



**SOTEAG**



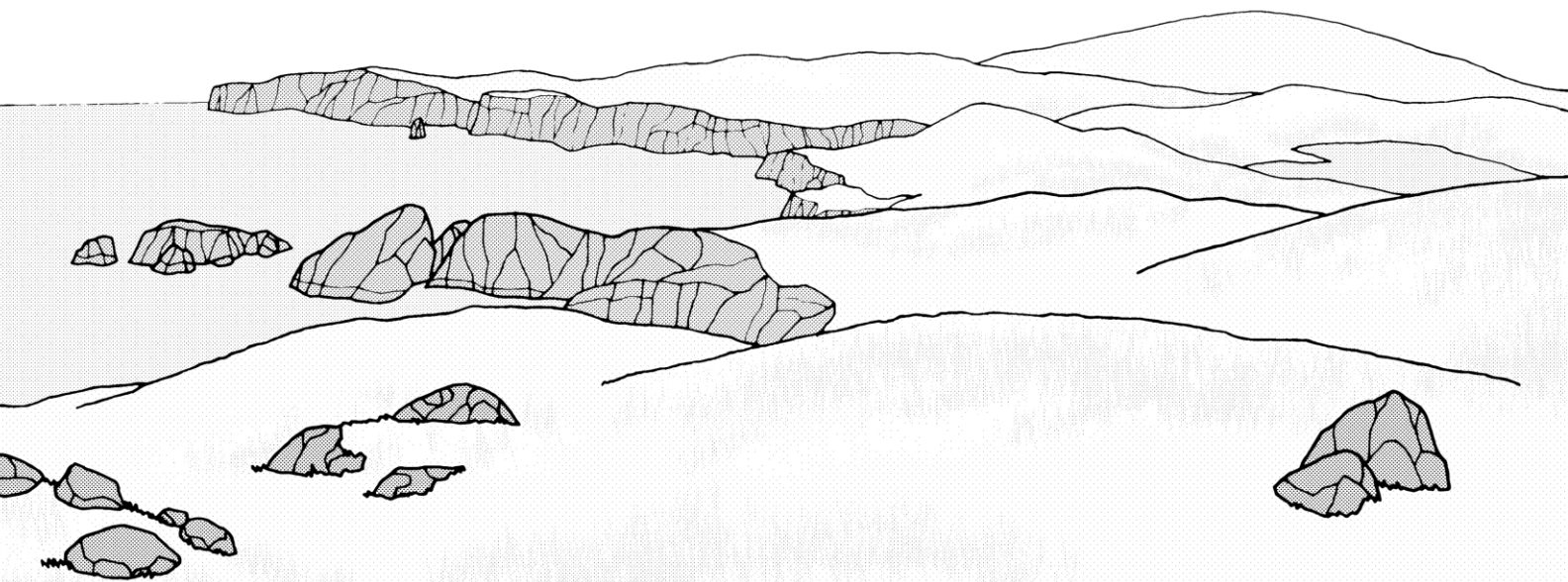
# Ornithological Monitoring Programme in Shetland



**2020**



*A report to the Shetland Oil Terminal  
Environmental Advisory Group  
by the University of St Andrews*



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# SOTEAG ORNITHOLOGICAL MONITORING PROGRAMME

## 2020 REPORT

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## **Impacts of the 2020 covid-19 lockdown on the SOTEAG Ornithological Monitoring Programme**

The covid-19 national lockdown period in 2020 coincided almost exactly with the breeding period of many cliff-nesting seabirds in Shetland. In accordance with the lockdown regulations, no fieldwork on breeding seabirds was carried out by SOTEAG staff in April, May and most of June. This meant that the standard breeding population monitoring of Northern Fulmar, European Shag, Black-legged Kittiwake, Common Guillemot, Razorbill and Red-throated Diver was not possible. In addition, it was not possible to monitor Northern Fulmar, Common Guillemot, Razorbill and Red-throated Diver breeding success.

Monitoring of European Shag and Black-legged Kittiwake breeding success and adult Common Guillemot colony attendance was achieved during lockdown by the use of fixed-position remote cameras at Sumburgh Head. Black Guillemot population monitoring was completed at two of the annually monitored sites in late March, just before lockdown began. The Beached Bird Survey was reduced during lockdown to those beaches within the allowed walking distance of surveyors' homes.

All other aspects of the annual monitoring programme were unaffected and proceeded as normal.

## **2020 Executive Summary**

**1. Monitoring of cliff-nesting seabirds.** Standard population monitoring of Northern Fulmar *Fulmarus glacialis*, European Shag *Phalacrocorax aristotelis*, Black-legged Kittiwake *Rissa tridactyla*, Common Guillemot *Uria aalge* and Razorbill *Alca torda* was not possible due to the covid-19 lockdown. The southeast Mainland Black-legged Kittiwake population monitoring transect was surveyed after lockdown had ended and 255 AON were found, 21.4% more than in 2019. During the survey, 181 chicks were seen, including 31 broods of two, indicating that Kittiwakes in this area fared well in 2020. Standard breeding success monitoring of Northern Fulmar, Common Guillemot and Razorbill was also not possible due to lockdown. However, monitoring of European Shag and Black-legged Kittiwake breeding success was achieved at Sumburgh Head using fixed-position remote cameras. European Shag breeding success was 1.65 chicks fledged per incubated nest at Sumburgh, 7.1% higher than in 2019. Black-legged Kittiwake breeding success was 1.07 chicks fledged per incubated nest, 9.2% higher than in 2019. Monitoring of adult Common Guillemot colony attendance using a remote camera at Sumburgh Head showed that attendance was high throughout the season, indicating that breeding success may also have been high in this species.

**2. Pre-breeding season population counts of Black Guillemots *Cephus grille*.** Surveys of two sites in the south Mainland in late March showed that population sizes had changed little since 2019. Other sites were not surveyed due to the covid-19 lockdown in April.

**3. Monitoring of breeding Red-throated Divers *Gavia stellata*.** Red-throated Diver monitoring at the standard area in Northmavine was not undertaken by SOTEAG staff due to the covid-19 lockdown. However, nesting activity at a study plot of 29 lochs at Tington, in northwest Mainland was monitored by the Shetland Amenity Trust. The results of this work, carried out annually since 2012, are included in this report for the first time. From 2012 to 2014, the number of confirmed breeding pairs at Tington increased sharply from 8 to 16 but has since remained stable at between 13 and 20 pairs.

**4. Population counts of moulting Common Eiders *Somateria mollissima*.** The annual monitoring areas in Sullom Voe and Yell Sound were surveyed as normal. The total count was 447 birds, 28.1% lower than in 2019 (622 birds) but similar to the 2010 to 2019 average of 403 birds.

**5. Winter counts of seaduck and diving seabirds.** Four of the seven standard monitoring transects were surveyed in 2020 and counts were either within or higher than the normal range.

**6. Beached Bird Surveys.** Twenty-nine oiled seabirds were found during the 2020 surveys, an unusually high total for recent years. Oil sample analyses identified most were contaminated with a refined petroleum of the same type. Such a numerous arrival of oiled birds all bearing the same oil type was unprecedented since the *Braer* oil spill and prompted speculation that the source might be the *Coelleira*, a fishing boat that ran aground on the Vee Skerries in August 2019, and in 2020 was beginning to break up. However, the Maritime and Coastguard Agency reported that the only oils potentially still onboard the *Coelleira* were not of this type (no samples were available for cross-checking analyses). The source of the matching samples was never determined but analyses showed that they, and the other oil samples analysed in 2020, were not from the Shetland oil industry.

**In summary, although the covid-19 lockdown interfered with fieldwork for much of the breeding season, there was no evidence that the operation of the Sullom Voe Terminal, or its associated tanker traffic, had any detrimental impact on Shetland's seabird populations during 2020.**

## Location map of ornithological monitoring sites

▲ Cliff-nesting seabirds population / breeding success monitoring sites

● Black Guillemot population monitoring sites

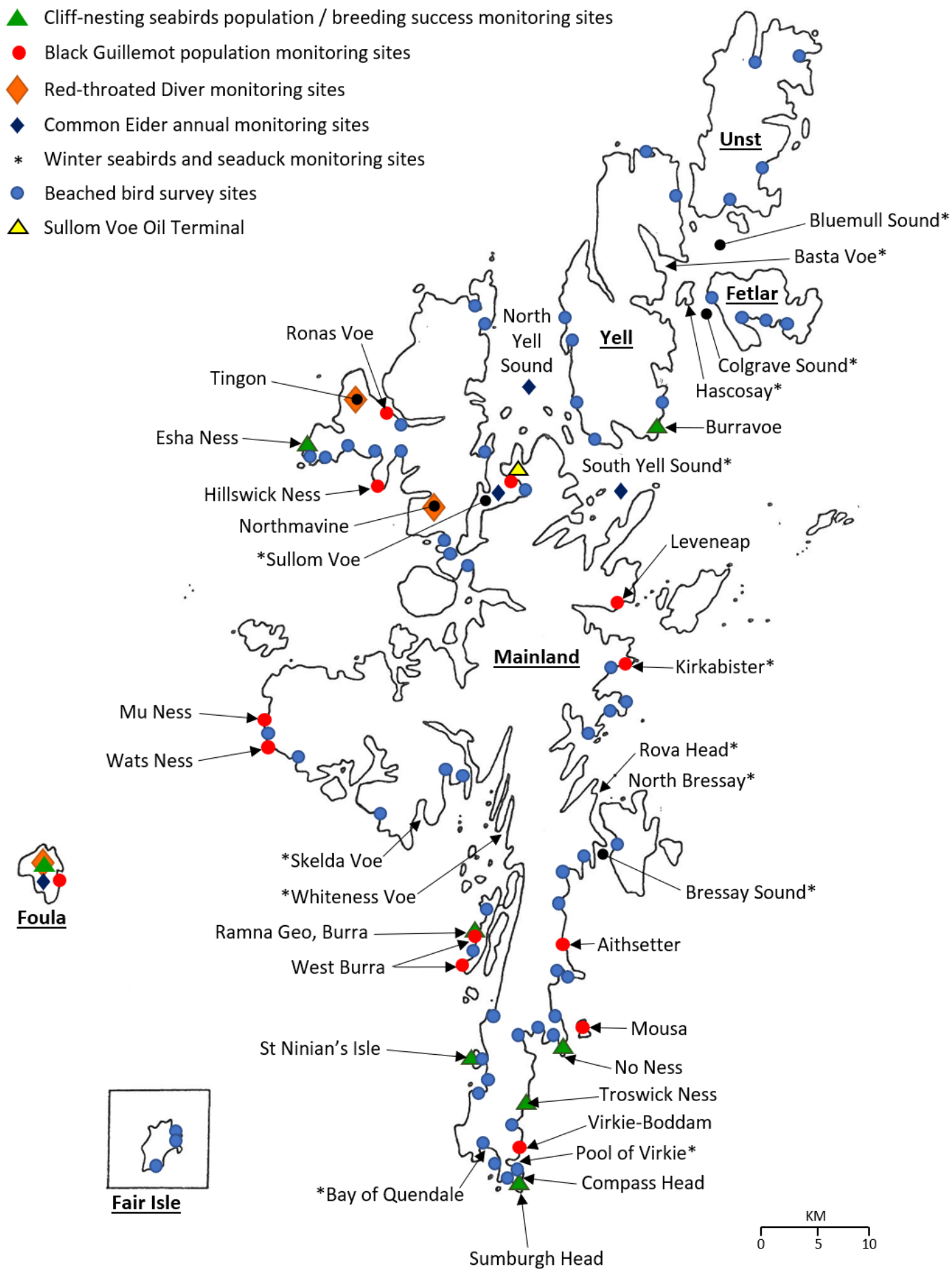
◆ Red-throated Diver monitoring sites

◆ Common Eider annual monitoring sites

\* Winter seabirds and seaduck monitoring sites

● Beached bird survey sites

▲ Sullom Voe Oil Terminal



## **1. Monitoring of cliff-nesting seabirds**

### **1.1. Weather during the 2020 seabird breeding season**

Calm and dry weather at the end of March allowed an early start to the annual pre-breeding population counts of Black Guillemots. This was fortuitous as from the beginning of April to the end of June fieldwork was not permitted due to the covid-19 lockdown. During this period, the weather was variable, with April mostly calm and dry, May much wetter and windier, and June mostly dry, calm and settled. July, August and September were mostly dry, calm, warm and favorable for fieldwork, with many good days for surveying and boat work.

The standard five-visit population counts of cliff-nesting seabirds in June were not carried out, so this report omits the usual summary table of weather conditions.

#### **1.2a. Northern Fulmar *Fulmarus glacialis* population counts**

#### **1.2b. Northern Fulmar *Fulmarus glacialis* breeding success**

Monitoring of the standard Fulmar population and breeding success sites was not possible due to covid-19. Please refer to the 2019 ornithological monitoring report for previous years' data (Miles & Mellor 2019).

#### **1.3a. European Shag *Phalacrocorax aristotelis* population counts**

Monitoring of the standard Shag population sites was not possible due to covid-19. Please refer to the 2019 ornithological monitoring report for previous years' data (Miles & Mellor 2019).

