



RSPB Bempton Cliffs & Flamborough Head SPA Seabird Monitoring Programme

2011 Report



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Summary

The 2011 Seabird Monitoring Programme was successfully completed by RSPB staff and volunteers. The monitoring programme was initially a two-year partnership project between Natural England and the RSPB, established in 2008 to complete seabird monitoring and research for the Bempton Cliffs and Flamborough Head Special Protection Area (SPA). The project was originally led by a Seabird Research Officer with the aim of establishing 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. Continued monitoring and research will inform the condition of the 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 Conservation Zone network.

Following on from this two year partnership, the programme of monitoring research is now led by RSPB Bempton Cliffs and delivered by the reserves Assistant Warden, with support from a dedicated team of volunteers. Alongside this team, a long-term residential volunteer was employed in 2011 to undertake a large proportion of the monitoring work, as well as recruiting new volunteers to replace ones that were unable to participate in this year's survey work.

An important observation that stands out from this season is how early birds returned to the colony to breed. For some species, mainly Auks, breeding commenced approximately 3 weeks ahead of what is 'normally' expected. One theory for this is that there were sufficient fish stocks available early on in the season, giving birds a head start in provisioning young.

Due to the nature of this year's early breeding season, the study-plot counts for Common Guillemot and Razorbill were not completed. Large numbers of both Auk species had already left the cliff when commencing the counts, data collected would have showing an undercount in population numbers.

The boat-based whole colony count for Gannets was not completed due to unfavorable sea conditions throughout July and August. The whole colony count for Gannets will be completed in 2012, alongside the Herring Gull colony count.

Black-legged Kittiwake study-plot counts were established in 2009 providing a 4.2% sample of the whole colony; this data provides a baseline for future comparison. In 2009, the highest study-plot count recorded was 1,585 apparently occupied nests (AON). In 2010, the study-plot highest count was 1,967 AON, and in 2011 the study-plot highest count was 2,067 AON.

Guillemot diet and provisioning studies were completed again this season. The surveys were conducted between the 6th and 14th of June 2011 and were undertaken by a conservation biology student from Hull University. A total of 132 feeds were recorded during this 9 day study. Sandeels were the most numerous prey species comprising 27.3% of total feeds, Clupeids comprised 26.5% and 46.2% of feeds were unidentified.

Productivity monitoring was a huge success this year with the continued monitoring of all 6 target species. The same number of monitoring plots were maintained for each species, with the exception of Kittiwake which dropped from 22 plots to 19, providing comparable data on colony productivity for our key breeding seabirds.

Razorbill breeding productivity averaged 0.74 fledged chicks per apparently occupied site (AOS) in 2011. This is the highest fledging rate recorded since the Seabird Monitoring Programme started in 2009. Razorbill productivity averaged 0.60 fledged chicks per AOS in 2009 and 0.64 fledged chicks per AOS in 2010.

Common Guillemot breeding productivity averaged 0.81 fledged chicks per AOS in 2011. Again, highest fledging rate recorded since the monitoring programme began. Guillemot productivity averaged 0.78 fledged chicks per AOS in 2009 and 0.75 fledged chicks per AOS in 2010.

Gannet breeding productivity averaged 0.83 fledged chicks per apparently occupied nest (AON) in 2011. The previous two years breeding figures averaged 0.86 fledged chicks per AON in 2009 and 0.82 fledged chicks per AON in 2010. This remains relatively constant with no major fluctuations in productivity observed.

Black-legged Kittiwake breeding productivity averaged 0.88 fledged chicks per AON in 2011. This is the lowest fledging recorded in 3 years; however, this is still well above the UK mean of 0.68 fledged chicks per AON, recorded between 1986 and 2005 from 30-61 colonies annually (Mavor et al. 2008). In 2009, the average productivity recorded was 0.97 fledged chicks per AON, and 1.17 fledged chicks per AON in 2010.

Northern Fulmar breeding productivity averaged 0.54 fledged chicks per AOS in 2011. In 2009, average productivity was recorded at 0.51 fledged chicks per AOS, and in 2010, 0.55 fledged chicks per AOS. This is still above the UK mean of 0.41 fledged chicks per AOS, recorded between 1986 and 2005 from between 13-41 colonies annually (Mavor et al. 2008).

Herring Gull breeding productivity averaged 1.04 fledged chicks per AON in 2011. There has been a steady decline in Herring Gull productivity since monitoring first began for this species in 2009. An average of 1.29 fledged chicks per AON was recorded in 2009 and 1.10 fledged chicks per AON recorded in 2010.

Two separate tagging projects took place again this year at Bempton and Flamborough colony. Staff and volunteers assisted Rowena Langston and Mark Bolton, both from RSPB Conservation-Science department, with their independent tagging studies.

A second year of Gannet satellite tracking took place at Staple Newk in July 2011, led by Rowena Langston – Principle Conservation Scientist. The project saw 13 satellite tags safely deployed on adult Gannets to track foraging ranges away from the colony during the breeding season.

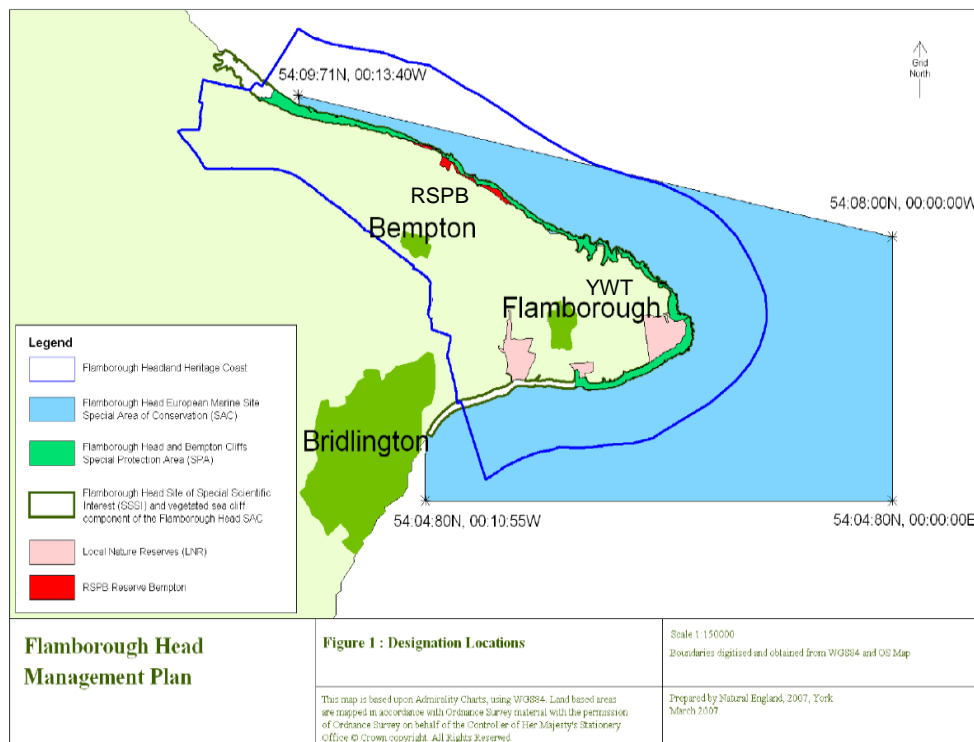
The FAME Kittiwake tagging project also took place again at Flamborough Head, led by Mark Bolton – Principle Conservation Scientist. In 2010, twenty Geo-locators were safely attached and deployed to 20 adult birds. Thirteen of these Geo-locators were recovered in 2011, of which eleven were redeployed this season. Along side this, 20 new tags were deployed and with the existing 7 that were not recovered in 2010, there are now a total of 38 Geo-locators current collecting data on Kittiwake wintering movements and foraging grounds. In addition to this, thirteen GPS trackers were successfully deployed and recovered over a 3-4 day period, gathering important data on foraging ranges during the breeding season.

Introduction

Bempton Cliffs and Flamborough Head SPA supports the largest seabird colony in England, the only mainland Gannetry in England, and the largest 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), RSPB nature reserve at Bempton Cliffs and Yorkshire Wildlife Trust at Flamborough Head (figure 1).

Figure 1 – Site designations on Flamborough Head



Bempton and Flamborough 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 Conservation Zones (MCZ) 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
Kittiwake, Guillemot and Razorbill 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**

Breeding seabird data has been collected at Bempton and Flamborough since 1969. 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 and whole colony count took place in Seabird 2000 and in 2008. Whole colony counts for Gannet were completed in 1970-77, 1981-83, 1985-95, 1997-99, 2002, 2004-05 and 2008-09 (table 1).

Breeding success data has been collected for Gannet in 1973-79, 1988-94, 1998, 2005-06 and 2008-09. Kittiwake breeding success has been monitored continuously between 1986-09. Razorbill were monitored in 2005-06 and 2009, Guillemot were monitored in 1991-95, 1998, 2005-06 and 2009. Fulmar and Herring Gull breeding success were monitored for the first time in 2009. Unfortunately it is not possible to monitor breeding success for Puffin and Shag at this colony (table 2).

Data collected by the project will 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 2011 seabird monitoring and research 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 for each breeding seabird species at Bempton and Flamborough

| | 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 | | |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|---|
| Gannet | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | | | ✓ | ✓ | | | | |
| Kittiwake | ✓ | | | | | | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | ✓ | | | | | | | | | | ✓ | | | |
| Razorbill | ✓ | | | | | | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | |
| Guillemot | ✓ | | | | | | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | |
| Puffin | | | | | | | | | | | | | | | | | | | | ✓ | | | | | | | | | | | | ✓ | | | | | | | | | | | | | |
| Herring Gull | ✓ | | | | | | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | ✓ |
| Fulmar | ✓ | | | | | | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | |
| Shag | | | | | | | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | ✓ | | | | | | | | | | | | | |

Table 2 – Summary of breeding success data for each breeding seabird species at Bempton and Flamborough

| | 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 | | | |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|---|---|
| Gannet | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| Kittiwake | | | | | | | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Razorbill | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Guillemot | | | | | | | | | | | | | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | | | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Puffin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Herring Gull | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| Fulmar | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| Shag | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Methods

The Seabird Monitoring Programme completed in 2011 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 Seabird Monitoring Handbook summarises the current census and productivity monitoring techniques for seabirds. The appropriate method was followed according to resources and practicality for each species at this seabird colony. Please refer to the '*Seabird monitoring handbook for Britain and Ireland*' for details on individual methodologies for each species.

Productivity Monitoring Results

In 2011, productivity monitoring was successfully completed for the third year running at Bempton Cliffs and Flamborough Head seabird colony. Productivity monitored was conducted for the following species of seabird: Razorbill, Common Guillemot, Gannet, Black-legged Kittiwake, Northern Fulmar and Herring Gull. For a detailed description of the methodologies followed, please refer to the Seabird Monitoring Handbook.

Razorbill productivity:

Razorbill productivity plots were successfully monitored throughout the colony in 2011. Razorbill productivity plots were monitored in '05, '06, '09, '10 and 2011, the recording method followed the '*Seabird monitoring handbook for Britain and Ireland, 1995*'. Eight Razorbill plots were monitored in 2011 from the end of April to the end of July (figure 2).

Figure 2 – Razorbill productivity plot locations



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In 2011, the overall productivity for Razorbill at Bempton and Flamborough from eight plots averaged 0.74 fledged chicks per Apparently Occupied Site (AOS). This is well above the national mean between 1986-2005 of 0.65 chicks per AOS recorded from between one and seven colonies annually (Mavor et al. 2008). This is the highest it has been in three years and shows a steady increase year on year (table 1). Razorbills have been our biggest success story this season with an overall increase of 1.0 fledged chick per AOS up on last year.

Table 3 – Razorbill productivity plot results for 2009, 2010 & 2011

| 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 |
|------------------|------------|--------------------|------------------------|------------|--------------------|------------------------|------------|--------------------|------------------------|
| Grandstand Gully | 13 | 3 | 0.23 | 14 | 6 | 0.43 | 11 | 4 | 0.36 |
| Grandstand North | 32 | 25 | 0.78 | 34 | 26 | 0.76 | 28 | 14 | 0.50 |
| Grandstand South | 16 | 6 | 0.38 | 17 | 11 | 0.65 | 18 | 12 | 0.67 |
| Newcombe | 52 | 34 | 0.65 | 61 | 43 | 0.70 | 66 | 52 | 0.79 |
| Back of Newcombe | – | – | – | 18 | 13 | 0.72 | 36 | 28 | 0.78 |
| Saddle Nook | – | – | – | 35 | 21 | 0.60 | 50 | 41 | 0.82 |
| Breil Nook | 19 | 11 | 0.58 | 40 | 26 | 0.65 | 49 | 41 | 0.84 |
| Swineshaw Hole | – | – | – | 34 | 16 | 0.47 | 48 | 35 | 0.73 |
| Total | 132 | 79 | 0.60 | 253 | 162 | 0.64 | 306 | 227 | 0.74 |

Common Guillemot productivity:

Guillemot productivity plots were monitored throughout the colony in 2011. Previous productivity monitoring has been carried out at this colony over the years in 1991-95, 1998, 2005, 2006, 2009 and 2010. The productivity recording method followed the 'Seabird monitoring handbook for Britain and Ireland, 1995'. Six guillemot plots were monitored in 2010 and five plots in 2011 (figure 3), monitoring took place from the beginning of May until the middle of July.

Figure 3 – Guillemot productivity plot locations



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In 2011, the overall productivity of Common Guillemot at Bempton and Flamborough from five plots averaged 0.81 fledged chicks per AOS. This is above the national mean between 1986-2005 of 0.69 chicks per AOS recorded from between three and fifteen colonies annually (Mavor et al. 2008), and an increase of 0.06 on last year. Regrettably, data collected from the Grandstand North plot was unusable this year due to inaccurate recording. Again, similarly to Razorbills, the productivity was the highest it has been in three years, with an overall increase of 0.06 fledged chicks per AOS up on last year (table 4).

Table 4 – Guillemot productivity plot results for 2009, 2010 & 2011

| 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 |
|------------------|------------|--------------------|------------------------|------------|--------------------|------------------------|------------|--------------------|------------------------|
| Nettletrip | 51 | 36 | 0.71 | 50 | 31 | 0.62 | 50 | 37 | 0.74 |
| Grandstand North | 48 | 39 | 0.81 | 50 | 36 | 0.72 | — | — | — |
| Grandstand South | 45 | 36 | 0.80 | 49 | 36 | 0.73 | 48 | 32 | 0.67 |
| Carter Lane 1 | 47 | 39 | 0.83 | 48 | 39 | 0.81 | 50 | 46 | 0.92 |
| Carter Lane 2 | 45 | 34 | 0.76 | 54 | 38 | 0.70 | 50 | 41 | 0.82 |
| Breil Nook | — | — | — | 50 | 46 | 0.92 | 50 | 46 | 0.92 |
| Total | 236 | 184 | 0.78 | 301 | 226 | 0.75 | 248 | 202 | 0.81 |

Gannet productivity:

Gannet productivity plots were successfully monitored in 2011. Gannet productivity monitoring has taken place at the reserve for the past twenty years, on and off. In recent years two plots have been monitored, in 2009 and 2010 five plots were monitored and these were repeated again in 2011 (figure 4). Monitoring took place from the beginning of May until the middle of September. Productivity recording followed the methods set out in the ‘Seabird monitoring handbook for Britain and Ireland, 1995’.

