Bowdun Offshore Wind Farm, Offshore EIA Report

Volume 3, Technical Appendix 11.1, Annex D: Comparison of MRSea-Based and Design-Based Outputs of Birds in the Digital Aerial Surveys

TWP-BOW-RPS-OFE-RPT-00091 | April 2026

Contents

This annex contains the comparison of MRSea-based and design-based estimates of all bird species for which MRSea was implemented. The numbers are given for the entire survey area only. Surveys flown over the Extended Digital Aerial Survey (DAS) Area (DAS Area extended to the Aberdeenshire coastline) are highlighted with an asterisk (*), the remaining surveys were flown over the DAS Area (E3 POA plus a 12 km buffer). The DAS Area only was surveyed during winter months (September to March inclusive) and the Extended DAS Area (April to August inclusive).

To improve readability of the tables, hyphens are used to indicate instances when no individuals of a particular species were observed. 95% confidence intervals are given in parentheses.

Tables

Table D1.1: Fulmar Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	707 (215 to 1,732)	699 (537 to 888)	1.1%
2022-04*	604 (242 to 1,329)	577 (429 to 744)	4.48%
2022-05*	1,019 (402 to 2,076)	1,034 (875 to 1,209)	-1.42%
2022-06*	3,049 (1,155 to 7,413)	3,187 (2,061 to 4,317)	-4.52%
2022-07*	4,211 (2,266 to 7,531)	4,172 (3,070 to 5,289)	0.92%
2022-08*	870 (326 to 1,880)	8,79 (734 to 1,037)	-1.04%
2022-09	642 (219 to 1,480)	650 (508 to 802)	-1.26%
2022-10	102 (24 to 291)	104 (62 to 154)	-1.76%
2022-11	2,133 (868 to 4,211)	2137 (1,751 to 2,574)	-0.18%
2022-12	958 (670 to 1,312)	953 (783 to 1,107)	0.5%
2023-01	1,426 (724 to 2,440)	1,449 (1,241 to 1,624)	-1.63%
2023-02	761 (290 to 1,558)	753 (615 to 881)	1.07%
2023-03	1,043 (452 to 2,054)	1,032 (869 to 1,194)	1.06%
2023-04*	5,106 (1,859 to 10,622)	4,469 (2911 to 6,072)	12.48%
2023-05*	1,053 (400 to 2,175)	1,064 (876 to 1,262)	-1.06%
2023-06*	840 (206 to 2,924)	820 (625 to 978)	2.32%
2023-07*	702 (293 to 1,364)	705 (575 to 848)	-0.4%
2023-08*	1,561 (920 to 2,429)	1,591 (1,293 to 1,846)	-1.92%
2023-09	1,210 (401 to 2,803)	1,220 (988 to 1,487)	-0.82%
2023-10	403 (153 to 837)	426 (190 to 685)	-5.77%
2023-11	500 (163 to 1,188)	492 (323 to 656)	0.51%
2023-12	1,390 (620 to 2,583)	1,388 (1,187 to 1,578)	0.2%
2024-01	1,096 (320 to 2,623)	1,068 (829 to 1,306)	2.55%
2024-02	485 (145 to 1,226)	476 (374 to 574)	1.76%

Table D1.2: Gannet Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	731 (234 to 1,807)	724 (544 to 883)	1.04%
2022-04*	2,741 (1,161 to 5,689)	2,661 (2,204 to 3,118)	2.91%
2022-05*	5,917 (3,279 to 9,771)	5,938 (4,967 to 6,998)	-0.36%
2022-06*	7,282 (4,616 to 10,694)	7,283 (6,672 to 7,897)	-0.01%
2022-07*	1,787 (789 to 3,385)	1,788 (1,569 to 2,015)	-0.06%
2022-08*	603 (162 to 1598)	598 (428 to 767)	0.77%
2022-09	2,438 (1,206 to 4,280)	2,439 (2,098 to 2,787)	-0.04%
2022-10	729 (333 to 1,389)	729 (568 to 909)	-0.05%
2022-11	94 (34 to 243)	93 (46 to 137)	1.72%
2022-12	277 (76 to 783)	291 (215 to 374)	-4.91%
2023-01	-	24 (0 to 53)	-
2023-02	97 (40 to 194)	97 (39 to 152)	-0.57%
2023-03	-	30 (11 to 58)	-
2023-04*	2,461 (1,008 to 5,057)	2,416 (2,035 to 2,843)	1.85%
2023-05*	1,938 (801 to 3,961)	1,794 (1,100 to 2,623)	7.43%
2023-06*	1,355 (808 to 2,121)	1,296 (951 to 1,670)	4.37%
2023-07*	1,864 (873 to 3,334)	1,897 (1,663 to 2,159)	-1.78%
2023-08*	2,790 (1,372 to 4,947)	2,776 (2,478 to 3,091)	0.49%
2023-09	2,011 (839 to 3,872)	2,014 (1,689 to 2,338)	-0.17%
2023-10	899 (303 to 2,002)	901 (731 to 1053)	-0.13%
2023-11	102 (26 to 316)	97 (48 to 141)	5.29%
2023-12	-	-	-
2024-01	-	11 (0 to 29)	-
2024-02	-	12 (0 to 29)	-

