Grey Seal Breeding Census Skomer Island 2021

Report No: 588

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Report series: NRW Evidence Report
Report number: 588
Publication date: February 2022
Contract number: 2022824
Contractor: The Wildlife Trust of South and West Wales
Contract Manager: Lock, K
Title: **Grey Seal Breeding Census Skomer Island 2021**
Author(s): **Büche, B.**

Peer Reviewer(s): Burton, M & Lock, K
Approved By: Lock, K
Restrictions: None

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Recommended citation for this volume:

Büche, B. 2021. Grey Seal Breeding Census Skomer Island 2021. NRW Evidence Report number 588 The Wildlife Trust of South and West Wales.

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Mae'r Morlo Llwyd (*Halichoerus grypus*) yn rhywogaeth Atodiad II y gellir dynodi Ardaloedd Cadwraeth Arbennig ar sail ei phresenoldeb, ac mae'n un o'r prif resymau dros ddynodiad ACA Forol Sir Benfro. Caiff ei chydnabod hefyd fel un o nodweddion Parth Cadwraeth Morol (PCM) Sgomer.

Ym 1983, sefydlwyd dull systematig o fonitro morloi ar Sgomer a dilynwyd y dull hwn gan ddefnyddio'r un fethodoleg, neu un debyg – a chyda mwy o ymdrech mewn rhai blynyddoedd na rhai eraill, gwaetha'r modd – tan 1996 pan safonodd Jim Poole y broses o fonitro morloi ar Sgomer ymhellach drwy gyflwyno'r Llawlyfr Monitro Morloi (Alexander (2015)). Yn 2021, fel mewn blynyddoedd blaenorol, cafodd gweithgarwch bridio'r morloi llwyd ar Ynys Sgomer ei arsylwi a'i gofnodi gan ddefnyddio'r fethodoleg hon.

Cafodd 265 o loi eu geni ar Sgomer, sef 22 yn fwy nag yn 2020 a'r cyfanswm uchaf yn ein cofnodion. Ar Benrhyn Marloes, cafodd 181 o loi eu geni, gan roi cyfanswm o 446 o loi ar gyfer PCM Sgomer yn ei gyfanrwydd. Cafodd llo cyntaf y tymor ei eni yn Castle Bay ar 07/08/21. Ganed 22 o loi ym mis Awst, 184 ym mis Medi, 56 ym mis Hydref a thri ym mis Tachwedd. Y traethau mwyaf cynhyrchiol oedd South Haven (52 o loi), North Haven (48 o loi) a Matthew's Wick (41 o loi).

Rydym yn gwybod, neu'n tybio, fod 195 o loi wedi goroesi ar Sgomer. Mae tynged saith llo yn anhysbys, gan roi cyfradd oroesi o 76%. Ar y tir mawr, rydym yn gwybod, neu'n tybio, fod 143 o loi wedi goroesi, gan roi cyfradd oroesi o 79%. Y gyfradd oroesi gyffredinol ar gyfer PCM Sgomer i gyd yw 77%.

Yn 2021, cofnodwyd y nifer fwyaf oedd yn gadael y dŵr, sef 378 o forloi, ar 13/11/21. Cafwyd y cyfrifiad uchaf o forloi oedd yn gadael y dŵr yn North Haven ar 14/11/21, Driftwood Bay ar 13/11/21, Castle Bay ar 02/11/21 a Matthew's Wick ar 13 ac 18/11/21.

Cafodd 40 o forloi creithiog (37 buwch a thri tharw) eu hadnabod eto o luniau blaenorol gan ddefnyddio catalog morloi Sgomer. Y fuwch hynaf i ddychwelyd oedd HD-014. Cafodd hi ei hachub o draeth Penberth, Cernyw ym mis Chwefror 2002. O 2010 tan 2012, câi ei gweld bob blwyddyn ar Sgomer. Y cofnod yn 2021 yw'r un cyntaf ers 2012. Y tarw hynaf i ddychwelyd i Sgomer yn 2021 oedd 12.NHV.B06. Fe'i gwelwyd ar draeth North Haven ym mis Medi a Hydref 2012 ac nid oedd wedi'i gofnodi ers hynny. Ym mis Hydref 2021, ef oedd y tarw trechaf ar draeth South Haven.

O'r 265 o fuchod a roddodd enedigaeth ar Sgomer yn 2021, roedd gan 38 greithiau. Cafodd 14 o'r buchod creithiog eu hadnabod, gan olygu bod 37% o'r buchod adnabyddadwy oedd yn bridio yn fuchod oedd wedi dychwelyd.

Tynnwyd lluniau o 40 o forloi unigol (pedwar morlo gwryw, 32 o forloi benyw a phedwar morlo ifanc) a oedd ag arwyddion amlwg o fod wedi'u dal mewn rhwydi ar ryw adeg yn eu bywydau. Craith ddofn o amgylch eu gyddfau oedd yr arwydd mwyaf cyffredin, yn aml gyda darnau o'r rhwydi'n dal yn sownd ynddynt.

Executive summary

The Grey Seal (*Halichoerus grypus*) is an Annex ll species for which Special Areas of Conservation can be designated and a primary reason for the selection of the Pembrokeshire Marine SAC. They are also recognised as a feature of the Skomer Marine Conservation Zone (MCZ).

In 1983, a systematic approach to seal monitoring on Skomer was established and continued, using the same or at least similar methodology, albeit at varying levels of intensity, until 1996 when Jim Poole standardised the seal monitoring on Skomer further by introducing the Seal Monitoring Handbook (Alexander (2015)). In 2021, as in previous years, the breeding activities of the grey seals on Skomer Island were observed and recorded using this methodology.

265 pups were born on Skomer, which is 22 more than in 2020 and the highest total on record. On the Marloes Peninsula 181 pups were born giving a total of 446 pups for the Skomer MCZ as a whole. The first pup of the season was born at Castle Bay on 07/08/21. 22 pups were born in August, 184 in September, 56 in October and three in November. The most productive beaches were South Haven (52 pups), North Haven (48 pups) and Matthew's Wick (41 pups).

195 pups are known, or assumed, to have survived on Skomer. The fate of seven pups is unknown, giving a survival rate of 76%. On the mainland 143 pups are known, or assumed to have survived, giving a survival rate of 79%The overall survival rate for the whole of the Skomer MCZ is 77%.

In 2021 the maximum haul-out of 378 seals was recorded on 13/11/21. North Haven had its peak haul-out count on 14/11/21, Driftwood Bay on 13/11/21, Castle Bay on 02/11/21 and Matthew's Wick on 13 and 18/11/21.

40 scarred seals (37 cows and three bulls) were re-identified from previous photos using the Skomer seal catalogue.The oldest returning cow was HD-014. She was rescued from Penberth, Cornwall in February 2002. From 2010 until 2012 she was seen annually on Skomer. The observation in 2021 is the first one since 2012.The oldest bull to have returned to Skomer in 2021 was 12.NHV.B06. He was observed on North Haven beach in September and October 2012 and had not been identified since then. In October 2021 he was the dominant bull on South Haven beach.

Of the 265 cows which pupped on Skomer in 2021, 38 had scars. 14 of the scarred cows were identified, hence 37% of identifiable breeding cows were returning cows.

40 individual seals (four males, 32 females and four immatures) were photographed with obvious signs of being entangled in nets at some time in their lives, most commonly a deep scar around their necks, often with netting still embedded.

1. Introduction

Between 08/08/21 and 22/11/21, the breeding activities of the Grey Seals (*Halichoerus grypus*) on Skomer Island were observed and recorded, using the methods employed in previous years. These methods are detailed in the Skomer MCZ & Skomer Island NNR Grey Seal Management Plan (Alexander, 2015), with revisions made regarding access to some sites (Nathan, 2015), and are also mentioned in the individual site sections of this report.

2. Objectives

1. To record the number of Grey Seal pups born at all known pupping sites around Skomer Island throughout the pupping season.

2. To determine the survival rate of seal pups up to their first moult and to record the probable cause of death of any fatalities.

4. To monitor the behaviour of all seals during site visits.

5. To maintain a daily record of the number of Grey Seals using the main haul-out sites, particularly Castle Bay and North Haven, including details of the age and sex of hauled out animals.

6. To record and document all observed cases of seal disturbance, their cause and outcome, including entanglement with man-made materials (angling line, fishing net, etc.).

7. To record and document individual adult and immature Grey Seals with distinctive scars/markings to compare with previous years.

8. To make comparisons of objectives 1 and 2 with previous years' data.

3. Census Methods

All the main Grey Seal pupping sites on Skomer Island were checked regularly and individual records were kept of each pup's progress, from birth to completion of moult, as laid out in the Skomer MCZ & Skomer Island NNR Grey Seal Management Plan (Alexander 2015).

During the main pupping season, the most important beaches; North Haven, South Haven, Driftwood Bay, Castle Bay, Matthew's Wick and Amy's Reach were checked from the cliff tops, weather permitting, daily. Most of these sites (apart from North Haven and South Haven) are located on an area known as The Neck which is separated from the main island by a narrow isthmus. The main island sites (South Stream, High Cliff Boulders, The Wick ,The Basin, Pig Stone Bay and the Garland Stone were also checked regularly, approximately every two to four days.

Beaches with difficult access (e.g., High Cliff Boulders) were only visited after having observed breeding behaviour by females in the vicinity, to avoid unnecessary disturbance.

The caves (The Lantern, Seal Hole and South Castle Beach Cave) and Protheroe's Dock were checked whenever conditions allowed. Entry to these sites is dependent on tides, weather and adult seal activity. To avoid causing more disturbance than absolutely necessary no cave was ever entered if a cow remained inside guarding her pup.

Beaches and caves were accessed no more than once a week to minimise disturbance. Access to Seal Hole was not possible on several occasions due to an adult seal being in the way, therefore several visits were made during the same week.

Most pups are found within 24 hours of being born on Skomer and therefore their date of birth is known very accurately. When pups were born in the less frequently visited sites their date of birth was approximated, based on the date of the previous visit and the pup's size and appearance using the SMRU five-stage age classification system (see Appendix 1).

Sites were visited when necessary to mark pups. This was done in accordance with the Skomer MCZ & Skomer Island NNR Grey Seal Management Plan (Alexander, 2015), unless otherwise stated due to recent safety recommendations (Nathan, 2015).

In most instances seal pups were individually marked using coloured aerosol sheep-fleece marker sprays. New-born pups were not routinely marked because of concerns that marking may interfere with the mother/pup bond. Younger pups were occasionally given a very small mark, usually near the tail, if the beach was being visited anyway. This allowed an individual to be monitored over the following days before being marked properly (when the pup was old enough).

During site visits and inspections every effort was made to keep disturbance to a minimum.

An assessment was made of the condition of each pup when last seen, classified on a five-point scale:

1. Very small	Assumed not to have survived long after moult
2. Small but healthy	In good condition, would have a reasonable chance of survival
3. Good size	Most should survive
4. Very good size	All should survive
5. Super-moulter	An exceptional sized pup

Seal pups were considered successful if they survived until the beginning of moult, unless they were in poor condition (Hewer, 1974). If a pup disappeared before the beginning of moult an individual assessment was made on its likelihood to have survived based on the above criteria. Pups ≥ size 3 were assumed successful, whereas pups smaller than size 3 were assumed unsuccessful.

4. Census Results

4.1 General

279 pups were monitored on Skomer Island in 2021, of which 265 were definitely born on Skomer and 14 turned up either just before the start of moult, or moulting (wanderers).

The total of 265 pups born on Skomer Island is 22 more than in 2020 and is the highest total recorded.

The first pup of the season was born on Castle Bay on 07/08/21. It was found on 08/08/21.

22 pups were born in August, 184 in September, 56 in October and three in November. The busiest month therefore was September.

195 pups are known, or assumed, to have survived on Skomer, the fate of seven pups is unknown, giving a survival rate of 76%.

The seal monitoring sites on Skomer are shown in Figures 1, 2 and 3.

Figure 1 Skomer Island overview

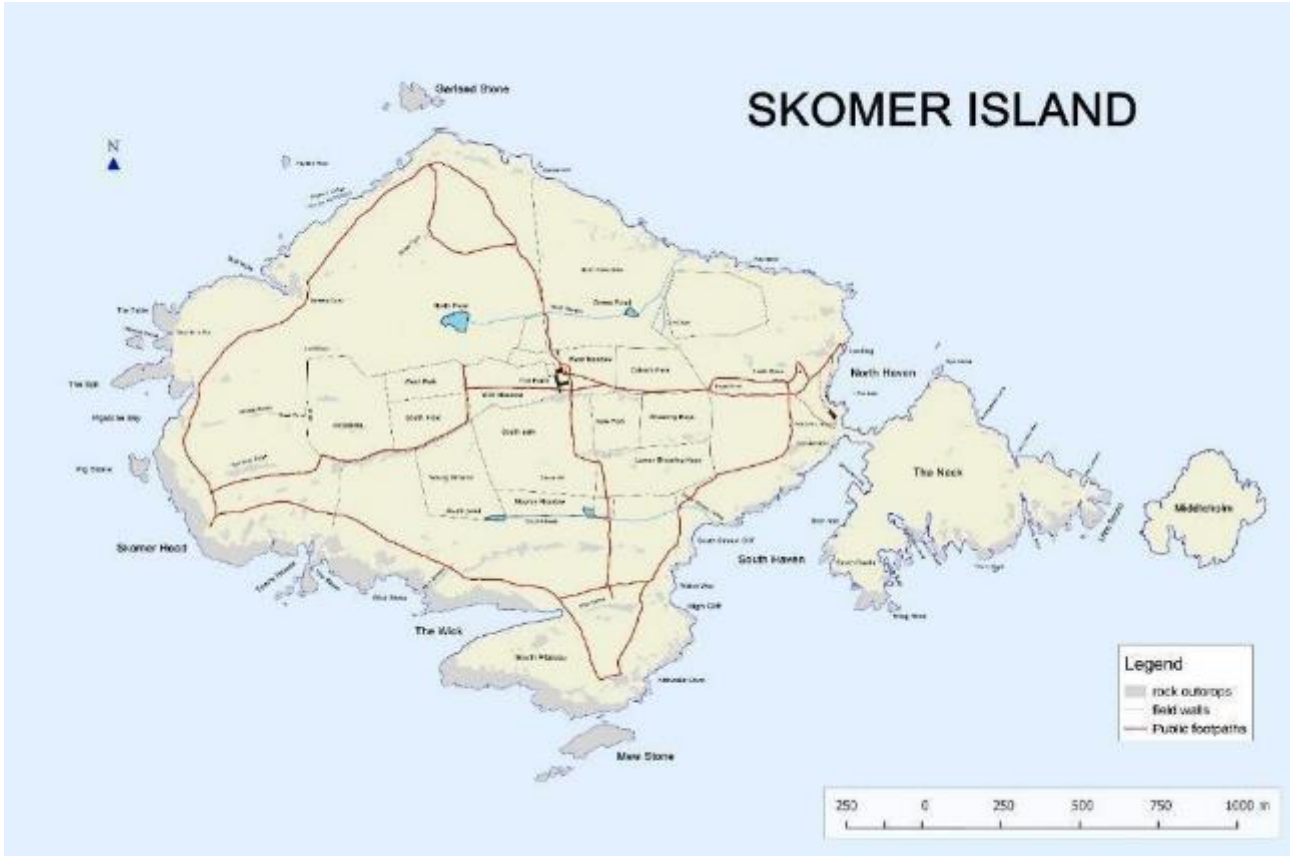


Figure 2 Skomer Island Grey Seal pupping sites east

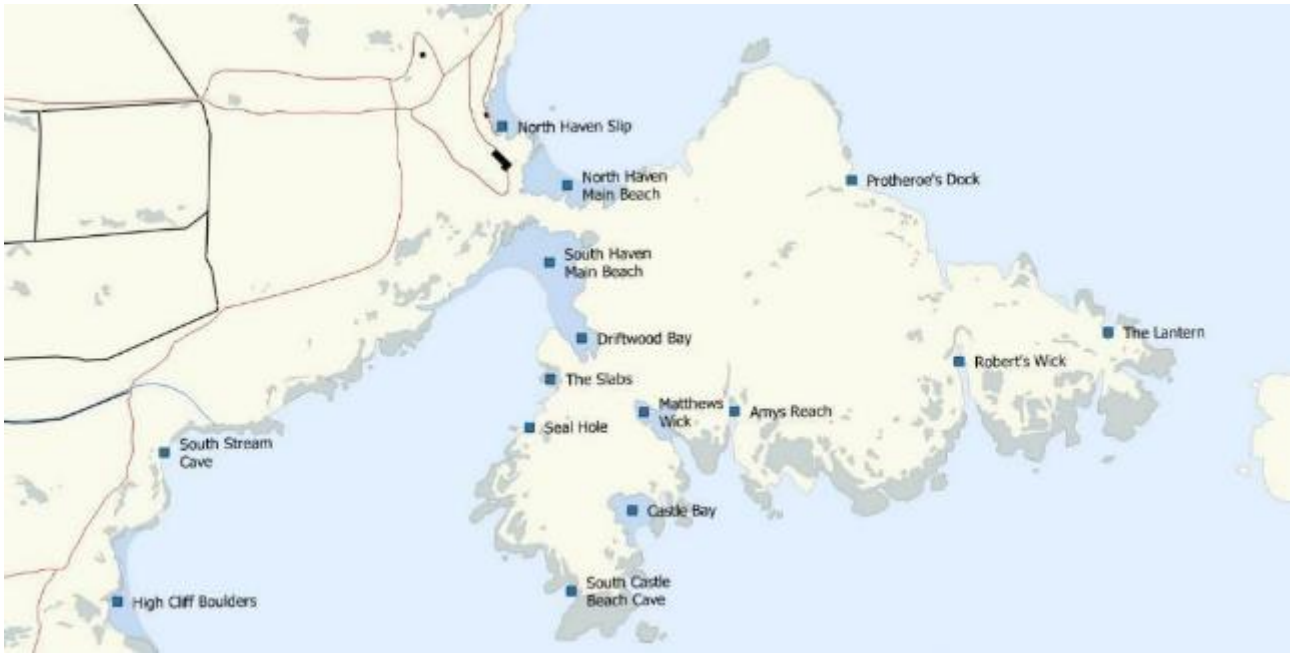


Figure 3 Skomer Island Grey Seal pupping sites west

4.2 Pup Numbers

2021 was another excellent breeding season for the seals within the Skomer MCZ with a total of 446 pups born, 24 more than in the previous record year of 2020. Of the 446 pups born this year 181 were born on the Marloes Peninsula.

On Skomer 279 pups were monitored in 2021. 265 of them were definitely born on Skomer and 14 pups (wanderers) turned up either just before the start of moult, or moulting. These pups could have been born within the Skomer MCZ but in a location hidden from view and thus cannot be included in this report. On 31/08/21 a cow with a pup was spotted by MCZ staff on rocks close to Robert's Wick. As this pup was never observed by the Skomer Seal Project Officer and the date of birth and fate are unknown it was not included in the analysis for this report.

In 2016 the number of seal pups born on Skomer dipped slightly after two years of exceptional pup numbers. In 2017 the numbers were up again to 225 and in 2018 they reached a new record of 241 pups. This increase was not experienced in 2019 but 2020 saw a new record with 243 pups born which was once again topped by the 2021 breeding season.

Figure 4 Number of seal pups born in Skomer MCZ 1983-2021

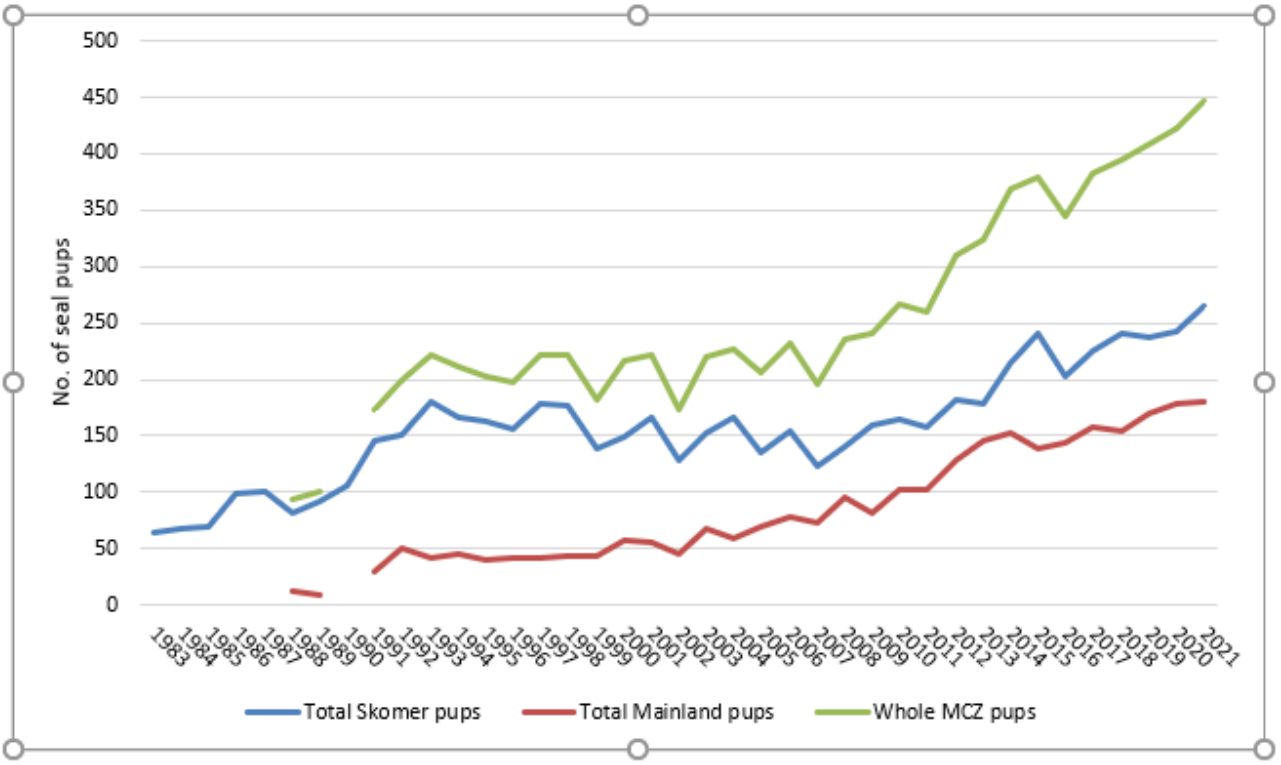


Figure 5 Daily totals of seal pups born on Skomer Island in 2021

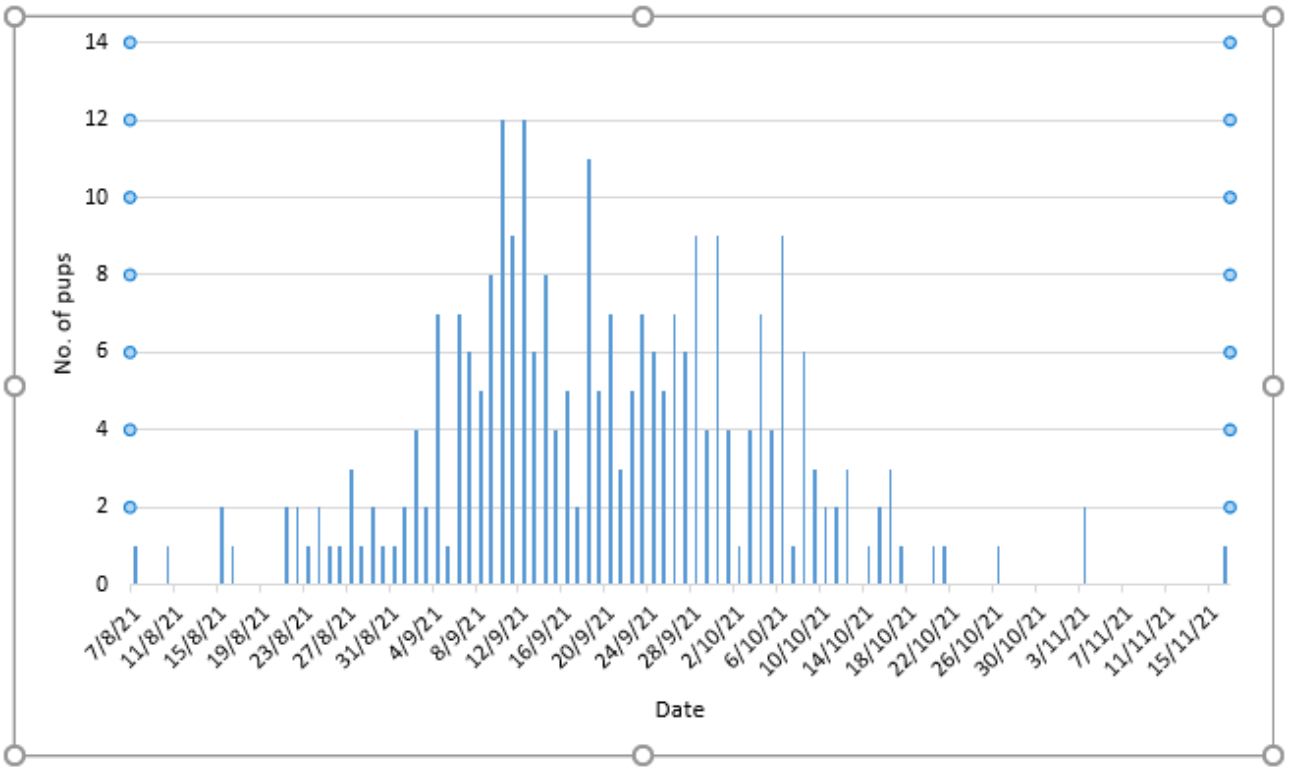


Table 1 Monthly number & percentage of seal pup births on Skomer Island 1983-2021

