

Duke SERDP Model Results

Ben Best

October 29, 2008

Table of Contents

Contents

Table of Contents	2
List of Tables	3
List of Figures	4
Introduction	5
1 Baleen whales	6
1.1 fall	6
1.1.1 east2	7
1.2 spring	22
1.2.1 east2	23
1.2.2 gomex2	39
1.3 summer	54
1.3.1 east2	55
1.4 winter	70
1.4.1 east2	71
2 Beaked whales	87
2.1 fall	87
2.2 spring	87
2.2.1 gomex2	88
2.3 summer	103
2.3.1 east2	104
2.3.2 gomex2	120
2.4 winter	135
2.4.1 east2	136
3 Delphinus	152
3.1 fall	152
3.1.1 east2	153
3.2 spring	168
3.2.1 east2	169
3.3 summer	184
3.3.1 east2	185
3.4 winter	200
3.4.1 east2	201
4 Harbour porpoise	217
4.1 fall	217
4.1.1 east2	218
4.1.2 ne2	234

4.2	spring	250
4.3	summer	250
4.3.1	east2	251
4.3.2	ne2	267
4.4	winter	283
5	Humpback whales	283
5.1	fall	283
5.1.1	east2	284
5.2	spring	299
5.2.1	east2	300
5.3	summer	315
5.3.1	east2	316
5.4	winter	331
5.4.1	east2	332
6	Killer whales	348
6.1	fall	348
6.2	spring	348
6.2.1	gomex2	349
6.3	summer	364
6.3.1	east2	365
6.3.2	gomex2	381
6.4	winter	397
7	Kogia	397
7.1	fall	397
7.2	spring	397
7.2.1	gomex2	398
7.3	summer	413
7.3.1	east2	414
7.3.2	gomex2	430
7.4	winter	446
8	Lags	446
8.1	fall	446
8.1.1	east2	447
8.2	spring	463
8.3	summer	463
8.3.1	east2	464
8.4	winter	480
9	Pilot whales	480
9.1	fall	480
9.1.1	east2	481
9.2	spring	496

9.2.1	gomex2	497
9.3	summer	512
9.3.1	east2	513
9.4	winter	528
9.4.1	east2	529
10	Right whales	545
10.1	fall	545
10.2	spring	545
10.3	summer	545
10.3.1	east2	546
10.4	winter	561
10.4.1	east2	562
11	Risso's dolphin	578
11.1	fall	578
11.1.1	east2	579
11.2	spring	594
11.2.1	gomex2	595
11.3	summer	610
11.3.1	east2	611
11.3.2	gomex2	627
11.4	winter	642
11.4.1	east2	643
12	Rough-toothed dolphin	659
12.1	fall	659
12.2	spring	659
12.3	summer	659
12.3.1	gomex2	660
12.4	winter	676
13	Sperm whales	676
13.1	fall	676
13.1.1	east2	677
13.1.2	gomex2	693
13.2	spring	708
13.2.1	east2	709
13.3	summer	724
13.3.1	east2	725
13.3.2	gomex2	741
13.4	winter	756
13.4.1	east2	757
13.4.2	gomex2	773

14	Stenella attenuata	789
14.1	fall	789
14.1.1	gomex2	790
14.2	spring	805
14.2.1	gomex2	806
14.3	summer	821
14.3.1	east2	822
14.3.2	gomex2	838
14.4	winter	854
15	Stenella frontalis	854
15.1	fall	854
15.1.1	east2	855
15.1.2	gomex2	871
15.2	spring	886
15.2.1	east2	887
15.2.2	gomex2	903
15.3	summer	918
15.3.1	east2	919
15.3.2	gomex2	935
15.4	winter	950
15.4.1	east2	951
15.4.2	gomex2	967
16	Stenella species	983
16.1	fall	983
16.2	spring	983
16.3	summer	983
16.3.1	east2	984
16.3.2	gomex2	1000
16.4	winter	1016
17	Striped dolphin	1016
17.1	fall	1016
17.2	spring	1016
17.2.1	gomex2	1017
17.3	summer	1032
17.3.1	east2	1033
17.3.2	gomex2	1049
17.4	winter	1065
18	Tursiops	1065
18.1	fall	1065
18.1.1	east2	1066
18.1.2	gomex2	1082
18.1.3	ne2	1098

18.1.4	se2	1114
18.2	spring	1129
18.2.1	east2	1130
18.2.2	gomex2	1146
18.2.3	ne2	1162
18.2.4	se2	1178
18.3	summer	1193
18.3.1	east2	1194
18.3.2	gomex2	1210
18.3.3	ne2	1226
18.3.4	se2	1242
18.4	winter	1257
18.4.1	east2	1258
18.4.2	gomex2	1274
18.4.3	ne2	1290
18.4.4	se2	1306
19	Appendicies	1322
19.1	Summary of Unfitted Models	1322
19.2	Summary of Fitted Models	1324

List of Tables

List of Tables

1	Taxonomic members of the "Baleen whales" guild.	6
2	Summary for duke(6) GAM model: for 'Baleen whales' guild during 'fall' season in 'east2' region.	7
3	Summary for duke(6) GAM model: for 'Baleen whales' guild during 'spring' season in 'east2' region.	23
4	Summary for duke(6) GAM model: for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	39
5	Summary for duke(6) GAM model: for 'Baleen whales' guild during 'summer' season in 'east2' region.	55
6	Summary for duke(6) GAM model: for 'Baleen whales' guild during 'winter' season in 'east2' region.	71
7	Taxonomic members of the "Beaked whales" guild.	87
8	Summary for duke(6) GAM model: for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	88
9	Summary for duke(6) GAM model: for 'Beaked whales' guild during 'summer' season in 'east2' region.	104
10	Summary for duke(6) GAM model: for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	120
11	Summary for duke(6) GAM model: for 'Beaked whales' guild during 'winter' season in 'east2' region.	136
12	Taxonomic members of the "Delphinus" guild.	152
13	Summary for duke(6) GAM model: for 'Delphinus' guild during 'fall' season in 'east2' region.	153
14	Summary for duke(6) GAM model: for 'Delphinus' guild during 'spring' season in 'east2' region.	169
15	Summary for duke(6) GAM model: for 'Delphinus' guild during 'summer' season in 'east2' region.	185
16	Summary for duke(6) GAM model: for 'Delphinus' guild during 'winter' season in 'east2' region.	201
17	Taxonomic members of the "Harbour porpoise" guild.	217
18	Summary for duke(6) GAM model: for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	218
19	Summary for duke(6) GAM model: for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	234
20	Summary for duke(6) GAM model: for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	251
21	Summary for duke(6) GAM model: for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	267
22	Taxonomic members of the "Humpback whales" guild.	283
23	Summary for duke(6) GAM model: for 'Humpback whales' guild during 'fall' season in 'east2' region.	284

24	Summary for duke(6) GAM model: for 'Humpback whales' guild during 'spring' season in 'east2' region.	300
25	Summary for duke(6) GAM model: for 'Humpback whales' guild during 'summer' season in 'east2' region.	316
26	Summary for duke(6) GAM model: for 'Humpback whales' guild during 'winter' season in 'east2' region.	332
27	Taxonomic members of the "Killer whales" guild.	348
28	Summary for duke(6) GAM model: for 'Killer whales' guild during 'spring' season in 'gomex2' region.	349
29	Summary for duke(6) GAM model: for 'Killer whales' guild during 'summer' season in 'east2' region.	365
30	Summary for duke(6) GAM model: for 'Killer whales' guild during 'summer' season in 'gomex2' region.	381
31	Taxonomic members of the "Kogia" guild.	397
32	Summary for duke(6) GAM model: for 'Kogia' guild during 'spring' season in 'gomex2' region.	398
33	Summary for duke(6) GAM model: for 'Kogia' guild during 'summer' season in 'east2' region.	414
34	Summary for duke(6) GAM model: for 'Kogia' guild during 'summer' season in 'gomex2' region.	430
35	Taxonomic members of the "Lags" guild.	446
36	Summary for duke(6) GAM model: for 'Lags' guild during 'fall' season in 'east2' region.	447
37	Summary for duke(6) GAM model: for 'Lags' guild during 'summer' season in 'east2' region.	464
38	Taxonomic members of the "Pilot whales" guild.	480
39	Summary for duke(6) GAM model: for 'Pilot whales' guild during 'fall' season in 'east2' region.	481
40	Summary for duke(6) GAM model: for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	497
41	Summary for duke(6) GAM model: for 'Pilot whales' guild during 'summer' season in 'east2' region.	513
42	Summary for duke(6) GAM model: for 'Pilot whales' guild during 'winter' season in 'east2' region.	529
43	Taxonomic members of the "Right whales" guild.	545
44	Summary for duke(6) GAM model: for 'Right whales' guild during 'summer' season in 'east2' region.	546
45	Summary for duke(6) GAM model: for 'Right whales' guild during 'winter' season in 'east2' region.	562
46	Taxonomic members of the "Risso's dolphin" guild.	578
47	Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	579
48	Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	595

49	Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	611
50	Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	627
51	Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	643
52	Taxonomic members of the "Rough-toothed dolphin" guild.	659
53	Summary for duke(6) GAM model: for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	660
54	Taxonomic members of the "Sperm whales" guild.	676
55	Summary for duke(6) GAM model: for 'Sperm whales' guild during 'fall' season in 'east2' region.	677
56	Summary for duke(6) GAM model: for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	693
57	Summary for duke(6) GAM model: for 'Sperm whales' guild during 'spring' season in 'east2' region.	709
58	Summary for duke(6) GAM model: for 'Sperm whales' guild during 'summer' season in 'east2' region.	725
59	Summary for duke(6) GAM model: for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	741
60	Summary for duke(6) GAM model: for 'Sperm whales' guild during 'winter' season in 'east2' region.	757
61	Summary for duke(6) GAM model: for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	773
62	Taxonomic members of the "Stenella attenuata" guild.	789
63	Summary for duke(6) GAM model: for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	790
64	Summary for duke(6) GAM model: for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	806
65	Summary for duke(6) GAM model: for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	822
66	Summary for duke(6) GAM model: for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	838
67	Taxonomic members of the "Stenella frontalis" guild.	854
68	Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	855
69	Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	871
70	Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	887
71	Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	903
72	Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	919

73	Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	935
74	Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	951
75	Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	967
76	Taxonomic members of the "Stenella species" guild.	983
77	Summary for duke(6) GAM model: for 'Stenella species' guild during 'summer' season in 'east2' region.	984
78	Summary for duke(6) GAM model: for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1000
79	Taxonomic members of the "Striped dolphin" guild.	1016
80	Summary for duke(6) GAM model: for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1017
81	Summary for duke(6) GAM model: for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1033
82	Summary for duke(6) GAM model: for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1049
83	Taxonomic members of the "Tursiops" guild.	1065
84	Summary for duke(6) GAM model: for 'Tursiops' guild during 'fall' season in 'east2' region.	1066
85	Summary for duke(6) GAM model: for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1082
86	Summary for duke(6) GAM model: for 'Tursiops' guild during 'fall' season in 'ne2' region.	1098
87	Summary for duke(6) GAM model: for 'Tursiops' guild during 'fall' season in 'se2' region.	1114
88	Summary for duke(6) GAM model: for 'Tursiops' guild during 'spring' season in 'east2' region.	1130
89	Summary for duke(6) GAM model: for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1146
90	Summary for duke(6) GAM model: for 'Tursiops' guild during 'spring' season in 'ne2' region.	1162
91	Summary for duke(6) GAM model: for 'Tursiops' guild during 'spring' season in 'se2' region.	1178
92	Summary for duke(6) GAM model: for 'Tursiops' guild during 'summer' season in 'east2' region.	1194
93	Summary for duke(6) GAM model: for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1210
94	Summary for duke(6) GAM model: for 'Tursiops' guild during 'summer' season in 'ne2' region.	1226
95	Summary for duke(6) GAM model: for 'Tursiops' guild during 'summer' season in 'se2' region.	1242
96	Summary for duke(6) GAM model: for 'Tursiops' guild during 'winter' season in 'east2' region.	1258

97	Summary for duke(6) GAM model: for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1274
98	Summary for duke(6) GAM model: for 'Tursiops' guild during 'winter' season in 'ne2' region.	1290
99	Summary for duke(6) GAM model: for 'Tursiops' guild during 'winter' season in 'se2' region.	1306
100	Summary of unfitted models because of insufficient presences (ie $N < 5$) or lack of GAM model convergence.	1323
101	Summary of fitted models with sufficient presences (ie $N \geq 5$) and GAM model convergence.	1327

List of Figures

List of Figures

1	Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'fall' season in 'east2' region.	9
2	Pairs plot of input variables for 'Baleen whales' guild during 'fall' season in 'east2' region.	10
3	Density histogram of depth log(meters) for 'Baleen whales' guild during 'fall' season in 'east2' region.	11
4	Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'fall' season in 'east2' region.	12
5	Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'fall' season in 'east2' region.	13
6	Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'fall' season in 'east2' region.	14
7	Density histogram of latitude (degrees) for 'Baleen whales' guild during 'fall' season in 'east2' region.	15
8	Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'fall' season in 'east2' region.	16
9	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'fall' season in 'east2' region.	17
10	Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'fall' season in 'east2' region.	18
11	Map of effort(hours/km ²) by cell summed through time for 'Baleen whales' guild during 'fall' season in 'east2' region.	19
12	Map of mean predicted habitat for 'Baleen whales' guild during 'fall' season in 'east2' region.	20
13	Map of standard error of habitat for 'Baleen whales' guild during 'fall' season in 'east2' region.	21
14	Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'fall' season in 'east2' region.	22
15	Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'spring' season in 'east2' region.	25
16	Pairs plot of input variables for 'Baleen whales' guild during 'spring' season in 'east2' region.	26
17	Density histogram of depth log(meters) for 'Baleen whales' guild during 'spring' season in 'east2' region.	27
18	Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'spring' season in 'east2' region.	28
19	Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'spring' season in 'east2' region.	29
20	Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'spring' season in 'east2' region.	30

21	Density histogram of latitude (degrees) for 'Baleen whales' guild during 'spring' season in 'east2' region.	31
22	Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'spring' season in 'east2' region.	32
23	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'spring' season in 'east2' region.	33
24	Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'spring' season in 'east2' region.	34
25	Map of effort(hours/km ²) by cell summed through time for 'Baleen whales' guild during 'spring' season in 'east2' region.	35
26	Map of mean predicted habitat for 'Baleen whales' guild during 'spring' season in 'east2' region.	36
27	Map of standard error of habitat for 'Baleen whales' guild during 'spring' season in 'east2' region.	37
28	Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'spring' season in 'east2' region.	38
29	Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	41
30	Pairs plot of input variables for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	42
31	Density histogram of depth log(meters) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	43
32	Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	44
33	Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	45
34	Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	46
35	Density histogram of latitude (degrees) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	47
36	Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	48
37	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	49
38	Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	50
39	Map of effort(hours/km ²) by cell summed through time for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	51
40	Map of mean predicted habitat for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	52
41	Map of standard error of habitat for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	53
42	Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.	54

43	Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'summer' season in 'east2' region.	57
44	Pairs plot of input variables for 'Baleen whales' guild during 'summer' season in 'east2' region.	58
45	Density histogram of depth log(meters) for 'Baleen whales' guild during 'summer' season in 'east2' region.	59
46	Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'summer' season in 'east2' region.	60
47	Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'summer' season in 'east2' region.	61
48	Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'summer' season in 'east2' region.	62
49	Density histogram of latitude (degrees) for 'Baleen whales' guild during 'summer' season in 'east2' region.	63
50	Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'summer' season in 'east2' region.	64
51	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'summer' season in 'east2' region.	65
52	Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'summer' season in 'east2' region.	66
53	Map of effort(hours/km ²) by cell summed through time for 'Baleen whales' guild during 'summer' season in 'east2' region.	67
54	Map of mean predicted habitat for 'Baleen whales' guild during 'summer' season in 'east2' region.	68
55	Map of standard error of habitat for 'Baleen whales' guild during 'summer' season in 'east2' region.	69
56	Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'summer' season in 'east2' region.	70
57	Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'winter' season in 'east2' region.	73
58	Pairs plot of input variables for 'Baleen whales' guild during 'winter' season in 'east2' region.	74
59	Density histogram of depth log(meters) for 'Baleen whales' guild during 'winter' season in 'east2' region.	75
60	Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'winter' season in 'east2' region.	76
61	Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'winter' season in 'east2' region.	77
62	Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'winter' season in 'east2' region.	78
63	Density histogram of latitude (degrees) for 'Baleen whales' guild during 'winter' season in 'east2' region.	79
64	Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'winter' season in 'east2' region.	80

65	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'winter' season in 'east2' region.	81
66	Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'winter' season in 'east2' region.	82
67	Map of effort(hours/km ²) by cell summed through time for 'Baleen whales' guild during 'winter' season in 'east2' region.	83
68	Map of mean predicted habitat for 'Baleen whales' guild during 'winter' season in 'east2' region.	84
69	Map of standard error of habitat for 'Baleen whales' guild during 'winter' season in 'east2' region.	85
70	Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'winter' season in 'east2' region.	86
71	Map of points of observational sightings and tracks of survey effort for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	90
72	Pairs plot of input variables for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	91
73	Density histogram of depth log(meters) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	92
74	Density histogram of distance to shelf log(meters) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	93
75	Density histogram of distance to coast log(meters) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	94
76	Density histogram of sea-surface temperature (degrees C) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	95
77	Density histogram of latitude (degrees) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	96
78	Terms plot of predictors to GAM model fit for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	97
79	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	98
80	Map of presence and absence by cell summed through time for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	99
81	Map of effort(hours/km ²) by cell summed through time for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	100
82	Map of mean predicted habitat for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	101
83	Map of standard error of habitat for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	102
84	Map of binary habitat (cutoff determined by ROC) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.	103
85	Map of points of observational sightings and tracks of survey effort for 'Beaked whales' guild during 'summer' season in 'east2' region.	106
86	Pairs plot of input variables for 'Beaked whales' guild during 'summer' season in 'east2' region.	107

87	Density histogram of depth log(meters) for 'Beaked whales' guild during 'summer' season in 'east2' region.	108
88	Density histogram of distance to shelf log(meters) for 'Beaked whales' guild during 'summer' season in 'east2' region.	109
89	Density histogram of distance to coast log(meters) for 'Beaked whales' guild during 'summer' season in 'east2' region.	110
90	Density histogram of sea-surface temperature (degrees C) for 'Beaked whales' guild during 'summer' season in 'east2' region.	111
91	Density histogram of latitude (degrees) for 'Beaked whales' guild during 'summer' season in 'east2' region.	112
92	Terms plot of predictors to GAM model fit for 'Beaked whales' guild during 'summer' season in 'east2' region.	113
93	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Beaked whales' guild during 'summer' season in 'east2' region.	114
94	Map of presence and absence by cell summed through time for 'Beaked whales' guild during 'summer' season in 'east2' region.	115
95	Map of effort(hours/km ²) by cell summed through time for 'Beaked whales' guild during 'summer' season in 'east2' region.	116
96	Map of mean predicted habitat for 'Beaked whales' guild during 'summer' season in 'east2' region.	117
97	Map of standard error of habitat for 'Beaked whales' guild during 'summer' season in 'east2' region.	118
98	Map of binary habitat (cutoff determined by ROC) for 'Beaked whales' guild during 'summer' season in 'east2' region.	119
99	Map of points of observational sightings and tracks of survey effort for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	122
100	Pairs plot of input variables for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	123
101	Density histogram of depth log(meters) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	124
102	Density histogram of distance to shelf log(meters) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	125
103	Density histogram of distance to coast log(meters) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	126
104	Density histogram of sea-surface temperature (degrees C) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	127
105	Density histogram of latitude (degrees) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	128
106	Terms plot of predictors to GAM model fit for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	129
107	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	130
108	Map of presence and absence by cell summed through time for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	131

109	Map of effort(hours/km ²) by cell summed through time for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	132
110	Map of mean predicted habitat for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	133
111	Map of standard error of habitat for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	134
112	Map of binary habitat (cutoff determined by ROC) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.	135
113	Map of points of observational sightings and tracks of survey effort for 'Beaked whales' guild during 'winter' season in 'east2' region.	138
114	Pairs plot of input variables for 'Beaked whales' guild during 'winter' season in 'east2' region.	139
115	Density histogram of depth log(meters) for 'Beaked whales' guild during 'winter' season in 'east2' region.	140
116	Density histogram of distance to shelf log(meters) for 'Beaked whales' guild during 'winter' season in 'east2' region.	141
117	Density histogram of distance to coast log(meters) for 'Beaked whales' guild during 'winter' season in 'east2' region.	142
118	Density histogram of sea-surface temperature (degrees C) for 'Beaked whales' guild during 'winter' season in 'east2' region.	143
119	Density histogram of latitude (degrees) for 'Beaked whales' guild during 'winter' season in 'east2' region.	144
120	Terms plot of predictors to GAM model fit for 'Beaked whales' guild during 'winter' season in 'east2' region.	145
121	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Beaked whales' guild during 'winter' season in 'east2' region.	146
122	Map of presence and absence by cell summed through time for 'Beaked whales' guild during 'winter' season in 'east2' region.	147
123	Map of effort(hours/km ²) by cell summed through time for 'Beaked whales' guild during 'winter' season in 'east2' region.	148
124	Map of mean predicted habitat for 'Beaked whales' guild during 'winter' season in 'east2' region.	149
125	Map of standard error of habitat for 'Beaked whales' guild during 'winter' season in 'east2' region.	150
126	Map of binary habitat (cutoff determined by ROC) for 'Beaked whales' guild during 'winter' season in 'east2' region.	151
127	Map of points of observational sightings and tracks of survey effort for 'Delphinus' guild during 'fall' season in 'east2' region.	155
128	Pairs plot of input variables for 'Delphinus' guild during 'fall' season in 'east2' region.	156
129	Density histogram of depth log(meters) for 'Delphinus' guild during 'fall' season in 'east2' region.	157
130	Density histogram of distance to shelf log(meters) for 'Delphinus' guild during 'fall' season in 'east2' region.	158
131	Density histogram of distance to coast log(meters) for 'Delphinus' guild during 'fall' season in 'east2' region.	159

132	Density histogram of sea-surface temperature (degrees C) for 'Delphinus' guild during 'fall' season in 'east2' region.	160
133	Density histogram of latitude (degrees) for 'Delphinus' guild during 'fall' season in 'east2' region.	161
134	Terms plot of predictors to GAM model fit for 'Delphinus' guild during 'fall' season in 'east2' region.	162
135	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Delphinus' guild during 'fall' season in 'east2' region.	163
136	Map of presence and absence by cell summed through time for 'Delphinus' guild during 'fall' season in 'east2' region.	164
137	Map of effort(hours/km ²) by cell summed through time for 'Delphinus' guild during 'fall' season in 'east2' region.	165
138	Map of mean predicted habitat for 'Delphinus' guild during 'fall' season in 'east2' region.	166
139	Map of standard error of habitat for 'Delphinus' guild during 'fall' season in 'east2' region.	167
140	Map of binary habitat (cutoff determined by ROC) for 'Delphinus' guild during 'fall' season in 'east2' region.	168
141	Map of points of observational sightings and tracks of survey effort for 'Delphinus' guild during 'spring' season in 'east2' region.	171
142	Pairs plot of input variables for 'Delphinus' guild during 'spring' season in 'east2' region.	172
143	Density histogram of depth log(meters) for 'Delphinus' guild during 'spring' season in 'east2' region.	173
144	Density histogram of distance to shelf log(meters) for 'Delphinus' guild during 'spring' season in 'east2' region.	174
145	Density histogram of distance to coast log(meters) for 'Delphinus' guild during 'spring' season in 'east2' region.	175
146	Density histogram of sea-surface temperature (degrees C) for 'Delphinus' guild during 'spring' season in 'east2' region.	176
147	Density histogram of latitude (degrees) for 'Delphinus' guild during 'spring' season in 'east2' region.	177
148	Terms plot of predictors to GAM model fit for 'Delphinus' guild during 'spring' season in 'east2' region.	178
149	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Delphinus' guild during 'spring' season in 'east2' region.	179
150	Map of presence and absence by cell summed through time for 'Delphinus' guild during 'spring' season in 'east2' region.	180
151	Map of effort(hours/km ²) by cell summed through time for 'Delphinus' guild during 'spring' season in 'east2' region.	181
152	Map of mean predicted habitat for 'Delphinus' guild during 'spring' season in 'east2' region.	182
153	Map of standard error of habitat for 'Delphinus' guild during 'spring' season in 'east2' region.	183

154	Map of binary habitat (cutoff determined by ROC) for 'Delphinus' guild during 'spring' season in 'east2' region.	184
155	Map of points of observational sightings and tracks of survey effort for 'Delphinus' guild during 'summer' season in 'east2' region.	187
156	Pairs plot of input variables for 'Delphinus' guild during 'summer' season in 'east2' region.	188
157	Density histogram of depth log(meters) for 'Delphinus' guild during 'summer' season in 'east2' region.	189
158	Density histogram of distance to shelf log(meters) for 'Delphinus' guild during 'summer' season in 'east2' region.	190
159	Density histogram of distance to coast log(meters) for 'Delphinus' guild during 'summer' season in 'east2' region.	191
160	Density histogram of sea-surface temperature (degrees C) for 'Delphinus' guild during 'summer' season in 'east2' region.	192
161	Density histogram of latitude (degrees) for 'Delphinus' guild during 'summer' season in 'east2' region.	193
162	Terms plot of predictors to GAM model fit for 'Delphinus' guild during 'summer' season in 'east2' region.	194
163	Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Delphinus' guild during 'summer' season in 'east2' region.	195
164	Map of presence and absence by cell summed through time for 'Delphinus' guild during 'summer' season in 'east2' region.	196
165	Map of effort(hours/km ²) by cell summed through time for 'Delphinus' guild during 'summer' season in 'east2' region.	197
166	Map of mean predicted habitat for 'Delphinus' guild during 'summer' season in 'east2' region.	198
167	Map of standard error of habitat for 'Delphinus' guild during 'summer' season in 'east2' region.	199
168	Map of binary habitat (cutoff determined by ROC) for 'Delphinus' guild during 'summer' season in 'east2' region.	200
169	Map of points of observational sightings and tracks of survey effort for 'Delphinus' guild during 'winter' season in 'east2' region.	203
170	Pairs plot of input variables for 'Delphinus' guild during 'winter' season in 'east2' region.	204
171	Density histogram of depth log(meters) for 'Delphinus' guild during 'winter' season in 'east2' region.	205
172	Density histogram of distance to shelf log(meters) for 'Delphinus' guild during 'winter' season in 'east2' region.	206
173	Density histogram of distance to coast log(meters) for 'Delphinus' guild during 'winter' season in 'east2' region.	207
174	Density histogram of sea-surface temperature (degrees C) for 'Delphinus' guild during 'winter' season in 'east2' region.	208
175	Density histogram of latitude (degrees) for 'Delphinus' guild during 'winter' season in 'east2' region.	209

176	Terms plot of predictors to GAM model fit for 'Delphinus' guild during 'winter' season in 'east2' region.	210
177	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Delphinus' guild during 'winter' season in 'east2' region.	211
178	Map of presence and absence by cell summed through time for 'Delphinus' guild during 'winter' season in 'east2' region.	212
179	Map of effort(hours/km ²) by cell summed through time for 'Delphinus' guild during 'winter' season in 'east2' region.	213
180	Map of mean predicted habitat for 'Delphinus' guild during 'winter' season in 'east2' region.	214
181	Map of standard error of habitat for 'Delphinus' guild during 'winter' season in 'east2' region.	215
182	Map of binary habitat (cutoff determined by ROC) for 'Delphinus' guild during 'winter' season in 'east2' region.	216
183	Map of points of observational sightings and tracks of survey effort for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	220
184	Pairs plot of input variables for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	221
185	Density histogram of depth log(meters) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	222
186	Density histogram of distance to shelf log(meters) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	223
187	Density histogram of distance to coast log(meters) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	224
188	Density histogram of sea-surface temperature (degrees C) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	225
189	Density histogram of latitude (degrees) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	226
190	Terms plot of predictors to GAM model fit for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	227
191	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	228
192	Map of presence and absence by cell summed through time for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	229
193	Map of effort(hours/km ²) by cell summed through time for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	230
194	Map of mean predicted habitat for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	231
195	Map of standard error of habitat for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	232
196	Map of binary habitat (cutoff determined by ROC) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.	233
197	Map of points of observational sightings and tracks of survey effort for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	236

198	Pairs plot of input variables for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	237
199	Density histogram of depth log(meters) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	238
200	Density histogram of distance to shelf log(meters) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	239
201	Density histogram of distance to coast log(meters) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	240
202	Density histogram of sea-surface temperature (degrees C) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	241
203	Density histogram of latitude (degrees) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	242
204	Terms plot of predictors to GAM model fit for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	243
205	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	244
206	Map of presence and absence by cell summed through time for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	245
207	Map of effort(hours/km ²) by cell summed through time for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	246
208	Map of mean predicted habitat for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	247
209	Map of standard error of habitat for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	248
210	Map of binary habitat (cutoff determined by ROC) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.	249
211	Map of points of observational sightings and tracks of survey effort for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	253
212	Pairs plot of input variables for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	254
213	Density histogram of depth log(meters) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	255
214	Density histogram of distance to shelf log(meters) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	256
215	Density histogram of distance to coast log(meters) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	257
216	Density histogram of sea-surface temperature (degrees C) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	258
217	Density histogram of latitude (degrees) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	259
218	Terms plot of predictors to GAM model fit for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	260
219	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	261

220	Map of presence and absence by cell summed through time for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	262
221	Map of effort(hours/km ²) by cell summed through time for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	263
222	Map of mean predicted habitat for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	264
223	Map of standard error of habitat for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	265
224	Map of binary habitat (cutoff determined by ROC) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.	266
225	Map of points of observational sightings and tracks of survey effort for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	269
226	Pairs plot of input variables for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	270
227	Density histogram of depth log(meters) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	271
228	Density histogram of distance to shelf log(meters) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	272
229	Density histogram of distance to coast log(meters) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	273
230	Density histogram of sea-surface temperature (degrees C) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	274
231	Density histogram of latitude (degrees) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	275
232	Terms plot of predictors to GAM model fit for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	276
233	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	277
234	Map of presence and absence by cell summed through time for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	278
235	Map of effort(hours/km ²) by cell summed through time for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	279
236	Map of mean predicted habitat for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	280
237	Map of standard error of habitat for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	281
238	Map of binary habitat (cutoff determined by ROC) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.	282
239	Map of points of observational sightings and tracks of survey effort for 'Humpback whales' guild during 'fall' season in 'east2' region.	286
240	Pairs plot of input variables for 'Humpback whales' guild during 'fall' season in 'east2' region.	287
241	Density histogram of depth log(meters) for 'Humpback whales' guild during 'fall' season in 'east2' region.	288

242	Density histogram of distance to shelf log(meters) for 'Humpback whales' guild during 'fall' season in 'east2' region.	289
243	Density histogram of distance to coast log(meters) for 'Humpback whales' guild during 'fall' season in 'east2' region.	290
244	Density histogram of sea-surface temperature (degrees C) for 'Humpback whales' guild during 'fall' season in 'east2' region.	291
245	Density histogram of latitude (degrees) for 'Humpback whales' guild during 'fall' season in 'east2' region.	292
246	Terms plot of predictors to GAM model fit for 'Humpback whales' guild during 'fall' season in 'east2' region.	293
247	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Humpback whales' guild during 'fall' season in 'east2' region.	294
248	Map of presence and absence by cell summed through time for 'Humpback whales' guild during 'fall' season in 'east2' region.	295
249	Map of effort(hours/km ²) by cell summed through time for 'Humpback whales' guild during 'fall' season in 'east2' region.	296
250	Map of mean predicted habitat for 'Humpback whales' guild during 'fall' season in 'east2' region.	297
251	Map of standard error of habitat for 'Humpback whales' guild during 'fall' season in 'east2' region.	298
252	Map of binary habitat (cutoff determined by ROC) for 'Humpback whales' guild during 'fall' season in 'east2' region.	299
253	Map of points of observational sightings and tracks of survey effort for 'Humpback whales' guild during 'spring' season in 'east2' region.	302
254	Pairs plot of input variables for 'Humpback whales' guild during 'spring' season in 'east2' region.	303
255	Density histogram of depth log(meters) for 'Humpback whales' guild during 'spring' season in 'east2' region.	304
256	Density histogram of distance to shelf log(meters) for 'Humpback whales' guild during 'spring' season in 'east2' region.	305
257	Density histogram of distance to coast log(meters) for 'Humpback whales' guild during 'spring' season in 'east2' region.	306
258	Density histogram of sea-surface temperature (degrees C) for 'Humpback whales' guild during 'spring' season in 'east2' region.	307
259	Density histogram of latitude (degrees) for 'Humpback whales' guild during 'spring' season in 'east2' region.	308
260	Terms plot of predictors to GAM model fit for 'Humpback whales' guild during 'spring' season in 'east2' region.	309
261	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Humpback whales' guild during 'spring' season in 'east2' region.	310
262	Map of presence and absence by cell summed through time for 'Humpback whales' guild during 'spring' season in 'east2' region.	311
263	Map of effort(hours/km ²) by cell summed through time for 'Humpback whales' guild during 'spring' season in 'east2' region.	312

264	Map of mean predicted habitat for 'Humpback whales' guild during 'spring' season in 'east2' region.	313
265	Map of standard error of habitat for 'Humpback whales' guild during 'spring' season in 'east2' region.	314
266	Map of binary habitat (cutoff determined by ROC) for 'Humpback whales' guild during 'spring' season in 'east2' region.	315
267	Map of points of observational sightings and tracks of survey effort for 'Humpback whales' guild during 'summer' season in 'east2' region.	318
268	Pairs plot of input variables for 'Humpback whales' guild during 'summer' season in 'east2' region.	319
269	Density histogram of depth log(meters) for 'Humpback whales' guild during 'summer' season in 'east2' region.	320
270	Density histogram of distance to shelf log(meters) for 'Humpback whales' guild during 'summer' season in 'east2' region.	321
271	Density histogram of distance to coast log(meters) for 'Humpback whales' guild during 'summer' season in 'east2' region.	322
272	Density histogram of sea-surface temperature (degrees C) for 'Humpback whales' guild during 'summer' season in 'east2' region.	323
273	Density histogram of latitude (degrees) for 'Humpback whales' guild during 'summer' season in 'east2' region.	324
274	Terms plot of predictors to GAM model fit for 'Humpback whales' guild during 'summer' season in 'east2' region.	325
275	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Humpback whales' guild during 'summer' season in 'east2' region.	326
276	Map of presence and absence by cell summed through time for 'Humpback whales' guild during 'summer' season in 'east2' region.	327
277	Map of effort(hours/km ²) by cell summed through time for 'Humpback whales' guild during 'summer' season in 'east2' region.	328
278	Map of mean predicted habitat for 'Humpback whales' guild during 'summer' season in 'east2' region.	329
279	Map of standard error of habitat for 'Humpback whales' guild during 'summer' season in 'east2' region.	330
280	Map of binary habitat (cutoff determined by ROC) for 'Humpback whales' guild during 'summer' season in 'east2' region.	331
281	Map of points of observational sightings and tracks of survey effort for 'Humpback whales' guild during 'winter' season in 'east2' region.	334
282	Pairs plot of input variables for 'Humpback whales' guild during 'winter' season in 'east2' region.	335
283	Density histogram of depth log(meters) for 'Humpback whales' guild during 'winter' season in 'east2' region.	336
284	Density histogram of distance to shelf log(meters) for 'Humpback whales' guild during 'winter' season in 'east2' region.	337
285	Density histogram of distance to coast log(meters) for 'Humpback whales' guild during 'winter' season in 'east2' region.	338

286	Density histogram of sea-surface temperature (degrees C) for 'Humpback whales' guild during 'winter' season in 'east2' region.	339
287	Density histogram of latitude (degrees) for 'Humpback whales' guild during 'winter' season in 'east2' region.	340
288	Terms plot of predictors to GAM model fit for 'Humpback whales' guild during 'winter' season in 'east2' region.	341
289	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Humpback whales' guild during 'winter' season in 'east2' region.	342
290	Map of presence and absence by cell summed through time for 'Humpback whales' guild during 'winter' season in 'east2' region.	343
291	Map of effort(hours/km ²) by cell summed through time for 'Humpback whales' guild during 'winter' season in 'east2' region.	344
292	Map of mean predicted habitat for 'Humpback whales' guild during 'winter' season in 'east2' region.	345
293	Map of standard error of habitat for 'Humpback whales' guild during 'winter' season in 'east2' region.	346
294	Map of binary habitat (cutoff determined by ROC) for 'Humpback whales' guild during 'winter' season in 'east2' region.	347
295	Map of points of observational sightings and tracks of survey effort for 'Killer whales' guild during 'spring' season in 'gomex2' region.	351
296	Pairs plot of input variables for 'Killer whales' guild during 'spring' season in 'gomex2' region.	352
297	Density histogram of depth log(meters) for 'Killer whales' guild during 'spring' season in 'gomex2' region.	353
298	Density histogram of distance to shelf log(meters) for 'Killer whales' guild during 'spring' season in 'gomex2' region.	354
299	Density histogram of distance to coast log(meters) for 'Killer whales' guild during 'spring' season in 'gomex2' region.	355
300	Density histogram of sea-surface temperature (degrees C) for 'Killer whales' guild during 'spring' season in 'gomex2' region.	356
301	Density histogram of latitude (degrees) for 'Killer whales' guild during 'spring' season in 'gomex2' region.	357
302	Terms plot of predictors to GAM model fit for 'Killer whales' guild during 'spring' season in 'gomex2' region.	358
303	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Killer whales' guild during 'spring' season in 'gomex2' region.	359
304	Map of presence and absence by cell summed through time for 'Killer whales' guild during 'spring' season in 'gomex2' region.	360
305	Map of effort(hours/km ²) by cell summed through time for 'Killer whales' guild during 'spring' season in 'gomex2' region.	361
306	Map of mean predicted habitat for 'Killer whales' guild during 'spring' season in 'gomex2' region.	362
307	Map of standard error of habitat for 'Killer whales' guild during 'spring' season in 'gomex2' region.	363

308	Map of binary habitat (cutoff determined by ROC) for 'Killer whales' guild during 'spring' season in 'gomex2' region.	364
309	Map of points of observational sightings and tracks of survey effort for 'Killer whales' guild during 'summer' season in 'east2' region.	367
310	Pairs plot of input variables for 'Killer whales' guild during 'summer' season in 'east2' region.	368
311	Density histogram of depth log(meters) for 'Killer whales' guild during 'summer' season in 'east2' region.	369
312	Density histogram of distance to shelf log(meters) for 'Killer whales' guild during 'summer' season in 'east2' region.	370
313	Density histogram of distance to coast log(meters) for 'Killer whales' guild during 'summer' season in 'east2' region.	371
314	Density histogram of sea-surface temperature (degrees C) for 'Killer whales' guild during 'summer' season in 'east2' region.	372
315	Density histogram of latitude (degrees) for 'Killer whales' guild during 'summer' season in 'east2' region.	373
316	Terms plot of predictors to GAM model fit for 'Killer whales' guild during 'summer' season in 'east2' region.	374
317	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Killer whales' guild during 'summer' season in 'east2' region.	375
318	Map of presence and absence by cell summed through time for 'Killer whales' guild during 'summer' season in 'east2' region.	376
319	Map of effort(hours/km ²) by cell summed through time for 'Killer whales' guild during 'summer' season in 'east2' region.	377
320	Map of mean predicted habitat for 'Killer whales' guild during 'summer' season in 'east2' region.	378
321	Map of standard error of habitat for 'Killer whales' guild during 'summer' season in 'east2' region.	379
322	Map of binary habitat (cutoff determined by ROC) for 'Killer whales' guild during 'summer' season in 'east2' region.	380
323	Map of points of observational sightings and tracks of survey effort for 'Killer whales' guild during 'summer' season in 'gomex2' region.	383
324	Pairs plot of input variables for 'Killer whales' guild during 'summer' season in 'gomex2' region.	384
325	Density histogram of depth log(meters) for 'Killer whales' guild during 'summer' season in 'gomex2' region.	385
326	Density histogram of distance to shelf log(meters) for 'Killer whales' guild during 'summer' season in 'gomex2' region.	386
327	Density histogram of distance to coast log(meters) for 'Killer whales' guild during 'summer' season in 'gomex2' region.	387
328	Density histogram of sea-surface temperature (degrees C) for 'Killer whales' guild during 'summer' season in 'gomex2' region.	388
329	Density histogram of latitude (degrees) for 'Killer whales' guild during 'summer' season in 'gomex2' region.	389

330	Terms plot of predictors to GAM model fit for 'Killer whales' guild during 'summer' season in 'gomex2' region.	390
331	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Killer whales' guild during 'summer' season in 'gomex2' region.	391
332	Map of presence and absence by cell summed through time for 'Killer whales' guild during 'summer' season in 'gomex2' region.	392
333	Map of effort(hours/km ²) by cell summed through time for 'Killer whales' guild during 'summer' season in 'gomex2' region.	393
334	Map of mean predicted habitat for 'Killer whales' guild during 'summer' season in 'gomex2' region.	394
335	Map of standard error of habitat for 'Killer whales' guild during 'summer' season in 'gomex2' region.	395
336	Map of binary habitat (cutoff determined by ROC) for 'Killer whales' guild during 'summer' season in 'gomex2' region.	396
337	Map of points of observational sightings and tracks of survey effort for 'Kogia' guild during 'spring' season in 'gomex2' region.	400
338	Pairs plot of input variables for 'Kogia' guild during 'spring' season in 'gomex2' region.	401
339	Density histogram of depth log(meters) for 'Kogia' guild during 'spring' season in 'gomex2' region.	402
340	Density histogram of distance to shelf log(meters) for 'Kogia' guild during 'spring' season in 'gomex2' region.	403
341	Density histogram of distance to coast log(meters) for 'Kogia' guild during 'spring' season in 'gomex2' region.	404
342	Density histogram of sea-surface temperature (degrees C) for 'Kogia' guild during 'spring' season in 'gomex2' region.	405
343	Density histogram of latitude (degrees) for 'Kogia' guild during 'spring' season in 'gomex2' region.	406
344	Terms plot of predictors to GAM model fit for 'Kogia' guild during 'spring' season in 'gomex2' region.	407
345	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Kogia' guild during 'spring' season in 'gomex2' region.	408
346	Map of presence and absence by cell summed through time for 'Kogia' guild during 'spring' season in 'gomex2' region.	409
347	Map of effort(hours/km ²) by cell summed through time for 'Kogia' guild during 'spring' season in 'gomex2' region.	410
348	Map of mean predicted habitat for 'Kogia' guild during 'spring' season in 'gomex2' region.	411
349	Map of standard error of habitat for 'Kogia' guild during 'spring' season in 'gomex2' region.	412
350	Map of binary habitat (cutoff determined by ROC) for 'Kogia' guild during 'spring' season in 'gomex2' region.	413
351	Map of points of observational sightings and tracks of survey effort for 'Kogia' guild during 'summer' season in 'east2' region.	416
352	Pairs plot of input variables for 'Kogia' guild during 'summer' season in 'east2' region.	417

353	Density histogram of depth log(meters) for 'Kogia' guild during 'summer' season in 'east2' region.	418
354	Density histogram of distance to shelf log(meters) for 'Kogia' guild during 'summer' season in 'east2' region.	419
355	Density histogram of distance to coast log(meters) for 'Kogia' guild during 'summer' season in 'east2' region.	420
356	Density histogram of sea-surface temperature (degrees C) for 'Kogia' guild during 'summer' season in 'east2' region.	421
357	Density histogram of latitude (degrees) for 'Kogia' guild during 'summer' season in 'east2' region.	422
358	Terms plot of predictors to GAM model fit for 'Kogia' guild during 'summer' season in 'east2' region.	423
359	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Kogia' guild during 'summer' season in 'east2' region.	424
360	Map of presence and absence by cell summed through time for 'Kogia' guild during 'summer' season in 'east2' region.	425
361	Map of effort(hours/km ²) by cell summed through time for 'Kogia' guild during 'summer' season in 'east2' region.	426
362	Map of mean predicted habitat for 'Kogia' guild during 'summer' season in 'east2' region.	427
363	Map of standard error of habitat for 'Kogia' guild during 'summer' season in 'east2' region.	428
364	Map of binary habitat (cutoff determined by ROC) for 'Kogia' guild during 'summer' season in 'east2' region.	429
365	Map of points of observational sightings and tracks of survey effort for 'Kogia' guild during 'summer' season in 'gomex2' region.	432
366	Pairs plot of input variables for 'Kogia' guild during 'summer' season in 'gomex2' region.	433
367	Density histogram of depth log(meters) for 'Kogia' guild during 'summer' season in 'gomex2' region.	434
368	Density histogram of distance to shelf log(meters) for 'Kogia' guild during 'summer' season in 'gomex2' region.	435
369	Density histogram of distance to coast log(meters) for 'Kogia' guild during 'summer' season in 'gomex2' region.	436
370	Density histogram of sea-surface temperature (degrees C) for 'Kogia' guild during 'summer' season in 'gomex2' region.	437
371	Density histogram of latitude (degrees) for 'Kogia' guild during 'summer' season in 'gomex2' region.	438
372	Terms plot of predictors to GAM model fit for 'Kogia' guild during 'summer' season in 'gomex2' region.	439
373	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Kogia' guild during 'summer' season in 'gomex2' region.	440
374	Map of presence and absence by cell summed through time for 'Kogia' guild during 'summer' season in 'gomex2' region.	441

375	Map of effort(hours/km ²) by cell summed through time for 'Kogia' guild during 'summer' season in 'gomex2' region.	442
376	Map of mean predicted habitat for 'Kogia' guild during 'summer' season in 'gomex2' region.	443
377	Map of standard error of habitat for 'Kogia' guild during 'summer' season in 'gomex2' region.	444
378	Map of binary habitat (cutoff determined by ROC) for 'Kogia' guild during 'summer' season in 'gomex2' region.	445
379	Map of points of observational sightings and tracks of survey effort for 'Lags' guild during 'fall' season in 'east2' region.	449
380	Pairs plot of input variables for 'Lags' guild during 'fall' season in 'east2' region.	450
381	Density histogram of depth log(meters) for 'Lags' guild during 'fall' season in 'east2' region.	451
382	Density histogram of distance to shelf log(meters) for 'Lags' guild during 'fall' season in 'east2' region.	452
383	Density histogram of distance to coast log(meters) for 'Lags' guild during 'fall' season in 'east2' region.	453
384	Density histogram of sea-surface temperature (degrees C) for 'Lags' guild during 'fall' season in 'east2' region.	454
385	Density histogram of latitude (degrees) for 'Lags' guild during 'fall' season in 'east2' region.	455
386	Terms plot of predictors to GAM model fit for 'Lags' guild during 'fall' season in 'east2' region.	456
387	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Lags' guild during 'fall' season in 'east2' region.	457
388	Map of presence and absence by cell summed through time for 'Lags' guild during 'fall' season in 'east2' region.	458
389	Map of effort(hours/km ²) by cell summed through time for 'Lags' guild during 'fall' season in 'east2' region.	459
390	Map of mean predicted habitat for 'Lags' guild during 'fall' season in 'east2' region.	460
391	Map of standard error of habitat for 'Lags' guild during 'fall' season in 'east2' region.	461
392	Map of binary habitat (cutoff determined by ROC) for 'Lags' guild during 'fall' season in 'east2' region.	462
393	Map of points of observational sightings and tracks of survey effort for 'Lags' guild during 'summer' season in 'east2' region.	466
394	Pairs plot of input variables for 'Lags' guild during 'summer' season in 'east2' region.	467
395	Density histogram of depth log(meters) for 'Lags' guild during 'summer' season in 'east2' region.	468
396	Density histogram of distance to shelf log(meters) for 'Lags' guild during 'summer' season in 'east2' region.	469
397	Density histogram of distance to coast log(meters) for 'Lags' guild during 'summer' season in 'east2' region.	470
398	Density histogram of sea-surface temperature (degrees C) for 'Lags' guild during 'summer' season in 'east2' region.	471

399	Density histogram of latitude (degrees) for 'Lags' guild during 'summer' season in 'east2' region.	472
400	Terms plot of predictors to GAM model fit for 'Lags' guild during 'summer' season in 'east2' region.	473
401	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Lags' guild during 'summer' season in 'east2' region.	474
402	Map of presence and absence by cell summed through time for 'Lags' guild during 'summer' season in 'east2' region.	475
403	Map of effort(hours/km ²) by cell summed through time for 'Lags' guild during 'summer' season in 'east2' region.	476
404	Map of mean predicted habitat for 'Lags' guild during 'summer' season in 'east2' region.	477
405	Map of standard error of habitat for 'Lags' guild during 'summer' season in 'east2' region.	478
406	Map of binary habitat (cutoff determined by ROC) for 'Lags' guild during 'summer' season in 'east2' region.	479
407	Map of points of observational sightings and tracks of survey effort for 'Pilot whales' guild during 'fall' season in 'east2' region.	483
408	Pairs plot of input variables for 'Pilot whales' guild during 'fall' season in 'east2' region.	484
409	Density histogram of depth log(meters) for 'Pilot whales' guild during 'fall' season in 'east2' region.	485
410	Density histogram of distance to shelf log(meters) for 'Pilot whales' guild during 'fall' season in 'east2' region.	486
411	Density histogram of distance to coast log(meters) for 'Pilot whales' guild during 'fall' season in 'east2' region.	487
412	Density histogram of sea-surface temperature (degrees C) for 'Pilot whales' guild during 'fall' season in 'east2' region.	488
413	Density histogram of latitude (degrees) for 'Pilot whales' guild during 'fall' season in 'east2' region.	489
414	Terms plot of predictors to GAM model fit for 'Pilot whales' guild during 'fall' season in 'east2' region.	490
415	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Pilot whales' guild during 'fall' season in 'east2' region.	491
416	Map of presence and absence by cell summed through time for 'Pilot whales' guild during 'fall' season in 'east2' region.	492
417	Map of effort(hours/km ²) by cell summed through time for 'Pilot whales' guild during 'fall' season in 'east2' region.	493
418	Map of mean predicted habitat for 'Pilot whales' guild during 'fall' season in 'east2' region.	494
419	Map of standard error of habitat for 'Pilot whales' guild during 'fall' season in 'east2' region.	495
420	Map of binary habitat (cutoff determined by ROC) for 'Pilot whales' guild during 'fall' season in 'east2' region.	496

421	Map of points of observational sightings and tracks of survey effort for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	499
422	Pairs plot of input variables for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	500
423	Density histogram of depth log(meters) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	501
424	Density histogram of distance to shelf log(meters) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	502
425	Density histogram of distance to coast log(meters) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	503
426	Density histogram of sea-surface temperature (degrees C) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	504
427	Density histogram of latitude (degrees) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	505
428	Terms plot of predictors to GAM model fit for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	506
429	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	507
430	Map of presence and absence by cell summed through time for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	508
431	Map of effort(hours/km ²) by cell summed through time for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	509
432	Map of mean predicted habitat for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	510
433	Map of standard error of habitat for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	511
434	Map of binary habitat (cutoff determined by ROC) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.	512
435	Map of points of observational sightings and tracks of survey effort for 'Pilot whales' guild during 'summer' season in 'east2' region.	515
436	Pairs plot of input variables for 'Pilot whales' guild during 'summer' season in 'east2' region.	516
437	Density histogram of depth log(meters) for 'Pilot whales' guild during 'summer' season in 'east2' region.	517
438	Density histogram of distance to shelf log(meters) for 'Pilot whales' guild during 'summer' season in 'east2' region.	518
439	Density histogram of distance to coast log(meters) for 'Pilot whales' guild during 'summer' season in 'east2' region.	519
440	Density histogram of sea-surface temperature (degrees C) for 'Pilot whales' guild during 'summer' season in 'east2' region.	520
441	Density histogram of latitude (degrees) for 'Pilot whales' guild during 'summer' season in 'east2' region.	521
442	Terms plot of predictors to GAM model fit for 'Pilot whales' guild during 'summer' season in 'east2' region.	522

443	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Pilot whales' guild during 'summer' season in 'east2' region.	523
444	Map of presence and absence by cell summed through time for 'Pilot whales' guild during 'summer' season in 'east2' region.	524
445	Map of effort(hours/km ²) by cell summed through time for 'Pilot whales' guild during 'summer' season in 'east2' region.	525
446	Map of mean predicted habitat for 'Pilot whales' guild during 'summer' season in 'east2' region.	526
447	Map of standard error of habitat for 'Pilot whales' guild during 'summer' season in 'east2' region.	527
448	Map of binary habitat (cutoff determined by ROC) for 'Pilot whales' guild during 'summer' season in 'east2' region.	528
449	Map of points of observational sightings and tracks of survey effort for 'Pilot whales' guild during 'winter' season in 'east2' region.	531
450	Pairs plot of input variables for 'Pilot whales' guild during 'winter' season in 'east2' region.	532
451	Density histogram of depth log(meters) for 'Pilot whales' guild during 'winter' season in 'east2' region.	533
452	Density histogram of distance to shelf log(meters) for 'Pilot whales' guild during 'winter' season in 'east2' region.	534
453	Density histogram of distance to coast log(meters) for 'Pilot whales' guild during 'winter' season in 'east2' region.	535
454	Density histogram of sea-surface temperature (degrees C) for 'Pilot whales' guild during 'winter' season in 'east2' region.	536
455	Density histogram of latitude (degrees) for 'Pilot whales' guild during 'winter' season in 'east2' region.	537
456	Terms plot of predictors to GAM model fit for 'Pilot whales' guild during 'winter' season in 'east2' region.	538
457	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Pilot whales' guild during 'winter' season in 'east2' region.	539
458	Map of presence and absence by cell summed through time for 'Pilot whales' guild during 'winter' season in 'east2' region.	540
459	Map of effort(hours/km ²) by cell summed through time for 'Pilot whales' guild during 'winter' season in 'east2' region.	541
460	Map of mean predicted habitat for 'Pilot whales' guild during 'winter' season in 'east2' region.	542
461	Map of standard error of habitat for 'Pilot whales' guild during 'winter' season in 'east2' region.	543
462	Map of binary habitat (cutoff determined by ROC) for 'Pilot whales' guild during 'winter' season in 'east2' region.	544
463	Map of points of observational sightings and tracks of survey effort for 'Right whales' guild during 'summer' season in 'east2' region.	548
464	Pairs plot of input variables for 'Right whales' guild during 'summer' season in 'east2' region.	549

465	Density histogram of depth log(meters) for 'Right whales' guild during 'summer' season in 'east2' region.	550
466	Density histogram of distance to shelf log(meters) for 'Right whales' guild during 'summer' season in 'east2' region.	551
467	Density histogram of distance to coast log(meters) for 'Right whales' guild during 'summer' season in 'east2' region.	552
468	Density histogram of sea-surface temperature (degrees C) for 'Right whales' guild during 'summer' season in 'east2' region.	553
469	Density histogram of latitude (degrees) for 'Right whales' guild during 'summer' season in 'east2' region.	554
470	Terms plot of predictors to GAM model fit for 'Right whales' guild during 'summer' season in 'east2' region.	555
471	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Right whales' guild during 'summer' season in 'east2' region.	556
472	Map of presence and absence by cell summed through time for 'Right whales' guild during 'summer' season in 'east2' region.	557
473	Map of effort(hours/km ²) by cell summed through time for 'Right whales' guild during 'summer' season in 'east2' region.	558
474	Map of mean predicted habitat for 'Right whales' guild during 'summer' season in 'east2' region.	559
475	Map of standard error of habitat for 'Right whales' guild during 'summer' season in 'east2' region.	560
476	Map of binary habitat (cutoff determined by ROC) for 'Right whales' guild during 'summer' season in 'east2' region.	561
477	Map of points of observational sightings and tracks of survey effort for 'Right whales' guild during 'winter' season in 'east2' region.	564
478	Pairs plot of input variables for 'Right whales' guild during 'winter' season in 'east2' region.	565
479	Density histogram of depth log(meters) for 'Right whales' guild during 'winter' season in 'east2' region.	566
480	Density histogram of distance to shelf log(meters) for 'Right whales' guild during 'winter' season in 'east2' region.	567
481	Density histogram of distance to coast log(meters) for 'Right whales' guild during 'winter' season in 'east2' region.	568
482	Density histogram of sea-surface temperature (degrees C) for 'Right whales' guild during 'winter' season in 'east2' region.	569
483	Density histogram of latitude (degrees) for 'Right whales' guild during 'winter' season in 'east2' region.	570
484	Terms plot of predictors to GAM model fit for 'Right whales' guild during 'winter' season in 'east2' region.	571
485	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Right whales' guild during 'winter' season in 'east2' region.	572
486	Map of presence and absence by cell summed through time for 'Right whales' guild during 'winter' season in 'east2' region.	573

487	Map of effort(hours/km ²) by cell summed through time for 'Right whales' guild during 'winter' season in 'east2' region.	574
488	Map of mean predicted habitat for 'Right whales' guild during 'winter' season in 'east2' region.	575
489	Map of standard error of habitat for 'Right whales' guild during 'winter' season in 'east2' region.	576
490	Map of binary habitat (cutoff determined by ROC) for 'Right whales' guild during 'winter' season in 'east2' region.	577
491	Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	581
492	Pairs plot of input variables for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	582
493	Density histogram of depth log(meters) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	583
494	Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	584
495	Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	585
496	Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	586
497	Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	587
498	Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	588
499	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	589
500	Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	590
501	Map of effort(hours/km ²) by cell summed through time for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	591
502	Map of mean predicted habitat for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	592
503	Map of standard error of habitat for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	593
504	Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.	594
505	Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	597
506	Pairs plot of input variables for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	598
507	Density histogram of depth log(meters) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	599
508	Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	600

509	Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	601
510	Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	602
511	Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	603
512	Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	604
513	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	605
514	Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	606
515	Map of effort(hours/km ²) by cell summed through time for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	607
516	Map of mean predicted habitat for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	608
517	Map of standard error of habitat for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	609
518	Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.	610
519	Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	613
520	Pairs plot of input variables for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	614
521	Density histogram of depth log(meters) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	615
522	Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	616
523	Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	617
524	Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	618
525	Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	619
526	Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	620
527	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	621
528	Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	622
529	Map of effort(hours/km ²) by cell summed through time for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	623
530	Map of mean predicted habitat for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	624

531	Map of standard error of habitat for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	625
532	Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.	626
533	Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	629
534	Pairs plot of input variables for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	630
535	Density histogram of depth log(meters) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	631
536	Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	632
537	Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	633
538	Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	634
539	Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	635
540	Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	636
541	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	637
542	Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	638
543	Map of effort(hours/km ²) by cell summed through time for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	639
544	Map of mean predicted habitat for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	640
545	Map of standard error of habitat for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	641
546	Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.	642
547	Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	645
548	Pairs plot of input variables for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	646
549	Density histogram of depth log(meters) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	647
550	Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	648
551	Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	649
552	Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	650

553	Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	651
554	Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	652
555	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	653
556	Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	654
557	Map of effort(hours/km ²) by cell summed through time for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	655
558	Map of mean predicted habitat for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	656
559	Map of standard error of habitat for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	657
560	Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.	658
561	Map of points of observational sightings and tracks of survey effort for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	662
562	Pairs plot of input variables for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	663
563	Density histogram of depth log(meters) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	664
564	Density histogram of distance to shelf log(meters) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	665
565	Density histogram of distance to coast log(meters) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	666
566	Density histogram of sea-surface temperature (degrees C) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	667
567	Density histogram of latitude (degrees) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	668
568	Terms plot of predictors to GAM model fit for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	669
569	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	670
570	Map of presence and absence by cell summed through time for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	671
571	Map of effort(hours/km ²) by cell summed through time for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	672
572	Map of mean predicted habitat for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	673
573	Map of standard error of habitat for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	674
574	Map of binary habitat (cutoff determined by ROC) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.	675

575	Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'fall' season in 'east2' region.	679
576	Pairs plot of input variables for 'Sperm whales' guild during 'fall' season in 'east2' region.	680
577	Density histogram of depth log(meters) for 'Sperm whales' guild during 'fall' season in 'east2' region.	681
578	Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'fall' season in 'east2' region.	682
579	Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'fall' season in 'east2' region.	683
580	Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'fall' season in 'east2' region.	684
581	Density histogram of latitude (degrees) for 'Sperm whales' guild during 'fall' season in 'east2' region.	685
582	Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'fall' season in 'east2' region.	686
583	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'fall' season in 'east2' region.	687
584	Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'fall' season in 'east2' region.	688
585	Map of effort(hours/km ²) by cell summed through time for 'Sperm whales' guild during 'fall' season in 'east2' region.	689
586	Map of mean predicted habitat for 'Sperm whales' guild during 'fall' season in 'east2' region.	690
587	Map of standard error of habitat for 'Sperm whales' guild during 'fall' season in 'east2' region.	691
588	Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'fall' season in 'east2' region.	692
589	Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	695
590	Pairs plot of input variables for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	696
591	Density histogram of depth log(meters) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	697
592	Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	698
593	Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	699
594	Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	700
595	Density histogram of latitude (degrees) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	701
596	Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	702

597	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	703
598	Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	704
599	Map of effort(hours/km ²) by cell summed through time for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	705
600	Map of mean predicted habitat for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	706
601	Map of standard error of habitat for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	707
602	Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.	708
603	Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'spring' season in 'east2' region.	711
604	Pairs plot of input variables for 'Sperm whales' guild during 'spring' season in 'east2' region.	712
605	Density histogram of depth log(meters) for 'Sperm whales' guild during 'spring' season in 'east2' region.	713
606	Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'spring' season in 'east2' region.	714
607	Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'spring' season in 'east2' region.	715
608	Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'spring' season in 'east2' region.	716
609	Density histogram of latitude (degrees) for 'Sperm whales' guild during 'spring' season in 'east2' region.	717
610	Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'spring' season in 'east2' region.	718
611	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'spring' season in 'east2' region.	719
612	Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'spring' season in 'east2' region.	720
613	Map of effort(hours/km ²) by cell summed through time for 'Sperm whales' guild during 'spring' season in 'east2' region.	721
614	Map of mean predicted habitat for 'Sperm whales' guild during 'spring' season in 'east2' region.	722
615	Map of standard error of habitat for 'Sperm whales' guild during 'spring' season in 'east2' region.	723
616	Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'spring' season in 'east2' region.	724
617	Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'summer' season in 'east2' region.	727
618	Pairs plot of input variables for 'Sperm whales' guild during 'summer' season in 'east2' region.	728

619	Density histogram of depth log(meters) for 'Sperm whales' guild during 'summer' season in 'east2' region.	729
620	Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'summer' season in 'east2' region.	730
621	Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'summer' season in 'east2' region.	731
622	Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'summer' season in 'east2' region.	732
623	Density histogram of latitude (degrees) for 'Sperm whales' guild during 'summer' season in 'east2' region.	733
624	Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'summer' season in 'east2' region.	734
625	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'summer' season in 'east2' region.	735
626	Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'summer' season in 'east2' region.	736
627	Map of effort(hours/km ²) by cell summed through time for 'Sperm whales' guild during 'summer' season in 'east2' region.	737
628	Map of mean predicted habitat for 'Sperm whales' guild during 'summer' season in 'east2' region.	738
629	Map of standard error of habitat for 'Sperm whales' guild during 'summer' season in 'east2' region.	739
630	Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'summer' season in 'east2' region.	740
631	Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	743
632	Pairs plot of input variables for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	744
633	Density histogram of depth log(meters) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	745
634	Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	746
635	Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	747
636	Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	748
637	Density histogram of latitude (degrees) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	749
638	Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	750
639	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	751
640	Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	752

641	Map of effort(hours/km ²) by cell summed through time for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	753
642	Map of mean predicted habitat for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	754
643	Map of standard error of habitat for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	755
644	Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.	756
645	Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'winter' season in 'east2' region.	759
646	Pairs plot of input variables for 'Sperm whales' guild during 'winter' season in 'east2' region.	760
647	Density histogram of depth log(meters) for 'Sperm whales' guild during 'winter' season in 'east2' region.	761
648	Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'winter' season in 'east2' region.	762
649	Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'winter' season in 'east2' region.	763
650	Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'winter' season in 'east2' region.	764
651	Density histogram of latitude (degrees) for 'Sperm whales' guild during 'winter' season in 'east2' region.	765
652	Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'winter' season in 'east2' region.	766
653	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'winter' season in 'east2' region.	767
654	Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'winter' season in 'east2' region.	768
655	Map of effort(hours/km ²) by cell summed through time for 'Sperm whales' guild during 'winter' season in 'east2' region.	769
656	Map of mean predicted habitat for 'Sperm whales' guild during 'winter' season in 'east2' region.	770
657	Map of standard error of habitat for 'Sperm whales' guild during 'winter' season in 'east2' region.	771
658	Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'winter' season in 'east2' region.	772
659	Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	775
660	Pairs plot of input variables for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	776
661	Density histogram of depth log(meters) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	777
662	Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	778

663	Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	779
664	Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	780
665	Density histogram of latitude (degrees) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	781
666	Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	782
667	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	783
668	Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	784
669	Map of effort(hours/km ²) by cell summed through time for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	785
670	Map of mean predicted habitat for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	786
671	Map of standard error of habitat for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	787
672	Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.	788
673	Map of points of observational sightings and tracks of survey effort for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	792
674	Pairs plot of input variables for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	793
675	Density histogram of depth log(meters) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	794
676	Density histogram of distance to shelf log(meters) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	795
677	Density histogram of distance to coast log(meters) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	796
678	Density histogram of sea-surface temperature (degrees C) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	797
679	Density histogram of latitude (degrees) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	798
680	Terms plot of predictors to GAM model fit for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	799
681	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	800
682	Map of presence and absence by cell summed through time for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	801
683	Map of effort(hours/km ²) by cell summed through time for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	802
684	Map of mean predicted habitat for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	803

685	Map of standard error of habitat for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	804
686	Map of binary habitat (cutoff determined by ROC) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.	805
687	Map of points of observational sightings and tracks of survey effort for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	808
688	Pairs plot of input variables for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	809
689	Density histogram of depth log(meters) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	810
690	Density histogram of distance to shelf log(meters) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	811
691	Density histogram of distance to coast log(meters) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	812
692	Density histogram of sea-surface temperature (degrees C) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	813
693	Density histogram of latitude (degrees) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	814
694	Terms plot of predictors to GAM model fit for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	815
695	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	816
696	Map of presence and absence by cell summed through time for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	817
697	Map of effort(hours/km ²) by cell summed through time for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	818
698	Map of mean predicted habitat for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	819
699	Map of standard error of habitat for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	820
700	Map of binary habitat (cutoff determined by ROC) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.	821
701	Map of points of observational sightings and tracks of survey effort for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	824
702	Pairs plot of input variables for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	825
703	Density histogram of depth log(meters) for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	826
704	Density histogram of distance to shelf log(meters) for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	827
705	Density histogram of distance to coast log(meters) for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	828
706	Density histogram of sea-surface temperature (degrees C) for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	829

707	Density histogram of latitude (degrees) for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	830
708	Terms plot of predictors to GAM model fit for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	831
709	Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	832
710	Map of presence and absence by cell summed through time for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	833
711	Map of effort(hours/km ²) by cell summed through time for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	834
712	Map of mean predicted habitat for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	835
713	Map of standard error of habitat for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	836
714	Map of binary habitat (cutoff determined by ROC) for 'Stenella attenuata' guild during 'summer' season in 'east2' region.	837
715	Map of points of observational sightings and tracks of survey effort for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	840
716	Pairs plot of input variables for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	841
717	Density histogram of depth log(meters) for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	842
718	Density histogram of distance to shelf log(meters) for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	843
719	Density histogram of distance to coast log(meters) for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	844
720	Density histogram of sea-surface temperature (degrees C) for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	845
721	Density histogram of latitude (degrees) for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	846
722	Terms plot of predictors to GAM model fit for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	847
723	Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	848
724	Map of presence and absence by cell summed through time for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	849
725	Map of effort(hours/km ²) by cell summed through time for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	850
726	Map of mean predicted habitat for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	851
727	Map of standard error of habitat for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	852
728	Map of binary habitat (cutoff determined by ROC) for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.	853

729	Map of points of observational sightings and tracks of survey effort for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	857
730	Pairs plot of input variables for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	858
731	Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	859
732	Density histogram of distance to shelf log(meters) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	860
733	Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	861
734	Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	862
735	Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	863
736	Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	864
737	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	865
738	Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	866
739	Map of effort(hours/km ²) by cell summed through time for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	867
740	Map of mean predicted habitat for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	868
741	Map of standard error of habitat for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	869
742	Map of binary habitat (cutoff determined by ROC) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.	870
743	Map of points of observational sightings and tracks of survey effort for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	873
744	Pairs plot of input variables for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	874
745	Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	875
746	Density histogram of distance to shelf log(meters) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	876
747	Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	877
748	Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	878
749	Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	879
750	Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	880

751	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	881
752	Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	882
753	Map of effort(hours/km ²) by cell summed through time for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	883
754	Map of mean predicted habitat for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	884
755	Map of standard error of habitat for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	885
756	Map of binary habitat (cutoff determined by ROC) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.	886
757	Map of points of observational sightings and tracks of survey effort for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	889
758	Pairs plot of input variables for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	890
759	Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	891
760	Density histogram of distance to shelf log(meters) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	892
761	Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	893
762	Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	894
763	Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	895
764	Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	896
765	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	897
766	Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	898
767	Map of effort(hours/km ²) by cell summed through time for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	899
768	Map of mean predicted habitat for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	900
769	Map of standard error of habitat for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	901
770	Map of binary habitat (cutoff determined by ROC) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.	902
771	Map of points of observational sightings and tracks of survey effort for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	905
772	Pairs plot of input variables for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	906

773	Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	907
774	Density histogram of distance to shelf log(meters) for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	908
775	Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	909
776	Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	910
777	Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	911
778	Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	912
779	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	913
780	Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	914
781	Map of effort(hours/km ²) by cell summed through time for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	915
782	Map of mean predicted habitat for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	916
783	Map of standard error of habitat for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	917
784	Map of binary habitat (cutoff determined by ROC) for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.	918
785	Map of points of observational sightings and tracks of survey effort for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	921
786	Pairs plot of input variables for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	922
787	Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	923
788	Density histogram of distance to shelf log(meters) for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	924
789	Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	925
790	Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	926
791	Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	927
792	Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	928
793	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	929
794	Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	930

795	Map of effort(hours/km ²) by cell summed through time for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	931
796	Map of mean predicted habitat for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	932
797	Map of standard error of habitat for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	933
798	Map of binary habitat (cutoff determined by ROC) for 'Stenella frontalis' guild during 'summer' season in 'east2' region.	934
799	Map of points of observational sightings and tracks of survey effort for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	937
800	Pairs plot of input variables for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	938
801	Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	939
802	Density histogram of distance to shelf log(meters) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	940
803	Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	941
804	Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	942
805	Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	943
806	Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	944
807	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	945
808	Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	946
809	Map of effort(hours/km ²) by cell summed through time for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	947
810	Map of mean predicted habitat for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	948
811	Map of standard error of habitat for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	949
812	Map of binary habitat (cutoff determined by ROC) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.	950
813	Map of points of observational sightings and tracks of survey effort for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	953
814	Pairs plot of input variables for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	954
815	Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	955
816	Density histogram of distance to shelf log(meters) for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	956

817	Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	957
818	Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	958
819	Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	959
820	Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	960
821	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	961
822	Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	962
823	Map of effort(hours/km ²) by cell summed through time for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	963
824	Map of mean predicted habitat for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	964
825	Map of standard error of habitat for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	965
826	Map of binary habitat (cutoff determined by ROC) for 'Stenella frontalis' guild during 'winter' season in 'east2' region.	966
827	Map of points of observational sightings and tracks of survey effort for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	969
828	Pairs plot of input variables for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	970
829	Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	971
830	Density histogram of distance to shelf log(meters) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	972
831	Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	973
832	Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	974
833	Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	975
834	Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	976
835	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	977
836	Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	978
837	Map of effort(hours/km ²) by cell summed through time for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	979
838	Map of mean predicted habitat for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	980

839	Map of standard error of habitat for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	981
840	Map of binary habitat (cutoff determined by ROC) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.	982
841	Map of points of observational sightings and tracks of survey effort for 'Stenella species' guild during 'summer' season in 'east2' region.	986
842	Pairs plot of input variables for 'Stenella species' guild during 'summer' season in 'east2' region.	987
843	Density histogram of depth log(meters) for 'Stenella species' guild during 'summer' season in 'east2' region.	988
844	Density histogram of distance to shelf log(meters) for 'Stenella species' guild during 'summer' season in 'east2' region.	989
845	Density histogram of distance to coast log(meters) for 'Stenella species' guild during 'summer' season in 'east2' region.	990
846	Density histogram of sea-surface temperature (degrees C) for 'Stenella species' guild during 'summer' season in 'east2' region.	991
847	Density histogram of latitude (degrees) for 'Stenella species' guild during 'summer' season in 'east2' region.	992
848	Terms plot of predictors to GAM model fit for 'Stenella species' guild during 'summer' season in 'east2' region.	993
849	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella species' guild during 'summer' season in 'east2' region.	994
850	Map of presence and absence by cell summed through time for 'Stenella species' guild during 'summer' season in 'east2' region.	995
851	Map of effort(hours/km ²) by cell summed through time for 'Stenella species' guild during 'summer' season in 'east2' region.	996
852	Map of mean predicted habitat for 'Stenella species' guild during 'summer' season in 'east2' region.	997
853	Map of standard error of habitat for 'Stenella species' guild during 'summer' season in 'east2' region.	998
854	Map of binary habitat (cutoff determined by ROC) for 'Stenella species' guild during 'summer' season in 'east2' region.	999
855	Map of points of observational sightings and tracks of survey effort for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1002
856	Pairs plot of input variables for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1003
857	Density histogram of depth log(meters) for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1004
858	Density histogram of distance to shelf log(meters) for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1005
859	Density histogram of distance to coast log(meters) for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1006
860	Density histogram of sea-surface temperature (degrees C) for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1007

861	Density histogram of latitude (degrees) for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1008
862	Terms plot of predictors to GAM model fit for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1009
863	Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1010
864	Map of presence and absence by cell summed through time for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1011
865	Map of effort(hours/km ²) by cell summed through time for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1012
866	Map of mean predicted habitat for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1013
867	Map of standard error of habitat for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1014
868	Map of binary habitat (cutoff determined by ROC) for 'Stenella species' guild during 'summer' season in 'gomex2' region.	1015
869	Map of points of observational sightings and tracks of survey effort for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1019
870	Pairs plot of input variables for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1020
871	Density histogram of depth log(meters) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1021
872	Density histogram of distance to shelf log(meters) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1022
873	Density histogram of distance to coast log(meters) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1023
874	Density histogram of sea-surface temperature (degrees C) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1024
875	Density histogram of latitude (degrees) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1025
876	Terms plot of predictors to GAM model fit for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1026
877	Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1027
878	Map of presence and absence by cell summed through time for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1028
879	Map of effort(hours/km ²) by cell summed through time for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1029
880	Map of mean predicted habitat for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1030
881	Map of standard error of habitat for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1031
882	Map of binary habitat (cutoff determined by ROC) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.	1032

883	Map of points of observational sightings and tracks of survey effort for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1035
884	Pairs plot of input variables for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1036
885	Density histogram of depth log(meters) for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1037
886	Density histogram of distance to shelf log(meters) for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1038
887	Density histogram of distance to coast log(meters) for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1039
888	Density histogram of sea-surface temperature (degrees C) for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1040
889	Density histogram of latitude (degrees) for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1041
890	Terms plot of predictors to GAM model fit for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1042
891	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1043
892	Map of presence and absence by cell summed through time for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1044
893	Map of effort(hours/km ²) by cell summed through time for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1045
894	Map of mean predicted habitat for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1046
895	Map of standard error of habitat for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1047
896	Map of binary habitat (cutoff determined by ROC) for 'Striped dolphin' guild during 'summer' season in 'east2' region.	1048
897	Map of points of observational sightings and tracks of survey effort for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1051
898	Pairs plot of input variables for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1052
899	Density histogram of depth log(meters) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1053
900	Density histogram of distance to shelf log(meters) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1054
901	Density histogram of distance to coast log(meters) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1055
902	Density histogram of sea-surface temperature (degrees C) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1056
903	Density histogram of latitude (degrees) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1057
904	Terms plot of predictors to GAM model fit for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1058

905	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1059
906	Map of presence and absence by cell summed through time for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1060
907	Map of effort(hours/km ²) by cell summed through time for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1061
908	Map of mean predicted habitat for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1062
909	Map of standard error of habitat for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1063
910	Map of binary habitat (cutoff determined by ROC) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.	1064
911	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'fall' season in 'east2' region.	1068
912	Pairs plot of input variables for 'Tursiops' guild during 'fall' season in 'east2' region.	1069
913	Density histogram of depth log(meters) for 'Tursiops' guild during 'fall' season in 'east2' region.	1070
914	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'fall' season in 'east2' region.	1071
915	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'fall' season in 'east2' region.	1072
916	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'fall' season in 'east2' region.	1073
917	Density histogram of latitude (degrees) for 'Tursiops' guild during 'fall' season in 'east2' region.	1074
918	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'fall' season in 'east2' region.	1075
919	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'fall' season in 'east2' region.	1076
920	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'fall' season in 'east2' region.	1077
921	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'fall' season in 'east2' region.	1078
922	Map of mean predicted habitat for 'Tursiops' guild during 'fall' season in 'east2' region.	1079
923	Map of standard error of habitat for 'Tursiops' guild during 'fall' season in 'east2' region.	1080
924	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'fall' season in 'east2' region.	1081
925	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1084
926	Pairs plot of input variables for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1085
927	Density histogram of depth log(meters) for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1086
928	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1087

929	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1088
930	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1089
931	Density histogram of latitude (degrees) for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1090
932	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1091
933	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1092
934	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1093
935	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1094
936	Map of mean predicted habitat for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1095
937	Map of standard error of habitat for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1096
938	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'fall' season in 'gomex2' region.	1097
939	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'fall' season in 'ne2' region.	1100
940	Pairs plot of input variables for 'Tursiops' guild during 'fall' season in 'ne2' region.	1101
941	Density histogram of depth log(meters) for 'Tursiops' guild during 'fall' season in 'ne2' region.	1102
942	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'fall' season in 'ne2' region.	1103
943	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'fall' season in 'ne2' region.	1104
944	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'fall' season in 'ne2' region.	1105
945	Density histogram of latitude (degrees) for 'Tursiops' guild during 'fall' season in 'ne2' region.	1106
946	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'fall' season in 'ne2' region.	1107
947	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'fall' season in 'ne2' region.	1108
948	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'fall' season in 'ne2' region.	1109
949	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'fall' season in 'ne2' region.	1110
950	Map of mean predicted habitat for 'Tursiops' guild during 'fall' season in 'ne2' region.	1111
951	Map of standard error of habitat for 'Tursiops' guild during 'fall' season in 'ne2' region.	1112
952	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'fall' season in 'ne2' region.	1113

953	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'fall' season in 'se2' region.	1116
954	Pairs plot of input variables for 'Tursiops' guild during 'fall' season in 'se2' region. .	1117
955	Density histogram of depth log(meters) for 'Tursiops' guild during 'fall' season in 'se2' region.	1118
956	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'fall' season in 'se2' region.	1119
957	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'fall' season in 'se2' region.	1120
958	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'fall' season in 'se2' region.	1121
959	Density histogram of latitude (degrees) for 'Tursiops' guild during 'fall' season in 'se2' region.	1122
960	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'fall' season in 'se2' region.	1123
961	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'fall' season in 'se2' region.	1124
962	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'fall' season in 'se2' region.	1125
963	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'fall' season in 'se2' region.	1126
964	Map of mean predicted habitat for 'Tursiops' guild during 'fall' season in 'se2' region.	1127
965	Map of standard error of habitat for 'Tursiops' guild during 'fall' season in 'se2' region.	1128
966	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'fall' season in 'se2' region.	1129
967	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'spring' season in 'east2' region.	1132
968	Pairs plot of input variables for 'Tursiops' guild during 'spring' season in 'east2' region.	1133
969	Density histogram of depth log(meters) for 'Tursiops' guild during 'spring' season in 'east2' region.	1134
970	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'spring' season in 'east2' region.	1135
971	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'spring' season in 'east2' region.	1136
972	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'spring' season in 'east2' region.	1137
973	Density histogram of latitude (degrees) for 'Tursiops' guild during 'spring' season in 'east2' region.	1138
974	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'spring' season in 'east2' region.	1139
975	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'spring' season in 'east2' region.	1140
976	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'spring' season in 'east2' region.	1141

977	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'spring' season in 'east2' region.	1142
978	Map of mean predicted habitat for 'Tursiops' guild during 'spring' season in 'east2' region.	1143
979	Map of standard error of habitat for 'Tursiops' guild during 'spring' season in 'east2' region.	1144
980	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'spring' season in 'east2' region.	1145
981	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1148
982	Pairs plot of input variables for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1149
983	Density histogram of depth log(meters) for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1150
984	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1151
985	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1152
986	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1153
987	Density histogram of latitude (degrees) for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1154
988	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1155
989	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1156
990	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1157
991	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1158
992	Map of mean predicted habitat for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1159
993	Map of standard error of habitat for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1160
994	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'spring' season in 'gomex2' region.	1161
995	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'spring' season in 'ne2' region.	1164
996	Pairs plot of input variables for 'Tursiops' guild during 'spring' season in 'ne2' region.	1165
997	Density histogram of depth log(meters) for 'Tursiops' guild during 'spring' season in 'ne2' region.	1166
998	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'spring' season in 'ne2' region.	1167
999	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'spring' season in 'ne2' region.	1168

1000	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'spring' season in 'ne2' region.	1169
1001	Density histogram of latitude (degrees) for 'Tursiops' guild during 'spring' season in 'ne2' region.	1170
1002	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'spring' season in 'ne2' region.	1171
1003	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'spring' season in 'ne2' region.	1172
1004	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'spring' season in 'ne2' region.	1173
1005	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'spring' season in 'ne2' region.	1174
1006	Map of mean predicted habitat for 'Tursiops' guild during 'spring' season in 'ne2' region.	1175
1007	Map of standard error of habitat for 'Tursiops' guild during 'spring' season in 'ne2' region.	1176
1008	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'spring' season in 'ne2' region.	1177
1009	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'spring' season in 'se2' region.	1180
1010	Pairs plot of input variables for 'Tursiops' guild during 'spring' season in 'se2' region.	1181
1011	Density histogram of depth log(meters) for 'Tursiops' guild during 'spring' season in 'se2' region.	1182
1012	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'spring' season in 'se2' region.	1183
1013	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'spring' season in 'se2' region.	1184
1014	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'spring' season in 'se2' region.	1185
1015	Density histogram of latitude (degrees) for 'Tursiops' guild during 'spring' season in 'se2' region.	1186
1016	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'spring' season in 'se2' region.	1187
1017	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'spring' season in 'se2' region.	1188
1018	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'spring' season in 'se2' region.	1189
1019	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'spring' season in 'se2' region.	1190
1020	Map of mean predicted habitat for 'Tursiops' guild during 'spring' season in 'se2' region.	1191
1021	Map of standard error of habitat for 'Tursiops' guild during 'spring' season in 'se2' region.	1192
1022	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'spring' season in 'se2' region.	1193

1023	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'summer' season in 'east2' region.	1196
1024	Pairs plot of input variables for 'Tursiops' guild during 'summer' season in 'east2' region.	1197
1025	Density histogram of depth log(meters) for 'Tursiops' guild during 'summer' season in 'east2' region.	1198
1026	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'summer' season in 'east2' region.	1199
1027	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'summer' season in 'east2' region.	1200
1028	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'summer' season in 'east2' region.	1201
1029	Density histogram of latitude (degrees) for 'Tursiops' guild during 'summer' season in 'east2' region.	1202
1030	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'summer' season in 'east2' region.	1203
1031	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'summer' season in 'east2' region.	1204
1032	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'summer' season in 'east2' region.	1205
1033	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'summer' season in 'east2' region.	1206
1034	Map of mean predicted habitat for 'Tursiops' guild during 'summer' season in 'east2' region.	1207
1035	Map of standard error of habitat for 'Tursiops' guild during 'summer' season in 'east2' region.	1208
1036	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'summer' season in 'east2' region.	1209
1037	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1212
1038	Pairs plot of input variables for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1213
1039	Density histogram of depth log(meters) for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1214
1040	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1215
1041	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1216
1042	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1217
1043	Density histogram of latitude (degrees) for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1218
1044	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1219

1045	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1220
1046	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1221
1047	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1222
1048	Map of mean predicted habitat for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1223
1049	Map of standard error of habitat for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1224
1050	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'summer' season in 'gomex2' region.	1225
1051	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'summer' season in 'ne2' region.	1228
1052	Pairs plot of input variables for 'Tursiops' guild during 'summer' season in 'ne2' region.	1229
1053	Density histogram of depth log(meters) for 'Tursiops' guild during 'summer' season in 'ne2' region.	1230
1054	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'summer' season in 'ne2' region.	1231
1055	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'summer' season in 'ne2' region.	1232
1056	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'summer' season in 'ne2' region.	1233
1057	Density histogram of latitude (degrees) for 'Tursiops' guild during 'summer' season in 'ne2' region.	1234
1058	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'summer' season in 'ne2' region.	1235
1059	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'summer' season in 'ne2' region.	1236
1060	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'summer' season in 'ne2' region.	1237
1061	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'summer' season in 'ne2' region.	1238
1062	Map of mean predicted habitat for 'Tursiops' guild during 'summer' season in 'ne2' region.	1239
1063	Map of standard error of habitat for 'Tursiops' guild during 'summer' season in 'ne2' region.	1240
1064	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'summer' season in 'ne2' region.	1241
1065	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'summer' season in 'se2' region.	1244
1066	Pairs plot of input variables for 'Tursiops' guild during 'summer' season in 'se2' region.	1245
1067	Density histogram of depth log(meters) for 'Tursiops' guild during 'summer' season in 'se2' region.	1246

1068	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'summer' season in 'se2' region.	1247
1069	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'summer' season in 'se2' region.	1248
1070	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'summer' season in 'se2' region.	1249
1071	Density histogram of latitude (degrees) for 'Tursiops' guild during 'summer' season in 'se2' region.	1250
1072	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'summer' season in 'se2' region.	1251
1073	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'summer' season in 'se2' region.	1252
1074	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'summer' season in 'se2' region.	1253
1075	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'summer' season in 'se2' region.	1254
1076	Map of mean predicted habitat for 'Tursiops' guild during 'summer' season in 'se2' region.	1255
1077	Map of standard error of habitat for 'Tursiops' guild during 'summer' season in 'se2' region.	1256
1078	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'summer' season in 'se2' region.	1257
1079	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'winter' season in 'east2' region.	1260
1080	Pairs plot of input variables for 'Tursiops' guild during 'winter' season in 'east2' region.	1261
1081	Density histogram of depth log(meters) for 'Tursiops' guild during 'winter' season in 'east2' region.	1262
1082	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'winter' season in 'east2' region.	1263
1083	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'winter' season in 'east2' region.	1264
1084	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'winter' season in 'east2' region.	1265
1085	Density histogram of latitude (degrees) for 'Tursiops' guild during 'winter' season in 'east2' region.	1266
1086	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'winter' season in 'east2' region.	1267
1087	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'winter' season in 'east2' region.	1268
1088	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'winter' season in 'east2' region.	1269
1089	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'winter' season in 'east2' region.	1270
1090	Map of mean predicted habitat for 'Tursiops' guild during 'winter' season in 'east2' region.	1271

1091	Map of standard error of habitat for 'Tursiops' guild during 'winter' season in 'east2' region.	1272
1092	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'winter' season in 'east2' region.	1273
1093	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1276
1094	Pairs plot of input variables for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1277
1095	Density histogram of depth log(meters) for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1278
1096	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1279
1097	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1280
1098	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1281
1099	Density histogram of latitude (degrees) for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1282
1100	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1283
1101	Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1284
1102	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1285
1103	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1286
1104	Map of mean predicted habitat for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1287
1105	Map of standard error of habitat for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1288
1106	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'winter' season in 'gomex2' region.	1289
1107	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'winter' season in 'ne2' region.	1292
1108	Pairs plot of input variables for 'Tursiops' guild during 'winter' season in 'ne2' region.	1293
1109	Density histogram of depth log(meters) for 'Tursiops' guild during 'winter' season in 'ne2' region.	1294
1110	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'winter' season in 'ne2' region.	1295
1111	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'winter' season in 'ne2' region.	1296
1112	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'winter' season in 'ne2' region.	1297
1113	Density histogram of latitude (degrees) for 'Tursiops' guild during 'winter' season in 'ne2' region.	1298

1114	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'winter' season in 'ne2' region.	1299
1115	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'winter' season in 'ne2' region.	1300
1116	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'winter' season in 'ne2' region.	1301
1117	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'winter' season in 'ne2' region.	1302
1118	Map of mean predicted habitat for 'Tursiops' guild during 'winter' season in 'ne2' region.	1303
1119	Map of standard error of habitat for 'Tursiops' guild during 'winter' season in 'ne2' region.	1304
1120	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'winter' season in 'ne2' region.	1305
1121	Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'winter' season in 'se2' region.	1308
1122	Pairs plot of input variables for 'Tursiops' guild during 'winter' season in 'se2' region.	1309
1123	Density histogram of depth log(meters) for 'Tursiops' guild during 'winter' season in 'se2' region.	1310
1124	Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'winter' season in 'se2' region.	1311
1125	Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'winter' season in 'se2' region.	1312
1126	Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'winter' season in 'se2' region.	1313
1127	Density histogram of latitude (degrees) for 'Tursiops' guild during 'winter' season in 'se2' region.	1314
1128	Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'winter' season in 'se2' region.	1315
1129	Reciever operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'winter' season in 'se2' region.	1316
1130	Map of presence and absence by cell summed through time for 'Tursiops' guild during 'winter' season in 'se2' region.	1317
1131	Map of effort(hours/km ²) by cell summed through time for 'Tursiops' guild during 'winter' season in 'se2' region.	1318
1132	Map of mean predicted habitat for 'Tursiops' guild during 'winter' season in 'se2' region.	1319
1133	Map of standard error of habitat for 'Tursiops' guild during 'winter' season in 'se2' region.	1320
1134	Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'winter' season in 'se2' region.	1321

Introduction

These models are for advising Naval environmental compliance.

1 Baleen whales

Guildid:ba3

Table 1: Taxonomic members of the "Baleen whales" guild.

	Scientific Name	Common Name	Taxonomic #
1	Balaenoptera	baleen whales	180523
2	Balaenoptera acutorostrata	minke whale	180524
3	Balaenoptera borealis	sei whale	180526
4	Balaenoptera edeni	Eden's whale	180525
5	Balaenoptera musculus	blue whale	180528
6	Balaenoptera physalus	fin whale	180527

1.1 fall

1.1.1 east2

Modelrun identifier: duke_06_ba3_fall_east2

Date generated: 2008-10-21 14:13:17

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 2: Summary for duke(6) GAM model: for 'Baleen whales' guild during 'fall' season in 'east2' region.

