



# SKOKHOLM

BIRD OBSERVATORY



## Seabird Report 2022

Ymddiriedolaeth Natur  
De a Gorllewin Cymru  
Wildlife Trust of  
South & West Wales

**A summary of the status of seabirds breeding on Skokholm in 2022.**

The lower limits given here, taken from the Skokholm Island Management Plan, have been established by the Wildlife Trust of South and West Wales and endorsed by the Seabird Subgroup of the Islands Conservation Advisory Committee. A green box is an attribute above its lower limit, a red box an attribute below the lower limit stipulated in the plan.

		Whole Island or Annual Plot Total (2021-2017 in parenthesis)	Productivity (2021-2017 in parenthesis)
<b>Great Black-backed Gull</b>		<b>Whole Island population:</b> not to drop below the 2017-2021 mean of 87	
Population	Productivity	<b>Productivity:</b> 3 in any 5 consecutive years with less than 1.10 chicks per breeding pair 78 nests (80, 83, 86, 93, 93)	1.30 (1.51, 1.40, 1.43, 1.40, 1.54)
<b>Herring Gull</b>		<b>Whole Island population:</b> not to drop below the 2017-2021 mean of 306	
Population	Productivity	<b>Productivity:</b> 3 in any 5 consecutive years with less than 0.70 chicks per breeding pair 309 nests (305, 301, 301, 320, 302)	0.69 (0.84, 0.33, 0.69, 0.73, 0.70)
<b>Lesser Black-backed Gull</b>		<b>Whole Island population:</b> 3 in any 5 consecutive years with less than 4600 pairs	
Population	Productivity	<b>Productivity:</b> 3 in any 5 consecutive years with less than 0.60 chicks per breeding pair 833 aia (935, 880, 1028, 1069, 1123)	0.53 (0.89, 0.12, 0.27, 0.63, 0.38)
<b>Guillemot</b>		<b>Whole Island population:</b> not to drop below the 2017-2021 mean of 4635	
Population	Not set	<b>Productivity:</b> not monitored on Skokholm 5515 aol (5065, 5101, 4654, 4316, 4038)	- (0.55-0.61 in 2013)
<b>Razorbill</b>		<b>Whole Island population:</b> not to drop below the 2017-2021 mean of 2941	
Population	Productivity	<b>Productivity:</b> 3 in any 5 consecutive years with less than 0.80 chicks per breeding pair 3965 aol (3356, 3517, 2755, 2585, 2491)	0.64 (0.47, 0.56, 0.63, 0.69, 0.40)
<b>Puffin</b>		<b>Whole Island population:</b> not to drop below the 2017-2021 mean of 8758	
Population	Productivity	<b>Productivity:</b> 3 in any 5 consecutive years with less than 0.74 chicks per breeding pair 10,611 adults (11245, 8534, 7447, 8762, 7800)	0.72 (0.80, 0.78, 0.76, 0.75, 0.80)
<b>Storm Petrel</b>		<b>Study plot population:</b> any measurable decrease in the population	
Population	Not set	<b>Productivity:</b> limit not yet set due to a lack of data 102 transect responses (86, No census, 89, 83, 89)	0.85 (0.80, 0.45, 0.74, 0.55, 0.50)
<b>Fulmar</b>		<b>Whole Island population:</b> not to drop below the 2017-2021 mean of 212	
Population	Productivity	<b>Productivity:</b> 3 in any 5 consecutive years with less than 0.50 chicks per breeding pair 224 aos (225, 207, 198, 217, 213)	0.52 (0.51, 0.51, 0.62, 0.49, 0.45)
<b>Manx Shearwater</b>		<b>Study plot population:</b> any measurable decrease in the population	
Population	Productivity	<b>Productivity:</b> 3 in any 5 consecutive years with less than 0.69 chicks per breeding pair 710 sites in 8000m <sup>2</sup> (670, 730, 655, 739, 584)	0.69 (0.79, 0.68, 0.72, 0.70, 0.80)

**Great Black-backed Gull *Larus marinus***

**Gwylan Gefnddu Fwyaf**

**Fairly Common Breeder and Common Visitor**

26 trapped (including 20 pulli), 47 resighted, 2 controls

1936-1976: 231 trapped, 2012-2021: 509 trapped, 15 retrapped, 266 resighted, 6 controls

Many birds were again absent during March, with daycounts peaking at 86 on the 8<sup>th</sup> and 98 on the 9<sup>th</sup>; March daycounts reached between 117 and 132 in the years between 2015 and 2019, with lower highs in more recent years mirroring the declining breeding population. The majority of the birds present were on territory, with maximum roost counts of 29 on the 8<sup>th</sup> and 26 on the 13<sup>th</sup>; the peak March roost between 2014 and 2019 averaged 40.3 birds, with highs of 48 in 2016 and 2017, however there were highs of only 20 in 2020 and 22 last year. A peak daycount of 98 on the 16<sup>th</sup> was the lowest April high of the last decade, down on a 2013-2021 mean high of 145.9. Despite the low daycounts, communal roosts were larger than of late, with highs from the Bog of 42 on the 4<sup>th</sup>, 54 on the 7<sup>th</sup> and 11<sup>th</sup> and 48 on the 16<sup>th</sup>; the peak was well up on the 16 of last year and was the largest April roost since 2017, however it was down on a 2013-2021 mean of 66.4 and highs of 213 in 2013, 63 in 2015 and 58 in 2016 and 2017. A whole Island census between 25<sup>th</sup> April and 17<sup>th</sup> May located



78 apparently incubating birds (the only nests not visited to confirm the presence of eggs were adjacent to the Bog Lesser Black-backed Gull colony and on offshore stacks); although the total was the 11<sup>th</sup> highest on record, it was down on the 80 mapped last year, highs of 93 in 2016, 2017 and 2018 and a 2013-2021 mean of 85.4 ±sd 6.6. Indeed this proved the fourth year in succession in which the total number of breeding pairs has fallen below the lower limit stipulated in the Skokholm Management Plan. A drop in adult survival is seemingly, at least in part, to blame for the decline in the size of the Skokholm breeding population (see below). A decline in the size of the spring roosts is perhaps indicative of a drop in the number of birds available to recruit to the breeding population.

**The number of Great Black-backed Gull breeding pairs 1928-2022 (where data exists). Control of numbers started in 1949 (destruction of both nests and adults) and stopped in 1985.**



A colour ringing project, begun eight years ago, is providing an insight into how adult return rates influence the number of breeding pairs. Of 23 adults wearing rings in 2014, 19 (82.6%) returned for the 2015 breeding season; the number of nesting pairs dropped from 84 in 2014 to 83 in 2015. There followed an apparent increase in adult survival, during which time the breeding population increased to, and then stabilised at, 93 pairs; of 21 adults wearing colour rings in 2015, 19 returned in 2016 (90.5%), whilst 32 of 33 returned in 2017 (97.0%) and 32 of 36 returned in 2018 (88.9%). Of 43 adults wearing rings in 2018, only 34 (79.1%) returned in 2019, the breeding population dropping



by seven pairs during the same period, whilst 37 of 43 birds (86.1%) returned in 2020 (the nest count dropping by three) and 29 of 37 birds (78.4%) returned last year (the breeding population declined by a further three pairs). This year saw 24 of 29 adults return (82.8%), whilst there were two fewer breeding pairs; this suggests that approximately 28 established adults did not return to breed in 2022 and that 24 new birds recruited in their place. Since this study began, the population has only increased or remained stable with adult survival of 88.9% or better. One potential issue is that the ringing of adults on the nest could deter them from returning (thus making survival appear lower than it is in reality), however if we exclude the data collected in the year after ringing (when any disturbance should take effect), the return rates remain at a similar 89.5% in 2016, 100% in 2017, 90.6% in 2018, 74.2% in 2019, 81.8% in 2020, 78.4% in 2021 and 82.8% this year; it thus seems likely that disturbance during ringing is not responsible for the recent decline in return rates.

The 2018 and 2019 return rates were previously reported as being lower than listed above. However a chance close encounter with a metal only ringed bird in 2020 revealed it to be an adult colour ringed in 2014 (which lost its colour mark between the 2017 and 2018 seasons). A close inspection of birds occupying territories from which colour ringed individuals had previously gone missing revealed a further darvic loss, this from another 2014 ringed adult (which had lost its ring between the 2018 and 2019 breeding seasons). Additionally W:142, ringed as an adult in 2016, lost its colour ring between the 5<sup>th</sup> and 6<sup>th</sup> June 2020; the dropped ring was found in the Puffin study plot, allowing the loss to be attributed to snapping rather than glue failure. Although the rate of ring loss is seemingly low, it will perhaps increase as the rings age; a careful check for metal rings is thus important, although reading the inscribed digits demands good views and significant patience (at least two of the three adults which lost their plastic rings were breeding this year, their metal rings again being read (these do not form part of the adult survival statistics)). In an effort to better understand ring loss, an additional red ring was fitted above the metal ring on every bird ringed this year (as will be the case in future years); it is hoped that this ring will outlast the taller numbered darvic and thus draw attention to any birds with missing rings (below photograph).



It is not clear what may have caused such seemingly high adult mortality since 2018, although interactions with the fishing industry and poisoning have been raised as areas for concern (the H5N1 strain of HPAI can also now be added to this list, see below). Major leg injuries (including missing feet and snapped bones) and punctured torsos have occurred, wounds seemingly too severe to have been caused by anything other than anthropogenic means. Aggressive encounters with other gulls and extreme weather events have previously resulted in broken wings and apparent internal injuries, whilst it seems likely that undamaged corpses are the result of toxins (including those



produced by *Clostridium botulinum*). A full record of the injuries recorded in previous years can be found in the Skokholm Seabird Reports. A juvenile with severe chest lacerations, present at Orchid Bog on 2<sup>nd</sup> October, was the only injured Great Black-backed Gull encountered this year. Dead adults were found on the 3<sup>rd</sup> and 9<sup>th</sup> September and five dead juveniles were logged between 24<sup>th</sup> July and 15<sup>th</sup> September. This species was again regularly observed behind fishing vessels, although some boats were clearly more attractive than others; the peak count was of 12 adults behind the potting vessel Boy's Pride on 22<sup>nd</sup> March (this down on a 2021 high of 21 and a 2020 high of 32). An important step in understanding the Skokholm population will be to discover if such anthropogenic food sources are regularly exploited; additional food will increase survival, particularly during the winter or periods of low seabird and Rabbit numbers, however foraging around boats or mainland food sources also has the potential to seriously impact health.

The H5N1 strain of highly pathogenic avian influenza (HPAI), which was first identified in wild British birds in October 2021, was not confirmed in Pembrokeshire until 2<sup>nd</sup> August this year when dead Gannets collected from Grassholm proved positive. Although none of the dead birds collected from Skokholm tested positive for HPAI this year, a juvenile Great Black-backed Gull found on the North Haven beach on 9<sup>th</sup> September was perhaps infected (below photograph); having shown a lack of coordination, it became stuck on its back, this the position in which it was soon found dead. Adult W:028 (ringed as an adult in 2014) was, perhaps coincidentally, found dead on the same date and W:247, a fourth-summer bird found on Ramsey Island on 22<sup>nd</sup> August, later tested negative for HPAI. Given that the Great Black-backed Gull colour ringing project has shown regular visits to Grassholm, it would seem inevitable that the disease will impact this species; unsurprisingly it has been proposed that gulls will prove a vector for transmission both between colonies and between seasons. It is hoped that colour ringing will highlight any significant drop in survival.



Checks of any accessible and seemingly complete nests from 10<sup>th</sup> April failed to find any eggs until the morning of the 11<sup>th</sup>; a search of the area to the southwest of North Pond located a nest with two eggs, although the other pairs in this area were either yet to build or were lingering near empty nests. The first eggs encountered in 2020 and 2021, a full complement of three in both years, were found on the 16<sup>th</sup>, this also the date of the 2013-2021 first egg mean (with the earliest found on the 10<sup>th</sup> in 2014 (a single egg) and 2018 (a clutch of three) and the latest on the 25<sup>th</sup> in 2013). The first chicks to be seen in 2022 were along Medicine Wall on 17<sup>th</sup> May (two chicks were alongside a hatching egg); the first of last year were found on the 15<sup>th</sup>, the first of 2020 on the 17<sup>th</sup> and the first of 2019 on the 16<sup>th</sup>. Of 40 monitored nests, 14 pairs failed, six pairs fledged a singleton, 14 pairs



fledged two and six pairs fledged three. There were thus 52 young fledged, resulting in a productivity figure of 1.30 fledglings per monitored pair; productivity was 13.9% down on that of 2021 and 10.3% down on a 2013-2021 mean of 1.45 ( $\pm$ se 0.08), but 19.3% up on the 1989-2004 mean of 1.09.

**Productivity estimates 2002-2022 (average number of fledglings per monitored pair).**

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1.09	0.91	-	0.76	1.07	1.02	1.02	-	0.71	0.89	-
2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
1.80	0.93	1.66	1.38	1.54	1.40	1.43	1.40	1.51	1.30	



The Great Black-backed Gulls are spectacular apex predators and an exciting component of the Skokholm seabird assemblage, however it is important we monitor the impact of higher breeding numbers on the Manx Shearwater population. Dead shearwaters were counted for a ninth consecutive year, the vast majority of which had been eaten by Great Black-backed Gulls (see the Manx Shearwater section for further details); a total of 2832 corpses, comprising 2104 adults and 728 youngsters, were marked this year. The number of adults marked was the third lowest of the last nine years, down on a record 3008 logged in 2020 and 11.4% down on a 2014-2021 mean of 2373.6  $\pm$ sd 473.4. The number of youngsters marked was the lowest to date, 37.0% down on a 2014-2021 mean of 1156.1  $\pm$ sd 184.8 (a high of 1398 was recorded in 2016 and a low of 967 last year). The total number of marked corpses was the second lowest to date, only up on the 2661 of 2019 and 19.8% down on a 2014-2021 mean of 3529.8  $\pm$ sd 538.2. There are many factors influencing the number of corpses found; observer effort has been rather consistent, but possible or certain differences between years have included the number of Great Black-backed Gulls present (which may include differences in the number of shearwater specialists (Westerberg *et al.*, 2018)), the number of shearwaters available (including differences in the number of prospecting individuals likely to spend longer on the surface), the prevalence of suitable hunting conditions (governed primarily by the moon cycle and weather), the size of the Rabbit population (which may provide an alternative food source) and the prevalence of puffinosis (which may make young birds easier to catch). Although the number of dead birds currently being found represents a relatively small proportion of the Skokholm shearwater population, there is clearly a benefit to understanding these relationships in greater detail. Ad hoc observations suggested that shearwaters were regularly being dug out from their burrows this year (as opposed to being taken from the entrance or from above ground), indeed birds in four of 185 active study burrows were seemingly accessed via an excavated

hole; this form of hunting has the potential to impact more than just the eaten individual, as it reduces the suitability of nest sites and the stability of the colony.



The percentage of Great Black-backed Gulls colour ringed as fledglings to be encountered in each subsequent year.

Ringed in	2014	2015	2016	2017	2018	2019	2020	2021	Mean
% not seen again	25.58	46.15	53.13	63.89	42.11	22.73	48.72	54.29	<b>44.57</b>
% seen again	74.42	53.85	46.88	36.11	57.89	77.27	51.28	45.71	<b>55.43</b>
% seen 1+ year	48.84	36.54	31.25	27.78	39.47	36.36	30.77	17.14	<b>33.52</b>
% seen 2+ years	37.21	30.77	18.75	22.22	39.47	27.27	17.95		<b>27.66</b>
% seen 3+ years	32.56	26.92	18.75	22.22	28.95	15.91			<b>24.22</b>
% seen 4+ years	30.23	25.00	15.63	16.67	18.42				<b>21.19</b>
% seen 5+ years	18.60	19.23	15.63	8.33					<b>15.45</b>
% seen 6+ years	16.28	13.46	12.50						<b>14.08</b>
% seen 7+ years	13.95	13.46							<b>13.71</b>
% seen 8+ years	9.30								<b>9.30</b>
% found dead	9.30	1.92	9.38	2.78	2.63	6.82	2.56	5.71	<b>5.14</b>

The colour ringing project initiated in 2014 is also providing information on juvenile survival and recruitment. Of 43 fledglings ringed in 2014, 32 (74.42%) have been resighted subsequently, including four which have been found dead. At least 21 birds (48.84%) definitely survived their first full year, 16 (37.21%) survived two years, 14 (32.56%) survived three years, 13 (30.23%) survived four years, eight (18.60%) survived five years, seven (16.28%) survived six years, six (13.95%) survived seven years and four (9.30%) have survived at least eight years (one of which was seen on Skokholm but did not breed). The birds ringed as fledglings in 2015 have provided similar results (see table above). Although these figures do not give an exact measure of juvenile survival, the birds ringed longer ago (of which more have returned to Skokholm and for which there has been longer for them to be encountered on the mainland), suggest that at least 25% of fledglings are surviving to four years of age. Two ringed as fledglings in 2015 and one ringed at the same age in 2017 all bred on Skokholm this year, these the first ringed as youngsters to be found breeding here. Two 2014 ringed fledglings were found breeding on Skomer in 2020, although they were not reported as doing so since (at least one is still alive), whilst a 2016 ringed bird bred there for the first time this year. Only time will tell whether this study provides a sound estimate of recruitment to the breeding population, something which may well be dependent on how many establish territories on Skokholm or Skomer (where they should be seen) as opposed to other less studied breeding sites. Of 49 youngsters which have so far returned to Skokholm at some point, 13 were first back as first-



summers, seven as second-summers, 17 as third-summers, ten as fourth-summers, one as a fifth-summer and one as a sixth-summer; it would appear that birds are most likely to first return in their third summer, with 6.94% of all youngsters ringed between 2014 and 2019 having first returned to the Island at this age (8.98% returned at this age, this including birds first back in earlier years).

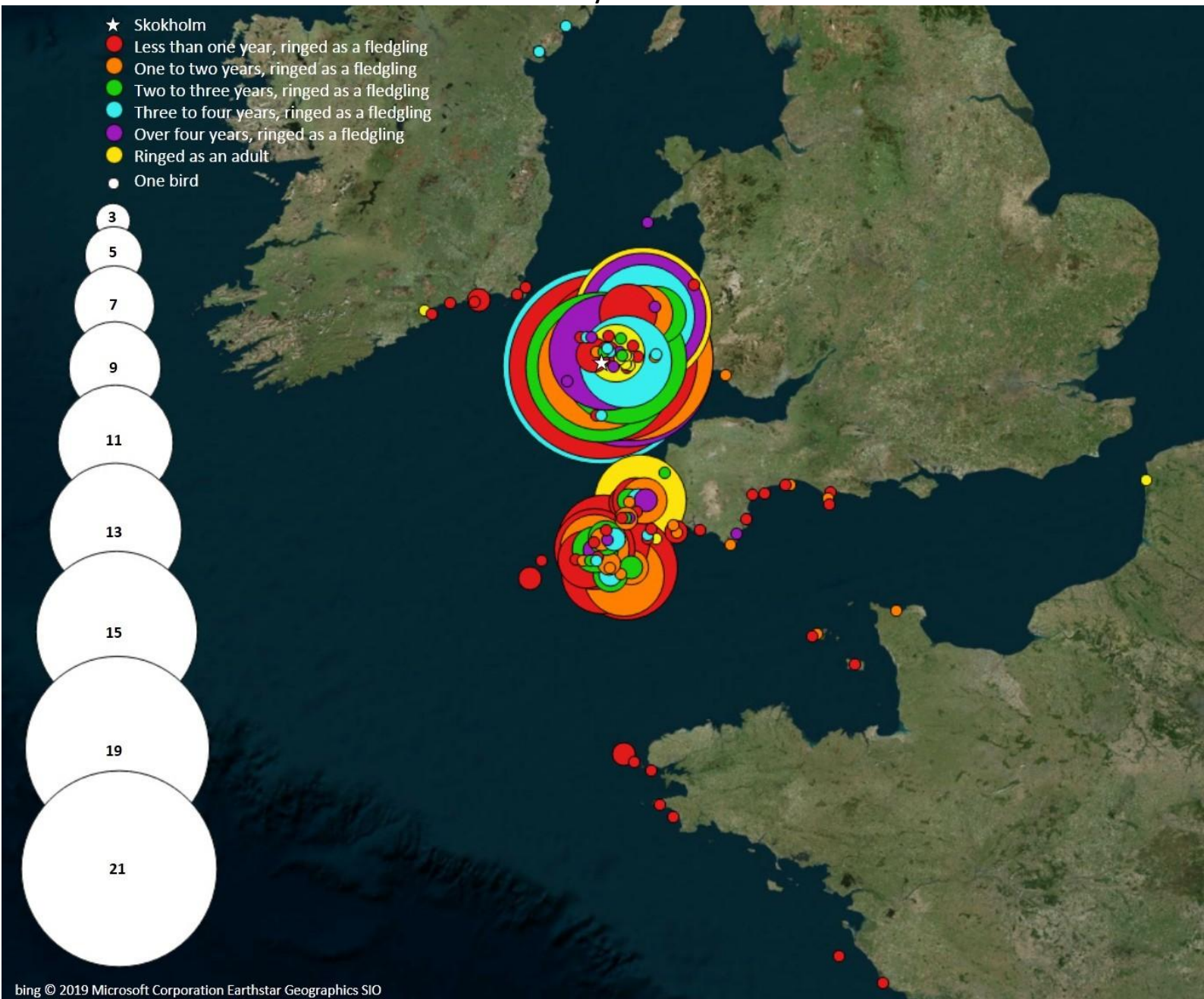
Although resightings away from Skokholm will be somewhat biased by a preponderance of birders at the main roost sites in Cornwall, it seems likely that the typical southerly movements observed in young Great Black-backed Gulls reflect their genuine post-fledging distribution (see map below). Birds gravitate back towards Pembrokeshire as they get closer to breeding age (see both the table and map below). In addition to those sightings listed below, there were 12 individuals ringed as breeding adults and found 7.5km away on the Gann Estuary (birds captured on their Skokholm nests between 2014 and 2022). The ages given in the following table are known for birds ringed as near-fledglings, whereas 'adult' denotes a bird ringed at a minimum of four years which is thus of unknown age. All of these records were received since a similar table was published in the 2021 Seabird Report.

Darvic	Ring	Location	County/COUNTRY	Age	Date
W:039	HT94878	Kete	Pembrokeshire	Eighth-summer	04/09/22
W:055	HT94917	Nevern Estuary	Pembrokeshire	Eighth-winter	16/02/22
W:057	HT94918	Gann Estuary	Pembrokeshire	Ninth-winter	15/10/22
W:064	HT94925	Skomer Island	Pembrokeshire	Eighth-summer	20/04/22
W:064	HT94925	Gann Estuary	Pembrokeshire	Ninth-winter	26/12/22
W:077	HT94934	Skokholm	Pembrokeshire	Eighth-summer	08/05/22
W:083	HT94940	Skokholm	Pembrokeshire	Seventh-summer	28/08/22
W:085	HT94942	Gannel River, Newquay	Cornwall	Seventh-summer	08/09/22
W:108	HT94971	Skokholm	Pembrokeshire	Seventh-summer	10/08/22
W:108	HT94971	Gann Estuary	Pembrokeshire	Eighth-winter	09/12/22
W:114	HT94943	Skomer Island	Pembrokeshire	Seventh-summer	15/06/22
W:119	HT94979	Skokholm	Pembrokeshire	Seventh-summer	30/04/22, 28/08/22
W:121	HT94981	Skokholm	Pembrokeshire	Seventh-summer	09/08/22 (breeding)
W:124	HT94955	Skokholm	Pembrokeshire	Seventh-summer	07/06/22 (breeding)
W:154	MA37811	Skokholm	Pembrokeshire	Sixth-summer	07/05/22
W:158	MA37815	Bardsey Island	Gwynedd	Sixth-summer	21/08/22
W:162	MA37820	Skomer Island	Pembrokeshire	Sixth-summer	28/07/22 (breeding)
W:168	MA37826	Skokholm	Pembrokeshire	Sixth-summer	08/05/22
W:195	MA37862	Gothian Sands, Gwithian	Cornwall	Fifth-winter	28/12/21 (sic)
W:195	MA37862	Skokholm	Pembrokeshire	Fifth-summer	05/04/22 (breeding)
W:219	MA37884	Ballyteige NNR, Wexford	IRELAND	Fifth-winter	16/11/21 (sic)
W:219	MA37884	Skokholm	Pembrokeshire	Fifth-winter	20/03/22
W:219	MA37884	Gann Estuary	Pembrokeshire	Sixth-winter	25/11/22
W:221	MA37886	Gann Estuary	Pembrokeshire	Sixth-winter	26/12/22
W:230	MA37844	Dale Airfield	Pembrokeshire	Adult	29/08/22
W:246	MA37915	Skokholm	Pembrokeshire	Fourth-summer	01/05/22, 27/06/22
W:247	MA37916	Skokholm	Pembrokeshire	Fourth-summer	10/05/22
W:247	MA37916	Ramsey Island	Pembrokeshire	Fourth-summer	22/08/22 (dead)
W:254	MA37919	Amroth	Pembrokeshire	Fourth-winter	19/02/22
W:254	MA37919	Gann Estuary	Pembrokeshire	Fourth-summer	08/03/22
W:254	MA37919	Skokholm	Pembrokeshire	Fourth-summer	27/04/22
W:267	MA37924	Gann Estuary	Pembrokeshire	Fifth-winter	03/12/22
W:271	MA37928	Celtic Sea, 41km SW of Skokholm		Fifth-winter	16/10/22



<b>W:272</b>	MA37929	Slapton Sands	Devon	Fourth-summer	18/06/22, 05/08/22
<b>W:274</b>	MA37931	Camel Estuary	Cornwall	Fifth-winter	17/12/22

The movements of Skokholm ringed Great Black-backed Gulls 2014-2022. The different colours represent the different ages at which the birds were resighted. 38 birds ringed as fledglings and resighted on Skokholm over four years later and 46 birds ringed as adults and resighted on the Gann Estuary are omitted.



Darvic	Ring	Location	County/COUNTRY	Age	Date
<b>W:277</b>	MA37934	Skomer Island	Pembrokeshire	Fourth-summer	12/09/22
<b>W:294</b>	MA37962	Skokholm	Pembrokeshire	Third-summer	23/04/22, 27/04/22
<b>W:294</b>	MA37962	Skomer Island	Pembrokeshire	Third-summer	12/09/22
<b>W:296</b>	MA37964	Gann Estuary	Pembrokeshire	Third-winter	15/03/22
<b>W:304</b>	MA37979	Newquay Harbour	Cornwall	Third-summer	23/04/22
<b>W:304</b>	MA37979	Newlyn Harbour	Cornwall	Third-summer	20/05/22

<b>W:304</b>	MA37979	Gothian Sands, Gwithian	Cornwall	Fourth-winter	09/10/22, 24/10/22
<b>W:305</b>	MA37980	Skokholm	Pembrokeshire	Third-summer	07/09/22
<b>W:315</b>	MA37989	Skokholm	Pembrokeshire	Third-summer	17/04/22, 28/08/22
<b>W:317</b>	MA37991	Skokholm	Pembrokeshire	Third-summer	25/07/22
<b>W:318</b>	MA37992	Sandy Haven	Pembrokeshire	Third-winter	24/12/21 (sic)
<b>W:320</b>	MA37994	Skokholm	Pembrokeshire	Third-summer	28/08/22
<b>W:325</b>	MA37999	Skokholm	Pembrokeshire	Third-summer	28/08/22
<b>W:325</b>	MA37999	Gann Estuary	Pembrokeshire	Fourth-winter	09/12/22
<b>W:332</b>	MA46913	Skokholm	Pembrokeshire	Second-summer	07/09/22
<b>W:339</b>	MA46920	Sandy Haven	Pembrokeshire	Second-winter	24/12/21 (sic)
<b>W:343</b>	MA46924	Newlyn Harbour	Cornwall	Third-winter	09/10/22
<b>W:346</b>	MA46927	Gannel River, Newquay	Cornwall	Second-winter	18/02/22
<b>W:346</b>	MA46927	Camel Estuary	Cornwall	Third-winter	15/10/22
<b>W:347</b>	MA46928	Gothian Sands, Gwithian	Cornwall	Second-summer	07/05/22
<b>W:348</b>	MA46929	Gann Estuary	Pembrokeshire	Second-winter	27/12/21 (sic)
<b>W:358</b>	MA46942	Gann Estuary	Pembrokeshire	Third-winter	23/11/22, 24/12/22
<b>W:361</b>	MA46946	Dale Airfield	Pembrokeshire	Second-summer	10/09/22
<b>W:365</b>	MA46949	Hayle Estuary	Cornwall	Second-winter	03/03/22
<b>W:365</b>	MA46949	Skokholm	Pembrokeshire	Second-summer	06/09/22
<b>W:370</b>	MA46956	Gann Estuary	Pembrokeshire	Second-winter	09/12/22
<b>W:376</b>	MA46963	Dale Airfield	Pembrokeshire	First-summer	02/09/22, 03/09/22
<b>W:376</b>	MA46963	Gann Estuary	Pembrokeshire	First-summer	21/09/22
<b>W:379</b>	MA46966	Skokholm	Pembrokeshire	First-summer	26/08/22
<b>W:382</b>	MA46969	Newlyn Harbour	Cornwall	First-winter	18/12/21 (sic)
<b>W:384</b>	MA46971	Gann Estuary	Pembrokeshire	Second-winter	09/12/22
<b>W:386</b>	MA46975	Camel Estuary	Cornwall	First-summer	16/08/22
<b>W:388</b>	MA46977	Île d'Yeu, Vendée	FRANCE	First-winter	12/02/22
<b>W:391</b>	MA46980	Anse du Loc'h, Plogoff	FRANCE	First-winter	16/02/22
<b>W:392</b>	MA46981	Gothian Sands, Gwithian	Cornwall	First-winter	18/12/21 (sic)
<b>W:400</b>	MA46974	Skokholm	Pembrokeshire	First-summer	09/09/22
<b>W:419</b>	MA55411	Gann Estuary	Pembrokeshire	First-winter	23/12/22

Breeding season roosts again formed regularly in the Bog and were often larger than in recent years; whereas there were 11 roosts of 25 birds or more between 15<sup>th</sup> April and 15<sup>th</sup> June in 2020 and only two during the same period in 2021, there were 21 this year including peaks of 48 on 16<sup>th</sup> April, 54 on 13<sup>th</sup> May and 49 on 8<sup>th</sup> June. The first two flying fledglings were noted on 29<sup>th</sup> June, these the earliest to have been encountered this decade and four days earlier than the 2014-2021 mean (the earliest during this period were recorded on 30<sup>th</sup> June in 2016 and 2019 and the latest on 11<sup>th</sup> July 2021). The largest July roosts were of only 30 on the 5<sup>th</sup> and 29 on the 19<sup>th</sup>, indeed it was not until mid-August that the larger post-breeding roosts began to develop, with the largest gatherings being of 68 on the 16<sup>th</sup> and 43 on the 18<sup>th</sup>, 25<sup>th</sup> and 26<sup>th</sup> (there were three August peaks of between 68 and 86 during the same period last year). The largest September roost counts were up on a 2021 high of 48, albeit down on those logged in most recent years; peak counts of 63 on the 5<sup>th</sup>, 69 on the 11<sup>th</sup> and 95 on the 13<sup>th</sup> were down on September highs of 130 in 2020, 113 in 2019, 135 in 2018, 183 in 2017, 193 in 2016, 179 in 2015 and 355 in 2013 (the September 2014 maximum was only 52). Numbers were also down in October, with single-figure daycounts on 19 dates; there were 12 such counts in 2015 and 13 in 2018, with the remaining years this decade seeing between one and 11. Peak October daycounts of 39 on the 6<sup>th</sup> and 46 on the 7<sup>th</sup> were well down on a 2021 high of 152 and a 2013-2021 mean October high of 152.3 (there was a low of 91 in 2020 and a high of 264 in 2013). The only November daycounts in excess of ten were of 12 on the 24<sup>th</sup>, 15 on the 25<sup>th</sup> and 17 on the 27<sup>th</sup>, these also the lowest highs this decade (the 2013-2021 mean November high is 82.0). Counts



during the first ten days of December peaked at 18 on the 7<sup>th</sup>. The first fledgling to be seen away from the Island was at the Gann on 23<sup>rd</sup> December; this was the first year since the colour ringing project began in which a youngster was not seen in southwest England before the end of the year (the 2014-2021 mean first southwest resighting date is 29<sup>th</sup> September, with a bird at Newquay Harbour, Cornwall on 10<sup>th</sup> August 2019 the earliest and different birds at Gothian Sands and Newlyn Harbour (both Cornwall) on 5<sup>th</sup> December 2021 the latest).

**Ringing recovery** MA34201 (white darvic with red L:CD7)

**Originally ringed** as a chick, ST GEORGE'S (LOOE) ISLAND, LOOE, CORNWALL 18<sup>th</sup> June 2015

**Previously recovered** as a first-winter, ILE DE SEIN, FINISTÈRE, FRANCE 8<sup>th</sup> October 2015

**Previously recovered** as a second-winter, PORT DU LOCH, BRITTANY, FRANCE 14<sup>th</sup> January 2017

**Recovered** as an adult, THE HEAD, SKOKHOLM 20<sup>th</sup> March 2022

**Finding condition** Colour ring read in field

**Distance travelled** 163km at 340 degrees (NNW)

**Days since ringed** 2467

This is only the second Looe Island ringed bird to be seen on Skokholm following L:AU8, a bird ringed as a chick in 2011 and resighted here in September 2013 after 807 days. L:CD7 was associating with W:219, a Skokholm bird ringed as a chick in 2017 which was first seen back on the Island in May 2021 and which was in County Wexford in November 2021. Neither W:219 or L:CD7 were seen on Skokholm again (although the former was on the Gann Estuary in November 2022).



