Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme

2013 Report

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Summary

The Flamborough Head and Bempton Cliffs seabird monitoring programme is an ongoing partnership between RSPB and Natural England, set up to monitor and report on the condition of this internationally important seabird colony. Established in 2008, the project aims to establish repeatable baseline census monitoring of the colony, and to pursue a number of key areas of research and surveillance required to inform the condition of this site. The continued monitoring and research allows us to inform and review the Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) and provide critical data to conservation agencies to enable the government to make informed decisions in the establishment of the Marine Protected Area (MPA) network.

The 2013 seabird monitoring programme was successfully completed by a dedicated team of staff, volunteers and two long-term residential seabird researchers.

This season, prolonged storms in the North Sea during March had serious impacts on birds preparing for this year's breeding season. Large numbers of auks were washed up on beaches along the length of the east coast either dead or dying from exhaustion and starvation. A secondary effect came to light when significant numbers of Kittiwake attempted to breed but only laid small clutches or didn't breed at all. This suggests that birds struggled to reach breeding condition. For some species e.g. Kittiwake and Gannet, this resulted in a protracted breeding season with birds laying as late as three weeks than in previous years, however, others, e.g. Guillemot and Razorbill, were more traditional with their egg laying dates. Once the season was underway, a good run of weather and signs of available fish shoals off the Yorkshire coast meant birds that did breed where relatively successful and productivity remained above the national average for all but Kittiwake this season.

Common Guillemot study-plot counts were completed in 2013. The average total count was 1,279 individuals (IND) – this is the highest recorded total average count since the study was set up, with an increase of 187 individuals on last year, and 154 individuals since the first study in 2009.

Razorbill study-plot counts were completed in 2013. The average total count was 586 IND – this is the highest recorded total average count since the study was set up, with an increase of 51 individuals on last year, and 254 individuals since the first study in 2009.

Black-legged Kittiwake study-plot counts were completed in 2013. The results show a reduction of 413 apparently occupied nests since 2012. The results support a poor breeding season and the results from productivity monitoring.

Herring Gull whole-colony counts were not completed this year due to unfavorable sea conditions, persistent on-shore winds prevented the colony counts from being completed throughout June and July.

Razorbill productivity averaged 0.67 chicks per apparently occupied site.

Common Guillemot productivity averaged 0.78 chicks per apparently occupied site.

Northern Gannet productivity averaged 0.83 chicks per apparently occupied nest.

Black-legged Kittiwake productivity averaged 0.51 chicks per apparently occupied nest.

Northern Fulmar productivity averaged 0.52 chicks per apparently occupied site.

Herring Gull productivity averaged 0.84 chicks per apparently occupied nest.

The RSPB's Seabird Tracking and Research (STAR) project took place again at Flamborough and Bempton; led by Dr Ellie Owen, RSPB conservation scientist. The project is now in its fifth year of fieldwork and data collection, tracking black-legged kittiwakes to investigate foraging behaviour. This season the project was supported by Alice Macmillan (RSPB) as part of her sabbatical. Thirty-three GPS tags were deployed in 2013 on adult birds at Flamborough, twenty-one of these were recovered. Work was also carried out at the pSPA site at Filey for the first time. Thirty-three GPS tags were also deployed here, of which twenty were recovered. The findings from this year's tracking projects will be available on the RSPB website in 2014.

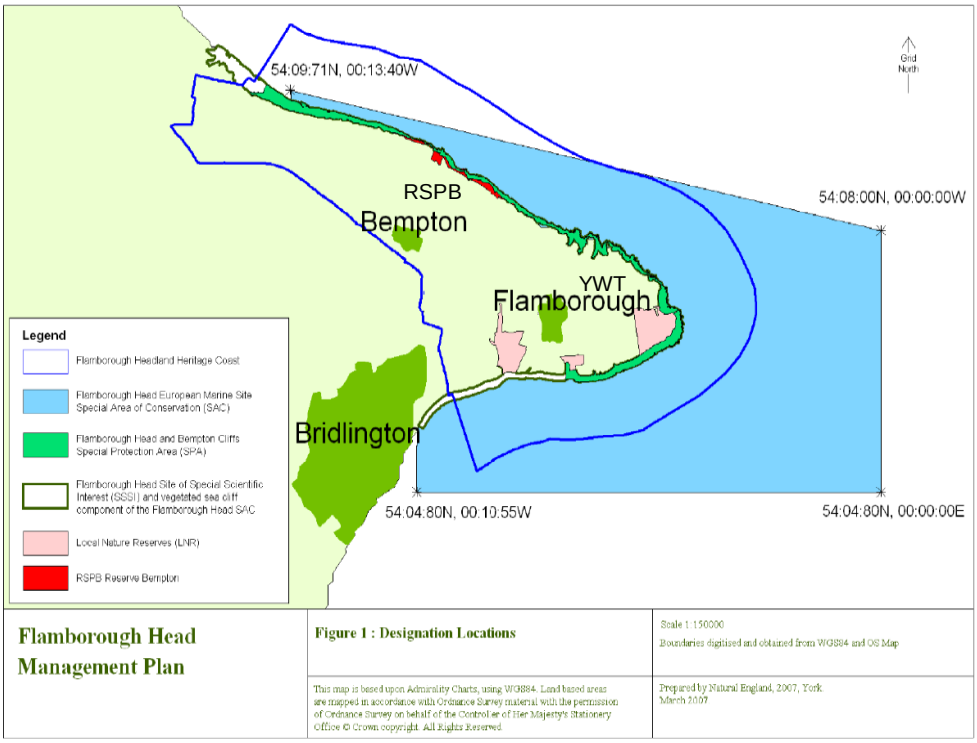
This year, in an attempt to stream-line the Flamborough and Bempton seabird report, all plot locations and boundaries pictures have been removed. These can be referred to in the previous four years reports, the most current being '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

Introduction

Flamborough Head and Bempton Cliffs SPA supports the largest mainland seabird colony in England, the only mainland gannetry in England, and the largest mainland black-legged kittiwake colony in the UK.

Flamborough Head is a highly protected site both for its wildlife and unique chalk habitats. The site is designated as a Site of Special Scientific Interest (SSSI), a Special Protection Area (SPA), a Special Area of Conservation (SAC), a Heritage Coast site, includes three Local Nature Reserves (LNR), an RSPB nature reserve at Bempton Cliffs and a Yorkshire Wildlife Trust site at Flamborough Head (Figure 1).

Figure 1 – Site designations on Flamborough Headland



Flamborough and Bempton qualifies under Article 4.2 of the Birds Directive for the following reasons:

- Regularly supports internationally important populations of the following migratory species: Black-legged Kittiwake *(Rissa tridactyla)*
- Regularly supports an internationally important seabird assemblage; nationally important populations of Common Guillemot *(Uria aalge)*, Razorbill *(Alca torda)* and Atlantic Puffin *(Fratercula artica).*

Due to the importance of the seabird colony and level of site protection, Natural England and RSPB proposed a project to enable a baseline count, population monitoring and further research to collect data on the health of the colony. The data will inform the condition of the designated sites and the government to help establish a network of Marine Protected Areas) that will be set up to protect important areas at sea for all marine life including important sites for feeding seabirds.

The project aims are as follows:

- **Understanding variation and trends in seabird productivity**
  Guillemot, Razorbill, Gannet, Kittiwake, Fulmar and Herring Gull plots to be monitored annually

- **Understanding population numbers and trends**
  Whole colony census to be carried out every 5 years, commencing 2008
  Gannet colony counts to be carried out on alternate years, commencing 2009
  Herring Gull colony counts to be carried out on alternate years, commencing 2010
  Kittiwake, Guillemot and Razorbill study-plot counts to be carried out annually commencing 2009

- **Understanding how RSPB Bempton Cliffs relates to wider SPA and potential impacts on disturbance by developing research proposals to address the following management issues**
  What are the types of human activities that could disturb the colony and what are their effects?
  For those activities that are of concern, develop specific research proposals which assess level of impact

- **Understanding foraging behaviours of colony including preferred foraging areas and trends in provisioning for example, determining key feeding areas for key species and factors influencing their location using range finders, remote tracking, and fish data and benthic mapping data, monitor annual variation in provisioning rates and prey types for guillemot and razorbill**

Seabird population data has been collected at Flamborough and Bempton since 1969 (Table 1). In 1969, all species were counted as part of 'Operation Seafarer' except for Puffin and Shag. In 1987, all species were counted during the 'Seabird Colony Register' census, in 2000 for 'Seabird 2000' and again in 2008. Whole-colony counts for Gannet were completed in 1970-77, 1981-83, 1985-95, 1997-99, 2002, 2004-05, 2008-09 and 2012. In addition, whole -colony counts for herring gull were completed in 2010.

Breeding success data has been collected for Gannet during 1973-79, 1988-94, 1998, 2005-06, 2008-12 and 2013. Kittiwake breeding success has been monitored continuously between 1986 and 2013. Razorbill were monitored in 2005-06, 2009-12 and 2013, Guillemot were monitored in 1991-95, 1998, 2005-06, 2009-12 and 2013. Fulmar and Herring Gull breeding success were monitored for the first time in 2009, and is ongoing (Table 2). Unfortunately, it is not possible to monitor breeding success for Puffin and Shag at this colony.

Data collected by the project will also be used to inform the Seabird Monitoring Programme (SMP) coordinated by Joint Nature Conservation Committee (JNCC), the RSPB's Annual Reserve Monitoring (ARM) programme and the Yorkshire Wildlife Trust's reserve management.

