

# Flamborough & Filey Coast pSPA: 2017 seabird colony count and population trends

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## Executive Summary

In 2017 the first land and boat-based whole colony count of the proposed Flamborough and Filey Coast potential Special Protection Area (F&FC pSPA) was successfully completed, establishing a baseline for the pSPA breeding seabird assemblage.

The count revealed that the F&FC pSPA, situated on Yorkshire's North Sea coast, supports the UK's largest mainland breeding seabird colony with an estimated 149,272 breeding pairs or 298,544 individual breeding birds, including:

- Northern Gannet *Morus bassanus* - 13,392 apparently occupied sites (AOS), equivalent to c.4.5% of the UK population in 2015
- Black-legged Kittiwake *Rissa tridactyla* - 51,535 apparently occupied nests (AON), equivalent to c.20% of the UK population based upon JNCC upper estimates in 2015
- Razorbill *Alca torda* – 30,228 individuals on land, equivalent to 16% of the UK population index in 2000) and
- Common Guillemot *Uria aalge* – 90,861 individuals on land, equivalent to (4.3% of the UK population index).

Whilst it wasn't possible to determine population trends for the F&FC pSPA, as this was the first complete count of the pSPA, a comparison of past counts of the original Flamborough Head and Bempton Cliffs SPA (FH&BC SPA), which forms the largest component of the pSPA, revealed that the health of the breeding seabird assemblage is very positive although the population trends of individual species portray a mixed picture. The following trends, using comparisons with the Seabird 2000 results, were recorded:

- Northern Gannet population has increased by 425% since 1999, although the average annual rate of growth has fallen from 22% per annum between 1969-1987, to 8.6% per annum between 2008 and 2017
- Razorbill population has increased by 230% since year 2000 at an average annual rate of growth of 6%

- Common Guillemot population has increased by 79% since year 2000 at an average annual rate of increase of 4% per annum.
- Black-legged Kittiwake population has increased by 6% since 2000 with an average annual rate of increase of 0.5% per annum at a time when the IUCN have red-listed this species and classed its conservation status as vulnerable, due to a >40% decline in the European population. These results highlight the growing international importance of this colony as a potential engine-house for the recovery of this species. However, whilst the Black-legged Kittiwake population status appears positive the long-term breeding productivity of the colony shows a continuing downward trend suggests that the future status of Black-legged Kittiwake may become more precarious.
- European Shag *Phalacrocorax aristotelis*, with 25 AON
- Great Cormorant *Phalacrocorax carbo* with 27 AON
- Northern Fulmar *Fulmaris glacialis* breeding population of 846 AOS has declined by 37.8% since the year 2000, at an average annual rate of decline of 2.75% per annum
- European Herring Gull *Larus argentatus*, with 351 AOS, has declined by 51% since the year 2000 at an average annual rate of decline of 3% per annum between 2000 and 2014 and an alarming 10% per annum between 2014 and 2017.
- Atlantic Puffin *Fratercula arctica*, 2879 pre-breeding rafting birds, will hopefully provide a new population index and useful baseline against which to measure future changes.

The overall growth in the F&FC pSPA colony is in sharp contrast to the widespread declines of seabird species reported at many Scottish colonies since the year 2000 (JNCC 2015) and elsewhere in the UK and North-West Europe.

It is suggested that the legal protection conferred by the Seabird Preservation Act 1869, the Wild Bird Protection Act 1954, the Wildlife and Countryside Act 1981 (as amended) and the Conservation Regulations 1994 \*(as amended) which implement the EU Birds and Habitat Directives in England, together with the designation of the Flamborough Head SSSI, the Flamborough Head and Bempton Cliffs SPA and European Marine Site and the proposed Flamborough and Filey Coast pSPA, the creation of the Heritage Coast and the RSPB's Bempton

Cliffs and Yorkshire Wildlife Trust's Flamborough Cliffs Nature Reserves have played a significant role in safeguarding the seabirds.

There is an ongoing need to identify the core foraging areas and prey-species that the birds depend upon. Several species are able to exploit local Sprat *Sprattus sprattus* populations as an alternative to the declining North Sea sandeel populations. The absence of offshore marine protected areas to safeguard the key foraging areas of the birds breeding in the F&FC pSPA is a concern.

Preliminary investigations suggest a significant percentage of birds present in the colony could be non-breeders which currently go unrecorded. There is a need to better understand the proportion of the non-breeding population of each species and how it varies through the season.

Similarly, the study revealed that in 2017 a minimum of 115,130 young birds fledged successfully from the colony. These birds should also be factored into any environmental assessment.

This comparative study also highlighted the problems associated with sourcing accurate historical data and managing current data to ensure that it is accessible, supported by accurate metadata and quality controlled. A record of recent comparable counts and historical count references was created and is included in the supplementary information.

Recommendations for future census work include:

- original count data and methodologies for each count should be stored securely and made accessible – it is recommended that the JNCC Seabird Monitoring Programme is the most appropriate current location
- future counts should be verified with photographic evidence, taken simultaneously, to enable quality control and calibration of the accuracy of counts – ideally these photographs should be securely stored with the original data and be made accessible
- future counts, whilst monitoring the F&FC pSPA, should maintain the original Seabird Monitoring Programme plot boundaries and distinction between FH&BC and Filey Cliffs to enable long-term intra-colony variations in population change and distribution

- the JNCC SMP database should be checked and amended where necessary to ensure that counts relating to the FH&BC SPA and F&FC pSPA are accurately recorded, and that count boundaries and names are correct
- the 2017 count should be published
- an assessment/count of the proportion of non-breeding birds present in the colony during the breeding season is undertaken
- a repeat whole colony count of the F&FC pSPA to be carried out at a minimum of every five years
- complete the comparative study of different count methodologies including land and sea-based observer, boat, drone and aircraft –based photography and determine most cost-effective count methodology for future counts. Use drone to calibrate accuracy of boat and land-based counts.
- undertake a survey of urban nesting gulls in adjacent towns
- maintain the Common Guillemot chick diet study



## Introduction

### The Flamborough and Filey Coast potential Special Protection Area (F&FC pSPA)

The F&FC pSPA was proposed in 2014 (Appendix One). The F&FC pSPA regularly supports more than 1% of the biogeographical population of four regularly occurring migratory species (Black-legged Kittiwake *Rissa tridactyla*, Northern Gannet *Morus bassanus*, Razorbill *Alca torda* and Common Guillemot *Uria aalge*) and greatly exceeds the minimum qualifying assemblage of more than 20,000 breeding seabirds. Northern Fulmar *Fulmarus glacialis* are also present in sufficient numbers to warrant being listed as a main component species of the assemblage, since numbers exceed 2,000 individuals (10% of the minimum qualifying assemblage of 20,000 individuals). The pSPA incorporates both the Flamborough Head and Bempton Cliffs SPA (FH&BC SPA) colony which was originally classified in 1993, and Filey Cliffs which extend northwards from Filey Brigg to Cunstone Nab.

The site also includes a generic 2 km seaward extension for Northern Fulmar and Northern Gannet incorporating a 1km seaward extension for Common Guillemot and Razorbill, vital for ensuring some essential ecological requirements of the breeding seabird populations are met (e.g. preening, bathing, displaying and potentially local foraging)

### The Location

The F&FC pSPA is located on the North and East Yorkshire coast between Bridlington and Scarborough (Figure 1).



Figure 1 The location of the Flamborough and Filey Coast pSPA including the extensions and the original Flamborough Head and Bempton Cliffs SPA.

The F&FC pSPA incorporates c19km of seabird breeding cliffs and includes the RSPB Bempton Cliffs nature reserve, the Yorkshire Wildlife Trust Flamborough Cliffs nature reserve and the East Riding of Yorkshire Council Flamborough Head Local Nature Reserve. Flamborough Head and Bempton Cliffs rise to 135.6 metres and are composed of Cretaceous chalk. These cliffs have been eroded into a series of bays, arches, pinnacles and gullies with an extensive system of caves at sea-level. The cliffs from Filey Brigg to Cunstane Nab comprise a range of sedimentary rocks including Jurassic shales and sandstones. The cliffs are overlaid by a varying thickness of glacial till deposited in the last Ice-age. Cliff top vegetation comprises maritime grassland vegetation growing alongside species more typical of chalk grassland.

## The breeding seabird population counts

Although there are numerous historic references to the status of seabirds at Flamborough Head and Bempton Cliffs, including Wade (1907) and Nelson (1907), the first attempted systematic count wasn't until 1952 (Brownsey and Peakall 1953), followed by Williams and Kermode (1964). A series of UK-wide seabird counts ensured a sequence of counts were carried out in 1969 for Operation Seafarer (Cramp et al 1974), in 1987 for the Seabird Colony Register (Lloyd et al 1991) and in 1999/2000 for Seabird 2000 (Mitchell et al 2004). A further whole colony count of the FH&BC SPA was undertaken, by the RSPB, in 2008 although this count did not include the South Landing to High Stacks plot at the southern limit of the SPA (Clarkson unpublished), and Northern Gannet and European Herring Gull *Larus argentatus* whole colony counts have been undertaken at intervals between 2009 and 2016. Part of the purpose of the paper was to research and validate previous colony count methodologies and where possible assess whether the counts are compatible with recent counts.

For a more detailed historical record of Flamborough Head and Bempton Cliffs counts see Supplementary Information – contact RSPB Bempton Cliffs.

With the exception of the Great Cormorant colony there appears to be no accurate or complete historical counts of the Filey Cliffs colony other than a series of counts carried out by the RSPB from 2010 onwards (Appendix Two). These contemporary counts were used by Natural England to inform the proposed designation of the F&FC pSPA.

## Developing a co-ordinated approach to seabird monitoring across the Flamborough and Filey Coast pSPA

The breeding seabird assemblage faces a number of potential risks including:

- a climate-change driven increase in sea surface temperatures and shifts in frontal systems and marine currents which could fundamentally alter food sources (Frederiksen *et al* 2004 and Carroll *et al* 2015)
- the development of offshore wind arrays, situated in the North Sea, relatively close to the F&FC pSPA. The first two wind farm projects within the Hornsea zone have been granted planning consent and work has already commenced on Project One. The potential impacts

of offshore wind-farms on seabirds include collision risk, particularly for Black-legged Kittiwake and Northern Gannet (Furness et al 2013) and displacement, particularly for Common Guillemot, Razorbill and Atlantic Puffin (Searle *et al* 2014). Both of these could lead to population change and/or effects on demographic rates such as productivity (breeding output) or survival rates within the pSPA.

- impact of existing, changing and new fishing practices e.g. the Dogger Bank sandeel fishery which has been shown to negatively impact Black-legged Kittiwake breeding productivity following high catch years (Carroll et al 2017).
- increased recreational disturbance from a variety of sources including military and light aircraft, paragliders, personal watercraft (including jet-skis) and motorised vessels, angling, coastering, sea-kayaking, wildlife photography and bird-watching can negatively impact on breeding productivity

In the light of these ongoing and potential developments there is a need for Natural England and the Flamborough Head European Marine Site Management Scheme, to better understand the potential effects of existing and proposed activities and developments on the pSPA features. To ensure a coordinated approach to seabird monitoring and conservation in the area, a voluntary F&FC seabird monitoring group has been set up comprising representatives of the organisations listed above as well as the RSPB, Ørsted (DONG Energy) and their consultants (currently NIRAS), to ensure assessments and decisions are based upon accurate and agreed data and evidence.

## Project aims

This project, funded through the Natural England's Action for Birds in England (AfBiE) Fund, and developed by the F&FC the Seabird Monitoring Group, aims to assess the current status and population trends of the pSPA breeding seabird assemblage and provide a baseline against which post consent-monitoring linked to the Hornsea Offshore wind array, Projects One and Two, can be compared through undertaking a boat and land-based whole colony count of the F&FC pSPA in 2017 and comparing the results with past colony counts.

## Methods

The report adopts the British Ornithologist Union’s ninth British list (December 2017) and the now agreed IOC international English name (see [www.worldbirdnames.org](http://www.worldbirdnames.org)) with the exception of Common Murre which is referred to using the English vernacular name, Common Guillemot.

For each species the whole-colony count followed the standard census methods (Table One) outlined in the Seabird Monitoring Handbook (Walsh et al 1995) and Bird Monitoring Methods (Gilbert et al 1998). The same methodology was used in the 2000, 2008 and 2017 surveys.

Table 1 A summary of species specific census methodologies used for the whole colony counts in 2000, 2008 and 2017

<b>Species</b>	<b>Methodology <sup>1</sup></b>	<b>Timing of count <sup>2</sup></b>	<b>F&amp;FC specific methodology</b>
Northern Fulmar	Whole-colony census method using Apparently Occupied Sites (AOS)	Late May-early June (ideally June) between 0900h and 1730h – ideally mean of several counts	
Northern Gannet	Census method 1 - AOS and club-birds or AON where non-breeding birds are scattered amongst breeding birds. Counts should ideally be replicated by two observers.	June or July (mid-May/mid-Aug) between 0900h and 1600h ideally repeated several weeks later	AOS and separate count for club birds
European Shag	Census method – AON plus loafing adults. Repeat counts where possible using highest count.	Late-may – early June	AON plus separate count of loafing adults
Great Cormorant	Census method 1 - AON plus number of adult birds present	May-June	AON plus separate count of loafing adults

<b>Black-legged Kittiwake</b>	The recommended count unit is the AON, defined as a well-built nest capable of holding eggs or young, at which at least one adult is present plus sample counts of AOS (including trace-nests. Where possible repeat several times in breeding season.	Late May to mid-June, ideally early-June	AON including trace nests as not possible to see complete nest structure on high cliffs
<b>European Herring Gull</b>	Census method 1 – AONs plus Apparently occupied territories (AOTs) based upon spacing of adults. Ideally repeat visits using highest count.	Late May-early June between 0900h and 1600h BST.	AOS as often not possible to see nest structure
<b>Common Guillemot</b>	Whole-colony census method, uses unit of individual adults on land. Ideally repeat counts on five occasions and take mean count and standard deviation as final figure. Where time is limited a single count may be used.	Late-May to late-June, ideally first three weeks of June (incubation/early nestling period) between 0800h and 1600h BST	Individuals on land (excluding ‘club’ birds at base of cliff)
<b>Razorbill</b>	Whole-colony census method, uses unit of individual adults on land. Ideally repeat counts on five occasions and take mean count and standard deviation as final figure. Where time is limited a single count may be used.	Late-May to late-June, ideally first three weeks of June (incubation/early nestling period) between 0800h and 1600h BST	Individuals on land (excluding ‘club’ birds at base of cliff)
<b>Atlantic Puffin</b>	AOS or apparently occupied burrow	Late-April to mid-May or between late April and early August. Counts made early in the breeding season, before immatures arrive, are potentially the most useful	Individuals rafting on sea during pre-season gathering (Prof. Mike Harris pers. comm.)

<sup>1 & 2</sup> as recommended in the Seabird Monitoring handbook (Walsh et al 1995)

In 2000, Trevor Charlton, then the RSPB Bempton Cliffs Site Manager, divided the original Flamborough Head and Bempton Cliffs SPA into 13 discrete sections of cliff which formed the

basis of what was then the JNCC’s Seabird Monitoring Programme for the colony (Figure 2). A 14<sup>th</sup> and final section between South Landing, the south-western boundary of the SPA, and High Stacks, was not included in the initial monitoring plots. Each section was photographed and further subdivided into a number of smaller count units creating 178 contiguous sections which together with the South Landing plot covered the length of the colony (Appendix 3). These were used, with the exception of the South Landing plot, in 2008 (Appendix 4) and in their entirety in 2017 (Appendix 5 and 6).



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Figure 2 The Flamborough Head and Bempton Cliffs Seabird Monitoring Programme colony count sub-sections

The Filey colony was photographed in 2010 and the three SMP sections (Figure 3) were subdivided to create 23 plots and these sections were used in subsequent colony counts, including the 2017 survey. Unfortunately, the JNCC SMP no longer records these sub-units and therefore



evidence of future changes in the spatial shifts in the distribution of breeding populations within the colony may be lost.



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Figure 3 The Filey Cliffs Seabird Monitoring Programme colony count sub-sections

The Survey was carried out using a combination of land-based counts where safe access and viewing is possible from either above or below the cliffs at low tide and by boat (indicated in Appendix Five). All land-based counts were carried out by Keith Clarkson and Derren Fox.

Sea-based counts of the Flamborough and Bempton Cliffs colony were accessed using a Yorkshire coble, the 'Summer Rose' which is owned by the Emmerson family and sails out of the North Landing harbour. The coble was skippered by Mike Emmerson who uses his intimate knowledge of the seabed around the headland to access all parts of the colony. The Filey cliffs were accessed using the Filey Sailing Club Safety R.I.B. skippered by Dave Warburton. Sailing was only possible when a) the sea-state was Douglas Scale 2 or less with calm or smooth wavelets and a swell of less than 0.5m, b) no rain, c) wind strength less than Beaufort Scale 4 and d) good visibility. The only



weather-related hindrance to counting occurred when counting the high cliffs between Bempton and Speeton, in the afternoon, in clear skies, when, typically, the cliffs were in shadow but the glare at the top of the cliffs was so strong that it made the identification of birds nesting at the top of the 100m high cliffs, and assessing their breeding status, challenging. The combination of land and sea-based counting ensured that all parts of the colony were included in the census.

The census team was Dave Aitken, Mike Babcock - who both had experience of carrying out individual species whole colony counts in previous years - Trevor Charlton, the ex-Bempton Cliffs Site Manager who led the Seabird 2000 count, Derren Fox who has experience of counting many colonies including seabird research for the British Antarctic Survey, Saskia Wischniewski who has experience counting seabird colonies around the UK and Ireland and Keith Clarkson who has worked on seabirds in the Canadian Arctic and led the 2008 Flamborough and Bempton Cliffs whole-colony count and subsequent Filey whole colony count teams.

The aim was to undertake the survey during the period 15 May and 15 June. In reality, thanks to favourable weather conditions, the count was completed on 9th June.

Due to the size and length of the colony and the likely limited number of days when sailing would be possible in the core count period it was not possible to carry out multiple counts of each plot and in favourable conditions counting was extended until 1800h. In the absence of multiple counts training sessions were carried out, prior to the census starting, when all team members carried out simultaneous counts of a number of plots, results were then compared, and counts repeated until the team achieved a consistent approach. Each team member was then allocated a species to count for each plot. The allocation was changed at each plot to minimise individual bias. A repeat count was undertaken of 10 plots taken at random to compare results. Where this was done the mean of the two counts was used.

Boat-based photographs were also taken on the day of the counts using a Canon 7D Mk2 but unfortunately the resolution of the images was not high enough and we were unable to carry out systematic and comparable counts. On a later date photographs of all sections of the colony were taken by professional photographer, George Stoye. These photographs using a Sony ILCE 7RM2

camera suggest that it is feasible to use boat-based photographs to count birds nesting on the lower cliff sections of the colony, up to a height of 60m. Unfortunately, the photographic-based counts become problematic on higher cliffs due to the perspective resulting in too many birds being obscured. The human eye and brain appears to be able to compensate for the movement of the boat and challenging perspective more effectively than the cameras we were able to use.

To overcome this problem we had intended, with the funding support of Orsted, and under the supervision of NIRAS, to produce a drone-based photographic record of the high cliffs and calibration of the count accuracy. Unfortunately, due to a number of unforeseen challenges it was not possible to complete this work. Lessons learnt from this approach will be reported elsewhere.

## Results

The results of the 2017 whole colony count suggest that the F&FC pSPA supports a breeding seabird assemblage of 149,272 pairs, equivalent to 298,544 individual breeding birds.

The individual species counts for the F&FC pSPA, including the counts for the original FH&BC SPA and Filey Cliffs were as follows (Table Two):

Table 2 The 2017 Flamborough and Filey Coast pSPA whole colony count results

	Flamborough Head and Bempton Cliffs SPA	Filey Cliffs	Flamborough and Filey Coast pSPA	Equivalent number of breeding pairs
Northern Fulmar (AOS)	846	411	1257	1257
Northern Gannet (AOS)	13,392	0	13,392	13,392
European Shag (AON)	25	0	25	25
Great Cormorant (AON)	0	27	27	27
Black-legged Kittiwake (AON)	45,504	6031	51,535	51,535
European Herring Gull (AOS)	351	115	466	466
Common Guillemot (individuals on land)	84,647	6214	90,861	60,877 *
Razorbill (individuals on land)	27,967	2261	30,228	20,253 **
Atlantic Puffin (individual pre-season rafting birds)	2636	243	2879	1440
Total				149,272 pairs

\* conversion factor of 0.67 (Birkhead 1978, Harris 1989)

\*\* conversion factor of 0.67 (Lloyd 1975, Harris 1989)

The distribution of birds within the colony is shown in Appendix Six.

