SURVEYS OF BREEDING SEABIRDS ON LUNDY: 1981 - 1996

By

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INTRODUCTION

In 1996 a full island survey of breeding seabirds was carried out during the first week in June. This was one of a series of surveys that have been undertaken at approximately five yearly intervals since 1981. This report describes the manner in which these surveys were conducted and provides an overall summary of their results.

BACKGROUND

In 1969 "Operation Seafarer", the first national census of breeding seabirds, was carried out and as part of this a complete survey was carried out on Lundy (Britton 1969). Apart from providing a much needed indicator as to the importance of Britain for seabirds, this national census also highlighted the paucity of data on seabird numbers. It was, however, recognised that due to the logistics and extensive organisation involved in carrying out such a major survey, it was not going to be feasible to undertake repeat surveys at frequent intervals. An alternative approach was therefore sought to attempt to monitor population changes on a more regular basis. As a result the RSPB in conjunction with the Seabird Group began to establish monitoring sites where annual counts could be carried out at significant breeding colonies on a sampling basis.

During the 1970's monitoring sites were set up at major colonies in Britain, and proved particularly valuable in indicating trends from year to year. However, few such sites had been established in southern England and in 1980 it was decided to set up a series of sample plots on Lundy. Seven "Study Plots" (as they became known) were selected on Lundy, primarily aimed at breeding auks, and annual monitoring was initiated. A full description of this process and the early results was provided by Martin Davies (1981).

In order to relate this sampling to the total seabird population on Lundy it was recognised that a full island census would be valuable as a base line for assessing trends and changes, and therefore in 1981 a complete island survey was undertaken. This was followed by a repeat survey in 1982 to check the validity of the approach adopted in 1981. Subsequently full island surveys have been carried out on the same basis in 1986, 1992 and 1996. It is the conduct and results of these five surveys that are the main focus of this report.

SURVEY METHODS

Census Techniques

Undertaking census work on breeding seabirds, and particularly cliff nesting birds on an island such as Lundy, provides various challenges. Firstly it is important to select a period when birds are relatively settled at nest sites and there is not too much "coming and going". The recommended stage for most species is when they are on eggs, and this is generally early June. After this as time goes on there is the problem of birds flying back and forth feeding young, and increasingly non-breeding birds appear on the cliffs. Thus the principle objective is to tackle the census intensively over a period of one to two weeks at this time of year.

The main target species were Guillemots, Razorbills, Puffins, Kittiwakes, Fulmars and Shags. Of these Shags pose something of a problem in that they tend to breed earlier than the other species and so by June some may well have already fledged young. Gulls are similarly better censused a little earlier when birds are incubating. As a result the

survey only recorded gulls on a simple basis, generally using best estimates rather than individual nest counts, and as such the recording of these species was less reliable and not always comprehensive. Manx Shearwaters present other problems in that they nest underground and only come into the island during the darkest hours of the night. They were therefore excluded from the census work.

Having established the target species and the census period, it is necessary to adopt different strategies for different species in terms of actual recording. Guillemots do not build any sort of nest and it is therefore difficult (without spending a lot of time studying each site) to establish which birds are on eggs and which birds are their partners just standing around. As a result, the recommended census unit is "birds at breeding colonies". This means that an observer can count all birds on breeding cliffs, but ignore those on the sea or obviously "loafing" at non breeding sites. Razorbills present similar problems in that they invariably nest in cracks and crevices, or behind boulders, and are therefore often invisible when on their eggs. They are therefore also counted in units of "birds at breeding colonies". Puffins are even more difficult in that they always nest totally out of sight in holes and in old rabbit burrows. In view of this and as there are so few on Lundy it was decided that the unit for counting should be "birds" both on the cliffs and on the sea within 200m of the shore.

Kittiwakes are more straightforward in that they build nests and with a reasonable view it can be established whether these are occupied - thus the unit for them is "apparently occupied nests". Fulmars are generally easily viewed, but as they lay their eggs directly on the ground it is necessary to determine which birds are incubating and which are merely resting, and then to only count such "apparently occupied sites" for census purposes. With care and practice this separation can be achieved to a satisfactory level of accuracy. Finally Shags are recorded in units of "apparently occupied nests", though this requires a more deductive approach to locating them. They invariably nest under large boulders or in narrow gullies, and it is usually by careful searching for "whitewash" on the cliffs that a nesting site may be located above this (often in semi-darkness - which invariably taxes the optical properties of telescopes in trying to see whether there is a sitting bird present).