The results of the 2013 seabird monitoring and research programme are detailed in this document with the intention of providing all raw data and monitoring procedures to enable interpretation by others in the future.

Table 1 – Summary of whole-colony count data collected from Flamborough and Bempton 1969-2013

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Gannet	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓		✓	✓			✓	✓			✓	
Kittiwake	✓																		✓													✓									✓					
Razorbill	✓																		✓													✓									✓					
Guillemot	✓																		✓													✓									✓					
Puffin																			✓													✓									✓					
Herring Gull	✓																		✓													✓									✓		✓			
Fulmar	✓																		✓													✓									✓					
Shag																			✓													✓									✓					

Table 2 – Summary of breeding success data collected from Flamborough and Bempton 1973-2013

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Gannet					✓	✓	✓	✓	✓	✓	✓									✓	✓	✓	✓	✓	✓	✓				✓							✓	✓		✓	✓	✓	✓	✓	✓
Kittiwake																		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Razorbill																																					✓	✓			✓	✓	✓	✓	✓
Guillemot																							✓	✓	✓	✓	✓			✓							✓	✓			✓	✓	✓	✓	✓
Puffin																																													
Herring Gull																																									✓	✓	✓	✓	✓
Fulmar																																									✓	✓	✓	✓	✓
Shag																																													

Methods

The 2013 seabird monitoring programme followed the guidelines and methodologies set out in the '*Seabird monitoring handbook for Britain and Ireland. By Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W., & Tasker, M.L. 1995*'. JNCC / RSPB / ITE / Seabird Group, Peterborough.

The handbook summarises the current census and productivity monitoring techniques for seabirds. The appropriate methods were followed according to resources and practicality for each species at this colony. Please refer to the '*Seabird monitoring handbook for Britain and Ireland, 1995'* for details on individual methodologies for each species.

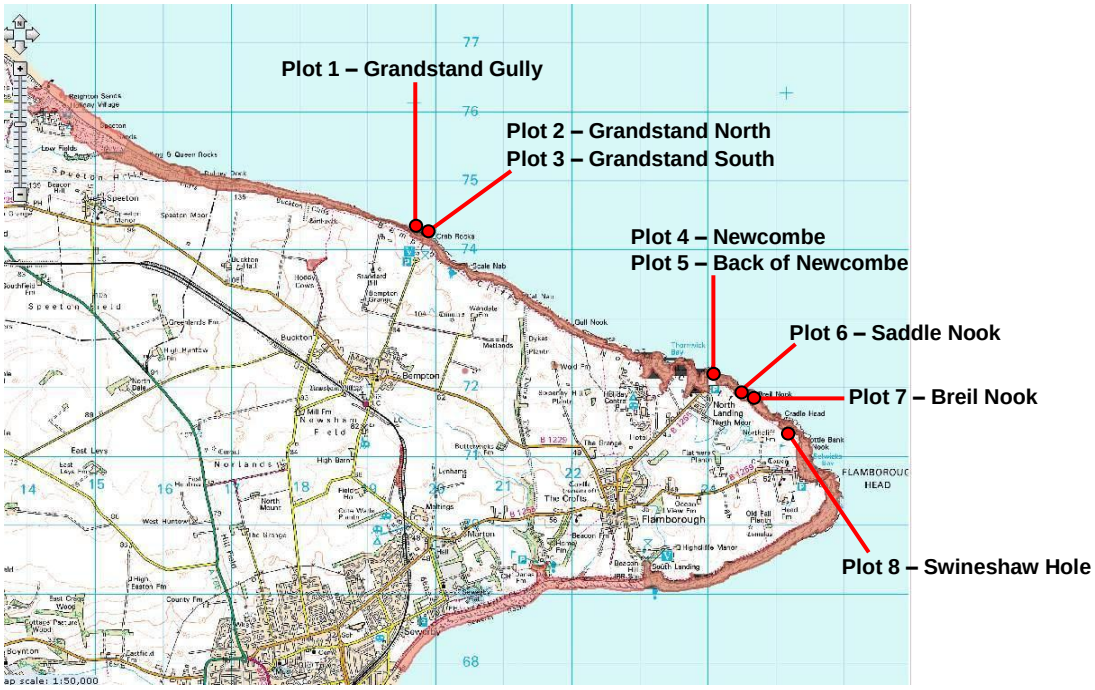
Productivity monitoring

Productivity monitoring was completed for a fifth year running at the Flamborough and Bempton colony. Monitoring was carried out for six of the eight seabird species found at this site: Razorbill, Common Guillemot, Northern Gannet, Black-legged Kittiwake, Northern Fulmar and Herring Gull. For a detailed description of the methodologies followed, please refer to the '*Seabird monitoring handbook for Britain and Ireland, 1995*'.

Razorbill (*Alca torda*)

Eight productivity plots were monitored throughout the Flamborough and Bempton colony between April and July 2013 (Figure 2).

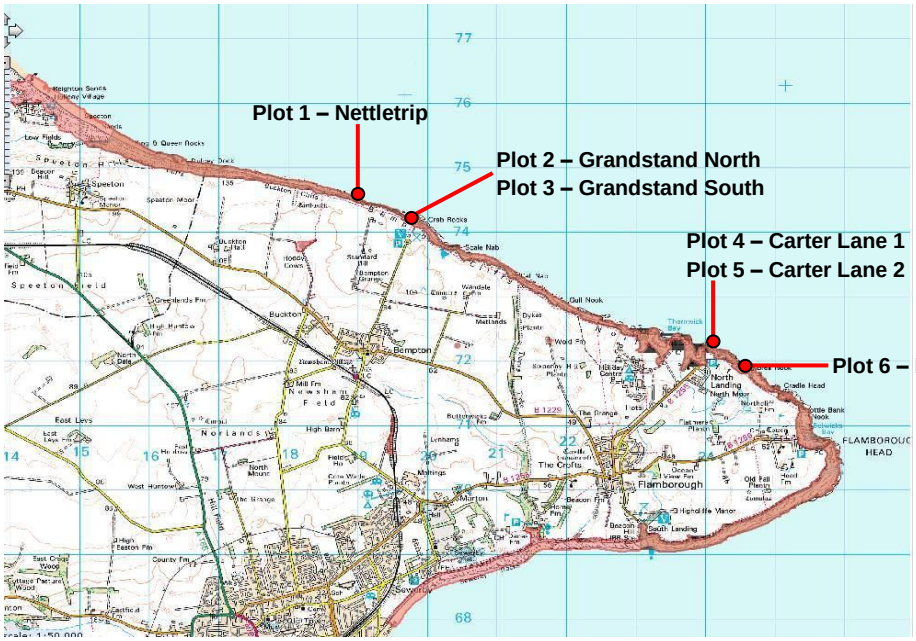
Figure 2 – Razorbill productivity plot locations



Common Guillemot (*Uria aalge*)

Five productivity plots were monitored throughout the Flamborough and Bempton colony between April and July 2013 (Figure 3).

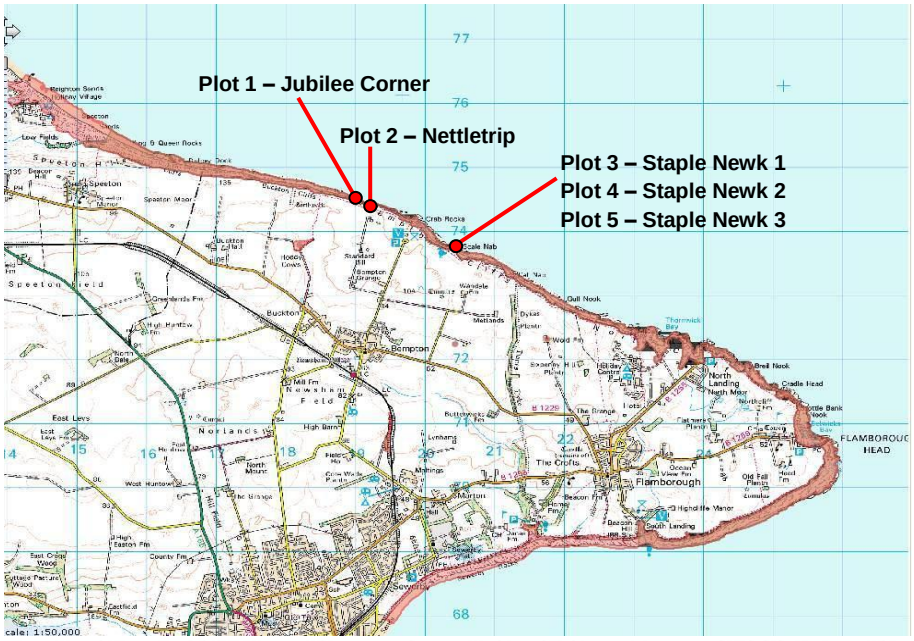
Figure 3 – Guillemot productivity plot locations



Northern Gannet (*Morus bassanus*)

Five productivity plots were monitored at Bempton from the beginning of May until the end of October 2013 (Figure 4).

