

East and North Caithness Cliff SPAs monitoring 2013: plot counts and breeding productivity





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COMMISSIONED REPORT

Commissioned Report No. 622

East and North Caithness Cliff SPAs monitoring 2013: plot counts and breeding productivity

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COMMISSIONED REPORT

Summary

East and North Caithness Cliff SPAs monitoring 2013: plot counts and breeding productivity

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Keywords

Special Protection Area; seabirds; Caithness Cliffs; plot monitoring; breeding productivity.

Background

The East Caithness Cliffs SPA and North Caithness Cliffs SPA seabird monitoring plots were last surveyed in 2005 (Swann, 2012). Since then there have been major declines in many seabird populations throughout Scotland (Foster and Marrs, 2012). There are plans for major offshore wind farm developments off the Caithness coast. It is important to have up to date information on the current status of the East Caithness and North Caithness seabird populations, in terms of numbers and breeding productivity. Thirty-three species-specific plots and 16 colony plots were surveyed in 2013.

Main findings

The plot counts revealed:

- Northern fulmar numbers were 1% higher than 2005.
- European shag numbers had increased markedly from 2005, as the birds recovered from the large winter 2004/05 wreck.
- Black-legged kittiwake numbers have declined by 29% since 2005.
- Common guillemot numbers have declined by 37% since 2005.
- Razorbill numbers have declined by 10% since 2005.
- Breeding productivity levels for northern fulmar and black-legged kittiwake in 2013 were not high enough to maintain stable populations, whilst the European shag productivity figure, if maintained, would result in population increases.

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1. INTRODUCTION

A number of areas for lease have been awarded by The Crown Estate to developers for the generation of renewable energy from tidal and wave energy developments at sites across the Pentland Firth and Orkney Waters and from offshore wind in Scottish waters. The Habitats Regulations Appraisal (HRA) and Environmental Impact Assessment (EIA) processes require up-to-date population estimates to accurately assess the potential impacts of these developments on the SPA qualifying features. However, a recent report by Natural Power for Marine Scotland on breeding seabird colonies in Scottish SPAs highlighted the lack of recent counts for both East and North Caithness Cliffs SPAs as being an issue (Lewis *et al.*, 2012). Whole colony counts for these two SPAs were last undertaken in 1999-2002 as part of the Seabird 2000 census. The foraging ranges of seabird qualifying features at these two SPAs overlaps with 11 wave and tidal lease areas in Pentland Firth and Orkney Waters, and two offshore wind application sites along the east coast. SNHs recently published Trend Note (Foster and Marrs, 2012) has highlighted the declines of many of these sensitive species in Scotland, therefore there is an urgency to establish current population estimates for these SPAs and their condition status. Without these up-to-date estimates any population or impact modelling undertaken as part of the application process, may be inaccurate.

Monitoring plots were established in 1980, but with amendments made in 1985 and 1993 for long term monitoring of selected seabird species (northern fulmar *Fulmarus glacialis*, European shag *Phalacrocorax aristotelis*, common guillemot *Uria aalge*, razorbill *Alca torda*, and black-legged kittiwake *Rissa tridactyla*) at three SSSIs (Site of Special Scientific Interest), Duncansby Head, Craig Hammel to Sgaps Geo and Berriedale Cliffs (see Mudge, 1986; Callaghan *et al.*, 1999; Evans, 2001; Mitchell *et al.*, 2004) in Caithness. These SSSIs contain the largest colonies of seabirds within the North Caithness Cliffs SPA and East Caithness Cliffs SPA. The plots are separated into two different types, species specific plots and colony plots. While this longer term dataset exists, a continuity analysis with data from before 1999 remains to be undertaken. Therefore this report is based on the 30 species-specific plots and 15 colony plots that were set up in 1993. The same plots were revisited in 1999 during the Seabird 2000 census and again in 2005 as part of the site condition monitoring work (Swann, 2012).

2. METHODS

2.1 Timing of plot visits

Counts were undertaken on the plots between 4th June 2013 and 25th June 2013. The methods used were as per the Seabird Monitoring Handbook (Walsh *et al.*, 1995). These are identical to the methods used in previous surveys (Callaghan *et al.*, 1999, Swann, 2012) though, as in 2005, three plot counts were done, rather than the two in 1999. The minimum gap between each plot count in 2013 was seven days. All counts were made between 0800 and 1600 hours, though northern fulmar plots were not counted till after 0900 hours. To allow comparisons with previous surveys each plot was counted from the same position (as described in Swann 2012) with reference to the marked photographs from the 2005 survey. Follow up visits were made on 23rd July and 6th August 2013 in order to estimate breeding productivity of selected species.

2.2 Species methodology - counts

Northern fulmar. Apparently occupied sites (AOS) were counted. A site is taken as occupied when there is a bird sitting tightly on a reasonably horizontal area large enough to hold an egg. Two birds on such a site, apparently paired, count as one site.

European shag. Apparently occupied nests (AON) include all substantial or well constructed nests occupied by at least one bird.

Black-legged kittiwake. Apparently occupied nests include all substantial or well constructed nests capable of holding eggs and occupied by one standing bird or a bird within touching distance of the nest.

Common guillemot and razorbill. All individual birds on land in the demarcated areas were counted.

2.3 Species methodology - productivity

Productivity monitoring was undertaken for three species:

Northern fulmar. Ten fulmar plots were revisited in early August to record the number of large chicks present. For each plot the number of AOS was derived from the mean of the three count visits (rounded to the nearest whole number). This was then used to calculate the number of large chicks per AOS.

European shag. Ten shag plots were revisited in late July and early August to record the number of large chicks present in each nest. Nests had been marked on photographs and contents noted on the previous count visits. For each plot the number of AON was taken as the maximum number counted on the plot during the three count visits. This was then used to calculate the number of large chicks per AON.

Black-legged kittiwake. Fourteen kittiwake plots were revisited in late July and early August to record the number of large chicks present in each nest. Nests with chicks were marked on photographs and contents noted on the July visit and rechecked on the early August visit. For each plot the number of AON was taken as the maximum number counted on the plot during the three count visits. This was then used to calculate the number of large chicks per AON.

3. MONITORING PLOTS

There are two plot types: colony plots, where all seabird species were counted, and single species plots. The plots are grouped into five areas. These are Badbea, Inver Hill, An Dun, Riera Geo - Ires Geo (within East Caithness Cliffs SPA), and Skirza Head (within North Caithness Cliffs SPA). At each plot a GPS reading identifies the count point and a digital photograph showing the position and boundary of the site is given in Swann, (2012). Table 1 gives details of all plots, their code, their plot reference name (to allow comparisons with previous censuses), the species monitored and the GPS reading of the count point. The plots are arranged in the table in the order they were monitored within each colony during the 2005 and 2013 surveys (usually from north to south or vice versa). Those in bold are the colony plots. Refer to Annex 1 for a map of the location of the plots within the two SPAs.

Table 1. Details of monitoring plots. Species codes are northern fulmar (FU), European shag (SH), great black-backed gull (GB), lesser black-backed gull (LB), black-legged kittiwake (KI), common guillemot (GU), razorbill (RZ)

Plot code	Colony	Study Plot ref name	GPS reading	Species monitored
BASH1	Badbea	S1	ND08838 19893	SH
BASH2	Badbea	S2a and S2b	ND08690 19539	SH
BASH3	Badbea	S3	ND08560 19455	SH
BASH5	Badbea	S4	ND08384 19234	SH
BASH4	Badbea	S5	ND08384 19234	SH
BAS1	Badbea	Traigh Muile Cleite Rock	ND08384 19234	GU,RZ,KI,SH,FU, LB,GB
BASH6	Badbea	S6	ND08122 19084	SH
BASH7	Badbea	S7	ND08051 18927	SH, KI
BASH8	Badbea	S8	ND08051 18927	SH
IHS3	Inver Hill	plot1	ND11416 21434	GU,RZ,KI
IHS2	Inver Hill	plot2	ND11357 21363	GU,RZ,KI,FU
IHS1	Inver Hill	plot3	ND10945 21046	GU,RZ,KI
IHSH1	Inver Hill	S1	ND10759 20887	SH, KI
ADSH3	An Dun	S3	ND14316 26226	SH
ADFU1	An Dun	F1	ND14314 26225	FU
ADSH2	An Dun	S2	ND14314 26225	SH
ADKI1	An Dun	K5	ND14157 25917	KI
ADS2	An Dun	Plot 5	ND14139 25920	GU,RZ,FU
ADS3	An Dun	Plot 4 (top)	ND14139 25920	GU,RZ,KI,FU
ADS3b	An Dun	Plot 4 (bottom)	ND14139 25920	GU,RZ,KI,FU
ADS1	An Dun	Plots1,2,3 + extra	ND14135 25895	GU,RZ,KI,FU
ADKI2	An Dun	K4	ND14135 25895	KI
ADKI5	An Dun	K3	ND14068 25681	KI
ADFU4	An Dun	F4	ND13912 25590	FU
ADKI3	An Dun	K1	ND13912 25590	KI
ADRA1	An Dun	R1	ND13912 25590	RZ
ADFU2	An Dun	F3	ND13953 25499	FU
ADFU3	An Dun	F2	ND13953 25499	FU
ADKI4	An Dun	K2	ND13953 25499	KI
ADSH1	An Dun	S1	ND13953 25499	SH

Table 1 cont. Details of monitoring plots.