Figure 4 – Gannet productivity plot locations



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In 2011, the overall productivity for Gannet at Bempton and Flamborough from five plots averaged 0.83 chicks fledged per Apparently Occupied Nest (AON). This is still higher than the UK mean between 1986-2005 of 0.69 chicks per AON recorded from between three and six colonies annually (Mavor et al. 2008). Overall, there was a slight increase of 0.01 fledged chicks per AON up on last year (table 5). For full plot locations and boundaries, see Appendix 1.

Table 5 – Gannet productivity plot results for 2009, 2010 & 2011

| 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 |
|------------------|------------|--------------------|------------------------|------------|--------------------|------------------------|------------|--------------------|------------------------|
| Jubilee Corner | 52 | 43 | 0.83 | 50 | 41 | 0.82 | 49 | 40 | 0.82 |
| Nettletrip | 49 | 45 | 0.92 | 50 | 41 | 0.82 | 49 | 44 | 0.90 |
| Staple Newk 1 | 50 | 43 | 0.86 | 50 | 41 | 0.82 | 49 | 40 | 0.82 |
| Staple Newk 2 | 50 | 43 | 0.86 | 50 | 44 | 0.88 | 49 | 39 | 0.80 |
| Staple Newk 3 | 50 | 41 | 0.82 | 50 | 39 | 0.78 | 50 | 43 | 0.86 |
| Total | 251 | 215 | 0.86 | 250 | 206 | 0.82 | 248 | 206 | 0.83 |

Black-legged Kittiwake productivity:

Kittiwake productivity plots were monitored throughout the colony in 2011 (figure 5). Kittiwake productivity monitoring has taken place at the reserve for the past twenty-four years; in 2009 eleven plots were monitored, an increase from five plots over the last few years, in 2010 twenty-two plots were monitored and in 2011, twenty plots were monitored at this colony (tables 6 & 7). Monitoring took place from mid-May through to the beginning of August. The productivity recording followed the Seabird Monitoring Handbook methodologies.

Figure 5 – Kittiwake productivity plot locations



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In 2011, the overall productivity for Black-legged Kittiwake at Bempton and Flamborough from twenty plots averaged 0.88 fledged chicks per AON. This figure is above the national mean between 1986-2005 of 0.68 chicks per AON, recorded from between thirty and sixty-one colonies annually (Mavor et al. 2008). For full plot locations and boundaries, see Appendix 1.

Table 6 – Kittiwake productivity plot results 2011

| | Jubilee Far | Bartlett Nab Near | Bartlett Nab Far | Grandstand North Near | Grandstand North Near Edge | Grandstand North Mid | Grandstand North Far edge | Grandstand North Low | Old Dor | Newcombe | Back of Newcombe | Carter Lane 1 | 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 | 8 | 14 | 16 | 12 | 5 | 6 | 11 | 11 | 10 | 8 | 25 | 17 | 18 | 8 | 22 | 18 | 23 | 17 | 17 | 22 | 288 |
| Nests Fledging 1 Chicks | 34 | 22 | 22 | 27 | 31 | 31 | 25 | 33 | 23 | 26 | 17 | 27 | 26 | 31 | 27 | 25 | 21 | 26 | 30 | 19 | 523 |
| Nests Fledging 2 Chicks | 8 | 15 | 11 | 7 | 14 | 13 | 14 | 6 | 17 | 6 | 8 | 6 | 4 | 9 | 2 | 7 | 6 | 7 | 2 | 4 | 165 |
| Nests Fledging 3 Chicks | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total Fledged | 50 | 52 | 47 | 41 | 59 | 57 | 53 | 45 | 57 | 38 | 33 | 39 | 34 | 52 | 31 | 39 | 33 | 40 | 34 | 27 | 861 |
| Tatol AON | 50 | 50 | 50 | 48 | 50 | 50 | 50 | 50 | 50 | 40 | 50 | 50 | 48 | 49 | 50 | 50 | 50 | 50 | 49 | 45 | 979 |
| Total Fledged Per Nest | 1.00 | 1.04 | 0.94 | 0.85 | 1.18 | 1.14 | 1.06 | 0.90 | 1.14 | 0.95 | 0.66 | 0.78 | 0.71 | 1.06 | 0.62 | 0.78 | 0.66 | 0.80 | 0.69 | 0.60 | 0.88 |

Table 7 – Kittiwake productivity plot comparison for 2009, 2010 & 2011

| | Jubilee Far 2009 | Jubilee Far 2010 | Jubilee Far 2011 | Bartlett Nab Far 2009 | Bartlett Nar Far 2010 | Bartlett Nab Far 2011 | Grandstand North Mid 2009 | Grandstand North Mid 2010 | Grandstand North Mid 2011 | Grandstand North Near Edge 2009 | Grandstand North Near Edge 2010 | Grandstand North Near Edge 2011 | Old Dor 2009 | Old Dor 2010 | Old Dor 2011 | Back of Newcombe 2009 | Back of Newcombe 2010 | Back of Newcombe 2011 | Saddle Nook 1 2009 | Saddle Nook 1 2010 | Saddle Nook 1 2011 | Saddle Nook 2 2009 | Saddle Nook 2 2010 | Saddle Nook 2 2011 |
|--------------------------------|------------------|------------------|------------------|-----------------------|-----------------------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------------|---------------------------------|---------------------------------|--------------|--------------|--------------|-----------------------|-----------------------|-----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Nests Fledging 0 Chicks | 11 | 8 | 8 | 14 | 10 | 16 | 14 | 15 | 6 | 15 | 13 | 5 | 13 | 10 | 10 | 24 | 11 | 25 | 15 | 7 | 18 | 12 | 4 | 8 |
| Nests Fledging 1 Chicks | 24 | 24 | 34 | 22 | 25 | 22 | 18 | 20 | 31 | 22 | 24 | 31 | 19 | 19 | 23 | 16 | 21 | 17 | 22 | 21 | 26 | 21 | 30 | 31 |
| Nests Fledging 2 Chicks | 15 | 18 | 8 | 14 | 15 | 11 | 18 | 15 | 13 | 13 | 13 | 14 | 18 | 21 | 17 | 10 | 16 | 8 | 13 | 22 | 4 | 17 | 16 | 9 |
| Nests Fledging 3 Chicks | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Fledged | 54 | 60 | 50 | 50 | 55 | 47 | 54 | 50 | 57 | 48 | 50 | 59 | 55 | 61 | 57 | 36 | 59 | 33 | 48 | 65 | 34 | 55 | 62 | 52 |
| Tatol AON | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 48 | 50 | 50 | 49 |
| Total Fledged Per Nest | 1.08 | 1.20 | 1.00 | 1.00 | 1.10 | 0.94 | 1.08 | 1.00 | 1.14 | 0.96 | 1.00 | 1.18 | 1.10 | 1.22 | 1.14 | 0.72 | 1.18 | 0.66 | 0.98 | 1.30 | 0.71 | 1.10 | 1.24 | 1.06 |

Northern Fulmar productivity:

Fulmar productivity plots were monitored for the first time at this seabird colony in 2009, these were then repeated in 2010 and again in 2011 (figure 6). The productivity recording method followed the ‘Seabird monitoring handbook for Britain and Ireland, 1995’. Monitoring took place between the end of May and the end of August at the five established study plots between Bempton Cliffs and Flamborough Head.

Figure 6 – Fulmar productivity plot locations



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In 2011, the overall productivity for Northern Fulmar at Bempton and Flamborough from five plots averaged 0.54 fledged chicks per AOS. This is above the UK mean between 1986-2005 of 0.41 chicks per AOS recorded from between thirteen and forty-one colonies annually (Mavor et al. 2008). Over all, there has been a slight decrease in productivity, with 0.01 fledged chicks per AOS down on last year (table 8). For full plot locations and boundaries, see Appendix 1.

Table 8 – Fulmar productivity plot results for 2009, 2010 & 2011

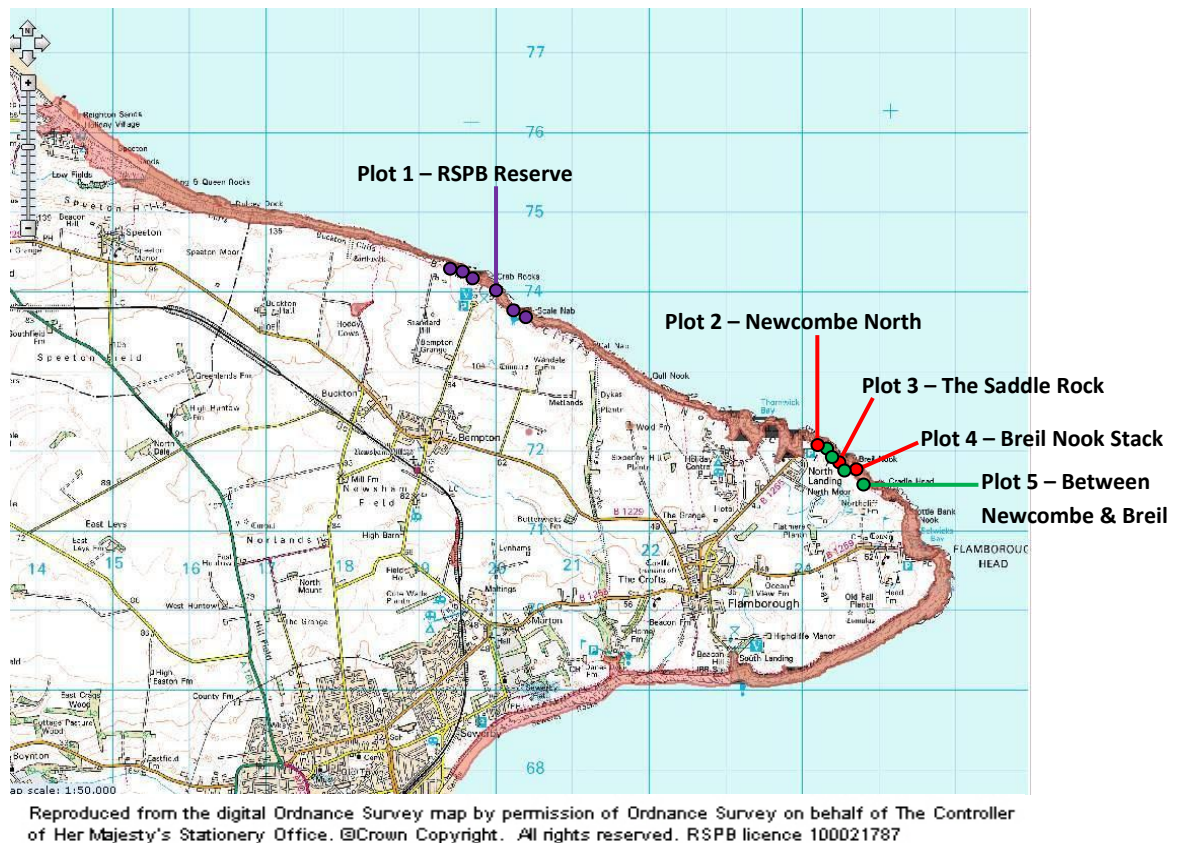
| Monitoring Site: | AOS 2009 | Fledged Chicks '09 | Productivity ch/pr '09 | AOS 2010 | Fledged Chicks '10 | Productivity ch/pr '10 | AOS 2011 | Fledged Chicks '11 | Productivity ch/pr '11 |
|------------------|-----------|--------------------|------------------------|-----------|--------------------|------------------------|-----------|--------------------|------------------------|
| New Roll-up | 6 | 4 | 0.67 | 10 | 4 | 0.40 | 6 | 2 | 0.33 |
| Old Dor | 16 | 8 | 0.50 | 19 | 8 | 0.42 | 17 | 8 | 0.47 |
| Newcombe | 7 | 4 | 0.57 | 11 | 6 | 0.55 | 12 | 7 | 0.58 |
| Breil Nook | 7 | 3 | 0.43 | 15 | 14 | 0.93 | 16 | 12 | 0.75 |
| Swineshaw Hole | 9 | 4 | 0.44 | 16 | 7 | 0.44 | 15 | 7 | 0.47 |
| Total | 45 | 23 | 0.51 | 71 | 39 | 0.55 | 66 | 36 | 0.54 |

Herring Gull productivity:

Herring Gull productivity plots were monitored for the first time at this seabird colony in 2009 and were repeated again in 2010 and 2011 (figure 7). The productivity recording method followed the 'Seabird monitoring handbook for Britain and Ireland, 1995'.

Herring Gulls were monitored along the length of the colony totalling a sample of 82 nests. Monitoring took place from the middle of May through to the end of August.

Figure 7 – Herring Gull productivity plot locations



In 2011, the overall productivity for Herring Gull at Bempton and Flamborough from a sample of eighty-two nests averaged 1.04 fledged chicks per AON. A steady decline of successfully fledged Herring Gull chicks at this colony is clearly visible from the previous three years worth of data collected (table 9). Over all, productivity was down 0.06 fledged chicks per AON on last year.

Table 9 – Herring Gull productivity plot results for 2009, 2010 & 2011

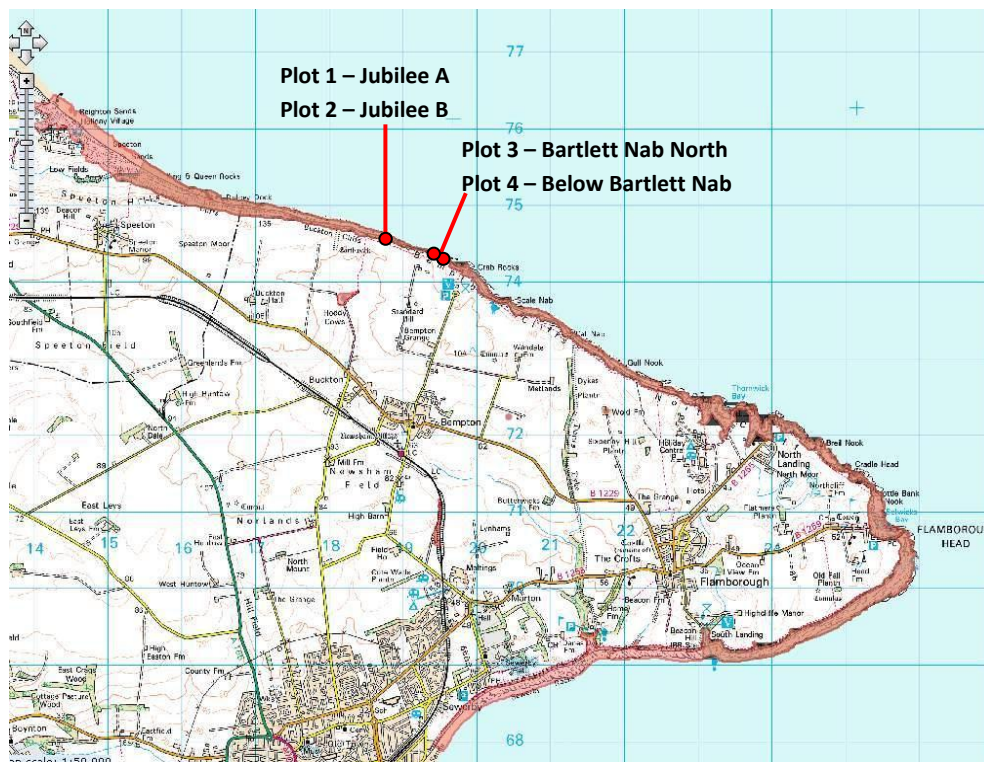
| Monitoring Site: | AON 2009 | Fledged Chicks '09 | Productivity ch/AON '09 | AON 2010 | Fledged Chicks '10 | Productivity ch/AON '10 | AON 2011 | Fledged Chicks '11 | Productivity ch/AON '11 |
|------------------------------------|-----------|--------------------|-------------------------|-----------|--------------------|-------------------------|-----------|--------------------|-------------------------|
| RSPB Reserve | – | – | – | 13 | 10 | 0.77 | 18 | 12 | 0.67 |
| Newcombe North | – | – | – | 12 | 9 | 0.75 | 9 | 12 | 1.33 |
| The Saddle Rock | 19 | 19 | 1.00 | 16 | 18 | 1.13 | 21 | 27 | 1.29 |
| Breil Nook - Stack | 14 | 19 | 1.36 | 16 | 11 | 0.69 | 15 | 10 | 0.67 |
| Between North landing & Breil Nook | 19 | 29 | 1.53 | 27 | 44 | 1.63 | 19 | 24 | 1.26 |
| Total | 52 | 67 | 1.29 | 84 | 92 | 1.10 | 82 | 85 | 1.04 |

Guillemot Diet and Provisioning Study

Four Guillemot diet study-plots were established in 2009 to collect data on different prey species fed to chicks, as well as calculating provisioning rates throughout an 18-hour foraging window. These plots were monitored again in 2010 and 2011 at this colony (figure 8). Thomas Spink, a Conservation Biology student from Hull University, took up the bulk of this year's diet and provisioning monitoring, with assistance from RSPB staff and residential volunteer. This was an opportunity for Tom to contribute towards important seabird research work at Bempton Cliffs, as well as collecting data for his university degree project.

