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Volume 7B Proposed Development (Offshore) Appendices

Appendix 6-1 Offshore Ornithology Baseline Characterisation Report Annex 5 Model-based and Design-based Density and Abundance Estimates of Birds in Flight (Caledonia North)

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Volume 7B Appendix 6-1 Annex 5 Model-based and Design-based Density and Abundance Estimates of Birds in Flight (Caledonia North)

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Acronyms and Abbreviations

CV	Coefficient of Variation
DAS	Digital Aerial Survey
LCI	Lower Confidence Interval
OWF	Offshore Wind Farm
UCI	Upper Confidence Interval

1 Introduction

- 1.1.1.1 This annex provides the design-based density and abundance estimates for in flight in the Caledonia Offshore Wind Farm (OWF), specifically the Caledonia North Site, and relevant buffers (2km and 4km). The tables provide both the unapportioned, and apportioned estimates. Model-based density and abundance estimates for kittiwake in flight recorded in the Caledonia North Site have also been provided. For the full justification see Volume 7B, Appendix 6-1: Offshore Ornithology Baseline Characterisation Report
- 1.1.1.2 For each species recorded within the 24-month Digital Aerial Survey (DAS) the raw count, abundance estimate (number of birds), lower and upper confidence intervals (LCI and UCI), density (birds/km²) and the Coefficient of Variation (CV) as a measure of precision.
- 1.1.1.3 As per the NatureScot guidance (NatureScot, 2023¹), tables on species abundance and density have been ordered first by taxonomic species groupings, then by most abundant species within each grouping.

2 Species Accounts

2.1 Wildfowl

2.1.1 Unidentified species

Unidentified wader species

2.1.1.1 The density and population estimates of unidentified wader species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-1.

Table 2-1: Density and population estimate of Unidentified wader species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
<i>None recorded</i>						
Caledonia North (+2km)						
<i>None recorded</i>						
Caledonia North (+4km)						
Jun-22	1	6	1	17	0.01	1.00

2.1.2 Pink-footed goose

2.1.2.1 The density and population estimates of pink-footed goose in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-2.

Table 2-2: Density and population estimates of pink-footed geese in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis. No apportionment required for this species.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Jan-23	1	6	1	17	0.03	1.00
Caledonia North (+2km)						
Jan-23	1	6	1	18	0.02	1.00
Caledonia North (+4km)						
Jan-23	1	6	1	18	0.01	1.00

2.1.3 Mallard

2.1.3.1 No mallard in flight were recorded in Caledonia North.

2.2 Laridae

2.2.1 Unidentified species

Unidentified black-backed gull species

2.2.1.1 The density and population estimates of unidentified black backed gull species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-3.

Table 2-3: Density and population estimate of unidentified black backed gull species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
<i>None recorded</i>						
Caledonia North (+2km)						
Nov-21	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
Nov-21	1	6	1	18	0.01	1.00

Unidentified large gull species

2.2.1.2 The density and population estimates of unidentified large gull species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-4.

Table 2-4: Density and population estimate of unidentified large gull species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
<i>None recorded</i>						
Caledonia North (+2km)						
Nov-21	2	11	2	34	0.03	0.71
Caledonia North (+4km)						
Nov-21	2	12	2	35	0.02	0.71

Unidentified gull species

2.2.1.3 No unidentified gull species in flight were recorded in Caledonia North.

Unidentified fulmar and/or gull species

2.2.1.4 The density and population estimates of unidentified fulmar and/or gull species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-5.

Table 2-5: Density and population estimate of unidentified fulmar and/or gull species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
<i>None recorded</i>						
Caledonia North (+2km)						
<i>None recorded</i>						
Caledonia North (+4km)						
Nov-22	1	6	1	18	0.01	1.00
Mar-23	1	6	1	18	0.01	1.00

2.2.2 Kittiwake

2.2.2.1 The density and population estimates of kittiwake in Caledonia North (plus the 2km buffer and plus the 4km buffer), calculated using model-based analysis for the breeding season (Mid-April to August) and design-based analysis for the non-breeding season (September to mid-April) have been presented in Table 2-6 and Table 2-7.

2.2.2.2 Table 2-6 includes the unapportioned density and population estimates of kittiwakes, and Table 2-7 includes the apportioned density and population estimates of kittiwakes.

2.2.2.3 Table 2-7 presents the density and population estimates of kittiwake in Caledonia North (plus the 2km buffer and plus the 4km buffer), calculated using design-based analysis.

Table 2-6: Unapportioned density and population estimate of kittiwake in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using model-based analysis for the breeding season (Mid-April to August) and design-based analysis for the non-breeding season (September to mid-April)..

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
May-21	44	114	75	174	0.52	0.20
Jun-21	21	119	67	211	0.55	0.32
Jul-21	21	472	197	1,124	2.12	0.44
Aug-21	22	235	112	510	1.06	0.37
Sep-21	5	29	6	58	0.13	0.45
Oct-21	16	93	23	181	0.43	0.25
Nov-21	61	357	199	567	1.64	0.13
Dec-21	5	29	5	64	0.13	0.45
Jan-22	5	29	12	52	0.13	0.45
Feb-22	4	22	5	43	0.10	0.5
Mar-22	9	48	16	91	0.22	0.33
Apr-22	13	61	41	95	0.28	0.23
May-22	66	588	288	1,203	2.77	0.40
Jun-22	89	454	227	1,024	2.26	0.41
Jul-22	28	283	147	534	1.41	0.35
Aug-22	29	154	100	238	0.71	0.24
Sep-22	10	57	11	138	0.26	0.32
Oct-22	1	6	1	17	0.03	1.00
Nov-22	4	24	6	47	0.11	0.5
Jan-23	1	6	1	17	0.03	1.00
Feb-23	5	29	5	75	0.13	0.45
Mar-23	1	6	1	18	0.03	1.00
Apr-23	7	93	32	293	0.42	0.65

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North (+2km)						
May-21	56	198	130	305	0.54	0.21
Jun-21	36	228	130	406	0.64	0.33
Jul-21	55	787	338	1,845	2.13	0.44
Aug-21	50	393	192	823	1.06	0.36
Sep-21	13	74	28	131	0.2	0.28
Oct-21	31	177	86	280	0.47	0.18
Nov-21	89	508	297	770	1.35	0.11
Dec-21	15	85	40	125	0.23	0.26
Jan-22	5	28	6	51	0.07	0.45
Feb-22	4	21	5	48	0.06	0.50
Mar-22	12	64	21	117	0.17	0.29
Apr-22	22	103	67	162	0.28	0.24
May-22	192	846	410	1,760	2.18	0.42
Jun-22	130	762	389	1,680	2.06	0.41
Jul-22	84	571	314	1,026	1.64	0.34
Aug-22	49	256	164	403	0.69	0.25
Sep-22	15	87	29	168	0.23	0.26
Oct-22	2	12	2	29	0.03	0.71
Nov-22	7	40	7	92	0.11	0.38
Dec-22	1	6	1	18	0.02	1.00
Jan-23	2	12	2	29	0.03	0.71
Feb-23	6	34	6	86	0.09	0.41
Mar-23	3	17	6	35	0.05	0.58
Apr-23	9	155	50	511	0.42	0.68

