was divided by the total number of individuals aged (*J-check*) for each farm area and the percentage calculated. This percentage represents a mean value for all *J-check* counts summed over the winter, and is considered to be more representative than a single or maximum count per winter. Age ratios for farm areas with a total *J-check* value of less than 50 are not considered here due to the small sample size. There were marked differences in the age ratios between farm areas, with *juvenile* percentages ranging from approximately 10-33%. It will be interesting to see whether the qualitative nature of these differences is repeated in the coming winter, suggesting an underlying cause rather than a chance effect.

Table 6. Rhinns transect counts, farm area averages and age ratios

Complete Rhinns transect counts

| <u>Count</u> | <u>Date</u> | <u>Count total</u> |
|--------------|-------------|--------------------|
| Rh#1 | 30.11.91 | 305 * |
| Rh#2 | 1.12.91 | 894 |
| Rh1 | 14.12.91 | 921 |
| Rh2 | 14.01.92 | 1377 |
| Rh# | 27.01.92 | 1371 |
| Rh# | 9.02.92 | 1216 |
| Rh# | 10.02.92 | 1269 |
| Rh4 | 24.02.92 | 1645 |
| Rh#5 | 28.03.92 | 1430 |
| Rh#6 | 29.03.92 | 942 |
| Rh5 | 1.04.92 | 1553 |
| Mean | | 1261.8 |

* - This count excluded from calculation of mean due to poor weather on day of count

Farm area count means

| <u>Farm</u> | <u>Name</u> | <u>N</u> | <u>Av. count</u> |
|-------------|----------------------|----------|------------------|
| ---- | ---- | -- | ----- |
| BA | Ballimony | 9 | 0 |
| BH | Bruichladdich | 20 | 210.7 |
| BS | Bolsay | 12 | 34.3 |
| CF | Craigfad | 10 | 23.2 |
| CL | Claddach | 9 | 1.7 |
| CS | Conisby | 13 | 50.6 |
| CV | Cladville | 11 | 105.7 |
| CW | Carn west | 10 | 0 |
| EE | Easter Ellister | 9 | 1.8 |
| GE | Gearach | 10 | 1.5 |
| KE | Kelsay | 10 | 0 |
| KI | Kilchiaran | 16 | 196.0 |
| KW | Kentraw | 28 | 103.4 |
| LO | Lossit farm (Rhinns) | 11 | 27.3 |
| MN | Balymeanach | 9 | 142.2 |
| OF | Octofad | 12 | 135.5 |
| OM | Octomore | 14 | 219.7 |
| PC | Port Charlotte | 15 | 170.7 |
| PR | Portnahaven | 9 | 0 |

(RHINNS COUNT AREA cont.)

| <u>Farm</u> | <u>Name</u> | <u>N</u> | <u>Av. count</u> |
|-------------|-----------------|----------|------------------|
| PW | Port Wemyss | 9 | 1.4 |
| WE | Wester Ellister | 9 | 29.2 |
| Total | | | 1454.8 |

Per cent juveniles in Rhinns count areas

| <u>Farm</u> | <u>Name</u> | <u>Sum of Juvs</u> | <u>Sum of J-check</u> | <u>% juvs</u> |
|-------------|----------------------|--------------------|-----------------------|---------------|
| BA | Ballimony | - | - | - |
| BH | Bruichladdich | 229 | 1477 | 15.5 |
| BS | Bolsay | 11 | 28 | 39.3 |
| CF | Craigfad | - | - | - |
| CL | Claddach | 0 | 15 | 0 |
| CS | Conisby | 36 | 222 | 16.2 |
| CV | Cladville | 28 | 241 | 11.6 |
| CW | Cam west | - | - | - |
| EE | Easter Ellister | 0 | 2 | 0 |
| GE | Gearach | - | - | - |
| KE | Kelsay | - | - | - |
| KI | Kilchiaran | 116 | 1141 | 10.2 |
| KW | Kentraw | 63 | 362 | 17.4 |
| LO | Lossit farm (Rhinns) | 22 | 172 | 12.8 |
| MN | Balymeanach | 66 | 413 | 16.0 |
| OF | Octofad | 55 | 352 | 15.6 |
| OM | Octomore | 73 | 991 | 7.4 |
| PC | Port Charlotte | 66 | 583 | 11.3 |
| PR | Portnahaven | - | - | - |
| PW | Port Wemyss | 6 | 13 | 46.2 |
| WE | Wester Ellister | 10 | 98 | 10.2 |

