



# Awel y Môr Offshore Wind Farm

## Category 6: Environmental Statement

### Volume 4, Annex 4.2: Offshore Ornithology Displacement

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## **Awel y Môr Offshore Wind Farm**

### **Annex 4.2: Offshore Ornithology; Displacement**

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**APEM Ref: P00004817**

**January 2022**

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## 1. Introduction

### 1.1 Project Background

Awel y Môr Offshore Wind Farm Limited ('the Applicant') is proposing to develop the Awel y Môr Offshore Wind Farm (AyM OWF) as a proposed extension to the operational Gwynt y Môr (GyM) OWF. AyM is located approximately 10.5 km offshore from the north-east coast of Wales at its closest point, with the array covering an area of approximately 78 km<sup>2</sup>. AyM will comprise both offshore and onshore infrastructure, including an offshore generating station (wind farm), export cables to landfall, and an onshore substation for connection to the electricity transmission network (please see **Volume 2, Chapter 1: Offshore Project Description (application ref: 6.2.1)** and **Volume 3, Chapter 1: Onshore Project Description (application ref: 6.3.1)** for full details on the Project Design).

APEM Ltd (hereafter APEM) was commissioned by the Applicant to undertake a study of offshore ornithology that characterise the area that may be influenced by AyM. A separate report (**Volume 4, Annex 4.1: Offshore Ornithology; Baseline Characterisation Report (application ref: 6.4.4.1)**) provides the findings from offshore ornithology data to determine the receptors that characterise the baseline and are of relevance to the assessment of potential impacts from AyM. This technical annex has been produced to support **Volume 2, Chapter 4: Offshore Ornithology (application ref: 6.2.4)**.

The consideration of offshore ornithology for AyM has been discussed with consultees through the Expert Topic Group (ETG) meetings; of which Natural Resources Wales (NRW), The Joint Nature Conservation Committee (JNCC), Natural England and the Royal Society for the Protection of Birds (RSPB) are members. Agreements made with consultees within the ETG process are set out in **the Evidence Plan Report (application ref: 8.2.)** and the consultation table within **Volume 2, Chapter 4: Offshore Ornithology (application ref: 6.2.4)**.

### 1.2 Displacement Analysis

The presence of offshore Wind Turbine Generators (WTGs) has the potential to directly disturb and displace seabirds that would normally reside within and around the area of sea where AyM is proposed. This in effect represents indirect habitat loss, potentially reducing the area available for those seabirds sensitive to disturbance to forage, loaf and/ or moult in the way that they are currently able to within and around AyM. There is also the potential for the construction and decommissioning of WTGs, substations and cable laying to directly disturb and displace seabirds, though the nature of such potential impacts is more restricted spatially and temporally by virtue of the nature of those phases of the development.

Following consultation with the ETG, six seabird species have been identified for which potential disturbance and displacement should be considered in relation to AyM. These are:

- Gannet, *Morus bassanus*;
- Guillemot *Uria aalge*;
- Razorbill, *Alca torda*;
- Common scoter, *Melanitta nigra*;
- Red-throated diver, *Gavia stellata*; and
- Manx shearwater, *Puffinus puffinus*.

## 2. Methods

### 2.1 Buffers for Displacement

The main assessment on disturbance and displacement is found within **Volume 2, Chapter 4: Offshore Ornithology (application ref: 6.2.4)**. The scale of the potential displacement applied in this report is in response to guidance in the literature (SNCBs, 2017) and comments received to date from the ETG (see **Section 4.2 in Volume 2, Chapter 4 (application ref: 6.2.4)**).

Following the same generic guidance (SNCBs, 2017), this report presents displacement matrices that consider gannet, Manx shearwater, guillemot, razorbill, common scoter and red-throated diver. These matrices present abundances for gannet, Manx shearwater, guillemot and razorbill within the AyM array area plus a 2 km buffer, and common scoter within the AyM array area plus 4 km buffer, as agreed with the ETG. For red-throated diver, displacement has been considered for the AyM array area and out to an 8 km buffer, with varying displacement rates applied to the array area, 0-5 km buffer and 5-8 km buffer, as agreed with the ETG.

The existing GyM OWF has been excluded from the buffer zones used in the AyM abundance estimates used for analysing disturbance and displacement, as agreed with the ETG (**Figure 1**). It is unlikely that birds found within the GyM array area would subsequently be displaced by AyM, given that those individuals are currently tolerating the presence of infrastructure and vessel traffic associated with GyM, and the infrastructure and vessel traffic associated with AyM would be more remote from those birds. (see **Section 4.2 in Volume 2, Chapter 4 (application ref: 6.2.4)**; **Figure 1**).

