

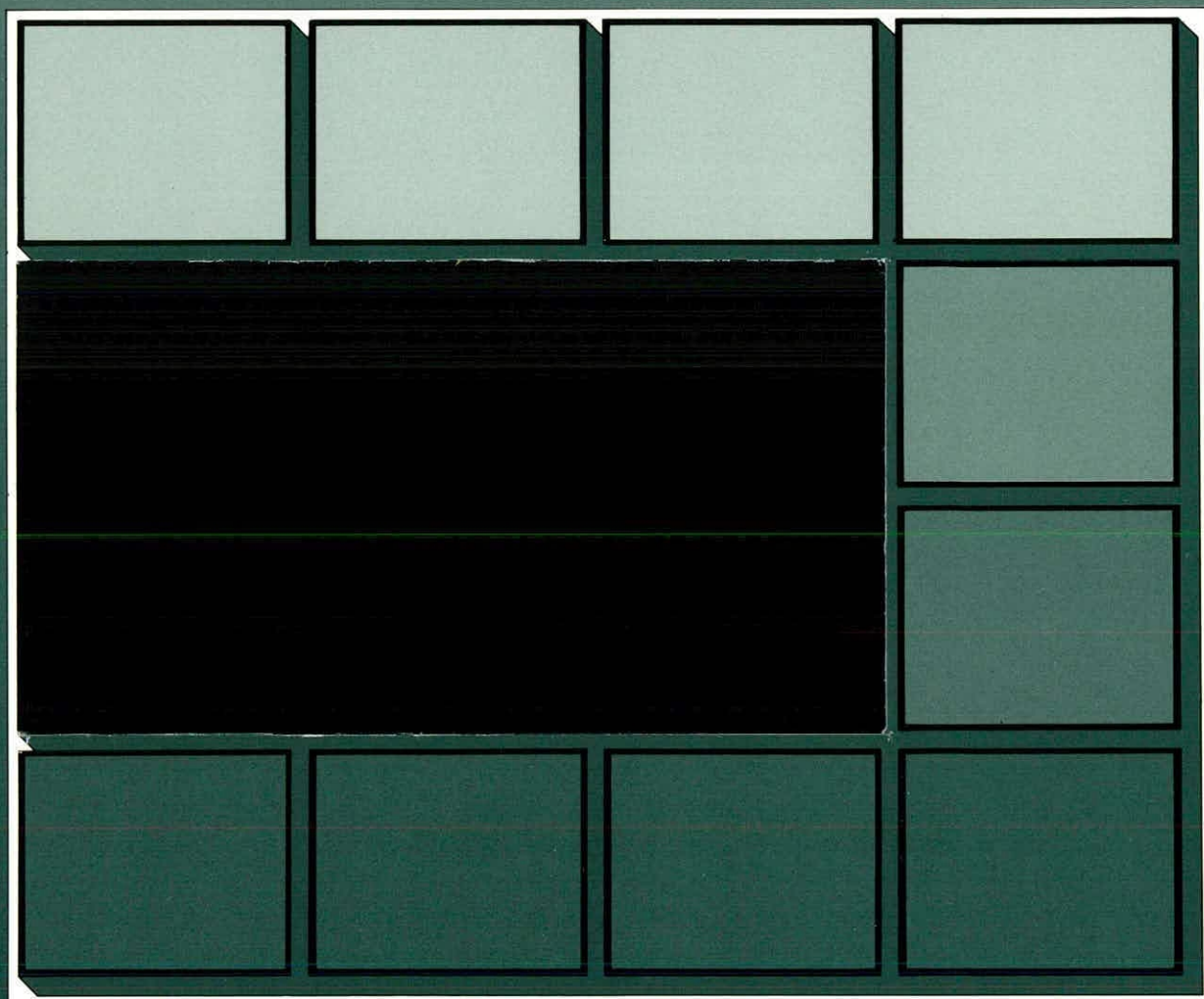
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POPULATION TRENDS OF GULLS AND CLIFF-NESTING
SEABIRDS ON THE ISLE OF MAY

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1 INTRODUCTION

Following a request from the Isle of May Bird Observatory in the early 1970s, NCC has put considerable effort into reducing the numbers of herring gulls Larus argentatus and lesser black-backed gulls L. fuscus breeding on the Isle of May NNR, Fife. It is now apparent that the British populations of both species are declining and there is a need to obtain up-to-date information on adult survival rate and breeding output and to continue making annual assessments of the numbers of breeding gulls on the Isle of May. Such information is needed for modelling the population dynamics of these species. NCC has, therefore, given ITE a contract to undertake the following work annually.

- 1.1 Count the gull nests
- 1.2 Estimate the annual survival of adult herring and lesser black-backed gulls
- 1.3 Ensure that adequate samples of young gulls are ringed
- 1.4 Estimate breeding output

The senior author has incorporated this into his ongoing multi-species study of the islands seabirds.

For convenience, we include details of ITE/NCC's schemes for monitoring the changes in numbers of the cliff-nesting seabirds which was not part of this contract.

The second author was an NCC summer warden on the Isle of May with responsibility for carrying out much of this work.

Various people helped with the counts and they are acknowledged in the notes to the tables. For ease of comparison, the layouts of the individual tables follow those in the Summer Wardens' Annual reports.

2 METHODS AND RESULTS

2.1 Gull nest count

The count was carried out on 29-31 May 1989 by 9 people systematically searching the island and recording and marking all clutches and well-formed but empty nests (Table 1). The efficiency of counting was assessed by a single observer visiting an area after it had been counted and recording the proportion of nests and clutches which had been marked during the count (Table 2).

In all, 1945 nests and clutches were marked and the overall calculated total taking account of those missed was 2270 (Table 3). This total was virtually the same as the 1988 count (2274). However, subtotals for various sections of the colony showed some substantial increases and declines in different parts of the colony.

The proportions of herring and lesser black-backed gulls nesting in the various areas were assessed by counts of individual gulls visible from vantage points after they had been disturbed (Table 4). About 40% of the individual gulls estimated to be present on the island were checked. Assuming that the ratio of herring:lesser black-backed gulls in the total population was the same as in the samples then there were 1629 herring gull nests and 643 lesser black-backed gull nests. The comparable 1988 totals were 1711 and 563 which suggests a decrease of 5% in the herring gull total and an increase of 14% in the lesser black-backed total. In reality there had probably been little change.

2.2 Colour-ringing

Incubating adults were caught with walk-in traps. Due to the low numbers of lesser black-backed gull nests, trapping was extended from the intended areas to include North Plateau. Each gull was given a unique colour-combination which included a green ring with a large engraved M (as a colony specific ring.) Each gull had its overall head and bill-length taken which enabled it to be sexed after the cumulative frequency distribution curve had been plotted (Figure 1, see Coulson *et al.* *Ibis* 125 (1983): 549-557). The head and bill lengths separating the larger males from the smaller females for herring and lesser black-backed gulls were 120 and 116 mm, respectively.

Details of the 158 herring and 104 lesser black-backed gulls colour-ringed are given in Tables 6 and 7. We caught herring gulls which had been ringed on the Isle of May as chicks in 1972 (1), 1976 (1), 1977 (2), 1979 (1), 1982 (7) and 1983 (14), and lesser black-backed gull chicks from 1980 (1), 1982 (12), 1983 (3) and 1986 (1). Single individuals of both species had been ringed elsewhere but details of ringing are not yet available.

2.3 Gull ringing and breeding output

Totals of 1574 young herring and 421 young lesser black-backed gulls were ringed (Table 8); the bulk of these were ringed when a half or more grown as it was essential to identify the species. Three checks of fledged and near fledged young found that 67% of them had been ringed (Table 9). Assuming this figure was representative, c. 2350 and c. 630 juvenile herring and lesser black-backed gulls fledged from 2272 and 643 nests respectively i.e. almost exactly one young per pair. This was extremely close to the mean fledging success of 1.1 young/pair recorded for Isle of May herring gulls in a total of 5 years between 1967 and 1981 (Parsons *J. Anim. Ecol.* 44 (195): 553-573; Graves, Whiten & Henzi *Anim. Behav.* 32 (1984): 798-805). Thus, breeding output of the Isle of May gulls remains high.

