

# Appendix 11.4, Annex B: Offshore Ornithology MRSea and Design-Based Abundance Estimates Comparison

Array EIA Report

2024

Revision	Comments	Author	Checker	Approver
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Approval for Issue		
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# CONTENTS

1. MRSea and Design-Based Comparison .....1

## TABLES

Table 1.1: Guillemot in Array Area: Relative Abundance and Density Estimates Comparison ..... 1  
 Table 1.2: Kittiwake in Array Area: Relative Abundance and Density Estimates Comparison ..... 2  
 Table 1.3: Gannet in Array Area: Relative Abundance and Density Estimates Comparison ..... 3  
 Table 1.4: Fulmar in Array Area: Relative Abundance and Density Estimates Comparison ..... 4  
 Table 1.5: Razorbill in Array Area: Relative Abundance and Density Estimates Comparison ..... 5  
 Table 1.6: Puffin in Array Area: Relative Abundance and Density Estimates Comparison ..... 6

## FIGURES

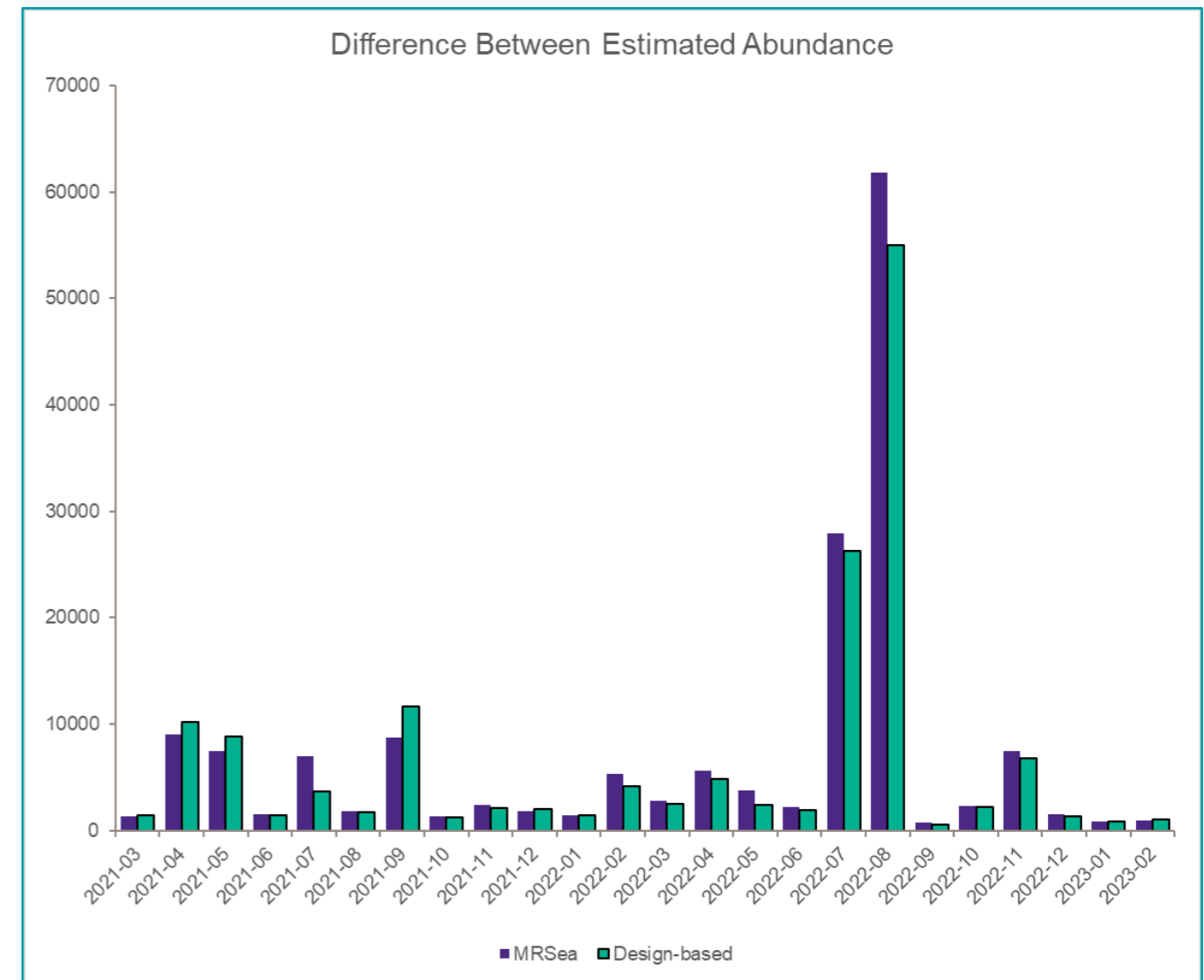
Figure 1.1: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Guillemot ..... 1  
 Figure 1.2: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Kittiwake ..... 2  
 Figure 1.3: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Gannet..... 3  
 Figure 1.4: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Northern Fulmar .... 4  
 Figure 1.5: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Razorbill..... 5  
 Figure 1.6: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Razorbill..... 6

