

**RWE Renewables UK Dogger Bank
South (West) Limited**

**RWE Renewables UK Dogger Bank
South (East) Limited**

**Dogger Bank South Offshore
Wind Farms**

**Spatial modelling of baseline seabird data for
Dogger Bank South**

Document Date: October 2025

Document Reference: 20.4

Revision Number: 01

Classification: Unrestricted

Company:	RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited	Asset:	Development		
Project:	Dogger Bank South Offshore Wind Farms	Sub Project/Package	Consents		
Document Title or Description:	Spatial modelling of baseline seabird data for Dogger Bank South				
Document Number:	006039848-01	Contractor Reference Number:	PC2340-RHD-OF-ZZ-RP-Z-0231		
<i>COPYRIGHT © RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited, 2025. All rights reserved.</i> <i>This document is supplied on and subject to the terms and conditions of the Contractual Agreement relating to this work, under which this document has been supplied, in particular:</i> LIABILITY <i>In preparation of this document RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited has made reasonable efforts to ensure that the content is accurate, up to date and complete for the purpose for which it was contracted. RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited makes no warranty as to the accuracy or completeness of material supplied by the client or their agent.</i> <i>Other than any liability on RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited detailed in the contracts between the parties for this work RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited shall have no liability for any loss, damage, injury, claim, expense, cost or other consequence arising as a result of use or reliance upon any information contained in or omitted from this document.</i> <i>Any persons intending to use this document should satisfy themselves as to its applicability for their intended purpose.</i> <i>The user of this document has the obligation to employ safe working practices for any activities referred to and to adopt specific practices appropriate to local conditions.</i>					
Rev No.	Date	Status/Reason for Issue	Author	Checked by	Approved by
01	October 2025	Post-Examination Update	SLR	RWE	RWE

Contents

1	Introduction	7
2	Methods.....	8
3	Results	9
4	Conclusion	10
	References	11
	Appendix A - Seasonal plots	12
	Appendix B - Survey plots.....	23
	Appendix C - Model summary information for survey models	34
	Appendix D - Model summary information for seasonal models.....	134

Tables

Table 3-1	Assignment of months to species-specific seasons.....	9
-----------	---	---

Figures

Figure A-1	Seasonal plots for gannet plotted on consistent scale	13
Figure A-2	Seasonal plots for gannet plotted on individual scale	14
Figure A-3	Seasonal plots for kittiwake plotted on consistent scale	15
Figure A-4	Seasonal plots for kittiwake plotted on individual scale.....	16
Figure A-5	Seasonal plots for guillemot plotted on consistent scale	17
Figure A-6	Seasonal plots for guillemot plotted on individual scale	18
Figure A-7	Seasonal plots for razorbill plotted on consistent scale.....	19
Figure A-8	Seasonal plots for razorbill plotted on individual scale	20
Figure A-9	Seasonal plots for puffin plotted on consistent scale	21
Figure A-10	Seasonal plots for puffin plotted on individual scale	22
Figure B-1	Survey plots for gannet plotted on consistent scale.....	24
Figure B-2	Survey plots for gannet plotted on individual scale	25
Figure B-3	Survey plots for kittiwake plotted on consistent scale	26
Figure B-4	Survey plots for kittiwake plotted on individual scale	27
Figure B-5	Survey plots for guillemot plotted on consistent scale.....	28

Figure B-6 Survey plots for guillemot plotted on individual scale.....	29
Figure B-7 Survey plots for razorbill plotted on consistent scale	30
Figure B-8 Survey plots for razorbill plotted on individual scale.....	31
Figure B-9 Survey plots for puffin plotted on consistent scale	32
Figure B-10 Survey plots for puffin plotted on individual scale.....	33

Glossary

Term	Definition
Array Areas	The DBS East and DBS West offshore Array Areas, where the wind turbines, offshore platforms and array cables would be located. The Array Areas do not include the Offshore Export Cable Corridor or the Inter-Platform Cable Corridor within which no wind turbines are proposed. Each area is referred to separately as an Array Area.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Environmental Statement	A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
The Applicants	The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms).

Acronyms

Acronym	Definition
DBS	Dogger Bank South
PEIR	Preliminary Environmental Information Report

1 Introduction

1. At Deadline 7, the Applicants submitted **Appendix A - Offshore Ornithology Year 1 and 2 Combined Spatial Plots** [REP7-137] in response to Natural England's comments made during Examination regarding the use of 'seabird hotspot modelling' to refine the Projects' Offshore Development Area to avoid high density areas of birds within the Projects' Array Areas. This document provided density surfaces fitted to the site-specific aerial survey data that were produced and examined in the pre-application phase of the Projects to indicate which areas (if any) within the Array Areas showed higher and lower densities of birds. The report demonstrated that refinement of the Projects' Array Areas boundaries between Preliminary Environment Information Report (PEIR) and Environmental Statement stages, accounted for hot spots of higher densities of birds, where applicable.
2. While Natural England welcomed the provision of this report, further comments on the document were provided at Deadline 8 in their Cover Letter [REP8-051] requesting additional information. Given the short timeframe between Deadlines 8 and 9 of Examination, the Applicants did not have time to address each of Natural England's comments in **Appendix A - Offshore Ornithology Year 1 and 2 Combined Spatial Plots (Revision 2)** [REP8-040] submitted at Deadline 9.
3. Following the close of Examination, the Applicants developed a plan to address Natural England's remaining comments on the matter and the following scope of work was shared with Natural England:
 - Undertake hotspot modelling for five species: kittiwake, guillemot, razorbill, puffin, gannet;
 - Provide maps for species-specific seasons;
 - Provide monthly hot spot maps for each species, where possible;
 - Use standardised z-axis (i.e. colour scale) for each species to allow comparison between months/seasons;
 - Overlay the 'refined' boundaries and buffers (of the submitted wind farm design); and
 - Provide full model and diagnostic details – for >100 models (subject to robust model fitting).
4. Natural England responded via email on 20th August 2025, stating that they were 'on the whole happy with the proposed outputs', with minor clarifications issued to Natural England following this email. As a result, the current report was produced to provide the information listed above in order to address Natural England's outstanding request for seabird hotspot modelling and to resolve this matter.

5. At the request of Natural England spatial modelling has been conducted using the ornithological data collected for the Dogger Bank South (DBS) baseline site characterisation. The model results are presented as density surface maps showing the DBS East and West boundaries and their 4km buffers for each survey individually and summarised for each season. Summary model diagnostic information has also been provided.

2 Methods

6. Spatial models were fitted to the survey data for five species (gannet, kittiwake, guillemot, razorbill and puffin) using the MRSea R package (Scott-Hayward *et al.*, 2013). Two separate analyses were conducted, the first involved fitting a model independently to each survey, the second to data combined by species-specific seasons, separately in each year (i.e. the breeding season data for year one were combined for analysis separately from the breeding season for year two). The only model term in the spatial models was the spatial smoother (denoted $s(x,y)$), with no one-dimensional covariates (e.g. distance to coast, bathymetry, etc.). The addition of covariates such as these is typically beneficial for predicting seabird distributions beyond the confines of the surveyed area. However, in the current situation this was not required, since the purpose of the modelling was to present the bird distributions in relation to the wind farms in order to identify the presence of any consistent areas of high or low usage, and not to perform extrapolation to areas that were not surveyed (i.e. beyond the buffered areas). With only the spatial term in the model, the fitting process was free to reflect the observed bird locations. An area offset term was included in the models to allow for variations in image area in the data.
7. Following successful model fitting, the model coefficients were used to make predictions to a grid of cells distributed across the surveyed region. These were then used to produce density surface maps. Two formats are provided, one used a consistent scale for the density surface, scaled to the survey with the highest abundance. These figures provide a comparative indication of bird presence across surveys and seasons. The second set of figures presents densities scaled to each individual survey. The latter maps therefore share a similar colour palette ranging from low to high relative densities, while the former provide an overall absolute indication of abundance, but at the cost of making variations within individual plots more difficult to discern.
8. Spatial models require sufficient observations to achieve a successful fit to the data, hence no attempt was made to fit models to surveys with fewer than ten observations, although in some cases models could not be fitted to surveys with more than ten observations. These are presented in the results as uniform density surfaces (coloured green).

3 Results

9. **Figure A-1 to Figure A-10 in Appendix A** provide seasonal outputs for each species, with the scaled abundance and flexible abundance plots paired (i.e. **Figure A-1** is the gannet seasonal maps with all plots on the same density scale and **Figure A-2** provides the same results with each plot scaled independently). Depending on the species, there are between two and four defined seasons, and hence for two years there are between four and eight seasonal plots.
10. The months within each season for each species are provided in **Table 3-1**.

Table 3-1 Assignment of months to species-specific seasons.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gannet	Spring		Breeding							Autumn		Spring
Kittiwake	Spring		Breeding						Autumn			
Guillemot	Nonbreeding		Breeding					Post-breeding		Nonbreeding		
Razorbill	Spring			Breeding				Autumn			Nonbreeding	
Puffin	Nonbreeding			Breeding					Nonbreeding			

11. **Figure B-1 to Figure B-10 in Appendix B** provide the equivalent (scaled and flexible) plots for each survey. These are presented in calendar order for year one and year two, labelled as 1-1, 1-2 to 1-12 for year one surveys and 2-1 etc. for year two. On each plot the modelled abundance within DBS East and West (east wf, west wf) and within their 4km buffers (east 4km, west 4km) has been provided. Note that the abundance within the 4km buffer includes the wind farms (i.e. this relates to the total area, not the buffer zone alone).
12. Summary model information is provided in **Appendix C** (each survey model) and **Appendix D** (each seasonal model) with each model identified using the same labelling system.

4 Conclusion

13. As is typically found in snapshot surveys for wind farm sites, there is little to indicate the presence of any areas of consistently high or low activity from the spatial models for any species that could be used to justify further refinement of the Array Areas.
14. Therefore, this report further supports both the evidence provided in **Appendix A - Offshore Ornithology Year 1 and 2 Combined Spatial Plots** [REP7-137] and [REP8-040] and the Applicants' position that all reasonable steps have already been taken to avoid potential areas of high abundance for ornithological receptors, and that additional survey work would not provide any material evidence with which to inform any further refinement of the Projects' Array Areas.

References

Scott-Hayward L.A.S., Oedekoven C., Mackenzie M.L., Walker C.G., Rexstad E. (2013). User Guide for the MRSea Package: Statistical Modelling of bird and cetacean distributions in offshore renewables development areas. University of St. Andrews. Contract with Marine Scotland: SBg (CR/2012/05).

Appendix A - Seasonal plots

Note, any months or seasons for which model fitting failed (i.e. due to insufficient data) the output appears as a uniform shade (green). These are only apparent in plots with flexible z-axes as use of the standardised scale imposes a uniform shade of blue. For example, this can be seen in **Figure A-1** and **Figure A-2** for the first gannet spring plot.