2.4 Counts and monitoring of other species

Shag: The count of 1703 nests was 32% up on the 1988 count (Table 10).

Kittiwake: The count of 7564 nests was virtually the same as that in 1988 (7638, Table 10) but the nest monitoring plots indicated a 16% increase since 1988 (Table 11) as did numbers present in the biological monitoring plots. In 1988, there had been concern that the total count was too high, as it suggested a 13% increase whereas the monitoring plots and general impressions were that there had been little change since 1987. There has obviously been a large increase in kittiwake numbers 1987-89 but it is unclear whether the main increase occurred 1987-88 or 1988-89.

Guillemot, razorbill: Both the total and the monitoring counts indicated a substantial increase in the numbers of birds present (Tables 10, 12-16).

Puffin: The population was estimated at 18,600 occupied burrows which compared with 3100 in 1975 and 12,200 in 1984 (Table 17).

3 THE FUTURE

3.1 The arrangements whereby one of the summer wardens worked under the direction of the contractor for much of the breeding season was very successful and should be continued.

3.2 It is relatively easy to mark large samples of birds for the estimation of survival rates but much greater effort is needed to ensure adequate levels of recapture or survival. Changes of only a few percent in the survival rates of these long-lived species have a highly significant effect in demographic terms. In 1990 we anticipate needing to colour-ring c. 30 herring and c. 70 lesser black-backed gulls. This will be mainly in June. However, much time will have to be spent in April and May in searching for gulls mated in 1989 which have survived the winter. The time spent by the summer warden on this work should remain about the same.

3.3 Accurate knowledge of population structure and dynamics is essential in assessing the interactions of seabirds and their prey. This knowledge can only come from long-term studies. Very few such studies are now being started which increases substantially the value of ongoing ones. It is imperative that those on the Isle of May continue. NCC should continue to play its part, and thus monetary and logistic support from NCC (SE Scotland) is gratefully acknowledged.

Table 1. Details of counts of Herring and Lesser Black-backed Gull nests on the Isle May 29-31 May 1989

| | Empty nest | c/1 | c/2 | c/3 | Total | Extra |
|------------------------------|------------|-----|-----|-----|-------|-------------------------|
| Mars Rocks/North Ness | 13 | 11 | 26 | 72 | 122 | |
| North Horn - North Ness | 14 | 7 | 8 | 34 | 66 | 1 predated 2 hatched |
| North Horn - Iron Bridge | 1 | 2 | 1 | 14 | 18 | |
| Iron Bridge - Altarstanes | 4 | 3 | 6 | 14 | 28 | 1 brood |
| Rona Plot | 7 | 8 | 14 | 44 | 73 | |
| Rona east | 32 | 16 | 50 | 174 | 281 | + 9 hatched |
| Tarbet extra/plot | 14 | 8 | 10 | 57 | 94 | 5 hatched |
| Tarbet - Low Light | 18 | 5 | 19 | 45 | 90 | |
| Rocks below Low Light | 2 | 2 | 9 | 31 | 51 | |
| Cleaver | ? | ? | ? | ? | 8 | |
| Stacks off Lady's Bed | ? | ? | ? | ? | 20 | |
| South Ness Rocks | 1 | 3 | 5 | 20 | 29 | |
| Ardcarran Rocks | 0 | 1 | 5 | 8 | 14 | |
| Kirkhaven Rocks | 0 | 3 | 1 | 2 | 6 | |
| Pillow | 0 | 0 | 0 | 0 | 0 | |
| Burrian | 1 | 9 | 22 | 79 | 144 | 30?, 3 broods |
| Altarstanes - Horse Hole | 1 | 3 | 0 | 10 | 14 | |
| Colm Hole | 3 | 1 | 8 | 28 | 40 | |
| Kettle | 13 | 16 | 30 | 72 | 133 | 2 broods |
| North McLeods/East Braes | 0 | 0 | 0 | 0 | 0 | |
| Cliffs below S Horn | ? | ? | ? | ? | 4 | |
| South Horn | 4 | 1 | 9 | 5 | 19 | |
| Cross Park | 0 | 0 | 0 | 0 | 0 | |
| Lady's Bed/Plot | 5 | 5 | 15 | 50 | 83 | + 8 others |
| Ardcarran | 7 | 2 | 20 | 42 | 72 | b/3 |
| Ardcarran Plot | 6 | 1 | 0 | 1 | 8 | |
| Three Tarn Nick - Horse Hole | 17 | 4 | 19 | 66 | 108 | + 2 broods |
| North Plateau Plot | 7 | 4 | 7 | 36 | 54 | |
| Horse Hole | 2 | 0 | 5 | 12 | 19 | |
| Ardcarran Plot - Kirkhaven | 0 | 1 | 3 | 4 | 8 | |
| Clett | 0 | 0 | 2 | 1 | 3 | |
| Middens | 1 | 2 | 4 | 9 | 16 | |
| South Lochside | 0 | 1 | 1 | 0 | 2 | |
| Cornerstone - Pilgrims | ? | ? | ? | ? | 4 | |
| South Plateau Cliffs | 0 | 2 | 5 | 7 | 14 | |
| South Plateau | 0 | 0 | 3 | 1 | 4 | |
| North Lochside | 0 | 0 | 2 | 8 | 10 | |
| Three Tarn Nick - Lochside | ? | ? | ? | ? | 12 | |
| Maidens inner | 12 | 15 | 33 | 62 | 123 | 1 brood |
| Maidens outer | 6 | 14 | 35 | 50 | 119 | + 14 others |
| Maidens Sea Rocks | 1 | 3 | 14 | 13 | 32 | + brood |

Counts made by S. Holloway, R Proctor, S Wanless, P Kinnear, L. Johnston, R. Payne, V. Wilson, M.P. Harris and R. Charles

Table 2. Counting efficiency of gulls nests during the whole island nest count, 29-31 May 1989

| | Number marked | Number unmarked | % marked |
|---------------------------------|---------------|-----------------|----------|
| North Horn - Iron Bridge | 14 | 2 | 87.5 |
| Iron Bridge - Altarstone | 12 | 1 | 92.3 |
| North Ness - North Horn | 21 | 4 | 84.0 |
| Tarbet - Low Light | 22 | 5 | 81.5 |
| Tarbet | 36 | 0 | 100 |
| Rona east | 63 | 5 | 92.6 |
| Rona plot | 26 | 5 | 83.9 |
| Burrian | 23 | 10 | 69.7 |
| Colm | 24 | 0 | 100 |
| Kettle | 51 | 3 | 94.4 |
| Ladies Bed/Ardcarron/South Horn | 92 | 11 | 83.2 |
| North Plateau | 62 | 11 | 84.9 |

Mean = 88.7%

Table 3. The total number of gull nests counted on the Isle of May, 29-31 May 1989, and a comparison with 1988. Changes in sections with less than 10 nests are ignored.

| | Nests counted | Counting efficiency (%) | Total nests | % Change 1988-9 |
|------------------------------|------------------|----------------------------|----------------|--------------------|
| Kirkhaven Rocks | 6 | 89 | 7 | - |
| Foreigner's Point - Colm | 133 | 94 | 141 | - 22 |
| Colm Plot | 40 | 100 | 40 | - 23 |
| Colm - Low Light | 144 | 70 | 206 | + 10 |
| Rocks below Low Light | 51 | 70 | 73 | + 18 |
| Holyman(s) - Main Road | 0 | - | 0 | - |
| Main Road - Palpitation Brae | 0 | - | - | - |
| Lochside - Three Tarn Nick | 22 | 89 | 25 | - 68 |
| Three Tarn Nick - Horse Hole | 108 | 85 | 127 | + 25 |
| North Plateau Plot | 54 | 85 | 63 | + 19 |
| Horse Hole | 19 | 85 | 22 | + 22 |
| Horse Hole - Altarstanes | 14 | 89 | 16 | - 20 |
| Altarstanes - Iron Bridge | 28 | 92 | 30 | 0 |
| Rona east | 281 | 93 | 302 | - 11 |
| Rona west | 18 | 87 | 21 | - 16 |
| North Horn - North Ness | 66 | 84 | 79 | + 16 |
| Rona Plot | 73 | 84 | 87 | + 24 |
| North Ness | 122 | 84 | 145 | + 10 |
| Tarbet Plot | 94 | 100 | 94 | - 20 |
| Tarbet - Low Light | 90 | 81.5 | 110 | + 37 |
| South Plateau | 24 | 87 | 28 | 0 |
| Ardcarran | 94 | 83 | 113 | - 3 |
| Ardcarran Plot | 8 | 83 | 10 | - |
| Lady's Bed | 111 | 83 | 134 | + 11 |
| South Ness Rocks | 29 | 83 | 35 | + 13 |
| Cross Park | 0 | - | 0 | - |
| South Horn | 23 | 83 | 28 | - 36 |
| Maidens | 242 | 87 | 278 | + 30 |
| Maidens Sea Rocks | 32 | 87 | 37 | + 48 |
| Pillow | 0 | - | - | - |
| Middens | 16 | 87 | 18 | + 20 |
| Clett | 3 | 87 | 3 | - |
| | 1945 | | 2272 | 0 |

