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No. 332

Fair Isle Seabird Studies 2000

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1 Summary

1.1 Whole island census 2000

Population changes from 1999 were as follows:

| | | |
|------------------|---------|--|
| Northern gannet: | +3.5% | to 1,162 apparently occupied nests (AON); |
| Arctic skua: | -5.8% | to 65 apparently occupied territories (AOT); |
| Great skua: | +2.3% | to 135 AOT; |
| Mew gull: | +33.3% | to 8 nests; |
| Common tern: | 0.0% | 3 pairs; |
| Arctic tern: | +122.6% | to 1,251 apparently incubating adults (AIA). |

Whole island counts were carried out for four species, in conjunction with 'Seabird 2000':

The whole island census of black-legged kittiwakes revealed 8,175 AON, a decrease of 29.8% since the last complete island count in 1997.

The whole island census of northern fulmars revealed 20,424 apparently occupied sites (AOS), a decrease of 52.9% since the last complete island count in 1996.

The whole island census of razorbills revealed a total of 3,599 birds, an increase of 9.2% since the last complete island count in 1998.

The whole island census of Atlantic puffins produced an estimate of 80,000 birds. This would have represented a 100% increase on the 1995 estimate of 40,000 birds, but the 2000 figure may be an over-estimate as the regular presence of great skuas at the Roskilie colony almost certainly resulted in there being a low % of the population visible (see Results section 4.1.4).

1.2 Population changes at monitored plots

Northern fulmars, European shags, and black and common guillemots all increased at monitored plots in 2000 compared with 1999, the first three species bucking the trend of recent years. European shags showed a substantial increase of 61.4% at the five monitored beaches, while northern fulmars (contrary to the results of the whole island census), black and common guillemots all increased by approximately 20%. Black-legged kittiwakes continued their steady long-term decline; overall numbers at monitoring plots were 4.7% lower in 2000 compared with 1999, but four of the ten sites did show small (non-significant) increases.

1.3 Breeding productivity

The 2000 breeding season was generally productive, but affected by a storm on 13 June, which resulted in heavy losses on the exposed west coast. This meant that while plots on the sheltered east coast did well, those exposed to the storms did badly. As a result, northern gannet, razorbill and Atlantic puffin all had a below average season (razorbills had their lowest productivity since monitoring began and northern gannet their lowest

since 1991). Black-legged kittiwake, European shag, northern fulmar, black guillemot and Arctic terns all had an above average breeding season. However, the apparent overall success of European shags (highest productivity since monitoring began in 1986) may be misleading as the monitoring plot is on the east coast; European shags on the west coast were the hardest hit of all species during the June storms.

1.4 Adult survival

Black-legged kittiwakes showed an increased survival compared with recent years. From a total of 33 birds known to be alive in 1999, 26 were seen in 2000, an apparent over-winter survival from 1999-2000 of 78.8%. Ten new birds were ringed in 2000.

Atlantic puffins showed an uncharacteristically low survival; from a total of 104 birds known to be alive in 1999, just 75 were located in 2000, giving a survival estimate from 1999-2000 of 72.1%, the lowest since recording began in 1986. Fifteen new birds were colour-ringed in 2000.

1.5 Diet

Sandeels comprised the majority of food items for European shags, black-legged kittiwakes, common guillemots, razorbills and Atlantic puffins in 2000. The lengths of sandeels brought to common guillemot chicks, and load weights of Atlantic puffin feeds were about average.

2 Introduction and Objectives

The Joint Nature Conservation Committee (JNCC) has a responsibility to advise on the condition of the natural marine environment. Seabirds are one of the more important components of this environment and Britain has internationally important populations of several species. The JNCC's Seabird Monitoring Programme has been designed to assess population changes and breeding success of selected species of seabirds at a range of colonies. In addition, selected 'key site' colonies have been targeted for more detailed monitoring of breeding performance, annual survival rates and feeding ecology. These sites are geographically spread in order to give as full a coverage as possible of British waters. Fair Isle is a very suitable site in North Britain, situated between the two important archipelagos of Orkney and Shetland.

Long-term studies on the numbers, breeding success, adult survival, chick growth and chick diet have been undertaken on up to eleven species on Fair Isle since 1986, with JNCC (formerly NCC CSD) support. Due to the long period of immaturity and high annual survival rates of seabirds, it is essential that continuity of long-term studies is maintained. As part of its Seabird Monitoring programme, the JNCC has contracted the Fair Isle Bird Observatory Trust (FIBOT) to:

- (a) monitor numbers of northern fulmar *Fulmarus glacialis*, European shag *Phalacrocorax aristotelis*, Arctic skua *Stercorarius parasiticus*, great skua *Catharacta skua*, black-legged kittiwake *Rissa tridactyla*, Arctic tern *Sterna paradisaea*, common tern *Sterna hirundo*, common guillemot *Uria aalge*, razorbill *Alca torda*, black guillemot *Cepphus grylle* and Atlantic puffin *Fratercula arctica* nesting on Fair Isle.
- (b) monitor breeding success of northern fulmar, northern gannet *Morus bassanus*, European shag, Arctic skua, great skua, black-legged kittiwake, common tern, Arctic tern, common guillemot, razorbill, black guillemot and Atlantic puffin.
- (c) monitor adult survival of black-legged kittiwake and Atlantic puffin.
- (d) assess feeding frequency of common guillemot and Atlantic puffin chicks through timed watches, and identify prey composition of food brought to the colonies during chick rearing period by collecting regurgitated samples or pellets for the following species: European shag, black-legged kittiwake, common guillemot, razorbill and Atlantic puffin.
- (f) undertake special studies on species as agreed between the nominated officer and contractor e.g. weighing and measuring samples of chicks of all accessible species.

This report presents the results of seabird monitoring on Fair Isle in 2000, the fifteenth season of work. Some of the data collected in previous years have been re-analysed and therefore some of the results for the years 1986-99 published in this report may differ slightly from those in previous reports.

3 Methods

In addition to annual or regular total island counts, population changes of northern fulmar, European shag, black-legged kittiwake, common guillemot and black guillemot are monitored in plots. Full details of methods used are presented in Riddiford & Osborn (1986 & 1987), Riddiford & Silcocks (1988), Harvey *et al.* (1989, 1990, 1992), Harvey & Orsman (1991), Riddington *et al.* (1994, 1995, 1996, 1997), Baker *et al.* (1998) and Walsh *et al.* (1995).

4 Results

The results summarised below are presented in full in Tables 1-26 and Appendices 1-5.

4.1 Complete island census 2000

Species too numerous to count annually are censused every five years, or more regularly when in conjunction with projects such as Seabird 2000. The target species in 2000 were northern fulmar, black-legged kittiwake, razorbill and Atlantic puffin. To facilitate comparison with past (and future) counts, the island was split into twelve standard sectors for all the counts.

4.1.1 Northern fulmar (Table 1)

The island population of northern fulmars was counted during June. The final count of 20,424 AOS represents a 52.9% decrease on the 1996 count, which itself was the highest total count since records began in 1969. This population decrease was equally marked across all the count sectors of the island. Interestingly, there appears to have been a similar decrease on the island of Foula, 64 km to the north (Harvey, pers. comm.).

4.1.2 Black-legged kittiwake (Table 2)

The island population of black-legged kittiwakes was counted in June. The final count of 8,175 AON represents a 29.8% decrease on the (1997) count of 11,650 AON, and is a continuation of a long-term decline since 1988. A similar rate of decline was noted at the individual breeding productivity plots during the 1990s.

4.1.3 Razorbill (Table 3)

The island population of razorbills was counted on the evenings of 1-3 May, a period when a maximum number of birds are considered to be most visible. The final count of 3,599 individuals represents a 9.2% increase on the previous (1998) total of 3,296 birds.

4.1.4 Atlantic puffin (Table 4)

The whole island census of Atlantic puffins, done on the evenings of 29 April-3 May, revealed a total estimated population of 80,000 birds, double that estimated in 1995 and more in line with the estimated 70,000 birds in 1989, although the calculating method applied in 2000 may have been flawed. As only a percentage of the island population is visible at any one time, by using the colour-ringed population at Roskilie it is possible to estimate the percentage of birds ashore at any one time. However, this particular colony was subject to very persistent attack from great skuas in 2000, resulting in fewer birds ashore there than was usual. Therefore the 'correction factor' that was applied to the counts from the other colonies may well have led to an over-estimate of the percentage of

“non-visible” individuals at all other parts of the island and, hence, an over-estimate of the whole island population.

4.1.5 Northern gannet (Tables 5 & 6)

Northern gannets were counted on 13 June. The breeding population showed a small increase in the number of AON, up 3.5% from 1999, to 1,162 nests. Following the presence of single pairs in 1997 and 1999, four pairs nested on Sheep Rock in 2000. At the south end of the island, Fugli Stack continued to be a regular loafing site and may prove to be a potential breeding site.

4.1.6 Arctic skua (Table 5)

The number of AOT, counted between 28 May and 4 June, decreased from 69 to 65 (-5.8%). The distribution of territories was generally similar to 1999.

4.1.7 Great skua (Table 5)

Great skuas were censused between 28 May and 4 June. The population increased slightly (2.3%) from 132 territories in 1999, to 135 in 2000. The distribution of territories was similar to 1999.

4.1.8 Mew gull (Table 5)

Eight pairs of mew gull *Larus canus* were estimated to have attempted to breed in 2000, including five pairs on the favoured site at Byerwall above The Plantation. This total represented an increase of 33% on the six pairs in 1999.

4.1.9 Common tern (Table 5)

Three pairs were estimated to have bred in 2000 (all within the Arctic tern colony on Buness), the same number as in 1999 although precise estimates are difficult to achieve with this species due to their nesting habitat and their habit of nesting within the Arctic tern colonies.

4.1.10 Arctic tern (Table 5)

A large increase in the population of Arctic terns nesting on Fair Isle occurred in 2000. The total of 1,251 AIA was an increase of 122.6% compared with the 1999 total of 562. Buness and Tarryfield formed the core of the colony with smaller numbers on Eas Brecks, Horstibrekks and Byerwall. In contrast to 1999, no birds were present at the small colonies at South Light and Brecks o' Busta. The islanders of Fair Isle continue to voice their concerns over the potential dangers to air traffic of loafing terns on the Airstrip, which lies adjacent to the Tarryfield colony.

4.2 Population changes as revealed by monitoring plots

4.2.1 Northern fulmar (Table 7)

Numbers of AOS increased at each of the five monitoring plots, with an overall increase (sites combined) of 19.2% compared to 1999. Three sites recorded particularly notable increases; South Ramnigeo (+37.3%), North Haven (+19.3%) and Heilli Stack/Linni Geo (+16.0%). However this rise in apparent occupied sites at the monitoring plots is contrary to the results of a whole island census in 2000, which indicated there had been a decrease of 52.8%, since the last complete count in 1996 (Table 1).

4.2.2 European shag (Table 8)

Nest counts in 2000 showed a notable increase at all five plots counted, compared to 1999, measured at +61.4% for all plots combined. The increase was particularly marked at North Ramnigeo (+109%) and Lericum (+96.7%). This represents a reversal of the trend of a long-term decline of the European shag population on the island, which reached an all-time low at the counted plots in 1999. A whole island count of this species is due to take place in the year 2001 as part of the Seabird 2000 Project.

4.2.3 Black-legged kittiwake (Table 9)

Numbers of black-legged kittiwakes at the ten monitoring plots showed an overall decline of 4.7% compared to 1999, continuing the long-term trend of decline. The greatest decreases were recorded at Da Swadin (-24.3%), South Gunnawark (-14.5%) and Trottie Kame (-14.0%). Four sites showed small increases, the largest of which was at Holms/Dog Geo (+6.9%).

4.2.4 Common guillemot (Table 10; Appendix 2)

Counts of attendant adults at monitoring plots increased in 2000, compared with 1999, with an overall increase of 19.4%. Counts increased at all of the five plots, though not statistically significantly at North Gunnawark and only significantly at one of the three sub-plots at both Shaldi Cliff and Da Swaddin. The increases were most marked at Kristal Kame and Guidicum, which experienced increases of over 15%. The mean count, at all five plots combined, was 3.3% lower than when consistent monitoring began in 1987.

4.2.5 Black guillemot (Tables 11a & 11b)

Numbers at Busta Geo (Table 11a) declined slightly between 1999 and 2000, continuing their steady decline there since 1989. Predation by domestic cats is thought to be responsible for the decline at this former island stronghold, with breeding no longer taking place on the boulder beach there. At the SOTEAG monitoring plot along the east coast (Table 11b), numbers rose compared with the previous year, the maximum count of 173 being an increase of 20.1% on the maximum 1999 count of 144 breeding plumaged birds. This may represent the reversal of the recent trend of decline.

4.3 Breeding success

4.3.1 Northern fulmar (Table 12)

In 2000, northern fulmar productivity was the highest recorded since 1995, an average of 0.45 chicks fledged per AOS. There was very little variation in success between the five monitoring plots, all sites recording productivities of between 0.43 and 0.47.

4.3.2 Northern gannet (Table 13)

As in the previous breeding season, northern gannet nests suffered in a storm in mid-June; from a sample of 196 occupied nests, 16 (8.2%) were lost. A total of 107 chicks reached fledging age, a productivity of just 0.55 which, although similar to that of 1999, was the worst since 1991.

4.3.3 European shag (Table 14)

In 2000, European shag productivity along the section of coast from Mavers Geo to Johnny's Peats was the second highest since monitoring began in 1986; 136 chicks fledged from 76 nests, a mean productivity of 1.79 chicks per nest. It should be noted that this sample site is on the east coast of the island, and hence was sheltered from the south-west gale on 13 June. The exposed west coast suffered estimated nest losses of 40-50%.

4.3.4 Arctic skua (Table 15)

1999 was a below average breeding season, with counts of fledged chicks on 27 July – 13 August revealing an estimated 24 chicks fledging from 65 AOT, a productivity 0.37. This represents a 42% decrease compared with the 0.64 estimated in 1999. At least 20 corpses of chicks were discovered, having been depredated by great skuas.

4.3.5 Great skua (Table 15)

A count on 13 August revealed 100 chicks fledged or near-fledged from 135 nests, a productivity of 0.74 chicks per nest. This is slightly lower than productivity estimates for recent seasons, yet still high.

4.3.6 Mew gull (Table 16)

In 2000, six chicks fledged from eight nests, an estimated productivity of 0.75 chicks per nest.

4.3.7 Black-legged kittiwake (Tables 17 & 18)

Following the record year in 1999, black-legged kittiwake breeding success on Fair Isle in 2000 was again high. An average of 1.15 chicks fledged per AON. Nine of the ten plots recorded above average productivities, ranging from 0.72 at Trottie Kame to 1.59 at Shaldi Cliff (one of the typically successful east coast sites). South and west coast sites suffered small losses during the gale on 13 June. The small colony at Da Swadin experienced a very poor year with a productivity of 0.04%, largely due to chick predation by herring gulls *Larus argentatus* and great skuas.

4.3.8 Common tern (Table 19)

Two common tern chicks were known to have fledged from three nests. Productivity was therefore estimated to be 0.67 chicks per nest.

4.3.9 Arctic tern (Table 19)

Arctic terns had a productive year on Fair Isle in 2000, with a count of approximately 1,000 fledged young during the third week of July (before most chicks had moved away from their breeding areas). Productivity was consequently estimated at 0.80 chicks per AIA, representing a record productivity for the Fair Isle colony and a significant increase on the productivity in 1999 (0.27).

4.3.10 Common guillemot (Table 20)

Common guillemots were fairly productive again in 2000, with productivity across the two monitoring sites averaging 0.77 chicks per AIA.

