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**POPULATION TRENDS OF A GULL
COLONY - ISLE OF MAY**

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Report to Scottish Natural Heritage

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RECOMMENDATIONS

1. ITE should continue (under contract) to make annual counts of gull nests. Eider nests would be counted at the same time.
2. SNH should decide (a) how many gulls can be accommodated on the island, given the various other biota and human activities which use the area, and (b) where these should be. This will need much discussion. Only then can a sensible management strategy be formulated.
3. Much data on gull numbers and population dynamics over the past 10 years have been accumulated by ITE and SNH. These should be incorporated into a model to assess probable future changes in numbers.
4. The annual monitoring of adult survival should cease.
5. Breeding output should be assessed annually.
6. Studies should continue to monitor whether or not the gulls have any detrimental effect on the other breeding seabirds.
7. Until a management policy has been agreed, we suggest that breeding output of gulls breeding in the main colonies on vegetated areas (i.e. mainly lesser black-backed gulls) should be reduced by smashing eggs. This will hopefully reduce recruitment directly and by making the areas less attractive to potential recruits.

SUMMARY

1. In 1994, 2122 herring and 1270 lesser black-backed gulls nests were counted. These figures were similar to the unexpectedly high counts in 1993. They confirm that the population has increased considerably.
2. Annual survival of adult herring and lesser black-backed gulls 1989-94 was estimated at 85.0% and 89.8%, respectively. These figures allow for birds which may have survived and not returned to the island.
3. Many previous breeders still alive failed to breed in 1994. There is potential for the population to increase markedly in the next few years.
4. The total breeding population of herring gulls in the Forth has increased by 22% since 1985. That of the lesser black-backed gull has increased by 72%.
5. Only two gulls previously recorded breeding on the Isle of May were seen on the other islands. Both had been seen on the Isle of May in 1994. There was, therefore, no evidence of experienced adults emigrating.

1 INTRODUCTION

1.1 Following a request for the Isle of May Bird Observatory in the early 1970s, NCC put considerable effort into reducing the numbers of herring gulls *Larus argentatus* and lesser black-backed gulls *L. fuscus* breeding on the Isle of May NNR, Fife during the 1970s and the 1980s. The British populations of both species are now declining and there is a need to obtain up-to-date information on adult survival rates and breeding output and to continue making annual assessments of the numbers of breeding gulls on the Isle of May. Such long-term data are essential for the sensible management of the National Nature Reserve.

1.2 1989 NCC gave ITE a contract to (1) organize an annual count of the gull nests, (2) estimate the annual survival of adult herring and lesser black-backed gulls, (3) ensure that adequate samples of young of both species were ringed, and (4) estimate breeding output. In 1991 this contract was renewed by SNH.

1.3 A sudden and marked increase, 50% in both herring and lesser black-backed gulls, between 1992 and 1993, resulted in populations in excess of those recommended in the current Management Plan. There is potential for a continued increase in gull numbers which could be to the detriment of the vegetation and bird species for which the site qualifies as SPA.

The Management plan will be reviewed in late 1994. As part of this exercise consideration will need to be given as to whether or not a reduction in the number of breeding gulls and/or their productivity will need to be implemented in the future. Such a decision will depend on having access to good quality data on the current population dynamics and on the two gull species both on the Isle of May and neighbouring colonies.

In 1994, SNH placed a contract with ITE to

- (1) Census the breeding population on the Isle of May in 1994.
- (2) Ensure that the gulls breeding at nearby colonies were censused in 1994.
- (3) Determine adult survival rates of the Isle of May gulls up to 1994 and check nearby colonies for "missing" birds.
- (4) Produce a report containing full details of the counts carried out, together with interpretation of the results against the background of similar counts in recent years and a list of potential management options with recommendations.

Modelling of the population, using data collected by ITE both under and outwith SNH/NCC contracts, was outside the scope of this contract but was likely to be covered by a future contract.

1.4 The second author was a SNH summer warden on the Isle of May with responsibility for organising, and part-taking in, the counts and checks of gulls on the other Forth Islands. Various people helped with the counts and they are acknowledged in the notes to the tables.

1.5 For ease of comparison, the layout of the report follows past reports and layouts and numbering of the individual tables follow previous Summer Wardens' Annual reports.

