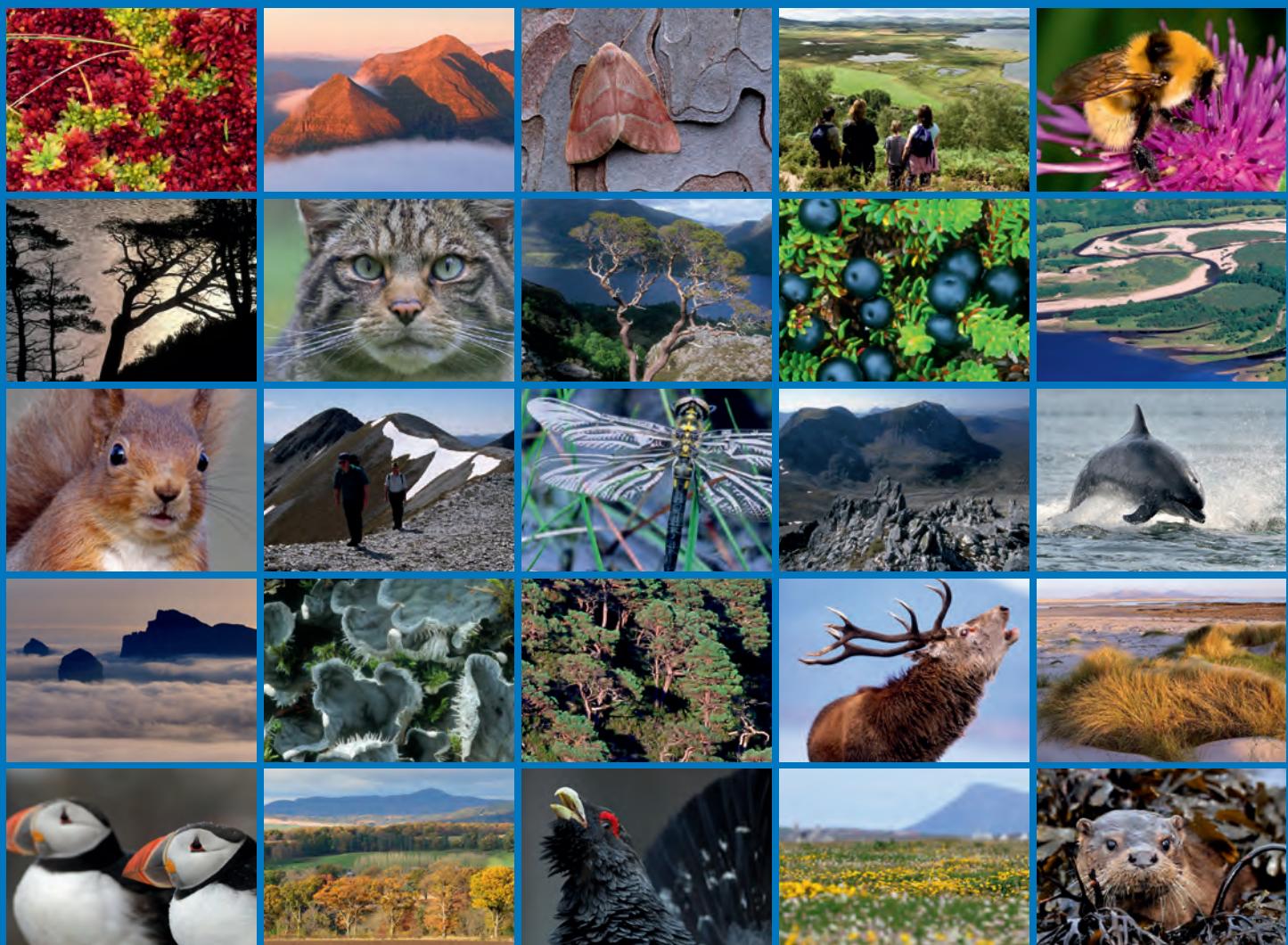


# Surveys of harbour and grey seals on the west coast of Scotland (Ullapool to Scarba), in the Moray Firth and in the Firth of Tay, in August 2014





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# COMMISSIONED REPORT

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### Commissioned Report No. 869

## **Surveys of harbour and grey seals on the west coast of Scotland (Ullapool to Scarba), in the Moray Firth and in the Firth of Tay, in August 2014**

For further information on this report please contact:

Professor John M. Baxter  
Scottish Natural Heritage  
Silvan House  
231 Corstorphine Road  
EDINBURGH  
EH12 7AT  
Telephone: 0131 3162610  
E-mail: john.baxter@snh.gov.uk

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# COMMISSIONED REPORT

# Summary

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## Surveys of harbour and grey seals on the west coast of Scotland (from Ullapool to Scarba), in the Moray Firth and in the Firth of Tay, in August 2014

**Commissioned Report No. 869**

**Project No: 15120**

**Contractor: University of St Andrews, Sea Mammal Research Unit**

**Year of publication: 2015**

### **Keywords**

Harbour (common) seal; grey seal; West Scotland; Moray Firth; Firth of Tay; declines.

### **Background**

The Sea Mammal Research Unit (SMRU) aims to complete Scotland-wide August surveys of harbour and grey seals on an approximate five-year cycle. Over the last 15 years, SMRU surveys have documented a continuing decline of more than 75% in counts of harbour seals in Orkney and a continuing decline of over 90% in the Firth of Tay & Eden Estuary. In marked contrast, harbour seal numbers on at least part of the west coast of Scotland have increased. Harbour seal numbers in the Western Isles appeared to be declining until a high count in August 2011. In 2014, a large section of the Scottish west coast was surveyed as a continuation of the current round-Scotland survey.

### **Main findings**

- In August 2014, the Sea Mammal Research Unit, University of St Andrews, carried out aerial surveys of moulting harbour seals and of grey seals on part of the west coast of Scotland from the head of Loch Broom to the Firth of Lorn, in the Moray Firth, and in the Firth of Tay & Eden Estuary.
- Prolonged wet weather resulted in the loss of three full survey days (11<sup>th</sup>, 12<sup>th</sup> and 17<sup>th</sup> August). This resulted in the survey finishing on the mainland coast by Scarba rather than at the southern tip of the Mull of Kintyre as planned.
- In the northern section of the West Scotland Management Area (most of which was surveyed in August 2013) a total of **1,115** harbour seals were counted compared with 692 counted in 2008, an increase of 61% in six years. This is the highest count for West Scotland - North to date.
- In the central section of the West Scotland Management Area **6,424** harbour seals were counted compared with 4,004 counted in 2007 and 2008, an increase of 60% over six years. This is the highest count for West Scotland - Central to date.

- In the subregions of the southern section of West Scotland that were surveyed in 2014 **4,230** harbour seals were counted compared with 3,810 counted in 2007 and 2009, an increase of 11% over (an average of) six years.
- The updated total count for harbour seals in West Scotland is **13,878** (2009-2014 data) compared with 9,972 in 2007-2008 or 8,811 in 1996-1997. This is the highest count for West Scotland to date.
- In the Moray Firth Seal Management Area, **693** harbour seals were counted in the area surveyed annually, between Findhorn and Helmsdale, compared with 858 in 2013 and 1,033 in 2012. It is SMRU's lowest count to date and is 25% lower than the mean count (909) between 2002 and 2013.
- In the Dornoch Firth and Morrich More SAC, **111** harbour seals were counted in 2014 compared with 143 in 2013 and 157 in 2012. This is the lowest count for the SAC and represents 19% of the mean count (599) between 1992 and 1997.
- In the Firth of Tay & Eden Estuary SAC, **29** harbour seals were counted in 2014 compared with 50 counted in 2013 and 88 in 2012. This is the lowest count for the SAC and represents only 4.5% of the mean count (641) between 1990 and 2002.
- Using data from the 2014 surveys, the revised estimate of the minimum size of the harbour seal population in Scotland was **23,355**. This is the number of hauled-out harbour seals counted during surveys carried out in 2007 (Firth of Clyde, Solway Firth, south-east coast from Border to Aberlady Bay), 2008 (north Moray Firth from Wick to Duncansby Head), 2009 (Shetland, southern part of West Scotland), 2011 (Western Isles, Moray Firth from Helmsdale to Wick), 2013 (east coast from Aberlady Bay to Fraserburgh, Moray Firth from Fraserburgh to Helmsdale, Orkney, North Coast and north-west coast from Cape Wrath to Ullapool) and 2014 (Ullapool to Scarba in the Firth of Lorn).

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*For further information on this project contact:*

Professor John M. Baxter, Scottish Natural Heritage, Silvan House, 231 Corstorphine Road,  
Edinburgh, EH12 7AT.

Tel: 0131 316 2610 or john.baxter@snh.gov.uk

*For further information on the SNH Research & Technical Support Programme contact:*

Knowledge & Information Unit, Scottish Natural Heritage, Great Glen House, Inverness, IV3 8NW.  
Tel: 01463 725000 or research@snh.gov.uk

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## **1. INTRODUCTION**

SMRU undertakes routine surveys of harbour and grey seals around Scotland and in part of England. These surveys provide the basis of the information the Natural Environment Research Council is obliged to submit to the Scottish Government and to the Department of the Environment, Food and Rural Affairs (Defra) under the Marine (Scotland) Act 2010 and the Conservation of Seals Act 1970 respectively, on the size, distribution and status of UK seal populations. The most recent advice can be found at: <http://www.smru.st-and.ac.uk/documents/2589.pdf>. The surveys also provide information required by Scottish Natural Heritage to satisfy Scottish obligations under the EU's Habitats Directive on reporting the conservation status of seals within Special Areas of Conservation (SACs) and in Scotland.

In the UK, harbour seal population surveys are carried out during their annual moult, in August. In Scotland, the entire coast is surveyed approximately on a five year cycle (Figure 2), although surveys are carried out annually in the Moray Firth and the Firth of Tay & Eden Estuary. Harbour seals in part of the Moray Firth are also surveyed annually during their breeding season, between mid-June and mid-July. Grey seals hauled ashore are counted during all surveys, providing information on their summer distribution. However, grey seal numbers can be highly variable from day to day during the summer months.

This report summarises the results from August 2014 surveys of harbour and grey seals on the west coast of Scotland between the head of Loch Broom by Ullapool and the Firth of Lorn coast, opposite Scarba, in the Moray Firth, and in the Firth of Tay & Eden Estuary. The surveys were carried out to obtain updated estimates of the numbers of harbour and grey seals in the areas surveyed. Seal numbers are reported for the seven Scottish Seal Management Areas and for Subdivisions of two of these Management Areas (Orkney and North Coast and West Scotland; Figure 1).

## **2. METHODS**

The Sea Mammal Research Unit (SMRU) carried out most surveys of harbour seals by helicopter using a thermal imaging camera. For estuarine areas (Moray Firth and Firth of Tay & Eden Estuary) a small fixed-wing aircraft without a thermal imaging camera was used. Oblique high-resolution digital images were taken during all flights, and all surveys followed the standard SMRU survey protocol:

- Surveys were restricted to within two hours either side of low tides occurring between 12:30 and 19:30 (approximately).
- Surveys were restricted to the August harbour seal moult.
- There was no surveying on rainy days.
- High resolution digital photographs were taken of almost all groups of seals on shore.
- During the helicopter surveys, initial counts were made in real time and subsequently confirmed or corrected by reviewing the thermal image footage in conjunction with the high-resolution digital images.

All maps were produced using Manifold System 8.0 Ultimate Edition. The coastlines were drawn using Global Self-consistent, Hierarchical, High-resolution Shoreline data (Wessel & Smith, 1996), available to download from the National Geophysical Data Center website, and high-resolution Scotland mean high and low water shape-files based on Ordnance Survey data (Pope, 2011).

### 3. RESULTS

#### 3.1 Scotland - composite

Figure 2 shows the years in which different segments of the Scottish coast were surveyed most recently, between 2007 and 2014. The distribution of harbour seals in Scotland from these most recent August surveys is shown in Figure 3. Counts were aggregated by 10km squares in order to show the general August distribution more clearly. The numbers of harbour seals counted in Seal Management Areas in Scotland are given in Table 1. West Scotland is now by far the most important Management Area for harbour seals in Scotland. From the most recent surveys of the Scottish coast, a total of **23,355** harbour seals were counted. This is significantly higher than the total for the 2007-2009 period (20,360) and similar to the total for 2000-2006 (23,423); but is still considerably lower than the 1996-1997 total (29,514).

Figure 4 similarly shows the summer distribution of grey seals in Scotland. In 2011, there was a very low grey seal count for the Monach Isles, off North Uist, which was likely due to the sunny day and high ambient temperatures. Large numbers of grey seals were observed in the water close to haul-out sites but, because they were not on land, were not included in the count. Since this consistently high count was ‘missing’ in 2011, data for the Monach Isles from the 2008 survey are used here instead. The numbers of grey seals counted in Seal Management Areas in Scotland are given in Table 2. The numbers of grey seals hauling out can be highly variable in the summer months and caution is advised when interpreting August counts of grey seals.

Figure 5 shows the trends in numbers of harbour seals counted in all Seal Management Areas in Scotland since 1996. Three points have been added for 2014: for East Scotland, for the Moray Firth and for West Scotland. Most plotted points are an amalgamation of counts from different years with new points added only in years with significant new data. There is a marked difference in the trajectories of counts in the west of Scotland (general increase) and counts in the north and east of Scotland (general decrease).