4.3.11 Razorbill (Table 21)

Breeding success at Easter Lothar was estimated at 0.47 chicks assumed fledged per egg laid, similar to the 0.51 in 1999. Prior to 1999, the average productivity at this site since records began in 1990 was 0.65.

4.3.12 Black guillemot (Table 22)

Due to the continued difficulty in finding accessible nest sites, a small sample of fifteen black guillemot nests was used in 2000, an improvement on the sample of nine in 1999. The monitored nests were again relatively successful however, fledging an average of 1.07 chicks per active nest. For the third successive year, no sites were found in the boulder beaches in the south-east corner of the island, where domestic cats are thought to have been responsible for the desertion of several traditional sites. Consequently, the majority of nests were further north, including four in South Haven and three in Kirn o' Skroo.

4.3.13 Atlantic puffin (Table 23)

Breeding success of Atlantic puffins was again below average in 2000. A productivity value of 0.58 chicks fledged per occupied burrow represents a slight decrease on the 0.63 in 1999 and the same as in 1998.

4.4 Adult survival estimates

Breeding seabirds are fairly faithful to their breeding colony, returning to the same section of cliff and even the same nest site year after year. Therefore, by individually marking a sample of nesting adults, it is possible to estimate the year to year survival of that colony, i.e. the number of the marked birds returning in spring can give an approximation of the over-winter survival. In interpreting the results obtained with this method, it should be remembered that the survival estimates are likely to be under-estimates, since the non-appearance of a bird at a colony does not necessarily mean that the bird is dead. Table 24 presents two sets of calculations. Table 24a shows the return rate of colour-ringed birds seen at the breeding colony in the second of a two year pairing divided by the number seen at the colony in the first year of a pairing. It excludes sightings of birds from years subsequent to the two year pairing. Figure 24b includes such sightings and thus gives a better estimate of adult survival, which is updated each year if birds reappear after a period of absence.

4.4.1 Black-legged kittiwake (Table 24)

Sixteen visits were made to the colour-ringed population at Goorn in 2000. Table 24a shows that of the 21 colour-ringed birds present at the Goorn colony in 1999 14 were seen there again in 2000, a return rate of 66.7%. This is a substantial increase on the very low return rates of 21.7% and 29.2% recorded in 1997/98 and 1998/99. Table 24b shows that the very low return rates noted in 1997/98 and 1998/99 were not solely due to mortality, as some birds absent in those years were to return in subsequent years, giving estimated survival rates of 41.3% and 69.7% respectively and 78.8% for 1999/2000. These data, together with recent improved breeding success (Table 18), are an indication that there has at last been a change in fortune for this species. Ten new birds were colour-ringed in 2000.

4.4.2 Atlantic puffin (Tables 24)

Thirty visits were made to the colour-ringed population at Roskilie in 2000. Table 24a shows that of the 84 colour-ringed birds seen in the colony in 1999, 53 were observed in 2000, a return rate of 63.1% which is the lowest rate since recording began in 1986. Table 24b shows that re-sightings of birds in the years subsequent to 2000 reveal an estimated survival rate for 1999/2000 of 72.1%, still a comparatively very low figure, although with future re-sighting this may of course prove to be an underestimate. It is of note that the low return rate of 1997/98 (68.6%; Table 24a) related to an estimated survival rate for those years of 87.7% (which is near average), since many birds were seen subsequently. Fifteen new individuals were colour-ringed in 2000.

4.5 Diet

4.5.1 European shag (Appendix 3)

Thirty-five samples were collected from the colonies, between 20 June and 21 July. As in past years, sandeel *Ammodytes* sp. was the main species in European shag's diet, with 32 of the 35 samples (91.3%) being predominantly sandeel. Single other samples were predominantly clupeid and gadoid, with a further one remaining unidentified. The average weight of samples collected from pulli was 32.37g and that of pellets from adults was 1.77g.

4.5.2 Black-legged kittiwake (Appendix 3)

A total of 26 identifiable samples was collected from the colonies between 28 June and 19 July.

The majority of these were wholly sandeel (84.6%). Three of the remaining four samples were predominantly juvenile Gadoids. The mean (\pm standard error) weight of samples from pulli was 8.15 ± 1.7 g and from adults 18.26 ± 2.95 g.

4.5.3 Common guillemot (Table 25, Appendix 3)

A total of 303 food items was observed during 20 hours of feeding watches at the Peitron colony. The majority of these were between one and two times the length of an adult's bill. The feeding rates recorded were average for recent seasons, indicative of an adequate food supply.

Of 27 samples collected from the colonies (on various dates between 14 June and 11 July), 22 out of 27 (81.5%) were sandeels, with the remaining five comprising four Norway pout *Trisopterus esmarki* (a species not generally recorded in close inshore waters) and a single sprat *Sprattus sprattus*. Approximately half the sandeels were within the size range of 2 and 3 year olds (120-140mm), the remainder being younger fish. The mean (\pm standard error) weight of sandeels was 5.74 ± 1.14 g.

4.5.4 Razorbill (Appendix 3)

Eleven food samples, containing 16 individual fish, were collected from the colonies between 18 June and 4 July; all but one of these fish were sandeels. Unusually, these were generally similar sized fish to those brought in by common guillemots. In past years, common guillemot food samples have been somewhat larger. Mean (\pm standard error) load weight was 4.4 ± 1.16 g.

4.5.5 Atlantic puffin (Table 26, Appendix 3)

Thirty-eight samples were collected from Atlantic puffins in 2000 (37 of these samples were collected on 9 July), which yielded a total of 231 individual fish. Of the fish

collected, 97% were sandeels, while 2.1% were sprats and 0.9% were Gadoids, which is similar to 1999 when sandeels represented 96% of fish collected. The mean weight (6.07 ± 0.55 g) was slightly below the previous 14 year average of 7.6g.

The feeding rates of adult Atlantic puffins was about average (5.2 feeds per burrow per day were recorded during the all-day feeding watch at Roskilie on 7th July). During the all-day watch, 98.7% of identified samples were sandeels.

4.6 Chick weights and wing-lengths (Appendix 4)

Data were collected on the weights and wing-lengths of chicks of northern fulmar (Table A4.1), European shag (Table A4.2), Arctic skua (Table A4.3), great skua (Table A4.4), herring gull (Table A4.5), lesser black-backed gull *Larus fuscus* (Table A4.6), black-legged kittiwake (Table A4.7), Arctic tern (Table A4.8), common guillemot (Table A4.9), razorbill (Table A4.10), black guillemot (Table A4.11) and Atlantic puffin (Table A4.12) chicks.

4.7 Adult weights and wing-lengths (Appendix 5)

Data were collected on weights and wing-lengths of adult northern fulmars (Table A5.1), black-legged kittiwakes (Table A5.2), common guillemots (Table A5.3), razorbills (Table A5.4), black guillemots (Table A5.5) and Atlantic puffins (Table A5.6).

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Tables: 1-26

Table 1. Northern fulmar - total island census counts 1969-2000.

| Year | Count | % change since previous count |
|------|--------|-------------------------------|
| 1969 | 16,264 | - |
| 1975 | 25,648 | +57.7% |
| 1986 | 26,995 | +5.3% |
| 1991 | 35,213 | +30.4% |
| 1996 | 43,317 | +23.0% |
| 2000 | 20,424 | -52.8% |

Figures refer to apparently occupied sites.

See also Appendix 1a, for a sector by sector breakdown of the 1996 and 2000 counts.

Table 2. Black-legged kittiwake – total island census counts 1969-2000

| Year | Count | % change since previous count |
|------|--------|-------------------------------|
| 1969 | 12,121 | - |
| 1975 | 17,000 | +40.3% |
| 1986 | 19,072 | +12.2% |
| 1988 | 19,340 | +1.4% |
| 1992 | 18,159 | -6.1% |
| 1997 | 11,650 | -35.8% |
| 2000 | 8,175 | -29.8% |

Figures refer to apparently occupied nests.

See also Appendix 1b, for a sector by sector breakdown of the 1997 and 2000 counts.

Table 3. Razorbill – total island census counts 1975-2000

| Year | Count | % change since previous count |
|------|-------|-------------------------------|
| 1975 | 2,500 | - |
| 1986 | 3,882 | +55.3% |
| 1988 | 5,114 | +31.7% |
| 1993 | 4,130 | -19.6% |
| 1998 | 3,296 | -20.2% |
| 2000 | 3,599 | +9.2% |

Figures refer to individuals.

See also Appendix 1c, for a sector by sector breakdown of the 2000 count.

Table 4. Atlantic puffin – total island estimated counts 1966-2000

| Year | Count |
|-------------|--------------|
| 1966 | 20,000 pairs |
| 1986 | 20,000 birds |
| 1989 | 70,000 birds |
| 1995 | 40,000 birds |
| 2000 | 80,000 birds |

See also Appendix 1d, for a sector by sector breakdown of the 2000 count.

Table 5. Annual total island census counts of selected species for 1987-2000

| | Northern gannet | Arctic skua | Great skua | Mew gull | Common tern | Arctic tern |
|----------------------|------------------------|--------------------|-------------------|-----------------|--------------------|--------------------|
| 1987 | 304 | 95 | 72 | 10 | 37 | 211 |
| 1988 | 488 | 78 | 78 | 9 | 59 | 345 |
| 1989 | 676 | 114 | 72 | 10 | 25 | 283 |
| 1990 | 643 | 105 | 75 | 9 | 7 | 400 |
| 1991 | 687 | 99 | 79 | 9 | 10 | 650 |
| 1992 | 781 | 109 | 110 | 10 | 17 | 1,100 |
| 1993 | 764 | 107 | 101 | 10 | 9 | 808 |
| 1994 | 825 | 93 | 101 | 7 | 3 | 615 |
| 1995 | 965 | 87 | 130 | 5 | 6 | 1,200 |
| 1996 | 1,090 | 86 | 120 | 6 | 5 | 1,250 |
| 1997 | 1,116 | 98 | 152 | 5 | 7 | 1,730 |
| 1998 | 1,118 | 67 | 79 | 5 | 3 | 1,249 |
| 1999 | 1,123 | 69 | 132 | 6 | 3 | 562 |
| 2000 | 1,162 | 65 | 135 | 8 | 3 | 1,251 |
| % change '99-2000 | +3.5% | -5.8% | +2.3% | +33.3% | +0% | +122.6% |

Counting units: AON (Northern gannet), AOT (Arctic skua, great skua), number of nests (mew gull, terns 1986-1988), AIA (terns 1989-2000).

Table 6. Northern gannet counts by colony 2000, and comparison with 1999.

| | 1999 | 2000 |
|----------------------|--------------|--------------|
| Outer Stack | 314 | 432 |
| Inner Stack | 98 | 100 |
| Yellow Head | 38 | 44 |
| Dronger | 66 | 76 |
| North Felsigeo | 346 | 212 |
| Toor O' Da Ward Hill | 140 | 130 |
| Matchi Stack | 36 | 50 |
| Kame o' Guidicum | 84 | 114 |
| Sheep Rock | 1 | 4 |
| Total | 1,123 | 1,162 |

Figures are counts of Apparently Occupied Nests (AON), i.e. nest material with adult(s) present. The count for Inner Stack 2000 includes a boat count of 75 nests.

Table 7. Northern fulmar population change at five monitored plots 1986-2000.

| | North Haven | South Gunnawark | South Ramnigeo | Easter Lother | Heilli Stack/ Linni Geo | All Sites |
|--------------------|--------------------|------------------------|-----------------------|----------------------|------------------------------------|------------------|
| 1986 | 118 | 90 | 125 | 90 | 87 | 510 |
| 1987 | 136 | 59 | 103 | 71 | 70 | 439 |
| 1988 | 72 | 66 | 121 | 68 | 71 | 398 |
| 1989 | 96 | 60 | 107 | 79 | 77 | 419 |
| 1990 | 104 | 67 | 107 | 72 | 73 | 423 |
| 1991 | 86 | 73 | 109 | 82 | 51 | 401 |
| 1992 | 95 | 62 | 134 | 102 | 76 | 469 |
| 1993 | 59 | 50 | 113 | 89 | 50 | 361 |
| 1994 | 65 | 50 | 109 | 86 | 63 | 373 |
| 1995 | 77 | 49 | 106 | 91 | 64 | 387 |
| 1996 | 78 | 54 | 110 | 118 | 71 | 431 |
| 1997 | 69 | 48 | 113 | 101 | 69 | 400 |
| 1998 | 41 | 53 | 112 | 108 | 65 | 379 |
| 1999 | 57 | 47 | 94 | 91 | 50 | 339 |
| 2000 | 68 | 48 | 129 | 101 | 58 | 404 |
| % change 1999-2000 | +19.3% | +2.2% | +37.3% | +9.9% | +16.0% | +19.2% |
| % change 1986-2000 | NA | -46.7% | +3.2% | +12.2% | -33.4% | -20.1% |

Figures refer to AOS (apparently incubating birds present at a suitable nest site on each of three visits to plots between 1 June and 10 June).

All sites % change for 1986-2000 excludes North Haven due to change in study site with construction of new pier and breakwater in 1992-93.

Table 8. European shag population change at five monitored plots 1986-2000.

| | North Ramnigeo | South Ramnigeo | South Naaversgill | South Gunnawark | Lericum | All Sites |
|--------------------|-------------------|-------------------|----------------------|--------------------|---------|-----------|
| 1986 | 27 | 38 | 52 | 64 | 36 | 217 |
| 1987 | 30 | 31 | 28 | 49 | 102 | 240 |
| 1988 | 24 | 53 | 45 | 48 | 51 | 221 |
| 1989 | 20 | 73 | 42 | 53 | 53 | 241 |
| 1990 | 20 | 60 | 25 | 43 | 54 | 202 |
| 1991 | 27 | 53 | 17 | 38 | 63 | 198 |
| 1992 | 21 | 49 | 16 | 26 | 63 | 175 |
| 1993 | 20 | 35 | 19 | 24 | 76 | 174 |
| 1994 | 26 | 46 | 17 | 24 | 58 | 171 |
| 1995 | 18 | 37 | 20 | 23 | 62 | 160 |
| 1996 | 26 | 51 | 24 | 33 | 72 | 206 |
| 1997 | 16 | 47 | 19 | 26 | 55 | 163 |
| 1998 | 13 | 32 | 20 | 25 | 45 | 135 |
| 1999 | 11 | 20 | 16 | 19 | 30 | 96 |
| 2000 | 23 | 30 | 18 | 25 | 59 | 155 |
| % change 1999-2000 | +109.0% | +50.0% | +12.5% | +31.5% | +96.7% | +61.4% |
| % change 1986-2000 | -14.8% | -21.1% | -65.4% | -61.0% | +63.9% | -28.6% |

Figures refer to number of nests (counted during a single visit to each plot between 14 June and 24 June).