#### **1.3b. European Shag *Phalacrocorax aristotelis* breeding success**

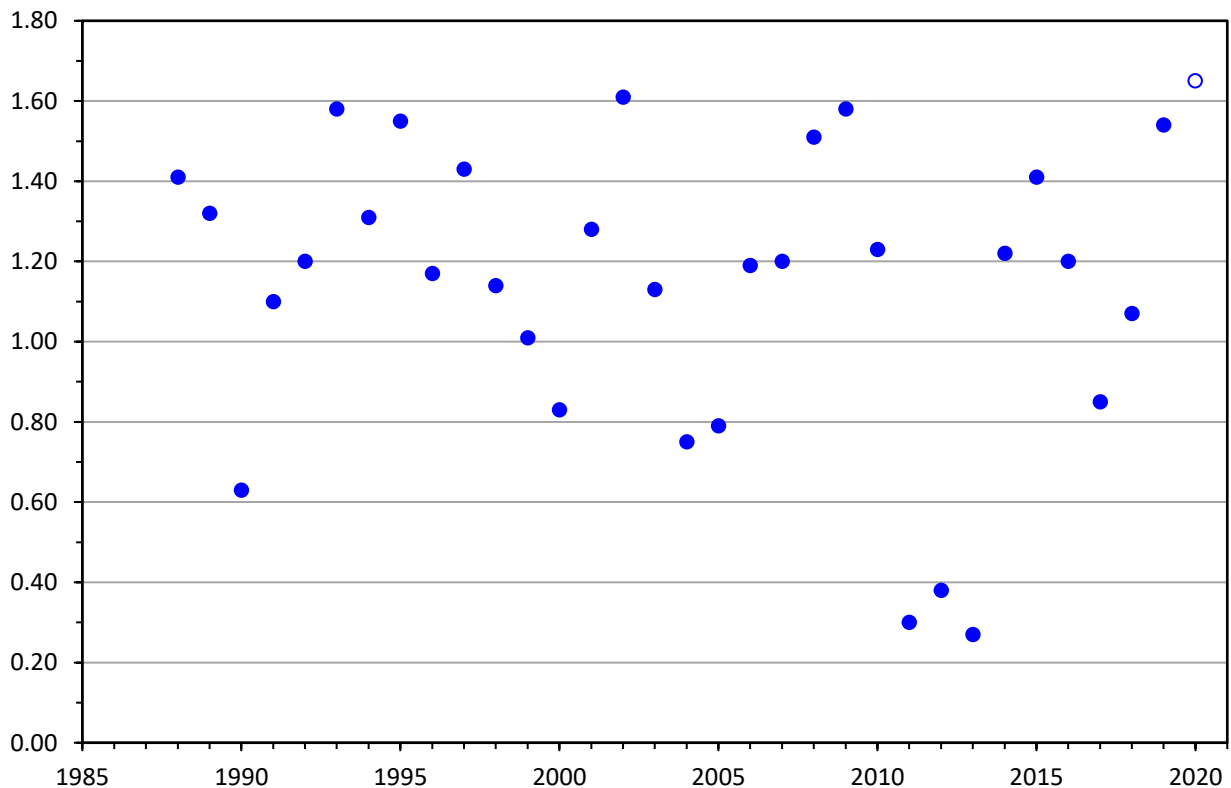
Monitoring at the standard Shag breeding success site at Burravoe was not possible due to covid-19. However, monitoring of a reduced number of nests at the monitoring plots at Sumburgh Head was achieved using fixed-position cameras, located around the normal monitoring areas at the site, with no obvious biases regarding locations (nest sampling was still apparently random).

Fifty-one nests were monitored in 2020 at Sumburgh (24 checks, 31<sup>st</sup> March–17<sup>th</sup> August), in comparison with 114 nests in 2019 (28 checks, 25<sup>th</sup> March–30<sup>st</sup> September). Breeding success was 1.65 chicks fledged per incubated nest in 2020, the highest measure on record and 7.1% higher than in 2019, when breeding success was 1.54 (**Table 1.1, Figure 1.1**). The 2020 measure must be treated with caution however, because of the reduced sample size of nests monitored. The proportion of incubated nests at Sumburgh that progressed to hatch (80.4%) was similar to 2019 (80.6%), mean brood size was similarly high (2.06 in 2019, 2.08 in 2020) and there was again a high proportion of fledged broods of three chicks (21.4% in 2019, 23.1% in 2020). This indicates that food availability during the incubation and chick-rearing periods was not greatly constrained in 2020 (**Table 1.1, Figure 1.1**).

**Table 1.1.** Shag breeding success summary statistics at Sumburgh Head, 2010–20: the total number of trace nests (Tr), well-built but empty nests (AON) and incubated nests (Inc), the percentage of all nests which progressed to incubation (% Inc.), the percentage of incubated nests at which chicks were recorded (% H), the percentage of incubated nests from which no chicks fledged (0 FI), the number of chicks fledged (Ch), mean brood size at fledging (Brood), and sum breeding success (SBS [=Ch/Inc]). In 2020, monitoring was not possible at Burravoe due to the covid-19 lockdown restrictions and only a relatively small sample of nests was monitored at Sumburgh, using fixed-position cameras.

<b>Sumburgh Head</b>									
<b>Year</b>	<b>Tr</b>	<b>AON</b>	<b>Inc</b>	<b>% Inc</b>	<b>% H</b>	<b>0 FI</b>	<b>Ch</b>	<b>Brood</b>	<b>SBS</b>
<b>2010</b>	23	12	222	86.4	73.0	41.0	274	2.09	<b>1.23</b>
<b>2011</b>	21	11	141	82.1	22.5	83.0	43	1.79	<b>0.30</b>
<b>2012</b>	21	14	96	73.3	30.2	76.0	36	1.57	<b>0.38</b>
<b>2013</b>	15	27	56	57.1	16.1	83.9	15	1.67	<b>0.27</b>
<b>2014</b>	2	2	108	96.4	67.6	36.1	132	1.91	<b>1.22</b>
<b>2015</b>	5	3	111	93.3	76.6	28.8	157	1.99	<b>1.41</b>
<b>2016</b>	2	6	94	92.2	74.5	36.2	113	1.88	<b>1.20</b>
<b>2017</b>	6	5	108	90.8	61.1	50.9	92	1.74	<b>0.85</b>
<b>2018</b>	11	17	68	70.8	69.1	38.2	73	1.78	<b>1.07</b>
<b>2019</b>	3	8	103	90.3	80.6	25.2	159	2.06	<b>1.54</b>
<b>2020</b>	1	1	49	96.1	80.4	20.4	81	2.08	<b>1.65</b>

**Figure 1.1.** Shag breeding success (chicks fledged per incubated nest) at Sumburgh Head, 1988–2020. The covid-19 lockdown restrictions in 2020 (open circle) meant that only a relatively reduced sample size of nests could be monitored, using fixed position cameras.





#### 1.4a. Black-legged Kittiwake *Rissa tridactyla* population counts

Monitoring of the standard Kittiwake population sites at the normal time in June was not possible due to covid-19.

The only population monitoring that was possible in 2020 was a boat survey of Compass Head and the southeast Mainland population transect on 3<sup>rd</sup> August. This survey provided at least some indication of the Kittiwake breeding season, but the results must be interpreted very cautiously, because the timing was wrong for standardised monitoring data. The number of nests counted at Compass Head on 3<sup>rd</sup> August was 39, in comparison with 35 in 2019, an increase of 11% (**Table 1.2**).

**Table 1.2.** Counts of Kittiwake nests (total of all incubating, empty and trace nests) at Compass Head in 1981 (baseline count) and from 2010-2020. All counts were made from the sea. Due to the covid-19 lockdown in 2020 the count was made in August, much later than the standard timing (in June).

	1981		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Compass Head	464		163			90	109		65	46	45	35	39

The three survey transects that are now used for annual Kittiwake population monitoring are also those used for Shag population monitoring (see Miles & Mellor 2019). In a normal year, each transect is surveyed once by boat during the peak incubation period, normally in June (judged from breeding success monitoring), and all visible fully-built Kittiwake nests (total AON) are counted and mapped. Surveys began in 2018 (Miles & Mellor 2018).

In 2020, the Fetlar and southeast Yell transects were not possible, but the southeast Mainland transect was surveyed on 3<sup>rd</sup> August, well outside of the standard monitoring period in June. A total of 255 AON was counted, an increase of 21.4% since 2019, when the total was 210 AON. During the 2020 survey, 181 Kittiwake chicks were seen, including 31 broods of two chicks. Overall, the different counts from this survey were all indicative that Kittiwakes in the southeast Mainland likely had a productive breeding season, with numbers of nests and chicks relatively high.

#### 1.4b. Black-legged Kittiwake *Rissa tridactyla* breeding success

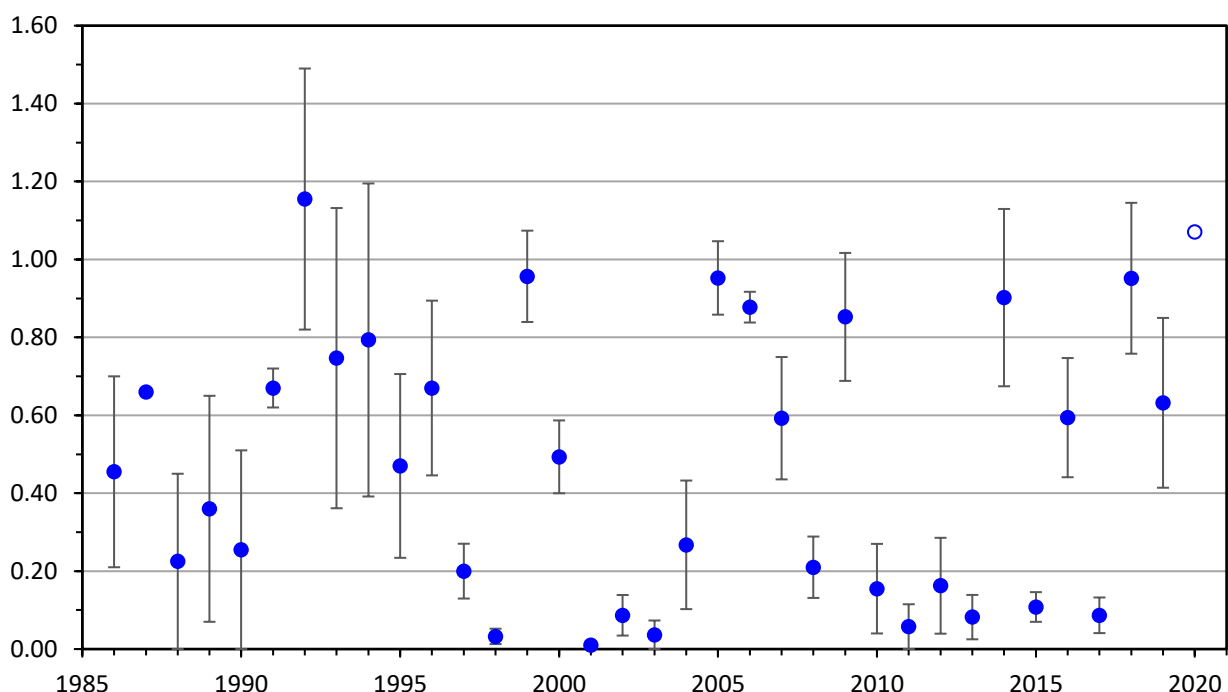
Monitoring was not possible at most of the standard Kittiwake breeding success sites due to covid-19. However, monitoring of a reduced number of nests at the Sumburgh Head plots was achieved using fixed-position cameras. These were located around the normal monitoring areas at the site, with no obvious biases regarding locations (nest sampling was still apparently random, even though the sample size of nests that could be monitored was lower than normal).

Eighty-six nests were monitored at Sumburgh Head in 2020, compared with 156 in 2019. Breeding success was 1.07 chicks fledged per incubated nest, 9.2% higher than in 2019, when breeding success was 0.98 (**Table 1.3**). The 2020 measure must be treated with caution though, because of the reduced sample size of nests monitored. Mean breeding success across the monitored sites was not calculated in 2020 because only one site was monitored (**Table 1.3, Figure 1.2**).

**Table 1.3.** Kittiwake breeding success summary statistics for Sumburgh Head, 2010–20: the number of nests (Total nests [= full nests + trace nests]); the number of nests where incubation was recorded or assumed (Incubating); the percentage of nests where incubation was recorded or assumed (% Incubating [= (Incubating / Total nests) x100]); the percentage of incubated nests where at least one chick was known to have hatched (% Incubated that hatched); the percentage of hatched nests where two chicks were seen (% Hatched that b/2); the percentage of incubated nests that failed (% Incubated that failed); the total number of chicks fledged (Chicks fledged); and breeding success (Breeding success = [Chicks fledged / Incubating]). In 2020, monitoring was restricted to Sumburgh Head which was monitored that year using fixed-position cameras.

Sumburgh Head	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total nests	177	145	139	138	150	135	142	148	151	156	86
Incubating	151	94	93	89	115	117	119	119	116	129	76
% Incubating	85.3	64.8	66.9	64.5	76.7	86.7	83.8	80.4	76.8	82.7	88.4
% Incubated that hatched	86.8	21.3	60.2	32.6	85.2	59.8	82.4	58.8	83.6	87.6	81.6
% Hatched that b/2	11.5	15.0	1.8	0	46.9	2.9	31.6	5.7	47.4	34.5	64.5
% Incubated that failed	88.1	100	84.9	100	20.9	71.8	43.7	72.3	17.2	20.2	23.7
Chicks fledged	18	0	14	0	132	33	79	34	139	127	81
Breeding success	0.12	0	0.15	0	1.15	0.28	0.66	0.29	1.20	0.98	1.07

**Figure 1.2.** Mean Kittiwake breeding success (chicks fledged per incubated nest) and standard two to six monitored sites per year, 1986–2020. In 2020, only Sumburgh Head could be monitored (open circle).



### 1.5a. Common Guillemot *Uria aalge* population counts

Monitoring of the standard Guillemot population sites was not possible due to covid-19. Please refer to the 2019 ornithological monitoring report for previous years' data (Miles & Mellor 2019).