Plot code	Colony	Study Plot ref name	GPS reading	Species monitored
IGS1	Ires Geo	Repeat census site 2	ND35769 45564	GU,RZ,KI,FU
IGFU1	Ires Geo	F4 & F5 combined	ND35769 45564	FU
IGSH1	Ires Geo	shag plot	ND35769 45564	SH
IGFU2	Ires Geo	F3	ND35861 45517	FU
IGK11	Ires Geo	K4	ND35891 45479	KI
IGK2	Ires Geo	K1+K2	ND35755 45122	KI
AGS1	Ashy Geo	Ashy Geo arch Plot	ND35802 44990	GU,RZ,KI,FU
AGFU1	Ashy Geo	F1	ND35673 44861	FU
TGS1	Tod's Gote	Tod's Gote	ND35670 44690	GU,RZ,KI,FU
BGFU1	Broad Geo	F1	ND35327 44292	FU
BGSH1	Broad Geo	Shag Plot	ND35327 44292	SH
RGS1	Riera Geo	Riera Geo	ND35324 43831	GU,RZ,KI,FU
SKK11	Skirza Head	Kittiwake plot	ND39464 68456	KI
SKS1	Skirza Head	North Plot	ND39464 68456	GU,RZ,KI,FU
SKS2	Skirza Head	Ledge Plot	ND39464 68456	GU,RZ,KI
SKS3	Skirza Head	south plot1	ND39421 68181	GU,RZ,KI
SKS4	Skirza Head	South plot2	ND39421 68181	GU,RZ,KI

Note: plots highlighted in red contain changes from Swann, 2012.

In the course of the current monitoring work it was noted that the GPS reading of two plots in Swann (2012) were erroneous. These are the readings for BASH6 and IHS3. The correct readings are highlighted in red in table A.

Swann (2012) highlighted problems associated with plots ADS1 and ADS3 at An Dun. Due to changes in bird distributions on the cliff face since these plots were established the boundaries of these plots have become quite difficult to ascertain with accuracy. As a result, and following the recommendations given in Swann (2012), separate figures are given in the plot record card (Annex 2) for each species in each section of plot S1 (1, 2, 3, extra top (A), extra bottom (B)) and the boundaries of these study plots are shown in Figure 1.

At plot ADS3 Swann (2012) highlighted major discrepancies in counts at this section between different surveys. The boundary of the ADS3 (top) plot as used for the 2005 and 2013 counts is shown in Figure 2.

In addition to aid productivity monitoring three extra black-legged kittiwake plots were monitored and the ADS3 (top) plot was extended to ADS3b (bottom) and counted separately.

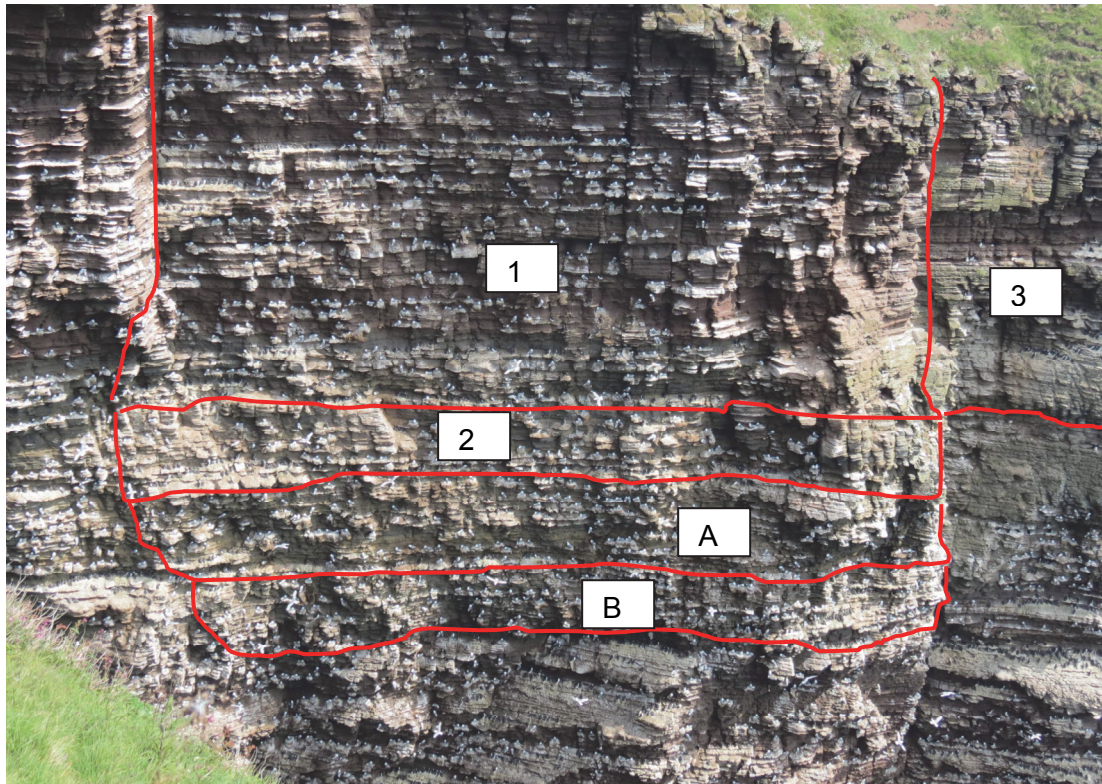


Figure 1. Boundary of individual study plots within ADS1 (For main photo see Swann, 2012)

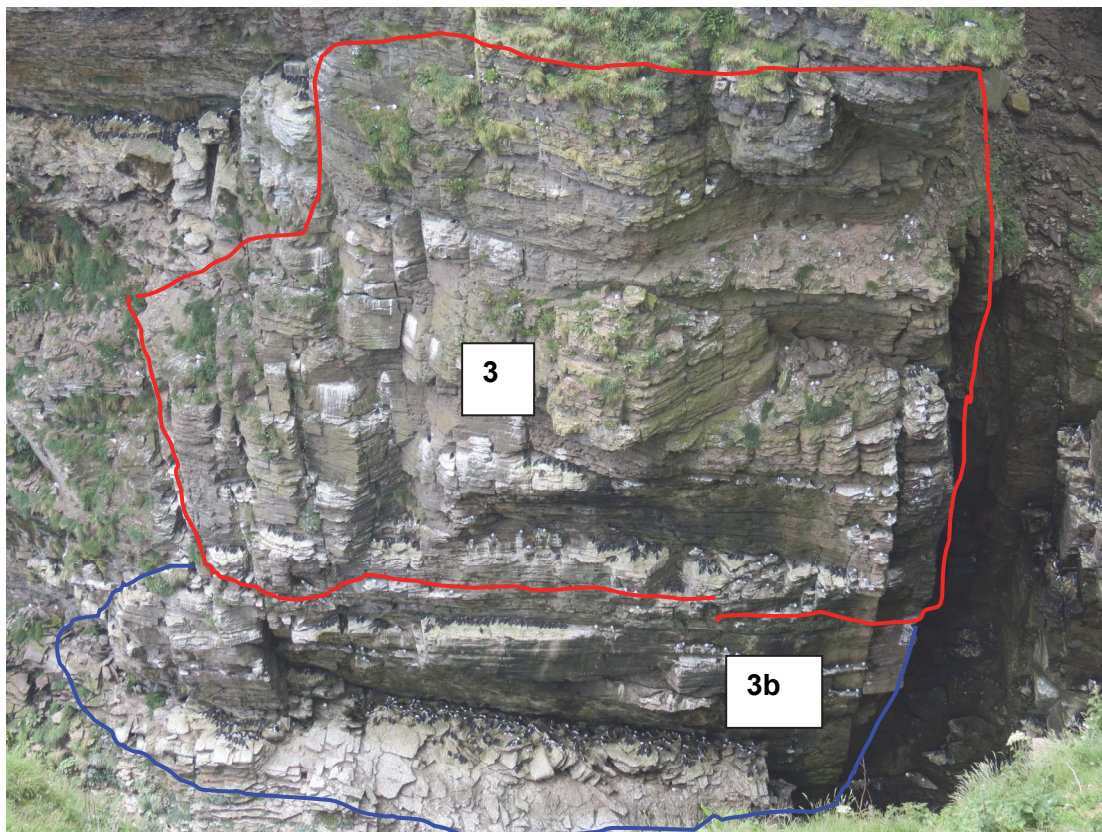


Figure 2. Boundary of plot ADS3 in red and ADS3b in blue

The three new black-legged kittiwake plots are at Badbea, Inver Hill and Skirza Head (plots BASH7, IHS1 and SKKI1). At BASH7 all kittiwake nests within the BASH7 shag plot were counted. Figures 3 and 4 outlines the boundaries of the IHS1 and SKKI1 plots.