	Value
Number.presences	47
Number.absences	1817
GAM.converged	TRUE
R.squared	0.304059
Deviance.explained	0.365696
ROC.optimum	0.369921
Maximum.fit	0.0295519
Maximum.prediction	0.389591

Model text summary...

```
duke_06_ba3_fall_east2 run on Tue Oct 21 14:11:49 2008
  provider:duke, version:06, guild:Baleen whales (ba3), season:'fall', region:east2

max.fit:0.369921, max.prediction:0.389591, ROC.optimum:0.029552

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -4.9462      0.1594  -31.02   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  2.488e-06  0.500  5.49e-06    0.962
s(log(d2shelf)) 8.826e-01  1.383   15.79  6.93e-06 ***
s(log(d2coast)) 1.945e+00  2.445   24.47  3.85e-13 ***
s(sst)         7.860e-01  1.286   14.67  2.62e-05 ***
s(lat)         8.327e-01  1.333   33.68  6.12e-11 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.304   Deviance explained = 36.6%
GCV score = 0.00094118   Scale est. = 0.00093613   n = 1826

summary(dat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.   : 1654  Min.   :  6.0  Min.   :  10  Min.   : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0  1st Qu.:12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0  Median : 30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5  Mean   :47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.:197.0  3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
        NA's    :      1    NA's    :      1    NA's    :37.00

summary(newdat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :  5  Min.   :1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :4.375e-08  Min.   :5.129e-08  Min.   :0.000e+00  Min.   :1.290e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:9.822e-04  1st Qu.:3.851e-04  1st Qu.:0.000e+00  1st Qu.:5.348e-04  1st Qu.:0.0000
Median :11616  Median :6.021e-03  Median :1.857e-03  Median :0.000e+00  Median :2.645e-03  Median :0.0000
Mean   :11171  Mean   :2.796e-02  Mean   :4.370e-03  Mean   :4.242e-02  Mean   :8.763e-03  Mean   :0.1850
3rd Qu.:14088  3rd Qu.:2.269e-02  3rd Qu.:5.656e-03  3rd Qu.:0.000e+00  3rd Qu.:6.382e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :3.896e-01  Max.   :3.132e-02  Max.   :1.000e+00  Max.   :5.995e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.780e+03  NA's :8.780e+03
```

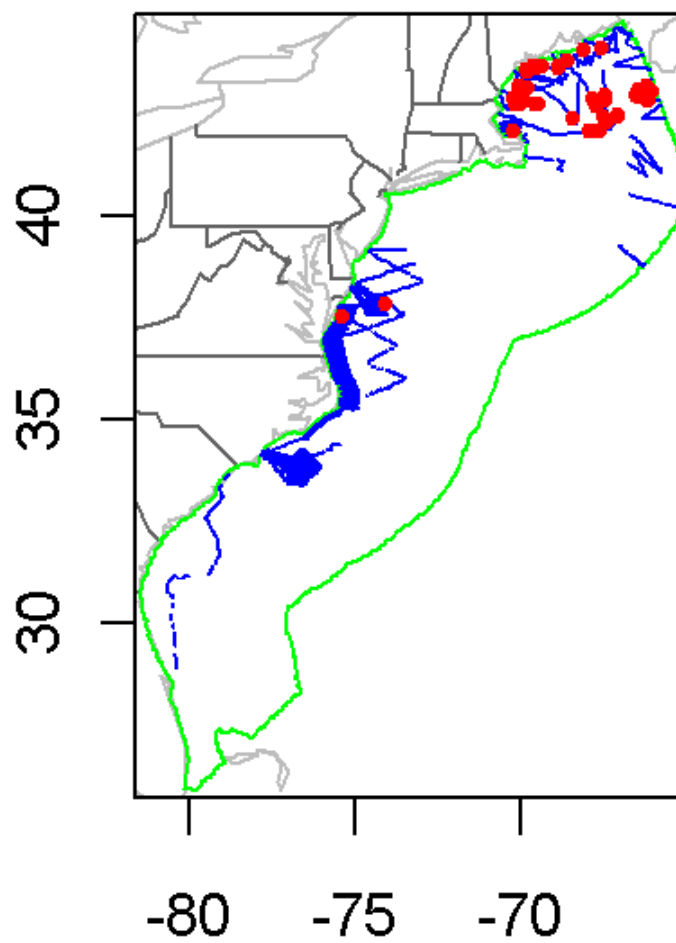


Figure 1: Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'fall' season in 'east2' region.

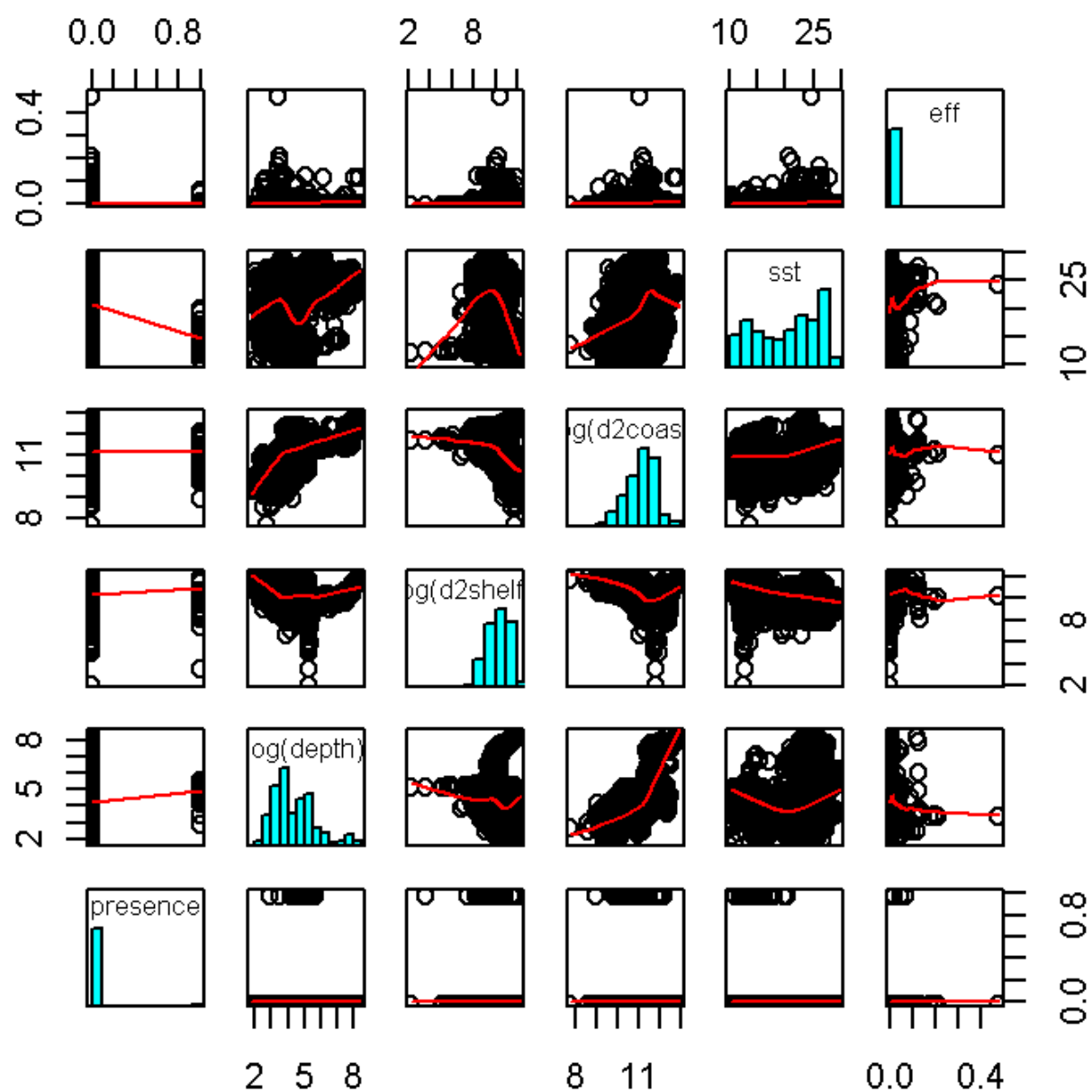


Figure 2: Pairs plot of input variables for 'Baleen whales' guild during 'fall' season in 'east2' region.

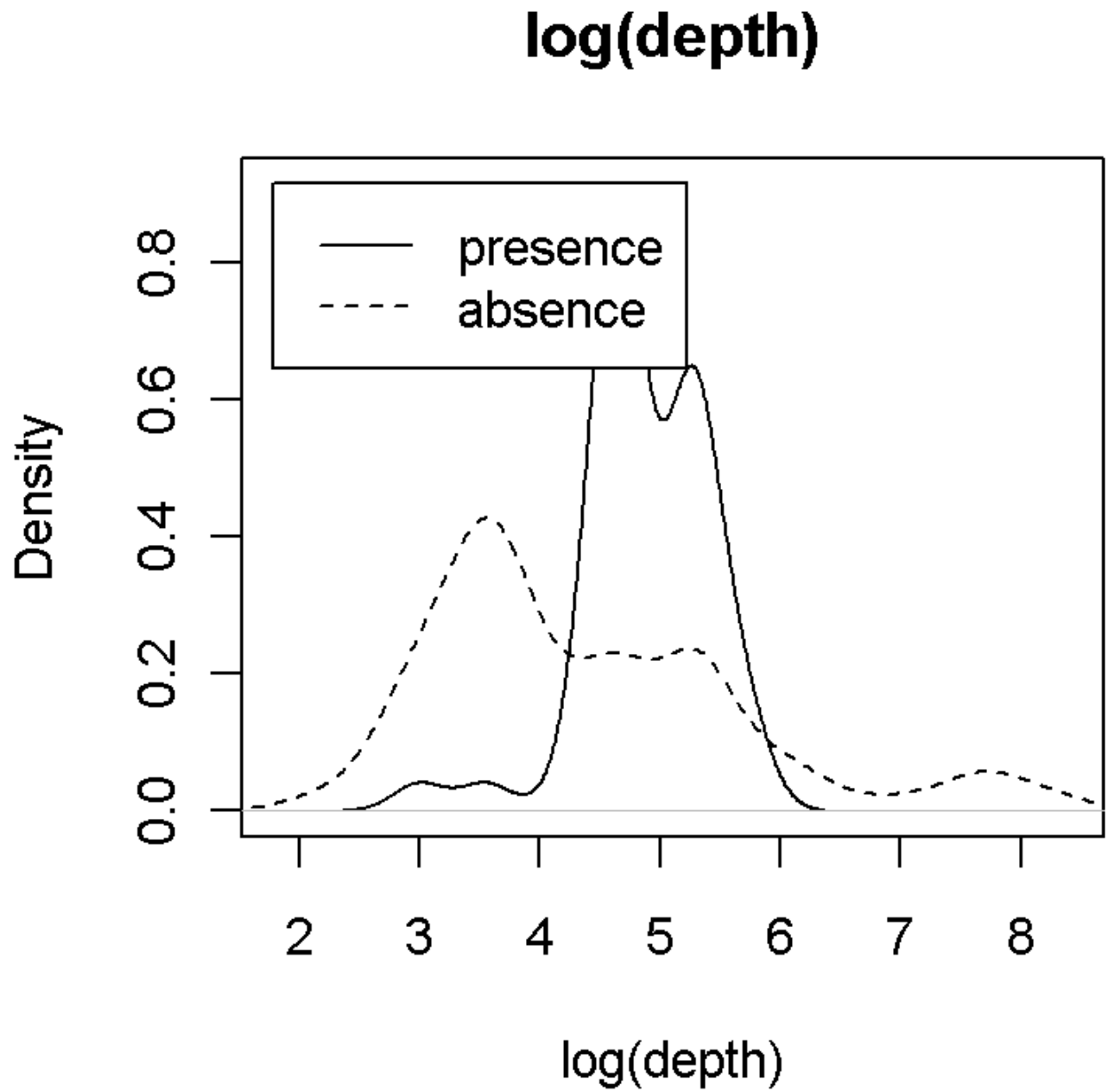


Figure 3: Density histogram of depth log(meters) for 'Baleen whales' guild during 'fall' season in 'east2' region.

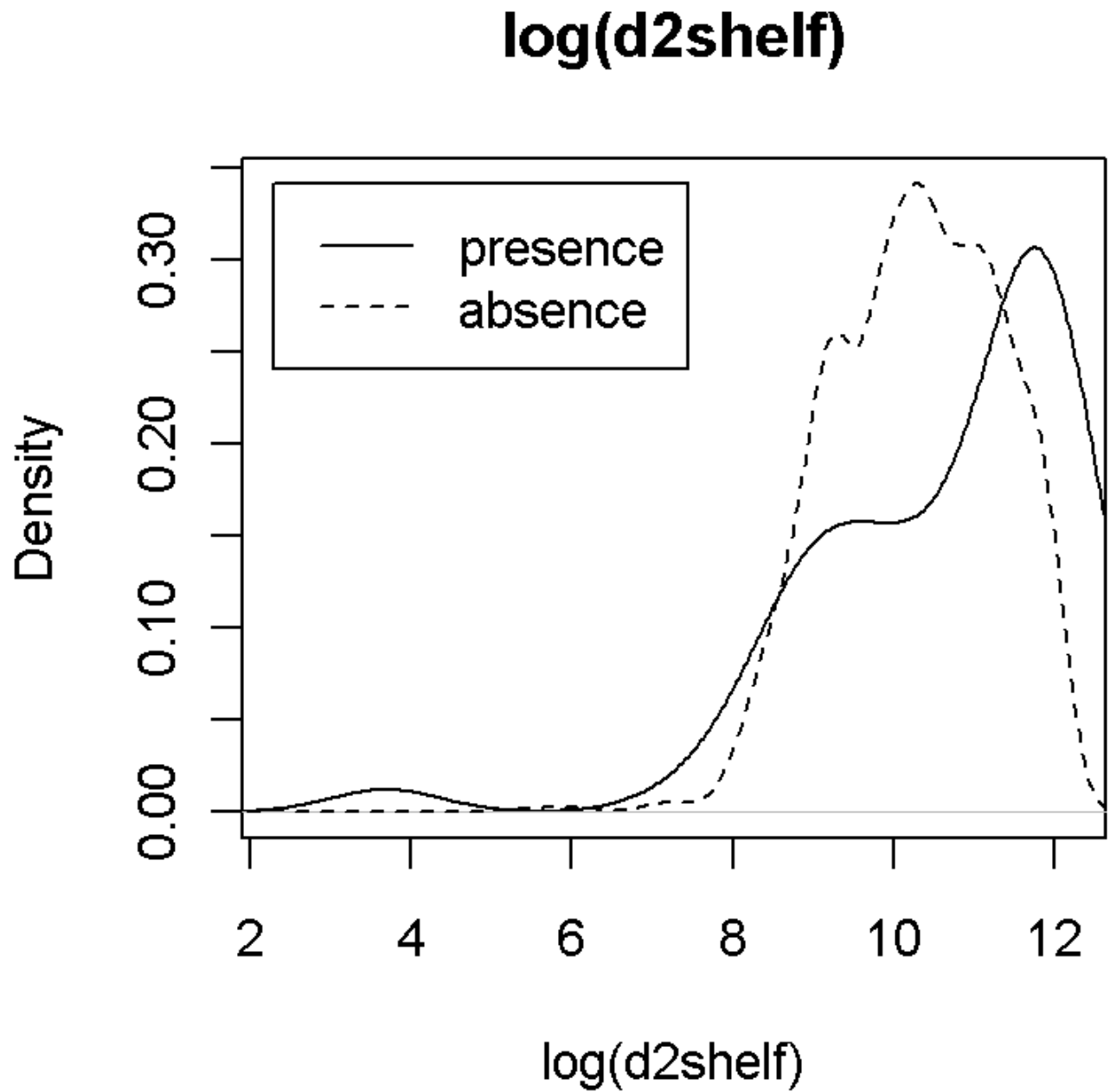


Figure 4: Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'fall' season in 'east2' region.

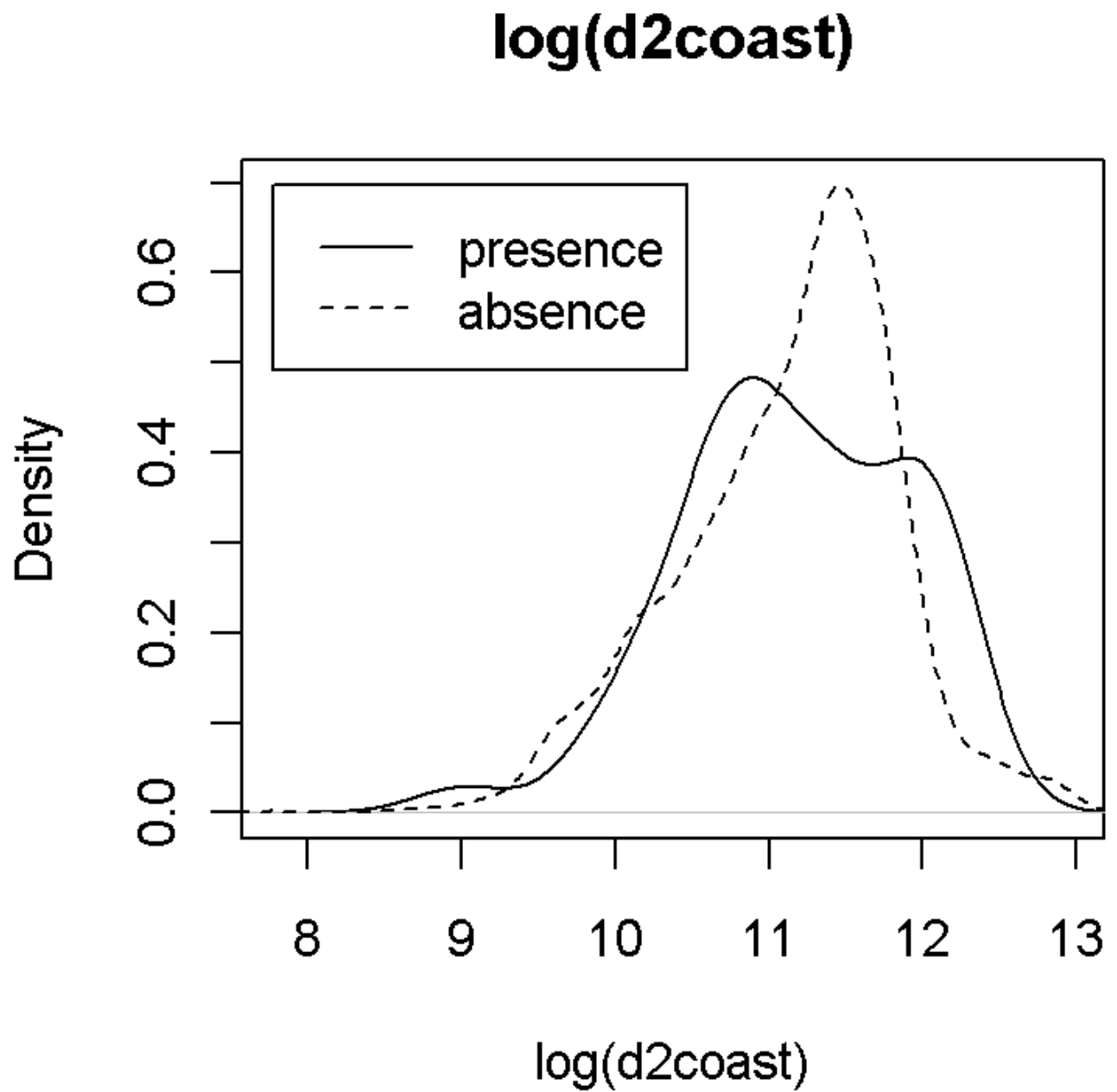


Figure 5: Density histogram of distance to coast $\log(\text{meters})$ for 'Baleen whales' guild during 'fall' season in 'east2' region.

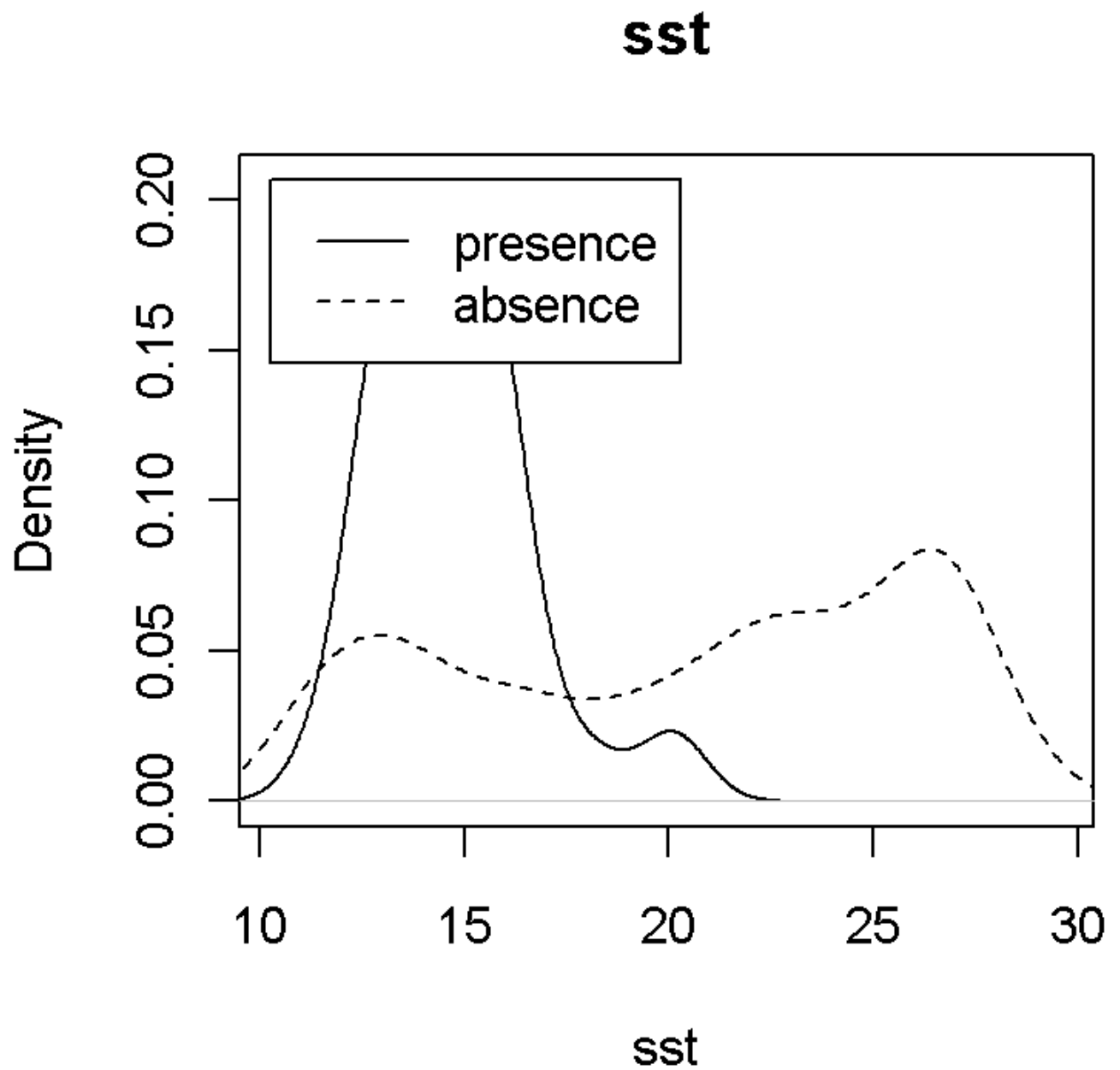


Figure 6: Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'fall' season in 'east2' region.

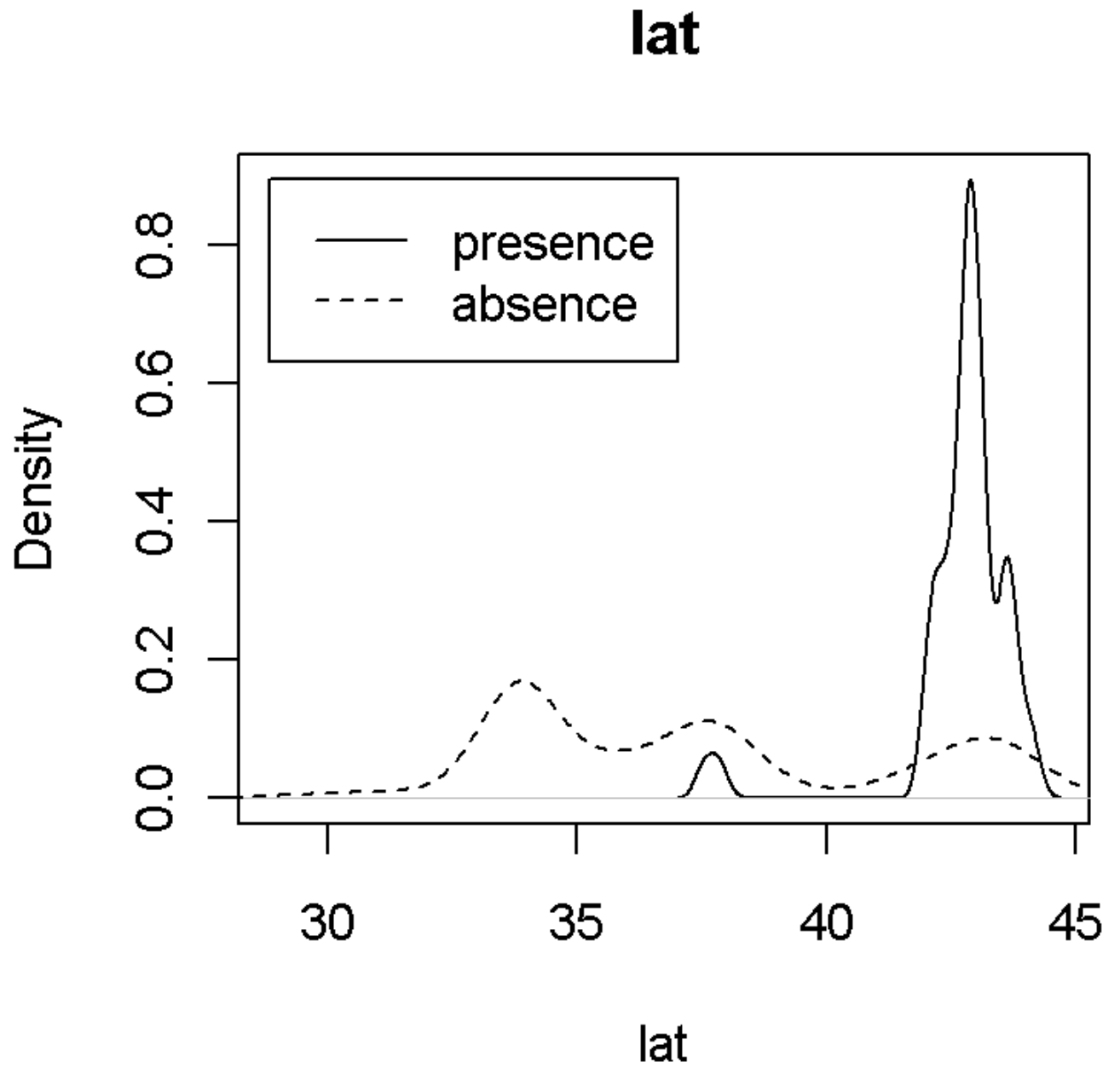


Figure 7: Density histogram of latitude (degrees) for 'Baleen whales' guild during 'fall' season in 'east2' region.

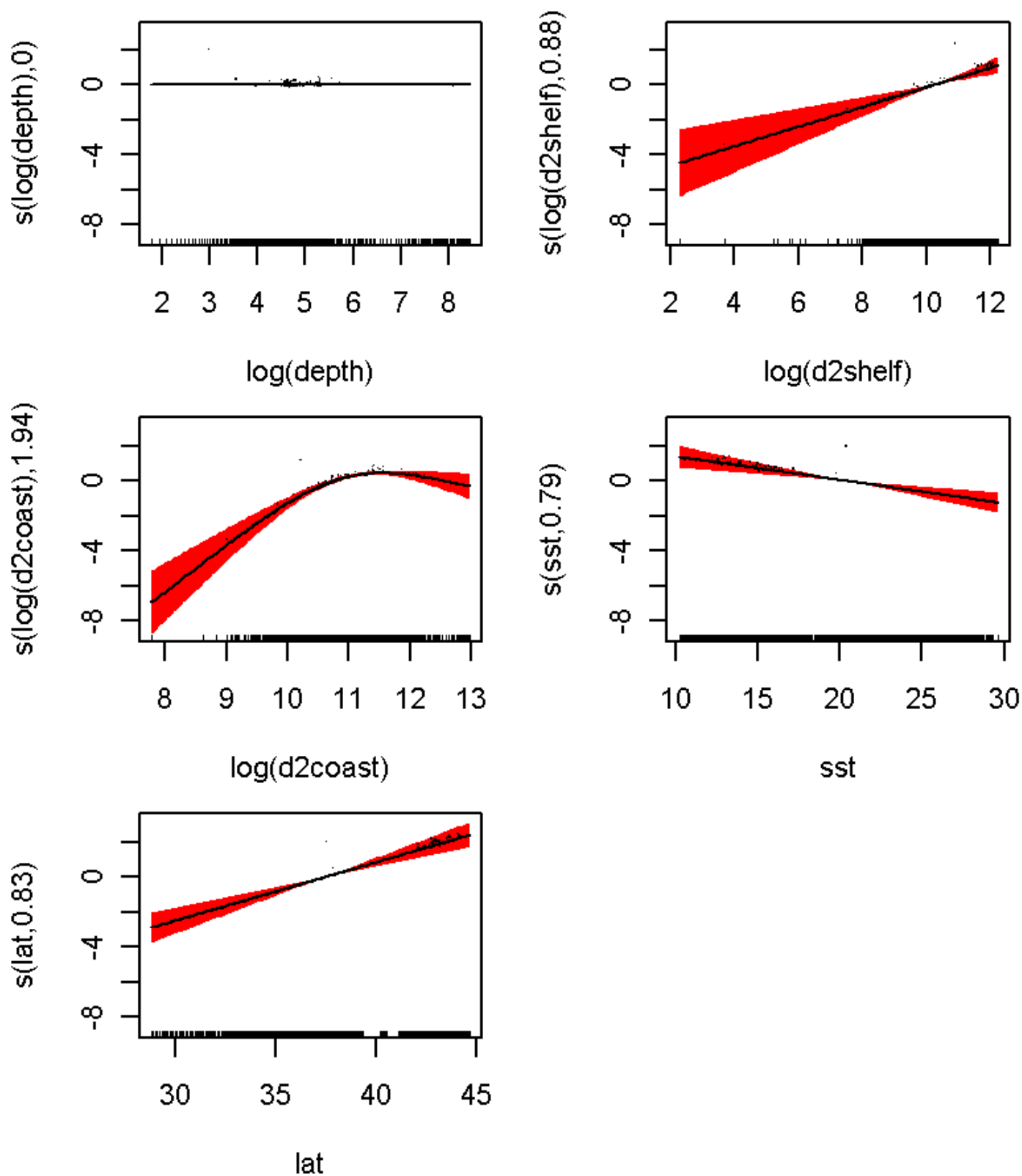


Figure 8: Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'fall' season in 'east2' region.

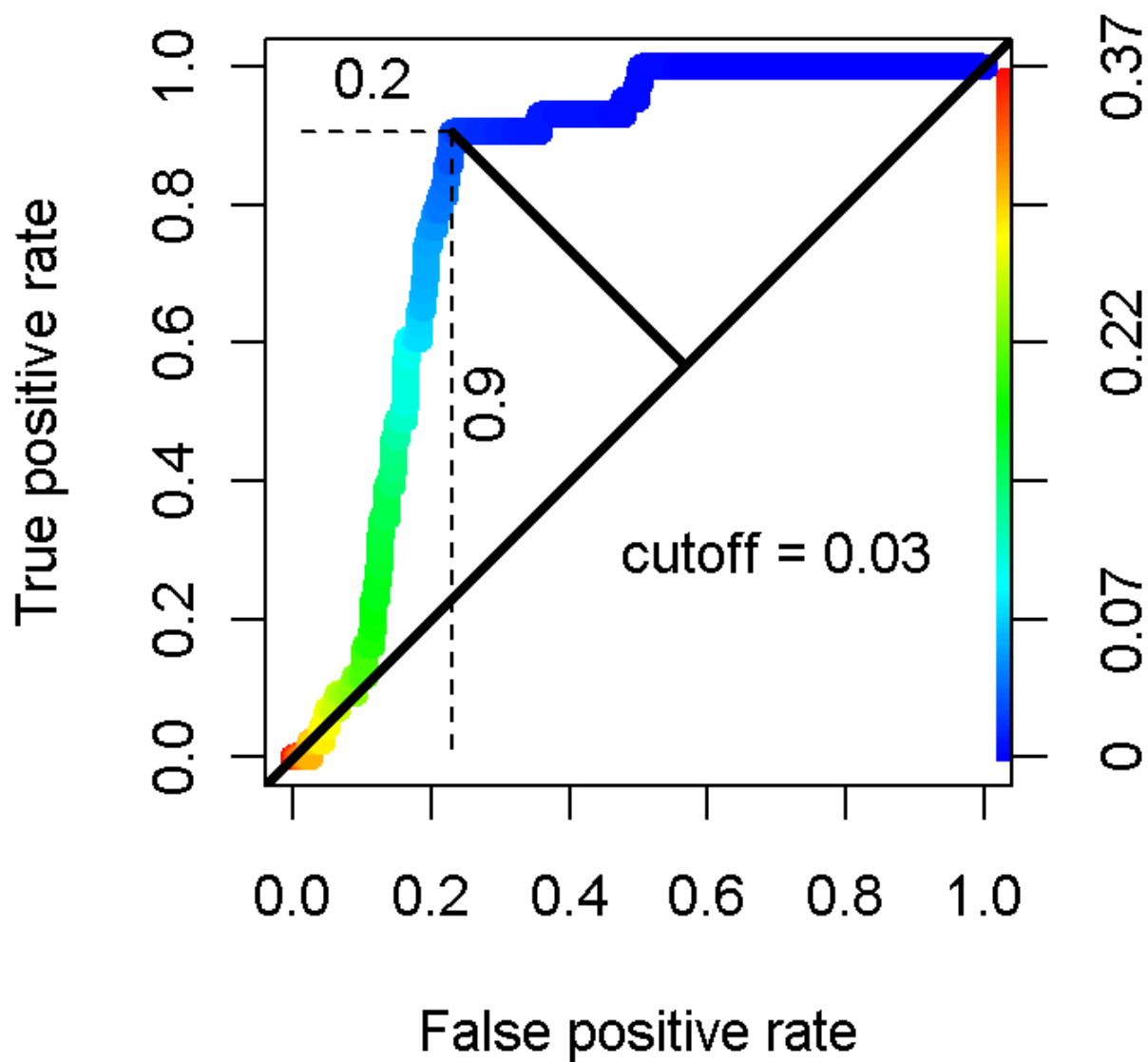


Figure 9: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'fall' season in 'east2' region.

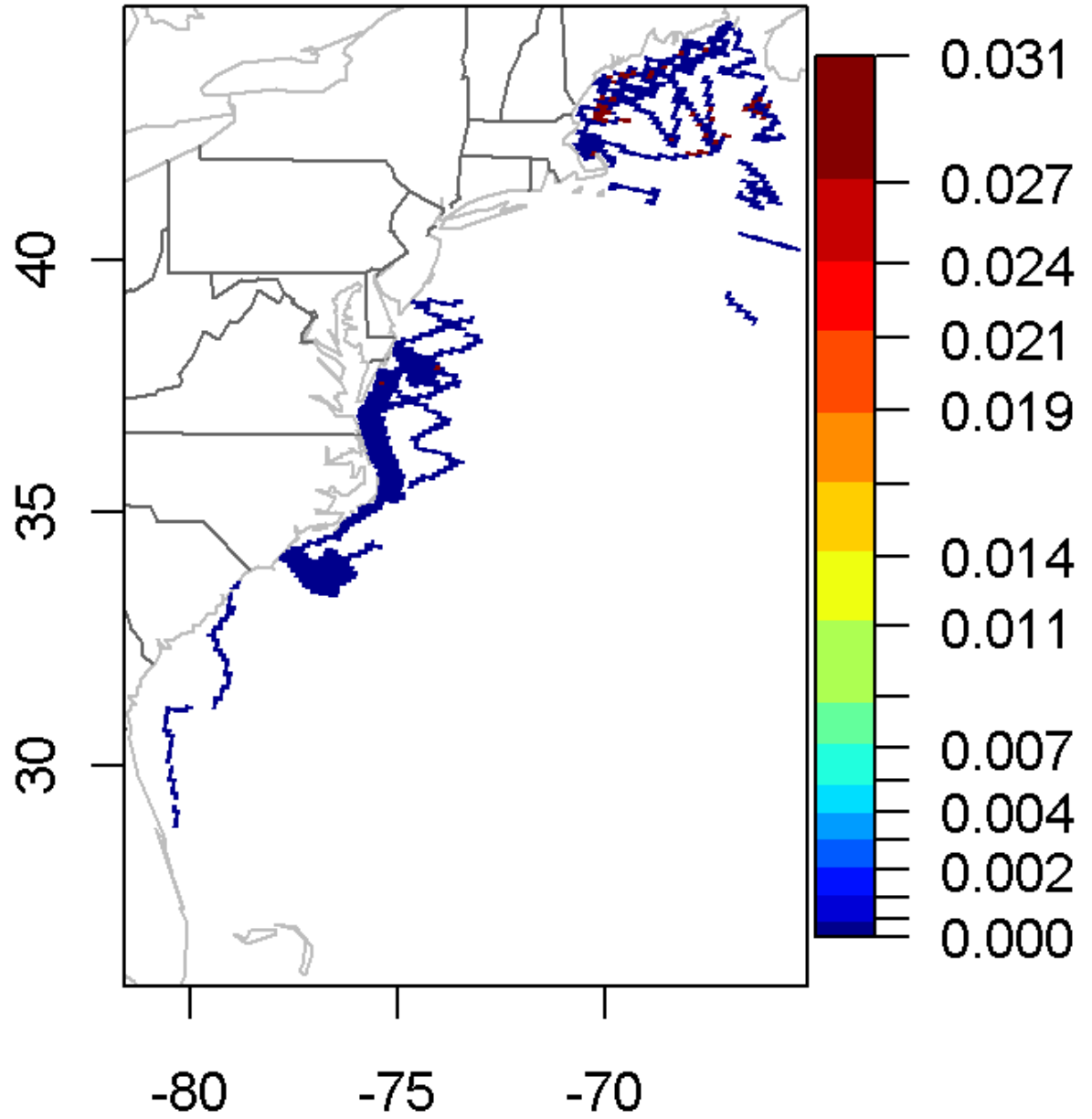


Figure 10: Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'fall' season in 'east2' region.

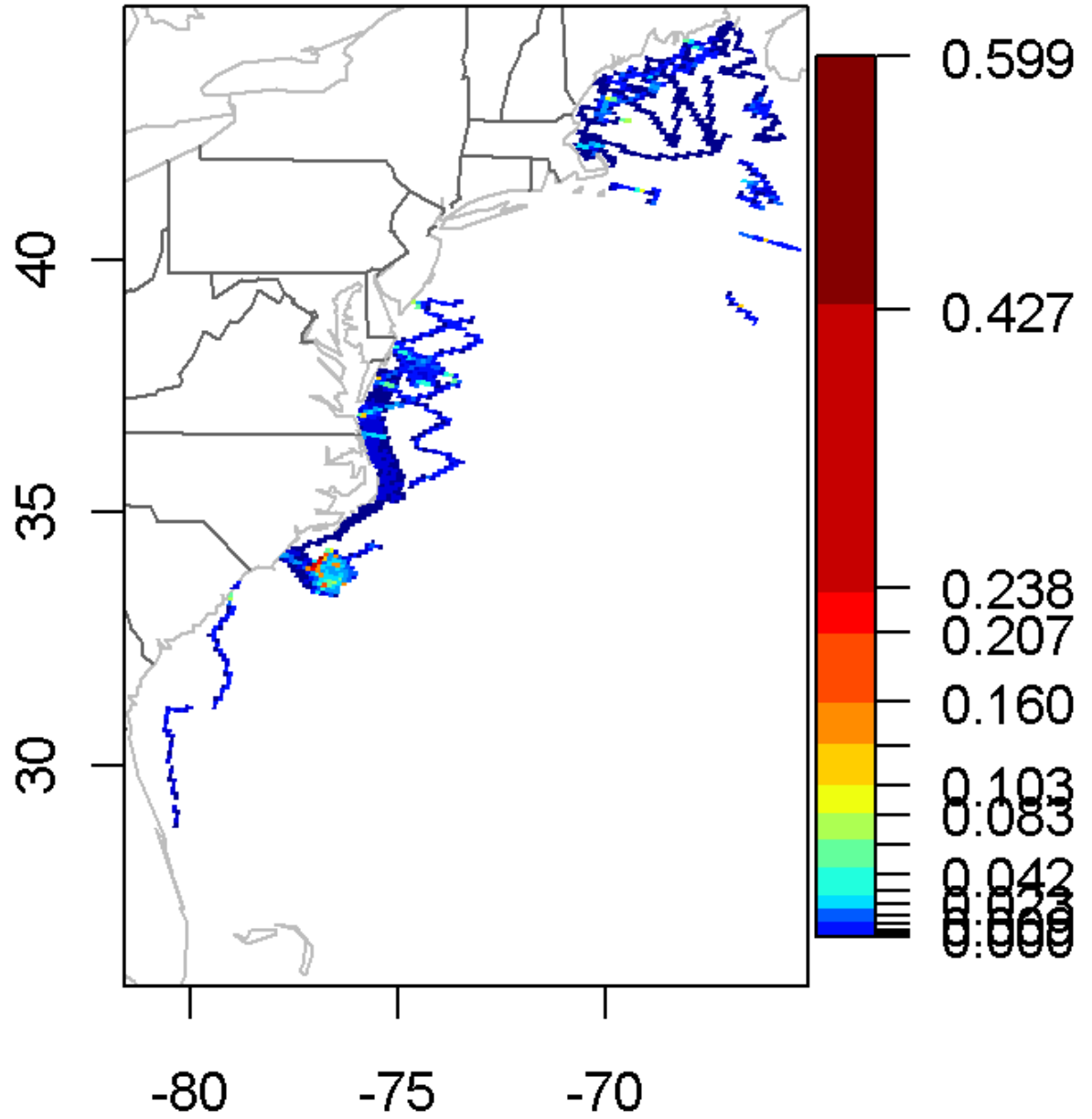


Figure 11: Map of effort(hours/km²) by cell summed through time for 'Baleen whales' guild during 'fall' season in 'east2' region.

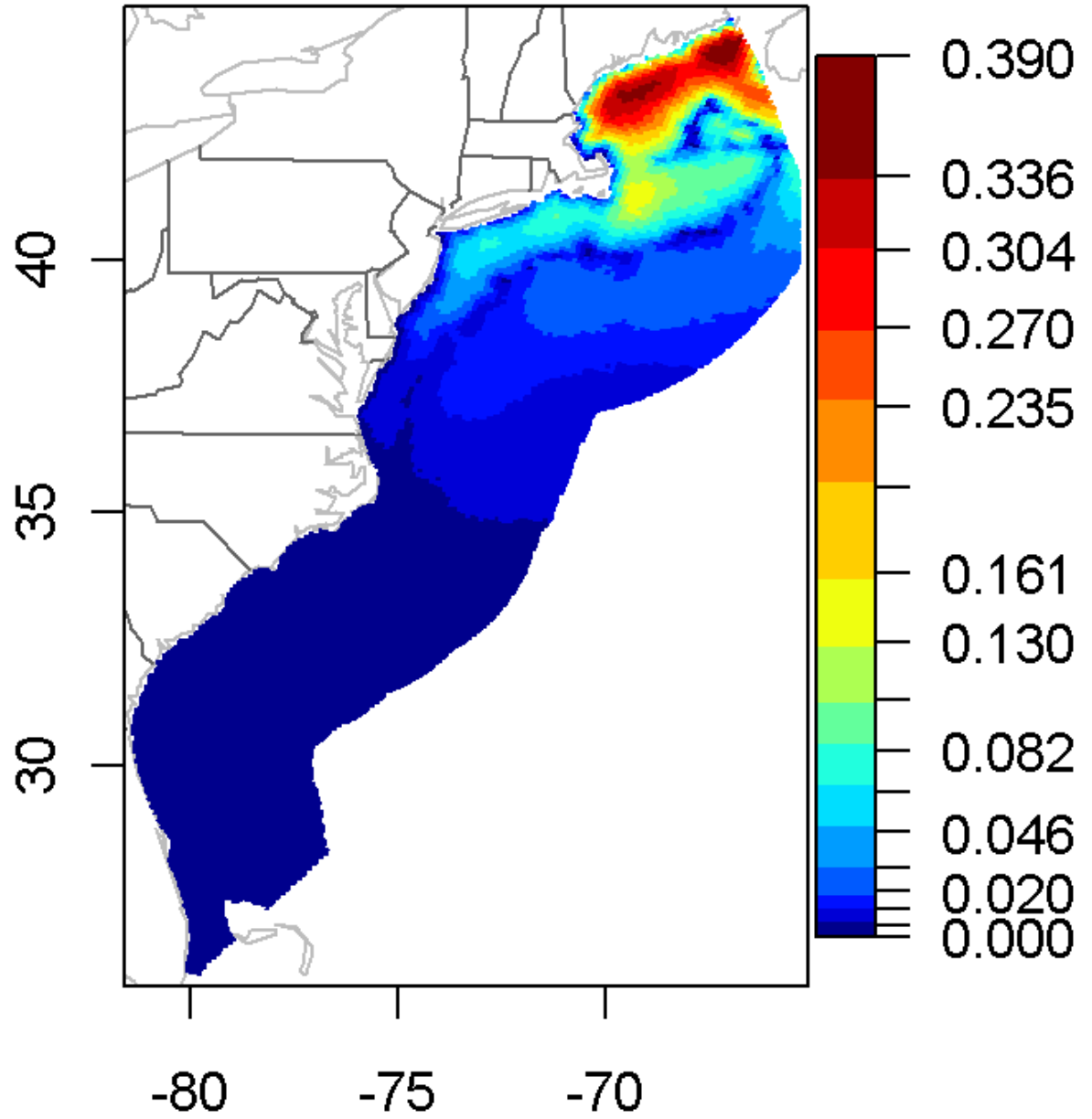


Figure 12: Map of mean predicted habitat for 'Baleen whales' guild during 'fall' season in 'east2' region.

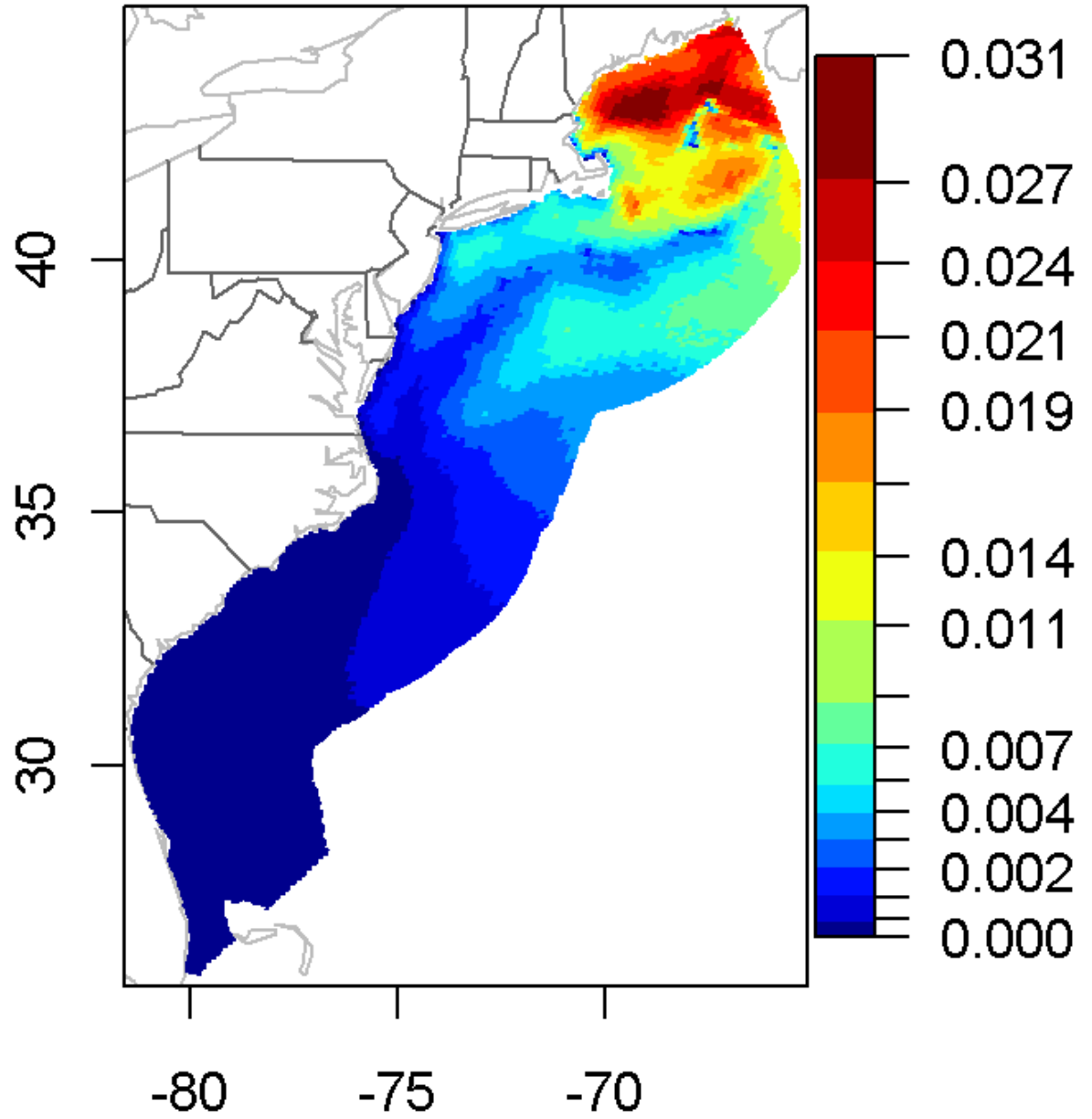


Figure 13: Map of standard error of habitat for 'Baleen whales' guild during 'fall' season in 'east2' region.

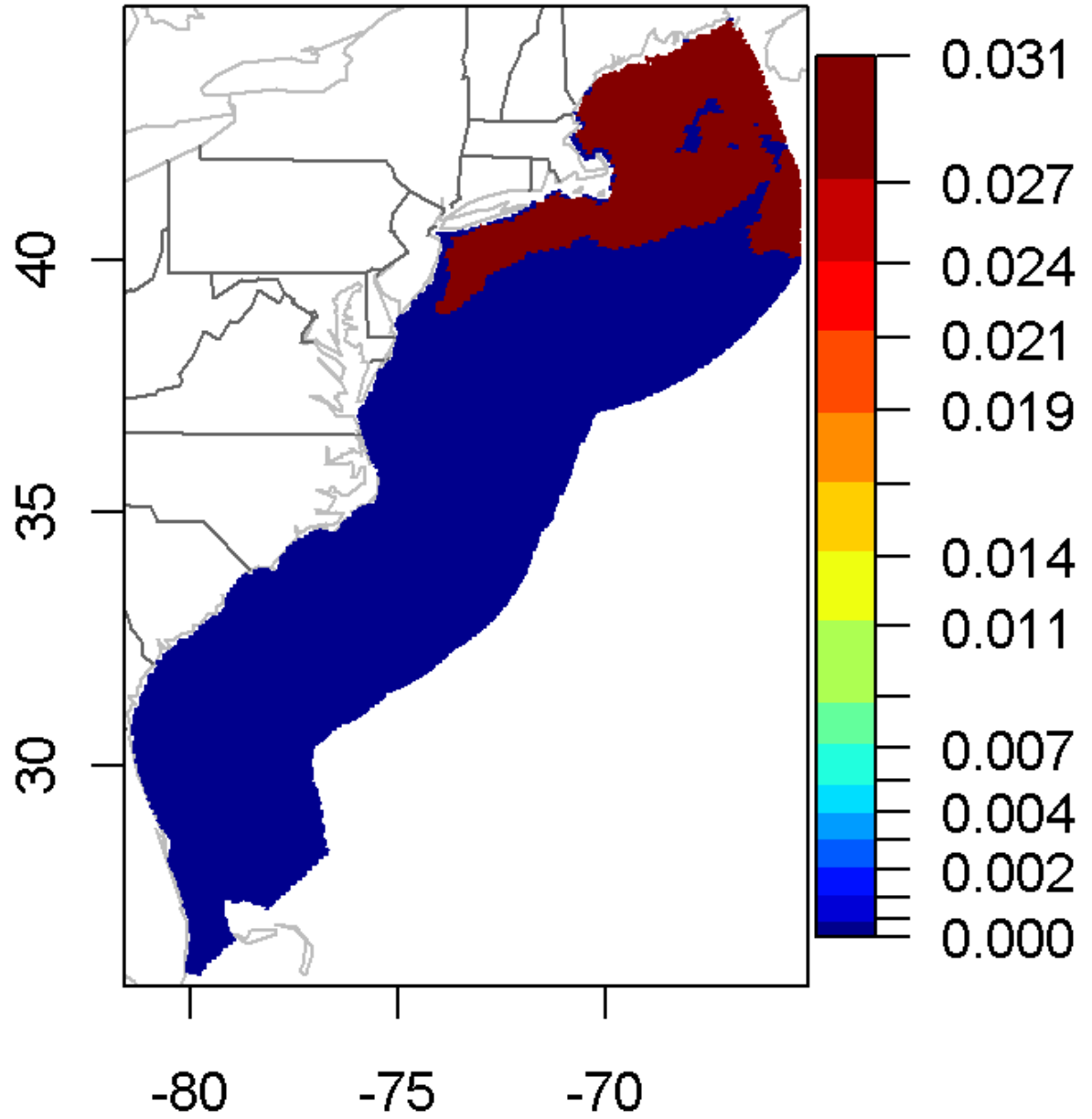


Figure 14: Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'fall' season in 'east2' region.

1.2 spring

1.2.1 east2

Modelrun identifier: duke_06_ba3_spring_east2

Date generated: 2008-10-21 14:37:25

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 3: Summary for duke(6) GAM model: for 'Baleen whales' guild during 'spring' season in 'east2' region.

	Value
Number.presences	16
Number.absences	2857
GAM.converged	TRUE
R.squared	0.413482
Deviance.explained	0.662309
ROC.optimum	0.931528
Maximum.fit	0.00451277
Maximum.prediction	1

Model text summary...

```
duke_06_ba3_spring_east2 run on Tue Oct 21 14:36:01 2008
  provider:duke, version:06, guild:Baleen whales (ba3), season:'spring', region:east2

max.fit:0.931528, max.prediction:1.000000, ROC.optimum:0.004513

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -299.90      32.45   -9.242  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.999   2.499 201.99 <2e-16 ***
s(log(d2shelf)) 1.997   2.497  67.84 <2e-16 ***
s(log(d2coast)) 1.977   2.477  32.55 <2e-16 ***
s(sst)         1.841   2.341  81.90 <2e-16 ***
s(lat)         1.993   2.493  31.86 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.413   Deviance explained = 66.2%
GCV score = 7.0221e-05   Scale est. = 6.9673e-05   n = 2490

summary(dat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1087  Min.    : 1654  Min.    :  4.0  Min.    :  995  Min.    : 1471  Min.    :  4.886  Min.    :26.17
se2:1786  1st Qu.:10323  1st Qu.: 20.0  1st Qu.: 13946  1st Qu.: 32021  1st Qu.: 13.386  1st Qu.:33.83
          Median :10844  Median : 29.0  Median : 31680  Median : 52718  Median : 17.732  Median :34.55
          Mean   : 9852  Mean   :236.4  Mean   : 41188  Mean   : 60965  Mean   : 16.976  Mean   :34.44
          3rd Qu.:11293  3rd Qu.: 45.0  3rd Qu.: 56624  3rd Qu.: 75007  3rd Qu.: 20.903  3rd Qu.:35.66
          Max.    :15889  Max.    :5270.0  Max.    :329182  Max.    :420801  Max.    : 26.475  Max.    :42.39
          NA's    :      6      NA's    :      6      NA's    :378.000

summary(newdat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :  5  Min.    : 1259  Min.    :  2.850  Min.    :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:  9.675  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :20.025	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.626	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.575	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :26.175	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :4.787e-16  Min.   :0.000e+00  Min.   :2.601e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.220e-16  1st Qu.:3.871e-15  1st Qu.:0.000e+00  1st Qu.:5.086e-04  1st Qu.:0.0000
Median :11616  Median :2.220e-16  Median :1.603e-14  Median :0.000e+00  Median :3.743e-03  Median :0.0000
Mean   :11171  Mean   :9.006e-02  Mean   :9.739e-03  Mean   :1.638e-02  Mean   :1.009e-02  Mean   :0.1247
3rd Qu.:14088  3rd Qu.:2.220e-16  3rd Qu.:6.470e-14  3rd Qu.:0.000e+00  3rd Qu.:9.634e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :1.000e+00  Max.   :8.389e-01  Max.   :2.000e+00  Max.   :2.202e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.911e+03  NA's :8.911e+03
```

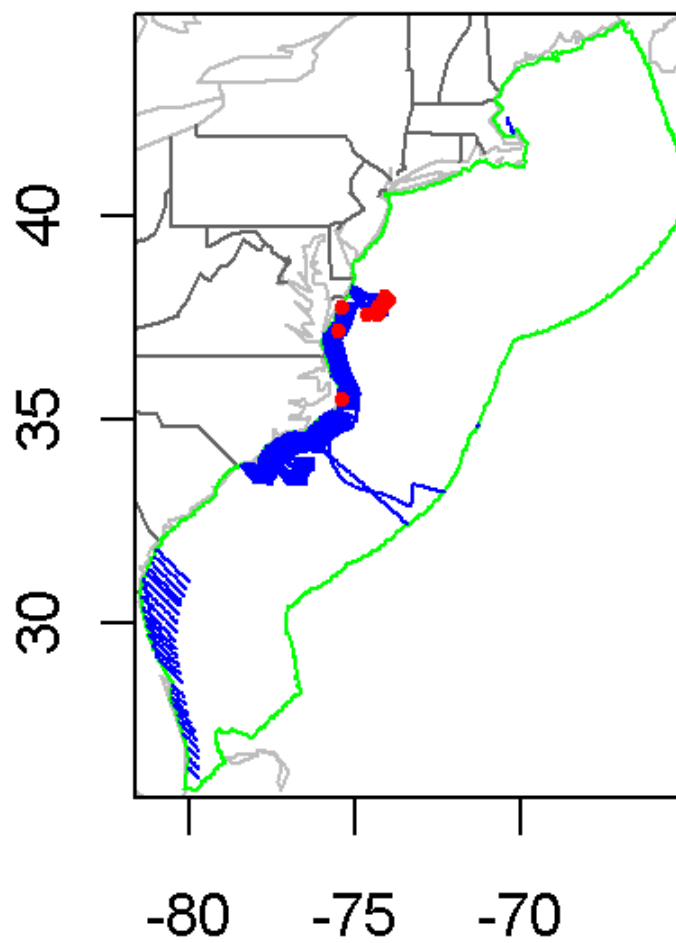


Figure 15: Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'spring' season in 'east2' region.

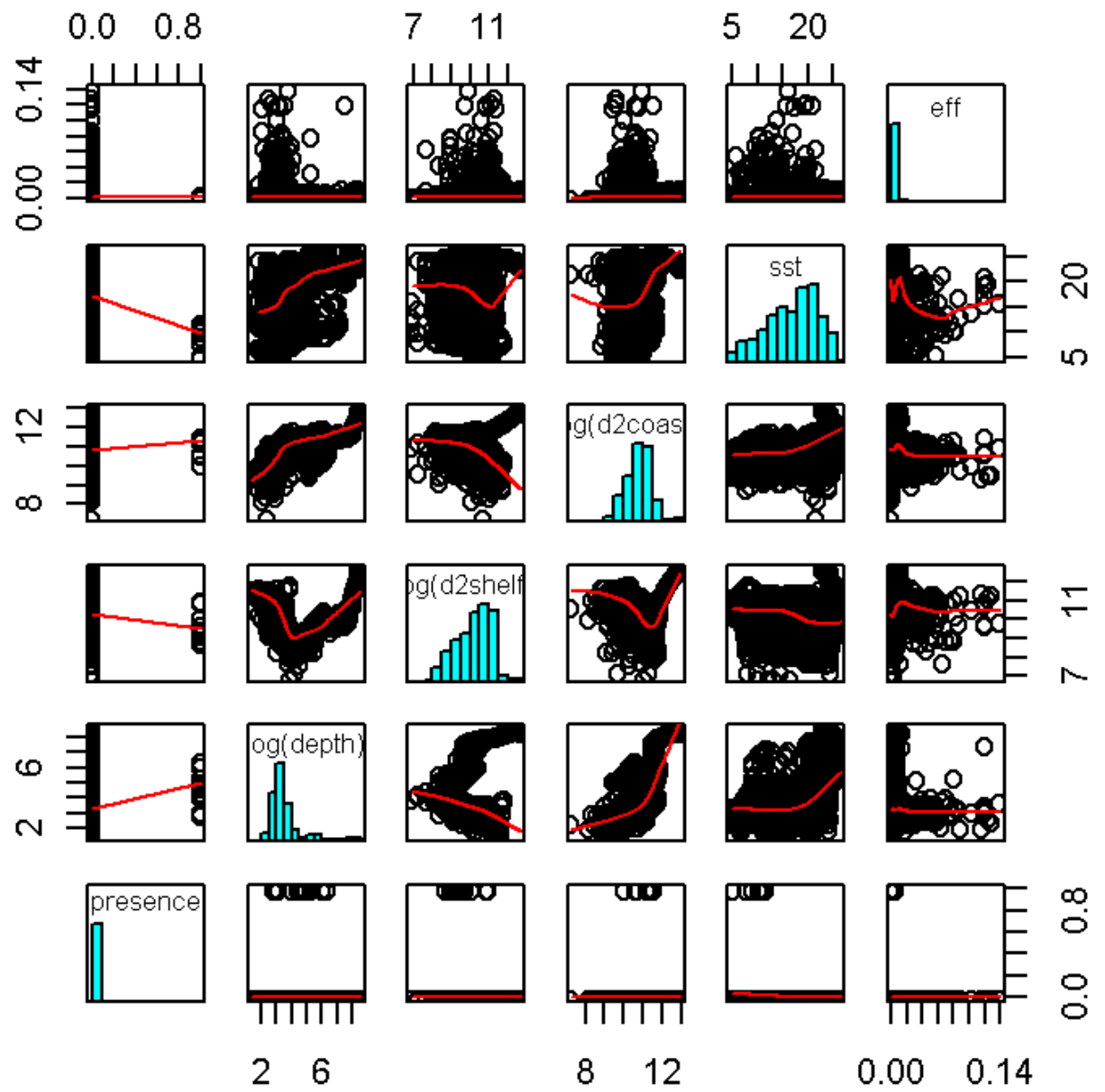


Figure 16: Pairs plot of input variables for 'Baleen whales' guild during 'spring' season in 'east2' region.

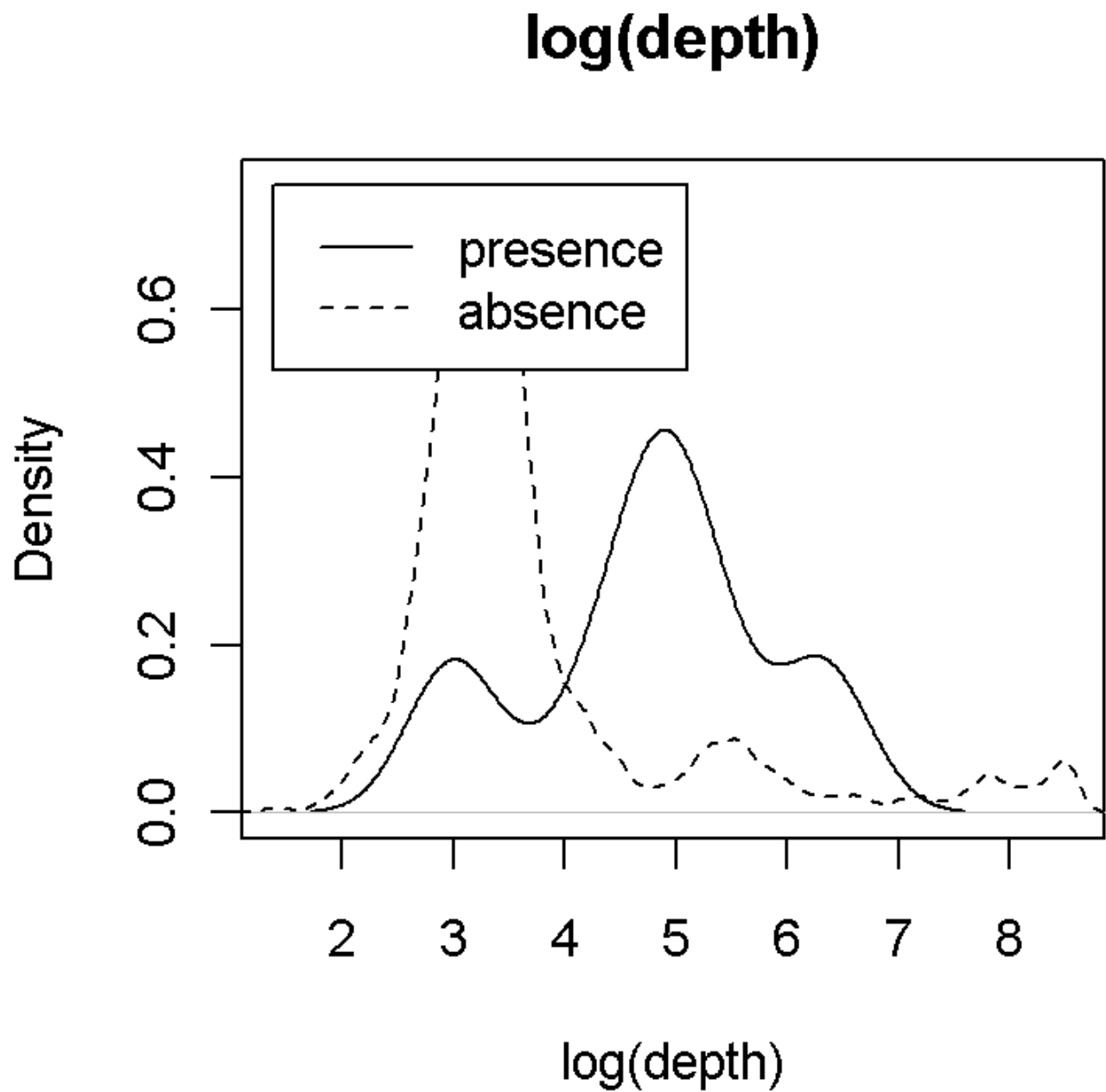


Figure 17: Density histogram of depth log(meters) for 'Baleen whales' guild during 'spring' season in 'east2' region.

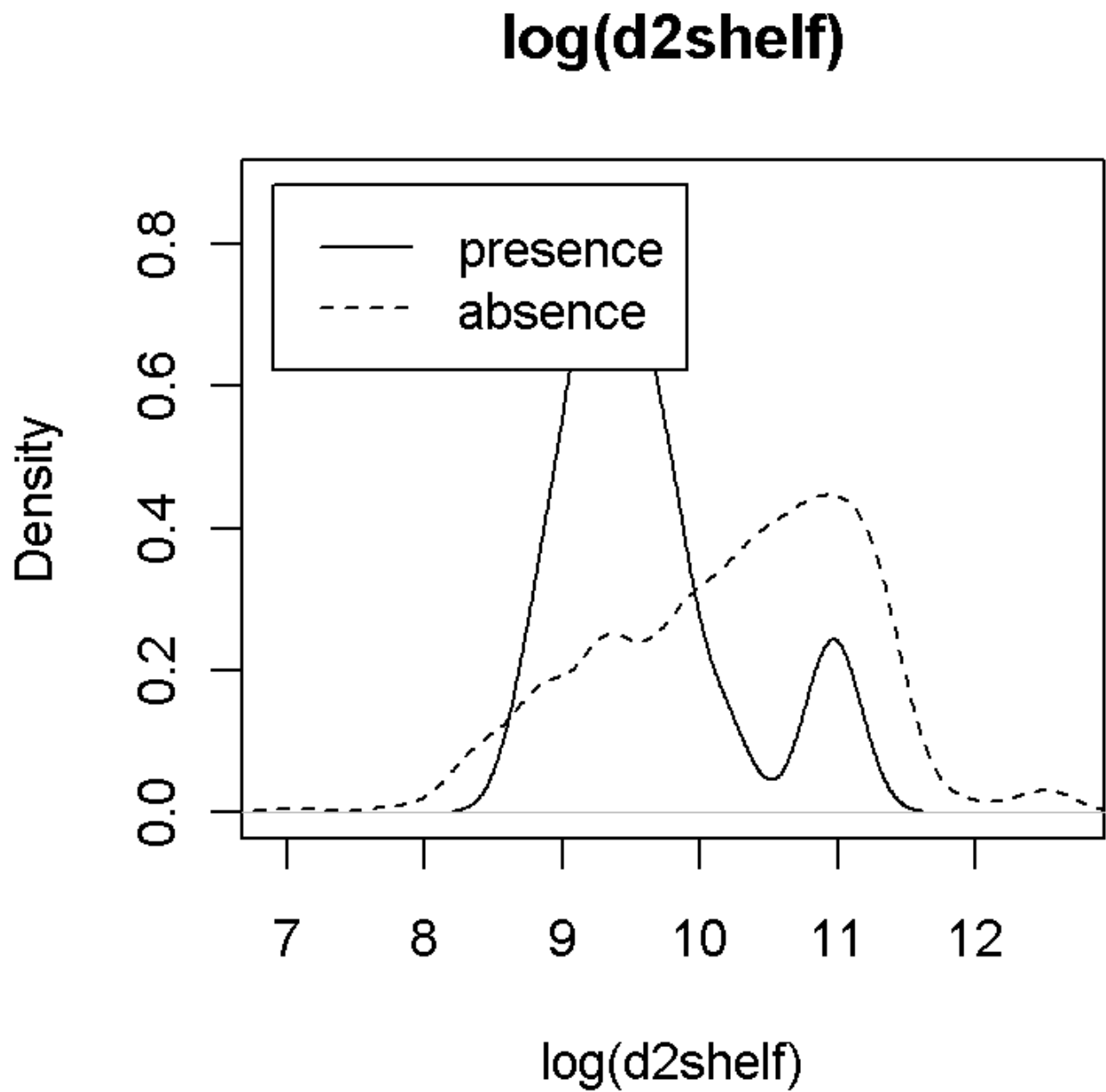


Figure 18: Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'spring' season in 'east2' region.

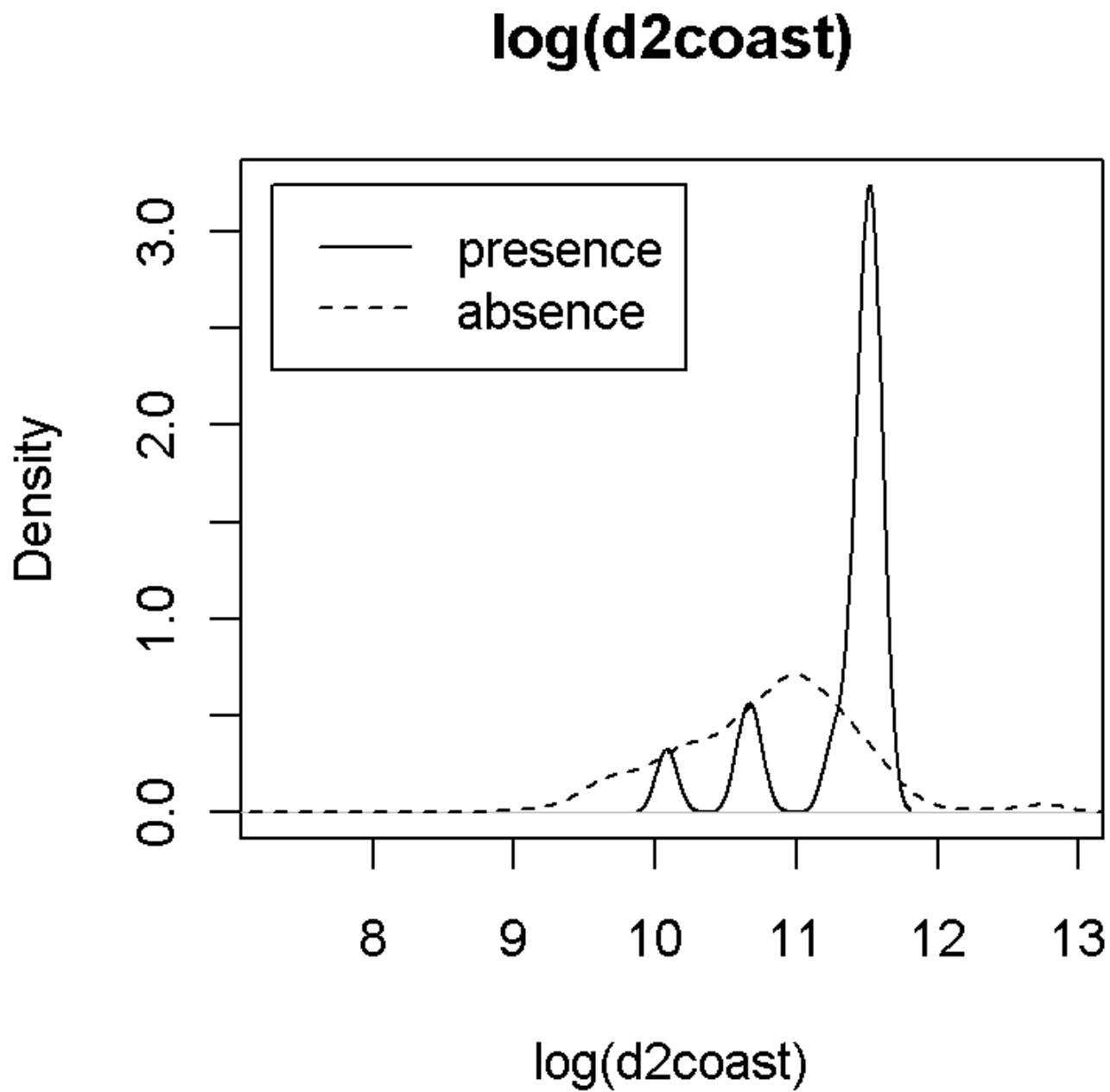


Figure 19: Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'spring' season in 'east2' region.

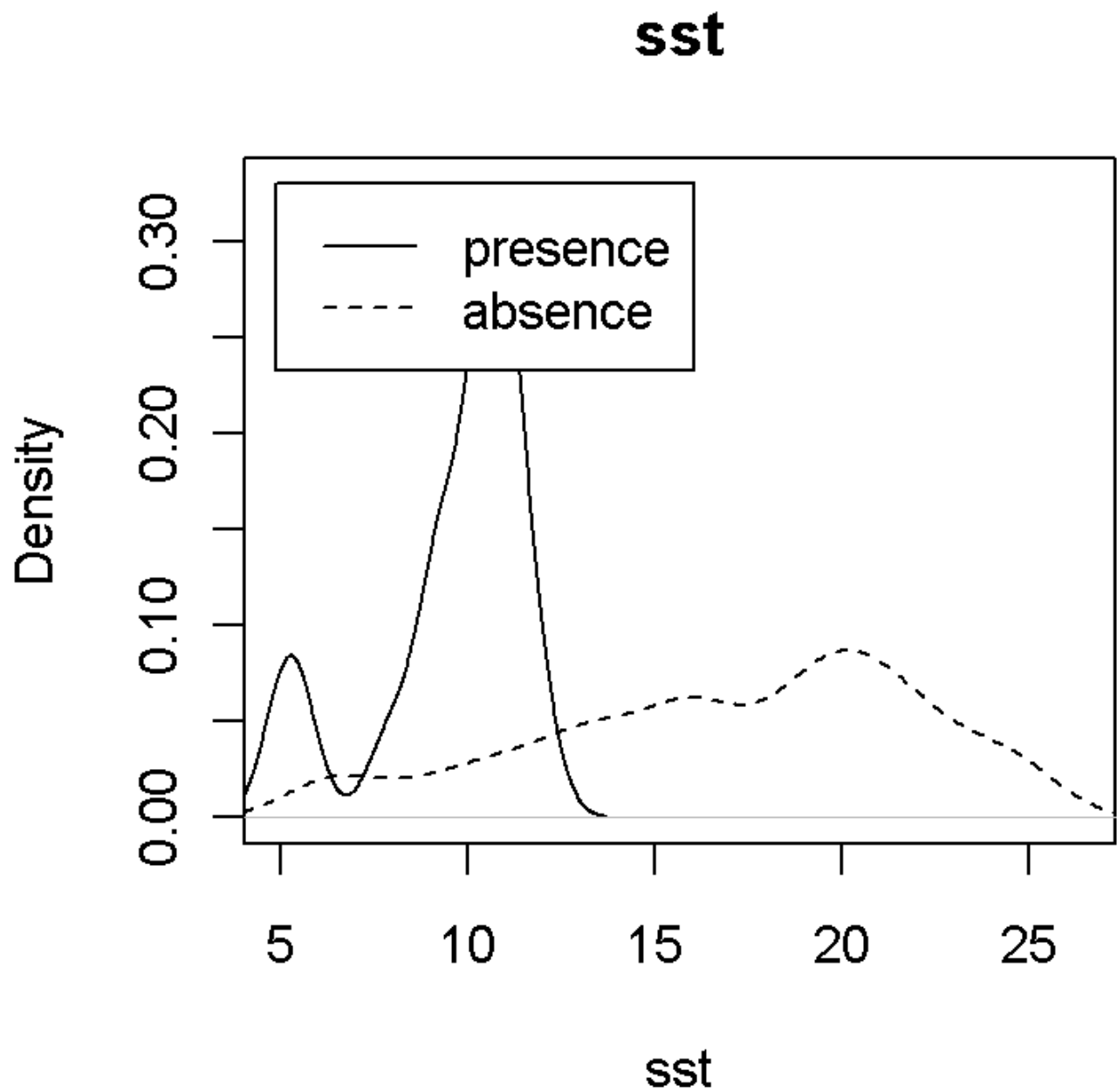


Figure 20: Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'spring' season in 'east2' region.

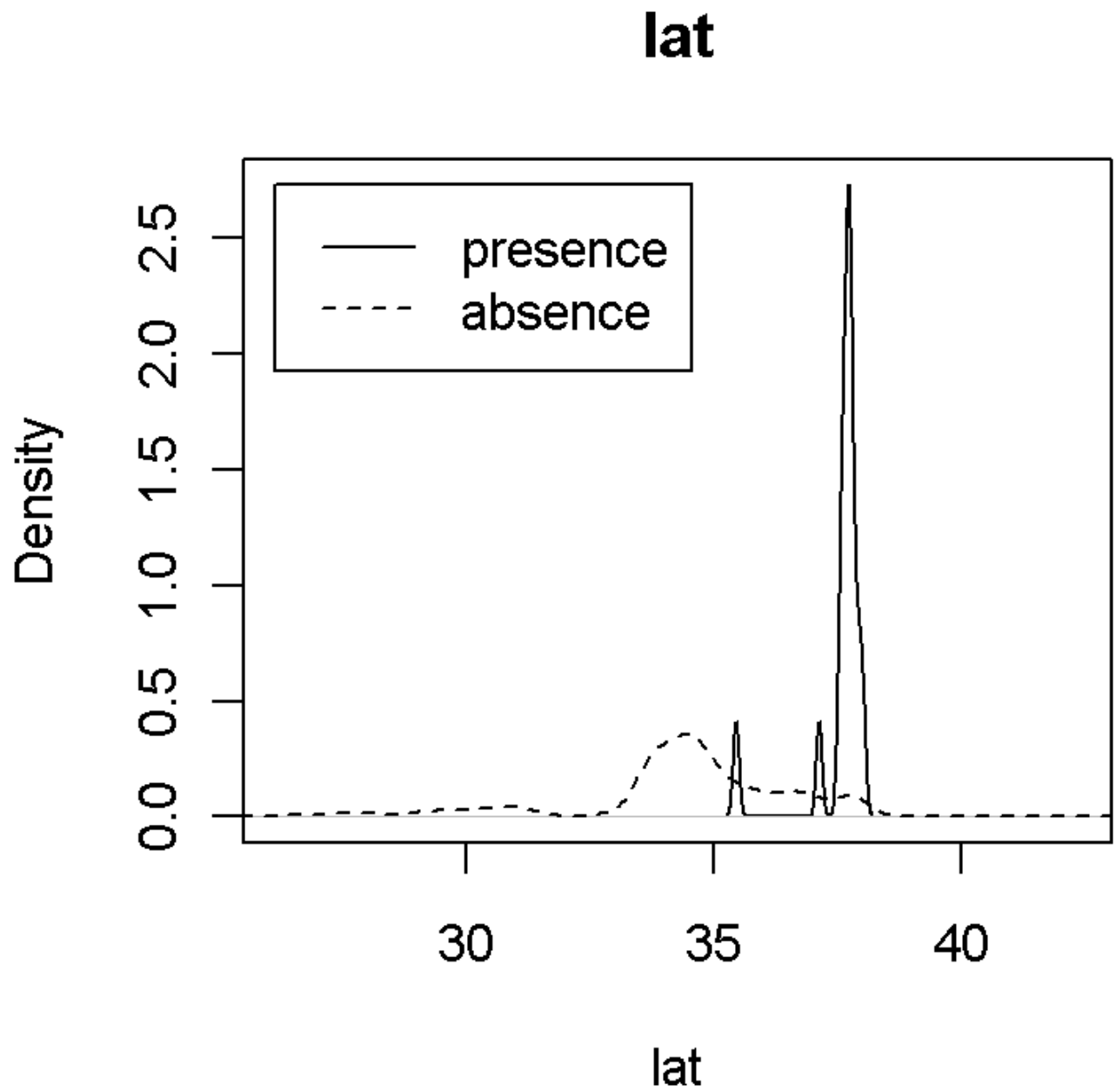


Figure 21: Density histogram of latitude (degrees) for 'Baleen whales' guild during 'spring' season in 'east2' region.

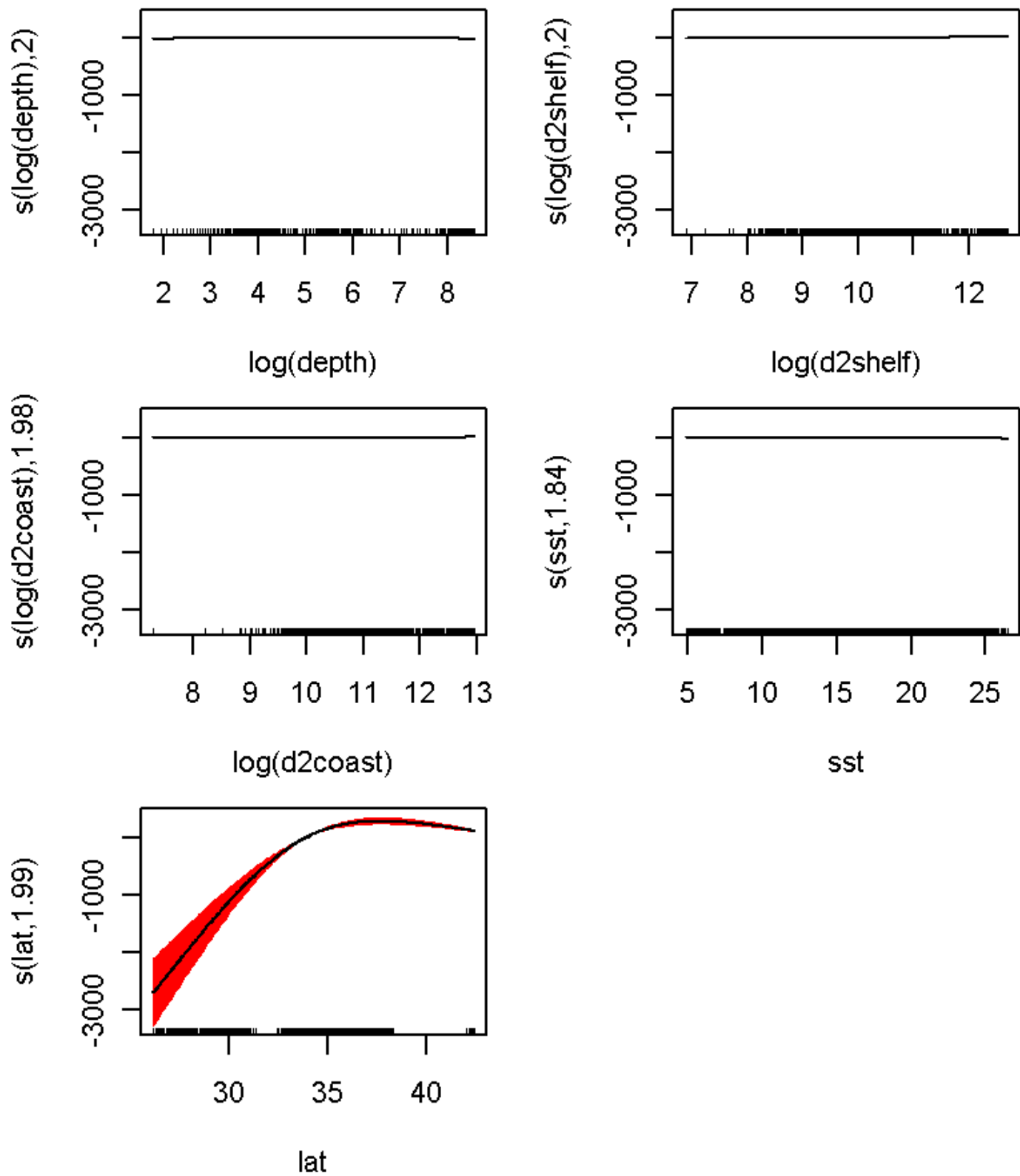


Figure 22: Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'spring' season in 'east2' region.

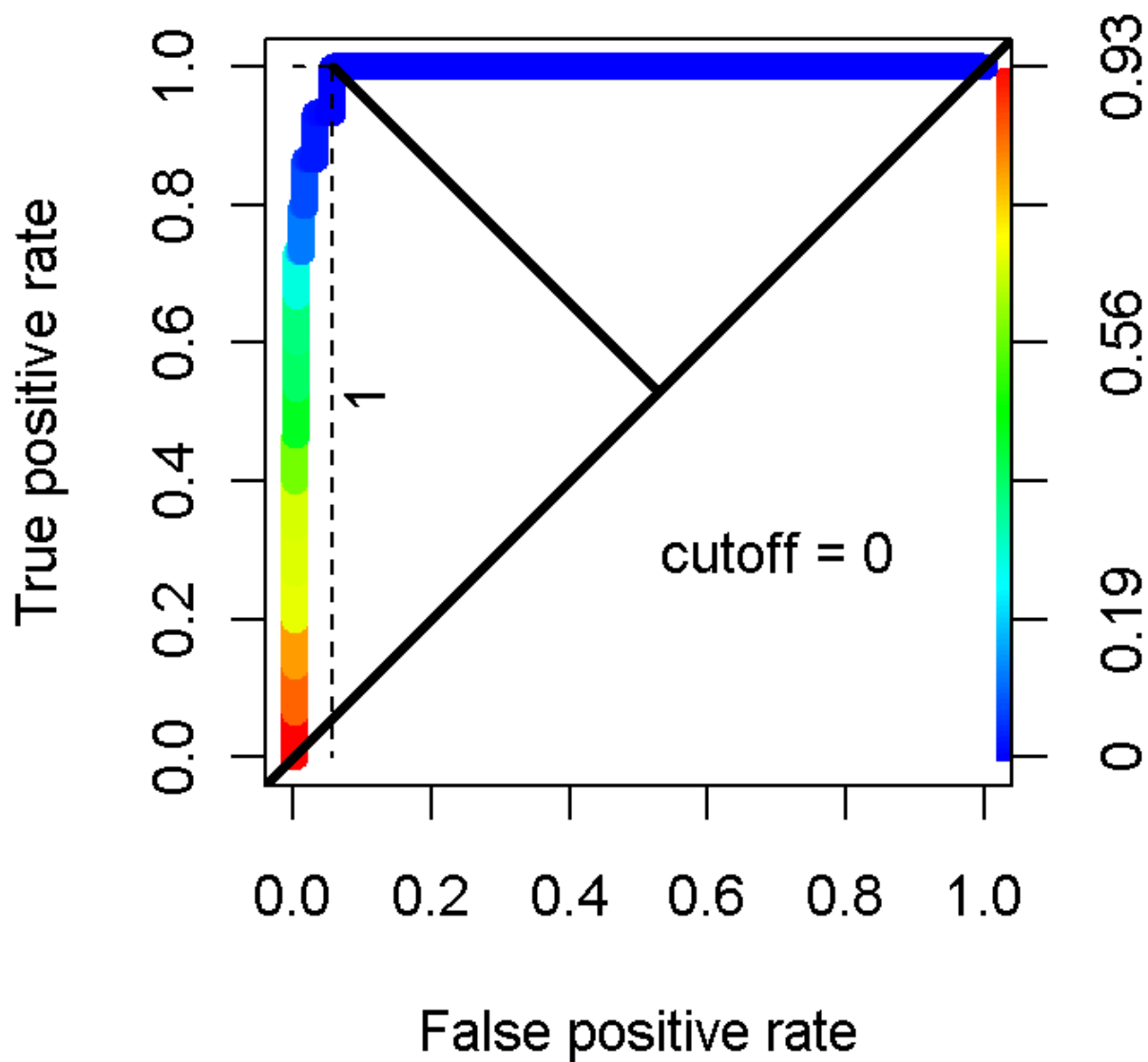


Figure 23: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'spring' season in 'east2' region.

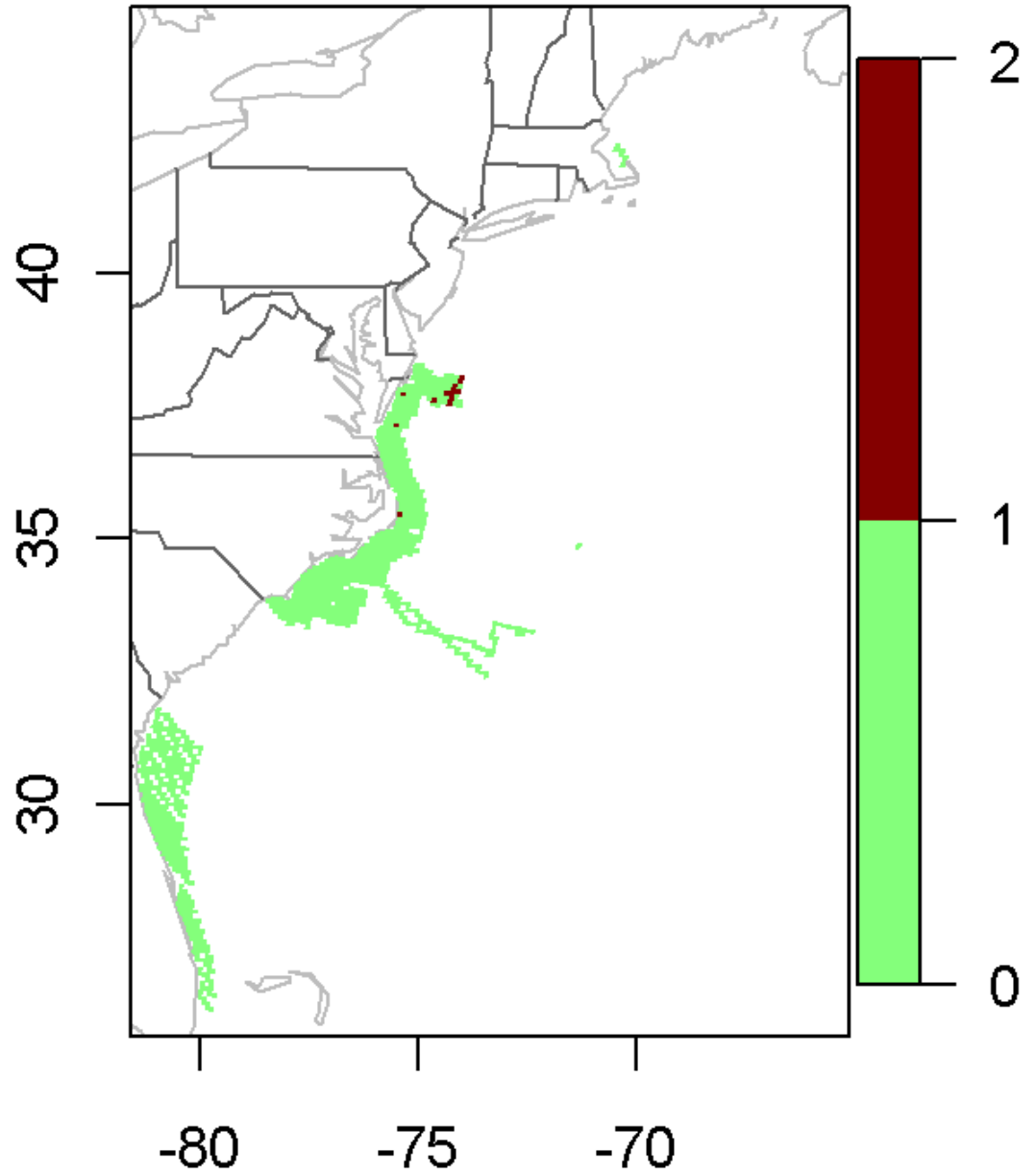


Figure 24: Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'spring' season in 'east2' region.