### 1.5b. Common Guillemot *Uria aalge*: breeding success and chick diet at Sumburgh Head

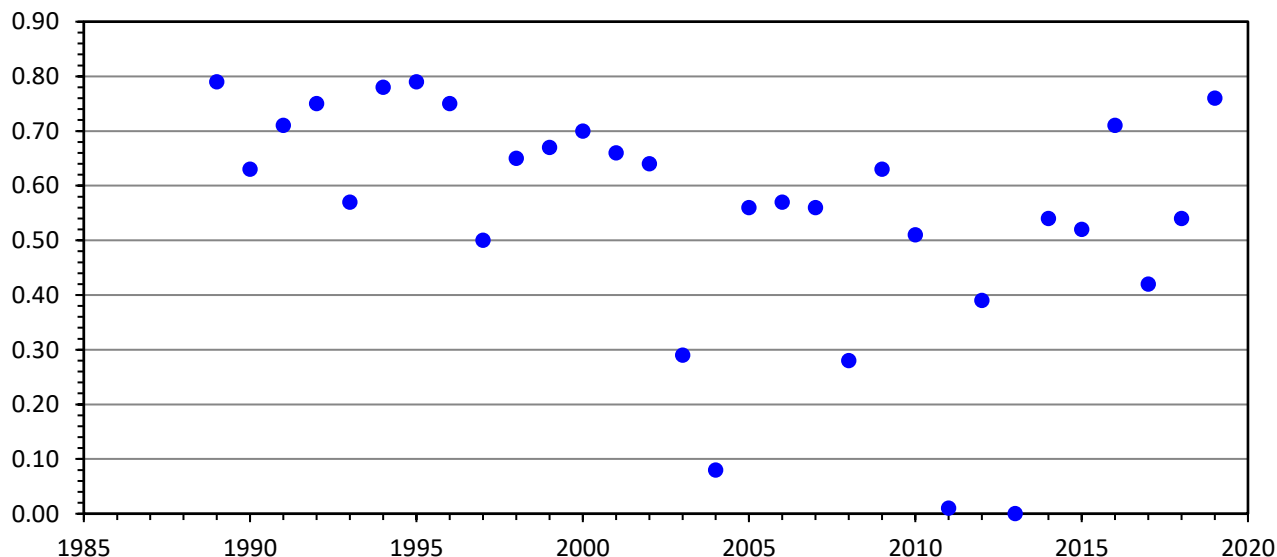
Detailed monitoring of the standard Guillemot breeding success plot at Sumburgh Head was generally unfeasible due to covid-19, including calculation of k-values (see Miles & Mellor 2019). However, using a fixed-position remote camera, it proved possible to monitor Guillemot site attendance (daily number of adults in the plot) and record the first date that an egg was seen. In 2019, it was decided that monitoring would cease at the Guillemot breeding success plot at Burravoe, on Yell, because the site was heavily predated, frequently abandoned mid-season and, as a Guillemot study colony and sampling site, was atypical for monitoring purposes. Therefore, Guillemot breeding success at Burravoe no longer features in this report.

In 2020, from 24<sup>th</sup> April to 28<sup>th</sup> July, the number of adult Guillemots in the monitored plot at Sumburgh Head was recorded daily at 0830 from detailed, high-resolution camera footage. As in previous years, at the start of the season the number of adults at the plot fluctuated greatly until the first week of May, then remained consistently high (>100 individuals) until mid-July, with 234 adults on 18<sup>th</sup> June the 2020 peak count (**Figure 1.4**). Numbers of adults decreased rapidly from 19<sup>th</sup> July onwards, with the last bird seen on 28<sup>th</sup> July (**Figure 1.4**). Guillemot productivity had been high at the monitoring plot in 2019, with 0.76 chicks fledged per apparently incubating pair, the fourth highest record since 1989 (**Table 1.4, Figure 1.3**). The general similarity in the pattern of adult colony attendance in 2019 and 2020 suggests that productivity may also have been high in 2020 (**Figure 1.4**). The first egg in 2020 was seen on 4<sup>th</sup> May, five days earlier than in 2019 (**Figure 1.5**).

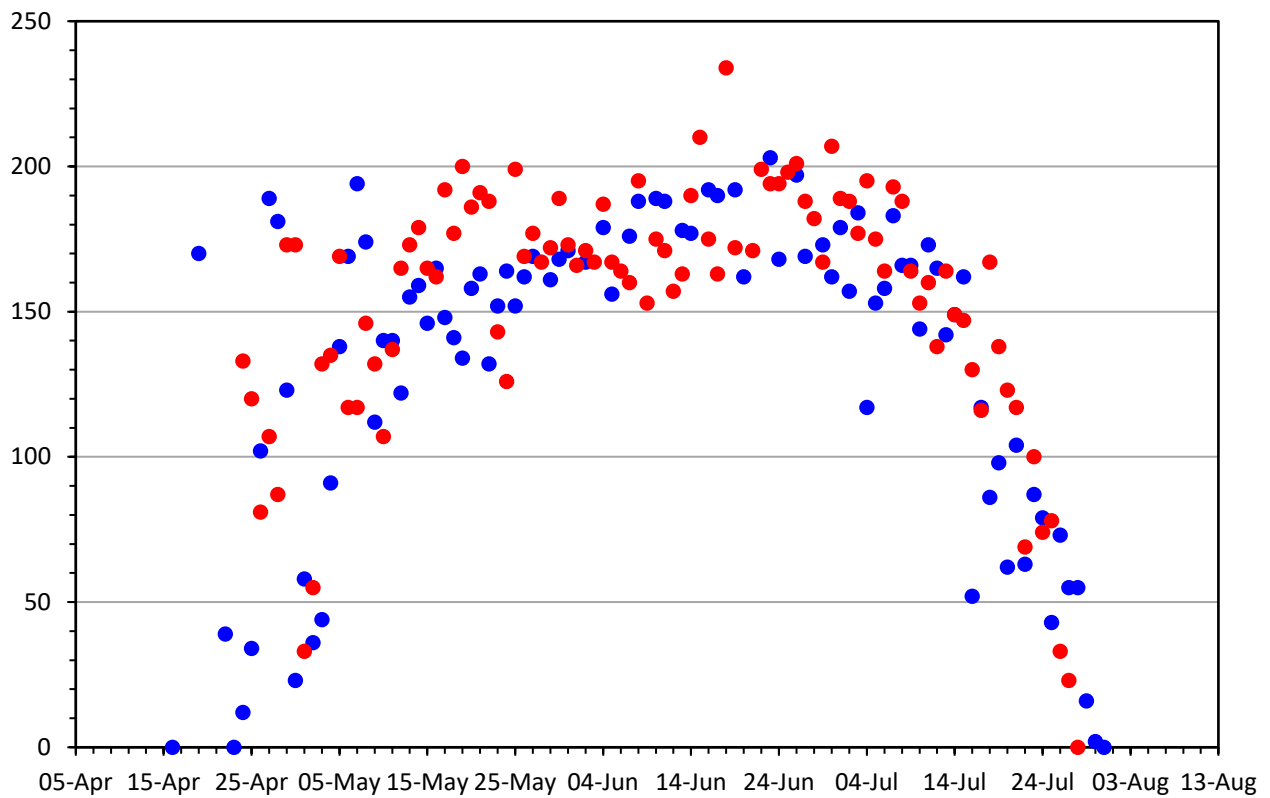
**Table 1.4.** Common Guillemot breeding parameters at Sumburgh Head, 2010–2020, including breeding success calculated as chicks fledged per apparently incubating pair. Detailed monitoring was not possible in 2020 due to the covid-19 lockdown restrictions.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Incubating pairs	154	142	140	98	122	135	132	130	134	129	-
First date an egg seen	2/5	29/4	4/5	7/5	6/5	5/5	4/5	9/5	8/5	9/5	4/5
Median laying date	9/5	9/5	14/5	19/5	16/5	14/5	13/5	15/5	17-18/5	13-14/5	-
Chicks fledged	78	2	55	0	66	70	94	54	72	98	-
Breeding success	0.51	0.01	0.39	0.00	0.54	0.52	0.71	0.42	0.54	0.76	-

**Figure 1.3.** Common Guillemot breeding success at the Sumburgh Head monitoring plot, 1989–2019. Monitoring was not possible in 2020 due to the covid-19 lockdown restrictions.



**Figure 1.4.** Common Guillemot site attendance (daily number of adults) at the monitored plot at Sumburgh Head through the breeding season in 2019 (blue) and 2020 (red).



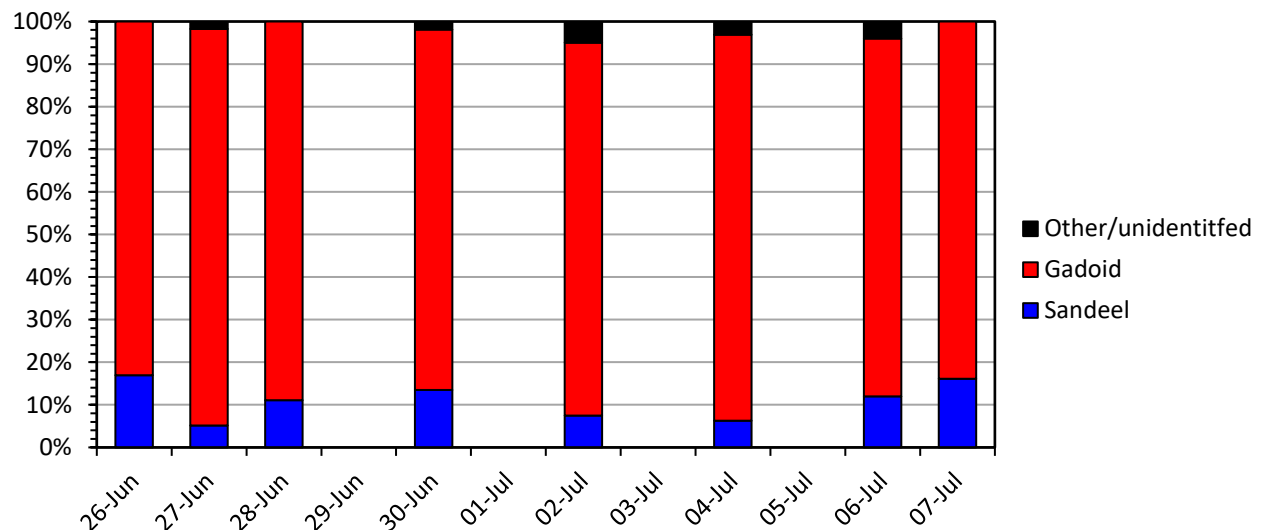
**Figure 1.5.** Guillemots at the Sumburgh Head breeding success monitoring plot, viewed at home during lockdown using the remote online webcam ‘SOTEAG Cliff Cam 1’ (<https://www.shetlandwebcams.com/cliff-cam/>). This photo shows a relatively small section of the monitored plot, but the camera is mounted on a motorised pivot and throughout lockdown was programmed to scan across the plot, stopping at different points so that section-by-section the whole plot could be observed, at this magnification but also others, including a wide-angle view showing the entire cliff face. The first egg of the year was on May 4<sup>th</sup> and is circled in red.



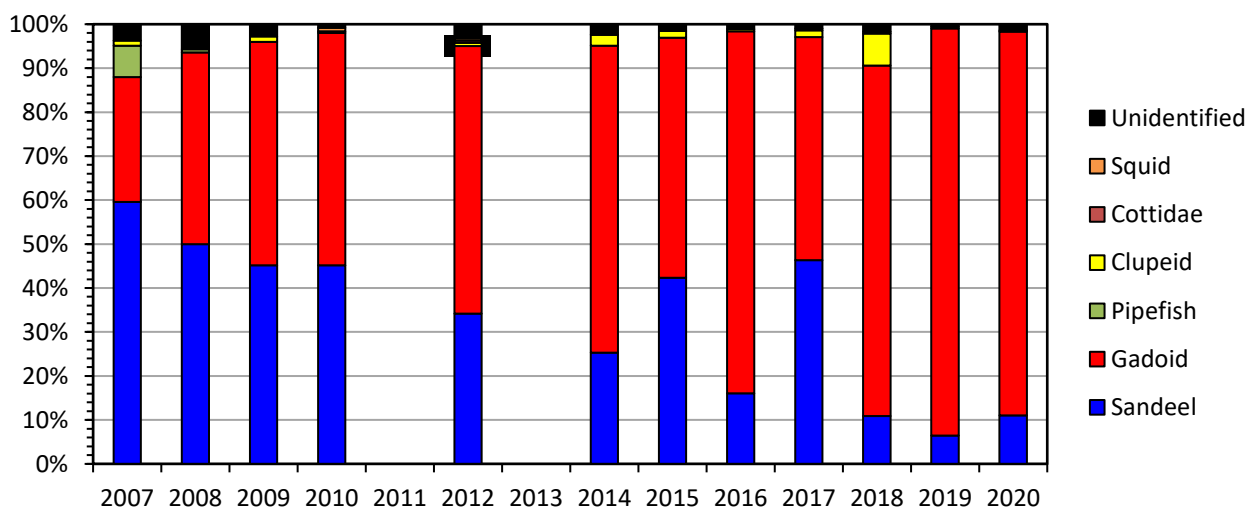
Guillemot chick feeding watches were carried out on eight days in 2020, between 26<sup>th</sup> June and 7<sup>th</sup> July inclusive, at the standard chick diet monitoring plot at Sumburgh Head (which includes the breeding success plot). During watches, each adult Guillemot flying into the plot was checked to see if it was carrying a fish, and if so, the adult was watched to see if its fish was presented to a chick. Fish presented to chicks were identified to the lowest possible taxon and their size estimated against bill length. All watches lasted 90 minutes, from 0900 to 1030 BST.

In 2020, a total of 354 fish were observed during feeding watches; 87.3% were gadids and 11.0% sandeels, compared with 92.6% gadids and 6.4% sandeels in 2019 (**Figure 1.7**). The proportional occurrence of gadids in the chick diet in 2020 was the second highest on record, after 2019. The occurrence of this prey type has increased across the study years (2007-20) while the occurrence of sandeels has decreased (**Figure 1.7**). On each day that feeding watches were carried out in 2020 and 2019, most fish presented to chicks were gadids (>80% each day) and sandeels occurred infrequently (<13% each day; **Figure 1.6**). No clupeids and a single squid was recorded in both 2020 and 2019 (**Figure 1.6 & Figure 1.7**). The general impression of the colony during the feeding watches was that many chicks were present and very few were left unattended. Thus, it appears as though breeding success in 2020 was at least reasonable.

**Figure 1.6.** The percentages of different general prey types fed to Common Guillemot chicks at the Sumburgh Head monitoring plot during feeding watches on 8 dates in 2020 (date range: 26/6–7/7; total sample size of prey items presented to chicks = 354).



**Figure 1.7.** The percentages of different general prey types fed to Common Guillemot chicks at the Sumburgh Head monitoring plot during feeding watches in 2007–2020. Prey sample sizes: 2007 = 324; 2008 = 140; 2009 = 250; 2010 = 250; 2012 = 401; 2014 = 629; 2015 = 515; 2016 = 790; 2017 = 509; 2018 = 492; 2019 = 202; 2020 = 354. There were too few chicks in 2011 and 2013 for meaningful observations.



### 1.6a. Razorbill *Alca torda* population counts

### 1.6b. Razorbill *Alca torda*: breeding success at Sumburgh Head

Monitoring of the standard Razorbill population and breeding success sites was not possible due to covid-19. Please refer to the 2019 ornithological monitoring report for previous years' data (Miles & Mellor 2019).