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North (+4km)						
May-21	74	333	214	521	0.63	0.22
Jun-21	78	434	243	787	0.85	0.33
Jul-21	118	1,282	546	3,042	2.40	0.44
Aug-21	66	642	310	1,359	1.20	0.36
Sep-21	14	82	35	140	0.15	0.27
Oct-21	47	275	129	438	0.49	0.15
Nov-21	130	759	490	1,092	1.36	0.09
Dec-21	17	99	47	151	0.18	0.24
Jan-22	7	41	12	69	0.07	0.38
Feb-22	6	33	11	66	0.06	0.41
Mar-22	30	162	76	259	0.29	0.18
Apr-22	34	168	107	265	0.32	0.24
May-22	217	1,148	546	2,452	2.06	0.43
Jun-22	212	1,250	655	2,688	2.35	0.41
Jul-22	232	1,150	639	2,063	2.29	0.33
Aug-22	64	410	257	652	0.76	0.25
Sep-22	20	116	35	204	0.21	0.22
Oct-22	3	18	3	35	0.03	0.58
Nov-22	9	53	9	118	0.10	0.33
Dec-22	4	24	4	65	0.04	0.50
Jan-23	4	24	4	47	0.04	0.50
Feb-23	11	64	23	116	0.11	0.30
Mar-23	5	29	6	59	0.05	0.45
Apr-23	9	253	79	858	0.47	0.69

Table 2-7: Apportioned density and population estimate of kittiwake in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
May-21	257	93	478	1.18
Jun-21	124	41	219	0.57
Jul-21	124	47	213	0.57
Aug-21	127	64	185	0.58
Sep-21	29	6	58	0.13
Oct-21	93	23	181	0.43
Nov-21	357	199	567	1.63
Dec-21	29	5	64	0.13
Jan-22	29	12	52	0.13
Feb-22	22	5	43	0.10
Mar-22	48	16	91	0.22
Apr-22	75	34	126	0.34
May-22	383	162	627	1.75
Jun-22	507	131	1168	2.32
Jul-22	164	76	263	0.75
Aug-22	167	81	271	0.76
Sep-22	57	11	138	0.26
Oct-22	6	1	17	0.03
Nov-22	24	6	47	0.11
Jan-23	6	1	17	0.03
Feb-23	29	5	75	0.13
Mar-23	6	1	18	0.03
Apr-23	39	11	73	0.18

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North (+2km)				
May-21	320	143	589	0.85
Jun-21	208	87	388	0.55
Jul-21	317	138	519	0.84
Aug-21	284	216	369	0.76
Sep-21	74	28	131	0.20
Oct-21	177	86	280	0.47
Nov-21	508	297	770	1.35
Dec-21	85	40	125	0.23
Jan-22	28	6	51	0.07
Feb-22	21	5	48	0.06
Mar-22	64	21	117	0.17
Apr-22	124	56	197	0.33
May-22	1,093	427	2,044	2.91
Jun-22	750	312	1,471	2.00
Jul-22	481	292	721	1.28
Aug-22	280	149	418	0.75
Sep-22	87	29	168	0.23
Oct-22	12	2	29	0.03
Nov-22	40	7	92	0.11
Dec-22	6	1	18	0.02
Jan-23	12	2	29	0.03
Feb-23	34	6	86	0.09
Mar-23	17	6	35	0.05
Apr-23	51	17	86	0.14

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North (+4km)				
May-21	433	234	685	0.78
Jun-21	461	183	763	0.83
Jul-21	715	279	1472	1.28
Aug-21	383	279	493	0.69
Sep-21	82	35	140	0.15
Oct-21	275	129	438	0.49
Nov-21	759	490	1,092	1.36
Dec-21	99	47	151	0.18
Jan-22	41	12	69	0.07
Feb-22	33	11	66	0.06
Mar-22	162	76	259	0.29
Apr-22	196	121	271	0.35
May-22	1,262	483	2,378	2.26
Jun-22	1,225	647	1,930	2.20
Jul-22	1,358	533	2,716	2.44
Aug-22	366	195	555	0.66
Sep-22	116	35	204	0.21
Oct-22	18	3	35	0.03
Nov-22	53	9	119	0.10
Dec-22	24	4	65	0.04
Jan-23	24	4	47	0.04
Feb-23	64	23	116	0.11
Mar-23	30	6	62	0.05
Apr-23	52	17	92	0.09

2.2.3 Great black-backed gull

2.2.3.1 The density and population estimates of great black-backed gull in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-8 and Table 2-9.

2.2.3.2 Table 2-8 includes the unapportioned density and population estimates of great black-backed gull, and Table 2-9 includes the apportioned density and population estimates of great black-backed gull.

Table 2-8: Unapportioned density and population estimate of great black-backed gull in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Sep-21	4	23	4	70	0.11	0.50
Nov-21	6	35	12	58	0.16	0.41
Dec-21	2	12	2	35	0.05	0.71
Jan-22	3	17	6	35	0.08	0.58
Feb-22	4	22	5	43	0.10	0.50
Sep-22	2	11	2	23	0.05	0.71
Oct-22	2	12	2	23	0.05	0.71
Nov-22	3	18	3	41	0.08	0.58
Dec-22	1	6	1	17	0.03	1.00
Jan-23	8	46	17	75	0.21	0.35
Caledonia North (+2km)						
Sep-21	5	28	5	85	0.07	0.45
Nov-21	8	46	11	86	0.12	0.35
Dec-21	3	17	3	40	0.05	0.58
Jan-22	7	40	17	62	0.11	0.38
Feb-22	8	43	11	86	0.11	0.35
Mar-22	1	5	1	16	0.01	1.00
Sep-22	4	23	6	41	0.06	0.50

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Oct-22	3	18	6	35	0.05	0.58
Nov-22	7	40	17	63	0.11	0.38
Dec-22	4	24	4	47	0.06	0.50
Jan-23	10	59	23	94	0.16	0.32
Feb-23	2	11	2	29	0.03	0.71
Mar-23	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
Sep-21	8	47	8	111	0.08	0.35
Nov-21	13	76	23	128	0.14	0.28
Dec-21	5	29	6	52	0.05	0.45
Jan-22	9	52	29	75	0.09	0.33
Feb-22	9	50	11	99	0.09	0.33
Mar-22	2	11	2	27	0.02	0.71
Sep-22	4	23	6	41	0.04	0.50
Oct-22	3	18	3	35	0.03	0.58
Nov-22	9	53	24	83	0.10	0.33
Dec-22	11	65	24	112	0.12	0.30
Jan-23	11	65	29	100	0.12	0.30
Feb-23	5	29	12	46	0.05	0.45
Mar-23	1	6	1	18	0.01	1.00