# 1. MRSEA AND DESIGN-BASED COMPARISON

**Table 1.1: Guillemot in Array Area: Relative Abundance and Density Estimates Comparison**

Survey	MRSea Based Abundance	Design Based Abundance	Difference Between MRSea and Design-Based Estimate
2021-03	1,320 (1,032-1,765)	1,458 (950-2,029)	Mean: -138 (LCI: 82, UCI: -264)
2021-04	8,995 (5,208-14,391)	10,187 (4166-18,222)	Mean: -1192 (LCI: 1042, UCI: -3831)
2021-05	7,488 (5,492-10,148)	8,822 (6,084-11,654)	Mean: -1334 (LCI: -592, UCI: -1506)
2021-06	1,556 (1,046-2,230)	1,411 (903-2,030)	Mean: 145 (LCI: 143, UCI: 200)
2021-07	6,972 (5,506-8,433)	3,667 (2,885-4,545)	Mean: 3305 (LCI: 2621, UCI: 3888)
2021-08	1,884 (1,400-2,435)	1,726 (1,272-2,254)	Mean: 158 (LCI: 128, UCI: 181)
2021-09	8,717 (4,439-16,921)	11,708 (5,966-18,945)	Mean: -2991 (LCI: -1527, UCI: -2024)
2021-10	1,344 (1,149-1,578)	1,246 (861-1,682)	Mean: 98 (LCI: 288, UCI: -104)
2021-11	2,393 (1,914-2,898)	2,145 (1,643-2,671)	Mean: 248 (LCI: 271, UCI: 227)
2021-12	1,819 (1,494-2,182)	2,080 (1,457-2,751)	Mean: -261 (LCI: 37, UCI: -569)
2022-01	1,400 (1,150-1,721)	1,404 (1,127-1,692)	Mean: -4 (LCI: 23, UCI: 29)
2022-02	5,355 (4,731-6,170)	4,158 (3,609-4,700)	Mean: 1197 (LCI: 1122, UCI: 1470)
2022-03	2,859 (2,154-3,568)	2,471 (1,895-3,117)	Mean: 388 (LCI: 259, UCI: 451)
2022-04	5,610 (4,448-7,030)	4,869 (3,744-6,151)	Mean: 741 (LCI: 704, UCI: 879)
2022-05	3,784 (2,872-5,089)	2,426 (1,153-4,003)	Mean: 1358 (LCI: 1719, UCI: 1086)
2022-06	2,179 (1,786-2,670)	1,957 (1,218-2,827)	Mean: 222 (LCI: 568, UCI: -157)
2022-07	27,959 (24,567-31,832)	26,300 (22,826-30,149)	Mean: 1659 (LCI: 1741, UCI: 1683)
2022-08	61,775 (45,200-83,170)	54987 (38,383-73,543)	Mean: 6788 (LCI: 6817, UCI: 9627)
2022-09	774 (618-957)	536 (311-838)	Mean: 238 (LCI: 307, UCI: 119)
2022-10	2,324 (1,899-2,887)	2,244 (1,427-3,037)	Mean: 80 (LCI: 472, UCI: -150)
2022-11	7,525 (6,504-8,484)	6,770 (5,847-7,732)	Mean: 755 (LCI: 657, UCI: 752)