Year	July	August	September	October	November
2021	0	22 (8.3%)	184 (69.4%)	56 (21.1%)	3 (1.1%)
2020	0	25 (10.3%)	158 (65.0%)	55 (22.6%)	5 (2.1%)
2019	0	16 (6.7%)	144 (60.5%)	73 (30.7%)	5 (2.1%)
2018	1 (0.4%)	22 (9.1%)	125 (51.9%)	87 (36.1%)	6 (2.5%)
2017	2 (0.9%)	12 (5.3%)	146 (64.9%)	57 (25.3%)	8 (3.5%)
2016	0	16 (7.9%)	96 (47.5%)	84 (41.58%)	6 (3.0%)
2015	0	12 (5%)	91 (37.9%)	114 (47.5%)	23 (9.6%)
2014	0	8 (3.7%)	77 (35.8%)	107 (49.8%)	23 (10.7%)
2013	0	8 (4.5%)	60 (33.5%)	92 (51%)	19 (11%)
2012	0	19 (10%)	65 (36%)	77 (42%)	21 (12%)
2011	0	11 (7%)	55 (35%)	56 (36%)	35 (22%)
2010	0	11 (7%)	75 (46%)	50 (30%)	28 (17%)
2009	0	13 (8%)	62 (39%)	47 (30%)	36 (23%)
2008	0	11 (8%)	79 (57%)	37 (27%)	11 (8%)
2007	0	10 (8.5%)	63 (53%)	35 (30%)	10 (8.5%)
2006	0	11 (7%)	78 (52%)	47 (31%)	15 (10%)
2005	0	12 (9%)	79 (58.5%)	35 (26%)	9 (6.5%)
2004	0	24 (14%)	98 (59%)	37 (22%)	8 (5%)
2003	1 (1%)	17 (11%)	92 (60%)	38 (25%)	6 (4%)
2002	0	21 (16.5%)	62 (48.5%)	42 (33%)	3 (2%)
2001	0	17 (10%)	90 (54.5%)	57 (34.5%)	1 (1%)

Year	July	August	September	October	November
2000	2 (1%)	14 (9%)	102 (65%)	40 (25%)	No survey
1999	0	6 (4%)	91 (65%)	44 (31%)	No survey
1998	0	7 (4%)	96 (54%)	70 (39%)	5 (3%)
1997	0	3 (2%)	75 (43%)	85 (49%)	10 (6%)
1996	0	0	61 (39%)	75 (48%)	20 (13%)
1995	0	2 (1%)	49 (30%)	99 (61%)	13 (8%)
1994	0	2 (1%)	51 (31%)	96 (58%)	16 (10%)
1993	0	6 (3%)	67 (38%)	87 (49%)	18 (10%)
1992	1 (0.5%)	4 (3%)	40 (28%)	73 (50%)	27 (18.5%)
1991	1 (1%)	0	20 (14%)	75 (54%)	43 (31%)
1990	0	3 (3%)	17 (16%)	69 (64%)	18 (17%)
1989	0	2 (2%)	18 (19%)	45 (46%)	32 (33%)
1987*	0	0	11 (11%)	41 (41%)	32 (32%)
1986*	0	4 (4%)	22 (25%)	32 (36%)	34 (39%)
1985*	0	0	18 (24%)	20 (27%)	20 (27%)
1984*	0	0	9 (13%)	28 (41%)	18 (26%)
1983*	0	0	24 (33%)	31 (42%)	15 (20%)

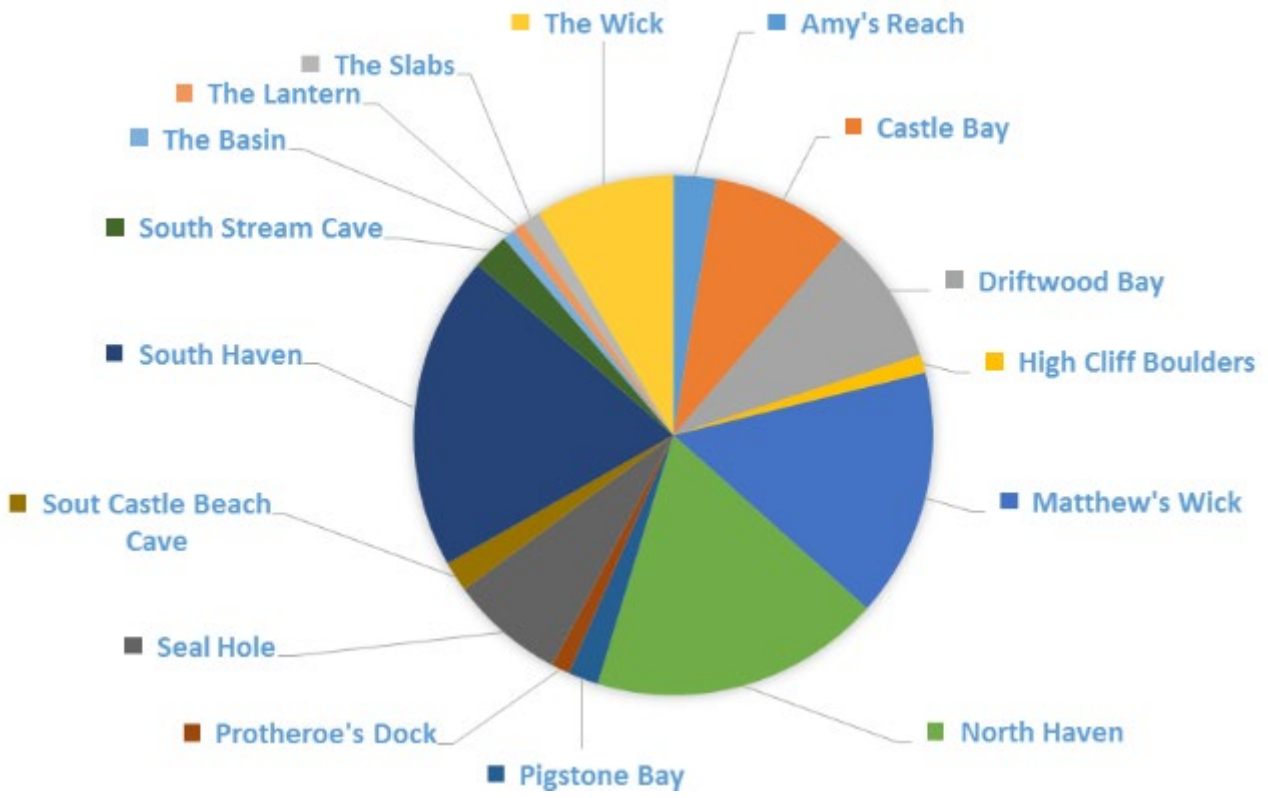
Seal observations continued to mid-December in 1983, 1985 and 1986 and to the end of January in 1984 and 1987. The following data (pups) was recorded in these survey years: 1983 Dec: 3 (4%), 1984 Dec: 6 (9%), Jan: 6 (9%). 1985 Dec: 14 (19%), 1986 Dec: 5 (5%), 1987 Dec: 15 (15%), Jan: 5 (5%). From 1989 onwards the survey has only continued up to the end of November, when the island gets vacated by staff. This table also excludes 1988 as it was not possible to extract the data.

There are occasional records of seal pups in July and these are included in the table, however the full survey, with routine site visits, does not commence until August.

In 2021 the period with most pups born came two weeks earlier than in the previous year. In 2021 the busiest weeks were weeks 36 (06-12/09) and 37 (13/9-19/9) with 59 and 41 births respectively. The following weeks, week 38 (40 pups) and 39 (37 pups) were less busy although still a good number of seals were born.

The most productive beaches were South Haven (52 pups), North Haven (48 pups) and Matthew's Wick (41 pups).

Figure 6 Percentage of seal pups born at each site on Skomer Island in 2021



4.3 Survival Rate

The fate of 258 pups (of 265 born) is known with relative certainty. The fate of seven pups were unknown and thus excluded from the survival rate calculation. The survival rate is calculated as the total number of pups

a) assumed to have survived (disappeared before beginning of moult (class III, size ≥ 3)
b) survived to beginning of moult (started moult (class IV) but disappeared before completion, in a healthy state)
c) survived and were weaned (finished moult (class V), in a healthy state)

divided by the total number of pups born (where the fate is known).

195 pups are known, or assumed, to have survived on Skomer, giving a survival rate of 75.6%, which is slightly lower than the average of 77.9% since records began.

On the mainland 181 pups are known, or assumed to have survived, giving a survival rate of 79%.

The overall survival rate for the whole of the Skomer MCZ is 77%.

Figure 7 Percentage of seal pups surviving in Skomer/MCZ from 1983-2021

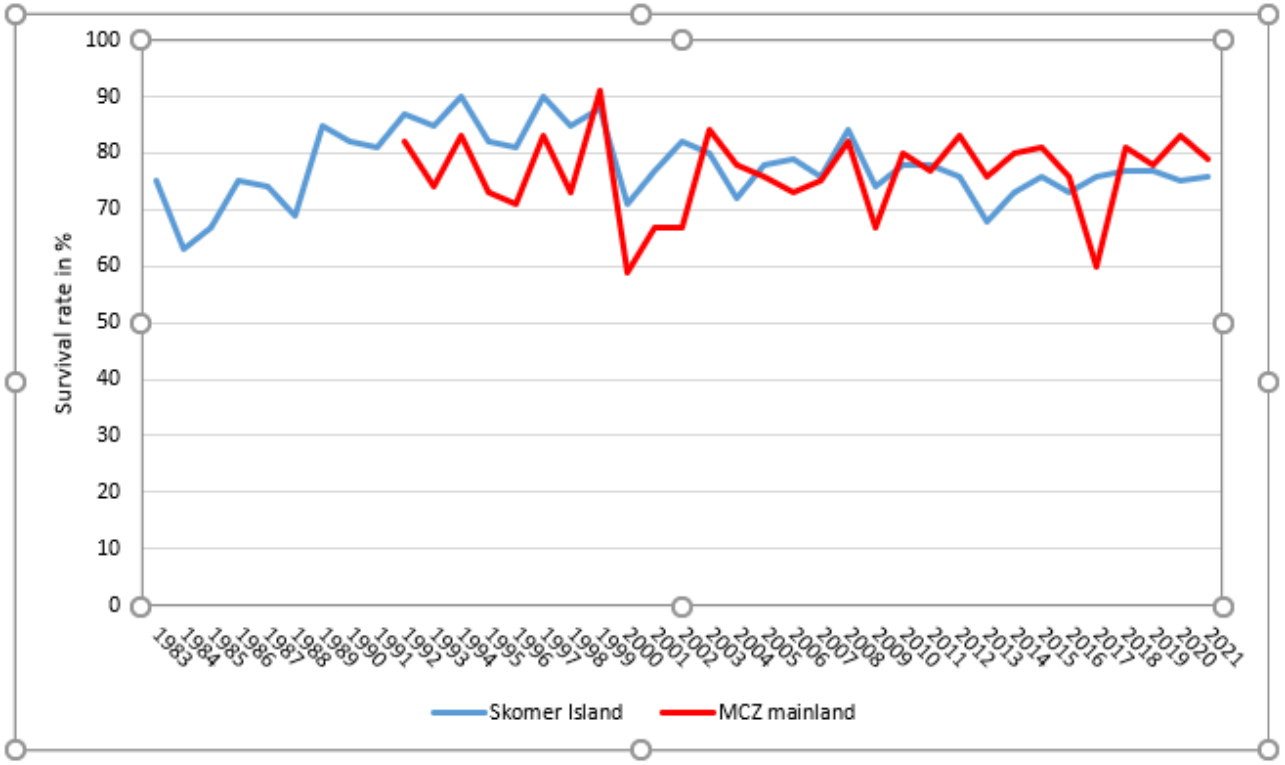


Figure 8 Weekly seal pup births and deaths on Skomer Island in 2020 and 2021

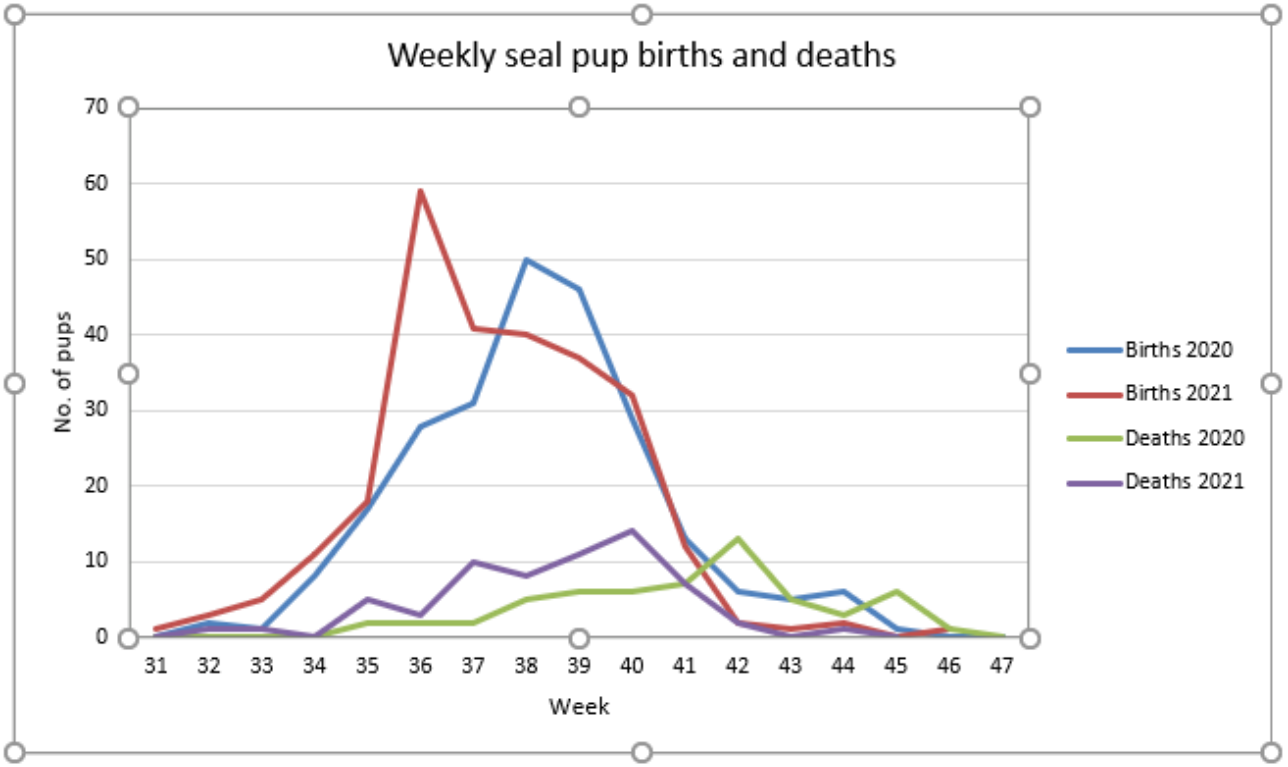


Table 2 Survival rates per site on Skomer Island 2017-2021

Site	Total number of pups raised	Number of pups survived	% Survival
Amy's Reach	7	7	100
Castle Bay	23	18	78
Driftwood Bay	23	16	70
Garland Stone	0	n/a	n/a
High Cliff Boulders	3	2	67
Matthew's Wick	41	31	76
Mew Stone	0	n/a	n/a
North Haven	48	41	85
Pigstone Bay	5	0	0
Protheroe's Dock	3	3	100
Seal Hole	19	9	64
South Castle Beach Cave	5	2	40
South Haven	52	36	71
South Stream	6	5	83
The Basin	2	2	100
The Lantern	2	1	50
The Slabs	3	2	67
The Wick	23	20	87

Note: Pups that moved from their natal beach to a new location and spent the majority of their time there were added to that beach's total to establish the survival rate for this location. Pups for which fates were unknown were not taken into account when calculating the survival rate.

Table 3 Causes of seal pup deaths on Skomer Island in 2021

Cause of death	No. of pups	% of deaths	% of total pups born with fate known
Abandoned/separated/starved	13	21	8
Accident/injured/killed	3	5	2
Disappeared ≤ stage 3	18	29	11
Diseased	0	0	0
Drowned	4	6	2
Stillborn	9	14	6
Unknown	16	25	10
Other	0	0	0
Total	**63**		

4.4 Site Summaries

4.4.1 North Haven

Pups on the main North Haven beach can be very difficult to monitor as there are several caves and overhangs at the back of the beach where pups often disappear, especially during rough weather and big tides. The beach is a popular haul-out site, and it can become impossible to try and see hidden pups without disturbing hauled out animals. The North Haven site also includes North Haven Slip and the cave by the metal ladder.

Usually, North Haven beach is accessed by rowing from the slip round to the main beach. In 2021 this was not possible as a landslide had affected an area next to the slip and walking under the cliff to the beach was deemed too dangerous. Hence there were fewer site visits made to the North Haven Slip as well as the main beach. Occasionally visits were possible on very calm days by rowing from the landing steps across the bay to both beaches.

A total of 48 pups were born in North Haven in 2021, six less than in the previous year. The fate of all 48 pups is known, of which 41 are assumed to have survived, survived to the beginning of moult or were weaned, giving a survival rate of 85% which is 15% higher than the previous year. A possible explanation for this very good survival rate is that there were few northerly storms in the autumn of 2021.

Figure 9 Number of seal pups born on North Haven 1983–2021

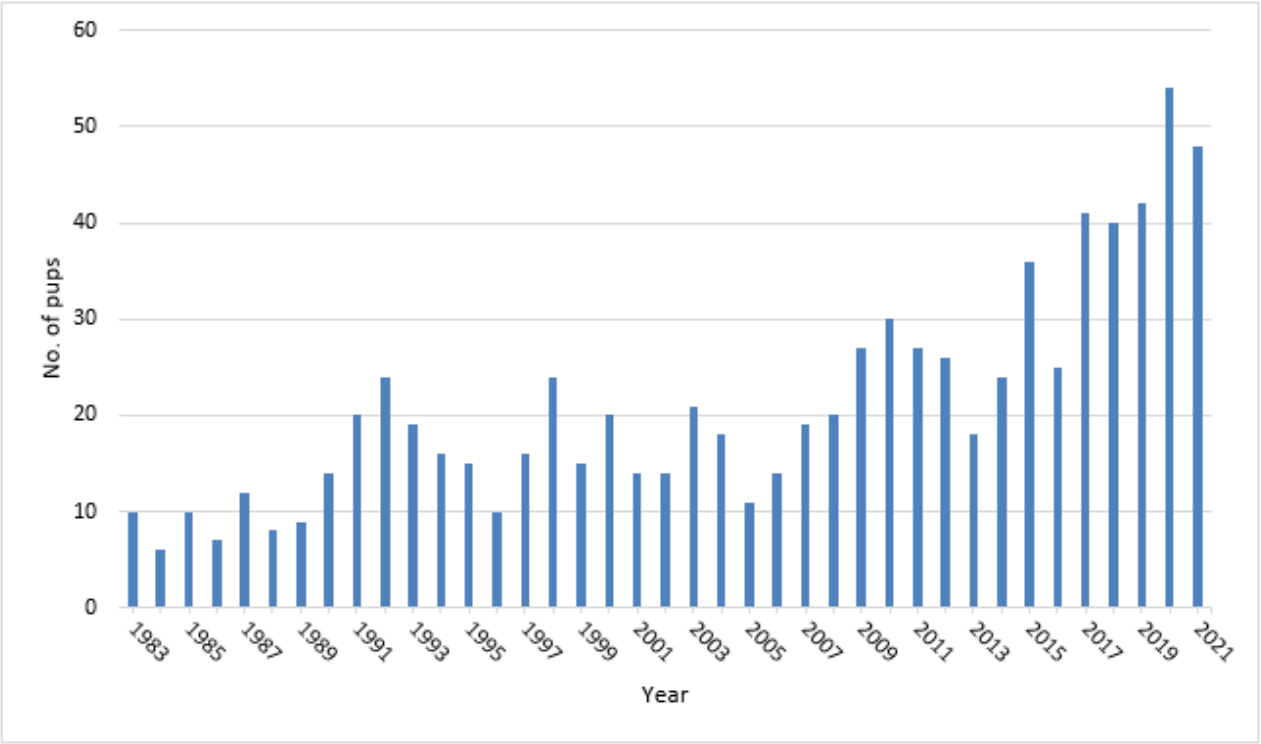


Figure 10 Weekly seal pup births on North Haven in 2021

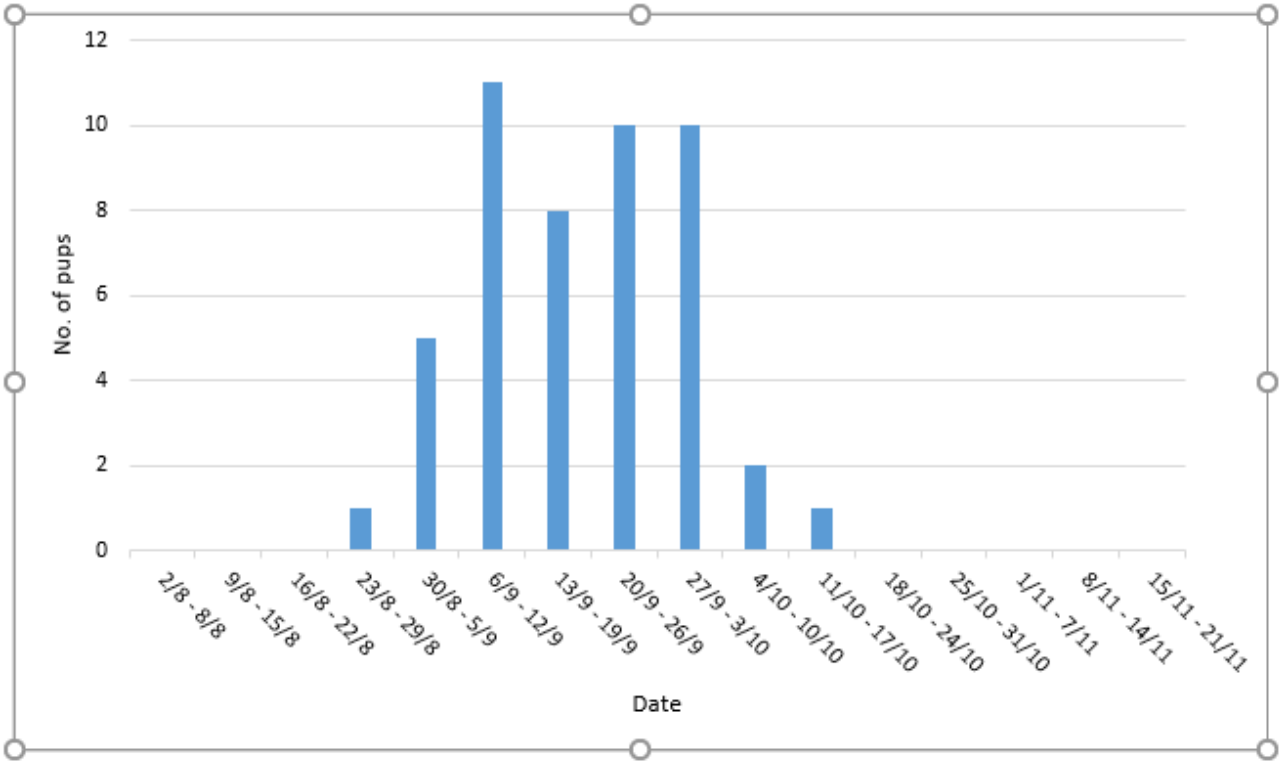


Table 4 Fate of pups on North Haven in 2021

Fate	**No. of pups**
Assumed survived	4
Survived to beginning of moult	8
Survived to weaning	29
Assumed dead	3
Dead	4
Unknown	0
Total	**48**

Table 5 Causes of seal pup deaths on North Haven beach in 2021

Cause of death	**No. of pups**
Abandoned/separated/starved	4
Accident/injured/killed	0
Disappeared ≤ stage 3	3
Diseased	0
Drowned	0
Stillborn	0
Unknown	0
Other	0
Total	**7**

4.4.2 Protheroe's Dock

In 2021 three pups were born on Protheroe's Dock. All pups are assumed to have survived or survived to the beginning of moult, giving a survival rate of 100%.