Table 9. Black-legged kittiwake population change at ten monitored plots 1986-2000.

| | SG | L | DN | HDG | JP | SH | SC | DS | TK | B | All Sites |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|
| 1986 | c.207 | c.166 | c.203 | c.207 | c.217 | - | - | - | - | - | - |
| 1987 | c.217 | c.165 | c.188 | c.205 | c.208 | c.93 | c.93 | c.91 | c.94 | c.92 | 1,446 |
| 1988 | 197 | 137 | 189 | 204 | 176 | 94 | 111 | 87 | 100 | 111 | 1,406 |
| 1989 | 196 | 155 | 184 | 218 | 177 | 92 | 124 | 85 | 97 | 99 | 1,427 |
| 1990 | 178 | 142 | 186 | 200 | 178 | 82 | 125 | 80 | 106 | 86 | 1,363 |
| 1991 | 162 | 140 | 182 | 169 | 154 | 76 | 120 | 72 | 100 | 78 | 1,253 |
| 1992 | 172 | 146 | 160 | 142 | 155 | 81 | 110 | 81 | 111 | 72 | 1,230 |
| 1993 | 139 | 106 | 139 | 130 | 127 | 71 | 83 | 54 | 97 | 51 | 997 |
| 1994 | 129 | 97 | 136 | 130 | 124 | 81 | 80 | 52 | 83 | 63 | 975 |
| 1995 | 127 | 92 | 130 | 134 | 109 | 78 | 68 | 51 | 67 | 61 | 917 |
| 1996 | 121 | 79 | 137 | 135 | 117 | 73 | 69 | 44 | 88 | 61 | 924 |
| 1997 | 115 | 78 | 138 | 126 | 110 | 62 | 63 | 47 | 87 | 59 | 885 |
| 1998 | 100 | 69 | 117 | 123 | 97 | 64 | 47 | 31 | 71 | 46 | 765 |
| 1999 | 97 | 69 | 96 | 116 | 95 | 66 | 57 | 33 | 79 | 43 | 751 |
| 2000 | 83 | 64 | 92 | 124 | 98 | 67 | 51 | 25 | 68 | 44 | 716 |
| % change 1999-2000 | -14.5 | -7.3 | -4.2 | +6.9 | +3.2 | +1.5 | -10.6 | -24.3 | -14.0 | +2.4 | -4.7 |
| % change 1986-2000 | -60.0 | -61.5 | -54.7 | -40.1 | -54.9 | -28.0 | -45.2 | -72.6 | -27.7 | -52.2 | -50.5 |

Figures refer to mapped AON, based on 15-20 visits to each plot between 15 May and 8 August.

Sites are SG: South Gunnawark; L: Lericum; DN: Da Nizz; HDG: Holms/Dog Geo; JP: Johnny's Peats; SH: Stroms Heelor; SC: Shaldi Cliff; DS: Da Swadin; TK: Trottle Kame; B: Bergaroo.

Table 10. Common guillemot population change at five monitored colonies 1986-2000.

| | Shaldi Cliff | North Gunnawark | Guidicum | Da Swadin | Kristal Kame | All Sites |
|---|--------------|--------------------|----------|-------------|--------------|-----------|
| 1986 | 496 | 306 | 506 | 243 | - | - |
| 1987 | 475 | 174 | 456 | 282 | 1,891 | 3,278 |
| 1988 | 365 | 165 | 432 | 254 | 1,172 | 2,388 |
| 1989 | 410 | 174 | 433 | 292 | 1,166 | 2,475 |
| 1990 | 313 | 130 | 288 | 219 | 807 | 1,757 |
| 1991 | 405 | 173 | 353 | 287 | 1,333 | 2,551 |
| 1992 | 461 | 185 | 456 | 357 | 1,702 | 3,161 |
| 1993 | 458 | 183 | 401 | 402 | 1,601 | 3,045 |
| 1994 | 437 | 352 | 338 | 367 | 1,440 | 2,934 |
| 1995 | 470 | 145 | 302 | 453 | 1,305 | 2,675 |
| 1996 | 483 | 158 | 344 | 439 | 1,279 | 2,703 |
| 1997 | 513 | 171 | 323 | 491 | 1,428 | 2,926 |
| 1998 | - | 170 | 347 | - | 1,377 | - |
| 1999 | 424 | 172 | 326 | 406 | 1,330 | 2,658 |
| 2000 | 492 | 188 | 376 | 422 | 1,696 | 3,174 |
| % change 1999-2000 | +16.1% | +9.3% | +15.4% | +4.0% | +27.6% | +19.4% |
| P value of 1999-2000 change in numbers | */n.s./n.s. | n.s | *** | */n.s./n.s. | **/** | - |
| % change 1986-2000 | -0.8% | -38.6% | -25.7 % | +73.7% | -10.3% | -3.3% |

Data are based on eight counts between 3 and 22 June at each plot. Note that sample size was four in 1998 (for the sites shown), eight in 1994 and 1999, nine in 1988 and 1986, and ten in all other years. Also as no data was collected from Kristal Kame in 1986, the all sites comparison is from 1987-2000. Statistical significance of differences 1999-2000 as revealed by t-test on log-transformed counts: *P<0.05, ** P<0.01, ***P<0.001. Within each colony, from one to three plots were counted, and the statistical tests were done for each plot.

Table 11a. Black guillemot counts, Busta Geo, 1989-2000.

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|------|------|-------|------|-------|------|------|------|-------|-------|------|-------|
| First count | 41 | 39 | 30 | 32 | 26 | 24 | 23 | 22 | 13 | 6 | 6 | 3 |
| Second count | 40 | 33 | 35 | 32 | 25 | 25 | 14 | 21 | 19 | 5 | 3 | 4 |
| % change in max. count from previous year | +2.4 | -4.9 | -10.3 | -8.6 | -18.8 | -3.9 | -8.0 | -4.3 | -13.6 | -68.4 | 0.0 | -33.3 |

Count dates were: 1988 (1/5, 12/5); 1989 (9/4, 27/4); 1990 (7/4, 21/4); 1991 (13/4, 22/4), 1992 (17/4, 29/4), 1993 (14/4, 25/4), 1994 (16/4, 22/4), 1995 (14/4, 21/4), 1996 (26/4, 30/4), 1997 (16/4, 20/4), 1998 (19/4, 30/4), 1999 (28/3, 20/4), 2000 [9/4, 17/4]

Counts are number of individuals in breeding plumage.

Table 11b. Black guillemot counts, North Light - South Light, east side, 1987-2000.

| | 1987 | 1989 | 1991 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| First count | 220 | 281 | 230 | 183 | 238 | 214 | 189 | 254 | 153 | 144 | 173 |
| Second count | 209 | 286 | 241 | 190 | 240 | 216 | 224 | 230 | 160 | 135 | 132 |
| % change in max. count from previous year | -13.4 | +30.0 | -15.7 | -21.2 | +26.3 | -10.0 | +3.7 | +13.4 | -37.0 | -10.0 | +20.1 |

Count dates were: 1987 (12/4, 23/4); 1988 (1/5, 12/5); 1989 (9/4, 27/4); 1990 (7/4, 21/4); 1991 (13/4, 22/4), 1992 (17/4, 29/4), 1993 (14/4, 25/4), 1994 (16/4, 22/4), 1995 (14/4, 21/4), 1996 (26/4, 30/4), 1997 (16/4, 20/4), 1998 (19/4, 30/4), 1999 (28/3, 20/4), 2000 [9/4, 17/4]

Counts are number of individuals in breeding plumage.

Table 12. Northern fulmar breeding success at five monitored plots 1990-2000.

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| NHV | 0.25 | 0.24 | 0.37 | 0.46 | 0.28 | 0.33 | 0.32 | 0.26 | 0.43 | 0.28 | 0.43 |
| SGU | 0.21 | 0.52 | 0.58 | 0.51 | 0.48 | 0.47 | 0.31 | 0.29 | 0.23 | 0.38 | 0.44 |
| SRA | 0.36 | 0.60 | 0.55 | 0.51 | 0.53 | 0.54 | 0.55 | 0.42 | 0.30 | 0.29 | 0.43 |
| ELO | 0.29 | 0.49 | 0.59 | 0.71 | 0.53 | 0.55 | 0.51 | 0.40 | 0.31 | 0.32 | 0.47 |
| H/L | 0.23 | 0.73 | 0.64 | 0.66 | 0.70 | 0.56 | 0.48 | 0.42 | 0.37 | 0.48 | 0.45 |
| mean | 0.27 | 0.52 | 0.55 | 0.57 | 0.50 | 0.49 | 0.43 | 0.36 | 0.33 | 0.34 | 0.45 |
| ± SE | ±.03 | ±.08 | ±.05 | ±.05 | ±.07 | ±.04 | ±.05 | ±.03 | ±.03 | ±.04 | ±.02 |

Site codes: NHV = North Haven; SGU = South Gunnawark; SRA = South Ramnigeo; ELO = Easter Lother; H/L = Heilli Stack/Linni Geo.

Northern fulmar productivity is expressed as number of chicks fledged per AOS. From 1986 to 1994, an AOS was defined as a site occupied on three consecutive visits in early June, plus any other site within the monitoring plot where a chick was subsequently present. However, estimates of productivity should strictly define AOS only as those sites found to be occupied on three consecutive checks in June (Walsh *et al.* 1995) as the addition of sites which were not found to be occupied in early June but in which a chick was subsequently seen will cause upward bias in productivity estimates. Productivity figures calculated by this more rigorous definition are given for 1995-99.

Table 13. Northern gannet breeding success 1989-2000.

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|----------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Occupied nests | 147 | 159 | 150 | 129 | 152 | 141 | 166 | 222 | 222 | 187 | 165 | 196 |
| Chicks fledged | 114 | 95 | 78 | 94 | 117 | 109 | 125 | 149 | 157 | 149 | 96 | 107 |
| Productivity | 0.78 | 0.60 | 0.52 | 0.73 | 0.78 | 0.77 | 0.75 | 0.67 | 0.71 | 0.80 | 0.58 | 0.55 |

Note: Figures refer to whole island counts

Table 14. European shag breeding success 1989-2000.

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|----------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Occupied nests | 59 | 62 | 95 | 74 | 72 | 79 | 71 | 85 | 89 | 71 | 60 | 76 |
| Chicks fledged | 84 | 60 | 112 | 122 | 130 | 130 | 94 | 117 | 115 | 102 | 65 | 136 |
| Productivity | 1.42 | 0.97 | 1.18 | 1.65 | 1.81 | 1.65 | 1.38 | 1.38 | 1.29 | 1.44 | 1.08 | 1.79 |

Note: Figures refer to counts from a plot on the east of the island.

Table 15. Breeding success of Arctic skua and great skua, 1991-2000.

| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|----------------------|-------|---------|---------|------|-----------|------|------|------|------|------|
| Arctic skua | | | | | | | | | | |
| Occupied territories | 99 | 109 | 107 | 93 | 87 | 86 | 98 | 67 | 69 | 65 |
| Chicks fledged | 74 | 130 | 81-100 | 65 | 65-70 | 76 | 80 | 9 | 44 | 24 |
| Productivity | 0.75 | 1.2 | 0.8-0.9 | 0.70 | 0.75-0.80 | 0.88 | 0.82 | 0.13 | 0.64 | 0.37 |
| Great skua | | | | | | | | | | |
| Occupied territories | 79 | 110 | 101 | 101 | 130 | 120 | 152 | 79 | 132 | 135 |
| Chicks fledged | 53-58 | 55-88 | 100-120 | 121 | 150 | 100 | 115 | 79 | 101 | 100 |
| Productivity | 0.70 | 0.5-0.8 | 1.0-1.2 | 1.20 | 1.15 | 0.83 | 0.76 | 1.00 | 0.76 | 0.74 |

Productivity = number of chicks fledged per AOT.

Table 16. Breeding success of Mew gull, 1992-2000.

| Year | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|----------------|------|------|------|------|------|------|------|------|------|
| Nests | 10 | 10 | 7 | 5 | 6 | 5 | 8 | 6 | 8 |
| Chicks fledged | 0 | 4 | 4 | 3 | 6 | 2 | 3 | 4 | 6 |
| Productivity | 0 | 0.40 | 0.57 | 0.60 | 1.00 | 0.40 | 0.60 | 0.67 | 0.75 |

Productivity = number of chicks fledged per nest

Table 17. Black-legged kittiwake breeding success, 2000.

| | AON | Trace nest | Chicks fledged | Productivity |
|-----------------|-----|------------|----------------|--------------|
| South Gunnawark | 83 | 6 | 125 | 1.51 |
| Lericum | 64 | 5 | 82 | 1.28 |
| Da Nizz | 92 | 1 | 135 | 1.47 |
| Holms/Dog Geo | 124 | 6 | 114 | 0.92 |
| Johnny's Peats | 98 | 7 | 132 | 1.35 |
| Stroms Heelor | 67 | 1 | 97 | 1.45 |
| Shaldi Cliff | 51 | 5 | 81 | 1.59 |
| Da Swadin | 25 | 4 | 1 | 0.04 |
| Trottie Kame | 68 | 0 | 49 | 0.72 |
| Bergaroo | 44 | 0 | 51 | 1.16 |
| Total | | | | 1.15 |

Productivity = number of chicks fledged per AON

Table 18. Black-legged kittiwake breeding success at monitored plots, 1989-2000.

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|-----------------------------|------------|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| S.Gunnawark | 0.34 | 0 | 0.78 | 1.09 | 0.69 | 1.33 | 1.03 | 1.09 | 0.74 | 0.10 | 1.33 | 1.51 |
| Lericum | 0.39 | 0 | 0.90 | 1.42 | 1.04 | 1.00 | 0.60 | 1.15 | 0.55 | 0.07 | 1.03 | 1.28 |
| Da Nizz | 0.40 | 0 | 0.92 | 1.43 | 1.13 | 1.37 | 0.97 | 1.36 | 0.53 | 0.12 | 1.39 | 1.47 |
| Holms/Dog geo | 0.19 | 0 | 0.50 | 1.32 | 1.06 | 1.32 | 0.88 | 1.49 | 0.69 | 0.13 | 1.36 | 0.92 |
| Johnny's Peats | 0.36 | 0 | 0.74 | 1.20 | 0.93 | 1.30 | 1.04 | 1.38 | 0.75 | 0.17 | 1.37 | 1.35 |
| Stroms Heelor | 0.38 | 0 | 1.08 | 1.54 | 1.13 | 1.02 | 0.71 | 1.36 | 0.81 | 0.25 | 1.36 | 1.45 |
| Shaldi Cliff | 0.29 | 0 | 1.01 | 1.24 | 1.17 | 1.21 | 1.09 | 1.17 | 1.00 | 0.31 | 1.47 | 1.59 |
| Da Swadin | 0.32 | 0 | 1.00 | 1.15 | 1.02 | 1.06 | 0.14 | 0.59 | 0.21 | 0.03 | 1.18 | 0.04 |
| Trottie Kame | 0.59 | 0 | 1.10 | 1.34 | 1.30 | 1.43 | 1.10 | 1.35 | 0.75 | 0.23 | 1.34 | 0.72 |
| Bergaroo | 0.42 | 0 | 0.86 | 1.25 | 1.35 | 1.27 | 1.03 | 1.36 | 0.58 | 0.06 | 1.28 | 1.16 |
| Mean (\pm se), all plots | 0.37 | 0 | 0.89 | 1.30 | 1.08 | 1.23 | 0.87 | 1.23 | 0.66 | 0.15 | 1.33 | 1.15 |
| | ± 0.01 | - | ± 0.06 | ± 0.04 | ± 0.06 | ± 0.05 | ± 0.09 | ± 0.08 | ± 0.07 | ± 0.03 | ± 0.07 | ± 0.15 |

Productivity = number of chicks fledged per AON

Table 19. Breeding success of Arctic tern and common tern, 1988-2000.

| | Arctic tern | | | Common tern | | |
|------|-------------|----------------|--------------|-------------|----------------|--------------|
| | AIA | Chicks fledged | Productivity | AIA | Chicks fledged | Productivity |
| 1988 | 345 | 1 | 0.00 | 59 | 2 | 0.03 |
| 1989 | 283 | 36 | 0.13 | 25 | 1 | 0.04 |
| 1990 | 400 | 1 | 0.00 | 7 | 0 | 0 |
| 1991 | 650 | 650-845 | 1.0-1.3 | 10 | 2 | 0.20 |
| 1992 | 1100 | 1100+ | 1.0+ | 17 | c.16 | c.1.00 |
| 1993 | 808 | 50 | 0.06 | 9 | 1 | 0.11 |
| 1994 | 615 | 150 | 0.24 | 3 | 4 | 1.33 |
| 1995 | 1200 | 200 | 0.17 | 6 | 0 | 0 |
| 1996 | 1250 | 900+ | 0.75+ | 5 | 3 | 0.60 |
| 1997 | 1730 | 800 | 0.46 | 7 | c. 7 | c.1.00 |
| 1998 | 1249 | 1 | 0.00 | 2 | 0 | 0 |
| 1999 | 562 | 150 | 0.27 | 3 | 3 | 1.00 |
| 2000 | 1251 | 1000 | 0.80 | 3 | 2 | 0.67 |

Productivity = number of chicks fledged per pair AIA.