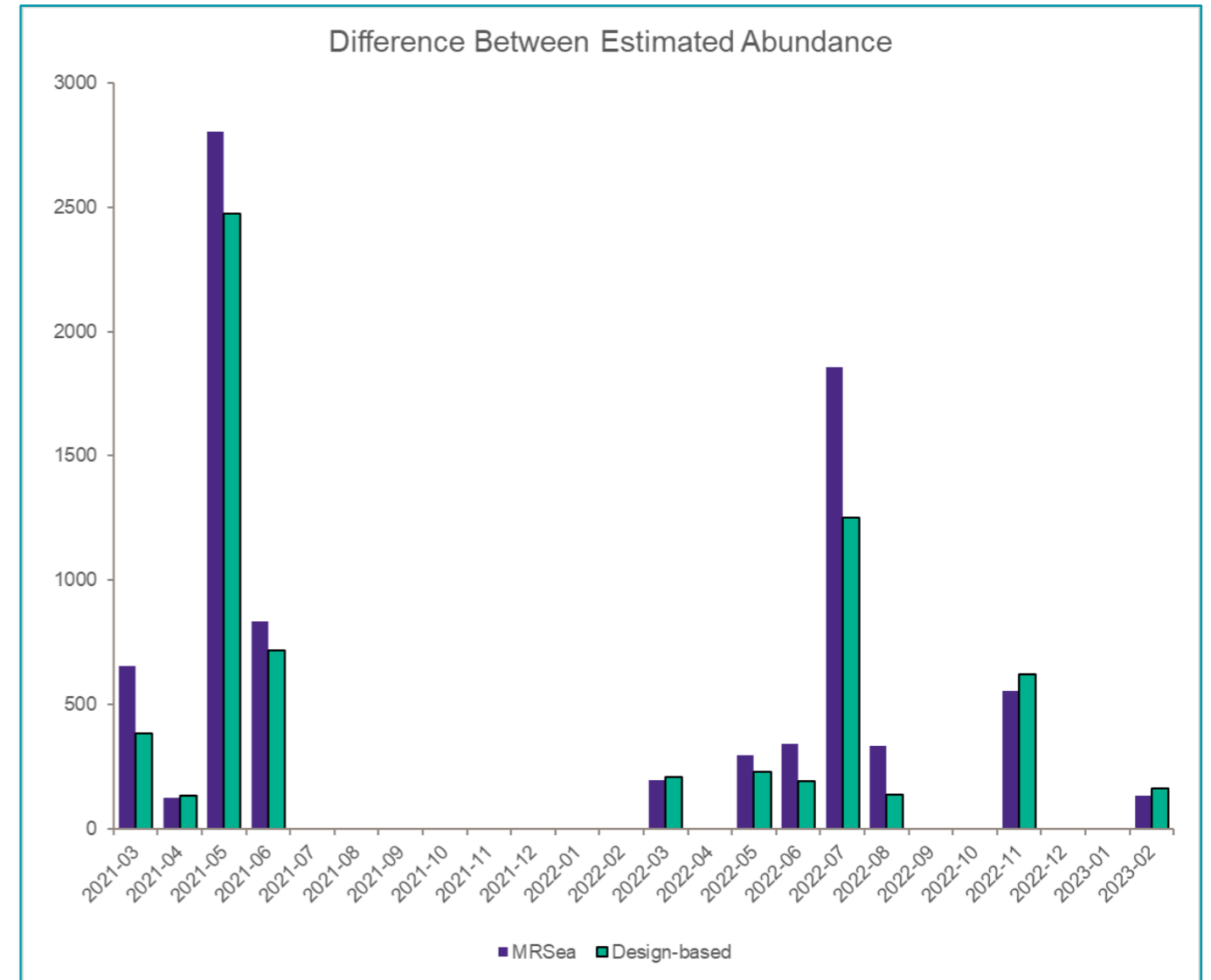
Survey	MRSea Based Abundance	Design Based Abundance	Difference Between MRSea and Design-Based Estimate
2022-12	1,570 (1,260-1,894)	1,394 (1,064-1,739)	Mean: 176 (LCI: 196, UCI: 155)
2023-01	829 (689-982)	817 (571-1,064)	Mean: 12 (LCI: 118, UCI: -82)
2023-02	996 (840-1,182)	1,057 (631-1,514)	Mean: -61 (LCI: 209, UCI: -332)



