



SKOKHOLM

BIRD OBSERVATORY



South and West Wales
De a Gorllewin Cymru

Seabird Report 2021

A summary of the status of seabirds breeding on Skokholm in 2021.

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 (2020-2016 in parenthesis)	Productivity (2020-2016 in parenthesis)
Great Black-backed Gull		Whole Island population: not to drop below the 2016-2020 mean of 90	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 1.10 chicks per breeding pair	
		80 nests (83, 86, 93, 93, 93)	1.51 (1.40, 1.43, 1.40, 1.54, 1.38)
Herring Gull		Whole Island population: not to drop below the 2016-2020 mean of 309	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.70 chicks per breeding pair	
		305 nests (301, 301, 320, 302, 322)	0.84 (0.33, 0.69, 0.73, 0.70, 0.86)
Lesser Black-backed Gull		Whole Island population: 3 in any 5 consecutive years with less than 4600 pairs	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.60 chicks per breeding pair	
		935 aia (880, 1028, 1069, 1123, 1397)	0.89 (0.12, 0.27, 0.63, 0.38, 0.23)
Guillemot		Whole Island population: not to drop below the 2016-2020 mean of 4412	
Population	Not set	Productivity: not monitored on Skokholm	
		5065 aol (5101, 4654, 4316, 4038, 3949)	- (0.55-0.61 in 2013)
Razorbill		Whole Island population: not to drop below the 2016-2020 mean of 2718	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.80 chicks per breeding pair	
		3356 aol (3517, 2755, 2585, 2491, 2242)	0.47 (0.56, 0.63, 0.69, 0.40, 0.39)
Puffin		Whole Island population: not to drop below the 2016-2020 mean of 7847	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.74 chicks per breeding pair	
		11,245 adults (8534, 7447, 8762, 7800, 6692)	0.80 (0.78, 0.76, 0.75, 0.80, 0.73)
Storm Petrel		Study plot population: any measurable decrease in the population	
Population	Not set	Productivity: limit not yet set due to a lack of data	
		87 transect responses (No census, 89, 83, 89, 76)	0.80 (0.45, 0.74, 0.55, 0.50, 0.58)
Fulmar		Whole Island population: not to drop below the 2016-2020 mean of 206	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.50 chicks per breeding pair	
		225 aos (207, 198, 217, 213, 194)	0.51 (0.51, 0.62, 0.49, 0.45, 0.57)
Manx Shearwater		Study plot population: any measurable decrease in the population	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.69 chicks per breeding pair	
		670 sites in 8000m ² (730, 655, 739, 584, 588)	0.79 (0.68, 0.72, 0.70, 0.80, 0.68)

Great Black-backed Gull *Larus marinus*

Gwylan Gefnddu Fwyaf

Fairly Common Breeder and Common Visitor

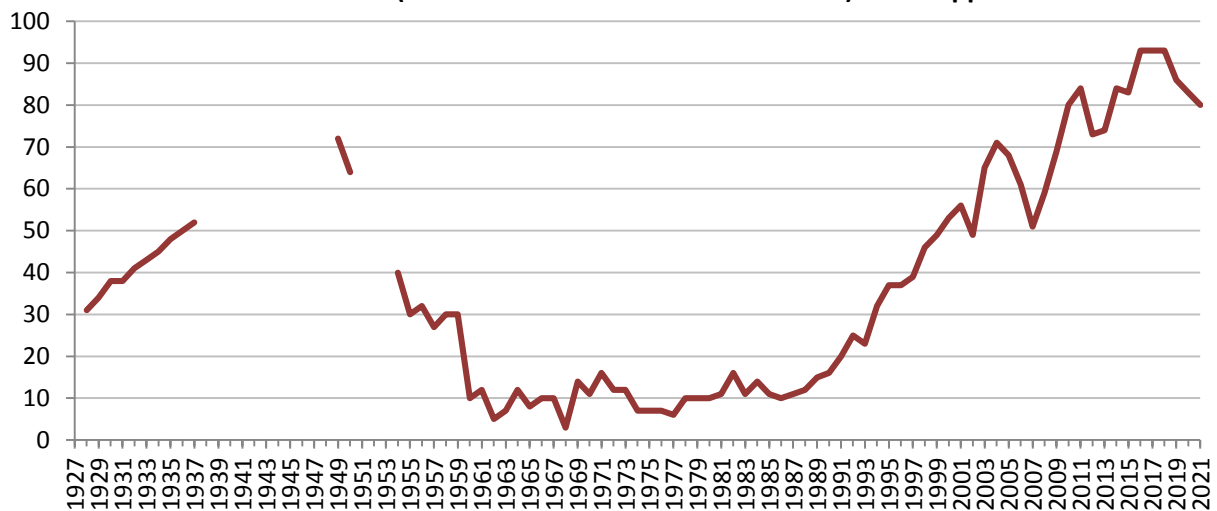
38 trapped (including 37 pulli), 48 resighted

1936-1976: 231 trapped, 2012-2020: 471 trapped, 15 retrapped, 218 resighted, 6 controls

Many birds were again absent during March, with daycounts peaking at 74 on the 11th and 75 on the 24th; the peak was the lowest March high since the 68 of 2014 (between 2015 and 2019 March daycounts reached between 117 and 132, although they only peaked at 88 last year). The majority of the birds present were on territory, with maximum roost counts of only 15 on the 1st and 22 on the 11th; the peak March roost between 2013 and 2020 averaged 37.4 birds, with highs of 48 in 2016 and 2017, but a low of 20 last year. Numbers again increased in April, however a maximum daycount of 118 on the 24th was the lowest April high of the last decade. Communal roosts only formed occasionally and were all small, with highs from the Bog of 14 on the 23rd and 26th and 16 on the 25th; the peak April roost between 2013 and 2020 averaged 72.8 birds, with a high of 213 on the 3rd in 2013 and a low of 38 in 2019. A whole Island census between 25th April and 16th May located 80 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, equal with that of 2010, the ninth highest on record, it was down on the 83 mapped last year and highs of 93 mapped in 2016, 2017 and 2018. Indeed this proved the third 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 1928-2021 (where data exists). Control of numbers started in 1949 (destruction of both nests and adults) and stopped in 1985.



A colour ringing project, begun seven 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 adults 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 that year. This year saw 28 of 36 birds return (77.8%), whilst the breeding population declined by a further three pairs; this suggests that approximately 37 established adults did not return to breed in 2021 and that 31 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 and 77.8% in 2021; it thus seems likely that disturbance 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 5th and 6th June last year; 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. It would appear that Skokholm Great Black-backed Gulls rarely take a year away from the colony or go unseen; between 2016 and 2019, no missing colour ringed birds were found subsequently (with the exception of those which had lost their darvic). However last year saw the appearance of W:235 on North Plain in August, a bird which had not been found since the end of the 2018 breeding season; this bird was not seen this year. Additionally W:239, also ringed in 2018 and which occupied its 2018 territory in 2019, was not seen until 1st December last year, perhaps suggesting that it had been present but had departed early; this year it bred close to where it was ringed.



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 in recent Skokholm Seabird

Reports as areas for concern. There were no injuries recorded this year, however dead adults were found above Peter’s Bay on 9th March and at Wardens’ Rest on 4th June (the latter, ringed as a chick in 2013, was accompanied by three small dead chicks and an alarming partner). Last year saw an adult with a broken and almost severed wing, two adults found dead, a lethargic adult with a bleeding puncture wound in its flank and a juvenile with a broken leg (additionally a juvenile had a damaged wing during August, although this was almost certainly the result of misadventure during its first storm). In August 2018 an unringed adult arrived to the Lighthouse with a bloody leg which was missing its foot, whilst five individuals were found with serious leg injuries between 16th April and 30th May 2019 (similar injuries were seen in Herring Gulls). Although birds can be injured during aggressive encounters with other gulls (as was perhaps the case with the broken winged adult last year), it seems likely that undamaged corpses are often caused by poisoning, perhaps botulism, and that many violent injuries are caused by interactions with fishing gear. Great Black-backed Gulls were again regularly observed behind fishing vessels this year, although clearly some boats were more attractive than others; peak counts were of 21 behind ‘Boy’s Pride’ on 13th August (down on a high of 32 logged last year when a crew member was deliberately feeding fish remains to gulls), six behind ‘Our Hazel’ on 13th August (down on a high of 26 last year) and six behind White Water II on 4th June (the latter were fishing with rod and line, the former two are potting vessels). An important step in understanding the Skokholm Great Black-backed Gull 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.

Checks of any accessible and seemingly complete nests from 10th April failed to find any eggs until the 16th; a search of the area above Blacksmith’s Landing on the latter date located a nest with three eggs, although no other pairs were seemingly sitting at this time. The first eggs encountered last year, also a full complement of three, were also found on the 16th, this the date of the mean 2013-2020 first egg (with the earliest found on the 10th in 2014 (a single egg) and 2018 (a clutch of three) and the latest on the 25th in 2013). The first chicks to be seen in 2021 were present at the same site as the first eggs on 15th May; the first of last year were found on the 17th, the first of 2019 on the 16th and the first of 2018 on the 20th. Of 43 monitored nests, 12 pairs failed, seven pairs fledged a singleton, 14 pairs fledged two and ten pairs fledged three. There were thus 65 young fledged, resulting in a productivity figure of 1.51 fledglings per monitored pair; productivity was 7.9% up on that of 2020, 38.5% up on the 1989-2004 mean of 1.09 and 4.9% up on the 2013-2020 mean (1.44 ± 0.09). One of the North Plain youngsters was adopted and fed to fledging by a neighbouring pair, seemingly to the detriment of the adopting pair’s breeding success; the adoption coincided with the death of one of the adopting pair’s three small chicks, the adopted youngster being larger and able to outcompete the remaining two, this probably contributing to the demise of a second chick when three-quarter sized and perhaps to the death of the remaining youngster soon after it fledged (see Brown and Eagle (2019) for photographs of a Lesser Black-backed Gull chick being fed by an adult Great Black-backed Gull, this perhaps also the result of a chick stage adoption following the death of a youngster).

Productivity estimates 2002-2021 (average number of fledglings per monitored pair).

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

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 an eighth 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 3099 corpses, comprising 2132 adults and 967 youngsters, were marked this year. The number of adults marked was down on a record 3008 logged last year and 11.5% down on a 2014-2020 mean of 2408.1 \pm sd 500.3, whilst the number of youngsters marked was the lowest to date, 18.3% down on a 2014-2020 mean of 1183.1 \pm sd 181.7 (a high of 1398 was recorded in 2016 and a low of 970 last year). The total number of marked corpses was the second lowest to date, only up on the 2661 of 2019 and 13.7% down on a 2014-2020 mean of 3591.3 \pm sd 550.0. 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). Ad hoc observations suggested a large reduction in the number of shearwaters being dug out from their burrows this year (as opposed to being taken from the entrance), although one of 160 study chicks was 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. Although the number of dead birds currently being found represents a relatively small proportion of the Skokholm shearwater population, it seems likely that any growth in the Great Black-backed Gull population will impact the shearwaters. Ultimately more data is required to understand these relationships in greater detail.



The colour ringing project initiated in 2014 is also providing information on juvenile survival and recruitment. Of 43 fledglings ringed in 2014, 31 (72.09%) have been resighted subsequently, including four which have been found dead. At least 20 birds (46.51%) definitely survived their first full year, 15 (34.88%) survived two years, 13 (30.23%) survived three years, 12 (27.91%) survived four years, seven (16.28%) survived five years, six (13.95%) survived six years and three (6.98%) have survived at least seven years (one of which was seen on Skokholm (but did not breed here) and two of which were on Skomer (one definitely breeding)). The birds ringed as fledglings in 2015 have provided similar results (see table below). 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

approximately 25% of fledglings are surviving to four years of age. 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 40 youngsters which have so far returned to Skokholm at some point, 11 were first back as first-summers, seven as second-summers, 13 as third-summers, seven as fourth-summers, one as a fifth-summer and one as a sixth-summer (none of these have bred on the Island); it would appear that birds are most likely to first return in their third summer, with a mean of 6.34% of all youngsters ringed between 2014 and 2018 having first returned to the Island at this age.

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

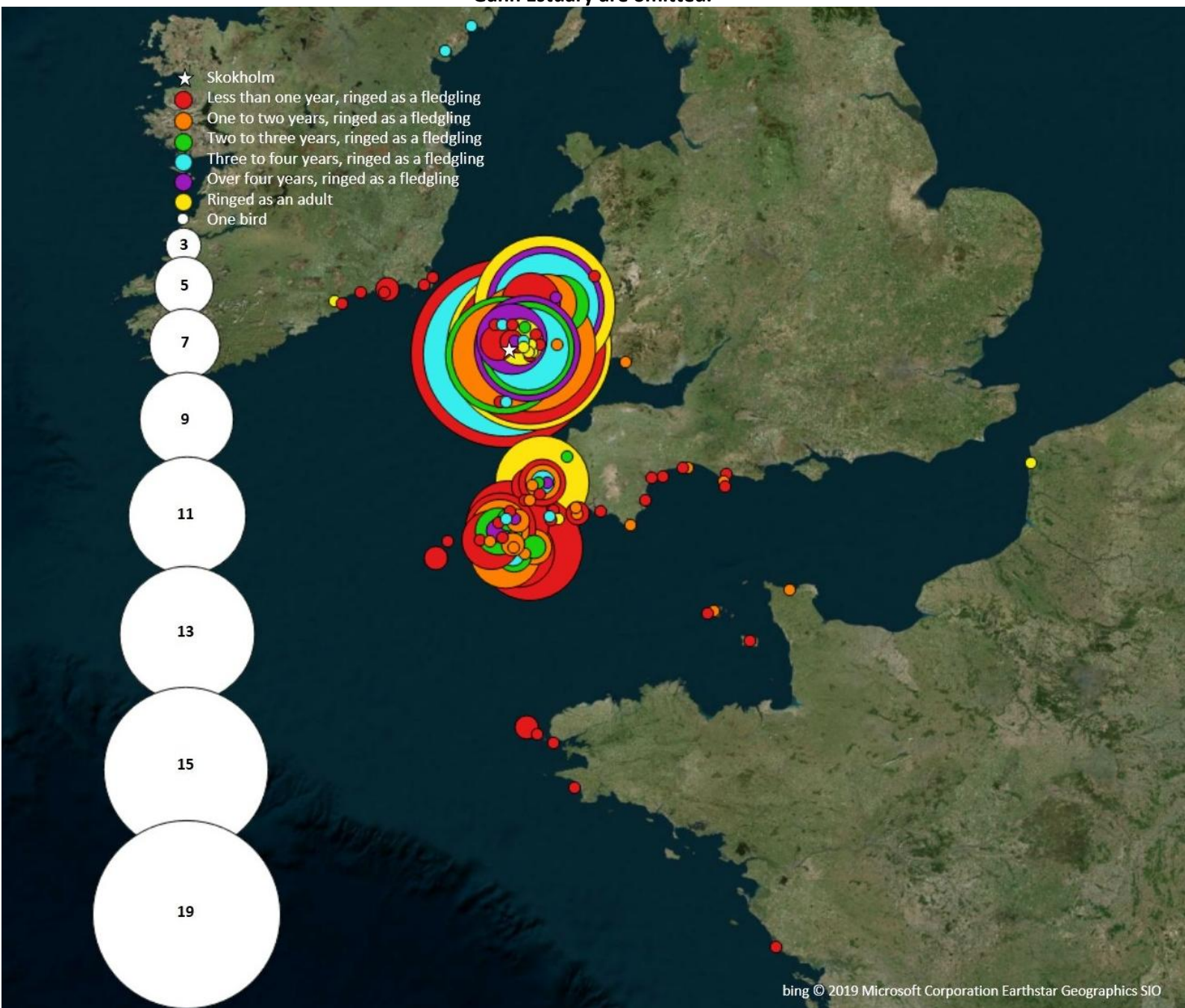
Ringed in	2014	2015	2016	2017	2018	2019	2020	Mean
% not seen again	27.91	48.08	56.25	63.89	42.11	25.00	56.41	45.66
% seen again	72.09	51.92	43.75	36.11	57.89	75.00	43.59	54.34
% seen 1+ year	46.51	34.62	28.13	27.78	34.21	31.82	17.95	31.57
% seen 2+ years	34.88	28.85	15.63	25.00	31.58	13.64		24.93
% seen 3+ years	30.23	25.00	15.63	22.22	15.79			21.77
% seen 4+ years	27.91	23.08	12.50	11.11				18.65
% seen 5+ years	16.28	15.38	6.25					12.64
% seen 6+ years	13.95	9.62						11.78
% seen 7+ years	6.98							6.98
% found dead	9.30	1.92	9.38	2.78	2.63	6.82	2.56	5.06

Although resighting records away from Skokholm will be somewhat biased by a preponderance of birders at the main roost sites in Cornwall, it seems likely that there is a genuine southerly bias to the movements of young Skokholm Great Black-backed Gulls (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 14 birds ringed as breeding adults and found 7.5km away on the Gann Estuary (birds captured on their Skokholm nests between 2014 and 2019). 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 2020 Seabird Report.

Darvic	Ring	Location	County	Age	Date
W:004	MA37971	Camel Estuary	Cornwall	Second-summer	05/08/21
W:004	MA37971	Hayle Estuary	Cornwall	Third-winter	15/12/21
W:007	MA37974	Nevern Estuary	Pembrokeshire	Second-winter	22/02/21, 06/03/21
W:025	HT94870	Nevern Estuary	Pembrokeshire	Adult	01/04/21
W:039	HT94878	Skomer Island	Pembrokeshire	Seventh-summer	07/03/21
W:055	HT94917	Nevern Estuary	Pembrokeshire	Seventh-summer	11/03/21, 27/04/21
W:064	HT94925	Skomer Island	Pembrokeshire	Seventh-summer	14/07/21 (breeding)
W:064	HT94925	Gann Estuary	Pembrokeshire	Eighth-winter	15/12/21
W:067	HT94927	Gann Estuary	Pembrokeshire	Eighth-winter	17/11/21
W:077	HT94934	Skokholm	Pembrokeshire	Eighth-winter	21/04/21, 10/09/21
W:083	HT94940	Gann Estuary	Pembrokeshire	Seventh-winter	20/11/21
W:114	HT94943	Skomer Island	Pembrokeshire	Sixth-summer	03/04/21, 18/07/21
W:116	HT94976	Nevern Estuary	Pembrokeshire	Sixth-summer	31/03/21
W:119	HT94979	Skokholm	Pembrokeshire	Sixth-summer	20/04/21, 26/06/21
W:121	HT94981	Skokholm	Pembrokeshire	Sixth-summer	22/03/21, 24/07/21
W:121	HT94981	Gann Estuary	Pembrokeshire	Sixth-summer	26/03/21

W:124	HT94955	Gann Estuary	Pembrokeshire	Sixth-summer	27/03/21
W:124	HT94955	Skokholm	Pembrokeshire	Seventh-winter	19/04/21, 17/09/21
W:139	HT94994	Cunnigar, Waterford	IRELAND	Adult	18/09/21
W:145	HT95000	Angle to Milford Haven	Pembrokeshire	Adult	26/02/21
W:154	MA37811	Skokholm	Pembrokeshire	Fifth-summer	07/06/21
W:168	MA37826	Skokholm	Pembrokeshire	Fifth-summer	20/04/21
W:179	MA37838	Skokholm	Pembrokeshire	Fifth-summer	20/06/21, 23/06/21
W:192	MA37859	Skokholm	Pembrokeshire	Fourth-summer	16/06/21
W:195	MA37862	Skokholm	Pembrokeshire	Fourth-summer	19/03/21, 12/05/21

The movements of Skokholm ringed Great Black-backed Gulls 2014-2021. The different colours represent the different ages at which the birds were resighted. 27 birds ringed as fledglings and resighted on Skokholm over four years later and 34 birds ringed as adults and resighted on the Gann Estuary are omitted.



Darvic	Ring	Location	County	Age	Date
W:196	MA37863	Carlingford Lough	County Down	Fourth-winter	05/01/21
W:196	MA37863	Dundrum Inner Bay	County Down	Fourth-summer	19/04/21
W:219	MA37884	Skokholm	Pembrokeshire	Fourth-summer	07/05/21, 20/07/21
W:221	MA37886	Nevern Estuary	Pembrokeshire	Fourth-summer	01/04/21
W:222	MA37887	Gann Estuary	Pembrokeshire	Fifth-winter	30/11/21
W:226	MA37891	Gann Estuary	Pembrokeshire	Fourth-winter	17/01/21
W:242	MA37911	Gann Estuary	Pembrokeshire	Fourth-winter	17/11/21
W:247	MA37916	Gann Estuary	Pembrokeshire	Fourth-winter	27/03/21, 30/11/21
W:254	MA37919	Gann Estuary	Pembrokeshire	Fourth-winter	30/11/21
W:258	MA37903	Skokholm	Pembrokeshire	Fourth-winter	13/09/21
W:261	MA37906	Skokholm	Pembrokeshire	Third-summer	27/03/21
W:267	MA37924	Gann Estuary	Pembrokeshire	Fourth-winter	09/03/21, 14/12/21
W:269	MA37926	Skokholm	Pembrokeshire	Fourth-winter	19/08/21
W:296	MA37964	Skokholm	Pembrokeshire	Second-summer	20/04/21
W:317	MA37991	Gann Estuary	Pembrokeshire	Third-winter	20/11/21
W:318	MA37992	Gann Estuary	Pembrokeshire	Second-winter	10/02/21
W:320	MA37994	Skokholm	Pembrokeshire	Third-winter	27/11/21
W:320	MA37994	Gann Estuary	Pembrokeshire	Third-winter	01/12/21
W:321	MA37995	Gann Estuary	Pembrokeshire	Third-winter	30/01/21, 26/11/21
W:322	MA37996	Skokholm	Pembrokeshire	Third-winter	08/09/21
W:325	MA37999	Gann Estuary	Pembrokeshire	Third-winter	30/11/21
W:327	MA46908	Skokholm	Pembrokeshire	Second-winter	22/08/21, 17/09/21
W:332	MA46913	Skokholm	Pembrokeshire	First-summer	04/08/21
W:332	MA46913	Gann Estuary	Pembrokeshire	Second-winter	03/12/21
W:333	MA46914	Halzephron Cliffs	Cornwall	Second-winter	17/11/21
W:345	MA46926	Perelle Beach, Guernsey	CHANNEL ISLANDS	First-summer	23/03/21, 25/03/21
W:347	MA46928	Newlyn Harbour	Cornwall	First-summer	03/01/21, 08/05/21
W:348	MA46929	Gann Estuary	Pembrokeshire	Second-winter	30/11/21
W:351	MA46935	Little Porth, St. Mary's	Isles of Scilly	First-winter	04/01/21, 07/01/21
W:352	MA46936	Gothian Sands, Gwithian	Cornwall	Second-winter	27/09/21
W:353	MA46937	Camel Estuary	Cornwall	First-winter	20/02/21
W:358	MA46942	Gann Estuary	Pembrokeshire	First-summer	22/02/21, 15/03/21
W:364	MA46948	Tacumshin Lake, Wexford	IRELAND	First-winter	25/02/21
W:365	MA46949	Skokholm	Pembrokeshire	Second-winter	17/09/21, 25/09/21
W:368	MA46954	Grassholm	Pembrokeshire	Juvenile	24/08/21
W:374	MA46961	Gann Estuary	Pembrokeshire	First-winter	17/11/21
W:381	MA46968	Gothian Sands, Gwithian	Cornwall	First-winter	05/12/21
W:382	MA46969	Newlyn Harbour	Cornwall	First-winter	05/12/21

Breeding season roosts again formed regularly in the Bog, although 47 on 4th May and 33 on 23rd May were the only counts of more than 25; the smallest post-2012 breeding season roosts have occurred in the last four years. The first three flying fledglings were not noted until 11th July, these the latest to be recorded during the last eight years (the 2014-2020 first fledgling mean is 2nd July, with the earliest recorded on 30th June 2019 and the latest on 7th July 2015). It was not until mid-August that the larger post-breeding roosts began to develop, with the largest gatherings being of 86 on the 22nd, 59 on the 26th, 68 on the 28th and 76 on the 29th. The first fledgling to be seen away from the Island was at Grassholm on 24th August; this was six days later than a bird seen to the north of Aberaeron, Ceredigion last year. Fledglings had reached Gothian Sands and Newlyn Harbour by 5th December; these were the latest first southwest resightings of the last eight years, 77 days later than

both the first of last year and the 2014-2020 mean (a bird at Newquay Harbour, Cornwall on 10th August remains our earliest southwest resighting, whilst one at Marazion, Cornwall on 26th November was the latest). September roost counts were considerably lower than seen in most recent years, with 48 at North Plain on the 13th being the largest gathering; counts peaked at 130 in 2020, 113 in 2019, 135 in 2018, 183 in 2017, 247 in 2016 (when there were six daycounts of more than 200), 249 in 2015 and 355 in 2013 (the September 2014 maximum was only 52). There were peak October daycounts of 116 on the 4th (when 36 roosted on Western Plain and 62 were on the sea off the Bluffs) and 152 on the 5th (when 85 roosted on Western Plain and 46 were in Mad Bay), the latter being the highest October daycount since 175 were logged in 2016, however counts failed to exceed 24 on each date from the 9th and a bird-days total of 904 was the lowest October tally this decade (the 2013-2020 October bird-days mean is 1441.9, with a high of 3113 in 2013 and a low of 943 in 2018). The only November daycounts in excess of 32 were of 34 on the 6th (which included a lingering juvenile found dead on the 9th) and 79 on the 27th, the peak being the fifth highest of the last nine years (down on the 117 of last year and three 2013 daycounts which included a record 270 on the 3rd). Counts during the first five days of December peaked at 24 on the 1st and 2nd.



Ringing recovery MA37945

Originally ringed as a juvenile, SKOKHOLM 1st September 2018

Recovered as a third-summer, PLAYA DE SANTA CRUZ, OLEIROS, SPAIN 6th June 2021

Finding condition Metal ring read in field

Distance travelled 958km at 194 degrees (SSW)

Days since ringed 1009

There have been 53 Great Black-backed Gulls ringed in Great Britain and found in Spain.