+ = Figure given is probably an underestimate

Table 20. Common guillemot breeding success at two monitored plots, 1988-2000.

| | Peitron | | Da Swadin | | Mean productivity |
|------|----------------|--------------|------------------|--------------|-------------------|
| | AIA | Productivity | AIA | Productivity | |
| 1988 | 53 | 0.77 | 54 | 0.80 | 0.78 |
| 1989 | 57 | 0.79 | 60 | 0.78 | 0.78 |
| 1990 | 58 | 0.72 | 48 | 0.71 | 0.72 |
| 1991 | 136 | 0.79 | 57 | 0.61 | 0.70 |
| 1992 | 102 | 0.75 | 39 | 0.72 | 0.74 |
| 1993 | 148 | 0.86 | 50 | 0.84 | 0.85 |
| 1994 | 151 | 0.77 | 45 | 0.67 | 0.74 |
| 1995 | 117 | 0.68 | 48 | 0.65 | 0.67 |
| 1996 | 157 | 0.74 | 57 | 0.77 | 0.75 |
| 1997 | 106 | 0.69 | 55 | 0.84 | 0.74 |
| 1998 | 142 | 0.71 | 77 | 0.71 | 0.71 |
| 1999 | 112 | 0.77 | 56 | 0.82 | 0.79 |
| 2000 | 100 | 0.79 | 48 | 0.71 | 0.77 |

Productivity = number of chicks fledged per AIA.

Table 21. Razorbill breeding success, Easter Lothar, 1991-2000.

| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------------|------|------|------|------|------|------|------|------|------|------|
| No. eggs laid | 64 | 69 | 77 | 72 | 47 | 78 | 100 | 75 | 59 | 86 |
| Productivity | 0.58 | 0.55 | 0.77 | 0.64 | 0.49 | 0.72 | 0.61 | 0.80 | 0.51 | 0.47 |

Productivity = number of chicks assumed fledged per eggs laid

Table 22. Black guillemot breeding success at monitored nests, 1990-2000.

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|
| Nests with eggs | 33 | 48 | 47 | 31 | 19 | 32 | 30 | 23 | 13 | 9 | 15 |
| Chicks fledged | 24 | 41 | 47 | 38 | 11 | 23 | 17 | 10 | 9 | 9 | 16 |
| Productivity | 0.73 | 0.85 | 1.00 | 1.23 | 0.58 | 0.72 | 0.57 | 0.43 | 0.69 | 1.00 | 1.07 |

Productivity = number of chicks assumed to have fledged per site with egg(s).

Table 23. Atlantic puffin breeding success at monitored burrows, 1990-2000.

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|
| Sites with eggs | 96 | 120 | 97 | 110 | 64 | 109 | 109 | 124 | 79 | 68 | 64 |
| Chicks fledged | 55 | 104 | 73 | 76 | 53 | 81 | 87 | 98 | 46 | 43 | 37 |
| Productivity | 0.57 | 0.87 | 0.75 | 0.69 | 0.83 | 0.74 | 0.80 | 0.79 | 0.58 | 0.63 | 0.58 |

Productivity = number of chicks assumed to have fledged per burrow with egg.

Table 24a. Year to year return rates of black-legged kittiwake and Atlantic puffin to Fair Isle, 1990-2000.

| | 90-91 | 91-92 | 92-93 | 93-94 | 94-95 | 95-96 | 96-97 | 97-98 | 98-99 | 99-00 |
|---------------------------|-------------------------|-------------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Black-legged kittiwake | - | 24/28 85.7% | 17/24 70.8% | 37/47 78.7% | 30/37 81.1% | 44/50 88.0% | 42/48 87.5% | 10/46 21.7% | 7/24 29.2% | 14/21 66.7% |
| Atlantic puffin | 104/131 79.4% | 101/127 79.5% | 92/106 86.8% | 75/99 75.8% | 70/79 88.6% | 80/86 93.0% | 80/90 88.9% | 59/86 68.6% | 69/94 73.4% | 53/84 63.1% |

Note: This table shows the number of colour-ringed birds seen at a breeding colony in the second year of a two year pairing divided by the number seen at the breeding colony in the first year. Colonies studied: Goorn for black-legged kittiwakes, Roskillie for Atlantic puffins.

Table 24b Survival estimates of adult black-legged kittiwakes and Atlantic puffins on Fair Isle, 1990-2000.

| | 90-91 | 91-92 | 92-93 | 93-94 | 94-95 | 95-96 | 96-97 | 97-98 | 98-99 | 99-00 |
|---------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|-------------------------|------------------------|-------------------------|------------------------|
| Black-legged kittiwake | - | 25/28 89.3% | 18/25 72.0% | 40/47 85.1% | 36/40 90.0% | 52/56 92.9% | 46/52 88.5% | 19/46 41.3% | 23/33 69.7% | 26/33 78.8% |
| Atlantic puffin | 114/145 78.6% | 116/137 84.7% | 109/120 90.8% | 96/113 85.0% | 97/100 97.0% | 104/108 96.3% | 102/104 98.1% | 93/106 87.7% | 104/119 87.4% | 75/104 72.1% |

Note: This table shows the number of birds known to be alive in the second year of a two year pairing divided by the number known to be alive in the first year. Unlike table 24a it includes birds that are seen at the breeding colony in years subsequent to the two year pairings, and so known to be alive even if not actually seen in the years in question. Survival estimates therefore continue to be updated as a small number of birds re-appear after a period of absence. This table includes birds re-sighted up to and including 2002.

Table 25. Numbers and lengths of fish fed to common guillemot chicks and feeding rate to chicks at Peitron colony 2000.

| Size of fish; relative to length of adult bill | Number of fish | Percentage of total |
|---|-----------------------|----------------------------|
| Less than 1.0 | 33 | 10.9 |
| 1.0 – 1.5 | 124 | 40.9 |
| 1.5 – 2.0 | 115 | 37.9 |
| 2.0 – 2.5 | 16 | 5.4 |
| Undetermined | 15 | 4.9 |

NUMBER OF CHICKS OBSERVED - 89

AVERAGE FEEDING RATE – 3.41 feeds / chick / day

Counts made between 14.30 – 23.30 and 03.30 – 14.30 BST

Table 26. Weight and composition of Atlantic puffin food samples, Fair Isle, 1986 – 2000.

| Year | Sample dates | Mean weight \pm s.e. (n) | Total no. fish | Percentage total fish | | | | | | |
|------|--------------|-------------------------------|-------------------|-----------------------|-------|------|-------|-------|----------|-------|
| | | | | Sandeels | | Gad. | Sprat | Rock. | Flatfish | Unid. |
| | | | | Large | Small | | | | | |
| 1986 | 27/06-23/07 | 7.0 \pm 0.8 (20) | 44 | 26 | 70 | 2 | 0 | 2 | 0 | 0 |
| 1987 | 03/07-03/08 | 4.6 \pm 0.4 (27) | 32 | 25.0 | 75.0 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 02/07-21/07 | 6.0 \pm 0.6 (34) | 159 | 5.2 | 37.1 | 50.9 | 5.0 | 1.2 | 0.6 | 0 |
| 1989 | 02/07-24/07 | 9.3 \pm 0.6 (64) | 428 | 4.2 | 76.6 | 16.1 | 1.6 | 1.4 | 0 | 0 |
| 1990 | 29/06-02/08 | 7.6 \pm 0.4 (73) | 613 | 0.7 | 44.5 | 41.6 | 0 | 13.1 | 0 | 0.1 |
| 1991 | 22/06-21/07 | 10.0 \pm 0.5 (72) | 384 | 17.7 | 75.5 | 3.9 | 0 | 2.9 | 0 | 0 |
| 1992 | 25/06-16/07 | 9.1 \pm 0.4 (107) | 520 | 11.9 | 16.9 | 61.0 | 0 | 6.7 | 0 | 3.5 |
| 1993 | 12/07 | 6.0 \pm 0.9 (15) | 52 | 5.8 | 38.5 | 0 | 3.8 | 51.9 | 0 | 0 |
| 1994 | 28/06-16/07 | 9.8 \pm 1.3 (18) | 99 | 9.1 | 73.7 | 16.2 | 0 | 0 | 0 | 1.0 |
| 1995 | 24/06-17/07 | 7.7 \pm 1.0 (28) | 143 | 13.3 | 42.6 | 35.6 | 7.7 | 0.7 | 0 | 0 |
| 1996 | 11/07-27/07 | 10.1 \pm 0.9 (26) | 163 | 2.5 | 85.8 | 6.1 | 5.5 | 0 | 0 | 0 |
| 1997 | 07/07-20/07 | 8.5 \pm 0.8 (44) | 449 | 0.2 | 40.5 | 37.4 | 1.3 | 13.8 | 0 | 6.7 |
| 1998 | 20/06-20/07 | 5.3 \pm 0.45 (57) | 264 | 3.8 | 14.0 | 77.3 | 0 | 0 | 0 | 4.9 |
| 1999 | 19/06-07/07 | 6.1 \pm 1.08 (32) | 193 | 1.6 | 94.3 | 3.1 | 1.0 | 0 | 0 | 0 |
| 2000 | 22/06-09/07 | 6.1 \pm 0.55 (38) | 231 | 0.9 | 96.1 | 0.9 | 2.1 | 0 | 0 | 0 |

Key: Gad = Gadoid; Rock = Rockling ; Unid = Unidentified; Large sandeels are > 100mm length

Note: In 2000, 37 of the 38 samples were collected on 9 July.

APPENDIX 1: Total island census 2000

1a. Sector by sector breakdown of northern fulmar total island census result, 2000 (with 1996 figures for comparison)

| Sector | 2000 | 1996 | % change |
|-------------------------|---------------|---------------|-----------------|
| <u>1996-99</u> | | | |
| 1 Lericum - Biskam | 1,228 | 2,340 | -47.5% |
| 2 Biskam – North Haven | 2,011 | 3,853 | -47.8% |
| 3 N.Haven – South Haven | 350 | 667 | -47.5% |
| 4 S.Haven – Goorn | 517 | 1,545 | -66.5% |
| 5 Goorn – Shieldi | 3,420 | 4,974 | -31.3% |
| 6 Shieldi – Whaleback | 855 | 1,406 | -39.2% |
| 7 Whaleback – S.Hbr | 547 | 827 | -33.6% |
| 8 S.Hbr – Fugli | 410 | 629 | -34.8% |
| 9 Fugli – Hoini | 1,720 | 4,136 | -58.4% |
| 10 Hoini – Lerness | 2,266 | 8,376 | -73.0% |
| 11 Lerness – Dronger | 4,684 | 9,305 | -49.7% |
| 12 Dronger – Lericum | 2,416 | 5,120 | -52.8% |
| Total | 20,424 | 43,317 | -52.9% |

1b. Sector by sector breakdown of black-legged kittiwake total island census result, 2000 (with 1997 figures for comparison).

| Sector | 2000 | 1997 | % change |
|-------------------------|--------------|---------------|-----------------|
| <u>1997-2000</u> | | | |
| 1 Lericum - Biskam | 959 | 1,340 | -28.4% |
| 2 Biskam – North Haven | 303 | 412 | -26.5% |
| 3 N.Haven – South Haven | 88 | 144 | -38.9% |
| 4 S.Haven – Goorn | 242 | 399 | -39.4% |
| 5 Goorn – Shieldi | 1,245 | 2,069 | -39.8% |
| 6 Shieldi – Whaleback | 42 | 38 | +10.5% |
| 7 Whaleback – S.Hbr | 321 | 322 | -0.1% |
| 8 S.Hbr – Fugli | 706 | 908 | -22.3% |
| 9 Fugli – Hoini | 451 | 521 | -13.4% |
| 10 Hoini – Lerness | 1,947 | 2,730 | -28.7% |
| 11 Lerness – Dronger | 1,409 | 1,965 | -28.3% |
| 12 Dronger – Lericum | 522 | 802 | -34.9% |
| Total | 8,175 | 11,650 | -29.8% |

1c. Sector by sector breakdown of razorbill total island census result, 2000

| Sector | Birds at breeding sites | Loafers | Total |
|-------------------------|--------------------------------|----------------|--------------|
| 1 Lericum - Biskam | 225 | 80 | 305 |
| 2 Biskam – North Haven | 41 | 5 | 46 |
| 3 N.Haven – South Haven | 25 | | 25 |
| 4 S.Haven – Goorn | 140 | 15 | 155 |
| 5 Goorn – Shieldi | 410 | 17 | 427 |
| 6 Shieldi – Whaleback | 42 | 82 | 124 |
| 7 Whaleback – S.Hbr | 143 | 45 | 188 |
| 8 S.Hbr – Fugli | 162 | 45 | 207 |
| 9 Fugli – Hoini | 265 | 110 | 375 |
| 10 Hoini – Lerness | 786 | 295 | 1,081 |
| 11 Lerness – Dronger | 210 | 26 | 226 |
| 12 Dronger – Lericum | 350 | 80 | 430 |
| Total | 2,799 | 800 | 3,599 |

1d. Sector by sector breakdown of Atlantic puffin total island census result, 2000

| Sector | Ashore | Offshore | Wheeling | Total |
|-------------------------|---------------|-----------------|-----------------|---------------|
| 1 Lericum - Biskam | 710 | | 66 | 776 |
| 2 Biskam – North Haven | 340 | 1,255 | 222 | 1,817 |
| 3 N.Haven – South Haven | 150 | 255 | | 405 |
| 4 S.Haven – Goorn | 70 | 430 | 10 | 510 |
| 5 Goorn – Shieldi | 725 | 100 | | 825 |
| 6 Shieldi – Whaleback | 233 | 225 | | 458 |
| 7 Whaleback – S.Hbr | 42 | 51 | 26 | 119 |
| 8 S.Hbr – Fugli | 265 | 640 | 245 | 1,150 |
| 9 Fugli – Hoini | 748 | 185 | 100 | 1,033 |
| 10 Hoini – Lerness | 3,625 | 500 | 140 | 4,265 |
| 11 Lerness – Dronger | 1,500 | 500 | 100 | 2,100 |
| 12 Dronger – Lericum | 1,310 | 350 | | 1,660 |
| Total | 9,718 | 4,491 | 909 | 15,118 |

APPENDIX 2: Fair Isle common guillemot and razorbill census 2000

FAIR ISLE COMMON GUILLEMOT CENSUS COUNTS, JUNE 2000

COLONY: Shaldi Cliff

OBSERVER: Deryk Shaw

| | | | | | | | | | |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DATE: | 3 | 4 | 6 | 10 | 15 | 16 | 20 | 21 | 22 |
| START TIME: | 10.30 | 10.00 | 10.30 | 10.45 | 09.45 | 09.50 | 09.50 | 09.40 | 10.10 |

PLOT COUNT

| | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| A | 250 | 240 | 270 | 260 | 240 | 240 | 215 | 215 | 210 |
| B | 180 | 200 | 200 | 210 | 200 | 190 | 185 | 160 | 165 |
| C | 65 | 72 | 70 | 65 | 72 | 74 | 62 | 52 | 59 |

Loafers

| | | | | | | | | | |
|---|-----|-----|----|----|-----|----|----|----|----|
| X | 11 | 5 | 0 | 15 | 12 | 1 | 5 | 16 | 0 |
| Y | 96 | 18 | 0 | 89 | 105 | 41 | 15 | 25 | 17 |
| Z | 110 | 160 | 65 | 58 | 120 | 99 | 11 | 25 | 0 |

| | | | | | | | | | |
|-----------------------|---|---|----|----|---|---|----|-----|-----|
| CLOUD | 1 | 6 | 8 | 1 | 6 | 1 | 8 | 7 | 8 |
| RAIN | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 |
| SEA | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 2 |
| SWELL | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 2-3 |
| VISIBILITY, COLONY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| VISIBILITY, SEA | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2-3 | 2 |
| WIND SPEED | 2 | 2 | 0 | 2 | 3 | 1 | 2 | 1 | 1 |
| WIND DIRECTION | N | N | NE | SW | W | W | NE | SE | S |

KEY

Cloud cover in oktas. Wind speed is Beaufort scale.

