MacArthur Green

West of Orkney Windfarm

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Revision	01
Approved Mr Stuart McAuley - Offshore Wind Power Limited Oct 2, 2024, 5:14 PM GMT+1:00	

West of Orkney Windfarm

Offshore Ornithology Supplementary Environmental Information

Annex 3C: Word output files from Caneco shiny app

Date: 20 August 2024

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These word documents are outputs from the Caneco Shiny app.
Each word document corresponds to a single run of the tool.
The naming convention of each file is:

dcrm = deterministic (Band) model in the shiny app
scrm = stochastic model

the number corresponds to the date when the tool was run, 06062024 =

the next two letters describes the species:
AE: arctic tern
NX: great skua
GB: great black backed gull
GX: gannet
KI: kittiwake

MLS = most likely scenario
WCS = worst case scenario

sCRM Run Report: Collision Risk Estimates

06 June 2024

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NB: This is a prototype document. The inclusion of additional sections (e.g. tables with input values for each scenario) is currently under consideration.

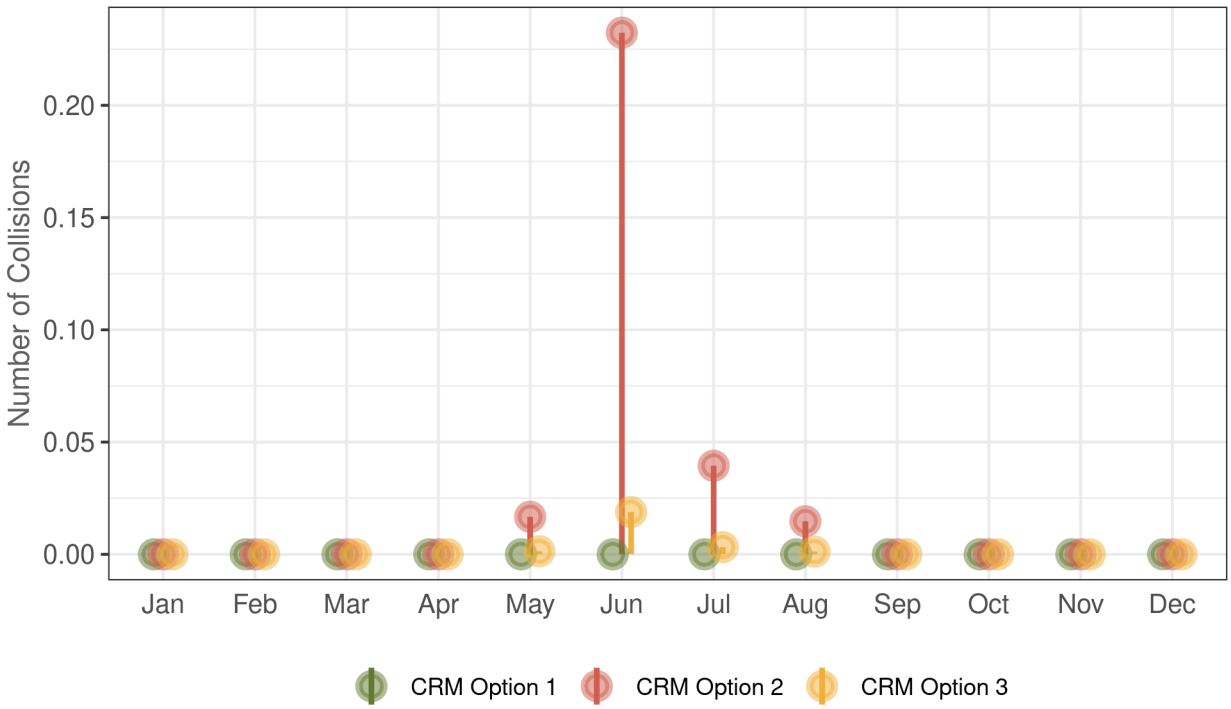
1 sCRM Run Overview

- Simulation mode: Deterministic
- Number of iterations: Not applicable
- Wind farm scenarios specified:
  - **West of Orkney**, containing the following species:
    - Arctic Tern

2 WEST OF ORKNEY

2.1 ARCTIC TERN

Figure 1: Collision risk estimates for Arctic Tern at West of Orkney, by Month



Collision estimates for Arctic Tern at West of Orkney, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	
	Option 2	
	Option 3	
February	Option 1	
	Option 2	0.000
	Option 3	
March	Option 1	
	Option 2	
	Option 3	

Time Period	CRM Option	No. Collisions
April	Option 1	
	Option 2	
	Option 3	
May	Option 1	
	Option 2	0.017
	Option 3	0.001
June	Option 1	0.000
	Option 2	0.232
	Option 3	0.019
July	Option 1	0.000
	Option 2	0.039
	Option 3	0.003
August	Option 1	0.000
	Option 2	0.015
	Option 3	0.001
September	Option 1	0.000
	Option 2	
	Option 3	
October	Option 1	
	Option 2	
	Option 3	
November	Option 1	
	Option 2	
	Option 3	
December	Option 1	
	Option 2	
	Option 3	

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

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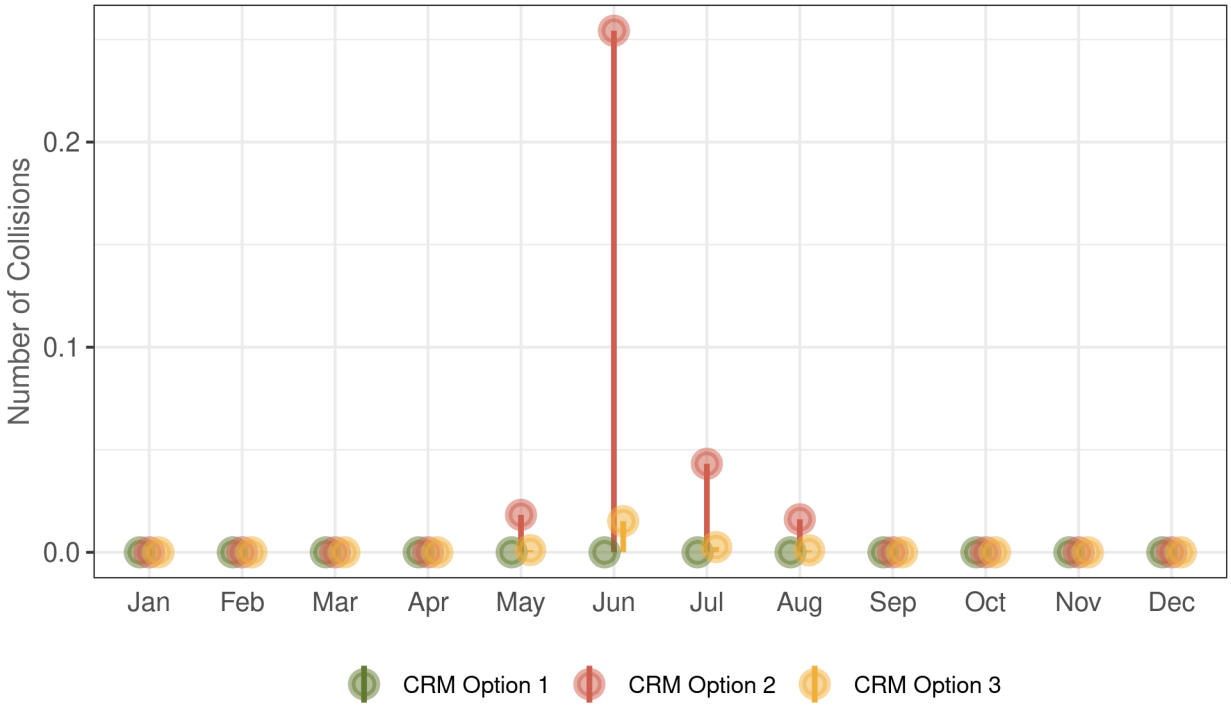

Collision estimates for Arctic Tern at West of Orkney, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	
	Option 2	
	Option 3	
February	Option 1	
	Option 2	0.000
	Option 3	
March	Option 1	
	Option 2	
	Option 3	

Time Period	CRM Option	No. Collisions
April	Option 1	
	Option 2	
	Option 3	
May	Option 1	
	Option 2	0.018
	Option 3	0.001
June	Option 1	0.000
	Option 2	0.254
	Option 3	0.015
July	Option 1	0.000
	Option 2	0.043
	Option 3	0.003
August	Option 1	0.000
	Option 2	0.016
	Option 3	0.001
September	Option 1	0.000
	Option 2	
	Option 3	
October	Option 1	
	Option 2	
	Option 3	
November	Option 1	
	Option 2	
	Option 3	
December	Option 1	
	Option 2	
	Option 3	

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

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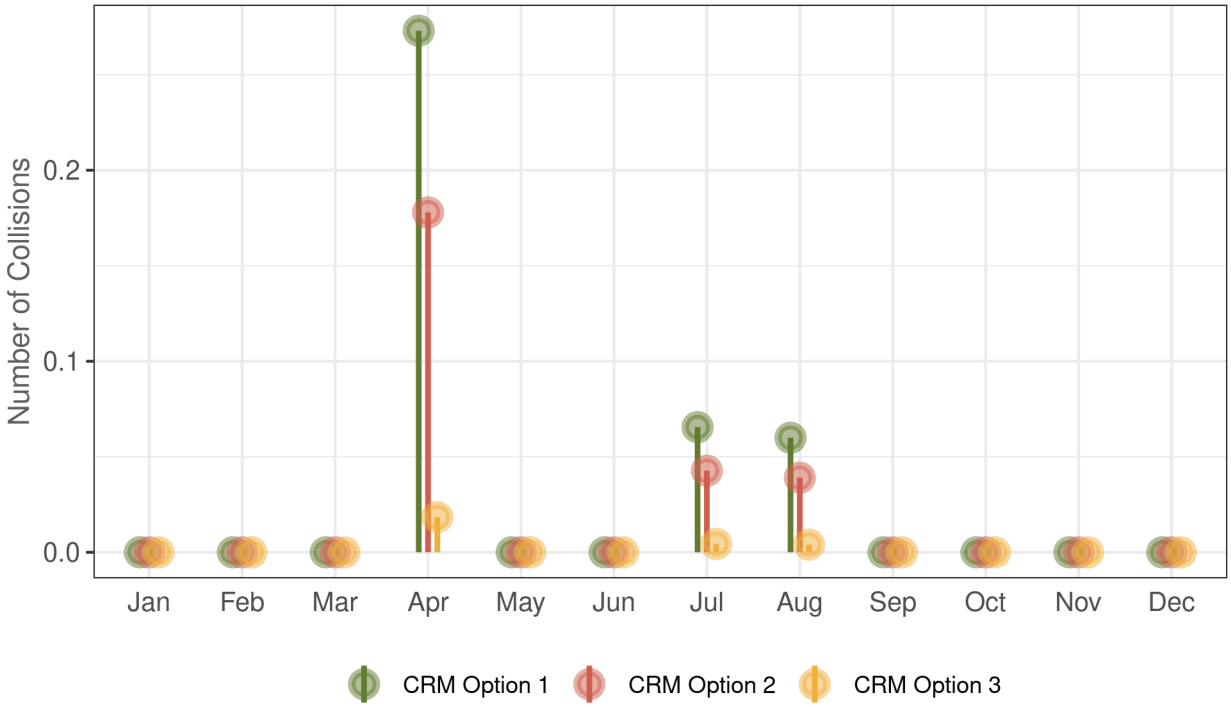
- Simulation mode: Deterministic
- Number of iterations: Not applicable
- Wind farm scenarios specified:
  - **WoW**, containing the following species:
    - Great skua

