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Grey Seal Breeding Census Skomer Island 2014

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Summary

215 Grey seal pups were definitely born on Skomer Island in 2014. In addition eleven pups (wanderers) turned up either just before the start of moult, or moulting.

36 more pups were born than last year and this is the highest total ever recorded. See section 4.2.

379 pups were born in the Marine Nature Reserve as a whole in 2014: 215 on Skomer and 153 on the mainland. See section 4.2.

The busiest week this year was week 41 (06-12/10) when 36 pups were born, See section 4.2.

The most productive beaches were Matthew's Wick (41 pups) and South Haven (34 pups). In 2014, in contrast to 2013, Castle Bay (30 pups) was more popular than Driftwood Bay (26 pups) and North Haven beach was more productive (24 pups). See section 4.2.

154 pups are known, or assumed to have survived on Skomer, giving a survival rate of 73%, which is slightly higher than last year's rate (68%) but still lower than the average of the last ten years (76%). See section 4.3.

The mean size at onset of moult was three; the mean age at onset of moult was 14 days; the mean age at completion of moult was 20 days and the mean duration of moult was six days. See section 4.6.

In 2014 the maximum haul-out of 300 was recorded on 16/11/14. The number of seals using the haul-outs was slightly lower than the average for the last ten years. See section 5.

32 different cows, twelve bulls, one immature and two weaners were photographed with obvious signs of being entangled in nets at some time in their lives, often with netting still embedded. See section 6.

Photo-monitoring continued in 2014 and nearly 4000 pictures of seals were taken. Ca. 80% of breeding females were photographed and 634 pelage photos were collected and catalogued which will be entered into the [SMRU-Wales](#) seal ID database. Only Bulls and scarred individuals were identified by eye, in total 135 seals were identified, of which 50 were known from previous years. See section 11.

Crynodeb

Cafodd 215 o loi morloi llwyd eu geni yn bendant ar Ynys Sgomer yn 2014. Yn ogystal, cyrhaeddodd un ar ddeg o loi (crwydriaid) naill ai ychydig cyn neu yn ystod y cyfnod bwrw blew.

Ganed 36 yn fwy o loi na'r llynedd a dyma'r cyfanswm uchaf a gofnodwyd erioed. Gweler adran 4.2.

Ganed 379 o loi yn y Warchodfa Natur Forol i gyd yn 2014: 215 ar Sgomer a 153 ar y tir mawr. Gweler adran 4.2.

Wythnos brysuraf y flwyddyn oedd wythnos 41 (06-12 Hydref) pan aned 36 o loi. Gweler adran 4.2.

Y traethau mwyaf cynhyrchiol oedd Matthew's Wick (41 llo) a South Haven (34 llo). Yn 2014, yn wahanol i 2013, roedd Castle Bay (30 llo) yn fwy poblogaidd na Driftwood Bay (26 llo) ac roedd traeth North Haven yn fwy cynhyrchiol (24 llo). Gweler adran 4.2.

Fe wyddom, neu fe dybiom, fod 154 o loi wedi goroesi ar Sgomer, gan roi cyfradd oroesi o 73%, sef ychydig yn well na'r llynedd (68%) ond yn is o hyd na'r cyfartaledd ar gyfer y deng mlynedd diwethaf (76%). Gweler adran 4.3.

Y maint cymedrig ar ddechrau'r cyfnod bwrw blew oedd tri, yr oedran cymedrig ar ddechrau'r cyfnod bwrw blew oedd 14 diwrnod, yr oedran cymedrig ar ddiwedd y cyfnod oedd 20 diwrnod, a hyd cymedrig y cyfnod oedd chwe diwrnod. Gweler adran 4.6.

Yn 2014, gwelwyd y nifer fwyaf yn gadael y dŵr, sef 300, ar 16 Tachwedd. Bu ychydig yn llai o adael y dŵr nag a fu ar gyfartaledd yn ystod y deng mlynedd diwethaf. Gweler adran 5.

Tynnwyd lluniau 32 o fuchod, deuddeg o deirw, un heb gyrraedd llawn-dwf a dau newydd eu diddyfnu, a oedd yn amlwg wedi bod yn sownd mewn rhwydi. Mewn rhai achosion, roedd darnau o'r rhwyd ynghlwm wrth eu cyrff o hyd. Gweler adran 6.

Parhaodd y gwaith o dynnu lluniau i fonitro'r morloi yn 2014, a thynnwyd bron 4000 o luniau i gyd. Tynnwyd lluniau tua 80% o'r morloi benyw magu. Hefyd, casglwyd 634 o ffotograffau blew. Cafodd y rhain eu catalogio ac fe'i cofnodir yng nghronfa ddata [SMRU-Cymru](#) o fanylion adnabod morloi. Dim ond teirw ac unigolion â chreithiau a gafodd eu hadnabod â'r llygad yn unig. Cafodd 135 o forloi eu hadnabod fel hyn, ac roedd 50 yn hysbys eisoes. Gweler adran 11.

Contents

1. Introduction	10
2. Objectives	10
3. Census Methods.....	11
4. Census Results.....	13
4.1 General	13
4.2 Pup Numbers	16
4.3 Survival Rate.....	20
4.4 Site Summaries	25
4.4.1 North Haven.....	25
4.4.2 Prothero's Dock	27
4.4.3 The Lantern	28
4.4.4 Amy's Reach.....	29
4.4.5 Matthew's Wick.....	30
4.4.6 Castle Bay	33
4.4.7 South Castle Beach Cave.....	35
4.4.8 Seal Hole	37
4.4.9 The Slabs.....	40
4.4.10 Driftwood Bay	41
4.4.11 South Haven	44
4.4.12 South Stream Cave and Boulders	47
4.4.13 High Cliff Boulders	49
4.4.14 The Wick.....	50
4.4.15 The Basin.....	52
4.4.16 Robert's Wick.....	53
4.4.17 Tom's House.....	53
4.4.18 Pigstone Bay.....	53
4.4.19 The Garland Stone	53
4.5 Movements.....	54
4.6 Wanderers.....	55
4.7 Seal Pup Moulting.....	55
5. Haul-outs in 2014.....	59
6. Pollution	65
6.1 Netting.....	65
6.2 Oil/Tar	66

7 Disturbance.....	67
8. Seal Behaviour	68
10. Disease.....	70
11. Identification of individual seals	72
11.1 Breeding Cows Returning In 2014.....	74
11.1.2 Site fidelity	7776
11.1.3 Pupping date.....	7776
11.2 Returning Bulls In 2014	7877
12. Skomer Seals Seen Elsewhere	7978
Acknowledgments.....	8079
References	8180
Appendix 1. Ea. Smiths’s Age Classification System.....	8382
Appendix 2. Key.....	8483

List of Figures

Figure 1 Number of seal pups born in Skomer Marine Nature Reserve 1983-2014	<u>1617</u>
Figure 2 Daily totals of seal pups born on Skomer Island in 2014	<u>1718</u>
Figure 3 Percentage of seal pups born at each site on Skomer Island in 2014	<u>1920</u>
Figure 4 Total number of seal pups born/survived on Skomer Island, 1983-2014	<u>2021</u>
Figure 5 Total number of seal pups born in the Marine Nature Reserve 1988-2014	<u>2122</u>
Figure 6 Percentage of seal pups surviving in Skomer/Marine Nature Reserve 1983-2014	<u>2122</u>
Figure 7 Weekly seal pup births and deaths on Skomer Island in 2014	<u>2223</u>
Figure 8 Number of seal pups born in North Haven 1983–2014.....	<u>2526</u>
Figure 9 Weekly seal pup births in North Haven in 2014	<u>2627</u>
Figure 10 Number of seal pups born in Prothero’s Dock 1983-2014	<u>2728</u>
Figure 11 Number of seal pups born in The Lantern 1983-2014	<u>2829</u>
Figure 12 Number of seal pups born in Amy’s Reach 1983–2014.....	<u>2930</u>
Figure 13 Number of seal pups born in Matthew’s Wick 1983–2014	<u>3031</u>
Figure 14 Weekly seal pup births in Matthew’s Wick in 2014	<u>3031</u>
Figure 15 Number of seal pups born in Castle Bay 1983-2014	<u>3334</u>
Figure 16 Weekly seal pup births in Castle Bay in 2014.....	<u>3334</u>
Figure 17 Number of seal pups born in South Castle Beach Cave 1983-2014.....	<u>3536</u>
Figure 18 Weekly seal pup births in South Castle Beach Cave in 2014	<u>3637</u>
Figure 19 Number of seal pups born in Seal Hole 1983-2014	<u>3738</u>
Figure 20 Weekly seal pup births in Seal Hole in 2014.....	<u>3839</u>
Figure 21 Number of seal pups born on The Slabs 1983-2014	<u>4041</u>
Figure 22 Weekly seal pup births on The Slabs in 2014.....	<u>4041</u>
Figure 23 Number of seal pups born in Driftwood Bay 1983-2014	<u>4142</u>
Figure 24 Weekly seal pup births in Driftwood Bay in 2014	<u>4243</u>
Figure 25 Number of seal pups born in South Haven 1983-2014.....	<u>4445</u>
Figure 26 Weekly seal pup births in South Haven in 2014.....	<u>4546</u>
Figure 27 Number of seal pups born in South Stream Cave 1983-2014	<u>4748</u>
Figure 28 Weekly seal pup births in South Stream Cave and Boulders in 2014	<u>4849</u>
Figure 29 Number of seal pups born at High Cliff Boulders 1983-2014.....	<u>4950</u>
Figure 30 Number of seal pups born in The Wick 1983-2014.....	<u>5051</u>
Figure 31 Weekly seal pup births in The Wick in 2014	<u>5051</u>
Figure 32 Number of seal pups born in The Basin 1983-2014.....	<u>5253</u>
Figure 33 Weekly seal pup births in The Basin in 2014	<u>5253</u>
Figure 34 Variability of size at onset of moult depending on sample size	<u>5758</u>
Figure 35 Variability of age at onset of moult depending on sample size	<u>5758</u>
Figure 36 Variability of age at end of moult depending on sample size	<u>5859</u>
Figure 37 Peak haul-out counts on Skomer Island 1983-2014	<u>5960</u>
Figure 38 Daily average number of seals using Skomer between August and November.	<u>6061</u>
Figure 39 Average haul out on Castle Bay, North Haven, Driftwood Bay and Matthew’s Wick in 2014	<u>6061</u>
Figure 40 North Haven seal haul-outs and tidal range compared.....	<u>6162</u>
Figure 41 North Haven haul-out in 2013.....	<u>6162</u>
Figure 42 Castle Bay haul-out in 2014.....	<u>6263</u>
Figure 43 Driftwood Bay haul-out in 2014.....	<u>6263</u>
Figure 44 Matthew’s Wick haul-out in 2014	<u>6364</u>

Figure 45 Garland Stone 2014..... ~~63~~64
Figure 46 All haul-outs combined in 2014..... ~~64~~65
Figure 47 Percentage of returning and new pupping cows on Skomer Island 2008-2014 .76
Figure 48 Difference in pupping date of returning cows on Skomer Island 2012-2014..... 78

List of Tables

Table 1 Monthly number & percentage of seal pup births on Skomer Island 1983-2014...	18
Table 2 Survival rates of seal pups on Skomer Island in 2014	23
Table 3 Causes of seal pup deaths on Skomer Island in 2014	24
Table 4 Fate of pups in North Haven in 2014	26
Table 5 Causes of seal pup deaths on North Haven beach in 2014	26
Table 6 Sizes of pups at onset of moult in North Haven in 2014	26
Table 7 Fate of pups on Mathew's Wick in 2014	31
Table 8 Causes of seal pup deaths on Mathew's Wick in 2014	31
Table 9 Sizes of pups at onset of moult on Mathew's Wick in 2014	32
Table 10 Fate of pups on Castle Bay in 2014	34
Table 11 Causes of seal pup deaths on Castel Bay in 2014.....	34
Table 12 Sizes of pups at onset of moult on Castle Bay in 2014	34
Table 13 Fate of pups in Seal Hole in 2014	38
Table 14 Causes of seal pup deaths in Seal Hole in 2014	39
Table 15 Fate of pups on Driftwood Bay in 2014	42
Table 16 Causes of seal pup deaths on Driftwood Bay in 2014.....	43
Table 17 Sizes of pups at onset of moult on Driftwood Bay in 2014	43
Table 18 Fate of pups in South Haven in 2014	45
Table 19 Causes of seal pup deaths in South Haven in 2014	46
Table 20 Sizes of pups at onset of moult in South Haven in 2014	46
Table 21 Fate of pups on The Wick 2014	51
Table 22 Causes of seal pup deaths on The Wick in 2014	51
Table 23 Sizes of pups at onset of moult on The Wick in 2014	51
Table 24 Movements of marked pups on Skomer Island in 2014	54
Table 25 Seal pup moult records on Skomer Island 1995-2014	56
Table 26 Rate of occurrence of moult study results between 1995 and 2014.....	56
Table 27 Year of first sighting of seals seen on Skomer Island in 2014.....	73
Table 28 Number of distinctive cows per site in 2014	74
Table 29 Pupping date of returning cows on Skomer Island in 2011-2014	<u>776</u>

List of Plates

Plate 1 Skomer Island Grey Seal pupping sites.....	14
Plate 2 Main concentration of pupping sites on Skomer Island.....	15
Plate 3 Pup 170 with eye infection	32
Plate 4 Pup 170 with eye infection	32
Plate 5 Bull with blue strap 16/03/14.....	65
Plate 6 Bull with blue strap on 14/11/14 and without strap on 16/11/14.....	66
Plate 7 Seal pup on 05/11/14 with oil stain	66
Plate 8 Two Jet skiers watching seals and disturbing haul-out at Seal Hole 02/09/14.....	67
Plate 9 Mum of pup 18 suckling her own pup (right) and pup 20 (left) on 21/09/14	68
Plate 10 Pup 166 with two mothers on 27/10/14.....	68
Plate 11 Pup 166, size five at 24 days of age	68
Plate 12 Twins still born on 02/10/14	69
Plate 13 Female LBK-003 with dead twins	69
Plate 14 Very small weaner on Mathew's Wick 25/11/14.....	70
Plate 15 Small weaner on Mathew's Wick 05/11/14	70
Plate 16 Emaciated weaner dead on 17/11/14	70
Plate 17 Pup 62 on 23/20/24 alive in the morning and dead later in the afternoon.....	71
Plate 18 Pup 216 on 23/11/14 (left) and dead on 24/11/14 (right)	71
Plate 19 Pup 90 with conjunctivitis on 18/10/14.....	71
Plate 20 Immature seal with tag.....	<u>7978</u>

1. Introduction

Between 06 August and 25 November 2014 the breeding activities of Grey Seals (*Halichoerus grypus*) on Skomer Island were observed and recorded, using the methods employed in previous years. These are detailed in the Grey Seal Monitoring Handbook, Skomer Island (Poole 1996a), with revisions made regarding access to some sites (Hughes 1999 & 2002), 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.
3. To record details of Grey Seal pup moult, especially the age at the onset of moult and duration of moult.
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, supplementing the methods in Poole (1996a) with digital photographs.
8. To make comparisons of objectives 1, 2 and 3 with previous years' data.

3. Census Methods

Between 22 August and 15 November 2013 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 Poole (1996a)

The most important beaches; North Haven, Amy's Reach, Matthew's Wick, Castle Bay, Driftwood Bay and South Haven were checked daily from the cliff tops. This year we also managed to check High Cliff Boulders, The Basin, The Wick, Pig Stone Bay and The Garland Stone almost daily between the 10th of August and the 26th of October. There are a few caves that run off North Haven and South Haven beaches which can only be properly checked by entering them. To avoid excessive disturbance these were only visited after having observed pregnant females on the beach. The same was true of South Stream Cave and High Cliff Boulders.

In August South Stream Cave was checked daily from across South Haven; from September onwards we surveyed South Stream Beach from the bottom of South Stream outlet several times a week.

Because checking Prothero's Dock and High Cliff Boulders causes unavoidable disturbance, as the beaches have to be visited and pups searched for among the boulders, visits were conducted no more than once a week. High Cliff Boulders can also be surveyed from the top and any activity followed up with a site inspection.

Due to access difficulties and the unavoidable disturbance all the main cave sites (The Lantern, Seal Hole and South Castle Beach Cave) were checked whenever conditions allowed but not more often than once a week. Entry to the caves 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.

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, the pup's size and appearance using EA Smith's five-stage age classification system (see appendix 1).

Pups without definite dates of birth were not included in the moult study.

Sites were visited when necessary to mark pups in accordance with Poole (1996a), unless otherwise stated due to recent safety recommendations, Hughes (2002).

In most instances seal pups were individually marked using coloured aerosol sheep-fleece marker sprays. Pups younger than four days old 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 disturbance was kept 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 |

In 2014 no assessment of the quality of care given by cows was made. In 2013 some cows were never observed feeding their pup but none the less the pup grew in a normal way. Possibly these cows prefer to suckle at night time or during high tide, hence they never get observed caring for their young, so previous assessments of daytime care alone will have presented a partial picture. Assessment of quality of care will be reviewed

Seal pups were considered successful if they survived until the onset of moult, unless they were in poor condition (Hewer, 1974). If a pup disappeared before the onset of moult an individual assessment was made on its likelihood to have survived based on the above criteria.

4. Census Results

4.1 General

226 pups were monitored on Skomer Island in 2014, 215 of them were definitely born on Skomer, eleven pups (wanderers) turned up either just before the start of moult, or moulting.

The total of 215 pups born on Skomer Island is the highest total ever recorded and 36 more than in 2013.

The first pup of the season was born in Castle Bay on approximately 01/08 and was found on 06/08.

Eight pups were born in August, 77 in September, 107 in October and 23 in November. Therefore the busiest month was October, the same as in the previous three years, whereas more pups were born in September than in October between 1998 and 2010.

The busiest week this year was week 41 (06-12/10).

154 pups are known, or assumed, to have survived on Skomer, giving a survival rate of 73%, which is slightly higher than last year's rate (68%) but still lower than the average of the last ten years (76%).

