

BERWICK BANK WIND FARM OFFSHORE ENVIRONMENTAL IMPACT ASSESSMENT

**APPENDIX 11.1, ANNEX E:
DESIGN-BASED ANALYSIS –
POPULATION ESTIMATES FOR
SITTING BIRDS GROUPED BY
SPECIES (BERWICK BANK
DEVELOPMENT AREA PLUS
16KM BUFFER)**

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NOTE

This annex provides unapportioned (detections assigned to species only) density and population estimates for sitting birds of focal species for the Offshore Ornithology Study Area. 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 the Baseline Report and Annex F)

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Table 1: Unapportioned density and population estimates of sitting common scoters in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Common scoter	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	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: Unapportioned density and population estimates of sitting kittiwakes in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Kittiwake	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-19	8.85	4.7	13.44	35217	18704	53447	8693	24.68%
May-19	0.72	0.47	1	2857	1866	3987	508	17.77%
Jun-19	1.27	0.97	1.63	5046	3852	6488	642	12.72%
Jul-19	1.95	1.6	2.37	7739	6346	9419	819	10.57%
Aug-19	5.35	4.28	6.42	21293	17032	25523	2248	10.56%
Sep-19	1.11	0.77	1.47	4421	3072	5842	700	15.83%
Oct-19	0.69	0.26	1.38	2726	1020	5509	1193	43.74%
Nov-19	0.06	0.03	0.1	251	126	387	67	26.58%
Dec-19	0.29	0.08	0.54	1143	312	2151	497	43.43%
Jan-20	1.1	0.53	1.83	4377	2090	7286	1342	30.65%
Feb-20	0.77	0.5	1.14	3067	2007	4538	661	21.52%

Sitting Kittiwake	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-20	2.94	1.74	4.53	11690	6912	18037	2865	24.5%
May S01 20	1.13	0.58	1.77	4506	2291	7046	1239	27.48%
May S02 20	1.45	1.06	1.92	5767	4211	7618	904	15.68%
Jun-20	0.74	0.61	0.89	2957	2409	3555	302	10.19%
Jul-20	4.38	3.24	5.55	17401	12876	22085	2356	13.54%
Aug-20	6.02	4.61	7.44	23955	18330	29583	2865	11.96%
Sep-20	10.46	7.41	13.98	41595	29454	55585	6905	16.6%
Oct-20	0.54	0.19	1.05	2165	771	4165	952	43.98%
Nov-20	1.02	0.66	1.42	4040	2643	5664	790	19.55%
Dec-20	0.76	0.21	1.67	3036	850	6662	1659	54.65%
Jan-21	2.63	0.86	5.26	10472	3403	20909	4621	44.12%
Feb-21	0.78	0.2	1.53	3084	806	6067	1494	48.44%
Apr S01 21	3.1	2.49	3.78	12329	9901	15043	1363	11.06%
Apr S02 21	4.87	2.33	8.21	19373	9278	32659	6001	30.98%

Table 3: Unapportioned density and population estimates of sitting black-headed gulls in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Black-headed gull	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	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 4: Unapportioned density and population estimates of sitting little gulls in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Little gull	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0.01	9	0	26	8	94.55%
Aug-19	0	0	0.01	9	0	26	8	96.31%
Sep-19	0	0	0	0	0	0	0	0
Oct-19	0	0	0	0	0	0	0	0
Nov-19	0	0	0.01	8	0	26	8	93.34%
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	0.01	0	0.02	27	0	94	26	97.66%
Aug-20	0	0	0.01	16	0	40	11	66.63%
Sep-20	0	0	0.01	8	0	25	9	102.38%
Oct-20	0	0	0.01	8	0	24	8	95.56%
Nov-20	0	0	0	0	0	0	0	0
Dec-20	0	0	0.01	9	0	24	9	93.7%
Jan-21	0	0	0.02	18	0	63	18	97.68%
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	32	8	63	14	43.88%

Table 5: Unapportioned density and population estimates of sitting common gulls in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Common gull	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-19	0	0	0.01	13	0	38	12	92.49%
May-19	0	0	0.01	9	0	24	8	92.64%
Jun-19	0	0	0	0	0	0	0	0
Jul-19	0	0	0.01	9	0	25	8	95.81%
Aug-19	0	0	0	0	0	0	0	0
Sep-19	0	0	0	0	0	0	0	0
Oct-19	0	0	0.01	9	0	27	8	96.57%
Nov-19	0	0	0.01	16	0	48	15	92.57%
Dec-19	0.03	0	0.08	111	0	324	88	79.29%
Jan-20	0	0	0	0	0	0	0	0
Feb-20	0.02	0.01	0.05	99	32	181	38	38.16%
Mar-20	0	0	0	0	0	0	0	0

