



# Flamborough and Filey Coast pSPA Seabird Monitoring Programme

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## 2016 Report



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## **SUMMARY**

The Flamborough and Filey Coast seabird monitoring programme is a partnership between the 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 are 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 population trends. For 2016 the results of seabird monitoring at Bempton/Flamborough and Filey have been consolidated into a single report covering the Flamborough and Filey Coast proposed Special Protection Area (pSPA).

The results inform the pSPA and underlying Site of Special Scientific Interest (SSSI) condition assessments and provide critical data to inform casework and the establishment of a Marine Protected Area (MPA) network.

In 2016 the seabird monitoring programme was successfully completed by a dedicated team of staff, volunteers, a Seabird Research Assistant who is funded by the National Lottery through the Heritage Lottery Fund and a residential seabird research volunteer.

Despite challenging weather and sea conditions throughout late May and early-June a Black-legged Kittiwake pSPA whole-colony count was successfully completed this year, the first since 2008. A total of 51,001 AON were recorded for the pSPA including 45,278 AON in the original Flamborough Head and Bempton Cliffs SPA.

An early season count of Atlantic Puffin at Flamborough and Bempton Cliffs was completed this year. Approximately 2300 Puffins were counted staging on the sea during the pre-breeding period.

Land based counts of Common Guillemot and Razorbill on sections of cliff at Flamborough Head suggest that the number of both species in that area has increased significantly since 2008.

The Razorbill study-plots produced a mean count of 643 individuals, a slight increase on the previous record high mean count of 638 in 2014 and in line with the general upward trend since the first counts in 2009.

The Common Guillemot study-plots produced a mean count of 1386 individuals, very close to the 2015 mean of 1389 which was the second highest mean count recorded since the study was set up (the highest being 1,454 in 2014).

Black-legged Kittiwake study-plots produced a mean count of 1837 AON; this is the third lowest mean recorded since 2009, although Kittiwake plot means have been more variable than those for Common Guillemot or Razorbill.

A feasibility study to assess the suitability of using digital photography, captured using a drone, to count breeding seabird populations was carried out by NIRAS Consulting Ltd., funded by DONG Energy UK. The results suggest that very accurate counts could be obtained, given suitable weather conditions, and a whole colony count would take up to 8 days of filming.

2016 was a fairly poor breeding season for most species. Poor weather, with frequent sea fret and days of Northerly winds plus associated 'big' seas in late May and early June may have affected birds ability to feed successfully and, in some species, attain breeding condition. Many Black-legged Kittiwakes, in particular, appeared to build nests but make no further effort to breed. Both auk species had lower than average productivity; plot-specific factors may have affected the results. Breeding numbers of both Herring Gull and Fulmar were down on the productivity plots, although Fulmar productivity held steady. Black-legged Kittiwake had their second worst productivity in the last 10 years. Gannet productivity was steady, although there were anecdotal reports of more pairs than usually not breeding on some plots. The productivity results were as follows:

- Northern Fulmar productivity – 63 pairs were monitored from which 38 chicks fledged, 0.60 chicks per apparently occupied site (AOS).
- Northern Gannet productivity – 265 nests were monitored from which 228 chicks fledged, 0.86 chicks per apparently occupied nest (AON).
- Razorbill productivity – 383 pairs were monitored from which 209 chicks fledged, 0.55 chicks per AOS.
- Common Guillemot productivity – 322 pairs were monitored from which 206 chicks fledged, 0.64 chicks per AOS.
- Black-legged Kittiwake productivity at Bempton/Flamborough – a remarkable 1019 nests were monitored from which 546 chicks fledged, 0.54 chicks per AON.
- Black-legged Kittiwake productivity at Filey – 231 nests were monitored from which 55 chicks fledged, 0.24 chicks per AON.
- Herring Gull productivity – 89 nests were monitored from which 64 chicks fledged, 0.72 chicks per AON.

The study of how European Shag use the pSPA throughout the year, intended to assess whether communal winter roosts support nationally significant numbers of wintering Shag at this site, continued. Ongoing investigations will help us build a clearer picture and understanding of how birds use the SPA year-round. Recording colour ring sightings helps researchers understand Shag dispersal between colonies on the East Coast.

Data for the Common Guillemot diet composition study was collected in the course of Common Guillemot productivity monitoring since a dedicated research assistant was not available this year. A total of 69 prey items were recorded, of which 73% were Clupeids, while 20% were Sandeel spp and 7% were other/unidentified.

There was no seabird tracking work carried out at Flamborough or Filey this year.

Recreational disturbance continues to be a threat to the breeding success of the colony. The Flamborough Head European Marine Site (EMS) partnership study of disturbance incidents across the SPA identified incidents involving jet skis, paragliders, civil aircraft and kayakers in 2016. A voluntary angling code of conduct for Bempton and Speeton Cliffs incorporating a closed season for cliff-top angling from 1 March to 30 September, developed with local angling groups and supported by review meetings, was considered a success. In 2016 a voluntary code of conduct for personal

watercraft was introduced and the Flamborough Head EMS Project Officer facilitated an agreement with the Chief Pilot of the Humberside Search and Rescue helicopter about training during the breeding season.

## **INTRODUCTION**

Flamborough and Filey Coast pSPA supports the largest mainland seabird colony in England, the only mainland gannetry in England and one of the largest mainland Black-legged Kittiwake colonies in the UK. The landward boundary of the pSPA generally follows the coast at Flamborough Head from South Landing in the south to Speeton in the North with an additional section from the forefront of Filey Brigg headland to Cunstone Nab. The seaward boundary extends approximately 2km parallel to the coast from the landward boundaries before moving seawards and extends approximately 2km into the marine environment (See maps at Appendix 1).

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

At the north end of the pSPA the Filey Brigg SSSI falls within the pSPA and the Gristhorpe Bay and Red Cliff SSSI is just to the north of the pSPA.

The Flamborough and Filey Coast pSPA qualifies under Article 4.2 of the Birds Directive for the following reasons:-

- It supports over 1% of the biogeographical population of four regularly occurring migratory species: Black-legged Kittiwake (*Rissa tridactyla*); Northern Gannet (*Morus bassanus*); Common Guillemot (*Uria aalge*); and Razorbill (*Alca torda*)
- It is used regularly by over 20,000 seabirds in any season: during the breeding season the area regularly supports over 200,000 seabirds.

Due to the importance of the seabird colony and level of site protection, Natural England and the RSPB proposed in 2008 a project to enable a baseline count, population monitoring and further research to collect data on the health of the colony and the Flamborough Head and Bempton Cliffs SPA and underpinning SSSIs. This proposal led to the establishment of the Flamborough Head and Bempton Cliffs seabird monitoring programme, which began with the 2009 seabird breeding season.

In 2009, a boat-based whole-colony count of the breeding seabird assemblage nesting on the cliffs between Filey and Cayton was carried out by the RSPB. The results suggested that the total number of breeding seabirds in the colony exceeded 20,000 birds, and as such, under the EU Birds Directive met SPA qualifying criteria. In response to this evidence the RSPB, with funding support from Natural England, completed five consecutive years of colony count data. The results were comparable with earlier counts enabling determination of population trends and comparison with results from the Flamborough Head and Bempton Cliffs SPA. This data supported the proposed extension of the existing SPA to create the pSPA.

The data collected by the enlarged Flamborough and Filey Coast seabird monitoring programme will inform the condition and management of the Flamborough and Filey Coast pSPA and underpinning SSSIs. In addition, the results will also inform current and new planning enquiries and environmental assessments e.g. the proposed Hornsea and Dogger Bank offshore wind arrays that

may have a detrimental impact on the features of the designated sites. It is also hoped that seabird tracking data collected from the colony will inform potential new offshore MPAs.

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

The key aims of the seabird monitoring programme, and how they are currently implemented, are as follows:-

- **Understanding variation and trends in seabird productivity**  
Fulmar, Gannet, Razorbill, Guillemot, Kittiwake and Herring Gull plots have been monitored for breeding productivity annually since 2009.
- **Understanding population numbers and trends**  
Razorbill, Guillemot and Kittiwake study-plot counts have been carried out annually since 2009.  
A whole-colony census was carried out in 2008.  
Single species colony counts are carried out every year on a rotating basis with a view to, where resources and conditions permit, counting each species at least once every five years
- **Understanding the relationship between the colony and the larger marine environment**  
As the relevant technology improves we are also working to better understand foraging behaviours of birds breeding in the colony. We hope to identify 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. This includes ongoing seabird tracking, currently focused on Black-legged Kittiwake, and monitoring of Common Guillemot diet composition.
- **Understanding how RSPB Bempton Cliffs relates to wider pSPA 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? Currently recreational disturbance is monitored and recorded by Bempton Cliffs and others on an ad-hoc basis. For those activities that are of particular concern, we hope to develop specific research proposals which assess level of impact

The programme of research is coordinated by the RSPB Bempton Cliffs seabird monitoring team lead by the reserve Warden, the Seabird Research Officer, who is funded by the National Lottery, through the Heritage Lottery Fund, and a team of dedicated volunteer seabird researchers including members of Flamborough Bird Observatory and Filey Bird Observatory & Group.

The results of the 2016 Flamborough and Filey Coast seabird monitoring and research programme are detailed in this report.

## **Background**

Bird population data has been collected at Flamborough and Bempton since at least 1969. In 1969, all species but Shag and Puffin were counted as part of the 'Operation Seafarer' national seabird census. In 1987, all species were counted during the 'Seabird Colony Register' census. All species were counted again in 2000 for 'Seabird 2000' and again in 2008. Whole-colony counts of Northern Gannet were completed in 1970-77, 1981-83, 1985-95, 1997-99, 2002, 2004-05, 2008-09, 2012 and again in 2015. In addition, whole-colony counts for Herring Gull were completed in 2010 and 2014 and for European Shag in 2014.

Before the commencement of the Flamborough Head and Bempton Cliffs seabird monitoring programme in 2009 breeding success data for Bempton/Flamborough was collected for Gannet during 1973-79, 1988-94, 1998, 2005-06 and 2008. Kittiwake breeding success has been monitored continuously since 1986. Razorbill productivity was monitored in 2005-06. Guillemot productivity was monitored in 1991-95, 1998 and 2005-06. Fulmar and Herring Gull breeding success were monitored for the first time in 2009, and is ongoing. Unfortunately, it is not possible to monitor breeding success for Puffin at this colony and only limited monitoring of European Shag is possible depending on nest site use.

At Filey, a whole-colony count was carried out in 1986 (Williams 1996). In 2002 the Seabird 2000 census team identified a significant seabird colony nesting on the cliffs to the north of Filey Bay (Mitchell et al 2004). The significance of this colony came to light in 2008 in response to large numbers of Razorbill and Guillemot being caught and killed in gill nets set by fishermen in Filey Bay. It was recognised that birds caught in the nets could have originated from either the Flamborough/Bempton or Filey colonies. Unfortunately, at that time there was little current data about the state of the colony at Filey.

## **Raw Data**

Access to the productivity and population monitoring data collected during the seabird monitoring programme is available to researchers and conservation organisations by arrangement with the RSPB Bempton Cliffs office.



## **METHODS**

The Flamborough and Filey Coast seabird monitoring programme follows the methods and guidelines set out in the '*Seabird monitoring handbook for Britain and Ireland*' (Walsh et al., 1995) – ("the Handbook"). The Handbook summarises census and productivity monitoring techniques for seabirds relevant to colonies in Britain and Ireland. The appropriate methods are followed for each species at this colony taking into account the resources available and the physical geography of the colony. Please refer to the Handbook for more details on methodologies for each species and survey undertaken.