Table 4. Counts of individual herring and lesser black-backed gulls
30 May 1989.

| | No. HG | No. LBBG | % Herring Gull | % LBB Gull |
|---------------------------|--------|----------|-------------------|---------------|
| North Ness | 72 | 71 | 50 | 0 |
| North Ness - Horn | 49 | 48 | 51 | 49 |
| North Horn - Bridge | 20 | 7 | 74 | 26 |
| Iron Bridge - Alterstanes | 50 | 0 | 100 | 0 |
| Rona Plot | 55 | 30 | 65 | 35 |
| Rona east | 200 | 87 | 70 | 30 |
| Tarbet | 90 | 12 | 88 | 12 |
| Tarbet - Low Light | 39 | 19 | 67 | 33 |
| Low Light | | 5 pairs | | |
| Cleaver | All | | 100 | 0 |
| Lady's Bed Stacks | All | | 100 | |
| S Ness Rocks | All | | 100 | |
| Ardcarran and Rocks | 71 | 30 | 70 | 30 |
| Altarstanes - Horse Hole | All | | 100 | |
| Colm Hole | All | | 100 | |
| Burrian | 76 | 37 | 67 | 33 |
| Kettle | 89 | 73 | 55 | 45 |
| South Horn | 4 | 14 | 22 | 78 |
| Lady's Bed | 65 | 20 | 76 | 24 |
| Ardcarron | 71 | 30 | 70 | 30 |
| Ardcarron/Kirkhaven | 18 | 2 | 90 | 10 |
| North Plateau | 95 | 244 | 28 | 72 |
| South Plateau | 9 | 3 | 75 | 25 |
| Greengates | 30 | 0 | 100 | |

Table 5. Calculated gull nest totals 29-31 May 1989

| | Nests counted | % Counting efficiency | Total nests | % Herring Gull | Total Herring Gull nests | Total Lesser Black-backed Gull nests |
|------------------------------|---------------|-----------------------------|----------------|----------------------|--------------------------------|-----------------------------------------------|
| Kirkhaven Rocks | 6 | 89 | 7 | 50 | 4 | 3 |
| Kettle | 133 | 94 | 141 | 55 | 78 | 63 |
| Colm Plot | 40 | 100 | 40 | 100 | 40 | 0 |
| Colm - Low Light | 144 | 70 | 206 | 67 | 138 | 68 |
| Low Light Rocks | 51 | 70 | 73 | - | 68 | 5 |
| Holyman's - Main Road | 0 | | 0 | | | |
| Main Road - Palpitation Brae | 0 | 89 | 0 | 100 | 25 | 0 |
| Lochsides - Three Tarn Nick | 22 | 89 | 25 | 28 | 36 | 91 |
| Three Tarn Nick - Horse Hole | 108 | 89 | 127 | | | |
| North Plateau Plot | 54 | 85 | 63 | 28 | 18 | 45 |
| Horse Hole | 19 | 85 | 22 | 100 | 22 | 0 |
| Horse Hole - Alterstanes | 14 | 89 | 16 | 100 | 16 | 0 |
| Altarstanes - Iron Bridge | 28 | 92 | 30 | 100 | 30 | 0 |
| Rona east | 281 | 93 | 302 | 70 | 211 | 91 |
| Rona west | 18 | 87 | 21 | 74 | 16 | 5 |
| North Horn - North Ness | 66 | 84 | 79 | 51 | 40 | 39 |
| Rona Plot | 73 | 84 | 87 | 65 | 57 | 30 |
| North Ness | 122 | 84 | 145 | 50 | 73 | 72 |
| Tarbet | 94 | 100 | 94 | 88 | 83 | 11 |
| Tarbet - Low Light | 90 | 81.5 | 110 | 67 | 74 | 36 |
| South Plateau | 24 | 87 | 28 | 75 | 21 | 7 |
| Ardcarren | 94 | 83 | 113 | 70 | 79 | 34 |
| Ardcarren Plot | 8 | 83 | 10 | 70 | 7 | 3 |
| Lady's Bed (inc. Cleaver) | 111 | 83 | 134 | 76 | 102 | 32 |
| South Ness Rocks | 29 | 83 | 35 | 100 | 35 | 0 |
| Cross Park | 0 | | 0 | | | |
| South Horn | 23 | 83 | 28 | 70 | 20 | 8 |
| Maidens | 242 | 87 | 278 | 100 | 278 | - |
| Maidens Sea rocks | 32 | 87 | 37 | 100 | 37 | - |
| Pillar | 0 | | | | | |
| Midden | 15 | 87 | 18 | 100 | 18 | - |
| Clett | 3 | 87 | 3 | 100 | 3 | - |
| TOTAL | 1345 | | 2272 | | 1629 | 643 |

Table 6. Details of breeding herring gulls colour-ringed on the Isle of May in 1989.

Colour rings: All below joint, M = Green engraved with a white M

BTO ring above joint on left leg

Sex: by bill and head length

Locality code (under year)

M = Maidens
A = Ardcarron
K = Kettle
LB = Ladies Bed
NP = North Plateau
TAR = Tarbet
CH = Colms Hole
R/RON = RONA
NH = North Horn
DED = Found dead later in the season