Sitting Common gull	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
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	0.01	9	0	24	9	95.35%
Aug-20	0	0	0.01	8	0	24	8	96.9%
Sep-20	0.01	0	0.01	24	0	55	14	58.11%
Oct-20	0	0	0	0	0	0	0	0
Nov-20	0	0	0	0	0	0	0	0
Dec-20	0.07	0	0.17	283	4	689	169	59.81%
Jan-21	0	0	0.01	16	0	40	12	70.18%
Feb-21	0	0	0	0	0	0	0	0
Apr S01 21	0	0	0.01	16	0	40	11	67.25%
Apr S02 21	0	0	0.01	17	0	40	12	67.68%

Table 6: Unapportioned density and population estimates of sitting great black-backed gulls in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Great black-backed gull	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0.01	0	0.03	39	0	112	32	81.53%
Jul-19	0.01	0	0.02	33	8	67	18	54.18%
Aug-19	0	0	0.01	9	0	26	9	96.75%
Sep-19	0	0	0.01	8	0	24	8	99.23%
Oct-19	0	0	0	0	0	0	0	0
Nov-19	0.04	0	0.08	147	15	320	80	54.06%
Dec-19	0.01	0	0.03	55	7	125	32	56.72%
Jan-20	0	0	0	0	0	0	0	0
Feb-20	0	0	0.01	8	0	24	8	98.31%
Mar-20	0	0	0.01	9	0	25	9	98.86%
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	32	8	64	15	46.55%
Aug-20	0	0	0.01	17	0	44	12	68.73%
Sep-20	0	0	0	0	0	0	0	0
Oct-20	0	0	0	0	0	0	0	0
Nov-20	0	0	0.01	17	0	39	11	61.65%
Dec-20	0.05	0.02	0.1	218	79	386	81	36.77%
Jan-21	0.03	0.01	0.07	126	24	271	66	52.27%
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 sitting herring gulls in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Herring gull	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0.01	17	0	48	16	91.91%
Jun-19	0.31	0.14	0.51	1218	571	2027	370	30.34%
Jul-19	0.11	0.06	0.16	426	249	648	102	23.81%
Aug-19	0.07	0.01	0.16	259	42	628	159	61.33%
Sep-19	0	0	0	0	0	0	0	0
Oct-19	0	0	0	0	0	0	0	0
Nov-19	0.17	0.01	0.46	688	47	1835	498	72.33%
Dec-19	0.1	0	0.3	398	15	1191	326	81.88%
Jan-20	0.01	0	0.02	34	0	79	20	59.1%
Feb-20	0	0	0.01	17	0	40	11	65.11%
Mar-20	0	0	0.01	8	0	25	8	103.48%
May S01 20	0	0	0.01	8	0	23	8	104.34%
May S02 20	0	0	0.01	8	0	24	8	94.4%
Jun-20	0.02	0	0.05	93	8	211	53	56.58%
Jul-20	0.8	0.45	1.24	3197	1771	4921	767	23.99%
Aug-20	0.06	0.03	0.12	254	101	464	100	39.44%
Sep-20	0.06	0.03	0.09	220	112	349	64	28.94%
Oct-20	0	0	0.01	17	0	40	12	68.75%
Nov-20	0.01	0	0.01	24	0	48	14	57.18%
Dec-20	0.42	0.02	1.1	1651	82	4391	1172	71%
Jan-21	0.07	0.01	0.19	285	39	750	218	76.32%
Feb-21	0.01	0	0.02	32	0	83	24	74.96%
Apr S01 21	0	0	0.01	8	0	24	8	99.53%
Apr S02 21	0.01	0	0.03	58	8	125	31	52.86%

Table 8: Unapportioned density and population estimates of sitting lesser black-backed gulls in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Lesser black-backed gull	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0.01	8	0	24	8	92.82%
Jun-19	0.01	0	0.03	56	16	111	24	41.9%
Jul-19	0.02	0.01	0.04	90	42	144	27	29.96%
Aug-19	0.01	0	0.02	41	8	83	20	48.7%
Sep-19	0	0	0.01	15	0	48	15	98.17%
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