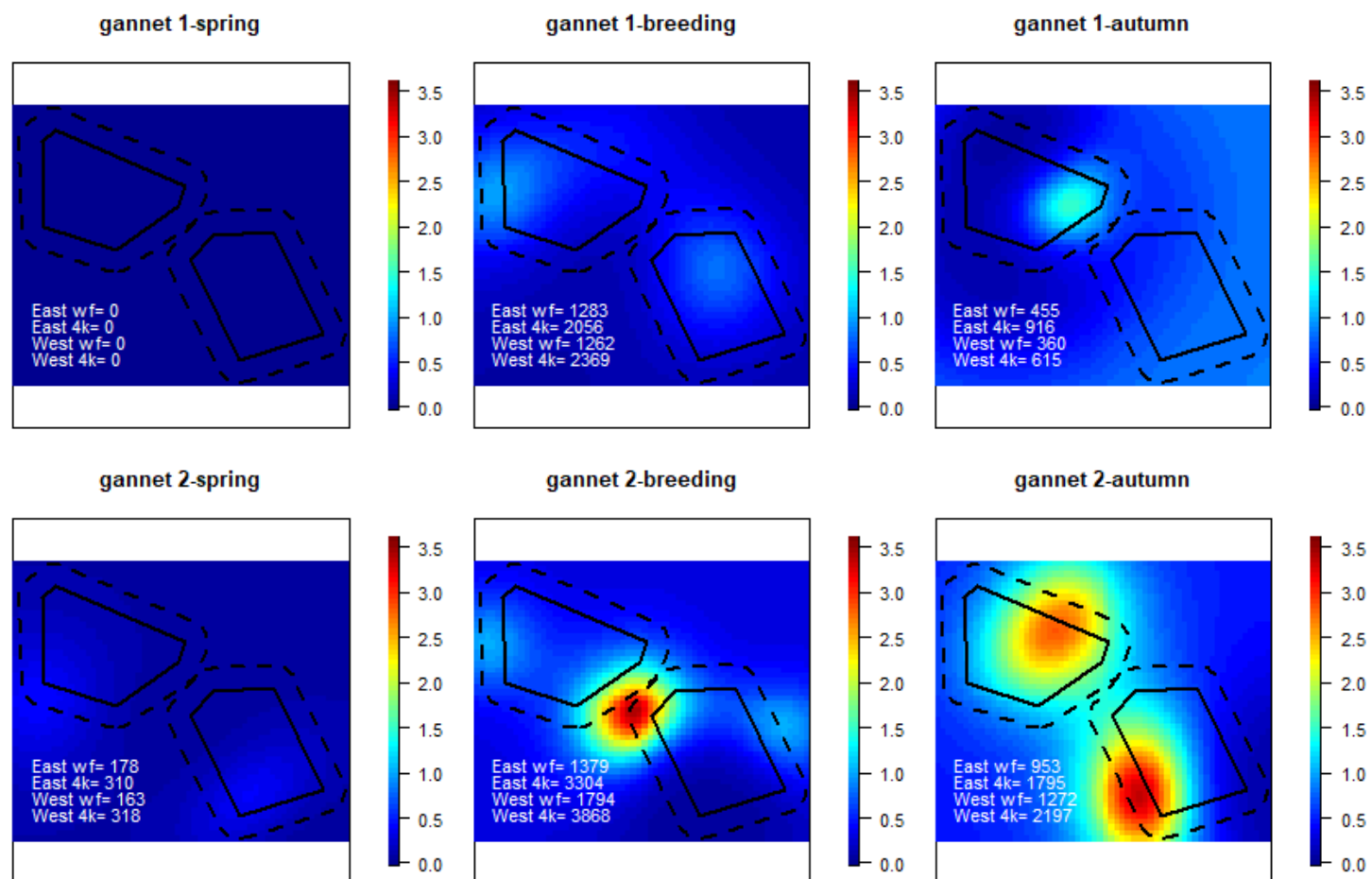


Figure A-1 Seasonal plots for gannet plotted on consistent scale

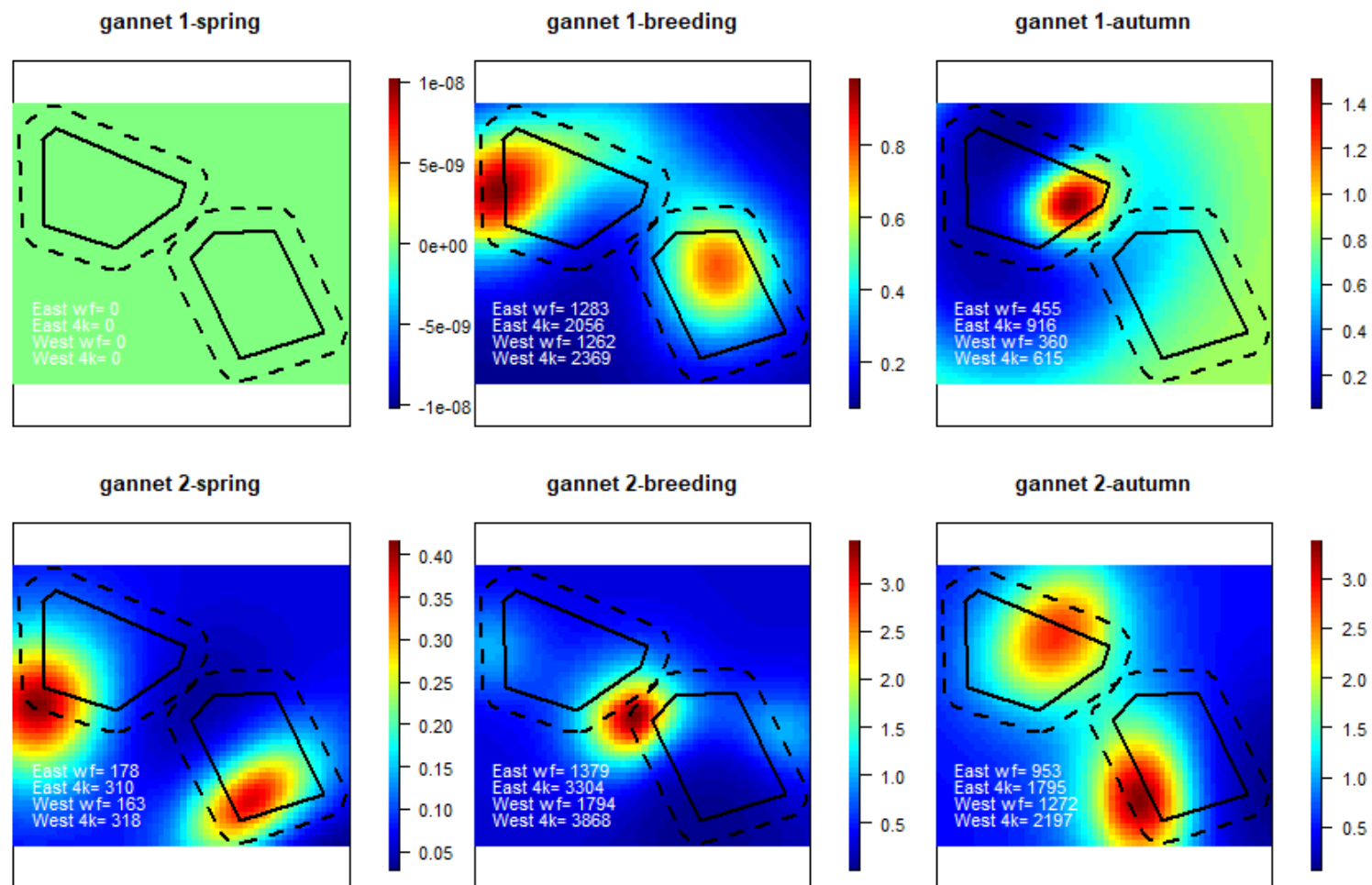


Figure A-2 Seasonal plots for gannet plotted on individual scale

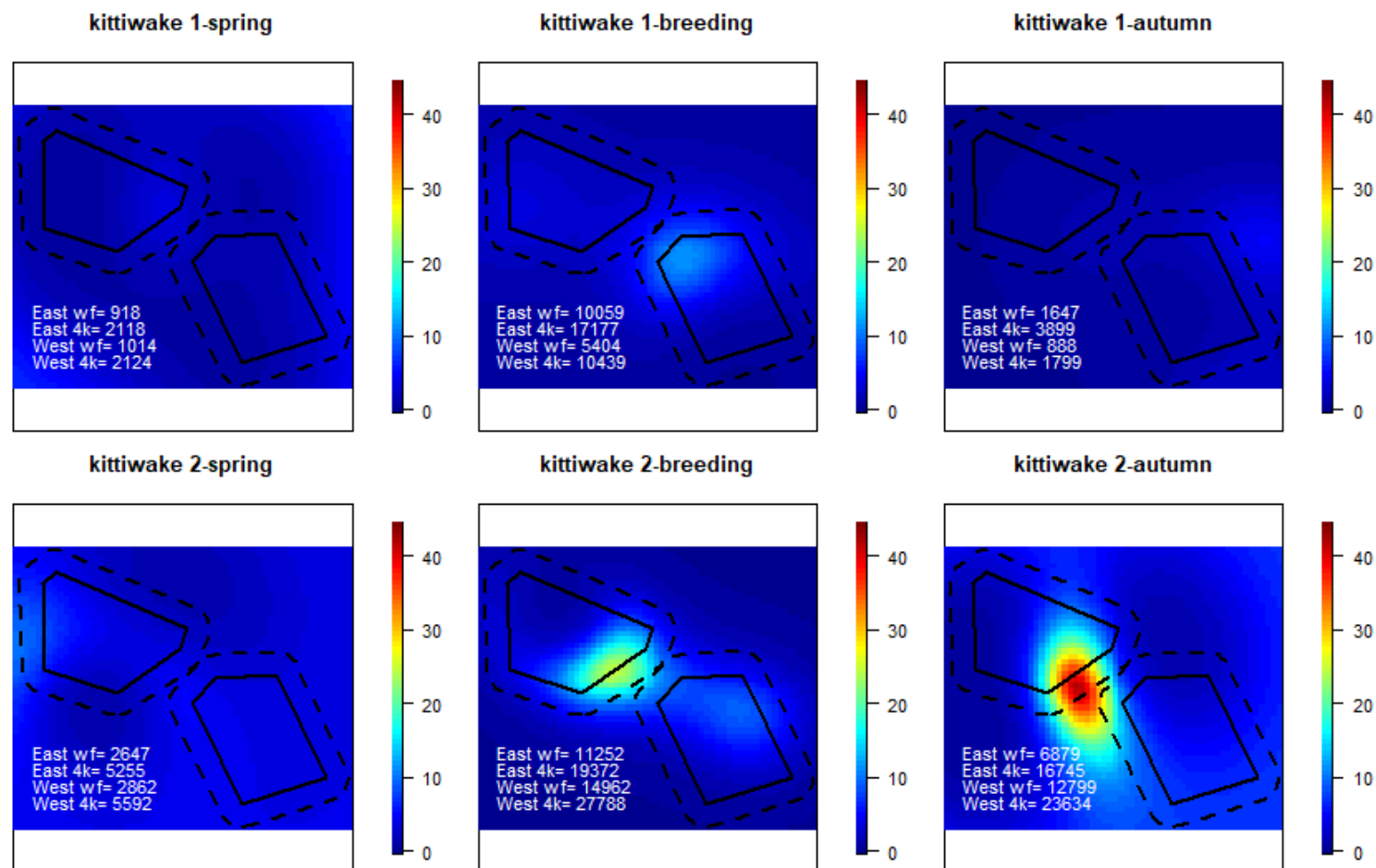


Figure A-3 Seasonal plots for kittiwake plotted on consistent scale

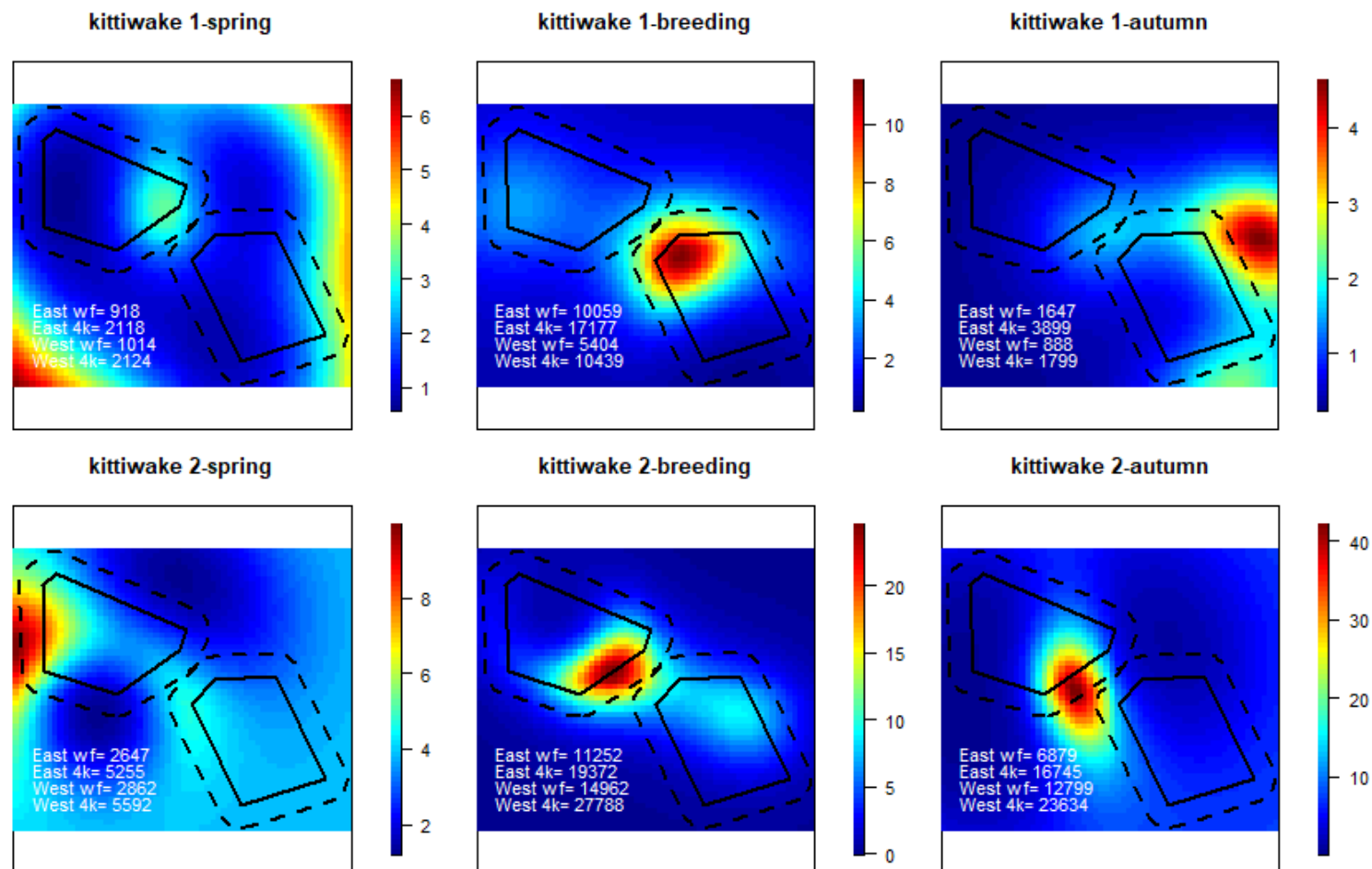


Figure A-4 Seasonal plots for kittiwake plotted on individual scale

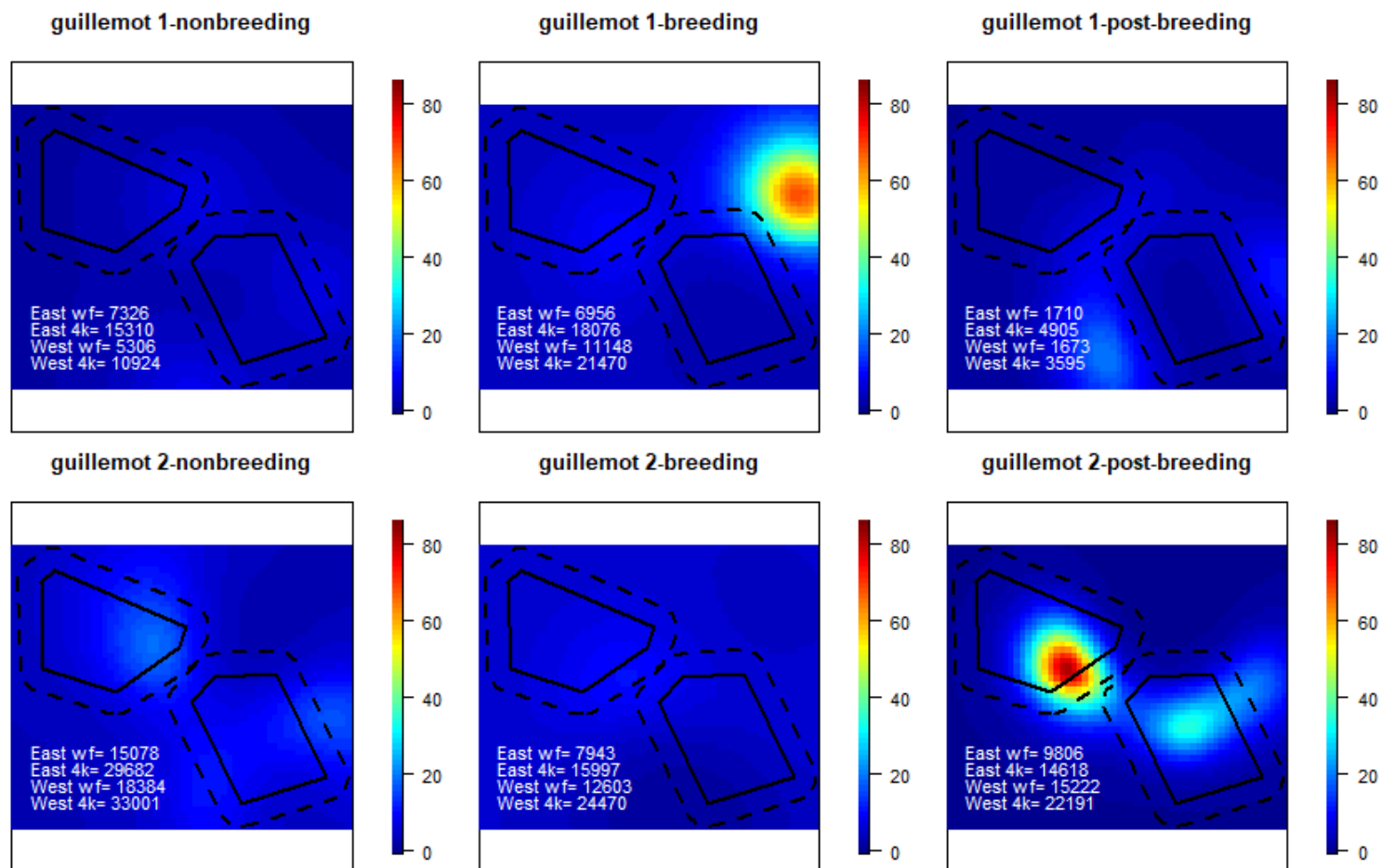


Figure A-5 Seasonal plots for guillemot plotted on consistent scale

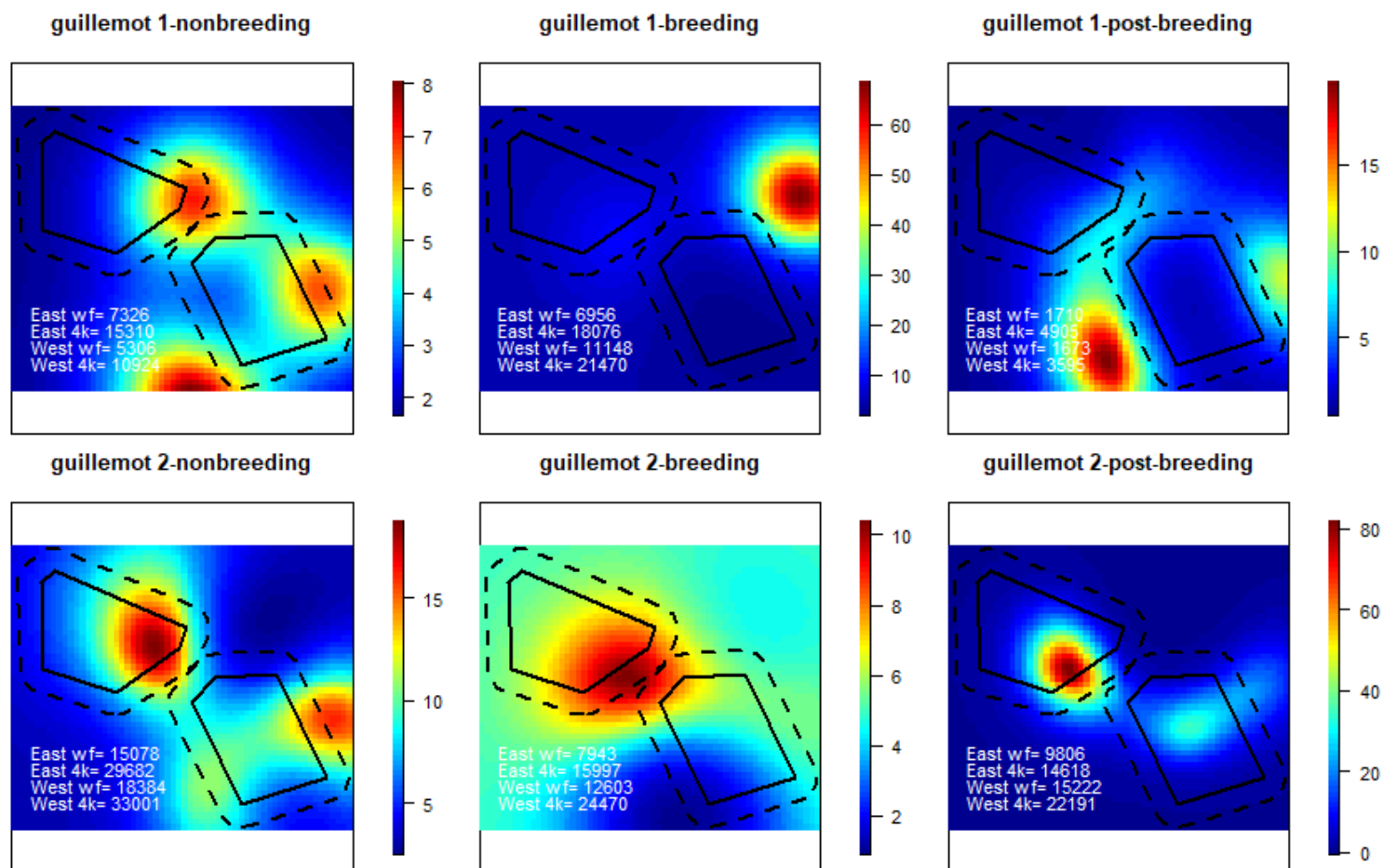


Figure A-6 Seasonal plots for guillemot plotted on individual scale

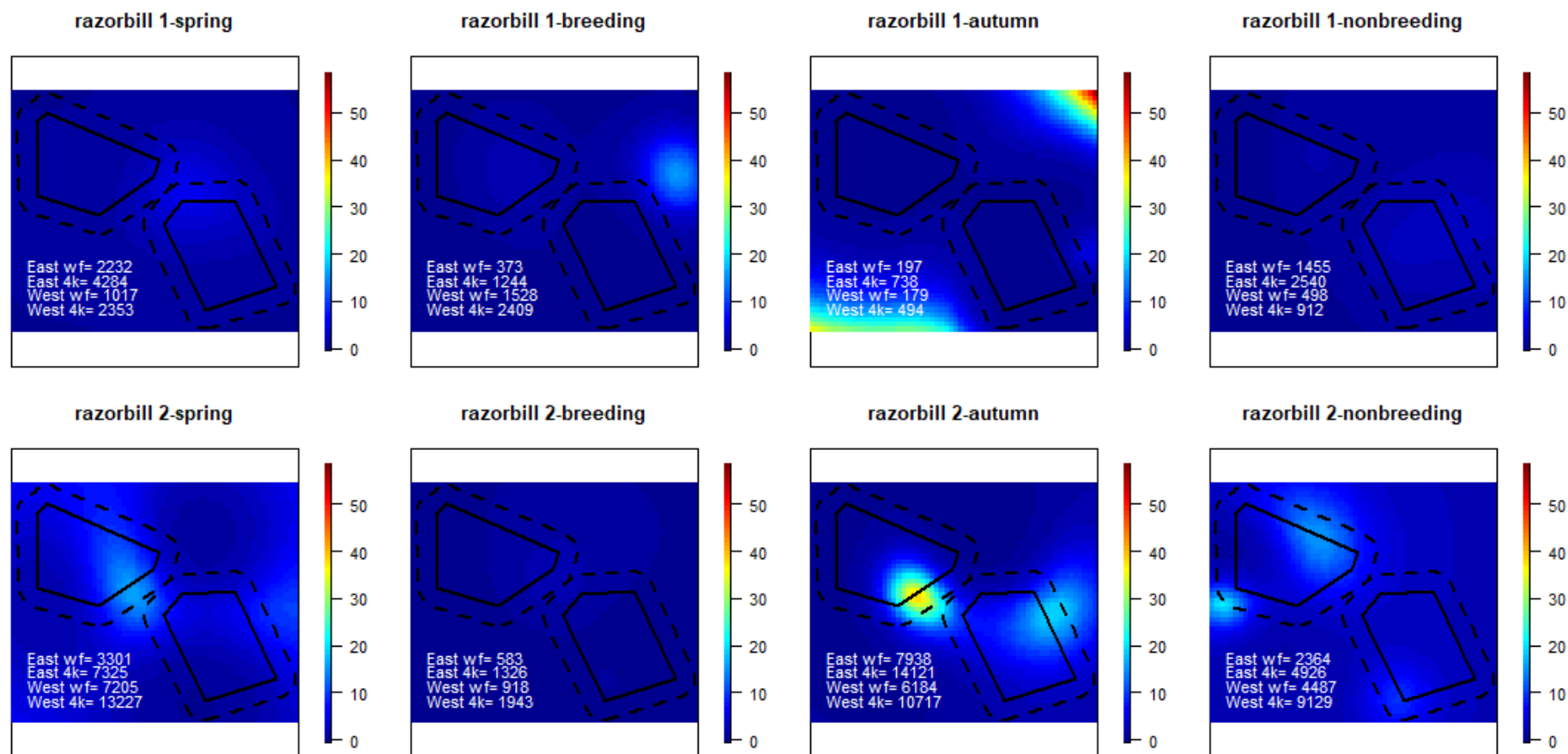


Figure A-7 Seasonal plots for razorbill plotted on consistent scale

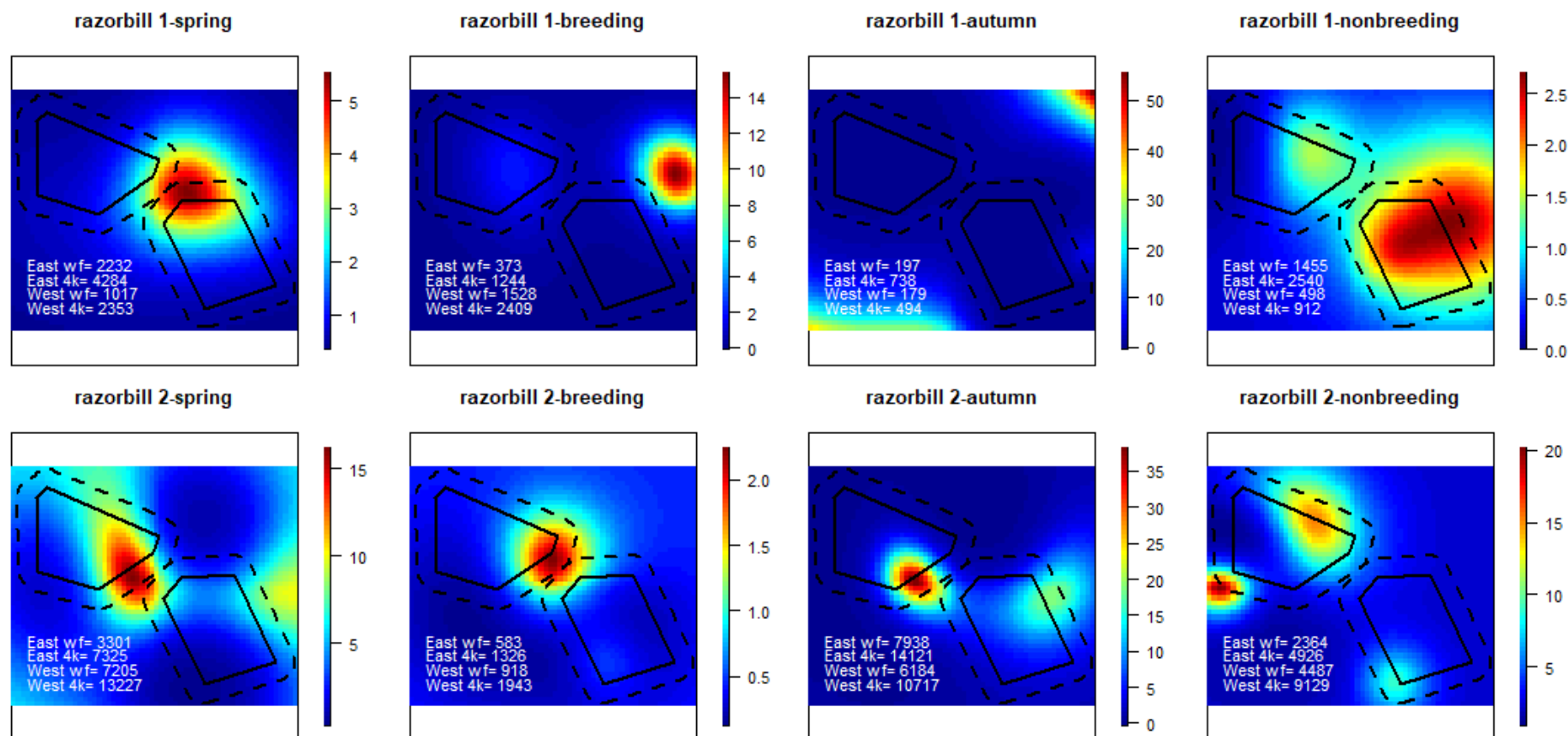


Figure A-8 Seasonal plots for razorbill plotted on individual scale

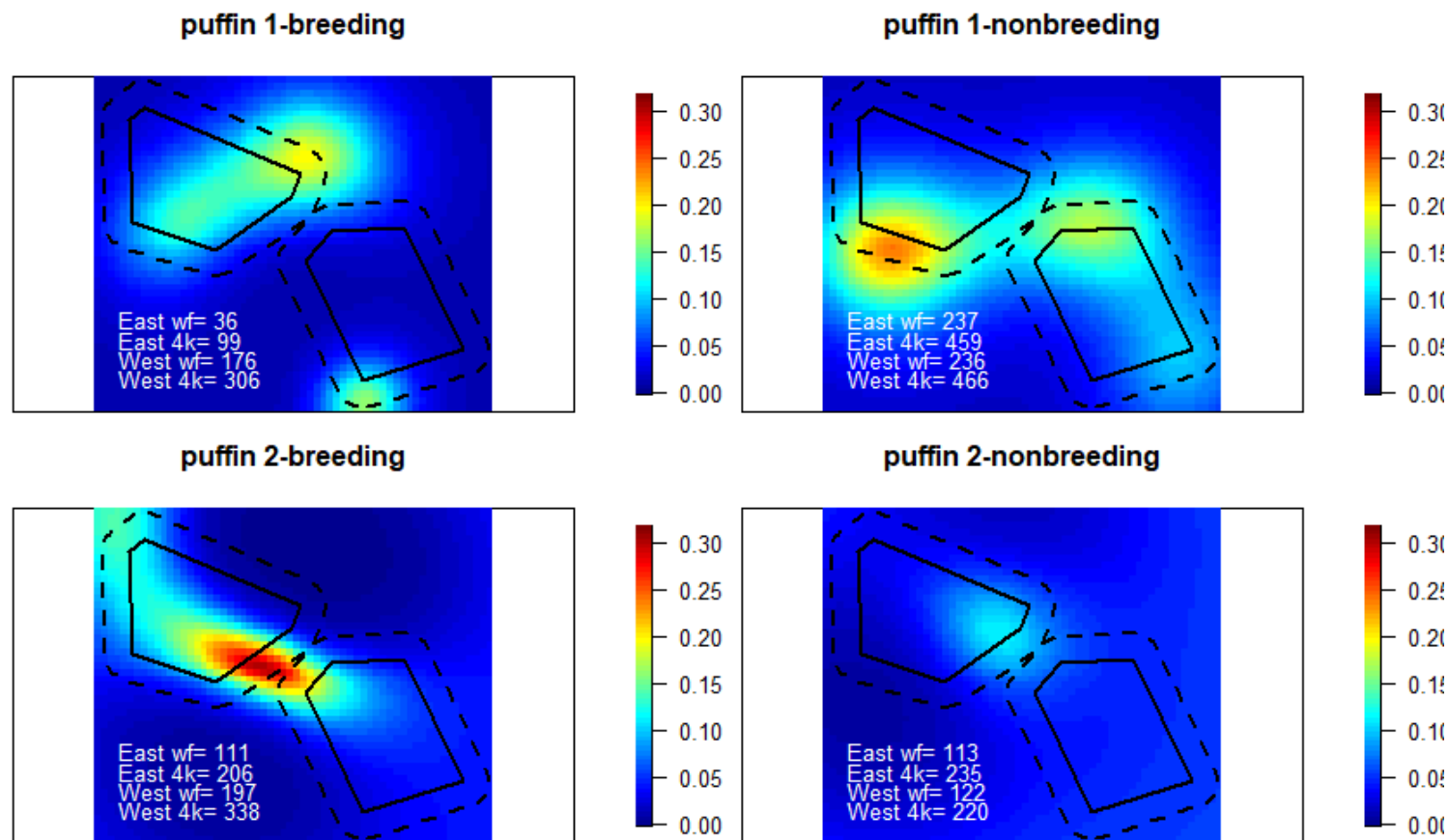


Figure A-9 Seasonal plots for puffin plotted on consistent scale

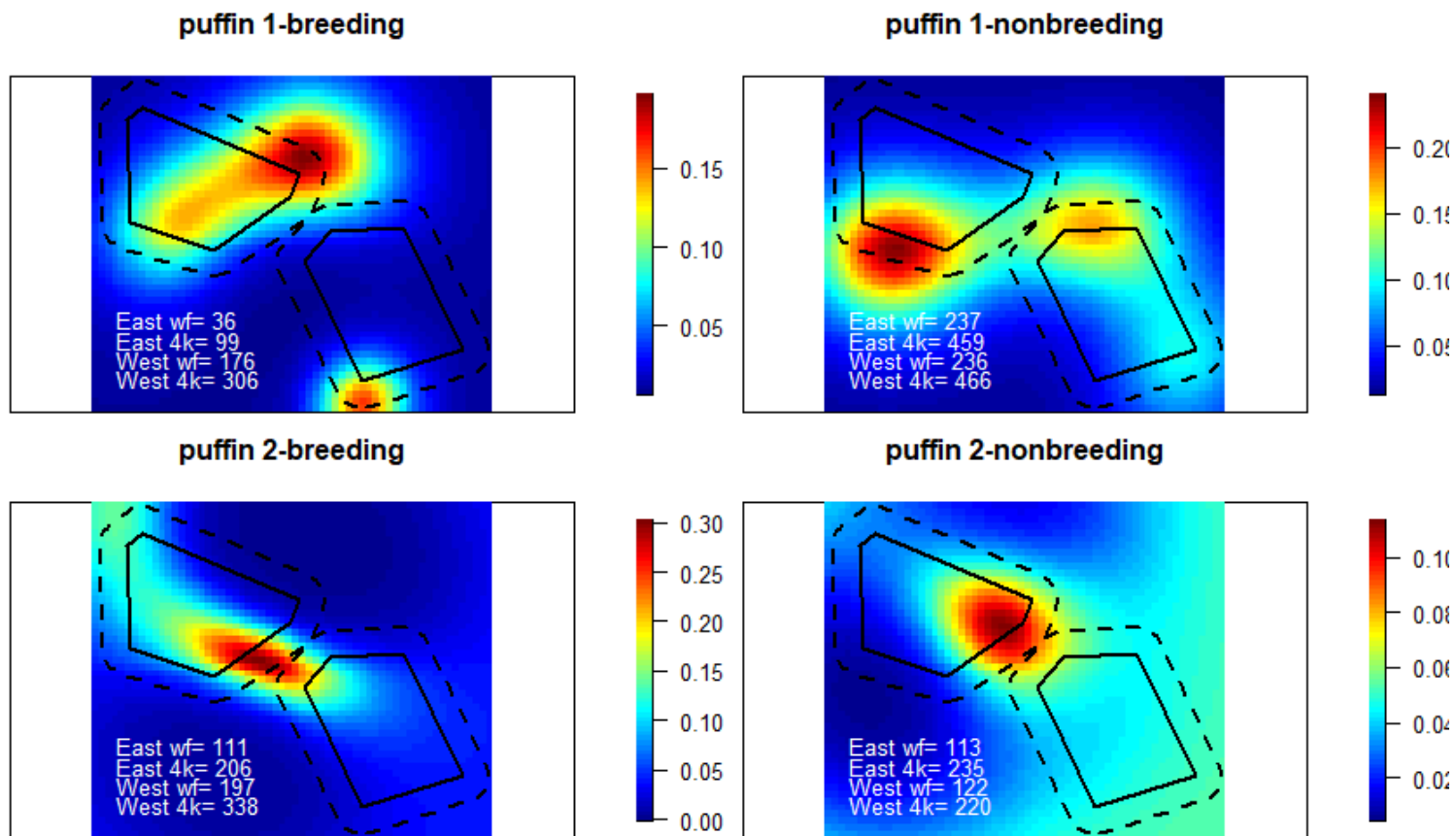


Figure A-10 Seasonal plots for puffin plotted on individual scale