2 WoW

2.1 GREAT SKUA

Figure 1: Collision risk estimates for Great skua at WoW, by Month



Collision estimates for Great skua at WoW, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	
	Option 2	
	Option 3	
February	Option 1	
	Option 2	0.000
	Option 3	
March	Option 1	
	Option 2	
	Option 3	

Time Period	CRM Option	No. Collisions
April	Option 1	0.273
	Option 2	0.178
	Option 3	0.018
May	Option 1	0.000
	Option 2	
	Option 3	
June	Option 1	
	Option 2	
	Option 3	
July	Option 1	0.066
	Option 2	0.043
	Option 3	0.004
August	Option 1	0.060
	Option 2	0.039
	Option 3	0.004
September	Option 1	0.000
	Option 2	
	Option 3	
October	Option 1	
	Option 2	
	Option 3	
November	Option 1	
	Option 2	
	Option 3	
December	Option 1	
	Option 2	
	Option 3	

3 REFERENCES

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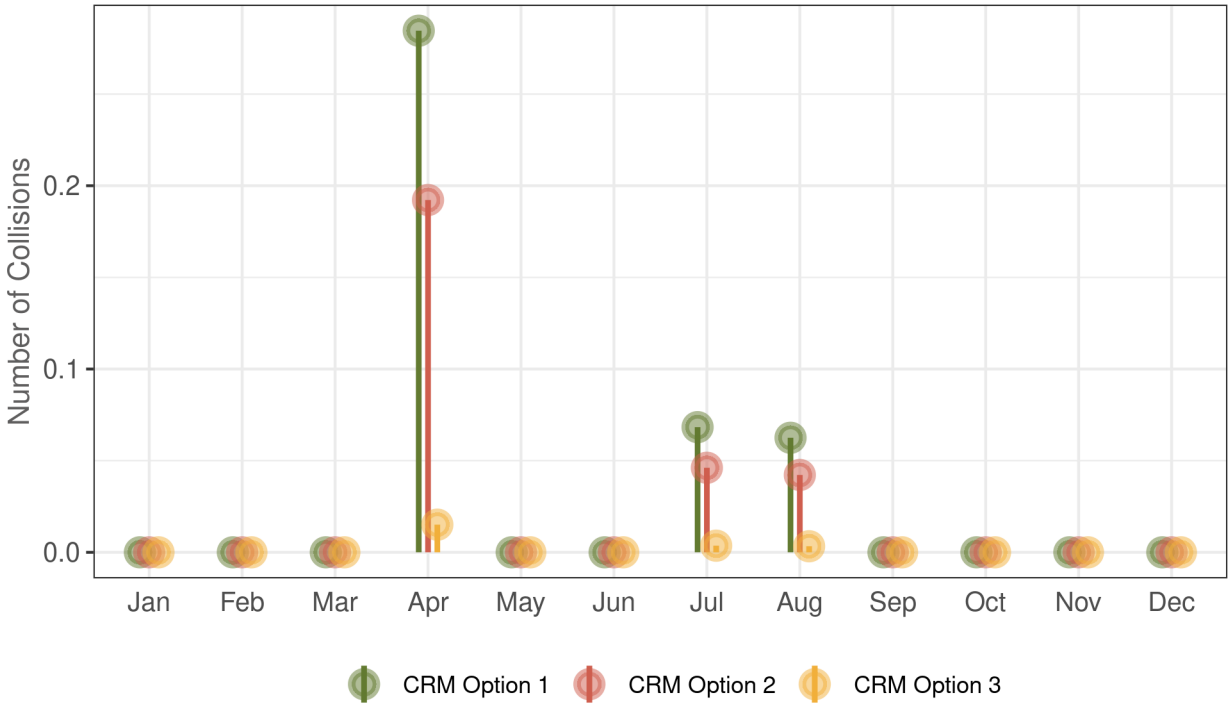
    - Great skua

2 WoW

2.1 GREAT SKUA

Figure 1: Collision risk estimates for Great skua at WoW, by Month



Collision estimates for Great skua at WoW, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	
	Option 2	
	Option 3	
February	Option 1	
	Option 2	0.000
	Option 3	
March	Option 1	
	Option 2	
	Option 3	

Time Period	CRM Option	No. Collisions
April	Option 1	0.285
	Option 2	0.192
	Option 3	0.015
May	Option 1	0.000
	Option 2	
	Option 3	
June	Option 1	
	Option 2	
	Option 3	
July	Option 1	0.068
	Option 2	0.046
	Option 3	0.004
August	Option 1	0.062
	Option 2	0.042
	Option 3	0.003
September	Option 1	0.000
	Option 2	
	Option 3	
October	Option 1	
	Option 2	
	Option 3	
November	Option 1	
	Option 2	
	Option 3	
December	Option 1	
	Option 2	
	Option 3	

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sCRM Run Report: Collision Risk Estimates

26 May 2024

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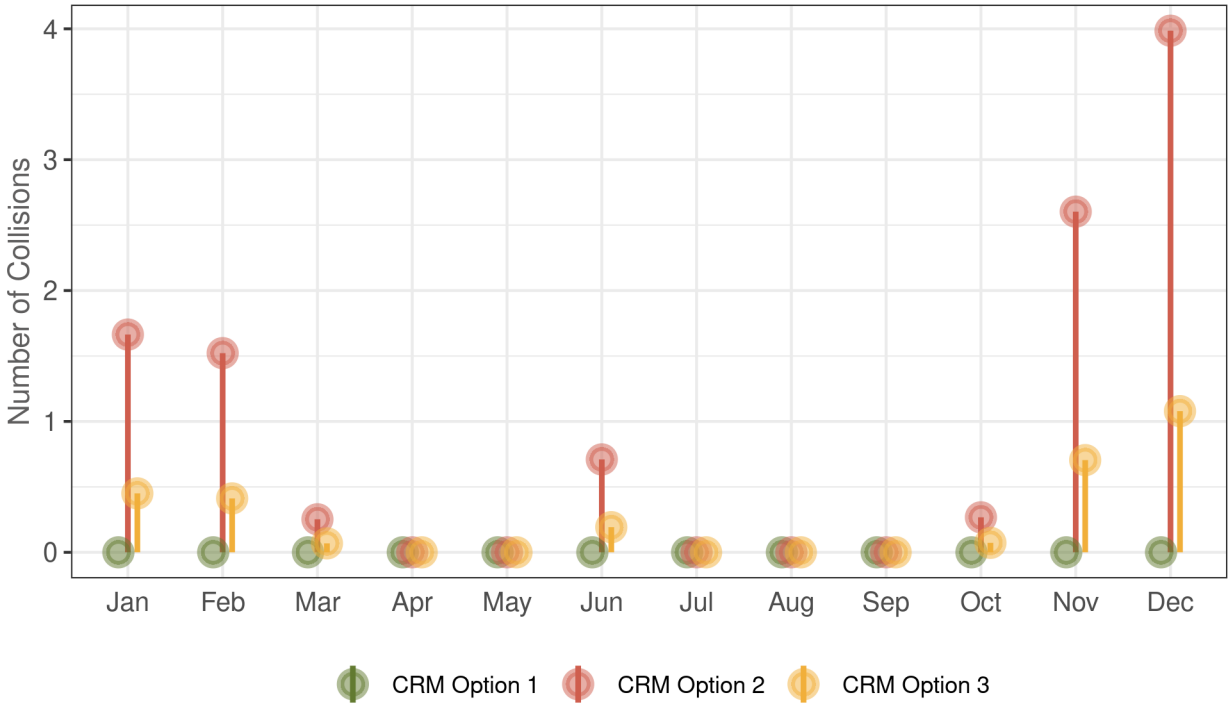
- Simulation mode: Deterministic
- Number of iterations: Not applicable
- Wind farm scenarios specified:
  - **West of Orkney**, containing the following species:
    - Great Black-backed Gull

2 WEST OF ORKNEY

2.1 GREAT BLACK-BACKED GULL

Figure 1: Collision risk estimates for Great Black-backed Gull at West of Orkney, by Month



Collision estimates for Great Black-backed Gull at West of Orkney, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	0.000
	Option 2	1.664
	Option 3	0.450
February	Option 1	0.000
	Option 2	1.522
	Option 3	0.412
March	Option 1	0.000
	Option 2	0.252
	Option 3	0.068

Time Period	CRM Option	No. Collisions
April	Option 1	0.000
	Option 2	
	Option 3	
May	Option 1	
	Option 2	
	Option 3	
June	Option 1	
	Option 2	0.710
	Option 3	0.192
July	Option 1	0.000
	Option 2	
	Option 3	
August	Option 1	
	Option 2	
	Option 3	
September	Option 1	
	Option 2	
	Option 3	
October	Option 1	
	Option 2	0.267
	Option 3	0.072
November	Option 1	0.000
	Option 2	2.603
	Option 3	0.704
December	Option 1	0.000
	Option 2	3.985
	Option 3	1.079