**Figure 1.1: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Guillemot**

**Table 1.2: Kittiwake in Array Area: Relative Abundance and Density Estimates Comparison**

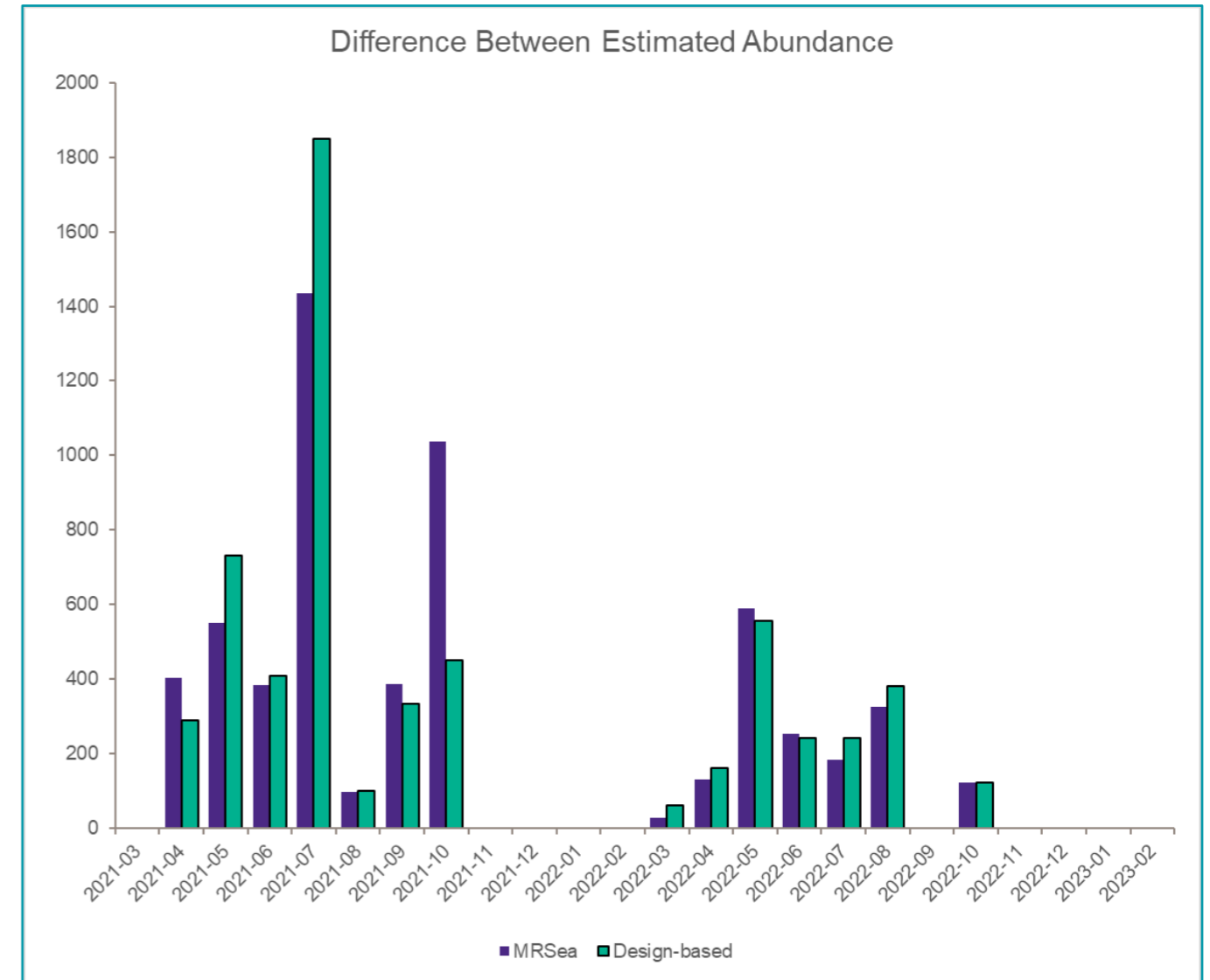
Survey	MRSea Based Abundance	Design Based Abundance	Difference Between MRSea and Design-Based Estimate
2021-03	654 (143-1,649)	384 (67-919)	Mean: 270 (LCI: 76, UCI: 730)
2021-04	123 (65-231)	133 (77-195)	Mean: -10 (LCI: -12, UCI: 36)
2021-05	2,803 (2,104-3,736)	2,474 (1,723-3,462)	Mean: 329 (LCI: 381, UCI: 274)
2021-06	835 (611-1,074)	716 (449-1,059)	Mean: 119 (LCI: 162, UCI: 15)
2022-03	196 (146-261)	210 (129-298)	Mean: -14 (LCI: 17, UCI: -37)
2022-05	294 (223-403)	230 (147-322)	Mean: 64 (LCI: 76, UCI: 81)
2022-06	343 (184-573)	190 (94-312)	Mean: 153 (LCI: 90, UCI: 261)
2022-07	1,856 (1,267-2,790)	1,252 (790-1,725)	Mean: 604 (LCI: 477, UCI: 1065)
2022-08	332 (136-737)	137 (10-371)	Mean: 195 (LCI: 126, UCI: 366)
2022-11	556 (262-1,083)	623 (208-1,202)	Mean: -67 (LCI: 54, UCI: -119)
2023-02	134 (88-187)	163 (90-247)	Mean: -29 (LCI: -2, UCI: -60)



