

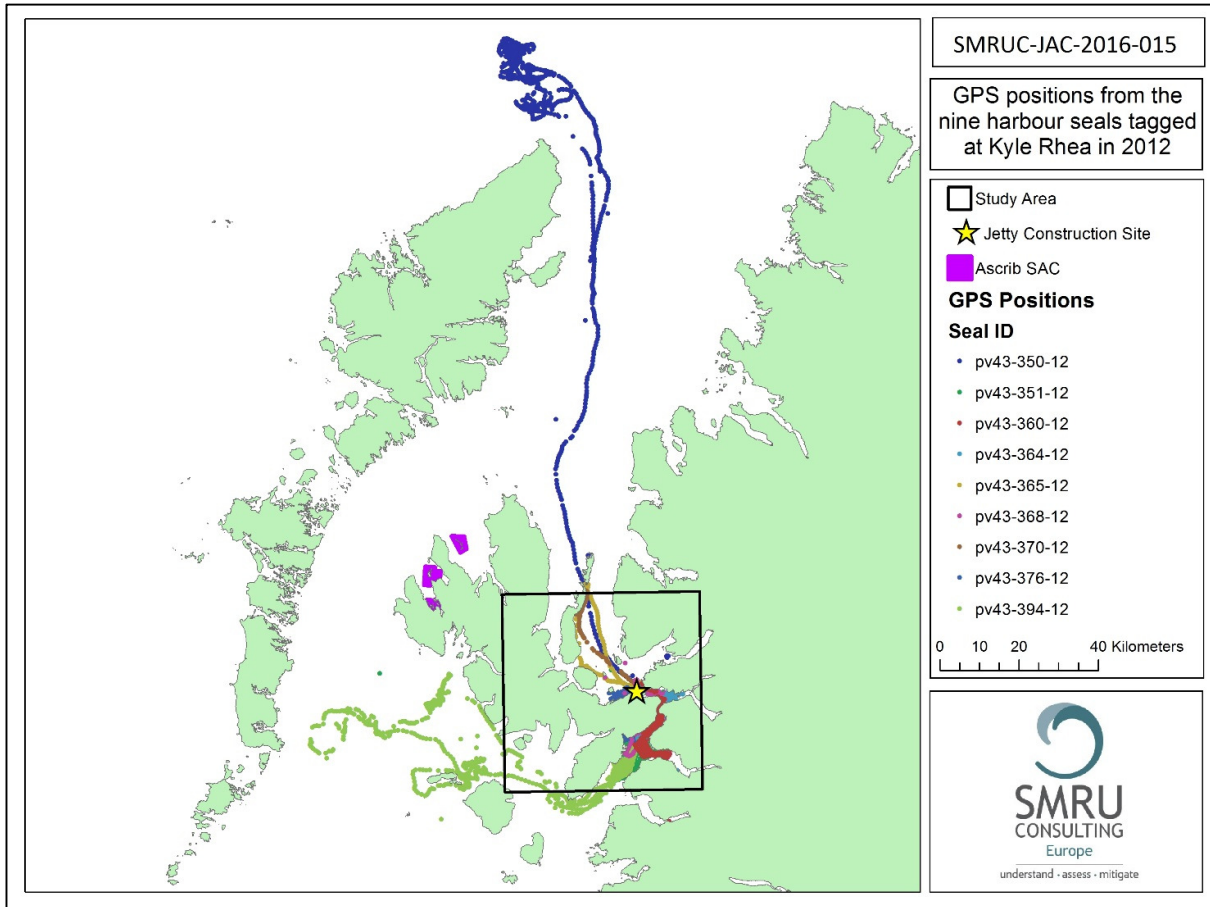
**Figure 15 Telemetry tracks from the 13 harbour seals tagged at Loch Bay and Loch Dunvegan within the Ascrib, Islay and Dunvegan SAC in 2004 and 2005.**

### 5.2.1 Kyle Rhea data

The telemetry data from the Kyle Rhea study shows a very high density of tracks moving through and/or foraging within the channel between Skye and mainland Scotland (Figure 16). In total, 93.4% of all the GPS positions obtained from these nine seals were inside the Study Area. Only two seals left the Study Area for a significant portion of their time. Seal pv43-394-12 recorded 75% of its GPS positions inside the Study Area; for the remaining 25% of the time it travelled south out of the narrows at Kyle Rhea and west to off the south east coast of South Uist (Figure 16). Seal pv43-350-12 recorded 50% of its GPS positions inside the Study Area; for the remaining 50% of the time it travelled north out of the Study Area directly to the Butt of Lewis (Figure 16).

Of these nine tagged seals, six left the narrows at Kyle Rhea at travelled north and west round the coast of Skye past the Project Site (Figure 16). One seal (pv43-376-12) moved along the coast of Skye, directly past the jetty construction site, with GPS location positions only 90 m from the construction site (Figure 17). These data show that there is clear connectivity between the Project

construction site and the harbour seal haul out in Kyle Rhea. None of the nine harbour seals tagged at Kyle Rhea had tracks that entered into an SAC.



**Figure 16 GPS telemetry positions of the nine harbour seals tagged in Kyle Rhea in 2012.**

There are two groups of haul out sites near to the Project construction site that were visited by Kyle Rhea seals (Figure 17). At the closest group of haul out sites (~1 km to the north of the construction site, blue circle in **Error! Reference source not found.**) the annual count has varied between 36 harbour seals in 1996 to 51 in 2014. At the next closest group of haul out sites used by the Kyle Rhea seals (~5 km to the west of the construction site, orange circle in Figure 17) the annual count has varied between 36 harbour seals in 2005 and 141 in 2000.

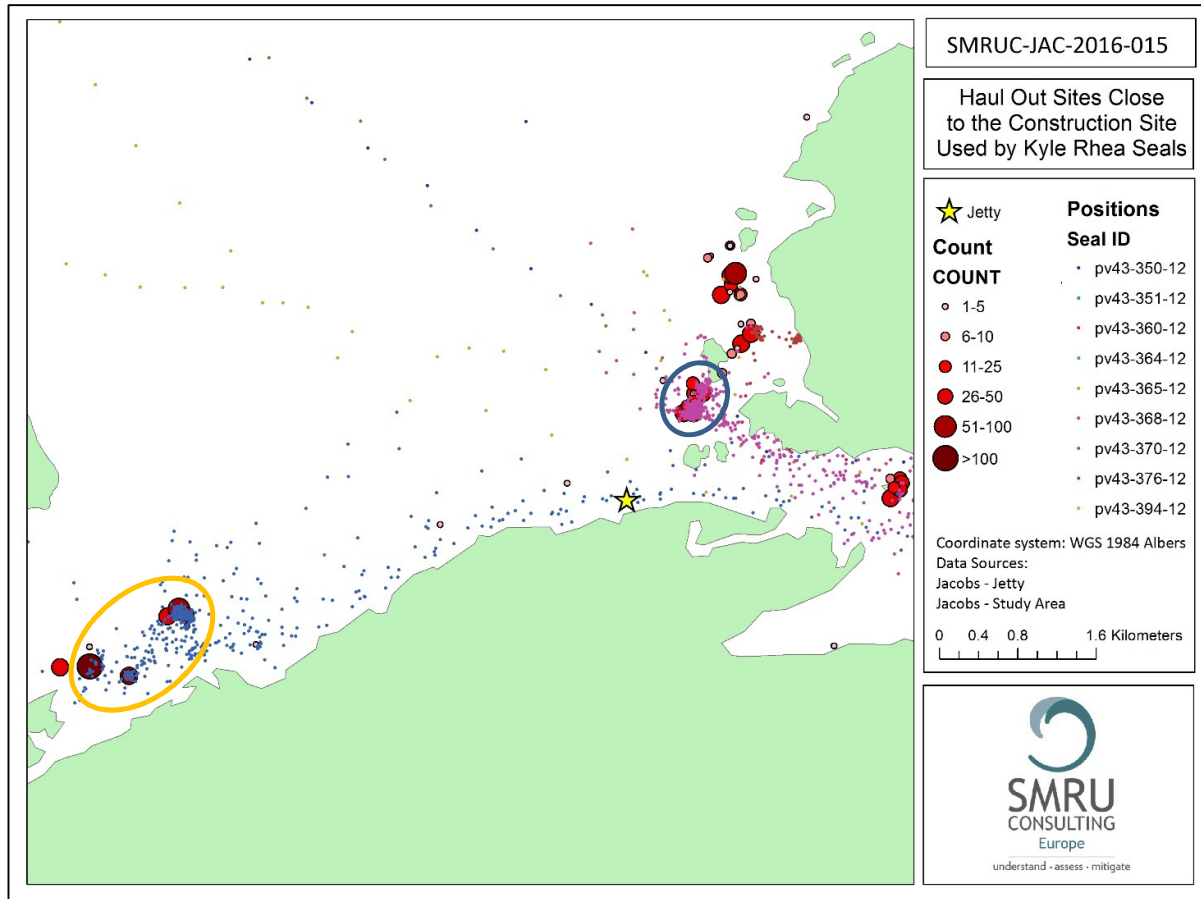


Figure 17 GPS positions from the nine harbour seals tagged in Kyle Rhea 2012 in relation to the Project construction site and close by haul out sites.

## 6 Grey Seal Counts

### 6.1 August Grey Seal Counts in the UK

A total of 30,625 grey seals were counted in the UK and Northern Ireland during the August harbour seal moult surveys between 2007 and 2014, with 20,449 of these counted in Scotland (SCOS, 2015). This is only 2% lower than the Scottish count obtained during the August harbour seal moult surveys between 2000 and 2006 (SCOS, 2015).