Rain: 1 = none, 2 = discontinuous light, 3 = discontinuous heavy, 4 = continuous light, 5 = continuous heavy.

Sea: 1 = flat calm, 2 = small waves, 3 = large waves, 4 = white wave crests, 5 = waves breaking high onto rocks.

Swell: 1 = no swell, 2 = light swell, 3 = moderate swell, 4 = heavy swell.

Visibility: 1 = good, 2 = fair, 3 = poor.

FAIR ISLE COMMON GUILLEMOT CENSUS COUNTS, JUNE 2000

COLONY: North Gunnawark

OBSERVER: Charlie Holt

| | | | | | | | | | |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DATE: | 3 | 4 | 6 | 10 | 15 | 16 | 20 | 21 | 22 |
| START TIME: | 10.40 | 11.00 | 11.00 | 11.00 | 10.30 | 10.20 | 11.00 | 10.50 | 10.00 |
| PLOT COUNT | 195 | 187 | 182 | 197 | 206 | 204 | 183 | 167 | 167 |
| Loafers | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 5 | 17 |
| CLOUD | 1 | 7 | 7 | 1 | 2 | 0 | 8 | 7 | 8 |
| RAIN | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SEA | 2 | 2 | 1 | 2 | 3 | 1 | 2 | 1 | 1 |
| SWELL | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| VISIBILITY, COLONY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| VISIBILITY, SEA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| WIND SPEED | 3 | 3 | 1 | 3 | 4 | 1 | 3 | 2 | 1 |
| WIND DIRECTION | N | NE | NE | SW | NW | NW | E | SE | S |

KEY

Cloud cover in oktas. Wind speed is Beaufort scale.

Rain: 1 = none, 2 = discontinuous light, 3 = discontinuous heavy, 4 = continuous light, 5 = continuous heavy.

Sea: 1 = flat calm, 2 = small waves, 3 = large waves, 4 = white wave crests, 5 = waves breaking high onto rocks.

Swell: 1 = no swell, 2 = light swell, 3 = moderate swell, 4 = heavy swell.

Visibility: 1 = good, 2 = fair, 3 = poor.

FAIR ISLE COMMON GUILLEMOT CENSUS COUNTS, JUNE 2000

COLONY: Guidicum

OBSERVER: Charlie Holt

| | | | | | | | | | |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DATE: | 3 | 4 | 6 | 10 | 15 | 16 | 20 | 21 | 22 |
| START TIME: | 10.00 | 10.30 | 10.20 | 11.00 | 10.00 | 09.50 | 10.20 | 10.10 | 10.30 |
| PLOT COUNT | 385 | 386 | 366 | 390 | 393 | 404 | 367 | 340 | 350 |
| Loafers | 10 | 9 | 2 | 20 | 1 | 0 | 14 | 17 | 10 |
| CLOUD | 1 | 7 | 7 | 1 | 2 | 0 | 8 | 8 | 7 |
| RAIN | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 |
| SEA | 2 | 2 | 1 | 2 | 3 | 1 | 2 | 1 | 1 |
| SWELL | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| VISIBILITY, COLONY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| VISIBILITY, SEA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| WIND SPEED | 3 | 3 | 1 | 4 | 4 | 1 | 3 | 2 | 1 |
| WIND DIRECTION | N | NE | NE | SW | NW | NW | E | SE | SW |

KEY

Cloud cover in oktas. Wind speed is Beaufort scale.

Rain: 1 = none, 2 = discontinuous light, 3 = discontinuous heavy, 4 = continuous light, 5 = continuous heavy.

Sea: 1 = flat calm, 2 = small waves, 3 = large waves, 4 = white wave crests, 5 = waves breaking high onto rocks.

Swell: 1 = no swell, 2 = light swell, 3 = moderate swell, 4 = heavy swell.

Visibility: 1 = good, 2 = fair, 3 = poor.

FAIR ISLE COMMON GUILLEMOT CENSUS COUNTS, JUNE 2000

COLONY: Da Swadin

OBSERVER: Deryk Shaw

| DATE: | 3 | 4 | 6 | 10 | 15 | 16 | 20 | 21 | 22 |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| START TIME: | 09.50 | 10.30 | 09.40 | 10.05 | 10.30 | 09.50 | 10.40 | 10.40 | 10.45 |
| PLOT COUNT | | | | | | | | | |
| A | 140 | 135 | 115 | 125 | 115 | 115 | 135 | 100 | 105 |
| B | 150 | 170 | 140 | 135 | 150 | 130 | 130 | 110 | 100 |
| C | 185 | 172 | 152 | 161 | 179 | 180 | 164 | 153 | 152 |
| Loafers | 105 | 100 | 90 | 70 | 80 | 100 | 100 | 100 | 66 |
| CLOUD | 2 | 7 | 7 | 1 | 3 | 1 | 8 | 6 | 7 |
| RAIN | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SEA | 2 | 2 | 1-2 | 2 | 2 | 1 | 2 | 2 | 2 |
| SWELL | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2-3 |
| VISIBILITY, COLONY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| VISIBILITY, SEA | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 |
| WIND SPEED | 2 | 2 | 0-1 | 2-3 | 3 | 1 | 2 | 0 | 1 |
| WIND DIRECTION | N | NNE | NE | SW | W | W | NE | SE | S |

KEY

Cloud cover in oktas. Wind speed is Beaufort scale.

Rain: 1 = none, 2 = discontinuous light, 3 = discontinuous heavy, 4 = continuous light, 5 = continuous heavy.

Sea: 1 = flat calm, 2 = small waves, 3 = large waves, 4 = white wave crests, 5 = waves breaking high onto rocks.

Swell: 1 = no swell, 2 = light swell, 3 = moderate swell, 4 = heavy swell.

Visibility: 1 = good, 2 = fair, 3 = poor.

FAIR ISLE COMMON GUILLEMOT CENSUS COUNTS, JUNE 2000

COLONY: Kristal Kame

OBSERVER: Hywel Maggs

| | | | | | | | | | |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DATE: | 3 | 4 | 6 | 10 | 15 | 16 | 20 | 21 | 22 |
| START TIME: | 10.15 | 10.00 | 09.00 | 11.00 | 09.00 | 10.00 | 10.00 | 10.00 | 10.00 |

PLOT COUNT

| | | | | | | | | | |
|---|------|------|------|------|------|------|------|------|------|
| A | 1630 | 1200 | 1330 | 1500 | 1480 | 1370 | 1540 | 1340 | 1080 |
|---|------|------|------|------|------|------|------|------|------|

| | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| B | 440 | 310 | 290 | 270 | 290 | 330 | 270 | 290 | 300 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|

| | | | | | | | | | |
|---------|----|----|----|----|----|----|-----|----|----|
| Loafers | 30 | 40 | 30 | 50 | 70 | 45 | 100 | 55 | 30 |
|---------|----|----|----|----|----|----|-----|----|----|

| | | | | | | | | | |
|-------|---|---|---|---|---|---|---|---|---|
| CLOUD | 1 | 6 | 7 | 3 | 3 | 2 | 8 | 7 | 7 |
|-------|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|---|
| RAIN | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
|------|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|---|
| SEA | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 2 |
|-----|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|-------|---|---|---|---|---|---|---|---|---|
| SWELL | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 |
|-------|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|---|---|
| VISIBILITY, COLONY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
|-----------------------|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|--------------------|---|---|---|---|---|---|---|---|---|
| VISIBILITY, SEA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
|--------------------|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|
| WIND SPEED | 3 | 3 | 1 | 3 | 4 | 1 | 3 | 1 | 1 |
|------------|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|-------------------|----|----|----|----|----|----|----|---|----|
| WIND DIRECTION | NE | NE | NE | SW | NW | NW | NE | E | SE |
|-------------------|----|----|----|----|----|----|----|---|----|

KEY

Cloud cover in oktas. Wind speed is Beaufort scale.

Rain: 1 = none, 2 = discontinuous light, 3 = discontinuous heavy, 4 = continuous light, 5 = continuous heavy.

Sea: 1 = flat calm, 2 = small waves, 3 = large waves, 4 = white wave crests, 5 = waves breaking high onto rocks.

Swell: 1 = no swell, 2 = light swell, 3 = moderate swell, 4 = heavy swell.

Visibility: 1 = good, 2 = fair, 3 = poor.

FAIR ISLE RAZORBILL CENSUS COUNTS, JUNE 2000

COLONY: Lericum

OBSERVER: Hywel Maggs

| | | | | | | | | | |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DATE: | 3 | 4 | 6 | 10 | 15 | 16 | 20 | 21 | 22 |
| START TIME: | 10.45 | 10.30 | 10.00 | 11.00 | 09.00 | 10.00 | 10.00 | 10.30 | 10.30 |
| PLOT COUNT | 100 | 70 | 60 | 54 | 42 | 63 | 85 | 83 | 67 |
| CLOUD | 1 | 7 | 7 | 1 | 8 | 2 | 8 | 7 | 7 |
| RAIN | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 |
| SEA | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 2 |
| SWELL | 3 | 2 | 1 | 1 | 3 | 3 | 2 | 1 | 1 |
| VISIBILITY, COLONY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| VISIBILITY, SEA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| WIND SPEED | 3 | 2 | 1 | 3 | 4 | 1 | 3 | 0-1 | 0-1 |
| WIND DIRECTION | NE | NE | NE | SW | NW | NW | NE | E | SE |

KEY

Cloud cover in oktas. Wind speed is Beaufort scale.

Rain: 1 = none, 2 = discontinuous light, 3 = discontinuous heavy, 4 = continuous light, 5 = continuous heavy.

Sea: 1 = flat calm, 2 = small waves, 3 = large waves, 4 = white wave crests, 5 = waves breaking high onto rocks.

Swell: 1 = no swell, 2 = light swell, 3 = moderate swell, 4 = heavy swell.

Visibility: 1 = good, 2 = fair, 3 = poor.

APPENDIX 3: Food sample collections and feeding watches in 2000.

Table A3.1. European shag food samples, 2000.

| Sample no. | Date | Site | Mass (g) | Principal constituents |
|------------|-------|----------------------|----------|------------------------|
| 1 | 20.06 | South Gunnawark | 5.8 | Gadoid |
| 2 | 20.06 | North Gunnawark | 31.3 | Sandeel |
| 3 | 20.06 | North Gunnawark | 54.5 | Sandeel |
| 4 | 26.06 | North Ramnigeo | 44.5 | Sandeel, Clupeid |
| 5 | 26.06 | North Ramnigeo | 46.8 | Sandeel |
| 6 | 28.06 | North Gunnawark | 8.9 | Sandeel |
| 7 | 04.07 | Lericum | 10.0 | Sandeel |
| 8 | 04.07 | Lericum | 13.2 | Sandeel |
| 9 | 04.07 | Lericum | 13.9 | Sandeel |
| 10 | 04.07 | Lericum | 41.4 | Sandeel |
| 11 | 04.07 | Lericum | 26.0 | Sandeel |
| 12 | 04.07 | Lericum | 35.0 | Sandeel |
| 13 | 04.07 | Lericum | 32.0 | Sandeel |
| 14 | 04.07 | Lericum | 53.1 | Sandeel |
| 15 | 04.07 | South Naaversgill | 10.5 | Sandeel |
| 16 | 06.07 | Skank | 19.8 | Sandeel |
| 17 | 07.07 | South Mila Hesslands | 26.6 | Sandeel |
| 18 | 07.07 | South Mila Hesslands | 90.5 | Sandeel |
| 19 | 11.07 | Wester Lother | 58.0 | Sandeel |
| 20 | 19.07 | Lericum | 6.5 | Sandeel |
| 21 | 20.07 | Jivvi Geo | 23.3 | Sandeel |
| 22 | 20.07 | Jivvi Geo | 56.5 | Sandeel |
| 23 | 21.07 | Da Soonds | 36.5 | Sandeel |
| 24 | 20.06 | North Gunnawark | 0.5 | Sandeel |
| 25 | 20.06 | North Gunnawark | 0.8 | Sandeel |
| 26 | 20.06 | North Gunnawark | 0.8 | Sandeel |
| 27 | 28.06 | North Gunnawark | 2.5 | Sandeel |
| 28 | 28.06 | North Gunnawark | 2.4 | Sandeel |
| 29 | 28.06 | North Gunnawark | 1.5 | Sandeel |
| 30 | 04.07 | Lericum | 1.0 | Sandeel |
| 31 | 07.07 | South Mila Hesslands | 1.0 | Sandeel |
| 32 | 07.07 | South Mila Hesslands | 2.0 | Sandeel |
| 33 | 07.07 | South Mila Hesslands | 2.9 | Sandeel |
| 34 | 11.07 | Wester Lother | 2.0 | Sandeel |
| 35 | 19.07 | Lericum | 3.8 | Unidentified |

Number of samples: 35

Mean load weight of pulli regurgitates – samples 1-23 (g) = 32.4 ± 4.5 (SE)

Mean load weight of adult pellets – samples 24-35 (g) = 1.8 ± 0.3 (SE)

| Load composition: | Species | % of loads of which principal constituent |
|-------------------|--------------|---|
| | Sandeel | 91.3 |
| | Clupeid | 2.9 |
| | Gadoid | 2.9 |
| | Unidentified | 2.9 |

Table A3.2. Black-legged kittiwake food samples, 2000.

| Sample no. | Date | Site | Bird age | Wet mass (g) | Principal constituents |
|------------|-------|----------------------|----------|--------------|------------------------|
| 1 | 28.06 | South Gunnawark | Pullus | 9.6 | Sandeel |
| 2 | 28.06 | South Gunnawark | Pullus | 11.5 | Sandeel |
| 3 | 06.07 | Skank | Pullus | 5.5 | Sandeel |
| 4 | 07.07 | South Mila Hesslands | Pullus | 12.1 | Sandeel |
| 5 | 07.07 | South Mila Hesslands | Pullus | 10.2 | Sandeel |
| 6 | 07.07 | South Mila Hesslands | Pullus | 2.2 | Sandeel |
| 7 | 07.07 | South Mila Hesslands | Pullus | 5.8 | Sandeel |
| 8 | 07.07 | South Mila Hesslands | Adult | 11.8 | Sandeel |
| 9 | 07.07 | South Mila Hesslands | Adult | 7.1 | Sandeel |
| 10 | 07.07 | South Mila Hesslands | Adult | 5.5 | Sandeel |
| 11 | 07.07 | South Mila Hesslands | Adult | 13.4 | Sandeel |
| 12 | 07.07 | South Mila Hesslands | Adult | 34.5 | Sandeel |
| 13 | 07.07 | South Mila Hesslands | Adult | 33.6 | Sandeel, Gadidae |
| 14 | 12.07 | Goorn | Pullus | 1.1 | Sandeel |
| 15 | 12.07 | Goorn | Pullus | 8.4 | Sandeel |
| 16 | 12.07 | Goorn | Pullus | 22.8 | Sandeel |
| 17 | 12.07 | Goorn | Pullus | 3.6 | Sandeel |
| 18 | 12.07 | Goorn | Adult | 30.3 | Sandeel, Gadidae |
| 19 | 12.07 | Goorn | Adult | 21.9 | Gadidae, Sandeel |
| 20 | 12.07 | Goorn | Adult | 27.8 | Gadidae |
| 21 | 12.07 | Goorn | Adult | 28.8 | Sandeel |
| 22 | 12.07 | Goorn | Adult | 20.0 | Sandeel |
| 23 | 12.07 | Goorn | Adult | 6.2 | Sandeel |
| 24 | 12.07 | Goorn | Adult | 10.5 | Sandeel |
| 25 | 15.07 | South Gunnawark | Adult | 4.5 | Gadidae |
| 26 | 19.07 | Lericum | Pullus | 5.0 | Unidentified |