**Ringing recovery** MA56048 (green darvic with white B:191)

**Originally ringed** as a chick, YNYS GWYLAN-FAWR, GWYNEDD 15<sup>th</sup> June 2022

**Recovered** as a first-winter, NORTH PLAIN, SKOKHOLM 29<sup>th</sup> September 2022

**Finding condition** Colour ring read in field

**Distance travelled** 127km at 199 degrees (SSW)

**Days since ringed** 106

This is the second bird colour ringed on the Gwylans to be resighted on Skokholm. Given that the majority of Skokholm ringed youngsters disperse to the south, it is perhaps unsurprising that birds ringed in north Wales are following a similar pattern.

**Herring Gull** *Larus argentatus*

**Gwylan y Penwaig**

**Common Breeder** Abundant Breeder in the 1970s

36 trapped (including 2 pulli), 3 retrapped, 36 resighted

1934-1976: 13,265 trapped, 2013-2021: 142 trapped, 28 retrapped, 59 resighted, 1 control

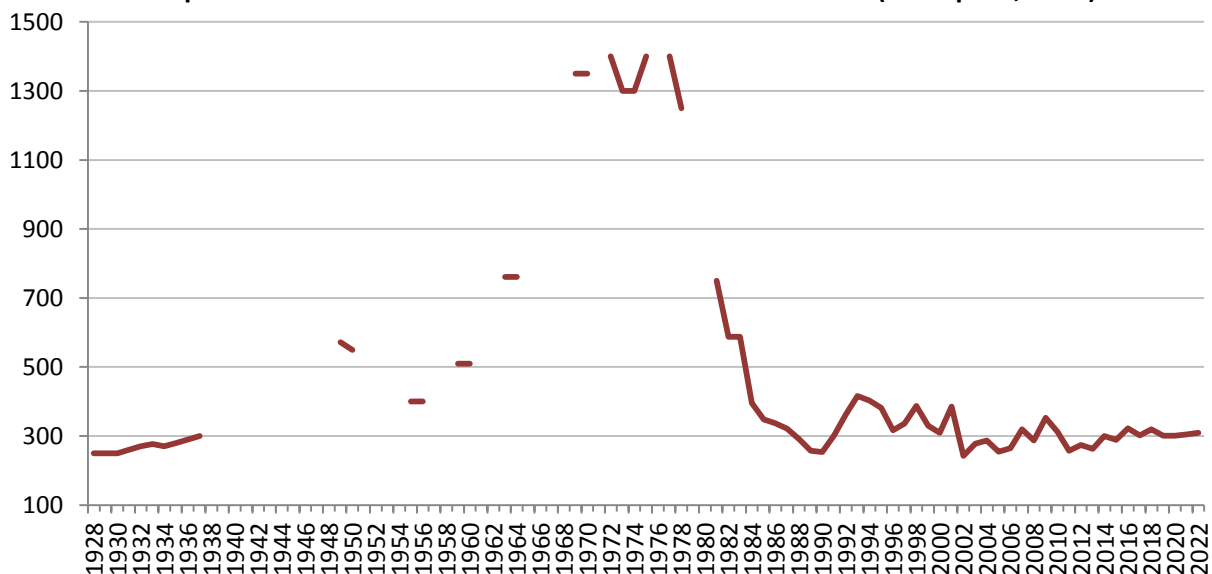
March daycounts again fluctuated widely, with 80 or less logged on ten dates, including lows of 32 on

the 7<sup>th</sup>, 41 on the 8<sup>th</sup> and 42 on the 20<sup>th</sup> when birds fed and roosted away from Skokholm, but highs of 293 on the 3<sup>rd</sup> and 278 on the 23<sup>rd</sup> when many were back on territory. Roosts again included a reasonable number of young birds (for example a group of 13 subadults at North Pond on 29<sup>th</sup> March), this in contrast with observations made of Lesser Black-backed Gulls during the same period. A 15<sup>th</sup> April check of early nests around the Neck found them all to be empty, the first lone egg being present in Peter’s Bay on the 17<sup>th</sup> (neighbouring nests were all empty or still under construction); this was two days later than the first of last year (also found in Peter’s Bay), but one day earlier than the 2013-2021 first egg mean (see table below). It was not until the 23<sup>rd</sup> that two eggs were seen in Dumbbell Bay. Whole Island counts between the 15<sup>th</sup> and 17<sup>th</sup> May located 302 active nests, whilst an additional seven were present on the east side of the Stack on 1<sup>st</sup> June; a total of 309 nests was four more than recorded last year and 3.8% up on the 2012-2021 mean (297.7 ±sd 18.3), but was 1.9% down on the 1984-2021 mean (315.0 ±sd 45.5). This was the first year in four in which the total has risen above the lower limit set in the Skokholm Management Plan. The number of breeding pairs has apparently stabilised at a level close to that seen in the 1930s (the 1928-1937 mean was 269.70 ±sd 17.47), counts well down on the artificial peak of the 1970s (see chart below).

**When in April the first egg was located in each year 2013-2022, along with the 2013-2021 mean.**

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Mean
18 <sup>th</sup>	14 <sup>th</sup>	25 <sup>th</sup>	17 <sup>th</sup>	18 <sup>th</sup>	19 <sup>th</sup>	18 <sup>th</sup>	22 <sup>nd</sup>	15 <sup>th</sup>	17 <sup>th</sup>	18 <sup>th</sup> April

**The number of breeding pairs 1928-2022 (where data exists). The 1970s peak was attributed to the exploitation of local fish waste and the decline to botulism (Thompson, 2007).**



**The number of breeding pairs and productivity estimates (average number of fledglings per sample pair) 2008-2022.**

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
287	353	312	257	274	263	300	289	322	302	320	301	301	305	309
-	-	0.82	0.67	1.15	0.72	0.70	0.66	0.86	0.70	0.73	0.69	0.33	0.84	0.69

The monitoring of adult survival in Herring Gulls has been undertaken on Skomer for many years, however recent struggles with trapping sufficient adult birds to produce a reliable estimate led to the Islands Conservation Advisory Committee recommending that a project be established on Skokholm in 2017. There were 13 adults colour ringed in 2017 (all trapped on the nest), 17 in 2018 (11 on the nest and six in the Gull Trap), ten in 2019 (nine on the nest and one in a Spring Trap) and four in 2021 (all in the Gull Trap); a COVID-19 dictated staffing shortage meant that there were no adults trapped in 2020. Each bird is ringed with a red darvic inscribed W:9\*\* or W:8\*\* in white, the



latter two digits identifying the individual. Birds trapped away from the nest are only included in the adult survival sample in the year after they have been found at a nest; seven of the 11 trapped in this way were found at a nest prior to this season and one of the 2021 birds was found this year (and will be included in the 2023 estimate). Of the 13 birds marked in 2017, 11 bred in 2018 (84.6%). Of 26 with rings in 2018, 17 (65.4%) were still alive during the 2019 breeding season, four of these Gull Trap birds (100% survival) and 13 nest trapped birds (59.1%); two of the nest trapped birds were only seen elsewhere and were seemingly not breeding, whilst two had changed nest site (one moved 370m and one moved 837m). Of 27 with rings in 2019, 19 (70.4%) were alive in 2020, five of these Gull Trap birds (100%) and 14 nest trapped birds (63.6%); five of the nest trapped birds and two of the Gull Trap birds were not seen at a nest. All 20 alive in 2020 were resighted in 2021; four nest trapped birds and one Gull Trap bird were not found breeding (four were only seen on the mainland). Of the 21 alive in 2021, 18 (85.7%) were logged this year, seven of these Gull Trap birds (100%) and 11 nest trapped birds (78.6%); four of these were not seen at a nest, including two only seen on the mainland. A further 36 adults were colour ringed this year, 35 of these taken in the Gull Trap (19 were subsequently linked to a breeding territory).



**For a fifth successive year, the only colour ring resightings away from Skokholm came from mainland Pembrokeshire.**

Darvic	Ring	Location	County	Age	Date
W:998	GV22352	Freshwater West	Pembrokeshire	Adult	24/07/22 (dead)
W:984	GV22423	Gann Estuary	Pembrokeshire	Adult	25/11/22, 29/11/22
W:978	GV22428	Gann Estuary	Pembrokeshire	Adult	05/10/22, 04/12/22
W:976	GV22420	Gann Estuary	Pembrokeshire	Adult	06/10/22
W:974	GV22432	Johnston	Pembrokeshire	Adult	14/01/22
W:972	GR87973	Gann Estuary	Pembrokeshire	Adult	05/10/22
W:971	GV22440	Gann Estuary	Pembrokeshire	Adult	26/08/22
W:970	GV22457	Gann Estuary	Pembrokeshire	Adult	01/01/22, 05/10/22
W:965	GV83063	Gann Estuary	Pembrokeshire	Adult	06/10/22
W:964	GV83064	Gann Estuary	Pembrokeshire	Adult	01/01/22, 06/10/22
W:961	GV83058	Gann Estuary	Pembrokeshire	Adult	26/02/22
W:958	GY02321	Pembroke Dock	Pembrokeshire	Adult	12/08/22
W:958	GY02321	Gann Estuary	Pembrokeshire	Adult	30/08/22, 06/10/22, 28/12/22
W:957	GY02323	Frainslake Beach	Pembrokeshire	Adult	23/08/22 (dead)
W:899	GY02325	Gann Estuary	Pembrokeshire	Adult	05/10/22

<b>W:898</b>	GY02304	Gann Estuary	Pembrokeshire	Adult	30/08/22
<b>W:897</b>	GR87920	Gann Estuary	Pembrokeshire	Adult	29/08/22
<b>W:893</b>	GY02309	Gann Estuary	Pembrokeshire	Adult	21/09/22
<b>W:889</b>	GY02327	Gann Estuary	Pembrokeshire	Adult	05/10/22, 24/12/22
<b>W:888</b>	GY02328	Dale Airfield	Pembrokeshire	Adult	08/09/22
<b>W:888</b>	GY02328	Gann Estuary	Pembrokeshire	Adult	05/10/22, 18/11/22, 25/11/22
<b>W:883</b>	GY02334	Gann Estuary	Pembrokeshire	Adult	05/10/22
<b>W:881</b>	GY02335	Dale Airfield	Pembrokeshire	Adult	08/09/22
<b>W:878</b>	GY02337	Gann Estuary	Pembrokeshire	Adult	28/12/22
<b>W:872</b>	GY02368	Gann Estuary	Pembrokeshire	Adult	05/10/22

Five of the colour ringed birds have been found dead, including three this year; in addition to the two found on Pembrokeshire beaches (see table above), W:955 (ringed on 15<sup>th</sup> July 2022) was found dead in South Haven on 24<sup>th</sup> August. The latter was tested for HPAI by the Animal and Plant Health Agency but proved negative; although the cause of death was not determined, the necropsy found ‘scant gastro-intestinal contents ... suggestive of little recent feeding, [with] poor body condition and malnutrition ... likely to have contributed to its demise’. An additional eight unringed dead adults were recorded this year, seven of which were found seemingly uninjured (including two on 29<sup>th</sup> May which were dead at their nests in the west arm of North Haven). The eighth was a bird found wounded at Orchid Bog on 21<sup>st</sup> July which perished on the 24<sup>th</sup>. A lethargic and uncoordinated adult present at the Sugarloaf on 25<sup>th</sup> July was still alive two days later; it was not seen again. A total of nine dead adults was up on the two of 2020 and the three of 2021, however there was no evidence to suggest that this was linked to the H5N1 strain of highly pathogenic avian influenza. Injured Herring Gull are encountered most years (broken limbs and puncture wounds are most common, see previous Skokholm Seabird Reports); it would seem likely that interactions with fishing gear are responsible for some of these injuries, unsurprisingly so given how this species searches around boats for food (additionally a dead bird found in 2021 was strangled by fishing line). Following four impacted birds in 2019, no incidences of oiling have been recorded for three years.



The first chicks were seen in Little Bay on 16<sup>th</sup> May, these one day later than the first of last year but one day earlier than the 2017-2021 mean; they were destroyed during an eight metre swell on the



night of the 17<sup>th</sup>. The first two flying fledglings were to the south of Winter Pond on 7<sup>th</sup> July, this seven days later than the first of last year and four days later than the 2013-2021 mean; although the first were also on the 7<sup>th</sup> in 2013 and 2017, the only later first fledgling noted during this period was aloft on 10<sup>th</sup> July in 2015 (the earliest were on 30<sup>th</sup> June in 2016 and 2021). Checks of the Neck productivity plot during July, where 134 pairs had established nests (seven fewer than last year), located a maximum of 90 fledging-sized young (along with 26 smaller chicks, three of which had fledged by 13<sup>th</sup> August (these late attempts were the result of first brood egg loss which occurred during the same rough weather which took the first chicks)). The resulting 2022 productivity figure of 0.69 fledged young per pair was 17.9% down on the 0.84 of last year, but matched the 2013-2021 mean (0.69  $\pm$ sd 0.15); there was a high during this period of 0.86 in 2016 and a low of 0.33 in 2020, with the remaining years all seeing productivity of at least 0.66 fledglings per pair. Disappointing 2020 productivity was linked to a period of rough May weather which resulted in low nests being destroyed by unseasonable 11 metre waves. The weather last May was even more unusual, with southwesterly winds gusting at up to 69mph and the Mid Channel Rock Lighthouse Beacon off St Ann's Head registering an average wave height of 11 metres and multiple waves of at least 16 metres; nevertheless overall productivity was high, with the pairs around the Neck which were not impacted by the storm doing particularly well. This May was thus the third in a row in which nests were destroyed by large seas.

August saw the customary post-breeding departure of both adults and fledglings, however a mean daycount of 120.3 was the highest of the last decade and up on a 2013-2021 mean of 74.7; although there were lows of 40 on the 20<sup>th</sup>, 45 on the 21<sup>st</sup> and 30 on the 22<sup>nd</sup>, there were six daycounts of 210 or more and highs of 320 on the 6<sup>th</sup>, 290 on the 7<sup>th</sup> and 238 on the 25<sup>th</sup> (primarily made up of large feeding flocks off the Bluffs (peaking at 220 on the 7<sup>th</sup>), off Crab Bay (peaking at 168 on the 25<sup>th</sup>) and taking ants on North Plain (peaking at 210 on the 11<sup>th</sup>)). As is typically the case, fewer Herring Gulls visited Skokholm in September; there were four single-figure daycounts and ten counts of 20 or less, although highs of 177 on the 3<sup>rd</sup> (157 of which roosted on the Island) and 242 on the 25<sup>th</sup> (the vast majority of which were feeding offshore) contributed to the highest September bird-days total of the last decade (1502 being well up on the previous high of 1150 logged in 2015). Given the busy late summer, it was perhaps surprising that October daycounts were so low, indeed there were no birds seen at all on four dates, a further 21 dates with only single-figure counts and highs of just 25 on the 2<sup>nd</sup> and 73 on the 23<sup>rd</sup> (63 of which headed southwest through Broad Sound); an October bird-days total of 221 was the lowest this decade, down on a 2013-2021 mean of 1046.2. Numbers again increased in November, albeit not to the extent seen in recent years; although there were still 19 daycounts of less than 30, there were highs of 132 on the 11<sup>th</sup>, 75 on the 25<sup>th</sup> and 83 on the 27<sup>th</sup> when evening roosts formed. A November bird-days total of 961 was down on a 2013-2021 mean of 2945.9 and the peak daycount was down on a mean of 362.9 logged during the same period (there were daycount highs of 585 in 2015, 588 in 2016 and 612 in 2017, the majority of which were feeding with the smaller gulls in Broad Sound). The first ten days of December saw highs of 59 on the 1<sup>st</sup>, 51 on the 2<sup>nd</sup> and 32 on the 5<sup>th</sup>, this quite the contrast to last year when large numbers feeding in Broad Sound led to record daycounts of 465 on the 1<sup>st</sup>, 838 on the 2<sup>nd</sup> and 425 on the 3<sup>rd</sup>.

#### Lesser Black-backed Gull *Larus fuscus*

Gwylan Gefnddu Leiaf

**Abundant Breeder** previously a Very Abundant Breeder

51 trapped (including 18 pulli), 3 retrapped, 7 resighted, 2 controls

1938-1976: 11,912 trapped, 2013-2021: 620 trapped, 29 retrapped, 107 resighted, 17 controls

A mean March daycount of 419.9 was the lowest this decade, down on a 2013-2021 mean of 603.8, a high during that period of 827.0 in 2014 and a low of 473.4 last year (the four lowest mean March daycounts have occurred in the last four years). The number of birds within the colonies again fluctuated considerably during the day; for example the Middle Heath colony contained 43 birds on the morning of 5<sup>th</sup> March but only one that afternoon, whilst the Frank's Point colony contained 12

birds on the morning of the 20<sup>th</sup> but 73 in the evening and 31 on the morning of the 25<sup>th</sup> but 89 in the evening. The larger communal roosts recorded in previous years were again generally absent; the majority of March counts were of birds on territory, with the largest roosts forming in the Bog where there were at least 120 on the 1<sup>st</sup>, 3<sup>rd</sup> and 21<sup>st</sup>. A more detailed description of how the gulls prepare for the breeding season was available in 2015 and 2016 due to the GPS trackers fitted by the British Trust for Ornithology in 2014 (funded by the Department of Energy and Climate Change) which gave some idea as to when birds first returned to Skokholm (see the relevant Skokholm Seabird Reports for details of return dates and the range of over-wintering strategies used); the last of the functioning trackers and the base station were removed in 2017. A daycount of 750 on the 11<sup>th</sup> was the lowest April maximum this decade, down on a 2013-2021 mean high of 1274.1; there were highs of 2109 in 2014 and 1703 in 2016, whilst the four lowest peaks have occurred in the last four years (including previous lows of 759 in 2019 and 796 last year). April nest checks at Middle Heath, Green Heath and the Neck located two eggs at the former site on the 24<sup>th</sup> (in the same nest); these were found on the same day as the first of 2021 but were three days earlier than the 2013-2021 mean.

**When the first egg was located in each year 2014-2022, along with the 2013-2021 first egg mean.**

2014	2015	2016	2017	2018	2019	2020	2021	2022	Mean
24 <sup>th</sup> April	4 <sup>th</sup> May	25 <sup>th</sup> April	1 <sup>st</sup> May	26 <sup>th</sup> April	28 <sup>th</sup> April	25 <sup>th</sup> April	24 <sup>th</sup> April	24 <sup>th</sup> April	27 <sup>th</sup> April



Vantage point counts of the inland breeding subcolonies and a full census of the coast nesting pairs were made between the 15<sup>th</sup> and 19<sup>th</sup> May, during which 750 apparently incubating adults were located; this was the lowest count in over 50 years, a total down on the 795 of 2020, the 842 of last year and 29.1% down on the 2014-2021 mean (1057.9 ±sd 248.3). In an effort to reduce disturbance in the colony, the Islands Conservation Advisory Committee has suggested that the walkthrough surveys, which have traditionally been used to check the accuracy of the point counts, are no longer performed annually; there was thus no walkthrough for a third year (the lack of a walkthrough in 2020 was due to a COVID-19 dictated lack of personnel). The number of apparently incubating adults (as assessed using the vantage point counts) and the number of nests containing eggs (as located during walkthrough surveys) invariably differ, primarily due to incubating birds being hidden by



vegetation (particularly in areas where there are no raised vantage points). Between 2013 and 2019 there were on average 12.83% more nests containing eggs than apparently incubating adults (although this was as low as 0.82% in a year with a particularly short breeding season sward height and as high as 27.32% when vegetation was taller (see table below)). The walkthrough surveys also reveal a variable number of empty nests; over the period 1991-2002 the count of empty nests varied from 11-44% of the total number of nests (with a mean of 22.7% (Thompson, 2007)), although between 2013 and 2019 this dropped to between 4.98% and 17.62% (with a mean of 14.03%). It is unclear whether empty nests are second nests made by the pairs present, nests robbed of eggs or nests where adults are yet to lay. The breeding season is certainly a protracted one, with the first 2022 chick located on 22<sup>nd</sup> May (the 2013-2021 mean is 24<sup>th</sup> May, with one on the 18<sup>th</sup> last year the earliest and one on 6<sup>th</sup> June 2015 the latest), but a nest near the Top Tank containing recently hatched young on 14<sup>th</sup> July, the latter five days after the first fledgling was seen near the Top Tank (the 2016-2021 first fledgling mean is 4<sup>th</sup> July, with the earliest on 30<sup>th</sup> June 2020). It would thus seem likely that some (but given their extremely close proximity to each other, not all), empty nests belong to additional pairs. Between 2013 and 2019 the total number of nests (including empty nests) was between 20.68% and 43.45% higher than the vantage point total (with a mean of 31.36%, see table below).

**A comparison of vantage point counts (of apparently incubating adults) and the number of nests (both empty and with eggs) located during walkthrough surveys of the same areas. The difference each year provided a correction factor to predict the number of nests (both empty and with eggs) which were actually present. The 2013-2019 means may be useful in years when walkthrough surveys are not possible/desirable.**

Year	Vantage point count	Walk through count	Empty/ With egg(s)	Percentage of empty nests	Difference between counts (%)*	Correction (no empty nests)	Difference between counts (%)**	Correction (including empty nests)
2019	194aia	251	39 212	15.54	9.28	1.09	29.38	1.29
2018	266aia	321	16 305	4.98	14.66	1.15	20.68	1.21
2017	366aia	517	51 466	9.86	27.32	1.27	41.26	1.41
2016	550aia	789	139 650	17.62	18.18	1.18	43.45	1.43
2015	493aia	636	110 526	17.30	6.69	1.07	29.01	1.29
2014	613aia	827	135 692	16.32	12.89	1.13	34.91	1.35
2013	245aia	296	49 247	16.55	0.82	1.01	20.82	1.21
<b>Mean</b>				<b>14.03</b>	<b>12.83</b>	<b>1.13</b>	<b>31.36</b>	<b>1.31</b>

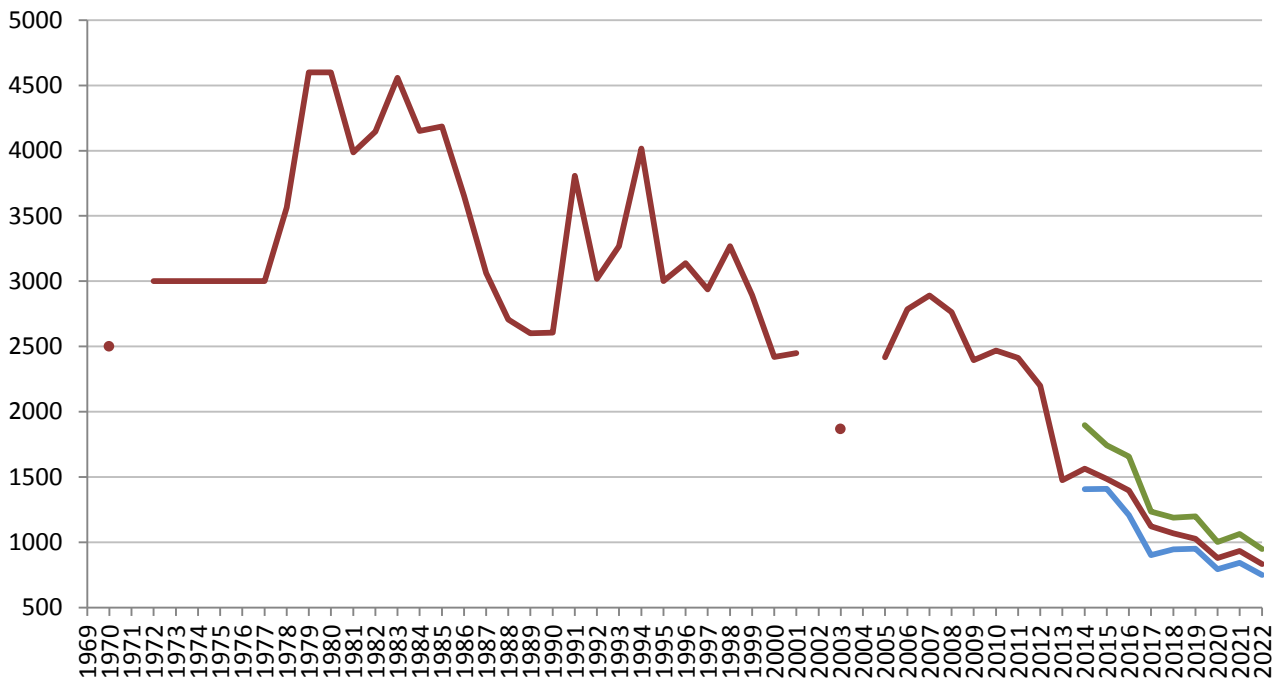
\* How many more nests (containing eggs) were present than the number of apparently incubating birds seen (as a percentage).

\*\* How many more nests (including empty nests) were present than the number of apparently incubating birds seen (as a percentage).

Of the 750 apparently incubating adults counted this year, 113 were in open (primarily coastal) areas where it was apparent that additional pairs were not present. A mean 2013-2019 correction factor of 1.13 (see table above) would suggest that the remaining 637 apparently incubating birds actually represented a total of 720 nests with eggs (giving a 2022 breeding population estimate of 833); this is the lowest estimate of the post-War era, down on the previous low of 880 recorded in 2020 and 29.7% down on the 2014-2021 mean (1185.4  $\pm$ sd 261.2). A mean 2013-2019 correction factor of 1.31 would suggest that the remaining 637 apparently incubating birds actually represented a total of 834 nests (including empty nests); this gives a 2022 breeding population estimate of 947, a total down on the 2014-2021 mean (1373.6  $\pm$ sd 340.1) and the first estimate of less than four-figures. The actual number of breeding pairs probably lies somewhere between these two estimates (833-947). It was clear during the vantage point surveys that the vegetation was taller and thicker than usual this year; it is thus likely that the estimate of inland pairs (using the 2013-2019 mean correction factor)

will be lower than what was actually present. However, even if we use the 2017 correction factor (that generated in a year with similar high vegetation), the 2022 whole Island estimate would only be 922 (which is still down on the 935 predicted using the mean correction factor last year).

**The total number of Lesser Black-backed Gull breeding pairs 1970-2022. Control measures started in 1984 (destruction of nests) and stopped in 1998. The green line is the population estimate if all empty nests are assumed to belong to additional pairs. The maroon line is the corrected population estimate based on a comparison of vantage point counts and the number of nests which contained eggs. The blue line is the uncorrected vantage point count total (of apparently incubating adults). A lack of walkthrough surveys means that the corrected 2020-2022 totals are based on the 2013-2019 means.**



Lesser Black-backed Gull productivity is typically assessed by entering various subcolonies to ring as many near-fledglings as possible, the BTO rings becoming marks for a mark/resighting population estimate. However it has lately proven difficult to resight sufficient ringed fledglings to allow for a meaningful evaluation. In an attempt to increase the number of resightings, recent years have seen staff and volunteers re-enter the subcolonies (rather than observing fledglings at a distance with a telescope). A simple calculation, '(number ringed on first visit x number checked for rings on second visit) / number of birds found to have rings on second visit', predicts the number of near-fledglings within an area (which can then be compared with the number of pairs thought to have been present there). Whereas the walkthrough surveys allowed for an accurate assessment of how many nests were in an area, a lack of walkthroughs from 2020 onwards means that productivity estimates are less accurate (as they are based on corrected vantage point counts); given that the vegetation was particularly tall this year, productivity at the inland site may have been lower than that given below (as there may have been more pairs present than predicted using the mean correction). Visits to the Middle Heath and Green Rocks area during early July suggested that 32 near-fledglings had been produced by 61 pairs (the uncorrected vantage point count for this area was 54 pairs); the resulting productivity figure of 0.52 fledglings per pair was the third highest inland estimate of the last ten years. The coastal slopes of Purple Cove were investigated for a sixth year as this discreet subcolony, with very short sward or rocky substrate, is seemingly suitable for an accurate fledgling count using only a telescope; here 39 pairs produced a minimum of 21 fledglings, giving a productivity figure of 0.54 fledglings per pair (the 2017-2021 Purple Cove mean is  $0.89 \pm se 0.13$ , with a high of 1.21 in 2018 and a previous low of 0.55 in 2020). Between 2017 and 2020, Purple Cove productivity proved



to be consistently higher than that observed inland, this fitting ad hoc observations made in recent years and perhaps supporting the theory that birds in larger subcolonies are struggling in part due to the intraspecific depredation of small chicks. However the productivity observed at both coastal and inland subcolonies has been very similar for the last two years, this perhaps due in part to declining numbers inland.

Combining data from Purple Cove and Middle Heath suggests that 100 pairs fledged 53 young; a combined productivity figure of 0.53 is the third highest estimate of the last decade, this 51.4% up on the 2013-2021 mean of  $0.35 \pm se 0.09$  (there was a high during this period of 0.89 in 2021 and a low of 0.12 in 2020). It is unclear why productivity was above average this year. Ad hoc observations did not mirror the estimate; although fledglings across North Pond and North Plain could potentially have come from anywhere on Skokholm (and possibly elsewhere), a maximum of 56 on 31<sup>st</sup> July was the lowest July or early August count this decade, down on lows of 65 in 2018 and 66 in 2020 (although it should be remembered that the breeding population has fallen considerably during the same period, the 2014-2021 mean maximum is 108.6, with highs of 141 in 2014 and 136 in 2021 (the latter reflecting the high productivity estimate of that year)).

**Lesser Black-backed Gull productivity estimates 2005-2022 (where data exists).**

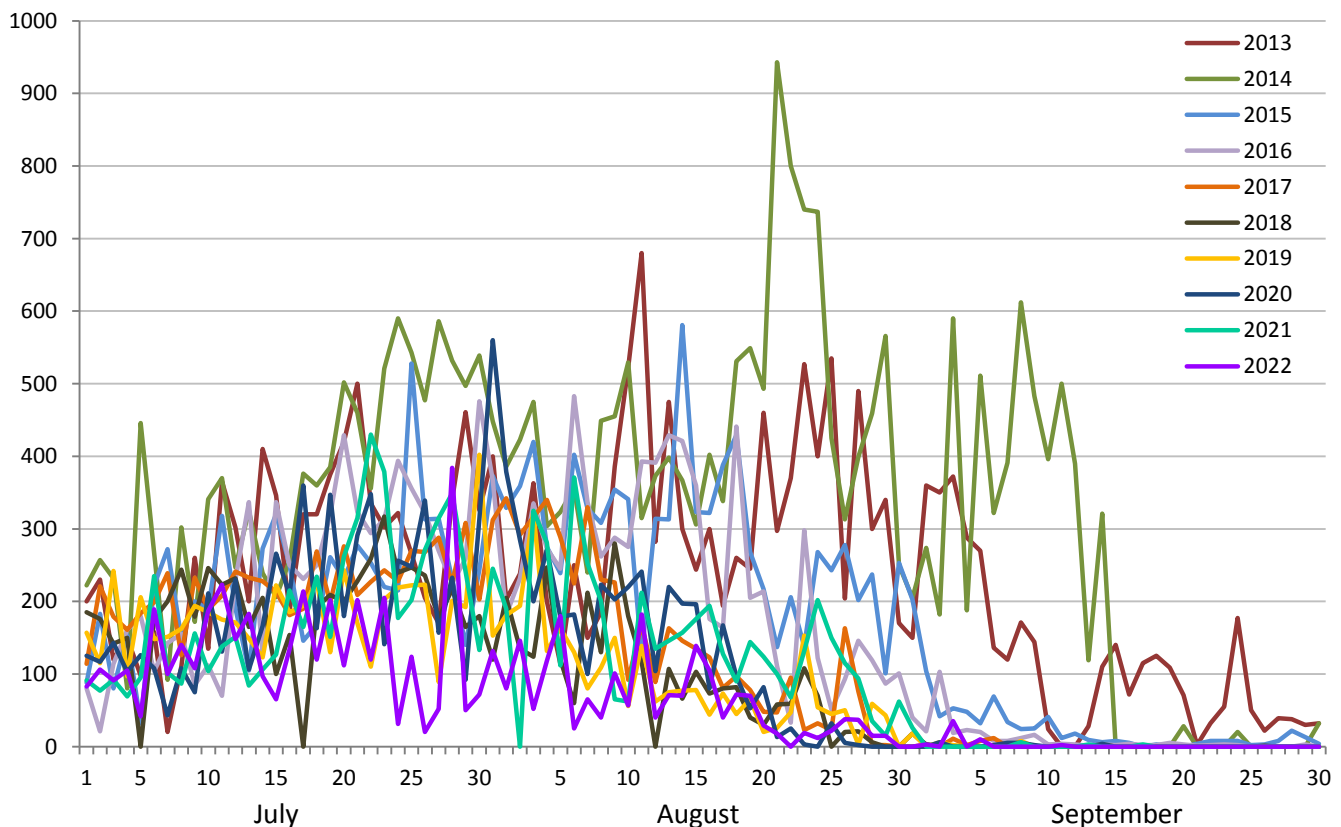
2005	2008	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
0.27	0.27	0.03	0.16	0.16	0.30	0.15	0.23	0.38	0.63	0.27	0.12	0.89	0.53



Although poor productivity is seemingly driving the decline in the Skokholm breeding population, it also seems possible that disease may be taking its toll in some years. There were 21 dead adults found in 2016 which were thought to be diseased or poisoned, with the period before death characterised by very lethargic behaviour, fine shaking and an eventual loss of limb control. There were three dead adults in 2017, 15 adults in 2018 (including a bird with a particularly dirty vent and a bird handed in live from a passing boat which exhibited the same symptoms prevalent in 2016), two adults in 2019, 11 adults in 2020 (including an uncoordinated bird (with a clean vent) found dead two days later, but not including two live birds with broken wings, one with a broken leg and one with a missing foot) and 14 adults last year (along with one which had recently lost a leg and one which exhibited the symptoms noted in 2016). This year saw six adults found dead between 16<sup>th</sup> March and 25<sup>th</sup> July, a second-summer found dead on 4<sup>th</sup> July, uncoordinated adults on the 18<sup>th</sup> and

22<sup>nd</sup> May (which were not seen again), an adult severely injured by a Great Black-backed Gull on 4<sup>th</sup> June (not seen again) and a sick adult with poor limb control found on 8<sup>th</sup> July which was dead by the 10<sup>th</sup>. Additionally a lethargic adult found at North Pond on 4<sup>th</sup> August was dead within two hours of its discovery; the body, tested by the Animal & Plant Health Agency, was not carrying HPAI, the cause of death instead being quite unexpected. A necropsy revealed ‘[a] 1cm diameter circular scab on the ... right hind limb [and] a deficit in the musculature ... extending from the scabbed area, through the soft tissues, into the abdominal cavity. This was a roughly circular ‘tunnel’ through the tissue, and there were blood-soaked feathers within this soft tissue deficit. There was an approximately 0.8cm circular hole in the wall of the proventriculus just proximal to the junction with the gizzard. Present within the gizzard was a metal pellet. There was a large volume of free blood and multiple blood clots in the thoracic cavity.’ The pellet was considered typical of that fired using an air gun, this a tragic reminder of what faces gulls away from Skokholm. There were thus nine non-juveniles found dead this year; although it is possible that aggressive interactions with other birds may have caused some deaths (indeed a corpse on 25<sup>th</sup> July was inverted in much the same way as that of a Manx Shearwater), disease or poisoning again seems likely in the majority of cases.