Table 7. Gorm transect counts, farm area averages and age ratios

Total counts for Loch Gorm goose count area

| <u>Count</u> | <u>Date</u> | <u>Sum of GWfs</u> |
|--------------|-------------|--------------------|
| Gm#1 | 30.11.91 | 775 * |
| Gm#2 | 1.12.91 | 1665 |
| Gm1 | 6.12.91 | 1527 |
| Gm2 | 14.01.92 | 1460 |
| Gm#3 | 9.02.92 | 1420 |
| Gm#4 | 10.02.92 | 1589 |
| Gm5 | 27.02.92 | 1645 |
| Gm#5 | 28.03.92 | 1748 |
| Gm#6 | 29.03.92 | 1538 |
| Gm6 | 21.04.92 | 1678 |
| Mean | | 1585.6 |

* Poor count due to bad weather, excluded from calculation of mean.

Key: Gm# = part of whole island census
Gm = counted by CRM

Mean counts for Gorm farm areas

| <u>Farm</u> | <u>Name</u> | <u>Mean Count</u> | <u>N</u> |
|-------------|-------------|-------------------|----------|
| BB | Ballinaby | 157.5 | 13 |
| CO | Coul | 212.1 | 15 |
| FO | Foreland | 150.5 | 16 |
| GG | Grulinbeg | 81.6 | 11 |
| LK | Leek | 112.0 | 9 |
| RK | Rockside | 448.7 | 23 |
| SG | Sanaigmore | 76.2 | 10 |
| SM | Smaull | 0 | 7 |
| SU | Sunderland | 384.4 | 29 |
| Total | | 1622.8 | |

(LOCH GORM COUNT AREA cont.)

Per cent juveniles in Gorm count areas

| <u>Farm</u> | <u>Name</u> | <u>Total</u> <u>No. Juvs</u> | <u>Total</u> <u>J-check</u> <u>(a)</u> | <u>% JUVS</u> <u>(b)</u> | <u>Ave. Fm.</u> <u>count</u> <u>(a*b/100)</u> | <u>Ave. no.</u> <u>juvs</u> |
|-------------|-------------|---------------------------------|--|-----------------------------|---|--------------------------------|
| BB | Ballinaby | 235 | 914 | 25.7 | 157.5 | 40.5 |
| CO | Coul | 1181 | 1287 | 14.1 | 212.1 | 29.9 |
| FO | Foreland | 146 | 1035 | 14.1 | 150.5 | 21.2 |
| GG | Grulinbeg | 199 | 633 | 31.4 | 81.6 | 25.6 |
| LK | Leek | 33 | 262 | 12.6 | 112.0 | 14.1 |
| RK | Rockside | 444 | 3625 | 12.3 | 448.7 | 55.2 |
| SG | Sanaig | 59 | 276 | 21.4 | 76.2 | 16.3 |
| SM | Smaull | -- | - | - | - | - |
| SU | Sunderland | 1080 | 8345 | 12.9 | 384.4 | 49.6 |
| Total | | | | 1622.8 | 252.4 | (15.55%) |

Table 8. Gruinart transect counts, farm area averages and age ratios

Gruinart total census counts

| <u>Count</u> | <u>Date</u> | <u>Total count</u> |
|--------------|-------------|--------------------|
| Gt#1 | 30.11.91 | 817 |
| Gt#2 | 1.12.91 | 843 |
| Gt1 | 5.12.91 | 597 |
| Gt2 | 14.01.92 | 670 |
| Gt#3 | 9.02.92 | 540 |
| Gt#4 | 10.02.92 | 535 |
| Gt3 | 28.02.92 | 462 |
| Gt#5 | 28.03.92 | 399 |
| Gt#6 | 29.03.92 | 360 |