#### 3.2 Helicopter & thermal imager surveys in 2014

##### 3.2.1 West Scotland

All helicopter surveys were carried out between 8 August and 19 August 2014. The sections of the West Scotland coast surveyed on different days are shown in Figure 6 and were:

- 8 Aug 2014: Head of Loch Broom to north side Loch Diabeg (Loch Torridon)
- 9 Aug 2014: Loch Torridon to Skye Bridge, including Loch Alsh and Loch Duich
- 10 Aug 2014: Skye Bridge to Loch Poolteil (west Skye)
- 11 &12 Aug 2014: No survey, rain days
- 13 Aug 2014: Loch Pooltiel to Skye Bridge, west coast to Morar
- 14 Aug 2014: Morar to Kilchoan (Ardnamurchan), Coll, Tiree
- 15 Aug 2014: Kilchoan to Oban Airport, Small Isles
- 16 Aug 2014: Mull: Ardmore Point to Iona, where rain stopped survey
- 17 Aug 2014: No survey, rain day
- 18 Aug 2014: Mull: Iona to Ardmore Point, Lismore, Oban Airport to Loch Feochan
- 19 Aug 2014: Loch Feochan to Craobh Haven (east of Shuna)

The subregions of West Scotland that were surveyed in August 2014 are shown in Figure 7.

The large West Scotland Management Area is divided into three subdivisions (Figure 1). Counts for the North and Central subdivisions were completed in 2014, together with part of the South subdivision (Figure 6). The distribution of harbour seals in the part of West Scotland that was surveyed in August 2014 is shown in Figure 8 with counts in Table 3. Similarly, the distribution of grey seals in West Scotland is shown in Figure 9 with counts in Table 4. The boundaries for these subregions are shown in Figure 7.

In West Scotland - North, between Cape Wrath and Rubha Reidh, **1,115** harbour seals were counted in 2013 and 2014, compared to the previous highest total of 692 in 2008. This represents an apparent average annual increase of 8% over six years and is in marked contrast to the declines observed in the Northern Isles, and the north and east coasts of Scotland. The 2013 and 2014 grey seal count of 390 was higher than the 2008 count of 177, but similar to the 1997 count of 379. The main increase in harbour seal numbers in the North subdivision of West Scotland was recorded in the Summer Isles (**666** in 2013 and 327 in 2008; equivalent to an average of +15% p.a.; Duck & Morris 2014). It is not clear whether this increase is mainly due to changes in overall population size or due to local redistribution around the coast from West Scotland - Central.

In West Scotland - Central, from Rubha Reidh to Ardnamurchan Point, **6,424** harbour seals were counted in 2014 compared with the previous highest count of 4,004 in 2007 and 2008. This represents an apparent average annual increase of 8%, similar to that seen in the North subdivision. SMRU's highest ever counts of harbour seals were recorded in 13 of 16 subregions in West Scotland - Central. The distribution of seals around the Ascrib, Isay and Dunvegan harbour seal SAC is shown in Figure 10. There were significant numbers of harbour seals hauled out at locations outside the SAC, particularly on the islands at the mouth of Loch Greshornish.

Only part of West Scotland - South was surveyed, between Ardnamurchan Point and Craobh Haven by Loch Melfort. On this section of coast, **4,230** harbour seals were counted, compared with a total of 3,810 counted in 2007 and 2009, an apparent average annual increase of 2% over six years. The distribution of seals around the Eileanan agus Sgeiran Lios Mór harbour seal SAC is shown in Figure 11.

### 3.3 Annual fixed-wing surveys

#### 3.3.1 Moray Firth

Figure 12 shows harbour and grey seal distribution around the Moray Firth, between Findhorn and Helmsdale, on 21 August 2014. The number of harbour seals counted in the Moray Firth from 1992 to 2014, including totals from different sections of the coast between Findhorn and Helmsdale are in Table 5 and shown as histograms in Figure 13. While the counts of harbour seals at Ardersier (**28**), the Dornoch Firth and Morrich More harbour seal SAC (**111**) and at Brora (**1**) were the lowest ever recorded by SMRU, the counts at Culbin and at Loch Fleet were the highest ever recorded. The mean harbour seal count for the Dornoch Firth SAC between 1992 and 2000 was 551; the mean count between 2003 and 2014 was 189. Detailed counts of grey seals in the Moray Firth are in Table 6 and in Figure 14.

#### 3.3.2 Firth of Tay and Eden Estuary

In East Scotland, the Firth of Tay & Eden Estuary SAC was surveyed on 20 August 2014. Figure 15 shows the distribution of harbour and grey seals in the Firth of Tay & Eden Estuary. Only **29** harbour seals were counted in August 2014, less than 5% of the mean count between 1990 and 2002 (641). Figure 16 & Figure 17 show the contributions to the harbour and grey seal counts from different areas of the SAC. Counts of harbour seals from these areas are in Table 7 and counts of grey seals in Table 8.

### **3.4 Harbour seal SACs**

Counts of harbour seals within most Scottish SACs have changed considerably since they were first identified in the early 1990s (Figure 18, Table 9). Six of the nine harbour seal SACs in Scotland have been surveyed since 2011; the remaining three were last surveyed in 2009. One is in West Scotland - South (South-east Islay Skerries) and two are in Shetland (Yell Sound Coast and Mousa); all three are due to be surveyed in August 2015.

Compared with SACs in other Management Areas, the three SACs in West Scotland show the least dramatic variation in counts since 1996. Counts have remained broadly similar in South-east Islay Skerries while at Ascrib, Isay and Dunvegan and at Lismore (SMRU aerial survey data only), there has been a gradual decline interspersed with occasional increases.

The remaining six SACs in the Western Isles, Shetland, Orkney and the North Coast, the Moray Firth, and in East Scotland all show consistent declines with the most severe on Sanday, Orkney) and in the Firth of Tay & Eden Estuary. The decline in the Sanday SAC count was from 1,458 in 1997 to **93** in 2013 or 93.7% over 16 years, equivalent to an average annual decline of almost 16%. The Firth of Tay & Eden Estuary SAC count declined from a mean of 641 between 1990 and 2002 to **29** in 2014 (a 95% drop), an average annual decline of approximately 23% over 12 years.

Note: 'Lismore' is an abbreviation of this SAC's full name, Eileanan agus Sgeirean Lios Mòr.

### **3.5 Surveys planned for 2015**

In August 2015, SMRU proposes to survey the west coast of Scotland from the Firth of Lorn to the Solway Firth, the south-east coast of Scotland from the Farne Islands to Aberlady Bay, and Shetland.

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## ANNEX 1: TABLES

*Table 1. Counts of harbour seals in Scottish Seal Management Areas. SMAs are lightly shaded. Totals are also given for subdivisions of some of the SMAs. The darker shaded data bars represent the numbers of seals within each area. In 1996 and 1997, harbour seals were fairly evenly spread between Shetland, Orkney and West Scotland. Subsequently, West Scotland has supported an increasing proportion of the Scottish population while the Shetland and Orkney proportion has declined.*

Seal Management Area	Harbour seal counts		
	2007-2014	2000-2006	1996-1997
1 Southwest Scotland	834 (2007)	623 (2005)	929 (1996)
2 West Scotland	<sup>a</sup> 13,878 (2007-2009; 2013-2014)	11,702 (2000; 2005)	8,811 (1996-1997)
2a West Scotland - South	6,339 (2007; 2009; 2014)	7,037 (2000; 2005)	5,651 (1996)
2b West Scotland - Central	6,424 (2014)	3,956 (2005)	2,700 (1996)
2c West Scotland - North	1,115 (2013; 2014)	709 (2005)	460 (1996-1997)
3 Western Isles	2,739 (2008; 2011)	1,981 (2003; 2006)	2,820 (1996)
4 North Coast & Orkney	1,938 (2013)	4,384 (2005-2006)	8,787 (1997)
4a North Coast	73 (2013)	146 (2005-2006)	265 (1997)
4b Orkney	1,865 (2013)	4,238 (2006)	8,522 (1997)
5 Shetland	3,039 (2009)	3,038 (2006)	5,994 (1997)
6 Moray Firth	733 (2008; 2011; 2013-2014)	1,028 (2005-2006)	1,409 (1997)
6.1 Duncansby Head to Helmsdale	1 (2008; 2011)	1 (2005)	1 (1997)
6.2 Helmsdale to Findhorn	693 (2014)	1,024 (2006)	1,407 (1997)
6.3 Burghead to Fraserburgh	39 (2013)	3 (2005)	1 (1997)
7 East Scotland	194 (2007; 2013-2014)	667 (2005-2006)	764 (1997)
7.1 Fraserburgh to Carnoustie	18 (2013)	45 (2005)	15 (1997)
7.2 Tay & Eden SAC	29 (2014)	342 (2006)	633 (1997)
7.3 St Andrews to border	147 (2007; 2013)	280 (2005)	116 (1997)
<b>SCOTLAND TOTAL</b>	<b>23,355</b> (2007-2009; 2011; 2013-2014)	<b>23,423</b> (2000; 2003; 2005-2006)	<b>29,514</b> (1996-1997)

<sup>a</sup> Parts of the West Scotland survey in 2009 funded by Scottish Power and Marine Scotland.

*Table 2. Counts of grey seals in Scottish Seal Management Areas. SMAs are lightly shaded. Totals are also given for subdivisions of some of the SMAs. The darker shaded data bars represent the number of seals within each area. Unlike harbour seals (Table 1), the relative proportion of grey seals within each area of Scotland has remained fairly constant over these three intervals.*

Seal Management Area	Grey seal counts		
	2007-2014	2000-2006	1996-1997
1 Southwest Scotland	374 (2007)	206 (2005)	75 (1996)
2 West Scotland	<sup>a</sup> 4,095 (2007-2009; 2013-2014)	2,383 (2000; 2005)	3,435 (1996-1997)
2a West Scotland - South	2,649 (2007; 2009; 2014)	1,771 (2000; 2005)	2,125 (1996)
2b West Scotland - Central	1,056 (2014)	361 (2005)	931 (1996)
2c West Scotland - North	390 (2013; 2014)	251 (2005)	379 (1996-1997)
3 Western Isles	* 3,743 (2008; 2011)	3,528 (2003; 2006)	4,062 (1996)
4 North Coast & Orkney	8,035 (2013)	10,155 (2005-2006)	9,427 (1997)
4a North Coast	195 (2013)	576 (2005-2006)	597 (1997)
4b Orkney	7,840 (2013)	9,579 (2006)	8,830 (1997)
5 Shetland	1,536 (2009)	1,371 (2006)	1,724 (1997)
6 Moray Firth	532 (2008; 2011; 2013-2014)	1,272 (2005-2006)	551 (1997)
6.1 Duncansby Head to Helmsdale	15 (2008; 2011)	59 (2005)	0 (1997)
6.2 Helmsdale to Findhorn	259 (2014)	1,008 (2006)	486 (1997)
6.3 Burghead to Fraserburgh	258 (2013)	205 (2005)	65 (1997)
7 East Scotland	2,134 (2007; 2013-2014)	1,898 (2005-2006)	2,328 (1997)
7.1 Fraserburgh to Carnoustie	991 (2013)	411 (2005)	145 (1997)
7.2 Tay & Eden SAC	634 (2014)	1,379 (2006)	1,891 (1997)
7.3 St Andrews to border	509 (2007; 2013)	108 (2005)	292 (1997)
<b>SCOTLAND TOTAL</b>	<b>20,449</b> (2007-2009; 2011; 2013-2014)	<b>20,813</b> (2000; 2003; 2005-2006)	<b>21,602</b> (1996-1997)

<sup>a</sup> Parts of the West Scotland survey in 2009 funded by Scottish Power and Marine Scotland.

\* During the 2011 survey, warm weather probably kept hundreds of grey seals from hauling out at the Monach Isles. Therefore the 2011 count for the Monach Isles has been replaced with the 2008 count.

Table 3. Counts of harbour seals in the West Scotland Seal Management Area. red = lowest count for a given area, green = highest count. The light grey boxes indicate which counts were used to calculate the totals in the dark grey boxes.

