

## **BERWICK BANK WIND FARM OFFSHORE ENVIRONMENTAL IMPACT ASSESSMENT**

**APPENDIX 11.1, ANNEX H:  
DESIGN-BASED ANALYSIS –  
POPULATION ESTIMATES FOR  
ALL BIRDS GROUPED BY  
SPECIES (BERWICK BANK  
DEVELOPMENT ARRAY ONLY)**

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## NOTE

This annex provides both apportioned (detections assigned from species groups to species) and unapportioned (detections assigned to species only) density and population estimates for focal species within the Berwick Bank Development Array only. Estimates presented for auk species do not account for availability bias. Further EIA/HRA assessments should rely on those that have this correction applied (see Annex K).

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**Table 1: Unapportioned density and population estimates of all common scoters in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Common scoter | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|-------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b>     |   |                                       |                                       |                              |                       |                       |    |    |
| Mar-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Mar-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S01 20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S02 20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-21            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-21            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S01 21        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S02 21        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

**Table 2: Apportioned density and population estimates of all common scoters in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Common scoter | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|-------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b>     |   |                                       |                                       |                              |                       |                       |    |    |
| Mar-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-19            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

| All Common scoter | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|-------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b>     |   |                                       |                                       |                              |                       |                       |    |    |
| Mar-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S01 20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S02 20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-21            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-21            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S01 21        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S02 21        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

**Table 3: Unapportioned density and population estimates of all kittiwakes in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Kittiwake | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD   | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|------|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |      |        |
| Mar-19        | 15.1                                      | 7.85                                  | 23.42                                 | 15262                        | 7933                  | 23671                 | 4087 | 26.78% |
| May-19        | 4.09                                      | 2.96                                  | 5.24                                  | 4138                         | 2993                  | 5299                  | 619  | 14.94% |
| Jun-19        | 2.59                                      | 2.07                                  | 3.22                                  | 2616                         | 2088                  | 3257                  | 307  | 11.73% |
| Jul-19        | 4.97                                      | 4.22                                  | 5.71                                  | 5023                         | 4263                  | 5767                  | 380  | 7.55%  |
| Aug-19        | 6.91                                      | 5.83                                  | 8.06                                  | 6989                         | 5890                  | 8143                  | 585  | 8.36%  |
| Sep-19        | 2.18                                      | 1.52                                  | 3                                     | 2208                         | 1538                  | 3035                  | 391  | 17.7%  |
| Oct-19        | 0.58                                      | 0.45                                  | 0.74                                  | 592                          | 452                   | 749                   | 78   | 13.17% |
| Nov-19        | 0.27                                      | 0.15                                  | 0.41                                  | 272                          | 153                   | 414                   | 67   | 24.38% |
| Dec-19        | 0.27                                      | 0.13                                  | 0.5                                   | 277                          | 135                   | 508                   | 97   | 35.12% |
| Jan-20        | 2.1                                       | 1.14                                  | 3.4                                   | 2127                         | 1156                  | 3441                  | 592  | 27.82% |
| Feb-20        | 1.83                                      | 0.91                                  | 3.03                                  | 1845                         | 920                   | 3064                  | 518  | 28.05% |
| Mar-20        | 5.51                                      | 4                                     | 6.89                                  | 5566                         | 4039                  | 6966                  | 747  | 13.41% |
| May S01 20    | 6.15                                      | 2.65                                  | 10.38                                 | 6215                         | 2677                  | 10495                 | 1968 | 31.67% |
| May S02 20    | 8.35                                      | 6.23                                  | 10.71                                 | 8439                         | 6299                  | 10823                 | 1242 | 14.71% |
| Jun-20        | 9.01                                      | 7.42                                  | 10.52                                 | 9108                         | 7496                  | 10631                 | 809  | 8.88%  |
| Jul-20        | 8.72                                      | 6.85                                  | 10.75                                 | 8812                         | 6924                  | 10866                 | 1011 | 11.46% |
| Aug-20        | 13.26                                     | 9.58                                  | 17.28                                 | 13405                        | 9683                  | 17464                 | 2015 | 15.03% |
| Sep-20        | 15.94                                     | 10.73                                 | 22.73                                 | 16112                        | 10844                 | 22981                 | 3180 | 19.73% |
| Oct-20        | 1.46                                      | 0.92                                  | 2.13                                  | 1475                         | 930                   | 2150                  | 325  | 21.99% |
| Nov-20        | 4.73                                      | 2.8                                   | 6.98                                  | 4787                         | 2834                  | 7052                  | 1091 | 22.79% |
| Dec-20        | 1.04                                      | 0.66                                  | 1.49                                  | 1047                         | 665                   | 1504                  | 226  | 21.58% |
| Jan-21        | 2.2                                       | 1.27                                  | 3.34                                  | 2224                         | 1282                  | 3375                  | 521  | 23.4%  |
| Feb-21        | 2.79                                      | 0.58                                  | 6.03                                  | 2822                         | 589                   | 6091                  | 1458 | 51.65% |
| Apr S01 21    | 6.72                                      | 4.85                                  | 8.93                                  | 6794                         | 4902                  | 9029                  | 1060 | 15.59% |
| Apr S02 21    | 20.51                                     | 10.57                                 | 32.76                                 | 20736                        | 10686                 | 33118                 | 5781 | 27.88% |

**Table 4: Apportioned density and population estimates of all kittiwakes in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Kittiwake | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD   | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|------|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |      |        |
| Mar-19        | 15.19                                     | 8.29                                  | 23.38                                 | 15358                        | 8377                  | 23629                 | 3977 | 25.89% |
| May-19        | 4.13                                      | 2.93                                  | 5.57                                  | 4176                         | 2958                  | 5632                  | 673  | 16.1%  |
| Jun-19        | 2.65                                      | 2.09                                  | 3.35                                  | 2681                         | 2113                  | 3382                  | 319  | 11.88% |
| Jul-19        | 5.02                                      | 4.34                                  | 5.69                                  | 5075                         | 4389                  | 5753                  | 360  | 7.08%  |
| Aug-19        | 6.93                                      | 5.72                                  | 8.22                                  | 7004                         | 5783                  | 8307                  | 646  | 9.21%  |
| Sep-19        | 2.15                                      | 1.45                                  | 2.98                                  | 2173                         | 1466                  | 3016                  | 410  | 18.85% |
| Oct-19        | 0.62                                      | 0.46                                  | 0.78                                  | 625                          | 467                   | 794                   | 83   | 13.18% |
| Nov-19        | 0.29                                      | 0.18                                  | 0.41                                  | 295                          | 178                   | 415                   | 65   | 22.03% |
| Dec-19        | 0.28                                      | 0.15                                  | 0.49                                  | 288                          | 156                   | 491                   | 90   | 31.05% |
| Jan-20        | 2.19                                      | 1.11                                  | 3.59                                  | 2215                         | 1125                  | 3632                  | 642  | 28.98% |
| Feb-20        | 1.91                                      | 0.97                                  | 3.08                                  | 1929                         | 977                   | 3116                  | 557  | 28.86% |
| Mar-20        | 5.59                                      | 4                                     | 7.1                                   | 5648                         | 4046                  | 7179                  | 796  | 14.09% |
| May S01 20    | 6.53                                      | 2.37                                  | 11.29                                 | 6601                         | 2399                  | 11410                 | 2208 | 33.45% |
| May S02 20    | 8.41                                      | 6.19                                  | 10.81                                 | 8498                         | 6258                  | 10925                 | 1273 | 14.98% |
| Jun-20        | 9.06                                      | 7.45                                  | 10.72                                 | 9159                         | 7534                  | 10841                 | 884  | 9.65%  |
| Jul-20        | 8.69                                      | 6.95                                  | 10.84                                 | 8785                         | 7022                  | 10958                 | 1054 | 11.99% |
| Aug-20        | 13.32                                     | 9.56                                  | 17.38                                 | 13464                        | 9666                  | 17568                 | 2033 | 15.1%  |
| Sep-20        | 16.11                                     | 10.67                                 | 22.37                                 | 16282                        | 10789                 | 22614                 | 3135 | 19.25% |
| Oct-20        | 1.49                                      | 0.88                                  | 2.23                                  | 1508                         | 885                   | 2255                  | 361  | 23.89% |
| Nov-20        | 4.84                                      | 2.72                                  | 7.03                                  | 4888                         | 2749                  | 7106                  | 1174 | 24.01% |
| Dec-20        | 1.09                                      | 0.68                                  | 1.63                                  | 1104                         | 690                   | 1644                  | 251  | 22.69% |
| Jan-21        | 2.19                                      | 1.35                                  | 3.22                                  | 2210                         | 1369                  | 3257                  | 484  | 21.87% |
| Feb-21        | 2.83                                      | 0.58                                  | 5.72                                  | 2857                         | 586                   | 5785                  | 1445 | 50.57% |
| Apr S01 21    | 6.85                                      | 4.91                                  | 9.08                                  | 6924                         | 4969                  | 9179                  | 1059 | 15.28% |
| Apr S02 21    | 20.7                                      | 10.61                                 | 32.66                                 | 20923                        | 10721                 | 33018                 | 5943 | 28.4%  |