3 REFERENCES

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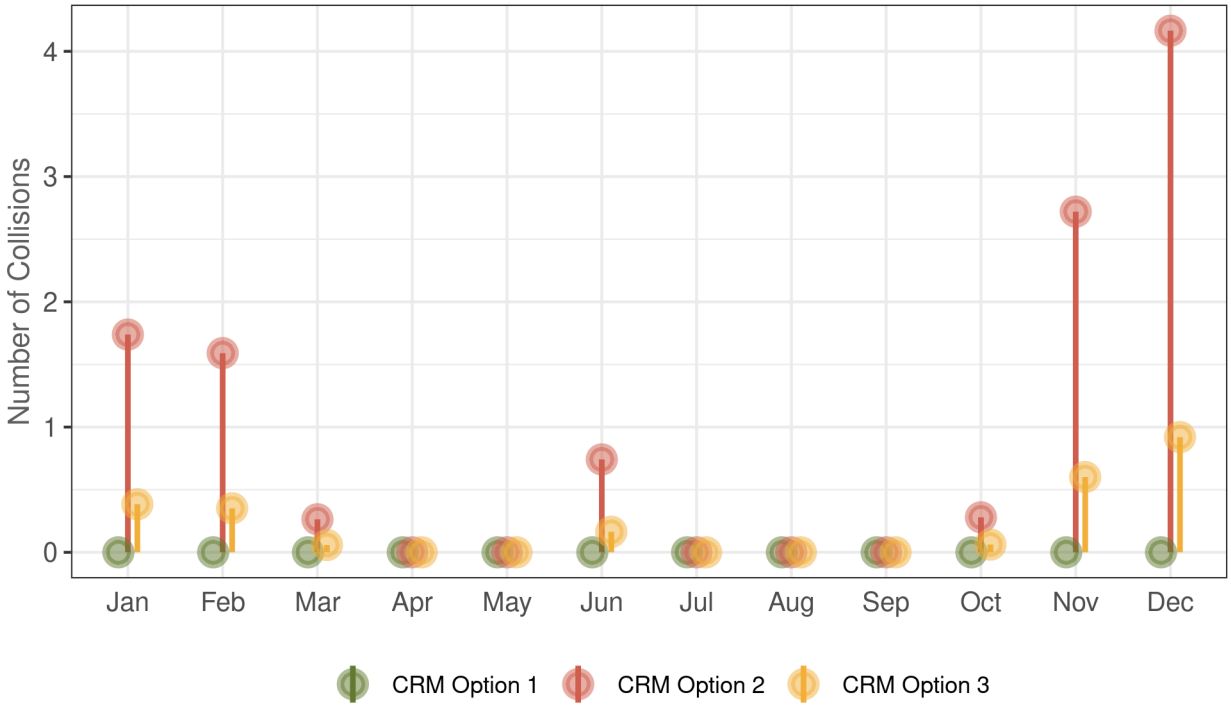

Collision estimates for Great Black-backed Gull at West of Orkney, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	0.000
	Option 2	1.739
	Option 3	0.384
February	Option 1	0.000
	Option 2	1.590
	Option 3	0.351
March	Option 1	0.000
	Option 2	0.264
	Option 3	0.058

Time Period	CRM Option	No. Collisions
April	Option 1	
	Option 2	
	Option 3	
May	Option 1	0.000
	Option 2	
	Option 3	
June	Option 1	
	Option 2	0.742
	Option 3	0.164
July	Option 1	
	Option 2	
	Option 3	
August	Option 1	
	Option 2	
	Option 3	0.000
September	Option 1	
	Option 2	
	Option 3	
October	Option 1	
	Option 2	0.279
	Option 3	0.062
November	Option 1	0.000
	Option 2	2.720
	Option 3	0.601
December	Option 1	0.000
	Option 2	4.165
	Option 3	0.920

3 REFERENCES

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- Simulation mode: Deterministic
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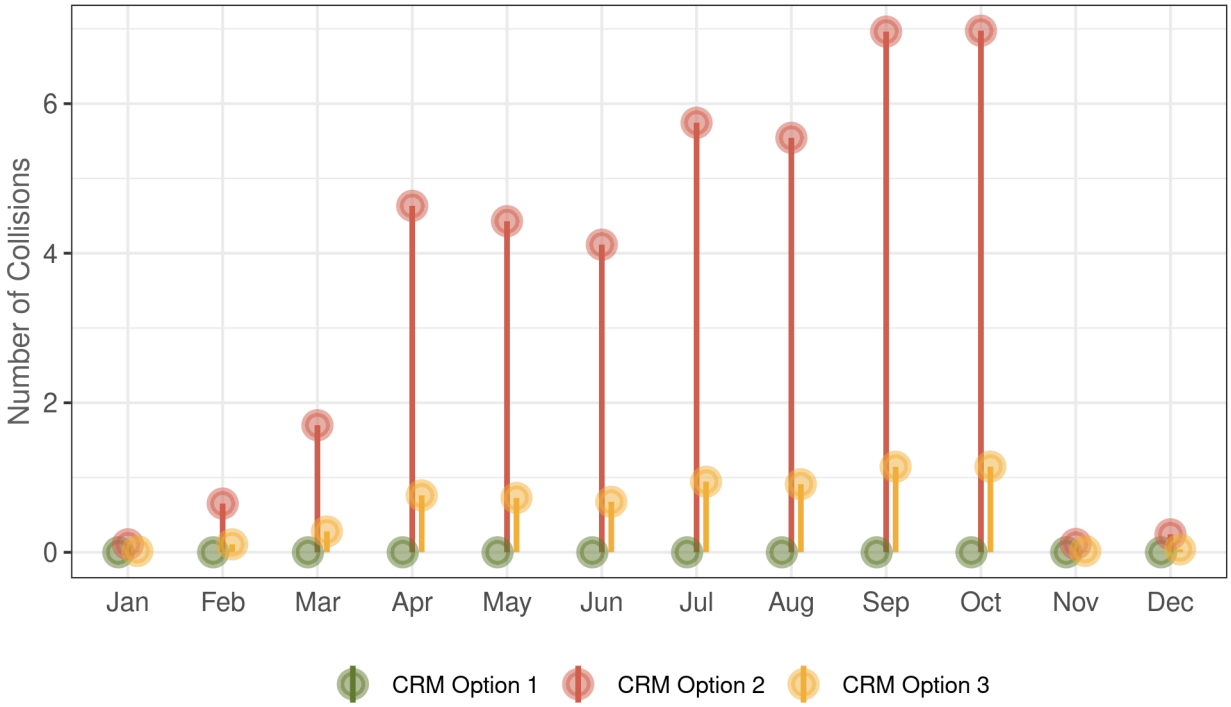
- Wind farm scenarios specified:
  - **West of Orkney**, containing the following species:
    - Northern Gannet

2 WEST OF ORKNEY

2.1 NORTHERN GANNET

Figure 1: Collision risk estimates for Northern Gannet at West of Orkney, by Month



Collision estimates for Northern Gannet at West of Orkney, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	0.000
	Option 2	0.108
	Option 3	0.018
February	Option 1	0.000
	Option 2	0.652
	Option 3	0.107
March	Option 1	0.000
	Option 2	1.700
	Option 3	0.279

Time Period	CRM Option	No. Collisions
April	Option 1	0.000
	Option 2	4.634
	Option 3	0.761
May	Option 1	0.000
	Option 2	4.428
	Option 3	0.728
June	Option 1	0.000
	Option 2	4.115
	Option 3	0.676
July	Option 1	0.000
	Option 2	5.745
	Option 3	0.944
August	Option 1	0.000
	Option 2	5.543
	Option 3	0.911
September	Option 1	0.000
	Option 2	6.964
	Option 3	1.144
October	Option 1	0.000
	Option 2	6.976
	Option 3	1.146
November	Option 1	0.000
	Option 2	0.112
	Option 3	0.018
December	Option 1	0.000
	Option 2	0.241
	Option 3	0.040

3 REFERENCES

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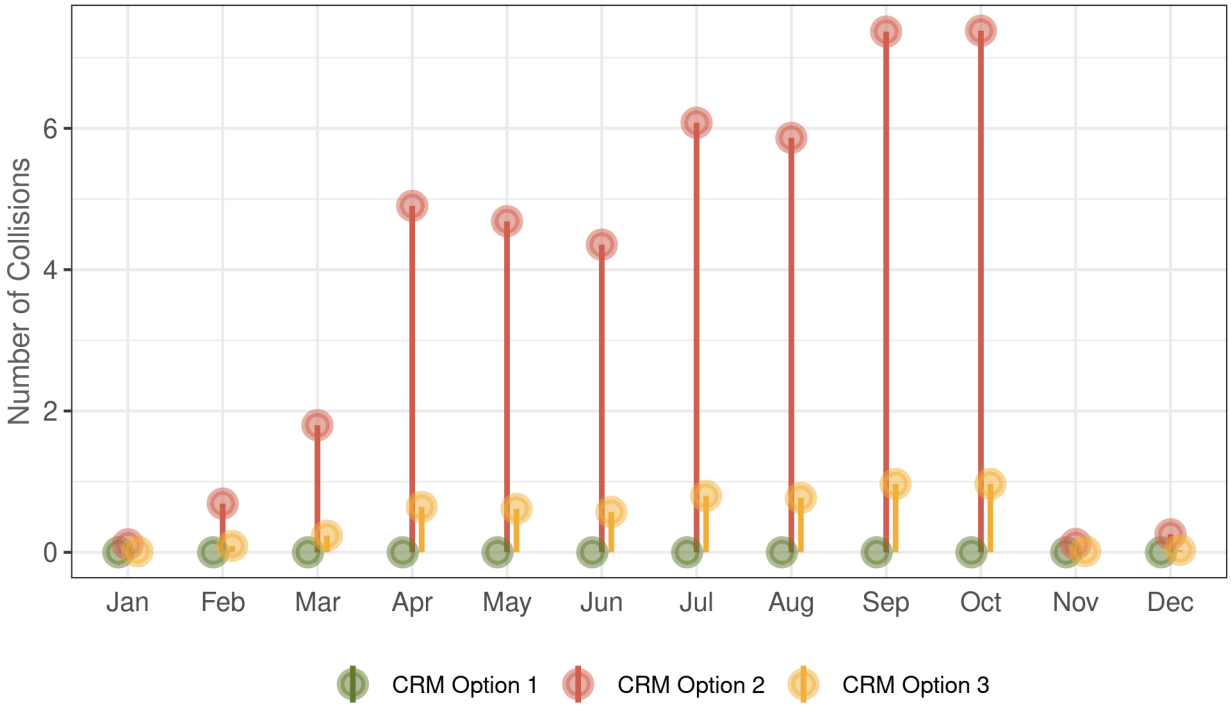
2 WEST OF ORKNEY

2.1 NORTHERN GANNET

Figure 1: Collision risk estimates for Northern Gannet at West of Orkney, by Month



Collision estimates for Northern Gannet at West of Orkney, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	0.000
	Option 2	0.114
	Option 3	0.015
February	Option 1	0.000
	Option 2	0.690
	Option 3	0.091
March	Option 1	0.000
	Option 2	1.798
	Option 3	0.236

Time Period	CRM Option	No. Collisions
April	Option 1	0.000
	Option 2	4.903
	Option 3	0.644
May	Option 1	0.000
	Option 2	4.686
	Option 3	0.615
June	Option 1	0.000
	Option 2	4.354
	Option 3	0.571
July	Option 1	0.000
	Option 2	6.079
	Option 3	0.798
August	Option 1	0.000
	Option 2	5.865
	Option 3	0.770
September	Option 1	0.000
	Option 2	7.369
	Option 3	0.967
October	Option 1	0.000
	Option 2	7.381
	Option 3	0.969
November	Option 1	0.000
	Option 2	0.119
	Option 3	0.016
December	Option 1	0.000
	Option 2	0.255
	Option 3	0.033