Table D1.3: Kittiwake Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	2,188 (869 to 4,358)	2,151 (1,720 to 2,603)	1.71%
2022-04*	14,547 (8,374 to 23,420)	14,658 (10,166 to 18,767)	-0.77%
2022-05*	17,443 (8,914 to 33,294)	16,891 (13,314 to 21,179)	3.16%
2022-06*	36,456 (25,441 to 50,277)	35,843 (30,628 to 41,138)	1.68%
2022-07*	28,027 (20,086 to 37,408)	27,339 (25,110 to 29,286)	2.46%
2022-08*	56,257 (35,210 to 84,659)	54,909 (50,463 to 59,837)	2.39%
2022-09	1,093 (540 to 1,899)	1,100 (842 to 1,387)	-0.63%
2022-10	2,335 (1,128 to 4,240)	2,334 (1,900 to 2,743)	0.04%
2022-11	1,012 (523 to 1,763)	1,014 (843 to 1,182)	-0.2%
2022-12	697 (252 to 1,529)	696 (579 to 820)	0.18%
2023-01	543 (213 to 1,107)	572 (272 to 1,017)	-5.31%
2023-02	1,813 (568 to 4,384)	1,781 (1,370 to 2,181)	1.77%
2023-03	2,847 (1,815 to 4,293)	2,873 (2,524 to 3,270)	-0.94%
2023-04*	13,448 (9,537 to 18,208)	9,837 (7,820 to 12,188)	26.85%
2023-05*	18,964 (12,341 to 27,498)	17,649 (14,692 to 21,577)	6.94%
2023-06*	11,629 (7,218 to 17,294)	11,569 (10,434 to 12,922)	0.52%
2023-07*	8,383 (6,155 to 11,103)	8,269 (6,674 to 10,277)	1.36%
2023-08*	5,345 (2,405 to 10,083)	5,332 (4,032 to 6,786)	0.24%
2023-09	185 (61 to 411)	193 (96 to 296)	-4.29%
2023-10	243 (75 to 663)	239 (152 to 323)	1.75%
2023-11	237 (88 to 537)	241 (146 to 330)	-1.62%
2023-12	101 (38 to 224)	101 (52 to 148)	-0.43%
2024-01	127 (25 to 412)	129 (73 to 195)	-1.39%
2024-02	116 (38 to 259)	118 (58 to 192)	-1.49%

Table D1.4: Great Black-backed Gull Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	-	28 (0 to 73)	-
2022-04*	-	58 (12 to 116)	-
2022-05*	-	35 (11 to 63)	-
2022-06*	127 (52 to 270)	122 (66 to 181)	3.59%
2022-07*	-	25 (6 to 51)	-
2022-08*	89 (39 to 170)	88 (29 to 144)	0.75%
2022-09	-	-	-
2022-10	70 (23 to 163)	70 (35 to 111)	-0.15%
2022-11	130 (22 to 458)	128 (64 to 188)	1.20%
2022-12	317 (61 to 1,015)	318 (235 to 411)	-0.21%
2023-01	-	18 (0 to 36)	-
2023-02	-	12 (0 to 24)	-
2023-03	-	23 (0 to 41)	-
2023-04*	-	55 (18 to 92)	-
2023-05*	54 (34 to 83)	52 (17 to 81)	3.26%
2023-06*	79 (27 to 196)	82 (35 to 129)	-4.70%
2023-07*	-	30 (6 to 64)	-
2023-08*	-	29 (6 to 53)	-
2023-09	-	-	-
2023-10	-	-	-
2023-11	87 (27 to 212)	82 (37 to 130)	4.8%
2023-12	165 (71 to 309)	164 (102 to 223)	0.12%
2024-01	-	23 (6 to 47)	-
2024-02	-	30 (6 to 53)	-