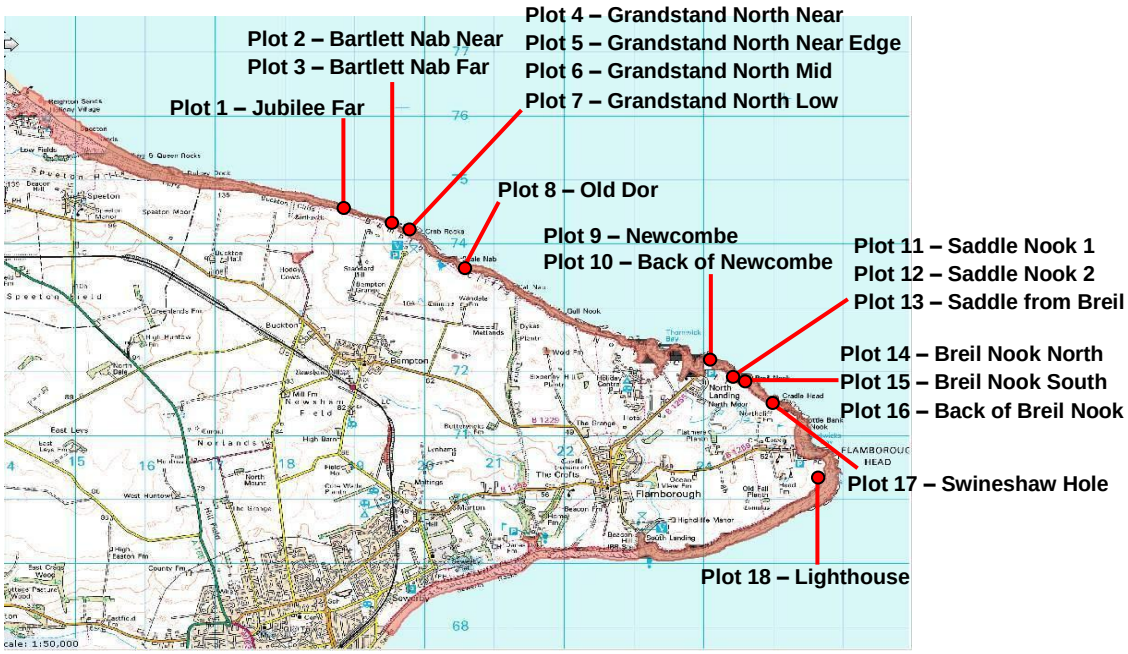
Figure 4 – Gannet productivity plot locations



Black-legged Kittiwake (*Rissa tridactyla*)

Eighteen productivity plots were monitored between Flamborough and Bempton from mid-May until August 2013 (Figure 5).

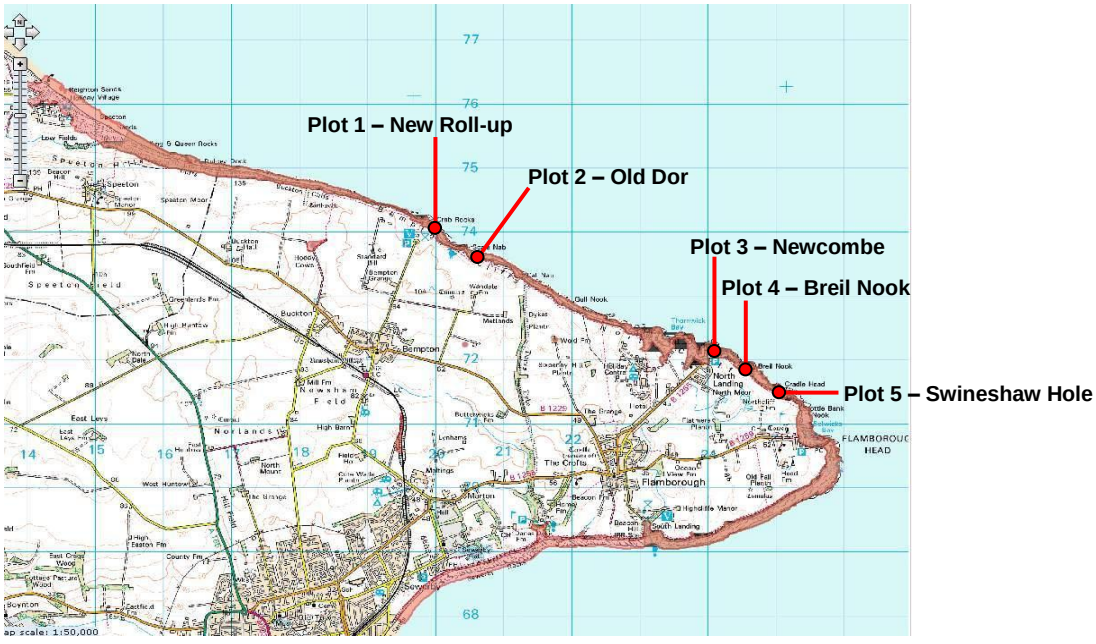
Figure 5 – Kittiwake productivity plot locations



Northern Fulmar (*Fulmarus glacialis*)

Five productivity plots were monitored between Flamborough and Bempton on three visits between the end of May and beginning of June, with a final visit mid-August 2013 (Figure 6).

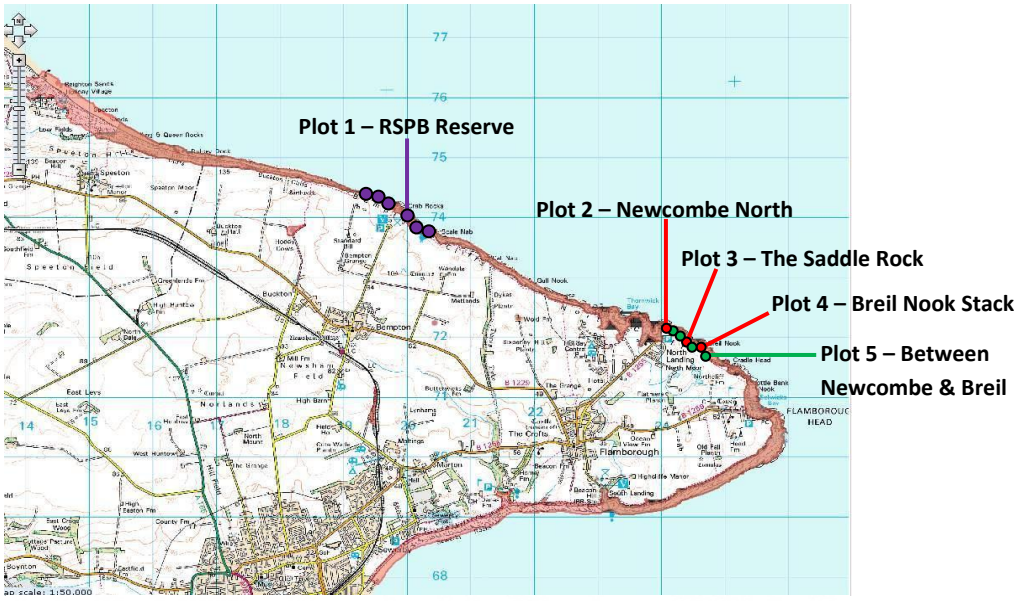
Figure 6 – Fulmar productivity plot locations



Herring Gull (*Larus argentatus*)

Seventy-nine apparently occupied nests (AON) were monitored along the length of the colony from mid May through to the beginning of August 2013 (Figure 7).

Figure 7 – Herring Gull productivity plot locations

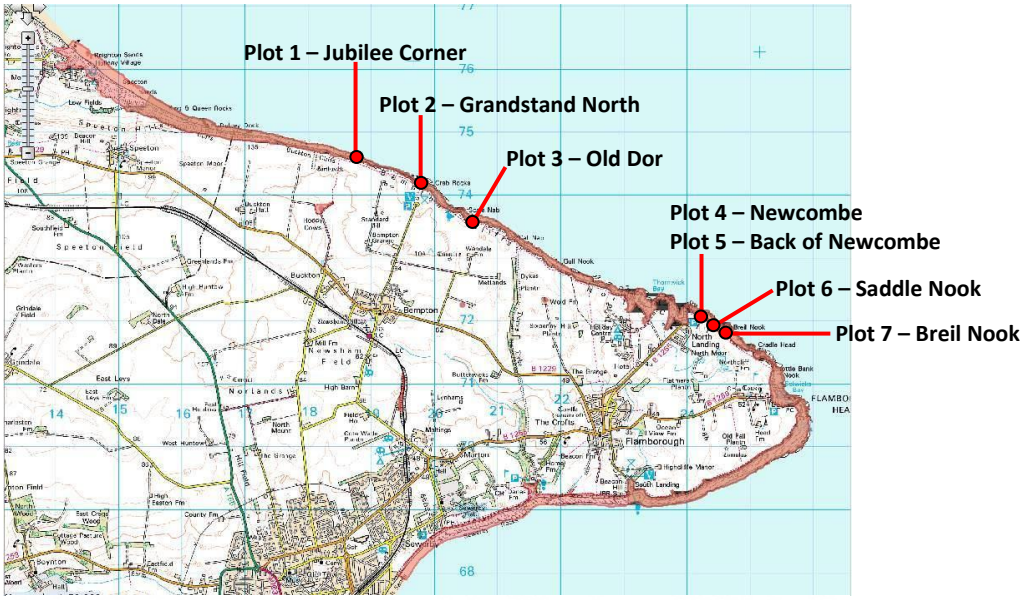


Study-plot counts

Black-legged Kittiwake study-plot count

Seven study-plots were counted twice in the peak season (Figure 8). Guidance from the seabird monitoring handbook suggests that study-plot counts are not recommended for general use when counting kittiwakes, as population changes may not be detected due to movements of birds within the colony or colony extensions, or losses rather than through changes of density across the colony. However, as Flamborough and Bempton holds the largest mainland Kittiwake population in the UK, it is important that trends in numbers are monitored.