Figure 11 Number of seal pups born on Protheroe's Dock 1983-2021

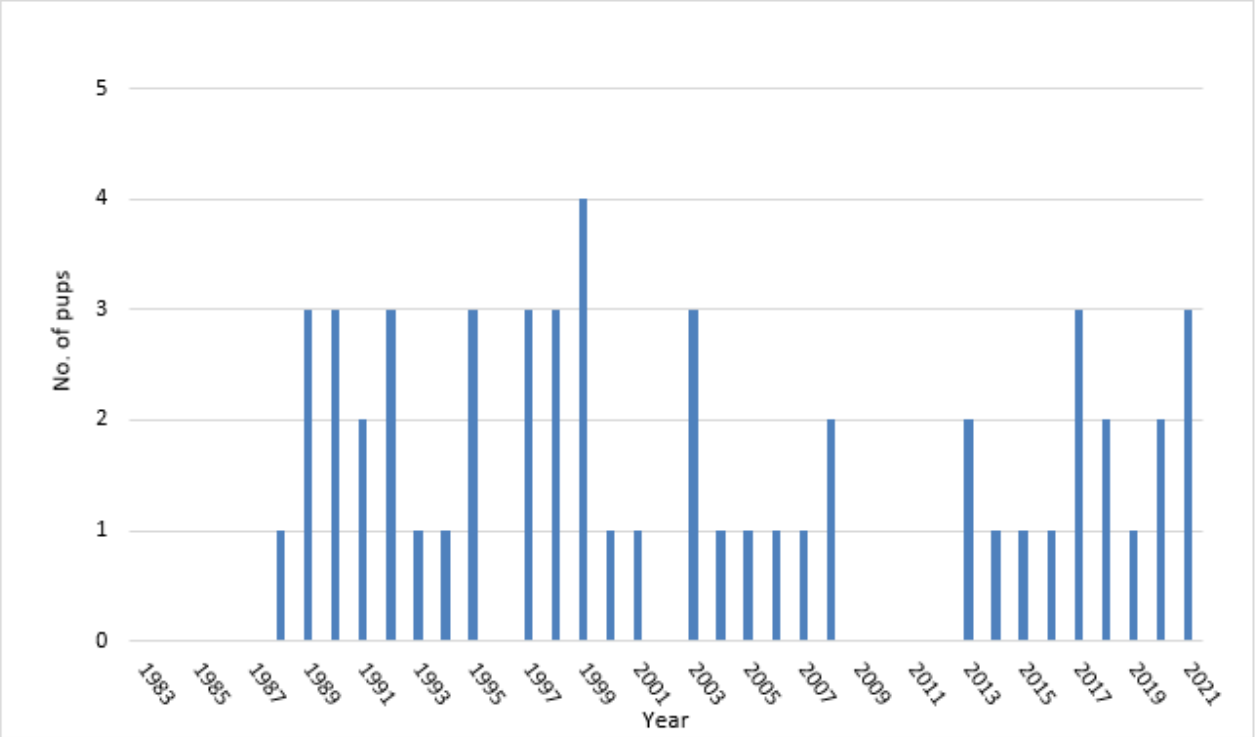


Figure 12 Weekly seal pup births on Protheroe's Dock in 2021

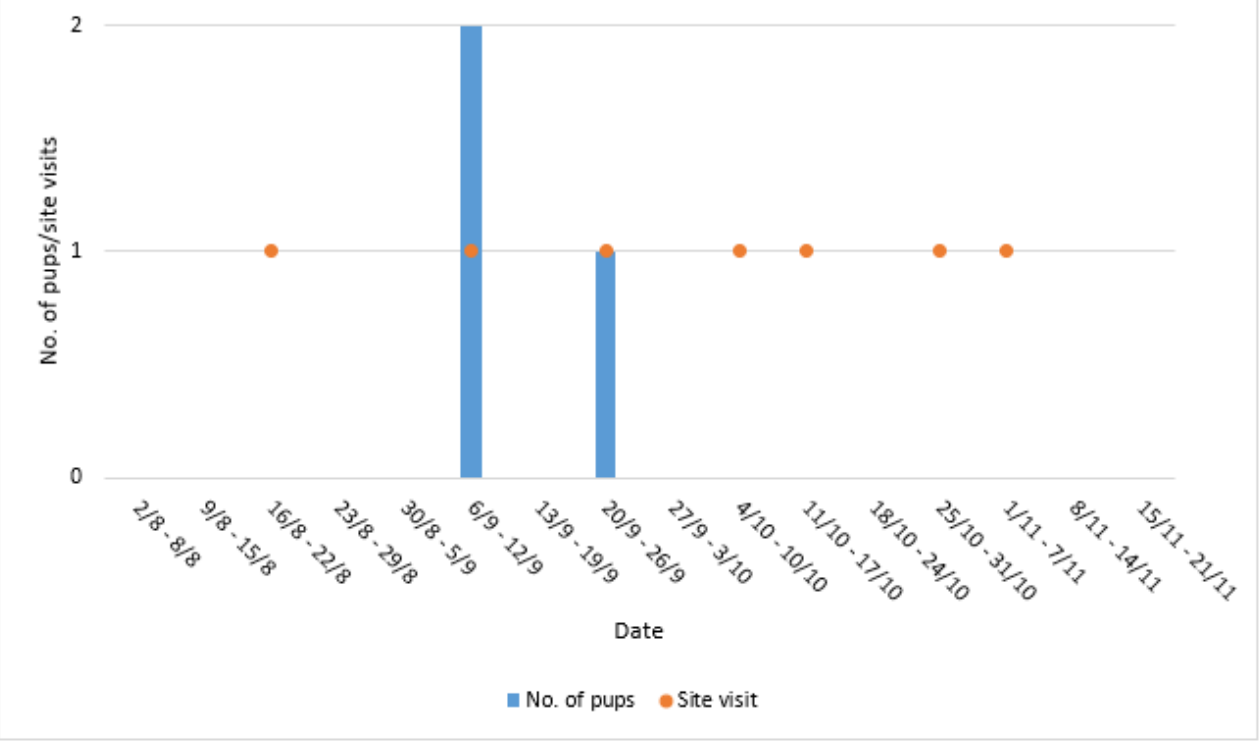


Table 6 Fate of pups on Protheroe's Dock in 2021

Fate	No. of pups
Assumed survived	1
Survived to beginning of moult	2
Survived to weaning	0
Assumed dead	0
Dead	0
Unknown	0
Total	**3**

4.4.3 The Lantern

Access to the Lantern is only possible on certain low tides. All access routes into the Lantern are hazardous in wet weather or when there is a big swell. Even if access is possible cows often remain deep inside the cave making marking pups impossible and accurately assessing their progress very difficult.

Since 2014 access has been gained by abseiling from a rocky outcrop into the eastern entrance which enables access on low tides of less than 2.0m. In 2015 this route was risk assessed by Leo Nathan and was deemed to be the best and safest way of entering the Lantern. A semi-permanent rope (which is removed in winter) was installed around a rocky outcrop. When conducting a site visit the abseil rope is clipped on to this one via a karabiner; this setup reduces risk and speeds up the site visit.

In 2021 two pups were born in the Lantern. As access is very tide and weather dependant some pups might have been missed. The fate of one pup is unknown (and therefore removed from survival analysis), and the other is assumed to have survived.

Figure 13 Number of seal pups born in The Lantern 1984-2021

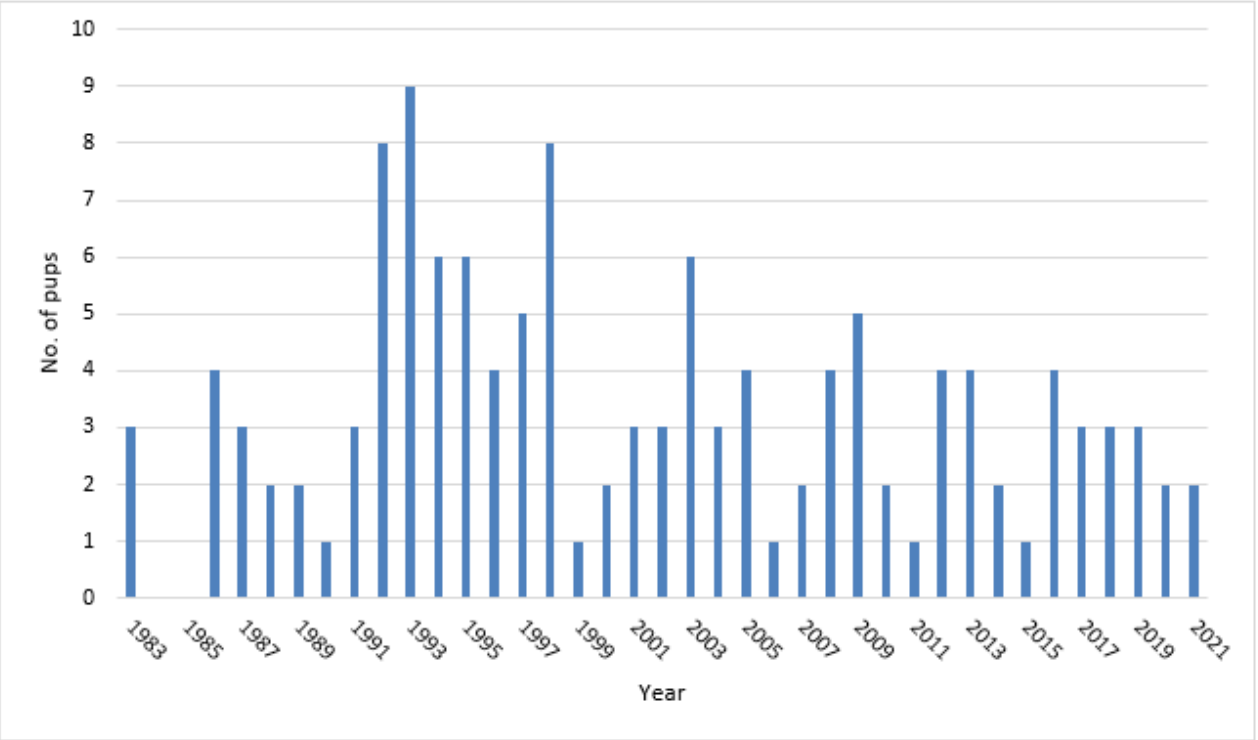


Figure 14 Weekly seal pup births in The Lantern in 2021

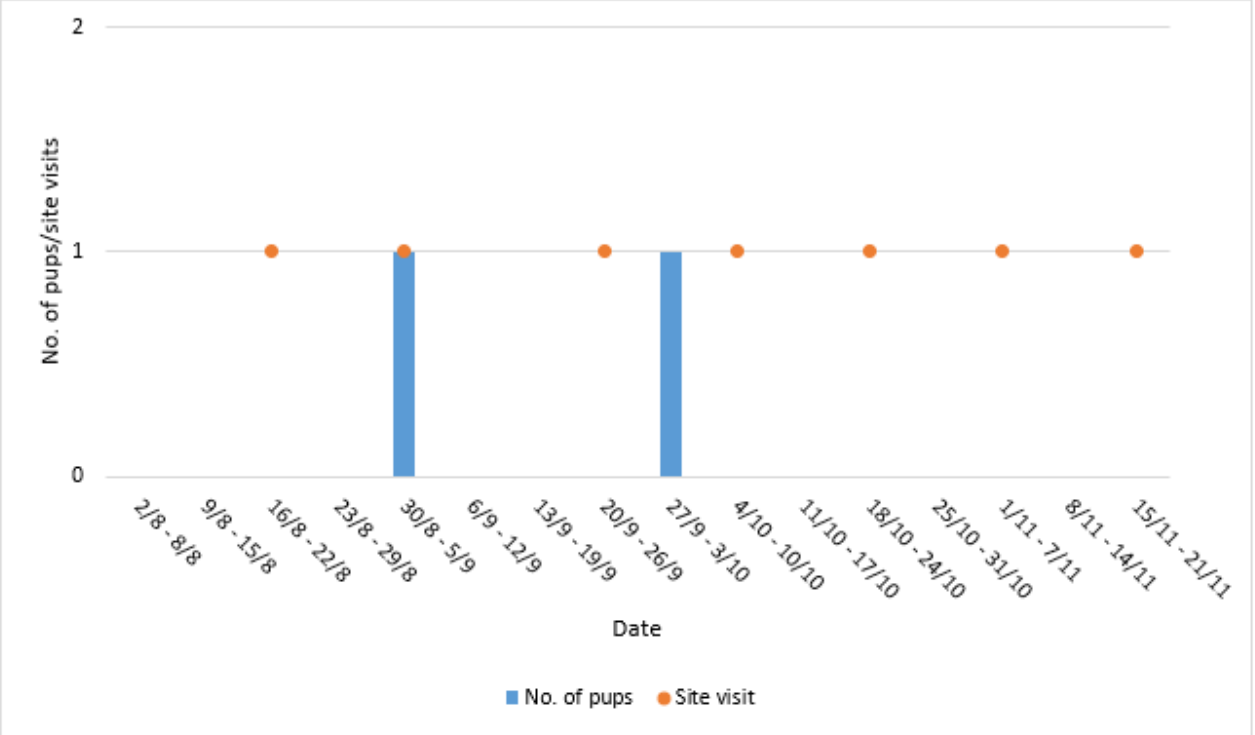


Table 7 Fate of pups in The Lantern in 2021

Fate	No. of pups
Assumed survived	1
Survived to beginning of moult	0
Survived to weaning	0
Assumed dead	0
Dead	0
Unknown	1
Total	**2**

4.4.4 Amy's Reach

Seven pups were born on Amy's Reach which all either survived and weaned, survived to the beginning of moult or were assumed to have survived resulting in a survival rate of 100%.

Figure 15 Number of seal pups born on Amy's Reach in 1984-2021

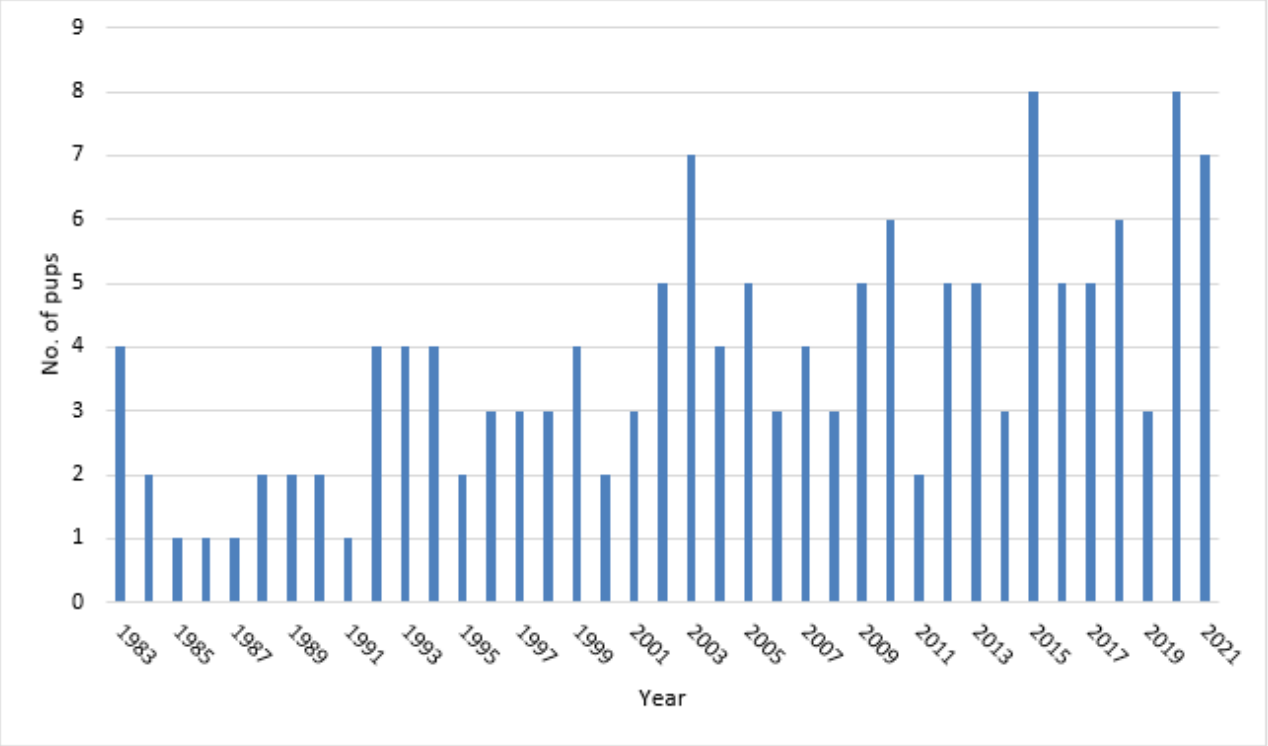


Figure 16 Weekly seal pup births on Amy's Reach in 2021

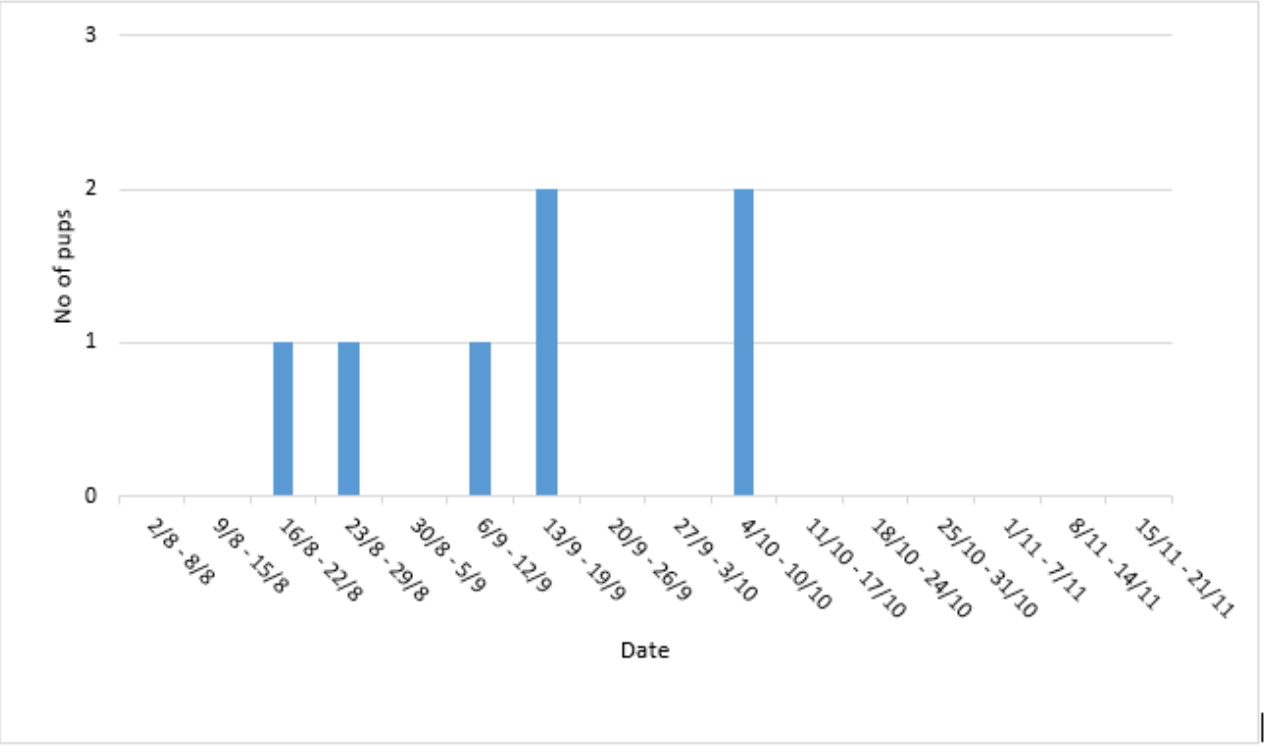


Table 8 Fate of pups on Amy's Reach in 2021

Fate	**No. of pups**
Assumed survived	3
Survived to beginning of moult	2
Survived to weaning	2
Assumed dead	0
Dead	0
Unknown	0
Total	**7**

4.4.5 Matthew's Wick

In 2021 41 pups were born on Matthew's Wick which is five more than in 2020. 31 pups are assumed to have survived, survived to the beginning of moult or survived and were weaned. This gives a survival rate of 76% which is 2% less than the previous year.

Figure 17 Number of seal pups born on Matthew's Wick in 1984-2021

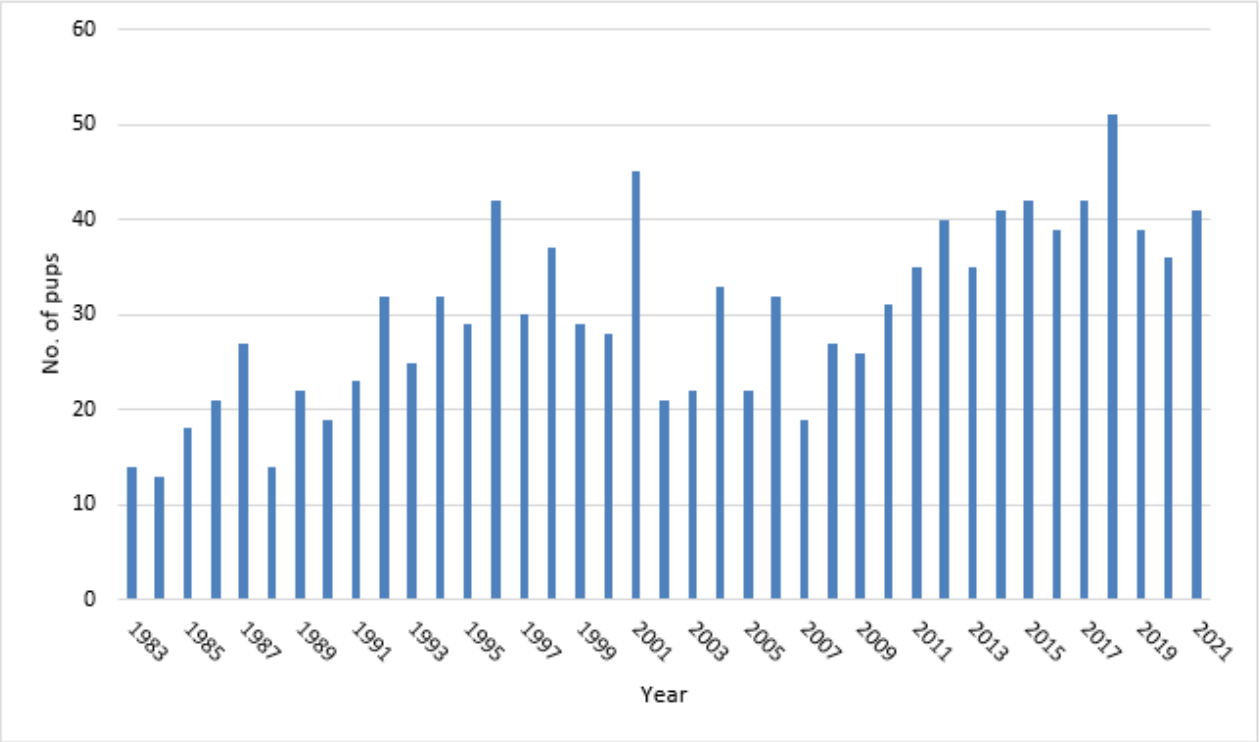


Figure 18 Weekly seal pup births on Matthew's Wick in 2021

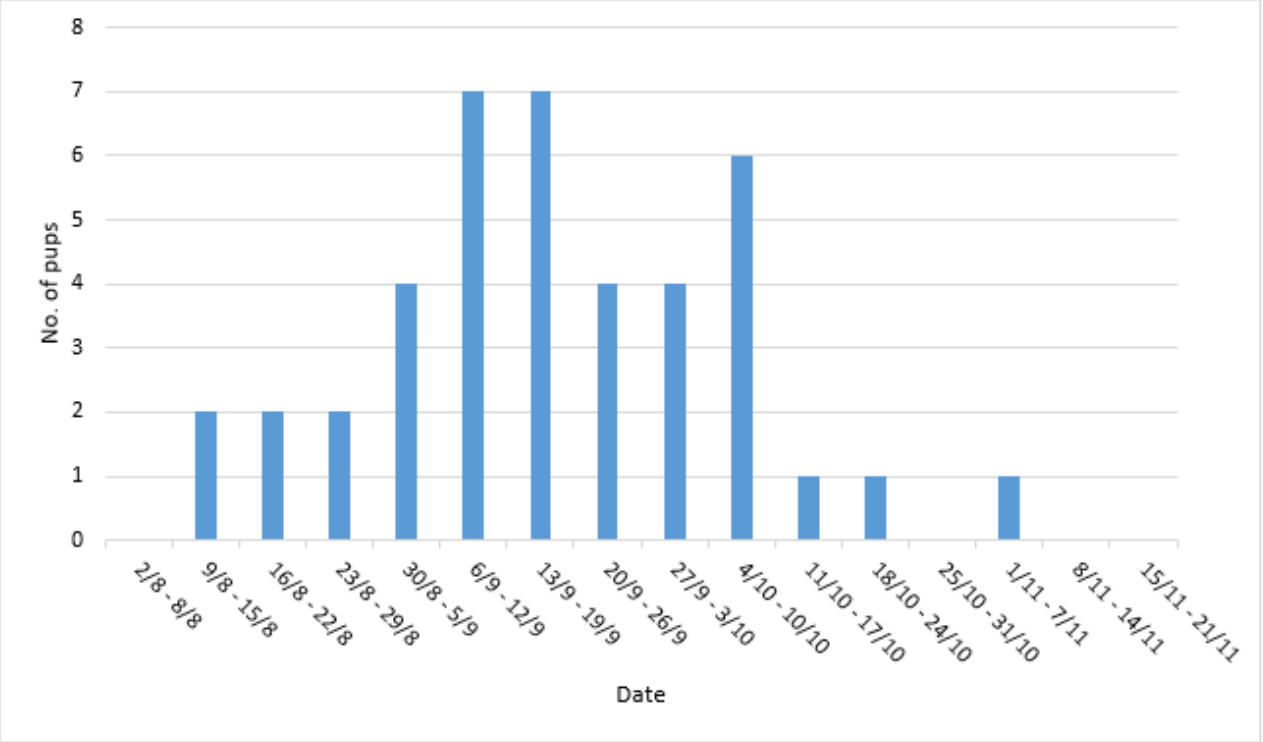


Table 9 Fate of pups on Matthew's Wick in 2021

Fate	No. of pups
Assumed survived	3
Survived to beginning of moult	4
Survived to weaning	
Assumed dead	1
Dead	9
Unknown	24
Total	**41**

Table 10 Causes of seal pup deaths on Matthew's Wick in 2021

Cause of death	No. of pups
Abandoned/separated/starved	4
Accident/injured/killed	0
Disappeared ≤ stage 3	1
Diseased	0
Drowned	0
Stillborn	3
Unknown	2
Other	0
Total	**10**

4.4.6 Castle Bay

Access to Castle Bay is impossible and pups born there do not get marked. Hence monitoring is more challenging than on other beaches and potentially less accurate. 23 pups were born in Castle Bay in 2021. 18 pups are assumed to have survived, survived to the beginning of moult or survived and weaned, giving a survival rate of 78% which is 10% higher than the previous year. Usually, the survival rate of Castle Bay is lower than the whole island rate as it is directly facing into the prevailing wind direction and gets fully flooded during storm tides. Büche and Stubbings (2015) speculated that as Castle Bay is the beach with the largest and most permanent haul-out the presence of other seals could unsettle the mothers and pups and lead to abandonment of the pup, or the site. However, in 2021 Castle Bay was a very successful pupping beach – possibly due to the more settled weather.