## **2. Pre-breeding season population counts of Black Guillemots *Cephus grylle***

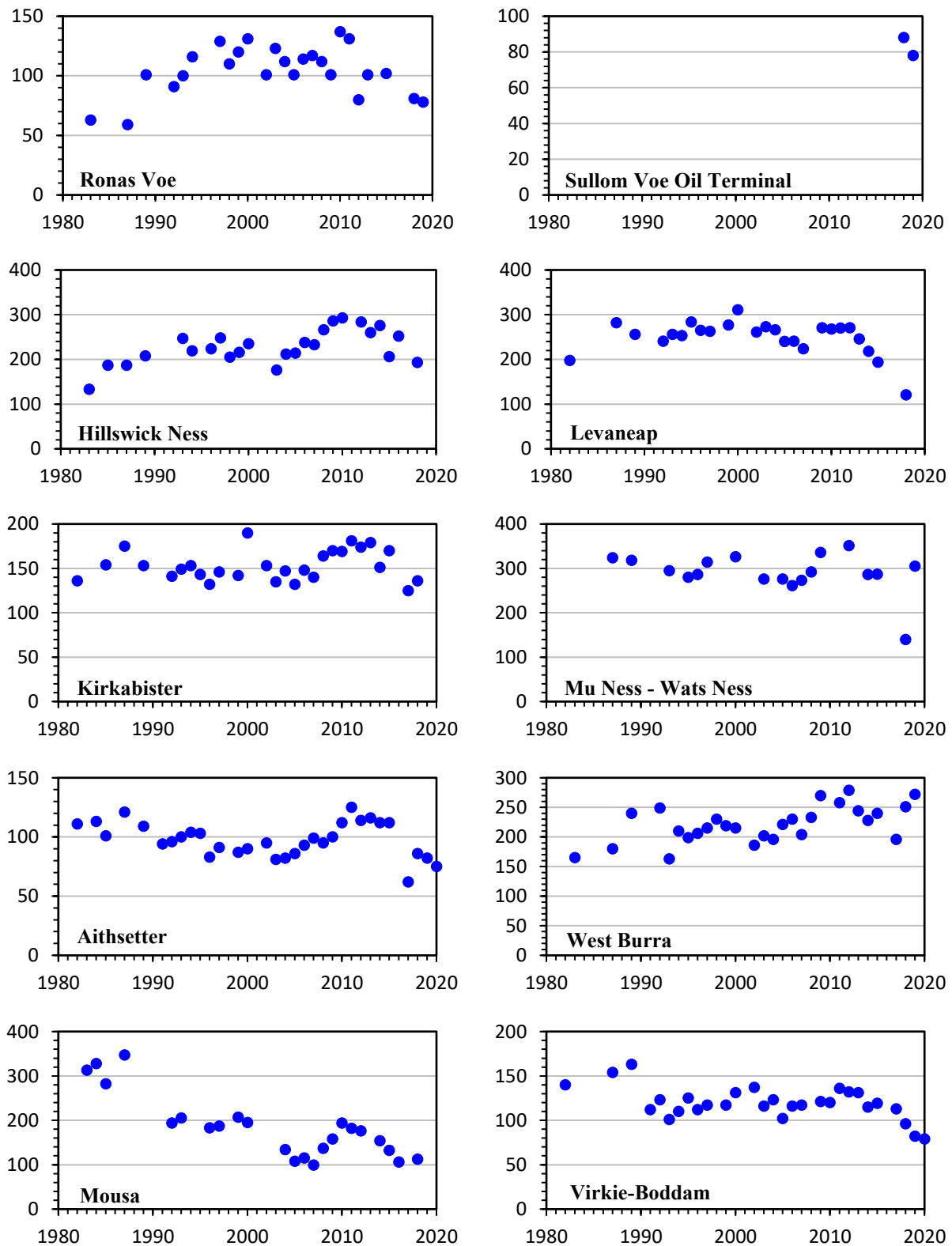
Counts of pre-breeding Black Guillemots are only made in late March and April (before egg laying) in dry conditions with little or no sea swell and little or no wind (or at most an offshore wind of Force 4). Ideally, two counts of each of the SOTEAG standard monitoring sites are made each year. This is rarely possible however, as it requires many days in April with the right weather and sea conditions. During surveys, attempts are made to flush any birds on land out onto the sea, to join displaying groups that can be readily counted. The willingness of individuals to leave the land varies from day to day though and diminishes through April. Also, after about 0900 displaying individuals tend to disperse, but the timing of this varies, with birds occasionally departing the colony area unusually early. Counts are therefore subject to high variation, sometimes including low counts that are difficult to interpret.

In 2020, calm, dry weather at the end of March allowed an early start to monitoring. The Aithsetter and Virkie-Boddam monitoring sites were surveyed in the last week of the month, and the counts at both sites were similar to counts the previous year (**Table 2.1, Figure 2.1**). The early start in March was fortuitous, as fieldwork was not possible throughout April due to the covid-19 lockdown.

**Table 2.1.** Counts of Black Guillemots in full breeding plumage at ten standard monitoring sites, 2011–20. Data presented are the highest early spring day counts for the year, with sites listed north to south. Percentage change (% ch.) is between 2020 and the most recent previous count. Sullom Voe Oil Terminal was first surveyed in 2018. In 2016 and 2017 Black Guillemot counts of sections of the Shetland coastline elsewhere, for the national seabird census, were prioritised over the standard monitoring sites (see 2016 and 2017 SOTEAG ornithological monitoring reports). In 2020, monitoring was limited by the covid-19 lockdown.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	% ch.
<b>Ronas Voe</b>	131	80	101		102			81	78		
<b>Sullom Voe Oil Terminal</b>								88	78		
<b>Hillswick Ness</b>	249	284	260	276	206	252		193			
<b>Levaneap</b>	270	271	246	218	194			121			
<b>Kirkabister</b>	181	174	179	151	170		125	136			
<b>Mu Ness - Wats Ness</b>	264	351	285	286	287				305		
<b>Aithsetter</b>	125	114	116	112	112		62	86	82	75	-8.5
<b>West Burra</b>	258	279	244	228	240		196	251	272		
<b>Mousa</b>	182	176		154	132	106		112			
<b>Virkie-Boddam</b>	136	132	131	115	119		113	96	82	79	-3.7

**Figure 2.1.** Counts of Black Guillemots in full breeding plumage at the standard monitoring sites, 1982–2020. Data presented are the highest early spring day counts for the year, with sites listed from north to south. Monitoring at Sullom Voe Oil Terminal began in 2018.





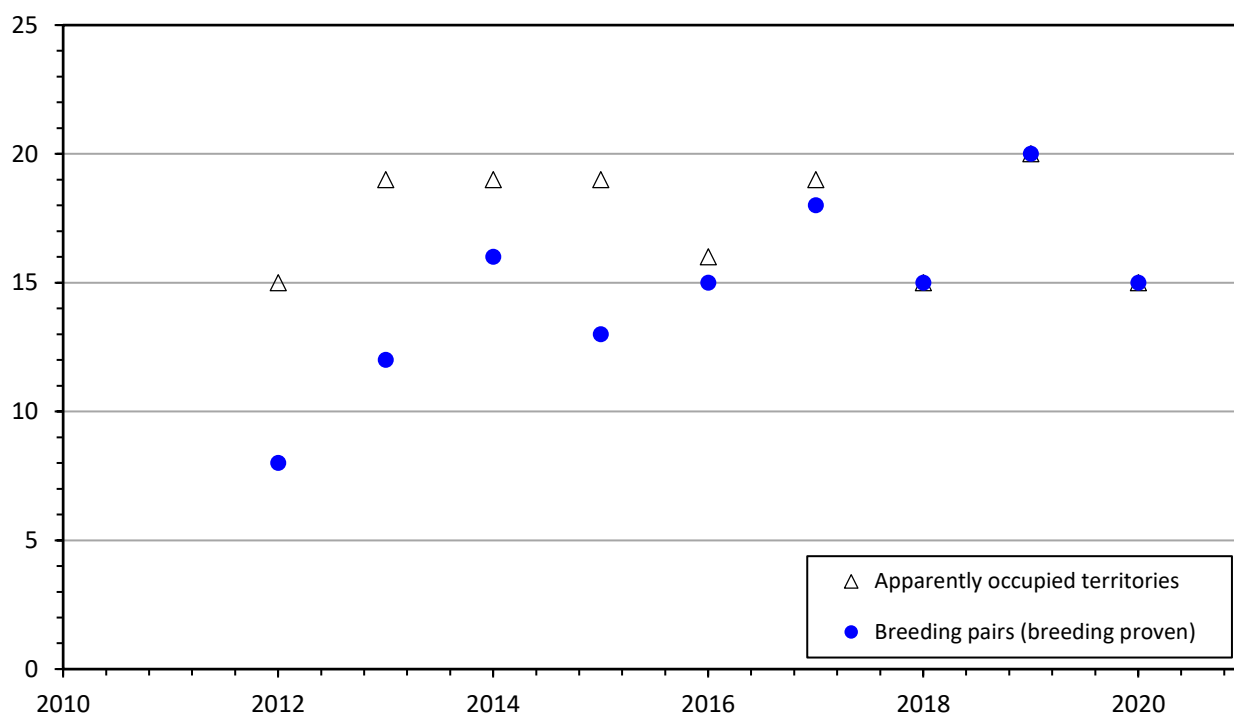
### **3. Monitoring of breeding Red-throated Divers *Gavia stellata***

Monitoring of the standard Red-throated Diver population and productivity plot at Northmavine was not possible by SOTEAG staff in 2020 due to covid-19. Please refer to the 2018 ornithological monitoring report for previous years' data (Miles & Mellor 2018).

Red-throated diver nesting activity is monitored every year by the Shetland Amenity Trust, under contract from SOTEAG, at a study plot of 29 lochs at Tington, in northwest Mainland. Monitoring began at Tington in 2012 and was possible in 2020. Two population monitoring visits are now made each year to the area (one in early June and one in early July). Prior to 2016, only one monitoring visit was made to this site per year (in June).

From 2012 to 2014, the number of confirmed breeding pairs at Tington increased sharply from 8 to 16, with the number of apparently occupied territories increasing from 15 to 19 (**Figure 3.1**). However, since then the number of confirmed breeding pairs and apparently occupied territories has fluctuated between 13 and 20 and remained relatively stable overall (**Figure 3.1**).

**Figure 3.2.** Red-throated Diver nesting activity in the Tington study area, 2012–2020. In 2018, 2019 and 2020 all pairs present were proved to breed.





#### 4. Population counts of moulting Common Eiders *Somateria mollissima*

The Shetland-wide survey of moulting Common Eiders is carried-out every two to five years during the moult period (late July to early-September). The most recent survey was in 2019 (Miles & Mellor 2019) and the next survey is scheduled for 2022.

Eiders in Sullom Voe, North Yell Sound and South Yell Sound are counted annually, always during the moult period. In some years, however, complete counts of these three survey areas have not been possible due to unsuitable weather and sea conditions. The first year of full coverage was 1988, when the total count was 426 birds (**Figure 4.1**).

Since 1988, numbers have been highly variable in these areas, possibly due to local movements of flocks between different areas of coast, some outside the boundaries of the monitored region (**Figure 4.1**). However, the counts show a broad general pattern of relatively high numbers in the 1980s (>200 birds), low numbers in the 1990s and 2006 (<200 birds) and high but very variable numbers thereafter (between 200 and 700 birds; **Table 4.1**, **Figure 4.1**).

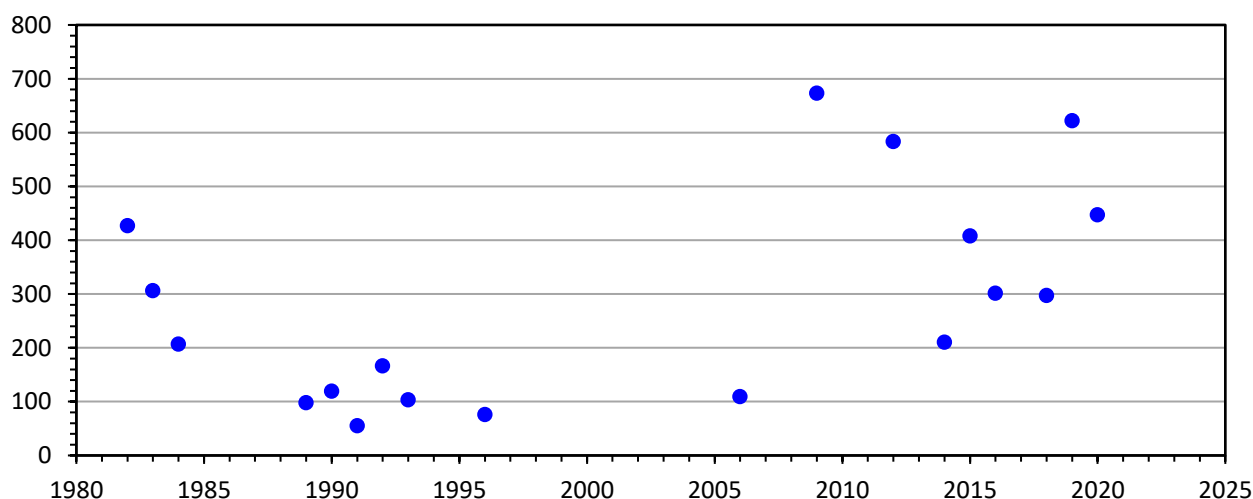
In 2020, Sullom Voe was surveyed on 10<sup>th</sup> August, North Yell Sound on 6<sup>th</sup> August and South Yell Sound on 4<sup>th</sup> August, all from a boat. In total, 69 birds were counted in Sullom Voe, comprising 41 males, 6 females, 11 juveniles and 11 females/juveniles ('brown' individuals), with most birds located around the jetty piers of the oil terminal. In North Yell Sound there were 24 birds in total, comprising no males, 15 females, 7 juveniles and 2 female/juveniles, mostly located around Little Holm. A total of 354 birds were counted in South Yell Sound, comprising 127 males, 2 females, 2 juveniles and 223 female/juveniles, with several large flocks encountered, distributed widely across the survey area but often in close proximity to salmon cages and mussel lines.

The grand total of 447 birds counted across the three survey areas in 2020 was 28.1% lower than the 2019 total of 622 birds, but relatively close to the 2010-2019 average of 403 birds (**Table 4.1**, **Figure 4.1**).

