ATLANTIC GREY SEAL *HALICHOERUS GRYPUS* POPULATION AND PRODUCTIVITY STUDIES, LUNDY 2017

by

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INTRODUCTION

The Atlantic Grey seal population has been surveyed annually on Lundy since 2011 to a varying degree and intermittently beforehand. Previously, the surveys have been carried out by the warden throughout the year measuring population size, distribution and productivity. In 2016 the survey method was reviewed to enable the data collected at Lundy to contribute to wider seal population assessments, such as the Sea Mammal Research Unit (SMRU) national seal surveys.

METHODS

Pups are generally born all year round on Lundy, though following the review of previous data it is expected that the peak pupping period is between September and November. This is difficult to distinguish however due to the lack of data covering the winter months on the island. This is primarily due to weather limitations during this period, though on occasion, records of pups around Lundy are submitted from as early as June right up until February. For this project, standardised surveys were carried out with the aim of collecting data four times approximately 10 days apart over the peak summer/autumn pupping period. This timing was set in order to get reliable data for the Sea Mammal Research Unit (SMRU) population model.

Monitoring by boat was carried out whenever possible which allowed the entire coastline to be surveyed. At times when the weather and sea state conditions prohibited this, surveys were completed from the land using 17 predetermined observation points (Figure 4 in Jones, 2017). It was recommended that during the peak pupping period at least one land survey was to be carried out simultaneously with a boat survey to allow extrapolation of the accuracy of data collected from land-based surveys.

Monitoring sites

Lundy's coastline has been divided into 46 subsections (Figure 4 in Jones, 2017) which are easily viewed from a boat. There are no land-based observation points on the west coast as there are very few points where the shoreline is visible. Furthermore it is not practical to have land-based survey points the whole way around the island as they could not all be surveyed in one tide by one person (Macdonald, 2015).

Procedure

The methodology described in the Marine Monitoring Handbook for Lundy SAC was followed (MacDonald, 2015).

RESULTS

A summary of results is given here. The full results including detailed tables are given in Jones (2017).

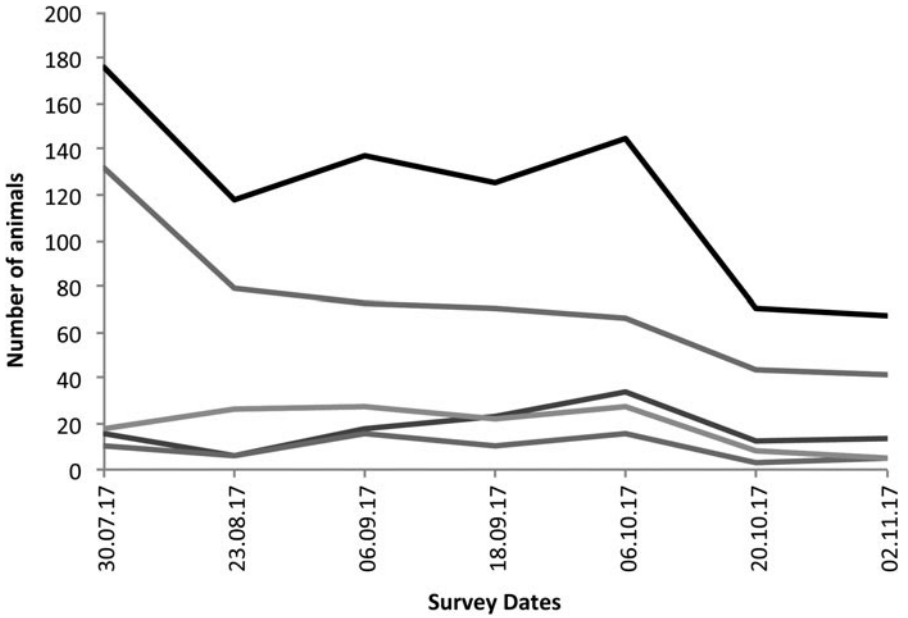

Figure 1. A graph showing the variations in seal abundance from seven surveys spanning from the end of July to the start of November. The lines (from top to bottom at the right side of the figure) are: Total; Females; Males; Unknown (age/sex); Juveniles.

Abundance

The highest abundance of Grey Seals around Lundy during the study period was on 6th October, when a total of 176 animals were noted along the east coast – observed from the charter boat *Obsession II*.