Herring Gull *Larus argentatus*

Gwylan y Penwaig

Common Breeder Abundant Breeder in the 1970s

8 trapped (including 1 pullus), 4 retrapped, 17 resighted

1934-1976: 13,265 trapped, 2013-2020: 134 trapped, 24 retrapped, 42 resighted, 1 control

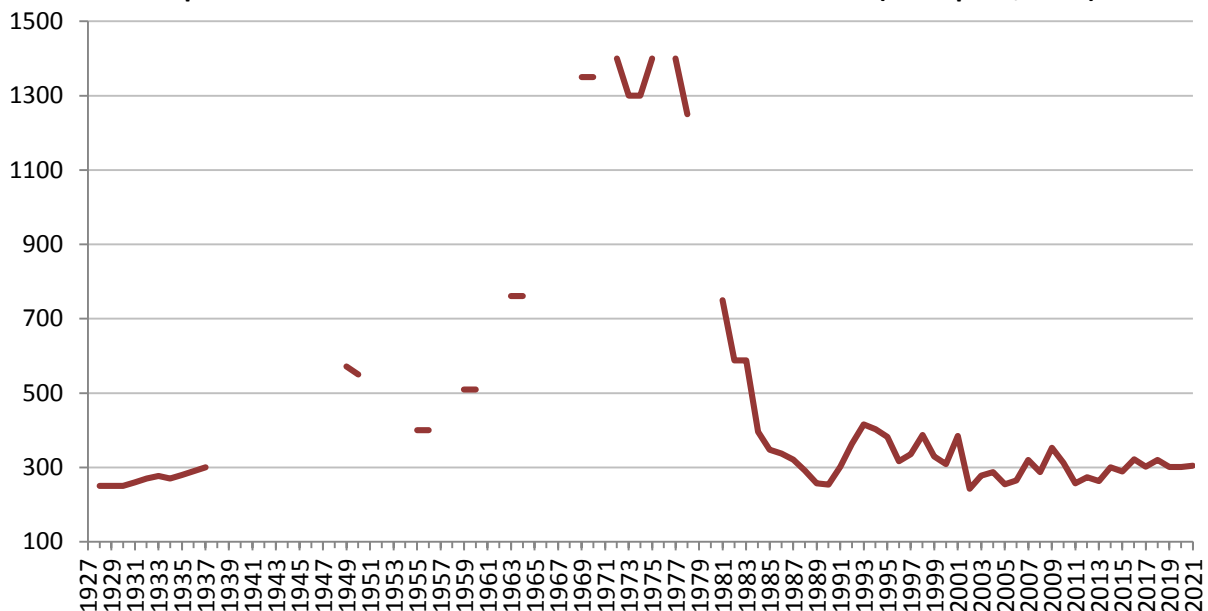
March daycounts again fluctuated widely, with 80 or less logged on eight dates, including lows of 18 on the 2nd, 41 on the 4th and 39 on the 5th when birds fed and roosted away from Skokholm, but highs of 295 on the 16th and 269 on the 21st when many were back on territory. Coastal roosts again included reasonable numbers of young birds (for example a group of 25 subadults at Oystercatcher

Rock on 20th March), this in contrast with observations made of Lesser Black-backed Gulls during the same period. The first lone egg was found in Peter’s Bay on 15th April, although a full check of the nests around the Neck revealed only one other apparently incubating adult; this was seven days earlier than the first of last year and three days earlier than the mean 2013-2020 first egg date (see table below), indeed the only earlier first egg was found on the 14th in 2014. Only one egg was found during a full check of the Blacksmith’s Landing nests the following day. Whole Island counts between the 15th and 17th May located 305 active nests, four more than were recorded in both 2020 and 2019 and a total up on the 2011-2020 mean (292.9 ±sd 22.1) but 3.2% down on the 1984-2020 mean (315.2 ±sd 46.1). This was thus the third consecutive year in which the total has fallen below the lower limit set in the Skokholm Management Plan. Nevertheless 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 the first egg was located in each year 2013-2021, along with the 2013-2020 first egg mean.

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

The number of breeding pairs 1928-2021 (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) 2007-2021.

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
320	287	353	312	257	274	263	300	289	322	302	320	301	301	305
0.61	-	-	0.82	0.67	1.15	0.72	0.70	0.66	0.86	0.70	0.73	0.69	0.33	0.84

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) and ten in 2019 (nine on the nest and one in a Spring Trap); two of the Gull Trap birds were only linked to territories in later years (one in 2019 and one in 2020) and the Spring Trap bird has not been linked to a breeding territory (and is thus not included in survival estimates). A COVID-19 dictated staffing shortage meant that there were no adults trapped in 2020. Each bird was ringed with a red darvic inscribed W:9** in white, the latter two digits

identifying the individual. Of the 13 birds marked in 2017, 11 bred in 2018 (84.6%). Of 26 birds with rings in 2018, 17 (65.4%) were still alive during the 2019 breeding season, four of these Gull Trap birds (100.0% return) and 13 nest trapped birds (59.1% return); 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, 18 (66.7%) were alive in 2020, four of these Gull Trap birds (80.0% return) and 14 nest trapped birds (63.6% return); five of the nest trapped birds and one of the Gull Trap birds were not seen on the Island. Of 19 colour ringed birds alive in 2020, all 19 were resighted this year; all five Gull Trap birds were on territory, whereas four nest trapped birds were not found breeding (including three only seen on the mainland). Although the sample size is perhaps too small to draw any firm conclusions, these observations suggest that trapping on the nest is increasing the likelihood that birds will not be found in the same area the following year (which is not the case with Great Black-backed Gulls). With this in mind, adults were not trapped on the nest in 2021 and will not be again until further off-nest Gull Trap work is conducted and analysed. In an effort to increase the sample size for birds trapped away from the nest, four adults were taken in the Gull Trap this year; one of these was later found on territory.



Two of the colour ringed birds have been found dead, both on Skokholm and with no apparent cause of death. This year saw unringed dead adults found floating in Crab Bay on 2nd April, ashore near the Bluffs on 30th April and hanging from fishing line in Calf Bay on 6th July (above photograph), whilst a live adult with a badly broken leg was present on 15th April. Two dead adults were found last year, whilst injuries included a badly broken leg, a bloody hole in a flank and a recently amputated foot. Three serious leg injuries were noted in 2019. Following four affected birds in 2019, no incidences of oiling have been recorded for two years. 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. This season saw a peak count of 42 behind Boy's Pride (a potting vessel) on 16th March, whilst smaller numbers were regularly present around boats fishing with rod and line.

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

Darvic	Ring	Location	County	Age	Date
W:998	GV22352	Gann Estuary	Pembrokeshire	Adult	16/12/21
W:998	GV22352	Sandy Haven	Pembrokeshire	Adult	20/12/21

W:985	GV22422	Gann Estuary	Pembrokeshire	Adult	19/11/21, 20/11/21
W:985	GV22422	Sandy Haven	Pembrokeshire	Adult	20/12/21
W:984	GV22423	Gann Estuary	Pembrokeshire	Adult	05/03/21, 13/11/21
W:983	GV22390	Llanstadwell	Pembrokeshire	Adult	27/04/21
W:983	GV22390	Gann Estuary	Pembrokeshire	Adult	01/12/21 (Skokholm 03/12/21)
W:978	GV22428	Gann Estuary	Pembrokeshire	Adult	02/03/21, 26/11/21, 14-18/12/21
W:977	GR98293	Sandy Haven	Pembrokeshire	Adult	20/12/21
W:975	GV22431	Gann Estuary	Pembrokeshire	Adult	19/11/21
W:973	GV22439	Gann Estuary	Pembrokeshire	Adult	01/03/21, 13/11/21, 14/12/21
W:972	GR87973	Dale Beach	Pembrokeshire	Adult	01/03/21
W:972	GR87973	Gann Estuary	Pembrokeshire	Adult	14/11/21, 16/11/21
W:972	GR87973	Sandy Haven	Pembrokeshire	Adult	20/12/21, 21/12/21
W:971	GV22440	Gann Estuary	Pembrokeshire	Adult	10/01/21, 18/03/21, 01/12/21
W:970	GV22457	Gann Estuary	Pembrokeshire	Adult	14/11/21, 30/11/21, 13/12/21
W:969	GV83059	Gann Estuary	Pembrokeshire	Adult	02/01/21, 28/02/21
W:966	GV83062	Gann Estuary	Pembrokeshire	Adult	10/01/21, 01/03/21, 16/11/21
W:965	GV83063	Gann Estuary	Pembrokeshire	Adult	30/01/21, 07/03/21, 10/11/21
W:965	GV83063	Sandy Haven	Pembrokeshire	Adult	20/12/21
W:964	GV83064	Gann Estuary	Pembrokeshire	Adult	14/11/21, 16/11/21, 20/11/21
W:964	GV83064	Sandy Haven	Pembrokeshire	Adult	20/12/21
W:961	GV83058	Gann Estuary	Pembrokeshire	Adult	15/01/21, 02/03/21, 16-17/11/21
W:961	GV83058	Sandy Haven	Pembrokeshire	Adult	21/12/21
W:953	GV83151	Gann Estuary	Pembrokeshire	Adult	14/11/21 (Skokholm 16/11/21)
W:953	GV83151	Sandy Haven	Pembrokeshire	Adult	20/12/21
W:952	GV83147	Gann Estuary	Pembrokeshire	Adult	13/12/21
W:950	GV83136	Sandy Haven	Pembrokeshire	Adult	20/12/21



The first chicks were seen in the South Haven sea cave on 15th May, these two days earlier than the first of last year and the earliest of the last five years. The first flying fledgling was at North Plain on 30th June, this one day earlier than the first of last year and four days earlier than the 2013-2020 mean; the only other June fledgling noted during this period was logged on the 30th in 2016, with the latest first aloft on 10th July in 2015. Checks of the Neck productivity plot during July, where 141 pairs had established nests (12 more than last year), located a maximum of 119 fledging-sized young

(along with 16 small chicks, although none of these late attempts seemingly resulted in fledglings). The resulting 2021 productivity figure of 0.84 fledged young per pair was 154.5% up on the 0.33 of last year (the lowest estimate since 2004), 25.4% up on the 2011-2020 mean (0.67 \pm se 0.05) and the highest since the 0.86 of 2016. Disappointing 2020 productivity was linked to rough weather on the 22nd and 23rd May which resulted in several low nests being destroyed by unseasonable 11 metre waves at the point when many eggs were hatching. However this year saw similar wild weather, indeed the weather between the 20th and 21st May was even more extreme, 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. Several nests to the south of the Neck (in the productivity plot) were lost, as were nests along the South Coast cliffs and in Little Bay (the latter the only site where dead chicks were seen). Birds were nest building at the Dip, in South Haven and to the south of the Neck on the 21st and in Crab Bay on the 22nd, whilst rafts of 32 adults off the Lighthouse, 18 off Crab Bay and six off South Haven on the 22nd were unusual and perhaps mirrored breeding failures. Presumably the pairs around the Neck which were not impacted by the storm had a particularly successful breeding season, this theory supported by ad hoc observations which recorded many pairs with two or three large young (resulting in the higher than average productivity seen this year).



August saw the customary post-breeding departure of both adults and fledglings, however a mean daycount of 90 was the second highest of the last nine years and up on a 2013-2020 mean of 73 (this perhaps reflecting both higher productivity and more regular ant swarms); although there were lows of 34 on the 19th, 25 on the 29th and 14 on the 30th, there were highs of 225 on the 23rd, 193 on the 24th and 220 on the 25th when up to 165 (predominantly adults) fed on ants. As is typically the case, few Herring Gulls visited Skokholm in September; there were 12 single-figure daycounts, although offshore birds led to highs of 115 on the 6th, 86 on the 14th and 91 on the 22nd which contributed to the second highest September bird-days total of the last decade (878 only being down on the 1150 bird-days of 2015). October counts were up on last year but down on the 2013-2020 mean; only six daycounts exceeded 40, including highs of 204 on the 6th and 129 on the 7th when the majority were at sea. Numbers again increased in November, with many birds returning to their breeding territories (including at least 75% of the colour ringed birds which had bred in South Haven) and more returning to Skokholm to roost; eight three-figure daycounts included a peak of 180 on the 27th (when 159 roosted at North Pond), this down on a 2013-2020 mean high of 386 and the lowest November maximum of the last nine years (the all-time November highs are the 585 of 2015, the

588 of 2016 and the 612 of 2017, the majority of which were feeding with the smaller gulls in Broad Sound). There were record December daycounts, with 465 on the 1st (including 309 in the Sound), 838 on the 2nd (751 in the Sound) and 425 on the 3rd (225 in the Sound); the previous December high was the 400 of 1979, indeed this year's 2nd December tally exceeds all earlier autumn daycounts (although this species was routinely only recorded as being 'present' in the past).

Ringing recovery Blue darvic with white W:572 (GPS tagged)

Originally ringed as a rehabilitated juvenile, released MID-CORNWALL

Recovered as a juvenile, THE NECK, SKOKHOLM 0900hrs 25th August 2021

Finding condition Bird not seen, GPS track only

Taken as a chick and released following care, this bird reached Pembrokeshire during mid-August and lingered around the Dale and Marloes peninsula. The GPS tag detached when on Middleholm at the end of October.

Lesser Black-backed Gull *Larus fuscus*

Gwylan Gefnddu Leiaf

Abundant Breeder previously a Very Abundant Breeder

41 trapped (including 26 pulli), 3 retrapped, 2 resighted, 1 control

1938-1976: 11,912 trapped, 2013-2020: 579 trapped, 26 retrapped, 105 resighted, 16 controls

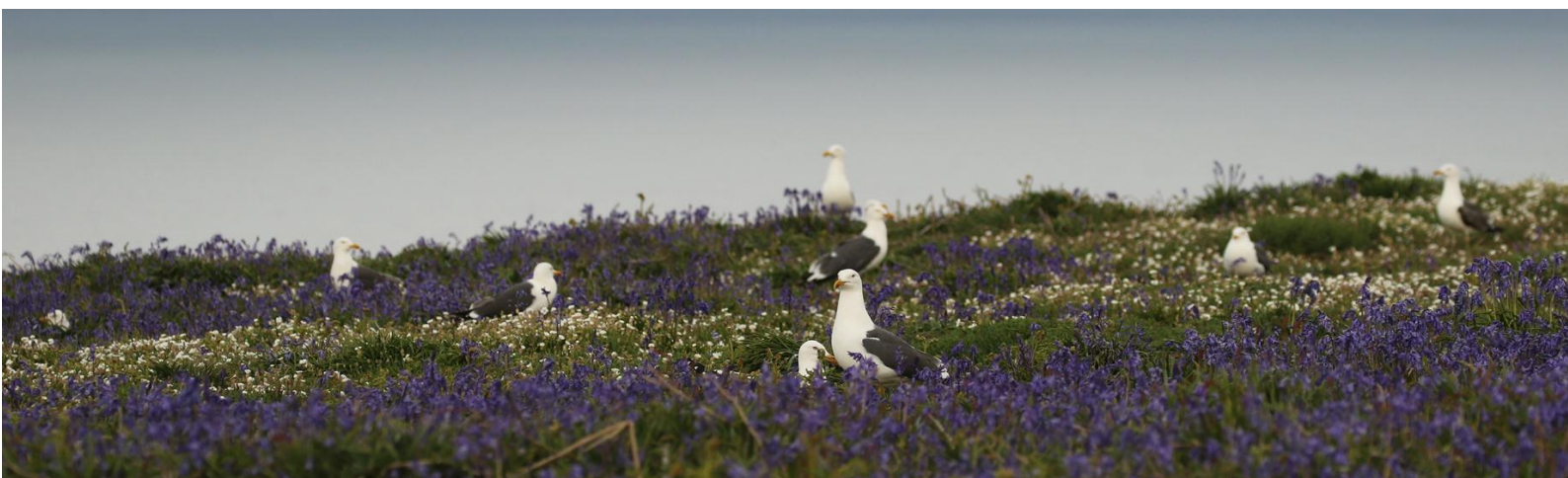
A mean March daycount of 473 was remarkably similar to the 476 of 2020 and 2019, but down on the 568 of 2018, the 515 of 2017 and the 823 of 2016. The number of birds within the colonies again fluctuated considerably during the day; for example the Frank's Point colony, empty on the morning of the 5th, contained 34 birds that afternoon. 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 being of 78 in the Bog on the afternoon of the 1st, 55 there on the 5th and 36 at North Pond on the 9th. 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. The peak April daycounts were also very similar to those logged recently, with highs of 789 on the 4th and 796 on the 26th almost matching the 798 of last year and the 759 of 2019 (albeit being well down on a 2013-2020 mean of 1333.9 and a high during that period of 2109 in 2014). A check of nests near the Top Tank on 24th April located three eggs; these were one day earlier than the first single of 2020 and four days earlier than the 2013-2020 mean.

When the first egg was located in each year 2013-2021, along with the 2013-2020 first egg mean.

2013	2014	2015	2016	2017	2018	2019	2020	2021	Mean
3 rd May	24 th April	4 th May	25 th April	1 st May	26 th April	28 th April	25 th April	24 th April	28 th April

Vantage point counts of the inland breeding subcolonies and a full census of the coast nesting pairs were made between the 15th and 19th May, during which 842 apparently incubating adults were located; this was the second lowest count in over 50 years, a total only up on the 795 of last year and 22.7% down on the 2014-2020 mean (1088.7 ±sd 251.1). 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 this year (as was the case in 2020 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 2021 chick located on 18th May (on the 22nd in 2020 and 2019, the 23rd in 2018 and the 24th in 2017) but a nest near the Top Tank containing small chicks on 9th July, the latter five days after the first fledgling was seen at North Pond (the first fledgling was noted on 30th June in 2020 and between the 5th and 7th July in each year between 2016 and 2019). 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
Mean				14.03	12.83	1.13	31.36	1.31

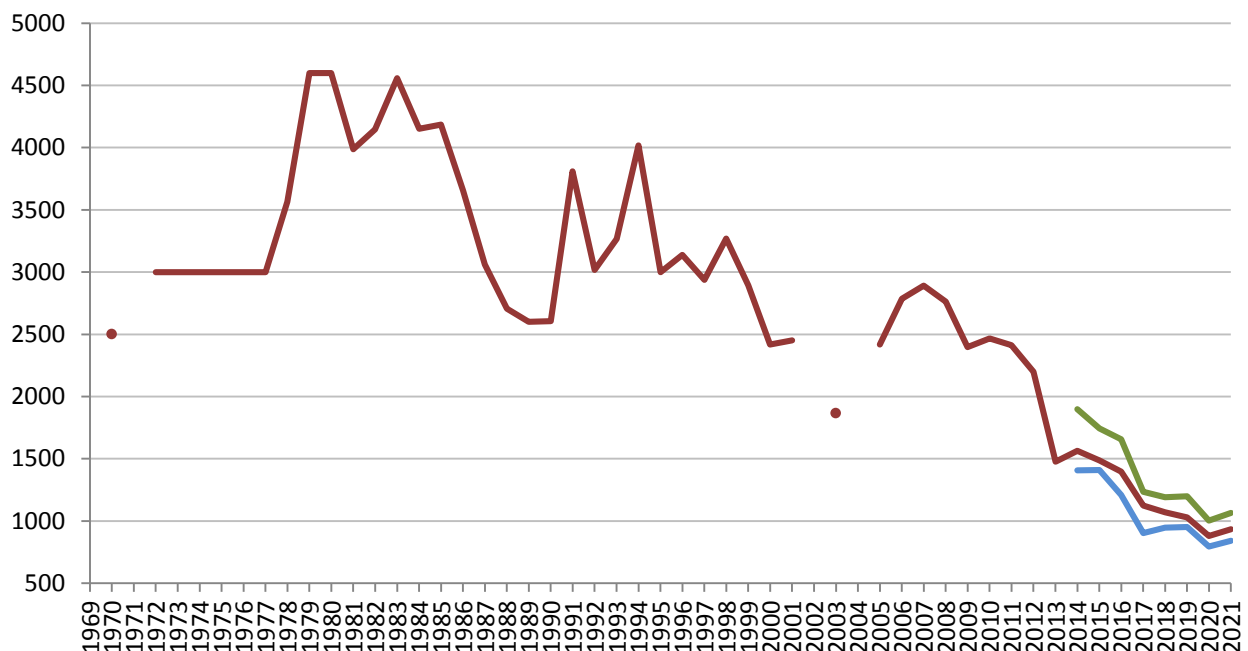
* How many more nests (containing eggs) were present than the number of apparently incubating birds seen (as a percentage).

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

Of the 842 apparently incubating adults counted this year, 125 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 717 apparently incubating birds actually represented a total of 810 nests with eggs (giving a 2021 breeding population estimate of 935); this is the second lowest estimate of the post-War era, a total up on the 880 of last year but down on the 1028 of 2019 and the 2014-2020 mean (1221.1 ±sd 260.1). A mean 2013-2019 correction factor of 1.31 would suggest that the remaining 717 apparently incubating birds actually represented a total of 939 nests (including empty nests); this gives a 2021 breeding population estimate of 1064, a total up on the 1003 of last year but down on the 2014-2020 mean (1417.9 ±sd 341.5). The actual number of breeding pairs probably lies somewhere between these two estimates (935-1064), this assuming that the sward height in 2021 was typical of that seen in recent years.

The total number of Lesser Black-backed Gull breeding pairs 1970-2021. 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 2020-2021 totals are based on the 2013-2019 means.



Lesser Black-backed Gull productivity is typically assessed by entering various colonies to ring as many near-fledglings as possible, the BTO rings becoming marks for a mark/recapture 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 colonies (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 in 2020 and 2021 means that productivity estimates are less accurate (as they are based on corrected vantage point counts). Visits to the Middle Heath and Green Rocks area during early July suggested that 54 near-fledglings had been produced by 63 pairs (the uncorrected vantage point count for this area was 56 pairs); the resulting productivity figure of 0.86 fledglings per pair was the highest inland estimate of the last nine years. The coastal slopes of Purple Cove were investigated for a fifth 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 42 pairs produced a minimum of 39 fledglings, giving a productivity figure of 0.93 fledglings per pair (the 2017-2020 Purple Cove mean is 0.89, with a high of 1.21 in 2018). Between 2017 and 2020, productivity at the latter site 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 colonies are struggling in part due to the intraspecific depredation of small chicks.

Combining data from Purple Cove and Middle Heath suggests that 105 pairs fledged 93 young; a combined productivity figure of 0.89 is the highest estimate of the last nine years, this 217.9% up on the 2013-2020 mean of $0.28 \pm se 0.06$ (there was a high during this period of 0.63 in 2018 and a low of 0.12 last year). It is unclear why productivity was so high this year, however ad hoc observations mirrored the estimate; although fledglings across North Pond and North Plain could potentially have come from anywhere on Skokholm (and possibly elsewhere), a maximum of 136 on 23rd July was the highest July or early August count since 141 were present in 2014 (although it should be remembered that the breeding population has fallen considerably during the same period, the 2014-2020 mean maximum is 104.7, with the lowest three counts occurring between 2018 and 2020).

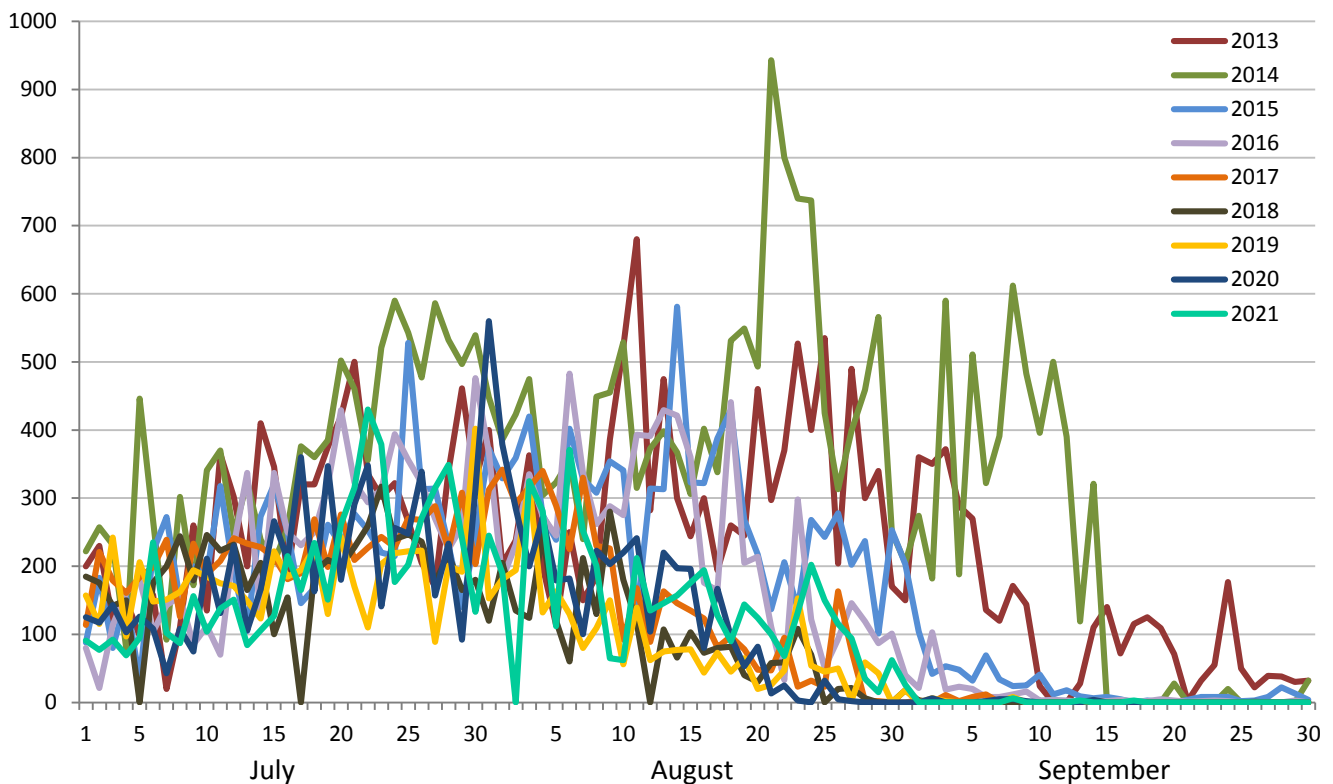


Lesser Black-backed Gull productivity estimates 2004-2021 (where data exists).

2004	2005	2008	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
0.07	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

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 between March and August 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 logged in 2017, 15 dead 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 dead adults in 2019 and 11 dead adults last year (including a very weak and 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). This year saw 14 adults found dead between 6th April and 28th August, an adult on 20th April which had recently lost a leg, a very lethargic adult on 6th June (which had missing feathers and a possible head injury) and a sick adult on 23rd June exhibiting the symptoms noted in 2016; although it is possible that aggressive interactions with other birds may have caused some deaths, disease or poisoning again seems likely.

The number of Lesser Black-backed Gulls roosting on North Plain and in the vicinity of North Pond 2013-2021.



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 430 birds on the 22nd, this down on July peaks of up to 590 logged in each year between 2013 and 2016 and the 560 of last year, but up on those recorded between 2017 and 2019. Despite the higher productivity seen this year, a cumulative July total of 5798 roosting birds was the third lowest to be noted during the same period, a total only up on the 5764 of 2018 and the 5660 of 2019. Whereas roost counts between 2013 and 2017 peaked in August, the last four years have seen a more rapid departure of birds from the Island. This year saw an August peak of 371 on the 6th, this just eight down on that of last year and the second largest August roost since the 483 of 2016 (albeit

well down on August counts between 2013 and 2015 which peaked at 943 on the 21st in 2014). An August total of 4364 roosting birds was up on the 3759 of last year and was the highest tally since the 7306 of 2016 (between 2013 and 2015 the August total ranged between 8903 and 13,849). The last three-figure roost count of the year was the 115 present on 16th August, this the same date as the last of 2017 but up to nine days later than the last such counts made between 2018 and 2020; between 2013 and 2016 the last three-figure roost counts were logged in September. September again proved to be exceedingly quiet, with only 12 roosting birds noted during the entire month; in 2015 and 2016 the September roost total was in three-figures, whilst in 2013 and 2014 it was in four (with a high of 5359 in 2014). A peak October daycount of 26 on the 6th was the highest since the 83 of 2013, however the 79 bird-days logged over 17 dates was down on the 85 of last year and a 2013-2020 mean of 171.5. Sightings on all but five November dates totalled 206 birds and included highs of 18 on the 10th, 43 on the 26th (all roosting at North Pond) and 51 on the 27th (47 at North Pond); the peak daycount was the highest since 2016, but the total was down on the 277 of last November (the highest tally since 1991). Daily sightings during the first five days of December peaked at 23 on the 1st and 25 on the 5th.

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

Originally ringed as a subadult male, CHOUET LANDFILL, GUERNSEY 24th May 2013

Previously recovered as a subadult, FIGUEIRA DA FOZ, COIMBRA, PORTUGAL 8th November 2013

Previously recovered as a subadult, VIL DE MATOS LANDFILL, PORTUGAL 8th November 2013

Previously recovered as an adult, DUMBELL BAY, SKOKHOLM 13th May and 29th June 2016

Previously recovered as an adult, GANN ESTUARY, PEMBROKESHIRE 9th March 2020

Recovered as an adult, PETER'S BAY, SKOKHOLM 14th June 2021

Finding condition Darvic ring read in field

Distance travelled 311km at 320 degrees (NW)

Days since ringed 2944

Ringling recovery GR87994

Originally ringed as an adult, HOME MEADOW GULL TRAP, SKOKHOLM 3rd August 2015

Recovered as an adult, HAVERFORDWEST, PEMBROKESHIRE 13th June 2021

Finding condition Found with open wing fracture and euthanised

Distance travelled 25km at 63 degrees (ENE)

Days since ringed 2141

Ringling recovery GV22403

Originally ringed as a near-fledgling, SKOKHOLM 9th July 2017

Recovered as a fifth-winter, ILHA DESERTA, FARO, PORTUGAL 27th October 2021

Finding condition Dead on beach, leg and ring only

Distance travelled 1652km at 188 degrees (S)

Days since ringed 1571

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. The darvic rings have yielded a fantastic number of field resightings; the 73 ringed birds have produced 177 separate resightings of 38 different individuals away from Skokholm. The following table summarises resightings received since similar tables were published in the 2014-2020 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 subsequent winters. 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 (including 8A:W this September, which had been seen at the same site in September 2017, and 9X:W last September, which had been seen at the same site in September 2014 (see below)).