**The number of Lesser Black-backed Gulls roosting on North Plain and in the vicinity of North Pond 2013-2022.**



As is typically the case, the number of birds using traditional roost sites increased during July; North Plain and the area around North Pond again proved to be the usual site for the largest post-breeding roost, with smaller numbers congregating around the coast and at South Pond. This year saw the July roost peak at 384 on the 28<sup>th</sup> (birds first attracted to flying ants); this was the third lowest July peak this decade, down on a 2013-2021 mean of 456.8 and a high during that period of 590 in 2014. A cumulative July total of 4041 roosting birds was the lowest to be logged since roost recording began in 2013, this down on a previous low of 5660 noted in 2019 and well down on highs of 8353 in 2013 and 11,226 in 2014. Whereas roost counts between 2013 and 2017 peaked in August, the last five years have seen a more rapid departure of birds from the Island. This year saw an August peak of just 182 on the 11<sup>th</sup>, this the lowest August high this decade (the 2013-2021 mean high is 487.0,



with a low of 280 in 2018 and a peak of 943 in 2014). An August total of 1858 roosting birds was also the lowest this decade, down on a 2013-2021 mean of 6414.9 and a previous low of 2695 in 2019 (between 2013 and 2015 the August total ranged between 8903 and 13,849). The last three-figure roost count of the year was the 105 present on 16<sup>th</sup> August; this was the earliest such count this decade, ten days earlier than the last of 2021 (between 2013 and 2016 the last three-figure roost counts were logged in September). September again proved to be quiet, with only 50 roosting birds noted during the month; although up on totals of between eight and 41 logged in each year between 2017 and 2021, the September roost total was in three-figures in 2015 and 2016, whilst in 2013 and 2014 it was in four (with a high of 5359 in 2014). A peak daycount of five on the 18<sup>th</sup> was the lowest October high this decade, whilst only six further bird-days during the entire month led to a total down on a 2013-2021 mean of 161.2 and a previous low of 44 logged in 2017. There were only four November daycounts, all of four or less, prior to the 25<sup>th</sup>, although daily counts of between ten and 27 on each of the last six days of the month took the bird-days total to 101; the peak daycount was down on a 2013-2021 mean November high of 45.8 (there was a maximum of 98 in 2015), whilst the total was down on a mean of 162.9 logged during the same period. Sightings on all but two December dates to the 10<sup>th</sup> peaked at five on the 1<sup>st</sup> and ten on the 2<sup>nd</sup>.

**Ringing recovery** Left leg D7734, Right leg black darvic with white 5AW8

**Originally ringed** as a subadult male, CHOUET LANDFILL, GUERNSEY 24<sup>th</sup> May 2013

**Previously recovered** as a subadult, FIGUEIRA DA FOZ, COIMBRA, PORTUGAL 8<sup>th</sup> November 2013

**Previously recovered** as a subadult, VIL DE MATOS LANDFILL, PORTUGAL 8<sup>th</sup> November 2013

**Previously recovered** as an adult, DUMBELL BAY, SKOKHOLM 13<sup>th</sup> May and 29<sup>th</sup> June 2016

**Previously recovered** as an adult, GANN ESTUARY, PEMBROKESHIRE 9<sup>th</sup> March 2020

**Previously recovered** as an adult, PETER'S BAY, SKOKHOLM 14<sup>th</sup> June 2021

**Recovered** as an adult, SOUTH HAVEN, SKOKHOLM 15<sup>th</sup> and 27<sup>th</sup> April 2022

**Recovered** as an adult with chick, NORTHEAST OF SOUTH HAVEN, SKOKHOLM 21<sup>st</sup> and 30<sup>th</sup> July 2022

**Finding condition** Darvic ring read in field

**Distance travelled** 311km at 320 degrees (NW)

**Days since ringed** 3354



**Ringing recovery** Left leg green darvic with black 3NF, Right leg FH07803

**Originally ringed** as a juvenile, FLAT HOLM ISLAND, CARDIFF 2<sup>nd</sup> July 2006

**Previously recovered** as a juvenile, GLOUCESTER LANDFILL, GLOUCESTERSHIRE 17<sup>th</sup> July 2006

**Previously recovered** as an adult, GLOUCESTER LANDFILL, GLOUCESTERSHIRE 30<sup>th</sup> June 2010

**Previously recovered** as an adult, QUARTEIRA, FARO, PORTUGAL 6<sup>th</sup> and 8<sup>th</sup> October 2010

**Previously recovered** as an adult, FIGUEIRA DA FOZ, COIMBRA, PORTUGAL 10<sup>th</sup> November 2011

**Recovered** as an adult, EAST BOG, SKOKHOLM 31<sup>st</sup> July 2022

**Finding condition** Darvic ring read in field

**Distance travelled** 154km at 283 degrees (WNW)

**Days since ringed** 5873

Perhaps surprisingly this is the first Flat Holm ringed bird to have been encountered on Skokholm.

**Ringing recovery** GR98280

**Originally ringed** as an adult, HOME MEADOW GULL TRAP, SKOKHOLM 16<sup>th</sup> June 2014

**Previously recovered** as an adult, HOME MEADOW GULL TRAP, SKOKHOLM 7<sup>th</sup> June 2018

**Recovered** as an adult, PRAIA DE MIRA, AVEIRO, COIMBRA, PORTUGAL 30<sup>th</sup> October 2022

**Finding condition** Metal ring read in field

**Distance travelled** 1279km at 193 degrees (SSW)

**Days since ringed** 3058

The birds previously carrying GPS tags, along with an additional 48 non-tagged controls, were all fitted with yellow darvic rings with a black alpha-numeric code (number/letter:W e.g. 5A:W) in 2014. The colour ring is on the left leg and a BTO metal ring on the right. Although the number of encounters logged each year is unsurprisingly declining, the darvic rings have yielded a fantastic number of field resightings; the 73 ringed birds have produced 182 separate resightings of 38 different individuals away from Skokholm. The following table summarises resightings received since similar tables were published in the 2014-2021 Seabird Reports. As has been shown by the British Trust for Ornithology GPS tracking project on Skokholm, and at other British Trust for Ornithology tracking sites (Ross-Smith, *pers. comm.*), Lesser Black-backed Gulls show a high degree of wintering site fidelity; this is reflected in the colour ringing data, with 19 birds having been resighted at the same location in more than one winter. Records of returning birds have come from several sites in Portugal and Spain, along with two in France, one in the Channel Islands and one in Morocco. This year saw 9J:W at a landfill near the harbour it has frequented in the past and at a marsh near a river mouth it has been seen at previously. Seven different individuals were seen on Skokholm this year.

Darvic	Ring	Location	Country	Date
8C:W	GR98248	Eirol Landfill, Aveiro	Portugal	05/11/21 (sic)
9J:W	GR98265	Los Ruices Landfill, Malaga	Spain	28/01/22
9J:W	GR98265	Marismas de Barbate	Spain	30/09/22

### Guillemot *Uria aalge*

### Gwylog

**Very Abundant Breeder** Common during the period 1928-1996, numbers then increasing rapidly

1 pullus trapped, 1 control

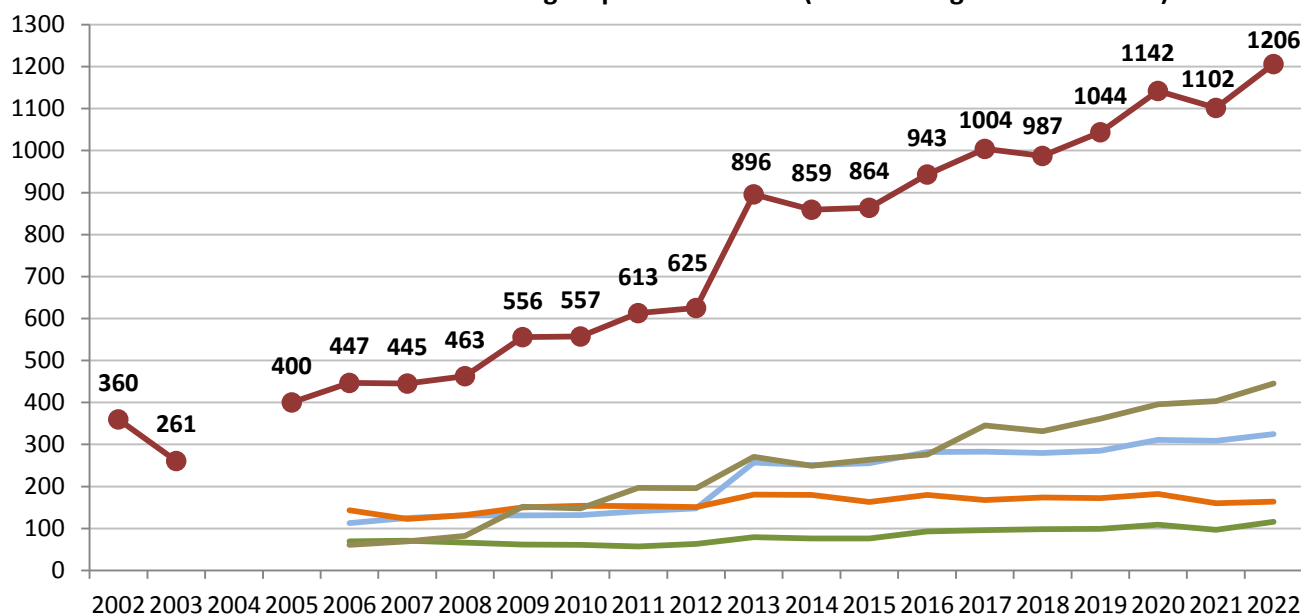
1936-1976: 1021 trapped, 2014-2021: 6 pulli trapped, 23 controls

The mean March daycount was 1159.6, this a new high and well up on a 2013-2021 mean of 549.1; although there were ten dates without a sighting and a further five dates when between two and five were encountered, there were highs of 3636 on the 3<sup>rd</sup>, 4306 on the 5<sup>th</sup> and 3999 on the 15<sup>th</sup>. Customary departures for the sea continued in April, with 16 dates when counts of less than 600 were logged (including five dates without a sighting and five dates with between one and 26 birds present); there were 11 similar mass April departures last year, nine during an unprecedentedly early 2019 breeding season and an average of 15.0 between 2013 and 2021 (with a high of 25 in 2013). A minimum of 3500 on the 25<sup>th</sup> was the third highest April peak to date, a tally down on the 3971 of 2020 and the 3725 of last year. The first two eggs to be found were at Middlerock on 27<sup>th</sup> April, these four days earlier than a 2013-2021 first egg mean of 1<sup>st</sup> May; although nine days later than the first 2019 egg (which was believed to be the earliest yet recorded in Wales (Birkhead, *pers. comm.*) and perhaps the result of unusually high sea surface temperatures (Burton, M., 2019)), the



first of 2022 matched those of 2020 and 2021 as the second earliest of the last decade (the latest egg during this period, found on 15<sup>th</sup> May 2014, followed a winter of prolonged storms and significant auk wrecks). Early eggs are likely to be at risk during spring storms, as was the case on the night of 26<sup>th</sup> April 2019 when Storm Hannah encouraged the majority of auks back to sea (leaving those incubating birds which managed to protect their early eggs from the storm more exposed to predators). Exceptional 16 metre seas during the 20<sup>th</sup> and 21<sup>st</sup> May 2021 led to the loss of many eggs from the more exposed ledges, an unseasonable disruption which probably altered the number of adults present on at least some areas of cliff during the 2021 survey period. May weather was more clement this year, although an eight metre sea on the night of 17<sup>th</sup> May, which destroyed both Razorbill and Herring Gull eggs, may also have impacted Guillemots in some areas.

**The total number of adult Guillemot in all six study plots 2002-2022 (as an average from ten visits) and the totals from the four largest plots since 2006 (as an average from ten visits).**



**The whole Island totals (adults on ledges suitable for breeding), mean plot totals, the range of totals over ten study plot visits, the standard deviation observed over the ten visits and the percentage of the Island total made up of study plot birds 2013-2022.**

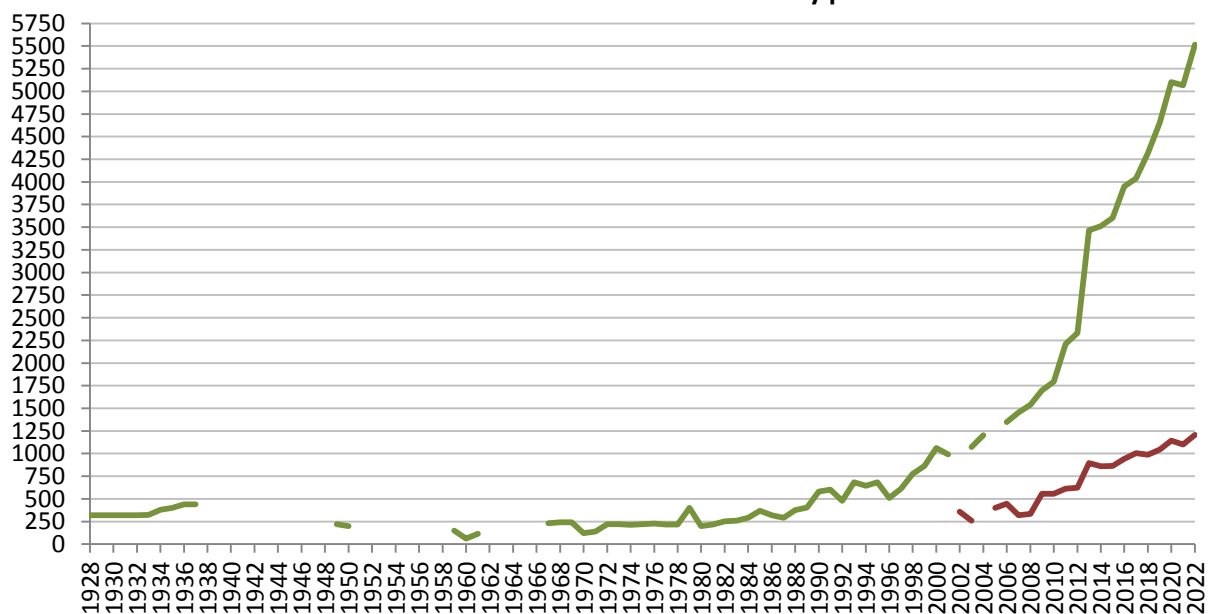
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Island</b>	3466	3512	3603	3949	4038	4316	4654	5101	5065	5515
<b>Plots</b>	896	859	864	943	1004	987	1044	1142	1102	1206
<b>Range</b>	824-949	797-947	756-939	887-1003	939-1144	937-1060	982-1140	1069-1213	1012-1209	1144-1318
<b>±SD</b>	39.20	54.25	58.30	40.25	57.45	37.38	54.40	50.57	68.55	55.19
<b>Plot %</b>	25.9	24.5	24.0	23.9	24.9	22.9	22.4	22.4	21.8	21.9

The six study plots were counted on ten dates between 27<sup>th</sup> May and 9<sup>th</sup> June. The mean total from all plots was 1206 adults on ledges; this was 9.4% up on that recorded last year, 27.4% up on the 2012-2021 mean (946.6 ±sd 148.0) and the highest total yet recorded. The mean increased in all six plots, however in two areas this was down on previous highs; a mean of 52 at Middlerock was down on a 2013-2021 average of 58.6, on all but one total recorded during that period and on a high of 64 logged in 2015 and 2016, whilst a mean of 164 at Guillemot Cliff was down on a 2013-2021 average of 173.4, on all but two totals recorded during that period and on a high of 182 logged in 2020. A Little Bay mean of 325 was up on a previous high of 311 recorded in 2020 and a 2013-2021 mean of 279.3. A Steep Bay mean of 116 was up on a previous high of 109 recorded in 2020 and a 2013-2021 mean of 91.5. A North Gully mean of 445 was up on a previous high of 403 recorded last year and a 2013-2021 mean of 321.8. A slope to Purple Cove mean of 104 was up on a previous high of 85

recorded in 2020 and 2021 and a 2013-2021 mean of 57.5. A possible explanation for the lower numbers seen in the Middlerock and Guillemot Cliff plots of Twinlet is an increasing Fulmar presence; the number of Fulmar in the Middlerock plot has more than doubled in the last decade and the number in the Guillemot Cliff plot remained at an all-time high, the petrels perhaps excluding auks from previously occupied areas and halting any further expansion of auks along their current ledges. Although Fulmar-free ledges apparently suitable for colonisation by cliff nesting auks are present within the study plot boundaries, these new areas were not utilised this year. The only other plot which contains Fulmar is at Little Bay, however numbers here have declined from a high of 19 in 2013 to only 12 in 2022, this no doubt reducing any impact on the auks. The remaining three plots, where Guillemot numbers continue to rise, did not contain Fulmar this year. The Twinlet counts will also have been impacted by a pair of Crows which nested in the top east corner of Guillemot Cliff this year; this pair specialised in taking the eggs and young of Guillemots, with one Crow grabbing an auk until they tumbled towards the sea, this allowing the second bird to snatch unattended ledge contents.



The total number of Guillemots (adults on ledges suitable for breeding) recorded on Skokholm since 1928 and the number of birds within the study plots since 2002.



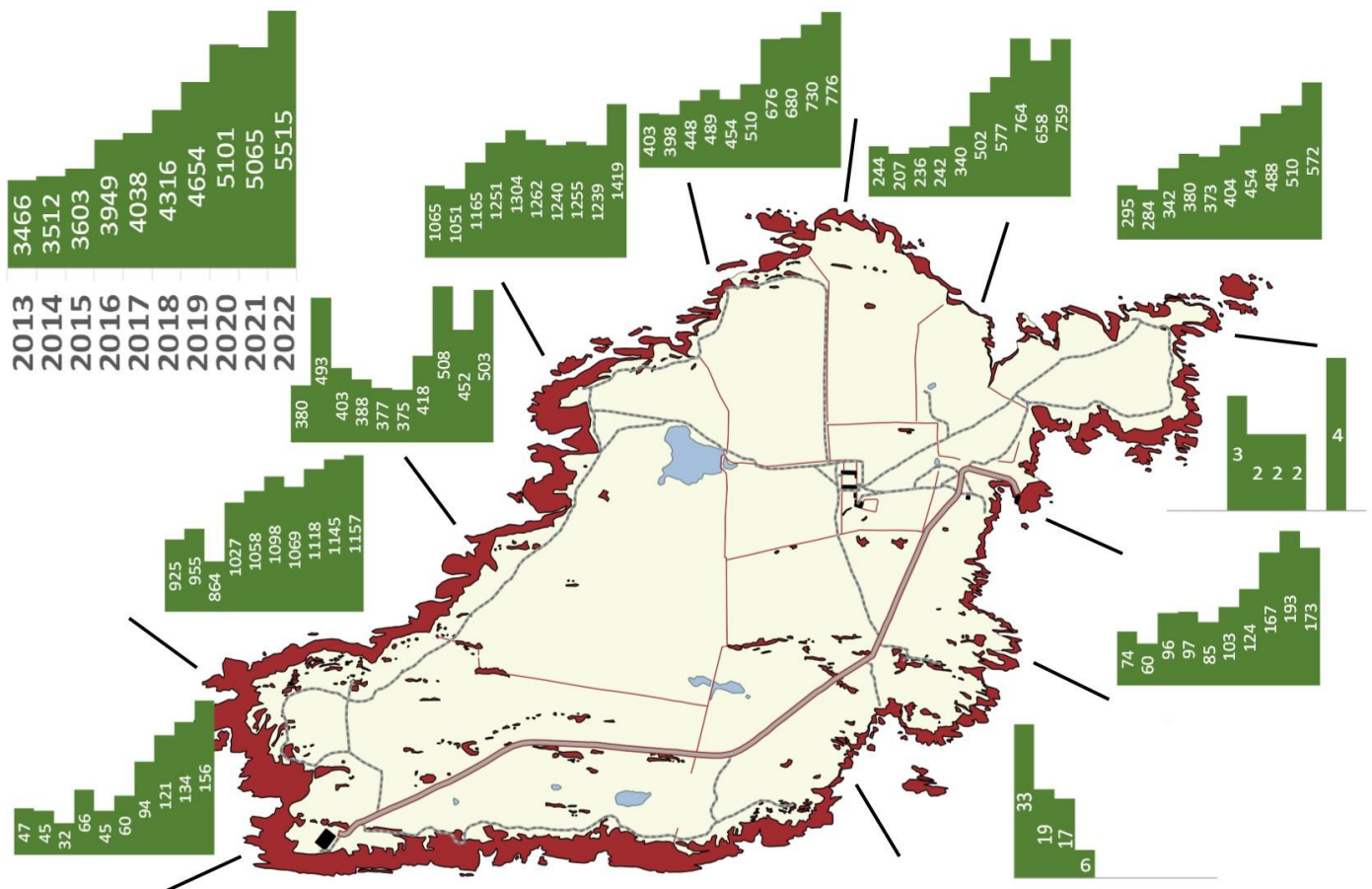
The plots now contain more birds than were present on all of the Skokholm cliffs prior to 2006 and nearly twice the number present in the plots during 2011, whilst the lowest of the ten 2022 plot



counts was up on the highest 2019 plot count. A distinctive adult with a yellow bill and feet was again present in the North Gully plot (above photograph); similar aberrants have been seen on the Isle of Man, Bass Rock, the Farne Islands and Lambay.

Whole Island counts were made from the land between 27<sup>th</sup> May and 7<sup>th</sup> June and calm seas allowed for a boat-based survey on 1<sup>st</sup> June. Boat-based surveys allow some areas to be monitored which cannot be viewed from on the Island and enable closer access to some areas which can normally only be viewed at a distance; they have not always been available, with 2012 the last year without at least one visit. A mean total of 5515 adults in suitable breeding habitat was 8.9% up on the 2021 count and the highest tally yet recorded on Skokholm. Although down on the 9.6% growth seen between 2015 and 2016 and between 2019 and 2020, this was otherwise the largest change since that observed between 2012 and 2013; this was perhaps due in part to the fact that the 2021 total was 0.7% down on that of 2020 (the first time since 2001 in which the mean whole Island total had declined and perhaps due to extreme weather prior to the counts). The proportion of the whole Island total made up of study plot birds (21.9%) was down on the 2006-2021 mean of 25.5% and was the third lowest on record, perhaps suggesting that some of the factors limiting the more intensively studied plots are not impacting the entire Island population in the same way.

The distribution of Guillemots on suitable breeding ledges 2013-2022.



As can be seen from the above map, the only numerical declines occurred in Peter's Bay (four fewer birds leading to extinction from this area) and between South Haven and Wreck Cove (20 fewer birds). There was an average of 22 more birds around the Quarry, 12 more between Wardens' Rest and Fossil Bay, 51 more between Purple Cove and Twinlet, 180 more between the Jogs and the Dents, 46 more around Little Bay and Little Bay Point, 101 more between Far and Smith's Bays and 62 more along the north coast of the Neck. There were no birds occupying the ledges around Crab

Bay for a sixth year. These counts of individuals on ledges potentially include incubating adults, some of their partners, failed breeders, non-breeding adults and younger birds yet to pair; a correction factor is thus sometimes adopted to convert the count to an estimate of breeding pairs (Harris *et al.*, 2015). A 2015 survey on Skokholm found the correction factor to be 0.64, a figure close to the 0.67 widely adopted in previous studies (see the Skokholm Seabird Report 2015); the latter correction factor predicts the Skokholm breeding population to be in the region of 3695 pairs, this a new high.



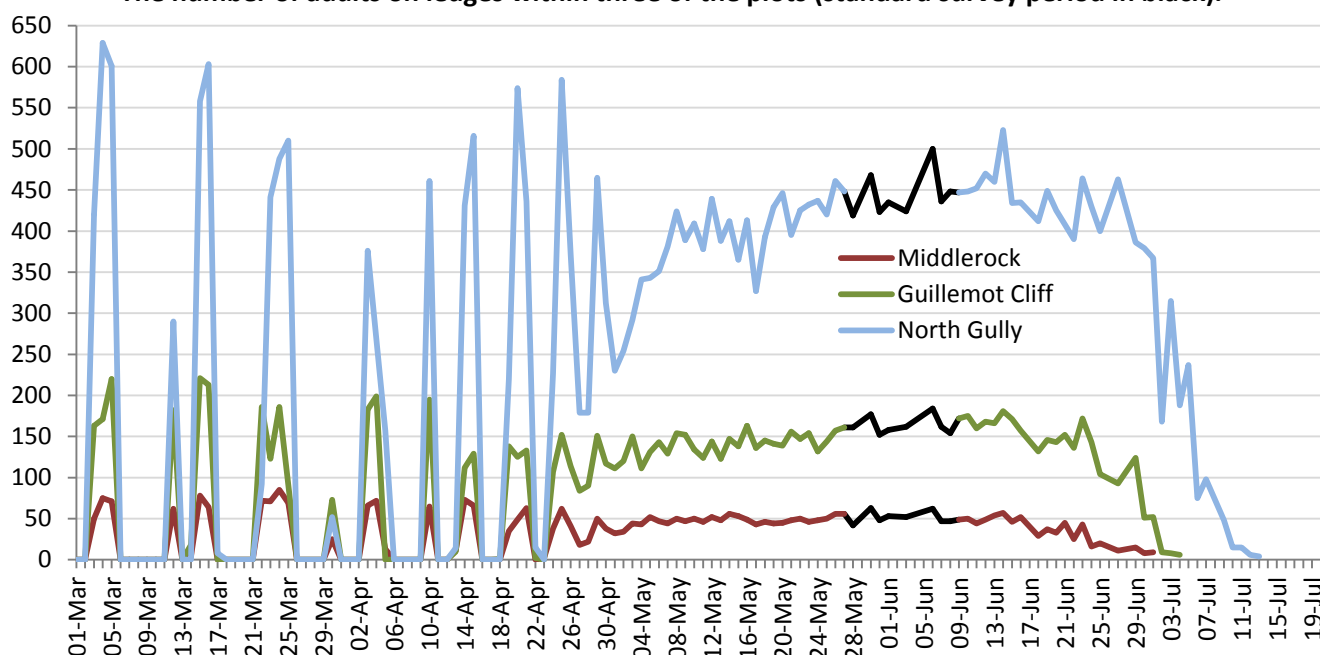
The first chick to be seen this year was at Middlerock on 31<sup>st</sup> May; this was two days later than the first to be seen last year (which was also at Middlerock), but three days earlier than the 2013-2021 mean (the earliest chick during this period was logged on the 23<sup>rd</sup> in 2019, whilst the first chick of 2014, the year following the severe winter auk wrecks, was on 13<sup>th</sup> June). Productivity, calculated at between 0.55 and 0.61 jumplings per pair in 2013 and at 0.6 in 2007, was not assessed in 2022 following recommendations from the Islands Conservation Advisory Committee. Although no counts were made, it was felt that the number of visible large chicks present in the North Gully plot on 21<sup>st</sup> June was unusually high. Chicks were watched jumping from the third week of June and the number of adults recorded in the three regularly monitored plots dropped from 679 on the 23<sup>rd</sup> to 524 on the 25<sup>th</sup>, 428 on 1<sup>st</sup> July and 177 on the 2<sup>nd</sup> (see chart below). There was only one late spike in the number of birds occupying the plots this year, with the total on the 3<sup>rd</sup> increasing to 323; similar late season returns occur each July.

Between the 1<sup>st</sup> and 2<sup>nd</sup> July, the number of adults in the Middlerock plot dropped from nine to zero, this the earliest departure from this plot in nine years of monitoring; between 2014 and 2021, the last day with birds in the Middlerock plot averaged 11<sup>th</sup> July, with the latest still present on the 17<sup>th</sup> in 2021 and the earliest last seen on the 5<sup>th</sup> in 2019. The six birds present at Guillemot Cliff on 4<sup>th</sup> July were the last to be seen in this plot, this four days earlier than the 2014-2021 mean; the only earlier last birds were logged on the 2<sup>nd</sup> in 2019, whilst one was still present on the 16<sup>th</sup> in 2014. Counts at North Gully dropped from 48 on the 9<sup>th</sup> to 15 on the 10<sup>th</sup> and from six on the 12<sup>th</sup> to four on the 13<sup>th</sup>, these the last to be seen in the plots this year; between 2014 and 2021, the last day with birds in the North Gully plot averaged 17<sup>th</sup> July, with the latest still present on the 22<sup>nd</sup> in 2014 and the earliest last seen on the 14<sup>th</sup> in 2020. This was thus the eighth year of the last nine in which birds



have remained for longer at North Gully, this probably explained by the larger breeding population at this site. Whole Island counts mirrored those made at the plots, with Steep Bay and Hump Bay the only sites to see breeding birds ashore after the 13<sup>th</sup>; there were three at the former site and five at the latter on the 15<sup>th</sup>, two still with a chick at Steep Bay on the 17<sup>th</sup> and singles at both sites on the 19<sup>th</sup>. One in Hog Bay on 20<sup>th</sup> July was the last to be seen ashore, although there had seemingly not been a bird at this site for over a week. Between 2013 and 2021 the date of the last bird ashore averaged 22<sup>nd</sup> July, with the earliest last seen on the 16<sup>th</sup> in 2019 and the latest on the 27<sup>th</sup> in 2013 and 2021. Birds were seen at sea on all but one date to the end of the month, with highs of 100 on the 24<sup>th</sup> and 143 on the 26<sup>th</sup>. There were sightings on 26 August dates (16 more than last year), with 14 single-figure daycounts but highs of 205 on the 2<sup>nd</sup>, 71 on the 5<sup>th</sup> and 95 on the 29<sup>th</sup>; an August bird-days total of 640 was only down on the 3841 of 2018, the 1129 of 2019 and the 1138 of 2020. A seemingly healthy bird ashore below the Dip on 27<sup>th</sup> August was unusual.

**The number of adults on ledges within three of the plots (standard survey period in black).**



Sightings on 16 September dates included ten daycounts of ten or less but highs of 21 on the 6<sup>th</sup>, 160 on the 23<sup>rd</sup> and 18 on the 26<sup>th</sup> which took the bird-days total to 277; there have only been higher September daycounts in three years (with a peak of 362 in 2014), whilst the only higher totals are the 287 of 2012, the 563 of 2014 and the 1419 of 2018. Moribund singles were on the Great Jog on 21<sup>st</sup> September and in North Haven five days later, neither of which was accessible for HPAI testing. There were an additional 2814 distant, unidentified auks logged during September, this the highest total in this month (up on a previous high of 2613 in 2018). Sightings of up to 77 Guillemots on 11 October dates totalled 178 bird-days, this the second highest October tally to date (only down on the 519 of last year when there was an unprecedentedly early return to the cliffs). A Moribund bird was on the Anticline on 8<sup>th</sup> October and a dead bird was floating in South Haven 13 days later; again neither were accessible for HPAI testing. An additional 781 unidentified auks were logged during October, this down on a 2013-2021 mean of 1845.0 and on five of the years during that period (there was an all-time high of 7951 last year). There was again a staff presence throughout November, with sightings on 16 dates and highs of 66 on the 4<sup>th</sup>, 99 on the 10<sup>th</sup> and 68 on the 14<sup>th</sup> taking the bird-days total to 391; the peak November daycount was down on a 2013-2021 mean of 335.0 (there was a high of 790 in 2015) and the total was down on a mean of 1325.3 logged during the same period (a high of 3441 was tallied in 2019). An additional 4674 distant auks were noted during the month, this up on the 3985 of 2019 and a new November high. Birds were logged on seven of the first ten days of December, with highs of 61 on the 1<sup>st</sup>, 77 on the 4<sup>th</sup>, 173 on the 5<sup>th</sup> and

12 on the 8<sup>th</sup>. Given the increase in the Pembrokeshire breeding population, it is perhaps unsurprising that autumn counts during the last few years have proven to be the highest on record.