Figure 19 Number of sea pups born on Castle Bay in 1984-2021

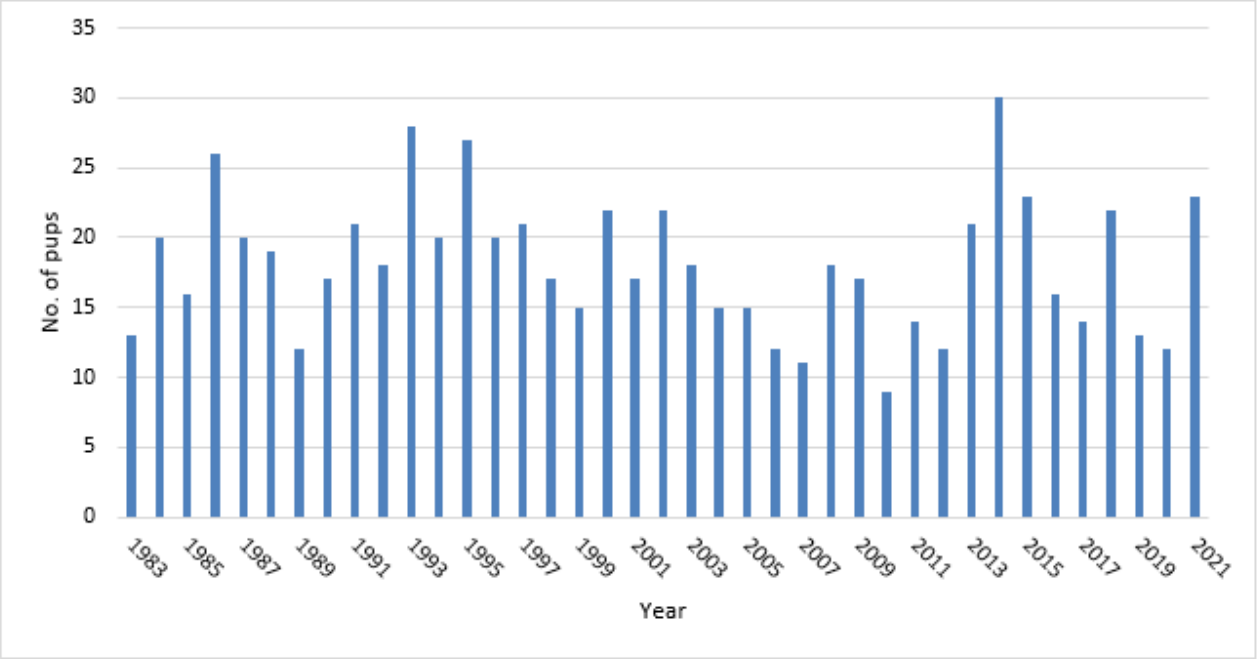


Figure 20 Weekly seal pup births on Castle Bay in 2021

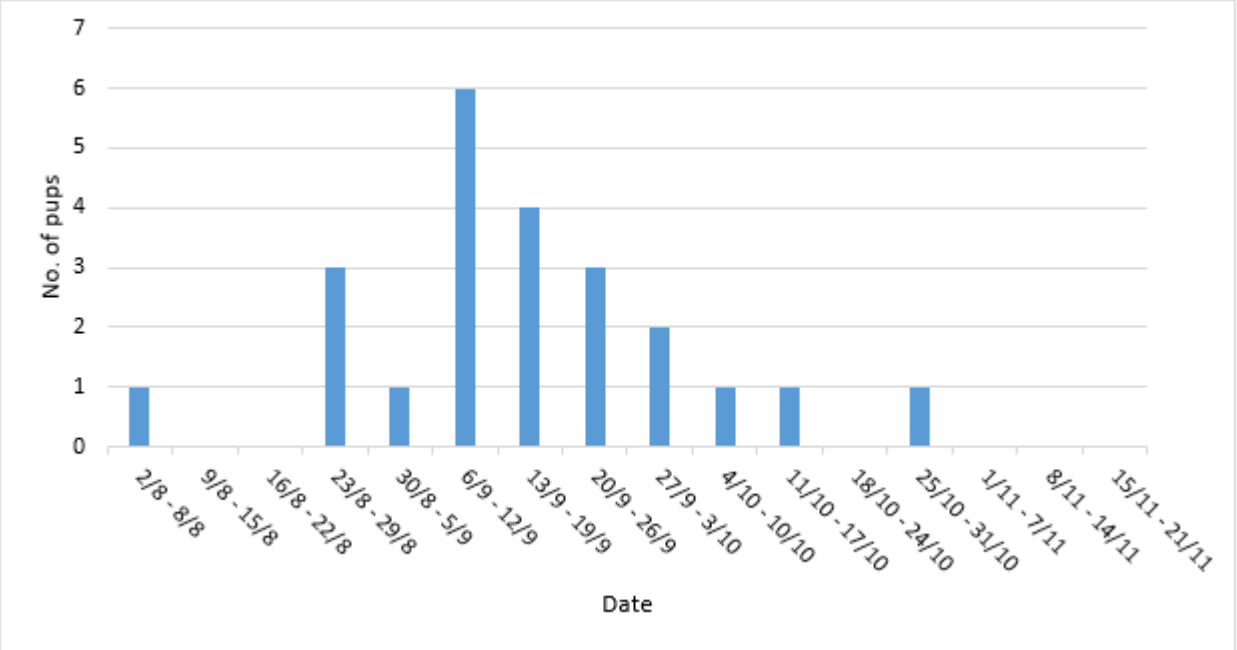


Table 11 Fate of pups on Castle Bay in 2021

Fate	No. of pups
Assumed survived	5
Survived to beginning of moult	3
Survived to weaning	10
Assumed dead	0
Dead	5
Unknown	0
Total	**23**

Table 12 Causes of seal pup deaths on Castle Bay in 2021

Cause of death	No. of pups
Abandoned/separated/starved	2
Accident/injured/killed	
Disappeared ≤ stage 3	
Diseased	
Drowned	1
Stillborn	2
Unknown	
Other	
Total	**5**

4.4.7 South Castle Beach Cave

South Castle Beach Cave was overlooked as a pupping site prior to 1990, and between 1999-2001 access was severely limited as the unstable nature of the rock above was deemed unsafe for the rope access recommended in the Handbook (Poole, J, 1996a), and boat access was (and remains) virtually impossible due to the almost constant swell. Following a re-assessment in 2002 it was considered that a scramble route without rope was a reasonable option in dry conditions (Hughes, 2002). However, in 2015 the route was reassessed by Leo Nathan and an abseil route was installed making access easier and safer. The cave is only accessible from land at low tide and because of the long and rocky route from the cave to the water it was decided not to enter the cave when cows were present to avoid excessive disturbance.

Access to South Castle Beach Cave was limited due to numerous factors including bad weather during spring tides and larger numbers of cows present. Five pups were born at South Castle Beach Cave in 2021. Two pups survived to beginning of moult / survived and weaned, giving a survival rate of 40%.

Figure 21 Number of seal pups born in South Castle Beach Cave in 1984-2021

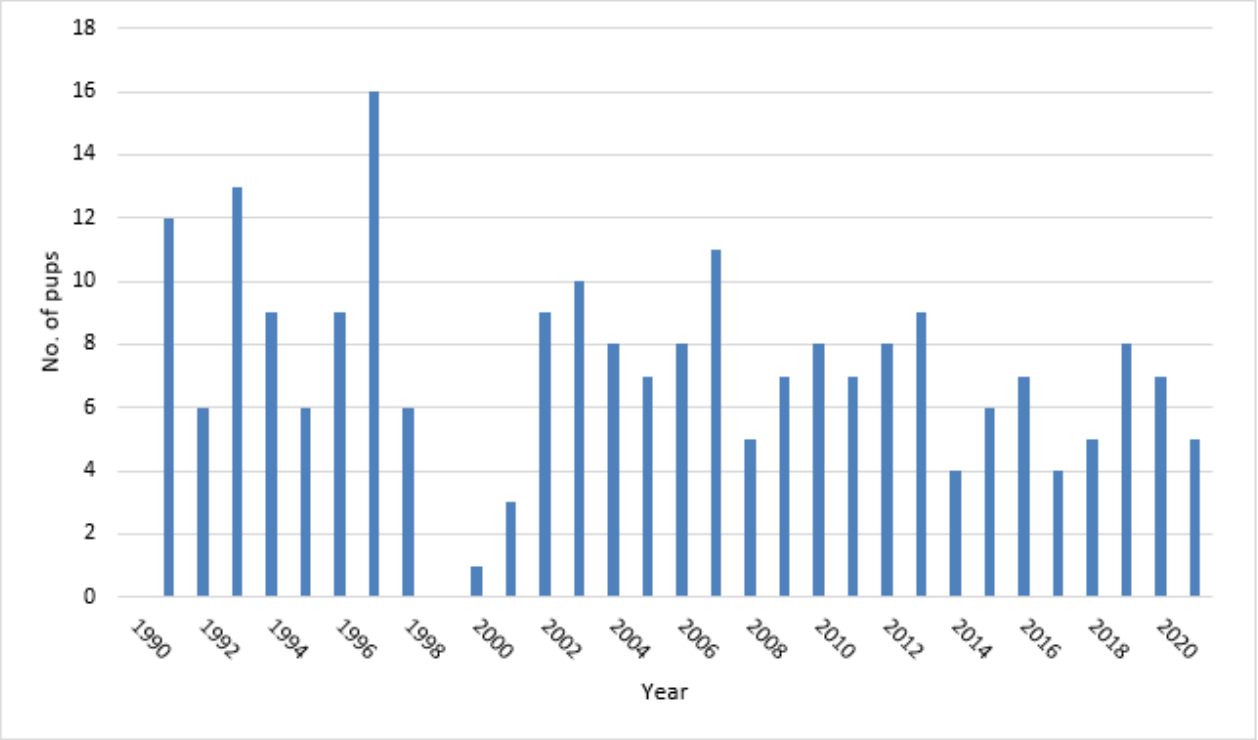


Figure 22 Weekly seal pup births in South Castle Beach Cave in 2021

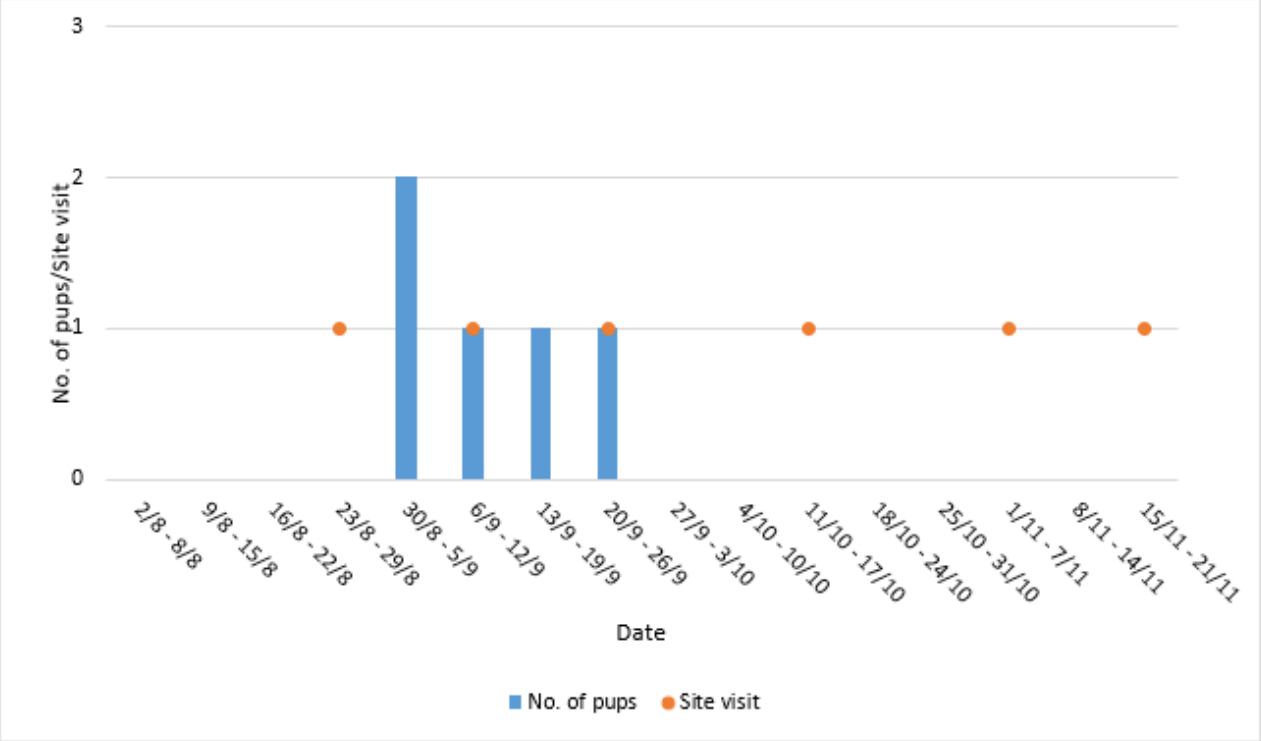


Table 13 Fate of pups in South Castle Beach Cave in 2021

Fate	No. of pups
Assumed survived	0
Survived to beginning of moult	1
Survived to weaning	1
Assumed dead	0
Dead	3
Unknown	0
Total	**5**

Table 14 Causes of seal pup deaths in South Castle Beach Cave in 2021

Cause of death	No. of pups
Abandoned/separated/starved	0
Accident/injured/killed	2
Disappeared ≤ stage 3	0
Diseased	0
Drowned	0
Stillborn	0
Unknown	1
Other	0
Total	**3**

Two pups presumably died during the storm on 27/09/21. They were found on 04/10/21 at the back of the beach with broken bones and injuries which looked like they had resulted from being tossed against the rocks.

4.4.8 Seal Hole

19 pups were born in Seal Hole in 2021 which is a record number for this site. Due to the high seal activity, it was difficult to access the site and several attempts, especially in September, failed as seals were blocking the entrance. Nine pups are assumed to have survived, survived to the beginning of moult or survived and weaned. The fate of five pups is unknown, hence these pups were removed from the survival analysis, giving a survival rate of 64% which is 20% higher than last year's.

Figure 23 Number of seal pups born in Seal Hole in 1984-2021

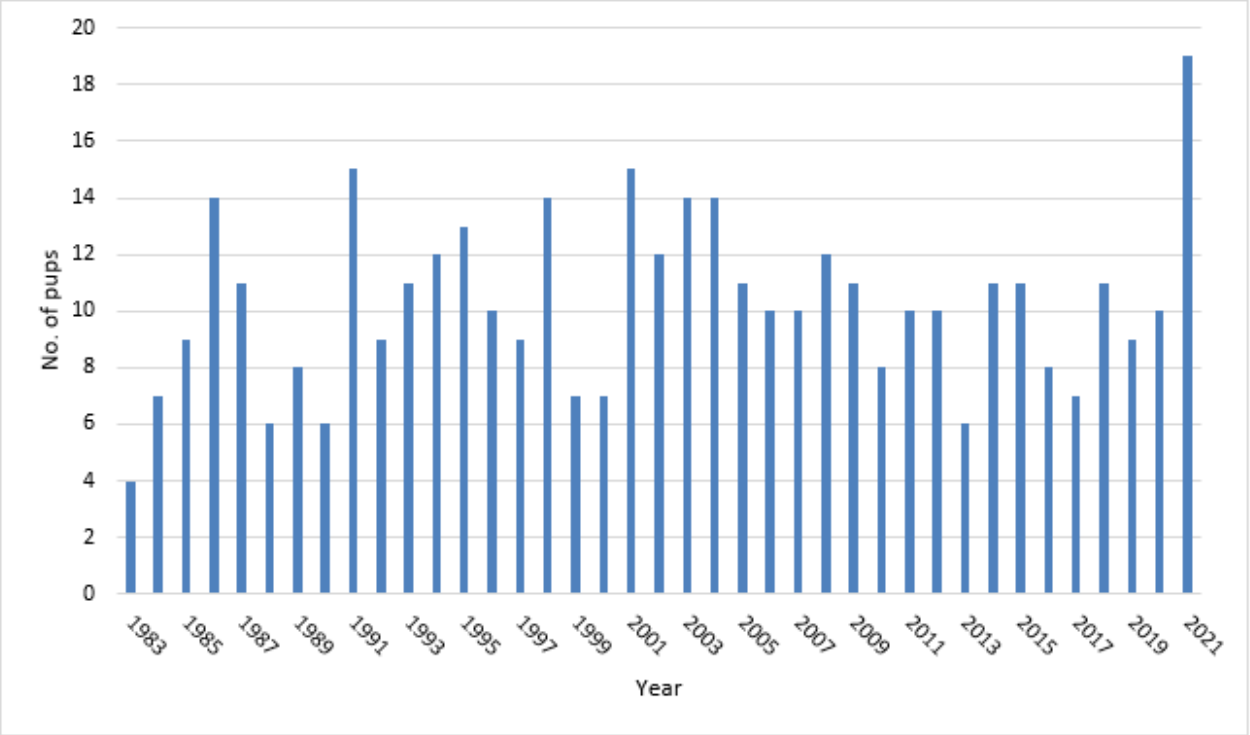


Figure 24 Weekly seal pup births in Seal Hole in 2021

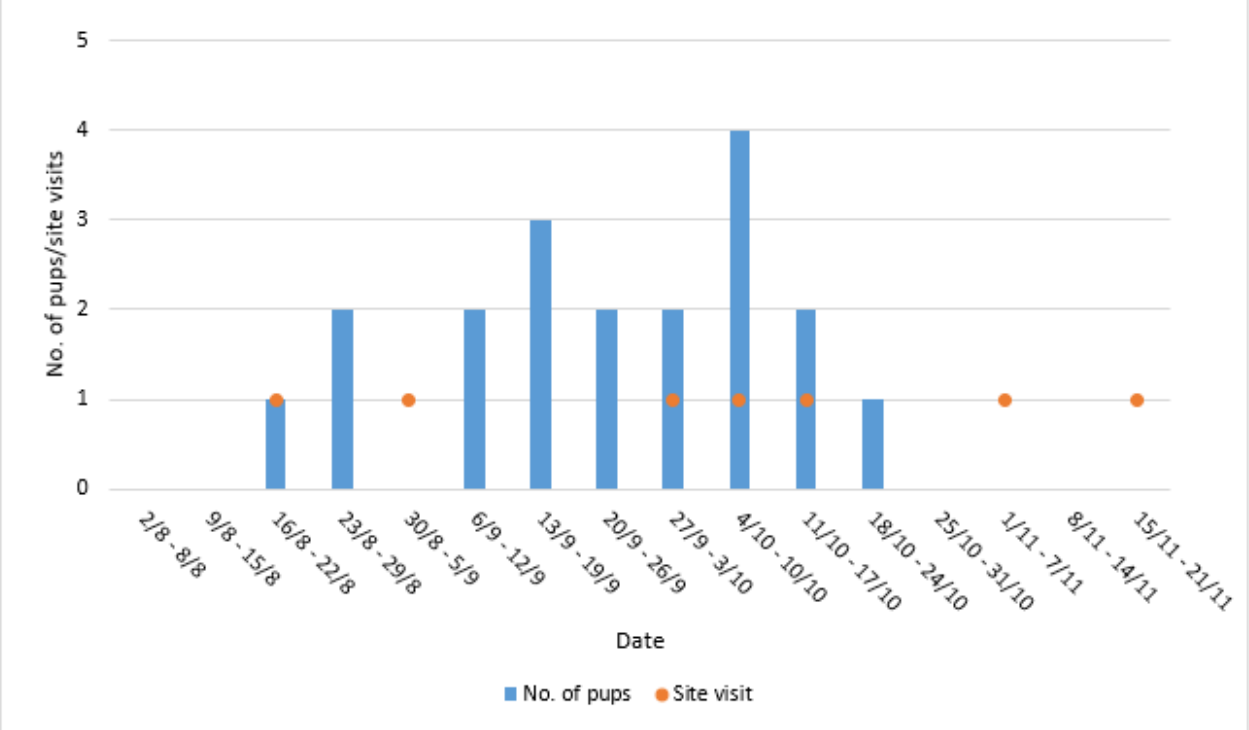


Table 15 Fate of pups in Seal Hole in 2021

Fate	**No. of pups**
Assumed survived	3
Survived to beginning of moult	5
Survived to weaning	1
Assumed dead	3
Dead	2
Unknown	5
Total	**19**

Table 16 Causes of seal pup deaths in Seal Hole in 2021

Cause of death	**No. of pups**
Abandoned/separated/starved	0
Accident/injured/killed	0
Disappeared ≤ stage 3	2
Diseased	0
Drowned	0
Stillborn	0
Unknown	3
Other	0
Total	**5**

4.4.9 The Slabs

Three pups were born on The Slabs in 2021. Two pups are assumed to have survived/survived and weaned giving a survival rate of 67%.

Figure 25 Number of seal pups born on The Slabs in 1984-2021

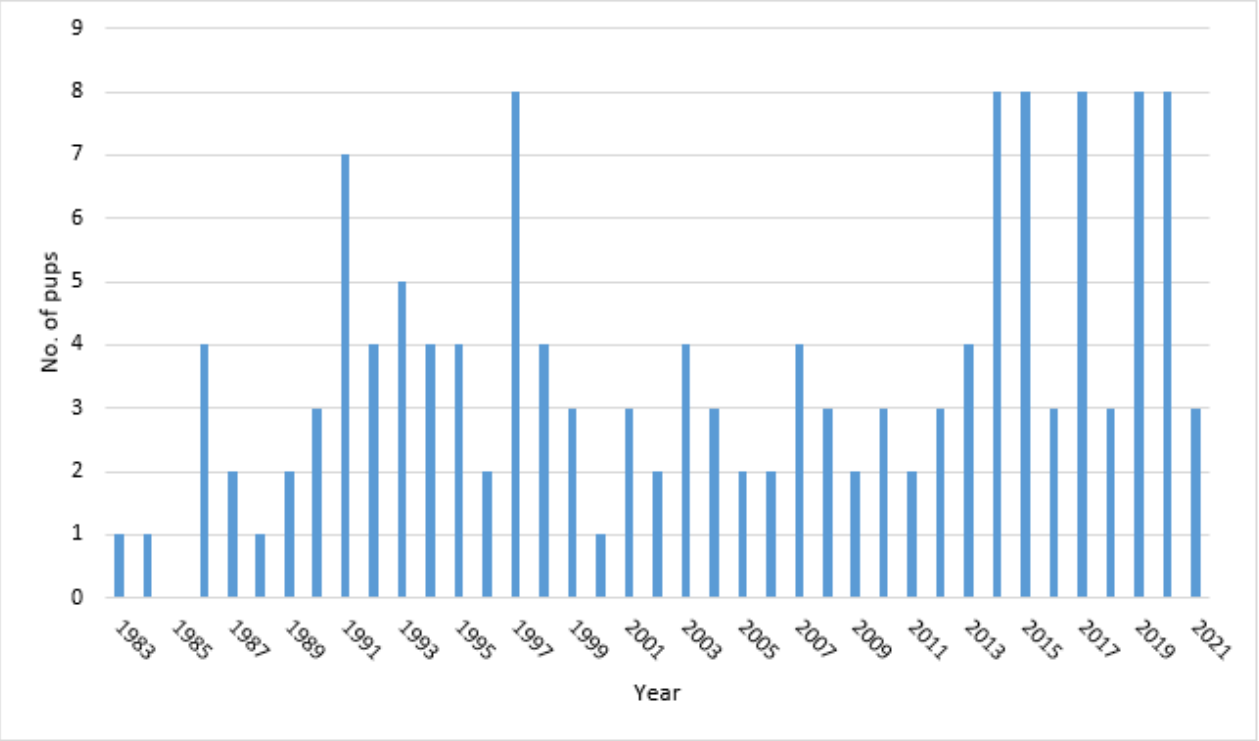


Figure 26 Weekly seal pup births on The Slabs in 2021

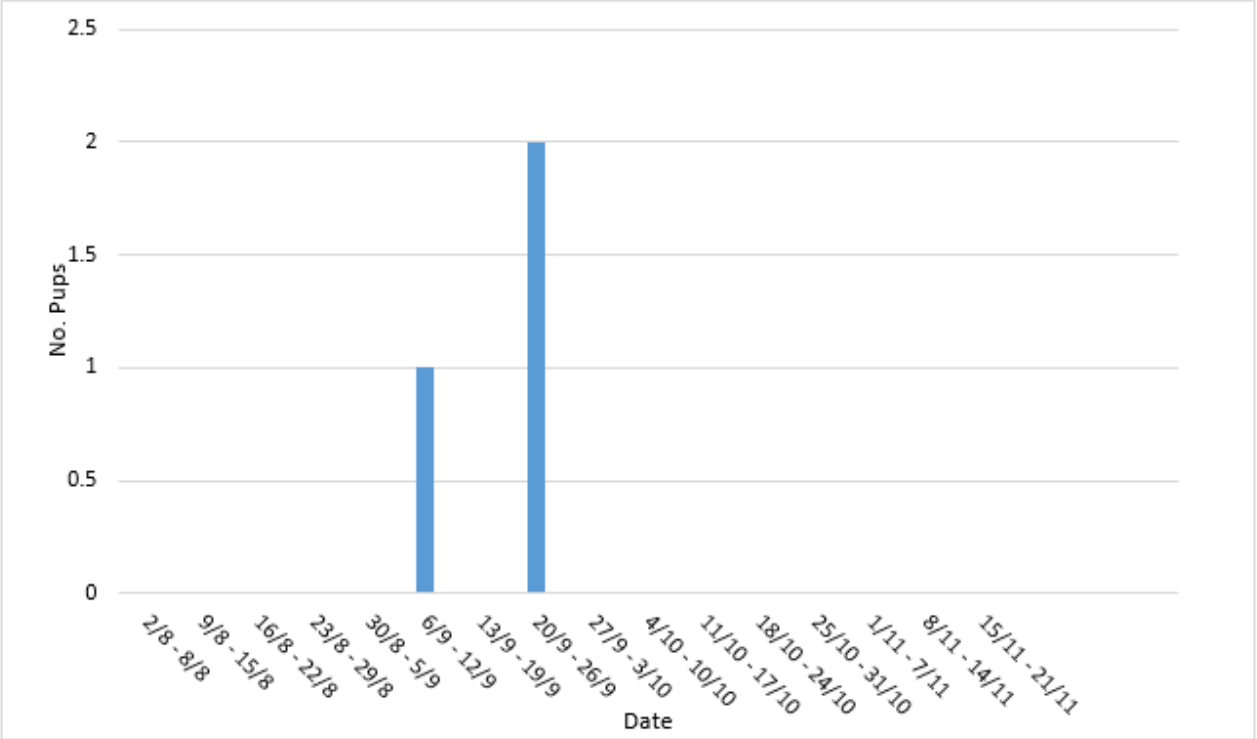


Table 17 Fate of pups on The Slabs in 2021

Fate	No. of pups
Assumed survived	1
Survived to beginning of moult	0
Survived to weaning	1
Assumed dead	1
Dead	0
Unknown	0
Total	**3**

Table 18 Causes of seal pup deaths on The Slabs in 2021

Cause of death	No. of pups
Abandoned/separated/starved	0
Accident/injured/killed	0
Disappeared ≤ stage 3	1
Diseased	0
Drowned	0
Stillborn	0
Unknown	0
Other	0
Total	**1**

4.4.10 Driftwood Bay

23 pups were born on Driftwood Bay in 2021, which is ten less than last year. 16 are assumed to have survived, survived to beginning of moult or survived and were weaned, giving a survival rate of 70%, which is 4% less than the previous year.