**Table 5: Unapportioned density and population estimates of all black-headed gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Black-headed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|-----------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b>         |   |                                       |                                       |                              |                       |                       |    |    |
| Mar-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Mar-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

| All Black-headed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|-----------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b>         |   |                                       |                                       |                              |                       |                       |    |    |
| May S01 20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S02 20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-21                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-21                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S01 21            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S02 21            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

**Table 6: Apportioned density and population estimates of all black-headed gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Black-headed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV      |
|-----------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|---------|
| <b>Survey</b>         |   |                                       |                                       |                              |                       |                       |    |         |
| Mar-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jul-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Aug-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Sep-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Oct-19                | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 92.97%  |
| Nov-19                | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 62.25%  |
| Dec-19                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jan-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Feb-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Mar-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May S01 20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May S02 20            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jul-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Aug-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Sep-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Oct-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Nov-20                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Dec-20                | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 100.21% |
| Jan-21                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Feb-21                | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Apr S01 21            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Apr S02 21            | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |

**Table 7: Unapportioned density and population estimates of all little gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Little gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV      |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|---------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |    |         |
| Mar-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jul-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Aug-19          | 0.01                                      | 0                                     | 0.03                                  | 8                            | 0                     | 26                    | 9  | 101.01% |
| Sep-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Oct-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Nov-19          | 0.01                                      | 0                                     | 0.02                                  | 7                            | 0                     | 22                    | 7  | 104.32% |
| Dec-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jan-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Feb-20          | 0.02                                      | 0                                     | 0.06                                  | 25                           | 0                     | 64                    | 18 | 72%     |
| Mar-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May S01 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May S02 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jul-20          | 0.01                                      | 0                                     | 0.03                                  | 9                            | 0                     | 31                    | 9  | 101.76% |
| Aug-20          | 0.07                                      | 0                                     | 0.18                                  | 72                           | 0                     | 187                   | 52 | 71.81%  |
| Sep-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Oct-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Nov-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Dec-20          | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 95.66%  |
| Jan-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Feb-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Apr S01 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Apr S02 21      | 0.02                                      | 0                                     | 0.04                                  | 16                           | 0                     | 39                    | 11 | 66.41%  |

**Table 8: Apportioned density and population estimates of all little gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Little gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV      |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|---------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |    |         |
| Mar-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jul-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Aug-19          | 0.01                                      | 0                                     | 0.03                                  | 8                            | 0                     | 30                    | 9  | 105.65% |
| Sep-19          | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 87.67%  |
| Oct-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Nov-19          | 0.01                                      | 0                                     | 0.03                                  | 8                            | 0                     | 28                    | 8  | 99.5%   |
| Dec-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |

| All Little gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |    |        |
| Jan-20          | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 93.4%  |
| Feb-20          | 0.02                                      | 0                                     | 0.06                                  | 24                           | 0                     | 64                    | 18 | 72.78% |
| Mar-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-20          | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 96.8%  |
| Aug-20          | 0.12                                      | 0.03                                  | 0.24                                  | 124                          | 32                    | 241                   | 53 | 42.09% |
| Sep-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20          | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 94.05% |
| Nov-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20          | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 88.83% |
| Jan-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21      | 0.03                                      | 0.01                                  | 0.06                                  | 31                           | 9                     | 60                    | 13 | 41.25% |

**Table 9: Unapportioned density and population estimates of all common gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Common gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV      |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|---------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |    |         |
| Mar-19          | 0.01                                      | 0                                     | 0.03                                  | 15                           | 0                     | 31                    | 9  | 58.93%  |
| May-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jul-19          | 0.01                                      | 0                                     | 0.04                                  | 15                           | 0                     | 43                    | 14 | 93.89%  |
| Aug-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Sep-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Oct-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Nov-19          | 0.07                                      | 0.01                                  | 0.15                                  | 67                           | 15                    | 151                   | 38 | 56.48%  |
| Dec-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jan-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Feb-20          | 0.04                                      | 0                                     | 0.08                                  | 41                           | 0                     | 84                    | 21 | 50.83%  |
| Mar-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May S01 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May S02 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jul-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Aug-20          | 0.03                                      | 0                                     | 0.08                                  | 32                           | 0                     | 77                    | 20 | 62.02%  |
| Sep-20          | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 104.11% |
| Oct-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Nov-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Dec-20          | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 95.83%  |
| Jan-21          | 0.02                                      | 0                                     | 0.05                                  | 23                           | 0                     | 48                    | 12 | 52.62%  |
| Feb-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Apr S01 21      | 0.02                                      | 0                                     | 0.04                                  | 17                           | 0                     | 40                    | 11 | 63.92%  |

| All Common gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |    |        |
| Apr S02 21      | 0.05                                      | 0.01                                  | 0.11                                  | 50                           | 8                     | 107                   | 27 | 53.47% |

**Table 10: Apportioned density and population estimates of all common gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Common gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19          | 0.01                                      | 0                                     | 0.03                                  | 15                           | 0                     | 32                    | 9  | 61.2%  |
| May-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19          | 0.01                                      | 0                                     | 0.04                                  | 15                           | 0                     | 42                    | 13 | 88.13% |
| Aug-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19          | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 92.59% |
| Nov-19          | 0.09                                      | 0.01                                  | 0.17                                  | 90                           | 16                    | 173                   | 43 | 47.42% |
| Dec-19          | 0   | 0                                     | 0                                     | 2                            | 0                     | 4                     | 2  | 96.92% |
| Jan-20          | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 89.26% |
| Feb-20          | 0.04                                      | 0                                     | 0.08                                  | 41                           | 0                     | 83                    | 21 | 50.25% |
| Mar-20          | 0   | 0                                     | 0                                     | 1                            | 1                     | 1                     | 1  | 44.88% |
| May S01 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-20          | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 89.09% |
| Aug-20          | 0.03                                      | 0                                     | 0.08                                  | 33                           | 1                     | 79                    | 21 | 62.42% |
| Sep-20          | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 97.55% |
| Oct-20          | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 88.71% |
| Nov-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20          | 0.01                                      | 0                                     | 0.03                                  | 14                           | 2                     | 32                    | 9  | 60.52% |
| Jan-21          | 0.02                                      | 0                                     | 0.05                                  | 24                           | 0                     | 53                    | 13 | 53.55% |
| Feb-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21      | 0.02                                      | 0                                     | 0.04                                  | 16                           | 1                     | 39                    | 11 | 65.43% |
| Apr S02 21      | 0.05                                      | 0.01                                  | 0.09                                  | 48                           | 8                     | 94                    | 23 | 47.18% |

**Table 11: Unapportioned density and population estimates of all great black-backed gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Great black-backed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>               |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19                      | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 97.42% |
| Jul-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

| All Great black-backed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>               |   |                                       |                                       |                              |                       |                       |    |        |
| Aug-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19                      | 0.08                                      | 0                                     | 0.25                                  | 85                           | 0                     | 248                   | 78 | 91.36% |
| Dec-19                      | 0.01                                      | 0                                     | 0.02                                  | 7                            | 0                     | 22                    | 7  | 95.86% |
| Jan-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20                  | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20                  | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-20                      | 0.02                                      | 0                                     | 0.04                                  | 16                           | 0                     | 39                    | 10 | 63.1%  |
| Aug-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20                      | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 91.66% |
| Jan-21                      | 0.04                                      | 0.01                                  | 0.07                                  | 39                           | 15                    | 70                    | 15 | 37.07% |
| Feb-21                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21                  | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21                  | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

**Table 12: Apportioned density and population estimates of all great black-backed gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Great black-backed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>               |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19                      | 0.01                                      | 0                                     | 0.02                                  | 9                            | 1                     | 26                    | 7  | 77.5%  |
| Jul-19                      | 0   | 0                                     | 0                                     | 1                            | 0                     | 2                     | 1  | 57.73% |
| Aug-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19                      | 0.09                                      | 0                                     | 0.25                                  | 87                           | 0                     | 253                   | 81 | 92.66% |
| Dec-19                      | 0.01                                      | 0                                     | 0.02                                  | 7                            | 0                     | 21                    | 7  | 92.91% |
| Jan-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20                  | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20                  | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-20                      | 0.02                                      | 0                                     | 0.04                                  | 19                           | 2                     | 41                    | 11 | 55.21% |
| Aug-20                      | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 92.28% |
| Sep-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |



| All Great black-backed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>               |   |                                       |                                       |                              |                       |                       |    |        |
| Nov-20                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20                      | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 94.47% |
| Jan-21                      | 0.04                                      | 0.01                                  | 0.07                                  | 40                           | 15                    | 71                    | 15 | 37.28% |
| Feb-21                      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21                  | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21                  | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