**Table 4.1.** Counts of Eiders in Sullom Voe and Yell Sound during the moult period (Jul-Aug), 2010–20. Totals are given only for the years with complete coverage of all three survey areas (- = no count).

Area	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sullom Voe	-	-	72	118	59	160	210	146	156	123	69
North Yell Sound	-	-	12	-	0	8	5	-	15	19	24
South Yell Sound	771	386	499	494	151	240	86	55	126	480	354
<b>Total</b>			<b>583</b>		<b>210</b>	<b>408</b>	<b>301</b>		<b>297</b>	<b>622</b>	<b>447</b>

**Figure 4.1.** Total counts of Eiders in Sullom Voe and Yell Sound during the moult period (Jul-Aug), 1982–2020.



## 5. Winter counts of seaduck and diving seabirds

### 5.1. Rova Head to Kirkabister, east Mainland

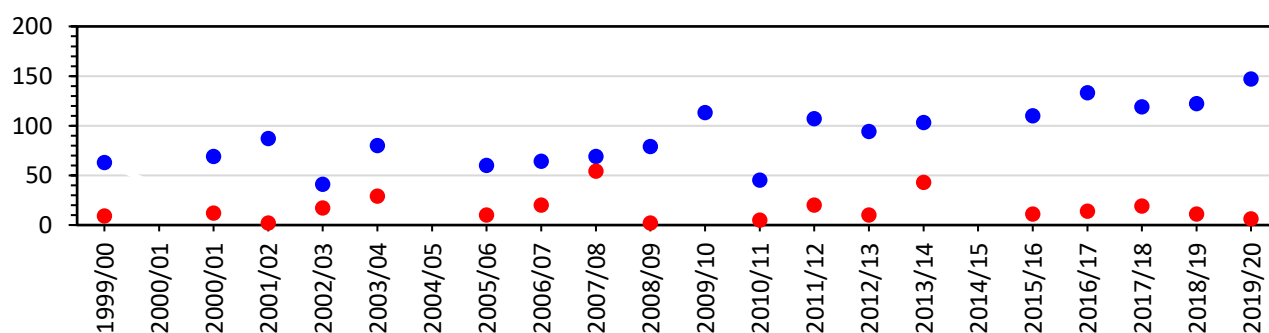
The Rova Head to Kirkabister transect was surveyed on 2<sup>nd</sup> February 2020 from MV *Seabird* with four observers. The survey began at 0845 and finished at 1350. Conditions were ideal. There was little or no wind throughout, the sea was flat calm (or only very lightly rippled) and there was little or no swell. It was bright and sunny, with cloud cover of 2/8. Visibility was excellent (>10km) and there was no rain.

The 2019/20 survey recorded unusually high counts of Great Northern Diver (highest count on record; **Figure 5.1**), Slavonian Grebe (third-highest on record), Long-tailed Duck (second-highest on record), Razorbill (third-highest on record) and Black-guillemot (second-highest on record; **Table 5.1**). In comparison with the previous five surveys, counts of Common Guillemot, Little Auk and Puffin were also relatively high (**Table 5.1**). Red-throated Diver was the only species for which unusually low numbers were seen, having dropped from double-figures on every survey since 2010/11 to six in 2019/20 (**Table 5.1**, **Figure 5.1**). The counts of other species during the 2019/20 survey were similar to the 2018/19 survey or were within the normal long-term variation of counts (**Table 5.1**).

**Table 5.1.** Counts of seaduck and diving seabirds seen from Rova Head (north Bressay Sound) to Kirkabister (north Nesting) during winter boat count surveys, winters of 2011/12 to 2019/20.

Winter	2011/12	2012/13	2013/14	2015/16	2016/17	2017/18	2018/19	2019/20
Survey date	19/12	30/11	17/2	12/12	7/1	12/12	11/1	2/2
Number of observers	2	3	2	2	3	3	4	4
Common Eider	126	93	59	154	77	50	67	62
Long-tailed Duck	119	134	161	121	219	189	137	229
Common Scoter	3	0	0	1	0	1	1	0
Velvet Scoter	0	0	0	0	1	0	0	0
Goldeneye	31	27	16	9	27	25	14	24
Red-breasted Merganser	181	126	101	105	181	134	199	174
Goosander	0	0	0	0	0	0	0	0
Red-throated Diver	20	10	43	11	14	19	11	6
Great Northern Diver	107	94	103	110	133	119	122	147
White-billed Diver	0	0	0	0	0	0	0	1
Red-necked Grebe	0	0	0	0	0	1	0	0
Slavonian Grebe	57	48	46	38	68	48	39	50
Cormorant	69	41	52	11	4	36	34	30
Shag	515	382	419	362	333	478	312	286
Common Guillemot	8	47	43	15	6	9	33	70
Razorbill	3	4	7	5	5	0	2	26
Black Guillemot	422	409	281	329	306	370	391	468
Little Auk	0	0	0	8	5	1	1	5
Puffin	4	0	1	1	1	1	1	6
<b>Total</b>	<b>1665</b>	<b>1415</b>	<b>1332</b>	<b>1280</b>	<b>1380</b>	<b>1481</b>	<b>1368</b>	<b>1584</b>

**Figure 5.1.** Counts of Great Northern Divers (blue) and Red-throated Divers (red) along the Rova Head to Kirkabister winter boat count transect in the winters of 1999/2000 to 2019/20.



## 5.2. Whiteness Voe to Skelda Voe, west Mainland

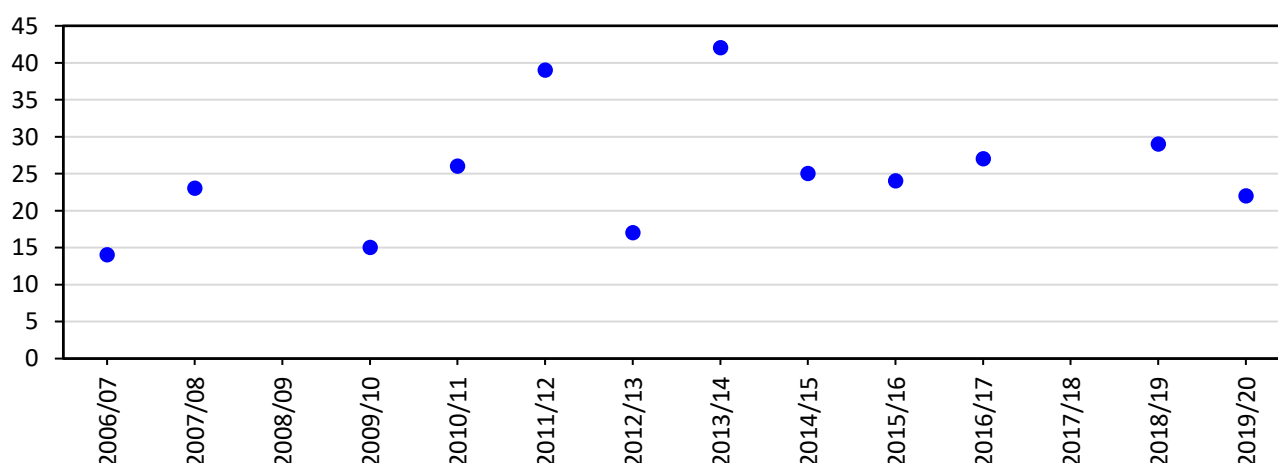
The Whiteness Voe to Skelda Voe area was surveyed on 29<sup>th</sup> January 2020 from land by one observer. The survey began at 0830 and finished at 1430. It was flat calm until 1200, but thereafter the wind picked up from the south-west, up to 13 knots by 1430. The sea was totally calm in the morning but by 1430 there were small wavelets and a moderate swell. Cloud cover was 1/8 to begin with, clouding over to 8/8 by the end of the survey. Visibility was good (>10km) and there was no rain throughout.

Counts of Common Eiders, Cormorants and Shags were higher during the 2019/20 survey than in 2018/19 (**Table 5.2**). The count of two Long-tailed Ducks during the 2019/20 survey was the lowest on record, extending the long-term pattern of linear decrease in numbers of this species in this area since the winter of 2009/10 (**Table 5.2**). Counts of the other species were similar to 2018/19 and within the normal long-term variation in numbers (**Table 5.2**). Black-throated Diver has only been recorded once before during the Whiteness Voe to Skelda Voe survey, a single bird seen during the 2014/15 survey (**Table 5.2**).

**Table 5.2.** Counts of seaduck and diving seabirds seen in the Whiteness Voe to Skelda Voe survey area during land-based winter surveys, winters of 2011/12 to 2019/20.

Winter	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2018/19	2019/20
Date	23/1	13/12	7/2	15/2	12/1	11/2	11/2	29/1
Common Eider	58	317	42	134	16	94	42	61
Long-tailed Duck	36	26	23	20	12	12	5	2
Common Scoter	5	0	2	0	1	0	0	0
Velvet Scoter	1	0	0	0	0	0	0	0
Goldeneye	21	18	28	15	2	9	13	10
Red-breasted Merganser	110	156	188	109	72	96	110	106
Goosander	3	0	1	0	0	4	4	1
Red-throated Diver	1	2	3	0	2	3	2	1
Black-throated Diver	0	0	1	0	0	0	0	1
Great Northern Diver	39	17	42	25	29	27	29	22
White-billed Diver	0	0	0	0	0	0	1	0
Slavonian Grebe	74	55	57	66	23	69	38	44
Cormorant	10	17	27	8	0	7	1	39
Shag	104	145	127	128	146	99	71	148
Common Guillemot	0	0	76	1	26	1	11	2
Razorbill	0	3	11	4	4	8	11	3
Black Guillemot	76	44	106	81	61	117	80	60
Little Auk	0	0	0	0	23	0	0	0
Puffin	0	0	1	1	5	2	0	0
<b>Total</b>	<b>528</b>	<b>800</b>	<b>735</b>	<b>592</b>	<b>422</b>	<b>548</b>	<b>548</b>	<b>500</b>

**Figure 5.2.** Counts of Great Northern Divers in the Whiteness Voe to Skelda Voe survey area, winters of 2006/07 to 2019/20.



### 5.3. Bressay Sound and north Bressay

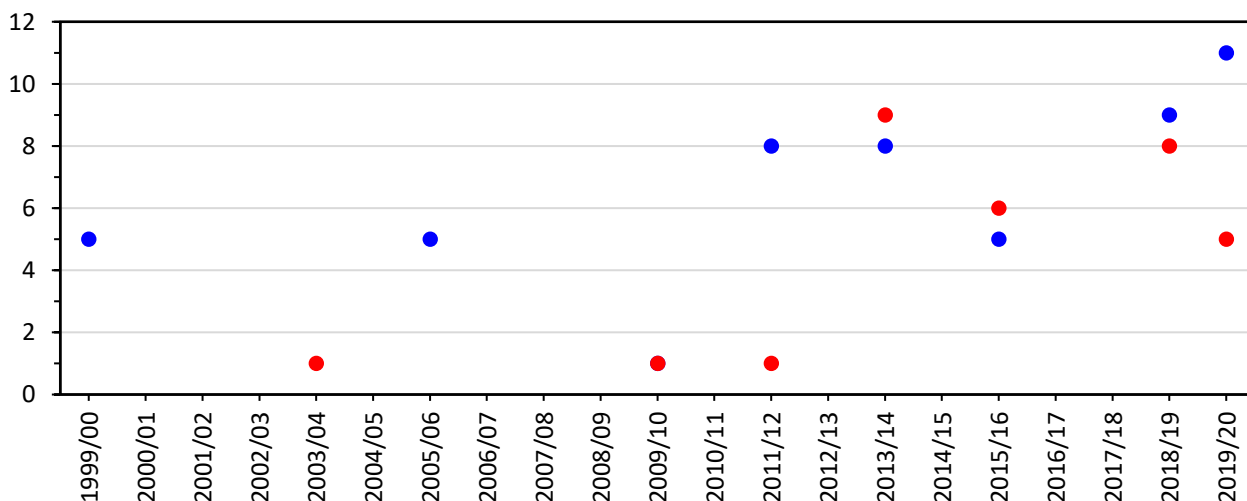
The Bressay Sound and north Bressay transect was surveyed on 14<sup>th</sup> February 2020 from MV *Seabird* with three observers. The survey began at 1305 and finished at 1530. The wind was south-westerly, speed 5 knots (gusting to 9 knots in the showers), the sea was rippled and the swell mostly light, although up to 1.5m in the most exposed areas. Cloud cover was 6/8 and it was overcast, although visibility was good (>10km). There were occasional wintry showers during the survey.

Numbers of Common Eider, Great Northern Diver, Cormorant and Shag during the 2019/20 survey were very similar to numbers during the 2018/19 survey (**Table 5.3**). The count of Red-breasted Mergansers was the highest on record and 86% higher than the 2018/19 winter count (**Table 5.3**). Perhaps due to the wintry conditions and ripple on the water reducing visibility of this species, the count of Black Guillemots was unusually low, down by 72% in comparison with the 2018/19 survey (**Table 5.3**). The counts of other species were unremarkable and within the normal long-term variation of counts (**Table 5.3**).

**Table 5.3.** Counts of seaduck and diving seabirds seen in Bressay Sound and along the north Bressay coastline during winter boat count surveys, winters of 2011/12 to 2019/20.

Winter	2011/12	2012/13	2013/14	2015/16	2016/17	2017/18	2018/19	2019/20
Date	3/2	12/12	19/2	26/2	13/12	14/12	9/1	14/2
No. of observers	2	2	2	2	2	2	3	3
Common Eider	223	99	150	144	109	94	94	102
Long-tailed Duck	62	84	127	78	97	31	61	33
Common Scoter	4	1	3	2	3	0	1	4
Goldeneye	1	3	2	20	2	3	0	4
Red-breasted Merganser	44	23	16	30	28	31	36	67
Red-throated Diver	11	0	9	8	3	4	6	9
Great Northern Diver	9	9	17	11	26	31	17	16
Slavonian Grebe	2	0	0	4	3	3	3	5
Cormorant	3	1	5	3	4	28	19	22
Shag	234	359	150	221	357	681	356	345
Common Guillemot	9	11	20	12	6	3	9	24
Razorbill	18	0	7	13	11	1	2	10
Black Guillemot	358	302	326	283	279	193	374	104
Little Auk	19	0	0	0	2	0	0	0
Puffin	0	0	0	1	0	0	1	0
<b>Total</b>	<b>998</b>	<b>892</b>	<b>887</b>	<b>830</b>	<b>930</b>	<b>1103</b>	<b>981</b>	<b>745</b>

**Figure 5.3.** Counts of Great Northern Divers along the Bressay Sound winter boat count transect (red) and North Bressay transect (blue), winters of 1999/00 to 2019/20. In winters when more than one survey was completed, data are from the survey that occurred within the standard survey period (15<sup>th</sup> December to the last day of February) and that was closest to the winter solstice date.



