**SUPPORTING INFORMATION**

**Table S1.** Arctic skua and great skua population size (AOTs) at the start (1992) and end (2007–15) of the time-series for each of the 33 study sites in Orkney, Shetland and Sutherland. **Bold** = colonies with great skua to Arctic skua ratio ≥ 3 at the end of the study period. Years = number of years data contributing to analyses of Arctic skua AOT trends (AOT) and productivity (P).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Region** | **Area** | **Site** | **Colony type** | **Years** | **Arctic skua** | **Great skua** |
|  |  |  |  | AOT / P | Start | End | Start | End |
| Orkney | Eday | Ward Hill | 3 | 6 / 0 | a 17 | d 12 | 0 | d 5 |
| Orkney | Flotta | Fara | 3 | 5 / 0 | 20 | f 13 | 7 | f17 |
| Orkney | Flotta | Flotta | 3 | 5 / 0 | 66 | d 47 | 2 | d 29 |
| Orkney | Hoy/South Walls | Binga Fea | 3 | 19 / \*13 | 20 | i 1 | 33 | d 22 |
| Orkney | Mainland | Loons | 1 | 8 / 0 | 2 | d 0 | 0 | d 0 |
| Orkney | Mainland | Lushan | 3 | 15 / 13 | 22 | d 17 | 2 | d 12 |
| Orkney | North Ronaldsay | North Ronaldsay | 3 | 13 / \*10 | 1 | f 1 | 0 | f 2 |
| Orkney | Papa Westray | North Hill | 2 | 24 / \*24 | 151 | i 25 | 3 | i 15 |
| Orkney | Rousay | Brings | 2 | 13 / \*12 | 30 | c 14 | 3 | d 16 |
| Orkney | Rousay | Onziebust | 3 | 6 / 0 | 0 | d 0 | 0 | d 0 |
| **Orkney** | **Rousay** | **Trumland** | **3** | 9 / 0 | **2** | **e 1** | **2** | **i 8** |
| Orkney | Stronsay | Auskerry | 3 | 9 / 0 | 2 | h 1 | 1 | d 1 |
| Orkney | Stronsay | Rothiesholm | 3 | 8 / 0 | 34 | f 5 | 13 | f 13 |
| Orkney | Westray | Gallo Hill | 1 | 12 / \*11 | 33 | c 17 | 4 | c 3 |
| **Shetland** | **Fair Isle** | **Fair Isle** | **1** | 24 / 24 | **109** | **i 37** | **109** | **i 188** |
| **Shetland** | **Fetlar** | **Tronamire/Funzie** | **3** | 22 / \*20 | **25** | **i 0** | **7** | **c 51** |
| **Shetland** | **Fetlar** | **Vord Hill/Cruss** | **2** | 6 / 0 | **31** | **c 24** | **7** | **c 76** |
| **Shetland** | **Foula** | **Foula** | **1** | 24 / \*21 | **159** | **i 28** | **2174** | **b 1657** |
| Shetland | Mainland Central  | Mioness | 3 | 6 / 0 | 7 | c 2 | 1 | c 0 |
| Shetland | Mainland North  | Tingon | 3 | 6 / 0 | 31 | c 13 | 7 | c 6 |
| Shetland | Mainland South  | Dalsetter | 2 | 13 / \*12 | 19 | c 4 | 3 | c 2 |
| Shetland | Mainland South  | Kettlaness | 3 | 14 / \*12 | 16 | c 4 | 7 | c 2 |
| **Shetland** | **Mainland South**  | **Mousa** | **2** | 24 / \*22 | **25** | **i 5** | **10** | **i 35** |
| **Shetland** | **Mainland South**  | **Noness** | **2** | 12 / 8 | **1** | **c 1** | **18** | **c 30** |
| **Shetland** | **Mainland South**  | **Noss** | **1** | 24 / \*23 | **17** | **i 2** | **423** | **g 465** |
| **Shetland** | **Mainland South**  | **Noss Hill** | **2** | 13 / \*10 | **5** | **c 1** | **28** | **c 33** |
| Shetland | Mainland West  | Culswick | 2 | 6 / 0 | 12 | c 8 | 0 | c 3 |
| **Shetland** | **Papa Stour** | **Papa Stour** | **2** | 6 / 0 | **101** | **c 12** | **28** | **c 45** |
| **Shetland** | **Unst** | **Colvadale** | **3** | 14 / \*12 | **24** | **c 3** | **9** | **c 18** |
| **Shetland** | **Unst** | **Hermaness** | **1** | 24 / \*23 | **19** | **i 1** | **272** | **\*\*\*** |
| Shetland | Yell | Black Park | 3 | 16 / \*12 | 23 | i 1 | 3 | e 0 |
| **Shetland** | **Yell** | **Lumbister** | **3** | 14 / \*12 | **11** | **i 3** | **8** | **c 31** |
| **Sutherland** | **NW Sutherland** | **Handa** | **1** | 24 / \*13 | **26** | **i 16** | **103** | **i 256** |
| TOTAL |  |  |  |  | 1061 | 319 | \*\*3015 | \*\*3041 |

a 2000; b 2007; c 2008; d 2010; e 2011; f 2012, g 2013, h 2014, i 2015.

\* fewer years used in GLMMs of determinants of Arctic skua productivity, due to incomplete data on hosts and/or great skuas;\*\* Excluding Hermaness; \*\*\* count of 751 in 2007, but over a wider area.

**Table S2.** Spearman correlation coefficients (*rs* values) of GLMM annual productivity estimates (chicks fledged per pair) for Arctic skua, great skua, black-legged kittiwake, common guillemot, Atlantic puffin and Arctic tern throughout the study area, 1992–2015 (n = 24 years). **Bold** = statistically significant (*P* < 0.01) with a strong degree of correlation (*rs* > 0.600).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | great skua | b-l kittiwake | c guillemot | A puffin | Arctic tern |
| Arctic skua | **0.642** | **0.870** | **0.884** | **0.638** | **0.690** |
| great skua |  | 0.547 | **0.661** | 0.155 | 0.443 |
| b-l kittiwake |  |  | **0.914** | **0.696** | **0.678** |
| c guillemot |  |  |  | **0.603** | **0.686** |
| A puffin |  |  |  |  | 0.500 |

**Figure S1.** Arctic skua population trends and productivity at **(a)** type 1 colonies, **(b)** type 2 colonies, **(c)** type 3 colonies. Annual estimates (± 95% confidence intervals) from GLMMs with *year* as a categorical effect are shown, along with modelled trend lines from GLMMs with *year* and *year2* as covariates (overall predicted % population changes are presented). Population size indices are relative to the Seabird 2000 census. Type 1, 2 and 3 colonies = > 10 000, 1000–10 000 and < 1000 cliff-nesting seabird host pairs, respectively.

**a)**

**b)**

**c)**

**Figure S2.** Variation in population trends between the three types of Arctic skua colony for **(a)** great skua, **(b)** black-legged kittiwake, **(c)** Arctic tern. Annual estimates (± 95% confidence intervals) from GLMMs with *year* as a categorical effect are shown, along with modelled trend lines from GLMMs with *year* and *year2* as covariates (*P* values and overall predicted % change are presented). Type 1, 2 and 3 colonies = > 10 000, 1000–10 000 and < 1000 cliff-nesting seabird host pairs, respectively.

**a)**

**b)**

**c)**