**Table 13: Unapportioned density and population estimates of all herring gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Herring gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV      |
|------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|---------|
| <b>Survey</b>    |   |                                       |                                       |                              |                       |                       |     |         |
| Mar-19           | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 20                    | 7   | 86.89%  |
| May-19           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| Jun-19           | 1.15                                      | 0.57                                  | 1.77                                  | 1159                         | 578                   | 1795                  | 321 | 27.66%  |
| Jul-19           | 0.25                                      | 0.15                                  | 0.37                                  | 257                          | 148                   | 376                   | 58  | 22.41%  |
| Aug-19           | 0.04                                      | 0.01                                  | 0.08                                  | 40                           | 8                     | 78                    | 18  | 44.11%  |
| Sep-19           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| Oct-19           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| Nov-19           | 0.05                                      | 0.01                                  | 0.09                                  | 48                           | 15                    | 96                    | 23  | 48.4%   |
| Dec-19           | 0.01                                      | 0                                     | 0.02                                  | 7                            | 0                     | 21                    | 7   | 98.33%  |
| Jan-20           | 0.01                                      | 0                                     | 0.03                                  | 9                            | 0                     | 28                    | 8   | 92.66%  |
| Feb-20           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| Mar-20           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| May S01 20       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| May S02 20       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| Jun-20           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| Jul-20           | 2.31                                      | 1.4                                   | 3.42                                  | 2340                         | 1418                  | 3461                  | 539 | 23.03%  |
| Aug-20           | 0.06                                      | 0.02                                  | 0.09                                  | 57                           | 16                    | 95                    | 21  | 35.89%  |
| Sep-20           | 0.06                                      | 0.02                                  | 0.1                                   | 57                           | 23                    | 104                   | 22  | 37.37%  |
| Oct-20           | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8   | 101.64% |
| Nov-20           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |
| Dec-20           | 0.06                                      | 0.01                                  | 0.11                                  | 57                           | 12                    | 107                   | 26  | 44.75%  |
| Jan-21           | 0.06                                      | 0.02                                  | 0.11                                  | 63                           | 16                    | 117                   | 27  | 42.31%  |
| Feb-21           | 0.01                                      | 0                                     | 0.03                                  | 9                            | 0                     | 30                    | 9   | 94.36%  |
| Apr S01 21       | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8   | 95.59%  |
| Apr S02 21       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0       |

**Table 14: Apportioned density and population estimates of all herring gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Herring gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b>    |   |                                       |                                       |                              |                       |                       |     |        |
| Mar-19           | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 21                    | 7   | 89.01% |
| May-19           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jun-19           | 1.21                                      | 0.6                                   | 1.86                                  | 1221                         | 608                   | 1882                  | 334 | 27.3%  |
| Jul-19           | 0.3                                       | 0.2                                   | 0.41                                  | 300                          | 199                   | 415                   | 58  | 19.24% |
| Aug-19           | 0.05                                      | 0.01                                  | 0.08                                  | 47                           | 15                    | 85                    | 19  | 38.97% |
| Sep-19           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Oct-19           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Nov-19           | 0.09                                      | 0.01                                  | 0.24                                  | 96                           | 14                    | 239                   | 64  | 66.29% |
| Dec-19           | 0.01                                      | 0                                     | 0.02                                  | 7                            | 0                     | 21                    | 6   | 84.07% |
| Jan-20           | 0.01                                      | 0                                     | 0.03                                  | 14                           | 1                     | 34                    | 9   | 63.07% |
| Feb-20           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Mar-20           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| May S01 20       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| May S02 20       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jun-20           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jul-20           | 2.39                                      | 1.5                                   | 3.45                                  | 2419                         | 1517                  | 3487                  | 534 | 22.05% |
| Aug-20           | 0.09                                      | 0.04                                  | 0.13                                  | 88                           | 42                    | 136                   | 26  | 28.6%  |
| Sep-20           | 0.06                                      | 0.02                                  | 0.12                                  | 65                           | 18                    | 122                   | 27  | 41.31% |
| Oct-20           | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8   | 95.1%  |
| Nov-20           | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Dec-20           | 0.06                                      | 0.02                                  | 0.11                                  | 60                           | 16                    | 108                   | 25  | 40.72% |
| Jan-21           | 0.07                                      | 0.02                                  | 0.13                                  | 70                           | 23                    | 134                   | 29  | 41.61% |
| Feb-21           | 0.02                                      | 0                                     | 0.03                                  | 16                           | 2                     | 34                    | 9   | 52.05% |
| Apr S01 21       | 0.01                                      | 0                                     | 0.03                                  | 11                           | 0                     | 29                    | 8   | 73.34% |
| Apr S02 21       | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 16                    | 5   | 52.52% |

**Table 15: Unapportioned density and population estimates of all lesser black-backed gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Lesser black-backed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|------------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>                |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19                       | 0.07                                      | 0.02                                  | 0.11                                  | 71                           | 24                    | 116                   | 22 | 30.62% |
| Jul-19                       | 0.12                                      | 0.08                                  | 0.16                                  | 118                          | 77                    | 161                   | 23 | 18.81% |
| Aug-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

| All Lesser black-backed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|------------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| Survey                       |   |                                       |                                       |                              |                       |                       |    |        |
| Feb-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20                   | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20                   | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20                       | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 7  | 96.21% |
| Jul-20                       | 0.47                                      | 0.34                                  | 0.63                                  | 471                          | 348                   | 639                   | 75 | 15.86% |
| Aug-20                       | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 7  | 85.52% |
| Sep-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-21                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21                   | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21                   | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

**Table 16: Apportioned density and population estimates of all lesser black-backed gulls in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Lesser black-backed gull | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV      |
|------------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|---------|
| Survey                       |   |                                       |                                       |                              |                       |                       |    |         |
| Mar-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-19                       | 0.08                                      | 0.03                                  | 0.13                                  | 79                           | 35                    | 129                   | 25 | 31.95%  |
| Jul-19                       | 0.12                                      | 0.08                                  | 0.16                                  | 124                          | 80                    | 166                   | 23 | 18.17%  |
| Aug-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Sep-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Oct-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Nov-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Dec-19                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jan-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Feb-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Mar-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| May S01 20                   | 0   | 0                                     | 0                                     | 1                            | 0                     | 1                     | 1  | 87.88%  |
| May S02 20                   | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jun-20                       | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 103.56% |
| Jul-20                       | 0.48                                      | 0.35                                  | 0.65                                  | 484                          | 350                   | 657                   | 79 | 16.16%  |
| Aug-20                       | 0.01                                      | 0                                     | 0.03                                  | 11                           | 1                     | 27                    | 7  | 63.73%  |
| Sep-20                       | 0   | 0                                     | 0                                     | 1                            | 0                     | 2                     | 1  | 93.4%   |
| Oct-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Nov-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Dec-20                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Jan-21                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Feb-21                       | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Apr S01 21                   | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |
| Apr S02 21                   | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0       |

**Table 17: Unapportioned density and population estimates of all common terns in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Common tern | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| Survey          |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-19          | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 91.79% |
| Sep-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20      | 0.01                                      | 0                                     | 0.03                                  | 9                            | 0                     | 30                    | 9  | 99.71% |
| May S02 20      | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 89.32% |
| Jun-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-20          | 0.05                                      | 0                                     | 0.14                                  | 50                           | 0                     | 144                   | 48 | 96.71% |
| Aug-20          | 0.02                                      | 0                                     | 0.04                                  | 17                           | 0                     | 39                    | 11 | 64.83% |
| Sep-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

**Table 18: Apportioned density and population estimates of all common terns in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Common tern | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| Survey          |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19          | 0.07                                      | 0.04                                  | 0.09                                  | 66                           | 45                    | 92                    | 13 | 18.98% |
| Aug-19          | 0.21                                      | 0.16                                  | 0.26                                  | 208                          | 166                   | 263                   | 26 | 12.29% |
| Sep-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

| All Common tern | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |     |        |
| Jan-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Feb-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Mar-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| May S01 20      | 0.02                                      | 0                                     | 0.04                                  | 20                           | 3                     | 41                    | 11  | 53.13% |
| May S02 20      | 0.01                                      | 0                                     | 0.03                                  | 15                           | 3                     | 34                    | 9   | 61.11% |
| Jun-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jul-20          | 0.07                                      | 0.01                                  | 0.19                                  | 71                           | 7                     | 189                   | 54  | 76.23% |
| Aug-20          | 2.37                                      | 1.05                                  | 3.88                                  | 2395                         | 1062                  | 3925                  | 753 | 31.44% |
| Sep-20          | 0.06                                      | 0                                     | 0.15                                  | 57                           | 0                     | 157                   | 49  | 85.65% |
| Oct-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Nov-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Dec-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jan-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Feb-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Apr S01 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Apr S02 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |

**Table 19: Unapportioned density and population estimates of all Arctic terns in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Arctic tern | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19          | 0.14                                      | 0.05                                  | 0.27                                  | 142                          | 55                    | 272                   | 60 | 41.67% |
| Aug-19          | 0.12                                      | 0.05                                  | 0.21                                  | 122                          | 47                    | 212                   | 45 | 36.73% |
| Sep-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20          | 0.02                                      | 0                                     | 0.06                                  | 24                           | 0                     | 62                    | 17 | 70.2%  |
| Jul-20          | 0.03                                      | 0                                     | 0.09                                  | 32                           | 0                     | 96                    | 32 | 100.7% |
| Aug-20          | 0.04                                      | 0                                     | 0.08                                  | 39                           | 0                     | 80                    | 21 | 52.16% |
| Sep-20          | 0.01                                      | 0                                     | 0.03                                  | 9                            | 0                     | 31                    | 9  | 98.89% |
| Oct-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

| All Arctic tern | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |    |    |
| Apr S02 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