### **Productivity monitoring**

Productivity monitoring was completed for the eighth year running for six of the eight breeding seabird species found in the colony: Northern Fulmar, Northern Gannet, Razorbill, Common Guillemot, Black-legged Kittiwake and Herring Gull. Unfortunately, it is not possible to monitor Atlantic Puffin at this colony. In 2016 a small number European Shag nests at Flamborough Head were monitored for the second time.

All productivity monitoring was based on marking apparently occupied sites (AOSs) or apparently occupied nests (AONs) on a laminated photograph of the relevant plot. For a detailed description of the relevant methodology, please refer to the section of the Handbook for the relevant species.

The productivity monitoring plots were originally selected when the Flamborough Head and Bempton Cliffs seabird monitoring programme was established in 2009. Plots were selected with a view to providing, where possible, a sample size in the region of 50 AOS or AON per plot and a total sample in excess of 250 AOS/AON for each species while providing safe vantage points for the observer with little or no disturbance to breeding seabirds. In 2011 five additional monitoring plots for Black-legged Kittiwake were established at Filey Cliffs; in 2014 one of these was dropped and an additional monitoring plot added on Filey Brigg. Indicative maps of the productivity plot locations are included in Appendix 2.

This year, as well as presenting species productivity data by aggregating the results of each plot (total chicks fledged / total nests (or sites) monitored) we also present productivity calculated as the mean of the individual plot results for each species.

#### **Northern Fulmar (*Fulmarus glacialis*)**

Five productivity plots were monitored. Plots are photographed in early May and AOSs are marked on the laminated photographs over 3 visits over the late May/early June period. A final visit is made in mid-August and large chicks present at that time are assumed to fledge.

#### **Northern Gannet (*Morus bassanus*)**

Five productivity plots were monitored between late April and late October. Plots are photographed in mid to late April and up to 50 or 60 AONs are marked on the laminated photographs. The plots are then visited every 7 – 10 days. Average visit time early in the season is 2 – 3 hours per plot, but reduces once chicks get larger and are more visible. Presence of an egg or chick is recorded (if seen) each visit.

### **Razorbill** (*Alca torda*)

Eight productivity plots were monitored between late April and the end of July. Plots are photographed in late April/early May and up to 50 to 70 AOSs are marked on the laminated photographs over two visits. Plots are then visited every third day. Additional sites may be added over the course of the season, especially if it has been hard to get 50 AOSs. Presence of an egg or chick is recorded (if seen) each visit. Average visit time early in the season is 2 – 2.5 hours, but reduces once chicks get larger and are more visible.

### **Common Guillemot** (*Uria aalge*)

Six productivity plots were monitored between late April and end of July. Plots are photographed in late April/early May and up to 50 to 60 AOSs are marked on the laminated photographs over two visits. Plots are then visited every third day. Additional sites may be added over the course of the season, especially if it has been hard to get 50 AOSs. Presence of an egg or chick is recorded (if seen) each visit. Average visit time early in the season is 2 – 2.5 hours, but reduces once chicks get larger and are more visible.

### **Black-legged Kittiwake** (*Rissa tridactyla*)

Twenty-five productivity plots were monitored between May and August, 21 - 1058 AONs - across Bempton and Flamborough and five - 257 AONs - at Filey. Plots are photographed in early to mid May and up to 50 or 60 AONs are marked on the laminated photographs. Plots are then visited every week, ideally on the same day so visits are 7 days apart. Presence and number of eggs or chicks at each AON is recorded (if seen) each visit. Volunteers are also asked to record chick size using standard codes, but not all do. Average visit time varies according to the volunteer, but 1 to 1.5 hrs per visit is probably typical.

### **Herring Gull** (*Larus argentatus*)

Five productivity plots were monitored between May and August. Two of the plots are linear and include all safely observable nests found on a defined stretch of cliff. One linear plot is at Bempton and one is at Flamborough. Plots are photographed around early/mid May and AONs are marked on the laminated photographs over two visits. Additional AONs may be added over the course of the season. Plots are then visited every week, ideally on the same day so visits are 7 days apart. Presence and number of eggs or chicks at each AON is recorded (if seen) each visit. Volunteers are also asked to use size codes for chicks. Average visit time varies according to the volunteer, but 1 to 2 hrs per visit is probably typical; the linear plots which require a walk from nest to nest.

### **European Shag** (*Phalacrocorax aristotelis*)

In 2016 informal productivity monitoring was carried out on 7 European Shag nests at Breil Nook (6) and Saddle Nook (1) Flamborough alongside the nearby auk productivity monitoring plots. These nests were not selected at random – being the nests it was possible to see from existing seabird monitoring points – and 4 of them were in recesses in the cliff and not always possible to see clearly. The nest sites were marked on laminated photographs of the cliffs and checked approximately weekly from 30 April until the end of July. No more than 30 minutes per visit was spent. Presence and number of eggs or chicks (to the extent visible) were recorded each visit.

## **Whole-colony counts**

### **Atlantic Puffin (*Fratercula arctica*) at Flamborough/Bempton**

Given the impossibility of monitoring the population or productivity of cliff nesting Atlantic Puffins the species was not included in the Bempton/Flamborough (now Flamborough and Filey Coast) seabird monitoring programme. However, after the species was Red Listed it was decided to attempt to monitor the breeding population to the extent possible. Advice was sought from Puffin expert Professor Mike Harris, who recommended that we count adults on the sea when large numbers of birds return en masses pre-breeding season (M Harris 2016 pers comm.). Although this cannot be considered to provide an accurate census, it does provide an index with changes from year to year can be compared. Accordingly, in March 2016 RSPB Bempton Cliffs viewpoint volunteers, who are out watching the sea every day, were asked to inform staff as soon as large numbers of Puffins appeared staging on the sea. The first reports were in the morning of 22 March. Based on the advice received, a team of two RSPB staff with extensive seabird monitoring experience walked the distance from High Stacks at Flamborough Head (just south of the lighthouse) to the end of Speeton Cliffs before Hunmanby Gap – approximately 15 kilometers – over the afternoon of 22 March and 23 March 2016. Using visual markers the sea was divided into sections and the number of Puffins on the sea in each section was counted using binoculars and/or telescopes as appropriate. The length of the cliffs to be covered meant that only one count was possible over two days.

### **Black-legged Kittiwake (*Rissa tridactyla*)**

A whole-colony count of Black-legged Kittiwake apparently occupied nests (AONs) was completed over the course of the breeding season. Boat-based counts of parts of the colony by RSPB staff assisted by the Emmerson family of Flamborough and the hire of their fishing coble took place on 22 May, 12 June, 21 June and 22 June. Land based counts of parts of the colony were made by RSPB staff on 19 and 24 May and 8 June. Survey methods followed the methodologies and guidelines set out in the Handbook. For the purpose of boat (and land) based surveys the Bempton to Flamborough section of the Flamborough and Filey Coast pSPA is divided into 178 sub-sections, comprising 15km of coastline. These subsections have been marked on a set of laminated photographs which cover the length of the cliffs. Black-legged Kittiwake nests are dispersed along the full length of the colony and on Filey Cliffs

As part of the whole-colony count a count of the Black-legged Kittiwake at Filey was completed on 22 June and took approximately 5 hours to complete. It was a boat-based survey and was undertaken by RSPB staff with assistance from Filey Sailing Club and the use of their RIB. Survey methods followed the methodologies and guidelines set out in the Handbook. The Filey colony is divided into five recording areas, taken from the JNCC Seabird Monitoring Programme (SMP) website; within these recording areas, 24 sub-sections have been established and marked on photographs of the cliffs to assist the counts.

## **Study-plot counts**

The size and nature of the Flamborough and Filey Coast colony mean that annual whole colony population monitoring is not practicable. Accordingly, study-plots for population monitoring of Razorbill, Common Guillemot and Black-legged Kittiwake were established at Bempton and Flamborough in 2009. Plots were selected to be dispersed through the colony as randomly as

possible given the need to provide a safe vantage point and minimise disturbance to breeding birds. Counts have been conducted each year since 2009. In 2011 counts of Razorbill and Common Guillemot were abandoned due to an early breeding season.

For each species the same plots are used each year as required by the Handbook; plot boundaries, based on clear cliff features, are marked on laminated photographs of the relevant area of cliff. Indicative maps of the study-plot locations at Bempton and Flamborough are included in Appendix 3.

The Handbook suggests that study-plot counts are not recommended for general use when counting Black-legged Kittiwake, as population changes may not be detected due to movements within the colony or colony extensions, or losses rather than through changes of density across the colony. However, as Flamborough and Bempton holds one of the largest mainland populations in the UK, it is important that trends are monitored.

### **Razorbill study-plot counts**

Seven study-plots were counted between 0800 and 1600 on four occasions (one count was missed due to illness) during the period from 1 June to 22 June.

### **Common Guillemot study-plot counts**

Seven study-plots were counted between 0800 and 1600 on four occasions (one count was missed due to illness) during the period from 1 June to 22 June.

### **Black-legged Kittiwake study-plot counts**

Seven study-plots were counted between 0800 and 1600 on at least two occasions during the period from 1 June to 22 June.

### **Common Guillemot, Razorbill and Herring Gull land based counts at Flamborough Head**

As part of an anticipated whole-colony count of Common Guillemot and Razorbill, which was not completed due to poor weather and sea conditions during late May and June, 39 of the cliff sub-sections at Flamborough Head used for whole-colony counts were counted from the land using binoculars or a telescope as required. This was done using the same marked cliff photographs that are used for boat-based colony counts.

### **Common Guillemot diet study**

In 2016 only casual diet observations in the course of productivity or other monitoring were recorded. Details (date, time, location) were noted on a recording sheet each time an adult bird was observed returning with a fish. Each fish was identified as Clupeid, Sandeel or Other/Unidentified and assigned to a size category (S, M, L). Identification and sizing was done using an identification guide created for the RSPBs STAR project and modified for this study. Razorbill productivity monitors were also encouraged to record feeds observed, including the number of prey items and species/size information for each item.

### **European Shag roost counts**

The investigation of the use of the Shag roost identified in 2014 at Breil Nook, Flamborough Head is ongoing.

The aims of the project are to:-

- Determine whether Shag recorded on Flamborough Bird Observatory (FBO) seawatches are from local roost sites
- Undertake independent roost counts to assess population size throughout the year
- Use findings to help inform conservation status of Shag within the pSPA and SSSI

Land based counts by RSPB staff of the communal Shag roost at Breil Nook, Flamborough are conducted monthly over the autumn and winter months. The counts are made from specified observation points either side of Breil Nook to enable an observer to view from a safe location and to be able to see as much of the communal roost as possible. Counts are made from an hour before dusk until dark, using binoculars and telescope, recording all birds already present and birds that subsequently arrive into the roost. On the days that counts are made the number of Shag recorded on the FBO seawatch is also noted. In addition, darvic colour-ring numbers are recorded, where practicable, and reported to the Centre for Ecology & Hydrology's winter Shag distribution project.

### **Seabird tracking**

There was no seabird tracking work carried out at Flamborough or Filey this year.