Darvic	Ring	Location	Country	Date
5E:W	GR98203	Duncannon Beach, Wexford	Ireland	05/01/21*
8A:W	GR98247	Praia da Caparica, Lisbon	Portugal	16/09/21
8U:W	GR98259	Gann Estuary, Pembrokeshire	UK	30/11/21
9E:W	GR98263	Duncannon Beach, Wexford	Ireland	12/01/21*
9X:W	GR98275	Torreira, Aveiro	Portugal	13/09/20 (sic)

*That two birds with such similar ring numbers arrived at the same site within eight days was cause for concern, however it was reported that ‘huge numbers of gulls were present on a bonanza sprat fishery’. Neither had been seen elsewhere before.

Guillemot *Uria aalge*

Gwylog

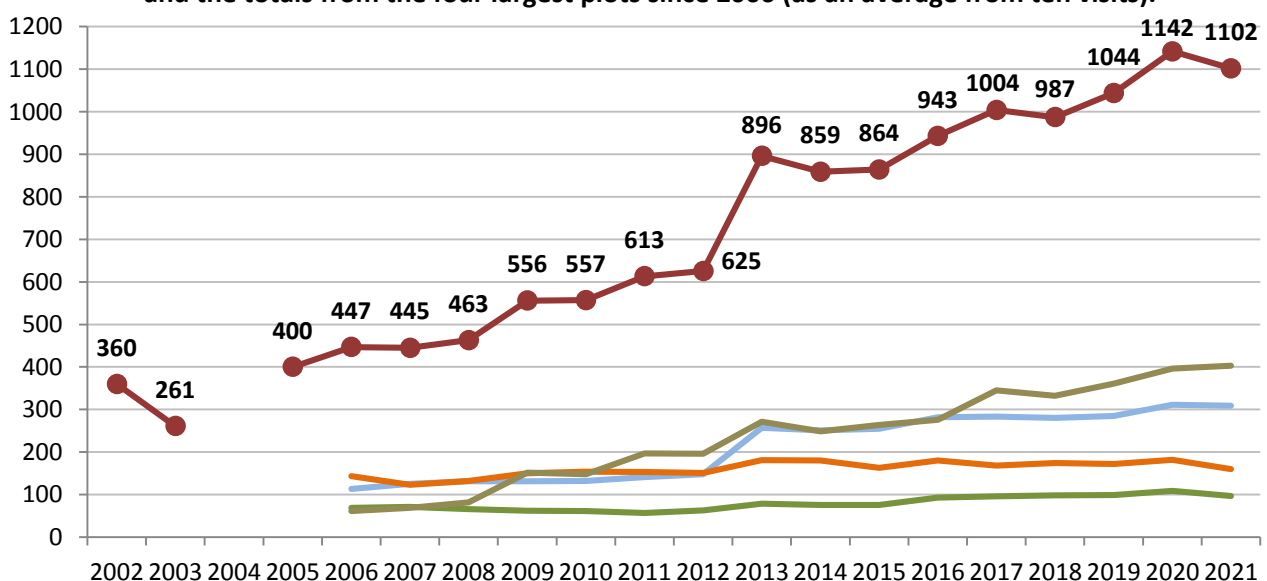
Very Abundant Breeder Common during the period 1928-1996, numbers then increasing rapidly

1 pullus trapped, 3 controls

1936-1976: 1021 trapped, 2014-2020: 5 pulli trapped, 20 controls

There were at least 578 ashore during thick fog on 27th February and 1731 were logged the following day. The mean March daycount was 666, this down on the 725 of last year (when observations began on the 16th); although there were ten dates without a sighting and a further eight dates when between one and 17 were encountered, there were highs of 3195 on the 7th and 2495 on the 30th. Customary departures for the sea continued in April, with 11 dates when counts of less than 600 were logged (including five dates without a sighting and two dates with between one and eight birds present); there were ten similar mass April departures last year, nine during an unprecedentedly early 2019 breeding season and an average of 15.5 between 2013 and 2020 (with a high of 25 in 2013). A minimum of 3725 on the 14th was the second highest April daycount to date, a tally only down on the 3971 logged on the 3rd last year. Over 1000 birds were flushed from the Mad Bay cliffs by the potting vessel ‘Boy’s Pride’ on 19th April; it is unclear what impact disturbance events such as this have on the colony during the pre-laying period.

The total number of adult Guillemot in all six study plots 2002-2021 (as an average from ten visits) and the totals from the four largest plots since 2006 (as an average from ten visits).



The first egg to be found was at Middlerock on 27th April, this five days earlier than a 2013-2020 first egg mean of 2nd May; although nine days later than the first 2019 egg (which was believed to be the

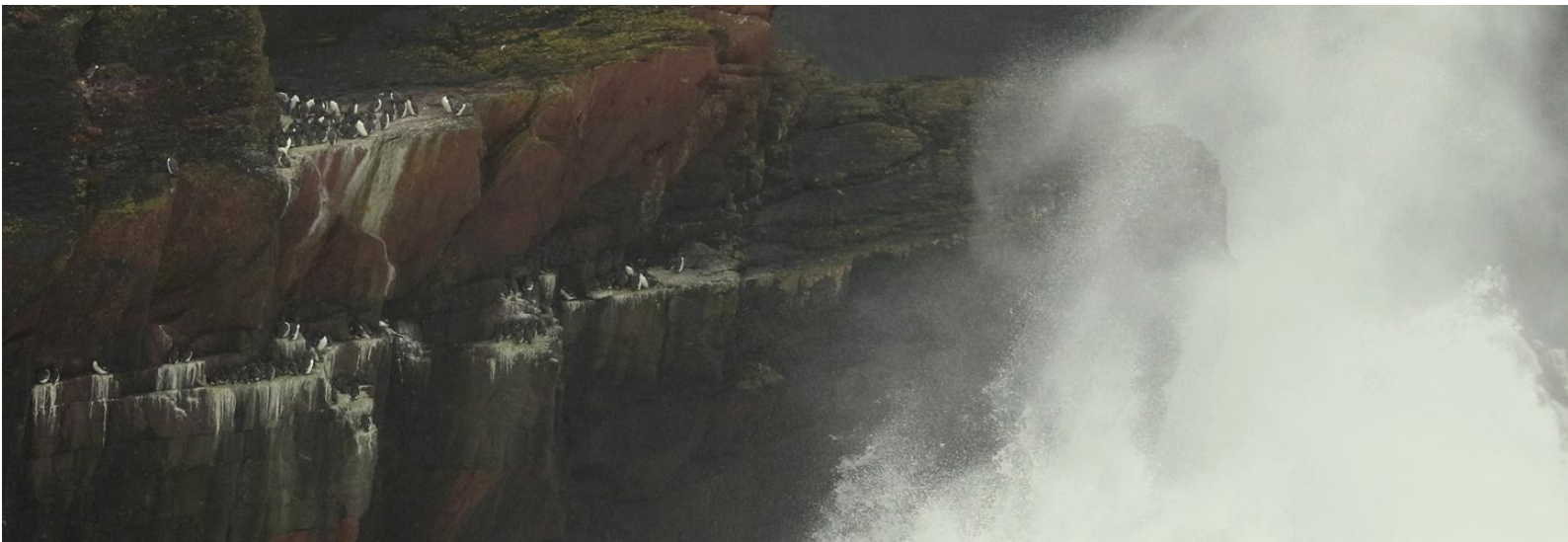
earliest yet recorded in Wales (Birkhead, *pers. comm.*) and perhaps the result of unusually high 2019 sea surface temperatures (Burton, M., 2019)), the first of 2021 matched that of last year as the second earliest of the last nine years (the latest egg during this period, found on 15th May 2014, followed 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 26th 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). The weather during late April and the first half of May was more settled this year, however very strong winds and exceptional 16 metre seas during the 20th and 21st May led to the loss of many eggs from the more exposed ledges; this unseasonable disruption probably altered the number of adults present on at least some areas of cliff during the 2021 survey period.



The six study plots were counted on ten dates between 26th May and 7th June. The mean total from all plots was 1102 adults on ledges; this was 3.5% down on the record 2020 total, but 22.8% up on the 2011-2020 mean (897.7 \pm sd 170.1) and the second highest total yet recorded. Numbers declined significantly in three of the plots; at Middlerock the ten visit mean declined from 58 to 48 (a 17.2% drop which took the total to 16 birds down on the high set in 2015 and 2016), at Guillemot Cliff the mean declined from 182 to 160 (a 12.1% drop which took the total to a new low, 22 birds down on the record set last year) and at Steep Bay the mean declined from 109 to 97 (an 11.0% drop, although the total was still the fourth highest yet recorded at this site). The Little Bay plot contained an average of 309 birds, this almost matching the record 2020 mean of 311. The slope to Purple Cove contained an average of 85 birds, this matching that of last year as the highest mean to date. The North Gully plot contained an average of 403, this 1.8% up on the 396 of last year and a new high. The plots now contain more birds than were present on all of the Skokholm cliffs prior to 2004 and nearly twice the number present in the plots during 2010, whilst the lowest of the ten 2021 plot counts exceeded the highest 2016 plot count. A distinctive yellow billed adult 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.

This was the third time in nine years in which numbers have declined in the plots, although such small declines are perhaps a short-term consequence of the weather conditions and local factors prevalent each year, rather than of a genuine drop in the number of birds looking to occupy these areas; the previous declines were followed by an increase in numbers over the next two years. Recent Skokholm Reports have suggested that some of the study plots (particularly the Middlerock and Guillemot Cliff ledges of Twinlet) are seemingly close to capacity, perhaps in part due to an

increase in Fulmar numbers; it seems possible that in some areas Fulmars will halt any further expansion of auks along their current ledges and they may be excluding auks from previously occupied areas. 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. Interestingly the birds present on the expanding upper edge of the North Gully colony (which still lie within the plot boundary) are perhaps more likely to be disturbed; a Rabbit which ran through this area of the plot on 13th June flushed approximately 20 Guillemot, including one which lost its egg.

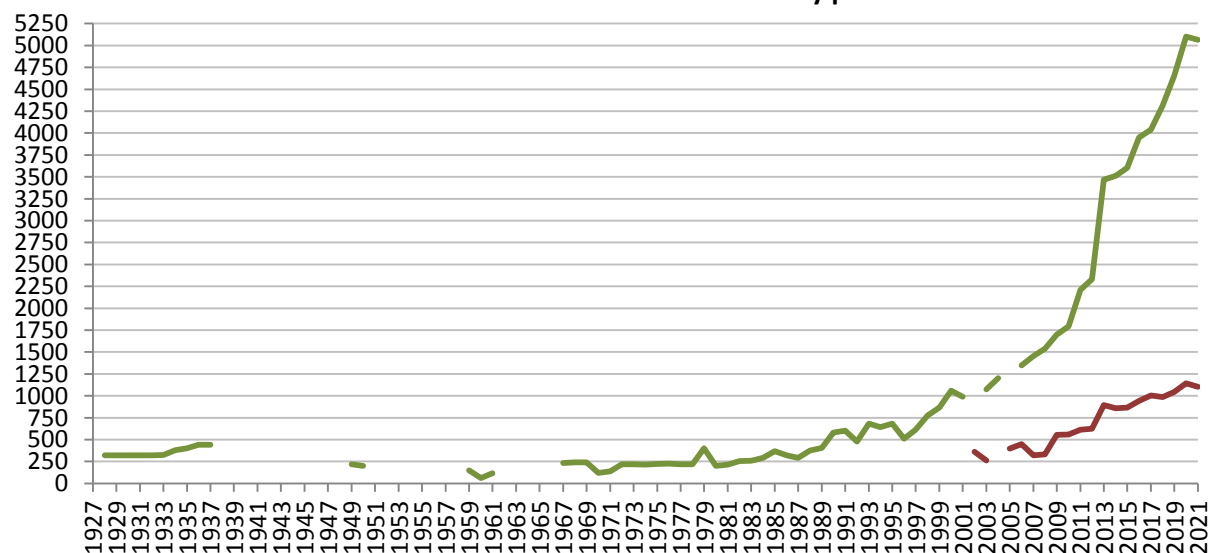


The whole Island totals (adults on ledges suitable for breeding), mean plot totals, the range of totals over ten study plot visits, the standard deviation observed over the ten visits since 2013 and the percentage of the Island total made up of study plot birds 2012-2021.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Island	2330*	3466	3512	3603	3949	4038	4316	4654	5101	5065
Plots	625	896	859	864	943	1004	987	1044	1142	1102
Range	530-746	824-949	797-947	756-939	887-1003	939-1144	937-1060	982-1140	1069-1213	1012-1209
±SD		39.20	54.25	58.30	40.25	57.45	37.38	54.40	50.57	68.55
Plot %	26.8*	25.9	24.5	24.0	23.9	24.9	22.9	22.4	22.4	21.8

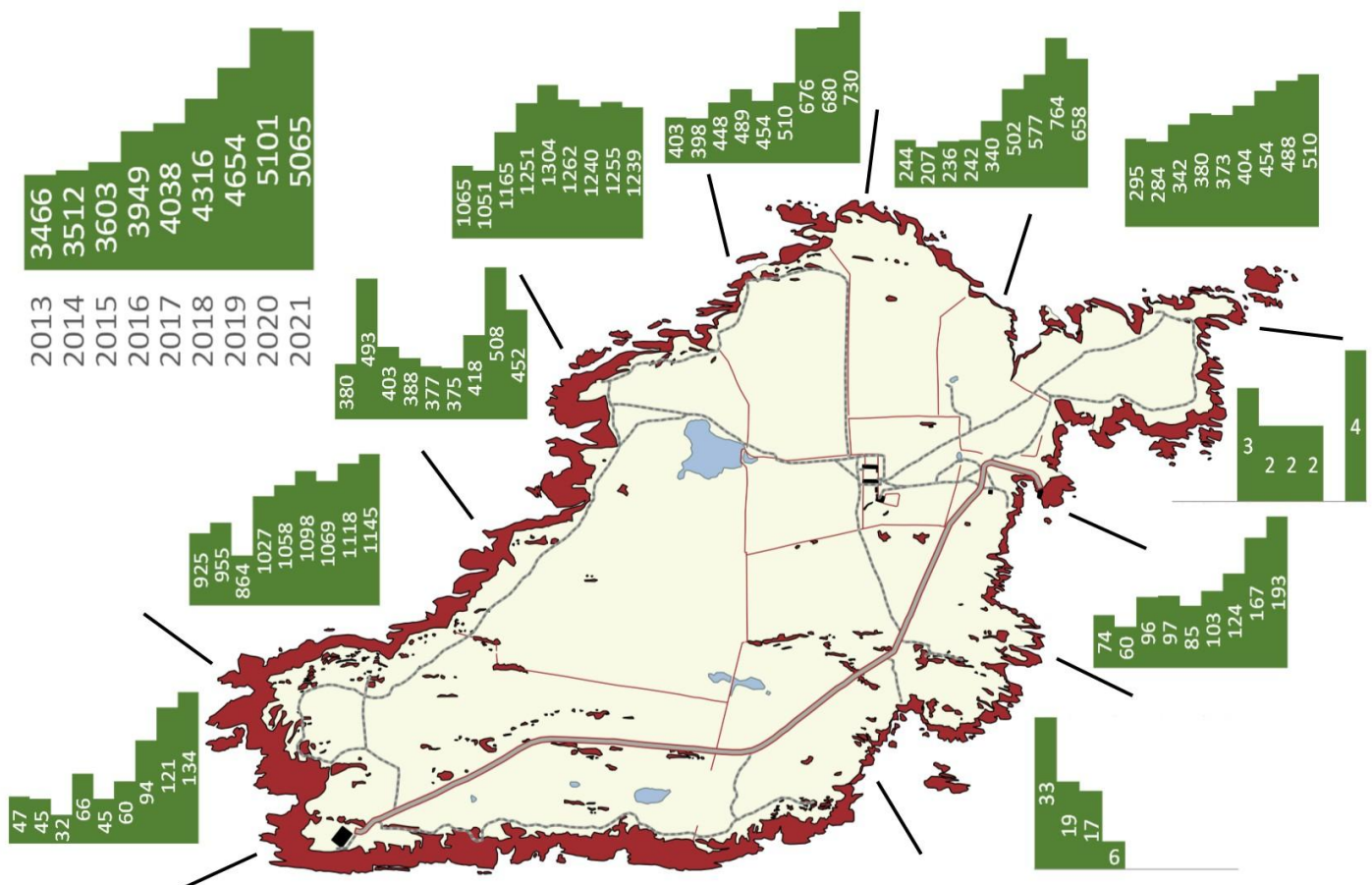
* There was no boat-based count in 2012.

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.



Whole Island counts were made from the land between 28th May and 6th June and calm seas allowed for a boat-based survey on 7th 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. A mean total of 5065 adults in suitable breeding habitat was 0.7% down on the 2020 count, but the second highest tally yet recorded on Skokholm. This was the first time since 2001 in which the mean whole Island count had declined on that recorded the previous year; the 1.3% growth logged between 2013 and 2014 and the 2.3% growth logged between 2016 and 2017 were the lowest increases during this period, whilst mean population growth between 2006 and 2021 was 9.8% per annum. The proportion of the whole Island count made up of study plot birds (21.8%) was down on the 2011-2020 mean of 24.5% and was the lowest since 2008, perhaps suggesting that some of the factors limiting the more intensively studied plots are not impacting the entire Island population in the same way (a 3.5% decline in the plots was higher than that seen across the Island as a whole). However, the Island total is based on fewer visits and only one boat-based survey, meaning that it is more likely to be further from the genuine mean.

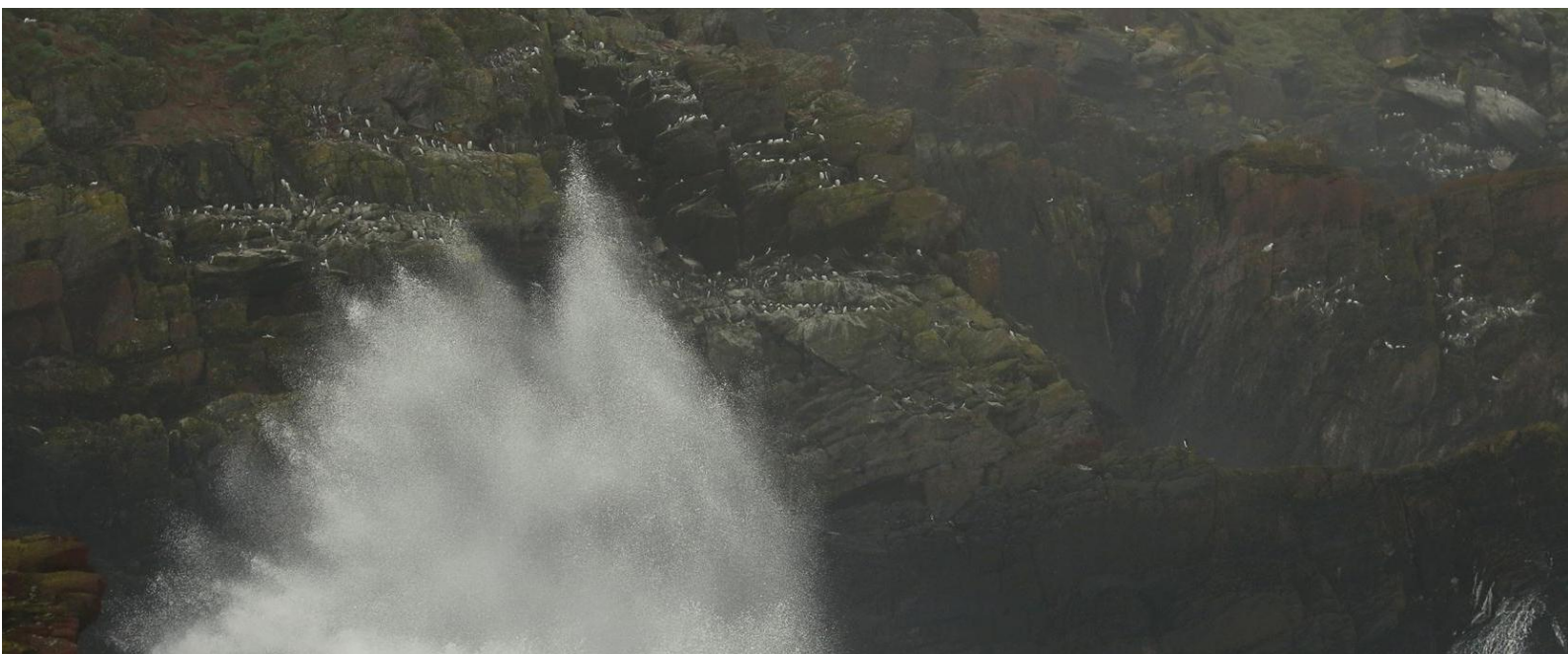
The distribution of Guillemots on suitable breeding ledges 2013-2021.



As can be seen from the above map, the only numerical declines occurred between Purple Cove and Twinlet (56 fewer birds), between the Jogs and the Dents (16 fewer birds) and between Smith's and Far Bays (106 fewer birds). There was an average of 13 more birds around the Quarry, 27 more birds between Wardens' Rest and Fossil Bay, 50 more birds around Little Bay and Little Bay Point, 22 more birds along the north coast of the Neck and 26 more birds in the vicinity of South Haven and Hog Bay. Following a lack of birds in 2020, an average of four occupied a ledge in Peter's Bay. There were no birds occupying the ledges around Crab Bay for a fifth 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 3394 pairs, this 24 fewer than last year.

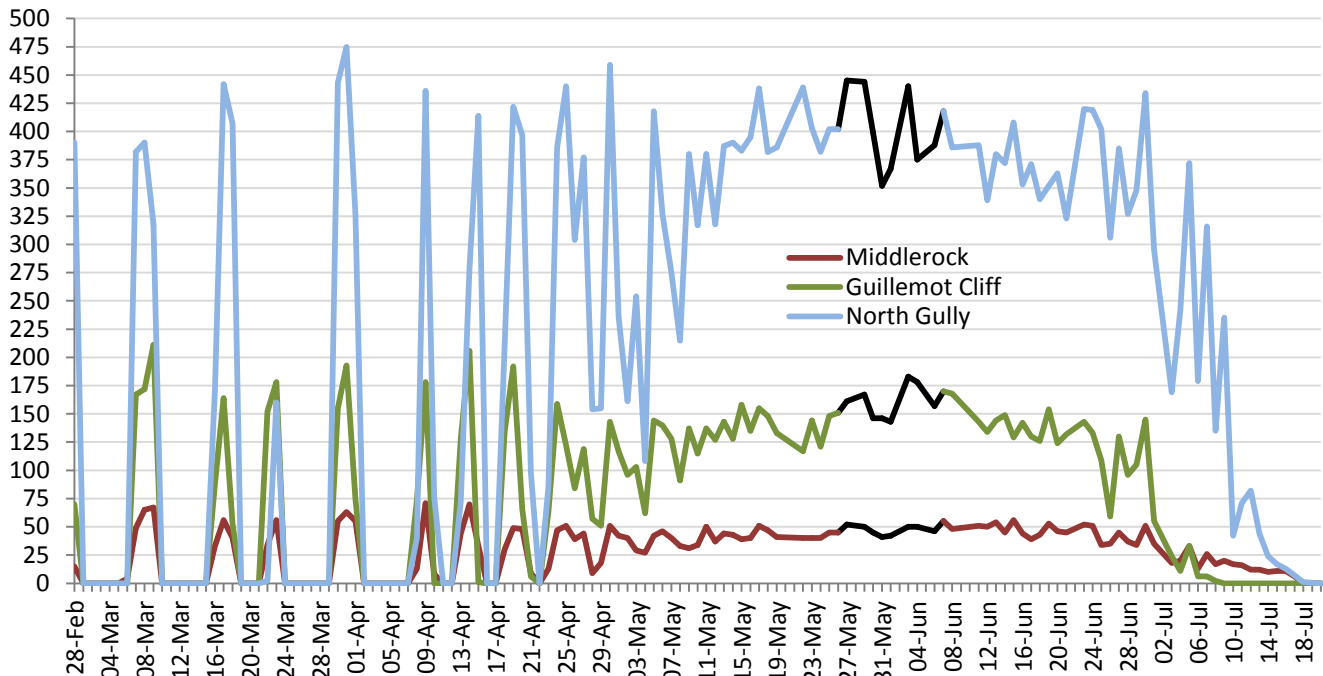
The first egg to be seen this year was still an egg on 26th May, whilst the first chick of the year was present on an adjacent Middlerock ledge three days later (when it could not be confirmed if the first egg had hatched); this was one day later than the first chick to be seen last year, but six days earlier than the 2013-2020 mean (the earliest chick during this period was logged on the 23rd in 2019, whilst the first chick of 2014, the year following the severe winter auk wrecks, was on 13th June). Productivity, calculated at between 0.55 and 0.61 jumplings per pair in 2013 and 0.6 in 2007, was not assessed in 2021 following recommendations from the Islands Conservation Advisory Committee. Chicks were jumping from the third week of June and the number of adults recorded in the three regularly monitored plots dropped from 615 on the 23rd to 545 on the 25th, 400 on the 26th, 211 on 3rd July and 154 on 8th July (see chart below).



There were the usual late spikes in the number of Guillemot occupying the plots, with the total in the three monitored plots increasing from 198 on the 6th to 348 on the 7th and from 154 on the 8th to 255 on the 9th; similar late season returns occur each July. Between the 8th and 9th July, the number of adults in the Guillemot Cliff plot dropped from two to zero; the last birds had departed Guillemot Cliff by the 6th last year, the 3rd in 2019, the 14th in 2018 and the 5th in 2017. The number of birds in the Middlerock plot dropped from 11 on the 16th to six on the 17th and zero on the 18th; Middlerock was deserted on the 17th in 2020 and 2018, on the 6th in 2019 and on the 9th in 2017. Counts at North Gully dropped to seven on the 17th, one on the 18th and zero on the 20th; North Gully was deserted on the 15th last year, the 16th in 2019, the 20th in 2018 and the 17th in 2017. This was thus the seventh year of the last eight in which birds have remained for longer at North Gully; although the larger breeding population at North Gully probably accounts for the typically later departure, the last five years have seen the last birds depart Guillemot Cliff before Middlerock (this despite the larger population at Guillemot Cliff). Whole Island counts mirrored those made at the plots, with Steep Bay the only site to see birds ashore after the 22nd; 15 birds were still ashore on the 23rd, there were 13 two days later, six on the 26th and six on the 27th were the last to be seen on land this breeding season (this six days later than the 2013-2020 last bird mean, with two on 16th July 2019 the earliest last birds and six on the 27th in 2013 the latest (equal with those of this year)). Up to six

were seen at sea on a further four dates to the end of July and in August there were records on just ten dates, totalling 121 bird-days and with peaks of 45 on the 5th and 36 on the 8th; the August bird-days total was the lowest since the 47 of 2016 and well down on totals of between 1129 and 3841 logged in the three years between 2018 and 2020 (a total of 178 in 2017 was the previous August high, however a boat trip four miles offshore that year revealed hundreds of rafting Guillemots).