Weather conditions are another factor to consider as birds will not be reliably present on cliffs when the wind is strong, or if it is raining. They also tend to become more mobile towards the end of each day. Thus counts are carried out from 08:00 to 16:00 and only in fine conditions when the wind is less than force 5.

The above criteria accord with instructions provided in the Seabird Monitoring Handbook (produced jointly by JNCC, RSPB, ITE and the Seabird Group).

Site Register

Armed with the above techniques for counting birds, it became apparent that some sort of strategic approach to coverage was required to enable an island the size of Lundy to be tackled logically, and in a way that was repeatable by other observers in subsequent years. The concept of a site register was therefore developed. This involved identifying and describing all individual breeding sites around the coast and counting the birds within these, then subsequently totalling them up for a full island figure. Such sites are typically a cliff face or a gully, which has reasonably well defined boundaries and contains at least one of the target species breeding within it. Though this approach was developed as an aid to fieldwork, it has proved extremely valuable for detailed analysis and for establishing patterns of distribution, as well as for simply obtaining total population figures.

The Site Register has been produced as a document in its own right, and comprises some 150 individual sites. The coast of Lundy was originally divided into 12 sections (A-K) for Operation Seafarer and these sections have been retained so that the individual sites have been grouped within these. Each site is given a code and marked on a large scale map. Full details are then recorded for each, to include a description of the site, the specific distribution of different species within the site, details of the location from which it should be viewed, where appropriate a field sketch, plus detailed counts for previous visits.

A typical extract from the 1996 Site Register is as follows:

Site - ***G5***

Description - *Fragmented face opposite St Peter's Stone*
GM: on ledge on overhanging face at LHS and behind fallen rock below
RZ: at base of LH cliff +1 site on top right near sheer cliff face
SH: (1986) with group of RZs

Viewing - *View from above St John's Stone at (Gf) and from (Ge) for different angle*

	1981	1982	1986	1992	1996		
					3/6	5/6	6/6
GM..birds..... -	*8*	*7*	*10*	*19*	*7*	*7*	*5*
RZ...birds.... -	*13*	*17*	*19*	*14*	*8*	*7*	*6*
SH...aon..... -	-	-	*1*	-	-	-	-

A copy of this Site Register is held for the Lundy Field Society by the Warden and is available on the island if required.

RESULTS

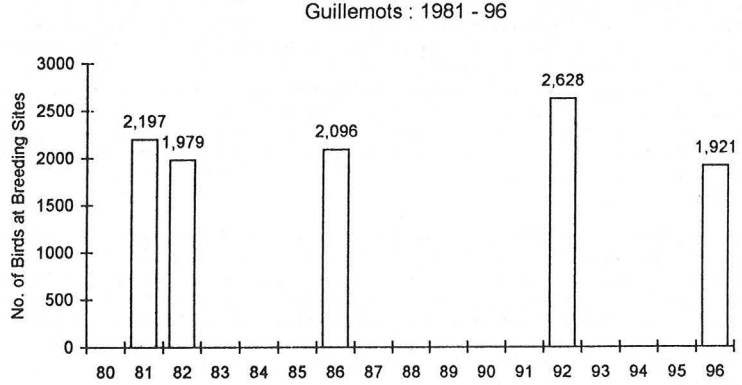
The prime purpose of the all island surveys was to establish total breeding populations in any one year for each of the target species, and the following summarises the results of these for each in turn. The detail of the results is mainly focused on the 1981-96 period, but reference is made where appropriate to earlier surveys as presented in LFS Annual Reports, and to a major study undertaken in 1939 by Richard Perry in his book *Lundy, Isle of Puffins*.

Analysis of the distribution aspects of the survey data shows interesting patterns and preferences for different species, but much of the detail of this is beyond the scope of this report. All such analyses have been included in a separate full written report, which incorporates detailed counts, distributions, study plot figures and comparisons with earlier breeding bird surveys carried out on Lundy.