3 REFERENCES

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- Simulation mode: Deterministic
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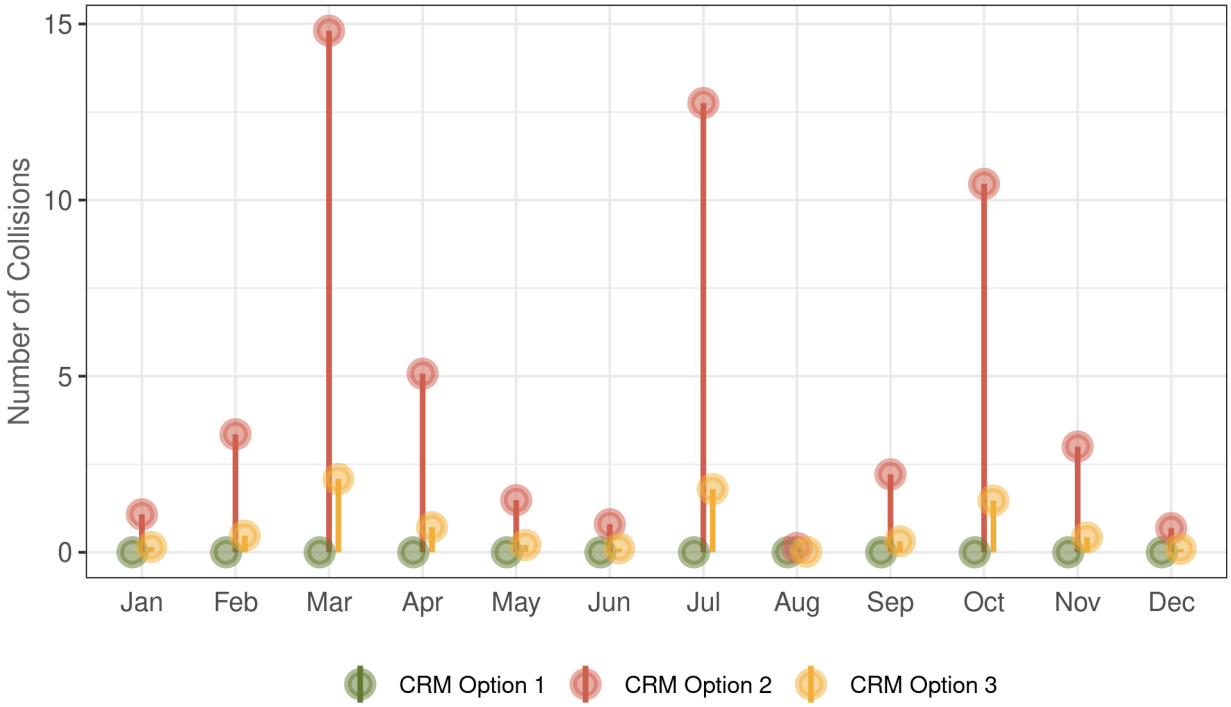
- Wind farm scenarios specified:
  - **West of Orkney**, containing the following species:
    - Black-legged Kittiwake

2 WEST OF ORKNEY

2.1 BLACK-LEGGED KITTIWAKE

Figure 1: Collision risk estimates for Black-legged Kittiwake at West of Orkney, by Month



Collision estimates for Black-legged Kittiwake at West of Orkney, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	0.000
	Option 2	1.078
	Option 3	0.152
February	Option 1	0.000
	Option 2	3.350
	Option 3	0.471
March	Option 1	0.000
	Option 2	14.808
	Option 3	2.082

Time Period	CRM Option	No. Collisions
April	Option 1	0.000
	Option 2	5.071
	Option 3	0.713
May	Option 1	0.000
	Option 2	1.480
	Option 3	0.208
June	Option 1	0.000
	Option 2	0.798
	Option 3	0.112
July	Option 1	0.000
	Option 2	12.755
	Option 3	1.793
August	Option 1	0.000
	Option 2	0.125
	Option 3	0.018
September	Option 1	0.000
	Option 2	2.214
	Option 3	0.311
October	Option 1	0.000
	Option 2	10.459
	Option 3	1.470
November	Option 1	0.000
	Option 2	3.002
	Option 3	0.422
December	Option 1	0.000
	Option 2	0.688
	Option 3	0.097

3 REFERENCES

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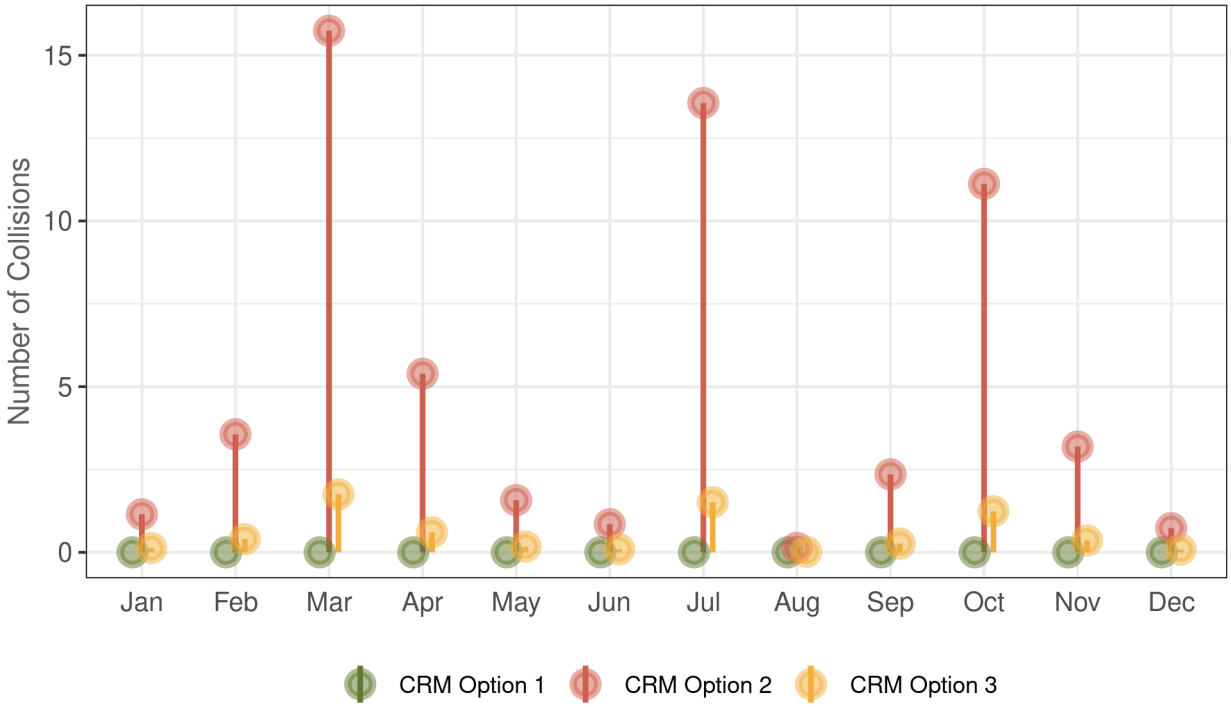
2.1 BLACK-LEGGED KITTIWAKE

Figure 1: Collision risk estimates for Black-legged Kittiwake at West of Orkney, by Month



Collision estimates for Black-legged Kittiwake at West of Orkney, by Month

Time Period	CRM Option	No. Collisions
January	Option 1	0.000
	Option 2	1.146
	Option 3	0.128
February	Option 1	0.000
	Option 2	3.561
	Option 3	0.396
March	Option 1	0.000
	Option 2	15.742
	Option 3	1.752

Time Period	CRM Option	No. Collisions
April	Option 1	0.000
	Option 2	5.390
	Option 3	0.600
May	Option 1	0.000
	Option 2	1.573
	Option 3	0.175
June	Option 1	0.000
	Option 2	0.848
	Option 3	0.094
July	Option 1	0.000
	Option 2	13.560
	Option 3	1.509
August	Option 1	0.000
	Option 2	0.133
	Option 3	0.015
September	Option 1	0.000
	Option 2	2.354
	Option 3	0.262
October	Option 1	0.000
	Option 2	11.119
	Option 3	1.237
November	Option 1	0.000
	Option 2	3.192
	Option 3	0.355
December	Option 1	0.000
	Option 2	0.731
	Option 3	0.081

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

sCRM Run Report: Collision Risk Estimates

06 June 2024

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NB: This is a prototype document. The inclusion of additional sections (e.g. tables with input values for each scenario) is currently under consideration.

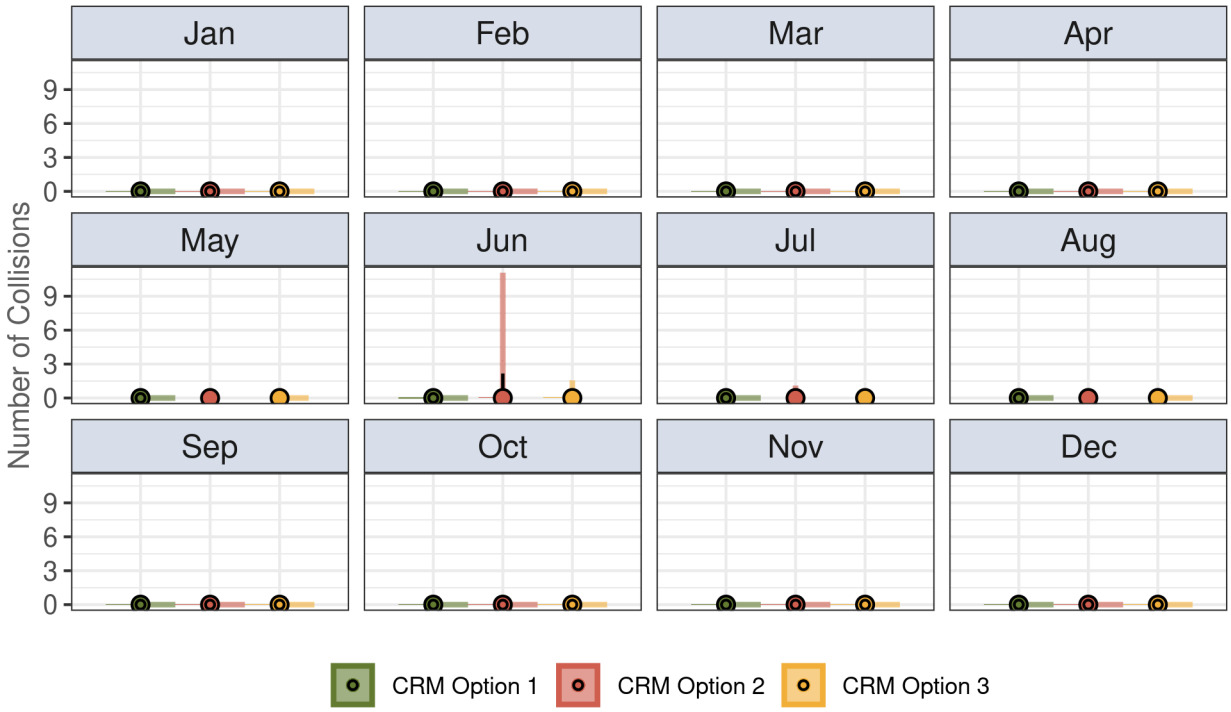
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney**, containing the following species:
    - Arctic Tern

2 WEST OF ORKNEY

2.1 ARCTIC TERN

Figure 1: Collision risk estimates for Arctic Tern at West of Orkney, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Arctic Tern at West of Orkney, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1						
	Option 2						
	Option 3						
February	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2						
	Option 3						
March	Option 1						
	Option 2						

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 3						
April	Option 1						
	Option 2						
	Option 3						
May	Option 1						
	Option 2	0.023		0.065	280.973		0.172
	Option 3	0.002		0.008	345.023		0.020
June	Option 1	0.000		0.000			0.000
	Option 2	0.317		0.901	284.076		2.165
	Option 3	0.034		0.121	358.753		0.232
July	Option 1	0.000		0.000			0.000
	Option 2	0.051		0.105	207.748		0.301
	Option 3	0.005		0.014	259.401		0.036
August	Option 1	0.000		0.000			0.000
	Option 2	0.017		0.042	244.516		0.119
	Option 3	0.002		0.005	302.183		0.012
September	Option 1						
	Option 2						
	Option 3						
October	Option 1						
	Option 2						
	Option 3						
November	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
December	Option 1						
	Option 2						
	Option 3						

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

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NB: This is a prototype document. The inclusion of additional sections (e.g. tables with input values for each scenario) is currently under consideration.