Four study-plots were identified at this site where observers could record the identity of prey delivered by adult birds to their chicks from a range of less than 30 metres, without causing disturbance. Since the rate of food delivered to chicks may vary during the course of the day, to obtain a reliable estimate of the overall daily provisioning rate, data was collected during all daylight hours: 05:00am – 21:00pm between 12th and 22nd June 2009, 04:00am – 22:00pm between 2nd and 11th June 2010, and 04:00am – 22:00pm between 6th and 14th June 2011. As different observers may vary in their ability to observe and record feeds, it was important to ensure that each observer collected data across all time periods and study-plots. In 2009, monitoring took place across four days with monitoring periods rotated back to back. In 2010 and 2011, the sampling took place over nine days to accommodate for differences in weather conditions and to allow the observer enough time for coverage of each time slot across all four monitoring plots. Two-hour sampling periods were alternated on/off, with each time slot monitored on each plot across the different days.

Figure 8 – Guillemot diet study-plot locations



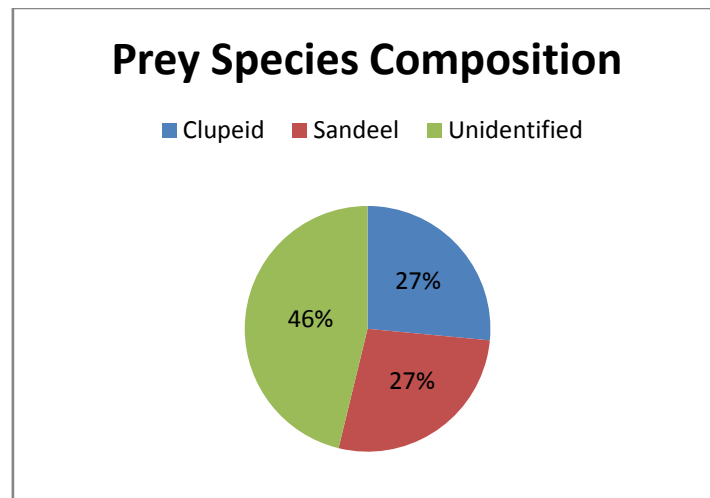
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Diet and provisioning study results:

The survey was carried out between 6th and 14th of June 2011. Feeds are recorded every time an adult bird returns with a fish, including whether it is used to provision or for display purposes. If possible the species of fish is recorded, however if the feed is too fast to identify, or the bird is positioned in such a way that a good view of the prey is not possible, the species is recorded as 'Unidentified'. In addition, weather conditions such as cloud cover, wind speed, sea state and temperature were also recorded.

A total of 132 feeds were recorded during the nine day study. Sandeels were the most numerous prey species comprising 27.3% of total feeds observed, Clupeids comprised 26.5% and 46.2% of feeds were unidentified. This is partly due to inexperience of prey species identification by observers (figure 9).

Figure 9 – Prey species composition from diet study



There is some uncertainty over how reliable the data collected on prey species is. As each observer has had limited experience in the identification of prey species, coupled with the brief window of opportunity to make each observation, I would be reluctant to use the prey species composition data in any external publishing's. A variation in the proportion of unidentified prey will affect the relative proportion of the other prey classes as it is unlikely that the unidentified items were an equal split between clupeids and sandeels. The provisioning rates however are reliable and continue to provide comparable data year on year.

Because of the difficulty in identifying many of the prey items, it is only possible to determine provisioning rates and not the nutritional value of the prey provided.

Guillemot provisioning rates:

Data is collected on each feed made within a monitoring plot. A provisioning rate for each two-hour time slot was calculated based on number of chicks on each plot. The number of feeds is divided by the number of chicks being provisioned and then divided by 2 to provide a rate per hour within that particular window of time (table 10).

To calculate the 'mean' provisioning rate per chick per hour over the length of the study, the total number of feeds is divided by the total number of chicks in each time slot across all monitoring plots and divided by 2 to find the provisioning rate per hour per chick. The total number of feeds recorded was 132 and the total number of chicks was 360; the average provisioning rate per hour for this study was 0.18 feeds per chick per hour.

Table 10 – Guillemot provisioning data

DAY 1: 06/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 0800-1000 | 3 | 11 | 0.27 | 0.135 |
| Below Bartlett Nab | 1200-1400 | 2 | 10 | 0.2 | 0.1 |
| Jubilee A | 1600-1800 | 1 | 4 | 0.25 | 0.125 |
| Jubilee B | 2000-2200 | 2 | 12 | 0.17 | 0.08 |

DAY 2: 07/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 1200-1400 | 2 | 11 | 0.18 | 0.09 |
| Below Bartlett Nab | 1600-1800 | 5 | 11 | 0.45 | 0.225 |
| Jubilee A | 2000-2200 | 0 | 4 | 0 | 0 |
| Jubilee B | 0600-0800 | 5 | 12 | 0.42 | 0.21 |

DAY 3: 08/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 1000-1200 | 3 | 13 | 0.23 | 0.115 |
| Below Bartlett Nab | 1400-1600 | 3 | 10 | 0.3 | 0.15 |
| Jubilee A | 1800-2000 | 0 | 4 | 0 | 0 |
| Jubilee B | 0400-0600 | 7 | 12 | 0.58 | 0.29 |

DAY 4: 09/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 1400-1600 | 4 | 13 | 0.31 | 0.155 |
| Below Bartlett Nab | 1800-2000 | 2 | 10 | 0.2 | 0.1 |
| Jubilee A | 0400-0600 | 1 | 4 | 0.25 | 0.125 |
| Jubilee B | 0800-1000 | 5 | 11 | 0.45 | 0.225 |

DAY 5: 10/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 1800-2000 | 6 | 12 | 0.5 | 0.25 |
| Below Bartlett Nab | 0400-0600 | 6 | 10 | 0.6 | 0.3 |
| Jubilee A | 0800-1000 | 2 | 4 | 0.5 | 0.25 |
| Jubilee B | 1200-1400 | 5 | 11 | 0.45 | 0.225 |

DAY 6: 11/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 0400-0600 | 8 | 12 | 0.67 | 0.335 |
| Below Bartlett Nab | 0800-1000 | 7 | 10 | 0.7 | 0.35 |
| Jubilee A | 1200-1400 | 0 | 4 | 0 | 0 |
| Jubilee B | 1600-1800 | 5 | 11 | 0.45 | 0.225 |

DAY 7: 12/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 1600-1800 | 4 | 12 | 0.33 | 0.165 |
| Below Bartlett Nab | 2000-2200 | 3 | 10 | 0.3 | 0.15 |
| Jubilee A | 0600-0800 | 2 | 4 | 0.5 | 0.25 |
| Jubilee B | 1000-1200 | 3 | 11 | 0.27 | 0.135 |

DAY 8: 13/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 2000-2200 | 4 | 12 | 0.33 | 0.165 |
| Below Bartlett Nab | 0600-0800 | 8 | 9 | 0.89 | 0.445 |
| Jubilee A | 1000-1200 | 1 | 4 | 0.25 | 0.125 |
| Jubilee B | 1400-1600 | 1 | 11 | 0.09 | 0.045 |

DAY 9: 14/06/11

| Plot | Monitoring time slot | Number of feeds | No. of chicks observed | Provisioning rate per 2 hour observation period | Provisioning rate per hour |
|--------------------|----------------------|-----------------|------------------------|---|----------------------------|
| Bartlett Nab North | 0600-0800 | 12 | 11 | 1.09 | 0.545 |
| Below Bartlett Nab | 1000-1200 | 3 | 7 | 0.43 | 0.215 |
| Jubilee A | 1400-1600 | 2 | 4 | 0.5 | 0.25 |
| Jubilee B | 1800-2000 | 5 | 11 | 0.45 | 0.225 |

Whole-colony and Population Study-plot Counts

Gannet whole-colony count:

Due to unfavorable sea conditions throughout July and August, the boat based whole-colony count for Gannets were not completed. There were two opportunities during this period where sea conditions became favorable; however, RSPB staff were unavailable on these occasions. There also seemed to be some reluctance from the Emmersons boat hire to capitalize on other potential calm sea state days. In 2012 we will consider using other alternatives for boat hire, with Filey Sailing Club already expressing interest in assisting us with our colony count surveys.

The whole-colony count for Gannet will be completed in 2012, along side the whole-colony counts for Herring Gull.

Kittiwake study plot count:

Kittiwake study-plot counts were successfully completed again this year, following on from counts conducted in 2009 and 2010 (figure 10). Guidance from the Seabird Monitoring Handbook suggests that study-plots 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 the Bempton and Flamborough colony holds the largest mainland Kittiwake population in the UK it is important that trends in numbers are monitored. For full study-plot count locations please see appendix 2.

Figure 10 – Kittiwake study-plot locations



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In 2011, the seven established study-plots were counted twice in the peak of the season (table 11). The plots were originally selected to provide representation across the main body of the colony whilst making sure minimum disturbance to the birds was maintained, as well as ensuring safe access for the observer.

Table 11 – Study-plot count totals

| Date | Total Count AON | Date | Total Count AON | Date | Total Count AON |
|------------|-----------------|------------|-----------------|------------|-----------------|
| 26/06/2009 | 1585 | 17/06/2010 | 1967 | 09/06/2011 | 2035 |
| 06/07/2009 | 1541 | 21/06/2010 | 1938 | 14/06/2011 | 2067 |
| 09/07/2009 | 1554 | | | | |
| 13/07/2009 | 1497 | | | | |

In 2009, counts were conducted towards the end of the breeding season resulting in a potential undercount; therefore, the 2011 and 2010 counts were completed mid June – in the peak of the breeding season. It was decided through discussions with RSPB Senior Reserves Ecologist, Simon Wightman, that two counts in the peak week would be sufficient. Future counts should aim to be completed in the middle two weeks of June, on a minimum of two occasions. The result from 2010, despite being conducted slightly earlier than 2009, had increased by just under 400 AON across all study count plots. The results from 2011 again show a slight increase on the previous years count, with 100 additional AON recorded across all study plots. The total Kittiwake population in 2008 was 37,617 AON, therefore based on this figure the study-plots provide around a 5.2% sample of the population. For full study-plot count data see Appendix 3.

Common Guillemot and Razorbill study-plot counts:

The study-plot counts for Auks were not completed this year. Due to the nature of this year’s early breeding season large numbers of Guillemot and Razorbill pairs had already begun to leave the cliffs during the period that population monitoring is conducted. Guidance from the Seabird Monitoring Handbook advises that counts should be carried out in the first three weeks of June, this is also in-line with the study-plot counts completed in 2010, however by this same time in 2011 there were clearly fewer pairs in each study-plot and so data collected would potentially show an under count. There is also the danger that any data collected would not be comparable against previous years. The decision was made to abandon the Auk counts this season and focus our attention on successfully completing the Kittiwake study-plot counts.

Discussions between D. Aitken, S. Wightman, I. Kendall, and K. Clarkson have highlighted the need for greater attention to be paid to variations and fluctuations on bird return dates to the colony; this will allow for quicker reaction times to these changes and thus be better prepared for study-plot population monitoring in the future.

Discussion & Conclusion

The 2011 Seabird Monitoring Programme at Bempton Cliffs and Flamborough Head SPA was a successful one. Productivity monitoring plots that were established throughout this colony in 2009 were completed again this year for the third year running, allowing us to continue our assessment and understanding of the state and health of this internationally important colony for our six target seabird species. Other areas of seabird monitoring were also completed, with the completion of Guillemot diet and provisioning studies and Kittiwake study-plot counts.

The recruitment of a seabird research residential volunteer (resi-vol) allowed us to maintain large areas of monitoring coverage in 2011, with our resi-vol contributing approximately 450 hours worth of work time to the research programme. This resi-vol placement scheme for seabird research has now been established at Bempton cliffs and will continue to provide much needed assistance to the project in future years, as well as offering a volunteer the opportunity to gain invaluable experience in seabird research monitoring and techniques.

The existing volunteer team is still very much in place with many observers showing long-term commitment to the project. A number of repeat volunteers contributed again to the 2011 monitoring season and have expressed genuine interest in continuing their involvement. There were five new volunteers recruited this year, which allowed us to cover monitoring plots that some people were unable to continue with.

Links with universities are still growing and this year a student from Hull University assisted with the Guillemot diet and provisioning studies. This programme of work enables us to add to our dataset collected in 2009 and 2010 on provisioning rates and prey species provisioned to Guillemot chicks during the breeding season. With three years worth of data collected so far, we are keen for this monitoring work to continue so that we can build up an idea on trends and changes in this area of important research. We have already had interest from a student from Anglia Ruskin University who is interested in pursuing this study for us in 2012.

The whole-colony counts for Gannet were missed due to a number of overriding factors. Unfavourable weather for most of July and August meant that we were unable to conduct the boat-based surveys. There also seemed to be some reluctance from the boat hire company to capitalise on days where sea conditions appeared suitable. As the Emmersons run both a crab fishing and boat tour business, potentially the prospect of giving their time to this programme of work is not as financially appealing as their existing ventures. There were two occasions during July and August when sea conditions were right and the boat company were available but unfortunately RSPB staff were not. Next year there will be a third RSPB staff member available so this will hopefully be avoided; S.Wightman has offered his services for the whole-colony counts and will assist D.Aitken and K.Clarkson with the whole-colony counts for Gannet and Herring Gull in 2012. Connections with Filey Sailing Club will also be explored as they have expressed interest in assisting us with our boat-based surveys, this could possibly resolve problems we had with the Emmersons this season to get out and conduct the whole-colony counts.

Staff and volunteer resources from Bempton Cliffs assisted with Gannet and Kittiwake tagging projects that took place on the SPA this year. Mark Bolton and Rowena Langston, from RSPB Conservation Science Department, conducted their independent tagging projects, which successfully saw the recovery and redeployment of tracking devices on Kittiwakes and satellite tags on Gannets. These projects took place on

two separate occasions over June and July, the results of which will go towards our understanding of bird foraging and wintering movements away from the colony. Both projects are likely to go ahead next year and there should be sufficient resources in place again at Bempton to assist with these programmes of work.