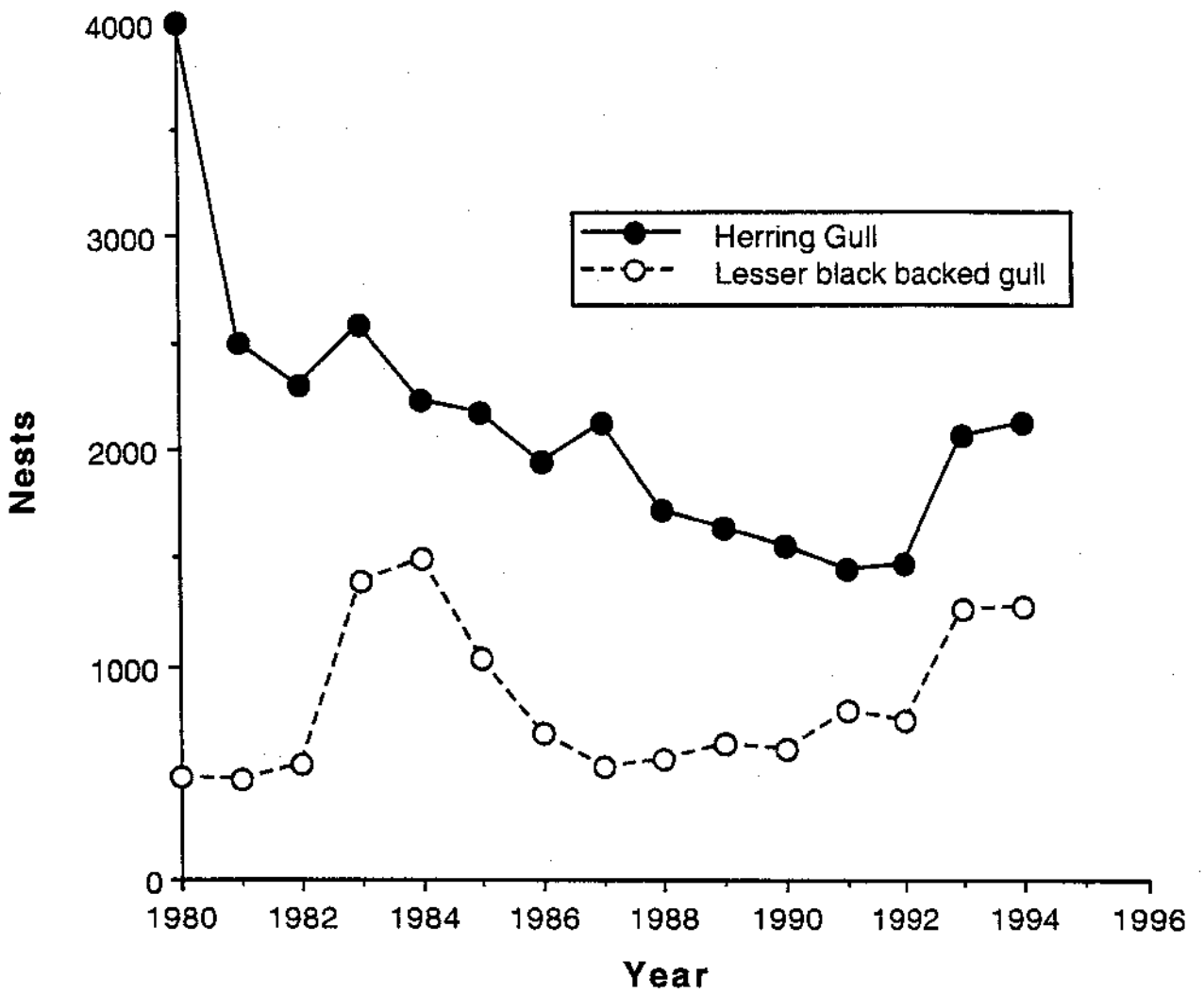


Figure 1. Changes in the numbers of gull nests on the Isle of May 1980-1994.