Appendix B - Survey plots

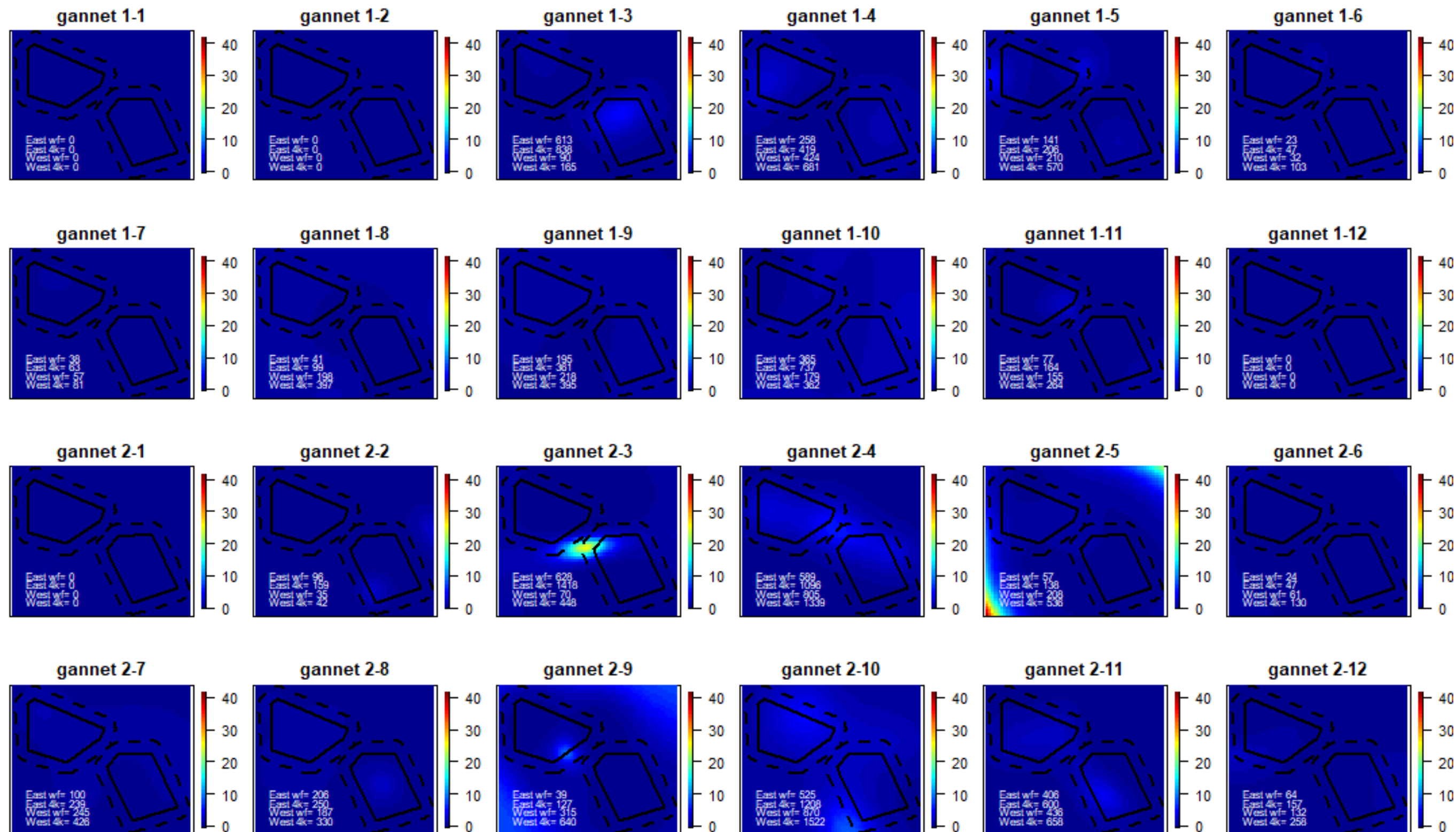


Figure B-1 Survey plots for gannet plotted on consistent scale

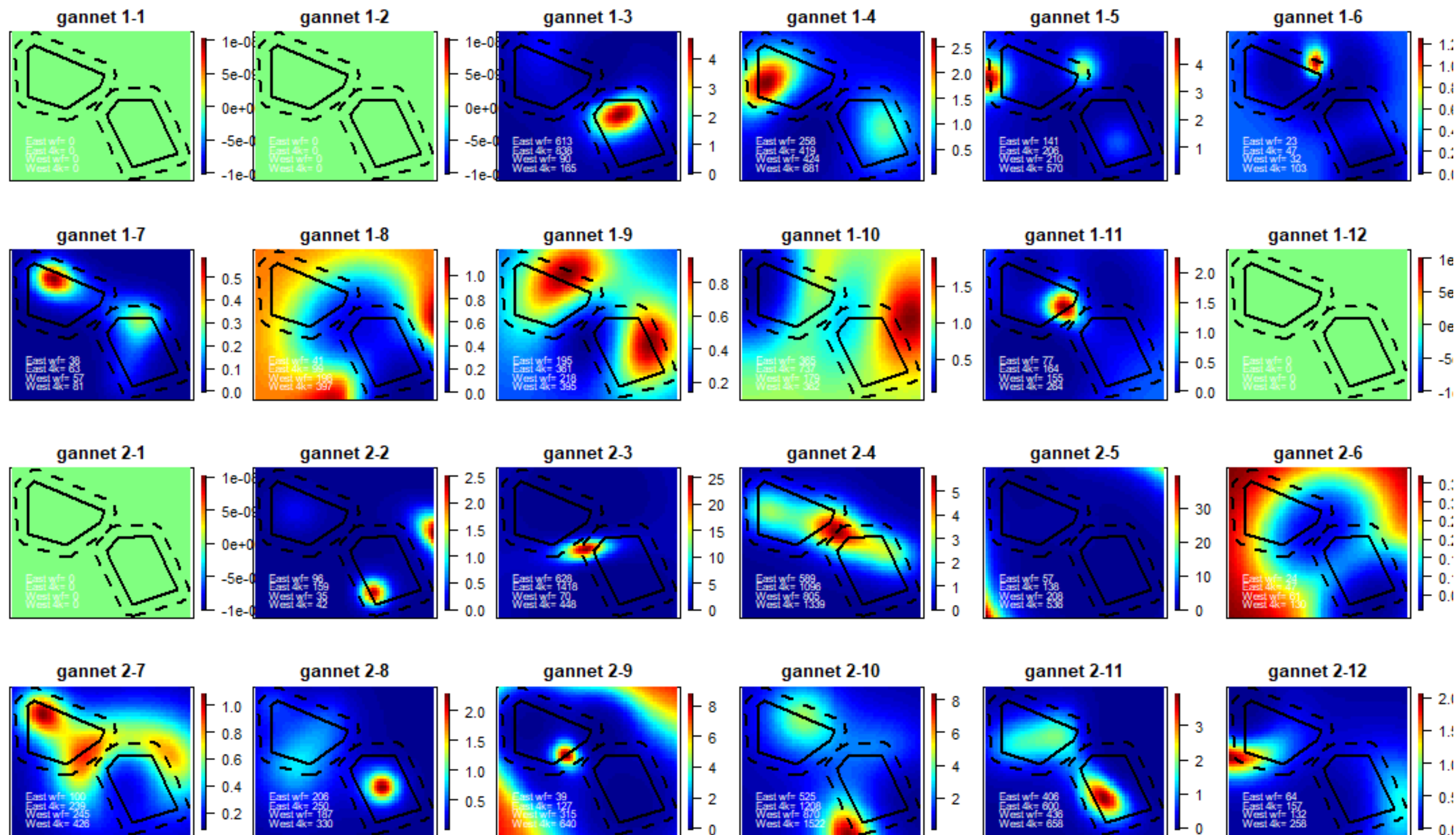


Figure B-2 Survey plots for gannet plotted on individual scale

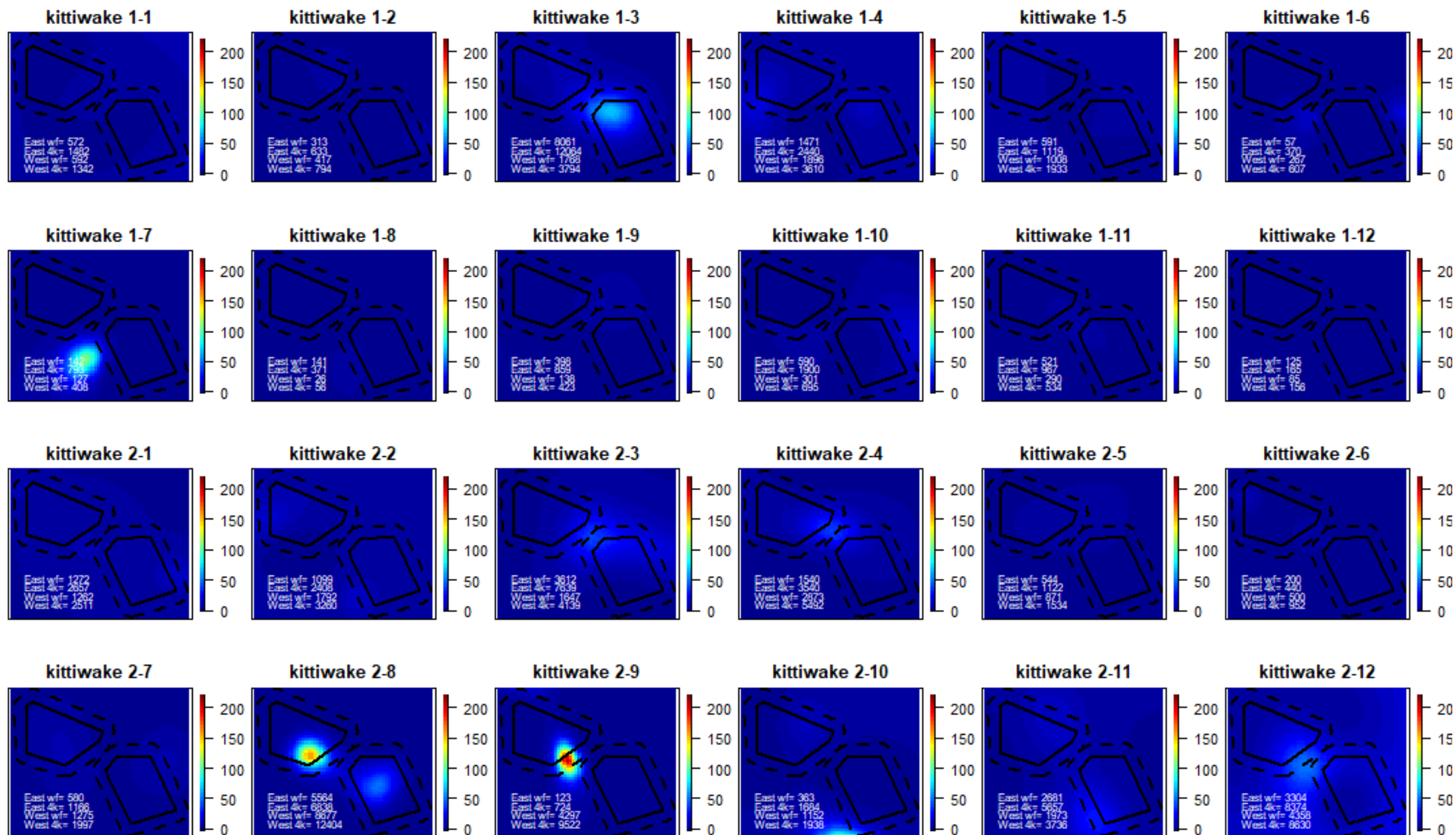


Figure B-3 Survey plots for kittiwake plotted on consistent scale

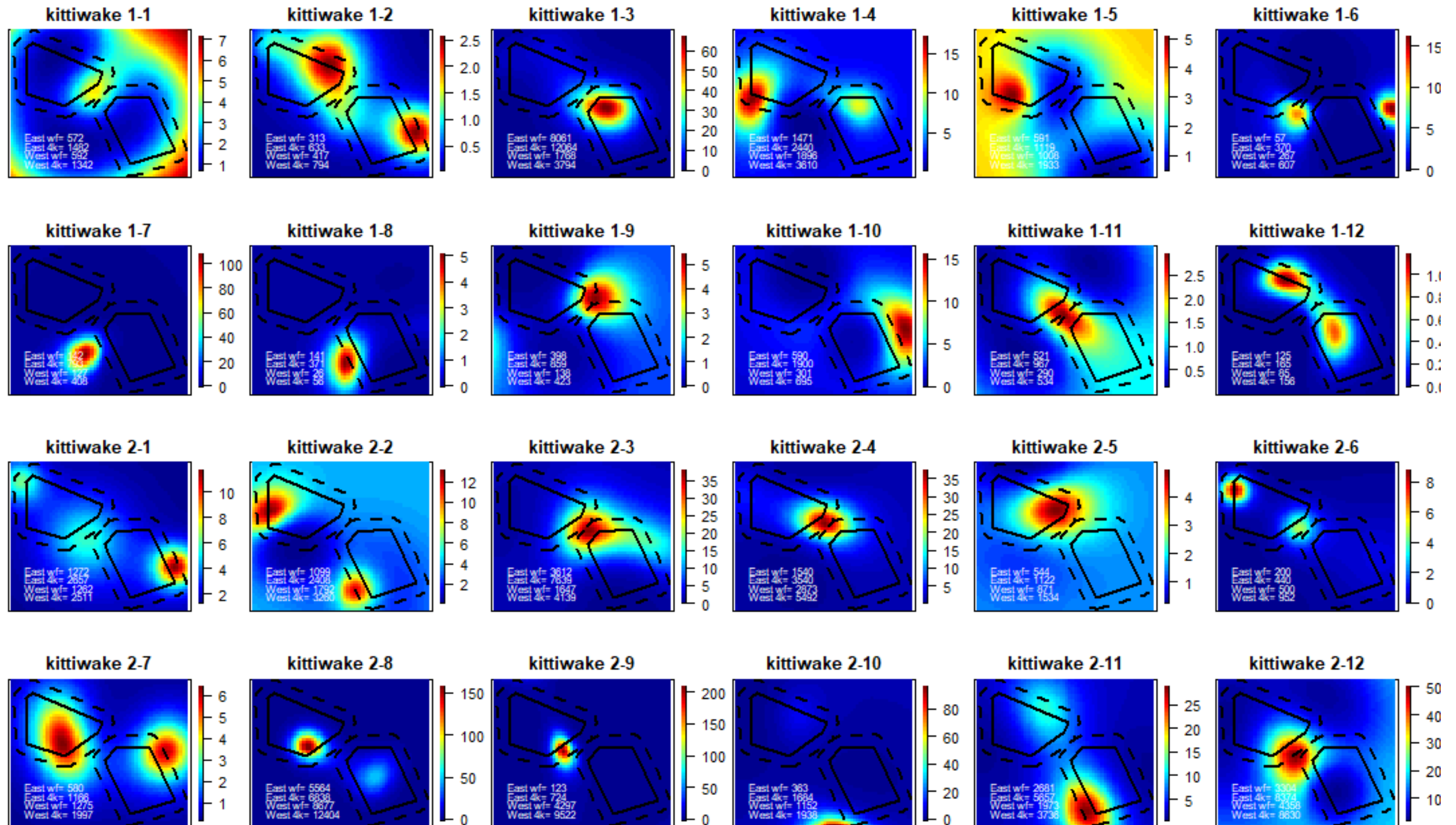


Figure B-4 Survey plots for kittiwake plotted on individual scale

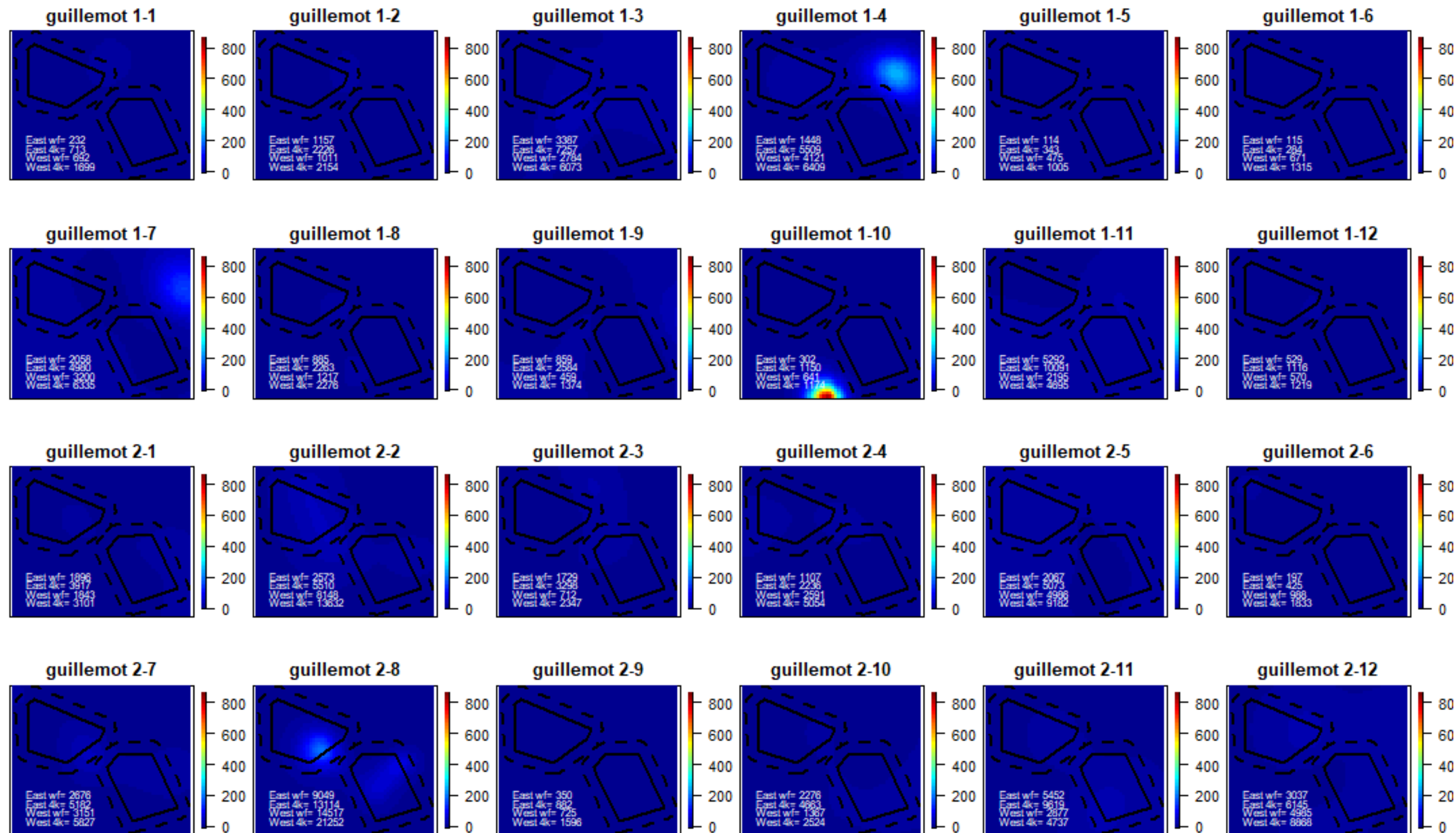


Figure B-5 Survey plots for guillemot plotted on consistent scale

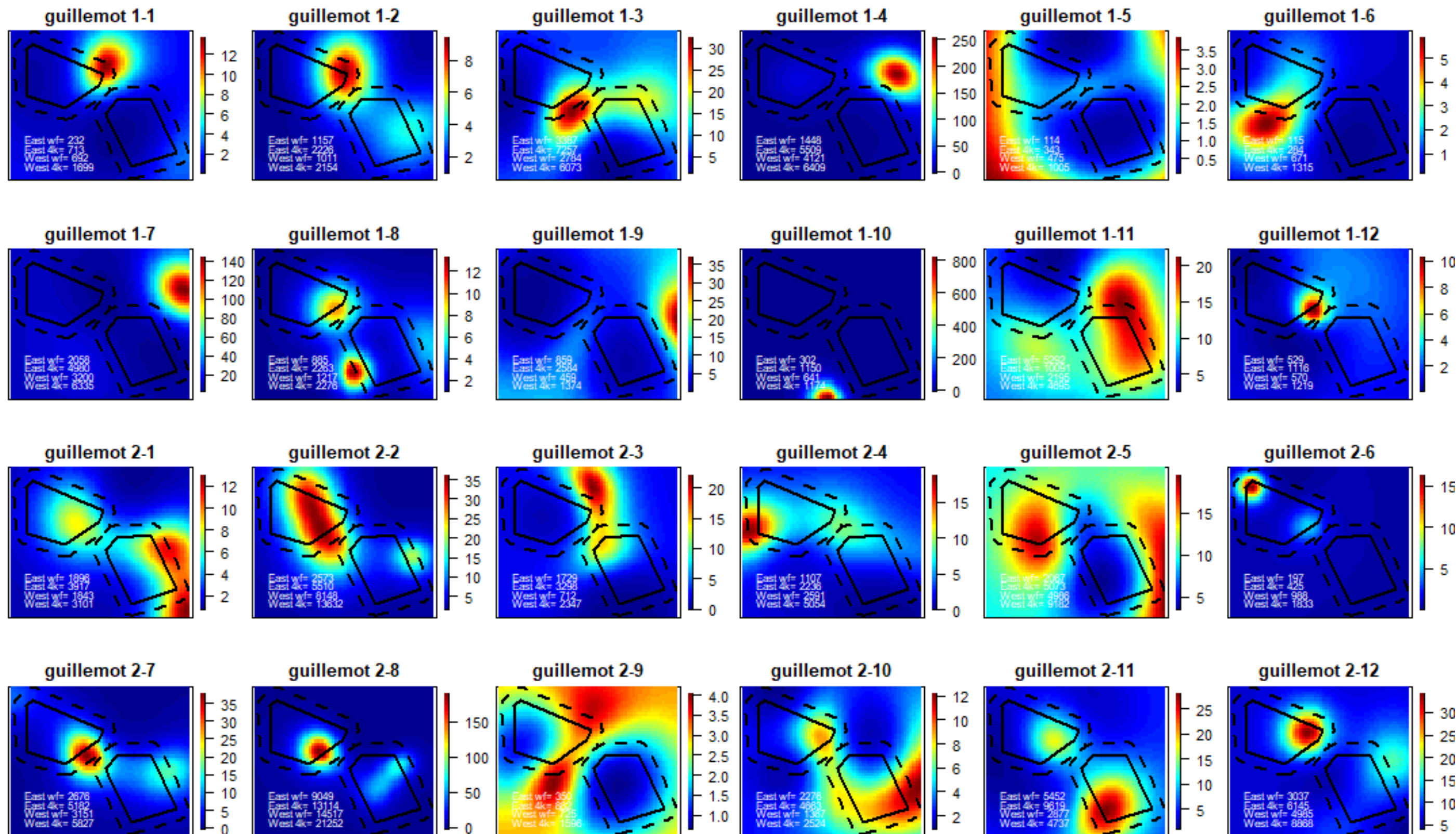


Figure B-6 Survey plots for guillemot plotted on individual scale

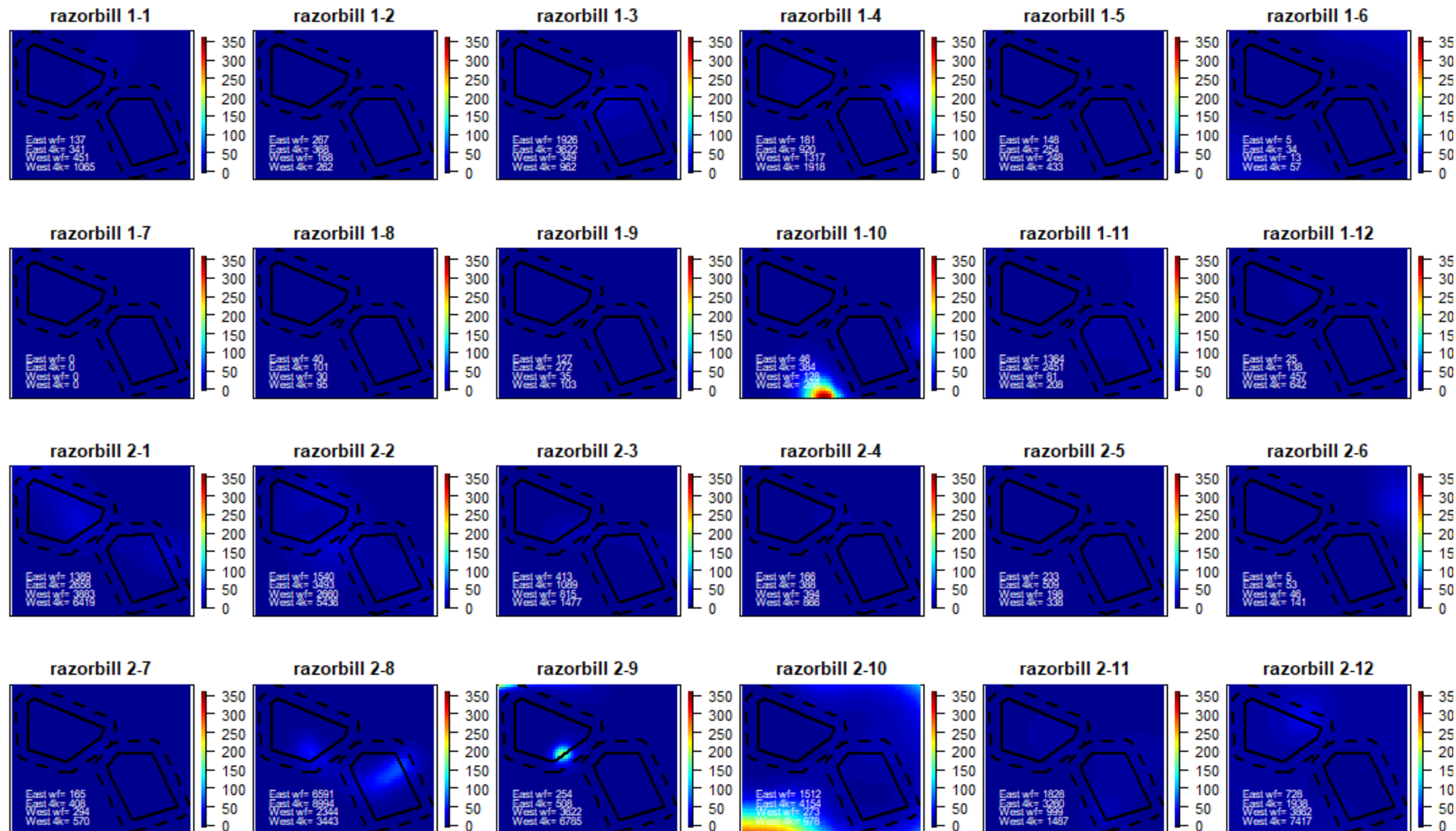


Figure B-7 Survey plots for razorbill plotted on consistent scale

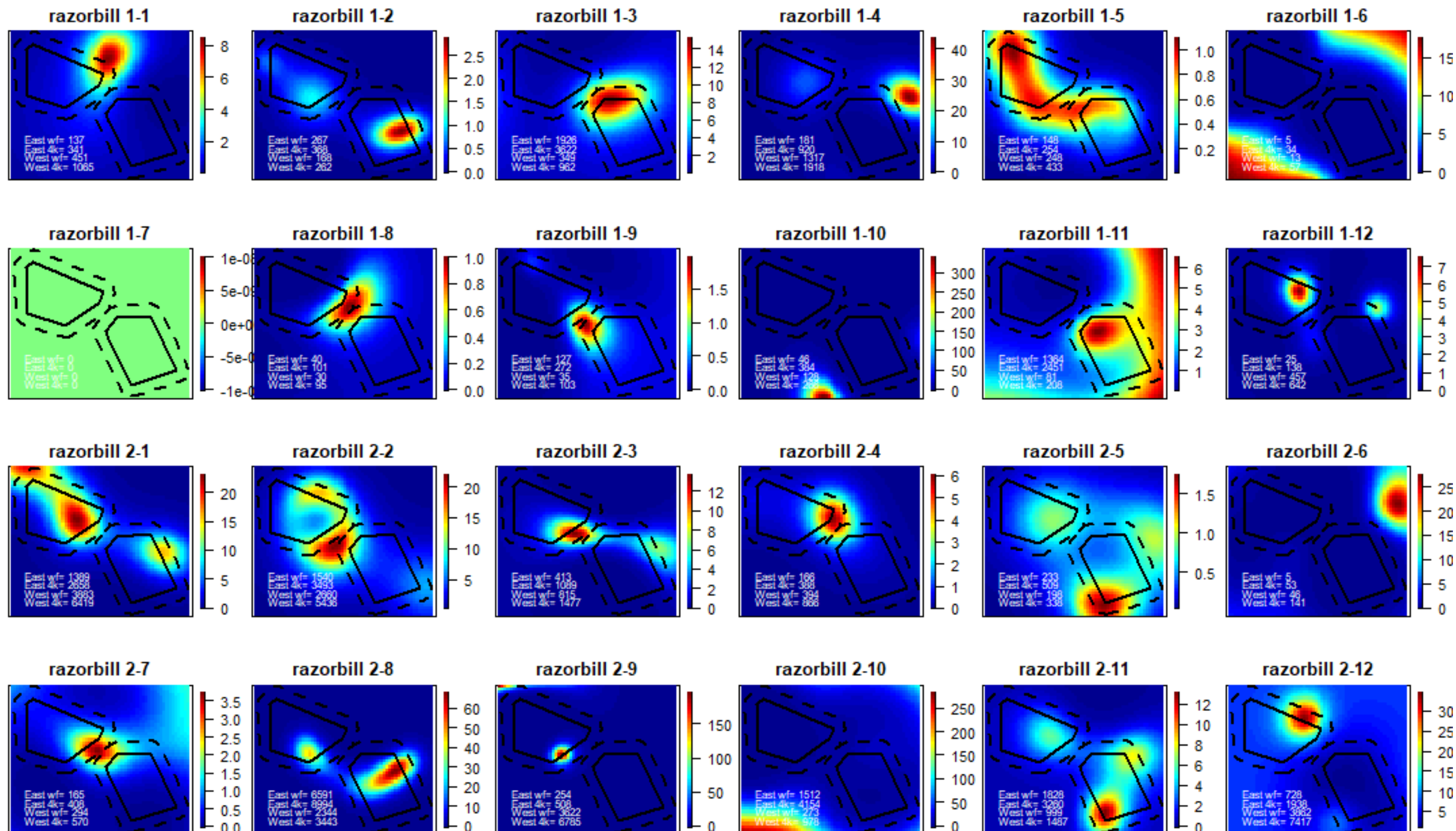


Figure B-8 Survey plots for razorbill plotted on individual scale

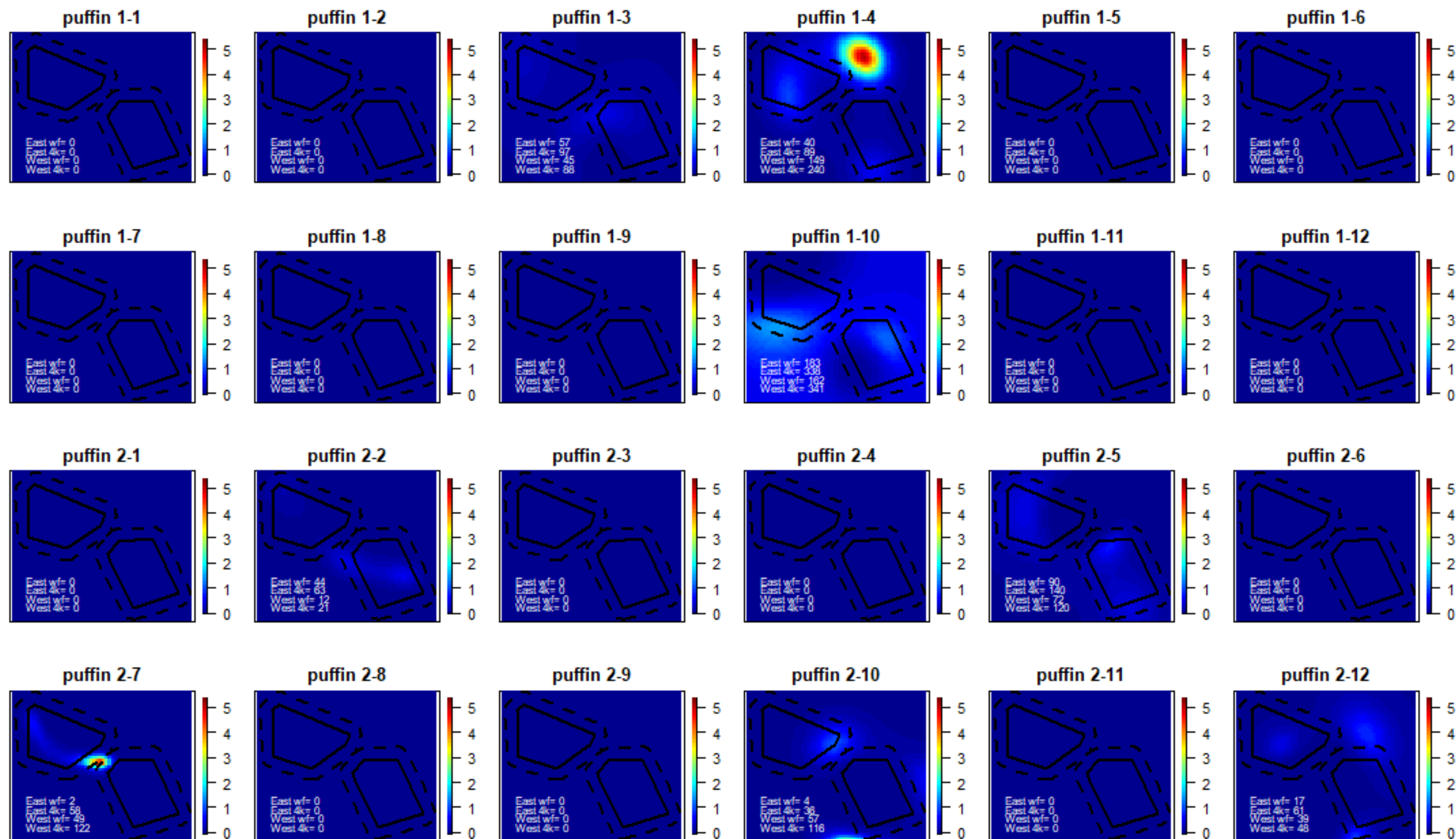


Figure B-9 Survey plots for puffin plotted on consistent scale

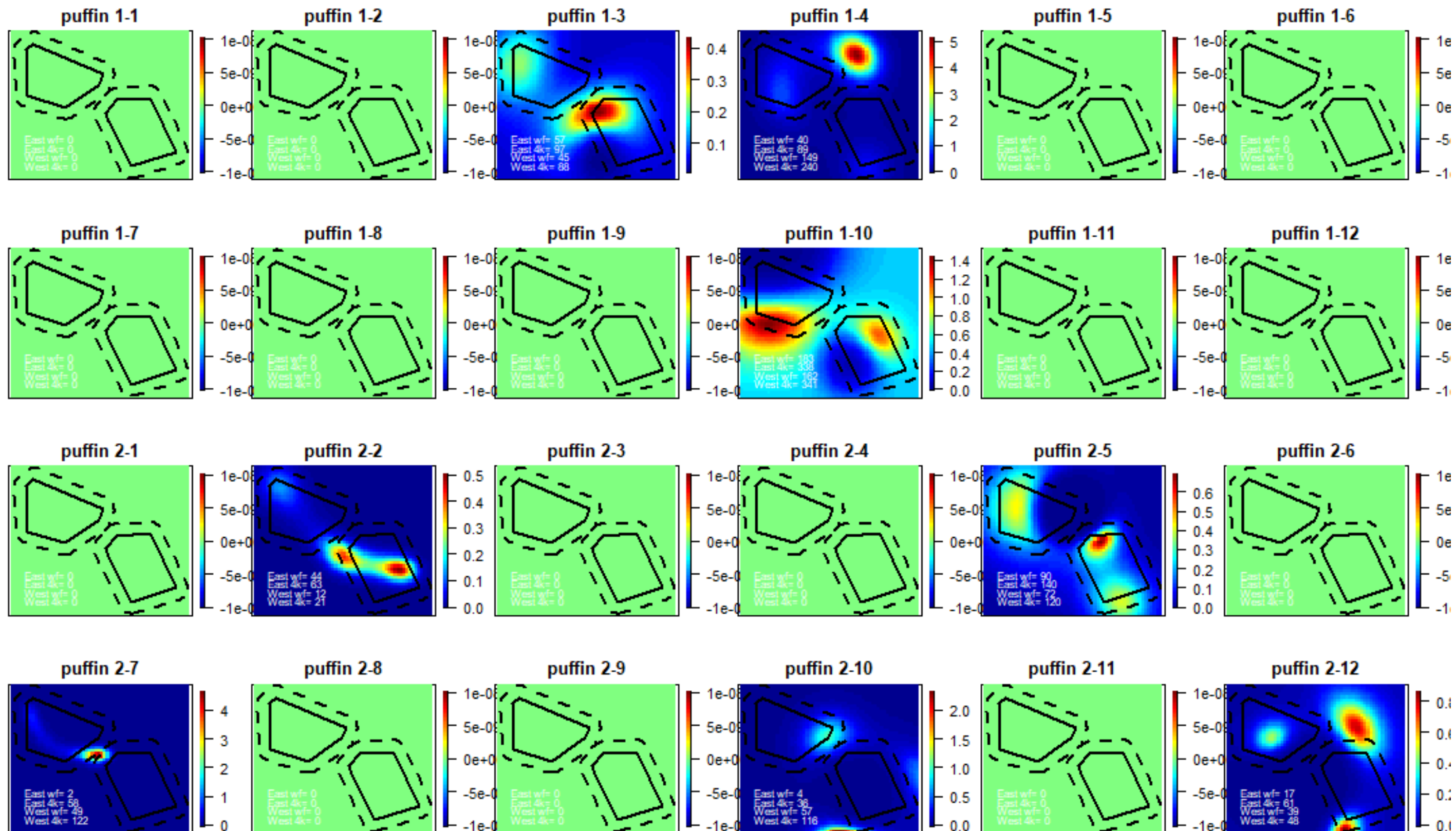


Figure B-10 Survey plots for puffin plotted on individual scale

Appendix C - Model summary information for survey models

Table 1. Salsa2D model: Gannet 1-1 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.3491	-0.1715	-0.1165	-0.0607	4.2227

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-11.897	3.652	3.652	-3.257	0.00115 **
LRF.g(radiusIndices, dists, radii, aR)b1	10.254	3.495	3.495	2.934	0.00339 **
LRF.g(radiusIndices, dists, radii, aR)b2	4.612	2.111	2.111	2.185	0.02902 *
LRF.g(radiusIndices, dists, radii, aR)b3	7.688	2.627	2.627	2.926	0.00348 **
LRF.g(radiusIndices, dists, radii, aR)b4	7.991	3.573	3.573	2.237	0.02544 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.038726)

Null deviance: 162.49 on 1583 degrees of freedom
 Residual deviance: 144.25 on 1579 degrees of freedom
 AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
 Number of Fisher Scoring iterations: 8

Table 2. Salsa2D model: Gannet 1-3 Survey Spatial Model Runs

Table 2. Salsa2D model: Gannet 1-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.9953	-0.3440	-0.2317	-0.1582	4.7617