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



September counts are rarely high (the record bird-days totals remain the 563 of 2014 and the 1419 of 2018), however this year saw sightings on only ten dates tally just 44 birds; the 2011-2020 mean is 291, with only one total during this period being down on that of 2021. However, there were an additional 1261 distant, unidentified auks logged during September, this the second highest total in this month (only down on the 2613 of 2018). Sightings of up to 135 Guillemots on 14 October dates totalled 519 bird-days, this the highest October tally to date (the previous high was the 123 of last year); this increase reflected an unprecedentedly early return to the cliffs (see below). An additional 7951 unidentified auks were logged during the same period, this including a record daycount of 3569 on the 3rd and by far the highest October tally to date (the previous high being the 2055 of 2016). There was again a staff presence throughout November, with sightings on 20 dates and highs of 539 on the 8th and 538 on the 9th taking the bird-days total to 2647; the peak November daycount was only down on the 790 of 2015 and the 785 of 2019, whilst the bird-days total was only down on the 3441 of 2019. An additional 3026 distant auks were noted during November, this total only down on the 3985 of 2019 and the 3038 of 2020. Given the increase in the 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 16th November in 2013 and 24th November in 2014. However birds have been seen ashore in six of seven subsequent Novembers, with 2017 the only year without a record (when staff departed on the 9th). This season saw 129 birds ashore above the Jogs on 23rd October, this seemingly the earliest ever return to the Island; there were 125 ashore on 5th November last year, with the only earlier landfalls being of birds on 27th October in 1999, on 3rd November in 2016 and on the 1st and 4th November in 2019. There were landfalls on the next three October dates (with a high of 62 above the Jogs on the 25th) and on nine November dates, with birds at Guillemot Cliff and

Steep Bay on the 6th the first ashore at a site other than above the Jogs. There were highs of 375 ashore on 8th November (across four sites) and 511 the following day (across six sites). No birds were ashore during the first five days of December. 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 green darvic with white 69K, Right leg N00620

Originally ringed as a pullus, THE AMOS, SKOMER ISLAND, PEMBROKESHIRE June 2005

Previously recovered as an adult, SKOMER ISLAND, PEMBROKESHIRE four times in 2009

Previously recovered as an adult, SKOMER ISLAND, PEMBROKESHIRE 11 times in 2010

Previously recovered as an adult, SKOMER ISLAND, PEMBROKESHIRE seven times in 2011

Previously recovered as an adult, NORTH GULLY, SKOKHOLM 5th May 2014

Previously recovered as an adult, NORTH GULLY, SKOKHOLM 29th April 2015

Previously Recovered as an adult with a chick, NORTH GULLY, SKOKHOLM 21st June 2020

Recovered as an adult, NORTH GULLY 8th April 2021

Finding condition Colour ring read in field

Distance travelled 4km at 163 degrees (SSE)

Days since ringed 5762 (approximately)

Razorbill *Alca torda*

Llurs

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

35 pulli trapped, 1 retrapped

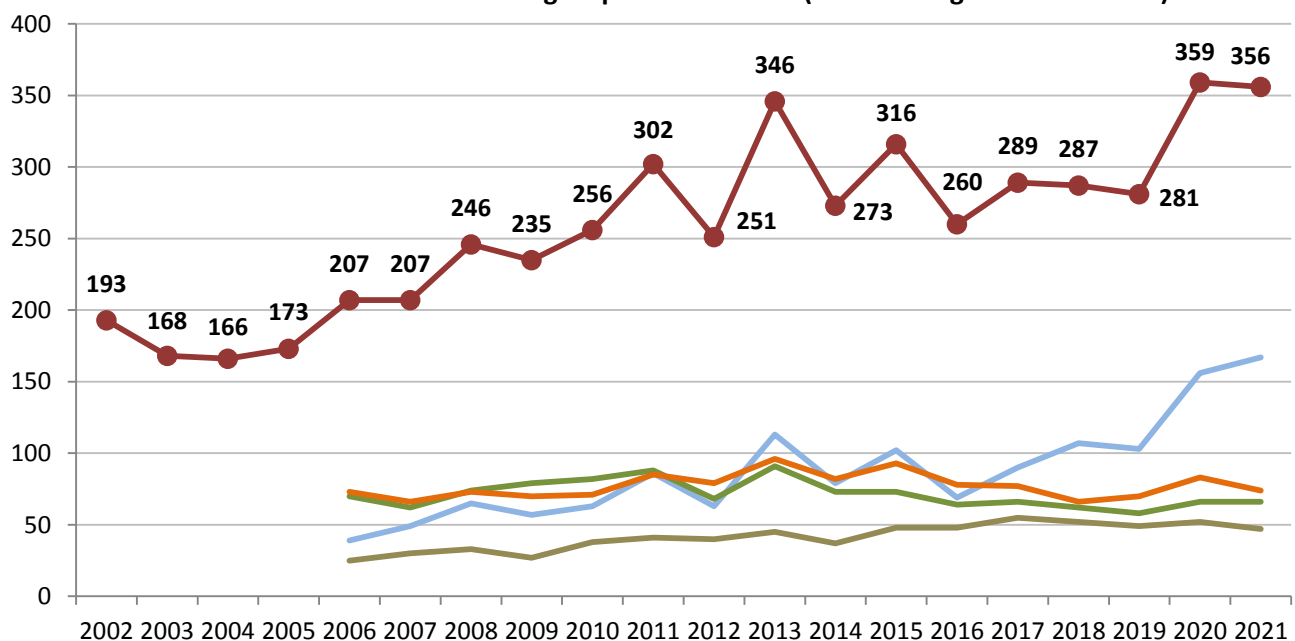
1931-1976: 9705 trapped, 2013-2020: 286 trapped, 7 retrapped, 4 controls

There were sightings on the last three days of February and on all but five March dates, with highs of 1929 on the 7th and 1665 on the 16th, but eight further dates with fewer than 13 noted; the majority were at sea, with 1038 on the 7th and 779 on the 8th the highest counts of birds ashore. There were three March dates on which 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 1811 on the 8th (924 of

which were at sea) and 1816 on the 14th (1065 at sea), but lows of between zero and ten on six dates between the 2nd and 11th. The number on the cliffs increased steadily from 17th April and the first egg to be seen was being incubated at North Gully on the 24th; although five days later than the first of 2019 (an exceptionally early egg which was probably the result of unseasonably high sea surface temperatures) and one day later than the first of last year, this was earlier than any egg laid prior to 2019 and was five days earlier than the 2013-2020 mean (the latest first egg during this period was found on 13th May 2014, this no doubt a consequence of the winter storms preceding that breeding season). The majority of eggs were produced during early May, with 76% of Neck plot pairs and 77% of North Gully plot pairs having eggs by the 7th.



The total number of adult Razorbill in all six study plots 2002-2021 (as an average from ten visits) and the totals from the four largest plots since 2006 (as an average from ten visits).



The weather between the 20th and 21st May was extreme, 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, very unseasonable, waves of at least 16 metres. A check of the

Neck plot on 22nd May revealed that 17 pairs (58.6%) had lost eggs since the 18th, whilst two pairs at North Gully lost eggs during the same period (6.5%). This was the second consecutive year in which a May storm has had a significant impact on the breeding Razorbills; the 2020 storm resulted in similar losses, with 60% of Neck pairs losing their eggs, but just one (or possibly two) of the North Gully eggs being lost. Inevitably such untimely losses impact the number of adults on ledges during the usual whole Island and study plot count period; the period following the egg losses again saw an increase in the number of adults present in some areas, however counts at the start of the survey period were down on those made in the week prior to the storm (perhaps due to females egg forming elsewhere or the abandonment of the colony by failed pairs which did not re-lay). Given these fluctuations in the number of birds present, it might be expected that the range in study plot counts (and the standard deviation given in the table below) might be higher than usual; this was indeed the case, although both values were down on those logged during a 2019 season which saw a run of unsettled weather. The counts are inevitably affected by the weather; 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 nine years (see table below)). It is possible that some higher counts, and thus the higher standard deviation observed in some years, are due to ameliorating rough weather encouraging more birds to the cliffs; there is seemingly a trend for the highest plot counts to occur following rough non-survey days.

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 since 2013 and the percentage of the Island total made up of study plot birds 2012-2021.

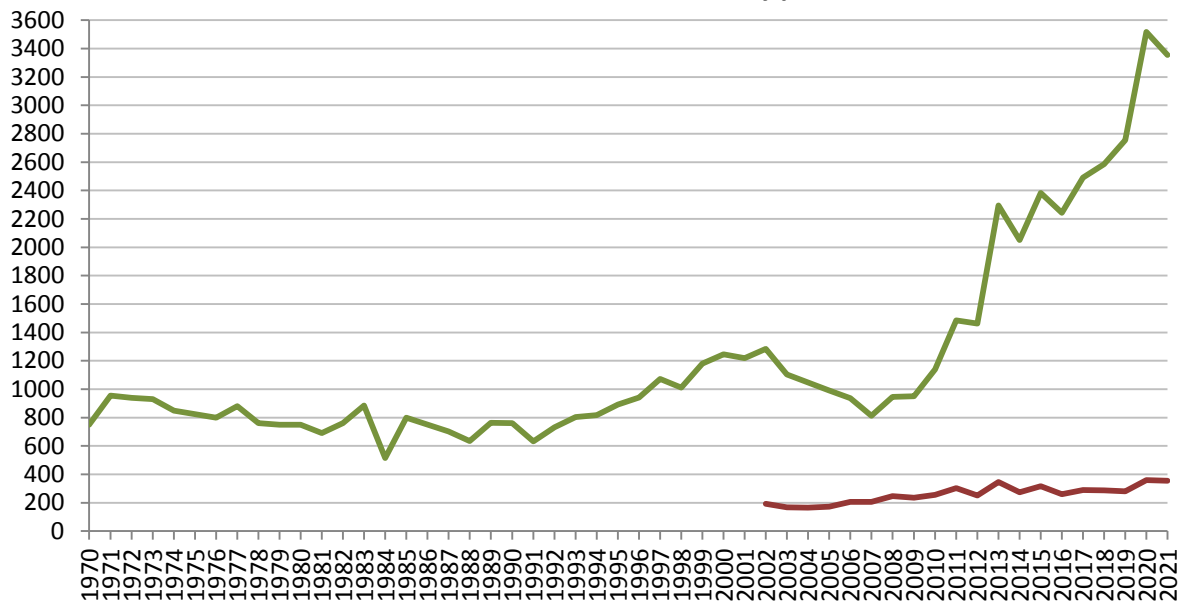
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Island	1463*	2294	2052	2382	2242	2491	2585	2755	3517	3356
Plots	251	346	273	316	260	289	287	281	359	356
Range	164-338	301-397	254-315	291-346	236-324	253-334	263-309	230-351	312-395	312-411
±SD		30.54	19.96	15.78	26.58	25.61	13.25	40.82	30.72	34.06
Plot %	17.2*	15.1	13.4	13.3	11.6	11.6	11.1	10.2	10.2	10.6

* There was no boat-based count in 2012.

The six study plots, established in 2002, were visited on ten dates between 26th May and 7th June when every adult in suitable breeding habitat was counted. The mean single visit total of 356 adults on ledges was three (0.8%) down on that logged last year but the second highest total to date, 20.1% up on the 2011-2020 mean (296.5 ±sd 35.1). The largest numerical increase was again seen at Little Bay where the mean rose by 7.1% from 156 to 167; this was a new high for this site. An average of two birds were present on the Steep Bay ledges, this becoming only the third year of the last nine in which birds were present on enough occasions to register (there was a mean of two in 2014 and one in 2016). The Middlerock mean remained at 66, this matching that logged in 2017 and 2020 as the highest since the 73 of 2015 (albeit being well down on a high of 91 in 2013). There were nine fewer birds logged on Guillemot Cliff, a total of 74 being the third lowest of the last nine years and well down on highs of 96 in 2013 and 93 in 2015. There were five fewer birds at North Gully, a total of 47 being the lowest since a 2014 mean of 37. A mean of one bird joined the Guillemot ledge on the slope to Purple Cove; although up to two birds have been seen at this site on at least one date in each year since 2013, only singles in 2013 and 2014 and two in 2020 have been present regularly enough to register on the ten visit mean. The 84.5% increase in the number of birds occupying the plots since 2002 has thus primarily been driven by a jump in the number seen in Little Bay; the Little Bay total has increased by 128 birds (328%) since 2006 (the blue line on the above graph). A smaller 88% increase has been seen at the North Gully plot during the same period (the grey line on the above graph). 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; it is possible that rough weather in 2020 and 2021 (as

documented above) impacted this area more than the other plots. Quite why the Twinlet plots have declined in recent years, particularly given the general upwards trend seen at Little Bay, North Gully and across the Island as a whole, is unclear. A possible factor is that the Twinlet study plots are areas shared with Fulmars, this a species currently increasing on Skokholm as a whole; the total number of apparently occupied Fulmar sites in the Middlerock and Guillemot Cliff plots was six in 2013 and 12 in 2021, this increase perhaps leading to competition with Razorbills for space within the confines of the plot boundaries.

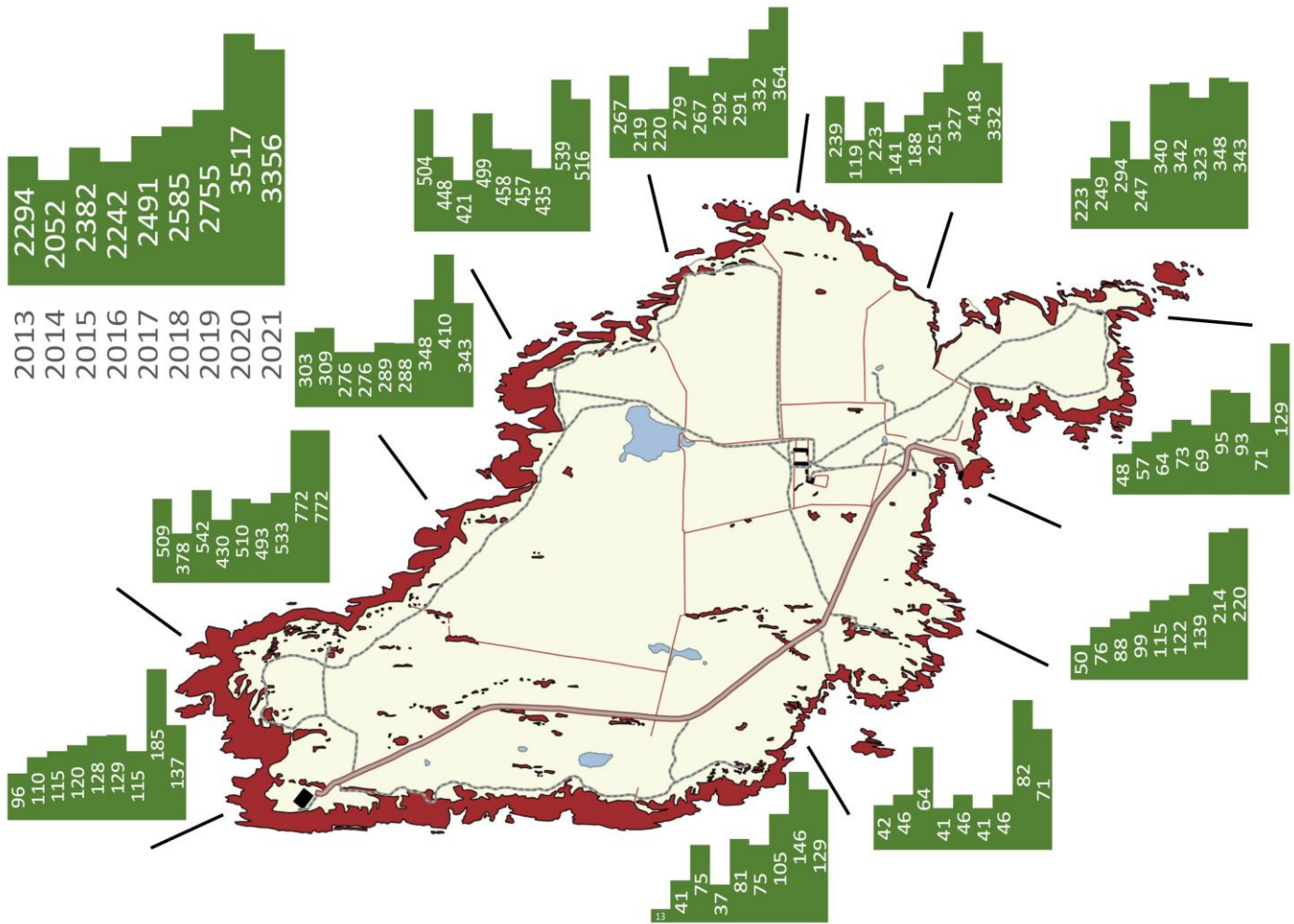
The total number of Razorbills (adults on ledges suitable for breeding) recorded on Skokholm since 1970 and the number of birds within the study plots since 2002.



Whole Island counts were made from the land between 28th May and 6th June, whilst a boat-based count was possible on 7th June. This was the ninth 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 2021 whole Island mean of 3356 adults in suitable breeding habitat was 4.6% down on the 3517 logged in 2020 but the second highest total yet recorded on Skokholm (44.2% up on the 2011-2020 mean of 2326.7 ±sd 599.4). The significantly higher numbers recorded in the last two years are perhaps in part due to the number of pairs impacted by huge seas shortly before the start of the survey period (see above), conditions which may also have changed the behaviour of non-breeding birds. Given that the ten visit study plot mean also declined (albeit only by 0.8%), the drop 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. Although any decline in numbers is cause for concern, similar drops were noted in 2014 and 2016, both followed by a record total the following year. Indeed it should be noted that some single visit counts (for example combined plot totals of 402 on 3rd June and 411 on 6th June) were the highest to date.

As can be seen from the map below, the number of adults present did not decline in all areas; there was an average of 32 more birds located in the vicinity of Little Bay and Little Bay Point, 58 more birds around the southerly portion of the Neck and six more birds between South Haven and Hog Bay. The average number of adults between Wardens’ Rest and Fossil Bay matched the 2020 record. However there were 48 fewer in the vicinity of the Quarry, 67 fewer between Purple Cove and Twinlet, 23 fewer between the Jogs and the Dents, 86 fewer between Smith’s and Far Bays, five fewer to the north of the Neck, 11 fewer around Crab Bay and 17 fewer along the South Coast.

The distribution of Razorbills on suitable breeding ledges 2013-2021.



Productivity monitoring was undertaken for a ninth consecutive year. There are some concerns among ICAC members that recent Pembrokeshire productivity estimates have been quite low (on Skokholm ranging between 0.21 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 29 incubating pairs were mapped between the 2nd and 16th May, one the ledges around North Gully where 31 pairs were mapped between 24th April and 18th May and one an area among the Bluffs boulders where 54 egg sites were marked on 7th May.

The first chick to be seen anywhere on Skokholm was found in the North Gully productivity plot on 27th May; this was four days later than the first of last year, but six days earlier than the 2013-2020 mean (which is 2nd June, with the earliest on 18th May 2019 and the latest on 15th June 2013). The North Gully plot saw ten egg stage failures (of which three pairs re-laid, one again failing at egg or small chick stage and two producing jumping age chicks), two failures at egg or very small chick stage (ledges were found empty, with no indication as to what had happened) and one failing at chick stage. There were 18 pairs successful at the first attempt. The resulting productivity value of 0.65

jumplings per pair was down on the 0.76 of last year and the 0.71 of 2019, but up on the 0.62 of 2018 and the 0.58 of 2017 (the 2017-2020 mean is $0.67 \pm se 0.03$). At the Neck there were 22 egg stage failures (including the 17 seemingly lost during the May storm), two chick stage failures and five pairs produced jumping age chicks at the first attempt; of the pairs which failed with their first egg, 12 re-laid, five of which again failed at egg stage, two of which failed at egg or small chick stage, three of which failed at chick stage and two of which produced jumplings (both of which departed between the 25th and 26th July). Thus only seven chicks attained jumping size at the Neck; the resulting productivity figure of 0.24 was very similar to the storm impacted 0.21 of 2020 and down on a 2013-2020 mean of $0.40 \pm se 0.11$ (productivity at this site is very variable, with highs of 0.86 in 2018 and 0.77 in 2013, but lows of 0.14 in 2017 and 0.03 in 2016). The combined productivity estimate for cliff nesting pairs was 0.44; this was down on a 2017-2020 mean of $0.56 \pm se 0.06$ and the lowest combined cliff estimate since the 0.36 of 2017.



Among the Bluffs boulders seven pairs failed at egg stage, ten pairs failed with eggs or small chicks (crevices were found empty, with no indication as to what had happened) and eight pairs failed with chicks (four went missing at between eight and ten days of age, three went missing at between 13 and 16 days and one was found dead at 16 days). Two pairs produced a second egg, both of which again failed at egg stage. Thus 29 pairs produced a jumpling, this equating to a productivity value of 0.54 per pair. The 2021 productivity estimate was down on the 0.71 of 2020, but matched both that of 2019 and a 2013-2020 mean of $0.54 \pm se 0.05$ (lows during the period were of 0.29 in 2015 and 0.44 in 2014, whilst 0.74 in 2016 was the only value up on that of last year). For a ninth year running, the last of the breeding attempts within the boulders were concluded before the last of the attempts on the cliffs. Of 20 chicks examined at the Bluffs, two had 'winter-plumage' white throats (below left photograph) and 18 had 'summer-plumage' black throats (below right photograph).

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 0.47 jumplings per pair and the latter 0.49. Primarily as a result of the disappointing productivity recorded at the Neck plot, the 2021 estimate was down on that seen in each of the last three years, but was close to a 2013-2020 mean of $0.49 \pm se 0.06$ (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).

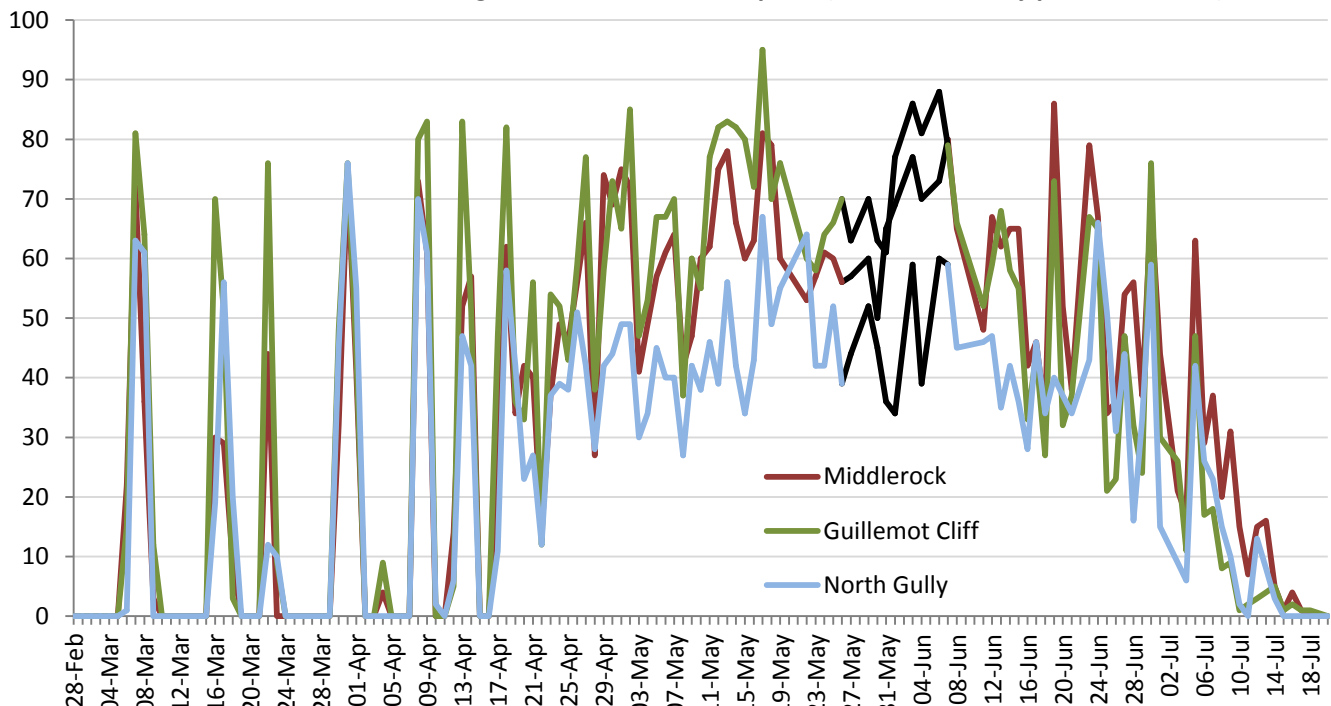


In an effort to ascertain the pattern of colony attendance, near daily counts were made at three of the plots throughout the breeding season (see chart below). There were again fluctuating numbers in all three subcolonies following the usual count period and regular peaks when the totals were augmented 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 14th June; although six days later than the first of last year (the earliest successful jumpling to date) and five days later than the first of 2019, this was three days earlier than the 2015-2020 mean (between 2015 and 2018 the first productivity plot chick jumped between the 20th and 26th June). The number of adults within the three plots declined during June, with only double-figure totals logged from 6th July (the 2014-2020 mean is 8th July, ranging between 30th June in 2019 and 17th July in 2014) and single-figure counts from 15th July (the 2014-2020 mean is 19th July, ranging between 9th July in 2019 and 27th July in 2014). Whereas all of the Bluffs study chicks had departed by 1st July, 12 of 29 attempts at the Neck plot and two of 31 attempts at the North Gully plot were still active on 6th July (these primarily second attempts following the May storm). The last North Gully chick jumped between the 18th and 20th July and the last two successful Neck plot chicks jumped between the 25th and 26th. Despite the early start to the 2021 breeding season, there were single-figure counts of adults ashore each day from the 25th until 29th July, with one to the west of the Jogs on the latter date the last to be seen; the 2013-2020 mean last adult ashore date is 27th July, with the earliest last date being 24th July in 2015, 2016 and 2017 and the latest being 2nd August in 2018.

There were sightings of Razorbills at sea on just four August dates (all between the 3rd and 8th), with a high of 14 on the 5th taking the bird-days total to 29; both the peak daycount and bird-days total were the lowest since those of 2016, the total well down on all-time highs of 392 in 2018, 158 in 2019 and 575 last year. Counts on just seven September dates, with a high of 16 on the 24th, led to a similarly disappointing bird-days total of only 32, this the lowest tally in this month for seven years; three of the four highest September bird-days totals have been recorded in the last five years, with a high of 1708 logged in 2017. Although October also began quietly, birds became more regular from the 20th, with highs of 164 on the 22nd, 104 on the 23rd and 67 on the 25th taking the bird-days total to 392; there have only been three higher daycounts and four higher totals in October (daycounts of

up to 763 led to a record total of 1224 in 2019). A daycount of 76 on the 24th was the second highest to be logged in November, only down on the 82 of 2016, whilst a bird-days total of 117 was the fourth highest tally in this month (between 167 and 228 were logged in each year between 2016 and 2018). Given recent increases in the size of the Skokholm breeding population, it is perhaps no surprise that unprecedented numbers have been logged in recent autumns. There were however no Razorbills seen ashore for a ninth successive November, this seemingly an auk behaviour confined to Guillemots 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 1261 in September, 7951 in October, 3026 in November and 198 in the first five days of December, with a peak of 3569 on 3rd October which was the highest autumn daycount to date (the ten highest daycounts have come in the last eight years).