Although a return of Guillemots to the breeding ledges in early winter is to be expected, there was no record of this behaviour on Skokholm between 2000 and 2014, despite the fact that staff did not depart until 16<sup>th</sup> November in 2013 and 24<sup>th</sup> November in 2014. However birds have been seen ashore in seven of eight subsequent Novembers, with 2017 the only year without a record (when staff departed on the 9<sup>th</sup>). Two at Twinlet and six above the Jogs on 6<sup>th</sup> November were the first to be seen ashore this year (there was additional guano at North Gully and on further ledges above the Jogs); the only earlier landfalls were on 27<sup>th</sup> October 1999, 3<sup>rd</sup> November 2016, the 1<sup>st</sup> and 4<sup>th</sup> November 2019, 5<sup>th</sup> November 2020 and on six dates between 23<sup>rd</sup> October and 4<sup>th</sup> November last year. Birds were ashore on five further dates between the 10<sup>th</sup> and 19<sup>th</sup> November, with highs of 91 on the 10<sup>th</sup> and 68 on the 14<sup>th</sup>, and on 1<sup>st</sup> December when 47 were logged; all of the birds seen ashore after the 6<sup>th</sup> November landfall were above the Jogs. Such a return to the colony outside of the breeding season, with the risk of being attacked, must have a substantial benefit; it has been suggested that the return may be to secure the best ledge and thus attract the best mate (Harris *et al.*, 2006), but birds ashore may also use less energy than those at sea (Humphreys *et al.*, 2007). The majority of early winter sightings of birds ashore come from the ledges above the Jogs; this site holds the largest breeding season aggregation, perhaps suggesting that the need to come to land is greater in birds which occupy areas with more neighbours.

**Ringing recovery** Left leg white darvic with black 48T, Right leg N01129

**Originally ringed** as a pullus, THE AMOS, SKOMER ISLAND, PEMBROKESHIRE 2<sup>nd</sup> July 2006

**Recovered** as an adult, NORTH GULLY, SKOKHOLM 11<sup>th</sup> July 2021 (sic)

**Finding condition** Colour ring read in field

**Distance travelled** 4km at 129 degrees (SE)

**Days since ringed** 5488

**Ringing recovery** Left leg white darvic with black 24A, Right leg N03025

**Originally ringed** as a pullus, THE AMOS, SKOMER ISLAND, PEMBROKESHIRE 3<sup>rd</sup> July 2006

**Recovered** as an adult, NORTH GULLY, SKOKHOLM 15<sup>th</sup> April 2022

**Finding condition** Colour ring read in field

**Distance travelled** 4km at 129 degrees (SE)

**Days since ringed** 5765

**Ringing recovery** Left leg white darvic with black 1019, Right leg N09846

**Originally ringed** as a pullus, THE AMOS, SKOMER ISLAND, PEMBROKESHIRE 3<sup>rd</sup> July 2019

**Recovered** as an adult, NORTH GULLY, SKOKHOLM 17<sup>th</sup> June 2021 (sic)

**Finding condition** Colour ring read in field

**Distance travelled** 4km at 129 degrees (SE)

**Days since ringed** 715

**Razorbill** *Alca torda*

**Llurs**

**Very Abundant Breeder** Common or Abundant until 2007, numbers then increasing rapidly

43 trapped (including 39 pulli), 1 retrapped

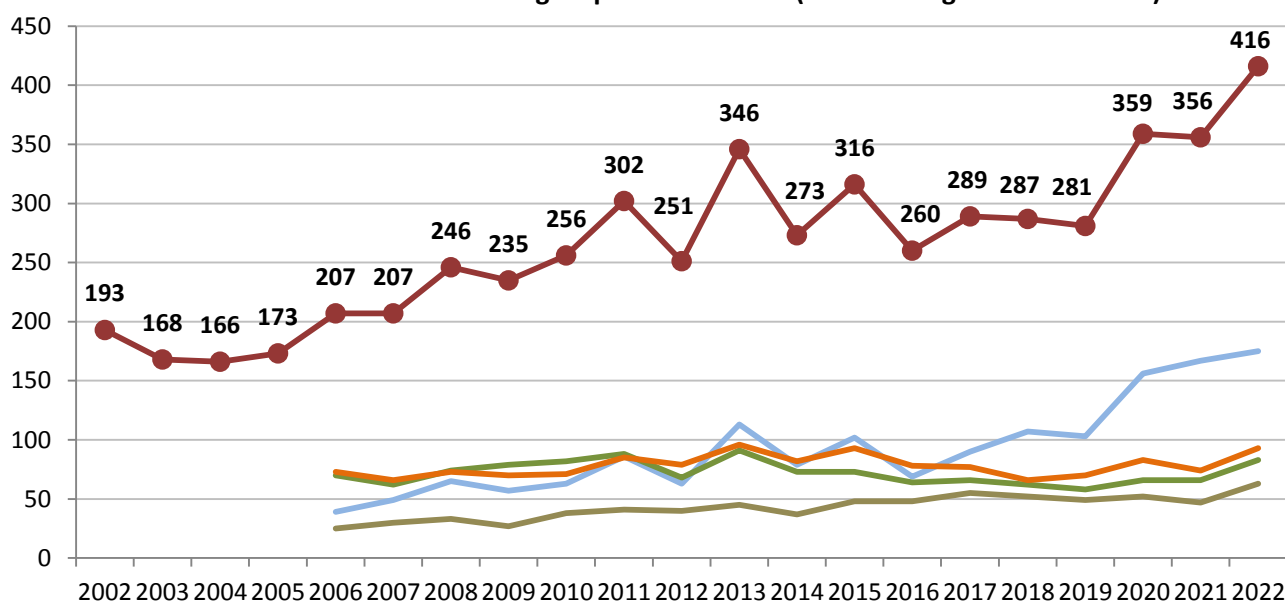
1931-1976: 9705 trapped, 2013-2021: 321 trapped, 8 retrapped, 4 controls

There were sightings on all but seven March dates, with highs of 2866 on the 3<sup>rd</sup>, 2307 on the 12<sup>th</sup> and 2221 on the 22<sup>nd</sup>, but five further dates when fewer than 18 were noted; the majority were at sea, with 947 on the 5<sup>th</sup>, 1351 on the 16<sup>th</sup> and 1073 on the 25<sup>th</sup> the highest counts of birds ashore. There was again a date in March when the only Razorbills ashore were those occupying crevices in the Anticline, the Oystercatcher roost perhaps offering sufficient safety in numbers to allow for a



landfall. Daycounts continued to fluctuate during early April, with highs of 1480 on the 3<sup>rd</sup> (1193 of which were at sea) and 2200 on the 10<sup>th</sup> (1766 at sea), but lows of between zero and 25 on five dates to the 13<sup>th</sup>. There were 2200 logged on the 14<sup>th</sup> and only 740 the following day, although the latter included a bird on an egg at North Gully; this was nine days earlier than the first to be seen last year (which was also at North Gully), 13 days earlier than the 2013-2021 first egg mean and the earliest to have been recorded on Skokholm (the latest first egg this decade was found on 13<sup>th</sup> May 2014, this no doubt a consequence of the winter storms preceding that breeding season, whilst the earliest prior to this year was on 19<sup>th</sup> April 2019). Only six were seen ashore the following day, these including the incubating bird at North Gully and birds apparently incubating on both Middlerock and Guillemot Cliff. The majority of eggs were produced during early May, with 92% of Bluffs plot pairs having eggs by the 5<sup>th</sup> and at least 63% of Neck plot pairs having eggs by the 8<sup>th</sup>.

**The total number of adult Razorbill in all six study plots 2002-2022 (as an average from ten visits) and the totals from the four largest plots since 2006 (as an average from ten visits).**



**The whole Island totals (adults on ledges suitable for breeding), mean plot totals, the range of totals over ten study plot visits, the standard deviation observed over the ten visits and the percentage of the Island total made up of study plot birds 2013-2022.**

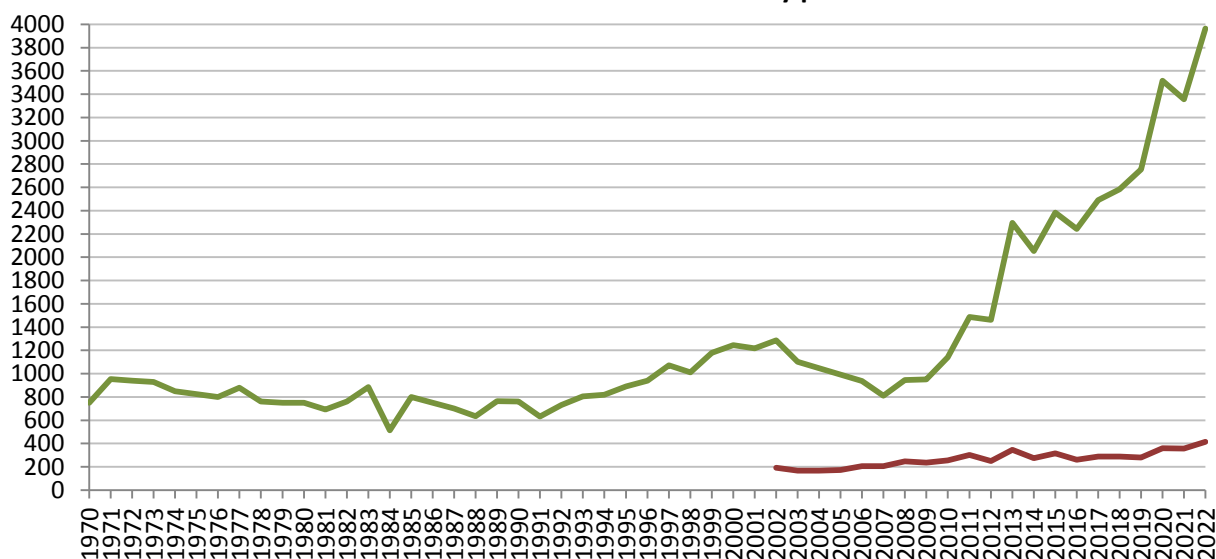
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Island</b>	2294	2052	2382	2242	2491	2585	2755	3517	3356	3965
<b>Plots</b>	346	273	316	260	289	287	281	359	356	416
<b>Range</b>	301-397	254-315	291-346	236-324	253-334	263-309	230-351	312-395	312-411	376-446
<b>±SD</b>	30.54	19.96	15.78	26.58	25.61	13.25	40.82	30.72	34.06	23.15
<b>Plot %</b>	15.1	13.4	13.3	11.6	11.6	11.1	10.2	10.2	10.6	10.5

Both 2020 and 2021 saw severe May weather impact the Razorbills nesting in the productivity plots (and no doubt elsewhere); a 2020 storm, with multiple waves of at least 11 metres, resulted in 60% of Neck pairs losing their eggs (but just one or possibly two of the North Gully eggs being lost), whilst a 2021 storm, with winds gusting at up to 69mph and several waves of at least 16 metres, led to 59% of Neck pairs and 7% of North Gully pairs losing their eggs. May seas peaked at eight metres this year (as measured by the Mid Channel Rock Lighthouse Beacon off St Ann's Head), with rough weather on the night of 17<sup>th</sup> May probably being responsible for one egg loss at the Neck (elsewhere there was a loss of Herring Gull eggs and chicks and some low nesting Razorbills lost eggs along the North Coast). There were four Neck plot egg losses between the 21<sup>st</sup> and 24<sup>th</sup> May, these perhaps linked to heavy showers on the evening of the 23<sup>rd</sup>. Extreme May weather inevitably impacts the

number of adults on ledges during the usual whole Island and study plot count period; in the unsettled June of 2012, plot counts fluctuated between 164 and 338 birds, whereas the 2018 counts, made during a prolonged period of high pressure, fluctuated between 263 and 309 (with the lowest standard deviation of the last decade (see table above)). Given that far fewer plot birds were impacted by the weather this year, it might be expected that the range in study plot counts (and the standard deviation given in the table above) might be lower than in 2020 and 2021; this was indeed the case, with both values down on those logged in all but three years this decade.



**The total number of Razorbills (adults on ledges suitable for breeding) recorded on Skokholm since 1970 and the number of birds within the study plots since 2002.**

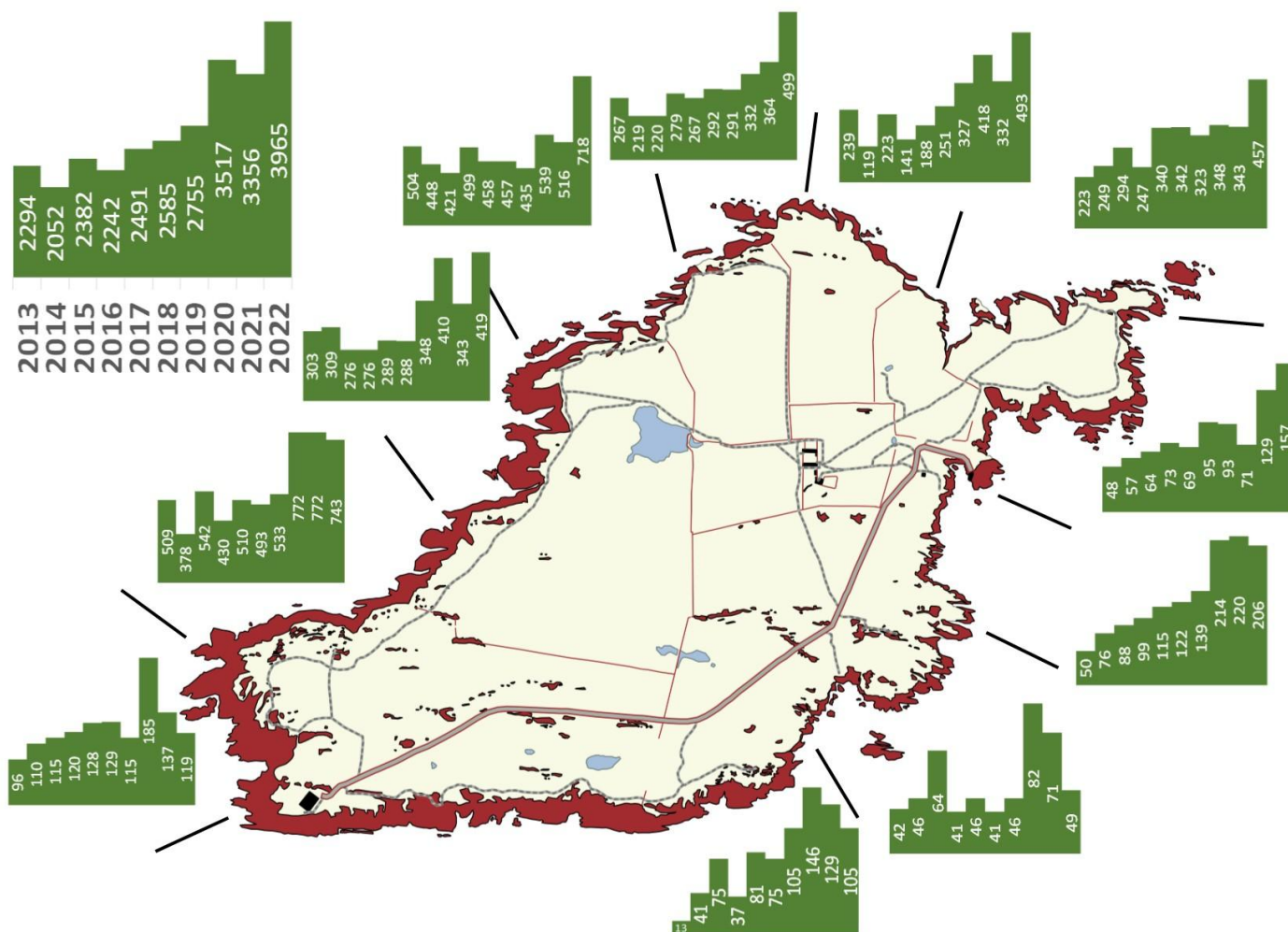


The six study plots, established in 2002, were visited on ten dates between 27<sup>th</sup> May and 9<sup>th</sup> June when every adult in suitable breeding habitat was counted. The mean single visit total of 416 adults on ledges was 60 (16.9%) up on that logged last year and the highest total to date, 37.8% up on the 2012-2021 mean (301.9 ±sd 39.8). The largest numerical increase was at Guillemot Cliff where the mean rose by 25.7% from 74 to 93; this matched the 2015 mean and was only down on the 96 of 2013. An average of 17 (25.8%) more birds at Middlerock led to a total only down on the 91 of 2013. Recent years have seen a decline in the number of Razorbill occupying these two Twinlet plots, drops tentatively linked to an increasing Fulmar population (which has no doubt led to competition



for space within the confines of the plot boundaries); quite why there was a steep increase in both areas this year is thus unclear, although it would seem that small ledges are still available for a species apparently at ease with nesting some distance from its neighbours. There was a mean of 16 more birds at North Gully, this a 34.0% increase on the 2021 total; a mean of 63 was a new high for this site, up on the 55 logged in 2017. Eight more birds at Little Bay also led to a new high; this site (the blue line on the above graph) has driven the jump in the number of Razorbill recorded in the plots, with a 2022 mean of 175 being 348.7% up on the 39 present when the plots were established in 2006. It should be noted that the birds occupying the boulders in Little Bay are closer to sea level than most of those in the other plots; they are likely to be impacted more by rough weather events. A mean of two birds joined the Guillemot ledge on the slope to Purple Cove; although up to two have been seen at this site on at least one date in each year since 2013, only singles in 2013, 2014 and 2021 and two in 2020 have been present regularly enough to register on the ten visit mean. This became the fourth year of the last ten in which birds were present at Steep Bay on enough occasions to register; there was a mean of two in 2014 and 2021 and one in 2016 and this year.

**The distribution of Razorbills on suitable breeding ledges 2013-2022.**



Whole Island counts were made from the land between 27<sup>th</sup> May and 7<sup>th</sup> June, whilst a boat-based count was possible on 1<sup>st</sup> June. This was the tenth year running in which access to a boat had been available, inevitably leading to higher but more accurate whole Island counts; in 2012 rough seas meant that there was no opportunity for a boat-based count and it was concluded that ‘there remains a section of North Coast that was missed, while other parts of the North Coast and Bluffs were counted less accurately at a distance’ (Gillham and Yates, 2012). A 2022 whole Island mean of 3965 adults in suitable breeding habitat was 18.1% up on the 3356 logged in 2021 and the highest

total yet recorded on Skokholm (57.7% up on the 2012-2021 mean of 2513.7  $\pm$ sd 599.7). Given that the ten visit study plot mean also increased (albeit only by 16.9%), the large increase in overall numbers seen this year was likely genuine and not due to the fact that the whole Island count is based on fewer visits. As can be seen from the map above, the number of adults present did not increase in all areas; there were 18 fewer in the vicinity of the Quarry (there have been higher means in five years at this site), 29 fewer between Wardens' Rest and Fossil Bay (there have been higher means in two years), 14 fewer between South Haven and Hog Bay (there have been higher means in two years), 22 fewer between Wreck Cove and Crab Bay (there have been higher means in three years) and 24 fewer along the South Coast (there have been higher means in two years). Perhaps coincidentally these declines all occurred in the southerly half of Skokholm. Increases in the six northerly sectors all led to new highs; there was a mean of 76 more birds between Purple Cove and Twinlet, 202 more between the Jogs and the Dents, 135 more in the vicinity of Little Bay and Little Bay Point, 161 more between Far and Smith's Bays, 114 more to the north of the Neck and 28 more around the southerly portion of the Neck.



Productivity monitoring was undertaken for a tenth consecutive year. There are some concerns among ICAC members that recent Pembrokeshire productivity estimates have been quite low (on Skokholm ranging between 0.23 in 2015 and 0.69 in 2018), perhaps lower than what actually occurred given the continued growth of the population and certainly too low to maintain the expansion; one explanation for continued population growth despite low productivity estimates could be that the plots do not represent the Island as a whole. This is potentially the case at the exposed Neck plot where predation levels are often quite high and where, in recent years, extreme weather events have had a greater impact; although Razorbills nest in similarly exposed places elsewhere on Skokholm, an additional plot looking at cliff nesting pairs was established at North Gully in 2017 in an attempt to study birds in a somewhat more sheltered setting. There were thus three survey areas this year, one a cliff below the Neck Razorbill Hide where 30 incubating pairs were mapped between the 3<sup>rd</sup> and 20<sup>th</sup> May, one the ledges around North Gully where 36 pairs were mapped between 15<sup>th</sup> April and 14<sup>th</sup> May and one an area among the Bluffs boulders where 51 egg sites were marked from 5<sup>th</sup> May.

The first two chicks to be encountered anywhere on Skokholm were at Middlerock on 27<sup>th</sup> May (one of which was only seen as it was eaten by a Crow); this was on the same date as the first of last year, but five days earlier than the 2013-2021 mean (which is 1<sup>st</sup> June, with the earliest on 18<sup>th</sup> May 2019 and the latest on 15<sup>th</sup> June 2013). At the Neck there were seven egg stage failures, two failures at either egg or small chick stage (ledges were found empty, with no indication as to what had



happened), one large chick failure and 20 pairs produced jumping age chicks at the first attempt; of the pairs which failed with their first egg, three re-laid, two of which again failed at egg stage and one of which failed at small chick stage. The resulting productivity figure of 0.67 was well up on the 0.21 of 2020 and the 0.24 of 2021 (both values heavily impacted by May storms) and was 76.3% up on a 2013-2021 mean of  $0.38 \pm se 0.10$  (productivity at this site is very variable, with highs of 0.77 in 2013 and 0.86 in 2018, but lows of 0.03 in 2016 and 0.14 in 2017). The North Gully plot saw 22 pairs successful at the first attempt, eight egg stage failures (of which two pairs re-laid (including the pair which had the earliest ever Skokholm egg), both producing jumping age chicks at the second attempt), three failures at egg or very small chick stage and three chick stage failures. One of the chick stage failures was brought about when an aggressive encounter between the incubating adult and another bird led to both falling from the ledge; a third adult picked the isolated chick up by its head and walked it over a metre, before throwing it from the cliff. A similar case of infanticide was photographed at the Neck plot in 2019 (see the Skokholm Seabird Report 2019). The resulting North Gully productivity value of 0.67 jumplings per pair was exceptionally close to both the 0.65 of last year and a 2017-2021 mean of  $0.66 \pm se 0.03$  (there was a high of 0.76 in 2020 and a low of 0.58 in 2017). The combined productivity estimate for cliff nesting pairs was 0.67; this was up on a 2017-2021 mean of  $0.54 \pm se 0.07$  and matched that of 2019 as the second highest estimate in this period.



Among the Bluffs boulders, seven pairs failed at egg stage (six eggs went missing and one was buried in mud), eight pairs failed with eggs or small chicks (crevices were found empty, with no indication as to what had happened) and seven pairs failed with chicks (six of which went missing and one of which was found dead). Only one pair produced a second egg, an attempt which again failed at egg stage. Thus 29 pairs produced a jumpling, this equating to a productivity value of 0.57 per pair. The 2022 productivity estimate was very close to both the 0.54 of 2021 and a 2013-2021 mean of  $0.54 \pm se 0.05$  (lows during the period were of 0.44 in 2014 and 0.29 in 2015, whilst the 0.74 of 2016, the 0.60 of 2018 and the 0.71 of 2020 are the only values up on that of this year). For a tenth year running, the last of the breeding attempts within the boulders were concluded before the last of the attempts on the cliffs. Of 13 chicks examined at the Bluffs, four had 'winter-plumage' white throats (above photograph) and nine had 'summer-plumage' black throats.

Combining the productivity figures for the cliff plots and the boulder plot to give an indication of overall productivity on Skokholm can be achieved in two ways, either by averaging the final values obtained for the three sites, as recommended in the Seabird Monitoring Handbook (Walsh *et al.*,

1995), or by combining all the data from the three plots (that is to say by dividing the total number of jumplings at all sites by the total number of monitored sites). The former, preferred, technique produces a productivity estimate of 0.64 jumplings per pair and the latter 0.62. Primarily as a result of calmer May weather and improved Neck plot productivity, the 2022 estimate was up on that seen in each of the last three years and was up on a 2013-2021 mean of  $0.49 \pm se 0.05$  (lows during this period were of 0.23 in 2015 and 0.39 in 2016, both these calculated prior to the establishment of the less variable and more sheltered North Gully plot, whilst the only values up on that of this year are the 0.66 of 2013 and the 0.69 of 2018).

In an effort to ascertain the pattern of colony attendance, near daily counts were made at three of the plots throughout the breeding season (see chart below). There were again fluctuating numbers in all three subcolonies following the usual count period and regular peaks when the totals were augmented by the return of partners, failed adults, successful females or non-breeding birds; interestingly these peaks were again broadly consistent between subcolonies, and to a lesser extent coincided with Guillemot arrivals, suggesting that returning auks respond to the same environmental cues. The first jumpling had departed the productivity plots by 12<sup>th</sup> June; this was five days earlier than the 2015-2021 mean and two days earlier than the first of last year, but four days later than the first of 2020 (between 2015 and 2021 the first productivity plot chick jumped between the 8<sup>th</sup> and 26<sup>th</sup> June). The number of adults within the three plots declined during June, with only double-figure totals logged from 1<sup>st</sup> July (the 2014-2021 mean is 8<sup>th</sup> July, ranging between 30<sup>th</sup> June in 2019 and 17<sup>th</sup> July in 2014) and single-figure counts from 9<sup>th</sup> July (the 2014-2021 mean is 18<sup>th</sup> July, ranging between 9<sup>th</sup> July in 2019 and 27<sup>th</sup> July in 2014). Whereas all of the Bluffs study chicks had departed by 27<sup>th</sup> June, three of 30 attempts at the Neck plot and two of 36 attempts at the North Gully plot were still active on 1<sup>st</sup> July (these all second attempts following early egg stage failures). The last North Gully chick jumped between the 9<sup>th</sup> and 11<sup>th</sup> July and the last two Neck plot attempts failed by 18<sup>th</sup> July. Despite the early start to the 2022 breeding season, there were 22 adults ashore on 19<sup>th</sup> July and single-figure counts each day from the 20<sup>th</sup> until 27<sup>th</sup> July, with one to the north of the Neck on the latter date the last to be seen; the 2013-2021 mean last adult ashore date is 28<sup>th</sup> July, with the earliest last date being 24<sup>th</sup> July in 2015, 2016 and 2017 and the latest being 2<sup>nd</sup> August in 2018.

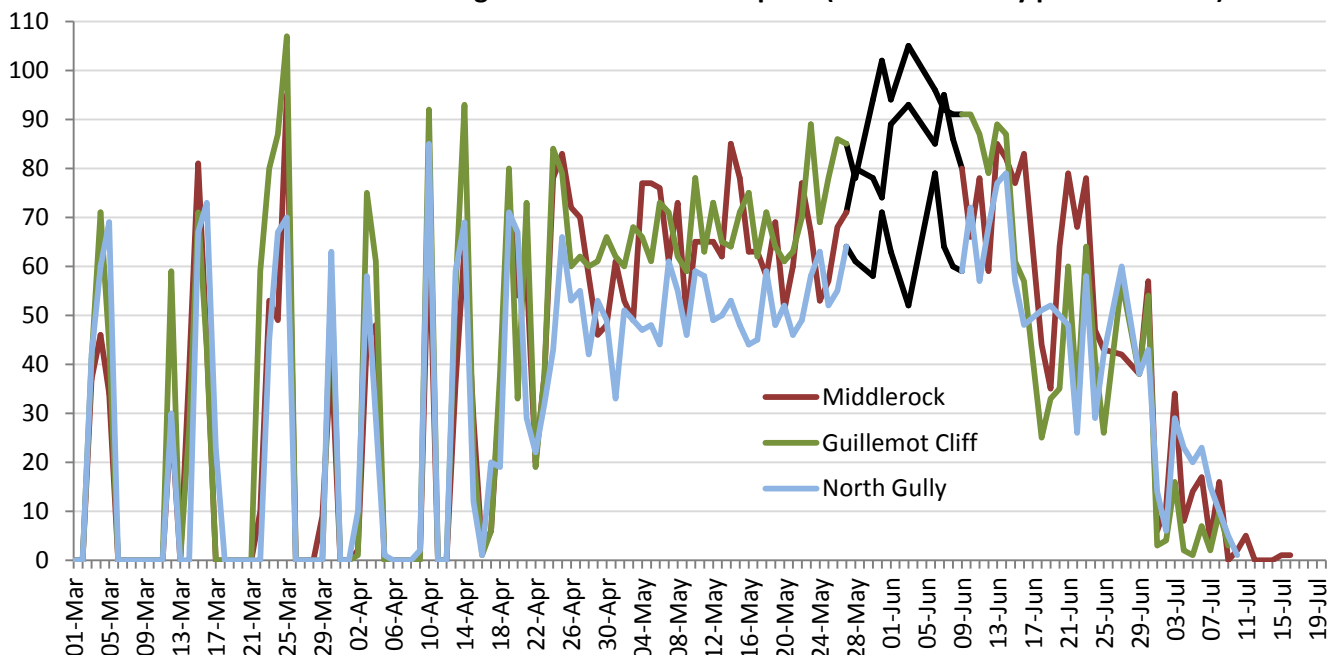


There were sightings of Razorbill at sea on 20 August dates, with highs of 25 on the 2<sup>nd</sup> and 50 on the 22<sup>nd</sup> taking the bird-days total to 164; the only higher August daycounts were logged in 2018 and 2020, with a peak of 159 in the latter year, whilst the only higher totals are the 392 of 2018 and the 575 of 2020. Counts on 19 September dates, with highs of 42 on the 26<sup>th</sup>, 174 on the 27<sup>th</sup> and 96 on the 28<sup>th</sup>, led to a bird-days total of 618, this the third highest September tally to date; four of the five



highest September bird-day totals have been recorded in the last six years, with a peak of 1708 logged in 2017. Although October Guillemot counts were higher than usual, Razorbill were only noted on 11 dates, with a high of 28 on the 4<sup>th</sup> and a bird-days total of just 56; the peak October daycount was the second lowest this decade, whilst the total was the lowest in 11 years (the 2013-2021 October bird-days mean is 404.1, with a high of 1224 in 2019 and a low of 109 in 2016). November was quieter still, with sightings of up to seven birds on three dates totalling ten bird-days; the 2013-2021 peak November daycount mean is 44.3 and the mean bird-days total for the same period is 108.0. Up to five birds were logged on four of the first ten days of December. There were no Razorbill seen ashore for a tenth successive November, this seemingly an auk behaviour confined to Guillemot during the early winter period. Further large auks were present at sea during the autumn, but they remained unidentified due to their distance from the Island; there were 2814 in September (a new high), 781 in October (57.7% down on the 2013-2021 mean), 4674 in November (also a new high) and 2278 in the first ten days of December.

The number of adults on ledges within three of the plots (standard survey period in black).



**Ringling recovery K41996**

**Originally ringed** as a pullus, THE BLUFFS, SKOKHOLM 8<sup>th</sup> June 2021

**Recovered** as an adult, PRAIA DO BALEAL, LEIRIA, PORTUGAL 4<sup>th</sup> February 2022

**Finding condition** Freshly dead on beach (unknown species)

**Distance travelled** 1406km at 193 degrees (SSW)

**Days since ringed** 241

There have been 177 Razorbill ringed in Britain or Ireland and recovered in Portugal, this more than in any other country bar France (700) and Spain (404).

