

Grey Seal Behaviour, Pup Census and Photo Identification Study: Calf of Man
Final Report 2013

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With thanks to the Calf wardens (Daniel Reynoldson and Will Hayward) and field volunteers (Fiona Shimmin, Anna Bunney and Rebecca Crow)

Key Findings

- 52 pups at 13 different sites.
- Predominant behaviour at sites was resting, with suckling observed in 19.3% of intervals.
- Individual variation was quantified in the mothers' investment in their pups, revealing personality differences across the colony.
- 32 females and 6 males were fully identified.
- 24 females and 3 males have been seen in previous years.

1.0 Introduction

Grey seal monitoring during the pupping season has again taken place in 2013, covering a good percentage of the pupping season. Volunteer availability meant that less of the season was covered compared with previous years. Although there were considerably less general behavioural observations, the pup count was still considered to be adequately representative. The detailed study was conducted between the 15th October and the 1st November 2013, with assistance before and after from the Calf wardens. The project was again carried out under license from the Isle of Man Government (Department of Environment, Food & Agriculture, license number WLA/G014/13).

2.0 Methods

Methodology followed was the same as in 2012 (see 2010/2011/2012 reports for methodology). The pup count was carried out on an ad hoc basis while the wardens were carrying out other duties. When the volunteer observers arrived, effort was increased with almost daily walks to the main pupping sites. Pup presence was recorded and pups were assigned to one of 5 developmental stages, to ensure that pups weren't double counted. Behavioural observations were carried out, with the majority of effort concentrated at 3 sites, Grant's Harbour, the Puddle and Cow Harbour. Photo identification of females, males and fully moulted pups was carried out wherever possible.

An additional behavioural study was initiated in 2012, looking at the variation in the behaviour of individual mothers. This was continued in 2013, although the element of the study looking at the reactions of mothers to other seals was dropped, as it was hard to conduct and the resulting sample size was too small to give meaningful results. The study aims to give an indication of the differing personalities among the population, which in turn may affect a population's ability to respond to rapid environmental change (Twiss et al, 2012). The methods followed were the same as in 2012, but no responses to other seals was recorded.

3.0 Results

3.1 Pup Census

52 pups were recorded on the Calf in 2013, at 13 different sites. Only 4 dead pups were recorded, making the pre-weaning mortality rate 7.7%. This is similar to previous years on the Calf, as well as being relatively low compared to general grey seal pup mortality (<http://www.iucnredlist.org/details/9660/0>). This is the highest number of pups recorded in one season (previous range: 27*-41. *=2009 was only a short pilot study). It is also the highest number of sites recorded in one year (previous range: 9-12).

The distribution of pups can be seen in Figure 3.1.1 below. This map also has the distribution of pups in previous years. Distribution is broadly similar, with a clear high density of pups at Cow & Grant's harbours once again. There were an increased number of pups at both the Puddle and South Harbour in 2013. However, four of the pups at the Puddle were recorded late in the season on an extra visit to the Calf. In previous years, although the wardens were still present at this time, they may have missed these late born pups.

3.2 Behaviour

Behavioural observations were carried out for a total of 58.25 hours, over 15 days. This is less than in previous years due to fewer volunteers being available for the study. The breakdown of time spent at each site is shown in the table below:

Site	Hours Observation
Grant's Harbour	24
The Puddle	15.75
Cow Harbour	14.5
The Leodan	2
South Harbour	2

Figure 3.1.1: Distribution of pups, 2009-2013 (2013 pup numbers in red)

Location & number of pups born in 2009-2013.

Code	Location
CL	The Cletts
FP	Fold Point
GH	Grant's Harbour
CH	Cow Harbour
WC	West of Cow
GI	Gibdale
BF	Bay Fine
AM	Amulty
BO	Bay yn Ow
GL	Ghaw Lang
SC	Smugglers Cave
CP	Caigher Point
LE	The Leodan
MG	Mill Giau
PU	The Puddle
SH	South Harbour