The following species accounts essentially present the results of the surveys. There is little attempt to provide explanations for the population changes as this is a topic which demands a much wider consideration of the breeding biology of the species concerned and the environmental conditions within which they live, both during and outside the breeding season.

1. GUILLEMOT

The summarised totals from each of the five survey years for Guillemots are as follows:



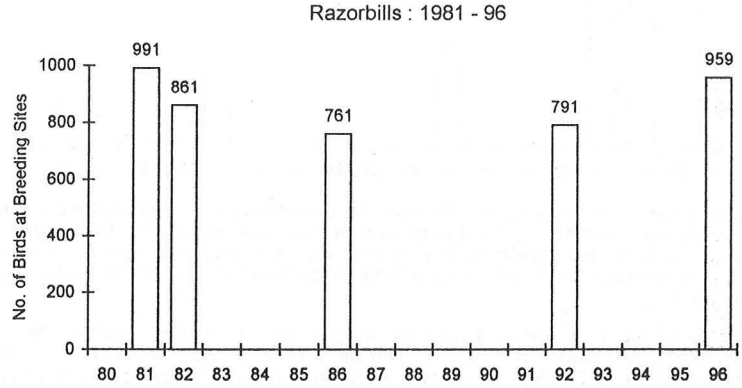
The above graph shows a somewhat variable pattern, with an overall average of just over 2,000 breeding birds present during the 15 year period. The apparent changes in numbers between the survey years may not be linear and the Study Plot counts, which have been carried out more frequently, indicate that there were several undulations in the period between 1982 and 1992, though the overall trend was definitely upwards (Willcox 1987). Since the peak of 2,628 in 1992 there has been a major loss of some 700 birds over the following four years to an all time low in 1996. In the light of the *Sea Empress* oil spill in early 1996 it is tempting to associate some of the decline with this incident, particularly as the majority of oiled birds washed ashore were indeed Guillemots. Unfortunately the Study Plot counts for the period 1993-96 were not consistently carried out and so it is difficult to see whether the majority of this decline took place between '95 and '96. The limited evidence suggests that perhaps there had already been a decrease in numbers by 1995.

In terms of their distribution around the island Guillemots are very much concentrated along the west coast in the stretch from Battery Point to North West Point. There are now virtually none south of Battery Point on the west coast, and none south of Gannets' Rock on the east.

In a wider context, the population figures for this 15 year period look very meagre when compared with Perry's 1939 count of some 19,000 pairs on the island - (probably equivalent under our current count methodology to at least 30,000 birds!). However, by 1949 numbers had tumbled to an estimate of 10,000 birds, and were down further to just below 4,000 by the mid 1950's. Since then there has been a steadier, but somewhat variable decline to around the 2,000 mark by the start of the 1980s and the current series of surveys.

2. RAZORBILL

Compared with Guillemots, the Razorbills counts from the five surveys show an almost reverse pattern, with peak numbers in 1981 and 1996 and something of a trough in the intervening years:



The Study Plot counts however indicate that 1987 was also a potential peak year (Willcox 1987), though numbers were generally low between 1988 and 1992.

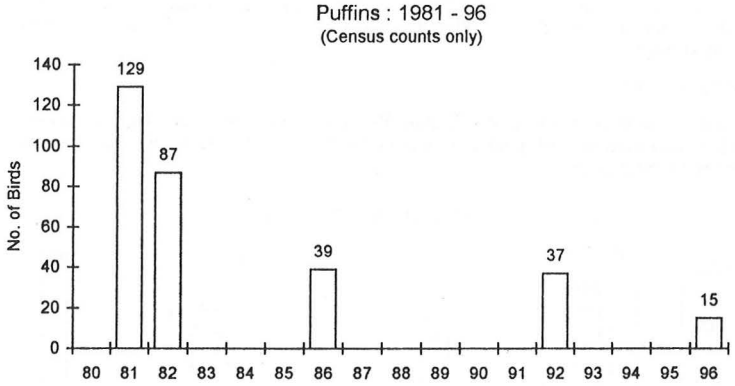
Prior to 1981 counts in the early seventies indicated totals up to 1,200 birds, and in 1962 a full island survey produced just over 2,000 birds. However, during the preceding two decades of the 40's and 50's no full surveys appear to have been carried out for Razorbills, probably due to the physical difficulties in counting such a widespread species. There is therefore no indication during this period of what happened to Perry's 1939 population of 10,500 pairs.