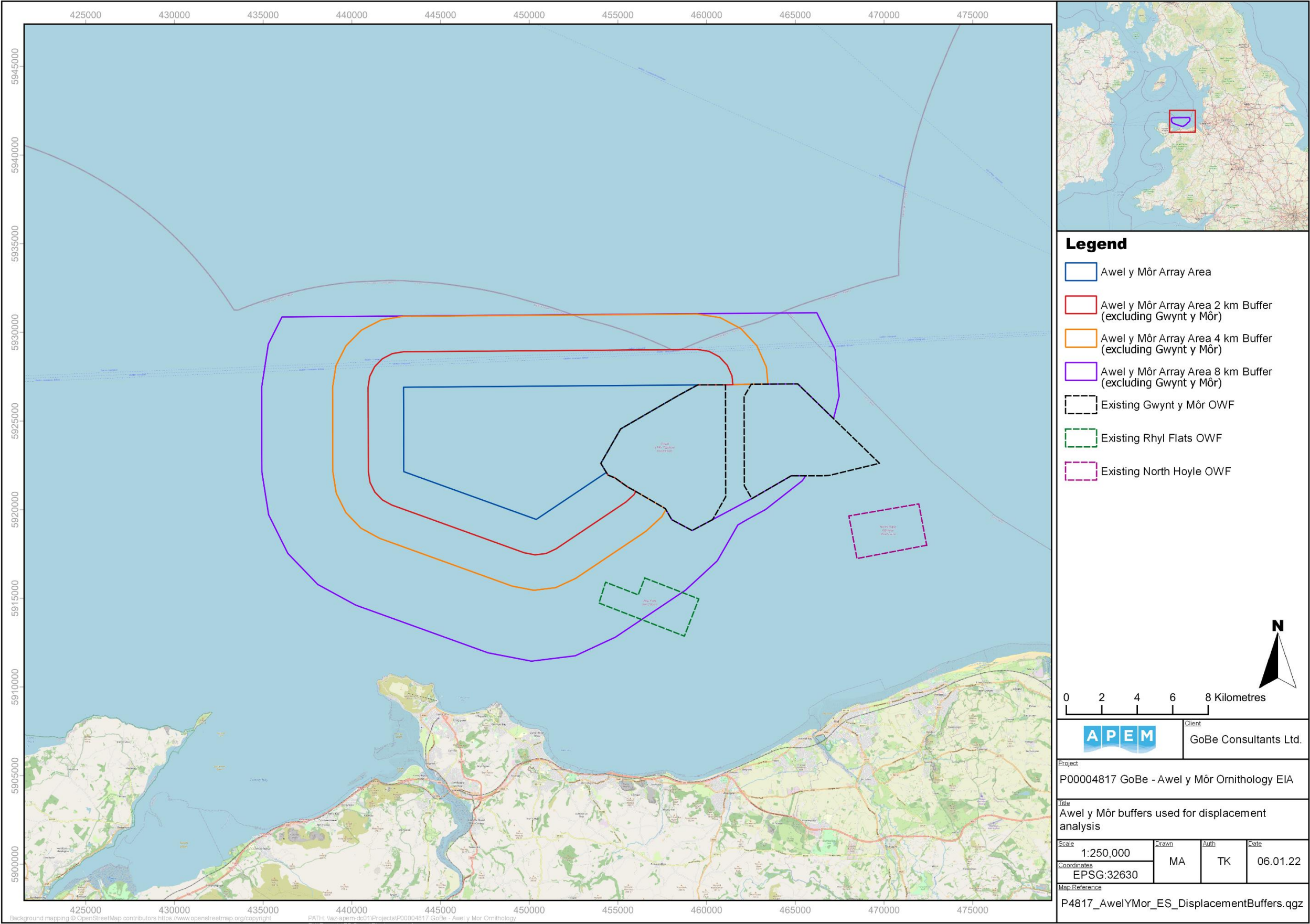


Figure 1 AyM array area and buffer zones used for estimating abundances for displacement analysis.



## 2.2 Data sources for displacement matrices

The data contributing to this annex are taken from the 24 months of aerial digital surveys across AyM plus buffers, covering March 2019 to February 2021, inclusive. Full details of the site-specific surveys can be found in **Volume 4, Annex 4.1: Offshore Ornithology; Baseline Characterisation Report (application ref: 6.4.4.1)**. These data are inclusive of apportionment of unidentified birds and corrections for availability bias, where appropriate.

Displacement matrices are presented for each of the six species (gannet, Manx shearwater, guillemot, razorbill, common scoter and red-throated diver) separately for each bio-season. For four species (gannet, Manx shearwater, guillemot and razorbill), displacement matrices are presented for the array area and the array area plus 2 km buffer. For common scoter displacement matrices are presented for the array area plus 4 km buffer (common scoter only) and for red-throated diver they are presented for the array area only, 0-5 km buffer only and 5-8 km buffer only, as agreed with the ETG. For all six species both flying and 'sitting' (including birds observed diving, landing and taking off) abundances were included in the displacement analysis, as agreed with the ETG. Note that barrier effects are considered separately in **Volume 2, Chapter 4: Offshore Ornithology (application ref: 6.2.4)**.

## 2.3 Data limitations

The data within this annex for all six species are reliant upon site-specific high-resolution aerial digital stills surveys undertaken across the AyM survey area. These data are considered to be the most reliable source for characterising the baseline environment for offshore ornithology. However, using these data to characterise the abundances for each species within individual bio-seasons (as described in Section 2.5) is subject to interpretation, given variation in migratory movements between species and between years, the age classification of birds within each bio-season, connectivity to breeding colonies and other factors. Therefore, these data may be used for the assessments accompanying the Development Consent Order (DCO) and Marine Licence applications (i.e. within the Environmental Statement (ES) Chapter and the Report to Inform Appropriate Assessment (RIAA)) in differing manners, depending upon additional factors considered when assessing the potential impacts and/ or effects of displacement on these species.

## 2.4 Presentation of displacement by bio-seasons

Bio-seasons are based on Furness (2015) for all species in this analysis, except common scoter which are based on Cramp & Simmons (1977). The bio-seasons used for each species and the constituent months are presented in **Table 1**.

In order to provide a visual approach to presenting data on the species considered for disturbance and displacement, a colour-coding system has been used within the tables to represent different bio-seasons and combined/ extended bio-seasons. For each species, the months defining each bio-season are different; the number of bio-seasons also varies between species. The colours used to define the bio-seasons are presented in **Table 1**.

**Table 1 Bio-season colour coding.**

Bio-season	Gannet	Guillemot	Razorbill	Common scoter	Red-throated diver	Manx shearwater
Return Migration (Green)	Dec – Mar	N/A	Jan – Mar	N/A	Feb – Apr	Mar – May
Migration-free Breeding (Purple)	Apr – Aug	N/A	Apr – Jul	N/A	May – Aug	Jun – Jul
Post-breeding Migration (Orange)	Sept – Nov	N/A	Aug – Oct	N/A	Sept – Nov	Aug – Oct
Migration-free Winter (Grey/Blue)	N/A	N/A	Nov – Dec	N/A	Dec – Jan	N/A
Breeding (Pink)	N/A	Mar - Jul	N/A	May - Aug	N/A	N/A
Extended Non-breeding (Yellow)	N/A	Aug – Feb	N/A	Sep - Apr	N/A	N/A

## 2.5 Bio-season mean peak abundances

As per SNCB (2017) guidance, the displacement assessment is based on bio-season mean peak abundances. The bio-season mean peak abundance is calculated as the highest recorded monthly abundance within each bio-season averaged across the two years' worth of data. It should be noted that calculating bio-season abundance in such a way can be considered precautionary, as it is highly unlikely that the abundance within a given bio-season remains at such a high abundance especially when considering the non-breeding bio-season. The calculated bio-season mean peak abundances used for these analyses are presented in **Table 2**.

**Table 2 Bio-season mean peak abundances in the AyM array area and corresponding buffers (all behaviours).**

Bio-season	Mean Peak Abundance						
	Survey Area	Gannet	Guillemot	Razorbill	Common scoter	Red-throated diver	Manx Shearwater
Return Migration	AyM array area	0	N/A	299	N/A	9	58
	AyM array area plus 2 km buffer	0	N/A	336	N/A	N/A	177
	AyM 0-5 km buffer only	N/A	N/A	N/A	N/A	28	N/A
	AyM 5-8 km buffer only	N/A	N/A	N/A	N/A	50	N/A
Migration-free Breeding	AyM array area	193	N/A	71	N/A	0	20
	AyM array area plus 2 km buffer	328	N/A	140	N/A	N/A	26
	AyM 0-5 km buffer only	N/A	N/A	N/A	N/A	5	N/A