Table 2-9: Apportioned density and population estimate of great black-backed gull in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
Sep-21	23	4	70	0.11
Nov-21	35	12	58	0.16
Dec-21	12	2	35	0.05
Jan-22	17	6	35	0.08
Feb-22	22	5	43	0.10
Sep-22	11	2	23	0.05
Oct-22	12	2	23	0.05
Nov-22	18	3	41	0.08
Dec-22	6	1	17	0.03
Jan-23	46	17	75	0.21
Caledonia North (+2km)				
Sep-21	28	5	85	0.07
Nov-21	63	14	137	0.17
Dec-21	17	3	40	0.05
Jan-22	40	17	62	0.11
Feb-22	43	11	86	0.11
Mar-22	5	1	16	0.01
Sep-22	23	6	41	0.06
Oct-22	18	6	35	0.05
Nov-22	40	17	63	0.11
Dec-22	24	4	47	0.06
Jan-23	59	23	94	0.16
Feb-23	11	2	29	0.03

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Mar-23	6	1	17	0.02
Caledonia North (+4km)				
Sep-21	47	8	111	0.08
Nov-21	94	26	181	0.17
Dec-21	29	6	52	0.05
Jan-22	52	29	75	0.09
Feb-22	50	11	99	0.09
Mar-22	11	2	27	0.02
Sep-22	23	6	41	0.04
Oct-22	18	3	35	0.03
Nov-22	53	24	84	0.10
Dec-22	65	24	112	0.12
Jan-23	65	29	100	0.12
Feb-23	29	12	46	0.05
Mar-23	6	1	19	0.01

2.2.4 Herring gull

2.2.4.1 The density and population estimates of herring gull in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-10 and Table 2-11.

2.2.4.2 Table 2-10 includes the unapportioned density and population estimates of herring gull, and Table 2-11 includes the apportioned density and population estimates of herring gull.

Table 2-10: Unapportioned density and population estimate of herring gull in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Sep-21	1	6	1	17	0.03	1.00
Oct-21	1	6	1	18	0.03	1.00
Dec-21	2	12	2	23	0.05	0.71
Dec-22	1	6	1	17	0.03	1.00
Caledonia North (+2km)						
Sep-21	1	6	1	17	0.02	1.00
Oct-21	1	6	1	17	0.02	1.00
Dec-21	2	11	2	28	0.03	0.71
Dec-22	2	12	2	29	0.03	0.71
Caledonia North (+4km)						
Sep-21	1	6	1	18	0.01	1.00
Oct-21	1	6	1	18	0.01	1.00
Dec-21	2	12	2	29	0.02	0.71
Jun-22	1	6	1	17	0.01	1.00
Jul-22	9	53	9	158	0.10	0.33
Dec-22	3	18	3	35	0.03	0.58

Table 2-11: Apportioned density and population estimate of herring gull in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
Sep-21	6	1	17	0.03
Oct-21	6	1	18	0.03
Dec-21	12	2	23	0.05
Dec-22	6	1	17	0.03
Caledonia North (+2km)				
Sep-21	6	1	17	0.02
Oct-21	6	1	17	0.02
Dec-21	11	2	28	0.03
Dec-22	12	2	29	0.03
Caledonia North (+4km)				
Sep-21	6	1	18	0.01
Oct-21	6	1	18	0.01
Dec-21	12	2	29	0.02
Jun-22	6	1	17	0.01
Jul-22	53	9	158	0.10
Dec-22	18	3	35	0.03

2.2.5 Common gull

2.2.5.1 The density and population estimates of common gull in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-12 and Table 2-13.

2.2.5.2 Table 2-12 includes the unapportioned density and population estimates of common gull, and Table 2-13 includes the apportioned density and population estimates of common gull.

Table 2-12: Unapportioned density and population estimate of common gull in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Aug-22	2	12	2	35	0.05	0.71
Dec-22	1	6	1	17	0.03	1.00
Caledonia North (+2km)						
Sep-21	2	11	2	34	0.03	0.71
Aug-22	2	11	2	34	0.03	0.71
Dec-22	2	12	2	29	0.03	0.71
Caledonia North (+4km)						
Sep-21	2	12	2	35	0.02	0.71
Nov-21	1	6	1	18	0.01	1.00
Aug-22	2	11	2	34	0.02	0.71
Dec-22	2	12	2	29	0.02	0.71

Table 2-13: Apportioned density and population estimate of common gull in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
Aug-22	12	2	35	0.05
Dec-22	6	1	17	0.03
Caledonia North (+2km)				
Sep-21	11	2	34	0.03
Aug-22	11	2	34	0.03
Dec-22	12	2	29	0.03
Caledonia North (+4km)				
Sep-21	12	2	35	0.02
Nov-21	6	1	18	0.01
Aug-22	11	2	34	0.02
Dec-22	12	2	29	0.02

2.2.6 Lesser black-backed gull

2.2.6.1 The density and population estimates of lesser black-backed gull in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-14 and Table 2-15.

2.2.6.2 Table 2-14 includes the unapportioned density and population estimates of lesser black-backed gull, and Table 2-15 includes the apportioned density and population estimates of lesser black-backed gull.

Table 2-14: Unapportioned density and population estimate of lesser black-backed gull in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Jun-22	2	11	2	34	0.05	0.71
Caledonia North (+2km)						
Jun-22	2	12	2	35	0.03	0.71
Caledonia North (+4km)						
May-22	1	6	1	17	0.01	1.00
Jun-22	2	12	2	35	0.02	0.71

Table 2-15: Apportioned density and population estimate of lesser black-backed gull in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
Jun-22	11	2	34	0.05
Caledonia North (+2km)				
Jun-22	12	2	35	0.03
Caledonia North (+4km)				
May-22	6	1	17	0.01
Jun-22	12	2	35	0.02

2.3 Sterninae

2.3.1 Unidentified species

Commic tern

2.3.1.1 The density and population estimates of commic tern in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-16.

Table 2-16: Density and population estimate of unidentified commic tern species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Aug-21	2	12	2	35	0.05	0.71
May-22	2	12	2	35	0.05	0.71
Aug-22	1	6	1	17	0.03	1.00
Caledonia North (+2km)						
Aug-21	2	11	2	34	0.03	0.71
May-22	2	11	2	34	0.03	0.71
Aug-22	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
Aug-21	2	12	2	35	0.02	0.71
May-22	2	12	2	35	0.02	0.71
Aug-22	1	6	1	17	0.01	1.00

Unidentified tern species

2.3.1.2 No unidentified tern species in flight were recorded in Caledonia North.

2.3.2 Common tern

2.3.2.1 The density and population estimates of common tern in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-17 and Table 2-18.