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



Puffin *Fratercula arctica*

Pâl

Very Abundant Breeder

112 trapped, 4 retrapped, 217 resighted

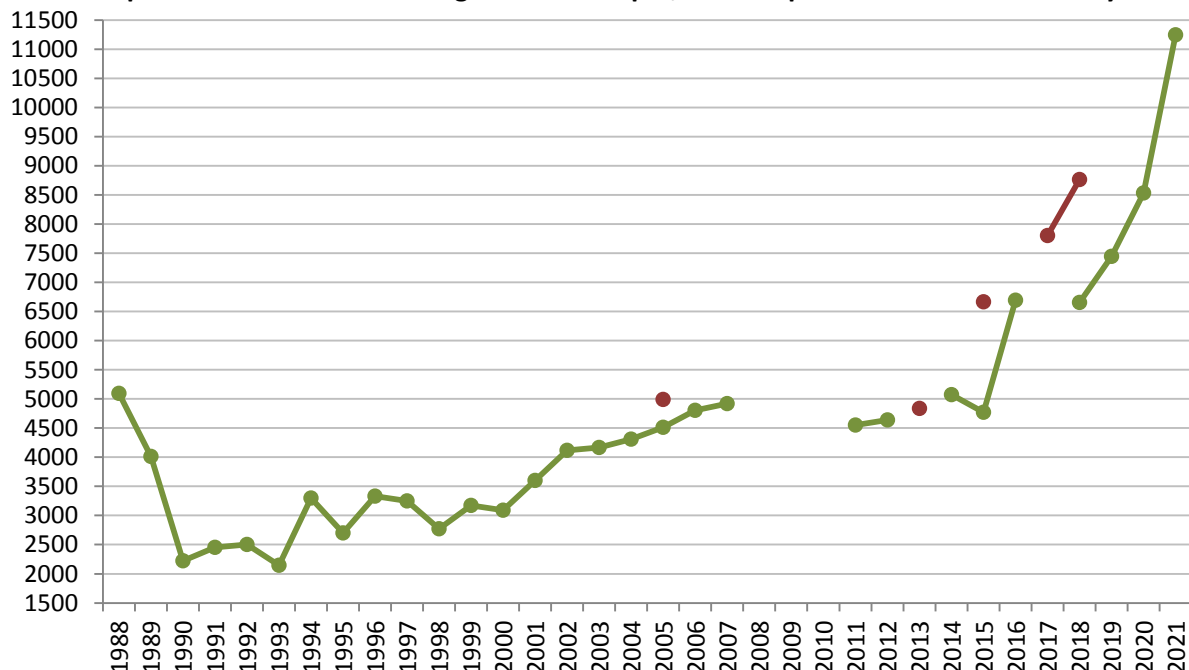
1936-1976: 5412 trapped, 2011-2020: 560 trapped, 25 retrapped, 1625 resighted, 1 control

There were singles off Little Bay Point, North Haven and South Haven on the morning of 7th March, with 19 recorded at the latter site during the early afternoon (numbers reduced as the afternoon went on); this was the most to have been recorded this early in the season, with the only earlier sightings being of one on the 1st and four on the 6th in 2019. There were 11 present the following day and 204 on the 9th, although there were no further sightings for five days; these were all earlier than anything logged prior to 2019, with four on the 12th in 1982 the earliest pre-2019 March record. Following 48 on the 15th, there were sightings on each March date bar the 19th and 26th, with a mean daycount of 1698 and highs of 6531 on the 21st, 11,245 on the 22nd and 3810 on the 30th which took the March bird-days total to 29,098; the three highest March totals have occurred in the last three years, with 23,633 bird-days recorded in 2019 and 20,240 last year. The first two birds to be seen ashore were to the north of Spy Rock on 21st March, this five days earlier than the 2013-2020 first landfall mean; the latest landfall during this period was on 6th April in 2013, whilst landfalls on 19th March in 2019 and 17th March in 2020 are the only records earlier than that of this year. 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, however COVID-19 dictated staffing shortages meant that this was not an option in 2020 and 2021 (see the 2013-2019 Seabird Reports for charts showing spring attendance around the Neck). The impetus for the whole Island count on 22nd March was thus an assessment of the (remarkable) number of birds rafting in and around South Haven.



The maximum Puffin daycount recorded each spring during the period 1988-2021. Green points represent counts made during March and April, maroon points counts made in May.



The 22nd March survey produced a total of 11,245 birds (to the north there were 2133 on the sea, 309 in the air and 443 on land, to the south 3599 on the sea, 184 in the air and 1371 on land and around the Neck there were 2600 on the sea, 200 in the air and 406 on land); although numbers are still well down on Lockley's spring estimates of approximately 40,000, this was the highest post-War spring count, up on the 10,000 logged on nine occasions between 6th April 1950 and 22nd April 1953. Although the whole Island counts provide a relatively consistent long-term method for monitoring the trend in numbers, how the totals reflect the Skokholm breeding population is difficult to ascertain. Monitoring work at the Crab Bay study plot revealed 76 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 1520 pairs for Crab Bay (as active burrow distribution is apparently quite even). A predicted Crab Bay total of 3040 individuals is close to the 2961 counted during the 22nd March whole Island count, however this is rarely the case; there were 1637 birds counted in Crab Bay in 2020 (when monitoring work suggested 2880 should be present) and 1851 in 2019 (when monitoring work suggested 3000 should be present).



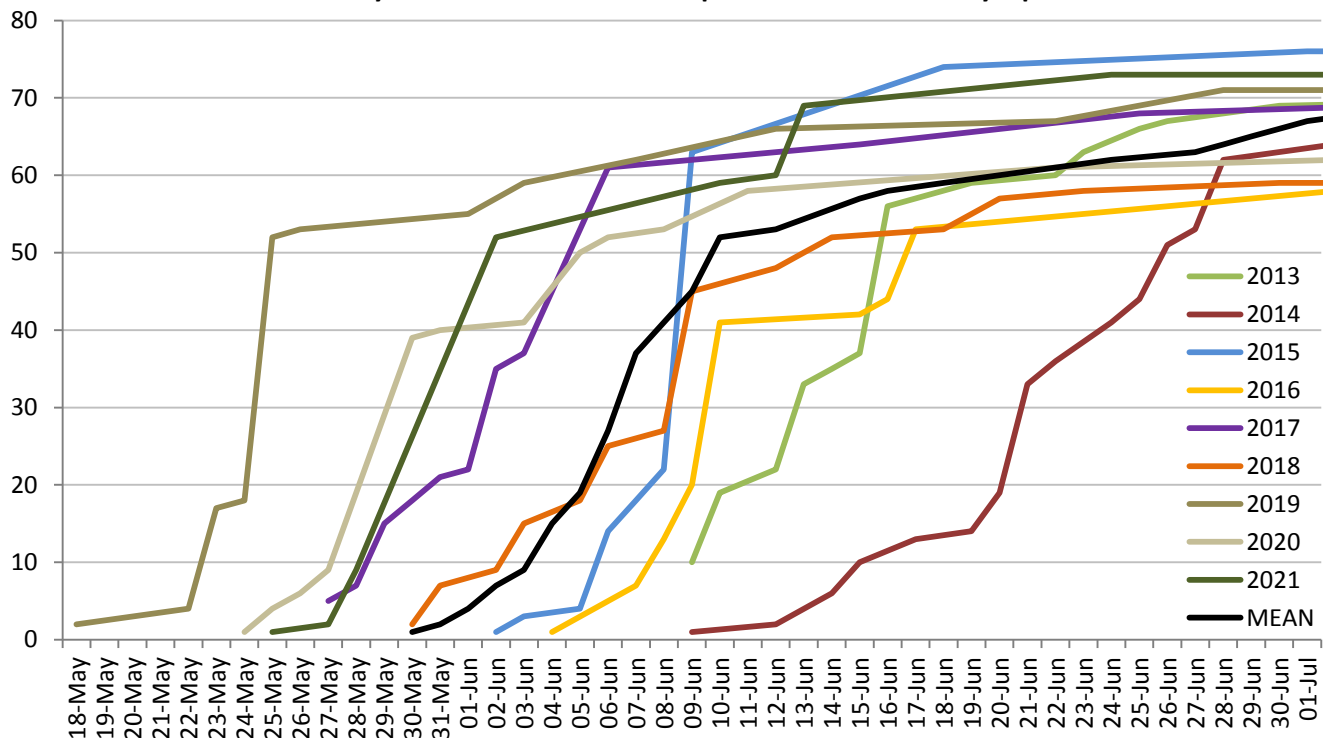
A productivity plot established at Crab Bay in 2013 was used for a ninth season. The majority of the 100 burrows individually numbered in 2013 were again used this year, although a small number of posts were repositioned due to either winter losses or subsequent excavations making it difficult to tell which hole was marked. Of these, 71 were seen to be occupied and were visible throughout the season (67 in 2020); productivity estimates are based on observations of these burrows. Chick provisioning was first witnessed on 21st May, with deliveries made to one Crab Bay and two South Haven burrows; these were three days earlier than the first of last year and four days earlier than the 2013-2020 mean (the earliest in this period was logged on 14th May in 2019 and the latest on 3rd June in a post-wreck 2014). The mean 2013-2020 first fish delivery to the Crab Bay plot is 30th 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 a fish delivery to the plot on 25th May, this one day later than the first of last year but 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 71% of burrows had been provisioned within nine days of the first fish arriving, these with chicks eight days earlier than the 2013-2020 mean. The 2021 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 three earliest chick provisioning periods between 2013 and 2021 have occurred in the last three years, with the start of the 2021 provisioning period being the third earliest to date. Two active burrows (2.82%) were not seen to be provisioned with fish and it is assumed that these failed at egg stage (the 2013-2020 mean is 6.10%, with a high of 7.79% in 2013 and a low of 3.28% in 2018).

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, 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 saw a return to watches lasting all of the daylight hours.



The number of study burrows which had been provisioned with fish by a particular date.



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 20 days old (see table below). 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 the ad hoc recording, the 2013 to 2021 productivity estimates of between 0.73 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 2021 productivity figure of 0.80 was similar to that of recent years, indeed it matched that of 2017 as the highest of the last nine (the 2013-2020 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 2021 data suggests that, of the 71 monitored attempts, perhaps as few as 44 (61.97%) were potentially successful (which equates to a productivity figure of 0.62 fledglings per pair); the 2013-2020 mean ad hoc productivity figure is 0.56 \pm se 0.02, with a high of 0.64 in 2016 and 2020 and a low of 0.49 in 2013. At least 47 attempts saw a chick reach a minimum of 26 days (66.2% or 0.66 chicks per pair, see third table below); this figure is down on the 0.72 logged in 2019 and 2020.

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
No. of burrows 2 June		8	17	6	12	2	2	1							
No. of burrows 13 June	1	5	7	7	8	16	7	2	4	2	2		1		
No. of burrows 24 June	1	4		9	4	10	6	11	2	2	1	3	3		5
No. of burrows 7 July		9	6	5	2	4	5	6	1	3	1	1	2	1	
No. of burrows 13 July		5	1	1	1	3	2		1	1	1	1		2	1

Calculating productivity using only three daylight watches. The first watch was between 25th May and 28th June (dependent on the date of first fish delivery that year), the second between 11th June and 8th July and the third between 28th June and 24th 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.
2021	25 May	24 Jul	38	23 (2/6 - 24/6)	11	20 (24/6 - 13/7)	8	42 (2/6 - 13/7)	0.80 (57 of 71)	0.62
2020	24 May	14 Jul	3	13 (30/5 - 11/6)	16	22 (11/6 - 2/7)	33	34 (30/5 - 2/7)	0.78 (52 of 67)	0.64
2019	18 May	24 Jul	19	19 (25/5 - 12/6)	9	17 (12/6 - 28/6)	29	35 (25/5 - 28/6)	0.76 (57 of 75)	0.55
2018	30 May	30 Jul	20	22 (9/6 - 30/6)	11	18 (30/6 - 17/7)	15	39 (9/6 - 17/7)	0.75 (46 of 61)	0.56
2017	27 May	30 Jul	33	20 (6/6 - 25/6)	6	18 (25/6 - 12/7)	16	37 (6/6 - 12/7)	0.80 (55 of 69)	0.57
2016	04 Jun	13 Aug	7	16 (17/6 - 2/7)	3	13 (2/7 - 14/7)	38	28 (17/6 - 14/7)	0.73 (48 of 66)	0.64
2015	02 Jun	05 Aug	16	14 (18/6 - 1/7)	2	12 (1/7 - 12/7)	42	25 (18/6 - 12/7)	0.75 (60 of 80)	0.55
2014	09 Jun	06 Aug	14	11 (28/6 - 8/7)	4	17 (8/7 - 24/7)	38	27 (28/6 - 24/7)	0.74 (56 of 76)	0.50
2013	09 Jun	14 Aug	11	15 (16/6 - 30/6)	6	14 (30/6 - 13/7)	39	28 (16/6 - 13/7)	0.73 (56 of 77)	0.49

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	10		1	1	10	3	8	21	14	1



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.

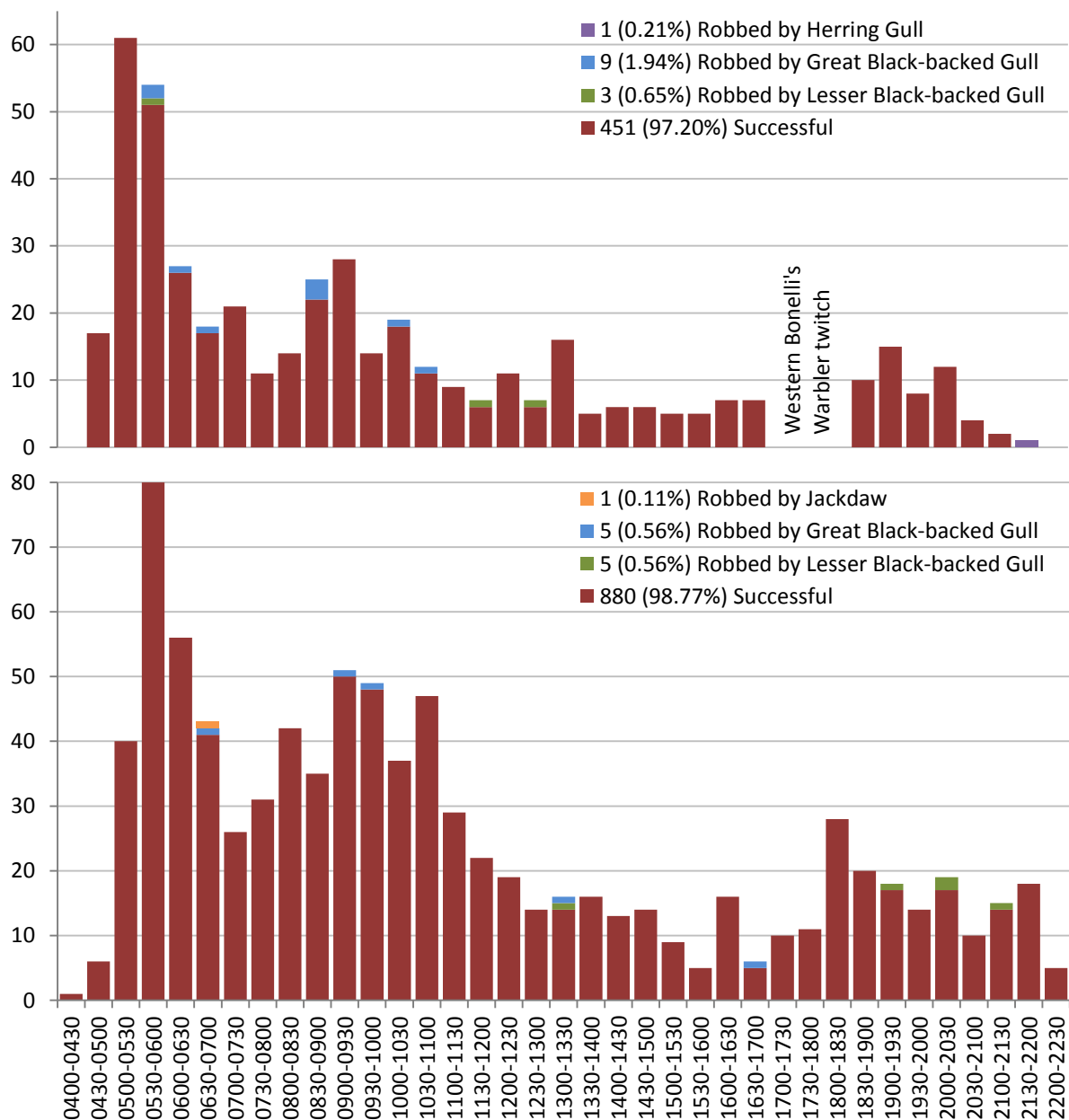
		Watch 1	Watch 2	Watch 3	Watch 4	Watch 5	Total
2021	Number of deliveries	464	891	1262	813	394	3824
	Number parasitised	13	11	9	11	5	49
	Percentage parasitised	2.80	1.23	0.71	1.35	1.27	1.28
2020*	Number of deliveries	357	553	600	659	170	2339
	Number parasitised	22	37	3	10	5	77
	Percentage parasitised	6.16	6.69	0.50	1.52	2.94	3.29
2019	Number of deliveries	579	929	504	429	228	2669
	Number parasitised	25	18	14	18	5	80
	Percentage parasitised	4.32	1.94	2.78	4.20	2.19	3.00
2018	Number of deliveries	701	852	527	511	359	2950
	Number parasitised	19	12	8	8	33	80
	Percentage parasitised	2.71	1.41	1.52	1.57	9.19	2.71
2017	Number of deliveries	844	991	1100	527	177	3639
	Number parasitised	30	11	3	7	5	56
	Percentage parasitised	3.55	1.11	0.27	1.33	2.82	1.54
2016	Number of deliveries	421	733	889	489	525	3057
	Number parasitised	20	45	35	10	28	138
	Percentage parasitised	4.75	6.14	3.94	2.04	5.33	4.51
2015	Number of deliveries	699	927	916	521	123	3186
	Number parasitised	43	34	23	10	4	114
	Percentage parasitised	6.15	3.67	2.51	1.92	3.25	3.58

*watches stopped at 1700hrs.

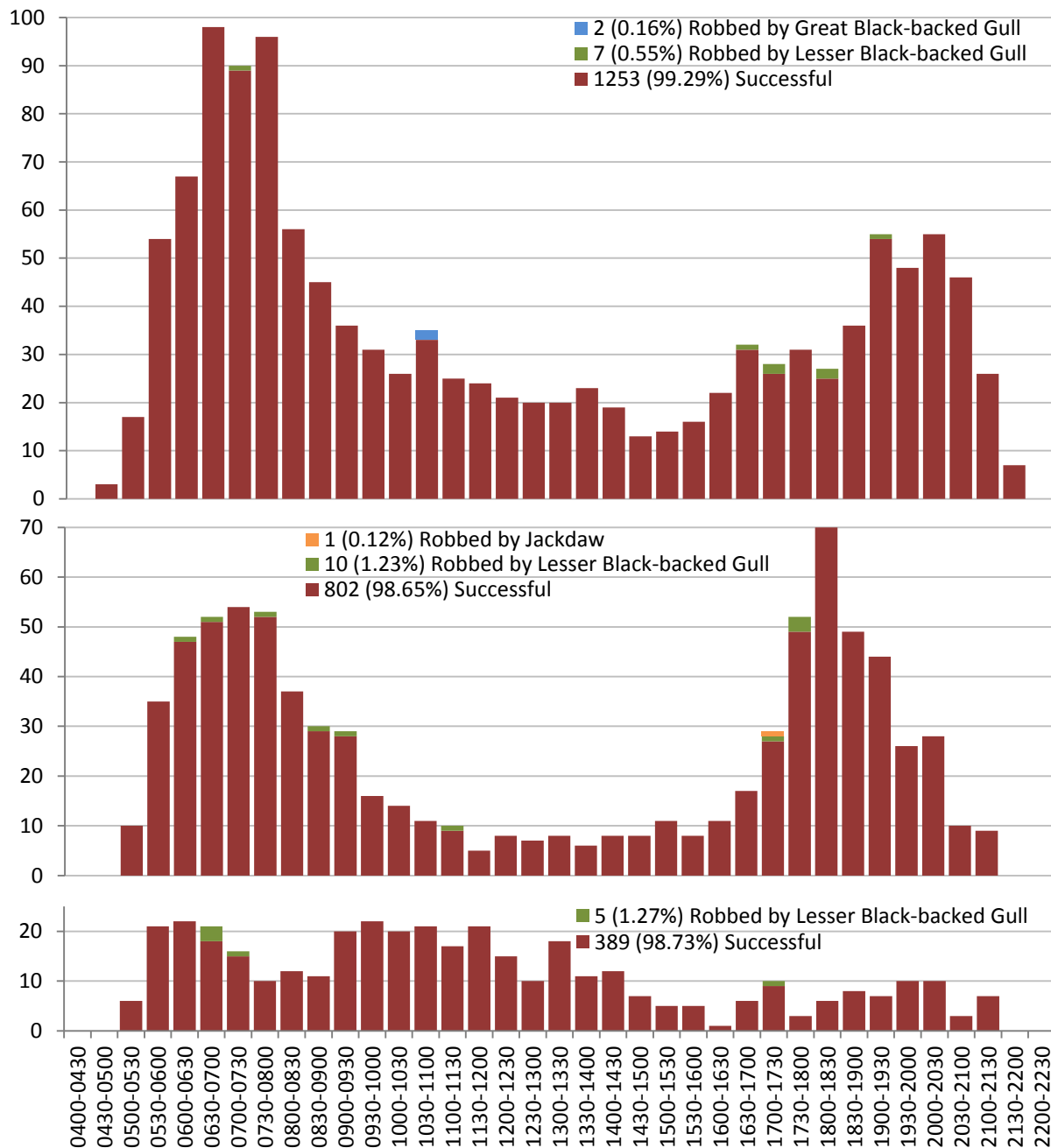
The five daylight watches were also used to monitor kleptoparasitism. The study plot was again confined to the area of the 100 numbered burrow stakes at Crab Bay. On 2nd June 464 Puffins arrived to the study area with fish and of these 13 (2.80%) were successfully robbed. On 13th June 891

arrived and 11 (1.23%) were robbed. On 24th June 1262 arrived and just nine (0.71%) were robbed. On 7th July 813 arrived and 11 (1.35%) were robbed. On 13th July 394 arrived and five (1.27%) 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 1.28% was the lowest of the last nine years, down on a 2013-2020 mean of 3.97%. The last five 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 40.3% in the last seven years), although higher Great Black-backed Gull numbers 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 both in 2020 and this year.

The number of chick provisioning attempts during daylight on the 2nd and 13th June 2021, along with the number of times that gulls and corvids successfully robbed the fish.



The number of chick provisioning attempts during daylight on 24th June and the 7th and 13th July 2021, 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 and 106 between 2016 and 2019; a ringing team could not be safely assembled in 2020 due to the COVID-19 pandemic, whilst a further 40 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 14 were not seen for two years (including two which went missing for two years twice), seven were not seen for three years and two confirmed this year had not been seen for four and five years respectively. We now know, for example, that the 154 birds seen in 2013 was only 92.8% of the number actually alive and that when 219 were seen last year, at least 242 were alive. A 2020-2021 survival figure of 89.67% is thus likely to increase in the future. With ten 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% (in 2014) and 96.51% (in 2013), with only the 2014 return rate being below 89% and a 2012-2020 mean of 91.78% \pm sd 5.06. 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% (in 2014) to 97.37% (in 2013), with a 2013-2020 mean of 92.70% \pm sd 5.40. 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 215 birds (93.48%) 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	Total	Survival after one year
Total Ringed	128	58	51	57	23	24	31	28	400	
Seen in 2012	72								72	
Alive in 2012	114								114	
% survival	89.06								89.06	No data
Seen in 2013	102	52							154	
Alive in 2013	111	55							166	
% survival	97.37	94.83							96.51	97.37
Seen in 2014	86	36	37						159	
Alive in 2014	93	40	40						173	
% survival	83.78	72.73	78.43						79.72	80.12
Seen in 2015	78	37	35	50					200	
Alive in 2015	86	39	37	53					215	
% survival	92.47	97.50	92.50	92.98					93.48	93.64
Seen in 2016	67	34	32	43					176	
Alive in 2016	79	38	35	47					199	
% survival	91.86	97.44	94.59	88.68					92.56	92.56
Seen in 2017	71	35	31	44	19				200	
Alive in 2017	79	38	32	44	20				213	
% survival	100.00	100.00	91.43	93.62	86.96				95.95	96.98
Seen in 2018	69	34	28	40	19	20			210	
Alive in 2018	75	37	30	40	20	22			224	
% survival	94.94	97.37	93.75	90.91	100.00	91.67			94.51	94.84
Seen in 2019	65	33	27	36	17	20	21		219	
Alive in 2019	68	35	28	37	19	22	28		237	
% survival	90.67	94.59	93.33	92.50	95.00	100.00	90.32		92.94	93.30
Seen in 2020	60	31	23	33	15	18	22	17	219	
Alive in 2020	63	33	25	36	17	20	26	22	242	
% survival	92.65	94.29	89.29	97.30	89.47	90.91	92.86	78.57	91.32	92.83
Seen in 2021	57	30	23	28	16	16	25	22	217	
% survival	90.48	90.91	92.00	77.78	94.12	80.00	96.15	100.00	89.67	89.67

Ad hoc records again mirrored the whole Island count in suggesting that the number of birds on Skokholm is increasing; one on 18th May, which exited and then entered a burrow near 3A in the

Crab Bay Manx Shearwater plot, was the first grounded bird to be seen inland of the Lighthouse Track for many decades, whilst one which flew over the Well Heligoland towards Orchid Bog on 28th May was unusual. Although the main colonies were again crowded on the 14th and 15th July, there had been no obvious non-breeding loafs on the 13th and few had arrived that evening. Crab Bay was almost devoid of surface birds on the evening of the 19th, although there were more around South Haven and the Neck and substantial offshore rafts. A two hour watch on the morning of 24th July recorded only three fish deliveries to study plot burrows and the last four-figure daycount was logged the following day (the majority of which were at sea). Raft counts remained in the hundreds until 5th August (29th July in 2020 and 2nd August in 2019) and no more than 25 were noted on each date from the 6th. The last two fish deliveries to be seen this year were made to South Haven burrows on 11th August, this two days later than the last of 2020 but one day earlier than the 2013-2020 mean; the latest last delivery recorded during this period was on 23rd August in 2014, whilst one on 4th August 2019 was the earliest. The only other sightings were of birds at sea, with two on 12th August, one on the 14th and two in Broad Sound on the 21st which were the last of the year.