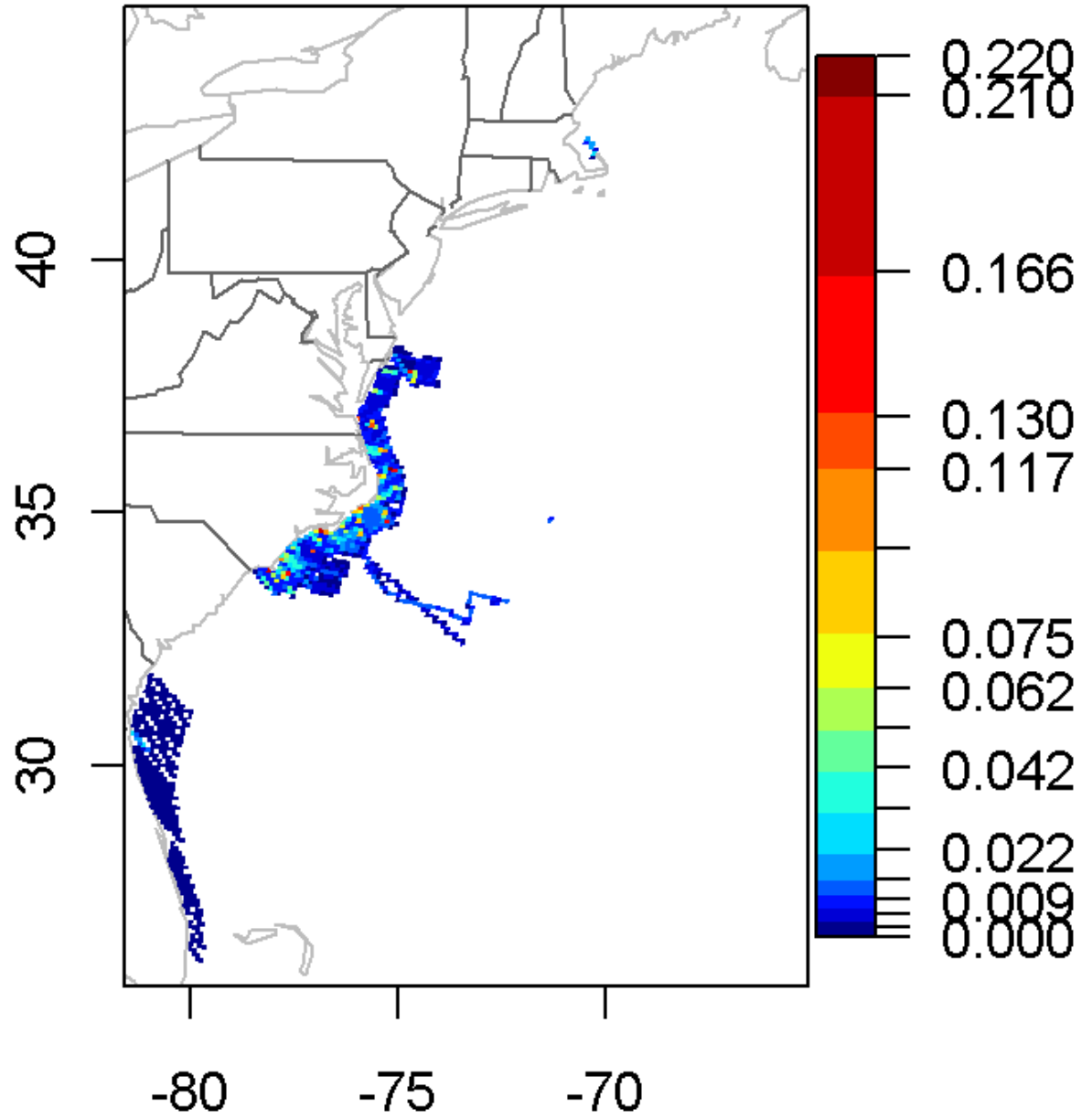


Figure 25: Map of effort(hours/km²) by cell summed through time for 'Baleen whales' guild during 'spring' season in 'east2' region.

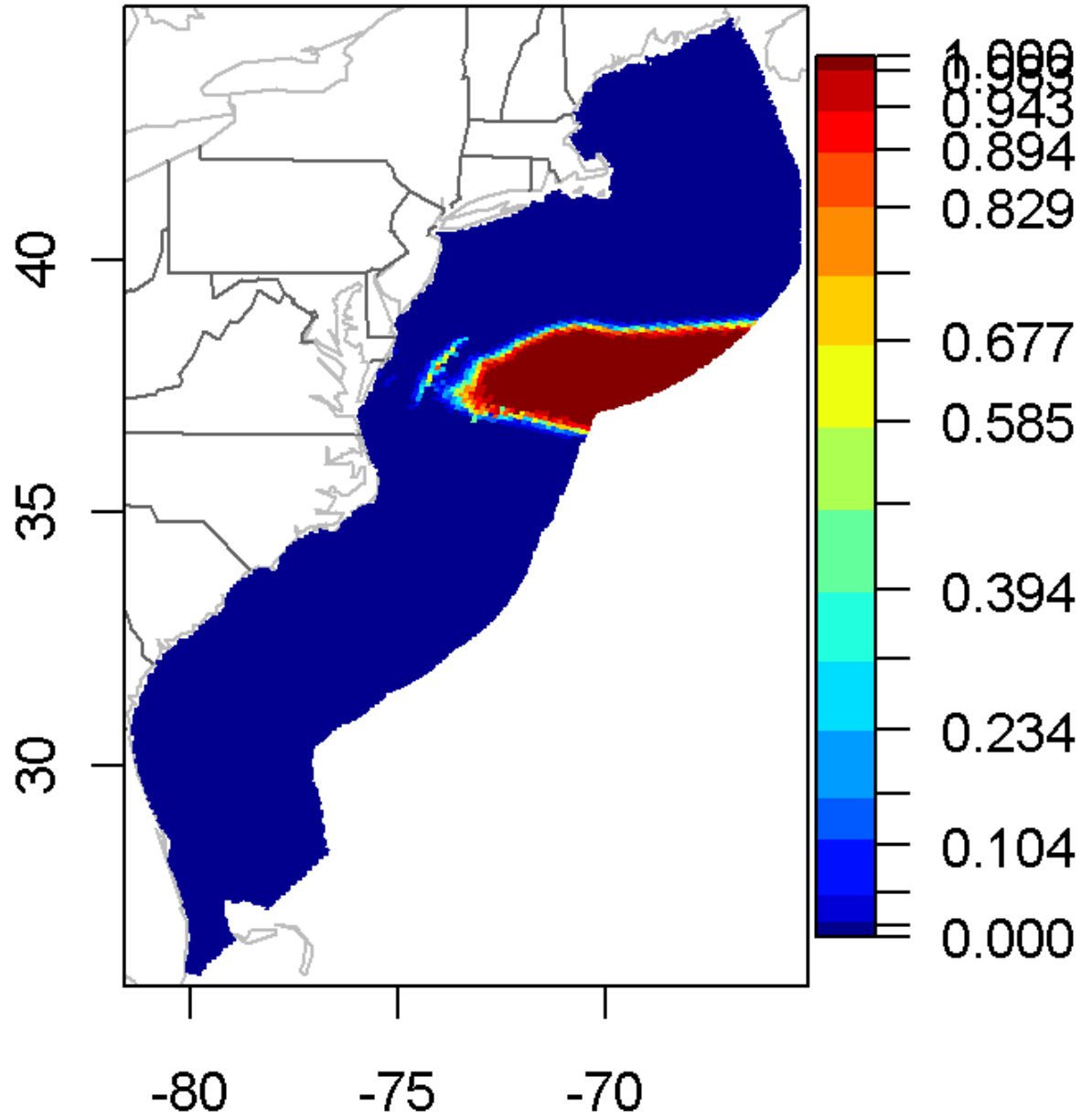


Figure 26: Map of mean predicted habitat for 'Baleen whales' guild during 'spring' season in 'east2' region.

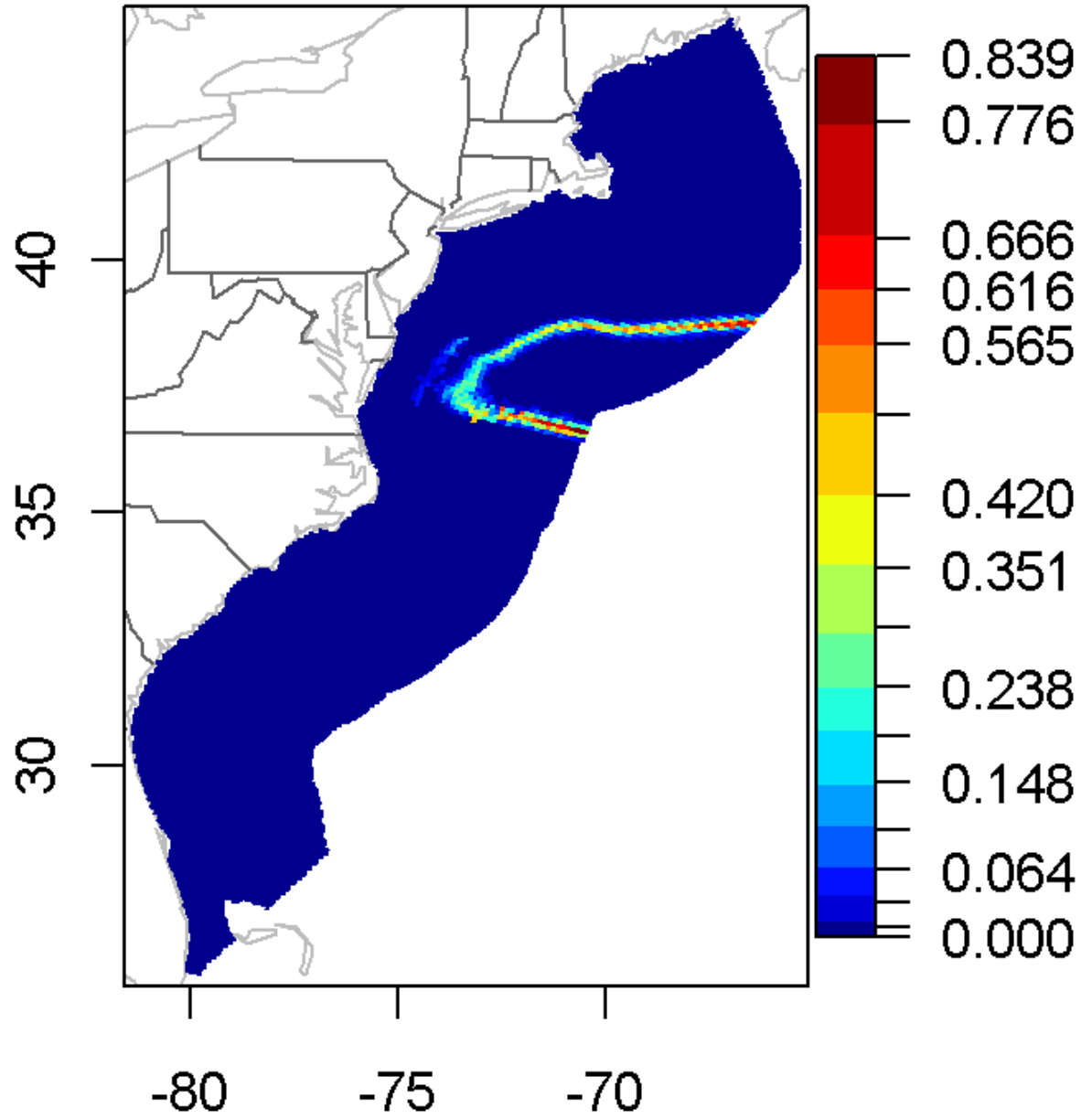


Figure 27: Map of standard error of habitat for 'Baleen whales' guild during 'spring' season in 'east2' region.

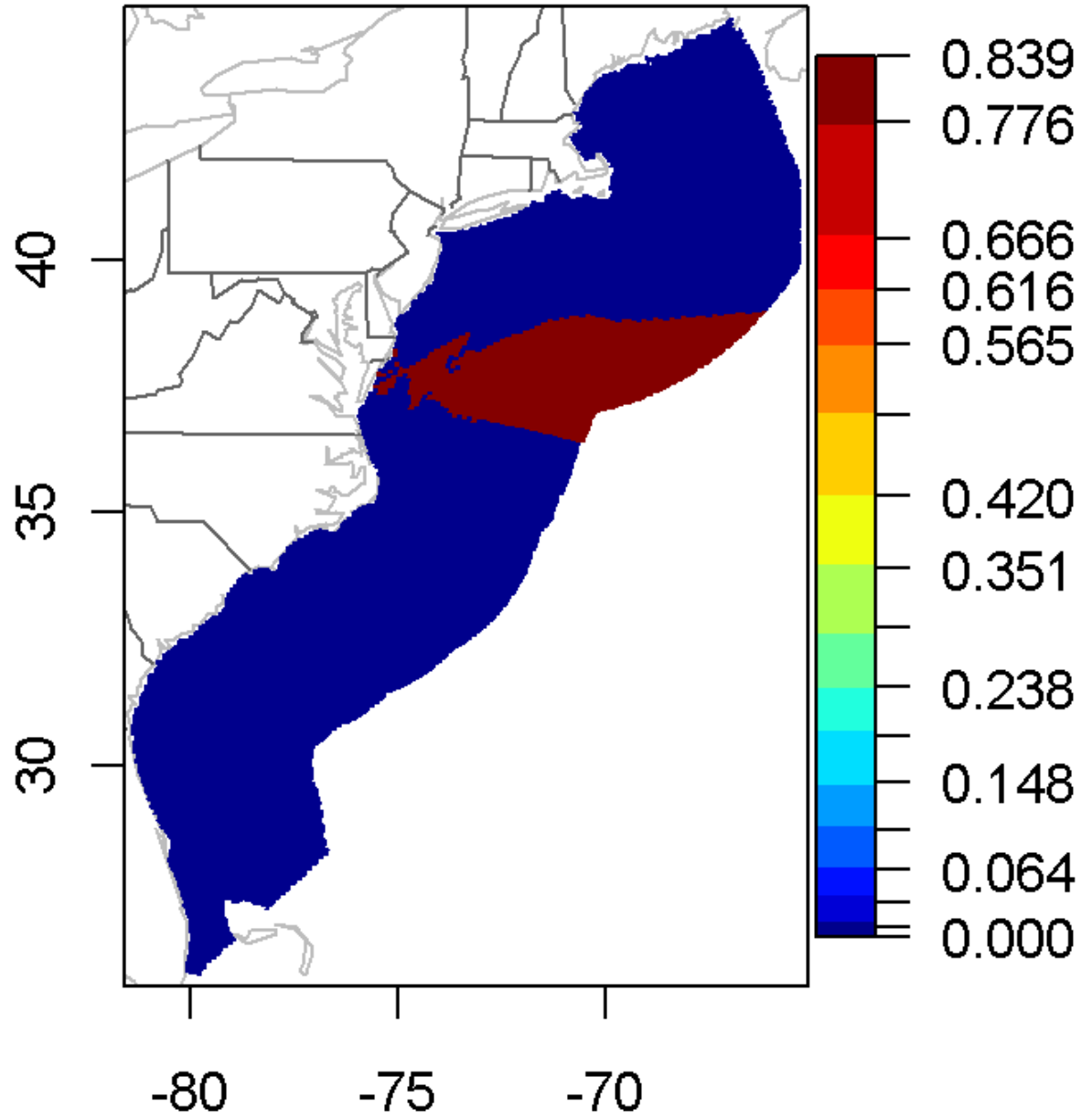


Figure 28: Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'spring' season in 'east2' region.

1.2.2 gomex2

Modelrun identifier: duke_06_ba3_spring_gomex2

Date generated: 2008-10-21 11:44:17

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 4: Summary for duke(6) GAM model: for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	8
Number.absences	4809
GAM.converged	TRUE
R.squared	0.0261755
Deviance.explained	0.35311
ROC.optimum	0.0826606
Maximum.fit	0.0063995
Maximum.prediction	0.103877

Model text summary...

```
duke_06_ba3_spring_gomex2 run on Tue Oct 21 11:43:00 2008
provider:duke, version:06, guild:Baleen whales (ba3), season:'spring', region:gomex2

max.fit:0.082661, max.prediction:0.103877, ROC.optimum:0.006399

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -19.699      1.219   -16.16  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  3.984e-07  0.500  6.30e-05  0.9305
s(log(d2shelf)) 1.972e+00  2.472  53.230  <2e-16 ***
s(log(d2coast))  3.727e-07  0.500  2.23e-06  0.9698
s(sst)          7.512e-01  1.251   5.506  0.0129 *
s(lat)          9.665e-01  1.467  146.012  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0262  Deviance explained = 35.3%
GCV score = 0.00021156  Scale est. = 0.00021119  n = 4817

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:4817  Min.   : 14   Min.   : 11   Min.   : 272   Min.   : 21187   Min.   :19.73   Min.   :24.05
              1st Qu.:2144   1st Qu.: 511   1st Qu.: 24696   1st Qu.:142982   1st Qu.:24.23   1st Qu.:26.38
              Median :4222   Median :1292   Median : 63128   Median :211670   Median :25.35   Median :27.38
              Mean   :3977   Mean   :1537   Mean   : 82827   Mean   :213952   Mean   :25.14   Mean   :27.25
              3rd Qu.:5932   3rd Qu.:2668   3rd Qu.:131568   3rd Qu.:276022   3rd Qu.:26.17   3rd Qu.:28.13
              Max.   :8191   Max.   :3523   Max.   :257870   Max.   :404358   Max.   :28.42   Max.   :30.06

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :19.95   Min.   :23.85
              1st Qu.:1861   1st Qu.: 46.0   1st Qu.: 31617   1st Qu.: 85289   1st Qu.:21.83   1st Qu.:26.28
              Median :4110   Median : 433.5   Median : 71100   Median :157258   Median :23.02   Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:4.062e-16	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.00000
1st Qu.	:1861	1st Qu.	:3.947e-13	1st Qu.	:7.936e-13	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.00000
Median	:4110	Median	:1.961e-09	Median	:2.442e-09	Median	:0.000e+00	Median	:9.499e-03	Median	:0.00000
Mean	:3997	Mean	:1.367e-03	Mean	:1.334e-04	Mean	:5.453e-03	Mean	:2.365e-02	Mean	:0.04197
3rd Qu.	:6015	3rd Qu.	:8.299e-06	3rd Qu.	:4.648e-06	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:0.00000
Max.	:8351	Max.	:1.039e-01	Max.	:7.989e-03	Max.	:2.000e+00	Max.	:2.695e-01	Max.	:1.00000
						NA's	:4.838e+03	NA's	:4.838e+03		

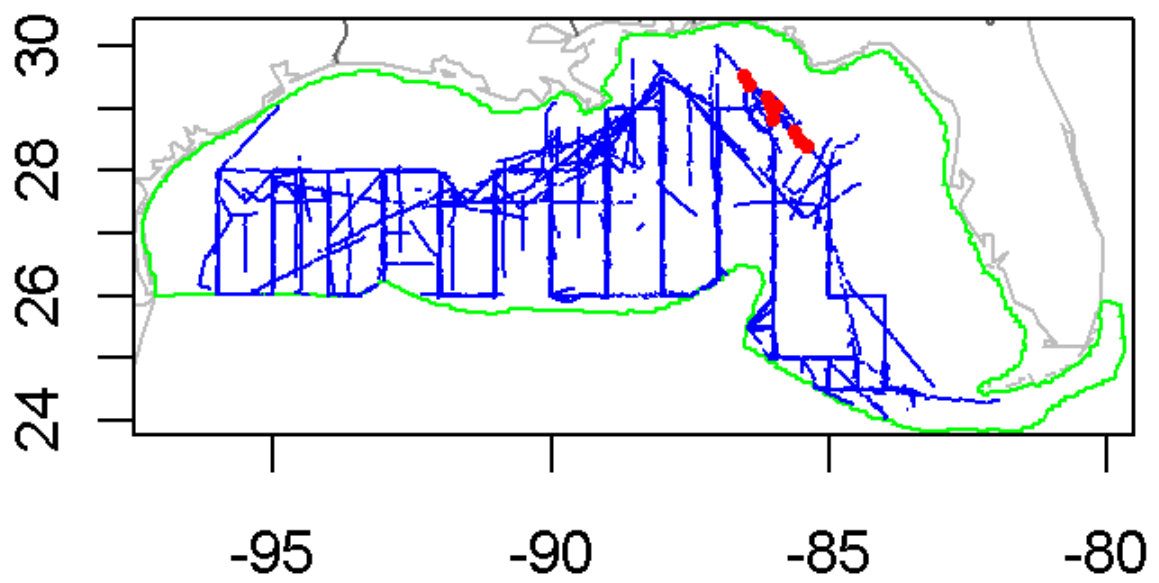


Figure 29: Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

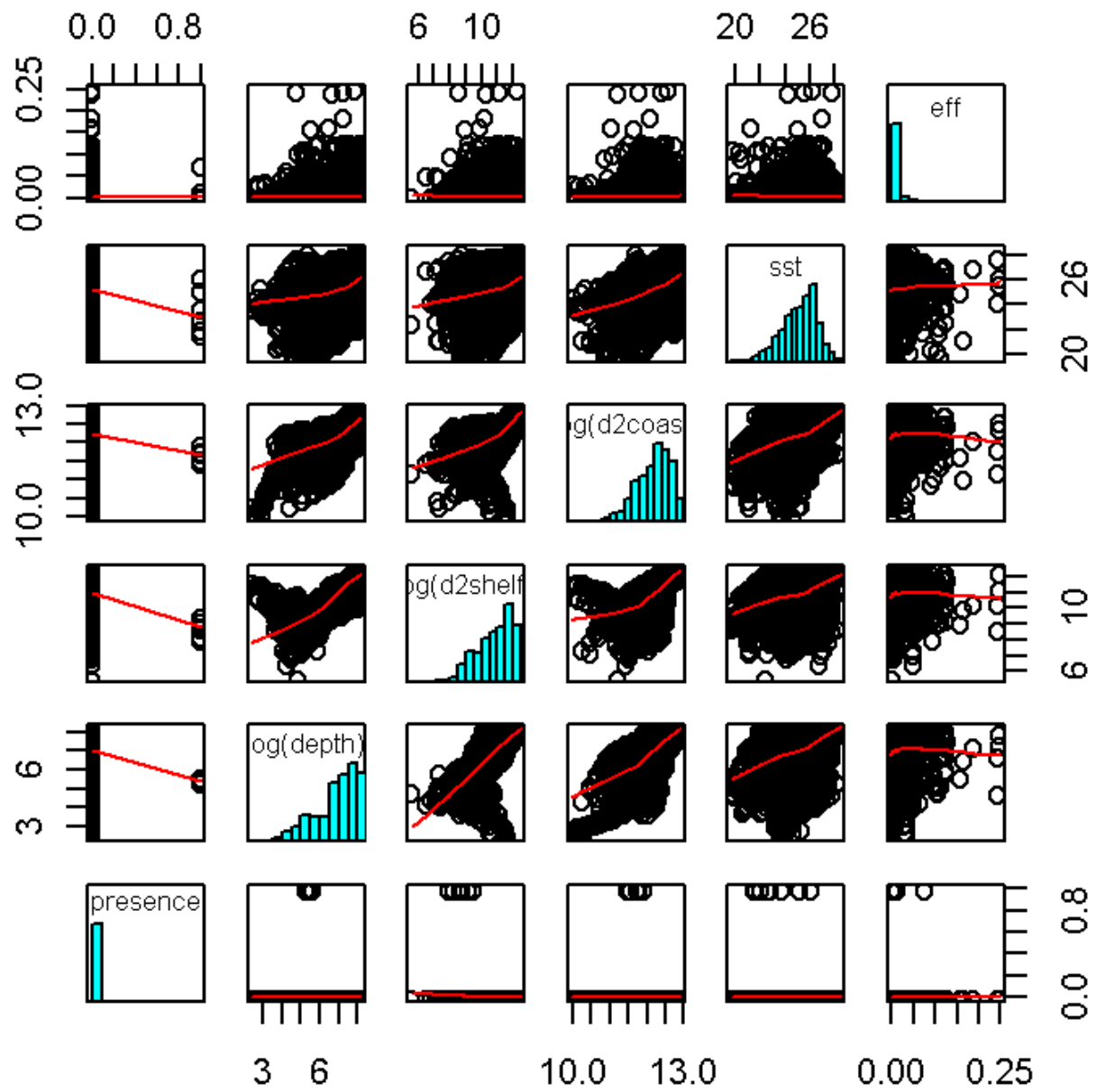


Figure 30: Pairs plot of input variables for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

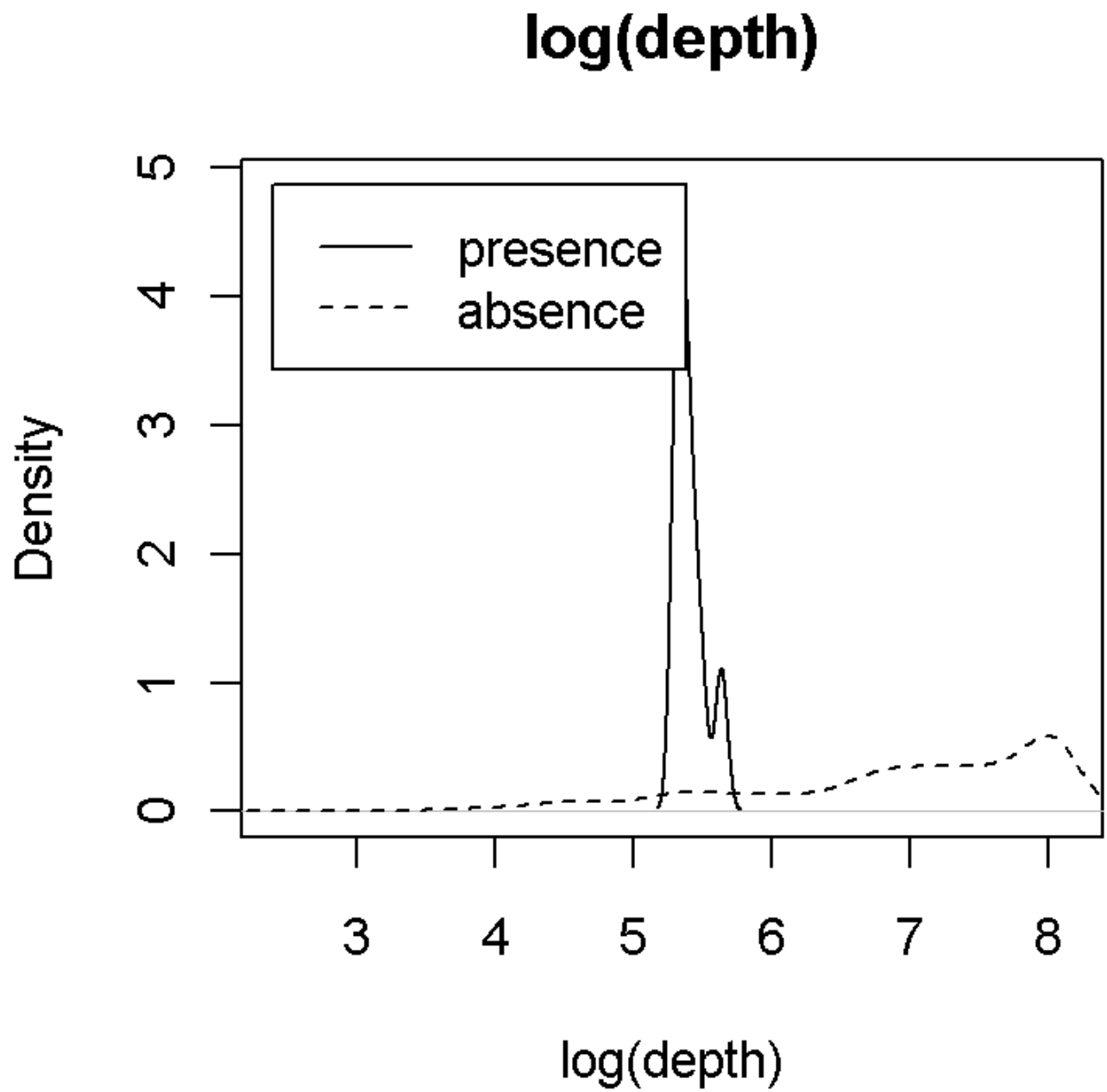


Figure 31: Density histogram of depth log(meters) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

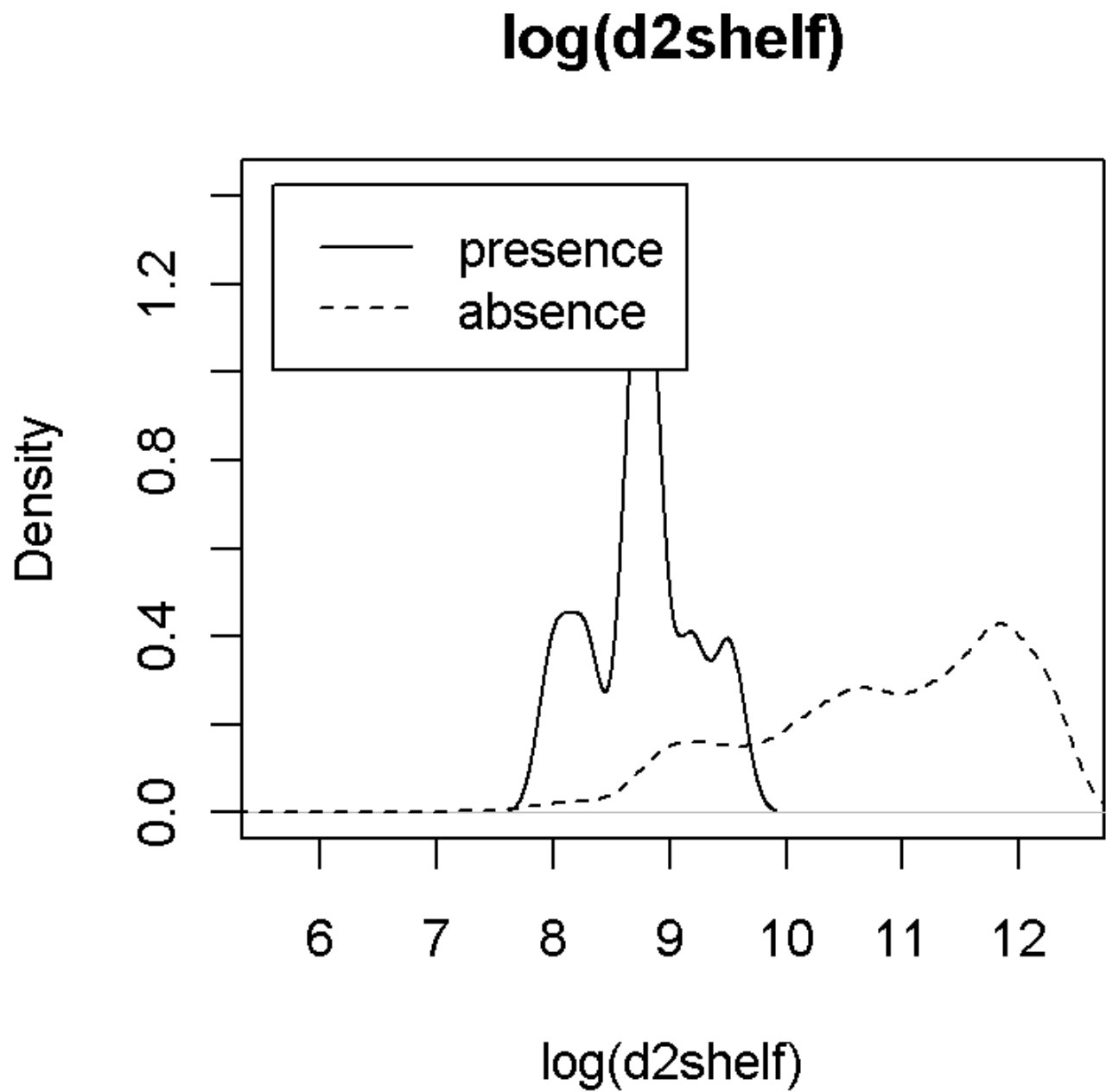


Figure 32: Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

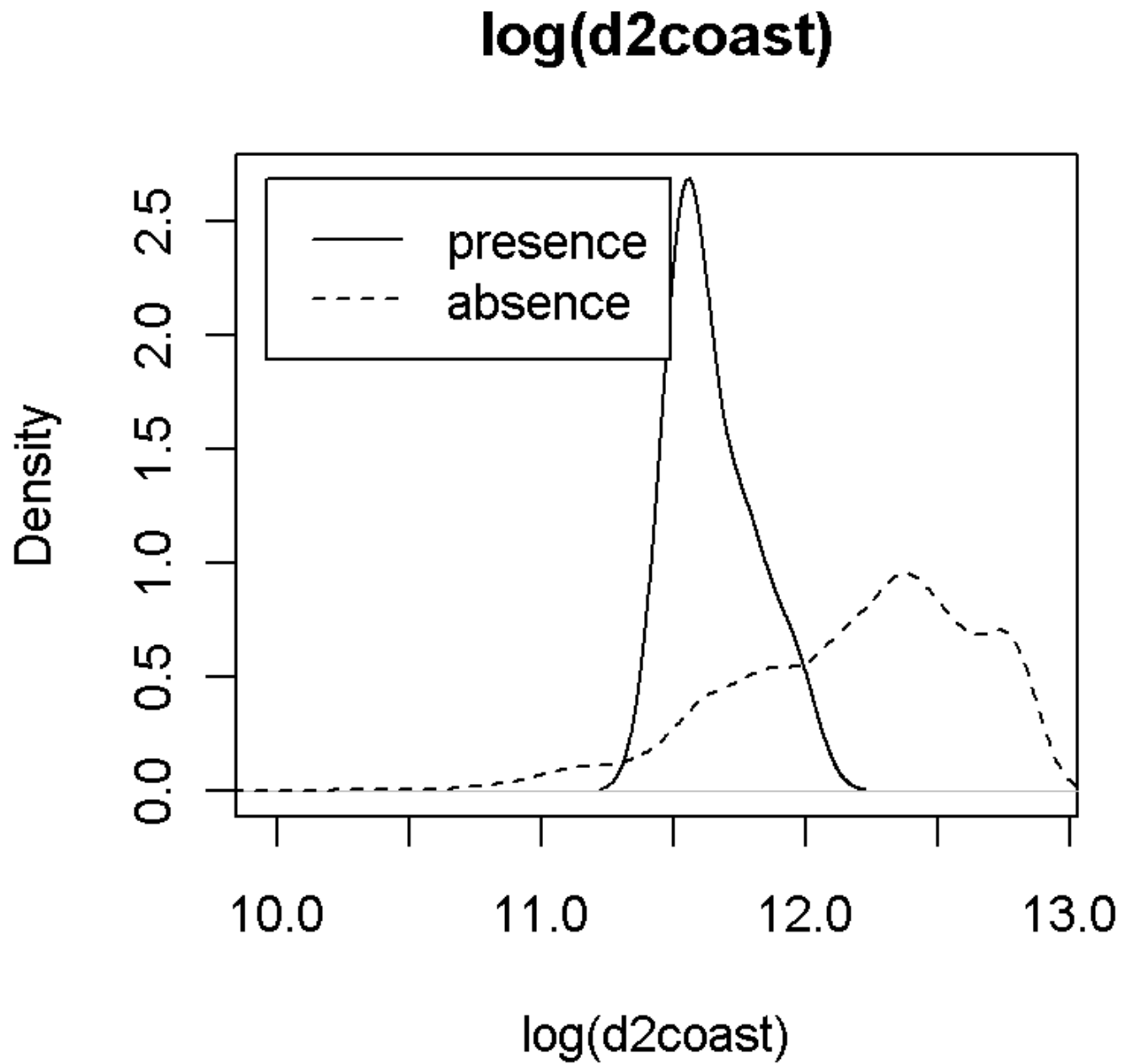


Figure 33: Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

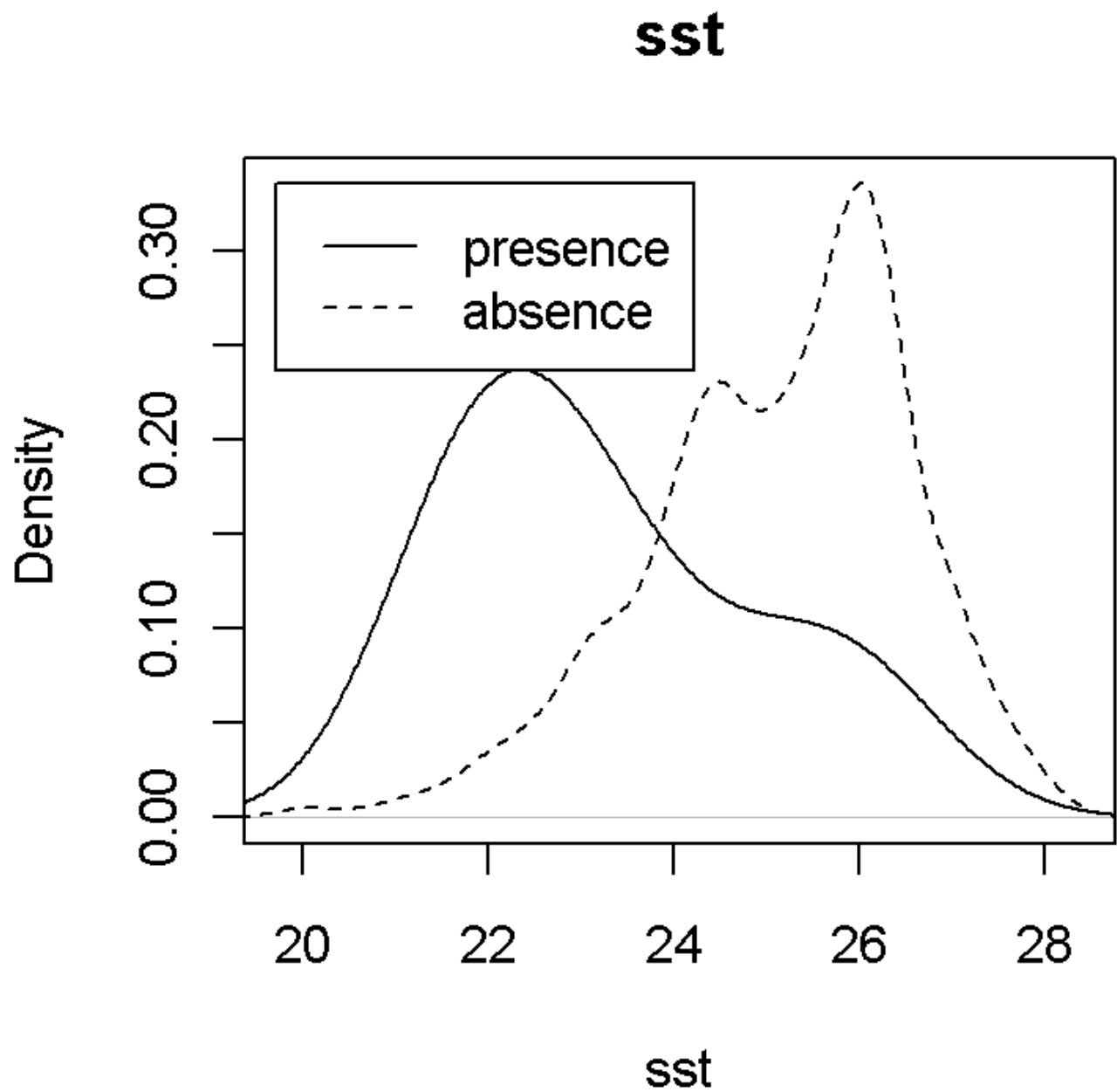


Figure 34: Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

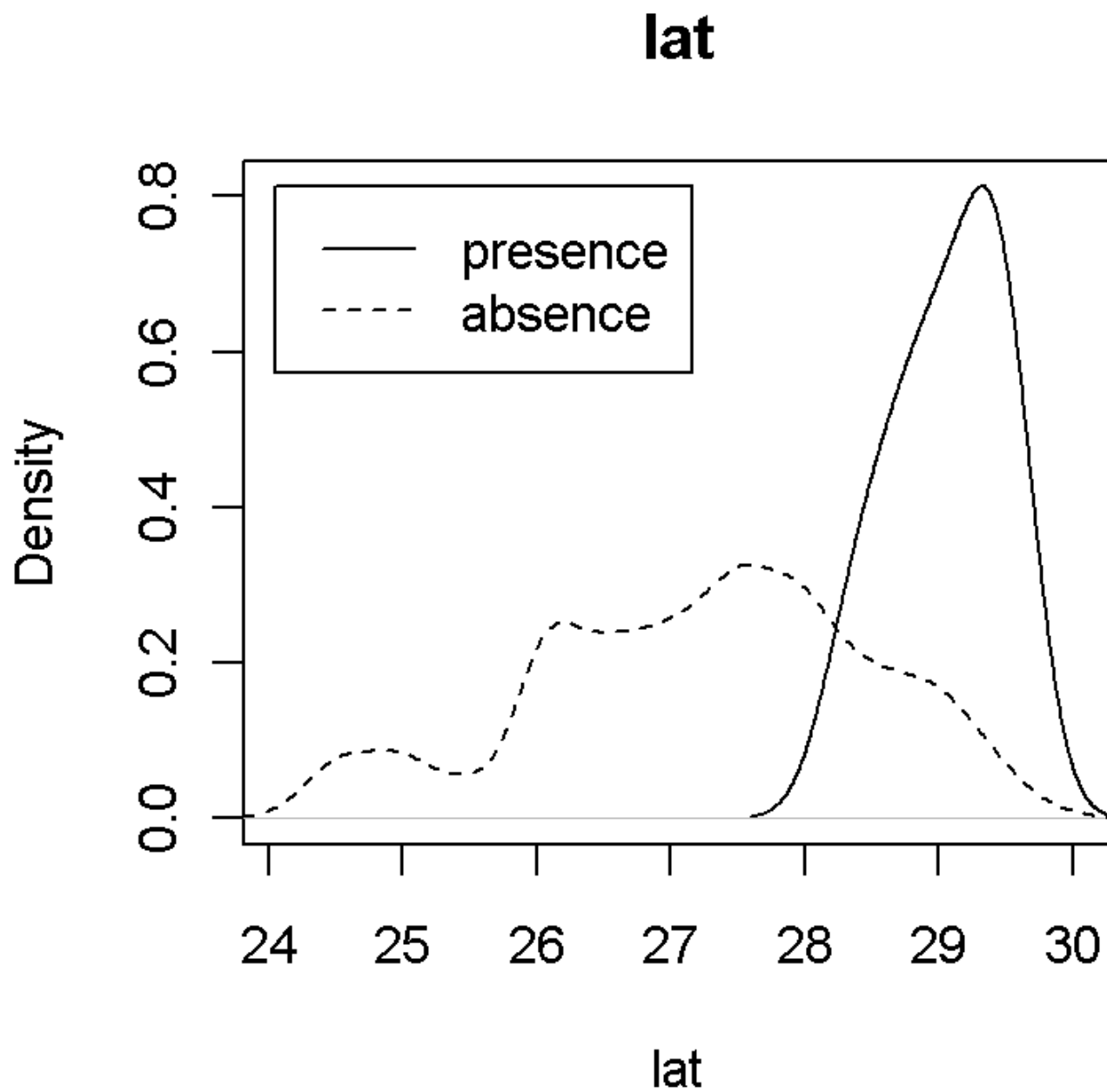


Figure 35: Density histogram of latitude (degrees) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

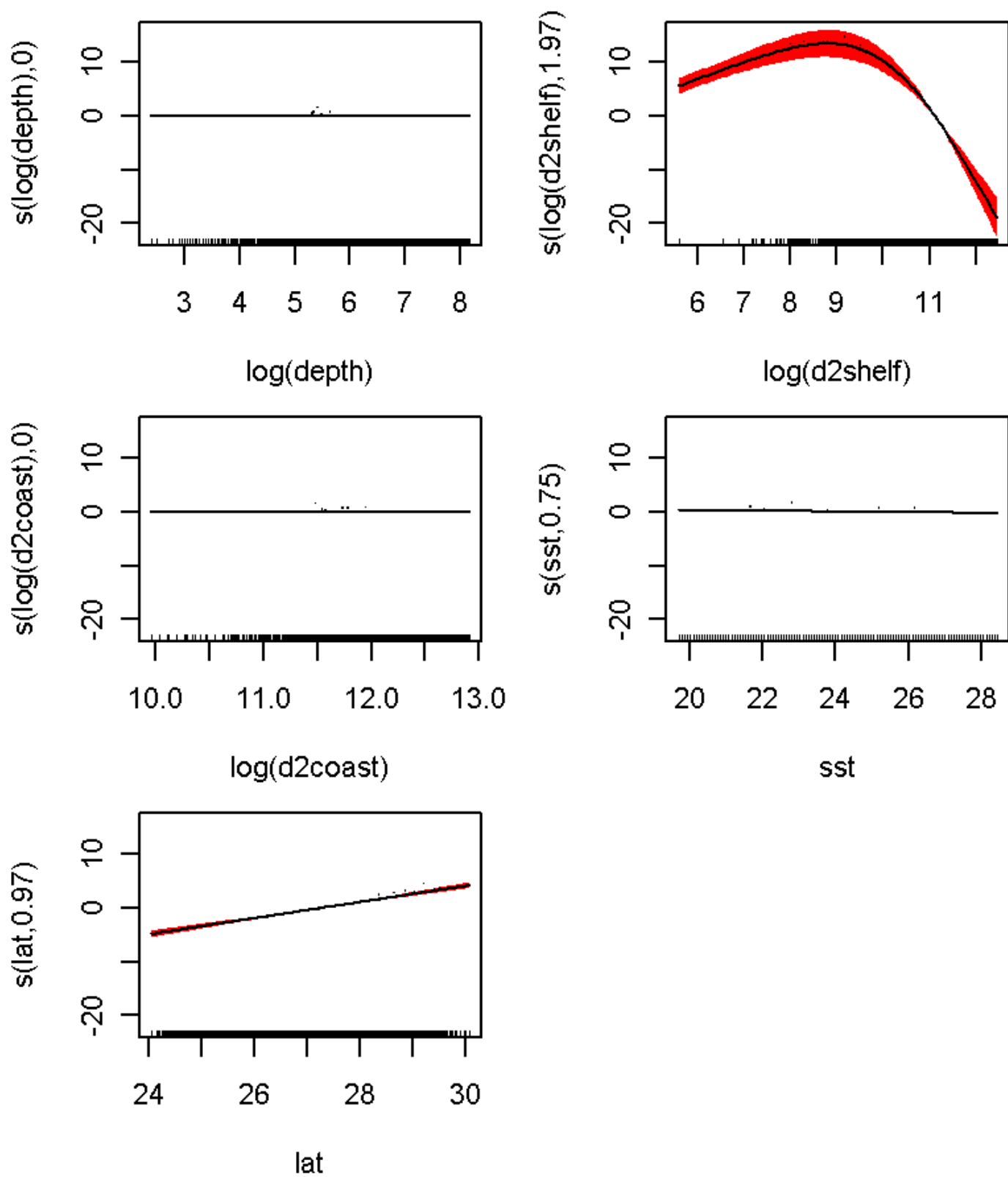


Figure 36: Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

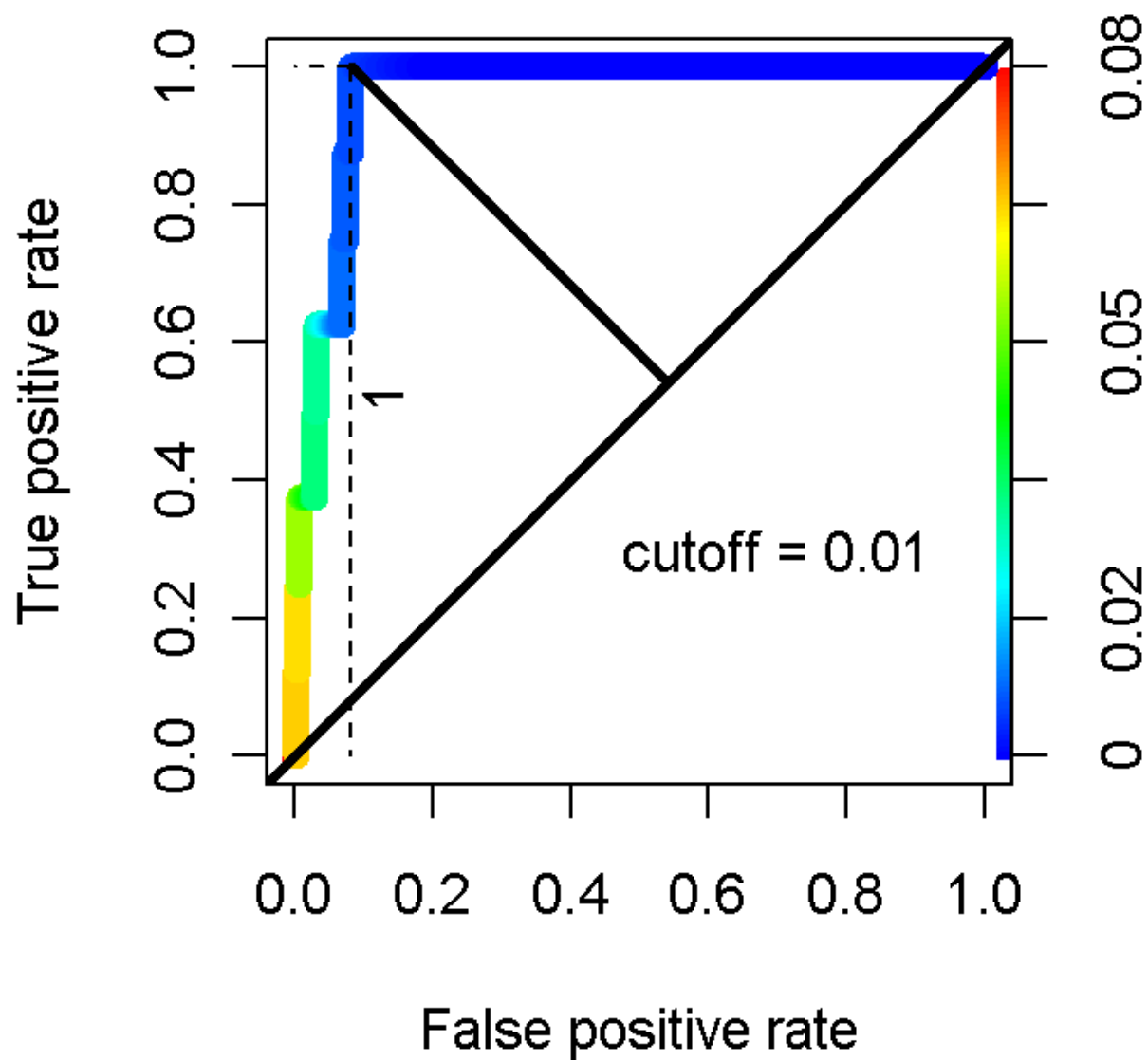


Figure 37: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

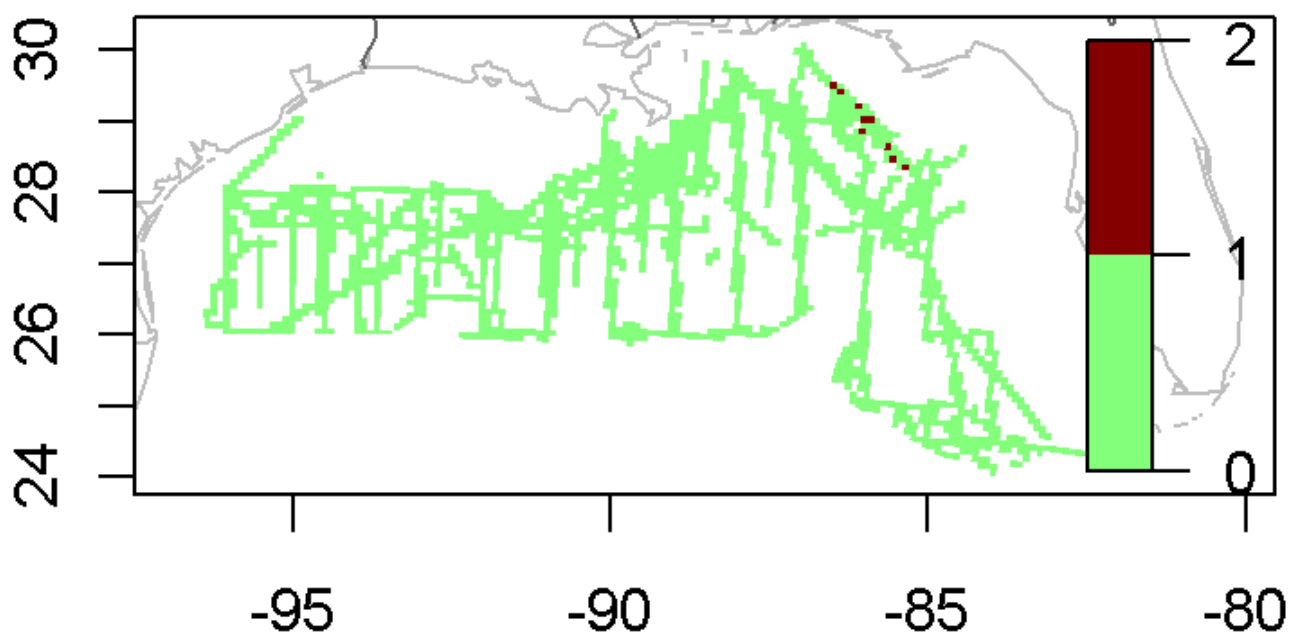


Figure 38: Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

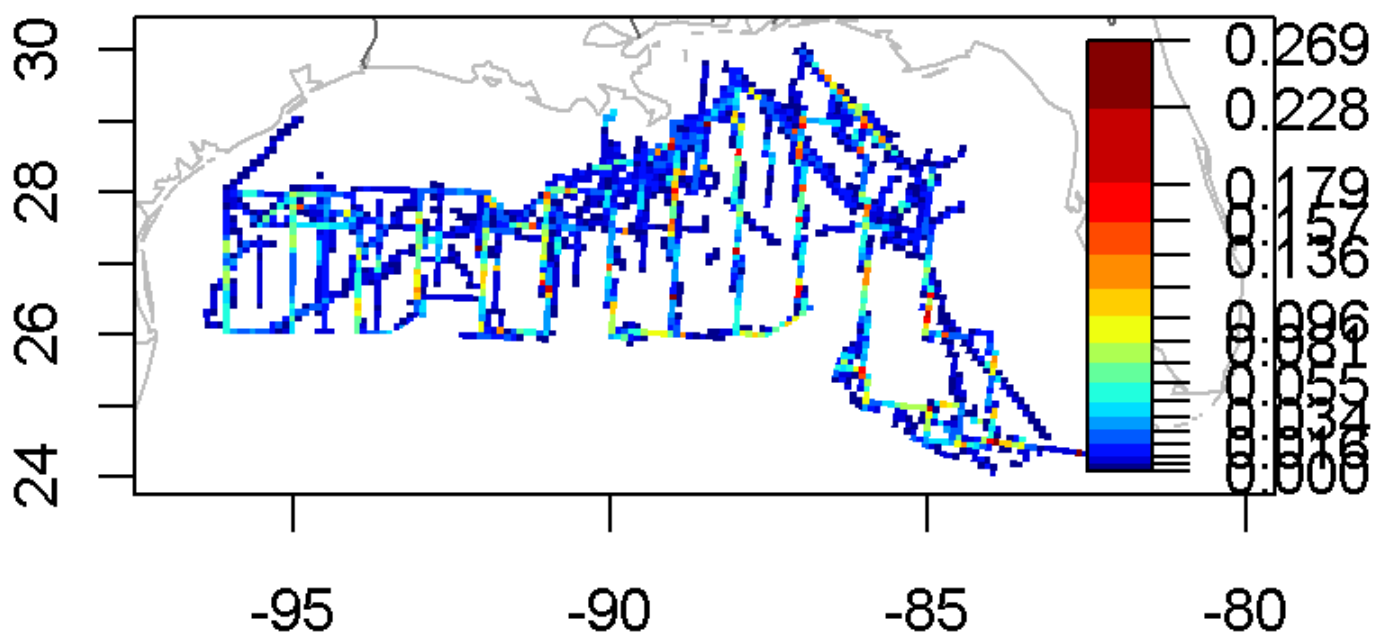


Figure 39: Map of effort(hours/km²) by cell summed through time for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

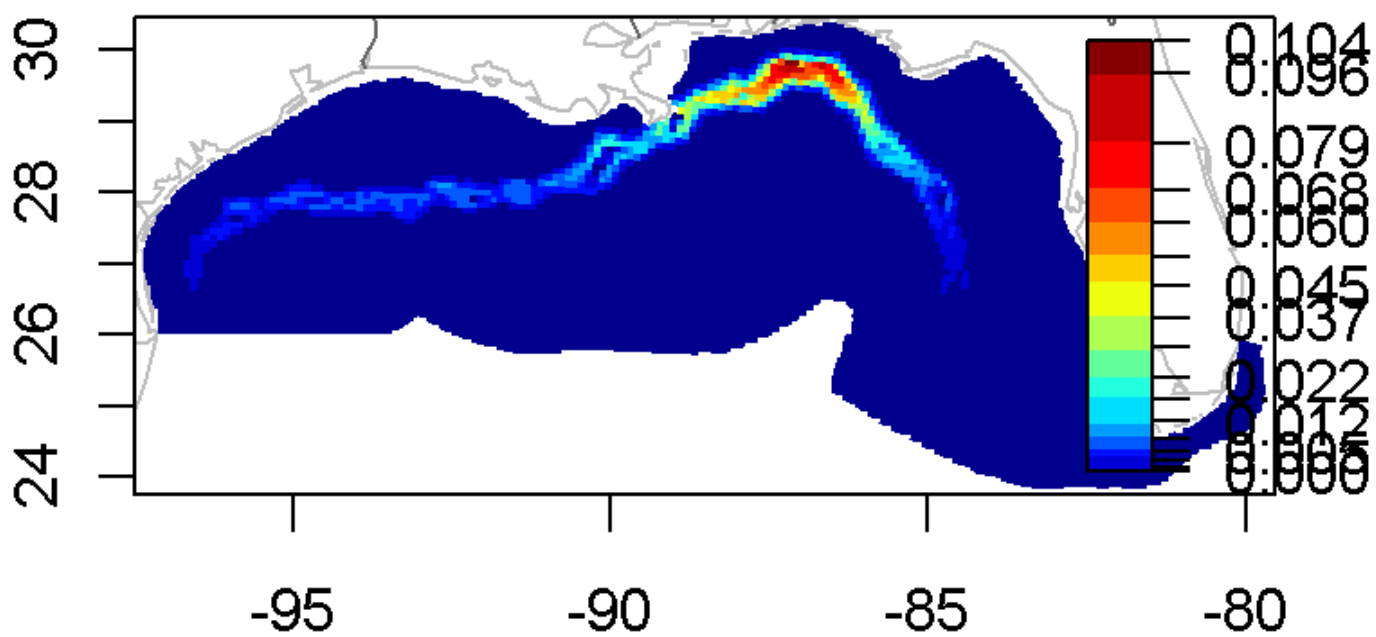


Figure 40: Map of mean predicted habitat for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

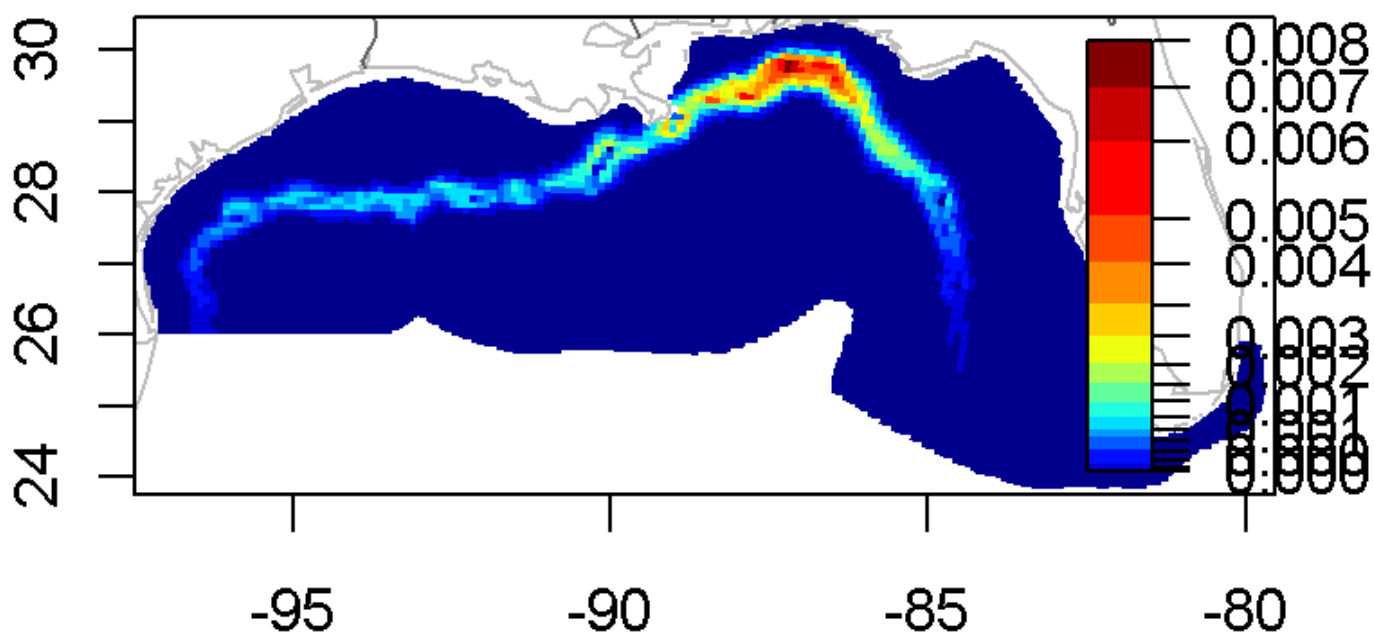


Figure 41: Map of standard error of habitat for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

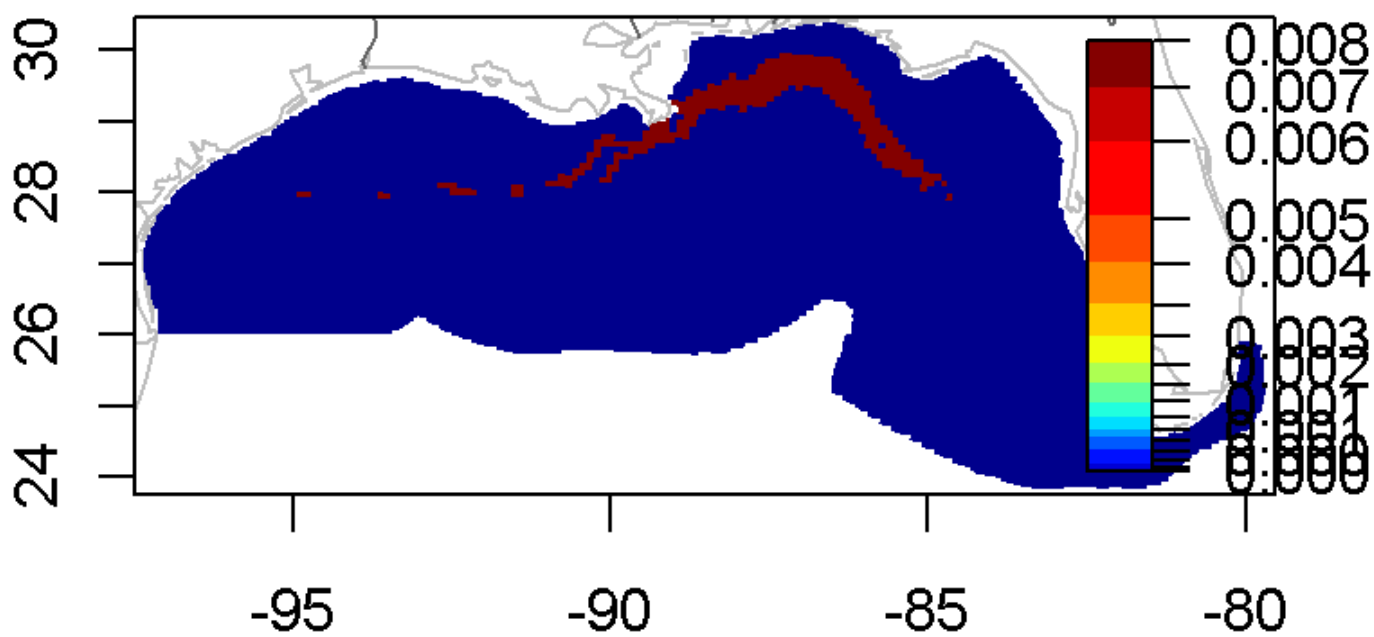


Figure 42: Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'spring' season in 'gomex2' region.

1.3 summer

1.3.1 east2

Modelrun identifier: duke_06_ba3_summer_east2

Date generated: 2008-10-21 12:39:32

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 5: Summary for duke(6) GAM model: for 'Baleen whales' guild during 'summer' season in 'east2' region.

	Value
Number.presences	372
Number.absences	8706
GAM.converged	TRUE
R.squared	0.182955
Deviance.explained	0.266012
ROC.optimum	0.581464
Maximum.fit	0.0400907
Maximum.prediction	0.606017

Model text summary...

```
duke_06_ba3_summer_east2 run on Tue Oct 21 12:36:11 2008
provider:duke, version:06, guild:Baleen whales (ba3), season:'summer', region:east2

max.fit:0.581464, max.prediction:0.606017, ROC.optimum:0.040091

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -4.938      0.192   -25.72  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  0.002105  0.5021    0.013  0.738
s(log(d2shelf)) 1.989983  2.4900  176.905 <2e-16 ***
s(log(d2coast)) 1.948299  2.4483  108.246 <2e-16 ***
s(sst)         1.967542  2.4675   40.768 <2e-16 ***
s(lat)         1.733880  2.2339  228.697 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.183   Deviance explained = 26.6%
GCV score = 0.0016006   Scale est. = 0.0015977   n = 8663