Figure 27 Number of seal pups born on Driftwood Bay in 1984-2021

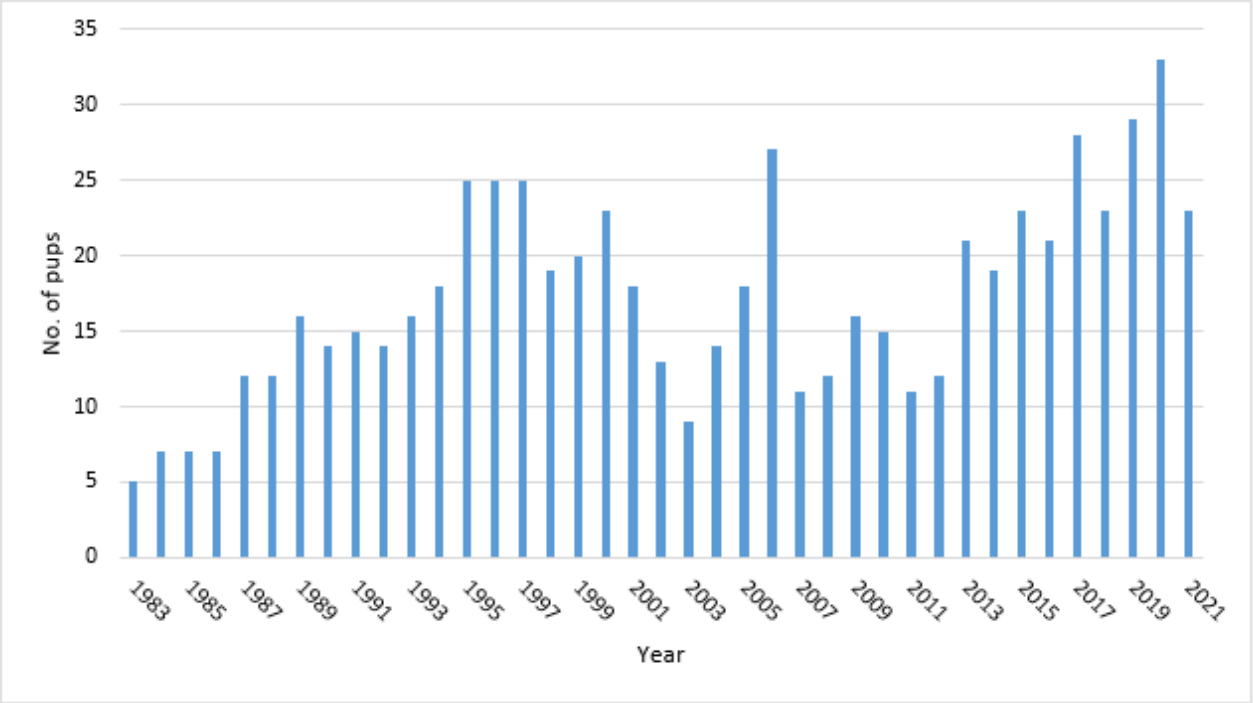


Figure 28 Weekly seal pup births on Driftwood Bay in 2021

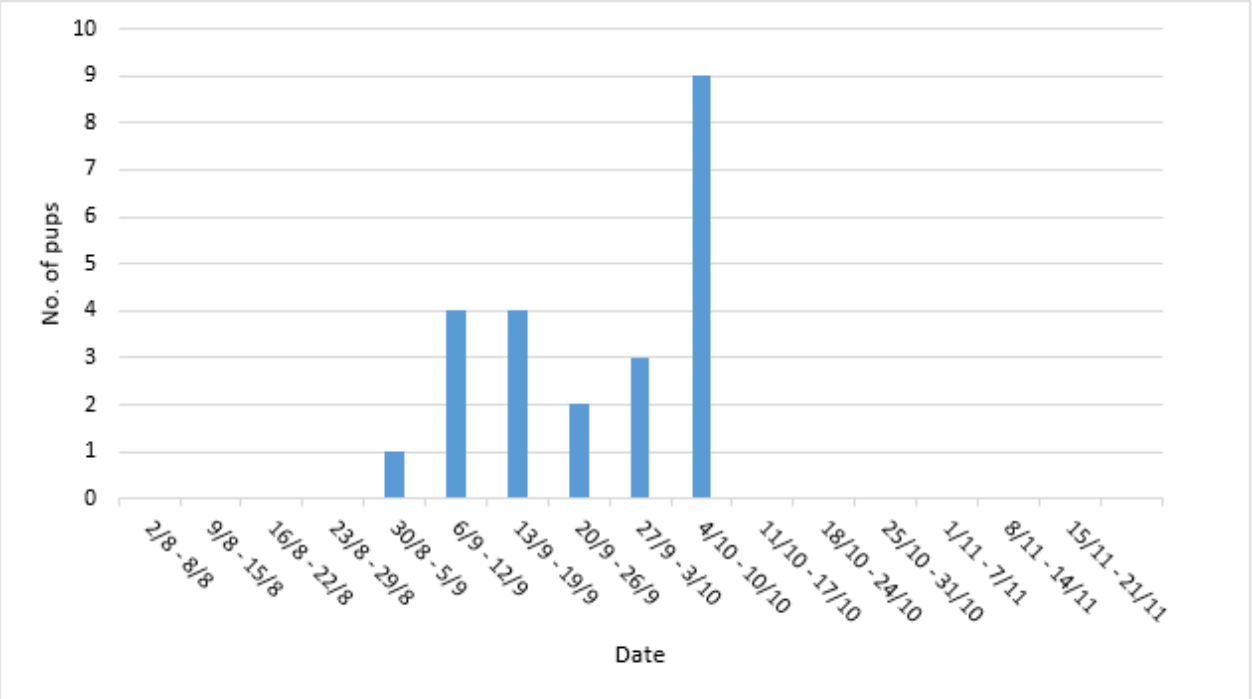


Table 19 Fate of pups on Driftwood Bay in 2021

Fate	No. of pups
Assumed survived	3
Survived to beginning of moult	3
Survived to weaning	10
Assumed dead	1
Dead	6
Unknown	0
Total	**23**

Table 20 Causes of seal pup deaths on Driftwood Bay in 2021

Cause of death	No. of pups
Abandoned/separated/starved	1
Accident/injured/killed	0
Disappeared ≤ stage 3	1
Diseased	0
Drowned	1
Stillborn	0
Unknown	4
Other	0
Total	**7**

4.4.11 South Haven

This site is made up of South Haven main beach and the two caves between the beach and Driftwood Bay. The caves were only visited when pups were marked on the main beach as accessing the caves inevitably disturbs all seals on the beach. The entrances to the caves can be monitored from across the bay and, moreover, pups tend to move out of the caves within their first week and can be observed from above thereafter.

In 2021 52 pups were born in South Haven, 18 more than in 2020 which saw an unusually low number of births on this beach. The fate of 51 pups was known, 36 are assumed to have survived, survived to beginning of moult or survived and were weaned, giving a survival rate of 71%.

Figure 29 Number of seal pups born on South Haven in 1984-2021

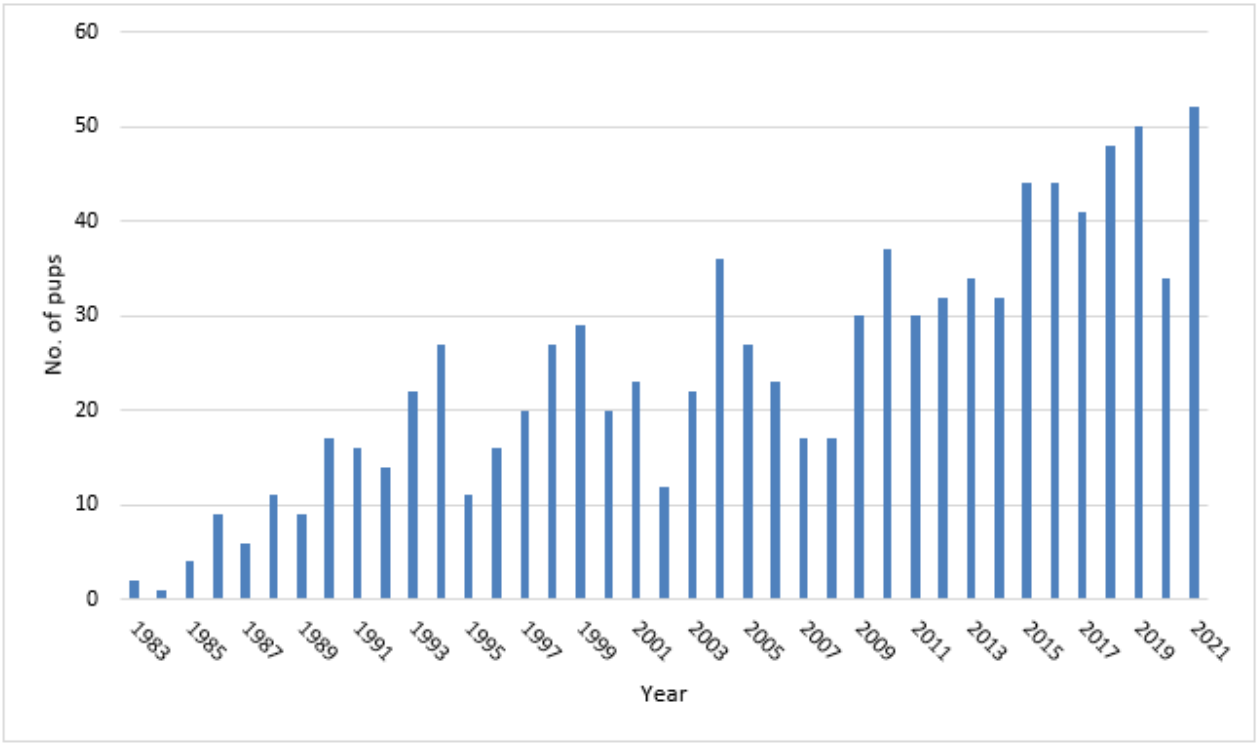


Figure 30 Weekly seal pup births on South Haven in 2021

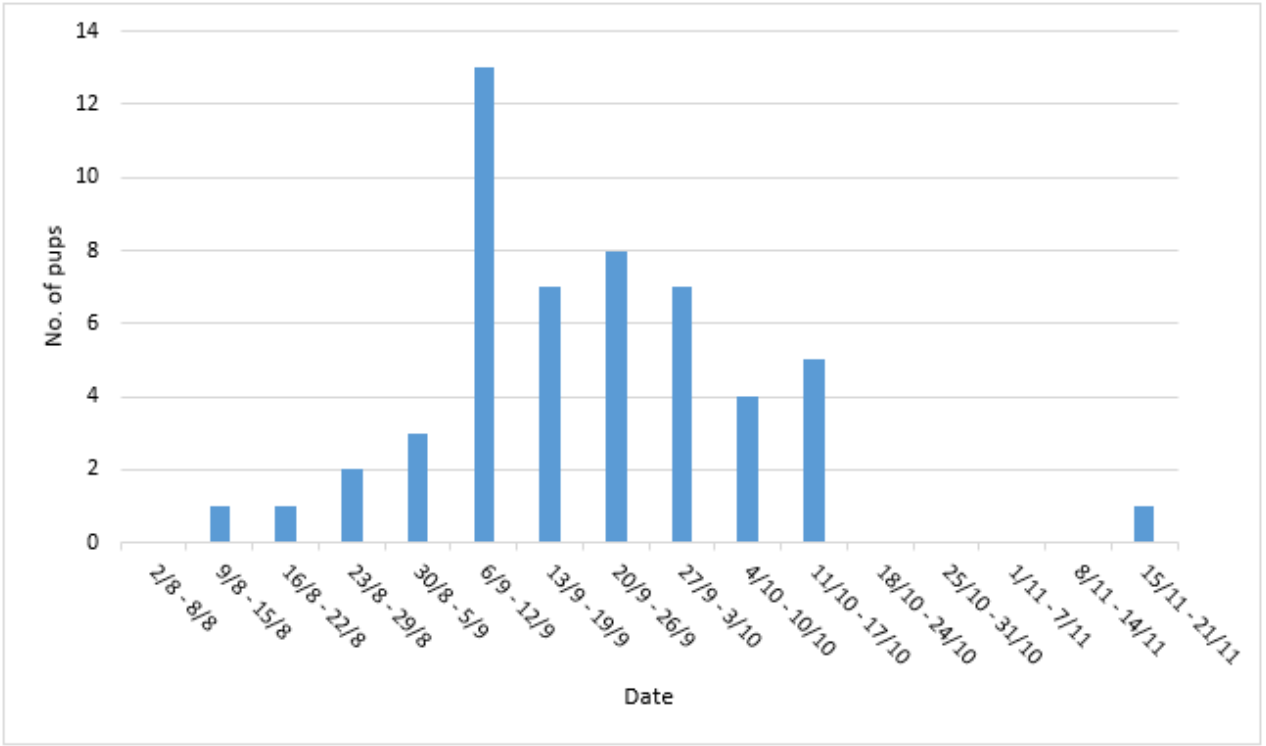


Table 21 Fate of pups on South Haven in 2021

Fate	No. of pups
Assumed survived	3
Survived to beginning of moult	12
Survived to weaning	21
Assumed dead	5
Dead	10
Unknown	1
Total	**52**

Table 22 Causes of seal pup deaths on South Haven in 2021

Cause of death	No. of pups
Abandoned/separated/starved	2
Accident/injured/killed	1
Disappeared ≤ stage 3	5
Diseased	0
Drowned	1
Stillborn	3
Unknown	3
Other	0
Total	**15**

4.4.12 South Stream Cave

South Stream Cave and Boulders (hereafter South Stream) is a hard site to monitor well. Access to the cave is only possible at low tide and is very treacherous in wet weather, pups are usually hidden in the cave or behind boulders and the only sign that they are present is when cows are seen swimming offshore. Before 2014 it was customary to check the site daily from The Neck and then follow up any activity with a visit to the cave. However, in August 2014 it was deemed that pups could easily be missed when inspecting from such a distance. In 2021 the site was checked from South Stream outfall every two to four days, sometimes less often if the weather conditions prevented the site from being safely accessed. No full site visit was conducted.

Six pups were born at South Stream in 2021, of which five are assumed to have survived, survived to the beginning of moult or survived and were weaned resulting in a survival rate of 83%.

Figure 31 Number of seal pups born in South Stream Cave in 1984-2021

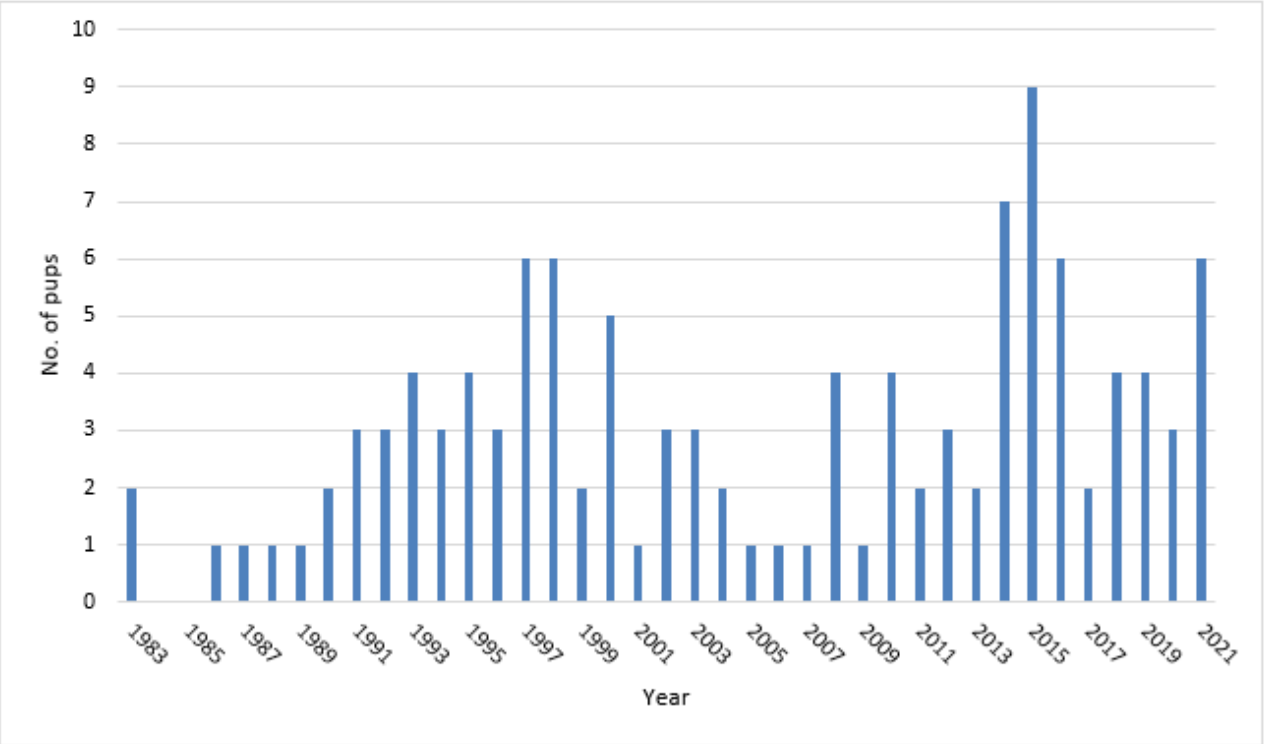


Figure 32 Weekly seal pup births in South Stream Cave in 2021

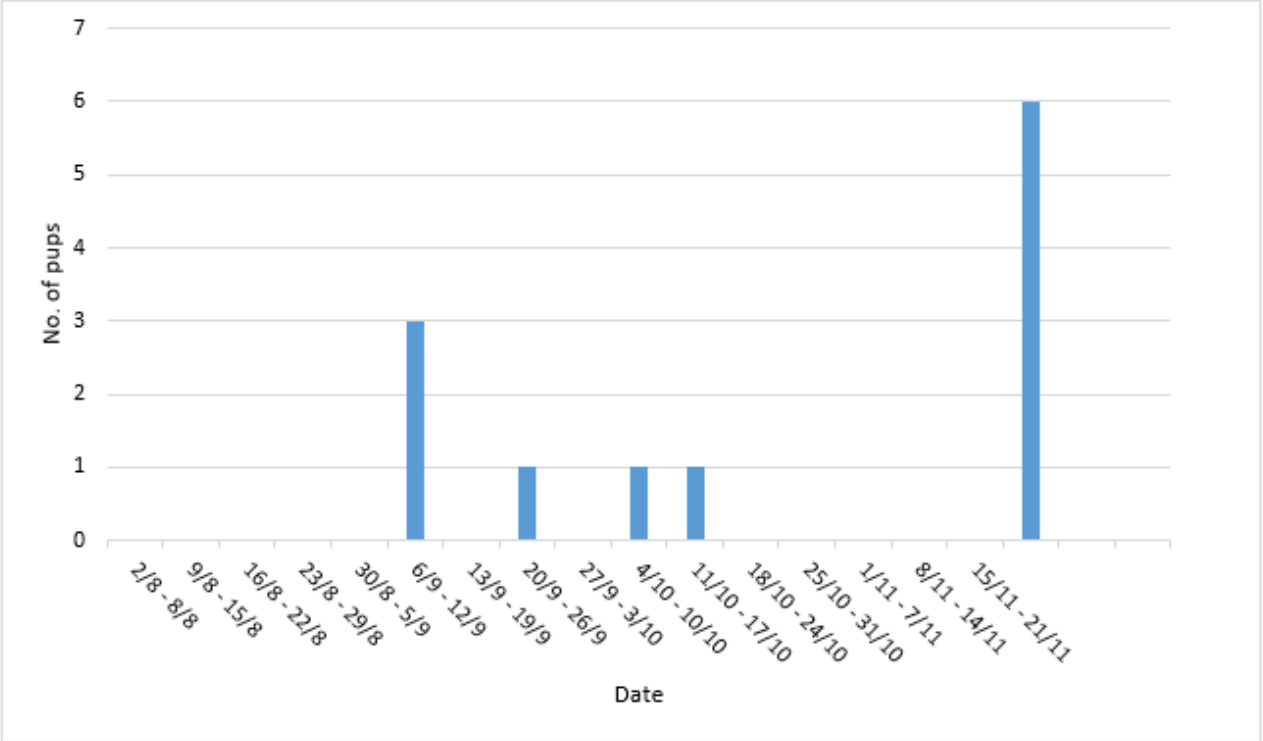


Table 23 Fate of pups in South Stream Cave in 2021

Fate	No. of pups
Assumed survived	2
Survived to beginning of moult	3
Survived to weaning	0
Assumed dead	1
Dead	0
Unknown	0
Total	**6**

Table 24 Causes of seal pup deaths at South Stream Cave in 2021

Cause of death	No. of pups
Abandoned/separated/starved	0
Accident/injured/killed	0
Disappeared ≤ stage 3	1
Diseased	0
Drowned	0
Stillborn	0
Unknown	0
Other	0
Total	**1**

4.4.13 High Cliff Boulders

High Cliff Boulders is a site which is difficult to monitor as the boulders can shield the pups from view. The only way to check the beach fully is to scramble to the bottom and search within the rocks. High Cliff Boulders was checked every two to four days from Welsh Way and three pups were found. Two pups are assumed to have survived / survived to the beginning of moult resulting in a survival rate of 67%.

Figure 33 Number of seal pups born at High Cliff Boulders in 1984-2021

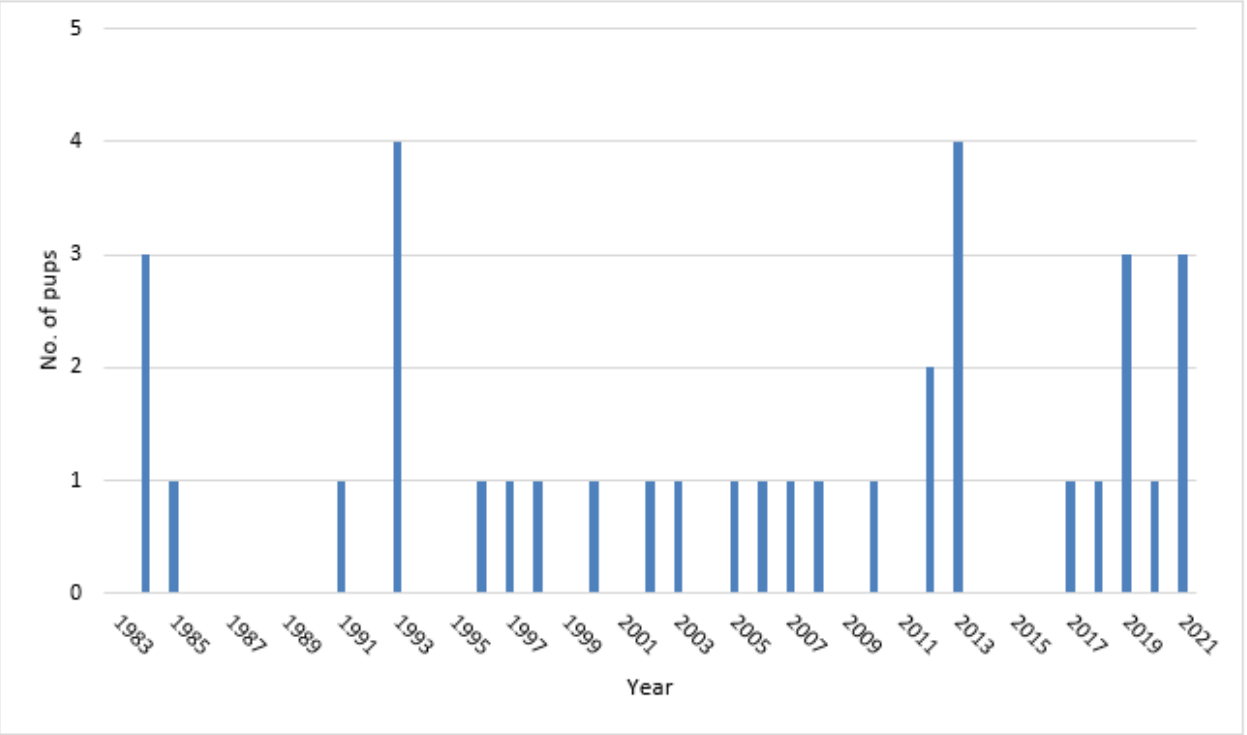


Figure 34 Weekly seal pup births at High Cliff Boulders in 2021

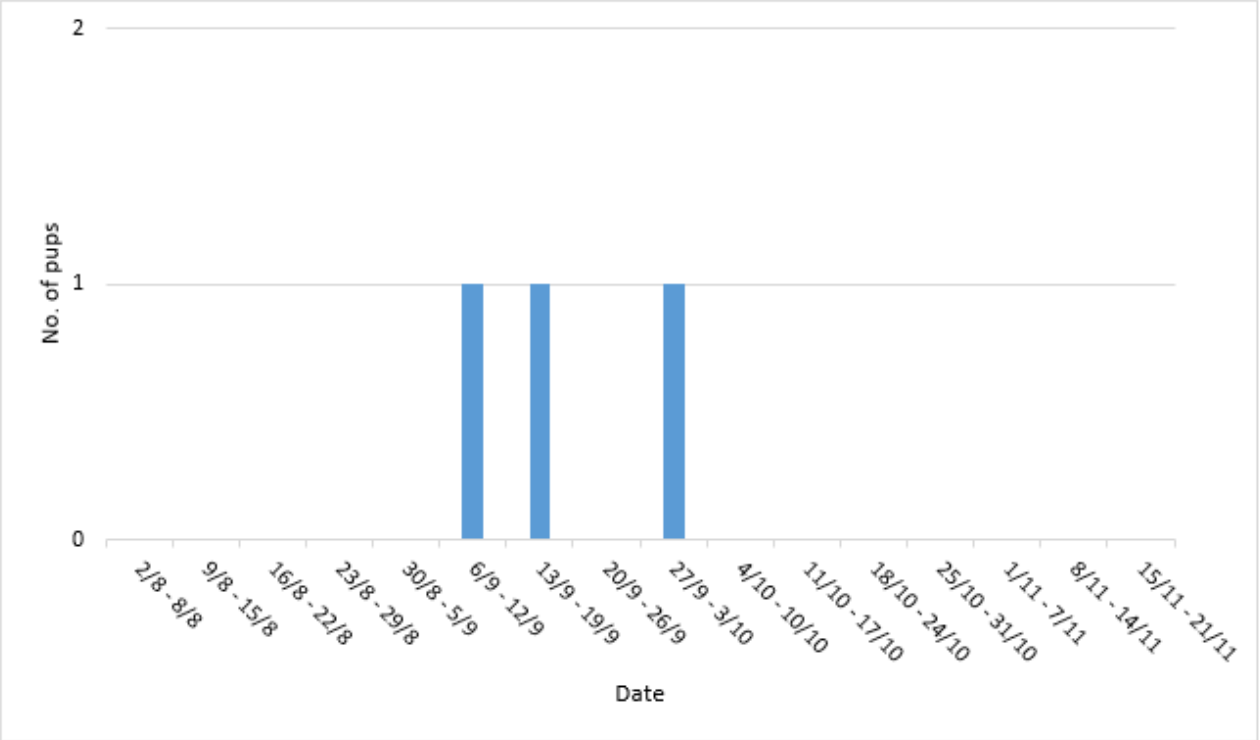


Table 25 Fate of pups at High Cliff Boulders in 2021

Fate	No. of pups
Assumed survived	1
Survived to beginning of moult	1
Survived to weaning	0
Assumed dead	1
Dead	0
Unknown	0
Total	**3**

Table 26 Causes of seal pup deaths at High Cliff Boulders in 2021

Cause of death	No. of pups
Abandoned/separated/starved	0
Accident/injured/killed	0
Disappeared ≤ stage 3	1
Diseased	0
Drowned	0
Stillborn	0
Unknown	0
Other	0
Total	**1**

4.4.14 The Wick

After a record count of pups in the previous year the numbers dropped down again to a pre-2020 level of 23 seal pups. 20 pups are assumed to have survived, survived to the beginning of moult or survived and were weaned, giving a survival rate of 87%.