### **Seabird colony count feasibility study using drone-captured digital imagery**

A feasibility study was carried out to assess whether a drone can be used to capture digital images of individual breeding birds and whether this methodology could be used to carry out a whole-colony count without causing any significant disturbance to the birds. The study was undertaken by NIRAS Consulting Ltd, funded by DONG Energy UK. The pilot, Simon Strickland, of Dragon's Eye Filming, has a CAA operating license and was supervised by NIRAS drone-specialist Soren Rollin. The RSPB provided ground support and secured consent from Natural England for the feasibility flights. The drone used by NIRAS was a high specification octocopter, a Mikrokopter OKTO XL, capable of carrying higher quality photographic equipment (a Canon EOS M3 with 22mm lens) than standard commercially available drones. The pilot maintained direct sight of the drone at all times to comply with CAA requirements. The test flights were carried out on 29 and 30 June.

### **Recreational disturbance**

The European Marine Site (EMS) study into recreational activity has identified recreational disturbance as an ongoing issue across the pSPA. Recreational disturbance can include: anglers descending the cliffs to access the foreshore; cliff-top angling during the breeding season; boat, jet ski and kayak use; paragliders, powered hang gliders and low flying aircraft. Wherever possible, disturbance events are recorded and photographed. The information is passed to the EMS project

officer, Heather Davison, who is gathering data on recreational disturbance across the pSPA 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 pSPA. A future challenge is to determine how to assess the impact of these activities on the breeding seabird assemblage and then manage this impact.

## **RESULTS**

### **Productivity monitoring**

#### **Northern Fulmar (*Fulmaris glacialis*)**

Overall productivity for Fulmar averaged 0.59 chicks per pair. A total of 63 AOSs were monitored across five plots, from which 38 chicks successfully fledged (Table 1, Figure 1). The mean productivity for Fulmar recorded between 1986-2005 from between thirteen and forty-one colonies annually was 0.41 chicks per pair, (Mavor et al. 2008). Mean Fulmar productivity (calculated for each year as the mean of productivity plot results) at Bempton-Flamborough for the years 2009 – 2015 is 0.55.

Table 1 : Fulmar productivity 2016

| Plot                                     | AOS       | Fledged chicks | Productivity ch/pr |
|--|-----------|----------------|--------------------|
| New Roll-up                              | 3         | 2              | 0.67               |
| Old Dor                                  | 26        | 19             | 0.73               |
| Newcombe                                 | 9         | 6              | 0.67               |
| Breil Nook                               | 12        | 5              | 0.42               |
| Swineshaw Hole                           | 13        | 6              | 0.46               |
| <b>Aggregate productivity</b>            | <b>63</b> | <b>38</b>      | <b>0.60</b>        |
| <b>Mean of plot productivity ch/pair</b> |           | <b>0.59</b>    | <b>±0.0625 SE</b>  |

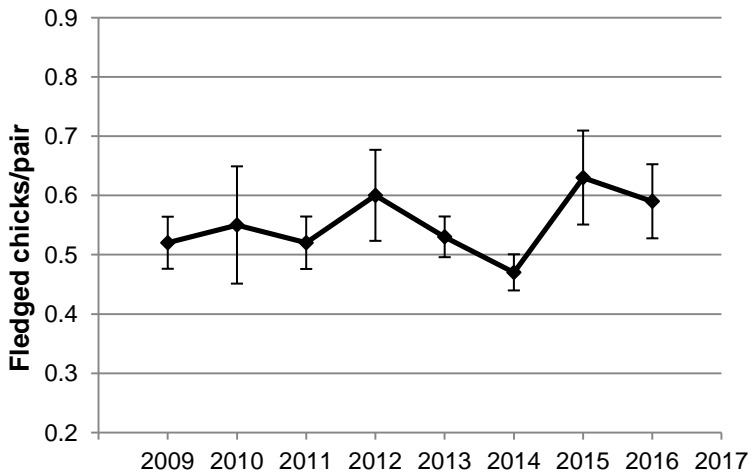


Fig. 1: Fulmar productivity 2009 – 2016, mean of plot productivity results plus/minus SE.

#### **Northern Gannet (*Morus bassanus*)**

Overall productivity for Northern Gannet averaged 0.86 chicks per pair. A total of 265 AONs were monitored across five plots, from which 228 chicks successfully fledged (Table 2, Figures 2 and 3). The mean productivity for Northern Gannet recorded between 1986-2005 from between three and six colonies annually was 0.69 chicks per pair, (Mavor et al. 2008). Mean Northern Gannet productivity (calculated for each year as the mean of productivity plot results) at Bempton-Flamborough for the years 2009 – 2015 is 0.83.

Table 2: Northern Gannet productivity 2016

| Plot                                     | AOS        | Fledged chicks | Productivity ch/pr |
|--|------------|----------------|--------------------|
| Jubilee Corner                           | 53         | 45             | 0.85               |
| Nettletrip                               | 52         | 46             | 0.88               |
| Staple Newk 1                            | 53         | 45             | 0.85               |
| Staple Newk 2                            | 55         | 46             | 0.84               |
| Staple Newk 3                            | 52         | 46             | 0.88               |
| <b>Aggregate productivity</b>            | <b>265</b> | <b>228</b>     | <b>0.86</b>        |
| <b>Mean of plot productivity ch/pair</b> |            | <b>0.86</b>    | <b>±0.0100 SE</b>  |

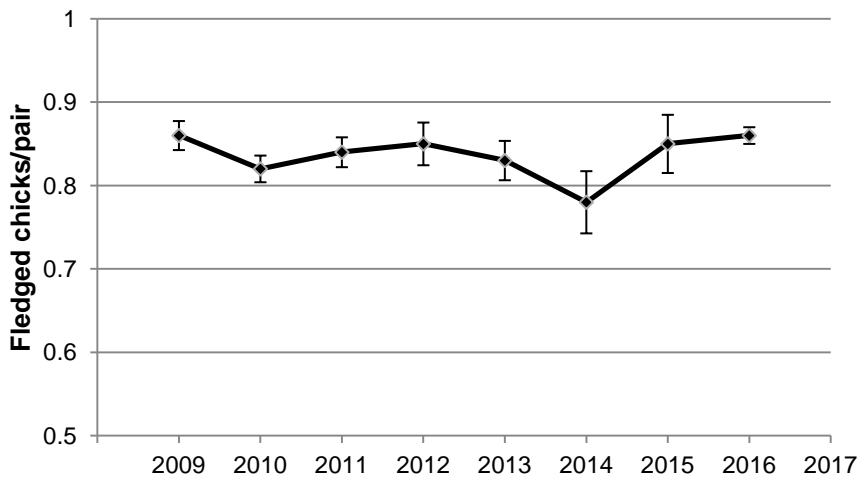


Fig. 2: Northern Gannet productivity 2009 – 2016, mean of plot productivity results plus/minus SE.

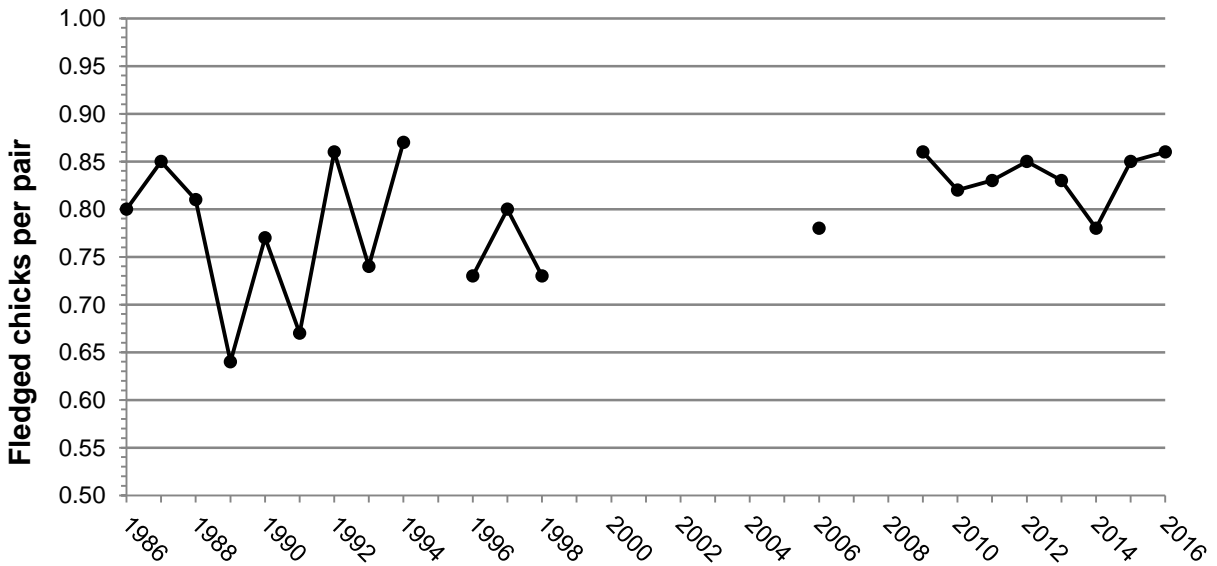


Fig. 3: Northern Gannet productivity 1986 to 2016, aggregate productivity.



**Razorbill (*Alca torda*)**

Overall productivity for Razorbill averaged 0.50 chicks per pair. A total of 383 AOSs were monitored across eight plots, from which 209 chicks successfully fledged (Table 3, Figures 4 and 5). The mean productivity for Razorbill recorded between 1986-2005, from between one and seven colonies annually, was 0.65 chicks per pair (Mavor et al. 2008). Mean Razorbill productivity (calculated for each year as the mean of productivity plot results) at Bempton-Flamborough for the years 2009 – 2015 is 0.65.

Table 3: Razorbill productivity 2016

| Plot                                     | AOS        | Fledged chicks | Productivity ch/pr |
|--|------------|----------------|--------------------|
| Grandstand Gully                         | 17         | 4              | 0.24               |
| Grandstand North                         | 55         | 25             | 0.45               |
| Grandstand South                         | 28         | 7              | 0.25               |
| Newcombe                                 | 68         | 41             | 0.60               |
| Back of Newcombe                         | 53         | 34             | 0.64               |
| Saddle Nook                              | 56         | 27             | 0.48               |
| Breil Nook                               | 55         | 36             | 0.65               |
| Swineshaw Hole                           | 51         | 35             | 0.69               |
| <b>Aggregate productivity</b>            | <b>383</b> | <b>209</b>     | <b>0.55</b>        |
| <b>Mean of plot productivity ch/pair</b> |            | <b>0.50</b>    | <b>±0.0633 SE</b>  |

It is notable that the four plots with the lowest productivity were all affected by corvid activity. A Carrion Crow pair nested again on the Saddle Nook plot and regular instances of Carrion Crow predation of Razorbill eggs were observed in the vicinity of the Grandstand viewpoint at the RSPB Bempton Cliffs reserve. It is therefore possible that productivity on the productivity plots is not typical of the larger colony.