2.3.2.2 Table 2-17 includes the unapportioned density and population estimates of common tern, and Table 2-18 includes the apportioned density and population estimates of common tern.

Table 2-17: Unapportioned density and population estimate of common tern in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Aug-21	3	17	3	52	0.08	0.58
Caledonia North (+2km)						
Aug-21	3	17	3	51	0.05	0.58
Caledonia North (+4km)						
Aug-21	3	17	3	52	0.03	0.58

Table 2-18: Apportioned density and population estimate of common tern in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
Aug-21	29	5	87	0.13
Aug-22	6	1	17	0.03
Caledonia North (+2km)				
Aug-21	28	5	85	0.07
Aug-22	6	1	17	0.02
Caledonia North (+4km)				
Aug-21	29	5	87	0.13
Aug-22	6	1	17	0.03

2.3.3 Arctic tern

2.3.3.1 The density and population estimates of Arctic tern in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-19 and Table 2-20.

2.3.3.2 Table 2-19 includes the unapportioned density and population estimates of Arctic tern, and Table 2-20 includes the apportioned density and population estimates of Arctic tern.

Table 2-19: Unapportioned density and population estimate of Arctic tern in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
<i>None recorded</i>						
Caledonia North (+2km)						
May-21	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
May-21	3	18	3	41	0.03	0.58

Table 2-20: Apportioned density and population estimate of Arctic tern in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
May-22	12	2	35	0.05
Caledonia North (+2km)				
May-21	6	1	17	0.02
May-22	11	2	34	0.03
Caledonia North (+4km)				
May-21	18	3	41	0.03
May-22	12	2	35	0.02

2.4 Stercorariidae

2.4.1 Great skua

2.4.1.1 The density and population estimates of great skua in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-21 and Table 2-22.

2.4.1.2 Table 2-21 includes the unapportioned density and population estimates of great skua, and Table 2-22 includes the apportioned density and population estimates of great skua.

Table 2-21: Unapportioned density and population estimate of great skua in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
May-21	1	6	1	17	0.03	1.00
Jun-21	1	6	1	18	0.03	1.00
Jul-21	1	6	1	18	0.03	1.00
Aug-21	3	17	3	41	0.08	0.58
Caledonia North (+2km)						
May-21	1	6	1	17	0.02	1.00
Jun-21	1	6	1	17	0.02	1.00
Jul-21	1	6	1	17	0.02	1.00
Aug-21	4	23	4	57	0.06	0.50
Caledonia North (+4km)						
May-21	1	6	1	18	0.01	1.00
Jun-21	1	6	1	18	0.01	1.00
Jul-21	3	18	3	36	0.03	0.58
Aug-21	6	35	6	75	0.06	0.41
Aug-22	1	6	1	18	0.01	1.00

Table 2-22: Apportioned density and population estimate of great skua in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
May-21	6	1	17	0.03
Jun-21	6	1	18	0.03
Jul-21	6	1	18	0.03
Aug-21	17	3	41	0.08
Caledonia North (+2km)				
May-21	6	1	17	0.02
Jun-21	6	1	17	0.02
Jul-21	6	1	17	0.02
Aug-21	23	4	57	0.06
Caledonia North (+4km)				
May-21	6	1	18	0.01
Jun-21	6	1	18	0.01
Jul-21	18	3	36	0.03
Aug-21	35	6	75	0.06
Aug-22	6	1	18	0.01

2.4.2 Arctic skua

2.4.2.1 The density and population estimates of Arctic skua in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-23 and Table 2-24.

2.4.2.2 Table 2-23 includes the unapportioned density and population estimates of Arctic skua, and Table 2-24 includes the apportioned density and population estimates of Arctic skua.

Table 2-23: Unapportioned density and population estimate of Arctic skua in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Aug-22	1	6	1	17	0.03	1.00
Caledonia North (+2km)						
Aug-22	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
Aug-22	1	6	1	17	0.01	1.00

Table 2-24: Apportioned density and population estimate of Arctic skua in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
Aug-22	6	1	17	0.03
Caledonia North (+2km)				
Aug-22	6	1	17	0.02
Caledonia North (+4km)				
Aug-22	6	1	17	0.01

2.5 Alcidae

2.5.1 Unidentified species

Unidentified guillemot and/or razorbill

2.5.1.1 The density and population estimates of unidentified guillemot and/or razorbill species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-25.

Table 2-25: Density and population estimate of unidentified guillemot and/or razorbill in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
May-21	1	6	1	17	0.03	1.00
Jun-21	2	12	2	30	0.05	0.71
Sep-21	2	12	2	35	0.05	0.71
Oct-21	9	53	9	123	0.24	0.33
Nov-21	3	18	3	53	0.08	0.58
Jan-22	4	23	4	69	0.11	0.50
Mar-22	2	11	2	32	0.05	0.71
Apr-22	1	6	1	17	0.03	1.00
Jul-22	1	6	1	18	0.03	1.00
Feb-23	3	17	3	40	0.08	0.58
Caledonia North (+2km)						
May-21	5	29	5	80	0.08	0.45
Jun-21	4	23	6	52	0.06	0.50
Sep-21	2	11	2	34	0.03	0.71
Oct-21	9	51	9	126	0.14	0.33
Nov-21	3	17	3	51	0.05	0.58
Jan-22	4	23	4	68	0.06	0.50

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Feb-22	1	5	1	16	0.01	1.00
Mar-22	2	11	2	32	0.03	0.71
Apr-22	1	6	1	17	0.02	1.00
Jul-22	3	17	6	34	0.05	0.58
Sep-22	1	6	1	17	0.02	1.00
Oct-22	28	164	28	435	0.44	0.19
Feb-23	3	17	3	46	0.05	0.58
Mar-23	2	12	2	35	0.03	0.71
Caledonia North (+4km)						
May-21	6	35	6	88	0.06	0.41
Jun-21	10	59	10	148	0.11	0.32
Sep-21	5	29	5	70	0.05	0.45
Oct-21	18	105	23	222	0.19	0.24
Nov-21	4	23	4	58	0.04	0.50
Dec-21	8	47	8	140	0.08	0.35
Jan-22	4	23	4	69	0.04	0.50
Feb-22	1	6	1	17	0.01	1.00
Mar-22	2	11	2	32	0.02	0.71
Apr-22	1	6	1	17	0.01	1.00
Jul-22	3	18	6	35	0.03	0.58
Sep-22	3	17	3	35	0.03	0.58
Oct-22	47	276	47	622	0.50	0.15
Nov-22	1	6	1	18	0.01	1.00
Feb-23	13	75	13	179	0.13	0.28
Mar-23	2	12	2	35	0.02	0.71

Unidentified auk species

2.5.1.2 The density and population estimates of unidentified auk species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-26.