The population trend for the original FH&BC SPA colony, shows a significant increase in the seabird assemblage since Seabird 2000 (Table Three). Unfortunately, there are no comparable counts of Great Cormorant and Puffin.

Table 3 A comparison between the results of the breeding seabird counts for the original Flamborough Head and Bempton Cliffs SPA colony (excluding Filey Cliffs) 2000 and 2017

Species	2000	2017
Northern Fulmar (AOS)	1,360	846
Northern Gannet (AOS)	2552*	13,392**
European Shag (AON)	31	25
Black-legged Kittiwake (AON)	42,582	45,504
European Herring Gull (AON)	719	351
Common Guillemot (individuals on land)	47,215	84,647
Razorbill (individuals on land)	8,463	27,967
TOTAL of birds counted	102,922	172,732

\* 1999 Northern Gannet count

\*\* 2000 Northern Gannet May/June count

A breakdown of the individual species counts, and population trends, are as follows:

### Northern Fulmar *Fulmaris glacialis*

1,257 AOS were counted across the pSPA, including 846 AOS within the original FH&BC SPA colony and an additional 411 AOS within the Filey Cliffs colony. There are few accurate counts of Filey Cliffs prior to 2010 therefore it was only possible to compare data for the original FH&BC SPA (Figure 4).

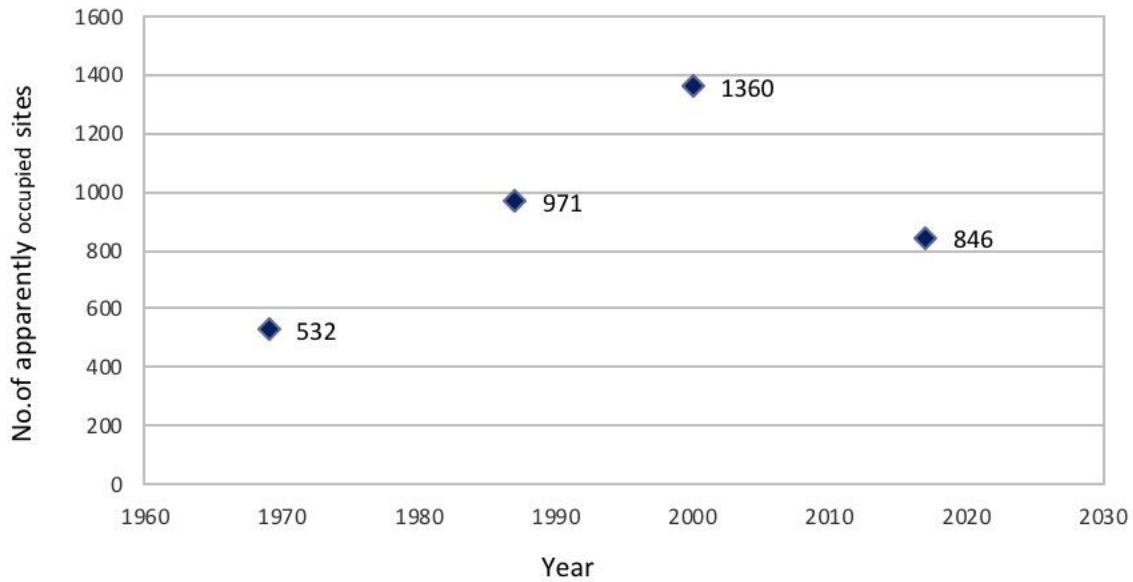


Figure 4 The trend in the Northern Fulmar *Fulmaris glacialis* breeding population - Flamborough Head and Bempton Cliffs SPA colony, excluding Filey Cliffs (1969-2017)

The FH&BC SPA colony data-set reveals that the Northern Fulmar population, a species that was first reported on the cliffs in the 1920s when c20 pairs were present (Mather 1986), grew rapidly through the 1930s reaching an apparent peak in the year 2000 when 1,360 AOS were present in the FH&BC SPA. After-which the colony has undergone a 37.8% decline to a low point of 846 AOS in 2017, an average annual population decline of 2.75% per annum since 2000. This compares with a UK-wide 31% decline between 1998/2000 and 2015 (JNCC 2015). The more recent Filey Cliffs colony count data (Appendix Two) suggests a decline from 597 AOS in 2010 to 411 AOS in 2017 – an average annual population decline of 5.25% per annum in the Filey Cliffs breeding population.

### Northern Gannet *Morus bassanus*

13,392 AOS were counted which includes breeding pairs and non-breeding pairs defending apparent nest territories. An additional 1,169 non-breeding birds were also present in ‘clubs’ which are likely to form future extensions of the colony.

The local Northern Gannet breeding population has shown a spectacular increase since the first colonists in the 1920s (Mather 1986). The number of breeding pairs remained in single figures

until the 1960s, with a peak count of 21 pairs in 1969. After-which a dramatic increase in the local breeding population was evident (Figure 5 and Table Four).

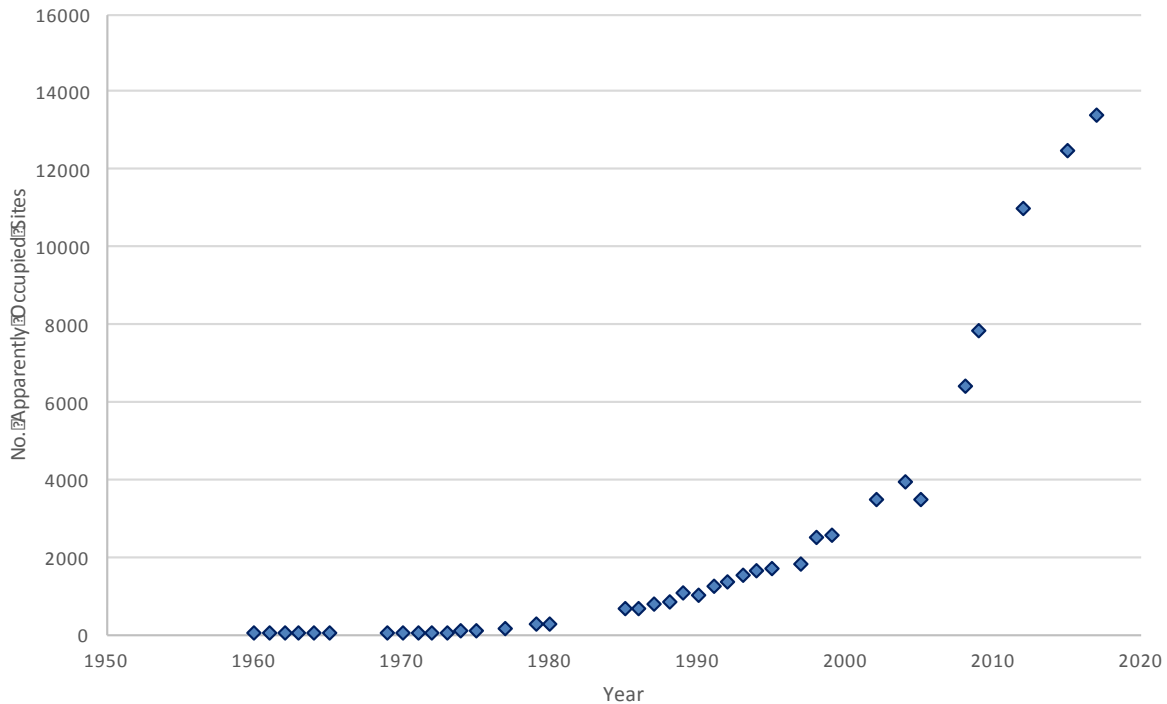


Figure 5 The trend in Northern Gannet *Morus bassanus* breeding population - Flamborough and Filey Coast pSPA (1950-2017)

The mean annual rate of population growth reached a peak of 22.2% per annum between 1969 and 1987 since when the growth rate has declined but remains strong, with an average annual rate of growth of 8.6% per annum since 2008 (Table Four). The F&FC pSPA population has increased by 425% since 1999 compared to a UK-wide increase of 35% in the period 1998/2000 – 2015 (JNCC 2015).

Nesting territories are currently restricted to the high chalk cliffs between North Dykes (TA213733) and Speeton (TA 165750). The growth in numbers is spread fairly evenly across the colony with most new colonists infilling alongside existing nesting territories (Appendix Seven).

Table 4 Changes in the mean annual rate growth in the population of breeding Northern Gannet *Morus bassanus* in the Flamborough and Filey Coast pSPA colony

Year	Flamborough Head and Bempton Cliffs Colony count	Mean annual percentage population growth rate since previous count
1960	9 AON	
1969	21 AON	8.7%
1987	780 AON	22.2%
1999	2552 AOS	11.2%
2008	6386 AOS	11%
2017	13,392 AOS	8.6%

### European Shag *Phalacrocorax aristotelis*

A total of 25 AONs were located. The small breeding population of European Shag, which has been present since the 1950s continues to be restricted to the Flamborough Head and Bempton Cliffs areas of the colony. The population has declined by 19.4% from a peak of 31 AON, recorded in 1987 and 2000, to a recent low of 16 AON in 2014, since when there has been a small recovery to 25 AON in 2017 (Figure 6). The UK population has declined by 34% in the same period (JNCC 2015).

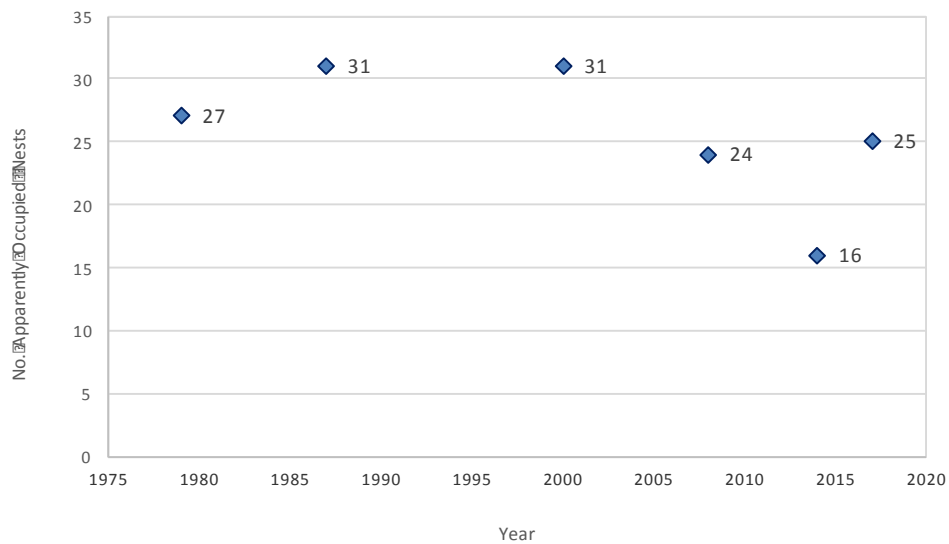


Figure 6 Trend in European Shag *Phalacrocorax aristotelis* breeding population - Flamborough Head and Bempton Cliffs SPA (1987-2017)

Observations of colour-marked individuals suggest that both breeding and non-breeding birds originated from colonies on the Farne Islands, the Isle of May and the Firth of Forth.

### Great Cormorant *Phalacrocorax carbo*

A total of 27 AONs were counted in the F&FC pSPA in 2017. A 10% population decline since 2000. The UK population has declined by 8% since 1998/2000 (JNCC 2015). This species was first reported breeding on Filey Cliffs in the late 1880s (Nelson 1907) where a small colony has persisted to present day. Counts made from land and sea in the last 48 years suggest that although the number of birds nesting in any one year varies the overall breeding population has remained fairly stable throughout this period at c 25 pairs. (Figure 7).

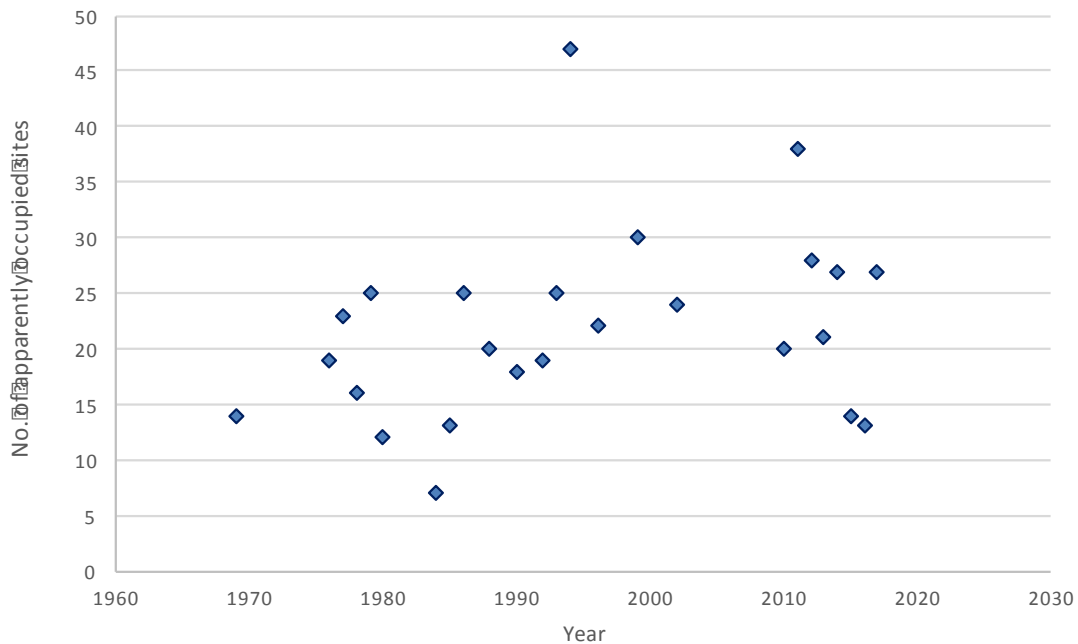


Figure 7 The trend in the Great Cormorant *Phalacrocorax carbo* breeding population - Flamborough and Filey Coast pSPA (1969-2017)

The recent population crash in 2015 followed sustained heavy late winter storms which resulted in a major wreck of seabirds along the North Sea coast.



### Black-legged Kittiwake *Rissa tridactyla*

The F&FC pSPA supported 51,535 AON, which is equivalent to 103,070 breeding individuals and represents c.13% of the UK population. It is likely that the F&FC pSPA is the largest Black-legged Kittiwake colony in the UK. The 2017 count included 45,504 AON in the FH&BC SPA colony and 6,031 AON in the Filey Cliffs colony.

There is a high degree of confidence in these results which compare very favourably to an equivalent count carried out in 2016 when 45,563 AON were counted in the Flamborough Head and Bempton Cliffs colony and 5,723 in the Filey Cliffs colony.

The fortunes of the Black-legged Kittiwake colony appear to have fluctuated significantly in the last 200 years. In 1834 Charles Waterton described the 'Kittiwake' as being abundant on the cliffs (Mather 1986). However, by the 1860's the cumulative impact of the annual shooting of thousands of breeding Black-legged Kittiwakes started to put the species status at risk. This slaughter precipitated the Seabird Preservation Act of 1869 which made the shooting of seabirds, during the breeding season, illegal. A likely consequence of this persecution is that by the turn of the 19<sup>th</sup> Century the number of Black-legged Kittiwakes in the colony was described in hundreds rather than thousands (Wade 1907).

In the 20<sup>th</sup> century a slow recovery occurred (Mather 1986). In 1952, 17,600 individual Black-legged Kittiwake were counted, from land, between Bridlington and Speeton (Brownsey and Peakall 1953). A similar count methodology produced 22,100 nests between Flamborough Head and Speeton in 1957 (Coulson and White 1958) and 31,195 nests in 1964 (Williams and Kermodé 1968). Whilst on Filey Cliffs 660 were counted in 1957 (Coulson and White 1958) and 954 nests were located in 1959 (Coulson 1963). Five years later, in 1969 the Operation Seafarer census, reportedly carried out from land and sea, produced a similar count 30,800 pairs for the Flamborough Head and Bempton Cliffs colony. Reports made over the next twenty years suggested an ongoing increase in numbers reaching an apparent peak in 1987 when over 85,000 pairs of Black-legged Kittiwake were reported to breed on the cliffs (Mitchell et al. 2004).

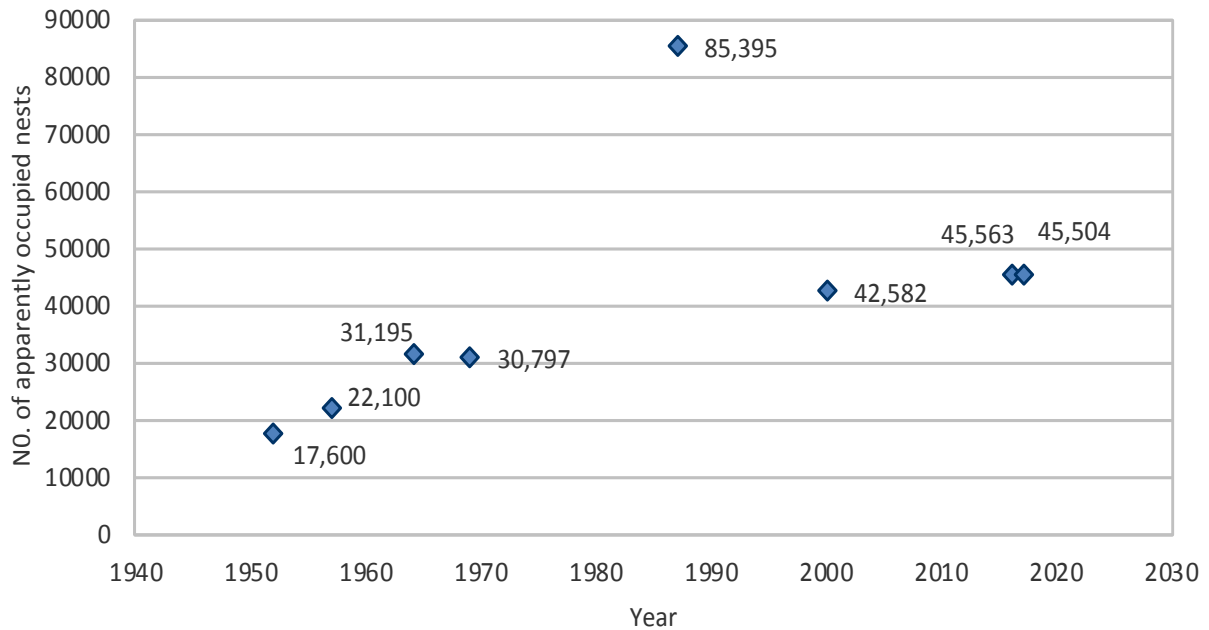


Figure 8 The trend in the Black-legged Kittiwake *Rissa tridactyla* breeding population - original Flamborough Head and Bempton Cliffs SPA colony, excluding Filey Cliffs (1969-2017)

However, there is much controversy about the accuracy of the counts in the 1970s and 80s (Coulson 2011). Closer examination of the RSPB Bempton Cliffs annual reports reveals that nearly all of the counts made during this period (Appendix 8) were land-based estimates with estimates for the sections of cliff that were not visible from land. As large areas of the colony are not visible we believe that these whole colony estimates should be treated with caution. The exception appears to be the 1987 whole colony count which was undertaken as part of the Seabird Colony Register. Although even this count, which was based upon both land and sea-based observations carried out by a team of four observers, was almost double any other qualified count and raises many questions. Detailed analysis of the data suggests that the increase appears to have been restricted to the high cliffs of Bempton and Buckton whilst, surprisingly, the number of birds breeding on the lower cliffs at Flamborough Head appear to have declined in this period (Figure 9). It may be that the maximum numbers will never be confidently known (Coulson 2011).

