LUNDY NOW INTERNATIONALLY IMPORTANT FOR SEABIRDS: CLIFF NESTING SEABIRD SURVEY 2021

by

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ABSTRACT

The upward trend for most seabirds on Lundy continues, with huge increases in auks, and more modest increases for a range of other species, masking an overall decline in gull numbers. The overall increase in the assemblage highlights how the importance of Lundy has increased significantly in recent years. The island's breeding seabird population is now starting to regularly exceed the qualifying figure for Special Protection Area status and a repeat of the Manx shearwater survey planned for 2023 will determine if this remains the case.

The overall increase in cliff-nesting seabirds continues to be driven by the significant gains shown by auks on Lundy, outstripping changes recorded nationally for these three species (JNCC, 2021). Jenny's Cove remains the single most important site for cliff nesters on Lundy, although availability of suitable habitat elsewhere does not appear to be a limiting factor, particularly for razorbill and puffin which are expanding around the northern half of the island.

With 40,000 pairs (80,000 birds) of seabirds recorded in 1939 (Perry, 1940) there is historical evidence that there is still potentially suitable habitat for seabirds to occupy. It will be interesting to see whether the overall seabird population will return to this level or indeed exceed it.

Keywords: *Lundy*, *guillemot*, *razorbill*, *puffin*, *rats*, *international importance*.

INTRODUCTION

Lundy's seabird populations have been regularly surveyed, enabling us to track the fortunes of each species over recent decades. The most recent combined population totals of cliff nesting seabirds (surveyed in 2017) and Manx shearwaters (surveyed in 2017/2018) was estimated at over 21,000 birds.

In 2021, 40 years after the first census in the current series was conducted in 1981, we returned to Lundy to reassess the numbers and distribution of the cliff nesting seabirds. This report presents the results of the 2021 survey and the overall importance of Lundy as a seabird colony.

There has been considerable effort to conserve the seabirds on Lundy including the removal of rats which has provided safer nesting sites for a number of species. However, our understanding of other important factors that can drive population changes is more poorly understood, especially those at sea. Long term monitoring remains an important conservation tool in providing information on how seabirds are faring and, along with other research help identify where conservation action should be targeted.

Plate 1. Paul St Pierre surveying in Section G on the north-west coast. Image: Helen Booker.

METHODS

In June 2021, a repeat survey of the cliff nesting seabirds was undertaken for guillemots *Uria aalge*, razorbills *Alca torda*, puffins *Fratercula arctica*, kittiwakes *Rissa tridactyle*, fulmars *Fulmarus glacialis*, shags *Phalacrocorax aristotelis*, lesser black-backed gulls *Larus fuscus*, herring gulls *Larus argentatus* and great black-backed gulls *Larus marinus*.

The survey was conducted between 1st and 10th June 2021, using a direct repeat of methods from previous surveys, the most recent conducted in 2017 and reported in detail in the Lundy Field Society Journal (Booker *et al.*, 2018). This and all previous surveys were based on the published standard methods for surveying each species (Walsh *et al.*, 1995) and we therefore have not included full details here. The purpose of the survey is to provide a population estimate and does not provide information on the success of breeding attempts which is provided by the study plots surveyed by the Lundy wardening team for the species they cover.

Every section of coastal cliff was monitored from the same vantage points as used in previous surveys, using a register to record numbers of all breeding seabirds at each site. In line with national methods, puffin, razorbill and guillemot were recorded as individuals (I), for all gulls and shag apparently occupied nests (AONs) were recorded and for fulmar apparently occupied sites (AOSs). For *Larus* gulls and shag the timing of the survey, which was later than ideal for these species, meant that it was difficult to determine all nesting attempts, as some sites had been abandoned or chicks had moved. The gull data has been included in this report, but a further survey is planned in 2022 to gain a more accurate estimate of numbers.

The full set of survey sections is depicted in Figure 1. Weather conditions during the 2021 survey were favourable allowing for the completion of two visits to the busier colonies around Jenny's Cove and further north on the west coast in sections E, F and G. Where two visits were undertaken, the higher recorded figure was used.