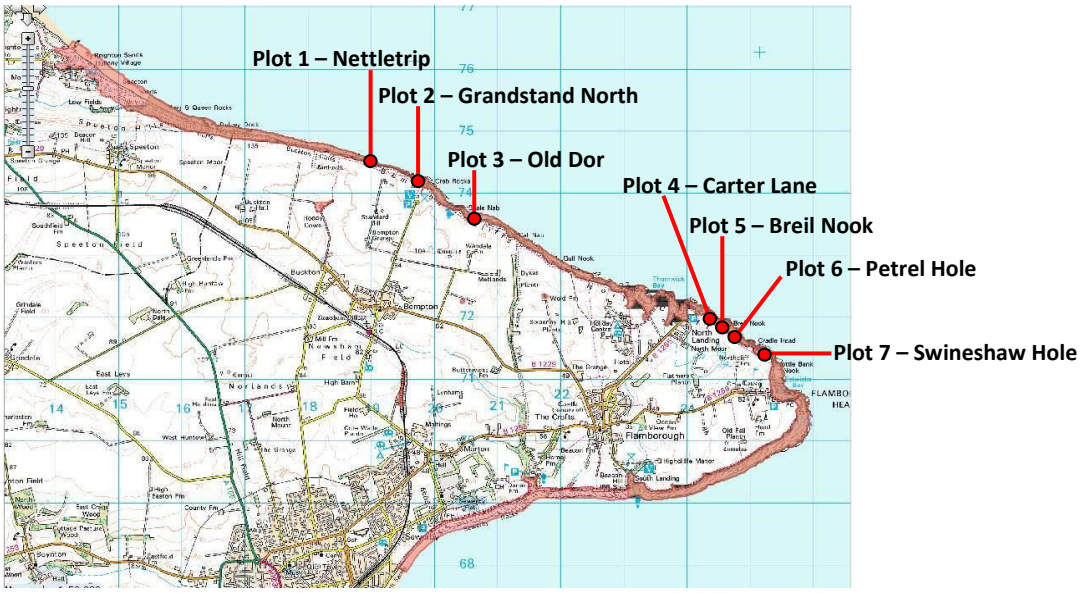
Figure 8 – Kittiwake study-plot locations



Common Guillemot study-plot count

Seven study-plots were each counted on five occasions in the peak of the season (Figure 9).The study-plots were originally set up in 2009 and were repeated in 2010 and 2012. In 2011, counts were abandoned due to an early breeding season.

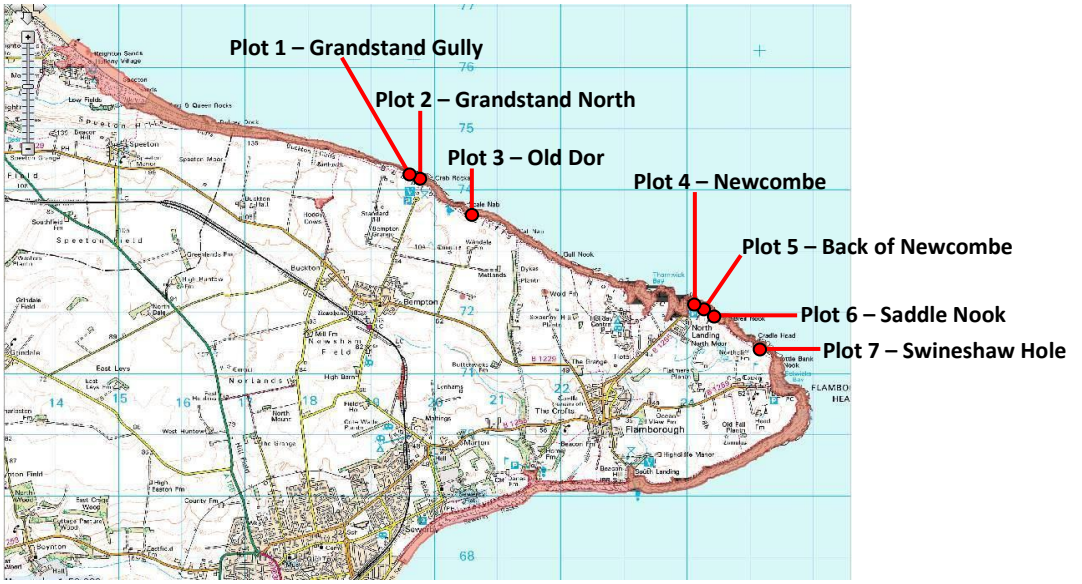
Figure 9 – Guillemot study-plot locations



Razorbill study-plot count

Seven study-plots were each counted on five occasions in the peak of the season (Figure 10).The study-plots were originally set up in 2009 and were repeated in 2010 and 2012. In 2011, counts were abandoned due to an early breeding season.

Figure 10 – Razorbill study-plot locations



Kittiwake foraging areas

The RSPB's Seabird Tracking and Research (STAR) project took place again at Flamborough and Bempton SPA and Filey Cliffs; led by Dr Ellie Owen, RSPB conservation scientist. The Flamborough tracking project is now in its fifth year of fieldwork and data collection, tracking Black-legged Kittiwake to investigate foraging behaviour. This season the project was supported by Alice Macmillan (RSPB) as part of her sabbatical.

Results

Productivity monitoring

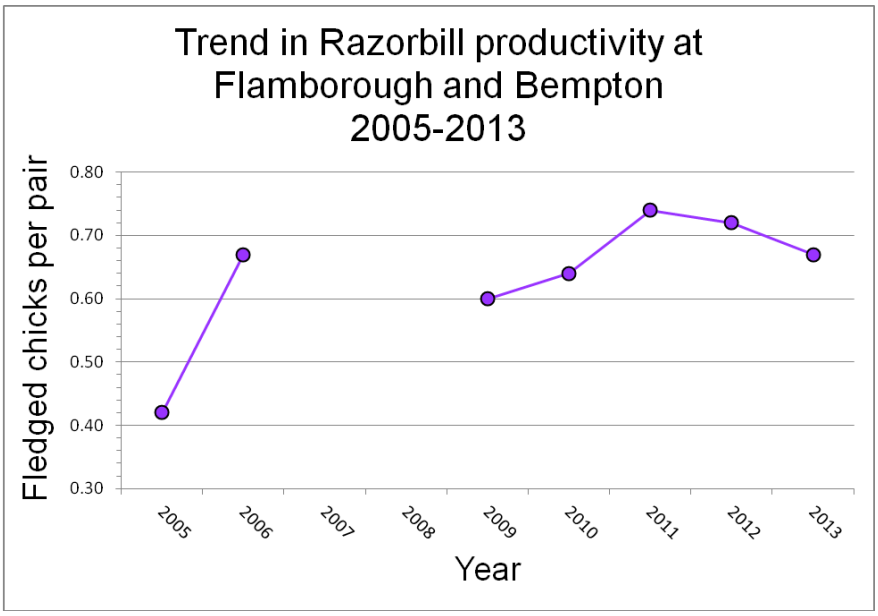
Razorbill (*Alca torda*)

Overall productivity for Razorbill at Flamborough and Bempton averaged 0.67 chicks per site. A total of 321 AOS's where monitored across eight plots, of which 215 chicks successfully fledged (Table 3). The national mean for razorbill is 0.65 chicks per AOS, recorded between 1986-2005 from between one and seven colonies annually (Mavor et al. 2008).

Table 3 – Razorbill productivity results

Monitoring site	AOS 2009	Fledged Chicks '09	Productivity ch/pr '09	AOS 2010	Fledged Chicks '10	Productivity ch/pr '10	AOS 2011	Fledged Chicks '11	Productivity ch/pr '11	AOS 2012	Fledged Chicks '12	Productivity ch/pr '12	AOS 2013	Fledged Chicks '13	Productivity ch/pr '13
Grandstand Gully	13	3	0.23	14	6	0.43	11	4	0.36	13	5	0.38	12	7	0.58
Grandstand North	32	25	0.78	34	26	0.76	28	14	0.50	29	14	0.48	45	30	0.67
Grandstand South	16	6	0.38	17	11	0.65	18	12	0.67	18	15	0.83	16	6	0.38
Newcombe	52	34	0.65	61	43	0.70	66	52	0.79	47	40	0.85	52	27	0.52
Back of Newcombe	–	–	–	18	13	0.72	36	28	0.78	42	29	0.69	42	32	0.76
Saddle Nook	–	–	–	35	21	0.60	50	41	0.82	50	36	0.72	52	42	0.81
Breil Nook	19	11	0.58	40	26	0.65	49	41	0.84	49	38	0.77	52	39	0.75
Swineshaw Hole	–	–	–	34	16	0.47	48	35	0.73	53	39	0.74	50	32	0.64
Total	**132**	**79**	**0.60**	**253**	**162**	**0.64**	**306**	**227**	**0.74**	**301**	**216**	**0.72**	**321**	**215**	**0.67**