Bio-season	Mean Peak Abundance						
	Survey Area	Gannet	Guillemot	Razorbill	Common scoter	Red-throated diver	Manx Shearwater
	AyM 5-8 km buffer only	N/A	N/A	N/A	N/A	0	N/A
Post-breeding Migration	AyM array area	113	N/A	32	N/A	4	150
	AyM array area plus 2 km buffer	201	N/A	66	N/A	N/A	214
	AyM 0-5 km buffer only	N/A	N/A	N/A	N/A	0	N/A
	AyM 5-8 km buffer only	N/A	N/A	N/A	N/A	58	N/A
Migration-free Winter	AyM array area	N/A	N/A	86	N/A	4	N/A
	AyM array area plus 2 km buffer	N/A	N/A	150	N/A	N/A	N/A
	AyM 0-5 km buffer only	N/A	N/A	N/A	N/A	5	N/A



Bio-season	Mean Peak Abundance						
	Survey Area	Gannet	Guillemot	Razorbill	Common scoter	Red-throated diver	Manx Shearwater
	AyM 5-8 km buffer only	N/A	N/A	N/A	N/A	39	N/A
Breeding	AyM array area	N/A	662	N/A	0	N/A	N/A
	AyM array area plus 2 km buffer	N/A	1,569	N/A	N/A	N/A	N/A
	AyM array area plus 4 km buffer	N/A	N/A	N/A	0	N/A	N/A
Non-breeding	AyM array area	N/A	1,064	N/A	0	N/A	N/A
	AyM array area plus 2 km buffer	N/A	2,919	N/A	N/A	N/A	N/A
	AyM array area plus 4 km buffer	N/A	N/A	N/A	31	N/A	N/A

### 3. Results

#### 3.1 Gannet displacement matrices

**Table 3** Gannet return migration displacement matrix (based on an abundance of 0 for AyM array area only).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 4      Gannet return migration displacement matrix (based on an abundance of 0 for AyM array area plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 5** Gannet migration-free breeding displacement matrix (based on an abundance of 193 for AyM array area only).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2
10	0	0	0	1	1	1	2	4	6	8	10	12	13	15	17	19
20	0	0	1	1	2	2	4	8	12	15	19	23	27	31	35	39
30	0	1	1	2	2	3	6	12	17	23	29	35	40	46	52	58
40	0	1	2	2	3	4	8	15	23	31	39	46	54	62	69	77
50	0	1	2	3	4	5	10	19	29	39	48	58	67	77	87	96
60	0	1	2	3	5	6	12	23	35	46	58	69	81	92	104	116
70	0	1	3	4	5	7	13	27	40	54	67	81	94	108	121	135
80	0	2	3	5	6	8	15	31	46	62	77	92	108	123	139	154
90	0	2	3	5	7	9	17	35	52	69	87	104	121	139	156	173
100	0	2	4	6	8	10	19	39	58	77	96	116	135	154	173	193

**Table 6** Gannet migration-free breeding displacement matrix (based on an abundance of 328 for AyM array area plus 2 km buffer).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
10	0	0	1	1	1	2	3	7	10	13	16	20	23	26	29	33
20	0	1	1	2	3	3	7	13	20	26	33	39	46	52	59	66
30	0	1	2	3	4	5	10	20	29	39	49	59	69	79	88	98
40	0	1	3	4	5	7	13	26	39	52	66	79	92	105	118	131
50	0	2	3	5	7	8	16	33	49	66	82	98	115	131	147	164
60	0	2	4	6	8	10	20	39	59	79	98	118	138	157	177	197
70	0	2	5	7	9	11	23	46	69	92	115	138	160	183	206	229
80	0	3	5	8	10	13	26	52	79	105	131	157	183	210	236	262
90	0	3	6	9	12	15	29	59	88	118	147	177	206	236	265	295
100	0	3	7	10	13	16	33	66	98	131	164	197	229	262	295	328

**Table 7      Gannet post-breeding migration displacement matrix (based on an abundance of 113 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
10	0	0	0	0	0	1	1	2	3	5	6	7	8	9	10	11
20	0	0	0	1	1	1	2	5	7	9	11	14	16	18	20	23
30	0	0	1	1	1	2	3	7	10	14	17	20	24	27	31	34
40	0	0	1	1	2	2	5	9	14	18	23	27	32	36	41	45
50	0	1	1	2	2	3	6	11	17	23	28	34	40	45	51	57
60	0	1	1	2	3	3	7	14	20	27	34	41	47	54	61	68
70	0	1	2	2	3	4	8	16	24	32	40	47	55	63	71	79
80	0	1	2	3	4	5	9	18	27	36	45	54	63	72	81	90
90	0	1	2	3	4	5	10	20	31	41	51	61	71	81	92	102
100	0	1	2	3	5	6	11	23	34	45	57	68	79	90	102	113

**Table 8      Gannet post-breeding migration displacement matrix (based on an abundance of 201 for AyM array area plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2
10	0	0	0	1	1	1	2	4	6	8	10	12	14	16	18	20
20	0	0	1	1	2	2	4	8	12	16	20	24	28	32	36	40
30	0	1	1	2	2	3	6	12	18	24	30	36	42	48	54	60
40	0	1	2	2	3	4	8	16	24	32	40	48	56	64	72	80
50	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
60	0	1	2	4	5	6	12	24	36	48	60	72	84	96	108	120
70	0	1	3	4	6	7	14	28	42	56	70	84	98	112	126	140
80	0	2	3	5	6	8	16	32	48	64	80	96	112	128	144	160
90	0	2	4	5	7	9	18	36	54	72	90	108	126	144	162	180
100	0	2	4	6	8	10	20	40	60	80	100	120	140	160	180	201

**Table 9      Gannet annual displacement matrix (based on an abundance of 306 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1	1	1	2	2	2	2	3	3
10	0	0	1	1	1	2	3	6	9	12	15	18	21	24	27	31
20	0	1	1	2	2	3	6	12	18	24	31	37	43	49	55	61
30	0	1	2	3	4	5	9	18	27	37	46	55	64	73	82	92
40	0	1	2	4	5	6	12	24	37	49	61	73	86	98	110	122
50	0	2	3	5	6	8	15	31	46	61	76	92	107	122	137	153
60	0	2	4	5	7	9	18	37	55	73	92	110	128	147	165	183
70	0	2	4	6	9	11	21	43	64	86	107	128	150	171	192	214
80	0	2	5	7	10	12	24	49	73	98	122	147	171	196	220	244
90	0	3	5	8	11	14	27	55	82	110	137	165	192	220	247	275
100	0	3	6	9	12	15	31	61	92	122	153	183	214	244	275	306