Sitting Lesser black-backed gull	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-20	0	0	0	0	0	0	0	0
May S01 20	0	0	0.01	8	0	23	8	92.26%
May S02 20	0	0	0	0	0	0	0	0
Jun-20	0	0	0.01	17	0	40	12	71.31%
Jul-20	0.12	0.09	0.16	495	362	624	68	13.65%
Aug-20	0.02	0.01	0.05	88	24	182	42	47.16%
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	0.01	9	0	24	8	94.41%
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 9: Unapportioned density and population estimates of sitting common terns in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Common tern	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	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	0.01	10	0	24	9	91.53%
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 10: Unapportioned density and population estimates of sitting Arctic terns in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Arctic tern	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0	0.01	8	0	25	8	99.61%
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	0.01	8	0	25	8	101.31%
Jul-20	0.01	0	0.02	34	0	96	32	94.4%
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	0.02	0	0.05	66	0	191	61	92.97%

Table 11: Unapportioned density and population estimates of sitting great skuas in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Great skua	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0.01	9	0	25	8	93.11%
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

Sitting Great skua	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
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	0.01	8	0	24	8	96.95%
Jul-20	0	0	0	0	0	0	0	0
Aug-20	0	0	0.01	8	0	24	8	99.77%
Sep-20	0	0	0.01	9	0	24	9	95.37%
Oct-20	0	0	0.01	9	0	24	9	97.25%
Nov-20	0.01	0	0.01	26	0	56	14	54.27%
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 12: Unapportioned density and population estimates of sitting little auks in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Little auk	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-19	0	0	0.01	13	0	31	8	63.55%
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	0.01	8	0	24	8	100.1%
Nov-19	0.01	0	0.03	54	0	126	33	61.07%
Dec-19	0	0	0.01	16	0	37	10	64.14%
Jan-20	0.03	0.01	0.05	128	57	211	40	31.46%
Feb-20	0.03	0.01	0.05	111	28	210	49	43.83%
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	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	0.01	0.01	0.03	58	24	104	22	36.9%
Dec-20	0.14	0.09	0.21	574	344	848	133	23.08%
Jan-21	0.09	0.06	0.12	353	231	496	69	19.51%
Feb-21	0.01	0	0.03	49	8	106	27	55.59%
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 sitting guillemots in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Guillemot	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-19	4.92	3.71	6.18	19550	14762	24599	2625	13.43%
May-19	18.51	15.37	22.17	73604	61118	88194	6842	9.3%
Jun-19	3.8	2.89	4.83	15115	11497	19216	2013	13.31%
Jul-19	17.32	13.07	21.84	68888	51982	86846	8615	12.51%
Aug-19	29.09	19.26	39.77	115693	76606	158187	20619	17.82%
Sep-19	3.6	3.07	4.28	14326	12206	17004	1187	8.28%
Oct-19	4.18	2.12	6.84	16626	8446	27193	5005	30.1%
Nov-19	1.3	0.88	1.91	5161	3482	7582	1069	20.7%
Dec-19	2.62	1.51	3.95	10423	5998	15715	2466	23.66%
Jan-20	8.43	6.18	10.85	33546	24564	43173	4808	14.33%
Feb-20	4.8	3.77	5.84	19078	15003	23247	2165	11.34%
Mar-20	15.15	11.24	18.94	60241	44688	75345	7557	12.54%
May S01 20	21.68	17.66	25.51	86216	70233	101459	7997	9.27%
May S02 20	16.94	13.9	20.26	67384	55277	80583	6561	9.74%
Jun-20	20.49	17.44	23.35	81509	69363	92887	5826	7.15%
Jul-20	7.05	5.79	8.44	28059	23036	33566	2620	9.33%
Aug-20	23.73	20.2	27.27	94370	80323	108448	7641	8.1%
Sep-20	34.42	26.01	43.94	136883	103435	174743	17918	13.09%
Oct-20	7.64	4.31	10.98	30380	17146	43663	6865	22.6%
Nov-20	5.59	3.41	7.81	22219	13567	31060	4297	19.34%
Dec-20	13.51	10.34	17.38	53729	41123	69106	7214	13.43%
Jan-21	6.66	5.83	7.54	26501	23207	29993	1806	6.81%
Feb-21	3.15	2.47	3.95	12534	9810	15694	1563	12.46%
Apr S01 21	17.6	14.32	21.21	69994	56962	84367	7227	10.32%
Apr S02 21	44.68	34.73	55.7	177723	138124	221537	21480	12.09%