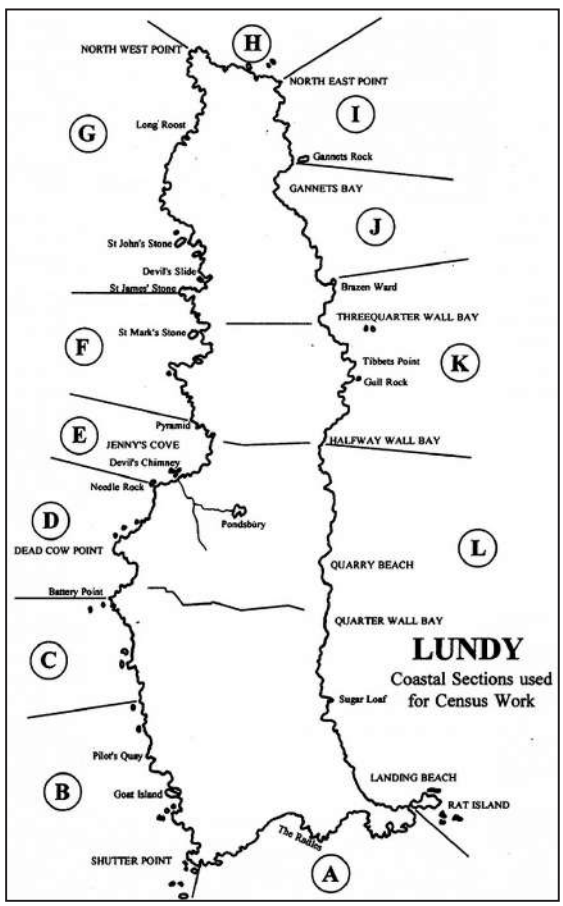

Figure 1. Section map for Lundy cliff-nesting seabird survey.

RESULTS

Overview of species totals and trends

The total all-island counts for 2021 for each species are presented in Table 1 along with the count totals from the previous nine surveys, providing an indication of species trends over the past 40 years. All the data has been submitted to the Joint Nature Conservation Committee (JNCC) to contribute to the latest national survey 'Seabirds Count'.

For the three auk species (guillemot, razorbill, puffin) there has been a significant increase in numbers, building on previous increases observed in the 2017 survey (Booker, 2018). Their populations far exceed the figures for the last national seabird census, Seabird 2000. Kittiwake, fulmar and shag have shown more modest increases since Seabird 2000, but overall gull populations have declined. Kittiwakes have shown mixed fortunes, with increases recorded by the 2017 and 2021 censuses being insufficient to offset the significant long-term decline since 1981. The removal of rats from Lundy was a major piece of seabird conservation work and the date has been added to species where this action could explain the changes in their populations.

Table 1. Numbers of cliff-nesting seabirds between 1981 and 2021. (Note: The count unit for auks is individual birds. For other species AON=Apparently Occupied Nests and AOS=Apparently Occupied Sites.)

Year	Guillemot (ind)	Razorbill (ind)	Puffin (ind)	Kittiwake (AON)	Fulmar (AOS)	Shag (AON)	Herring gull (AON)	Lesser black-backed gull (AON)	Great black-backed gull (AON)
1981	2,197	991	129	933	109	29	-	-	-
1982	1,979	861	87	911	117	43	573	75	27
1986	2,096	761	39	718	185	35	392	62	22
1992	2,628	791	37	407	174	22	497	166	28
1996	1,914	951	15	392	202	37	753	328	23
2000	2,348	950	13	237	190	56	762	443	35
2004	2,321	841	5	148	178	63	708	444	58
2008	3,302	1,045	14	151	170	63	534	263	57
2013	4,114	1,324	80	127	209	112	437	242	50
2017	6,198	1,735	375	238	227	55	229	132	46
2021	9,880	3,533	848	284	265	96	248	91	21
% Change 2017-2021	+59%	+104%	+126%	+19%	+17%	+75%	+8%	-31%	-54%
% Change 2000-2021	+320%	+272%	+6,423%	+20%	+40%	+71%	-68%	-80%	-40%

Species accounts

Guillemot and razorbill. Guillemots are the second most numerous seabird species breeding on Lundy (after Manx shearwater) with an estimated 9,880 individuals in 2021, which represents a staggering 59% increase on the 2017 figure. Lundy now supports almost four times the number of guillemots recorded in 2004, and the population is currently at a level not seen since the late 1940s. This increase for these species, although in line with wider UK trends (JNCC 2021), is greater here on Lundy.