SMRU subregions & SMA subdivisions		1988	1989	1990	1991	1996	1997	2000	2004	2005	2007	2008	2009	2013	2014	
1 Kinlochbervie						33				22		7		18		
2 Eddrachillis Bay						207		252		257		277		355		
3 Enard Bay						6		13		30		38		56		
4 Summer Isles						80		120		347		327		666		
5 Little Loch Broom			1				0			10		4		0		
6 Gruinard Bay			3				5			15		6		0		
7 Loch Ewe			7				1			28		33		20		
<b>West Scotland - North TOTAL</b>			<b>337</b>				<b>460</b>			<b>709</b>		<b>692</b>		<b>1,115</b>		
1 Gairloch			2				7			0		1		5		
2 Torridon			18				3		36	20	53			188		
3 Applecross			48				45		134	86	86			323		
4 Plockton			282	158			277		271	279	335			549		
5 Raasay			3				38		155	90	151			294		
6 Rona			21				101		163	194	173	257		582		
7 Skye			1,233	1,269			1,728		2,220		1,899	1,757		2,411		
8 Kyle			43	15			9				31	23		78		
9 Sound of Sleat			43	53			76				60	83		100		
10 Loch Nevis			30	68			75		26	79		31		26		
11 Arisaig			456	499			213		597	650	692			1,006		
12 Ardnamurchan North			33				13		118	153	148			258		
13 Rum				10			2			0		0		24		
14 Eigg				29			36			77		66		92		
15 Muck				25			58			140		94		107		
16 Canna				41			19			219		227		381		
<b>West Scotland - Central TOTAL</b>			<b>2,292</b>				<b>2,700</b>		<b>3,927</b>		<b>3,956</b>		<b>4,004</b>		<b>6,424</b>	
1 Ardnamurchan South			85				139		325		112	165		284		
2 Sound of Mull			23				36		77		62	80		119		
3 Loch Linnhe			110				135		150		125	74		126		
4 Coll				367			947		987			690		1,223		
5 Tiree				124			338		357			231		244		
6 Mull		*	607	940	1,008	883	1,059		1,616			989		1,596	1,332	
7 Treshnish Isles			29				41		31			14		0		
8 Lismore			535	398	491	405	611		457			326		498	392	
9 Loch Creran			36				66		67			55		50		
10 Loch Etive				35			26		31			27		41		
11 Firth of Lorn		†		461			431		527			380		419		
12 Colonsay				109			83		102			59		87		
13 Oronsay				24			0		75			2		0		
14 Jura				375			122		548			539		601		
15 Islay				724			605		1,108			1,001		792		
16 West Coast Kintyre		‡		1,153			1,012		832			644		629		
<b>West Scotland - South TOTAL</b>			<b>5,154</b>				<b>5,651</b>		<b>7,290</b>		<b>5,276</b>		<b>6,339</b>			
1988-1991      1996-1997      -2000      2005-      2007-2008      2009-2014																
<b>West Scotland TOTAL</b>			<b>7,783</b>				<b>8,811</b>		<b>11,802</b>		<b>9,921</b>		<b>9,972</b>		<b>13,878</b>	

\* Torran Rocks were not surveyed in 2009. The 2009 total shown includes 81 harbour seals counted there in 2007.

† Firth of Lorn subregion not completed in 2014. The 2014 total shown includes 52 harbour seals counted there in 2009.

‡ West Coast Kintyre not completed in 2000. The 2000 total shown includes 51 harbour seals counted there in 1996.

**Table 4.** Counts of grey seals in the West Scotland Seal Management Area. red = lowest count for a given area, green = highest count. The light grey boxes indicate which counts were used to calculate the totals in the dark grey boxes.

SMRU subregions & SMA subdivisions		1988	1989	1990	1991	1996	1997	2000	2004	2005	2007	2008	2009	2013	2014	
1 Kinlochervie						157		136		40		45		29		
2 Eddrachillis Bay						3		122		116		54		166		
3 Enard Bay						9		82		7		7		9		
4 Summer Isles						21		24		73		54		144		
5 Little Loch Broom		0					0			14		12			8	
6 Gruinard Bay		0					0			0		2		12		
7 Loch Ewe		0					15			1		3		22		
<b>West Scotland - North TOTAL</b>		<b>190</b>				<b>379</b>			<b>251</b>		<b>177</b>		<b>390</b>			
1 Gairloch		0					0			0		3		4		
2 Torridon		0					0		0	5		0		28		
3 Applecross		11					0		3	1		2		23		
4 Plockton		0	0				0		1	0		0		1		
5 Raasay		0					0		1	6		5		14		
6 Rona		5					0		4	4		3		41		
7 Skye		130	46				378		328		156		203		270	
8 Kyle		0	0				0			0		0		0		
9 Sound of Sleat		0	6				2			2		0		2		
10 Loch Nevis		0	0				0		16		3		1		2	
11 Arisaig		0	20				0		5	9		4		5		
12 Ardnamurchan North		0					0		0	1		0		4		
13 Rum			57				84			22		66		72		
14 Eigg			31				9			26		66		21		
15 Muck			17				22			13		18		73		
16 Canna			151				436			113		190		496		
<b>West Scotland - Central TOTAL</b>		<b>344</b>				<b>931</b>		<b>911</b>		<b>361</b>		<b>561</b>		<b>1,056</b>		
1 Ardnamurchan South		0					0		9	1		0		3		
2 Sound of Mull		0					0		1	0		0		0		
3 Loch Linnhe		0					0		0	0		0		0		
4 Coll			167				243		274			98		562		
5 Tiree			337				910		450			330		674		
6 Mull		*	52	47	35	32	63		86		100		89		125	
7 Treshnish Isles		56					170		65		73			85		
8 Lismore		0	3	0	0		0		25		3		10		20	
9 Loch Creran		0					0		0		0		0		0	
10 Loch Etive			0				0		0		0		0		0	
11 Firth of Lorn		†					0		4		10			16		
12 Colonsay			10				35		57		21			63		
13 Oronsay			17				230		342		395		392			
14 Jura			26				27		19		59		39			
15 Islay			162				441		415		551		657			
16 West Coast Kintyre		‡	17				6		27		21		13			
<b>West Scotland - South TOTAL</b>		<b>1,130</b>				<b>2,125</b>		<b>1,774</b>		<b>1,661</b>		<b>2,649</b>				
1988-1991      1996-1997      -2000      2005-      2007-2008      2009-2014																
<b>West Scotland TOTAL</b>		<b>1,664</b>				<b>3,435</b>		<b>3,000</b>		<b>2,274</b>		<b>2,399</b>		<b>4,095</b>		

\* Torran Rocks were not surveyed in 2009. The 2009 total shown includes 34 grey seals counted there in 2007.

† Firth of Lorn subregion not completed in 2014. The 2014 total shown includes 3 grey seals counted there in 2009.

‡ West Coast Kintyre not completed in 2000. The 2000 total shown includes 3 grey seals counted there in 1996.

**Table 5.** Counts of harbour seals in the Moray Firth Seal Management Area. Mean values are given for areas surveyed more than once in a single season (2004-2008); red = lowest (mean) count for given area, green = highest (mean) count. A histogram of these data is given in Figure 13 and a distribution map for 2014 data is shown in Figure 12. Data are from aerial surveys by the Sea Mammal Research Unit.

Area	1992	1993	1994	1997	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Survey method	fw	fw	fw	ti	fw	fw & ti	fw	2fw	2fw & 1ti	fw & ti	ti	fw & ti	fw	fw	ti	fw	fw
(MEAN) COUNTS	Duncansby Head to Helmsdale		2		1					1			1					
	Helmsdale to Brora		92		193		188			113	150	54	73	19	101	87	102	70
	Loch Fleet		16		27	33	59	56	64	71	80	83	82	65	114	113	133	135
	Dornoch Firth (SAC)	662		542	593	405	220	290	231	191	257	144	145	166	219	208	157	143
	Cromarty Firth	41		95	95	38	42	113	88	106	106	102	90	90	140	101	144	63
	Beauly Firth (incl. Milton)	220		203	219	204	66	151	178	127	176	146	150	85	140	57	60	30
	Ardersier (incl. Eathie)		221	234	191	110	205	202	210	197	154	145	277	362	195	183	199	28
	Culbin & Findhorn		58	46	111	144	167	49	93	58	79	92	73	123	163	254	218	260
	Burghead to Fraserburgh		0	1					3		0				29			39
TOTALS	Dornoch Firth to Ardersier	1,061	1,141	838	438	759	699	634	736	546	530	618	861	561	544	435	276	
	Loch Fleet to Ardersier	1,168		871	497	815	763	705	816	629	612	683	975	674	677	570	432	
	Loch Fleet to Findhorn	1,214		982	641	982	812	798	874	708	704	756	1,098	837	931	788	692	
	Helmsdale to Findhorn	1,407		829				911	1,024	762	777	775	1,199	924	1,033	858	693	
Moray Firth SMA	*		1,409		831			915	1,028	763	778	776	1,200	954	1,063	898	733	

\* For years where only the main area was surveyed (i.e. Helmsdale to Findhorn), the most recent counts for the outlying areas are used to give a total for the Moray Firth Seal Management Area.

fw, fixed-wing survey; ti, thermal imager helicopter survey; SMA, Seal Management Area.

Table 6. Counts of grey seals in the Moray Firth Seal Management Area. Mean values are given for areas surveyed more than once in a single season (2004-2008); red = lowest (mean) count for given area, green = highest (mean) count. A histogram of these data is given in Figure 14 and a distribution map for 2014 data is shown in Figure 12. Data are from aerial surveys by the Sea Mammal Research Unit.

Area		1992	1993	1994	1997	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Survey method	fw	fw	fw	ti	fw	fw & ti	fw	2fw	2fw & 1ti	fw & ti	ti	fw & ti	fw	fw	ti	fw	fw	fw
(MEAN) COUNTS	Duncansby Head to Helmsdale *		33		0					59			9			15			
	Helmsdale to Brora				3		6			111	102	52	449	72	635	156	316	81	27
	Loch Fleet		0	0	0	0	0	0	0	0	1	3	1	0	7	7	20	18	7
	Domoch Firth (SAC)	233	903	456	121	321	79	473	431	748	516	523	819	717	679	74	604	127	
	Cromarty Firth	9	0	0	0	0	0	0	0	0	1	0	0	0	1	2	1	3	1
	Beaul Firth (incl. Milton)	8	2	3	8	0	0	0	0	0	3	4	0	0	2	3	1	5	2
	Ardersier (incl. Eathie)		36	24	85	0	3	44	55	142	74	142	94	297	74	24	109	2	
	Culbin & Findhorn		0	0	0	0	10	0	11	11	28	75	58	58	179	121	218	93	
	Burghead to Fraserburgh		30	65				205			61				18		258		
TOTALS	Dornoch Firth to Ardersier	941	483	214	321	82	517	486	894	594	665	913	1,017	758	100	721	132		
	Loch Fleet to Ardersier		483	214	321	82	517	486	895	597	666	913	1,024	765	120	739	139		
	Loch Fleet to Findhorn		483	214	321	92	517	497	906	625	741	971	1,082	944	241	957	232		
	Helmsdale to Findhorn		486		327			608	1,008	677	1,190	1,043	1,717	1,100	557	1,038	259		
	Moray Firth SMA	†		551		392			872	1,272	797	1,260	1,113	1,787	1,133	590	1,311	532	

\* In 2011, Duncansby Head to Wick was not surveyed. Therefore the 15 grey seals given for the northern most area in 2011 include 7 counted in 2008.

† For years where only the main area was surveyed (i.e. Helmsdale to Findhorn), the most recent counts for the outlying areas are used to give a total for the Moray Firth Seal Management Area.

fw, fixed-wing survey; ti, thermal imager helicopter survey; SMA, Seal Management Area.

**Table 7.** Counts of harbour seals in the Firth of Tay & Eden Estuary SAC. Mean values are given for areas surveyed more than once in a single season; red = lowest (mean) count for given area, green = highest (mean) count. A histogram of these data is given in Figure 16 and a distribution map for 2014 data is shown in Figure 15. Data are from aerial surveys by the Sea Mammal Research Unit.

Area	1990	1991	1992	1994	1997	2000	2002	2003	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Survey method	1fw	1fw	1fw	1fw	1ti	1fw	1fw	1fw	2fw,1ti	1fw	1fw,1ti	2fw	1fw	1fw	1fw	1ti	1fw	
Upper Tay	27	73	148	89	113	115	51	83	91	91	63	49	45	41	16	40	36	21
Broughty Ferry	77	83	97	64	35	52	0	90	51	31	27	13	28	15	18	16	3	0
Buddon Ness	13	86	72	53	0	113	109	142	25	96	64	27	8	23	11	8	10	1
Abertay & Tentsmuir	319	428	456	289	262	153	167	53	63	34	31	50	8	9	0	5	0	0
Eden Estuary	31	0	0	80	223	267	341	93	105	90	90	83	22	36	32	19	1	7
St Andrews to border																		
SAC total	467	670	773	575	633	700	668	461	335	342	275	222	111	124	77	88	50	29

fw, fixed-wing survey; ti, thermal imager helicopter survey; SAC, Special Area of Conservation

*Table 8. Counts of grey seals in the Firth of Tay & Eden Estuary SAC. Mean values are given for areas surveyed more than once in a single season; red = lowest (mean) count for given area, green = highest (mean) count. A histogram of these data is given in Figure 17 and a distribution map for 2014 data is shown in Figure 15. Data are from aerial surveys by the Sea Mammal Research Unit.*

Area	1990	1991	1992	1994	1997	2000	2002	2003	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Survey method	1fw	1fw	1fw	1fw	1ti	1fw	1fw	1fw	2fw,1ti	1fw	1fw,1ti	2fw	1fw	1fw	1fw	1fw	1ti	1fw	
Fraserburgh to Carnoustie																			
(MEAN) COUNTS	Upper Tay	0	0	18	20	61	64	78	50	42	22	27	41	55	98	16	39	127	62
	Broughty Ferry	0	3	0	9	0	0	0	16	0	8	1	4	0	0	2	3	0	2
	Buddon Ness	0	0	1	104	0	101	0	33	11	25	85	4	0	12	22	13	18	0
	Abertay & Tentsmuir	912	1,546	1,191	1,335	1,820	2,088	1,490	1,560	763	1,267	1,375	442	395	1,406	1,265	1,111	323	531
	Eden Estuary	0	0	16	0	10	0	25	4	27	57	31	17	0	39	17	36	14	39
St Andrews to border																			
SAC total		912	1,549	1,226	1,468	1,891	2,253	1,593	1,663	843	1,379	1,519	508	450	1,555	1,322	1,202	482	634

fw, fixed-wing survey; ti, thermal imager helicopter survey; SAC, Special Area of Conservation

Table 9. August counts of harbour seals in Special Areas of Conservation (SACs) designated for the protection of harbour seals. red = lowest count for a given area, green = highest count. Data are from aerial surveys by the Sea Mammal Research Unit. Information on the criteria for selecting SACs and on the grading system can be found in Pinn (2009).