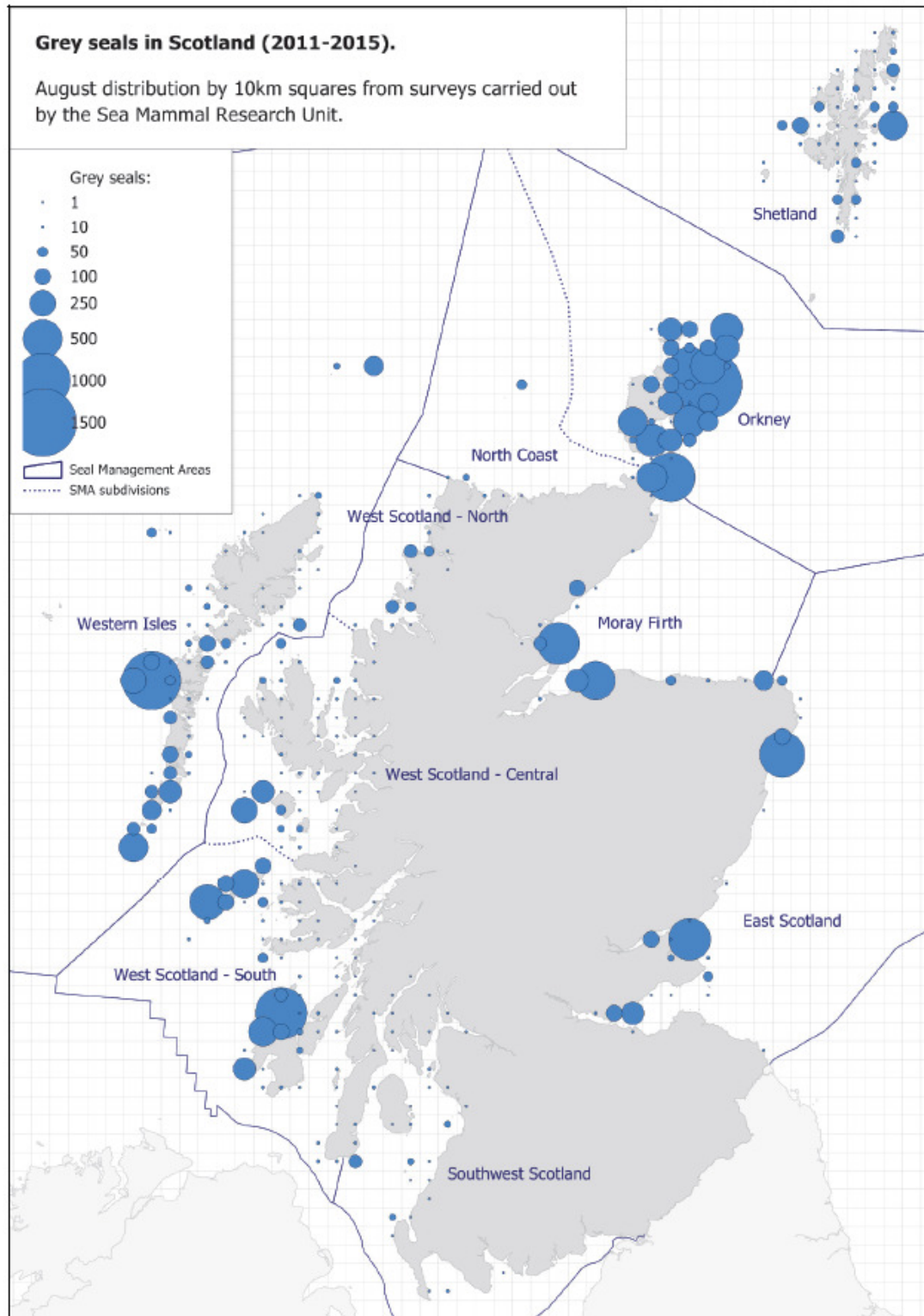


Figure 18 Number and distribution of grey seals at haul-out sites during August count surveys in Scotland by 10km squares (Duck & Morris, 2016).

## 6.2 August Grey Seal Counts in the West Scotland and Western Isles Management Units

On the west of Scotland, the areas with the highest grey seal counts are the Western Isles MU and the South subdivision of the West Scotland MU (Figure 18; Table 7). The West Coast MU North sub-division was last counted in 2013 and 2014, the Central sub-division was last counted in 2014 and the South sub-division was last counted in 2015 (Table 7).

The most recent UK wide total grey seal population size estimate was estimated based on pupping counts for the survey period between 2013 and 2015. The total grey seal August count for the West Scotland MU from the same survey period between 2013 and 2015 was 5,064 grey seals, which represents only 4.5% of the total UK grey seal population estimate based on pupping counts. Where survey effort across a region spans several years, counts are summed across years because different sites were counted in each survey year. These counts are then summed to produce the total count across the survey period for this subdivision. There is a risk that grey seals are double counted if they haul out at different sites between years; which is highly likely given that, unlike harbour seals who show site fidelity to moult sites, grey seals often move between haul out sites at a local and regional scale (eg: McConnell et al., 1999; Russell & McConnell, 2014) and are neither moulting nor breeding at the time of the survey.

**Table 7 Grey seal counts from August harbour seal moult surveys for the West Scotland and Western Isles Management Units. No value= not surveyed in that particular year.**

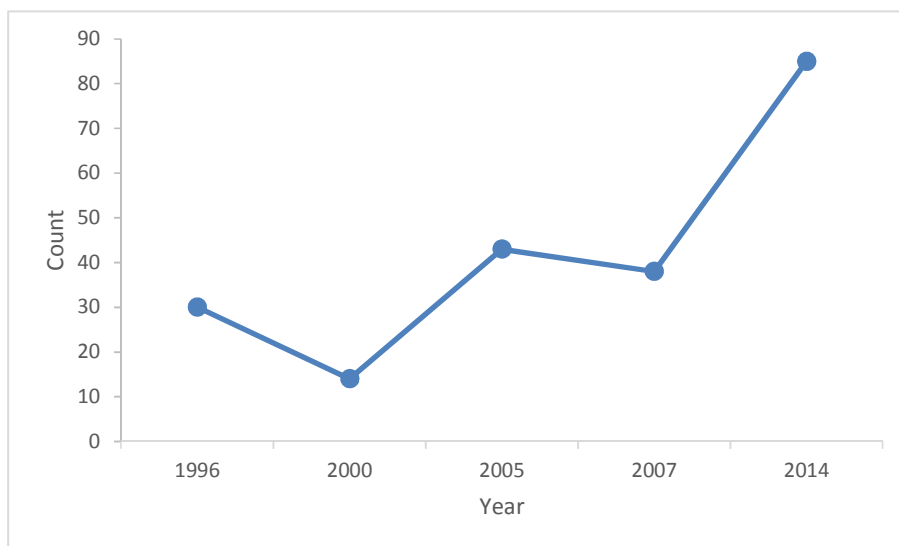
Survey Period	Year	West Scotland Central		West Scotland North		West Scotland South		Western Isles	
		# Sites	# Seals	# Sites	# Seals	# Sites	# Seals	# Sites	# Seals
1996-1997	1996	56	931	2	15	98	2125	213	4062
	1997			36	364				
2000-2006	2000	59	358			157	1771	205	5179
	2002							51	679
	2003							199	3064
	2005	76	361	32	251	7	10	3	401
	2006							164	3270
2007-2009	2007	50	221			175	1661		
	2008	36	340	33	177			251	3407
	2009					99	1232		
2011	2011							289	2322
2013-2015	2013			54	348				
	2014	185	1056	6	42	198	1538	13	295

	2015				194	2080		
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### 6.3 Grey Seal Counts in the Study Area

The number of grey seals counted at any one haul out site in any one year during the August harbour seal moult count surveys within the Study Area ranged from one seal (single seals were counted at multiple sites across all survey years) to 147 seals (at one haul out site counted in 1996). Total grey seal counts within the Study Area have varied greatly between surveys with lowest count in 2000 of 14 grey seals and highest in 2014 with a count of 85 grey seals (Figure 19). The closest haul out site counted was 4.8 km from the Jetty, where one grey seal was counted in 2007. Unlike harbour seals, there are no haul out sites where grey seals have been counted over multiple years close to the Jetty (within 5 km). The closest haul out site where >10 grey seals were counted in one year was 34 km from the Jetty, where 16 grey seals were counted in 2014.

As stated previously, while these grey seal counts provide information on the abundance and distribution of hauled out grey seals in August, they cannot be used as a population estimate nor are they necessarily representative of grey seal usage in the area out with the timing of these surveys.



**Figure 19 Total number of grey seals counted within the Study Area during August harbour seal moult surveys between 1996 and 2014.**



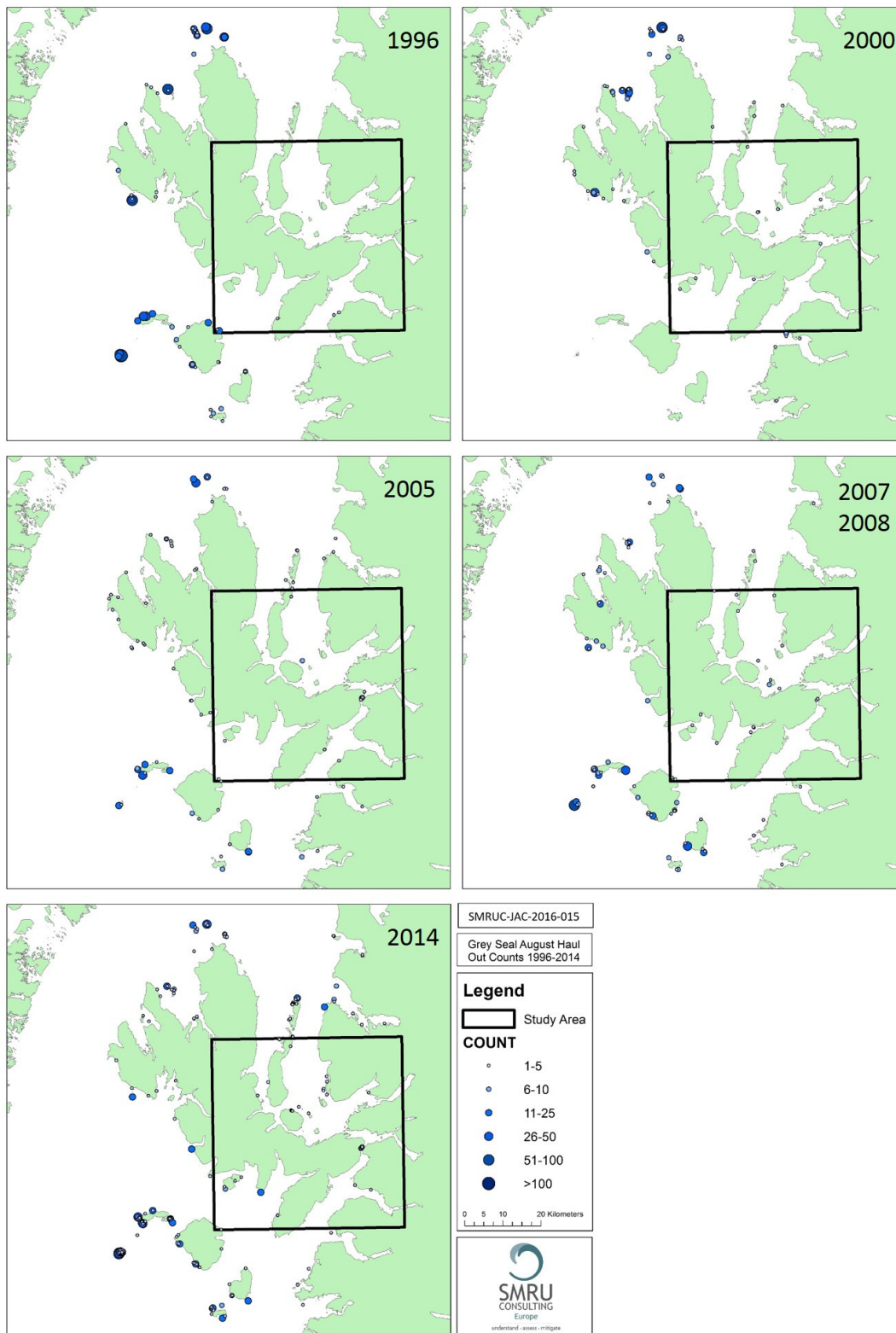


Figure 20 Grey seal August haul out counts between 1996 and 2014.

