

Seabird counts at St. Abb's Head to Fast Castle SPA in 2016 for Marine Renewables Casework





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RESEARCH REPORT

Research Report No. 964

Seabird counts at St. Abb's Head to Fast Castle SPA in 2016 for Marine Renewables Casework

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This report should be quoted as:

Swann, B. 2018. Seabird counts at St Abb's Head to Fast Castle SPA in 2016 for Marine Renewables Casework. *Scottish Natural Heritage Research Report No. 964.*

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RESEARCH REPORT

Summary

Seabird counts at St Abb's Head to Fast Castle SPA in 2016 for Marine Renewables Casework

Research Report No. 964

Project No: 016004

Contractor: Bob Swann, North of Scotland Ornithological Services

Year of publication: 2018

Background

The St. Abb's Head to Fast Castle SPA seabird colony underwent a census in 1986 and was last fully counted for Seabird 2000. Since then there have been major changes in many seabird populations throughout Scotland (Foster & Marrs, 2012). There are plans for major offshore windfarm developments off the coast of south east Scotland, some of which have now been consented. It is important to have up to date information on the current status of the SPA's seabird populations.

Main findings

The counts undertaken in 2016 within the SPA revealed:

- Northern fulmar – 206 AOS in 2016, 72% lower than 2000 and 73% lower than 1987.
- Great cormorant – 46 AON in 2015, compared to 36 in 2000 and 41 in 1987 an increase of 12% since 1987.
- European shag – 174 AON, 47% lower than 2000 and a continuation of a long-term 73% decline since 1987.
- Herring gull – 325 AON, a decline of 50% since 2000 and a continuation of a long-term 79% decline since 1987.
- Black-legged kittiwake – 3,334 AON, a decline of 78% since 2000 and a continuation of a long-term 84% decline since 1987.
- Common guillemot – 36,206 birds, a decline of 17% since 1998, but still 25% higher than the numbers present in 1987.
- Razorbill – 2,067 birds, a decline of 35% since Seabird 2000 but still 12% higher than the 1987 count.
- Atlantic puffin – no birds in 2016, a 100% decline from the 108 birds counted in 1987.
- Rates of declines at St. Abb's Head to Fast Castle SPA tended to be more severe than those reported nationally (at Scottish and UK levels) and rates of increases were far less.
- Changes in methodology may have had some effects on these results. Boat based surveys were used in 2016 and for Seabird 2000, but not in 1987. This means that the long term declines may be even more severe than indicated above, although comparisons with counts from 2000 are considered valid.

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Acknowledgements

The counts were undertaken by John Baxter (JB), Tracey Begg (TB), Jo Clarke (JC), Morven Carruthers (MC), Sarah Cunningham (SC), David Donnan (DD), Kirstie Dearing (KD), James Dargie (JD), Chris Eastham (CE), Karen Hall (KH), Erica Knott (EK), Flora Kent (FK), Lisa Kamphausen (LK), Chris Leakey (CL), Alex Robbins (AR), George Lees (GL), Cathy Tilbrook (CT), Emma Philip (EP), Susan Whiting (SW) and Liam Wright (LW), from SNH Coastal and Marine Ecosystems and Use unit (CMEU). The majority of the CMEU staff were experienced ecological surveyors. Each sub-team always had at least one experienced seabird counter as a member. Elizabeth Smith (LS) and Liza Cole (LC) counted the St. Abb's NNR sections for NTS and provided the collated results. The late Ray Murray provided counts undertaken by local Scottish Ornithologist Club (SOC) volunteers. Fieldwork for CMEU was co-ordinated by Alex Robbins and she compiled counts from that fieldwork.

St. Abb's Boat Charters provided the vessel used for the sea counts.

Glen Tyler (SNH Lerwick) provided full details of all counts and promptly responded to all communications regarding the collection of these data.

1. INTRODUCTION

Scottish Natural Heritage (SNH) commissioned this survey to provide up-to-date population estimates for complete colony counts at St. Abb's Head to Fast Castle Special Protection Area (SPA). This is in order to provide an evidence base that can be used to inform Habitat Regulations Appraisals (HRA), Appropriate Assessment (AA) and Environmental Impact Assessments (EIA) for development including renewable energy applications, as well as provide baselines for any post consent monitoring. The foraging ranges of seabird qualifying features of the SPA overlap with several consented offshore wind sites and others currently at the application stage along the east coast of Scotland.

The HRA and EIA processes, and any post consent monitoring, require up-to-date population estimates to accurately assess the impacts of marine activities and development on the SPA qualifying features and other sensitive species. However, the lack of recent counts, particularly for large colonies such as St. Abb's Head to Fast Castle Cliffs SPA, has increased uncertainty within these assessments.

Up-to-date counts will enable SNH to provide sound advice to both Marine Scotland as the regulator and to the individual developers. These counts will also be used as part of the next National Seabird Census and SNH's Site Condition Monitoring (SCM).

The most recent reliable count for the entire SPA was undertaken in 1999-2002 ('Seabird 2000'). The whole site had also been counted during the 'Seabird Colony Register' in 1987. SNH's recently published trend note (<http://www.snh.gov.uk/docs/B1163280.pdf>) has highlighted the declines of many seabird species in Scotland, therefore there is an urgency to establish current population estimates and condition status for these SPAs. Without up-to-date population estimates the risk of inaccurate future impact modelling is increased.

These counts will also be included within the next national seabird census (Seabirds Count). Site Condition Monitoring (SCM) is undertaken on a six yearly cycle. The third SCM cycle commenced in 2014.