Table 2-26: Density and population estimate of unidentified auk species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Jan-22	1	6	1	17	0.03	1.00
Caledonia North (+2km)						
Jan-22	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
Jan-22	1	6	1	17	0.01	1.00
Apr-22	1	6	1	17	0.01	1.00

Unidentified auks and/or shearwater species

2.5.1.3 The density and population estimates of unidentified auk and/or shearwater species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-27.

Table 2-27: Density and population estimate of unidentified auk and/or shearwater species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Jun-21	1	6	1	18	0.03	1.00
Caledonia North (+2km)						
May-21	1	6	1	17	0.02	1.00
Jun-21	1	6	1	17	0.02	1.00
Jul-21	1	6	1	17	0.02	1.00
Jun-22	2	12	2	35	0.03	0.71
Caledonia North (+4km)						
May-21	4	23	4	53	0.04	0.05
Jun-21	1	6	1	18	0.01	1.00
Jul-21	1	6	1	18	0.01	1.00
Jun-22	3	17	3	46	0.03	0.58

2.5.2 Common guillemot

2.5.2.1 The density and population estimates of common guillemot in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-28 and Table 2-29.

2.5.2.2 Table 2-28 includes the unapportioned density and population estimates of common guillemot, and Table 2-29 includes the apportioned density and population estimates of common guillemot.

Table 2-28: Unapportioned density and population estimate of common guillemot in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
May-21	34	198	64	356	0.91	0.17
Jun-21	34	201	124	272	0.92	0.17
Jul-21	118	699	314	1,184	3.20	0.09
Aug-21	7	41	12	75	0.19	0.38
Sep-21	1	6	1	17	0.03	1.00
Oct-21	4	23	4	70	0.11	0.50
Nov-21	2	12	2	23	0.05	0.71
Jan-22	1	6	1	17	0.03	1.00
Feb-22	1	5	1	16	0.02	1.00
Mar-22	13	69	13	144	0.32	0.28
Apr-22	54	310	86	580	1.42	0.14
May-22	48	279	145	424	1.28	0.14
Jun-22	56	319	80	666	1.46	0.13
Jul-22	62	363	176	562	1.66	0.13
Oct-22	1	6	1	17	0.03	1.00
Jan-23	1	6	1	17	0.03	1.00
Feb-23	93	536	190	922	2.46	0.10
Mar-23	14	82	18	182	0.38	0.27

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Apr-23	10	56	17	124	0.26	0.32
Caledonia North (+2km)						
May-21	53	303	114	561	0.81	0.14
Jun-21	52	301	168	429	0.80	0.14
Jul-21	190	1,095	600	1,620	2.92	0.07
Aug-21	11	62	23	108	0.17	0.30
Sep-21	6	34	6	97	0.09	0.41
Oct-21	8	46	8	114	0.12	0.35
Nov-21	2	11	2	29	0.03	0.71
Jan-22	2	11	2	34	0.03	0.71
Feb-22	2	11	2	27	0.03	0.71
Mar-22	20	106	32	186	0.28	0.22
Apr-22	75	421	180	714	1.12	0.12
May-22	58	330	165	518	0.88	0.13
Jun-22	105	606	237	1,084	1.61	0.10
Jul-22	139	796	441	1,225	2.12	0.08
Oct-22	18	106	18	294	0.28	0.24
Nov-22	1	6	1	17	0.02	1.00
Jan-23	1	6	1	18	0.02	1.00
Feb-23	127	724	325	1,158	1.93	0.09
Mar-23	18	104	23	226	0.28	0.24
Apr-23	18	103	46	177	0.27	0.24
Caledonia North (+4km)						
May-21	79	462	211	808	0.83	0.11
Jun-21	79	467	290	633	0.84	0.11

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Jul-21	229	1,387	696	2,083	2.49	0.07
Aug-21	16	93	46	139	0.17	0.25
Sep-21	6	35	6	99	0.06	0.41
Oct-21	8	47	8	117	0.08	0.35
Nov-21	4	23	4	53	0.04	0.50
Jan-22	3	17	3	41	0.03	0.58
Feb-22	8	44	8	88	0.08	0.35
Mar-22	28	151	49	275	0.27	0.19
Apr-22	99	570	276	886	1.02	0.10
May-22	78	454	244	674	0.81	0.11
Jun-22	166	959	329	1,832	1.72	0.08
Jul-22	193	1,130	656	1,633	2.03	0.07
Sep-22	1	6	1	17	0.01	1.00
Oct-22	18	106	18	294	0.19	0.24
Nov-22	1	6	1	18	0.01	1.00
Jan-23	6	35	12	65	0.06	0.41
Feb-23	143	826	335	1,444	1.48	0.08
Mar-23	23	135	53	258	0.24	0.21
Apr-23	47	269	137	424	0.48	0.15

Table 2-29: Apportioned density and population estimate of common guillemot in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
May-21	204	65	373	0.93
Jun-21	217	127	312	0.99
Jul-21	699	314	1,184	3.20
Aug-21	41	12	75	0.19
Sep-21	18	3	52	0.08
Oct-21	76	13	193	0.35
Nov-21	30	5	76	0.14
Jan-22	35	6	103	0.16
Feb-22	5	1	16	0.02
Mar-22	80	15	176	0.37
Apr-22	316	87	597	1.45
May-22	279	145	424	1.28
Jun-22	319	80	666	1.46
Jul-22	369	177	580	1.69
Oct-22	6	1	17	0.03
Jan-23	6	1	17	0.03
Feb-23	552	193	959	2.53
Mar-23	82	18	182	0.38
Apr-23	56	17	124	0.26
Caledonia North (+2km)				
May-21	338	120	658	0.90
Jun-21	327	175	487	0.87
Jul-21	1,101	601	1,637	2.93

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Aug-21	62	23	108	0.17
Sep-21	45	8	131	0.12
Oct-21	97	17	240	0.26
Nov-21	28	5	80	0.07
Jan-22	40	7	119	0.11
Feb-22	16	3	43	0.04
Mar-22	117	34	218	0.31
Apr-22	427	181	731	1.14
May-22	330	165	518	0.88
Jun-22	618	239	1,118	1.65
Jul-22	813	447	1,259	2.16
Oct-22	270	46	729	0.72
Nov-22	6	1	17	0.02
Jan-23	6	1	18	0.02
Feb-23	740	328	1,201	1.97
Mar-23	112	24	250	0.30
Apr-23	103	46	177	0.27
Caledonia North (+4km)				
May-21	520	221	949	0.93
Jun-21	527	301	778	0.95
Jul-21	1,393	697	21,00	2.50
Aug-21	93	46	139	0.17
Sep-21	64	11	169	0.11
Oct-21	152	31	339	0.27
Nov-21	46	8	111	0.08

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Dec-21	47	8	140	0.08
Jan-22	46	8	127	0.08
Feb-22	50	9	105	0.09
Mar-22	162	51	307	0.29
Apr-22	582	278	918	1.04
May-22	454	244	674	0.81
Jun-22	976	332	1,877	1.75
Jul-22	1,148	662	1,667	2.06
Sep-22	8	1	22	0.01
Oct-22	382	65	916	0.69
Nov-22	9	2	27	0.02
Jan-23	35	12	65	0.06
Feb-23	898	348	1,613	1.61
Mar-23	143	55	282	0.26
Apr-23	269	137	424	0.48

2.5.3 Razorbill

2.5.3.1 The density and population estimates of razorbill in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-30 and Table 2-31.