## 6.4 Other Data

Land-based visual vantage-point surveys were conducted at Kyle Rhea between July 2011 and July 2012 by Natural Research Projects (NRP) Ltd to support the Kyle Rhea Tidal Array EIA. The data collected during these surveys showed that in a similar pattern to harbour seals, grey seal sightings were relatively low or even absent between September and April with all winter months having sighting rates between zero and four grey seals per hour of effort (Figure 21). By contrast, the sightings rates were higher between May and August with highest sightings rate in July with 28.6 seals per hour of effort (Figure 21). These data show that the Kyle Rhea area is not an important breeding area or moult haul out site since numbers were low during these periods (grey seals breed between September and October and moult between January and March).

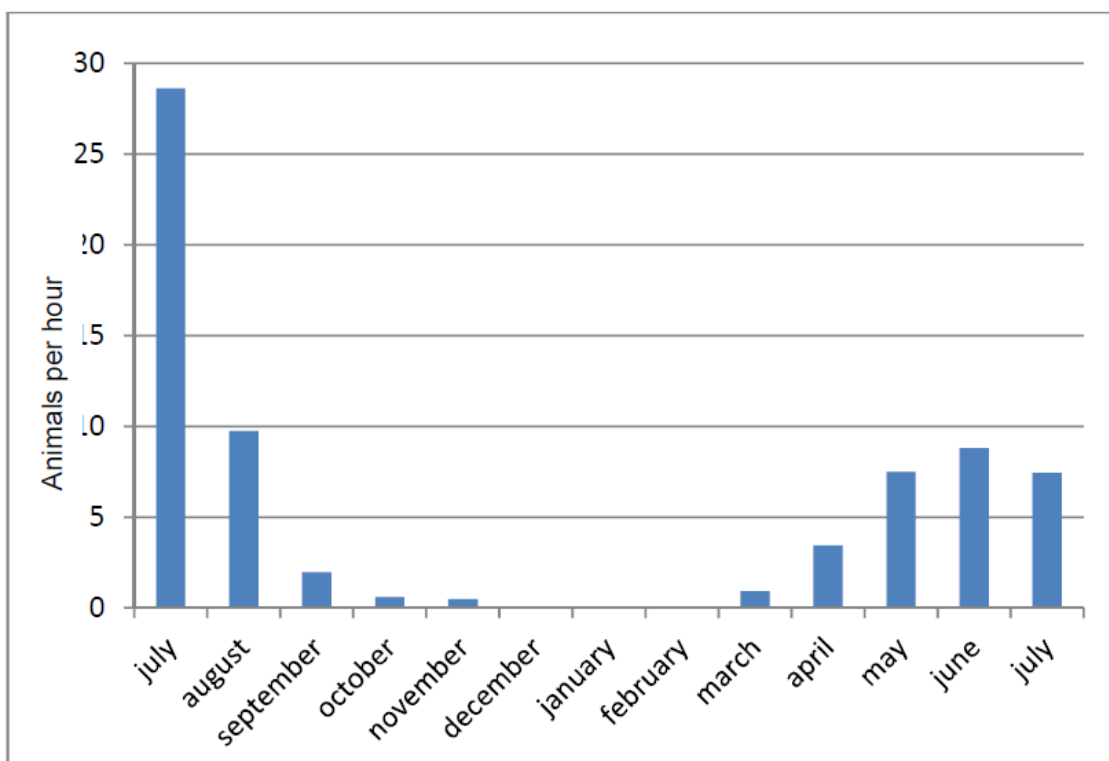


Figure 21 Monthly grey seal sightings per hour of effort during the 2011 to 2012 vantage point surveys (Royal Haskoning, 2012).

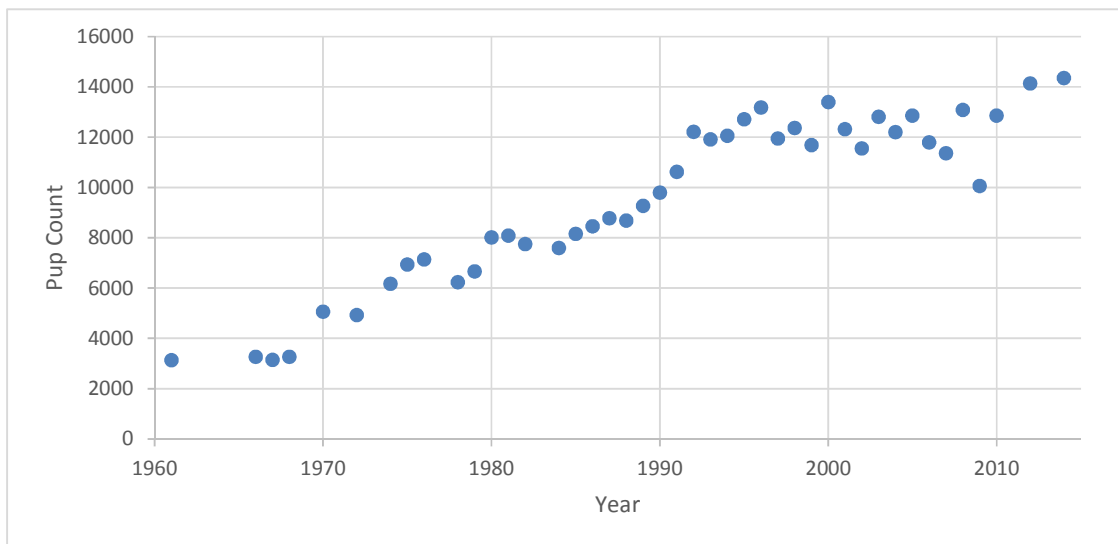
## 7 Grey Seal Pup Production

Approximately 38% of the world’s grey seals breed in the UK and 88% of these breed at colonies in Scotland with the main concentrations in the Outer Hebrides and in Orkney (SCOS, 2015). The latest total UK pup production estimate available is for 2012 when a total of 56,988 pups were estimated



to have been born in the UK and Northern Ireland; this was an increase of 6.5% from the estimate in 2010 (SCOS, 2015). These pup counts are converted into estimates of population size using a mathematical model. The most recent population estimate for UK grey seals is 111,600 grey seals aged 1+ (95% CI 91,400-139,200; SCOS, 2015).

There are no grey seal breeding colonies that are regularly counted by SMRU within the Study Area. The closest group of grey seal breeding colonies to the Study Area is the Outer Hebrides pupping region (Figure 23), where 14,348 pups were estimated to have been born in 2014, which is an 11.6% increase from the 2010 estimate and a 1.5% increase from the 2012 estimate (Figure 22). The pup counts in the Outer Hebrides pupping region are concentrated at the Monach Islands breeding colony (Figure 23) which has been identified as the largest grey seal breeding colony in the UK, contributing over 20% of the total UK grey seal pup production<sup>5</sup>. Given the high pup counts, the Monach Islands has been designated as an SAC with grey seals as the primary reason for site selection.



**Figure 22 Annual total grey seal pup counts for the Outer Hebrides group of breeding colonies between 1961 and 2014.**

<sup>5</sup> <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUcode=UK0012694>

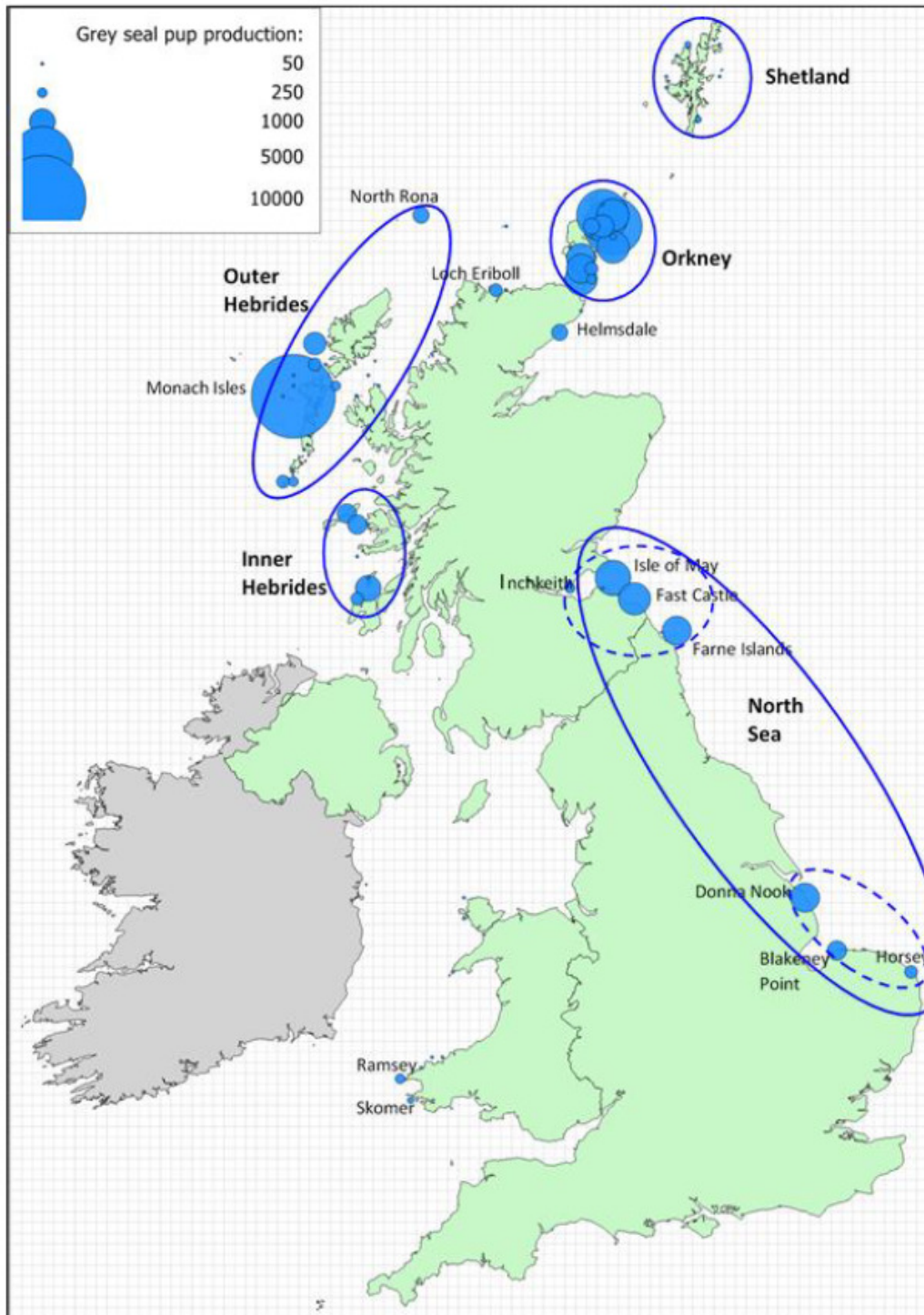


Figure 23 Distribution and size of grey seal breeding colonies (SCOS, 2015). Blue ovals indicate groups of colonies within each pupping region.