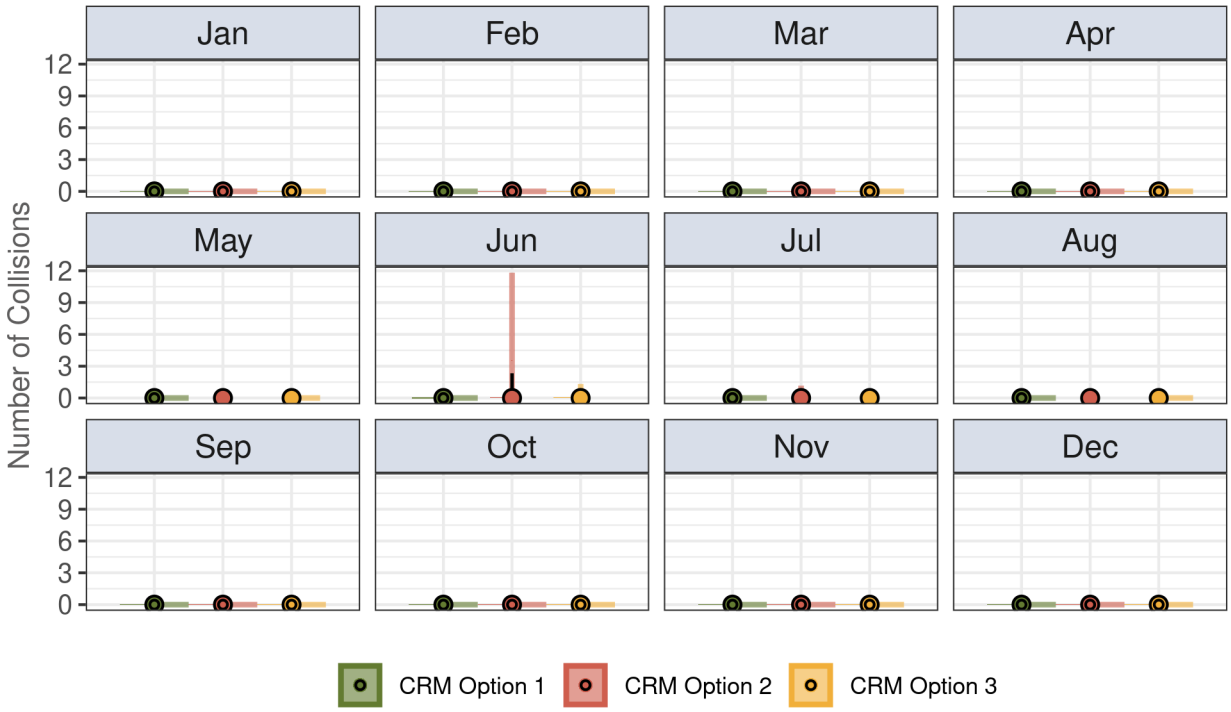
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney**, containing the following species:
    - Arctic Tern

2 West of Orkney

2.1 Arctic Tern

Figure 1: Collision risk estimates for Arctic Tern at West of Orkney, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Arctic Tern at West of Orkney, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2						
	Option 3						
February	Option 1						
	Option 2						
	Option 3						
March	Option 1						
	Option 2						

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 3						
April	Option 1						
	Option 2						
	Option 3						
May	Option 1						
	Option 2	0.025		0.069	277.749		0.185
	Option 3	0.002		0.007	351.150		0.016
June	Option 1	0.000		0.000			0.000
	Option 2	0.343		0.962	280.468		2.332
	Option 3	0.028		0.101	365.628		0.190
July	Option 1	0.000		0.000			0.000
	Option 2	0.055		0.113	205.342		0.322
	Option 3	0.004		0.011	264.308		0.030
August	Option 1	0.000		0.000			0.000
	Option 2	0.019		0.045	242.160		0.129
	Option 3	0.001		0.004	307.860		0.010
September	Option 1						
	Option 2						
	Option 3						
October	Option 1						
	Option 2						
	Option 3						
November	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
December	Option 1						
	Option 2						
	Option 3						

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

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NB: This is a prototype document. The inclusion of additional sections (e.g. tables with input values for each scenario) is currently under consideration.

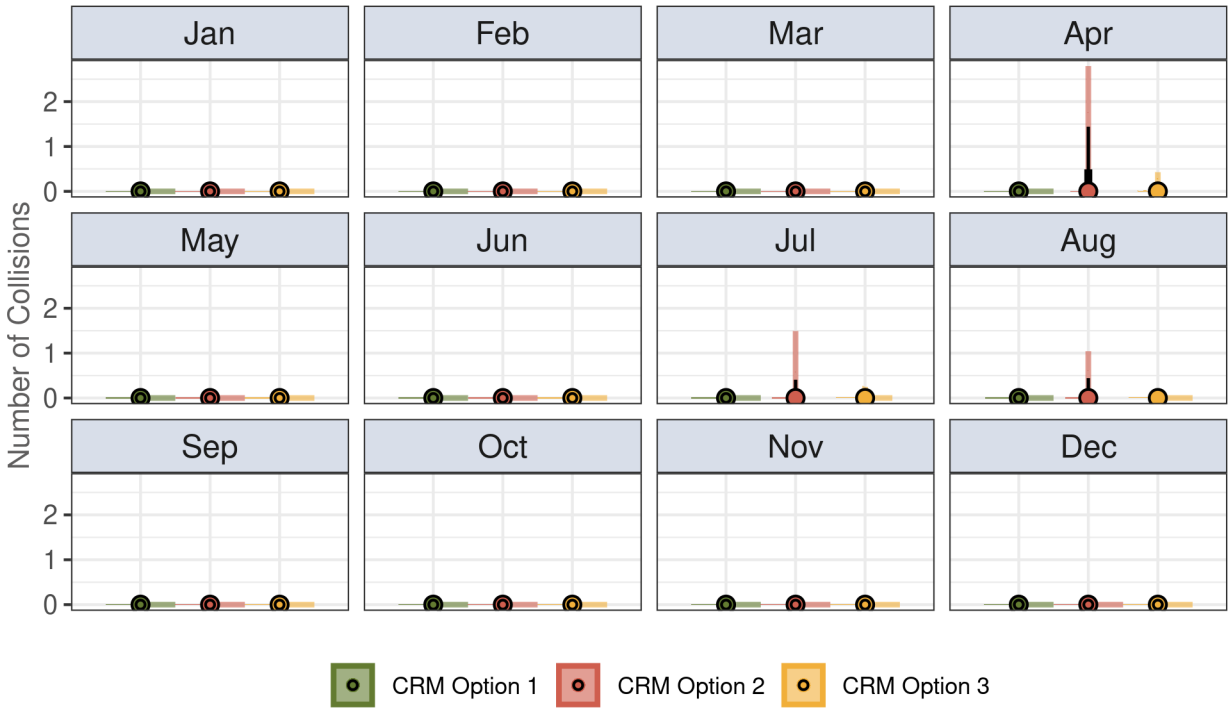
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney**, containing the following species:
    - Great skua

2 WEST OF ORKNEY

2.1 GREAT SKUA

Figure 1: Collision risk estimates for Great skua at West of Orkney, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Great skua at West of Orkney, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2						
	Option 3						
February	Option 1						
	Option 2						
	Option 3						
March	Option 1						
	Option 2						

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 3						
April	Option 1						
	Option 2	0.239		0.394	164.758		1.441
	Option 3	0.030		0.056	187.352		0.197
May	Option 1						
	Option 2						
	Option 3						
June	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
July	Option 1						
	Option 2	0.060		0.134	222.114		0.407
	Option 3	0.008		0.020	260.675		0.057
August	Option 1	0.000		0.000			0.000
	Option 2	0.055		0.122	221.218		0.443
	Option 3	0.007		0.017	247.710		0.060
September	Option 1						
	Option 2						
	Option 3						
October	Option 1						
	Option 2						
	Option 3						
November	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
December	Option 1						
	Option 2						
	Option 3						

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

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NB: This is a prototype document. The inclusion of additional sections (e.g. tables with input values for each scenario) is currently under consideration.