Razorbills are the most widely distributed cliff nesting seabird on Lundy occupying all sections. They have also increased considerably since 2004 with 3,533 individuals recorded in 2021 representing an incredible 104% increase on the previous survey.

Both species have shown significant population growth since the absence of rats on Lundy.

The populations of guillemots and razorbills are illustrated in Figure 2 below, showing the relatively stable populations until 2004, followed by marked increases.

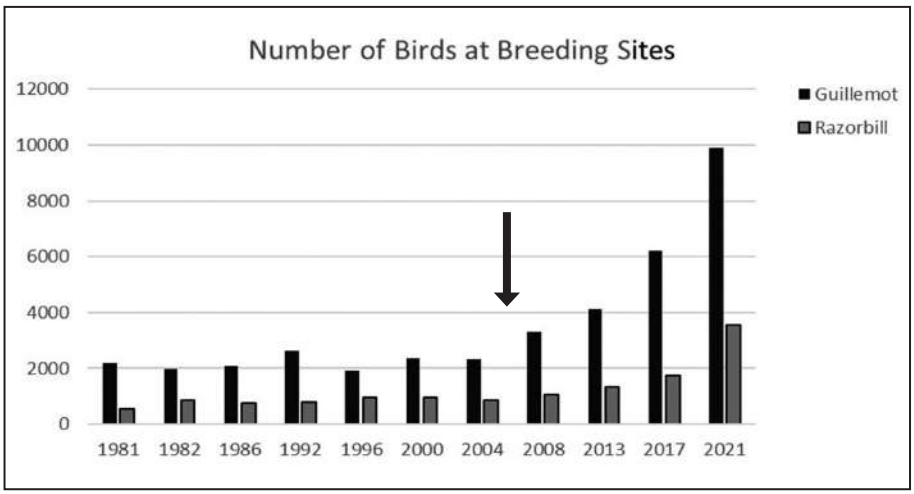

Figure 2. Guillemot and razorbill population change since 1981 (individuals). The arrow indicates the eradication of rats from Lundy, which was completed in March 2004 (Appleton *et al.*, 2006).

Puffin. The continued growth in puffin numbers since 2004 (just five birds) to 848 individuals in 2021 is extremely stark (Figure 3). It is recognised within the methodology used for assessing puffin populations (Walsh *et al.*, 1995) that obtaining absolute numbers is not possible (as many birds are out of sight in burrows). The counts, which are of all individual birds visible on the land and sea at a specific point in time, therefore represent an index of the population. However, as counts have been conducted on the same basis for all of the surveys since 1981, they are likely to provide actual trends for Lundy. Although not used in the results, information from intensive monitoring of individual study plots carried out by the Lundy conservation team over the whole breeding season (Davis & Jones, 2021) could potentially be used to extrapolate our figures that would

calculate a population figure that would be significantly bigger than ours. This species is considered one of the key beneficiaries of the rat removal on Lundy.