**Table 10      Gannet annual displacement matrix (based on an abundance of 528 for AyM array area plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5	5
10	0	1	1	2	2	3	5	11	16	21	26	32	37	42	48	53
20	0	1	2	3	4	5	11	21	32	42	53	63	74	84	95	106
30	0	2	3	5	6	8	16	32	48	63	79	95	111	127	143	158
40	0	2	4	6	8	11	21	42	63	84	106	127	148	169	190	211
50	0	3	5	8	11	13	26	53	79	106	132	158	185	211	238	264
60	0	3	6	10	13	16	32	63	95	127	158	190	222	253	285	317
70	0	4	7	11	15	18	37	74	111	148	185	222	259	296	333	370
80	0	4	8	13	17	21	42	84	127	169	211	253	296	338	380	422
90	0	5	10	14	19	24	48	95	143	190	238	285	333	380	428	475
100	0	5	11	16	21	26	53	106	158	211	264	317	370	422	475	528

### 3.2 Guillemot displacement matrices

Table 11 Guillemot breeding displacement matrix (based on an abundance of 662 for AyM array area only).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1	1	2	3	3	4	5	5	6	7
10	0	1	1	2	3	3	7	13	20	26	33	40	46	53	60	66
20	0	1	3	4	5	7	13	26	40	53	66	79	93	106	119	132
30	0	2	4	6	8	10	20	40	60	79	99	119	139	159	179	199
40	0	3	5	8	11	13	26	53	79	106	132	159	185	212	238	265
50	0	3	7	10	13	17	33	66	99	132	166	199	232	265	298	331
60	0	4	8	12	16	20	40	79	119	159	199	238	278	318	358	397
70	0	5	9	14	19	23	46	93	139	185	232	278	324	371	417	463
80	0	5	11	16	21	26	53	106	159	212	265	318	371	424	477	530
90	0	6	12	18	24	30	60	119	179	238	298	358	417	477	536	596
100	0	7	13	20	26	33	66	132	199	265	331	397	463	530	596	662

**Table 12** Guillemot breeding displacement matrix (based on an abundance of 1,569 for AyM array area plus 2 km buffer).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	2	3	5	6	8	9	11	13	14	16
10	0	2	3	5	6	8	16	31	47	63	78	94	110	126	141	157
20	0	3	6	9	13	16	31	63	94	126	157	188	220	251	282	314
30	0	5	9	14	19	24	47	94	141	188	235	282	330	377	424	471
40	0	6	13	19	25	31	63	126	188	251	314	377	439	502	565	628
50	0	8	16	24	31	39	78	157	235	314	392	471	549	628	706	785
60	0	9	19	28	38	47	94	188	282	377	471	565	659	753	847	941
70	0	11	22	33	44	55	110	220	330	439	549	659	769	879	989	1,098
80	0	13	25	38	50	63	126	251	377	502	628	753	879	1,004	1,130	1,255
90	0	14	28	42	56	71	141	282	424	565	706	847	989	1,130	1,271	1,412
100	0	16	31	47	63	78	157	314	471	628	785	941	1,098	1,255	1,412	1,569

**Table 13**      **Guillemot non-breeding displacement matrix (based on an abundance of 1,064 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	1	1	2	3	4	5	6	7	9	10	11
10	0	1	2	3	4	5	11	21	32	43	53	64	74	85	96	106
20	0	2	4	6	9	11	21	43	64	85	106	128	149	170	192	213
30	0	3	6	10	13	16	32	64	96	128	160	192	223	255	287	319
40	0	4	9	13	17	21	43	85	128	170	213	255	298	340	383	426
50	0	5	11	16	21	27	53	106	160	213	266	319	372	426	479	532
60	0	6	13	19	26	32	64	128	192	255	319	383	447	511	575	638
70	0	7	15	22	30	37	74	149	223	298	372	447	521	596	670	745
80	0	9	17	26	34	43	85	170	255	340	426	511	596	681	766	851
90	0	10	19	29	38	48	96	192	287	383	479	575	670	766	862	958
100	0	11	21	32	43	53	106	213	319	426	532	638	745	851	958	1,064

**Table 14** Guillemot non-breeding displacement matrix (based on an abundance of 2,919 for AyM array area plus 2 km buffer).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	1	1	1	1	3	6	9	12	15	18	20	23	26	29
10	0	3	6	9	12	15	29	58	88	117	146	175	204	234	263	292
20	0	6	12	18	23	29	58	117	175	234	292	350	409	467	525	584
30	0	9	18	26	35	44	88	175	263	350	438	525	613	701	788	876
40	0	12	23	35	47	58	117	234	350	467	584	701	817	934	1,051	1,168
50	0	15	29	44	58	73	146	292	438	584	730	876	1,022	1,168	1,313	1,459
60	0	18	35	53	70	88	175	350	525	701	876	1,051	1,226	1,401	1,576	1,751
70	0	20	41	61	82	102	204	409	613	817	1,022	1,226	1,430	1,635	1,839	2,043
80	0	23	47	70	93	117	234	467	701	934	1,168	1,401	1,635	1,868	2,102	2,335
90	0	26	53	79	105	131	263	525	788	1,051	1,313	1,576	1,839	2,102	2,364	2,627
100	0	29	58	88	117	146	292	584	876	1,168	1,459	1,751	2,043	2,335	2,627	2,919

**Table 15**      **Guillemot annual displacement matrix (based on an abundance of 1,726 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	1	1	1	2	3	5	7	9	10	12	14	16	17
10	0	2	3	5	7	9	17	35	52	69	86	104	121	138	155	173
20	0	3	7	10	14	17	35	69	104	138	173	207	242	276	311	345
30	0	5	10	16	21	26	52	104	155	207	259	311	362	414	466	518
40	0	7	14	21	28	35	69	138	207	276	345	414	483	552	621	690
50	0	9	17	26	35	43	86	173	259	345	432	518	604	690	777	863
60	0	10	21	31	41	52	104	207	311	414	518	621	725	828	932	1,036
70	0	12	24	36	48	60	121	242	362	483	604	725	846	967	1,087	1,208
80	0	14	28	41	55	69	138	276	414	552	690	828	967	1,105	1,243	1,381
90	0	16	31	47	62	78	155	311	466	621	777	932	1,087	1,243	1,398	1,553
100	0	17	35	52	69	86	173	345	518	690	863	1,036	1,208	1,381	1,553	1,726

**Table 16**      **Guillemot annual displacement matrix (based on an abundance of 4,488 for AyM array area plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	1	1	2	2	4	9	13	18	22	27	31	36	40	45
10	0	4	9	13	18	22	45	90	135	180	224	269	314	359	404	449
20	0	9	18	27	36	45	90	180	269	359	449	539	628	718	808	898
30	0	13	27	40	54	67	135	269	404	539	673	808	942	1,077	1,212	1,346
40	0	18	36	54	72	90	180	359	539	718	898	1,077	1,257	1,436	1,616	1,795
50	0	22	45	67	90	112	224	449	673	898	1,122	1,346	1,571	1,795	2,020	2,244
60	0	27	54	81	108	135	269	539	808	1,077	1,346	1,616	1,885	2,154	2,423	2,693
70	0	31	63	94	126	157	314	628	942	1,257	1,571	1,885	2,199	2,513	2,827	3,142
80	0	36	72	108	144	180	359	718	1,077	1,436	1,795	2,154	2,513	2,872	3,231	3,590
90	0	40	81	121	162	202	404	808	1,212	1,616	2,020	2,423	2,827	3,231	3,635	4,039
100	0	45	90	135	180	224	449	898	1,346	1,795	2,244	2,693	3,142	3,590	4,039	4,488