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.5564	0.7904	0.7904	-4.499	7.31e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	3.0362	1.0469	1.0469	2.900	0.003781 **
LRF.g(radiusIndices, dists, radii, aR)b2	-3.3207	0.9149	0.9149	-3.629	0.000293 ***
LRF.g(radiusIndices, dists, radii, aR)b3	7.2383	0.9864	0.9864	7.338	3.46e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-3.6177	1.2715	1.2715	-2.845	0.004495 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.556391)

Null deviance: 738.70 on 1583 degrees of freedom
Residual deviance: 577.63 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 3. Salsa2D model: Gannet 1-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.7507	-0.4520	-0.3492	-0.2512	5.1679

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.9360	0.6033	0.6033	-3.209	0.001358 **
LRF.g(radiusIndices, dists, radii, aR)b1	-66.1239	21.1600	21.1600	-3.125	0.001811 **
LRF.g(radiusIndices, dists, radii, aR)b2	23.7316	9.7402	9.7402	2.436	0.014941 *
LRF.g(radiusIndices, dists, radii, aR)b3	2.2629	0.7361	0.7361	3.074	0.002148 **
LRF.g(radiusIndices, dists, radii, aR)b4	43.8323	12.0210	12.0210	3.646	0.000275 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.536201)

Null deviance: 763.85 on 1583 degrees of freedom

Residual deviance: 701.29 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 4. Salsa2D model: Gannet 1-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0101	-0.3444	-0.2499	-0.1876	7.2647

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.05063	0.77622	0.77622	0.065	0.948004
LRF.g(radiusIndices, dists, radii, aR)b1	2.39333	0.65405	0.65405	3.659	0.000261 ***
LRF.g(radiusIndices, dists, radii, aR)b2	3.23401	0.70483	0.70483	4.588	4.82e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-3.14054	1.33718	1.33718	-2.349	0.018966 *
LRF.g(radiusIndices, dists, radii, aR)b4	3.05632	0.97639	0.97639	3.130	0.001779 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.765053)

Null deviance: 654.89 on 1583 degrees of freedom
Residual deviance: 567.06 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 5. Salsa2D model: Gannet 1-6 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4920	-0.1733	-0.1245	-0.0812	4.6282

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.3727	0.4166	0.4166	-3.295	0.00100 **
LRF.g(radiusIndices, dists, radii, aR)b1	-2.7777	1.5778	1.5778	-1.761	0.07851 .
LRF.g(radiusIndices, dists, radii, aR)b2	-7.0099	2.9544	2.9544	-2.373	0.01778 *
LRF.g(radiusIndices, dists, radii, aR)b3	8.2434	2.7145	2.7145	3.037	0.00243 **
LRF.g(radiusIndices, dists, radii, aR)b4	-5.1583	3.3304	3.3304	-1.549	0.12162

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.096805)

Null deviance: 172.35 on 1583 degrees of freedom

Residual deviance: 155.16 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 6. Salsa2D model: Gannet 1-7 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.3491	-0.1715	-0.1165	-0.0607	4.2227

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-11.897	3.652	3.652	-3.257	0.00115 **
LRF.g(radiusIndices, dists, radii, aR)b1	10.254	3.495	3.495	2.934	0.00339 **
LRF.g(radiusIndices, dists, radii, aR)b2	4.612	2.111	2.111	2.185	0.02902 *
LRF.g(radiusIndices, dists, radii, aR)b3	7.688	2.627	2.627	2.926	0.00348 **
LRF.g(radiusIndices, dists, radii, aR)b4	7.991	3.573	3.573	2.237	0.02544 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.038726)

Null deviance: 162.49 on 1583 degrees of freedom

Residual deviance: 144.25 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 7. Salsa2D model: Gannet 1-8 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4298	-0.3465	-0.2152	-0.1543	3.1539

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.1409	0.1723	0.1723	-0.818	0.41356
LRF.g(radiusIndices, dists, radii, aR)b1	-13.8388	4.3335	4.3335	-3.193	0.00143 **
LRF.g(radiusIndices, dists, radii, aR)b2	5.6553	3.0155	3.0155	1.875	0.06092 .
LRF.g(radiusIndices, dists, radii, aR)b3	41.0346	14.9866	14.9866	2.738	0.00625 **
LRF.g(radiusIndices, dists, radii, aR)b4	-36.9602	14.0930	14.0930	-2.623	0.00881 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 0.9487739)

Null deviance: 393.69 on 1583 degrees of freedom

Residual deviance: 357.05 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 8. Salsa2D model: Gannet 1-9 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4489	-0.3779	-0.3264	-0.2750	3.5948

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.2425	0.4472	0.4472	-2.779	0.00553 **
LRF.g(radiusIndices, dists, radii, aR)b1	1.7959	0.7008	0.7008	2.562	0.01049 *
LRF.g(radiusIndices, dists, radii, aR)b2	2.4971	1.0880	1.0880	2.295	0.02186 *
LRF.g(radiusIndices, dists, radii, aR)b3	4.6126	2.6901	2.6901	1.715	0.08661 .
LRF.g(radiusIndices, dists, radii, aR)b4	-7.1307	3.0654	3.0654	-2.326	0.02014 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.208035)

Null deviance: 549.37 on 1583 degrees of freedom

Residual deviance: 535.54 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 9. Salsa2D model: Gannet 1-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6084	-0.4651	-0.4063	-0.2420	4.3987

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.02095	0.26416	0.26416	0.079	0.936788
LRF.g(radiusIndices, dists, radii, aR)b1	-7.46669	2.06943	2.06943	-3.608	0.000318 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-1.93493	0.71198	0.71198	-2.718	0.006646 **
LRF.g(radiusIndices, dists, radii, aR)b3	0.95565	0.50376	0.50376	1.897	0.058007 .
LRF.g(radiusIndices, dists, radii, aR)b4	6.50895	2.04040	2.04040	3.190	0.001451 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.336539)

Null deviance: 727.42 on 1583 degrees of freedom

Residual deviance: 683.97 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 10. Salsa2D model: Gannet 1-11 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6808	-0.2605	-0.1970	-0.1419	4.8750

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.7361	0.3881	0.3881	-1.897	0.058049 .
LRF.g(radiusIndices, dists, radii, aR)b1	-4.4275	1.1736	1.1736	-3.773	0.000168 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-18.5677	4.4629	4.4629	-4.160	3.35e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-28.9077	6.3871	6.3871	-4.526	6.46e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b4	42.1848	9.1209	9.1209	4.625	4.05e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.14823)

Null deviance: 387.53 on 1583 degrees of freedom

Residual deviance: 337.37 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 11. Salsa2D model: Gannet 2-2 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.7007	-0.1469	-0.0865	-0.0551	8.8909

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-11.979	4.088	4.088	-2.931	0.00343 **
LRF.g(radiusIndices, dists, radii, aR)b1	9.908	4.228	4.228	2.343	0.01924 *
LRF.g(radiusIndices, dists, radii, aR)b2	23.371	11.136	11.136	2.099	0.03601 *
LRF.g(radiusIndices, dists, radii, aR)b3	30.473	10.812	10.812	2.818	0.00489 **
LRF.g(radiusIndices, dists, radii, aR)b4	-35.739	15.631	15.631	-2.286	0.02236 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.687163)

Null deviance: 267.48 on 1583 degrees of freedom

Residual deviance: 210.40 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 12. Salsa2D model: Gannet 2-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.3068	-0.3830	-0.1807	-0.0428	19.7171

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.2321	1.4014	1.4014	0.166	0.8685
LRF.g(radiusIndices, dists, radii, aR)b1	-34.3855	16.5889	16.5889	-2.073	0.0384 *
LRF.g(radiusIndices, dists, radii, aR)b2	-66.3239	33.1530	33.1530	-2.001	0.0456 *
LRF.g(radiusIndices, dists, radii, aR)b3	149.1927	70.4805	70.4805	2.117	0.0344 *
LRF.g(radiusIndices, dists, radii, aR)b4	-61.8321	29.8959	29.8959	-2.068	0.0388 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 21.0002)

Null deviance: 2070.8 on 1583 degrees of freedom
Residual deviance: 1392.0 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 8

Table 13. Salsa2D model: Gannet 2-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0908	-0.7167	-0.4913	-0.2474	6.6327

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-5.5475	0.9939	0.9939	-5.582	2.80e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b1	31.5765	5.8818	5.8818	5.369	9.12e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b2	4.0659	0.8732	0.8732	4.657	3.48e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	5.7526	0.9960	0.9960	5.776	9.22e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b4	5.4257	0.8519	0.8519	6.369	2.49e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-28.7231	5.6276	5.6276	-5.104	3.73e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.10221)

Null deviance: 1466.6 on 1583 degrees of freedom

Residual deviance: 1280.5 on 1578 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 14. Salsa2D model: Gannet 2-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0638	-0.3463	-0.2408	-0.1672	5.8030

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	5.427	1.164	1.164	4.663	3.38e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-5.599	1.243	1.243	-4.503	7.20e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-10.232	4.576	4.576	-2.236	0.02548 *
LRF.g(radiusIndices, dists, radii, aR)b3	17.102	6.861	6.861	2.493	0.01278 *
LRF.g(radiusIndices, dists, radii, aR)b4	-9.946	3.700	3.700	-2.688	0.00726 **
LRF.g(radiusIndices, dists, radii, aR)b5	-8.253	1.449	1.449	-5.696	1.46e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.773711)

Null deviance: 558.74 on 1583 degrees of freedom
Residual deviance: 487.46 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 15. Salsa2D model: Gannet 2-6 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.2773	-0.1892	-0.1378	-0.0986	3.6657

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.9918	0.3239	0.3239	-3.062	0.00223 **
LRF.g(radiusIndices, dists, radii, aR)b1	-46.5341	23.1253	23.1253	-2.012	0.04436 *
LRF.g(radiusIndices, dists, radii, aR)b2	-3.3638	3.3744	3.3744	-0.997	0.31898
LRF.g(radiusIndices, dists, radii, aR)b3	74.8283	34.4971	34.4971	2.169	0.03022 *
LRF.g(radiusIndices, dists, radii, aR)b4	-29.8008	13.3006	13.3006	-2.241	0.02519 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 0.9379759)

Null deviance: 184.38 on 1583 degrees of freedom

Residual deviance: 171.85 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 16. Salsa2D model: Gannet 2-7 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4765	-0.3693	-0.3019	-0.2246	5.6391

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.5161	0.7696	0.7696	-3.269	0.00110 **
LRF.g(radiusIndices, dists, radii, aR)b1	2.2731	0.9456	0.9456	2.404	0.01633 *
LRF.g(radiusIndices, dists, radii, aR)b2	2.3633	1.1054	1.1054	2.138	0.03267 *
LRF.g(radiusIndices, dists, radii, aR)b3	6.4002	2.2487	2.2487	2.846	0.00448 **
LRF.g(radiusIndices, dists, radii, aR)b4	-6.4623	2.3714	2.3714	-2.725	0.00650 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.822384)

Null deviance: 567.26 on 1583 degrees of freedom

Residual deviance: 547.79 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 17. Salsa2D model: Gannet 2-8 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6836	-0.3323	-0.2663	-0.1882	5.6828

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.4576	0.7241	0.7241	-4.775	1.96e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	1.6847	1.0143	1.0143	1.661	0.096913 .
LRF.g(radiusIndices, dists, radii, aR)b2	1.5541	0.7723	0.7723	2.012	0.044350 *
LRF.g(radiusIndices, dists, radii, aR)b3	3.1906	0.8575	0.8575	3.721	0.000205 ***
LRF.g(radiusIndices, dists, radii, aR)b4	3.9237	0.8878	0.8878	4.419	1.06e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.593675)

Null deviance: 487.94 on 1583 degrees of freedom

Residual deviance: 449.87 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 18. Salsa2D model: Gannet 2-9 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.3206	-0.2859	-0.1936	-0.1436	5.5670

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.0720	0.8648	0.8648	2.396	0.016690 *
LRF.g(radiusIndices, dists, radii, aR)b1	-5.1067	1.3589	1.3589	-3.758	0.000178 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-4.4800	1.3373	1.3373	-3.350	0.000827 ***
LRF.g(radiusIndices, dists, radii, aR)b3	4.8638	0.7241	0.7241	6.717	2.58e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-3.2615	1.0959	1.0959	-2.976	0.002964 **
LRF.g(radiusIndices, dists, radii, aR)b5	-5.0288	1.3019	1.3019	-3.863	0.000117 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.848049)

Null deviance: 663.61 on 1583 degrees of freedom
Residual deviance: 485.31 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 19. Salsa2D model: Gannet 2-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.2453	-0.6794	-0.5729	-0.3843	9.4321

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.1553	0.4873	0.4873	-2.371	0.017874 *
LRF.g(radiusIndices, dists, radii, aR)b1	2.5767	0.6129	0.6129	4.204	2.77e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-6.6653	1.7453	1.7453	-3.819	0.000139 ***
LRF.g(radiusIndices, dists, radii, aR)b3	6.3062	1.6178	1.6178	3.898	0.000101 ***
LRF.g(radiusIndices, dists, radii, aR)b4	4.1745	0.7271	0.7271	5.742	1.12e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.600258)

Null deviance: 1506.1 on 1583 degrees of freedom

Residual deviance: 1388.4 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 20. Salsa2D model: Gannet 2-11 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.9091	-0.5109	-0.3719	-0.1507	6.0466

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-4.7389	1.0166	1.0166	-4.662	3.40e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	4.6453	1.0479	1.0479	4.433	9.93e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	3.9561	0.8375	0.8375	4.724	2.52e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-21.2408	3.8287	3.8287	-5.548	3.39e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b4	20.6980	3.5697	3.5697	5.798	8.08e-09 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.801852)

Null deviance: 851.89 on 1583 degrees of freedom

Residual deviance: 735.62 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 21. Salsa2D model: Gannet 2-12 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6443	-0.2791	-0.1915	-0.1273	7.7607

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.900	1.130	1.130	-3.452	0.000571 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-21.770	6.710	6.710	-3.244	0.001201 **
LRF.g(radiusIndices, dists, radii, aR)b2	4.415	1.529	1.529	2.887	0.003942 **
LRF.g(radiusIndices, dists, radii, aR)b3	21.311	6.185	6.185	3.446	0.000585 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-3.242	1.738	1.738	-1.865	0.062376 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.191132)

Null deviance: 433.06 on 1583 degrees of freedom

Residual deviance: 385.21 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 22. Salsa2D model: Guillemot 1-1 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.6837	-0.5476	-0.3853	-0.3072	7.4157

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.4071	0.5696	0.5696	0.715	0.47489
LRF.g(radiusIndices, dists, radii, aR)b1	-3.2184	0.7086	0.7086	-4.542	6.00e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	3.0487	0.9392	0.9392	3.246	0.00119 **
LRF.g(radiusIndices, dists, radii, aR)b3	-6.5647	0.8577	0.8577	-7.654	3.38e-14 ***
LRF.g(radiusIndices, dists, radii, aR)b4	6.2178	0.6120	0.6120	10.160	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.505013)

Null deviance: 1504.5 on 1583 degrees of freedom

Residual deviance: 1169.3 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 23. Salsa2D model: Guillemot 1-2 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.3974	-0.8583	-0.7064	-0.4950	7.5142

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.1331	0.2662	0.2662	0.500	0.616976
LRF.g(radiusIndices, dists, radii, aR)b1	-16.2849	4.2380	4.2380	-3.843	0.000127 ***
LRF.g(radiusIndices, dists, radii, aR)b2	2.9915	0.6388	0.6388	4.683	3.07e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-10.4480	2.0134	2.0134	-5.189	2.39e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	26.2372	5.6221	5.6221	4.667	3.32e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.375394)

Null deviance: 2132.9 on 1583 degrees of freedom

Residual deviance: 1973.1 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 24. Salsa2D model: Guillemot 1-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.5021	-1.2532	-0.8005	0.1535	11.6874

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.0620	0.2108	0.2108	9.783	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-28.6780	4.2956	4.2956	-6.676	3.39e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b2	32.8389	4.7707	4.7707	6.883	8.40e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b3	4.2922	0.4910	0.4910	8.741	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-5.1638	0.9067	0.9067	-5.695	1.47e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-4.5479	0.5173	0.5173	-8.792	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.862953)

Null deviance: 4522.2 on 1583 degrees of freedom
Residual deviance: 3699.0 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 25. Salsa2D model: Guillemot 1-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-4.8060	-1.2607	-0.8076	-0.5110	21.3775

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.0017	0.5472	0.5472	-1.830	0.0674 .
LRF.g(radiusIndices, dists, radii, aR)b1	-44.9698	6.7264	6.7264	-6.686	3.18e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b2	3.7545	0.6971	0.6971	5.386	8.30e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b3	48.0978	6.6526	6.6526	7.230	7.50e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b4	3.6988	0.6169	0.6169	5.996	2.50e-09 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 7.436285)

Null deviance: 5713.9 on 1583 degrees of freedom

Residual deviance: 4525.6 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 26. Salsa2D model: Guillemot 1-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8005	-0.4890	-0.3787	-0.2605	7.1335

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.3744	0.2543	0.2543	5.404	7.51e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b1	49.7521	13.7013	13.7013	3.631	0.000291 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-17.3731	4.6158	4.6158	-3.764	0.000173 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-34.5519	9.7635	9.7635	-3.539	0.000413 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-4.2097	0.7802	0.7802	-5.396	7.86e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.874165)

Null deviance: 928.28 on 1583 degrees of freedom

Residual deviance: 846.67 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 27. Salsa2D model: Guillemot 1-6 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0548	-0.5588	-0.3529	-0.2581	8.0246

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.6375	0.6317	0.6317	-1.009	0.313057
LRF.g(radiusIndices, dists, radii, aR)b1	-3.0224	0.8444	0.8444	-3.579	0.000355 ***
LRF.g(radiusIndices, dists, radii, aR)b2	0.9675	0.6157	0.6157	1.571	0.116271
LRF.g(radiusIndices, dists, radii, aR)b3	4.1795	0.8214	0.8214	5.088	4.04e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-0.9530	1.0164	1.0164	-0.938	0.348574

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.289342)

Null deviance: 1149.7 on 1583 degrees of freedom

Residual deviance: 1012.4 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 28. Salsa2D model: Guillemot 1-7 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.5427	-1.3587	-1.0404	0.4835	8.7141

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.31393	0.09992	0.09992	23.159	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	109.56508	16.04532	16.04532	6.828	1.22e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-22.55886	3.51748	3.51748	-6.413	1.88e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b3	56.81025	7.49644	7.49644	7.578	5.94e-14 ***
LRF.g(radiusIndices, dists, radii, aR)b4	4.23794	0.88262	0.88262	4.802	1.72e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-146.93288	20.57301	20.57301	-7.142	1.40e-12 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.889659)

Null deviance: 3523.9 on 1583 degrees of freedom
Residual deviance: 3328.1 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 29. Salsa2D model: Guillemot 1-8 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.6649	-0.8703	-0.6945	-0.5305	14.0751

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.06821	0.27986	0.27986	0.244	0.80746
LRF.g(radiusIndices, dists, radii, aR)b1	3.33253	0.76567	0.76567	4.352	1.43e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	2.48601	0.79608	0.79608	3.123	0.00182 **
LRF.g(radiusIndices, dists, radii, aR)b3	2.25197	0.39785	0.39785	5.660	1.79e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-2.36107	0.95984	0.95984	-2.460	0.01401 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.892667)

Null deviance: 2792.6 on 1583 degrees of freedom

Residual deviance: 2584.1 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 30. Salsa2D model: Guillemot 1-9 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.5645	-0.8534	-0.5756	-0.3551	8.1976

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.4824	0.5004	0.5004	4.961	7.76e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-7.6836	1.2410	1.2410	-6.191	7.59e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-7.4965	1.6517	1.6517	-4.539	6.09e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	5.2381	0.8029	0.8029	6.524	9.18e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b4	11.9361	2.1308	2.1308	5.602	2.50e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-6.1314	1.0666	1.0666	-5.749	1.08e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.044746)

Null deviance: 2200.1 on 1583 degrees of freedom
Residual deviance: 1918.1 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 31. Salsa2D model: Guillemot 1-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.2498	-0.6140	-0.4767	-0.3737	10.5355

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.0810	0.4060	0.4060	-2.662	0.00784 **
LRF.g(radiusIndices, dists, radii, aR)b1	-77.1351	10.7781	10.7781	-7.157	1.26e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b2	2.6202	0.5356	0.5356	4.892	1.10e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	8.8770	1.4132	1.4132	6.281	4.33e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b4	88.5738	11.5747	11.5747	7.652	3.41e-14 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-14.3272	1.8088	1.8088	-7.921	4.42e-15 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.96613)

Null deviance: 1477.1 on 1583 degrees of freedom

Residual deviance: 1284.1 on 1578 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 32. Salsa2D model: Guillemot 1-11 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.1041	-1.4773	-1.0395	0.2813	7.7429

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.8785	0.1972	0.1972	9.527	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-26.7135	6.6099	6.6099	-4.041	5.57e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	28.8363	6.6776	6.6776	4.318	1.67e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	1.1354	0.2948	0.2948	3.852	0.000122 ***
LRF.g(radiusIndices, dists, radii, aR)b4	3.4446	1.0402	1.0402	3.311	0.000949 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-5.4033	1.0625	1.0625	-5.085	4.11e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.617292)

Null deviance: 4489.5 on 1583 degrees of freedom

Residual deviance: 4115.4 on 1578 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 33. Salsa2D model: Guillemot 1-12 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.4566	-0.5986	-0.4923	-0.2701	6.9646

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.5022	0.5062	0.5062	-0.992	0.32127
LRF.g(radiusIndices, dists, radii, aR)b1	-2.4641	0.7509	0.7509	-3.282	0.00105 **
LRF.g(radiusIndices, dists, radii, aR)b2	1.6612	0.6632	0.6632	2.505	0.01235 *
LRF.g(radiusIndices, dists, radii, aR)b3	3.7265	0.5435	0.5435	6.856	1.01e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-3.4682	0.6656	0.6656	-5.211	2.13e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.638673)

Null deviance: 1375.2 on 1583 degrees of freedom

Residual deviance: 1156.7 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 34. Salsa2D model: Guillemot 2-1 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.5616	-1.0625	-0.8248	0.1032	10.8451