## 8 Grey Seal Telemetry

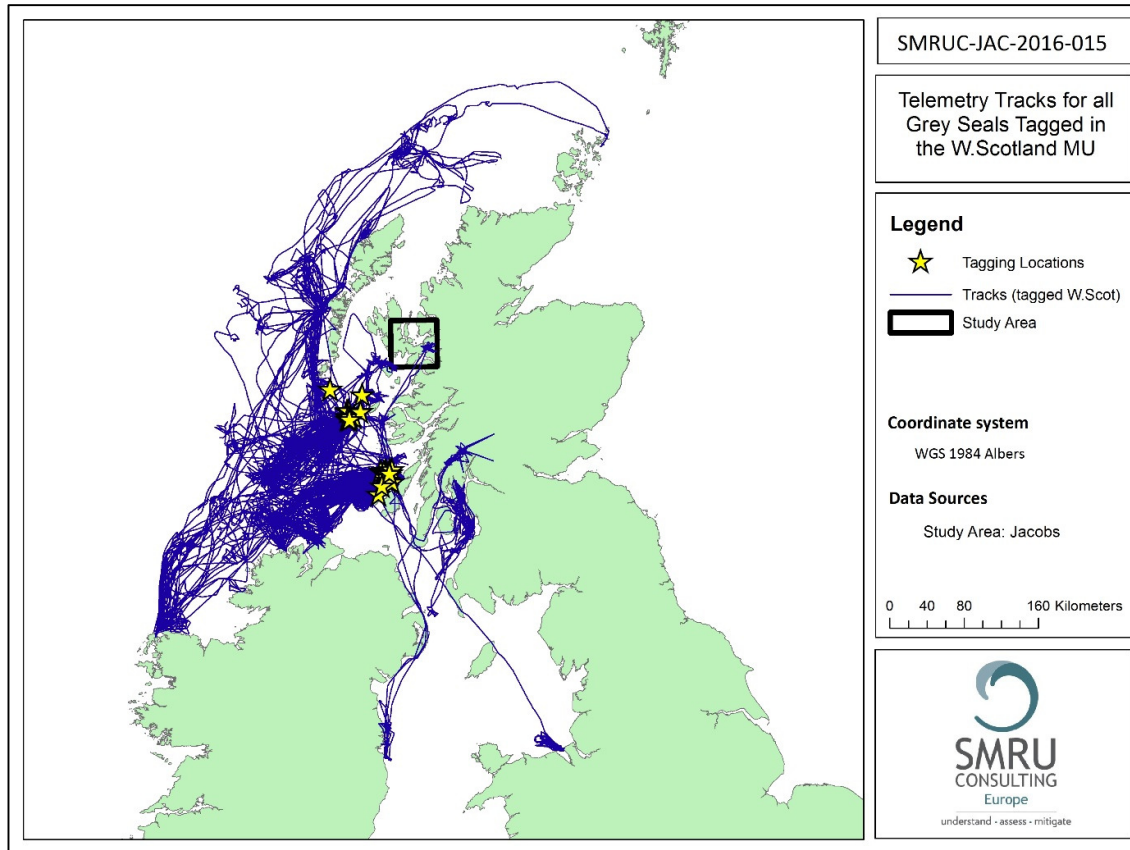
### 8.1 Grey Seal Telemetry in the West Scotland MU

A total of 34 grey seals have been tagged by SMRU between 2003 and 2004 in the West Scotland MU at the following locations: Colonsay, Tiree, Islay, Coll and Oronsay. Of these, 15 were females aged 1+ and 19 were males aged 1+ (Table 8). All 34 of these grey seals were tagged with ARGOS tags.

**Table 8 Number of female and male grey seals tagged in the West Scotland MU between 2003 and 2004. All grey seals listed here were tagged with ARGOS tags.**

Tagging Location	Distance from Project Site	2003		2004	
		F	M	F	M
Islay, Colonsay & Oronsay	~155-180 km	8	14		
Tiree & Coll	~100-125 km			7	5

The grey seals tagged in the West Scotland MU show wide ranging movements with distances travelled from the tagging locations of over 350 km for some seals (Figure 24). One adult male grey seal travelled from the tagging location at Islay to the River Dee in Wales, one adult male grey seal tagged at Oronsay travelled north to Sanday in the northern Orkney Islands and south to County Mayo in western Ireland and another adult male tagged at Oronsay travelled south to the Dublin area in eastern Ireland during the duration of the tag deployment.



**Figure 24 Tagging locations and tracks for all grey seals tagged in the West Scotland Management unit.**

## 8.2 Grey Seal Telemetry in the Study Area

SMRU tagged nine grey seal pups on the Monach Islands in the Western Isles MU in 1995. None of these pups entered into the Study Area, however, since this is a very small sample size and data from 11 years ago, it may not be representative of grey seal pup movement in more recent years. Therefore it is not possible to totally rule out the possibility of grey seal pups entering into the Study Area from the Monach Islands breeding colony.

Of the 43 grey seals tagged in the West Scotland MU, only two entered the Study Area (Table 9). One was tagged at Colonsay and the other at Tiree. The number of grey seal locations within the Study Area was 31.2% and 4.6% of their total recorded GPS locations respectively. The former spent most of its time within the Study Area at Kyle Rhea between the Isle of Skye and mainland Scotland while the latter spent most of its time within the Study Area at the north east side of the Isle of Rum (Figure 26). The closest telemetry GPS position recorded to the jetty where construction work will

take place was 5.4 km away. One of these seals also passed through the Treshnish Isles SAC, although didn't appear to spend any significant time there (Figure 25).

Note: Both grey seals that entered into the Study Area were tagged with Argos tags. The low temporal resolution and spatial accuracy of the locational data from these tags means that distance errors can be large and often precludes the identification of very fine scale movement. It is apparent in Figure 26 that there is some unfiltered error in locations.

**Table 9 Details of the two grey seals that entered into the Study Area and connectivity with SACs.**

	Tagging Location	Sex	Age	# GPS Points	# Points in Study Area	% Points in Study Area	SAC Visited	# Points in SAC	% Points in SAC
hg1-kintara-03	Colonsay	1+	F	1785	557	31.2%	Treshnish Isles	2	0.1%
hg6-133M8-04	Tiree	1+	M	632	29	4.6%			

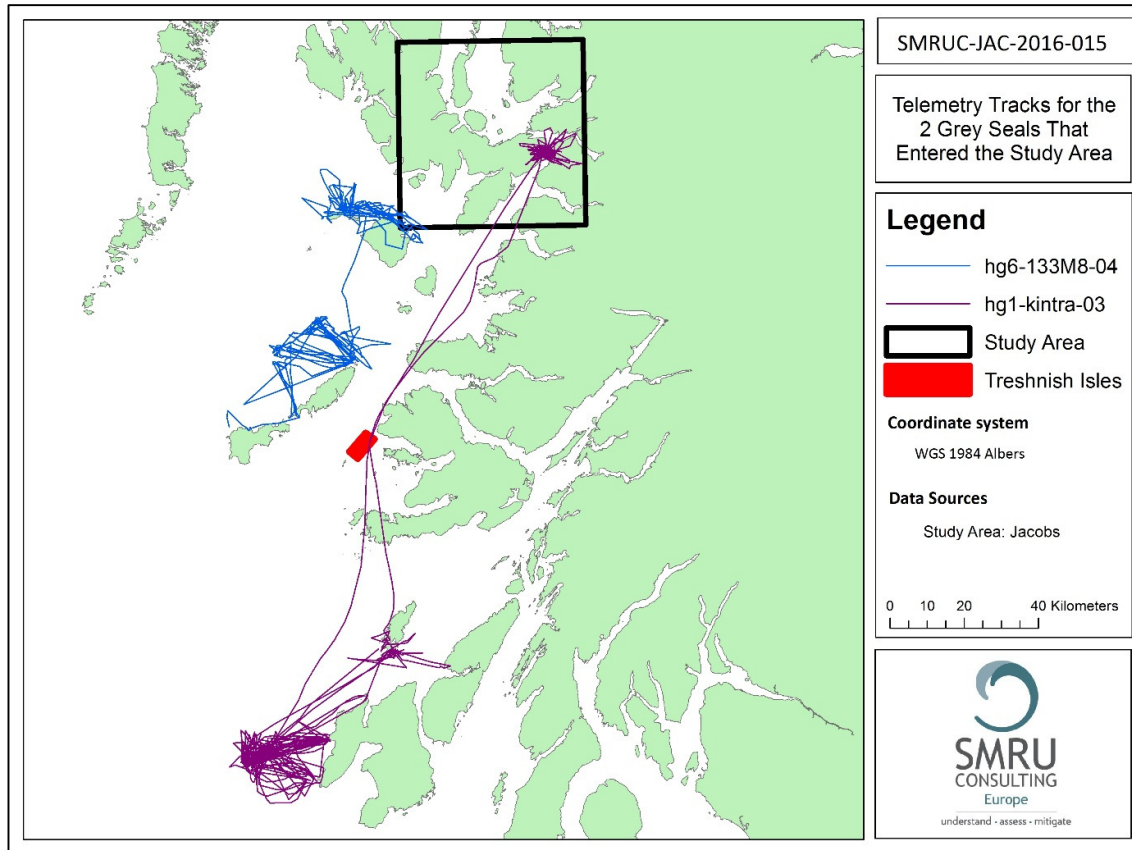


Figure 25 Telemetry tracks for the 2 grey seals that entered the Study Area and connectivity with SACs.