Figure 3. Boundary of new IHS1 Kittiwake plot



Figure 4. Boundary of new SKKI1 Kittiwake plot

4. RESULTS

4.1 Counts

The results from all visits to each monitoring plot are given on the monitoring plot record cards in Annex 2. Details are also given of dates, time of visit and weather and sea states during each visit. Table 2 gives a summary of the count information for the 16 colony plots (including the new ADS3b) and Table 3 gives a summary of the 31 species plots (note two of the new kittiwake plots are included within existing species plots).

Table 2. Summary of data collected from colony monitoring plot. Where no values are presented for a species in a plot, the species was not and has not been present. A '0' indicates that a species had been present in previous years but was not in these counts.

	BAS1: Traigh Muidhe Cleite			IHS3: Inver Hill plot 1		
Visit date	04/06/2013	12/06/2013	21/06/2013	04/06/2013	12/06/2013	24/06/2013
GU	654	684	797	240	236	266
RA	138	129	123	47	34	43
FU	33	28	15			
SH	17	19	19			
KI	4	6	5	0	0	0
LB	0	0	0			
HG	0	0	0			
GB	1	1	1			
	IHS2: Inver Hill plot 2			IHS1: Inver Hill plot 3		
Visit date	04/06/2013	12/06/2013	24/06/2013	04/06/2013	12/06/2013	24/06/2013
GU	258	248	284	302	344	374
RA	27	21	24	12	8	17
KI	21	21	21	5	5	3
	ADS1: *An Dun plots1-3+			ADS2: An Dun plot 5		
Visit date	07/06/2013	16/06/2013	25/06/2013	07/06/2013	16/06/2013	25/06/2013
GU	449	464	486	74	73	82
RA	140	172	258	2	4	4
KI	500	481	460			
FU	38	39	41	2	2	2
	ADS3: An Dun plot 4 (top)			RGS1: Riera Geo		
Visit date	07/06/2013	16/06/2013	25/06/2013	05/06/2013	13/06/2013	21/06/2013
GU	114	107	114	973	886	915
RA	32	31	38	151	139	161
KI	20	20	19	205	274	280
FU	21	20	20	74	68	66
SH				2	2	2
	TGS1: Tod's Gote			AGS1: Ashy Geo arch plot		
Visit date	06/06/2013	13/06/2013	21/06/2013	06/06/2013	14/06/2013	21/06/2013
GU	719	692	689	403	417	399
RA	72	64	62	101	113	107
KI	149	169	162	85	87	85
FU	9	8	9	4	4	4
	IGS1: Ires Geo			ADS3b: An Dun plot 4 (bottom)		
Visit date	06/06/2013	14/06/2013	21/06/2013		16/06/13	25/06/13
GU	1102	1147	1046		404	485
RA	348	354	380		16	24
KI	149	153	138		13	20
FU	20	18	18		5	4

* A breakdown of the ADS1 plots by section can be found in Annex 2

Table 2 cont. Summary of data collected from colony monitoring plots

	SKS1: Skirza Head north plot			SKS2: Skirza Head ledge plot		
Visit date	05/06/2013	13/06/2013	21/06/2013	05/06/2013	13/06/2013	21/06/2013
GU	60	69	80	123	118	134
RA	8	10	12	3	5	4
KI	2	1	0	0	0	0
FU	32	34	29	0	0	0
	SKS3: Skirza Head south plot 1			SKS4: Skirza Head south plot 2		
Visit date	05/06/2013	13/06/2013	21/06/2013	05/06/2013	13/06/2013	21/06/2013
GU	251	238	235	60	63	64
RA	11	14	8	8	6	4
KI	0	0	0	0	0	0
FU	0	0	0	0	0	0
SH	1	0	0	0	0	0

Table 3. Summary of data collected from species monitoring plots

	BASH1: Badbea S1			BASH 2: Badbea S2a+b		
Visit Date	04/06/13	12/06/13	24/06/13	04/06/13	12/06/13	24/06/13
SH	6	7	8	4	4	5
	BASH3: Badbea S3			BASH 4: Badbea S4		
Visit Date	04/06/13	12/06/13	24/06/13	04/06/13	12/06/13	24/06/13
SH	0	0	0	0	1	1
	BASH 5: Badbea S5*			BASH 6: Badbea S6		
Visit Date	04/06/13	12/06/13	24/06/13	04/06/13	12/06/13	24/06/13
SH				18	18	18
	BASH 7: Badbea S7			BASH 8: Badbea S8		
Visit Date	04/06/13	12/06/13	24/06/13	04/06/13	12/06/13	24/06/13
SH	2	2	2	17	17	17
KI				98	98	103
	IHS1: Inver Hill S1			ADSH1: An Dun S1		
Visit Date	04/06/13	12/06/13	24/06/13	07/06/13	14/06/13	24/06/13
SH	8	8	7	1	1	1
KI		72	77			
	ADSH2: An Dun S2			ADSH3: An Dun S3		
Visit Date	07/06/13	16/06/13	25/06/13	07/06/13	16/06/13	25/06/13
SH	9	8	8	3	5	5
	ADFU1: An Dun F1			ADFU2: An Dun F3		
Visit Date	07/06/13	16/06/13	25/06/13	07/06/13	14/06/13	24/06/13
FU	101	93	94	30	31	31
	ADFU3: An Dun F2			ADFU 4: An Dun F4		
Visit Date	07/06/13	14/06/13	24/06/13	07/06/13	14/06/13	24/06/13
FU	139	132	129	74	78	66
	ADKI1: An Dun K5			ADKI2: An Dun K4		
Visit Date	07/06/13	16/06/13	25/06/13	07/06/13	16/06/13	25/06/13
KI	46	50	48	160	167	168
	ADKI 3: An Dun K1			ADKI4: An Dun K2		
Visit Date	07/06/13	14/06/13	24/06/13	07/06/13	14/06/13	24/06/13
KI	282	313	295	425	438	444
	ADKI5: An Dun K3			ADRA1: An Dun R1		
Visit Date	07/06/13	16/06/13	25/06/13	07/06/13	14/06/13	24/06/13
KI	176	181	172			
RA				339	276	353
	IGFU1: Ires Geo F4+F5			IGFU2: Ires Geo F3		
Visit Date	06/06/13	14/06/13	21/06/13	06/06/13	14/06/13	21/06/13
FU	221	189	161	48	45	46

Table 3 cont. Summary of data collected from species monitoring plots

Visit Date KI	IGK1: Ires Geo K4 06/06/13 14/06/13 21/06/13 80 79 79			IGK2: Ires Geo K1+K2 06/06/13 14/06/13 21/06/13 143 144 144		
Visit Date SH FU	IGSH1: Ires Geo Shag plot 06/06/13 14/06/13 21/06/13 1 0 0			AGFU1: Ashy Geo F1 06/06/13 14/06/13 21/06/13 73 63 65		
Visit Date SH FU	BGFU1: Broad Geo F1 05/06/13 13/06/13 21/06/13 77 74 77			BGSH1: Broad Geo shag plot 05/06/13 13/06/13 21/06/13 0 1 1		
Visit Date KI	SKKI1: Skirza Head kittiwake plot 05/06/13 13/06/13 21/06/13 121 183 173					

4.2 Breeding Productivity

Breeding productivity was assessed for three species on the East Caithness Cliffs SPA: northern fulmar, European shag and black-legged kittiwake.

Results from ten northern fulmar plots are shown in Table 4. Overall 0.37 large young were present in early August per AOS. Excluding one Badbea plot (BAS1), productivity varied between 0.30-0.47 and was generally highest on the An Dun plots. The very low figure from the Badbea plot was probably a result of a large number of non-breeders holding sites on that plot.