**Figure 1.2: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Kittiwake**

**Table 1.3: Gannet in Array Area: Relative Abundance and Density Estimates Comparison**

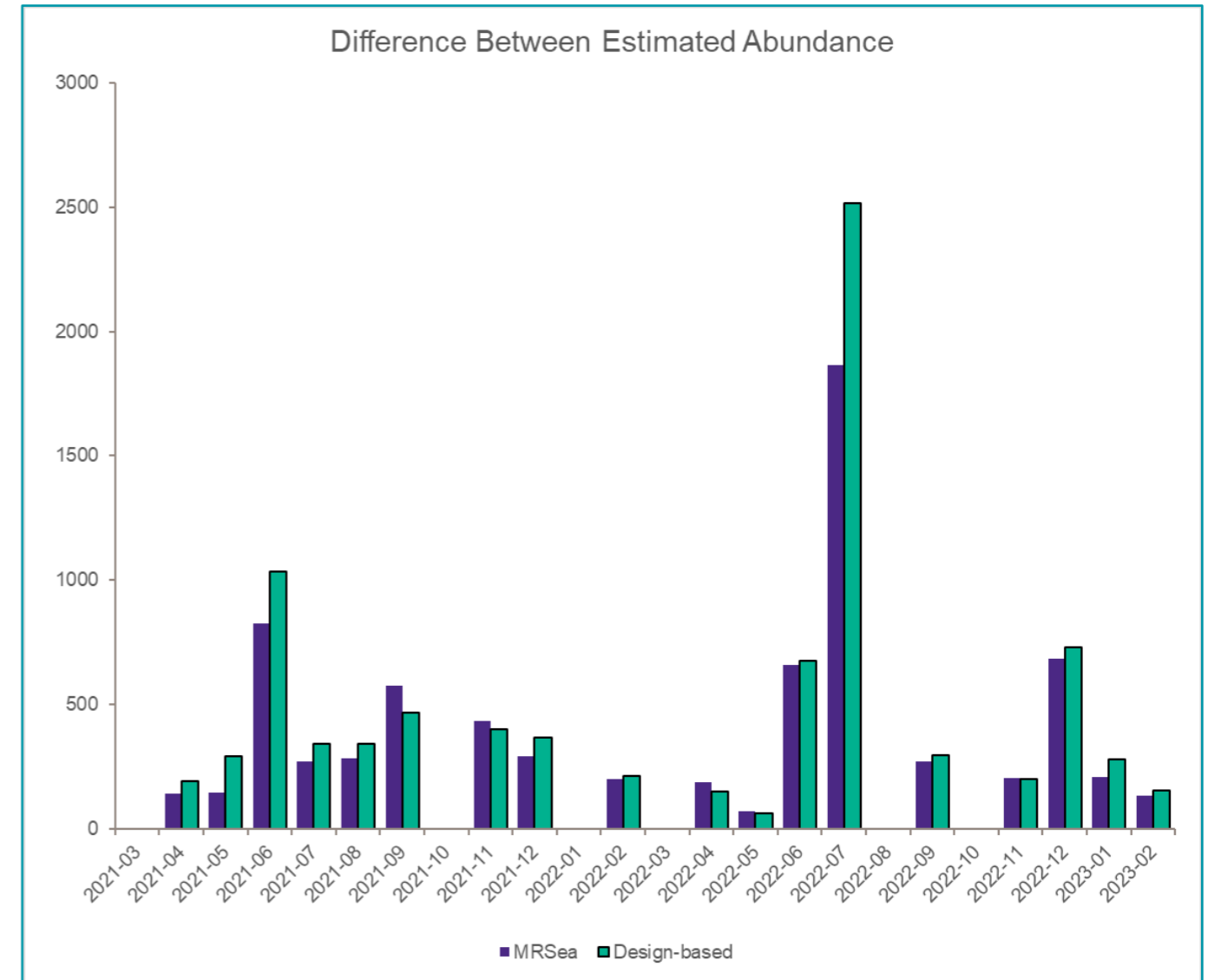
Survey	MRSea Based Abundance	Design Based Abundance	Difference Between MRSea and Design-Based Estimate
2021-04	402 (169-1,022)	289 (80-550)	Mean: 113 (LCI: 89, UCI: 472)
2021-05	551 (380-762)	730 (482-1,016)	Mean: -179 (LCI: -102, UCI: -254)
2021-06	384 (258-537)	408 (234-607)	Mean: -24 (LCI: 24, UCI: -70)
2021-07	1,434 (1,793-1,119)	1,849 (1,353-2,375)	Mean: -415 (LCI: 440, UCI: -1256)
2021-08	98 (46-203)	100 (40-76)	Mean: -2 (LCI: 6, UCI: 127)
2021-09	386 (247-627)	334 (168-518)	Mean: 52 (LCI: 79, UCI: 109)
2021-10	1,038 (643-1,625)	449 (286-620)	Mean: 589 (LCI: 357, UCI: 1,005)
2022-03	28 (9-87)	61 (20-109)	Mean: -33 (LCI: -11, UCI: -22)
2022-04	131 (80-194)	160 (78-259)	Mean: -29 (LCI: 2, UCI: -65)
2022-05	589 (434-767)	556 (354-853)	Mean: 33 (LCI: 80, UCI: -86)
2022-06	252 (185-324)	241 (148-342)	Mean: 11 (LCI: 37, UCI: -18)
2022-07	182 (129-248)	241 (133-364)	Mean: -59 (LCI: -4, UCI: -116)
2022-08	326 (224-441)	380 (249-528)	Mean: -54 (LCI: -25, UCI: -87)
2022-10	121 (72-186)	121 (48-213)	Mean: 0 (LCI: 24, UCI: -27)