Mean farm area counts

| <u>Farm</u> | <u>Name</u> | <u>N</u> | <u>Av. count</u> |
|-------------|-------------------|----------|------------------|
| AN | Ardnave | 7 | 1.7 |
| AO | Aoradh | 29 | 148.5 |
| BU | Bun an Uillt | 8 | 7.9 |
| CP | Corsapol | 9 | 61.2 |
| KA | Killinallan | 7 | 0 |
| KN | Kilnave | 9 | 9.7 |
| LY | Lyrabus | 9 | 104.7 |
| US | Uisge an t-Suidhe | 9 | 105.6 |
| Total | | | 439.2 |

Per cent juveniles in Gruinart count areas

| <u>Farm</u> | <u>Name</u> | <u>Sum of Juvs</u> | <u>Sum of J-check</u> | <u>% Juvs</u> |
|-------------|-------------------|--------------------|-----------------------|---------------|
| AN | Ardnave | 12 | 160 | 7.5 |
| AO | Aoradh | 153 | 991 | 15.4 |
| BU | Bun an Uillt | 0 | 18 | 0 |
| CP | Corsapol | 38 | 249 | 15.3 |
| KA | Killinallan | - | - | - |
| KN | Kilnave | 3 | 50 | 6.0 |
| LY | Lyrabus | 34 | 189 | 18.0 |
| US | Uisge an t-Suidhe | 28 | 305 | 9.2 |

Table 9. Kilmeny transect counts, farm area averages and age ratios

Total counts for Kilmeny goose count area

| <u>Area</u> | <u>Date</u> | <u>Sum of Gwfs</u> |
|-------------|-------------|--------------------|
| Km#1 | 30.11.91 | 3342 |
| Km#2 | 1.12.91 | 2297 |
| Km1 | 10.01.92 | 2958 |
| Km2 | 1.02.92 | 3474 |
| Km#3 | 9.02.92 | 2111 |
| Km#4 | 10.02.92 | 2464 |
| Km#5 | 28.03.92 | 2110 |
| Km#6 | 29.03.92 | 2987 |
| Km3 | 5.04.92 | 3312 |
| Mean | | 2783.9 |

Key: Km# = part of whole island census

Km = counted by CRM

Figures after count area, eg. Km1, Km#1 represent count identifiers

Mean counts for Kilmeny farm areas

| <u>Farm</u> | <u>Name</u> | <u>N</u> | <u>Av. count</u> |
|-------------|--------------|----------|------------------|
| BE | Bridgend | 8 | 279.4 |
| BM | Ballimartin | 10 | 161.9 |
| BN | Bunnahabhain | 9 | 34.2 |
| DA | Dail | 7 | 52.2 |
| EK | Esknish | 15 | 226.3 |
| EO | Eorrabus | 9 | 325.4 |
| FL | Finlaggan | 8 | 158.5 |
| KD | Knockdon | 8 | 48.6 |
| KL | Kiels | 9 | 252.7 |
| KM | Kilmeny | 8 | 170.9 |
| KP | Kepolls | 10 | 305.0 |
| MC | Mid Carrabus | 8 | 196.1 |
| MR | Mulreesh | 10 | 88.5 |
| OV | Octovullin | 11 | 649.8 |
| SC | Scarrabus | 7 | 105.2 |