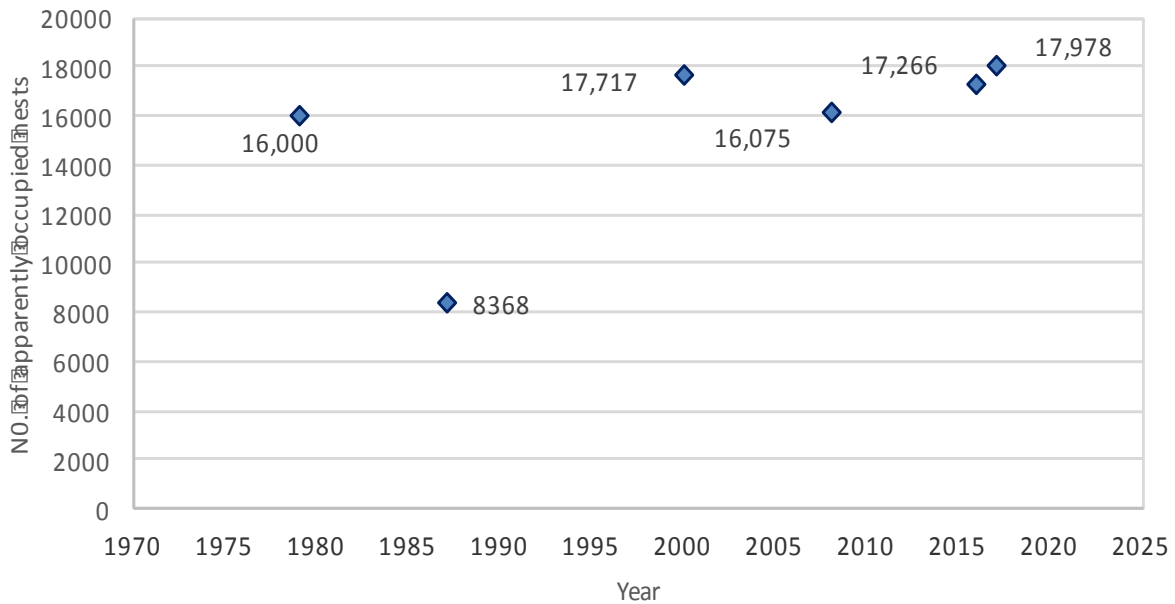


Figure 9 The trend in the Black-legged Kittiwake *Rissa tridactyla* breeding population on the low cliffs between Flamborough Head to Bempton Cliffs (1969-2017)

At a time when the FH&BC SPA breeding population appears to be fairly stable (Figure 8 & 9) with a recorded 6% population growth since year 2000 and an average population growth of 0.5% per annum, the UK population has declined by 44% (JNCC 2015) including losses of more than 95% on previous strongholds e.g. St Kilda (Miles et al 2016) and losses of over 62% at St Abbs (JNCC 2015). The only other large colonies to show an increase in the UK in the same period was the Firth of Forth colonies. The results highlight the growing international importance of the F&FC pSPA Black-legged Kittiwake as a potential engine-house for the recovery of this species in the UK.

The 2017 count also revealed that large numbers of non-breeding Kittiwakes were present in the colony, many on apparently suitable nest sites. In a small sample count of 16 plots containing 7226 AON, a further 9% of AOS, without any nest structure, were occupied by non-breeding birds. These birds were not included in the whole colony count but indicate that a significant proportion of the birds present during the breeding season are non-breeders.

## European Herring Gull *Larus argentatus argenteus*

466 AOS were counted across the F&FC pSPA in 2017. The count was based upon 351 AOS recorded in the original FH&BC SPA colony and a further 115 AOS on Filey Cliffs.

At the turn of the 19<sup>th</sup> Century the number of breeding birds were reported in single figures, undoubtedly due to persecution by the local ‘climbers’ or egg-collectors (Wade 1907). With reduced persecution in the 20<sup>th</sup> Century numbers recovered and by 1969 1246 pairs of European Herring Gull were present on the cliffs. However, counts undertaken since 1969, of the original FH&BC SPA colony, excluding Filey Cliffs, reveal a dramatic 71.8% long-term decline in European Herring Gull numbers since 1969 and a 51% decline since year 2000 (Figure 10). The annual rate of population decline has increased from a mean of 0.5% per annum in the 1970s and 80s, to an average rate of decline of c.3% per annum in the 1990s and 2000s. The rate of decline has accelerated further with an alarming 10% decline per annum since 2014.

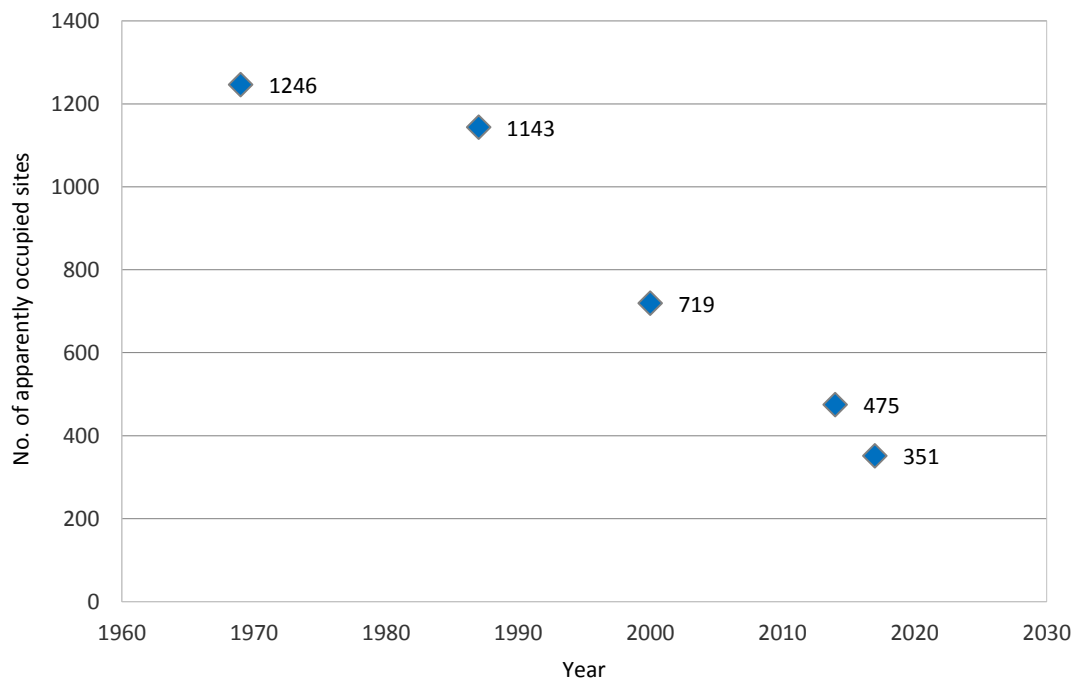


Figure 10 The trend in the European Herring Gull *Larus argentatus argenteus* breeding population - original Flamborough Head and Bempton Cliffs SPA colony (1969-2017), excluding Filey Cliffs

A comparison of more recent counts of Filey Cliffs suggest a mean 7% decline per annum, from 195 AOS in 2010 to 115 AOS in 2017. Unfortunately, there are no comparable counts of the breeding European Herring Gull population on Filey Cliffs prior to 2010.

It is not known whether this decline is offset by the significant growth in the number of birds now breeding in adjacent coastal towns of Bridlington, Filey and Scarborough.

### *Common Guillemot *Uria aalge**

90,861 individuals were counted on the cliffs of the F&FC pSPA which, using a correction factor of 0.67 (Birkhead 1978, Harris 1989), suggests a breeding population of c.60,887 pairs or 121,754 breeding individuals. Ideally, the correction factor should be re-calculated to reflect any changes in adult survivorship and attendance patterns specific to this colony (Harris et al 2015). However, in the absence of this data we have used the best available methodology. The results suggest that the F&FC pSPA Common Guillemot colony is probably the second largest in the UK (JNCC SMP 2015). The count included 84,647 individuals on land in the original FH&BC SPA colony and 6,214 individuals on land in the Filey Cliffs colony.

Historically, Thomas Pennant, in 1769 describes a great ‘loomery’, in such vast numbers as to be practicably innumerable’ (Nelson 1907). The eggs of the auks were always the main prize of the ‘climbers’ or local men who are known to have climbed the cliffs for eggs for at least three hundred years. In the 1850s persecution by shooting appears to have dramatically reduced the Common Guillemot population and by 1870 climbing had almost stopped due to lack of birds. By the turn of the century the population must have undergone a recovery as ‘climbing’ resumed and became more organised and intensive. In 1938, in response to concern about the reduced numbers of Common Guillemot due to the high levels of eggs taken, the Yorkshire Naturalists Union’s Wild Birds and Egg Protection Committee held a meeting with local landowners and climbers. The climbers recognised the decline but blamed the losses on the increased number of oil spill incidents and the increase in the number of ‘Kittiwakes’. The latter explanation being dismissed by the Committee as ‘Guillemots’ are dominant to ‘Kittiwakes’ (Mather 1986).

The whole colony counts for the original FH&BC SPA reveal an ongoing and dramatic increase in the breeding Common Guillemot population since the Operation Seafarer count in 1969 (Figure 11).

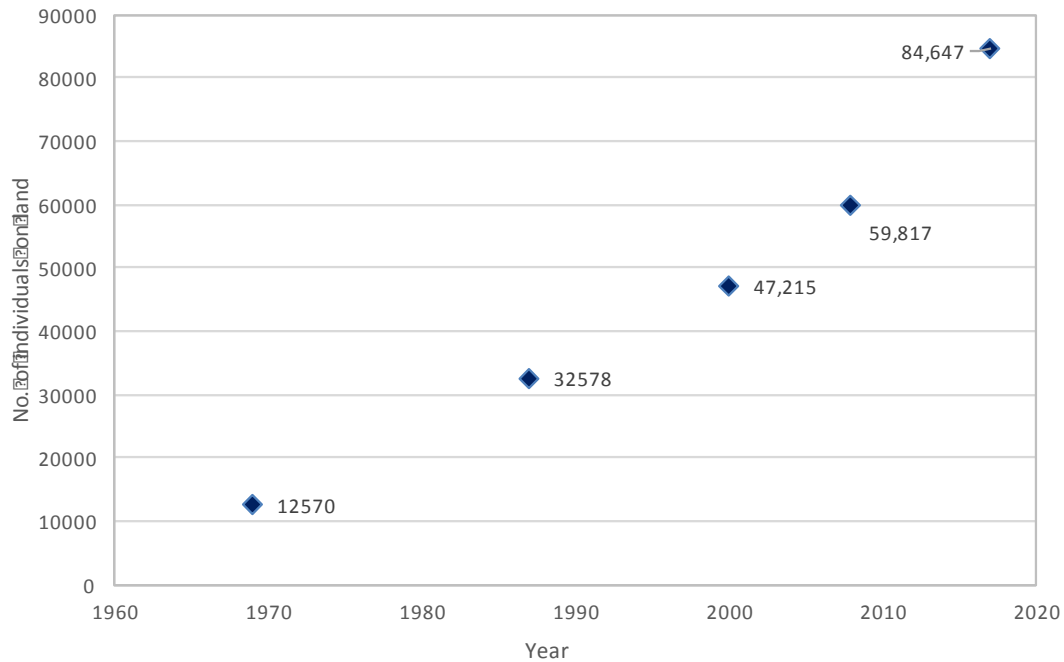


Figure 11 The trend in the Common Guillemot *Uria aalge* breeding population - original Flamborough Head and Bempton Cliffs SPA colony, excluding Filey Cliffs (1969-2017)

The FH&BC SPA colony has increased by 79% since year 2000 this compares with a UK-wide increase of only 5% in the period 1998/2000 - 2015 (JNCC 2015). The mean annual population growth rate for the FH&BC SPA Guillemot colony is 4% per annum although this has fluctuated between counts (Table Five). These figures compare favourably with Skomer Island where the population increased by 80% between 2000 and 2015, the Farne Islands, which increased by 70% at a rate of 3.6% per annum in the same period and Rathlin Island, the UK’s largest Common Guillemot colony, which increased by 37% at a rate of 2.7% per annum. All other UK colonies included in the JNCC Seabird Monitoring programme experienced population declines in the same period (JNCC 2015).

Table 5 Changes in the annual rate of Common Guillemot *Uria aalge* population growth - original Flamborough Head and Bempton Cliffs SPA colony, excluding Filey Cliffs

Year	Original Flamborough Head and Bempton Cliffs SPA Colony count	Annual percentage increase in population
1969	12,570	
1987	32,578	5.4%
2000	47,215	2.75%
2008	59,817	3%
2017	84,647	4%

Although there are no known accurate counts of the Filey Cliffs colony prior to 2010 a few pairs were reported on the cliffs in the early 1900s through to the 1970s (YNU 1976) after which there appears to have been a significant increase in the breeding population. The number of birds counted on the cliffs in the Filey Cliffs colony has increased at a very high rate of 9.1% per annum from 3,100 individuals on land in 2010 to 6,214 in 2017.

There is a growing concern at the F&FC pSPA and other colonies in the UK (Murray *et al* 2015 and Murray 2017) that the burgeoning Northern Gannet population may be displacing Common Guillemot from their traditional nest ledges and that this might be impacting the population. An analysis of rates of growth in the Common Guillemot population suggest that the scale of increase is highest in the lower density plots where Northern Gannet are absent and lowest in plots with a high density of both Common Guillemot and Northern Gannet. However, displacement by colonising Northern Gannet does not appear to be having a negative impact on the overall Common Guillemot breeding population (Table Six).

Table 6 A comparison between the mean rate of population growth for Common Guillemot *Uria aalge* nesting in areas of differing density of breeding Common Guillemot and Northern Gannet *Morus bassanus* in the original Flamborough Head and Bempton Cliffs SPA colony

	<b>0 Gannet present</b>	<b>Sections of cliffs with relatively low colonisation rate (i.e. plots &lt; 100 Northern Gannet (new AOS))</b>	<b>Sections of cliff with relatively high Northern Gannet colonisation rate (i.e. &gt;100 Northern Gannet (new AOS))</b>
<b>Plots with &lt;400 Guillemot</b>	Mean rate of increase per plot = 290% n = 63	Mean rate of Increase per plot = 208% n=13	Mean rate of increase per plot = 181% n=9
<b>Plots with &gt;400 Guillemot</b>	Mean rate of increase per plot = 97% n=18	Mean rate of increase per plot = 47% n=16	Mean rate of increase per plot = 38% n=16

### Razorbill *Alca torda*

30,228 individuals were counted on the cliffs within the pSPA, equivalent to 16% of UK population, which, using a correction factor of 0.67 (Birkhead 1978, Harris 1989) translates to 20,253 pairs or 40,506 breeding individuals which is 21.6% of the UK population based upon Seabird 2000 (Mitchell *et al* 2004). The count included 27,967 individuals counted on the cliffs of the original FH&BC SPA and 2,261 individuals on the Filey Cliffs.

There are very few historic references to Razorbill or their status in the colony. At the turn of the 19<sup>th</sup> Century it was considered that Guillemots out-numbered Razorbills by 100:1 (Nelson 1907). This situation has changed significantly. The whole colony counts for the original FH&BC SPA, excluding Filey Cliffs, reveal an ongoing and dramatic increase in the breeding Razorbill population (Figure 12), with a 230% increase since the year 2000. Whilst the mean annual population growth rate is c. 6% per annum since 1969.



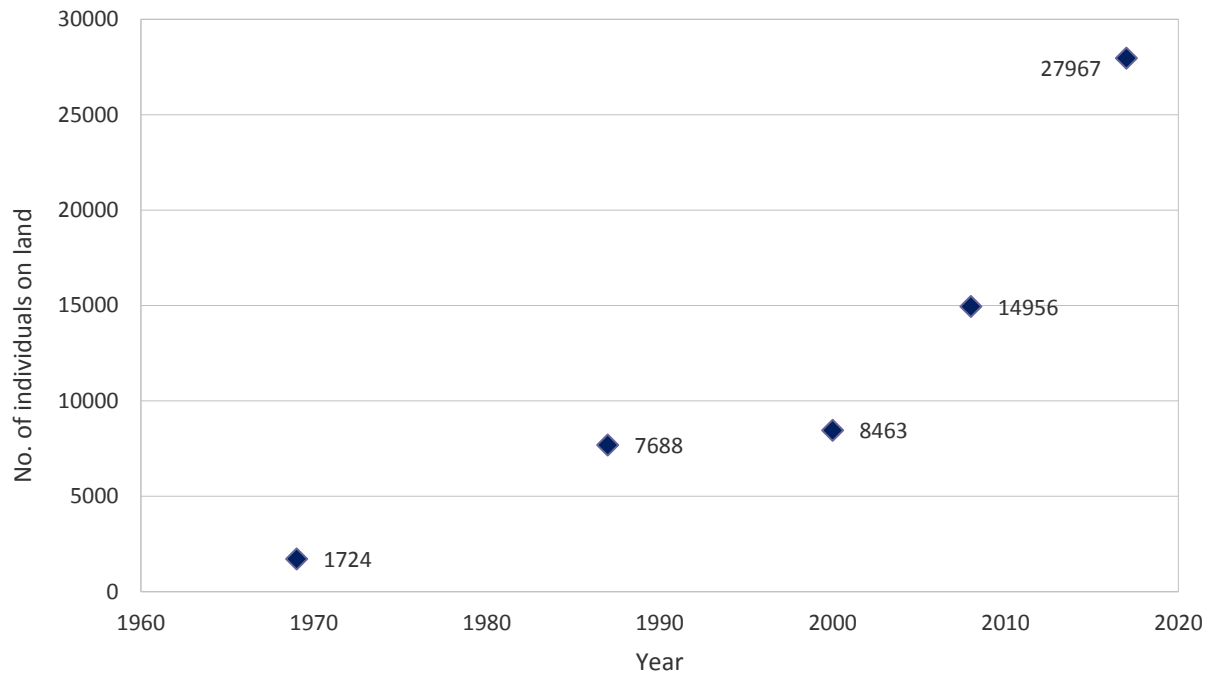


Figure 12 Trend in the breeding population of Razorbill *Alca torda* – original Flamborough Head and Bempton Cliffs SPA colon, excluding Filey Cliffs (1969-2017)

Although there are no known accurate counts of the Filey Cliffs colony prior to 2010, small numbers of birds were known to be breeding on the cliffs since the 1970s (YNU 1984) and had increased to 104 pairs in 1986 (Mather 1986). However, systematic sea-based counts carried out by the RSPB reveal that the number of birds counted on Filey Cliffs has increased from 814 individuals on land in 2010 to 2,261 individuals on land in 2017, a remarkable average annual population growth rate of 13.5%.

### Atlantic Puffin *Fratercula arctica*

A total of 2,879 individual Puffin were recorded rafting on the sea on 24 March 2017. The count for the original FH&BC SPA was 2,636 individuals, 16% higher than the first count in 2016 (Table Seven). These, the first and second pre-season counts of individual rafting Atlantic Puffin provide an important baseline population index for the F&FC pSPA against which future counts can be compared.

The analysis of historic data highlighted that the count methodologies used includes counts of individuals on land, individuals on the sea, and at widely varying times through the breeding season which unfortunately do not lend themselves to comparison.

Table 7 Pre-breeding season count of rafting Atlantic Puffin *Fratercula arctica* 2016 and 2017

	Number of rafting Atlantic Puffin (individuals)			
	Flamborough Head to Thornwick Bay	Thornwick Bay to Speeton Cliffs	Filey Cliffs	TOTAL
<b>22/23 March 2016</b>	805	1462	No count	<b>n/a</b>
<b>24 March 2017</b>	712	1924	243	<b>2,879</b>

## Discussion

The whole colony count reveals that the F&FC pSPA is one of the largest and most successful seabird colonies in the UK and currently supports a breeding assemblage of 149,272 pairs, equivalent to 298,544 breeding birds. However, the total number of birds using the colony at the height of the breeding season is substantially higher. Using average annual productivity data gathered over the last seven years (Babcock et al 2017), a minimum of 115,130 birds fledged from the colony in 2017 (Table Eight).

