

THE STATUS OF KITTIWAKES *RISSA TRIDACTYLA* ON LUNDY IN 1988

By
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INTRODUCTION

Prior to the beginning of the present century kittiwakes were heavily preyed by man (Coulson 1963). The netting of seabirds on Lundy was described by Loyd as the principal industry of the island and had probably been carried out since at least the early seventeenth century (Loyd 1925). In 1787 Mr Cleveland, the then owner, wrote on a visit of inspection: "The birds usually taken are muirrs, of which there are two sorts [guillemots and razorbills] — parrots [puffins] and a small type of gull [kittiwakes]". In the nineteenth century there was a demand for kittiwake wings (particularly those of juveniles) in the millinery trade. Large numbers of young birds were shot for this purpose and at Clovelly a staff was employed specifically to prepare plumes from Lundy birds (Yarrell & Saunders 1882-84). Despite the passing of the Seabirds Preservation Act of 1869 Lundy's kittiwakes continued to suffer a heavy and regular mortality when the close season expired on July 31st. "... fishing smacks, with extra boats and crews, used to commence their work of destruction by daybreak on the 1st of August, continuing this proceeding for upwards of a fortnight. . . . On one day 700 birds were sent back to Clovelly, on another 500, and so on; and, allowing for starving nestlings, it is well within the mark to say that at least 9000 of these inoffensive birds were destroyed during the fortnight" (Yarrell & Saunders 1882-84).

It is uncertain when this practice ceased, though most probably by the twentieth century. Authors variously described kittiwakes as "by far the most numerous of the gulls on the island" (Blathwayt 1900), "prodigious quantities" (Roosham 1908), "about twenty colonies varying in strength from 30 to 300 pairs" (Loyd 1925) and "kittiwakes exist in such numbers as to make a census impossible" (Harrison & Wynne-Edwards 1932).

Recent variation in the kittiwake population on Lundy.

The first count of kittiwakes was made by Perry (1940) who counted 3000 breeding pairs in 1939 (he considered this to be an exact figure). It would be expected that before and subsequent to the time of Perry's census kittiwake numbers would have been increasing on Lundy, in common with other British colonies, which were increasing at between 3 and 4% per annum (Coulson 1963). However, Lundy's census figures, despite brief increases, would seem to indicate a downward trend (graph 1). Coulson (1963) suggested that a concurrent increase in larger gulls on Lundy had prevented an increase occurring and Boyd (1956) showed that in 1955 and '56 nesting success was scarcely adequate to ensure the replacement of adult losses.