Per cent juveniles in Kilmeny count areas

| <u>Farm</u> | <u>Name</u> | <u>Sum of Juvs</u> | <u>Sum of J-check</u> | <u>% Juvs</u> |
|-------------|--------------|--------------------|-----------------------|---------------|
| BE | Bridgend | 274 | 1537 | 17.8 |
| BM | Ballimartin | 131 | 653 | 20.1 |
| BN | Bunnahabhain | 54 | 188 | 28.7 |
| DA | Daill | 17 | 106 | 16.0 |
| EK | Esknish | 68 | 632 | 10.8 |
| EO | Eorrabus | 191 | 1411 | 13.5 |
| FL | Finlaggan | 12 | 87 | 14.8 |
| KD | Knockdon | 58 | 319 | 18.2 |
| KL | Kiells | 125 | 732 | 17.1 |
| KM | Kilmeny | 78 | 586 | 13.3 |
| KP | Kepolls | 189 | 1554 | 12.2 |
| MC | Mid Carrabus | 111 | 657 | 16.9 |
| MR | Mulreesh | 29 | 297 | 9.8 |
| OV | Octovullin | 244 | 2028 | 12.0 |
| SC | Scarrabus | - | - | - |

Table 10. Laggan transect counts, farm area averages and age ratios

Complete Laggan transect counts

| <u>Area</u> | <u>Date</u> | <u>Sum of Gwfs</u> |
|-------------|-------------|--------------------|
| Ln#1 | 30.11.91 | 858 |
| Ln#2 | 1.12.91 | 1189 |
| Ln1 | 6.01.92 | 1463 |
| Ln2 | 30.01.92 | 1441 |
| Ln#3 | 9.02.92 | 1287 |
| Ln#4 | 10.02.92 | 1092 |
| Ln3 | 23.03.92 | 1331 |
| Ln#5 | 28.03.92 | 758 |
| Ln#6 | 29.03.92 | 759 |

Farm area count means

| <u>Type</u> | <u>Name</u> | <u>N</u> | <u>Av. count</u> |
|-------------|--------------|----------|------------------|
| AL | Ardlarach | 7 | 24.4 |
| BW | Bowmore | 8 | 24.1 |
| CG | Claggan | 7 | 32.9 |
| CR | Cruach | 9 | 43.3 |
| CT | Clachantree | 8 | 57.6 |
| CY | Corrory | 7 | 128.6 |
| DU | Duich | 7 | 2.1 |
| GC | Gartachossan | 7 | 272.4 |
| GM | Gartmain | 8 | 65.9 |
| IH | Island House | 7 | 24.3 |
| LN | Laggan | 8 | 49.3 |
| MY | Mulindry | 7 | 151.0 |
| NB | Neriby | 7 | 124.3 |
| RM | Ronnachmore | 9 | 61.7 |
| TL | Tallant | 10 | 203.9 |
| Total | | | 1265.8 |

(LAGGAN COUNT AREA cont.)

Per cent juveniles in Laggan count areas

| <u>Farm</u> | <u>Name</u> | <u>Sum of Juvs</u> | <u>Sum of J-check</u> | <u>% Juvs</u> |
|-------------|--------------|--------------------|-----------------------|---------------|
| AL | Ardlarach | 39 | 254 | 15.4 |
| BW | Bowmore | 10 | 26 | 38.5 |
| CG | Claggan | 15 | 141 | 10.6 |
| CR | Cruach | 3 | 49 | 6.1 |
| CT | Clachantree | 17 | 214 | 7.9 |
| CY | Corrary | 87 | 327 | 26.6 |
| DU | Duich | 0 | 5 | 0.0 |
| GC | Gartachossan | 71 | 492 | 14.4 |
| GM | Gartmain | 13 | 33 | 39.4 |
| IH | Island House | 27 | 113 | 23.9 |
| LN | Laggan | 18 | 79 | 22.8 |
| MY | Mulindry | 62 | 429 | 14.5 |
| NB | Neriby | 13 | 178 | 7.3 |
| RM | Ronnachmore | 30 | 429 | 7.0 |
| TL | Tallant | 98 | 684 | 14.3 |