**Table 20: Apportioned density and population estimates of all Arctic terns in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Arctic tern | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|-----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b>   |   |                                       |                                       |                              |                       |                       |     |        |
| Mar-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| May-19          | 0.04                                      | 0                                     | 0.12                                  | 41                           | 0                     | 119                   | 38  | 91.66% |
| Jun-19          | 0.04                                      | 0                                     | 0.09                                  | 41                           | 0                     | 87                    | 23  | 55.37% |
| Jul-19          | 1.09                                      | 0.71                                  | 1.55                                  | 1103                         | 716                   | 1566                  | 219 | 19.85% |
| Aug-19          | 2.65                                      | 2.08                                  | 3.31                                  | 2674                         | 2101                  | 3348                  | 328 | 12.27% |
| Sep-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Oct-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Nov-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Dec-19          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jan-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Feb-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Mar-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| May S01 20      | 0.02                                      | 0                                     | 0.04                                  | 19                           | 0                     | 45                    | 13  | 65.61% |
| May S02 20      | 0.07                                      | 0.02                                  | 0.12                                  | 67                           | 21                    | 126                   | 28  | 40.62% |
| Jun-20          | 0.03                                      | 0                                     | 0.08                                  | 32                           | 0                     | 77                    | 21  | 64.46% |
| Jul-20          | 0.06                                      | 0.01                                  | 0.15                                  | 63                           | 13                    | 154                   | 38  | 59%    |
| Aug-20          | 0.53                                      | 0.29                                  | 0.79                                  | 537                          | 297                   | 801                   | 138 | 25.58% |
| Sep-20          | 0.02                                      | 0                                     | 0.05                                  | 20                           | 0                     | 49                    | 13  | 65.95% |
| Oct-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Nov-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Dec-20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jan-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Feb-21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Apr S01 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Apr S02 21      | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |

**Table 21: Unapportioned density and population estimates of all great skuas in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Great skua | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>  |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19         | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 98.89% |

| All Great skua | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>  |   |                                       |                                       |                              |                       |                       |    |        |
| Jun-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19         | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 7  | 90.8%  |
| Aug-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20         | 0.01                                      | 0                                     | 0.03                                  | 10                           | 0                     | 30                    | 9  | 88.07% |
| May S01 20     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20         | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 91.3%  |
| Jul-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20         | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 98.37% |
| Nov-20         | 0.02                                      | 0                                     | 0.05                                  | 24                           | 4                     | 51                    | 13 | 53.07% |
| Dec-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-21         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

**Table 22: Apportioned density and population estimates of all great skuas in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Great skua | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>  |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19         | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 94.12% |
| Jun-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19         | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 93.1%  |
| Aug-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20         | 0.01                                      | 0                                     | 0.03                                  | 9                            | 0                     | 27                    | 9  | 93.48% |
| May S01 20     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20         | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 91.99% |
| Jul-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

| All Great skua | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>  |   |                                       |                                       |                              |                       |                       |    |        |
| Sep-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20         | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 95.97% |
| Nov-20         | 0.03                                      | 0                                     | 0.07                                  | 32                           | 0                     | 73                    | 18 | 55.5%  |
| Dec-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-21         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

**Table 23: Unapportioned density and population estimates of all little auks in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Little auk | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>  |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19         | 0.01                                      | 0                                     | 0.02                                  | 7                            | 0                     | 21                    | 7  | 94.46% |
| May-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19         | 0.02                                      | 0                                     | 0.04                                  | 16                           | 0                     | 38                    | 10 | 61.2%  |
| Dec-19         | 0.01                                      | 0                                     | 0.02                                  | 7                            | 0                     | 21                    | 7  | 92.63% |
| Jan-20         | 0.05                                      | 0.01                                  | 0.1                                   | 52                           | 9                     | 104                   | 24 | 45.47% |
| Feb-20         | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 97.9%  |
| Mar-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-20         | 0.02                                      | 0                                     | 0.06                                  | 25                           | 0                     | 64                    | 18 | 72.33% |
| Dec-20         | 0.3                                       | 0.14                                  | 0.49                                  | 307                          | 144                   | 492                   | 91 | 29.41% |
| Jan-21         | 0.03                                      | 0                                     | 0.08                                  | 26                           | 0                     | 81                    | 24 | 92.49% |
| Feb-21         | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 94.57% |
| Apr S01 21     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

**Table 24: Apportioned density and population estimates of all little auks in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Little auk | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|----------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b>  |   |                                       |                                       |                              |                       |                       |     |        |
| Mar-19         | 0.01                                      | 0                                     | 0.02                                  | 9                            | 2                     | 22                    | 6   | 71.19% |
| May-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jun-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jul-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Aug-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Sep-19         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Oct-19         | 0   | 0                                     | 0                                     | 3                            | 2                     | 4                     | 1   | 15.66% |
| Nov-19         | 0.02                                      | 0                                     | 0.05                                  | 24                           | 4                     | 48                    | 12  | 49.79% |
| Dec-19         | 0.01                                      | 0                                     | 0.03                                  | 15                           | 2                     | 31                    | 9   | 56.89% |
| Jan-20         | 0.11                                      | 0.04                                  | 0.19                                  | 110                          | 44                    | 196                   | 39  | 35.07% |
| Feb-20         | 0.06                                      | 0.03                                  | 0.1                                   | 64                           | 31                    | 105                   | 19  | 29.26% |
| Mar-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| May S01 20     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| May S02 20     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jun-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jul-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Aug-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Sep-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Oct-20         | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Nov-20         | 0.03                                      | 0.01                                  | 0.07                                  | 35                           | 8                     | 72                    | 17  | 48.51% |
| Dec-20         | 0.43                                      | 0.21                                  | 0.7                                   | 440                          | 216                   | 704                   | 120 | 27.13% |
| Jan-21         | 0.13                                      | 0.09                                  | 0.18                                  | 135                          | 94                    | 184                   | 24  | 17.43% |
| Feb-21         | 0.02                                      | 0                                     | 0.03                                  | 16                           | 4                     | 31                    | 8   | 50.19% |
| Apr S01 21     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Apr S02 21     | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |

**Table 25: Unapportioned density and population estimates of all guillemots in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Guillemot | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD   | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|------|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |      |        |
| Mar-19        | 9.15                                      | 6.2                                   | 12.35                                 | 9254                         | 6266                  | 12484                 | 1541 | 16.65% |
| May-19        | 22.03                                     | 17.25                                 | 28.9                                  | 22266                        | 17440                 | 29211                 | 3067 | 13.77% |
| Jun-19        | 5.48                                      | 3.65                                  | 7.82                                  | 5537                         | 3687                  | 7908                  | 1082 | 19.54% |
| Jul-19        | 22.5                                      | 18.4                                  | 27.3                                  | 22747                        | 18605                 | 27601                 | 2323 | 10.21% |
| Aug-19        | 25.9                                      | 16.64                                 | 39.38                                 | 26185                        | 16817                 | 39810                 | 6095 | 23.28% |
| Sep-19        | 3.02                                      | 2.36                                  | 3.72                                  | 3053                         | 2388                  | 3763                  | 343  | 11.21% |
| Oct-19        | 1.35                                      | 0.71                                  | 2.28                                  | 1367                         | 721                   | 2304                  | 410  | 29.96% |
| Nov-19        | 0.63                                      | 0.46                                  | 0.84                                  | 639                          | 466                   | 854                   | 101  | 15.67% |
| Dec-19        | 1.25                                      | 0.76                                  | 1.76                                  | 1264                         | 769                   | 1778                  | 261  | 20.65% |
| Jan-20        | 8.88                                      | 5.86                                  | 12.75                                 | 8979                         | 5924                  | 12893                 | 1852 | 20.62% |
| Feb-20        | 6.51                                      | 4.17                                  | 8.74                                  | 6576                         | 4221                  | 8831                  | 1160 | 17.63% |
| Mar-20        | 22.21                                     | 15.04                                 | 28.76                                 | 22456                        | 15201                 | 29071                 | 3494 | 15.56% |

| All Guillemot | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD   | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|------|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |      |        |
| May S01 20    | 15.87                                     | 9.92                                  | 22.55                                 | 16044                        | 10030                 | 22790                 | 3284 | 20.47% |
| May S02 20    | 14.97                                     | 9.73                                  | 20.85                                 | 15134                        | 9831                  | 21073                 | 2853 | 18.85% |
| Jun-20        | 35.6                                      | 27.82                                 | 43.36                                 | 35986                        | 28124                 | 43832                 | 3992 | 11.09% |
| Jul-20        | 8.21                                      | 6.48                                  | 9.97                                  | 8300                         | 6554                  | 10082                 | 915  | 11.01% |
| Aug-20        | 22.75                                     | 19.67                                 | 25.51                                 | 22993                        | 19884                 | 25788                 | 1569 | 6.82%  |
| Sep-20        | 25.67                                     | 18.79                                 | 32.91                                 | 25948                        | 18995                 | 33266                 | 3643 | 14.04% |
| Oct-20        | 2.18                                      | 1.6                                   | 2.8                                   | 2206                         | 1614                  | 2835                  | 313  | 14.15% |
| Nov-20        | 1.6                                       | 1.18                                  | 2.12                                  | 1621                         | 1192                  | 2143                  | 255  | 15.68% |
| Dec-20        | 10.82                                     | 7.24                                  | 15.87                                 | 10934                        | 7323                  | 16041                 | 2297 | 21%    |
| Jan-21        | 7.42                                      | 5.91                                  | 8.93                                  | 7498                         | 5971                  | 9025                  | 828  | 11.04% |
| Feb-21        | 4.47                                      | 2.85                                  | 6.7                                   | 4517                         | 2885                  | 6776                  | 1011 | 22.37% |
| Apr S01 21    | 19.93                                     | 16.33                                 | 23.66                                 | 20142                        | 16505                 | 23913                 | 1878 | 9.32%  |
| Apr S02 21    | 53.32                                     | 38.78                                 | 66.97                                 | 53895                        | 39206                 | 67700                 | 7166 | 13.29% |