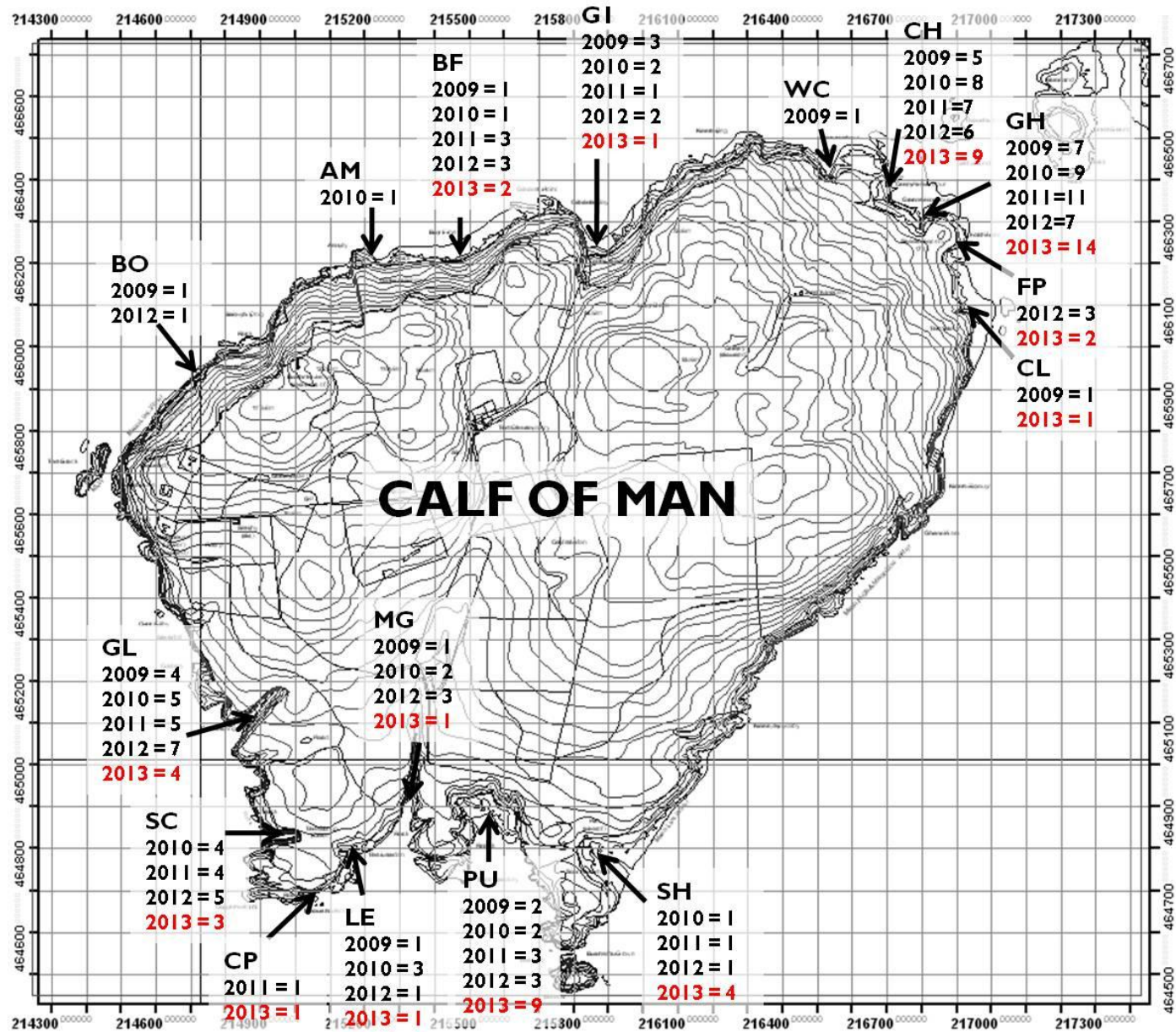


Figure 3.2.1 below shows the breakdown of the occurrence of all behaviours, males and females combined. This represents the number of intervals that were positive for that behaviour, rather than the length of time spent engaged in that behaviour. It can be seen that once again, the most commonly observed behaviour was resting, both on land and in the water. Suckling was observed in 19.3% of intervals. This is more comparable with the 2010 and 2011 figures, rather than 2012 when it dropped to 15%.

Figure 3.2.1: Occurrence of each behaviour, males and females combined. H = hauled, W = in the water, L-S = moving from land to sea, S-L = moving from sea to land.