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.1673	0.2354	0.2354	0.711	0.477
LRF.g(radiusIndices, dists, radii, aR)b1	12.4184	2.3150	2.3150	5.364	9.33e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-5.6240	1.0653	1.0653	-5.279	1.48e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b3	19.0895	3.1778	3.1778	6.007	2.34e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b4	6.3159	1.0563	1.0563	5.979	2.77e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-27.4120	5.0189	5.0189	-5.462	5.47e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.656858)

Null deviance: 2646.4 on 1583 degrees of freedom
Residual deviance: 2446.2 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 35. Salsa2D model: Guillemot 2-2 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.744	-1.340	-0.898	0.331	9.902

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.6778	0.1526	0.1526	4.442	9.51e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-2.6433	0.4360	0.4360	-6.063	1.67e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b2	2.2150	0.2725	0.2725	8.128	8.69e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b3	4.7461	0.4597	0.4597	10.325	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	2.2485	0.1656	0.1656	13.581	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.712757)

Null deviance: 5402.6 on 1583 degrees of freedom

Residual deviance: 4274.4 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 36. Salsa2D model: Guillemot 2-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.9355	-0.9272	-0.6006	-0.4247	14.1297

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.7467	0.3095	0.3095	2.412	0.016 *
LRF.g(radiusIndices, dists, radii, aR)b1	-3.6447	0.9236	0.9236	-3.946	8.29e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	4.1564	0.7680	0.7680	5.412	7.19e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b3	2.8247	0.5588	0.5588	5.055	4.80e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-4.9623	1.1571	1.1571	-4.288	1.91e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 6.634202)

Null deviance: 3627.9 on 1583 degrees of freedom
Residual deviance: 3001.4 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 7

Table 37. Salsa2D model: Guillemot 2-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.9976	-1.1365	-0.8007	-0.2181	9.3801

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.6386	0.3124	0.3124	2.044	0.041120 *
LRF.g(radiusIndices, dists, radii, aR)b1	3.0260	0.5079	0.5079	5.958	3.15e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b2	2.3767	0.5356	0.5356	4.438	9.73e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	6.9858	2.0042	2.0042	3.486	0.000504 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-2.3367	0.5677	0.5677	-4.116	4.05e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-9.0893	2.4380	2.4380	-3.728	0.000200 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.583399)

Null deviance: 3178.9 on 1583 degrees of freedom
Residual deviance: 2728.5 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 38. Salsa2D model: Guillemot 2-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.0146	-1.4688	-1.0084	0.4782	9.9431

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.2157	0.1214	0.1214	18.250	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-1.5506	0.3630	0.3630	-4.272	2.06e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	1.7717	0.3411	0.3411	5.194	2.32e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b3	1.6907	0.3672	0.3672	4.604	4.47e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-2.8124	0.3856	0.3856	-7.294	4.73e-13 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.251442)

Null deviance: 4005.9 on 1583 degrees of freedom

Residual deviance: 3703.8 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 39. Salsa2D model: Guillemot 2-6 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.8254	-0.5188	-0.3763	-0.3225	11.5501

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.9492	0.4192	0.4192	-2.264	0.02369 *
LRF.g(radiusIndices, dists, radii, aR)b1	0.9287	0.7534	0.7534	1.233	0.21785
LRF.g(radiusIndices, dists, radii, aR)b2	2.3131	0.4254	0.4254	5.438	6.25e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-3.5839	1.1667	1.1667	-3.072	0.00216 **
LRF.g(radiusIndices, dists, radii, aR)b4	6.0428	0.9775	0.9775	6.182	8.05e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.438425)

Null deviance: 1568.5 on 1583 degrees of freedom

Residual deviance: 1267.1 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 40. Salsa2D model: Guillemot 2-7 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.8016	-1.2401	-0.8458	-0.4103	10.9438

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.9356	0.3714	0.3714	-2.519	0.0119 *
LRF.g(radiusIndices, dists, radii, aR)b1	-9.0606	1.2393	1.2393	-7.311	4.20e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-6.5045	0.7697	0.7697	-8.451	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b3	4.0917	0.4859	0.4859	8.421	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	11.1956	1.0362	1.0362	10.804	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b5	8.6734	1.2594	1.2594	6.887	8.19e-12 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.288061)

Null deviance: 4721.7 on 1583 degrees of freedom
Residual deviance: 3825.1 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 41. Salsa2D model: Guillemot 2-8 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-6.3010	-1.9370	-0.9664	-0.4929	28.9722

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.1226	0.3554	0.3554	0.345	0.73
LRF.g(radiusIndices, dists, radii, aR)b1	-18.5325	1.7382	1.7382	-10.662	<2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b2	7.5670	0.6438	0.6438	11.754	<2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b3	21.4682	1.7310	1.7310	12.402	<2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	5.3528	0.5267	0.5267	10.163	<2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 20.16151)

Null deviance: 18413 on 1583 degrees of freedom

Residual deviance: 12512 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 42. Salsa2D model: Guillemot 2-9 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8976	-0.6734	-0.5472	-0.4584	7.4491

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.1200	0.2406	0.2406	4.656	3.50e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-2.1410	0.7706	0.7706	-2.779	0.00553 **
LRF.g(radiusIndices, dists, radii, aR)b2	-7.9669	1.7183	1.7183	-4.637	3.83e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	7.0613	1.5777	1.5777	4.476	8.16e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b4	1.8034	0.7749	0.7749	2.327	0.02007 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.216732)

Null deviance: 1430.8 on 1583 degrees of freedom

Residual deviance: 1375.1 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 43. Salsa2D model: Guillemot 2-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.5846	-1.1349	-0.6764	0.1123	7.0721

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.7927	0.3126	0.3126	2.536	0.01131 *
LRF.g(radiusIndices, dists, radii, aR)b1	-1.2463	0.4541	0.4541	-2.744	0.00613 **
LRF.g(radiusIndices, dists, radii, aR)b2	7.3424	0.9204	0.9204	7.978	2.84e-15 ***
LRF.g(radiusIndices, dists, radii, aR)b3	3.2274	0.5646	0.5646	5.716	1.30e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-2.4428	0.4273	0.4273	-5.716	1.30e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-8.4691	1.0515	1.0515	-8.055	1.56e-15 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.26388)

Null deviance: 2589.8 on 1583 degrees of freedom
Residual deviance: 2292.9 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 44. Salsa2D model: Guillemot 2-11 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.3924	-1.3625	-0.7737	0.3636	6.9238

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.6320	0.1621	0.1621	10.066	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-4.4077	0.5316	0.5316	-8.292	2.36e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-4.7101	0.6714	0.6714	-7.015	3.40e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b3	35.7040	3.5165	3.5165	10.153	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-31.1833	2.9575	2.9575	-10.544	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b5	4.3980	0.4042	0.4042	10.880	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.784399)

Null deviance: 3987.6 on 1583 degrees of freedom
Residual deviance: 3308.4 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 45. Salsa2D model: Guillemot 2-12 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.6568	-1.3348	-1.1610	0.2943	15.0552

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.8420	0.1351	0.1351	13.630	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	24.7811	8.2023	8.2023	3.021	0.00256 **
LRF.g(radiusIndices, dists, radii, aR)b2	1.9582	0.2444	0.2444	8.012	2.18e-15 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-16.6148	5.7077	5.7077	-2.911	0.00365 **
LRF.g(radiusIndices, dists, radii, aR)b4	-15.9541	5.7274	5.7274	-2.786	0.00541 **
LRF.g(radiusIndices, dists, radii, aR)b5	8.1214	3.2121	3.2121	2.528	0.01156 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 6.000671)

Null deviance: 4662.4 on 1583 degrees of freedom

Residual deviance: 4222.8 on 1578 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 46. Salsa2D model: Kittiwake 1-1 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0869	-0.6951	-0.5596	-0.4672	11.6428

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.0284	0.2969	0.2969	6.832	1.19e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-12.3893	2.3450	2.3450	-5.283	1.45e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-4.5813	0.9732	0.9732	-4.708	2.73e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	25.1241	4.6263	4.6263	5.431	6.49e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-13.3841	2.5339	2.5339	-5.282	1.46e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.923458)

Null deviance: 1649.5 on 1583 degrees of freedom

Residual deviance: 1561.5 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 47. Salsa2D model: Kittiwake 1-2 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.7345	-0.5222	-0.4150	-0.2887	5.5871

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.8420	0.5607	0.5607	-5.068	4.49e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b1	1.6363	0.6431	0.6431	2.544	0.01104 *
LRF.g(radiusIndices, dists, radii, aR)b2	3.7491	0.6422	0.6422	5.838	6.41e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b3	3.6572	0.6878	0.6878	5.317	1.20e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	1.4410	0.5466	0.5466	2.636	0.00846 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.420591)

Null deviance: 884.96 on 1583 degrees of freedom

Residual deviance: 821.37 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 48. Salsa2D model: Kittiwake 1-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.7060	-1.1104	-0.7501	-0.3745	9.9137

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.0743	0.2855	0.2855	-3.764	0.000174 ***
LRF.g(radiusIndices, dists, radii, aR)b1	1.5721	0.5490	0.5490	2.863	0.004246 **
LRF.g(radiusIndices, dists, radii, aR)b2	2.5097	0.4047	0.4047	6.202	7.11e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b3	2.2160	0.2150	0.2150	10.307	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	4.7463	0.3070	0.3070	15.459	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.72163)

Null deviance: 6320.1 on 1583 degrees of freedom

Residual deviance: 3931.7 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 49. Salsa2D model: Kittiwake 1-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.9121	-0.9585	-0.7482	-0.6010	17.7834

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.6373	0.2049	0.2049	3.111	0.00190 **
LRF.g(radiusIndices, dists, radii, aR)b1	3.5830	0.5099	0.5099	7.027	3.12e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b2	2.2621	0.8136	0.8136	2.780	0.00549 **
LRF.g(radiusIndices, dists, radii, aR)b3	1.8066	0.3702	0.3702	4.881	1.16e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-4.5238	1.0405	1.0405	-4.348	1.46e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 5.864777)

Null deviance: 3381.7 on 1583 degrees of freedom
Residual deviance: 3046.6 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 7

Table 50. Salsa2D model: Kittiwake 1-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0282	-0.7513	-0.5949	-0.4704	7.2163

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.2613	0.1785	0.1785	7.066	2.38e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b1	1.1597	0.3895	0.3895	2.977	0.002954 **
LRF.g(radiusIndices, dists, radii, aR)b2	-1.6429	0.4461	0.4461	-3.683	0.000238 ***
LRF.g(radiusIndices, dists, radii, aR)b3	1.3347	0.8378	0.8378	1.593	0.111358
LRF.g(radiusIndices, dists, radii, aR)b4	-2.6396	0.9852	0.9852	-2.679	0.007456 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.914089)

Null deviance: 1752.5 on 1583 degrees of freedom

Residual deviance: 1666.1 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 51. Salsa2D model: Kittiwake 1-6 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.5193	-0.3678	-0.2402	-0.0645	13.7740

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.6125	0.3494	0.3494	-1.753	0.07976 .
LRF.g(radiusIndices, dists, radii, aR)b1	7.4152	1.2940	1.2940	5.730	1.20e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-13.9715	4.8233	4.8233	-2.897	0.00382 **
LRF.g(radiusIndices, dists, radii, aR)b3	16.7225	3.9157	3.9157	4.271	2.07e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-19.1114	4.1883	4.1883	-4.563	5.43e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.414695)

Null deviance: 1011.55 on 1583 degrees of freedom

Residual deviance: 786.62 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 52. Salsa2D model: Kittiwake 1-7 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.6053	-0.3794	-0.1929	-0.1077	20.7944

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.5430	0.7508	0.7508	0.723	0.470
LRF.g(radiusIndices, dists, radii, aR)b1	71.2531	14.9157	14.9157	4.777	1.94e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-45.6965	9.8183	9.8183	-4.654	3.52e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-1.5359	1.4485	1.4485	-1.060	0.289
LRF.g(radiusIndices, dists, radii, aR)b4	-30.2505	7.0890	7.0890	-4.267	2.10e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 7.092728)

Null deviance: 1460.4 on 1583 degrees of freedom
Residual deviance: 1066.0 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 8

Table 53. Salsa2D model: Kittiwake 1-8 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0157	-0.1985	-0.1260	-0.1132	12.0874

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.8052	0.7807	0.7807	-3.593	0.000337 ***
LRF.g(radiusIndices, dists, radii, aR)b1	19.8850	10.0405	10.0405	1.980	0.047823 *
LRF.g(radiusIndices, dists, radii, aR)b2	-38.8894	17.6235	17.6235	-2.207	0.027480 *
LRF.g(radiusIndices, dists, radii, aR)b3	-32.3184	21.8777	21.8777	-1.477	0.139814
LRF.g(radiusIndices, dists, radii, aR)b4	57.1911	30.8191	30.8191	1.856	0.063682 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.011023)

Null deviance: 541.49 on 1583 degrees of freedom

Residual deviance: 428.98 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 54. Salsa2D model: Kittiwake 1-9 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0351	-0.4668	-0.3384	-0.1495	10.4856

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.0110	0.2697	0.2697	-0.041	0.967486
LRF.g(radiusIndices, dists, radii, aR)b1	-21.0350	7.3515	7.3515	-2.861	0.004274 **
LRF.g(radiusIndices, dists, radii, aR)b2	11.5027	2.6034	2.6034	4.418	1.06e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	16.6111	7.0398	7.0398	2.360	0.018416 *
LRF.g(radiusIndices, dists, radii, aR)b4	-10.4864	2.9907	2.9907	-3.506	0.000467 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.343114)

Null deviance: 1072.04 on 1583 degrees of freedom

Residual deviance: 908.34 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 55. Salsa2D model: Kittiwake 1-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.5865	-0.6126	-0.4988	-0.3187	25.3332

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.01885	0.59345	0.59345	-0.032	0.97466
LRF.g(radiusIndices, dists, radii, aR)b1	-4.73487	2.44594	2.44594	-1.936	0.05307 .
LRF.g(radiusIndices, dists, radii, aR)b2	3.09145	0.75576	0.75576	4.090	4.52e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	1.21044	0.98460	0.98460	1.229	0.21911
LRF.g(radiusIndices, dists, radii, aR)b4	-3.34306	1.05616	1.05616	-3.165	0.00158 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 8.049064)

Null deviance: 2166.1 on 1583 degrees of freedom

Residual deviance: 1889.5 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 56. Salsa2D model: Kittiwake 1-11 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.7854	-0.5252	-0.4551	-0.2498	7.2644

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.1552	0.1722	0.1722	0.901	0.36754
LRF.g(radiusIndices, dists, radii, aR)b1	-2.0594	0.5013	0.5013	-4.108	4.2e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-4.7749	1.5988	1.5988	-2.987	0.00287 **
LRF.g(radiusIndices, dists, radii, aR)b3	-8.9154	2.9430	2.9430	-3.029	0.00249 **
LRF.g(radiusIndices, dists, radii, aR)b4	11.5690	3.4909	3.4909	3.314	0.00094 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.448959)

Null deviance: 924.11 on 1583 degrees of freedom

Residual deviance: 853.26 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 57. Salsa2D model: Kittiwake 1-12 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.5013	-0.2764	-0.1316	-0.0600	7.1739

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-5.762	1.627	1.627	-3.541	0.000410 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-5.512	2.648	2.648	-2.082	0.037521 *
LRF.g(radiusIndices, dists, radii, aR)b2	16.524	4.737	4.737	3.489	0.000499 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-20.431	6.223	6.223	-3.283	0.001050 **
LRF.g(radiusIndices, dists, radii, aR)b4	13.668	4.156	4.156	3.289	0.001029 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.084428)

Null deviance: 357.83 on 1583 degrees of freedom

Residual deviance: 305.96 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 58. Salsa2D model: Kittiwake 2-1 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.5653	-0.9257	-0.7974	-0.7029	16.4004

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.2939	0.5500	0.5500	0.534	0.59310
LRF.g(radiusIndices, dists, radii, aR)b1	1.4419	0.8646	0.8646	1.668	0.09555 .
LRF.g(radiusIndices, dists, radii, aR)b2	1.9741	0.6567	0.6567	3.006	0.00269 **
LRF.g(radiusIndices, dists, radii, aR)b3	1.4042	0.7281	0.7281	1.929	0.05397 .
LRF.g(radiusIndices, dists, radii, aR)b4	0.2385	0.5705	0.5705	0.418	0.67596

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 10.7165)

Null deviance: 3383.3 on 1583 degrees of freedom

Residual deviance: 3289.1 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 59. Salsa2D model: Kittiwake 2-2 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.6580	-0.9495	-0.7739	-0.6288	19.7049

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.3591	0.2475	0.2475	5.492	4.63e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b1	2.7783	0.7864	0.7864	3.533	0.000423 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-1.0756	0.7988	0.7988	-1.346	0.178337
LRF.g(radiusIndices, dists, radii, aR)b3	2.1370	0.9153	0.9153	2.335	0.019690 *
LRF.g(radiusIndices, dists, radii, aR)b4	-4.3826	1.3846	1.3846	-3.165	0.001579 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 9.846895)

Null deviance: 3550.7 on 1583 degrees of freedom

Residual deviance: 3301.3 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 60. Salsa2D model: Kittiwake 2-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.843	-1.297	-0.616	-0.430	29.612

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.3282	0.5425	0.5425	0.605	0.545
LRF.g(radiusIndices, dists, radii, aR)b1	15.9599	2.1101	2.1101	7.563	6.62e-14 ***
LRF.g(radiusIndices, dists, radii, aR)b2	4.3819	0.9606	0.9606	4.562	5.47e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-13.7068	2.2542	2.2542	-6.081	1.50e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-4.5414	0.9960	0.9960	-4.560	5.52e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 12.24464)

Null deviance: 7275.7 on 1583 degrees of freedom

Residual deviance: 5663.8 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 61. Salsa2D model: Kittiwake 2-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.7962	-0.9880	-0.6806	-0.5042	14.4371

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.3850	0.2167	0.2167	1.777	0.0758 .
LRF.g(radiusIndices, dists, radii, aR)b1	1.1584	0.4579	0.4579	2.530	0.0115 *
LRF.g(radiusIndices, dists, radii, aR)b2	-6.9070	1.1209	1.1209	-6.162	9.11e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b3	27.6412	3.5481	3.5481	7.790	1.20e-14 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-20.6113	2.8930	2.8930	-7.125	1.58e-12 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 5.456162)

Null deviance: 4630.4 on 1583 degrees of freedom

Residual deviance: 3567.1 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 62. Salsa2D model: Kittiwake 2-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0175	-0.6394	-0.5526	-0.5225	11.8327

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.3683	0.1936	0.1936	1.902	0.057323 .
LRF.g(radiusIndices, dists, radii, aR)b1	-11.9243	3.9252	3.9252	-3.038	0.002422 **
LRF.g(radiusIndices, dists, radii, aR)b2	15.3213	4.0767	4.0767	3.758	0.000177 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-1.1160	1.6213	1.6213	-0.688	0.491340
LRF.g(radiusIndices, dists, radii, aR)b4	-3.4594	2.2353	2.2353	-1.548	0.121906

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.145118)

Null deviance: 1573.8 on 1583 degrees of freedom

Residual deviance: 1500.5 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 63. Salsa2D model: Kittiwake 2-6 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.3386	-0.4263	-0.3316	-0.2425	8.4603

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-4.5116	1.1712	1.1712	-3.852	0.000122 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-3.2960	0.9549	0.9549	-3.452	0.000572 ***
LRF.g(radiusIndices, dists, radii, aR)b2	4.1371	1.3459	1.3459	3.074	0.002150 **
LRF.g(radiusIndices, dists, radii, aR)b3	4.8430	0.7648	0.7648	6.332	3.14e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b4	8.5365	1.2608	1.2608	6.770	1.80e-11 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.401969)

Null deviance: 1140.09 on 1583 degrees of freedom

Residual deviance: 954.85 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 64. Salsa2D model: Kittiwake 2-7 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.1632	-0.7776	-0.5523	-0.4309	13.2153

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.5487	0.6729	0.6729	-2.302	0.021482 *
LRF.g(radiusIndices, dists, radii, aR)b1	2.0010	0.6942	0.6942	2.883	0.003998 **
LRF.g(radiusIndices, dists, radii, aR)b2	-5.0733	1.3510	1.3510	-3.755	0.000179 ***
LRF.g(radiusIndices, dists, radii, aR)b3	4.3407	1.0433	1.0433	4.161	3.35e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b4	5.7540	1.3189	1.3189	4.363	1.37e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 6.750903)

Null deviance: 2308.8 on 1583 degrees of freedom

Residual deviance: 2138.8 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 65. Salsa2D model: Kittiwake 2-8 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-5.561	-1.637	-0.636	-0.153	40.711

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-10.009	3.460	3.460	-2.893	0.003868 **
LRF.g(radiusIndices, dists, radii, aR)b1	-22.452	6.567	6.567	-3.419	0.000645 ***
LRF.g(radiusIndices, dists, radii, aR)b2	7.656	2.668	2.668	2.870	0.004163 **
LRF.g(radiusIndices, dists, radii, aR)b3	17.347	4.258	4.258	4.074	4.85e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b4	27.681	7.660	7.660	3.614	0.000311 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 114.7633)

Null deviance: 19037 on 1583 degrees of freedom

Residual deviance: 14103 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 66. Salsa2D model: Kittiwake 2-9 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-6.531	-0.538	-0.289	-0.061	55.860

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.5767	1.8438	1.8438	0.313	0.75447
LRF.g(radiusIndices, dists, radii, aR)b1	-15.4933	8.5254	8.5254	-1.817	0.06936 .
LRF.g(radiusIndices, dists, radii, aR)b2	-20.3052	9.1361	9.1361	-2.223	0.02639 *
LRF.g(radiusIndices, dists, radii, aR)b3	20.9109	7.5408	7.5408	2.773	0.00562 **
LRF.g(radiusIndices, dists, radii, aR)b4	7.9193	5.3107	5.3107	1.491	0.13611

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 187.6528)

Null deviance: 12661.0 on 1583 degrees of freedom

Residual deviance: 7507.8 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 67. Salsa2D model: Kittiwake 2-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.2434	-0.6901	-0.4483	-0.3241	18.4869

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.8994	0.3976	0.3976	2.262	0.0238 *
LRF.g(radiusIndices, dists, radii, aR)b1	-8.0028	1.5098	1.5098	-5.300	1.32e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b2	7.2372	1.3820	1.3820	5.237	1.85e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b3	38.0113	5.9230	5.9230	6.418	1.83e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-35.5090	6.0770	6.0770	-5.843	6.21e-09 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.410444)