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:7694   Min.    : 1635   Min.    :  5.0   Min.    :    5   Min.    : 1259   Min.    :  8.175   Min.    :25.94
se2:1384   1st Qu.: 11866   1st Qu.: 48.0   1st Qu.: 20989   1st Qu.: 50865   1st Qu.: 17.025   1st Qu.:37.53
              Median :14008   Median : 111.5   Median : 52230   Median :102266   Median : 22.200   Median :40.18
              Mean   :13275   Mean   : 677.3   Mean   : 67623   Mean   :125197   Mean   : 21.378   Mean   :39.35
              3rd Qu.:15645   3rd Qu.: 420.0   3rd Qu.: 99335   3rd Qu.:174835   3rd Qu.: 25.650   3rd Qu.:42.31
              Max.    :16560   Max.    :5251.0   Max.    :324910   Max.    :445165   Max.    : 30.900   Max.    :44.74
              NA's    :      7      NA's    :    7      NA's    :408.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685   Min.    : 1633   Min.    :  4   Min.    :    5   Min.    : 1259   Min.    :11.18   Min.    :25.91
se2:4203   1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042   1st Qu.: 89304   1st Qu.:22.80   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :1.368e-09  Min.   :3.452e-09  Min.   : 0.0000  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:1.373e-06  1st Qu.:1.430e-06  1st Qu.: 0.0000  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :3.194e-04  Median :1.016e-04  Median : 0.0000  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :2.061e-02  Mean   :1.603e-03  Mean   : 0.0809  Mean   :1.069e-02  Mean   :0.1409
3rd Qu.:14088  3rd Qu.:1.320e-02  3rd Qu.:1.462e-03  3rd Qu.: 0.0000  3rd Qu.:9.308e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :6.060e-01  Max.   :7.003e-02  Max.   : 4.0000  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5277.0000  NA's :5.277e+03
```

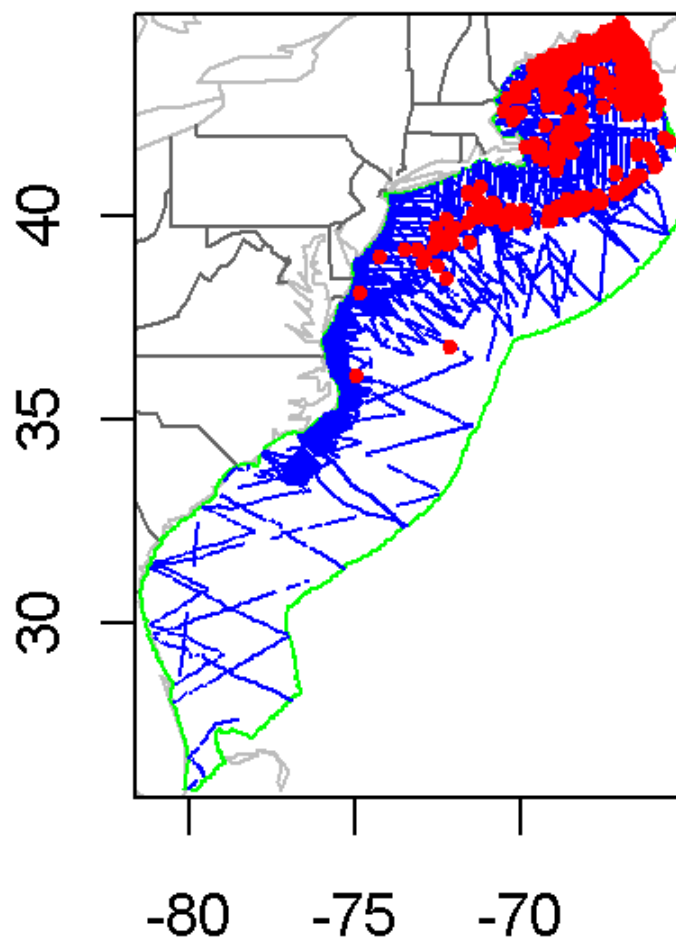


Figure 43: Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'summer' season in 'east2' region.

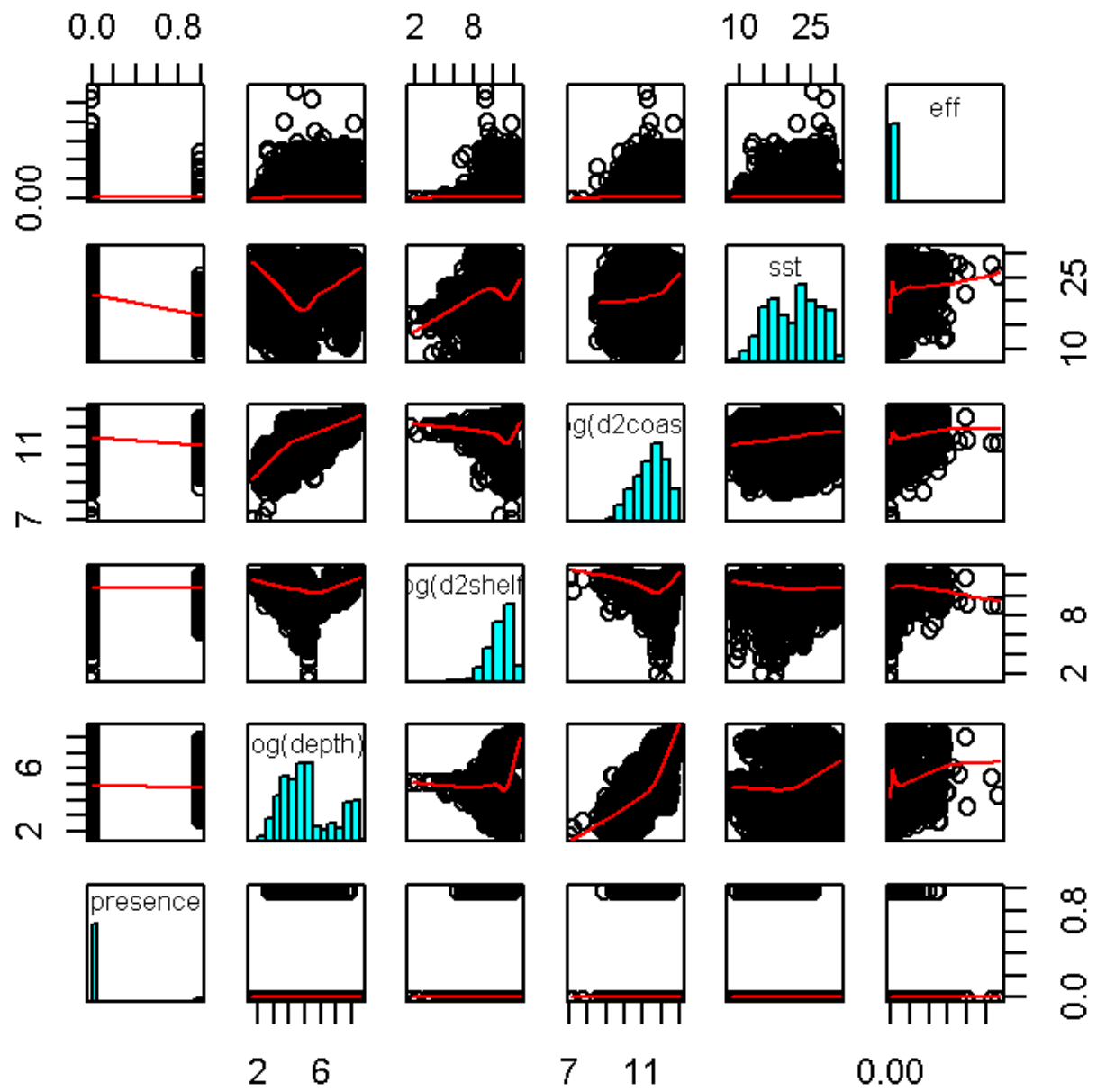


Figure 44: Pairs plot of input variables for 'Baleen whales' guild during 'summer' season in 'east2' region.

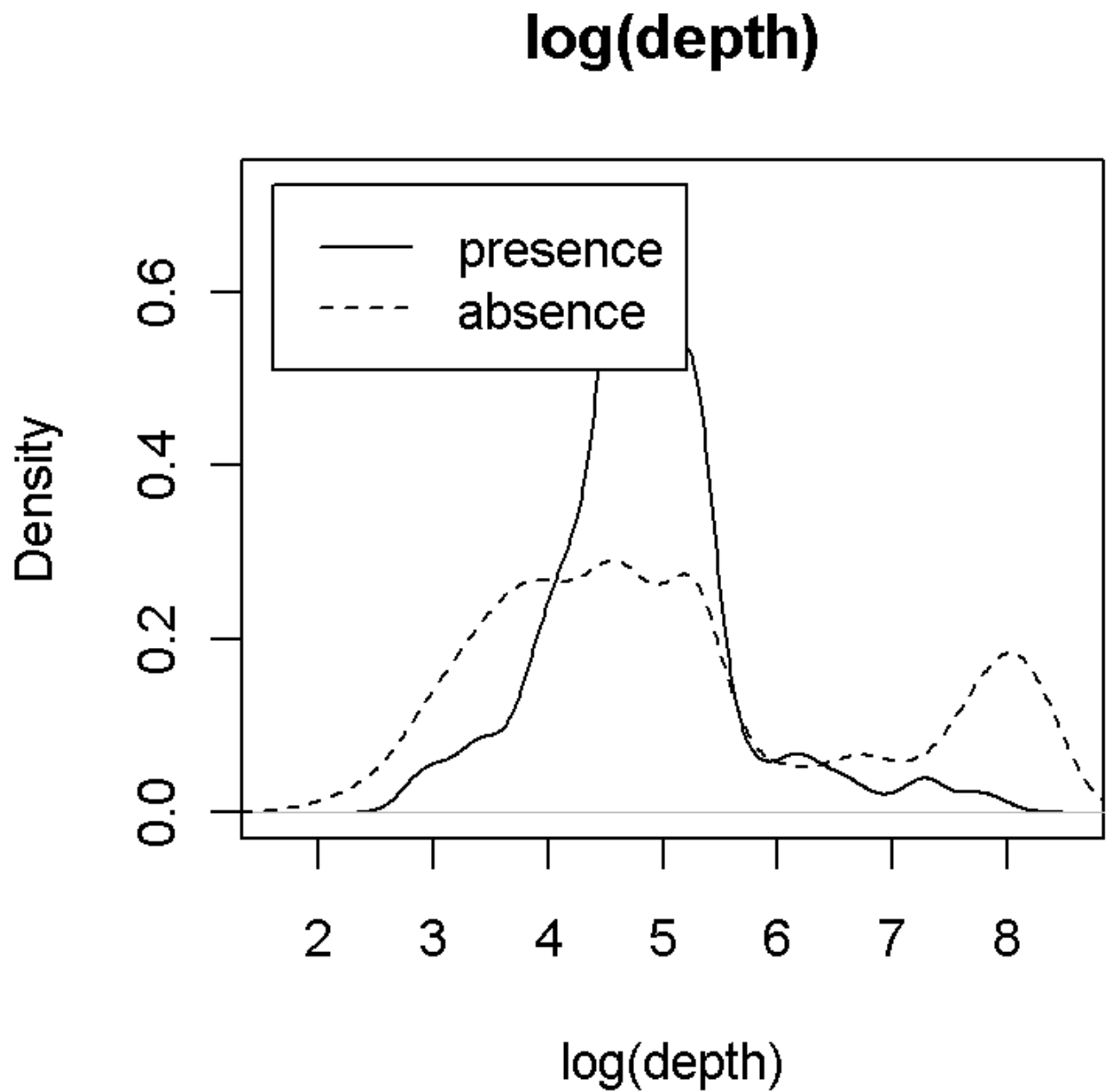


Figure 45: Density histogram of depth log(meters) for 'Baleen whales' guild during 'summer' season in 'east2' region.

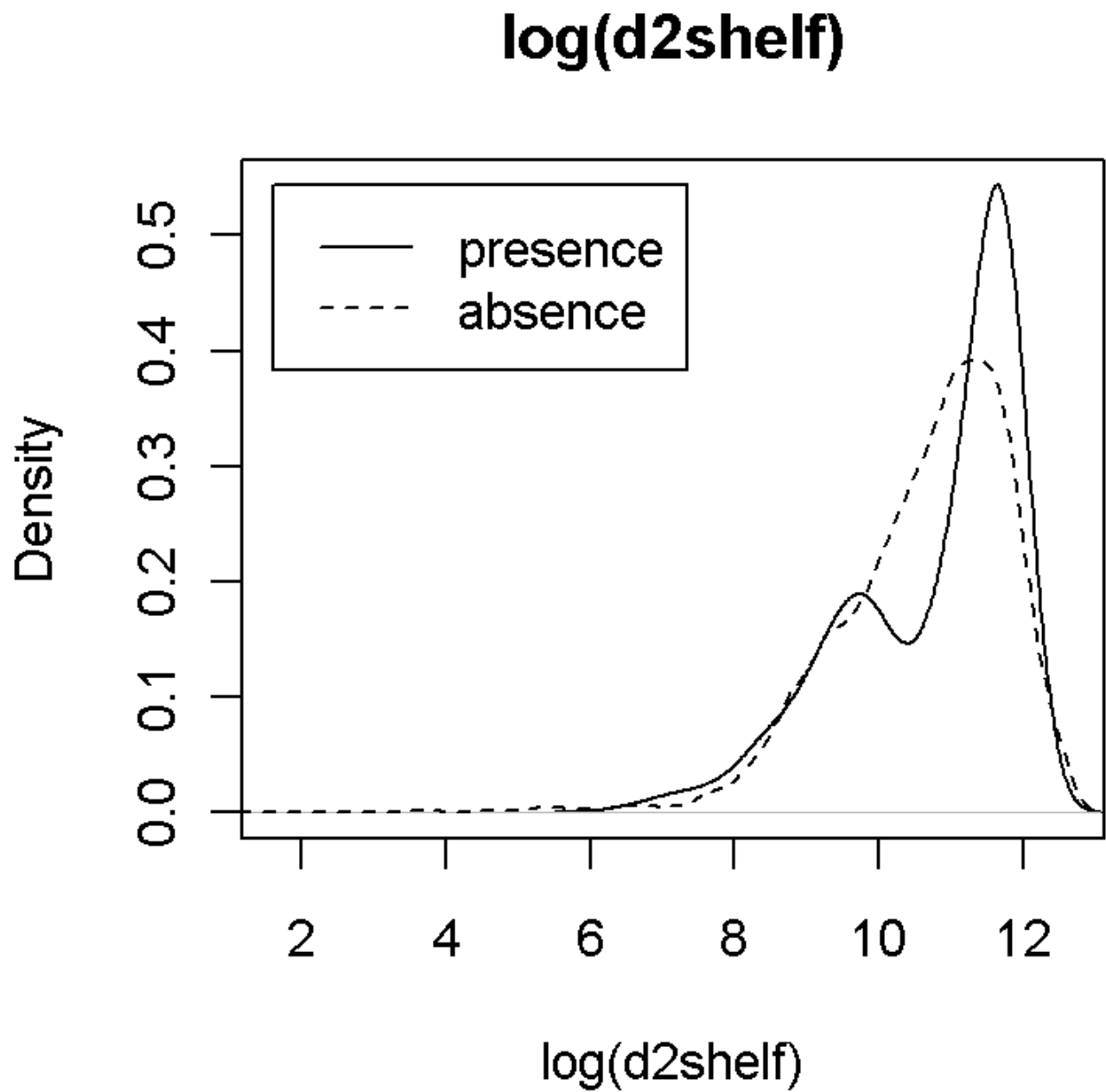


Figure 46: Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'summer' season in 'east2' region.

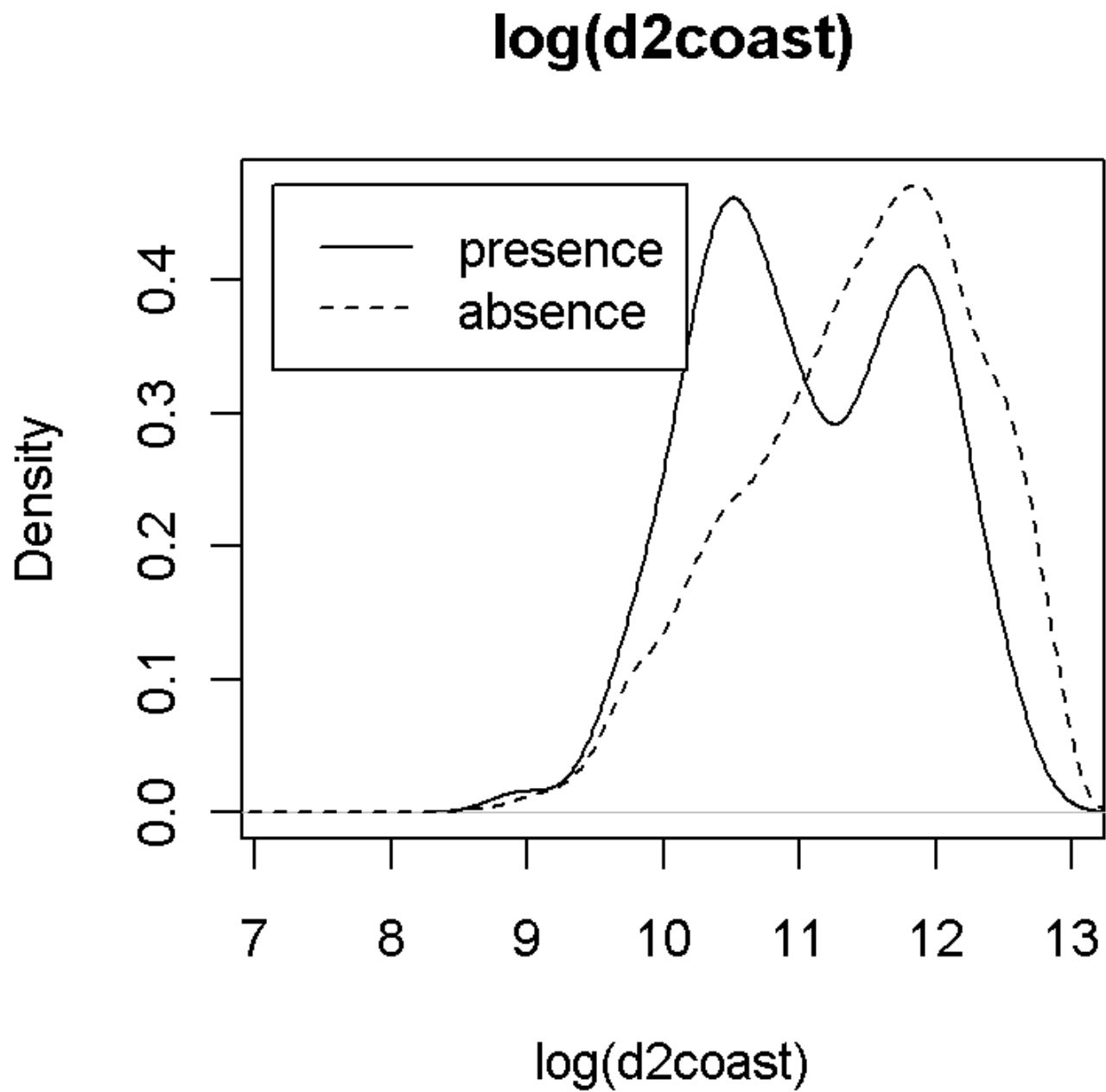


Figure 47: Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'summer' season in 'east2' region.

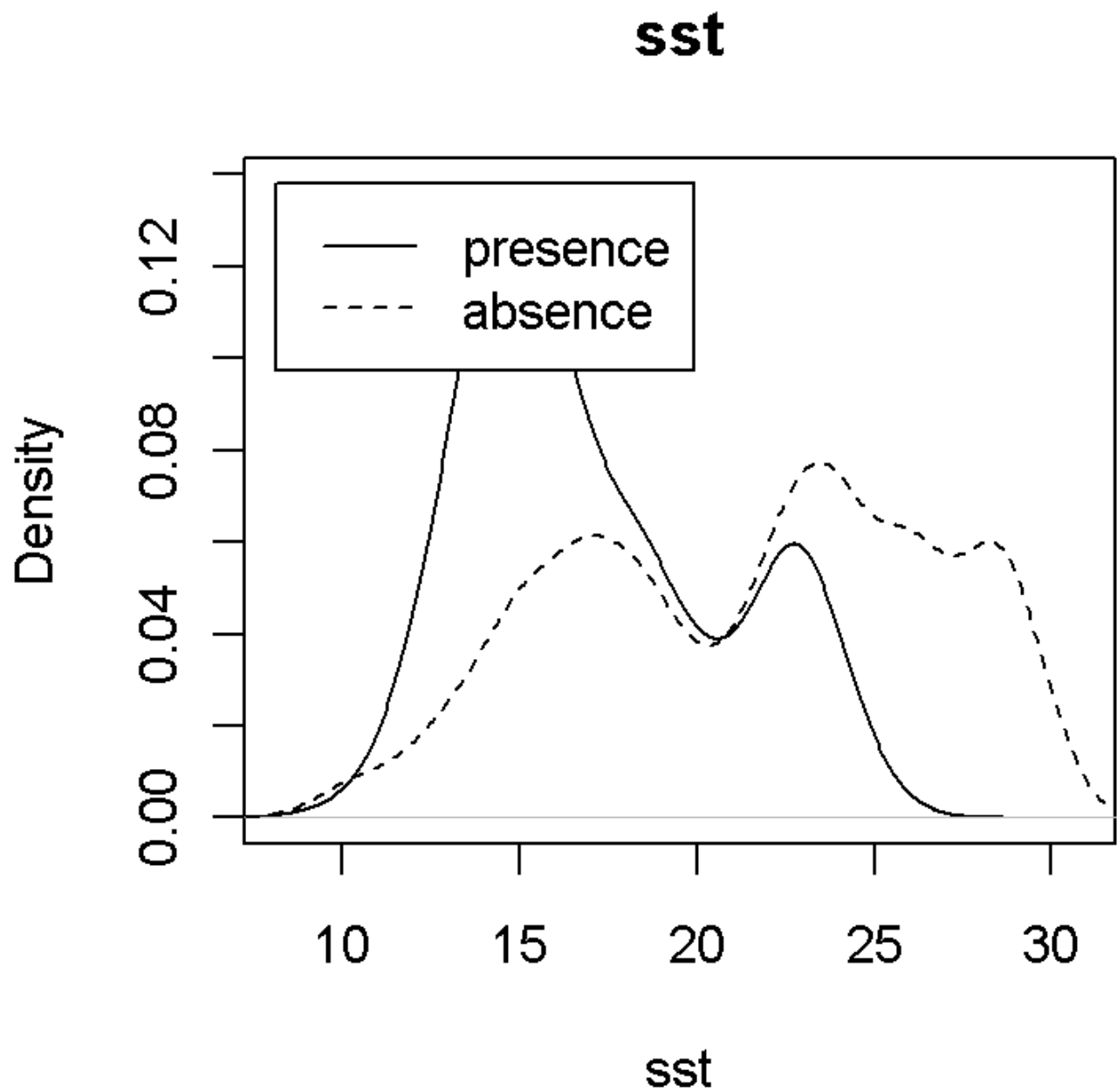


Figure 48: Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'summer' season in 'east2' region.

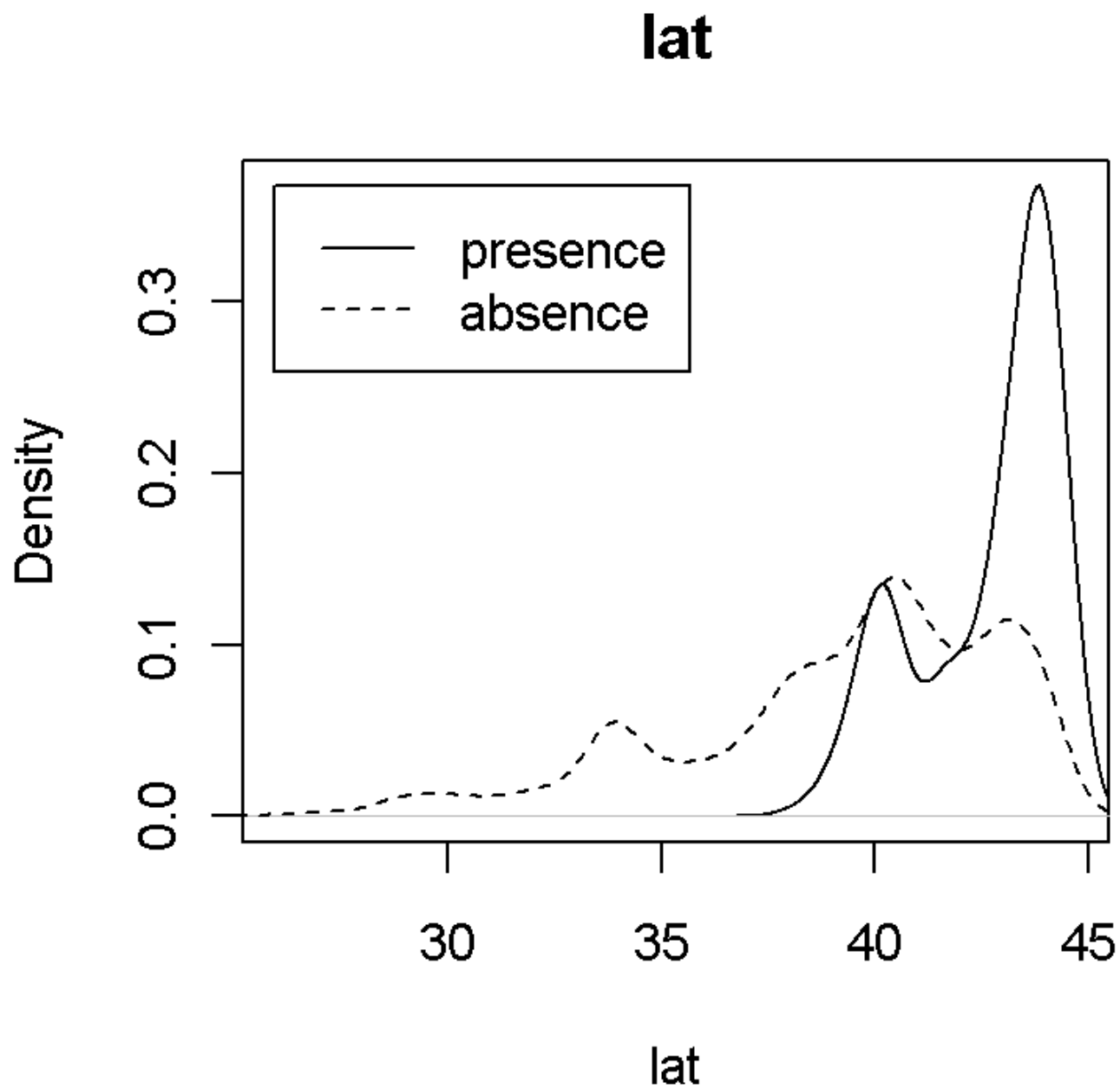


Figure 49: Density histogram of latitude (degrees) for 'Baleen whales' guild during 'summer' season in 'east2' region.

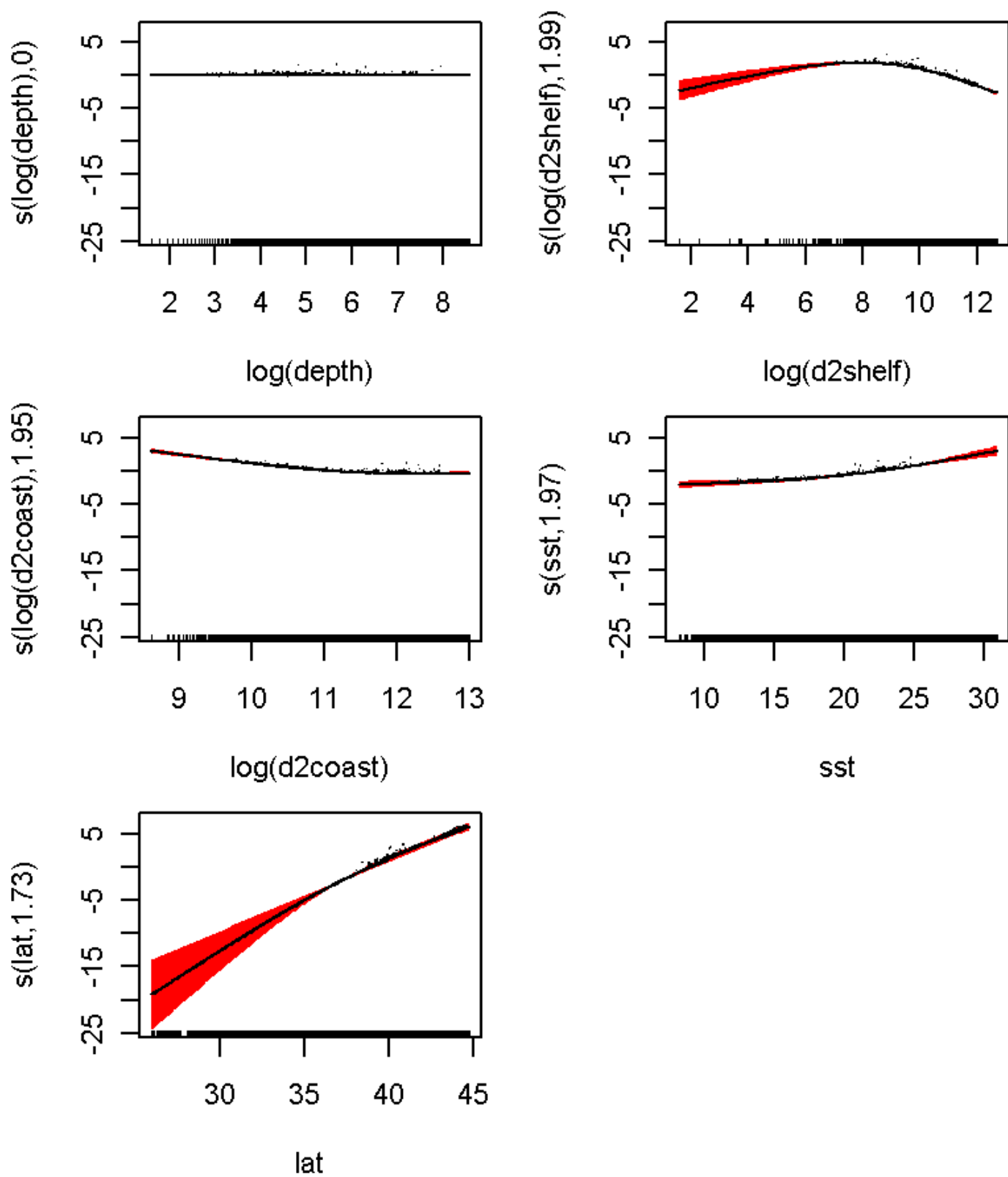


Figure 50: Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'summer' season in 'east2' region.

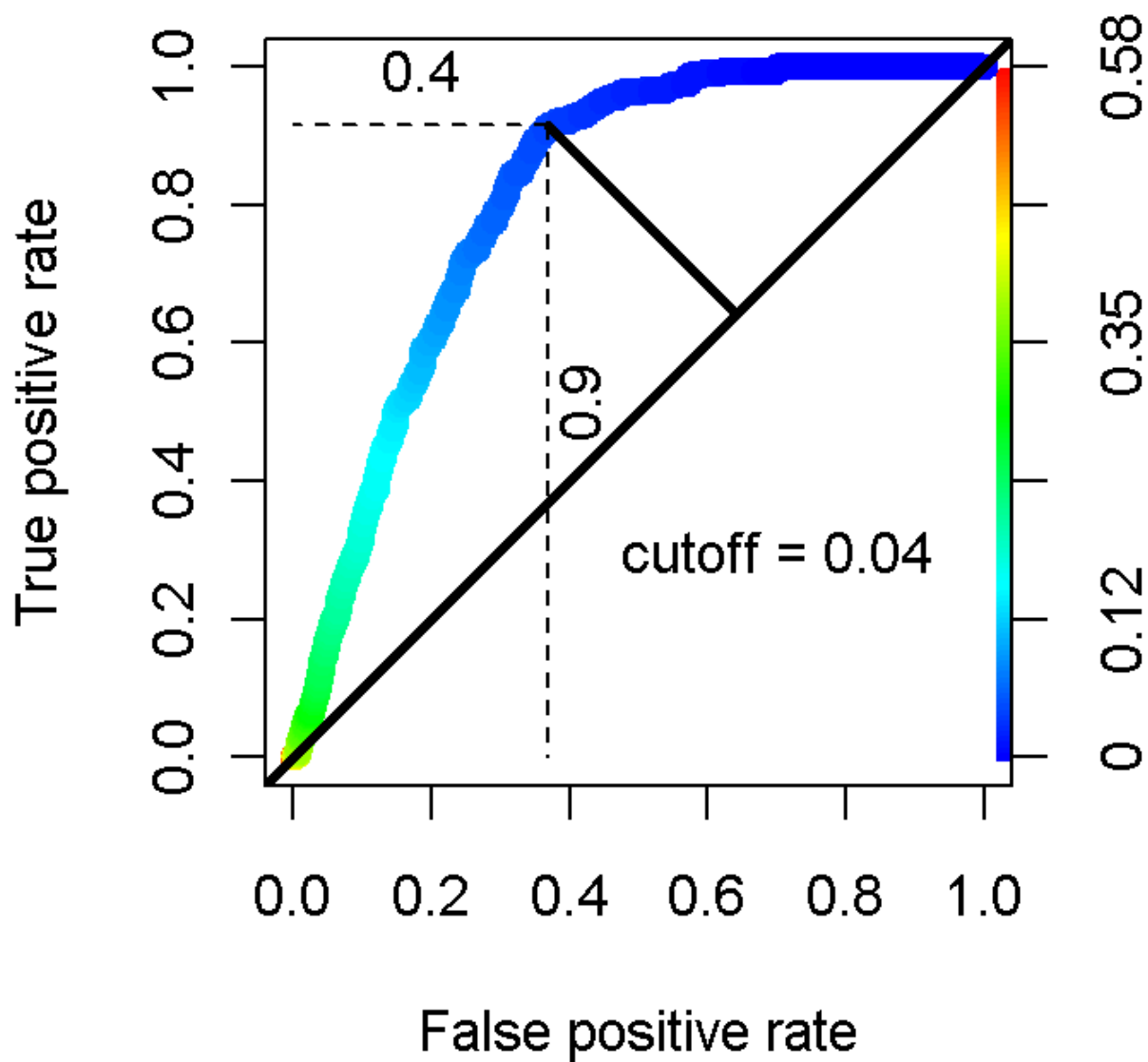


Figure 51: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'summer' season in 'east2' region.

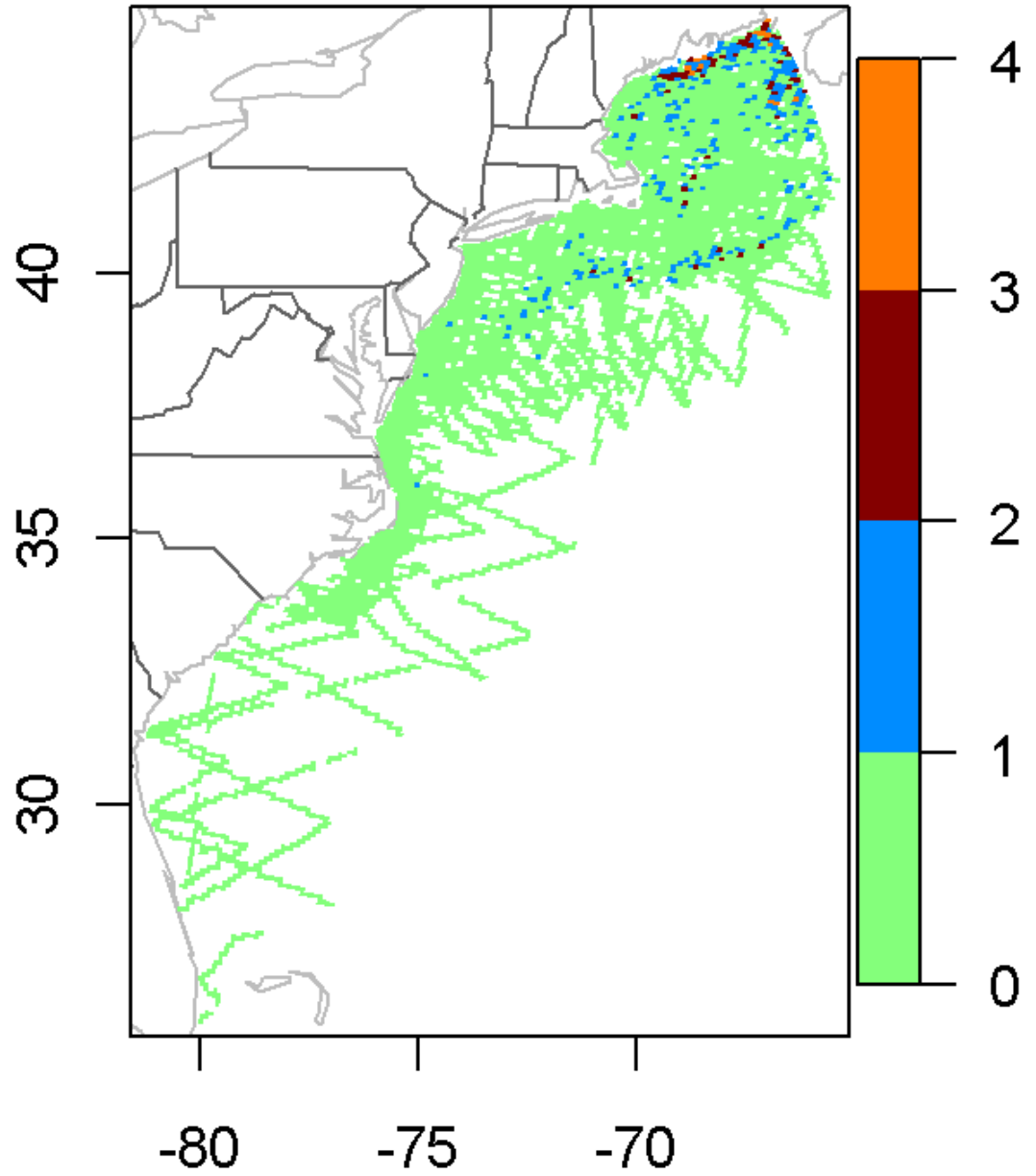


Figure 52: Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'summer' season in 'east2' region.

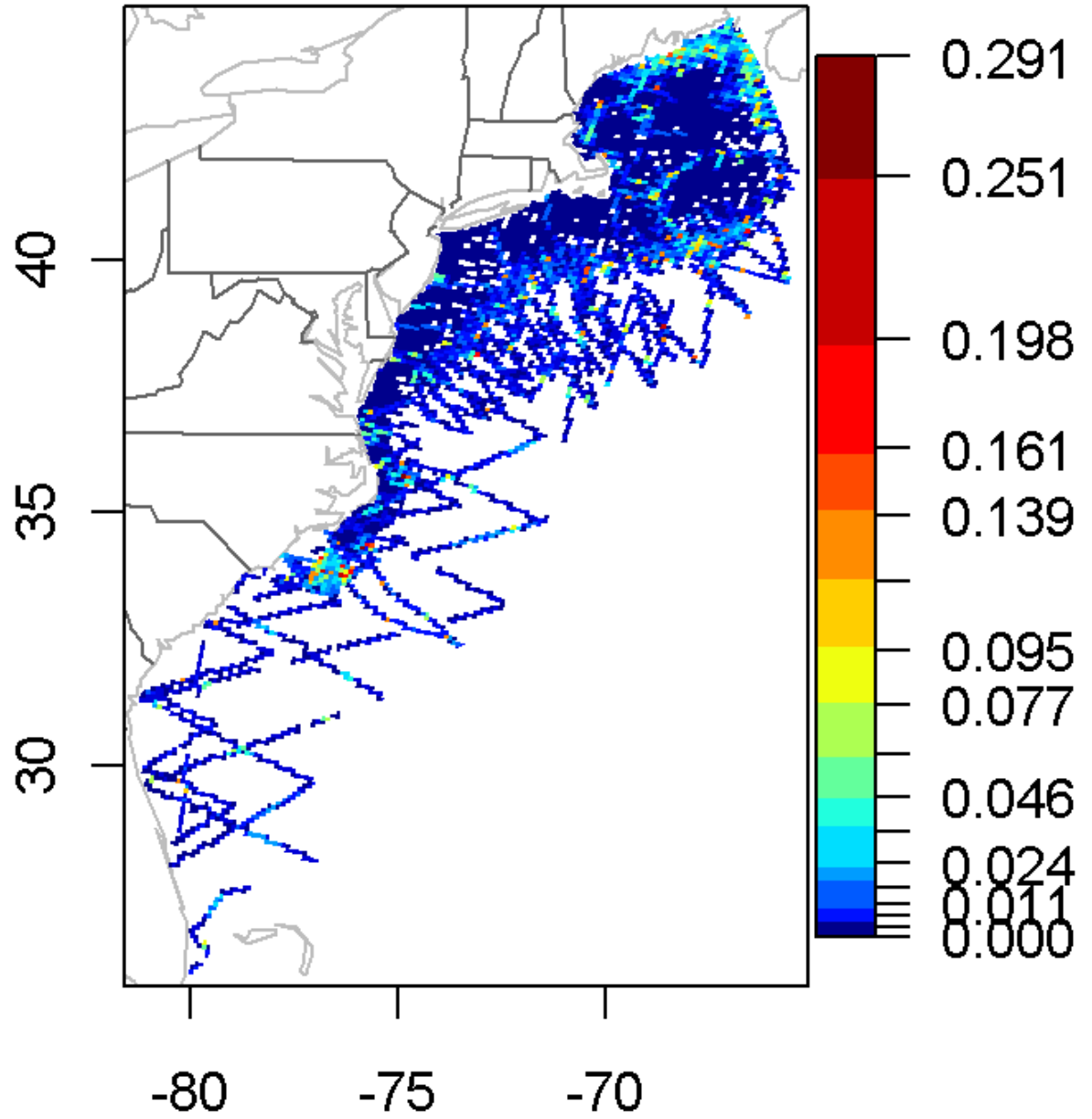


Figure 53: Map of effort(hours/km²) by cell summed through time for 'Baleen whales' guild during 'summer' season in 'east2' region.

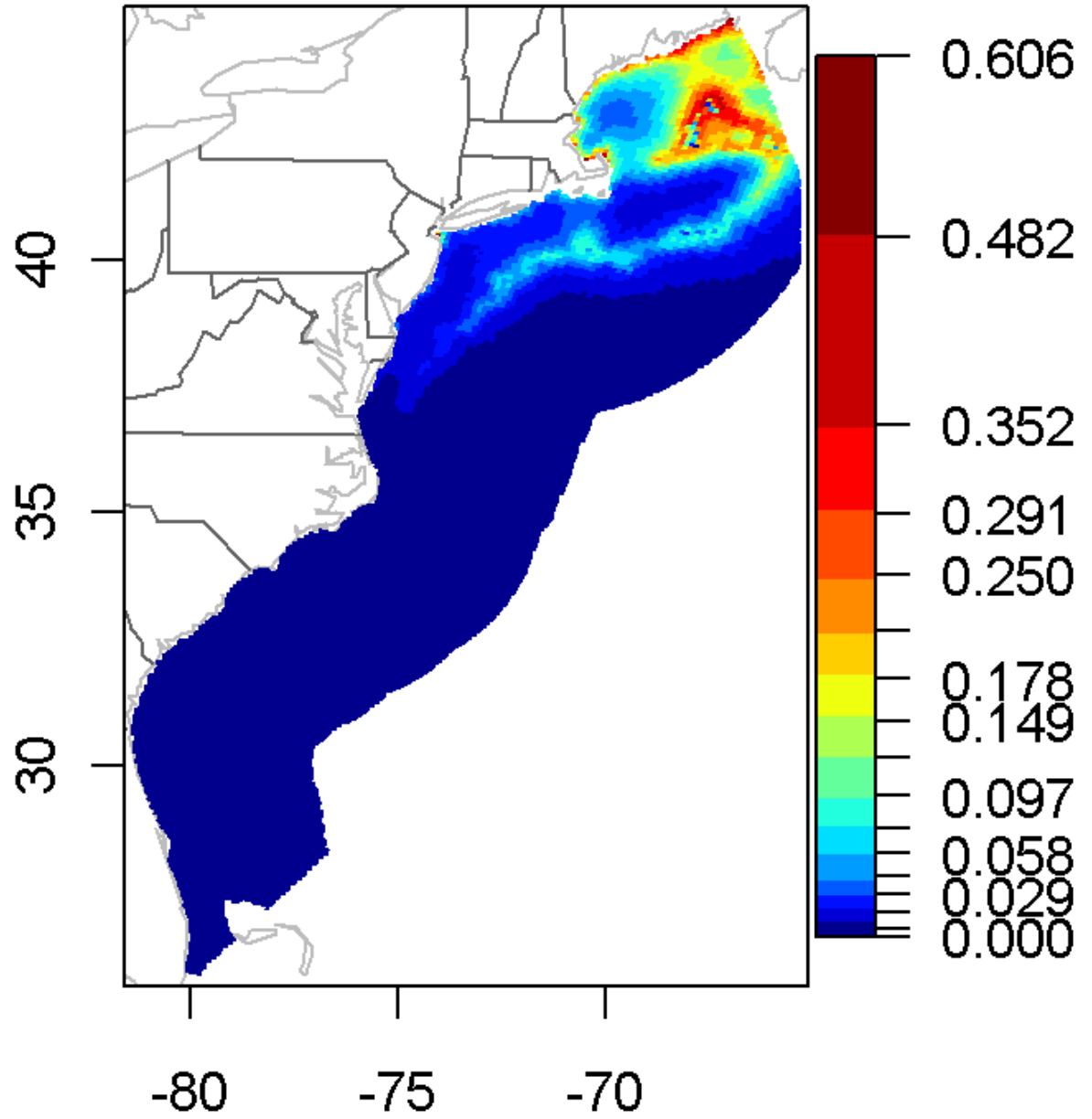


Figure 54: Map of mean predicted habitat for 'Baleen whales' guild during 'summer' season in 'east2' region.

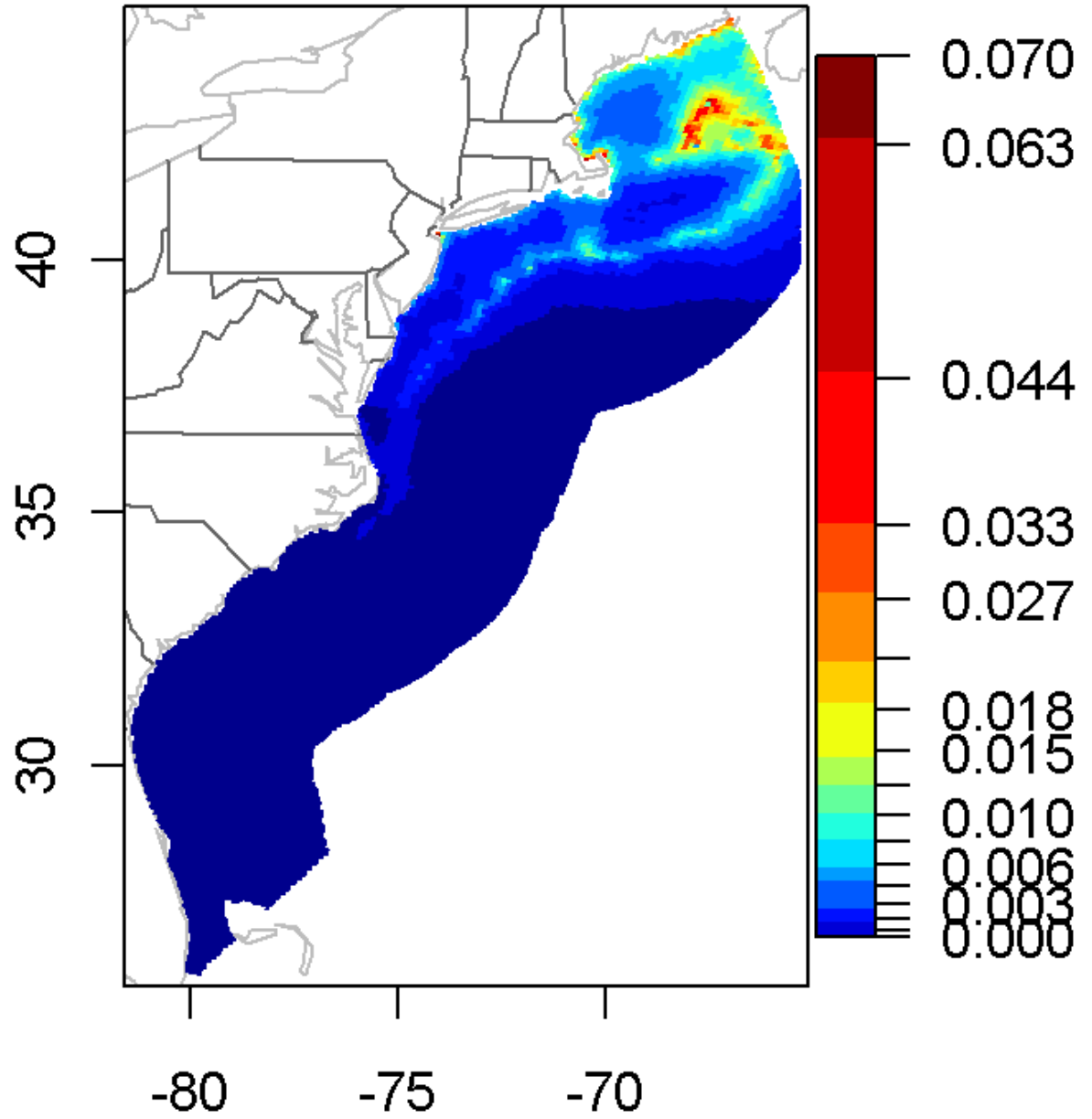


Figure 55: Map of standard error of habitat for 'Baleen whales' guild during 'summer' season in 'east2' region.

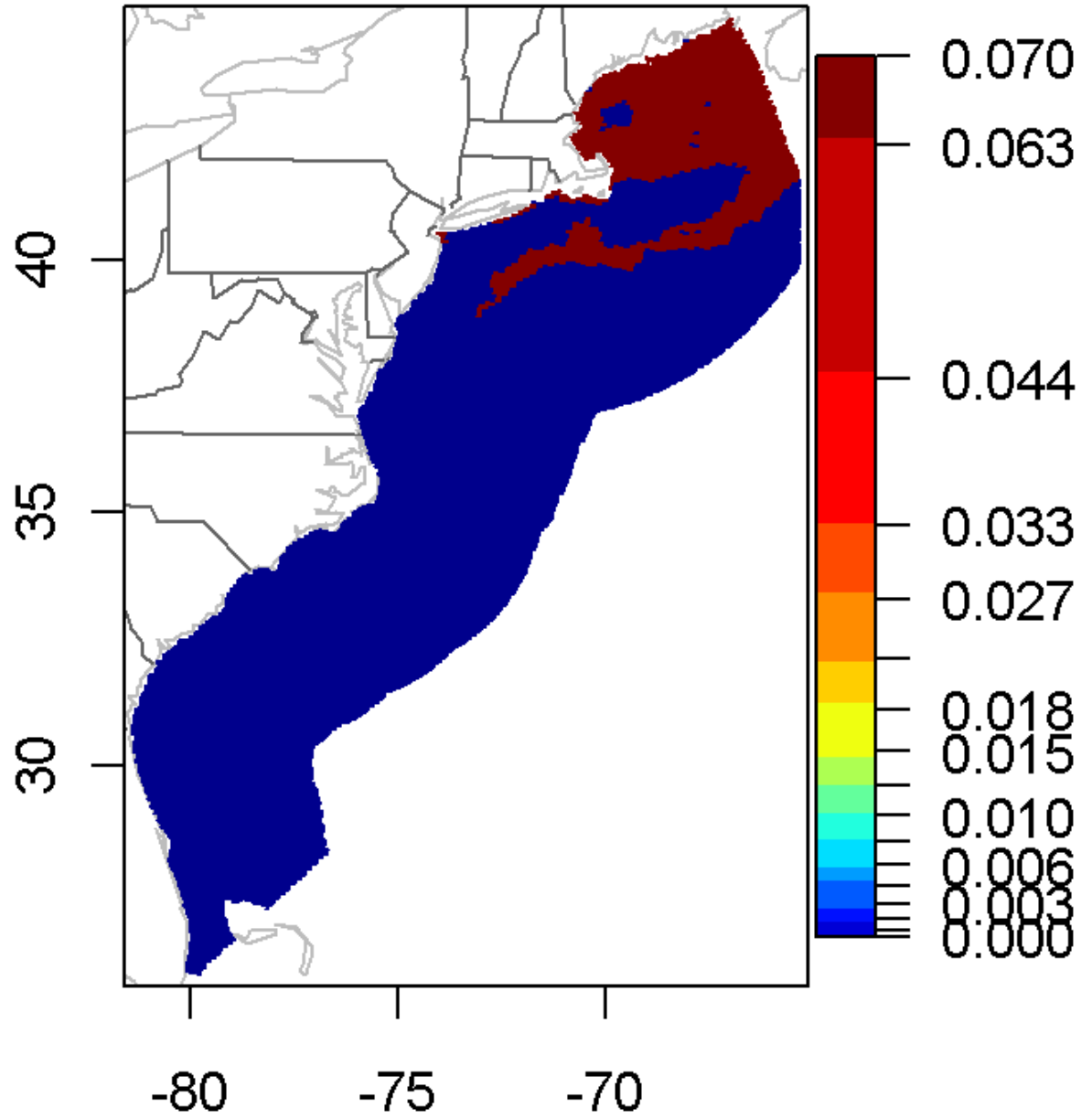


Figure 56: Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'summer' season in 'east2' region.

1.4 winter

1.4.1 east2

Modelrun identifier: duke_06_ba3_winter_east2

Date generated: 2008-10-21 14:57:16

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 6: Summary for duke(6) GAM model: for 'Baleen whales' guild during 'winter' season in 'east2' region.

	Value
Number.presences	16
Number.absences	3886
GAM.converged	TRUE
R.squared	0.450177
Deviance.explained	0.503567
ROC.optimum	0.561907
Maximum.fit	0.00307675
Maximum.prediction	1

Model text summary...

```
duke_06_ba3_winter_east2 run on Tue Oct 21 14:55:36 2008
  provider:duke, version:06, guild:Baleen whales (ba3), season:'winter', region:east2

max.fit:0.561907, max.prediction:1.000000, ROC.optimum:0.003077

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -10.7207      0.3696  -29.00  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  0.9876  1.488 302.824 <2e-16 ***
s(log(d2shelf)) 1.9996  2.500 143.595 <2e-16 ***
s(log(d2coast)) 1.9994  2.499 121.338 <2e-16 ***
s(sst)         1.9794  2.479  86.031 <2e-16 ***
s(lat)         0.7788  1.279   4.488  0.0252 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.45  Deviance explained = 50.4%
GCV score = 0.00019126  Scale est. = 0.00018998  n = 2337

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2: 844   Min.   : 1654   Min.   :  4.0   Min.   :  995   Min.   : 1471   Min.   :  2.654   Min.   :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0   1st Qu.: 18575   1st Qu.: 32272   1st Qu.: 13.500   1st Qu.:32.77
        Median :10479   Median : 28.0   Median : 38452   Median : 53042   Median : 19.208   Median :34.02
        Mean   : 9475   Mean   :153.2   Mean   : 44646   Mean   : 63558   Mean   : 17.745   Mean   :33.66
        3rd Qu.:10987   3rd Qu.: 41.0   3rd Qu.: 65053   3rd Qu.: 78087   3rd Qu.: 21.825   3rd Qu.:34.80
        Max.   :12763   Max.   :3612.0   Max.   :274566   Max.   :348168   Max.   : 26.400   Max.   :38.20
        NA's   :      NA's   : 14   NA's   :1561.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633   Min.   :  4   Min.   :  5   Min.   : 1259   Min.   :  2.400   Min.   :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042   1st Qu.: 89304   1st Qu.:  9.075   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :3.785e-16  Min.   :0.000e+00  Min.   :9.035e-07  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.386e-04  1st Qu.:5.435e-05  1st Qu.:0.000e+00  1st Qu.:7.474e-04  1st Qu.:0.0000
Median :11616  Median :2.425e-02  Median :3.988e-03  Median :0.000e+00  Median :3.451e-03  Median :1.0000
Mean   :11171  Mean   :1.701e-01  Mean   :2.095e-02  Mean   :1.116e-02  Mean   :9.821e-03  Mean   :0.6272
3rd Qu.:14088  3rd Qu.:1.910e-01  3rd Qu.:3.471e-02  3rd Qu.:0.000e+00  3rd Qu.:9.825e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :1.000e+00  Max.   :2.062e-01  Max.   :2.000e+00  Max.   :2.547e-01  Max.   :1.0000
      NA's :6.000e+00  NA's :6.000e+00  NA's :8.454e+03  NA's :8.454e+03
```

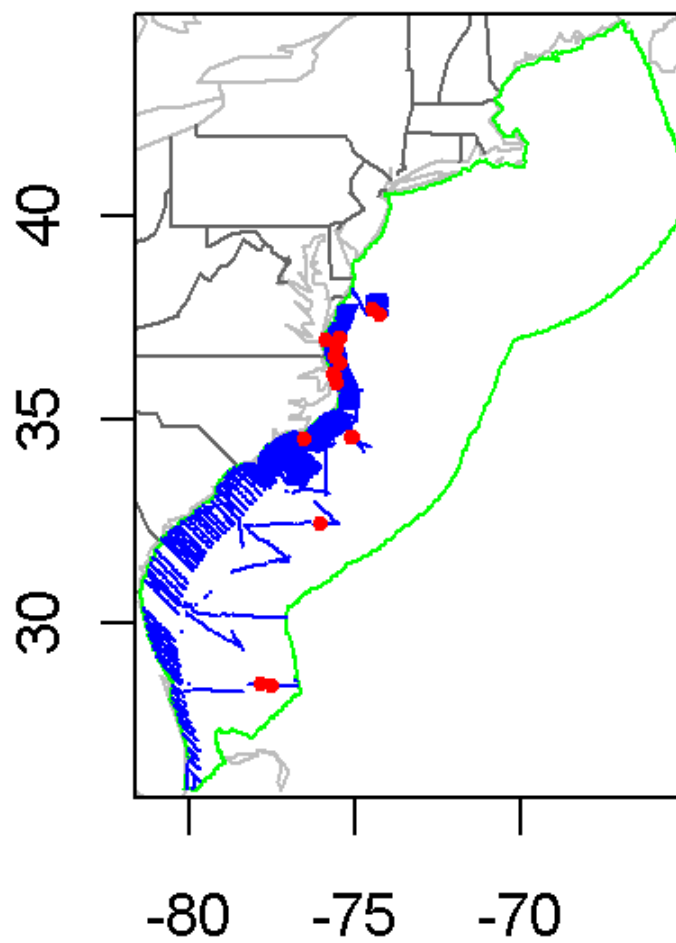


Figure 57: Map of points of observational sightings and tracks of survey effort for 'Baleen whales' guild during 'winter' season in 'east2' region.

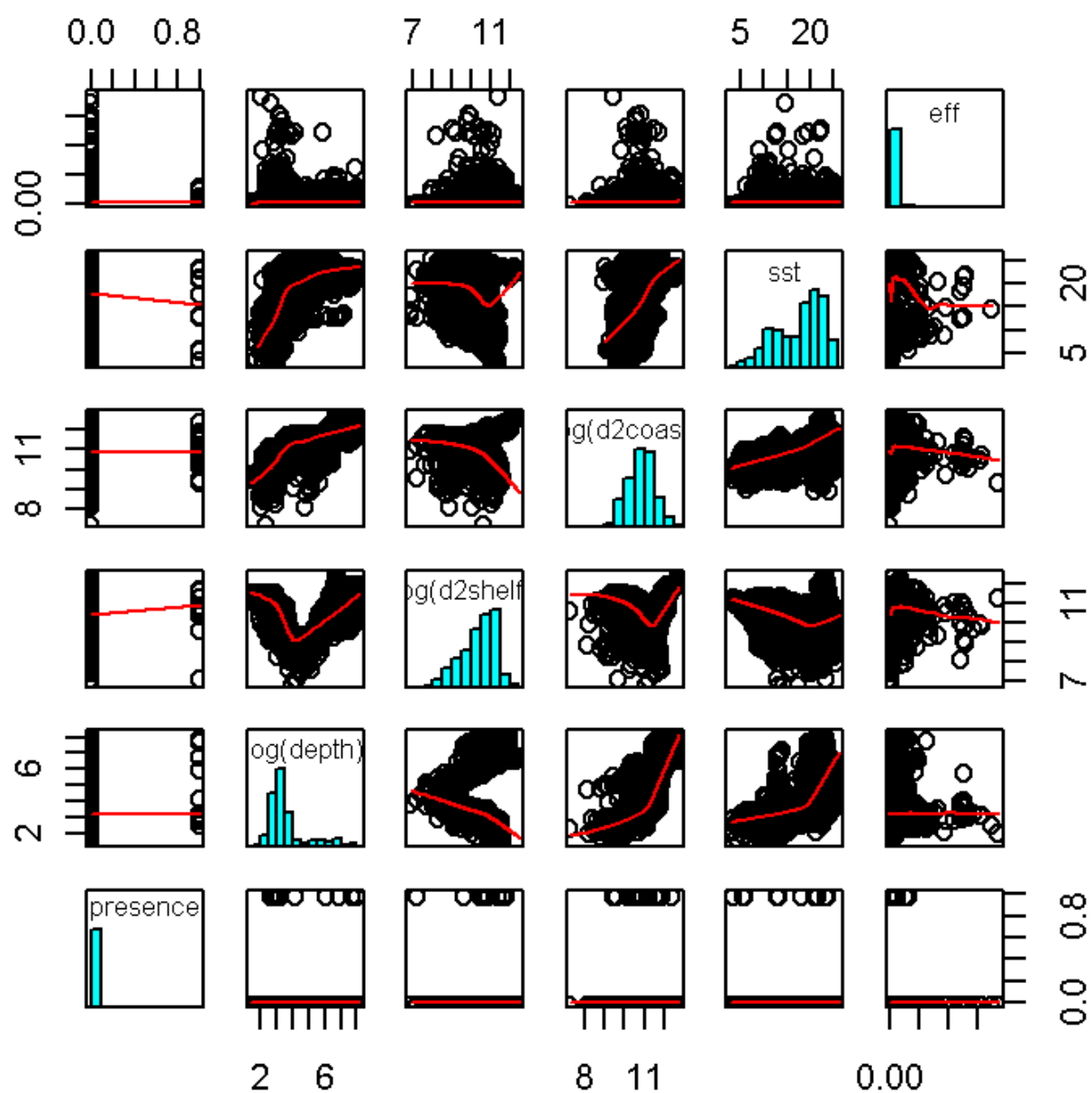


Figure 58: Pairs plot of input variables for 'Baleen whales' guild during 'winter' season in 'east2' region.

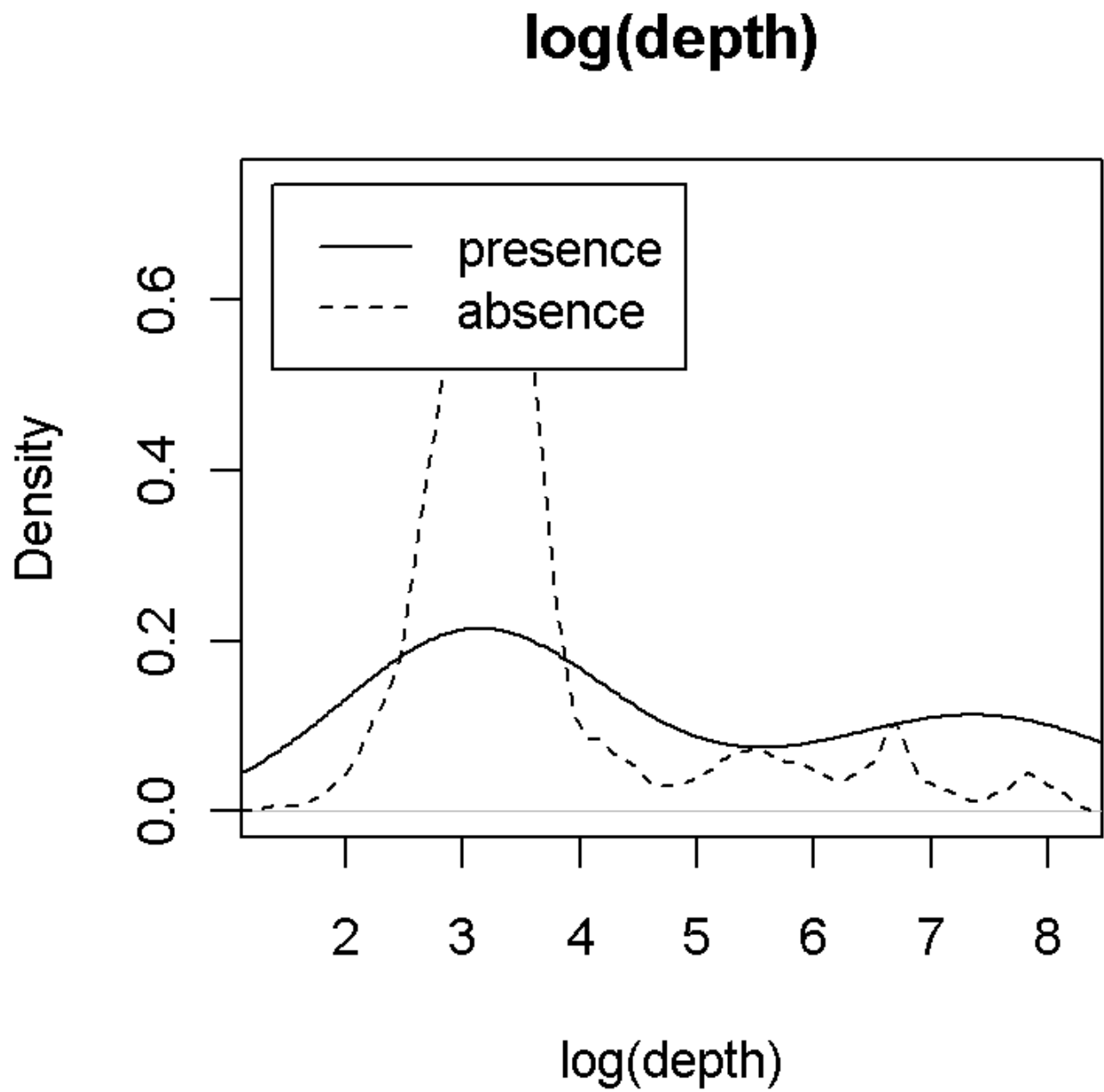


Figure 59: Density histogram of depth log(meters) for 'Baleen whales' guild during 'winter' season in 'east2' region.

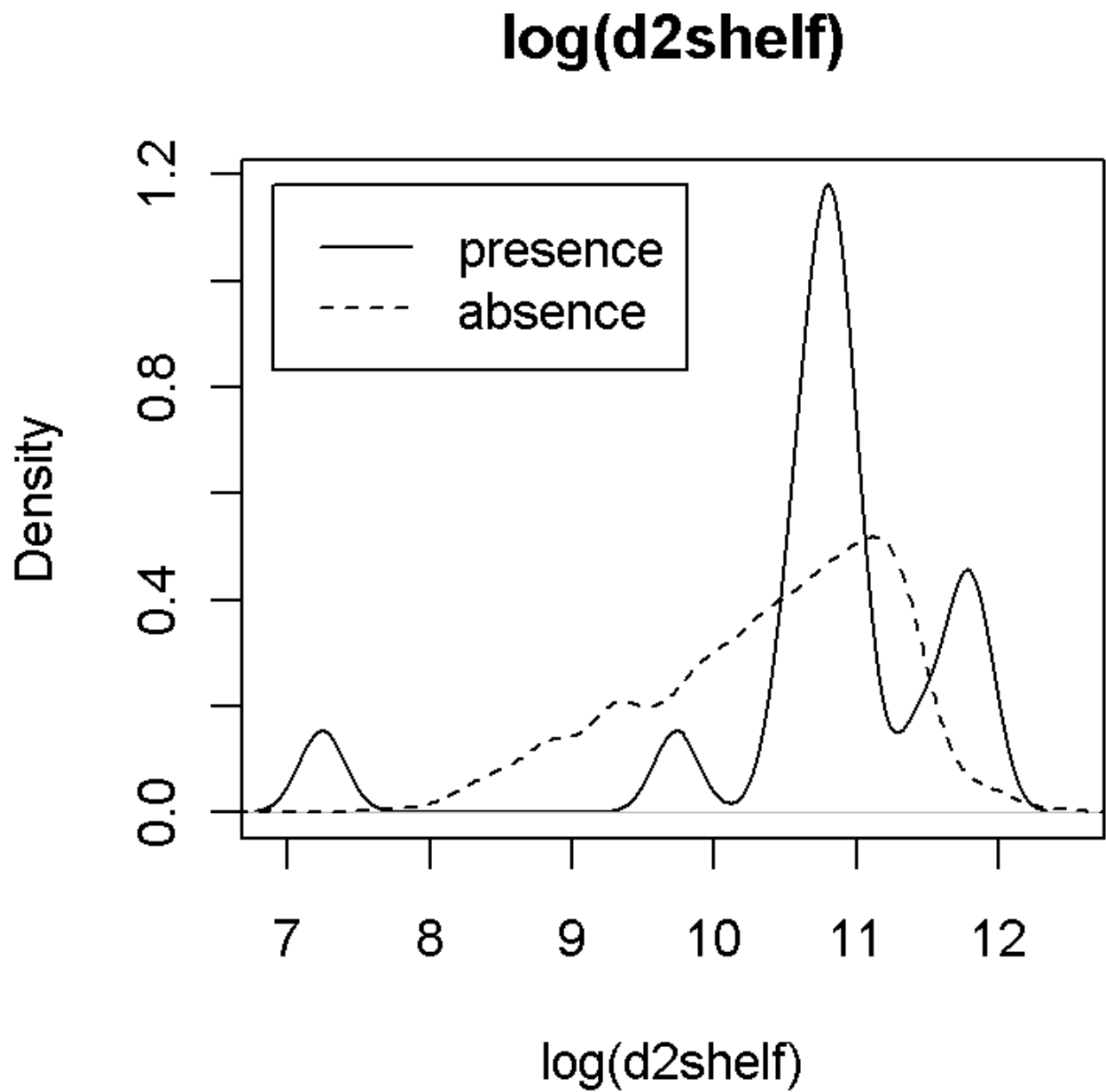


Figure 60: Density histogram of distance to shelf log(meters) for 'Baleen whales' guild during 'winter' season in 'east2' region.

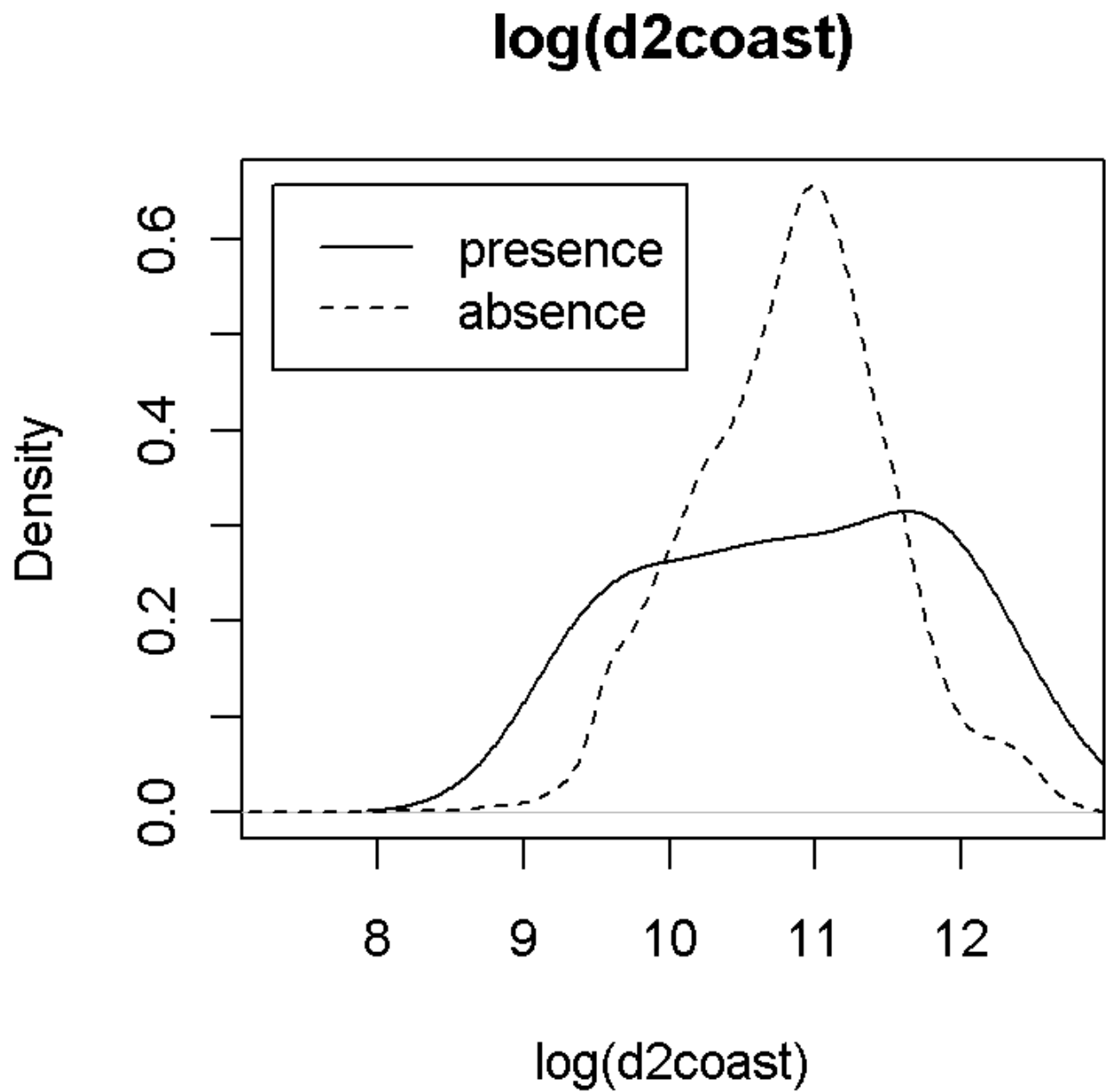


Figure 61: Density histogram of distance to coast log(meters) for 'Baleen whales' guild during 'winter' season in 'east2' region.

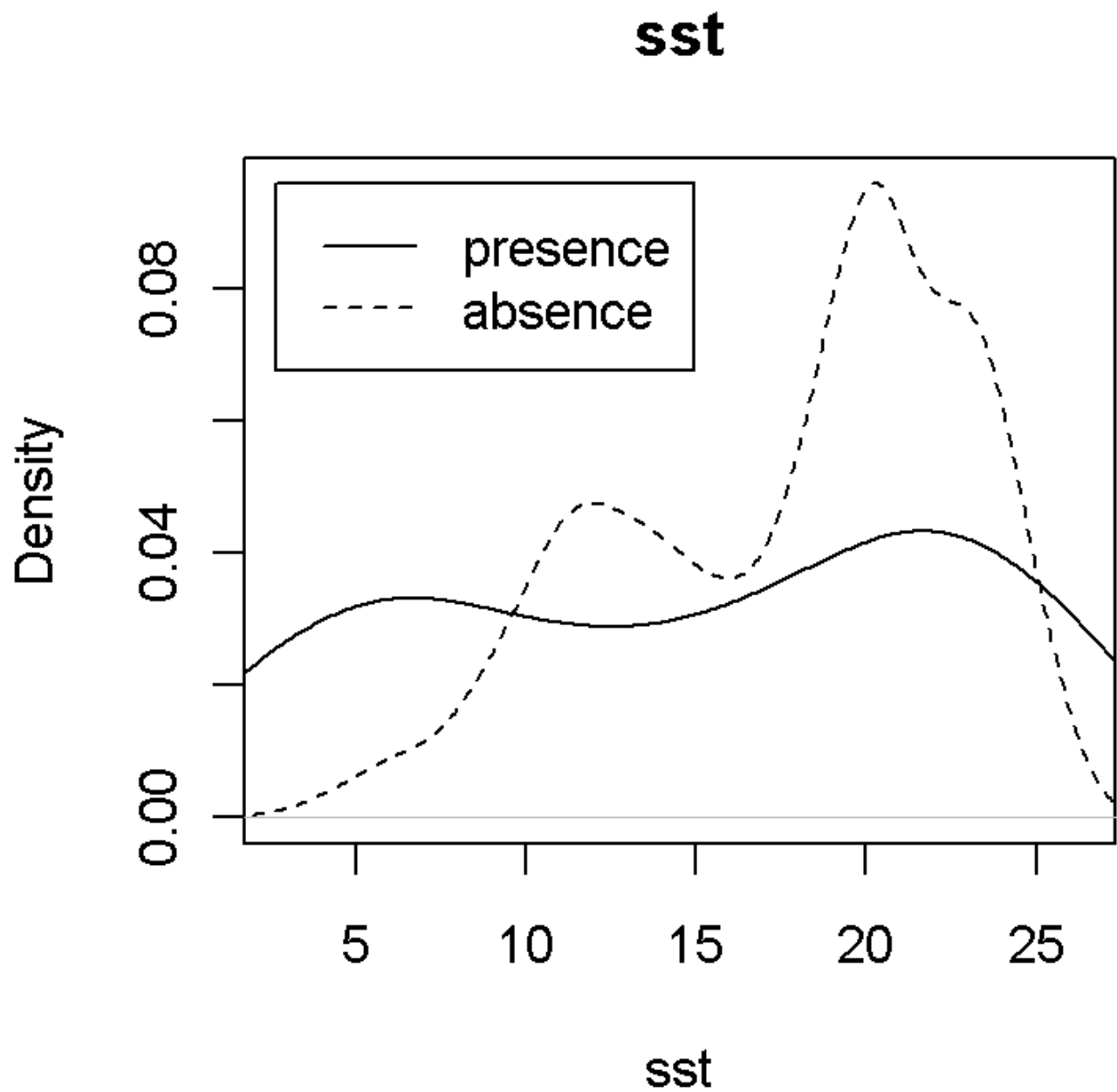


Figure 62: Density histogram of sea-surface temperature (degrees C) for 'Baleen whales' guild during 'winter' season in 'east2' region.

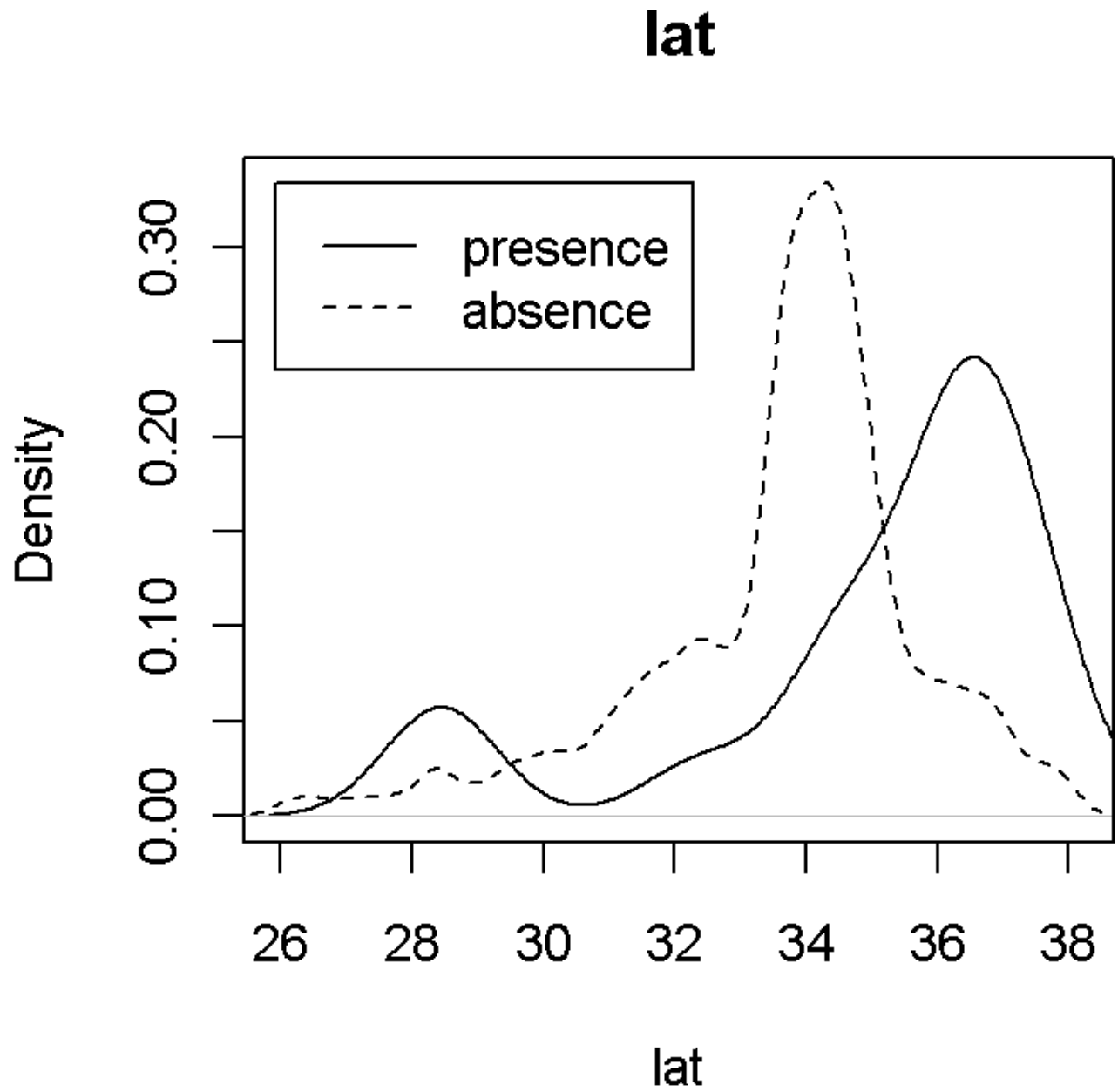


Figure 63: Density histogram of latitude (degrees) for 'Baleen whales' guild during 'winter' season in 'east2' region.

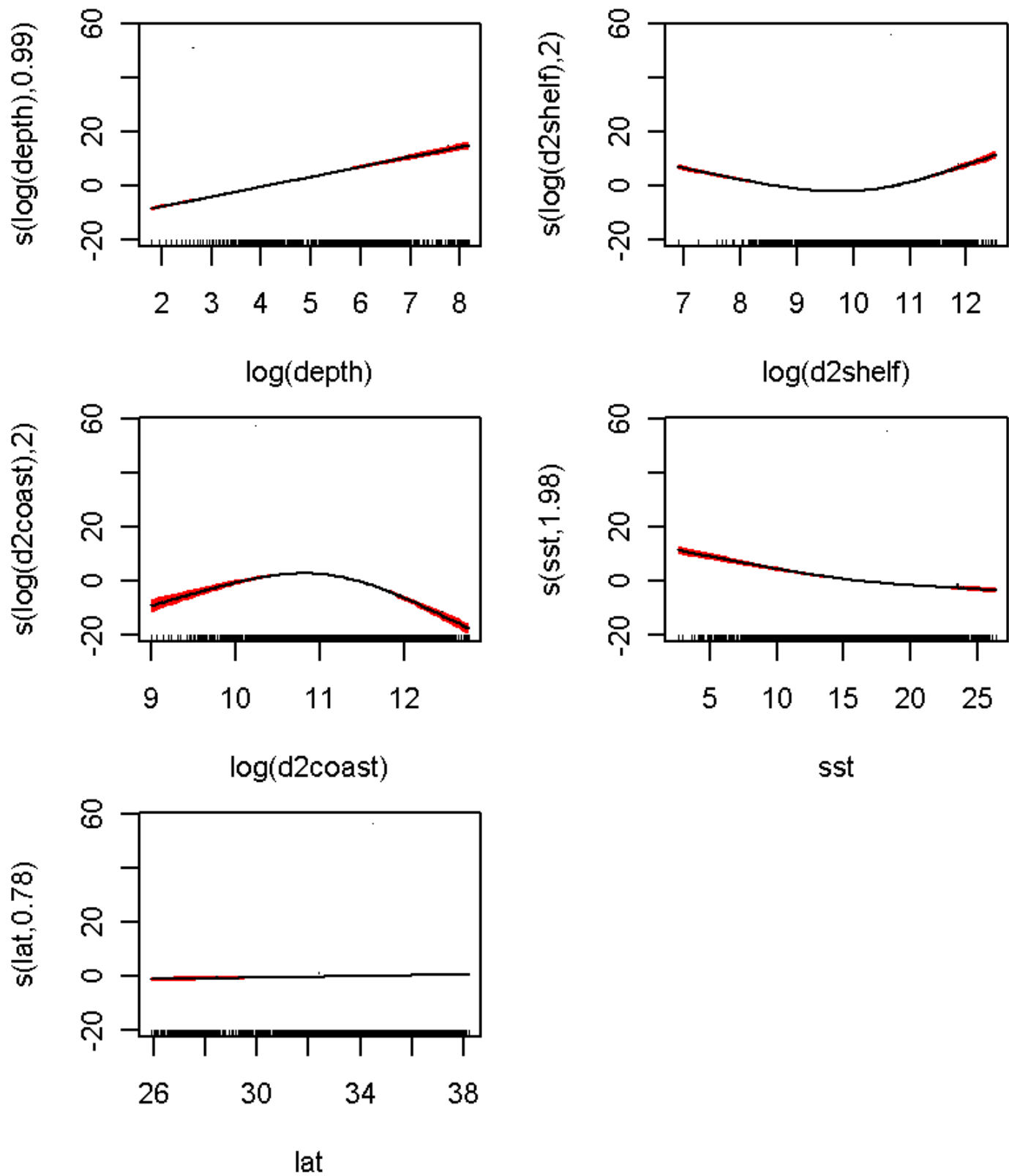


Figure 64: Terms plot of predictors to GAM model fit for 'Baleen whales' guild during 'winter' season in 'east2' region.

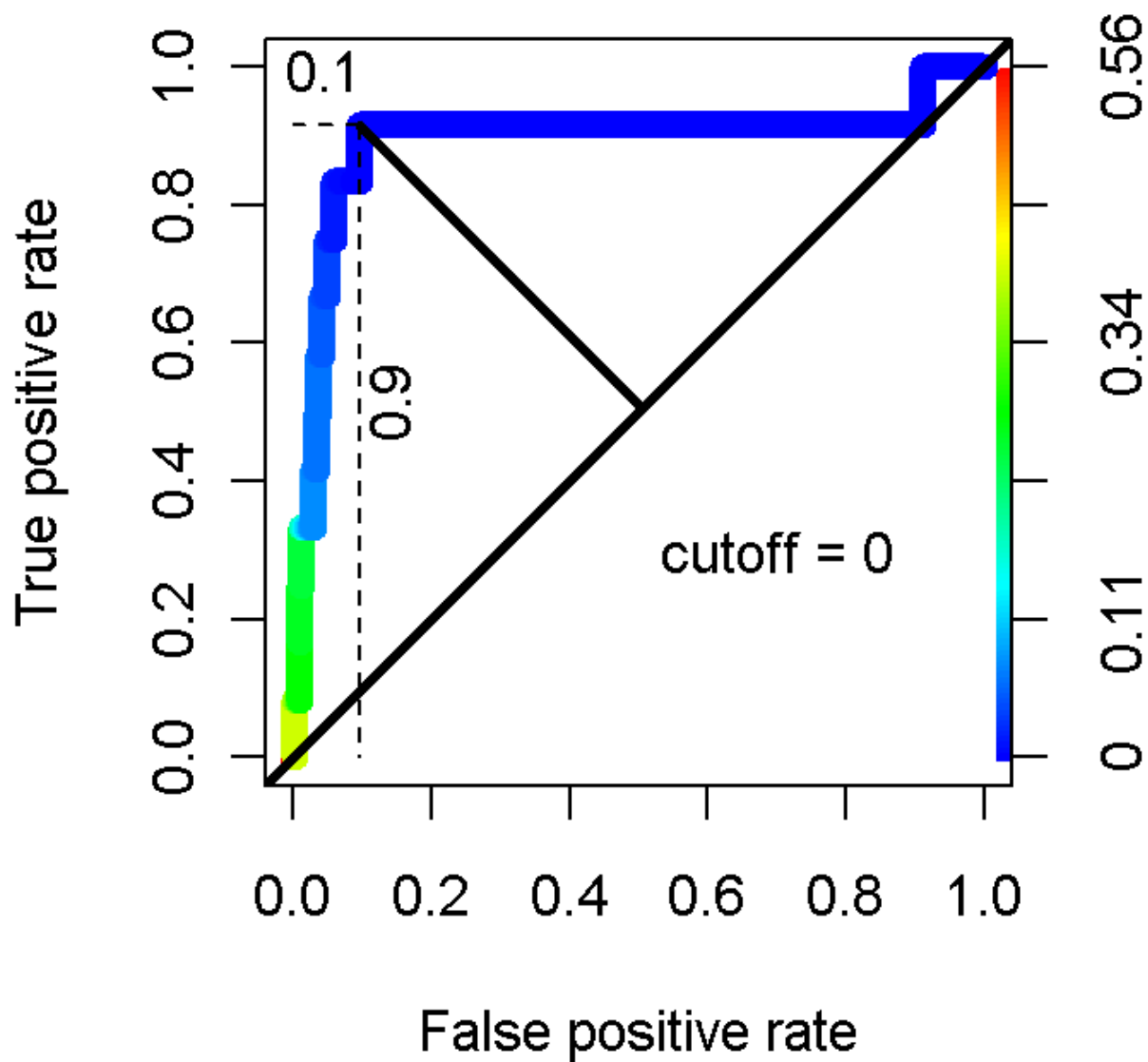


Figure 65: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Baleen whales' guild during 'winter' season in 'east2' region.

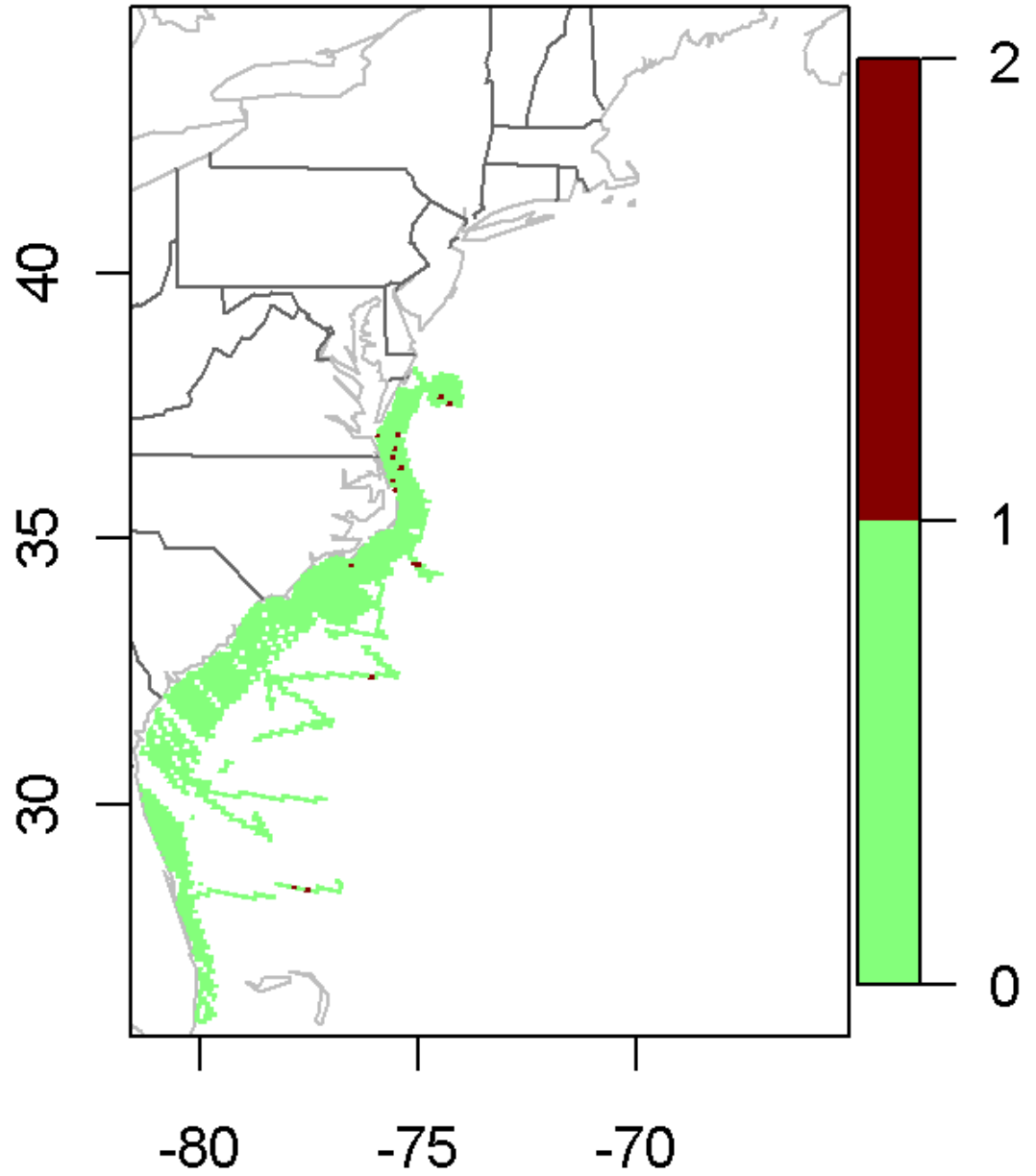


Figure 66: Map of presence and absence by cell summed through time for 'Baleen whales' guild during 'winter' season in 'east2' region.

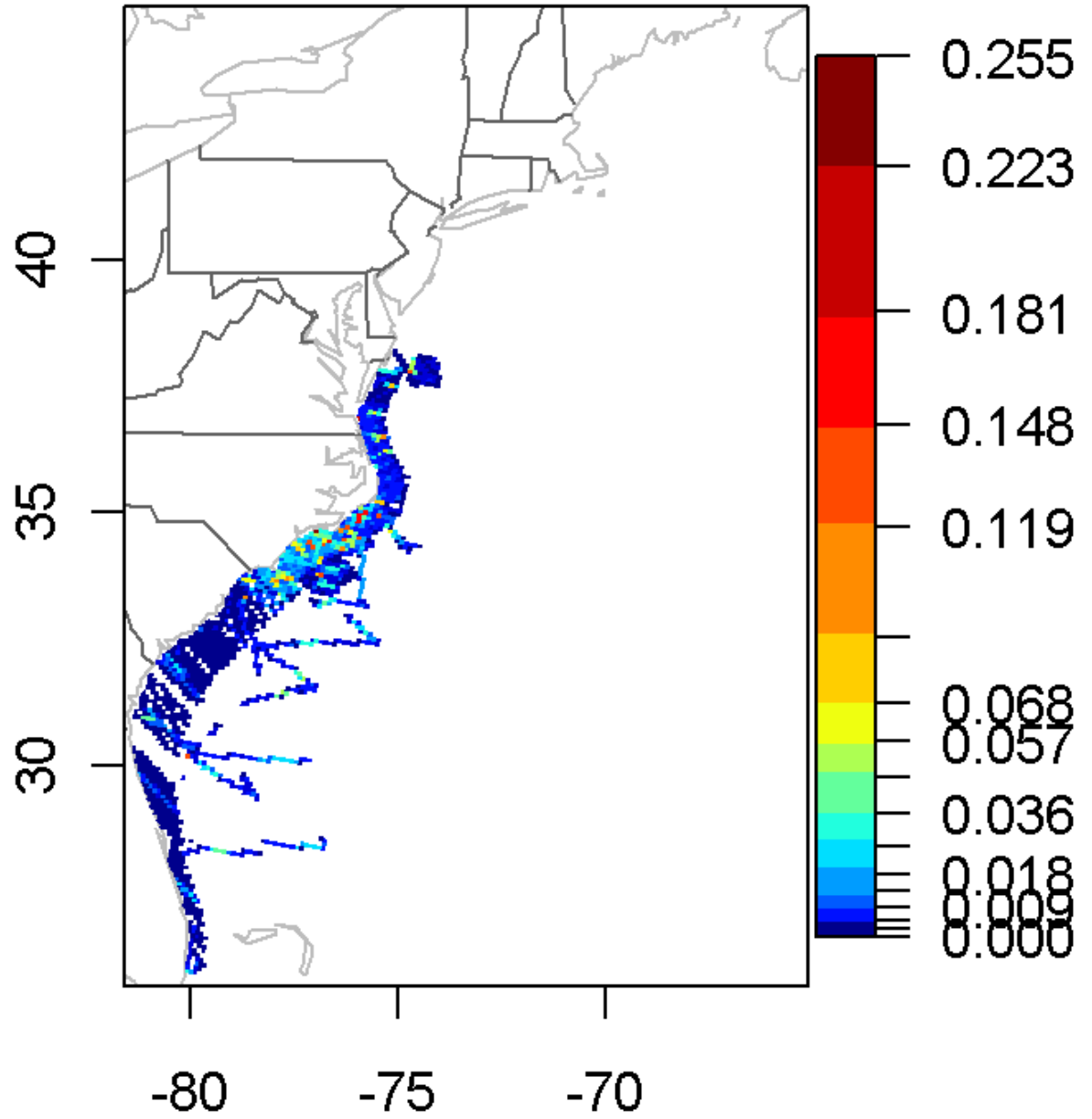


Figure 67: Map of effort(hours/km²) by cell summed through time for 'Baleen whales' guild during 'winter' season in 'east2' region.

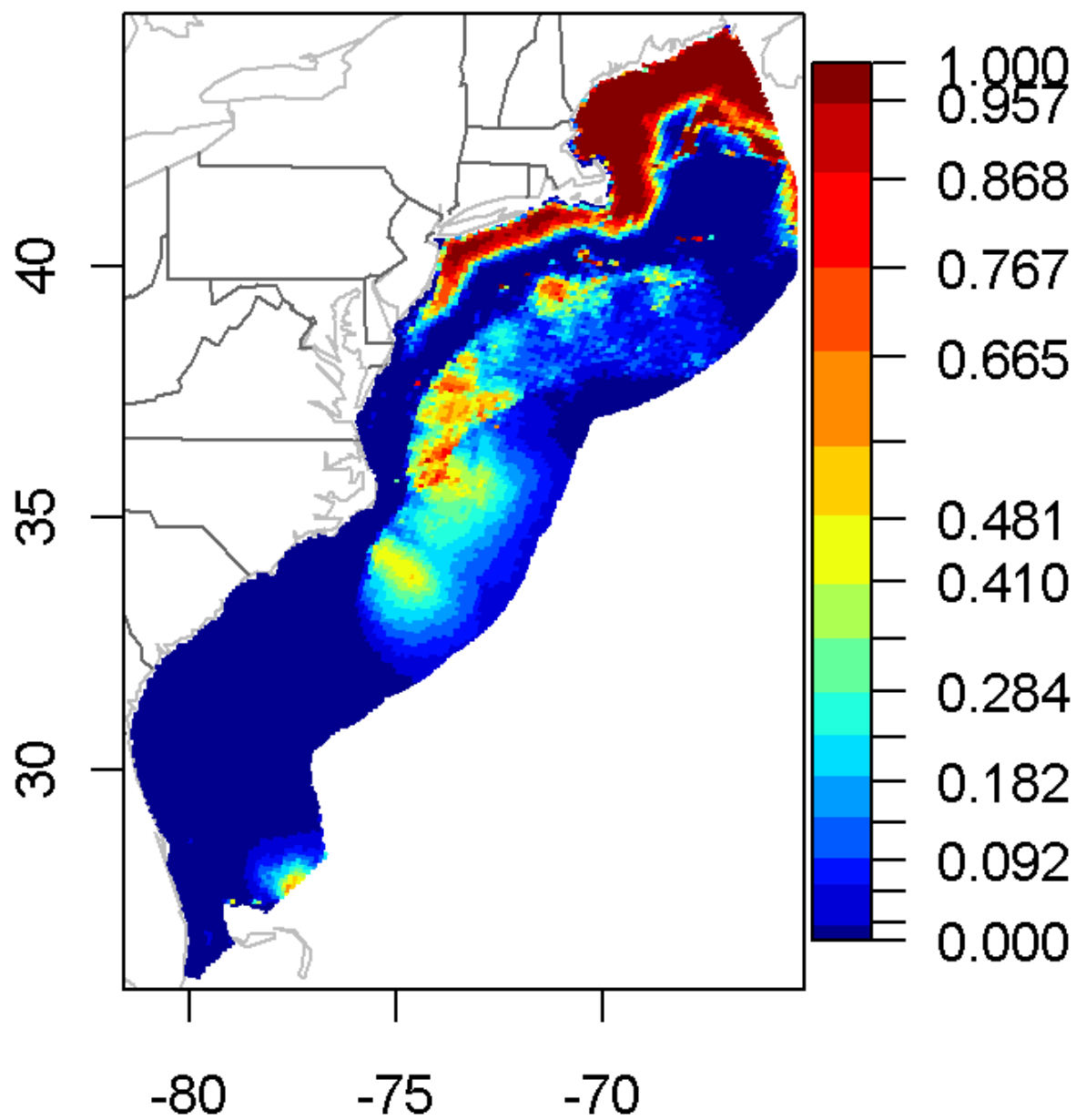


Figure 68: Map of mean predicted habitat for 'Baleen whales' guild during 'winter' season in 'east2' region.

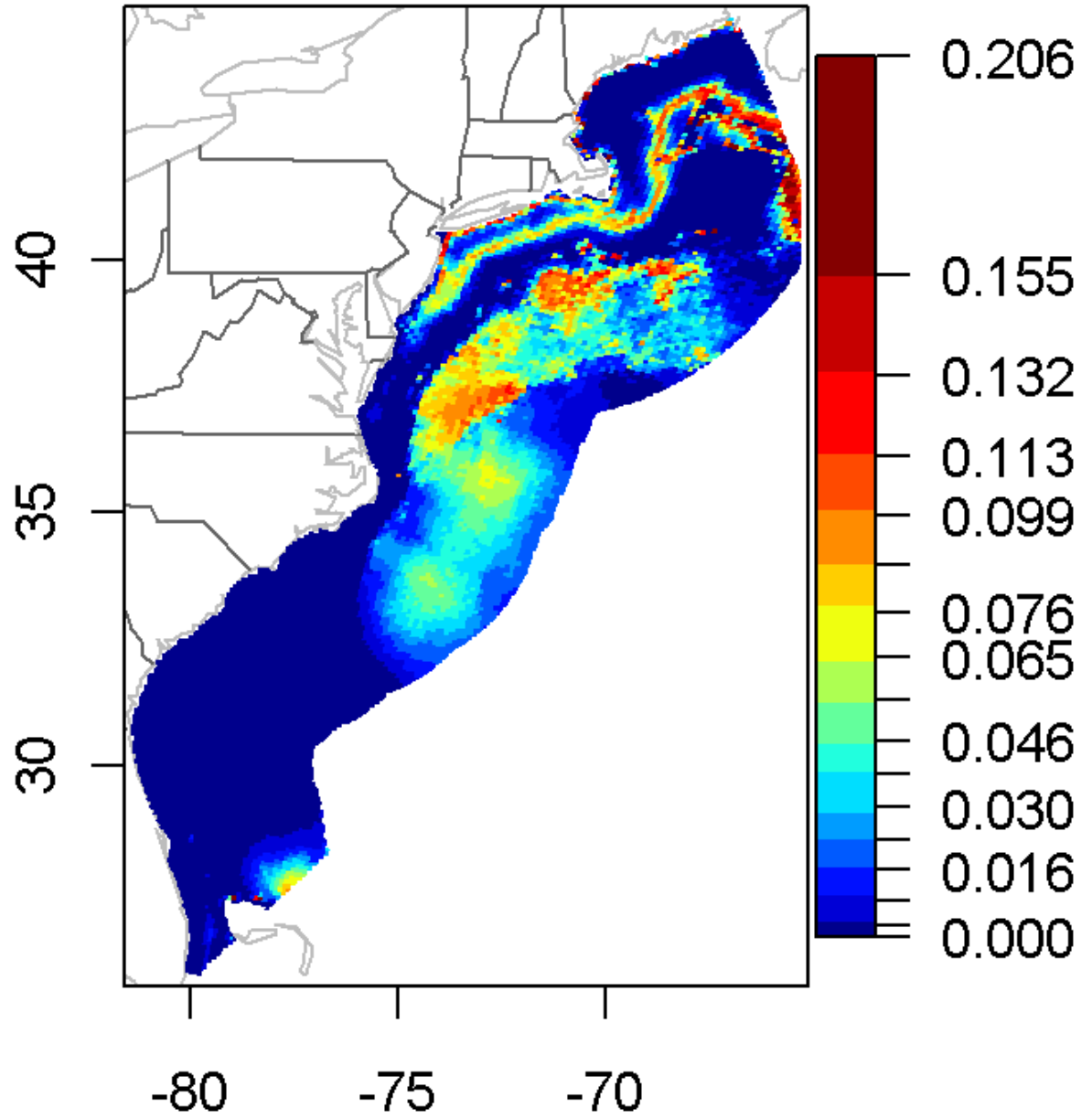


Figure 69: Map of standard error of habitat for 'Baleen whales' guild during 'winter' season in 'east2' region.

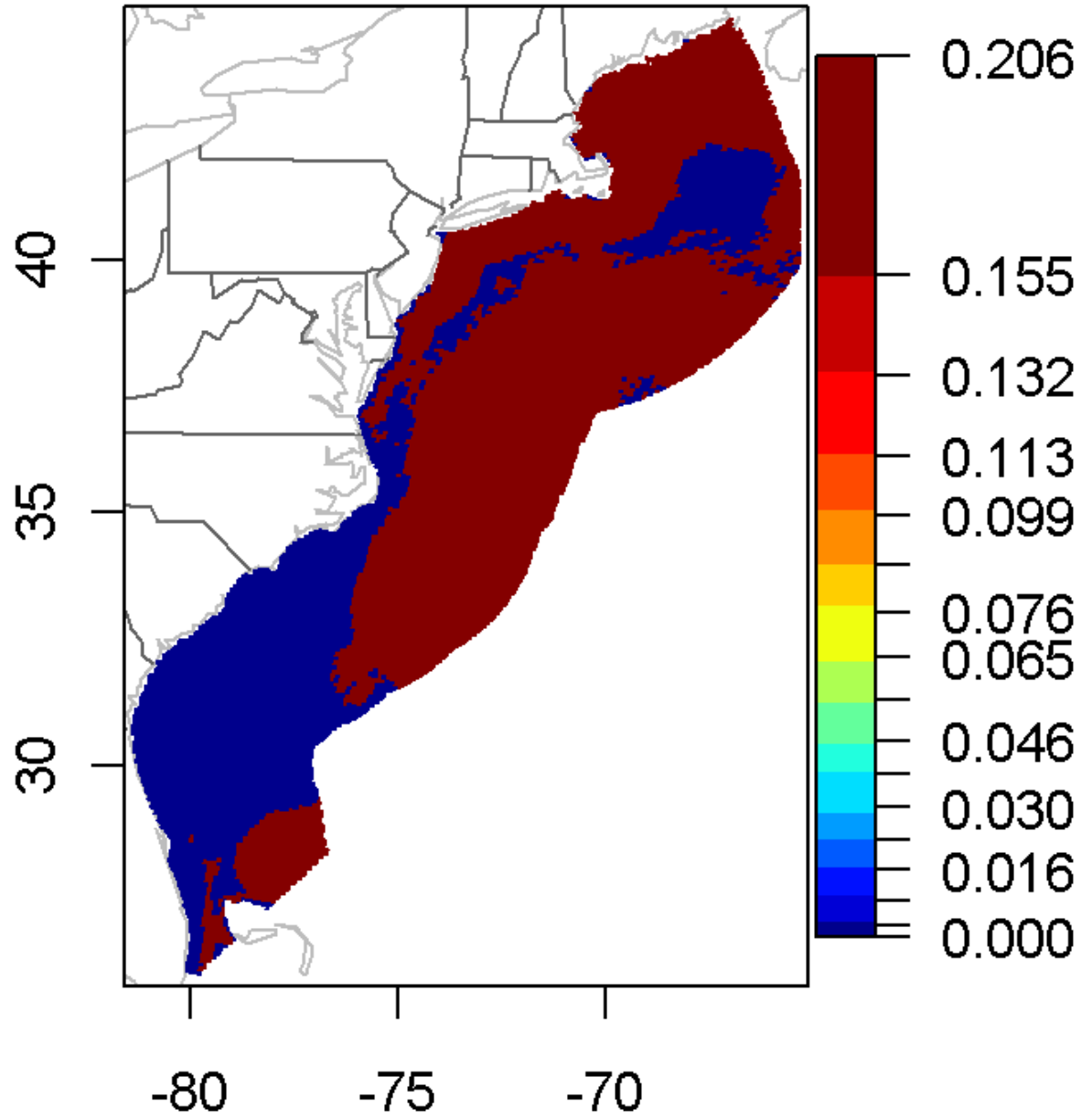


Figure 70: Map of binary habitat (cutoff determined by ROC) for 'Baleen whales' guild during 'winter' season in 'east2' region.

2 Beaked whales

Guildid:be3

Table 7: Taxonomic members of the "Beaked whales" guild.

	Scientific Name	Common Name	Taxonomic #
1	Berardius bairdii	Baird's beaked whale	180496
2	Hyperoodon ampullatus	North Atlantic bottle-nosed whale	180504
3	Indopacetus pacificus	Longman's beaked whale	180502
4	Mesoplodon	beaked whales	180506
5	Mesoplodon bidens	North Atlantic beaked whale	180515
6	Mesoplodon densirostris	Blainville's beaked whale	180517
7	Mesoplodon europaeus	Gervais' beaked whale	180509
8	Mesoplodon mirus	True's beaked whale	180508
9	Mesoplodon peruvianus	Peruvian beaked whale	552772
10	Ziphiidae	beaked whales	180493
11	Ziphius	goose-beaked whales	180497
12	Ziphius cavirostris	Cuvier's beaked whale	180498

2.1 fall

2.2 spring

2.2.1 gomex2

Modelrun identifier: duke_06_be3_spring_gomex2

Date generated: 2008-10-21 11:46:16

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 8: Summary for duke(6) GAM model: for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	56
Number.absences	4761
GAM.converged	TRUE
R.squared	0.092709
Deviance.explained	0.105252
ROC.optimum	0.15976
Maximum.fit	0.00352879
Maximum.prediction	0.0680439

Model text summary...