### 3.3 Razorbill displacement matrices

**Table 17** Razorbill return migration displacement matrix (based on an abundance of 299 for AyM array area only).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1	1	1	1	2	2	2	3	3
10	0	0	1	1	1	1	3	6	9	12	15	18	21	24	27	30
20	0	1	1	2	2	3	6	12	18	24	30	36	42	48	54	60
30	0	1	2	3	4	4	9	18	27	36	45	54	63	72	81	90
40	0	1	2	4	5	6	12	24	36	48	60	72	84	96	108	120
50	0	1	3	4	6	7	15	30	45	60	75	90	105	120	135	150
60	0	2	4	5	7	9	18	36	54	72	90	108	126	144	161	179
70	0	2	4	6	8	10	21	42	63	84	105	126	147	167	188	209
80	0	2	5	7	10	12	24	48	72	96	120	144	167	191	215	239
90	0	3	5	8	11	13	27	54	81	108	135	161	188	215	242	269
100	0	3	6	9	12	15	30	60	90	120	150	179	209	239	269	299



**Table 18**      **Razorbill return migration displacement matrix (based on an abundance of 336 for AyM array plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
10	0	0	1	1	1	2	3	7	10	13	17	20	24	27	30	34
20	0	1	1	2	3	3	7	13	20	27	34	40	47	54	60	67
30	0	1	2	3	4	5	10	20	30	40	50	60	71	81	91	101
40	0	1	3	4	5	7	13	27	40	54	67	81	94	108	121	134
50	0	2	3	5	7	8	17	34	50	67	84	101	118	134	151	168
60	0	2	4	6	8	10	20	40	60	81	101	121	141	161	181	202
70	0	2	5	7	9	12	24	47	71	94	118	141	165	188	212	235
80	0	3	5	8	11	13	27	54	81	108	134	161	188	215	242	269
90	0	3	6	9	12	15	30	60	91	121	151	181	212	242	272	302
100	0	3	7	10	13	17	34	67	101	134	168	202	235	269	302	336

**Table 19**      **Razorbill migration-free breeding displacement matrix (based on an abundance of 71 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
10	0	0	0	0	0	0	1	1	2	3	4	4	5	6	6	7
20	0	0	0	0	1	1	1	3	4	6	7	8	10	11	13	14
30	0	0	0	1	1	1	2	4	6	8	11	13	15	17	19	21
40	0	0	1	1	1	1	3	6	8	11	14	17	20	23	25	28
50	0	0	1	1	1	2	4	7	11	14	18	21	25	28	32	35
60	0	0	1	1	2	2	4	8	13	17	21	25	30	34	38	42
70	0	0	1	1	2	2	5	10	15	20	25	30	35	40	44	49
80	0	1	1	2	2	3	6	11	17	23	28	34	40	45	51	56
90	0	1	1	2	3	3	6	13	19	25	32	38	44	51	57	63
100	0	1	1	2	3	4	7	14	21	28	35	42	49	56	63	71

**Table 20**      **Razorbill migration-free breeding displacement matrix (based on an abundance of 140 for AyM array area plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
10	0	0	0	0	1	1	1	3	4	6	7	8	10	11	13	14
20	0	0	1	1	1	1	3	6	8	11	14	17	20	22	25	28
30	0	0	1	1	2	2	4	8	13	17	21	25	29	34	38	42
40	0	1	1	2	2	3	6	11	17	22	28	34	39	45	50	56
50	0	1	1	2	3	4	7	14	21	28	35	42	49	56	63	70
60	0	1	2	3	3	4	8	17	25	34	42	50	59	67	76	84
70	0	1	2	3	4	5	10	20	29	39	49	59	69	79	88	98
80	0	1	2	3	4	6	11	22	34	45	56	67	79	90	101	112
90	0	1	3	4	5	6	13	25	38	50	63	76	88	101	114	126
100	0	1	3	4	6	7	14	28	42	56	70	84	98	112	126	140

**Table 21      Razorbill post-breeding migration displacement matrix (based on an abundance of 32 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
20	0	0	0	0	0	0	1	1	2	3	3	4	4	5	6	6
30	0	0	0	0	0	0	1	2	3	4	5	6	7	8	9	10
40	0	0	0	0	1	1	1	3	4	5	6	8	9	10	11	13
50	0	0	0	0	1	1	2	3	5	6	8	10	11	13	14	16
60	0	0	0	1	1	1	2	4	6	8	10	11	13	15	17	19
70	0	0	0	1	1	1	2	4	7	9	11	13	16	18	20	22
80	0	0	1	1	1	1	3	5	8	10	13	15	18	20	23	25
90	0	0	1	1	1	1	3	6	9	11	14	17	20	23	26	29
100	0	0	1	1	1	2	3	6	10	13	16	19	22	25	29	32

**Table 22**      **Razorbill post-breeding migration displacement matrix (based on an abundance of 66 for AyM array area plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
10	0	0	0	0	0	0	1	1	2	3	3	4	5	5	6	7
20	0	0	0	0	1	1	1	3	4	5	7	8	9	11	12	13
30	0	0	0	1	1	1	2	4	6	8	10	12	14	16	18	20
40	0	0	1	1	1	1	3	5	8	11	13	16	18	21	24	26
50	0	0	1	1	1	2	3	7	10	13	16	20	23	26	30	33
60	0	0	1	1	2	2	4	8	12	16	20	24	28	32	36	40
70	0	0	1	1	2	2	5	9	14	18	23	28	32	37	41	46
80	0	1	1	2	2	3	5	11	16	21	26	32	37	42	47	53
90	0	1	1	2	2	3	6	12	18	24	30	36	41	47	53	59
100	0	1	1	2	3	3	7	13	20	26	33	40	46	53	59	66