2.5.3.2 Table 2-30 includes the unapportioned density and population estimates of razorbill, and Table 2-31 includes the apportioned density and population estimates of razorbill.

Table 2-30: Unapportioned density and population estimate of razorbill in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Jun-21	4	24	6	47	0.11	0.50
May-22	2	12	2	35	0.05	0.71
Sep-22	1	6	1	17	0.03	1.00
Nov-22	1	6	1	18	0.03	1.00
Feb-23	5	29	5	63	0.13	0.45
Mar-23	2	12	2	35	0.05	0.71
Caledonia North (+2km)						
Jun-21	6	35	6	81	0.09	0.41
May-22	2	11	2	34	0.03	0.71
Jul-22	1	6	1	17	0.02	1.00
Sep-22	7	41	7	110	0.11	0.38
Nov-22	1	6	1	17	0.02	1.00
Jan-23	6	34	6	74	0.09	0.41
Feb-23	8	46	8	104	0.12	0.35
Mar-23	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
Jun-21	6	35	6	89	0.06	0.41
Jul-21	2	12	2	36	0.02	0.71

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Apr-22	4	23	4	58	0.04	0.50
May-22	2	12	2	35	0.02	0.71
Jun-22	2	12	2	35	0.02	0.71
Jul-22	2	12	2	29	0.02	0.71
Sep-22	7	41	7	111	0.07	0.38
Nov-22	1	6	1	18	0.01	1.00
Feb-23	7	40	7	81	0.07	0.38
Mar-23	10	59	12	117	0.11	0.32
Apr-23	4	23	4	46	0.04	0.50

Table 2-31: Apportioned density and population estimate of razorbill in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
Jun-21	26	6	54	0.12
May-22	12	2	35	0.05
Sep-22	6	1	17	0.03
Nov-22	6	1	18	0.03
Feb-23	30	5	66	0.14
Mar-23	12	2	35	0.05
Caledonia North (+2km)				
Jun-21	38	6	92	0.10
May-22	11	2	34	0.03
Jul-22	6	1	17	0.02
Sep-22	47	8	127	0.13
Nov-22	6	1	17	0.02
Jan-23	35	6	77	0.09
Feb-23	50	9	115	0.13
Mar-23	6	1	17	0.02
Caledonia North (+4km)				
Jun-21	40	6	109	0.07
Jul-21	12	2	36	0.02
Apr-22	23	4	60	0.04
May-22	12	2	35	0.02
Jun-22	12	2	36	0.02
Jul-22	12	2	30	0.02
Sep-22	56	10	141	0.10

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Nov-22	9	2	27	0.02
Feb-23	43	7	91	0.08
Mar-23	63	12	128	0.11
Apr-23	23	4	46	0.04

2.5.4 Puffin

2.5.4.1 The density and population estimates of puffin in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-32 and Table 2-33.

2.5.4.2 Table 2-32 includes the unapportioned density and population estimates of puffin, and Table 2-33 includes the apportioned density and population estimates of puffin.

Table 2-32: Unapportioned density and population estimate of puffin in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Jun-21	1	6	1	18	0.03	1.00
Jul-21	3	18	3	41	0.08	0.58
Jun-22	1	6	1	17	0.03	1.00
Caledonia North (+2km)						
Jun-21	1	6	1	17	0.02	1.00
Jul-21	3	17	3	40	0.05	0.58
Jun-22	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
Jun-21	1	6	1	18	0.01	1.00
Jul-21	3	18	3	42	0.03	0.58
Jun-22	1	6	1	17	0.01	1.00
Sep-22	3	17	3	52	0.03	0.58

Table 2-33: Apportioned density and population estimate of puffin in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
Jun-21	6	1	19	0.03
Jul-21	18	3	41	0.08
Jun-22	6	1	17	0.03
Caledonia North (+2km)				
Jun-21	6	1	18	0.02
Jul-21	17	3	40	0.05
Jun-22	6	1	18	0.02
Caledonia North (+4km)				
Jun-21	6	1	18	0.01
Jul-21	18	3	42	0.03
Jun-22	6	1	17	0.01
Sep-22	17	3	52	0.03

2.5.5 Black guillemot

2.5.5.1 The density and population estimates of black guillemot in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-34 and Table 2-35.

2.5.5.2 Table 2-34 includes the unapportioned density and population estimates of black guillemot, and Table 2-35 includes the apportioned density and population estimates of black guillemot.

Table 2-34: Unapportioned density and population estimate of black guillemot in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
<i>None recorded</i>						
Caledonia North (+2km)						
Jun-22	1	6	1	17	0.02	1.00
Caledonia North (+4km)						
Jun-22	1	6	1	17	0.02	1.00

Table 2-35: Apportioned density and population estimate of black guillemot in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
<i>None recorded</i>				
Caledonia North (+2km)				
Jun-22	6	1	17	0.02
Caledonia North (+4km)				
Jun-22	6	1	17	0.02

2.6 Gaviidae

2.6.1 Red-throated diver

- 2.6.1.1 The density and population estimates of red-throated diver in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-36 and Table 2-37.
- 2.6.1.2 Table 2-36 includes the unapportioned density and population estimates of red-throated diver, and Table 2-37 includes the apportioned density and population estimates of red-throated diver.

Table 2-36: Unapportioned density and population estimate of red-throated diver in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
<i>None recorded</i>						
Caledonia North (+2km)						
<i>None recorded</i>						
Caledonia North (+4km)						
Oct-22	1	6	1	18	0.01	1.00

Table 2-37: Apportioned density and population estimate of red-throated in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
<i>None recorded</i>				
Caledonia North (+2km)				
<i>None recorded</i>				
Caledonia North (+4km)				
Oct-22	6	1	18	0.01

2.6.2 Great northern diver

2.6.2.1 No great northern diver in flight were recorded in Caledonia North.

2.7 Procellariidae

2.7.1 Unidentified species

Unidentified fulmar and/or gull species

2.7.1.1 The density and population estimates of unidentified fulmar and/or gull species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-38.

Table 2-38: Density and population estimate of unidentified fulmar and/or gull species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis. Repeated from Table 2-5.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
<i>None recorded</i>						
Caledonia North (+2km)						
<i>None recorded</i>						
Caledonia North (+4km)						
Nov-22	1	6	1	18	0.01	1.00
Mar-23	1	6	1	18	0.01	1.00

Unidentified small shearwater species

2.7.1.2 No unidentified small shearwater species in flight were recorded in Caledonia North.

Unidentified shearwater species

2.7.1.3 No unidentified shearwater species in flight were recorded in Caledonia North.

Unidentified auks and/or shearwater species

2.7.1.4 The density and population estimates of unidentified auk and/or shearwater species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-39.