Table 4. Northern fulmar productivity at ten sample monitoring plots showing number of nests that failed and number and proportion that produced one large young.

Plot	n	failed	young	av/young AOS
BAS1	25	23	2	0.08
ADFU4	73	39	34	0.47
ADFU3	133	78	55	0.41
ADFU2	31	19	12	0.39
ADS3+3B	25	13	12	0.48
ADFU1	96	64	32	0.33
BGFU1	76	49	27	0.35
AGFU1	67	45	22	0.33
IGFU2	46	32	14	0.30
SKS1	32	20	12	0.38
	604	382	222	0.37

Results from the ten European shag plots are shown in Table 5. Overall 85% of nests successfully fledged young. The number of young produced averaged 2.0 young per AON over the ten plots.

Table 5. European shag productivity at ten sample monitoring plots showing number of nests that failed and number that produced one, two and three large young.

Plot	n	failed	1 young	2 young	3 young
BASH1	8	4	1	2	1
BASH2	5	1	1	1	2
BASH4	1	0	0	0	1
BASH5	18	3	1	5	9
BASH6	18	3	5	3	7
BASH7	2	0	0	1	1
BASH8	14	0	2	3	9
IHSH1	8	1	0	3	4
ADSH1	1	0	0	0	1
ADSH2	9	1	0	3	5
	84	13	10	21	40

Results from the 14 black-legged kittiwake plots are shown in Table 6. This highlights widespread failures on many plots. A visit on 23rd July revealed that out of 1736 nests 68% of nests were empty, whilst 483 nests contained a single mainly medium-sized young and 41 nests contained two young, an overall average of 0.3 young/AON. Generally speaking at that stage the Inver Hill and An Dun colonies were doing slightly better than colonies further north.

By the final visit on 6th August there had been some dramatic changes. There was a virtual total failure at the southern two monitoring plots at Badbea/Inverhill (BASH8/IHSH1) where only 12 large young were present (0.07 young/AON). In the far north all nests at Skirza Head (SKK11) had failed, whilst at the Ashy Geo and Ires Geo plots (AGS1 and IGK11 and 2) only one nest contained a large young (Table 6).

Table 6. Black-legged kittiwake productivity at 14 sample monitoring plots showing number of nests that failed, produced one large young or produced two large young.

Plot	n	failed	1 young	2 young
BASH8	103	93	9	1
IHSH1	77	74	3	0
ADS3+3B	40	40	0	0
ADK11	50	50	0	0
ADK12	168	148	20	0
ADS1_1	199	163	36	0
ADS1_2	73	53	20	0
ADK13 (part)	45	40	5	0
ADK14 (part)	306	184	118	4
ADK15	181	129	48	4
AGS1	87	87	0	0
IGK12	144	144	0	0
IGK11	80	79	1	0
SKK11	183	183	0	0
	1736	1467	260	9

The situation in the An Dun area was more mixed. Whilst one plot (ADK11) had totally failed others were doing much better. At ADK14, virtually all the young present on 23rd July were still present. Overall the An Dun plots had 0.25 young/AON. Another feature of the visit on the 6th August was that most of the chicks were unattended; only 36 (13%) of the 269 occupied nests had an adult bird in attendance. The overall number of large chicks per AON on the East Caithness Cliffs monitoring plots was 0.16, 85% of all nests failing to fledge young.

5. DISCUSSION AND COMPARISON WITH PREVIOUS COUNTS

5.1 General comments

Breeding seabird numbers are affected by both short term and long term changes in various environmental factors such as sea surface temperature, food availability and weather conditions (Wanless and Harris, 2012).

The SNH Biodiversity indicator (www.snh.gov.uk/docs/B424907.pdf) which highlighted trends in abundance and productivity of Scottish seabirds showed that between 1986 and 2011 mean seabird abundance in Scotland had declined by 53% and breeding productivity had declined by 37% over the same period.

In late December 2012 and early January 2013 there was a wreck of European shags in North-east Scotland. Following extreme onshore winds and torrential rain, large numbers of shags moved into harbours for shelter, but many still succumbed to the conditions. Many surviving birds are likely to have been in poor condition and may have delayed breeding. Indeed the maximum count recorded for this species on all plots was on the final visit. For this reason the maximum number of AONs per plot was used for comparative purposes with previous data, as was done in the 2005 report, when similar conditions prevailed. It was also used to assess productivity on sample plots.

It was also evident that the timing of the seabird breeding season was later than usual in many sites in Scotland in 2013 (*pers obs*). This was most evident amongst black-legged kittiwakes in Caithness. Birds were still observed to be gathering grass from cliff top fields in early June and at most plots the number of kittiwake nests increased between the first and second visit. Despite this the mean number of birds counted on all plots (2,521) was similar to the maximum number (2,589), so for comparative counts with previous years the mean count is used. To account for the variation between plots the maximum count was used to calculate productivity levels.

The number of auks and northern fulmars in the monitored plots showed much variation, with no obvious trends, between the three visits at each plot. It is recommended that the mean count be used for comparative purposes for these species.

5.2 Changes in numbers at monitoring plots

5.2.1 Northern fulmar

Table 7 summarises and compares the mean number of northern fulmar AOS at the four main 'colonies'. It shows an overall increase since 1999. Since 2005, however, there has been a modest 1% increase in the total number of birds on the monitoring plots.

Table 7. Comparison of the mean number of northern fulmar AOS in East Caithness colonies between 1999 and 2013.

Colony	Mean no. 1999	Mean no. 2005	Mean no. 2013	% change 2005-2013
Berriedale/Inver Hill	20	30	25	-17%
An Dun	188	365	394	+8%
Ires Geo-Riera Geo	332	498	480	-4%
Skirza Head	30	27	32	+19%
Total all colonies	570	920	931	+1%

This change in numbers since 2005 is similar to the change in the Scottish abundance index shown by sites monitored by JNCC in Scotland between 2005 and 2011 which recorded a 0% change over that period. (http://jncc.defra.gov.uk/docs/Data_points_1986-2011.xls).

Particularly low counts in 2012, however, resulted in the Scottish abundance index declining by 24% between 2005 and 2012 (http://jncc.defra.gov.uk/docs/Data_points_1986-2012.xls).

5.2.2 European shag

Table 8 summarises and compares the maximum number of European shag AONs at the four main 'colonies'. Between 1999 and 2005 there was a massive decrease in the mean number of AOS at all monitored plots in the East Caithness SPA. This was attributed to the effects of the large wreck that occurred in late winter/ spring 2005 in the North Sea and affected a large number of adults of this species (Frederikson *et al.* 2008). Despite a smaller wreck in winter 2012/13 numbers have bounced back and are currently 292% higher than in 2005 and back to similar numbers to 1999.

Table 8. Comparison of the maximum number of European shag AONs in East Caithness colonies between 1999 and 2013.

Colony	Max no. 1999	Max no. 2005	Max no. 2013	% change 2005-2013
Berriedale/Inver Hill	73	14	78	+457%
An Dun	12	8	15	+88%
Ires Geo-Riera Geo	4	2	4	n/a
Skirza Head	0	1	1	n/a
Total all colonies	89	25	98	+292%

This increase in numbers since 2005 contrasts with a 3% decline in the Scottish abundance index shown by sites monitored by JNCC in Scotland between 2005 and 2012 (http://jncc.defra.gov.uk/docs/Data_points_1986-2012.xls). This, however, can be attributed to the non-breeding event that affected Caithness shags in 2005.

5.2.3 Black-legged kittiwake

Table 9 summarises and compares the mean number of black-legged kittiwake AONs at the four main 'colonies'. Since 2005 there has been an overall decrease in numbers of 29% but numbers are still higher than 1999. This decline was most severe at the smaller colonies of Berriedale/Inver Hill and Skirza Head.

Table 9. Comparison of the mean and maximum number of black-legged kittiwake AONs in East Caithness colonies between 1999 and 2013.

Colony	Mean no. 1999	Max no. 2005	Mean no. 2013	% change 2005 - 2013
Berriedale/Inver Hill	86	70	29	-59%
An Dun	1269	1963	1621	-17%
Ires Geo-Riera Geo	679	1439	868	-40%
Skirza Head	120	89	2	-98%
Total all colonies	2154	3561	2520	-29%

This decline in numbers since 2005 is slightly lower than the 39% decline in the Scottish abundance index shown by sites monitored by JNCC in Scotland between 2005 and 2012 (http://jncc.defra.gov.uk/docs/Data_points_1986-2012.xls).

5.2.4 Common guillemot

Table 10 summarises and compares the mean number of common guillemots at the four main 'colonies'. Since 2005 there has been an overall decrease in numbers of 37%, with all four colonies showing roughly similar declines.