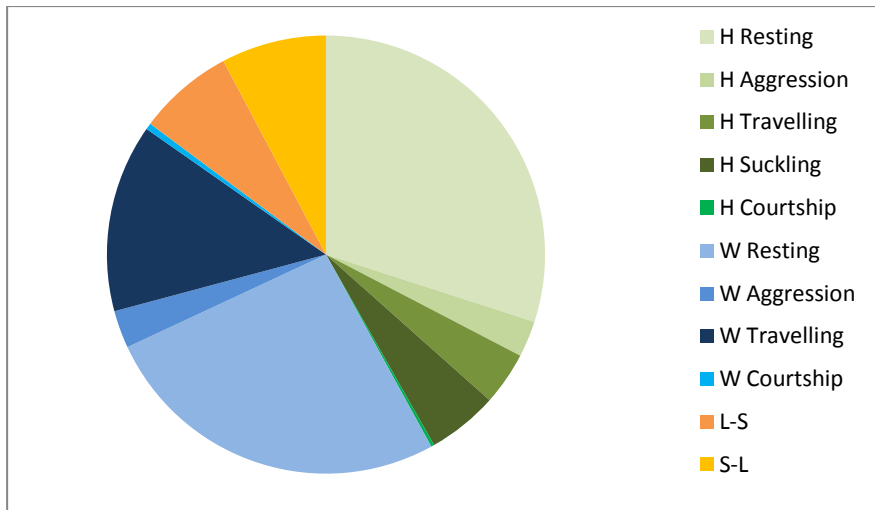
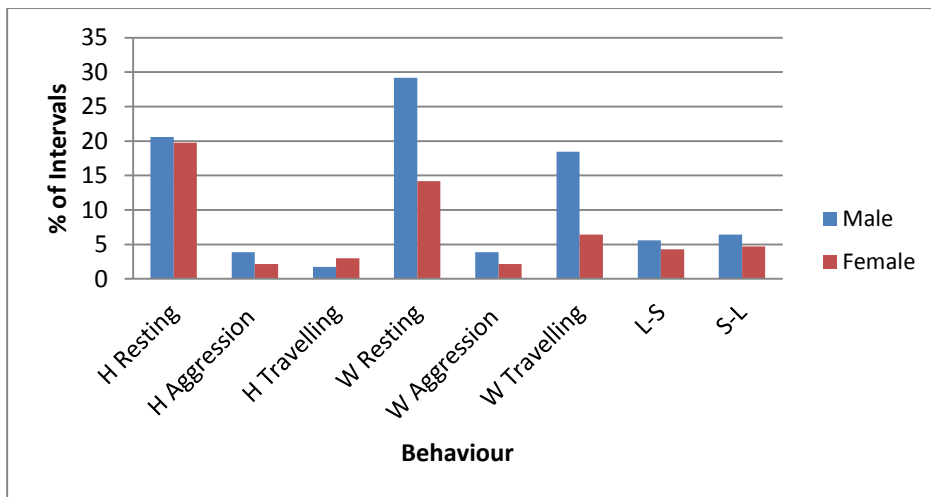


Figure 3.2.2 below shows the breakdown between males and females for the more commonly observed behaviours. The average number of males present in each interval was 1.2 and the average number of females was 4.4. Using these as correction factors makes the results for males/females more comparable. These behavioural observation patterns are very comparable with those of previous years.

Figure 3.2.2: Breakdown by males and females of the more commonly seen behaviours. H = hauled, W = in the water, L-S = moving from land to sea, S-L = moving from sea to land.



Pup behaviour was not quantified, but, as in previous years, pups showed a variety of behaviours, especially as they got older. There was also individual variation in the amount pups moved around and went in the water, partly dictated by their physical positions on the beach/rocks.

3.4 Mother Focal Study

Behavioural observations of individual mothers were recorded for a total of 178 hours (several mothers could be recorded simultaneously hence the higher observation time). The breakdown of time and location of observations is shown in the table below, with mothers which were also observed in 2012 in bold:

Location	Mother ID	Hours observation
Grant's Harbour	2	10.25
	5	8.3
	7	24
	8	13.25
	74	4.75
	102	18
	101	3
Cow Harbour	14	13.4
	73	1.1
	79	5.1
	93	2.1
	92	3
	94	4.1
Puddle	41	12.4
	49	15
	103	12
	104	12.9
South Harbour	99	2
The Leodan	39	2.1
Various	Unknowns	11.3

10 females which were observed for over 10 hours, or those which were focussed on in the 2012 study were included for further analysis. However all mothers are included for the purposes of the 'average' calculations.