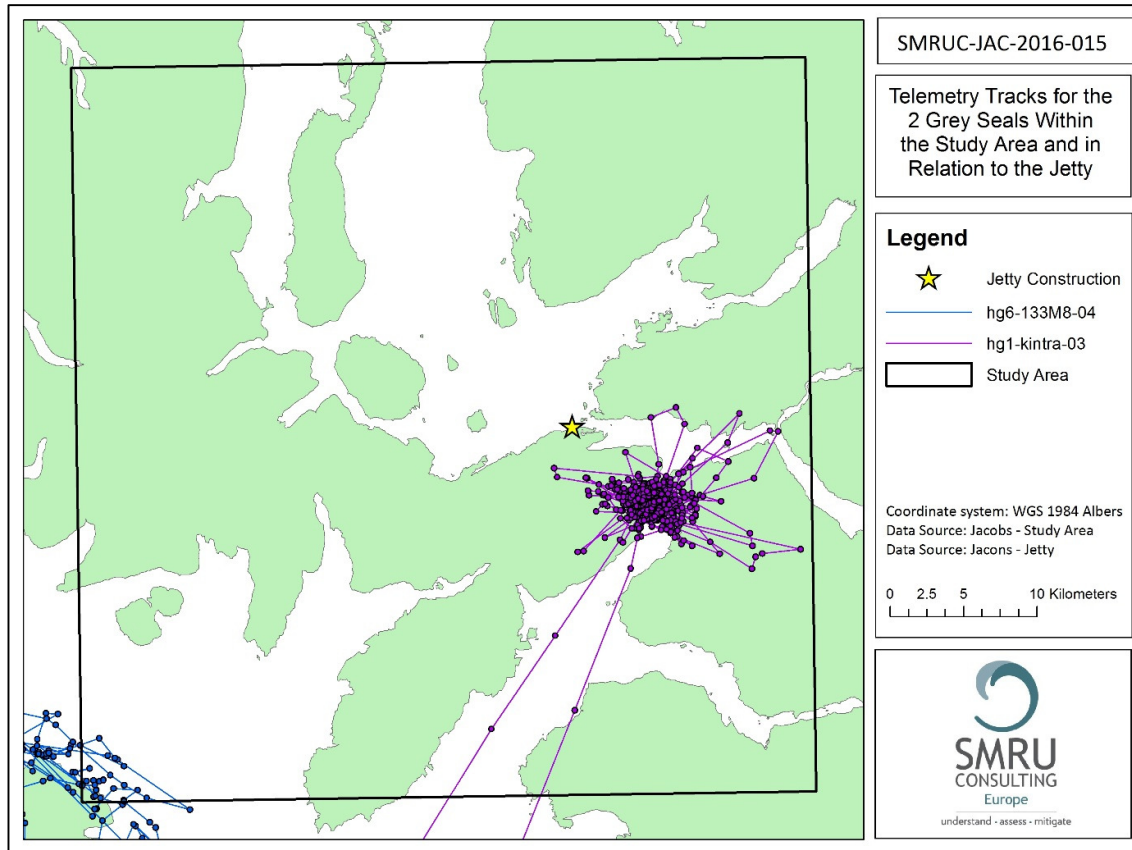


Figure 26 Telemetry tracks and location points for the 2 grey seals with points within the Study Area and in relation to the jetty construction site.

## 9 Conclusions

### 9.1 Count Data

The Western Isles and the West Coast are clearly important Management Units for harbour seals in Scotland, with August counts in the Western Isles and the West Coast comprising 62% of the total Scottish counts. Total counts within the Study Area have increased from 1,217 in 1996 to 2,589 in 2014 which shows that harbour seal numbers in the Study Area are relatively high, at least during the August moult period. During the August moult, haul out sites within 20 km of the Project site accounted for 62% of all harbour seals hauled out in the Study Area in 2014 and 25% of the total central subdivision of the West Scotland management unit.

Data from vantage point surveys have shown that harbour seals are mainly present in the Kyle Rhea area in the summer months, with sightings rates of >45 harbour seals per hour of effort. The lack of

pup sightings during the breeding months suggests that Kyle Rhea is not a breeding site for harbour seals. There is no equivalent survey data at other times of year elsewhere in the Study Area.

Unlike harbour seals, the West Scotland MU does not represent a major haul out area for grey seals, at least in August. The closest haul out site counted was 4.8 km from the Jetty, where one grey seal was counted in 2007. There are no haul out sites close to the construction site where grey seals have been counted over multiple years. The closest haul out site where >10 grey seals were counted in one year was 34 km from the Jetty, where 16 grey seals were counted in 2014. Data from vantage point surveys have shown that grey seals are mainly present in the Kyle Rhea area in the summer months, with sightings rates up to ~30 seals per hour of effort, while grey seals were either absent or present in low numbers during the winter surveys which suggests this area is not used for either breeding or moulting.

## 9.2 Telemetry Data

The telemetry data show some overlap of both harbour and grey seal movements with the Study Area. Three of the five seals that entered the Study Area had also spent time at an SAC, with one harbour seal also visiting the Ascrib, Isay and Dunvegan SAC, one harbour seal visiting the Eileanan agus Sgeiran Lios mor SAC and one grey seal passing through the Treshnish Isles SAC.

Excluding the Kyle Rhea harbour seal telemetry data, a very low proportion of the harbour seals tagged in the West Scotland and the Western Isles MU entered into the Study Area (3 out of 89 tagged, 3.4%). While there is some limited evidence for connectivity between the Study site and harbour seal SACs, the amount of time that the seals spent in either an SAC or in the Study Area was very small (eg: pv19a-Nancy-06 only spent 0.1% of its time in the Ascrib, Isay and Dunvegan SAC). This is further demonstrated by the fact that none of the 13 harbour seals tagged at the nearest SAC (Ascrib, Isay and Dunvegan) entered into the Study Area. Therefore, while some degree of connectivity cannot be ruled out, there is no evidence in this dataset to suggest any significant connectivity between the Study Area and the nearest harbour seal SAC.

Telemetry data from the nine harbour seals tagged in Kyle Rhea in 2012 show that there is connectivity between the haul out site in Kyle Rhea and the Project construction site, with six of the nine tagged seals exiting the narrows at Kyle Rhea and moving west round the cost of Skye past the Project Site. None of these seals showed any connectivity with an SAC.

There was very little overlap of tagged grey seal tracks with the Study Area. The grey seal telemetry data show that a low proportion of the grey seals tagged in the West Scotland MU entered into the Study Area (2 out of 34 tagged, 5.9%). There is also very limited evidence of connectivity between the Study Area and grey seal SACs (eg: hg1-kintara-03 only spent 0.1% of its time in the Treshnish Isles SAC). However, it should be noted that grey seal tagging in the West Scotland and the Western Isles MU has been limited to only two tagging studies (one in 2003 and one in 2004) and a sample size of only 34 tagged individuals. Since these two tagging studies took place 12/13 years ago, the at-sea movement data obtained from these seals may not be representative of grey seal movement in more recent years. In addition to this there has been no tagging of grey seals at either of the grey seal SACs in the West Scotland or the Western Isles MU and so it is difficult to draw conclusions from these telemetry data as to the level of expected connectivity between the Study Area and grey seal SACs.

### 9.3 Grey seal Pup Count Data

There are no grey seal breeding colonies that are regularly counted by SMRU within the Study Area. The closest group of grey seal breeding colonies to the Study Area are in the Outer Hebrides pupping region where pup counts are concentrated at the Monach Isles SAC and breeding colony. No pups tagged at the Monach Islands SAC and breeding colony entered the Study Area, however, this was a very small sample and the study took place 11 years ago so it may not be representative of grey seal pup movement in more recent years.