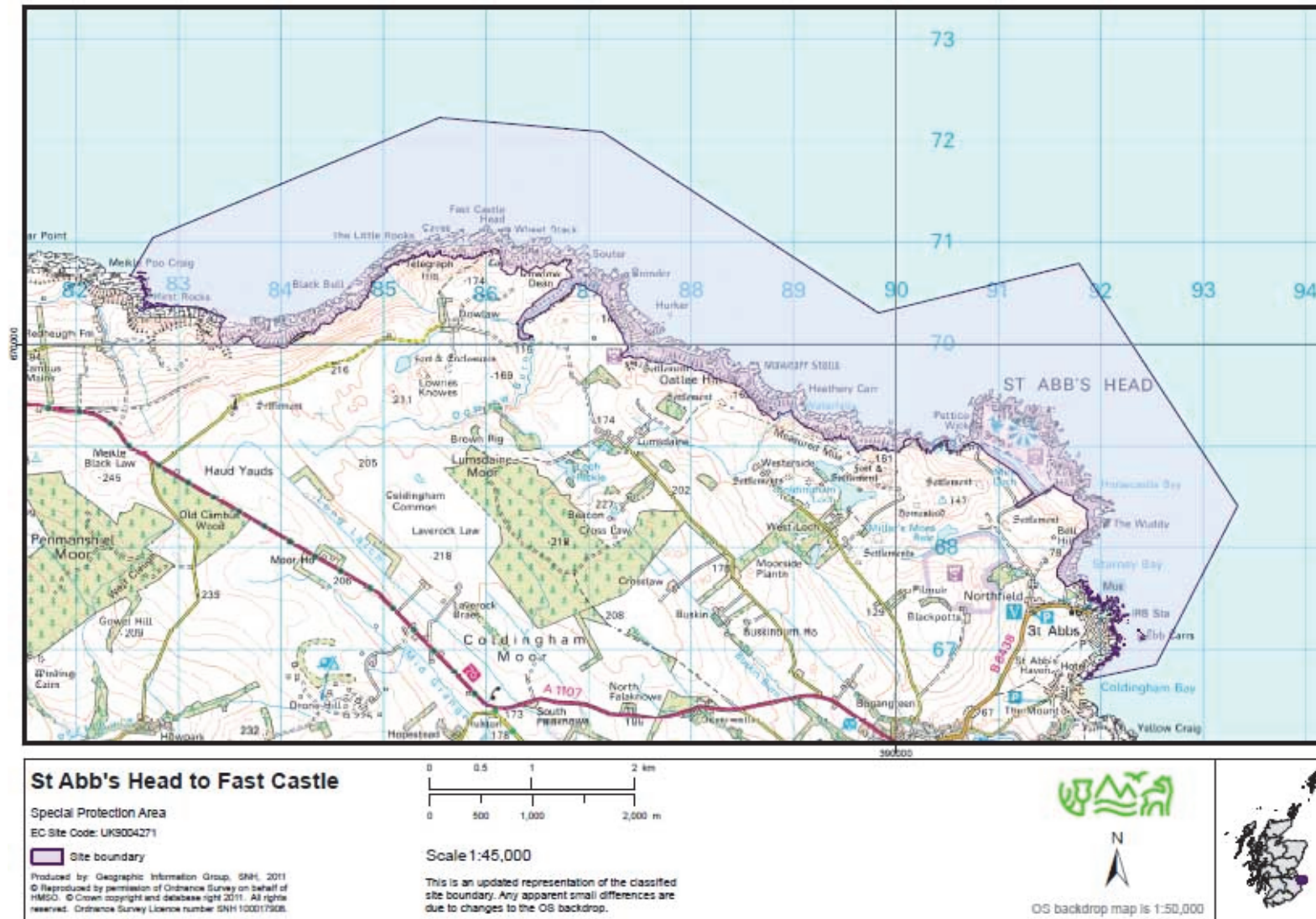


Figure 1. St.Abb's Head to Fast Castle SPA location. © Crown copyright [and database rights] 2017 OS 100017908

2. METHODS

2.1 Timing and organisation of visits

Visits were undertaken between 29th May and 30th June 2016 with counts being made between 0700 and 1700 hours. Counts were undertaken by members of SNH's 'Coastal and Marine Ecosystems and Use' Unit (CMEU), for all species out-with St. Abb's NNR and for both guillemot and razorbill only within the NNR. They were completed over two days on 7th and 8th June 2016. Additional counts for the NNR were provided by National Trust for Scotland (NTS) under a data sharing agreement with SNH. In addition, counts by a team of Scottish Ornithologists Club (SOC) volunteers took place during May and June 2016 and in the one sub-section where some species counts were higher than the CMEU counts they were used. These were also provided to SNH under a data sharing agreement.

A large team of counters contributed data. Those from NTS and SOC were experienced seabird surveyors, while the team from SNH CMEU contained some experienced and some less experienced surveyors. In order to ensure count quality was maintained, sub teams of CMEU counters (typically 3 persons) always contained at least one experienced member. All boat counts were undertaken by experienced seabird counters.

In order to allow comparisons with the previous survey each section was counted using the same boundaries as were used for Seabird 2000. Within the NNR counts of birds were divided into count sections used by NTS (see Annex 3). Some sections, mainly at St. Abb's Head NNR, were covered using a combination of land based counts and boat based counts. The latter made use of 'Stingray', an Offshore 105, 10.5m GRP planning profile single hull vessel. In these instances maps were provided to observers showing what areas could be seen and therefore counted from the land and areas which could only be seen and therefore counted from the sea (Figure 2, Annex 5). During the boat based surveys photographs were taken using a Canon SX40HS bridge camera with an effective 24mm-810mm zoom range. These are detailed in Annex 4 and provide a permanent record that can be used to make comparisons with future or past surveys. Some of these photographs were used later to assist with counts.

The counts were generally undertaken in suitable weather and sea conditions as per the Seabird Monitoring Handbook (Walsh *et al.*, 1995). Details of the count sections, the count type, weather and sea conditions are given in Annex 1 and 2. Details of count results and the method by which each section was counted (land-based or sea-based) are given in Annex 3 and Annex 4.

2.2 Species methodology - counts

Northern fulmar. An apparently occupied site (AOS) was counted as occupied only when a bird was sitting tightly on a reasonably horizontal area large enough to hold an egg. Two birds on such a site, apparently paired, count as one AOS.

Great cormorant. Apparently occupied nests (AON) were counted, including all substantial or well-constructed nests occupied by at least one bird.