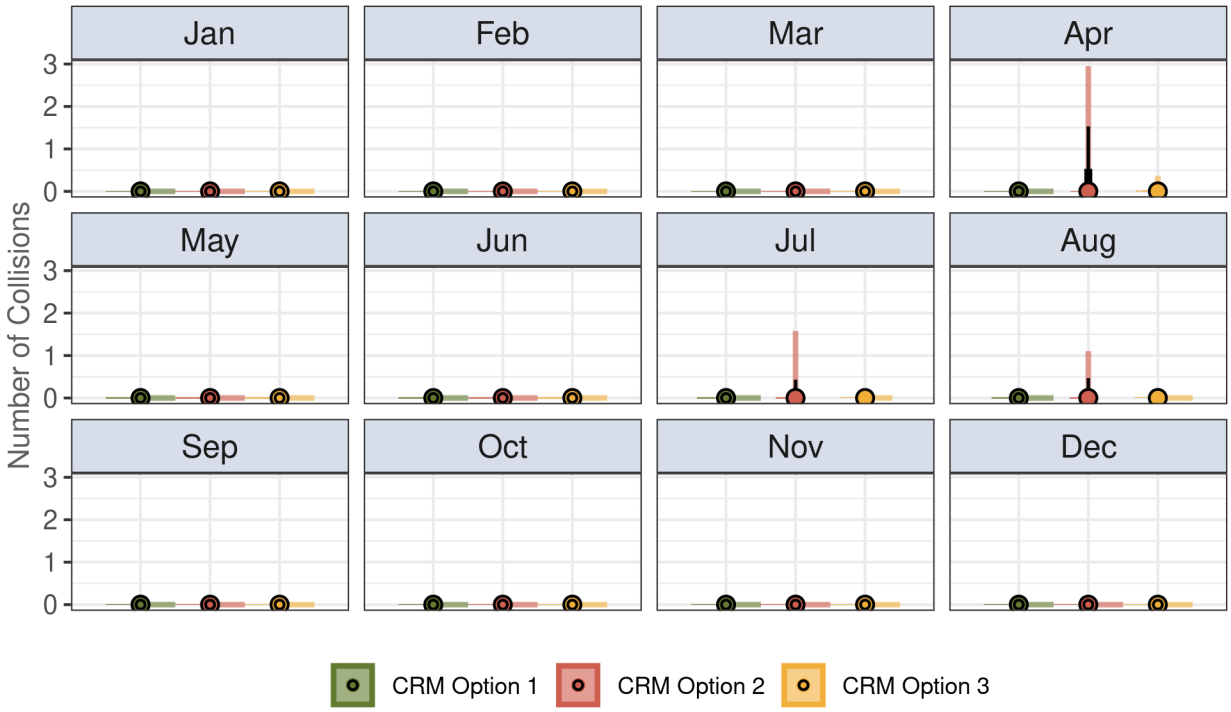
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney**, containing the following species:
    - Great skua

2 WEST OF ORKNEY

2.1 GREAT SKUA

Figure 1: Collision risk estimates for Great skua at West of Orkney, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Great skua at West of Orkney, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2						
	Option 3						
February	Option 1						
	Option 2						
	Option 3						
March	Option 1						
	Option 2						

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 3						
April	Option 1						
	Option 2	0.256		0.420	163.659		1.531
	Option 3	0.025		0.048	189.272		0.166
May	Option 1						
	Option 2						
	Option 3						
June	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
July	Option 1						
	Option 2	0.064		0.142	220.578		0.430
	Option 3	0.006		0.017	263.336		0.048
August	Option 1	0.000		0.000			0.000
	Option 2	0.059		0.130	219.895		0.468
	Option 3	0.006		0.015	249.569		0.050
September	Option 1						
	Option 2						
	Option 3						
October	Option 1						
	Option 2						
	Option 3						
November	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
December	Option 1						
	Option 2						
	Option 3						

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

sCRM Run Report: Collision Risk Estimates

26 May 2024

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NB: This is a prototype document. The inclusion of additional sections (e.g. tables with input values for each scenario) is currently under consideration.

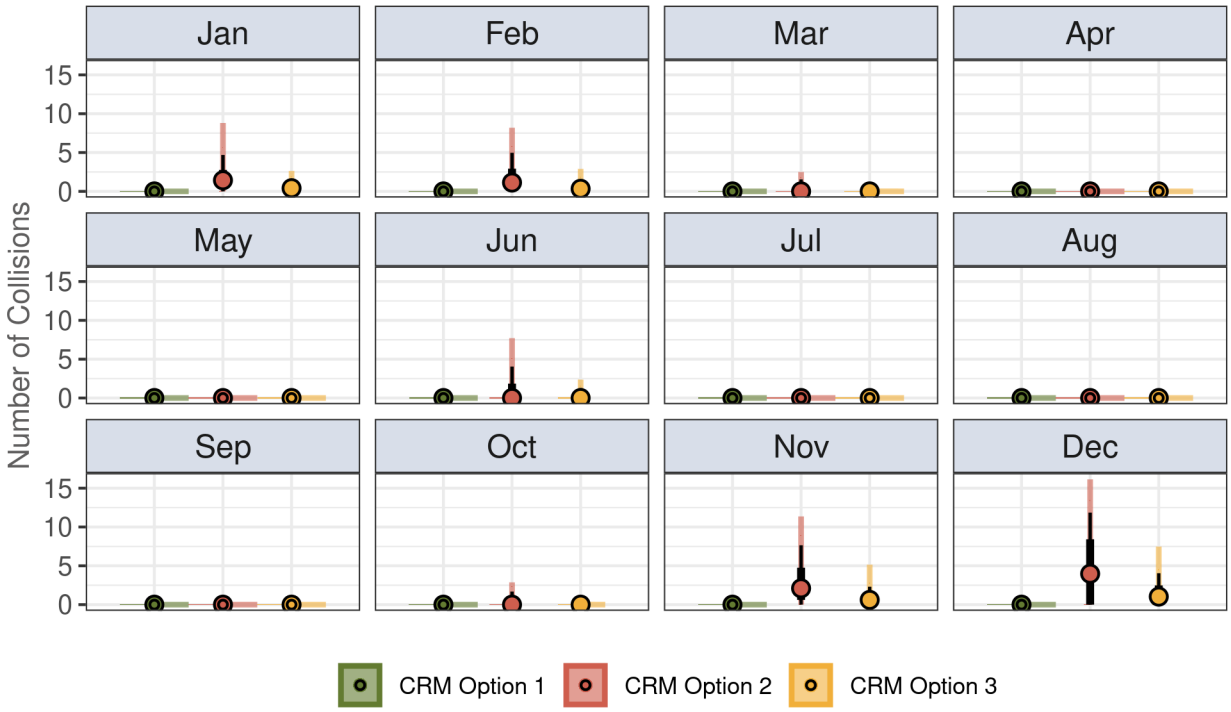
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney WCS**, containing the following species:
    - Great Black-backed Gull

2 WEST OF ORKNEY WCS

2.1 GREAT BLACK-BACKED GULL

Figure 1: Collision risk estimates for Great Black-backed Gull at West of Orkney WCS, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Great Black-backed Gull at West of Orkney WCS, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	1.675	1.427	1.253	74.777		4.686
	Option 3	0.490	0.409	0.391	79.793		1.497
February	Option 1	0.000	0.000	0.000			0.000
	Option 2	1.563	1.132	1.401	89.637		4.967
	Option 3	0.461	0.333	0.439	95.158		1.543
March	Option 1	0.000	0.000	0.000			0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	0.240		0.450	187.750		1.543
	Option 3	0.071		0.138	193.803		0.454
April	Option 1						
	Option 2						
	Option 3						
May	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
June	Option 1						
	Option 2	0.776		1.246	160.482		4.043
	Option 3	0.228		0.377	165.126		1.274
July	Option 1						
	Option 2						
	Option 3						
August	Option 1						
	Option 2	0.000		0.000			0.000
	Option 3						
September	Option 1						
	Option 2						
	Option 3						
October	Option 1						
	Option 2	0.304		0.506	166.711		1.680
	Option 3	0.091		0.158	174.582		0.504
November	Option 1	0.000		0.000			0.000
	Option 2	2.674	2.099	2.105	78.735		7.644
	Option 3	0.779	0.610	0.646	82.906		2.307
December	Option 1	0.000	0.000	0.000			0.000
	Option 2	4.207	3.979	3.890	92.457		11.850

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 3	1.240	1.032	1.213	97.854		4.045

3 REFERENCES

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Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

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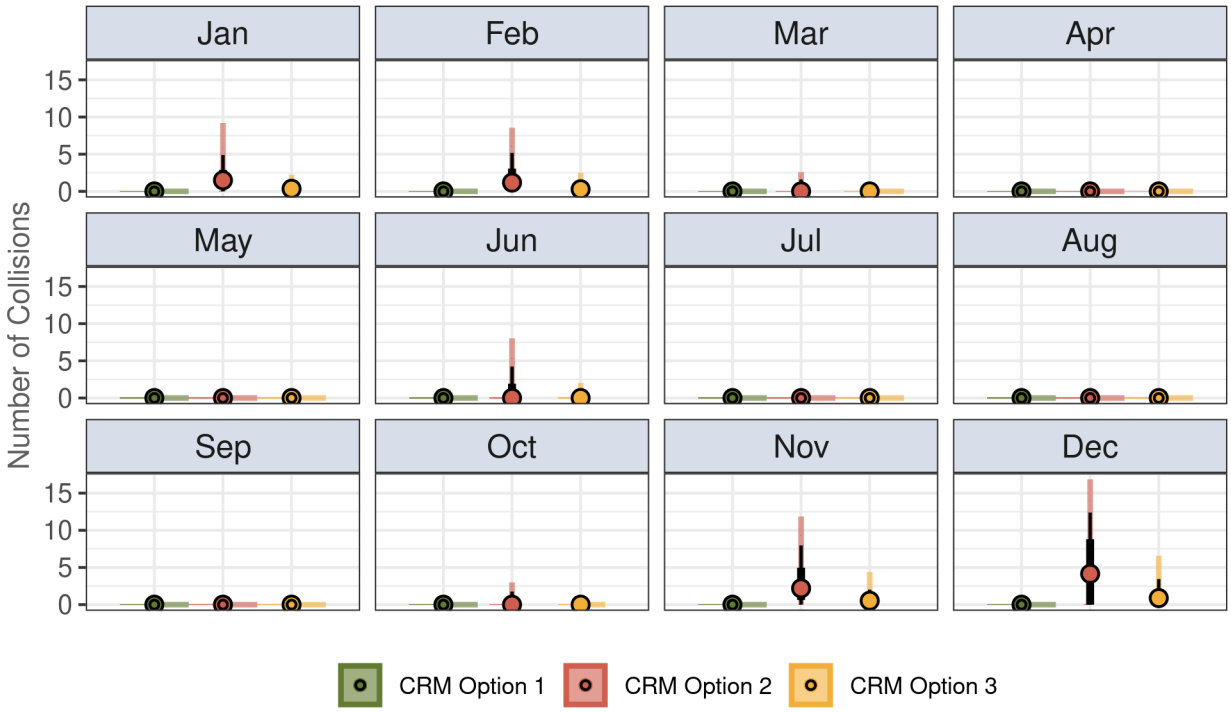
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney WCS**, containing the following species:
    - Great Black-backed Gull

2 WEST OF ORKNEY WCS

2.1 GREAT BLACK-BACKED GULL

Figure 1: Collision risk estimates for Great Black-backed Gull at West of Orkney WCS, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Great Black-backed Gull at West of Orkney WCS, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	1.749	1.491	1.307	74.740		4.890
	Option 3	0.419	0.349	0.335	79.840		1.307
February	Option 1	0.000	0.000	0.000			0.000
	Option 2	1.632	1.180	1.463	89.617		5.173
	Option 3	0.395	0.285	0.378	95.606		1.340
March	Option 1	0.000	0.000	0.000			0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	0.250		0.470	187.727		1.610
	Option 3	0.061		0.118	193.906		0.390
April	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
May	Option 1						
	Option 2						
	Option 3						
June	Option 1						
	Option 2	0.810		1.300	160.458		4.233
	Option 3	0.195		0.323	165.286		1.079
July	Option 1	0.000		0.000			0.000
	Option 2						
	Option 3						
August	Option 1						
	Option 2						
	Option 3						
September	Option 1						
	Option 2						
	Option 3						
October	Option 1						
	Option 2	0.317		0.528	166.669		1.754
	Option 3	0.078		0.135	174.702		0.440
November	Option 1	0.000		0.000			0.000
	Option 2	2.792	2.190	2.198	78.703		7.969
	Option 3	0.666	0.521	0.552	82.825		2.015
December	Option 1	0.000	0.000	0.000			0.000
	Option 2	4.393	4.148	4.061	92.431		12.379