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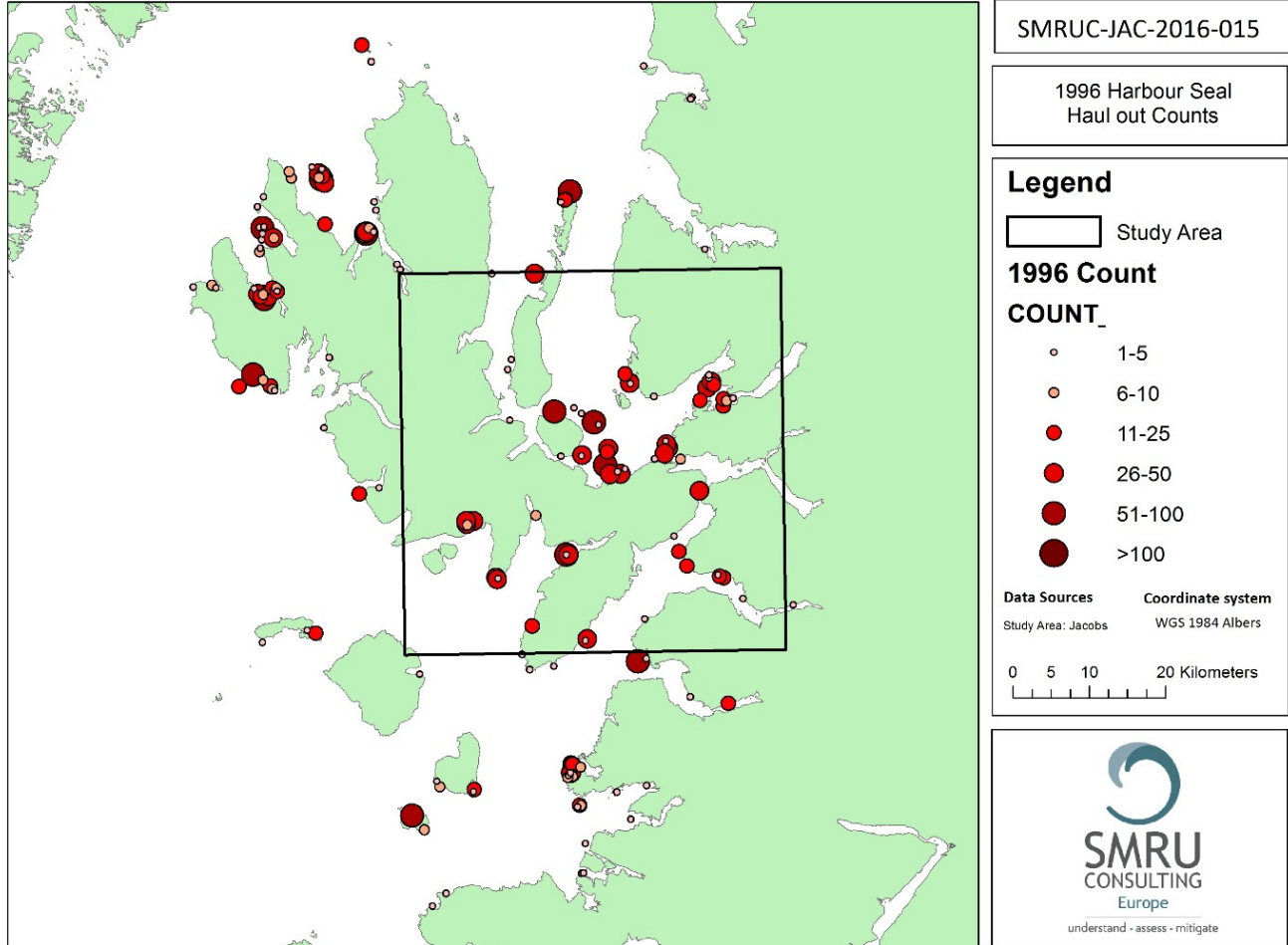
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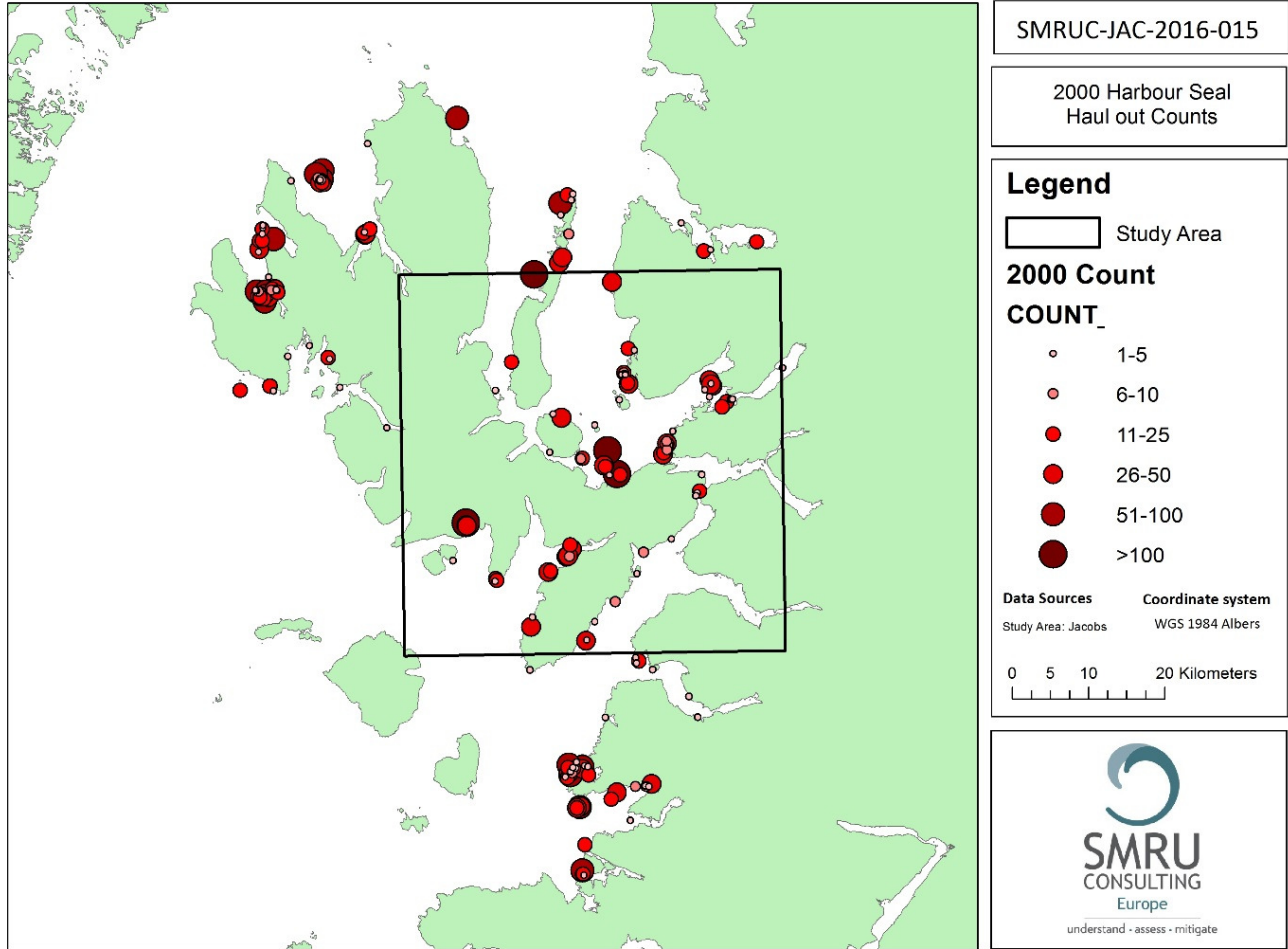
## 1 1 Glossary of Terms, Acronyms and Abbreviations

Term	Description
SMRU	Sea Mammal Research Unit
SAC	Special Area of Conservation
MU	Management Unit

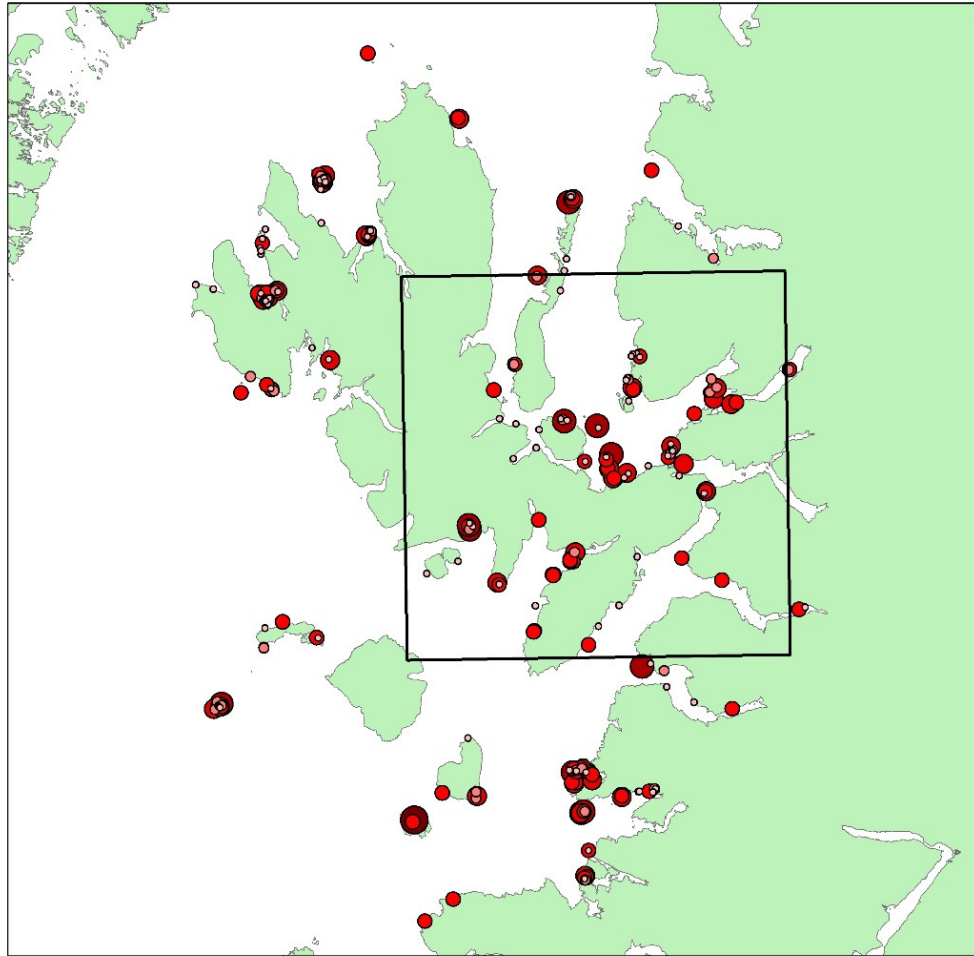


## Appendix 1 – Harbour Seal Count Maps for individual years









SMRUC-JAC-2016-015

2005 Harbour Seal  
Haul out Counts

**Legend**

Study Area

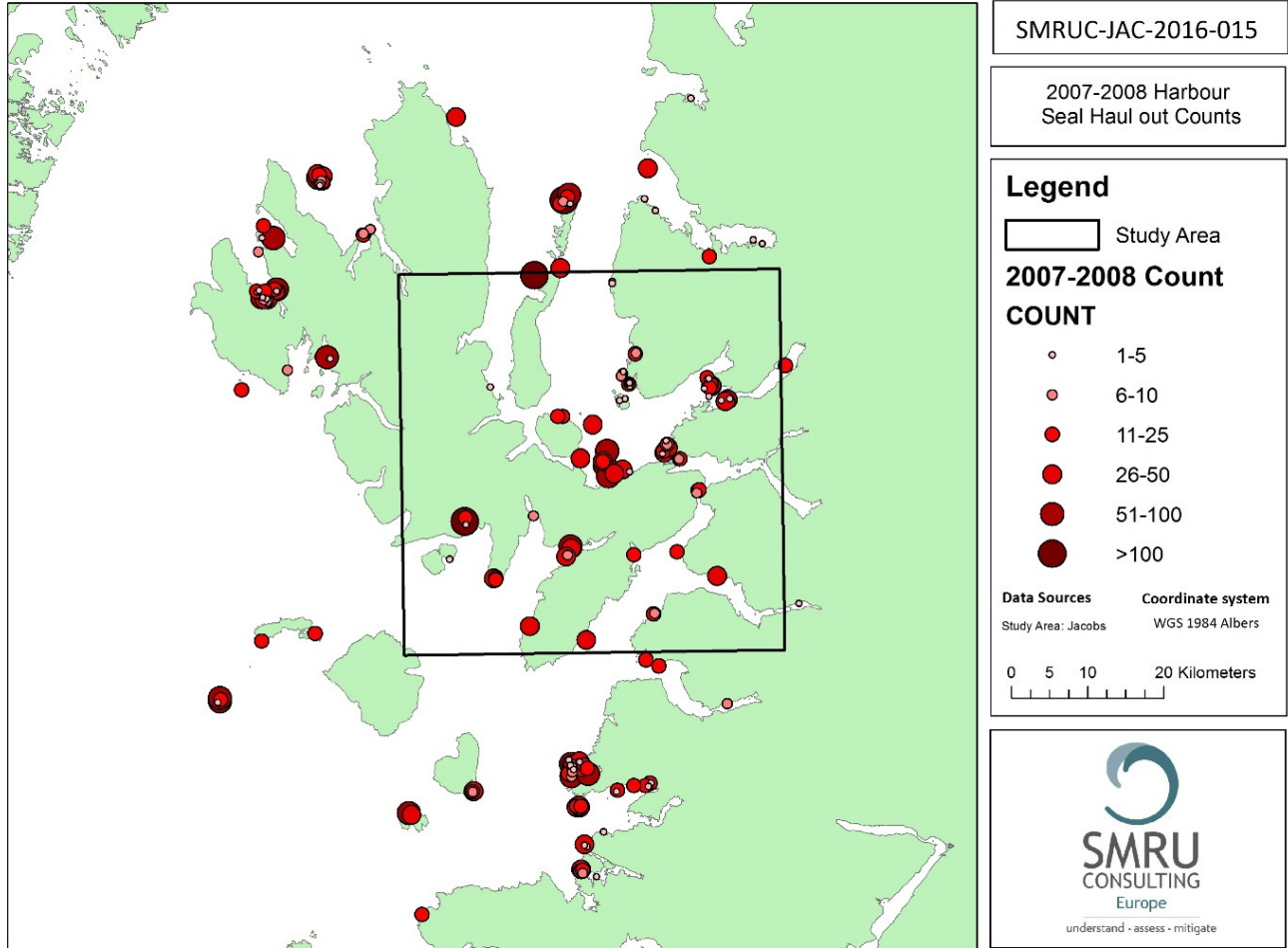
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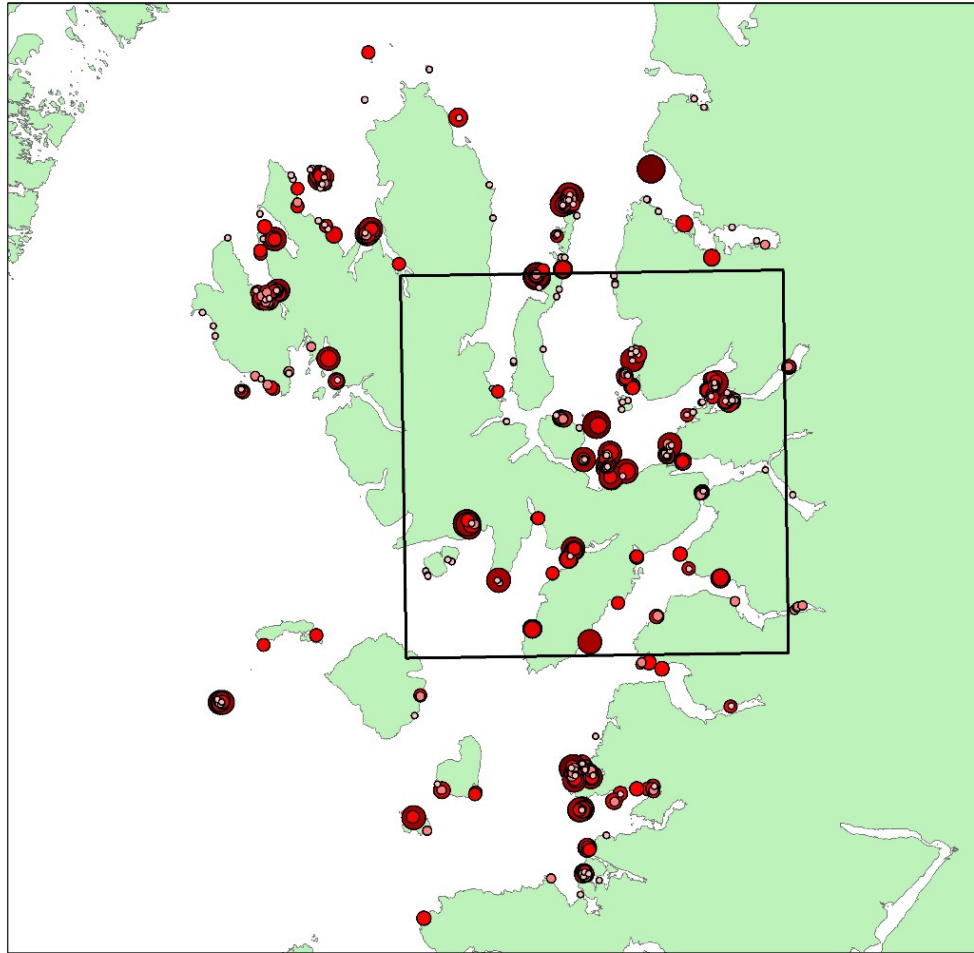
- 1-5
- 6-10
- 11-25
- 26-50
- 51-100
- >100