Table 8 The number of seabirds estimated to have fledged from the Flamborough and Filey Coast pSPA in 2017

	<b>Flamborough and Filey Coast pSPA count</b>	<b>Breeding pairs</b>	<b>Young birds fledged (mean productivity 2009-16)*</b>
<b>Northern Fulmar (AOS)</b>	1257	1257	691 (0.55)
<b>Northern Gannet (AOS)</b>	13,392	13,392	11,115 (0.83)
<b>European Shag (AON)</b>	25	25	73 (2.9)
<b>Great Cormorant (AON)</b>	27	27	not known
<b>Black-legged Kittiwake (AON)</b>	51,535	51,535	42,774 (0.83)
<b>Herring Gull (AOS)</b>	466	466	438 (0.94)
<b>Common Guillemot (individuals on land)</b>	90,861	**60,877	46,875 (0.77)
<b>Razorbill (individuals on land)</b>	30,228	***20,253	13,164 (0.65)
<b>Atlantic Puffin (individuals on the sea)</b>	2879	1440	not known
<b>TOTAL (minimum)</b>		149,272	115,130

\* based upon annual SMP productivity monitoring (RSPB unpublished)

\*\* conversion factor of 0.67 (Birkhead 1978, Harris 1989)

\*\*\* conversion factor of 0.67 (Lloyd 1975, Harris 1989))

The count also revealed the presence of large numbers of non-breeding birds which should also be factored into any environmental assessment. However, the standard count methodologies do not provide a clear indication of the proportion of non-breeding birds present in the population. For example, current count methodologies which focus on apparently occupied nests e.g. Black-legged Kittiwake, European Herring Gull, European Shag and Great Cormorant exclude non-breeders. A count of non-breeding Black-legged Kittiwake apparently occupied sites suggested a further 9% of the birds present were non-breeders. Northern Fulmar and Northern Gannet counts, using apparently occupied nest sites, will include many non-breeders although 'club' birds will be excluded and have to be counted separately. In 2017 the number of immature Northern Gannet attending 'clubs' of non-breeding birds was 1,169 birds equivalent to 4.5% of the breeding population. Counts of auks, which depend upon counting the number of individuals on land, do not make the distinction between breeding birds and non-breeders. Although anecdotal observations of a Razorbill productivity plot (n=100 pairs) also suggest a minimum of 10% of birds present on the cliff were non-breeders (Clarkson pers. comm.). The attendance pattern of non-breeding Atlantic Puffin on the Isle of May are known to change through the season with breeding adults returning in late March and early April, four-year-olds in early April, three-year-olds typically returning at the end of April or beginning of May and two-year-olds in June (Harris 1982). Historic high counts at F&FC, often reported later in the breeding season are likely to have included a large proportion of non-breeding birds. Although the data is inconclusive at present there clearly would be great benefit in better understanding the number of non-breeding birds present in the colony.

The health of the F&FC pSPA breeding seabird assemblage is generally very positive although a comparison of individual species population trends reveals a mixed picture. On the positive side, Northern Gannet, Common Guillemot and Razorbill have all undergone spectacular increases in the last 48 years, whilst Black-legged Kittiwake numbers have remained fairly stable, and may have increased slightly, since reported large declines in the 1980s. In contrast European Shag has undergone a small decline whilst Northern Fulmar and European Herring Gull have undergone significant population declines.

The growth in the F&FC pSPA colony is in sharp contrast to the widespread declines of seabird species reported at many Scottish colonies since 2000 (Miles 2013 and Miles et al 2016) and elsewhere in the UK and North-West Europe.

The F&FC pSPA colony, supports approximately 2.1% of the world population of Northern Gannet and has maintained an average annual growth rate of 10% per annum since 1999. This rate of growth is substantially higher than the Northern Gannet breeding population in Scotland which has increased by 33%, with an annual rate of increase of 2.9% per annum between 2003/4 and 2013/14 (Murray et al 2015). It is suggested that the lower and slowing rate of growth in many of the Scottish colonies is linked to density-dependent effects. We may now be seeing similar effects at the F&FC colony where, between 2008 and 2017, the annual rate of growth reduced to 7.6%. Productivity has remained high throughout the period 2009 – 2016 with an average of 0.84 chicks fledged per pair (Figure 13).

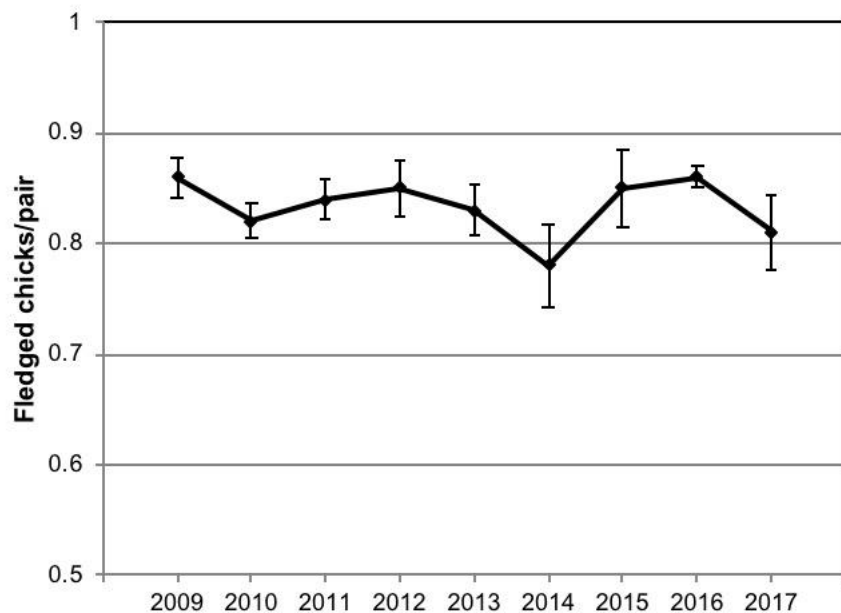


Figure 13 Northern Gannet *Morus bassanus* productivity - Flamborough and Filey Coast pSPA (2009 – 2017) (mean of plot productivity results plus/minus SE.)

That said, this is still a remarkable success story which suggests this species may be less sensitive to climate change and over-fishing than many other seabird species although they may be more vulnerable to some of the proposed ways of combating these problems. Thus, Northern Gannet

have been identified as one of the seabird species most at risk from collision mortality at offshore wind farms (Furness et al. 2013) and they may be impacted by changes in fisheries practice and an end to pelagic and demersal discards, which will remove a major source of prey for scavenging seabirds, including Northern Gannet.

When matched against changes elsewhere in the UK the dramatic increase in both the Common Guillemot and Razorbill populations correlates with ongoing increases in the Skomer, Rathlin and Farne Islands auk populations but elsewhere, and across much of Scotland the story is one of declines. A factor favouring the southern colonies is that these colonies coincide with the main range of the Sprat *Sprattus sprattus* (Heesen et al 2015) which provides a valuable alternative food source to sandeels. A study of the diet of Common Guillemot chicks at the F&FC pSPA, carried out since 2010 (Figure 14), shows an increasing proportion of Clupeids at the expense of Sandeels (Porter et al 2010, Aitken et al 2011, Aitken et al 2012, Babcock et al 2014, Babcock et al 2015 and Babcock et al 2016).

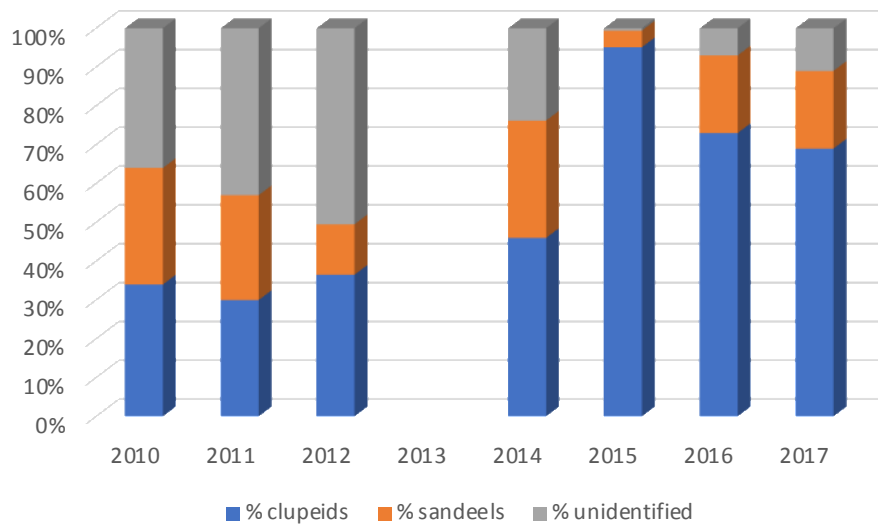


Figure 14 The proportion of Clupeids and Sandeel spp. in the diet of Common Guillemot *Uria aalge* chicks, Flamborough and Filey Coast pSPA, 2010-2017

Similarly, diet monitoring of Common Guillemot chicks on Skomer Island since 1973, reveals that the diet of mainly sprats with some sandeels and fewer gadids has remained consistent for

much of the period. However, in the last few years there has been a noticeable increase in gadids in the chick diet, which are a low-quality fish, with low calorific value. This shift in diet may signal an important change in the marine environment, possibly linked to climate change, and if it continues, could result in a major change in the Common Guillemot population (Riordan and Birkhead 2017).

With an average annual growth rate of 6% since 1969 the F&FC pSPA supports 4.4% of the global and 21.6% of the UK Razorbill population, based upon estimates of the world population in Mitchell et al 2004. The reasons behind such a large increase at this colony are unknown. However, the increases continue to be recorded over a 17-year period during which 3 whole colony counts have been undertaken using almost identical methodologies and involving some of the same experienced observers. The trend is also apparent in the annual study plot counts and from the productivity plots. It is clear that this is a very real effect and that at present we do not understand the drivers for the scale of increase.

In contrast the significant declines in the breeding population of the European Herring Gull and Northern Fulmar were recorded. The Flamborough Head and Bempton Cliffs colony data-set reveals that the Northern Fulmar population, following an ongoing increase between the 1960s and the year 2000, has declined by 38% since 2000. Whilst the Filey Cliffs colony has declined by an even more dramatic 31% since 2010. These declines mirror national trends with a 31% decrease noted across Seabird Monitoring Programme colonies between 2000 and 2015 (JNCC 2015). The decline is likely to be linked, at least in part, to the decline in the North Sea whitefish industry and a corresponding decline in the amount of offal discarded from its fleets - a trend which is likely to continue (Votier et al 2004). Declines in the abundance of natural prey such as sandeels in the North Sea and of certain species of zooplankton in the North Atlantic, are also likely to have had a detrimental effect on the population (JNCC 2015). Large numbers of Northern Fulmar may also still be caught and killed accidentally by the long-lining fleets in the Norwegian Sea and in the North Atlantic (Dunn & Steel 2001).

The UK coastal populations of European Herring Gull decreased by 54% between the 1969-70 (285,900 pairs) and 1998-2002 censuses (130,230 pairs) (JNCC 2015). During the same period the

FH&BC SPA colony declined by 42%. The decline continued unabated with a further 51% loss between Seabird 2000 and 2017. Factors influencing the ongoing decline are multiple and thought to include disease, decreases in the availability of food scavenged from refuse tips - associated with changes in refuse management in recent years (Madden & Newton 2004) and reductions in discards from fisheries (Furness et al 1992). Ground predators have also had an effect at some colonies. It is not known whether this decline in breeding numbers at F&FC pSPA is offset by the large increase in nesting European Herring Gulls reported in the adjacent urban towns of Bridlington, Filey and Scarborough. There is an urgent, ongoing need for a census of urban nesting gulls not just in local towns but across the UK.

At a time when the IUCN has red-listed the Black-legged Kittiwake and classed its global status as Vulnerable (BirdLife International 2017) the results of the 2017 colony count are even more significant. The 2017 F&FC pSPA count of 51,372 AON is equivalent to 20% of the UK population, assuming a maximum population of 250,000 pairs (JNCC 2015) and is the largest colony in the UK. Even more noteworthy is that, in contrast to much of the UK population, the F&FC pSPA population has remained fairly stable since the year 2000 and has increased by 6% during this period. Prior to the year 2000 it seems likely that the growth in the Black-legged Kittiwake population recorded throughout the 1950s-1960s continued into the 1980s and was followed by a decline in the 1990s. Which may in part have been driven by a decline in sandeel biomass in the North Sea which has occurred since the 1980s (Friederiksen et al 2004).

Black-legged Kittiwake breeding success and survival could be affected by two key factors (Friederiksen et al 2004). Firstly, the availability of sandeels *Ammodytes spp.* for food during the breeding season which may be affected by the impact of the North Sea sandeel fishery, and, secondly, a warming climate which can lead to rising sea surface temperatures and changes to stratification conditions, resulting in shifts in plankton distribution, abundance and availability which combine to reduce sandeel biomass and threaten Black-legged Kittiwake populations (Carroll et al 2015). GPS tracking studies of birds tagged from the F&FC pSPA colony, show adult breeding birds forage in the Dogger Bank and in adjacent, smaller offshore sandeel breeding grounds (Carroll et al 2015). An examination of data on fish mortality (level of catch), sandeel stocks, sea surface temperatures, and Black-legged Kittiwake breeding success found that lower



temperatures and lower fishing mortality in the Dogger Bank were positively associated with sandeel biomass, and higher sandeel biomass and lower fishing mortality were positively associated with Black-legged Kittiwake productivity (Carroll et al 2017). This may provide an early warning that Black-legged Kittiwake populations of eastern England are not isolated from effects of the fishery operating tens of kilometres from the coast. In light of these associations, and the ongoing decline in Black-legged Kittiwake breeding productivity there may be a need for a more precautionary approach to sandeel fishery management in which the sandeel stock has a greater opportunity to recover.

Perhaps the most popular question arising from the colony count, from both the media and the 110,000 visitors to the RSPB's Bempton Cliffs reserve was 'How many 'Puffins' are there and have they declined?' The answer is always going to be, within the constraints of current available technologies, that we don't know. The reality is that on a mainland colony almost all nests are hidden in inaccessible cracks or holes in vertical cliffs. Previous whole colony counts have included counts of individuals on land, individuals on land and sea and have been carried out at differing times in the breeding cycle and will have doubtless been influenced by the presence or absence of much more conspicuous non-breeding individuals. We therefore took the decision to discount all previous Atlantic Puffin counts and in 2016 commenced pre-breeding season counts of rafting individuals. The opportunity to count these birds is restricted to the first few days of arrival in mid-March when the breeding birds arrive en-masse, gather on the sea below or close to their nesting sites for 24 hours before commencing nest site inspection. Courtship and mating is often seen during these gatherings. In a situation where it is not possible to count or check nest burrows, due to their inaccessibility, a count, of pre-season rafting birds, carried out from land along the length of the colony, in this brief window, is probably the best index of the breeding population (Prof. Mike Harris pers. comm.). It is hoped that these counts will be carried out annually for the next three years to enable a five-year baseline to be established.

It is suggested that the Wild Bird Protection Act 1954 heralded the recovery of the colony, safeguarding the birds from shooting, disturbance and egg collecting. Protection that was enhanced by the Wildlife and Countryside Act 1981 and the designation of the Flamborough Head SSSI, and the Conservation of Habitats and Species Regulations (as amended 2010) and

designation of the SPA, SAC and subsequent forming of the European Marine Site. This protection was further enhanced by the creation of the RSPB's Bempton Cliffs nature reserve and Yorkshire Wildlife Trust's Flamborough Cliffs nature reserve. This legislation and protection has helped safeguard the breeding birds and has undoubtedly contributed to the recovery of the colony. However, there is a need to safeguard the key foraging areas of this seabird colony through the designation of marine protected areas and to work with the fishing industry and potential developers to safeguard the key foraging areas of these internationally important seabird populations.

Until recently, a combination of systematic boat-based and land-based counts has been the only realistic way to count the colony. Earlier attempts to use either land or boat-based counts could only produce broad estimates rather than accurate counts. Similarly, boat-based photographs proved impractical due to the height of the cliffs making it impossible to identify birds nesting towards the top of the high cliffs or nesting in dark cracks or crevices. However, with the advances in digital photography and the potential to harness both aircraft and drone-based photography, the production of more accurate counts and maintenance of the photographic record, should become a reality. The feasibility of using these different technologies and assessing their cost effectiveness and accuracy was investigated in 2017 and will be reported elsewhere once all results have been assessed and compared.

Despite the inaccessibility of much of the colony, which makes ringing and tagging birds problematic, the Flamborough and Filey Coast pSPA, thanks to the work of RSPB Bempton Cliffs staff and volunteers and the members of the Flamborough and Filey Bird Observatories, must be one of the most intensively studied seabird colonies in the UK. However, accessing and making sense of the historic data has proven to be a logistical challenge and highlighted the problems associated with many seabird monitoring schemes. There is a real need to better manage current data to ensure that it is safely and securely stored, accessible, underpinned by accurate metadata including GPS locations, detailed methodologies, photographs etc. and that the data gathering is quality controlled.

## Recommendations

Recommendations for future monitoring work include:

- original count data and methodologies for each count should be stored securely and made accessible – it is recommended that the JNCC Seabird Monitoring Programme is the most appropriate current location
- future counts should be verified with photographic evidence, taken simultaneously, to enable quality control and calibration of the accuracy of counts – ideally these photographs should be securely stored with the original data and be made accessible
- future counts and monitoring should maintain the original Seabird Monitoring Programme plot boundaries and distinction between FH&BC and Filey Cliffs to enable long-term intra-colony variations in population change and distribution
- the JNCC SMP database should be checked and amended where necessary to ensure that counts relating to the FH&BC SPA and F&FC pSPA are accurately recorded, and that count boundaries and names are correct
- the 2017 count should be published
- an assessment/count of the proportion of non-breeding birds present in the colony during the breeding season is undertaken
- a repeat whole colony count of the F&FC pSPA to be carried out at a minimum of every five years
- complete the comparative study of different count methodologies including land and sea-based observer, boat, drone and aircraft –based photography and determine most cost-effective count methodology for future counts. Use drone to calibrate accuracy of boat and land-based counts.
- undertake a survey of urban nesting gulls in adjacent towns
- maintain the Common Guillemot chick diet study

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## Appendix

### Appendix One: Summary of ornithological interest used by NE to inform the proposed Flamborough and Filey Coast pSPA

	Count (period)	% of subspecies or population (pairs)	Interest type
<b>Original classification:</b>			
Black-legged Kittiwake <i>Rissa tridactyla</i>	83,700 pairs (1987)	4% Western European	Migratory
<b>Revised proposal:</b>			
Black-legged Kittiwake <i>Rissa tridactyla</i>	44,520 pairs <sup>1</sup> 89,041 breeding adults <sup>2</sup> (2008-2011)	2% North Atlantic <sup>3</sup>	Migratory
Northern Gannet <i>Morus bassanus</i>	8,469 pairs <sup>4</sup> 16,938 breeding adults (2008-2012)	2.6% North Atlantic <sup>5</sup>	Migratory
Common Guillemot <i>Uria aalge</i>	41,607 pairs <sup>6</sup> 83,214 breeding adults (2008-2011)	15.6% ( <i>Uria aalge albionis</i> ) <sup>7</sup>	Migratory
Razorbill <i>Alca torda</i>	10,570 pairs <sup>8</sup> 21,140 breeding adults (2008-2011)	2.3% ( <i>Alca torda islandica</i> ) <sup>9</sup>	Migratory

	Count period	Average number of individuals
Seabird Assemblage	2008-2012	215,75010

1 Data from: Seabird Monitoring Programme (SMP) for original SPA (2008); RSPB counts for terrestrial extension (2009-2011), unpublished; black-legged Kittiwakes are counted as “apparently occupied nests” (AONs); 1 AON equates to 1 breeding pair.

2 Pairs multiplied by 2 to arrive at breeding adults; this rule applies to all species listed within the table.

3 Data from: AEWA (2012); 6,600,000 Ind. translated to pairs by dividing by 3 and compared to pairs reported for the revised SPA to derive % population.

4 Data from: SMP for original SPA (2008, 2009); RSPB counts for original SPA (2012), (Aitken et al. 2012); Northern Gannets are counted as AOSs; 1 AOS equates to 1 breeding pair.

5 Data from: AEWA (2012); 967,000 Ind. translated to pairs by dividing by 3 and compared to pairs reported for the revised SPA to derive % population.

6 Data from: SMP for original SPA (2008); RSPB counts for terrestrial extension (2009-2011), unpublished; Common Guillemots are counted as “individuals on land” (62,100 individuals on land (mean of counts 2008-2011)); individuals on land are multiplied by a correction factor of 0.67 (Harris 1989) to translate to breeding pairs.