Harbour seal SAC	Grade	1996	1997	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
South-east Islay Skerries	B	552		812							741		666					
Lismore/ Eileanan agus Sgeiran Lios mór	B	603		453							325		498					380
Ascrib, Isay & Dunvegan	B	656		968					664	678		719						434
Sound of Barra	C	576		276		249	201			179		92			116			
Sanday	B		1,458		1,148					478	425	260	308	107		180		92
Mousa	B		402		235					83			93					
Yell Sound Coast	B		501		351					212			168					
Dornoch Firth & Morrich More	B		593	405		220	290	231	191	257	144	145	166	219	208	157	143	111
Firth of Tay & Eden Estuary	B		633	700		668	461	459	335	342	275	222	111	124	77	88	50	29

## ANNEX 2: FIGURES

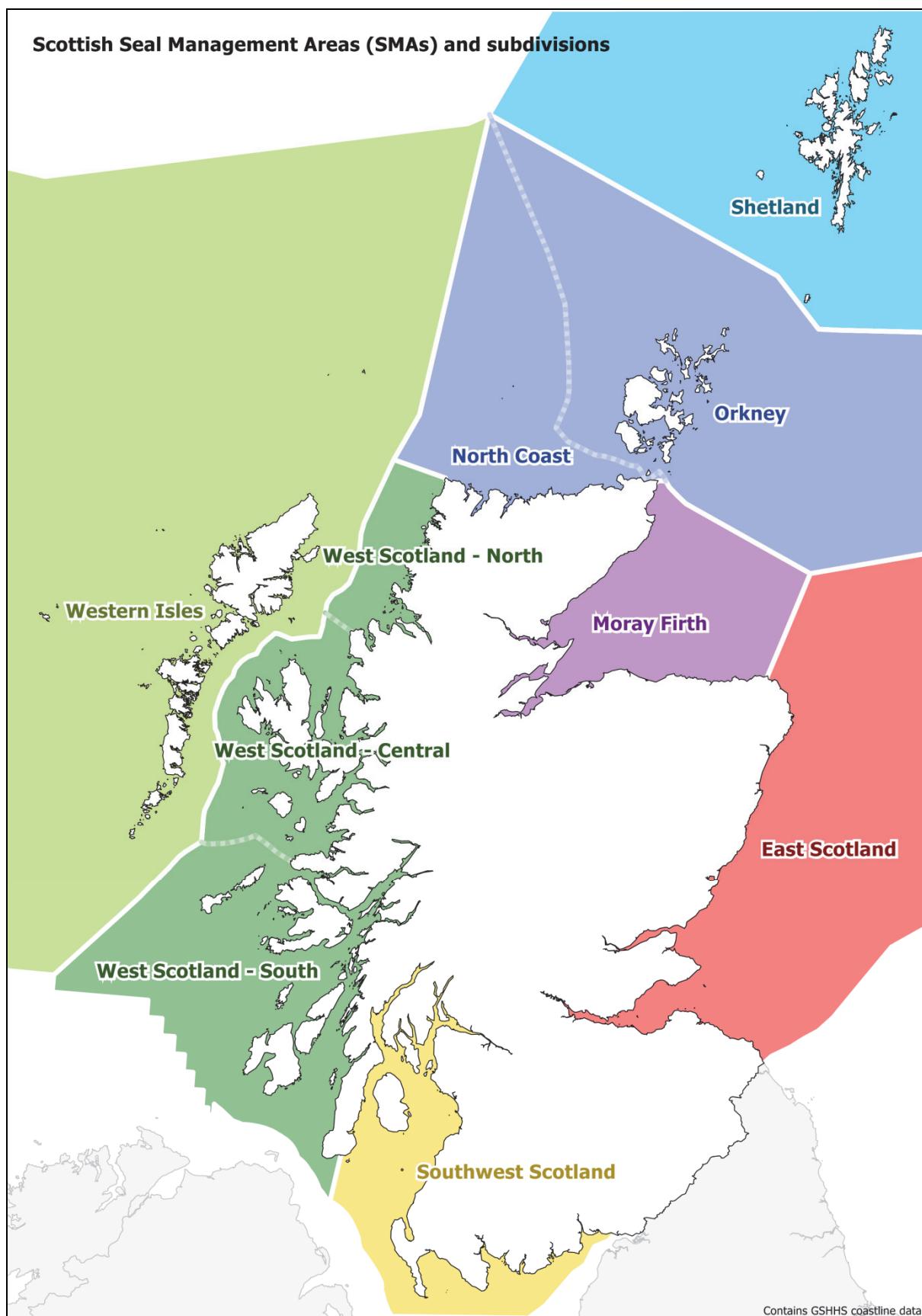
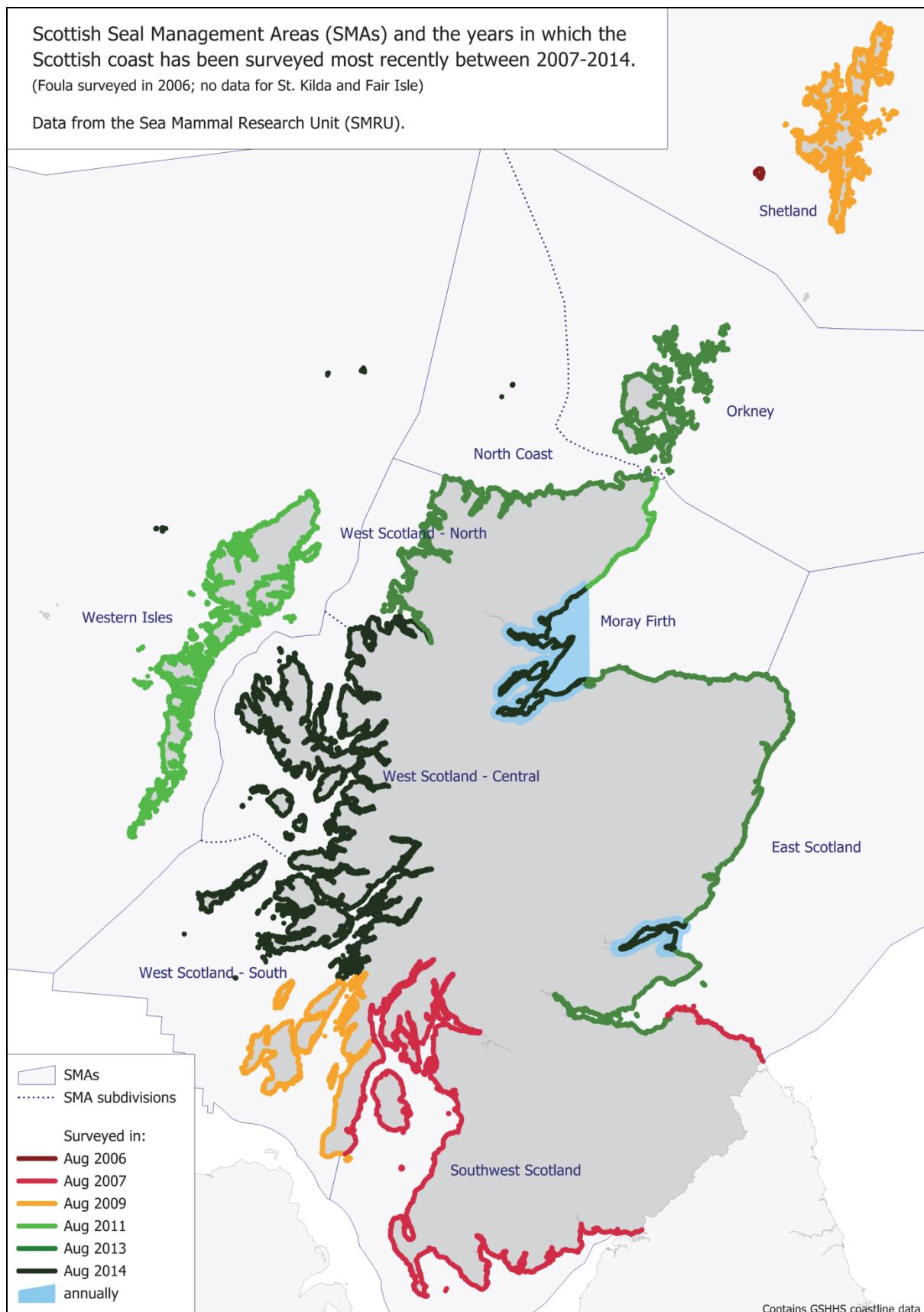
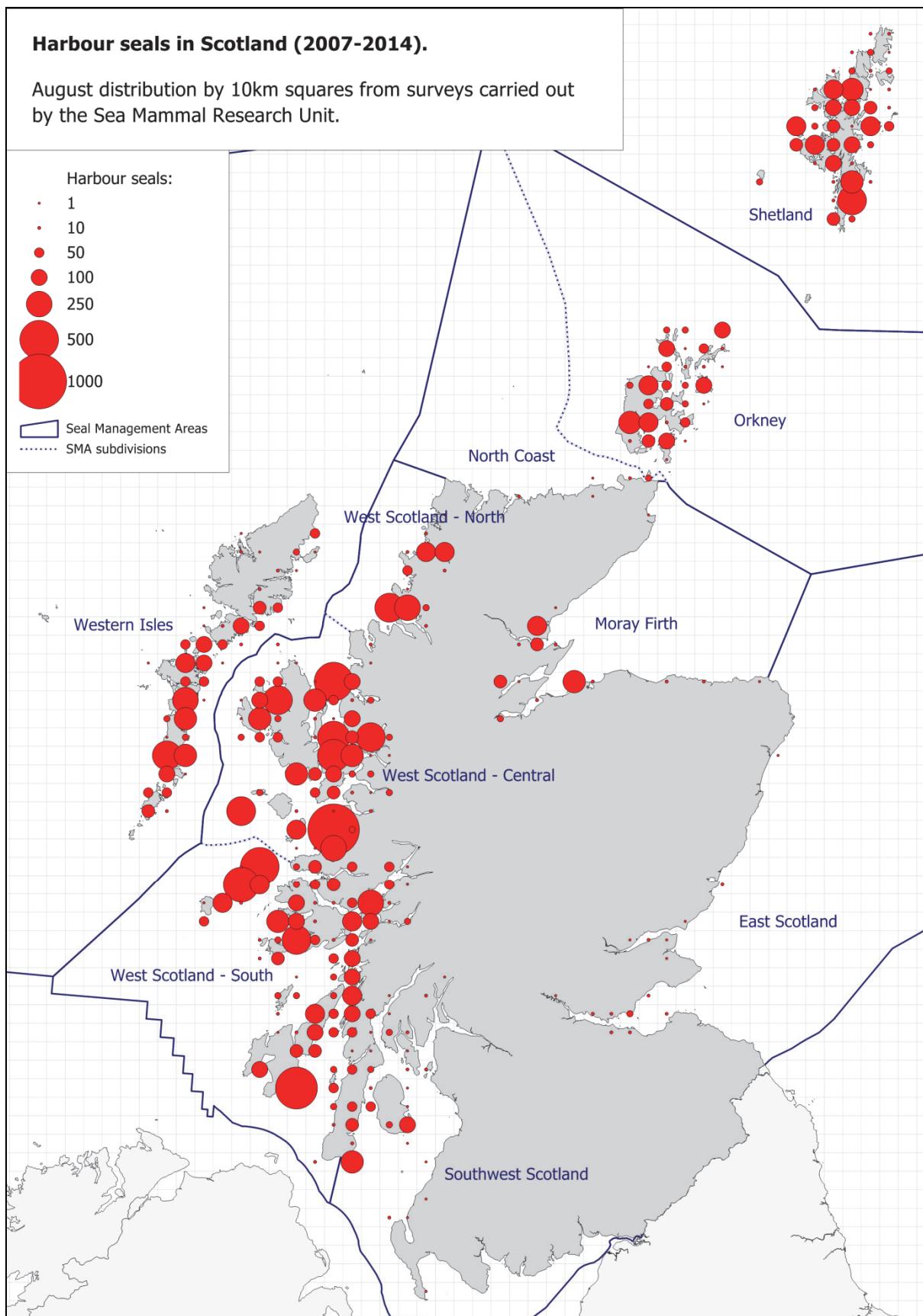


Figure 1. Scottish Seal Management Areas and subdivisions (dotted lines).



*Figure 2. Map showing the years in which different parts of Scotland were most recently surveyed for harbour seals. Most areas were surveyed between 2007 and 2014. The Firth of Tay and part of the Moray Firth are surveyed every year by fixed-wing aircraft. All other areas were surveyed by helicopter using a thermal imager.*



*Figure 3. The number and summer distribution of harbour seals at haul-out sites in Scotland by 10km squares. Seal Management Areas (SMAs) and subdivisions (dotted lines) are outlined.*

### Grey seals in Scotland (2007-2014).

August distribution by 10km squares from surveys carried out by the Sea Mammal Research Unit.