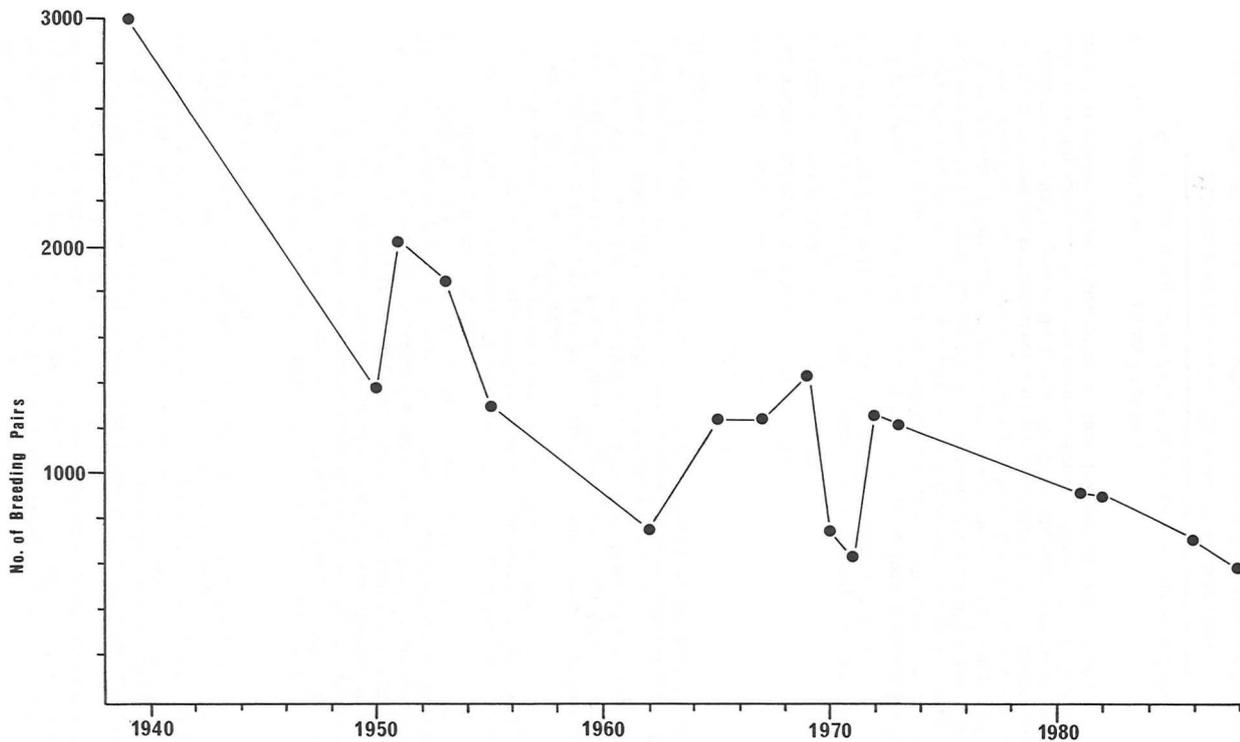
Since 1969 the national rate of increase has fallen and in some areas, including the south west and the north of Britain, the numbers of breeding kittiwakes have decreased (Coulson 1983, Heubeck *et al.* 1986). Unfortunately during much of this period no censuses were carried out on Lundy, though the resurgence of seabird interest experienced during the 1980's does indicate a recent decline (Davies & Price 1986, Willcox 1987).

The decline in some British colonies has been attributed to food shortage in the vicinity of the breeding colonies (Coulson 1983). In recent years very poor breeding success has been experienced by kittiwake colonies in the Shetland Islands. This is believed to be related to the supply of sandeel, *Ammodytes* spp. (Heubeck 1988).

The purpose of the 1988 census was to investigate whether kittiwakes are continuing to decline on Lundy and to consider the breeding success of different colonies.

METHODS

Apparently occupied nests (A.O.N.'s) were counted between June 10th and 23rd, 1988. All counts were made from land apart from the Shutter Rock colony which was counted from a boat. An A.O.N. was strictly defined as a well built structure at which an adult appeared to be either incubating or brooding. During June and early July fluctuations in adult kittiwakes and A.O.N.'s are normally minimal, with mean A.O.N. counts commonly exceeding 95% of the maximum count (Harris 1987, Richardson *et al.*



GRAPH 1 - Numbers of breeding pairs of kittiwakes

1981). However care does need to be taken when interpreting these counts as the 'breeding population', since by late June some pairs could have already failed and left the colony (Harris 1987). Indeed there was evidence of this on Lundy with some colonies containing abandoned nests and/or nests with adults in attendance but with no contents. These are detailed in the appendix.

A boat trip around the island in early August indicated that kittiwakes nested on the seaward face of Gannet's Rock; there were well constructed nests and fledged young.

Seabird monitoring on Lundy was considered in detail by Willcox (1987). Two of the Study Plots (S.P.'s), S.P.2 and S.P.8 (corresponding to G24 and part of F6/7 on Figure 1), contain large numbers of kittiwakes (17% of the entire population in 1988). Seven counts were made at S.P.2 between June 3rd and July 12th and five counts at S.P.8 between June 7th and July 12th.