**Table 23      Razorbill migration-free winter displacement matrix (based on an abundance of 86 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
10	0	0	0	0	0	0	1	2	3	3	4	5	6	7	8	9
20	0	0	0	1	1	1	2	3	5	7	9	10	12	14	15	17
30	0	0	1	1	1	1	3	5	8	10	13	15	18	21	23	26
40	0	0	1	1	1	2	3	7	10	14	17	21	24	27	31	34
50	0	0	1	1	2	2	4	9	13	17	21	26	30	34	39	43
60	0	1	1	2	2	3	5	10	15	21	26	31	36	41	46	51
70	0	1	1	2	2	3	6	12	18	24	30	36	42	48	54	60
80	0	1	1	2	3	3	7	14	21	27	34	41	48	55	62	69
90	0	1	2	2	3	4	8	15	23	31	39	46	54	62	69	77
100	0	1	2	3	3	4	9	17	26	34	43	51	60	69	77	86

**Table 24**      **Razorbill migration-free winter displacement matrix (based on an abundance of 150 for AyM array area plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2
10	0	0	0	0	1	1	2	3	5	6	8	9	11	12	14	15
20	0	0	1	1	1	2	3	6	9	12	15	18	21	24	27	30
30	0	0	1	1	2	2	5	9	14	18	23	27	32	36	41	45
40	0	1	1	2	2	3	6	12	18	24	30	36	42	48	54	60
50	0	1	2	2	3	4	8	15	23	30	38	45	53	60	68	75
60	0	1	2	3	4	5	9	18	27	36	45	54	63	72	81	90
70	0	1	2	3	4	5	11	21	32	42	53	63	74	84	95	105
80	0	1	2	4	5	6	12	24	36	48	60	72	84	96	108	120
90	0	1	3	4	5	7	14	27	41	54	68	81	95	108	122	135
100	0	2	3	5	6	8	15	30	45	60	75	90	105	120	135	150

**Table 25      Razorbill annual displacement matrix (based on an abundance of 487 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5
10	0	0	1	1	2	2	5	10	15	19	24	29	34	39	44	49
20	0	1	2	3	4	5	10	19	29	39	49	58	68	78	88	97
30	0	1	3	4	6	7	15	29	44	58	73	88	102	117	131	146
40	0	2	4	6	8	10	19	39	58	78	97	117	136	156	175	195
50	0	2	5	7	10	12	24	49	73	97	122	146	170	195	219	243
60	0	3	6	9	12	15	29	58	88	117	146	175	205	234	263	292
70	0	3	7	10	14	17	34	68	102	136	170	205	239	273	307	341
80	0	4	8	12	16	19	39	78	117	156	195	234	273	312	351	390
90	0	4	9	13	18	22	44	88	131	175	219	263	307	351	394	438
100	0	5	10	15	19	24	49	97	146	195	243	292	341	390	438	487



**Table 26      Razorbill annual displacement matrix (based on an abundance of 692 for AyM array area plus 2 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1	1	2	3	3	4	5	6	6	7
10	0	1	1	2	3	3	7	14	21	28	35	42	48	55	62	69
20	0	1	3	4	6	7	14	28	42	55	69	83	97	111	125	138
30	0	2	4	6	8	10	21	42	62	83	104	125	145	166	187	208
40	0	3	6	8	11	14	28	55	83	111	138	166	194	222	249	277
50	0	3	7	10	14	17	35	69	104	138	173	208	242	277	312	346
60	0	4	8	12	17	21	42	83	125	166	208	249	291	332	374	415
70	0	5	10	15	19	24	48	97	145	194	242	291	339	388	436	485
80	0	6	11	17	22	28	55	111	166	222	277	332	388	443	498	554
90	0	6	12	19	25	31	62	125	187	249	312	374	436	498	561	623
100	0	7	14	21	28	35	69	138	208	277	346	415	485	554	623	692

### 3.4 Common scoter displacement matrices

**Table 27 Common scoter breeding displacement matrix (based on an abundance of 0 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 28 Common scoter breeding displacement matrix (based on an abundance of 0 for AyM array area plus 4km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 29 Common scoter non-breeding displacement matrix (based on an abundance of 0 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 30 Common scoter non-breeding displacement matrix (based on an abundance of 31 for AyM array area plus 4 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	1	1	2	2	2	2	3	3
20	0	0	0	0	0	0	1	1	2	2	3	4	4	5	5	6
30	0	0	0	0	0	0	1	2	3	4	5	5	6	7	8	9
40	0	0	0	0	0	1	1	2	4	5	6	7	9	10	11	12
50	0	0	0	0	1	1	2	3	5	6	8	9	11	12	14	15
60	0	0	0	1	1	1	2	4	5	7	9	11	13	15	16	18
70	0	0	0	1	1	1	2	4	6	9	11	13	15	17	19	21
80	0	0	0	1	1	1	2	5	7	10	12	15	17	20	22	24
90	0	0	1	1	1	1	3	5	8	11	14	16	19	22	25	27
100	0	0	1	1	1	2	3	6	9	12	15	18	21	24	27	31

**Table 31 Common scoter annual displacement matrix (based on an abundance of 0 for AyM array area only).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 32 Common scoter annual displacement matrix (based on an abundance of 31 for AyM array area plus 4 km buffer).**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	1	1	2	2	2	2	3	3
20	0	0	0	0	0	0	1	1	2	2	3	4	4	5	5	6
30	0	0	0	0	0	0	1	2	3	4	5	5	6	7	8	9
40	0	0	0	0	0	1	1	2	4	5	6	7	9	10	11	12
50	0	0	0	0	1	1	2	3	5	6	8	9	11	12	14	15
60	0	0	0	1	1	1	2	4	5	7	9	11	13	15	16	18
70	0	0	0	1	1	1	2	4	6	9	11	13	15	17	19	21
80	0	0	0	1	1	1	2	5	7	10	12	15	17	20	22	24
90	0	0	1	1	1	1	3	5	8	11	14	16	19	22	25	27
100	0	0	1	1	1	2	3	6	9	12	15	18	21	24	27	31

### 3.5 Red-throated diver displacement matrices

**Table 33** Red-throated diver return migration displacement matrix (based on an abundance of 9 for AyM array area only).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
20	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2
30	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2	3
40	0	0	0	0	0	0	0	1	1	1	2	2	3	3	3	4
50	0	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5
60	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5	5
70	0	0	0	0	0	0	1	1	2	3	3	4	4	5	6	6
80	0	0	0	0	0	0	1	1	2	3	4	4	5	6	6	7
90	0	0	0	0	0	0	1	2	2	3	4	5	6	6	7	8
100	0	0	0	0	0	0	1	2	3	4	5	5	6	7	8	9



**Table 34 Red-throated diver return migration displacement matrix (based on abundance of 28 for AyM 0-5 km buffer only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2	3
20	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5	6
30	0	0	0	0	0	0	1	2	2	3	4	5	6	7	7	8
40	0	0	0	0	0	1	1	2	3	4	6	7	8	9	10	11
50	0	0	0	0	1	1	1	3	4	6	7	8	10	11	12	14
60	0	0	0	0	1	1	2	3	5	7	8	10	12	13	15	17
70	0	0	0	1	1	1	2	4	6	8	10	12	13	15	17	19
80	0	0	0	1	1	1	2	4	7	9	11	13	15	18	20	22
90	0	0	0	1	1	1	2	5	7	10	12	15	17	20	22	25
100	0	0	1	1	1	1	3	6	8	11	14	17	19	22	25	28

