

Observations on seals on the island of Surtsey in the period 1980-2012

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ABSTRACT

Grey seals (*Halichoerus grypus* Fabricius) and harbour seals (*Phoca vitulina* L.) have been surveyed on the coasts of Iceland since 1980. During the period 1980-2012, both seal species have declined markedly in numbers at the Icelandic coast. The grey seal has established a considerable breeding site on the northern spit of the Surtsey island. This is at present one of the biggest grey seal rookeries on the southern shores of Iceland, with estimated about 60 pups born there in the autumn of 2012. On the other hand, the harbour seal has not been numerous on Surtsey during breeding time in the summer. Breeding sites of harbour seals on the south coast of Iceland closest to Surtsey are in the estuaries of the glacial rivers Ölfusá, Þjórsá, Markarfljót and Kúðaflljót. Harbour seals, however, haul-out in great numbers on the northern shores of Surtsey during the winter, presumably using the island as a resting place after foraging in the adjacent waters.

INTRODUCTION

Harbour and grey seal numbers have been surveyed on the coasts of Iceland since 1980 (Hauksson 2008; Hauksson 2010; Granquist et al. 2011; Hauksson et al. 2014). Seals visited the island the first time shortly after it had formed, and used it as a resting place. Constant changes of the shore seem to have hindered seals in breeding there until first year 1983 (http://www.surtsey.is/pp_isl/lifsj_4.htm). Fridriksson (1994) noted that that grey seal breed regularly on the island but harbour seals only sporadically. Hauksson (2009) presented information from surveys on seals in Surtsey until the year 2005. New information, from the period 2006-2012, is here and discussed on context with previous work.

MATERIAL AND METHODS

The present work summarizes seal sightings on Surtsey island from year 1980 to 2012. Information on the survey methods and basic data analysis in

the grey seal pups surveys have been published in (Hauksson 2007) and the harbour seal aerial census is described in (Hauksson 2010). Further analyses of data and estimation of the grey seal breeding O-give is described in (Hauksson 2007).

RESULTS

Only a few harbour seals have ever been observed in Surtsey during August (Table 1), and hardly any during the grey seal surveys in the autumn months.

The first time the author observed grey seals in Surtsey from the air, was in August 1980, and grey seals have been regularly seen there since (Table 2). In 1989 estimated pup-production on the breeding site there was at least 38 pups and in 2012 a total of 62 pups were born (Table 3). In the period 1989 – 2012 the medium breeding date was the 12 October (Table 3). Pup-production was increasing from 1989 to 2008 and probably did decline in 2012 (Table 3).

Table 1. Observations on seals in Surtsey and vicinity from aerial surveys during the summer, aimed for harbour seals. Information about time of counting, time of midday, weather, tide and time of low tide, are included in the table for comparisons with future data. These factors can influence the number of harbour seals counted hauling out (see Hauksson 2010).

Day	Time of counting	Harbour seals	Grey seals	Time of midday	Weather	Tide	Time of low tide
11 Aug 1980	14:01	20	1	13:33	Wind force 1-2, cloudy	Spring tide	12:09
22 Jul 1985	14:57	4	3	13:34	NW-breeze, lightly cloudy	Spring tide	15:30
11 Jul 1988	12:18	0	6	13:33	N-4, lightly cloudy	Spring tide	16:11
9 May 1989	17:30	9	0	13:24	S-4, lightly cloudy	-	14:00
12 Aug 1990	16:40	18	0	13:33	S-breeze	Spring tide	15:27
12 Aug 1992	12:53	0	27	13:26	No wind cloudy	Increasing tide	11:17
23 Aug 1995	11:15	6	0	13:30	SV-4, cloudy	Neap tide	11:00
6 Aug 2003	20:57	2	1	13:26	NV-4, lightly cloudy	Neap tide	18:23
16 Aug 2006	16:40	0	0	13:24	NV-4, lightly cloudy	Neap tide	17:12
16 Jul 2011	12:05	0	0	13:27	NA-4, lightly cloudy	Spring tide	12:24

Table 2. Observations on grey seals in Surtsey and vicinity from aerial surveys during the autumn. Environmental factors not given because they do not influence significantly the number of pups seen