Table 11. Glen transect counts, farm area averages and age ratios

Complete Glen transect counts

| <u>Area</u> | <u>Date</u> | <u>Sum of Gwfs</u> |
|-------------|-------------|--------------------|
| Gl#1 | 30.11.91 | 471 |
| Gl#2 | 1.12.91 | 487 |
| Gl1 | 9.01.92 | 730 |
| Gl2 | 30.01.92 | 981 |
| Gl#3 | 9.02.92 | 637 |
| Gl#4 | 10.02.92 | 608 |
| Gl3 | 23.03.92 | 1100 |
| Gl#5 | 28.03.92 | 597 |
| Gl#6 | 29.03.92 | 465 |

Farm area count means

| <u>Farm</u> | <u>Name</u> | <u>N</u> | <u>Av. count</u> |
|--------------|-----------------|----------|------------------|
| AV | Avenvogie | 7 | 177.1 |
| CC | Ceannacroic | 8 | 81.1 |
| CN | Cluanach | 9 | 251.4 |
| KG | Kynagarry | 8 | 128.3 |
| KO | Knocklearoch | 7 | 95.3 |
| LT | Lossit (estate) | 7 | 11.4 |
| NG | North Glen | 9 | 94.9 |
| Total | | | 839.5 |

Per cent juveniles in Glen count areas

| <u>Farm</u> | <u>Name</u> | <u>Sum of Juvs</u> | <u>Sum of J-check</u> | <u>% Juvs</u> |
|-------------|-----------------|--------------------|-----------------------|---------------|
| AV | Avenvogie | 26 | 291 | 8.9 |
| CC | Ceannacroic | 26 | 187 | 13.9 |
| CN | Cluanach | 268 | 1557 | 17.2 |
| KG | Kynagarry | 28 | 193 | 14.5 |
| KO | Knocklearoch | 15 | 210 | 7.1 |
| LT | Lossit (estate) | | | |
| NG | North Glen | 34 | 311 | 10.9 |

Table 12. Oa transect counts, farm area averages and age ratios

Complete Oa transect counts

| <u>Area</u> | <u>Date</u> | <u>Sum of Gwfs</u> |
|-------------|-------------|--------------------|
| Oa#1 | 30.11.91 | 1412 |
| Oa#2 | 1.12.91 | 2243 |
| Oa1 | 24.12.91 | 1872 |
| Oa2 | 12.01.92 | 2059 |
| Oa#3 | 9.02.92 | 1870 |
| Oa#4 | 10.02.92 | 1742 |
| Oa3 | 8.03.92 | 2610 |
| Oa#5 | 28.03.92 | 1992 |
| Oa#6 | 29.03.92 | 1619 |

Farm area count means

| <u>Farm</u> | <u>Name</u> | <u>N</u> | <u>Av. count</u> |
|-------------|----------------|----------|------------------|
| BV | Ballivicar | 9 | 428.6 |
| CB | Cragabus | 7 | 16.4 |
| GA | Glen Astaile | 7 | 0.0 |
| GD | Glenedale | 8 | 58.8 |
| GL | Giol | 9 | 239.6 |
| IV | Imeraval | 3 | 55.0 |
| KB | Kinnabus | 8 | 278.5 |
| KT | Kintra | 10 | 148.7 |
| LR | Leorin | 9 | 553.9 |
| PE | Port Ellen | 7 | 30.7 |
| RB | Risabus | 9 | 180.3 |
| UK | Upper Killeyan | 8 | 105.3 |
| Total | | | 2095.8 |

Per cent juveniles in Oa count areas

| <u>Farm</u> | <u>Name</u> | <u>Sum of Juvs</u> | <u>Sum of J-check</u> | <u>% Juvs</u> |
|-------------|----------------|--------------------|-----------------------|---------------|
| BV | Ballivicar | 198 | 1460 | 13.6 |
| CB | Cragabus | 23 | 57 | 40.4 |
| FH | Carraig Fhada | - | - | - |
| GA | Glen Astaile | - | - | - |
| GD | Glenegedale | 57 | 205 | 27.8 |
| GL | Giol | 112 | 1050 | 10.7 |
| IV | Imeraval | - | - | - |
| KB | Kinnabus | 92 | 636 | 14.5 |
| KT | Kintra | 30 | 159 | 18.9 |
| LR | Leorin | 169 | 1872 | 9.0 |
| PE | Port Ellen | - | - | - |
| RB | Risabus | 80 | 330 | 24.2 |
| UK | Upper Killeyan | 47 | 235 | 20.0 |