**Table 35 Red-throated diver return migration displacement matrix (based on abundance of 50 for AyM 5-8 km buffer only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5
20	0	0	0	0	0	0	1	2	3	4	5	6	7	8	9	10
30	0	0	0	0	1	1	1	3	4	6	7	9	10	12	13	15
40	0	0	0	1	1	1	2	4	6	8	10	12	14	16	18	20
50	0	0	0	1	1	1	2	5	7	10	12	15	17	20	22	25
60	0	0	1	1	1	1	3	6	9	12	15	18	21	24	27	30
70	0	0	1	1	1	2	3	7	10	14	17	21	24	28	31	35
80	0	0	1	1	2	2	4	8	12	16	20	24	28	32	36	40
90	0	0	1	1	2	2	4	9	13	18	22	27	31	36	40	45
100	0	0	1	1	2	2	5	10	15	20	25	30	35	40	45	50

**Table 36 Red-throated diver migration-free breeding displacement matrix (based on abundance of 0 for AyM array area only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 37** Red-throated diver migration-free breeding displacement matrix (based on abundance of 5 for AyM 0-5 km buffer only)

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
30	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
40	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2
50	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2
60	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2	3
70	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
80	0	0	0	0	0	0	0	1	1	1	2	2	3	3	3	4
90	0	0	0	0	0	0	0	1	1	2	2	2	3	3	4	4
100	0	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5

**Table 38 Red-throated diver migration-free breeding displacement matrix (based on abundance of 0 for AyM 5-8 km buffer only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 39 Red-throated diver post-breeding migration displacement matrix (based on abundance of 4 for AyM array area only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
30	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
40	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2
50	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2
60	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2
70	0	0	0	0	0	0	0	1	1	1	1	2	2	2	3	3
80	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
90	0	0	0	0	0	0	0	1	1	1	2	2	3	3	3	4
100	0	0	0	0	0	0	0	1	1	2	2	2	3	3	4	4

**Table 40 Red-throated diver post-breeding migration displacement matrix (based on abundance of 0 for AyM 0-5 km buffer only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 41 Red-throated diver post-breeding migration displacement matrix (based on abundance of 58 for AyM 5-8 km buffer only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
10	0	0	0	0	0	0	1	1	2	2	3	3	4	5	5	6
20	0	0	0	0	0	1	1	2	3	5	6	7	8	9	10	12
30	0	0	0	1	1	1	2	3	5	7	9	10	12	14	16	17
40	0	0	0	1	1	1	2	5	7	9	12	14	16	18	21	23
50	0	0	1	1	1	1	3	6	9	12	14	17	20	23	26	29
60	0	0	1	1	1	2	3	7	10	14	17	21	24	28	31	35
70	0	0	1	1	2	2	4	8	12	16	20	24	28	32	36	40
80	0	0	1	1	2	2	5	9	14	18	23	28	32	37	41	46
90	0	1	1	2	2	3	5	10	16	21	26	31	36	41	47	52
100	0	1	1	2	2	3	6	12	17	23	29	35	40	46	52	58



**Table 42 Red-throated diver migration-free winter displacement matrix (based on abundance of 4 for AyM array area only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
30	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
40	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2
50	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2
60	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2
70	0	0	0	0	0	0	0	1	1	1	1	2	2	2	3	3
80	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
90	0	0	0	0	0	0	0	1	1	1	2	2	3	3	3	4
100	0	0	0	0	0	0	0	1	1	2	2	2	3	3	4	4

**Table 43** Red-throated diver migration-free winter displacement matrix (based on abundance of 5 for AyM 0-5 km buffer only)

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
30	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
40	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2
50	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2
60	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2	3
70	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
80	0	0	0	0	0	0	0	1	1	1	2	2	3	3	3	4
90	0	0	0	0	0	0	0	1	1	2	2	2	3	3	4	4
100	0	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5

**Table 44 Red-throated diver migration-free winter displacement matrix (based on abundance of 39 for AyM 5-8 km buffer only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	1	2	2	2	3	3	3	4
20	0	0	0	0	0	0	1	2	2	3	4	5	5	6	7	8
30	0	0	0	0	0	1	1	2	3	5	6	7	8	9	10	12
40	0	0	0	0	1	1	2	3	5	6	8	9	11	12	14	15
50	0	0	0	1	1	1	2	4	6	8	10	12	13	15	17	19
60	0	0	0	1	1	1	2	5	7	9	12	14	16	18	21	23
70	0	0	1	1	1	1	3	5	8	11	13	16	19	22	24	27
80	0	0	1	1	1	2	3	6	9	12	15	18	22	25	28	31
90	0	0	1	1	1	2	3	7	10	14	17	21	24	28	31	35
100	0	0	1	1	2	2	4	8	12	15	19	23	27	31	35	39

**Table 45 Red-throated diver annual displacement matrix (based on abundance of 17 for AyM array area only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2
20	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
30	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5	5
40	0	0	0	0	0	0	1	1	2	3	3	4	5	5	6	7
50	0	0	0	0	0	0	1	2	3	3	4	5	6	7	8	9
60	0	0	0	0	0	1	1	2	3	4	5	6	7	8	9	10
70	0	0	0	0	0	1	1	2	4	5	6	7	8	10	11	12
80	0	0	0	0	1	1	1	3	4	5	7	8	10	11	12	14
90	0	0	0	0	1	1	2	3	5	6	8	9	11	12	14	15
100	0	0	0	1	1	1	2	3	5	7	9	10	12	14	15	17

**Table 46 Red-throated diver annual displacement matrix (based on abundance of 37 for AyM 0-5 km buffer only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	1	1	2	2	3	3	3	4
20	0	0	0	0	0	0	1	1	2	3	4	4	5	6	7	7
30	0	0	0	0	0	1	1	2	3	4	5	7	8	9	10	11
40	0	0	0	0	1	1	1	3	4	6	7	9	10	12	13	15
50	0	0	0	1	1	1	2	4	5	7	9	11	13	15	16	18
60	0	0	0	1	1	1	2	4	7	9	11	13	15	18	20	22
70	0	0	1	1	1	1	3	5	8	10	13	15	18	20	23	26
80	0	0	1	1	1	1	3	6	9	12	15	18	20	23	26	29
90	0	0	1	1	1	2	3	7	10	13	16	20	23	26	30	33
100	0	0	1	1	1	2	4	7	11	15	18	22	26	29	33	37