**Puffin *Fratercula arctica***

**Pâl**

**Very Abundant Breeder**

94 trapped, 4 retrapped, 224 resighted

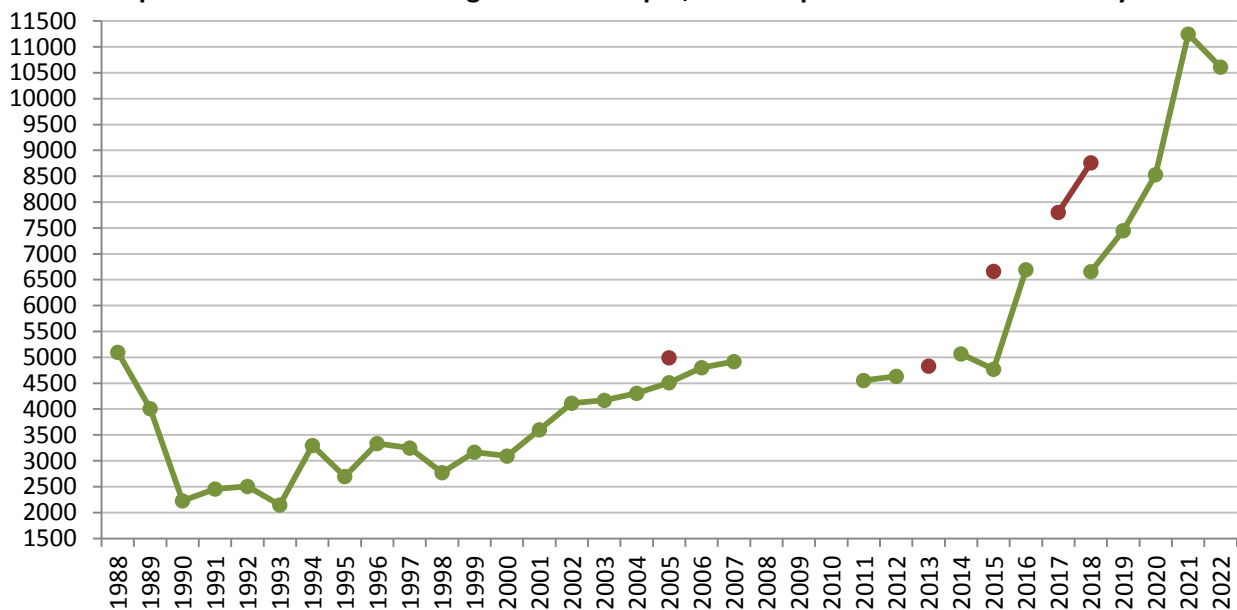
1936-1976: 5412 trapped, 2011-2021: 672 trapped, 29 retrapped, 1842 resighted, 1 control

One off North Haven on the afternoon of 10<sup>th</sup> March was the first of the year; although just three days earlier than the mean 2013-2021 first arrival, the only earlier records are of up to 23 birds over three dates from the 1<sup>st</sup> in 2019 and of up to 204 over three dates from the 7<sup>th</sup> in 2021. There were no Puffin on the 11<sup>th</sup> (this a date on which there has never been a record), but 197 on the 12<sup>th</sup> and

241 on the 14<sup>th</sup>, the latter the highest daycount to have been logged by this date. Likewise the 1741 recorded on the 15<sup>th</sup> (which included the first five to be seen ashore), was the earliest ever four-figure daycount, two days earlier than the 5217 logged on the 17<sup>th</sup> in 2020; the landfall was the earliest on record, two days earlier than that of 2020 and 11 days earlier than the 2013-2021 mean (the latest first landfall during this period was on 6<sup>th</sup> April 2013). There followed sightings on every March date bar the 19<sup>th</sup>, with highs of 9785 on the 22<sup>nd</sup>, 10,611 on the 23<sup>rd</sup> and 6486 on the 30<sup>th</sup> which took the March bird-days total to 43,349; the four highest March bird-day totals have occurred in the last four years, with this year's tally eclipsing last year's all-time record of 29,098. Between 2013 and 2019, daily counts were made from around the Neck each spring evening to record the pattern of colony attendance and to help select the most productive times for a whole Island count (see the 2013-2019 Seabird Reports for charts showing spring attendance around the Neck). The impetus for 2022 whole Island counts on the 22<sup>nd</sup> and 23<sup>rd</sup> March was an assessment of the (remarkable) number of birds rafting in and around South Haven.



The maximum Puffin daycount recorded each spring during the period 1988-2022. Green points represent counts made during March and April, maroon points counts made in May.



The 23<sup>rd</sup> March survey produced a total of 10,611 birds (to the north there were 2327 on the sea and nine in the air, to the south 4730 on the sea and 113 in the air and around the Neck there were 3393



on the sea and 39 in the air); although numbers are still well down on Lockley's spring estimates of approximately 40,000, this was the second highest post-War spring count, up on the 10,000 logged on nine occasions between 6<sup>th</sup> April 1950 and 22<sup>nd</sup> April 1953 and only down on the 11,245 counted on 22<sup>nd</sup> March last year. The Neck total was 226 up on that of 2021 and a new high, whilst to the south the total was 311 down on that of last year and to the north the total was 549 down; although no comparable count was made, ad hoc observations suggested that the number of birds rafting to the north peaked later in the spring. The whole Island counts provide a relatively consistent long-term method for monitoring the trend in numbers, however it is difficult to ascertain how the totals reflect the actual size of the Skokholm breeding population. Monitoring work at the Crab Bay study plot revealed 75 active burrows in an area which comprises approximately 10% of the colony and where less than half of occupied burrows were study burrows; we might thus predict a very rough minimum of 1500 pairs for Crab Bay (as active burrow distribution is apparently quite even), 3000 individuals being up on the 2635 seen there during the 23<sup>rd</sup> March whole Island count.

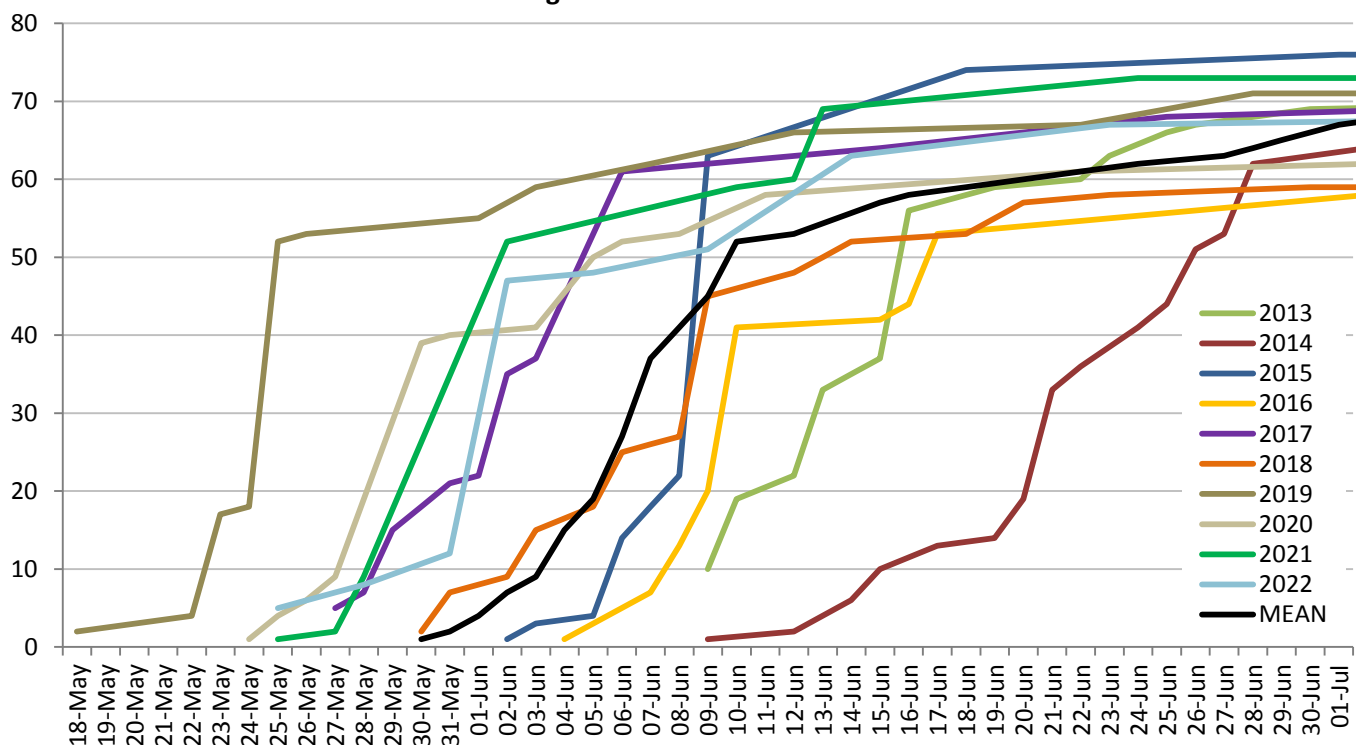


A productivity plot established at Crab Bay in 2013 was used for a tenth season, although all of the timber marker posts were replaced with longer recycled plastic posts in an effort to reduce the number breaking or becoming dislodged between seasons (all of the burrows were checked at the same time to ensure that they did not bifurcate). Of these, 68 were seen to be occupied and were visible throughout the season (71 in 2021); productivity estimates are based on observations of these burrows. Chick provisioning was first witnessed on 18<sup>th</sup> May, with deliveries made to two different burrows above North Haven; these were three days earlier than the first of last year and seven days earlier than the 2013-2021 mean (the earliest in this period was logged on 14<sup>th</sup> May in 2019 and the latest on 3<sup>rd</sup> June in a post-wreck 2014). The mean 2013-2021 first fish delivery to the Crab Bay plot is 30<sup>th</sup> May, this five days after the whole Island mean (in 2020 the first plot delivery was on the same date as the first delivery anywhere, whereas in 2013 it was ten days later); this year saw fish deliveries to five plot burrows on 25<sup>th</sup> May, these on the same date as the first of last year and five days earlier than the mean (see the graph below for the first plot delivery dates logged in previous years). The cumulative total of provisioned burrows again increased rapidly; over 69% of burrows had been provisioned within eight days of the first fish arriving, these with chicks eight days earlier than the 2013-2021 mean. The 2022 chick feeding period was two to three weeks earlier than in 2014 (the breeding season which followed the most severe winter storms recorded during this study). The breeding season is seemingly getting earlier; the four earliest chick provisioning periods

between 2013 and 2022 have occurred in the last four years. Ten active burrows (14.71%) were not seen to be provisioned with fish and it is assumed that these failed at egg stage (the 2013-2021 mean is 5.74%, with a high of 7.79% in 2013 and a low of 2.82% last year).



The number of study burrows which had been provisioned with fish by a particular date each year, along with the 2013-2021 mean.



Although the study plot was visited regularly following the first recorded fish delivery, it certainly cannot be assumed that the first and last fish provisioning was seen for each burrow. Indeed the daylight hours Puffin watches highlight how some burrows are provisioned infrequently (see table below). Additionally it proves difficult to standardise ad hoc recording effort between years. It was thus decided in 2016 that a three visit method would be used to calculate productivity on Skokholm, but that five visits and ad hoc records would still be amassed to allow further comparisons to be



made in the future (see the 2016 Seabird Report for more details). This is more in line with the Seabird Monitoring Handbook (Walsh *et al.*, 1995) which states that, when monitoring Puffin productivity in colonies where the nest is inaccessible and the colony is shared with Manx Shearwaters, the most appropriate technique is ‘When birds are feeding large chicks, make a few watches to determine which burrows/crevices have fish taken down them’. Establishing when burrows contain large chicks is inevitably the main issue with this technique, necessitating earlier watches to detect chick hatching dates (which since 2013 have varied by as much as a month). Whereas five daylight hours watches were performed in each year between 2014 and 2019 and in 2021, a COVID-19 dictated staffing shortage meant that the five 2020 watches each lasted from 0430-1700hrs only (approximately five fewer hours than usual); this year the watches again lasted all of the hours of daylight.

**The number of fish deliveries to known active burrows during five daylight watches.**

No. of deliveries	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of burrows 2 June		7	7	11	9	4	3	2	1	2						
No. of burrows 14 June	1	4	9	6	7	1	4	5	10	3	4		1	1	1	1
No. of burrows 23 June		3	4	5	2	9	7	12	8	6		2	2			
No. of burrows 5 July	1	12	6	13	5	5	4	1	1		2					
No. of burrows 13 July		10	1	6	1		1		1	2			1			

**Calculating productivity using only three daylight watches. The first watch was between 25<sup>th</sup> May and 28<sup>th</sup> June (dependent on the date of first fish delivery that year), the second between 11<sup>th</sup> June and 8<sup>th</sup> July and the third between 28<sup>th</sup> June and 24<sup>th</sup> July. Chicks are assumed to have fledged if fed on a minimum of two watches. Ad hoc productivity is based on a chick reaching 31 days.**

	First fish in plot	Last fish in plot	Fed watch 1 & 2	Min. chick age	Fed watch 2 & 3	Min. chick age	Fed all 3 watches	Min. chick age	Prod. based on 3 watches	Ad hoc prod.
<b>2022</b>	25 May	25 Jul	31	22 (2/6 - 23/6)	7	21 (23/6 - 13/7)	11	42 (2/6 - 13/7)	<b>0.72</b> (49 of 68)	0.53
<b>2021</b>	25 May	24 Jul	38	23 (2/6 - 24/6)	11	20 (24/6 - 13/7)	8	42 (2/6 - 13/7)	<b>0.80</b> (57 of 71)	0.62
<b>2020</b>	24 May	14 Jul	3	13 (30/5 - 11/6)	16	22 (11/6 - 2/7)	33	34 (30/5 - 2/7)	<b>0.78</b> (52 of 67)	0.64
<b>2019</b>	18 May	24 Jul	19	19 (25/5 - 12/6)	9	17 (12/6 - 28/6)	29	35 (25/5 - 28/6)	<b>0.76</b> (57 of 75)	0.55
<b>2018</b>	30 May	30 Jul	20	22 (9/6 - 30/6)	11	18 (30/6 - 17/7)	15	39 (9/6 - 17/7)	<b>0.75</b> (46 of 61)	0.56
<b>2017</b>	27 May	30 Jul	33	20 (6/6 - 25/6)	6	18 (25/6 - 12/7)	16	37 (6/6 - 12/7)	<b>0.80</b> (55 of 69)	0.57
<b>2016</b>	04 Jun	13 Aug	7	16 (17/6 - 2/7)	3	13 (2/7 - 14/7)	38	28 (17/6 - 14/7)	<b>0.73</b> (48 of 66)	0.64
<b>2015</b>	02 Jun	05 Aug	16	14 (18/6 - 1/7)	2	12 (1/7 - 12/7)	42	25 (18/6 - 12/7)	<b>0.75</b> (60 of 80)	0.55
<b>2014</b>	09 Jun	06 Aug	14	11 (28/6 - 8/7)	4	17 (8/7 - 24/7)	38	27 (28/6 - 24/7)	<b>0.74</b> (56 of 76)	0.50
<b>2013</b>	09 Jun	14 Aug	11	15 (16/6 - 30/6)	6	14 (30/6 - 13/7)	39	28 (16/6 - 13/7)	<b>0.73</b> (56 of 77)	0.49

Puffins can fledge having spent a minimum of 34 days as a burrow-bound chick, although this is more typically 38 days and can be anything up to 60 days (Ferguson-Lees *et al.*, 2011). A flaw with the three visit technique is that some chicks were counted as fledged when they had reached as little as 21 days old (see table above). However it would be incorrect to assume that only those

provisioned on all three watches went on to fledge; early hatchers could potentially have departed by the third watch, whilst others may have hatched after the first watch. Although this three visit technique is more standardised than ad hoc recording, the 2013 to 2022 productivity estimates of between 0.72 and 0.80 fledglings per pair certainly include birds which did not fledge; there have been examples each year of chicks already counted as having fledged which were eaten or found dead. This technique also misses fledglings in some years, with apparently successful chicks known to hatch after the second watch (which were thus recorded on only one of three watches and assumed to have failed). Nevertheless this more standardised monitoring suggests that a 2022 productivity figure of 0.72 was similar to that of recent years, albeit being down on that logged in each of the last nine (the 2013-2021 mean is 0.76  $\pm$ se 0.01). If the ad hoc records are included and it is assumed that a chick seen to be provisioned for 31 days or more was of fledging size, then the 2022 data suggests that, of the 68 monitored attempts, perhaps as few as 36 (52.94%) were potentially successful (which equates to a productivity figure of 0.53 fledglings per pair); the 2013-2021 mean ad hoc productivity figure is 0.57  $\pm$ se 0.02, with a high of 0.64 in 2016 and 2020 and a low of 0.49 in 2013. At least 44 attempts saw a chick reach a minimum of 26 days (64.7% or 0.65 chicks per pair, see table below); this figure was very close to the 0.66 of last year.

**The number of days between first and last observed chick feeding based on ad hoc recording and five daylight watches.**

Days	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
No. of burrows	6				8	8	20	3	13	

**The number of fish deliveries made to the study plot during each daylight hours watch, the number of Puffins which lost fish over the plot and the percentage which lost fish.**

		Watch 1	Watch 2	Watch 3	Watch 4	Watch 5	Total
<b>2022</b>	Number of deliveries	497	880	1131	541	243	<b>3292</b>
	Number parasitised	7	12	13	15	10	<b>57</b>
	Percentage parasitised	1.41	1.36	1.15	2.77	4.12	<b>1.73</b>
<b>2021</b>	Number of deliveries	464	891	1262	813	394	<b>3824</b>
	Number parasitised	13	11	9	11	5	<b>49</b>
	Percentage parasitised	2.80	1.23	0.71	1.35	1.27	<b>1.28</b>
<b>2020*</b>	Number of deliveries	357	553	600	659	170	<b>2339</b>
	Number parasitised	22	37	3	10	5	<b>77</b>
	Percentage parasitised	6.16	6.69	0.50	1.52	2.94	<b>3.29</b>
<b>2019</b>	Number of deliveries	579	929	504	429	228	<b>2669</b>
	Number parasitised	25	18	14	18	5	<b>80</b>
	Percentage parasitised	4.32	1.94	2.78	4.20	2.19	<b>3.00</b>
<b>2018</b>	Number of deliveries	701	852	527	511	359	<b>2950</b>
	Number parasitised	19	12	8	8	33	<b>80</b>
	Percentage parasitised	2.71	1.41	1.52	1.57	9.19	<b>2.71</b>
<b>2017</b>	Number of deliveries	844	991	1100	527	177	<b>3639</b>
	Number parasitised	30	11	3	7	5	<b>56</b>
	Percentage parasitised	3.55	1.11	0.27	1.33	2.82	<b>1.54</b>
<b>2016</b>	Number of deliveries	421	733	889	489	525	<b>3057</b>
	Number parasitised	20	45	35	10	28	<b>138</b>
	Percentage parasitised	4.75	6.14	3.94	2.04	5.33	<b>4.51</b>

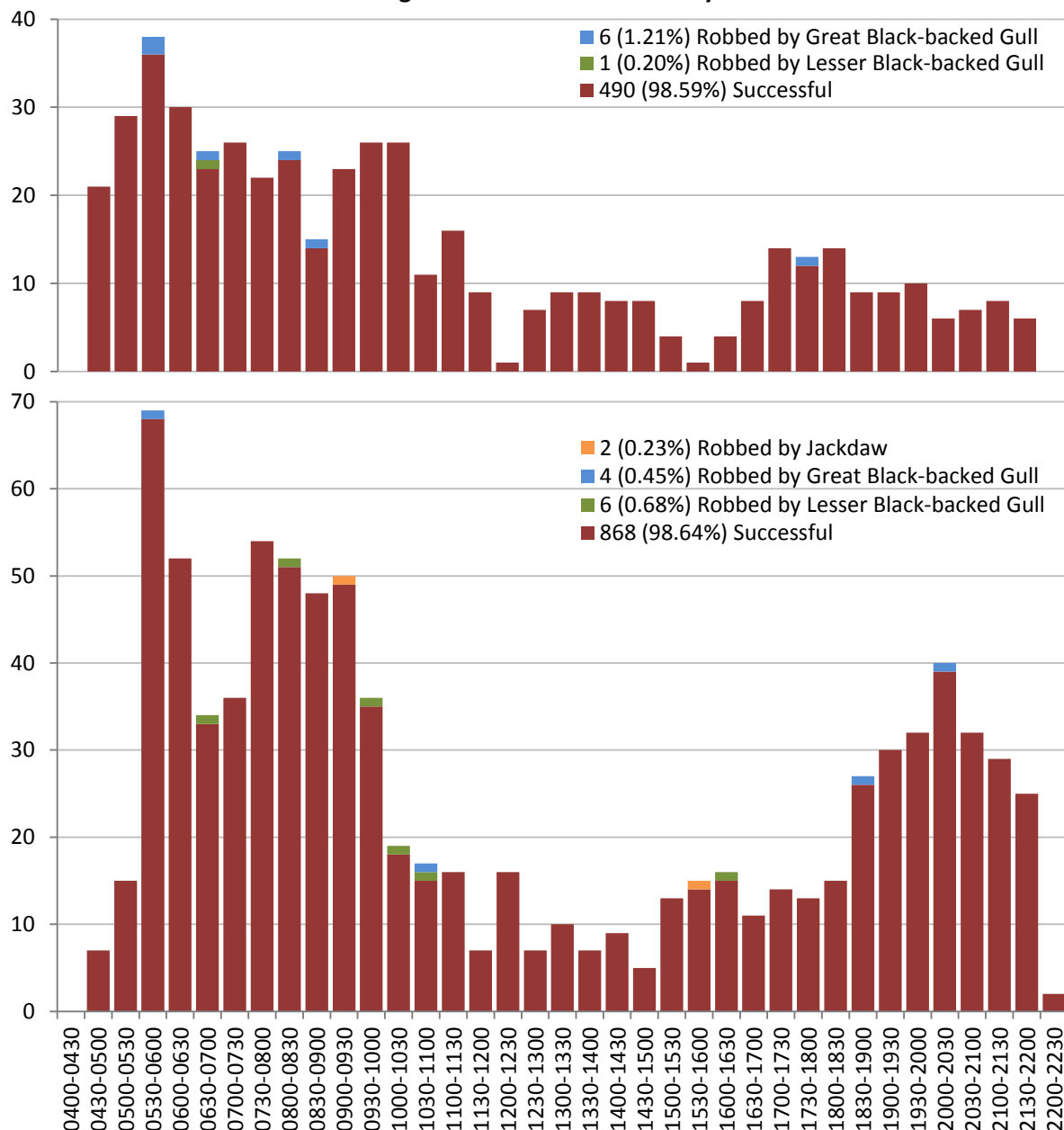
\*watches stopped at 1700hrs.

The five daylight watches were also used to monitor kleptoparasitism. The study plot was confined to the area of the 90 numbered burrow stakes at Crab Bay. On 2<sup>nd</sup> June 497 Puffins arrived to the study area with fish and of these seven (1.41%) were successfully robbed. On 14<sup>th</sup> June 880 arrived and 12 (1.36%) were robbed. On 23<sup>rd</sup> June 1131 arrived and 13 (1.15%) were robbed. On 5<sup>th</sup> July 541

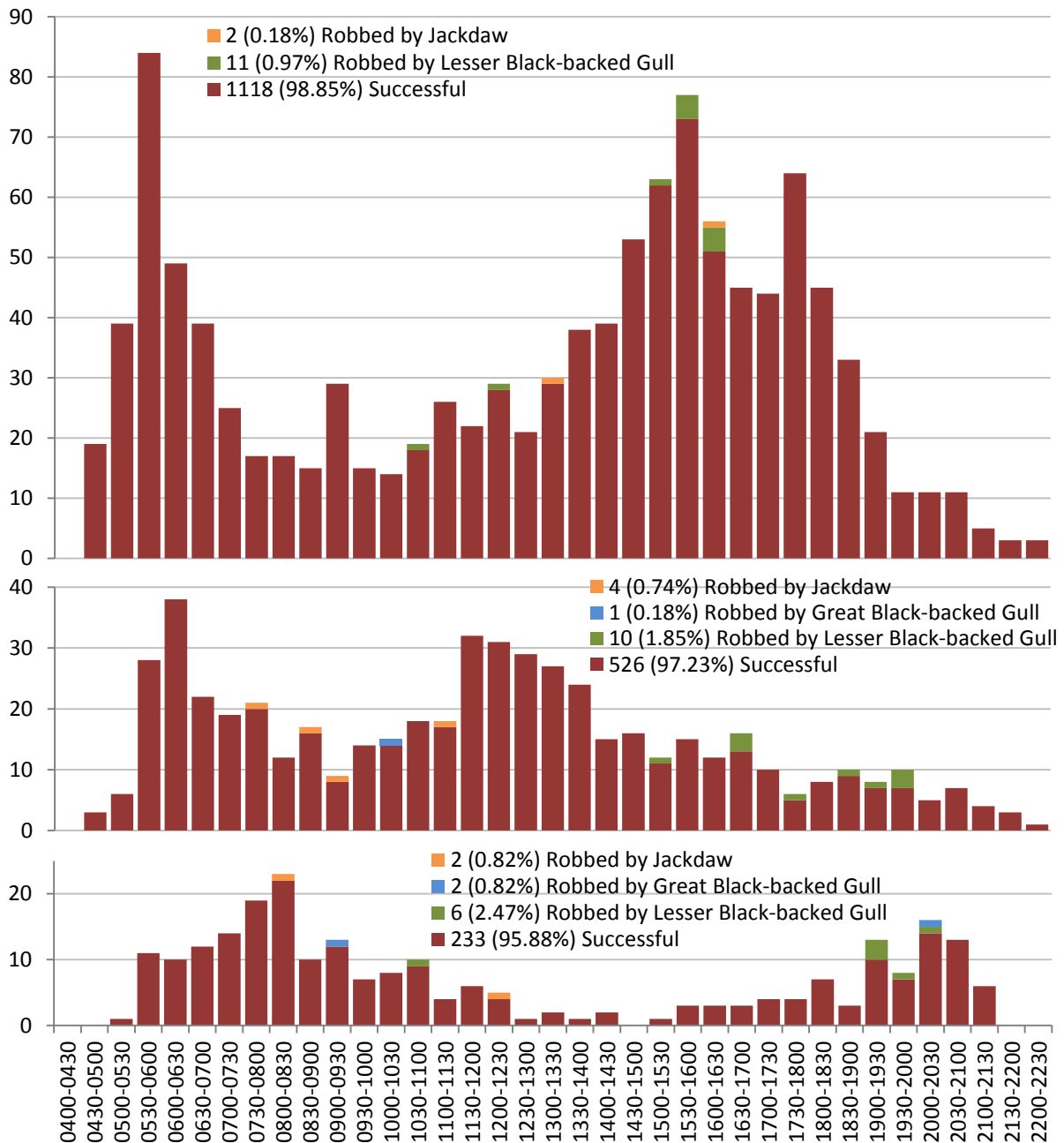


arrived and 15 (2.77%) were robbed. On 13<sup>th</sup> July 243 arrived and ten (4.12%) were robbed. These figures do not take into account the number of fish lost to gulls at sea or on the approach to the colony. In terms of the percentage of deliveries lost over the study plot, a five visit mean of 1.73% was the third lowest of the last ten years, down on a 2013-2021 mean of 3.67%. The last six years have seen the lowest levels of monitored kleptoparasitism, whilst the highest level to be recorded so far occurred in 2013 (when 8.77% of deliveries were lost during four daylight hours watches). A general decline in kleptoparasitism is perhaps in part due to a reduced Lesser Black-backed Gull population (which has declined by 40.4% in the last six years), although higher Great Black-backed Gull numbers in the vicinity of Crab Bay may at the same time be having an effect, with the more aggressive large gulls keeping the Herring and Lesser Black-backed Gulls from the study area. There has been an increase in corvids kleptoparasitising Puffins in the plot; there were no records between 2013 and 2016, a Crow stole one delivery in 2017, Jackdaws stole single deliveries in 2018 and 2019, a Raven stole a delivery in 2019 and Jackdaws successfully robbed fish twice in both 2020 and 2021. This year saw Jackdaws successfully steal fish on ten occasions during the five watches.

**The number of chick provisioning attempts during daylight on the 2<sup>nd</sup> and 14<sup>th</sup> June 2022, along with the number of times that gulls and corvids successfully robbed the fish.**



The number of chick provisioning attempts during daylight on 23<sup>rd</sup> June and the 5<sup>th</sup> and 13<sup>th</sup> July 2022, along with the number of times that gulls and corvids successfully robbed the fish.



A colour ringing project was begun at Crab Bay in 2011 to allow an estimate of adult survival to be made each year. There were 128 ringed in the first year, 166 between 2012 and 2014, 106 between 2016 and 2019 and 40 last year; a further 30 adults were colour marked this year. The table below summarises the resighting data collected so far. What is apparent is that some birds are not seen every year, perhaps because they have not returned to the plot or perhaps because their rings have not been seen. Indeed 18 were not seen for two years (including two which went missing for two years twice), 11 were not seen for three years, two were not seen for four years (including one found this year) and one was not confirmed for five years. We now know that when 217 were seen last year, at least 236 were alive; between 2013 and 2021 a mean of 91.18% of known live birds were seen each year. A 2021-2022 survival figure of 80.80% is thus likely to increase in the future. With 11 years of resighting data now available, we can start to look at fluctuations in survival over time. The percentage of birds surviving the winter during the period 2011 to 2021 has varied between 79.72% (2013-2014) and 96.51% (2012-2013), with only the 2014 return rate being below



89% and a 2012-2021 mean of 92.39%  $\pm$ sd 4.91. A flaw with this survival estimate is that colour marks were added to Puffins caught in flight, birds potentially resident in areas not visible to researchers; a better estimation of survival may therefore come from looking for birds previously seen in the field (thus discounting individuals in the year after ringing). The resulting survival estimates range from 80.12% (2013-2014) to 97.37% (2012-2013), with a 2013-2021 mean of 92.99%  $\pm$ sd 5.09. The most striking feature of these estimates is the substantial drop in survival noted after the severe 2013 to 2014 winter wrecks; it remains to be seen how often such drops in survival can occur before the spring raft counts show a decline.

**Survival in adult Puffins.** An average survival figure for each year is based on the number of birds ringed in the preceding year plus the number of previously ringed birds known to be still alive, for example 216 birds (93.91%) are now known to have been alive in 2015, of a 2014 total of 230 (57 ringed in 2014 plus 173 (93+40+40) ringed previously and known to be alive). Survival after a one year establishment period means that birds have been seen within the study area before (and are therefore assumed to be located in visible positions); birds ringed in the preceding year are therefore excluded from the calculations as they may be occupying hidden areas of the colony.

	2011	2012	2013	2014	2016	2017	2018	2019	2021	Total	Survival after one year
<b>Total Ringed</b>	128	58	51	57	23	24	31	28	40	440	
Seen in 2012	72									72	
Alive in 2012	114									114	
<b>% survival</b>	89.06									89.06	-
Seen in 2013	102	52								154	
Alive in 2013	111	55								166	
<b>% survival</b>	97.37	94.83								96.51	<b>97.37</b>
Seen in 2014	86	36	37							159	
Alive in 2014	93	40	40							173	
<b>% survival</b>	83.78	72.73	78.43							79.72	<b>80.12</b>
Seen in 2015	78	37	35	50						200	
Alive in 2015	86	39	37	54						216	
<b>% survival</b>	92.47	97.50	92.50	94.74						93.91	<b>93.64</b>
Seen in 2016	67	34	32	43						176	
Alive in 2016	79	38	35	48						200	
<b>% survival</b>	91.86	97.44	94.59	88.89						92.59	<b>92.59</b>
Seen in 2017	71	35	31	44	19					200	
Alive in 2017	79	38	32	45	20					214	
<b>% survival</b>	100.00	100.00	91.43	93.75	86.96					95.96	<b>97.00</b>
Seen in 2018	69	34	28	40	19	20				210	
Alive in 2018	75	37	30	41	20	23				226	
<b>% survival</b>	94.94	97.37	93.75	91.11	100.00	95.83				94.96	<b>94.86</b>
Seen in 2019	65	33	27	36	17	20	21			219	
Alive in 2019	68	36	28	39	19	23	30			243	
<b>% survival</b>	90.67	97.30	93.33	95.12	95.00	100.00	96.77			94.55	<b>94.25</b>
Seen in 2020	60	31	23	33	15	18	22	17		219	
Alive in 2020	63	34	25	38	17	22	28	25		252	
<b>% survival</b>	92.65	94.44	89.29	97.44	89.47	95.65	93.33	89.29		92.99	<b>93.42</b>
Seen in 2021	57	30	23	28	16	16	25	22		217	
Alive in 2021	58	32	24	33	17	20	27	25		236	
<b>% survival</b>	92.06	94.12	96.00	86.84	100.00	90.91	96.43	100.00		93.65	<b>93.65</b>
Seen in 2022	47	29	21	29	13	19	21	18	26	223	
<b>% survival</b>	81.03	90.63	87.50	87.88	76.47	95.00	77.78	72.00	65.0	80.80	<b>83.47</b>

Puffins were again regularly taken by Great Black-backed Gulls during the breeding season. Such observations typically become rarer during the Puffling feeding period, dropped fish seemingly a sufficient deterrent; ten dead adults found to the east of the Neck between the 10<sup>th</sup> and 29<sup>th</sup> June were thus unusual. Ad hoc records again mirrored recent whole Island counts in suggesting that the number of birds on Skokholm is increasing; there was seemingly an inland expansion of occupied burrows above Hog Bay, above Purple Cove and on the Neck. Crab Bay was regularly quiet from 8<sup>th</sup> July and was almost devoid of surface birds on the evening of the 19<sup>th</sup>, however the North Coast and Neck remained busy (this mirroring the whole Island count which suggested that birds to the north were breeding a little later than those to the south). The last four-figure daycount was logged on 24<sup>th</sup> July, one day earlier than the last of 2021, and raft counts remained in the hundreds until 31<sup>st</sup> July (between 2013 and 2021 the last three-figure daycount averaged 3<sup>rd</sup> August, with the earliest on 29<sup>th</sup> July 2020 and the latest on 6<sup>th</sup> August 2014). Daily August sightings to the 12<sup>th</sup> peaked at 64 on the 2<sup>nd</sup> and 15 on the 3<sup>rd</sup>. The last two fish deliveries to be seen this year were made to burrows to the north of the Neck on 11<sup>th</sup> August, these on the same date as the last of 2021 and one day earlier than the 2013-2021 mean; the latest last delivery recorded during this period was on 23<sup>rd</sup> August 2014, whilst one on 4<sup>th</sup> August 2019 was the earliest. One heading west off South Haven on the 2<sup>nd</sup> was the first October sighting since 2012. A recently deceased adult was floating in South Haven on 12<sup>th</sup> November; the body was not recoverable for HPAI testing.