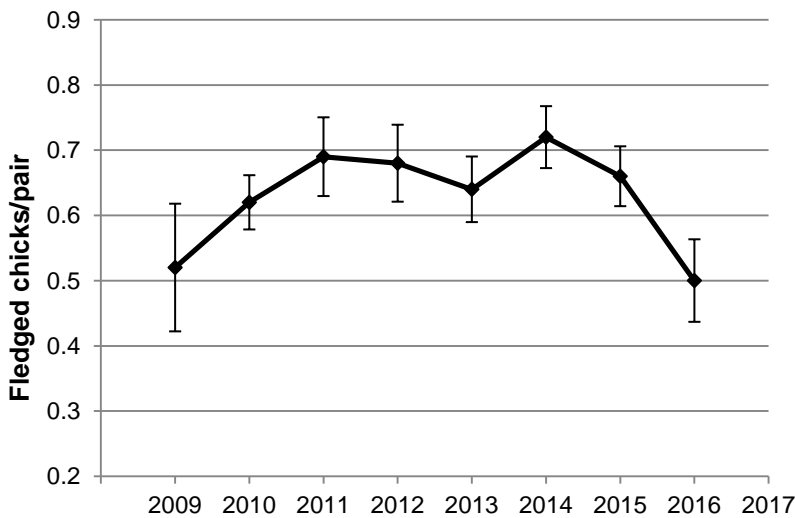


Fig. 4: Razorbill productivity 2009 – 2015, mean of plot results plus/minus SE.

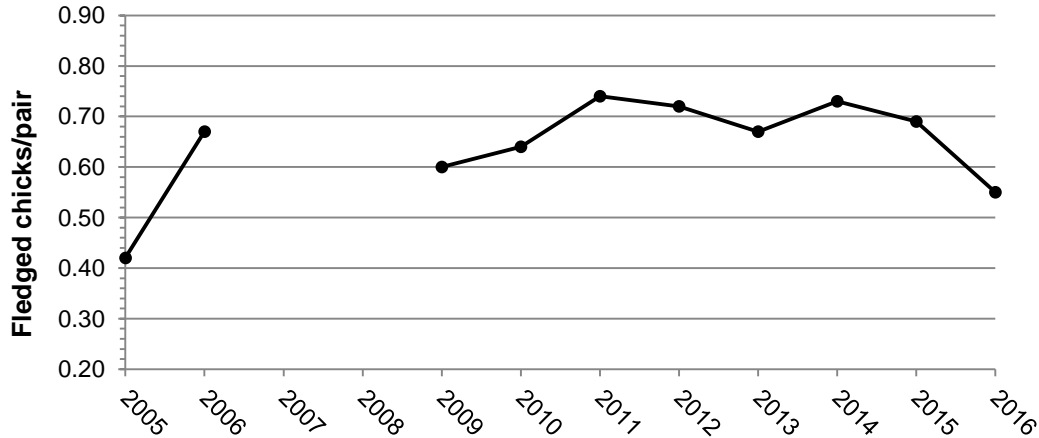


Fig. 5: Razorbill productivity 2005 – 2016, aggregate productivity.

### Common Guillemot (*Uria aalge*)

Overall productivity for Guillemot averaged 0.64 chicks per pair. A total of 322 AOSs were monitored across six plots, from which 206 chicks successfully fledged (Table 4, Figures 6 and 7). The mean productivity for Common Guillemot recorded between 1986-2005 from between three and fifteen colonies annually was 0.69 chicks per pair (Mavor et al. 2008). Mean Common Guillemot productivity (calculated for each year as the mean of productivity plot results) at Bempton-Flamborough for the years 2009 – 2015 is 0.77.

Table 4: Common Guillemot productivity 2016

| Monitoring site                          | AOS        | Fledged chicks | Productivity ch/pr |
|--|------------|----------------|--------------------|
| Nettletrip                               | 50         | 28             | 0.56               |
| Grandstand North                         | 58         | 33             | 0.57               |
| Grandstand South                         | 50         | 32             | 0.64               |
| Carter Lane 1                            | 56         | 35             | 0.63               |
| Carter Lane 2                            | 55         | 41             | 0.75               |
| Breil Nook                               | 53         | 37             | 0.70               |
| <b>Aggregate productivity</b>            | <b>322</b> | <b>206</b>     | <b>0.64</b>        |
| <b>Mean of plot productivity ch/pair</b> |            | <b>0.64</b>    | <b>±0.0295 SE</b>  |

As in the case of last year Common Guillemot productivity is lowest on the Nettletrip plot, where prospecting Northern Gannets were regularly observed on Guillemot breeding ledges. This year Grandstand North, another plot on which Gannet numbers are increasing, also had lower than average productivity.

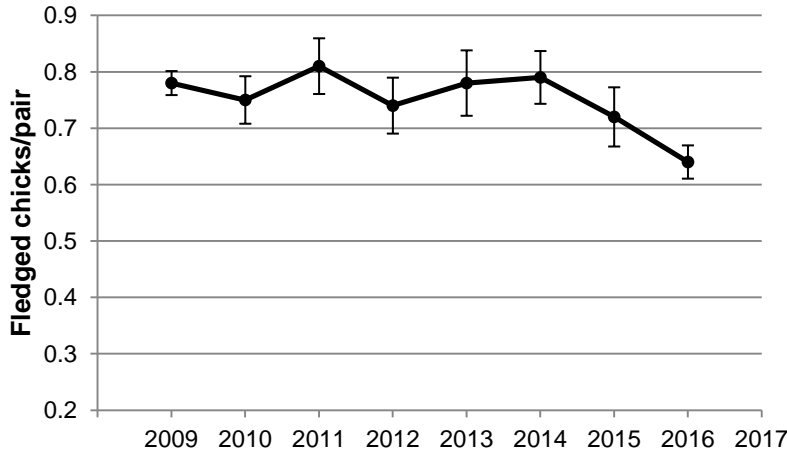


Fig. 6: Common Guillemot productivity 2009 – 2015, mean of plot results plus/minus SE.

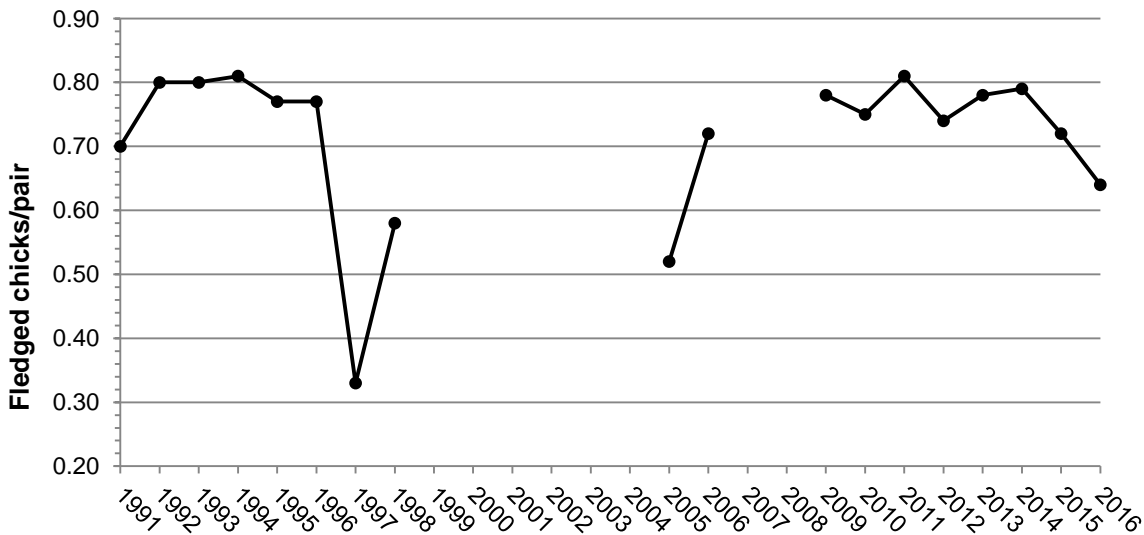


Fig. 7: Common Guillemot productivity 1991 – 2015, aggregate productivity.

### Black-legged Kittiwake (*Rissa tridactyla*) – Bempton and Flamborough

Overall productivity for Kittiwake at Bempton and Flamborough averaged 0.54 chicks per pair. A total of 1019 AONs were monitored across 20 plots, from which 546 chicks successfully fledged (Table 5, Figures 8 and 9). The mean productivity for Kittiwake recorded between 1986-2005 from between thirty and sixty-one colonies annually was 0.69 chicks per pair (Mavor et al. 2008). Mean Kittiwake productivity (calculated for each year as the mean of productivity plot results) at Bempton-Flamborough for the years 2009 – 2015 is 0.83.

Table 5: Bempton/Flamborough Black-legged Kittiwake productivity 2016

| Plot                  | AOS | Fledged chicks | Productivity ch/pr |
|-----------------------|-----|----------------|--------------------|
| Jubilee Far           | 50  | 25             | 0.50               |
| Bartlett Nab Near     | 51  | 35             | 0.69               |
| Bartlett Nab Far      | 50  | 16             | 0.32               |
| Grandstand North Near | 50  | 23             | 0.46               |

Flamborough and Filey Coast pSPA Seabird Monitoring Programme 2016

|  |             |            |                        |
|--|-------------|------------|------------------------|
| Grandstand North Near Edge               | 50          | 14         | 0.28                   |
| Grandstand North Mid                     | 50          | 38         | 0.76                   |
| Grandstand North Far Edge                | 54          | 31         | 0.57                   |
| Grandstand North Low                     | 50          | 20         | 0.40                   |
| Old Dor                                  | 50          | 28         | 0.56                   |
| Newcombe                                 | 50          | 8          | 0.16                   |
| Back of Newcombe                         | 61          | 28         | 0.46                   |
| Carter Lane 1                            | 50          | 12         | 0.24                   |
| Carter Lane 2                            | 50          | 36         | 0.72                   |
| Saddle Nook 1                            | -           | -          | -                      |
| Saddle Nook 2                            | 50          | 43         | 0.86                   |
| Saddle from Breil                        | 50          | 34         | 0.68                   |
| Breil Nook North                         | 50          | 40         | 0.80                   |
| Breil Nook South                         | 50          | 36         | 0.72                   |
| Back of Breil Nook                       | 53          | 30         | 0.57                   |
| Swineshaw Hole                           | 50          | 22         | 0.44                   |
| Lighthouse                               | 50          | 27         | 0.54                   |
| <b>Aggregate productivity</b>            | <b>1019</b> | <b>546</b> | <b>0.54</b>            |
| <b>Mean of plot productivity ch/pair</b> |             |            | <b>0.54 ±0.0436 SE</b> |

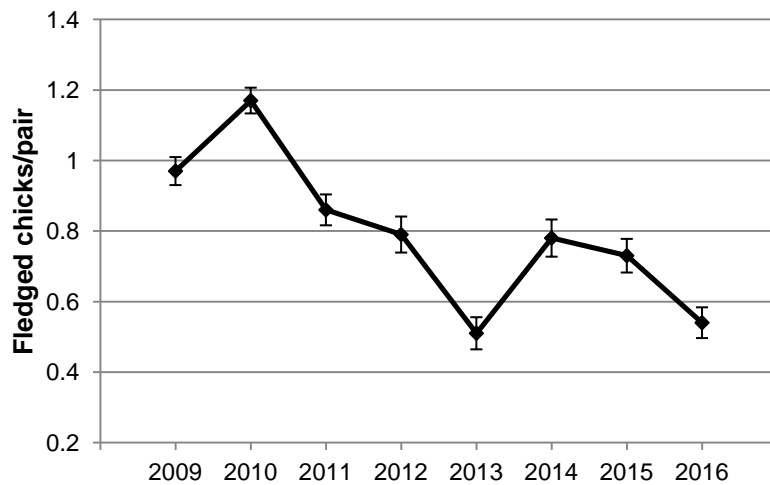


Fig. 8: Bampton/Flamborough Kittiwake productivity 2009 – 2016, mean of plot results plus/minus SE.