Figure 11 – Trend in Razorbill productivity 2005-2013



For full plot locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

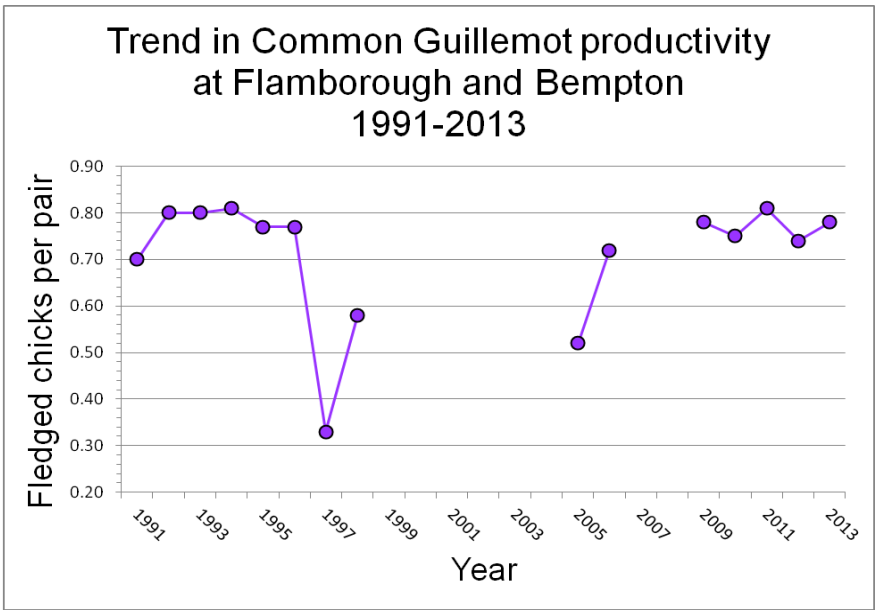
Common Guillemot (*Uria aalge*)

Overall productivity for Guillemot at Flamborough and Bempton averaged 0.78 chicks per site. A total of 249 AOS's were monitored across five plots, of which 194 chicks successfully fledged (Table 4). The national mean for guillemot is 0.69 chicks per AOS, recorded between 1986-2005 from between three and fifteen colonies annually (Mavor et al. 2008).

Table 4 – Guillemot productivity results

Monitoring site	AOS 2009	Fledged Chicks '09	Productivity ch/pr '09	AOS 2010	Fledged Chicks '10	Productivity ch/pr '10	AOS 2011	Fledged Chicks '11	Productivity ch/pr '11	AOS 2012	Fledged Chicks '12	Productivity ch/pr '12	AOS 2013	Fledged Chicks '13	Productivity ch/pr '13
Nettletrip	51	36	0.71	50	31	0.62	50	37	0.74	58	33	0.57	52	30	0.58
Grandstand North	48	39	0.81	50	36	0.72	–	–	–	55	35	0.64	-	-	-
Grandstand South	45	36	0.80	49	36	0.73	48	32	0.67	48	33	0.69	45	36	0.80
Carter Lane 1	47	39	0.83	48	39	0.81	50	46	0.92	48	40	0.83	49	42	0.86
Carter Lane 2	45	34	0.76	54	38	0.70	50	41	0.82	54	44	0.81	51	38	0.75
Breil Nook	–	–	–	50	46	0.92	50	46	0.92	65	57	0.88	52	48	0.92
Total	**236**	**184**	**0.78**	**301**	**226**	**0.75**	**248**	**202**	**0.81**	**328**	**242**	**0.74**	**249**	**194**	**0.78**

Figure 12 – Trend in Guillemot productivity 1991-2013



For full plot locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

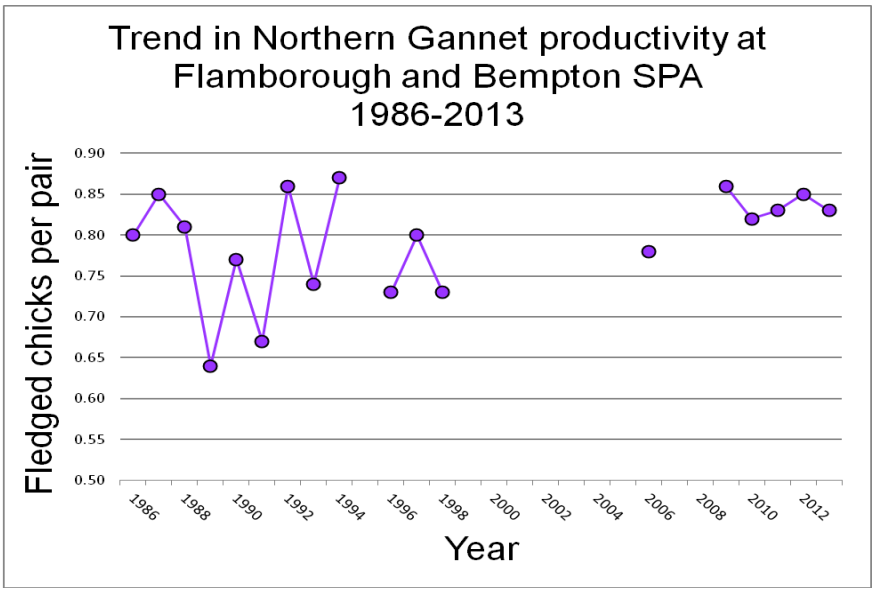
Northern Gannet (*Morus bassanus*)

Overall productivity for Gannet at Bempton averaged 0.83 chicks per pair. A total of 254 AON's were monitored across five plots, of which 212 chicks successfully fledged (Table 5). The national mean for Gannet is 0.69 chicks per AON, recorded between 1986-2005 from between three and six colonies annually (Mavor et al. 2008).

Table 5 – Gannet productivity results

Monitoring site	AON 2009	Fledged Chicks '09	Productivity ch/pr '09	AON 2010	Fledged Chicks '10	Productivity ch/pr '10	AON 2011	Fledged Chicks '11	Productivity ch/pr '11	AON 2012	Fledged Chicks '12	Productivity ch/pr '12	AON 2013	Fledged Chicks '13	Productivity ch/pr '13
Jubilee Corner	52	43	0.83	50	41	0.82	49	40	0.82	51	46	0.90	51	42	0.82
Nettletrip	49	45	0.92	50	41	0.82	49	44	0.90	52	46	0.88	51	40	0.78
Staple Newk 1	50	43	0.86	50	41	0.82	49	40	0.82	50	45	0.90	50	46	0.92
Staple Newk 2	50	43	0.86	50	44	0.88	49	39	0.80	50	41	0.82	50	42	0.84
Staple Newk 3	50	41	0.82	50	39	0.78	50	43	0.86	52	40	0.77	52	42	0.81
Total	**251**	**215**	**0.86**	**250**	**206**	**0.82**	**248**	**206**	**0.83**	**255**	**218**	**0.85**	**254**	**212**	**0.83**

Figure 13 – Trend in Gannet productivity 1986-2013



For full plot locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

Black-legged Kittiwake (*Rissa tridactyla*)

Overall productivity for Kittiwake at Flamborough and Bempton averaged 0.51 chicks per pair. A total of 895 AON's were monitored across eighteen plots, of which 458 chicks successfully fledged (Table 6). The national mean for Kittiwake is 0.68 chicks per AON, recorded between 1986-2005 from between thirty and sixty-one colonies annually (Mavor et al. 2008).

Table 6 – Kittiwake productivity results 2013

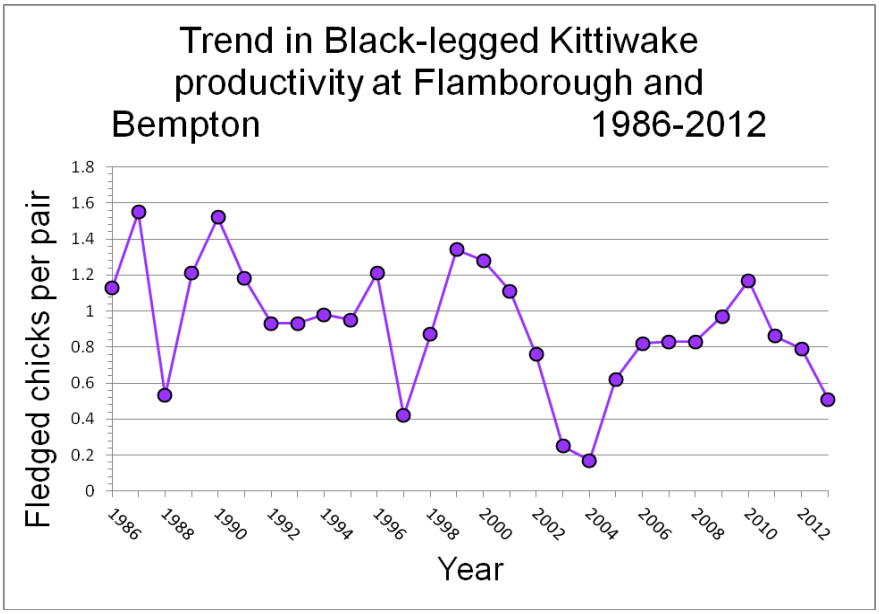
	Jubilee Far	Bartlett Nab Near	Bartlett Nab Far	Grandstand North Near	Grandstand North Near Edge	Grandstand North Mid	Grandstand North Low	Old Dor	Newcombe	Back of Newcombe	Saddle Nook 1	Saddle Nook 2	Saddle from Breil	Breil Nook North	Breil Nook South	Back of Breil Nook	Swineshaw Hole	Lighthouse	**Total**
Nests fledging 0 chicks	43	21	31	29	21	18	16	30	32	33	32	29	35	35	34	23	36	21	**519**
Nests fledging 1 chick	5	22	19	19	23	25	27	16	9	11	13	18	13	12	11	22	8	21	**294**
Nests fledging 2 chicks	2	7	0	2	6	7	8	4	8	6	4	5	2	3	5	6	0	7	**82**
Nests fledging 3 chicks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total fledged	9	36	19	23	35	39	43	24	25	23	21	28	17	18	21	34	8	35	**458**
Total AON	50	50	50	50	50	50	51	50	49	50	49	52	50	50	50	51	44	49	**895**
Productivity per plot	**0.18**	**0.72**	**0.38**	**0.46**	**0.70**	**0.78**	**0.84**	**0.48**	**0.51**	**0.46**	**0.43**	**0.54**	**0.34**	**0.36**	**0.42**	**0.67**	**0.18**	**0.71**	**0.51**

Kittiwake productivity has historically fluctuated at this colony (Tables 7 and 8); however, the trend since 2010 shows a year on year decline (Figure 14).