| BIRD | RING No. | L.LEG | R.LEG | SEX | 1989 | 1990 | 1991 |
|------|----------|----------|----------|-----|------|------|------|
| 1 | 0058238 | M-RED | RED-WH | F | M | | |
| 2 | 0058239 | M-BLK | RED-WH | M | M | | |
| 3 | 0058240 | M-GREEN | RED-WH | F | M | | |
| 4 | 0058241 | M-BLUE | RED-WH | M | M | | |
| 5 | 0058242 | M-YELLOW | RED-WH | M | M | | |
| 6 | 0058243 | M-WHITE | RED-WH | M | N | | |
| 7 | 0058244 | M-RED | RED-GRN | F | K | | |
| 8 | 0058245 | M-BLK | RED-GRN | F | A | | |
| 9 | 0058246 | M-GREEN | RED-GRN | F | A | | |
| 10 | 0058247 | M-BLUE | RED-GRN | F | A | | |
| 11 | 0058248 | M-YELLOW | RED-GRN | F | M | | |
| 12 | 0058249 | M-WHITE | RED-GRN | F | A | | |
| 13 | 0058250 | M-BLK | RED-BLK | M | M | | |
| 14 | 0058257 | M-GREEN | RED-BLK | M | M | | |
| 15 | 0058250 | M-BLUE | RED-BLK | F | M | | |
| 16 | 0058257 | M-RED | RED-BLK | M | CH | | |
| 17 | 0058260 | M-YELLOW | RED-BLK | M | CH | | |
| 18 | 0058261 | M-WHITE | RED-BLK | F | CH | | |
| 19 | 0058262 | M-RED | RED-BLU | M | A | | |
| 20 | 0058263 | M-BLK | RED-BLU | M | A | | |
| 21 | 0058264 | M-GREEN | RED-BLU | M | A | | |
| 22 | 0058265 | M-BLUE | RED-BLU | M | A | | |
| 23 | 0058266 | M-YELL | RED-BLU | M | A | | |
| 24 | 0058267 | M-WHITE | RED-BLU | F | TAR | | |
| 25 | 0058268 | M-RED | RED-YELL | F | TAR | | |
| 26 | 0058269 | M-BLK | RED-YELL | F | TAR | | |
| 27 | 0058270 | M-GREEN | RED-YELL | M | M | | |
| 28 | 0058271 | M-BLUE | RED-YELL | F | M | | |
| 29 | 0058272 | M-YELL | RED-YELL | F | K | | |
| 30 | 0058273 | M-WHITE | RED-YELL | F | TAR | | |
| 31 | 0058274 | M-RED | BLK-RED | F | TAR | | |
| 32 | 0058275 | M-BLACK | BLK-RED | F | TAR | | |
| 33 | 0058276 | M-GRN | BLK-RED | F | TAR | | |
| 34 | 0058277 | M-BLUE | BLK-RED | M | K | | |
| 35 | 0058278 | M-YELL | BLK-RED | M | K | | |
| 36 | 0058279 | M-WHITE | BLK-RED | F | K | | |
| 37 | 0058280 | M-RED | GRN-RED | F | K | | |
| 38 | 0058281 | M-BLACK | GRN-RED | F | TAR | | |
| 39 | 0058282 | M-GRN | GRN-RED | M | K | | |
| 40 | 0058283 | M-BLUE | GRN-RED | M | A | | |
| 41 | 0058284 | M-YELLOW | GRN-RED | M | A | | |
| 42 | 0058285 | M-WHITE | GRN-RED | M | A | | |
| 43 | 0058286 | M-RED | BLU-RED | F | A | | |
| 44 | 0058287 | M-BLK | BLU-RED | M | M | | |
| 45 | 0058288 | M-GRN | BLU-RED | M | M | | |
| 46 | 0058289 | M-BLUE | BLU-RED | M | M | | |
| 47 | 0058290 | M-YELLOW | BLU-RED | M | M | | |
| 48 | 0058291 | M-WHITE | BLU-RED | F | M | | |
| 49 | 0058292 | M-RED | YELL-RED | M | A | | |
| 50 | 0058293 | M-BLK | YELL-RED | F | A | | |
| 51 | 0058294 | M-GRN | YELL-RED | F | A | | |
| 52 | 0058295 | M-BLU | YELL-RED | M | A | | |
| 53 | 0058296 | M-YELL | YELL-RED | M | A | | |
| 54 | 0058297 | M-WHITE | YELL-RED | F | A | | |
| 55 | 0058298 | M-RED | WH-RED | M | A | | |

| | | | | | | |
|-----|---------|----------|----------|---|--|-----|
| 56 | GG58299 | M-BLACK | WH-RED | M | | A |
| 57 | GG58300 | M-GREEN | WH-RED | M | | NH |
| 58 | GG58301 | M-BLUE | WH-RED | F | | TAR |
| 59 | GG58302 | M-YELL | WH-RED | F | | NH |
| 60 | GG58303 | M-WHITE | WH-RED | F | | NH |
| 61 | GG58304 | M-RED | BLK-GRN | F | | A |
| 62 | GG58305 | M-BLK | BLK-GRN | F | | A |
| 63 | GG58306 | M-GRN | BLK-GRN | M | | M |
| 64 | GG58307 | M-BLUE | BLK-GRN | F | | M |
| 65 | GG58308 | M-YELL | BLK-GRN | M | | M |
| 66 | GG58309 | M-WHITE | BLK-GRN | F | | M |
| 67 | GG58310 | M-RED | BLK-BLU | F | | M |
| 68 | GG58311 | M-BLK | BLK-BLU | F | | M |
| 69 | GG58312 | M-GREEN | BLK-BLU | F | | M |
| 70 | GG58313 | M-BLUE | BLK-BLU | M | | M |
| 71 | GG58314 | M-YELL | BLK-BLU | M | | M |
| 72 | GG58315 | M-WHITE | BLK-BLU | M | | M |
| 73 | GG58316 | M-RED | BLK-YELL | F | | M |
| 74 | GG58317 | M-BLK | BLK-YEL | F | | M |
| 75 | GG58318 | M-GREEN | BLK-YEL | F | | A |
| 76 | GG58319 | M-BLUE | BLK-YEL | M | | A |
| 77 | GG58320 | M-YELLOW | BLK-YEL | F | | TAR |
| 78 | GG58321 | M-WHITE | BLK-YEL | M | | TAR |
| 79 | GG58322 | M-RED | BLK-WH | F | | TAR |
| 80 | GG58323 | M-BLK | BLK-WH | M | | RON |
| 81 | GG58324 | M-GREEN | BLK-WH | F | | A |
| 82 | GG58325 | M-BLUE | BLK-WH | F | | A |
| 83 | GG58326 | M-YELL | BLK-WH | M | | A |
| 84 | GG58327 | M-WHITE | BLK-WH | M | | A |
| 85 | GG58328 | M-RED | BLK-BLK | F | | M |
| 86 | GG58329 | M-BLK | BLK-BLK | M | | M |
| 87 | GG58330 | M-GREEN | BLK-BLK | F | | M |
| 88 | GG58331 | M-BLUE | BLK-BLK | M | | M |
| 89 | GG58332 | M-YELL | BLK-BLK | F | | M |
| 90 | GG58333 | M-WHITE | BLK-BLK | M | | M |
| 91 | GG58334 | M-RED | GRN-BLK | M | | A |
| 92 | GG58335 | M-BLACK | GRN-BLK | M | | RON |
| 93 | GG58336 | M-GRN | GRN-BLK | F | | CH |
| 94 | GG58337 | M-BLUE | GRN-BLK | M | | CH |
| 95 | GG58338 | M-YELL | GRN-BLK | F | | CH |
| 96 | GG58339 | M-WHITE | GRN-BLK | F | | M |
| 97 | GG58340 | M-RED | BLU-BLK | M | | M |
| 98 | GG58341 | M-BLK | BLU-BLK | F | | M |
| 99 | GG58342 | M-GRN | BLU-BLK | F | | M |
| 100 | GG58343 | M-BLUE | BLU-BLK | F | | M |
| 101 | GG58344 | M-YELLOW | BLU-BLK | M | | M |
| 102 | GG58345 | M-WHITE | BLU-BLK | M | | M |
| 103 | GG58346 | M-RED | WH-BLK | M | | M |
| 104 | GG58347 | M-BLK | WH-BLK | M | | M |
| 105 | GG58348 | M-GRN | WH-BLK | M | | M |
| 106 | GG58349 | M-BLU | WH-BLK | F | | LB |
| 107 | GG58350 | M-YELLOW | WH-BLK | F | | LB |
| 108 | GG58401 | M-WHITE | WH-BLK | F | | TAR |
| 109 | GG58402 | M-RED | GRN-BLU | F | | CH |
| 110 | GG58403 | M-BLK | YEL-BLK | F | | TAR |
| 111 | NONE | M-RED | YEL-BLK | M | | TAR |
| 112 | GG58404 | M-GRN | YEL-BLK | M | | NH |
| 113 | GG58405 | M-BLUE | YEL-BLK | F | | M |
| 114 | GG58406 | M-YELL | YEL-BLK | M | | M |
| 115 | GG58407 | BLK-BLU | CYST | M | | M |
| 116 | GG58408 | M-WHITE | YEL-BLK | M | | M |
| 117 | GG01525 | M-RED | GRN-GRN | M | | M |