Table 2-39: Density and population estimate of unidentified auk and/or shearwater species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis. Repeated from Table 2-27.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Jun-21	1	6	1	18	0.03	1.00
Caledonia North (+2km)						
May-21	1	6	1	17	0.02	1.00
Jun-21	1	6	1	17	0.02	1.00
Jul-21	1	6	1	17	0.02	1.00
Jun-22	2	12	2	35	0.03	0.71
Caledonia North (+4km)						
May-21	4	23	4	53	0.04	0.05
Jun-21	1	6	1	18	0.01	1.00
Jul-21	1	6	1	18	0.01	1.00
Jun-22	3	17	3	46	0.03	0.58

2.7.2 Fulmar

2.7.2.1 The density and population estimates of fulmar in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-40 and Table 2-41.

2.7.2.2 Table 2-40 includes the unapportioned density and population estimates of fulmar, and Table 2-41 includes the apportioned density and population estimates of fulmar.

Table 2-40: Unapportioned density and population estimate of fulmar in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
May-21	19	111	52	169	0.51	0.23
Jun-21	8	47	18	77	0.22	0.35
Jul-21	51	302	201	438	1.38	0.14
Aug-21	61	353	238	463	1.62	0.13
Sep-21	7	41	7	87	0.19	0.38
Oct-21	1	6	1	18	0.03	1.00
Nov-21	7	41	7	88	0.19	0.38
Dec-21	37	214	37	429	0.98	0.16
Jan-22	9	52	12	110	0.24	0.33
Feb-22	7	38	11	65	0.17	0.38
Mar-22	5	27	16	37	0.12	0.45
Apr-22	9	52	17	92	0.24	0.33
May-22	6	35	12	58	0.16	0.41
Jun-22	35	199	97	319	0.91	0.17
Jul-22	106	621	263	1,001	2.84	0.10
Aug-22	22	127	69	196	0.58	0.21
Sep-22	5	29	6	52	0.13	0.45
Nov-22	63	371	212	536	1.70	0.13

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Dec-22	22	128	22	256	0.59	0.21
Jan-23	8	46	12	104	0.21	0.35
Feb-23	5	29	12	52	0.13	0.45
Mar-23	8	47	8	105	0.22	0.35
Apr-23	3	17	3	39	0.08	0.58
Caledonia North (+2km)						
May-21	33	189	109	263	0.50	0.17
Jun-21	20	116	75	168	0.31	0.22
Jul-21	91	525	357	692	1.40	0.10
Aug-21	114	647	448	862	1.72	0.09
Sep-21	9	51	17	97	0.14	0.33
Oct-21	1	6	1	17	0.02	1.00
Nov-21	12	68	12	137	0.18	0.29
Dec-21	58	330	108	597	0.88	0.13
Jan-22	23	131	45	238	0.35	0.21
Feb-22	16	86	38	145	0.23	0.25
Mar-22	7	37	16	64	0.10	0.38
Apr-22	18	101	45	174	0.27	0.24
May-22	14	80	34	131	0.21	0.27
Jun-22	53	306	162	473	0.82	0.14
Jul-22	169	967	492	1,414	2.58	0.08
Aug-22	35	200	114	315	0.53	0.17
Sep-22	6	35	12	58	0.09	0.41
Nov-22	110	634	415	888	1.69	0.10
Dec-22	34	200	47	376	0.53	0.17

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Jan-23	15	88	29	158	0.23	0.26
Feb-23	10	57	29	91	0.15	0.32
Mar-23	12	70	17	133	0.19	0.29
Apr-23	7	40	11	74	0.11	0.38
Caledonia North (+4km)						
May-21	46	269	164	375	0.48	0.15
Jun-21	28	166	101	237	0.30	0.19
Jul-21	120	727	478	945	1.31	0.09
Aug-21	166	964	668	1,283	1.73	0.08
Sep-21	17	99	41	164	0.18	0.24
Oct-21	1	6	1	18	0.01	1.00
Nov-21	26	152	29	339	0.27	0.20
Dec-21	82	478	210	804	0.86	0.11
Jan-22	31	179	98	284	0.32	0.18
Feb-22	20	110	50	176	0.20	0.22
Mar-22	19	103	49	167	0.18	0.23
Apr-22	21	121	63	196	0.22	0.22
May-22	19	110	41	198	0.20	0.23
Jun-22	81	468	225	740	0.84	0.11
Jul-22	241	1,410	936	1,914	2.53	0.06
Aug-22	53	303	200	435	0.54	0.14
Sep-22	8	47	17	76	0.08	0.35
Nov-22	155	914	608	1,227	1.64	0.08
Dec-22	56	330	141	554	0.59	0.13
Jan-23	23	136	47	242	0.24	0.21

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Feb-23	18	104	58	150	0.19	0.24
Mar-23	23	135	47	235	0.24	0.21
Apr-23	14	80	34	132	0.14	0.27

Table 2-41: Apportioned density and population estimate of fulmar in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
May-21	111	52	169	0.51
Jun-21	47	18	77	0.22
Jul-21	302	201	438	1.38
Aug-21	353	238	463	1.62
Sep-21	41	7	87	0.19
Oct-21	6	1	18	0.03
Nov-21	41	7	88	0.19
Dec-21	214	37	429	0.98
Jan-22	52	12	110	0.24
Feb-22	38	11	65	0.17
Mar-22	27	16	37	0.12
Apr-22	52	17	92	0.24
May-22	35	12	58	0.16
Jun-22	199	97	319	0.91
Jul-22	621	263	1,001	2.84
Aug-22	127	69	196	0.58
Sep-22	29	6	52	0.13
Nov-22	371	212	536	1.70
Dec-22	128	22	256	0.59
Jan-23	46	12	104	0.21
Feb-23	29	12	52	0.13
Mar-23	47	8	105	0.22
Apr-23	17	3	39	0.08

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North (+2km)				
May-21	189	109	263	0.50
Jun-21	116	75	168	0.31
Jul-21	525	357	692	1.40
Aug-21	647	448	862	1.72
Sep-21	51	17	97	0.14
Oct-21	6	1	17	0.02
Nov-21	68	12	137	0.18
Dec-21	330	108	597	0.88
Jan-22	131	45	238	0.35
Feb-22	86	38	145	0.23
Mar-22	37	16	64	0.10
Apr-22	101	45	174	0.27
May-22	80	34	131	0.21
Jun-22	306	162	473	0.81
Jul-22	967	492	1,414	2.57
Aug-22	200	114	315	0.53
Sep-22	35	12	58	0.09
Nov-22	634	415	888	1.69
Dec-22	200	47	376	0.53
Jan-23	88	29	158	0.23
Feb-23	57	29	91	0.15
Mar-23	70	17	133	0.19
Apr-23	40	11	74	0.11