7 Data from: AEWA (2012); 800,000 Ind. translated to pairs by dividing by 3 and compared to pairs reported for the revised SPA to derive % population.

8 Data from: SMP for original SPA (2008); RSPB counts for terrestrial extension (2009-2011), unpublished; Razorbills are counted as “individuals on land” (15,776 individuals on land (mean of counts 2008-2011)); individuals on land are multiplied by a correction factor of 0.67 (Harris 1989) to translate to breeding pairs.

9 Data from: AEWA (2012); 1,380,000 Ind. translated to pairs by dividing by 3 and compared to pairs reported for the revised SPA to derive % population.

Appendix Two: Filey Cliffs (Filey Brigg-Cunstone Nab proposed SSSI) whole colony counts 2010-2017

	YEAR	Northern Fulmar (AOS)	Great Cormorant (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (individ)	Razorbill (individ)	Atlantic Puffin (individuals rafting on sea)	Breeding seabird assemblage
actual count	21-May-10	597	20	6420	195	3100	814	nc	
calculated no. of individuals	21-May-10	1194	40	12840	390	4154	1091	nc	19709
actual count	03-Jun-11	554	38	7877	198	3007	1120	nc	
calculated no. of individuals	03-Jun-11	1108	76	15754	396	4029	1501	nc	22864
actual count	18-Jun-12	386	28	6837	115	2568	1315	nc	
calculated no. of individuals	18-Jun-12	772	56	13674	230	3441	1762	nc	19981
actual count	03-Jun-13	420	21	6935	186	3064	1403	nc	
calculated no. of individuals	03-Jun-13	840	42	13870	372	4106	1880	nc	21,121
actual count	31-May-14	372	27	nc	187	4257	1120	nc	nc
calculated no. of individuals	31-May-14	744	54		374	8514	2240		nc
actual count	12-Jun-15	nc	14	6546	nc	nc	nc	nc	nc
calculated no. of individuals	12-Jun-15		28	13092					nc
actual count	22-Jun-16	nc	13	5723	nc	nc	nc	nc	nc
calculated no. of individuals	22-Jun-16		26	11446					nc
	24-Mar-17							243	
actual count	10-Jun-17	411	27	6031	115	6214	2261	nc	
calculated no. of individuals	10-Jun-17	822	54	12062	230	8327	3030	243	24,768
% change since 2010		-31%	35%	-6%	-41%	100%	178%		
<b>Mean total population of breeding seabird assemblage (no. of individuals)</b>									<b>21689</b>

## Appendix Three: Seabird 2000 - Flamborough Head and Bempton Cliffs SPA whole colony count - Plot data - 1

Plot No	SMP plot name	Northern Fulmar (AOS)	Northern Gannet (AOS)	European Shag (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (Individuals on land)	Razorbill (Individuals on land)	Atlantic Puffin (Individuals on land)	Date	Timed count	Observers	Location
High Stacks - South Landing		61	0	0	115	14	0	0	0				
1	HEAD	0	0	0	0	0	0	0	0	12-Jun-00	853	TDC & DC	sea
2	HEAD	2	0	0	63	11	0	2	17	12-Jun-00	0857-0902	TDC & DC	sea
3	HEAD	0	0	0	150	2	0	0	0	12-Jun-00	0906-0908	TDC & DC	sea
4	HEAD	0	0	0	110	0	0	0	0	12-Jun-00	0908h	TDC & DC	sea
5	HEAD	1	0	0	190	0	47	3	29	12-Jun-00	0908-0916	TDC & DC	sea
6	HEAD	0	0	0	170	0	8	23	8	12-Jun-00	0916-21	TDC & DC	sea
7	HEAD	5	0	0	140	2	110	59	6	31-May-00	1510-1525	TDC & DC	sea
8	HEAD	1	0	0	5	12	0	0	0	31-May-00	1525-1530	TDC & DC	sea
9	HEAD	0	0	0	0	1	0	0	0	31-May-00	1555h	TDC & DC	sea
10	HEAD	0	0	0	50	2	0	0	0	31-May-00	1555-1600	TDC & DC	sea
11	HEAD	0	0	0	110	0	15	12	0	31-May-00	1602-1610	TDC & DC	sea
12	HEAD	2	0	0	240	1	30	9	1	31-May-00	1610-1615	TDC & DC	sea
13	HEAD	1	0	0	30	1	24	22	10	31-May-00	1615-1620	TDC & DC	sea
14	HEAD	18	0	0	780	0	670	98	24	31-May-00	1622-1640	TDC & DC	sea
15	HEAD	2	0	0	130	0	850	23	2	12-Jun-00	0942-0948	TDC & DC	sea
16	HEAD	8	0	0	190	0	510	34	3	12-Jun-00	0948-0954	TDC & DC	sea
17	HEAD	3	0	0	110	0	450	22	8	12-Jun-00	0954-0958	TDC & DC	sea
18	HEAD	2	0	2	140	0	350	4	4	12-Jun-00	0958-1002	TDC & DC	sea
19	HEAD	7	0	0	150	0	270	24	3	12-Jun-00	1002-1010	TDC & DC	sea
20	HEAD	5	0	0	120	1	480	33	4	12-Jun-00	1014-1017	TDC & DC	sea
21	HEAD	13	0	0	160	0	280	43	13	12-Jun-00	1040-1050	TDC & DC	sea
22	HEAD	11	0	0	72	2	220	84	24	12-Jun-00	1025-30	TDC & DC	sea
23	HEAD	5	0	0	102	1	37	21	9	12-Jun-00	1030-1035	TDC & DC	sea
24	HEAD	8	0	0	128	5	70	40	7	01-Jun-00	0955-1010	TDC & DC	sea
25	HEAD	13	0	0	350	0	440	67	20	01-Jun-00	0905-0950	TDC & DC	sea
26	HEAD	12	0	1	130	0	410	74	10	02-Jun-00	1140-1200	TDC & DC	sea
27	HEAD	23	0	3	260	0	610	200	14	02-Jun-00	1020-1038	TDC & DC	sea
28	HEAD	5	0	0	48	1	134	66	2	02-Jun-00	0958-1005	TDC & DC	sea
29	HEAD	8	0	1	60	8	21	61	0	02-Jun-00	0950-0955	TDC & DC	sea
30	BREIL	6	0	0	13	12	0	12	1	02-Jun-00	1040-1045	TDC & DC	sea
31	BREIL	3	0	2	10	0	0	1	7	12-Jun-00	1041-1042	TDC & DC	sea
32	BREIL	15	0	0	140	1	193	25	6	02-Jun-00	1120-1129	TDC & DC	sea
33	BREIL	4	0	0	120	1	35	24	0	02-Jun-00	1057-1101	TDC & DC	sea
34	BREIL	7	0	0	190	1	110	13	0	02-Jun-00	1045-1053	TDC & DC	sea
35	BREIL	1	0	0	230	1	110	11	0	02-Jun-00	0930-0940	TDC & DC	sea
36	BREIL	5	0	0	490	2	108	35	9	02-Jun-00	0917-0925	TDC & DC	sea
37	BREIL	8	0	0	190	1	215	35	2	02-Jun-00	1205-1210	TDC & DC	sea
38	BREIL	3	0	0	240	0	270	8	1	02-Jun-00	0900-0910	TDC & DC	sea
39	BREIL	1	0	3	950	5	940	32	3	02-Jun-00	0845-0900	TDC & DC	sea
40	BREIL	3	0	2	220	0	110	19	9	12-Jun-08	1052-1100	TDC & DC	sea

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = red highlight

## Appendix Three: Seabird 2000 - Flamborough Head and Bempton Cliffs SPA whole colony count - Plot data – 2

41	BREIL	1	0	4	430	0	440	20	2	12-Jun-08	0835-0845	TDC & DC	sea
42	BREIL	1	0	0	54	0	86	19	0	12-Jun-08	1105-1107	TDC & DC	sea
43	SCAR	2	0	0	210	1	420	46	6	01-Jun-08	1335-1345	TDC & DC	sea
44	SCAR	9	0	2	680	3	950	48	5	01-Jun-08	1355-1415	TDC & DC	sea
45	SCAR	17	0	0	1550	19	290	55	2	01-Jun-08	1420-1440	TDC & DC	sea
46	SCAR	3	0	0	1340	13	0	48	6	01-Jun-08	1450-1505	TDC & DC	land
47	SCAR	1	0	0	41	0	0	7	0	02-Jun-08	1220h	TDC & DC	land
48	SCAR	8	0	1	830	12	31	58	7	01-Jun-08	1522-1535	TDC & DC	sea
49	SCAR	0	0	0	290	16	0	22	7	01-Jun-08	1510-1517	TDC & DC	land
50	SCAR	0	0	0	23	0	13	15	0	02-Jun-08	1225h	TDC & DC	sea
51	SCAR	6	0	0	330	3	208	38	5	01-Jun-08	1547-1553	TDC & DC	land
52	SCAR	0	0	2	35	0	0	2	9	12-Jun-08	1115-1117	TDC & DC	sea
53	SCAR	3	0	0	34	0	0	16	2	01-Jun-08	1531-1540	TDC & DC	land
54	SCAR	9	0	0	250	3	169	38	7	02-Jun-08	1235-1245	TDC & DC	sea
55	SCAR	4	0	0	122	3	0	31	4	02-Jun-08	1330-1335	TDC & DC	sea
56	SCAR	3	0	0	130	0	0	4	2	12-Jun-08	1118-1121	TDC & DC	sea
57	SCAR	3	0	0	49	2	13	5	0	02-Jun-08	1303-1307	TDC & DC	sea
58	SCAR	0	0	0	80	0	32	17	0	12-Jun-08	1122-1125	TDC & DC	sea
59	SCAR	1	0	0	240	0	143	19	0	02-Jun-08	1307h	TDC & DC	sea
60	SCAR	5	0	0	28	1	26	15	4	02-Jun-08	1126-1128	TDC & DC	sea
61	SCAR	7	0	0	246	2	70	34	3	12-Jun-08	1130-1137	TDC & DC	sea
62	SCAR	5	0	0	270	3	0	21	5	01-Jun-08	1255-1300	TDC & DC	sea
63	SCAR	3	0	0	17	2	0	9	2	12-Jun-08	1138-1140	TDC & DC	sea
64	SCAR	11	0	0	184	9	0	40	16	12-Jun-08	1120-1225	TDC & DC	sea
65	SCAR	0	0	0	126	2	0	0	7	12-Jun-08	1225-1230	TDC & DC	sea
66	SCAR	0	0	0	33	6	0	0	15	12-Jun-08	1245-1250	TDC & DC	sea
67	SCAR	0	0	0	43	9	0	0	3	12-Jun-08	1345-1350	TDC & DC	sea
68	SCAR	5	0	0	60	4	42	7	22	12-Jun-08	1143-1147	TDC & DC	sea
69	SCAR	6	0	0	40	1	0	8	14	12-Jun-08	1215-1220	TDC & DC	sea
70	SCAR	4	0	2	23	8	18	25	26	12-Jun-08	1148-1151	TDC & DC	sea
71	SCAR	17	0	0	15	0	0	13	24	01-Jun-08	1155-1200	TDC & DC	sea
72	SCAR	10	0	0	80	1	15	12	3	01-Jun-08	1153h	TDC & DC	sea
73	SCAR	4	0	0	44	0	0	8	7	05-Jun-08	1205-1210	TDC & DC	sea
74	SCAR	5	0	0	130	2	37	3	0	12-Jun-08	1158-1202	TDC & DC	sea
75	SCAR									12-Jun-08		TDC & DC	sea
76	SCAR	4	0	0	140	0	0	12	6	12-Jun-08	1205-1208	TDC & DC	sea
77	SCAR	1	0	0	130	0	190	59	3	05-Jun-08	0850h	TDC & DC	sea
78	SCAR	18	0	0	190	5	11	60	5	05-Jun-08	0825-0835	TDC & DC	sea
79	THOR	0	0	0	0	0	0	0	0	05-Jun-08		TDC & DC	sea
80	THOR	4	0	0	112	3	0	4	0	01-Jun-08	1122-1132	TDC & DC	sea
81	THOR	9	0	0	88	0	0	0	4	01-Jun-08	1133-1137	TDC & DC	sea
82	THOR	5	0	0	120	1	0	4	0	01-Jun-08	1140-1145	TDC & DC	sea
83	THOR	1	0	0	0	1	0	0	0	12-Jun-08	1215h	TDC & DC	sea
84	THOR	2	0	0	60	0	40	30	0	12-Jun-08	1218-1224	TDC & DC	sea
85	THOR	9	0	0	17	4	28	42	3	05-Jun-08	0950-0958	TDC & DC	sea
86	THOR	9	0	0	0	2	0	3	5	05-Jun-08	0958-1002	TDC & DC	sea
87	THOR	0	0	0	0	0	0	0	0	05-Jun-08		TDC & DC	sea
88	THOR	0	0	0	0	2	0	0	0	05-Jun-08		TDC & DC	sea
89	NORT	0	0	0	0	14	0	0	0	05-Jun-08	1015-1030	TDC & DC	sea
90	NORT	1	0	0	23	0	14	1	0	05-Jun-08	0930-0932	TDC & DC	sea

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = red highlight

### Appendix Three: Seabird 2000 - Flamborough Head and Bempton Cliffs SPA whole colony count - Plot data – 3

Plot No		Fulmar	Gannet	Shag	Kittiwake	Herring Gull	Guillemot	Razorbill	Puffin	Date	Timed count	Observers	Location
91	NORT	4	0	0	121	1	7	49	23	05-Jun-08	1130-1137	TDC & DC	sea
92	NORT	15	0	0	143	3	114	66	14	05-Jun-08	1117-1124	TDC & DC	sea
93	NORT	11	0	0	130	3	60	51	7	05-Jun-08	1035-1042	TDC & DC	sea
94	NORT	19	0	0	210	4	590	49	11	05-Jun-08	1050-1058	TDC & DC	sea
95	NORT	4	0	0	40	1	91	53	3	05-Jun-08	1237-1241	TDC & DC	sea
96	NORT	2	0	0	15	0	170	31	12	05-Jun-08	1058-1102	TDC & DC	sea
97	NORT	3	0	0	190	0	390	41	11	12-Jun-08	1312-1320	TDC & DC	sea
98	NORT	17	0	0	190	1	130	37	9	12-Jun-08	1320-1327	TDC & DC	sea
99	NORT	8	0	0	70	2	100	27	14	12-Jun-08	1330-1337	TDC & DC	sea
100	NORT	14	0	0	90	2	190	18	9	12-Jun-08	1337-1341	TDC & DC	sea
101	NORT	5	0	0	60	0	110	21	9	12-Jun-08	1341-1344	TDC & DC	sea
102	NORT	15	0	0	260	8	110	42	14	12-Jun-08	1351-1400	TDC & DC	sea
103	NORT	10	0	0	40	12	90	24	11	12-Jun-08	1400-1407	TDC & DC	sea
104	NORT	12	0	0	120	7	130	14	5	12-Jun-08	1407-1412	TDC & DC	sea
105	NORT	8	0	0	120	6	130	48	15	12-Jun-08	1417-1423	TDC & DC	sea
106	DYKE	8	0	0	80	0	280	29	11	12-Jun-08	1423-1429	TDC & DC	sea
107	DYKE	12	0	0	250	2	150	38	7	12-Jun-08	1435-1441	TDC & DC	sea
108	DYKE	9	0	0	180	3	330	73	7	12-Jun-08	1441-1447	TDC & DC	sea
109	DYKE	12	0	0	170	10	130	18	15	12-Jun-08	1450-1456	TDC & DC	sea
110	DYKE	12	0	0	190	15	170	36	12	12-Jun-08	1505-1511	TDC & DC	sea
111	DYKE	4	0	0	310	6	240	31	5	12-Jun-08	1511-1520	TDC & DC	sea
112	DYKE	12	0	0	200	1	80	25	7	12-Jun-08	1530-1537	TDC & DC	sea
113	DYKE	7	0	0	250	12	630	29	10	12-Jun-08	1537-1542	TDC & DC	sea
114	DYKE	7	0	0	130	11	210	12	3	12-Jun-08	1542-1555	TDC & DC	sea
115	DYKE	5	0	0	210	5	410	28	10	12-Jun-08	1555-1600	TDC & DC	sea
116	DYKE	8	0	0	110	1	280	32	7	12-Jun-08	1600-1603	TDC & DC	sea
117	DYKE	10	0	0	370	8	490	64	18	13-Jun-08	0843-0854	TDC & DC	sea
118	WAND	11	0	1	490	27	630	52	7	13-Jun-08	0854-0902	TDC & DC	sea
119	WAND	4	0	0	110	27	50	20	2	13-Jun-08	0905-0911	TDC & DC	sea
120	WAND	5	0	0	260	4	680	54	3	13-Jun-08	0924-0933	TDC & DC	sea
121	WAND	5	0	0	330	0	930	57	8	13-Jun-08	0933-0947	TDC & DC	sea
122	WAND	5	0	0	360	3	840	156	23	13-Jun-08	0947-1001	TDC & DC	sea
123	WAND	3	0	0	210	3	280	62	10	13-Jun-08	1001-1009	TDC & DC	sea
124	WAND	6	0	0	340	15	220	45	25	13-Jun-08	1019-1026	TDC & DC	sea
125	WAND	6	0	0	280	14	340	126	62	31-May-08	0840-0855	TDC & DC	sea
126	WAND	16	0	0	380	1	380	121	94	31-May-08	0855-0925	TDC & DC	sea
127	WAND	13	0	0	340	16	760	50	22	31-May-08	0925-1000	TDC & DC	sea
128	WAND	6	0	0	320	6	420	50	5	13-Jun-08	1039-1050	TDC & DC	sea
129	WAND	12	0	0	560	3	340	58	22	30-May-08	1330-1345	TDC & DC	sea
130	WAND	8	0	0	490	1	180	46	14	30-May-08	1315-1330	TDC & DC	sea
131	WAND	5	0	0	310	2	320	24	39	30-May-08	1300-1315	TDC & DC	sea
132	WAND	19		1	1140	4	840	130	104	30-May-08	1230-1300	TDC & DC	sea
133	GRAN	1		0	36	0	50	15	0	13-Jun-08	1055-1057	TDC & DC	sea
134	GRAN	22		0	210	4	710	470	156	26-May-08	1230-1400	TDC & DC	land
135	GRAN	14		0	670	3	1440	401	117	26-May-08	1405-1515	TDC & DC	land
136	GRAN	31		0	260	3	360	186	39	26-May-08	1525-1600	TDC & DC	land
137	GRAN	7		0	17	3	0	5	1	30-May-08	1055-1105	TDC & DC	sea
138	GRAN	11		0	54	4	460	109	41	30-May-08	1105-1245	TDC & DC	sea
139	GRAN	7		0	620	12	650	48	34	13-Jun-08	1107-1114	TDC & DC	sea
140	GRAN	8		0	390	6	1260	124	34	13-Jun-08	1114-1129	TDC & DC	sea
141	GRAN	5		0	1030	6	1030	77	22	13-Jun-08	1145-1200	TDC & DC	sea
142	GRAN	5		0	430	3	520	31	14	13-Jun-08	1200-1208	TDC & DC	sea
143	BART	17		0	550	4	580	50	13	13-Jun-08	1200-1234	TDC & DC	sea
144	BART	4		0	350	1	740	57	15	13-Jun-08	1355-1410	TDC & DC	sea
145	BART	0		0	460	2	460	44	19	05-Jun-08	1435-1445	TDC & DC	land
146	BART	6		0	370	2	510	19	6	13-Jun-08	1250-1255	TDC & DC	sea
147	BART	8		0	1030	1	1720	139	38	16-Jun-08	0845-0900	TDC & DC	sea
148	BART	4		0	520	3	400	61	18	05-Jun-08	1445-1455	TDC & DC	land
149	BART	7		0	820	4	560	112	13	16-Jun-08	0900-0915	TDC & DC	sea
150	BART	6		0	510	4	700	82	8	16-Jun-08	0928-0940	TDC & DC	sea