RESULTS

Figure 1 shows all the Lundy kittiwake colonies and indicates the direction of change that has occurred at each colony since the last complete census in 1986. Since smaller colonies will undergo greater proportional change than large colonies the detailed results are included in the appendix. Overall the number of A.O.N.'s has declined by 17% from 715 in 1986 to 594 in 1988, which is the lowest figure ever recorded for Lundy. Since the early 1970's the population has declined at approximately 4.6% per annum (graph 1). There have been no population recoveries, which were a feature of the earlier period. Puffin Gully has continued to decline, halving its numbers to 122 since 1986, which itself was almost half the 1982 level.

Perry reported approximately 42 colonies in 1939 and these have now declined to nineteen; furthermore just eight of Perry's colonies numbered less than twenty pairs, whilst nine presently do. The definition of a colony is slightly arbitrary; here it is taken to be any discrete group of kittiwakes.

The picture is not entirely one of decline and increases have occurred in three colonies between the Pyramid and St. James's Stone. There were just nine A.O.N.'s to the south of St. Mark's Stone in 1981, 51 in 1986 and 115 in 1988. It would seem probable that immigration is taking place from other less favoured colonies.

Information from the study plots allows a comparison of the area around St. Mark's Stone (S.P.8) with the Long Roost colony (S.P.2), which in recent years has declined (Willcox 1987):-

	S.P.2	S.P.8
Maximum number of adults	70	79
Maximum number of A.O.N.'s	49	52
Average number of A.O.N.'s	47	50

(The average number of A.O.N.'s was calculated from five counts between 3rd and 20th June for S.P.2 and from three between 7th and 20th June for S.P.8)

The average number of A.O.N.'s for S.P.2 is 22% up on 1987, though it is still down on the levels reported in the early 1980's. Note that S.P.8 results are not strictly comparable with those of 1987 since there was ambiguity over the site boundary. Large photographs are kept in the Lundy files in order to avoid further difficulties of this type.

A count made on July 12th, timed to coincide with the early fledging period, shows the poor breeding success experienced at S.P.2. Note that chick production and the average number of chicks hatched per nest have been calculated in a different way to that reported in the 1987 Report of the L.F.S. (Willcox). The new calculations are a better indicator of breeding success since account is taken of numbers of chicks fledging in July related to number of pairs incubating in June. The new calculations are:-

1. Average number of chicks fledged per nest

$\frac{\text{No of chick contained in AC1 + AC2 + AC3 at time of fledging}}{\text{Maximum number of A.O.N.'s (i.e. incubating pairs)}}$

In making this calculation, nests in which there was at least one chick present (exact number unknown) at the 'fledging count' have been omitted from the total number of A.O.N.'s.