| | | | | | |
|-----|----------|----------|----------|---|-----|
| 118 | GG58409 | M-BLK | GRN-GRN | F | M |
| 119 | GG58410 | M-GRN | GRN-GRN | M | M |
| 120 | GG58411 | M-BLUE | GRN-GRN | M | M |
| 212 | GG58412 | M-YELLOW | GRN-GRN | F | TAR |
| 122 | GG58413 | M-WHITE | GRN-GRN | F | TAR |
| 123 | GG58414 | M-BLK | GRN-BLU | M | CH |
| 124 | GG58415 | M-GRN | GRN-BLU | M | CH |
| 125 | GG58416 | M-BLU | GRN-BLU | F | CH |
| 126 | GG58417 | M-YELL | GRN-BLU | M | LD |
| 127 | GG58418 | M-WHITE | GRN-BLU | F | LD |
| 128 | GG58419 | M-RED | GRN-YEL | F | NH |
| 129 | GG58420 | M-BLK | GRN-YEL | M | LD |
| 130 | GG58421 | M-GRN | GRN-YELL | F | LD |
| 131 | GG58422 | M-BLUE | GRN-YEL | M | NH |
| 132 | GG58423 | M-YELLOW | GRN-YELL | M | LD |
| 133 | GG58423 | M-WHITE | GRN-YELL | M | LD |
| 13 | GG58425 | M-RED | GRN-WH | F | LD |
| 135 | GG58426 | M-BLK | GRN-WH | M | LD |
| 136 | GG58427 | M-GRN | GRN-WH | F | K |
| 137 | GG58428 | M-BLU | GRN-WH | F | NH |
| 138 | GG58429 | M-YELL | GRN-WH | M | CH |
| 139 | GG58430 | M-WHITE | GRN-WH | F | CH |
| 140 | GG58431 | M-RED | BLU-GRN | M | NP |
| 141 | GG58432 | M-BLK | BLU-GRN | M | R |
| 142 | GG58433 | M-GREEN | BLU-GRN | F | R |
| 143 | GG58434 | M-BLU | GN | M | K |
| 144 | GG58435 | M-YELLOW | BLU-GRN | F | R |
| 145 | GG58436 | M-WH | BLU-GRN | F | R |
| 146 | GG58437 | M-RED | YEL-GRN | F | R |
| 147 | GG58438 | M-BLK | YEL-GRN | M | NH |
| 148 | GG58439 | M-GREEN | YEL-GRN | M | NH |
| 149 | GG58440 | M-BLU | YEL-GRN | M | NH |
| 150 | GG58441 | M-YELL | YEL-GRN | M | NH |
| 151 | GG58442 | M-WHITE | YEL-GRN | F | NH |
| 152 | GG58443 | M-RED | WH-GRN | F | NH |
| 153 | GG58444 | M-BLACK | WH-GRN | F | NH |
| 154 | GG58445 | M-GRN | WH-GRN | F | NH |
| 155 | GG585446 | M-BLUE | WH-GRN | F | NH |
| 156 | GG58446 | M-BLUE | WH-GRN | M | NH |
| 157 | GG58448 | M-WHITE | WH-GRN | M | NH |
| 158 | GG58449 | M-RED | YEL-WH | F | NH |

Table 7. Details of breeding lesser black-backed gulls colour-ringed on the Isle of May in 1989
For conventions, see Table 6.

| BIRD | RING No. | LBBSGR. DAT | | SEX | 1989 |
|------|----------|-------------|----------|-----|------|
| | | L.LEG | R.LEG | | |
| 1 | GG58351 | M-RED | BLUE-RED | F | NH |
| 2 | GG58352 | M-BLK | BLUE-RED | M | R |
| 3 | GG58353 | M-GRN | BLUE-RED | M | LB |
| 4 | GG58354 | M-BLUE | BLUE-RED | M | LB |
| 5 | GG58355 | M-WHITE | BLUE-RED | F | R |
| 6 | GG58356 | M-RED | BLUE-OR | M | NH |
| 7 | GG58357 | M-RED | BLU-BLK | M | LB |
| 8 | GG58358 | M-BLACK | BLU-BLK | M | NH |
| 9 | GG58359 | M-GREEN | BLU-BLK | F | NH |
| 10 | GG58360 | M-BLACK | BLU-GRN | F | LB |
| 11 | GG58361 | M-BLUE | BLU-BLK | F | NH |
| 12 | GG58362 | M-WHITE | BLU-BLK | F | K |
| 13 | GG58363 | M-GREEN | BLU-GRN | F | LB |
| 14 | GG58364 | M-BLUE | BLU-GRN | F | LB |
| 15 | GG58365 | M-WHITE | BLU-GRN | F | NP |
| 16 | GG58666 | M-RED | BLU-BLU | M | NP |
| 17 | GG58367 | M-BLACK | BLU-BLU | M | NP |
| 18 | GG58368 | M-GREEN | BLU-BLU | M | K |
| 19 | GG58369 | M-BLUE | BLU-BLU | F | NP |
| 20 | GG58370 | M-WHITE | BLU-BLU | M | NK |
| 21 | GG58371 | M-RED | BLU-WH | F | NP |
| 22 | GG58372 | M-BLK | BLU-WH | M | NP |
| 23 | GG58373 | M-GRN | BLU-WH | F | NP |
| 24 | GG58374 | M-BLUE | BLUE-WH | M | NP |
| 25 | GG58375 | M-WHITE | BLU-WH | M | LB |
| 26 | GG58376 | M-RED | RED-BLU | F | LB |
| 27 | GG58377 | M-BLACK | RED-BLU | M | LB |
| 28 | GG58378 | M-GREEN | RED-BLU | M | LB |
| 29 | GG58379 | M-BLUE | RED-BLU | F | NP |
| 30 | GG58380 | M-WHITE | RED-BLU | F | NP |
| 31 | GG58381 | M-RED | BLK-BLU | M | NP |
| 32 | GG58382 | M-BLACK | BLK-BLU | F | K |
| 33 | GG58383 | M-GREEN | BLK-BLU | F | K |
| 34 | GG58384 | M-BLUE | BLK-BLU | M | K |
| 35 | GG58385 | M-WHITE | BLK-BLU | M | K |
| 36 | GG58386 | M-RED | GRN-BLU | M | LB |
| 37 | GG58387 | M-BLACK | GRN-BLU | M | NP |
| 38 | GG58388 | M-GREEN | GRN-BLU | F | NP |
| 39 | GG58389 | M-BLUE | GRN-BLU | F | K |
| 40 | GG58390 | M-RED | WH-BLUE | F | LB |
| 41 | GG58391 | M-WHITE | GRN-BLU | F | K |
| 42 | GG58392 | M-BLK | WH-BLU | M | K |
| 43 | GG58393 | M-GREEN | WH-BLUE | F | NP |
| 44 | GG58394 | M-BLUE | WH-BLUE | F | NP |
| 45 | GG58395 | M-WHITE | WH-BLUE | M | NP |
| 46 | GG58396 | M-RED | GRN-GRN | F | NP |
| 47 | GG58397 | M-BLACK | GRN-GRN | F | NP |