**Storm Petrel** *Hydrobates pelagicus*

**Pedryn Drycin**

**Abundant Breeder** a 2016 whole Island survey predicted 2383 occupied sites

389 trapped (including 32 pulli), 23 retrapped, 10 controls

1933-1976: 18,473 trapped, 2011-2021: 6358 trapped, 639 retrapped, 268 controls

Despite the sizable Skokholm breeding population and the significant amount of time dedicated to seawatching, Storm Petrels typically prove a rare sight at sea. Indeed the only at sea sightings this year were of six birds during a moderate westnorthwester on 25<sup>th</sup> July, one off the Lighthouse on the morning of 20<sup>th</sup> August, one feeding close to a dead Gannet on 5<sup>th</sup> September and a juvenile feeding around a Grey Seal with a fish on 24<sup>th</sup> November. The eyes of a bird found near the Farm on 23<sup>rd</sup> July were closed and seemingly full of soil; one eye was in a much better condition following irrigation and the bird flew strongly when released the following night. With the exception of a small number of incubating adults visible in shallow crevices or in nest boxes, all other 2022 sightings came at night, although birds occasionally called from holes during the day and vocal responses were elicited

for monitoring purposes. Birds were heard at sites traditionally used for productivity monitoring from 25<sup>th</sup> April and cameras installed in four Petrel Station boxes revealed that two were present on the night of the 28<sup>th</sup>. However the latter were not in the Petrel Station the following day, indeed it was not until 5<sup>th</sup> May that birds were first heard calling diurnally; this was 12 days earlier than the first of last year but on the same date as the 2013-2021 mean (the earliest during this period was heard on 23<sup>rd</sup> April 2017 and the latest on 25<sup>th</sup> May 2013). A bird heard calling from a rock pile above the Neck Razorbill productivity plot on 14<sup>th</sup> June was notable; there were no records included for this area during the 2016 whole Island survey. The infrared viewing equipment again proved popular, producing peak counts from the Quarry of at least 160 on the night of 19<sup>th</sup> May (when there were no birds seen on the Petrel Station cameras), 163 on the night of 23<sup>rd</sup> June and of at least 180 on the night of 3<sup>rd</sup> July.

**The total number of apparently occupied crevices (located over ten visits) responding to a recording of male song at each of the seven study sites. Numbers in parenthesis are the totals from the 2m wide Quarry transects (as stipulated in the project guidelines) as opposed to the more wayward crevices monitored since the project's inception. There was no 2020 survey, the mean that for the period 2010-2019 and 2021.**

Year	North Pond Wall	Little Bay Wall	North Haven Gully	Quarry transect 1	Quarry transect 2	Quarry transect 3	Quarry transect 4	Quarry total	Total						
2022	9	18	19	16 (5)	18 <sup>†</sup> (9) <sup>†</sup>	17 (10)	57 (32)	108 (56)	154 (102)						
2021	9	17	16	17 (5)	15 <sup>†</sup> (7) <sup>†</sup>	14 (10)	43 (22)	89 (44)	131 (86)						
2019	10	23	12	18 (7)	18 <sup>†</sup> (9) <sup>†</sup>	13 (8)	44 (20)	93 (44)	138 (89)						
2018	6	13	11 <sup>‡</sup>	15 (5)	15 <sup>†</sup> (10) <sup>†</sup>	12 (8)	49 (30)	91 (53)	121 (83)						
2017	7	20	14 <sup>‡</sup>	15 (5)	13 <sup>†</sup> (7) <sup>†</sup>	10 (9)	47 (27)	85 (48)	126 (89)						
2016	6	15	17	9* (4)*	**	**	11 (8)	41 (26)	61 (38)	99 (76)					
2015	7	17	17	14 (5)	21 (9)	12 (7)	42 (25)	89 (46)	130 (87)						
2014	9	12	13 <sup>‡</sup>	14 (5)	18 (9)	18 (12)	37 (22)	87 (48)	121 (82)						
2013	8	15	22	14 (4)	15 (8)	10 (7)	46 (27)	85 (46)	130 (91)						
2012	5	9	21	12 (5)	8 (4)	10 (5)	33 (17)	63 (31)	98 (66)						
2011	7	5	19	11 (5)	13 (8)	10 (7)	25 (14)	59 (34)	90 (65)						
2010	4	9	18	8 (5)	15 (12)	11 (8)	30 (17)	64 (42)	95 (73)						
Mean	7.1	14.1	16.4	13.4	5.0	15.1	8.3	11.9	8.1	39.7	22.5	78.7	43.1	116.3	80.6

\* Transect 1 was only visited on four occasions in 2016 due to safety concerns.

\*\* Transect 2 was not visited in 2016 due to a rock fall.

† Transect 2 was shortened in 2017 due to the 2016 rock fall.

‡ There was substantial scouring in the winters of 2013-14 and 2016-17 and in October 2017.

Four playback transects established at the Quarry in 2010, along with plots in North Haven Gully and along two of the walls which radiate from the Farm, potentially provide a sound method for monitoring changes in the Skokholm population (see the 2013-2019 and 2021 Seabird Reports for full details). Unfortunately the COVID-19 dictated Island closure meant that there were insufficient staff to safely survey the boulder areas in 2020, however a check of the accessible crevices used for productivity monitoring revealed incubating adults in the vast majority of usual sites. We were again joined by two Long-term Volunteers this year, this allowing the survey work to be completed in the usual period; ten visits were made to the study areas between 21<sup>st</sup> June and 15<sup>th</sup> July. An MP3 recording of male song was played into every crevice encountered along the transects, both numbered (and therefore used previously) and unmarked, with each active crevice being recorded and marked if new. It was first noted in 2013 how some marked crevices no longer fell within the two metre wide transects, an observation which prompted regular checks to assess the drift caused by (typically) small scale rock movements (and almost certainly in a small number of cases by erroneous measurements early in the project); it should be noted in future surveys that marked



crevices which were once within the two metre transects now lie outside of the survey area. The playback census this year again focused on the area delineated by marked burrows, although the results were then divided into those which fell within the two metre transects and those which fell just outside (see table above).

Between 31 and 53 responses were elicited on the Quarry transects using MP3 playback in each of the years between 2010 and 2019 and in 2021, although a substantial rock slide in 2016 significantly reduced the area which could be surveyed that year; Quarry transect two, which held between four and 12 responding birds, was almost entirely destroyed in 2016 and Quarry transect one was undercut on its southern edge, rendering both transects too dangerous to survey (see the 2016 Seabird Report for photographs and further details). It would seem from the records that the 2016 Quarry rock fall was by far the largest such event for over 35 years. Visits to the Quarry in 2017 established that there had been no further significant slides on any of the transects; the decision was made to reinstate transect one entirely and to use the upper section of transect two, a situation which has remained the same since. It was decided in 2017 that all of the data previously collected for transects one and two would be compared directly with future years; no adjustments have thus been made for the fact that transect two was shorter from 2017 onwards and that transects one and two were missed in 2016. Although it was again apparent that there had been some small winter rock slides, particularly in the lower third of transect four, there were no safety concerns this year.



There is a general consensus that the number of pairs utilising the 18<sup>th</sup> century herringbone walls on Skokholm has declined (Vaughan and Gibbons, 1996; Vaughan, 2001; Thompson, 2003; Sutcliffe, 2010), perhaps due to a loss of suitable nest sites as vegetation and soil fills gaps in the collapsing walls. However standardised survey work over the last 13 years suggests that there have been no further declines, although clearly there is some variation in the number of responses elicited each year (perhaps in part due to fluctuations in the number of transient, non-breeding birds, rather than to changes in the number of breeding pairs (Brown and Eagle, 2017)). This year saw 18.2% fewer wall responses than in a record 2019, however a combined North Pond Wall and Little Bay Wall total of 27 matched that of 2017 as the second highest to date (this 27.4% up on a 2010-2021 mean of 21.2  $\pm$ sd 6.4). It would seem that the Walls population can still be cautiously regarded as stable. A trial crevice excavated in North Pond Wall in 2021 was not used in 2022 (it was occupied by a successful Wheatear pair), however a further five sites were excavated by hand this year (all in North Pond Wall).

The huge swell generated by Storm Ophelia in October 2017, the remnants of the easternmost major Atlantic hurricane on record, caused yet another scouring event in North Haven Gully. Nest boxes installed in 2014, the access ladder to the lower portion of the slope and the central section of boulder scree which traditionally held many active crevices were all destroyed, whilst the painted marker stones were again moved from their original locations. This was the third major change to the North Haven landscape in five years, a series of events which almost certainly contributed to a 38.9% decline in the number of occupied crevices located between 2010 and 2018. No further significant changes to the North Haven landscape have been observed since, although a small rock fall above the upper east portion of the gully has created additional sites. Nevertheless, recent weather events releasing soil from further up the gully have seemingly reduced the overall number of open fissures suitable for nesting. How such a loss of available nest sites effects the Skokholm population as a whole is unclear; it would seem likely that nest sites are available away from North Haven and that the birds were not impacted directly (as they were predominantly absent during the scouring events), however the impact of looking for new nest sites on adult survival and productivity is something of an unknown. There were 19 active sites discovered in North Haven Gully this year, this up on a 2010-2021 mean of  $16.4 \pm \text{sd } 3.6$ , three more than last year and the highest total since the 22 of 2013 (the first big scouring event during this study was in the winter of 2013-2014).

The ephemeral nature of Storm Petrel nest sites was also evident at the Quarry where there were further small scale movements, particularly along transect four. The transect one total matched both that of last year and the 2010-2021 mean (there have been five transect responses in nine of 12 years). A transect two total of nine was two up on that of 2021 and close to the mean ( $8.3 \pm \text{sd } 2.1$ ), this despite the fact that the transect was shortened in 2017. The transect three total matched the ten of last year as the second highest on record, this up on a 2010-2021 mean of  $8.1 \pm \text{sd } 1.8$ . The transect four total was a surprise, with 32 responses elicited within the two metre wide transect over ten visits; this was a new site record, ten up on last year, two up on the 2018 high and well up on a 2010-2021 mean of  $22.5 \pm \text{sd } 5.0$ . The overall Quarry total of 56 was also a new high, three up on the previous record, 12 up on that of 2021 and 29.9% up on the mean ( $43.1 \pm \text{sd } 6.5$ ).

**The number of crevices which have at some point been occupied over the 12 study years (a total of 378), subdivided to show how many years the crevices have been apparently occupied for and the percentage of crevices occupied for a particular number of years. Crevices in the lower half of transect two, not visited after the 2016 rock fall, are not included in this table.**

	Quarry Transects	The Walls	North Haven Gully	Total	% of total
1 year of apparent occupancy	50	40	24	114	30.16
2 years of apparent occupancy	36	10	25	71	18.78
3 years of apparent occupancy	25	7	6	38	10.05
4 years of apparent occupancy	21	6	12	39	10.32
5 years of apparent occupancy	19	4	2	25	6.61
6 years of apparent occupancy	12	9	5	26	6.88
7 years of apparent occupancy	14	3		17	4.50
8 years of apparent occupancy	15	1	1	17	4.50
9 years of apparent occupancy	8			8	2.12
10 years of apparent occupancy	8	4		12	3.17
11 years of apparent occupancy	5			5	1.32
12 years of apparent occupancy	4	1	1	6	1.59
<b>Total</b>	<b>217</b>	<b>85</b>	<b>76</b>	<b>378</b>	

Overall there were 102 responses elicited this year, this a new record and 16 more than in 2021 (there were three more active sites in North Haven, one more in Little Bay Wall and 12 more in the Quarry); the total was up on a previous high of 91 logged in 2013 and a 2010-2021 mean of  $80.6 \pm \text{sd}$



9.3. It still seems likely that, over the last decade at least, the Skokholm study population has been stable at worst, a conclusion which is probably applicable to the Island population as a whole. This is positive news following what may have been a significant population decline between 1996 and 2010 (Sutcliffe and Vaughan, 2011; Wood *et al.*, 2017). One of the most important variables highlighted in recent years is nest site availability within the study areas; birds can only react to the changing landscape and maintain a stable population if further nest sites open up as others are lost. It is clear that some Storm Petrel nest crevices are short lived (as shown in the table above, just under a third of those found over the course of this study have only been occupied during a single year), however stable sites are also in existence; over 24% of the active crevices located during 12 years of study have shown signs of occupancy in six or more years and 6.08% of crevices have contained a calling bird in ten or more years. Although changes in the positioning of rocks will mean that some crevices were only available for a single year, it is tempting to suggest that some of the crevices occupied only once are perhaps unsuitable nest sites (although they contained a calling bird, such sites may have never actually supported a breeding attempt).



**The percentage of known active crevices which responded to male song during any single visit, averaged across all ten visits, and the 2014-2022 mean (the resulting correction factors are given in parenthesis).**

Year	The Walls	North Haven	Quarry	Rock fall	Average
2022	29.6 (3.38)	40.0 (2.50)	37.9 (2.64)	38.2 (2.62)	36.7 (2.73)
2021	34.2 (2.92)	36.9 (2.71)	32.1 (3.11)	32.9 (3.04)	33.1 (3.02)
2019	31.2 (3.20)	35.8 (2.79)	30.1 (3.23)	30.8 (3.24)	30.9 (3.24)
2018	22.6 (4.42)	31.8 (3.14)	32.6 (3.06)	32.5 (3.07)	31.0 (3.23)
2017	21.9 (4.58)	30.9 (3.23)	28.1 (3.55)	28.5 (3.51)	27.1 (3.69)
2016	40.0 (2.50)	25.9 (3.86)	23.3 (4.30)	23.9 (4.18)	27.7 (3.61)
2015	28.7 (3.48)	37.4 (2.68)	28.9 (3.46)	30.4 (3.29)	30.1 (3.33)
2014	36.2 (2.76)	40.0 (2.50)	26.2 (3.82)	26.4 (3.79)	28.1 (3.56)
Mean	<b>30.6 (3.27)</b>	<b>34.8 (2.87)</b>	<b>29.9 (3.34)</b>	<b>30.5 (3.28)</b>	<b>30.6 (3.27)</b>

The proportion of known active crevices which respond to a recording of male song during any single visit unsurprisingly fluctuates; there are several reasons for this, including the chance presence of



birds of different sexes, individual variation in response rate, nest site positioning (which will influence how occupants hear the stimulus) and breeding status (non-breeders are perhaps more likely to leave a crevice unattended, to occupy multiple crevices during the study period or to respond at a different rate to breeding birds, whilst breeding status could also change during the survey period). The Walls saw an average of 8.0 (29.6%) of the 27 active sites respond per visit, although between two and 12 responded on a single visit. At North Haven a mean of 7.6 (40.0%) of 19 active sites responded, although between five and 12 responded on a single visit. At the Quarry a mean of 40.9 (37.9%) of 108 active sites responded, but this was between 30 and 53 on any particular date. Despite this significant variation between dates, the mean response rate at the Walls and North Haven fell within the ranges observed between 2014 and 2021 (see table above). The mean response rate at the Quarry was higher than anything seen before (the previous high was 32.6% in 2018), this in a year which saw more active sites than at any point during the same period. An average response rate for all sites of 36.7% was the highest to be observed in eight years, up on a range of between 27.1% and 33.1% recorded between 2014 and 2021. The use of these response rates to produce a correction factor remains the best way to predict the number of birds present in a large area when ten visits are not logistically feasible (for example during the whole Island census). Based on the data collected over eight of the last nine years, the number of active sites present in an area is likely to be in the region of 3.27 times more than the number encountered on a single visit. However the variation seen in this year's figures is a reminder of how difficult it is to assess the population of a species which usually cannot be seen.



**A summary of Petrel Station contents 2018-2022**

	2018	2019	2020	2021	2022
<b>Number of pairs that produced eggs</b>	4	9	8	5	6
<b>Number of pairs that fledged young</b>	0	2	2	3	4
<b>Productivity</b>	0.00	0.22	0.25	0.60	0.67
<b>Boxes with signs of occupancy</b>	8	13	12	19	58

There is a clear need to discover what the birds which respond to playback during the annual monitoring are actually doing; due to the fact that the vast majority of responding birds are hidden, it is unclear how many of these (and indeed how many of the 2383 occupied sites predicted during the 2016 whole Island census (Wood *et al.*, 2022)) are actually breeding (as opposed to non-breeders moving around potential nest sites or diurnal refuges unsuitable for nesting). Previous attempts to use an endoscope in natural sites have failed to locate a sufficiently large sample size for monitoring purposes. One way to improve our knowledge is to encourage petrels to occupy

accessible artificial sites. With this in mind a study wall containing 119 nest holes was created during the 2016 season (with the final inspection hatches and endoscope holes added in April 2017). The plywood inspection hatches were replaced with recycled plastic in early April this year, this the last stage in producing a wall which should last for decades to come (above photo). Ten visits were made to this 'Petrel Station' between 26<sup>th</sup> June and 11<sup>th</sup> July 2020 when an MP3 playback census was conducted (this within the standard period used for the transect survey). The ten visits elicited calls from just three boxes, with a mean of 1.1 responses per visit and a mean apparent response rate of 36.67%. Confirmatory checks during the chick provisioning period revealed discrepancies between the playback results and the box contents; one of the boxes found to be active during the survey only contained a nest scrape, a further three boxes from which responses were not elicited contained nest scrapes and six additional boxes contained egg stage failures by silent pairs. This has obvious implications for the whole Island census as evidently some active sites were not detected over ten visits (which would perhaps suggest that the Skokholm population is larger than estimated in 2016). It should however be remembered that the Petrel Station is probably not yet representative of the Island as a whole, primarily as the majority of occupants are likely to be younger, inexperienced birds. This theory is supported by the 2018-2020 productivity estimates (see table above), these figures well down on those seen elsewhere on the Island. Given the poor productivity witnessed early in this project, it was decided that there would be no Petrel Station playback census in 2021 and 2022 (to allow for productivity checks in years without a potentially disturbing survey).



Visits to the Petrel Station during the 2022 chick provisioning period revealed that a remarkable 58 boxes had contained a Storm Petrel at some point this year. Only nest scrapes were present in 52 of these boxes, with six pairs having produced eggs. An egg in box 106 was abandoned (this the first time in four years that this box has been occupied), whilst a chick died during the hatching process in box 104 (this also a new site). Chicks fledged from boxes 11 and 64 for a fourth consecutive year, a chick fledged from box 12 for a second consecutive year (a response was elicited from box 12 during the 2020 playback survey, however it was later found to contain an empty scrape) and a late chick fledged from box 84 shortly after 17<sup>th</sup> October (there was an egg stage failure at this site in both 2019 and 2020, however it was not seemingly occupied last year). Assuming that no eggs had been removed from the Petrel Station by the petrels or scavengers (a difficult task as there is a lip between the nest chamber and the access tunnel to each box), then productivity was 0.67 fledglings per pair, this a new high for this site and more consistent with that previously observed elsewhere. It



is unclear whether the improved productivity seen in 2021 and 2022 was due to reduced disturbance or the fact that this site may now contain older, more experienced birds. Four cameras were installed in the Petrel Station this year, three of these in boxes 11, 12 and 64. The cameras captured courtship and mating, egg laying, incubation and chick feeding, along with some fascinating pebble tossing behaviour (the latter seen in both adults and chicks).

There were 20 sites discovered this season where an incubating bird was evident early enough in the nesting period to allow for a productivity estimate (this matching that of 2015, 2018, 2020 and 2021 as the largest post-2012 sample, up on a mean of 17.3); the Petrel Station birds were again excluded as it was felt that the sample could be biased towards younger, less experienced individuals. Although some early egg stage failures may have been missed, the study is biased towards birds in shallow crevices or boxes and the sample size is far from great, these visible birds provide a rare opportunity to estimate productivity on Skokholm. The first eggshell fragments indicative of hatched chicks were discovered at three Quarry sites on 2<sup>nd</sup> July, this six days earlier than the 2015-2021 mean (the earliest during this period was discovered on 29<sup>th</sup> June 2019 and the latest on 26<sup>th</sup> July 2021). Remarkably, only three of the 20 monitored nest attempts failed; attempts in the Gantry and the Cottage Wall failed at either egg or very small chick stage, whilst an attempt along Quarry transect four failed when the chick was at least 17 days old. The 17 remaining chicks were all more than half grown when H5N1 HPAI restrictions stopped access to the sites; a late season check of these areas did not locate any dead young, although there is a chance that bodies may have been scavenged. Assuming that all of the large chicks went on to fledge, the 2022 productivity estimate is 0.85 fledglings per pair; this is the highest estimate of the last nine years (the 2014-2021 mean is 0.61  $\pm$  se 0.04, with a high of 0.80 in 2021 and a low of 0.45 in 2020). It is unclear why productivity was so high this year, although predominantly dry conditions for a second year no doubt benefitted small chicks left alone in relatively exposed sites.



Although only small numbers of accessible chicks are ringed each year on Skokholm, the tape luring of adult birds in South Haven is giving some indication as to their post-fledging survival (this coupled with a small number of controls from elsewhere). Of four birds ringed as chicks in 2013, one has been found subsequently (25.0%), whilst three of 11 2014 chicks (27.3%), four of 17 2015 chicks (23.5%), one of six 2016 chicks (16.7%), one of seven 2017 chicks (14.3%), one of ten 2018 chicks



(10.0%), four of 23 2019 chicks (17.4%) and one of 14 2020 chicks (7.1%) have been encountered again (the controls being a 2015 ringed chick retrapped in Cornwall in 2018 and again in France in 2021, a 2016 chick retrapped on the nearby mainland in 2019 and a 2018 chick retrapped in Cornwall and then Wexford in 2021). Ten of the retrapped chicks were first encountered two summers after ringing (including one also seen three summers after) and six were first encountered three summers after ringing (including one also seen six summers after ringing and one seen four and seven summers after). One of the 16 birds ringed as pulli and reencountered subsequently was ringed in the Petrel Station (this in 2019 and the first chick to fledge from these boxes).

In 2013 a thermal imaging camera recorded a Short-eared Owl hunting Storm Petrels in the Quarry, an event which has subsequently been shown to be quite regular. The remains of six petrels were found that year, with 16 in 2014, 18 in 2015, 51 in 2016, 98 in 2017 (the only year on record in which Short-eared Owls have been proven to breed), 31 in 2018, five in 2019, three in 2020 and 39 last year; the majority of these were thought to be the victims of Short-eared Owls, usually due to the presence of feathers or pellets. There were only 17 Short-eared Owl bird-days logged this season, this the second lowest total this decade and down on a 2013-2021 mean of 35.6 (there was a high of 76 in 2017 and a low of 16 in 2020). The remains of five adult Storm Petrels were located this year, all between 12<sup>th</sup> August and 11<sup>th</sup> September and including one found near the Knoll which had been ringed as a chick in 2020. There were again no Little Owl records (the last was seen on 17<sup>th</sup> March 2018); this introduced species is a well-documented Storm Petrel predator, for example the 1936 Skokholm Bird Observatory Report includes details of a Little Owl nest containing the remains of nearly 200 petrels. In 2019 a House Mouse was watched via a live infrared camera feed as it entered Petrel Station burrow 64; it was seen to walk to the end of the entrance tunnel but did not drop down into the chamber or interact with the resident Storm Petrel chick, indeed neither seemingly reacted to the other's presence. The six eggs abandoned in the Petrel Station in 2020 and the two there in 2021 were left in situ to see if they would be found by mice; all eight were still present in the winter of the year in which they were deserted.



Adult Storm Petrels were lured to the traditional South Haven netting site on seven nights between the 11<sup>th</sup> and 23<sup>rd</sup> July; this was five fewer nights than last year and four fewer nights than the 2013-2021 mean. The largest catch was of 164 birds on the night of 11<sup>th</sup> July; this was 103 fewer than trapped on the night of 16<sup>th</sup> July last year (the largest single catch of the last nine years), and down on a 2013-2021 mean high of 193.1. Subsequent catches were considerably smaller, indeed only 17

birds were handled over two nights between the 14<sup>th</sup> and 17<sup>th</sup> (this over the full moon); despite the conditions, it was felt that the catches were smaller than is typical. Although these dates preceded the confirmation that the H5N1 strain of highly pathogenic avian influenza had reached Pembrokeshire, it was felt that there was at least the possibility that a reduction in numbers may have been connected; Storm Petrel ringing was thus suspended to ensure that activities did not exacerbate the situation. Of 388 adults handled in South Haven this year, 8.2% were already wearing a ring (the mean during the period 2013-2021 was 11.4%, with a high of 21.3% in 2021 and a low of 5.4% in 2014); these included one ringed in 2014 (and not seen since), one ringed in 2018 (and not seen since) and 11 ringed last year, whilst ten (2.58%) had been ringed elsewhere (the mean during the same period was 4.23%, with a high of 5.68% in 2013 and a low of 3.21% in 2020). Additional to those listed below, we received news of two birds ringed on Skomer Island (4km to the NNW) and retrapped on Skokholm (after one and four days) and 12 birds ringed on Skokholm and retrapped on Skomer (with three retrapped after between four and six days, singles retrapped after 356, 364, 370, 1441, 1458, 2185 and 2551 days and two birds retrapped twice (one after 360 and 361 days and one after 2185 and 2186 days)). Since ringing fully recommenced in 2013 we have now received news of 479 Storm Petrels either ringed on Skokholm and found elsewhere or ringed elsewhere and controlled on Skokholm; of these 301 have been exchanged with sites more than 10km away from the Island (see map below). Unless stated otherwise, all of the following recoveries were of birds deliberately mist netted.

**Ringing recovery 2547856****Originally ringed** as an adult, LITTLE SALTEE, WEXFORD, IRELAND 3<sup>rd</sup> July 2022**Recovered** as an adult, SOUTH HAVEN, SKOKHOLM 20<sup>th</sup> July 2022**Distance travelled** 102km at 119 degrees (ESE)**Days since ringed** 172746476 and 2758196 made the reverse journey, both reaching Little Saltee on 30<sup>th</sup> June 2022 after 1062 and 332 days respectively.**Ringing recovery 2593638****Originally ringed** as an adult, POINT LYNAS, ANGLESEY 19<sup>th</sup> July 2020**Recovered** as an adult, SOUTH HAVEN, SKOKHOLM 12<sup>th</sup> July 2022**Distance travelled** 203km at 200 degrees (SSW)**Days since ringed** 723**Ringing recovery 2639034****Originally ringed** as an adult, SHEEPLAND HARBOUR, DOWN, NORTHERN IRELAND 22<sup>nd</sup> August 2009**Recovered** as an adult, SOUTH HAVEN, SKOKHOLM 20<sup>th</sup> July 2022**Distance travelled** 288km at 177 degrees (S)**Days since ringed** 4715**Ringing recovery 2706016****Originally ringed** as a pullus, SKOKHOLM 2<sup>nd</sup> October 2015**Previously recovered** as an adult, GWENNAP HEAD, PORTHWARRA, CORNWALL 15<sup>th</sup> July 2018**Recovered** as an adult, ILE DE BANNEG, LE CONQUET, FINISTÈRE, FRANCE 3<sup>rd</sup> August 2021 (sic)**Distance travelled** 364km at 178 degrees (S)**Days since ringed** 2132

The commune of Le Conquet is home to Banneg, the largest Storm Petrel colony in France, an island believed to support just under a thousand pairs which primarily nest in abandoned Rabbit burrows. Interestingly this nesting habitat was not found to be in use on Skokholm during the 2016 whole Island census (although in 2019 birds were found calling from a small area of burrows to the west of Dip Gully). Although there have been eight individuals ringed on Banneg and found on Skokholm since 2013, this is just the third Skokholm ringed bird to be found there.

**Ringing recovery 2722547**

**Originally ringed** as an adult, SOUTH HAVEN, SKOKHOLM 5<sup>th</sup> August 2017

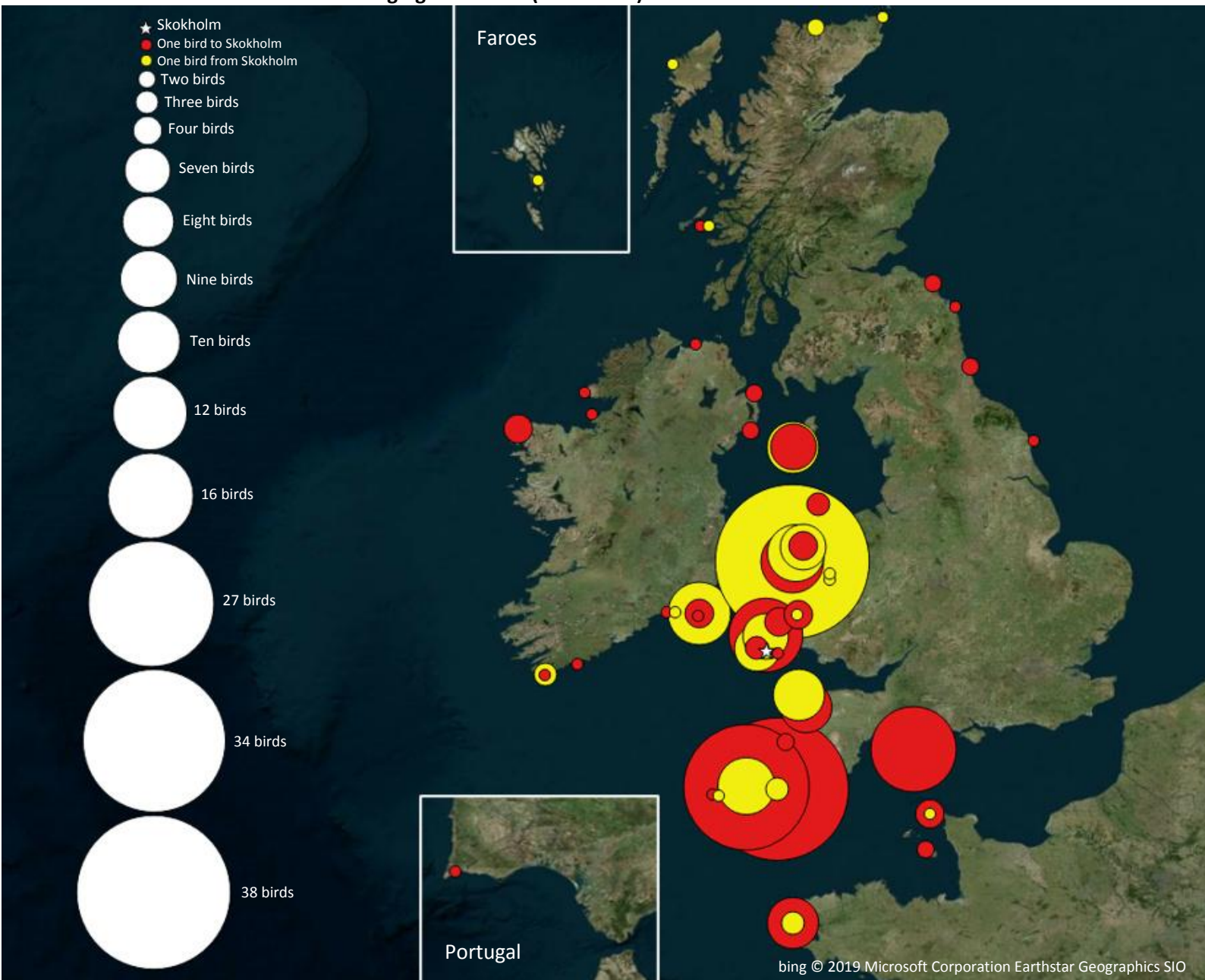
**Recovered** as an adult, BARDSEY ISLAND, GWYNEDD 29<sup>th</sup> July 2022

**Distance travelled** 123km at 16 degrees (NNE)

**Days since ringed** 1819

Additionally 2722637, 2746579, 2746703 and 2774084, ringed as adults in South Haven on 8<sup>th</sup> August 2017, 24<sup>th</sup> August 2019, 12<sup>th</sup> July 2020 and 11<sup>th</sup> August 2021 were controlled at Bardsey on the 17<sup>th</sup>, 29<sup>th</sup>, 28<sup>th</sup> and 29<sup>th</sup> July 2022 after 1804, 1070, 746 and 352 days respectively. 2773148, ringed as an adult at 2345hrs on 20<sup>th</sup> July, made the reverse journey, reaching South Haven at 2305hrs on 22<sup>nd</sup> July 2022 after two days. Whilst the majority of Storm Petrels controlled on Skokholm have been ringed to our south, primarily in Cornwall and Dorset, the majority of birds ringed on Skokholm are controlled to our north. Skokholm ringed birds have now been controlled at Bardsey Island on 38 occasions since 2013, with ten at Little Saltee, nine at Porth Iago and Gwennap Head and eight at Lundy and the Calf of Man the next highest tallies.