```
duke_06_be3_spring_gomex2 run on Tue Oct 21 11:44:54 2008
provider:duke, version:06, guild:Beaked whales (be3), season:'spring', region:gomex2

max.fit:0.159760, max.prediction:0.068044, ROC.optimum:0.003529

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.132      0.134   -38.29  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  0.9246  1.425 14.545 1.26e-05 ***
s(log(d2shelf)) 1.9770  2.477 30.593 < 2e-16 ***
s(log(d2coast)) 0.5640  1.064  1.649   0.200
s(sst)         0.9726  1.473 35.705 1.49e-12 ***
s(lat)         1.9961  2.496 84.193 < 2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.0927 Deviance explained = 10.5%
GCV score = 0.0014085 Scale est. = 0.0014046 n = 4817

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:4817  Min.   : 14   Min.   : 11   Min.   : 272   Min.   : 21187   Min.   :19.73   Min.   :24.05
              1st Qu.:2144 1st Qu.: 511 1st Qu.: 24696 1st Qu.:142982 1st Qu.:24.23 1st Qu.:26.38
              Median :4222 Median :1292 Median : 63128 Median :211670 Median :25.35 Median :27.38
              Mean   :3977 Mean   :1537 Mean : 82827 Mean :213952 Mean :25.14 Mean :27.25
              3rd Qu.:5932 3rd Qu.:2668 3rd Qu.:131568 3rd Qu.:276022 3rd Qu.:26.17 3rd Qu.:28.13
              Max.   :8191 Max.   :3523 Max.   :257870 Max.   :404358 Max.   :28.42 Max.   :30.06

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :19.95   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:21.83 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :23.02 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:6.489e-16	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:1.308e-03	1st Qu.	:4.581e-04	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.0000
Median	:4110	Median	:6.564e-03	Median	:1.050e-03	Median	:0.000e+00	Median	:9.499e-03	Median	:1.0000
Mean	:3997	Mean	:8.685e-03	Mean	:1.627e-03	Mean	:3.108e-02	Mean	:2.365e-02	Mean	:0.6195
3rd Qu.	:6015	3rd Qu.	:1.135e-02	3rd Qu.	:1.893e-03	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:6.804e-02	Max.	:2.135e-02	Max.	:2.000e+00	Max.	:2.695e-01	Max.	:1.0000
						NA's	:4.838e+03	NA's	:4.838e+03		

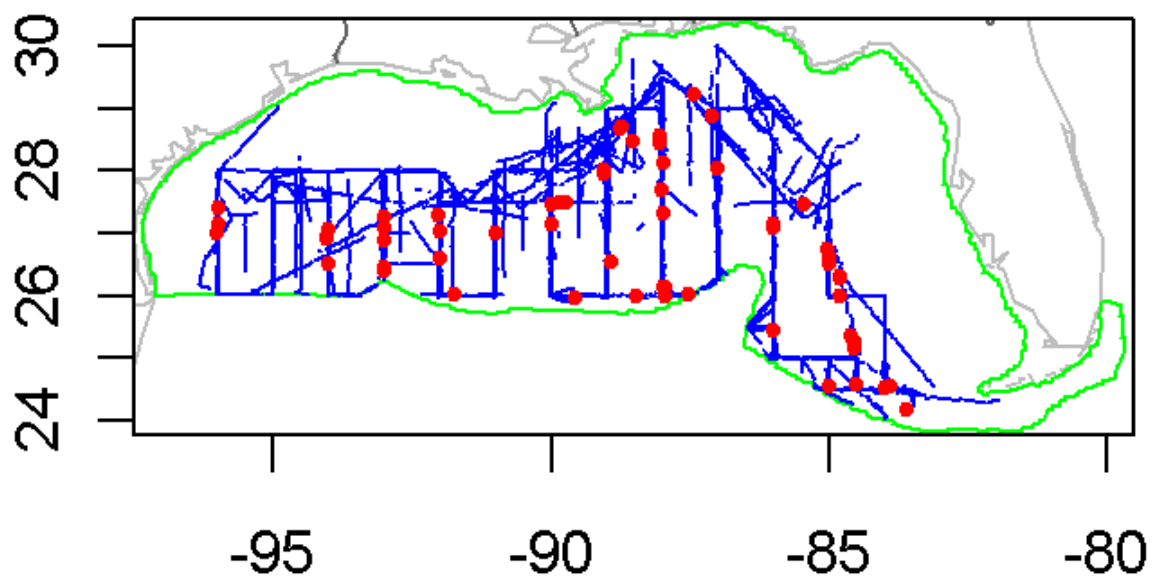


Figure 71: Map of points of observational sightings and tracks of survey effort for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

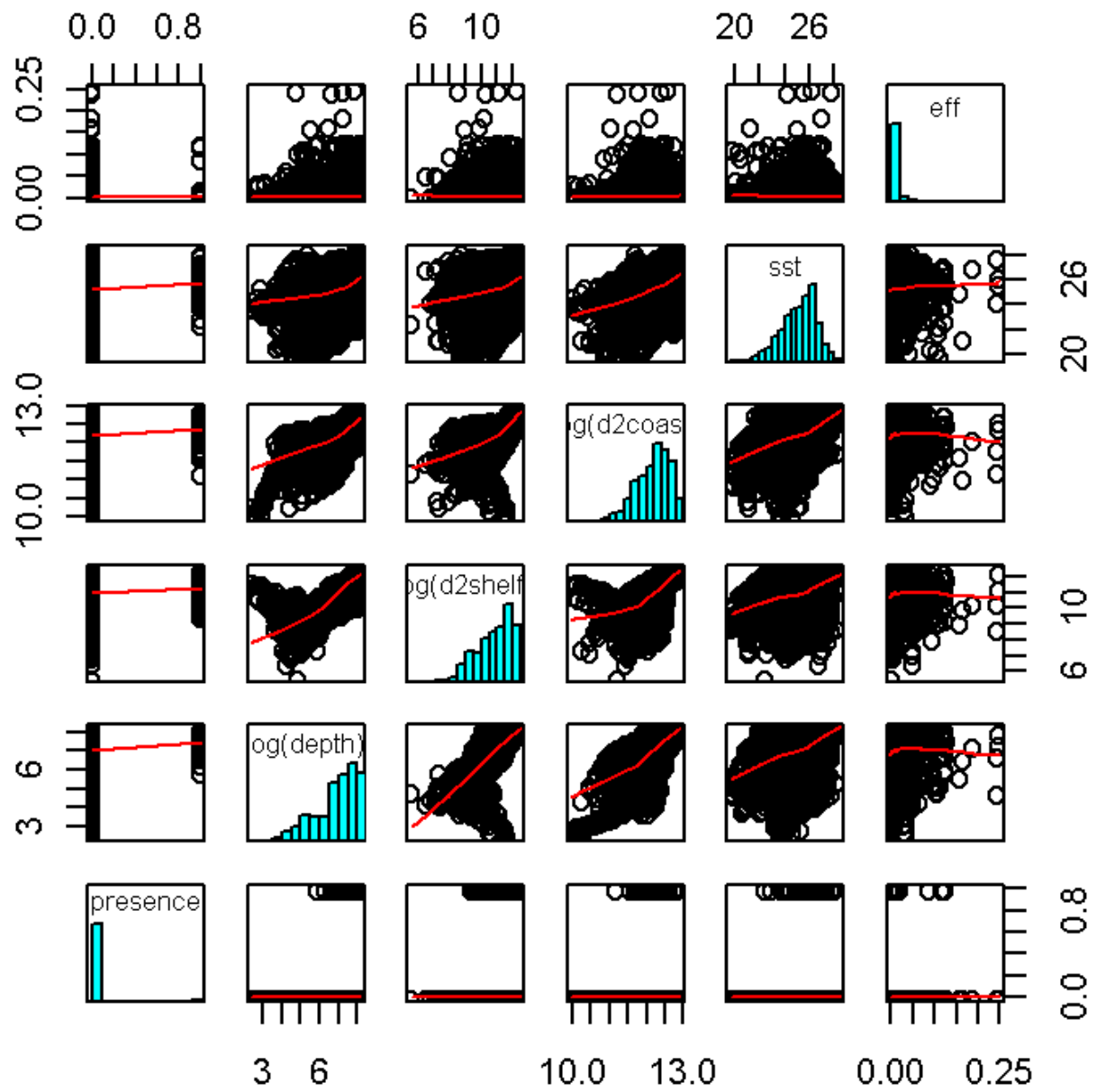


Figure 72: Pairs plot of input variables for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

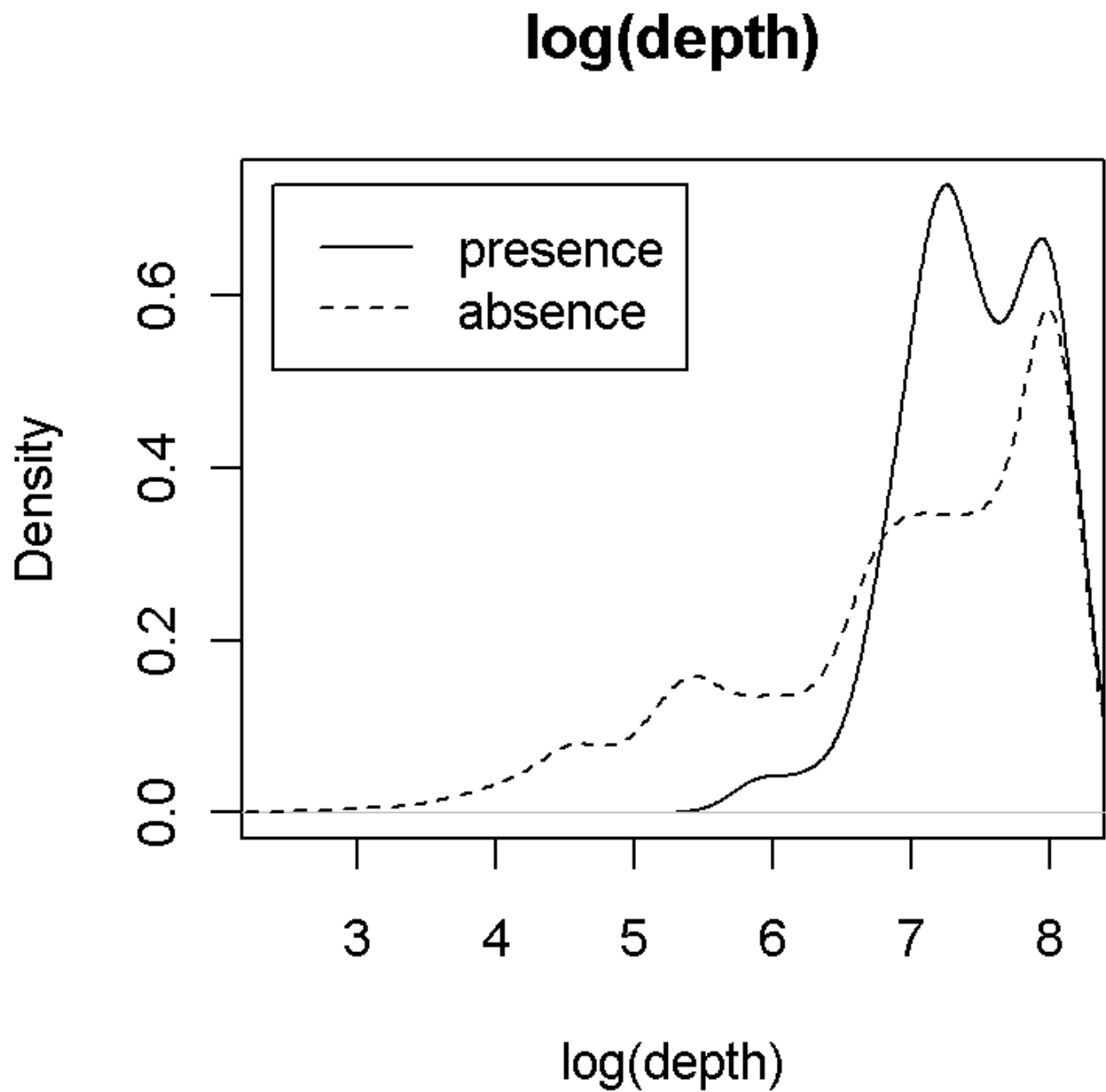


Figure 73: Density histogram of depth log(meters) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

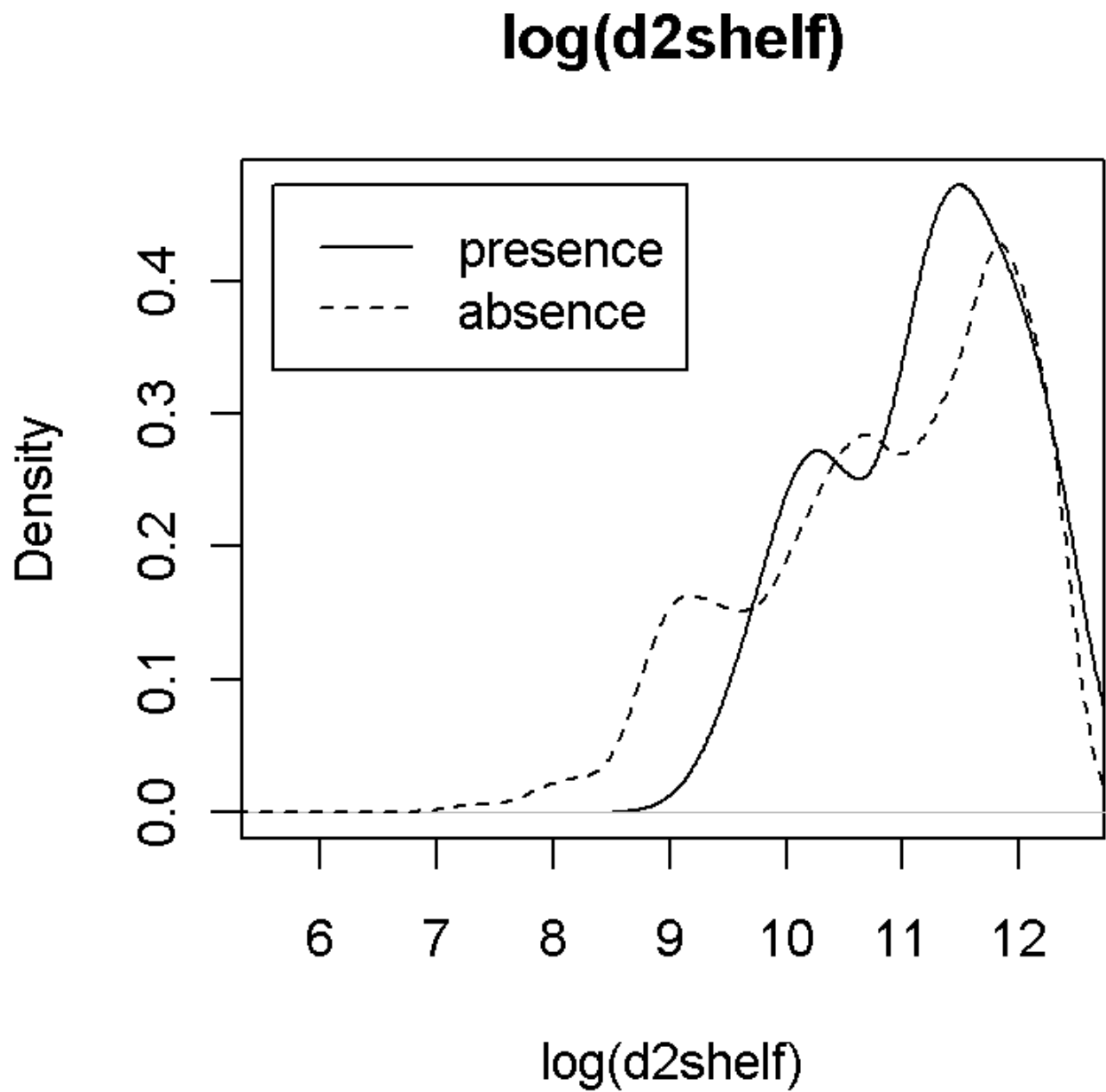


Figure 74: Density histogram of distance to shelf log(meters) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

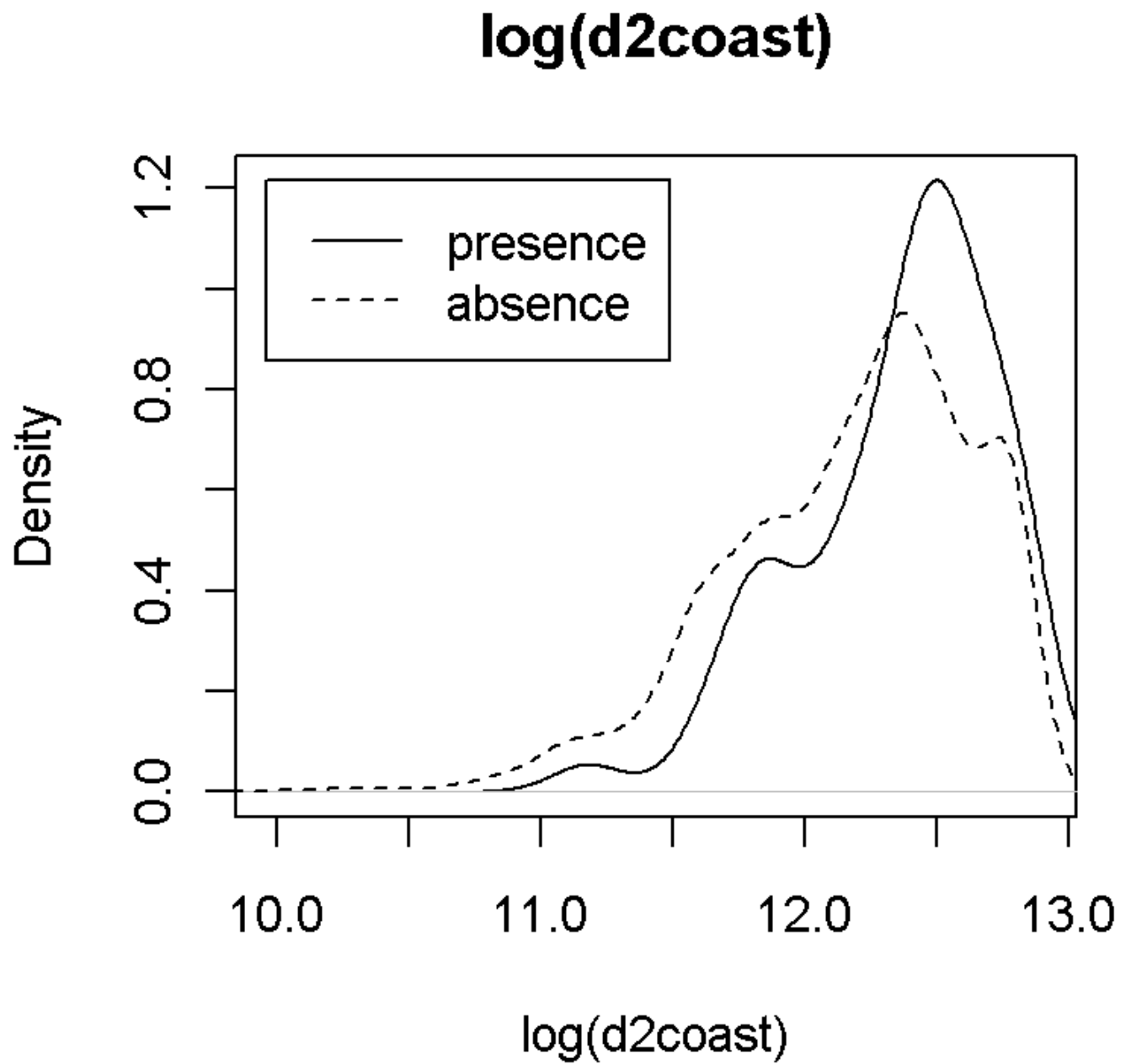


Figure 75: Density histogram of distance to coast log(meters) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

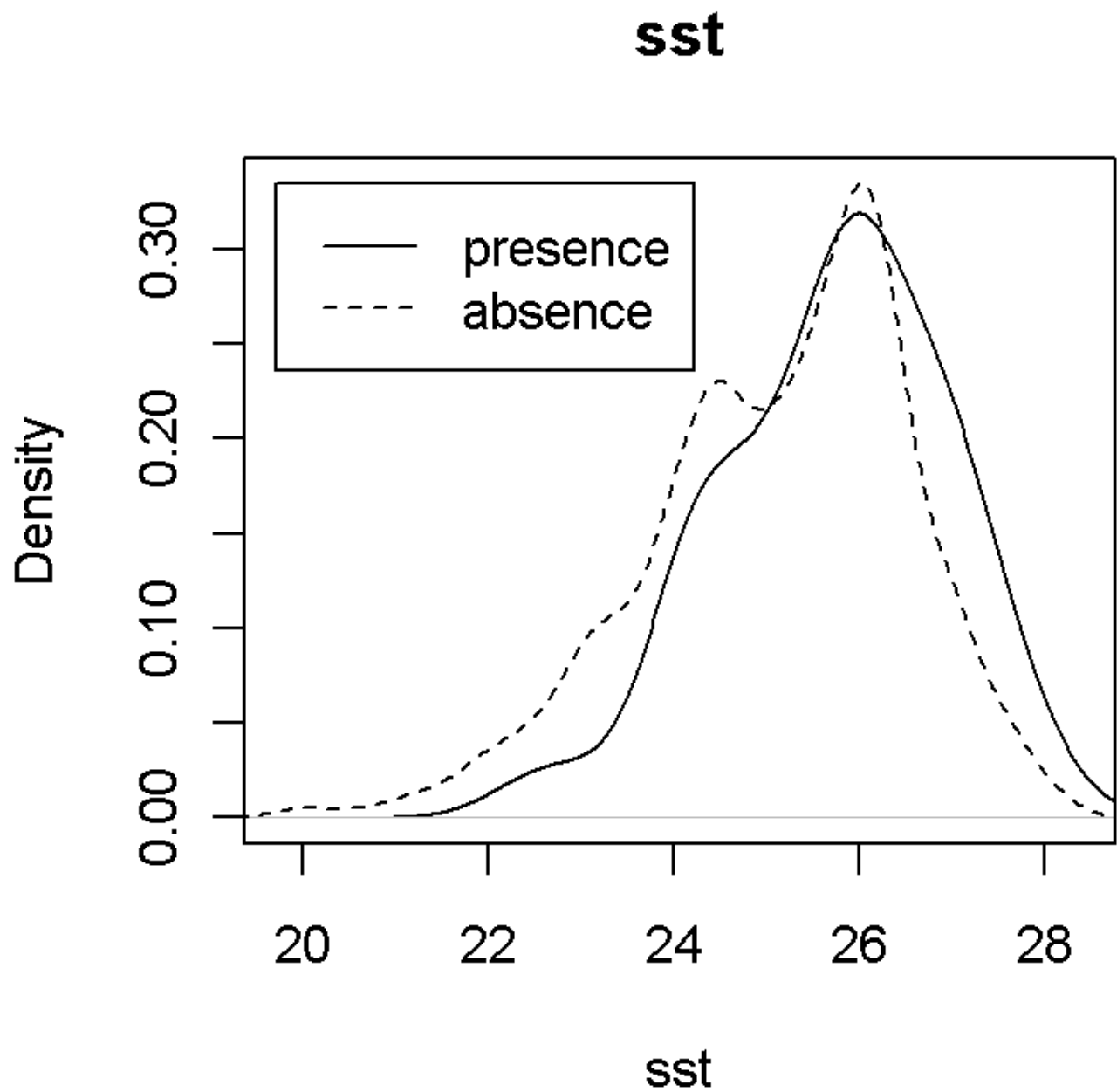


Figure 76: Density histogram of sea-surface temperature (degrees C) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

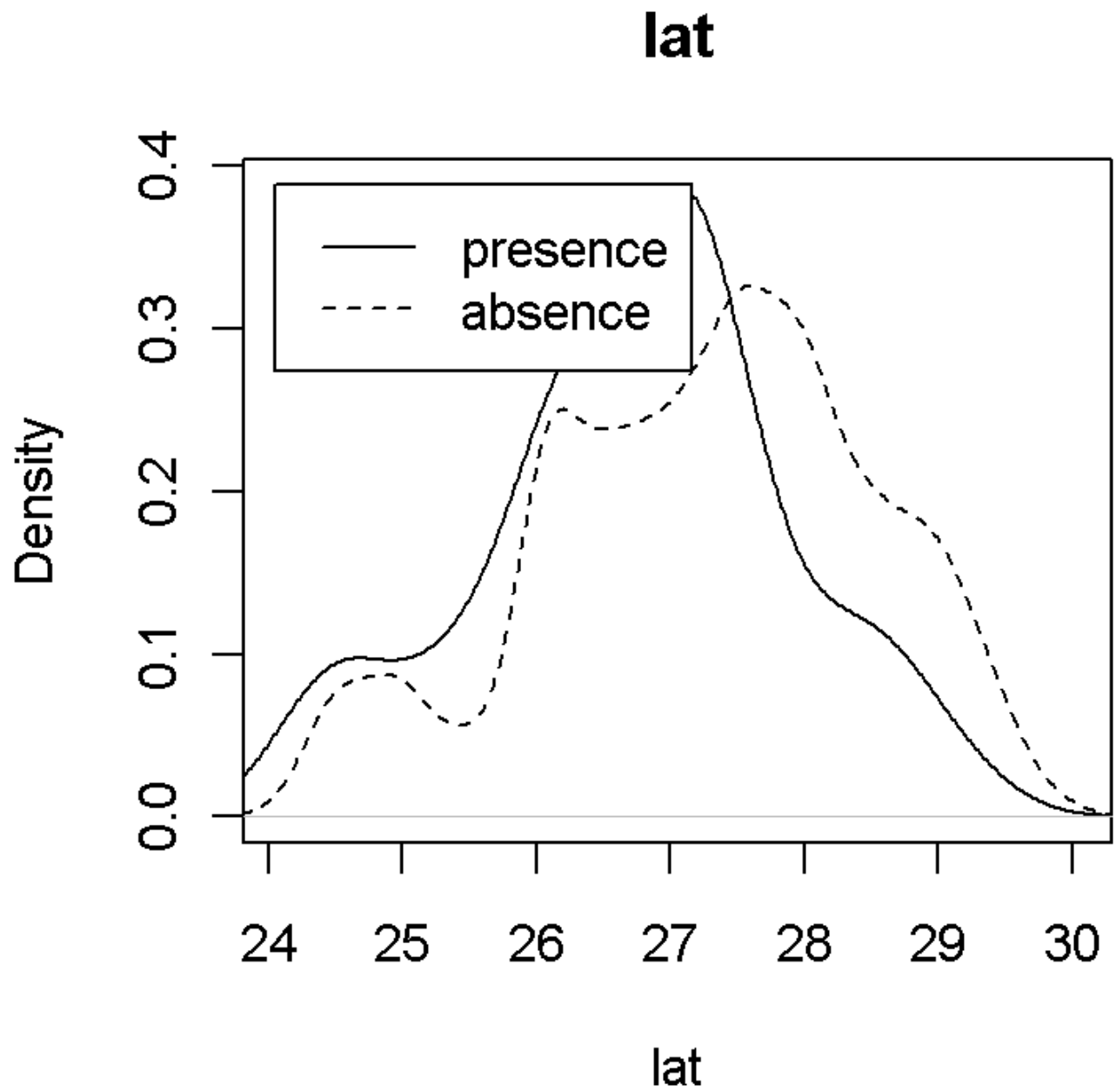


Figure 77: Density histogram of latitude (degrees) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

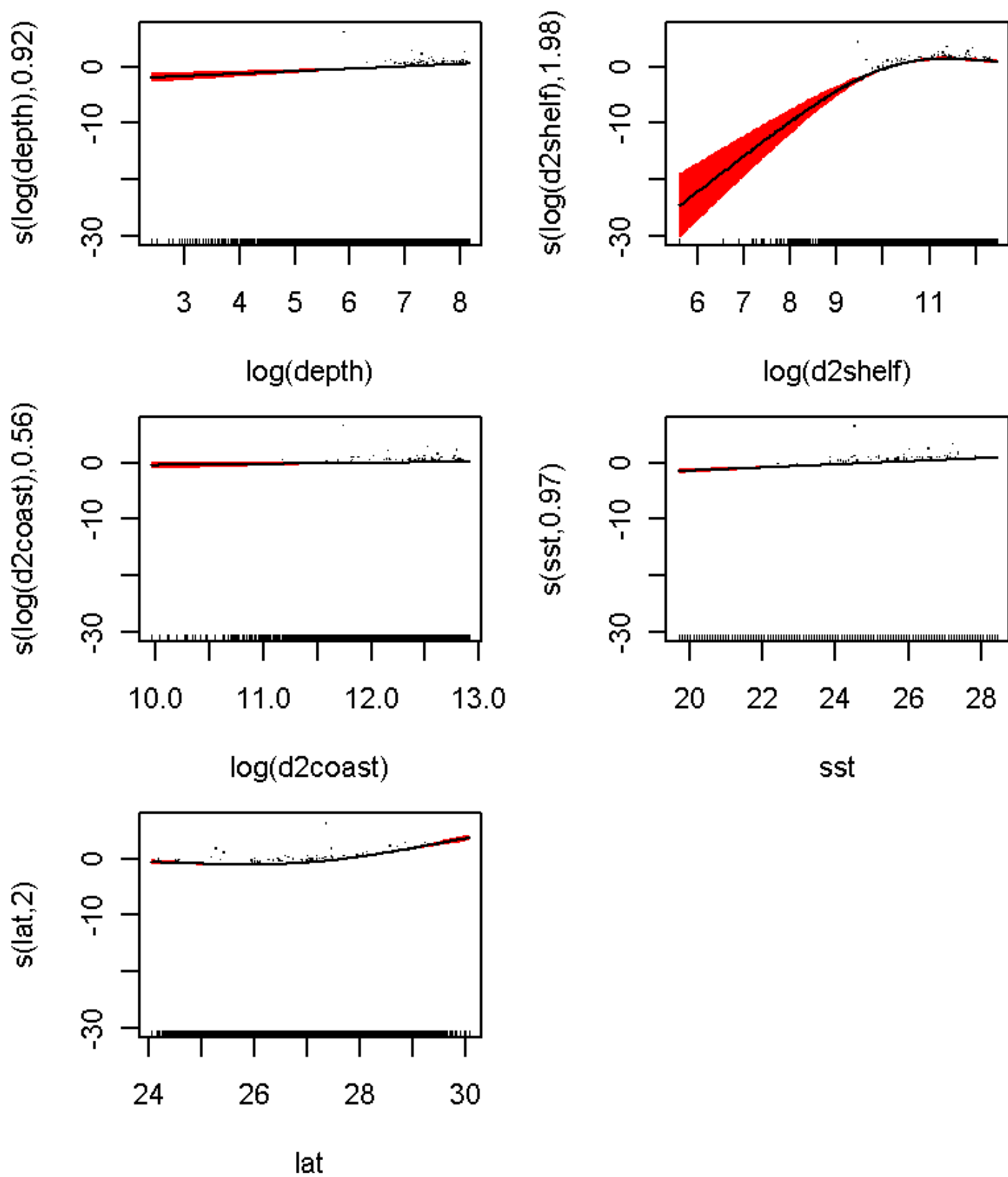


Figure 78: Terms plot of predictors to GAM model fit for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

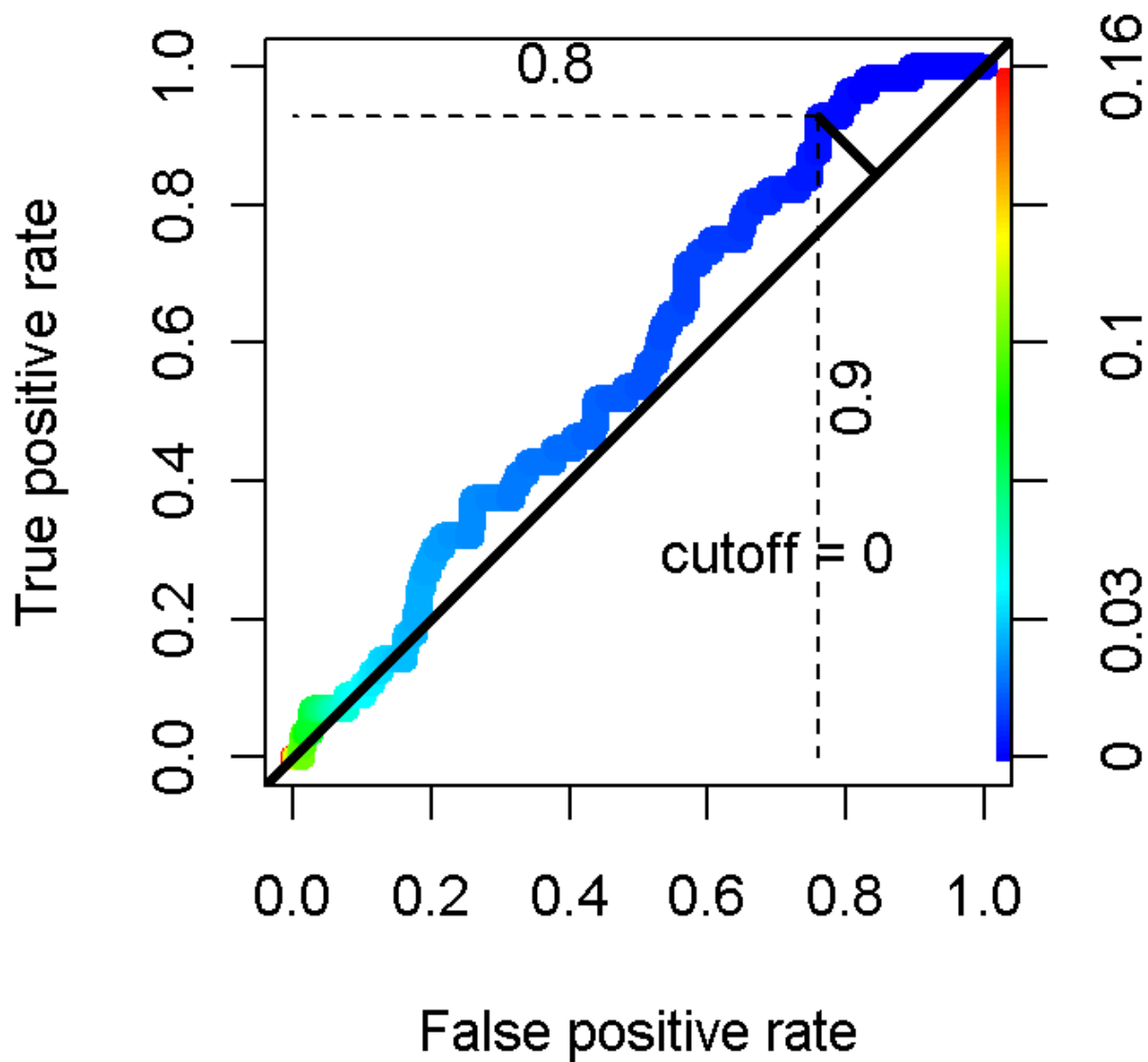


Figure 79: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

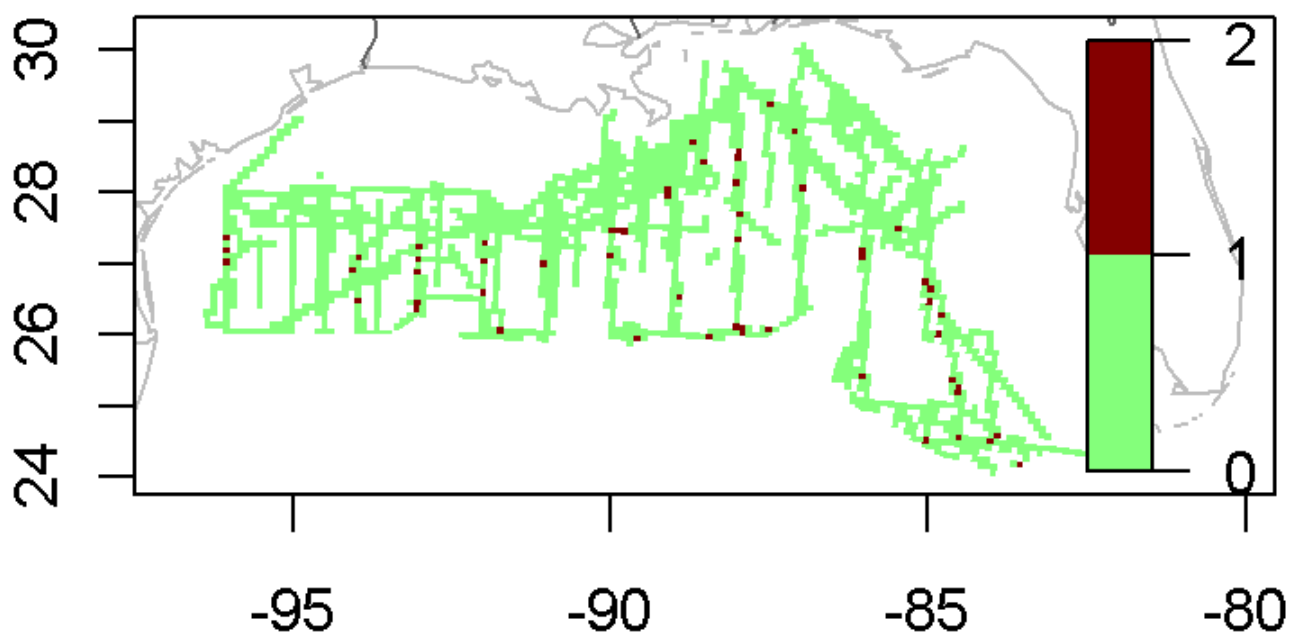


Figure 80: Map of presence and absence by cell summed through time for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

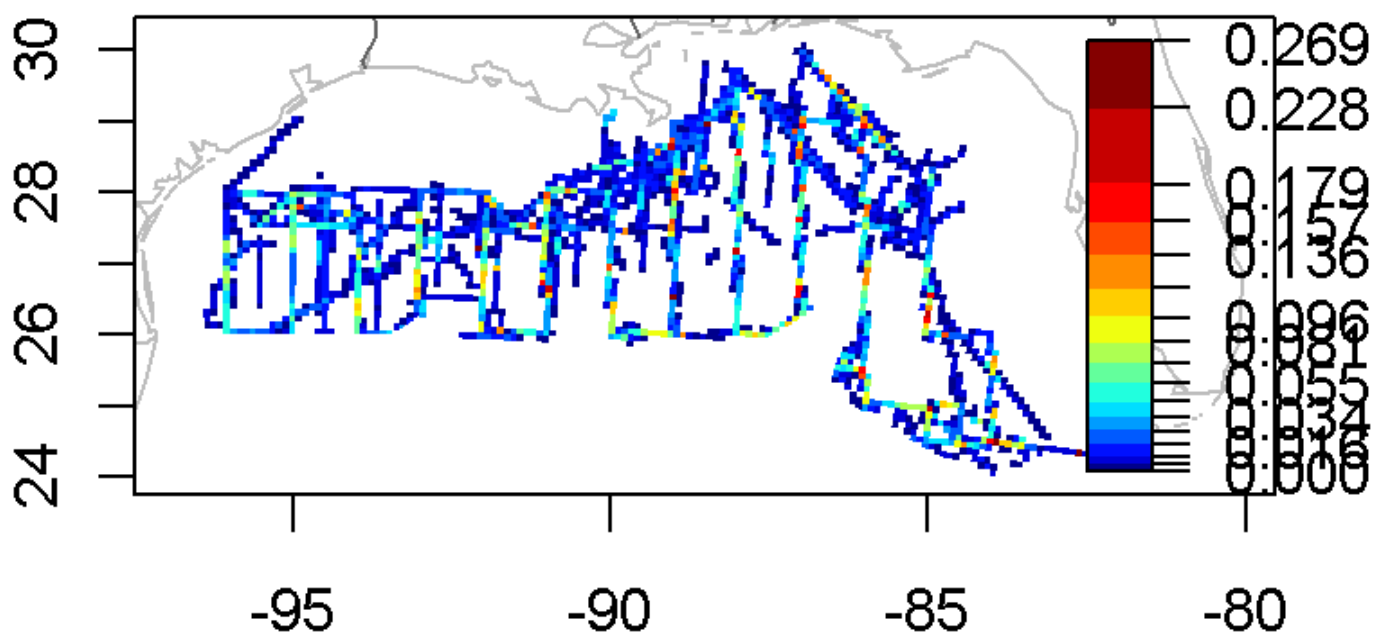


Figure 81: Map of effort(hours/km²) by cell summed through time for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

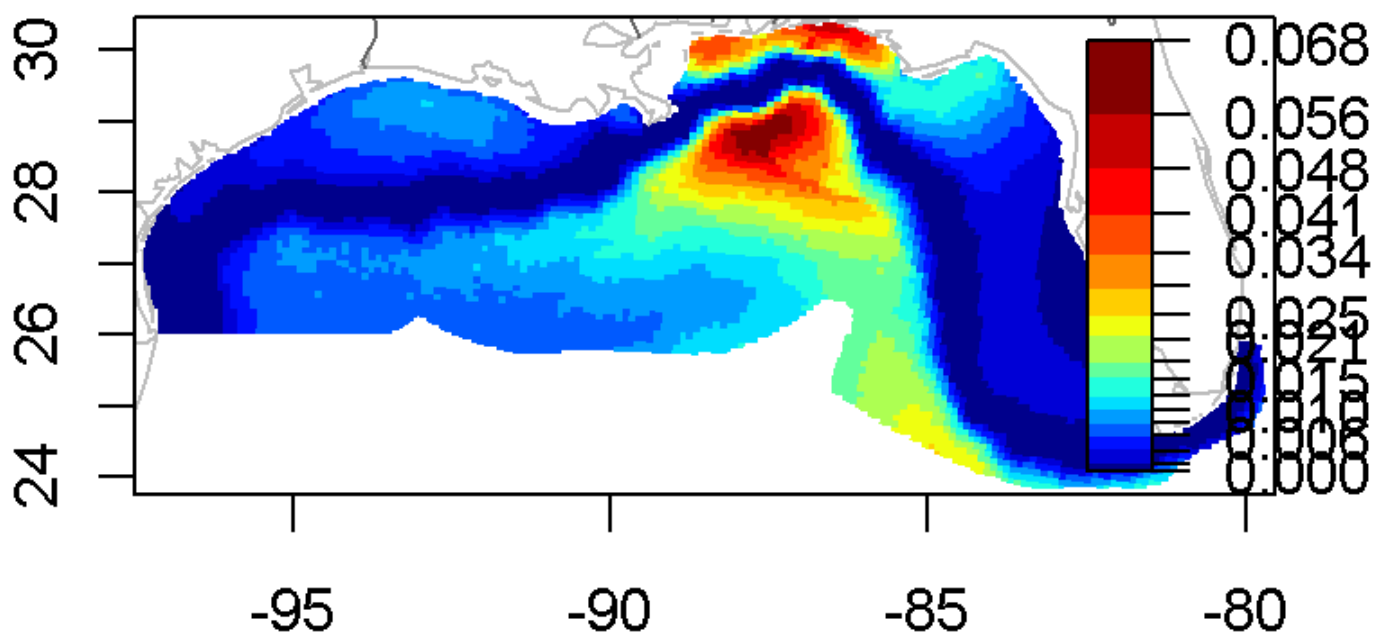


Figure 82: Map of mean predicted habitat for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

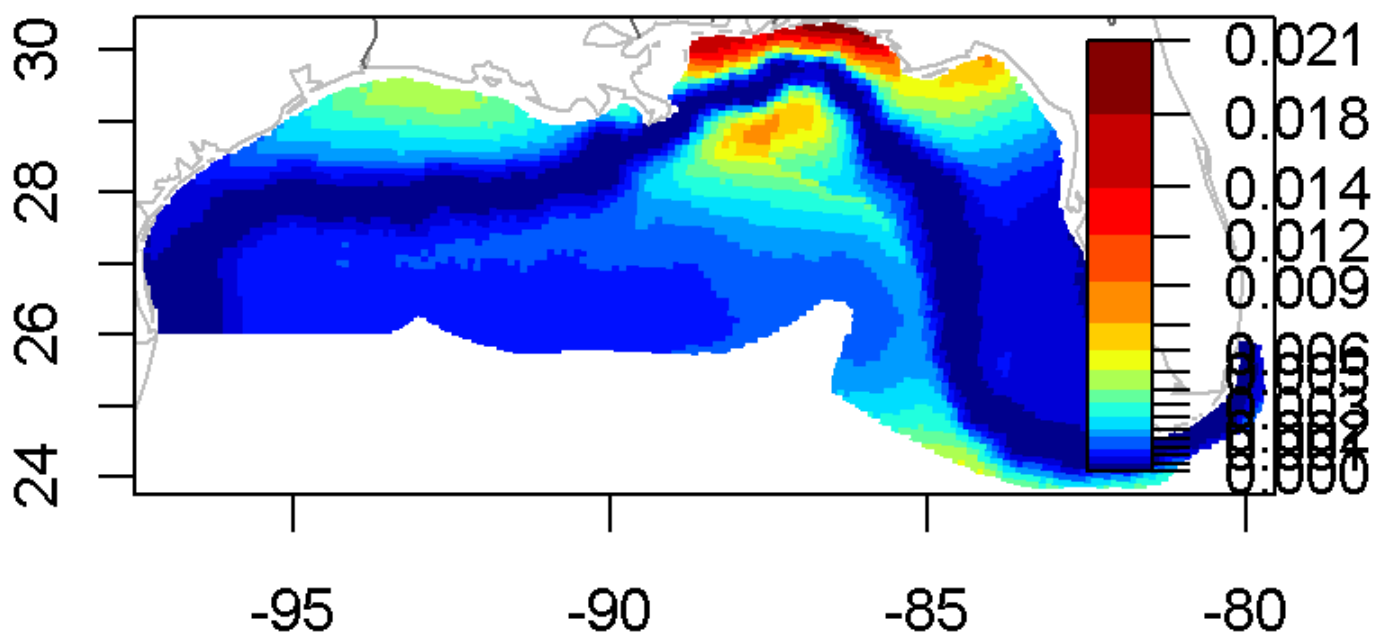


Figure 83: Map of standard error of habitat for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

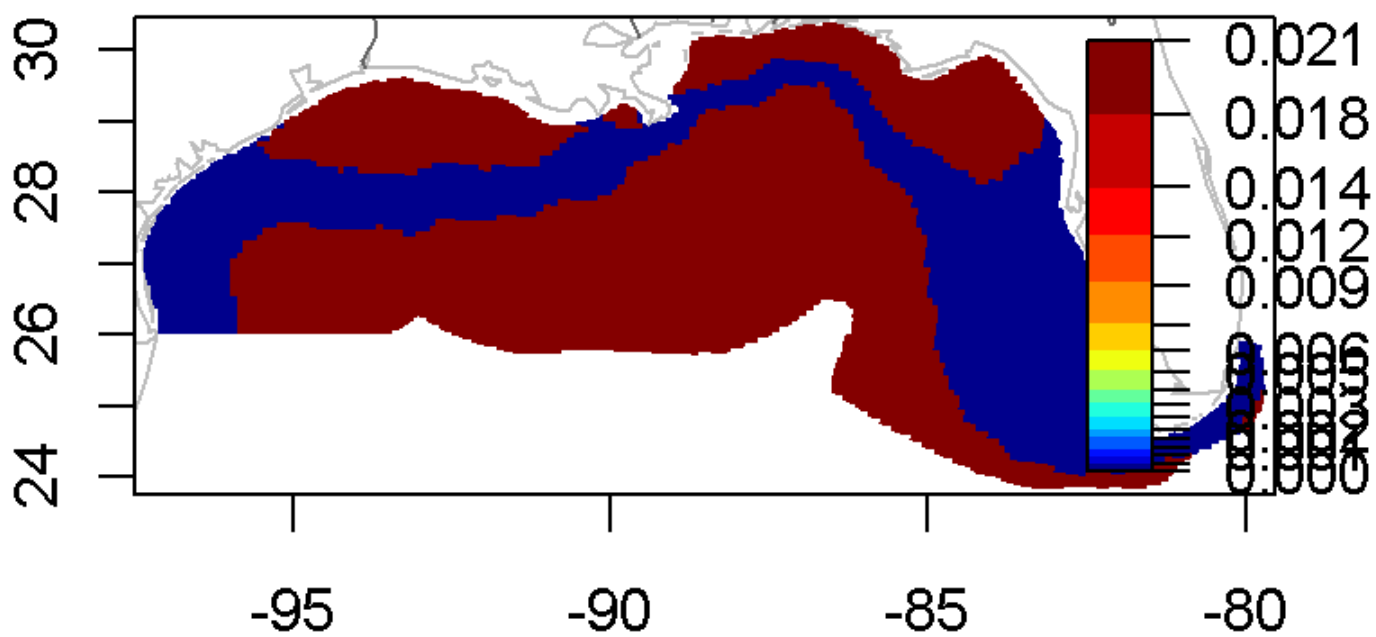


Figure 84: Map of binary habitat (cutoff determined by ROC) for 'Beaked whales' guild during 'spring' season in 'gomex2' region.

2.3 summer

2.3.1 east2

Modelrun identifier: duke_06_be3_summer_east2

Date generated: 2008-10-21 12:43:39

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 9: Summary for duke(6) GAM model: for 'Beaked whales' guild during 'summer' season in 'east2' region.

	Value
Number.presences	121
Number.absences	8957
GAM.converged	TRUE
R.squared	0.164088
Deviance.explained	0.2796
ROC.optimum	0.351673
Maximum.fit	0.011717
Maximum.prediction	0.538619

Model text summary...

```
duke_06_be3_summer_east2 run on Tue Oct 21 12:40:34 2008
provider:duke, version:06, guild:Beaked whales (be3), season:'summer', region:east2

max.fit:0.351673, max.prediction:0.538619, ROC.optimum:0.011717

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -9.0990      0.3951  -23.03   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.983   2.483  73.80   < 2e-16 ***
s(log(d2shelf)) 1.952   2.452  49.95   < 2e-16 ***
s(log(d2coast)) 1.991   2.491  35.21   < 2e-16 ***
s(sst)         1.964   2.464  39.76   < 2e-16 ***
s(lat)         1.992   2.492  29.77  2.44e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.164  Deviance explained =  28%
GCV score = 0.00098768  Scale est. = 0.00098545  n = 8663

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.   :  5.0  Min.   :  5  Min.   : 1259  Min.   :  8.175  Min.   :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.:20989  1st Qu.: 50865  1st Qu.: 17.025  1st Qu.:37.53
          Median :14008  Median :111.5  Median :52230  Median :102266  Median : 22.200  Median :40.18
          Mean   :13275  Mean   : 677.3  Mean   :67623  Mean :125197  Mean   : 21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.: 420.0  3rd Qu.:99335  3rd Qu.:174835  3rd Qu.: 25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   : 30.900  Max.   :44.74
          NA's    :      7      NA's    :  7      NA's    :408.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :  5  Min.   : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :5.931e-12  Min.   :9.250e-12  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.953e-05  1st Qu.:1.774e-05  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :3.736e-03  Median :8.365e-04  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :1.609e-02  Mean   :1.547e-03  Mean   :2.624e-02  Mean   :1.069e-02  Mean   :0.3373
3rd Qu.:14088  3rd Qu.:2.280e-02  3rd Qu.:2.405e-03  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :5.386e-01  Max.   :4.481e-01  Max.   :2.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

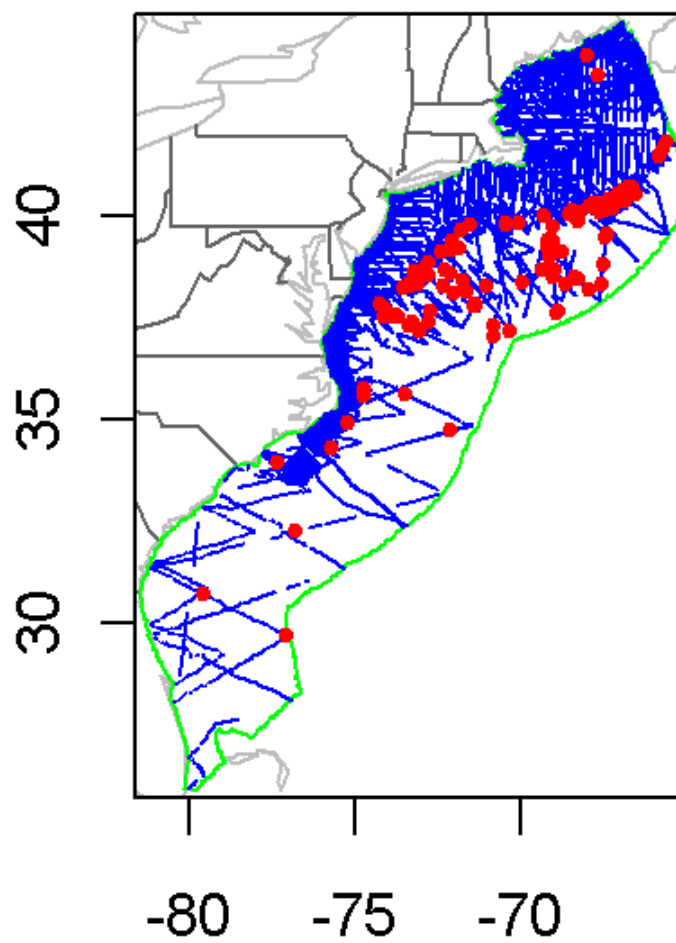


Figure 85: Map of points of observational sightings and tracks of survey effort for 'Beaked whales' guild during 'summer' season in 'east2' region.

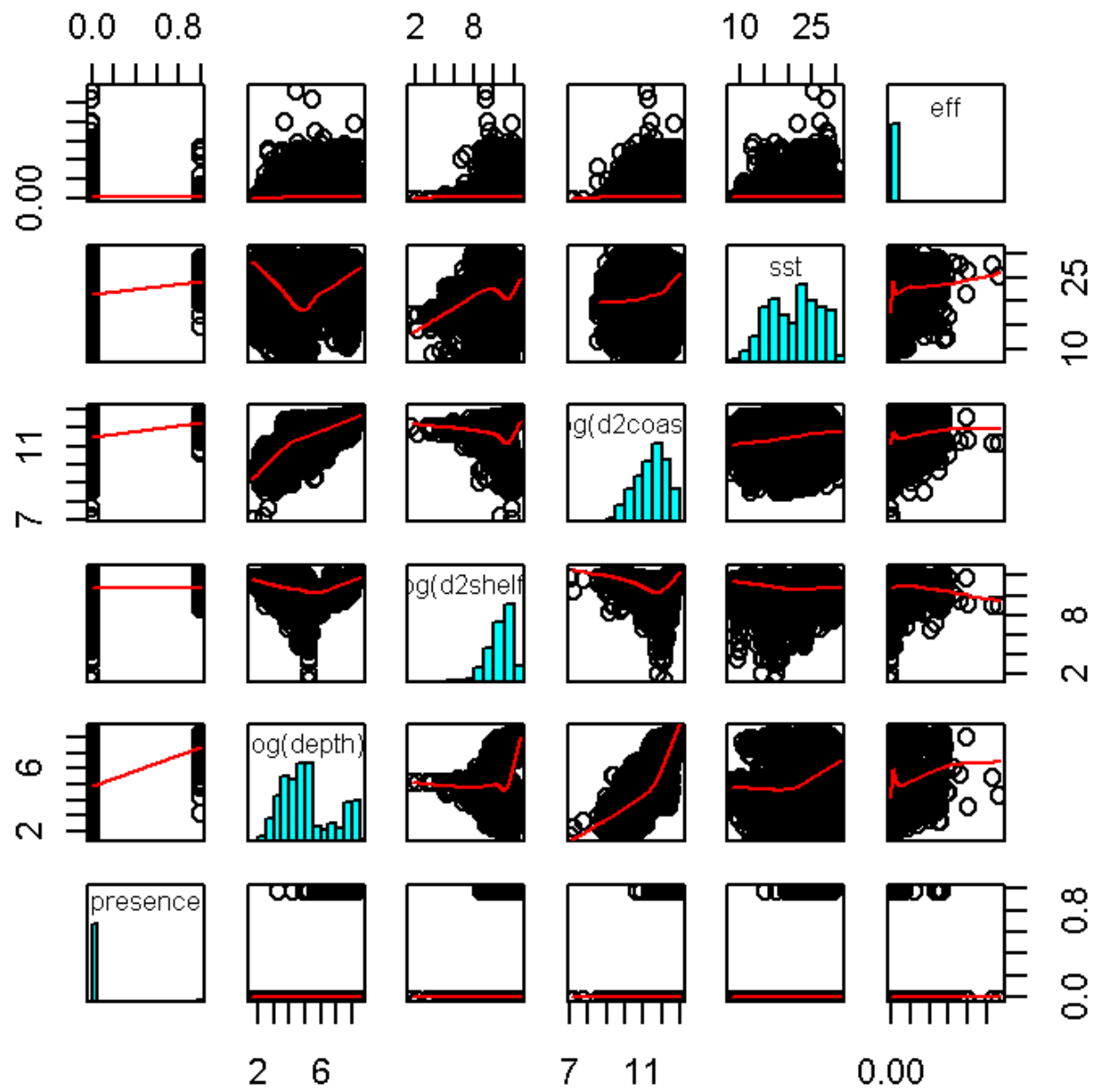


Figure 86: Pairs plot of input variables for 'Beaked whales' guild during 'summer' season in 'east2' region.

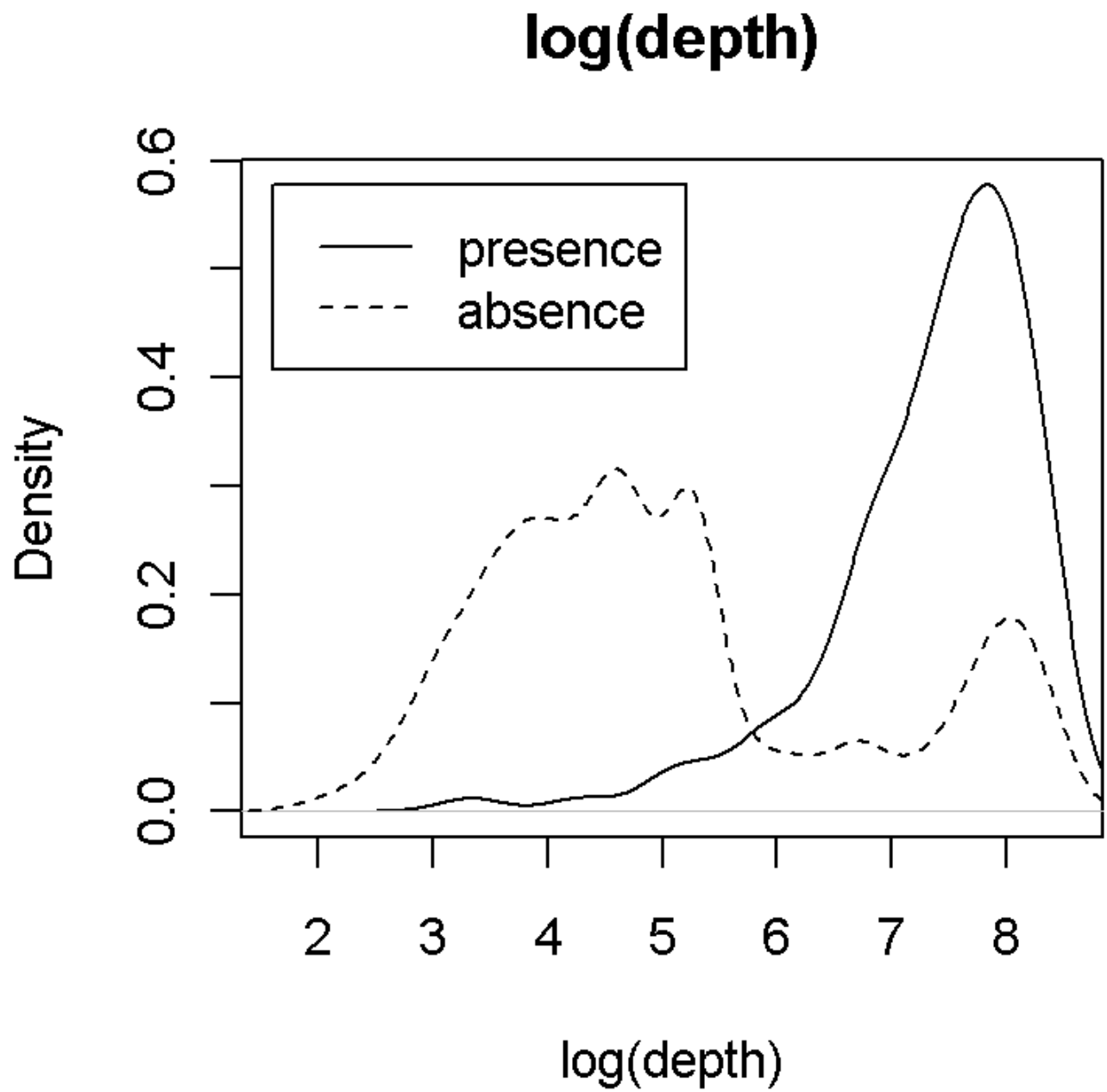


Figure 87: Density histogram of depth log(meters) for 'Beaked whales' guild during 'summer' season in 'east2' region.

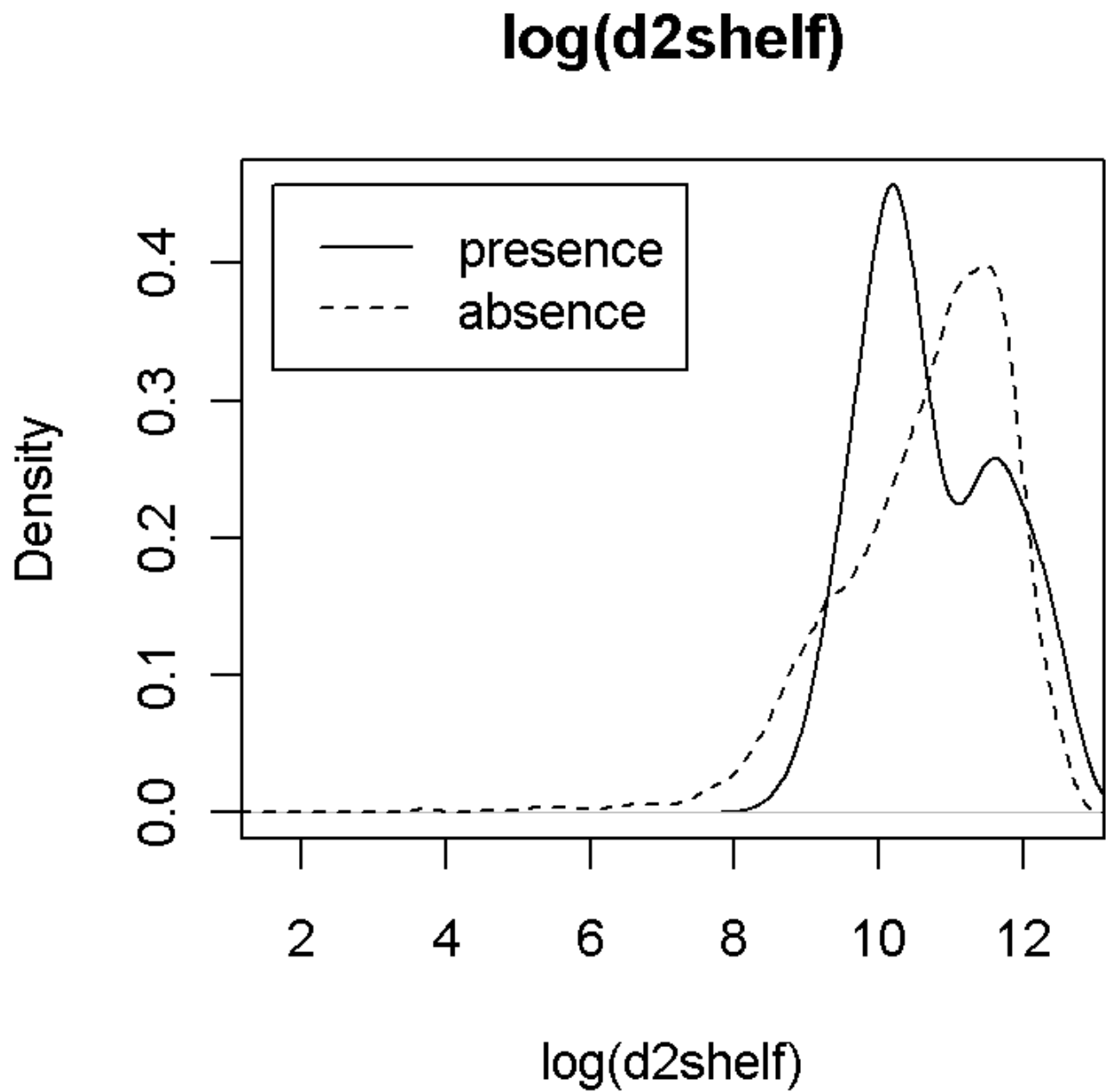


Figure 88: Density histogram of distance to shelf log(meters) for 'Beaked whales' guild during 'summer' season in 'east2' region.

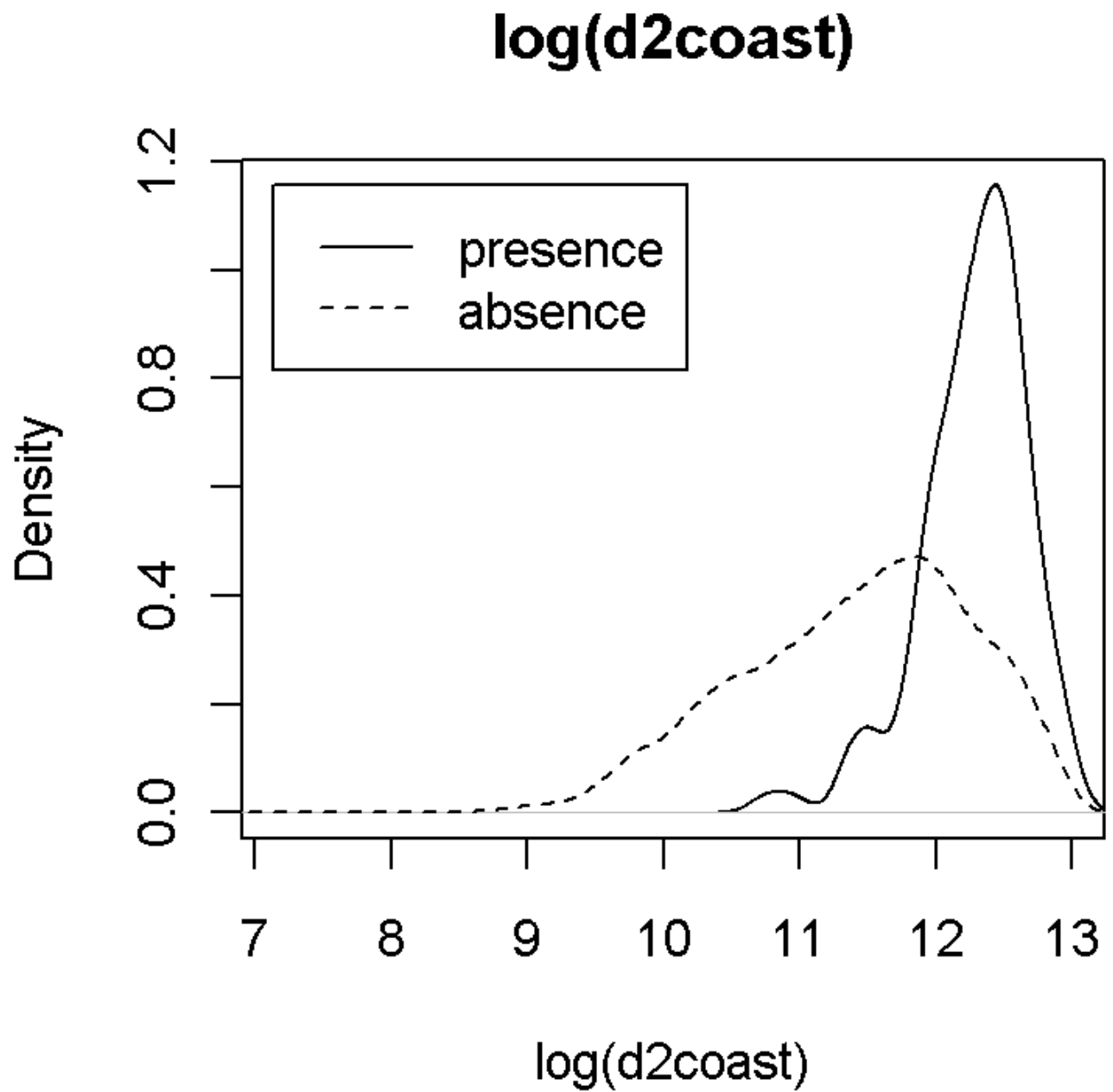


Figure 89: Density histogram of distance to coast log(meters) for 'Beaked whales' guild during 'summer' season in 'east2' region.

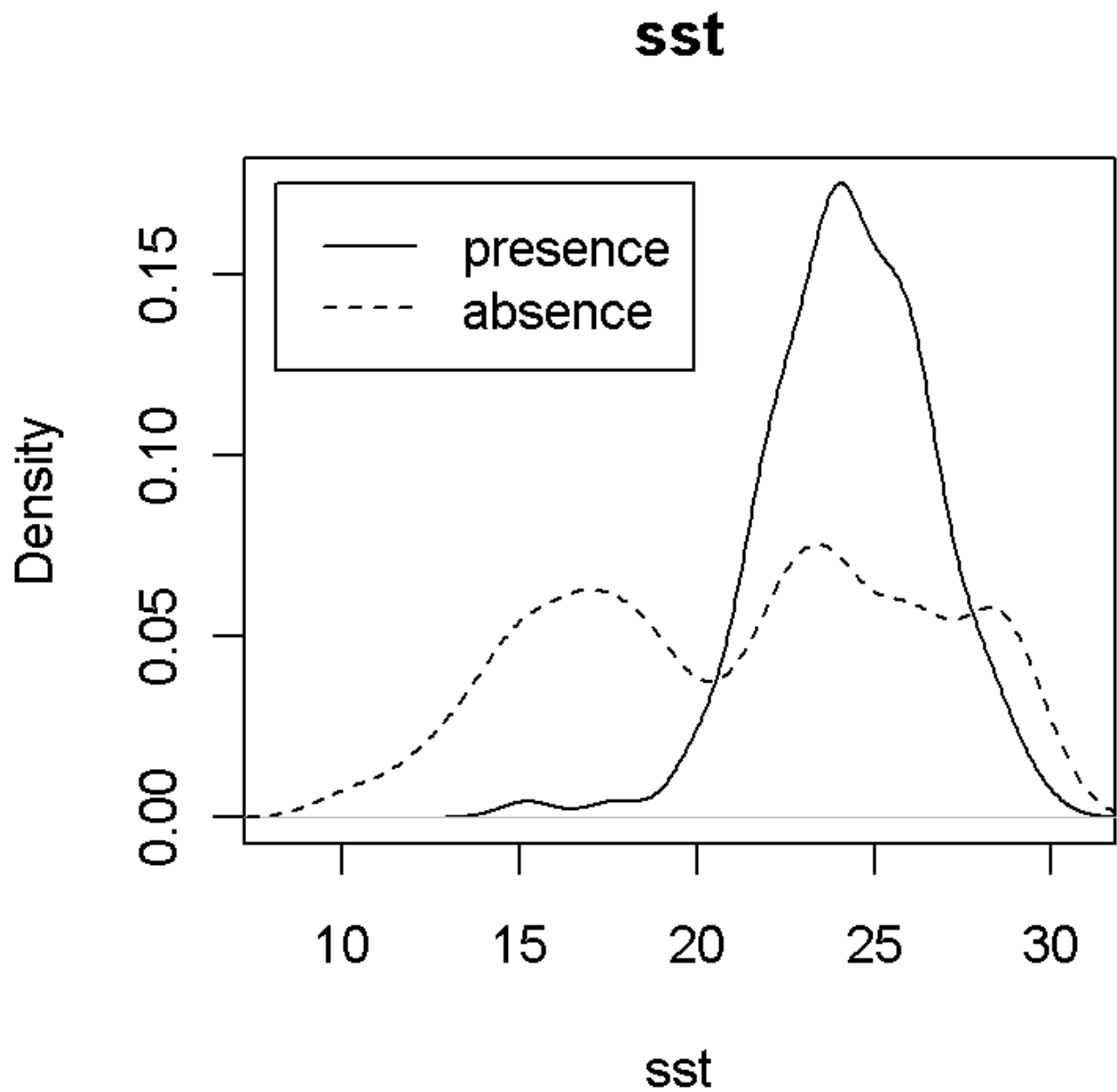


Figure 90: Density histogram of sea-surface temperature (degrees C) for 'Beaked whales' guild during 'summer' season in 'east2' region.

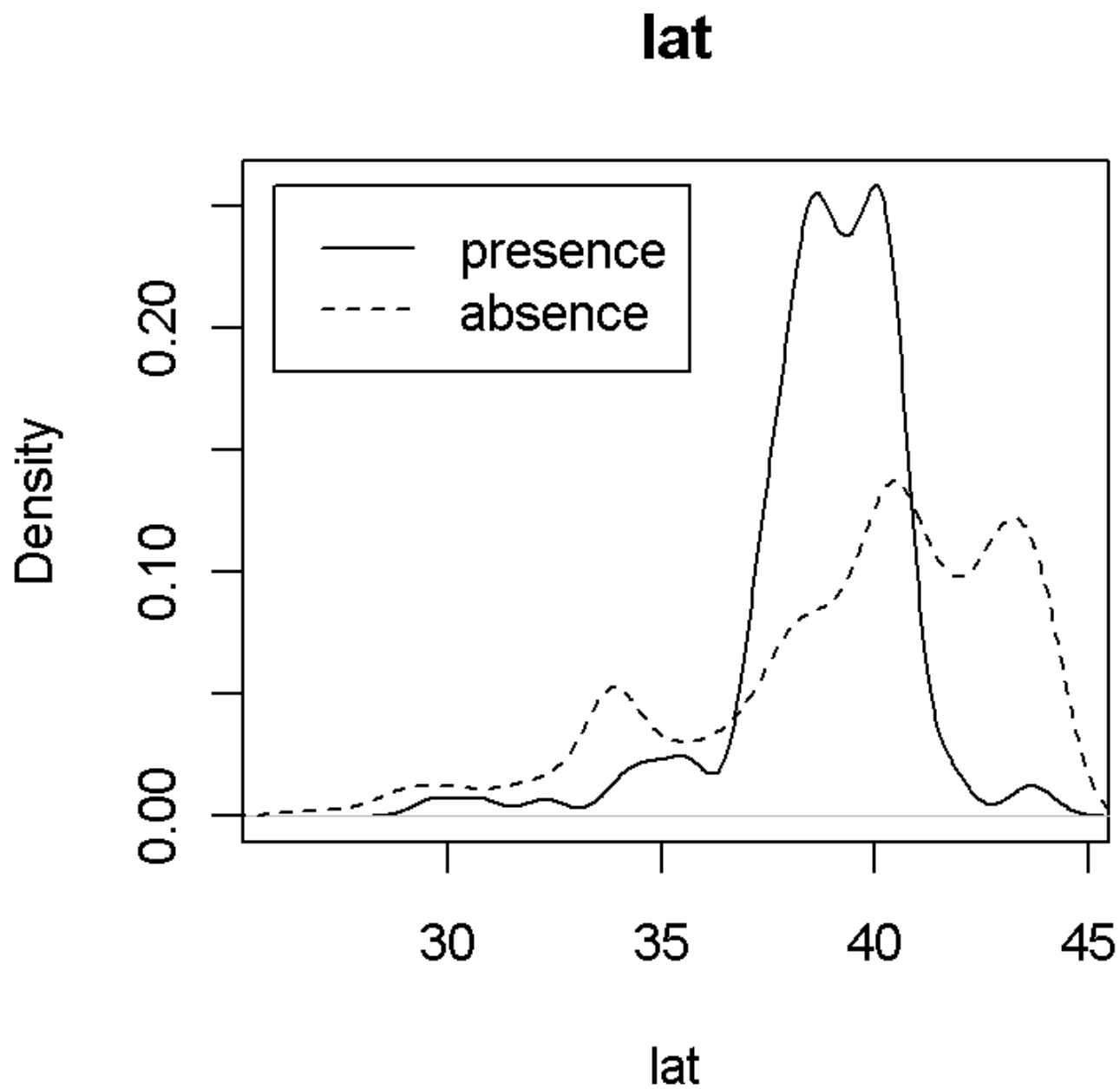


Figure 91: Density histogram of latitude (degrees) for 'Beaked whales' guild during 'summer' season in 'east2' region.

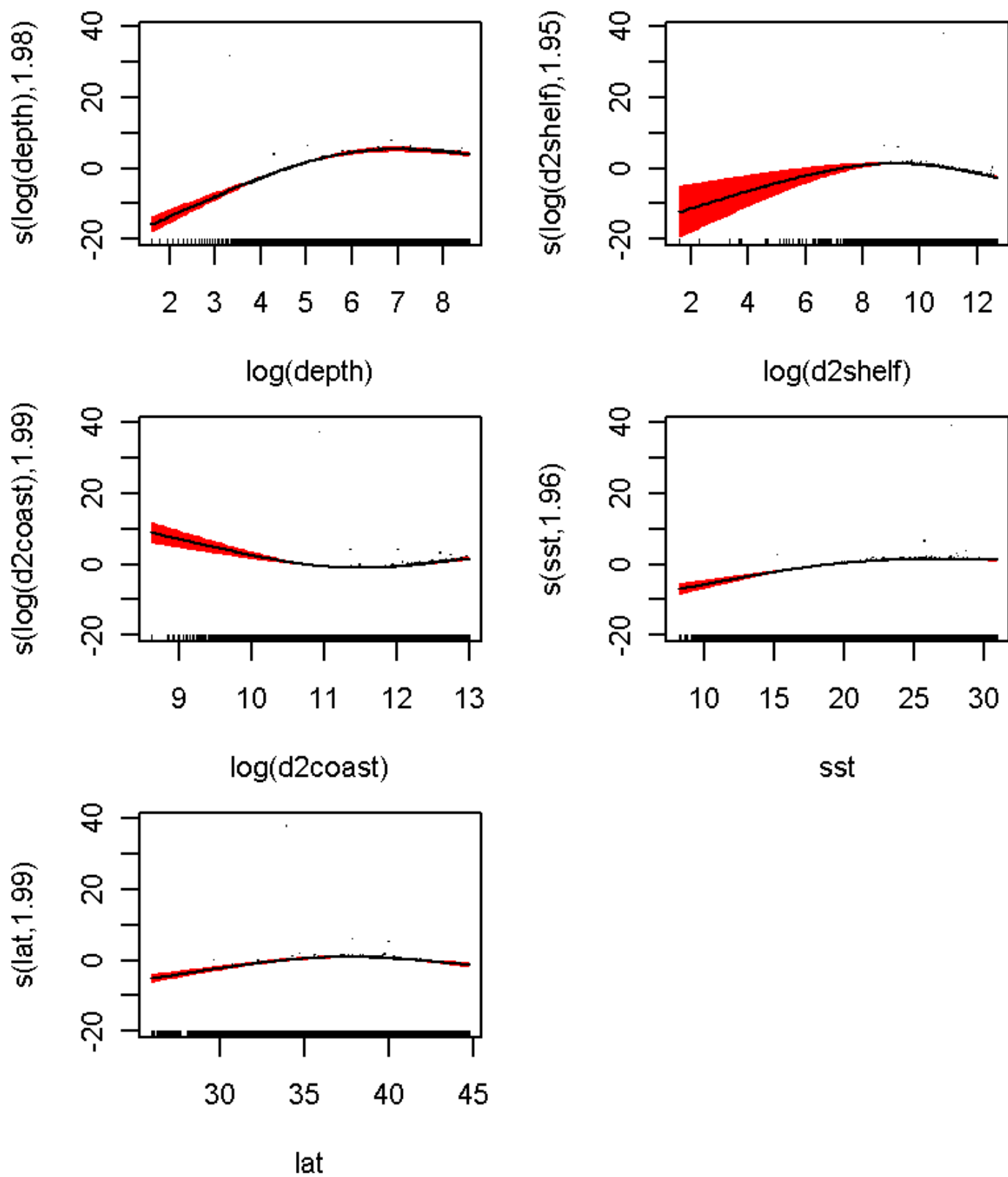


Figure 92: Terms plot of predictors to GAM model fit for 'Beaked whales' guild during 'summer' season in 'east2' region.

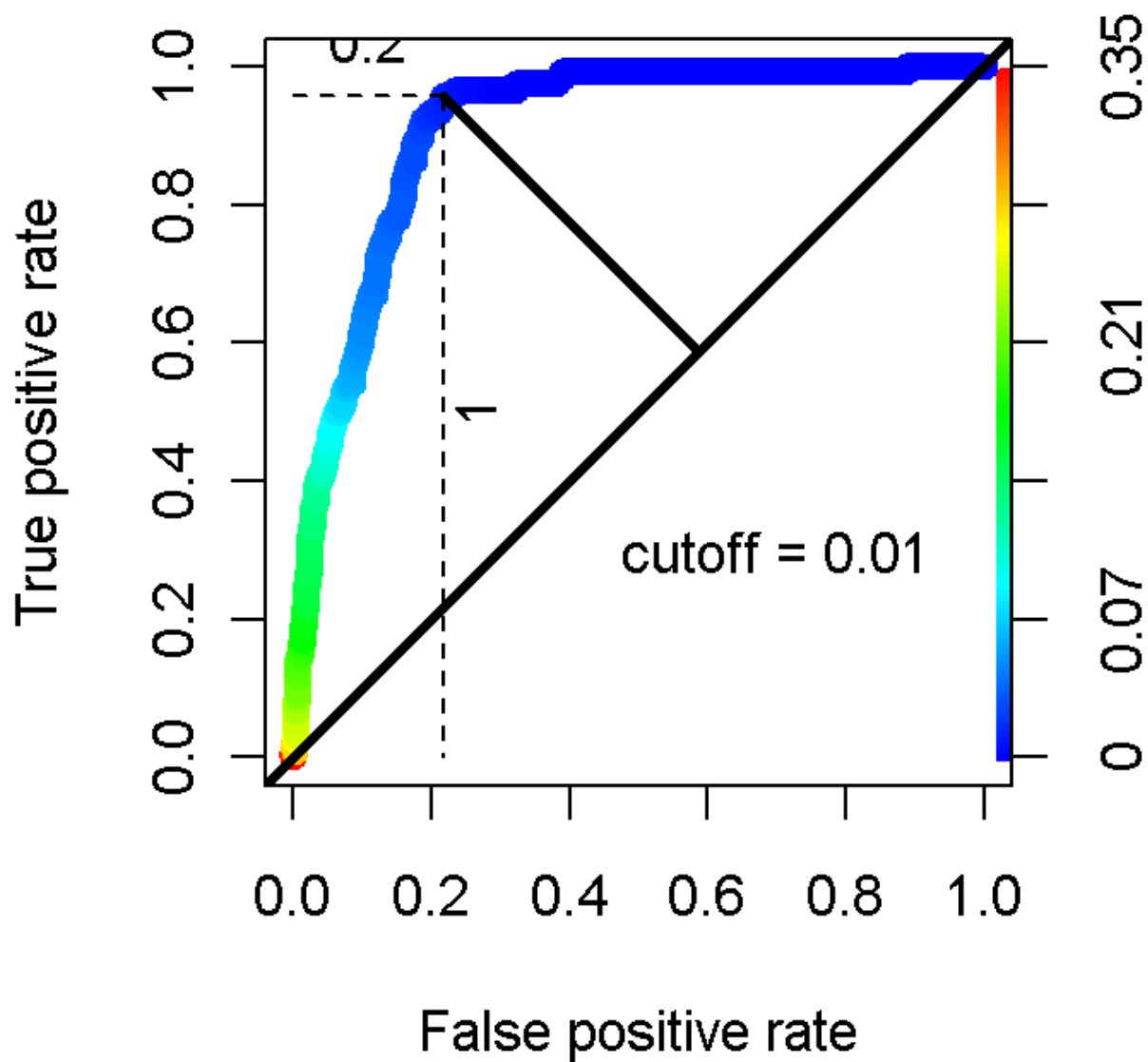


Figure 93: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Beaked whales' guild during 'summer' season in 'east2' region.

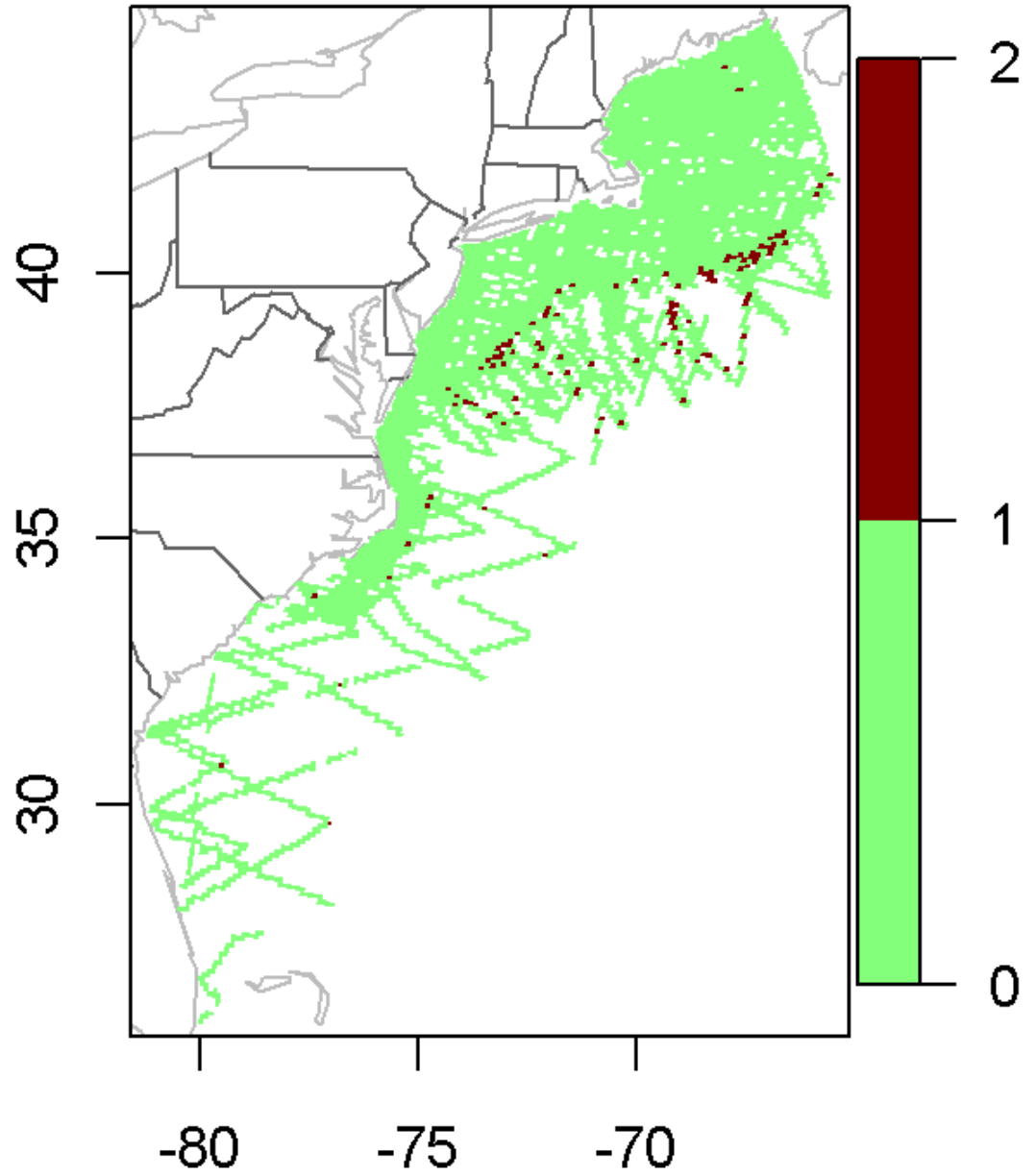


Figure 94: Map of presence and absence by cell summed through time for 'Beaked whales' guild during 'summer' season in 'east2' region.

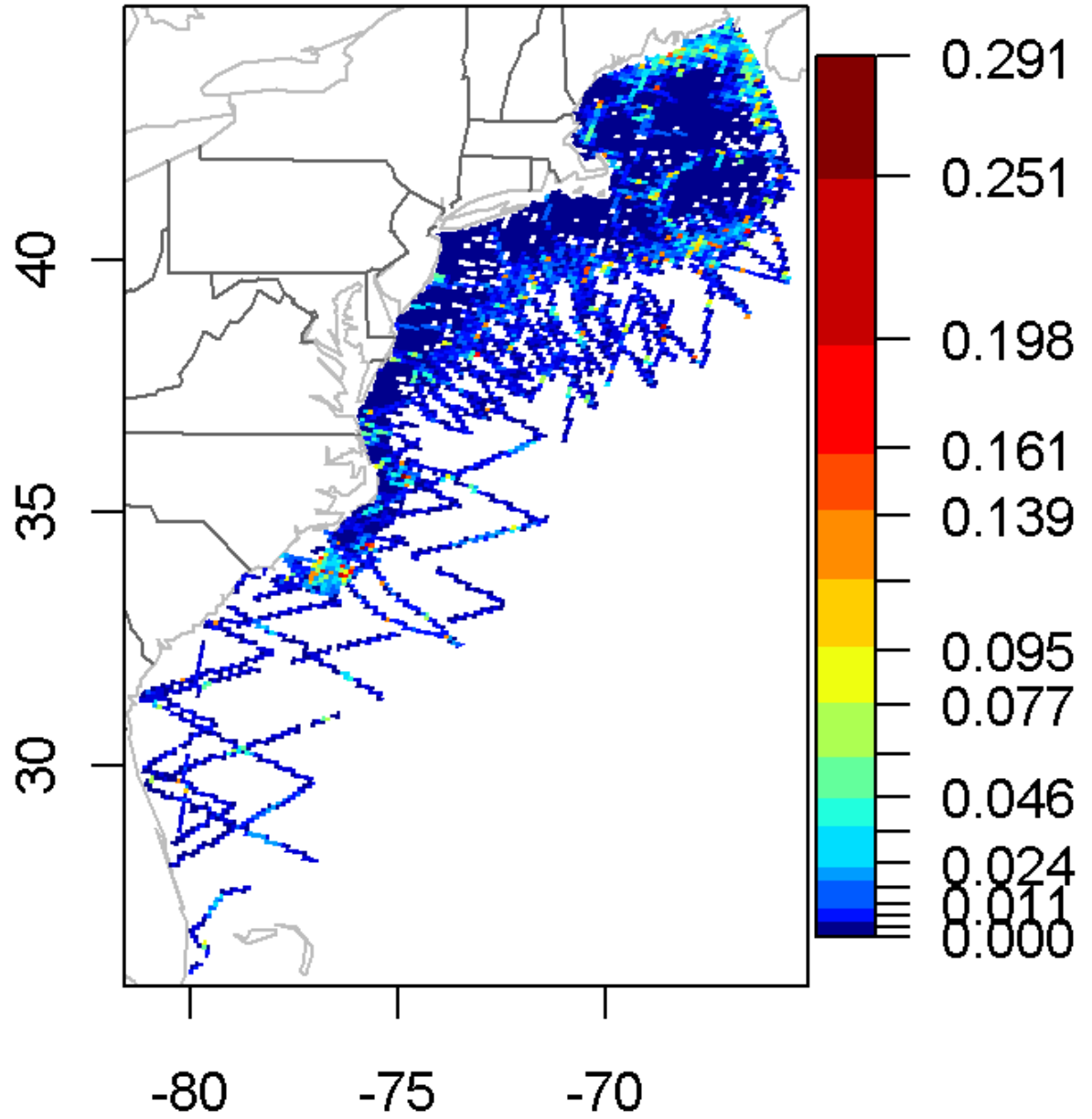


Figure 95: Map of effort(hours/km²) by cell summed through time for 'Beaked whales' guild during 'summer' season in 'east2' region.

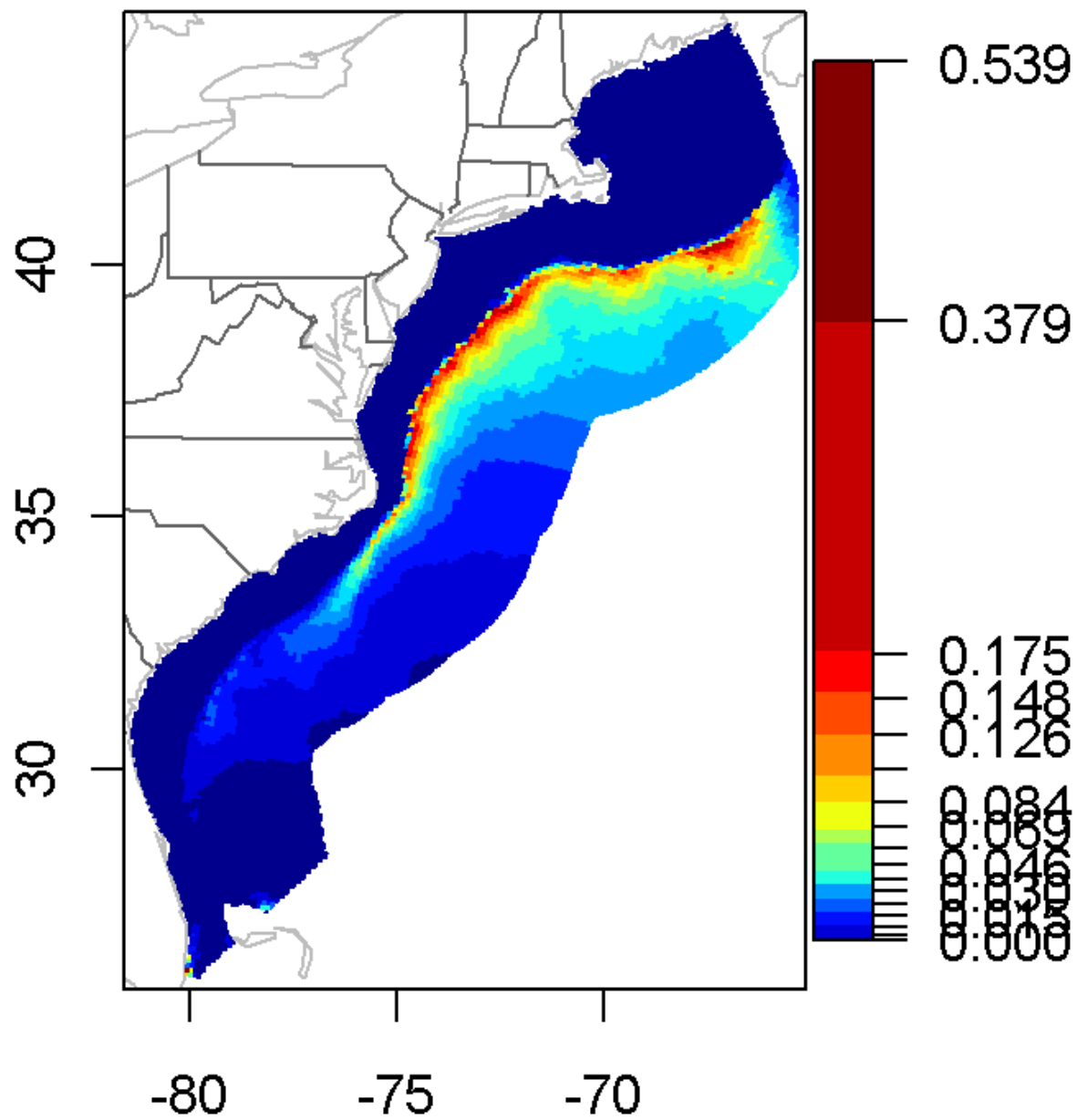


Figure 96: Map of mean predicted habitat for 'Beaked whales' guild during 'summer' season in 'east2' region.

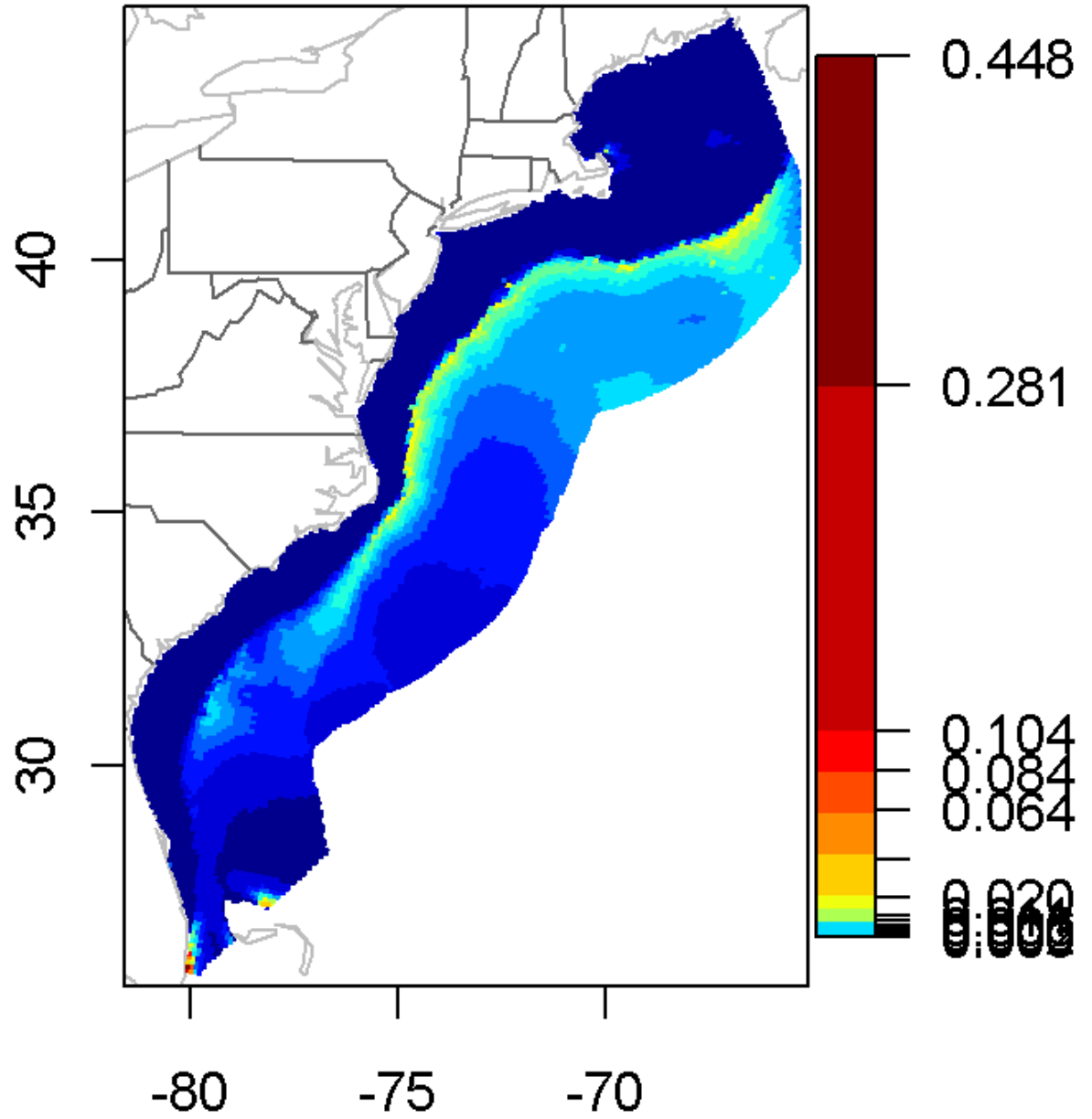


Figure 97: Map of standard error of habitat for 'Beaked whales' guild during 'summer' season in 'east2' region.

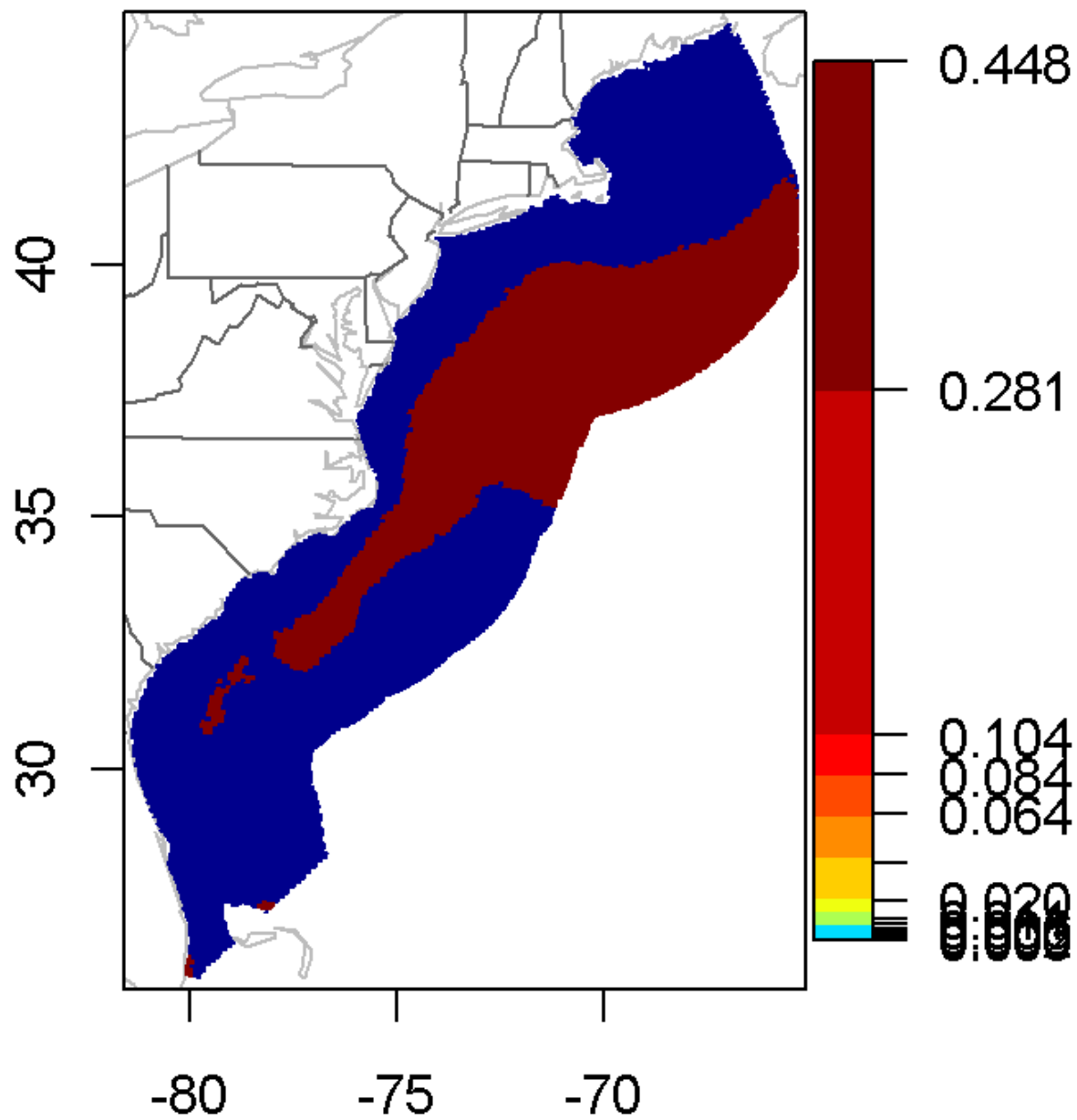


Figure 98: Map of binary habitat (cutoff determined by ROC) for 'Beaked whales' guild during 'summer' season in 'east2' region.

2.3.2 gomex2

Modelrun identifier: duke_06_be3_summer_gomex2

Date generated: 2008-10-21 11:26:15

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 10: Summary for duke(6) GAM model: for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	13
Number.absences	1391
GAM.converged	TRUE
R.squared	0.270033
Deviance.explained	0.371218
ROC.optimum	0.667173
Maximum.fit	0.00983088
Maximum.prediction	0.0882899

Model text summary...