#### 5.4. Pool of Virkie to Bay of Quendale, south Mainland

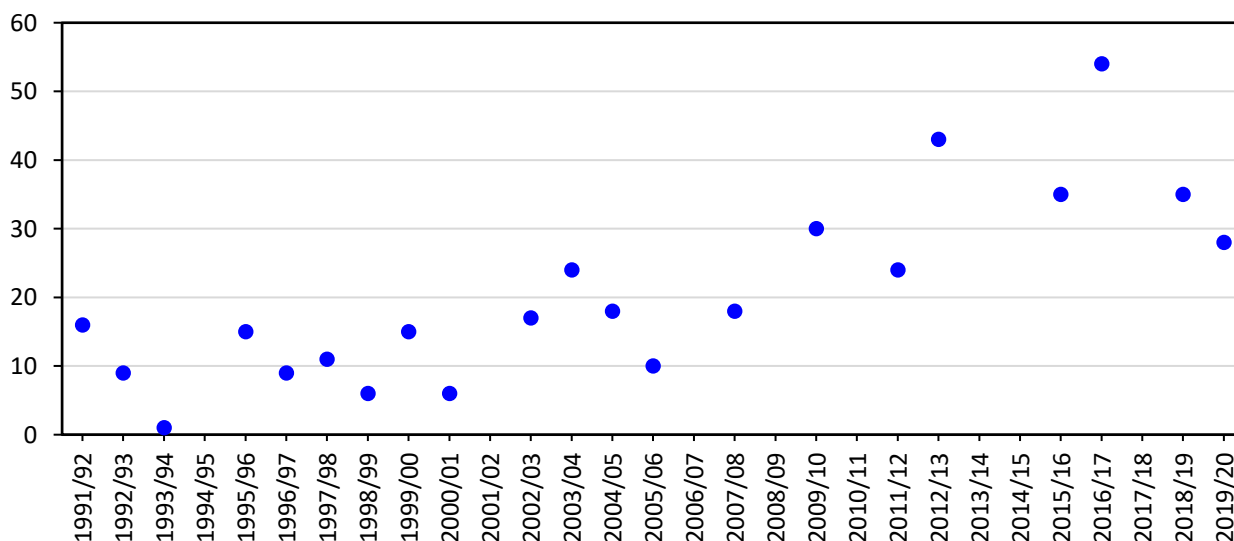
The Pool of Virkie to Bay of Quendale area was surveyed on 29<sup>th</sup> January 2020 from land by one observer. The survey began at 0950 and finished at 1410. The wind was southerly, speed 0-5 knots. The sea was variable, with just a light ripple in most areas, though larger waves and even some light surf in the more exposed regions. Cloud cover was 4-6/8. Visibility was good (>10km) and it remained dry throughout the survey.

The counts of Razorbill and Black Guillemot were substantially higher than in 2018/19, but numbers of most of the other species seen were low (**Table 5.4**). For example, compared with the 2018/19 counts, in 2019/20 numbers of Common Eider were down by 51%, Long-tailed Ducks by 25%, Red-throated Divers by 50%, Great Northern Divers by 20%, Shags by 56% and Common Guillemots by 19% (**Table 5.4, Figure 5.4**). There was no obvious explanation for these decreases, and it will be interesting to see if the 2020/21 survey records similarly low counts of these species. Unusual sightings in the 2019/20 survey were two Common Scoter and a single Slavonian Grebe, the first time the latter species has been recorded in the area by SOTEAG.

**Table 5.4.** Counts of seaduck and diving seabirds seen within the Pool of Virkie to the Bay of Quendale survey area during land-based winter surveys, winters of 2007/08 to 2019/20.

Winter	2007/08	2009/10	2011/12	2012/13	2015/16	2016/17	2018/19	2019/20
Survey date	12/1	10/2	30/12	9/2	12/1	12/2	24/1	29/1
Common Eider	45	43	21	9	14	7	55	27
Long-tailed Duck	201	121	242	114	165	77	101	76
Common Scoter	0	0	7	1	2	0	0	2
Goldeneye	32	15	38	12	12	12	0	0
Red-breasted Merganser	0	0	1	0	3	8	6	5
Red-throated Diver	10	1	10	5	1	7	14	7
Black-throated Diver	0	0	0	0	1	0	0	0
Great Northern Diver	18	30	24	43	35	54	35	28
Slavonian Grebe	0	0	0	0	0	0	0	1
Cormorant	0	2	1	2	0	2	1	3
Shag	76	115	119	139	132	148	117	52
Common Guillemot	2	4	26	79	6	3	27	22
Razorbill	1	0	2	2	0	1	2	23
Black Guillemot	24	61	29	71	45	48	22	38
Little Auk	0	0	1	0	0	0	0	0
<b>Total</b>	<b>409</b>	<b>392</b>	<b>521</b>	<b>477</b>	<b>416</b>	<b>367</b>	<b>380</b>	<b>264</b>

**Figure 5.4.** Counts of Great Northern Divers in the Pool of Virkie to Bay of Quendale winter counts survey area, winters of 1991/92 to 2019/20. In winters when more than one survey was completed, data are from the survey that occurred within the standard survey period (15<sup>th</sup> December to the last day of February) and that was closest to the winter solstice date.



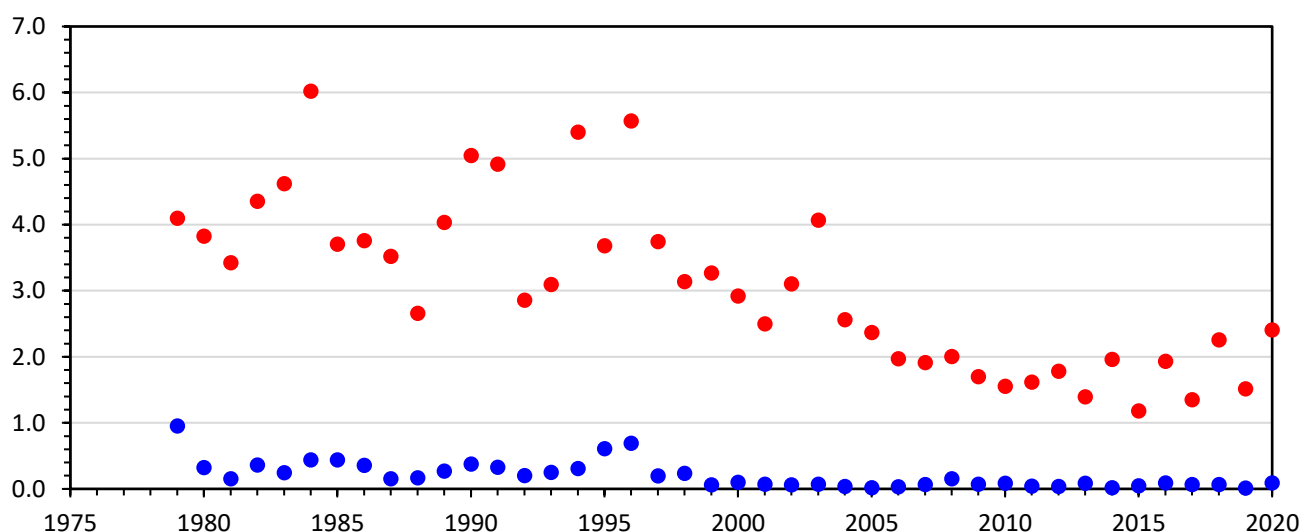
## 6. Beached Bird Surveys

The Shetland-wide monthly beached bird survey has operated continuously since March 1979 and is carried out by SOTEAG staff and local volunteers. All seabird corpses down to a single wing with all primary feathers present are identified to species, aged externally as far as possible and examined for oil contamination. Samples of oiled plumage or oil residues found on beaches are analysed by FUGRO (molecular structure determined and cross-checked with a global reference database, that includes the Shetland oil industry oils).

In 2020, survey coverage was reduced during the covid-19 lockdown period (April, May & June) to only those beaches within the allowed walking distance of surveyors' homes (**Table 6.3**). Due to an outbreak of avian influenza, no birds were counted or collected during the December survey, which was much reduced because volunteer coverage was suspended, and comprised SOTEAG staff surveying only for oil (**Table 6.3**).

The number of seabird corpses and oiled seabird corpses found per km surveyed has decreased across the years (1979-2020), with the number of seabird corpses remaining low (<3 corpses/km) since 2003 and the number of oiled seabird corpses remaining very low (<0.2 oiled corpses/km) since 1998 (**Figure 6.1**). The 2020 survey results continued these general patterns (**Figure 6.1** & **Table 6.3**).

**Figure 6.1.** Total seabird corpses found per km surveyed (red) and oiled seabird corpses found per km surveyed (blue) during the Shetland beached bird survey, 1979 to 2020.



**Table 6.1.** Summary statistics from the Shetland beached bird survey, 2010 to 2020. Km = total kilometers surveyed, Corpses = total number of corpses found, Oiled = total number of oiled corpses found, % Oiled = percentage of all corpses that were oiled, Corpses/km = number of corpses found per kilometer surveyed [Corpses/Km], Oiled/km = number of oiled corpses found per kilometer surveyed [Oiled/Km].

Year	Km	Corpses	Oiled	% Oiled	Corpses/km	Oiled/km
2010	551.3	857	46	5.37	1.555	0.083
2011	577.8	935	23	2.46	1.618	0.040
2012	579.2	1031	21	2.04	1.780	0.036
2013	581.1	811	49	6.04	1.396	0.084
2014	587.5	1152	11	0.96	1.961	0.019
2015	585.2	691	27	3.91	1.181	0.046
2016	389.4	752	35	4.65	1.931	0.090
2017	387.8	523	25	4.78	1.349	0.064
2018	367.1	828	24	2.89	2.255	0.065
2019	358.2	542	5	0.92	1.513	0.013
2020	316.4	707	29	4.10	2.406	0.092

## 6.1. Incidence of oiling

**January to April:** An exceptionally high number of oiled seabirds (20) were found in March and April: eight Fulmars (all lightly oiled), three Gannets (all heavily oiled), seven Guillemots (six heavily oiled, one lightly oiled), one Razorbill (lightly oiled) and one Great Black-backed Gull (heavily oiled). Fourteen were found on beaches on the west coast of Shetland (**Table 6.2**). Oil was sampled and analysed from 15 of the 20 birds. The oil on 11 of the birds was identified as a refined petroleum of the same type (probably a marine fuel oil originating from West Africa; **Table 6.2**). Such a numerous arrival of oiled birds all bearing the same oil type was unprecedented since the *Braer* oil spill and prompted speculation that the source of the oil might be the *Coelleira*, a fishing boat that ran aground on the Vee Skerries in August 2019, that in 2020 was beginning to disintegrate. However, the Maritime and Coastguard Agency were contacted and commented that the only oils potentially still onboard the *Coelleira* were not of the identified type (not marine fuel oils or of West African origin). Reference samples from the *Coelleira* were not available for cross-checking analyses. The source of the matching samples from birds found during the beaches surveys was never determined, but analyses showed it was not the Shetland oil industry. Of the other four samples analysed, one could not be identified to type, one was found not to be petrogenic, and the remaining two were crude oils, not originating from the Shetland oil industry (**Table 6.2**).

**May to August:** During the May beaches survey, a heavily oiled Guillemot was found at The Blade, Ronas Voe, and a moderately oiled Guillemot at Sandvøe. The oil was analysed and identified as a refined petroleum of the same type as 11 of the samples in January to April (probably a marine fuel oil originating from West Africa; **Table 6.2**). Oil sampled from a Guillemot found in July on Bannaminn Mouth beach was also of this type. Four other oiled seabirds were found during the July survey, namely a Fulmar and a Kittiwake at The Blade, a Fulmar at Sandvøe and a Great Black-backed Gull at Cullswick. Oil samples from the Kittiwake and Great Black-backed Gull were analysed and were both the same crude oil, not originating from the Shetland oil industry (**Table 6.2**). No oiled birds were found during the June and August surveys.

**September to December:** During the September survey, a heavily oiled Guillemot was found at Scord and a lightly oiled Guillemot at Banna Minn Mouth. Oil samples from these two birds were analysed and identified as a refined petroleum of the same type as 11 of the samples in January to April and 3 of the samples in May to August (probably a marine fuel oil originating from West Africa; **Table 6.2**). No oiled birds were found during the October, November and December surveys.

## 6.2. Non-oiled mortality

**January to April:** Despite the slightly reduced coverage of beaches in March and April because of the covid-19 restrictions, the frequency of corpses found during these months followed the normal pattern of relatively few found in January, February and March (<30 in each month) but considerably more in April (>50). An increase in the number of corpses in April is usual and coincides with when many breeding seabirds first arrive inshore and on the cliffs across Shetland. The three most frequently recorded species in these months were Fulmar, Gannet and Common Guillemot (**Table 6.3**).

**May to August:** The beaches surveys during these months normally produce the highest frequency of corpses of the year, and 2020 was no exception, despite the reduced survey coverage. Over 90 corpses were found each month during this period (**Table 6.3**). The high frequency at this time of year is likely due to natural deaths among the high numbers of seabirds inshore at this time, through the core months of the breeding season. The species found most frequently during this period were Fulmar, Gannet and Common Guillemot (**Table 6.3**). A Pink-footed Goose corpse was an unseasonal find during the June survey (**Table 6.3**).

**September to December:** Numbers of corpses found were lower during these months than in the summer, in accordance with the normal annual pattern (**Table 6.3**). Due to an outbreak of avian influenza, no birds were counted or collected during the December survey, which was much reduced because volunteer coverage was suspended, and SOTEAG staff surveyed only for oil. The three most frequently recorded species in these months were Fulmar, Gannet and Common Guillemot (**Table 6.3**).