Overall, it has been a good year for seabird research at Bempton Cliffs and Flamborough Head colony. With the monitoring research priorities now well established, the previous Seabird Research Office role has enabled these programmes of work to be delivered year on year. The appointment of a permanent Assistant Warden at Bempton Cliffs now sees that the Seabird Monitoring Programme priorities are met at this internationally important seabird colony. A solid volunteer base and newly implemented resi-vol research assistant scheme will allow the monitoring coverage to continue in 2012.

Acknowledgements

Special thanks go to all the volunteers and staff who gave a staggering **1318** hours of their time to help with the 2011 Seabird Monitoring Programme.

These wonderful people include Rachel Cartwright, David Clarke, Linda McKenzie, Nev Jones, Mike Crowther, Angela Belk, Richard Baines, Phil Cunningham, Dan Lombard, Lucy Murgatroyd, James Oliver, Sarah Wilkinson, Shelia Salmon, Tim Wilkinson, Alice Smith, Kat Sanders, Tom Spink, Keith Clarkson, Ian Kendall, Steve Race, Glenis Dawson, Dawn McKie and Johnny Phillips.

Thanks also go to all the reserve and visitor centre staff & volunteers who have supported the project throughout.

Thanks to the fundraising efforts of RSPB East Yorkshire Local Group and to the financial support from Flamborough Bird Observatory.

Continued support from Natural England for granting permission to carry out Gannet and Kittiwake tagging projects on the SPA.

Previous LEADER funding for optics and waterproofs continues to provide critical equipment for volunteer researchers.

The Yorkshire Wildlife Trust who provided access to the superb Flamborough Head reserve.

East Riding of Yorkshire Council who provided access to satellite tag Kittiwakes at Flamborough Head.

Lastly, thanks to the owners of the Caravel Cafe for providing us with parking permits for North Landing car park.

Without the help and support of all of these people involved either directly or indirectly, the Seabird Monitoring Programme would not be the success that it is and for this, I am eternally grateful.

D.Aitken

Appendix 1

Productivity plot locations:

- 1.1 Razorbill productivity plot locations
- 1.2 Common Guillemot productivity plot locations
- 1.3 Gannet productivity plot locations
- 1.4 Black-legged Kittiwake productivity plot locations
- 1.5 Northern Fulmar productivity plot locations
- 1.6 Herring Gull productivity plot locations

Key:

- - Plot location
- - Observer location

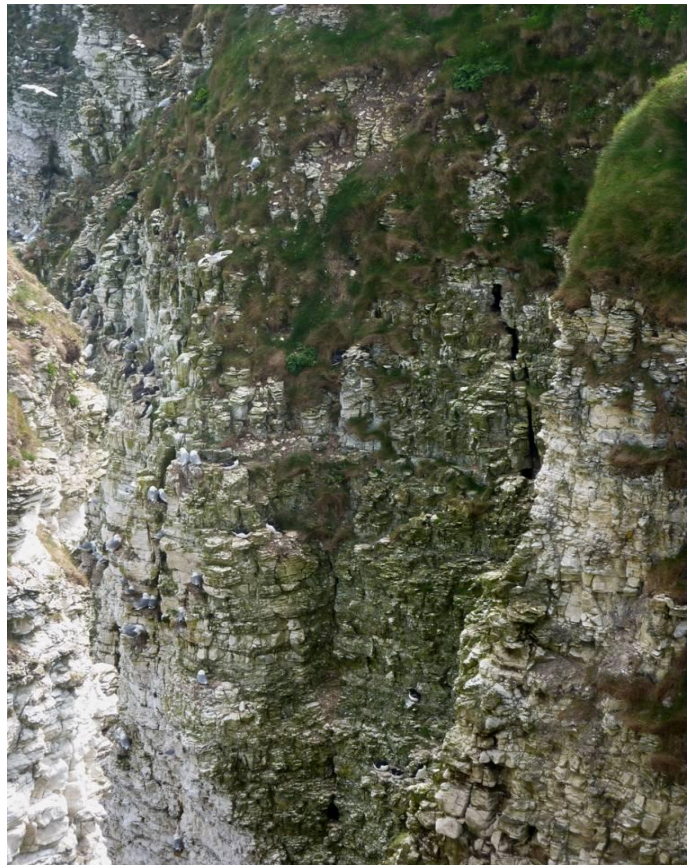
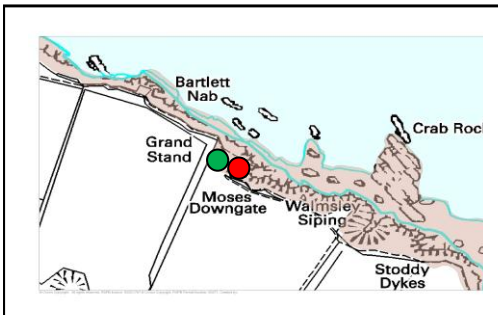
1.1 Razorbill productivity plots:

Plot 1: Grandstand Gully

Observer: Johnny Phillips

Dates monitored: 2nd May – 23rd July

Visit requirements: Every three days

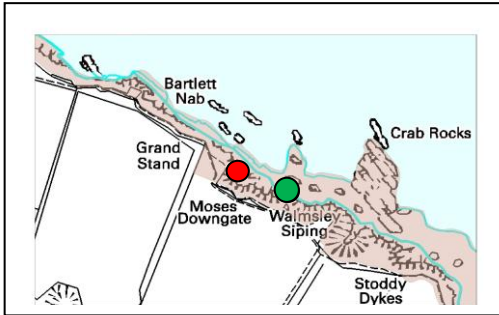


Plot 2: Grandstand North

Observer: Nev Jones

Dates monitored: 3rd May – 25th July

Visit requirements: Every three days

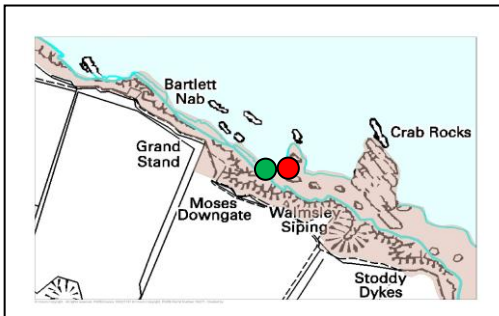


Plot 3: Grandstand South

Observer: Mike Crowther

Dates monitored: 3rd May – 1st July

Visit requirements: Every three days

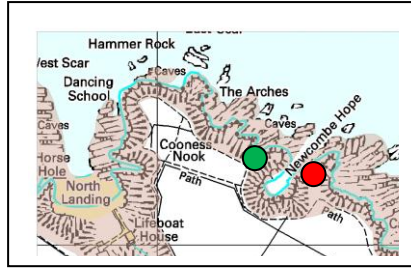


Plot 4: Newcombe

Observer: Keith Clarkson

Dates monitored: 27th April – 21st July

Visit requirements: Every three days

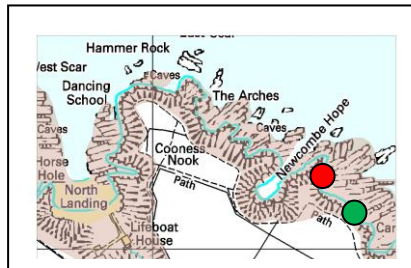


Plot 5: Back of Newcombe

Observer: David Aitken

Dates monitored: 3rd May – 17th July

Visit requirements: Every three days

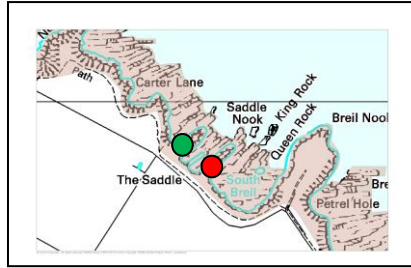


Plot 6: Saddle Nook

Observer: Rachel Cartwright

Dates monitored: 3rd May – 5th July

Visit requirements: Every three days

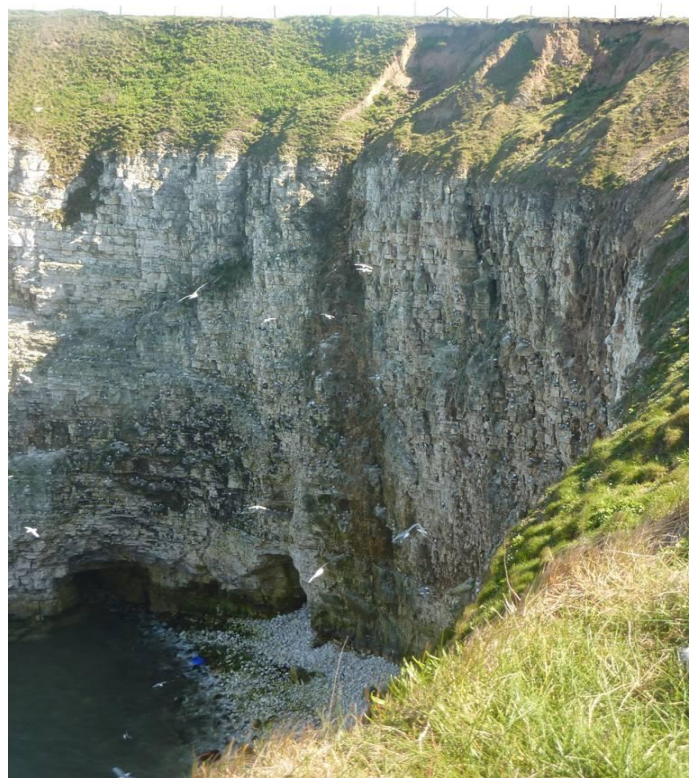
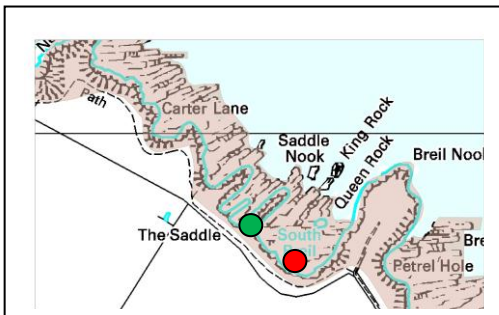


Plot 7: Breil Nook

Observer: Rachel Cartwright

Dates monitored: 3rd May – 11th July

Visit requirements: Every three days

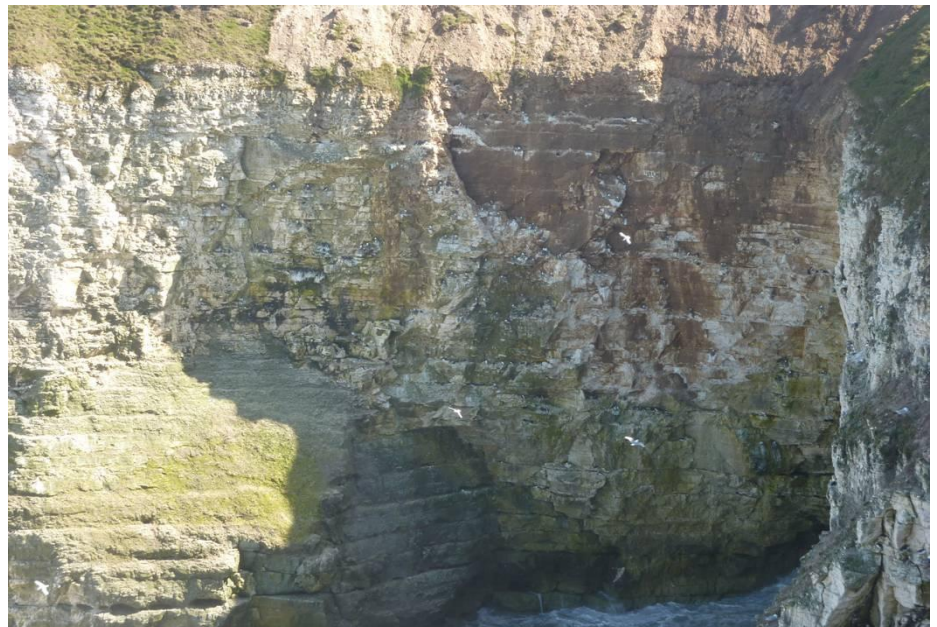
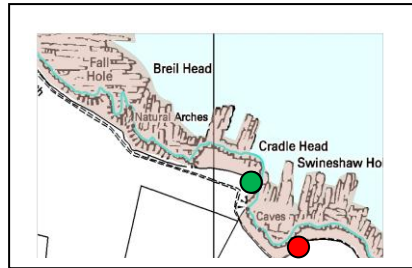


Plot 8: Swineshaw Hole

Observer: Rachel Cartwright

Dates monitored: 2nd May – 19th July

Visit requirements: Every three days



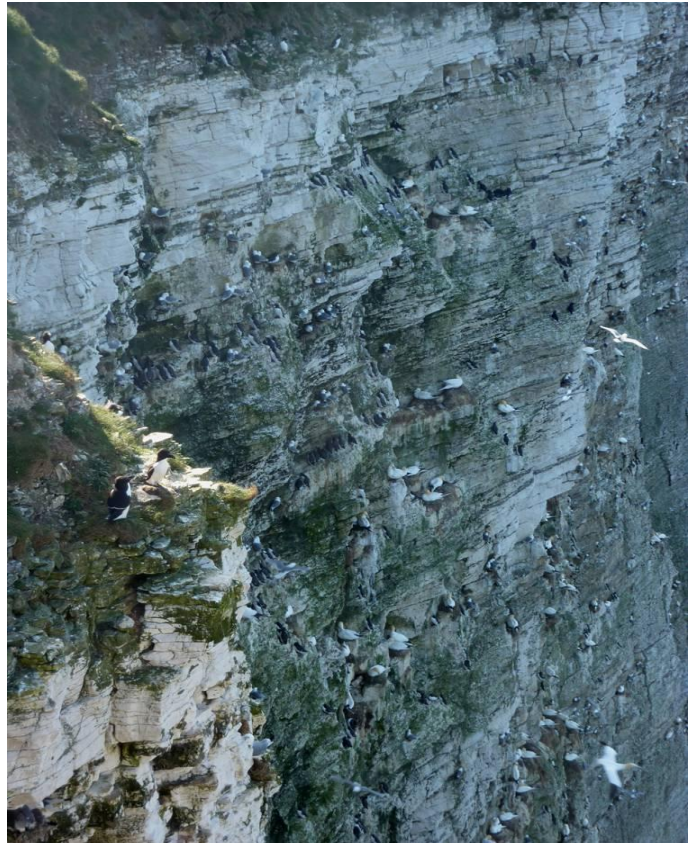
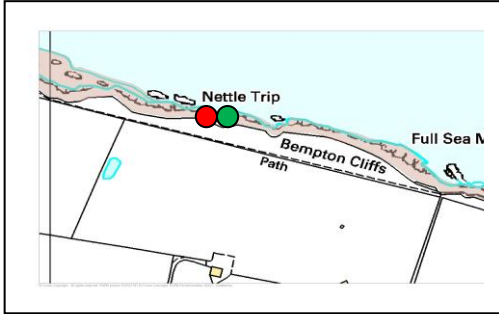
1.2 Common Guillemot productivity plots:

Plot 1: Nettletrip

Observer: David Aitken

Dates monitored: 5th May – 15th July

Visit requirements: Every three days

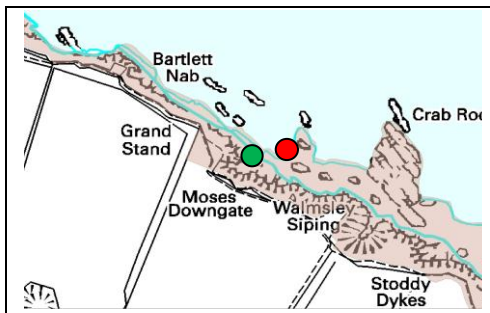


Plot 2: Grandstand South

Observer: James Oliver

Dates monitored: 1st May – 5th July

Visit requirements: Every three days

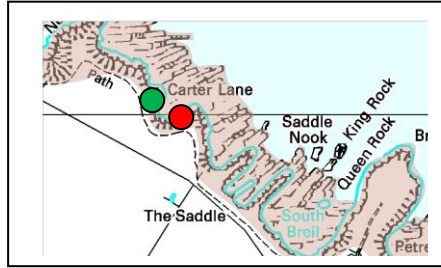


Plot 3: Carter Lane 1

Observer: Rachel Cartwright

Dates monitored: 3rd May – 21st July

Visit requirements: Every three days

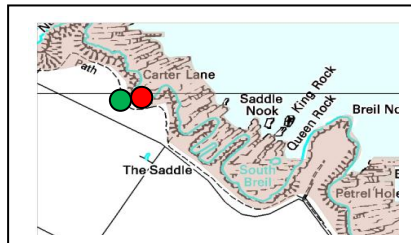


Plot 4: Carter Lane 2

Observer: Rachel Cartwright

Dates monitored: 2nd May – 7th July

Visit requirements: Every three days

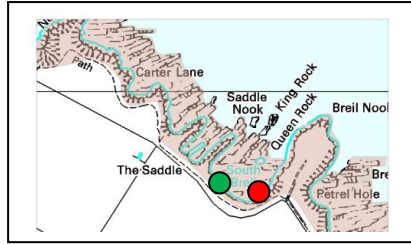


Plot 5: Breil Nook

Observer: Rachel Cartwright

Dates monitored: 3rd May – 14th July

Visit requirements: Every three days



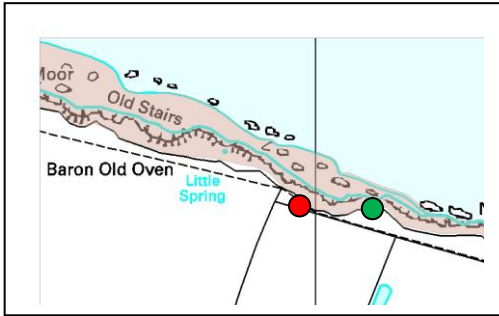
1.3 Gannet productivity plots:

Plot 1: Jubilee

Observer: David Aitken

Dates monitored: 4th May – 16th September

Visit requirements: Once a week

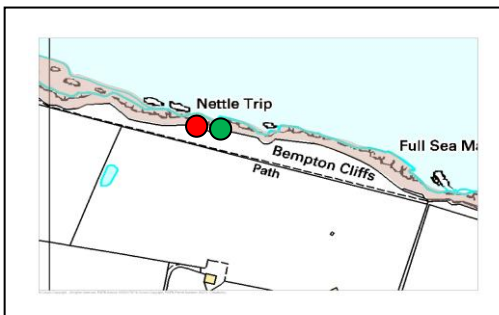


Plot 2: Nettletrip

Observer: Steve Race

Dates monitored: 13th May – 15th September

Visit requirements: Once a week

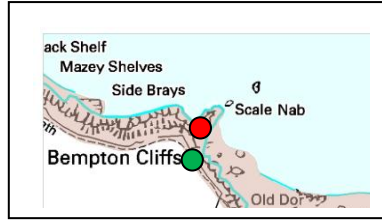


Plot 3: Staple Newk 1

Observer: Linda McKenzie

Dates monitored: 7th April – 6th September

Visit requirements: Once a week

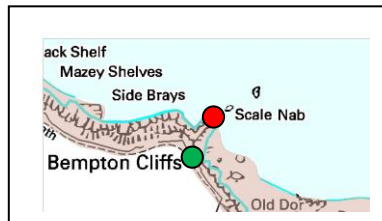


Plot 4: Staple Newk 2

Observer: Linda McKenzie

Dates monitored: 1st April – 13th September

Visit requirements: Once a week

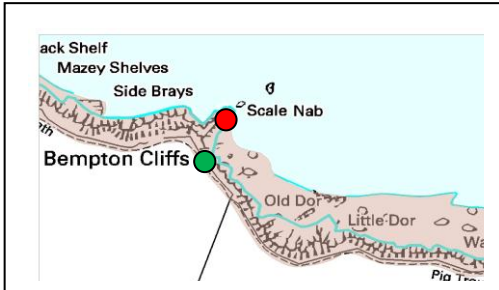


Plot 5: Staple Newk 3

Observer: Rachel Cartwright

Dates monitored: 2nd May – 15th September

Visit requirements: Once a week



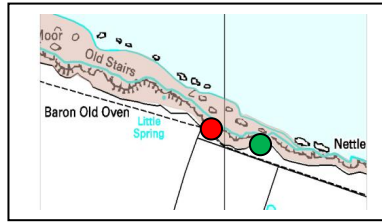
1.4 Black-legged Kittiwake productivity plots:

Plot 1: Jubilee Far

Observer: David Clarke

Dates monitored: 23rd May – 25th July

Visit requirements: Once a week

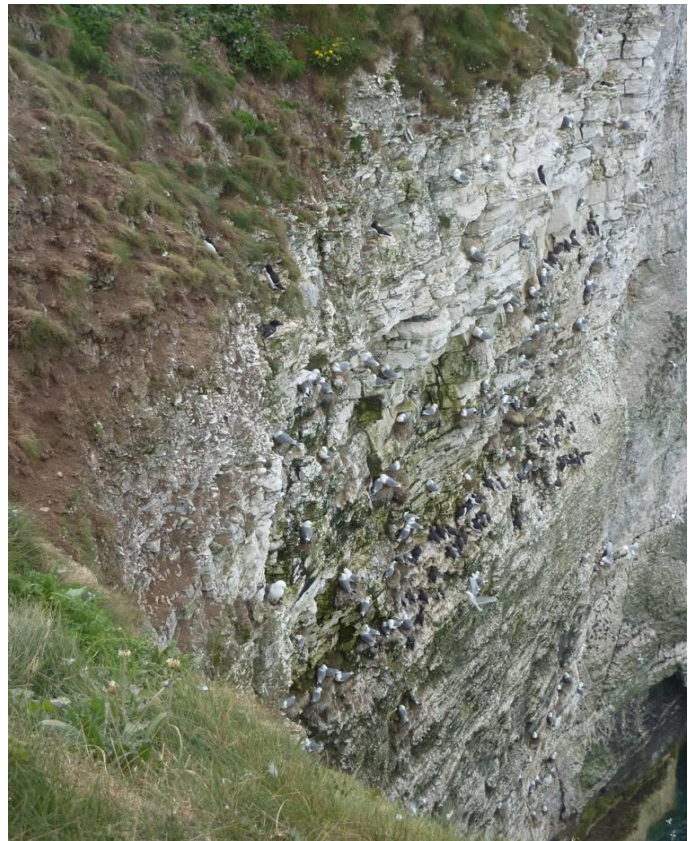
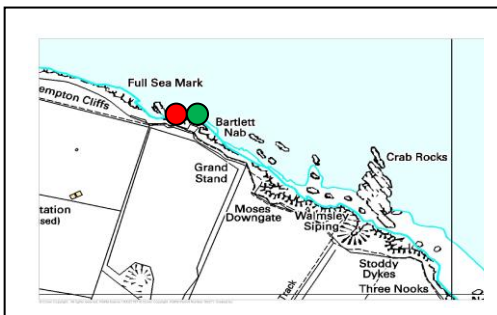


Plot 2: Bartlett Nab Near

Observer: Alice Smith

Dates monitored: 19th May – 9th August

Visit requirements: Once a week

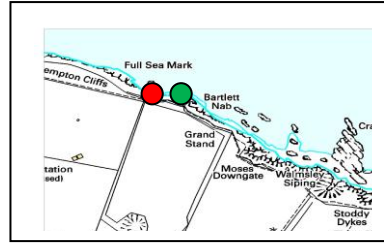


Plot 3: Bartlett Nab Far

Observer: David Clarke

Dates monitored: 23rd May – 25th July

Visit requirements: Once a week

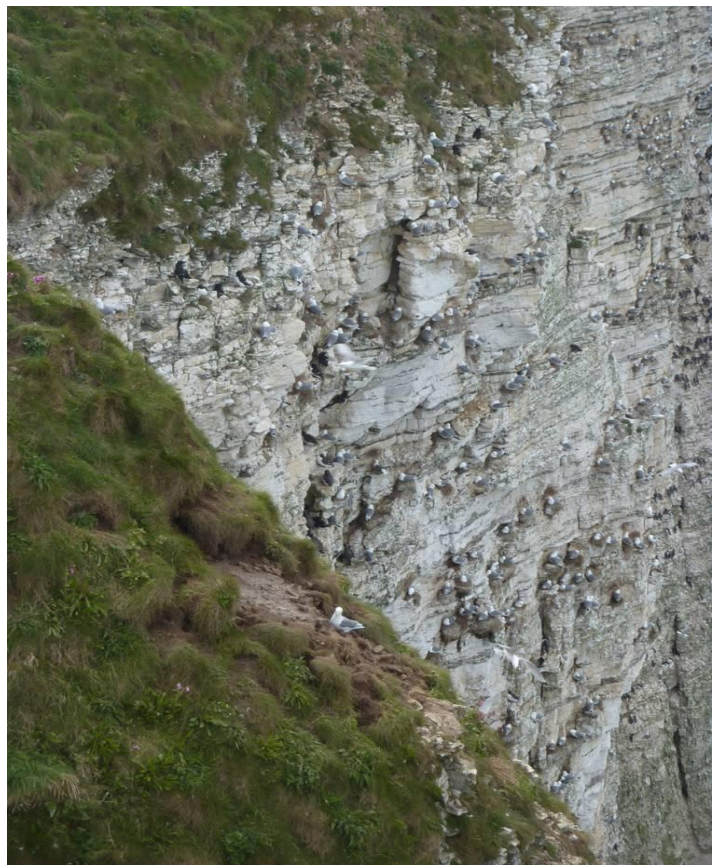
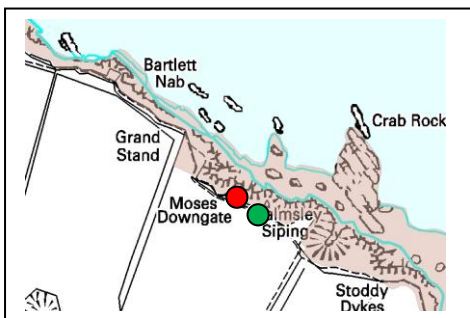


Plot 4: Grandstand North Near

Observer: Sheila Salmon

Dates monitored: 29th May – 2nd August

Visit requirements: Once a week

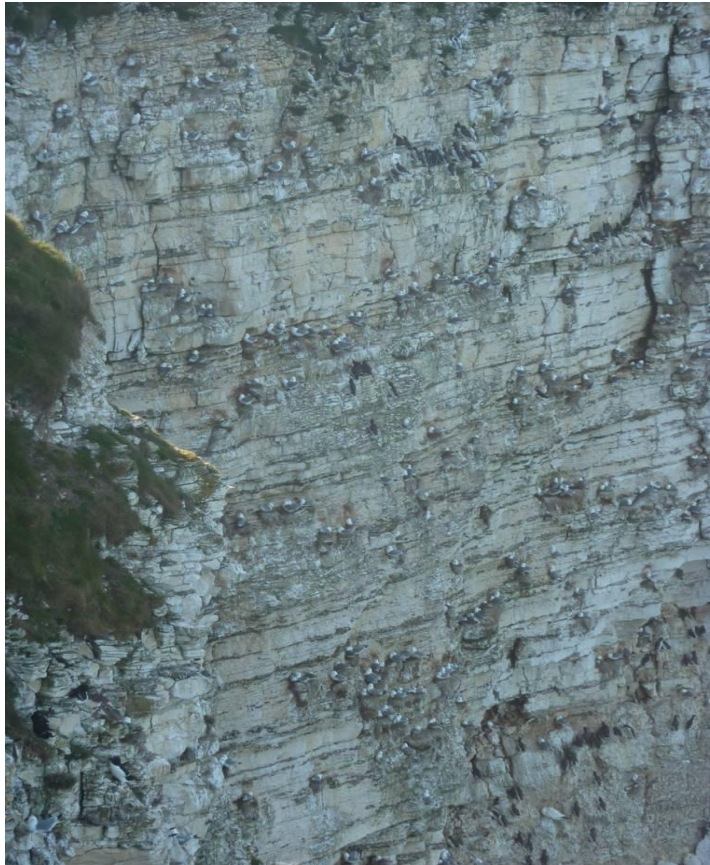
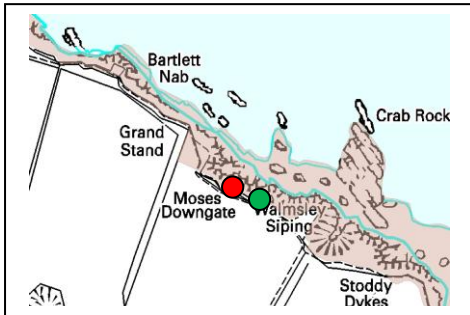


Plot 5: Grandstand North Near Edge

Observer: David Clarke

Dates monitored: 23rd May – 11th July

Visit requirements: Once a week

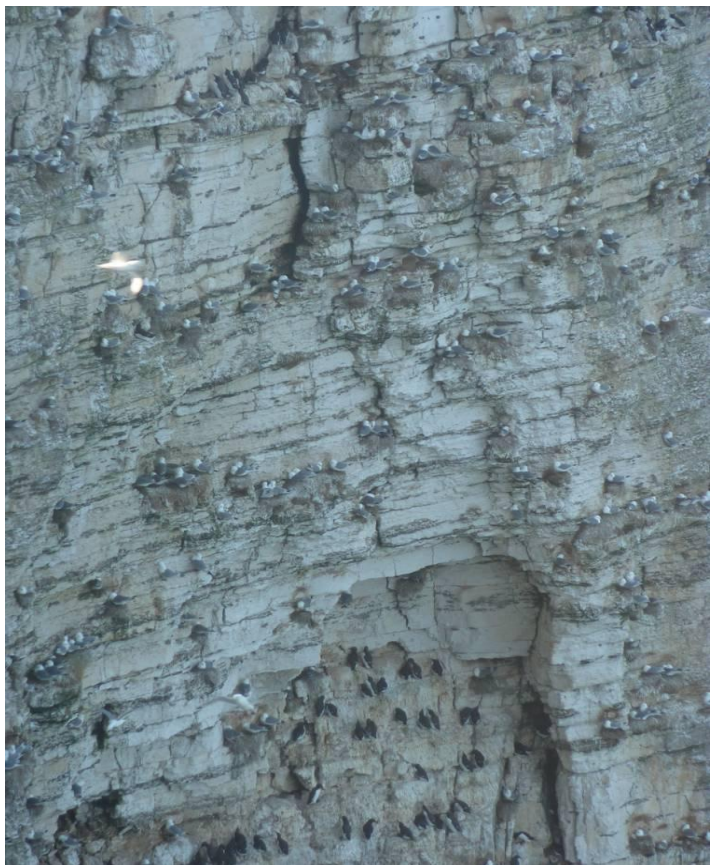
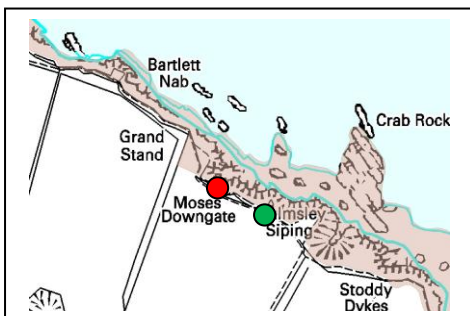