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 3	1.061	0.881	1.040	98.008		3.441

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

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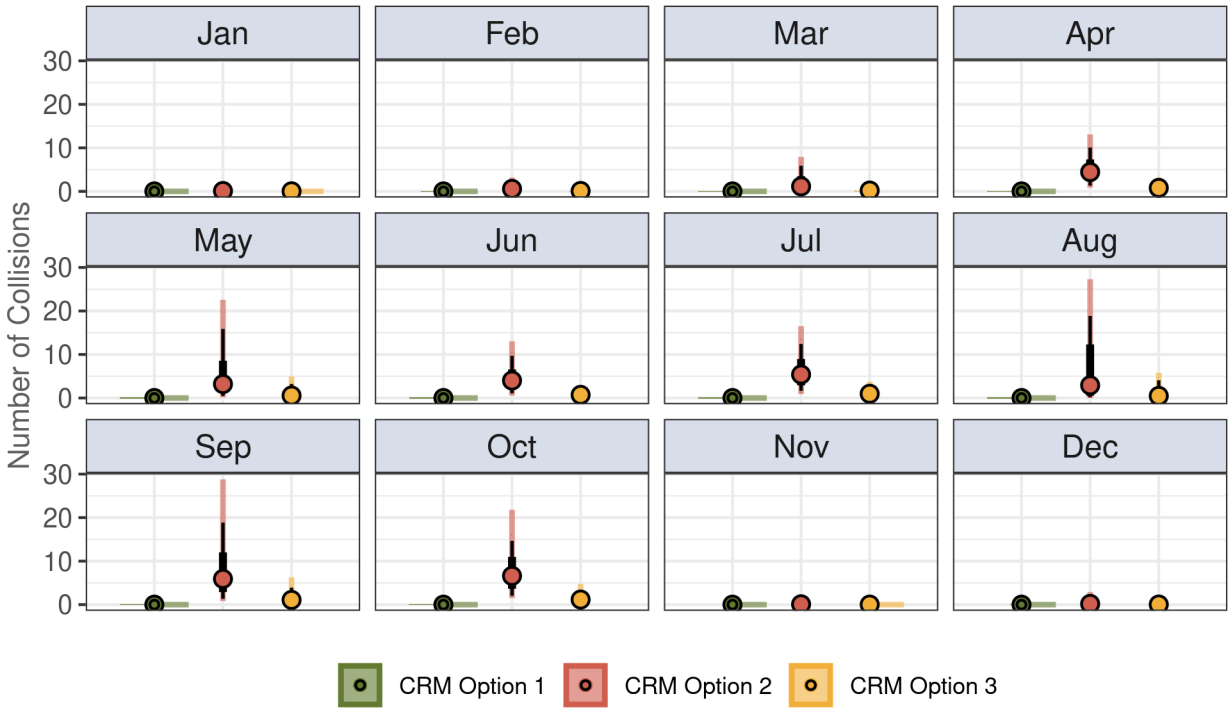
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney WCS**, containing the following species:
    - Northern Gannet

2 WEST OF ORKNEY WCS

2.1 NORTHERN GANNET

Figure 1: Collision risk estimates for Northern Gannet at West of Orkney WCS, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Northern Gannet at West of Orkney WCS, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000			0.000
	Option 2	0.115	0.088	0.125	108.530		0.443
	Option 3	0.022	0.015	0.026	118.415		0.090
February	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	0.663	0.569	0.555	83.653		1.971
	Option 3	0.125	0.093	0.117	93.372		0.421
March	Option 1	0.000	0.000	0.000			0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	1.791	1.146	1.725	96.293	0.070	5.893
	Option 3	0.337	0.192	0.356	105.688	0.010	1.252
April	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	4.798	4.449	2.461	51.288	1.323	10.068
	Option 3	0.904	0.800	0.559	61.839	0.182	2.143
May	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	4.658	3.199	4.107	88.174	0.490	15.868
	Option 3	0.879	0.559	0.865	98.309	0.069	3.220
June	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	4.305	4.014	2.279	52.928	1.086	9.699
	Option 3	0.810	0.724	0.510	62.951	0.156	2.029
July	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	5.909	5.395	2.967	50.216	1.653	12.425
	Option 3	1.114	0.974	0.678	60.891	0.228	2.607
August	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	5.647	2.921	5.952	105.402	0.182	18.859
	Option 3	1.057	0.481	1.207	114.177	0.028	4.058
September	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	7.206	5.915	4.768	66.169	1.348	18.857
	Option 3	1.361	1.087	1.035	76.018	0.185	3.906
October	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	7.210	6.606	3.527	48.916	2.046	14.649
	Option 3	1.357	1.171	0.810	59.739	0.283	3.115
November	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	0.116	0.085	0.137	118.010		0.462
	Option 3	0.022	0.014	0.028	127.519		0.098
December	Option 1	0.000	0.000	0.000			0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	0.253	0.174	0.256	101.086		0.853
	Option 3	0.048	0.030	0.053	110.849		0.179

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

sCRM Run Report: Collision Risk Estimates

26 May 2024

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NB: This is a prototype document. The inclusion of additional sections (e.g. tables with input values for each scenario) is currently under consideration.

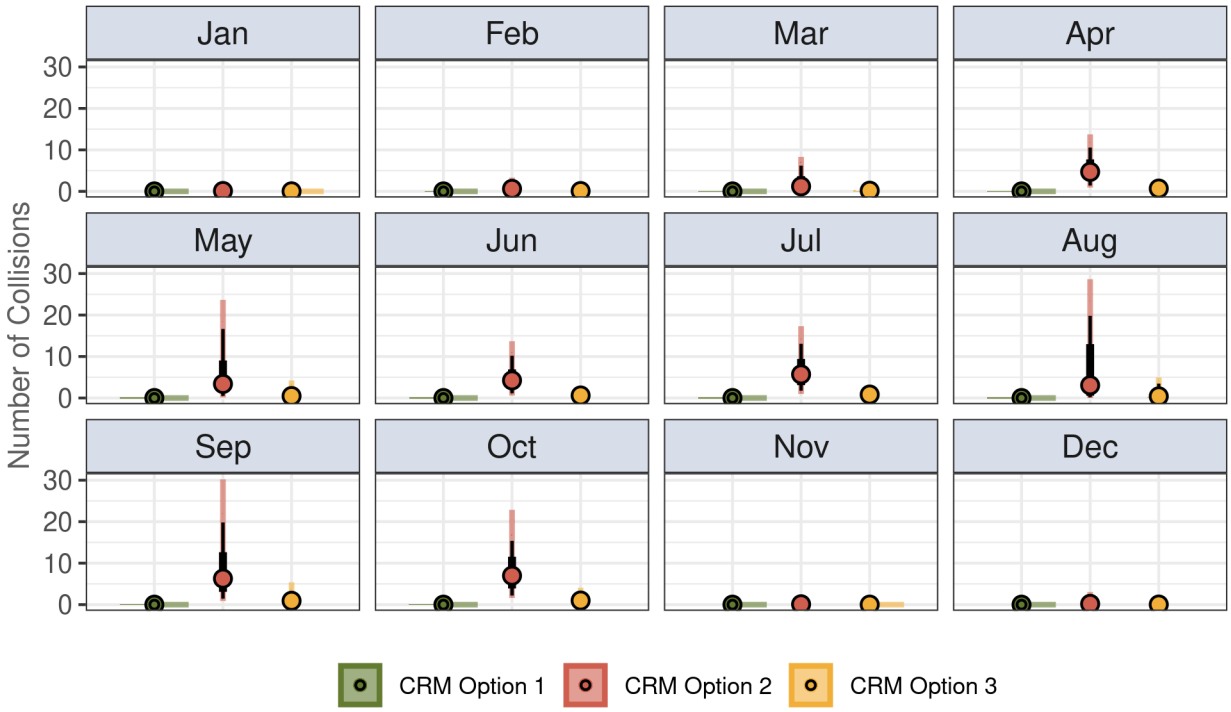
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney WCS**, containing the following species:
    - Northern Gannet

2 WEST OF ORKNEY WCS

2.1 NORTHERN GANNET

Figure 1: Collision risk estimates for Northern Gannet at West of Orkney WCS, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Northern Gannet at West of Orkney WCS, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000			0.000
	Option 2	0.122	0.093	0.132	108.163		0.469
	Option 3	0.019	0.012	0.022	118.957		0.076
February	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	0.700	0.604	0.583	83.278		2.072
	Option 3	0.106	0.078	0.100	93.972		0.361
March	Option 1	0.000	0.000	0.000			0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	1.891	1.206	1.814	95.937	0.075	6.199
	Option 3	0.286	0.161	0.304	106.279	0.008	1.069
April	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	5.065	4.709	2.575	50.842	1.414	10.556
	Option 3	0.767	0.678	0.480	62.481	0.151	1.832
May	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	4.917	3.385	4.316	87.775	0.526	16.648
	Option 3	0.747	0.474	0.739	98.922	0.057	2.753
June	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	4.545	4.240	2.386	52.498	1.157	10.190
	Option 3	0.688	0.611	0.438	63.623	0.129	1.736
July	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	6.239	5.696	3.105	49.772	1.776	13.062
	Option 3	0.946	0.830	0.583	61.599	0.190	2.231
August	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	5.962	3.070	6.263	105.039	0.193	19.816
	Option 3	0.898	0.399	1.030	114.754	0.023	3.466
September	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	7.607	6.273	5.004	65.776	1.445	19.813
	Option 3	1.157	0.919	0.887	76.710	0.151	3.336
October	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	7.612	6.976	3.688	48.452	2.196	15.386
	Option 3	1.152	0.988	0.696	60.414	0.235	2.658
November	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	0.122	0.090	0.144	117.652		0.484
	Option 3	0.019	0.012	0.024	128.078		0.083
December	Option 1	0.000	0.000	0.000			0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	0.267	0.183	0.269	100.690		0.901
	Option 3	0.040	0.025	0.045	111.574		0.154

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

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NB: This is a prototype document. The inclusion of additional sections (e.g. tables with input values for each scenario) is currently under consideration.