2 GULLS ON THE ISLE OF MAY

2.1 Gull nest count

The count was carried out on 29-31 May 1994 by a team of people systematically searching the island and recording and marking all clutches and well-formed but empty nests (Table 1). The efficiency of counting was assessed by a single observer visiting an area immediately after the nests there had been counted and recording the proportion of nests and clutches found which has been marked during the count (Table 2). Overall, counting efficiency was 86%.

A total of 2874 nests and clutches were marked and the overall calculated total taking account of those missed was 3392. This calculated total was only slightly in excess of the 1993 estimate (3318).

There was no obvious geographic pattern in the change between 1993 and 1994 (Table 5). However, a marked change in numbers during the last 10 years has occurred on the Maidens - the only area where adults were never culled or eggs smashed. In 1984, there were 208 nests, in 1988 numbers peaked at 295 nests and the annual estimates then declined each year subsequently - 290 in 1989, 261 in 1990, 213 in 1991, 182 in 1992, 183 in 1993; 1994 count was 163 nests.

The proportions of herring and lesser black-backed gulls nesting in each area were assessed by counts of individual gulls visible from vantage points after they had been disturbed (Table 3). About 31% of the individual gulls estimated to be present on the island were checked. Assuming that these herring:lesser black-backed gull ratios were representative, there were 2122 herring gull nests and 1270 lesser black-backed gull nests on the island (Table 4). The comparable 1993 totals were 2059 and 1259 which suggests (a) no change since 1993, and (b) that the unexpectedly high count in 1993 was not an artifact.

2.2 Adult survival

Over the years incubating adults were caught with walk-in traps. Each gull has been given a unique colour-combination which always included a green ring with a large engraved M (as a colony specific ring). Each gull had its overall head-and-bill length measured which enabled it to be sexed after the cumulative frequency distribution curve had been plotted (see Coulson *et al.* *Ibis*, 125, (1983); 549-557). The head-and-bill lengths separating the larger males from the smaller females for herring and lesser black-backed gulls were 120 and 116 mm, respectively. Attempts were made to have about 150 colour-ringed adults in the population at the end of each year.

Colony attendance of each colour-ringed individual was documented throughout the season. Some individuals were seen only very infrequently. Analysis of this data set, and incorporation of sightings in the coming winter will allow the calculation of more accurate survival rates, and also result in recommendations for future work.

Most previous studies including those on the Isle of May in the 1960s and 1970s have found adult survival of the herring gull to be 90% or more. The present findings continue to suggest that adult survival of Isle of May herring gulls has been substantially reduced. There are few previous data on the survival of lesser black-backed gulls.

2.2.1 Herring gull

Of 166 individuals seen on the island in 1993, 136 (81.9%) were recorded in 1994. Every year a few individuals known to be alive, as they are seen in a subsequent year, are not seen. It is impossible to exclude the possibility that they were indeed present and were overlooked but this is unlikely given the intensity of observations, which in 1993 and 1994 were made on a daily basis. Searches for these gulls on the other Forth islands in 1994 failed to locate any missing birds (see later). Thus it appears as though some adults take a year off breeding. In 1994, nine (33%) of 27 birds seen in 1992 but not in 1993 reappeared.

Assuming that the same rate of non-return applied in 1994, then ten (of the 30 missing individuals) should have been still alive. We, therefore, calculate a true survival of 88.0% $((136 + 10)/166)$ between 1993 and 1994. Using this figure, the mean annual survival of Isle of May herring gulls which had bred at least once between 1989 and 1994 was $85.0 \pm \text{SE } 1.5\%$.

2.2.2 Lesser black-backed gull

Of the 178 individual alive in 1993, 148 (83.1%) were seen in 1994. Following the method above, we calculated that seven more were still alive but were either overlooked or had failed to return. The estimated survival was then 87.1% (155/178). Using this figure the mean annual survival of Isle of May adult lesser black-backed gulls over the five years 1989-94 was $89.8 \pm \text{SE } 1.3\%$.

2.3 Nonbreeding

The actual nest count does not allow for the proportion of adult birds taking a year off breeding and so can only give a minimum estimate of the total or potential breeding population. In 1994, 60 out of 150

(40%) individually marked herring gulls probably did not breed - i.e. these birds were never observed attending eggs or young. The figure for lesser black-backed gulls was 71 out of 161 (44%). Comparable figures for 1993, were for herring gulls 33% (of 135 birds) and lesser black-backed gulls 33% (of 139 birds).