Null deviance: 2512.4 on 1583 degrees of freedom

Residual deviance: 1900.7 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 68. Salsa2D model: Kittiwake 2-11 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.4393	-1.1324	-0.6811	0.0544	13.0088

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.6220	0.3069	0.3069	2.027	0.0429 *
LRF.g(radiusIndices, dists, radii, aR)b1	-1.9069	0.3930	0.3930	-4.852	1.34e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	2.7665	0.4282	0.4282	6.461	1.38e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-4.3027	0.5765	0.5765	-7.463	1.39e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b4	5.9852	0.5290	0.5290	11.313	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.51949)

Null deviance: 3631.9 on 1583 degrees of freedom

Residual deviance: 2907.5 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 69. Salsa2D model: Kittiwake 2-12 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.235	-1.641	-1.105	-0.756	37.645

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.8625	0.3007	0.3007	9.519	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-2.5694	0.5501	0.5501	-4.671	3.25e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-7.2231	1.5902	1.5902	-4.542	5.99e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-2.0745	0.7398	0.7398	-2.804	0.0051 **
LRF.g(radiusIndices, dists, radii, aR)b4	8.3803	1.5397	1.5397	5.443	6.07e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 22.46966)

Null deviance: 9937.1 on 1583 degrees of freedom
Residual deviance: 8865.6 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 7

Table 70. Salsa2D model: Puffin 1-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.3001	-0.1917	-0.1525	-0.1138	4.4639

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.384	0.828	0.828	-4.087	4.59e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b1	3.963	1.962	1.962	2.020	0.0435 *
LRF.g(radiusIndices, dists, radii, aR)b2	8.079	3.292	3.292	2.454	0.0142 *
LRF.g(radiusIndices, dists, radii, aR)b3	-8.124	3.665	3.665	-2.217	0.0268 *
LRF.g(radiusIndices, dists, radii, aR)b4	-2.820	2.154	2.154	-1.309	0.1906

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.179598)

Null deviance: 197.47 on 1583 degrees of freedom

Residual deviance: 188.60 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 71. Salsa2D model: Puffin 1-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.5051	-0.2737	-0.1704	-0.1082	4.3673

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-7.440	1.757	1.757	-4.235	2.42e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b1	5.448	1.648	1.648	3.307	0.000965 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-48.960	15.541	15.541	-3.150	0.001662 **
LRF.g(radiusIndices, dists, radii, aR)b3	48.330	15.312	15.312	3.156	0.001628 **
LRF.g(radiusIndices, dists, radii, aR)b4	11.804	3.264	3.264	3.616	0.000308 ***
LRF.g(radiusIndices, dists, radii, aR)b5	6.698	2.015	2.015	3.324	0.000907 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.475832)

Null deviance: 314.70 on 1583 degrees of freedom
Residual deviance: 283.88 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 7

Table 72. Salsa2D model: Puffin 1-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.5538	-0.3749	-0.3011	-0.1580	4.6287

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.7723	0.2682	0.2682	-2.880	0.00403 **
LRF.g(radiusIndices, dists, radii, aR)b1	-7.8659	1.8901	1.8901	-4.162	3.33e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	1.4835	0.5970	0.5970	2.485	0.01307 *
LRF.g(radiusIndices, dists, radii, aR)b3	3.8493	0.9545	0.9545	4.033	5.78e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-2.6083	0.9333	0.9333	-2.795	0.00525 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.084243)

Null deviance: 515.09 on 1583 degrees of freedom

Residual deviance: 465.58 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 73. Salsa2D model: Puffin 2-2 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.3219	-0.1219	-0.0620	-0.0180	3.4851

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-22.183	7.622	7.622	-2.910	0.00366 **
LRF.g(radiusIndices, dists, radii, aR)b1	19.728	7.788	7.788	2.533	0.01140 *
LRF.g(radiusIndices, dists, radii, aR)b2	17.509	6.604	6.604	2.651	0.00810 **
LRF.g(radiusIndices, dists, radii, aR)b3	1.998	2.168	2.168	0.922	0.35693
LRF.g(radiusIndices, dists, radii, aR)b4	16.273	5.859	5.859	2.778	0.00554 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 0.8960519)

Null deviance: 107.010 on 1583 degrees of freedom

Residual deviance: 88.569 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 9

Table 74. Salsa2D model: Puffin 2-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.3832	-0.2396	-0.1940	-0.1124	3.9587

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-5.482	1.848	1.848	-2.965	0.00307 **
LRF.g(radiusIndices, dists, radii, aR)b1	4.907	2.158	2.158	2.273	0.02314 *
LRF.g(radiusIndices, dists, radii, aR)b2	-15.280	6.968	6.968	-2.193	0.02845 *
LRF.g(radiusIndices, dists, radii, aR)b3	4.152	2.008	2.008	2.068	0.03883 *
LRF.g(radiusIndices, dists, radii, aR)b4	5.137	1.935	1.935	2.655	0.00802 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.181413)

Null deviance: 268.84 on 1583 degrees of freedom

Residual deviance: 249.53 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 9

Table 75. Salsa2D model: Puffin 2-7 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0218	-0.0733	-0.0009	0.0000	6.6704

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-61.96	33.88	33.88	-1.828	0.0677 .
LRF.g(radiusIndices, dists, radii, aR)b1	47.16	26.02	26.02	1.812	0.0701 .
LRF.g(radiusIndices, dists, radii, aR)b2	36.24	21.98	21.98	1.649	0.0994 .
LRF.g(radiusIndices, dists, radii, aR)b3	22.03	11.69	11.69	1.884	0.0598 .
LRF.g(radiusIndices, dists, radii, aR)b4	43.06	23.44	23.44	1.837	0.0664 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 5.195032)

Null deviance: 259.67 on 1583 degrees of freedom
Residual deviance: 166.76 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 12

Table 76. Salsa2D model: Puffin 2-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4664	-0.1427	-0.0678	-0.0305	6.0782

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-6.396	1.356	1.356	-4.716	2.62e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	32.239	8.689	8.689	3.710	0.000214 ***
LRF.g(radiusIndices, dists, radii, aR)b2	10.788	3.231	3.231	3.339	0.000859 ***
LRF.g(radiusIndices, dists, radii, aR)b3	8.225	1.865	1.865	4.411	1.10e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-34.015	9.542	9.542	-3.565	0.000375 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 0.9301861)

Null deviance: 188.14 on 1583 degrees of freedom

Residual deviance: 149.40 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 77. Salsa2D model: Puffin 2-12 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4256	-0.1302	-0.0863	-0.0522	4.3723

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.7553	0.8441	0.8441	-4.449	9.24e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	16.1508	4.8726	4.8726	3.315	0.000939 ***
LRF.g(radiusIndices, dists, radii, aR)b2	15.2397	4.5633	4.5633	3.340	0.000858 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-27.2010	8.4414	8.4414	-3.222	0.001297 **
LRF.g(radiusIndices, dists, radii, aR)b4	4.9147	1.4078	1.4078	3.491	0.000495 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.017534)

Null deviance: 133.27 on 1583 degrees of freedom
Residual deviance: 113.28 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 9

Table 78. Salsa2D model: Razorbill 1-1 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.2780	-0.4582	-0.3156	-0.2445	7.9648

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.4611	0.4455	0.4455	-3.279	0.00106 **
LRF.g(radiusIndices, dists, radii, aR)b1	-14.8015	8.7621	8.7621	-1.689	0.09137 .
LRF.g(radiusIndices, dists, radii, aR)b2	-3.9709	1.4250	1.4250	-2.787	0.00539 **
LRF.g(radiusIndices, dists, radii, aR)b3	3.2558	2.3483	2.3483	1.386	0.16581
LRF.g(radiusIndices, dists, radii, aR)b4	17.0150	7.7160	7.7160	2.205	0.02759 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.379949)

Null deviance: 1145.7 on 1583 degrees of freedom

Residual deviance: 967.4 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 79. Salsa2D model: Razorbill 1-2 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.7736	-0.3397	-0.2271	-0.1406	5.8916

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-6.6177	1.3363	1.3363	-4.952	8.12e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b1	3.6802	1.2303	1.2303	2.991	0.00282 **
LRF.g(radiusIndices, dists, radii, aR)b2	6.1152	1.1937	1.1937	5.123	3.38e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b3	6.6551	1.5299	1.5299	4.350	1.45e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b4	3.7016	0.9332	0.9332	3.967	7.62e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.847845)

Null deviance: 548.27 on 1583 degrees of freedom
Residual deviance: 472.14 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 80. Salsa2D model: Razorbill 1-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.7807	-0.7163	-0.4890	-0.3454	7.6321

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.1390	0.2345	0.2345	-0.592	0.553637
LRF.g(radiusIndices, dists, radii, aR)b1	-18.7553	4.9396	4.9396	-3.797	0.000152 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-12.6421	1.9623	1.9623	-6.443	1.56e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b3	1.8654	0.3689	0.3689	5.056	4.77e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	14.8482	2.0365	2.0365	7.291	4.85e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b5	16.9140	4.7633	4.7633	3.551	0.000395 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.868173)

Null deviance: 2474.0 on 1583 degrees of freedom
Residual deviance: 1904.6 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 81. Salsa2D model: Razorbill 1-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.0138	-0.6943	-0.3509	-0.1963	11.1122

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.7540	0.6453	0.6453	-4.268	2.09e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b1	12.9354	1.7727	1.7727	7.297	4.64e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b2	4.8946	0.7335	0.7335	6.673	3.46e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-21.3715	4.3237	4.3237	-4.943	8.52e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	15.3347	3.7546	3.7546	4.084	4.64e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.093928)

Null deviance: 1903.8 on 1583 degrees of freedom

Residual deviance: 1475.8 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 82. Salsa2D model: Razorbill 1-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4819	-0.3985	-0.3057	-0.2029	5.4360

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-4.286	1.296	1.296	-3.306	0.000967 ***
LRF.g(radiusIndices, dists, radii, aR)b1	4.088	1.396	1.396	2.928	0.003463 **
LRF.g(radiusIndices, dists, radii, aR)b2	-2.557	1.964	1.964	-1.302	0.193180
LRF.g(radiusIndices, dists, radii, aR)b3	3.202	1.095	1.095	2.924	0.003507 **
LRF.g(radiusIndices, dists, radii, aR)b4	5.901	2.518	2.518	2.343	0.019227 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.377626)

Null deviance: 620.4 on 1583 degrees of freedom

Residual deviance: 586.0 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 83. Salsa2D model: Razorbill 1-6 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4972	-0.1089	-0.0505	-0.0223	5.0015

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.883	1.126	1.126	2.560	0.010558 *
LRF.g(radiusIndices, dists, radii, aR)b1	-31.786	10.477	10.477	-3.034	0.002454 **
LRF.g(radiusIndices, dists, radii, aR)b2	-69.093	21.530	21.530	-3.209	0.001358 **
LRF.g(radiusIndices, dists, radii, aR)b3	74.553	22.510	22.510	3.312	0.000947 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-18.482	4.433	4.433	-4.169	3.22e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 0.84404)

Null deviance: 125.952 on 1583 degrees of freedom

Residual deviance: 99.501 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 10

Table 84. Salsa2D model: Razorbill 1-8 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4573	-0.1720	-0.1026	-0.0573	4.7451

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.2109	0.7065	0.7065	-4.545	5.92e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-319.0442	246.2168	246.2168	-1.296	0.195239
LRF.g(radiusIndices, dists, radii, aR)b2	5.7876	1.7053	1.7053	3.394	0.000706 ***
LRF.g(radiusIndices, dists, radii, aR)b3	636.1096	537.4937	537.4937	1.183	0.236800
LRF.g(radiusIndices, dists, radii, aR)b4	-329.2261	297.7064	297.7064	-1.106	0.268949

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.7239)

Null deviance: 222.36 on 1583 degrees of freedom

Residual deviance: 184.91 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 9

Table 85. Salsa2D model: Razorbill 1-9 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6513	-0.2387	-0.1879	-0.0835	6.0845

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.8459	0.3385	0.3385	-5.453	5.73e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-17.2748	4.2376	4.2376	-4.077	4.80e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-10.8099	2.5994	2.5994	-4.159	3.37e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	16.3228	3.3157	3.3157	4.923	9.42e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	5.5792	1.9622	1.9622	2.843	0.00452 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.274124)

Null deviance: 369.84 on 1583 degrees of freedom
Residual deviance: 309.39 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 8

Table 86. Salsa2D model: Razorbill 1-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.4571	-0.2858	-0.2390	-0.1462	12.3734

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.3820	0.3538	0.3538	-3.907	9.76e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-63.5785	13.4510	13.4510	-4.727	2.49e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-32.6280	6.5426	6.5426	-4.987	6.81e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b3	15.2921	2.9810	2.9810	5.130	3.26e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	81.2030	16.1899	16.1899	5.016	5.88e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.343513)

Null deviance: 704.26 on 1583 degrees of freedom

Residual deviance: 579.49 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 87. Salsa2D model: Razorbill 1-11 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.1678	-0.7860	-0.2830	-0.2026	6.0882

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.0474	0.2794	0.2794	7.328	3.71e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-3.1206	0.5115	0.5115	-6.101	1.32e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-2.7530	0.8288	0.8288	-3.322	0.000915 ***
LRF.g(radiusIndices, dists, radii, aR)b3	3.6110	0.7162	0.7162	5.042	5.14e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-2.4739	0.7425	0.7425	-3.332	0.000882 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.069129)

Null deviance: 1535.8 on 1583 degrees of freedom

Residual deviance: 1227.9 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 88. Salsa2D model: Razorbill 1-12 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.2332	-0.2663	-0.1413	-0.0970	7.4091

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.1599	0.5459	0.5459	-3.957	7.94e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b1	7.4138	1.0870	1.0870	6.820	1.29e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b2	5.7332	1.0524	1.0524	5.448	5.91e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b3	11.0166	3.3989	3.3989	3.241	0.00122 **
LRF.g(radiusIndices, dists, radii, aR)b4	-10.0365	3.2028	3.2028	-3.134	0.00176 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.990069)

Null deviance: 679.76 on 1583 degrees of freedom

Residual deviance: 463.91 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 89. Salsa2D model: Razorbill 2-1 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.2006	-1.1705	-0.7312	-0.2322	14.3428

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.2484	0.6984	0.6984	-4.651	3.58e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	7.8990	1.0000	1.0000	7.899	5.23e-15 ***
LRF.g(radiusIndices, dists, radii, aR)b2	17.2804	2.1336	2.1336	8.099	1.10e-15 ***
LRF.g(radiusIndices, dists, radii, aR)b3	7.6157	0.9162	0.9162	8.312	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-2.7464	0.8647	0.8647	-3.176	0.00152 **
LRF.g(radiusIndices, dists, radii, aR)b5	-15.5527	2.0993	2.0993	-7.409	2.07e-13 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 5.33534)

Null deviance: 4342.5 on 1583 degrees of freedom

Residual deviance: 3465.1 on 1578 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 6

Table 90. Salsa2D model: Razorbill 2-2 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.1193	-1.2408	-0.8652	-0.5764	11.2086

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.7447	0.4116	0.4116	-1.809	0.0706 .
LRF.g(radiusIndices, dists, radii, aR)b1	-4.1523	0.8532	0.8532	-4.867	1.25e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	4.2623	0.7511	0.7511	5.674	1.65e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b3	3.7510	0.5246	0.5246	7.150	1.32e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b4	2.5715	0.5946	0.5946	4.325	1.62e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 6.181622)

Null deviance: 4547.2 on 1583 degrees of freedom
Residual deviance: 4055.4 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 7

Table 91. Salsa2D model: Razorbill 2-3 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.7153	-0.7065	-0.3405	-0.1591	27.6249

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.552	1.151	1.151	-1.348	0.17776
LRF.g(radiusIndices, dists, radii, aR)b1	-71.025	26.596	26.596	-2.670	0.00765 **
LRF.g(radiusIndices, dists, radii, aR)b2	7.170	3.028	3.028	2.368	0.01801 *
LRF.g(radiusIndices, dists, radii, aR)b3	70.803	25.754	25.754	2.749	0.00604 **
LRF.g(radiusIndices, dists, radii, aR)b4	-11.491	5.054	5.054	-2.274	0.02312 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 28.64709)

Null deviance: 2805.3 on 1583 degrees of freedom

Residual deviance: 2317.8 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 92. Salsa2D model: Razorbill 2-4 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.1235	-0.4114	-0.2818	-0.1838	8.1602

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.836	1.750	1.750	-2.192	0.02852 *
LRF.g(radiusIndices, dists, radii, aR)b1	6.064	2.755	2.755	2.201	0.02790 *
LRF.g(radiusIndices, dists, radii, aR)b2	9.929	2.508	2.508	3.959	7.86e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-8.540	2.722	2.722	-3.137	0.00174 **
LRF.g(radiusIndices, dists, radii, aR)b4	1.759	1.962	1.962	0.897	0.36999

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.217385)

Null deviance: 1105.95 on 1583 degrees of freedom

Residual deviance: 908.76 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 93. Salsa2D model: Razorbill 2-5 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6122	-0.3920	-0.3412	-0.2900	6.6150

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.184	1.130	1.130	-2.817	0.0049 **
LRF.g(radiusIndices, dists, radii, aR)b1	17.431	6.081	6.081	2.867	0.0042 **
LRF.g(radiusIndices, dists, radii, aR)b2	2.927	1.269	1.269	2.306	0.0212 *
LRF.g(radiusIndices, dists, radii, aR)b3	4.821	1.995	1.995	2.416	0.0158 *
LRF.g(radiusIndices, dists, radii, aR)b4	-17.362	6.539	6.539	-2.655	0.0080 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.954747)

Null deviance: 696.71 on 1583 degrees of freedom
Residual deviance: 670.21 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 94. Salsa2D model: Razorbill 2-6 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6393	-0.1745	-0.1028	-0.0461	4.0131

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.7154	0.7195	0.7195	2.384	0.017236 *
LRF.g(radiusIndices, dists, radii, aR)b1	14.6259	3.1513	3.1513	4.641	3.75e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-20.8436	4.8593	4.8593	-4.289	1.90e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-25.1048	6.4878	6.4878	-3.870	0.000113 ***
LRF.g(radiusIndices, dists, radii, aR)b4	33.5173	8.3178	8.3178	4.030	5.85e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-16.1077	3.4367	3.4367	-4.687	3.01e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.058982)

Null deviance: 214.05 on 1583 degrees of freedom
Residual deviance: 175.34 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 8

Table 95. Salsa2D model: Razorbill 2-7 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8840	-0.4227	-0.2958	-0.1622	9.8534

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.5344	0.7123	0.7123	0.750	0.453220
LRF.g(radiusIndices, dists, radii, aR)b1	-15.4625	4.2617	4.2617	-3.628	0.000294 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-3.9406	1.7890	1.7890	-2.203	0.027762 *
LRF.g(radiusIndices, dists, radii, aR)b3	-8.2122	2.1826	2.1826	-3.763	0.000174 ***
LRF.g(radiusIndices, dists, radii, aR)b4	20.2316	4.8747	4.8747	4.150	3.5e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.076691)

Null deviance: 930.04 on 1583 degrees of freedom
Residual deviance: 809.61 on 1579 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 7

Table 96. Salsa2D model: Razorbill 2-8 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.7902	-1.2637	-0.3218	-0.0694	28.6211

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-9.718	2.344	2.344	-4.145	3.57e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-17.413	3.326	3.326	-5.235	1.87e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b2	15.200	2.618	2.618	5.806	7.72e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b3	23.056	4.189	4.189	5.505	4.31e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b4	8.167	1.585	1.585	5.153	2.88e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 31.13792)

Null deviance: 9365.6 on 1583 degrees of freedom

Residual deviance: 6284.1 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 97. Salsa2D model: Razorbill 2-9 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-6.145	-0.437	-0.367	-0.162	33.031

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.475	1.992	1.992	-0.740	0.459164
LRF.g(radiusIndices, dists, radii, aR)b1	-18.646	7.207	7.207	-2.587	0.009766 **
LRF.g(radiusIndices, dists, radii, aR)b2	16.429	5.960	5.960	2.756	0.005911 **
LRF.g(radiusIndices, dists, radii, aR)b3	1.370	3.251	3.251	0.421	0.673549
LRF.g(radiusIndices, dists, radii, aR)b4	10.825	2.851	2.851	3.798	0.000152 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 82.71864)

Null deviance: 7767.5 on 1583 degrees of freedom

Residual deviance: 4111.9 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 8

Table 98. Salsa2D model: Razorbill 2-10 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.1586	-0.9558	-0.7253	-0.1673	18.8927

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	5.957	1.024	1.024	5.816	7.29e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-11.706	2.313	2.313	-5.062	4.64e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b2	10.477	2.859	2.859	3.665	0.000256 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-6.136	1.895	1.895	-3.239	0.001226 **
LRF.g(radiusIndices, dists, radii, aR)b4	-9.242	2.315	2.315	-3.992	6.84e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 11.42831)

Null deviance: 3922.3 on 1583 degrees of freedom

Residual deviance: 3330.2 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Table 99. Salsa2D model: Razorbill 2-11 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.6457	-0.8742	-0.6189	-0.3592	5.6236

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.9815	0.2996	0.2996	-3.276	0.00108 **
LRF.g(radiusIndices, dists, radii, aR)b1	4.1465	0.9648	0.9648	4.298	1.83e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-14.1792	2.2318	2.2318	-6.353	2.75e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b3	12.3643	1.8165	1.8165	6.807	1.41e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b4	3.1247	0.3291	0.3291	9.495	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b5	4.1062	0.8027	0.8027	5.116	3.51e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.033172)

Null deviance: 2078.7 on 1583 degrees of freedom
Residual deviance: 1787.5 on 1578 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584
Number of Fisher Scoring iterations: 6

Table 100. Salsa2D model: Razorbill 2-12 Survey Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.6955	-1.1923	-0.8169	-0.5861	11.5106

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.8981	0.1280	0.1280	14.834	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	1.9966	0.6426	0.6426	3.107	0.00192 **
LRF.g(radiusIndices, dists, radii, aR)b2	1.7372	0.2207	0.2207	7.870	6.54e-15 ***
LRF.g(radiusIndices, dists, radii, aR)b3	0.7572	0.6183	0.6183	1.225	0.22084
LRF.g(radiusIndices, dists, radii, aR)b4	-2.3749	0.5975	0.5975	-3.975	7.37e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 5.609457)