Table 10. Comparison of the mean number of common guillemots in East Caithness colonies between 1999 and 2013.

Colony	Mean no. 1999	Mean no. 2005	Mean no. 2013	% change 2005-2013
Berriedale/Inver Hill	2729	2473	1562	-37%
An Dun*	858/?	933/1114	543/654	-41%
Ires Geo-Riera Geo	4476	5072	3129	-38%
Skirza Head	961	806	498	-38%
Total all colonies*	9024/?	9284/9465	5843/5955	-37%

*These figures exclude/include the ADS3 Guillemot count (see Swann, 2012 for explanation)

This decline in numbers since 2005 is greater than the 14% decline in the Scottish abundance index shown by sites monitored by JNCC in Scotland between 2005 and 2012 (http://jncc.defra.gov.uk/docs/Data_points_1986-2012.xls).

5.2.5 Razorbill

Table 11 summarises and compares mean numbers of razorbills at the four main 'colonies'. It shows an increase since 1999. Since 2005 there has been an overall decrease in numbers of 10%, with much variation between the four colonies ranging from an 8% increase to a 52% decline.

Table 11. Comparison of the mean number of razorbills in East Caithness colonies between 1999 and 2013.

Colony	Mean no. 1999	Mean no. 2005	Mean no. 2013	% change 2005 - 2013
Berriedale/Inver Hill	158	195	211	+8%
An Dun	305	587	550	-6%
Ires Geo-Riera Geo	403	796	684	-14%
Skirza Head	42	65	31	-52%
Total all colonies	908	1643	1476	-10%

This decline in numbers since 2005 is far less than the 30% decline in the Scottish abundance index shown by sites monitored by JNCC in Scotland between 2005 and 2012 (http://jncc.defra.gov.uk/docs/Data_points_1986-2012.xls).

5.3 Longer term comparisons

The data set for the East and North Caithness Cliffs SPAs monitoring plots goes back to 1980. Swann (2012) compared the 2005 results with those collected in 1999. These showed that northern fulmar, black-legged kittiwake and razorbill appeared to show major increases, whilst common guillemot numbers were roughly stable. These trends contrasted strongly with declines being reported from other Scottish and UK colonies. This begs the question were the counts in Caithness in 1999 unusually low, or are the Caithness colonies performing better than the species more generally in Scotland. Understanding of this issue could be informed by inspecting the longer term trends back to 1980 and seeing how the 1999 data sets fits in to the overall pattern both locally and nationally.

5.4 Breeding productivity

Breeding productivity is a measurement of the number of chicks fledged per occupied nest or site. In reality it is difficult to prove (without continuous watches) the actual number of chicks fledging so the number of large chicks present on nests prior to fledging is recorded. This could overestimate actual fledging success. The breeding productivity figure is a good indicator of what conditions each species has faced during the breeding season with regards

to food supply etc. Runs of good or poor breeding productivity can ultimately influence population levels.

Analysis of the national Seabird Monitoring Programme (SMP) dataset by Cook and Robinson (2010) found mean breeding success of northern fulmars at monitored sites was 0.39 chicks per AOS per year between 1986 and 2008. Between 1986 and 2012 in Scotland productivity averaged 0.41 young per AOS (JNCC, 2013). In 2013 at East Caithness Cliffs SPA the northern fulmar productivity was close to this figure averaging 0.37 large young/AOS. Cook and Robinson (2010) predicted that if this level of breeding success (0.39) were maintained, northern fulmar abundance would decline by about 12% over 25 years. Conversely, were breeding success to increase to 0.50, populations would be expected to stabilise, and potentially increase. As northern fulmars, do not generally start breeding till age 9, there will be a lag before any declines are noted in the Caithness monitoring plots.

Between 1986 and 2012 productivity of European shags in Scotland averaged 1.18 young per AON (JNCC, 2013). Cook and Robinson (2010) found mean breeding success of European shags at monitored nests in the UK was 1.21 chicks per nest per year between 1986 and 2008. They calculated that were existing levels of breeding success to be maintained, population viability analysis (using available life history information such as population size, clutch size, age at first breeding and survival rates of different age classes) suggests the national population may decline by a modest 9% over 25 years. If the Caithness colonies continue to produce chicks at the level of productivity recorded in 2013 (2.0 large young/AON) numbers are likely to continue to increase.

Between 1986 and 2012 productivity of black-legged kittiwakes in Scotland averaged 0.61 young per AON (JNCC, 2013). Cook and Robinson (2010) found mean breeding success at monitored nests in UK black-legged kittiwake colonies was 0.68 and had declined at a rate of 0.016 chicks per nest per year. This equated to a decline in breeding success of 31% over the study period 1986-2008. They calculated that in order to prevent such a decline breeding success would need to increase to around 1.50. The 2013 Caithness productivity figure of 0.16, is well below that figure and suggests that the declines recorded between 2005 and 2013 are likely to continue if breeding productivity remains at these low levels.

6. CONCLUSIONS AND RECOMMENDATIONS

The 2013 results indicate that on monitored plots at the North and East Caithness SPAs since 2005 razorbills have declined by 10%, black-legged kittiwake by 25% and common guillemot by 35%. On the other hand northern fulmar numbers have remained fairly stable (+1%), whilst European shags, recovering from a major wreck in winter 2004/05 have shown a large increase. The declines recorded for black-legged kittiwake and razorbill are lower than those recorded at other monitoring sites in Scotland over the period 2005-2012, whilst the common guillemot decline is greater.

Changes over the longer term period since 1999 suggest that seabirds on the North and East Caithness Cliffs SPAs may be performing much better than those in other parts of Scotland. These changes, are all dependent on the fact that the 1999 counts were not, for some reason, unusually low. Given the importance of understanding seabird population trends at the North Caithness Cliffs SPA and East Caithness Cliffs SPA it is strongly recommended that a re-analysis of the Caithness plot data going back to 1980 is undertaken in order to make robust longer term comparisons of seabird numbers at this site.

Breeding productivity levels recorded for northern fulmar and black-legged kittiwake in 2013 are currently below the levels estimated to be necessary for a stable population (Cook and Robinson, 2010). The 2013 European shag productivity, however, is of the level that if maintained should result in an increasing population. It is further recommended that during any repeat survey of plot counts, breeding productivity is also undertaken, as conducted during the 2013 survey.

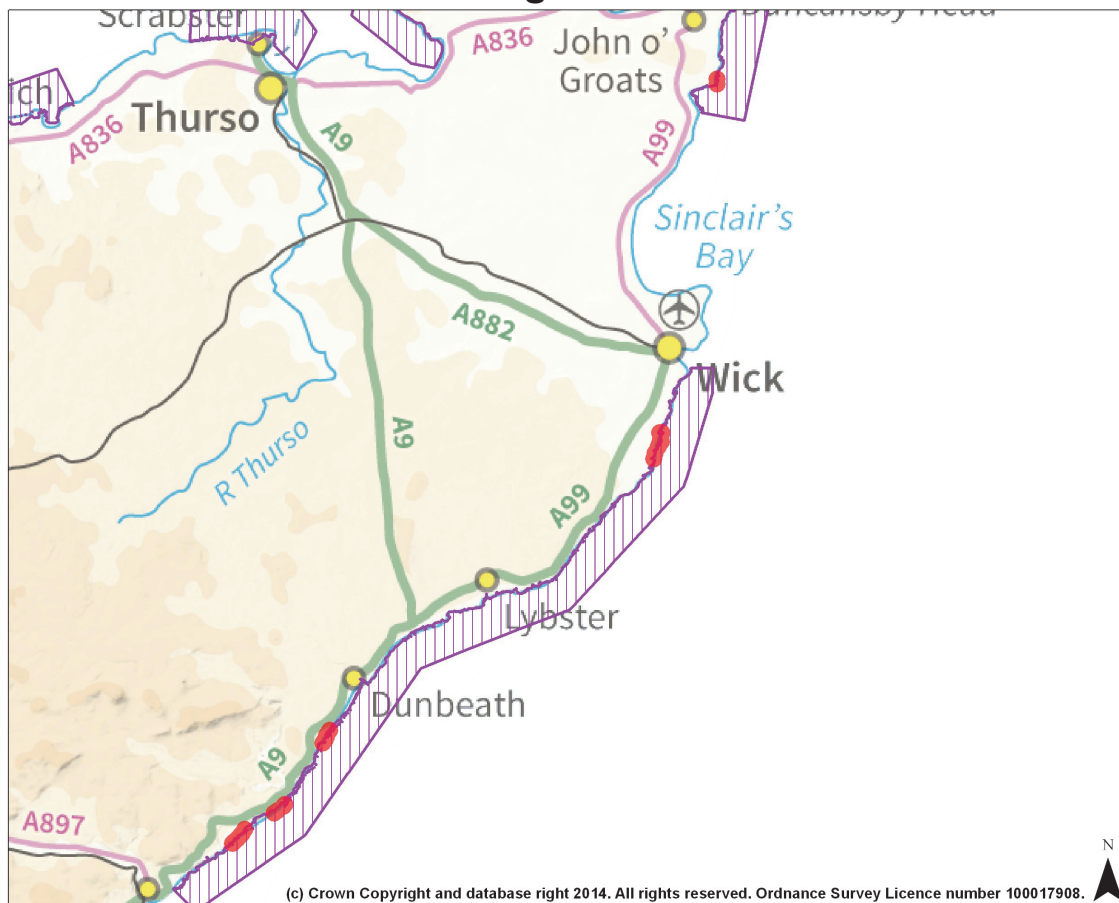
A final recommendation is that the changes to plots and the new plots used during the 2013 survey work (and highlighted in red in Table 1) are used during future survey work.