Table 13. Ardtalla transect counts, farm area averages and age ratios

Complete Ardtalla transect counts

| <u>Area</u> | <u>Date</u> | <u>Sum of Gwfs</u> |
|-------------|-------------|--------------------|
| At#1 | 30.11.91 | 372 |
| At#2 | 1.12.91 | 385 |
| At1 | 21.12.91 | 370 |
| At2 | 5.01.92 | 426 |
| At#3 | 9.02.92 | 431 |
| At#4 | 10.02.92 | 237 |
| At3 | 8.03.92 | 369 |
| At#5 | 28.03.92 | 329 |
| At#6 | 29.03.92 | 404 |
| At4 | 11.04.92 | 373 |

Farm area count means

| <u>Farm</u> | <u>Name</u> | <u>Count Mean</u> | <u>N</u> |
|-------------|-------------|-------------------|----------|
| AB | Ardbeg | 7.3 | 8 |
| AT | Ardtalla | 0 | 8 |
| BY | Brahunisary | 19.0 | 8 |
| KR | Kintour | 0 | 8 |
| LG | Laphroaig | 341.1 | 8 |
| Total | | 367.4 | |

Per cent juveniles in Rhinns count areas

| <u>Farm</u> | <u>Name</u> | <u>Sum of Juvs</u> | <u>Sum of J-check</u> | <u>%juvs</u> |
|-------------|-------------|--------------------|-----------------------|--------------|
| AB | Ardbeg | - | - | - |
| AT | Ardtalla | - | - | - |
| BY | Brahunisary | - | - | - |
| KR | Kintour | - | - | - |
| LG | Laphroaig | 74 | 647 | 11.4 |

4. HABITAT USE

The project began late in 1991 and the system of habitat recording developed during the winter. After the system was set up, habitat and patch use by White-fronts was recorded for all sightings. Within the Loch Gorm 10 km sq, habitat mapping will be completed this winter and farmers consulted about field age and treatments in preparation for a full habitat study in 1992-3. The aim is to analyse habitat use in relation to habitat availability within this area. Proportion of time spent feeding in broad habitat categories will be calculated to identify whether birds are feeding or loafing in these habitats.

Grazing pressure from other herbivores appeared to be important to White-fronts. Within the Sunderland farm area White-fronts appeared to prefer ungrazed fields for feeding. This ties in with their less efficient grazing ability as compared to Barnacle Goose: White-fronts require a longer sward for profitable feeding. I hope to look at this in more detail over the coming winter, but below I have made a simple comparison of counts between two adjacent farm areas, one with large numbers of Barnacles and few White-fronts (Aoradh, on the RSPB Barnacle goose refuge) and the other with mostly Whitefronts (Sunderland Farm), both equidistant from a large roost site (Moine nam Faoileann). At Aoradh, there is a large influx of White-fronts in the autumn, these birds feeding primarily on stubble fields (Mike Peacock pers. comm.). From November onwards many of these birds move away from the area (see Figure 9). In contrast, numbers at Sunderland Farm remain fairly constant throughout the winter (see Figure 10). I would suggest that there is competitive exclusion of White-fronts by the closer-grazing Barnacles at Aoradh, which makes this otherwise apparently suitable large area of intensively farmed grassland close to a roost site an unprofitable feeding site for White-fronts. Interestingly, the White-fronts which do occur at Aoradh are generally found in patches of semi-natural habitat such as *Juncus*-dominated pastures, field edges and bog as compared to Sunderland where they graze in open fields like Barnacle Geese. It is hoped to examine grazing dynamics of this nature over the coming winter and to make more frequent counts of Barnacle Geese away from the RSPB reserve.