The main pupping sites on Skomer are shown in Figures 1 and 2

Plate 1 Skomer Island Grey Seal pupping sites

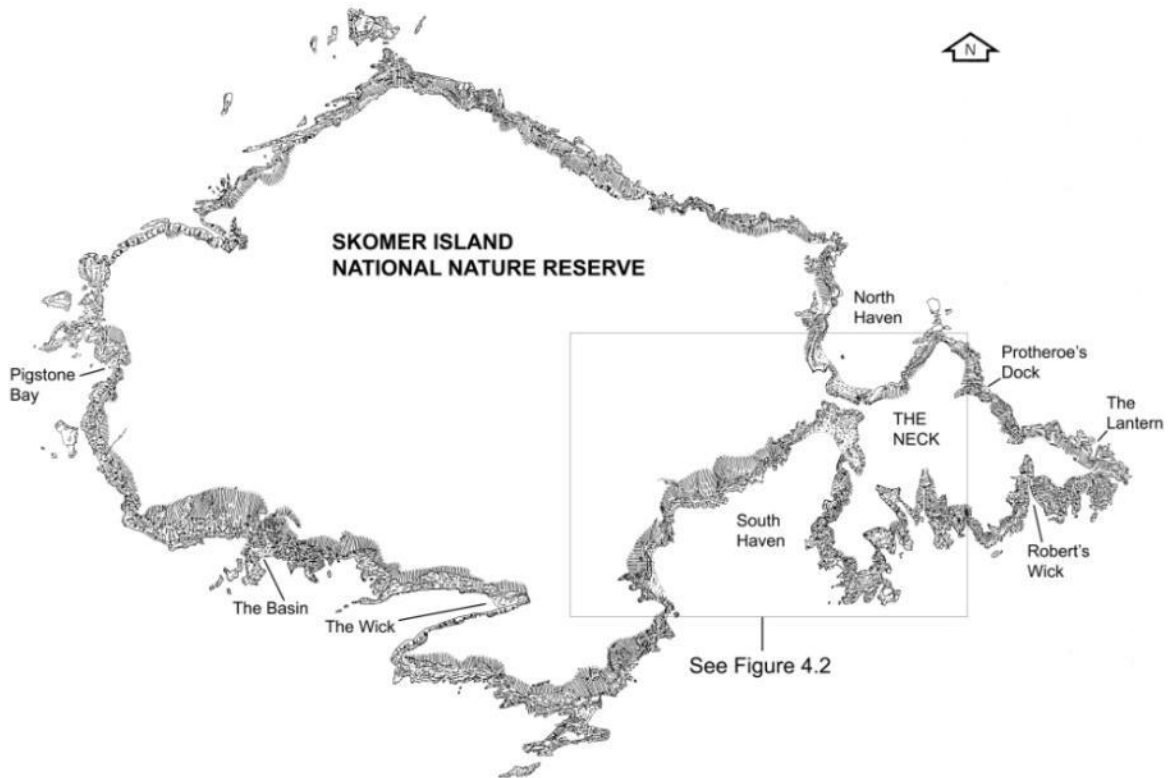
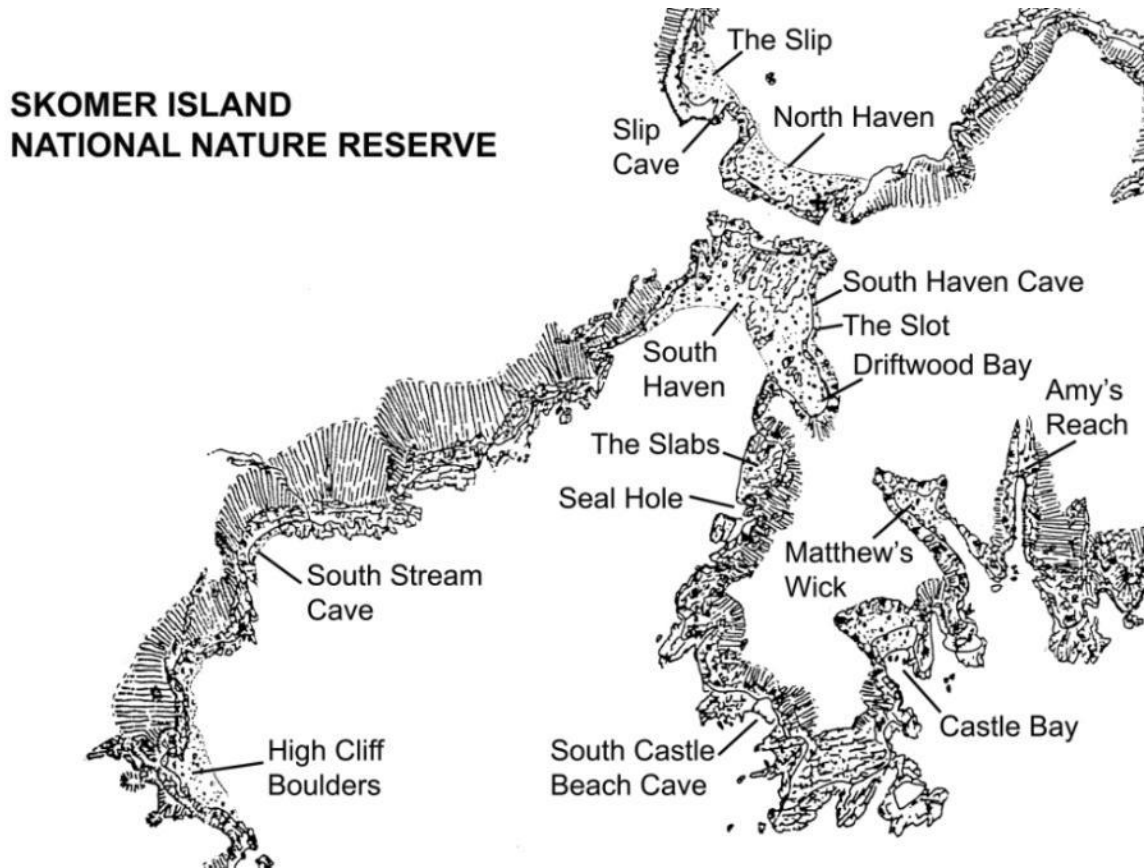


Plate 2 Main concentration of pupping sites on Skomer Island



4.2 Pup Numbers

2014 was a very good breeding season for the seals within the Skomer Marine Nature Reserve (MNR) and a record total of 379 pups were born in the MNR.

On Skomer 226 pups were monitored in 2014; 215 of them were definitely born on Skomer, eleven pups (wanderers) turned up either just before the start of moult, or moulting. These were potentially also born on Skomer but not recorded as they may have been born in inaccessible locations. October was a very wet and windy month and some of the caves were inaccessible for several weeks, thus seal pups born in these caves might have been missed.

There were pups born on Skomer Island on 16/03 and 15/04/14 which are not included in the analysis. Both of these pups disappeared before the onset of moult.

153 seal pups were born on the Marloes Peninsular.

Last season we assumed that Skomer, with +/-180 births, was at its capacity whereas the mainland appeared to be able to support a further increasing seal population. However this year showed that these assumptions were made prematurely.

Figure 1 Number of seal pups born in Skomer Marine Nature Reserve 1983-2014

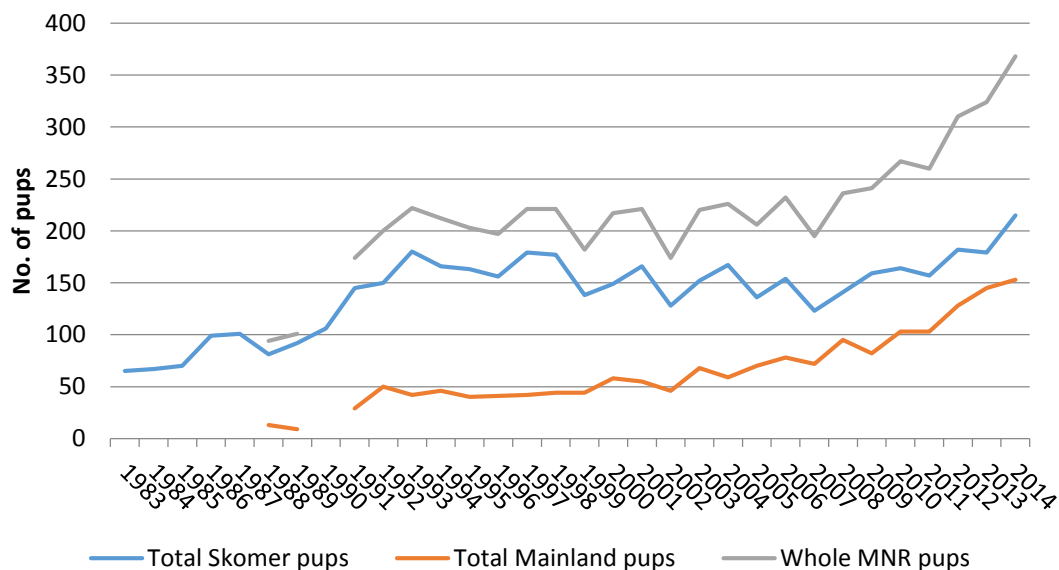


Figure 2 Daily totals of seal pups born on Skomer Island in 2014

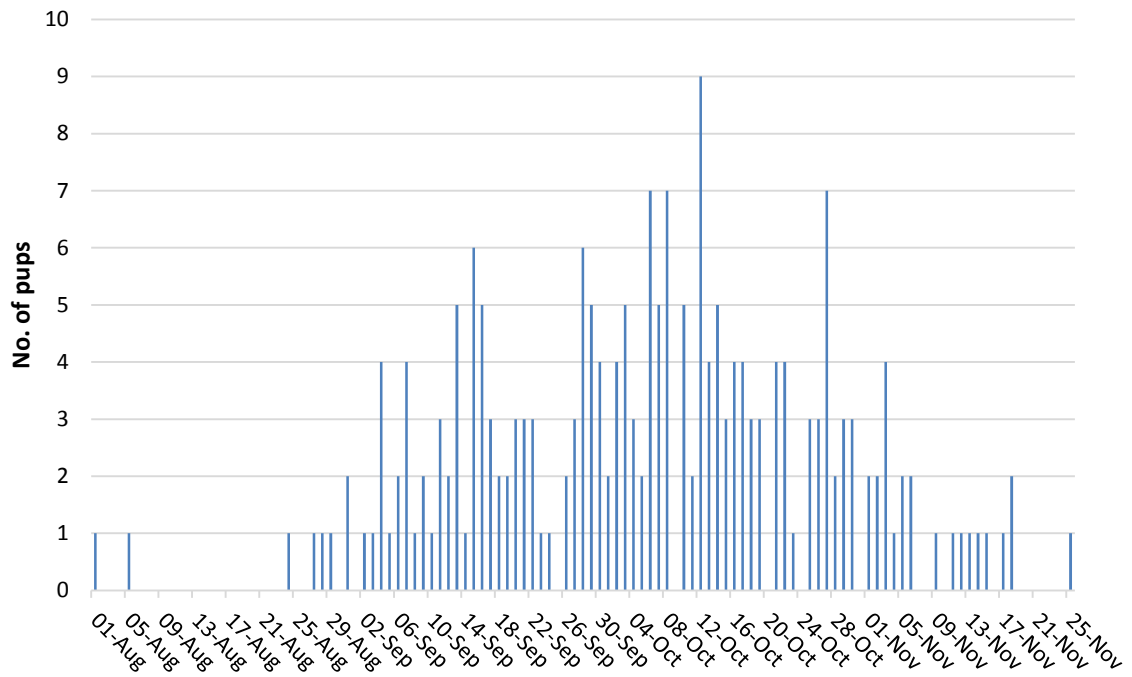


Table 1 Monthly number & percentage of seal pup births on Skomer Island 1983-2014

Year	July	August	September	October	November
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%)
2000	2 (1%)	14 (9%)	102 (65%)	40 (25%)	0
1999	0	6 (4%)	91 (65%)	44 (31%)	0
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 (13%)	41 (49%)	32 (38%)
1986	0	0	22 (25%)	32 (36%)	34 (39%)
1985	0	0	18 (31%)	20 (34.5%)	20 (34.5%)
1984	0	0	9 (16%)	28 (51%)	18 (33%)
1983	0	0	24 (34%)	31 (44%)	15 (22%)

This table excludes pups born outside the main observation period. There were pups born on Skomer Island on 16/03 and 15/04/14 which are not included in the table. In the early years of seal monitoring on Skomer, observations extended until at least mid-December, carrying on throughout the winter in 1984-1985, but since 1988 only 2006 had any observations in December.

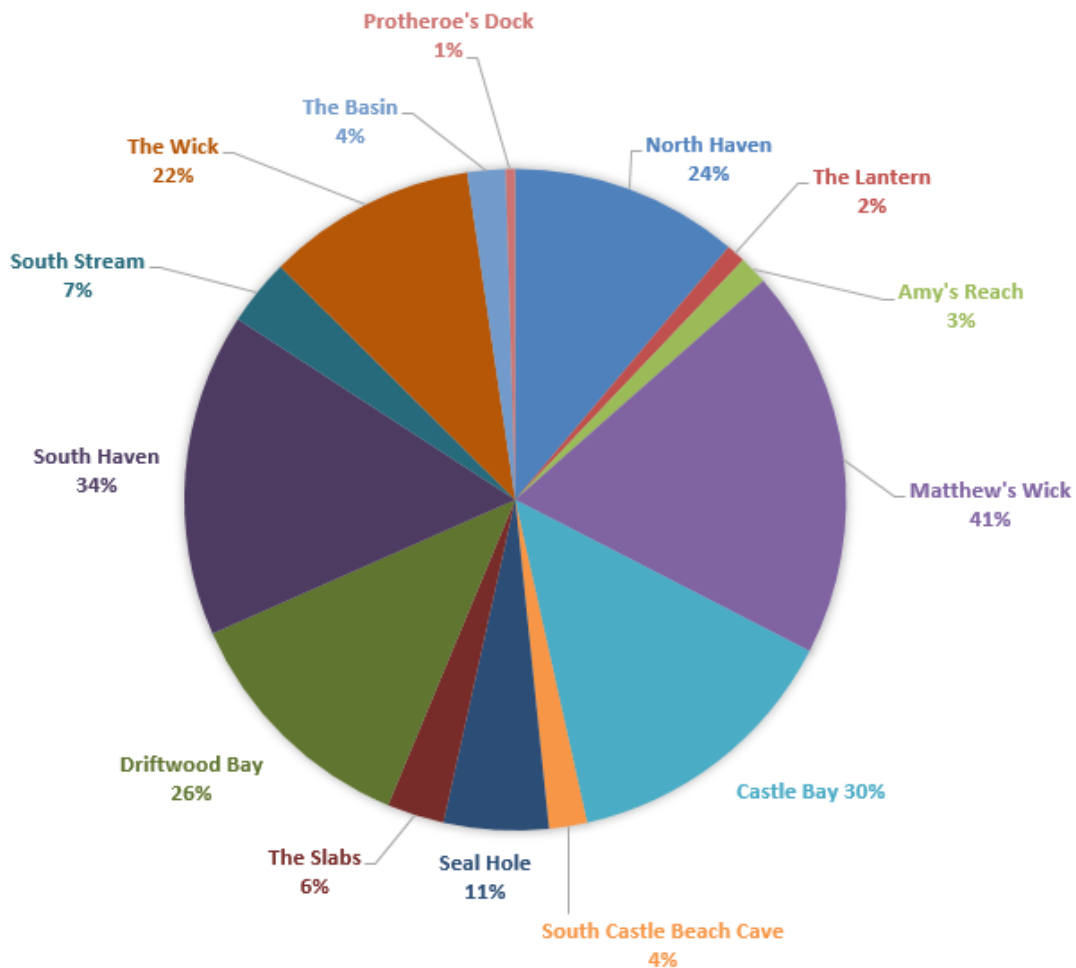
This table also excludes 1988 as it was not possible to extract the data.

Although pupping started at the beginning of August in 2014 the percentage of pups born in August is the lowest since 1997.

The busiest week this year was week 41 (06-12/10), the same as in 2012 and one week earlier than last year.

Like last year the most productive beaches were Matthew's Wick (41 pups) and South Haven (34 pups). In 2014, in contrast to 2013, Castle Bay (30 pups) was more popular than Driftwood Bay (26 pups) and North Haven beach was more productive than the year before (24 pups compared to 18 in 2013).

Figure 3 Percentage of seal pups born at each site on Skomer Island in 2014



4.3 Survival Rate

The fate of 211 pups is known with relative certainty. The fate of four pups is unknown, either because they were born just before the island was vacated or because they were born in a cave which could not be accessed for three weeks due to adverse weather conditions. When calculating the survival rate, these unknown pups were not considered, thus not effecting the overall result.

154 pups are known, or assumed to have survived on Skomer, giving a survival rate of 73%, which is slightly higher than last year's rate (68%) but still lower than the average of the last ten years (76%).

On the mainland 122 pups are known, or assumed to have survived, giving a survival rate of 80%.

Figure 4 Total number of seal pups born/survived on Skomer Island, 1983-2014

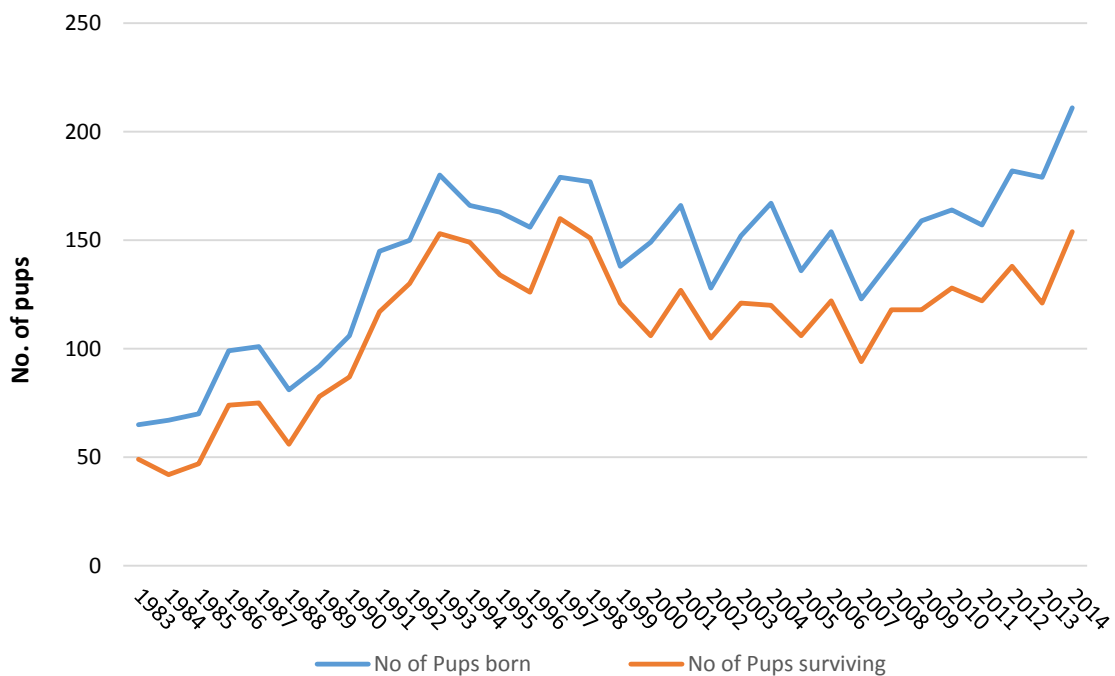


Figure 5 Total number of seal pups born in the Marine Nature Reserve 1988-2014

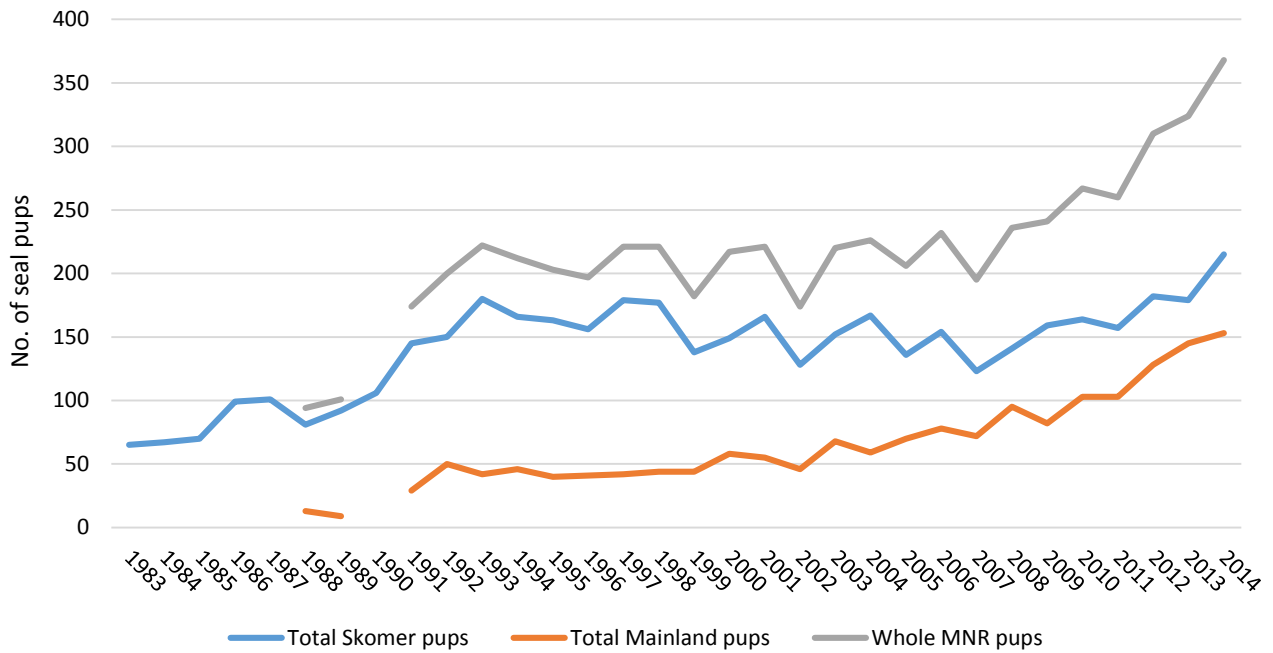


Figure 6 Percentage of seal pups surviving in Skomer/Marine Nature Reserve 1983-2014