The distribution of Razorbills is more extensive than Guillemots, with small numbers

found along the east coast and around the south west corner of the island. When comparing their current distribution with that of 1939, it is interesting to note that virtually all significant current sites were also in use at that time. However the largest colony on the island then (some 2,500 pairs) was occupying the boulder strewn areas of Puffin Slope all along the north coast of the island - an area now totally devoid of Razorbills.

3. PUFFIN

The methodology adopted for the survey is not entirely suitable for Puffins as it is generally considered better to tackle counts late in the day and earlier in the season if genuine numbers of breeding birds are to be established. From June onwards non-breeding immature birds begin to appear at colonies, and certainly most casual counts on Lundy have produced highest figures in late June and early July. (In 1995 Simon Griffith carried out four counts in June and the maximum count from these was 31 on 23rd - though only 6 birds were on land.) The following figures from the 1981-96 surveys should therefore not be considered as absolute population levels, as there have certainly been more seen in certain years than were recorded in the census work. However, on the basis that the counts were carried out at the same time of year and under the same conditions they should be comparable as an indicator of trends, and as can be seen from the following chart this is one of continued decline:

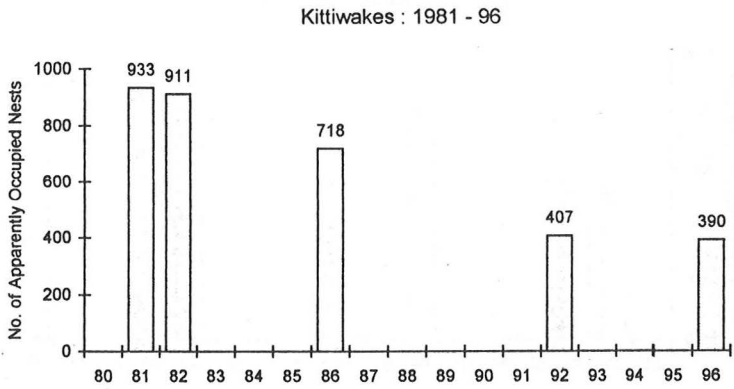


Prior to 1981 counts during the '60s and '70s recorded up to 160 birds, which is still not a very large number, so the decline over the last four decades has been relatively gradual. However, the population level is obviously now becoming critical and unless there is some major turn around in their fortunes the future for the species on the island looks bleak.

This is all the more discouraging when looking back at the 1939 figures when an estimate of 3,500 pairs was made. As with the Razorbills, the vast majority (c.2,500 pairs) nested on Puffin Slope along the north coast and from the descriptions in Perry's book this obviously provided quite a spectacle.

4. KITTIWAKE

The fortunes of Kittiwakes during the last 15 years are similarly rather discouraging, with a continued decline throughout the period:



Much of this decline is reflected in the virtual demise of the breeding site at Puffin Gully. The following table shows the counts from the survey years for this particular site:

Kittiwakes in Puffin Gully:	1981	1982	1986	1992	1996
Apparently Occupied Nests	414	422	226	102	54

The colony on Gannets' Rock, although much smaller, has also declined considerably. However, there is always a fair degree of mobility from year to year and some sites such as Long Roost are currently holding increased numbers of birds. This mobility, of course, makes a sampling approach (through the use of Study Plots) difficult, if not impossible, if attempting to monitor population changes for the species.

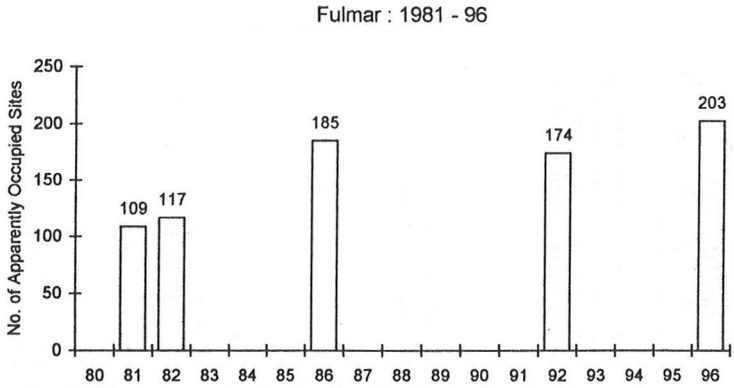
In 1939 there were some 3,000 pairs on Lundy and from this total the decline has been almost linear, with around 2,000 in the early 1950s, and c.1,200 in the late 60's and early 70's. This is all the more surprising in that for much of this period there was an overall national trend upwards with no less than a 22% increase nationally between 1969 and 1986. The equivalent trend on Lundy over this same 17 year period was a decline of 50%.