Using these estimates of non-breeding (a more detailed analysis will be carried out this coming winter), the populations of potential breeding birds on the Isle of May were

in 1993	6146 herring gulls; 3758 lesser black-backed gulls
in 1994	7073 herring gulls; 4536 lesser black-backed gulls

These represent increases of 15% and 21% for herring and lesser-black gulls respectively.

3.1 Populations estimates in 1994

Systematic counts of gulls nests on other Firth of Forth islands were carried out 25-27 May 1994, using same methods as on the Isle of May (Table 6). Since 1987, the date of the last complete count, the total herring gull nest counts have increased by 22% to 12795, that of lesser black-backed gulls by 72% to 7146. The combined population increased by 36% to 19941 (table 7.)

Fidra, Inchkeith and Inchcolm account for 96% of the herring gull increase. This species' other large colonies, Isle of May and Craigleith, increased relatively little.

All the major lesser black-backed gull colonies have increased substantially, with the curious exception of Craigleith.

3.2 Searches for colour-ringed adults

Some colour-ringed adults were seen only very infrequently on the Isle of May. To assess the possibility that some of these birds, and others, may be present in neighbouring colonies, searches were made at Inchcolm (8 May, 25 May, 10 July), Inchkeith (9 May, 26 May, 7 July), Fidra (11 May, 7 July) Craigleith (11 May, 27 May, 7 July) St Abbs (12 May, 6 July), Coire Odhaine (10 May, 8 July).

Only two birds, both lesser black-backed gulls, from the current colour-ringing scheme were seen - both on Craigleith on 7 July. Both had been seen regularly on the May during 1994, one had laid eggs (and subsequently failed), the other had not bred.

4 BREEDING SUCCESS

This was not part of the contract but data are given here for completeness. Eggs were smashed on North Plateau, South Plateau, Burrian, Colm Hole and south to Kirkhaven. Production figures refer to all other areas.

Totals of 1047 young herring and 218 young lesser black-backed gulls were ringed (Table 8). Virtually all of these were well-grown and most are thought to have fledged. A survey of c. 59% of the total of fledged or nearly fledged young present found that 59% had been ringed (Table 9). This compared with 65%-71% in 1989-93. Assuming that this figure was representative of both species, 1775 young herring and 369 young lesser black-backed gulls are predicted to have fledged in 1994; this is 1.16 and 0.53 chicks/nest, respectively.

The total population of large gulls on the Isle of May (here considered as a single unit) increased rapidly during the 1950s and 1960s to some 17-20,000 nests in 1972. High intensity culling then reduced the population to 3-4,000 pairs in 1980-83 and to 2,500-3,000 in 1986 (when the last major cull occurred). The annual estimate of herring gull nests continued to decrease until 1992 whereas that of the lesser black-backed gull bottomed out in 1987 and increased slightly during the period 1988-92 (Figure 1). The dramatic increase in the number of nests of both species between 1992 and 1993 was, therefore, unexpected. Superficially the population (as measured by nest counts) remained stable between 1993 and 1994. However many more birds survived the 1993-4 winter, returned but failed to breed than had been the case over the 1992-3 winter. Therefore the breeding population has the capacity to increase rapidly again in the near future.

In 1987 there were a estimated 1011 pairs of herring gulls and 4157 pairs of lesser black-backed gulls on the main Forth islands; of these 20% and 12.5% of these, respectively were on the Isle of May. By 1994 the total populations had increased to 12795 and 7146 pairs-increases of 22% and 72% p.a., and the Isle of May held 17% of the herring gulls and 18% of the lesser black-backed gulls in the Forth. Whatever happens to the Isle of May gulls in the near future may have relatively little impact on the population.

Since 1988 some 15,000 young gulls have been reared on the Isle of May, and unknown, but undoubtedly very large numbers, fledged from other colonies in the Firth of Forth. The Isle of May may now be particularly attractive to recruiting gulls which see large numbers of young being reared where there is plenty of room for colony expansion. Thus the population might increase very rapidly.

Table 1. Counts and contents of herring and lesser black-backed gull nests, 29-31 May 1994.