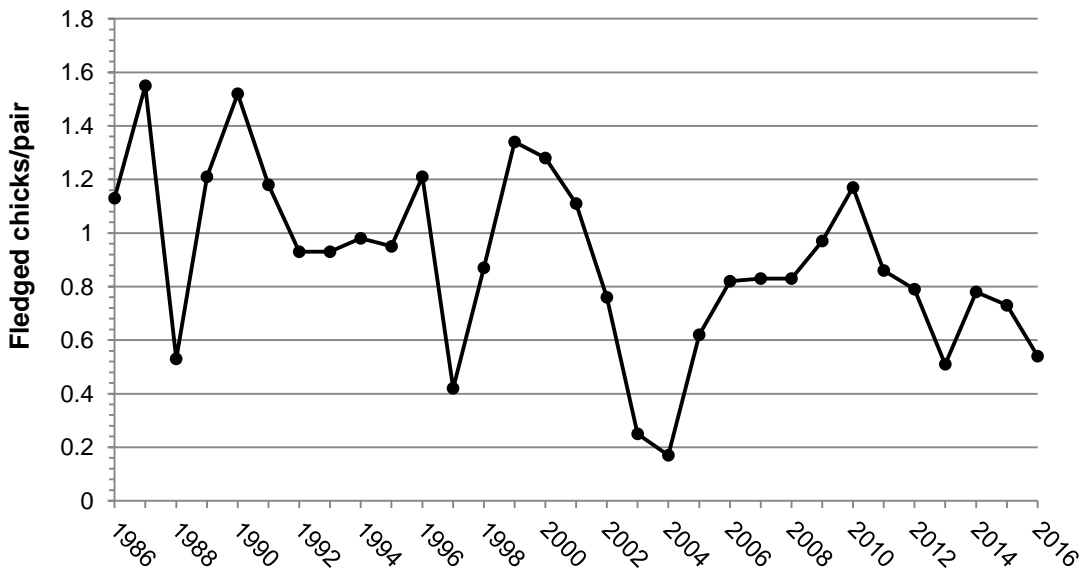


Fig. 9: Bempton/Flamborough Kittiwake productivity 1986 – 2016, aggregate productivity.

**Black-legged Kittiwake (*Rissa tridactyla*) – Filey Cliffs**

Overall productivity for Kittiwake at Filey averaged 0.23 chicks per pair. A total of 231 AONs were monitored across 5 plots, from which 55 chicks successfully fledged (Table 6 and Figure 10). The mean productivity for Kittiwake recorded between 1986-2005 from between thirty and sixty-one colonies annually was 0.69 chicks per pair (Mavor et al. 2008). Mean Kittiwake productivity (calculated for each year as the mean of productivity plot results) at Filey Cliffs for the years 2012 – 2015 is 0.35.

Table 6: Filey Black-legged Kittiwake productivity 2016

| Plot                                     | AOS        | Fledged chicks | Productivity ch/pr |
|--|------------|----------------|--------------------|
| Plot 1                                   | 50         | 18             | 0.36               |
| Plot 7                                   | 50         | 23             | 0.46               |
| Plot 8                                   | 50         | 8              | 0.16               |
| Plot 9(a)                                | 53         | 2              | 0.04               |
| Plot 10(a)                               | 28         | 4              | 0.14               |
| <b>Aggregate productivity</b>            | <b>231</b> | <b>55</b>      | <b>0.24</b>        |
| <b>Mean of plot productivity ch/pair</b> |            | <b>0.23</b>    | <b>±0.0772 SE</b>  |

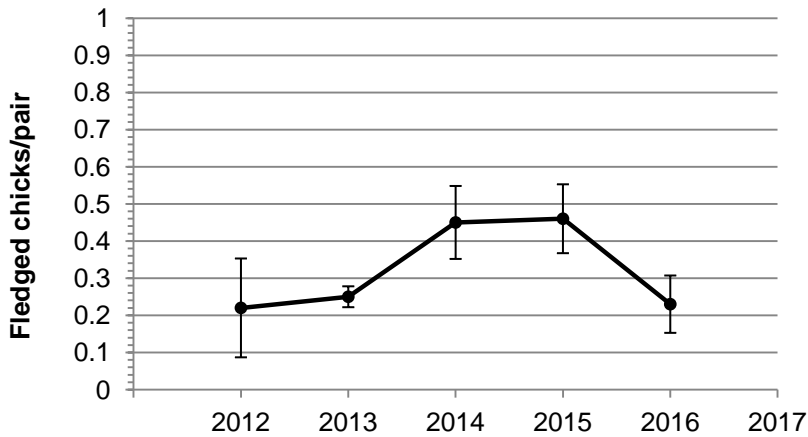


Fig. 10: Filey Kittiwake productivity 2012– 2016, mean of plot results plus/minus SE. Note that in 2012 productivity on 3 plots was 0.0 due to landslip.

### Herring Gull (*Larus argentatus*)

Overall productivity for Herring Gull averaged 0.70 chicks per pair. A total of 89 AONs were monitored across five plots, from which 64 chicks successfully fledged (Table 7, Figure 11). Mean Herring Gull productivity (calculated for each year as the mean of productivity plot results) at Bempton-Flamborough for the years 2009 – 2015 is 0.94.

Table 7: Herring Gull productivity 2016

| Monitoring site                          | AOS       | Fledged chicks | Productivity ch/pr |
|--|-----------|----------------|--------------------|
| Jubilee to Old Dor                       | 16        | 13             | 0.81               |
| Newcombe North                           | 7         | 4              | 0.57               |
| The Saddle Rock                          | 19        | 18             | 0.95               |
| Breil Nook Stack                         | 17        | 8              | 0.47               |
| Newcombe to Breil                        | 30        | 21             | 0.70               |
| <b>Aggregate productivity</b>            | <b>89</b> | <b>64</b>      | <b>0.72</b>        |
| <b>Mean of plot productivity ch/pair</b> |           | <b>0.70</b>    | <b>±0.2009 SE</b>  |

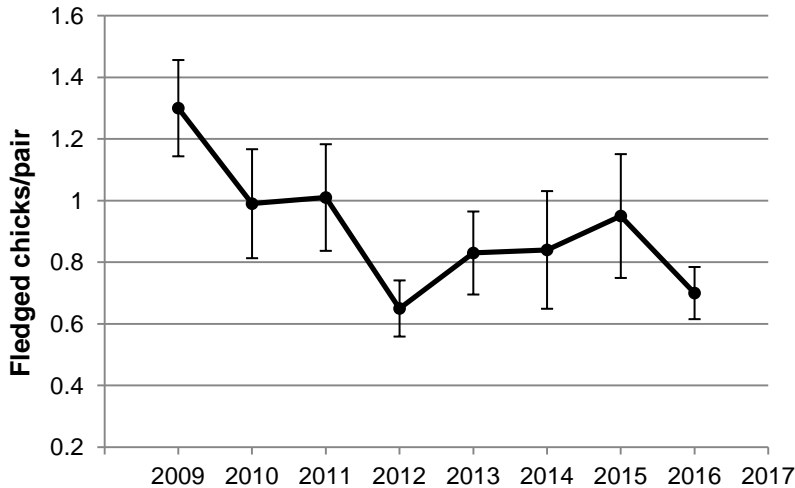


Fig. 11: Herring Gull productivity 2009 – 2016, mean of plot results plus/minus SE.

**European Shag (*Phalacrocorax aristotelis*)**

Seven European Shag nests in the area of Breil Nook, Flamborough Head were monitored. Due to the lines of sight involved it was not always possible to see the chicks clearly, but it is estimated that at least 20 and probably 21 chicks fledged. Accordingly, productivity for this group of nests was a minimum of 2.86 and probably 3 chicks per pair.

**Whole-colony counts**

**Atlantic Puffin (*Fratercula arctica*) at Flamborough/Bempton**

A total of 2267 Puffins were recorded staging on the sea over the two day count on 22 and 23 March 2016. The count was broken down into sections as follows (from South to North):-

- Flamborough Head to Thornwick Bay – 805
- Thornwick Bay to Grandstand Viewpoint – 794
- Grandstand to Speeton Cliffs – 668.

It should be stressed that these numbers should not be treated as a count of the breeding population; they are intended to serve as an index and enable detection of relatively large scale year to year variation.

**Black-legged Kittiwake (*Rissa tridactyla*)**

A total of 51,001 AON were recorded in the pSPA. Of these, 45,278 were in the Flamborough Head and Bempton Cliffs SPA area and 5,723 were in the Filey Cliffs extension.

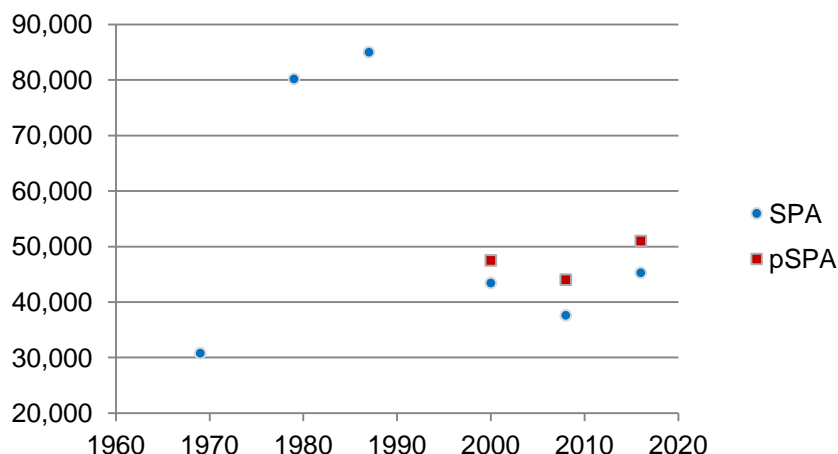


Fig. 12: Black-legged Kittiwake whole-colony counts for the Flamborough Head and Bempton Cliffs SPA area (blue) and for the Flamborough and Filey Coast pSPA area (red).

### Study-plot counts

#### Razorbill study-plot counts

Seven study-plots were each counted on four separate occasions in the first three weeks of June. The third count provided the highest total of 668 individuals (IND); the first count produced the lowest total of 570 IND (Table 8). The mean count for Razorbill was 643; this is the highest mean count recorded and is in line with the general upward trend since the first counts in 2009.

Table 8: Razorbill study plot count results

| Count | 2009 Total Ind | 2010 Total Ind | 2012 Total Ind | 2013 Total Ind | 2014 Total Ind | 2015 Total Ind | 2016 Total Ind |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1     | 338            | 316            | 476            | 552            | 584            | 592            | 570            |
| 2     | 365            | 344            | 455            | 584            | 694            | 535            | 654            |
| 3     | 320            | 348            | 629            | 556            | 565            | 662            | 686            |
| 4     | 309            | 358            | 591            | 624            | 591            | 607            | 660            |
| 5     | 328            | 343            | 522            | 613            | 754            | 482            | n/a            |
| Mean  | 332            | 342            | 535            | 586            | 638            | 576            | 643            |

#### Common Guillemot study plot counts

Seven study-plots were each counted on four separate occasions in the first three weeks of June. The first count provided the highest total of 1491 IND; the second count provided the lowest total of 1342 IND (Table 9). The mean count for Guillemot was 1386. Both the high count and mean were very similar to last year.