It is apparent that breeding success is a good measure of the health of a colony and recent studies have been undertaken to monitor this. 1996 was apparently a reasonable year, with pairs at Long Roost each rearing on average one young (Simon Griffith *pers comm*); however, continued work in future years is needed to establish longer term trends in this respect. An article by Neil Willcox (1988) has explored the status of Kittiwakes on Lundy in more detail and also looked at the subject of breeding success.

5. FULMAR

Against the background of overall decline this species is one which completely reverses the trend. In 1939 there were no breeding Fulmars on Lundy - just a few prospecting birds. F.W. Gade recorded first breeding in 1944, with four pairs occupying Jenny's Cove, and just one laying a single egg. The subsequent colonisation of the island is well documented in the early LFS reports from 1947 through to 1957 when the number of breeding pairs increased from 6 to around 25. The two main locations for this colonisation were Gannets' Rock and Jenny's Cove.

Numbers reached 100 in the early 70's and then from 1981 to 1996 the trend has continued upwards, though with some fluctuations:



The majority of nesting birds are still on Gannet's Rock and in Jenny's Cove (55 and 87 respectively in 1996), but there are now good numbers between Battery Point and Needle Rock (28 in 1996), they are increasing in the Long Roost area, and ten pairs are now nesting along the east coast down as far as Halfway Wall.

6. SHAG

As already noted the censusing of Shags in early June is not ideal. This is also a species which demands special attention to nest searching if a thorough assessment of numbers is to be carried out. The following figures from the five surveys should therefore be taken as a guide to minimum numbers and not a record of absolute population levels.

	1981	1982	1986	1992	1996
Apparently Occupied Nests	29	43	35	29	38

The need for special care in surveying is demonstrated by the range of counts obtained between 1954 and 1957 when the then warden (Barbara Whitaker) undertook an intensive study of the species, involving finding nests to carry out ringing of young. During these years the number of nests located was in the order 120-130, whereas counts of 50-70 were typical figures for most other years either side of this period. Based upon such proportions, the census figures for 1981 - 96 may well therefore be underestimates by an order of some 40-50%.

Despite the potential limitations of the data available, the species does not appear to have undergone any major decline, as even back in 1939 there were only 110 pairs nesting on the island (Perry 1939).

SUMMARY

It is considered that the census data from the five full island surveys conducted between 1981 and 1996 provides a reasonably accurate indication of the population levels of the six target species. Taken together with Study Plot data, breeding productivity monitoring and the results of earlier surveys, they help to provide a clearer picture of the status of the island's seabirds. It is also hoped that the raw data from these surveys may be of value for more investigative studies concerned with trying to establish the reasons behind some of the declines (or increases) in numbers.

In summary then, for Guillemots and Razorbills there has been some variability since 1981, with Guillemots currently at a low level and Razorbills at something of a peak. Puffins continue to decline to worryingly low numbers, and Kittiwakes are similarly not faring well, with on average a loss of 36 pairs per year over the fifteen year period.

Fulmars on the other hand maintain their steady increase and are colonising new sections of coast. Determining population levels for Shags is less conclusive, but the species does not appear to be under any particular threat at present.

ACKNOWLEDGEMENTS

I would particularly like to thank Martin Davies and the RSPB who initiated the project and organised the 1981 and 1982 surveys. Assistance with finances was provided in certain years by the Lundy Field Society, and was gratefully received, enabling additional time to be spent on the island carrying out the work. Thanks are also due to the various Lundy wardens who were most helpful and supportive during each of the survey years. Finally such work could not be carried out without the help of enthusiastic field workers and particular thanks are due to Peter Slader, Mark Robins, Leigh Lock and Elisabeth Price.

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