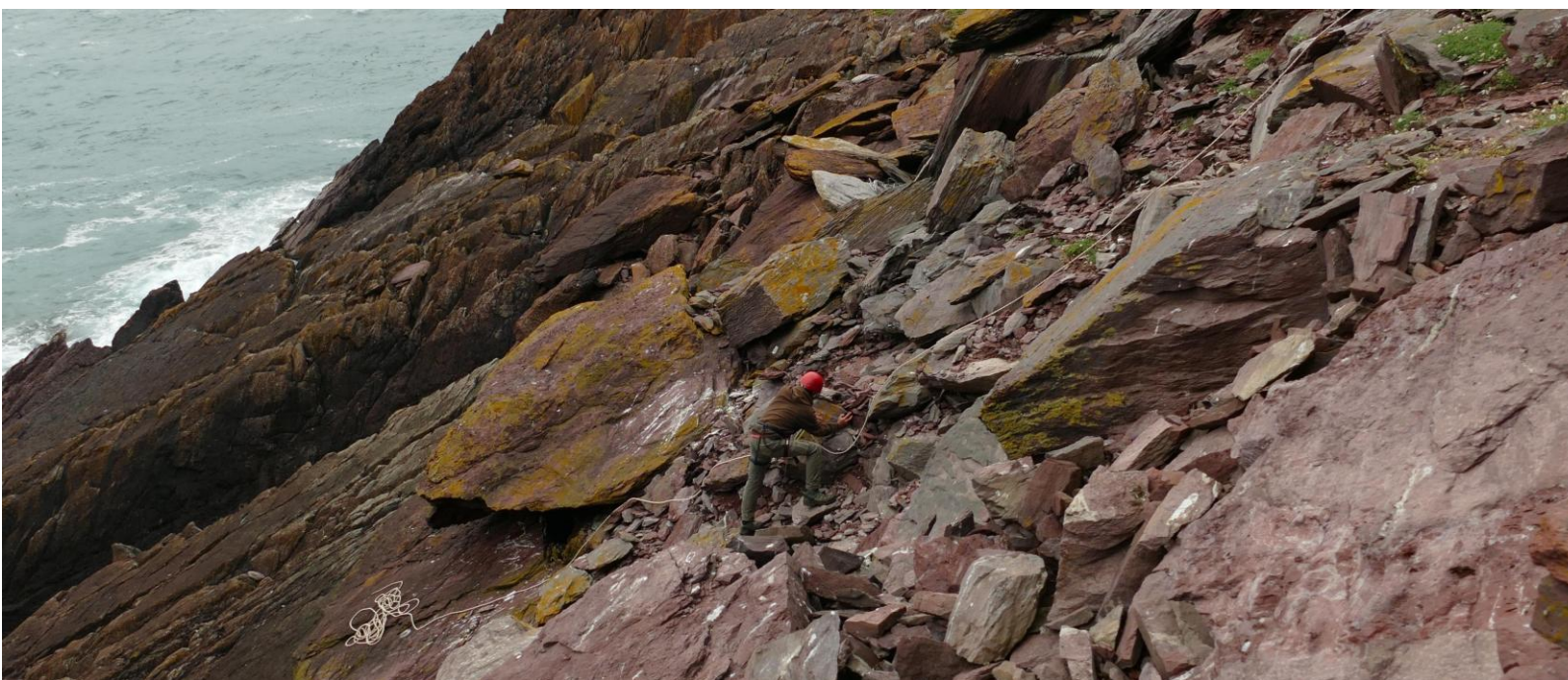
Storm Petrel *Hydrobates pelagicus*

Pedryn Drycin

Abundant Breeder a 2016 whole Island survey predicted 1910 occupied sites
1052 trapped (including 41 pulli), 223 retrapped, 54 controls
1933-1976: 18,473 trapped, 2011-2020: 5307 trapped, 409 retrapped, 219 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 sighting this year was of one heading east off the Lighthouse at 0915hrs on 2nd September. With the exception of a small number of incubating adults visible in shallow crevices or in nest boxes, all other 2021 sightings came at night, although birds occasionally called from holes during the day and vocal responses were elicited for monitoring purposes. Although the sites traditionally used for productivity monitoring were freshly scented from late April, it was not until 17th May that birds were first heard calling diurnally; this was the latest first daytime record in eight years, 13 days later than the 2013-2020 mean (the earliest during this period was heard on 23rd April in 2017). All of the productivity sites were empty on 9th June, suggesting that the 2021 breeding season was indeed a late one; this was mirrored at other Irish Sea colonies and on the Molène Archipelago (Cadiou, *pers. comm.*). The infrared viewing equipment again proved popular, producing peak counts from the Quarry of at least 80 on the night of 13th June and of at least 100 on 4th July.

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 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 boxes and accessible crevices used for productivity monitoring revealed incubating adults in the vast majority of usual sites; although the sample size is poor, there was nothing to suggest a major decline in numbers in 2020. 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 11th June and 10th 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 below).



Between 65 and 91 responses were elicited at the Quarry sites using MP3 playback in each of the years between 2010 and 2019, 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.

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. The mean is that from 2010-2019.

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						
2021	9	17	16	17 (5)	15 [†] (8) [†]	14 (10)	43 (22)	89 (45)	131 (87)						
2019	10	23	12	18 (7)	18 [†] (9) [†]	13 (8)	44 (20)	93 (44)	138 (89)						
2018	6	13	11 [‡]	15 (5)	15 [†] (10) [†]	12 (8)	49 (30)	91 (53)	121 (83)						
2017	7	20	14 [‡]	15 (5)	13 [†] (7) [†]	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 [‡]	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	6.9	13.8	16.4	13.0	5.0	15.1	8.4	11.7	7.9	39.4	22.5	77.7	43.0	114.8	80.1

* 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.

There is a general consensus that the number of pairs utilising the 18th 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 12 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 21.2% fewer wall responses than in a record 2019, however a combined North Pond Wall and Little Bay Wall total of 26 was the third highest to date, 25.6% up on the 2010-2019 mean (20.7 ±sd 6.6). It would seem that the walls population can still be cautiously regarded as stable.

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 by Whittington 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 affects 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 16 active sites discovered in North Haven Gully this year, this four more than in 2019 and a total close to the 2010-2019 mean of 16.4 \pm sd 3.8, but a tally 9.1% down on the 2010-2017 mean and 20.0% down on the 2010-2013 mean (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, although these rock slides did not seemingly impact the number of crevices available overall. The transect one total was two down on that of 2019, although five responses matched that logged in seven previous years and the 2010-2019 mean. The transect two total was one down on that of 2019 but was also close to the mean (8.4 \pm sd 2.2), this despite the fact that the transect was shortened in 2017. The transect three total was two up on that of 2019 and the 2010-2019 mean (7.9 \pm sd 1.8), indeed only in 2014 were there more responding sites in this area. Although there have been more responses in five years, the transect four total was two up on that of 2019 and almost matched the 2010-2019 mean (22.5 \pm sd 5.2). The overall Quarry total of 45 was the second lowest since 2016 (when a major rock fall reduced the survey area) and the third lowest since 2012, however it was one up on that of 2019 and fell slightly above the ten year mean (43.0 \pm sd 6.8).

The number of crevices which have at some point been occupied over the 11 year study (a total of 360), 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	57	39	30	126	35.00
2 years of apparent occupancy	28	7	20	55	15.28
3 years of apparent occupancy	26	6	6	38	10.56
4 years of apparent occupancy	16	7	12	35	9.72
5 years of apparent occupancy	20	6	3	29	8.06
6 years of apparent occupancy	16	7	2	25	6.94
7 years of apparent occupancy	12	2	1	15	4.17
8 years of apparent occupancy	10			10	2.78
9 years of apparent occupancy	12	3		15	4.17
10 years of apparent occupancy	3	1		4	1.11
11 years of apparent occupancy	6	1	1	8	2.22
Total	206	79	75	360	

Overall there were 87 responses elicited this year, two fewer than in 2019 (the loss of seven sites in the walls not quite offset by five additional sites across the Quarry and North Haven). The total matched that of 2015 as the fourth highest to date, this 8.1% up on the ten year mean (80.1 \pm sd 9.6). It still seems likely that, over the last decade at least, the Skokholm study population has been stable, 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 this year was again 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 over 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 21% of the active crevices located during the last 11 years have shown signs of occupancy in six or more years and 2.22% of crevices have contained a calling bird in every year. 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 2014-2019 mean (the resulting correction factors are given in parenthesis).

Year	The walls	North Haven	Quarry	Rock fall	Average
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	30.1 (3.32)	33.6 (2.97)	28.2 (3.55)	28.8 (3.48)	29.2 (3.43)

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 8.9 (34.2%) of the 26 active sites respond on any single visit, although the actual number varied between four and 17. At North Haven a mean of 5.9 (36.9%) of 16 active sites responded each visit, although the actual number was between one and ten. At the Quarry a mean of 28.6 (32.1%) of 89 active sites responded, but this was between 18 and 39 on any particular date. Despite this significant variation between dates, the mean response rate at all three sites fell within the relatively tight ranges observed between 2014 and 2019 (see table above), although in all three cases the rate was above the mean. An average response rate for all sites of 33.1% was the highest to be observed in seven years, up on a range of between 27.1% and 31.0% recorded between 2014 and 2019. 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 the last seven years, the number of active sites present in an area is likely to be in the region of 3.38 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.

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 1910 occupied sites predicted during the 2016 whole Island census) 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). Ten visits were made to this 'Petrel Station' between 26th June and 11th 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 (including the two which were successful in 2019), with a mean of 1.1 responses per visit and a mean apparent response rate of 36.67% (which is higher than that seen typically). 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 (four of the eggs were damaged and two had not developed, five of these in boxes which failed at egg stage in 2019); 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 productivity estimate; of eight boxes which definitely contained breeding attempts in 2020, only two young fledged; a productivity figure of 0.25 chicks per pair is well below what is expected on average (see below), as might be predicted for younger, less practiced pairs. Given the poor productivity witnessed in 2020 (and 2019) it was decided that there would be no Petrel Station playback census in 2021 (to allow for a productivity check in a year without a potentially disturbing survey).



Visits to the Petrel Station during the chick provisioning period revealed that 19 boxes had contained a Storm Petrel at some point this year (eight boxes showed signs of occupancy in 2018, with 13 in 2019 and 12 in 2020). Only nest scrapes were present in 14 of these boxes, with five pairs having

produced eggs (four pairs produced eggs in 2018, with nine in 2019 and eight in 2020). Two of these eggs were abandoned, one in box 42 (which has contained an egg stage failure in each year between 2019 and 2021) and one in box 92 (a new site). Chicks fledged from boxes 11 and 64 for a third consecutive year, whilst a chick fledged from box 12 for the first time (a response was elicited from box 12 during the 2020 playback survey, however it was later found to contain an empty scrape); there were no fledglings in 2018, whilst two fledged in both 2019 and 2020. Petrel Station productivity was thus 0.60 fledglings per pair, this a new high for this site and more consistent with that previously observed elsewhere. It is unclear whether this increase in productivity was due to reduced disturbance or the fact that this site may now contain older, more experienced birds. A camera in box 11 captured scenes of scrape creation, mating (on 4th June, image above), egg incubation and chick feeding (the lens eventually becoming obscured by faeces). The egg was produced at some point between the evenings of the 12th and 14th June and hatched between the evenings of the 19th and 20th July; the incubation period was between approximately 35 and 38 days.

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 equalling that of 2015, 2018 and 2020 as the largest post-2012 sample, up on a mean of 16.9); 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 are usually encountered towards the end of the transect survey period (between 29th June (in 2019) and 17th July (in 2016), with a mean of 5th July); there was no such evidence this year, with hatched eggshell first found near the Cottage Garden Wall on 26th July (although the Petrel Station camera revealed an earlier chick (see above)). Of the 20 monitored nests, one definitely failed at egg stage and two failed at either egg or small chick stage (but neither could be located). There was only one chick stage failure, with a soggy corpse found at a very wet site on 12th August. The 16 remaining chicks were all followed through to fledging, the resulting productivity value of 0.80 fledglings per pair being the highest of the last eight years (the 2014-2020 mean is 0.58 \pm se 0.04, with a high of 0.74 in 2019 and a low of 0.45 in 2020). It is unclear why productivity was so high this year, although predominantly dry conditions 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%) and four of 23 2019 chicks (17.4%) have been encountered again (the controls being a 2015 ringed chick retrapped in Cornwall in 2018, a 2016 chick retrapped on the nearby mainland in 2019 and a 2018 chick retrapped in Cornwall and then Wexford this year). Nine of the retrapped chicks were first encountered two summers after ringing (including one also seen three summers after ringing) and six were first encountered three summers after ringing (including one also seen after four summers and seven summers). Of the four 2019 ringed youngsters encountered in South Haven this summer, 2746611 was particularly notable, this the first ever chick to fledge the Petrel Station.



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 and three 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 27 Short-eared Owl bird-days logged this season, this the highest tally for four years (the 2013-2020 mean is 37.3 bird-days, with a high of 76 in 2017). The remains of 39 Storm Petrels were located this year, with 37 adults found between 5th June and 5th September (with 23 in and around the Quarry, seven around Wallsend, two both along Little Bay Wall and in Winter Pond Gully and singles near the Bluffs, Windmill Gully and the Knoll) and probable fledglings found near the Petrel Station on 15th September and 1st October. There were again no Little Owl records (the last was seen on 17th 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 this year 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 12 nights between 13th July and 22nd August; this was five more nights than last year and one more night than the 2013-2020 mean. The largest catch was of 267 birds on the night of 16th July; this was the largest single

catch of the last nine years, up on a 2013-2020 mean of 184 and a high during that period of 252 in 2017. Of 1284 adults handled in South Haven this year, 21.3% were already wearing a ring (the mean during the period 2013-2020 was 10.2%, with a high of 12.7% in 2017 and a low of 5.4% in 2014), including two ringed in 2013, four ringed in 2014, one ringed in 2015, three ringed in 2016, four ringed in 2017, six ringed in 2018, 12 ringed in 2019 and 18 ringed last year, whilst 54 (4.21%) had been ringed elsewhere (the mean during the same period was 4.24%, with a high of 5.68% in 2013 and a low of 3.21% last year). Additional to those listed below, we received news of ten birds ringed at Wooltack Point (4km to the NNE) retrapped on Skokholm (with nine retrapped after between six and 24 days and one retrapped after 370 days), three birds ringed on Skokholm and retrapped at Wooltack (after between one and five days), three birds ringed on Skomer Island (4km to the NNW) retrapped on Skokholm (after five, seven and 350 days) and nine birds ringed on Skokholm and retrapped on Skomer (with six retrapped after between four and 12 days and singles retrapped after 725, 1824 and 1825 days). Since ringing fully recommenced in 2013 we have now received news of 442 Storm Petrels either ringed on Skokholm and found elsewhere or ringed elsewhere and controlled on Skokholm; of these 280 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 2473714

Originally ringed as an adult, HARTLAND POINT, DEVON 5th July 2018

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 17th July 2021

Distance travelled 95km at 326 degrees (NNW)

Days since ringed 1108

Ringing recovery 2547504

Originally ringed as an adult, LITTLE SALTEE, WEXFORD, IRELAND 4th August 2021

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 11th August 2021

Distance travelled 102km at 119 degrees (ESE)

Days since ringed 7

Additionally 2769827 and 2769899, ringed as adults at Little Saltee on 30th June and 23rd July, were controlled in South Haven on the 18th and 28th July after 18 and five days respectively. 2740295, 2746874, 2758576, 2758632, 2758765, 2758793 and 2758898, ringed as adults in South Haven on 22nd July 2018, 17th July 2020 and 17th July, 17th July, 18th July, 18th July and 25th July 2021, made the reverse journey, reaching Little Saltee on 20th July, 22nd July, 2nd August, 2nd August, 22nd July, 22nd July and 1st August after 1094, 370, 16, 16, four, four and seven days respectively.

Ringing recovery 2593655

Originally ringed as an adult, POINT LYNAS, ANGLESEY 10th July 2021

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 13th and 18th July 2021

Distance travelled 203km at 200 degrees (SSW)

Days since ringed 3 and 8

Ringing recovery 2650052

Originally ringed as an adult, ANNAGH HEAD, MAYO, IRELAND 8th July 2010

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 11th August 2021

Distance travelled 429km at 132 degrees (SE)

Days since ringed 4052

Ringing recovery 2685006

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 16th July 2013

Recovered as an adult, ABER DYSYNNI, TYWYN, GWYNEDD 6th August 2021

Finding condition Dying on beach following stormy weather

Distance travelled 128km at 39 degrees (NE)
Days since ringed 2943

Ringing recovery 2698934

Originally ringed as an adult, EYEMOUTH, BERWICKSHIRE 3rd August 2019

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 25th July 2021

Distance travelled 509km at 205 degrees (SSW)

Days since ringed 722

Ringing recovery 2725355

Originally ringed as an adult, LUNGA, TRESHNISH ISLES, ARGYLL AND BUTE 25th June 2019

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 2nd August 2021

Distance travelled 537km at 172 degrees (S)

Days since ringed 769

2746296, ringed as an adult in South Haven on 27th July 2019, made the reverse journey, reaching Lunga on 2nd July after 706 days. Perhaps surprisingly, there had been no exchanges with the western Scottish islands until this year (when there were three).

Ringing recovery 2726178

Originally ringed as an adult, HOT POINT, THE LIZARD, CORNWALL 31st July 2017

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 14th July 2021

Distance travelled 193km at 358 degrees (N)

Days since ringed 1444

Ringing recovery 2727608

Originally ringed as an adult, ST JUSTINIAN, ST DAVIDS, PEMBROKESHIRE 22nd July 2020

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 22nd July 2021

Distance travelled 21km at 174 degrees (S)

Days since ringed 365

Additionally 2727639, ringed as an adult at St Justinian on 12th August 2020, was controlled in South Haven on the 25th and 28th July after 347 and 350 days. 2727647, ringed as an adult at St Justinian on 16th June 2021, was controlled in South Haven on 18th July after 32 days.

Ringing recovery 2738355

Originally ringed as an adult, CALF OF MAN, ISLE OF MAN 18th July 2020

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 24th July 2021

Distance travelled 263km at 187 degrees (S)

Days since ringed 371

Additionally 2738454, ringed as an adult at the Calf of Man on 15th August 2020, was controlled in South Haven on 22nd July after 341 days.

Ringing recovery 2740001

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 14th July 2018

Recovered as an adult, BARDSEY ISLAND, GWYNEDD 15th June 2021

Distance travelled 124km at 17 degrees (NNE)

Days since ringed 1067

Additionally 2746822 and 2758631, ringed as adults in South Haven on 13th July 2020 and 17th July 2021, were controlled at Bardsey on 5th July and 4th August after 357 and 18 days respectively. 2765900 and 2773009, both ringed as adults at Bardsey on 4th July, made the reverse journey, reaching South Haven on the 14th and 27th July after ten and 23 days respectively. 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 33 occasions since 2013, with nine at Porth Iago and eight at the Calf of Man, Gwennap Head and Little Saltee the next highest tallies.

Ringing recovery 2740060

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 14th July 2018

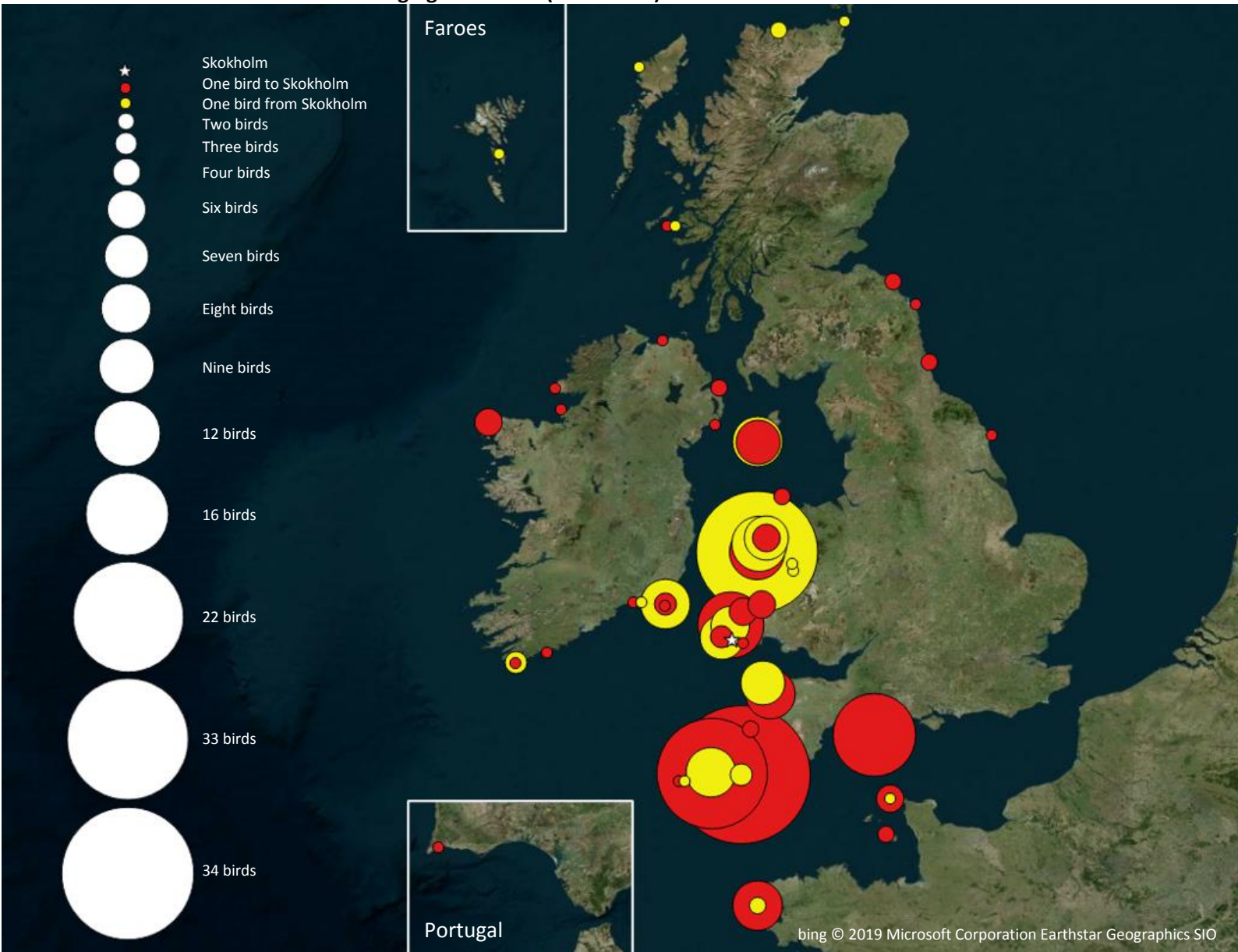
Recovered as an adult, BAY OF SANNICK, HIGHLAND 10th August 2021

Distance travelled 786km at 11 degrees (N)

Days since ringed 1123

One of two Skokholm ringed birds to be encountered along the north coast of Scotland this year.

Storm Petrel ringing recoveries (over 10km) recorded between 2013 and 2021.



Ringing recovery 2740805

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 29th August 2018

Recovered as an adult, MANGARSTADH, ISLE OF LEWIS, WESTERN ISLES 14th July 2021

Distance travelled 730km at 351 degrees (N)

Days since ringed 1050

The first Skokholm ringed Storm Petrel to be encountered on the Outer Hebrides.

Ringing recovery 2740813

Originally ringed as a chick, SKOKHOLM 5th September 2018

Recovered as an adult, GWENNAP HEAD, PORTHWARRA, CORNWALL 6th June 2021

Recovered as an adult, LITTLE SALTEE, WEXFORD, IRELAND 30th June 2021

Distance travelled 188km at 189 degrees (S) and 102km at 299 degrees (WNW)

Days since ringed 1005 and 1029

One of ten birds ringed as chicks in 2018. Additionally 2746232, 2746926 and 2758255, ringed as adults in South Haven on 23rd July 2019, 17th July 2020 and 14th July 2021, were controlled at Gwennap Head on 18th July, 7th June and 18th July after 726, 325 and four days respectively.

Ringing recovery 2746298

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 27th July 2019

Recovered as an adult, EILEAN NAN RON, HIGHLAND 10th July 2021

Distance travelled 764km at 5 degrees (N)

Days since ringed 714



Ringing recovery 2754666

Originally ringed as an adult, GWENNAP HEAD, PORTHWARRA, CORNWALL 6th July 2019

Previously recovered as an adult, SOUTH HAVEN, SKOKHOLM 13th August 2019

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 17th July 2021

Distance travelled 188km at 9 degrees (N)

Days since ringed 742

Additionally 2761282, 2761404, 2761423, 2761447 and 2761457, ringed as adults at Gwennap Head on 10th July, 18th July, 18th July, 18th July and 18th July, were controlled in South Haven on 22nd July, 3rd August, 28th July, 3rd August and 2nd August after 12, 16, ten, 16 and 15 days respectively.

Ringing recovery 2758218

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 14th July 2021

Recovered as an adult, DEEP POINT, ST MARY'S, ISLES OF SCILLY 25th July 2021

Distance travelled 211km at 200 degrees (SSW)

Days since ringed 11

Ringing recovery CIJ P10751

Originally ringed as an adult, BURHOU ISLAND, ALDERNEY, CHANNEL ISLANDS 19th July 2003

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 3rd August 2021

Distance travelled 307km at 316 degrees (NW)

Days since ringed 6590

Additionally P17179 and P17366, ringed as adults at Burhou Island on the 17th and 19th July 2020, were controlled in South Haven on 2nd August and 17th July after 381 and 363 days respectively.

Ringing recovery FRP SE39043

Originally ringed as an adult, LE CONQUET, FINISTÈRE, FRANCE 12th August 2020

Recovered as an adult, SOUTH HAVEN, SKOKHOLM 18th July 2021

Distance travelled 375km at 355 degrees (N)

Days since ringed 340

This is the eighth individual ringed in this region of France to be found on Skokholm since 2013. 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). A further two French controls reached South Haven this year, although the ringing details are yet to be shared.

Fulmar *Fulmarus glacialis*

Aderyn-drycin y Graig

Fairly Common Breeder first bred in 1967

1 pullus trapped

1968-1976: 19 trapped, 2017-2019: 5 pulli trapped

Birds were on the cliffs from when staff returned on 26th February, with at least some also ashore on every March date; between 2016 and 2020 there was at least one March date each year on which birds were entirely absent from the cliffs, with a mean of 2.4 days and a high of four days last year. A 16th to 31st March daycount mean of 78.7 was the second highest of the last nine years, up on a 2013-2020 mean of 58.7 (there was a high of 85.0 in 2018 and a low of 34.5 in 2013), whilst a peak daycount of 264 on the 25th was a new March record. Daycounts during the first week of April failed to exceed 58, this including lows of 19 on the 2nd and 16 on the 3rd, although six three-figure daycounts took the April bird-days total to 2268 (this down on a 2013-2020 mean of 2508.8). With the exception of 142 on the 4th (119 of which were at sea), no more than 67 were logged each day between the 2nd and 13th May (there were 148 present by the 16th), this pre-laying exodus mirroring that seen in recent years. The first egg to be seen was at Rat Bay on 16th May, this the same date as the first of 2019 and 2020 but otherwise the earliest this decade; the 2013-2020 first egg mean is 20th May, with the latest during this period logged on the 28th in 2014 (following prolonged and severe storms during the preceding winter). There were two more eggs at Rat Bay two days later.

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 since 2013 and the percentage of the Island total made up of study plot birds 2012-2021.

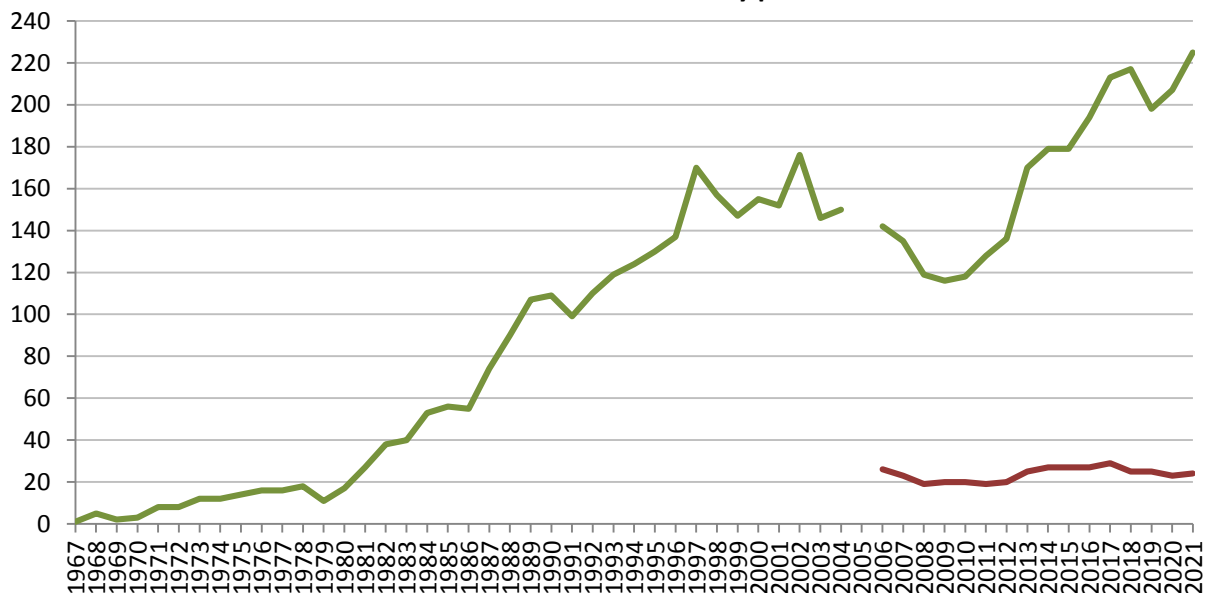
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Island	136*	170	179	179	194	213	217	198	207	225
Plots	20	25	27	27	27	29	25	25	23	24
Range	(16-25)	(22-28)	(23-29)	(26-29)	(25-29)	(26-31)	(23-27)	(23-27)	(19-27)	(21-27)
±SD		2.07	1.79	1.14	1.26	2.00	1.26	1.35	2.27	1.90
Plot %	14.7*	14.7	15.1	15.1	13.9	13.6	11.5	12.6	11.1	10.7

* There was no boat-based count in 2012.