**Storm Petrel ringing recoveries (over 10km) recorded between 2013 and 2022.**



bing © 2019 Microsoft Corporation Earthstar Geographics SIO



**Ringed recovery 2746631****Originally ringed** as an adult, SOUTH HAVEN, SKOKHOLM 11<sup>th</sup> July 2020**Recovered** as an adult, LUNDY ISLAND, DEVON 31<sup>st</sup> July 2022**Distance travelled** 72km at 144 degrees (SE)**Days since ringed** 750

Somewhat surprisingly this is only the eighth Skokholm ringed bird to be controlled on Lundy, whilst a Lundy ringed bird is yet to be found on Skokholm.

**Ringed recovery 2758199****Originally ringed** as an adult, SOUTH HAVEN, SKOKHOLM 3<sup>rd</sup> August 2021**Recovered** as an adult, GWENNAP HEAD, PORTHWARRA, CORNWALL 4<sup>th</sup> July 2022**Distance travelled** 188km at 189 degrees (S)**Days since ringed** 335

2761157, 2761400, 2780523, 2780616 and 2780618 made the reverse journey, reaching Skokholm on 12<sup>th</sup> July 2022, 17<sup>th</sup> July 2021 (sic) and the 23<sup>rd</sup>, 20<sup>th</sup> and 23<sup>rd</sup> July 2022 after 696, seven, 346, 16 and 19 days respectively.

**Ringed recovery 2758280****Originally ringed** as an adult, SOUTH HAVEN, SKOKHOLM 14<sup>th</sup> July 2021**Recovered** as an adult, ST JUSTINIAN, ST DAVID'S, PEMBROKESHIRE 19<sup>th</sup> July 2021 (sic)**Distance travelled** 21km at 354 degrees (N)**Days since ringed** 5**Ringed recovery 2758582****Originally ringed** as an adult, SOUTH HAVEN, SKOKHOLM 17<sup>th</sup> July 2021**Recovered** as an adult, MWNT, CEREDIGION 17<sup>th</sup> July 2022**Distance travelled** 65km at 43 degrees (NE)**Days since ringed** 365**Fulmar *Fulmarus glacialis*****Aderyn-drycin y Graig****Fairly Common Breeder** first bred in 1967

1968-1976: 19 trapped, 2017-2021: 6 pulli trapped

Birds were absent from the cliffs on both the 1<sup>st</sup> and 2<sup>nd</sup> March, indeed there were six March dates to the 20<sup>th</sup> when Fulmar were only seen at sea; birds were ashore on every day of March last year, whilst between 2016 and 2021 they were absent for an average of two days (with a high of four in 2020). A 16<sup>th</sup> to 31<sup>st</sup> March daycount mean of 54.8 was the second lowest of the last eight years, down on a 2013-2021 mean of 60.9 (there was a high of 85.0 in 2018 and a low of 34.5 in 2013), whilst a peak daycount of 158 on the 10<sup>th</sup> was down on a record 264 logged last year. Although there were 11 April daycounts of 67 or less, including lows of 19 on the 1<sup>st</sup>, 32 on the 2<sup>nd</sup> and 42 on the 11<sup>th</sup>, 12 three-figure daycounts took the April bird-days total to 2841 (this up on a 2013-2021 mean of 2482.0). With the exception of 94 on the 13<sup>th</sup>, no more than 79 were logged each day between the 5<sup>th</sup> and 14<sup>th</sup> May (there was a low of 28 on the 8<sup>th</sup> and 143 were present by the 16<sup>th</sup>), this pre-laying exodus mirroring that seen in recent years. The first egg to be seen was at Rat Bay on 14<sup>th</sup> May, this two days earlier than that of 2019, 2020 and 2021 and the earliest this decade; the 2013-2021 first egg mean is 19<sup>th</sup> May, with the latest during this period logged on the 28<sup>th</sup> in 2014 (following prolonged and severe storms during the preceding winter). Birds at both Twinlet and North Gully were probably also incubating from the 14<sup>th</sup>.

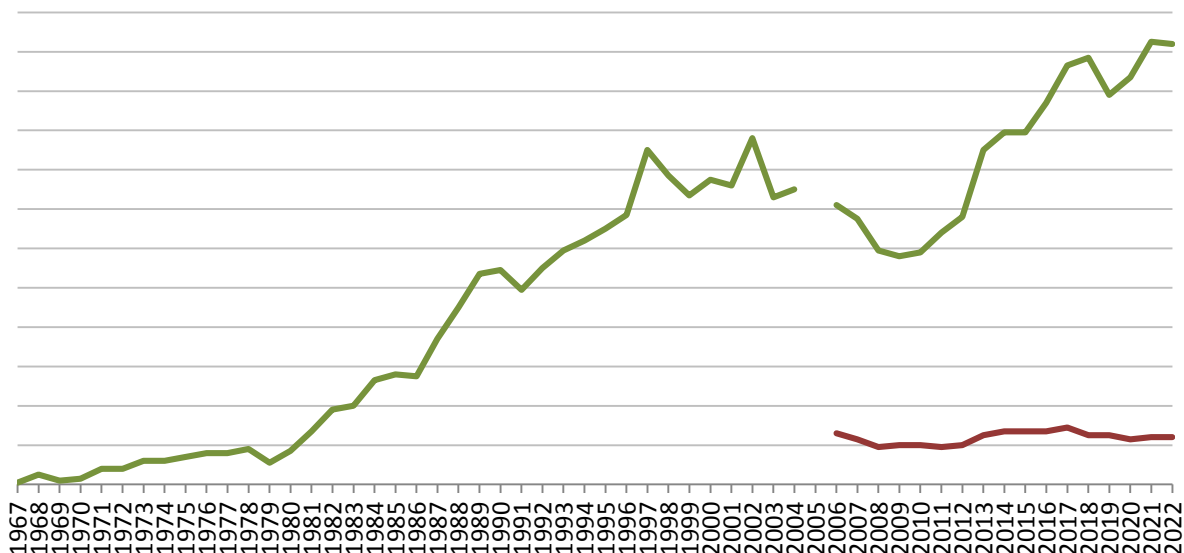
The six study plots counted annually since 2006 were visited on ten dates between 27<sup>th</sup> May and 9<sup>th</sup> June. This was a period dominated by gentle winds from the northerly quarter, with rougher southwesterlies experienced during the last few days. Although the southerly winds were far from

exceptional, a sea in excess of eight metres between the 17<sup>th</sup> and 18<sup>th</sup> May impacted some breeding auks and gulls (there was no indication that Fulmars had been affected); this was an improvement on the 2020 and 2021 seasons when May storms and huge seas had a much greater impact and probably changed Fulmar ledge attendance. The rough conditions were thought to have contributed to the higher than average standard deviation observed in 2020 and 2021, however it was again high this year (only 2020 has seen a larger range in study plot counts and a higher standard deviation). A 2022 average of 24 apparently occupied sites matched last year and a 2006-2021 mean of  $23.69 \pm \text{sd } 3.24$ , but was five down on the 2017 record and down on the 2013-2021 mean ( $25.78 \pm \text{sd } 1.86$ ). The mean total at Little Bay was 12, this a plot where the number of occupied ledges has declined from a high of 19 in 2013 to 18 in 2014 and 2017, 17 in 2015, 16 in 2016, 14 between 2018 and 2020 and 13 last year; quite why the total declined here is unclear, particularly given that the number of apparently occupied sites in the area which includes this plot increased by two to a total one down on a 2019 high (see map below). The Middlerock mean remained at seven, this matching last year's record, and the Guillemot Cliff mean remained at five, this matching that logged in all but one year between 2014 and 2021. Up until the 2017 season, only these three plots had contained Fulmars, however a hollow in the top third of the North Gully auk colony was occasionally occupied in three of the years between 2017 and 2020 (the overall mean was only changed in 2017); there were no Fulmars seen in the North Gully plot this year.

**The whole Island totals (apparently occupied sites), mean plot totals, the range of totals over ten study plot visits, the standard deviation observed over the ten visits and the percentage of the Island total made up of study plot birds 2013-2022.**

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Island</b>	170	179	179	194	213	217	198	207	225	224
<b>Plots</b>	25	27	27	27	29	25	25	23	24	24
<b>Range</b>	22-28	23-29	26-29	25-29	26-31	23-27	23-27	19-27	21-27	20-27
<b>±SD</b>	2.07	1.79	1.14	1.26	2.00	1.26	1.35	2.27	1.90	2.10
<b>Plot %</b>	14.7	15.1	15.1	13.9	13.6	11.5	12.6	11.1	10.7	10.7

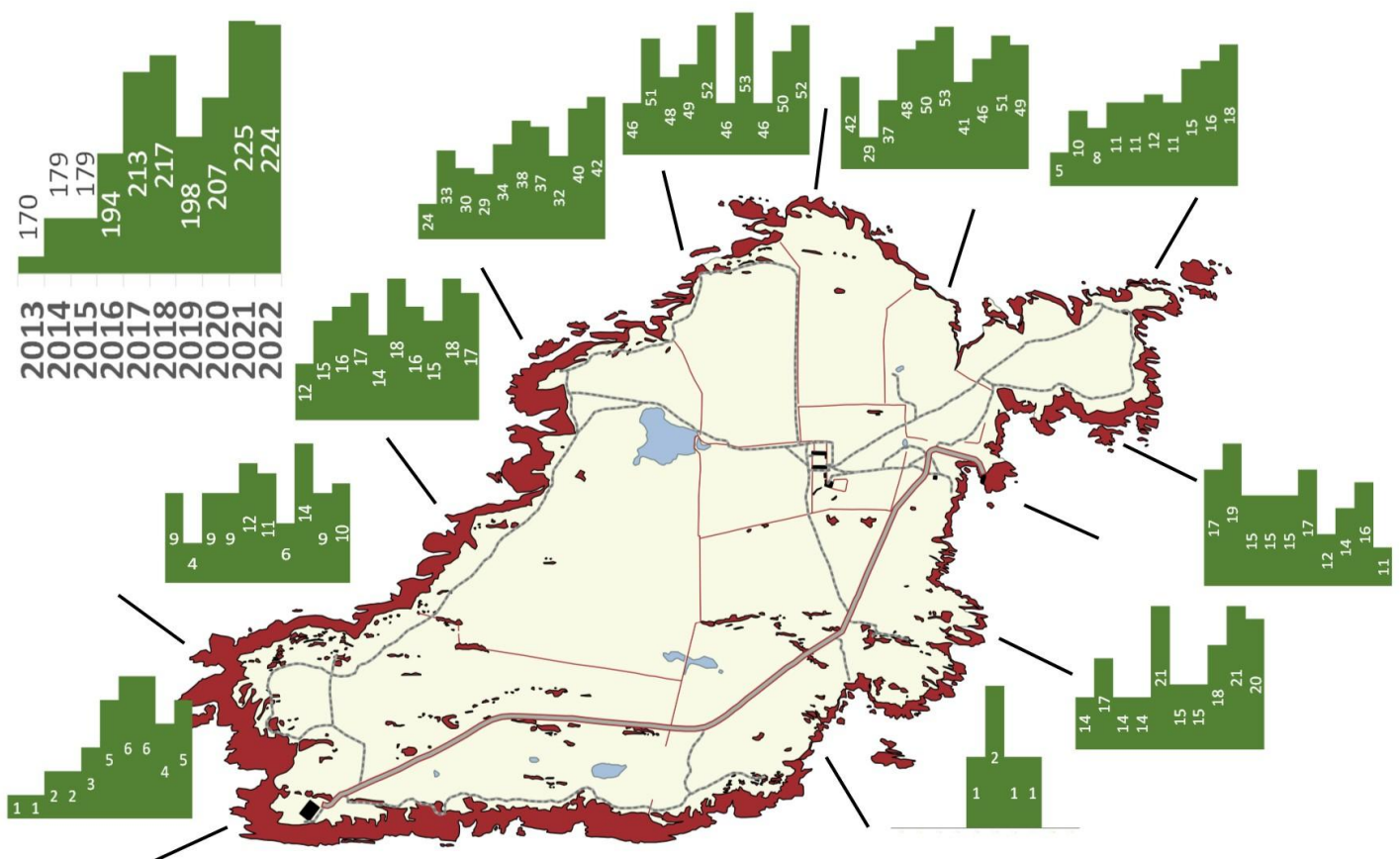
**The total number of apparently occupied Fulmar sites recorded on Skokholm since breeding began in 1967 and the number within the study plots since 2006.**



The whole Island counts undertaken between 27<sup>th</sup> May and 5<sup>th</sup> June yielded an average of 224 apparently occupied sites, this almost matching the 225 of last year and the second highest tally to date (a total 16.8% up on a 2012-2021 mean of  $191.80 \pm \text{sd } 26.62$ ). Nevertheless there was a decline

in numbers in four of the coastal sections, with one fewer site noted between Purple Cove and Twinlet, one fewer site in Hog Bay and two fewer sites between Far and Smith's Bays. There was an average of five fewer sites at Peter's Bay, the total being the lowest for over a decade and perhaps in some way connected to the poor productivity regularly recorded in this area (see below). Counts in the vicinity of the Quarry and Head Bay, between Wardens' Rest and the Bluffs and between Little Bay and Little Bay Point were all up, but down on those logged previously. There were two more sites both to the north of the Neck and between the Dents and the Jogs, this leading to new highs for these areas (for a third consecutive year at the former site and for a second consecutive year at the latter). The 2022 whole Island count includes approximately 40 pairs which would be difficult or impossible to see from the Island itself (birds seen from a boat to the west of North Gully, in Little Bay, on the Little Neck and in hidden crevices between Smith's Bay and Little Bay Point); the drop in numbers observed between 2006 and 2012 may perhaps thus be linked to a lack of boat access, although the study plots broadly mirrored the dip in the Island total. The proportion of the Island total made up of study plot birds remained at 10.7% this year; this is 19.5% down on the 2012-2021 mean (13.3%  $\pm$ sd 1.7), matched the lowest recorded since the plots were begun and is probably an indication that the plots are not representative of the Island as a whole (perhaps due to a lack of space for expansion, although up to seven more pairs have been resident in Little Bay previously). The study plots are nevertheless still useful as they give an indication as to how the number of occupied ledges varies during the whole Island count period; they thus serve as a reminder that the population could be somewhat different to that predicted during a comparatively low number of visits, particularly this year when the range of plot counts was the second highest this decade.

The distribution of apparently occupied Fulmar sites 2013-2022.



From 14<sup>th</sup> May, 66 incubating adults were selected for productivity monitoring (ten at Twinlet, 11 at North Gully and the Dents, 15 in Little Bay, 14 on Little Bay Point, seven at Rat Bay and nine at Peter's Bay); birds seen with eggs or those apparently incubating for ten consecutive days were



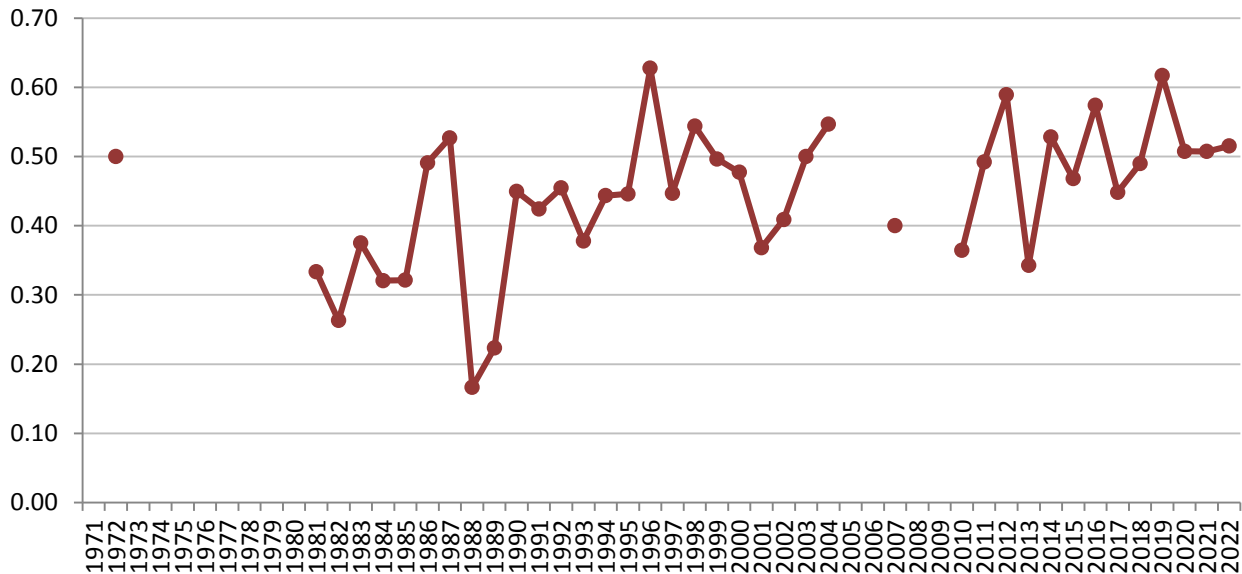
included in the sample (thus more birds were initially monitored but were soon discovered not to be incubating). An egg at Little Bay Point was abandoned within 24 hours of it being laid, one at Peter's Bay went missing after approximately 11 days and six attempts failed after between 14 and 22 days (all ledges were found to be empty with the exception of an abandoned egg at the Dents). There were further egg stage failures after 32 and 34 days at Little Bay and five further failures at late egg stage. An additional 13 failures became apparent at the time when the eggs of neighbouring pairs were hatching, however the nest sites were found to be empty; none of these sites were seen to contain abandoned eggs, hatched eggshell or dead chicks (the contents were thus removed by either the parents, by other Fulmars visiting abandoned ledges, by predators or by scavengers). Although a chick was not seen, a ledge at Little Bay Point contained sufficient down to suggest that a bird had hatched successfully, another chick went missing within a week of hatching and one at Little Bay Point went missing at under ten days (three adults were present on the ledge when the absence was discovered). The only larger chick stage failure recorded this year occurred at Little Bay where a bird disappeared at between 26 and 31 days old.



Of the 66 monitored breeding attempts, 34 (51.52%) were successful; a productivity estimate of 0.52 fledglings per pair is 15.6% up on the post-1972 average of  $0.45 \pm se 0.02$  and fractionally up on a 2012-2021 average of  $0.51 \pm se 0.02$  (although it is down on four of the last ten years). The last nine years have seen productivity above the long-term average, with a 2013 estimate of 0.34 fledglings per pair the last to fall below the mean. An above average productivity estimate, coupled with the second highest number of apparently occupied sites on record, leads to a predicted 115 Skokholm fledglings in 2022; this is the second highest predicted total to date, only down on the 122 of 2019 (when there were only 198 apparently occupied sites but monitored productivity was 0.62 fledglings per pair). Poor productivity at Peter's Bay in seven of the years between 2013 and 2021 influenced the overall estimates; Peter's Bay productivity in 2013 was 0.06 (compared with an overall figure of 0.34), in 2014 it was 0.33 (0.53 overall), in 2015 it was 0.18 (0.47 overall), in 2017 it was 0.31 (0.45 overall), in 2018 it was 0.36 (0.49 overall), in 2020 it was 0.33 (0.51 overall) and in 2021 it was 0.30 (0.51 overall). The 2016 season saw 0.54 fledglings per pair, a total virtually identical to the overall value of 0.57 and 2019 saw 0.60 fledglings per pair, a total virtually identical to the overall value of 0.62. The reason for this near annual discrepancy is still unclear, as is what linked the more successful 2016 and 2019 seasons; neither environmental factors, predation pressure nor the

behaviour of the birds themselves have been obviously different at this site. Five of the nine pairs monitored at Peter's Bay failed this year; a productivity value of 0.44 fledglings per pair was again down on the mean, but was the third highest observed at Peter's Bay this decade and was better than that witnessed at North Gully and the Dents (where 11 pairs fledged four (0.36)).

**Fulmar productivity (total number of fledged chicks per monitored pair) in each year that it has been calculated between 1972 and 2022. The 1972-2022 mean is 0.45 ± 0.02 fledglings per pair.**



It is likely that the larger Fulmar population of recent years will have affected other species; observations during the last few years have included both adult and young Herring Gulls oiled by nesting Fulmars, adult Fulmars sat on Herring Gull nests, Razorbill adults and chicks evicted from ledges by prospecting birds, an oiled juvenile Peregrine and what was probably a Raven oiled so extensively that it led to the failure of a nest attempt. Intraspecific interactions have also been witnessed; heavily oiled adults are noted on occasion, whilst two chick stage failures and at least two egg stage failures have been attributed to aggressive neighbours (the eggs were lost prior to the whole Island census). There were no similar observations this year.

The first two fledglings of the year had departed natal ledges at the Bluffs and Twinlet by 20<sup>th</sup> August, this two days earlier than the first of last year and one day earlier than the 2013-2021 first fledgling mean (the earliest during this period had departed on the 18<sup>th</sup> in 2019 and the latest on the 25<sup>th</sup> in 2013). The first two study plot fledglings left ledges at Little Bay and Little Bay Point on 22<sup>nd</sup> August, this on the same date as the first of last year and one day later than the 2014-2021 mean. All of the remaining 32 productivity plot fledglings departed over the following 15 days; the first 25% had fledged by 26<sup>th</sup> August (the same date as the 2014-2021 mean), 50% had departed by 29<sup>th</sup> August (the same date as the 2014-2021 mean) and 75% had departed by 3<sup>rd</sup> September (two days later than the 2014-2021 mean). The last had left Little Bay Point by 6<sup>th</sup> September, this two days earlier than the 2014-2021 mean (the earliest last fledgling during this period had departed by 3<sup>rd</sup> September in 2017, the latest by 22<sup>nd</sup> September last year); interestingly the late 2021 fledgling was not wholly the result of a late hatching, indeed it had first been seen as a hatchling on 20<sup>th</sup> July meaning that it was on its natal ledge for 64 days (this a period typically closer to 51 days). The number of birds around the cliffs again dropped rapidly as the fledglings departed, with September highs of 37 on the 5<sup>th</sup> and 55 on the 8<sup>th</sup>. The last youngster to be seen ashore was present on 6<sup>th</sup> September, this matching a bird in 2017 as the earliest last bird of the last nine years; the latest bird to be seen ashore between 2014 and 2021 was present on the 21<sup>st</sup> last year, with the 2014-2021 mean being 12<sup>th</sup> September. There were September sightings of birds at sea on 13 further dates from the 9<sup>th</sup>, with a high of 11 on the 10<sup>th</sup> and no more than two on six dates from the 17<sup>th</sup>.

Seawatching during October produced only a single on the 22<sup>nd</sup>, two on the 25<sup>th</sup> and four on the 28<sup>th</sup> and 30<sup>th</sup>; a bird-days total of 11 was down on that logged in each October between 2013 and 2017 (including a record 185 in the former year) and the 79 of 2020, but was close to the totals logged in 2018, 2019 and 2021. There were November records on all but six dates, although numbers varied; there were only two three-figure daycounts during the month (well down on a record 12 logged last year), with 109 on the 16<sup>th</sup> and 138 on the 20<sup>th</sup> (this the third lowest November peak of the last decade and down on a record 283 in 2019), whilst lows of between one and 26 were noted on 13 dates. A November bird-days total of 927 was the lowest of the last four years (staff were present throughout the month in every year, with 2006 bird-days noted in 2019, 2222 in 2020 and a record 2683 last year). Seven birds returned to the cliffs above the Jogs on 6<sup>th</sup> November, these three days later than the first of last year but one day earlier than the 2013-2021 mean; three ashore on the 3<sup>rd</sup> in 2021 was the earliest landfall during this period, with one on the 11<sup>th</sup> in 2015 the latest. There were birds ashore on 12 further November dates (11 fewer than last year), including highs of 26 on the 16<sup>th</sup>, 25 on the 19<sup>th</sup> and 30 on the 22<sup>nd</sup> (the peak was well down on a 2021 high of 180 on the 19<sup>th</sup> and a record 189 on the 28<sup>th</sup> in 2019). Although staff did not depart until the 10<sup>th</sup>, the only December records were of ten on the 1<sup>st</sup>, two on the 2<sup>nd</sup>, one on the 7<sup>th</sup> and nine on the 9<sup>th</sup> (all 22 of which were at sea); a peak December daycount of 173 was logged in 2019 and a high of 657 bird-days were amassed by the 7<sup>th</sup> in 2020.



**Manx Shearwater** *Puffinus puffinus*

**Very Abundant Breeder** a 2018 census estimated 88,945 pairs (95% CI: 21,892). 2012-13 est. 63,980  
743 trapped (including 128 pulli), 703 retrapped, 3 controls  
1928-1976: 171,509 trapped, 2012-2021: 14,682 trapped, 6149 retrapped, 28 controls

**Aderyn Drycin Manaw**

A minimum of two calling after dark on 6<sup>th</sup> March was the earliest record of birds over the Island since singles on 27<sup>th</sup> February and 4<sup>th</sup> March 2000 (the only other earlier record this century is of one off the Lighthouse on 3<sup>rd</sup> March 2019). One eaten on the night of the 9<sup>th</sup> was the earliest Great Black-backed Gull casualty on record. Although nocturnal counts increased as the month progressed, it was not until 22<sup>nd</sup> March that birds were heard calling from burrows during the day (two days earlier than the first of last year) and it was on 25<sup>th</sup> March that the first 20 were seen from the Lighthouse (two weeks later than the first 150 of last year). Heavy rain during mid-April resulted in several birds



diurnally departing flooding burrows and a 2013 ringed adult emerged into the Courtyard. As in the majority of previous years, seawatching during April resulted in some surprisingly small counts; there were highs of 5200 on the 18<sup>th</sup> and 980 on the 21<sup>st</sup>, the peak down on a 2013-2021 mean of 6977 (a daycount of 21,600, recorded during Storm Hannah in 2019, is the highest to date in April). Peak May daycounts of 10,000 on the 17<sup>th</sup> and 12,550 on the 18<sup>th</sup> were made during a period of calm to moderate winds, although a large swell suggested rough pelagic conditions; the 2013-2021 mean May peak is 13,695, with a high of 28,200 counted during a southwesterly gale in 2018. June daycounts were all of 5000 or less, these the lowest since 2018 and well down on a mean 2013-2021 maximum of 19,602 (there were highs during this period of 24,750 in 2020 and 72,000 during heavy rain and a near gale in 2019). Although seawatching effort increases in July, highs of 10,500 during gentle southwesterlies on the 19<sup>th</sup>, 22,000 during moderate southerlies on the 24<sup>th</sup> and 8500 on a calm 29<sup>th</sup> reflected a definite increase in the number of birds lingering offshore; the 2013-2021 peak July daycount mean is 21,978, with a record 45,016 logged in 2018. A very light easterly on 14<sup>th</sup> August saw a minimum of 27,500 over a flat sea, this the highest daycount of the year but down on a 2013-2021 mean August high of 41,327 and the all-time high of 87,520 logged in August 2020.

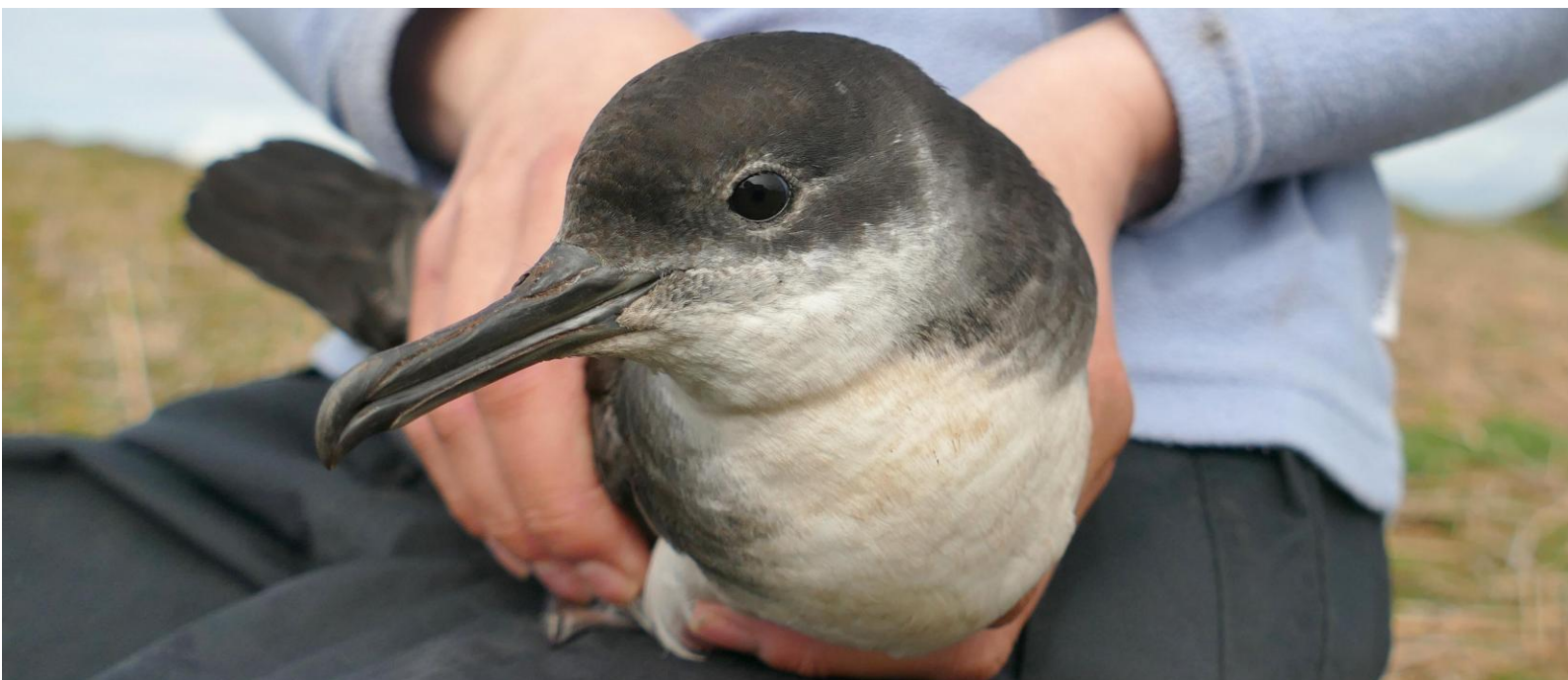
Three areas of study burrows, that is to say natural burrows where a paving slab covers a manmade access point to the nest chamber, were established in 2012 and 2013 (see map below); all birds found within the burrows are ringed. Of 316 breeding adults bearing rings in 2021, 283 were found this year (89.56%); this was the highest next-year return rate of the last nine years, up on a 2014-2021 mean of 80.04% (only 76.38% of 2017 birds were encountered in 2018, this following the ravages of Storm Ophelia which destroyed several study burrows). The next-year return rate is not an accurate estimate of survival as there is no searching for marked birds in neighbouring, non-study burrows; the number of birds known to be alive will thus be revised upwards as they are discovered in future years. For example 82.27% of 2013 adults were encountered in 2014, but we now know that at least 89.36% of birds were alive (see table below). This year saw 19 2020 breeders encountered which were not logged last year, two which had not been seen since 2019, three which had not been seen since 2018 and singles which had not been seen since 2017, 2016, 2015 and 2014. Given that we are still encountering birds not logged for over seven years, it is likely that many of the figures given below will again be revised upwards in the future; nevertheless a 2014-2019 mean return rate of 88.13% is already higher than that reported on Skomer Island.

**The number of Manx Shearwaters breeding in the study plots encountered the following year and the number to have been found by 2022 (which were actually alive the following year).**

	Birds found the next year		Birds found by 2022	
Birds breeding in 2021	283 of 316	89.56%	283 of 316	89.56%
Birds breeding in 2020	253 of 328	77.13%	272 of 328	82.93%
Birds breeding in 2019	245 of 308	79.55%	255 of 308	82.79%
Birds breeding in 2018	247 of 296	83.45%	268 of 296	90.54%
Birds breeding in 2017	236 of 309	76.38%	253 of 309	81.88%
Birds breeding in 2016	238 of 287	82.93%	268 of 287	93.38%
Birds breeding in 2015	230 of 283	81.27%	248 of 283	87.63%
Birds breeding in 2014	215 of 278	77.34%	239 of 278	85.97%
Birds breeding in 2013	116 of 141	82.27%	126 of 141	89.36%

There is typically a discrepancy in return rates dependent on the breeding success of the previous year; of 253 birds successful with their 2021 breeding attempt, 232 were found in 2022 (91.70%), whereas only 51 of 63 unsuccessful birds returned (80.95%). Of 33 birds which went missing in 2022, 12 (36.36%) had failed with their 2021 breeding attempt. Assuming that not all of the failures were due to the death of a bird, it could be concluded that some of the missing birds have rather opted for more suitable nesting sites. It was noted in 2017 that Storm Ophelia had caused considerable damage to the Lighthouse Study Plot, a destruction of burrows which no doubt led, at least in part,

to the reduced number of recaptures in 2018; although 17 of the missing birds have been found subsequently, the return rate of 2017 breeders remains the lowest of the last seven years (81.88%). Ultimately the study burrows give a better insight into burrow fidelity and show an interesting correlation with the stability of the colony; in the fragile Lighthouse colony 15 of 82 marked birds were in the same burrow this year as that in which they bred in 2013 (18.3%), whereas in the more stable Quarry Track and Crab Bay colonies four of 18 birds (22.2%) and 18 of 41 birds (43.9%) were still in their 2013 burrows respectively. The fragile nature of the Lighthouse colony, along with the high density of burrowing birds and occasional storm events, sees the structure of many breeding tunnels change annually; clearly some lose their suitability as nest sites. Of the 28 birds encountered in all ten years between 2013 and 2022, five have fledged a chick in every year (EY41695 and EY41711 in Crab Bay burrow 8, EY41685 and EY41754 in Quarry Track burrow 6 and EY41636 in Lighthouse burrow 1). Of the remaining 23 birds, two have fledged young on 70% of occasions, ten have fledged young on 80% of occasions and 11 have fledged young on 90% of occasions; that the vast majority of these birds are exhibiting above average productivity is no doubt reflected in their continued use of the same stable burrows.