**Figure 1.3: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Gannet**

**Table 1.4: Fulmar in Array Area: Relative Abundance and Density Estimates Comparison**

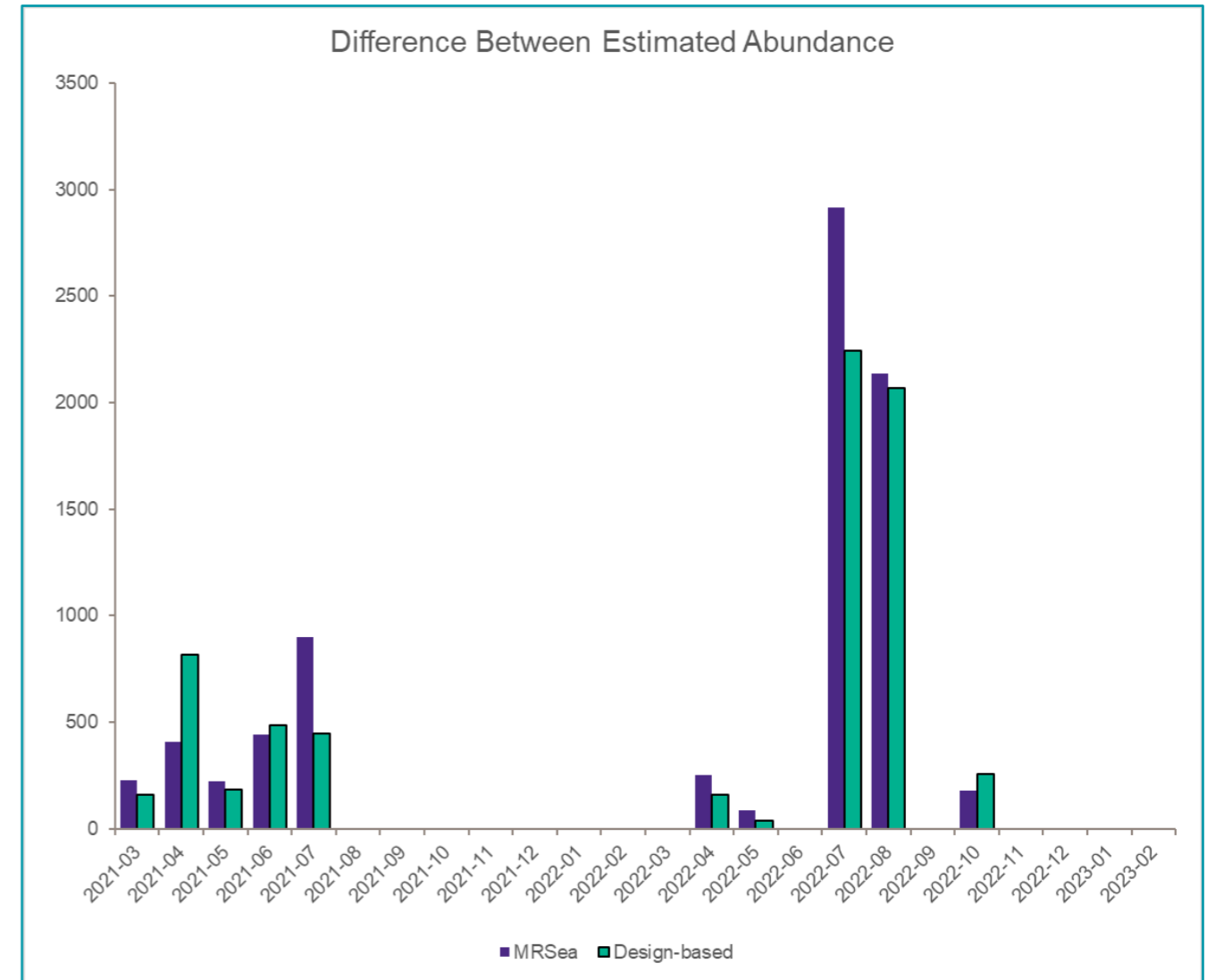
Survey	MRSea Based Abundance	Design Based Abundance	Difference Between MRSea and Design-Based Estimate
2021-04	140 (83-220)	191 (110-274)	Mean: -51 (LCI: -27, UCI: -54)
2021-05	147 (62-291)	290 (170-427)	Mean: -143 (LCI: -108, UCI: -136)
2021-06	825 (543-1,196)	1,035 (551-1,750)	Mean: -210 (LCI: -8, UCI: -554)
2021-07	272 (173-387)	343 (236-454)	Mean: -71 (LCI: -63, UCI: -67)
2021-08	283 (133-546)	340 (169-595)	Mean: -57 (LCI: -36, UCI: -49)
2021-09	577 (266-1,087)	467 (214-817)	Mean: 110 (LCI: 52, UCI: 270)
2021-11	433 (352-517)	398 (269-532)	Mean: 35 (LCI: 83, UCI: -15)
2021-12	293 (190-466)	367 (240-504)	Mean: -74 (LCI: -50, UCI: -38)
2022-02	198 (126-303)	211 (110-318)	Mean: -13 (LCI: 16, UCI: -15)
2022-04	189 (95-315)	149 (59-256)	Mean: 40 (LCI: 36, UCI: 59)
2022-05	70 (28-141)	61 (20-100)	Mean: 9 (LCI: 8, UCI: 41)
2022-06	657 (446-932)	675 (497-875)	Mean: -18 (LCI: -51, UCI: 57)
2022-07	1863 (669-5062)	2515 (306-6,047)	Mean: -652 (LCI: 363, UCI: -985)
2022-09	272 (199-347)	296 (181-443)	Mean: -24 (LCI: 18, UCI: -96)
2022-11	203 (105-357)	200 (98-312)	Mean: 3 (LCI: 7, UCI: 45)
2022-12	684 (579-819)	730 (546-924)	Mean: -46 (LCI: 33, UCI: -105)
2023-01	210 (143-297)	279 (186-370)	Mean: -69 (LCI: -43, UCI: -73)
2023-02	134 (77-219)	152 (81-239)	Mean: -18 (LCI: -4, UCI: -20)