	Empty nest			Eggs			Contents unknown	Total	Counting efficiency %	Total nests present
	1	2	3	2	3					
Mars Rock	2	0	2	10	0	14	0	14	96	15
North Ness to Rocks	11	14	43	209	0	277	0	277	96	289
North Horn to Iron Bridge	8	1	6	22	0	37	0	37	83	45
North Horn	15	7	27	59*	0	108	0	108	83	130
Iron Bridge to Altarstones	4	0	5	21	0	30	0	30	85	35
East Rona	69	47	132	361	0	609	0	609	82	743
Tarbet	9	8	31	86	8	142	8	142	75	189
Low Light to Tarbet	5	8	13	34	0	60	0	60	95	63
Low Light Rocks	9	0	9	19	12	49	12	49	95	52
Cleaver	0	0	0	0	1	1	1	1	100	1
Lady's Bed Stacks	0	0	0	0	6	6	6	6	100	6
South Ness Rocks	6	6	8	15	0	35	0	35	87	40
Ardcarran Rocks	0	0	0	0	15	15	15	15	87	17
Pillow	1	0	1	2	0	4	0	4	100	4
Burrian	18	24	49	76	1	168	1	168	83	202
Altarstones to Horse Hole	2	2	9	15	5	33	5	33	88	38
Colm's Hole	1	1	7	17*	1	27	1	27	88	31
Kettle to Colm's Hole	42	35	121	185*	1	384	1	384	83	463
South Horn Cliffs	0	0	0	0	4	4	4	4	100	4
South Horn	2	0	4	2	0	8	0	8	83	10
Lady's Bed	15	10	32	87	0	144	0	144	87	166
Ardcarran to Kirk Haven	18	15	33	81	31	178	31	178	87	205
Three Tarn Nick-Horse Hole	29	19	77	219	0	344	0	344	82	420

Table 1. contd.

Horse Hole	0	0	1	5	6	12	88	14
Middens	1	0	0	1	0	2	100	2
South Lochside	0	0	0	0	2	2	100	2
Cornerstone to Pilgrims' Haven	0	0	0	0	1	1	100	1
South Plateau Cliffs	1	0	2	5	0	8	100	8
South Plateau	9	2	1	2	0	14	86	16
North Lochside	0	0	0	0	12	12	100	12
Three Tarn Nick to Lochside	1	1	3	0	0	5	100	5
Maidens (Inner)	6	10	18	28	5	67	86	78
(Outer)	5	9	21	20	2	57	86	66
(Sea rocks)	1	3	9	3	0	16	86	19
East Braes	0	0	1	0	0	1	100	1
Totals	290	222	665	1584	113	2874		3392

There were no nests at Clett or Kirk Haven Rocks

Notes: *includes 1 c/4

Counts were made by C. Wernham, J. Calladine, S. Wanless, A. Davis, C. Gallacher and M.A. Fuller

Table 2. Efficiency of counting gull nests during the whole island nest count, 29-31 May 1994.

	Sample checked	No. found to to be marked	%
North Ness	99	95	96
Iron Bridge to North Horn	18	15	83
Iron Bridge to Altarstanes	13	11	85
East Rona	98	82	84
Tarbet	57	43	75
Low Light to Tarbet	20	19	95
Horse Hole - Alterstanes	17	15	88
Kettle to Colm's Hole	114	95	83
Lady's Bed	63	55	87
Ardcarran to Kirk Haven	76	66	87
Three Tarn to Horse Hole	137	112	82
Mean			86

Table 3. Counts of individual herring (HG) and lesser black-backed gulls (LB) on 28 May 1994.

Area	Counted		Total	%	
	HG	LB		HG	LB
North Ness	115	65	180	64	36
Mars Rock	-	-	-	100	0
North Horn	45	45	90	50	50
North Horn to Bridge	25	4	29	86	14
Bridge to Altarstanes	32	1	33	97	3
Rona (east)	206	153	359	57	43
Tarbet	94	9	103	91	9
Tarbet to Low Light	41	10	51	80	20
Altarstanes to Horse Hole	41	0	41	100	0
Burrian	152	74	226	67	33
Colm's Hole	-	-	-	100	0
Kettle-Colm's Hole	144	177	321	45	56
South Horn	9	4	13	69	31
Lady's Bed	58	54	112	52	48
Ardcarran	90	52	142	63	37
North Plateau - North	173	227	400	43	57
North Plateau - South	0	2	2	0	100
Maidens	-	-	-	100	0
Low Light Rocks	45	4	49	92	8

Counts of nests

Mill Door - North side of Loch	18 HG
Lochside - North side	8 HG
Greenface	8 HG
Pillow	

Table 4. Calculated gull nest totals in 1994.