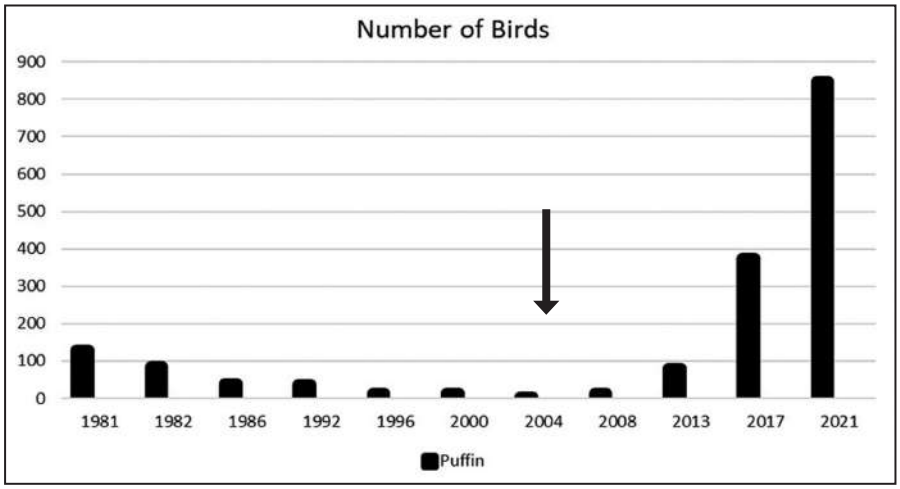

Figure 3. Puffin population change since 1981 (individuals). The arrow indicates the eradication of rats from Lundy.

Kittiwake. Kittiwakes declined consistently from 1981 through to 2013. The welcomed modest upturn in 2017 has continued to 2021, with a 19% increase to 284 AONs, restoring the population to its pre-2000 levels. However, in spite of the encouraging sign in this survey of AONs, more intensive study plots used by the wardening team have shown productivity to remain poor (Jones, 2018 & 2019) so maybe indicating that the population growth maybe a result of birds moving in from other colonies. There are wider regional and UK declines (JNCC, 2021) and this is thought to be linked to food availability, as a result of climatic factors or fisheries management (Mitchell *et al.*, 2004) which could also potentially be affecting some of the other surface or plunge feeding seabirds (e.g. Larid gulls) on Lundy.

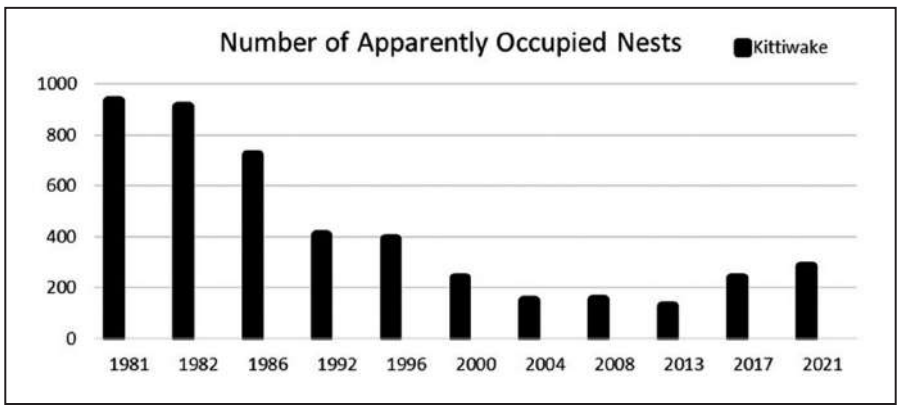

Figure 4. Kittiwake population on Lundy from 1981 to 2021 (AONs).

Fulmar. The 2021 survey produced an encouraging further increase in fulmars to 265 AONs, the highest count over the 40 years of the survey.