Plot 6: Grandstand North Mid

Observer: David Clarke

Dates monitored: 23rd May – 18th July

Visit requirements: Once a week

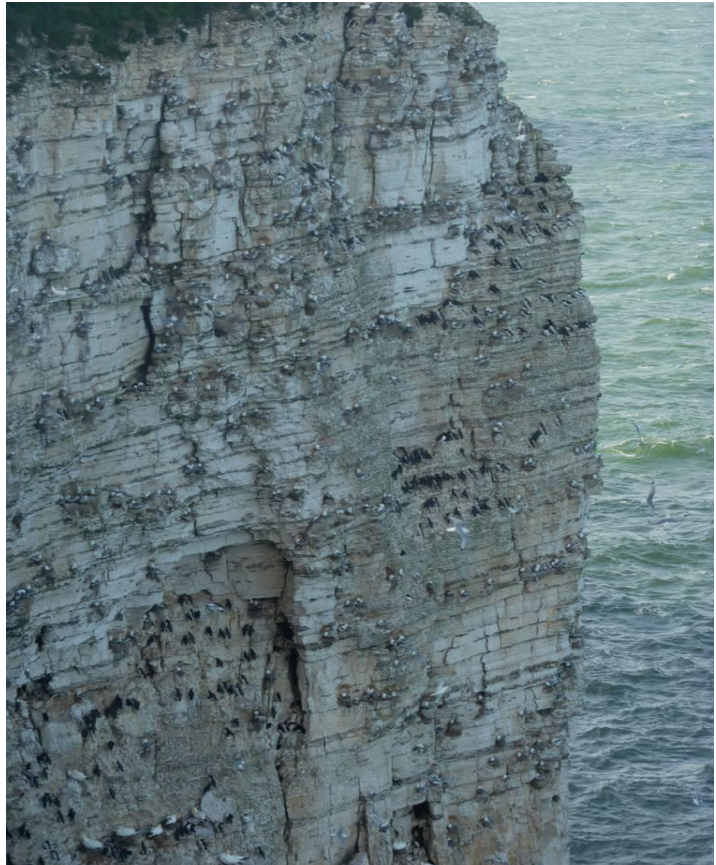
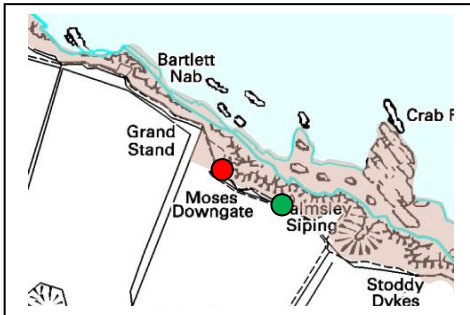


Plot 7: Grandstand North Far edge

Observer: Dawn McKie

Dates monitored: 17th May – 26th July

Visit requirements: Once a week

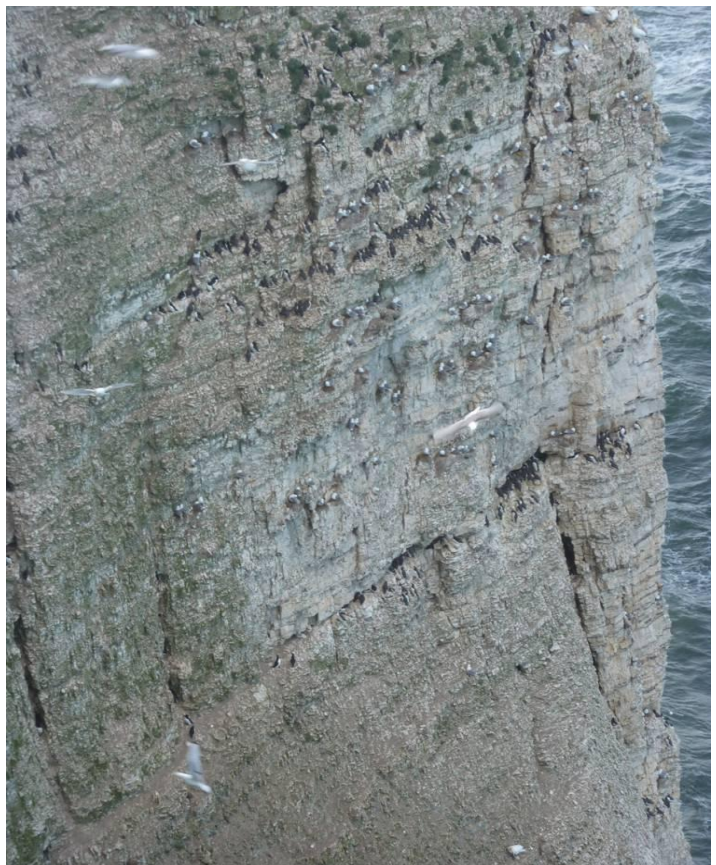
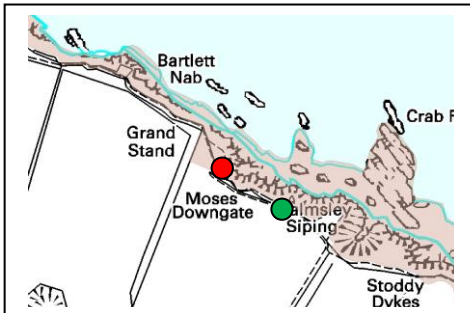


Plot 8: Grandstand North Low

Observer: David Aitken

Dates monitored: 12th May – 9th August

Visit requirements: Once a week

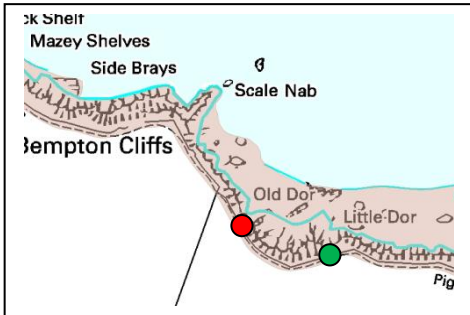


Plot 9: Old Dor

Observer: David Clarke

Dates monitored: 23rd May – 18th July

Visit requirements: Once a week

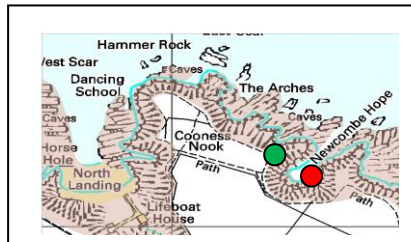


Plot 10: Newcombe

Observer: Angela Belk

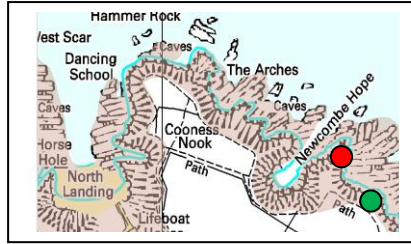
Dates monitored: 15th May – 21st July

Visit requirements: Once a week



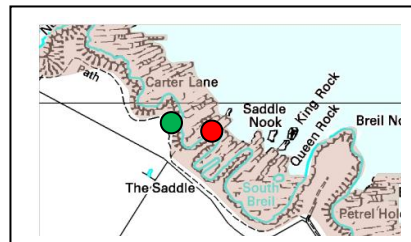
Plot 11: Back of Newcombe

Observer: Rachel Cartwright
Dates monitored: 10th May – 12th July
Visit requirements: Once a week



Plot 12: Carter Lane 1

Observer: Rachel Cartwright
Dates monitored: 11th May – 18th August
Visit requirements: Once a week

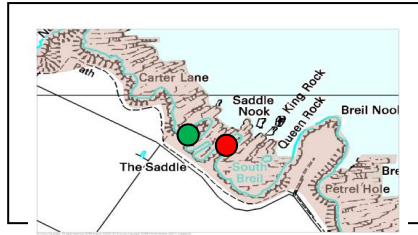


Plot 13: Saddle Nook 1

Observer: Sarah Wilkinson

Dates monitored: 17th May – 28th July

Visit requirements: Once a week

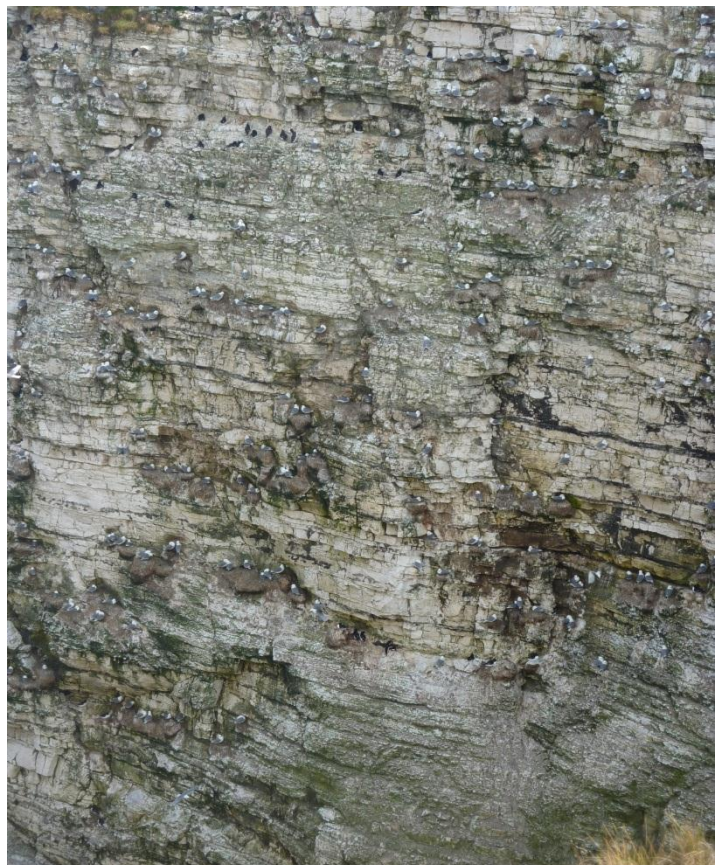
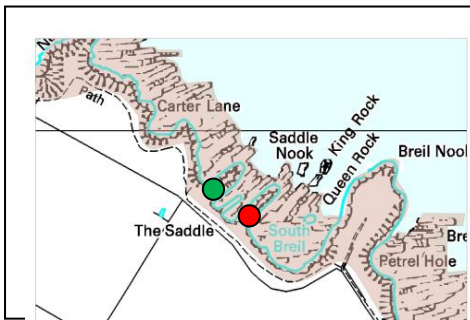


Plot 14: Saddle Nook 2

Observer: James Oliver

Dates monitored: 17th May – 28th July

Visit requirements: Once a week

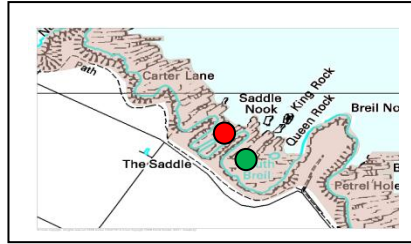


Plot 15: Saddle from Breil Nook

Observer: Kat Sanders

Dates monitored: 23rd May – 8th August

Visit requirements: Once a week

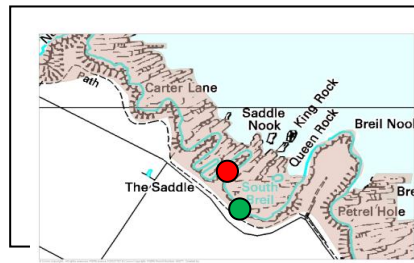


Plot 16: Breil Nook North

Observer: Lucy Murgatroyd

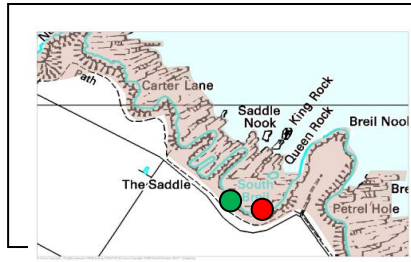
Dates monitored: 17th May – 17th July

Visit requirements: Once a week



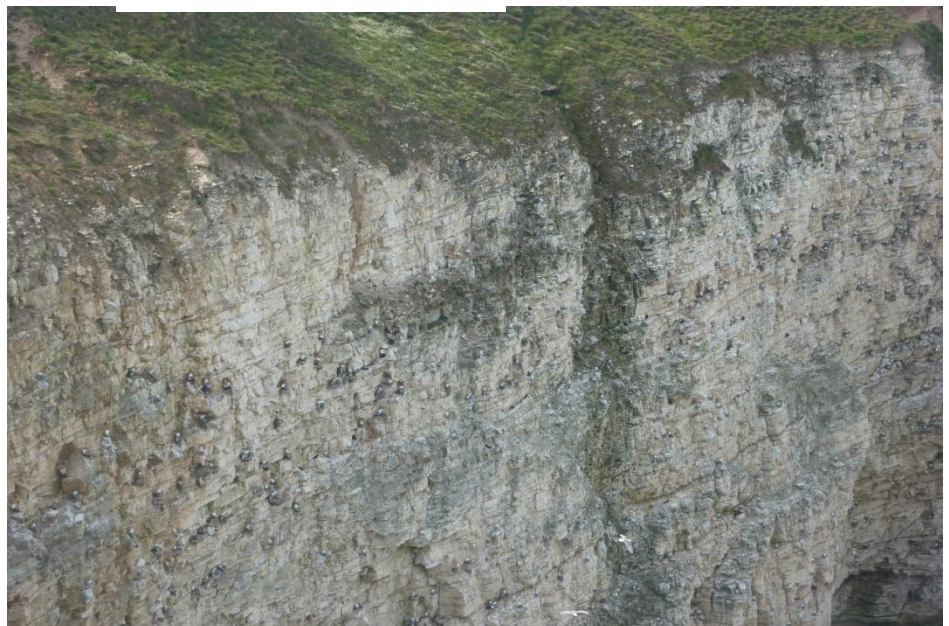
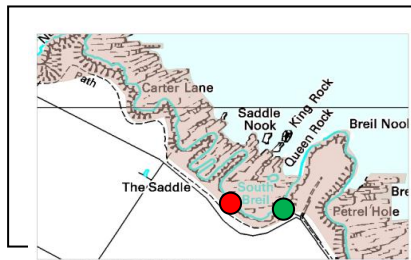
Plot 17: Breil Nook South

Observer: Lucy Murgatroyd
Dates monitored: 17th May – 17th July
Visit requirements: Once a week



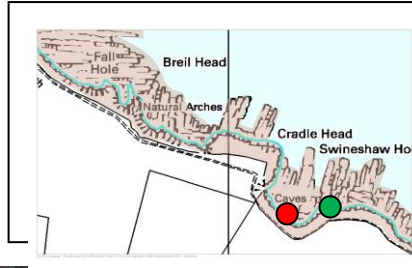
Plot 18: Back of Breil Nook North

Observer: Lucy Murgatroyd
Dates monitored: 21st May – 17th July
Visit requirements: Once a week



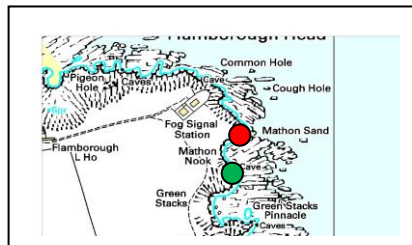
Plot 19: Swineshaw Hole

Observer: Phil Cunningham
Dates monitored: 15th May – 21st July
Visit requirements: Once a week



Plot 20: Lighthouse

Observer: Richard Baines
Dates monitored: 21st May – 22nd July
Visit requirements: Once a week