	Total nests		Herring gulls		Calculated nest total	
	present		%		Herring gull	Lesser black-backed gull
Mars Rocks	15		100		15	0
North Ness and Rocks	289		64		185	104
North Horn to Iron Bridge	45		86		39	6
North Horn	130		50		65	65
Iron Bridge to Altarstones	35		97		34	1
East Rona	743		57		424	319
Tarbet	189		91		172	17
Low Light to Tarbet	63		80		50	13
Low Light Rocks	52		92		48	4
Cleaver	1		100		1	0
Lady's Bed Stacks	6		100		6	0
South Ness Rocks	40		100		40	0
Ardcarran Rocks	17		95		16	1
Pillow	4		100		4	0
Burrian	202		67		135	67
Altarstones to Horse Hole	38		100		38	0
Colm's Hole	31		100		31	0
Kettle to Colm's Hole	463		45		208	255
South Horn Cliffs	4		100		4	0
South Horn	10		69		7	3
Lady's Bed	166		52		86	80
Ardcarran to Kirk Haven	205		63		129	76
Three Tarn Nick to Horse Hole	420		43		181	239

Table 4. contd.

Horse Hole	14	100	14	0
Middens	2	100	2	0
North Lochside	2	100	2	0
Cornerstone to Pilgrims'	1	100	1	0
South Plateau Cliffs	8	100	8	0
South Plateau	16	10	2	14
North Lochside	12	100	12	0
Three Tarn to Lochside	5	0	0	5
Maidens (Inner)	78	100	78	0
(Outer)	66	100	66	0
(Searocks)	19	100	19	0
East Braes	1	0	0	1

Totals	3392		2122	1270
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Table 5. Changes in estimated numbers of gull nests in 1993-94. Small areas are excluded.

	1993 estimate	1994 estimate	% change
Kettle to Colm's Hole	358	463	+29
Colm's Hole	34	31	-9
Burrian	234	202	-14
Low Light Rocks	53	52	-2
Low Light to Tarbet	89	63	-29
Tarbet	174	189	+9
East Rona	639	743	+16
North Ness and Mars Rocks	337	304	+10
Three Tarn to Horse Hole	473	420	+11
South Plateau and cliffs	20	24	+20
Lady's Bed and South Ness	201	206	+2
Maidens (all)	183	163	-11
Lochside-Three Tarn Cliffs	32	17	-53
Ardcarran/Kirk Haven	204	205	0
Total (incl. other areas)	3318	3392	+2

Table 6: Summary of gull nest counts on Forth Islands, 25-27 May 1994.

	Clutch size							Counting efficiency % (n)	Total	Head Count n %HG	HG nests	LB
	0	1	2	3	4+	?	total					
Inchcolm												
area 1	53	76	137	275	2	21	564	68 (204)	829	546 37	307	522
2	0	0	2	4	0	0	6	100 (6)	6	0 100	6	0
3	41	117	215	670	5	27	1075	87 (452)	1236	719 53	655	581
4	56	135	248	429	0	23	891	74 (333)	1204	1092 53	638	566
5	0	0	0	0	0	9	9	100 (9)	9	0 100	9	0
total									3284		1615	1669
Craigleith												
area 1	1	35	90	208	0	60	394	79 (206)	499	442 94	469	30
2	11	36	119	406	1	60	633	89 (276)	711	560 59	419	292
3	4	98	136	771	0	214	1223	58 (339)	2109	590 71	1497	612
total									3319		2385	934
Inchkeith												
area 1	62	176	286	767	11	315	1617	85 (357)	1902	1134 59	1122	780
2	44	103	221	562	4	236	1170	86 (410)	1360	1070 63	857	503
3	0	0	0	0	0	240	240	100 (0)	240	160 71	240	0
4	94	0	269	735	3	525	1626	87 (420)	1869	1049 56	1047	822
5	51	114	184	368	5	700	1422	84 (169)	1693	945 73	1236	457
6	6	17	32	110	0	272	437	87 (62)	502	166 91	457	45
7	0	0	0	0	0	18	18	100 (0)	18	0 100	18	0
total									7584		4977	2607
Fidra							1641			70	1149	492
The Lamb							185			70	130	55
Eyebroughy							45			100	45	0
Inchmickery							206	95	216	50	108	108
Inchgarvie							211				210	11