```
duke_06_be3_summer_gomex2 run on Tue Oct 21 11:20:00 2008
provider:duke, version:06, guild:Beaked whales (be3), season:'summer', region:gomex2

max.fit:0.667173, max.prediction:0.088290, ROC.optimum:0.009831

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -46.175      5.174   -8.925  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.973e+00  2.473   37.29 <2e-16 ***
s(log(d2shelf)) 1.774e-06  0.500  4.08e-07  0.980
s(log(d2coast)) 2.201e-06  0.500  8.03e-05  0.926
s(sst)         1.924e+00  2.424   99.34 <2e-16 ***
s(lat)         3.466e-05  0.500  2.77e-04  0.899
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.27   Deviance explained = 37.1%
GCV score = 0.00091915   Scale est. = 0.00091338   n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13   Min.   : 13.0   Min.   : 901   Min.   : 5700   Min.   :25.35   Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8 1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75 1st Qu.:26.68
              Median :5134 Median : 654.0 Median : 45466 Median :146059 Median :28.50 Median :27.90
              Mean   :4686 Mean   : 899.5 Mean   : 59670 Mean   :161835 Mean   :28.50 Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0 3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25 3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0 Max.   :249222 Max.   :386037 Max.   :31.20 Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :27.67   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0 1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :29.55 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:6.879e-16	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:2.220e-16	1st Qu.	:4.417e-15	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:2.849e-10	Median	:5.967e-10	Median	:0.000e+00	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:1.489e-02	Mean	:3.134e-03	Mean	:1.178e-02	Mean	:1.213e-02	Mean	:0.3831
3rd Qu.	:6015	3rd Qu.	:3.022e-02	3rd Qu.	:7.658e-03	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:8.829e-02	Max.	:1.447e-02	Max.	:1.000e+00	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5.568e+03	NA's	:5.568e+03		

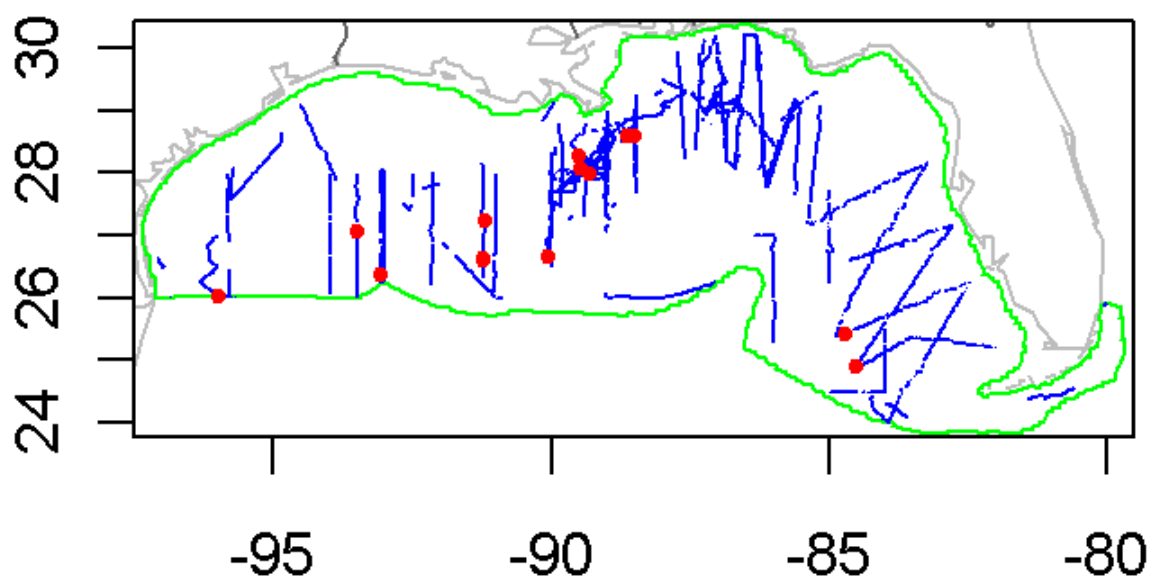


Figure 99: Map of points of observational sightings and tracks of survey effort for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

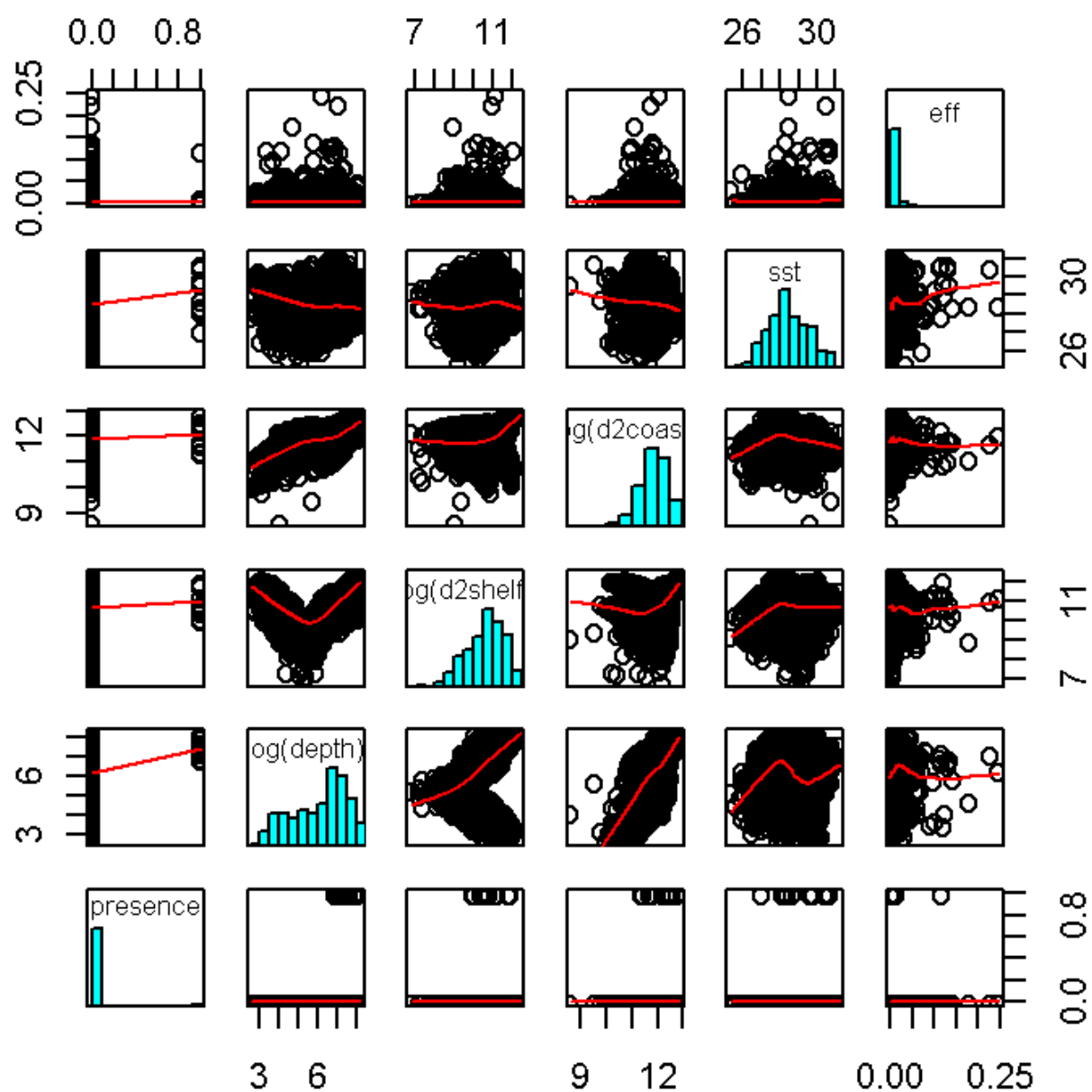


Figure 100: Pairs plot of input variables for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

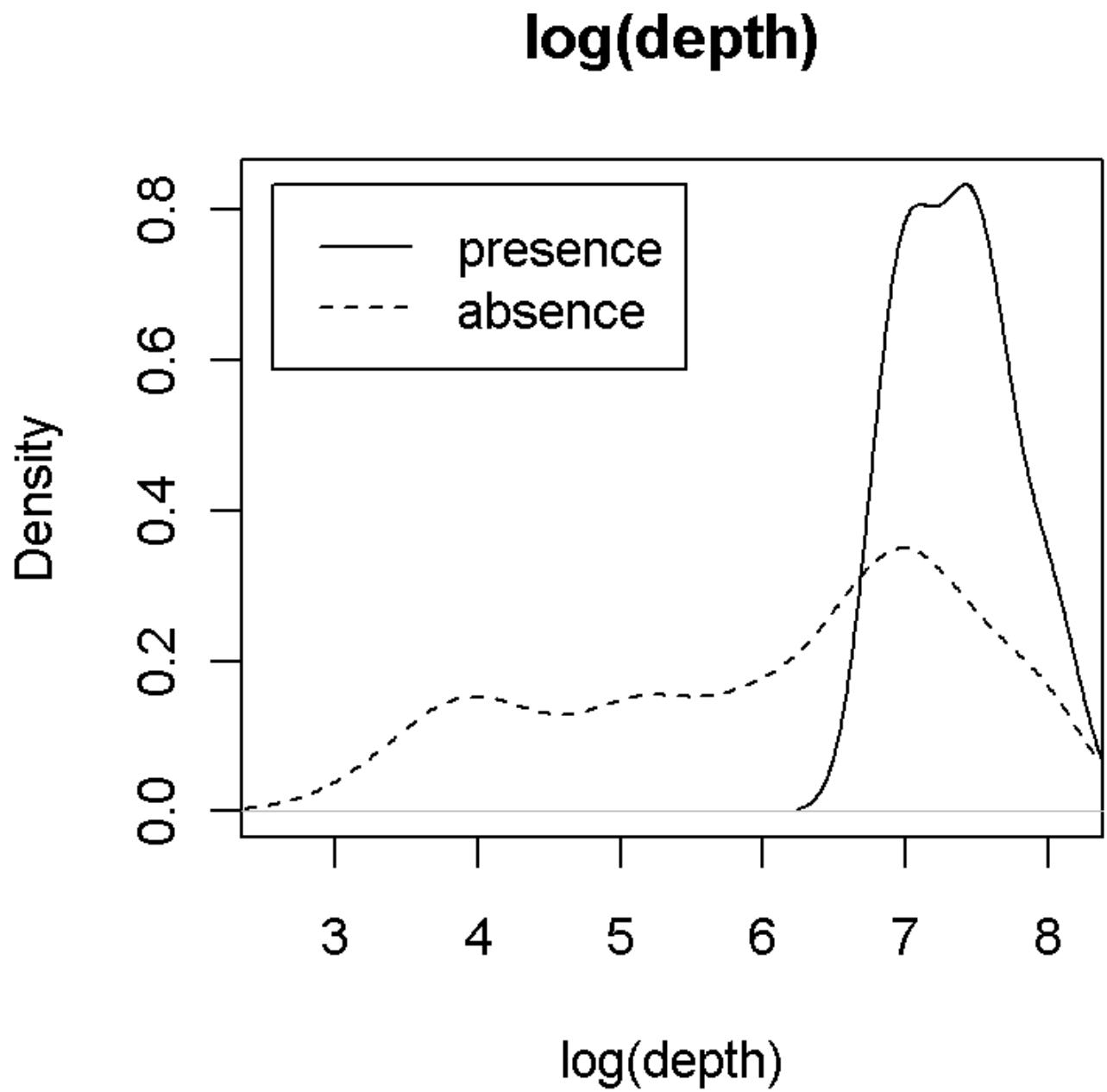


Figure 101: Density histogram of depth log(meters) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

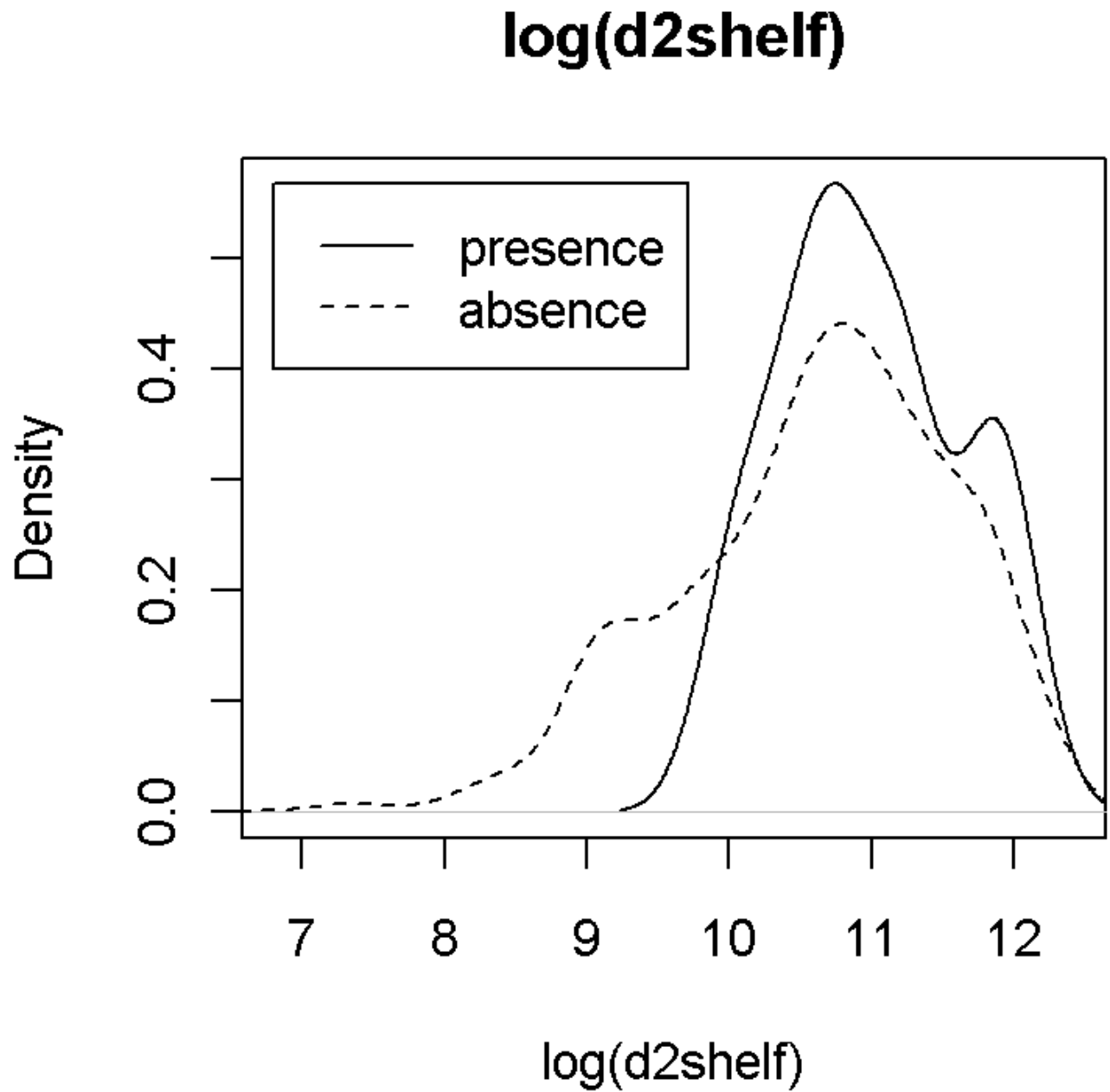


Figure 102: Density histogram of distance to shelf log(meters) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

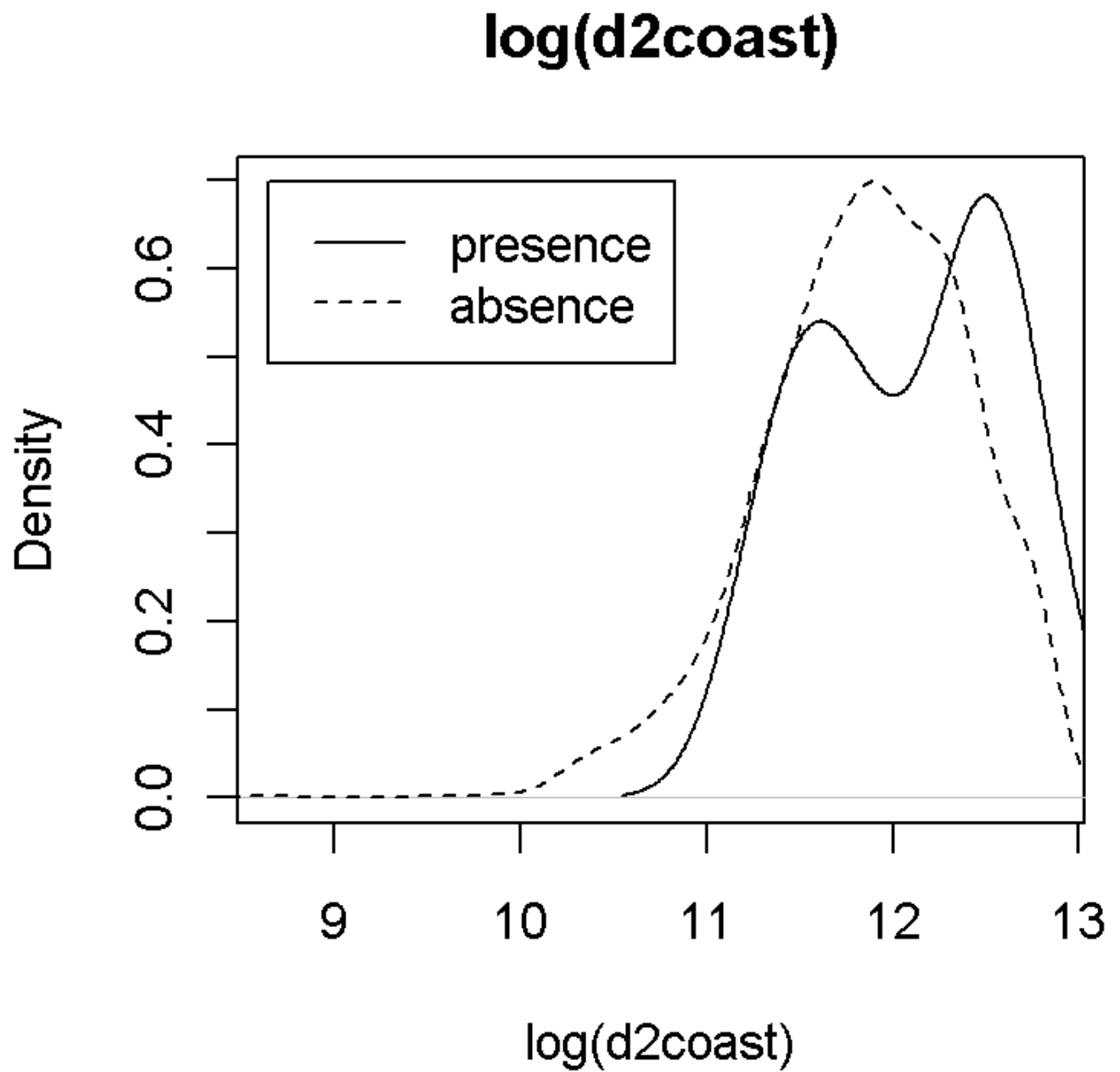


Figure 103: Density histogram of distance to coast log(meters) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

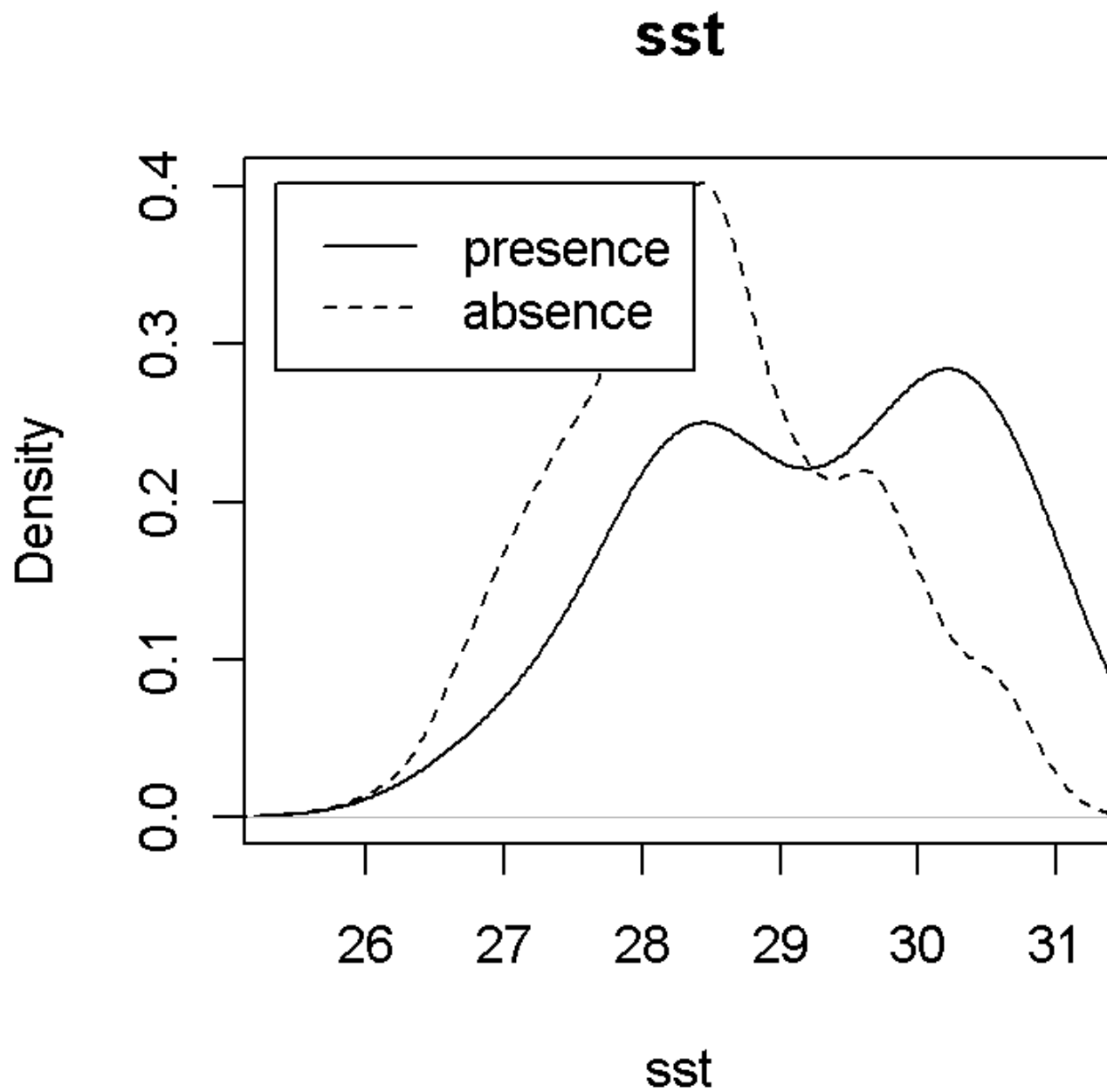


Figure 104: Density histogram of sea-surface temperature (degrees C) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

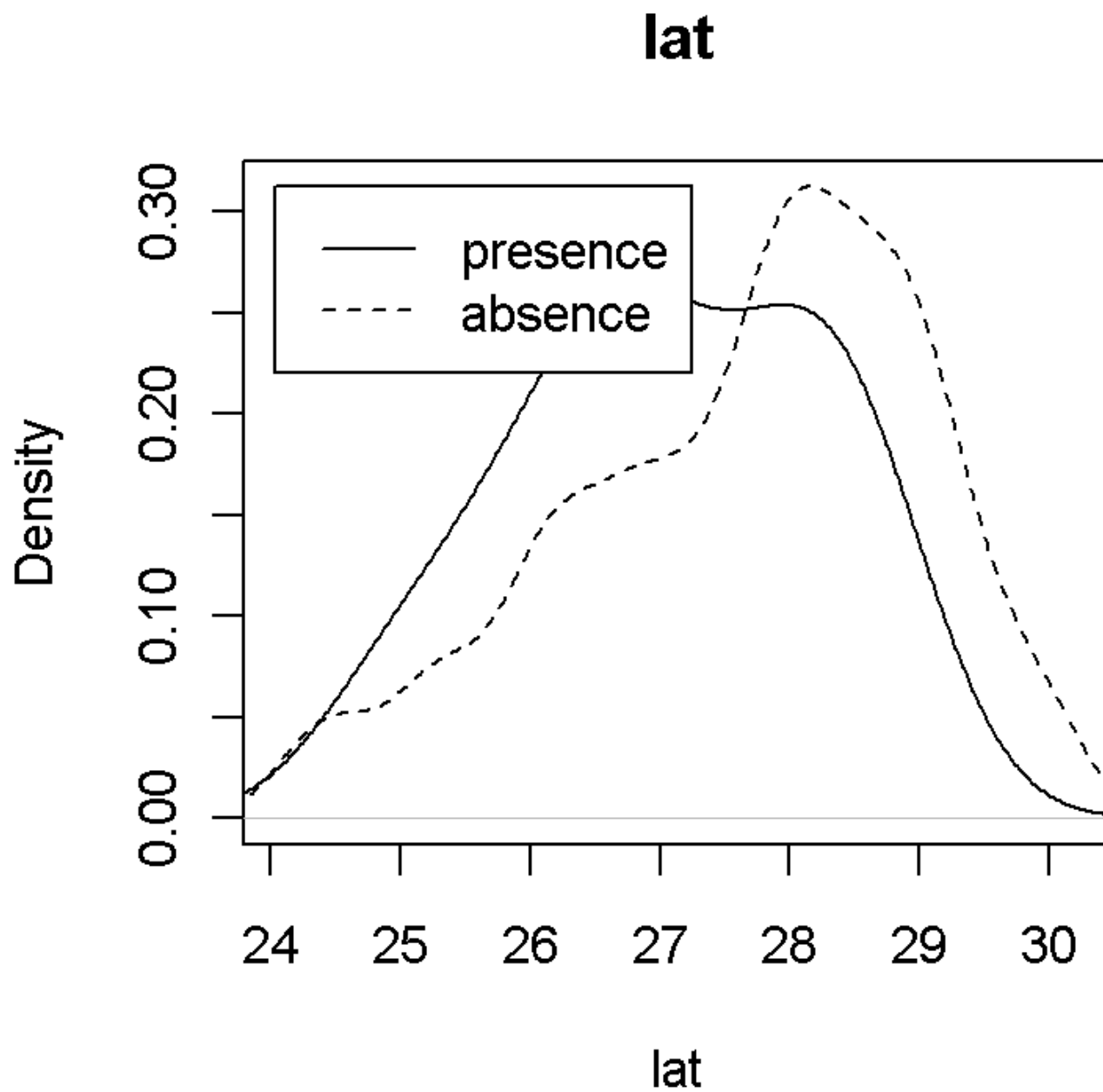


Figure 105: Density histogram of latitude (degrees) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

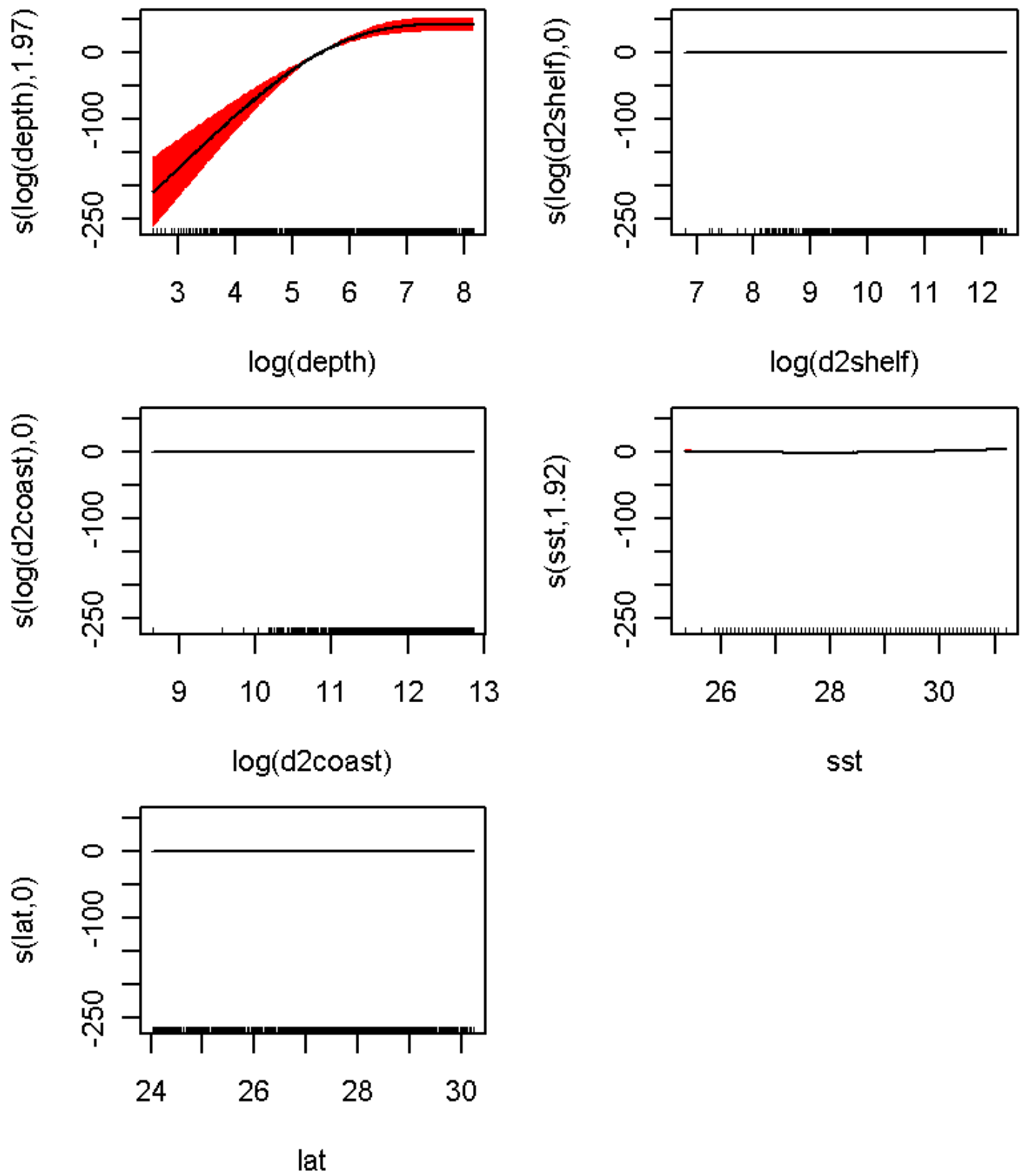


Figure 106: Terms plot of predictors to GAM model fit for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

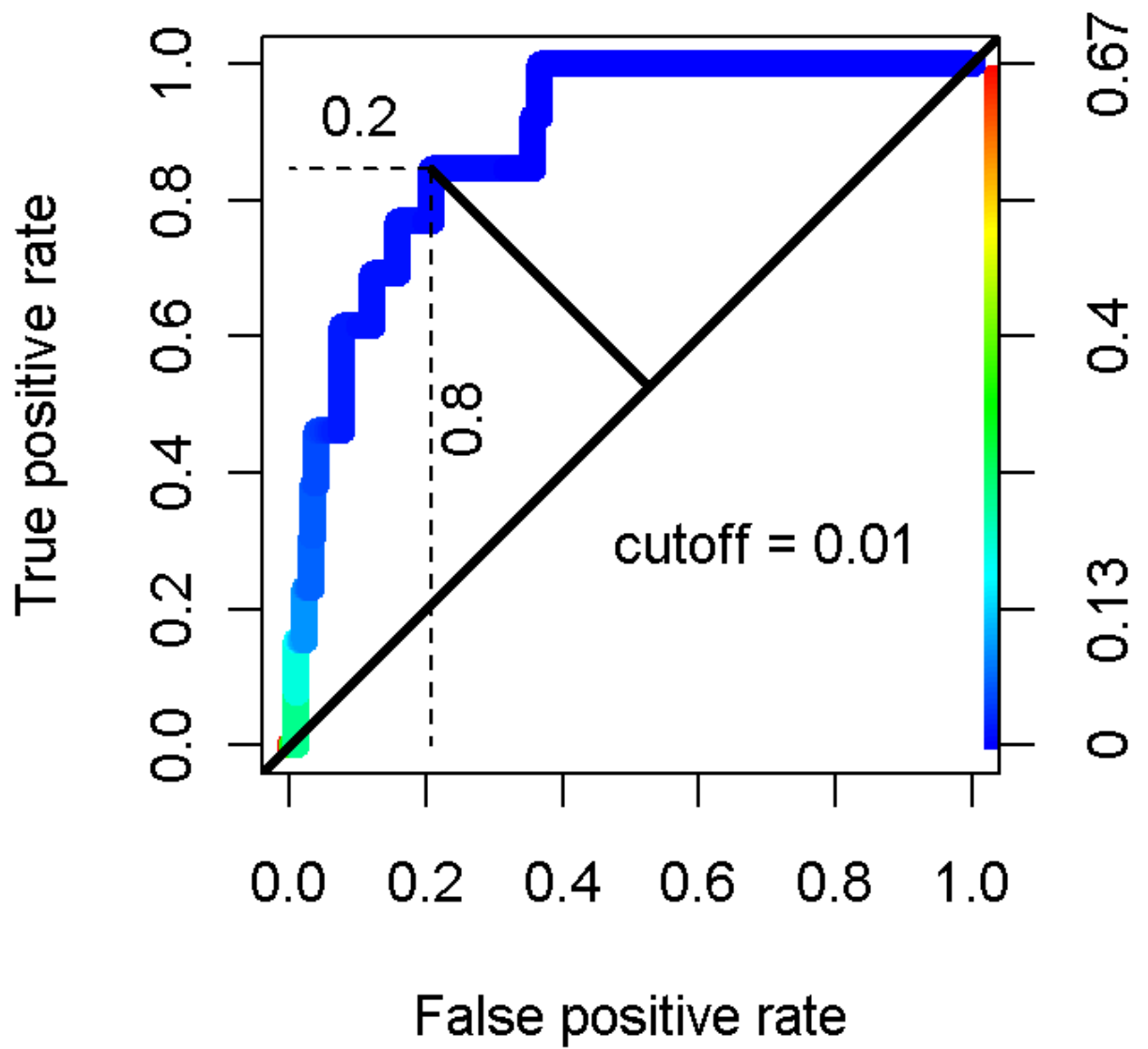


Figure 107: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

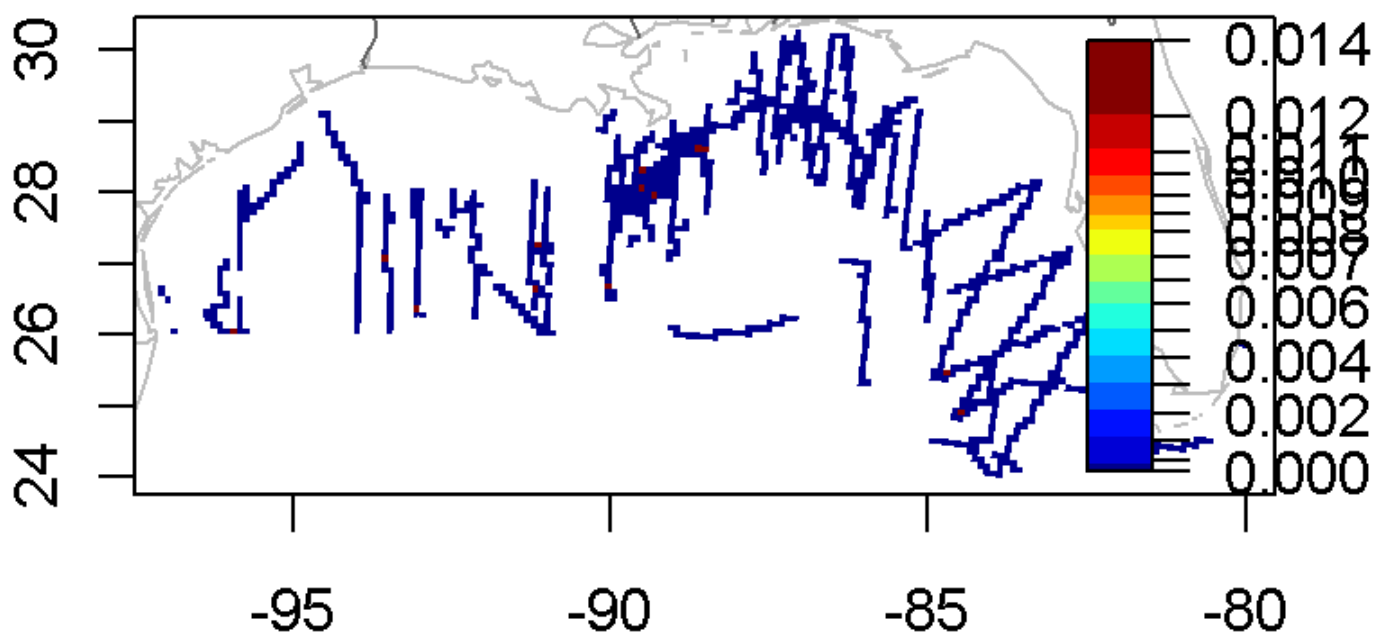


Figure 108: Map of presence and absence by cell summed through time for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

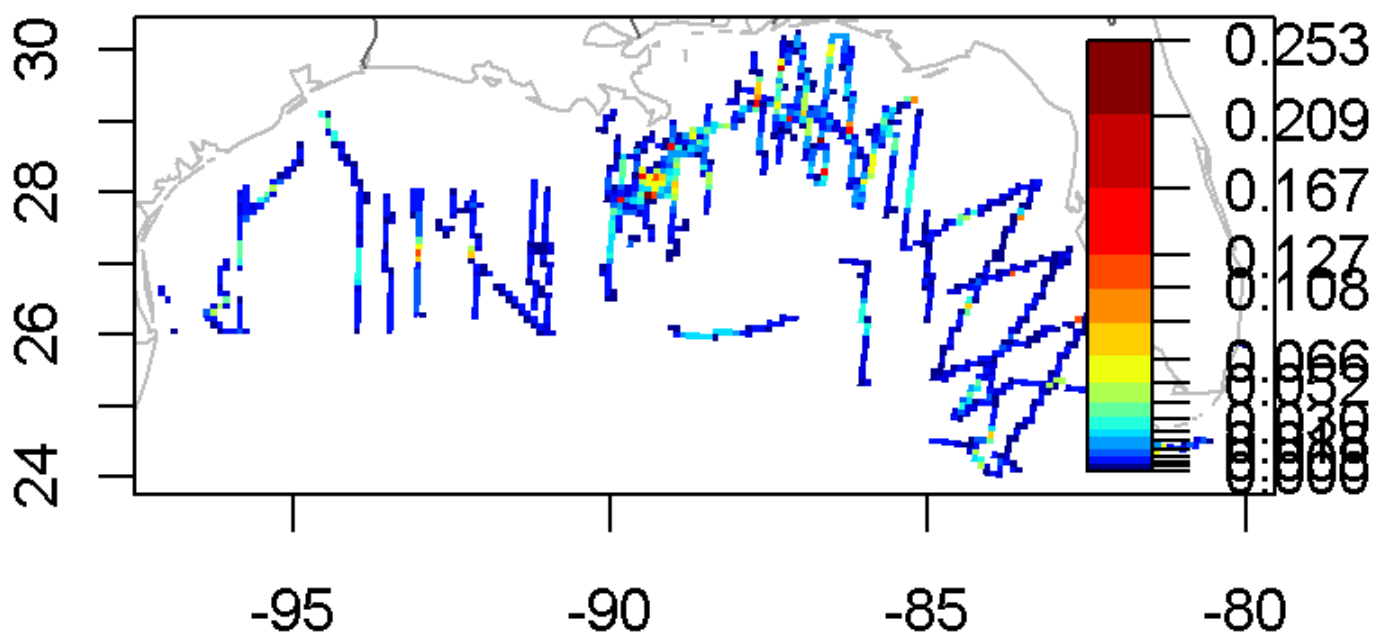


Figure 109: Map of effort(hours/km²) by cell summed through time for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

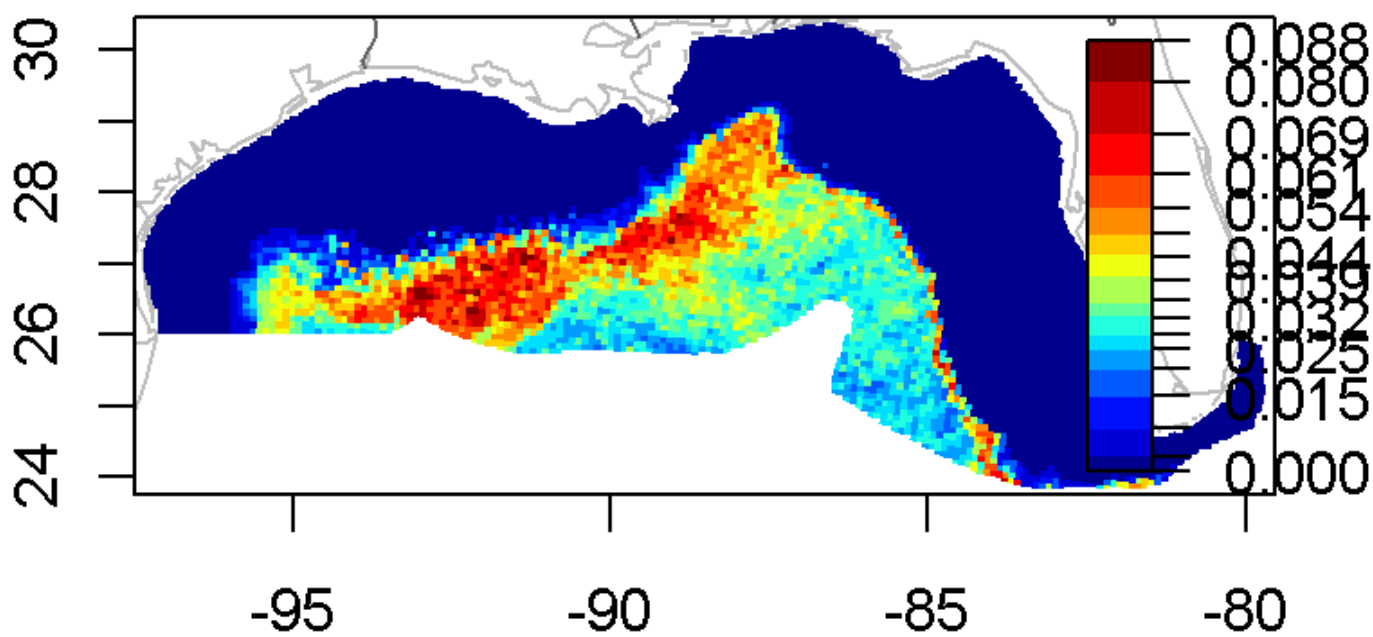


Figure 110: Map of mean predicted habitat for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

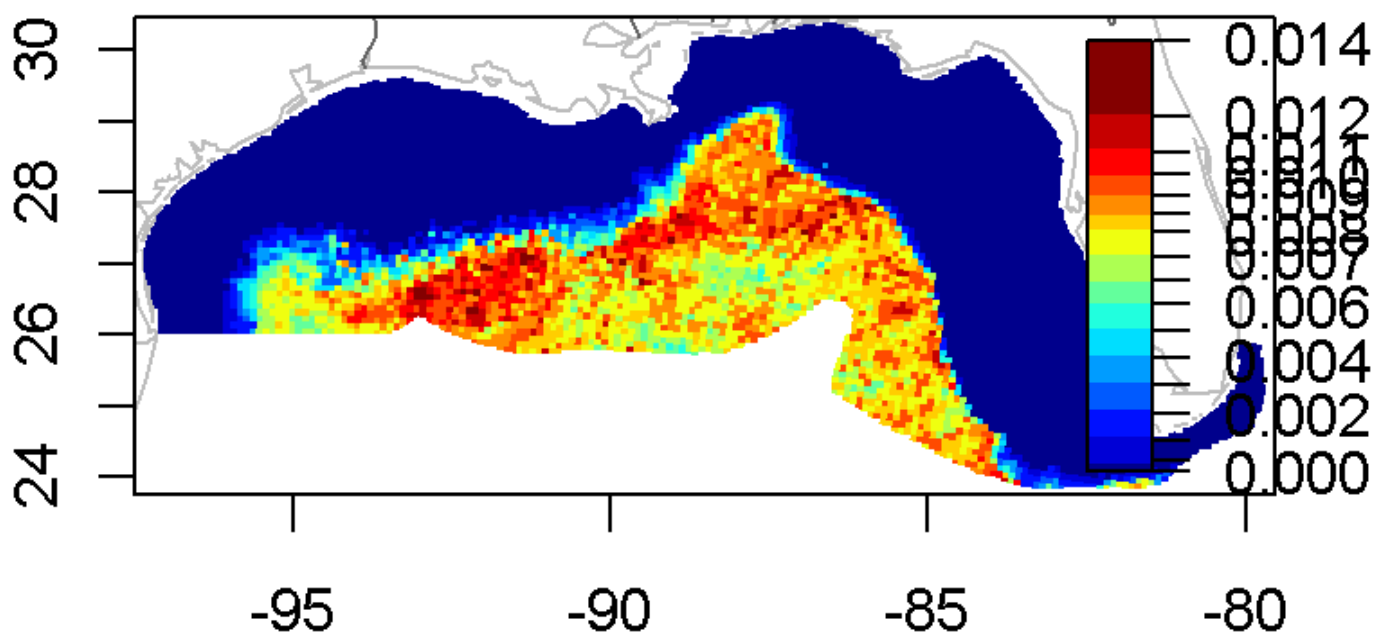


Figure 111: Map of standard error of habitat for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

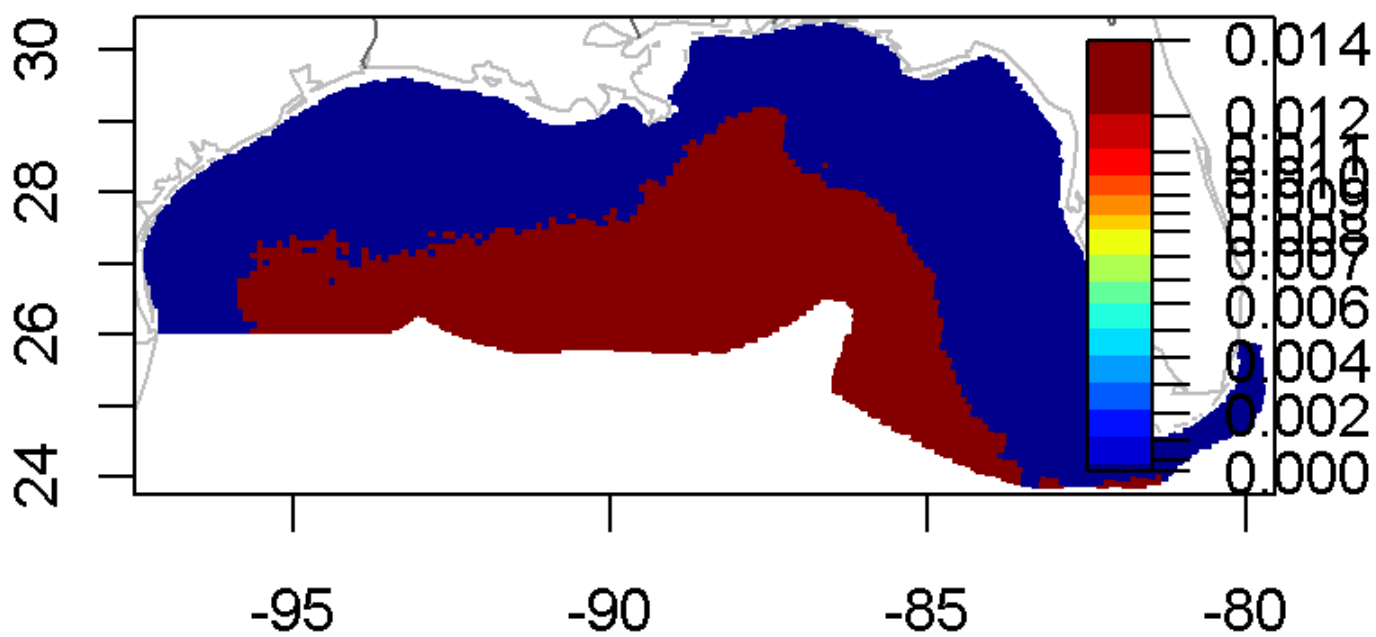


Figure 112: Map of binary habitat (cutoff determined by ROC) for 'Beaked whales' guild during 'summer' season in 'gomex2' region.

2.4 winter

2.4.1 east2

Modelrun identifier: duke_06_be3_winter_east2

Date generated: 2008-10-21 14:59:50

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 11: Summary for duke(6) GAM model: for 'Beaked whales' guild during 'winter' season in 'east2' region.

	Value
Number.presences	6
Number.absences	3896
GAM.converged	TRUE
R.squared	-0.0341889
Deviance.explained	0.173178
ROC.optimum	0.0458636
Maximum.fit	0.00185138
Maximum.prediction	0.721918

Model text summary...

```
duke_06_be3_winter_east2 run on Tue Oct 21 14:58:18 2008
provider:duke, version:06, guild:Beaked whales (be3), season:'winter', region:east2

max.fit:0.045864, max.prediction:0.721918, ROC.optimum:0.001851

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -8.625      0.254   -33.95   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  9.964e-01  1.496   53.65 <2e-16 ***
s(log(d2shelf)) 9.963e-01  1.496   89.69 <2e-16 ***
s(log(d2coast)) 1.462e-05  0.500   3.57e-04  0.893
s(sst)         8.351e-08  0.500   2.12e-06  0.970
s(lat)         1.817e+00  2.317   53.77 <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = -0.0342 Deviance explained = 17.3%
GCV score = 0.00010094 Scale est. = 0.00010056 n = 2337

summary(dat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2: 844   Min.    : 1654   Min.    : 4.0   Min.    : 995   Min.    : 1471   Min.    : 2.654   Min.    :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0   1st Qu.: 18575  1st Qu.: 32272  1st Qu.: 13.500  1st Qu.:32.77
          Median :10479 Median : 28.0   Median : 38452  Median : 53042  Median : 19.208  Median :34.02
          Mean   : 9475   Mean   :153.2   Mean   : 44646  Mean   : 63558  Mean   : 17.745  Mean   :33.66
          3rd Qu.:10987   3rd Qu.: 41.0   3rd Qu.: 65053  3rd Qu.: 78087  3rd Qu.: 21.825  3rd Qu.:34.80
          Max.    :12763   Max.    :3612.0   Max.    :274566  Max.    :348168  Max.    : 26.400  Max.    :38.20
                   NA's    : 14    NA's    : 14    NA's    :1561.000

summary(newdat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633   Min.    : 4   Min.    : 5   Min.    : 1259   Min.    : 2.400   Min.    :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.: 9.075   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :6.998e-11  Min.   :1.285e-10  Min.   :0.000e+00  Min.   :9.035e-07  Min.   :0.000
1st Qu.: 9145  1st Qu.:7.241e-04  1st Qu.:2.095e-04  1st Qu.:0.000e+00  1st Qu.:7.474e-04  1st Qu.:0.000
Median :11616  Median :2.216e-02  Median :5.121e-03  Median :0.000e+00  Median :3.451e-03  Median :1.000
Mean   :11171  Mean   :1.348e-01  Mean   :3.368e-02  Mean   :4.184e-03  Mean   :9.821e-03  Mean   :0.685
3rd Qu.:14088  3rd Qu.:2.068e-01  3rd Qu.:5.843e-02  3rd Qu.:0.000e+00  3rd Qu.:9.825e-03  3rd Qu.:1.000
Max.   :16560  Max.   :7.219e-01  Max.   :2.096e-01  Max.   :1.000e+00  Max.   :2.547e-01  Max.   :1.000
      NA's :6.000e+00  NA's :6.000e+00  NA's :8.454e+03  NA's :8.454e+03
```

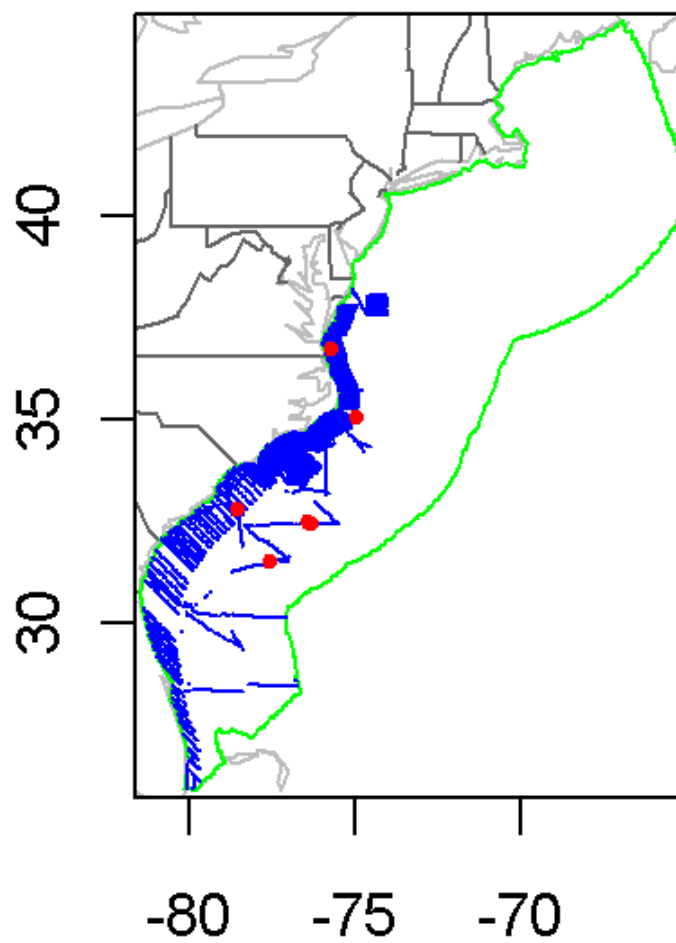


Figure 113: Map of points of observational sightings and tracks of survey effort for 'Beaked whales' guild during 'winter' season in 'east2' region.

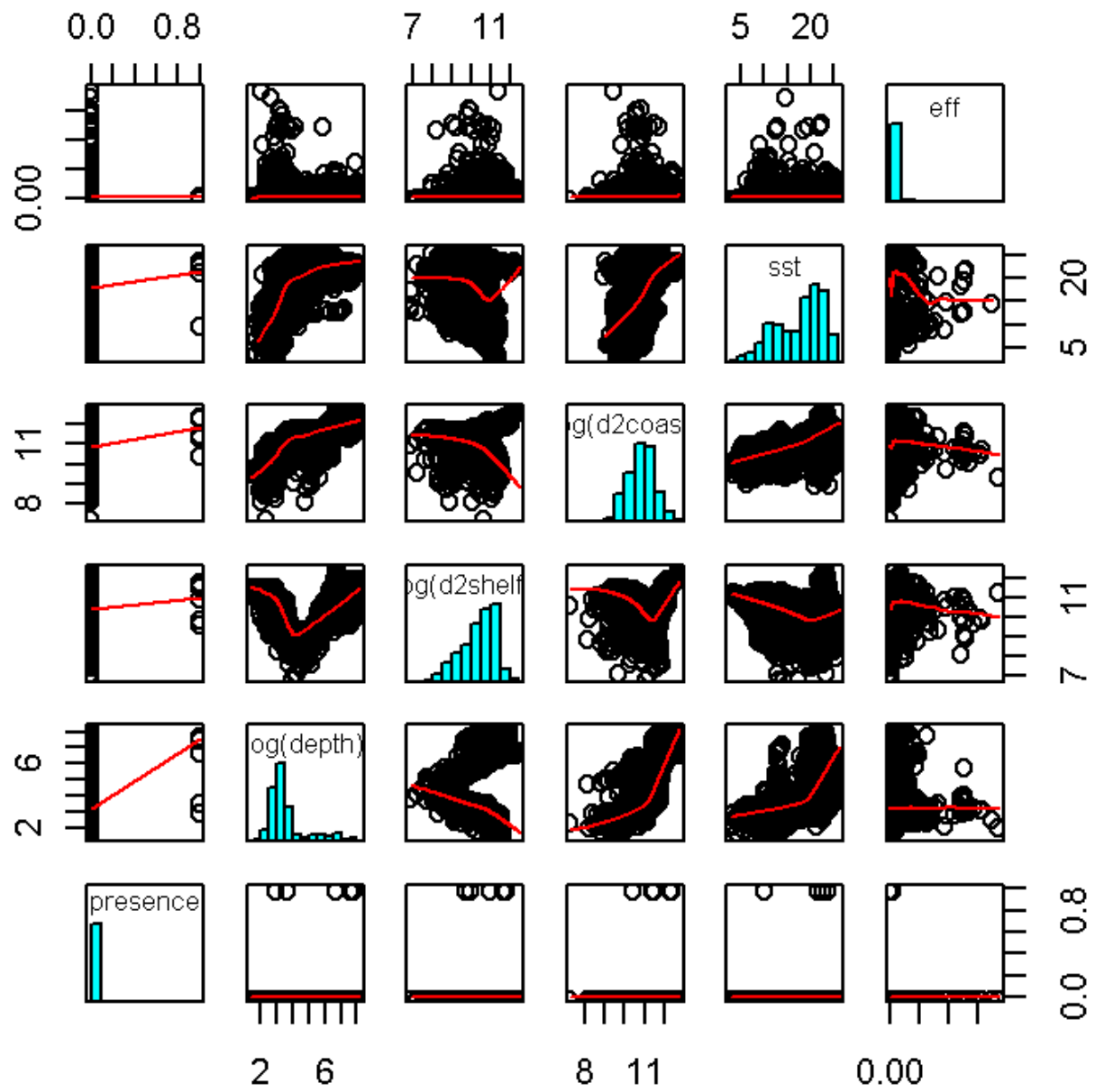


Figure 114: Pairs plot of input variables for 'Beaked whales' guild during 'winter' season in 'east2' region.

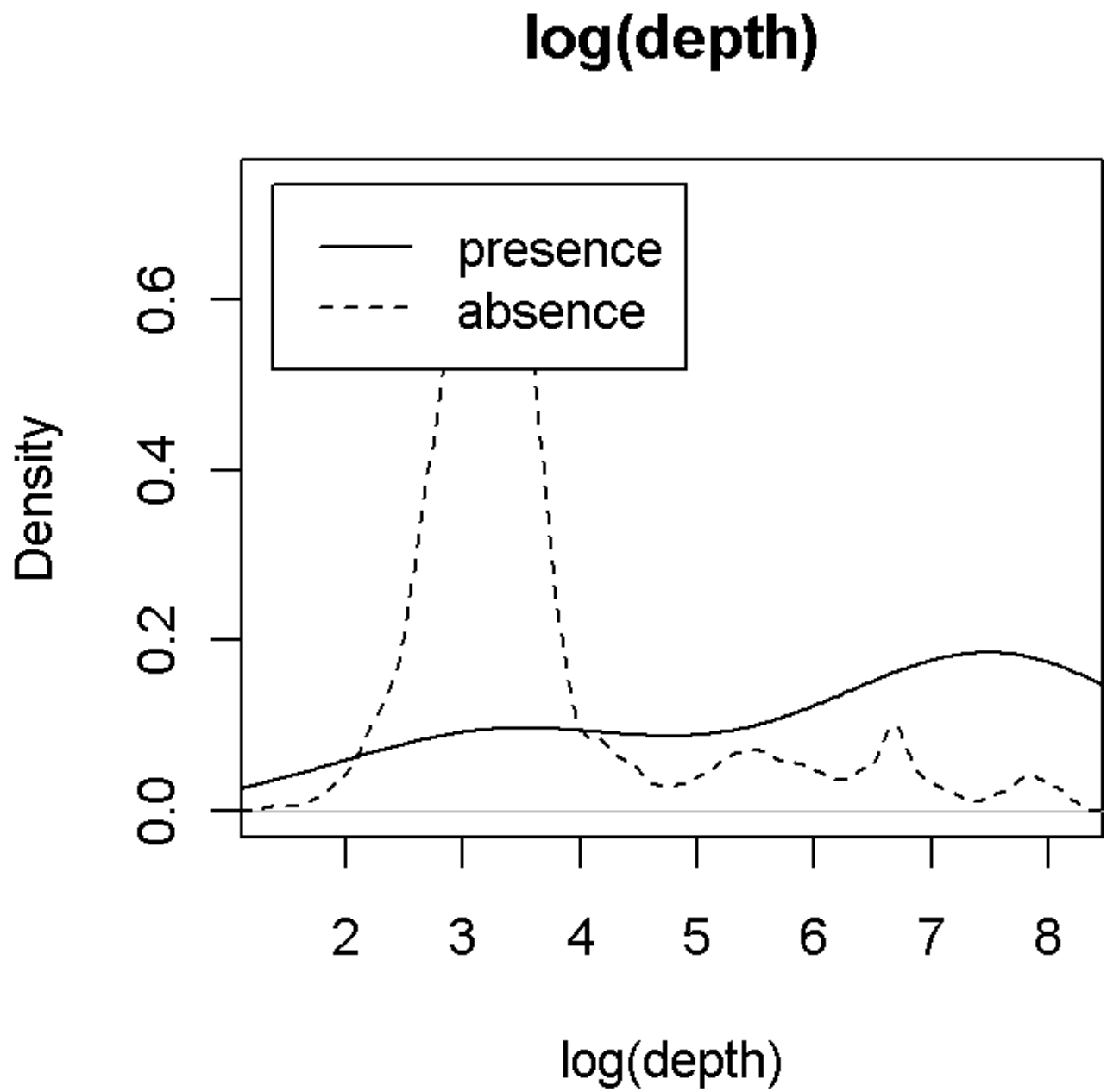


Figure 115: Density histogram of depth log(meters) for 'Beaked whales' guild during 'winter' season in 'east2' region.

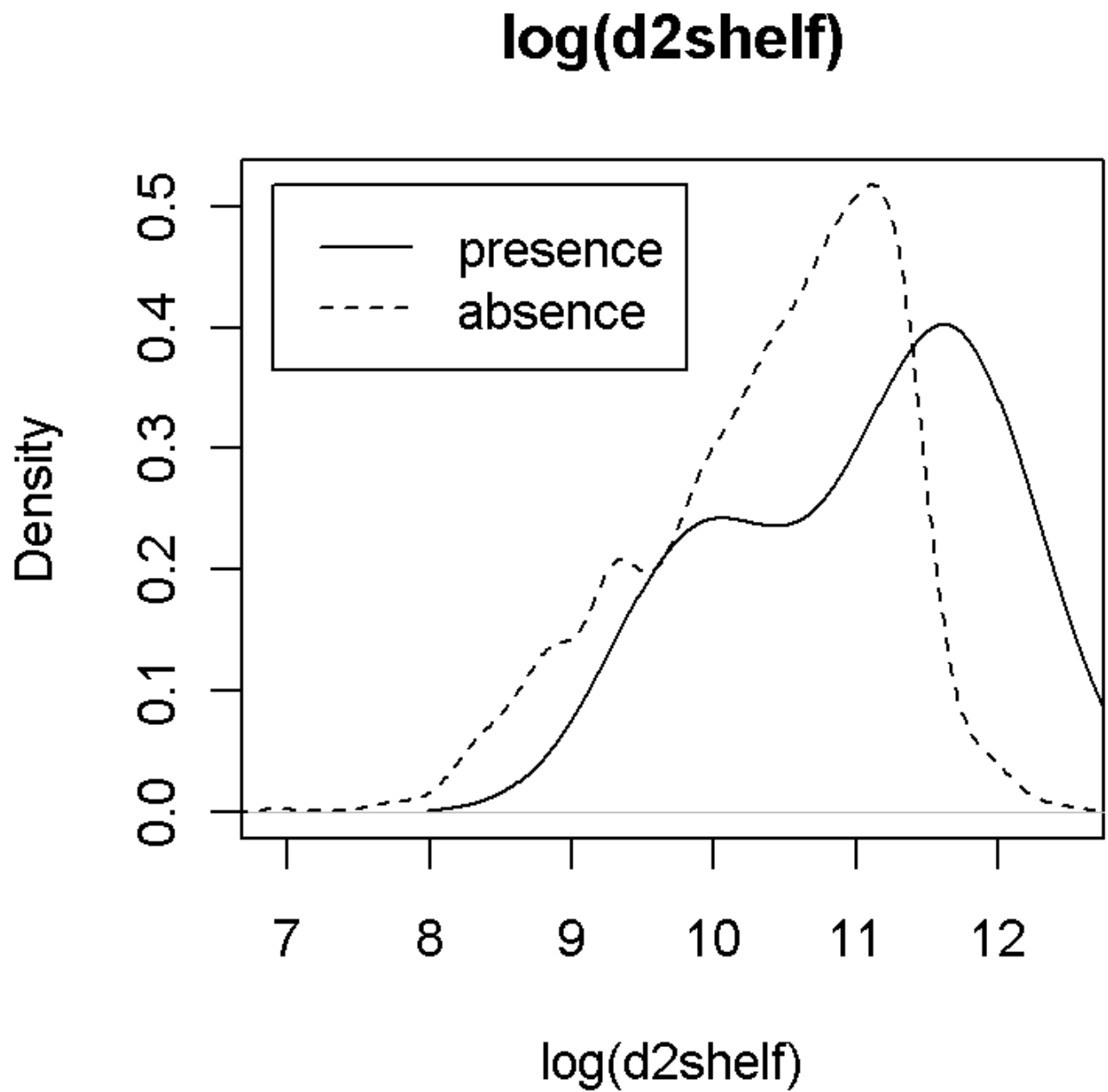


Figure 116: Density histogram of distance to shelf log(meters) for 'Beaked whales' guild during 'winter' season in 'east2' region.

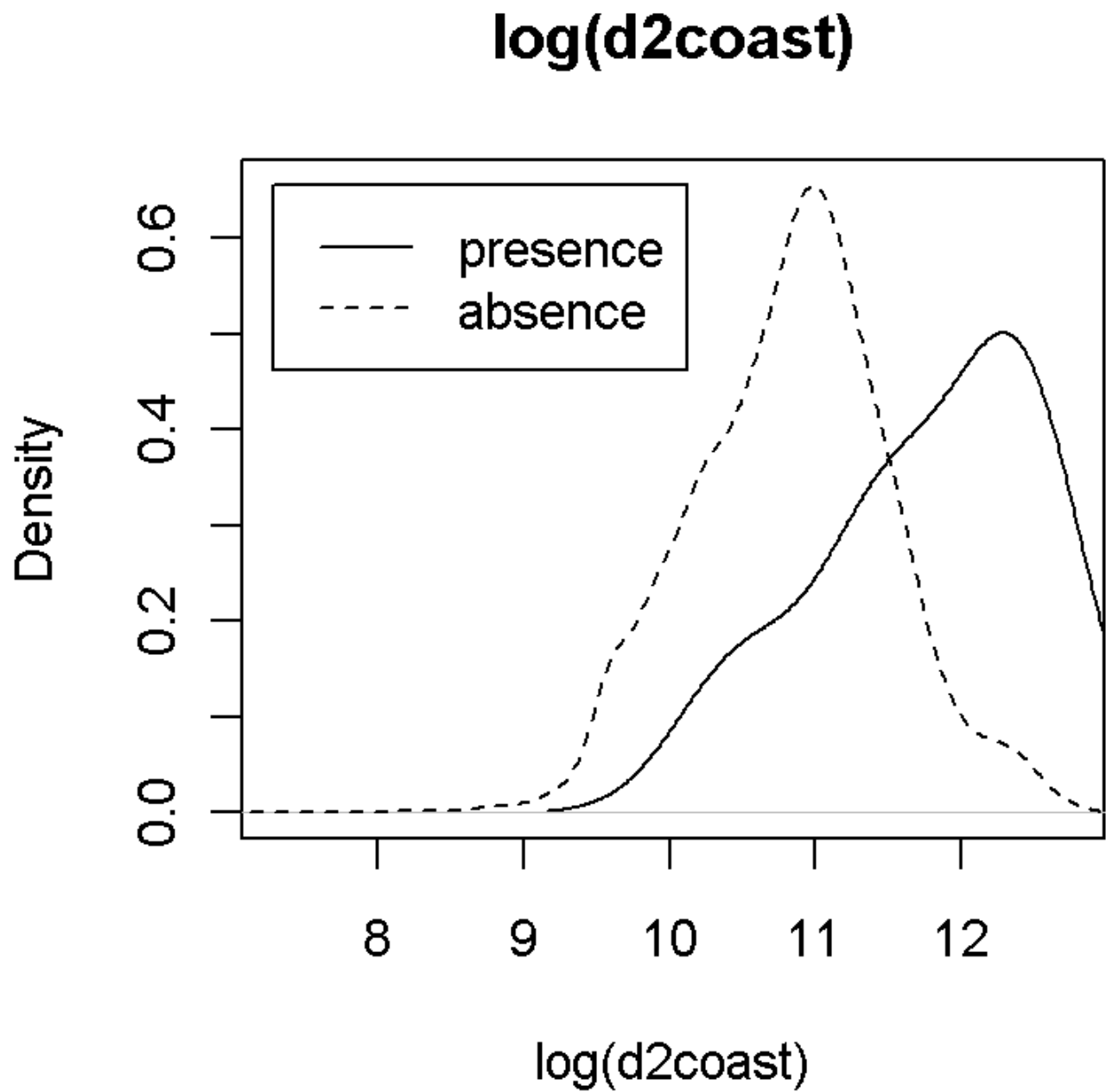


Figure 117: Density histogram of distance to coast log(meters) for 'Beaked whales' guild during 'winter' season in 'east2' region.

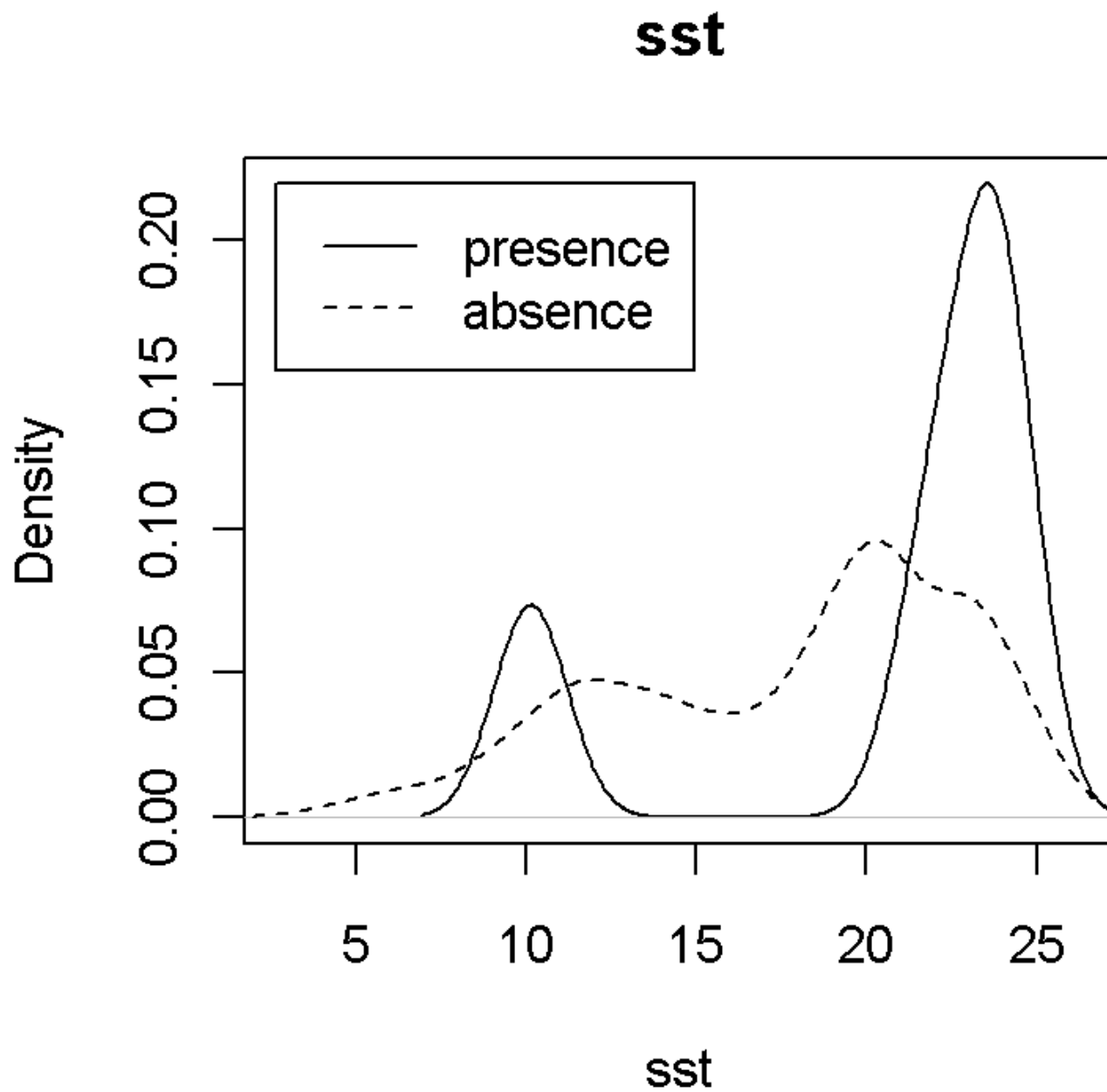


Figure 118: Density histogram of sea-surface temperature (degrees C) for 'Beaked whales' guild during 'winter' season in 'east2' region.

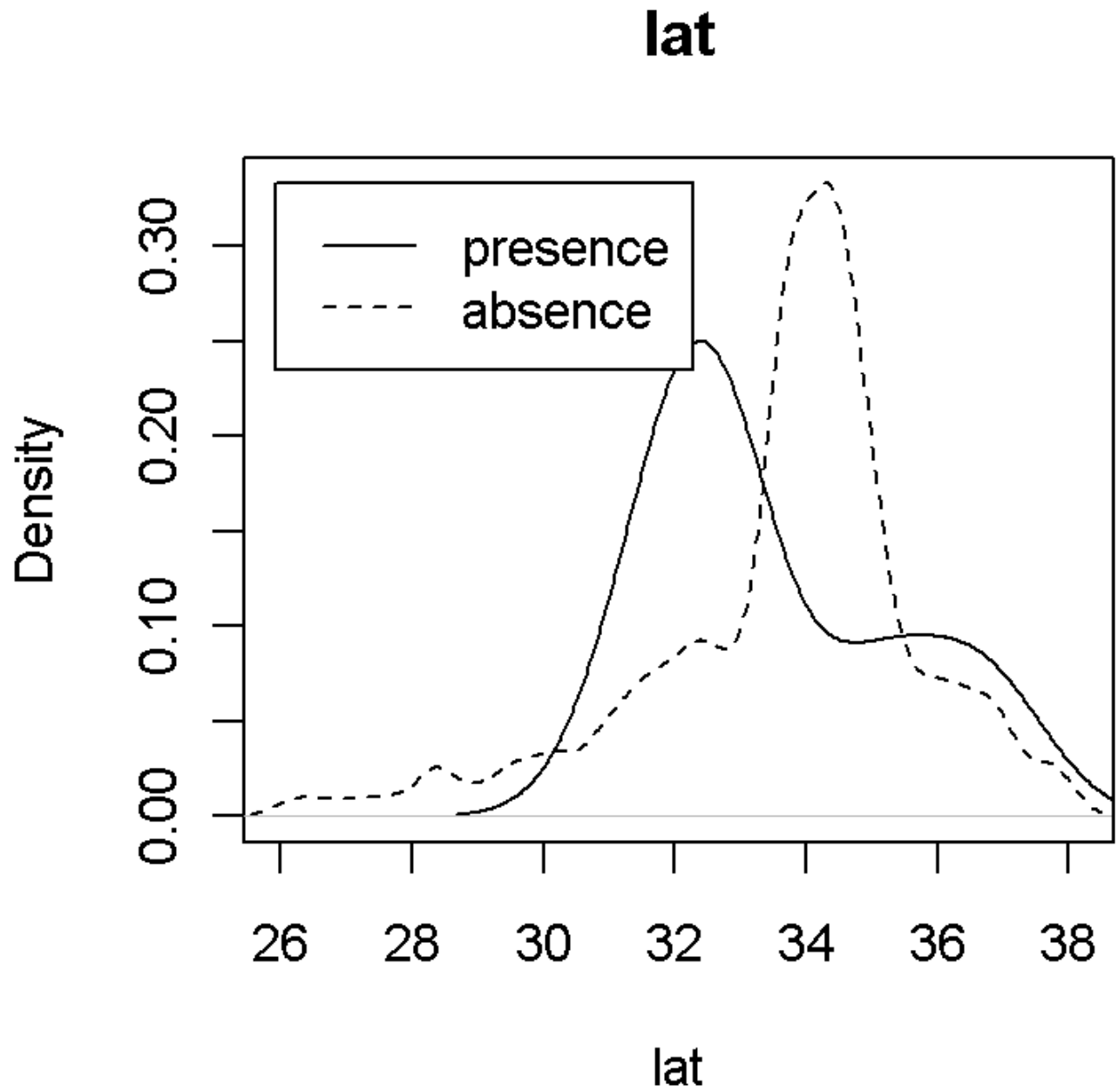


Figure 119: Density histogram of latitude (degrees) for 'Beaked whales' guild during 'winter' season in 'east2' region.

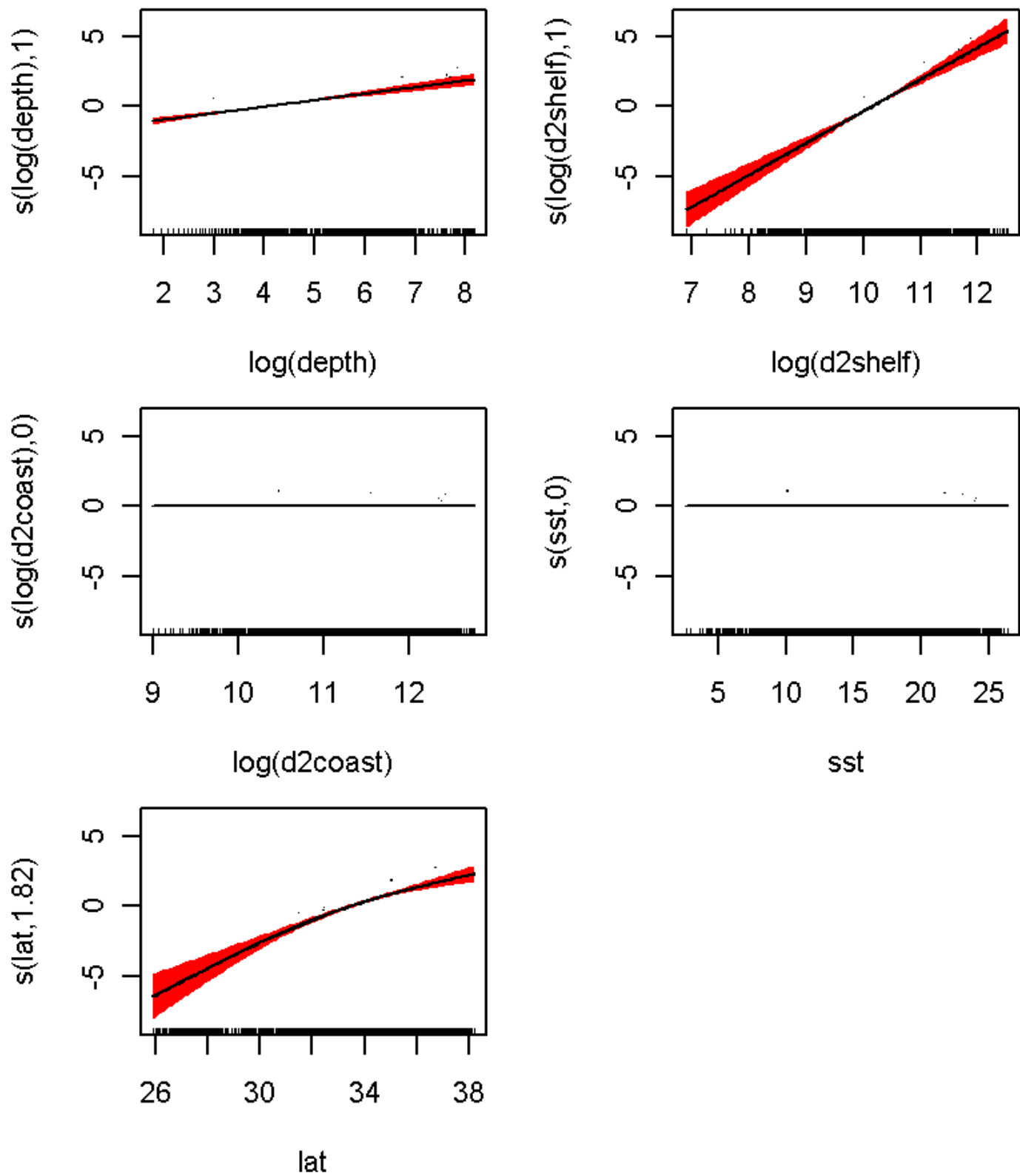


Figure 120: Terms plot of predictors to GAM model fit for 'Beaked whales' guild during 'winter' season in 'east2' region.

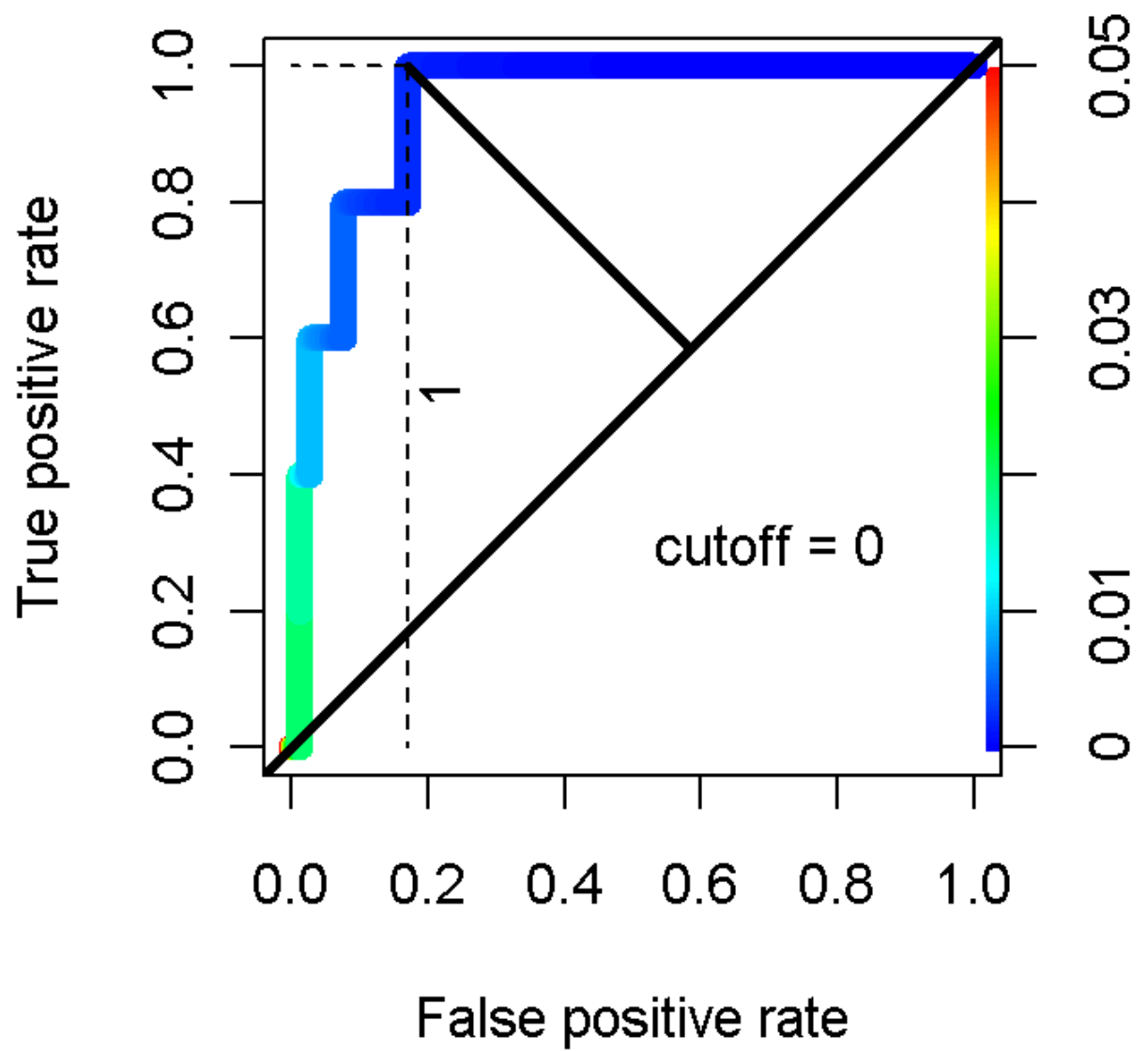


Figure 121: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Beaked whales' guild during 'winter' season in 'east2' region.

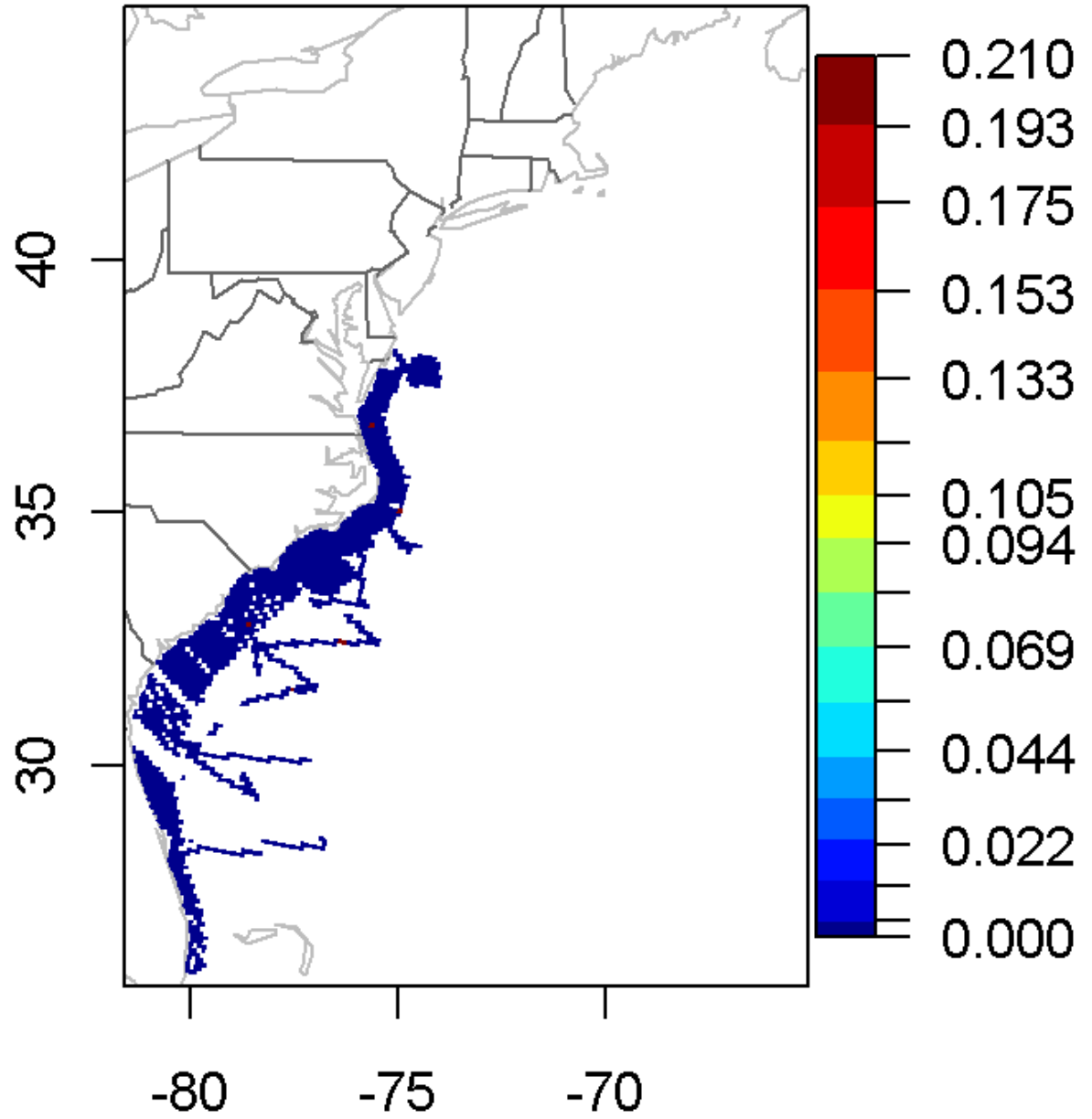


Figure 122: Map of presence and absence by cell summed through time for 'Beaked whales' guild during 'winter' season in 'east2' region.