The six study plots counted annually since 2006 were visited on ten dates between 26th May and 7th June. Although this was a period dominated by gentle winds from the easterly quarter, a storm

between the 20th and 21st May had impacted the breeding auks and gulls (when gusts peaked at 69mph and waves averaging 11 metres occasionally reached 16 metres). It was not confirmed if Fulmars were affected, however two egg stage failures (one at Rat Bay and one at Peter’s Bay) were discovered following the storm. As was perhaps the case last year, it is possible that this storm event may have impacted ledge attendance, resulting in the higher than average standard deviation observed this year (only in 2012 and 2020 has the range of totals across the ten visits been wider). A 2021 average of 24 apparently occupied sites was one up on last year and matched a 2006-2020 mean of 23.67 ±sd 3.35, but was five down on the 2017 record and two down on the 2013-2020 mean (26.00 ±sd 1.85).

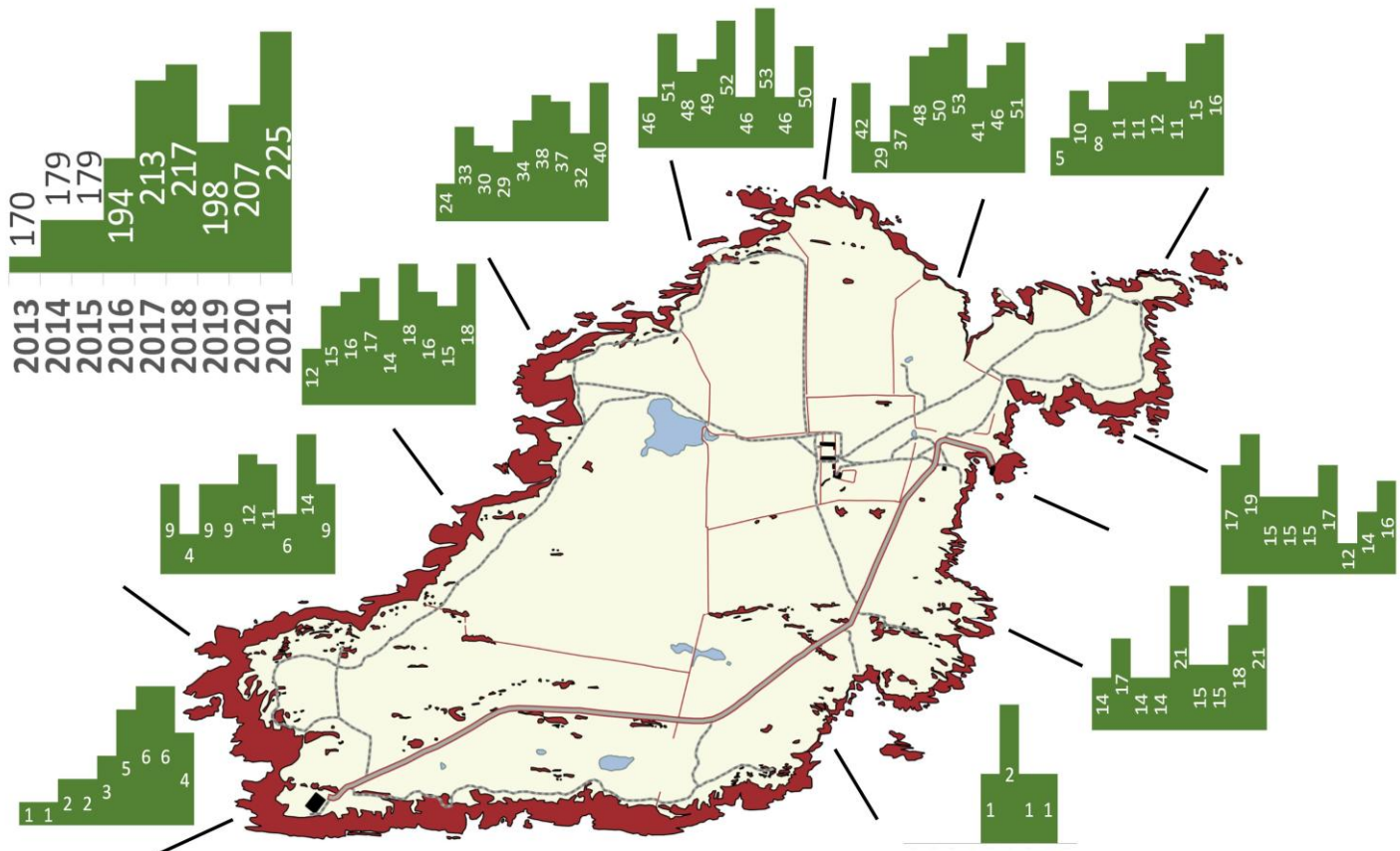
The total number of apparently occupied Fulmar sites recorded on Skokholm since breeding began in 1967 and the number within the study plots since 2006.



The mean total at Little Bay was 13, 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 and 14 between 2018 and 2020; 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 four to a total up on the 2013-2020

mean (see map below). The Middlerock mean increased from five to seven, this a new high for this plot, whilst the Guillemot Cliff mean increased from four to five, this matching the mean logged in each year between 2014 and 2019. 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 distribution of apparently occupied Fulmar sites 2013-2021.



The whole Island counts undertaken between 26th May and 7th June yielded an average of 225 apparently occupied sites, this an 8.7% increase on the 207 logged last year and the highest tally to date (a total 23.6% up on a 2011-2020 mean of 182.10 ±sd 30.56). Nevertheless there was a decline in numbers in three of the coastal sections, with five fewer sites noted around Wardens’ Rest and the Bluffs, two fewer sites in the vicinity of the Quarry and Head Bay and no birds around Crab Bay for the first time since 2016. Counts between Little Bay and Little Bay Point, between Far and Smith’s Bays and in Peter’s Bay were all up, but down on those logged in previous years. The counts from Hog Bay and between Purple Cove and Twinlet were both up on last year and matched the highest means to be recorded in these areas. An additional occupied site along the north coast of the Neck led to a new high for this area, whilst a mean increase of eight apparently occupied sites (the largest increase observed in any area this year) led to a new high for the area between the Dents and the Jogs. The 2021 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 declined to 10.7% this year; this is 21.9% down on the 2011-2020 mean (13.7% ±sd 1.5), the lowest recorded since the plots were begun and probably an indication

that the study plots are not representative of the Island as a whole (perhaps due to a lack of space for expansion, although, as mentioned above, up to six more pairs have been resident in the Little Bay plot 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 (and 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 larger than usual).

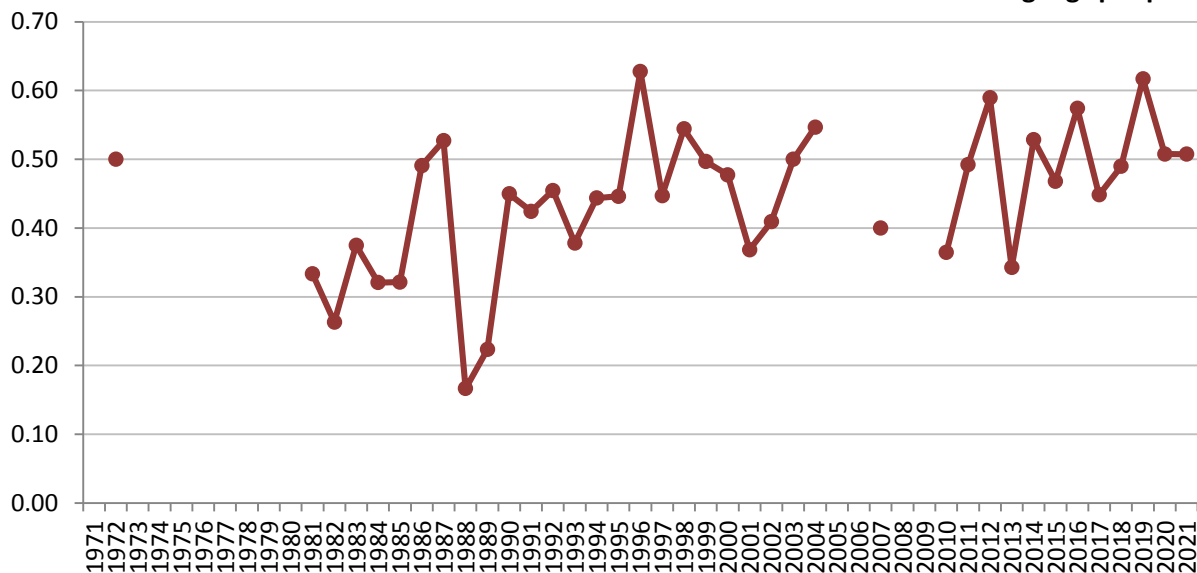
From 16th May, 67 incubating adults were selected for productivity monitoring (11 at Twinlet, 13 at North Gully and the Dents, 16 in Little Bay, 11 on Little Bay Point, six at Rat Bay and ten at Peter's Bay); birds seen with eggs or those apparently incubating for ten consecutive days were included in the sample (thus more birds were initially monitored but were soon discovered not to be incubating). There were three early egg stage failures, with pairs at Rat Bay and Peter's Bay losing eggs after ten days and one day respectively (possibly due to the May storm) and one egg going missing after approximately 17 days. A further attempt failed after approximately 30 days and one failed following a full 55 days of incubation (the egg was alone for a day before it went missing). An additional 22 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). There were four early chick stage failures, with hatched eggshell present at a Dents site where a chick was not seen, one at Little Bay Point going missing after three days, one in Little Bay going missing after six days and one on Middlerock going missing after seven days (the adult present at the latter site had been heavily oiled by a neighbouring pair). There were two large chick stage failures this year, both of which were in Peter's Bay; one chick died at approximately 45 days (the body remained on the ledge for eight days prior to going missing) and one died between the 3rd and 4th September at approximately 59 days (the decomposing body was still present on 1st October). Similar large chick failures were observed in 2014, 2015 and 2018.



Of the 67 monitored breeding attempts, 34 (50.75%) were successful; a productivity estimate of 0.51 fledglings per pair is 15.9% up on the post-1972 average of 0.44 \pm se 0.02 and matched both that of last year and a 2011-2020 average of 0.51 \pm se 0.02 (but was down on four of the last ten years). The last eight years have seen productivity above the long-term average, with a 2013 estimate of 0.34 fledglings per pair being the last to fall below the mean. An above average productivity estimate, coupled with a record number of apparently occupied sites, leads to a predicted 114 Skokholm

fledglings in 2021; 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 2013, 2014, 2015, 2017, 2018 and 2020 influenced the overall figures for those years; Peter’s Bay productivity in 2013 was 0.06 (compared with an overall figure of 0.34), in 2014 it was 0.33 (compared with 0.53), in 2015 it was 0.18 (compared with 0.47), in 2017 it was 0.31 (compared with 0.45), in 2018 it was 0.36 (compared with 0.49) and in 2020 it was 0.33 (compared with 0.51). 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. Seven of the ten pairs monitored at Peter’s Bay failed this year, the productivity value of 0.30 fledglings per pair again being down on that observed elsewhere; one failed just one day after the egg was seen (perhaps due to the May storm), four failed at the time when neighbouring eggs were hatching (but no nest contents were observed) and there were two late chick stage failures (see above). 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.

Fulmar productivity (total number of fledged chicks per monitored pair) in each year that it has been calculated between 1972 and 2021. The 1972-2021 mean is 0.44 ±se 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, with heavily oiled adults noted on occasion and at least two egg stage failures attributed to aggressive neighbours (in both cases eggs were lost prior to the whole Island census). The only similar observation this year came from Middlerock where the loss of a young chick coincided with one of the parents being heavily oiled by a neighbour (this at the same site where a previous egg stage failure was due to an interaction with neighbours on the same, somewhat higher, ledge).

The first two fledglings of the year had departed natal ledges in Little Bay and on Little Bay Point by 22nd August, this one day later than both the first of last year and the 2013-2020 first fledgling mean (the earliest during this period had departed on the 18th in 2019 and the latest on the 25th in 2013). All but one of the remaining 32 productivity plot fledglings departed over the following 15 days, with one lingering on Guillemot Cliff for a further 31 days; the first 25% had fledged by 25th August (one day earlier than the 2014-2020 mean), 50% had departed by 27th August (two days earlier than the

2014-2020 mean) and 75% had departed by 31st August (one day earlier than the 2014-2020 mean). The last had left by 22nd September, this 16 days later than the 2014-2020 mean and the latest plot departure of the last eight years (the earliest last fledgling during this period had departed by 3rd September in 2017, the previous latest by the 10th in 2015); interestingly the late 2021 fledgling was not wholly the result of a late hatching, indeed it had first been seen as a hatchling on 20th 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, although there were September highs of 65 on the 3rd, 61 on the 4th and 57 on the 11th. Daycounts between the 12th and 17th September ranged between one and 13 (not including the chick), with the only Fulmar seen on the 18th being the late youngster. Four were at sea on the 19th, these the last to be seen prior to the departure of the Guillemot Cliff fledgling at some point between the 21st and 22nd; the latest bird to be seen ashore between 2014 and 2020 was present on the 15th in 2019, with the 2014-2020 mean being 11th September and the earliest last bird being logged on the 6th in 2017. The only other September sightings were of one on the 23rd, three on the 26th, two on the 27th and one on the 30th.



Seawatching during October produced only a single on the 5th, ten on the 30th and three on the 31st; a bird-days total of 14 was down on that logged in each October between 2013 and 2017 (including a record 185 in the former year), the 79 of last year and a 2013-2020 October bird-days mean of 51.1. There were November records on all but three dates, although the number of birds present varied considerably; there were 12 three-figure daycounts during the month (a new record, up on the ten of last year), with peaks of 226 on the 16th, 220 on the 20th and 217 on the 30th (the maximum of which was the third highest November count, down on a high of 283 logged on the 28th in 2019), but lows of between two and 18 on six dates (in addition to the three days on which birds were absent). A November bird-days total of 2683 was a new high, up on the 2222 of 2020 and the 2006 of 2019. Three birds returned to the cliffs on 3rd November, this the earliest return of the last nine years but just four days earlier than the 2013-2020 mean; one ashore on the 4th in 2019 was the earliest landfall during this period, with one on the 11th in 2015 the latest. There were birds ashore on 23 further November dates (five more than last year), including highs of 168 on the 16th, 180 on the 19th and 155 on the 20th and 30th (the peak was down on a record 189 counted on the 28th in 2019). There were sightings on each December date prior to the departure of staff on the 5th, with a high of 163 on the 3rd (including 89 ashore), but just two on the 5th and between 22 and 28 on the remaining three dates (only four of which were on land).

Manx Shearwater *Puffinus puffinus*

Aderyn Drycin Manaw

Very Abundant Breeder a 2018 census estimated 88,945 pairs (95% CI: 21,892). 2012-13 est. 63,980
 1664 trapped (including 127 pulli), 594 retrapped, 3 controls
 1928-1976: 171,509 trapped, 2012-2020: 13,018 trapped, 5555 retrapped, 25 controls

A minimum of 150 offshore on 11th March was the first record of the year and the highest seawatch total to have been recorded so early in the season. It was not until the night of the 13th that significant numbers were coming ashore and it was not until the 24th that birds were heard calling from burrows during the day (this six days later than last year). As in the majority of previous years, seawatching during April resulted in some surprisingly small counts; although a peak of 8300 on the evening of the 28th was up on a 2013-2020 mean of 6811, minimums of 2000 on the evenings of the 27th and 29th were the only other four-figure counts (a daycount of 21,600, recorded during Storm Hannah in 2019, is the highest April count to date). The two highest May counts, namely the 16,340 logged on the 3rd and the 12,700 logged on the 21st, were made in southwesterly winds of at least gale force; the 2013-2020 mean May peak is 14,979, with a high of 28,200 counted during a southwesterly gale in 2018. June was calm, indeed the wind rarely exceeded 20 knots, with the four peak daycounts of at least 10,000 logged between the 20th and 30th being of birds rafting on calm evenings; the mean 2013-2020 June maximum is 20,803, with highs during this period of 24,750 in 2020 and 72,000 during heavy rain and a near gale in 2019. An even calmer July saw the lowest peak counts of the last seven years, with a high of 10,800 on the 5th being down on a 2013-2020 mean of 23,376 and a record 45,016 logged in 2018. Heavy rain and a stiff southeasterly on 5th August brought the highest count of the year, although a total of 16,360 was the lowest August peak of the last decade, down on a 2013-2020 mean of 44,448 and the all-time high of 87,520 logged last year.

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; all birds found within the burrows are ringed. Of 328 breeding adults bearing rings in 2020, 253 were found this year (77.13%); this was the second lowest next-year return rate of the last eight years, down on a 2014-2020 mean of 80.45% (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 (which included one not seen until 2020, see table below). This year saw four birds encountered which had not been seen since 2018 (raising the minimum survival figure for the period between the 2018 and 2019 breeding seasons from 88.18% to 89.53%) and eight birds which had not been seen since 2019 (raising the figure for the period between 2019 and 2020 from 79.55% to 82.14%). Given that we are still encountering birds not seen for up to six 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 87.73% is already fractionally up on that seen elsewhere.

The number of Manx Shearwaters breeding in the study plots to be encountered the following year and the number to have been found by 2021 (which were actually alive the following year).

	Birds found the next year		Birds found by 2021	
Birds breeding in 2020	253 of 328	77.13%		
Birds breeding in 2019	245 of 308	79.55%	253 of 308	82.14%
Birds breeding in 2018	247 of 296	83.45%	265 of 296	89.53%
Birds breeding in 2017	236 of 309	76.38%	252 of 309	81.55%
Birds breeding in 2016	238 of 287	82.93%	267 of 287	93.03%
Birds breeding in 2015	230 of 283	81.27%	247 of 283	87.28%
Birds breeding in 2014	215 of 278	77.34%	238 of 278	85.61%
Birds breeding in 2013	116 of 141	82.27%	126 of 141	89.36%

There is a discrepancy in return rates dependent on the breeding success of the previous year; of 230 birds successful with their 2020 breeding attempt, 195 were found in 2021 (84.78%), whereas only 58 of 98 unsuccessful birds returned (59.18%). Of 82 birds which went missing in 2021, 46 (56.10%) had either failed with their 2020 breeding attempt or had been found without an egg in a burrow in which they had previously bred. 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 16 of the missing birds have been found subsequently, the return rate of 2017 breeders remains the lowest of the last seven years (81.55%). 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 13 of 82 marked birds were in the same burrow this year as that in which they bred in 2013 (15.9%), whereas in the more stable Quarry Track and Crab Bay colonies five of 18 birds (27.8%) and 17 of 41 birds (41.5%) 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 29 birds encountered in all nine years between 2013 and 2021, 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 24 birds, three have fledged young on 66.7% of occasions, nine have fledged young on 77.8% of occasions and 12 have fledged young on 88.9% 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 11. Of these, FB46145 (ringed in LH19 in 2017), is unusual in that it bred successfully this year at just four years of age (in LH21, just two metres from its natal burrow). Two further birds have been found as four year olds, although one of these did not breed until it was six (it was unsuccessful this year in the burrow it had occupied in 2019 and 2020) and one seemingly did not breed until it was seven (a successful 2020 attempt in the burrow it occupied in 2017). Four birds were first found after five years, two of which bred successfully, one of which bred unsuccessfully and one of which did not produce an egg. Three birds were first found at six years of age, one of which bred successfully (and has since failed once and succeeded once), one of which failed (and was not seen again) and one of which did not produce an egg (a bird which bred successfully the following year).

Finally, one was first encountered as a seven year old when it successfully fledged a chick (although this bird also went missing the following year). Thus one was first known to breed at four years of age, three were first known to breed at five, three were first known to breed at six, three were first known to breed at seven and one has not been found with an egg.

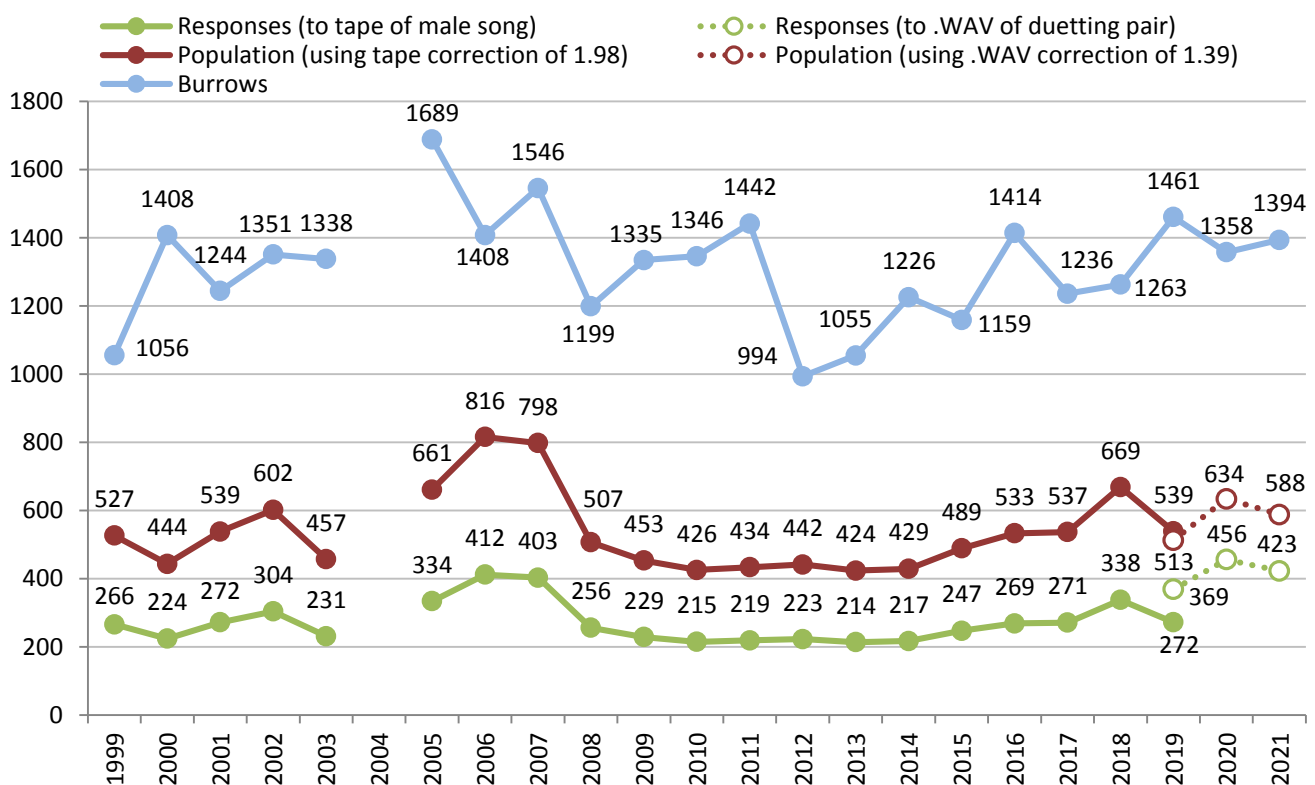


The study burrows facilitate an accurate assessment of breeding success on Skokholm. There were 128 burrows at the Lighthouse occupied by a pair which produced an egg, ten burrows contained an egg along the Quarry Track and 22 pairs produced an egg inland of Crab Bay. There were thus 160 burrows this year from which productivity could be assessed (although down on the 168 of last year, this was the second highest total to date, up on a 2014-2020 mean of 156). Of these, 12 definitely failed at egg stage; two eggs were found damaged and ten were found abandoned. An additional 17 pairs failed at egg or very small chick stage (but neither eggs nor dead chicks were found). There were three early chick stage failures, with one burrow found to contain a hatched shell but no chick and two found to contain down but no chicks; the missing youngsters were perhaps taken by Great Black-backed Gulls, although in only one instance had a hole been excavated to allow access to the nest chamber. The only larger chick stage failure occurred in Lighthouse burrow 58 where two (previously unencountered) adults were found alongside the body of a chick with a 147mm wing chord; it was unclear whether this was a case of infanticide, although one of the adults had a bill covered in the chick's down. A chick was assumed to be of fledging size when its wing length was in excess of 200mm; although not ready to fledge, we have shown that chicks larger than this size may swap to a different burrow and therefore go undetected. There were 127 chicks which reached this size in 2021. Productivity was thus 0.79 fledging-sized chicks per breeding pair (79.38% of pairs produced a fledging-sized chick); this was up on the 0.68 of last year, up on a 2013-2020 mean of 0.71 \pm se 0.02 and was the second highest productivity estimate of the last nine years (the peak during this period was the 0.80 observed in 2017). 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 (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). The latest of the study plot chicks had attained a wing chord of 221mm by 25th September.

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 10,057 birds ringed along the transect between 2013 and 2021 (4256 of which were ringed as fledglings), 2346 have been retrapped or found dead on Skokholm subsequently (with these recaptured individuals accounting for 3892 separate handlings).

The total number of burrows, responses (to tape 1999-2019 and to .WAV 2019-2021) and the corrected population estimates for the 7000m² 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 22 years. On each annual visit the number of burrows within the area is counted, as is the number of burrows from which a response is elicited when the call of a male bird is played down them. The standard correction factor (1.98) is then used to estimate the population within the 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 tape) as it has been shown that a dual-sex recording achieves a higher and less variable response rate (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. However COVID-19 dictated staffing shortages in 2020 and 2021 meant that there was not time to conduct both a tape and a .WAV playback census; it was thus decided that only the .WAV recording would be used as this would preserve the life of the cassettes and maximise the number of times that both techniques could be used in the same years.

This year saw each of the nine plots visited between 29th May and 3rd June. The 7000m² (seven plots) monitored since 1999 contained 36 more burrows than last year, the total being the third highest of the last ten years and 6.3% up on the 1999-2020 mean (1310.86 \pm sd 167.31). 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). An increase in the number of burrows present was also seen at the plot started in 2006, where there were 72 more, however there were 18 fewer 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 423 responses elicited in the original 7000m² using the .WAV recording, this 33 (7.2%) down on the 2020 total. Although there were two more responses in the plot near the Helipad and 17 more in the plot above the Dip, there were between four and six fewer responses at three sites, 15 fewer at the Neck plot (an area shared with an expanding Puffin population) and 23 fewer in the fragile Spy Rock plot (a site which has seen a steady increase in the predicted population since 1999). Using the Skokholm specific .WAV correction of 1.39 predicts that there were 588 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 previous years, this despite the 2021 decline in the number of responses. The 1000m² plot visited since 2006 produced ten fewer responses than last year. The 670 occupied burrows predicted across the 8000m² using the .WAV recording was down on the 730 of last year, but up on the 2019 .WAV estimate of 606 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 seven fewer responses to the .WAV recording at the Table plot first visited in 2015, the predicted population being the lowest to date (ten down on that of 2020). Nevertheless it would appear that the Skokholm 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 rather constant supports the conclusion that the population is stable (see above).

The estimated number of pairs in the 8000 square metres sampled 2007-2021.

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
954	620	525	499	495	501	521	477	533	588	584	739	655	730	670

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).