Note: clutch size '?' includes nests with unknown contents and those with young.

Table 7: Herring and Lesser Black-backed Gull population estimates for the Forth Islands in 1987 and 1994.

	HERRING GULL		L.B.B. GULL		COMBINED TOTAL	
	1987	1994 % change	1987	1994 % change	1987	1994 % change
Isle of May	2100	2122 + 1	520	1270 + 144	2620	3392 + 29
Craigeith	2281	2385 + 5	933	934 0	3214	3319 + 3
The Lamb	220	130 - 41	10	55 + 450	230	185 - 20
Fidra	410	1149 + 180	140	492 + 251	550	1641 + 198
Eyebroughy	170	45 - 74	0	0 0	170	45 - 74
Inchkeith	4091	4977 + 22	1753	2607 + 49	5844	7584 + 30
Inchmickery	61	108 + 77	61	108 + 77	122	216 + 77
Inchcolm	1040	1615 + 55	730	1669 + 129	1770	3285 + 86
Carr Craig	{28}	38 {+ 93}	0	0 0	{28}	38 {+ 93}
Haystack	{ }	16 { }	0	0 0	{ }	16 { }
Inchgarvie	110	210 + 91	10	11 + 10	120	221 + 84
Total	10511	12795 + 22	4157	7146 + 72	14668	19941 + 36

Table 8. The numbers of herring and lesser black-backed gulls ringed on the Isle of May in 1994 prior to the 9 August.

	Herring gull	Lesser black-backed gull
North Ness	174	47
North Horn	64	16
Rona	356	102
Altarstones	25	0
Tarbet	75	2
Horse Hole	20	0
Tarbet to Low Light	95	1
Ardcarran	99	11
Lady's Bed and South Ness	99	38
South Horn	4	1
Maidens	38	0
Total	1047	218

Table 9. Proportion of juvenile gulls which had rings at the end of the breeding season in 1994.

Area	No. checked	% with rings
Maidens	18	61
Lady's Bed/South Ness/ Ardearran/Pillow	264	64
Tarbet to Low Light	70	57
Rona and North Ness	210	54
Altarstanes to Horse Hole	8	63
Total	570	59

Notes: No attempt was made to separate the two species
Checks made on 9 August

Table 4. contd.

Horse Hole	14	100	14	0
Middens	2	100	2	0
North Lochside	2	100	2	0
Cornerstone to Pilgrims'	1	100	1	0
South Plateau Cliffs	8	100	8	0
South Plateau	16	10	2	14
North Lochside	12	100	12	0
Three Tarn to Lochside	5	0	0	5
Maidens (Inner)	78	100	78	0
(Outer)	66	100	66	0
(Searocks)	19	100	19	0
East Braes	1	0	0	1

Totals	3392	2122	1270
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Table 5. Changes in estimated numbers of gull nests in 1993-94. Small areas are excluded.

	1993 estimate	1994 estimate	% change
Kettle to Colm's Hole	358	463	+29
Colm's Hole	34	31	-9
Burrian	234	202	-14
Low Light Rocks	53	52	-2
Low Light to Tarbet	89	63	-29
Tarbet	174	189	+9
East Rona	639	743	+16
North Ness and Mars Rocks	337	304	+10
Three Tarn to Horse Hole	473	420	+11
South Plateau and cliffs	20	24	+20
Lady's Bed and South Ness	201	206	+2
Maidens (all)	183	163	-11
Lochside-Three Tarn Cliffs	32	17	-53
Ardcarran/Kirk Haven	204	205	0
Total (incl. other areas)	3318	3392	+2

Table 6: Summary of gull nest counts on Forth Islands, 25-27 May 1994.