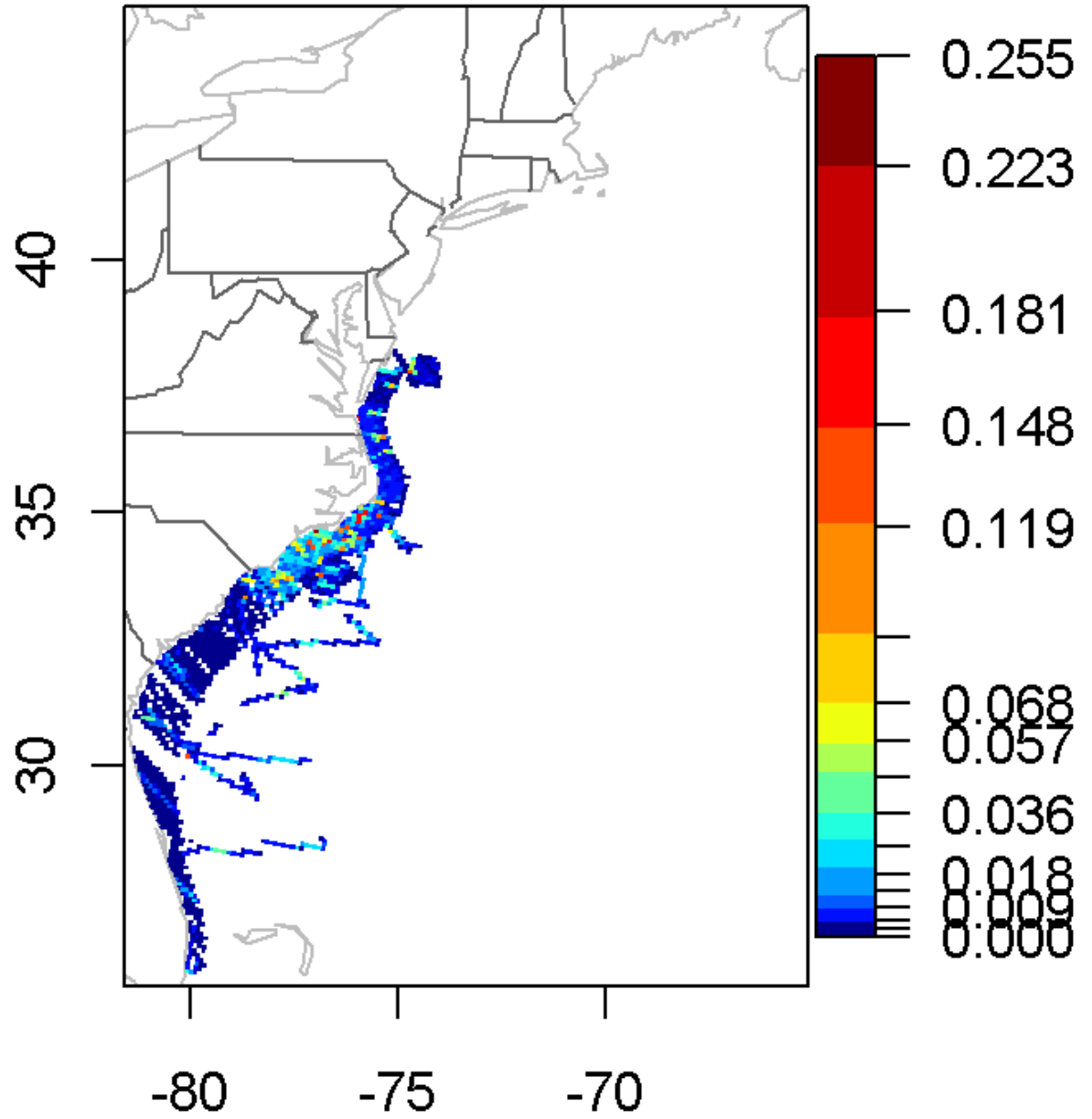


Figure 123: Map of effort(hours/km²) by cell summed through time for 'Beaked whales' guild during 'winter' season in 'east2' region.

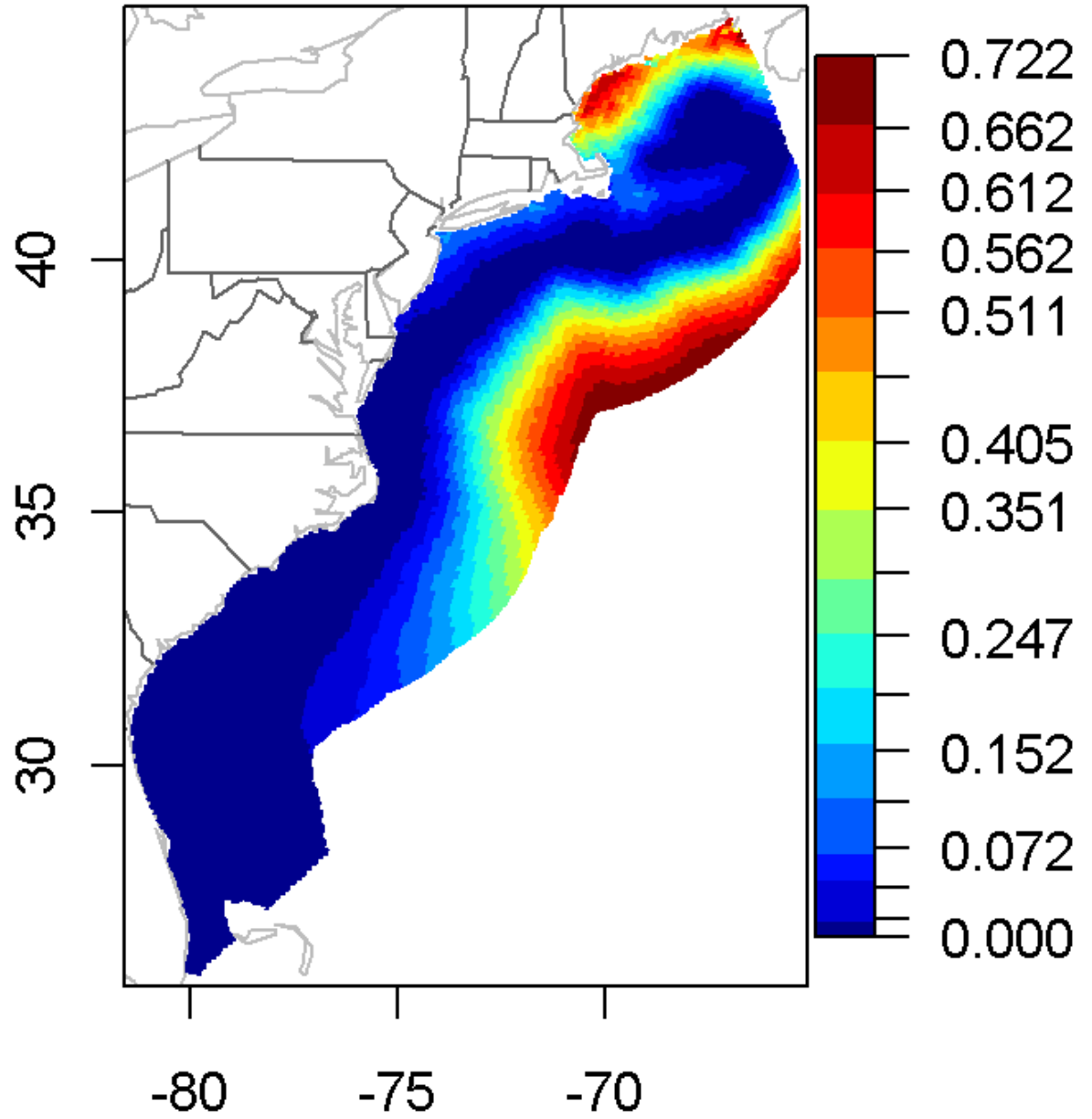


Figure 124: Map of mean predicted habitat for 'Beaked whales' guild during 'winter' season in 'east2' region.

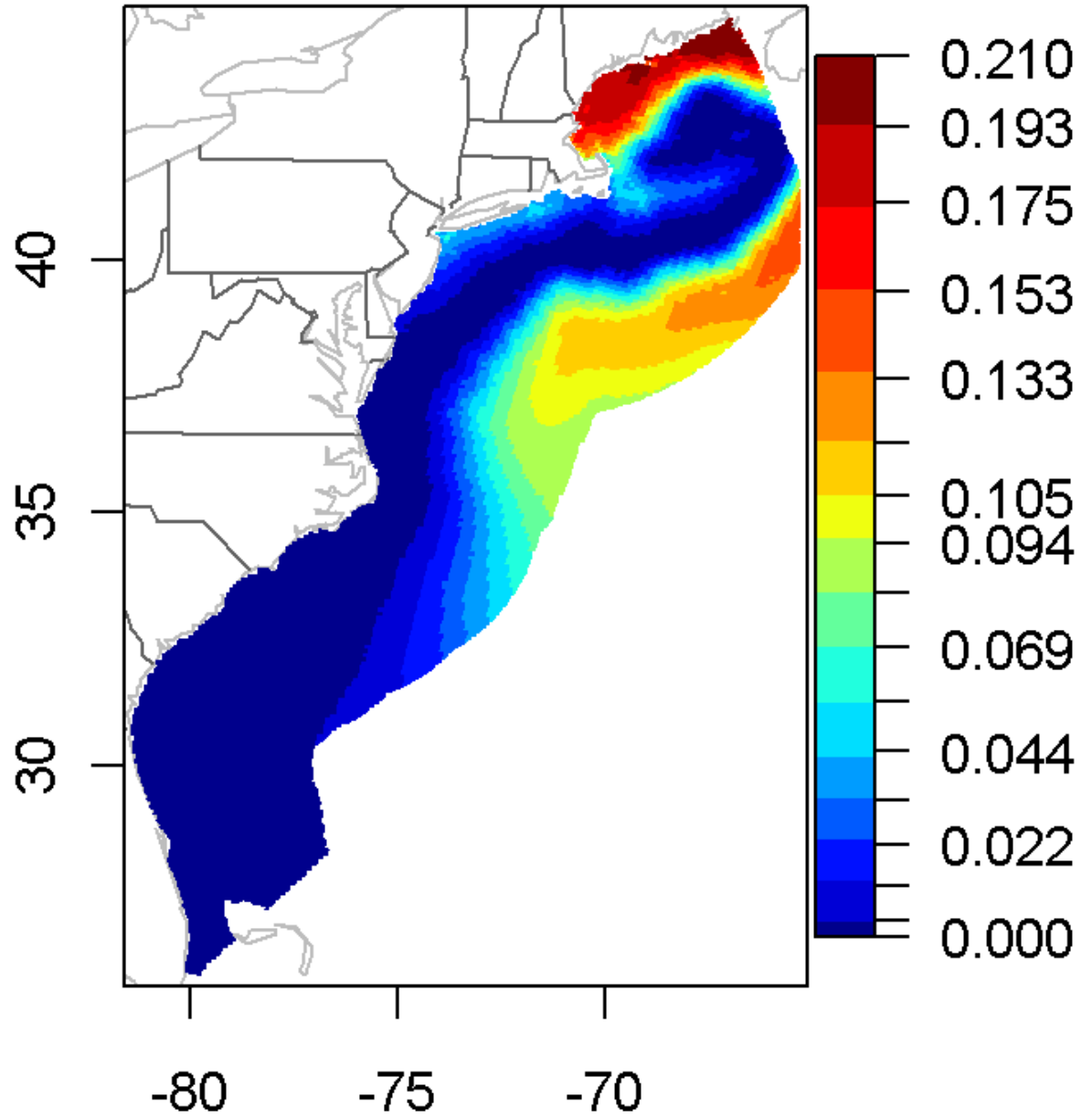


Figure 125: Map of standard error of habitat for 'Beaked whales' guild during 'winter' season in 'east2' region.

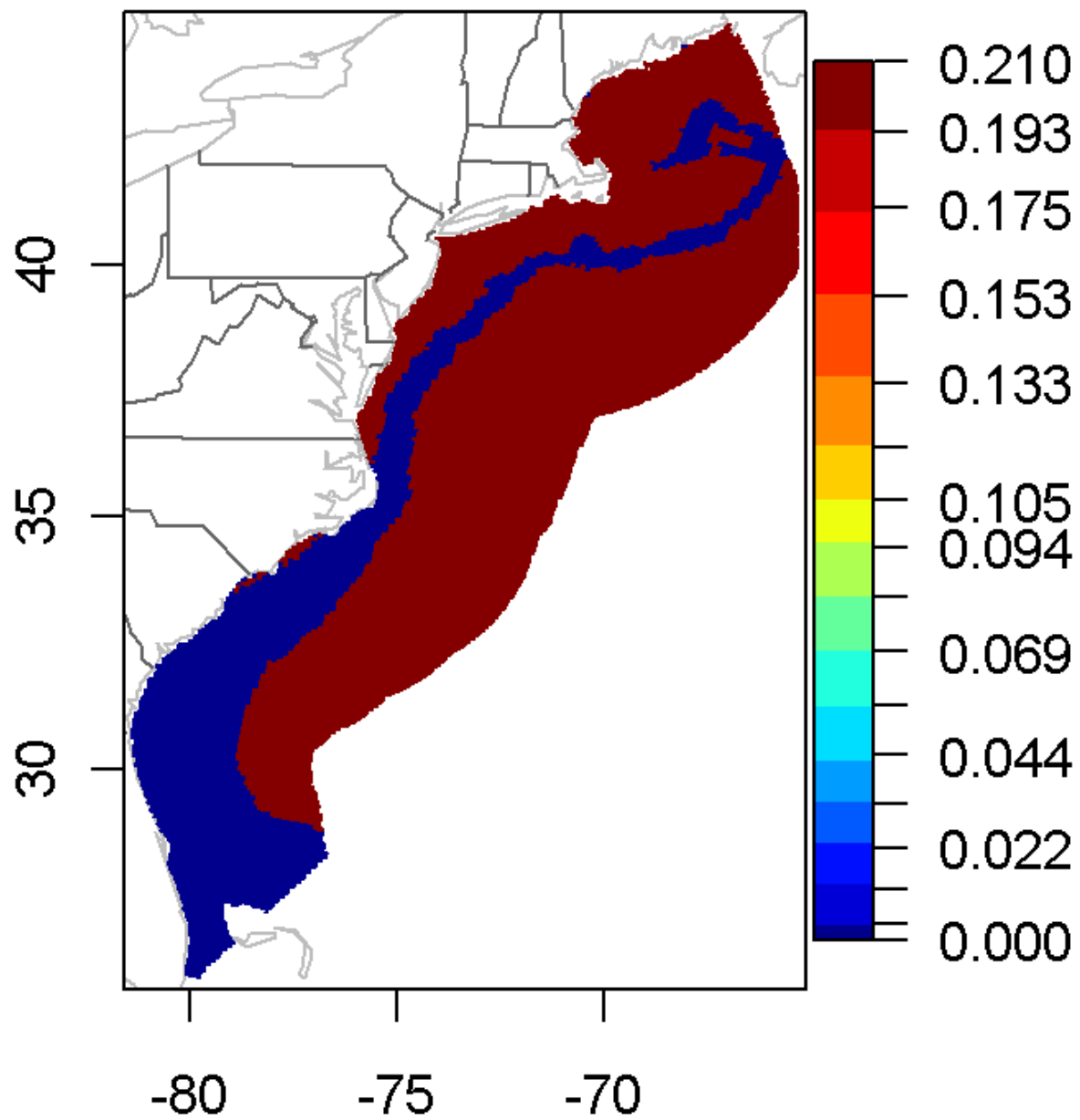


Figure 126: Map of binary habitat (cutoff determined by ROC) for 'Beaked whales' guild during 'winter' season in 'east2' region.

3 Delphinus

Guildid:de3

Table 12: Taxonomic members of the "Delphinus" guild.

	Scientic Name	Common Name	Taxonomic #
1	Delphinus	common dolphins	180437
2	Delphinus capensis	long-beaked common dolphin	555654
3	Delphinus delphis	common dolphin	180438

3.1 fall

3.1.1 east2

Modelrun identifier: duke_06_de3_fall_east2

Date generated: 2008-10-21 14:15:41

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 13: Summary for duke(6) GAM model: for 'Delphinus' guild during 'fall' season in 'east2' region.

	Value
Number.presences	6
Number.absences	1858
GAM.converged	TRUE
R.squared	0.162591
Deviance.explained	0.482478
ROC.optimum	0.342075
Maximum.fit	0.000775193
Maximum.prediction	0.417996

Model text summary...

```
duke_06_de3_fall_east2 run on Tue Oct 21 14:14:33 2008
  provider:duke, version:06, guild:Delphinus (de3), season:'fall', region:east2

max.fit:0.342075, max.prediction:0.417996, ROC.optimum:0.000775

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -11.8937      0.5231  -22.74   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  1.908e+00  2.408   6.833 0.000474 ***
s(log(d2shelf)) 1.977e+00  2.477  33.629 < 2e-16 ***
s(log(d2coast)) 9.538e-01  1.454 111.069 < 2e-16 ***
s(sst)         1.492e-05  0.500   0.002 0.843672
s(lat)         8.986e-01  1.399  30.400 2.28e-10 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.163  Deviance explained = 48.2%
GCV score = 8.7814e-05  Scale est. = 8.7231e-05  n = 1826

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.    : 1654  Min.    :  6.0  Min.    :  10  Min.    : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0  1st Qu.:12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0  Median : 30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5  Mean   : 47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.:197.0  3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
        NA's    :      1    NA's    :      1    NA's    :37.00

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :  5  Min.    :1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :3.129e-16  Min.   :0.000e+00  Min.   :1.290e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.345e-12  1st Qu.:8.034e-12  1st Qu.:0.000e+00  1st Qu.:5.348e-04  1st Qu.:0.0000
Median :11616  Median :3.004e-09  Median :5.161e-09  Median :0.000e+00  Median :2.645e-03  Median :0.0000
Mean   :11171  Mean   :4.306e-03  Mean   :6.937e-04  Mean   :5.415e-03  Mean   :8.763e-03  Mean   :0.1220
3rd Qu.:14088  3rd Qu.:6.789e-06  3rd Qu.:4.627e-06  3rd Qu.:0.000e+00  3rd Qu.:6.382e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :4.180e-01  Max.   :5.618e-02  Max.   :1.000e+00  Max.   :5.995e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.780e+03  NA's :8.780e+03
```

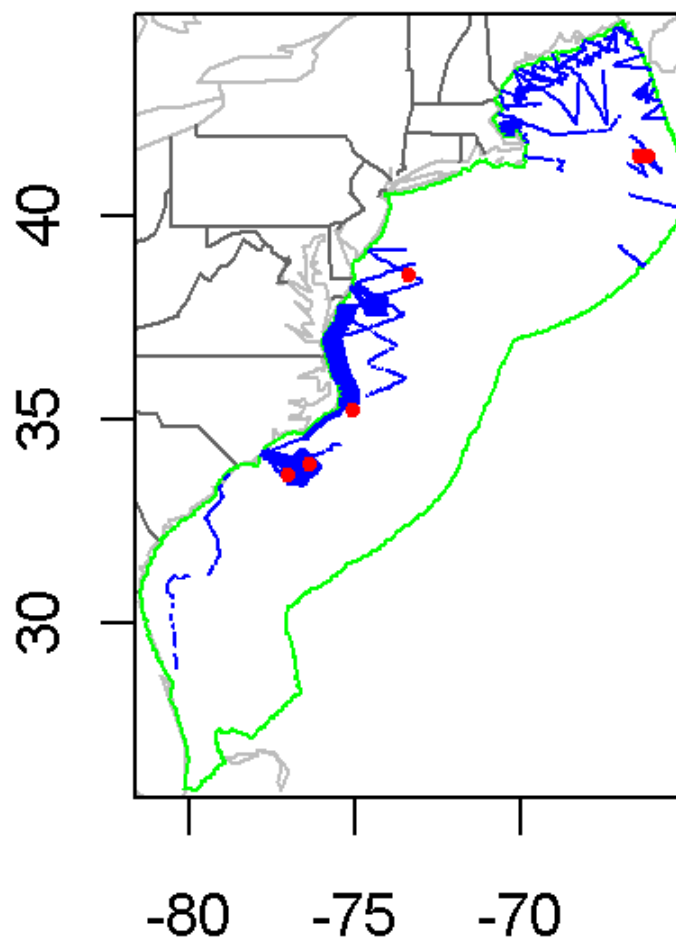



Figure 127: Map of points of observational sightings and tracks of survey effort for 'Delphinus' guild during 'fall' season in 'east2' region.

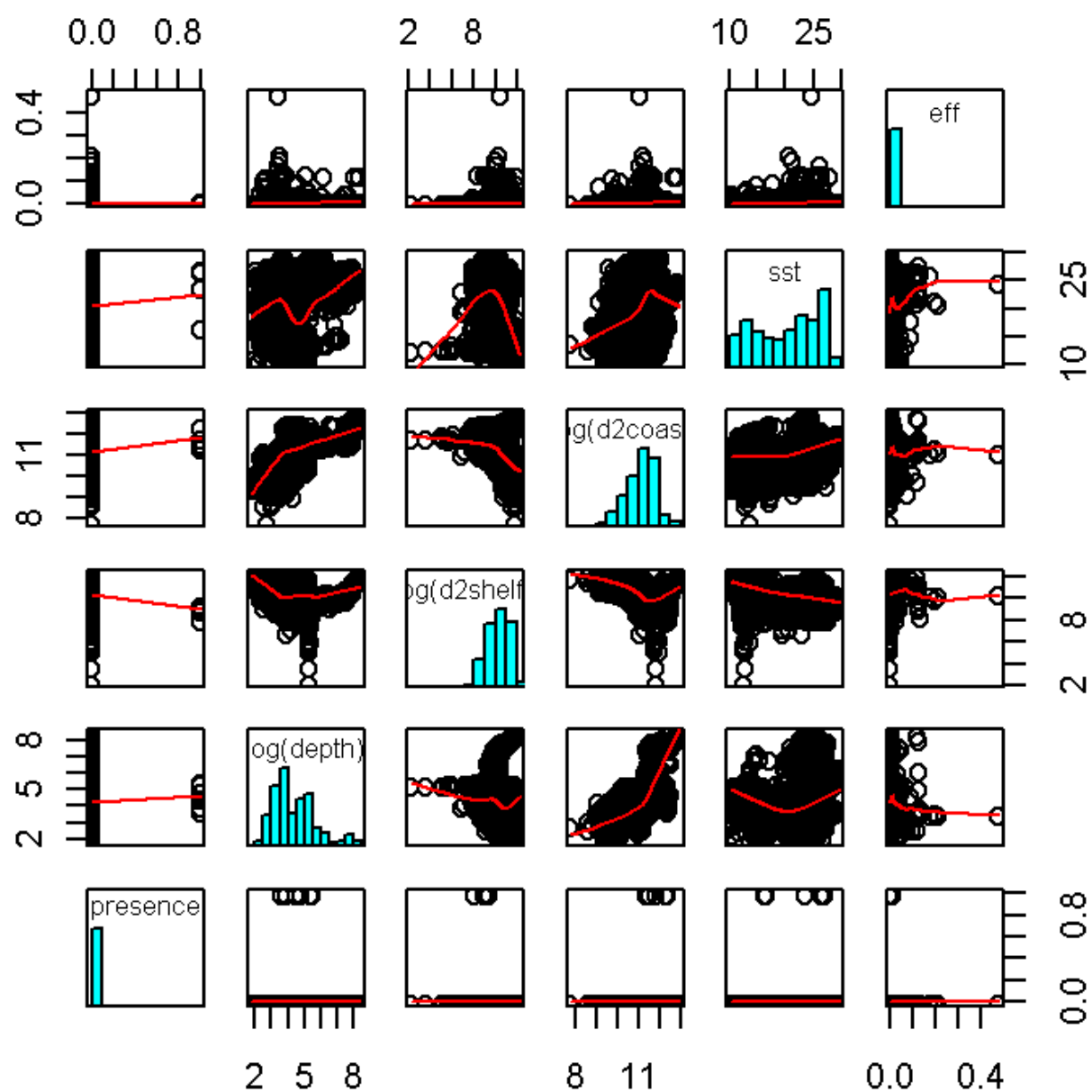


Figure 128: Pairs plot of input variables for 'Delphinus' guild during 'fall' season in 'east2' region.

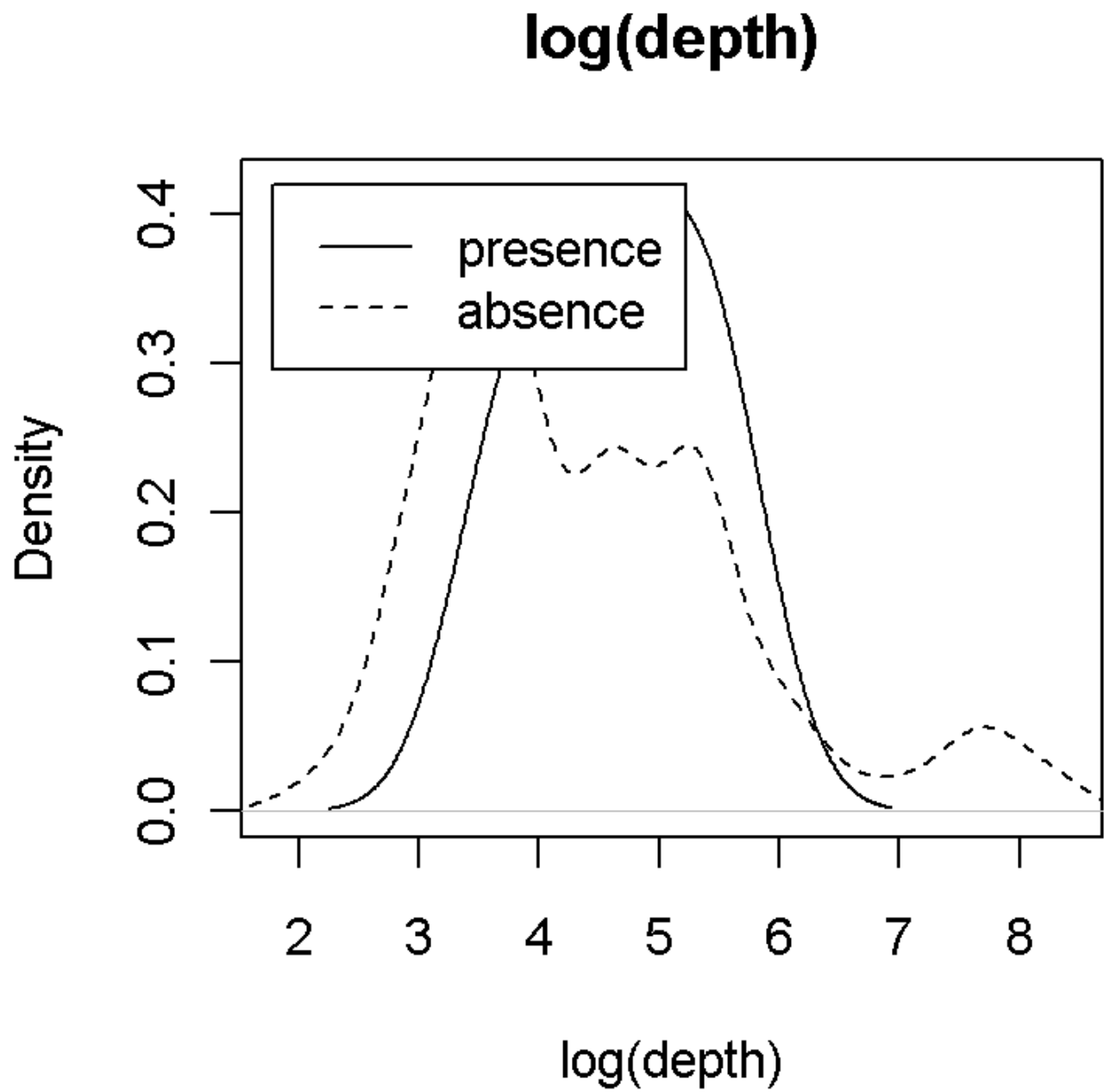


Figure 129: Density histogram of depth $\log(\text{meters})$ for 'Delphinus' guild during 'fall' season in 'east2' region.

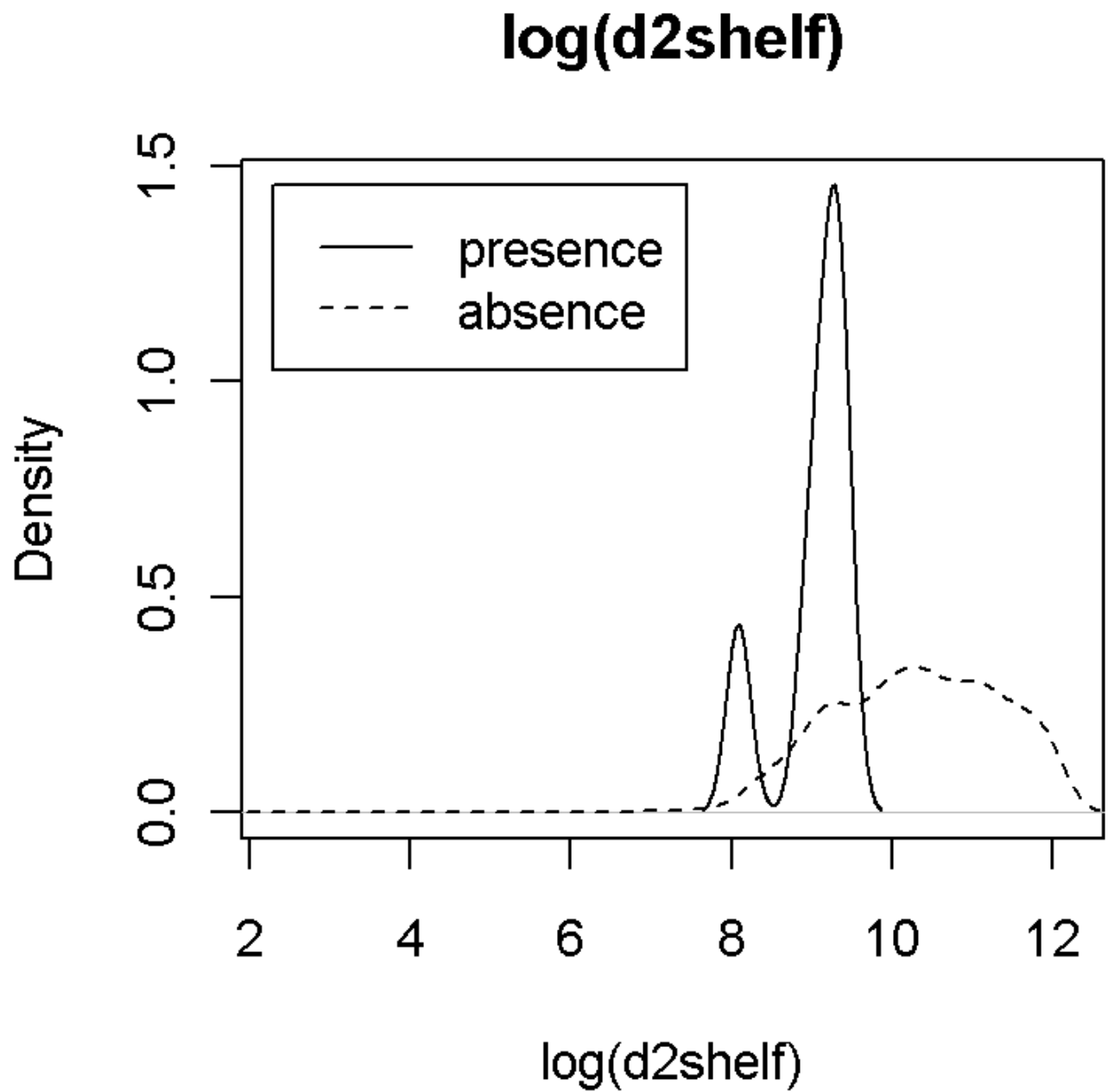


Figure 130: Density histogram of distance to shelf log(meters) for 'Delphinus' guild during 'fall' season in 'east2' region.

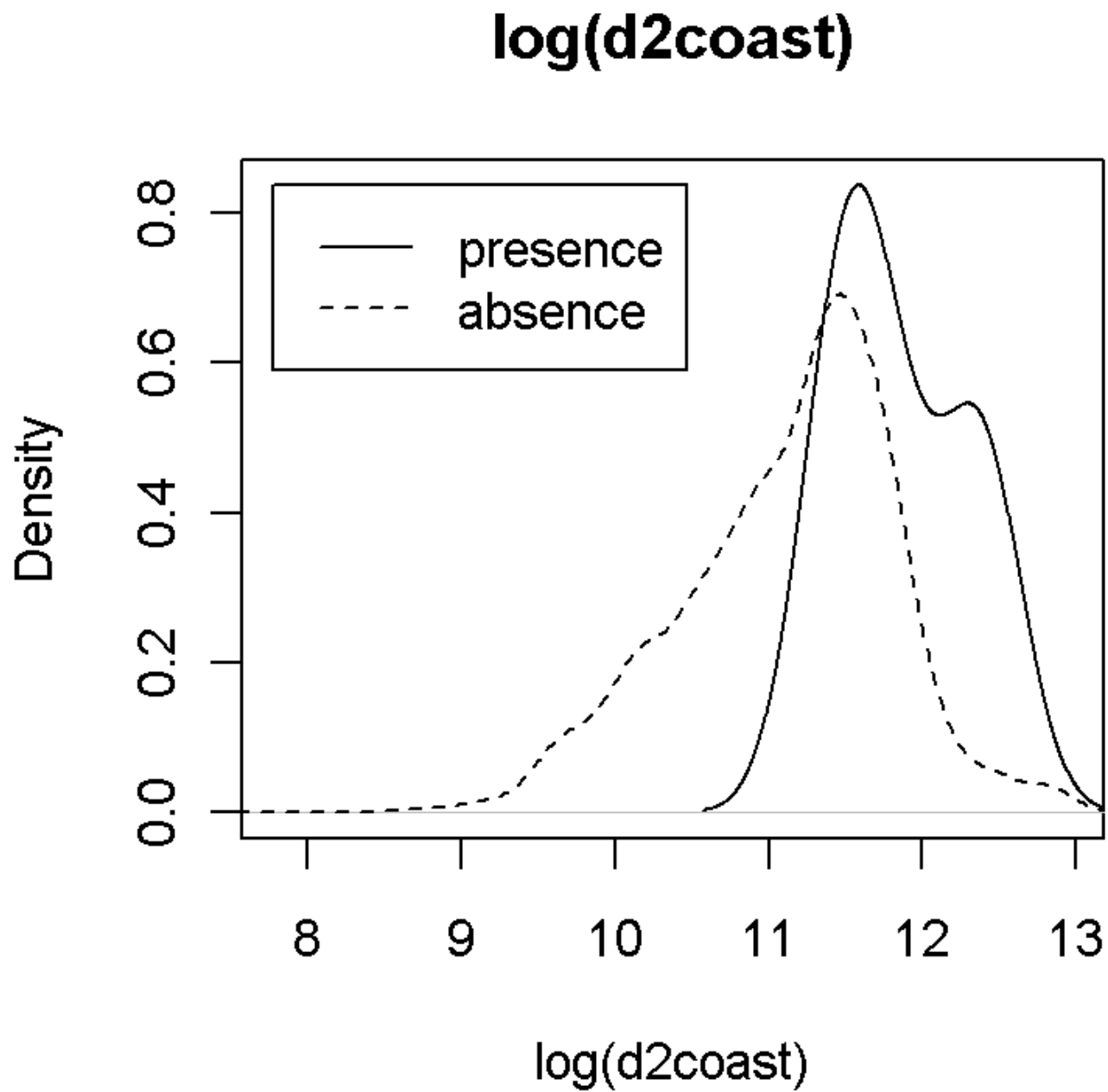


Figure 131: Density histogram of distance to coast log(meters) for 'Delphinus' guild during 'fall' season in 'east2' region.

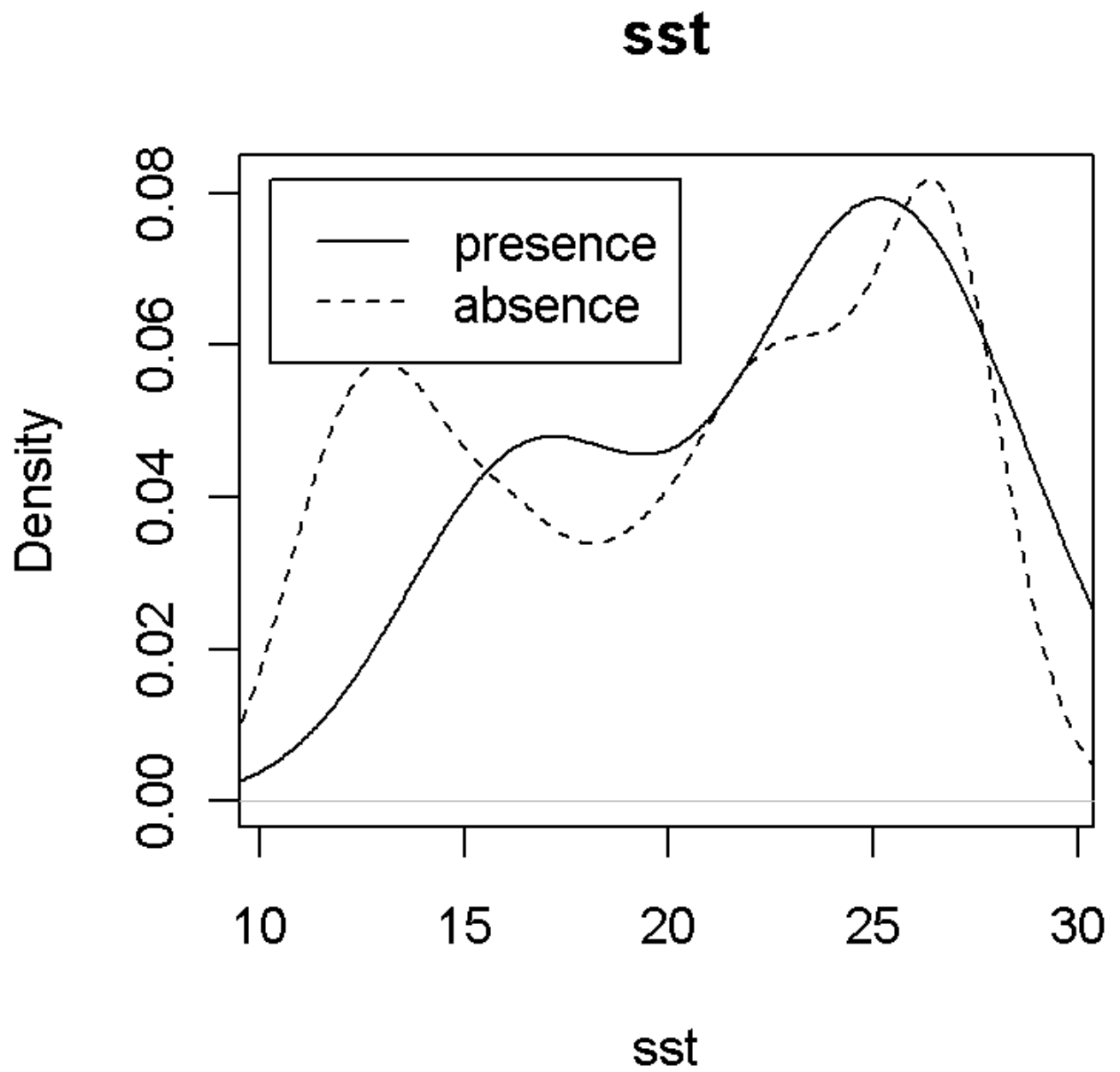


Figure 132: Density histogram of sea-surface temperature (degrees C) for 'Delphinus' guild during 'fall' season in 'east2' region.

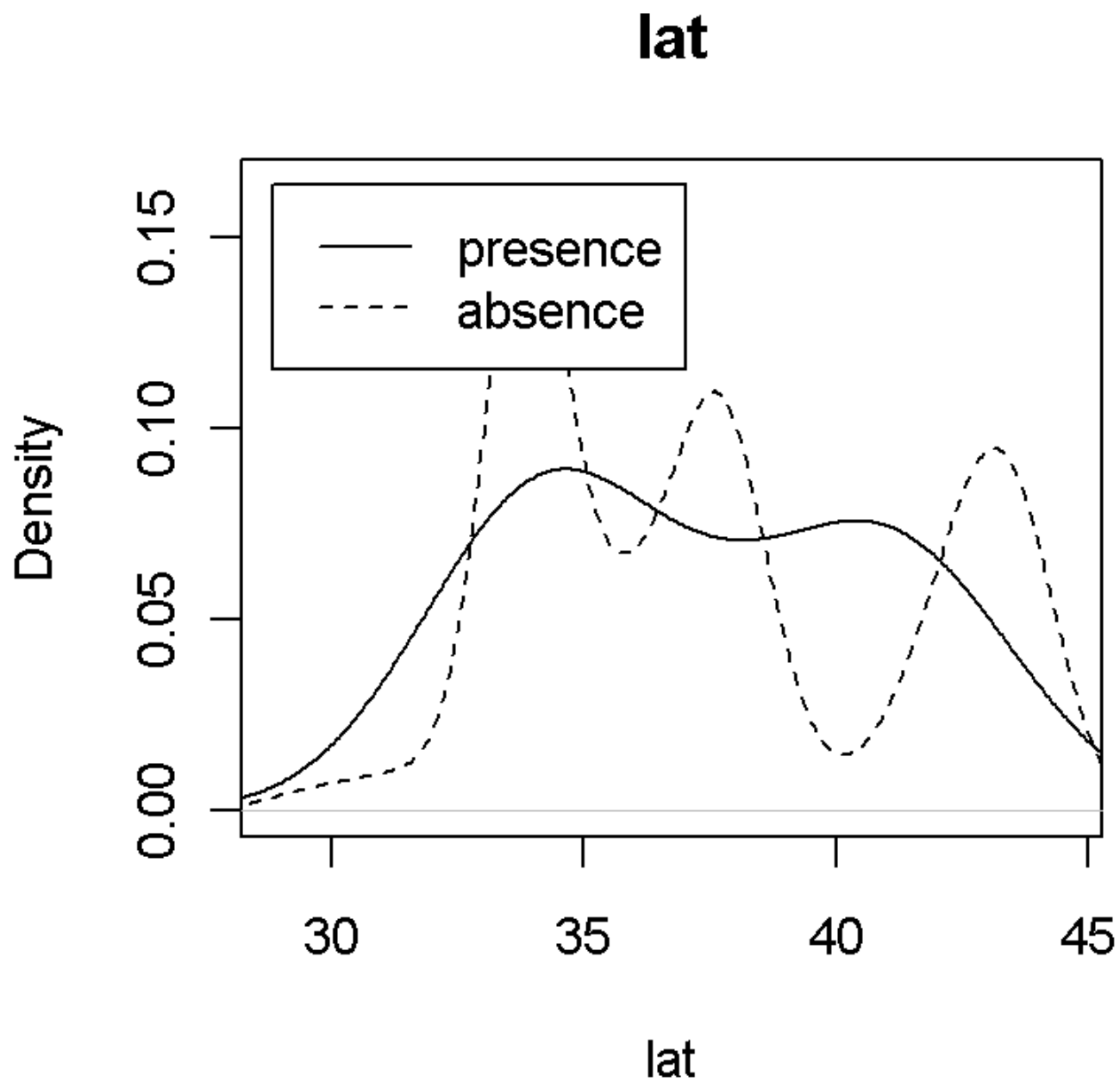


Figure 133: Density histogram of latitude (degrees) for 'Delphinus' guild during 'fall' season in 'east2' region.

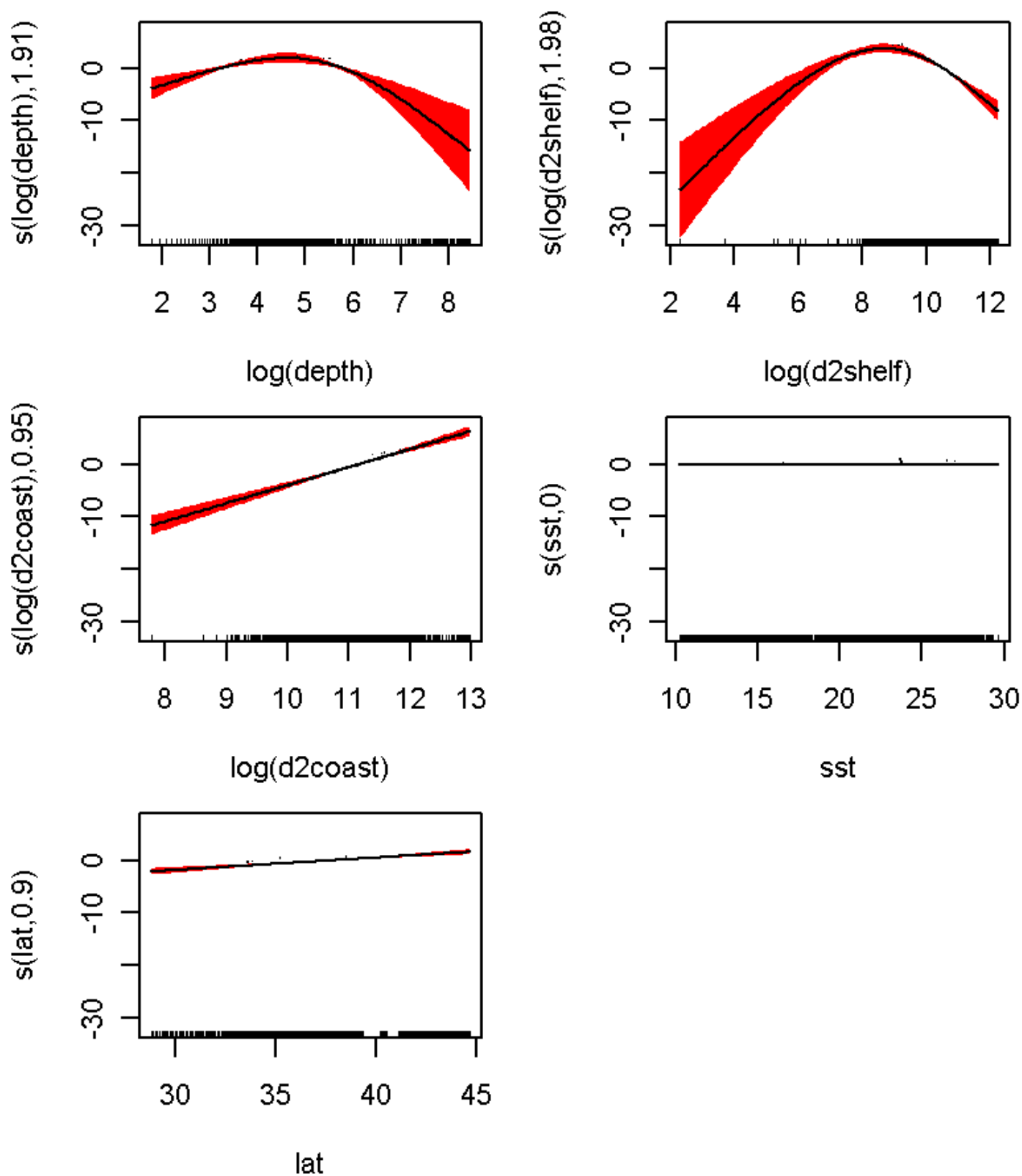


Figure 134: Terms plot of predictors to GAM model fit for 'Delphinus' guild during 'fall' season in 'east2' region.

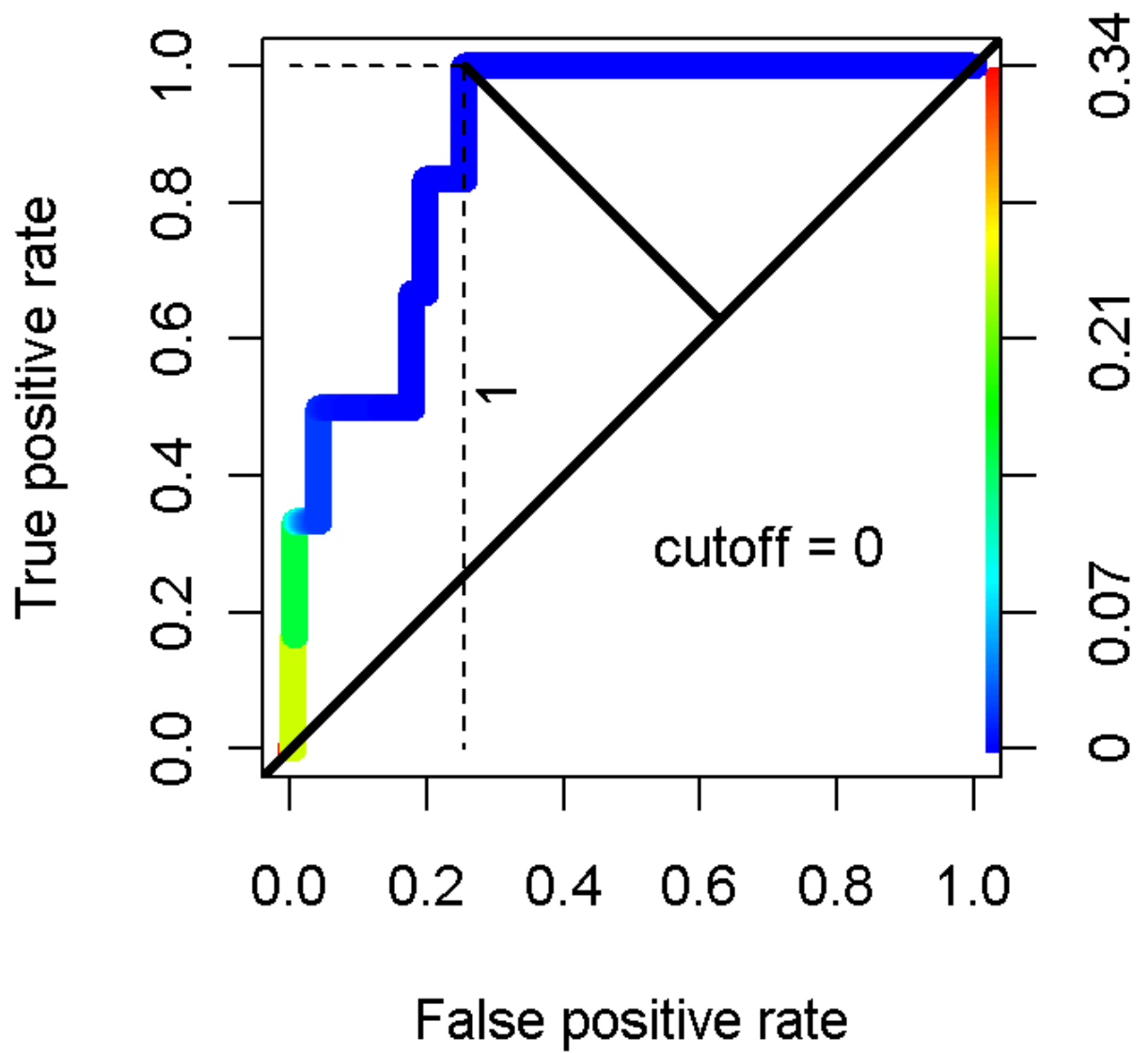


Figure 135: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Delphinus' guild during 'fall' season in 'east2' region.

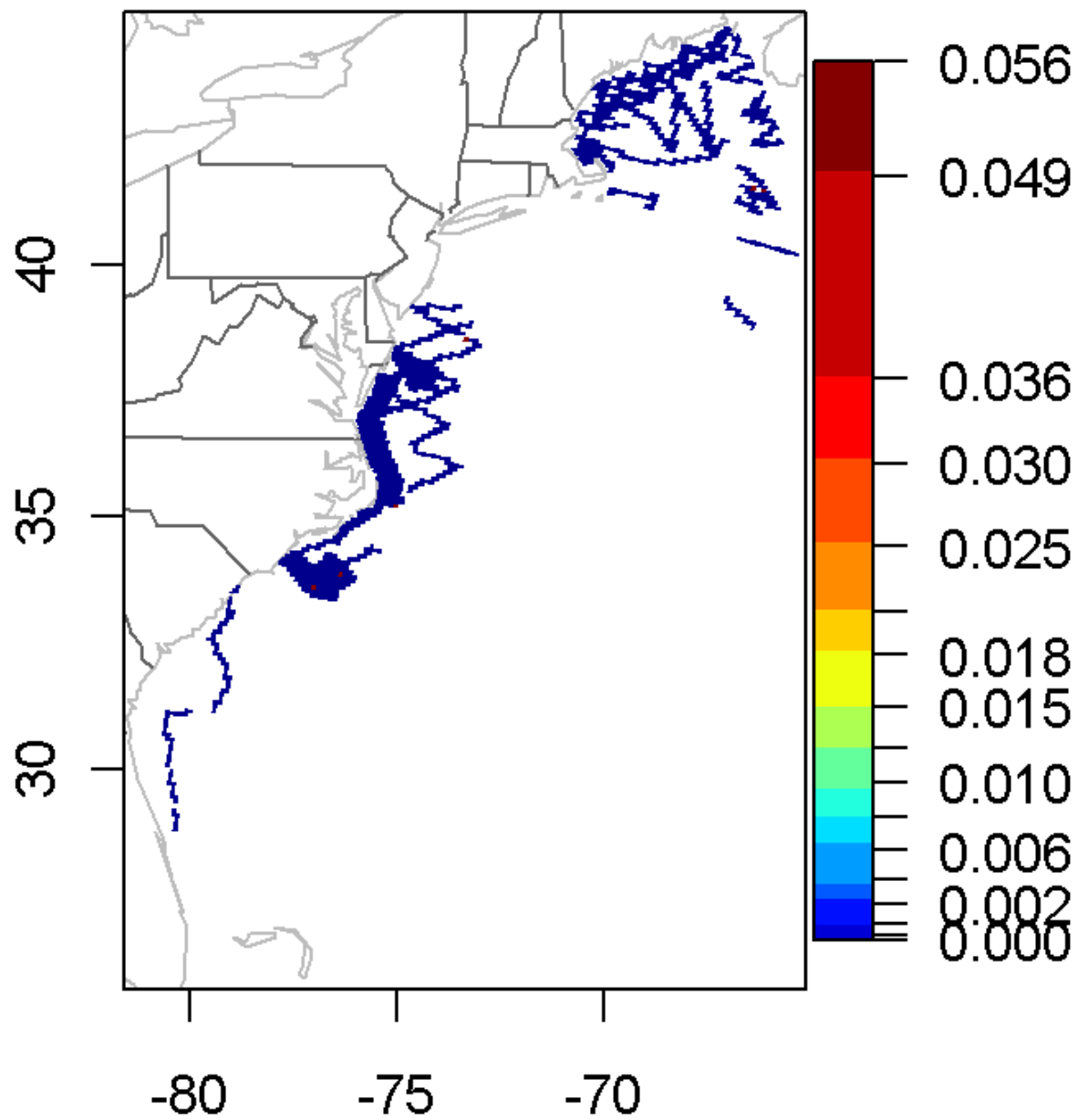


Figure 136: Map of presence and absence by cell summed through time for 'Delphinus' guild during 'fall' season in 'east2' region.

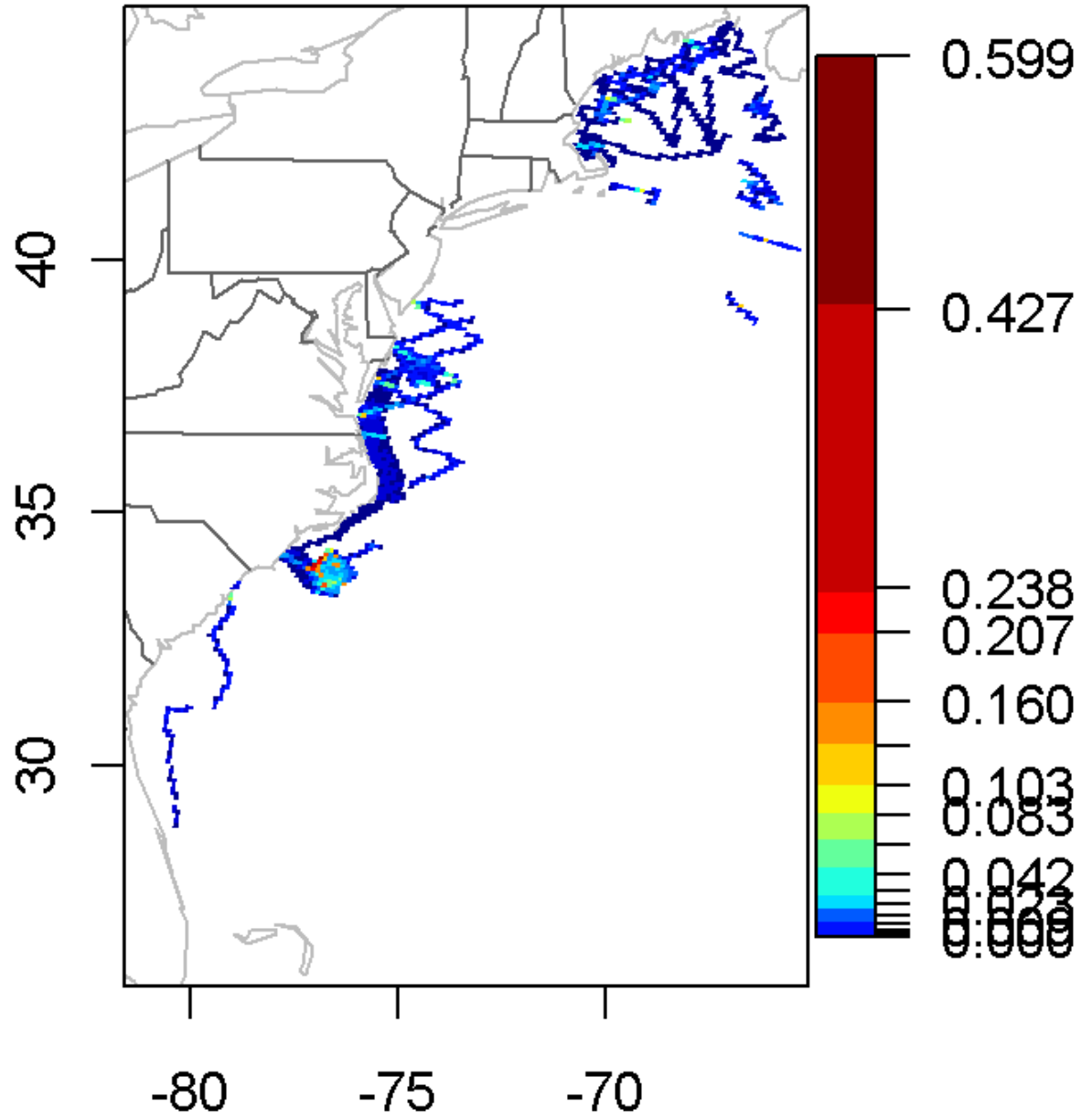


Figure 137: Map of effort(hours/km²) by cell summed through time for 'Delphinus' guild during 'fall' season in 'east2' region.

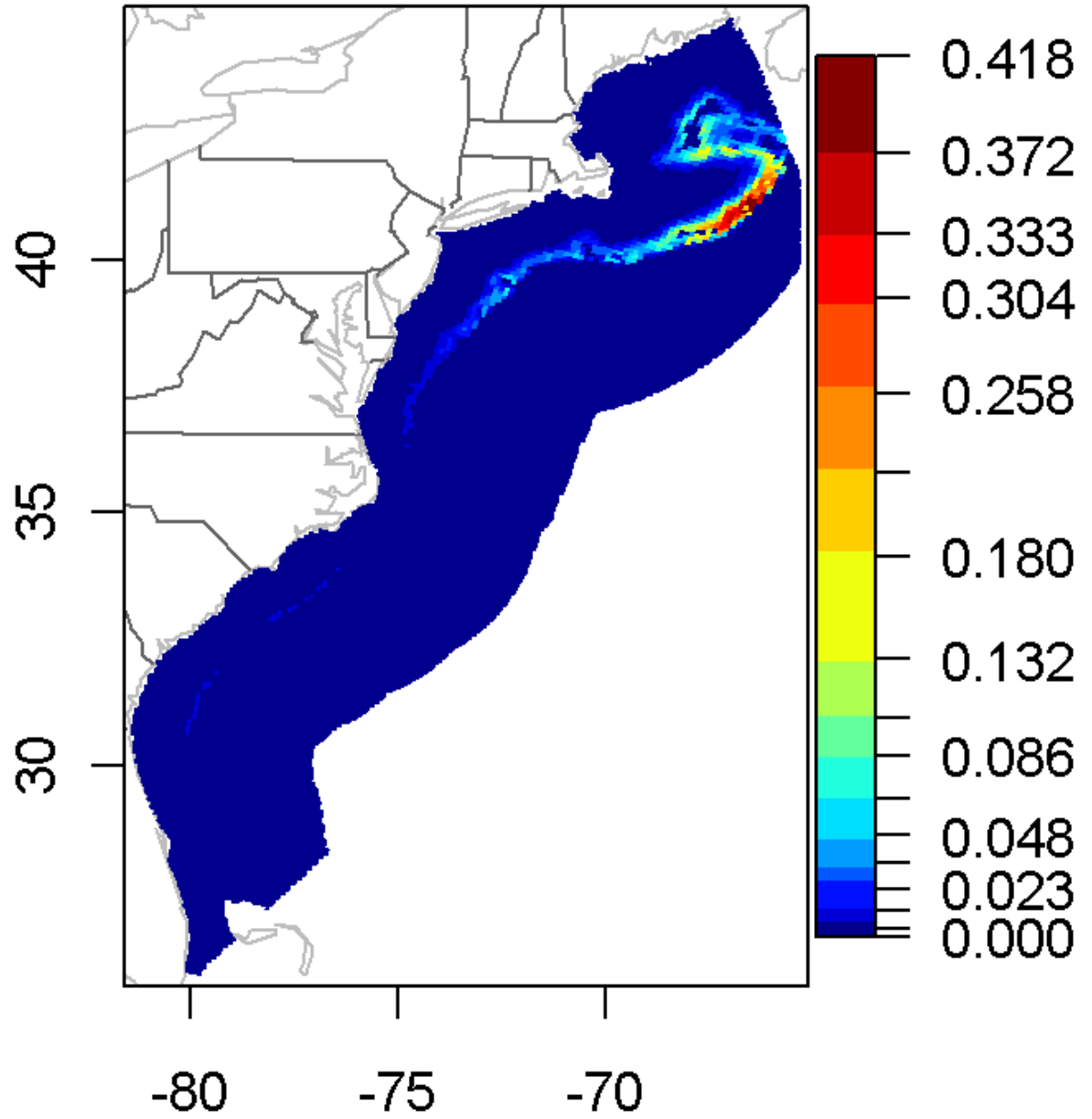


Figure 138: Map of mean predicted habitat for 'Delphinus' guild during 'fall' season in 'east2' region.

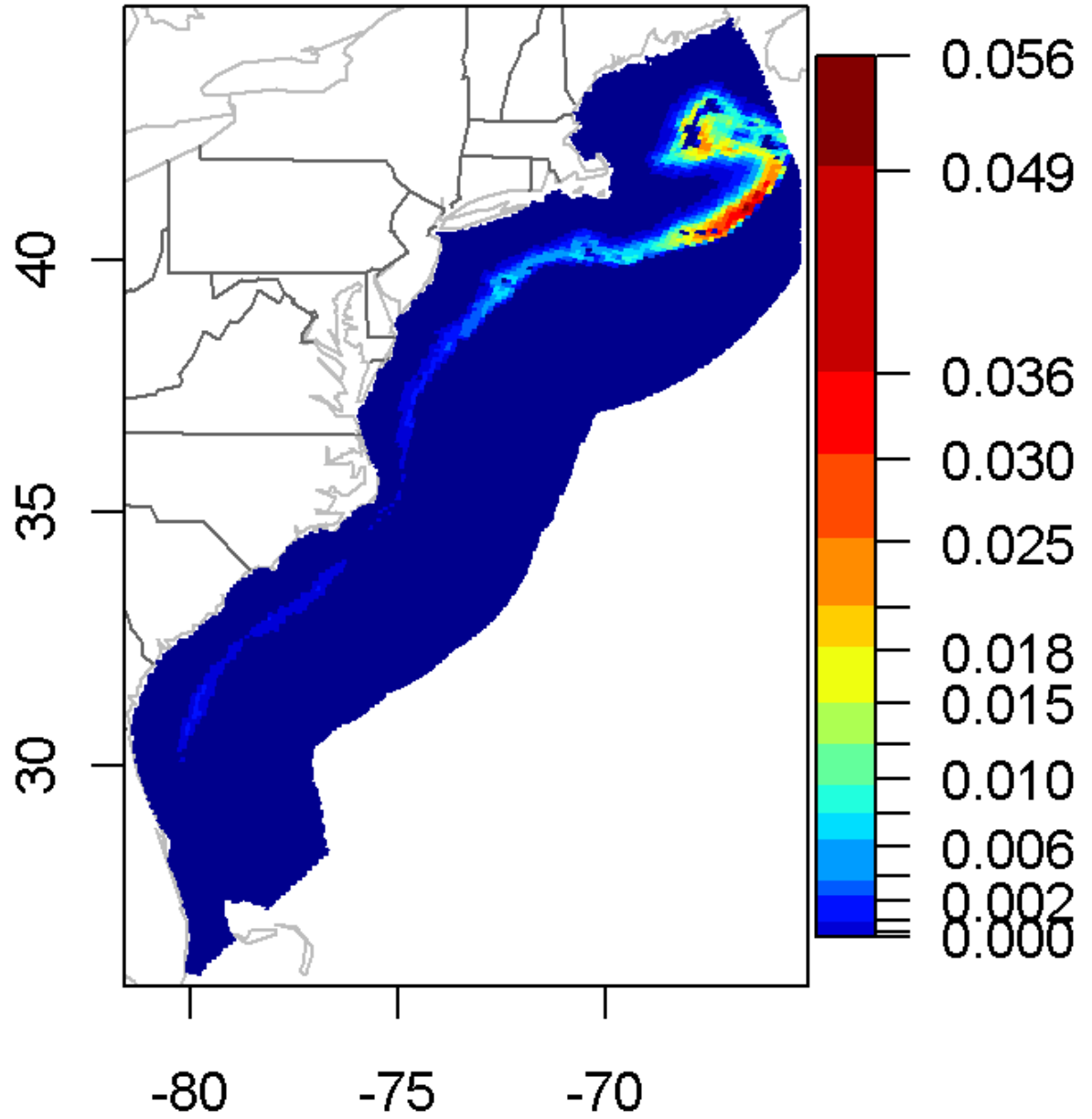


Figure 139: Map of standard error of habitat for 'Delphinus' guild during 'fall' season in 'east2' region.

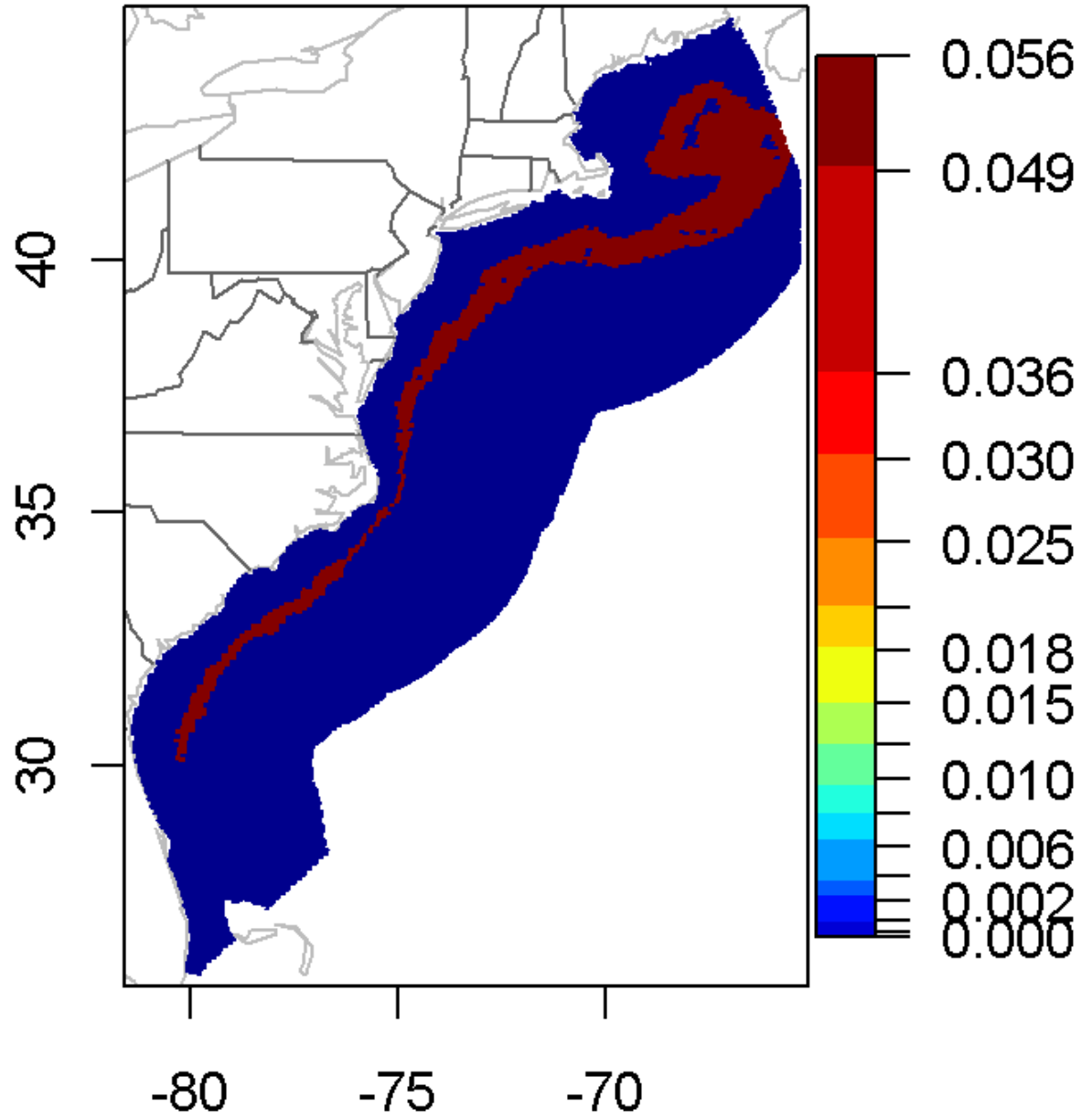


Figure 140: Map of binary habitat (cutoff determined by ROC) for 'Delphinus' guild during 'fall' season in 'east2' region.

3.2 spring

3.2.1 east2

Modelrun identifier: duke_06_de3_spring_east2

Date generated: 2008-10-21 14:40:07

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 14: Summary for duke(6) GAM model: for 'Delphinus' guild during 'spring' season in 'east2' region.

	Value
Number.presences	19
Number.absences	2854
GAM.converged	TRUE
R.squared	-0.0253543
Deviance.explained	0.0624524
ROC.optimum	0.0416446
Maximum.fit	0.00772883
Maximum.prediction	0.140399

Model text summary...

```
duke_06_de3_spring_east2 run on Tue Oct 21 14:38:48 2008
  provider:duke, version:06, guild:Delphinus (de3), season:'spring', region:east2

max.fit:0.041645, max.prediction:0.140399, ROC.optimum:0.007729

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -5.45523    0.08888   -61.38   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F  p-value
s(log(depth))  1.967e+00  2.467  49.37 < 2e-16 ***
s(log(d2shelf)) 1.042e-06  0.500  5.34e-05  0.933
s(log(d2coast)) 6.171e-07  0.500  6.81e-06  0.960
s(sst)          7.493e-07  0.500  8.56e-08  0.987
s(lat)          9.596e-01  1.460  30.06 1.24e-10 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = -0.0254   Deviance explained = 6.25%
GCV score = 0.00022099   Scale est. = 0.00022037   n = 2490

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1087  Min.    : 1654  Min.    :  4.0  Min.    :  995  Min.    : 1471  Min.    :  4.886  Min.    :26.17
se2:1786  1st Qu.:10323  1st Qu.: 20.0  1st Qu.:13946  1st Qu.:32021  1st Qu.:13.386  1st Qu.:33.83
          Median :10844  Median : 29.0  Median :31680  Median :52718  Median :17.732  Median :34.55
          Mean   : 9852  Mean   :236.4  Mean   :41188  Mean   :60965  Mean   :16.976  Mean   :34.44
          3rd Qu.:11293  3rd Qu.: 45.0  3rd Qu.:56624  3rd Qu.:75007  3rd Qu.:20.903  3rd Qu.:35.66
          Max.    :15889  Max.    :5270.0  Max.    :329182  Max.    :420801  Max.    :26.475  Max.    :42.39
          NA's    :      6      NA's    :      6      NA's    :378.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :  5  Min.    :1259  Min.    : 2.850  Min.    :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042  1st Qu.:89304  1st Qu.: 9.675  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :20.025	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.626	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.575	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :26.175	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :0.0001257  Min.   :4.184e-05  Min.   :0.000e+00  Min.   :2.601e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:0.0057173  1st Qu.:1.274e-03  1st Qu.:0.000e+00  1st Qu.:5.086e-04  1st Qu.:0.0000
Median :11616  Median :0.0119218  Median :2.234e-03  Median :0.000e+00  Median :3.743e-03  Median :1.0000
Mean   :11171  Mean   :0.0220764  Mean   :4.729e-03  Mean   :1.945e-02  Mean   :1.009e-02  Mean   :0.6385
3rd Qu.:14088  3rd Qu.:0.0261098  3rd Qu.:5.467e-03  3rd Qu.:0.000e+00  3rd Qu.:9.634e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :0.1403995  Max.   :3.569e-02  Max.   :2.000e+00  Max.   :2.202e-01  Max.   :1.0000
      NA's :5.0000000  NA's :5.000e+00  NA's :8.911e+03  NA's :8.911e+03
```

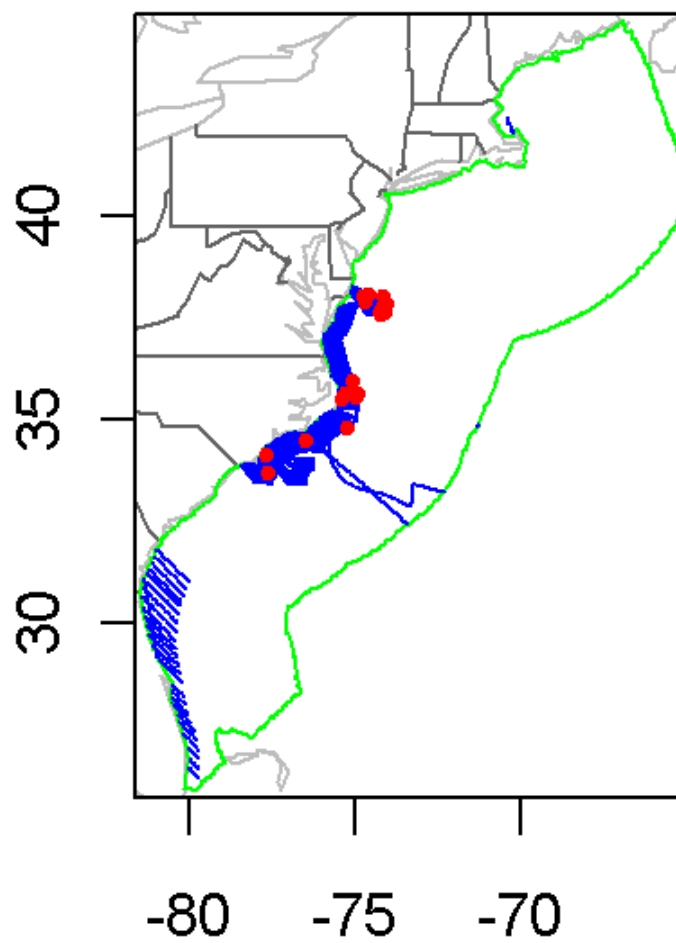



Figure 141: Map of points of observational sightings and tracks of survey effort for 'Delphinus' guild during 'spring' season in 'east2' region.

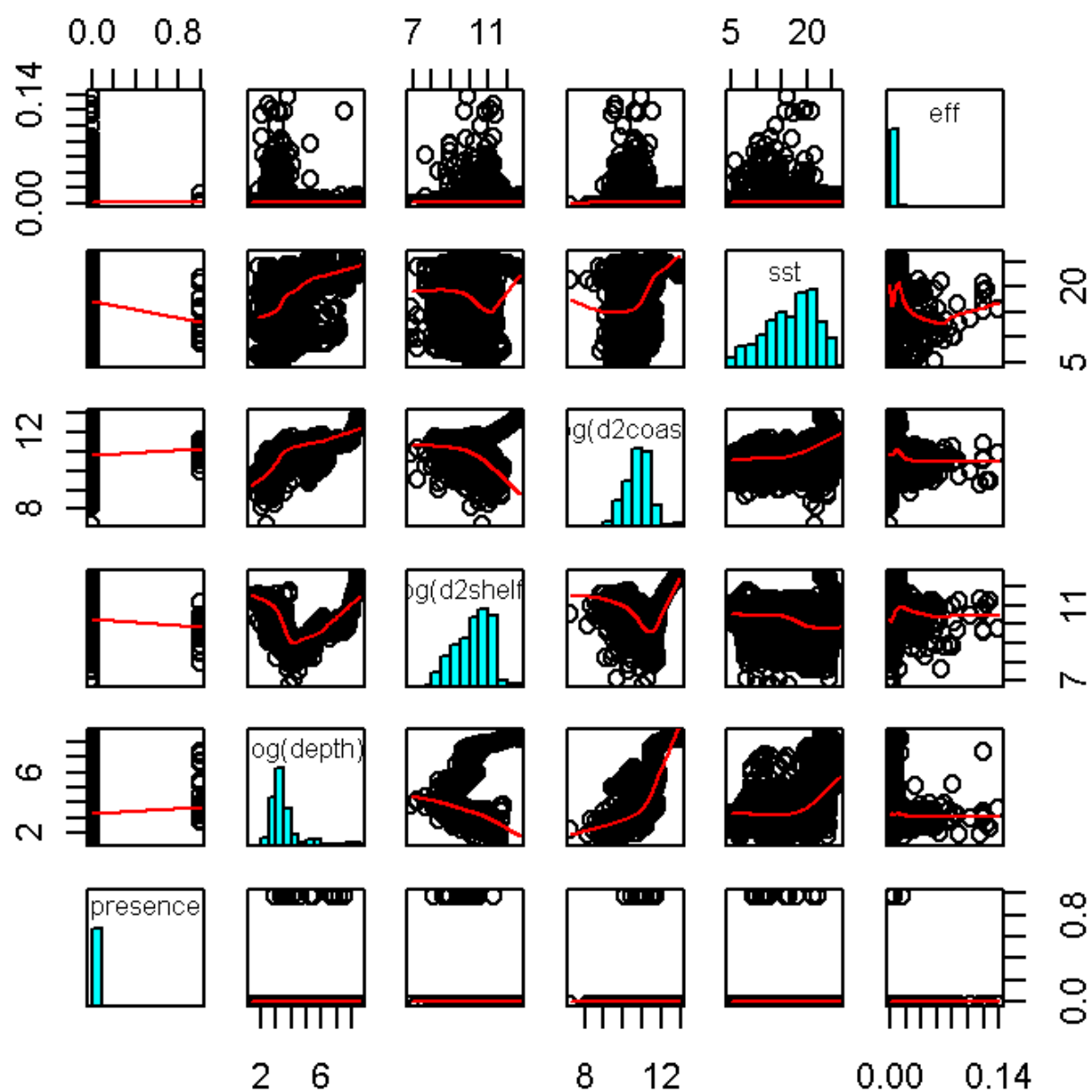


Figure 142: Pairs plot of input variables for 'Delphinus' guild during 'spring' season in 'east2' region.

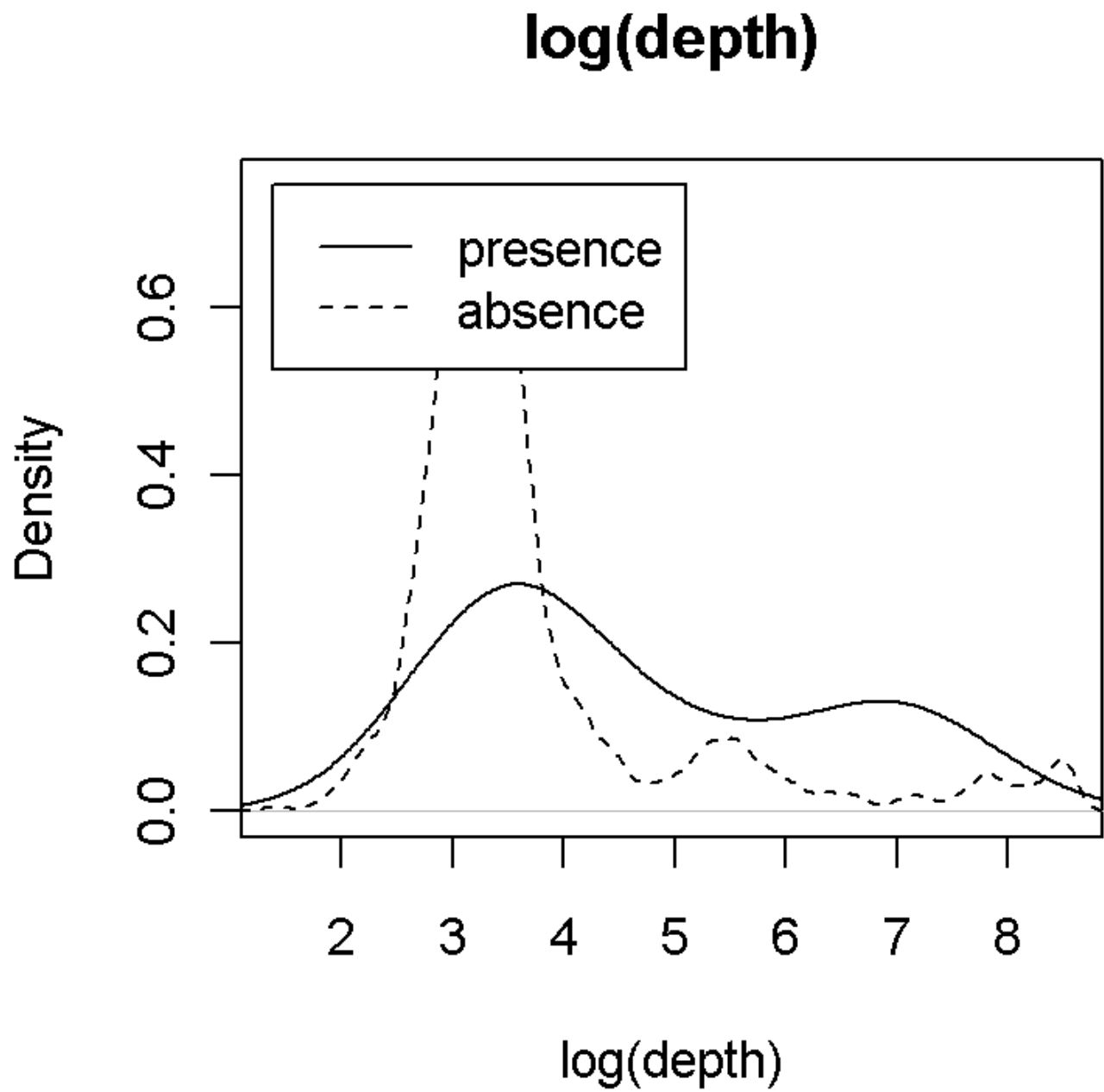


Figure 143: Density histogram of depth log(meters) for 'Delphinus' guild during 'spring' season in 'east2' region.

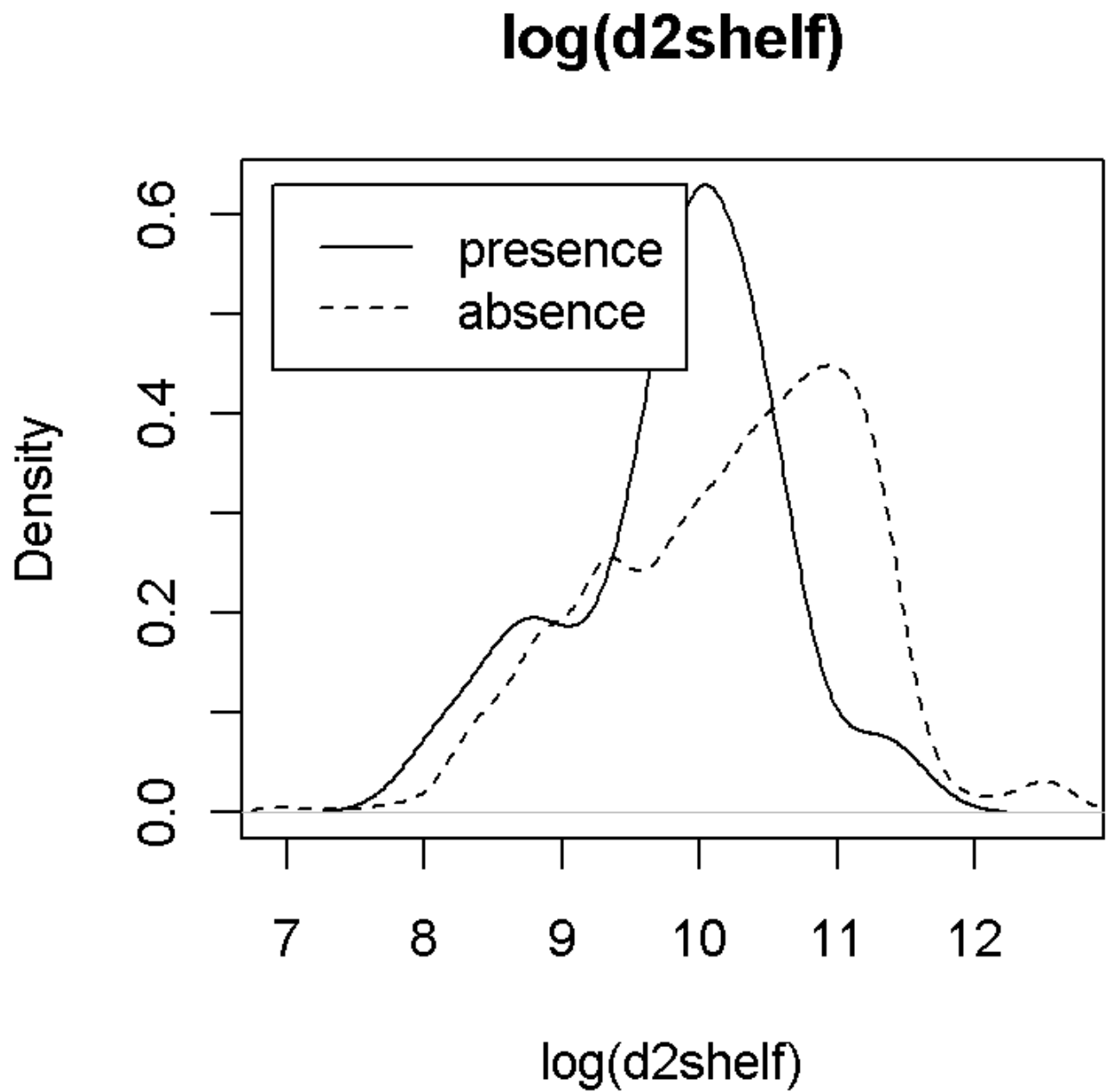


Figure 144: Density histogram of distance to shelf log(meters) for 'Delphinus' guild during 'spring' season in 'east2' region.

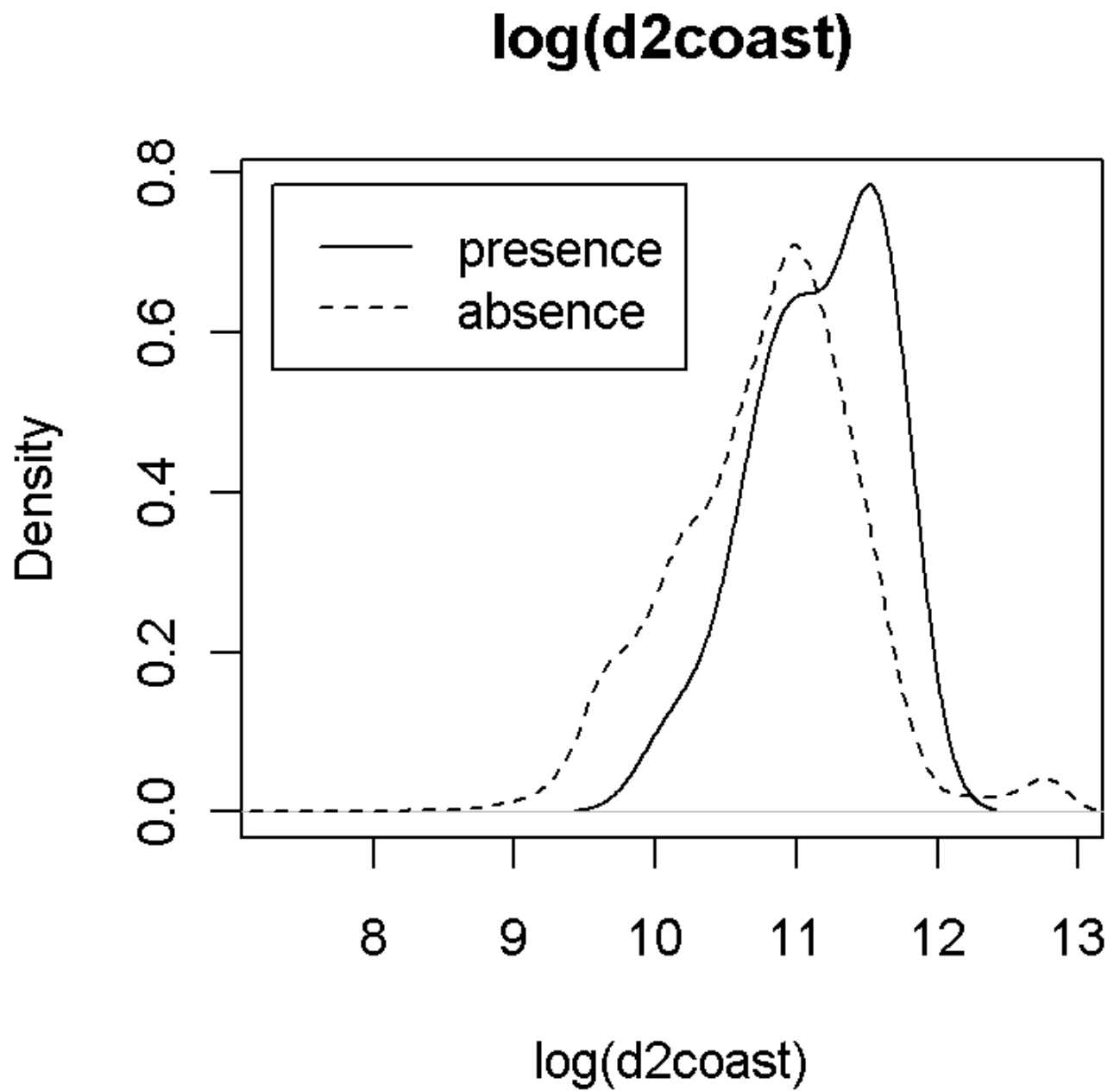


Figure 145: Density histogram of distance to coast log(meters) for 'Delphinus' guild during 'spring' season in 'east2' region.