7. REFERENCES

- Callaghan, D.A., Foster, S., Tovey, P. & Kirby, J.S. 1999. Caithness & Sutherland Seabird Survey: Phase 1 Main Report. Unpublished report to Scottish Natural Heritage.
- Cook, A.S.C.P. & Robinson, R.A. 2010. *How representative is the current monitoring of breeding success in the UK?* BTO Research Report No. 573, BTO, Thetford.
- Evans, R.J. 2001. Cliff nesting seabirds in east Caithness 1980 – 1993. *Scottish Birds* **22**, 73-81.
- Foster, S. & Marrs, S.J. 2012. Seabirds in Scotland. *Scottish Natural Heritage Trend Note No. 21*. 17pp.
- Frederiksen, M., Daunt, F., Harris, M.P. & Wanless, S. 2008. The demographic impact of extreme events: stochastic weather drives survival and population dynamics in a long-lived seabird. *Journal of Animal Ecology* **77** (5), 1020-1029.
- JNCC, 2013. Seabird Population Trends and Causes of Change: 1986-2012 Report Joint Nature Conservation Committee. Updated July 2013, accessed 28 August 2013. Available at: <http://www.jncc.defra.gov.uk/page-3201>
- Lewis, M., Lye, G., Pendlebury, C. & Walls, R. 2012. *Population sizes of seabirds breeding in Scottish SPAs*. Scottish Government (Marine Scotland).
- Mitchell, I.P., Newton, S.F., Ratcliffe, N. & Dunn, T.E. 2004. *Seabird populations of Britain and Ireland*. London. Collins.
- Mudge, G.P. 1986. Trends of population change at colonies of cliff-nesting seabirds in the Moray Firth. *Proceedings of the Royal Society of Edinburgh* **91B**, 73-80.
- Swann, B. 2012. East Caithness Cliffs SPA Site Condition Monitoring 2005. *Scottish Natural Heritage Commissioned Report No.148*.
- Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W., & Tasker, M.L. 1995. Seabird monitoring handbook for Britain and Ireland. JNCC / RSPB / ITE / Seabird Group, Peterborough.
- Wanless, S. & Harris, M.P. 2012. Scottish seabirds – past, present and future. *Scottish Birds* **32**, 38-45.

ANNEX 1: MAP OF MONITORING PLOTS FOR CAITHNESS CLIFFS

Caithness Cliffs Monitoring Plots



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Legend
STATUS
[Purple hatched box] SPA

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Notes: "Locations of seabird monitoring plots within East Caithness Cliffs SPA and North Caithness Cliffs SPA"



Map produced using geo.View 3.0
Printed: Aug 13, 2014 16:47:57, Scale: 1:346275

ANNEX 2: MONITORING PLOT RECORD CARDS

BAS1

Seabird Monitoring Plot Record Card

Colony name: Badbea **County: Caithness**
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: Traighe Muile Cleite **Grid Ref (GPS):** ND08384 19234
Counted from: land **Method of obs:** Telescope + binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	04/06/2013	12/06/2013	21/06/2005
Time (BST) start	10:16	10:15	09:50
Time (BST) finish	11:00	10:50	10:30
Cloud cover ¹	6	5	5
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	0	2	32
Wind direction		NE	NW
GU (IND)	654	684	797
RZ (IND)	138	129	123
KI (AON)	4	6	5
FU (AOS)	33	28	15
SH (AON)	17	19	19
GB (AOT)	1	1	1
LB (AOT)	0	0	0
HG (AOT)	0	0	0

¹ Cloud cover measured in oktas (eighths)

² 1= none; 2= discontinuous light, 3= discontinuous heavy, 4= continuous light, 5= continuous heavy

³ 1= calm, 2= small waves, 3= large waves, 4= white wave crests, 5 = rough

⁴ 1= none, 2 = slight, 3= moderate, 4= heavy

⁵ 1= good, 2= fair, 3= poor

⁶ Beaufort scale

BASH1 **Seabird Monitoring Plot Record Card**
Colony name: Badbea **County: Caithness**
Observer: BobSwann **Address: 14 St.Vincent Road, Tain**
Study Plot Ref: S1 **Grid Ref (GPS):ND08838 19893**
Counted from: land **Method of obs: Binoculars**
Type of colony: cliff **Photo taken: no**

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	13:10	09:30	08:50
Time (BST) finish	13:25	09:35	09:00
Cloud cover ¹	5	8	8
Rain ²	1	1	2
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	0	3	3
Wind direction		NE	NW
SH (AON)	6	7	8

BASH2 **Seabird Monitoring Plot Record Card**

Colony name: Badbea **County: Caithness**
Observer: Bob Swann **Address: 14 St.Vincent Road, Tain**
Study Plot Ref: S2a + S2b **Grid Ref (GPS):ND08690 19539**
Counted from: land **Method of obs: Binoculars**
Type of colony: cliff **Photo taken: no**

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	12:35	09:45	09:05
Time (BST) finish	12:55	09:55	09:25
Cloud cover ¹	6	8	8
Rain ²	1	1	2
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	0	3	3
Wind direction		NE	NW
GU (IND)	190, 40		256, 48
RZ (IND)	7, 40		12, 65
KI (AON)	0, 4		0, 4
FU (AOS)	0, 4		0, 4
SH (AON)	4, 0	4, 0	4, 1

BASH3 **Seabird Monitoring Plot Record Card**
Colony name: Badbea **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: S3 **Grid Ref (GPS):**ND08560 19455
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/6/13
Time (BST) start	12:20	09:55	09:30
Time (BST) finish	12:25	10:00	09:35
Cloud cover ¹	6	8	7
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	0	3	3
Wind direction		NE	NW
GU (IND)	39		65
RZ (IND)	47		63
KI (AON)			
FU (AOS)	20	22	16
SH (AON)	0	0	0

BASH4 **Seabird Monitoring Plot Record Card**
Colony name: Badbea **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: S4 **Grid Ref (GPS):**ND08384 19234
Counted from: land **Method of obs:** Telescope
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	12:05	10:10	09:45
Time (BST) finish	12:10	10:15	09:50
Cloud cover ¹	6	8	7
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	0	3	3
Wind direction		NE	NW
SH (AON)	0	1	1

BASH6 **Seabird Monitoring Plot Record Card**
Colony name: Badbea **County: Caithness**
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: S6 **Grid Ref (GPS):** ND08122 19084
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	04/06/2013	12/06/2013	25/06/2013
Time (BST) start	11:20	10:55	12:15
Time (BST) finish	11:30	11:05	12:30
Cloud cover ¹	7	5	7
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	0	2	1
Wind direction		NE	SW
SH (AON)	18	18	18

BASH7 **Seabird Monitoring Plot Record Card**
Colony name: Badbea **County: Caithness**
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: S7 **Grid Ref (GPS):** ND08051 18927
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	11:35	11:10	11:05
Time (BST) finish	11:40	11:20	11:10
Cloud cover ¹	6	6	7
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	0	2	3
Wind direction		NE	NW
SH (AON)	2	2	2

BASH8 **Seabird Monitoring Plot Record Card**
Colony name: Badbea **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: S8 **Grid Ref (GPS):**ND08051 18927
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	11:40	11:20	10:50
Time (BST) finish	11:45	11:30	11:05
Cloud cover ¹	6	6	7
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	0	2	3
Wind direction		NE	NW
GU (IND)			
RZ (IND)			
KI (AON)	98	98	103
FU (AOS)			
SH (AON)	17	17	17