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight

# Appendix Three: Seabird 2000 - Flamborough Head and Bempton Cliffs SPA whole colony count - Plot data – 4

Plot No		Fulmar	Gannet	Shag	Kittiwake	Herring Gull	Guillemot	Razorbill	Puffin	Date	Timed count	Observers	Location
151	BART	2		1	250	1	590	36	9	16-Jun-08	0944-0950	TDC & DC	sea
152	BART	7		1	370	0	870	64	21	16-Jun-08	0952-1005	TDC & DC	sea
153	BART	7		0	720	6	610	84	38	16-Jun-08	1010-1019	TDC & DC	sea
154	BART	8		0	340	3	420	76	34	16-Jun-08	1022-1028	TDC & DC	sea
155	JUBI	5		0	480	3	410	68	14	16-Jun-08	1030-1036	TDC & DC	sea
156	JUBI	18		2	570	4	940	293	24	16-Jun-08	1050-1104	TDC & DC	sea
157	JUBI	5		0	240	3	130	53	6	16-Jun-08	1105-1108	TDC & DC	sea
158	JUBI	13		0	230	3	510	112	68	16-Jun-08	1117-1125	TDC & DC	sea
159	JUBI	12		0	240	10	410	115	61	16-Jun-08	1127-1136	TDC & DC	sea
160	JUBI	19		0	550	6	520	91	42	16-Jun-08	1140-1151	TDC & DC	sea
161	BUCK	11		0	310	6	590	84	40	16-Jun-08	1152-1159	TDC & DC	sea
162	BUCK	7		0	250	3	430	88	22	16-Jun-08	1201-1208	TDC & DC	sea
163	BUCK	9		0	230	3	260	53	66	16-Jun-08	1219-1227	TDC & DC	sea
164	BUCK	13		0	310	5	640	91	28	16-Jun-08	1229-1237	TDC & DC	sea
165	BUCK	15		0	230	2	800	145	60	16-Jun-08	1257-1308	TDC & DC	sea
166	BUCK	3		0	120	0	240	79	38	16-Jun-08	1313-1320	TDC & DC	sea
167	TRIG	9		0	270	0	280	71	52	16-Jun-08	1330-1336	TDC & DC	sea
168	TRIG	12		0	120	2	440	77	40	16-Jun-08	1337-1344	TDC & DC	sea
169	TRIG	4		0	140	1	350	119	25	16-Jun-08	1345-1350	TDC & DC	sea
170	TRIG	9		0	380	7	320	131	72	16-Jun-08	1400-1409	TDC & DC	sea
171	TRIG	8		0	300	4	420	92	34	16-Jun-08	1412-1420	TDC & DC	sea
172	TRIG	9		0	350	3	340	83	20	16-Jun-08	1421-1425	TDC & DC	sea
173	TRIG	5		0	70	1	10	11	2	16-Jun-08	1425-1430	TDC & DC	sea
174	TRIG	1		0	130	3	40	22	6	16-Jun-08	1445-1452	TDC & DC	sea
175	SPEE	39		0	280	34	20	40	2	16-Jun-08	1452-1502	TDC & DC	sea
176	SPEE	36		0	540	14	40	61	1	16-Jun-08	1505-1520	TDC & DC	sea
177	SPEE	33		0	33	14	0	0	0	16-Jun-08	1523-1530	TDC & DC	sea
178	SPEE	13		0	0	18	0	0	0	16-Jun-08	1533-1536	TDC & DC	sea
<b>Flamborough and Filey Coast pSPA Whole colony</b>		<b>Northern Fulmar (AOS)</b>	<b>Northern Gannet (AOS) 1999</b>	<b>European Shag (AON)</b>	<b>Black-legged Kittiwake (AON)</b>	<b>European Herring Gull (AON)</b>	<b>Common Guillemot (Individuals on land)</b>	<b>Razorbill (Individuals on land)</b>	<b>Atlantic Puffin (Individuals on land)</b>				
<b>FH&amp;BC exc High Stacks - South Landing</b>		<b>1299</b>	<b>2552</b>	<b>31</b>	<b>42467</b>	<b>705</b>	<b>47215</b>	<b>8463</b>	<b>2629</b>				
<b>FH&amp;BC</b>		<b>1360</b>	<b>2552</b>	<b>31</b>	<b>42582</b>	<b>719</b>	<b>47215</b>	<b>8463</b>	<b>2629</b>				

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight



Appendix Four: 2008 Flamborough Head and Bempton Cliffs SPA whole colony count Plot data – 1:

Plot No	SMP Plot name	Northern Fulmar (AOS)	Northern Gannet (AOS)	European Shag (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (Individuals on land)	Razorbill (Individuals on land)	Date	Timed count	Observers	Location
<b>High Stacks - South Landing</b>												
		n/c	n/c	n/c	n/c	n/c	n/c	n/c				
1	HEAD	0	0	0	0	0	0	0	05-Jun-08	1640	KC	sea
2	HEAD	1	0	0	132	15	5	10	05-Jun-08	1640-1645	KC	sea
3	HEAD	0	0	0	225	1	0	3	05-Jun-08	1650-1655	KC	sea
4	HEAD	0	0	0	153	1	1	17	05-Jun-08	1655	KC	sea
5	HEAD	2	0	0	242	0	1	10	05-Jun-08	1655-1700	KC	sea
6	HEAD	1	0	0	174	1	0	30	05-Jun-08	1700-1710	KC	sea
7	HEAD	2	0	0	61	1	60	23	05-Jun-08	1710-1715	KC	sea
8	HEAD	4	0	0	8	16	0	0	05-Jun-08	1715-1720	KC	sea
9	HEAD	0	0	0	0	0	0	0	05-Jun-08	1720	KC	sea
10	HEAD	0	0	0	50	0	0	6	05-Jun-08	1720	KC	sea
11	HEAD	0	0	0	173	1	0	40	05-Jun-08	1725	KC	sea
12	HEAD	1	0	0	430	4	15	29	05-Jun-08	1725-35	KC	sea
13	HEAD	1	0	0	210	0	55	36	05-Jun-08	1725-40	KC	sea
14	HEAD	4	0	0	918	1	555	92	08-Jun-08	1720-1750	KC & WD	sea
15	HEAD	2	0	1	45	0	850	37	08-Jun-08	1710-1720	KC & WD	sea
16	HEAD	5	0	0	115	0	420	102	08-Jun-08	1700-1710	KC & WD	sea
17	HEAD	1	0	0	75	0	560	60	08-Jun-08	1655-1700	KC & WD	sea
18	HEAD	1	0	0	127	0	145	56	08-Jun-08	1650-55	KC & WD	sea
19	HEAD	3	0	1	117	0	370	109	08-Jun-08	1645-1650	KC & WD	sea
20	HEAD	7	0	0	425	0	700	95	08-Jun-08	1630-1645	KC & WD	sea
21	HEAD	7	0	0	115	0	720	77	08-Jun-08	1610-1630	KC & WD	sea
22	HEAD	9	0	0	140	1	725	175	08-Jun-08	1550-1610	KC & WD	sea
23	HEAD	2	0	0	55	0	225	138	08-Jun-08	1545-1550	KC & WD	sea
24	HEAD	5	0	0	125	0	225	123	08-Jun-08	1530-1545	KC & WD	sea
25	HEAD	5	0	0	340	1	965	142	08-Jun-08	1515-1530	KC & WD	sea
26	HEAD	7	0	0	161	1	970	295	08-Jun-08	1450-1515	KC & WD	sea
27	HEAD	4	0	0	75	0	530	200	08-Jun-08	1430-1450	KC & WD	sea
28	HEAD	9	0	0	65	0	195	175	08-Jun-08	1410-1430	KC & WD	sea
29	HEAD	4	0	0	157	5	56	196	04-Jun-08	1340-1355h	KC	
30	BREIL	3	0	1	23	1	0	14	04-Jun-08	1405-1410	KC	
31	BREIL	2	0	0	12	1	0	18		1400-1405	KC	
32	BREIL	3	0	1	130	4	345	127	09-Jun-08	0910-0920	KC	sea
33	BREIL	4	0	0	116	2	65	32	09-Jun-08	0920-0925	KC	sea
34	BREIL	0	0	0	155	1	52	14	09-Jun-08	0925-0930	KC	sea
35	BREIL	6	0	0	42	0	661	102	04-Jun	1430-1505	KC	sea
36	BREIL	3	0	0	405	2	180	108	09-Jun-08	0930-0950	KC	sea
37	BREIL	0	0	0	145	0	80	30	09-Jun-08	0950-1000	KC	sea
38	BREIL	0	0	0	452	0	245	11	09-Jun-08	1005-1010	KC	sea
39	BREIL	1	0	1	943	1	1119	35	08-Jun-08	1330-1410	KC&WD	sea
40	BREIL	0	0	0	159	0	175	76	08-Jun-08	1325-1330	KC&WD	sea
41	BREIL	2	0	5	343	0	345	40	08-Jun-08	1310-1325	KC&WD	sea
42	BREIL	0	0	0	110	0	200	12	08-Jun-08	1300-1310	KC&WD	sea
43	SCAR	0	0	0	87	0	485	43	08-Jun-08	1250-1300	KC&WD	sea
44	SCAR	7	0	2	666	1	1850	231	08-Jun-08	1230-1250	KC&WD	sea
45	SCAR	9	0	0	1031	14	264	192	02-Jun	1600-1645	KC	land
46	SCAR	7	0	0	1258	19	0	211	10-Jun-08	1700-1720	KC&WD	land
47	SCAR	0	0	0	45	0	1	11	09-Jun-08	1045	KC	sea
48	SCAR	6	0	1	435	8	72	197	02-Jun	1645-1700	KC	land
49	SCAR	2	0	2	204	24	19	64	02-Jun	1530-1600	KC	land
50	SCAR	0	0	0	9	2	50	7	09-Jun-08	1050-1055	KC	sea
51	SCAR	9	0	0	176	2	430	100	05-Jun-08	1150-1200	KC	land
52	SCAR	0	0	2	135	1	25	59	09-Jun-08	1055-1105	KC	sea
53	SCAR	1	0	0	61	1	15	24	09-Jun-08	1105-1110	KC	sea
54	SCAR	2	0	0	93	2	185	35	09-Jun-08	1110-1115	KC	sea
55	SCAR	3	0	0	55	1	0	42	05-Jun-08	1140-1145	KC	sea
56	SCAR	1	0	0	52	0	0	34	09-Jun-08	1120	KC	sea
57	SCAR	2	0	0	44	1	20	23	09-Jun-08	1115-1120	KC	sea
58	SCAR	1	0	0	6	0	45	8	09-Jun-08	1120-1125	KC	sea
59	SCAR	0	0	0	135	0	85	9	09-Jun-08	1125-1120	KC	sea
60	SCAR	1	0	0	42	1	70	86	09-Jun-08	1140	KC	sea
61	SCAR	5	0	0	435	1	10	98	09-Jun-08	1140	KC	sea
62	SCAR	1	0	0	100	1	0	20	06-Jun-08	1125-30	KC	land
63	SCAR	6	0	0	36	1	35	44	06-Jun-08	1135-40	KC	land
64	SCAR	10	0	0	131	3	76	170	06-Jun-08	1050-1100	KC	land
65	SCAR	0	0	0	55	0	0	0	06-Jun-08	1045-50	KC	land
66	SCAR	0	0	0	14	0	0	0	06-Jun-08	1050	KC	land
67	SCAR	0	0	0	0	7	0	0	06-Jun-08	1115-20	KC	land
68	SCAR	6	0	0	0	5	0	6	05-Jun-08	1625	KC	sea
69	SCAR	2	0	2	117	2	45	85	05-Jun-08	1615-25	KC	sea
70	SCAR	3	0	0	112	4	0	30	05-Jun-08	1605-15	KC	sea
71	SCAR	10	0	0	12	1	55	71	05-Jun-08	1030-35	KC	land
72	SCAR	7	0	0	92	1	125	44	05-Jun-08	1600-05	KC	sea
73	SCAR	1	0	0	0	0	0	0	05-Jun-08	1555	KC	sea
74	SCAR	5	0	0	70	0	10	26	05-Jun-08	1550-55	KC	sea
75	SCAR	0	0	0	0	0	0	0				



## Appendix Four: 2008 Flamborough Head and Bempton Cliffs SPA whole colony count Plot data – 2

76	SCAR	2	0	0	188	0	0	77	05-Jun-08	1540-50	KC	sea
77	SCAR	1	0	0	109	1	247	120	05-Jun-08	1530-40	KC	sea
78	SCAR	1	0	0	87	1	35	31	05-Jun-08	1525-1530	KC	sea
79	THOR	3	0	0	23	1	0	29	16-Jun-08	0800-0815	KC	land
80	THOR	4	0	0	246	2	13	0	04-Jun-08		KC	sea
81	THOR	9	0	0	96	0	0	9	04-Jun-08		KC	sea
82	THOR	5	0	0	180	0	0	25	04-Jun-08		KC	sea
83	THOR	1	0	0	0	0	0	4	04-Jun-08		KC	sea
84	THOR	0	0	0	62	0	153	154	04-Jun-08		KC	sea
85	THOR	6	0	0	41	0	72	163	04-Jun-08		KC	sea
86	THOR	1	0	0	0	1	0	7	04-Jun-08		KC	sea
87	THOR	0	0	0	0	0	0	0	05-Jun-08	1310	KC	sea
88	THOR	0	0	0	0	0	0	0	05-Jun-08	1310	KC	sea
89	NORT	2	0	0	1	9	0	7	05-Jun-08	1310	KC	sea
90	NORT	2	0	0	45	1	20	23	05-Jun-08	1505-10	KC	sea
91	NORT	2	0	0	165	1	0	34	05-Jun-08	1500-1505	KC	sea
92	NORT	8	0	0	69	1	55	69	05-Jun-08	1450-1500	KC	sea
93	NORT	4	0	0	101	2	115	56	05-Jun-08	1440-50	KC	sea
94	NORT	18	0	0	166	3	645	93	05-Jun-08	1425-40	KC	sea
95	NORT	11	0	0	33	1	155	28	05-Jun-08	1420-25	KC	sea
96	NORT	1	0	0	2	1	290	21	05-Jun-08	1410-1420	KC	sea
97	NORT	3	0	0	146	1	815	145	05-Jun-08	1355-1410	KC	sea
98	NORT	14	0	0	165	2	445	140	05-Jun-08	1345-55	KC	sea
99	NORT	14	0	0	75	2	280	110	05-Jun-08	1335-45	KC	sea
100	NORT	10	0	0	105	2	650	90	05-Jun-08	1315-1335	KC	sea
101	NORT	3	0	0	0	0	0	143	04-Jun-08	1425-1430h	KC	sea
102	NORT	3	0	0	14	3	65	24	09-Jun-08	1238-43	KC	sea
103	NORT	14	0	0	147	10	510	105	09-Jun-08	1245-1300	KC	sea
104	NORT	4	0	0	73	10	370	90	09-Jun-08	1300-1307	KC	sea
105	NORT	6	0	0	80	8	450	96	09-Jun-08	1307-1317	KC	sea
106	DYKE	4	0	0	55	1	605	90	09-Jun-08	1317-1330	KC	sea
107	DYKE	5	0	0	66	3	475	114	09-Jun-08	1330-1345	KC	sea
108	DYKE	5	0	0	88	6	285	140	09-Jun-08	1345-1400	KC	sea
109	DYKE	6	0	0	63	19	115	64	09-Jun-08	1400-1410	KC	sea
110	DYKE	4	0	0	32	27	285	111	09-Jun-08	1415-1422	KC	sea
111	DYKE	0	0	0	132	5	725	86	09-Jun-08	1422-1438	KC	sea
112	DYKE	2	0	0	235	2	1045	162	09-Jun-08	1445-1500	KC	sea
113	DYKE	4	0	0	331	2	660	185	09-Jun-08	1500-1510	KC	sea
114	DYKE	6	0	0	166	7	375	118	17-Jun-08	1330-1345	KC, WD & MF	sea
115	DYKE	6	0	0	182	3	489	148	17-Jun-08	1345-1400	KC, WD & MF	sea
116	DYKE	5	0	0	131	1	920	114	17-Jun-08	1400-1410	KC, WD & MF	sea
117	DYKE	4	0	0	163	8	586	113	17-Jun-08	1410-1425	KC, WD & MF	sea
118	WAND	14	0	1	381	26	1325	188	17-Jun-08	1425-1440	KC & WD	sea
119	WAND	1	0	0	66	6	65	51	17-Jun-08	1440-1450	MF	sea
120	WAND	1	0	0	375	6	1050	111	17-Jun-08	1450-1515	KC, WD & MF	sea
121	WAND	1	28	0	220	1	830	69	17-Jun-08	1450-1515	KC, WD & MF	sea
122	WAND	3	27	0	245	0	690	135	17-Jun-08	1515-1530	WD & MF	sea
123	WAND	7	0	0	108	1	90	79	17-Jun-08	1515-1530	KC	sea
124	WAND	5	0	0	64	14	260	93	17-Jun-08	1535-1550	KC, WD & MF	sea
125	WAND	6	0	0	371	23	675	219	17-Jun-08	1535-1550	KC, WD & MF	sea
126	WAND	20	1	0	208	10	370	147	17-Jun-08	1015-1025	KC, WD & MF	land & sea
127	WAND	6	0	1	307	6	705	167	17-Jun-08	1555-1610	KC, WD & MF	sea
128	WAND	2	0	0	181	13	485	21	19-Jun-08	1130-1200	KC, IK & CT	sea
129	WAND	4	0	0	230	5	150	12	19-Jun-08	1200-1220	KC, IK & CT	sea
130	WAND	10	0	0	850	3	570	50	19-Jun-08	0800-0830	KC	land
131	WAND	3	0	0	600	3	280	72	17-Jun-08	1130-1215	KC & WD	land
132	WAND	6	374	1	600	2	690	100	17-Jun-08	1045-1120	KC & WD	land
133	GRAN	6	170	0	107	0	205	60	19-Jun-08	0900-0910	KC & CT	land & sea
134	GRAN	7	97	0	135	1	145	120	19-Jun-08	0915-0930	KC	land
135	GRAN	8	134	0	550	3	1050	230	19-Jun-08	1000-1020	KC	land
136	GRAN	10	0	0	110	4	205	96	19-Jun-08	1020-1040	KC	land & sea
137	GRAN	0	0	0	71	3	110	93	19-Jun-08	1220-1240	KC & CT	sea
138	GRAN	4	0	0	495	5	790	127	19-Jun-08	1240-1310	KC & CT	sea
139	GRAN	2	0	0	315	1	850	240	19-Jun-08	1310-1330	KC & CT	sea
140	GRAN	7	0	0	470	3	1445	190	20-Jun-08	1115-1135	KC & WD	sea
141	GRAN	6	0	0	648	0	900	68	20-Jun-08	1140-1150	KC & WD	sea
142	GRAN	9	0	0	710	4	1565	129	20-Jun-08	1145-1200	KC & WD	sea
143	BART	11	0	0	440	0	810	104	20-Jun-08	1200-1215	KC & WD	sea
144	BART	3	0	0	505	0	535	42	20-Jun-08	1220-1230	KC & WD	sea
145	BART	8	146	0	685	0	1440	141	20-Jun-08	1245-1300	KC & WD	sea
146	BART	8	34	0	435	0	765	118	20-Jun-08	1305-1330	KC & WD	sea
147	BART	5	66	0	810	0	840	123	20-Jun-08	1330-1345	KC & WD	sea
148	BART	4	97	0	100	1	690	136	20-Jun-08	1345-1400	KC & WD	sea
149	BART	3	204	0	440	0	320	84	20-Jun-08	1400-1420	KC & WD	sea
150	BART	2	105	2	350	0	665	175	20-Jun-08	1420-1440	KC & WD	sea