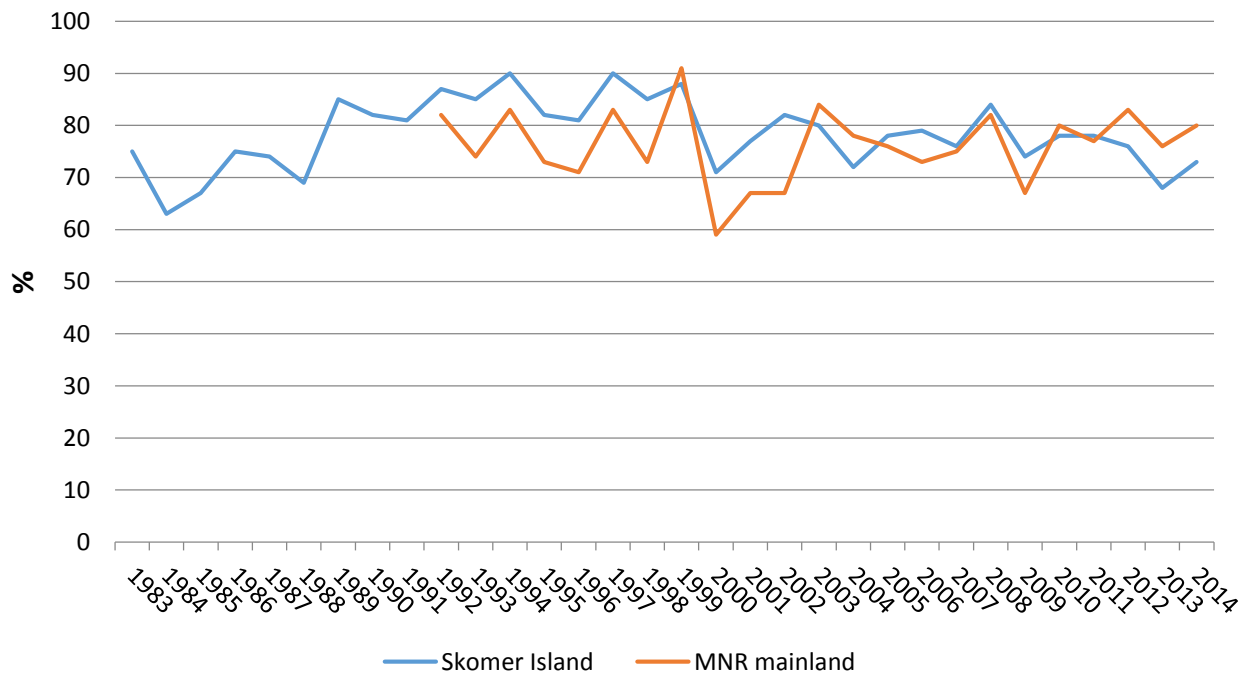


Figure 7 Weekly seal pup births and deaths on Skomer Island in 2014

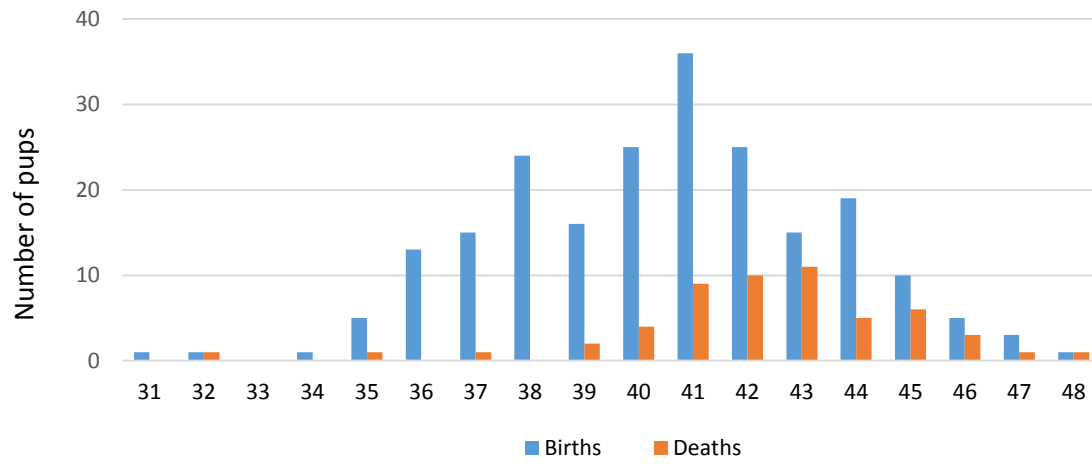


Table 2 Survival rates of seal pups on Skomer Island in 2014

Site	Total Number of pups born		Number of pups known/assumed to have survived		Survival Rate	
	2013	2014	2013	2014	2013	2014
Amy's Reach	5	3	2	3	40%	100%
Castle Bay	21	30	14	17	67%	57%
Driftwood Bay	21	26	18*	21	72%	81%
High Cliff Boulders	4	0	4		100%	
Matthew's Wick	35	41	25	32	71%	78%
North Haven	18	24	8	19	44%	79%
Pigstone Bay	0	0				
Prothero's Dock	2	1	2	1	100%	100%
Seal Hole	6	9	5	5	83%	56%
South Castle Beach Cave	9	4	7	4	78%	100%
South Haven	34	33	21*	23	72%	70%
South Stream	2	7	2	6	100%	86%
The Basin	1	4	0	4	0%	100%
The Lantern	4	1	3	1	75%	100%
The Slabs	4	6	1	2	25%	33%
The Wick	13	22	7	17	54%	77%
Total	179	211**	118			

** Excluding four pups which were born but whose fates are unknown

Note: Pups that had moved to another beach and survived/died there were added to that beach's total.

The much higher survival rate on North Haven beach might be due to fewer heavy storms from the North in 2014, in contrast to 2013.

Table 3 Causes of seal pup deaths on Skomer Island in 2014

Cause of death	No. of pups	% of deaths	% of total pups born
Abandoned/separated/starved	8	14	4
Abandoned/ill	2	4	1
Accident/killed	2	4	1
Stillborn	9	16	4
Stillborn/drowned	6	11	3
Drowned	7	13	3
Drowned/diseased	1	2	0
Diseased	3	5	1
Disappeared ≤ stage 2	18	32	9
Total	56	100	27

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. The beach is a popular haul out site and it becomes impossible to try and see hidden pups without disturbing the haul out.

A total of 24 pups were born in North Haven in 2014, six more than last year which had the lowest total since 2006. 19 pups are assumed to have survived to the onset of moult or were weaned, giving a survival rate of 79% which is much higher than last year's 44%. A possible reason for this is the reduced number of days with strong northerly winds in 2014 in comparison with 2013.

Figure 8 Number of seal pups born in North Haven 1983–2014

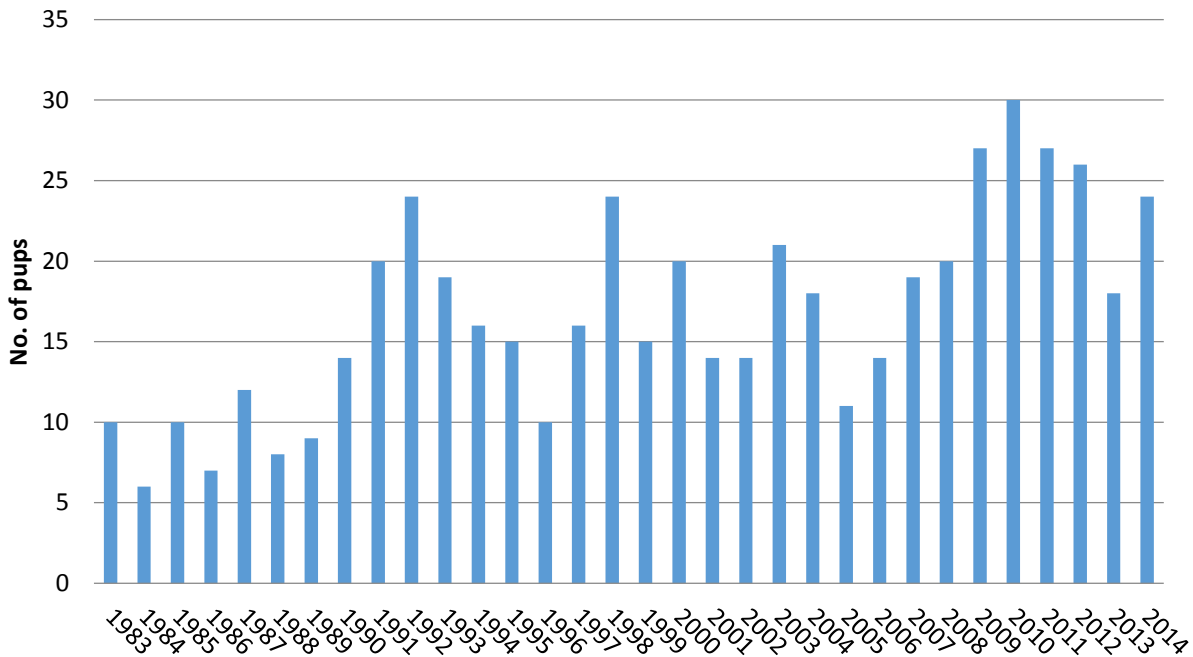


Figure 9 Weekly seal pup births in North Haven in 2014

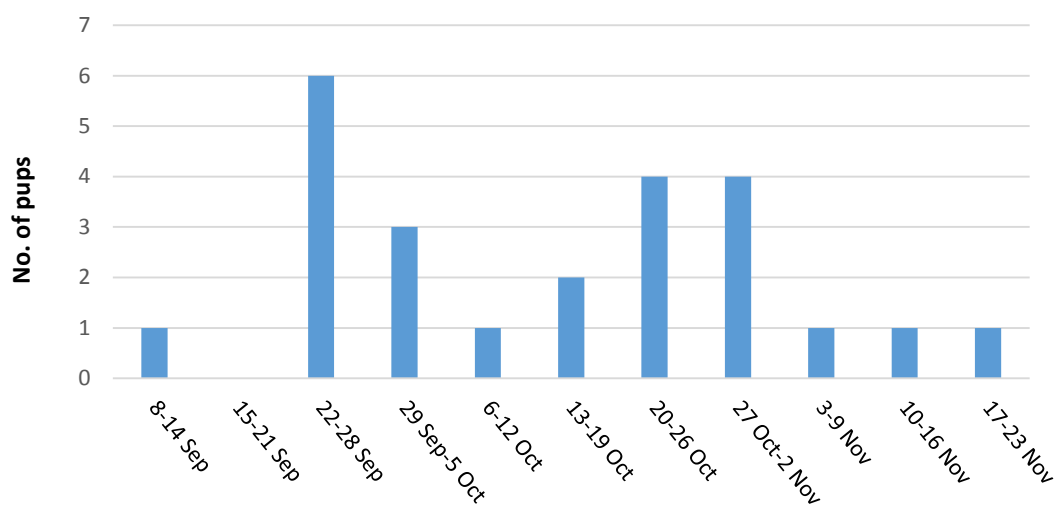


Table 4 Fate of pups in North Haven in 2014

Fate	No of pups
Assumed survived	1
Survived to onset of moult	9
Survived to weaning	9
Assumed dead	2
Dead	2
Total	

Table 5 Causes of seal pup deaths on North Haven beach in 2014

Cause of death	No. of pups
Abandoned/separated/starved	1
Stillborn/drowned	1
Disappeared ≤ stage 2	3
Total	5

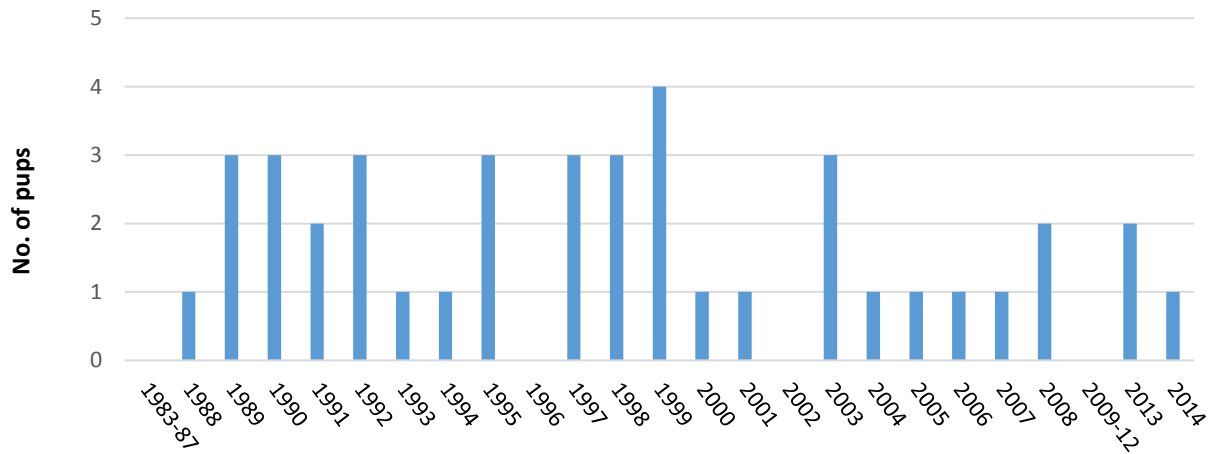
Table 6 Sizes of pups at onset of moult in North Haven in 2014

Size at onset of moult	No of pups
1 Very small	0
2 Small but healthy	1
3 Good size	15
4 Very good size	1
5 Super-moulter	0
Total	

4.4.2 Prothero's Dock

In 2014 one pup was born on Prothero's Dock in week 41 but it disappeared size one and was assumed to have died.

Figure 10 Number of seal pups born in Prothero's Dock 1983-2014



We conducted 14 site visits during the monitoring period.

4.4.3 The Lantern

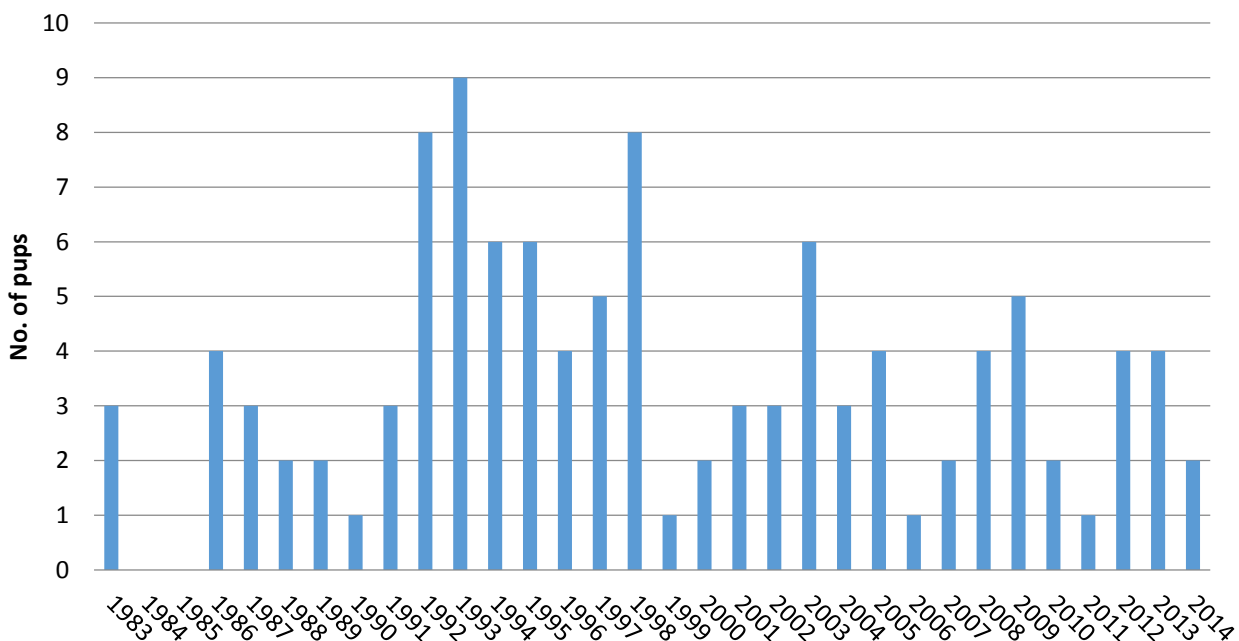
All access routes into the Lantern are hazardous in wet weather or when there is a big swell. Even if access is possible cows often remain high inside the cave making marking pups impossible and accurately assessing their progress very difficult.

After last winter's storms access into the Lantern through north-eastern entrance was not possible anymore as a deep pool had been scoured out which is too deep to wade through. In 2014 access was gained by abseiling from a rocky outcrop into the eastern entrance. This worked very well and access by abseiling can be gained even on smaller tides. It is very important to know abseil techniques very well and to have sufficient rock climbing experience to be able to assess suitable abseil and ascending routes. Furthermore it is of upmost importance to watch out for loose rocks and stones.

This year we managed to access The Lantern eight times. Although we used every possible opportunity we sometimes had gaps of up to three weeks in between visits as the weather prevented us from going more often.

Two pups were born in The Lantern in weeks 37 and 38. One survived to the onset of moult, the fate of the other one is unknown (due to causes described above), hence it was not included in the survival rate calculations.

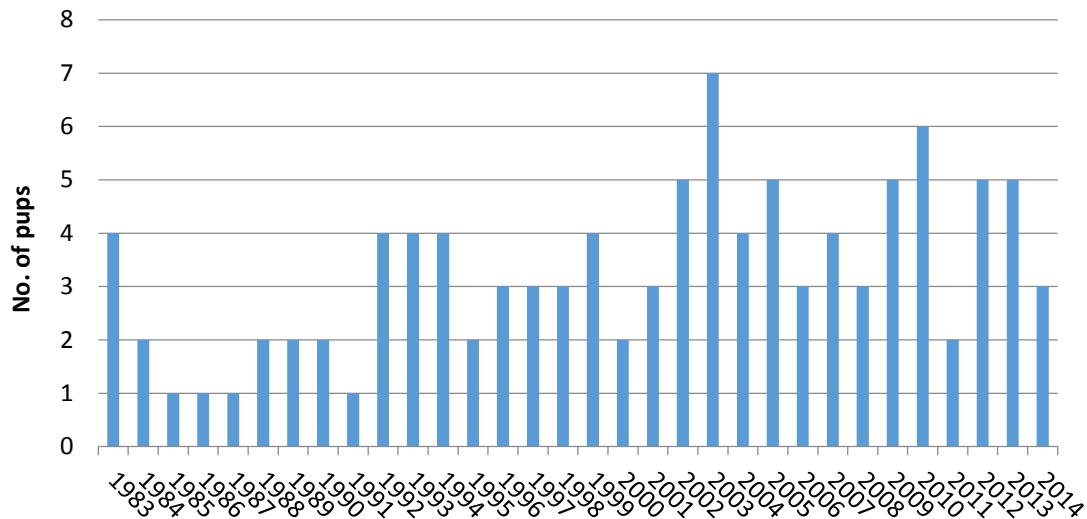
Figure 11 Number of seal pups born in The Lantern 1983-2014



4.4.4 Amy's Reach

Three pups were born in Amy's Reach in 2014. Pup 25 in week 37, pup 35 in week 38 and pup 142 in week 42. One pup survived and was weaned, two pups survived to the onset of moult, giving a survival rate of 100%.

Figure 12 Number of seal pups born in Amy's Reach 1983–2014



4.4.5 Matthew's Wick

41 pups were born on Matthew's Wick in 2014, six more than last year.

Figure 13 Number of seal pups born in Matthew's Wick 1983–2014

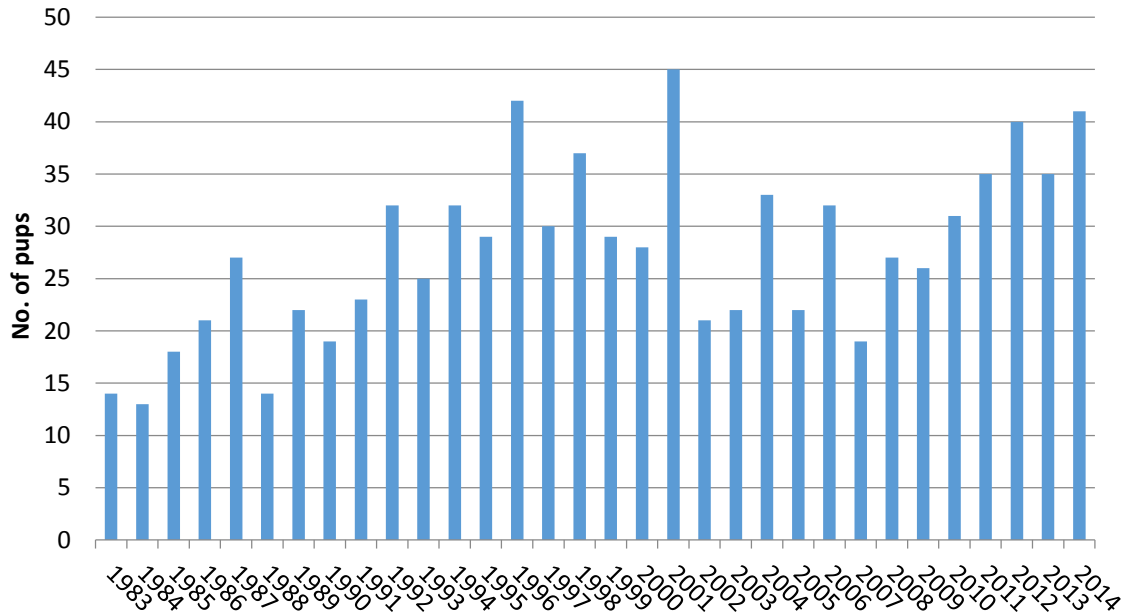
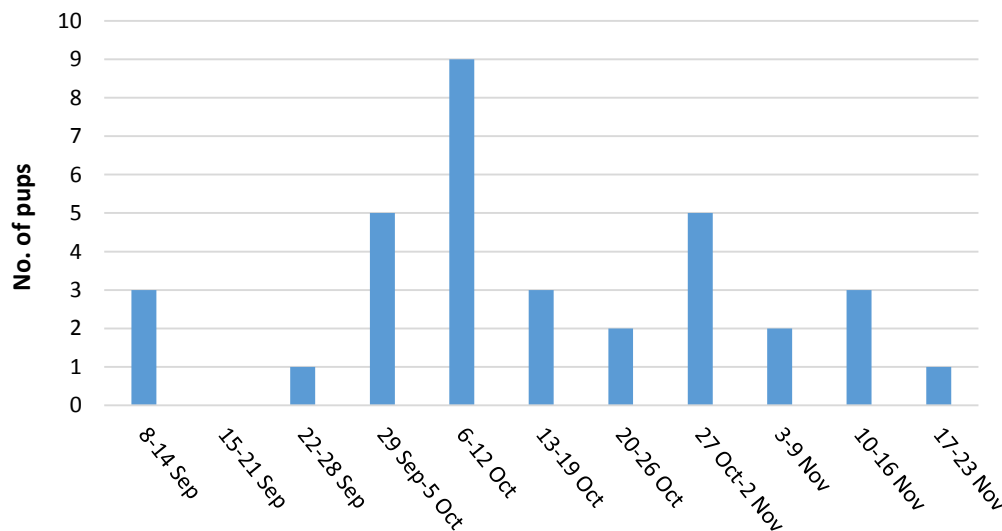


Figure 14 Weekly seal pup births in Matthew's Wick in 2014



32 pups are assumed to have survived, survived to onset of moult or survived and were weaned, giving a survival rate of 78%.