Number of samples: 26

Mean load weight = 13.60 g, \pm 1.94 (SE); n=26
 (pulli only) = 8.15 g, \pm 1.70 (SE); n=12
 (adults only) = 18.26 g, \pm 2.95 (SE); n=14

| Load composition: | Species | % of loads of which principal constituent |
|-------------------|--------------|---|
| | Sandeel | 22/26 = 84.6% |
| | Juv. Gadidae | 3/26 = 11.6% |
| | Unidentified | 1/26 = 3.8% |

Table A3.3. Common guillemot food samples, 2000.

| Sample no. | Date | Site | Weight (g) | Length (mm) | Principal constituents |
|------------|-------|-------------------|------------|-------------|------------------------|
| 1 | 14.06 | Easter Lothar | 3.5 | 106 | Sandeel |
| 2 | 21.06 | Kuthin | 10.4 | 148 | Sandeel |
| 3 | 21.06 | Kuthin | 5.4 | 122 | Sandeel |
| 4 | 21.06 | Kuthin | 9.3 | 155 | Sandeel |
| 5 | 23.06 | Wester Lothar | 21.9 | 143 | Norway pout |
| 6 | 04.07 | South Naaversgill | 4.7 | 117 | Sandeel |
| 7 | 04.07 | South Naaversgill | 13.0 | 126 | Norway pout |
| 8 | 04.07 | Easter Lothar | 11.4 | 117 | Sprat |
| 9 | 04.07 | Lericum | 17.7 | 133 | Norway pout |
| 10 | 04.07 | Lericum | 10.0 | 143 | Sandeel |
| 11 | 04.07 | Lericum | 5.0 | 119 | Sandeel |
| 12 | 04.07 | Lericum | 1.6 | 79 | Sandeel |
| 13 | 04.07 | Lericum | 1.9 | 82 | Sandeel |
| 14 | 04.07 | Lericum | 1.6 | 79 | Sandeel |
| 15 | 04.07 | Lericum | 1.7 | 81 | Sandeel |
| 16 | 04.07 | Lericum | 2.3 | 85 | Sandeel |
| 17 | 04.07 | Lericum | 0.9 | 65 | Sandeel |
| 18 | 04.07 | Lericum | 1.6 | 83 | Sandeel |
| 19 | 04.07 | Lericum | 1.4 | 78 | Sandeel |
| 20 | 04.07 | Lericum | 1.3 | 75 | Sandeel |
| 21 | 04.07 | Lericum | 1.3 | 75 | Sandeel |
| 22 | 04.07 | Lericum | 1.0 | 70 | Sandeel |
| 23 | 04.07 | Lericum | 1.5 | 84 | Sandeel |
| 24 | 04.07 | Lericum | 2.3 | 87 | Sandeel |
| 25 | 04.07 | Lericum | 3.1 | 100 | Sandeel |
| 26 | 04.07 | Lericum | 1.6 | 80 | Sandeel |
| 27 | 11.07 | Wester Lothar | 17.5 | 144 | Norway pout |

Number of samples: 27

Mean weight (all samples) = 5.74g \pm 1.14 (SE); n=27

% Sandeel = 81.5%

Mean length (sandeels) = 96.1 mm

Table A3.4. Razorbill food samples, 2000.

| Sample no. | Date | Site | Weight (g) | Length (mm) | Principal constituents |
|------------|-------|-------------------|------------|-------------|------------------------|
| 1 | 18.06 | South Naaversgill | 4.0 | 113 | Sandeel |
| | " | " | 4.5 | 116 | Sandeel |
| 2 | 20.06 | North Gunnawark | 5.5 | 120 | Sandeel |
| 3 | 20.06 | North Gunnawark | 7.0 | 129 | Sandeel |
| 4 | 23.06 | Easter Lother | 4.8 | - | Sandeel |
| 5 | 04.07 | South Naaversgill | 13.6 | 154 | Sandeel |
| 6 | 04.07 | South Naaversgill | 0.7 | 77 | Sandeel |
| 7 | 04.07 | South Naaversgill | 0.9 | 76 | Sandeel |
| | " | " | 0.5 | 56 | Sandeel |
| | " | " | 1.2 | 76 | Sandeel |
| 8 | 04.07 | Lericum | 2.6 | - | Gadidae |
| 9 | 04.07 | Lericum | 0.5 | 68 | Sandeel |
| 10 | 04.07 | Easter Lother | 0.5 | 60 | Sandeel |
| 11 | 04.07 | Easter Lother | 0.8 | 78 | Sandeel |
| | " | " | 0.4 | 61 | Sandeel |
| | " | " | 0.4 | 65 | Sandeel |
| | " | " | 0.5 | 66 | Sandeel |

Number of samples: 11

Mean load weight = $4.4 \text{ g} \pm 1.16 \text{ (SE)}$; n=11

Mean length of sandeels = $87.7 \text{ mm} \pm 7.9 \text{ (SE)}$; n=15

Note: Each figure refers to one fish; samples 1 and 7 contained more than one fish

Table A3.5. Atlantic puffin food samples, 2000.

No. of samples 38
 Dates collected 22 June & 09 July
 Mean load weight $6.07 \text{ g} \pm 0.55 \text{ (SE)}$

| Species composition | No. | Mean length (mm) \pm SE | % by no. |
|---------------------|-----|---------------------------|----------|
| Sandeel (all) | 224 | 71.5 ± 0.5 (n=224) | 97.0% |
| Sandeel (< 100mm) | 222 | 71.1 ± 0.4 (n=222) | 96.1% |
| Sandeel (> 100mm) | 2 | 121.5 | 0.9% |
| Gadidae | 2 | 49.0 | 0.9% |
| Sprat | 5 | 52.2 ± 2.4 (n=5) | 2.1% |

Table A3.6. Summary of Atlantic puffin feeding watch 8 July 2000, 03.00 - 23.00 hrs.

| Burrow no. | No. feeds | Sandeel | Gadoid | Sprat | Unidentified |
|-------------------|------------------|----------------|---------------|--------------|---------------------|
| 1 | 7 | 7 | - | - | - |
| 2 | 7 | 7 | - | - | - |
| 3 | 6 | 5 | - | - | 1 |
| 4 | 6 | 6 | - | - | - |
| 5 | 6 | 4 | - | - | 2 |
| 6 | 6 | 6 | - | - | - |
| 7 | 3 | 2 | - | - | 1 |
| 8 | 1 | - | - | - | 1 |
| 9 | 8 | 6 | - | - | 2 |
| 10 | 11 | 9 | - | - | 2 |
| 11 | 10 | 6 | 1 | 1 | 2 |
| 12 | 9 | 9 | - | - | - |
| 13 | 8 | 8 | - | - | - |
| 14 | 1 | - | - | - | 1 |
| 15 | 3 | 3 | - | - | - |
| 16 | 7 | 6 | - | - | 1 |
| 17 | 9 | 7 | - | 1 | 1 |
| 18 | 3 | 3 | - | - | - |
| 19 | 5 | 4 | - | - | 1 |
| 20 | 6 | 6 | - | - | - |
| 21 | 2 | 1 | - | - | 1 |
| 22 | 6 | 6 | - | - | - |
| 23 | 4 | 3 | - | - | 1 |
| 24 | 2 | 1 | - | - | 1 |
| 25 | 9 | 9 | - | - | - |
| 26 | 6 | 5 | - | - | 1 |
| 27 | 5 | 2 | - | - | 3 |
| 28 | 2 | 1 | - | - | 1 |
| 29 | 4 | 3 | - | - | 1 |
| 30 | 2 | 2 | - | - | - |
| 31 | 3 | 3 | - | - | - |
| 32 | 2 | 1 | - | - | 1 |
| 33 | 7 | 7 | - | - | - |
| 34 | 3 | 2 | - | - | 1 |
| 35 | 1 | 1 | - | - | - |
| Total | 180 | 151 | 1 | 2 | 27 |

Average no. feeds per burrow per day = 5.1

Of those specifically identified, 98.7% was sandeel

APPENDIX 4: Weights and wing-lengths of chicks in 2000.

Table A4.1. Northern fulmar: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 11.07 | 48 | 350 | 27.07 | 104 | 560 |
| 22.07 | 59 | 360 | 27.07 | 66 | 420 |
| 22.07 | 75 | 640 | 27.07 | 121 | 830 |
| 22.07 | 90 | 630 | 27.07 | 180 | 810 |
| 22.07 | 90 | 550 | 27.07 | 95 | 850 |
| 22.07 | 78 | 500 | 27.07 | 141 | 1010 |
| 22.07 | 70 | 430 | 27.07 | 78 | 500 |
| 22.07 | 65 | 390 | 27.07 | 70 | 430 |
| 22.07 | 64 | 460 | 27.07 | 65 | 390 |
| 22.07 | 95 | 495 | 27.07 | 64 | 460 |
| 22.07 | 66 | 420 | 27.07 | 95 | 495 |
| 22.07 | 70 | 440 | 27.07 | 66 | 420 |
| 22.07 | 66 | 420 | 27.07 | 70 | 440 |
| 22.07 | 82 | 720 | 27.07 | 66 | 420 |
| 22.07 | 85 | 540 | 27.07 | 82 | 720 |
| 22.07 | 90 | 530 | 27.07 | 85 | 540 |
| 22.07 | 50 | 330 | 27.07 | 90 | 530 |
| 22.07 | 104 | 560 | 27.07 | 50 | 330 |

Table A4.2. European shag chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Brood Size | Date | Wing (mm) | Weight (g) | Brood Size |
|-------|-----------|------------|------------|-------|-----------|------------|------------|
| 14.06 | 132 | 1380 | 1 | 26.06 | 154 | 1525 | unknown |
| 16.06 | 61 | 660 | 3 | 24.06 | 145 | 1760 | unknown |
| 16.06 | 61 | 690 | 3 | 26.06 | 105 | 1500 | unknown |
| 16.06 | 62 | 650 | 3 | 26.06 | 120 | 1100 | unknown |
| 16.06 | 94 | 1000 | 2 | 26.06 | 132 | 1400 | unknown |
| 16.06 | 81 | 740 | 2 | 26.06 | 87 | 920 | unknown |
| 16.06 | 159 | 1460 | 2 | 26.06 | 135 | 1500 | unknown |
| 16.06 | 161 | 1460 | 2 | 28.06 | 82 | 900 | 3 |
| 16.06 | 184 | 1410 | 3 | 28.06 | 70 | 725 | 3 |
| 16.06 | 159 | 1440 | 3 | 28.06 | 103 | 1000 | 3 |
| 16.06 | 152 | 1440 | 3 | 28.06 | 230 | 1850 | 1 |
| 16.06 | 110 | 1010 | 1 | 04.07 | 137 | 1440 | unknown |
| 17.06 | 95 | 1090 | 2 | 04.07 | 75 | 850 | 3 |
| 17.06 | 59 | 635 | 2 | 04.07 | 88 | 915 | 3 |
| 19.06 | 79 | 750 | 3 | 04.07 | 90 | 970 | 3 |
| 19.06 | 79 | 850 | 3 | 04.07 | 110 | 1000 | 2 |
| 19.06 | 63 | 710 | 3 | 04.07 | 115 | 1300 | 2 |
| 23.06 | 190 | 1710 | unknown | 04.07 | 65 | 700 | 3 |
| 26.06 | 92 | 1100 | unknown | 04.07 | 70 | 800 | 3 |
| 26.06 | 96 | 975 | 3 | 04.07 | 80 | 770 | 3 |
| 26.06 | 94 | 820 | 3 | 04.07 | 100 | 1140 | 1 |
| 26.06 | 97 | 800 | 3 | | | | |

Table A4.3a. Arctic skua: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Brood Size |
|-------|-----------|------------|------------|
| 26.06 | 43 | 105 | unknown |
| 26.06 | 124 | 290 | unknown |
| 02.07 | 161 | 360 | 2 |
| 02.07 | 177 | 380 | 2 |
| 05.07 | 166 | 400 | unknown |
| 05.07 | 76 | 180 | unknown |
| 05.07 | 174 | 340 | 2 |
| 05.07 | 160 | 340 | 2 |
| 05.07 | 160 | 310 | unknown |
| 05.07 | 238 | 375 | 2 |
| 05.07 | 153 | 250 | 1 |
| 05.07 | 185 | 310 | 1 |
| 05.07 | 192 | 340 | unknown |
| 05.07 | 165 | 345 | 2 |
| 05.07 | 167 | 290 | 2 |
| 05.07 | 170 | 350 | unknown |
| 06.07 | 198 | 375 | unknown |
| 06.07 | 175 | 250 | 2 |
| 06.07 | 208 | 400 | 2 |
| 06.07 | 225 | 375 | unknown |
| 06.07 | 159 | 270 | unknown |
| 06.07 | 105 | 230 | 2 |
| 06.07 | 145 | 325 | 2 |
| 06.07 | 179 | 340 | 2 |
| 06.07 | 153 | 310 | 2 |
| 06.07 | 169 | 355 | 2 |
| 06.07 | 201 | 440 | 2 |
| 06.07 | 211 | 430 | unknown |
| 06.07 | 183 | 380 | unknown |
| 06.07 | 171 | 295 | unknown |
| 10.07 | 239 | 410 | unknown |
| 10.07 | 150 | 340 | unknown |
| 10.07 | 169 | 370 | unknown |
| 10.07 | 50 | 135 | unknown |
| 10.07 | 154 | 325 | unknown |
| 10.07 | 247 | 450 | unknown |
| 10.07 | 201 | 370 | unknown |
| 11.07 | 150 | 345 | 2 |
| 11.07 | 134 | 325 | 2 |
| 17.07 | 245 | 460 | unknown |
| 17.07 | 36 | 83 | unknown |
| 17.07 | 203 | 460 | unknown |
| 18.07 | 123 | 280 | unknown |
| 18.07 | 233 | 390 | unknown |
| 18.07 | 151 | 320 | unknown |
| 22.07 | 155 | 293 | unknown |

Table A4.3b. Arctic skua: chicks weighed and measured twice.

| Date i | Wing (mm) | Weight (g) | Brood size | Date ii | Wing (mm) | Weight (g) |
|--------|-----------|------------|------------|---------|-----------|------------|
| 02.07 | 120 | 250 | 2 | 10.07 | 191 | 355 |
| 05.07 | 178 | 330 | 1? | 10.07 | 209 | 355 |
| 10.07 | 195 | 400 | 1? | 17.07 | 236 | 420 |