**Table 26: Apportioned density and population estimates of all guillemots in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Guillemot | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD   | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|------|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |      |        |
| Mar-19        | 9.63                                      | 6.85                                  | 13.17                                 | 9732                         | 6924                  | 13313                 | 1645 | 16.9%  |
| May-19        | 22.85                                     | 17.59                                 | 29.56                                 | 23100                        | 17779                 | 29882                 | 3203 | 13.86% |
| Jun-19        | 5.67                                      | 3.63                                  | 7.86                                  | 5736                         | 3670                  | 7950                  | 1097 | 19.12% |
| Jul-19        | 24.44                                     | 20.26                                 | 29.17                                 | 24707                        | 20480                 | 29490                 | 2332 | 9.44%  |
| Aug-19        | 27.34                                     | 16.85                                 | 40.23                                 | 27640                        | 17035                 | 40671                 | 6141 | 22.22% |
| Sep-19        | 3.86                                      | 3.14                                  | 4.61                                  | 3906                         | 3174                  | 4663                  | 402  | 10.28% |
| Oct-19        | 1.52                                      | 0.85                                  | 2.51                                  | 1542                         | 860                   | 2537                  | 422  | 27.38% |
| Nov-19        | 0.75                                      | 0.55                                  | 0.94                                  | 755                          | 560                   | 956                   | 110  | 14.45% |
| Dec-19        | 1.38                                      | 0.93                                  | 1.85                                  | 1397                         | 940                   | 1871                  | 242  | 17.28% |
| Jan-20        | 9.86                                      | 6.91                                  | 14.12                                 | 9963                         | 6985                  | 14271                 | 1794 | 18.01% |
| Feb-20        | 7.35                                      | 4.91                                  | 9.67                                  | 7432                         | 4964                  | 9779                  | 1288 | 17.32% |
| Mar-20        | 24.67                                     | 17.1                                  | 31.59                                 | 24942                        | 17288                 | 31935                 | 3734 | 14.97% |
| May S01 20    | 16.83                                     | 10.62                                 | 23.94                                 | 17011                        | 10734                 | 24199                 | 3466 | 20.37% |
| May S02 20    | 15.7                                      | 10.38                                 | 21.73                                 | 15873                        | 10497                 | 21964                 | 3010 | 18.96% |
| Jun-20        | 35.91                                     | 28.51                                 | 43.65                                 | 36300                        | 28822                 | 44124                 | 4080 | 11.24% |
| Jul-20        | 8.89                                      | 6.94                                  | 11.03                                 | 8983                         | 7020                  | 11155                 | 1083 | 12.06% |
| Aug-20        | 23.69                                     | 20.78                                 | 26.4                                  | 23949                        | 21004                 | 26683                 | 1556 | 6.49%  |
| Sep-20        | 26.96                                     | 20.3                                  | 35.08                                 | 27249                        | 20524                 | 35466                 | 3683 | 13.51% |
| Oct-20        | 2.38                                      | 1.81                                  | 3.1                                   | 2408                         | 1831                  | 3129                  | 338  | 14.01% |
| Nov-20        | 1.72                                      | 1.22                                  | 2.27                                  | 1743                         | 1233                  | 2290                  | 278  | 15.94% |
| Dec-20        | 11.44                                     | 7.44                                  | 16.37                                 | 11563                        | 7519                  | 16547                 | 2305 | 19.93% |
| Jan-21        | 8.22                                      | 6.71                                  | 9.83                                  | 8313                         | 6779                  | 9941                  | 846  | 10.18% |
| Feb-21        | 5.08                                      | 3.18                                  | 7.21                                  | 5137                         | 3219                  | 7289                  | 1050 | 20.43% |
| Apr S01 21    | 20.89                                     | 17.47                                 | 24.5                                  | 21115                        | 17661                 | 24770                 | 1913 | 9.06%  |
| Apr S02 21    | 54.16                                     | 40.63                                 | 69.49                                 | 54752                        | 41068                 | 70248                 | 7448 | 13.6%  |

**Table 27: Unapportioned density and population estimates of all razorbills in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Razorbill | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD   | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|------|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |      |        |
| Mar-19        | 1.2                                       | 0.65                                  | 1.9                                   | 1215                         | 662                   | 1922                  | 348  | 28.64% |
| May-19        | 1.08                                      | 0.77                                  | 1.45                                  | 1097                         | 782                   | 1462                  | 182  | 16.58% |
| Jun-19        | 0.17                                      | 0.03                                  | 0.36                                  | 169                          | 31                    | 362                   | 94   | 55.4%  |
| Jul-19        | 1.88                                      | 1.11                                  | 2.79                                  | 1900                         | 1118                  | 2822                  | 446  | 23.46% |
| Aug-19        | 1.34                                      | 0.82                                  | 2.05                                  | 1351                         | 830                   | 2073                  | 307  | 22.7%  |
| Sep-19        | 1.04                                      | 0.69                                  | 1.41                                  | 1049                         | 703                   | 1423                  | 197  | 18.77% |
| Oct-19        | 0.51                                      | 0.24                                  | 0.82                                  | 519                          | 241                   | 832                   | 148  | 28.52% |
| Nov-19        | 0.08                                      | 0.04                                  | 0.13                                  | 86                           | 38                    | 131                   | 24   | 27.36% |
| Dec-19        | 0.27                                      | 0.12                                  | 0.43                                  | 271                          | 124                   | 440                   | 82   | 29.96% |
| Jan-20        | 1.05                                      | 0.53                                  | 1.61                                  | 1064                         | 540                   | 1625                  | 272  | 25.51% |
| Feb-20        | 0.9                                       | 0.59                                  | 1.32                                  | 911                          | 600                   | 1334                  | 191  | 20.93% |
| Mar-20        | 4.94                                      | 3.33                                  | 6.43                                  | 4996                         | 3365                  | 6503                  | 784  | 15.69% |
| May S01 20    | 0.72                                      | 0.43                                  | 1.06                                  | 725                          | 430                   | 1074                  | 170  | 23.38% |
| May S02 20    | 0.4                                       | 0.17                                  | 0.69                                  | 403                          | 172                   | 694                   | 141  | 34.88% |
| Jun-20        | 0.8                                       | 0.56                                  | 1.12                                  | 813                          | 569                   | 1129                  | 148  | 18.15% |
| Jul-20        | 1.36                                      | 0.77                                  | 2.1                                   | 1376                         | 776                   | 2122                  | 370  | 26.83% |
| Aug-20        | 2.72                                      | 1.87                                  | 3.65                                  | 2751                         | 1894                  | 3689                  | 464  | 16.87% |
| Sep-20        | 8.11                                      | 5.61                                  | 11.12                                 | 8201                         | 5670                  | 11244                 | 1486 | 18.12% |
| Oct-20        | 0.56                                      | 0.25                                  | 0.97                                  | 568                          | 251                   | 984                   | 190  | 33.43% |
| Nov-20        | 0.2                                       | 0.09                                  | 0.31                                  | 198                          | 88                    | 316                   | 60   | 30.03% |
| Dec-20        | 1.06                                      | 0.57                                  | 1.56                                  | 1068                         | 572                   | 1580                  | 259  | 24.19% |
| Jan-21        | 2.69                                      | 1.91                                  | 3.64                                  | 2720                         | 1930                  | 3679                  | 437  | 16.04% |
| Feb-21        | 1.15                                      | 0.65                                  | 1.7                                   | 1159                         | 661                   | 1714                  | 270  | 23.28% |
| Apr S01 21    | 2.84                                      | 1.74                                  | 4.07                                  | 2871                         | 1755                  | 4110                  | 585  | 20.36% |
| Apr S02 21    | 1.17                                      | 0.88                                  | 1.49                                  | 1181                         | 888                   | 1509                  | 155  | 13.08% |