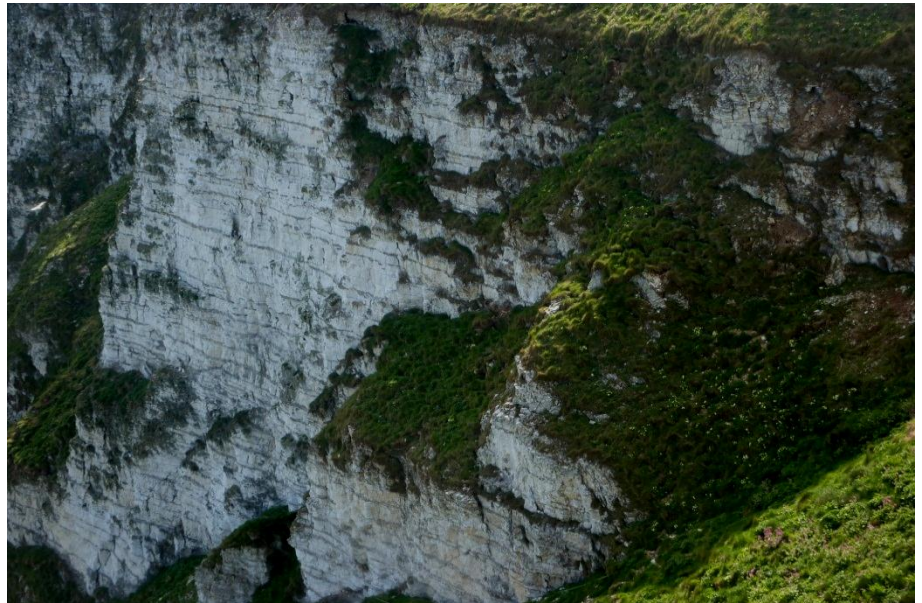
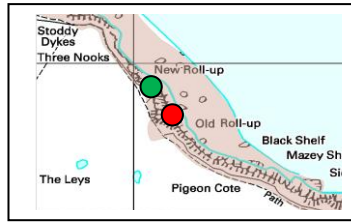
1.5 Northern Fulmar productivity plots:

Plot 1: New Roll-up

Observer: Ian Kendall

Dates monitored: 24th May – 22nd August

Visit requirements: Four visits in May & August

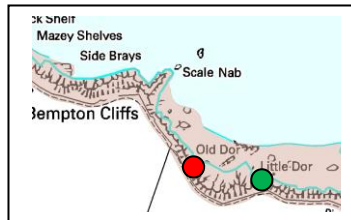


Plot 2: Old Dor

Observer: Ian Kendall

Dates monitored: 24th May – 22nd August

Visit requirements: Four visits in May & August

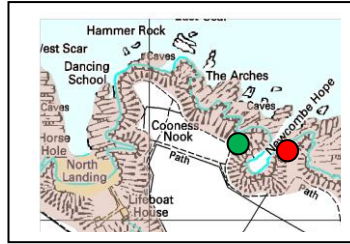


Plot 3: Newcombe

Observer: Keith Clarkson

Dates monitored: 14th May – 14th August

Visit requirements: Four visits in May & August

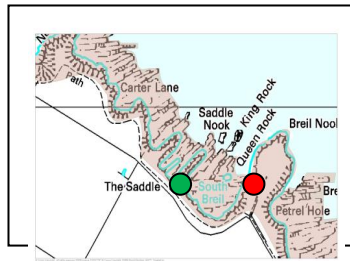


Plot 4: Breil Nook South (1 & 2)

Observer: Ian Kendall

Dates monitored: 26th May – 22nd August

Visit requirements: Four visits in May & August

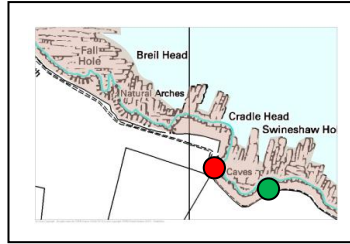


Plot 5: Swineshaw Hole

Observer: Ian Kendall

Dates monitored: 26th May – 22nd August

Visit requirements: Four visits in May & August



1.6 Herring Gull productivity plots:

Plot 1: RSPB Reserve

Observer: Glenis Dawson

Dates monitored: 21st May – 20th August

Visit requirements: Once a week

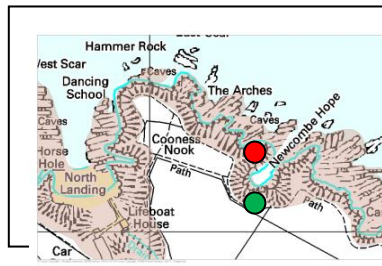


Plot 2: Newcombe North

Observer: D.Aitken / R.Cartwright

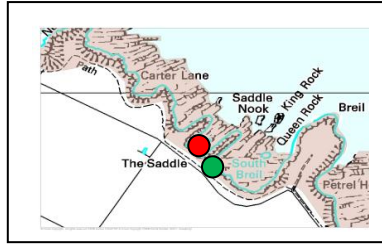
Dates monitored: 26th May – 18th August

Visit requirements: Once a week



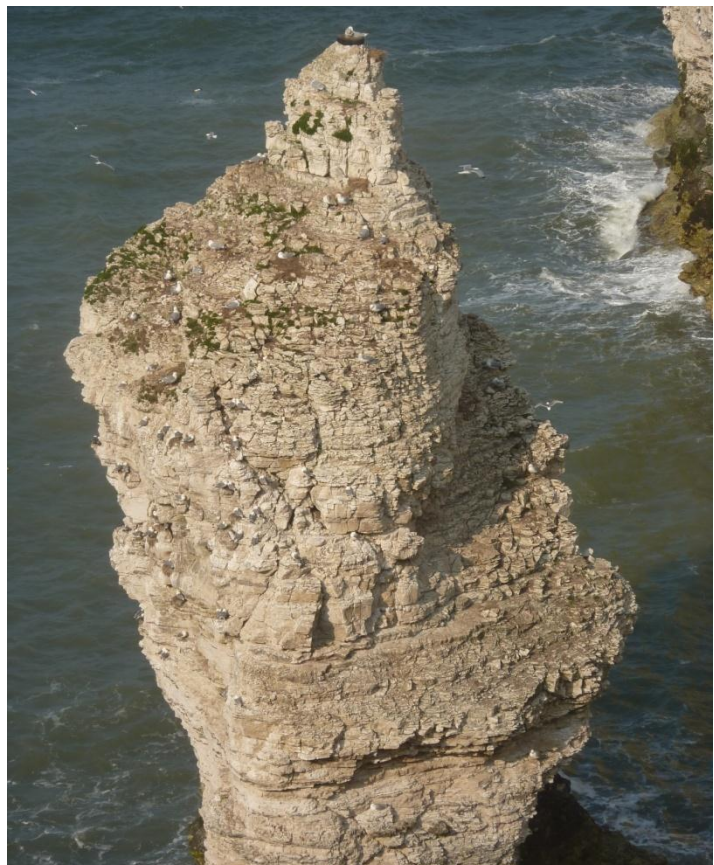
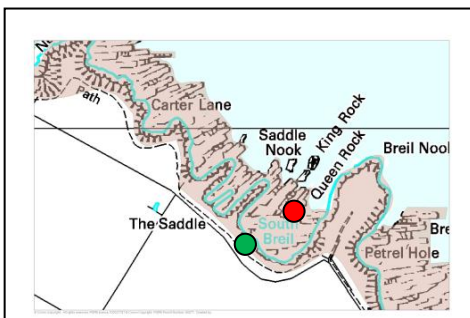
Plot 3: The Saddle Rock

Observer: Lucy Murgatroyd
Dates monitored: 21st May – 17th July
Visit requirements: Once a week



Plot 4: Breil Nook Stack

Observer: Tim Wilkinson
Dates monitored: 12th May – 6th August
Visit requirements: Once a week

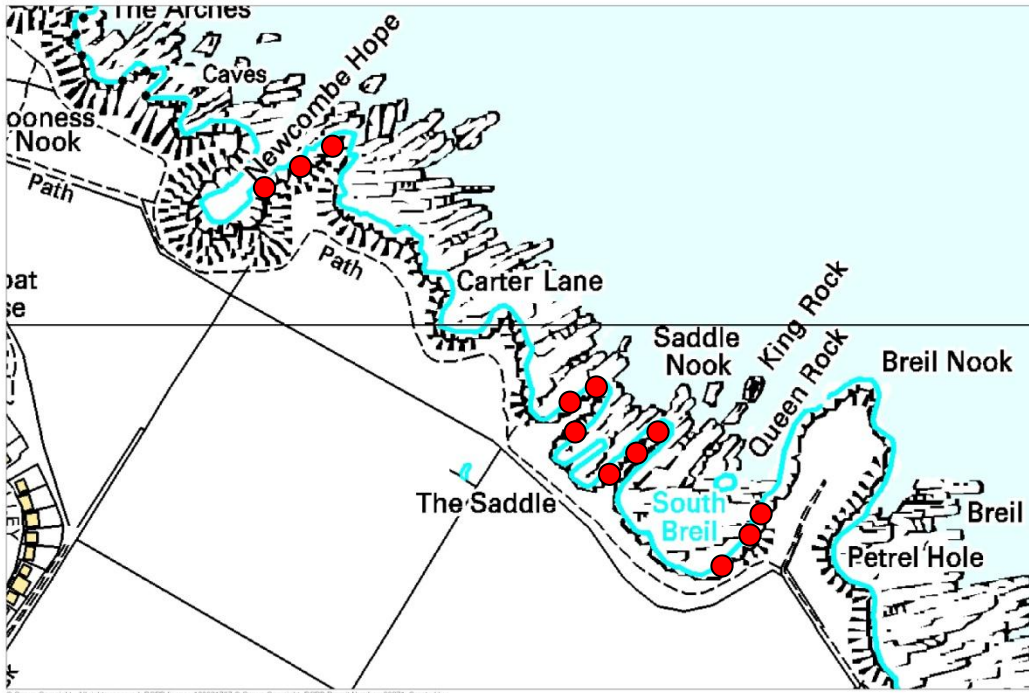


Plot 5: Between Newcombe and Breil

Observer: Rachel Cartwright

Dates monitored: 20th May – 18th August

Visit requirements: Once a week



Appendix 2

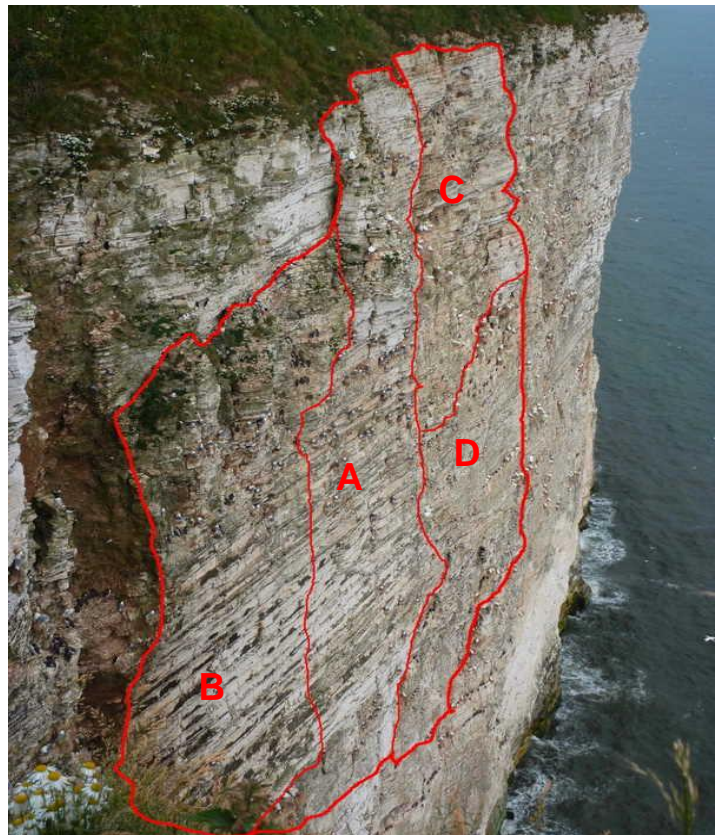
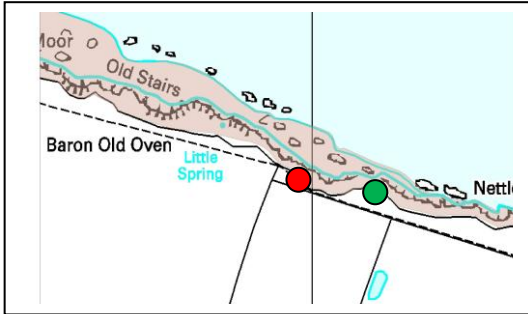
Kittiwake study-plot count locations:

Plot 1: Jubilee

Observer: Rachel Cartwright

Date of counts: 9th and 14th of June 2011

Number of visits: Two visits in June

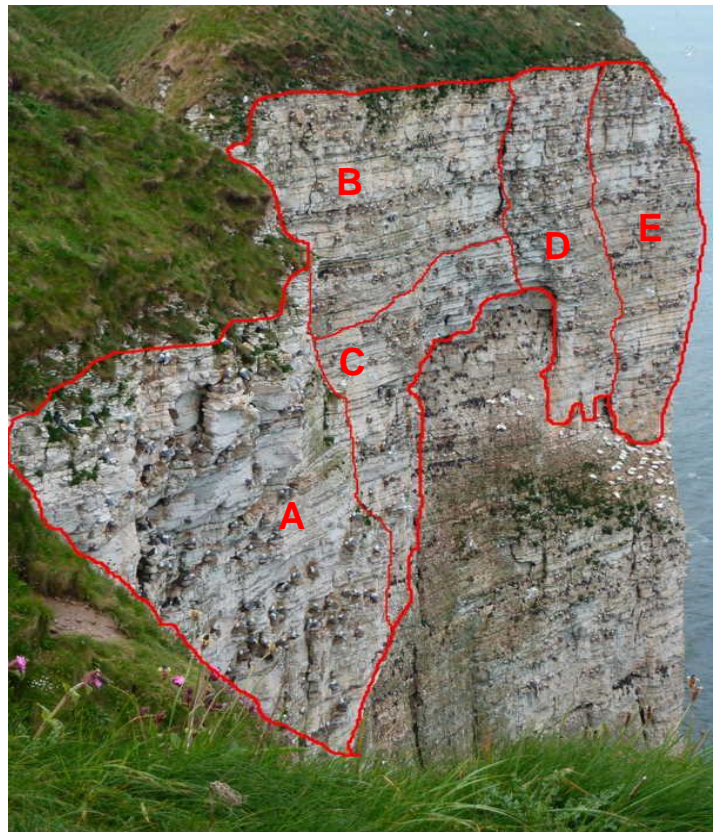
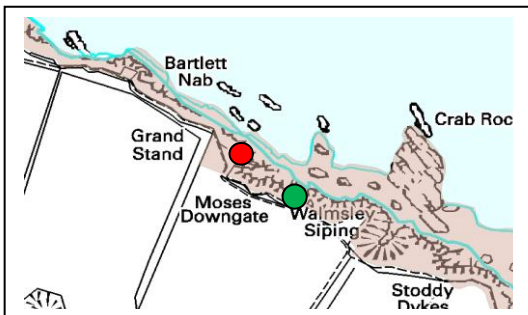