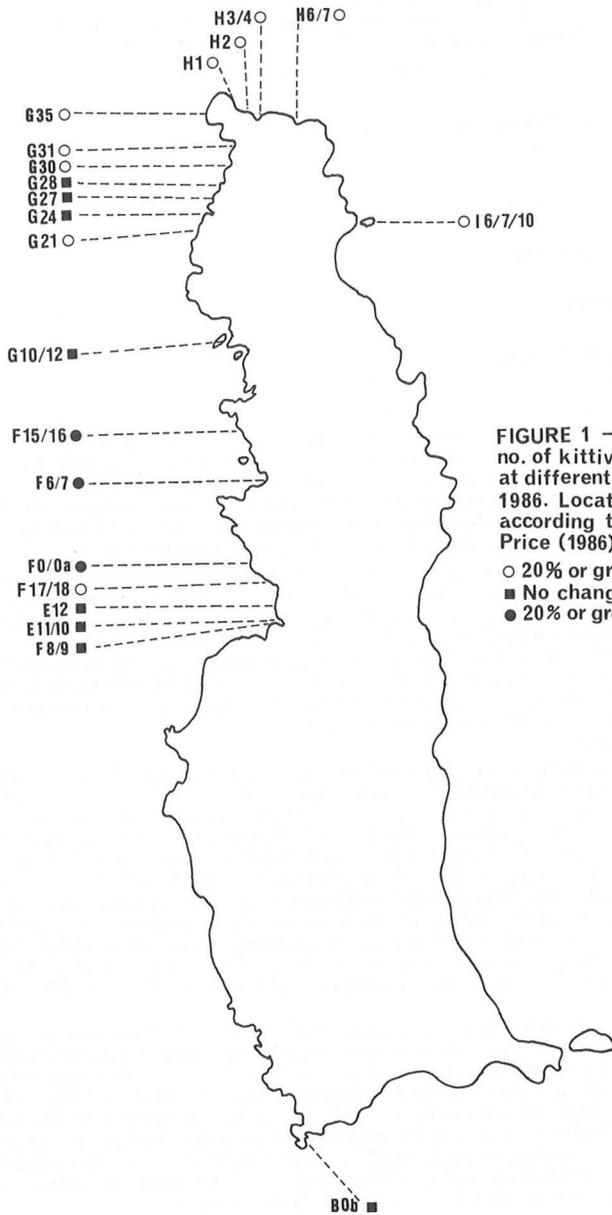


FIGURE 1 - Changes in the no. of kittiwake A.O.N.'s at different colonies since 1986. Location of sites according to Davies & Price (1986).

- 20% or greater decrease
- No change
- 20% or greater increase

2. Chick Production

Number of nest containing chicks at the time of fledging (i.e. 12th July)

	Maximum number of A.O.N.'s (i.e. incubating pairs)	
	S.P.2	S.P.8
Adults	45	62
A.O.N.'s with no chicks visible	1	3
A.O.N.'s with one chick present (AC1)	9	21
A.O.N.'s with at least one chick present	3	5
A.O.N.'s with two chick present (AC2)	3	14
A.O.N.'s with three chicks present (AC3)	0	0
Average number of chicks fledged per nest	0.31	1.04
Chick production	30.6%	76.9%

At S.P.8 the first chick was observed on 7th June and the number of nests containing chicks reached a maximum on 4th July. At S.P.2 the number of nests containing chicks had declined from 30 on July 7th to 15 on the 12th; many empty nests were evident and predation is suspected as being the cause of the failure (on two occasions ravens were noticed flying close to the colony causing an exodus of adult birds). There was no such decline in S.P.8 despite the nearby presence of a pair of breeding ravens.

In Puffin Gully David Dickins reports that, despite the decline in breeding pairs, breeding success was good in 1988 (mainly because of better hatching success) in contrast to 1987 and 1986 when it was very poor (just 29 nests fledged chicks in 1987 and 42 in 1986 compared with 75 in 1988). His results for chick production, 58.1%, and the average number of chicks fledged per nest, 0.84, are based on chicks still present on July 19th and fall between the results from S.P.2 and S.P.8. In fact Puffin Gully fledged more chicks in 1988 (109) than in any year since 1982, when there were four times as many nests and five times as many chicks surviving.

CONCLUSIONS

Other authors have shown that breeding success can vary greatly both between colonies in the same area and within a single colony (eg Harris 1987). This is not the first time that breeding success has been noted to vary between colonies on Lundy. In 1955 the colony on Shutter Rock was found to fledge 1.1 chicks per nest, whilst those in Puffin Gully and Kittiwake Gully fledged just 0.7 and 0.65 chicks respectively (L.F.S. Annual Report 1955). This study confirms these observations. For example the number of A.O.N.'s in Puffin Gully has declined to the lowest level ever reported and yet it has enjoyed a relatively good breeding season. In contrast the number of pairs breeding in S.P.2 has increased, though its breeding success has been poor; in 1987, when there were fewer pairs, breeding success was good (Willcox 1987). S.P.8 to the south of St. Mark's Stone is presently both increasing in numbers and having relatively good breeding success.