European shag. Apparently occupied nests were counted. This was straightforward on cliff sections, but not so in boulder areas. Here the numbers of adults present were used to estimate the number of nests.

Black-legged kittiwake. All apparently occupied nests were counted. These were substantial or well-constructed nests capable of holding eggs, occupied by at least one bird standing on or within touching distance of the nest. Trace nests, with insufficient material to contain eggs or young, were not counted.

Herring gull and great black-backed gull. In small colonies on or below cliffs all apparently occupied nests were counted. Where actual nests were likely to be obscured by vegetation, but sitting/standing birds were visible, the count was of apparently occupied territories.

Common guillemot and razorbill. All individual birds on land above the spring high water mark were counted.

Note that in all instances only a single count was recorded per section. If counters were confident that an accurate count had been taken (usually when densities of birds were low) then only a single sweep was conducted. In areas of higher density repeat counts in the same section were undertaken, either by the same observer immediately following a first count, or by two (or more) observers counting simultaneously. Where the numbers recorded were within 10% the mean of two counts or median of three was used as the registered count. Where values differed by more than 10% a repeat count was conducted to improve the estimate. Once the difference between two simultaneous counts or two consecutive counts was 10% or less the figure was recorded as before.

2.3 Counts from photographs

In section 12 of the St. Abb's NNR and in one sub-section of Broadhaven to Moorburn Point counts were obtained from photographs (Figure 3). JPEGs were loaded onto a computer and opened in Microsoft paint. By zooming in (x100 to x200) individual birds could be seen. These were then counted with each bird given a coloured spot, according to species, using the airbrush setting from the top menu bar. This work was undertaken by Glen Tyler (SNH, CMEU). A catalogue of photographs of the St Abb's Head NNR auk colony has been stored on optical disc for National Trust use.

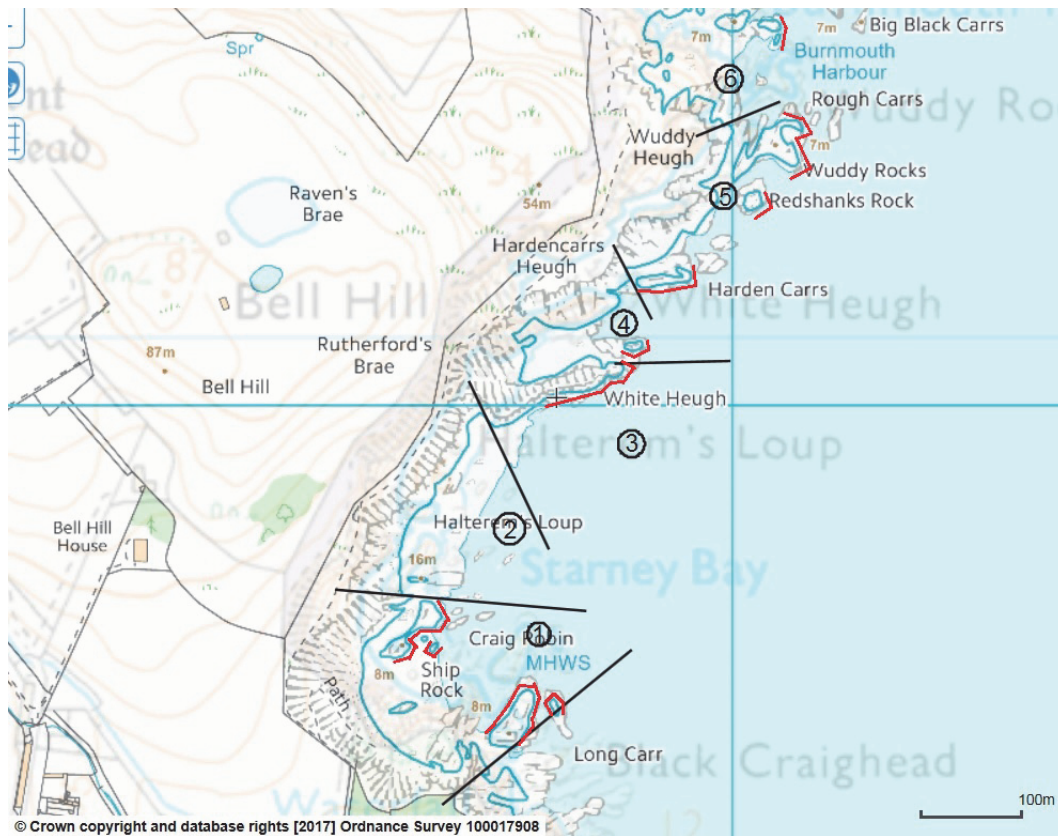


Figure 2. Map of St. Abb's Head NNR section 1-6, showing sections to be counted from sea (red). Maps of the other sections are in Annex 5.



Figure 3. Photograph of part of section 12 used to count auks.

3. RESULTS

3.1 Counts according to individual sections

The entire coastline was counted between St. Abb's Head and Fast Castle Head. The results according to the four SMP sections are given in Table 1.

Table 1. Summary of data collected from individual count sections

Site Code	FU	SA	CA	GB	HG	KI	GU	RA
STABa							29147	1223
STABb							4480	486
STABa*	88	94			180	2235		
STABb*	13	30			17	544		
BRMPa	69	3			60	352	1528	132
BRMPb	5					163	45	
MPFC	21	13			25	35	336	38
FCH	10	34	46	1	43	5	670	188

Notes:

Site codes: These are detailed in annex 1 and 2. For sections where counts were done both from land and sea a = land count and b = sea count.

Species codes: FU northern fulmar, SA European shag, CA great cormorant, GB great black-backed gull, HG herring gull, KI black-legged kittiwake, GU common guillemot, RA razorbill.

Counts. For units see methods section.

* counts provided by National Trust for Scotland

3.2 Counts according to designated areas

Two sections of the coast are designated. The entire coastline from St. Abb's Head to Fast Castle Head is designated as a Site of Special Scientific Interest and classified as an SPA. In addition the St. Abb's Head section (STAB) is a National Nature Reserve (NNR). Table 2 gives the totals for the entire SPA and the St. Abb's NNR.