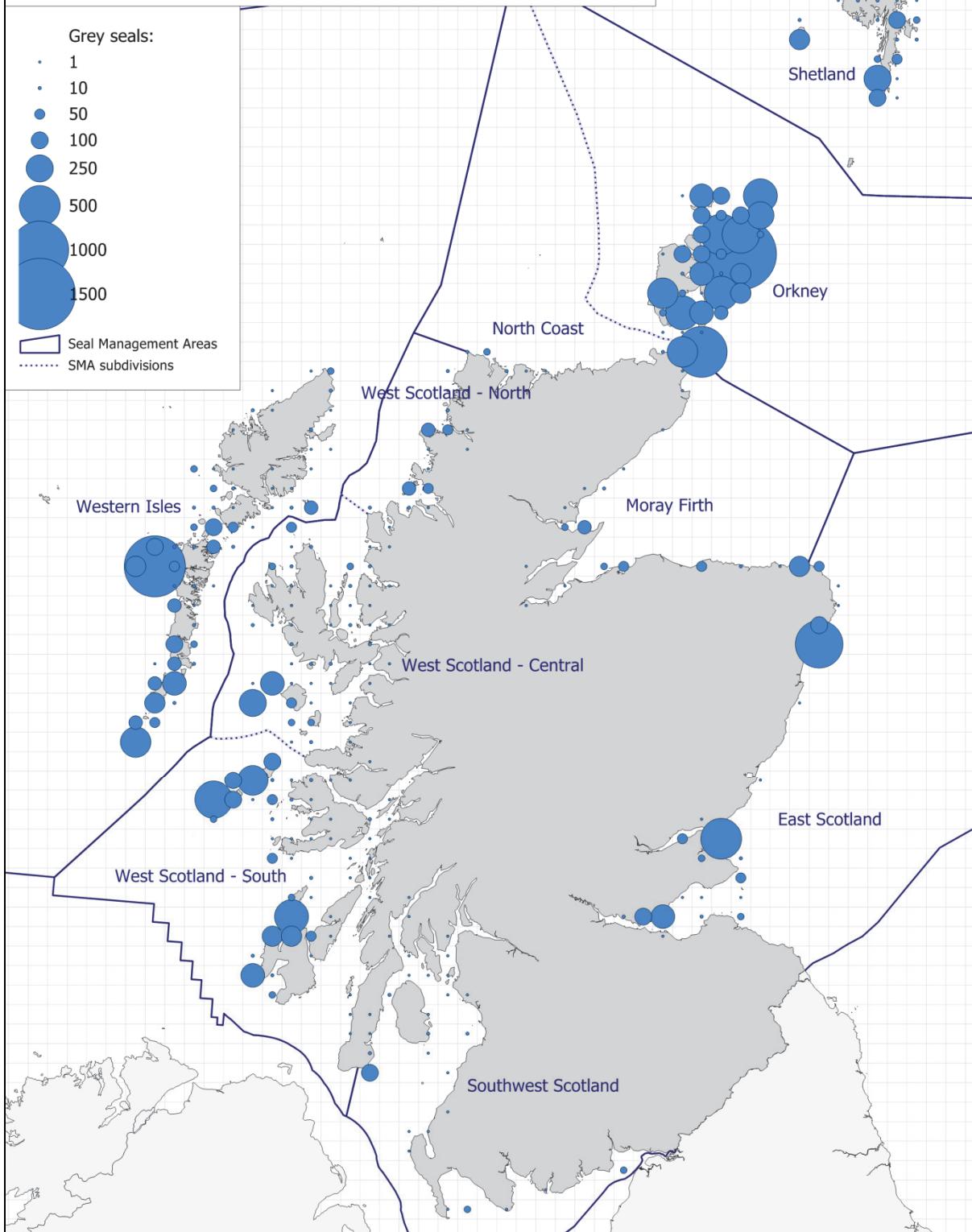


Figure 4. The number and summer distribution of grey seals at haul-out sites in Scotland by 10km squares. Seal Management Areas (SMAs) and subdivisions (dotted lines) are outlined.

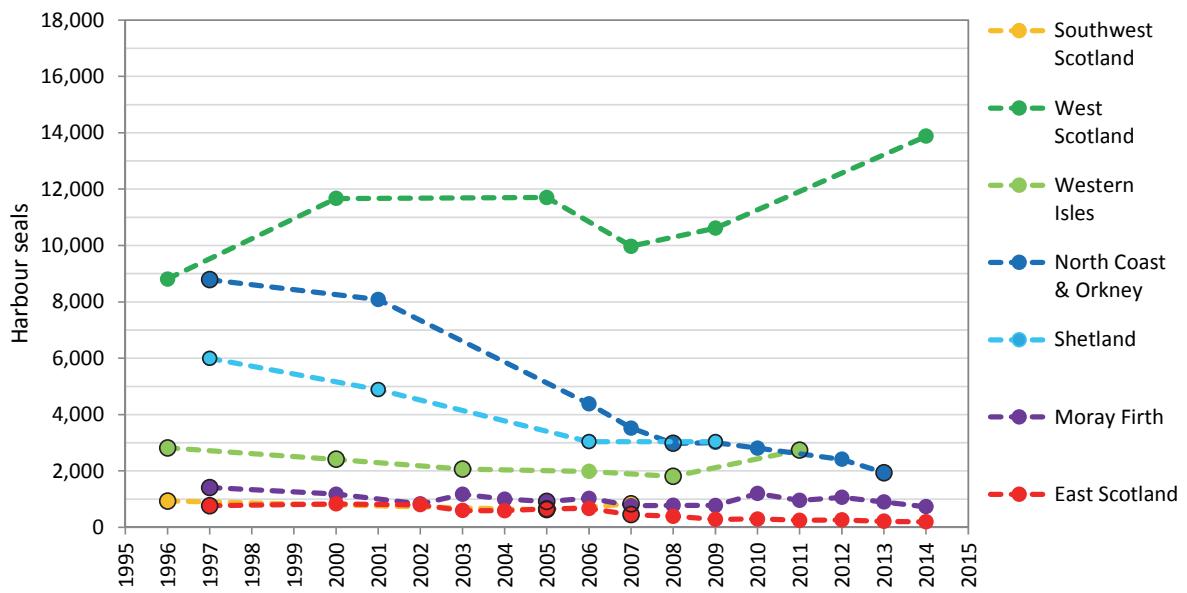


Figure 5. A comparison of August counts of hauled-out harbour seals in Scottish Seal Management Areas from 1996 to 2014. All surveys were carried out by the Sea Mammal Research Unit. Since 2006, thermal image counts have been verified using digital still images where possible. Note that because these data points represent counts of harbour seals distributed over large areas, individual data points may not be from surveys from only one year. Points are only shown for years in which a significant part of the SMA was surveyed. Points with a black outline are counts obtained in a single year.

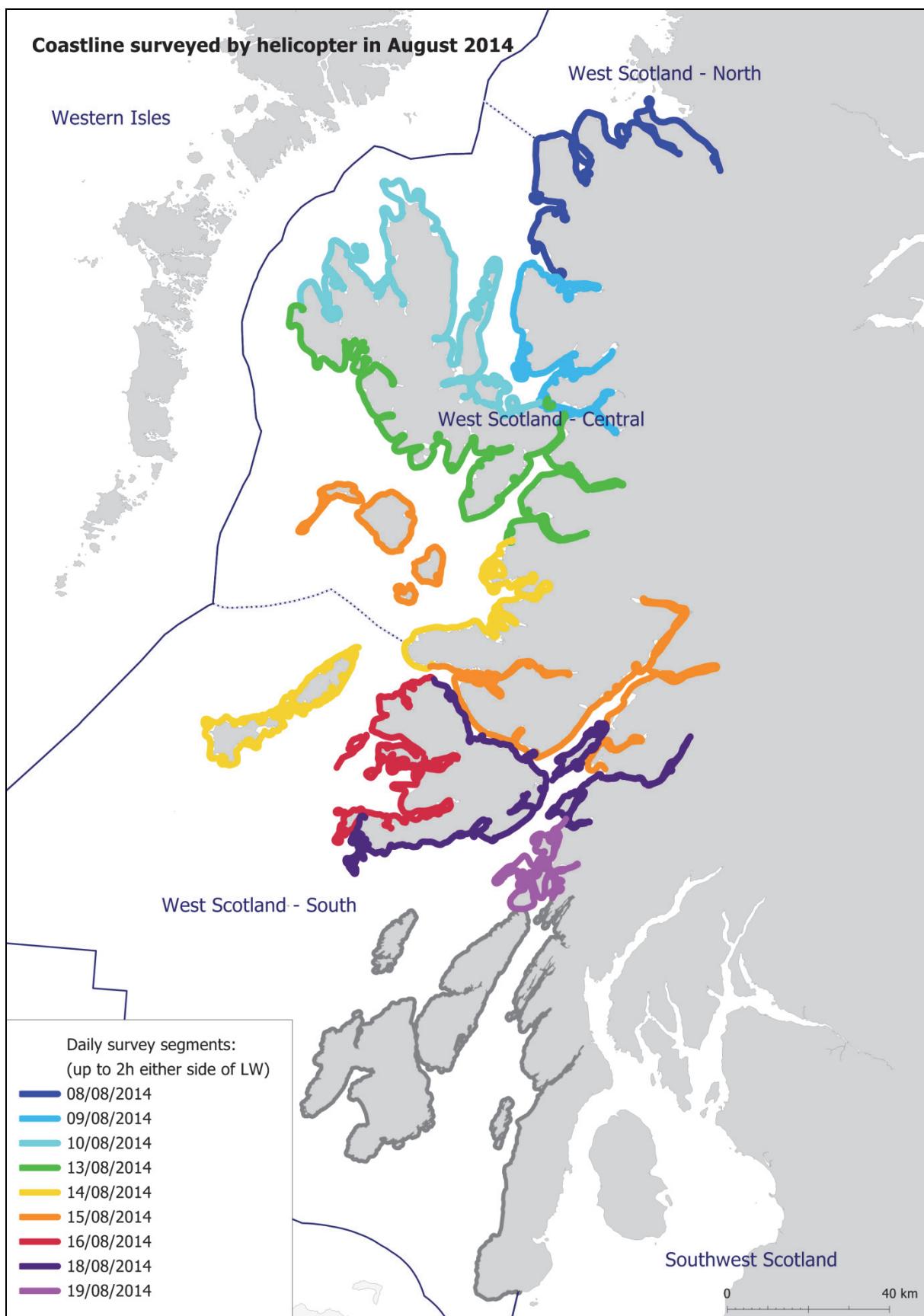


Figure 6. Sections of coastline covered each day during the August 2014 survey.