**Data Sources**      **Coordinate system**  
Study Area: Jacobs      WGS 1984 Albers

0 5 10 20 Kilometers







SMRUC-JAC-2016-015

2014 Harbour Seal  
Haul out Counts

**Legend**

Study Area

**2014 Pv Central  
COUNT**

- 1-5
- 6-10
- 11-25
- 26-50
- 51-100
- >100

**Data Sources**      **Coordinate system**  
Study Area: Jacobs      WGS 1984 Albers

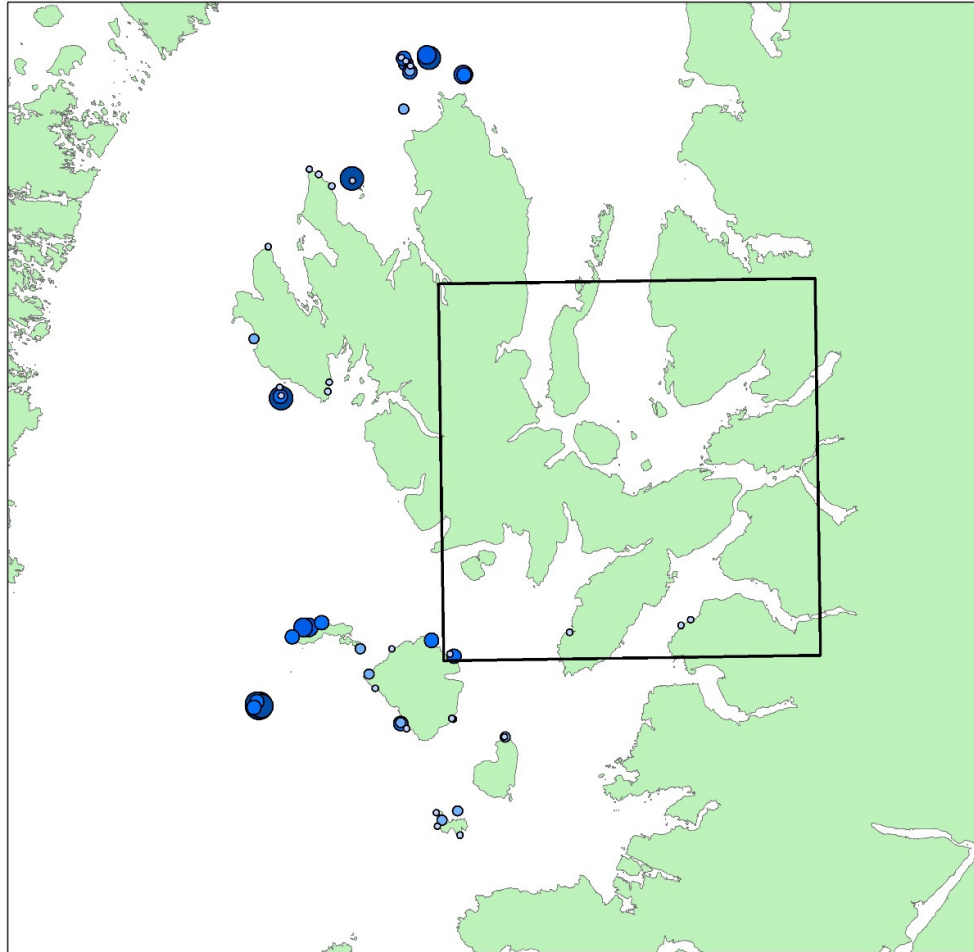
0 5 10 20 Kilometers

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## Appendix 2 – Grey Seal Count Maps for individual years