Table 7 Fate of pups on Mathew's Wick in 2014

Fate	No of pups
Assumed survived	4
Survived to onset of moult	10
Survived to weaning	18
Assumed dead	0
Dead	9
Total	41

Table 8 Causes of seal pup deaths on Mathew's Wick in 2014

Cause of death	No. of pups
Abandoned/separated/starved	1
Abandoned/ill	1
Stillborn	1
Stillborn/drowned	3
Drowned	2
Diseased	1
Total	9

At the end of October we noticed that several pups on Mathew's Wick were suffering from eye infections, this was obvious in pup 146, 170 and 162. Pup 146 and 170 seemed to be coping with the infection but pup 162 died on 31/10 even though it was well attended by its mum



Plate 3 Pup 170 with eye infection



Plate 4 Pup 170 with eye infection

Table 9 Sizes of pups at onset of moult on Mathew's Wick in 2014

Size at onset of moult	No of pups
1 Very small	1
2 Small but healthy	5
3 Good size	15
4 Very good size	8
5 Super-moulter	0
Total	29

4.4.6 Castle Bay

In 2013 Castle Bay was a very popular beach with 21 seal births and the trend continued in 2014. An all-time record of 30 pups were born on this site.

Figure 15 Number of seal pups born in Castle Bay 1983-2014

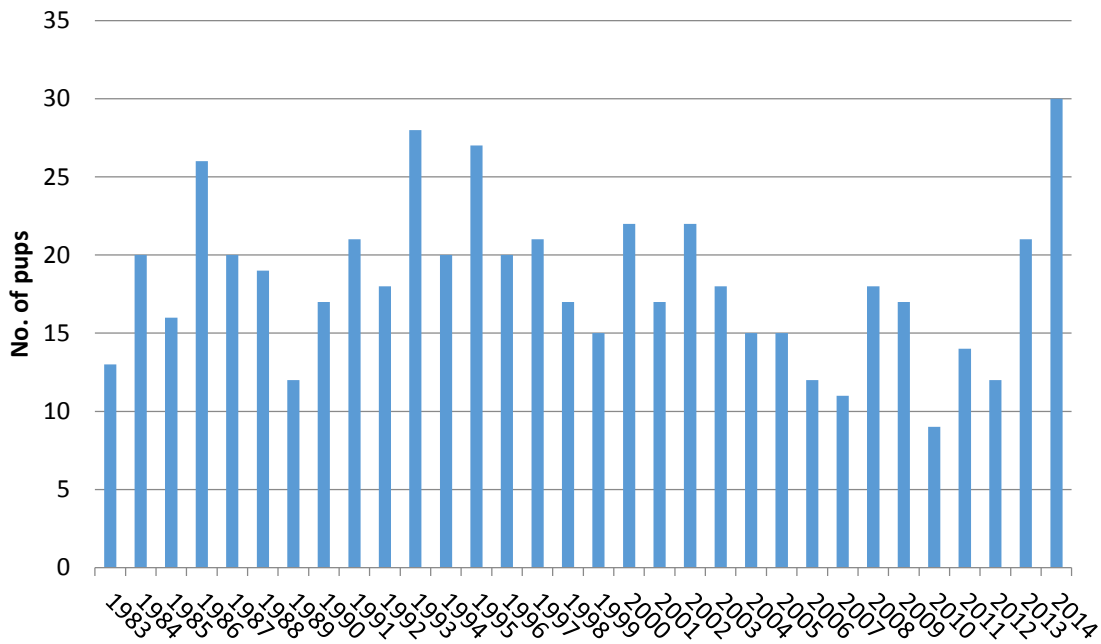
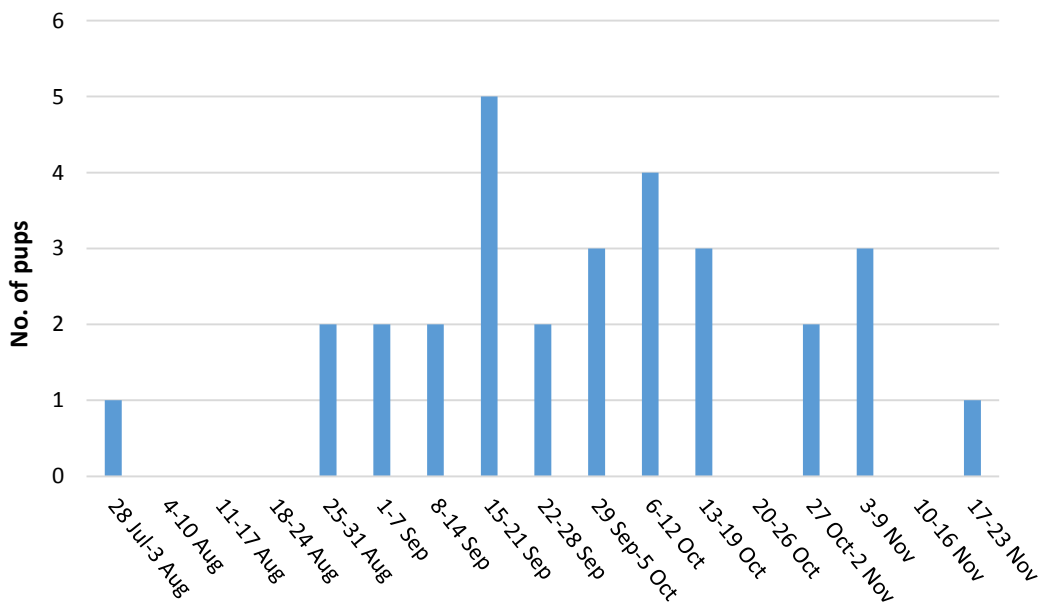


Figure 16 Weekly seal pup births in Castle Bay in 2014



17 pups are assumed to have survived, survived to onset of moult or survived and were weaned, giving a survival rate of 57%.

Table 10 Fate of pups on Castle Bay in 2014

Fate	No of pups
Assumed survived	4
Survived to onset of moult	4
Survived to weaning	9
Assumed dead	8
Dead	5
Total	30

Table 11 Causes of seal pup deaths on Castel Bay in 2014

Cause of death	No. of pups
Abandoned/separated/starved	1
Abandoned/ill	1
Accident/killed	1
Stillborn	2
Drowned	1
Drowned/diseased	1
Disappeared ≤ stage 2	6
Total	13

Table 12 Sizes of pups at onset of moult on Castle Bay in 2014

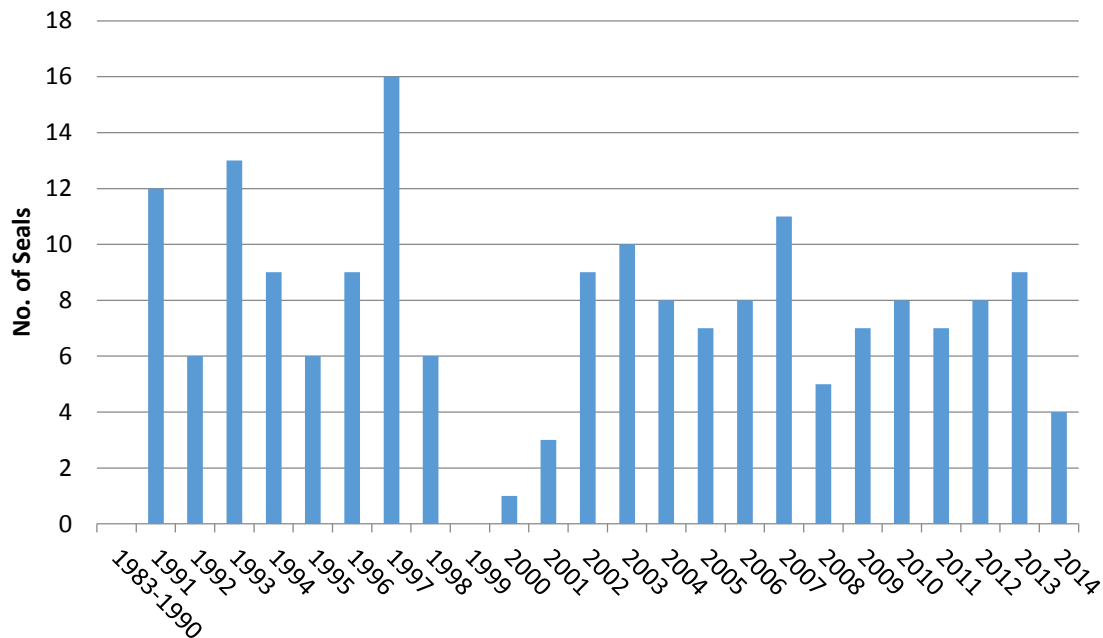
Size at onset of moult	No of pups
1 Very small	1
2 Small but healthy	0
3 Good size	10
4 Very good size	2
5 Super-moulter	0
Total	13

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, 1996a), and boat access is 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). 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.

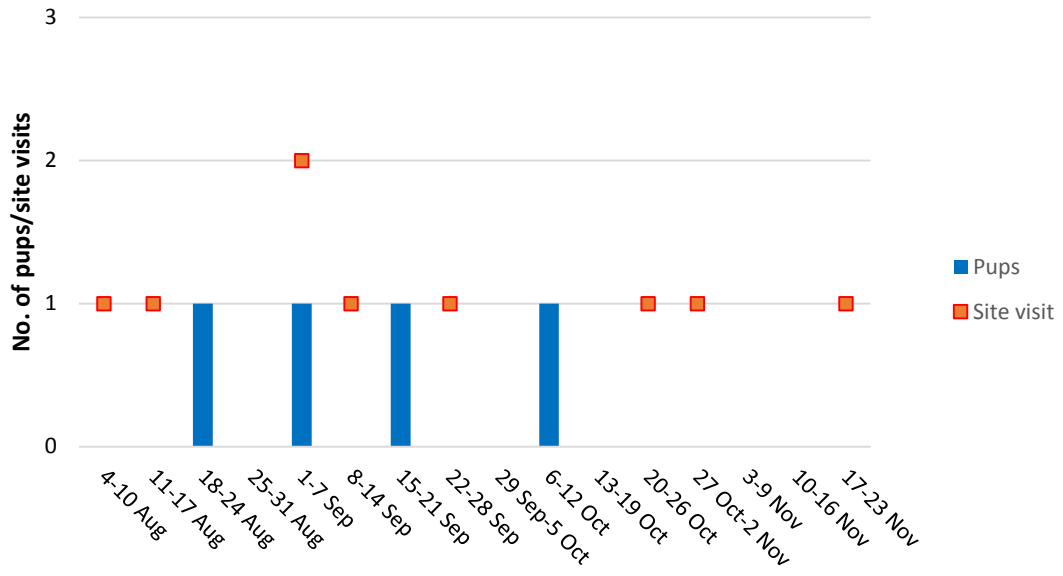
Four pups were born in South Castle Beach Cave in 2014. All of them survived to the onset of moult resulting in a survival rate of 100%.

Figure 17 Number of seal pups born in South Castle Beach Cave 1983-2014



We managed to visit South Castle Beach Cave nine times during the observation period. It proved more and more difficult to access the site as the year progressed due to weather and short days not giving the rocks time to dry out. Hence it is possible pups could have been missed.

Figure 18 Weekly seal pup births in South Castle Beach Cave in 2014



4.4.8 Seal Hole

Seal Hole is the easiest of the main cave sites to access and we visited the site ten times in 2014. However there was a period at the end of September until the middle of October in which we were not able to check Seal Hole for 24 days. On our visit (18/10) we only found one white coated pup and two weaners. As we cannot be certain that these weaners were born on Skomer we did not include them in the totals, even though it is rather likely that they were. This would take the overall total to 217 pups.

Eleven pups were born in Seal Hole in 2014.

Figure 19 Number of seal pups born in Seal Hole 1983-2014

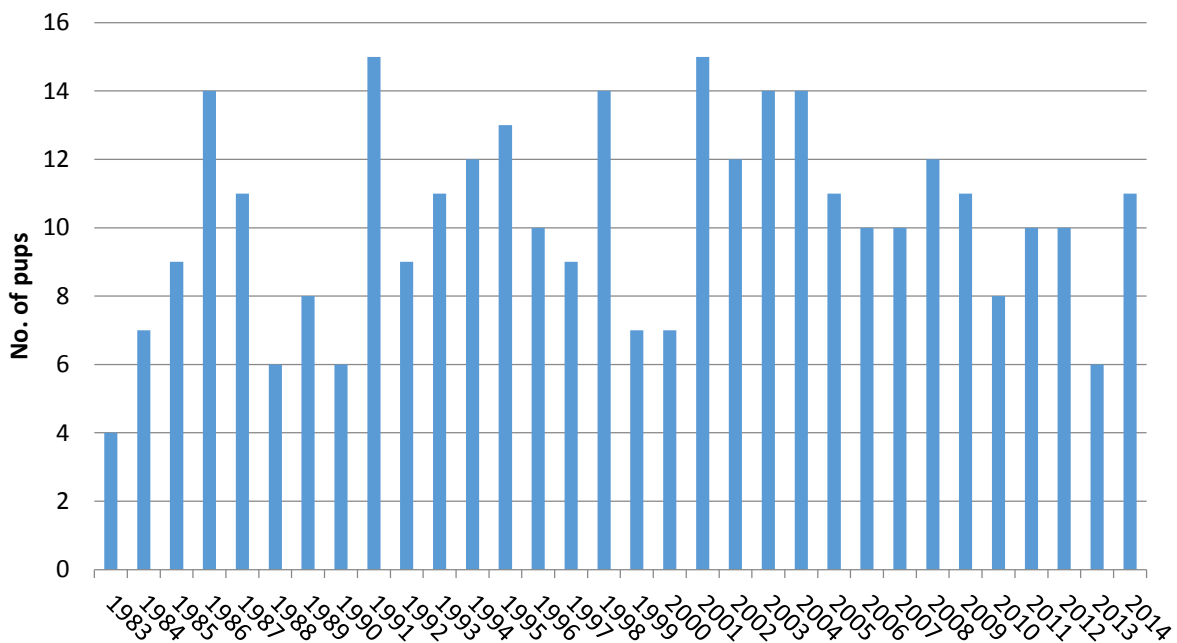
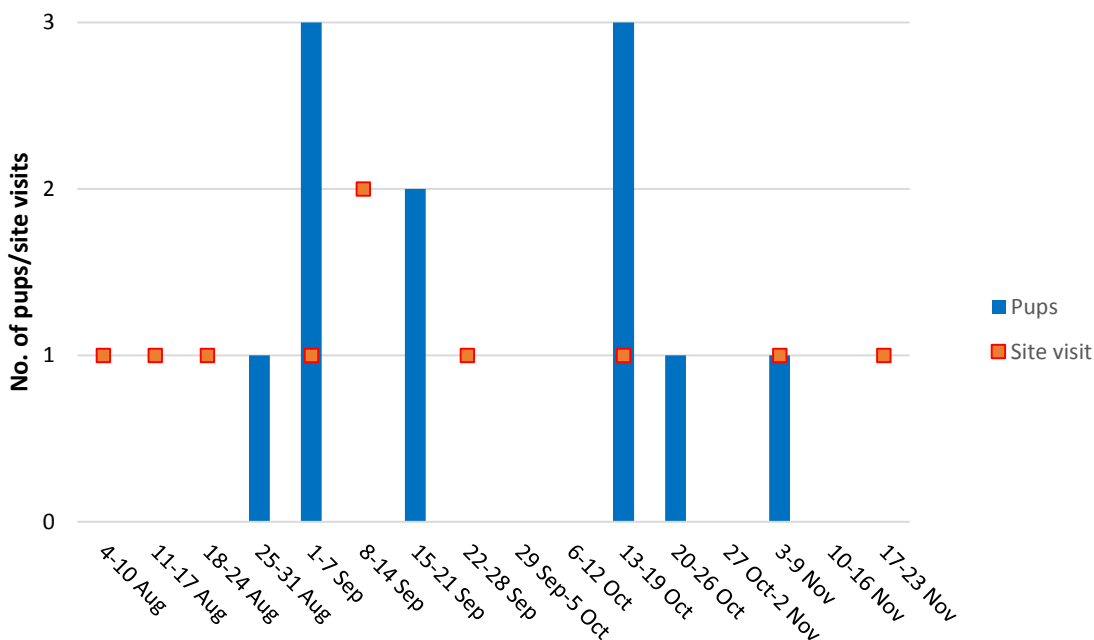


Figure 20 Weekly seal pup births in Seal Hole in 2014



Five pups born in Seal Hole are assumed to have survived, survived to onset of moult or survived and were weaned, giving a survival rate of 56%; (the fate of two pups is unknown).

Three pups which were born in Seal Hole drowned. One was marked green, size three and was later found apparently drowned inside Seal Hole, another pup, size one was also found apparently drowned inside the cave and pup 205, size three (marked purple/black) was seen floating dead in South Haven outside Seal Hole on 6/11. It seems that Seal Hole occasionally fills up completely, presumably on large tides which leads to seal pups being drowned. The occurrence of big spring tides between 5th and 8th November 2014 would support this.

Table 13 Fate of pups in Seal Hole in 2014

Fate	No of pups
Assumed survived	1
Survived to onset of moult	4
Survived to weaning	0
Assumed dead	0
Dead	4
Unknown	2
Total	11

Table 14 Causes of seal pup deaths in Seal Hole in 2014

Cause of death	No. of pups
Stillborn	1
Stillborn/drowned	1
Drowned	2
Total	4

4.4.9 The Slabs

Eight pups were born on The Slabs in 2014. Two of them moved onto Driftwood Bay soon after birth and are included in the Driftwood Bay survival calculation.

Two pups survived and were weaned, giving a survival rate of 33% which is slightly higher than last year (25%) but still much lower than the overall survival rate. The Slabs do not seem to be a very suitable place for seal pups as it offers little shelter and gets fully flooded on many tides.