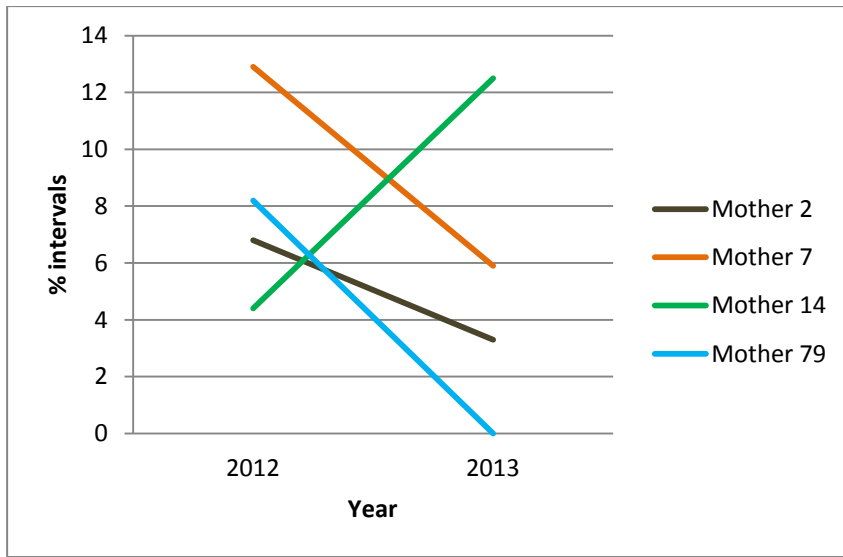
Suckling

At the start of each 5-minute interval, whether the mother was suckling the pup or not was recorded. The average percentage of 5-minute intervals in which suckling was observed was 4.6%. This is lower than the percentage recorded in the broader behavioural study, but is only thought to be due to methodological differences. It is also lower than the figure recorded in the 2012 mother focal study (6.5%). For the ten key mothers, the percentage of intervals suckling (in increasing order) was as below:

Mother ID	% intervals suckling	Number of known pups	Location
79	0	2	Cow Harbour
104	1.9	1	The Puddle
102	2.3	1	Grants Harbour
41	2.7	2	The Puddle
2	3.3	5	Grants Harbour
49	4.4	2	The Puddle
7	5.9	5	Grants Harbour
8	6.9	3	Grants Harbour
102	9	1	The Puddle
14	12.5	4	Cow Harbour

As was seen in 2012, there is individual variation in the amount of time spent suckling the pup. This does not seem to correlate with the number of pups the mother is known to have had previously or the location. Nevertheless, all these pups survived and were successfully weaned. A comparison of percentage intervals suckling in 2012 and 2013 for the 4 mothers observed in both years is seen in Figure 3.4.1. This shows that all but one of the mothers was observed spending considerably less time suckling. However, as all the pups were successfully weaned, this does not appear to be significant. The observations are clearly only carried out for a limited sample of time, so it could be that suckling was not observed by chance, or it could represent different mothers' abilities or behavioural strategies.