SMRUC-JAC-2016-015

1996 Grey Seal Haul Out Counts

**Legend**

Study Area

**1996**

**COUNT\_**

- 1-5
- 6-10
- 11-25
- 26-50
- 51-100
- >100

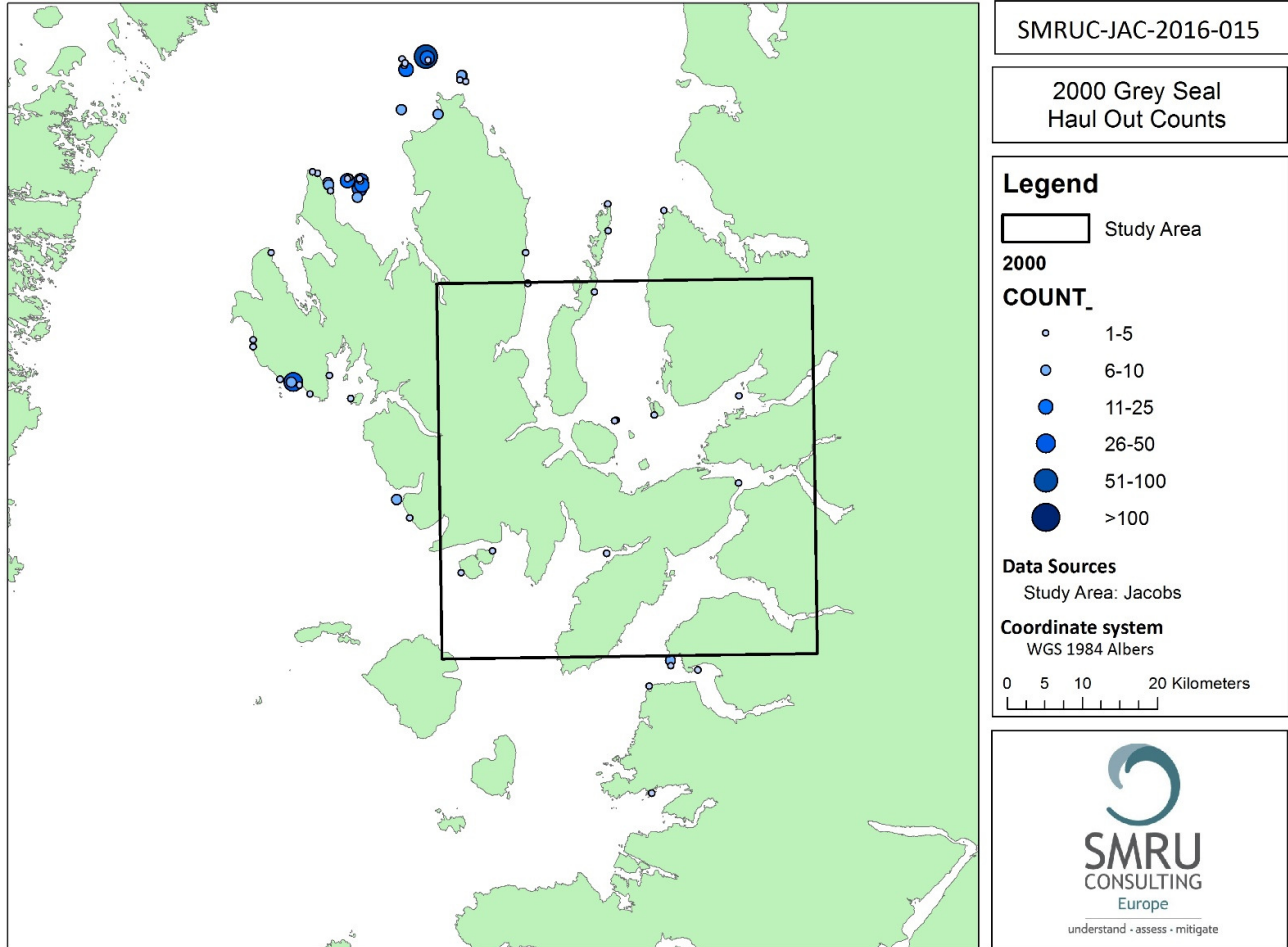
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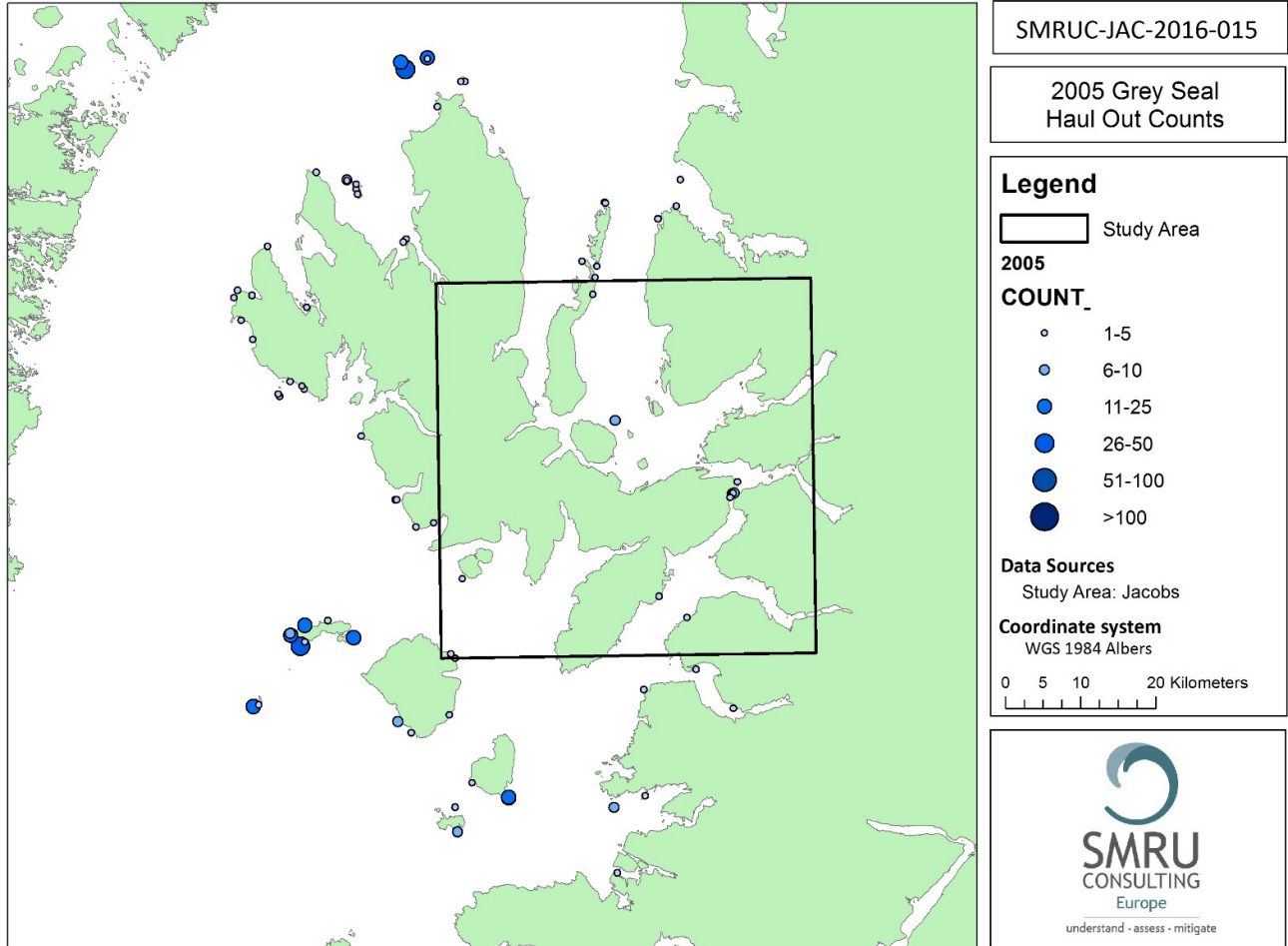
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WGS 1984 Albers

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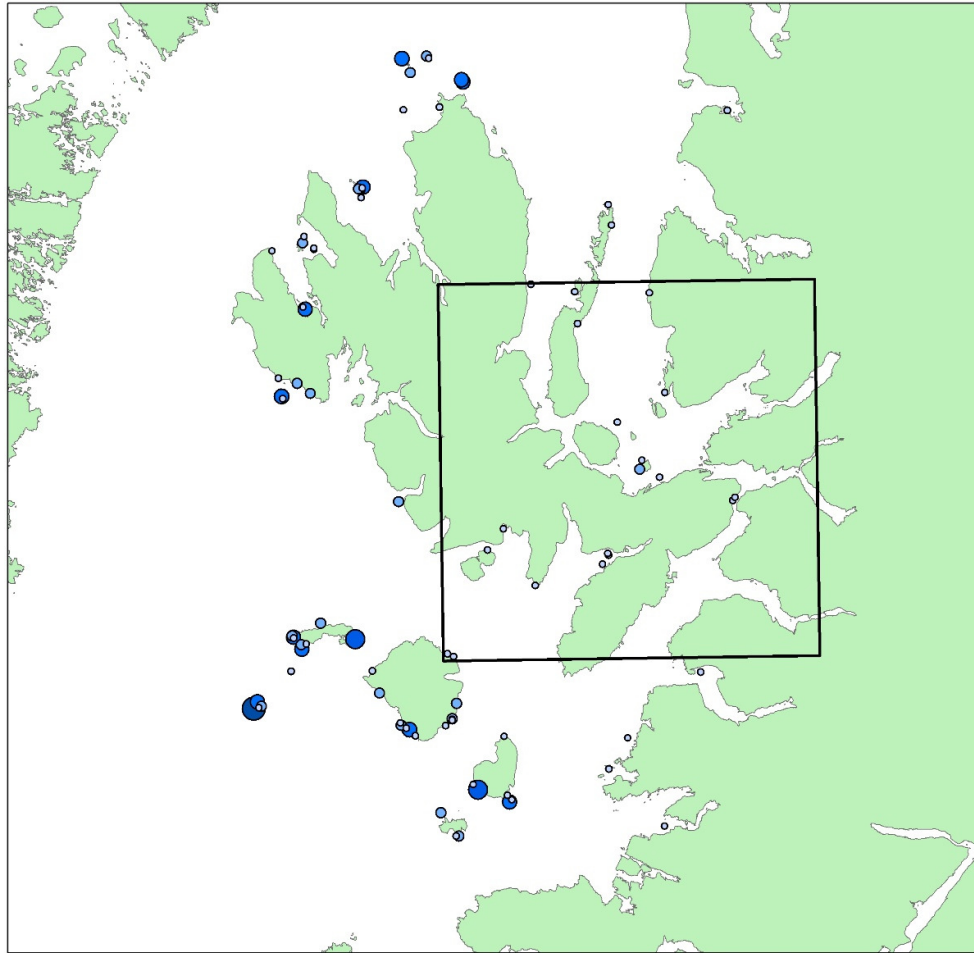
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2007-2008 Grey Seal Haul Out Counts

**Legend**

Study Area

**2007-8**

**COUNT\_**

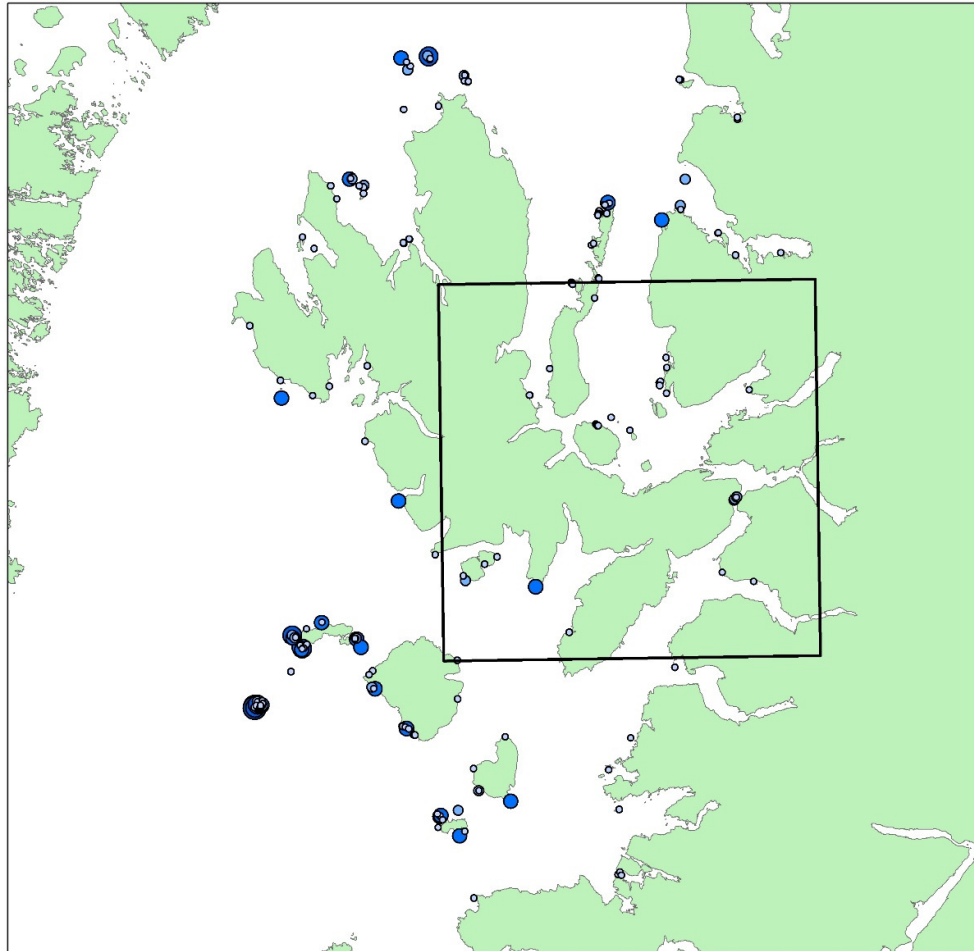
- 1-5
- 6-10
- 11-25
- 26-50
- 51-100
- >100

**Data Sources**  
Study Area: Jacobs

**Coordinate system**  
WGS 1984 Albers

0 5 10 20 Kilometers





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2014 Grey Seal  
Haul Out Counts

**Legend**

Study Area

**2014**

**COUNT\_**

- 1-5
- 6-10
- 11-25
- 26-50
- 51-100
- >100

**Data Sources**  
Study Area: Jacobs

**Coordinate system**  
WGS 1984 Albers

0 5 10 20 Kilometers

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TITLE: DATA REQUEST ISLE OF SKYE

DATE: NOVEMBER 2016

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