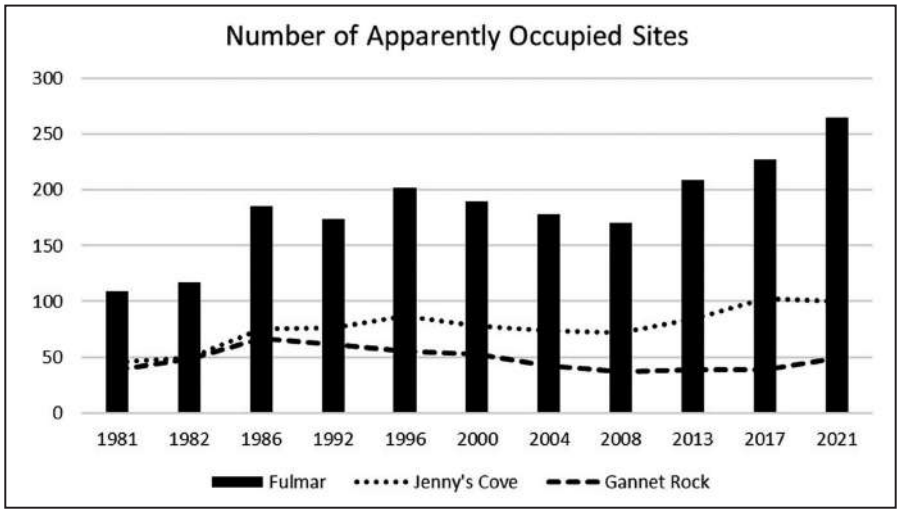

Figure 5. Fulmar breeding numbers from 1981 to 2021 (AOS).

Shag. The timing of seabird surveys on Lundy (which are chosen to optimise auk counts) is generally after the peak breeding period for shags. Consequently, results need to be interpreted with some caution. The 96 AONs in 2021 is a welcome increase over the 2017 figure of 55 AONs and much closer to the 112 AONs recorded in 2013.

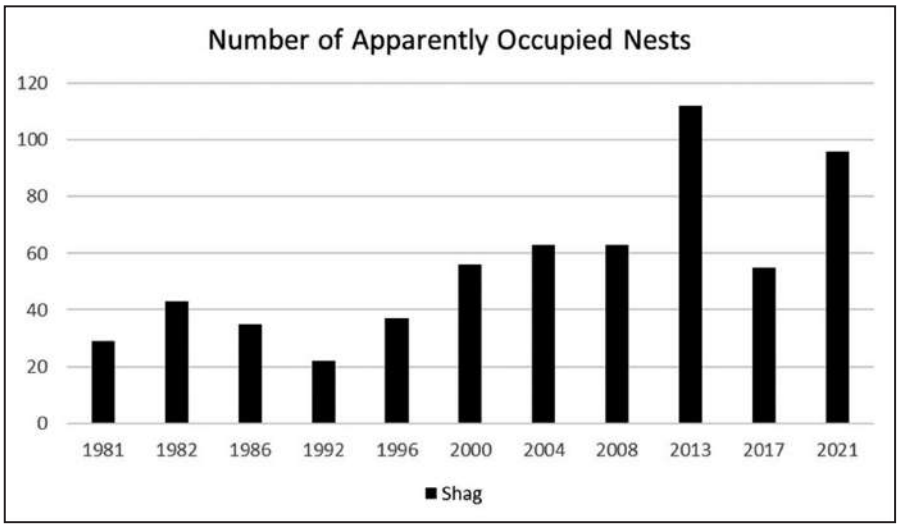

Figure 6. Change in the number of shag nests recorded since 1981.

***Larus* gulls**. The current timing of the survey is not optimal for censusing Lundy's three breeding *Larus* gull species (herring, lesser black-backed and great black-backed) as some pairs may have abandoned sites by the time survey work is carried out. As with shags,

some caution is therefore needed in interpreting results. Nevertheless, for these three species, the timing of field surveys has been consistent over the 40-year history of the census on Lundy and so results should be broadly comparable. As shown in Figure 7, the overall trend for gulls is downwards with the outlook for lesser black-backed gulls looking bleak and great black-backed gulls at their lowest level since 1996. However, herring gulls have shown a slight upturn and future surveys will seek to determine if this is the start of a more positive trend.