Figure 9

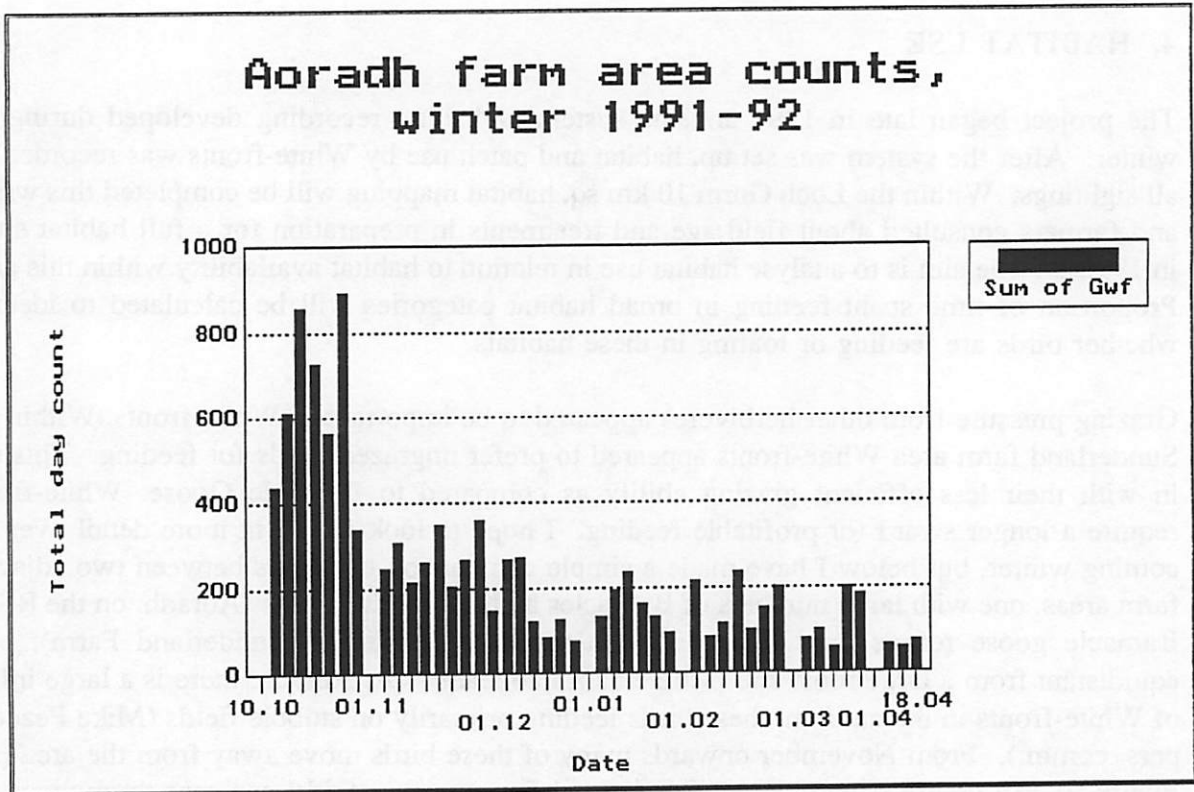
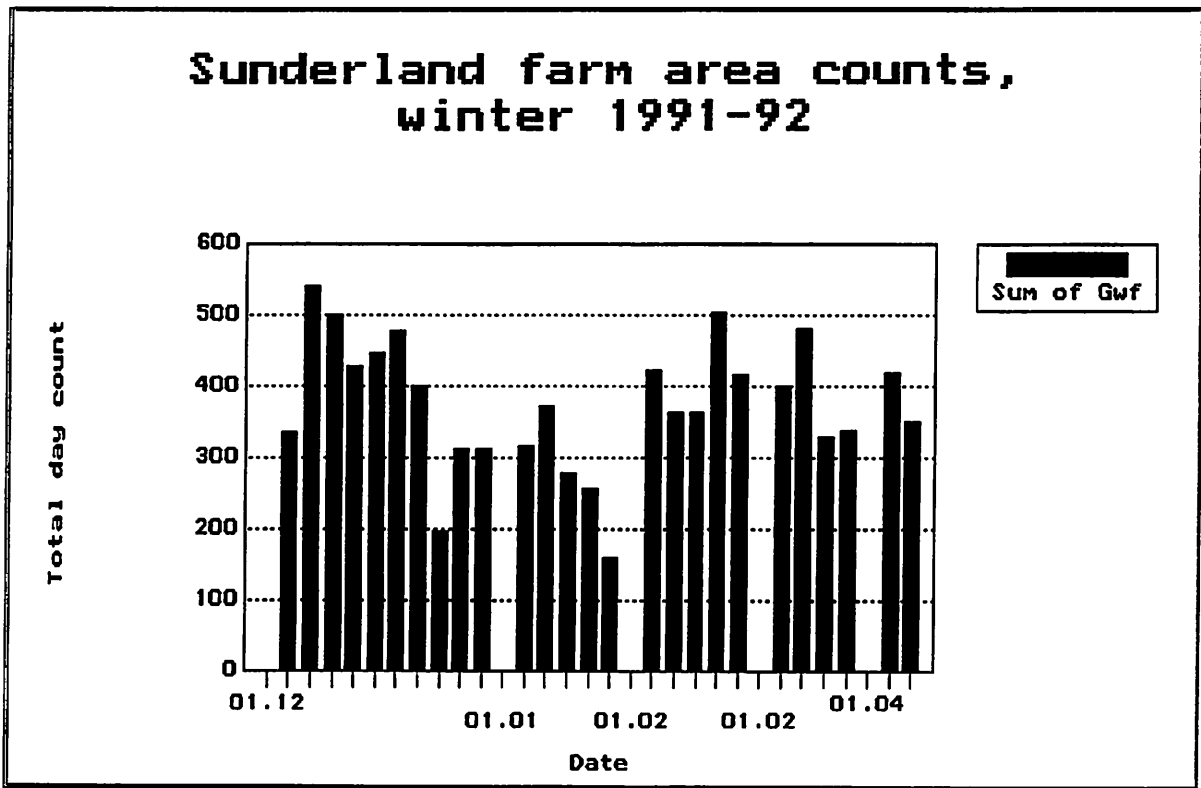