Table 7 – Average Kittiwake productivity for Flamborough and Bempton 1995-2013

1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
0.93	-	0.44	0.87	1.34	1.28	1.07	0.76	0.25	**0.19**	0.62	0.82	0.83	0.83	0.97	**1.17**	0.86	0.79	0.51

Figure 14 – Trend in Kittiwake productivity 1986-2013



For full plot locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'

Table 8 – Kittiwake productivity results 2009-2013

Monitoring site	AOS 2009	Fledged Chicks '09	Productivity ch/pr '09	AOS 2010	Fledged Chicks '10	Productivity ch/pr '10	AOS 2011	Fledged Chicks '11	Productivity ch/pr '11	AOS 2012	Fledged Chicks '12	Productivity ch/pr '12	AOS 2013	Fledged Chicks '13	Productivity ch/pr '13
Jubilee Far	50	54	1.08	50	60	1.20	50	50	1.00	50	32	0.64	50	9	0.18
Bartlett Nab Near	-	-	-	56	72	1.29	50	52	1.04	49	50	1.02	50	36	0.72
Bartlett Nab Far	50	50	1.00	50	55	1.10	50	47	0.94	48	37	0.77	50	19	0.38
Grandstand North Near	50	48	0.96	61	87	1.43	50	43	0.86	49	31	0.63	50	23	0.46
Grandstand North Near Edge	-	-	-	50	50	1.00	50	59	1.18	49	50	1.02	50	35	0.70
Grandstand North Mid	50	54	1.08	50	50	1.00	50	57	1.14	50	41	0.82	50	39	0.78
Grandstand North Far edge	-	-	-	50	68	1.36	50	53	1.06	51	61	1.20	-	-	-
Grandstand North Low	-	-	-	50	63	1.26	50	45	0.90	53	41	0.77	51	43	0.84
Old Dor	50	55	1.10	50	61	1.22	50	57	1.14	50	49	0.98	50	24	0.48
Newcombe	50	36	0.72	50	58	1.16	50	38	0.76	50	42	0.84	49	25	0.51
Back of Newcombe	-	-	-	50	59	1.18	50	33	0.66	53	44	0.83	50	23	0.46
Carter Lane 1	-	-	-	50	52	1.04	50	38	0.76	-	-	-	-	-	-
Carter Lane 2	-	-	-	50	51	1.02	-	-	-	-	-	-	-	-	-
Saddle Nook 1	50	48	0.96	50	65	1.30	50	34	0.68	50	18	0.36	49	21	0.43
Saddle Nook 2	50	55	1.10	50	62	1.24	50	52	1.04	48	34	0.71	52	28	0.54
Saddle from Breil	-	-	-	51	54	1.06	51	31	0.61	51	18	0.35	50	17	0.34
Breil Nook North	50	44	0.88	50	45	0.90	50	39	0.78	48	35	0.73	50	18	0.36
Breil Nook South	50	49	0.98	50	57	1.14	50	33	0.66	48	43	0.90	50	21	0.42
Back of Breil Nook	-	-	-	50	67	1.34	50	41	0.82	-	-	-	51	34	0.67
Swineshaw Hole	-	-	-	50	49	0.98	50	34	0.68	53	38	0.72	44	8	0.18
Lighthouse	50	38	0.76	50	78	1.56	50	27	0.54	48	46	0.96	49	35	0.71
Tagging Site	-	-	-	74	69	0.93	-	-	-	-	-	-	-	-	-
Total	**550**	**531**	**0.97**	**1142**	**1332**	**1.17**	**1001**	**863**	**0.86**	**898**	**710**	**0.79**	**895**	**458**	**0.51**

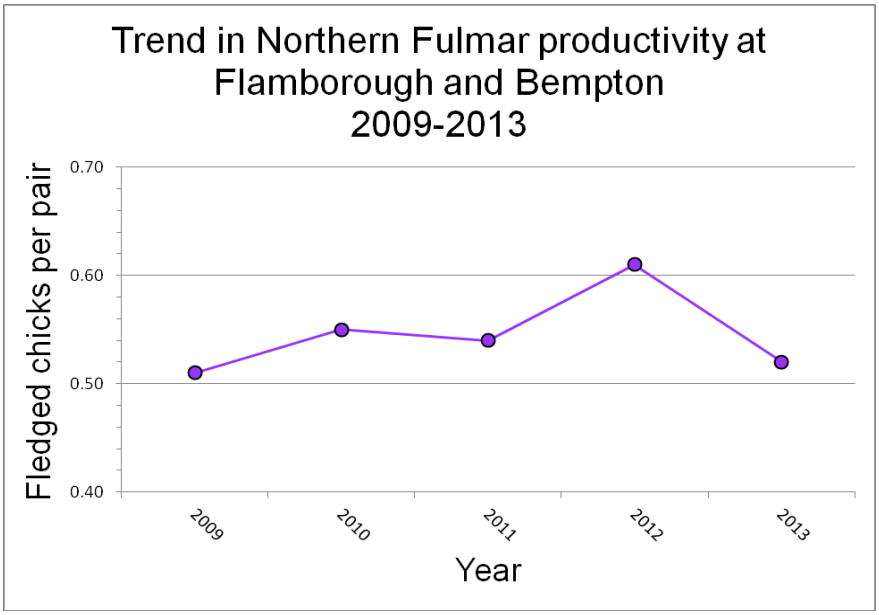
Northern Fulmar (*Fulmarus glacialis*)

Overall productivity for Fulmar at Flamborough and Bempton averaged 0.52 chicks per site. A total of 63 AOS's were monitored across five plots, of which 33 chicks successfully fledged (Table 9). The national mean for fulmar is 0.41 chicks per AOS, recorded between 1986-2005 from between thirteen and forty-one colonies annually (Mavor et al. 2008).

Table 9 – Fulmar productivity results

Monitoring site	AOS 2009	Fledged Chicks '09	Productivity ch/pr '09	AOS 2010	Fledged Chicks '10	Productivity ch/pr '10	AOS 2011	Fledged Chicks '11	Productivity ch/pr '11	AOS 2012	Fledged Chicks '12	Productivity ch/pr '12	AOS 2013	Fledged Chicks '13	Productivity ch/pr '13
New Roll-up	6	4	0.67	10	4	0.40	6	2	0.33	8	3	0.37	6	2	0.33
Old Dor	16	8	0.50	19	8	0.42	17	8	0.47	27	16	0.59	26	13	0.50
Newcombe	7	4	0.57	11	6	0.55	12	7	0.58	9	7	0.78	7	4	0.57
Breil Nook	7	3	0.43	15	14	0.93	16	12	0.75	16	12	0.75	10	8	0.80
Swineshaw Hole	9	4	0.44	16	7	0.44	15	7	0.47	12	6	0.50	14	6	0.43
Total	**45**	**23**	**0.51**	**71**	**39**	**0.55**	**66**	**36**	**0.54**	**72**	**44**	**0.61**	**63**	**33**	**0.52**

Figure 15 – Trend in Fulmar productivity 2009-2013



For full plot locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

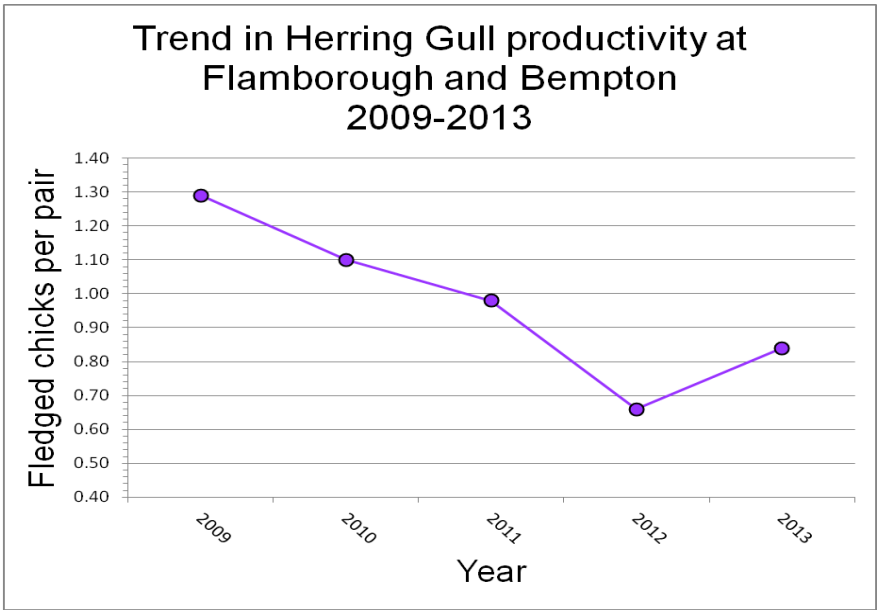
Herring Gull (*Larus argentatus*)

Overall productivity for Herring Gull at Flamborough and Bempton averaged 0.84 chicks per pair. A total of 79 AON's were monitored throughout the colony, of which 66 chicks successfully fledged (Table 10).