Table D1.5: Herring Gull Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	-	14 (0 to 33)	-
2022-04*	1,785 (341 to 5,546)	1,821 (1,086 to 2,549)	-1.99%
2022-05*	11,459 (2,427 to 40,461)	11,487 (5,438 to 19,290)	-0.25%
2022-06*	13,700 (8,633 to 20,207)	12,262 (10,216 to 14,488)	10.50%
2022-07*	11,061 (4,887 to 20,364)	9,796 (8,115 to 11,656)	11.44%
2022-08*	10,459 (5,944 to 16,511)	9,173 (7,792 to 10,564)	12.30%
2022-09	-	12 (0 to 35)	-
2022-10	224 (127 to 375)	215 (128 to 310)	4.11%
2022-11	-	29 (6 to 53)	-
2022-12	476 (158 to 1,136)	479 (383 to 597)	-0.52%
2023-01	-	-	-
2023-02	-	53 (23 to 86)	-
2023-03	-	23 (6 to 46)	-
2023-04*	3,822 (1,704 to 7,191)	4,574 (2,783 to 6,528)	-19.68%
2023-05*	3,970 (2,538 to 5,800)	3,288 (1,037 to 6,465)	17.19%
2023-06*	12,006 (5,908 to 21,463)	11,840 (9,877 to 13,684)	1.38%
2023-07*	4,299 (1,847 to 8,446)	2,883 (222 to 6,544)	32.93%
2023-08*	3,242 (268 to 30,116)	3,537 (916 to 6,477)	-9.11%
2023-09	-	-	-
2023-10	-	-	-
2023-11	132 (60 to 250)	129 (69 to 197)	2.15%
2023-12	-	30 (6 to 55)	-
2024-01	88 (16 to 311)	88 (35 to 146)	-0.74%
2024-02	-	12 (0 to 24)	-

Table D1.6: Arctic Tern Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	-	-	-
2022-04*	-	80 (0 to 193)	-
2022-05*	-	38 (0 to 77)	-
2022-06*	-	-	-
2022-07*	-	25 (0 to 58)	-
2022-08*	2,229 (739 to 5,081)	2,129 (1,367 to 3,085)	4.48%
2022-09	-	-	-
2022-10	-	-	-
2022-11	-	-	-
2022-12	-	-	-
2023-01	-	-	-
2023-02	-	-	-
2023-03	-	-	-
2023-04*	-	220 (95 to 352)	-
2023-05*	-	97 (24 to 171)	-
2023-06*	-	23 (0 to 52)	-
2023-07*	2,575 (723 to 7,256)	2,393 (1,549 to 3,473)	7.08%
2023-08*	2,225 (965 to 4,232)	2,384 (1,750 to 3,025)	-7.17%
2023-09	-	-	-
2023-10	-	-	-
2023-11	-	-	-
2023-12	-	-	-
2024-01	-	-	-
2024-02	-	-	-

Table D1.7: Guillemot Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	90,315 (72,044 to 111,160)	89,305 (85,519 to 93,825)	1.12%
2022-04*	91,993 (66,069 to 123,510)	89,792 (81,535 to 97,563)	2.39%
2022-05*	191,548 (152,609 to 235,343)	189,818 (177,946 to 203,244)	0.90%
2022-06*	115,309 (95,323 to 137,517)	113,902 (100,052 to 131,832)	1.22%
2022-07*	130,066 (106,244 to 156,745)	128,675 (121,276 to 136,057)	1.07%
2022-08*	190,870 (142,648 to 246,936)	189,473 (181,124 to 197,558)	0.73%
2022-09	29,079 (17,264 to 46,295)	28,692 (26,080 to 31,139)	1.33%
2022-10	21,080 (15,344 to 28,476)	20,873 (19,104 to 22,579)	0.98%
2022-11	2,344 (1,253 to 3,929)	2,416 (2,077 to 2,716)	-3.04%
2022-12	8,195 (5,259 to 11,898)	8,121 (7,461 to 8,723)	0.91%
2023-01	3,899 (1,806 to 7,545)	3,830 (3,192 to 4,440)	1.76%
2023-02	17,293 (12,617 to 22,998)	17,423 (16,271 to 18,534)	-0.76%
2023-03	20,537 (15,837 to 26,037)	20,281 (19,083 to 21,448)	1.24%
2023-04*	138,329 (106,661 to 174,922)	13,4447 (117,426 to 151,675)	2.81%
2023-05*	163,807 (124,515 to 209,756)	161,929 (146,396 to 181,261)	1.15%
2023-06*	122,511 (93,590 to 155,289)	121,550 (115,774 to 126,857)	0.78%
2023-07*	14,383 (9,734 to 20,297)	142,32 (12,869 to 15,562)	1.05%
2023-08*	18,120 (10,750 to 28,244)	18,664 (16,562 to 20,683)	-3.00%
2023-09	6,354 (3,146 to 11,965)	6,283 (4,860 to 7,630)	1.11%
2023-10	1,395 (926 to 2,000)	1,393 (1,136 to 1,683)	0.16%
2023-11	2,991 (1,515 to 5,100)	2,957 (2,561 to 3,344)	1.14%
2023-12	4,035 (2,311 to 6,449)	4,039 (3,564 to 4,470)	-0.10%
2024-01	6,919 (4,324 to 10,329)	6,761 (6,219 to 7,388)	2.28%
2024-02	1,390 (434 to 3,323)	1,389 (1,113 to 1,672)	0.08%