7

At the start of the survey period, the majority of animals around the island were females with some of those, from observational notes, showing obvious signs of pregnancy in some of the popular haul-out areas. From here the numbers of females dropped rather dramatically, possibly due to some of the pregnant females moving off into the island's inaccessible coastal caves to pup. The number of females reduced further though at a more gradual pace up until 20th October when another marked decrease in numbers was noted (Figure 1). Shortly before this drop in abundance, the number of males present around the island increased as the pupping season got well underway, possibly to patrol beaches and females in order to conceive next year's pups. The number of juvenile animals varied throughout, again dropping off somewhere between 6th and 20th October. Adverse weather conditions and the onset of the end of the peak pupping season could be the reason for this drop in abundance, though without detailed meteorological data and observations during this period, this is hard to tell.

Distribution

The distribution of seals around Lundy is heavily influenced by both weather and sea state. From observations at times when the winds came directly from either the north or south, animals seemed to disappear and move off from some of the more popular haul-outs, e.g. Rat and Mouse

Island, either to areas away from the island or to some of the caves or more sheltered bays on the island (e.g. Threequarter Wall Bay). The two most popular haul-outs during the study were Mouse and Rat Island during times of settled weather, and/or some of the north-eastern bays, namely Threequarter Wall Bay and Frenchman's Landing. The highest number of animals recorded from within the 46 sub-sections was from within Threequarter Wall Bay on 18th September where 49 individuals were counted (Figure 2).

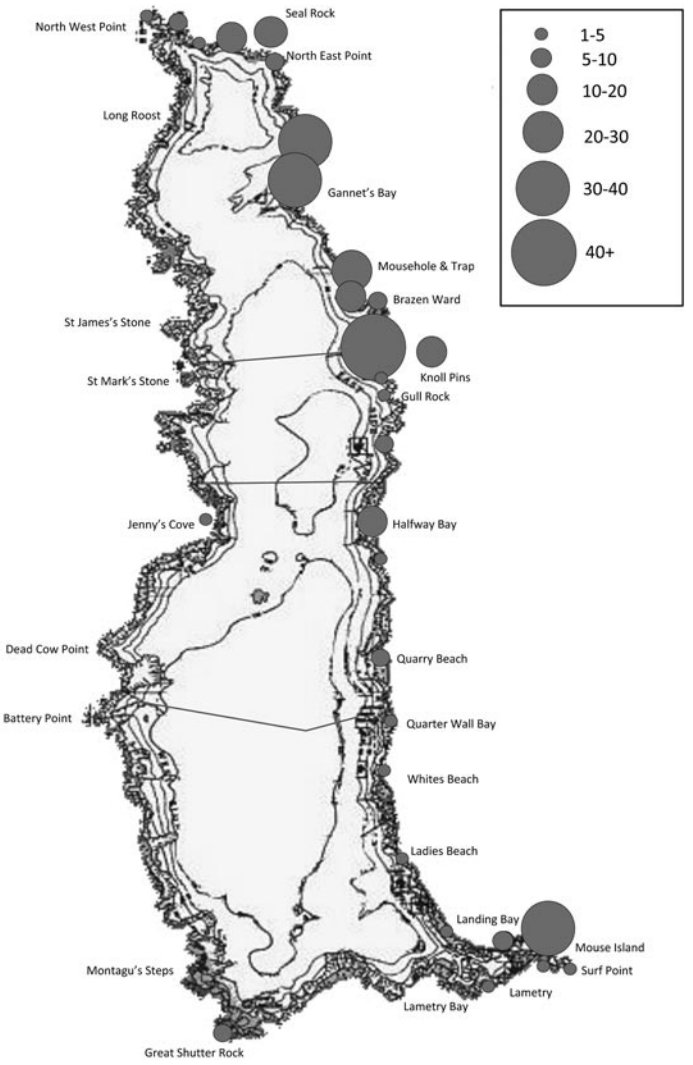

Figure 2. Grey Seal haul-out distribution. Figures show the highest numbers of animals found in each count section of coastline throughout the study period.

Hauled out or in the water?

On average, 82.26% of the seals throughout the study were recorded to be hauled out onto the shore rather than in the water. From notes taken during these surveys, the animals recorded in the water tended to be either bottling/resting, moving between sites, and/or males later in the season patrolling areas of the shore (Beach masters). It would be very beneficial to ensure further behavioural notes are taken with regard to individuals in the water to try and gain a better understanding of the use of some of these bays.