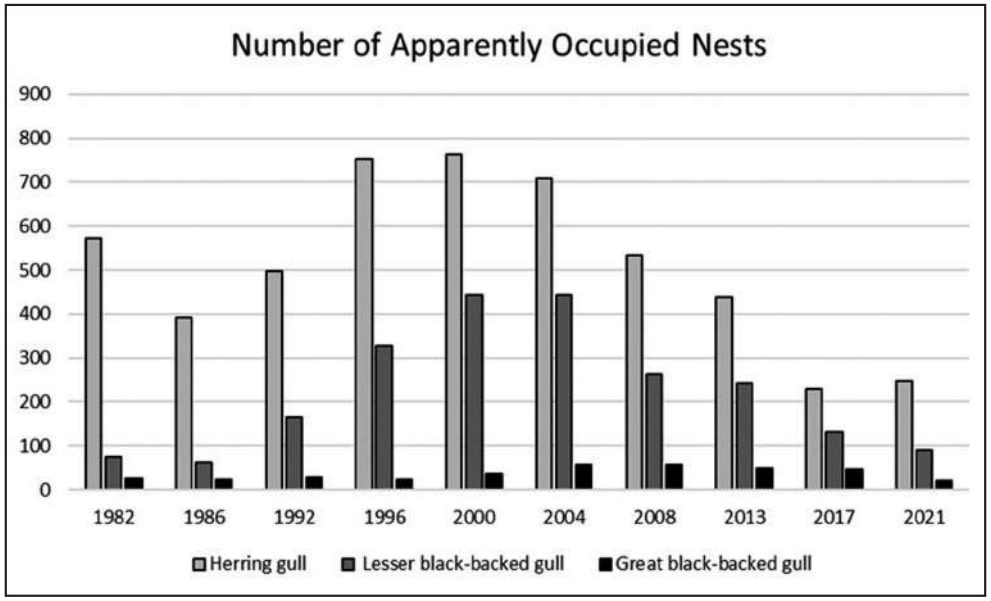

Figure 7. Change in number of *Larus* gull nests recorded since 1982.

Changes in the distribution of seabirds on Lundy

As populations increase, it is interesting to see how species' distributions change over time. The 2021 survey results show that over 90% of cliff-nesting seabirds are found on the west side of the island between Jenny's Cove and North West Point (sections E, F, G – Figure 1 and Table 2). This concentration on the west coast has always been the case, even back in 1939 (Perry, 1940), but there has nevertheless been considerable change within this area. Jenny's Cove (Section E) remains the most important site on the island, but numbers have increased considerably during the last decade such that it currently supports nearly half of all the island's cliff-nesting seabirds (Table 2). It now looks and sounds like a true 'seabird city'.

Since the last survey in 2017, the area from Jenny's Cove northwards to North West Point, continues to support growing numbers of auks, particularly guillemots, where the extensive sheer cliffs and ledges provide ample habitat for this species to occupy. Numbers in Jenny's Cove alone have increased by a staggering 2,761 birds (101%) in just this four-year period, while just to the north of Jenny's Cove, in Section F (Pyramid to St James Stone) there has been an increase of 551 birds.

Plate 2. Guillemots on St Mark's Stone. Image: Paul St Pierre.

Jenny's Cove also remains the most important site for puffins and survey counts for section E have swelled from 198 in 2017 to 536 in 2021, an increase of 338 in just four years (Table 3). As noted above, this is considerably lower than the total numbers present as the Lundy Conservation Team's monitoring of puffin burrows in their study plot in Jenny's Cove found 347 apparently occupied burrows (AOBs).

Puffins and razorbills have also spread north along the coast occupying suitable available habitat (holes and crevices respectively). This range expansion has extended around the northeast of the island and south to Brazen Ward.

Razorbills, occupying all count sections, have seen numbers between Needle Rock on the west coast and Halfway Wall on the east coast (sections E to K, inclusive, representing the northern half of the island), double since the last survey. Whether the increase in distribution reflects a greater availability of rat free habitat for this species compared to guillemot and accounts for the greater increase in this species since the last survey is unknown. Other factors such as differing feeding preferences or foraging areas could also play a role but would be something worthy of further investigation.

Table 2. Overview of results for cliff-nesting species in 2021 by survey count section.