**Table 6.2.** Results of analyses by FUGRO of oil samples collected in 2020. L = lightly oiled (< 10%); M = moderately oiled (10–25%); H = heavily oiled (> 25%). \* & † = samples an exact match and likely from the same source.

No.	Date	Location	Sample	Type	Source information
282	1/3	Ulsta, Yell	Gannet (H)	Unknown	Only trace levels of hydrocarbons found and could not be analysed to source
283*	24/3	West Voe, Mainland	Guillemot (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
284*	29/3	Scousburgh, Mainland	Guillemot (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
285*	29/3	Rerwick, Mainland	Razorbill (L)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
286*	30/3	Sandvoe, Mainland	Fulmar (L)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
287*	27/4	Pirrie Voe of Spiggie, Mainland	Guillemot (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
288	29/4	Easter Quarff, Mainland	Great black-backed Gull (H)	Vegetable oil	Not of petrogenic origin
289†	29/4	Culswick, Mainland	Fulmar (L)	Unrefined petroleum - crude oil	Likely originated from the Middle East and was released accidentally or illegally
290*	29/4	Culswick, Mainland	Guillemot (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
291	29/4	Sands of Sand, Mainland	Fulmar (L)	Unrefined petroleum - crude oil	No matches found, likely released accidentally or illegally
292*	29/4	Sands of Sand, Mainland	Guillemot (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
293	29/4	Garderhouse, Mainland	Fulmar (L)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally. Similar properties to #295.
294*	29/4	Mavis Grind East, Mainland	Guillemot (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
295	29/4	Sandwick Eshaness, Mainland	Gannet (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally. Similar properties to #293.
296*	2/5	Gluss Ayre West, Mainland	Guillemot (L)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
297*	25/5	Sandvoe, Mainland	Guillemot (M)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
298*	29/5	The Blade, Mainland	Guillemot (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
299†	26/7	Cullswick, Mainland	Great Black-backed Gull (L)	Unrefined petroleum - crude oil	Likely originated from the Middle East and was released accidentally or illegally
300*	26/7	Bannaminn North, Burra	Guillemot (L)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally



**Table 6.2.** (Continued)

301†	27/7	The Blade, Mainland	Kittiwake (L)	Unrefined petroleum - crude oil	Likely originated from the Middle East and was released accidentally or illegally
302*	28/9	Bannaminn North, Burra	Guillemot (L)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally
303*	7/10	Scord, Mainland	Guillemot (H)	Refined petroleum, such as a marine fuel oil	Likely originated from a west African feedstock and was released accidentally or illegally

**Table 6.3.** Monthly totals of seabirds and seaduck found during beached bird surveys in 2020 (number oiled in parentheses). Seabirds and seaduck found tangled in nets/ropes/hooks in 2020: 1 Fulmar in January (rope), 1 Gannet in May (hook), 1 Gannet in June (rope), 1 Fulmar in August (rope), 1 Great Black-backed Gull in August (rope), 1 Fulmar in September (rope). \*Due to an outbreak of avian influenza, no birds were counted or collected during the December survey (n/a), which was much reduced and only included searches for oil.

SEABIRDS & SEADUCK	J	F	M	A	M	J	J	A	S	O	N	*D	SUM
Common Eider						1				1	1		3
Long-tailed Duck	1												1
Fulmar	6	4	11(5)	26(3)	54	49	78(2)	85	38	5	9		365
Gannet	10	5(1)	4(1)	8(1)	7	24	17	9	5	4	4		97
Cormorant								2					2
Shag		2		3	4	3	3	2	3		4		24
Great Skua					1	2	2	1					6
Black-headed Gull						2			2		1		5
Common Gull		2		1	2		2	1	1	1			10
Herring Gull				3	3	1	5	7	2	4	2		27
Great Black-backed Gull	3	2	1	2(1)	5	4	3(1)	4	2	1	6		33
Lesser Black-backed Gull							1						1
Glaucous Gull	2												2
Kittiwake	4			1	3		2(1)	2	1		5		18
Arctic Tern							1	2					3
Common Guillemot	3	3	6(2)	11(5)	10(2)	11	11(1)	5	17(2)	2	2		81
Razorbill		1	1(1)	2	2	4		1	2				13
Black Guillemot						2		1					3
Puffin					3	3	2	3		1			12
Little Auk											1		1
<b>TOTAL FOUND</b>	<b>29</b>	<b>19</b>	<b>23</b>	<b>57</b>	<b>94</b>	<b>106</b>	<b>127</b>	<b>125</b>	<b>73</b>	<b>19</b>	<b>35</b>	<b>n/a</b>	<b>707</b>
<b>TOTAL OILED</b>	<b>0</b>	<b>1</b>	<b>9</b>	<b>10</b>	<b>2</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29</b>
<b>% OILED</b>	<b>0.0</b>	<b>5.3</b>	<b>39.1</b>	<b>17.5</b>	<b>2.1</b>	<b>0.0</b>	<b>3.9</b>	<b>0.0</b>	<b>2.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>4.1</b>
<b>TOTAL KM SURVEYED</b>	<b>30.7</b>	<b>29.2</b>	<b>21.7</b>	<b>17.7</b>	<b>21.4</b>	<b>25.1</b>	<b>27.3</b>	<b>28.9</b>	<b>30.7</b>	<b>30.7</b>	<b>30.5</b>	<b>22.5</b>	<b>316.4</b>
(Previous year)	30.5	30.7	29.7	30.7	29.6	28.1	29.2	30.7	29.2	29.7	29.4	30.7	358.2
<b>FOUND / KM</b>	<b>0.94</b>	<b>0.65</b>	<b>1.06</b>	<b>3.22</b>	<b>4.39</b>	<b>4.22</b>	<b>4.65</b>	<b>4.33</b>	<b>2.38</b>	<b>0.62</b>	<b>1.15</b>	<b>n/a</b>	<b>2.41</b>
<b>OILED / KM</b>	<b>0.00</b>	<b>0.03</b>	<b>0.41</b>	<b>0.56</b>	<b>0.09</b>	<b>0.00</b>	<b>0.18</b>	<b>0.00</b>	<b>0.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.09</b>
<b>Other species found</b>	<b>J</b>	<b>F</b>	<b>M</b>	<b>A</b>	<b>M</b>	<b>J</b>	<b>J</b>	<b>A</b>	<b>S</b>	<b>O</b>	<b>N</b>	<b>D</b>	<b>SUM</b>
Whooper Swan											1		1
Greylag Goose	1			4	4	5	3	8	3	3	3		34
Pink-footed Goose						1			1				2
Pheasant								1					1
Grey Heron							1	1					2
Oystercatcher			1	3	1	2	4	2	1				14
Curlew							2						2
Raven									1				1
Hooded Crow					2								2
Starling		1											1
Rock Dove			1	1	1		2	2	1	1	2		11
<b>Total</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>12</b>	<b>14</b>	<b>7</b>	<b>4</b>	<b>6</b>	<b>n/a</b>	<b>71</b>

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## **Appendix 1. Seabird monitoring on Foula in 2020, conducted by Sheila Gear (Foula Ranger Service).**

**Common Eider.** In 2020, male Eider numbers were down but female numbers were slightly up in comparison with 2019. The count was done on 26<sup>th</sup> July by Penny Gear and Sheila Gear. Conditions were very good, with a light southerly wind and sunshine. Breeding was late and breeding success was very poor, similar to 2019, with most broods only having one or two surviving chicks by the time of the counts. Mean brood size in 2020 was 2.00, up by 2 % from 2019, when it was 1.96.

	26/7/11	27/7/12	25/7/13	27/7/14	25/7/15	24/7/16	29/7/17	12/8/18	4/8/19	26/7/19
Males	74	108	94	81	33	81	45	64	79	50
Females	51	50	71	87	52	68	69	65	58	65
<b>Adults</b>	<b>125</b>	<b>158</b>	<b>165</b>	<b>168</b>	<b>85</b>	<b>149</b>	<b>114</b>	<b>129</b>	<b>137</b>	<b>115</b>
Chicks	26	81	27	49	21	70	38	47	49	34
<b>Total</b>	<b>151</b>	<b>239</b>	<b>192</b>	<b>217</b>	<b>106</b>	<b>219</b>	<b>152</b>	<b>176</b>	<b>186</b>	<b>149</b>
Brood/1	7	7	15	5	3	14	4	10	9	7
Brood/2	6	12	3	11	2	7	6	6	8	6
Brood/3	1	8	2	6	2	7	6	7	8	3
Brood/4	1	4	0	1	2	4	1	1	0	0
Brood/5	0	2	0	0	0	1	0	0	0	0
Brood/6	0	0	0	0	0	0	0	0	0	1
<b>Mean Br.</b>	<b>1.73</b>	<b>2.45</b>	<b>1.35</b>	<b>2.13</b>	<b>2.33</b>	<b>2.12</b>	<b>2.38</b>	<b>1.96</b>	<b>1.96</b>	<b>2.00</b>

**Red-throated Diver.** Red-throated Divers had better season than in 2019. Although only 12 sites were occupied, there were 11 breeding attempts, and eight chicks were assumed to have fledged. Three pairs failed, with broken eggshells seen in their nests. Due to the drought in early summer, the water in pool B was only c.1ft deep and the pool was not occupied this year.

<b>Foula Red-throated Divers</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Sites occupied at least once	13	12	13	13	12	15	11	12	14	12
Breeding attempts	11	8	12	12	12	13	10	11	11	11
Sites where chicks hatched	7	6	7	11	11	11	6	9	9	8
Minimum number of chicks	9	8	9	17	12	12	7	14	13	9
Chicks presumed fledged	5	5	4	15	10	6	5	9	5	8
<b>Breeding success</b>	<b>0.45</b>	<b>0.63</b>	<b>0.33</b>	<b>1.25</b>	<b>0.83</b>	<b>0.46</b>	<b>0.50</b>	<b>0.82</b>	<b>0.45</b>	<b>0.73</b>

**Northern Fulmar.** Four of the Foula plots were picked at random and monitored by Sheila Gear. The weather during incubation was dry and no nest sites were flooded out. Predation of eggs by a pair of Ravens, nesting just south of the plots, was frequently observed. A total of 15 ‘extra’ fledglings were produced in nest sites where birds had been present on less than three observations earlier in the year.

<b>Plot</b>	<b>Total AOS</b>	<b>AOS on all 3 checks (%)</b>	<b>Chicks at all-3-check sites + ‘extra’ sites</b>	<b>Success</b>
1	89	32 (35.9%)	13 + 7	20/39 = 0.51
2	59	19 (32.2%)	8 + 4	12/23 = 0.52
6	59	31 (52.4%)	14 + 3	17/34 = 0.50
8	26	19 (73.1%)	11 + 1	12/20 = 0.60
	233	101 (43.3%)	46 + 15	61/116 = 0.53
<b>Mean ± SE of 4 plots</b>				<b>0.53 ± 0.02</b>

Overall breeding success in 2020 was 0.53 fledglings per AON, 29.3% higher than in 2019.

<b>Fulmar</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Qualifying AOS	119	196	135	113	123	137	119	124	233	101
‘Extra’ sites	0	0	0	33	16	10	18	28	14	15
Chicks in August	57	125	96	97	45	80	79	88	87	61
<b>Mean success</b>	<b>0.48</b>	<b>0.64</b>	<b>0.73</b>	<b>0.67</b>	<b>0.33</b>	<b>0.56</b>	<b>0.58</b>	<b>0.58</b>	<b>0.41</b>	<b>0.53</b>

**European Shag.** Shag numbers continue to be very low and many areas remain deserted. Breeding success was 11.0% lower in 2020 (0.97 chicks fledged per incubated nest) than in 2019 (1.09 chicks fledged per incubated nest).

<b>Shag</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Trace nest only	1	0	4	3	0	1	1	2	5	1	1
Incubating nests	41	27	10	4	35	29	26	22	24	33	29
% Incubating	95.3	96.4	58.8	36.4	100	93.5	96.3	91.7	82.8	97.0	96.7
Young fledged	56	20	5	3	66	23	19	12	44	36	28
<b>Fledged / inc.</b>	<b>1.37</b>	<b>0.74</b>	<b>0.50</b>	<b>0.75</b>	<b>1.89</b>	<b>0.79</b>	<b>0.73</b>	<b>0.55</b>	<b>1.83</b>	<b>1.09</b>	<b>0.97</b>

**Arctic Skua.** The first bird was seen ashore on 24<sup>th</sup> April, but most birds returned later. There were 21 AOTs but only 18 pairs were seen to have laid; however, this was a slight increase from 2019 (16 laid). All AOTs were near the airstrip except for two. Two AOTs had only single adults and one AOT had a pair that arrived back very late, near the end of June, and was not seen to lay. Mean 1<sup>st</sup> clutch size was 1.56 eggs per pair laid, down from 2019 (1.73). Two pairs lost their single eggs and relaid - the first relays observed for many years - but the relays also disappeared, as did two other eggs in the same part of the colony. Three eggs were seen broken. All pairs were fed one feed per day, in the evening, in order to encourage them to still hunt for themselves through the day. The feed was mainly mackerel but also sometimes herring, saithe or octopus, cut up into small strips equivalent to a full grown sandeel. Three strips were fed per pair during incubation, increasing to six strips for pairs with one fledgling and eight strips for two fledglings. Feeding continued until 4<sup>th</sup> September, by which time the latest hatched fledglings were deemed old enough to leave the colony with the adults. Twenty chicks fledged, the highest number for at least ten years. The colony was aggressive throughout the summer and no fledglings were found predated. No adults were found dead.

<b>Arctic Skua</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
First seen on land	26/4	22/4		3/5	29/4	26/4	26/4	28/4	27/4	25/4	24/4
AOT	50	41	37	35	24	28	27	23	20	19	21
Pairs laid	39	32	27	26	21	26	17	17	14	16	18
Mean clutch	1.73	1.63	1.58	1.77	1.70	1.62	1.47	1.81	1.71	1.73	1.56
Fledged	(1)	0	4	0	18	17	4	0	2	16	20
<b>Success/AOT</b>	<b>0.00</b>	<b>0</b>	<b>0.11</b>	<b>0</b>	<b>0.75</b>	<b>0.61</b>	<b>0.15</b>	<b>0</b>	<b>0.14</b>	<b>0.84</b>	<b>1.11</b>

**Great Skua.** Great Skuas once more returned very late. The first one was not seen until 3<sup>rd</sup> April, with four seen on 5<sup>th</sup> April, but many did not come ashore until May. The sample plot in the Bitten was monitored. Numbers of AOTs on the plot were good. Birds were very aggressive, suggesting they were in good condition, and mean clutch size was 1.80. Predation of chicks was high, particularly in periods of fog, and only 19 chicks survived to ringing, carried out on 22<sup>nd</sup> to 24<sup>th</sup> July. Nine chicks survived to fledge. Productivity was very low at 0.18 fledglings per pair.