**Table 28: Apportioned density and population estimates of all razorbills in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Razorbill | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |     |        |
| Mar-19        | 1.29                                      | 0.74                                  | 1.97                                  | 1302                         | 744                   | 1993                  | 327 | 25.11% |
| May-19        | 1.18                                      | 0.87                                  | 1.54                                  | 1195                         | 885                   | 1555                  | 178 | 14.85% |
| Jun-19        | 0.18                                      | 0.05                                  | 0.39                                  | 185                          | 53                    | 391                   | 94  | 50.59% |
| Jul-19        | 2.08                                      | 1.31                                  | 2.91                                  | 2101                         | 1321                  | 2945                  | 428 | 20.38% |
| Aug-19        | 1.52                                      | 0.98                                  | 2.15                                  | 1542                         | 992                   | 2177                  | 306 | 19.81% |
| Sep-19        | 1.22                                      | 0.88                                  | 1.64                                  | 1236                         | 890                   | 1657                  | 198 | 16.01% |
| Oct-19        | 0.71                                      | 0.41                                  | 1.06                                  | 718                          | 418                   | 1076                  | 174 | 24.15% |
| Nov-19        | 0.12                                      | 0.07                                  | 0.17                                  | 119                          | 72                    | 171                   | 26  | 21.19% |
| Dec-19        | 0.38                                      | 0.18                                  | 0.64                                  | 388                          | 187                   | 643                   | 120 | 30.95% |
| Jan-20        | 1.47                                      | 0.91                                  | 2.12                                  | 1486                         | 924                   | 2139                  | 306 | 20.55% |
| Feb-20        | 0.99                                      | 0.67                                  | 1.41                                  | 1002                         | 679                   | 1421                  | 200 | 19.94% |
| Mar-20        | 5.33                                      | 3.79                                  | 7                                     | 5385                         | 3827                  | 7072                  | 843 | 15.64% |

| All Razorbill | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD   | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|------|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |      |        |
| May S01 20    | 0.79                                      | 0.43                                  | 1.16                                  | 801                          | 438                   | 1177                  | 188  | 23.37% |
| May S02 20    | 0.47                                      | 0.23                                  | 0.8                                   | 476                          | 236                   | 808                   | 145  | 30.4%  |
| Jun-20        | 0.85                                      | 0.56                                  | 1.14                                  | 860                          | 568                   | 1153                  | 154  | 17.88% |
| Jul-20        | 1.5                                       | 0.8                                   | 2.4                                   | 1517                         | 812                   | 2427                  | 423  | 27.89% |
| Aug-20        | 2.9                                       | 2.06                                  | 3.89                                  | 2935                         | 2078                  | 3930                  | 483  | 16.43% |
| Sep-20        | 8.97                                      | 5.9                                   | 12.61                                 | 9072                         | 5965                  | 12745                 | 1698 | 18.71% |
| Oct-20        | 0.76                                      | 0.41                                  | 1.15                                  | 765                          | 411                   | 1166                  | 191  | 24.88% |
| Nov-20        | 0.27                                      | 0.15                                  | 0.4                                   | 274                          | 154                   | 403                   | 65   | 23.73% |
| Dec-20        | 1.52                                      | 0.97                                  | 2.15                                  | 1537                         | 981                   | 2170                  | 317  | 20.59% |
| Jan-21        | 3.18                                      | 2.42                                  | 4.19                                  | 3218                         | 2445                  | 4233                  | 449  | 13.95% |
| Feb-21        | 1.34                                      | 0.81                                  | 2                                     | 1356                         | 815                   | 2020                  | 303  | 22.32% |
| Apr S01 21    | 3.14                                      | 2.05                                  | 4.24                                  | 3171                         | 2076                  | 4290                  | 582  | 18.35% |
| Apr S02 21    | 1.31                                      | 0.99                                  | 1.64                                  | 1325                         | 1006                  | 1660                  | 169  | 12.74% |

**Table 29: Unapportioned density and population estimates of all puffins in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Puffin    | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |     |        |
| Mar-19        | 0.77                                      | 0.48                                  | 1.11                                  | 782                          | 487                   | 1119                  | 167 | 21.24% |
| May-19        | 1.61                                      | 1.3                                   | 1.9                                   | 1627                         | 1310                  | 1922                  | 155 | 9.5%   |
| Jun-19        | 0.26                                      | 0.13                                  | 0.45                                  | 268                          | 133                   | 456                   | 86  | 31.95% |
| Jul-19        | 1.66                                      | 1.24                                  | 2.08                                  | 1683                         | 1255                  | 2102                  | 226 | 13.38% |
| Aug-19        | 2.17                                      | 1.59                                  | 2.68                                  | 2196                         | 1605                  | 2707                  | 286 | 13.02% |
| Sep-19        | 0.6                                       | 0.22                                  | 1.13                                  | 603                          | 226                   | 1140                  | 247 | 40.99% |
| Oct-19        | 0.15                                      | 0.08                                  | 0.23                                  | 153                          | 77                    | 236                   | 41  | 26.76% |
| Nov-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Dec-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jan-20        | 0.02                                      | 0                                     | 0.04                                  | 17                           | 0                     | 40                    | 11  | 60.82% |
| Feb-20        | 0.03                                      | 0                                     | 0.07                                  | 32                           | 0                     | 71                    | 17  | 53.57% |
| Mar-20        | 0.27                                      | 0.13                                  | 0.44                                  | 272                          | 128                   | 446                   | 79  | 29.01% |
| May S01 20    | 0.62                                      | 0.34                                  | 0.9                                   | 624                          | 344                   | 909                   | 151 | 24.14% |
| May S02 20    | 0.35                                      | 0.24                                  | 0.44                                  | 350                          | 243                   | 449                   | 54  | 15.28% |
| Jun-20        | 0.42                                      | 0.25                                  | 0.59                                  | 422                          | 258                   | 597                   | 89  | 21.04% |
| Jul-20        | 0.66                                      | 0.32                                  | 1.16                                  | 664                          | 319                   | 1175                  | 235 | 35.34% |
| Aug-20        | 1.13                                      | 0.76                                  | 1.55                                  | 1146                         | 771                   | 1568                  | 207 | 18.04% |
| Sep-20        | 10.68                                     | 8.99                                  | 12.67                                 | 10793                        | 9091                  | 12807                 | 876 | 8.11%  |
| Oct-20        | 0.06                                      | 0.03                                  | 0.1                                   | 65                           | 30                    | 103                   | 20  | 29.83% |
| Nov-20        | 0.07                                      | 0.02                                  | 0.13                                  | 71                           | 23                    | 131                   | 29  | 40.27% |
| Dec-20        | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8   | 97.82% |
| Jan-21        | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8   | 86.22% |
| Feb-21        | 0.19                                      | 0.09                                  | 0.31                                  | 192                          | 95                    | 314                   | 58  | 30.14% |
| Apr S01 21    | 0.43                                      | 0.26                                  | 0.64                                  | 440                          | 264                   | 649                   | 99  | 22.3%  |
| Apr S02 21    | 2.88                                      | 2.04                                  | 3.73                                  | 2910                         | 2064                  | 3773                  | 438 | 15.02% |

**Table 30: Apportioned density and population estimates of all puffins in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Puffin    | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD   | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|------|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |      |        |
| Mar-19        | 1.17                                      | 0.77                                  | 1.67                                  | 1181                         | 781                   | 1685                  | 227  | 19.15% |
| May-19        | 2.01                                      | 1.6                                   | 2.37                                  | 2031                         | 1623                  | 2395                  | 198  | 9.74%  |
| Jun-19        | 0.32                                      | 0.16                                  | 0.5                                   | 324                          | 158                   | 504                   | 90   | 27.72% |
| Jul-19        | 2.85                                      | 1.93                                  | 3.61                                  | 2877                         | 1954                  | 3651                  | 436  | 15.14% |
| Aug-19        | 3.43                                      | 2.66                                  | 4.23                                  | 3465                         | 2693                  | 4279                  | 397  | 11.43% |
| Sep-19        | 0.92                                      | 0.54                                  | 1.51                                  | 927                          | 544                   | 1522                  | 267  | 28.81% |
| Oct-19        | 0.25                                      | 0.16                                  | 0.35                                  | 248                          | 165                   | 354                   | 48   | 19.09% |
| Nov-19        | 0.02                                      | 0.01                                  | 0.04                                  | 24                           | 9                     | 43                    | 10   | 39.06% |
| Dec-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0    | 0      |
| Jan-20        | 0.05                                      | 0.02                                  | 0.08                                  | 46                           | 21                    | 84                    | 16   | 34.24% |
| Feb-20        | 0.17                                      | 0.08                                  | 0.28                                  | 170                          | 83                    | 286                   | 55   | 31.9%  |
| Mar-20        | 0.5                                       | 0.27                                  | 0.72                                  | 507                          | 274                   | 733                   | 120  | 23.7%  |
| May S01 20    | 1.61                                      | 0.97                                  | 2.22                                  | 1625                         | 979                   | 2245                  | 358  | 21.98% |
| May S02 20    | 0.63                                      | 0.45                                  | 0.82                                  | 640                          | 457                   | 830                   | 99   | 15.44% |
| Jun-20        | 0.73                                      | 0.5                                   | 0.96                                  | 743                          | 502                   | 966                   | 129  | 17.37% |
| Jul-20        | 0.89                                      | 0.48                                  | 1.5                                   | 904                          | 484                   | 1518                  | 272  | 30.09% |
| Aug-20        | 1.59                                      | 1.07                                  | 2.12                                  | 1607                         | 1080                  | 2141                  | 280  | 17.42% |
| Sep-20        | 11.88                                     | 9.93                                  | 14.06                                 | 12008                        | 10035                 | 14211                 | 1084 | 9.02%  |
| Oct-20        | 0.12                                      | 0.08                                  | 0.16                                  | 119                          | 80                    | 160                   | 21   | 17.14% |
| Nov-20        | 0.12                                      | 0.07                                  | 0.19                                  | 124                          | 71                    | 189                   | 31   | 24.95% |
| Dec-20        | 0.02                                      | 0.01                                  | 0.04                                  | 26                           | 14                    | 42                    | 8    | 30.22% |
| Jan-21        | 0.02                                      | 0.01                                  | 0.04                                  | 22                           | 11                    | 40                    | 8    | 37.58% |
| Feb-21        | 0.36                                      | 0.22                                  | 0.51                                  | 363                          | 219                   | 513                   | 77   | 21.18% |
| Apr S01 21    | 0.85                                      | 0.58                                  | 1.15                                  | 862                          | 586                   | 1167                  | 147  | 16.99% |
| Apr S02 21    | 4.12                                      | 3.02                                  | 5.38                                  | 4164                         | 3053                  | 5438                  | 607  | 14.58% |