Figure 21 Number of seal pups born on The Slabs 1983-2014

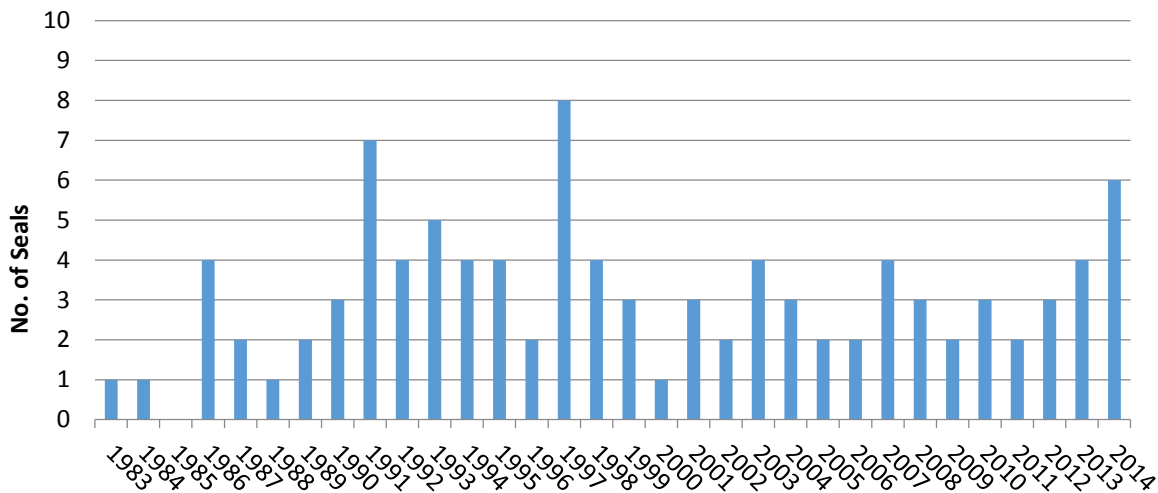
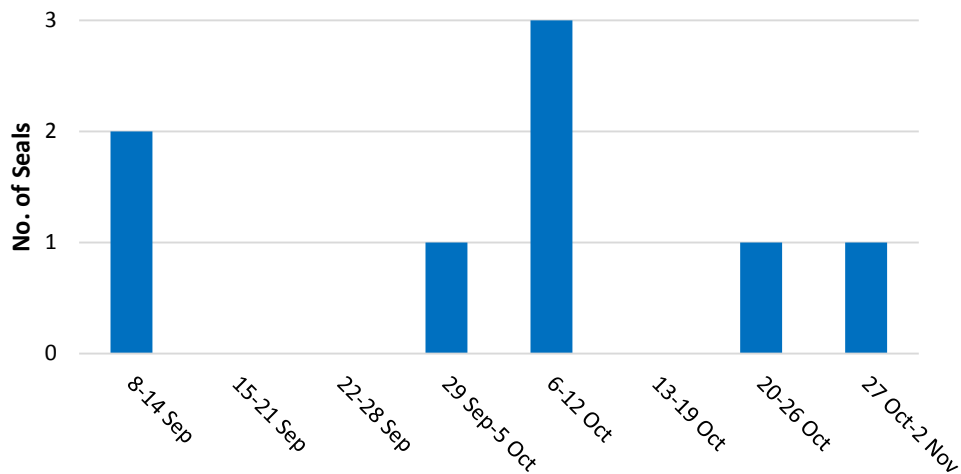


Figure 22 Weekly seal pup births on The Slabs in 2014



4.4.10 Driftwood Bay

19 pups were born in Driftwood Bay in 2013 which is two less than last year but still more than the average of 16 of the last 10 years.

Figure 23 Number of seal pups born in Driftwood Bay 1983-2014

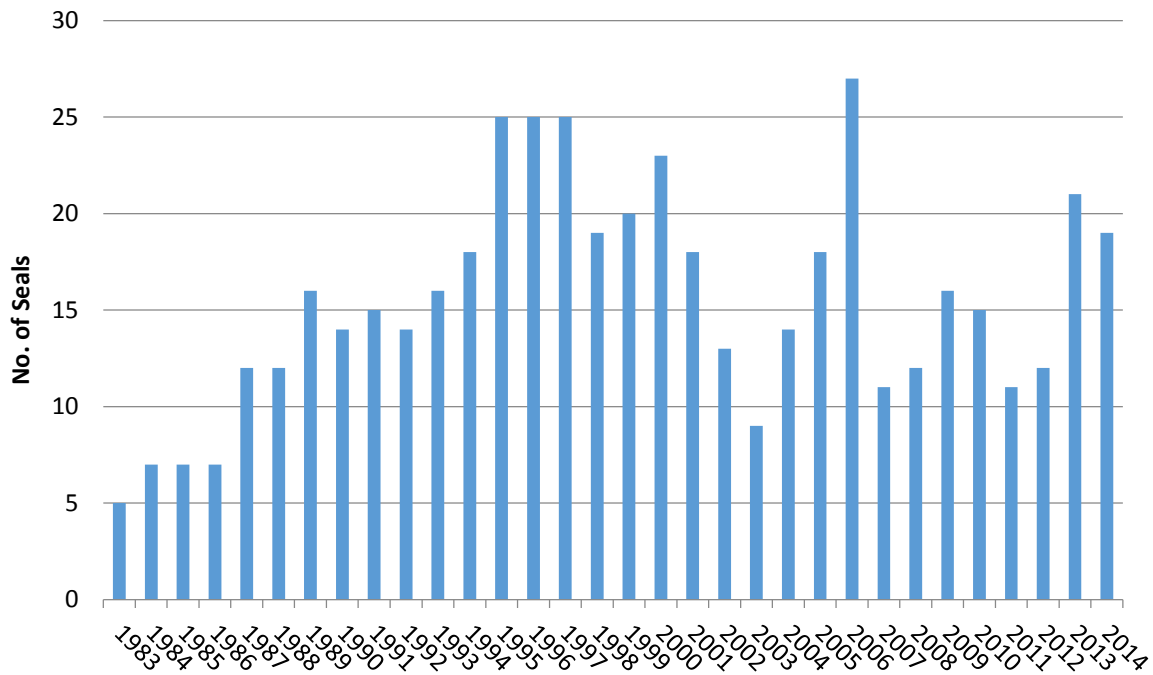
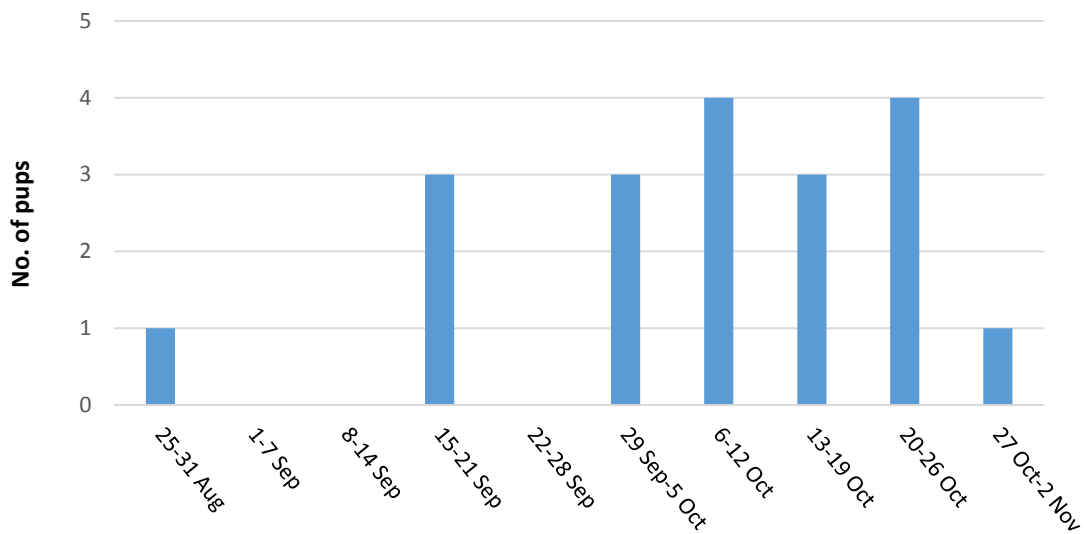


Figure 24 Weekly seal pup births in Driftwood Bay in 2014



Eight pups moved from other sites (The Slabs, South Haven, Seal Hole) to Driftwood Bay. In total 26 pups spent most of their first three weeks on Driftwood Bay. In order to obtain survival rate/ moult score etc. for Driftwood Bay the immigrants were taken into account. 21 pups are assumed to have survived, survived to onset of moult or survived and were weaned, giving a survival rate of 81% which reflects the good quality of Driftwood Bay as a breeding site.

Interestingly, when only looking at the survival rate of the pups which were actually born on Driftwood Bay the result is very different (26% survival rate).

Table 15 Fate of pups on Driftwood Bay in 2014

Fate	No of pups
Assumed survived	0
Survived to onset of moult	4
Survived to weaning	17
Assumed dead	2
Dead	3
Total	26

Table 16 Causes of seal pup deaths on Driftwood Bay in 2014

Cause of death	No. of pups
Abandoned/separated/starved	2
Stillborn/drowned	1
Disappeared ≤ stage 2	2
Total	5

Table 17 Sizes of pups at onset of moult on Driftwood Bay in 2014

Size at onset of moult	No of pups
1 Very small	1
2 Small but healthy	1
3 Good size	8
4 Very good size	10
5 Super-moulter	0
Total	20

4.4.11 South Haven

32 pups were born on South Haven beach in 2014, only two less than last year.

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 pups tend to move out of the caves within their first week and can be observed from above thereafter.

Figure 25 Number of seal pups born in South Haven 1983-2014

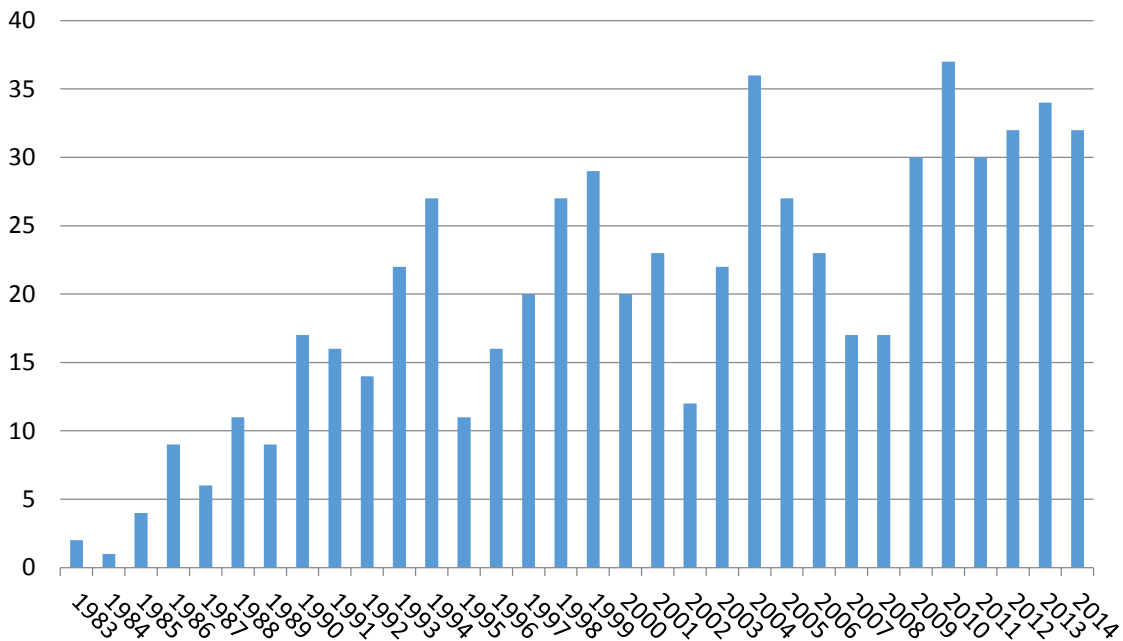
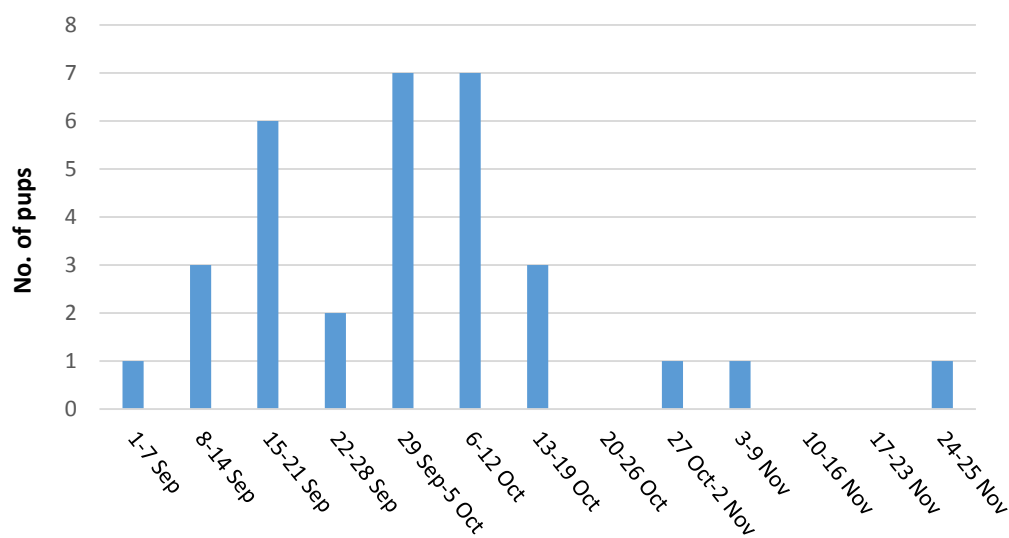


Figure 26 Weekly seal pup births in South Haven in 2014



Two pups moved from Driftwood Bay to South Haven and four pups moved from South Haven to Driftwood Bay. In order to obtain survival rate/ moult score etc. for South Haven the immigrants were taken into account and the emigrants excluded. One pup was born one day before the island was vacated and as its fate is unknown it has not been included in the survival calculations. In total 33 pups (including immigrants, excluding emigrants and one pup with fate unknown) spent most of their first three weeks in South Haven which results in a survival rate of 70%.

Table 18 Fate of pups in South Haven in 2014

Fate	No of pups
Assumed survived	1
Survived to onset of moult	8
Survived to weaning	14
Assumed dead	2
Dead	8
Unknown	1
Total	34

Table 19 Causes of seal pup deaths in South Haven in 2014

Cause of death	No. of pups
Abandoned/separated/starved	3
Accident/killed	1
Stillborn	4
Drowned	1
Diseased	1
Total	10

Table 20 Sizes of pups at onset of moult in South Haven in 2014

Size at onset of moult	No of pups
1 Very small	1
2 Small but healthy	0
3 Good size	16
4 Very good size	4
5 Super-moulter	0
Total	21

4.4.12 South Stream Cave and Boulders

South Stream Cave and Boulders 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 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 we discovered that pups can easily be missed when inspecting from such a distance. From September onwards we surveyed South Stream beach from the bottom of South Stream outlet several times a week and we conducted four full site visits.

South Stream Cave was very popular in 2014. Seven pups were born on this site, the highest number of pups since records began.

Figure 27 Number of seal pups born in South Stream Cave 1983-2014

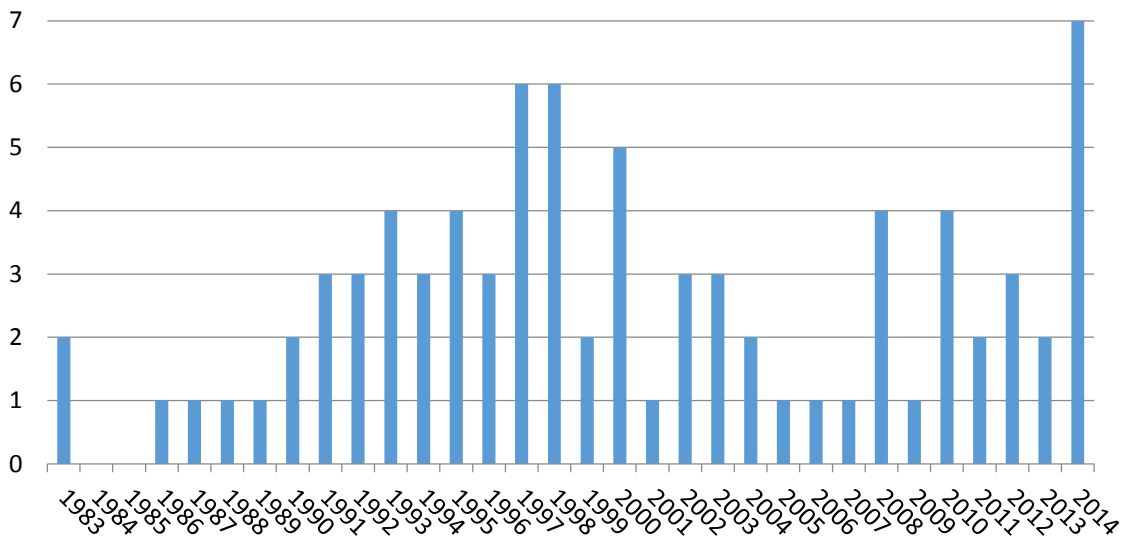
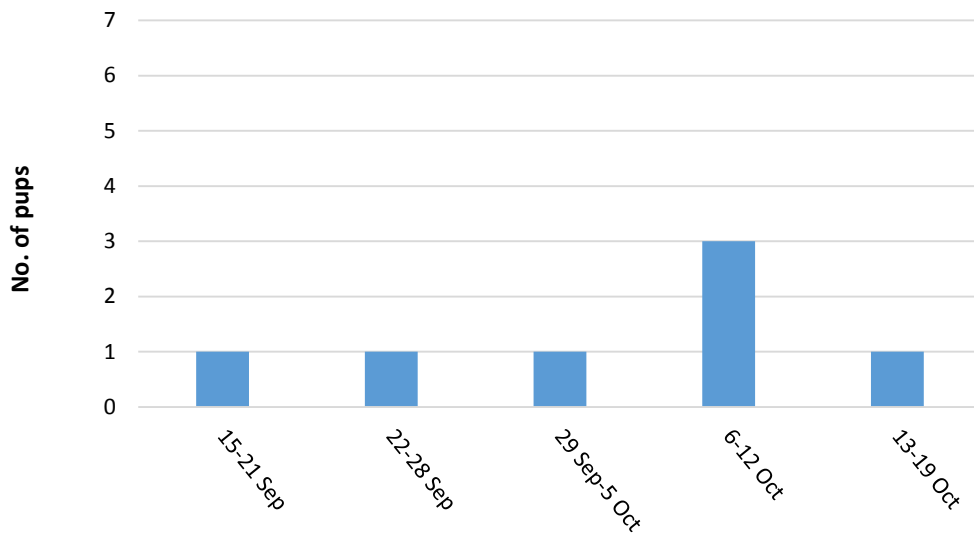


Figure 28 Weekly seal pup births in South Stream Cave and Boulders in 2014

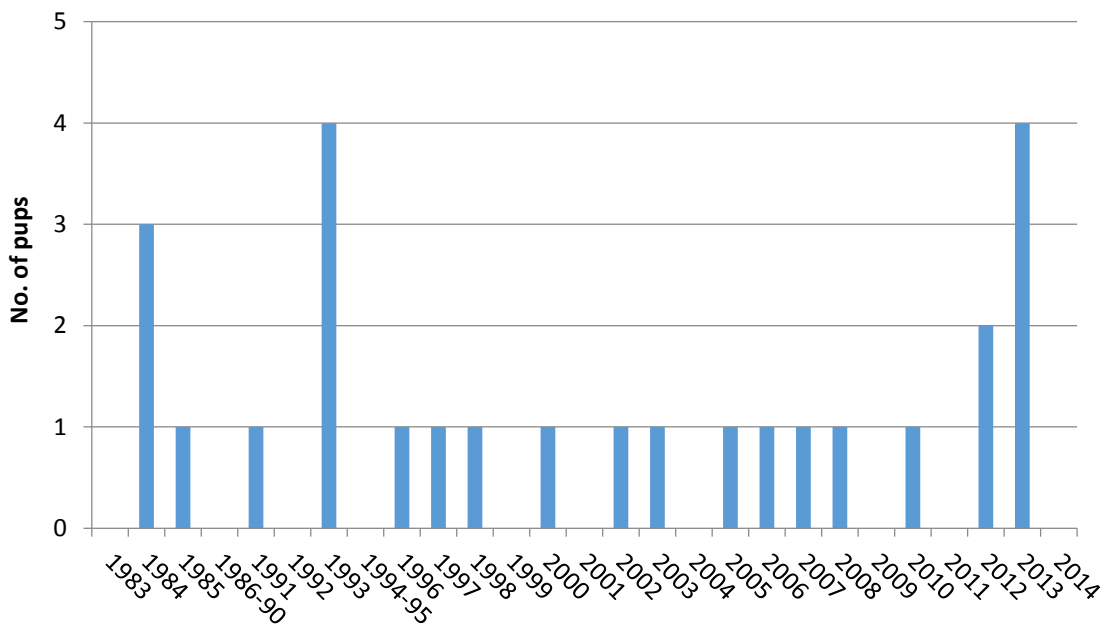


Three pups survived to onset of moult, one survived and was weaned, two are assumed to have survived and one is assumed to have died, resulting in a survival rate of 86%.

4.4.13 High Cliff Boulders

High Cliff Boulders is another site which is difficult to monitor as the boulders shield the pups from view. The only way to check the beach fully is to scramble to the bottom and search within the rocks. We visited High Cliff Boulders nearly daily (in total 65 times) and we conducted two full site visits but no seal activity was observed. None the less some pups might have been missed if they died or moved onto other sites within their first week. No pups were recorded born on this site in 2014. One pup turned up on High Cliff Boulders, size two but did not look healthy and disappeared within two days.

Figure 29 Number of seal pups born at High Cliff Boulders 1983-2014



4.4.14 The Wick

22 seal pups were born on The Wick in 2014; together with 2012 the highest number since records began.