Table 14: Unapportioned density and population estimates of sitting razorbills in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Razorbill	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-19	0.73	0.52	0.99	2900	2049	3930	477	16.43%
May-19	1.02	0.83	1.22	4054	3292	4844	420	10.36%
Jun-19	0.23	0.14	0.34	920	551	1336	209	22.68%
Jul-19	1.6	0.83	2.46	6378	3300	9781	1644	25.77%
Aug-19	1.85	1.27	2.53	7354	5046	10072	1314	17.86%
Sep-19	1.03	0.82	1.26	4102	3279	4994	428	10.43%
Oct-19	2.02	0.97	3.39	8016	3872	13484	2521	31.45%
Nov-19	0.3	0.07	0.61	1203	270	2411	583	48.48%
Dec-19	0.55	0.31	0.87	2197	1222	3477	580	26.39%
Jan-20	0.91	0.61	1.31	3633	2439	5203	690	18.98%
Feb-20	0.57	0.4	0.73	2260	1585	2919	353	15.6%

Sitting Razorbill	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-20	2.82	2.01	3.72	11200	8003	14779	1848	16.49%
May S01 20	0.9	0.64	1.17	3577	2551	4665	537	15%
May S02 20	0.63	0.42	0.89	2510	1669	3535	483	19.24%
Jun-20	0.55	0.43	0.69	2188	1695	2727	271	12.36%
Jul-20	1.4	0.97	1.87	5570	3841	7423	928	16.65%
Aug-20	2.42	1.81	3.09	9641	7183	12291	1294	13.41%
Sep-20	10.79	7.29	14.49	42910	29012	57643	7295	17%
Oct-20	0.75	0.38	1.21	2990	1509	4803	817	27.33%
Nov-20	0.28	0.17	0.38	1110	674	1519	219	19.68%
Dec-20	0.9	0.56	1.29	3598	2242	5135	734	20.4%
Jan-21	1.86	1.38	2.39	7378	5500	9522	1018	13.79%
Feb-21	0.62	0.43	0.83	2477	1728	3294	410	16.54%
Apr S01 21	2.33	1.7	3.03	9262	6758	12068	1413	15.26%
Apr S02 21	1.13	0.94	1.34	4508	3730	5340	402	8.91%

Table 15: Unapportioned density and population estimates of sitting puffins in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Puffin	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-19	0.99	0.74	1.24	3921	2950	4924	488	12.45%
May-19	1.39	1.21	1.58	5547	4819	6277	390	7.01%
Jun-19	1.03	0.5	1.71	4098	1990	6783	1202	29.32%
Jul-19	2.21	1.55	2.97	8803	6156	11806	1453	16.5%
Aug-19	1.72	1.25	2.21	6850	4964	8788	1017	14.83%
Sep-19	0.77	0.49	1.09	3057	1946	4343	609	19.9%
Oct-19	0.18	0.11	0.26	715	448	1053	160	22.31%
Nov-19	0.02	0	0.03	70	16	133	32	45.03%
Dec-19	0	0	0	0	0	0	0	0
Jan-20	0.02	0	0.03	60	17	111	25	41.37%
Feb-20	0.04	0.02	0.06	167	95	247	40	23.86%
Mar-20	0.28	0.16	0.4	1098	652	1588	246	22.35%
May S01 20	0.75	0.51	1.02	2997	2019	4044	524	17.48%
May S02 20	0.27	0.21	0.35	1094	850	1375	132	12.05%
Jun-20	0.37	0.26	0.49	1473	1054	1939	229	15.49%
Jul-20	0.96	0.58	1.42	3832	2325	5645	859	22.4%
Aug-20	1.25	0.99	1.49	4963	3958	5907	515	10.36%
Sep-20	6.61	5.53	7.72	26280	21978	30697	2145	8.16%
Oct-20	0.09	0.06	0.12	339	225	468	64	18.85%
Nov-20	0.1	0.06	0.15	394	231	595	92	23.27%
Dec-20	0.01	0.01	0.02	56	24	96	20	34.93%
Jan-21	0.02	0.01	0.03	63	24	120	25	38.76%
Feb-21	0.19	0.11	0.3	748	441	1180	196	26.1%
Apr S01 21	0.84	0.52	1.23	3358	2084	4888	740	22.03%
Apr S02 21	2.52	1.98	3.1	10012	7861	12327	1150	11.48%