Day	Time of counting	Pups	Adults	Notes
8 Oct 1982	15:45	0	0	
19 Oct 1986	13:14	34	16	Estimated minimal pup-production in 1986; $34 \times 1.25^1 = 42$
9 Oct 1988	10:30	1	1	
21 Nov 1988	11:30	15	11	Estimated minimal pup-production in 1988; $16 \times 1.25^1 = 20$
25 Nov 1989	11:05	3	1	
21 Nov 1989	10:55	35	0	
13 Dec 1989	12:00	73	0	Three white pups 70 grey weaned pups
3 Nov 1990	11:00	23	-	Estimated minimal pup-production in 1990; $23 \times 1.25^1 = 29$
2 Nov 1992	10:30	25	10	Estimated minimal pup-production in 1992; $25 \times 1.25^1 = 31$
19 Oct 1995	16:10	39	-	Estimated minimal pup-production in 1995; $39 \times 1.25^1 = 49$
15 Oct 1998	-	30	-	Karl Gunnarsson counted on foot (personal communication)
16 Oct 2002	11:36	22	-	
6 Nov 2002	12:55	35	-	Estimated minimal pup-production in 2002; $35 \times 1.25^1 = 44$
17 Sep 2003	-	3	-	
8 Oct 2003	-	23	-	
29 Oct 2003	-	37	-	
21 Nov 2003	-	8	-	
9 Dec 2003	-	5	-	
24 Sep 2005	10:45	10	-	
20 Oct 2005	13:00	34	-	
11 Nov 2005	10:30	29	-	
25 Nov 2005	12:50	66	-	Six white pups, 60 weaned pups
25 Sep 2008	10:50	24	$\cong 10$	
18 Oct 2008	11:49	9	-	Additionally 34 weaned pups counted
21 Nov 2008	11:13	13	-	Additionally 69 weaned pups and juveniles counted
19 Sep 2012	10:34	8	-	One dead pup probably, motionless and gulls standing by it
1 Oct 2012	10:36	45	-	
5 Oct 2012	15:30	41	-	
17 Oct 2012	11:49	55	-	
11 Nov 2012	-	54	-	

¹ From (Hauksson 2007).

DISCUSSION

It is not known why the peak birthing date of grey seals on the island was about month earlier in year 2003 compared with year 1989. However, the

birthing O-give in 1989 was only based on three non-negative counts, which is the absolute minimum for fitting a normal distribution to it, so it was not as sound as the O-give in 2003, which was based on

Table 3. Peek birthing date and 90% confidence interval births for the grey seal herd in Surtsey and information for estimation of the relationship between pup counts on breeding sites (n), estimated pup production and correction factor to correct pup counts.

Date	Max count (n)	Breeding (Time interval for 90% births)	Pup-production (p)	p/n	The distribution that gave best fit (log likelihood value)
14 Sep – 13 Dec 1989	35	19 Nov (7 Nov – 1 Dec)	38	1.09	Normal (-129.36)
17 Sep - 11 Dec 2003	37	20 Oct (25 Sep – 26 Nov)	54	1.46	Gamma (-230.98)
24 Sep – 25 Nov 2005	34	24 Oct (28 Sep – 13 Nov)	63	1.85	Weibull (-241.41)
25 Sep – 21 Nov 2008	24	13 Oct (5 Oct – 21 Oct)	88	inconclusive	Lognormal (-310.28)
19 Sep – 17 Oct 2012	55	4 Oct (12 Sep – 26 Oct)	62	1.13	Loglogistic (-222.24)
Median (min – max)	35 (24 – 55)	12 Oct (12 Sep – 1 Dec)	62 (38 – 88)	1.46 (1.09 – 1.85)	

five counts. But there is evidence for different peek birthing dates in same rookery in different years in Breidafjord, W-Iceland, but the reason for it is only speculative (Hauksson 2007).

The grey seal has established a sizeable breeding site on the northern spit of Surtsey, which is now one of the biggest rookeries on the southern shores of Iceland. It was of similar size in 1989 to 2008 in spite of considerable decrease in the Icelandic grey seal population (Hauksson 2010). All hunting is prohibited in Surtsey and only researchers are allowed to visit and stay on the island, so it can truly be said that the grey seal rookery is protected in Surtsey. In spite of that it has not increased markedly since 1989, probably because pups born there have died, as juveniles and adults, elsewhere along the Icelandic coast. Gill-nets are especially dangerous for juvenile grey seals, as if they get caught they easily drown. Juvenile grey seals have been found to undertake extensive trips as marked weaned pups have been recaptured far away from the site where they were marked (Einarsson 1993).

The harbour seals are not numerous in Surtsey during breeding in the summer. Their main breeding sites on the south coast of Iceland closest to Surtsey are in the estuaries of the glacial rivers Ölfusá, Þjórsá, Markarfljót and Kúðaflljót (Hauksson 2010). They, however, haul-out in great numbers on the shores of Surtsey during the wintertime, when feeding. Therefore, Surtsey seems not as important for breeding of harbour seals as it is for the breeding of grey seals. There is also evidence for grey seals driving harbour seals a way from places they have colonized (Hauksson and Ólafsdóttir 2004).

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