Table 9: Common Guillemot study plot count results

| Count | 2009 Total Ind | 2010 Total Ind | 2012 Total Ind | 2013 Total Ind | 2014 Total Ind | 2015 Total Ind | 2016 Total Ind |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1     | 1191           | 1164           | 1120           | 1193           | 1411           | 1396           | 1491           |
| 2     | 1138           | 1123           | 980            | 1226           | 1486           | 1410           | 1342           |
| 3     | 1069           | 1151           | 1228           | 1333           | 1327           | 1494           | 1361           |
| 4     | 1101           | 1114           | 1205           | 1323           | 1475           | 1420           | 1351           |
| 5     | 1126           | 1103           | 926            | 1318           | 1573           | 1226           | n/a            |
| Mean  | 1125           | 1131           | 1092           | 1279           | 1454           | 1389           | 1386           |



**Black-legged Kittiwake study plot counts**

Seven study-plots were each counted on two separate occasions in the first three weeks of June. The first count provided the higher total of 1858 AONs. The mean of the two counts was 1837 AONs, a decrease on last year and the third lowest mean since 2009 (Table 10).

Table 10: Black-legged Kittiwake study plot count results

| Visit | 2009 AON Total | 2010 AON Total | 2011 AON Total | 2012 AON Total | 2013 AON Total | 2014 AON Total | 2015 AON Total | 2016 AON Total |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1     | 1585           | 1967           | 2035           | 1967           | 1554           | 1917           | 1966           | 1858           |
| 2     | 1541           | 1938           | 2067           | 1952           | 1508           | 1996           | 1977           | 1816           |
| Mean  | 1563           | 1953           | 2051           | 1960           | 1531           | 1957           | 1972           | 1837           |

**Common Guillemot, Razorbill and Herring Gull land based counts at Flamborough Head**

The land based counts of individual Common Guillemot and Razorbill 39 cliff subsections which were also counted as part of whole-colony counts of those species in 2000 and 2008 suggest that the numbers are increasing at Flamborough Head (Figure 13). Land based counts of Herring Gull AON on 39 cliff subsections which were also counted as part of whole-colony counts of those species in 2000 and 2008 suggest that the number of breeding Herring Gull has fallen (Figure 14). However some care should be taken with these figures since they may not capture movement within the colony. In particular it would be interesting to know whether Common Guillemot and Razorbill are being displaced from other areas of the colony by the increasing Northern Gannet population on Speeton Cliffs and the RSPB Bempton Cliffs Reserve (Babcock et al, 2015, p. 25).

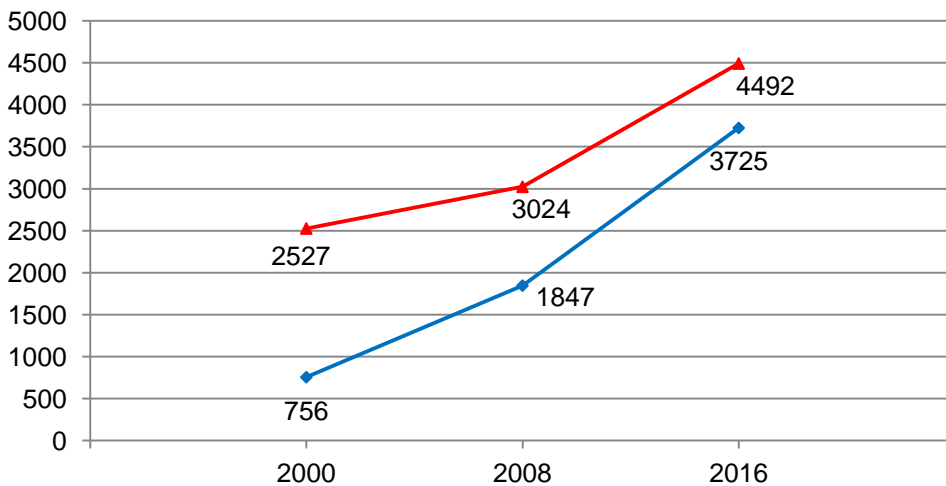


Fig. 13: numbers of Common Guillemot (Red) and Razorbill (blue) individuals on 39 cliff sub-sections at Flamborough Head.

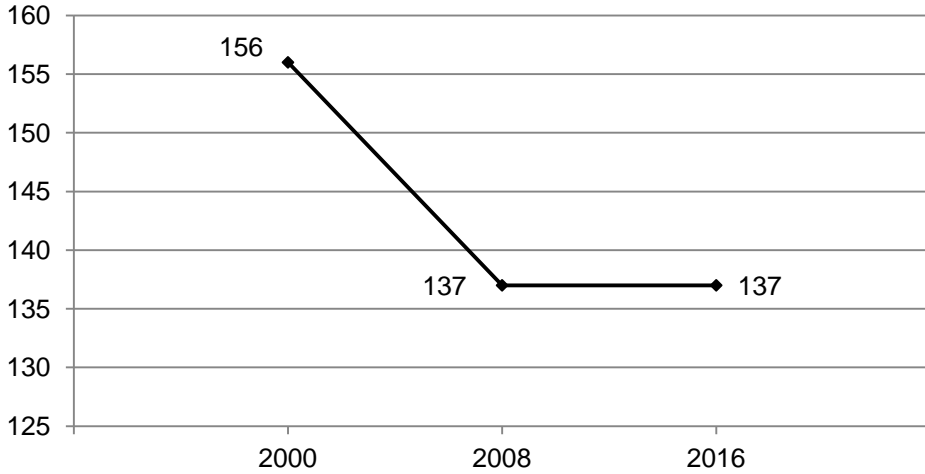


Fig. 14: numbers of Herring Gull AON on 39 cliff sub-sections at Flamborough Head.

**Common Guillemot diet study**

A total of 69 Common Guillemot prey items were recorded during the study, reflecting the lack of dedicated diet observation sessions. Of these 73% were Clupeids, 20% were Sandeels and 7% were other/unidentified (Figure 15).

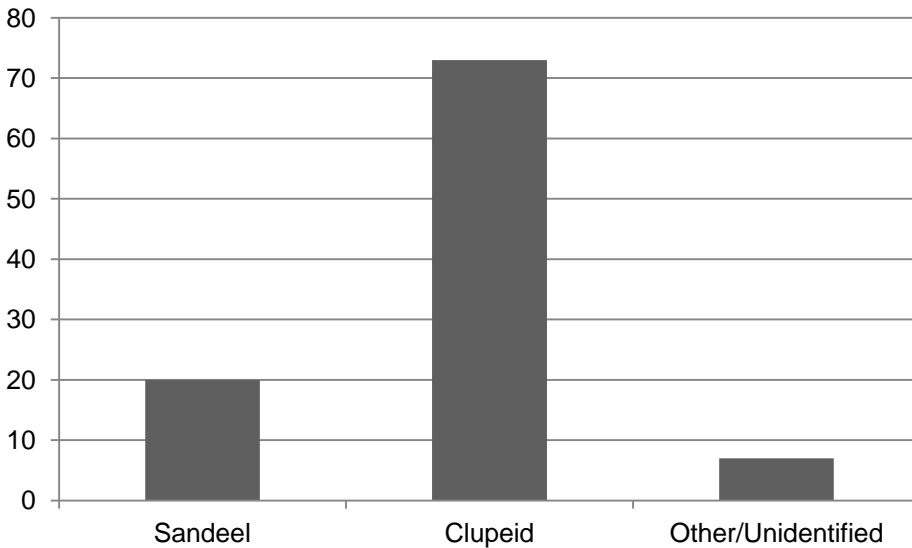


Fig. 15: 2016 Common Guillemot diet composition – percentage of observed prey items at Bempton Cliffs/Flamborough Head. n = 69 prey items.

Productivity researchers were also asked to record Razorbill chick feeds as casual observations. This was more challenging and only 31 items were recorded from 9 feeds. Of these, 30 were Sandeels and one was other/unidentified.

**European Shag roost counts**

Three roost counts were completed over the winter 2015-2016. The numbers recorded 165, 137 and 117 were consistent with previous years. Winter roost counts will be continued for 2016-17 but

if count numbers continue to fall well short of the original FBO seawatch counts (Aitken et al, 2014(a), p.16) the roost counts will be discontinued.

### **Seabird tracking**

There was no seabird tracking work carried out at Flamborough or Filey this year.

### **Seabird colony count feasibility study using drone-captured digital imagery**

The feasibility study showed that:-

- the drone performed well in moderate winds and turbulence;
- there was no significant disturbance to seabirds;
- it was possible to get images which allows ID of species and of breeding and non- breeding birds (including distinguishing Guillemots and Razorbills);
- 35-50 metres from the cliff is the optimum operating distance, giving an image width of 60m of cliff face;
- the optimum camera angle was 10° from the horizontal; and
- the images can be processed to 'stitch' them together and create a continuous image of a section of the cliffs but further work is needed to ensure that images of birds are not lost in the 'stitching' process.

### **Recreational disturbance**

Recreational disturbance continues to be a threat to the breeding success of the colony. The Flamborough Head European Marine Site (EMS) partnership study of disturbance incidents across the SPA identified incidents involving jet skis, paragliders, civil aircraft and kayakers in 2016.

The voluntary code of conduct for Bempton and Speeton Cliffs incorporating a closed season for cliff-top angling from 1 March to 30 September, developed with local angling groups and supported by review meetings, was considered a success.

The Flamborough Head EMS Project Officer facilitated a workshop between personal watercraft users, the Personal Watercraft Partnership, local authorities, Natural England and the RSPB in order to create a new Personal Watercraft Voluntary Code of Conduct which covers the seaward extension of the pSPA. The Code of Conduct applies from 1 March to 30 September; users are asked to maintain a no-wake speed within 300m of the cliffs and near rafts of birds.

It is hoped that a similar collaborative approach can be applied to the development of similar codes of conduct for paragliders, canoeists/kayakers and for other recreational activities which take place within the protected area if required. The pursuit of discussions with representatives of these groups is ongoing.

This year the Flamborough Head EMS Project Officer also facilitated an agreement with the Chief Pilot of the Humberside Search and Rescue helicopter whereby from 15 March to 15 August each

year crews will not carry out training exercises between North Landing and High Stacks (just south of the lighthouse). This agreement compliments the existing Ministry of Defense 'Environmental Avoidance' area around Bempton Cliffs and does not cover emergency responses, which will continue as normal.

## **DISCUSSION**

The Flamborough Head and Bempton Cliffs SPA, now Flamborough and Filey Coast pSPA, supports the largest mainland seabird colony, the largest Kittiwake colony in the UK and the only Gannet colony in England. It is also the most southerly large cliff-nesting seabird colony on the North Sea coast. The Flamborough and Filey Coast pSPA Seabird Monitoring Programme has been operating for the last eight years, since 2009, providing a real insight into trends in breeding seabird productivity and populations.

The general picture is one of a successful seabird colony. A whole colony Kittiwake count completed in 2016 despite challenging weather and sea conditions during much of the counting period suggests that Kittiwake numbers remain steady since an apparent decline between 1987 and 2000. Several authors (Coulson, 2011; Vaughn, 1998) have expressed doubts about the high Kittiwake colony counts in 1987. At the time of writing RSPB Bempton Cliffs staff members are researching historic count records with a view to finding any available additional information that can clarify those counts if possible.

The weather and sea conditions meant that it was not possible to complete the planned whole colony counts of Guillemot and Razorbill, or to trial boat based DSLR photographic counts. It is hoped to carry out whole colony counts of Fulmar, Guillemot and Razorbill in 2017. Whole colony counts of Guillemot and Razorbill by cliff section should confirm whether the increase in numbers observed this year on 39 cliff sections counted from the land at Flamborough Head represent population increase or the displacement of auks from the high Speeton Cliffs by the increasing Gannet population.