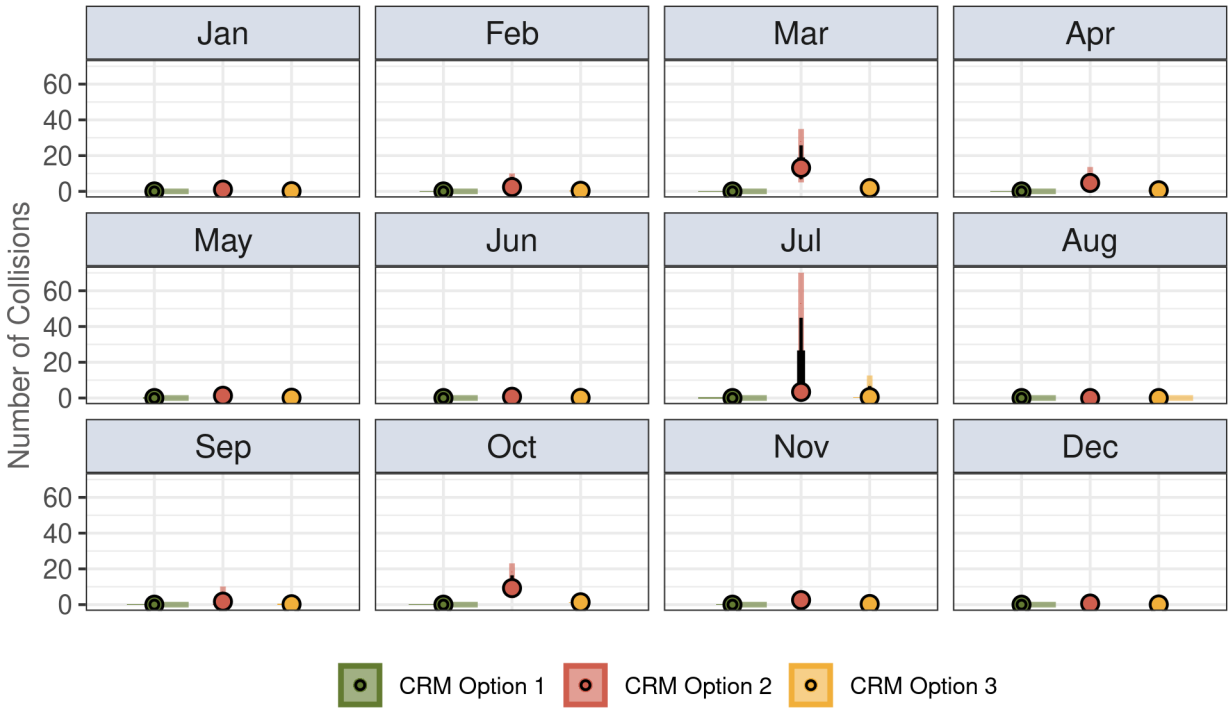
1 sCRM Run Overview

- Simulation mode: Stochastic
- Number of iterations: 1000
- Wind farm scenarios specified:
  - **West of Orkney WCS**, containing the following species:
    - Black-legged Kittiwake

2 WEST OF ORKNEY WCS

2.1 BLACK-LEGGED KITTIWAKE

Figure 1: Collision risk estimates for Black-legged Kittiwake at West of Orkney WCS, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Black-legged Kittiwake at West of Orkney WCS, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	1.021	0.999	0.391	38.259	0.320	1.903
	Option 3	0.146	0.141	0.060	40.851	0.044	0.279
February	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	3.149	2.395	2.217	70.408	0.523	8.133
	Option 3	0.450	0.333	0.323	71.828	0.072	1.216
March	Option 1	0.000	0.000	0.000		0.000	0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	13.972	13.186	5.034	36.025	6.899	25.761
	Option 3	1.995	1.847	0.765	38.326	0.917	3.783
April	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	4.855	4.711	2.730	56.229	0.979	10.166
	Option 3	0.693	0.636	0.404	58.253	0.129	1.532
May	Option 1	0.000	0.000	0.000			0.000
	Option 2	1.351	1.270	0.923	68.316		3.149
	Option 3	0.193	0.181	0.135	70.210		0.470
June	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	0.745	0.701	0.408	54.715		1.634
	Option 3	0.107	0.099	0.060	56.622		0.246
July	Option 1	0.000	0.000	0.000			0.000
	Option 2	12.161	3.399	13.547	111.401	1.077	44.894
	Option 3	1.741	0.492	1.968	113.046	0.146	6.682
August	Option 1	0.000	0.000	0.000			0.000
	Option 2	0.115		0.185	160.437		0.602
	Option 3	0.016		0.027	161.955		0.083
September	Option 1	0.000		0.000		0.000	0.000
	Option 2	2.096	1.682	2.152	102.649		6.698
	Option 3	0.300	0.231	0.313	104.424		0.989
October	Option 1	0.000	0.000	0.000			0.000
	Option 2	9.821	9.247	3.194	32.520	4.691	16.414
	Option 3	1.404	1.315	0.498	35.447	0.637	2.510
November	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	2.780	2.548	1.317	47.387	0.827	5.684
	Option 3	0.398	0.360	0.197	49.599	0.112	0.868
December	Option 1	0.000	0.000	0.000		0.000	0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	0.636	0.612	0.306	48.116	0.145	1.318
	Option 3	0.091	0.086	0.046	50.303	0.020	0.192

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

Masden, E (2015) Developing an avian collision risk model to incorporate variability and uncertainty. Scottish Marine and Freshwater Science Report Vol 6 No 14. Marine Scotland Science. ISSN: 2043-7722 DOI: 10.7489/1659-1

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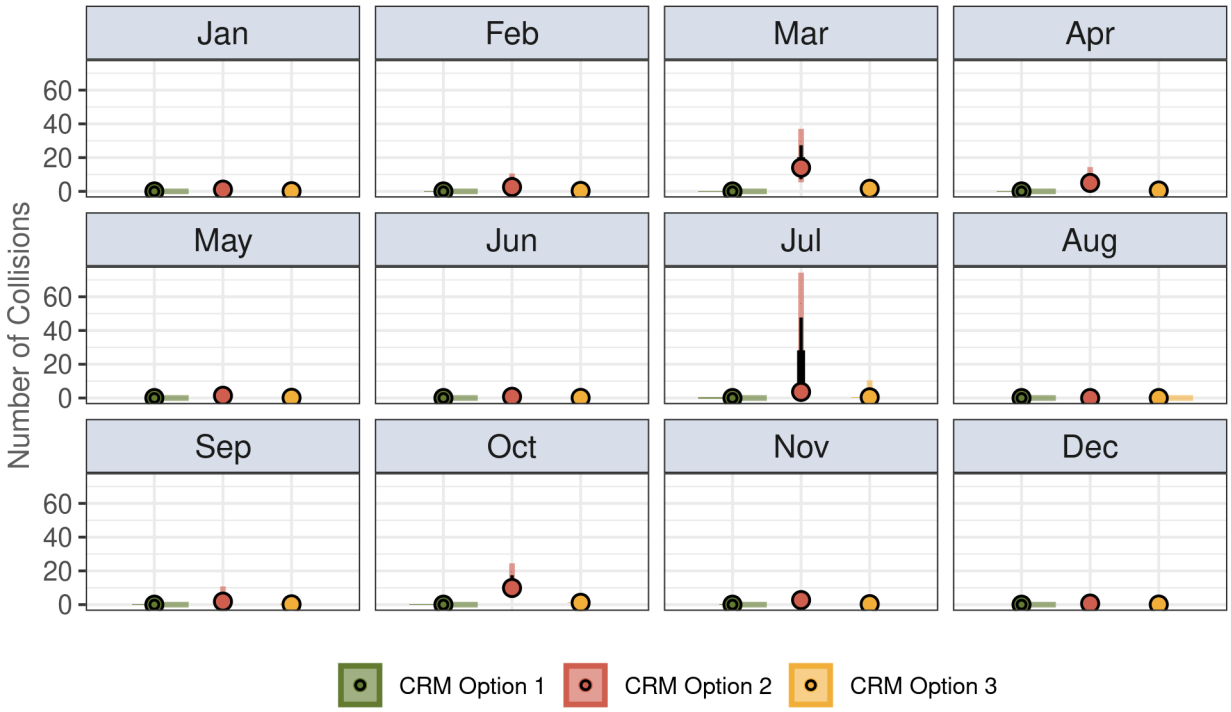
    - Black-legged Kittiwake

2 WEST OF ORKNEY WCS

2.1 BLACK-LEGGED KITTIWAKE

Figure 1: Collision risk estimates for Black-legged Kittiwake at West of Orkney WCS, by Month. Density distribution, median, 66% and 95% quantile intervals and quantile dotplots (each dot represents ~2% chance outcome) of simulated values



Summary statistics of collision estimates for Black-legged Kittiwake at West of Orkney WCS, by Month

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
January	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	1.085	1.061	0.415	38.194	0.340	2.021
	Option 3	0.123	0.119	0.050	40.934	0.037	0.235
February	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	3.348	2.549	2.356	70.366	0.558	8.623
	Option 3	0.379	0.280	0.272	71.903	0.061	1.023
March	Option 1	0.000	0.000	0.000		0.000	0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	14.854	14.032	5.342	35.961	7.331	27.346
	Option 3	1.680	1.556	0.646	38.429	0.766	3.200
April	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	5.161	5.003	2.900	56.186	1.044	10.798
	Option 3	0.584	0.535	0.340	58.315	0.108	1.296
May	Option 1	0.000	0.000	0.000			0.000
	Option 2	1.436	1.349	0.980	68.258		3.346
	Option 3	0.162	0.153	0.114	70.307		0.398
June	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	0.792	0.746	0.433	54.666		1.736
	Option 3	0.090	0.083	0.051	56.701		0.208
July	Option 1	0.000	0.000	0.000			0.000
	Option 2	12.927	3.612	14.396	111.362	1.147	47.709
	Option 3	1.466	0.415	1.658	113.066	0.123	5.638
August	Option 1	0.000	0.000	0.000			0.000
	Option 2	0.122		0.196	160.397		0.642
	Option 3	0.014		0.022	162.047		0.070
September	Option 1	0.000		0.000		0.000	0.000
	Option 2	2.228	1.791	2.286	102.600		7.106
	Option 3	0.253	0.195	0.264	104.520		0.833
October	Option 1	0.000	0.000	0.000			0.000
	Option 2	10.440	9.865	3.387	32.441	4.998	17.435
	Option 3	1.182	1.107	0.420	35.555	0.534	2.116
November	Option 1	0.000	0.000	0.000		0.000	0.000
	Option 2	2.955	2.708	1.399	47.326	0.883	6.030
	Option 3	0.335	0.302	0.166	49.689	0.094	0.734
December	Option 1	0.000	0.000	0.000		0.000	0.000

Time Period	CRM Option	Mean	Median	SD	CV	2.5%	97.5%
	Option 2	0.676	0.651	0.325	48.058	0.155	1.401
	Option 3	0.077	0.072	0.039	50.383	0.017	0.163

3 REFERENCES

Band, B. (2012) Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report, The Crown Estate.

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