**Subregions surveyed by helicopter using a thermal imager in August 2014**

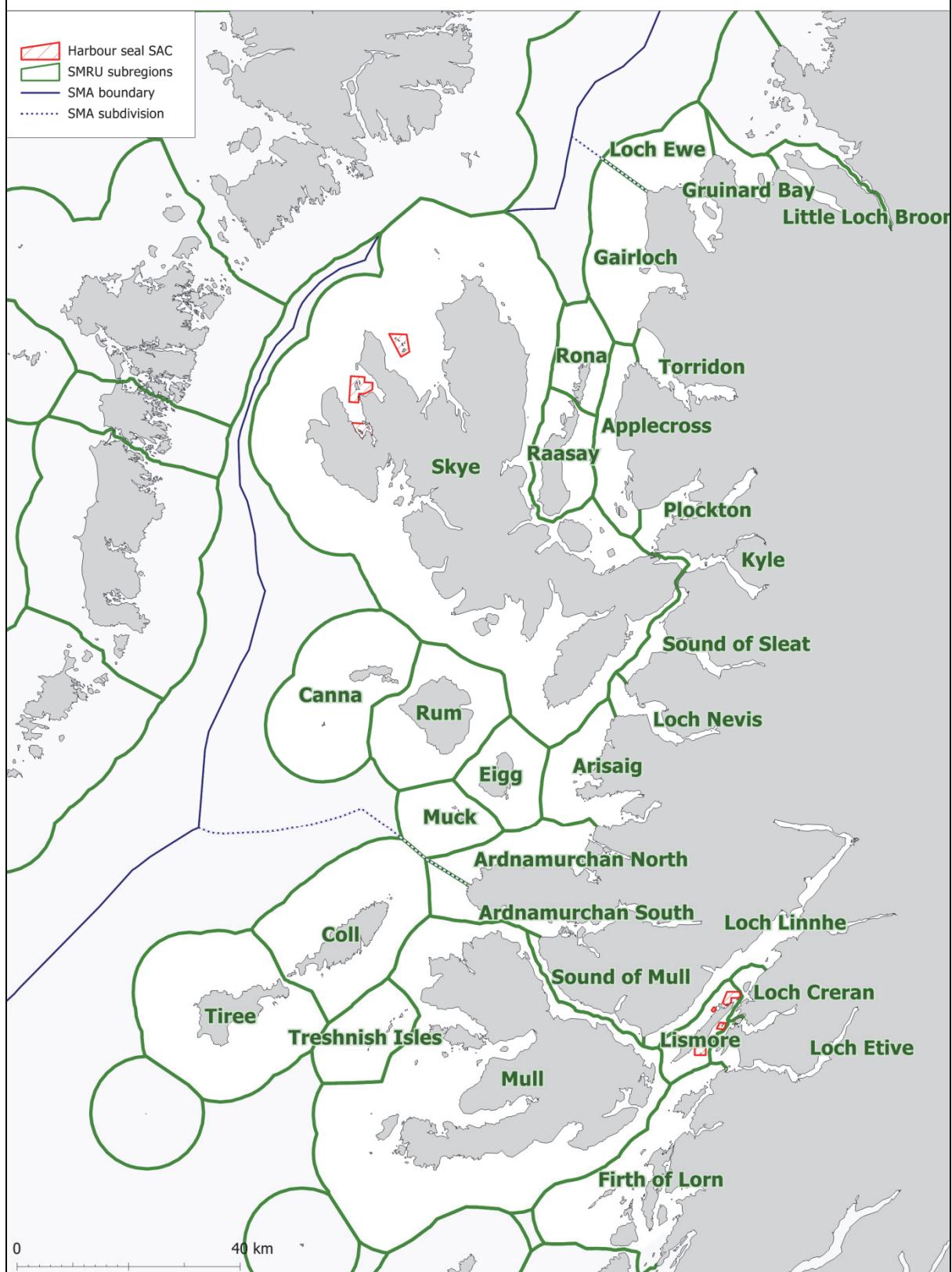
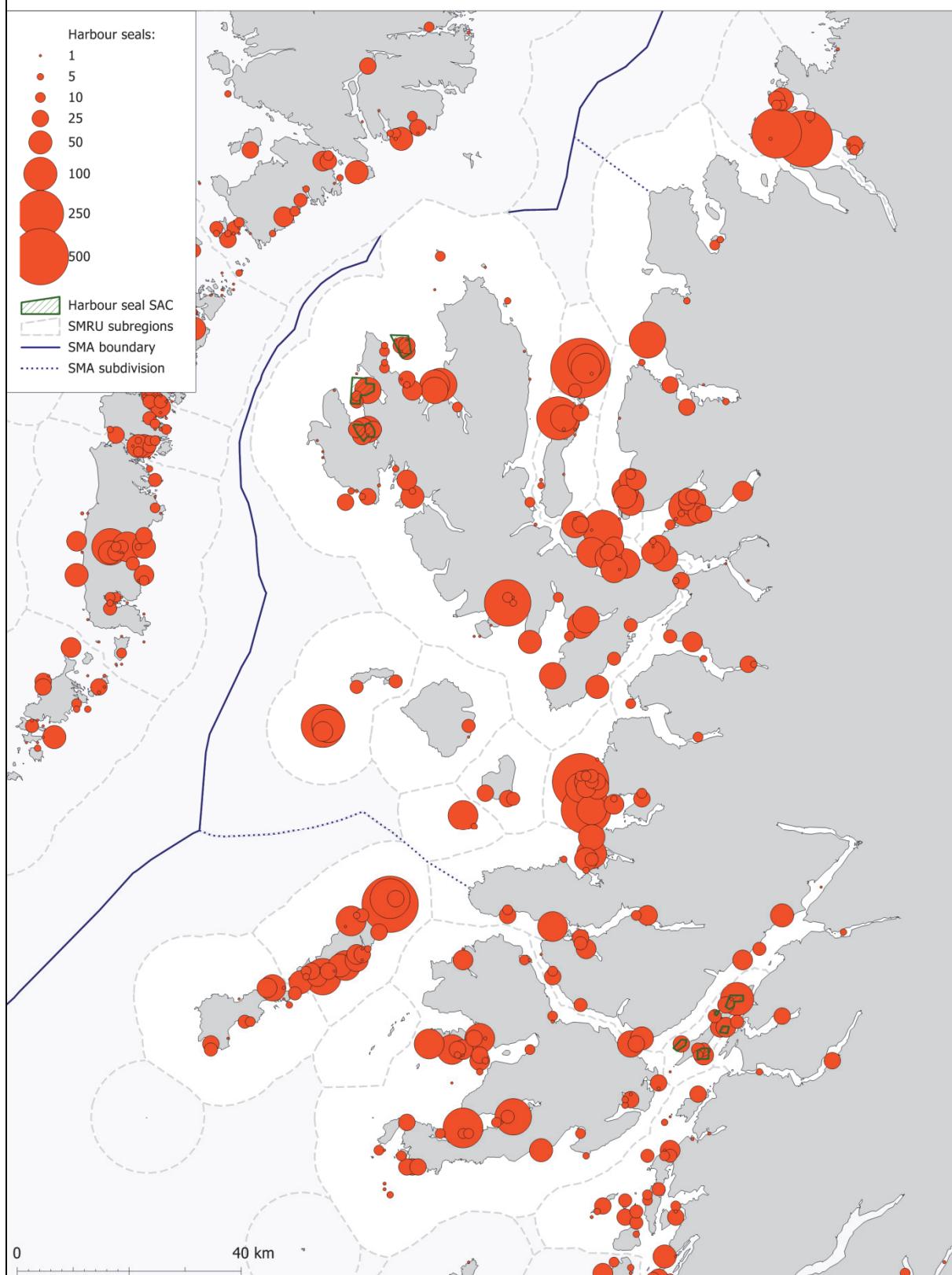


Figure 7. The subregions in West Scotland that were surveyed in August 2014. Harbour seal SACs within the area surveyed are outlined in red.

**Harbour seals in the 'West Scotland' Management Area in August 2014 by 1km squares.**

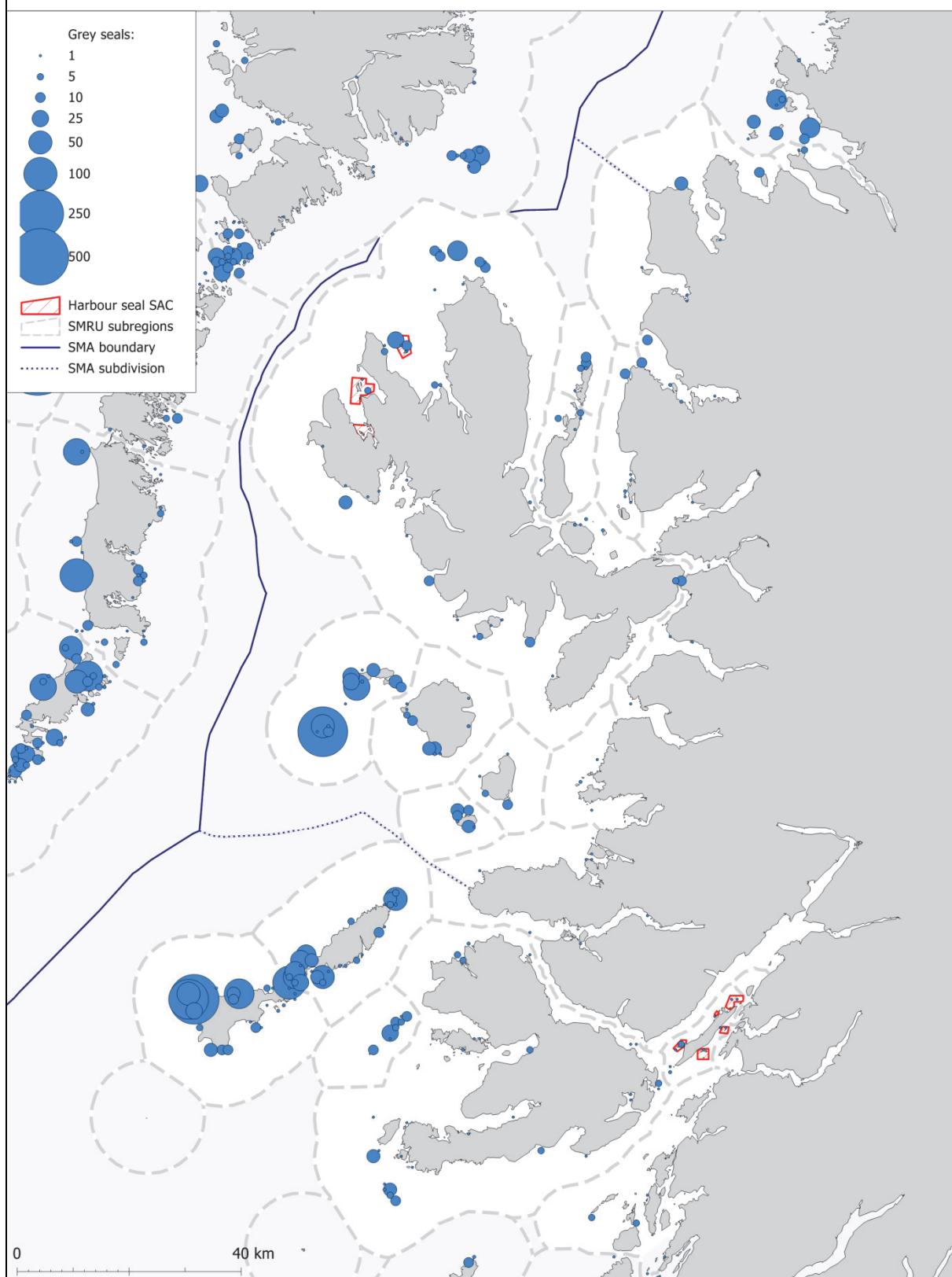
Seal count data from Sea Mammal Research Unit helicopter surveys.



*Figure 8. The distribution of harbour seals counted in West Scotland in August 2014 (clear areas). Harbour seals previously counted on adjacent coasts (shaded in grey) are included. Counts are aggregated by 1km squares. Details of counts are given in Table 3.*

**Grey seals in the 'West Scotland' Management Area in August 2014 by 1km squares.**

Seal count data from Sea Mammal Research Unit helicopter surveys.



*Figure 9. The distribution of grey seals counted in West Scotland in August 2014 (clear areas). Grey seals previously counted on adjacent coasts (shaded in grey) are included. Counts are aggregated by 1km squares. Details of counts are given in Table 4.*

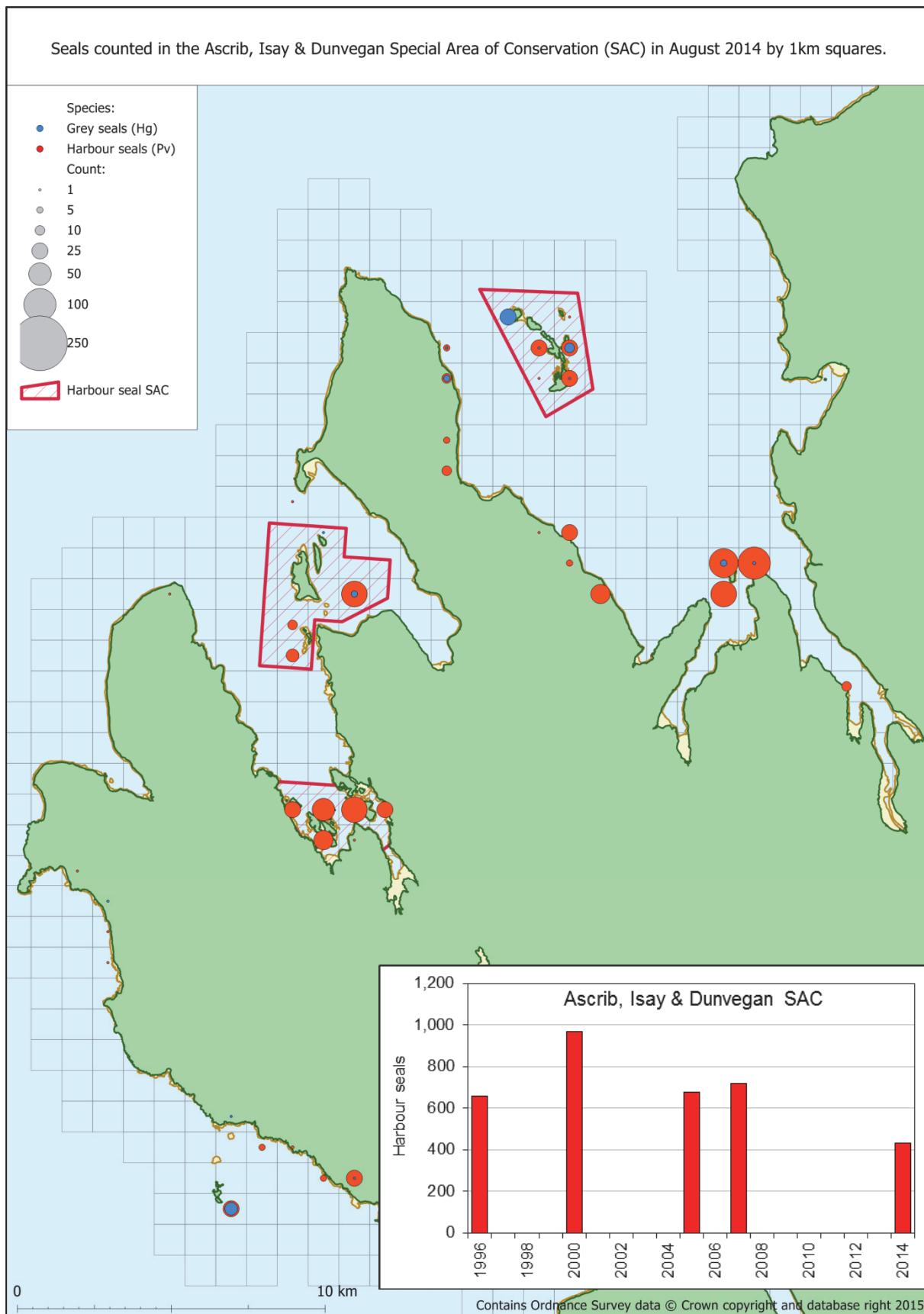


Figure 10. The distribution of harbour seals in and around the Dunvegan and Ascrib Islands harbour seal SAC in August 2014. To eliminate overlapping small groups, counts were aggregated by 1km.