The drone feasibility study (Hazleton 2016) highlighted the potential to use still digital photographs, captured using a drone, to determine more accurate whole colony counts with minimal disturbance to the breeding seabirds. NIRAS, who carried out the feasibility study, estimate that it would take 8-12 days to achieve full photographic coverage of the colony using a combination of land and sea-based drone flights. A similar number of days are required for traditional count methods. Additional days would be required to count the birds in images captured by a drone, so at present drone based counts would actually take more time than traditional counts. In the future citizen science or image recognition software may change this. Despite the additional effort (currently) involved, drone based counts have several potential advantages over traditional methods: boat based counts are not possible on even moderately windy days; drone counts should be repeatable year on year as the programmed route can be replicated exactly; and repeat counts of the birds in the photographs can be done at any point in the future by any party.

It is hoped that a whole colony count will be carried out in 2017 using a combination of boat and land-based drone photography and land and boat-based observer counts subject to funding availability.

If possible, boat and land-based observer counts will be compared with drone, boat and land-based digital photography counts. It is also intended to repeat the count of Puffins staging on the sea in the pre-breeding season; although this is not an actual census it can give a snapshot of breeding numbers and act as an index for the breeding population.

The severe weather which affected the colony this season also served as a timely reminder that if climate changes increases the frequency of such weather events during the breeding season it could have a direct effect on the breeding seabirds at the colony in addition to possible indirect effects on prey availability or overwinter survival. While numbers have been approximately steady for the last 16 years, Kittiwake productivity at Bempton/Flamborough was at its second lowest for 10 years; a number of Kittiwake monitoring volunteers commented that some birds seem to have built nests but never produced any eggs – suggesting that they may have struggled to get into breeding condition. There have now been 5 consecutive years since recorded Kittiwake productivity at Bempton and Flamborough was above the 0.80 which is believed to be necessary to sustain the population (Coulson, 2011). Breeding productivity at Filey was again very poor; productivity has not been above 0.50 since productivity monitoring of Filey Kittiwakes started in 2012. The Filey cliffs may be a sink area within the larger colony, or an area where lower quality birds breed.

Razorbill and Guillemot breeding success were also both relatively low this year, notwithstanding that they should find it easier to locate food items in bad weather than Kittiwakes. In both cases it is also possible that some of the productivity plots were affected by particular factors – nesting or prospecting Gannets on two Guillemot plots on the RSPB Bempton Cliffs reserve and Carrion Crow activity on three Razorbill plots in the Grandstand area at Bempton Cliffs and on the Saddle Nook plot at Flamborough Head – which are not typical of the colony as a whole.

After last year, not having a dedicated observer of auk diet meant that we achieved a much smaller set of chick diet observations than the very large sample achieved last year (Jeavons, 2015). Although it is possible to record some Guillemot feeding observations in the course of productivity monitoring, feedback from Razorbill productivity monitors was that this didn't work well for Razorbill. It is also possible that casual observations miss the small prey items fed to Guillemot chicks for the first few days of chick rearing, skewing the recorded sample (Professor Tim Birkhead, pers. com.). The diet observations form an important indicator of prey availability in the sea around the colony and next year we hope to have a student or students working on auk diet again.

The approval in August of Hornsea Project Two wind farm proposal also brought home the need to understand the way in which seabirds breeding at the colony use the surrounding seas. While there has been no tracking work at the colony this season we hope that analysis of the Kittiwake data collected in recent years will be completed shortly and that the work done so far can be extended to other species. It would be particularly interesting to repeat the Kittiwake and Gannet tagging and mark and track auks in order to calculate survival and determine core foraging areas during the breeding and non-breeding seasons. Conditions for catching and marking birds in the colony are challenging but it is to be hoped that developments in tracking technology will make this possible.

The day to day work of managing recreational disturbance across the colony remains ongoing. Although the legal process involving two jet-ski operators last season was dramatic, the real progress comes from working with users to agree how activity close to the colony can be managed. The new code of conduct for personal watercraft is a positive development and we hope that this partnership approach will also be successful in ongoing discussions with representatives of paragliders and canoeists user groups. Positive relationships with local angling clubs, Filey Brigg Angling Society and Bridlington Shore Anglers, have produced a very successful voluntary code of conduct which is widely respected. Recent developments include extending the closed season for cliff-top angling, from March to October (inclusive), and excluding Bempton Cliffs from the annual Filey Fishing Festival. Both actions were identified to reduce potential disturbance to breeding

Gannets. In return, the RSPB seeks the necessary permissions from Natural England to carry out angling activity on the SSSI and SPA and provides access to the cliff-top in the closed season, as well as free-parking at the reserve. Only by working with all stakeholders involved in the pSPA including the Flamborough Head European Marine Site Regulating Authorities, Flamborough and Filey Bird Observatories, the East Yorkshire RSPB Local Group, Yorkshire Wildlife Trust and representatives of user groups will meaningful progress be made in limiting disturbance.

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Initial LEADER funding for optics, waterproofs and other monitoring equipment that continue to provide essential tools for our volunteer team.

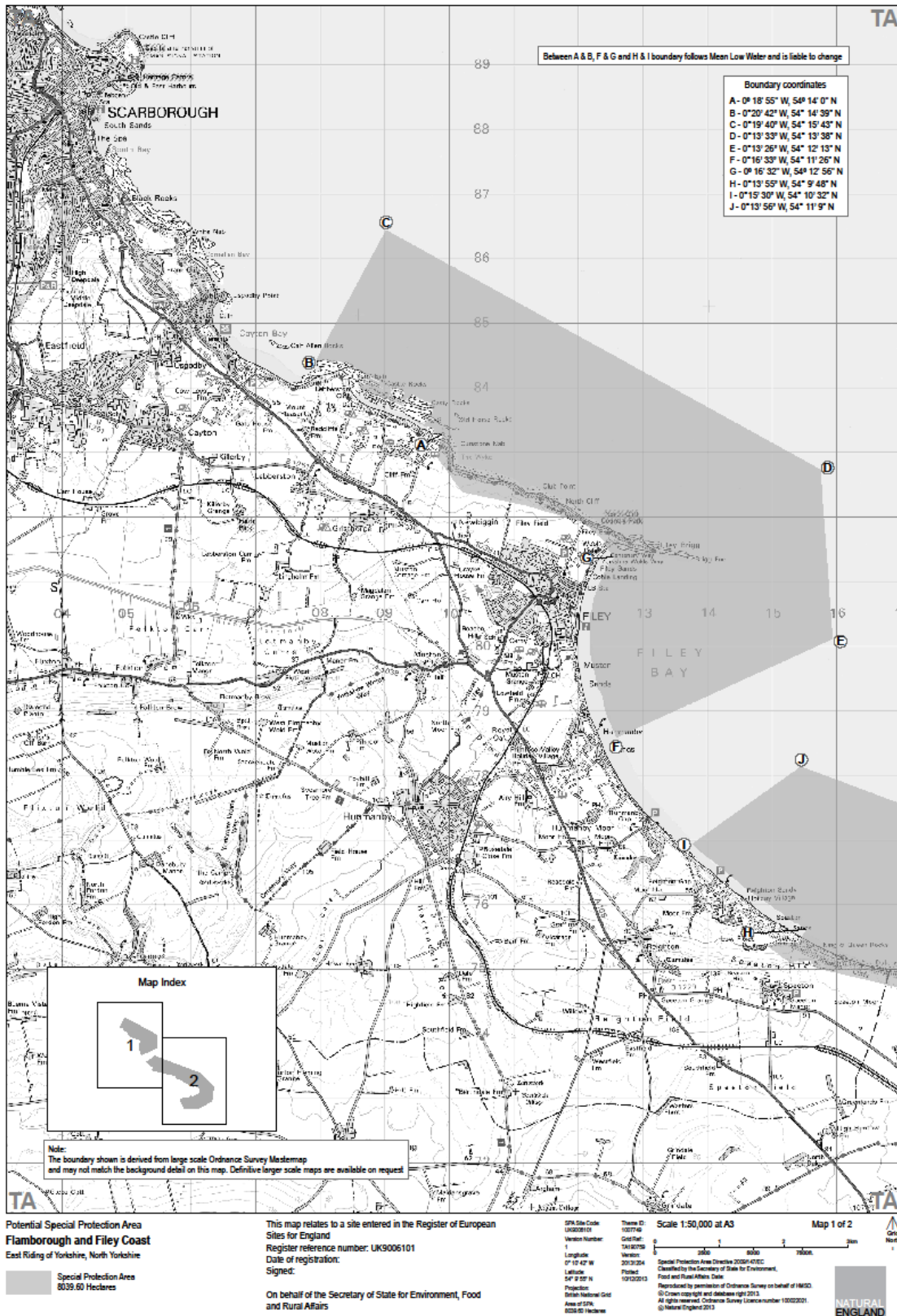
Access at Blue Dolphin Holiday Park at Filey allowed us to reach important sections of the colony for essential monitoring works.

Last but not least, thanks to the owners and management at Thornwick Bay Holiday Village at Flamborough for providing parking permits for North Landing car park, which are invaluable.

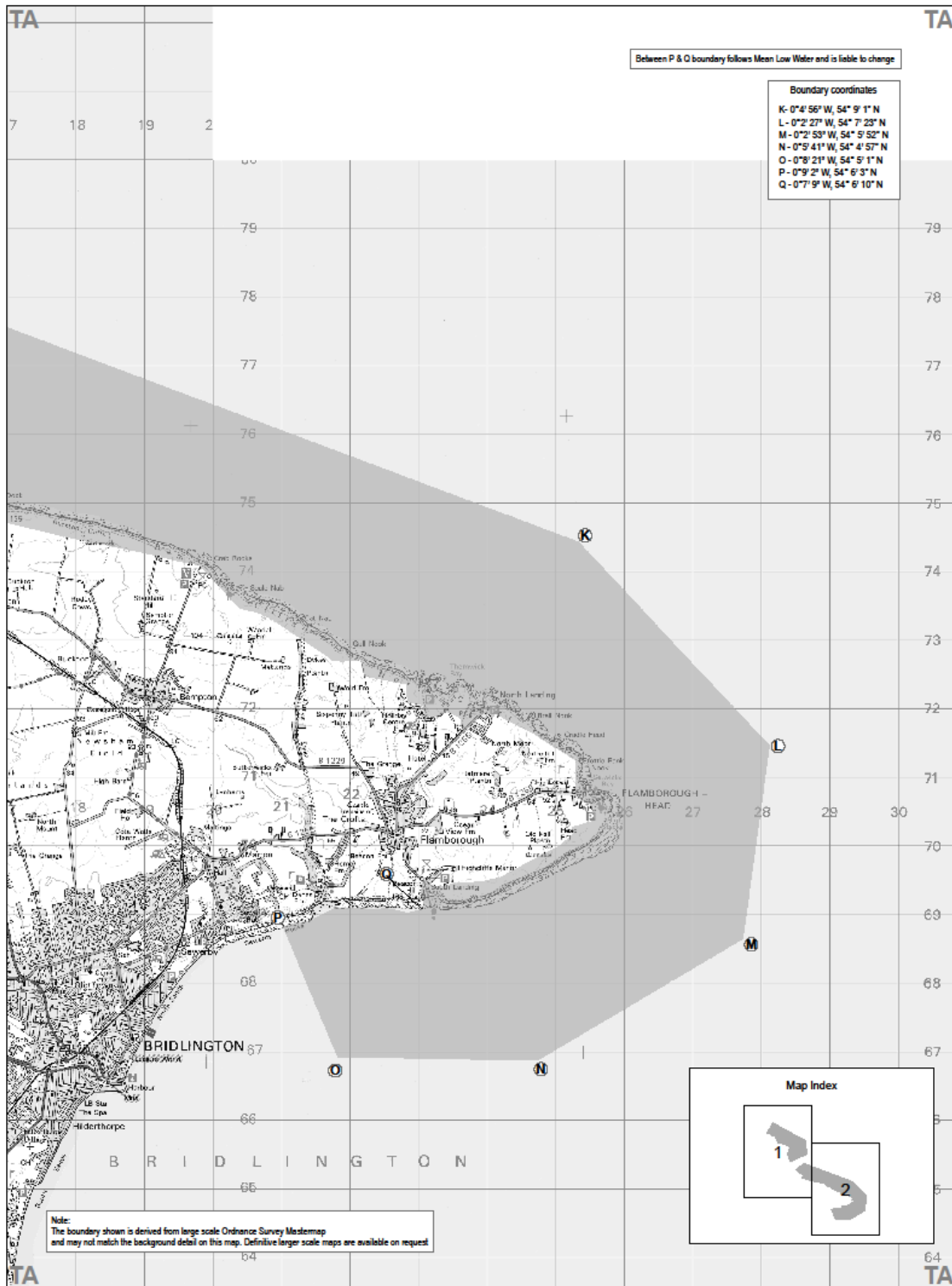
Without all of the aforementioned, the Flamborough and Filey Coast seabird monitoring programme would not be the success that it is.