Table 10 – Herring Gull productivity results

Monitoring site	AON 2009	Fledged Chicks '09	Productivity ch/AON '09	AON 2010	Fledged Chicks '10	Productivity ch/AON '10	AON 2011	Fledged Chicks '11	Productivity ch/AON '11	AON 2012	Fledged Chicks '12	Productivity ch/AON '12	AON 2013	Fledged Chicks '13	Productivity ch/AON '13
Jubilee to Old Dor	–	–	–	13	10	0.77	23	12	0.52	17	11	0.65	18	7	0.39
Newcombe North	–	–	–	12	9	0.75	9	12	1.33	12	5	0.42	9	7	0.78
The Saddle Rock	19	19	1.00	16	18	1.13	21	27	1.29	20	10	0.50	19	22	1.16
Breil Nook Stack	14	19	1.36	16	11	0.69	15	10	0.67	18	17	0.94	16	17	1.06
Newcombe to Breil	19	29	1.53	27	44	1.63	19	24	1.26	22	16	0.73	17	13	0.76
Total	**52**	**67**	**1.29**	**84**	**92**	**1.10**	**87**	**85**	**0.98**	**89**	**59**	**0.66**	**79**	**66**	**0.84**

Figure 16 – Trend in Herring Gull productivity 2009-2013



For full plot locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

Common Guillemot diet and provisioning study

Following on from discussions with RSPB reserves ecology and Natural England at the annual seabird review meeting, this area of research is currently under review and as such, no data was gathered in 2013 on diet and provisioning.

Herring Gull whole-colony count

Several attempts were made to complete the boat based colony count; persistent on-shore winds throughout June and July prevented the count from being completed.

Study-plot counts

Black-legged Kittiwake study-plot count

Kittiwake study-plot counts were completed in 2013 for a fifth year running. The results show a reduction of 413 AON since 2012 (Table 11). A poor breeding season and many birds appearing not to breed support the results from productivity monitoring.

Table 11 – Kittiwake study-plot count results 2009-2013 (green = peak count)

Date	Total AON count	Date	Total AON count	Date	Total AON count	Date	Total AON count	Date	Total AON count
26/06/2009	1585	17/06/2010	1967	09/06/2011	2035	05/06/2012	1967	1st count *	1554
06/07/2009	1541	21/06/2010	1938	14/06/2011	2067	12/06/2012	1952	2nd count *	1508
09/07/2009	1554								
13/07/2009	1497								

***** 1st count dates – 03/06/13, 04/06/13, 06/06/13 and 07/06/13
***** 2nd count dates – 12/06/13, 13/06/13 and 14/06/13

For individual study-plot count results, see Appendix 1. For full study-plot count locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

Common Guillemot study-plot count

Seven study-plots were each counted on five separate occasions in the first three weeks of June. The third count provided the highest total of 1333 individuals; the first count provided the lowest total of 1193 individuals (Table 12). The average total count for Guillemot was 1279; this is the highest recorded total average count since the study was set up, with an increase of 187 individuals on last year, and 154 individuals since the first study in 2009.

Table 12 – Guillemot study-plot count results (green = peak counts)

Date	Total count	Date	Total count	Date	Total count	Date	Total count
08/06/2009	1191	03/06/2010	1164	06/06/2012	1120	1st count *	1193
11/06/2009	1138	06/06/2010	1123	09/06/2012	980	2nd count *	1226
14/06/2009	1069	08/06/2010	1151	11/06/2012	1228	3rd count *	1333
18/06/2009	1101	10/06/2010	1114	14/06/2012	1205	4th count *	1323
20/06/2009	1126	14/06/2010	1103	17/06/2012	926	5th count *	1318
Average	**1125**	**Average**	**1131**	**Average**	**1092**	**Average**	**1279**

* 1st count dates – 03/06/13, 04/06/13, 07/06/13
* 2nd count dates – 06/06/13, 07/06/13, 11/06/13
* 3rd count dates – 09/06/13, 10/06/13, 14/06/13
* 4th count dates – 12/06/13, 13/06/13, 17/06/13
* 5th count dates – 15/06/13, 16/06/13, 20/06/13

For individual study-plot count results, see Appendix 1. For full study-plot count locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

Razorbill study-plot count

Seven study-plots were each counted on five separate occasions in the first three weeks of June. The fourth count provided the highest total of 624 individuals; the first count provided the lowest total of 552 individuals (Table 13). The average total count for razorbill was 586; this is the highest recorded total average count since the study was set up, with an increase of 51 individuals on last year, and 254 individuals since the first study in 2009.

Table 13 – Razorbill study-plot count results (green = peak count)

Date	Total count	Date	Total count	Date	Total count	Date	Total count
08/06/2009	338	03/06/2010	316	06/06/2012	476	1st count *	552
11/06/2009	365	06/06/2010	344	09/06/2012	455	2nd count *	584
14/06/2009	320	08/06/2010	348	11/06/2012	629	3rd count *	556
18/06/2009	309	10/06/2010	358	14/06/2012	591	4th count *	624
20/06/2009	328	14/06/2010	343	17/06/2012	522	5th count *	613
Average	**332**	**Average**	**342**	**Average**	**535**	**Average**	**586**

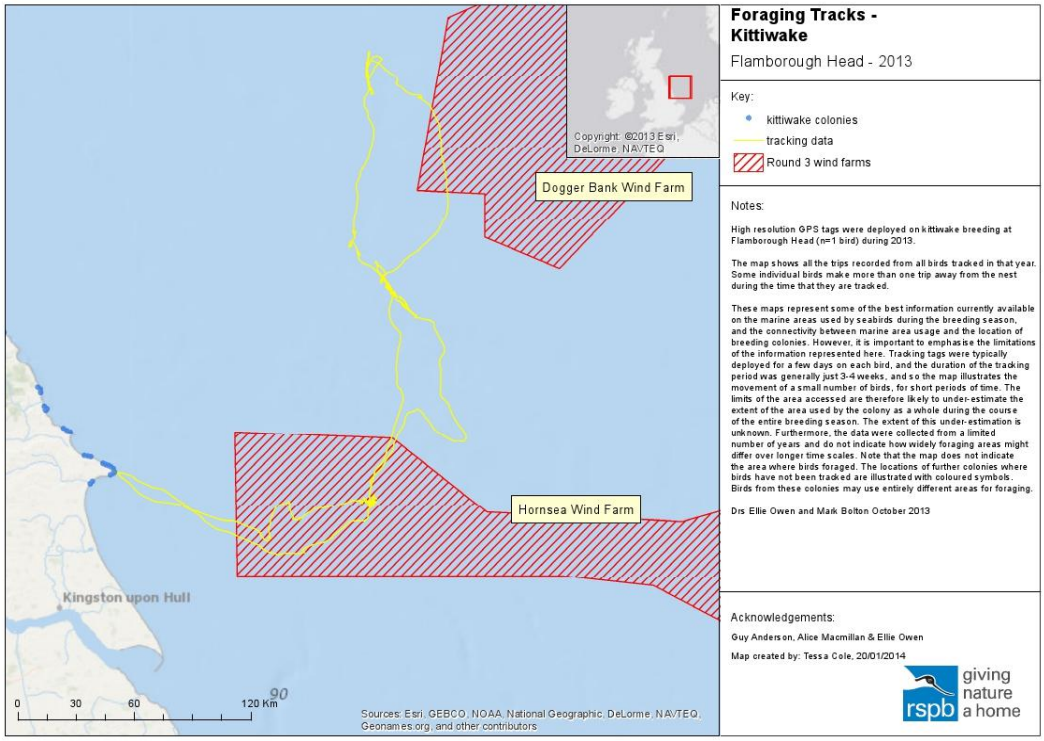
* 1st count dates – 03/06/13, 04/06/13 and 07/06/13
* 2nd count dates – 06/06/13, 07/06/13 and 11/06/13
* 3rd count dates – 09/06/13, 10/06/13 and 14/06/13
* 4th count dates – 12/06/13, 13/06/13 and 17/06/13
* 5th count dates – 15/06/13, 16/06/13, 19/06/13 and 20/06/13

For individual study-plot count results, see Appendix 1. For full study-plot count locations and boundaries, please refer to '*Flamborough Head and Bempton Cliffs SPA Seabird Monitoring Programme Report 2012. By Aitken, D et al*'.

Kittiwake foraging areas

Thirty-three GPS tags were deployed in 2013 on adult birds at Flamborough, twenty-one of these were recovered (Figure 17). Work was also carried out at the pSPA site at Filey for the first time where thirty-three GPS tags were also deployed, of which twenty were recovered. The findings from this year's tracking projects will be available on the RSPB website in 2014.

Figure 17 – Kittiwake foraging track from Flamborough Head 2013



Discussion and conclusion

No two years are the same at the Flamborough and Bempton colony. The season got off to a poor start as the east coast, from Scotland to Norfolk, experienced prolonged North Sea storms throughout much of March and early April. The first wave of casualties were auks – Puffin, Guillemot and Razorbill were found washed up on beaches either dead or dying from exhaustion or starvation. A secondary effect of the storms came in the form of Kittiwakes; many appeared not to reach breeding condition and either nest built but didn't lay, only laid small clutches, or didn't breed at all. This was followed by a run of much finer weather however and birds that did breed were able to successfully raise young.

Productivity monitoring for Razorbill, Guillemot, Gannet, Kittiwake, Fulmar and Herring Gull as well as Kittiwake, Razorbill and Guillemot study-plot counts were completed this year.