Figure 10



5. NIGHT FEEDING

Observations of birds feeding by night in the 1991-92 winter, made using the nightscope, indicated that White-fronts fed in fields during the brightest phases of the moon. There were notable differences between the Rockside and Sunderland "flocks", with more birds night-feeding at Sunderland than at Rockside. This may be due to the higher quality grass in the Rockside area (where there is a regular reseedling programme) as compared to the older pastures in the Sunderland area, which may "force" birds to spend more time feeding at night in order to meet their daily energy requirement. This hypothesis will be investigated further in the coming winter.

6. EXPERIMENTAL WORK - PREPARATION FOR 1992-92

Greenland White-fronted Geese traditionally inhabit rush-dominated pastures much more than Barnacle Geese do on Islay. However, in recent years, they have turned to feeding in improved pastures to a much greater extent. The question arises as to how one might adapt rushy-pastures currently of limited wildlife value and make them more attractive to White-fronts, whilst possibly simultaneously benefiting other wildlife, such that these "rushy-fields" might act as mini White-front sanctuaries.

Three aspects of these rushy fields are currently being investigated :

- 1) The degree to which rush-dominated fields have to be "opened up" to attract White-fronts into them;
- 2) How this process affects breeding wader and song-bird populations and use by Barnacle Geese; and
- 3) The impact of liming and fertilising (which will probably increase goose usage) on sward/herb diversity within improved areas.

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