Table 2. Summary of data collected from designated sites.

Site	FU	SA	CA	GB	HG	KI	GU	RA
SPA	206	174	46	1	325	3334	36206	2067
NNR	101	124	0	0	197	2779	33627	1709

Note: Count units are given in methods section.

4. COMPARISON WITH PREVIOUS COUNTS

The St. Abb's Head to Fast Castle SPA was last counted in 2000 as part of the Seabird 2000 survey, with the exception of common guillemot and razorbill which in the STAB section were counted in 1998. Prior to this the entire SPA was counted in 1987 as part of the NCC/Seabird Group's repeat national survey (The Seabird Colonies Register).

4.1 Counts according to designated areas

Table 3 gives details of the total number of seabirds counted in 1987, for Seabird 2000 and in 2016 at the SPA along with the percentage changes.

Table 3. Summary of data St. Abb's Head to Fast Castle SPA.

	FU*	SA**	CA**	GB**	HG**	LB**	KI**	GU***	RA***	PU***
1987	764	651	41	0	1522	3	21374	28963	1853	108
Seabird 2000	732	329	36	1	647	1	15222	43744	3157	58
2016	206	174	46	1	325	0	3334	36206	2067	0
% change										
2000-2016	-72%	-47%	28%	0%	-50%	-100%	-78%	-17%	-35%	-100%
% change										
1987-2016	-73%	-73%	+12%	-	-79%	-100%	-84%	+25%	+12%	-100%

* Units are Apparently Occupied Sites (AOS)

** Units are Apparently Occupied Nests (AON)

*** Units are adult individuals ashore (Ind)

Since 1987 northern fulmar, European shag, herring gull, black-legged kittiwake and Atlantic puffin have all shown long-term continual and fairly substantial declines (Table 3). Common guillemots and razorbills showed increases of 51% and 70% respectively between 1987 and the Seabird 2000 counts. Between then and 2016 common guillemots declined by 17% and razorbills by 35%, but still showed an overall increase of 25% and 12% respectively on the 1987 total. Following a small decline in 2000, great cormorants have shown a small overall increase between 1987 and 2016. According to St. Abb's Head NNR seabird reports Atlantic puffins were last recorded ashore in 2013.

Table 4. Summary of data St. Abb's Head NNR.

	FU	SA	GB	HG	LB	KI	GU	RA	PU
1987	338	396	0	697	2	15182	26702	1557	88
Seabird 2000	274	233	1	307	0	11077	40720	2214	58
2016	101	124	0	197	0	2779	33627	1709	0
% change									
2000-2016	-63%	-47%	-100%	-36%	-	-75%	-17%	-23%	-100%
% change									
1987-2016	-70%	-69%	-	-72%	-100%	-82%	+26%	+10%	-100%

Within the St. Abb's Head NNR the changes have all been of a similar pattern and a similar scale to those described for the entire SPA (Table 4).

4.2 St. Abb's Head to Fast Castle SPA trend versus national trend

National seabird population trends are available from JNCC's Seabird Monitoring Programme. The UK trends are presented in an annual report (JNCC 2016), whilst the Scottish trends can be established using the original data which is available on request (<http://jncc.defra.gov.uk/page-3201>).

Change in numbers at the St. Abb's Head to Fast Castle SPA between Seabird 2000 and 2016 show different trends to changes at a UK and Scottish level, over the same period for those species where national data is available (Table 5).

Table 5. Changes in numbers at St. Abb's Head to Fast Castle SPA 2000 to 2016 compared to Scottish and UK trends.

	FU	SA	HG	KI	GU	RA
St. Abb's Head to Fast Castle SPA	-72%	-47%	-50%	-78%	-17%	-35%
Scotland	-43%	-35%	-55%	-58%	-24%	-6%
UK	-31%	-34%	n/a	-44%	5%	32%

Northern fulmar, European shag, black-legged kittiwake and razorbill all showed much larger declines at the St. Abb's Head to Fast Castle SPA than those recorded overall in Scotland and the UK. Common guillemot had a smaller decline than that recorded as a whole in Scotland, though it was still notable compared to the overall increase recorded in the UK as a whole. The herring gull decline was similar to that recorded throughout Scotland.

Table 6. Changes in numbers at St. Abb's Head to Fast Castle SPA 1987 to 2016 compared to Scottish and UK trends.

	FU	SA	HG	KI	GU	RA
St. Abb's Head to Fast Castle SPA	-73%	-73%	-79%	-84%	25%	12%
Scotland	-37%	-45%	-73%	-68%	-10%	39%
UK	-37%	-60%	n/a	-60%	37%	87%

Longer term changes since 1987 (Table 6) show that for northern fulmar, European shag and black-legged kittiwake the declines have been more severe at the St. Abb's Head to Fast Castle SPA than Scotland or the UK as a whole, whilst for herring gull they have been similar. The increase in razorbills is not as high as that recorded as a whole in Scotland or the UK, whilst for common guillemots numbers have actually increased compared to an overall decline in Scotland, though not as much as the UK as a whole.

5. DISCUSSION

5.1 Changes in methodology

The changes in numbers of birds shown in this report between earlier surveys and the present survey could be real, could be due to methodological changes or more likely could be a combination of both these factors.

Overall the 2016 count followed the methodology used by the 1987 and Seabird 2000 counts. In 1987, however, all counts were land based. For Seabird 2000 and the 2016 count a boat was used to do additional sea counts mainly in the St. Abb's NNR (STAB), but the majority of counts were land-based. The lack of a boat in 1987 meant that areas that could not be seen by land based observers during later surveys could not be counted. This would be expected to result in lower totals, particularly for cliff nesting species in 1987. For instance 30 European shag AONs, 544 black-legged kittiwake AONs, 486 razorbills and 4,480 common guillemots were counted from the sea in STAB in 2016. If these counts had been excluded from the overall SPA totals there would have been only 76 European shag AONs, a decline of 78% on the 1987 count, 2235 black-legged kittiwake AONs, a decline of 87% and 1,581 razorbills a decline of 15% on the 1987 figure. For common guillemot the 2016 total would have been 31,726 only a 10% increase on the 1987 figure. This change in methodology, assuming that there had been no change in the overall distribution of seabirds on the SPA, means that the declines in numbers for most species since 1987 are real and probably more severe than suggested in Tables 3-6.