Entanglement

Only two records of entanglement were recorded during the survey periods, both of which involved the same individual (see colour plate 14). This seal was first seen in Gannets' Bay on 30th July and then on a later survey on Mouse Island on 26th August. Supplementary to this, additional sightings of this animal had been submitted to the warden outside of the survey times from a number of visitors, most of which were from these two areas on the island.

During a snorkel safari the warden was actually able to approach this animal rather closely to try and see the extent of the damage. The damage seemed to be coming from a fine recreational fishing line which has wrapped around the animal's neck multiple times. Some of the coils had broken and frayed but a number of them were still present and cutting into the seal's flesh. Although the damage from the line seemed rather foul, the animal never showed any signs of severe pain or stress from the entanglement.

Disturbance

Instances of disturbance were recorded on three out of the eight surveys. Although the seal code of conduct was adhered to during each survey, two of these disturbances occurred due to the presence of the survey vessel.

- 30th July: 15 animals were disturbed into the sea due to the presence of the survey boat (charter boat, *Obsession II*).
- 6th September: 10 animals were disturbed by a walker present on the low shore of Brazen Ward (land-based).
- 2nd November: 6 animals were disturbed into the sea by the survey boat (island RIB).

Productivity

A total of 26 pups were recorded from 28th August to 20th November, only seven of which were found during the surveys. White Beach proved the most popular for pups this season with a total of 5 pups being recorded here through the study period (Figure 3).

Numerous other larger weaner pups were noted during the latter part of the season (outside of the survey dates) but were not included here as the origin of these individuals was unknown, and it is known that young pups are very able to travel vast distances at very young ages.

Mortality

At least seven of the pups recorded perished, all at very young ages. All the pups which were born around the Lamentor and Mermaid's Hole area (South East Point) disappeared during a period of very strong winds and swell created from Storm Ophelia. Another pup found in Lametry Bay shortly after Ophelia was lost after a second bout of stormy weather during storm Brian. The reasons and birthing locations for the other three corpses are unknown. For a detailed breakdown see Jones, 2017.

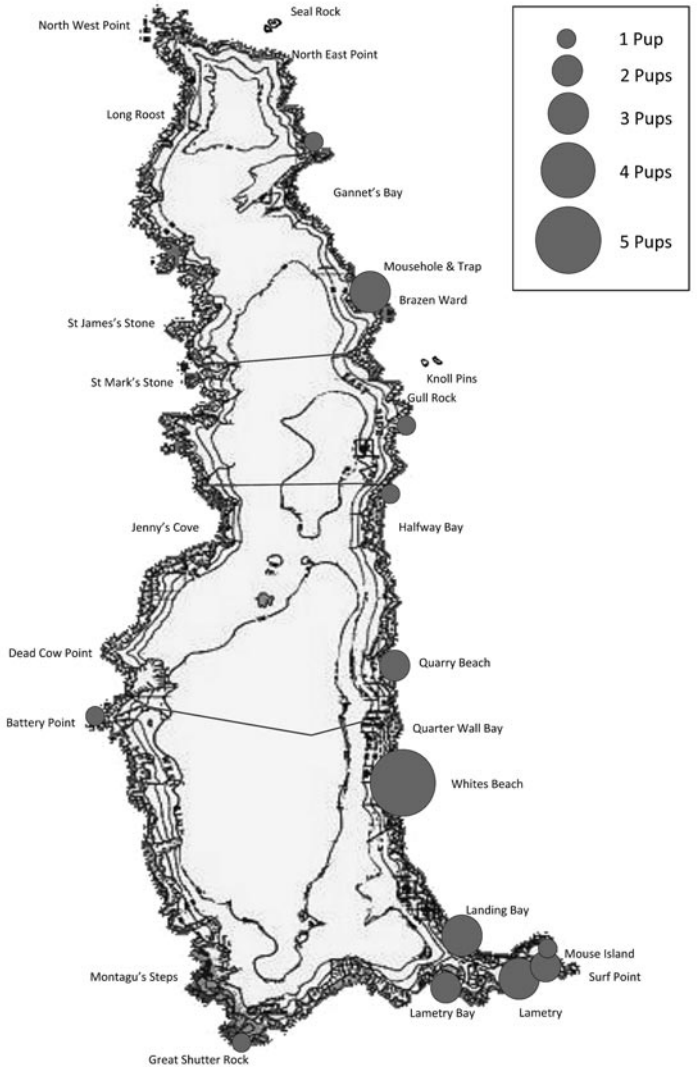

Figure 3. Grey Seal pup distribution. Figures show the total numbers of pups found around Lundy's coastline throughout the study period.