Null deviance: 4631.5 on 1583 degrees of freedom

Residual deviance: 3902.3 on 1579 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 1584

Number of Fisher Scoring iterations: 7

Appendix D - Model summary information for seasonal models

Table 1. Salsa2D model: Gannet 1-autumn Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.5613	-0.3999	-0.3440	-0.1847	4.9120

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.1914	0.1523	0.1523	-1.257	0.2088
LRF.g(radiusIndices, dists, radii, aR)b1	5.1041	1.0719	1.0719	4.762	2.00e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-3.7066	0.8121	0.8121	-4.564	5.21e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-1.0402	0.5844	0.5844	-1.780	0.0752 .
LRF.g(radiusIndices, dists, radii, aR)b4	-2.6170	0.5840	0.5840	-4.481	7.68e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.364664)

Null deviance: 1151.3 on 3167 degrees of freedom
 Residual deviance: 1083.9 on 3163 degrees of freedom
 AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 3168
 Number of Fisher Scoring iterations: 6

Table 2. Salsa2D model: Gannet 1-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.4544	-0.3453	-0.2937	-0.2380	9.5507

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.5611	0.3429	0.3429	-7.469	8.66e-14 ***
LRF.g(radiusIndices, dists, radii, aR)b1	2.5438	0.3763	0.3763	6.761	1.44e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b2	1.9991	0.4631	0.4631	4.316	1.60e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	2.4634	0.4248	0.4248	5.799	6.85e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-1.4579	0.3843	0.3843	-3.793	0.00015 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.777696)

Null deviance: 3629.2 on 11087 degrees of freedom

Residual deviance: 3528.5 on 11083 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 11088

Number of Fisher Scoring iterations: 6

Table 3. Salsa2D model: Gannet 2-autumn Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8434	-0.6149	-0.4985	-0.3672	10.5527

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.7788	0.2840	0.2840	-2.743	0.00613 **
LRF.g(radiusIndices, dists, radii, aR)b1	0.7971	0.3578	0.3578	2.228	0.02598 *
LRF.g(radiusIndices, dists, radii, aR)b2	1.4721	0.3446	0.3446	4.272	1.99e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-3.0707	0.6801	0.6801	-4.515	6.57e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b4	3.2569	0.5216	0.5216	6.244	4.82e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.64433)

Null deviance: 2424.6 on 3167 degrees of freedom
Residual deviance: 2277.1 on 3163 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 3168
Number of Fisher Scoring iterations: 6

Table 4. Salsa2D model: Gannet 2-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8553	-0.4193	-0.3508	-0.2684	26.5102

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.3079	0.2042	0.2042	-6.403	1.58e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-4.4740	0.6698	0.6698	-6.680	2.51e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b2	1.2985	0.3912	0.3912	3.319	0.000906 ***
LRF.g(radiusIndices, dists, radii, aR)b3	4.9727	0.5489	0.5489	9.060	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	2.8474	0.5676	0.5676	5.017	5.33e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.045343)

Null deviance: 6430.1 on 11087 degrees of freedom
Residual deviance: 5924.5 on 11083 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 11088
Number of Fisher Scoring iterations: 7

Table 5. Salsa2D model: Gannet 2-spring Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.2966	-0.2101	-0.1578	-0.1212	11.2012

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.7509	0.6579	0.6579	-4.181	2.95e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b1	39.0314	32.2609	32.2609	1.210	0.2264
LRF.g(radiusIndices, dists, radii, aR)b2	-30.4294	26.8167	26.8167	-1.135	0.2566
LRF.g(radiusIndices, dists, radii, aR)b3	1.9191	0.9250	0.9250	2.075	0.0381 *
LRF.g(radiusIndices, dists, radii, aR)b4	-9.0410	7.7307	7.7307	-1.169	0.2423

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.976704)

Null deviance: 776.17 on 4751 degrees of freedom
Residual deviance: 746.31 on 4747 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 4752
Number of Fisher Scoring iterations: 7

Table 6. Salsa2D model: Guillemot 1-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.4327	-1.1441	-0.9478	-0.7229	27.5478

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.40071	0.07945	0.07945	17.630	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	33.87975	3.17220	3.17220	10.680	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b2	1.38575	0.18827	0.18827	7.360	2.02e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-12.46826	1.22013	1.22013	-10.219	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-20.25535	2.17922	2.17922	-9.295	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 6.005897)

Null deviance: 18448 on 7919 degrees of freedom
Residual deviance: 17347 on 7915 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 7920
Number of Fisher Scoring iterations: 6

Table 7. Salsa2D model: Guillemot 1-nonbreeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.2259	-0.9644	-0.8246	-0.6186	14.3156

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.52802	0.09267	0.09267	5.698	1.26e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b1	4.95484	0.98000	0.98000	5.056	4.38e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b2	1.53402	0.15871	0.15871	9.666	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b3	2.32616	0.32148	0.32148	7.236	5.06e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-4.66359	0.98058	0.98058	-4.756	2.01e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.749236)

Null deviance: 13082 on 7919 degrees of freedom

Residual deviance: 12622 on 7915 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 7920

Number of Fisher Scoring iterations: 6

Table 8. Salsa2D model: Guillemot 1-post-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.3316	-0.8984	-0.6416	-0.4458	15.8442

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.5197	0.2645	0.2645	-1.965	0.049490 *
LRF.g(radiusIndices, dists, radii, aR)b1	24.0475	3.4153	3.4153	7.041	2.33e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-1.4686	0.4424	0.4424	-3.320	0.000911 ***
LRF.g(radiusIndices, dists, radii, aR)b3	6.5605	0.8911	0.8911	7.362	2.29e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-26.0643	3.7450	3.7450	-6.960	4.13e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b5	3.1265	0.3646	0.3646	8.575	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.433536)

Null deviance: 4997.3 on 3167 degrees of freedom
Residual deviance: 4578.4 on 3162 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 3168
Number of Fisher Scoring iterations: 7

Table 9. Salsa2D model: Guillemot 2-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.4899	-1.1760	-1.0471	-0.5583	15.1383

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.59605	0.06427	0.06427	24.834	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-5.17175	1.06923	1.06923	-4.837	1.34e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b2	8.74164	2.46314	2.46314	3.549	0.000389 ***
LRF.g(radiusIndices, dists, radii, aR)b3	3.04066	0.56444	0.56444	5.387	7.37e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-7.30276	2.07508	2.07508	-3.519	0.000435 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 5.439911)

Null deviance: 18496 on 7919 degrees of freedom

Residual deviance: 17765 on 7915 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 7920

Number of Fisher Scoring iterations: 6

Table 10. Salsa2D model: Guillemot 2-nonbreeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.9810	-1.3837	-1.0808	0.2719	15.0983

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.1262	0.1093	0.1093	10.304	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-7.6375	0.8614	0.8614	-8.866	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b2	14.7707	1.4362	1.4362	10.285	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b3	2.0990	0.2075	0.2075	10.116	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	1.3279	0.1794	0.1794	7.401	1.49e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-8.7259	0.8475	0.8475	-10.296	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.476829)

Null deviance: 20399 on 7919 degrees of freedom

Residual deviance: 19317 on 7914 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 7920

Number of Fisher Scoring iterations: 6

Table 11. Salsa2D model: Guillemot 2-post-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-4.139	-1.733	-0.888	-0.440	31.876

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.4797	0.3920	0.3920	-3.775	0.000163 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-38.6086	3.3361	3.3361	-11.573	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b2	6.7013	0.6775	0.6775	9.891	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b3	39.4213	3.2571	3.2571	12.103	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b4	2.1700	0.3459	0.3459	6.273	4.03e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 20.88401)

Null deviance: 23774 on 3167 degrees of freedom

Residual deviance: 18549 on 3163 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 3168

Number of Fisher Scoring iterations: 7

Table 12. Salsa2D model: Kittiwake 1-autumn Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8768	-0.5389	-0.4078	-0.2882	30.2340

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.2974	0.3890	0.3890	-3.335	0.000858 ***
LRF.g(radiusIndices, dists, radii, aR)b1	7.2109	2.5365	2.5365	2.843	0.004485 **
LRF.g(radiusIndices, dists, radii, aR)b2	-28.9828	9.7621	9.7621	-2.969	0.003000 **
LRF.g(radiusIndices, dists, radii, aR)b3	1.7144	0.5655	0.5655	3.032	0.002442 **
LRF.g(radiusIndices, dists, radii, aR)b4	25.8080	8.0718	8.0718	3.197	0.001394 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 8.877426)

Null deviance: 4765.6 on 6335 degrees of freedom

Residual deviance: 4507.1 on 6331 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 6336

Number of Fisher Scoring iterations: 7

Table 13. Salsa2D model: Kittiwake 1-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.5579	-0.8345	-0.7001	-0.5197	24.7399

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.4434	0.2678	0.2678	-1.655	0.0979 .
LRF.g(radiusIndices, dists, radii, aR)b1	1.7557	0.3412	0.3412	5.146	2.72e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-8.2567	1.2202	1.2202	-6.767	1.40e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b3	2.5022	0.5476	0.5476	4.569	4.96e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b4	15.5411	1.6046	1.6046	9.685	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-7.9877	0.8204	0.8204	-9.736	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 6.974434)

Null deviance: 18245 on 9503 degrees of freedom
Residual deviance: 16583 on 9498 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 9504
Number of Fisher Scoring iterations: 7

Table 14. Salsa2D model: Kittiwake 1-spring Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.9447	-0.6118	-0.4924	-0.4196	12.3488

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.0701	0.3364	0.3364	6.154	8.52e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-7.7696	1.2638	1.2638	-6.148	8.85e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-8.6481	1.5780	1.5780	-5.481	4.57e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b3	39.2469	6.3575	6.3575	6.173	7.54e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-27.9048	4.5222	4.5222	-6.171	7.66e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b5	-1.8865	0.5027	0.5027	-3.752	0.000178 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.524559)

Null deviance: 2589.9 on 3167 degrees of freedom
Residual deviance: 2474.5 on 3162 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 3168
Number of Fisher Scoring iterations: 6

Table 15. Salsa2D model: Kittiwake 2-autumn Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.988	-1.206	-0.888	-0.475	69.304

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	2.0029	0.1938	0.1938	10.335	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-31.2948	5.1855	5.1855	-6.035	1.68e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-9.2668	1.7387	1.7387	-5.330	1.02e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b3	38.6065	6.1361	6.1361	6.292	3.35e-10 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-2.2806	0.4454	0.4454	-5.121	3.13e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 31.52214)

Null deviance: 29865 on 6335 degrees of freedom

Residual deviance: 25918 on 6331 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 6336

Number of Fisher Scoring iterations: 8

Table 16. Salsa2D model: Kittiwake 2-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.292	-1.218	-0.806	-0.489	53.789

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.2296	0.8273	0.8273	-2.695	0.007055 **
LRF.g(radiusIndices, dists, radii, aR)b1	-3.2815	0.8774	0.8774	-3.740	0.000185 ***
LRF.g(radiusIndices, dists, radii, aR)b2	2.2859	0.9988	0.9988	2.289	0.022119 *
LRF.g(radiusIndices, dists, radii, aR)b3	5.3798	0.8216	0.8216	6.548	6.13e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b4	4.0991	0.9407	0.9407	4.357	1.33e-05 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 47.68788)

Null deviance: 39535 on 9503 degrees of freedom

Residual deviance: 35570 on 9499 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 9504

Number of Fisher Scoring iterations: 8

Table 17. Salsa2D model: Kittiwake 2-spring Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.4303	-0.9161	-0.8735	-0.7251	21.3829

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.3514	0.1611	0.1611	8.387	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	1.6687	0.4920	0.4920	3.392	0.000703 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-3.5903	1.4185	1.4185	-2.531	0.011420 *
LRF.g(radiusIndices, dists, radii, aR)b3	-2.7761	1.1968	1.1968	-2.320	0.020423 *
LRF.g(radiusIndices, dists, radii, aR)b4	3.5900	1.7161	1.7161	2.092	0.036521 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 12.07126)

Null deviance: 6936.9 on 3167 degrees of freedom
Residual deviance: 6786.1 on 3163 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 3168
Number of Fisher Scoring iterations: 7

Table 18. Salsa2D model: Puffin 1-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.2028	-0.1383	-0.0900	-0.0573	6.1120

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-4.7801	0.6324	0.6324	-7.559	4.52e-14 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-16.8570	5.8344	5.8344	-2.889	0.003872 **
LRF.g(radiusIndices, dists, radii, aR)b2	2.8502	0.7640	0.7640	3.731	0.000192 ***
LRF.g(radiusIndices, dists, radii, aR)b3	3.1449	1.0147	1.0147	3.099	0.001946 **
LRF.g(radiusIndices, dists, radii, aR)b4	18.6458	5.8026	5.8026	3.213	0.001317 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.380254)

Null deviance: 529.74 on 7919 degrees of freedom
Residual deviance: 497.31 on 7915 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 7920
Number of Fisher Scoring iterations: 8

Table 19. Salsa2D model: Puffin 1-nonbreeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.2245	-0.1618	-0.1376	-0.1039	6.3080

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-4.4136	0.5443	0.5443	-8.108	5.67e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	37.6343	13.0601	13.0601	2.882	0.00396 **
LRF.g(radiusIndices, dists, radii, aR)b2	38.1004	14.3859	14.3859	2.648	0.00810 **
LRF.g(radiusIndices, dists, radii, aR)b3	2.8819	0.6860	0.6860	4.201	2.68e-05 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-71.9294	26.5271	26.5271	-2.712	0.00671 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.309185)

Null deviance: 1060.4 on 11087 degrees of freedom

Residual deviance: 1029.4 on 11083 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 11088

Number of Fisher Scoring iterations: 7

Table 20. Salsa2D model: Puffin 2-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.2538	-0.1539	-0.1069	-0.0866	8.6241

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.2343	0.4634	0.4634	-6.980	3.2e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b1	1.6581	0.8223	0.8223	2.016	0.0438 *
LRF.g(radiusIndices, dists, radii, aR)b2	-429.2024	183.9943	183.9943	-2.333	0.0197 *
LRF.g(radiusIndices, dists, radii, aR)b3	-270.5509	112.7375	112.7375	-2.400	0.0164 *
LRF.g(radiusIndices, dists, radii, aR)b4	695.6656	294.1326	294.1326	2.365	0.0180 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.042519)

Null deviance: 729.09 on 7919 degrees of freedom
Residual deviance: 691.29 on 7915 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 7920
Number of Fisher Scoring iterations: 8

Table 21. Salsa2D model: Puffin 2-nonbreeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.1540	-0.1044	-0.0976	-0.0831	7.9681

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-2.9249	0.3889	0.3889	-7.520	5.9e-14 ***
LRF.g(radiusIndices, dists, radii, aR)b1	23.3956	16.4848	16.4848	1.419	0.1559
LRF.g(radiusIndices, dists, radii, aR)b2	-13.4615	10.3866	10.3866	-1.296	0.1950
LRF.g(radiusIndices, dists, radii, aR)b3	-3.1851	1.6399	1.6399	-1.942	0.0521 .
LRF.g(radiusIndices, dists, radii, aR)b4	-9.6874	6.8874	6.8874	-1.407	0.1596

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 1.441608)

Null deviance: 616.13 on 11087 degrees of freedom

Residual deviance: 604.43 on 11083 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 11088

Number of Fisher Scoring iterations: 8

Table 22. Salsa2D model: Razorbill 1-autumn Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8873	-0.2758	-0.1988	-0.1570	13.2290

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	5.441	1.132	1.132	4.804	1.60e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-22.490	4.193	4.193	-5.363	8.55e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-7.853	1.359	1.359	-5.779	8.01e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-9.289	1.770	1.770	-5.248	1.61e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b4	23.450	4.025	4.025	5.826	6.05e-09 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.422953)

Null deviance: 1330.4 on 4751 degrees of freedom

Residual deviance: 1214.1 on 4747 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 4752

Number of Fisher Scoring iterations: 7

Table 23. Salsa2D model: Razorbill 1-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0365	-0.4389	-0.2795	-0.1794	13.9167

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-3.0064	0.3696	0.3696	-8.134	4.95e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	3.5761	0.7174	0.7174	4.985	6.38e-07 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-27.5728	4.6399	4.6399	-5.943	2.95e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b3	2.9887	0.4052	0.4052	7.376	1.84e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b4	30.0884	4.6018	4.6018	6.538	6.70e-11 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.280837)

Null deviance: 3343.1 on 6335 degrees of freedom
 Residual deviance: 2979.9 on 6331 degrees of freedom
 AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 6336
 Number of Fisher Scoring iterations: 6

Table 24. Salsa2D model: Razorbill 1-nonbreeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.7538	-0.5922	-0.4877	-0.2532	9.0038

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-1.7233	0.5184	0.5184	-3.324	0.000897 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-4.3418	1.2579	1.2579	-3.452	0.000564 ***
LRF.g(radiusIndices, dists, radii, aR)b2	3.6528	1.0016	1.0016	3.647	0.000270 ***
LRF.g(radiusIndices, dists, radii, aR)b3	2.6912	0.6007	0.6007	4.480	7.73e-06 ***
LRF.g(radiusIndices, dists, radii, aR)b4	0.5730	0.3095	0.3095	1.851	0.064237 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 2.385504)

Null deviance: 2344.9 on 3167 degrees of freedom

Residual deviance: 2149.7 on 3163 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 3168

Number of Fisher Scoring iterations: 6

Table 25. Salsa2D model: Razorbill 1-spring Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.0786	-0.6392	-0.4201	-0.3461	9.5622

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.9438	0.2734	0.2734	-3.453	0.00056 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-4.4246	1.3668	1.3668	-3.237	0.00122 **
LRF.g(radiusIndices, dists, radii, aR)b2	6.0580	1.1232	1.1232	5.393	7.25e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b3	0.8449	0.3665	0.3665	2.305	0.02119 *
LRF.g(radiusIndices, dists, radii, aR)b4	0.8772	0.6042	0.6042	1.452	0.14660

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.21445)

Null deviance: 4622.8 on 4751 degrees of freedom

Residual deviance: 4171.6 on 4747 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 4752

Number of Fisher Scoring iterations: 6

Table 26. Salsa2D model: Razorbill 2-autumn Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.838	-1.236	-0.764	-0.293	44.114

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.1059	0.4388	0.4388	0.241	0.809
LRF.g(radiusIndices, dists, radii, aR)b1	-9.2608	1.5675	1.5675	-5.908	3.71e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-17.8687	2.5293	2.5293	-7.065	1.84e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b3	5.3538	0.7795	0.7795	6.868	7.36e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-17.4154	3.1972	3.1972	-5.447	5.38e-08 ***
LRF.g(radiusIndices, dists, radii, aR)b5	38.0301	5.6693	5.6693	6.708	2.20e-11 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 28.65311)

Null deviance: 21439 on 4751 degrees of freedom

Residual deviance: 17985 on 4746 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 4752

Number of Fisher Scoring iterations: 7

Table 27. Salsa2D model: Razorbill 2-breeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
aR) + offset(log(area)), family = "quasipoisson", data = count.data,
splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6874	-0.3593	-0.2843	-0.2513	9.7656

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	-0.8127	0.2216	0.2216	-3.667	0.000247 ***
LRF.g(radiusIndices, dists, radii, aR)b1	1.5500	0.7772	0.7772	1.994	0.046142 *
LRF.g(radiusIndices, dists, radii, aR)b2	3.4426	0.4956	0.4956	6.946	4.13e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-2.3152	0.6145	0.6145	-3.767	0.000166 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-1.6879	0.5893	0.5893	-2.864	0.004195 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 3.023726)

Null deviance: 3054.4 on 6335 degrees of freedom

Residual deviance: 2868.8 on 6331 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 6336

Number of Fisher Scoring iterations: 7

Table 28. Salsa2D model: Razorbill 2-nonbreeding Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.0475	-1.0439	-0.7866	-0.6663	11.8531

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	0.7761	0.1296	0.1296	5.990	2.33e-09 ***
LRF.g(radiusIndices, dists, radii, aR)b1	5.0361	0.5685	0.5685	8.859	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b2	-20.7540	2.5988	2.5988	-7.986	1.94e-15 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-3.9840	0.5388	0.5388	-7.395	1.81e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b4	22.1260	2.5358	2.5358	8.725	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b5	1.4417	0.2557	0.2557	5.639	1.87e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 4.493527)

Null deviance: 6894.2 on 3167 degrees of freedom
Residual deviance: 6234.9 on 3162 degrees of freedom
AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 3168
Number of Fisher Scoring iterations: 6

Table 29. Salsa2D model: Razorbill 2-spring Season Spatial Model Runs

Call:

```
gamMRSea(formula = response ~ LRF.g(radiusIndices, dists, radii,
  aR) + offset(log(area)), family = "quasipoisson", data = count.data,
  splineParams = splineParams)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.8515	-1.0978	-0.8412	-0.5326	27.0600

Coefficients:

	Estimate	Std. Error	Robust S.E.	t value	Pr(> t)
(Intercept)	1.9097	0.1972	0.1972	9.683	< 2e-16 ***
LRF.g(radiusIndices, dists, radii, aR)b1	-6.0141	0.8656	0.8656	-6.948	4.22e-12 ***
LRF.g(radiusIndices, dists, radii, aR)b2	53.1844	7.1971	7.1971	7.390	1.73e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b3	-9.1089	1.3666	1.3666	-6.666	2.94e-11 ***
LRF.g(radiusIndices, dists, radii, aR)b4	-48.9690	6.7348	6.7348	-7.271	4.15e-13 ***
LRF.g(radiusIndices, dists, radii, aR)b5	7.1348	1.0752	1.0752	6.636	3.58e-11 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for quasipoisson family taken to be 8.666537)

Null deviance: 12262 on 4751 degrees of freedom

Residual deviance: 11091 on 4746 degrees of freedom

AIC: NA

Max Panel Size = 1 (independence assumed); Number of panels = 4752

Number of Fisher Scoring iterations: 7

RWE Renewables UK Dogger Bank
South (West) Limited

RWE Renewables UK Dogger Bank
South (East) Limited

Windmill Business Park
Whitehill Way
Swindon
Wiltshire, SN5 6PB

RWE

MASDAR 