| | | | | | |
|-----|---------|---------|---------|---|----|
| 48 | 0050398 | M-GREEN | GRN-GRN | F | LB |
| 49 | 0050399 | M-BLUE | GRN-GRN | F | LB |
| 50 | 0050400 | M-WHITE | GRN-GRN | M | K |
| 51 | 0050451 | M-RED | GRN-RED | M | R |
| 52 | 0050452 | M-BLACK | GRN-RED | F | R |
| 53 | 0050453 | M-GREEN | GRN-RED | M | R |
| 54 | 0050454 | M-BLUE | GRN-RED | F | NP |
| 55 | 0050455 | M-WHITE | GRN-RED | F | NP |
| 56 | 0050456 | M-RED | GRN-BLK | M | NP |
| 57 | 0050457 | M-BLACK | GRN-BLK | M | K |
| 58 | 0050458 | M-GREEN | GRN-BLK | F | K |
| 59 | 0050459 | M-BLUE | GRN-BLK | F | K |
| 60 | 0050460 | M-WHITE | GRN-BLK | F | K |
| 61 | 0050461 | M-RED | GRN-WH | F | R |
| 62 | 0050462 | M-BLACK | GRN-WH | F | R |
| 63 | 0050463 | M-GREEN | GRN-WH | F | R |
| 64 | 0050464 | M-BLUE | GRN-WH | M | NH |
| 65 | 0050465 | M-WHITE | GRN-WH | F | NH |
| 66 | 0050466 | M-RED | RED | M | NP |
| 67 | 0050467 | M-BLACK | RED-GRN | F | R |
| 68 | 0050468 | M-GREEN | RED-GRN | F | R |
| 69 | 0050469 | M-BLUE | RED-GRN | F | R |
| 70 | 0050470 | M-WHITE | RED-GRN | F | K |
| 71 | 0050471 | M-RED | BLK-GRN | F | K |
| 72 | 0050472 | M-BLK | BLK-GRN | M | K |
| 73 | 0050473 | M-GREEN | BLK-GRN | M | NP |
| 74 | 0050474 | M-BLUE | BLK-GRN | M | R |
| 75 | 0050475 | M-WHITE | BLK-GRN | M | NP |
| 76 | 0050476 | M-RED | WH-GRN | M | R |
| 77 | 0050477 | M-BLACK | WH-GRN | M | R |
| 78 | 0050478 | M-GREEN | WH-GRN | M | NP |
| 79 | 0050479 | M-BLUE | WH-GRN | M | K |
| 80 | 0050480 | M-WHITE | WH-GRN | F | NP |
| 81 | 0050481 | M-RED | BLK-BLK | F | R |
| 82 | 0050482 | M-BLACK | BLK-BLK | M | R |
| 83 | 0050482 | M-BLACK | BLK-BLK | M | NP |
| 84 | 0050484 | M-BLUE | BLK-BLK | M | NH |
| 85 | 0050485 | M-WHITE | BLK-BLK | F | NH |
| 86 | 0050586 | M-RED | BLK-RED | M | NH |
| 87 | 0050487 | M-BLACK | BLK-RED | M | NH |
| 88 | 0050488 | M-GREEN | BLK-RED | F | K |
| 89 | 0050489 | M-BLUE | BLK-RED | M | K |
| 90 | 0050490 | M-WHITE | BLK-RED | F | NH |
| 91 | 0050491 | RED-M | BLK-GRN | M | NH |
| 92 | 0050492 | BLACK-M | BLK-GRN | M | NH |
| 93 | 0050493 | GREEN-M | BLK-GRN | F | NH |
| 94 | 0050494 | BLUE-M | BLK-GRN | M | NH |
| 95 | 0050495 | WHITE-M | BLK-GRN | M | NH |
| 96 | 0050496 | RED-M | BLK-BLU | M | NH |
| 97 | 0050497 | BLACK-M | BLK-BLU | M | NH |
| 98 | 0050498 | GREEN-M | BLK-BLU | M | NH |
| 99 | 0050499 | BLUE-M | BLK-BLU | M | NH |
| 100 | 0050500 | WHITE-M | BLK-BLU | M | K |
| 101 | 0050551 | M-RED | BLK-WH | M | K |
| 102 | 0050552 | M-BLACK | BLK-WH | M | NH |
| 103 | 0050553 | M-GREEN | BLK-WH | F | NH |
| 104 | 0050554 | M-BLUE | BLK-WH | M | NH |

Table 8. The numbers of herring and lesser black-backed gulls ringed on the Isle of May in 1989.

| | Herring Gull | | Lesser black-backed | |
|-----------------------------------------|--------------|--------------------------|---------------------|--------------------------|
| | Ringed | Calculated nest total | Ringed | Calculated nest total |
| Maidens | 286 | 315 | 0 | 0 |
| South of Kirkhaven to Pilgrims Haven | 278 | 243 | 44 | 77 |
| South Plateau | 4 | 21 | 1 | 7 |
| North Plateau | 62 | 79 | 105 | 136 |
| Horse Hole-Iron Bridge | 67 | 68 | 0 | 0 |
| Rona and North Ness | 385 | 397 | 129 | 237 |
| East Tarbet | 110 | 83 | 4 | 11 |
| Tarbet-Low Light | 115 | 74 | 14 | 36 |
| Burrian | 112 | 227 | 46 | 73 |
| Colm-Kirkhaven | 155 | 122 | 78 | 66 |
| Total | 1574 | 2272 | 421 | 643 |

Table 9. Proportion of ringed juvenile gulls at the end of the breeding season in 1989.

| Date | No. checked | % with rings |
|-----------|-------------|--------------|
| 27 July | 325 | 68 |
| 3 August | 197 | 71 |
| 10 August | 168 | 61 |
| | Mean | 67% |

Note: no attempt was made to differentiate between herring and lesser black-backed gulls

Table 10. Whole island counts of shags, kittiwakes, guillemots, razorbills and fulmars on the Isle of May, 1989

| Area | Shag (nests) | Kittiwake (nests) | Guillemot (birds) | Guillemot (pairs) | Razorbill (birds) | Razorbill (pairs) | Fulmar (sites) |
|----------------------------------|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------|
| A Rona (W) | 353 | 381 | 525 | 373 | 55 | 47 | 7 |
| B Altarstones - Peregrine's Rest | 118 | 1276 | 2707 | 1814 | 453 | 379 | 26 |
| C Greengates | 52 | 1129 | 2713 | 1830 | 325 | 255 | 32 |
| D South Plateau | 110 | 1749 | 6971 | 4898 | 805 | 673 | 47 |
| E Cornerstone - Pilgrim's Haven | 62 | 1034 | 4053 | 2887 | 606 | 423 | 11 |
| F Pilgrim's Haven - Rubbish Tip | 134 | 409 | 483 | 328 | 166 | 134 | 11 |
| G The Maidens | 169 | 105 | 300 | 200 | 30 | 20 | 1 |
| H Lady's Bed | 228 | 218 | 206 | 140 | 51 | 41 | 13 |
| I South Ness - Colm Hole | 81 | 36 | - | - | - | - | 6 |
| J Colm Hole - Low Light | 242 | 501 | 66 | 50 | 32 | 26 | 15 |
| K Tarbet | 154 | 461 | 304 | 216 | 90 | 77 | 22 |
| L Rona (N and E) | - | 15 | - | - | - | - | - |
| Lochside (S) | - | 134 | - | - | - | - | 21 |
| Lochside (N) | - | 116 | - | - | - | - | - |
| TOTAL | 1703 | 7564 | 18328 | 12736 | 2613 | 2075 | 212 |
| TOTAL 1988 | 1290 | 7638 | 16791 | 11223 | 2128 | 1903 | ? |
| % change 1988-89 | +32 | -1 | +9 | +13 | +23 | +9 | ? |

- Notes:
1. Shag, kittiwake and fulmar count 29 May - 3 June except back of Maidens in early July.
 2. Guillemot/razorbill count 1-3 June, except back of Maidens in mid June. Counts of birds converted to 'pairs' using a correction factor obtained from the Cornerstone study area.
 3. Counts made by R. Proctor, S. Holloway, S. Wanless and M.P. Harris.
 4. Figures provisional and not to be used before consultation with M.P. Harris.

Table 11. Single counts of kittiwake nests in non-random plots on 3 June 1989

| Plot | Count (nests) | % change 1988-89 |
|--------|---------------|------------------|
| 1 | 31 | + 29 |
| 2L | 75 | + 10 |
| 2R | 58 | + 19 |
| 3 | 68 | + 26 |
| 4 | 173 | + 14 |
| 7 + 7b | 131 | + 27 |
| 8 | 7] | |
| 9 | 44] | 84 |
| 9 ex | 33] | |
| 10 | 204 | + 13 |
| Total | 824 | + 16 |

Counts in 1988 and 1989 were made by S. Wanless

Table 12. Counts of guillemots in monitoring plots on the Isle of May, June 1989.