There were six adults encountered in the Lighthouse Plot which had been ringed as chicks, this taking the total number of individuals ringed as plot chicks and subsequently found in the plots to 12. The only addition to this list was FB42950 which was ringed as a chick in 2015 and bred successfully this year, whilst FB46001, ringed as a chick in the same year, bred unsuccessfully having previously been found as a non-breeder in 2020 (it was not encountered in 2021). Of these 12 birds, five were first found to be breeding after seven years, three were first found breeding after six years, three were first found breeding after five years and FB46145 bred successfully in 2021 at just four years of age (just two metres from its natal burrow); the latter was not seen this year.

The study burrows facilitate an accurate assessment of breeding success on Skokholm. There were 149 burrows at the Lighthouse occupied by a pair which produced an egg, 11 burrows contained an egg along the Quarry Track and 25 pairs produced an egg inland of Crab Bay. There were thus 185 burrows this year from which productivity could be assessed (this was a new high, up on a 2014-2021 mean of 156.5). At the Lighthouse 20 definitely failed at egg stage; three eggs were found alone in burrows where birds incubating different eggs were resident (two of these attempts also failed at egg stage, perhaps due to aggressive encounters when birds attempted to return to



usurped eggs), four abandoned eggs were not found to be incubated and a further 11 eggs were abandoned by known pairs (six of which had been damaged during the incubation period). An additional 24 pairs failed at egg or very small chick stage (but neither eggs nor dead chicks were found). A chick with a 19mm wing chord was found dead, a tiny chick yet to be measured went missing and two chicks were dug out by Great Black-backed Gulls (one of which had a wing chord in excess of 76mm). There were four egg stage failures along the Quarry Track, three of which were damaged during the incubation period and one of which was deposited in a burrow already occupied by a pair which went on to fledge a chick. Near Crab Bay an egg went missing and one was damaged during incubation, three pairs failed at egg or very small chick stage (but neither eggs nor dead chicks were found) and a chick seemingly starved (it died with a wing of 135mm). A chick is typically assumed to be of fledging size when its wing length is in excess of 200mm; although not ready to fledge, we have shown that chicks larger than this may swap to a different burrow and therefore go undetected. However restrictions imposed due to this year's highly pathogenic avian influenza outbreak meant that some young were assumed to be fledged when wing chords had reached as little as 133mm (although a check of 50 chicks allowed under an exemption to the restrictions revealed that all had reached fledging size). In total 127 were believed to have attained fledging size.

Productivity was thus 0.69 fledging-sized chicks per breeding pair (68.65% of pairs produced a fledging-sized chick); productivity at the Lighthouse was 0.68 fledglings per pair, along the Quarry Track it was 0.64 and near Crab Bay it was 0.76. The combined 2022 productivity estimate was down on the 0.79 of last year and on a 2013-2021 mean of  $0.71 \pm se 0.02$ ; there have been higher estimates in five of these nine years, with a peak of 0.80 in 2017, whilst the low is the 0.63 recorded in 2014. It should be noted that this is the number of chicks which attained fledging size and does not reflect the number of fledglings which are lost to Great Black-backed Gulls (and to a lesser extent corvids) as they exercise their flight muscles and make their first flights. Having said that, none of the 127 fledglings ringed in the study plots were found eaten this year (none of 127 were found last year, one of 115 was found in both 2020 and 2019, none of 114 were found in 2018 and two of 135 were found eaten in 2017).



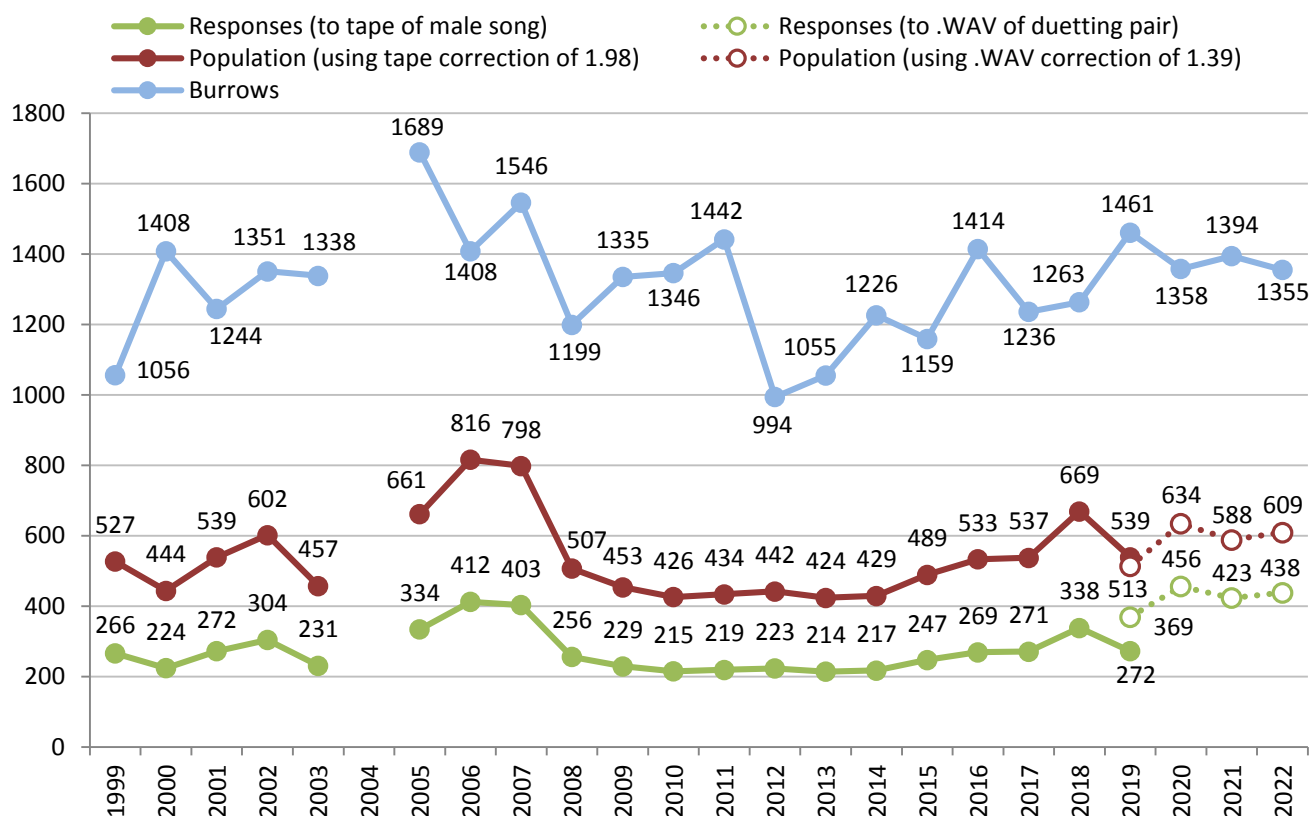
Crab Bay burrow 19 was found to be empty on 4<sup>th</sup> May and on 12<sup>th</sup> May contained EZ53220 and EZ86306 but no egg (the two birds which bred successfully in this burrow in each year between 2018 and 2021, 2017 being the last year in which an individual other than these two was encountered here). On 15<sup>th</sup> May EZ86306 was found with a damaged egg attached to the feathers surrounding its brood patch. The burrow was empty on the 19<sup>th</sup>, 23<sup>rd</sup>, 26<sup>th</sup> and 30<sup>th</sup> May, but on 3<sup>rd</sup> June both adults were present, as was a warm egg. Although it is possible that the original egg was produced by an additional adult, it appeared certain that the broken egg was being incubated after it was damaged.



It would seem much more plausible that the second egg was a re-lay, something rarely reported and never proved conclusively in this species. The second egg went on to hatch, on 4<sup>th</sup> August the chick had attained a wing chord of 36mm and on 2<sup>nd</sup> September it had reached 149mm.

A Manx Shearwater ringing transect was established in 2013. It was defined as the track between the Observatory and the Lighthouse and the length of a landing net to either side; ringers were not to deviate from the track. The aim was to see whether, by ringing birds on the surface in this defined area, the retrap data could be interpreted to provide large sample size estimates of adult survival and the recruitment of juveniles to the breeding population. This is still a project in its infancy which is producing a substantial amount of data, data which is currently difficult to examine in any detail as the British Trust for Ornithology changes its recording system from IPMR to DemOn (the latter of which still lacks the reporting capabilities of the former). Of the 10,561 birds ringed along the transect between 2013 and 2022 (4263 of which were ringed as fledglings), 2564 have been retrapped or found dead on Skokholm subsequently (with these recaptured individuals accounting for 4261 separate handlings).

**The total number of burrows, responses (to tape 1999-2019 and to .WAV 2019-2022) and the corrected population estimates for the 7000m<sup>2</sup> sampled annually since 1999.**



In 1999 nine study areas, each a circle of 1000 square metres, were established to allow a reasonable subset of the Skokholm Manx Shearwater population to be monitored from year to year. Two of these plots were discontinued, one in 2006 and one in 2007, as the survey work was disturbing the Lesser Black-backed Gull colonies. New plots were established in 2006 and 2015 to maintain a good sample size, however only seven plots have been studied for a full 23 years. On each annual visit the number of burrows within each area is counted, as is the number of burrows from which a response is elicited when a recording is played down them. Between 1999 and 2019 the recording was of a singing male made on a cassette tape, the standard correction factor of 1.98 then being used to estimate the population within an area (see the 2013 and 2014 Seabird Reports for checking of the correction factor). The latest whole Island census utilised a .WAV recording of a

duetting pair (as opposed to the male only cassette) as it has been shown that a dual-sex recording achieves a higher and less variable response rate, the correction factor thus dropping to 1.39 (Brown and Eagle, 2018; Perkins *et al.*, 2017). Bearing this in mind, along with the fact that the cassettes and playback devices are becoming harder to maintain and replace, it was decided in 2019 that it was time to begin the process of changing the annual plot methodology from the use of cassettes to the use of .WAV playback. This changeover will occur over the course of several years to ensure that the data collected over the previous 20 years remains comparable with that collected in the future.

This year saw each of the nine plots visited between the 1<sup>st</sup> and 11<sup>th</sup> June, a period lengthened by regular rain and occasional strong winds. The 7000m<sup>2</sup> (seven plots) monitored since 1999 contained 39 fewer burrows than last year, the total being the fifth highest of the last ten years and 3.1% up on the 1999-2021 mean (1314.64  $\pm$ sd 164.24). It is likely that this reflects a genuine change in numbers as opposed to counting inaccuracies; two separate visits to all nine plots in 2019 produced exceedingly similar burrow counts each time, with the mean difference between visits being 4.56 burrows, the largest difference between visits being 11 burrows and the overall totals differing by just nine (1992 burrows on one visit and 2001 on the next). A decline in the number of burrows present was also seen at the plot started in 2006, where there were 22 fewer, however there were 12 more at the plot started in 2015. It is not only digging by Manx Shearwaters which alters the number of burrows present; the weather may both close burrows and cause additional entrance holes to open (with both very dry and very wet periods shaping the landscape), whilst digging by Rabbits, Great Black-backed Gulls and in some areas by Puffins will also affect burrow counts.



There were 438 responses elicited in the original 7000m<sup>2</sup> using the .WAV recording, this 15 (3.5%) more than the 2021 total. However there were declines in six of the areas, with between one and five fewer responses from North Plain, the Neck and to the south of North Pond, ten fewer at Gull Field, 12 fewer to the north of Spy Rock and 19 fewer to the east of the Dip. These were offset by a significant increase of 66 responses along the Quarry Track. Using the Skokholm specific .WAV correction of 1.39 predicts that there were 609 occupied burrows across the seven plots (see chart above). Any comparison with the numbers predicted using the male only tape playback should clearly be a cautious one, although given that the 2019 .WAV population estimate was below the 2019 tape estimate, it could perhaps be concluded that we are not overestimating the population

when using the .WAV correction any more than when using the tape correction. It would appear that the population in this area remains similar to, or above, that seen in most previous years. The 1000m<sup>2</sup> plot visited since 2006 produced 14 more responses than last year. The 710 occupied burrows predicted across the 8000m<sup>2</sup> using the .WAV recording was up on the 670 of last year and the 2006-2019 tape playback mean of 611.36 ±sd 147.22, indeed it was a total only down on those of 2006, 2007, 2018 and 2020 (although this again relies on a cautious comparison of .WAV and tape playback results). There were 11 more responses to the .WAV recording at the Table plot first visited in 2015, a predicted population of 61 being down on the 2015-2019 tape playback mean of 69.40 ±sd 12.52 but up on the 2019-2021 .WAV mean of 57.33 ±sd 12.06. It would appear that the population can still be cautiously regarded as stable, although the observed variance in the percentage of birds which respond to the playback on any given date highlights the degree of error in these numbers (see Brown and Eagle, 2013, 2014 and 2019); that the number of pairs producing eggs in the accessible study burrows is stable or increasing supports this conclusion (see above).

**The estimated number of pairs in the 8000 square metres sampled 2006-2022.**

2006	2007	2008	2009	2010	2011	2012	2013	2014
869	954	620	525	499	495	501	521	476
2015	2016	2017	2018	2019	2020	2021	2022	
533	588	584	739	655	730	670	710	

In the period between 1957 and 1997 the number of dead Manx Shearwaters located on Skokholm was recorded in the daily census log. The corpses were either stored or thrown into the sea to ensure that birds were not counted more than once. The practice was stopped in 1997 as it was felt that the removal of carcasses would be impacting the species reliant on this food source. However, with a Great Black-backed Gull population more than twice the size it was when the counting was stopped, the study was begun again in 2014. The corpses are marked by neatly slicing the flight feathers of both wings with a pair of scissors (using scissors has the added advantage that it makes it easier to check for rings in tightly inverted bodies). Although the vast majority of Manx Shearwater kills are made by Great Black-backed Gulls, a small number are also taken by Peregrines and Ravens (a Sparrowhawk eating the head of a puffinised youngster in 2019 had perhaps also made the kill, whilst three Crow were seen tackling a live bird on 19<sup>th</sup> May this year).

**The number of Manx Shearwater corpses found between 1957 and 1983 from Gynn (1984) plus data from 1984 to 1991 and 2014 to 2022. The number of Great Black-backed Gull breeding pairs is also included for each year.**

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
<b>Corpses</b>	2465	1886	924	1354	1089	640	688	1059	857	946	816
<b>GBBGU</b>	27	30	30	10	12	5	7	12	8	10	10
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
<b>Corpses</b>	841	829	304	606	1350	1082	869	1051	1266	1913	1820
<b>GBBGU</b>	3	14	11	16	12	12	7	7	7	6	10
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
<b>Corpses</b>	1153	1024	1080	1479	1373	1316	1571	1068	1759	1760	1694
<b>GBBGU</b>	10	10	11	16	11	14	11	10	11	12	15
	1990	1991	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Corpses</b>	1915	2703	4271	4123	3782	3449	3270	2707	4091	3237	2902
<b>GBBGU</b>	16	20	84	83	93	93	93	86	83	80	78

As might be expected with a larger Great Black-backed Gull breeding population, the number of corpses marked over the last nine years has been the most ever. However the average number of corpses per Great Black-backed Gull pair was only 37.2 in 2022; this has only been lower in six previous years (including three of the last six), with all-time lows of 30.8 in 1959 and 27.6 in 1970



(there were highs of 280.3 in 1968, 318.8 in 1977 and 182.0 in 1978). One possible explanation for this reduction in kills per pair is that the gulls were routinely disturbed between 1949 and 1985 which, whilst reducing the number of breeding pairs, probably inflated the non-breeding flock (which would still be taking shearwaters). The number of adults found dead was very similar to last year, with a total of 2104 being 1.3% down on that of 2021 and 11.4% down on the 2014-2021 mean (2373.63 ±sd 473.38). Factors which may impact predation rates are the number of Great Black-backed Gulls present (and the number specialising in shearwaters (Westerberg *et al.*, 2018)), vegetation heights, the complexities of the weather and moon cycle influencing hunting, the availability of food away from the Island and perhaps the size of the Rabbit population (Rabbits being the other main prey item on the Island). The prevalence of puffinosis may well be affecting juvenile losses (see recent Skokholm Seabird Reports). It is often suggested that the majority of eaten shearwaters are younger, less experienced non-breeders, those which spend longer on the surface as they prospect for burrows and mates. However the 49 ringed birds found predated in 2022 again do little to support this theory (see below table and the 2018-2021 Seabird Reports); although several more years of ringing data would be helpful and there is no information on the breeding status of those eaten (so they could perhaps still have been unpaired or burrowless birds spending longer on the surface), there is little evidence that most eaten birds are younger.

**The number of adult and juvenile Manx Shearwater corpses found each year since 2014, along with the number of untouched puffinosised bodies.**

	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Adults</b>	2931	2702	2299	2071	2228	1618	3008	2132	2104
<b>Juveniles</b>	1287	1324	1398	1289	971	1043	970	967	728
<b>Puffinosis</b>	53	97	85	89	71	46	113	138	70
<b>Total</b>	<b>4271</b>	<b>4123</b>	<b>3782</b>	<b>3449</b>	<b>3270</b>	<b>2707</b>	<b>4091</b>	<b>3237</b>	<b>2902</b>

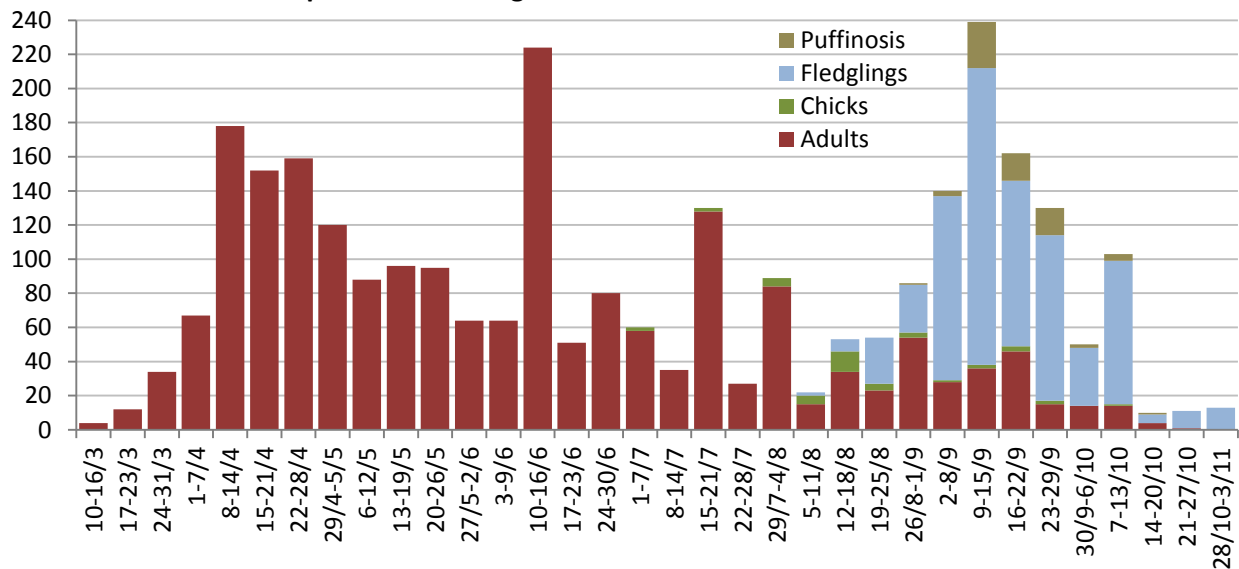
**When the 49 ringed shearwaters found eaten in 2022 were marked. Note that the pre-2011 birds were controls ringed elsewhere and that intensive ringing on Skokholm recommenced in 2013.**

<b>Adult</b> <b>2003</b>	<b>Adult</b> <b>2009</b>	<b>Adult</b> <b>2011</b>	<b>Adult</b> <b>2013</b>	<b>Adult</b> <b>2014</b>	<b>Adult</b> <b>2015</b>	<b>Fledged</b> <b>2015</b>	<b>Adult</b> <b>2016</b>
1	1	1	6	5	5	1	2
<b>Adult</b> <b>2017</b>	<b>Pullus</b> <b>2017</b>	<b>Adult</b> <b>2018</b>	<b>Fledged</b> <b>2018</b>	<b>Adult</b> <b>2019</b>	<b>Fledged</b> <b>2019</b>	<b>Pullus</b> <b>2020</b>	<b>Adult</b> <b>2021</b>
3	1	2	1	10	2	1	7

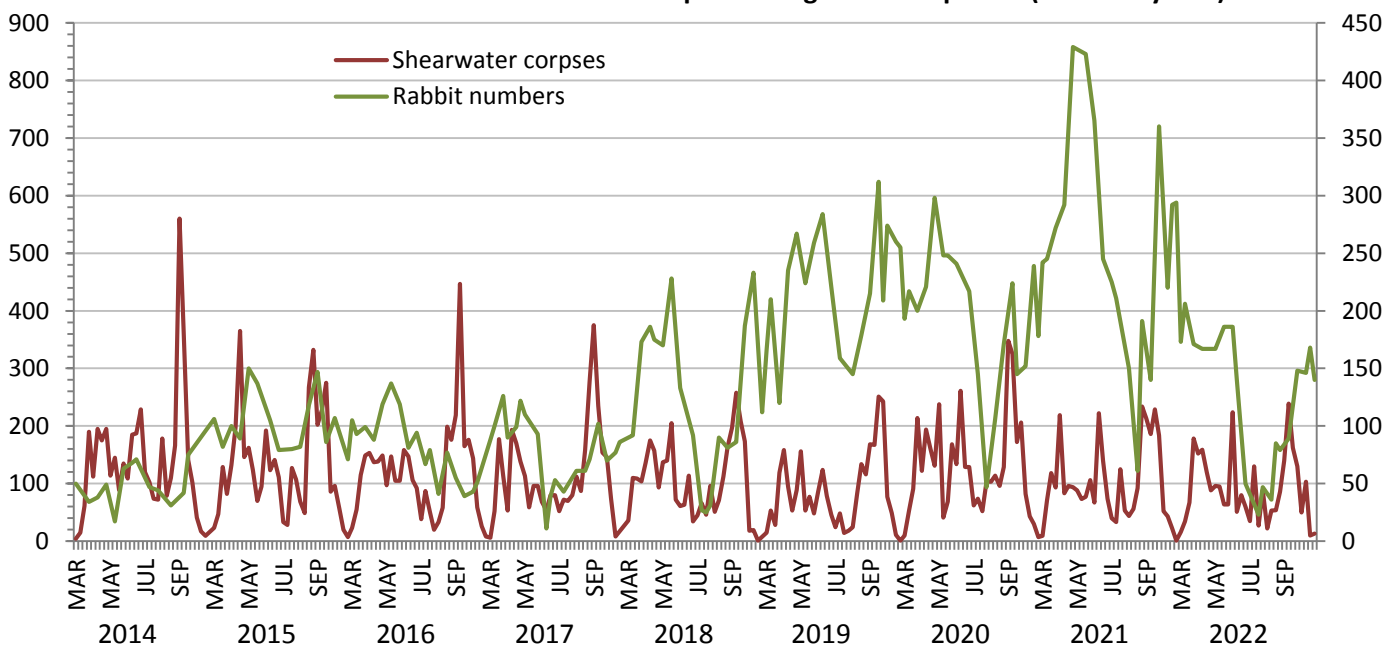


The data from the last nine years lends some support to the theory that Rabbit numbers influence Manx Shearwater predation (by providing an alternative food source for the gulls). The North Plain Rabbit count was lowest in 2014, when shearwater mortality and the number of corpses per pair were at their highest. The Rabbit counts were at their highest in 2019 and 2021, the former the year with the fewest shearwater corpses and the lowest number of corpses per pair, the latter the year with the third fewest corpses found. This year saw the fourth highest Rabbit counts and the fourth lowest number of corpses per Great Black-backed Gull pair (albeit the second lowest corpse total of the last nine years). The 2020 data did not fit this pattern, with the highest number of adult Manx Shearwater corpses being found in a year with a high Rabbit population (although a COVID-19 dictated reduction in disturbance may have given the gulls longer to hunt). One potential issue with this comparison is that North Plain Rabbit counts are probably not representative of the whole Island, with the effects of Viral Haemorrhagic Disease seemingly differing in different parts of the Island at the same time. It will be interesting to see if the next crash in Rabbit numbers coincides with an increase in Manx Shearwater carcasses.

**The number of corpses found during each week from 10<sup>th</sup> March until 3<sup>rd</sup> November 2022.**



**The total number of Manx Shearwater carcasses found each week 2014-2022 and the number of Rabbits counted in the North Plain census plot during the same period (secondary axis).**



There were 13 chick rearing adults in the Lighthouse Study Plot fitted with Techno Smart Axy-Trek data loggers (these weigh about ten grams and collect GPS and accelerometry data), with Oliver Padget and his team from the Oxford Navigation Group fitting and retrieving devices from 22<sup>nd</sup> July to 8<sup>th</sup> August. The birds were from 13 separate nests, with the chicks at these sites and 11 control sites monitored to assess for any impacts caused by the tags. Previous studies have shown that birds during this period regularly visit the waters earmarked for the Erebus wind farm and similar future projects. The tracking results will be reported upon in due course.

The first fledgling to be encountered was along the Lighthouse Track on 19<sup>th</sup> August, this two days later than the first of last year but two days earlier than the 2013-2021 mean; the 2021 fledgling was the earliest recorded during this period, whilst two on the 27<sup>th</sup> in 2018 were the latest. The first fledgling showing signs of puffinosis was along the Lighthouse Track on the 25<sup>th</sup>, this five days earlier than the first of last year and four days earlier than the first of 2020. Puffinosis is a mysterious affliction which has been linked to the actions of a coronavirus, this leading to the development of conjunctivitis and blistered feet, further bacterial infection and problems with limb control (Nuttall and Harrap, 1982); it is typically fatal. A paper published on 7<sup>th</sup> December this year concludes that, rather than being the result of a virus, the bacterial infection may actually occur following prolonged exposure to caustic faecal ammonia which causes foot dermatitis, this similar to the Foot Pad Dermatitis seen in chickens (Esmonde *et al.*, 2022). Foot Pad Dermatitis occurs in chickens kept in poorly ventilated conditions, where respiration and excretion lead to high moisture levels which exacerbate the impact of faecal ammonia burns (Esmonde *et al.*, 2022). Puffinosis has long been associated with the damper areas of Skokholm, conditions which would lead to a similar build-up of moist ammonia. In an attempt to achieve a better understanding of how puffinosised birds are distributed across the Island during the course of the autumn and of how the number of infected individuals changes from year to year, a transect walked by Island staff over eight September nights was established in 2015 (the 2015 Seabird Report gives details of the route). The position of each fledgling is recorded using a GPS unit before they are inspected for signs of puffinosis. Restrictions put in place to limit the spread of any potential HPAI outbreak this year meant that birds could not be adequately inspected, the puffinosis survey thus being suspended for 2022 (see the 2016-2021 Seabird Reports for the proportion of youngsters found showing signs each year and maps showing the distribution of both healthy and puffinosised fledglings). Although the vast majority of puffinosised birds on Skokholm are youngsters, on rare occasions adults also show symptoms (for example the bird found on 26<sup>th</sup> May this year (below photograph)).





The restrictions put in place in response to nearby HPAI outbreaks meant that the study burrows were not visited towards the end of the breeding season; the fledging dates given in recent reports were thus not available this year. Likewise birds were not handled on the surface, meaning that there were no late season records of confirmed adults (birds were not heard calling after 20<sup>th</sup> September). The 147 counted at sea on 28<sup>th</sup> September was the highest daycount ever logged this late in the year (423 on the 26<sup>th</sup> in 2021 is the latest higher count). There were seawatching records on all but two October dates to the 9<sup>th</sup>, with a high of nine in an hour on the 7<sup>th</sup>, whilst three juveniles were recorded after dark on the 11<sup>th</sup> and a partially downy youngster on the night of the 13<sup>th</sup> was the last to be seen ashore (a very freshly eaten, still partially downy, fledgling at Migration Rocks on 22<sup>nd</sup> November 2021 remains the latest youngster to date, eight days later than a live fledgling encountered in 2014). Up to six were logged at sea on three further October dates, whilst seawatching in November resulted in singles on four dates to the 9<sup>th</sup>, four on the 13<sup>th</sup> and seven on the 15<sup>th</sup>, the latter the highest daycount to be made so late in the season (a count of 11 on 3<sup>rd</sup> November 2015 is the latest higher count); there have been 21 later bird-days, including one on 1<sup>st</sup> December last year which is the latest.

**Ringling recovery** EA72648

**Originally ringed** as an adult, SHEARWATER TRANSECT, SKOKHOLM 16<sup>th</sup> July 2021

**Recovered** as an adult, NANT, BARDSEY ISLAND, GWYNEDD 30<sup>th</sup> June 2022

**Finding condition** Intentionally captured

**Distance travelled** 124km at 17 degrees (NNE)

**Days since ringed** 349

**Ringling recovery** EA73169

**Originally ringed** as a juvenile, SHEARWATER TRANSECT, SKOKHOLM 3<sup>rd</sup> September 2021

**Recovered** as an adult, PRAIA DO GUAECÁ, SÃO SEBASTIÃO, BRAZIL 13<sup>th</sup> September 2022

**Finding condition** Fresh but headless on beach (unknown *Procellariidae* sp.)

**Distance travelled** 9277km at 206 degrees (SSW)

**Days since ringed** 375



**Ringling recovery** EA73386

**Originally ringed** as a juvenile, SKOKHOLM 4<sup>th</sup> September 2021

**Recovered** as a juvenile, SAUCE GRANDE, BUENOS AIRES PROVINCE, ARGENTINA 22<sup>nd</sup> February 2022

**Finding condition** Fresh dead on beach following violent weather (unknown species)

**Distance travelled** 11,464km at 209 degrees (SSW)

**Days since ringed** 171

This is the farthest south a Skokholm ringed bird has been encountered since ringing recommenced. Perhaps surprisingly there have only been 31 Manx Shearwater ringed in Britain or Ireland and recovered in Argentina, this far fewer than in Brazil (283) but more than in Uruguay (26).

**Ringing recovery** EA73442

**Originally ringed** as a juvenile, SKOKHOLM 5<sup>th</sup> September 2021

**Recovered** as an adult, BARRA DOS COQUEIROS, STATE OF SERGIPE, BRAZIL 16<sup>th</sup> August 2022

**Finding condition** Moribund on beach, died in Sergipe Rehabilitation Centre

**Distance travelled** 7607km at 204 degrees (SSW)

**Days since ringed** 345

Additional to the three listed here, there have been 14 Skokholm ringed Manx Shearwaters found dead or moribund in South America since 2013; there was one in September 2014, two in November 2015, two in September and one in October 2016, one in September and one in October 2017, one in November 2018, one in March and one in November 2019, two in September 2020 and one in September 2021. They have all been found in Brazil, bar the November 2018 casualty found in Uruguay. Three have been found in their first winter, one in its second winter, one in at least its third winter, four in at least their fourth winter, one in at least its fifth winter, three in at least their sixth winter and one in at least its tenth winter.

**Ringing recovery** EZ17972

**Originally ringed** as a pullus, LIGHTHOUSE PLOT, SKOKHOLM 13<sup>th</sup> August 2016

**Recovered** as an adult, SKOMER ISLAND, PEMBROKESHIRE 30<sup>th</sup> April 2022

**Finding condition** Intentionally captured

**Distance travelled** 4km at 343 degrees (NNW)

**Days since ringed** 2086

**Ringing recovery** FB10691

**Originally ringed** as an adult, BARDSEY ISLAND, GWYNEDD 29<sup>th</sup> April 2003

**Recovered** as an adult, SKOKHOLM 28<sup>th</sup> August 2022

**Finding condition** Fresh dead, eaten by Great Black-backed Gull

**Distance travelled** 123km at 197 degrees (SSW)

**Days since ringed** 7061

**Ringing recovery** FB34015

**Originally ringed** as an adult, BARDSEY ISLAND, GWYNEDD 23<sup>rd</sup> June 2009

**Recovered** as an adult, SKOKHOLM 16<sup>th</sup> June 2022

**Finding condition** Fresh dead, eaten by Great Black-backed Gull

**Distance travelled** 123km at 197 degrees (SSW)

**Days since ringed** 4741

On overcast nights, prior to its conversion from white to red light, Bardsey Lighthouse attracted thousands of disorientated shearwaters towards its shores.

**Ringing recovery** FB39280

**Originally ringed** as an adult, PORTH IAGO, LLANGWNNADL, GWYNEDD 25<sup>th</sup> June 2020

**Recovered** as an adult, SKOKHOLM 1<sup>st</sup> October 2021 (sic)

**Finding condition** Dead (not fresh), eaten by Great Black-backed Gull

**Distance travelled** 134km at 197 degrees (SSW)

**Days since ringed** 463

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