IHS1 **Seabird Monitoring Plot Record Card**
Colony name: Inver Hill **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: plot3 **Grid Ref (GPS):**ND10945 21046
Counted from: land **Method of obs:** Telescope
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	14:35	12:45	12:20
Time (BST) finish	14:50	13:05	12:35
Cloud cover ¹	4	6	8
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	1	1	3
Wind direction	NE	NE	NW
GU (IND)	302	344	374
RZ (IND)	12	8	17
KI (AON)	5	5	3
FU (AOS)			
SH (AON)			

IHS2**Seabird Monitoring Plot Record Card**

Colony name: Inver Hill **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: plot2 **Grid Ref (GPS):**ND11357 21363
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	15:05	13:15	12:45
Time (BST) finish	15:25	13:30	13:00
Cloud cover ¹	4	5	7
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	2	3
Wind direction	NE	NE	NW
GU (IND)	258	248	284
RZ (IND)	27	21	24
KI (AON)	21	21	21
FU (AOS)			
SH (AON)			

IHS3**Seabird Monitoring Plot Record Card**

Colony name: Inver Hill **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: plot1 **Grid Ref (GPS):**ND11416 21434
Counted from: land **Method of obs:** Telescope
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	15:30	13:40	13:05
Time (BST) finish	15:50	14:00	13:15
Cloud cover ¹	4	5	7
Rain ²	1	1	1
Sea state ³	1	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	NE	NE	NW
GU (IND)	240	236	266
RZ (IND)	47	34	43
KI (AON)	0	0	0
FU (AOS)			
SH (AON)			

IHSH1 **Seabird Monitoring Plot Record Card**
Colony name: Inver Hill **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: S1 **Grid Ref (GPS):**ND10759 20887
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	04/06/2013	12/06/2013	24/06/2013
Time (BST) start	14:15	12:30	12:00
Time (BST) finish	14:25	12:38	12:15
Cloud cover ¹	4	5	5
Rain ²	1	1	1
Sea state ³	1	2	3
Swell ⁴	1	2	2
Visibility at sea ⁵	1	1	1
Wind speed ⁶	1	2	3
Wind direction	NE	NE	SW
GU (IND)			
RZ (IND)			
KI (AON)		72	77
FU (AOS)			
SH (AON)	8	8	7

ADS1 **Seabird Monitoring Plot Record Card**
Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: 1,2,3,extra A, B **Grid Ref (GPS):**ND14135 25895
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	13:10	09:50	08:40
Time (BST) finish	14:10	11:15	09:40
Cloud cover ¹	3	8	7
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
GU (IND)	191, 111, 56, 58, 33	194, 119, 59, 57, 35	205, 114, 58, 61, 48
RZ (IND)	69, 12, 12, 26, 21	85, 19, 14, 26, 28	135, 26, 24, 32, 41
KI (AON)	189, 73, 0, 125, 113	199, 71, 0, 104, 107	192, 68, 0, 100, 100
FU (AOS)	23, 3, 8, 4, 0	23, 3, 12, 1, 0	23, 3, 13, 1, 1
SH (AON)			

ADS2**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: plot 5 **Grid Ref (GPS):**ND14139 25920
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	14:40	11:45	09:55
Time (BST) finish	14:45	11:50	10:00
Cloud cover ¹	3	6	8
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
GU (IND)	74	73	82
RZ (IND)	2	4	4
KI (AON)			
FU (AOS)	2	2	2
SH (AON)			

ADS3**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: plot 4 top **Grid Ref (GPS):**ND14139 25920
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	14:50	11:50	10:05
Time (BST) finish	15:11	12:10	10:03
Cloud cover ¹	3	6	7
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
GU (IND)	114	107	114
RZ (IND)	32	31	38
KI (AON)	20	20	19
FU (AOS)	21	20	20
SH (AON)			

ADS3b**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: plot 4 BTM **Grid Ref (GPS):**ND14139 25920
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	14:50	11:50	10:05
Time (BST) finish	15:11	12:10	10:03
Cloud cover ¹	3	6	7
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
GU (IND)		404	485
RZ (IND)		16	24
KI (AON)		13	20
FU (AOS)		5	4
SH (AON)			

ADFU1**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: F1 **Grid Ref (GPS):**ND14314 26225
Counted from: land **Method of obs:** telescope
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	15:31	12:25	11:00
Time (BST) finish	15:40	12:50	11:15
Cloud cover ¹	3	5	6
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
FU (AOS)	101	93	94

ADFU2**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: F3 **Grid Ref (GPS):**ND13910 25466
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	14/06/2013	24/06/2013
Time (BST) start	10:15	14:50	14:50
Time (BST) finish	10:20	15:00	14:55
Cloud cover ¹	3	6	6
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	1	3	3
Wind direction	N	SW	NW
FU (AOS)	30	31	31

ADFU3 + ADSH1**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: F2 + S1 **Grid Ref (GPS):**ND13910 25466
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	14/06/2013	24/06/2013
Time (BST) start	10:05	14:35	14:30
Time (BST) finish	10:15	14:50	14:50
Cloud cover ¹	3	6	6
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	1	3	3
Wind direction	N	SW	NW
FU (AOS)	139	132	129
SH (AON)	1	1	1

ADFU4**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: F4 **Grid Ref (GPS):** ND13912 25590
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	14/06/2013	24/06/2013
Time (BST) start	11:40	15:25	15:15
Time (BST) finish	11:50	15:40	15:25
Cloud cover ¹	3	6	6
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	3	3
Wind direction	N	SW	NW
FU (AOS)	74	78	66

ADKI1**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: K5 **Grid Ref (GPS):** ND14147 25920
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	15:12	12:10	10:35
Time (BST) finish	15:20	12:17	10:40
Cloud cover ¹	3	5	6
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
KI (AON)	46	50	48

ADKI2**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: K4 **Grid Ref (GPS):**ND14135 25895
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	14:10	11:20	09:40
Time (BST) finish	14:22	11:40	09:50
Cloud cover ¹	3	6	7
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
KI (AON)	160	167	168

ADKI3**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: K1 **Grid Ref (GPS):**ND13912 25590
Counted from: land **Method of obs:** binoculars + telescope
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	14/06/2013	24/06/2013
Time (BST) start	11:50	15:00	14:55
Time (BST) finish	12:06	15:25	15:15
Cloud cover ¹	3	6	6
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	3	3
Wind direction	N	SW	NW
KI (AON)	282	313	295

ADKI4**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: K2 **Grid Ref (GPS):**ND13910 25466
Counted from: land **Method of obs:** binoculars + TELESCOPE
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	14/06/2013	24/06/2013
Time (BST) start	10:20	14:00	14:00
Time (BST) finish	11:10	14:35	14:30
Cloud cover ¹	3	6	6
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	1	3	3
Wind direction	N	SW	NW
KI (AON)	425	438	444

ADKI5**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: K3 **Grid Ref (GPS):**ND14068 25681
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	12:25	09:20	08:20
Time (BST) finish	12:44	09:40	08:30
Cloud cover ¹	3	8	6
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
KI (AON)	176	181	172

ADRA1**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: R1 **Grid Ref (GPS):**ND13912 25590
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	14/06/2013	24/06/2013
Time (BST) start	11:10	15:40	15:30
Time (BST) finish	11:40	16:00	15:45
Cloud cover ¹	3	6	6
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	3	3
Wind direction	N	SW	NW
RZ (IND)	339	276	353

ADSH2**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: S2 **Grid Ref (GPS):**ND14314 26225
Counted from: land **Method of obs:** telescope
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	15:40	12:50	10:50
Time (BST) finish	15:45	12:55	11:00
Cloud cover ¹	3	4	6
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
SH (AON)	9	8	8

ADSH3**Seabird Monitoring Plot Record Card**

Colony name: An Dun **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: S1 **Grid Ref (GPS):**ND14316 26226
Counted from: land **Method of obs:** telescope
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	07/06/2013	16/06/2013	25/06/2013
Time (BST) start	15:45	12:55	11:20
Time (BST) finish	15:52	13:05	11:25
Cloud cover ¹	3	4	8
Rain ²	1	1	1
Sea state ³	2	1	1
Swell ⁴	1	1	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	1	3
Wind direction	N	NE	SW
SH (AON)	3	5	5

RGS1**Seabird Monitoring Plot Record Card**

Colony name: Riera Geo **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: Riera Geo **Grid Ref (GPS):**ND35324 43831
Counted from: land **Method of obs:** binoculars + telescope
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	05/06/2013	13/06/2013	21/06/2013
Time (BST) start	13:30	12:30	10:45
Time (BST) finish	15:00	13:30	11:55
Cloud cover ¹	4	7	8
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	4	1
Wind direction	NE	SW	N
GU (IND)	973	886	915
RZ (IND)	151	139	161
KI (AON)	205	274	280
FU (AOS)	74	68	66
SH (AON)	2	2	2
PU (IND)		2	4