Section	Guillemot (ind)	Razorbill (ind)	Puffin (ind)	Kittiwake (AON)	Fulmar (AOS)	Shag (AON)
A: South Light to Shutter Rock	8	119	0	0	1	0
B: Shutter Rock to Old Light	9	145	0	0	2	9
C: Old Light to Battery Point	0	15	0	0	0	0
D: Battery Point to Needle Rock	130	100	40	0	47	1
E: Needle Rock to Pyramid (Jenny's Cove)	5488	1037	536	125	100	7
F: Pyramid to St James Stone	2579	725	116	159	13	9
G: St James Stone to NW Point	1589	1071	132	0	42	32
H: NW Point to NE Point	38	65	4	0	0	0
I: NE Point to Gannets Rock	33	112	17	0	49	9
J: Gannets rock to Brazen Ward	0	76	0	0	0	1
K: Brazen Ward to Halfway Wall	6	26	3	0	11	11
L: Halfway Wall to South Light	0	42	0	0	0	17
TOTALS	**9880**	**3533**	**848**	**284**	**265**	**96**

Table 3 gives more detail of puffin numbers and distribution, and clearly shows the expansion into seven sections from just five birds at St Philips Stone in section E in 2004. It is also encouraging that since 2017 puffins have occupied their first new site on the east coast between Brazen Ward and Halfway Wall.

Whilst both kittiwake and fulmar numbers seem to be increasing again, the changes in occupancy of sites since the last survey are different for the two species. Kittiwakes, which do sometimes totally relocate colony sites between years, have increased from 59 AONs in Jenny's Cove in 2017 to 125 in 2021, but the numbers at the two Section F colonies declined from 179 to 159 AONs.

For Fulmars, the long-term increase along the west coast continues (numbers in Jenny's Cove seem to have stabilised) and numbers on the east coast have bounced back. There have been increases of 11 AOSs between Battery Point and Needle Rock (section D), 13 AOSs between St James' Stone and North West Point (section G) on the west coast, 10 AOSs at Gannets' Rock (section I) and 7 AOSs between Brazen Ward and Halfway Wall (section K) on the east coast (Figure 5).

Table 3. Puffin population change since 2004 by survey count section.

Section	2004	2008	2013	2017	2021
A: South Light to Shutter Rock					
B: Shutter Rock to Old Light					
C: Old Light to Battery Point					
D: Battery Point to Needle Rock			1	31	4
E: Needle Rock to Pyramid (Jenny's Cove)		6	61	198	536
F: Pyramid to St James Stone	5	8	15	57	116
G: St James Stone to NW Point			3	58	132
H: NW Point to NE Point				20	4
I: NE Point to Gannets Rock				11	17
J: Gannets Rock to Brazen Ward					
K: Brazen Ward to Halfway Wall					3
L: Halfway Wall to South Light					
Total	**5**	**14**	**80**	**375**	**848**

Seabird assemblage and importance of Lundy

Lundy supports 11 species of regularly breeding seabird, with the latest addition being storm petrel in 2014 (Taylor, 2014). The total number of cliff-nesting seabirds recorded during the 2021 survey was 16,271 individuals. This is presented in Figure 8 against previous population totals and in combination with the latest Manx shearwater numbers (and a storm petrel estimate) shows the trend in Lundy's seabird population over the last four decades and highlights the remarkable rise in numbers since 2004.

The 2021 survey indicates that the population of cliff nesting seabirds has continued to increase dramatically since 2004 with particularly large population gains shown for breeding auks and Manx shearwater.

Combining the figures from this survey and the last census of Manx shearwater in 2017/18 (Booker *et al.*, 2019) which estimated 5,504 pairs (or occupied burrows) – representing 11,008 individual birds and adding 100 storm petrels (based on a minimum estimate of 50 AOBs in 2021 (Davis & Jones, 2021) the overall seabird assemblage for Lundy now stands at a minimum of 27,329 individuals.