DISCUSSION

Due to adverse weather conditions during suitable tides, most of the surveys had to be carried out from the land. The comparative boat and land-based surveys unfortunately were not carried out due to a lack of available surveyors during appropriate survey conditions. With regard to the

boat-based surveys, from experience of surveying from three different vessels I have concluded that the island's RIB is really the only boat that can be used to allow for an accurate estimate of population size from the water. Unfortunately all of the planned charter trips during the season rarely tied in with the appropriate tide times, and views from MS Oldenburg were often difficult due to the size of the vessel, meaning it had to travel much further away from the coast, making it difficult to spot and appropriately sex individuals. This large vessel also creates a lot of noise which seemingly causes a lot of seals of hide away as the vessel approaches.

Additionally, due to the lack of staff this year, obtaining precise estimates and records of seal pups and numbers proved difficult at times. We are hoping to include an additional 'Seal Volunteer' next season to help out with surveys, record productivity and pup survival more accurately, and to record and reduce disturbance to breeding animals during this sensitive period. During the pupping season this volunteer will also help out with our photo identification catalogue, collecting photographs of our breeding seals for identification and inclusion in the Lundy Seal Identification Catalogue.

A review of the current methodology

As mentioned previously, the methodology for this survey had been developed in order to allow the data collected to be used alongside current Sea Mammal Research Unit (SMRU) national seal surveys and assessments. This is the first season this protocol has been used on Lundy, and after review I would like to now put forward a few queries and issues to improve on for next year's studies.

Land-based surveys

The areas highlighted in the Marine Monitoring handbook (MacDonald, 2015) do not allow for the full available coverage around Lundy's coast, e.g. Gull Rock, White Beach. Some of the survey points selected also are inadequate to accurately cover some sections of the coast, e.g. at Mouse Hole & Trap. A more accurate set of survey vantage points are detailed in Jones (2017).

Advantages of land-based surveys are:

- Better vantage point into some of the bays; e.g. can see pups behind large boulders which easily hide the pups from view if viewing from the water.
- Allows surveying during times of stronger westerly winds and of poorer sea state which prevents boat from being deployed.
- Fewer disturbances to hauled-out seals.

Disadvantages of land-based surveys are:

- More effort required to cover most of the East Sidelands within the tidal period.
- Cannot survey the island's entire coastline.
- Missed out important bays, e.g. Lametry Bay. Better way to tie in land-based qualitative counts at times of poor weather.
- Seals on Surf Point and Mouse Island cannot be identified to sex due to the vast distance between the site and the observer on the Quarry Terrace.

Additional survey amendments are:

- It would be best using a mixture of both land- and boat-based methods throughout the peak pupping season, and to try and survey more often whenever possible.

- Allow for the east coast to be assessed by boat if surveying the entire coastline is not possible.
- Tie in with fortnightly qualitative searching in areas by foot or by kayak, making sure not to disturb any of the breeding animals.
- Ensure that additional detailed comments, behavioural notes and changes in weather are noted within each survey sub-site.
- Ensure that the direction of land-based surveys is alternated to allow coverage of the sub-sections to be covered at times of alternate tidal height and time of day.
- To ensure adequate coverage during a land-based survey, commence the survey before the time of low water rather than starting at this time.
- Additional surveyors to cover more ground within periods of smaller tidal range; this would also allow for extra time to photograph breeding individuals.
- Try to incorporate a winter/spring monitoring schedule to estimate annual productivity.
- Tie in with meteorological data from throughout the entire period. A new weather station (currently being sourced for the island) might allow better understanding of variations in seal abundance and distribution.

Acknowledgement

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References

Jones, D.W. (2017) Atlantic Grey Seal (*Halichoerus grypus*) population and productivity studies, Lundy 2017. Published by the Landmark Trust and Natural England.

Macdonald, R. (2015). Marine Monitoring Handbook for Lundy's Special Area of Conservation (Warden Edition).

OTHER RESEARCH

Seabed surveys

Defra (via Cefas) funded a drop camera and benthic grab survey in 2017 within the Lundy Marine Protected Area (MPA) which was undertaken by the Environment Agency in conjunction with Natural England and Devon and Severn IFCA.

- Infauna and Particle Size Analysis (PSA) samples were collected at 98 stations across the MPA using a mini-Hamon grab.
- Four stations yielded only PSA samples.
- Five stations had additional sediment contaminant samples taken (Poly Chlorinated Biphenols, Poly Aromatic Hydrocarbons, heavy metals) using a Day grab.

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