| Date | Chatter- stones | A | B | D | E | F | H | G | I | J | Rona | Corner- stone | Old | New | Total using C New) |
|------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|------------------|-------|-------|--------------------------|
| 1 | 333 | 231 | 231 | 302 | 167 | 394 | 340 | 182 | 154 | 92 | 222 | 168 | 287 | 372 | 3196 |
| 3 | 335 | 202 | 266 | 309 | 174 | 429 | 313 | 169 | 141 | 83 | 189 | 175 | 250 | 340 | 3125 |
| 4 | 336 | 238 | 297 | 307 | 168 | 366 | 334 | 179 | 167 | 90 | 181 | 173 | 280 | 369 | 3205 |
| 6 | 382 | 228 | 293 | 295 | 177 | 395 | 361 | 184 | 146 | 83 | 170 | 175 | 268 | 351 | 3240 |
| 8 | 443 | 237 | 285 | 313 | 181 | 406 | 371 | 189 | 168 | 99 | 169 | 179 | 267 | 358 | 3398 |
| 11 | 434 | 219 | 275 | 317 | 171 | 430 | 434 | 201 | 162 | 95 | 184 | 171 | 264 | 351 | 3444 |
| 12 | 464 | 246 | 270 | 329 | 173 | 408 | 381 | 214 | 159 | 97 | 188 | 175 | 268 | 349 | 3453 |
| 15 | 454 | 254 | 283 | 342 | 191 | 452 | 347 | 204 | 165 | 88 | 243 | 165 | 253 | 366 | 3554 |
| 17 | 405 | 239 | 224 | 304 | 178 | 352 | 316 | 156 | 172 | 84 | 143 | 158 | 257 | 328 | 3059 |
| 18 | 413 | 234 | 241 | 308 | 161 | 410 | 348 | 189 | 173 | 100 | 158 | 167 | 244 | 320 | 3222 |
| Mean | 399.9 | 232.8 | 266.5 | 312.6 | 174.1 | 404.2 | 355.3 | 186.7 | 160.7 | 91.1 | 184.7 | 170.6 | 263.8 | 350.8 | 3289.6 |
| SD | 50.9 | 14.4 | 25.9 | 13.8 | 8.4 | 29.8 | 35.1 | 17.0 | 10.7 | 1.5 | 29.3 | 6.2 | 13.3 | 17.2 | 161.7 |
| SE | 16.1 | 4.6 | 8.2 | 4.4 | 2.6 | 8.4 | 11.1 | 5.4 | 3.4 | 2.1 | 9.3 | 2.0 | 4.2 | 5.4 | 51.1 |

Notes: The total differs from that used in Harris & Wanless publications as they do not include Chatterstones or Rona and use C old.
Counts made by M P Harris except for I, J and Rona (R. Proctor)

Table 13. Summary of changes in the number of individual guillemots in plots on the Isle of May 1988-89

| Plot | 1989 mean | SE | % Change from 1988 | Significance |
|---------------|-----------|------|-----------------------|--------------|
| Chatterstones | 399.9 | 16.1 | +40 | P < 0.001 |
| A | 232.8 | 8.2 | +26 | P < 0.001 |
| B | 266.5 | 8.2 | +32 | P < 0.001 |
| D | 312.6 | 4.4 | +14 | P < 0.001 |
| E | 174.1 | 2.6 | +22 | P < 0.001 |
| F | 404.2 | 8.4 | +25 | P < 0.001 |
| G | 186.7 | 5.4 | +16 | P < 0.001 |
| H | 355.3 | 11.1 | +13 | P < 0.01 |
| I | 160.7 | 3.4 | +15 | P < 0.001 |
| J | 91.1 | 2.1 | +21 | P < 0.001 |
| Rona | 184.7 | 9.3 | +28 | P < 0.001 |
| Cornerstone | 170.6 | 2.0 | +11 | P < 0.001 |
| C (New) | 350.8 | 5.4 | +18 | P < 0.001 |
| Total | 3289.6 | 51.1 | +23 | P < 0.001 |

Note: The means were compared using 't-tests'

Table 14. Counts of razorbills in 9 plots on the Isle of May, June 1989

| June | Greenface | Peregrines | A | B | Greengates | Bishops Cove | Horse Hole | Cornerstone | C (old) | C (new) | Total (C new) |
|------|-----------|------------|------|------|------------|-----------------|---------------|-------------|------------|------------|------------------|
| 1 | 52 | 56 | 41 | 43 | 113 | 82 | 4 | 36 | 23 | 51 | 478 |
| 3 | 102 | 65 | 43 | 37 | 125 | 75 | 4 | 47 | 23 | 50 | 548 |
| 4 | 90 | 73 | 50 | 48 | 99 | 103 | 5 | 46 | 29 | 56 | 570 |
| 6 | 93 | 70 | 47 | 39 | 125 | 84 | 5 | 42 | 32 | 59 | 564 |
| 8 | 75 | 51 | 52 | 36 | 132 | 91 | 3 | 47 | 34 | 63 | 550 |
| 11 | 88 | 62 | 59 | 36 | 131 | 93 | 4 | 42 | 29 | 59 | 574 |
| 12 | 115 | 71 | 38 | 43 | 153 | 91 | 4 | 44 | 31 | 63 | 622 |
| 15 | 91 | 67 | 51 | 34 | 126 | 90 | 4 | 42 | 22 | 61 | 566 |
| 17 | 73 | 54 | 50 | 33 | 112 | 109 | 4 | 37 | 27 | 64 | 536 |
| 18 | 77 | 46 | 41 | 32 | 126 | 111 | 3 | 42 | 26 | 62 | 540 |
| Mean | 86.7 | 61.5 | 47.2 | 38.1 | 124.2 | 92.9 | 4.0 | 42.5 | 27.6 | 58.8 | 554.8 |
| SD | 17.8 | 9.3 | 6.4 | 5.1 | 14.4 | 11.7 | 0.7 | 3.8 | 4.1 | 5.0 | 36.3 |
| SE | 5.6 | 2.9 | 2.0 | 1.6 | 4.5 | 3.7 | 0.2 | 1.2 | 1.3 | 1.6 | 11.4 |

Note: Counts by M P Harris except for Bishops Cove and Horse Hole (R Proctor)

Table 15. Summary of changes in the number of individual razorbills in 9 plots on the Isle of May 1988-89

| | 1989 mean | SE | % Change from 1988 | Significance |
|------------------|-----------|------|-----------------------|--------------|
| Greenface | 86.7 | 5.6 | + 6 | n.s. |
| Peregrine's Rest | 61.5 | 2.9 | + 17 | $P < 0.05$ |
| A | 47.2 | 2.0 | + 24 | $P < 0.01$ |
| B | 38.1 | 1.6 | + 7 | n.s. |
| Greengates | 124.2 | 4.5 | + 6 | n.s. |
| Bishop's Cove | 92.9 | 3.7 | + 19 | $P < 0.02$ |
| Horse Hole | 4.0 | 0.2 | sample size too small | |
| Cornerstone | 42.5 | 1.2 | + 24 | $P < 0.001$ |
| C (New) | 58.5 | 1.6 | + 4 | n.s. |
| TOTAL | 554.8 | 11.4 | + 11 | $P < 0.01$ |