Table D1.8: Razorbill Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	2,278 (972 to 4,523)	2,290 (1,942 to 2,640)	-0.51%
2022-04*	22,716 (16,272 to 30,486)	22,028 (17,916 to 25,182)	3.03%
2022-05*	16,074 (11,173 to 22,731)	15,979 (13,772 to 18,284)	0.59%
2022-06*	10,319 (6,322 to 15,826)	10,255 (8,680 to 11,948)	0.62%
2022-07*	11,561 (6,937 to 17,794)	11,618 (9,435 to 14,352)	-0.5%
2022-08*	66,378 (41,923 to 97,698)	66,653 (62,827 to 70,415)	-0.41%
2022-09	3,371 (1,829 to 5,556)	3,396 (2,854 to 3,882)	-0.74%
2022-10	1,468 (674 to 3,101)	1,484 (1,191 to 1,781)	-1.07%
2022-11	1,064 (409 to 2,485)	929 (673 to 1,187)	12.67%
2022-12	2,490 (1,203 to 4,519)	2,482 (2,107 to 2,842)	0.31%
2023-01	320 (151 to 578)	324 (205 to 448)	-1.23%
2023-02	2867 (1,412 to 5,358)	2,936 (2,447 to 3,517)	-2.41%
2023-03	4,573 (2,309 to 7,996)	4,629 (3,921 to 5,322)	-1.23%
2023-04*	13,435 (9,482 to 18,721)	13,065 (11,192 to 14,920)	2.75%
2023-05*	12,949 (8,822 to 18,098)	12,069 (10,633 to 13,638)	6.79%
2023-06*	20,708 (14,380 to 28,709)	20,534 (18,842 to 22,341)	0.84%
2023-07*	9,358 (6,523 to 12,957)	9,894 (8,531 to 11,281)	-5.72%
2023-08*	9,629 (6,650 to 13,401)	10,119 (8,416 to 11,738)	-5.09%
2023-09	904 (516 to 1,422)	907 (643 to 1202)	-0.37%
2023-10	318 (130 to 609)	313 (165 to 450)	1.78%
2023-11	484 (243 to 858)	490 (282 to 680)	-1.25%
2023-12	161 (49 to 366)	160 (79 to 242)	0.63%
2024-01	611 (124 to 1,850)	614 (461 to 790)	-0.60%
2024-02	758 (126 to 2,533)	746 (483 to 984)	1.58%

Table D1.9: Puffin Comparison Between MRSea-based and Design-based Abundance Estimates in the Entire DAS Area

Survey	Abundance estimates MRSea	Abundance estimates design-based	Percentage difference
2022-03	442 (82 to 1,404)	396 (274 to 514)	10.41%
2022-04*	994 (447 to 2,152)	998 (751 to 1,244)	-0.32%
2022-05*	562 (165 to 1,566)	564 (429 to 711)	-0.23%
2022-06*	791 (415 to 1,325)	788 (585 to 962)	-0.30%
2022-07*	636 (145 to 1,851)	648 (492 to 842)	-1.89%
2022-08*	4,319 (2,542 to 6,786)	4,325 (3,831 to 4,832)	-0.13%
2022-09	4,789 (2,778 to 7,545)	4,722 (4,200 to 5,174)	1.40%
2022-10	-	40 (13 to 72)	-
2022-11	-	43 (0 to 95)	-
2022-12	-	53 (20 to 88)	-
2023-01	-	35 (7 to 64)	-
2023-02	546 (153 to 1,427)	544 (411 to 682)	0.47%
2023-03	296 (76 to 925)	297 (186 to 399)	-0.3%
2023-04*	1,091 (413 to 2,271)	1,101 (904 to 1,313)	-0.86%
2023-05*	1,381 (483 to 3,005)	1,450 (1,211 to 1,664)	-4.99%
2023-06*	2,781 (1,385 to 4,797)	2,762 (2,432 to 3,071)	0.68%
2023-07*	913 (339 to 2,037)	912 (718 to 1,108)	0.06%
2023-08*	12,847 (9,060 to 17,672)	13,207 (12,125 to 14,262)	-2.8%
2023-09	3,369 (1,854 to 5,480)	3,354 (2998 to 3,666)	0.45%
2023-10	2,623 (1,406 to 4,345)	2,710 (2,401 to 3,033)	-3.33%
2023-11	221 (34 to 922)	209 (136 to 282)	5.44%
2023-12	-	27 (7 to 55)	-
2024-01	152 (37 to 461)	150 (85 to 217)	1.31%
2024-02	-	37 (8 to 70)	-