BGFU1 + BGS11

Colony name: Broad Geo
Observer: Bob Swann
Study Plot Ref: F1 + shag plot
Counted from: land
Type of colony: cliff

Seabird Monitoring Plot Record Card

County: Caithness
Address: 14 St.Vincent Road, Tain
Grid Ref (GPS):ND35327 44292
Method of obs: binoculars
Photo taken: yes

Count No	1	2	3
Date	05/06/2013	13/06/2013	21/06/2013
Time (BST) start	15:15	13:45	12:05
Time (BST) finish	16:00	14:00	12:20
Cloud cover ¹	4	7	8
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	4	1
Wind direction	NE	SW	N
FU (AOS)	77	74	77
SH (AON)	0	1	1

TGS1**Seabird Monitoring Plot Record Card**

Colony name: Tod'sGote
Observer: Bob Swann
Study Plot Ref: Tod'sGote
Counted from: land
Type of colony: cliff

County: Caithness
Address: 14 St.Vincent Road, Tain
Grid Ref (GPS):ND35670 44690
Method of obs: Binoculars + telescope
Photo taken: no

Count No	1	2	3
Date	06/06/2013	13/06/2013	21/06/2013
Time (BST) start	10:05	14:00	12:30
Time (BST) finish	10:55	14:45	13:00
Cloud cover ¹	3	7	8
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	4	1
Wind direction	N	SW	N
GU (IND)	719	692	689
RZ (IND)	72	64	62
KI (AON)	149	169	162
FU (AOS)	9	8	9
SH (AON)			

AGS1**Seabird Monitoring Plot Record Card**

Colony name: Ashy Geo **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: Ashy Geo arch plot **Grid Ref (GPS):** ND35802 44990
Counted from: land **Method of obs:** Binoculars + telescope
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	06/06/2013	14/06/2013	21/06/2013
Time (BST) start	11:05	09:20	13:10
Time (BST) finish	11:36	09:50	13:30
Cloud cover ¹	6	7	8
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	4	1
Wind direction	N	SW	NE
GU (IND)	403	417	399
RZ (IND)	101	113	107
KI (AON)	85	87	85
FU (AOS)	4	4	4
SH (AON)			

AGFU1**Seabird Monitoring Plot Record Card**

Colony name: Ashy Geo **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: F1 **Grid Ref (GPS):** ND35673 44861
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	06/06/2013	14/06/2013	21/06/2013
Time (BST) start	11:40	09:50	13:30
Time (BST) finish	12:10	10:10	13:45
Cloud cover ¹	5	7	8
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	4	1
Wind direction	NW	SW	NE
FU (AOS)	73	63	65

IGS1**Seabird Monitoring Plot Record Card**

Colony name: Ires Geo **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: Repeat census site 2 **Grid Ref (GPS):** ND35769 45564
Counted from: land **Method of obs:** Binoculars + telescope
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	06/06/2013	14/06/2013	21/06/2013
Time (BST) start	13:25	11:20	14:25
Time (BST) finish	15:00	12:20	15:40
Cloud cover ¹	5	5	4
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	3	0
Wind direction	NW	SW	
GU (IND)	1102	1147	1046
RZ (IND)	348	354	380
KI (AON)	149	153	138
FU (AOS)	20	18	18
SH (AON)			

IGFU1+IGSH1**Seabird Monitoring Plot Record Card**

Colony name: Ires Geo **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
F4+F5 &
Study Plot Ref: SHAG PLOT **Grid Ref (GPS):** ND35769 45564
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	06/06/2013	14/06/2013	21/06/2013
Time (BST) start	15:15	12:30	15:40
Time (BST) finish	16:00	13:00	16:00
Cloud cover ¹	4	5	4
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	4	0
Wind direction	N	SW	
FU (AOS)	221	189	161
SA (AON)	1	0	0

IGFU2**Seabird Monitoring Plot Record Card**

Colony name: Ires Geo **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: F3 **Grid Ref (GPS):**ND35861 45517
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	06/06/2013	14/06/2013	21/06/2013
Time (BST) start	13:00	1110	14:15
Time (BST) finish	13:15	1125	14:20
Cloud cover ¹	3	5	7
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	2	0
Wind direction	N	S	
FU (AOS)	48	45	46

IGK11**Seabird Monitoring Plot Record Card**

Colony name: Ires Geo **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: K4 **Grid Ref (GPS):**ND35891 45479
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	06/06/2013	14/06/2013	21/06/2013
Time (BST) start	12:40	10:50	14:10
Time (BST) finish	12:55	11:05	14:15
Cloud cover ¹	5	5	7
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	3	0
Wind direction	N	SW	
KI (AON)	80	79	79

IGKI2**Seabird Monitoring Plot Record Card**

Colony name: Ires Geo **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: K1+K2 **Grid Ref (GPS):** ND35755 45122
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	06/06/2013	14/06/2013	21/06/2013
Time (BST) start	12:20	10:20	13:55
Time (BST) finish	12:35	10:45	0.649305556
Cloud cover ¹	3	6	8
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	2	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	3	3	0
Wind direction	N	SW	
KI (AON)	143	144	144

SKS1**Seabird Monitoring Plot Record Card**

Colony name: Skirza Head **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: North Plot **Grid Ref (GPS):** ND39464 68456
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	05/06/2013	13/06/2013	21/06/2013
Time (BST) start	10:30	10:30	09:15
Time (BST) finish	10:40	10:40	09:20
Cloud cover ¹	8	8	8
Rain ²	1	2	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	4	1
Wind direction	NE	W	NE
GU (IND)	60	69	80
RZ (IND)	8	10	12
KI (AON)	2	1	0
FU (AOS)	32	34	29
SH (AON)			

SKS2 Seabird Monitoring Plot Record Card
Colony name: Skirza Head **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: Ledge plot **Grid Ref (GPS):** ND39464 68456
Counted from: land **Method of obs:** Telescope
Type of colony: cliff **Photo taken:** yes

Count No	1	2	3
Date	05/06/2013	13/06/2013	21/06/2013
Time (BST) start	10:40	10:40	09:15
Time (BST) finish	10:45	10:48	09:20
Cloud cover ¹	8	8	8
Rain ²	1	2	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	4	1
Wind direction	NE	W	NE
GU (IND)	123	118	134
RZ (IND)	3	5	4
KI (AON)	0	0	0
FU (AOS)			
SH (AON)			

SKS3 Seabird Monitoring Plot Record Card
Colony name: Skirza Head **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: south plot 1 **Grid Ref (GPS):** ND39421 68181
Counted from: land **Method of obs:** telescope
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	05/06/2013	13/06/2013	21/06/2013
Time (BST) start	10:55	11:31	09:55
Time (BST) finish	11:10	11:40	10:05
Cloud cover ¹	8	8	8
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	4	1
Wind direction	NE	W	NE
GU (IND)	251	238	235
RZ (IND)	11	14	8
KI (AON)	0	0	0
FU (AOS)	0	0	0
SH (AON)	1	0	0

SKS4**Seabird Monitoring Plot Record Card**

Colony name: Skirza Head **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: south plot 2 **Grid Ref (GPS):** ND39421 68181
Counted from: land **Method of obs:** binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	05/06/2013	13/06/2013	21/06/2013
Time (BST) start	10:50	11:25	09:50
Time (BST) finish	10:55	11:30	09:55
Cloud cover ¹	8	8	8
Rain ²	1	1	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	4	1
Wind direction	NE	W	NE
GU (IND)	60	63	64
RZ (IND)	8	6	4
KI (AON)	0	0	0
FU (AOS)	0	0	0
SH (AON)			

SKKI1**Seabird Monitoring Plot Record Card**

Colony name: Skirza Head **County:** Caithness
Observer: Bob Swann **Address:** 14 St.Vincent Road, Tain
Study Plot Ref: Kittiwake Plot **Grid Ref (GPS):** ND39464 68456
Counted from: land **Method of obs:** Binoculars
Type of colony: cliff **Photo taken:** no

Count No	1	2	3
Date	05/06/2013	13/06/2013	21/06/2013
Time (BST) start	10:40	10:40	09:25
Time (BST) finish	10:50	10:50	09:40
Cloud cover ¹	8	8	8
Rain ²	1	2	1
Sea state ³	2	2	1
Swell ⁴	1	2	1
Visibility at sea ⁵	1	1	1
Wind speed ⁶	2	4	1
Wind direction	NE	W	NE
KI (AON)	121	183	173

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