Boyd (1956) considered that the average of 0.7 chicks fledged per nest for three colonies in 1955 and '56 would be insufficient to ensure adequate replacement of adult losses. In this context the average of 0.77 chicks fledged per nest from Lundy's three study plots in 1988 may also be too low to replace adult losses. On the Isle of May in 1986 in an increasing kittiwake colony Harris (1987) recorded an average of 1.51 chicks per nest. My own studies on a large stable kittiwake colony in Shetland during the early 1980's revealed a breeding output of nearly 1.6 chicks per nest. This suggests that the breeding success of kittiwakes may have been low on Lundy for much of this century at a time when other colonies have been increasing. Why should this be?

The exact reasons for this are, as is so often the case in studies of this kind, poorly understood. Predation by corvids, great black-backed gulls and peregrines have all been cited as important influences (e.g. Loyd 1925, L.F.S. Annual Report 1955, Kruger 1984). Disturbance (especially at the easily visible Puffin Gully colony) may also be important (e.g. Boyd 1956). Why some colonies suffer more in some years than in others is not known. There is no evidence of starving chicks and of the dramatic breeding failure that is being experienced in the Northern Isles. The factors are likely to be subtle, though at the end of the day we can expect that food supply will be involved.

Clearly attempting to interpret the population as a whole from the small number of subjectively chosen study plots is inappropriate and misleading: in 1988 the results from S.P.2 and 8 would have indicated an overall increase in the population! Even adding the Puffin Gully study plot and increasing the sample size to 37% of the population gives a misleading idea of the population as a whole (this would indicate a 2.5% decline since 1986, when complete surveys show that there has been a 17% decline). This methodological inadequacy has also been noted at other kittiwake breeding sites on Skomer (Sutcliffe 1987) and Shetland (Heubeck *et al* 1986).

In conclusion censusing total breeding numbers is the only realistic way of assessing population changes of kittiwakes on Lundy. However the monitoring of study plots should continue since they give valuable information on breeding success for colonies that are presently subject to differing fortunes.

ACKNOWLEDGEMENT

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APPENDIX

Detailed results of the 1988 kittiwake census. Location of sites according to Davies and Price, 1986.

	A.O.N.'s	Adults	Notes
B — Shutter Point to Old Light			
BOb (Shutter Rock Gully)	42	50	
E — Needle Rock to Pyramid (Jenny's Cove)			
E8/E9 included together because of ambiguity over site boundary	34	36	
E10/E11	15	16	2
E12 Probably includes E13 of Davies & Price	22	27	
E17 (No A.O.N.'s recorded in E18)	1	1	
F — Pyramid to St. Jame's Stone			
F0/F0a	30	38	
F6/F7	115	156	3
F15/F16	62	75	
G — St. Jame's Stone to North West Point			
G10	25	38	1
G21	7	28	1
G24 (S.P.2)	47	68	4
G27	4	14	1
G28	4	6	
G30	—	8	1
G31	2	4	
G35	—	4	1
H — North West Point to North East Point			
H1	8	11	
H2	12	21	1
H3/H4 Kittiwake Gully	17	20	
H7/H6 Puffin Gully	122	147	1
I — North East Point to Gannet's Rock			
I6 North face of Gannet's Rock	—	6	1
I7 Seaward face of Gannet's Rock	c.25	?	5

Notes:

1. These colonies contained nests with no contents at the time of counting. These amounted to at least 54 nests and probably many more; the distance of viewing precluded an accurate assessment at some colonies. All the colonies concerned are to be found between St. John's Stone and Gannet's Rock. Particularly striking was the north face of Gannet's Rock which had no 'successful' nests.

2. One A.O.N. was recorded in E11 (S.P.6) by Davies and Price in 1986. This was probably close to the north face of Deep Zawn and hence part of E10.

3. On the south facing side of this inlet there was a single A.O.N. and this appears to be a new site.

4. S.P.2 count is the average of the five June counts.

5. The seaward face of Gannet's Rock was counted in early August and is, therefore, less accurate than the other counts.