Figure 35 Number of seal pups born on The Wick in 1984-2021

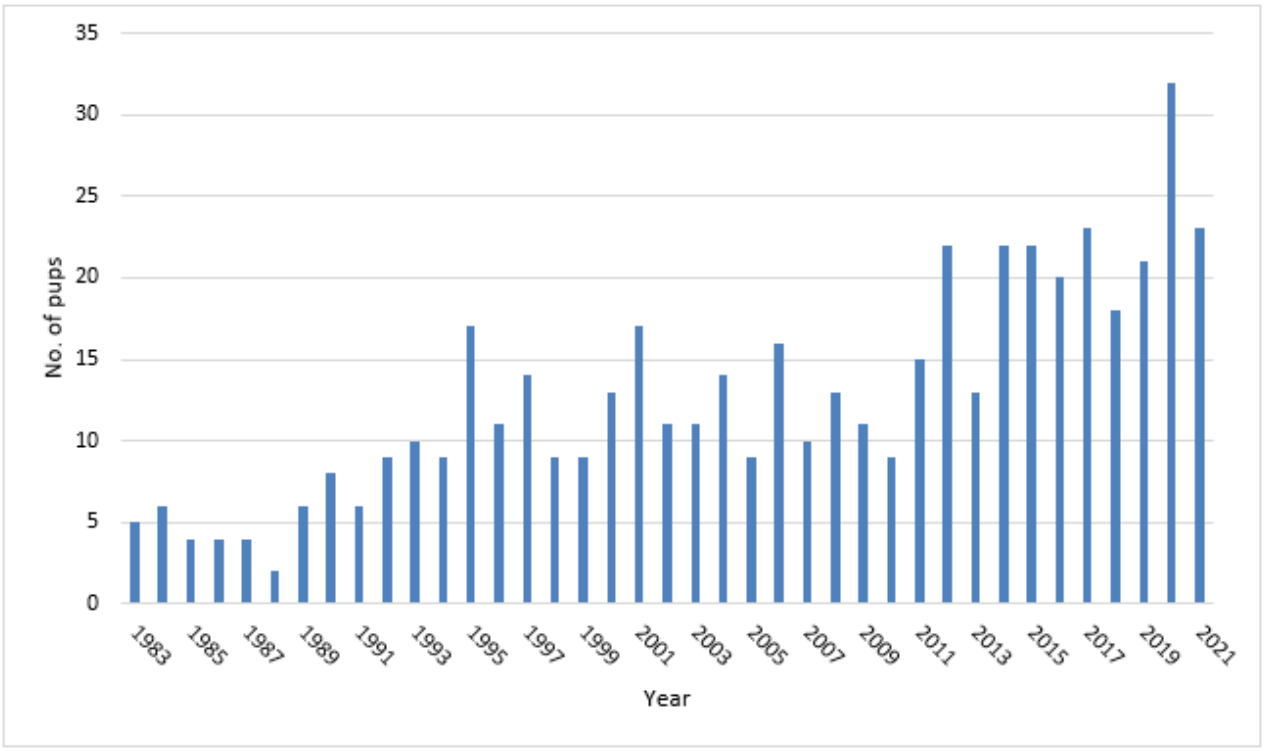


Figure 36 Weekly seal pup births on The Wick in 2021

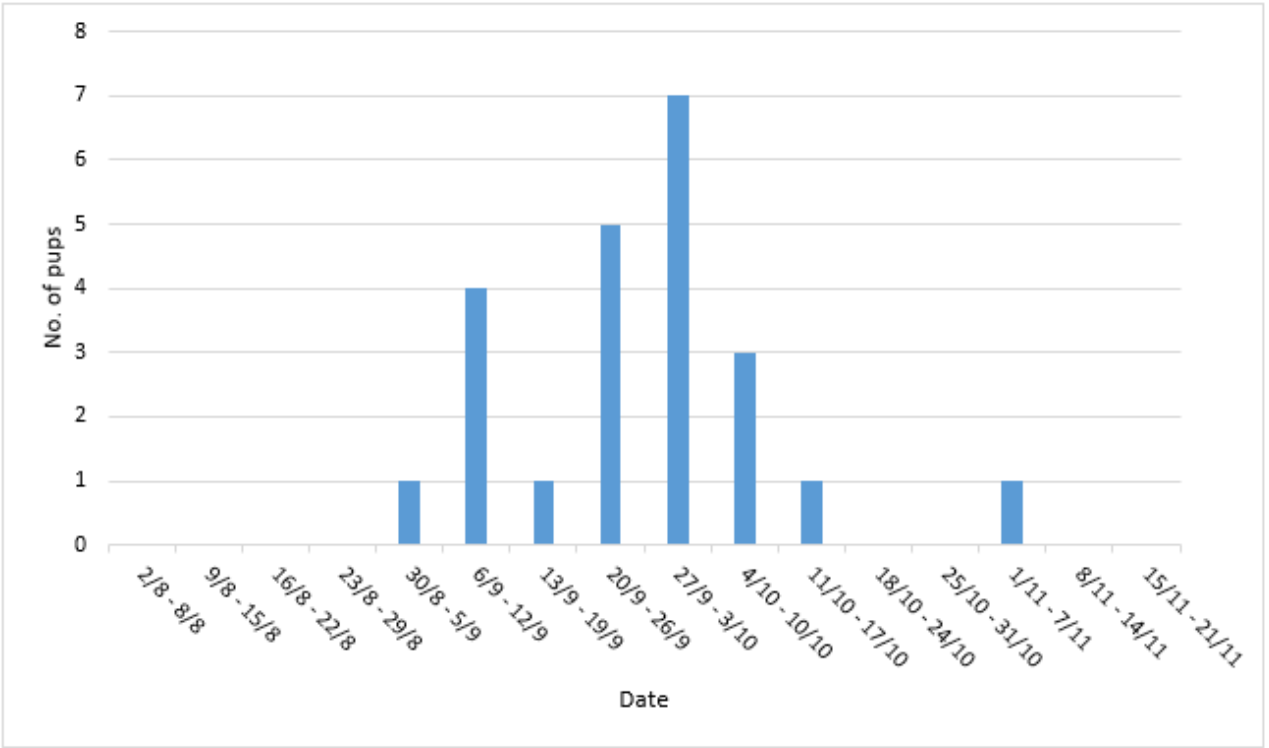


Table 27 Fate of pups on The Wick in 2021

Fate	No. of pups
Assumed survived	7
Survived to beginning of moult	10
Survived to weaning	3
Assumed dead	1
Dead	2
Unknown	0
Total	**23**

Table 28 Causes of seal pup deaths on The Wick in 2021

Cause of death	No. of pups
Abandoned/separated/starved	0
Accident/injured/killed	0
Disappeared ≤ stage 3	1
Diseased	0
Drowned	1
Stillborn	1
Unknown	0
Other	0
Total	**3**

4.4.15 The Basin

In 2021 two pups were born at the Basin. Both pups are assumed to have survived / survived to the beginning of moult resulting in a survival rate of 100%.

Figure 37 Number of seal pups born at The Basin in 1984-2021

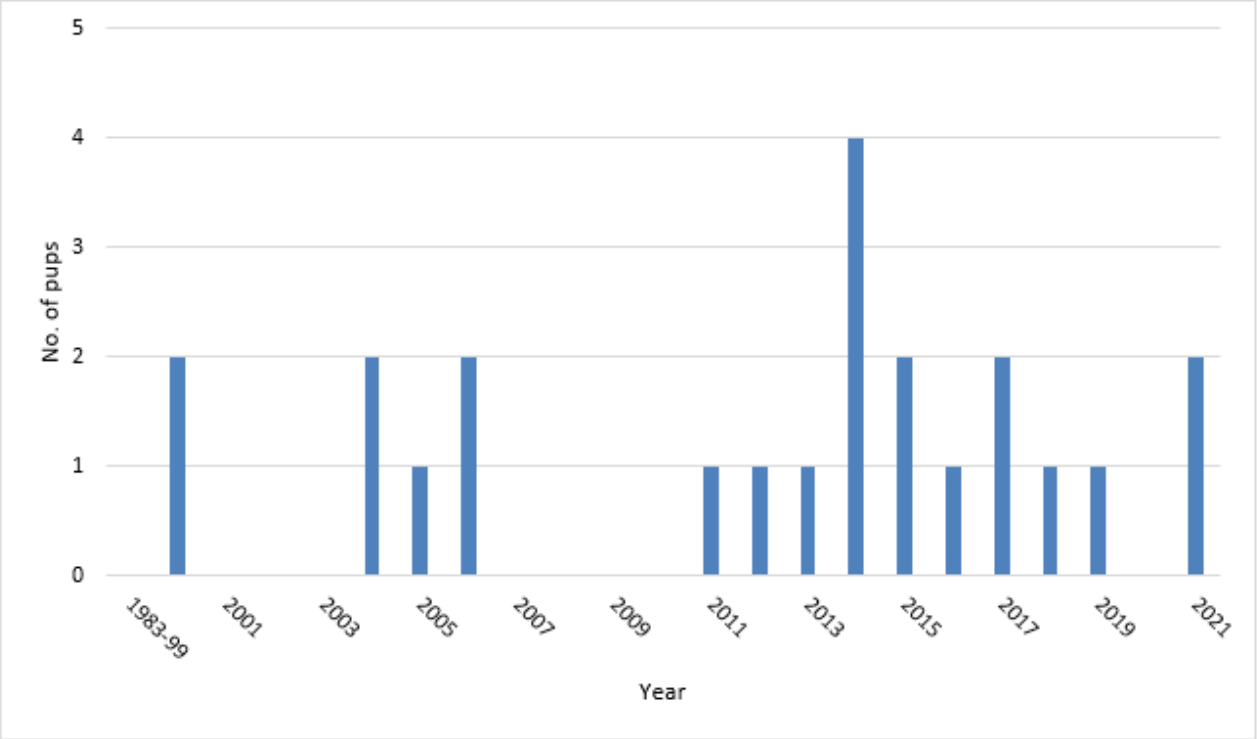


Figure 38 Weekly seal pup births at The Basin in 2021

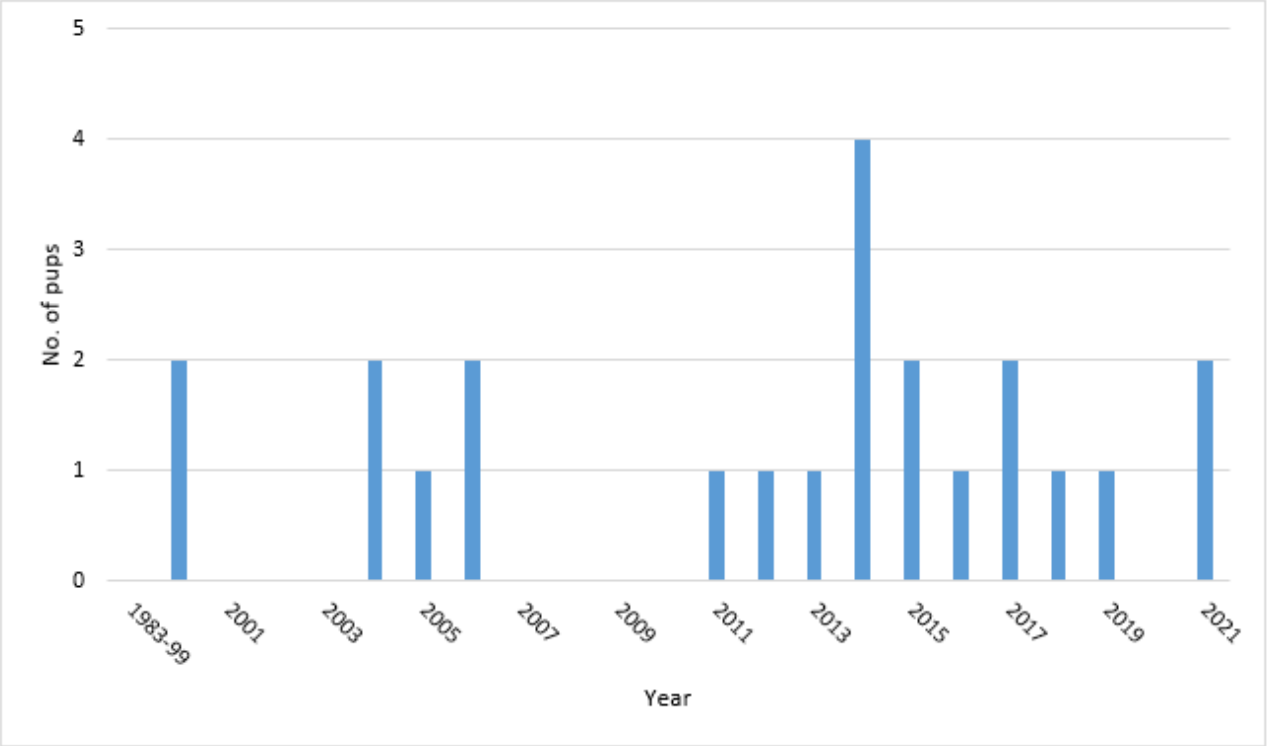


Table 29 Fate of pups at The Basin in 2021

Fate	No. of pups
Assumed survived	1
Survived to beginning of moult	1
Survived to weaning	0
Assumed dead	0
Dead	0
Unknown	0
Total	**2**

4.4.16 Pigstone Bay

Pigstone Bay is a difficult site to monitor as there is a sea cave, which is impossible to access from land. The cave was entered by boat in 1985 and found to end in a shingle beach which held about a dozen hauled out seals and it was considered the cave could be an important pupping site (Alexander & Alexander, 1987). Any pups that are found at Pigstone Bay are rarely seen again and are usually assumed to have died, although it is equally possible, they could have just swum back to the cave or to some other spot around the island.

The Pigstone Bay site comprises not only a cave but also a beach where it has been thought that pups were occasionally born or washed onto when displaced from the cave. Up until 2016 Pigstone Bay was monitored solely from the cliff top but, as only half the beach is visible from above, a route down to the beach was sought and is now used on occasions.

It is possible to walk down to the beach without having to scramble by following the edge of the bay and making one's way along a grassy slope to the start of the rocky slabs.

In 2021 the site was monitored approximately every two to four days when the weather allowed during the main pupping time. Five pups were born at Pigstone Bay in 2021. All of them are dead or are assumed to have died. Two pups disappeared at a young age and three were found dead in between rocks. The deaths of these pups are unexplained as there were no big weather events.

Figure 39 Number of seal pups born at Pigstone Bay in 1984-2021

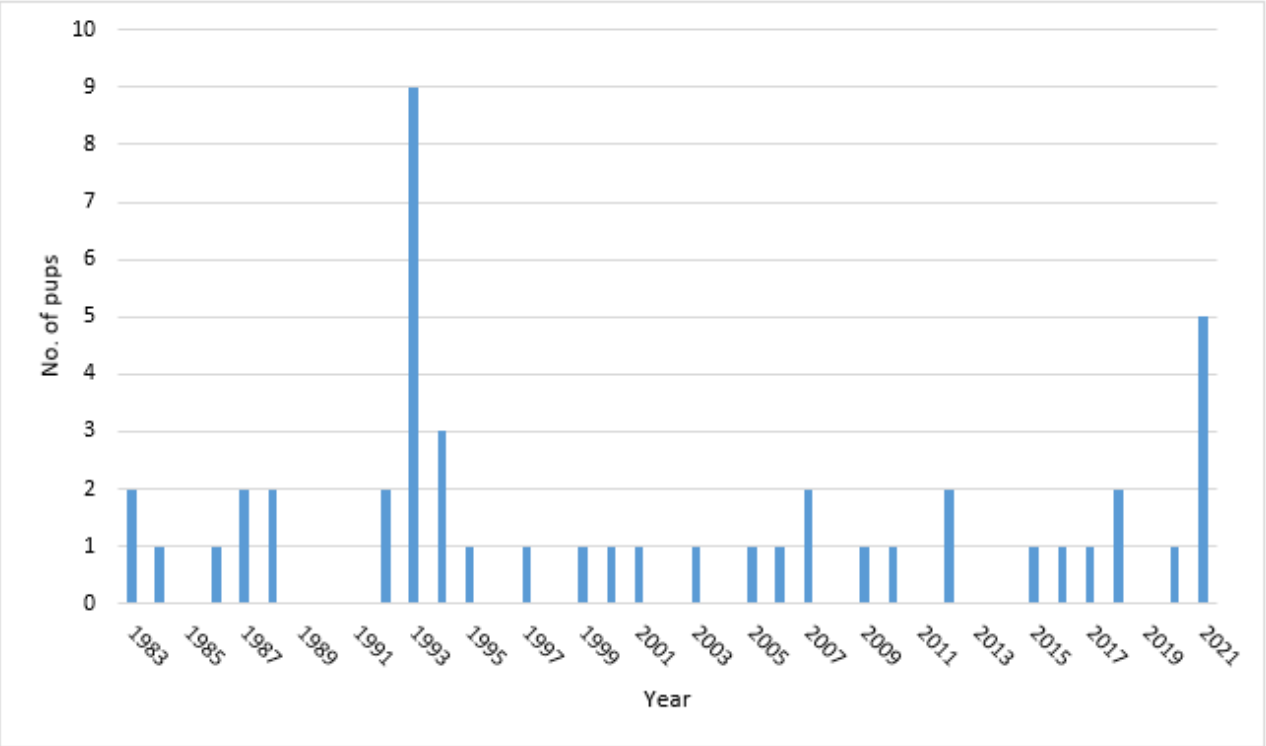


Figure 40 Weekly seal pup births at Pigstone Bay in 2021

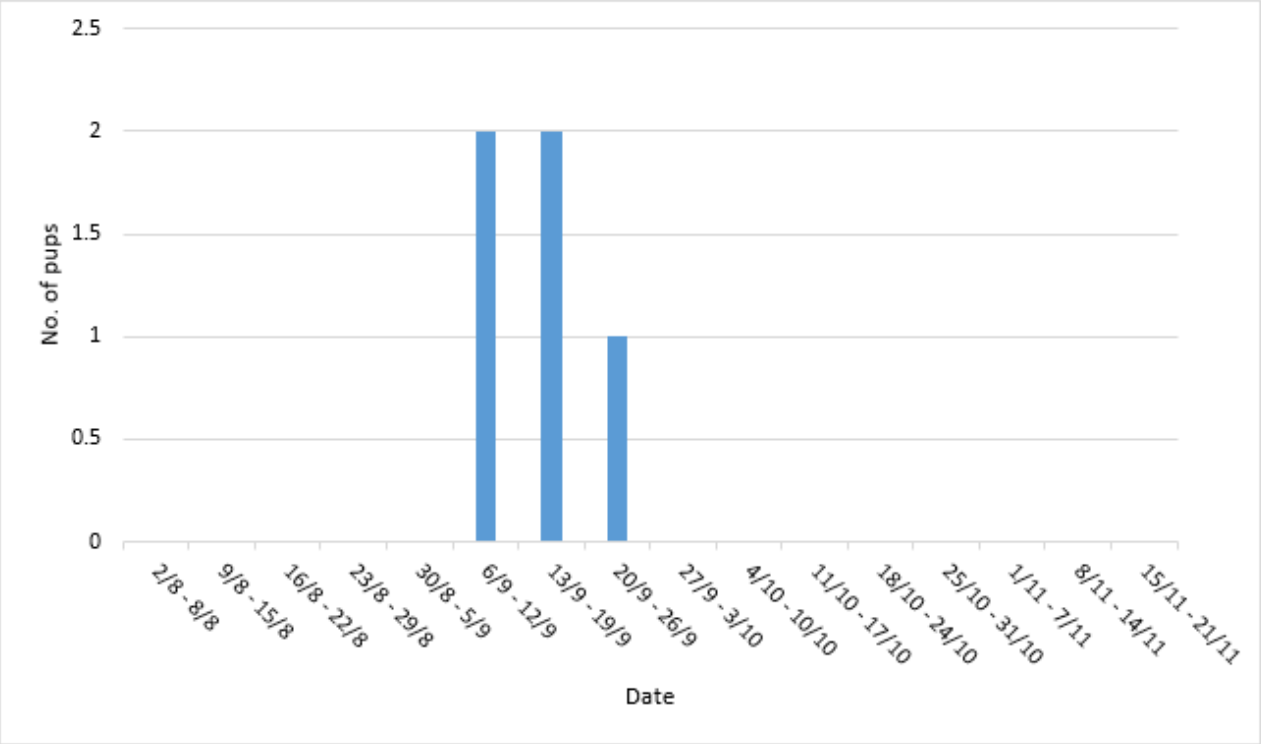


Table 30 Fate of pups at Pigstone Bay in 2021

Fate	No. of pups
Assumed survived	0
Survived to beginning of moult	0
Survived to weaning	0
Assumed dead	2
Dead	3
Unknown	0
Total	**5**

Table 31 Causes of seal pup deaths at Pigstone Bay in 2021

Cause of death	No. of pups
Abandoned/separated/starved	0
Accident/injured/killed	0
Disappeared ≤ stage 3	2
Diseased	0
Drowned	0
Stillborn	0
Unknown	3
Other	0
Total	**5**

4.4.17 Garland Stone

No pups were born at the Garland Stone in 2021. Single pups were born at this site in 2015, 2007 and in 2001.

4.4.18 Mew Stone

No pups were born at the Mew Stone in 2021. This site was possibly used once in 2015 when a freshly dead pup was found floating at the base of the Mew Stone.

4.4.19 Robert's Wick

On 31/08/21 a cow with a pup was spotted by MCZ staff on rocks behind Thorn Rock, west of Robert's Wick. As this pup was never observed by the Skomer Seal Project Officer and the date of birth and fate are unknown it was not included in the analysis for this report. Robert's Wick was possibly used once as a pupping site in 2001.

4.4.20 Tom's House

No pups were observed at Tom's House in 2021. The site has only been used once, in 1997, when a single pup was born.

4.4.21 Rye Rocks

No pups were observed at Rye Rocks in 2021. The last time the site was used was in 2018.

4.5 Movements

During 2021 there were very few movements of pups, possibly due to the generally more settled weather. Seven pups were observed moving but only one of them relocated to a beach further away; all other pups moved only a little distance and none of them spent the majority of their time before weaning on a different beach. Movements included pups that were born in South Haven Cave or Captain Kite's inlet to move onto the main beach, one pup also moved from South Haven beach to Driftwood Bay for a few days; there were movements from North Haven main beach to the slip beach and one pup that was born on the rocks next to The Slabs moved to The Slabs. Only pup 123 moved further from South Haven to The Wick. It disappeared at the beginning of moult, age 15 days and was found five days later on The Wick.

According to Boyle (2012) movements of pups between beaches usually occur during periods of strong winds and spring tides and are presumably a result of pups running out of dry land on their natal beach and then swimming to the nearest available dry site. This is certainly true however, pups seem to move frequently between Seal Hole, Driftwood Bay and South Haven and between North Haven main beach and North Haven Slip, irrespective of tides.

4.6 Wanderers

Five pups were recorded as wanderers. Wanderers are pups which turn up unaccompanied by their mothers, either moulting or just before the start of moult, and where their natal beach is unknown. Large wandering pups usually finish moult once they have established themselves on a beach, whereas the smaller ones (presumably abandoned or separated) usually disappear within days.

The appearance of wandering (unknown) pups is most likely linked with storm and spring tide events.