This total population of Lundy's seabirds meets the qualifying criteria for international importance. International importance for birds is often recognised by an increased level of statutory protection within the UK and notified as Special Protection Areas (SPAs). To qualify as an SPA, a seabird colony needs to regularly support an assemblage of over 20,000 birds, and/or more than 1% of the biogeographical population of a species listed on Annex 1 of the EU Birds Directive. This is the second survey of Lundy's cliff-nesting seabirds where the island has exceeded the SPA qualification threshold (20,000

individuals) for a seabird assemblage. The future for UK conservation designations is uncertain post Brexit, but the importance of Lundy as a seabird breeding site is clear and growing. Of particular note is that – in terms of overall numbers – Lundy is now likely to be the third largest cliff-nesting seabird colony in England, with only Flamborough SPA (412,000) and the Northumberland Coast SPA (over 200,000) supporting higher numbers.

The dramatic increase of auk species on Lundy follows the eradication of rats in 2004. Changes in spatial distribution, already observed in 2017, continues, with increasing expansion of birds into the broken ground where the cliff tops meet the steep grassy coastal slopes.

However, other factors are also likely to be playing a role in the growth of the seabird population on Lundy. Tracking information indicates that foraging ranges of some of Lundy's seabirds are smaller than expected (Thaxter *et al.*, 2012) and a recent study of forage fish (Campanella & van der Kooij, 2021) has highlighted the seas around Lundy as a hotspot for spawning and nursery grounds for a range of key seabird fish prey. However, our understanding of how and where Lundy's breeding seabirds use the Celtic Sea is still poorly understood, along with the status of their food prey items and this warrants further study.

Whilst the Lundy seabird population is showing encouraging signs of recovery there are still a range of threats that could affect their fortunes. A future incursion of rats

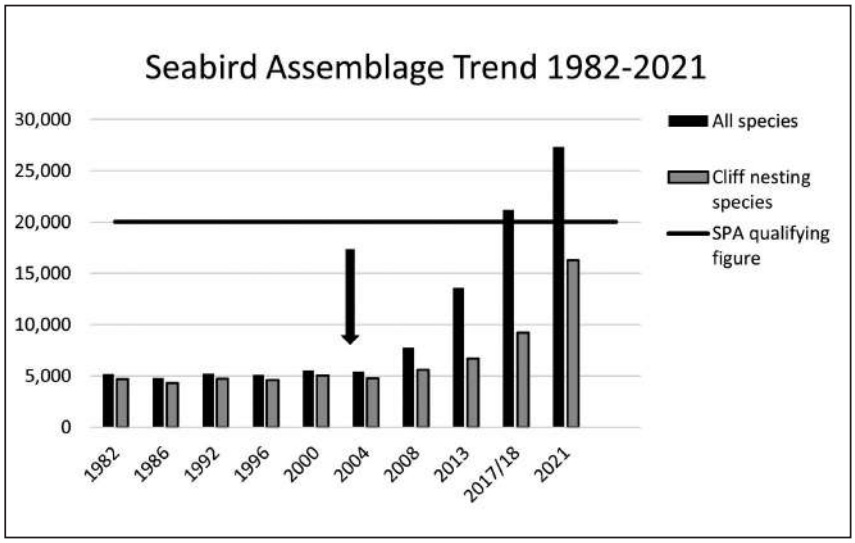

Figure 8. The change in the Lundy seabird population between 1982-2021 (the first year when gulls were also surveyed with other cliff nesting seabirds). The arrow signifies the eradication of rats from Lundy. Prior to 2000 the all-species total is given as an estimate (the cliff-nesting total plus a contribution of 500 birds for Manx shearwater) due to lack of data on Manx shearwater. Note that the Manx shearwater were surveyed over two years in 2017/18 whilst the cliff nesting seabirds were only surveyed in 2017. The horizontal bar signifies the qualifying figure for Special Protection Areas (SPAs).

onto the island could undermine the current recovery and therefore it is important to maintain good biosecurity measures. Diseases such as avian influenza which has devastated some UK seabird colonies has been recorded on Lundy so it will be important to monitor the situation. Also, the potential impact of badly placed floating wind farms could result in birds being excluded from key foraging areas. It will therefore be important to identify and protect the most important areas for Lundy's seabirds at sea as well as improving the level of protection of Lundy's seabird colony to SPA status to reflect it's true importance, so it is considered in the same way as the seabird colonies off Pembrokeshire and on Scilly.

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