**Figure 1.4: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Northern Fulmar**

**Table 1.5: Razorbill in Array Area: Relative Abundance and Density Estimates Comparison**

Survey	MRSea Based Abundance	Design Based Abundance	Difference Between MRSea and Design-Based Estimate
2021-03	228 (115-415)	160 (50-310)	Mean: 68 (LCI: 65, UCI: 105)
2021-04	407 (210-771)	817 (194-1,733)	Mean: -410 (LCI: 16, UCI: -962)
2021-05	225 (136-346)	183 (64-318)	Mean: 42 (LCI: 72, UCI: 28)
2021-06	443 (347-567)	486 (284-744)	Mean: -43 (LCI: 63, UCI: -177)
2021-07	901 (481-1,464)	445 (215-743)	Mean: 456 (LCI: 266, UCI: 721)
2022-04	252 (166-353)	160 (66-285)	Mean: 92 (LCI: 100, UCI: 68)
2022-05	89 (58-134)	40 (2-87)	Mean: 49 (LCI: 56, UCI: 47)
2022-07	2,917 (2,268-3,726)	2,242 (1,769-2,760)	Mean: 675 (LCI: 499, UCI: 966)
2022-08	2,138 (1,263-3,491)	2,066 (1,349-2,881)	Mean: 72 (LCI: -86, UCI: 610)
2022-10	181 (47-591)	256 (7-627)	Mean: -75 (LCI: 40, UCI: -36)