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North (+4km)				
May-21	269	164	375	0.48
Jun-21	166	101	237	0.30
Jul-21	727	478	945	1.30
Aug-21	964	668	1,283	1.73
Sep-21	99	41	164	0.18
Oct-21	6	1	18	0.01
Nov-21	152	29	339	0.27
Dec-21	478	210	804	0.86
Jan-22	179	98	284	0.32
Feb-22	110	50	176	0.20
Mar-22	103	49	167	0.18
Apr-22	121	63	196	0.22
May-22	110	41	198	0.20
Jun-22	468	225	740	0.84
Jul-22	1,410	936	1,914	2.53
Aug-22	303	200	435	0.54
Sep-22	47	17	76	0.08
Nov-22	919	609	1,242	1.65
Dec-22	330	141	554	0.59
Jan-23	136	47	242	0.24
Feb-23	104	58	150	0.19
Mar-23	140	48	249	0.25
Apr-23	80	34	132	0.14

2.7.3 Sooty shearwater

2.7.3.1 No sooty shearwater in flight were recorded in Caledonia North.

2.7.4 Manx shearwater

2.7.4.1 The density and population estimates of Manx shearwater in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-42 and Table 2-43.

2.7.4.2 Table 2-42 includes the unapportioned density and population estimates of Manx shearwater, and Table 2-43 includes the apportioned density and population estimates of Manx shearwater.

Table 2-42: Unapportioned density and population estimate of Manx shearwater in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
May-22	2	12	2	23	0.05	0.71
Caledonia North (+2km)						
May-22	2	11	2	28	0.03	0.71
Caledonia North (+4km)						
Jun-21	1	6	1	18	0.01	1.00
May-22	3	17	3	35	0.03	0.58

Table 2-43: Apportioned density and population estimate of Manx shearwater in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Abundance Estimate			Density
	Abundance	LCI	UCI	
Caledonia North				
May-22	12	2	23	0.05
Caledonia North (+2km)				
May-22	11	2	28	0.03
Caledonia North (+4km)				
Jun-21	6	1	18	0.01
May-22	17	3	35	0.03

2.8 Sulidae

2.8.1 Gannet

2.8.1.1 The density and population estimates of gannet species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-44.

Table 2-44: Density and population estimates of gannet in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis. No apportionment required for this species.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Jun-21	11	65	18	142	0.30	0.30
Jul-21	3	18	3	53	0.08	0.58
Aug-21	9	52	12	98	0.24	0.33
Sep-21	14	81	23	151	0.37	0.27
Oct-21	22	128	58	193	0.59	0.21
Nov-21	2	12	2	35	0.05	0.71
Dec-21	2	12	2	29	0.05	0.71
Apr-22	2	11	2	29	0.05	0.71
Jun-22	12	68	23	114	0.31	0.29
Jul-22	5	29	6	64	0.13	0.45
Aug-22	1	6	1	17	0.03	1.00
Sep-22	11	63	17	120	0.29	0.30
Oct-22	4	23	4	69	0.11	0.50
Feb-23	1	6	1	17	0.03	1.00
Caledonia North (+2km)						
May-21	5	29	6	63	0.08	0.45
Jun-21	13	75	23	151	0.20	0.28
Jul-21	3	17	3	52	0.05	0.58

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Aug-21	14	79	34	136	0.21	0.27
Sep-21	22	125	63	188	0.33	0.21
Oct-21	31	177	91	257	0.47	0.18
Nov-21	3	17	3	46	0.05	0.58
Dec-21	2	11	2	28	0.03	0.71
Apr-22	2	11	2	28	0.03	0.71
Jun-22	17	98	35	162	0.26	0.24
Jul-22	9	52	17	92	0.14	0.33
Aug-22	5	29	5	63	0.08	0.45
Sep-22	22	128	70	186	0.34	0.21
Oct-22	5	29	5	76	0.08	0.45
Dec-22	1	6	1	18	0.02	1.00
Jan-23	1	6	1	18	0.02	1.00
Feb-23	2	11	2	23	0.03	0.71
Caledonia North (+4km)						
May-21	6	35	6	76	0.06	0.41
Jun-21	16	95	30	195	0.17	0.25
Jul-21	7	42	12	79	0.08	0.38
Aug-21	19	110	58	180	0.20	0.23
Sep-21	26	152	70	239	0.27	0.20
Oct-21	41	240	140	351	0.43	0.16
Nov-21	4	23	4	47	0.04	0.50
Dec-21	2	12	2	29	0.02	0.71
Apr-22	3	17	3	35	0.03	0.58
May-22	2	12	2	29	0.02	0.71

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Jun-22	21	121	52	202	0.22	0.22
Jul-22	15	88	23	164	0.16	0.26
Aug-22	6	34	6	74	0.06	0.41
Sep-22	34	198	111	303	0.36	0.17
Oct-22	7	41	7	94	0.07	0.38
Dec-22	3	18	3	35	0.03	0.58
Jan-23	1	6	1	18	0.01	1.00
Feb-23	3	17	3	46	0.03	0.58
Apr-23	1	6	1	17	0.01	1.00

2.9 Turdidae

2.9.1 Unidentified thrush species

2.9.1.1 The density and population estimates of unidentified thrush species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-45.

Table 2-45: Density and population estimates of unidentified thrush species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Oct-22	4	23	4	58	0.11	0.50
Caledonia North (+2km)						
Oct-22	105	617	105	1,733	1.64	0.10
Caledonia North (+4km)						
Oct-22	214	1,257	235	2,472	0.07	2.26

2.10 Passeriformes

2.10.1 Unidentified passerine species

2.10.1.1 The density and population estimates of unidentified passerine species in Caledonia North (plus the 2km buffer and plus the 4km buffer, calculated using design-based analysis) have been presented in Table 2-46.

Table 2-46: Density and population estimates of unidentified passerine species in flight in Caledonia North; plus 2km buffer and plus 4km buffer, calculated using design-based analysis.

Survey	Raw Count	Abundance Estimate			Density	CV
		Abundance	LCI	UCI		
Caledonia North						
Oct-22	14	81	14	243	0.37	0.27
Caledonia North (+2km)						
Oct-22	17	100	17	276	0.27	0.24
Caledonia North (+4km)						
Oct-22	57	335	57	681	0.60	0.13

3 References

¹ NatureScot (2023) 'Guidance Note 2: Guidance to support Offshore Wind Applications: Advice for Marine Ornithology Baseline Characterisation Surveys and Reporting'. Available at :<https://www.nature.scot/doc/guidance-note-2-guidance-support-offshore-wind-applications-advice-marine-ornithology-baseline> (Accessed 01/07/2024)

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