The risk of double counting areas of the NNR when teams were operating in the boat and on land simultaneously was considered. Given time constraints on the survey the marking of maps for areas that would be counted from sea only was a practical solution. Most, if not all, of these areas were not visible from the land vantage points used for counting, so the risk of double counts is considered small (see annex 6).

Another change in methods has been the use of photographs. These were used to count two sections, one in STAB and the other in BRMP. There was an issue with poor visibility early on in the morning of the 7th June at BRMP due to a haar drifting in. Once the haar lifted this section was revisited by boat and photographs taken. Parts of the cliff that had been hidden by the haar were counted from the photographs. In addition on other sections photographs were used to check counts to ensure accuracy, these suggested that no nesting areas had been missed. The 2016 counts were also compared with counts undertaken done by NTS staff in recent years. Broad agreement in these counts confirms that the major declines recorded are likely to be real.

5.2 St. Abb's Head to Fast Castle SPA trend versus national trends

The SNH Biodiversity indicator ([Scottish Biodiversity Indicator- Abundance of Breeding Seabirds](#)) 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. 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 & Harris, 2012). This may lead to different species or areas showing different trends.

Four species have undergone major declines at this SPA since 1987. For three of them, northern fulmar, European shag and black-legged kittiwake, these declines are more severe than that recorded at a national level, whilst for razorbill the percentage increase in numbers within the SPA is not as high as that recorded nationally. As discussed above these changes are unlikely to be solely due to changes in methodology, indeed what changes there have been in methodology suggest that the declines may actually be more severe than reported.

This suggests that different environmental factors are operating locally compared to other parts of the country, the most likely one being food supply.

6. CONCLUSIONS AND RECOMMENDATIONS

The monitoring results indicate that since Seabird 2000, seven monitored species underwent major declines at the St. Abb's to Fast Castle SPA: black-legged kittiwake (-78%), northern fulmar (-72%), herring gull (-50%), European shag (-47%), razorbill (-35%) common guillemot (-17%), whilst the small Atlantic puffin population had totally gone. The only increase involved the small great cormorant population. Over the longer term since 1987 black-legged kittiwake (-84%), herring gull (-79%), northern fulmar (-73%) and European shags (-73%) had declined, whilst great cormorant (+12%), razorbill (+12%) and common guillemot (+25%) showed increases. Generally speaking the changes at St. Abb's Head to Fast Castle SPA have been more severe than those recorded at a national level.

In order to reduce the effects of changing methodology the following recommendations are made.

1. All future surveys of the SPA should include a combination of land and sea based counts.
2. Where there is a mixture of land and sea counts in a section photographs are taken to try and clearly mark the sub-sections counted from land so that these are available during the boat based surveys.
3. On all complex sections of coastline a series of overlapping photographs are taken to enable any field counts to be double checked.

7. REFERENCES

Foster, S. & Marrs, S.J. 2012. Seabirds in Scotland. *Scottish Natural Heritage Trend Note No. 21*. 17pp.

JNCC. 2016. Seabird Population Trends and Causes of Change: 1986-2015 Report. Joint Nature Conservation Committee. Available at: <http://jncc.defra.gov.uk/page-3201>

Walsh, I.P., 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/ITE/Seabird Group, Peterborough.

Wanless, S. & Harris, M.P. 2012. Scottish seabirds – past, present and future. *Scottish Birds*, 32, 38-45.

ANNEX 1: ST. ABB'S HEAD TO FAST CASTLE SPA COUNT SECTIONS

Section	Site code	Grid start	Grid end
St.Abb's Head NNR	STAB	NT917676	NT907676
Broadhaven – Moorburn Point	BRMP	NT907691	NT890695
Moorburn Point- Fast Castle	MPFC	NT890695	NT861711
Fast Castle Head	FCH	NT861711	NT834701

ANNEX 2: COUNT SECTION VISIT DETAILS

Site code	Date	Method	Observer	Visibility	Sea state	Rain	Wind
STABa	08/06/16	Land	CMEU	1	2	1	1
STABb	08/06/16	Sea	CMEU	1	2	1	1
STABa	29/05/-22/06/16	Land	NTS	-	-	-	-
STABb	2-23/06/16	Sea	NTS	-	-	-	-
BRMPa	07/06/16	Land	CMEU	2-3	2	1	1
BRMPb	07/06/16	Sea	CMEU	2	2	1	1
MPFC	07/06/16	Land	CMEU	2	2	1	1
FCH	07/06/16	Land	CMEU	2	2	1	1

Notes:

Site Code: Refers to count sections as listed in Annex 1.

Method: Counted from land or sea

Weather codes (not available for NTS surveys):

Visibility: 1 good, 2 fair, 3 poor. **Sea State:** 1 flat calm, 2 small waves, 3 large waves, 4 white wave crests, 5 waves breaking high onto rocks. **Rain:** 1 none, 2 discontinuous light, 3 discontinuous heavy, 4 continuous light, 5 continuous heavy. **Wind (beaufort Scale):** 0, 1, 2, 3, 4, >4

ANNEX 3: COUNT DETAILS OF SPA SECTIONS OUTSIDE THE NNR

SPA Section	Date	Observer	Count type	FU	SA	GB	HG	KI	GU	RA
Broadhaven to Moorburn Point	07/06/2016	AR, EK, SW / CL, CG, LW	1.2 – land-based	74	3	0	60	515	157 3	132
Moorburn Point to Fast Castle	07/06/2016	TB, KD, JD, JB / GT, FK, SW, CC	1.2 – land-based	21	13	0	25	35	336	38
Fast Castle Head	07/06/2016	CE, CT, DD / KH, EP, SH/ SOC	1.2 – land-based	10	34	1	43	5	670	188