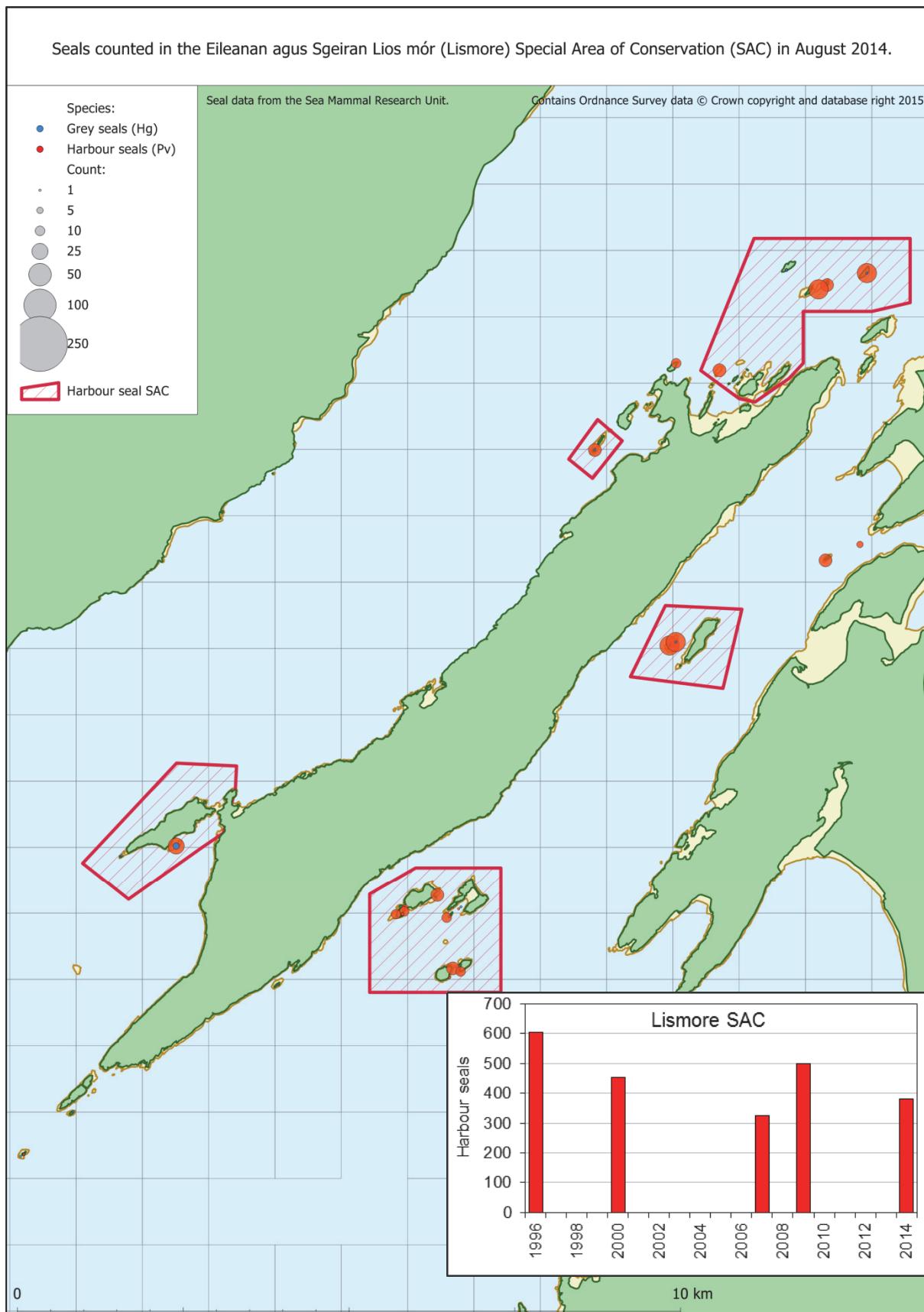


Figure 11. The distribution of harbour seals in and around the Eileanan agus Sgeiran Lios Mór (Lismore) harbour seal SAC in Loch Linnhe in August 2014.

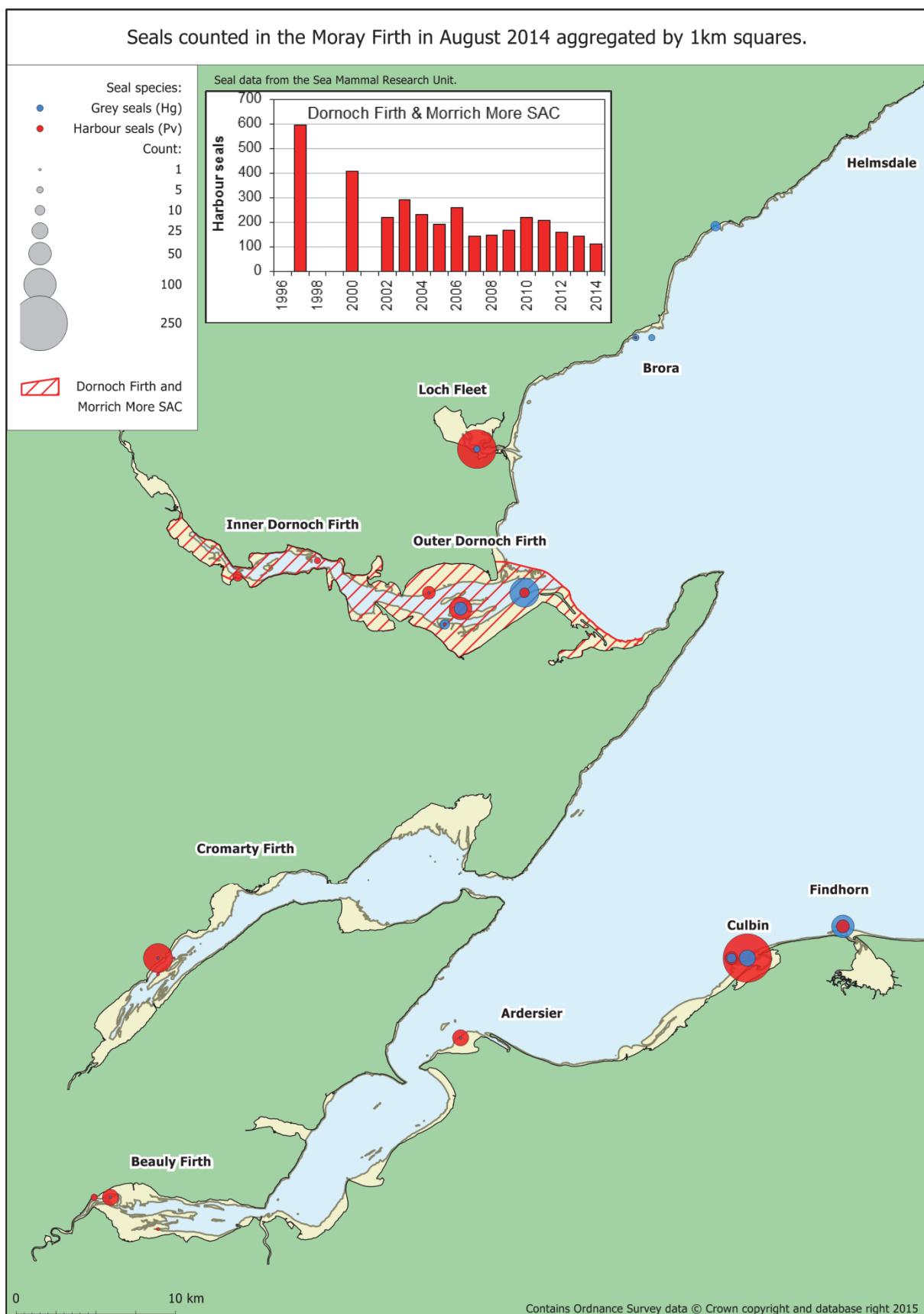
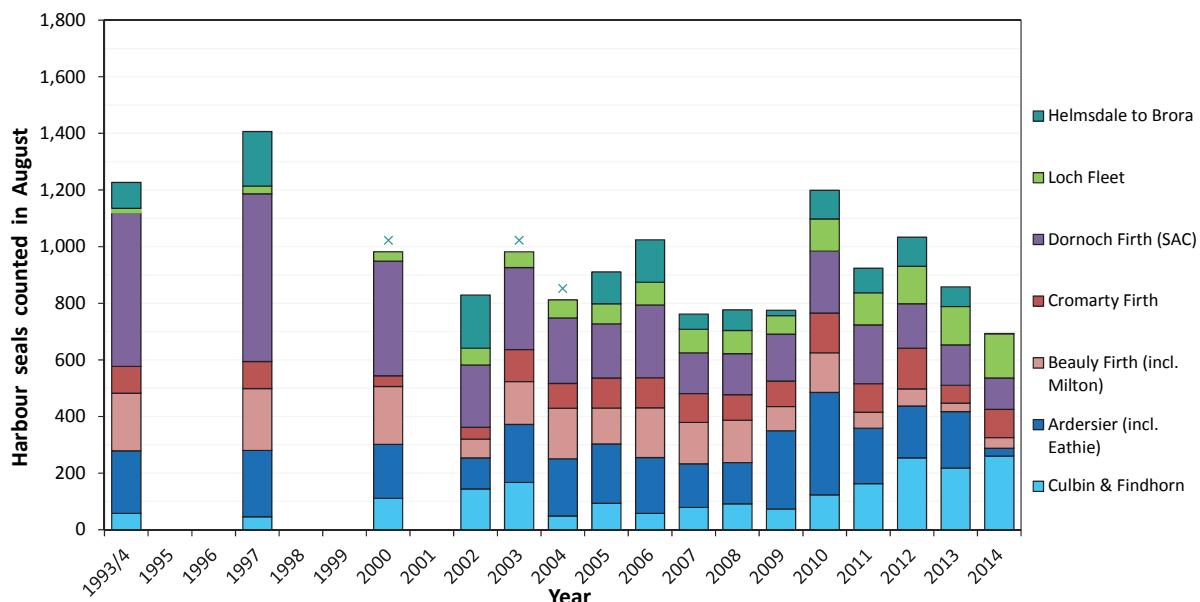
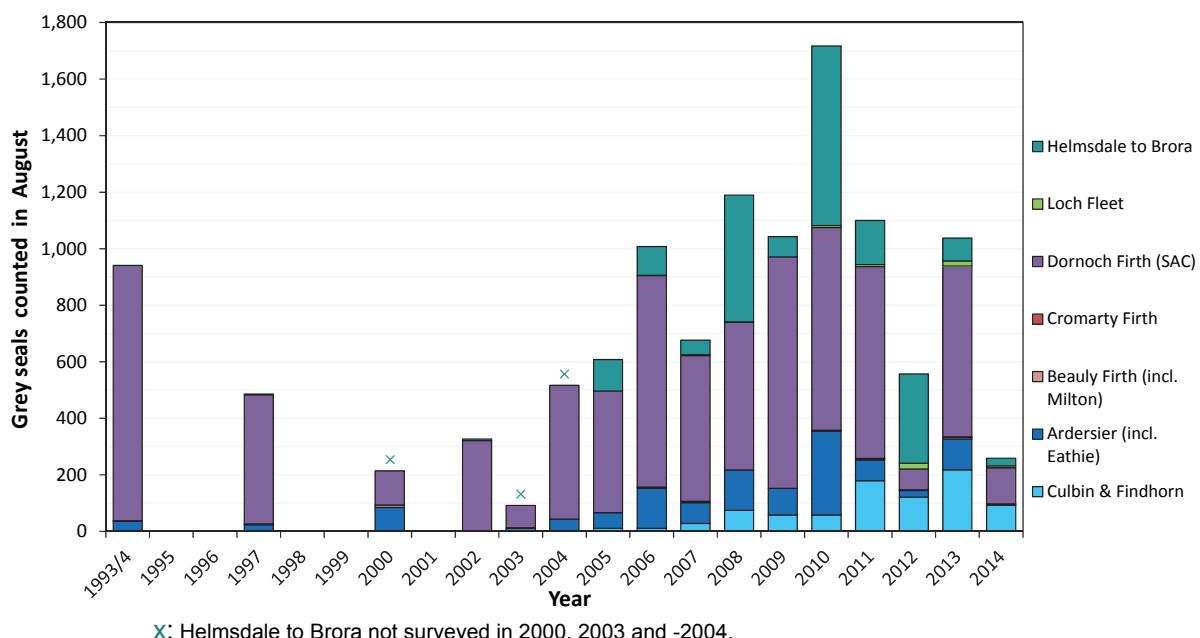


Figure 12. The distribution of harbour and grey seals counted in the Moray Firth in August 2014. Detailed counts are given in Figure 13 (harbour seals) and Figure 14 (grey seals).



X: Helmsdale to Brora not surveyed in 2000, 2003 and 2004.