Table A4.4a. Great skua: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Brood size |
|-------|-----------|------------|------------|
| 05.07 | 100 | 550 | 2 |
| 05.07 | 64 | 415 | 2 |
| 05.07 | 137 | 800 | 1? |
| 05.07 | 176 | 960 | 1? |
| 05.07 | 85 | 500 | 1? |
| 05.07 | 93 | 710 | 1? |
| 05.07 | 92 | 520 | 1? |
| 05.07 | 105 | 690 | 1? |
| 05.07 | 101 | 650 | 2 |
| 05.07 | 109 | 675 | 2 |
| 05.07 | 135 | 870 | 1? |
| 05.07 | 115 | 730 | 1? |
| 05.07 | 85 | 570 | 1? |
| 05.07 | 80 | 500 | 2 |
| 05.07 | 64 | 480 | 2 |
| 05.07 | 108 | 620 | 2 |
| 05.07 | 114 | 690 | 2 |
| 05.07 | 52 | 390 | 1? |
| 05.07 | 58 | 445 | 1? |
| 05.07 | 142 | 840 | 1? |
| 05.07 | 109 | 745 | 1? |
| 05.07 | 86 | 630 | 2 |
| 05.07 | 120 | 650 | 1? |
| 05.07 | 67 | 460 | 1? |
| 05.07 | 90 | 500 | 2 |
| 05.07 | 75 | 450 | 2 |
| 05.07 | 129 | 770 | 1? |
| 05.07 | 158 | 880 | 1? |
| 05.07 | 123 | 750 | 1? |
| 05.07 | 68 | 420 | 2 |
| 05.07 | 50 | 330 | 2 |
| 05.07 | 102 | 670 | 1? |
| 05.07 | 137 | 720 | 1? |
| 05.07 | 84 | 660 | 1? |
| 05.07 | 135 | 760 | 1? |
| 06.07 | 76 | 440 | 1? |
| 06.07 | 40 | 240 | 1? |
| 06.07 | 41 | 260 | 1? |
| 06.07 | 97 | 620 | 1? |
| 06.07 | 78 | 540 | 1? |
| 06.07 | 97 | 660 | 1? |
| 06.07 | 104 | 610 | 1? |
| 06.07 | 113 | 720 | 1? |
| 06.07 | 51 | 420 | 1? |
| 06.07 | 57 | 390 | 1? |
| 06.07 | 87 | 500 | 1? |
| 06.07 | 73 | 500 | 2 |
| 06.07 | 64 | 400 | 2 |
| 06.07 | 75 | 500 | 1? |
| 06.07 | 104 | 600 | 1? |
| 06.07 | 52 | 420 | 1? |
| 06.07 | 71 | 600 | 1? |
| 06.07 | 108 | 715 | 1? |
| 06.07 | 44 | 320 | 1? |
| 06.07 | 125 | 780 | 1? |
| 06.07 | 77 | 545 | 1? |
| 06.07 | 63 | 505 | 1? |
| 06.07 | 155 | 865 | 2 |

| Date | Wing (mm) | Weight (g) | Brood size |
|-------|-----------|------------|------------|
| 06.07 | 177 | 990 | 2 |
| 06.07 | 115 | 705 | 2 |
| 06.07 | 119 | 690 | 2 |
| 06.07 | 70 | 450 | 1? |
| 06.07 | 40 | 200 | 2 |
| 06.07 | 50 | 360 | 2 |
| 06.07 | 120 | 680 | 2 |
| 06.07 | 146 | 700 | 1? |
| 06.07 | 45 | 275 | 1? |
| 06.07 | 142 | 390 | 1? |
| 06.07 | 56 | 370 | 1? |
| 06.07 | 142 | 810 | 1? |
| 06.07 | 165 | 875 | 1? |
| 06.07 | 112 | 580 | 1? |
| 06.07 | 116 | 710 | 1? |
| 06.07 | 139 | 705 | 1? |
| 06.07 | 85 | 590 | 1? |
| 06.07 | 49 | 380 | 1? |
| 06.07 | 79 | 515 | 1? |
| 06.07 | 227 | 1200 | 1? |
| 06.07 | 158 | 800 | 1? |
| 06.07 | 157 | 880 | 2 |
| 06.07 | 167 | 990 | 2 |
| 06.07 | 60 | 420 | 1? |
| 06.07 | 96 | 600 | 1? |
| 06.07 | 111 | 660 | 1? |
| 06.07 | 170 | 940 | 1? |
| 06.07 | 147 | 780 | 1? |
| 06.07 | 52 | 350 | 2 |
| 06.07 | 55 | 450 | 2 |
| 10.07 | 97 | 600 | 1? |
| 10.07 | 172 | 1000 | 1? |
| 10.07 | 150 | 910 | 1? |
| 10.07 | 170 | 925 | 1? |
| 10.07 | 169 | 950 | 1? |
| 10.07 | 95 | 660 | 1? |
| 10.07 | 47 | 300 | 1? |
| 10.07 | 173 | 1010 | 1? |
| 10.07 | 129 | 770 | 1? |
| 10.07 | 107 | 730 | 1? |
| 10.07 | 75 | 540 | 1? |
| 10.07 | 138 | 850 | 1? |
| 10.07 | 98 | 620 | 1? |
| 10.07 | 210 | 1100 | 2 |
| 10.07 | 111 | 490 | 1? |
| 10.07 | 154 | 800 | 1? |
| 10.07 | 174 | 750 | 1? |
| 10.07 | 192 | 860 | 1? |
| 10.07 | 40 | 260 | 2 |
| 10.07 | 40 | 320 | 2 |
| 18.07 | 215 | 820 | 1? |
| 18.07 | 190 | 1100 | 1? |
| 18.07 | 229 | 1070 | 1? |
| 18.07 | 52 | 400 | 1? |
| 18.07 | 240 | 1200 | 1? |
| 18.07 | 167 | 820 | 1? |
| 18.07 | 285 | 1150 | 1? |
| 18.07 | 220 | 1250 | 1? |

Table A4.4b. Great skua: chicks weighed and measured twice.

| Date i | Wing (mm) | Weight (g) | Brood Size | Date ii | Wing (mm) | Weight (g) |
|---------------|------------------|-------------------|-------------------|----------------|------------------|-------------------|
| 05.07 | 64 | 480 | 2 | 10.07 | 80 | 600 |
| 05.07 | 99 | 670 | 2 | 10.07 | 162 | 950 |
| 05.07 | 66 | 460 | 1? | 10.07 | 112 | 600 |
| 05.07 | 88 | 625 | 1? | 10.07 | 150 | 850 |
| 05.07 | 86 | 640 | 2 | 17.07 | 203 | 860 |
| 05.07 | 83 | 550 | 1? | 10.07 | 114 | 780 |
| 05.07 | 70 | 400 | 1? | 10.07 | 100 | 640 |
| 05.07 | 107 | 660 | 2 | 10.07 | 142 | 925 |
| 06.07 | 142 | 800 | 1? | 10.07 | 170 | 950 |
| 06.07 | 65 | 420 | 1? | 18.07 | 165 | 820 |
| 06.07 | 50 | 350 | 1? | 18.07 | 145 | 875 |
| 06.07 | 113 | 620 | 1? | 18.07 | 224 | 920 |
| 06.07 | 227 | 1030 | 1? | 18.07 | 302 | 1170 |
| 10.07 | 200 | 950 | 2 | 18.07 | 260 | 1150 |

Table A4.5. Herring gull: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------------|------------------|-------------------|-------------|------------------|-------------------|
| 29.06 | 215 | 790 | 08.07 | 230 | 800 |
| 29.06 | 214 | 715 | 09.07 | 188 | 830 |
| 29.06 | 165 | 770 | 09.07 | 235 | 900 |
| 29.06 | 233 | 910 | 09.07 | 215 | 700 |
| 29.06 | 235 | 980 | 13.07 | 172 | 660 |
| 29.06 | 196 | 705 | 13.07 | 100 | 470 |
| 29.06 | 197 | 715 | 13.07 | 317 | 1050 |
| 29.06 | 149 | 845 | 13.07 | 168 | 600 |
| 29.06 | 211 | 950 | 13.07 | 118 | 450 |
| 29.06 | 169 | 760 | 13.07 | 330 | 990 |
| 29.06 | 144 | 740 | 13.07 | 260 | 900 |
| 29.06 | 195 | 740 | 13.07 | 273 | 1100 |
| 29.06 | 146 | 680 | 13.07 | 306 | 950 |
| 29.06 | 194 | 740 | 08.07 | 230 | 750 |
| 04.07 | 246 | 750 | 08.07 | 81 | 550 |
| 04.07 | 234 | 750 | 08.07 | 274 | 1050 |
| 04.07 | 231 | 700 | 08.07 | 219 | 850 |
| 08.07 | 230 | 770 | 08.07 | 221 | 920 |

Table A4.6. Lesser black-backed gull: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 09.07 | 251 | 900 | 09.07 | 215 | 800 |
| 09.07 | 248 | 875 | 09.07 | 140 | 550 |
| 09.07 | 252 | 980 | 09.07 | 130 | 500 |
| 09.07 | 215 | 800 | 09.07 | 187 | 650 |
| 09.07 | 221 | 850 | 09.07 | 201 | 620 |

Table A4.7. Black-legged kittiwake: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Brood size | Date | Wing (mm) | Weight (g) | Brood size |
|-------|-----------|------------|------------|-------|-----------|------------|------------|
| 06.07 | 119 | 345 | 1 | 07.07 | 130 | 290 | 1 |
| 06.07 | 152 | 330 | 2 | 07.07 | 207 | 300 | 3 |
| 06.07 | 199 | 215 | 2 | 07.07 | 195 | 380 | 3 |
| 07.07 | 100 | 240 | 1 | 07.07 | 210 | 360 | 3 |
| 07.07 | 173 | 430 | 2 | 07.07 | 228 | 320 | 1 |
| 07.07 | 173 | 430 | 2 | 07.07 | 97 | 220 | 1 |
| 07.07 | 93 | 405 | 1 | 07.07 | 188 | 380 | 2 |
| 07.07 | 197 | 380 | 2 | 07.07 | 170 | 330 | 2 |
| 07.07 | 189 | 370 | 2 | 07.07 | 175 | 340 | 2 |
| 07.07 | 141 | 340 | 1 | 07.07 | 185 | 350 | 2 |
| 07.07 | 202 | 485 | 2 | 07.07 | 152 | 320 | 2 |
| 07.07 | 213 | 410 | 2 | 07.07 | 131 | 320 | 2 |
| 07.07 | 128 | 380 | 2 | 07.07 | 163 | 320 | 1 |
| 07.07 | 173 | 410 | 2 | 07.07 | 152 | 360 | 2 |
| 07.07 | 128 | 320 | 1 | 07.07 | 144 | 320 | 2 |
| 07.07 | 152 | 340 | 2 | 07.07 | 133 | 320 | 1 |
| 07.07 | 148 | 300 | 2 | | | | |

Table A4.8a. Arctic tern: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------------|------------------|-------------------|-------------|------------------|-------------------|
| 24.06 | 57 | 60 | 27.06 | 124 | 111 |
| 24.06 | 81 | 82 | 27.06 | 123 | 90 |
| 24.06 | 70 | 78 | 27.06 | 118 | 92 |
| 24.06 | 83 | 84 | 27.06 | 132 | 99 |
| 24.06 | 53 | 69 | 27.06 | 119 | 103 |
| 24.06 | 90 | 91 | 27.06 | 90 | 86 |
| 24.06 | 97 | 97 | 27.06 | 77 | 77 |
| 24.06 | 84 | 92 | 27.06 | 62 | 70 |
| 24.06 | 76 | 80 | 27.06 | 112 | 99 |
| 24.06 | 65 | 81 | 27.06 | 89 | 74 |
| 24.06 | 50 | 64 | 27.06 | 93 | 80 |
| 24.06 | 65 | 68 | 27.06 | 87 | 86 |
| 24.06 | 108 | 103 | 27.06 | 115 | 106 |
| 24.06 | 68 | 74 | 27.06 | 97 | 100 |
| 24.06 | 62 | 69 | 27.06 | 78 | 74 |
| 24.06 | 32 | 55 | 27.06 | 81 | 77 |
| 24.06 | 49 | 61 | 27.06 | 105 | 105 |
| 24.06 | 34 | 47 | 04.07 | 103 | 80 |
| 24.06 | 111 | 110 | 04.07 | 138 | 95 |
| 26.06 | 111 | 101 | 04.07 | 166 | 120 |
| 26.06 | 127 | 105 | 04.07 | 96 | 93 |
| 26.06 | 97 | 85 | 04.07 | 167 | 110 |
| 26.06 | 80 | 79 | 04.07 | 150 | 100 |
| 26.06 | 122 | 104 | 04.07 | 160 | 120 |
| 26.06 | 78 | 76 | 04.07 | 102 | 65 |
| 26.06 | 101 | 99 | 04.07 | 167 | 105 |
| 26.06 | 80 | 74 | 04.07 | 153 | 103 |
| 26.06 | 100 | 92 | 04.07 | 160 | 100 |
| 26.06 | 100 | 99 | 04.07 | 166 | 120 |
| 27.06 | 110 | 107 | 04.07 | 135 | 105 |
| 27.06 | 111 | 120 | 04.07 | 170 | 105 |
| 27.06 | 111 | 106 | 17.07 | 147 | 111 |
| 27.06 | 100 | 97 | 17.07 | 138 | 99 |
| 27.06 | 114 | 112 | 17.07 | 120 | 99 |
| 27.06 | 120 | 106 | 17.07 | 172 | 109 |
| 27.06 | 100 | 92 | 17.07 | 102 | 96 |
| 27.06 | 102 | 103 | 17.07 | 120 | 114 |
| 27.06 | 68 | 71 | 17.07 | 166 | 112 |
| 27.06 | 92 | 92 | 17.07 | 132 | 106 |
| 27.06 | 103 | 94 | 17.07 | 138 | 112 |
| 27.06 | 124 | 100 | 17.07 | 134 | 117 |

Table A4.8b. Arctic tern: chicks weighed and measured twice.

| Date i | Wing (mm) | Weight (g) | Date ii | Wing (mm) | Weight (g) |
|---------------|------------------|-------------------|----------------|------------------|-------------------|
| 24.06 | 57 | 72 | 04.07 | 92 | 153 |
| 27.06 | 109 | 86 | 02.07 | 133 | 71 |
| 27.06 | 85 | 89 | 02.07 | 128 | 100 |
| 27.06 | 103 | 105 | 02.07 | 144 | 95 |
| 27.06 | 135 | 107 | 02.07 | 160 | 90 |
| 27.06 | 109 | 95 | 02.07 | 144 | 91 |
| 27.06 | 113 | 98 | 02.07 | 139 | 80 |
| 27.06 | 82 | 86 | 02.07 | 127 | 95 |
| 27.06 | 72 | 72 | 02.07 | 116 | 92 |
| 28.06 | 100 | 94 | 04.07 | 151 | 110 |

Table A4.9 Common guillemot: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------------|------------------|-------------------|-------------|------------------|-------------------|
| 14.06 | 38 | 190 | 18.06 | 45 | 265 |
| 14.06 | 55 | 295 | 18.06 | 47 | 260 |
| 14.06 | 44 | 260 | 18.06 | 40 | 235 |
| 16.06 | 42 | 210 | 18.06 | 38 | 215 |
| 16.06 | 42 | 230 | 18.06 | 59 | 240 |
| 16.06 | 48 | 225 | 18.06 | 53 | 240 |
| 16.06 | 66 | 250 | 18.06 | 55 | 220 |
| 16.06 | 55 | 250 | 18.06 | 46 | 280 |
| 16.06 | 47 | 195 | 18.06 | 60 | 285 |
| 16.06 | 38 | 220 | 18.06 | 45 | 250 |
| 16.06 | 58 | 285 | 18.06 | 28 | 145 |
| 16.06 | 41 | 190 | 18.06 | 40 | 185 |
| 16.06 | 72 | 260 | 18.06 | 53 | 235 |
| 16.06 | 48 | 245 | 18.06 | 60 | 230 |
| 18.06 | 40 | 215 | 18.06 | 35 | 170 |
| 18.06 | 45 | 265 | 18.06 | 57 | 220 |
| 18.06 | 57 | 320 | 18.06 | 55 | 220 |
| 18.06 | 45 | 265 | 18.06 | 35 | 190 |
| 18.06 | 58 | 325 | 20.06 | 43 | 225 |