	Clutch size							? total	Counting efficiency % (n)	Total	Head			
	0	1	2	3	4+	?	Count n				%HG	HG nests	I.B	
Inchcolm														
area 1	53	76	137	275	2	21	564	68 (204)	829	546	37	307	522	
area 2	0	0	2	4	0	0	6	100 (6)	6	0	100	6	0	
area 3	41	117	215	670	5	27	1075	87 (452)	1236	719	53	655	581	
area 4	56	135	248	429	0	23	891	74 (333)	1204	1092	53	638	566	
area 5	0	0	0	0	0	9	9	100 (9)	9	0	100	9	0	
total									3284			1615	1669	
Craigleith														
area 1	1	35	90	208	0	60	394	79 (206)	499	442	94	469	30	
area 2	11	36	119	406	1	60	633	89 (276)	711	560	59	419	292	
area 3	4	98	136	771	0	214	1223	58 (339)	2109	590	71	1497	612	
total									3319			2385	934	
Inchkeith														
area 1	62	176	286	767	11	315	1617	85 (357)	1902	1134	59	1122	780	
area 2	44	103	221	562	4	236	1170	86 (410)	1360	1070	63	857	503	
area 3	0	0	0	0	0	240	240	100 (0)	240	160	71	240	0	
area 4	94	0	269	735	3	525	1626	87 (420)	1869	1049	56	1047	822	
area 5	51	114	184	368	5	700	1422	84 (169)	1693	945	73	1236	457	
area 6	6	17	32	110	0	272	437	87 (62)	502	166	91	457	45	
area 7	0	0	0	0	0	18	18	100 (0)	18	0	100	18	0	
total									7584			4977	2607	
Fidra							1641			70	1149		492	
The Lamb							185			70	130		55	
Eyebroughy							45			100	45		0	
Inchmickery							206	95	216	50	108		108	
Inchgarvie							211				210		11	

Note: clutch size '?' includes nests with unknown contents and those with young.

Table 7: Herring and Lesser Black-backed Gull population estimates for the Forth Islands in 1987 and 1994.

	HERRING GULL		L.B.B. GULL		COMBINED TOTAL	
	1987	1994 % change	1987	1994 % change	1987	1994 % change
Isle of May	2100	2122 + 1	520	1270 + 144	2620	3392 + 29
Craigleith	2281	2385 + 5	933	934 0	3214	3319 + 3
The Lamb	220	130 - 41	10	55 + 450	230	185 - 20
Fidra	410	1149 + 180	140	492 + 251	550	1641 + 198
Eyebroughy	170	45 - 74	0	0 0	170	45 - 74
Inchkeith	4091	4977 + 22	1753	2607 + 49	5844	7584 + 30
Inchmickery	61	108 + 77	61	108 + 77	122	216 + 77
Inchcolm	1040	1615 + 55	730	1669 + 129	1770	3285 + 86
Carr Craig	{28}	38 {+ 93}	0	0 0	{28}	38 {+ 93}
Haystack	{ }	16 { }	0	0 0	{ }	16 { }
Inchgarvie	110	210 + 91	10	11 + 10	120	221 + 84
Total	10511	12795 + 22	4157	7146 + 72	14668	19941 + 36

Table 8. The numbers of herring and lesser black-backed gulls ringed on the Isle of May in 1994 prior to the 9 August.

	Herring gull	Lesser black-backed gull
North Ness	174	47
North Horn	64	16
Rona	356	102
Altarstones	25	0
Tarbet	75	2
Horse Hole	20	0
Tarbet to Low Light	95	1
Ardcarran	99	11
Lady's Bed and South Ness	99	38
South Horn	4	1
Maidens	38	0
Total	1047	218

Table 9. Proportion of juvenile gulls which had rings at the end of the breeding season in 1994.

Area	No. checked	% with rings
Maidens	18	61
Lady's Bed/South Ness/ Ardcarran/Pillow	264	64
Tarbet to Low Light	70	57
Rona and North Ness	210	54
Altarstanes to Horse Hole	8	63
Total	570	59

Notes: No attempt was made to separate the two species
Checks made on 9 August