ANNEX 4: COUNT DETAILS ACCORDING TO ST. ABB'S HEAD NNR SECTIONS

NNR section	Date	Observer	Count type	FU	SA	GB	HG	KI	GU	RA
1	29/05/2016	LS	1.2 - Land-based		0		0			
1	20/06/2016	LS	1.2 - Land-based	0				0		
2	29/05/2016	LS	1.2 - Land-based		0		0			
2	08/06/2016	CT, MC, SW	1.2 - Land-based						44	4
2	20/06/2016	LS	1.2 - Land-based	7				0		
3	29/05/2016	LS	1.2 - Land-based		2		9			
3	08/06/2016	CT, MC, SW	1.2 - Land-based						1200	20
3	20/06/2016	LS	1.2 - Land-based	8				0		
4	29/05/2016	LS	1.2 - Land-based		8		11			
4	08/06/2016	CT, MC, SW	1.2 - Land-based						143	96
4	20/06/2016	LS	1.2 - Land-based					37		
5	29/05/2016	LS	1.2 - Land-based		1		60			
5	08/06/2016	Boat	1.1 - Boat-based						51	18
5	08/06/2016	LC, LS	1.1 - Boat-based				3			
5	20/06/2016	LS	1.2 - Land-based					4		
6	29/05/2016	LS	1.2 - Land-based		2		46			
6	08/06/2016	DD, FK	1.2 - Land-based						4	19
6	20/06/2016	LS	1.2 - Land-based	1				0		
7	29/05/2016	LS	1.2 - Land-based				3			
7	02/06/2016	LS	1.1 - Boat-based		2					
7	08/06/2016	DD, FK	1.2 - Land-based						337	87
8	29/05/2016	LS	1.2 - Land-based				1			
8	08/06/2016	Boat	1.1 - Boat-based						780	13
8	08/06/2016	LC, LS	1.1 - Boat-based		10					
8	20/06/2016	LS	1.2 - Land-based	10				43		
8	23/06/2016	LC, LS	1.1 - Boat-based	2				37		
9	29/05/2016	LS	1.2 - Land-based				4			
9	02/06/2016	LS	1.2 - Land-based		5					
9	08/06/2016	Boat	1.1 - Boat-based						60	5
9	08/06/2016	LC, LS	1.1 - Boat-based		10					
9	08/06/2016	JD, EK, KH	1.2 - Land-based						318	38
9	20/06/2016	LS	1.2 - Land-based					62		
9	21/06/2016	LS	1.2 - Land-based	1				49		
9	23/06/2016	LC, LS	1.1 - Boat-based					3		
10	29/05/2016	LS	1.2 - Land-based				1			
10	02/06/2016	LS	1.2 - Land-based		4					
10	08/06/2016	Boat	1.1 - Boat-based						311	10
10	08/06/2016	LC, LS	1.1 - Boat-based		1					
10	08/06/2016	JD, EK, KH	1.2 - Land-based						793	132
10	21/06/2016	LS	1.2 - Land-based	7				175		
10	23/06/2016	LC, LS	1.1 - Boat-based					41		
11	29/05/2016	LS	1.2 - Land-based				0			
11	02/06/2016	LS	1.2 - Land-based		1					
11	08/06/2016	AR, LK	1.2 - Land-based						700	26
11	21/06/2016	LS	1.2 - Land-based					263		
12	29/05/2016	LS	1.2 - Land-based				0			
12	08/06/2016	Boat	1.1 - Boat-based						618	12
12	21/06/2016	LS	1.2 - Land-based					26		
13	30/05/2016	LC	1.2 - Land-based				2			
13	08/06/2016	Boat	1.1 - Boat-based						505	44
13	08/06/2016	SC, JC	1.2 - Land-based						2000	32
13	21/06/2016	LC	1.2 - Land-based					118		
14	30/05/2016	LC	1.2 - Land-based		27		7			
14	08/06/2016	Boat	1.1 - Boat-based						250	10

14	08/06/2016	AR, LK	1.2 - Land-based					2473	142
14	21/06/2016	LC	1.2 - Land-based	23			511		
14	23/06/2016	LC, LS	1.1 - Boat-based				99		
15	30/05/2016	LC	1.2 - Land-based		4	6			
15	08/06/2016	AR, LK	1.2 - Land-based					4048	49
15	21/06/2016	LC	1.2 - Land-based	1			79		
16	30/05/2016	LC	1.2 - Land-based		2	1			
16	08/06/2016	Boat	1.1 - Boat-based					63	14
16	08/06/2016	AR, LK	1.2 - Land-based					6710	56
16	21/06/2016	LC	1.2 - Land-based	2			10		
16	23/06/2016	LC, LS	1.1 - Boat-based				13		
17	30/05/2016	LC	1.2 - Land-based			0			
17	08/06/2016	Boat	1.1 - Boat-based					234	28
17	23/06/2016	LC, LS	1.1 - Boat-based				72		
18	30/05/2016	LC	1.2 - Land-based		3	2			
18	08/06/2016	Boat	1.1 - Boat-based					1021	47
18	08/06/2016	AR, LK	1.2 - Land-based					475	94
18	21/06/2016	LC	1.2 - Land-based	13			494		
19	30/05/2016	LC	1.2 - Land-based		4	1			
19	08/06/2016	LC, LS	1.1 - Boat-based		1				
19	08/06/2016	AR, LK	1.2 - Land-based					3890	50
19	21/06/2016	LS	1.2 - Land-based				19		
19	22/06/2016	LC	1.2 - Land-based	3			2		
19	23/06/2016	LC, LS	1.1 - Boat-based				13		
20	30/05/2016	LC	1.2 - Land-based		1	1			
20	08/06/2016	Boat	1.1 - Boat-based					174	97
20	08/06/2016	CL,KD,	1.2 - Land-based					2030	97
20	21/06/2016	LC	1.2 - Land-based	1			8		
20	23/06/2016	LC, LS	1.1 - Boat-based				18		
21	30/05/2016	LC	1.2 - Land-based		1	8			
21	08/06/2016	Boat	1.1 - Boat-based					241	73
21	08/06/2016	LC, LS	1.1 - Boat-based			9			
21	08/06/2016	CL,KD,	1.2 - Land-based					2000	39
21	22/06/2016	LC	1.2 - Land-based	1			5		
21	23/06/2016	LC, LS	1.1 - Boat-based				45		
22	30/05/2016	LC	1.2 - Land-based		2	6			
22	08/06/2016	LC, LS	1.1 - Boat-based		2	3			
22	08/06/2016	CL,KD,	1.2 - Land-based					870	152
22	21/06/2016	LC	1.2 - Land-based	10					
22	22/06/2016	LC	1.2 - Land-based				232		
22	23/06/2016	LC, LS	1.1 - Boat-based	10			147		
23	30/05/2016	LC	1.2 - Land-based		14	4			
23	08/06/2016	LC, LS	1.1 - Boat-based			2			
23	08/06/2016	CL,KD,	1.2 - Land-based					200	37
23	22/06/2016	LC	1.2 - Land-based				27		
24	30/05/2016	LC	1.2 - Land-based		1	2			
24	08/06/2016	CL,KD,	1.2 - Land-based					912	53
24	22/06/2016	LC	1.2 - Land-based				57		
25	30/05/2016	LC	1.2 - Land-based		4	3			
25	06/06/2016	LC	1.2 - Land-based		8	2			
25	08/06/2016	Boat	1.1 - Boat-based					172	115
25	08/06/2016	LC, LS	1.1 - Boat-based		3				
25	22/06/2016	LC	1.2 - Land-based				14		
25	23/06/2016	LC, LS	1.1 - Boat-based	1	1		56		