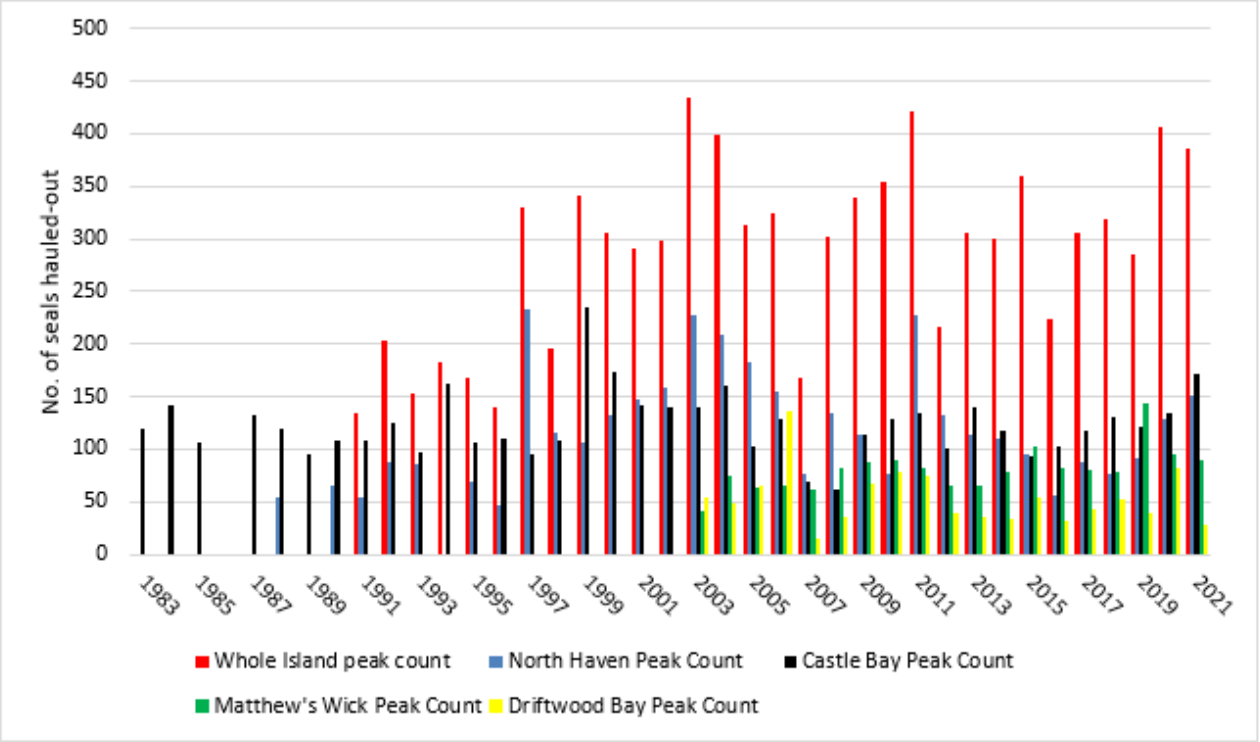
4.7 Haul-outs

In 2021 the maximum haul-out (on the main haul-out sites of North Haven, Driftwood Bay, Castle Bay and Matthew's Wick) of 378 seals (six seals less than in 2020) was recorded on 13/11/21, nine days later than in the previous year.

The average maximum haul-out for the last ten years is 311, therefore the peak number of seals using Skomer to haul-out in 2021 was above the ten-year average.

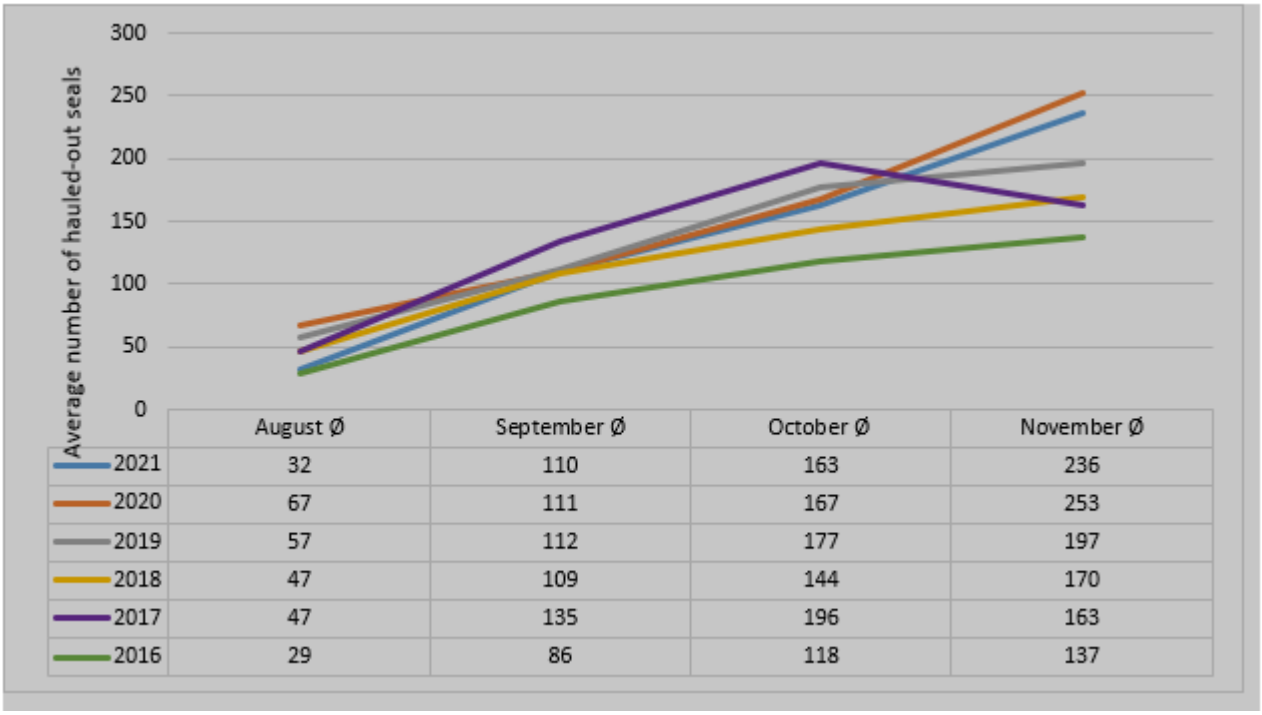
In 2021 North Haven had its peak haul-out count on 14/11/221, Driftwood Bay on 13/11/21, Castle Bay on 02/11/21 and Matthew's Wick on 13 and 18/11/21.

Figure 41 Peak haul-out counts on Skomer Island 1983-2021



As in previous years an attempt was made to cover all beaches suitable for hauling-out simultaneously during low tide in order to establish how many seals are using Skomer on a daily basis.

Figure 42 Average number of seals using Skomer per month 2016-2021



	August Ø	September Ø	October Ø	November Ø
2021	32	110	163	236
2020	67	111	167	253
2019	57	112	177	197
2018	47	109	144	170
2017	47	135	196	163
2016	29	86	118	137

The number of hauled-out animals during the entire observation period was similar to that of 2020, although August saw fewer animals using Skomer's beaches than in previous years. The trend line of haul-outs is typical for Skomer, with the counts increasing throughout the season.

When looking at the average number of seals hauled-out per site in 2021, Castle Bay (including Shag Rock) was again the most popular haul-out site with an average daily haul-out of 46 seals. Also, as with the previous year, the second most popular beach was North Haven (including Rye Rocks and North Haven Slip) with an average daily haul-out of 31 individuals. Matthew's Wick was the third most important haul-out site with a daily average of 27 seals. In 2021 contrary to previous years the Garland Stone was the fourth most popular haul-out site with a daily average of twelve seals. Driftwood Bay was used less in 2021 and only saw a daily average of seven seals. The settled whether throughout the autumn probably allowed seals to haul-out on exposed rocks and beaches like the Garland Stone meaning sheltered beaches like Driftwood Bay were not selected preferentially.

The number of seals hauled-out per site varies significantly from day to day and is most likely determined by weather conditions. How weather and sea conditions impact the haul-outs was especially visible when looking at the numbers at the Garland Stone throughout the monitoring period with many consecutive days of no seals due to strong winds and big swells.

Figure 43 Average haul-out at the main haul-out sites per week in 2021

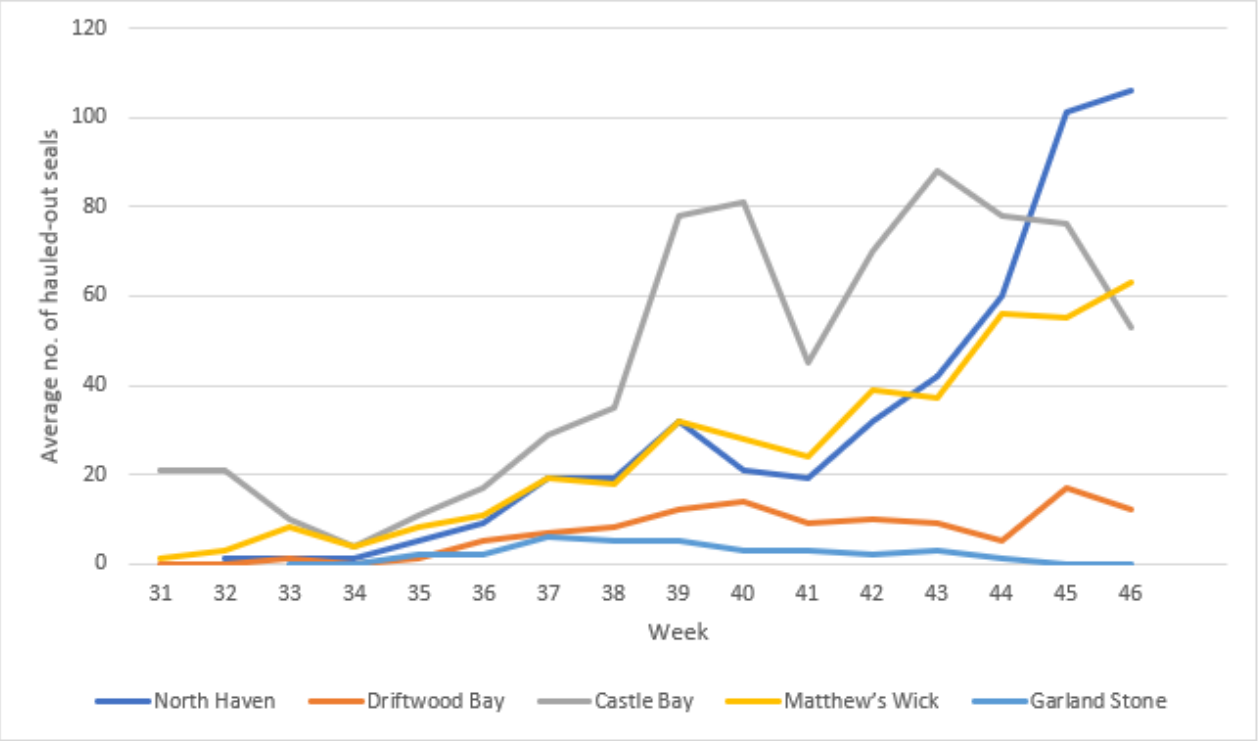


Figure 44 North Haven haul-out in 2021

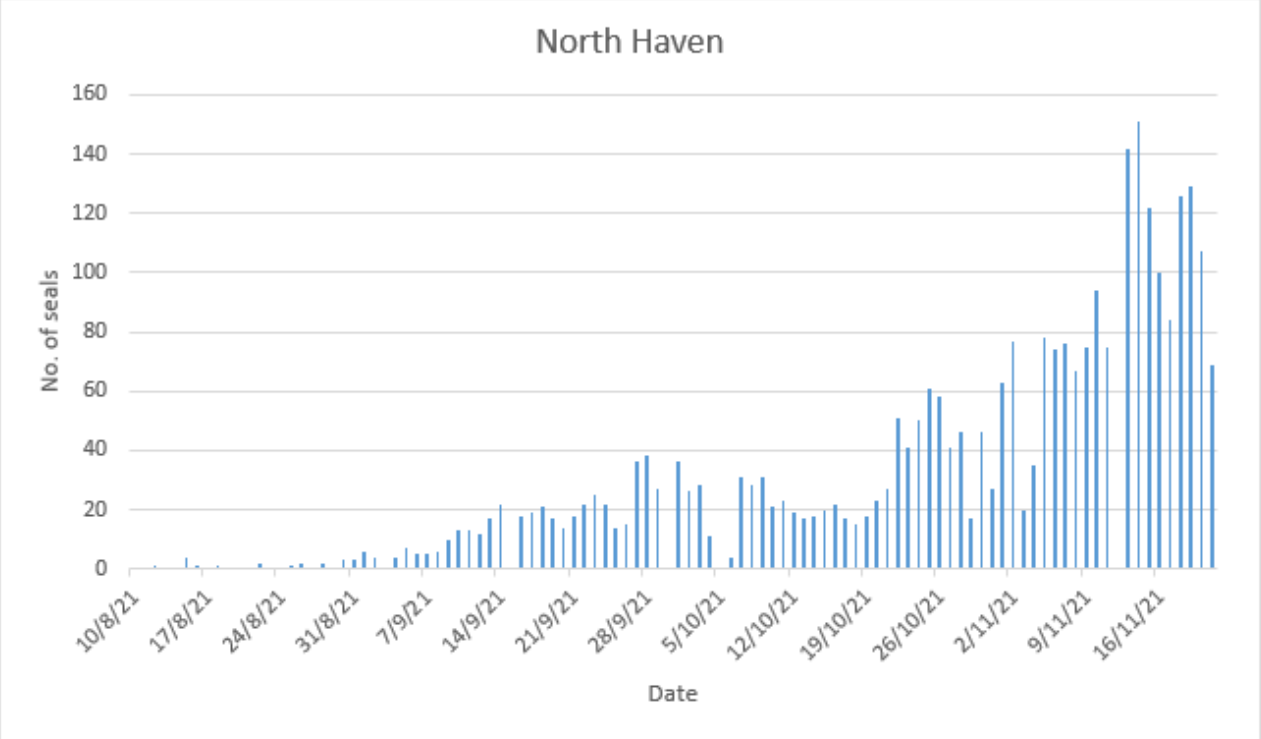


Figure 45 Castle Bay haul-out in 2021

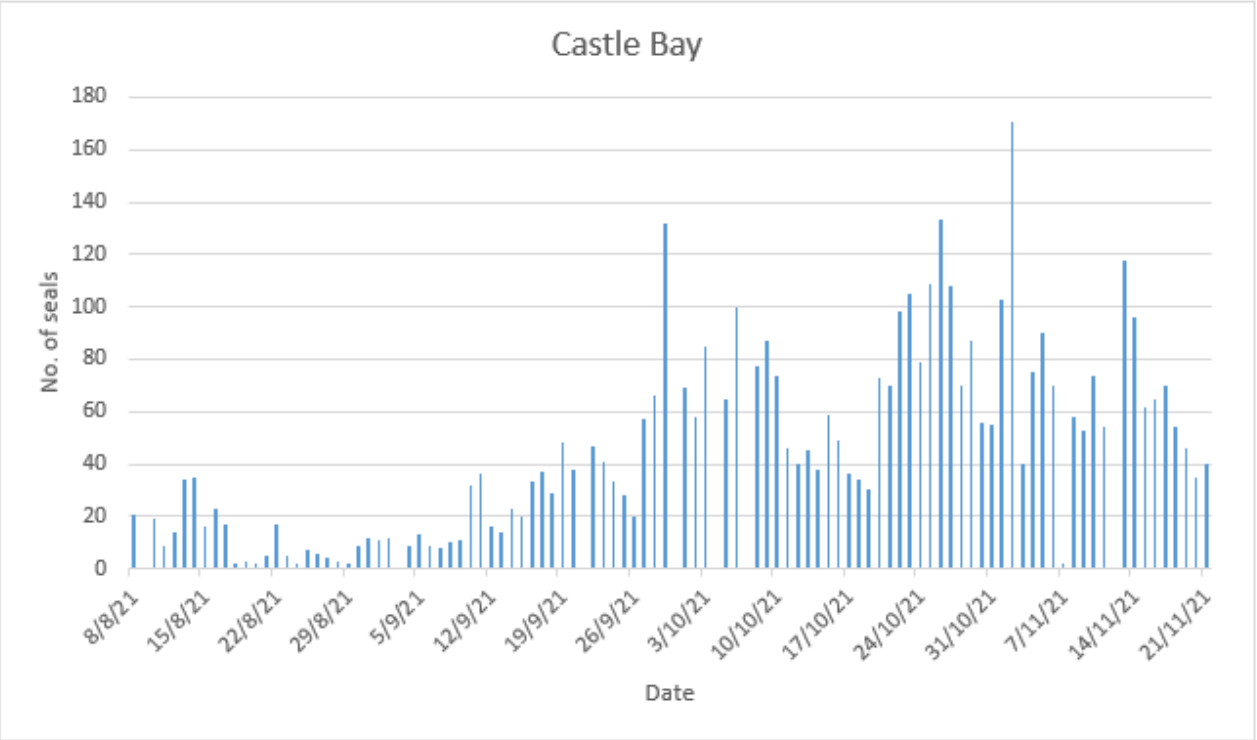


Figure 46 Driftwood Bay haul-out in 2021

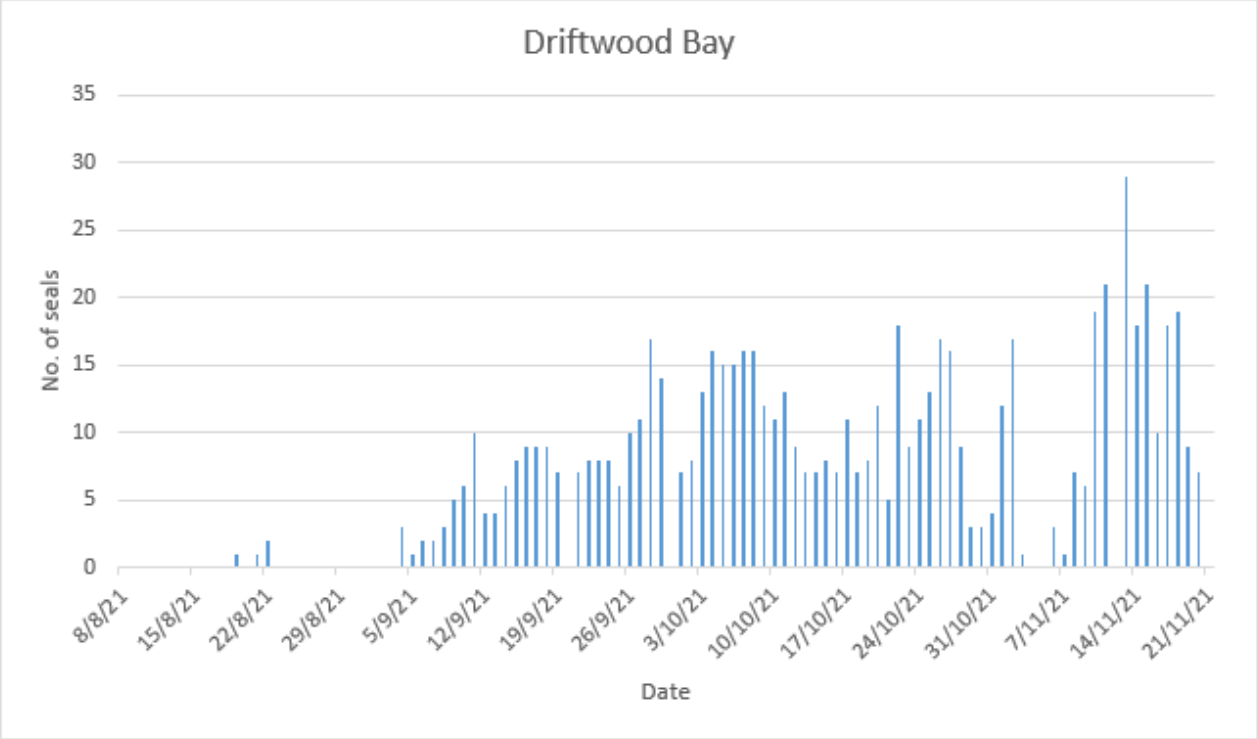


Figure 47 Matthew's Wick haul-out in 2021

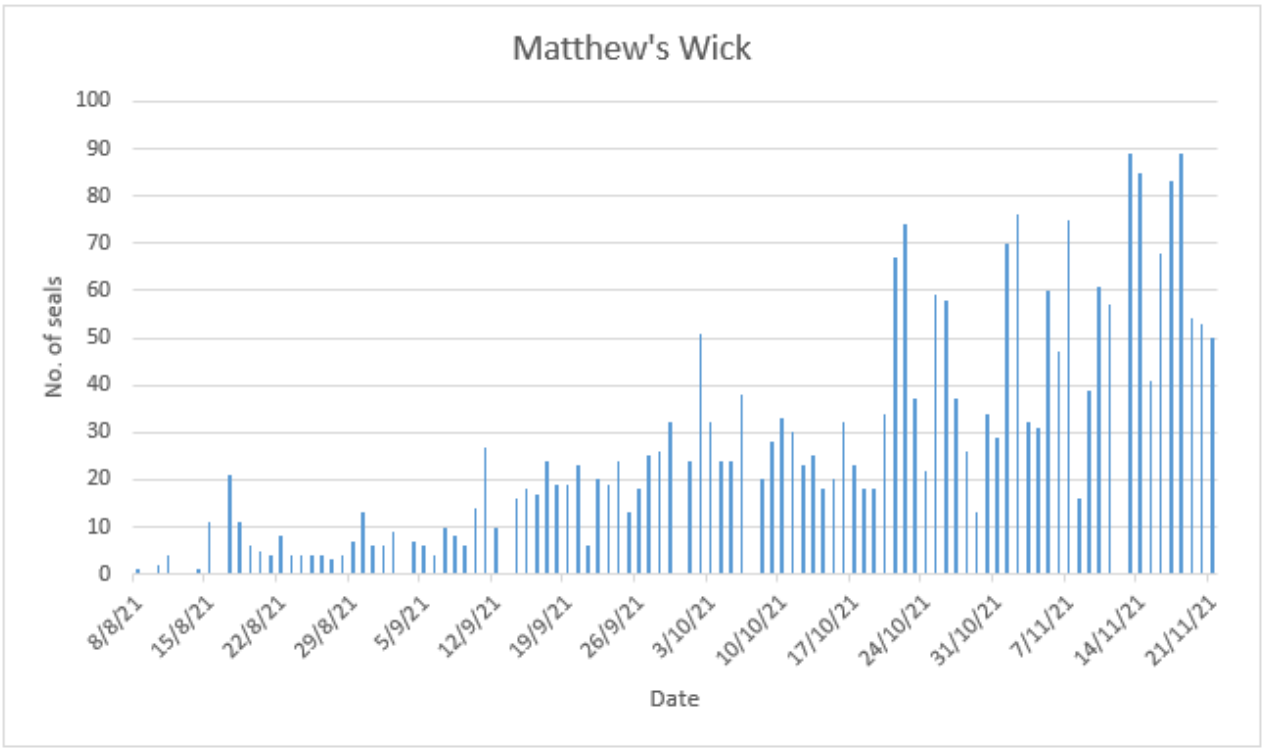


Figure 48 Garland Stone haul-out in 2021

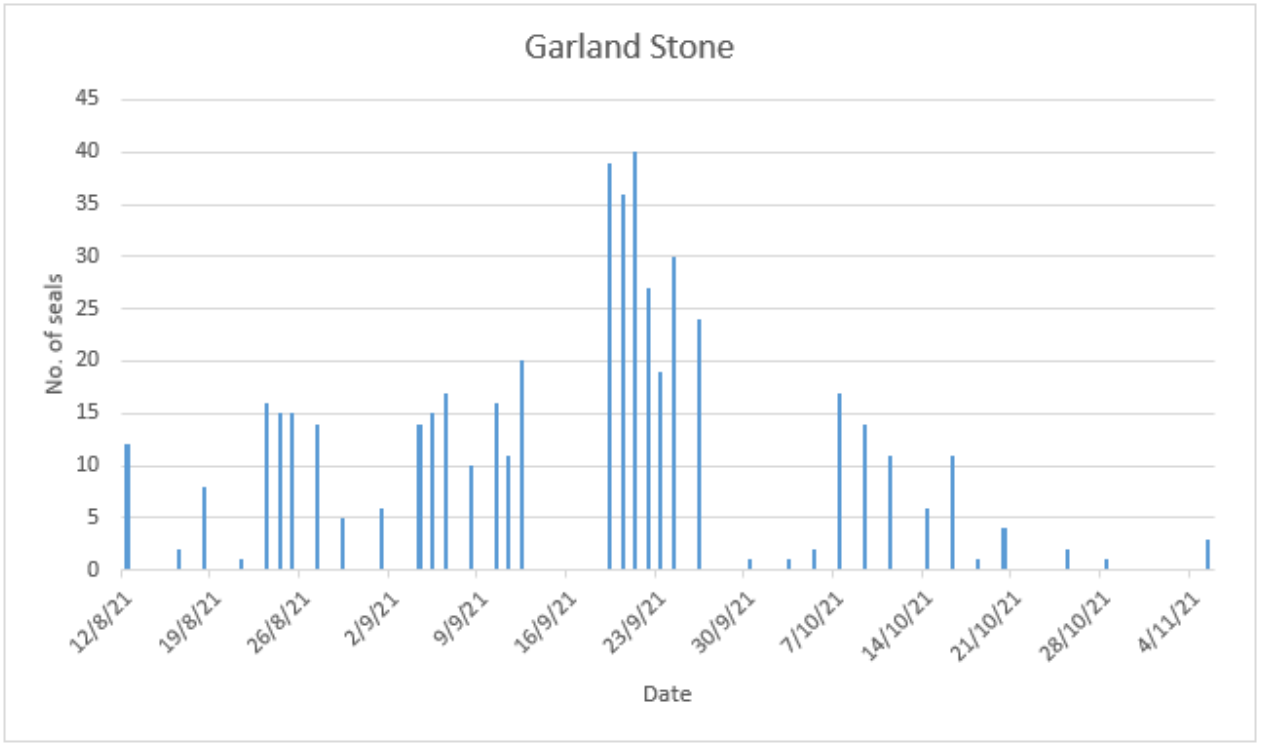
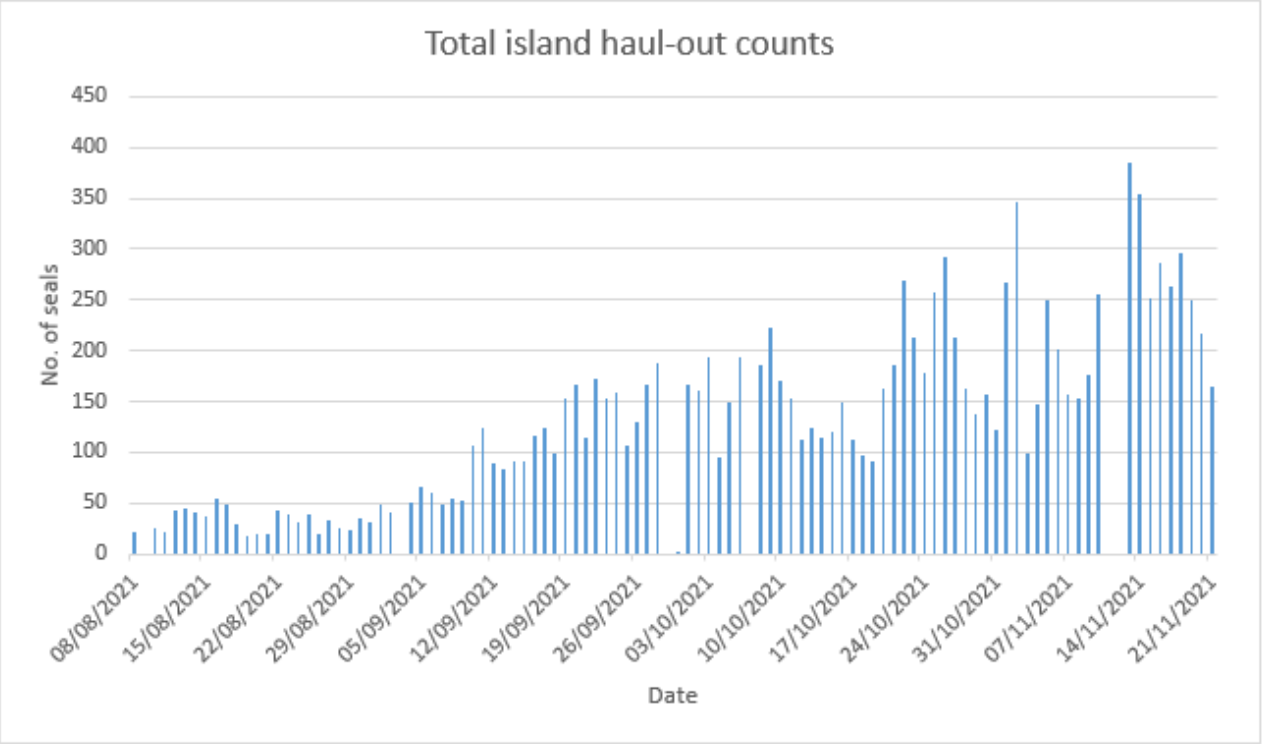


Figure 49 Total island haul-out counts in 2021



4.8 Pollution

4.8.1 Netting

Typically, monofilament line and netting were the most obvious pollutants affecting seals in 2021. 40 individual seals (four males, 32 females and four immatures) were photographed with obvious signs of being entangled in nets at some time in their lives, most commonly a deep scar around their necks, often with netting still embedded.