**Appendix 1: Flamborough and Filey Coast pSPA Maps**

North



South



Potential Special Protection Area  
**Flamborough and Filey Coast**  
 East Riding of Yorkshire, North Yorkshire

Special Protection Area  
 8039.60 Hectares

This map relates to a site entered in the Register of European Sites for England  
 Register reference number: UK9006101  
 Date of registration:  
 Signed:

On behalf of the Secretary of State for Environment, Food and Rural Affairs

OSN Site Code  
 UK0006101  
 Version Number  
 1  
 Longitude  
 0° 15' 47" W  
 Latitude  
 54° 9' 20" N  
 Projection  
 British National Grid  
 Area of SPA  
 8039.60 Hectares

Theme ID  
 1007740  
 Grid Ref  
 56182750  
 Version  
 2013/204  
 Planned  
 19/02/2013

Scale 1:50,000 at A3  
 Map 2 of 2  
 Special Protection Area Directive 2009/147/EC  
 Classified by the Secretary of State for Environment, Food and Rural Affairs Date  
 19/02/2013  
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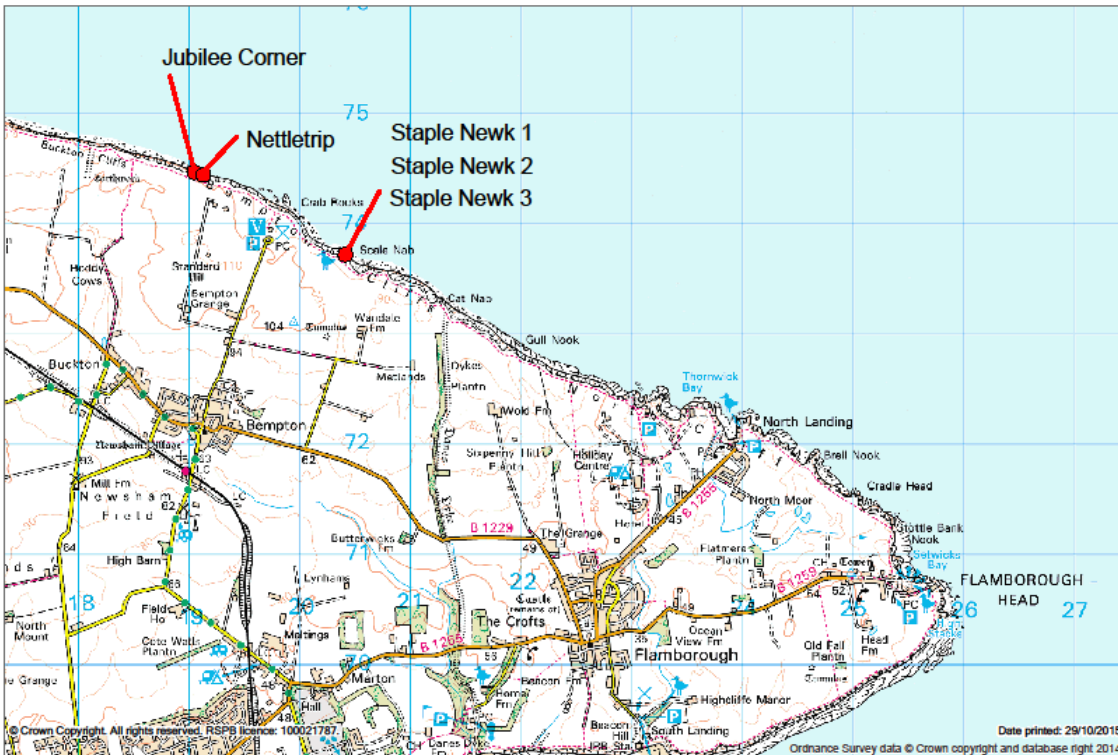


## Appendix 2 - Productivity Plot Locations

### Northern Fulmar Productivity Plots



### Northern Gannet Productivity Plots



### Razorbill Productivity Plots



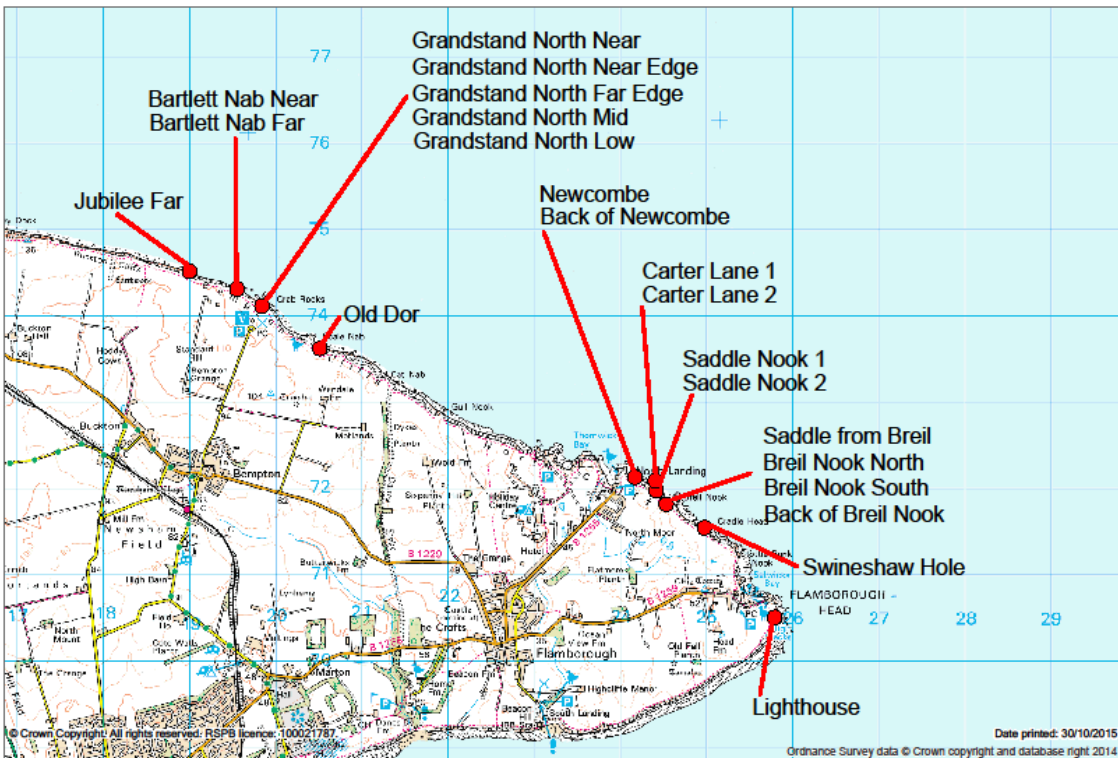
### Common Guillemot Productivity Plots



**Black-legged Kittiwake Productivity Plots - Bempton/Flamborough**



**Black-legged Kittiwake Productivity Plots - Filey**



### Herring Gull Productivity Plots

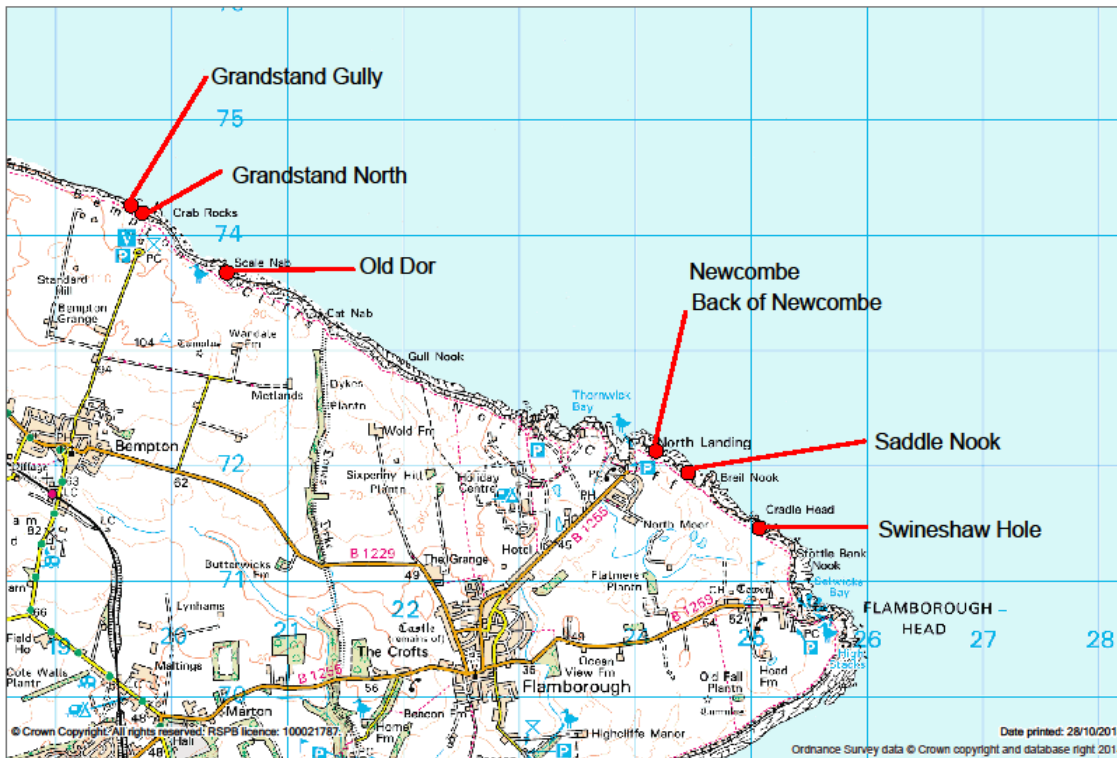


### Appendix 3 - Study Plot Locations

#### Common Guillemot Study Plots



#### Razorbill Study Plots





### Black-legged Kittiwake Study Plots