Table 16: Unapportioned density and population estimates of sitting red-throated divers in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Red-throated diver	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0.01	0	0.02	41	8	80	20	48.87%
Jun-19	0	0	0.01	16	0	40	11	68.36%
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	0.01	8	0	25	8	98.04%
Nov-19	0	0	0.01	8	0	24	8	98.49%
Dec-19	0	0	0	0	0	0	0	0
Jan-20	0	0	0	0	0	0	0	0
Feb-20	0	0	0.01	8	0	24	8	98.2%
Mar-20	0	0	0	0	0	0	0	0
May S01 20	0	0	0	0	0	0	0	0
May S02 20	0.01	0	0.02	32	0	72	19	57.11%
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	0.05	94	16	201	51	53.38%
Dec-20	0.01	0	0.02	32	0	72	19	59.09%
Jan-21	0.01	0	0.02	32	0	86	26	79.18%
Feb-21	0	0	0.01	9	0	24	9	101.23%
Apr S01 21	0	0	0	0	0	0	0	0
Apr S02 21	0	0	0.01	9	0	24	8	94.29%

Table 17: Unapportioned density and population estimates of sitting fulmars in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Fulmar	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0.01	0	0.02	41	8	80	20	48.87%
Jun-19	0	0	0.01	16	0	40	11	68.36%
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	0.01	8	0	25	8	98.04%
Nov-19	0	0	0.01	8	0	24	8	98.49%
Dec-19	0	0	0	0	0	0	0	0
Jan-20	0	0	0	0	0	0	0	0
Feb-20	0	0	0.01	8	0	24	8	98.2%
Mar-20	0	0	0	0	0	0	0	0

Sitting Fulmar	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
May S01 20	0	0	0	0	0	0	0	0
May S02 20	0.01	0	0.02	32	0	72	19	57.11%
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	0.05	94	16	201	51	53.38%
Dec-20	0.01	0	0.02	32	0	72	19	59.09%
Jan-21	0.01	0	0.02	32	0	86	26	79.18%
Feb-21	0	0	0.01	9	0	24	9	101.23%
Apr S01 21	0	0	0	0	0	0	0	0
Apr S02 21	0	0	0.01	9	0	24	8	94.29%

Table 18: Unapportioned density and population estimates of sitting Manx shearwaters in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Manx shearwater	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	0	0	0	0	0	0	0
Sep-19	0.01	0	0.02	25	0	72	24	96.77%
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	0.01	16	0	40	12	70.73%
Jul-20	0.01	0	0.02	33	0	96	32	96.26%
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 19: Unapportioned density and population estimates of sitting gannets in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Gannet	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
Mar-19	0.05	0.02	0.1	216	73	406	88	40.55%
May-19	0.13	0.08	0.2	522	304	779	123	23.44%
Jun-19	0.49	0.4	0.59	1941	1577	2357	203	10.42%
Jul-19	1.46	1.21	1.71	5790	4809	6786	521	8.99%
Aug-19	2.09	1.62	2.69	8304	6441	10713	1089	13.11%
Sep-19	0.3	0.24	0.37	1201	957	1453	133	11.03%
Oct-19	0.65	0.32	1.15	2576	1281	4566	893	34.67%
Nov-19	0.13	0.03	0.26	529	128	1015	233	43.98%
Dec-19	0.02	0	0.06	61	0	230	63	103.18%
Jan-20	0	0	0	0	0	0	0	0
Feb-20	0	0	0.01	9	0	24	8	93.64%
Mar-20	0.03	0.01	0.05	110	41	206	44	39.67%
May S01 20	0.09	0.05	0.14	356	188	546	93	25.98%
May S02 20	0.15	0.11	0.2	614	432	816	97	15.67%
Jun-20	0.18	0.11	0.26	716	430	1030	158	22.06%
Jul-20	1.61	1.32	1.89	6396	5255	7498	582	9.1%
Aug-20	1.1	0.84	1.37	4368	3357	5455	532	12.16%
Sep-20	0.58	0.41	0.77	2307	1615	3060	385	16.67%
Oct-20	0.52	0.38	0.72	2087	1525	2874	342	16.36%
Nov-20	0.51	0.35	0.69	2014	1395	2752	353	17.51%
Dec-20	0.24	0.1	0.38	942	411	1530	297	31.51%
Jan-21	0.05	0.02	0.09	209	71	366	77	36.81%
Feb-21	0.03	0	0.06	109	8	256	64	58.09%
Apr S01 21	0.12	0.06	0.19	495	250	775	142	28.59%
Apr S02 21	0.61	0.25	1.06	2416	983	4223	820	33.91%

Sitting Shag	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	Population Estimate (number)	Lower 95% CI (number)	Upper 95% CI (number)	SD	CV
Survey								
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	0.01	8	0	24	8	95.96%
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 20: Unapportioned density and population estimates of sitting shags in the Offshore Ornithology Study Area, calculated using design-based analysis

Sitting Shag	Density Estimate (birds/km ²)	Lower 95% CI (birds/km ²)	Upper 95% CI (birds/km ²)	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	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