**Table 47 Red-throated diver annual displacement matrix (based on abundance of 146 for AyM 5-8 km buffer only)**

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
10	0	0	0	0	1	1	1	3	4	6	7	9	10	12	13	15
20	0	0	1	1	1	1	3	6	9	12	15	17	20	23	26	29
30	0	0	1	1	2	2	4	9	13	17	22	26	31	35	39	44
40	0	1	1	2	2	3	6	12	17	23	29	35	41	47	52	58
50	0	1	1	2	3	4	7	15	22	29	36	44	51	58	65	73
60	0	1	2	3	3	4	9	17	26	35	44	52	61	70	79	87
70	0	1	2	3	4	5	10	20	31	41	51	61	71	81	92	102
80	0	1	2	3	5	6	12	23	35	47	58	70	81	93	105	116
90	0	1	3	4	5	7	13	26	39	52	65	79	92	105	118	131
100	0	1	3	4	6	7	15	29	44	58	73	87	102	116	131	146

### 3.6 Manx shearwater displacement matrices

Table 48 Manx shearwater return migration displacement matrix (based on an abundance of 58 for AyM array area).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
10	0	0	0	0	0	0	1	1	2	2	3	3	4	5	5	6
20	0	0	0	0	0	1	1	2	3	5	6	7	8	9	10	12
30	0	0	0	1	1	1	2	3	5	7	9	10	12	14	16	17
40	0	0	0	1	1	1	2	5	7	9	12	14	16	18	21	23
50	0	0	1	1	1	1	3	6	9	12	14	17	20	23	26	29
60	0	0	1	1	1	2	3	7	10	14	17	21	24	28	31	35
70	0	0	1	1	2	2	4	8	12	16	20	24	28	32	36	40
80	0	0	1	1	2	2	5	9	14	18	23	28	32	37	41	46
90	0	1	1	2	2	3	5	10	16	21	26	31	36	41	47	52
100	0	1	1	2	2	3	6	12	17	23	29	35	40	46	52	58

**Table 49** Manx shearwater return migration displacement matrix (based on an abundance of 177 for AyM array area plus 2 km buffer).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2
10	0	0	0	1	1	1	2	4	5	7	9	11	12	14	16	18
20	0	0	1	1	1	2	4	7	11	14	18	21	25	28	32	35
30	0	1	1	2	2	3	5	11	16	21	27	32	37	42	48	53
40	0	1	1	2	3	4	7	14	21	28	35	42	50	57	64	71
50	0	1	2	3	4	4	9	18	27	35	44	53	62	71	80	89
60	0	1	2	3	4	5	11	21	32	42	53	64	74	85	96	106
70	0	1	2	4	5	6	12	25	37	50	62	74	87	99	112	124
80	0	1	3	4	6	7	14	28	42	57	71	85	99	113	127	142
90	0	2	3	5	6	8	16	32	48	64	80	96	112	127	143	159
100	0	2	4	5	7	9	18	35	53	71	89	106	124	142	159	177



**Table 50** Manx shearwater migration-free breeding displacement matrix (based on an abundance of 20 for AyM array area).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2
20	0	0	0	0	0	0	0	1	1	2	2	2	3	3	4	4
30	0	0	0	0	0	0	1	1	2	2	3	4	4	5	5	6
40	0	0	0	0	0	0	1	2	2	3	4	5	6	6	7	8
50	0	0	0	0	0	1	1	2	3	4	5	6	7	8	9	10
60	0	0	0	0	0	1	1	2	4	5	6	7	8	10	11	12
70	0	0	0	0	1	1	1	3	4	6	7	8	10	11	13	14
80	0	0	0	0	1	1	2	3	5	6	8	10	11	13	14	16
90	0	0	0	1	1	1	2	4	5	7	9	11	13	14	16	18
100	0	0	0	1	1	1	2	4	6	8	10	12	14	16	18	20

**Table 51** Manx shearwater migration-free breeding displacement matrix (based on an abundance of 26 for AyM array area plus 2 km buffer).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2	3
20	0	0	0	0	0	0	1	1	2	2	3	3	4	4	5	5
30	0	0	0	0	0	0	1	2	2	3	4	5	5	6	7	8
40	0	0	0	0	0	1	1	2	3	4	5	6	7	8	9	10
50	0	0	0	0	1	1	1	3	4	5	7	8	9	10	12	13
60	0	0	0	0	1	1	2	3	5	6	8	9	11	12	14	16
70	0	0	0	1	1	1	2	4	5	7	9	11	13	15	16	18
80	0	0	0	1	1	1	2	4	6	8	10	12	15	17	19	21
90	0	0	0	1	1	1	2	5	7	9	12	14	16	19	21	23
100	0	0	1	1	1	1	3	5	8	10	13	16	18	21	23	26

**Table 52** Manx shearwater diver post-breeding migration displacement matrix (based on an abundance of 150 for AyM array area).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2
10	0	0	0	0	1	1	2	3	5	6	8	9	11	12	14	15
20	0	0	1	1	1	2	3	6	9	12	15	18	21	24	27	30
30	0	0	1	1	2	2	5	9	14	18	23	27	32	36	41	45
40	0	1	1	2	2	3	6	12	18	24	30	36	42	48	54	60
50	0	1	2	2	3	4	8	15	23	30	38	45	53	60	68	75
60	0	1	2	3	4	5	9	18	27	36	45	54	63	72	81	90
70	0	1	2	3	4	5	11	21	32	42	53	63	74	84	95	105
80	0	1	2	4	5	6	12	24	36	48	60	72	84	96	108	120
90	0	1	3	4	5	7	14	27	41	54	68	81	95	108	122	135
100	0	2	3	5	6	8	15	30	45	60	75	90	105	120	135	150

**Table 53** Manx shearwater diver post-breeding migration displacement matrix (based on an abundance of 214 for AyM array area plus 2 km buffer).

Displacement (%)	Mortality rates (%)															
	0	1	2	3	4	5	10	20	30	40	50	60	70	80	90	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2
10	0	0	0	1	1	1	2	4	6	9	11	13	15	17	19	21
20	0	0	1	1	2	2	4	9	13	17	21	26	30	34	39	43
30	0	1	1	2	3	3	6	13	19	26	32	39	45	51	58	64
40	0	1	2	3	3	4	9	17	26	34	43	51	60	68	77	86
50	0	1	2	3	4	5	11	21	32	43	54	64	75	86	96	107
60	0	1	3	4	5	6	13	26	39	51	64	77	90	103	116	128
70	0	1	3	4	6	7	15	30	45	60	75	90	105	120	135	150
80	0	2	3	5	7	9	17	34	51	68	86	103	120	137	154	171
90	0	2	4	6	8	10	19	39	58	77	96	116	135	154	173	193
100	0	2	4	6	9	11	21	43	64	86	107	128	150	171	193	214

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