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight

## Appendix Four: 2008 Flamborough Head and Bempton Cliffs SPA whole colony count Plot data – 3

Plot No		Fulmar	Gannet	Shag	Kittiwake	Herring Gull	Guillemot	Razorbill	Date	Timed count	Observers	Location
151	BART	3	109	0	301	1	795	74	20-Jun-08	1450-1515	KC&WD	sea
152	BART	10	254	0	670	2	840	134	20-Jun-08	1525-1545	KC&WD	sea
153	BART	8	380	0	1060	3	500	147	20-Jun-08	1550-1610	KC&WD	sea
154	BART	6	222	0	740	0	615	132	20-Jun-08	1615-1630	KC&WD	sea
155	JUBI	1	290	0	775	4	595	137	20-Jun-08	1640-1655	KC&WD	sea
156	JUBI	1	58	0	140	1	120	143	20-Jun-08	1700-1720	KC&WD	sea
157	JUBI	5	26	0	275	5	500	140	20-Jun-08	1720-1735	KC&WD	sea
158	JUBI	16	211	0	300	2	420	182	20-Jun-08	1745-1800	KC&WD	sea
159	JUBI	0	516	0	274	0	215	83	20-Jun-08	1810-1825	KC&WD	sea
160	JUBI	13	102	0	465	0	580	210	20-Jun-08	1825-1845	KC&WD	sea
161	BUCK	16	131	0	336	5	1075	148	25-Jun-08	1245-1310	KC&WD	sea
162	BUCK	13	285	0	233	1	700	93	25-Jun-08	1310-1330	KC&WD	sea
163	BUCK	13	19	0	190	2	285	61	25-Jun-08	1330-1350	KC&WD	sea
164	BUCK	7	180	0	169	1	595	53	25-Jun-08	1350-1415	KC&WD	sea
165	BUCK	4	501	0	169	1	660	116	25-Jun-08	1415-1445	KC&WD	sea
166	BUCK	0	574	0	149	0	164	78	25-Jun-08	1445-1515	KC&WD	sea
167	TRIG	3	390	0	200	0	301	79	25-Jun-08	1515-1535	KC&WD	sea
168	TRIG	12	140	0	116	4	315	106	25-Jun-08	1535-1555	KC&WD	sea
169	TRIG	2	115	0	135	0	410	103	25-Jun-08	1555-1630	KC&WD	sea
170	TRIG	8	23	0	105	4	250	83	25-Jun-08	1630-1655	KC&WD	sea
171	TRIG	10	151	0	179	2	180	155	17-Jun-08	1730-1745	KC, WD & MF	sea
172	TRIG	4	226	0	261	0	161	132	17-Jun-08	1720-1730	KC, WD & MF	sea
173	TRIG	3	0	0	39	1	35	50	17-Jun-08	1715-1720	KC, WD & MF	sea
174	TRIG	9	0	0	102	13	99	138	17-Jun-08	1705-1715	KC, WD & MF	sea
175	SPEE	28	0	0	38	20	55	40	17-Jun-08	1700-1705	KC, WD & MF	sea
176	SPEE	34	0	0	295	11	50	146	17-Jun-08	1640	KC, WD & MF	sea
177	SPEE	15	0	0	0	1	0	0	17-Jun-08	1635	KC, WD & MF	sea
178	SPEE	12	0	0	0	2	0	0	17-Jun-08	1635	KC, WD & MF	sea
<b>TOTAL</b>		<b>869</b>	<b>6386</b>	<b>24</b>	<b>37617</b>	<b>541</b>	<b>59817</b>	<b>14956</b>				
Flamborough Head and Bempton Cliffs exc High Stacks-South landing 2008 Count		Northern Fulmar (AOS)	Northern Gannet (AOS)	European Shag (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (Individuals on land)	Razorbill (Individuals on land)				
		869	6,386	24	37,617	541	59,817	14,956				

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight

## Appendix Five: 2017 Flamborough Head and Bempton Cliffs SPA whole colony count – plot data - 1

Plot No	SMP Plot Name	Northern Fulmar (AOS)	Northern Gannet (AOS)	European Shag (AON)	Great Cormorant (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (IND)	Razorbill (IND)	Atlantic Puffin (IND)	Date	Timed count	Observers	Plot No
South Landing to Plot One		56	0	0		175	24	0	0	0	30-May-17	1330h-1500h	KC	South Landing to Plot One
1	HEAD	0	0	0	0	0	0	0	0	0	30-May-17	1500h	KC	1
2	HEAD	0	0	0	0	170	11	7	11	1	30-May-17	1505h	KC	2
3	HEAD	0	0	0	0	285	1	0	2	0	30-May-17	1510h	KC	3
4	HEAD	0	0	0	0	107	0	15	35	0	30-May-17	1520h	KC	4
5	HEAD	0	0	0	0	357	0	91	45	1	18-May-17	1330h	KC, DA, MB, DF, SP & SW	5
6	HEAD	1	0	0	0	134	1	88	63	0	18-May-17	1345h	KC, DA, MB, DF, SP & SW	6
7	HEAD	4	0	0	0	23	0	53	71	5	18-May-17	1400h	KC, DA, MB, DF, SP & SW	7
8	HEAD	1	0	0	0	0	14	0	0	0	30-May-17	1630h	KC	8
9	HEAD	0	0	0	0	0	0	0	0	0	30-May-17	1640h	KC	9
10	HEAD	0	0	0	0	114	0	0	9	0	30-May-17	1650h	KC	10
11	HEAD	0	0	0	0	185	1	2	6	0	30-May-17	1710h	KC	11
12	HEAD	7	0	0	0	577	4	27	32	0	30-May-17	1730h	KC	12
13	HEAD	2	0	0	0	64	0	38	29	0	30-May-17	1630h	KC	13
14	HEAD	12	0	0	0	1185	2	938	148	29	05-Jun-17	0800h	KC	14
15	HEAD	0	0	0	0	35	0	785	78	3	13-Jun-17	0830h	KC and MB	15
16	HEAD	0	0	0	0	150	0	900	172	0	18-May-17	1415h	KC, DA, MB, DF, SP & SW	16
17	HEAD	3	0	0	0	115	0	450	72	1	18-May-17	1430h	KC, DA, MB, DF, SP & SW	17
18	HEAD	1	0	0	0	115	0	152	52	2	18-May-17	1445h	KC, DA, MB, DF, SP & SW	18
19	HEAD	7	0	0	0	173	1	720	85	1	18-May-17	1500h	KC, DA, MB, DF, SP & SW	19
20	HEAD	4	0	0	0	135	0	962	143	6	18-May-17	1500h	KC, DA, MB, DF, SP & SW	20
21	HEAD	7	0	0	0	110	0	490	163	5	18-May-17	1515h	KC, DA, MB, DF, SP & SW	21
22	HEAD	6	0	0	0	23	0	146	86	3	18-May-17	1530h	KC, DA, MB, DF, SP & SW	22
23	HEAD	4	0	0	0	46	0	340	132	5	18-May-17	1545h	KC, DA, MB, DF, SP & SW	23
24	HEAD	11	0	0	0	140	3	453	225	8	18-May-17	1600h	KC, DA, MB, DF, SP & SW	24
25	HEAD	23	0	0	0	428	1	1354	314	16	01-Jun-17	1100h	KC	25
26	HEAD	3	0	0	0	136	0	1695	302	8	18-May-17	1630h	KC, DA, MB, DF, SP & SW	26
27	HEAD	3	0	0	0	128	0	915	306	3	18-May-17	1700h	KC, DA, MB, DF, SP & SW	27
28	HEAD	5	0	0	0	85	0	408	248	5	18-May-17	1730h	KC, DA, MB, DF, SP & SW	28
29	HEAD	11	0	0	0	166	2	371	277	1	21-May-17	1130h	KC, DA, DF, SW	29
30	BREIL	5	0	0	0	9	2	1	80	2	21-May-17	1200h	KC, DA, DF, SW	30
31	BREIL	6	0	1	0	19	2	0	56	0	21-May-17	1145h	KC, DA, DF, SW	sea
32	BREIL	8	0	0	0	76	1	306	314	2	21-May-17	1215h	KC, DA, DF, SW	sea
33	BREIL	8	0	0	0	202	0	179	168	0	21-May-17	1215h	KC, DA, DF, SW	sea
34	BREIL	0	0	0	0	169	2	106	74	1	21-May-17	1230h	KC, DA, DF, SW	sea
35	BREIL	4	0	0	0	430	2	364	155	1	21-May-17	1330h	KC, DA, DF, SW	sea

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight

Appendix Five: 2017 Flamborough Head and Bempton Cliffs SPA whole colony count – plot data - 2

Plot No	SMP Plot Name	Northern Fulmar (AOS)	Northern Gannet (AOS)	European Shag (AON)	Great Cormorant (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (IND)	Razorbill (IND)	Atlantic Puffin (IND)	Date	Timed count	Observers	Plot No
36	BREIL	0	0	0	0	739	0	421	290	2	21-May-17	1345h	KC, DA, DF, SW	sea
37	BREIL	2	0	0	0	207	0	253	147	1	21-May-17	1400h	KC, DA, DF, SW	sea
38	BREIL	2	0	1	0	560	0	539	75	1	21-May-17	1400h	KC, DA, DF, SW	sea
39	BREIL	0	0	2	0	895	0	2289	84	1	21-May-17	1415h	KC, DA, DF, SW	sea
40	BREIL	0	0	0	0	195	0	171	68	0	21-May-17	1430h	KC, DA, DF, SW	sea
41	BREIL				0						21-May-17	1430h	KC, DA, DF, SW	sea
42	BREIL	4	0	5	0	510	0	1043	99	1	21-May-17	1445h	KC, DA, DF, SW	sea
43	SCAR	3	0	0	0	321	0	970	223	0	21-May-17	1500h	KC, DA, DF, SW	sea
44	SCAR	11	0	1	0	358	1	3233	490	16	24-May-17	1445h	KC	land
45	SCAR	10	0	6	0	1124	18	621	427	17	24-May-17	1345h	KC	land
46	SCAR	14	0	2	0	1555	8	127	464	21	24-May-17	1545h	KC	land
47	SCAR	0	0	0	0	48	0	27	24	0	21-May-17	1515h	KC, DA, DF, SW	sea
48	SCAR	3	0	0	0	448	4	147	399	7	20-May-17	1300h	KC	land
49	SCAR	3	0	0	0	188	26	51	93	1	20-May-17	1330h	KC	land
50	SCAR	0	0	0	0	12	0	127	58	1	21-May-17	1530h	KC, DA, DF, SW	sea
51	SCAR	0	0	0	0	159	2	575	269	3	20-May-17	1200h	KC	land
52	SCAR	1	0	0	0	118	0	97	76	0	06-Jun-17	1000h	KC	only partially viewable from land
53	SCAR	6	0	0	0	145	3	65	170	4	06-Jun-17	1030h	KC	land
54	SCAR	3	0	0	0	186	0	413	129	0	21-May-17	1545h	KC, DA, DF, SW	sea
55	SCAR	2	0	0	0	84	0	27	152	3	20-May-17	1115h	KC	land
56	SCAR	1	0	0	0	11	0	0	32	0	21-May-17	1600h	KC, DA, DF, SW	sea
57	SCAR	1	0	0	0	50	1	36	84	0	21-May-17	1615h	KC, DA, DF, SW	sea
58	SCAR										21-May-17	1615h	KC, DA, DF, SW	sea
59	SCAR	1	0	1	0	249	0	220	136	0	21-May-17	1630h	KC, DA, DF, SW	sea
60	SCAR													
61	SCAR	8	0	0	0	583	2	236	383	2	20-May-17	1050h	KC et al	land (61B) 21 may and sea 22 may
62	SCAR	2	0	0	0	14	0	0	34	3	22-May-17	1145h	KC, DA, MB, TDC, SP & Nia	land
63	SCAR	2	0	0	0	30	0	95	76	6	22-May-17	1200h	KC, DA, MB, TDC, SP & Nia	sea
64	SCAR	7	0	0	0	193	5	169	203	5	16-May-17	1600h	KC	land
65	SCAR	0	0	0	0	58	3	0	3	1	16-May-17	1615h	KC	land
66	SCAR	0	0	0	0	25	0	0	10	5	16-May-17	1620h	KC	land
67	SCAR	0	0	0	0	1	5	0	4	0	16-May-17	1625h	KC	land
68	SCAR	2	0	0	0	0	5	0	60	14	22-May-17	1215h	KC, DA, MB, TDC, SP & Nia	sea
69	SCAR	0	0	0	0	125	1	163	102	20	22-May-17	1230h	KC, DA, MB, TDC, SP & Nia	sea
70	SCAR	6	0	0	0	116	1	134	63	29	22-May-17	1245h	KC, DA, MB, TDC, SP & Nia	sea

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight

## Appendix Five: 2017 Flamborough Head and Bempton Cliffs SPA whole colony count – plot data – 3

Plot No	SMP Plot Name	Northern Fulmar (AOS)	Northern Gannet (AOS)	European Shag (AON)	Great Cormorant (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (IND)	Razorbill (IND)	Atlantic Puffin (IND)	Date	Timed count	Observers	Plot No
71	SCAR	8	0	0	0	25	0	181	88	23	20-May-17	1015h	KC	land
72	SCAR	9	0	0	0	215	1	232	65	8	22-May-17	1300h	KC,DA, MB, TDC, SP & Nia	sea
73	SCAR	0	0	0	0	0		2	14	1	22-May-17	1315h	KC,DA, MB, TDC, SP & Nia	sea
74	SCAR	4	0	0	0	100	0	15	66	4	22-May-17	1330h	KC,DA, MB, TDC, SP & Nia	sea
75	SCAR				0						22-May-17	1345h	KC,DA, MB, TDC, SP & Nia	sea
76	SCAR	3	0	0	0	261	0	25	103	5	22-May-17	1400h	KC,DA, MB, TDC, SP & Nia	sea
77	SCAR	1	0	0	0	138	0	355	226	6	22-May-17	1415h	KC,DA, MB, TDC, SP & Nia	sea
78	SCAR	7	0	0	0	236	1	181	165	17	22-May-17	1430h	KC,DA, MB, TDC, SP & Nia	sea
79	THOR	5	0	0	0	141	0	0	113	5	05-Jun-17	0830h	KC	land
80	THOR	8	0	0	0	0	0	27	59	0	20-May-17	0930h	KC	land
81	THOR	13	0	0	0	89	0	0	33	0	20-May-17	0945h	KC	land
82	THOR	7	0	0	0	102	0	50	62	0	20-May-17	0955h	KC	land
83	THOR	0	0	0	0	1		0	56	1	22-May-17	1500h	KC,DA, MB, TDC, SP & Nia	sea
84	THOR	0	0	0	0	36	0	241	184	2	22-May-17	1500h	KC,DA, MB, TDC, SP & Nia	sea
85	THOR	7	0	0	0	26	1	229	373	7	22-May-17	1515h	KC,DA, MB, TDC, SP & Nia	sea
86	THOR	1	0	0	0	0	1	0	20	7	22-May-17	1515h	KC,DA, MB, TDC, SP & Nia	sea
87	THOR	0	0	0	0	0	0	0	0	0	22-May-17	1515h	KC,DA, MB, TDC, SP & Nia	sea
88	THOR	0	0	0	0	0	1	0	3	0	22-May-17	1515h	KC,DA, MB, TDC, SP & Nia	sea
89	NORT	7	0	0	0	0	7	0	70	0	22-May-17	1515h	KC,DA, MB, TDC, SP & Nia	sea
90	NORT	0	0	0	0	51	0	85	75	1	22-May-17	1530h	KC,DA, MB, TDC, SP & Nia	sea
91	NORT	4	0	0	0	175	0	55	118	14	22-May-17	1545h	KC,DA, MB, TDC, SP & Nia	sea
92	NORT	7	0	0	0	65	1	91	121	4	22-May-17	1600h	KC,DA, MB, TDC, SP & Nia	sea
93	NORT	8	0	0	0	52	3	125	111	3	22-May-17	1615h	KC,DA, MB, TDC, SP & Nia	sea
94	NORT	20	0	0	0	240	1	860	201	1	22-May-17	1630h	KC,DA, MB, TDC, SP & Nia	sea
95	NORT	17	0	0	0	29	1	137	130	1	22-May-17	1645h	KC,DA, MB, TDC, SP & Nia	sea
96	NORT	0	0	0	0	86	0	750	187	1	22-May-17	1700h	KC,DA, MB, TDC, SP & Nia	sea
97	NORT	3	0	0	0	98	0	770	234	4	25-May-17		KC, TC, DF & SW	sea
98	NORT	9	0	0	0	146	2	870	192	0	25-May-17		KC, TC, DF & SW	sea
99	NORT	4	0	0	0	18	2	340	58	2	25-May-17		KC, TC, DF & SW	sea
100	NORT	17	0	0	0	67	3	524		1	25-May-17		KC, TC, DF & SW	sea
101	NORT	2	0	0	0	46	0	512	180	0	25-May-17		KC, TC, DF & SW	sea
102	NORT	11	0	0	0	59	3	310	153	1	25-May-17		KC, TC, DF & SW	sea
103	NORT	6	0	0	0	37	6	485	179	20	25-May-17		KC, TC, DF & SW	sea
104	NORT	4	0	0	0	29	7	230	115	9	25-May-17		KC, TC, DF & SW	sea
105	NORT	1	0	0	0	12	5	249	65	2	25-May-17		KC, TC, DF & SW	sea

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight

Appendix Five: 2017 Flamborough Head and Bempton Cliffs SPA whole colony count – plot data - 4

Plot No	SMP Plot Name	Northern Fulmar (AOS)	Northern Gannet (AOS)	European Shag (AON)	Great Cormorant (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (IND)	Razorbill (IND)	Atlantic Puffin (IND)	Date	Timed count	Observers	Plot No
106	DYKE	4	0	0	0	55	2	746	183	6	25-May-17		KC, TC, DF & SW	sea
107	DYKE	4	0	0	0	45	0	286	160	8	25-May-17		KC, TC, DF & SW	sea
108	DYKE	7	0	0	0	106	1	420	135	2	25-May-17		KC, TC, DF & SW	sea
109	DYKE	6	0	0	0	134	30	285	135	4	25-May-17		KC, TC, DF & SW	sea
110	DYKE	5	0	0	0	132		360	235	14	25-May-17		KC, TC, DF & SW	LAND-SLIP SINCE 2008
111	DYKE	2	0	0	0	361	1	746	80	2	25-May-17		KC, TC, DF & SW	sea
112	DYKE	4	0	0	0	265	1	878	173	13	25-May-17		KC, TC, DF & SW	sea
113	DYKE	3	0	0	0	282	2	612	179	4	25-May-17		KC, TC, DF & SW	sea
114	DYKE	3	0	0	0	239	4	550	112	6	25-May-17		KC, TC, DF & SW	sea
115	DYKE	4	0	0	0	238	1	1020	225	9	25-May-17		KC, TC, DF & SW	sea
116	DYKE	3	0	0	0	225	1	865	154	2	25-May-17		KC, TC, DF & SW	sea
117	DYKE	4	0	0	0	202	10	830	234	1	25-May-17		KC, TC, DF & SW	sea
118	WAND	4	0	0	0	662	14	1649	525	8	25-May-17		KC, TC, DF & SW	sea
119	WAND	2	168	0	0	112	3	106	33	0	25-May-17		KC, TC, DF & SW	sea
120	WAND	2	52	0	0	365	0	808	104	1	25-May-17		KC, TC, DF & SW	sea
121	WAND	1	156	0	0	478	0	556	138	0	25-May-17		KC, TC, DF & SW	sea
122	WAND	0	127	0	0	279	0	653	417	0	25-May-17		KC, TC, DF & SW	sea
123	WAND	1	175	0	0	387	0	497	196	2	25-May-17		KC, TC, DF & SW	sea
124	WAND	6	39	0	0	193	4	640	268	8	25-May-17		KC, TC, DF & SW	sea
125	WAND	5	103	0	0	635	8	1635	335	5	25-May-17		KC, TC, DF & SW	sea
126	WAND	5	15	1	0	942	1	597	691	5	25-May-17		KC, TC, DF & SW	sea
127	WAND	14	7	0	0	386	3	1325	448	10	25-May-17		KC, TC, DF & SW	sea
128	WAND	5	0	0	0	97	4	115	98	3	01-Jun-17	1330h	KC, DA, MB & TC	sea
129	WAND	5	0	0	0	425	3	585	226	17	01-Jun-17	1350h	KC, DA, MB & TC	sea
130	WAND	9	20	0	0	415	5	490	290	15	13-Jun-17	1400	KC	land
131	WAND	11	22	1	0	755	1	463	239	22	01-Jun-17	1410h	KC, DA, MB & TC	sea and land
132	WAND	8	992	2	0	1010	1	1155	338	32	06-Jun-17	1230h	KC	land
133	GRAN	5	414	1	0	155	0	360	209	14	01-Jun-17	1330h	KC, DA, MB & TC	sea
134	GRAN	4	158	0	0	150	0	311	274	33	01-Jun-17	1350h	KC, DA, MB & TC	sea
135	GRAN	6	405	0	0	517	0	1242	616	42	07-Jun-17	0935h	KC	land
136	GRAN	5	24	0	0	147	2	692	329	15	01-Jun-17	1410h	KC, DA, MB & TC	sea and land
137	GRAN	1	0	0	0	63	1	478	270	9	01-Jun-17	1430h	KC, DA, MB & TC	sea
138	GRAN	5	23	0	0	413	0	1320	366	29	01-Jun-17	1450h	KC, DA, MB & TC	sea
139	GRAN	3	44	0	0	470	1	1610	72	17	01-Jun-17	1510h	KC, DA, MB & TC	sea
140	GRAN	1	48	0	0	540	0	2650	166	20	01-Jun-17	1530h	KC, DA, MB & TC	sea
141	GRAN	2	2	0	0	604	1	1009	90	4	01-Jun-17	1550h	KC, DA, MB & TC	sea
142	GRAN	4	3	0	0	668	1	1955	322	5	01-Jun-17	1610h	KC, DA, MB & TC	sea
143	BART	5	130	0	0	545	1	1180	249	3	01-Jun-17	1630h	KC, DA, MB & TC	sea
144	BART	1	97	0	0	520	0	690	140	3	01-Jun-17	1650h	KC, DA, MB & TC	sea
145	BART	6	278	0	0	1006	0	1606	177	15	02-Jun-17	0750h	KC, DA, MB & TC	sea