In 2020 only 16 seals with scars from netting were observed. It is unknown whether this increase mirrors a rise in pollution or rather fishing activity or whether it is due to observer effort. Photographing netted seals relies very much on good weather and time spent in the field so will vary from year to year. Furthermore, some seals might get counted twice as it is not always possible to photograph both sides of a seal during one session. If the same seal gets photographed the next day from the other side it might not be possible to match the animal, hence the seal gets counted again.

In order to increase accuracy and comparability a more systematic approach to monitoring netted seals is recommended. During the quieter period (August, mid-October until the end of November) all seals hauled-out on North Haven beach and Castle Bay which are fully visible, and all netted animals should be counted regularly. This way a percentage of netted seals can be calculated which does not rely on identifying individual animals. This figure can then be compared throughout the years to determine a trend.

In 2021 bull 14.SB-NK-015.NHV was known from 2014. Furthermore 17 cows were known from previous years, the oldest being NK-020 which was first seen in 2007.

4.8.2 Oil/Tar

Skomer's beaches remain relatively clean, no pollution by oil or tar was observed in 2021.

4.8.3 Plastic

No beach clean was possible in 2021 and there was a lot of plastic bottles and containers present on the beaches throughout the season. Furthermore, there are still large pieces of debris which came from an insulated container that had fallen off a tanker in December 2019.

4.9 Disturbance

Only one significant disturbance to seals was recorded during the 2021 pupping season. At the end of August five snorkelers were seen swimming very close to South Haven beach which had several females with pups on it. The next day one of the pups which had been attended by its mum had disappeared. Several minor disturbances to seals were recorded and boats were regularly observed within the voluntary no access zone. For more information about boats entering the voluntary no access zone see Appendix 3.

Table 32 Seal disturbance (records made internally) on Skomer Island in 2021

Date	Time	Location	Type	Severity	Comment
27/8/21	14:33	RRK	RIB	1	disturbed seals hauled-out on RRK
22/8/21	13:47	CBY	Airplane	1	disturbed seals hauled-out on CBY
20/8/21	12:00	RRK	Diving boat	2	8 snorkelers went through the middle of RR at low tide
29/8/21	16:36	SHV	Snorkelers	1-3	5 snorkelers very close to SHV beach with pups on, mums in water, next day a pup on W-side gone
9/9/21	13:30	RRK	Kayak	2	2 kayaks
14/9/21	16:19	RRK	Kayak	2	2 kayaks disturbing haul-out, seals enter water in panic

Level of disturbance: 1 = little disturbance (lifting of heads); 2 = Seals enter water in response to perceived threat; 3 = major disturbance involving abandonment of pup or similar

4.10 Behaviour

In 2021, like in most years, allo-suckling, females nursing others' young, was observed. Arso Civil et. al. states that is widespread in pinnipeds, particularly among true seals. Given the high costs of lactation in pinnipeds, allo-suckling is a puzzling behaviour. On South Haven, Driftwood Bay as well as Matthew's Wick, females were observed fighting over pups and suckling not only their own pups but others as well.

The mother of pup 202, born 30/09/21, was seen on 10/10/21 fighting over and later suckling the much younger pup 220.

Figure 50 Mum of pup 202 (above) looking after pup 220 after having fought off its mum (below)

The mother of pup 220 was also allo-suckling other pups. On 13/10/21 she was seen suckling a moulted pup. Her own pup was eight days old at that time

Figure 51 Mum of pup 220 suckling a weaner on 13/10/21

One case of fostering was observed in 2021. Pup 133 was born on Matthew's Wick on 20/09/21. At first it was attended, but then it must have been abandoned as it only reached size 2 by the time it started moult at 16 days of age.

Figure 52 Pup 133, 16 days old

On the 12/10/21 a female was observed that seemed to be looking for her pup as she was fighting with other cows who were guarding theirs. After some time, the female found pup 133, which she started to suckle.

Figure 53 Pup 133 being suckled by the foster mum on 21/10/21

The two of them were seen several times more with the last time on 24/10/21. By then, the pup was a very good size, and 34 days old!

Figure 54 Pup 133 on 24/10/21

4.11 Disease

In 2021, as in previous years, the usual amount of small and ill-looking weaners were observed, it was especially evident from around the middle and towards the end of the pupping season. As the survival rate of weaners born on Skomer is unknown, no assumption to the extent of mortality in weaners can be made. Observations suggest that a large proportion of young seals die within weeks of being weaned.

Some eye infections were noted in 2021. It seems to mostly affect pups on Matthew's Wick and some at the Wick. A possible explanation for this is the fact that Matthew's Wick only gets flooded during spring tides so rotting seaweed, seal excrement, dead pups etc. accumulate on the beach, possibly spreading diseases. This is similar at the Wick but not quite to the same extent as Matthew's Wick, only a small part of the beach does not get submerged at the rate other beaches do. Matthew's Wick, being a busy pupping and haul-out site, could also lead to a higher rate of disease transmission as seals lie closely bunched up on the shore.

4.12 Identification of individual seals

For the 16th consecutive year photographic monitoring of adult seals continued in 2021. The old method of making sketches is now completely replaced with photographs. In 2007 David Boyle developed a catalogue of seal ID photos which has been updated annually and now comprises nearly 800 individual seals and ca. 2500 photos. Identifying seals by matching pictures with the existing catalogue became more and more laborious and a new way of identifying seals was needed, especially as the photo work was expanded to other Pembrokeshire sites: Marloes Peninsula and Ramsey Island in 2010.

NRW developed the Wales Seal Photo ID database called EIRPHOT. Photos of seals were entered using head and neck profiles and standardised patches of pelage patterns were extracted and matched within the database. In 2014 NRW workers and trained volunteers were contracted to enter seal photos into this database and by March 2015 all existing Pembrokeshire photos (2007 to 2014) had been uploaded. Photos of the following years were stored ready for entering, however in 2019 the decision was made not to continue with the Wales Seal Photo ID database.

Identifying scarred male and female seals continued in 2021 and distinctively marked/scarred seals were photographed and checked against the Skomer seal catalogue.120 seals with scars or tags were photographed in 2021, of which 40 (37 cows and three bulls) were re-identified from previous photos

The oldest returning cow was HD-014. She was rescued from Penberth, Cornwall and treated for an ulcerated left eye in February 2002. From 2010 until 2012 she was seen annually, once pregnant, but she was never observed actually pupping on Skomer. The observation in 2021 is the first since 2012. She was hauled-out on Matthew's Wick but did not pup on Skomer.

The oldest bull to have returned to Skomer in 2021 was 12.NHV.B06. He was the dominant bull on North Haven beach in September and October 2012 and had not been identified since then. In October 2021 he was the dominant bull on South Haven beach.

Table 33 Year of first sighting of seals seen on Skomer Island in 2021

Year first observed	No. of seals seen in 2021 known from previous years
2020	4
2019	2
2018	2
2017	5
2016	4
2015	1
2014	5
2013	1
2012	3
2011	1
2010	1
2009	4
2008	2
2007	1
2006	0
2005	0
2004	2
2003	1
2002	1
TOTAL	40

4.12.1 Seals from elsewhere seen on Skomer

Every year some tagged seals, usually around three to four, get seen on Skomer. This year however seven different individuals were identified. The cause of this increase in sightings of tagged seals is unknown, either more seals get rehabilitated and tagged or, more likely, it is influenced by observer effort. In 2021 two tagged seals were known from previous years. Trixie was born in autumn 2016 and due to injury rescued and rehabilitated by RSPCA West Hatch Wildlife in February 2017. In autumn 2017 and spring 2018 she was regularly seen on Skomer's beaches and in 2021 she was observed on Castle Bay as an adult female.

The other female which was known from previous years is called Bagshot. She was found entangled in netting in 2010 and was taken into care by the Seal Sanctuary, Cornwall. Since 2011 she has been seen around Skomer most years, and in 2017 she pupped on North Haven beach.

Table 34 Tagged seals on Skomer in 2021

Skomer name	Tag	Name	Sex	Beach
BK-066	blue 39	Bagshot	female	CBY
17.SI-TAG-004.NHV	orange 80191	Trixie	female	CBY
21.SB.TAG.80296.CBY	red 80296	Austin	male	CBY
21.SC.TAG.373.NHV	green 373	Bella	female	NHV
21.SI.TAG.80494.AMR	red 80494	Oregano	male	AMR
21.SI.TAG.001.CBY	orange left	unknown	immature	CBY
21.SI.TAG.80370.CBY	red 80370	Chipmunk	male	CBY
21.SI.TAG.80390.CBY	red 80390	Sparkford	female	CBY
21.SI.TAG.80426.NHV	red 80426	Boscastle	male	NHV

Figure 55 Adult seal Trixie in 2021

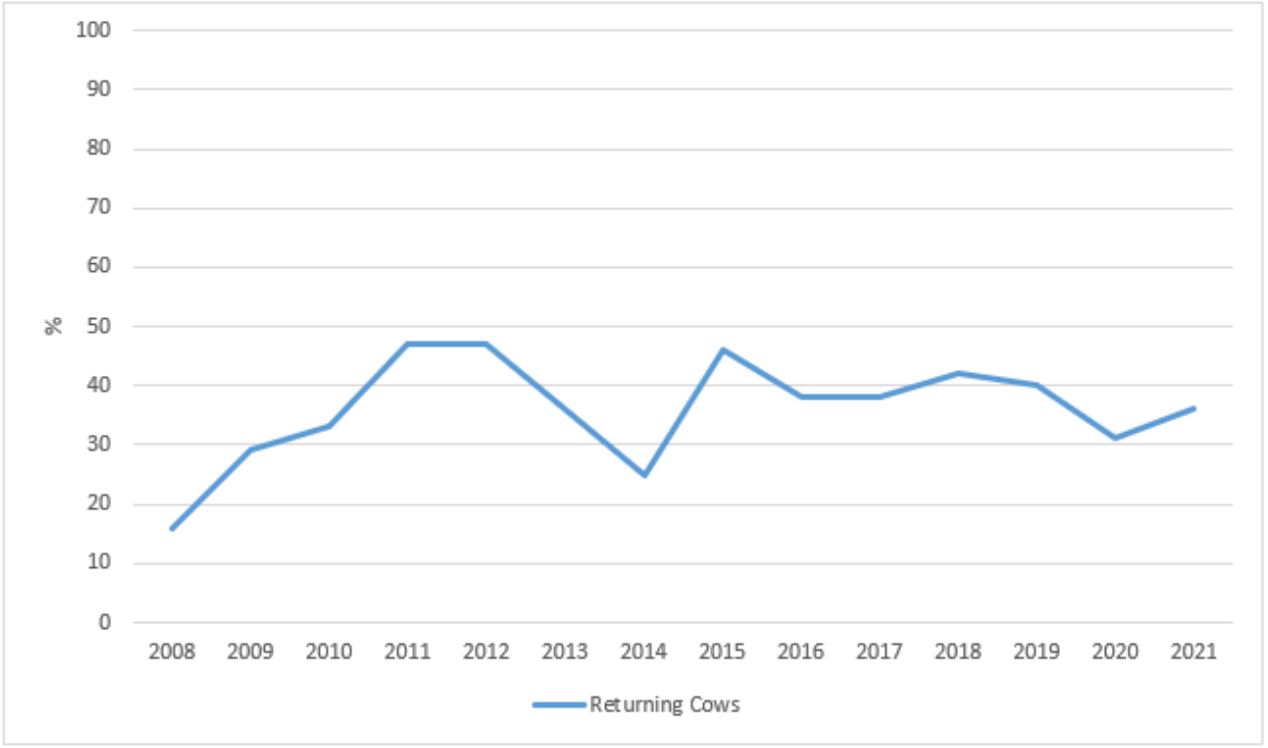
Figure 56 Immature seal Trixie in 2018

4.12.2 Breeding Cows Returning in 2021

Boyle (2012) says that the main reason for expanding the seal identification work was to try and learn more about the pupping cows on Skomer Island. He had assumed there was going to be a 'resident' Skomer population which could be largely identified in a few years. In his report for 2012 he stated that 32% of the breeding cows had bred the previous year and that over the five-year period, when the majority of breeding cows were photographed, only 47% of the cows had given birth to pups sometime during the previous five years. Alexander (2015) suggests that the Skomer MCZ animals are part of a much larger, but ill-defined, mobile population, which can use a range of different areas for breeding and hauling out. It is possible that any or all of the individuals which are part of the Irish Sea and southwest British population could, for certain periods in their lives, spend time in the Skomer MCZ.

Of the 265 cows which pupped on Skomer in 2021, 38 had scars. 14 of the scarred cows were identified, hence 37% of identifiable breeding cows were returning cows. The percentage of returning cows usually lies around 40% and annual variation is possibly the result of a combination of factors such as unknown dynamics in the seal population, different photographic equipment, observer skill, time availability and weather conditions.

Figure 57 Percentage of returning and new pupping cows on Skomer Island 2008-2021



Note: Change in methodology, only scarred seals identified by eye since 2014

The oldest breeding female was LS-002 who pupped for the eighth time in 2021. She was first seen hauled-out in 2003 and then again in 2004. In 2005 she was thought to be the mum of pup 95, therefore she would have been at least three to five years of age, as female Grey Seals reach sexual maturity at that age. Between 2003 and 2021 she was recorded on Skomer 13 times and in 2021 would have been around 21 years of age.

Figure 58 LS-002 with her pup on South Haven beach on 21/08/21

4.12.3 Site fidelity

All five identified cows which bred in 2020 and 2021 pupped on the same beach or on adjacent beaches. The female 16.SC-BK-177.MWK pupped in three consecutive years on Matthew's Wick where she also bred, after one year of absence, in 2016 and 2017.

16.SC-US-117.SHV pupped on North Haven beach in 2020 and potentially also in 2021 – however in 2021 she was not actually seen with a pup, but was observed going into a cave for several days. As this female is not able to feed her pups due to a large scar on her belly, her pups always die.

There are cows which show preferences for certain beaches whereas some animals are less site faithful and switch between sites, possibly influenced by weather conditions and competition. It also seems likely that cows use different sites on Skomer but also that they migrate to other beaches within the Skomer MCZ or travel even further afield.

4.12.4 Pupping Date

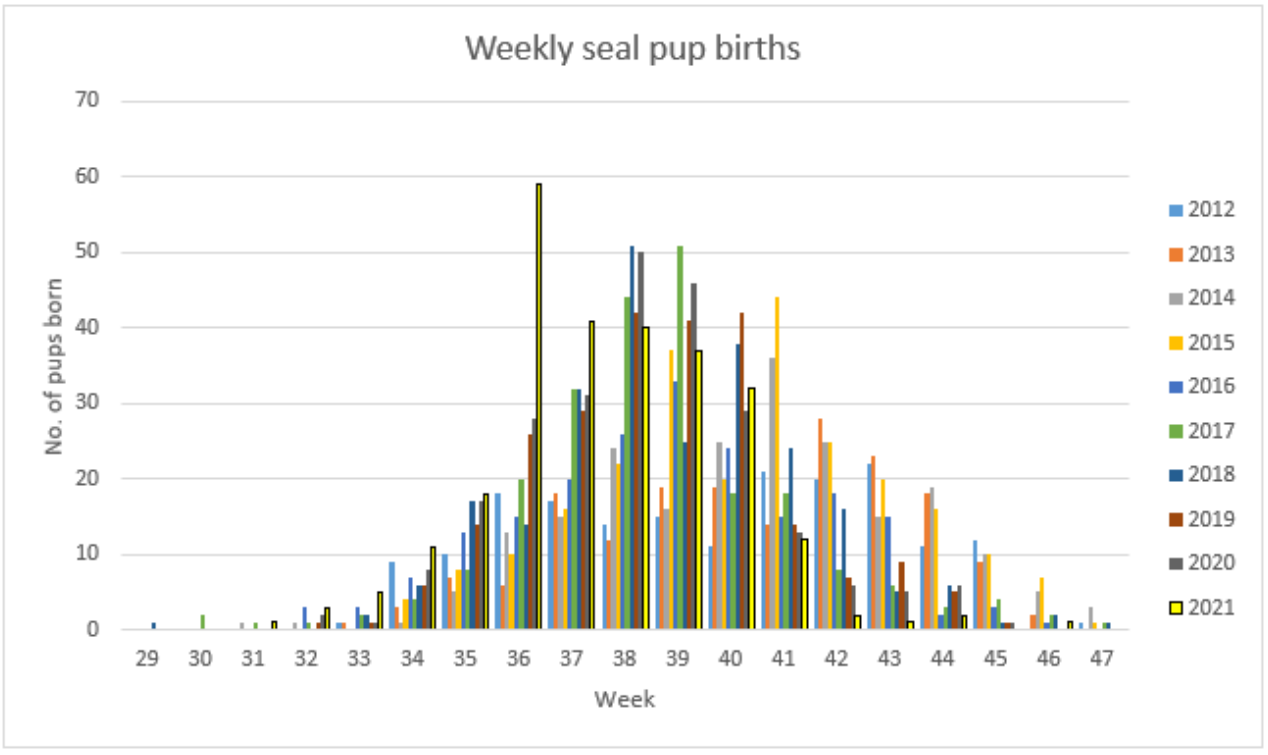
Due to the small sample size and the fact that only five returning cows pupped in consecutive years it is difficult to make an accurate statement about the general timing of breeding by looking at the pupping data of these five seals. Furthermore, recording the exact day of birth for each pup becomes more and more difficult the busier the pupping season gets, hence some of the dates are estimates.

However, when looking at all pupping seals and not at the individual it is clear that 2021 was an extraordinarily early pupping season in which the majority of seals were born in early September, see Figure 57 and 59.

Table 35 Pupping date of returning cows on Skomer Island in 2018-2021

Cow	2018	2019	2020	2021	2019/20	2020/21
LBK-036	Not seen	Not seen	Not seen	14/09/21	0	0
LBK-046	Not seen	Not seen	Not seen	09/10/21	0	0
LBK-074	Not seen	25/09/19	Not seen	25/09/21	0	0
LS-002	22/08/18	Not seen	13/08/20	10/08/21	0	-2
LS-017	Not seen	Not seen	Not seen	16/10/21	0	0
14.SC-HD-166b.SBS	Not seen	Not seen	Not seen	30/09/21	0	0
14.SC-RS-222.NHV	Not seen	Not seen	Not seen	30/09/21	0	0
16.SC-BK-177.MWK	Not seen	06/10/19	20/09/20	06/10/21	-16	+16
16.SC-RS-193.SHV	Not seen	12/10/19		04/10/21	0	0
16.SC-US-117.SHV	04/10/18	Not seen	29/09/20	11/10/21	0	+12
17.SC-LBK-025.SBS	Not seen	Not seen	04/09/20	02/09/21	0	-2
17.SC-NET-183.MWK	Not seen	Not seen	Not seen	24/09/21	0	0
19.SC.LBK.001.CBY	Not seen	Not seen	Not seen	09/09/21	0	0
20.SC.NET.218.SBS	Not seen	Not seen	13/10/20	30/09/21	0	-13

Figure 59 Weekly seal births 2012-2021



4.13 Further Research

There was no additional research conducted on the island in 2021.

Acknowledgments

Many thanks to Natural Resources Wales who funded this project in 2021.

A big thank you goes to Freya Blockley, who assisted us in the busiest time of the seal monitoring and the Skomer team: Leighton Newman, Ceris Aston, Beth Thompson, Ed Betteridge and Rowie Burcham. I would also like to thank Mari Elin and Gruffydd Jones for their help matching seal photos; Lisa Morgan, Kate Lock and Mark Burton for project support and advice; Eddie Stubbings for proof-reading the report and assisting me in countless ways; everyone from seal rescue centres, RSPCA, BDMLR and the Cornwall Seal Group Research Trust, especially Sue Sayer and Paul Oaten for helping to trace and identify tagged seals.

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Appendices

Appendix 1 SMRU Age classification of pups

I –first day or two after birth, fresh pink umbilicus, poor coordination, ribs visible, white coat stained yellow
II- usually days 3-9, white coat, ribs less prominent early on, good coordination
III- usually days 10+, white coat (although dark marks around head/flips may be visible), noticeably fat – abdomen rounded out
IV- usually days 14+, some white coat, but moulting
V- anytime from day 16+, no white coat left, fully moulted.

Appendix 2 Key

Fate:

SBM	Known to have survived to the beginning of moult
SW	Known to have survived and weaned
D	Known to have died
ASM	Assumed to have survived to the beginning of moult
AD	Assumed to have died

Birth Sites:

AMR	Amy's Reach
BAS	The Basin
CBY	Castle Bay
DWB	Driftwood Bay
GST	Garland Stone
HCB	High Cliff Boulders
LAN	The Lantern (former LTN)
MWK	Matthew's Wick
NHV	North Haven
NHV(S)	North Haven Slip
NHV(SC)	North Haven Slip Cave
MST	Mew Stone
PSB	Pigstone Bay
SBS	The Slabs
SCBC	South Castle Beach Cave
SHO	Seal Hole
SHV	South Haven
SHV(C)	South Haven Cave
SHV (CKI)	South Haven (Captain Kites Inlet)
SSC	South Stream Cave
WCK	The Wick

Condition at Beginning of Moult:

1	Very Small	Assumed not to have survived long after moult
2	Small, but healthy	In good condition, should have a reasonable chance of survival
3	Good Size	Most should survive
4	Very good size	All should survive
5	Super-moulter	An exceptionally sized pup

Appendix 3 Boats and kayaks in voluntary no access zone

Date	Time	Location	Craft	No. on board	Comment
7/9/21	12:59	SHV	Yacht	?	Inside voluntary no access zone
7/9/21	12:59	SHV	Motorboat	?	Inside voluntary no access zone fishing
20/9/21	12:00	SHV	Speedboat	2	Inside voluntary no access zone
10/10/21	13:45	SHV	Yacht	2	Inside voluntary no access zone
10/10/21	13:45	SHV	Motorboat	2	Inside voluntary no access zone fishing
10/10/21	15:00	SHV	Yacht	2	Inside voluntary no access zone

Data Archive Appendix

Data outputs associated with this project are archived in [NRW to enter relevant corporate store and / or reference numbers] on server–based storage at Natural Resources Wales.

Or

No data outputs were produced as part of this project.

The data archive contains: [Delete and / or add to A-E as appropriate. A full list of data layers can be documented if required]

[A] The final report in Microsoft Word and Adobe PDF formats.

[B] A full set of maps produced in JPEG format.

[C] A series of GIS layers on which the maps in the report are based with a series of word documents detailing the data processing and structure of the GIS layers

[D] A set of raster files in ESRI and ASCII grid formats.

[E] A database named [name] in Microsoft Access 2000 format with metadata described in a Microsoft Word document [name.doc].

[F] A full set of images produced in [jpg/tiff] format.

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue https://libcat.naturalresources.wales (English Version) and https://catllyfr.cyfoethnaturiol.cymru (Welsh Version) by searching 'Dataset Titles'. The metadata is held as record no [NRW to insert this number]

Further copies of this report are available from library@cyfoethnaturiolcymru.gov.uk