A total of 23 volunteers and staff members were involved in the monitoring programme, contributing 1009 hours to monitoring and research. This includes two residential volunteer seabird researchers which enabled the RSPB to maintain high levels of monitoring across the SPA and contributed 415 hours to the monitoring programme between them.

The Herring Gull whole-colony counts were not completed due to unfavourable sea conditions throughout June and July. Two attempts were made to complete the boat based count, however, both were forced to be abandon due to rough seas.

Recreational activity is still an ongoing issue on the reserve and continues to be recorded. Fisherman descending the cliffs to access the shore and cliff top angling during the breeding season are still issues that need addressing, as is boat and kayak-use in the intertidal area and hand gliders and low flying aircraft activity overhead. All events are recorded and information passed to the Flamborough Head project office, Heather Davison, who is gathering data on recreational disturbance across the Flamborough Head SPA in an attempt to build a better picture of the activities taking place, the frequency that they occur and the possible impact they may have on the SPA. A future challenge is to determine how to assess the impact of these activities on the breeding seabird assemblage and then manage this impact.

Productivity monitoring was carried out for Black-legged Kittiwake again at Filey, as well as a fifth consecutive year of whole-colony counts (*Filey pSPA Seabird Monitoring Report 2013, Aitken, D and Clarkson, K*). This work is part of the proposed SPA extension to the Flamborough and Bempton and colony, covering Filey Brigg to Cayton Bay, where productivity monitoring for kittiwake and full colony count monitoring priorities have been agreed between Natural England and RSPB to assess and inform on the state of this colony in relation to the proposed SPA extension.

The project is making significant progress against its population and productivity monitoring objectives, informing the assessment and review of SPA and SSSI condition and boundaries. However, progress to determine the impacts of recreational disturbance, predation and to identify key foraging areas and dietary trends are more resource hungry and need to be reviewed.

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Lastly, thanks to Pam and her team at the Caravel Cafe for providing us with parking permits for North Landing car park.

Without all of these people involved, either directly or indirectly, the Flamborough and Bempton seabird monitoring programme would not be the success that it is.

Appendix 1

Table 14 – Kittiwake study-plot count data 2013

Plot 1: Jubilee Corner									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
04/06/2013	234	0/8	1	2	1	1	1	3	N
13/06/2013	222	7/8	2	2	1	2	1	2	S
Average	**228**								

Plot 2: Grandstand North									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
04/06/2013	382	0/8	1	2	1	1	1	3	N
13/06/2013	372	7/8	2	2	1	2	1	2	S
Average	**377**								

Plot 3: Old Dor									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
07/06/2013	209	0/8	1	2	1	2	1	2	E
14/06/2013	222	3/8	1	1	1	1	1		SW
Average	**216**								

Plot 4: Newcombe									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
04/06/2013	178	1/8	1	2	2	3	1	2	NE
13/06/2013	163	7/8	2	2	2	2	1	2	S
Average	**171**								

Plot 5: Back of Newcombe									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
04/06/2013	170	2/8	1	1	3	3	1	3	NE
14/06/2013	173	5/8	1	1	2	3	1		W
Average	**172**								

Plot 6: Saddle Nook									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
03/06/2013	272	0/8	1	2	1	2	1	2	NE
12/06/2013	262	7/8	1	2	1	2	1	2	S
Average	**267**								

Plot 7: Breil Nook									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
06/06/2013	109	6/8	1	2	2	2	1	2	E
13/06/2013	94	7/8	1	2	2	2	1	4	SSW
Average	**102**								

Table 15 – Guillemot study-plot count data 2013

Plot 1: Nettletrip									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
04/06/2013	124	1/8	1	2	2	3	1	3	NE
07/06/2013	124	1/8	1	2	1	3	1	2	E
10/06/2013	123	7/8	1	2	2	2	1	2	NNE
13/06/2013	137	7/8	2	2	1	2	1	4	SSW
16/06/2013	135	2/8	1	2	2	3	1	4	SW
Average	**129**								

Plot 2: Grandstand North									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
04/06/2013	122	0/8	1	2	1	1	1	3	N
07/06/2013	111	2/8	1	1	2	1	1	1	E
10/06/2013	133	7/8	1	1	1	2	1	1	E
13/06/2013	128	7/8	2	2	1	2	1	2	S
16/06/2013	118	5/8	1	2	2	1	1	2	W
Average	**122**								

Plot 3: Old Dor									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
07/06/2013	127	0/8	1	2	1	2	1	1	E
11/06/2013	132	7/8	2	2	1	2	1		SW
14/06/2013	132	3/8	1	1	1	1	1		SW
17/06/2013	141	2/8	1	1	1	2	1		
20/06/2013	140	8/8	2	1	1	2	1		
Average	**134**								

Plot 4: Carter Lane									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
03/06/2013	204	0/8	1	1	1	2	1	3	E
06/06/2013	198	1/8	1	2	2	2	1	1	E
09/06/2013	213	7/8	1	2	1	2	1	1	E
12/06/2013	207	6/8	1	2	2	2	1	3	S
15/06/2013	210	5/8	1	2	1	2	1	2	SW
Average	**206**								

Plot 5: Breil Nook									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
03/06/2013	198	1/8	1	2	2	2	1	2	NE
06/06/2013	228	6/8	1	2	2	2	1	2	E
09/06/2013	258	8/8	1	2	2	2	1	3	NNE
12/06/2013	237	7/8	1	3	2	2	1	4	S
15/06/2013	239	5/8	1	2	2	3	1	4	SW
Average	**232**								

Plot 6: Petrel Hole									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
03/06/2013	272	1/8	1	2	2	1	1	2	NE
06/06/2013	270	1/8	1	2	2	1	1	2	E
09/06/2013	312	8/8	1	2	2	2	1	3	NNE
12/06/2013	313	7/8	1	2	2	2	1	3	S
15/06/2013	319	5/8	2	2	2	1	1	4	SW
Average	**297**								

Plot 7: Swineshaw Hole									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
03/06/2013	146	1/8	1	2	2	2	1	2	NE
07/06/2013	163	1/8	1	2	2	2	1	2	E
09/06/2013	162	8/8	1	2	2	2	1	2	NNE
12/06/2013	160	7/8	1	2	2	2	1	4	S
15/06/2013	157	5/8	2	2	2	2	1	4	SW
Average	**158**								

Table 16 – Razorbill study-plot count data 2013

Plot 1: Grandstand Gully									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
04/06/2013	27	1/8	1	2	2	3	1	3	NE
07/06/2013	29	1/8	1	2	1	2	1	2	E
10/06/2013	24	8/8	1	2	1	2	1	1	NNE
13/06/2013	27	8/8	2	2	2	2	1	4	SSW
16/06/2013	28	2/8	1	2	2	3	1	4	SW
Average	**27**								

Plot 2: Grandstand North									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
04/06/2013	35	0/8	1	2	1	1	1	3	N
07/06/2013	40	3/8	1	1	2	1	1	1	E
10/06/2013	40	7/8	1	2	1	2	1	1	E
13/06/2013	41	7/8	2	2	1	2	1	2	S
16/06/2013	39	3/8	1	2	2	1	1	2	W
Average	**39**								

Plot 3: Old Dor									
Date	Total count	Cloud cover (in eights)	Rain	Sea conditions	Swell	Light conditions	Visibility	Wind Speed (Beaufort scale)	Wind direction
07/06/2013	75	0/8	1	2	1	2	1	1	E
11/06/2013	70	7/8	2	2	1	2	1		SW
14/06/2013	69	3/8	1	1	1	1	1		SW
17/06/2013	70	2/8	1	1	1	2	1	1	SW
20/06/2013	72	8/8	2	1	1	2	1		
Average	**71**								

Plot 4: Newcombe									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
04/06/2013	96	1/8	1	2	2	3	1	2	NE
07/06/2013	107	1/8	1	2	2	3	1	2	NE
10/06/2013	111	7/8	1	1	1	2	1	0	
13/06/2013	113	7/8	2	2	2	2	1	2	S
16/06/2013	111	4/8	1	2	2	3	1	2	W
Average	**108**								

Plot 5: Back of Newcombe									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
04/06/2013	97	2/8	1	1	3	3	1	2	NE
07/06/2013	122	1/8	1	1	2	2	1	2	E
14/06/2013	91	5/8	1	1	2	2	1		W
17/06/2013	143	7/8	1	1	1	2	1	1	SW
19/06/2013	130	8/8	1	2	2	2	1		
Average	**117**								

Plot 6: Saddle Nook									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
03/06/2013	116	0/8	1	2	1	2	1	2	NE
06/06/2013	101	1/8	1	2	2	3	1	2	E
09/06/2013	108	7/8	1	2	1	2	1	1	E
12/06/2013	101	7/8	1	2	1	2	1	2	S
15/06/2013	100	5/8	1	2	1	2	1	2	SW
Average	**105**								

Plot 7: Swineshaw Hole									
Date	**Total count**	**Cloud cover (in eights)**	**Rain**	**Sea conditions**	**Swell**	**Light conditions**	**Visibility**	**Wind Speed (Beaufort scale)**	**Wind direction**
03/06/2013	106	1/8	1	2	2	2	1	2	NE
07/06/2013	115	1/8	1	2	2	2	1	2	E
09/06/2013	113	8/8	1	2	2	2	1	2	NNE
12/06/2013	129	7/8	1	3	2	2	1	4	S
15/06/2013	133	5/8	2	2	2	2	1	4	SW
Average	**119**								