<b>Great Skua</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
First seen on land	6/4	2/4	28/3	10/4	10/4	3/4	2/4	4/4	12/4	28/3	3/4
AOT monitored	48	53	38	41	48	42	54	54	50	46	51
Mean clutch	1.87	1.74	1.76	1.54	1.88	1.62	1.77	1.69	1.90	1.80	1.80
Fledged	11	14	8	3	8	3	14	2	11	12	9
<b>Success/AOT</b>	<b>0.23</b>	<b>0.26</b>	<b>0.21</b>	<b>0.07</b>	<b>0.17</b>	<b>0.07</b>	<b>0.26</b>	<b>0.04</b>	<b>0.22</b>	<b>0.26</b>	<b>0.18</b>

**Black-legged Kittiwake.** Kittiwakes were counted on 14th June, in good conditions. Numbers were slightly up from 2019, with a total of 308 complete attended nests. Some birds appeared to have relocated from 2019, perhaps in response to weather conditions. There are still no Kittiwakes nesting on the big open cliff faces on the west side of the isle where the very large colonies used to be located.

<b>Black-legged Kittiwake</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Census count (AON)	582	480	378	327	361	277	272	256	262	259	308
% change per year	+14.3	-17.5	-21.3	-13.5	+10.4	-23.3	-1.8	-5.9	+2.3	-1.1	+18.9

Six pairs attempted to nest at the sub colony In Under da Stee. Material continues to come down from a large loose area of rock high above the site, so only 3 monitoring visits were carried out. 7 chicks were thought to have fledged and no chicks were found dead. Productivity in 2020 was 1.17 chicks fledged per well-built nest.

At the Hodden sub-colony the first monitoring visit was done before the covid-19 restrictions were lifted, by using photographs. There were 55 well-built nests, an increase on the 41 recorded in 2019. Thirty-eight chicks survived to fledge, mainly single chicks. Productivity was comparatively low in 2020, with only 0.69 chicks fledged per well-built nest.

<b>In Under da Stee</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Completed nests	52	50	44	32	20	2	2	3	4	4	6
Fledged	3	0	0	0	0	1	1	0	0	3	7
Success	0.06	0	0	0	0	0.50	0.50	0.00	0.00	0.75	1.17
<b>Hodden</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Completed nests	31	22	20	18	18	21	20	23	27	41	55
Fledged	0	2	0	0	15	4	9	8	19	34	38
Success	0	0.09	0	0	0.83	0.19	0.45	0.35	0.70	0.83	0.69
<b>Mean success</b>	<b>0.03</b>	<b>0.05</b>	<b>0</b>	<b>0</b>	<b>0.42</b>	<b>0.35</b>	<b>0.48</b>	<b>0.18</b>	<b>0.35</b>	<b>0.79</b>	<b>0.93</b>

**Arctic Tern.** The first birds were seen on 17<sup>th</sup> May at the Hame Banks, with numbers building up to c.100 by 20<sup>th</sup> May. The main colony was again east of the Punds dyke, but further towards the airstrip than in 2019. No birds bred on the Cletts in 2020. The first eggs were seen on 6<sup>th</sup> June, by which time the colony had built up to c.200 birds. An evening flush-count of the colony in early July gave a total of 268 individuals (photographed); similar numbers to 2019 (291 individuals). Near the beginning of July, after a bad spell of heavy rain and sleet, a number of chicks of mixed ages, from newly hatched to near-fledged, were found dead but in apparently good body condition. Possibly these died of exposure and chilling rather than starvation. The first chick was seen flying on 15<sup>th</sup> July. On 22<sup>nd</sup> July, 30 fledglings were counted at the airstrip, plus another 28 were gathered at the Hame Banks. It was estimated that breeding productivity was less than 0.5 fledgling per pair. The colony was gone on 31<sup>st</sup> July.

**Common Guillemot.** Guillemots had an extremely poor season. Numbers were very low, and chicks were very late and very scarce.

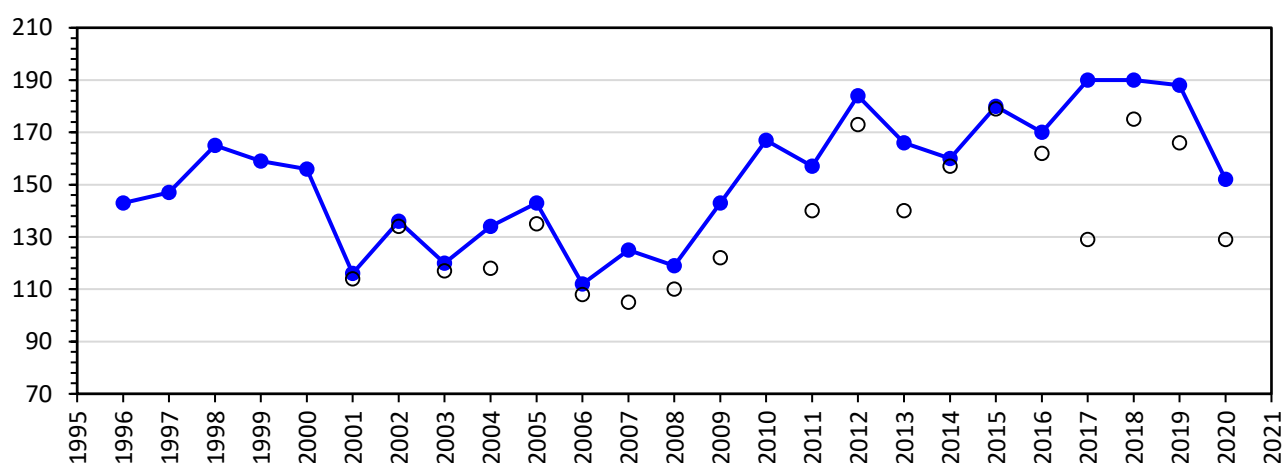
**Razorbill.** Razorbills appeared to do noticeably better than Guillemots this year, but numbers of adults were low.

**Atlantic Puffin.** Puffins had another very poor, late season with numbers continuing to decline further. The first birds were seen on land 17<sup>th</sup> April. Very few appeared to be breeding, but those that did appeared to raise their chicks successfully, with no chicks found dead at burrow entrances. Adults were seen coming in with a wide variety of small fish, but none were observed with sandeels. Non-breeders returned through the summer during fine spells of weather, far out numbering the breeders.

**Black Guillemot.** Counts were made by Sheila and Jim Gear. Numbers were down in 2020 compared with the previous three years. However, this may be an artefact of the covid-19 lockdown, since the counts could not be done quite as thoroughly as usual because their timing had to fit in with the permitted covid-19 daily walk restrictions, also there was request from the rescue services to avoid walking in areas where rescue by helicopter might be necessary. However, the 2020 counts do at least indicate a minimum figure for numbers present. Conditions for counting were quite difficult because, despite having had a week of light winds, there was still a heavy swell and shore break during both surveys. Birds were seen both on land and in the water. Two birds were in winter plumage.

Area counted	Date & time	Weather & tide	Count
East coast survey area	21/4: 7.45–9.00am	E 3-4, sunny, chop on the water, noisy breaking of waves	152 adults
East coast survey area	24/4: 7.50-9.00 am	NW-NNE 4, cloudy, noisy breaking of waves	129 adults

**Figure 1.** Counts of adult Black Guillemots along the East coast survey area, 1996–2020. Open circles are the lower count when two were made in a year.



## **Appendix 2. Seabird ringing in Shetland in 2020.**

Ringing of seabirds provides valuable information on population distributions, individual movements, longevity and causes of mortality. SOTEAG has supported seabird ringing in Shetland since 1980 by making a donation to the cost of seabird rings. Annual ringing totals have fluctuated due to variation in demographic factors and the number of adults and chicks available for ringing. Over the years, ringing totals have generally decreased in Shetland though, corresponding with seabird numbers decreasing and accessible colonies becoming fewer.

The total of 968 seabirds ringed in 2020 was lower than in 2019 (1,683) in large part due to the covid-19 lockdown restrictions on fieldwork through much of the spring and summer. Totals in 2020 were down for all species except Arctic Skua and Storm Petrel, which were up by 28 and 4 birds, respectively. The largest between-year discrepancy in numbers was for Guillemots (433 in 2019). Despite Guillemot chicks being present in numbers on the cliffs in 2020, very few sites could be visited at the right time because of lockdown.

**Recommendation:** SOTEAG offers a donation for the cost of seabird rings for all species listed in Table 1 (except for non-breeding European and Leach's Storm-petrels, as per the normal policy). In 2020, this donation would amount to £467.26 in total, comprising £379.43 to Fair Isle Bird Observatory, £47.37 to Shetland Ringing Group (plus £14.10 for Red-throated Diver rings), and £26.36 to the University of Glasgow, which supplies the rings used on Foula.

**Table 1.** Seabirds ringed in Shetland in 2020. FI = Fair Isle Bird Observatory; SRG = Shetland Ringing Group; FO = Foula. Numbers of non-breeding adult storm-petrels are omitted as ringing costs are not covered by SOTEAG. The unit cost of British Trust for Ornithology (BTO) rings includes manufacturing costs and administration (e.g. recovery data from live/dead ringed birds). BTO does not charge for Guillemot and Razorbill rings. Total A = site totals and grand totals for numbers ringed and cost; Total B = age and breeding category totals. \*The cost of Red-throated Diver rings is covered by a separate SOTEAG grant to SRG.

Species	Chicks			Breeding adults			Non-breeding adults		Total birds ringed	Unit cost	Total cost
	FI	SRG	FO	FI	SRG	FO	FI	SRG			
Red-throated Diver*	0	20	0	0	10	0	0	0	<b>30</b>	£0.47	<b>£14.10</b>
Northern Fulmar	113	1	0	5	0	0	0	0	<b>119</b>	£0.40	<b>£47.60</b>
European Storm Petrel	1	37	0	0	0	0	n/a	n/a	<b>38</b>	£0.47	<b>£17.86</b>
Leach's Storm Petrel	0	0	0	0	0	0	n/a	n/a	<b>0</b>	£0.18	<b>£0.00</b>
European Shag	2	14	0	1	3	0	0	0	<b>20</b>	£0.47	<b>£9.40</b>
Great Skua	169	13	19	3	0	0	0	0	<b>204</b>	£0.68	<b>£138.72</b>
Arctic Skua	37	0	20	1	0	8	0	0	<b>66</b>	£0.48	<b>£31.68</b>
Common Gull	7	10	0	0	0	0	0	0	<b>17</b>	£0.48	<b>£8.16</b>
Lesser Black-backed Gull	7	0	0	0	0	0	0	0	<b>7</b>	£1.90	<b>£13.30</b>
Herring Gull	32	1	0	0	1	0	0	0	<b>34</b>	£1.90	<b>£64.60</b>
Great Black-backed Gull	2	1	0	0	0	0	2	0	<b>5</b>	£0.70	<b>£3.50</b>
Arctic Tern	189	14	0	10	0	0	0	0	<b>213</b>	£0.23	<b>£48.99</b>
Common Tern	0	1	0	0	0	0	0	0	<b>1</b>	£0.23	<b>£0.23</b>
Common Guillemot	0	69	0	0	0	0	0	0	<b>69</b>	Free	-
Razorbill	0	1	0	0	0	0	0	0	<b>1</b>	Free	-
Atlantic Puffin	1	0	0	143	0	0	0	0	<b>144</b>	£0.48	<b>£69.12</b>
Black Guillemot	0	0	0	0	0	0	0	0	<b>0</b>	£0.48	<b>£0.00</b>
<b>Total A</b>	<b>560</b>	<b>182</b>	<b>39</b>	<b>163</b>	<b>14</b>	<b>8</b>	<b>2</b>	<b>0</b>	<b>968</b>		<b>£467.26</b>
<b>Total B</b>	<b>781</b>			<b>185</b>			<b>2</b>				

### **Appendix 3. Data contributions to other organisations in 2020**

The following organisations received SOTEAG ornithological monitoring data in 2020:

- British Trust for Ornithology (BTO) – wintering population counts were contributed to the BTO's national Wetland Birds Survey (WeBS) database.
- Joint Nature Conservation Committee (JNCC) – breeding population counts and breeding success data were contributed to the national Seabird Monitoring Programme (SMP) database managed by JNCC.
- Royal Society for the Protection of Birds (RSPB) – the results of the February beached birds survey were contributed to the national beached birds survey database managed by RSPB, and all breeding data for Sumburgh Head were contributed to the Sumburgh RSPB reserve annual records database.
- The Seabird Group – A summary of the breeding season data was contributed to The Seabird Group for its early autumn Newsletter.
- Wageningen University, The Netherlands – Fulmar corpses contributed to Wageningen University for continuation of the long-term, multi-partner research studies on plastic waste and marine wildlife in the Northeast Atlantic, lead by Jan Andries van Franeker and Susanne Kühn.
- Shetland Biological Records Centre (SBRC) – breeding and wintering population counts were contributed to the Shetland biological records database.
- Shetland Bird Club (SBC) – breeding and wintering population counts and breeding success data were contributed to SBC for the annual Shetland Bird Report.

### **Appendix 4. National Seabird Census – SOTEAG survey work in 2020.**

The covid-19 lockdown restrictions in 2020 meant that seabird population counts for the national seabird census were not possible until July. However, after lockdown, SOTEAG fieldwork for the annual monitoring programme was intense in July and August, leaving little time for national census work. The only census surveys possible in 2020 were for European and Leach's Storm-petrels on Gruney (off the north Mainland), Gloup Holm (off north Yell), the Holm of Heogland, Wedder Holm and Sound Gruney (all in Bluemull Sound), and North Benelip (Out Skerries). Across the UK, due to the covid-19 lockdown restrictions, so few data could be collected for the national seabird census in 2020 that the survey period has been extended for an additional year.