Figure 30 Number of seal pups born in The Wick 1983-2014

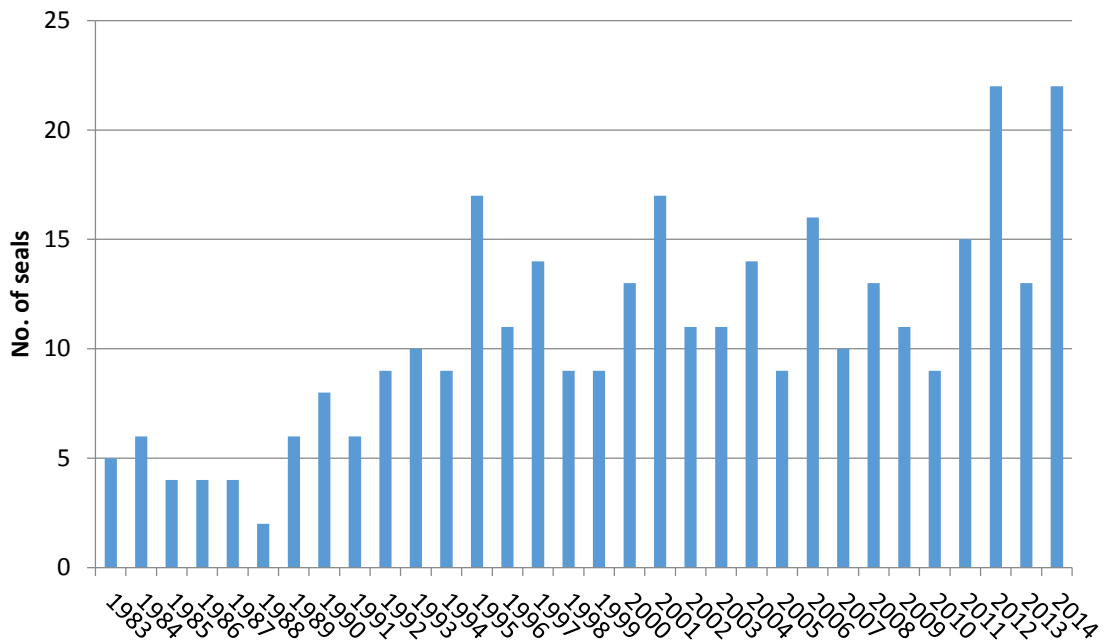


Figure 31 Weekly seal pup births in The Wick in 2014

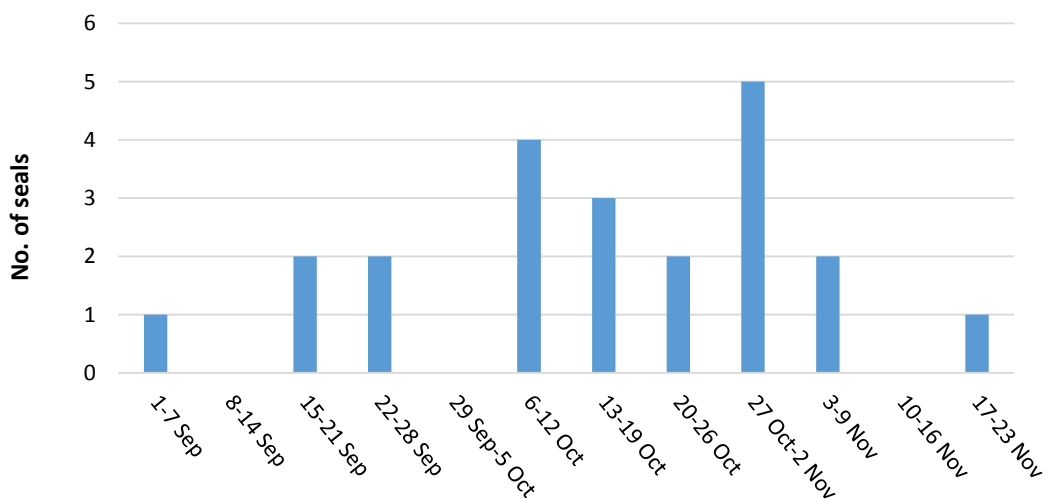


Table 21 Fate of pups on The Wick 2014

Fate	No of pups
Assumed survived	7
Survived to onset of moult	5
Survived to weaning	5
Assumed dead	2
Dead	3
Total	22

Table 22 Causes of seal pup deaths on The Wick in 2014

Cause of death	No. of pups
Ill	1
Stillborn	1
Stillborn/drowned	1
Disappeared ≤ stage 2	2
Total	5

Table 23 Sizes of pups at onset of moult on The Wick in 2014

Size at onset of moult	No of pups
1 Very small	0
2 Small but healthy	2
3 Good size	5
4 Very good size	0
5 Super-moulter	0
Total	7

4.4.15 The Basin

Four pups were born in The Basin in 2014. We visited The Basin nearly daily (a total of 67 visits) during the monitoring period.

Figure 32 Number of seal pups born in The Basin 1983-2014

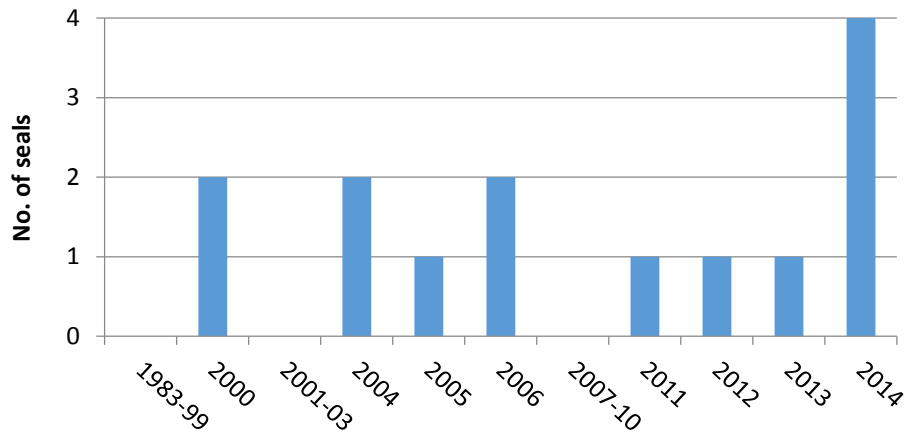
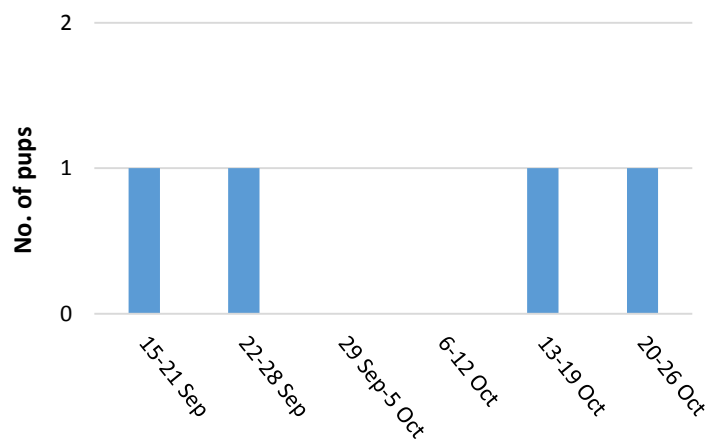


Figure 33 Weekly seal pup births in The Basin in 2014



Three pups survived and were weaned, one pup survived to beginning of moult, resulting in a survival rate of 100%.

4.4.16 Robert's Wick

No pups were born in Robert's Wick in 2014. This site was possibly used once, in 2001.

4.4.17 Tom's House

No pups were born at Tom's House in 2014. The site has only been used once, in 1997, when a single pup was born.

4.4.18 Pigstone Bay

Pigstone Bay is the only site on Skomer which is impossible to monitor. There is boulder beach where it has been thought pups were occasionally born. However, there is a sea cave, which is impossible to access, which seems to be the source of pups found on the beach, presumably having been washed out during spring tides/big swells. 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 seen at Pigstone Bay are rarely seen again and are usually assumed to have died, although it is equally possible they could have just swam back to the cave or to some other spot around the island.

In 2014 we conducted 57 site visits but did not encounter any seal pups.

4.4.19 The Garland Stone

We visited the Garland Stone daily between 10/08 and 26/ during low tide to count the seal haul-outs. No pups were seen on the Garland Stone in 2014. The site has only been used twice, in spring 2001 and in 2007, when single pups were born.

4.5 Movements

During 2014 13 marked pups were recorded making movements between beaches on Skomer.

According to BOYLE, D (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. However pups seem to move frequently between Seal Hole, Driftwood Bay and South Haven and also between North Haven main beach and North Haven slip.

Table 24 Movements of marked pups on Skomer Island in 2014

Natal Site	Pup No.	Desti-nation	Age (on arrival at desti-nation)	Pup condition (when last seen)	Comments
Shag Rock	19	Castle Bay	5	3.5	Weaned on Castle Bay
Driftwood Bay	23	South Haven	14	3	Weaned on South Haven
Slabs	28	Driftwood Bay	6	3	Weaned on Driftwood Bay
South Haven	50	Driftwood Bay	4	3.5	Weaned on Driftwood Bay
Slabs	67	Driftwood Bay	8	3	Weaned on Driftwood Bay
South Stream Cave	76	High Cliff Boulders	10	2	Disappeared
South Haven	78	Driftwood Bay	7	3.5	On Driftwood Bay to onset of moult
Driftwood Bay	98	South Haven	6	2	Died, separated/abandoned
Driftwood Bay	101	Slabs	17	3.5	Weaned on Slabs
South Haven Cave	149	Driftwood Bay	5	3.5	On Driftwood Bay to onset of moult
South Haven Cave	150	Driftwood Bay	7	4	Weaned on Driftwood Bay
Seal Hole	156	Driftwood Bay	9	3	Weaned on Driftwood Bay
North Haven	177	North Haven Slip	3	3	On North Haven Slip to onset of moult

4.6 Wanderers

Eleven pups were recorded as wanderers. These are pups which turned up unaccompanied by their mothers and their natal beach is unknown. The large wandering pups usually moult once they have established themselves on a beach whereas the smaller ones (presumably abandoned or separated) usually disappear within days.

One pup turned up on North Haven beach moulting, size two on 17/09. We gave it a red mark and the next day it was seen on Martin's Haven beach. On 22/09 it returned to Skomer North Haven beach but left the next day again.

4.7 Seal Pup Moul

Details of moult were recorded for pups whose progress could be accurately monitored from birth, but only for pups where date of birth and moulting strategy were known to within 24 hours.

The age of pups at the start of moult is normally quite easy to record but pups have a nasty habit of vanishing just before they complete moult, or become indistinguishable from other moulting or moulted pups once they lose their individual markings, making accurately recording the age at completion and duration of moult much harder to record.

For moult details see 2014 Seal Monitoring Raw Data file.

The mean size at onset of moult was three, exactly the same as last year.

The mean age at onset of moult was 14 days (n=100, range 1-23 days), exactly the same as last year.

The mean age at completion of moult was 20 days (n=67, range 10-28 days), two days less than last year.

The mean duration of moult was six days (n=67, range 2-16 days), one day less than last year.

Looking at this year's data and comparing it with data from previous years it is noticeable that size and age at onset of moult as well as age at end of moult do not vary much from year to year. Between 2014 and 1995 mean age at onset of moult and mean duration of moult varied by no more than five days and mean age at completion of moult only varied by three days (see Table 25). However, in most years there is even less variation (see Table 25)

Table 25 Seal pup moult records on Skomer Island 1995-2014

Year	Mean age at onset (days)	Mean duration (days)	Mean age at completion (days)
2014	14	6	20
2013	14	7	22
2012	15	6	20
2011	15	5	20
2010	14	6	19
2009	15	6	22
2008	14	5	20
2007	10 (flippers) 15 (body)	10 (max.) 6 (min.)	20
2006	8 (flippers) 13 (body)	12 (max.) 6 (min.)	19
2005	10 (flippers) 14 (body)	8 (max.) 5 (min.)	19
2004	11 (flippers) 15 (body)	10 (max.) 6 (min.)	21
2003	11 (flippers) 14 (body)	10 (max.) 6 (min.)	21
2002	12	9	22
2001	13	6	20
2000	16	4	20
1999	15	5	20
1998	17	6	22
1997	17	5	22
1996	16	5	20
1995	16	5	22

Table 26 Rate of occurrence of moult study results between 1995 and 2014

Mean age at onset (days)	Rate	Mean duration (days)	Rate	Mean age at completion (days)	Rate
12	1	4	1	19	3
13	2	5	6	20	9
14	6	6	6	21	2
15	6	7	2	22	6
16	3	8	3		
17	2	9	2		

When plotting the moult data in a scatter graph it is visible that a sample size of 20 to 30 pups is sufficient to determine moult duration etc. (see figures 36-38)

Due to the fact that moult strategies do not vary between years we recommend to evaluate the reason for continuing the moult study. If the moult study should carry on we propose to reduce the sample size to ca. 30 pups in order to increase efficiency of the seal study as a whole.

Figure 34 Variability of size at onset of moult depending on sample size

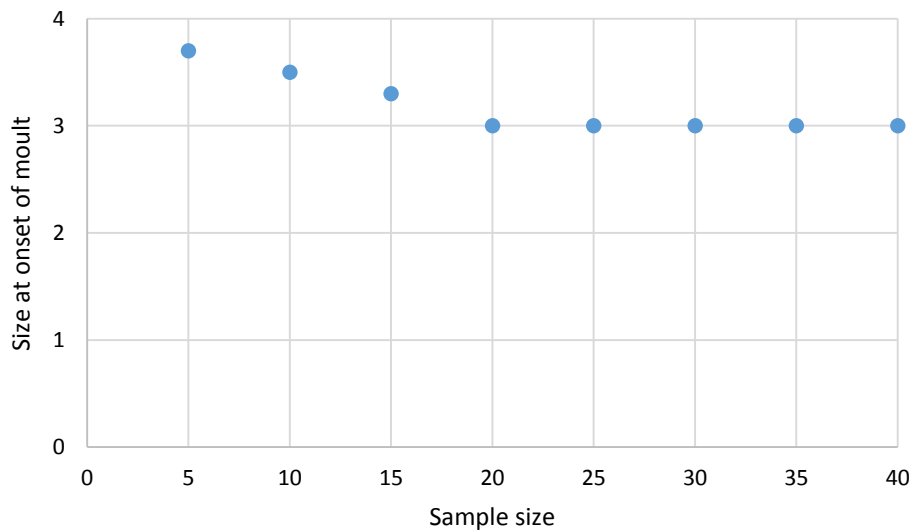


Figure 35 Variability of age at onset of moult depending on sample size

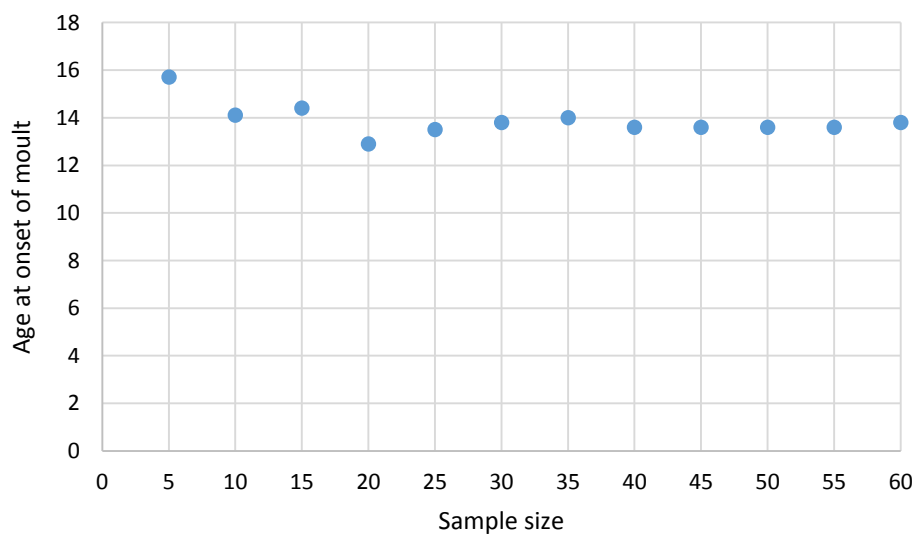
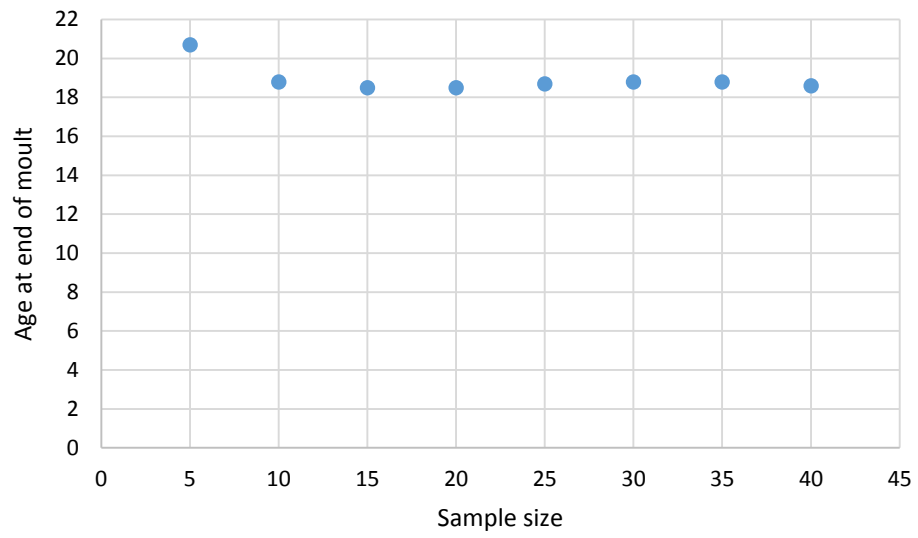


Figure 36 Variability of age at end of moult depending on sample size

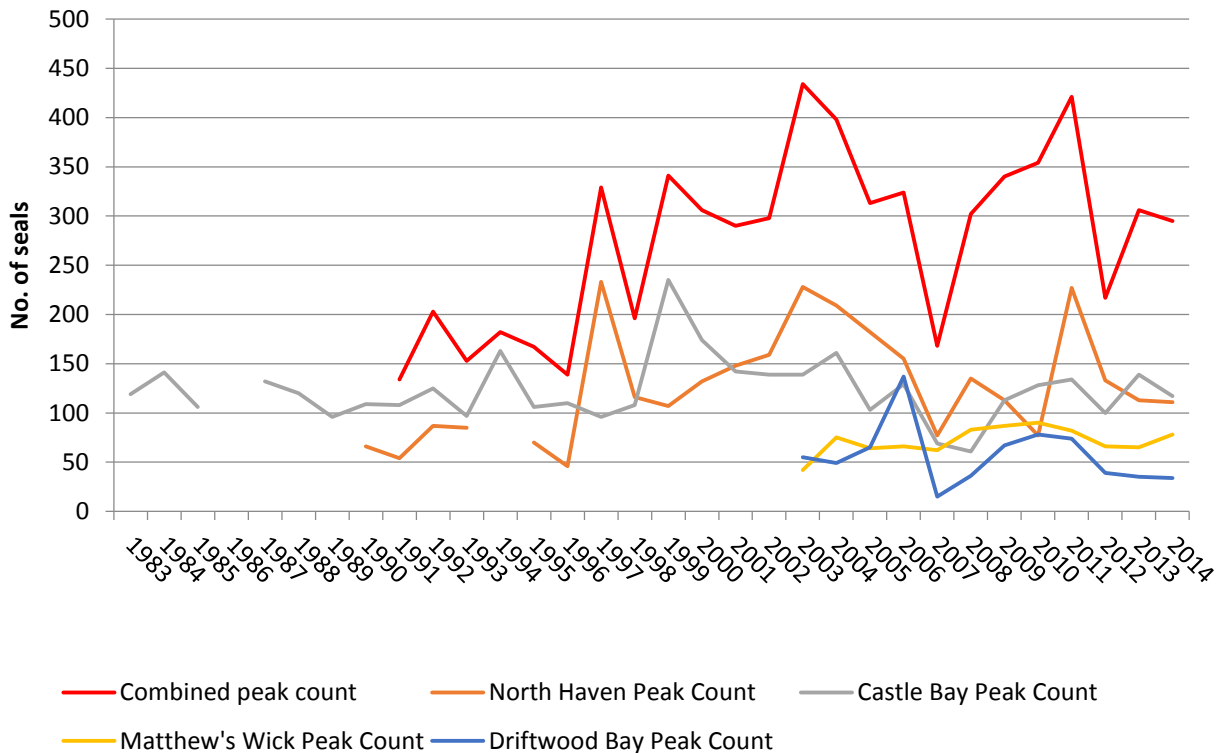


5. Haul-outs in 2014

In 2014 the maximum haul-out of 300 was recorded on 16/11; 18 days later than in 2013. The average maximum haul-out on Skomer Island for the last ten years is 314, hence the number of seals using the haul-outs was slightly lower than the average. In 2012 the number of seals using Skomer to haul-out had reached its lowest peak since 2007 (BOYLE, D (2012)).