**Table 31: Unapportioned density and population estimates of all red-throated divers in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Red-throated diver | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>          |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19                 | 0.02                                      | 0                                     | 0.04                                  | 17                           | 0                     | 39                    | 11 | 65.56% |
| Jun-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19                 | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 101%   |
| Dec-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

| All Red-throated diver | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>          |   |                                       |                                       |                              |                       |                       |    |        |
| Feb-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20             | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20             | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20                 | 0.02                                      | 0                                     | 0.04                                  | 16                           | 0                     | 38                    | 11 | 63.3%  |
| Jan-21                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21             | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21             | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 92.67% |

**Table 32: Apportioned density and population estimates of all red-throated divers in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Red-throated diver | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>          |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19                 | 0.02                                      | 0                                     | 0.04                                  | 20                           | 0                     | 42                    | 11 | 53.27% |
| Jun-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19                 | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 23                    | 7  | 90.89% |
| Dec-19                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20             | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20             | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Sep-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20                 | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 97.37% |
| Nov-20                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20                 | 0.02                                      | 0                                     | 0.04                                  | 16                           | 0                     | 39                    | 10 | 62.18% |
| Jan-21                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21                 | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21             | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

| All Red-throated diver | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|------------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>          |   |                                       |                                       |                              |                       |                       |    |        |
| Apr S02 21             | 0.01                                      | 0                                     | 0.02                                  | 9                            | 0                     | 24                    | 8  | 95.51% |

**Table 33: Unapportioned density and population estimates of all fulmars in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Fulmar    | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |     |        |
| Mar-19        | 0.18                                      | 0.11                                  | 0.26                                  | 180                          | 115                   | 267                   | 39  | 21.66% |
| May-19        | 0.05                                      | 0.02                                  | 0.09                                  | 49                           | 16                    | 89                    | 19  | 38.64% |
| Jun-19        | 0.04                                      | 0.01                                  | 0.08                                  | 41                           | 8                     | 84                    | 21  | 50.05% |
| Jul-19        | 0.07                                      | 0.03                                  | 0.12                                  | 66                           | 27                    | 120                   | 25  | 37.53% |
| Aug-19        | 0.06                                      | 0.02                                  | 0.11                                  | 62                           | 23                    | 117                   | 26  | 41.25% |
| Sep-19        | 0.02                                      | 0                                     | 0.05                                  | 17                           | 0                     | 48                    | 16  | 92.76% |
| Oct-19        | 0.03                                      | 0.01                                  | 0.05                                  | 33                           | 13                    | 53                    | 10  | 29.18% |
| Nov-19        | 0.22                                      | 0.13                                  | 0.34                                  | 225                          | 133                   | 344                   | 54  | 23.81% |
| Dec-19        | 0.09                                      | 0.03                                  | 0.18                                  | 89                           | 30                    | 179                   | 42  | 47.11% |
| Jan-20        | 0.17                                      | 0.08                                  | 0.25                                  | 169                          | 85                    | 252                   | 42  | 24.34% |
| Feb-20        | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8   | 94.96% |
| Mar-20        | 0.03                                      | 0.01                                  | 0.07                                  | 35                           | 9                     | 68                    | 16  | 45.83% |
| May S01 20    | 0.04                                      | 0                                     | 0.09                                  | 39                           | 0                     | 96                    | 26  | 67.87% |
| May S02 20    | 0.01                                      | 0                                     | 0.04                                  | 15                           | 0                     | 38                    | 10  | 64.52% |
| Jun-20        | 0.05                                      | 0.02                                  | 0.1                                   | 49                           | 16                    | 99                    | 22  | 43.69% |
| Jul-20        | 0.07                                      | 0.02                                  | 0.13                                  | 73                           | 24                    | 133                   | 29  | 39.52% |
| Aug-20        | 0.1                                       | 0.04                                  | 0.17                                  | 102                          | 40                    | 171                   | 33  | 31.91% |
| Sep-20        | 0.58                                      | 0.37                                  | 0.77                                  | 583                          | 375                   | 782                   | 103 | 17.62% |
| Oct-20        | 0.34                                      | 0.19                                  | 0.56                                  | 344                          | 191                   | 562                   | 99  | 28.77% |
| Nov-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Dec-20        | 0.26                                      | 0.16                                  | 0.37                                  | 258                          | 158                   | 373                   | 53  | 20.48% |
| Jan-21        | 0.1                                       | 0.04                                  | 0.18                                  | 103                          | 42                    | 185                   | 38  | 36.36% |
| Feb-21        | 0.11                                      | 0.05                                  | 0.16                                  | 110                          | 56                    | 164                   | 28  | 25.46% |
| Apr S01 21    | 0.03                                      | 0                                     | 0.06                                  | 31                           | 4                     | 63                    | 16  | 50.73% |
| Apr S02 21    | 0.12                                      | 0.06                                  | 0.18                                  | 122                          | 63                    | 184                   | 32  | 25.76% |

**Table 34: Apportioned density and population estimates of all fulmars in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Fulmar    | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19        | 0.18                                      | 0.11                                  | 0.27                                  | 185                          | 115                   | 275                   | 43 | 22.81% |
| May-19        | 0.05                                      | 0.02                                  | 0.09                                  | 49                           | 16                    | 88                    | 19 | 38.5%  |
| Jun-19        | 0.06                                      | 0.01                                  | 0.1                                   | 60                           | 15                    | 106                   | 23 | 38.5%  |

| All Fulmar    | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |     |        |
| Jul-19        | 0.08                                      | 0.04                                  | 0.13                                  | 86                           | 43                    | 133                   | 24  | 27.93% |
| Aug-19        | 0.07                                      | 0.02                                  | 0.13                                  | 71                           | 23                    | 128                   | 27  | 36.76% |
| Sep-19        | 0.02                                      | 0                                     | 0.05                                  | 25                           | 0                     | 56                    | 17  | 67.1%  |
| Oct-19        | 0.04                                      | 0.01                                  | 0.06                                  | 39                           | 15                    | 62                    | 12  | 29.68% |
| Nov-19        | 0.23                                      | 0.14                                  | 0.34                                  | 237                          | 138                   | 343                   | 54  | 22.65% |
| Dec-19        | 0.1                                       | 0.03                                  | 0.21                                  | 105                          | 35                    | 211                   | 47  | 44.9%  |
| Jan-20        | 0.2                                       | 0.11                                  | 0.3                                   | 205                          | 114                   | 302                   | 49  | 23.82% |
| Feb-20        | 0.02                                      | 0                                     | 0.06                                  | 24                           | 0                     | 62                    | 16  | 64.98% |
| Mar-20        | 0.03                                      | 0.01                                  | 0.07                                  | 35                           | 9                     | 67                    | 16  | 43.83% |
| May S01 20    | 0.07                                      | 0.02                                  | 0.16                                  | 69                           | 16                    | 159                   | 41  | 59.18% |
| May S02 20    | 0.02                                      | 0                                     | 0.04                                  | 16                           | 0                     | 38                    | 10  | 59.32% |
| Jun-20        | 0.05                                      | 0.01                                  | 0.09                                  | 48                           | 15                    | 92                    | 20  | 42.04% |
| Jul-20        | 0.08                                      | 0.03                                  | 0.14                                  | 78                           | 29                    | 139                   | 30  | 38.04% |
| Aug-20        | 0.1                                       | 0.05                                  | 0.17                                  | 105                          | 46                    | 174                   | 34  | 31.75% |
| Sep-20        | 0.69                                      | 0.46                                  | 0.94                                  | 700                          | 465                   | 946                   | 124 | 17.62% |
| Oct-20        | 0.34                                      | 0.2                                   | 0.56                                  | 348                          | 199                   | 563                   | 100 | 28.63% |
| Nov-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Dec-20        | 0.26                                      | 0.17                                  | 0.37                                  | 263                          | 170                   | 370                   | 52  | 19.71% |
| Jan-21        | 0.1                                       | 0.04                                  | 0.19                                  | 103                          | 38                    | 191                   | 40  | 38.27% |
| Feb-21        | 0.15                                      | 0.07                                  | 0.23                                  | 156                          | 74                    | 237                   | 42  | 26.72% |
| Apr S01 21    | 0.03                                      | 0                                     | 0.06                                  | 32                           | 4                     | 65                    | 16  | 50.71% |
| Apr S02 21    | 0.19                                      | 0.09                                  | 0.32                                  | 194                          | 92                    | 328                   | 61  | 31.19% |

**Table 35: Unapportioned density and population estimates of all Manx shearwaters in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Manx shearwater | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV    |
|---------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|-------|
| <b>Survey</b>       |   |                                       |                                       |                              |                       |                       |    |       |
| Mar-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| May-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Jun-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Jul-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Aug-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Sep-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Oct-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Nov-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Dec-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Jan-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Feb-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Mar-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| May S01 20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| May S02 20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Jun-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Jul-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |
| Aug-20              | 0.06                                      | 0                                     | 0.19                                  | 66                           | 0                     | 190                   | 62 | 93.5% |
| Sep-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0     |



| All Manx shearwater | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|---------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b>       |   |                                       |                                       |                              |                       |                       |    |    |
| Oct-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-21              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-21              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S01 21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S02 21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