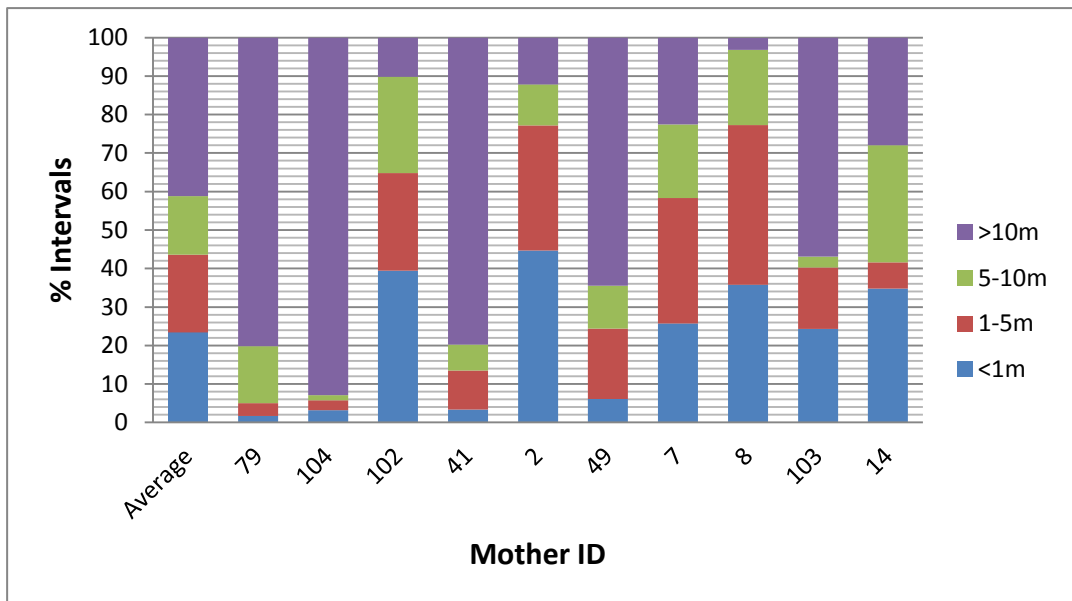
Figure 3.4.1: Change in percentage intervals suckling for the 4 mothers observed in both seasons.



Distance from Pup

The maternal personalities, investment and behavioural strategies can also be looked at by recording the distance from her pup. At the start of each 5-minute interval, the distance a mother was from her pup was recorded, in 4 distance bands. The percentage of intervals at each distance band for the ten focal mothers is shown in Figure 3.4.2 below, along with the average for all the mothers. This has been ordered as in the suckling table above.

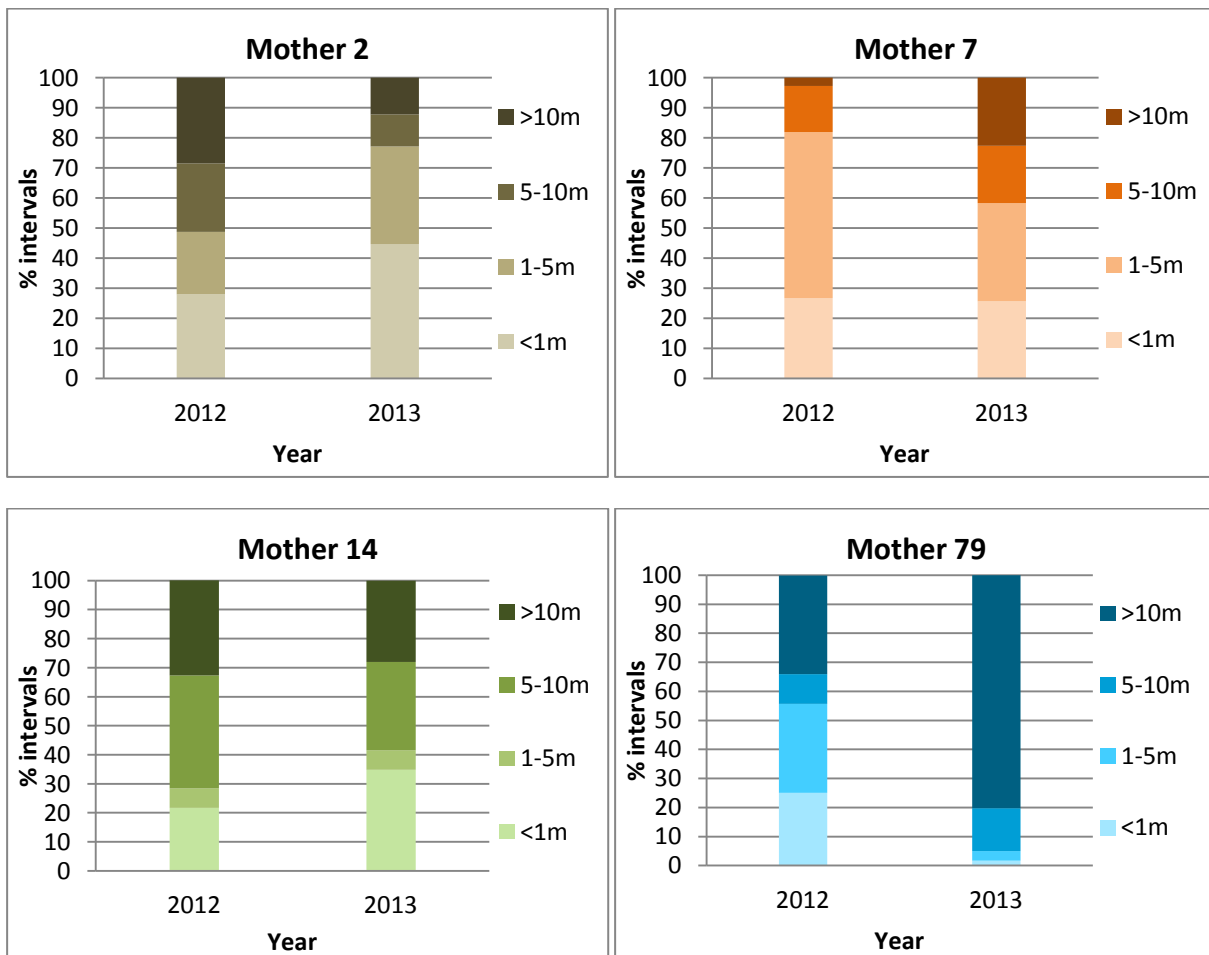
Figure 3.4.2: Percentage of occurrence at different distance bands for the key mothers, alongside the average for all mothers.