Castle Bay (including Shag Rock) and North Haven (including Rye Rocks) were the most popular haul-out sites closely followed by Matthew's Wick. Castle Bay had an average of 35 (same as 2014) and a maximum of 117 (139 in 2013) seals on 17/10, North Haven had an average of 28 (36 in 2013) and a maximum of 100 (113 in 2013) seals on 16/11 hauled-out. It seems that although more pups are being born on Skomer the number of seals hauling out is stable or even slightly declining.

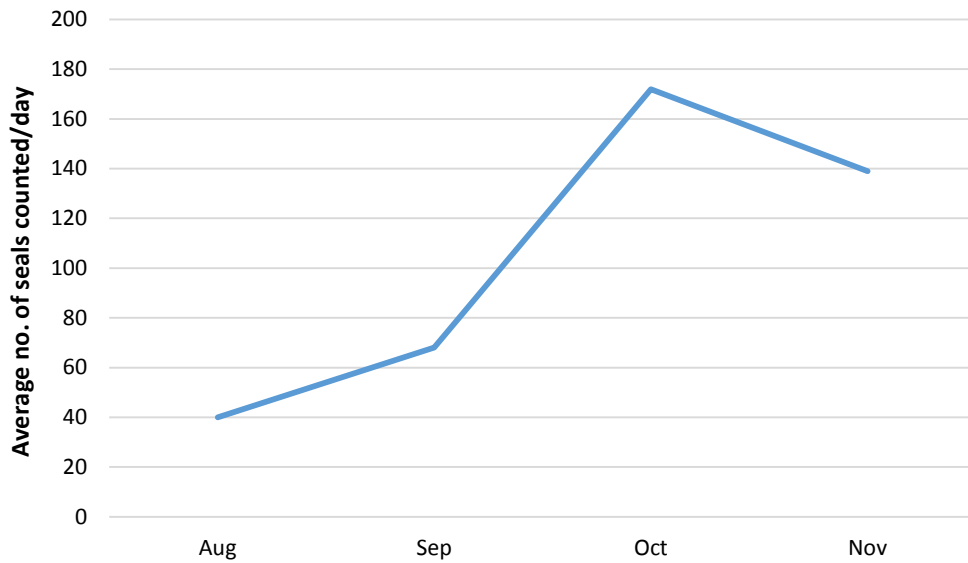
Figure 37 Peak haul-out counts on Skomer Island 1983-2014



For haul-out details see 2014 Haul-out Raw Data file.

This year, for the first time, we tried to cover all beaches suitable for hauling-out simultaneously during low tide in order to establish how many seals are actually using Skomer on a daily basis.

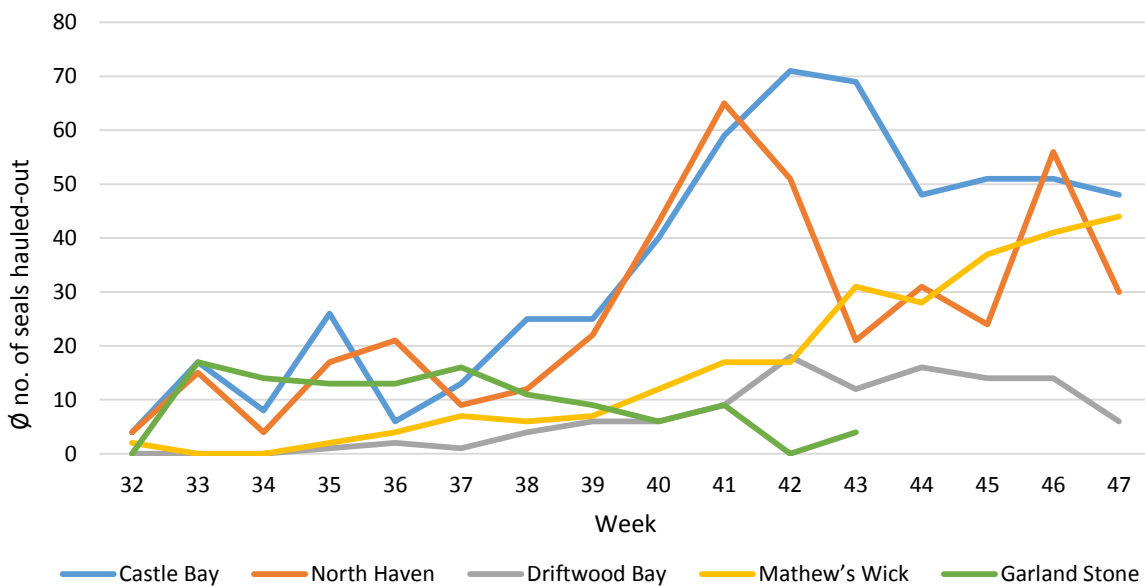
Figure 38 Daily average number of seals using Skomer between August and November.



Note: The Garland Stone was not counted in November

Although overall haul-out numbers increased throughout October and decreased thereafter the situation on specific haul-out sites can vary greatly. Caste Bay experienced its peak counts in week 42/43 (13-26/10). Driftwood Bay and North Haven also had maximum number of seals hauled-out in mid-October but North Haven experienced another peak count in week 46 (11-16/11). In contrast to this pattern, Mathew’s Wick’s counts increased later in the season and were still climbing when the island was vacated.

Figure 39 Average haul out on Castle Bay, North Haven, Driftwood Bay and Matthew’s Wick in 2014



POOLE, J (1996a) wanted to find out whether there is a correlation between seal haul-outs and tidal range. BOYLE, D (2012) says that North Haven and especially Rye Rocks are not very suitable haul-out sites on days with strong northerly winds and/or neap tides. However in 2013 we showed that there is no correlation between seal haul-outs and tidal range. Data collected in 2014 reinforce this result (see figure 5.2). The random distribution noticeable in the scatter graph visualises the fact that seals do not choose North Haven as a haul-out site depending on tidal range.

Figure 40 North Haven seal haul-outs and tidal range compared

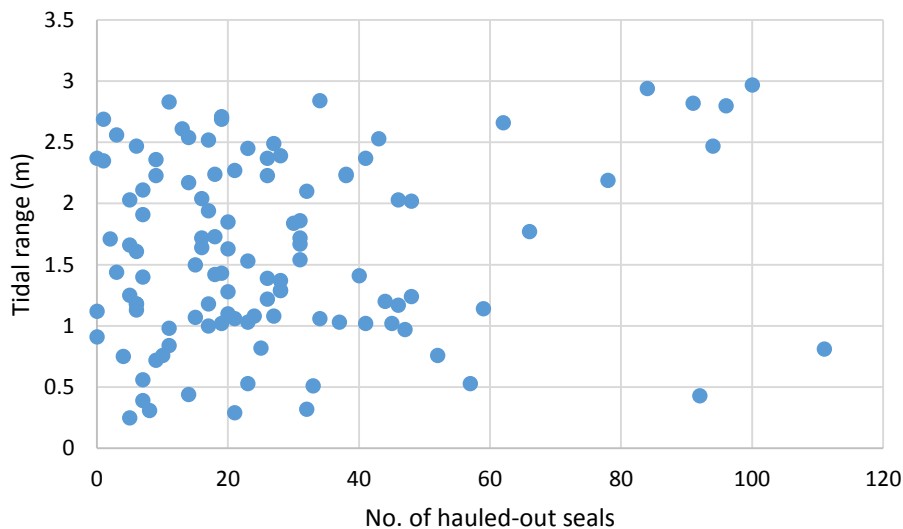


Figure 41 North Haven haul-out in 2013

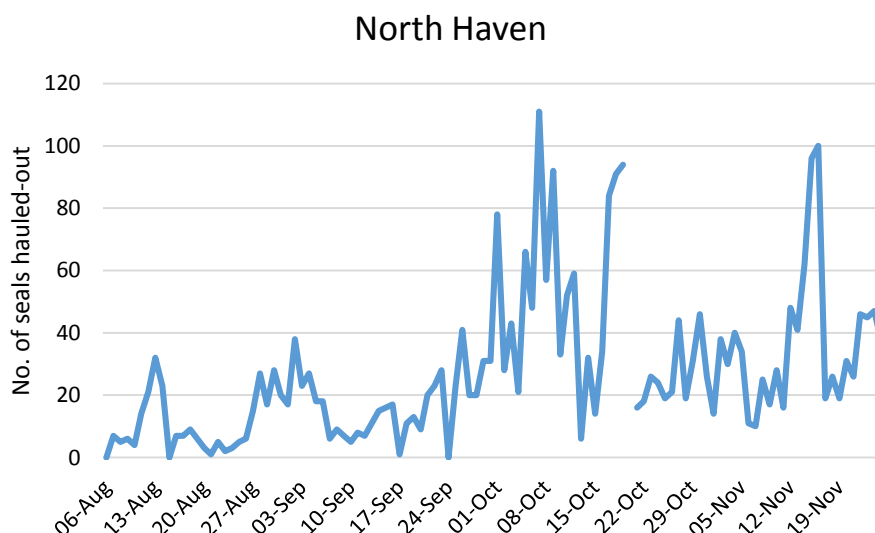


Figure 42 Castle Bay haul-out in 2014

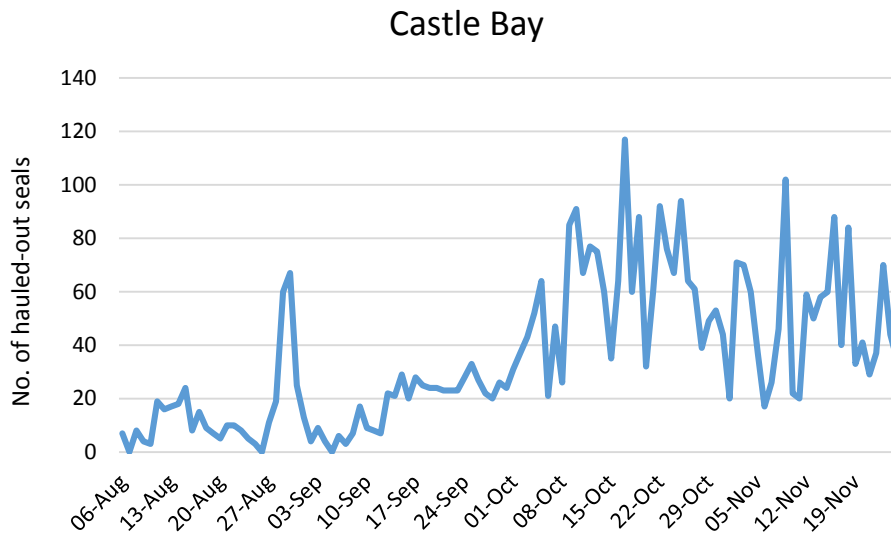


Figure 43 Driftwood Bay haul-out in 2014

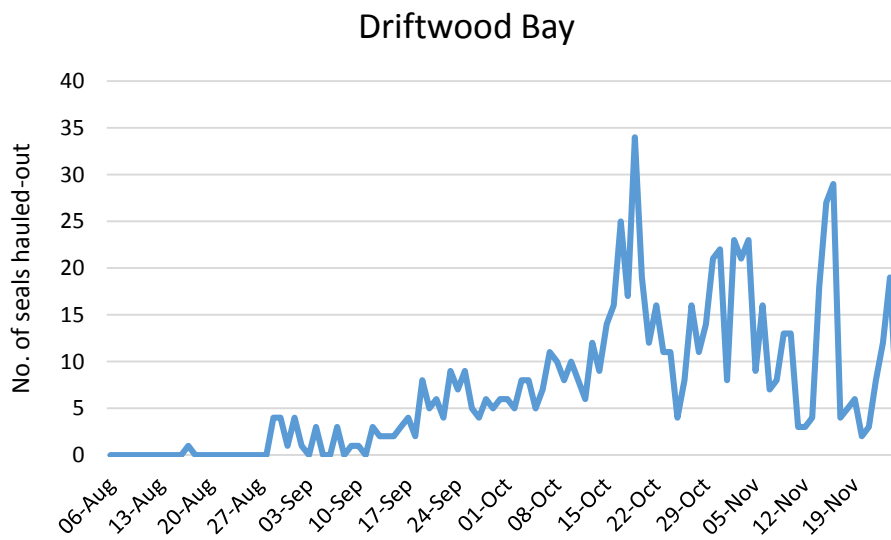


Figure 44 Matthew's Wick haul-out in 2014

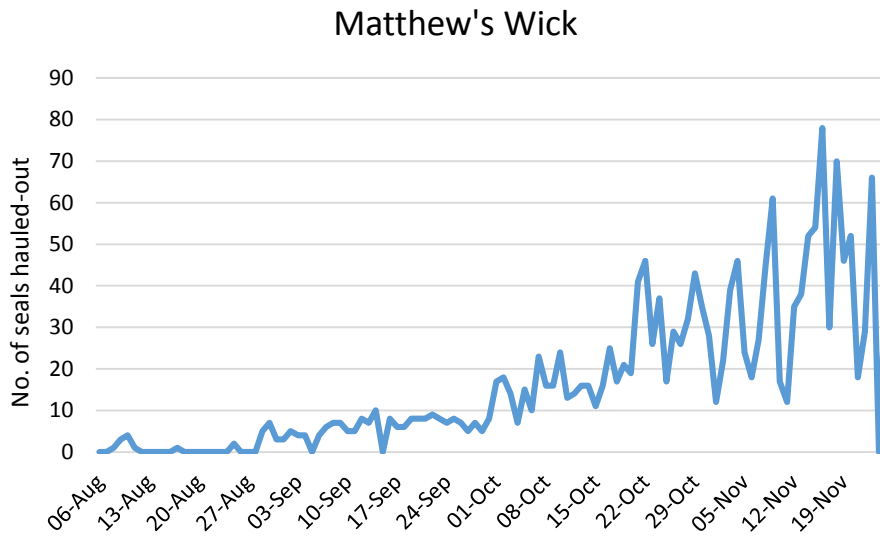


Figure 45 Garland Stone 2014

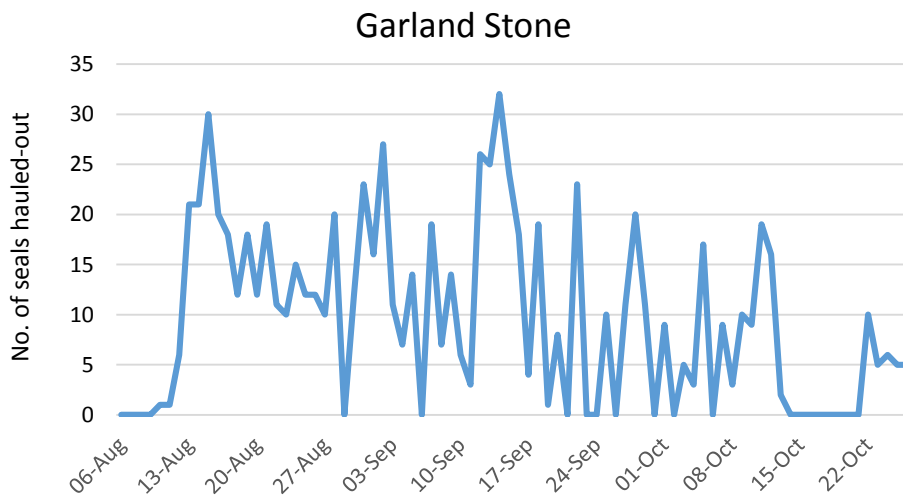
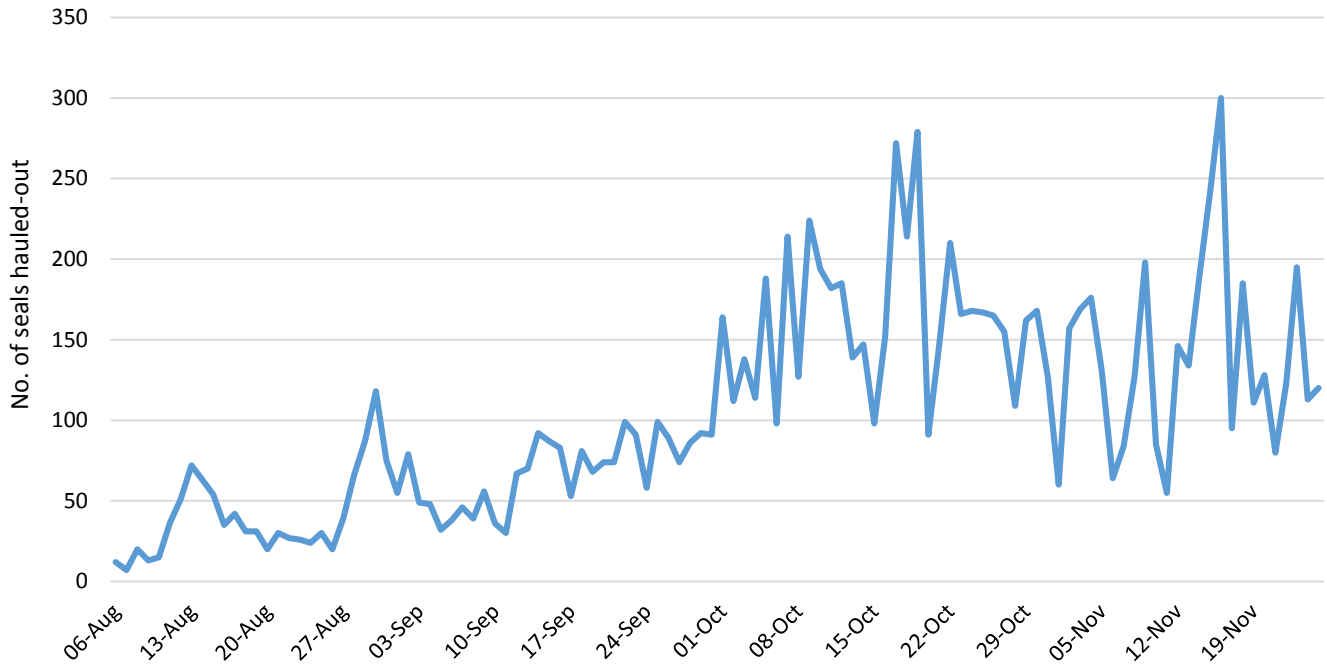


Figure 46 All haul-outs combined in 2014



6. Pollution

6.1 Netting

Monofilament line and netting were the obvious pollutants affecting seals. In 2014 32 different cows, twelve bulls one immature and two weaners 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. Two bulls were known from previous years: NK-067 was dominant bull at Mathew's Wick in 2012 and 2014; NK-036 has been seen in North Haven most years since 2009. Five cows were known from previous years: NK-020, NK-023, NK-033, BK-054, 13.SC-NK-073.CBY. The oldest of these cows (NK-020) has been recorded on Skomer most years since 2007.

In March an adult bull was photographed hauled out on North Haven beach with a blue strap around his neck. In mid-October he was the dominant bull on North Haven beach. On 14/10/14 he was photographed with the blue strap still around his neck. Two days later he was seen without the restricting "accessory". It seems that he was lucky and able to rid himself of the packing strap.



Plate 5 Bull with blue strap 16/03/14



Plate 6 Bull with blue strap on 14/11/14 and without strap on 16/11/14

6.2 Oil/Tar

Skomer's beaches remain very clean, however one pup was seen with an oil spot on its coat at roughly the same time as one gull was observed covered in oil.



Plate 7 Seal pup on 05/11/14 with oil stain

7 Disturbance

There were no serious instances of disturbance to seals on Skomer in 2014. However seven incidents of slight disturbance were recorded. Throughout September the very nice weather attracted divers, jet skiers, kayakers, canoeists and sailors which put hauled-out seals into the water in North Haven, South Haven, Mathew's Wick and Castle Bay.



Plate 8 Two Jet skiers watching seals and disturbing haul-out at Seal Hole 02/09/14

8. Seal Behaviour

In 2014 one case of a cow suckling two pups was observed. On Matthew's Wick the mother of pup 20 was also suckling pup 18. Pup 20 was born moulting and struggled to compete against pup 18. None the less both pups survived although they grew slower than other pups.



Plate 9 Mum of pup 18 suckling her own pup (right) and pup 20 (left) on 21/09/14

On the Slabs two females were noted caring for pup 166. The two females had little squabbles over the pup but most of the time they quite peacefully took turns in suckling the pup, which grew to enormous proportions. The real mum left the pup when it was 16 days old and the foster mum stayed with the pup until it was 22 days old.



Plate 10 Pup 166 with two mothers on 27/10/14



Plate 11 Pup 166, size five at 24 days of age

On 02/10 a very rare incident was observed on South Haven beach. It was apparent that a female had given birth to twins. Unfortunately the pups were still born. The mother (LBK-003) is well known and has been pupping regularly on Skomer since 2001. She stayed with her still born pups for two days before she abandoned them.



Plate 12 Twins still born on 02/10/14



Plate 13 Female LBK-003 with dead twins

10. Disease

Although 2014 was a successful season we observed many small and ill-looking weaners.



Plate 15 Small weaner on Mathew's Wick
05/11/14



Plate 14 Very small weaner on Mathew's Wick
25/11/14

On 15 and 16/11/14 an extremely emaciated weaner was observed on Mathew's Wick which died on 17/11/14.