The number of Manx Shearwater corpses found between 1957 and 1983 from Gynn (1984) plus data from 1984 to 1991 and 2014 to 2021. 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
Corpses	2465	1886	924	1354	1089	640	688	1059	857	946	816
GBBGU	27	30	30	10	12	5	7	12	8	10	10
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Corpses	841	829	304	606	1350	1082	869	1051	1266	1913	1820
GBBGU	3	14	11	16	12	12	7	7	7	6	10
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Corpses	1153	1024	1080	1479	1373	1316	1571	1068	1759	1760	1694
GBBGU	10	10	11	16	11	14	11	10	11	12	15
	1990	1991	2014	2015	2016	2017	2018	2019	2020	2021	
Corpses	1915	2703	4271	4123	3782	3449	3270	2707	4091	3237	
GBBGU	16	20	84	83	93	93	93	86	83	80	

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

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

As might be expected with a larger Great Black-backed Gull breeding population, the number of corpses marked over the last eight years has been the most ever. However the average number of corpses per Great Black-backed Gull pair was only 40.5 in 2021; this has only been lower in six previous years (including three of the last five), with all-time lows of 30.8 in 1959 and 27.6 in 1970 (there were highs of 318.8 in 1977, 280.3 in 1968 and 182.0 in 1978). One possible explanation for this reduction in kills per pair is that the breeding 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). There was a drop in the number of adult corpses found this year; a total of 2132 was 29.1% down on that logged in 2020 and 11.5% down on the 2014-2020 mean (2408.14 ±sd 500.32), the increased human presence brought about by relaxing COVID-19 restrictions perhaps reducing the amount of time in which gulls could hunt undisturbed. 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 100 ringed birds found predated in 2021 again do little to support this theory (see below table and the 2018-2020 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 no evidence that most eaten birds are younger. Other factors which may impact predation rates are vegetation heights, the number of gulls specialising in shearwaters (Westerberg *et al.*, 2018), 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 Skokholm). The prevalence of puffinosis may well be affecting juvenile losses (see below).

When the 100 ringed shearwaters found eaten in 2021 were marked. Note that the pre-2013 birds were controls ringed elsewhere and that intensive ringing on Skokholm recommenced in 2013.

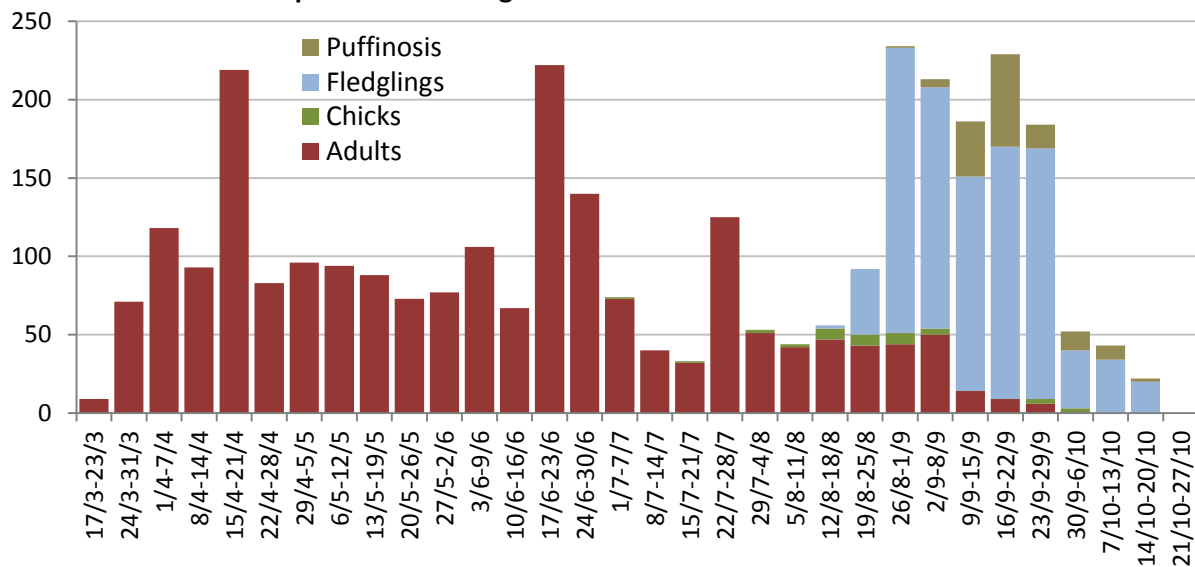
Adult 2012	Fledged 2012	Adult 2013	Fledged 2013	Adult 2014	Adult 2015	Fledged 2015	Adult 2016	Fledged 2016
1	1	10	4	12	12	2	7	3
Adult 2017	Fledged 2017	Adult 2018	Fledged 2018	Adult 2019	Fledged 2019	Adult 2021	Fledged 2021	
3	1	8	3	2	1	2	28	



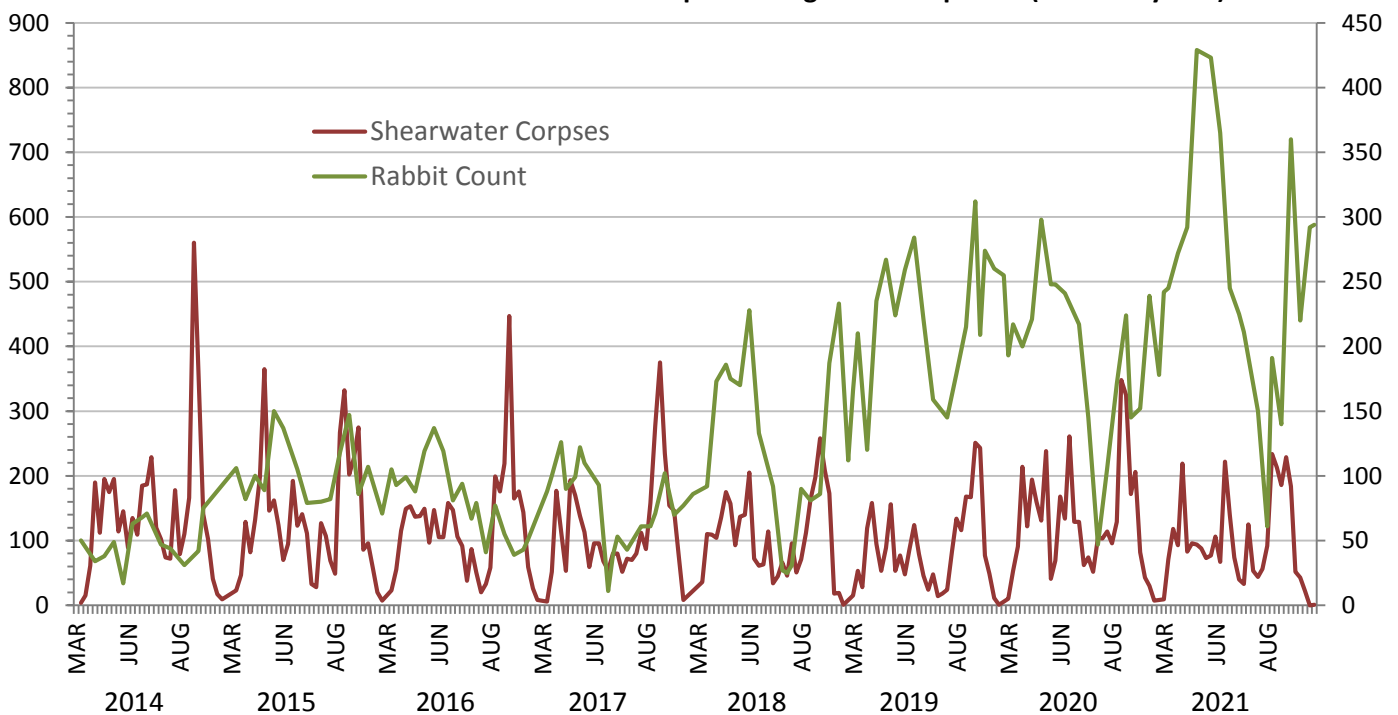
The data from the last eight years lends some support to the theory that Rabbit numbers influence Manx Shearwater predation (by providing an alternative food source for the gulls), with the North Plain Rabbit count being considerably lower in 2014, when shearwater mortality was at its highest, and progressively higher during 2018 and 2019, the period during which fewer shearwater carcasses were located (see second chart below). This year saw the highest Rabbit numbers of the last eight

years, this coinciding with the second lowest number of corpses and the lowest number of juvenile corpses to be found during the same period. However 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, as mentioned above, 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 17th March until 27th October 2021.



The total number of Manx Shearwater carcasses found each week 2014-2021 and the number of Rabbits counted in the North Plain census plot during the same period (secondary axis).



The first fledgling had departed on 17th August, this one day earlier than the first of last year and five days earlier than the 2013-2020 first fledgling mean (birds gone by the 18th in 2019 and 2020 were the earliest during this period and two on the 27th in 2018 were the latest). The first fledgling

showing signs of puffinosis was at Billy’s Dyke on the 30th, one day later than the first infected individual to be found last year. Puffinosis is a mysterious affliction which, possibly due to the actions of a virus which leads to bacterial infection, sees the development of conjunctivitis, blistered feet and problems with limb control; it is often fatal. The number of puffinosised birds found dead and intact during the last eight years has ranged between 46 and 138 (see above table); unlike eaten birds, which are usually taken to open areas, puffinosised birds may die deep in the Bracken (meaning that corpses in fragile areas of dense vegetation are probably going undetected). In an attempt to achieve a better understanding of how puffinosised birds are distributed across Skokholm 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 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.

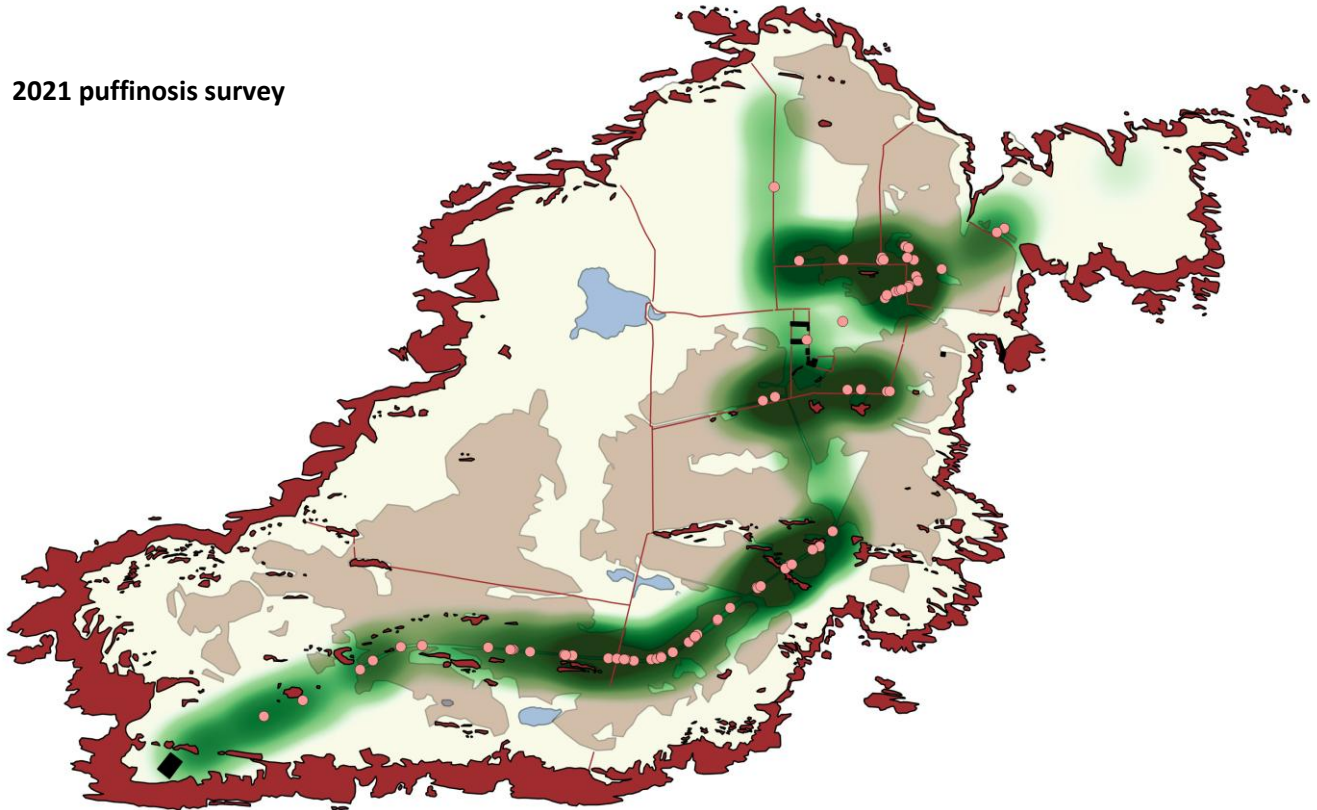
The number of fledgling Manx Shearwaters encountered along the transect between 2016 and 2021, the number which showed signs of puffinosis and the percentage of encountered birds made up of those showing signs.

2021	1st-2nd	4th-5th	7th-8th	11th-12th	13th-14th	16th-17th	18th-19th	20th-21st	Total
Birds	147	143	228	152	111	75	29	16	901
Puffinosised	9	10	16	14	11	9	10	4	83
% Puffinosised	6.1	7.0	7.0	9.2	9.9	12.0	34.5	25.0	9.2
2020	1st-2nd	4th-5th	7th-8th	11th-12th	13th-14th	16th-17th	18th-19th	20th-21st	Total
Birds	52	101	201	235	118	111	68	55	941
Puffinosised	1	5	2	23	14	14	15	10	84
% Puffinosised	1.9	5.0	1.0	9.8	11.9	12.6	22.1	18.2	8.9
2019	1st-2nd	4th-5th	7th-8th	11th-12th	13th-14th	16th-17th	18th-19th	20th-21st	Total
Birds	120	182	100	70	55	81	34	49	691
Puffinosised	6	2	11	16	9	9	6	6	65
% Puffinosised	5.0	1.1	11.0	22.9	16.4	11.1	17.6	12.2	9.4
2018	1st-2nd	4th-5th	7th-8th	9th-10th	12th-13th	15th-16th	18th-19th	21st-22nd	Total
Birds	72	142	139	197	155	167	88	48	1008
Puffinosised	2	3	11	16	23	21	10	2	88
% Puffinosised	2.8	2.1	7.9	8.1	14.8	12.6	11.4	4.2	8.7
2017	1st-2nd	4th-5th	8th-9th	11th-12th	14th-15th	17th-18th	20th-21st	23rd-24th	Total
Birds	44	77	100	115	66	43	42	21	508
Puffinosised	4	13	16	10	4	16	14	1	78
% Puffinosised	9.1	16.9	16.0	8.7	6.1	37.2	33.3	4.8	15.4
2016	2nd-3rd	5th-6th	8th-9th	11th-12th	14th-15th	17th-18th	20th-21st	23rd-24th	Total
Birds	110	194	159	88	42	33	43	51	720
Puffinosised	20	18	22	13	8	5	5	6	97
% Puffinosised	18.2	9.3	13.8	14.8	19.1	15.2	11.6	11.8	13.5

The number of shearwater fledglings located along the transect is likely to be different between years, not just because of fluctuations in productivity, but more critically due to differences in the weather and moon cycle which influence their surface behaviour. In total over the eight visits there were 40 fewer fledglings encountered this year than in 2020, with a total of 901 being 10.2% up on the 2015-2020 mean (817.57 ±sd 181.86). Although the count of apparently infected birds was one down on last year, the percentage of birds showing signs was fractionally up, albeit the third lowest to date. As in previous years, puffinosised birds were primarily distributed in the wetter areas of Skokholm, away from more exposed aspects which also typically lack Bracken. Indeed a drier northerly route, which held 270 fledglings over eight 2020 nights, only produced one bird showing signs of puffinosis (0.4%); the infected bird was along North Pond Wall, close to the Farm where a small number of similar birds have been seen previously (see lower map below).

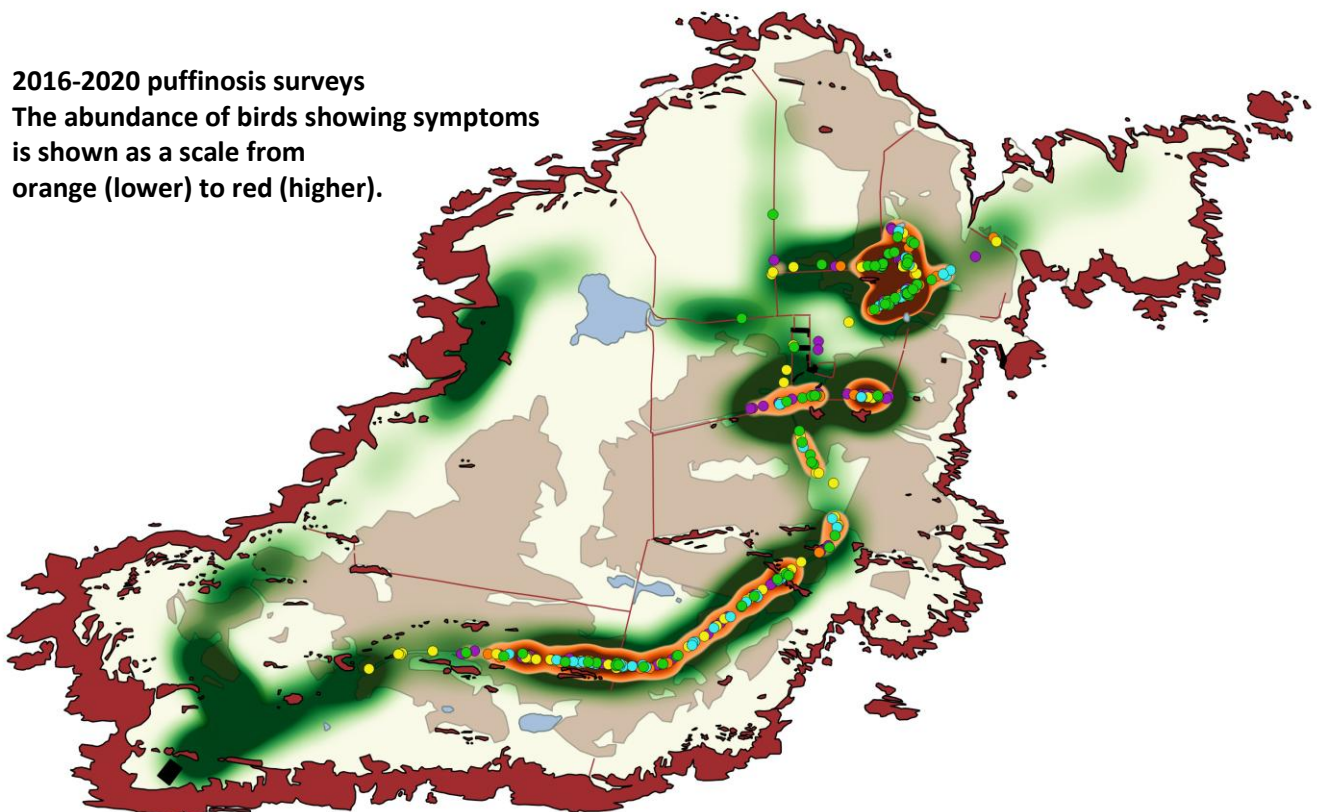
The 2021 and 2016-2020 puffinosis surveys. Manx Shearwater fledgling density is shown in green, with the darker areas holding more birds (the northern footpath between Middle Heath and the Table was only surveyed in 2020). Each puffinosised bird encountered over the eight visits is marked by a circle, pink in 2021, lime in 2020, blue in 2019, yellow in 2018, orange in 2017 and purple in 2016. The 2018 Bracken distribution is also shown.

2021 puffinosis survey



2016-2020 puffinosis surveys

The abundance of birds showing symptoms is shown as a scale from orange (lower) to red (higher).



Given that there is seemingly a link between wetter, poorly drained areas and diseased birds, one possible explanation for the lower proportion of puffinosised individuals encountered during the last four years is that they all proved to be comparatively dry breeding seasons. That the proportion of infected birds was lowest in the four years between 2018 and 2021, the same four years which have seen the lowest totals of predated juveniles (see above table), is intriguing; it is quite probable that puffinosised birds are easier for Great Black-backed Gulls to catch, potentially leading to higher mortality in high puffinosis years (it would usually be difficult to tell that an eaten bird had been suffering from disease). However the number of juvenile corpses located in 2015, the worst puffinosis year of this seven year study, was not significantly higher than in 2016 and 2017 when the proportion of puffinosised birds was lower.

Of the 127 study plot fledglings, 63 (49.6%) had departed by 4th September and 104 (81.9%) had departed by the 11th. Although birds were occasionally calling at night until 8th October, the last grounded adult to be encountered along the transect was a 2018 fledgling retrapped on 13th September, this four days later than the last of 2020 but five days earlier than the last of 2019. The 423 counted at sea on the afternoon of 26th September was the highest daycount ever logged this late in the season (1043 on the 23rd in 2017 is the latest higher count). There were seawatching records on all but one October date to the 7th, with a high of 17 on the 6th, and juveniles were either seen after dark or found freshly eaten on all but one further date to the 16th. A freshly eaten juvenile in North Haven on 20th October was five days later than the last of 2020 (but two days earlier than the last live fledgling recorded in 2019), and up to two birds were seen at sea on each date between the 25th and 27th. Despite regular seawatching, the only November record was of a very freshly eaten, still partially downy, fledgling at Migration Rocks on the 22nd; this remarkably late record is the latest Skokholm youngster to date, eight days later than a live fledgling encountered in 2014. One heading west through Broad Sound on the 1st was the first December record for Skokholm, this five days later than one in 1991 and seven days later than singles in 1991 and 2020.

Ringing recovery EA12116

Originally ringed as an adult, LIGHTHOUSE STUDY BURROW 154, SKOKHOLM 22nd May 2019

Previously recovered as an adult, LIGHTHOUSE STUDY BURROW 154, SKOKHOLM 26th May 2020

Previously recovered as an adult, LIGHTHOUSE STUDY BURROW 154, SKOKHOLM 30th May 2021

Recovered as an adult, PRAIA DE ATALAIA, ARACAJU, SERGIPE, BRAZIL 13th September 2021

Finding condition Found alive on beach and taken to a rehabilitation centre

Distance travelled 7618km at 204 degrees (SSW)

Days since ringed 858

This individual, paired with EA12107 in all three years, failed at small chick stage in both 2019 and 2020 and at egg stage this year. It will be fascinating to see if it survives the rehabilitation process. There have been 13 Skokholm ringed Manx Shearwaters found dead 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 and two in September 2020. They have all been found in Brazil, bar the November 2018 casualty found in Uruguay. Three have died 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, two in at least their sixth winter and one in at least its tenth winter.

Ringing recovery EX93715

Originally ringed as a chick, SKOMER ISLAND, PEMBROKESHIRE 16th September 2012

Recovered as an adult, SOUTH POND, SKOKHOLM 30th March 2021

Finding condition Dead, eaten by Great Black-backed Gull

Distance travelled 4km at 163 degrees (SSE)

Days since ringed 3117

Ringing recovery FB36198

Originally ringed as an adult, BARDSEY ISLAND LIGHTHOUSE, GWYNEDD 28th June 2012

Recovered as an adult, SKOKHOLM 5th July 2021

Finding condition Dead, eaten by Great Black-backed Gull

Distance travelled 122km at 196 degrees (SSW)

Days since ringed 3294

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



Ringing recovery FB42559

Originally ringed as an adult, MANX SHEARWATER TRANSECT, SKOKHOLM 5th July 2013

Previously recovered as an adult, SHEARWATER TRANSECT, SKOKHOLM 29th May and 5th June 2014

Previously recovered as an adult, SHEARWATER TRANSECT, SKOKHOLM 4th and 6th August 2015

Recovered as an adult, SKOMER ISLAND, PEMBROKESHIRE 1st May 2021

Finding condition Intentionally captured

Distance travelled 4km at 343 degrees (NNW)

Days since ringed 2857

Ringing recovery FB46680

Originally ringed as a chick, LIGHTHOUSE STUDY BURROW 23, SKOKHOLM 15th August 2019

Recovered as an adult, BARDSEY ISLAND, GWYNEDD 12th July 2021

Finding condition Intentionally captured

Distance travelled 123km at 16 degrees (NNE)

Days since ringed 697

This is an early landfall for a bird which fledged shortly before 5th September 2019.

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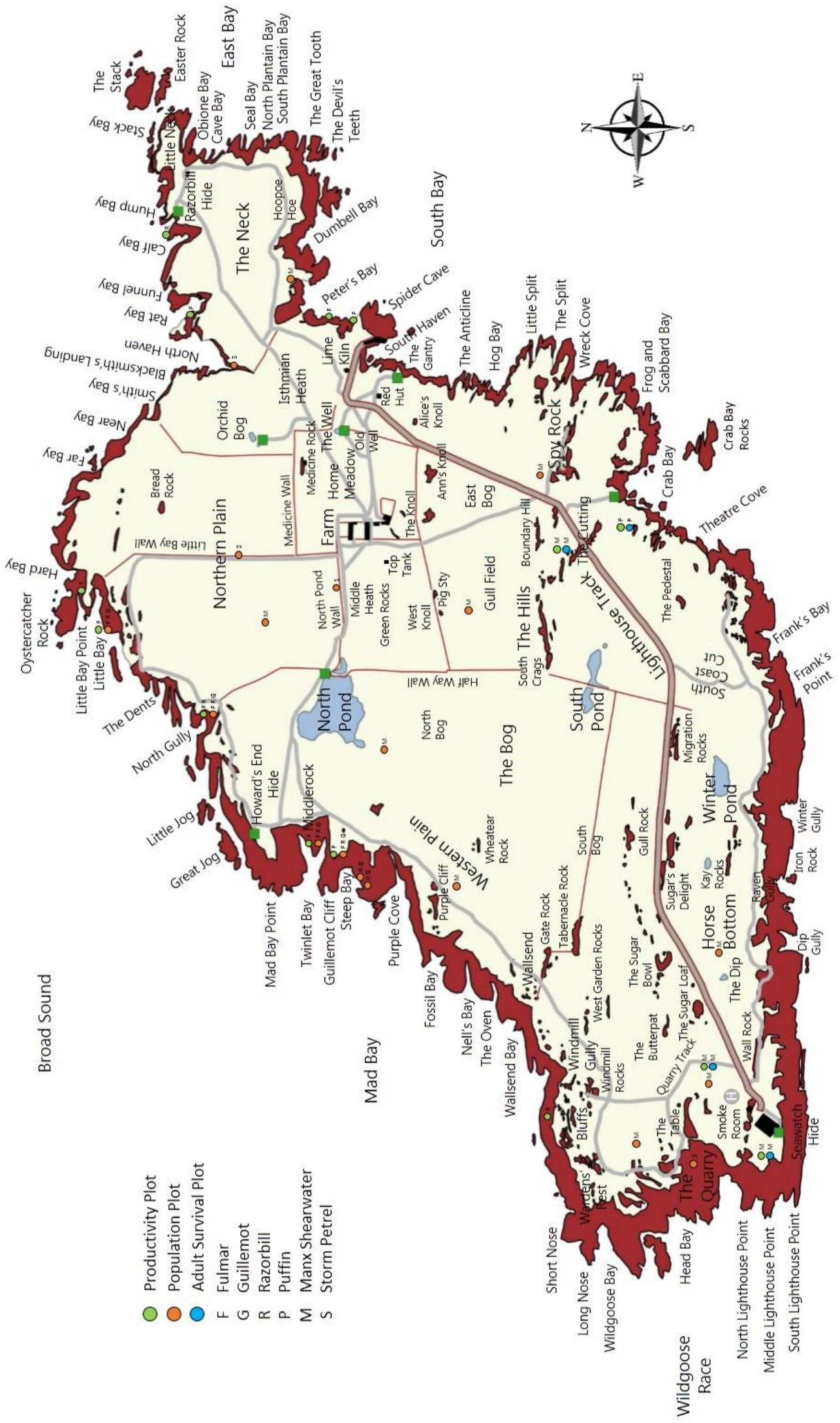
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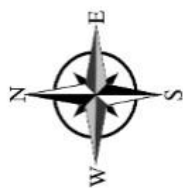
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Report compiled by Richard Brown and Giselle Eagle



Broad Sound

- Productivity Plot
- Population Plot
- Adult Survival Plot
- F Fulmar
- G Guillemot
- R Razorbill
- P Puffin
- M Manx Shearwater
- S Storm Petrel





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