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight

Appendix Five: 2017 Flamborough Head and Bempton Cliffs SPA whole colony count – plot data – 5

Plot No	SMP Plot Name	Northern Fulmar (AOS)	Northern Gannet (AOS)	European Shag (AON)	Great Cormorant (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (IND)	Razorbill (IND)	Atlantic Puffin (IND)	Date	Timed count	Observers	Plot No
146	BART	4	147	0	0	490	0	1295	89	8	02-Jun-17	0810h	KC, DA, MB & TC	sea
147	BART	6	153	1	0	1118	1	1280	120	10	02-Jun-17	0830h	KC, DA, MB & TC	sea
148	BART	3	203	0	0	212	0	315	183	6	02-Jun-17	0900h	KC, DA, MB & TC	sea
149	BART	1	343	0	0	582	1	322	100	1	02-Jun-17	0920h	KC, DA, MB & TC	sea
150	BART	2	261	0	0	483	0	520	185	5	02-Jun-17	0940h	KC, DA, MB & TC	sea
151	BART	1	184	0	0	376	0	445	40	0	02-Jun-17	1000h	KC, DA, MB & TC	sea
152	BART	4	365	0	0	622	0	1405	62	5	02-Jun-17	1020h	KC, DA, MB & TC	sea
153	BART	2	377	0	0	802	0	750	105	4	02-Jun-17	1040h	KC, DA, MB & TC	sea
154	BART	6	365	0	0	676	0	675	175	6	02-Jun-17	1100h	KC, DA, MB & TC	sea
155	JUBI	6	449	0	0	830	1	730	120	4	02-Jun-17	1120h	KC, DA, MB & TC	sea
156	JUBI	3	170	0	0	333	1	760	159	7	02-Jun-17	1140h	KC, DA, MB & TC	sea
157	JUBI	7	92	0	0	467	0	1100	126	10	02-Jun-17	1300h	KC, DA, MB & TC	sea
158	JUBI	2	282	0	0	304	1	485	127	2	02-Jun-17	1320h	KC, DA, MB & TC	sea
159	JUBI	0	354	0	0	290	0	205	96	2	02-Jun-17	1340h	KC, DA, MB & TC	sea
160	JUBI	10	355	0	0	603	1	555	238	2	02-Jun-17	1400h	KC, DA, MB & TC	sea
161	BUCK	9	342	0	0	640	1	860	231	8	02-Jun-17	1420h	KC, DA, MB & TC	sea
162	BUCK	3	532	0	0	314	0	630	162	0	02-Jun-17	1440h	KC, DA, MB & TC	sea
163	BUCK	3	163	0	0	225	0	666	172	6	04-Jun-17	1315h	KC, DA, MB, SW	sea
164	BUCK	4	373	0	0	230	1	825	191	6	04-Jun-17	1335h	KC, DA, MB, SW	sea
165	BUCK	1	1117	0	0	498	1	885	390	10	04-Jun-17	1355h	KC, DA, MB, SW	sea
166	BUCK	2	617	0	0	242	0	320	219	8	04-Jun-17	1415h	KC, DA, MB, SW	sea
167	TRIG	0	523	0	0	357	0	731	267	10	04-Jun-17	1435h	KC, DA, MB, SW	sea
168	TRIG	2	422	0	0	232	1	729	207	8	04-Jun-17	1455h	KC, DA, MB, SW	sea
169	TRIG	1	211	0	0	144	0	285	281	2	04-Jun-17	1515h	KC, DA, MB, SW	sea
170	TRIG	7	251	0	0	221	2	390	493	6	04-Jun-17	1535h	KC, DA, MB, SW	sea
171	TRIG	11	626	0	0	368	2	380	381	3	04-Jun-17	1555h	KC, DA, MB, SW	sea
172	TRIG	4	346	0	0	161	0	246	174	2	04-Jun-17	1615h	KC, DA, MB, SW	sea
173	TRIG	10	67	0	0	45	0	144	120	2	04-Jun-17	1635h	KC, DA, MB, SW	sea
174	TRIG	10	184	0	0	113	2	93	212	6	04-Jun-17	1655h	KC, DA, MB, SW	sea
175	SPEE	32	0	0	0	14	17	44	102	0	04-Jun-17	1705h	KC, DA, MB, SW	sea
176	SPEE	13	16	0	0	136	5	66	104	0	01-Jun-17	1430h	DF	sea or land
177	SPEE	9	0	0	0	0	1	0	6	0	01-Jun-17	1500h	DF	sea or land
178	SPEE	4	0	0	0	0	0	0	0	0	01-Jun-17	1530h	DF	sea or land
Total exc High Stacks - South landing		790	13392	25	0	45329	327	84647	27967					
H&BC SPA		846	13,392	25	0	45,504	351	84,647	27,967					
Filey Cliffs		411	0	0	27	6,031	115	6,214	2,261					
F&FC pSPA		1,257	13,392	25	27	51,535	466	90,861	30,228	2,879				
F&FC pSPA number of breeding pairs (c)		149,271	1,257	13,392	25	27	51,535	466	60,877	20,253	1440			
F&FC pSPA number of breeding birds		298,542	2,514	26,784	50	54	103,070	932	121,754	40,506	2,879			

NB: RSPB Bempton Cliffs = Yellow highlight, YWT Flamborough Cliffs = orange highlight

Appendix Six: 2017 - Filey Cliffs (Filey Brigg – Cunstone Nab proposed SSSI)  
whole colony - plot counts

9 June 2017, 1300h-1730h, Keith Clarkson and Mike Babcock, Filey Sailing Club RIB

SMP Plot	Northern Fulmar (AOS)	Great Cormorant (AON)	Black-legged Kittiwake (AON)	European Herring Gull (AON)	Common Guillemot (individuals on land)	Razorbill (individuals on land)	Atlantic Puffin (rafting individuals)
Filey 3: plot 1	1	0	0	0	0	0	0
Filey 3: plot 2	17	0	168	1	3	33	0
Filey 3: plot 3	0	0	0	0	0	0	0
Filey 3: plot 4	0	0	0	0	0	0	0
Filey 3: plot 5	5	0	60	2	250	146	0
Filey 3: plot 6	3	0	69	0	1265	252	0
Filey 3: plot 7	5	0	59	4	320	142	0
Filey 3: plot 8							0
Filey 3: plot 9	10	0	382	0	2285	416	0
Filey 3: plot 10	19	0	663	2	663	234	0
Filey 3: plot 11	35	0	656	9	245	123	0
Filey 3: plot 12	6	0	0	7	0	0	0
Filey 2: plot1	44	0	786	10	425	105	0
Filey 2: plot 2	16	0	660	12	353	112	0
Filey 2: plot 3	32	4	1366	11	267	270	0
Filey 2: plot 4	17	8	372	1	56	63	0
Filey 1: plot 1	22	13	274	6	0	15	0
Filey 1: plot 2	25	0	0	8	0	3	0
Filey 1: plot 3	14	2	129	11	0	34	0
Filey 1: plot 4	12	0	23	8	0	0	0
Filey 1: plot 5	28	0	131	21	71	216	0
Filey 1: plot 6	90	0	219	2	11	97	0
Filey 1: plot 7	10	0	14	0	0	0	0
<b>TOTAL</b>	<b>411</b>	<b>27</b>	<b>6031</b>	<b>115</b>	<b>6214</b>	<b>2261</b>	<b>243</b>



Appendix Seven: Changes in distribution of nesting Northern Gannet in the Flamborough and Filey Coast pSPA - a comparison between years 2008-2017 (southern part of colony)

Yellow highlight = RSPB Bempton Cliffs

		2008	2009	2012	2015	2017
Plot no.	SMP Plot name					
118	Wandale	0	0	0	0	0
119	Wandale	0	0	0	30	168
120	Wandale	4	6	59	63	52
121	Wandale	31	49	103	126	156
122	Wandale	34	88	130	160	127
123	Wandale	0	0	5	10	175
124	Wandale	0	0	4	34	39
125	Wandale	0	6	69	85	103
126	Wandale	0	0	0	5	15
127	Wandale	0	0	0	0	7
128	Wandale	0	0	0	0	0
129	Wandale	0	0	0	0	0
130	Wandale	0	0	0	12	20
131	Wandale	0	0	0	4	22
132	Wandale	517	430	538	585	992
133	Grandstand	198	275	335	335	414
134	Grandstand	68	80	146	148	157
135	Grandstand	115	150	291	384	405
136	Grandstand	0	0	0	0	24
137	Grandstand	0	0	0	0	0
138	Grandstand	0	0	0	0	23
139	Grandstand	0	0	0	0	44
140	Grandstand	0	0	0	0	48
141	Grandstand	0	0	0	0	2
142	Grandstand	0	0	0	2	3
143	Bartlett	0	0	0	6	130
144	Bartlett	3	6	51	66	97
145	Bartlett	192	202	269	287	278
146	Bartlett	42	94	90	89	147

Appendix Seven: Changes in distribution of nesting Northern Gannet in the Flamborough and Filey Coast pSPA - a comparison between years 2008-2017 (Northern part of colony)

Yellow highlight = RSPB Bempton Cliffs

Plot no.	SMP Plot name	Apparently Occupied Sites (AOS)				
147	Bartlett	43	75	76	117	153
148	Bartlett	66	92	192	178	203
149	Bartlett	244	220	233	246	343
150	Bartlett	179	194	195	268	261
151	Bartlett	131	173	214	266	184
152	Bartlett	248	271	347	373	365
153	Bartlett	369	306	447	435	377
154	Bartlett	251	237	350	412	365
155	Jubilee	281	226	485	383	449
156	Jubilee	63	85	131	151	170
157	Jubilee	72	39	63	49	92
158	Jubilee	298	180	285	290	282
159	Jubilee	440	540	520	412	354
160	Jubilee	263	280	447	515	355
161	Buckton	155	125	360	307	342
162	Buckton	311	405	458	546	532
163	Buckton	38	50	56	143	163
164	Buckton	187	246	396	480	373
165	Buckton	455	606	871	1030	1117
166	Buckton	386	445	564	677	617
167	Trig Point	386	550	519	784	523
168	Trig Point	206	230	444	400	422
169	Trig Point	145	250	285	215	211
170	Trig Point	55	28	128	280	251
171	Trig Point	258	290	412	433	626
172	Trig Point	219	330	433	584	346
173	Trig Point	1	0	24	23	67
174	Trig Point	0	0	36	66	184
175	Speeton	0	0	0	0	0
176	Speeton	0	0	0	0	16
177	Speeton	0	0	0	0	0
178	Speeton	0	0	0	0	0
<b>TOTAL (AOS)</b>		<b>6,954</b>	<b>7,859</b>	<b>11,061</b>	<b>12,494</b>	<b>13,391</b>

## Appendix Eight: Flamborough Head and Bempton Cliffs – Historic record of known Black-legged Kittiwake counts pre-2000

Year	Count/Unit	Source/Methods/Comments
1952	17,600 (birds)	<p>Brownsey and Peakall (1953). A three-day land based count done 21 -23 June 1952; “the count was conducted along the cliffs from Bridlington Bay to Speeton Bay and the method employed was that of counting from one buttress the number of birds on the face of the opposite buttress species by species. Due to the fact that not all of the cliff face could be seen, the length of the hidden cliff face was recorded and it was found that this amounted to only 3.5%. No checking was carried out as it was found that the whole of the three days was required to carry out the count over six or so miles of cliff.” Counts were increased by 3.5% to reflect the above.</p> <p>“The figures obtained represent the ‘apparent’ breeding population of each species. This ‘apparent’ breeding population would equal the actual breeding population if the only birds on the cliff were breeding birds, and if only one bird of each breeding pair was present. The number of birds on the cliff would then be the actual number of breeding pairs present, but in practice such ideal conditions do not exist and other birds, both breeding and non-breeding, will be included in the count. Thus the figure obtained is larger than the actual breeding population ... ”</p> <p><i>Comment: From personal experience we consider that much more than 3.5% of the cliffs from Bridlington to Speeton are not visible from the cliff tops – this count is therefore likely to be understated. Three days is a short period to count 7 species over the full length of the colony including walking from vantage point to vantage point. It is difficult to compare a count of birds present on cliff with counts of either apparently occupied nests or sites.</i></p>
1964	31,195 (nests)	<p>Williams and Kermod (1968). A count of the cliffs between Sewerby and “Redcliff” at Speeton. “The census was taken between the 5<sup>th</sup> and 14<sup>th</sup> of June 1964. The method used was to count from each buttress the birds on the opposite cliff face, species by species. There were two observers and each counted each species separately, recounts being made when there was a disagreement.”... “As with Brownsey &amp; Peakall, between three and four percent of the cliff was found impossible to count from the cliff top.”</p> <p><i>Comment: From personal experience we consider that much more than 3.5% of the cliffs from Bridlington to Speeton are not visible from the cliff tops – this count is therefore likely to be understated. The time taken seems to us more realistic for a full colony count.</i></p>
1969	30,800 (pairs)	<p>Operation Seafarer; reported in Lloyd et. al., 1991.</p> <p><i>Comment: In Cramp et. al. 1974 (p.137) reference is made to counting nests from land or sea; we have not been able to locate any details of how counts were conducted at Bempton/Flamborough.</i></p>
1975	52,710 (nests)	<p>RSPB Bempton Cliffs Annual Report 1975. “A census was made this year. The vast numbers had been a stumbling block but after unsuccessful attempts in the past 2 seasons I arrived at a figure of 52,710 nests by a series of sample counts and in-between estimates by the methods outlined in another section of this report on seabird census methods. The area surveyed was the same as for the auk census, i.e. from Dulcey Dock to Lang Ness” [<i>Speeton Cliffs to north of Thornwick Bay</i>]</p> <p>“The most numerous seabird at Bempton is the Kittiwake, which is increasing tremendously and the sheer numbers and density made it a hard bird to census. I tried to count them but photography from a boat but the white chalk cliffs did not highlight the birds and this was a failure. The method of counting the kittiwakes was relatively crude, but at least we now have an idea of the size of the populations: a series of sample faces of approximately the same size were sketched in a note book and counted nest by nest, usually with a second observer present who counted at the same time, an average figure was then obtained when it was realised that the density was fairly even on suitable faces. The rest of the intervening sections of cliff were then measured crudely and the number of sites estimated from the number of samples. Any unsuitable or less densely populated sections were subtracted or counted separately and a final figure of 52,710 nests arrived at.”</p> <p><i>Comment: We have not been able to locate any records of the actual counts, cliff section measurements, calculations or adjustments so we have no way of testing how accurate they were.</i></p>
1977	60,000 to 65,000 (est)	<p>RSPB Bempton Cliffs Annual Report 1977. “No accurate census was attempted this year. However whilst counting the auk species a rough estimation was made of this species. I arrived at a figure of between 60,000 and 65,000 pairs. If the areas of cliff outside the reserve are taken into account the</p>

	(pairs)	total number for the Flamborough headland must be in the region of 100,000 pairs and from previous counts it seems as if the Kittiwake is enjoying a healthy and stable existence. However in terms Of the reserve itself we must reach a saturation point before long and perhaps we already have”. <i>Comment: No information given on how the estimates for the reserve and the larger headland were arrived at.</i>
1979	80,180 (pairs)	RSPB Bempton Cliffs Annual Report 1979. “A full census was carried out for the reserve length and also the cliffs North of Cmpt 1 to Speeton Gap. The results were sent to Dr. J. Coulson of Durham University - the organiser for the 1979 B.T.O. Kittiwake Survey. The Flamborough Head Seawatchers (P.A. Lassey et al) counted from the reserve boundary at Compartment 20 and then covered the whole headland. A total of c16,000 pairs were counted and estimated. This, plus my counts and estimates for the reserve length of 64,180 pairs, make the counts for the whole headland a grand total of c80,180 pairs, which is possibly one of the biggest colonies in Great Britain. This is considerably more than the last census carried out by Steve Madge in 1975, and gives an increase of c13,970 pairs during a four year period, for the reserve. This compares well with the rapid increase of this species over the rest of Britain and Ireland during the recent years. Last year Steve Rooke estimated the population for the whole headland in the region of c100,000 pairs. But this is way above the counts and estimates made by the Flamborough watchers and myself and should be looked at with some reservation.” <i>Comment: The 1979 Annual Report includes a breakdown by reserve compartment but we have not been able to locate any further details of the methods used (land or sea) or of what, if any proportion of this figure was estimated and how any such estimates were arrived at.</i>
1986	50,000 to 70,000 (est) (pairs)	Copy Seabird Colony Register Data Sheet – Speeton Cliffs (TA153750) to Gull Nook (TA222727). “Kittiwake – Not counted, nor really assessed in ’86: figure is from previous colony estimates.” “Large parts of colony only visible from boat. Cliff edge often dangerous and loose: slumping of cliff top clay and rock falls are common. Unprotected counter can see about 40 -60% of cliff from top.” <i>Comment: No information available about how the estimate was arrived at. This assessment of the extent of the cliffs visible from the cliff tops feels, from personal experience, far more accurate at least for the section from Danes Dyke to Speeton Cliffs.</i>
1987	85,000	RSPB Bempton Cliffs Annual Report 1987. “The 1986 annual report indicates that that the counts conducted for ‘seabird colony register’ were less than adequate. I therefore determined to repeat the counts in an attempt to achieve greater precision. The counts were limited to the reserve recording area – Speeton Heights to Gull Nook – as the area outside of this was being counted by Mike Higgins of the Bridlington members group. Counts were made from the clifftops and from boats. The clifftop counts started in late May and continued until mid-July. The auk species being counted first (in order that Guillemots and Razorbills were counted during their optimum counting period). These were followed by the Kittiwakes from mid-June; Fulmar, Herring Gull and Shag during late June ... [some non KI text omitted] I enlisted the help of two competent volunteers to assist with the clifftop count. We each counted a section of cliff, then swapped over, so that each section was counted at least twice by independent observers. Where our results differed by greater than 5% the section was recounted together. This proved quite acceptable (with only a few sections having to be recounted), except in the case of the Puffin where the apparent numbers on the cliff could change substantially in less than an hour.  Five boat based counts were undertaken, two concentrating on Gannets whilst the other three concentrated on the remaining species. Assistance was received on two of these boat based counts. [some non KI text omitted] The Kittiwake and auk counts proved acceptable but yielded up to 20% lower figures than the clifftop counts. This was taken into consideration when estimating the number on the sections of the cliff which could not be counted from the clifftops. @ Kittiwake.....(occupied nests)..... 75000 @ = An accuracy of the order of 10% is believed to have been achieved. The accuracy of the clifftop counts were of the order of 5% but the boat based counts would have reduced this accuracy.” <i>Comment : No breakdown of which sections were counted from land and which from sea – or which were estimated and of how such estimates were made. If 2 of 5 boat days were spent on Gannets only 3 were available for other species.</i>