**Figure 13.** August counts of harbour seals in parts of the Moray Firth from 1994 to 2014. Detailed counts are given in Figure 13. Mean values were used for areas surveyed more than once in a single season (2002, 2004-2008). Helmsdale to Brora and Loch Fleet were not surveyed in 1994, so 1993 counts were used for these areas. The Dornoch Firth and Morrich More is a harbour seal SAC. Data are from aerial surveys by the Sea Mammal Research Unit.



X: Helmsdale to Brora not surveyed in 2000, 2003 and -2004.

**Figure 14.** August counts of grey seals in parts of the Moray Firth from 1994 to 2014. Detailed counts are given in Figure 14. Mean values were used for areas surveyed more than once in a single season (2002, 2004-2008). Helmsdale to Brora and Loch Fleet were not surveyed in 1994, so 1993 counts were used for these areas. The Dornoch Firth and Morrich More is a harbour seal SAC. Data are from aerial surveys by the Sea Mammal Research Unit.

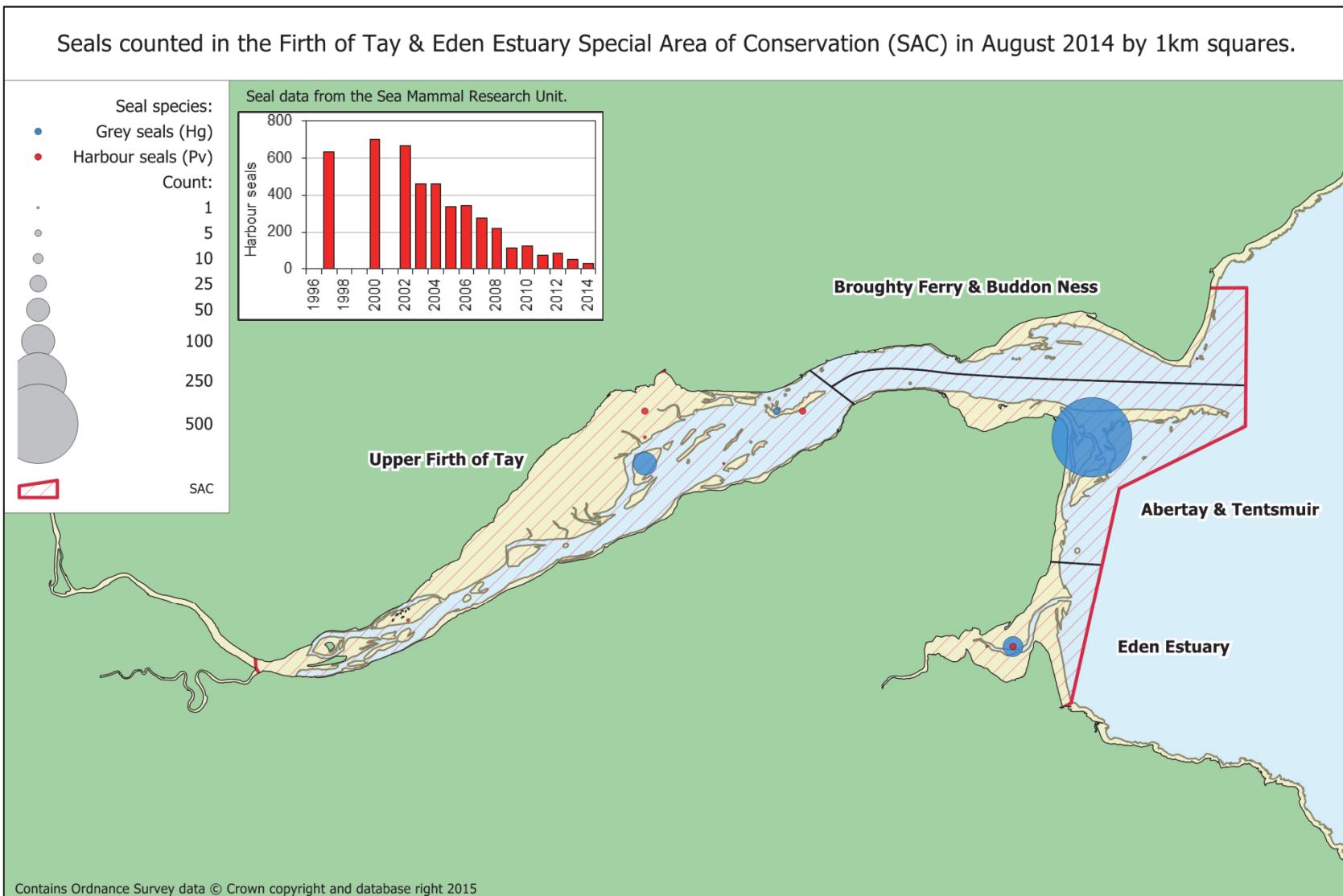


Figure 15. The distribution of harbour and grey seals counted in the Firth of Tay & Eden Estuary SAC in August 2014. Detailed counts for the SAC are given in Table 7 and Table 8.

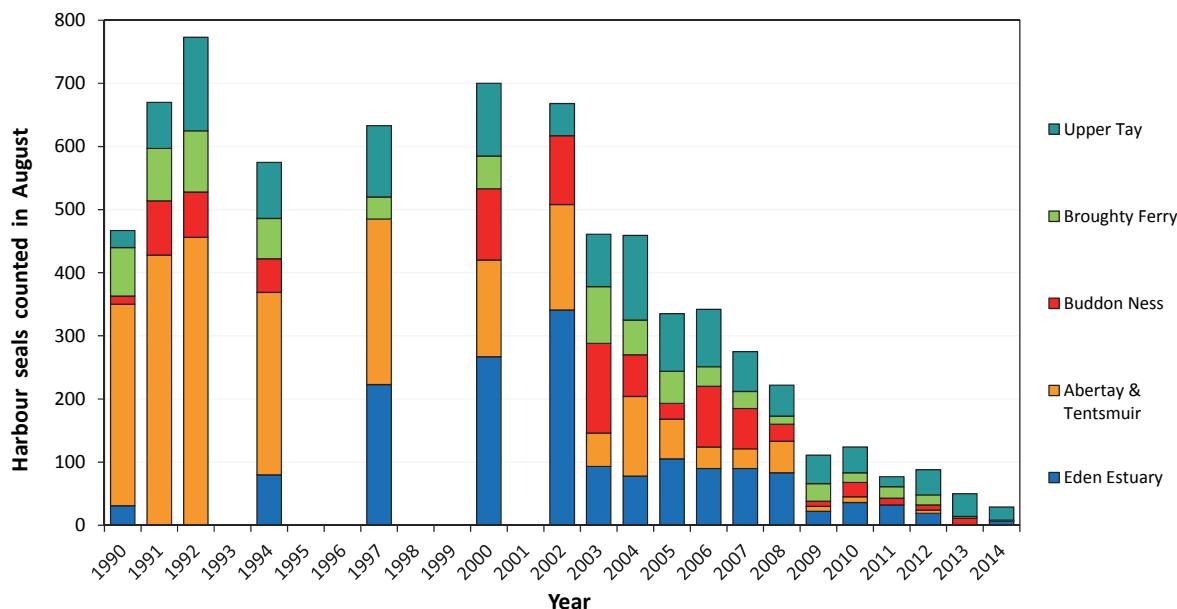


Figure 16. August counts of harbour seals in the Firth of Tay & Eden Estuary harbour seal SAC from 1990 to 2014. Mean values are given for areas surveyed more than once in a single season (2005, 2007, 2008). Detailed counts for each subarea are given in Table 7, and a distribution map for 2014 counts is shown in Figure 15. Data are from aerial surveys by the Sea Mammal Research Unit.

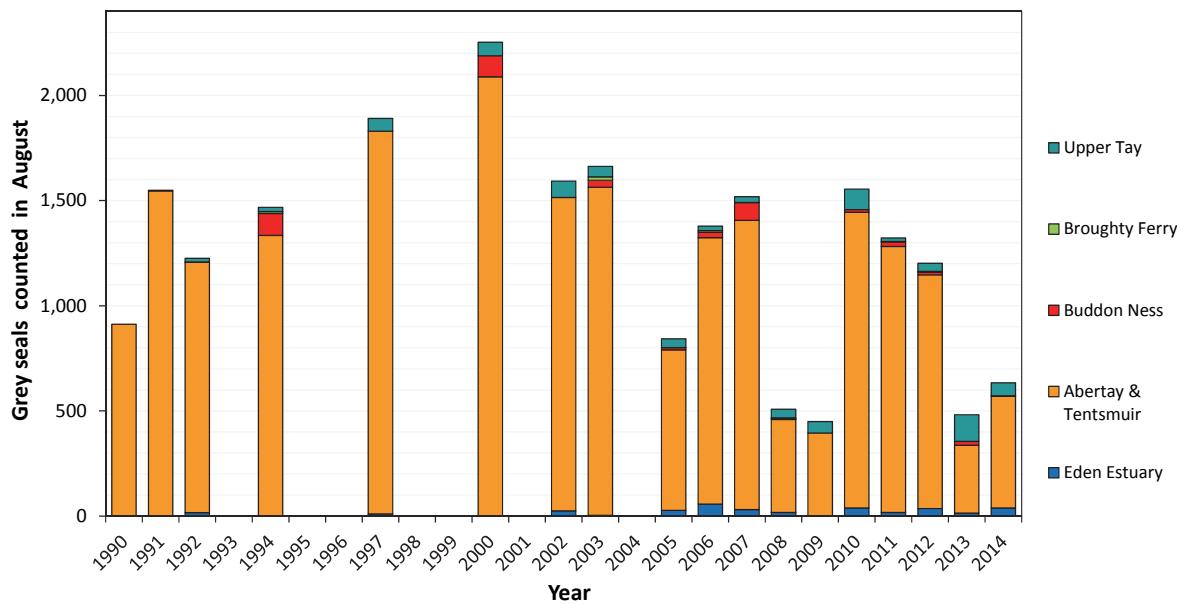


Figure 17. August counts of grey seals in the Firth of Tay & Eden Estuary harbour seal SAC from 1990 to 2014. Mean values are given for areas surveyed more than once in a single season (2005, 2007, 2008). Detailed counts for each subarea are given in Table 8, and a distribution map for 2014 counts is shown in Figure 15. Data are from aerial surveys by the Sea Mammal Research Unit.

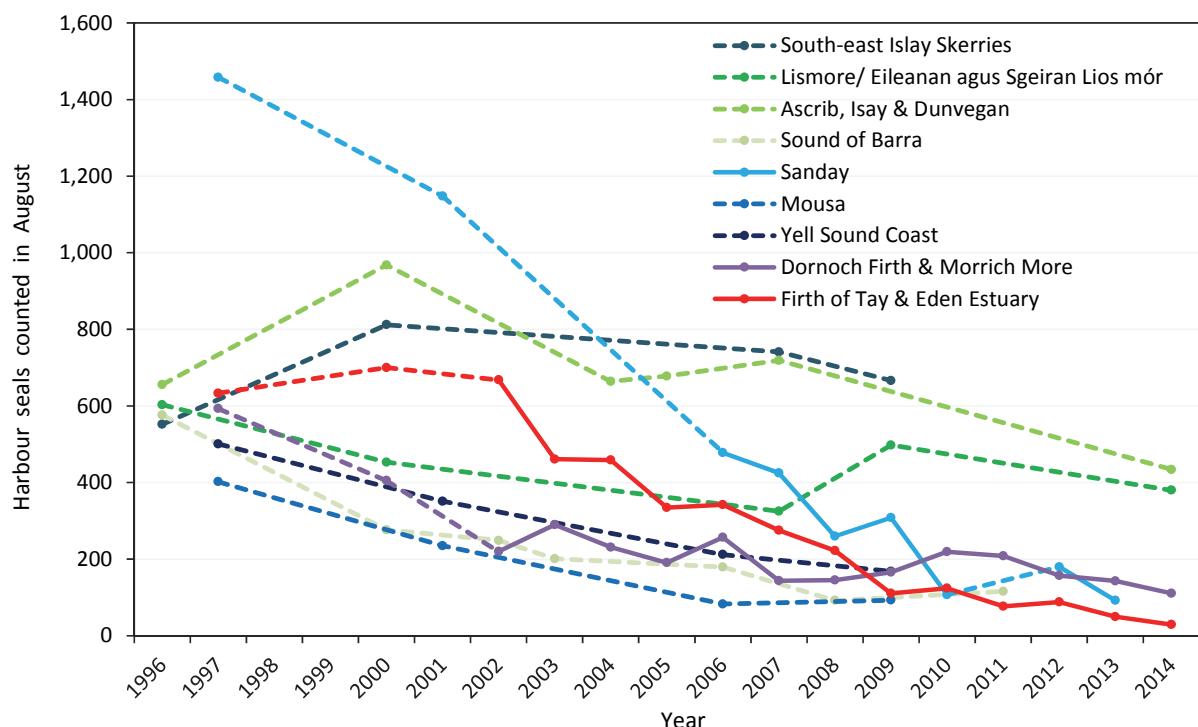


Figure 18. A comparison of harbour seals counted in Special Areas of Conservation in Scotland, designated for the protection of harbour seals, from 1996 – 2014. Detailed counts for each SAC are given in Table 9.

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Policy and Advice Directorate, Great Glen House,  
Leachkin Road, Inverness IV3 8NW  
T: 01463 725000

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