ANNEX 5: ST. ABB'S HEAD NNR PHOTOGRAPHIC RECORD

Photo Number	Section	Notes
Number of photograph (or range)	Section numbers and whether images are context or detail images	Location or subject. Times are timestamp on image.
IMG_4863	Section 25 - context	Staple Rock (10:09 on Camera) cliffs north of Staple Rock
IMG_4864 - 4872	Section 25 - detail	Ends at 10:12 on camera
IMG_4873 - 4875	Section 25 - 3 context	10:12 camera
IMG_4876 - 4909	Section 25 - 33 detail shots	
IMG_4910 - 4914	Not count photos	People / birds
IMG_4915 - 4917	Section 24 - context	10:21 camera
IMG_4918 - 4921	Section 23 - context	10:22
IMG_4922 - 4929	Section 24 - detail	10:24
IMG_4930	Section 22 - detail	
IMG_4931	Section 24 - detail	
IMG_4932 - 4937	Section 23 - detail	10:24
IMG_4938 - 4980	Section 24 - detail	10:25 - 10:28
IMG_4981 - 4984	Kelp	
IMG_4985	Section 21 - wide context	10:37
IMG_4986 - 4988	Section 21 - context	10:37 Floater
IMG_4989 - 5030	Section 21 - detail	10:37 - 10:41 Floater from West
IMG_5031	Section 20 - context	11:00 Skelly from North
IMG_5032 - 5054	Section 20 - detail	11:01 - 11:03 Skelly
IMG_5055 - 5057	Section 20-21 - context	
IMG_5058 - 5063	Section 19 - context	11:09 - 11:10 small stack south of Big Channeler
IMG_5064 - 5097	Section 19 - detail	11:10 - 11:12
IMG_5098 - 5101	Section 19 - context	11:14 Millers Folly
IMG_5102 - 5141	Section 19 - detail	11:14 - 11:17 NW face of stack
IMG_5142 - 5143	Section 18 - wide context	11:20
IMG_5144 - 5145	Section 22 - context	11:20
IMG_5146 - 5166	Section 22 - detail	11:20 - 11:21 N face Hopes Heugh
IMG_5167	Section 19 - context	11:24 NE face Little Channeler stack
IMG_5168 - 5172	Section 19 - detail	11:24 Little Channeler
IMG_5173 - 5176	Section 15	11:25 Downie's Goats
IMG_5177 - 5217	Section 15	11:25 - 11:28
IMG_5218 - 5122	Section 14-16 - context	11:29 - 11:31
IMG_5223 - 5228	Section 16 - detail	11:31 - 11:33
IMG_5231 - 5254	Section 14 - detail	11:33 - 11:35
IMG_5255	Section 16 - context	11:36 Foul Carr
IMG_5256 - 5298	Section 16 - detail	11:36 - 11:39 Foul Carr
IMG_5299	Section 16 - context	11:41 Foul Carr
IMG_5300 - 5311	Section 16 - detail	11:41 - 11:42 Foul Carr
IMG_5312 - 5314	Section 15-16 - context	11:44
IMG_5315 - 5372	Section 15-16 - detail	11:44 - 11:49
IMG_5373	Section 15 - context	11:49
IMG_5374 - 5379	Section 15 - detail	11:49 - 11:50
IMG_5380 IMG_5382	Section 14 - context	11:51 NW face headland west of Cleaver Rock
IMG_5383 - 5419	Section 14 - detail	11:51 - 11:55
IMG_5420 - 5425	Birds on water	
IMG_5426 - 5431	Section 14 - context	11:58 N face of headland west of Cleaver Rock
IMG_5432 - 5454	Section 14 - detail	11:58 - 12:00 both sides of cave
IMG_5455 - 5461	Section 13 - context	12:01 - 12:02 Cleaver Rock
IMG_5462 - 5500	Section 13 - detail	12:03 - 12:06 Cleaver Rock