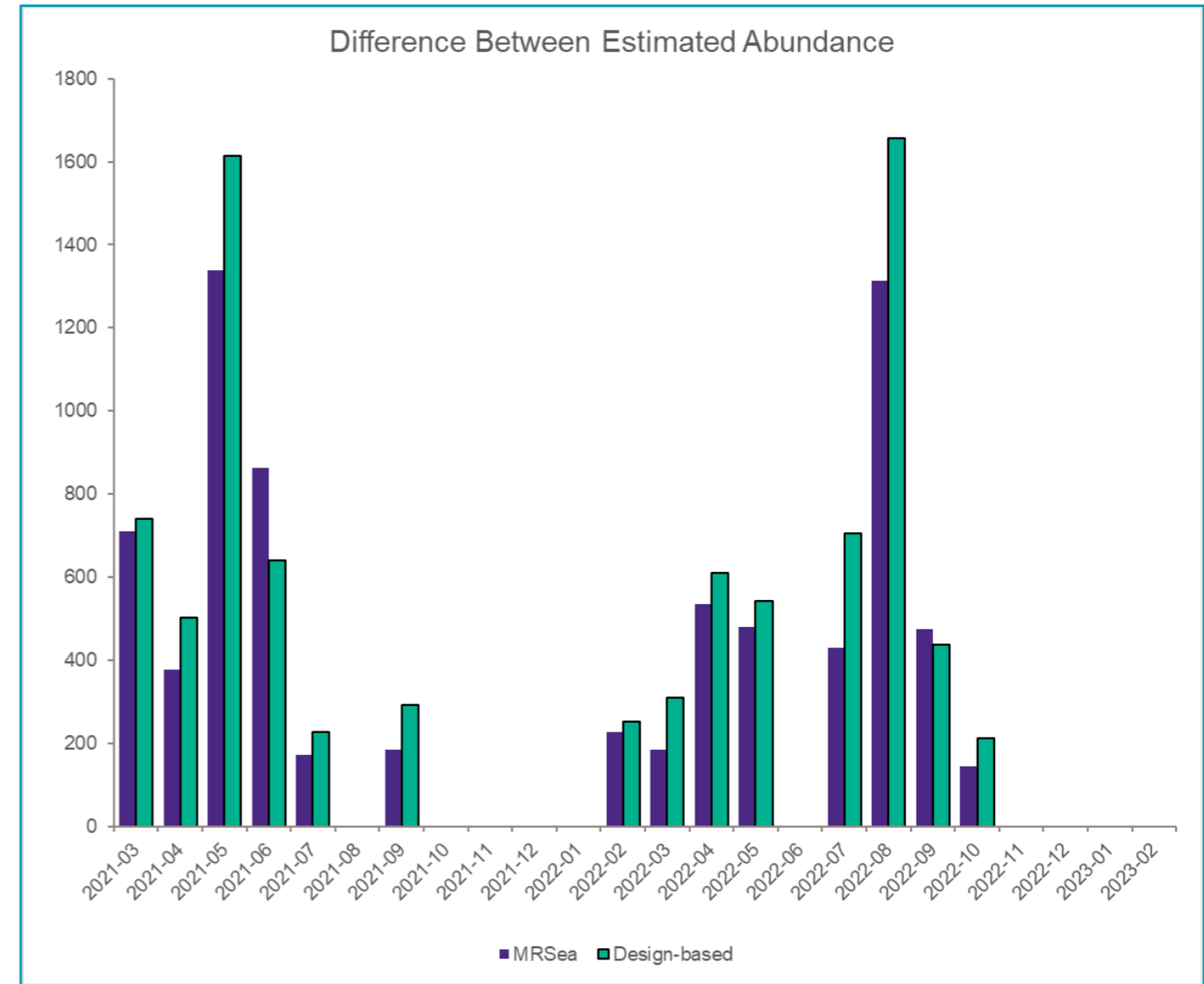


**Figure 1.5: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Razorbill**



**Table 1.6: Puffin in Array Area: Relative Abundance and Density Estimates Comparison**

Survey	MRSea Based Abundance	Design Based Abundance	Difference Between MRSea and Design-Based Estimate
2021-03	709 (520-980)	741 (513-989)	Mean: -32 (LCI: 7, UCI: -9)
2021-04	378 (277-509)	503 (320-706)	Mean: -125 (LCI: -43, UCI: -197)
2021-05	1,339 (783-2,007)	1,615 (1,064-2,223)	Mean: -276 (LCI: -281, UCI: -216)
2021-06	863 (556-1,320)	640 (381-913)	Mean: 223 (LCI: 175, UCI: 407)
2021-07	173 (93-284)	228 (106-407)	Mean: -55 (LCI: -17, UCI: -109)
2021-09	184 (116-270)	291 (127-483)	Mean: -107 (LCI: -11, UCI: -213)
2022-02	228 (169-301)	252 (142-370)	Mean: -24 (LCI: 27, UCI: -69)
2022-03	185 (107-308)	309 (160-468)	Mean: -124 (LCI: -53, UCI: -160)
2022-04	535 (363-750)	609 (414-815)	Mean: -74 (LCI: -51, UCI: -65)
2022-05	480 (312-702)	542 (346-769)	Mean: -62 (LCI: -34, UCI: -67)
2022-07	431 (274-700)	706 (581-830)	Mean: -275 (LCI: -307, UCI: -130)
2022-08	1,313 (824-1,861)	1,657 (772-2,675)	Mean: -344 (LCI: 6, UCI: -878)
2022-09	474 (337-698)	437 (301-582)	Mean: 37 (LCI: 36, UCI: 116)
2022-10	144 (86-262)	211 (93-346)	Mean: -67 (LCI: -7, UCI: -84)



**Figure 1.6: Difference Between Monthly MRSea and Design-Based Abundance Estimates for Puffin**

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