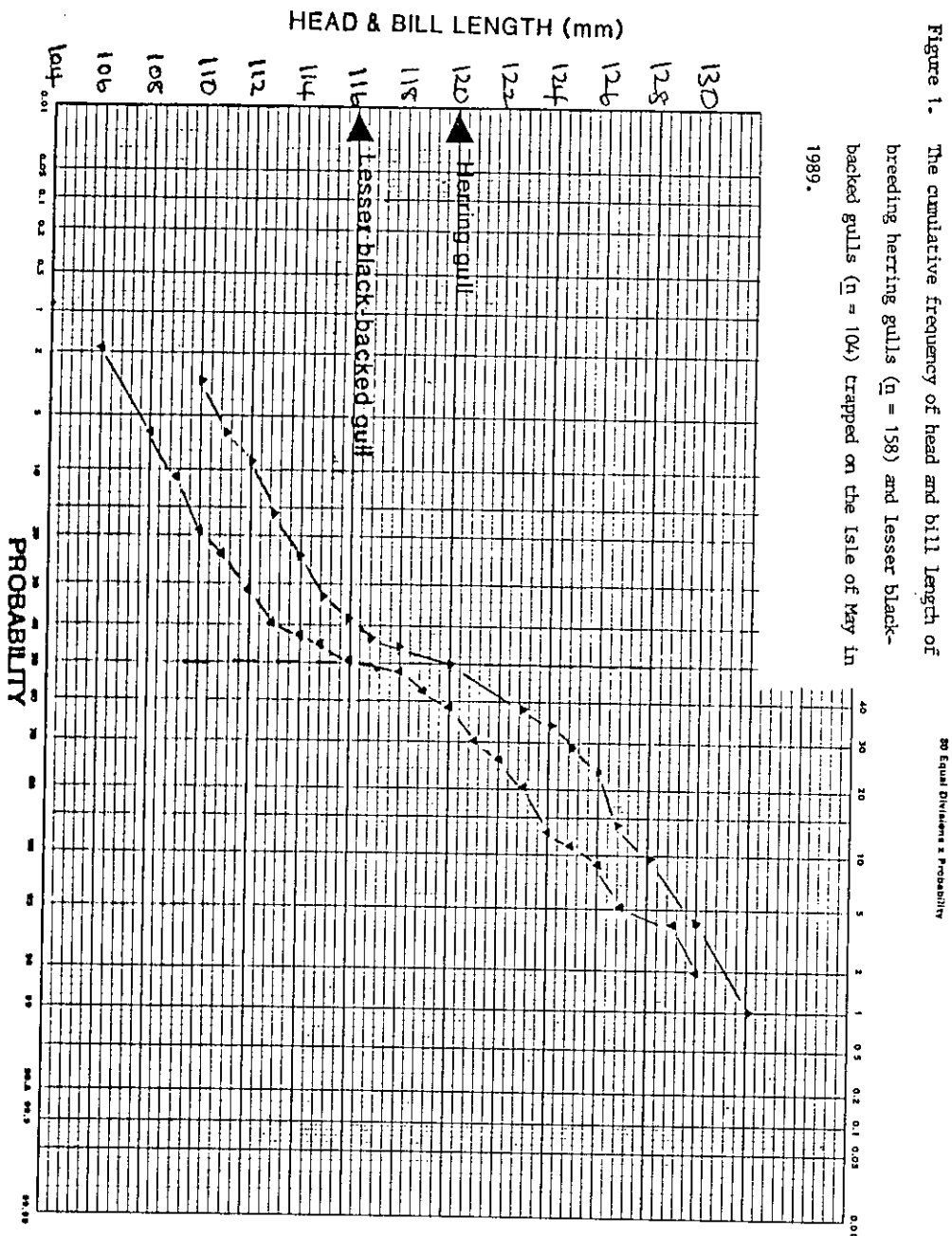
Note: The annual mean counts were compared using 't-tests'

Table 16. Weather conditions for seabird monitoring counts in June 1989

| Date | Direction | Wind | Sea state | Cloud cover | Visibility |
|--------|-----------|----------------|-----------|-------------|------------|
| | | Beaufort scale | | | |
| June 1 | N | 2 | slight | 3/8 | excellent |
| 3 | NE | 3-4 | slight | 3/8 | excellent |
| 4 | calm | 0 | calm | 1/8 | excellent |
| 6 | N | 4 | slight | 6/8 | good |
| 8 | calm | 0 | calm | 2/8 | excellent |
| 11 | SW | 3 | calm | 3/8 | excellent |
| 12 | S | 3 | slight | 8/8 | fog |
| 15 | SW | 2 | calm | 3/8 | excellent |
| 17 | calm | 0 | calm | 1/8 | moderate |
| 18 | calm | 0 | calm | 1/8 | haze |

Table 17. Puffin census Isle of May 29-30 April 1989
Units = occupied burrows

| | 1975 | 1984 | 1989 |
|----------------------------|------|------|------|
| Area | | | |
| Kirkhaven - Colm Hole | 345 | 1518 | 2458 |
| Colm Hole - Low Light | | | |
| Quadrat | 144 | 378 | 570 |
| Rest | 968 | 2408 | 3522 |
| TOTAL | 1112 | 2786 | 4092 |
| Holyman's Road (West side) | | | |
| South of Colm | 40 | 561 | 1068 |
| North of Colm | 63 | 347 | 517 |
| Low Light - Tarbet | 75 | 380 | 795 |
| Rona | | | |
| East quadrat | 34 | 165 | 211 |
| Rest of east | 422 | 2342 | 2731 |
| North of Horn | 43 | 106 | 112 |
| West quadrats | 19 | 46 | 80 |
| Rest of west | 31 | 77 | 103 |
| TOTAL | 549 | 2571 | 3237 |
| North Ness | 160 | 225 | 371 |
| North Plateau | | | |
| Horse Hole quadrat | 147 | 609 | 656 |
| Bishop's Cove quadrat | 76 | 163 | 79 |
| North of Three Tarn | 83 | 1193 | 1698 |
| South of Three Tarn | 0 | 82 | 125 |
| TOTAL | 306 | 2047 | 2558 |



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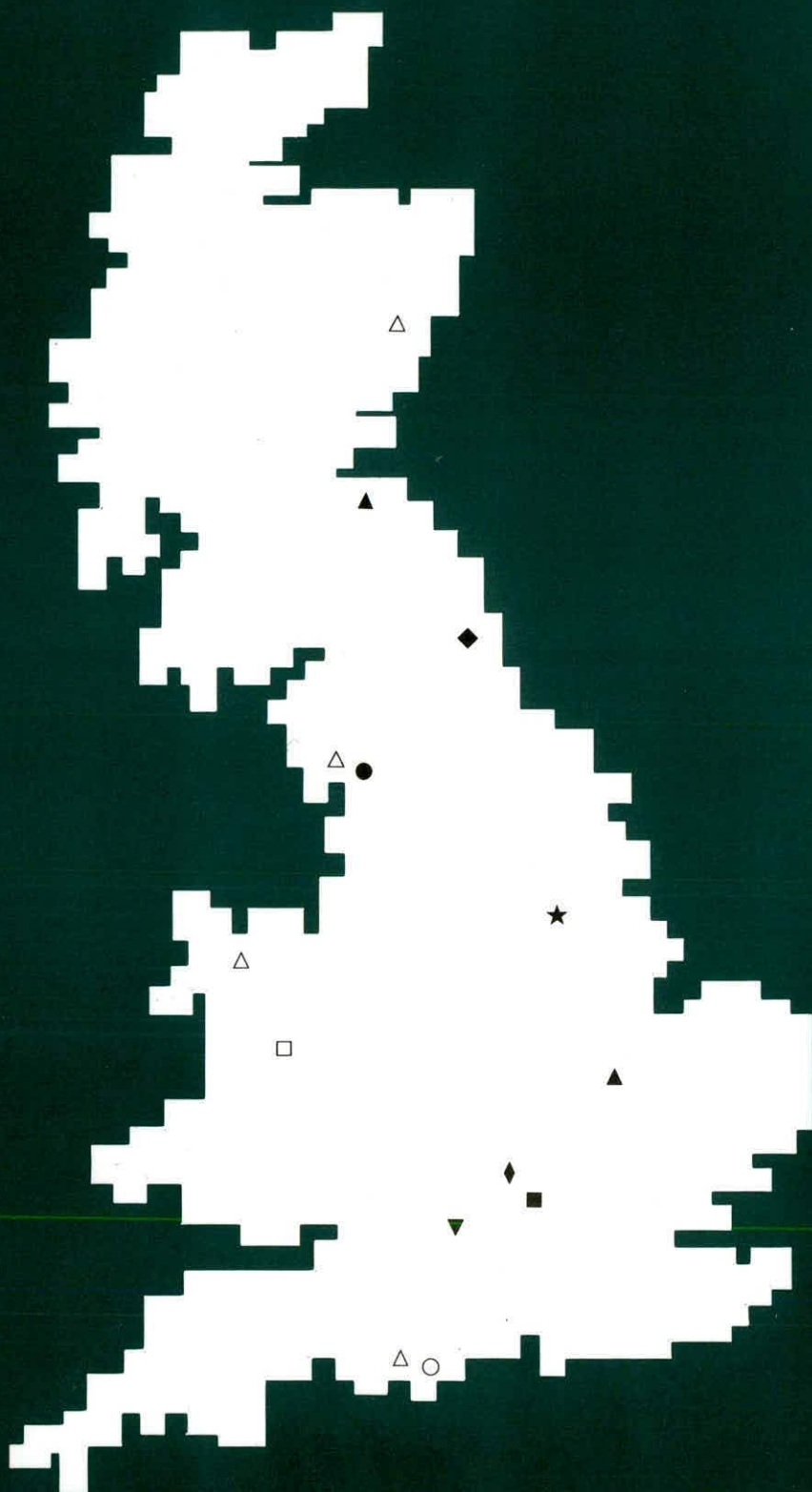
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