IMG_5501 - 5519	Birds and comb jellies	12:06 - 12:19
IMG_5520 - 5525	Section 11 - context	12:19 - 12:20 head of Calica Rib
IMG_5526 - 5542	Section 11 - detail	12:20 - 12:21
IMG_5543	Section 12 - context	12:23 Cleaver Rock west of Calica Rib
IMG_5544 - 5558	Section 12 - detail	12:23 - 12:25 Cleaver Rock west of Calica Rib
IMG_5559 - 5560	Section 11 - context	12:26 - 12:27 east face Goose Cruves
IMG_5561 - 5570	Section 11 - detail	12:27 Goose Cruves
IMG_5571 - 5573	Section 10 - context	12:28 NW face headland inside Craig Rock
IMG_5574 - 5615	Section 10 - detail	12:28 - 12:32
IMG_5616 - 5617	Section 10 - context	12:33 east face below lighthouse
IMG_5618 - 5656	Section 10 - detail	12:33 - 12:38
IMG_5649	Section 10 - context	12:36 NW face - opposite side of bay
IMG_5657 - 5679	Section 10 - detail	12:38 - 12:40
IMG_5681 - 5685	Birds (including fishing line)	
IMG_5686 - 5687	Section 9 - context	12:49
IMG_5688 - 5702	Section 9 - detail	12:49 - 12:50 bay west of Black Gable
IMG_5703 - 5706	Birds	
IMG_5707 - 5710	Section 8 - context	12:54 West face Cauldron Cove
IMG_5711 - 5714	Section 8 - detail	12:55
IMG_5715	Section 8 - context	12:56 South east face Cauldron Cove
IMG_5716 - 5729	Section 8 - detail	12:56 - 12:57 SE face Cauldron Cove
IMG_5730 - 5732	Birds	
IMG_5733 - 5735	Section 8 - context	13:00 opposite side previous headland
IMG_5736 - 5767	Section 8 - detail	13:00 - 13:02
IMG_5768 - 5769	Section 7 - context	13:11 South face East Hurker
IMG_5770 - 5775	Section 7 - detail	13:11 - 13:12
IMG_5776 - 5783	Fishermen rubbish	
IMG_5784 - 5785	Section 6 - context	13:18 Horsecastle bay
IMG_5786 - 5787	Section 6 - detail	13:19
IMG_5788	Section 6 - context	13:19 Horsecastle Bay
IMG_5789 - 5790	Section 6 - detail	13:19
IMG_5791 - 5792	Section 6 - context	13:22 Burnmouth harbour
IMG_5793 - 5796	Section 6 - detail	13:22 - 13:23
IMG_5797 - 5798	Section 5 - context	13:27 The Split
IMG_5799 - 5803	Section 5 - detail	13:28
IMG_5804 - 5805	Section 5 - context	13:30 Harden Carrs south face
IMG_5806 - 5809	Section 5 - detail	13:31 Harden Carrs south face
IMG_5810	Section 4 - context	13:32 south of Harden Carrs Heugh
IMG_5811 - 5813	Section 4 - detail	13:32
IMG_5814 - 5815	Section 4 - context	13:33 North face White Heugh
IMG_5816 - 5844	Section 4 - detail	13:33 - 13:35
IMG_5845 - 5846	Birds	
IMG_5847 - 5848	Section 3 - context	13:38 south face White Heugh
IMG_5849 - 5887	Section 3 - detail (various zooms)	13:38 - 13:41 south face White Heugh

Note: All photographs were taken on 08/06/2016

Photographs are stored by SNH CMEU on their S drive. Copies on optical disc also supplied to National Trust for Scotland at St. Abb's Head NNR.

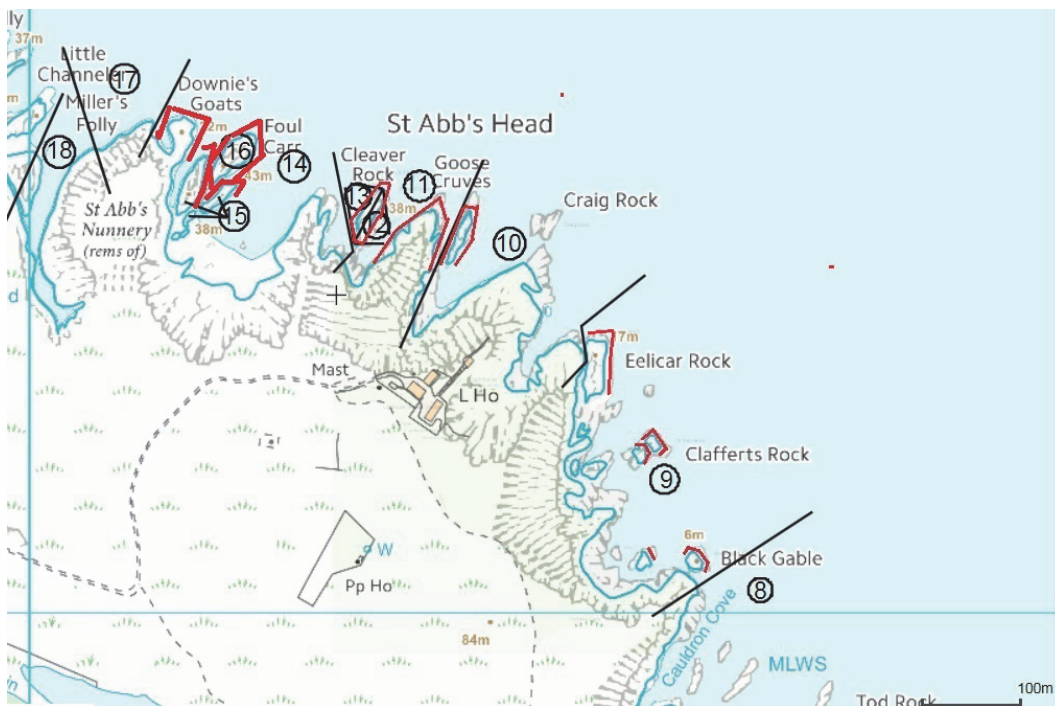
ANNEX 6: ST. ABB'S HEAD NNR MAPS SHOWING SECTION BOUNDARIES (black lines and section numbers) AND AREAS TO BE COUNTED BY BOAT (red sections)

Sections 7-8



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Sections 9-17



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Sections 18-25



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ISBN: 978-1-78391-437-1

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