Table A4.10a Razorbill: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 14.06 | 57 | 150 | 23.06 | 69 | 205 |
| 14.06 | 58 | 165 | 23.06 | 42 | 150 |
| 14.06 | 47 | 175 | 23.06 | 57 | 190 |
| 14.06 | 45 | 145 | 23.06 | 60 | 195 |
| 14.06 | 50 | 165 | 23.06 | 49 | 155 |
| 16.06 | 40 | 115 | 23.06 | 82 | 215 |
| 16.06 | 37 | 147 | 23.06 | 70 | 235 |
| 16.06 | 54 | 175 | 23.06 | 76 | 190 |
| 16.06 | 64 | 200 | 23.06 | 74 | 220 |
| 16.06 | 45 | 170 | 23.06 | 62 | 180 |
| 16.06 | 42 | 165 | 23.06 | 76 | 245 |
| 16.06 | 43 | 155 | 23.06 | 61 | 180 |
| 16.06 | 40 | 155 | 23.06 | 67 | 200 |
| 16.06 | 48 | 185 | 23.06 | 68 | 195 |
| 16.06 | 51 | 165 | 23.06 | 73 | 175 |
| 17.06 | 45 | 140 | 23.06 | 70 | 185 |
| 17.06 | 54 | 185 | 23.06 | 62 | 150 |
| 17.06 | 35 | 120 | 23.06 | 68 | 195 |
| 17.06 | 35 | 120 | 23.06 | 60 | 125 |
| 17.06 | 70 | 190 | 28.06 | 70 | 180 |
| 17.06 | 71 | 190 | 29.06 | 67 | 185 |
| 17.06 | 72 | 195 | 29.06 | 69 | 199 |
| 17.06 | 56 | 170 | 29.06 | 75 | 240 |
| 17.06 | 35 | 150 | 29.06 | 50 | 160 |
| 17.06 | 64 | 205 | 29.06 | 72 | 209 |
| 17.06 | 63 | 205 | 29.06 | 70 | 225 |
| 18.06 | 37 | 135 | 04.07 | 52 | 200 |
| 18.06 | 63 | 280 | 04.07 | 60 | 200 |
| 23.06 | 60 | 225 | | | |

Table A4.10b Razorbill: chicks weighed and measured twice.

| Date i | Wing (mm) | Weight (g) | Date ii | Wing (mm) | Weight (g) |
|--------|-----------|------------|---------|-----------|------------|
| 14.06 | 47 | 150 | 23.06 | 79 | 245 |
| 14.06 | 54 | 150 | 23.06 | 78 | 200 |
| 14.06 | 45 | 150 | 23.06 | 73 | 165 |
| 14.06 | 52 | 190 | 23.06 | 82 | 215 |
| 14.06 | 54 | 180 | 23.06 | 75 | 225 |
| 14.06 | 55 | 150 | 23.06 | 81 | 170 |
| 23.06 | 53 | 170 | 29.06 | 74 | 190 |
| 23.06 | 60 | 175 | 29.06 | 81 | 240 |
| 23.06 | 56 | 180 | 29.06 | 78 | 220 |
| 23.06 | 58 | 190 | 29.06 | 78 | 215 |
| 23.06 | 75 | 225 | 29.06 | 88 | 230 |
| 23.06 | 70 | 225 | 29.06 | 87 | 235 |
| 23.06 | 67 | 200 | 29.06 | 81 | 215 |
| 23.06 | 60 | 225 | 29.06 | 79 | 200 |
| 23.06 | 58 | 165 | 29.06 | 76 | 202 |
| 29.06 | 56 | 180 | 04.07 | 72 | 180 |

Table A4.11a. Black guillemot: chicks measured once.

| Date | Wing (mm) | Weight (g) | Brood size |
|-------|-----------|------------|------------|
| 03.07 | 51 | 185 | 2 |
| 03.07 | 42 | 145 | 2 |
| 19.07 | 57 | 230 | 1 |
| 19.07 | 38 | 185 | 1 |
| 19.07 | 79 | 290 | 1 |
| 19.07 | 37 | 105 | 1 |
| 21.07 | 119 | 410 | 2 |
| 21.07 | 33 | 95 | 2 |
| 21.07 | 33 | 95 | 2 |
| 02.08 | 67 | 235 | 2 |
| 02.08 | 38 | 140 | 1 |

Table A4.11b. Black guillemot: chicks measured twice.

| Date i | wing, weight | Date ii | wing, weight |
|--------|--------------|---------|--------------|
| 21.07 | 86, 280 | 02.08 | 125, 435 |
| 21.07 | 79, 275 | 02.08 | 122, 450 |

Table A4.12a. Atlantic puffin: chicks weighed and measured once.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 29.06 | 45 | 160 | 08.07 | 112 | 330 |
| 29.06 | 60 | 244 | 08.07 | 124 | 330 |
| 29.06 | 27 | 80 | 08.07 | 140 | 390 |
| 29.06 | 60 | 205 | 08.07 | 71 | 215 |
| 04.07 | 65 | 250 | 08.07 | 109 | 340 |
| 04.07 | 76 | 315 | 08.07 | 75 | 250 |
| 04.07 | 64 | 240 | 08.07 | 125 | 350 |
| 04.07 | 49 | 180 | 08.07 | 116 | 370 |
| 04.07 | 102 | 300 | 08.07 | 136 | 310 |
| 08.07 | 105 | 310 | 08.07 | 105 | 310 |
| 08.07 | 114 | 330 | 08.07 | 127 | 330 |
| 08.07 | 58 | 175 | 08.07 | 106 | 310 |

Table A4.12b. Atlantic puffin: chicks weighed and measured twice.

| Date i | Wing (mm) | Weight (g) | Date ii | Wing (mm) | Weight (g) |
|--------|-----------|------------|---------|-----------|------------|
| 14.06 | 55 | 190 | 04.07 | 125 | 340 |
| 14.06 | 79 | 295 | 04.07 | 136 | 290 |

APPENDIX 5: Weights and wing-lengths of adults in 2000.

Table A5.1. Northern fulmar

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 04.07 | 315 | 600 | 13.07 | 348 | 800 |
| 04.07 | 340 | 850 | 13.07 | 312 | 850 |
| 11.07 | 335 | 800 | 13.07 | 345 | 950 |
| 11.07 | 328 | 720 | 13.07 | 345 | 1000 |
| 13.07 | 320 | 750 | 15.07 | 340 | 900 |
| 13.07 | 330 | 875 | 15.07 | 335 | 850 |
| 13.07 | 327 | 800 | 15.07 | 325 | 660 |
| 13.07 | 330 | 750 | 15.07 | 325 | 700 |
| 13.07 | 330 | 1040 | 15.07 | 312 | 720 |
| 13.07 | 335 | 1050 | 15.07 | 327 | 780 |
| 13.07 | 347 | 970 | 15.07 | 338 | 850 |
| 13.07 | 315 | 740 | 15.07 | 338 | 960 |
| 13.07 | 325 | 930 | 15.07 | 338 | 1100 |
| 13.07 | 325 | 800 | 15.07 | 335 | 660 |
| 13.07 | 328 | 950 | 15.07 | 336 | 820 |
| 13.07 | 330 | 1150 | 15.07 | 332 | 920 |
| 13.07 | 340 | 900 | 15.07 | 340 | 950 |
| 13.07 | 330 | 1000 | | | |

Table A5.2. Black-legged kittiwake.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 07.07 | 310 | 380 | 12.07 | 295 | 310 |
| 07.07 | 320 | 370 | 12.07 | 303 | 390 |
| 07.07 | 310 | 400 | 12.07 | 300 | 330 |
| 07.07 | 310 | 390 | 12.07 | 302 | 330 |
| 07.07 | 314 | 390 | 12.07 | 310 | 300 |
| 07.07 | 301 | 315 | 12.07 | 307 | 330 |
| 07.07 | 300 | 360 | 12.07 | 300 | 325 |
| 07.07 | 303 | 360 | 12.07 | 301 | 325 |
| 07.07 | 300 | 305 | 12.07 | 297 | 375 |
| 07.07 | 310 | 340 | 12.07 | 300 | 360 |
| 07.07 | 310 | 365 | 12.07 | 313 | 380 |
| 07.07 | 300 | 350 | 12.07 | 302 | 370 |
| 07.07 | 310 | 360 | 12.07 | 303 | 390 |
| 07.07 | 325 | 445 | 12.07 | 301 | 330 |
| 07.07 | 305 | 360 | 15.07 | 317 | 390 |
| 07.07 | 310 | 390 | 15.07 | 310 | 390 |
| 07.07 | 310 | 330 | 15.07 | 305 | 340 |
| 07.07 | 300 | 350 | 15.07 | 310 | 385 |
| 12.07 | 304 | 325 | 15.07 | 299 | 350 |
| 12.07 | 310 | 350 | 15.07 | 304 | 310 |
| 12.07 | 300 | 340 | 15.07 | 301 | 350 |
| 12.07 | 310 | 380 | 15.07 | 304 | 400 |
| 12.07 | 299 | 310 | 15.07 | 300 | 340 |

Table A5.3. Common guillemot.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 16.06 | 210 | 1000 | 04.07 | 204 | 850 |
| 16.06 | 192 | 965 | 04.07 | 197 | 900 |
| 16.06 | 201 | 1025 | 04.07 | 196 | 850 |
| 19.06 | 198 | 1100 | 04.07 | 200 | 950 |
| 19.06 | 208 | 1100 | 04.07 | 200 | 920 |
| 23.06 | 200 | 910 | 04.07 | 213 | 900 |
| 28.06 | 195 | 975 | 04.07 | 218 | 900 |
| 28.06 | 196 | 925 | 04.07 | 200 | 800 |
| 28.06 | 198 | 900 | 04.07 | 205 | 940 |
| 28.06 | 205 | 920 | 04.07 | 192 | 880 |
| 28.06 | 205 | 920 | 04.07 | 197 | 850 |
| 29.06 | 205 | 940 | 04.07 | 185 | 760 |
| 04.07 | 202 | 870 | 04.07 | 195 | 900 |
| 04.07 | 202 | 885 | 04.07 | 198 | 890 |
| 04.07 | 203 | 925 | 04.07 | 199 | 925 |
| 04.07 | 201 | 850 | 04.07 | 198 | 890 |
| 04.07 | 199 | 925 | 04.07 | 210 | 900 |
| 04.07 | 203 | 840 | 04.07 | 200 | 910 |
| 04.07 | 195 | 900 | 04.07 | 203 | 975 |
| 04.07 | 195 | 860 | 04.07 | 203 | 900 |
| 04.07 | 194 | 900 | 04.07 | 196 | 850 |
| 04.07 | 200 | 910 | 04.07 | 199 | 910 |
| 04.07 | 200 | 900 | 04.07 | 205 | 940 |

Table A5.4. Razorbill.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 14.06 | 199 | 650 | 29.06 | 194 | 600 |
| 14.06 | 200 | 660 | 29.06 | 200 | 580 |
| 14.06 | 190 | 565 | 29.06 | 190 | 600 |
| 14.06 | 197 | 600 | 29.06 | 187 | 540 |
| 16.06 | 200 | 665 | 29.06 | 190 | 620 |
| 16.06 | 197 | 645 | 29.06 | 191 | 620 |
| 16.06 | 191 | 615 | 29.06 | 198 | 580 |
| 16.06 | 198 | 615 | 29.06 | 192 | 600 |
| 16.06 | 188 | 590 | 29.06 | 194 | 580 |
| 16.06 | 203 | 640 | 04.07 | 187 | 500 |
| 16.06 | 200 | 565 | 04.07 | 190 | 540 |
| 16.06 | 193 | 600 | 04.07 | 189 | 610 |
| 23.06 | 188 | 570 | 04.07 | 190 | 590 |
| 23.06 | 196 | 585 | 17.06 | 190 | 580 |
| 28.06 | 190 | 650 | 17.06 | 194 | 600 |
| 28.06 | 186 | 520 | 17.06 | 200 | 580 |
| 28.06 | 190 | 570 | 17.06 | 190 | 600 |
| 28.06 | 193 | 650 | 17.06 | 187 | 540 |
| 28.06 | 195 | 570 | 17.06 | 190 | 620 |
| 28.06 | 181 | 600 | 17.06 | 191 | 620 |
| 28.06 | 195 | 620 | 17.06 | 198 | 580 |
| 28.06 | 200 | 620 | 17.06 | 192 | 600 |

Table A5.5. Black guillemot

| Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|
| 25.06 | 159 | 385 |
| 19.07 | 159 | 395 |
| 20.07 | 157 | 420 |

Table A5.6. Atlantic puffin.

| Date | Wing (mm) | Weight (g) | Date | Wing (mm) | Weight (g) |
|-------|-----------|------------|-------|-----------|------------|
| 24.05 | 165 | 450 | 09.07 | 150 | 380 |
| 29.05 | 163 | 445 | 09.07 | 152 | 420 |
| 29.05 | 160 | 385 | 09.07 | 153 | 340 |
| 02.06 | 164 | 370 | 09.07 | 153 | 390 |
| 03.06 | 156 | 380 | 09.07 | 155 | 395 |
| 11.06 | 158 | 410 | 09.07 | 160 | 440 |
| 11.06 | 171 | 420 | 09.07 | 155 | 325 |
| 11.06 | 160 | 415 | 09.07 | 155 | 420 |
| 16.06 | 165 | 450 | 09.07 | 158 | 420 |
| 21.06 | 154 | 385 | 09.07 | 161 | 355 |
| 22.06 | 167 | 390 | 09.07 | 152 | 420 |
| 23.06 | 160 | 460 | 09.07 | 164 | 475 |
| 25.06 | 163 | 420 | 09.07 | 155 | 400 |
| 03.07 | 170 | 400 | 09.07 | 160 | 450 |
| 03.07 | 164 | 390 | 09.07 | 156 | 410 |
| 03.07 | 170 | 410 | 09.07 | 148 | 345 |
| 09.07 | 154 | 420 | 09.07 | 145 | 360 |
| 09.07 | 162 | 375 | 09.07 | 164 | 400 |
| 09.07 | 159 | 440 | 09.07 | 158 | 350 |
| 09.07 | 164 | 420 | 09.07 | 157 | 380 |
| 09.07 | 154 | 345 | 09.07 | 162 | 450 |
| 09.07 | 163 | 410 | 09.07 | 160 | 430 |
| 09.07 | 161 | 360 | 09.07 | 157 | 400 |
| 09.07 | 152 | 370 | 09.07 | 155 | 380 |
| 09.07 | 155 | 390 | 09.07 | 160 | 380 |
| 09.07 | 157 | 380 | 09.07 | 155 | 420 |
| 09.07 | 163 | 380 | 09.07 | 159 | 460 |
| 09.07 | 166 | 400 | 09.07 | 160 | 380 |
| 09.07 | 156 | 360 | 09.07 | 154 | 450 |
| 09.07 | 158 | 400 | 09.07 | 153 | 400 |
| 09.07 | 158 | 390 | 09.07 | 158 | 360 |
| 09.07 | 160 | 390 | 09.07 | 156 | 360 |
| 09.07 | 159 | 440 | 14.07 | 160 | 435 |
| 09.07 | 161 | 390 | 22.07 | 160 | 420 |
| 09.07 | 160 | 430 | 22.07 | 159 | 370 |