**Table 36: Apportioned density and population estimates of all Manx shearwaters in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Manx shearwater | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV     |
|---------------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|--------|
| <b>Survey</b>       |   |                                       |                                       |                              |                       |                       |    |        |
| Mar-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jul-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-19              | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8  | 96.24% |
| Sep-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-19              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Mar-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S01 20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| May S02 20          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jun-20              | 0.01                                      | 0                                     | 0.05                                  | 15                           | 0                     | 47                    | 15 | 95.29% |
| Jul-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Aug-20              | 0.06                                      | 0                                     | 0.19                                  | 64                           | 0                     | 190                   | 62 | 96.04% |
| Sep-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Oct-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Nov-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Dec-20              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Jan-21              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Feb-21              | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S01 21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |
| Apr S02 21          | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0      |

**Table 37: Unapportioned density and population estimates of all gannets in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Gannet    | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |     |        |
| Mar-19        | 0.27                                      | 0.12                                  | 0.45                                  | 272                          | 125                   | 452                   | 85  | 31.21% |
| May-19        | 0.73                                      | 0.46                                  | 1.01                                  | 741                          | 467                   | 1018                  | 142 | 19.16% |
| Jun-19        | 1.62                                      | 1.22                                  | 2.1                                   | 1634                         | 1234                  | 2118                  | 227 | 13.9%  |
| Jul-19        | 3.58                                      | 2.92                                  | 4.23                                  | 3622                         | 2952                  | 4280                  | 331 | 9.12%  |
| Aug-19        | 3.34                                      | 2.73                                  | 3.89                                  | 3381                         | 2762                  | 3935                  | 302 | 8.93%  |
| Sep-19        | 2.66                                      | 2.15                                  | 3.19                                  | 2686                         | 2174                  | 3226                  | 281 | 10.44% |
| Oct-19        | 0.79                                      | 0.63                                  | 0.99                                  | 799                          | 635                   | 1004                  | 95  | 11.82% |
| Nov-19        | 0.17                                      | 0.1                                   | 0.24                                  | 169                          | 105                   | 245                   | 39  | 22.63% |
| Dec-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jan-20        | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8   | 90.82% |
| Feb-20        | 0.01                                      | 0                                     | 0.03                                  | 9                            | 0                     | 27                    | 8   | 94.62% |
| Mar-20        | 0.26                                      | 0.12                                  | 0.43                                  | 265                          | 126                   | 430                   | 80  | 29.96% |
| May S01 20    | 0.42                                      | 0.2                                   | 0.65                                  | 425                          | 200                   | 660                   | 122 | 28.5%  |
| May S02 20    | 0.81                                      | 0.55                                  | 1.11                                  | 820                          | 556                   | 1118                  | 150 | 18.22% |
| Jun-20        | 1.14                                      | 0.81                                  | 1.56                                  | 1155                         | 818                   | 1575                  | 199 | 17.24% |
| Jul-20        | 3.51                                      | 3                                     | 4.11                                  | 3545                         | 3037                  | 4153                  | 294 | 8.28%  |
| Aug-20        | 2.43                                      | 1.82                                  | 3                                     | 2460                         | 1840                  | 3032                  | 312 | 12.65% |
| Sep-20        | 1.43                                      | 1.03                                  | 1.92                                  | 1451                         | 1042                  | 1940                  | 236 | 16.25% |
| Oct-20        | 0.82                                      | 0.55                                  | 1.07                                  | 825                          | 556                   | 1078                  | 134 | 16.23% |
| Nov-20        | 1.22                                      | 0.89                                  | 1.62                                  | 1233                         | 897                   | 1641                  | 191 | 15.45% |
| Dec-20        | 0.2                                       | 0.02                                  | 0.49                                  | 199                          | 20                    | 497                   | 129 | 64.68% |
| Jan-21        | 0.09                                      | 0.04                                  | 0.15                                  | 87                           | 39                    | 148                   | 30  | 33.71% |
| Feb-21        | 0.13                                      | 0.02                                  | 0.28                                  | 128                          | 16                    | 288                   | 73  | 56.43% |
| Apr S01 21    | 0.57                                      | 0.44                                  | 0.68                                  | 573                          | 445                   | 692                   | 67  | 11.57% |
| Apr S02 21    | 1.41                                      | 0.42                                  | 2.88                                  | 1430                         | 422                   | 2913                  | 688 | 48.08% |

**Table 38: Apportioned density and population estimates of all gannets in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Gannet    | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |     |        |
| Mar-19        | 0.27                                      | 0.13                                  | 0.45                                  | 276                          | 136                   | 454                   | 85  | 30.62% |
| May-19        | 0.74                                      | 0.48                                  | 1.08                                  | 751                          | 490                   | 1093                  | 159 | 21.09% |
| Jun-19        | 1.62                                      | 1.18                                  | 2.17                                  | 1641                         | 1198                  | 2190                  | 233 | 14.2%  |
| Jul-19        | 3.58                                      | 2.94                                  | 4.21                                  | 3624                         | 2967                  | 4257                  | 324 | 8.93%  |
| Aug-19        | 3.37                                      | 2.83                                  | 3.94                                  | 3408                         | 2857                  | 3982                  | 291 | 8.51%  |
| Sep-19        | 2.65                                      | 2.17                                  | 3.24                                  | 2684                         | 2196                  | 3278                  | 274 | 10.17% |
| Oct-19        | 0.79                                      | 0.62                                  | 0.96                                  | 799                          | 627                   | 971                   | 94  | 11.73% |
| Nov-19        | 0.16                                      | 0.1                                   | 0.24                                  | 166                          | 99                    | 245                   | 40  | 23.61% |
| Dec-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0   | 0      |
| Jan-20        | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8   | 99.39% |
| Feb-20        | 0.01                                      | 0                                     | 0.02                                  | 8                            | 0                     | 24                    | 8   | 95.9%  |
| Mar-20        | 0.26                                      | 0.12                                  | 0.43                                  | 264                          | 120                   | 435                   | 83  | 31.47% |

| All Gannet    | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD  | CV     |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|-----|--------|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |     |        |
| May S01 20    | 0.42                                      | 0.22                                  | 0.68                                  | 421                          | 221                   | 688                   | 122 | 28.9%  |
| May S02 20    | 0.81                                      | 0.57                                  | 1.12                                  | 823                          | 573                   | 1136                  | 146 | 17.69% |
| Jun-20        | 1.14                                      | 0.82                                  | 1.54                                  | 1153                         | 828                   | 1560                  | 197 | 17.01% |
| Jul-20        | 3.48                                      | 2.92                                  | 4.1                                   | 3520                         | 2951                  | 4141                  | 313 | 8.87%  |
| Aug-20        | 2.44                                      | 1.84                                  | 3.05                                  | 2463                         | 1860                  | 3086                  | 320 | 12.96% |
| Sep-20        | 1.42                                      | 1.02                                  | 1.9                                   | 1435                         | 1036                  | 1919                  | 237 | 16.48% |
| Oct-20        | 0.8                                       | 0.57                                  | 1.06                                  | 814                          | 579                   | 1071                  | 130 | 15.95% |
| Nov-20        | 1.23                                      | 0.9                                   | 1.62                                  | 1239                         | 915                   | 1639                  | 185 | 14.88% |
| Dec-20        | 0.19                                      | 0.02                                  | 0.46                                  | 195                          | 23                    | 469                   | 122 | 62.83% |
| Jan-21        | 0.09                                      | 0.03                                  | 0.15                                  | 87                           | 32                    | 148                   | 32  | 36.12% |
| Feb-21        | 0.12                                      | 0.01                                  | 0.29                                  | 127                          | 16                    | 291                   | 71  | 55.76% |
| Apr S01 21    | 0.57                                      | 0.43                                  | 0.69                                  | 576                          | 438                   | 698                   | 69  | 11.89% |
| Apr S02 21    | 1.41                                      | 0.42                                  | 2.82                                  | 1428                         | 421                   | 2849                  | 651 | 45.57% |

**Table 39: Unapportioned density and population estimates of all shags in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Shag      | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |    |    |
| Mar-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Mar-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S01 20    | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S02 20    | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-21        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-21        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S01 21    | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S02 21    | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

**Table 40: Apportioned density and population estimates of all shags in the Berwick Bank Development Array only, calculated using design-based analysis**

| All Shag      | Density Estimate (birds/km <sup>2</sup> ) | Lower 95% CI (birds/km <sup>2</sup> ) | Upper 95% CI (birds/km <sup>2</sup> ) | Population Estimate (number) | Lower 95% CI (number) | Upper 95% CI (number) | SD | CV |
|---------------|---|---------------------------------------|---------------------------------------|------------------------------|-----------------------|-----------------------|----|----|
| <b>Survey</b> |   |                                       |                                       |                              |                       |                       |    |    |
| Mar-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-19        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Mar-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S01 20    | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| May S02 20    | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jun-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jul-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Aug-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Sep-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Oct-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Nov-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Dec-20        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Jan-21        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Feb-21        | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S01 21    | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |
| Apr S02 21    | 0   | 0                                     | 0                                     | 0                            | 0                     | 0                     | 0  | 0  |