Plot 2: Grandstand North

Observer: David Aitken

Date of counts: 9th and 14th of June 2011

Number of visits: Two visits in June

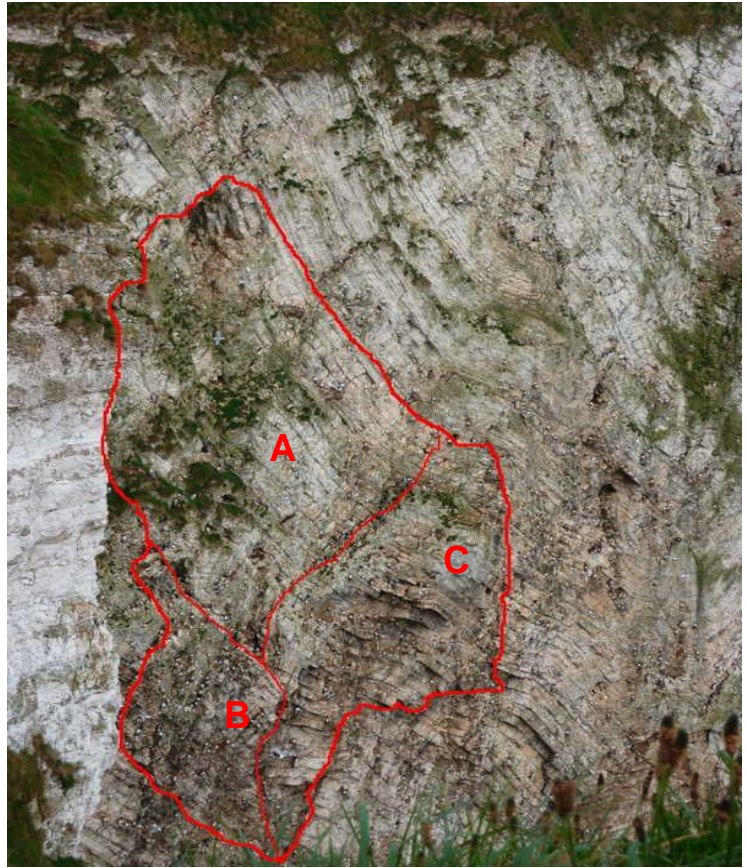
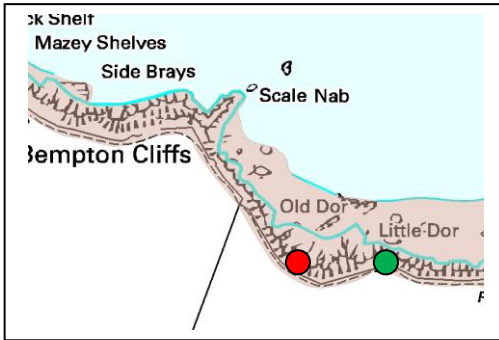


Plot 3: Old Dor

Observer: David Aitken

Date of counts: 9th and 14th of June 2011

Number of visits: Two visits in June

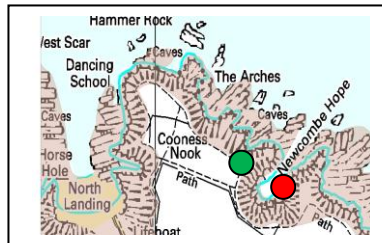


Plot 4: Newcombe

Observer: Rachel Cartwright

Date of counts: 9th and 14th of June 2011

Number of visits: Two visits in June

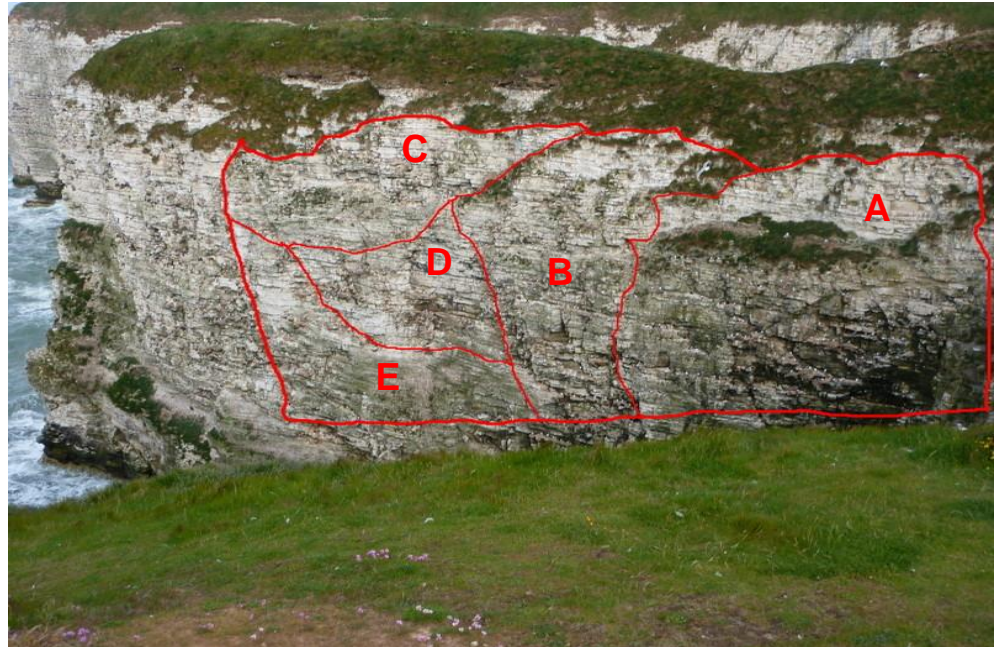
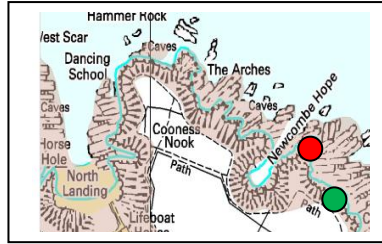


Plot 5: Back of Newcombe

Observer: David Aitken

Date of counts: 9th and 14th of June 2011

Number of visits: Two visits in June

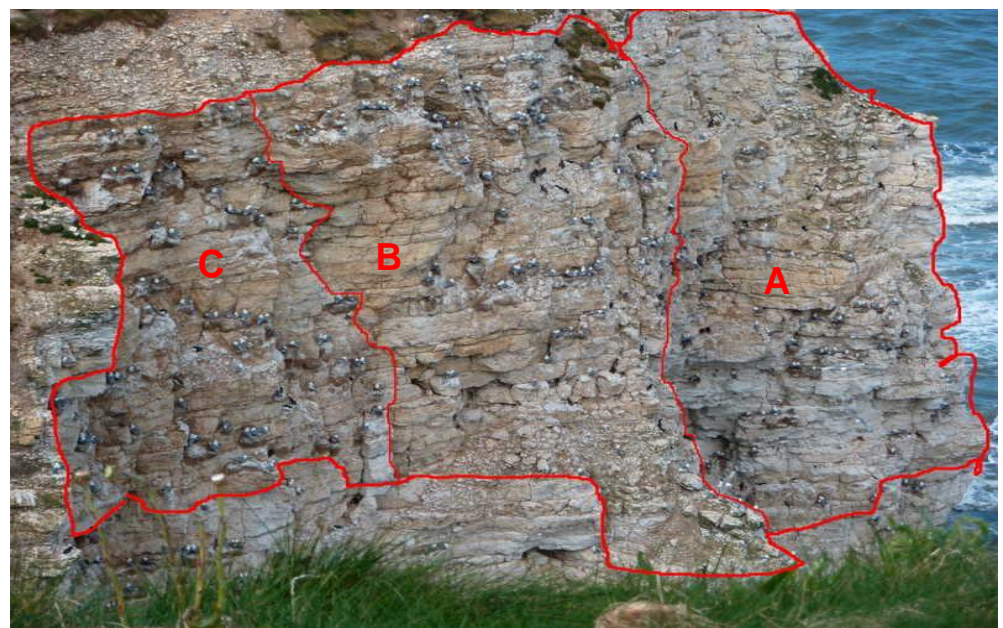
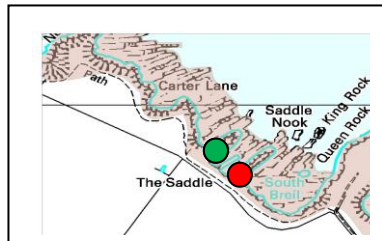


Plot 6: Saddle Nook

Observer: Rachel Cartwright

Date of counts: 9th and 14th of June 2011

Number of visits: Two visits in June

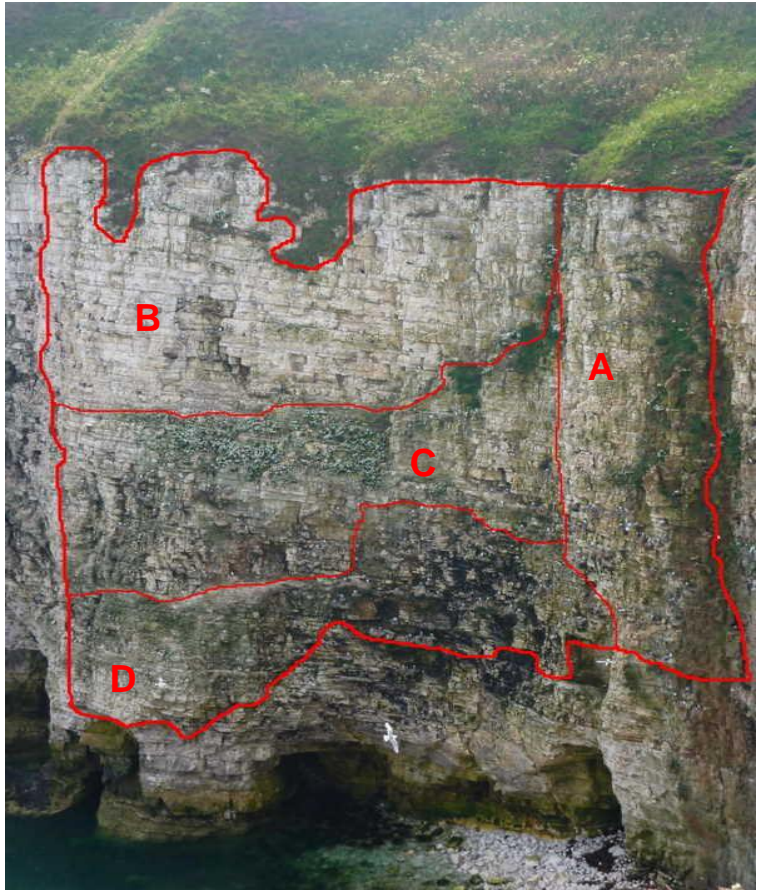
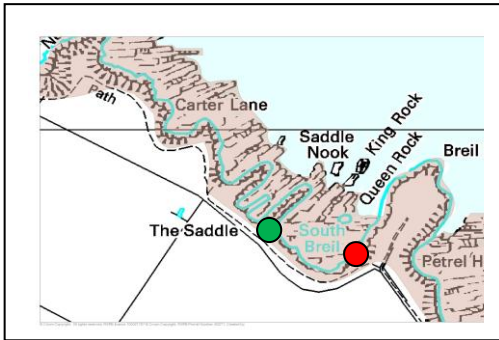


Plot 7: Breil Nook

Observer: Rachel Cartwright

Date of counts: 9th and 14th of June 2011

Number of visits: Two visits in June



Appendix 3

Table 12 – Kittiwake study-plot count data

| Plot 1: Jubilee | Sub-section Counts | Total Count | Cloud Cover | Rain | Sea Conditions | Swell Conditions | Light Conditions | Visibility |
|-------------------------|-------------------------------|----------------|----------------|------|-------------------|---------------------|---------------------|------------|
| 09/06/2011 0940-1016 | A-73 B-34 C-74 D-136 | 317 | 4/8 | 1 | 1 | 1 | 1 | 1 |
| 14/06/2011 1605-1640 | A-95 B-32 C-86 D-134 | 347 | 3/8 | 1 | 1 | 1 | 2 | 1 |
| | Average | 332 | | | | | | |

| Plot 2: Grandstand North | Sub-section Counts | Total Count | Cloud Cover | Rain | Sea Conditions | Swell Conditions | Light Conditions | Visibility |
|-----------------------------|---|----------------|----------------|------|-------------------|---------------------|---------------------|------------|
| 09/06/2011 1015-1033 | A-98 B-108 C-105 D-94 E-101 | 506 | 4/8 | 1 | 2 | 1 | 3 | 1 |
| 14/06/2011 0955-1025 | A-96 B-110 C-93 D-111 E-89 | 499 | 1/8 | 1 | 1 | 1 | 1 | 1 |
| | Average | 502.5 | | | | | | |

| Plot 3: Old Dor | Sub-section Counts | Total Count | Cloud Cover | Rain | Sea Conditions | Swell Conditions | Light Conditions | Visibility |
|-------------------------|-----------------------|----------------|----------------|------|-------------------|---------------------|---------------------|------------|
| 09/06/2011 0940-1000 | A-84 B-92 C-68 | 244 | 4/8 | 1 | 2 | 1 | 3 | 1 |
| 14/06/2011 1115-1130 | A-83 B-86 C-87 | 256 | 3/8 | 1 | 1 | 1 | 3 | 1 |
| | Average | 250 | | | | | | |

| Plot 4: Newcombe | Sub-section Counts | Total Count | Cloud Cover | Rain | Sea Conditions | Swell Conditions | Light Conditions | Visibility |
|-------------------------|-----------------------|----------------|----------------|------|-------------------|---------------------|---------------------|------------|
| 09/06/2011 1100-1121 | A-67 B-48 C-119 | 234 | 5/8 | 1 | 1 | 1 | 3 | 1 |
| 14/06/2011 1130-1147 | A-95 B-32 C-86 | 237 | 4/8 | 1 | 1 | 1 | 3 | 1 |
| | Average | 235.5 | | | | | | |

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| Plot 5: Back of Newcombe | Sub-section Counts | Total Count | Cloud Cover | Rain | Sea Conditions | Swell Conditions | Light Conditions | Visibility |
|-----------------------------|-----------------------|----------------|----------------|------|-------------------|---------------------|---------------------|------------|
| 09/06/2011 1427-1448 | A-95 B-50 C-64 | 209 | 6/8 | 1 | 2 | 2 | 3 | 1 |
| 14/06/2011 0820-0839 | A-92 B-49 C-64 | 205 | 1/8 | 1 | 2 | 1 | 1 | 1 |
| | Average | 207 | | | | | | |

| Plot 6: Saddle Nook | Sub-section Counts | Total Count | Cloud Cover | Rain | Sea Conditions | Swell Conditions | Light Conditions | Visibility |
|-------------------------|---------------------------------------|----------------|----------------|------|-------------------|---------------------|---------------------|------------|
| 09/06/2011 1410-1445 | A-73 B-104 C-61 D-45 E-36 | 319 | 6/8 | 1 | 1 | 1 | 3 | 1 |
| 14/06/2011 1010-1055 | A-76 B-93 C-65 D-45 E-38 | 320 | 4/8 | 1 | 1 | 1 | 2 | 1 |
| | Average | 319.5 | | | | | | |

| Plot 7: Breil Nook | Sub-section Counts | Total Count | Cloud Cover | Rain | Sea Conditions | Swell Conditions | Light Conditions | Visibility |
|-------------------------|------------------------------|----------------|----------------|------|-------------------|---------------------|---------------------|------------|
| 09/06/2011 1520-1540 | A-56 B-25 C-62 D-63 | 206 | 6/8 | 1 | 1 | 1 | 1 | 1 |
| 14/06/2011 0928-0956 | A-48 B-40 C-54 D-61 | 203 | 2/8 | 1 | 1 | 1 | 2 | 1 |
| | Average | 204.5 | | | | | | |