Although for a mother to be suckling, she would clearly have to be within 1 metre of her pup, this graph shows that in fact most of the mothers spent considerably more time than just when suckling at this close proximity, with the exception of 79, 104 and 41. There is, however, considerable variation between the mothers, again possibly reflecting different personalities and levels of vigilance.

Figure 3.4.3 below shows the distance bands for the 4 mothers observed in both years, with 2012 and 2013 results alongside each other. These results show that each of the mothers showed slightly different patterns in the 2 different years, although this was most striking for mother 79. Mother 79 was the only mother who had a pup in a different location in 2013 to where she had it in 2012. Although the locations (Grant’s harbour in 2012 and Cow harbour in 2013) are very close geographically, they do differ physically, with Grant’s harbour being a connected series of small gullies and Cow harbour a small open beach. This may explain the difference in proximity to her pup. However, the sample size for mother 79 was only small in 2013, so this result should be treated with caution. It is not known how mother or pup health differed between the years.

Figure 3.4.3: Comparison between years of distance bands for 4 mothers.



3.5 Photo Identification

In 2013, 32 females and 6 males were identified fully, i.e from good quality photos of both the left and right side of the head. Additionally, a further 8 females were identified, either from poorer quality photos or from photos of only one side. The total number of individuals in the catalogue is now:

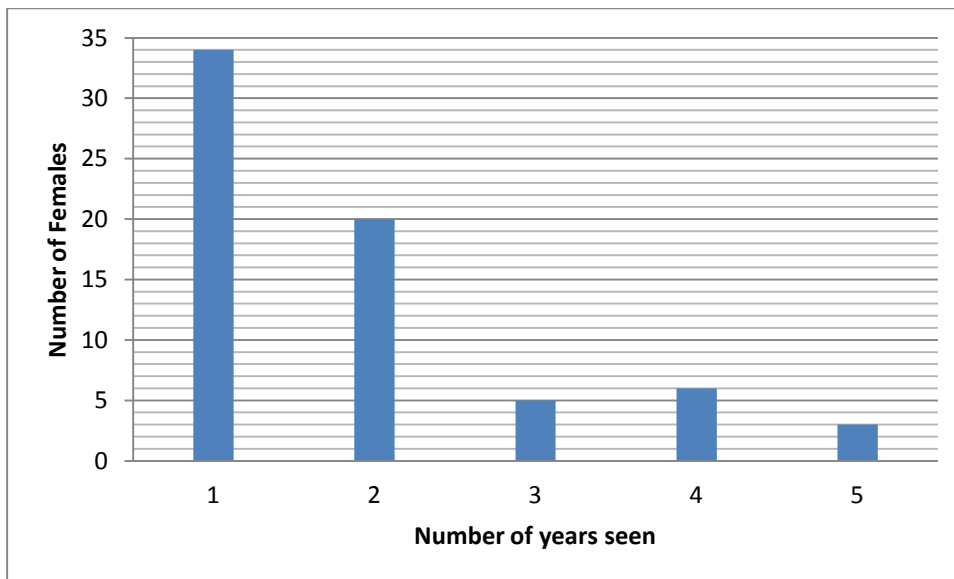
Females (full ID) = 68

Left/Right females = 36

Males = 18

Of the females identified, 26 had pups in 2013. 24 females identified had been seen in previous years – 2 of which have now had a pup in 5 different seasons. There is also 1 male who has been identified 5 years running and 3 males which have been seen in previous years. Figure 3.5.1 shows the number of repeat identifications of females across different years. This shows that there is clear site fidelity to the Calf, with many females seen in multiple years. However there are still a number of females which have only been seen once, indicating that there are still new individuals in the population being identified or represents a degree of emigration/immigration.

Figure 3.5.1: The number of years in which females have been seen



Returning females generally had pups in a close location to previous years – there is an apparent ‘north south divide’ between the sites in the north (Cow & Grant’s harbours), and the sites on the south west coast.

4.0 Potential Disturbance

The study was carried out according to the terms of the license, in order to minimise disturbance. Although it was noticed that females in particular showed a reaction to the presence of the observer, typically they reverted to their original behaviour once the observer had settled into position. There was also considerable individual variation in the level of response shown towards the observer – another indication of different

personalities within the colony. Over the length of the study, seals typically became habituated to the presence of the observer.

At Grant's harbour 2 pups travelled quite far inland in 2013. One pup was commonly observed on the path immediately coming up from the harbour, whereas another was briefly seen on the higher path back towards Cow harbour. It is not known how this pup got to or from this location! When this occurred, the observers maintained a greater distance from the pups, who did not appear disturbed by their presence.

There were three pups in South Harbour in 2013. In previous years there has only been one. The three pups were born spanning the length of the pupping season and all would have been subject to a small amount of boat traffic coming in and out of the harbour. One pup in particular was quite near the jetty, however it did not react strongly to the presence of people or the boat. The mother was also noticeably calm and would only get agitated if anyone came very close.

At least 2 young pups and a stage 5 pup were seen by the slipway and store at Cow harbour. Although the rough weather probably prevented it from occurring, these pups would potentially be at risk from boats coming into the harbour. If this pattern at both South and Cow harbours continues, it may be necessary to warn boat visitors of the potential presence of pups and encourage a safe distance to be maintained.

5.0 Conclusions

The grey seal pup study was again carried out very successfully during the 2013 season and the results showed similarities to previous year's results. The total number of pups, at 52, was the highest yet recorded. Most of the same locations were used for pupping.

Behavioural observations were also fairly consistent with previous years. The continuation of the focal mother behaviour study has revealed interesting new patterns as to the individual personalities that seals have. These different personalities not only highlight the complex and intelligent society that seals live in, but may also confer differing levels of ability to adapt to a rapidly changing environment¹. Continuing this study in future years will not only refine the differences/similarities between individuals, but should also show whether individuals show plasticity in their behaviour over time.

Photo identification is proving very useful for studying site fidelity to the Calf. Each year more females are being added to the catalogue, indicating that we still haven't encountered all the different seals that use the Calf for pupping. However, the increasing number of seals recognised as returning to the Calf indicates it continues to be a suitable pupping location for this population. It has not yet been possible to track any of the seals beyond the Calf, but potentially comparisons with other photo ID catalogues may also show up more wide scale movements. Long term photo ID studies will enable a more accurate estimate of the number of grey seals utilising the Calf, as well as a greater understanding of life history traits such as longevity and fecundity. As the Calf has the highest density of pups around the Isle of Man, long term study should also continue to ensure this protected species is monitored during this crucial life stage.

¹ Twiss SD, Cairns C, Culloch RM, Richards SA, Pomeroy PP (2012) Variation in Female Grey Seal (*Halichoerus grypus*) Reproductive Performance Correlates to Proactive-Reactive Behavioural Types. PLoS ONE 7(11): e49598. doi:10.1371/journal.pone.0049598