Plate 16 Emaciated weaner dead on 17/11/14

On South Haven we observed two and on Caste Bay one unexpected death of healthy looking pups. Pup 145 was well attended by its mother but only grew slowly and died when it was seven days old.

Pup 62 was observed on the morning of the 23/10/14 healthy and nearly moulted at 22 days of age, size three but was found later that day dead on the beach.



Plate 17 Pup 62 on 23/10/14 alive in the morning and dead later in the afternoon

Pup 216 was 13 days old and size three when it was suddenly found dead on Castle Bay on 24/11/14



Plate 18 Pup 216 on 23/11/14 (left) and dead on 24/11/14 (right)

These deaths of otherwise healthy looking pups might have been the result of fights with adult seals or accidents with fallen rocks

The worst case of eye infections was noted on South Haven beach. Pup 90 was abandoned but survived until it was 16 days of age when it disappeared. Possibly due to the malnourishment it developed a very bad case of conjunctivitis.



Plate 19 Pup 90 with conjunctivitis on 18/10/14

Also see section 4.4.5.

11. Identification of individual seals

For the tenth year in a row photographic monitoring of adults continued in 2014 and has now completely replaced the old method of drawing sketches. In 2007 David Boyle developed a catalogue of seal ID photos which was 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 the MNR team (Kate Lock) on the Marloes Peninsula and by surveyors on Ramsey Island (Lisa Morgan) in 2010.

NRW have been developing an EIRPHOT database called the Wales Seal Photo ID database (developed in collaborations with SMRU). Photos are entered using head and matched within the database. Over the last year NRW has been contracting workers or using trained volunteers to get as many of the seal ID images onto this database and by March 2015 all existing Pembrokeshire photos (2007 to 2014) will have been entered.

Hence we decided not to identify seals by pelage in 2014 but only by obvious scars in order to reduce the work load to a manageable level. None the less we took nearly 4000 pictures of seals. We managed to photograph ca. 80% of breeding females and collected and catalogued 634 pelage photos which will be entered into the [SMRU Wales](#) seal ID database.

In 2014 135 seals were identified which is 46 more than in 2013, even though we concentrated exclusively on scarred individuals in 2014. The reason for the increase in seal ID by eye is the fact that we used a Canon EOS 7D camera with a 500mm lens. This camera is the Skomer Warden's private equipment which was generously made available. Furthermore we increased our efforts to photograph seals and profited from experience gained last year.

Of the 135 seals identified by eye

- 50 of them were re-identified from previous photos.
- 85 new seals were photographed and added to the ID catalogues.
- The oldest cows (BK-002, LBK-003, LBK-006) to have returned to Skomer were first recorded in 2001.
- The oldest bulls (07.CBY.B01, 07.MWK.B01, 07.NHV.B02) to have returned to Skomer were first recorded in 2007.

Table 27 Year of first sighting of seals seen on Skomer Island in 2014

Year	No. of animals first seen on Skomer
2001	3
2002	2
2003	3
2004	3
2005	1
2006	
2007	6
2008	6
2009	6
2010	6
2011	6
2012	3
2013	5

11.1 Breeding Cows Returning In 2014

BOYLE, D (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. He concludes that this is not the case.

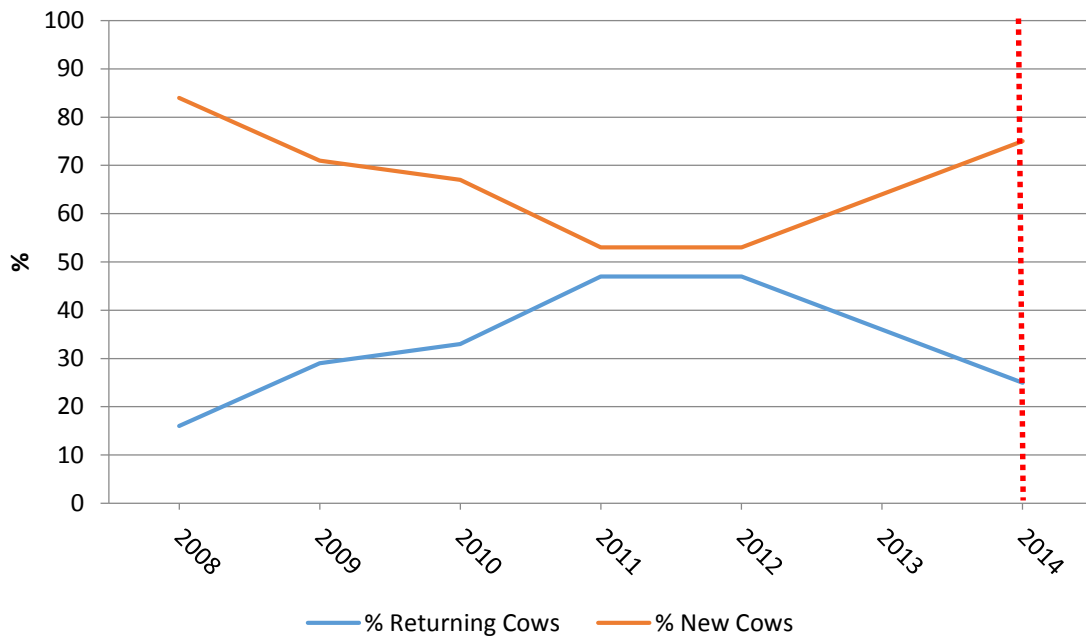
Table 28 Number of distinctive cows per site in 2014

Site	Distinctive breeding cows	Identified
CBY	9	4
DWB	11	1
MWK	14	5
NHV	4	2
SBS	2	0
SCBC	1	0
SHV	11	2
SSC	4	0
WCK	3	1
Total	59	15

Of the 215 cows which pupped on Skomer 59 had distinctive markings/scars and were photographed well enough for comparing with the catalogue. 15 matches were found, hence 25% of identifiable breeding cows were returning cows. In 2013 36% of cows were returning cows. This difference might be the result of a decreased sample size as only scarred individuals were identified by eye in 2014 (photo's of unscarred cows are now being analysed using the Wales Seal photo ID database). Furthermore the detectability of cows varies from year to year due to weather and different photographic equipment, which may also alter the outcome. This needs to be kept in mind when looking at the results of seal identification work.

- Nine of the 15 cows that pupped on Skomer in 2014 had also pupped in 2013, (60% in 2014, 86% in 2013).
- Six cows pupped on Skomer in three consecutive years 2012-2014, (40% in 2014, 48% in 2013).
- Three cows pupped on Skomer in four consecutive years 2011-2014 (20% in 2014, 29% in 2013).
- One cow has pupped every year on Skomer since 2007.
- Four cows (BK-002, LBK-003, LBK-006, BK-002) which pupped on Skomer in 2014 were also recorded pupping in 2001, hence these are the oldest pupping cows of the 2014 season.
- Nine cows pupped on Skomer in 2014 that did not pup in 2013 but did pup in 2012.

Figure 47 Percentage of returning and new pupping cows on Skomer Island 2008-2014



..... Change in methodology (only scarred seals were analysed).

11.1.2 Site fidelity

- Of the nine cows that pupped on Skomer in both 2014 and 2013, seven returned to pup at the same site (78% in 2014, 67% in 2013).
- Of the six cows that pupped on Skomer in three consecutive years 2012-2014, four used the same site in all three years (67% in 2014, 70% in 2013).
- Of the six cows that pupped on Skomer in four consecutive years 2011-2014, four used the same site in all four years (67% in 2014, 67% in 2013).
- Of the three cows that pupped in five consecutive years 2010-2014, two used the same site in all five years (67% in 2014, 33% in 2013).
- Before 2013 only two sites (Matthew's Wick and South Haven) had been used by the same cows for more than three seasons. In 2013 BK-002 pupped for the fourth year at Castle Bay and in 2014 for the fifth's year running.
- BK-007 holds the "site fidelity record"; she pupped at The Wick for the eleventh time in 2014.

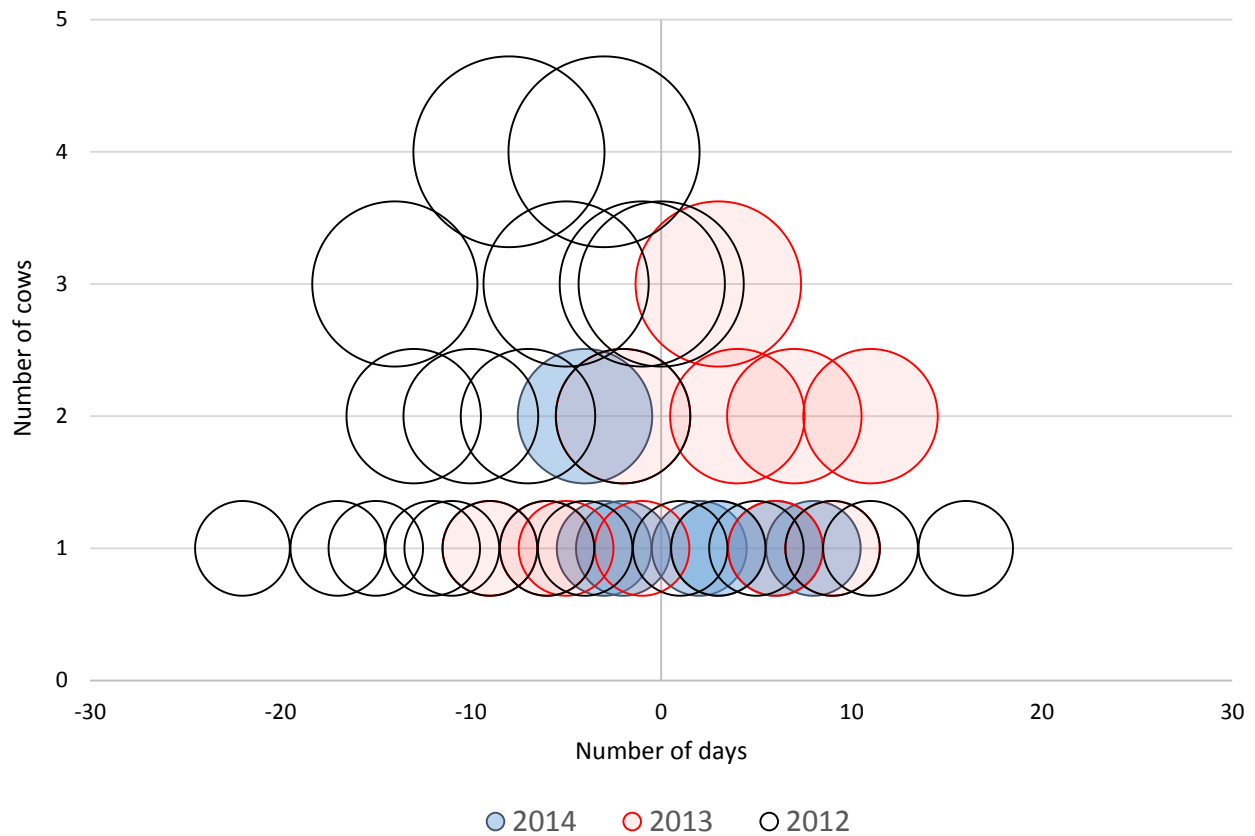
11.1.3 Pupping date

Table 29 Pupping date of returning cows on Skomer Island in 2011-2014

	2014	2013	2012	2011	Difference (Days)	Difference (Days)	Average difference
					2014/2013	2013/2012	(Days)
07.C114.SHV	08-Oct	02-Oct	07-Oct	11-Oct	6	-5	5.5
08.C016.MWK	28-Aug	31-Aug	28-Aug	03-Sep	-3	3	3
BK-002	07-Sep	09-Sep	02-Sep	01-Sep	-2	7	4.5
BK-007	16-Sep	14-Sep	07-Sep	15-Sep	2	7	4.5
BK-008	28-Sep	n/a	n/a	n/a			
13.SC-BK-001.NHV	04-Oct	n/a					
13.SC-BK-178.MWK	05-Nov	09-Nov			-4		4
LBK-003	02-Oct	n/a	29-Aug	08-Sep			
LBK-030	16-Sep	13-Sep	10-Sep	18-Sep	3	3	3
LBK-033	06-Sep	29-Aug	n/a	23-Aug	8		8
LBK-065	22-Sep	26-Sep	23-Sep	02-Oct	-4	3	3.5
LS-017	19-Oct	n/a	n/a	20-Oct			
LS-020	27-Oct	n/a	28-Oct	n/a			
NK-015	06-Sep	n/a	03-Sep	23-Aug			
HD-009	04-Sep	n/a	n/a	05-Sep			

Due to the small sample size it is difficult to make an accurate statement about the timing of breeding. However, looking at the distribution of the difference in pupping date for the 15 identified cows it seems that 2014 was an average year (see figure 48).

Figure 48 Difference in pupping date of returning cows on Skomer Island 2012-2014



For pupping site fidelity and pupping date details see “2014 Returning Cows Raw Data” file.

11.2 Returning Bulls In 2014

43 bulls were identified in 2014, of which 17 had been recorded previously on Skomer.

12. Skomer Seals Seen Elsewhere

In 2014 five seals which had been recorded on Skomer previously were also seen elsewhere. RS-009 was seen on 30/08/14 pregnant at Porth Lleuog on Ramsey and RS-027 was seen on 23/10/14 in Cornwall. LBK-006 was seen hauled-out on 02/11/14 on Mathew's Wick. She had given birth to a pup at Aber Felin on Ramsey, at 09:00 on 15/09/14. LS-017 had pupped on Skomer on 19/10/14 and had previously been seen in Cornwall in 2010.

Two seals were traced due to flipper tags. On 09/11/14 an immature seal was hauled out on Mathew's Wick which was identified as Bianca who was rescued by the Cornish Seal Sanctuary from Porthgwarra on 09/02/14 and released on 23/05/14 in Gunwalloe.



Plate 20 Immature seal with tag

Also in 2014, a seal, which was hauled out on Skomer with a red tag with the number 117 on 04/11/13, was identified as Tina from the Cornish Seal Sanctuary. She was released at Gwithain on 06/05/13.

No further matches were available at time of writing.

Acknowledgments

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A great thank you goes to Jason Moss, Andrew Bramwell, Holly Dillion and Megan Jones for assisting with field work, Kate Lock for help and advice and Sonia Gadd for her vital help with seal ID.

Also thanks to Sue Sayer of the Cornwall Seal Group who does an amazing amount of work with photo-id of adult seals.

References

- Alexander, R J S and Alexander, M.** (1987) *A study of the Grey Seal Halichoerus grypus on Skomer Island, Dyfed, 1983-1985*. Report to the Nature Conservancy Council.
- BeDard, C and Kovacs K (1993)** *Cannibalism by grey seals, Halichoerus grypus, on Amet Island, Nova Scotia*. Marine Mammal Science 9:421-424
- Bonner, W N** (1989) *The Natural History of Seals*, Christopher Helm, London.
- Boyle, D** (2001) *Grey Seal Breeding Census: Skomer Island 2001*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council of Wales. CCW report no. 507
- Boyle, D** (2009) *Grey Seal Breeding Census: Skomer Island 2009*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council of Wales.
- Boyle, D** (2010) *Grey Seal Breeding Census: Skomer Island 2010*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council of Wales
- Boyle, D** (2011) *Grey Seal Breeding Census: Skomer Island 2010*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council of Wales
- Boyle, D** (2012) *Grey Seal Breeding Census: Skomer Island 2011*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council of Wales
- Büche, B and Stubbings, E** (2013) *Grey Seal Breeding Census: Skomer Island 2013*. Wildlife Trust of South and West Wales, unpublished report to the National Resources Wales
- Duffield, S E** (2002) *Grey Seal Breeding Census: Skomer Island 2002*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council of Wales. CCW report no. 555
- Field, R.** (1999) *Grey Seal Breeding Census: Skomer Island 1999*. Wildlife Trust (West Wales), unpublished report to the Countryside Council for Wales. CCW report no.388.
- Hewer, H R** (1974) *British Seals*, No. 57 in the New Naturalist series, Collins, London
- Hughes, D** (2002) *TYF Recommendations for Safe Access and Egress at Specified Seal Beaches on Skomer*. Report to the Wildlife Trust of South and West Wales.
- King, J E** (1983) *Seals of the world*, Oxford University Press.
- Lockley, R M** (1966) *Grey Seal, Common Seal*, White Lion, London.
- Matthews, J H** (2006) *Grey Seal Breeding Census: Skomer Island 2006*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council for Wales. CCW report no. CCW/WW/06/7
- Matthews, J H** (2005) *Grey Seal Breeding Census: Skomer Island 2005*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council for Wales. CCW report no. CCW/WW/05/7
- Matthews, J H** (2004) *Grey Seal Breeding Census: Skomer Island 2004*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council for Wales. CCW report no. CCW/WW/04/7
- Matthews, J H** (2003) *Grey Seal Breeding Census: Skomer Island 2003*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council for Wales. CCW report no. 621
- Matthews, J H and Boyle, D P** (2007) *Grey Seal Breeding Census: Skomer Island 2007*. Wildlife Trust of South and West Wales, unpublished report to the Countryside Council for Wales. CCW Regional Report CCW/WW/08/1
- Perrin, W F, Würsig, B and Thewissen, J G M** (2009) *Encyclopaedia of Marine Mammals*, Academic Press, Boston.

Orsman, C (1990) *Grey Seal Breeding Success: Skomer Island 1989*. A report to the Dyfed Wildlife Trust.

Orsman, C (1991) *Grey Seal Breeding Success: Skomer Island 1990*. A report to the Dyfed Wildlife Trust.

Pilsworth, M (2000) *Grey Seal Breeding Success: Skomer Island 2000*. Wildlife Trust (West Wales). Unpublished report to the Countryside Council for Wales. CCW report no. 445

Poole, J (1992) *Grey Seal Breeding Census: Skomer Island 1991*. Dyfed Wildlife Trust unpublished report to the Countryside Council for Wales.

Poole, J (1993) *Grey Seal Breeding Census: Skomer Island 1992*. Dyfed Wildlife Trust unpublished report to the Countryside Council for Wales.

Poole, J (1994) *Grey Seal Breeding Census: Skomer Island 1993*. Dyfed Wildlife Trust unpublished report to the Countryside Council for Wales.

Poole, J (1995) *Grey Seal Breeding Census: Skomer Island 1994*. Dyfed Wildlife Trust unpublished report to the Countryside Council for Wales.

Poole, J (1996a) *Grey Seal Monitoring Handbook, Skomer Island*. Countryside Council for Wales. Unpublished report.

Poole, J (1996) *Grey Seal Breeding Census: Skomer Island 1995*. Dyfed Wildlife Trust unpublished report to the Countryside Council for Wales.

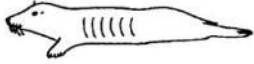
Poole, J (1997) *Grey Seal Breeding Census: Skomer Island 1996*. Dyfed Wildlife Trust unpublished report to the Countryside Council for Wales. CCW report no. 191.

Poole, J (1998) *Grey Seal Breeding Census: Skomer Island 1997*. Wildlife Trust (West Wales) unpublished report to the Countryside Council for Wales. CCW report no.252.

Poole, J (1999) *Grey Seal Breeding Census: Skomer Island 1998*. Wildlife Trust (West Wales) unpublished report to the Countryside Council for Wales. CCW report no.316.

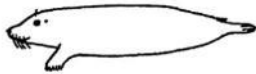
Appendix 1. Ea. Smiths's Age Classification System

Stage 1: 1 – 5 days old



Body contour thin, neck well defined, skin in loose folds around body. Coat often stained yellow by prenatal excreta. Umbilical cord conspicuous, pink or brown, not dried (variable character). Claws soft, whitish. Voice a weak bleat. Docile.

Stage 2: 6 – 10 days old



Outline smoother with neck still recognisable, but no loose folds on body. Cord atrophied, or a conspicuous scar. Claws dark and hard. Voice loud, snarling when handled

Stage 3: 11 to 15 days old



Outline rounded to barrel-shaped. Neck indistinguishable and naval inconspicuous. Vigorous attack and escape reactions to handling,

Stage 4: 16 – 20 days old

As Stage 3 but with patches of white natal fur moulted to reveal first-year pelage underneath. These pups are weaned or approaching weaning.

Stage 5: 21+ days old

Fully moulted to first-year pelage. All weaned and often segregated (with some Stage 4's) from breeding area

Appendix 2. Key

Fate:

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

Birth Sites:

AMR	Amy's Reach
BAS	The Basin
CBY	Castle Bay
DWB	Driftwood Bay
HCB	High Cliff Boulders
LTN	The Lantern
MWK	Matthew's Wick
NHV	North Haven
NHV(S)	North Haven Slip
NHV(SC)	North Haven Slip Cave
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)
SHV(S)	South Haven Slot
SSC	South Stream Cave
WCK	The Wick

Condition at Onset 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



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