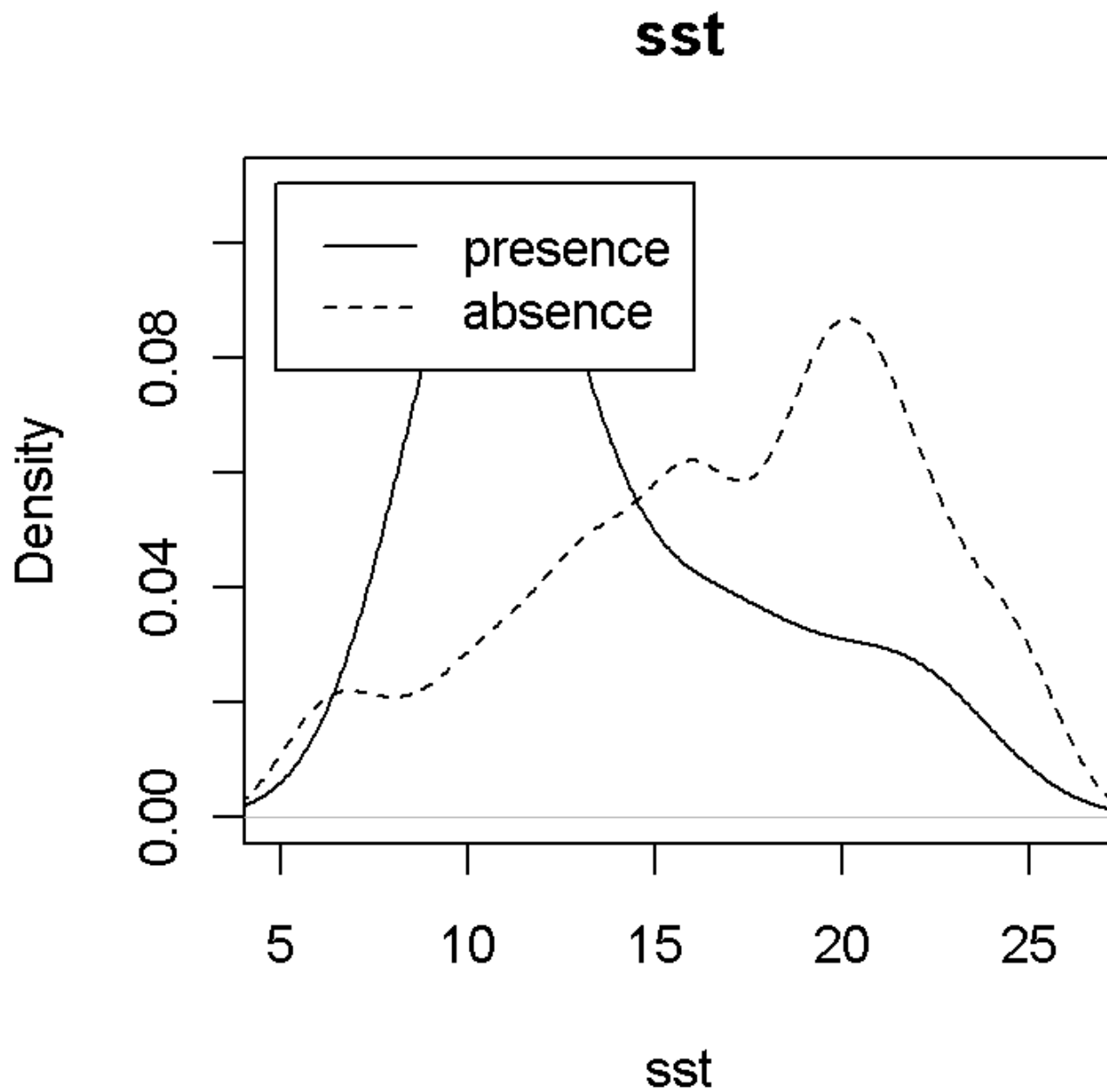


Figure 146: Density histogram of sea-surface temperature (degrees C) for 'Delphinus' guild during 'spring' season in 'east2' region.

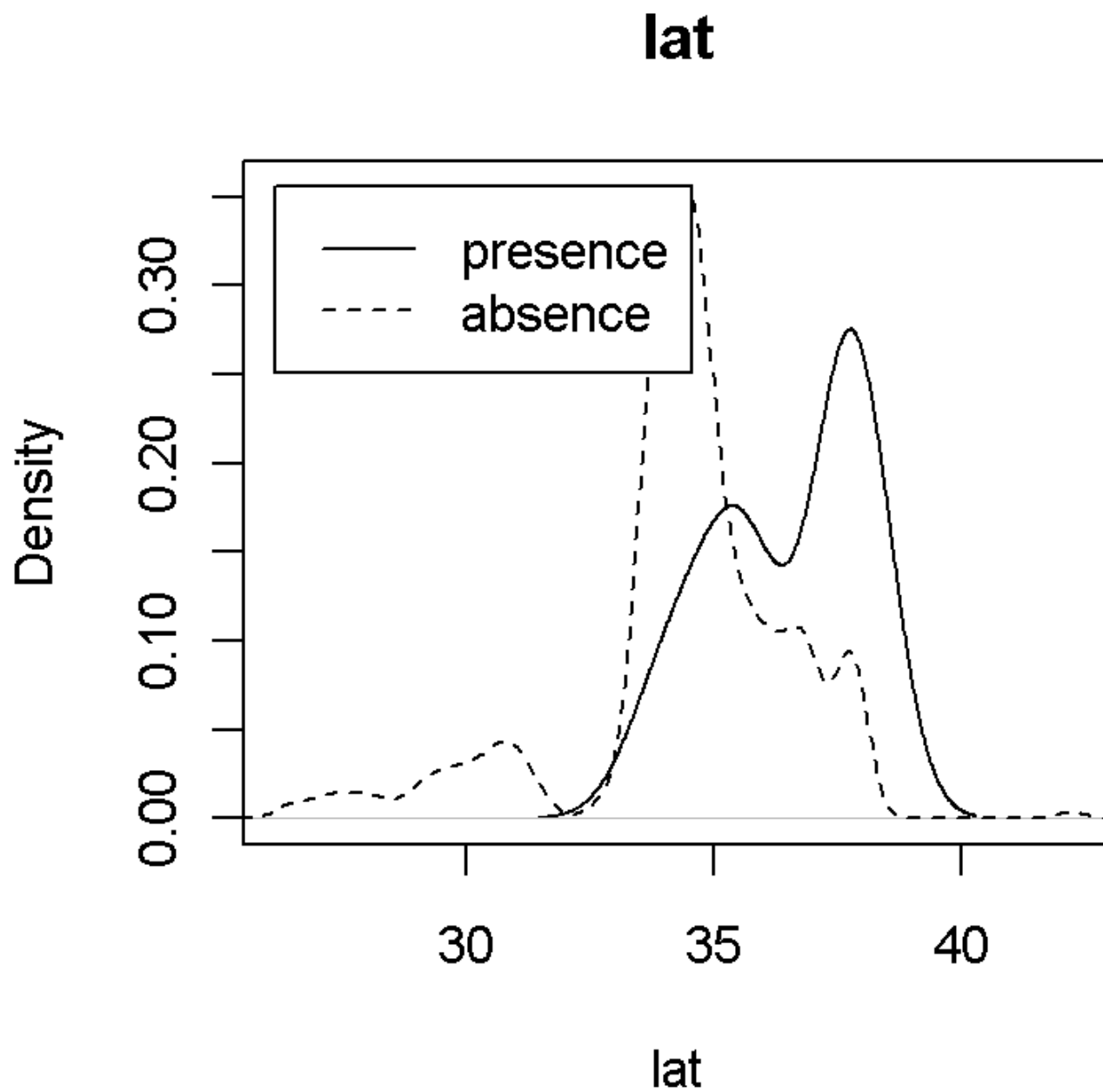


Figure 147: Density histogram of latitude (degrees) for 'Delphinus' guild during 'spring' season in 'east2' region.

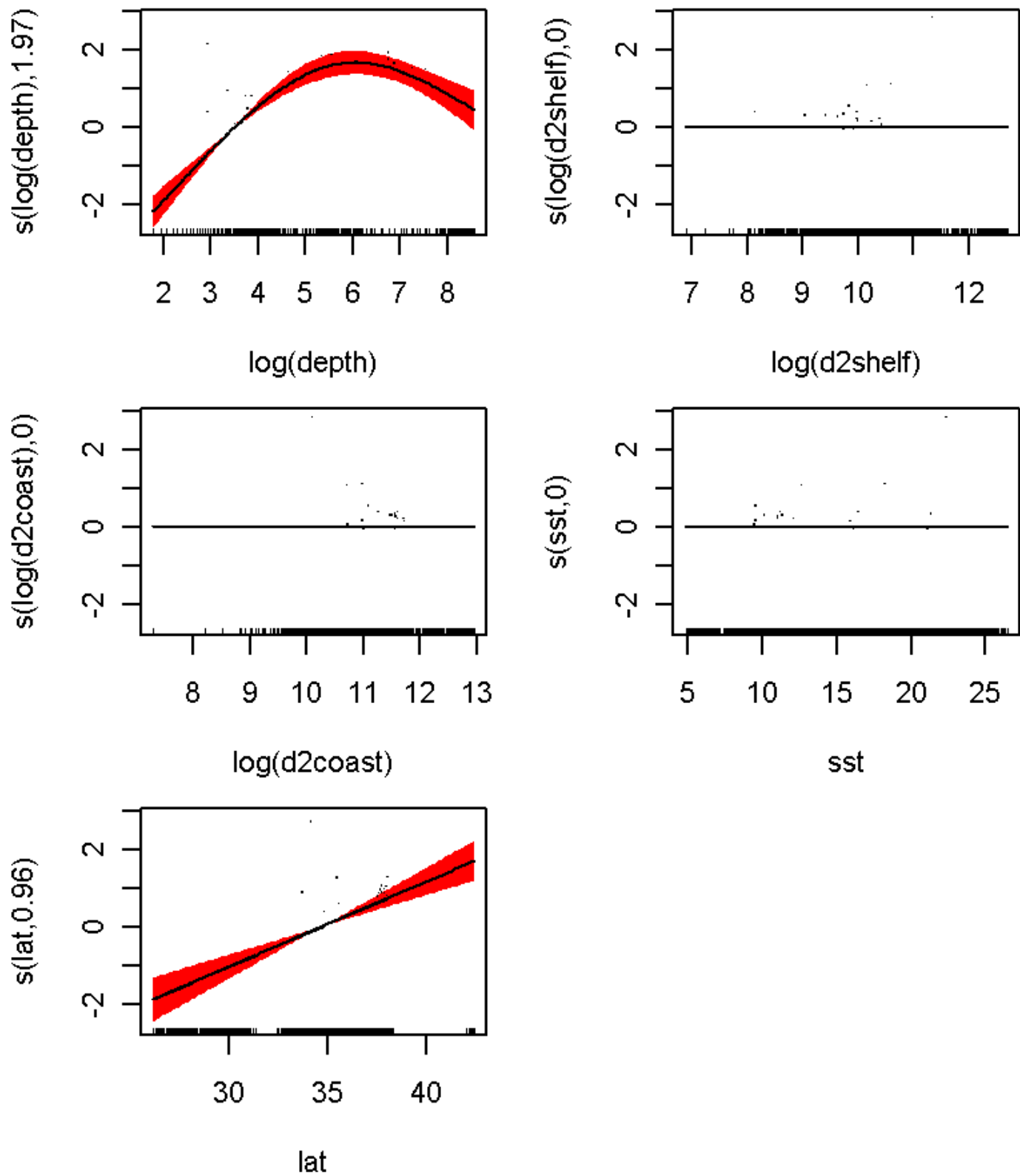


Figure 148: Terms plot of predictors to GAM model fit for 'Delphinus' guild during 'spring' season in 'east2' region.

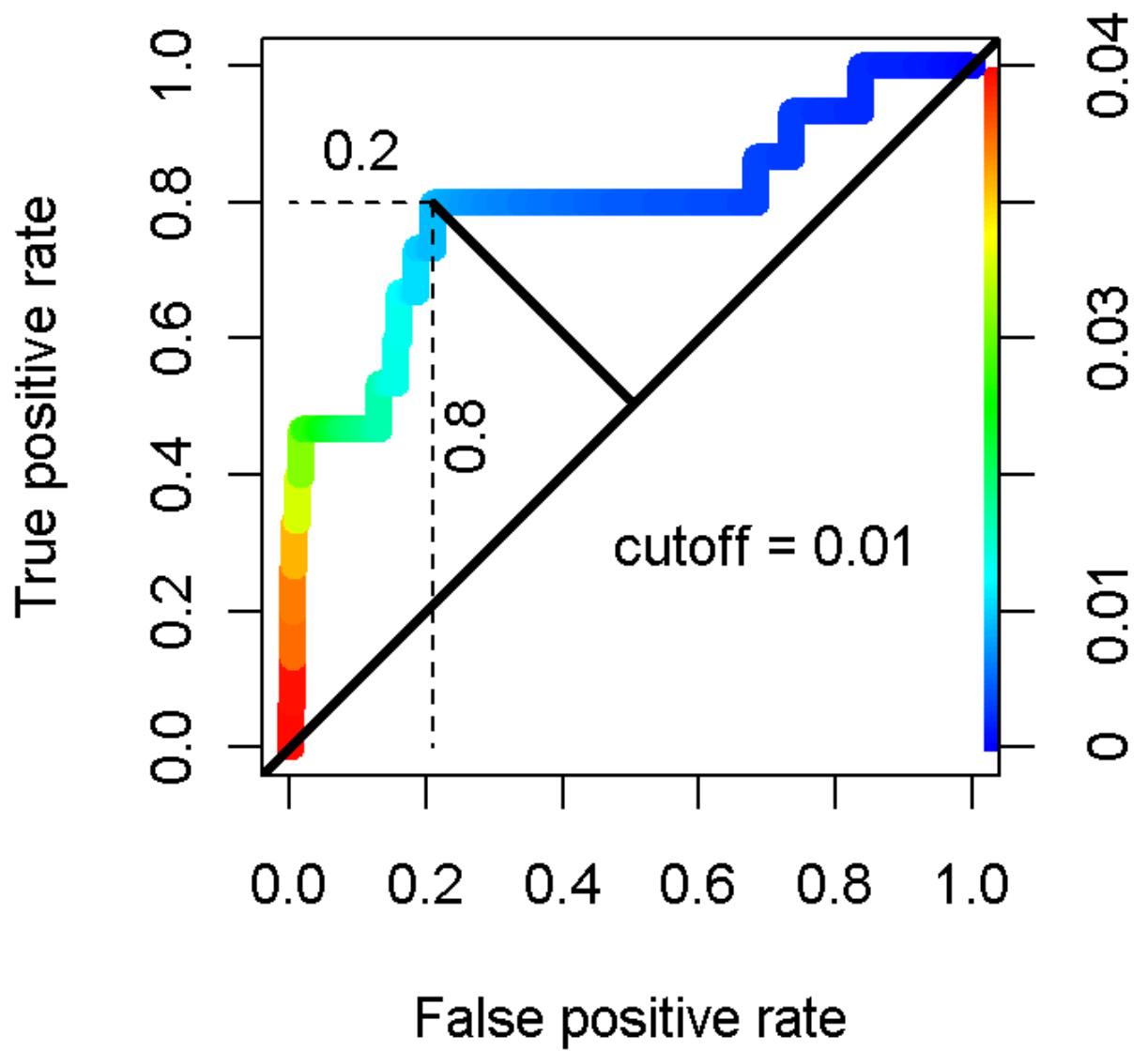


Figure 149: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Delphinus' guild during 'spring' season in 'east2' region.

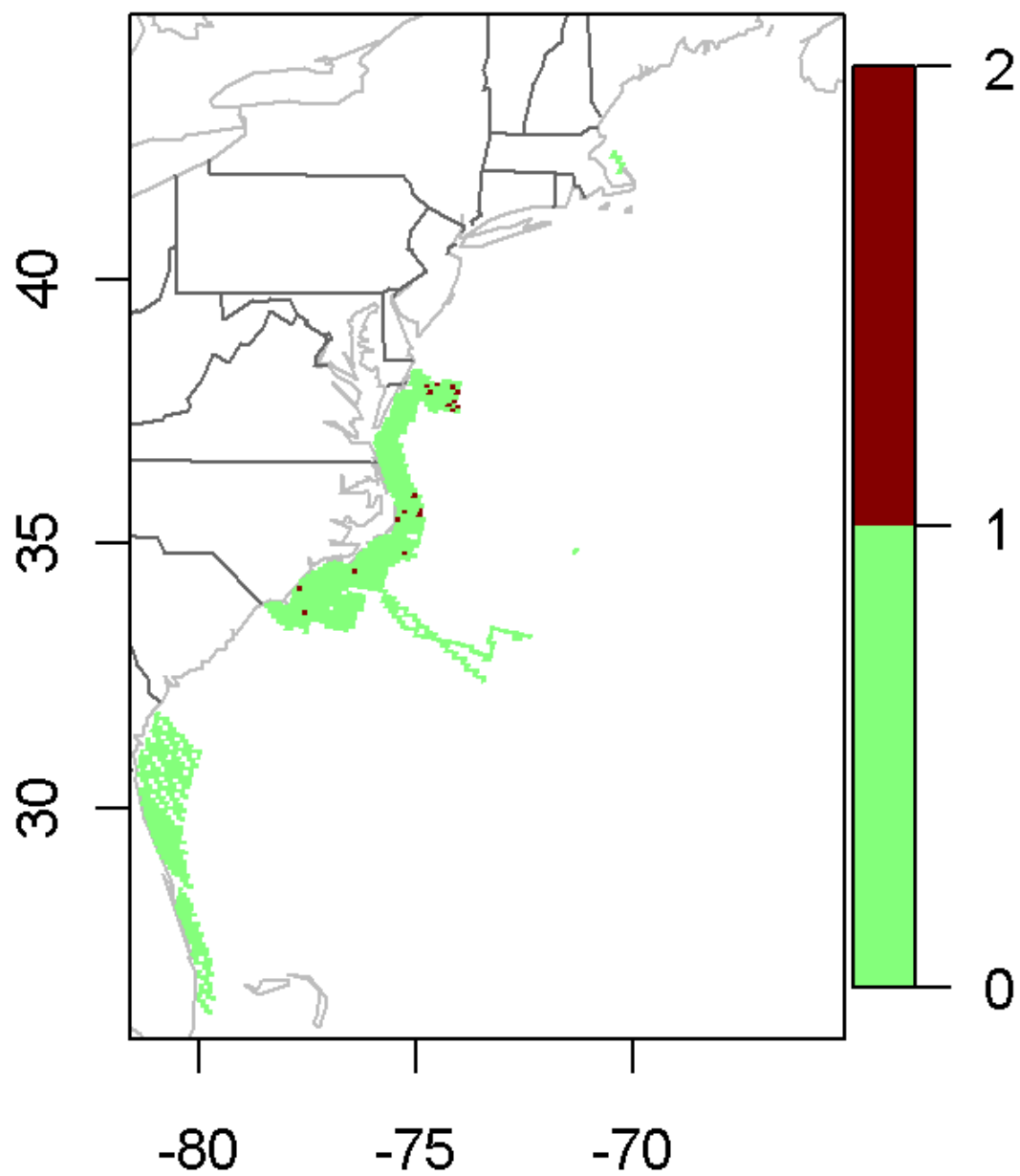


Figure 150: Map of presence and absence by cell summed through time for 'Delphinus' guild during 'spring' season in 'east2' region.

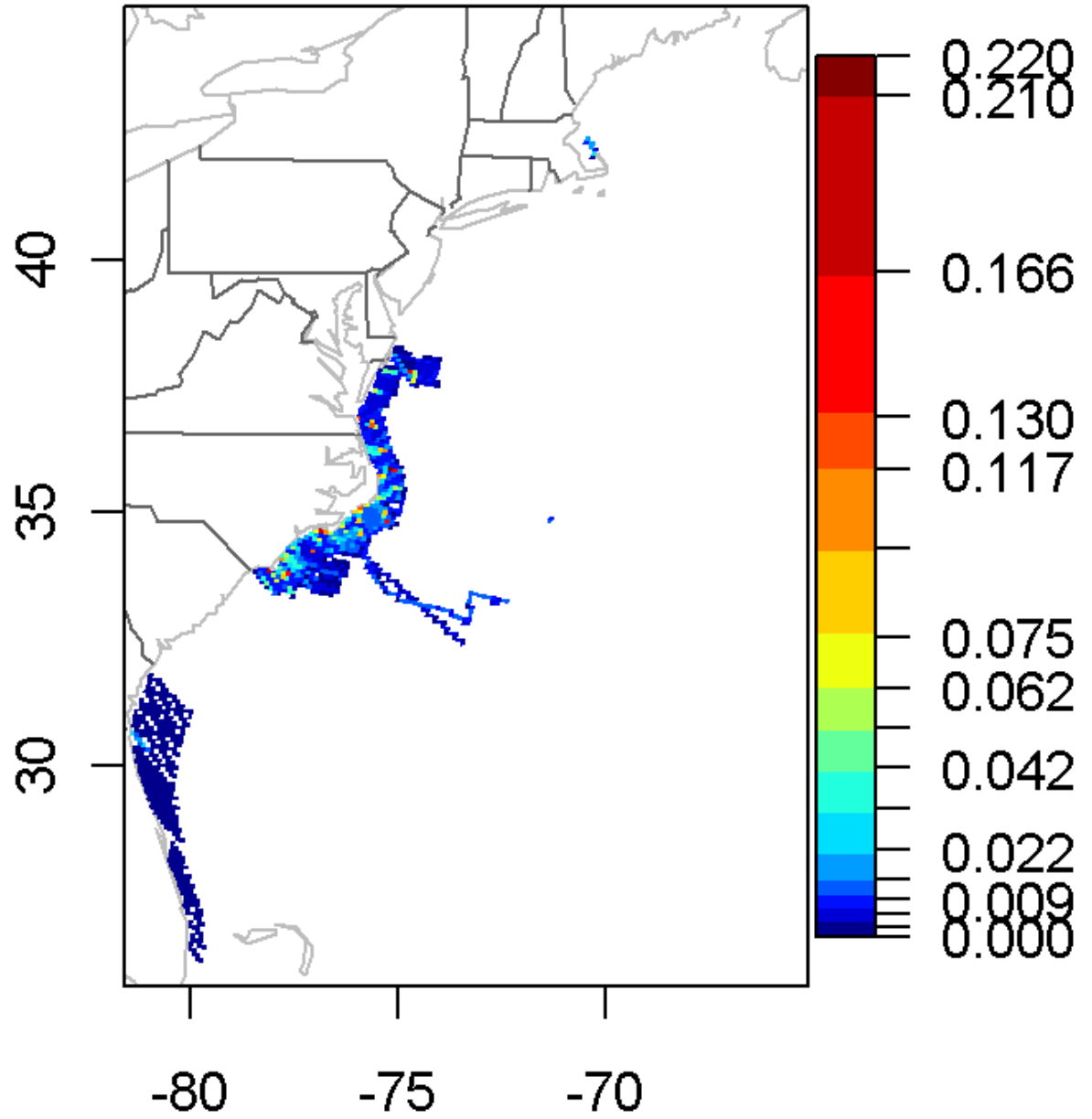


Figure 151: Map of effort(hours/km²) by cell summed through time for 'Delphinus' guild during 'spring' season in 'east2' region.

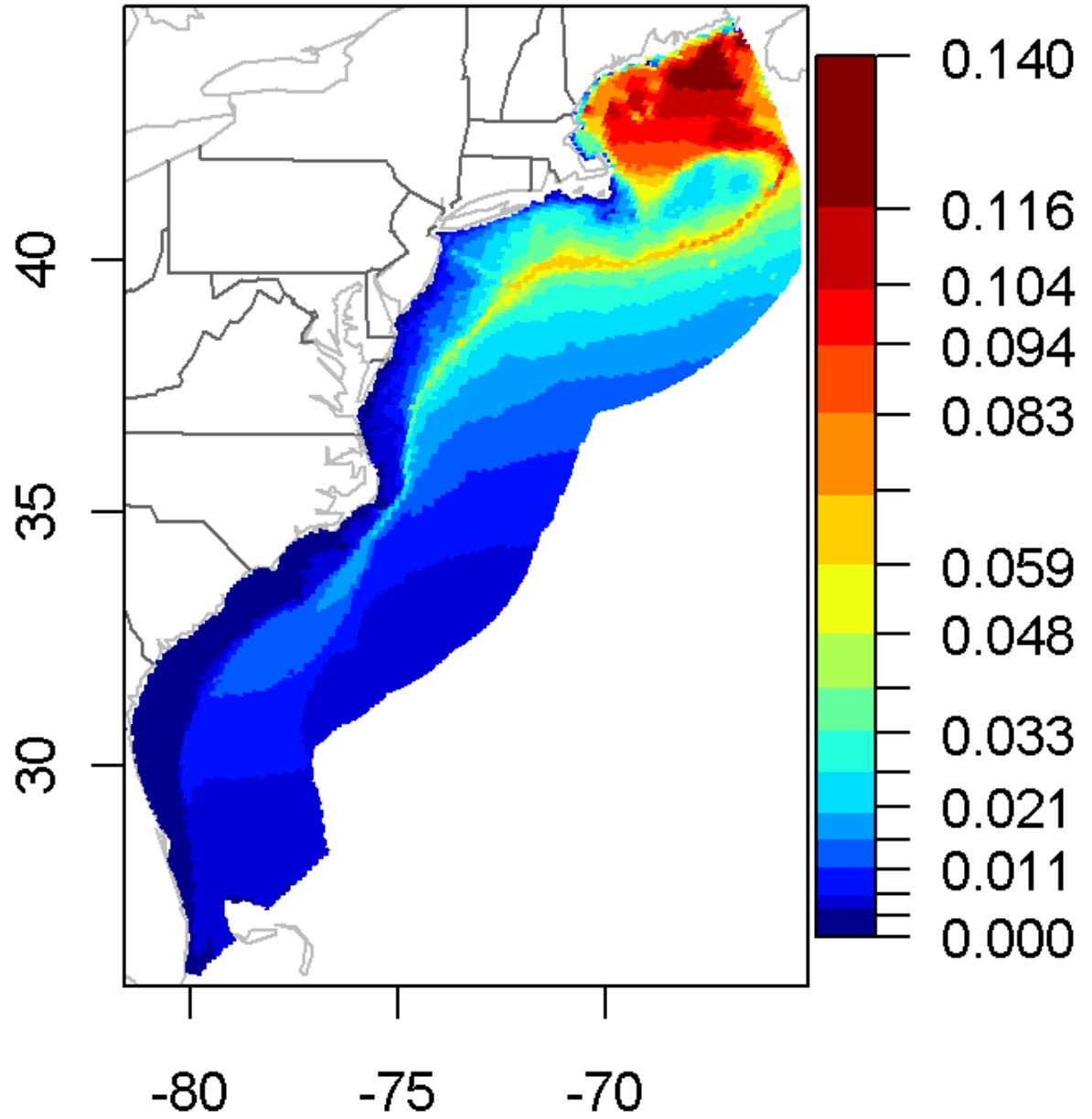


Figure 152: Map of mean predicted habitat for 'Delphinus' guild during 'spring' season in 'east2' region.

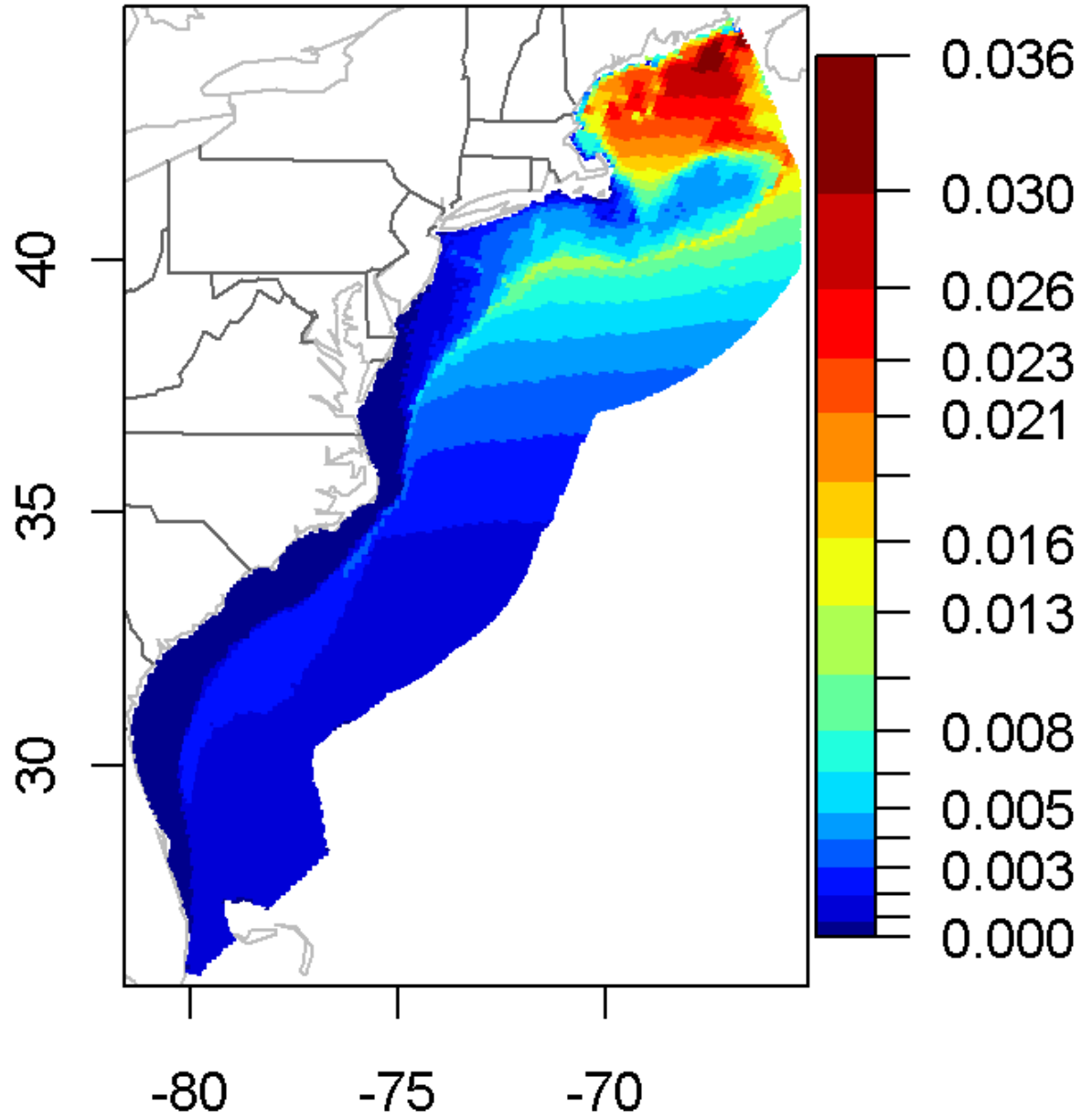


Figure 153: Map of standard error of habitat for 'Delphinus' guild during 'spring' season in 'east2' region.

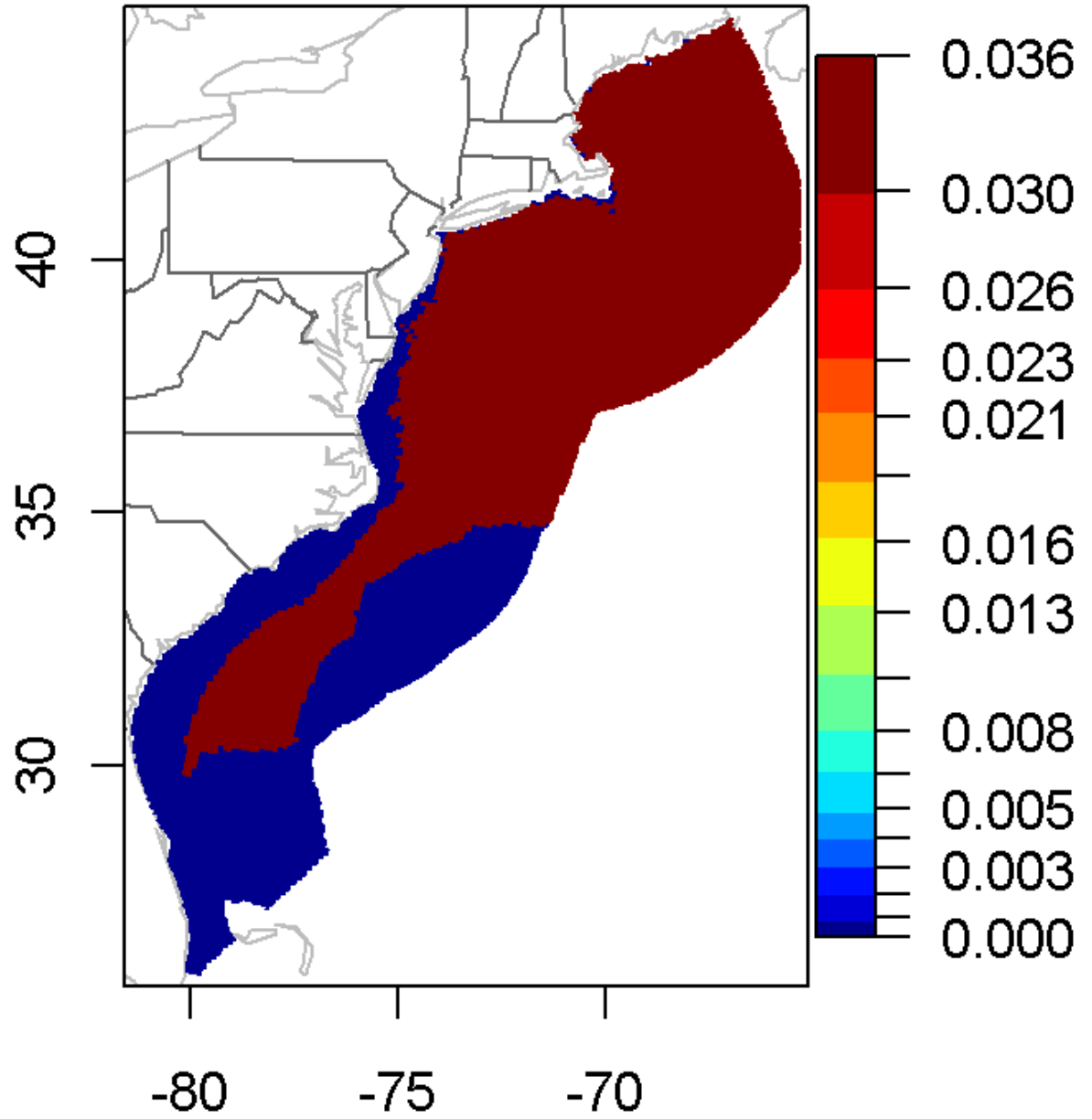


Figure 154: Map of binary habitat (cutoff determined by ROC) for 'Delphinus' guild during 'spring' season in 'east2' region.

3.3 summer

3.3.1 east2

Modelrun identifier: duke_06_de3_summer_east2

Date generated: 2008-10-21 12:48:33

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 15: Summary for duke(6) GAM model: for 'Delphinus' guild during 'summer' season in 'east2' region.

	Value
Number.presences	187
Number.absences	8891
GAM.converged	TRUE
R.squared	-0.12386
Deviance.explained	0.213347
ROC.optimum	0.170433
Maximum.fit	0.0135978
Maximum.prediction	0.171273

Model text summary...

```
duke_06_de3_summer_east2 run on Tue Oct 21 12:44:37 2008
provider:duke, version:06, guild:Delphinus (de3), season:'summer', region:east2

max.fit:0.170433, max.prediction:0.171273, ROC.optimum:0.013598

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -7.0982    0.2456   -28.9   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  8.504e-01  1.350    6.62 0.00497 **
s(log(d2shelf)) 1.976e+00  2.476  117.09 < 2e-16 ***
s(log(d2coast)) 1.972e+00  2.472   61.24 < 2e-16 ***
s(sst)         1.960e+00  2.460   77.80 < 2e-16 ***
s(lat)         4.902e-06  0.500  0.000145 0.91442
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = -0.124 Deviance explained = 21.3%
GCV score = 0.00067322 Scale est. = 0.00067214 n = 8663

summary(dat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.    : 1635  Min.    :  5.0  Min.    :    5  Min.    : 1259  Min.    :  8.175  Min.    :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.: 20989  1st Qu.: 50865  1st Qu.: 17.025  1st Qu.:37.53
          Median :14008  Median : 111.5  Median : 52230  Median :102266  Median : 22.200  Median :40.18
          Mean   :13275  Mean   : 677.3  Mean   : 67623  Mean   :125197  Mean   : 21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.: 420.0  3rd Qu.: 99335  3rd Qu.:174835  3rd Qu.: 25.650  3rd Qu.:42.31
          Max.    :16560  Max.    :5251.0  Max.    :324910  Max.    :445165  Max.    : 30.900  Max.    :44.74
          NA's    :      7      NA's    :      7      NA's    :408.000

summary(newdat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :    5  Min.    : 1259  Min.    :11.18  Min.    :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :5.774e-16  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:3.580e-04  1st Qu.:8.083e-05  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :1.024e-03  Median :1.808e-04  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :9.979e-03  Mean   :8.565e-04  Mean   :4.056e-02  Mean   :1.069e-02  Mean   :0.1499
3rd Qu.:14088  3rd Qu.:4.834e-03  3rd Qu.:6.174e-04  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :1.713e-01  Max.   :1.538e-02  Max.   :2.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

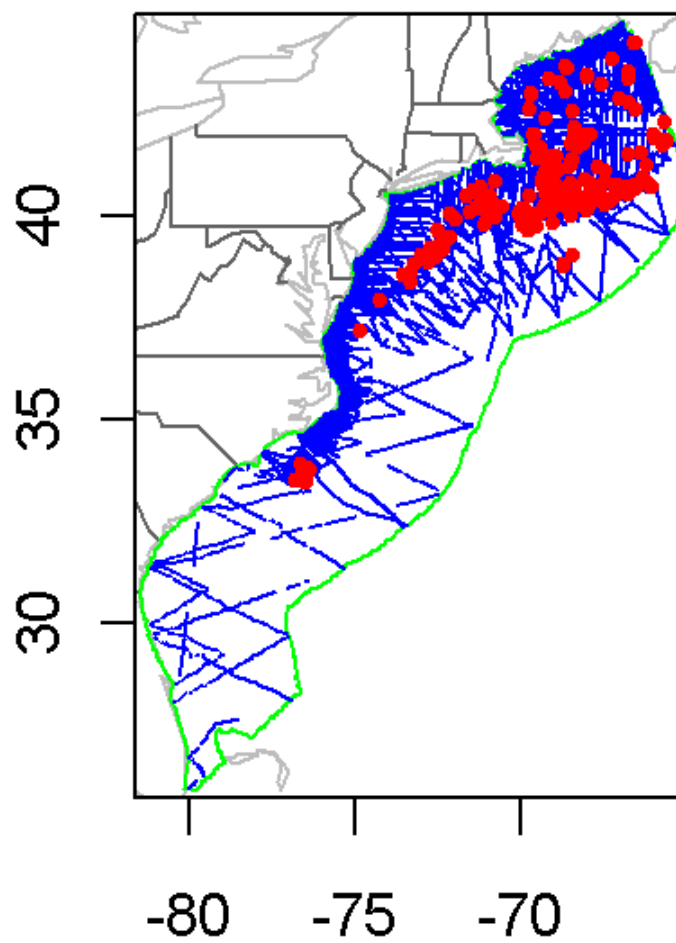



Figure 155: Map of points of observational sightings and tracks of survey effort for 'Delphinus' guild during 'summer' season in 'east2' region.

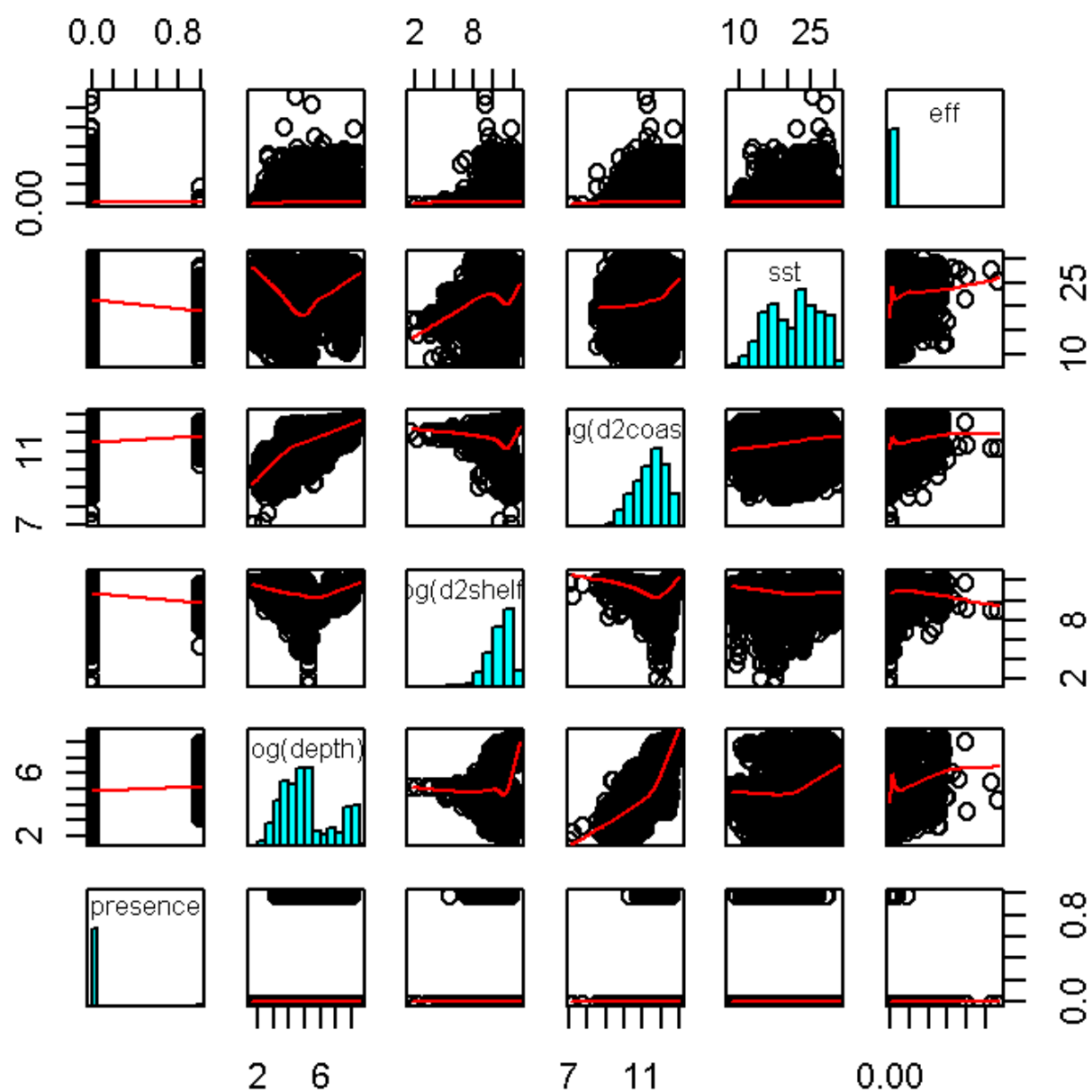


Figure 156: Pairs plot of input variables for 'Delphinus' guild during 'summer' season in 'east2' region.

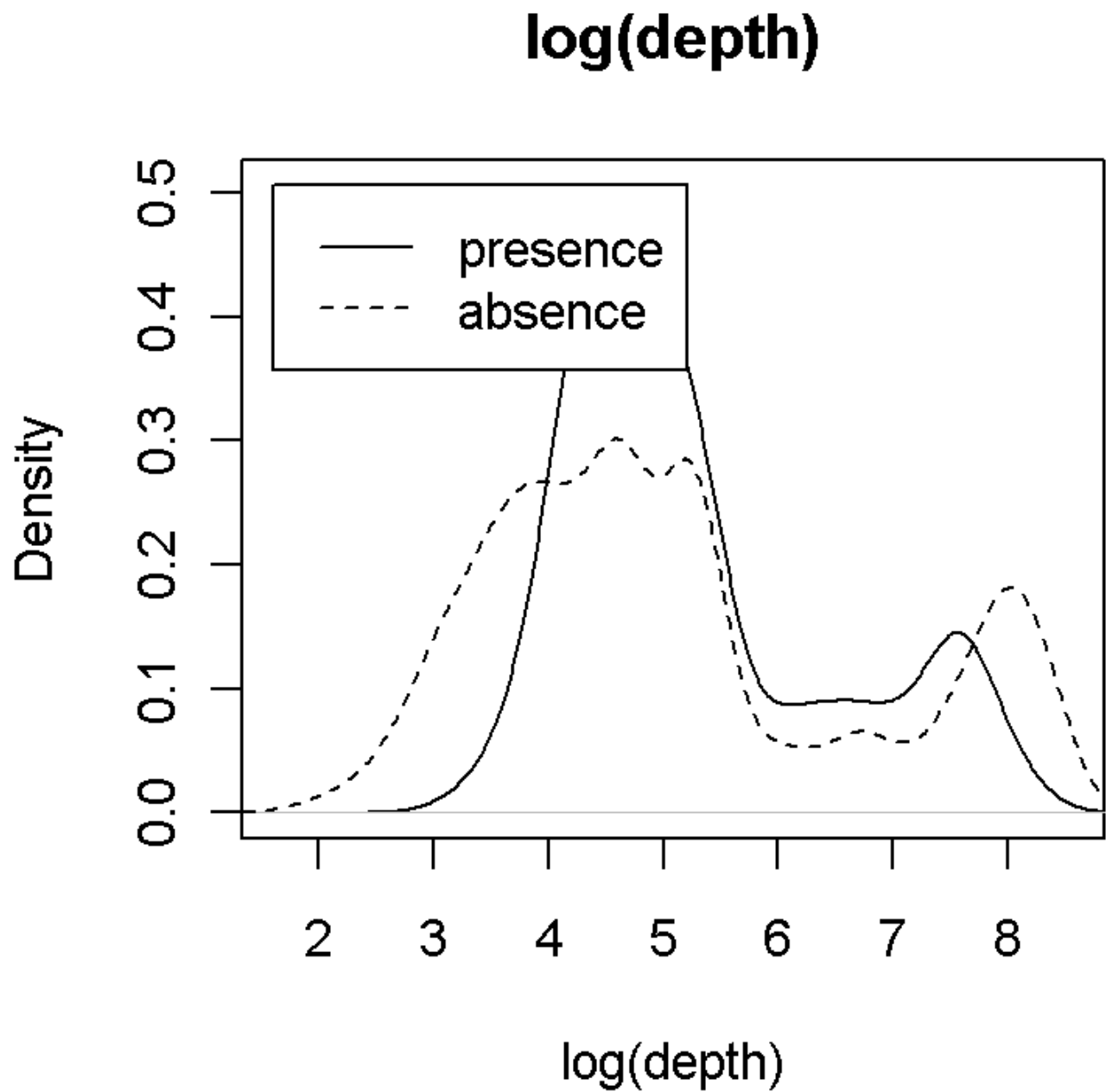


Figure 157: Density histogram of depth log(meters) for 'Delphinus' guild during 'summer' season in 'east2' region.

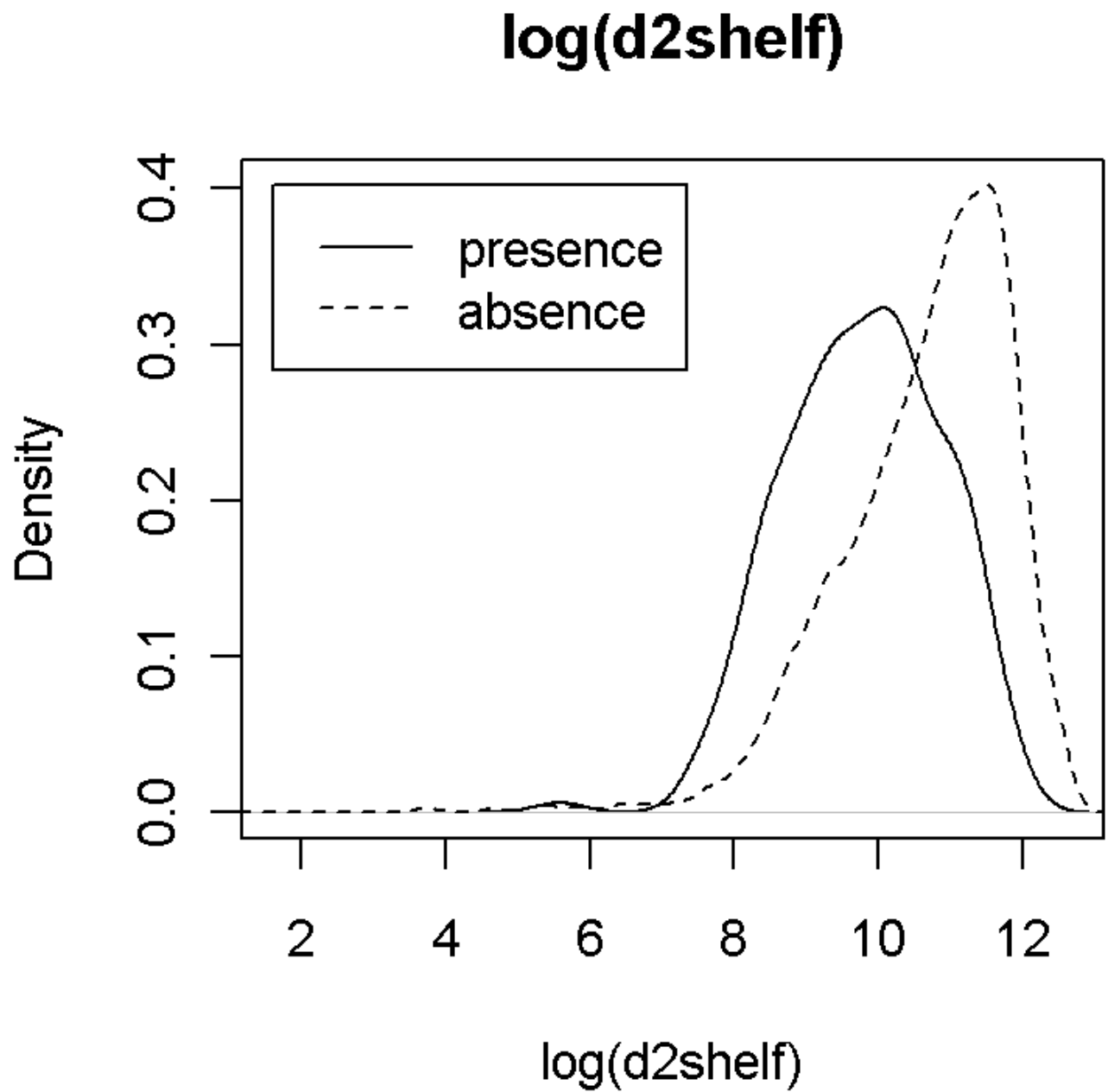


Figure 158: Density histogram of distance to shelf log(meters) for 'Delphinus' guild during 'summer' season in 'east2' region.

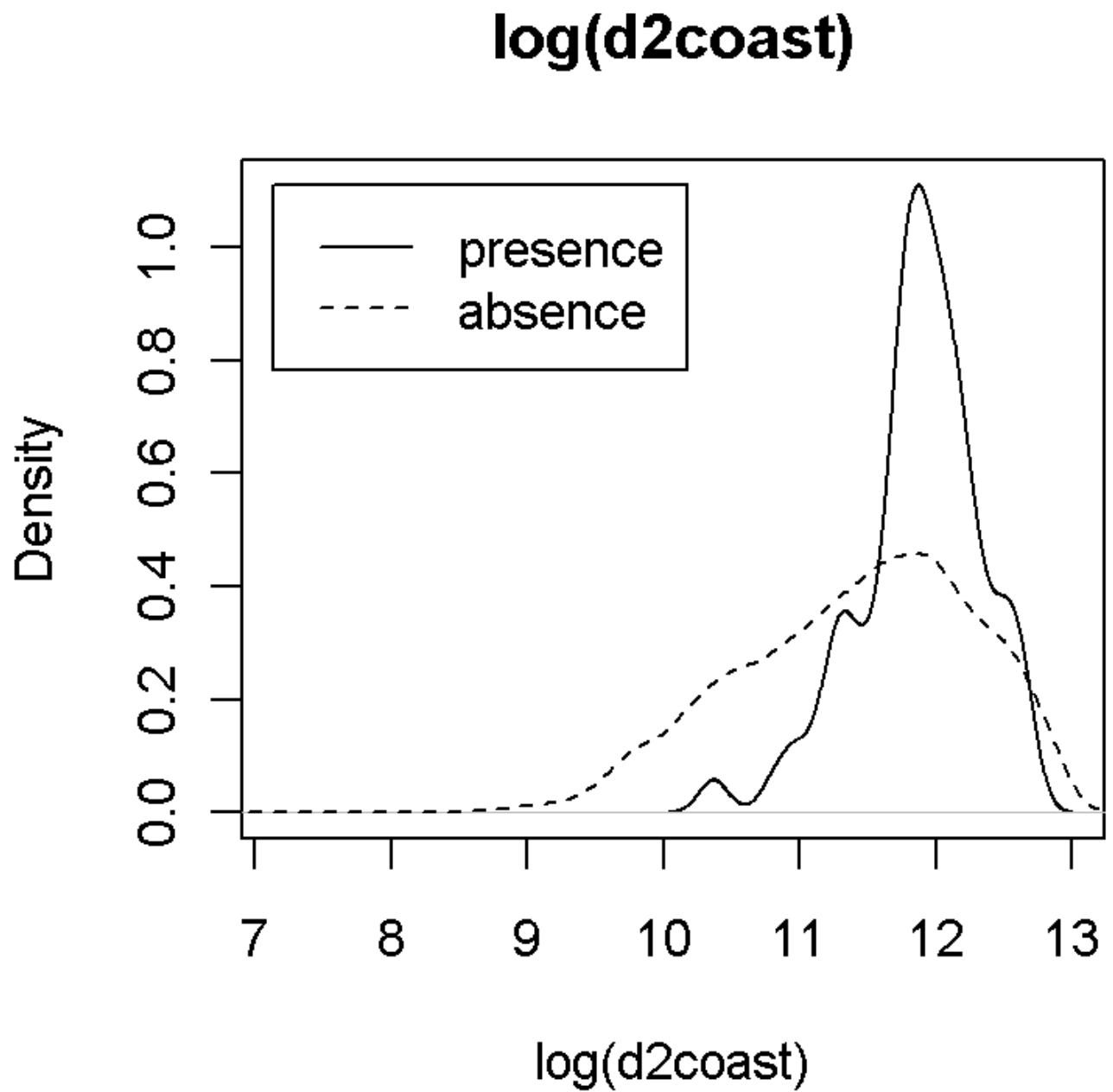


Figure 159: Density histogram of distance to coast log(meters) for 'Delphinus' guild during 'summer' season in 'east2' region.

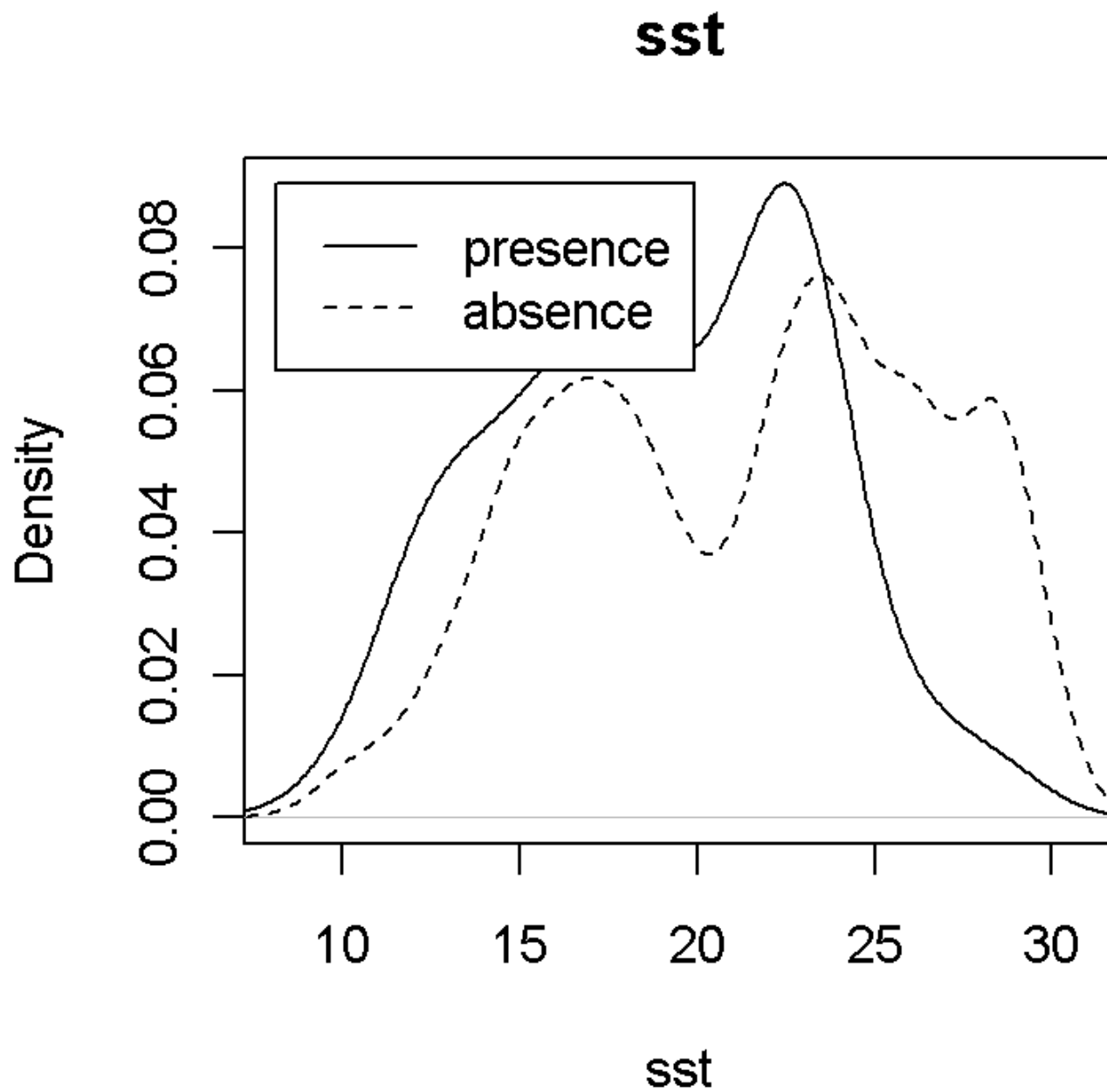


Figure 160: Density histogram of sea-surface temperature (degrees C) for 'Delphinus' guild during 'summer' season in 'east2' region.

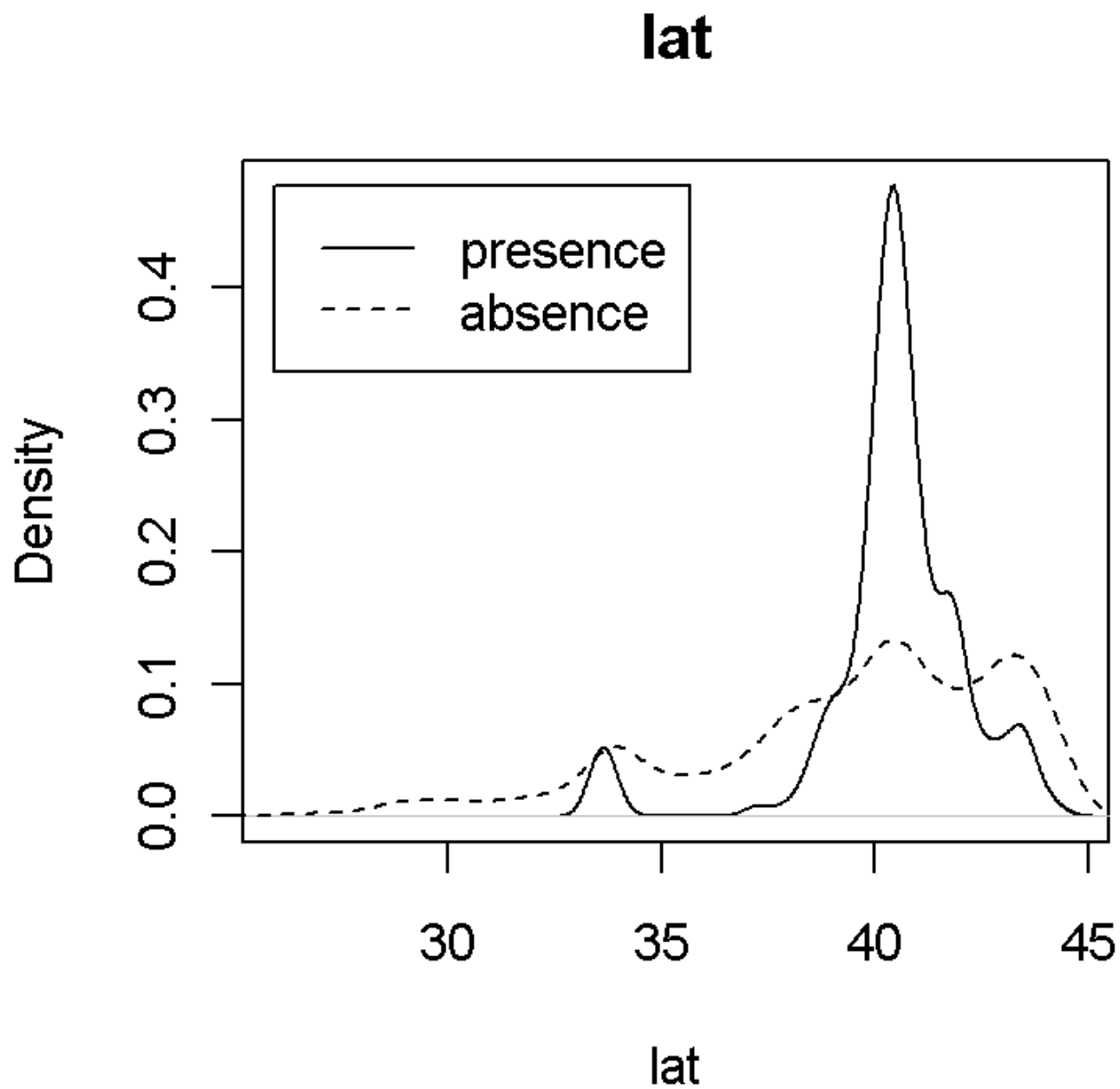


Figure 161: Density histogram of latitude (degrees) for 'Delphinus' guild during 'summer' season in 'east2' region.

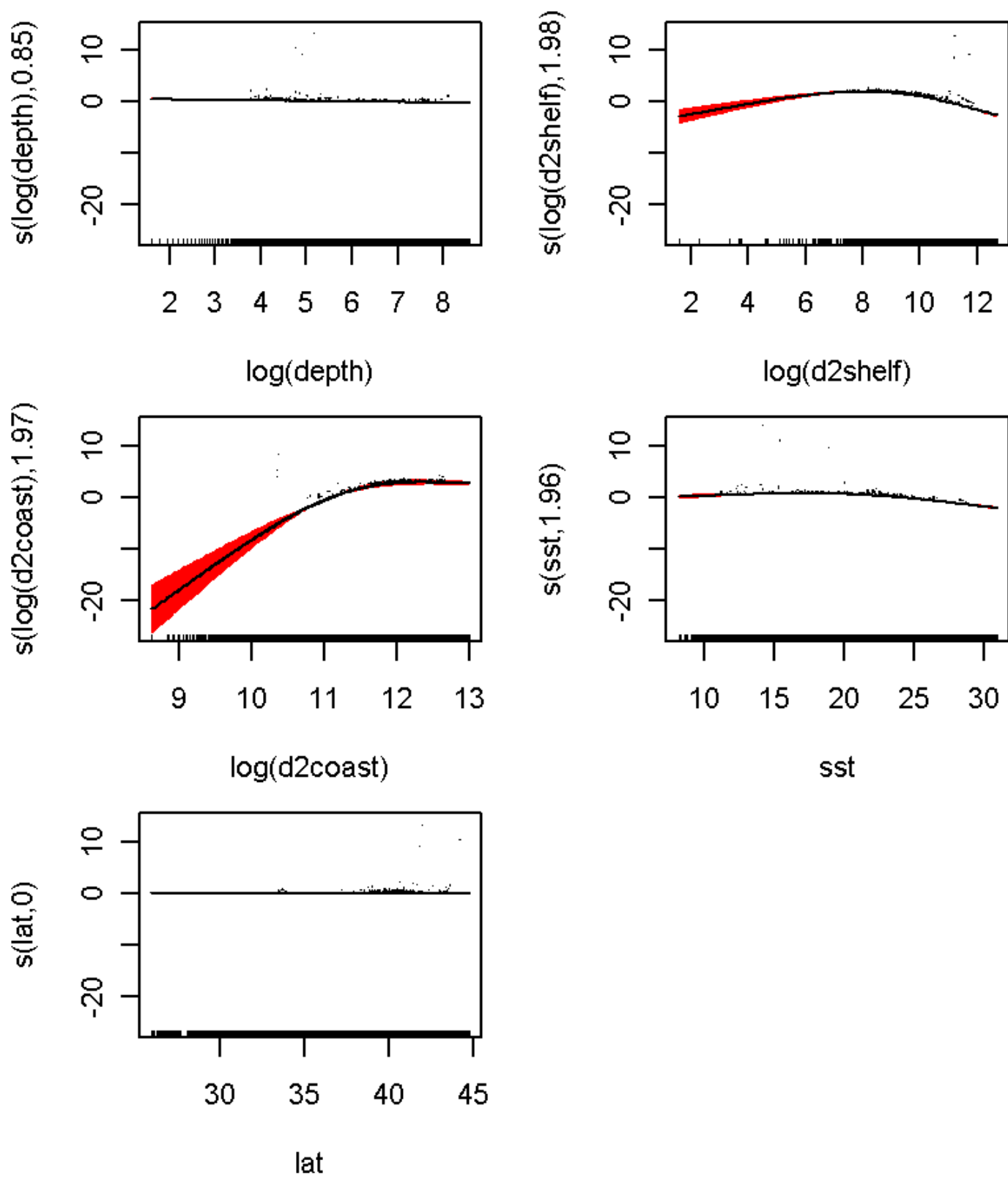


Figure 162: Terms plot of predictors to GAM model fit for 'Delphinus' guild during 'summer' season in 'east2' region.

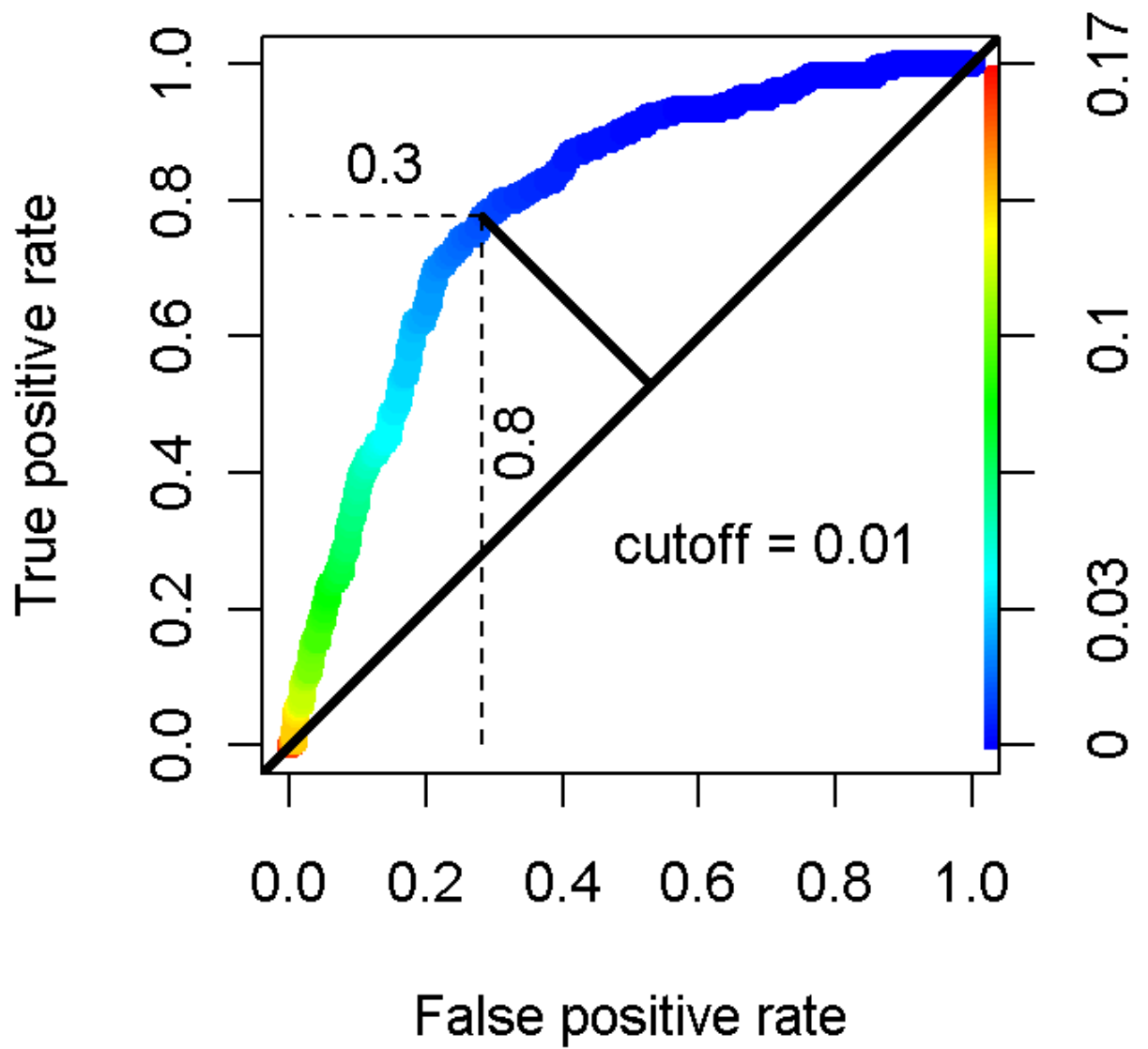


Figure 163: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Delphinus' guild during 'summer' season in 'east2' region.

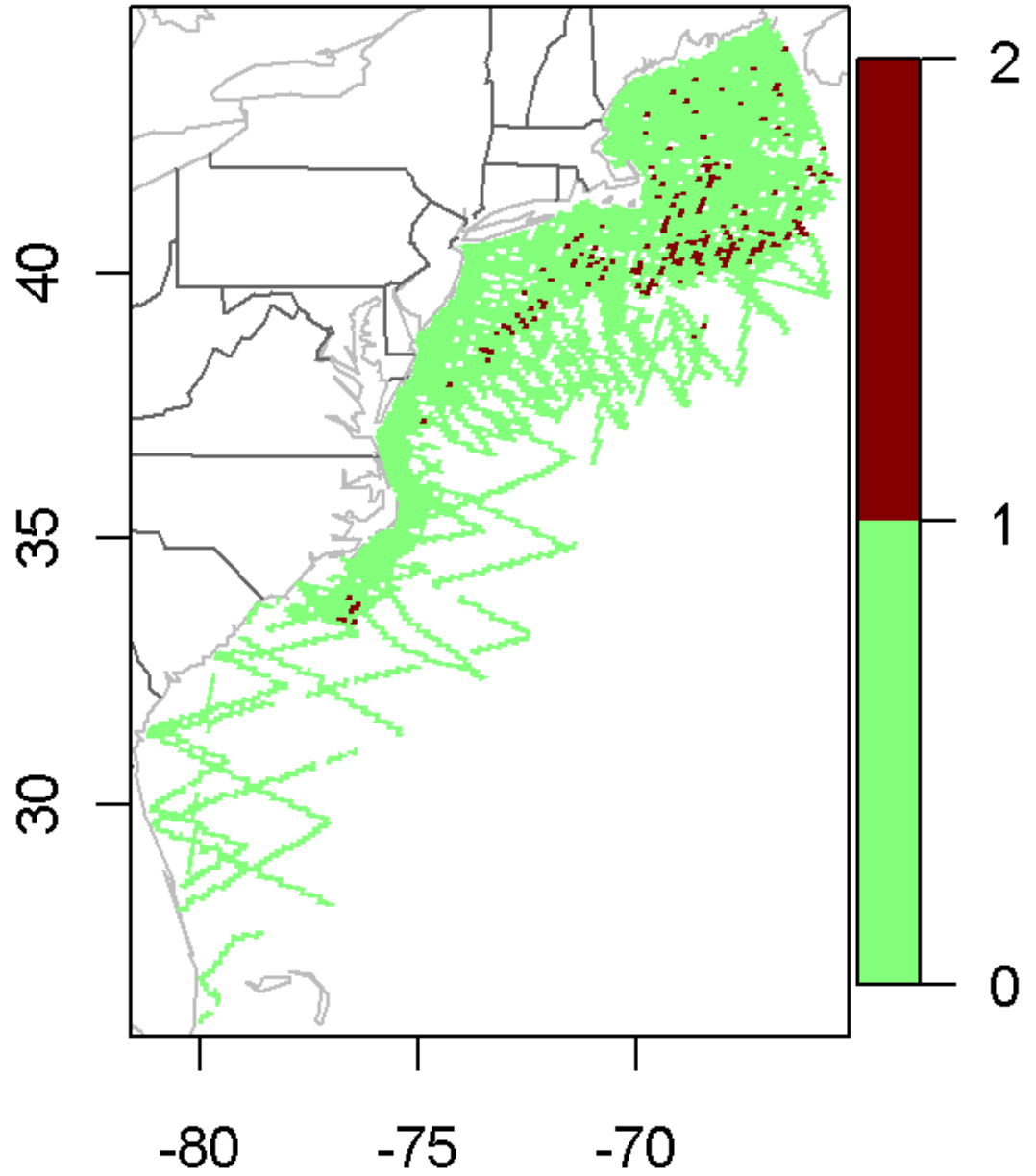


Figure 164: Map of presence and absence by cell summed through time for 'Delphinus' guild during 'summer' season in 'east2' region.

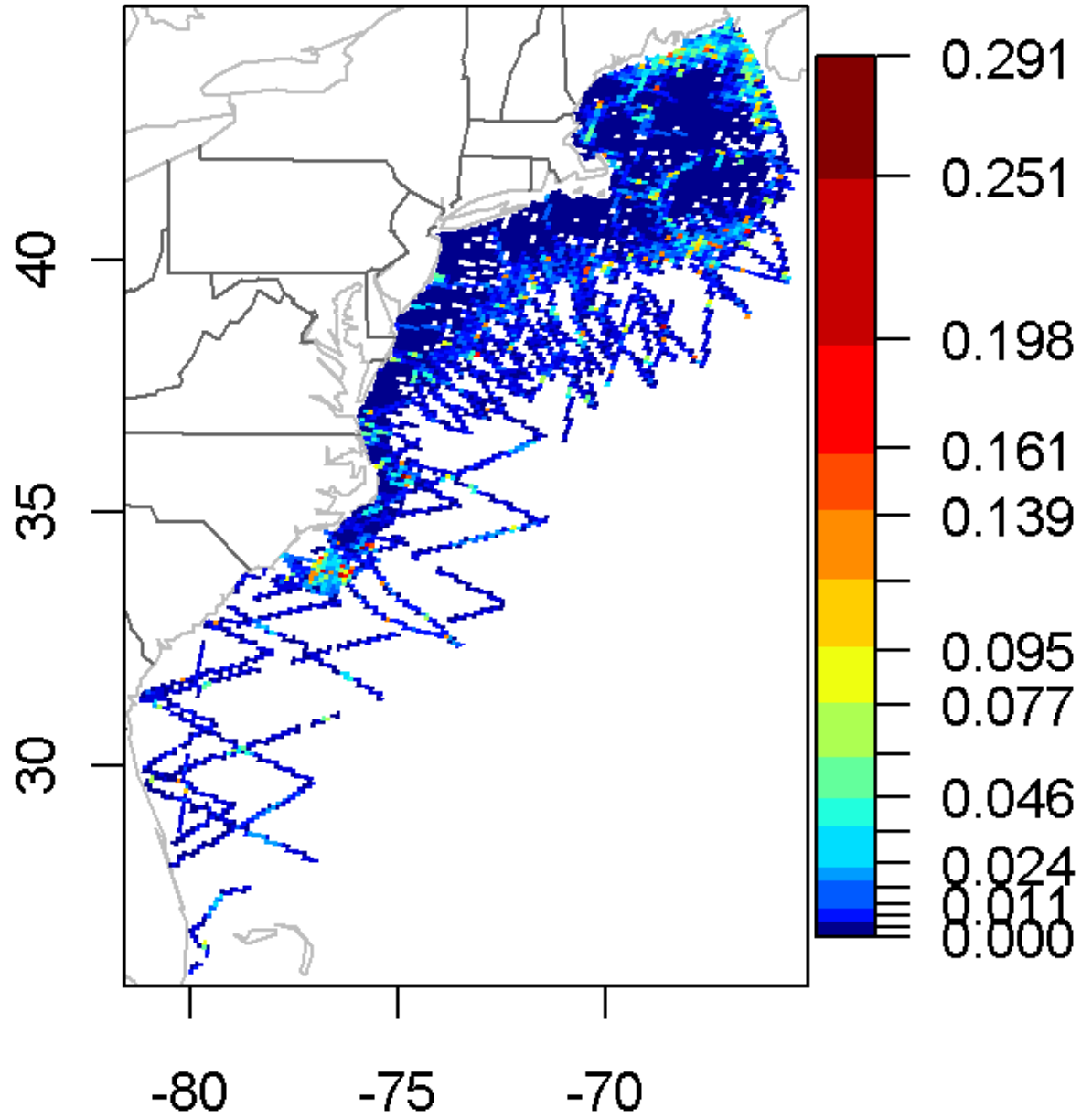


Figure 165: Map of effort(hours/km²) by cell summed through time for 'Delphinus' guild during 'summer' season in 'east2' region.

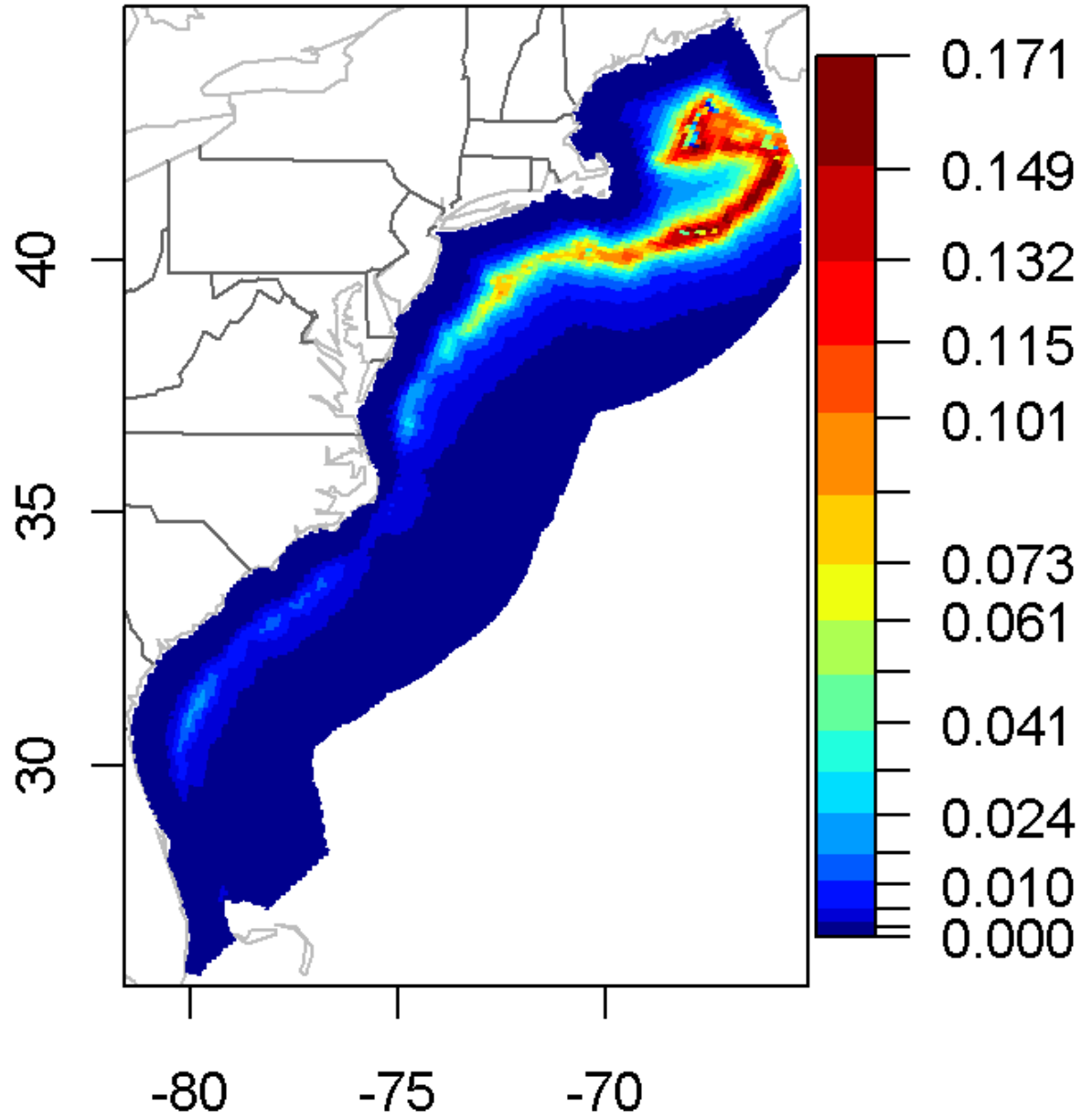


Figure 166: Map of mean predicted habitat for 'Delphinus' guild during 'summer' season in 'east2' region.

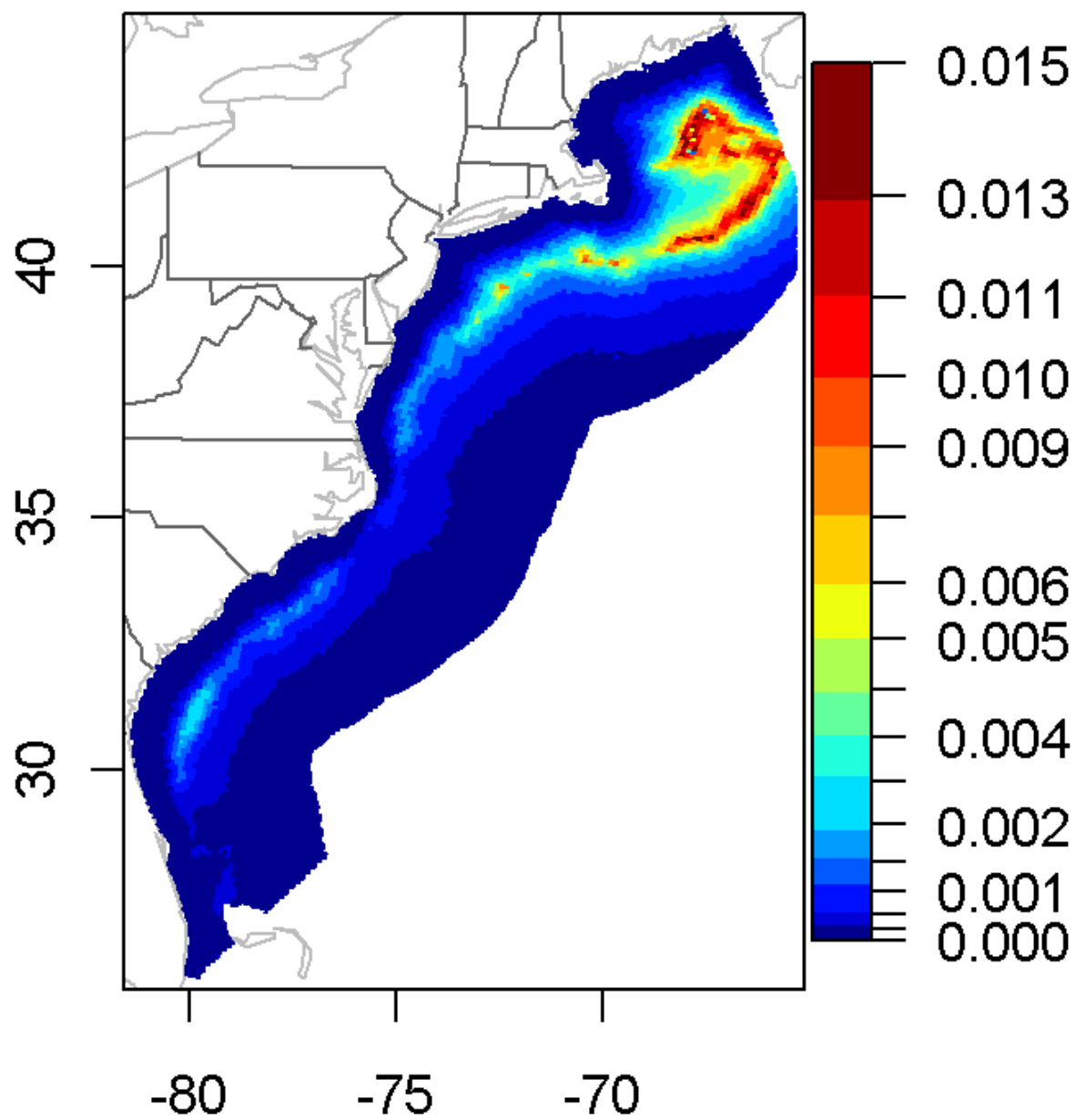


Figure 167: Map of standard error of habitat for 'Delphinus' guild during 'summer' season in 'east2' region.

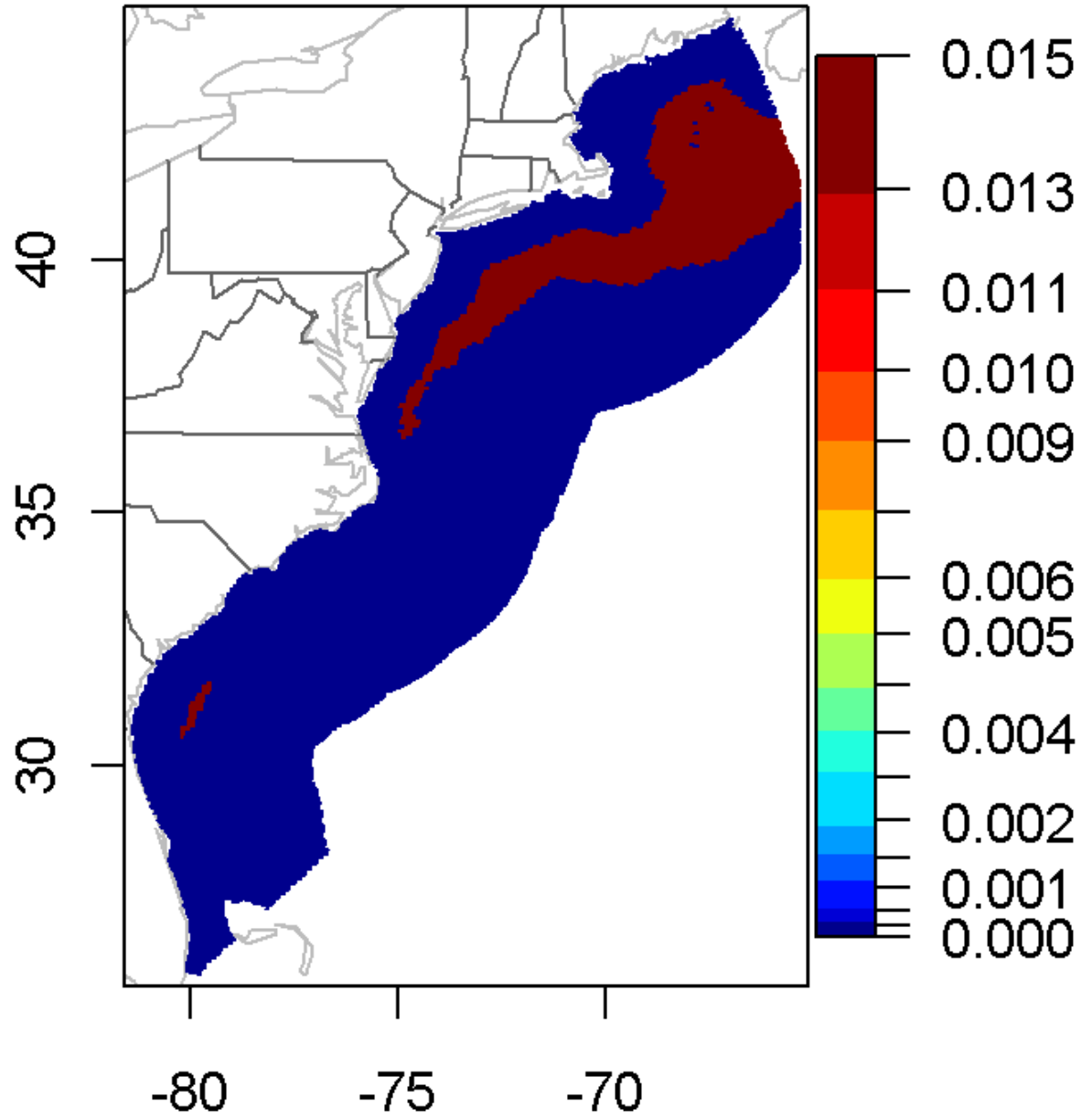


Figure 168: Map of binary habitat (cutoff determined by ROC) for 'Delphinus' guild during 'summer' season in 'east2' region.

3.4 winter

3.4.1 east2

Modelrun identifier: duke_06_de3_winter_east2

Date generated: 2008-10-21 15:02:33

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 16: Summary for duke(6) GAM model: for 'Delphinus' guild during 'winter' season in 'east2' region.

	Value
Number.presences	49
Number.absences	3853
GAM.converged	TRUE
R.squared	-0.0988468
Deviance.explained	0.382432
ROC.optimum	0.544862
Maximum.fit	0.0218501
Maximum.prediction	0.580749

Model text summary...

```
duke_06_de3_winter_east2 run on Tue Oct 21 15:01:02 2008
  provider:duke, version:06, guild:Delphinus (de3), season:'winter', region:east2

max.fit:0.544862, max.prediction:0.580749, ROC.optimum:0.021850

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -7.6553      0.2357  -32.48   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F  p-value
s(log(depth))  1.934e+00  2.434  133.26 < 2e-16 ***
s(log(d2shelf)) 9.484e-01  1.448   47.09 7.55e-16 ***
s(log(d2coast)) 1.301e-07  0.500   3.4e-05    0.94
s(sst)         1.991e+00  2.491   65.76 < 2e-16 ***
s(lat)         9.393e-01  1.439   18.26 7.94e-07 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  -0.0988  Deviance explained = 38.2%
GCV score = 0.00019669  Scale est. = 0.00019566  n = 2337

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2: 844   Min.   : 1654   Min.    : 4.0   Min.    : 995   Min.    : 1471   Min.    : 2.654   Min.   :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0   1st Qu.: 18575  1st Qu.: 32272  1st Qu.: 13.500  1st Qu.:32.77
          Median :10479  Median : 28.0   Median : 38452  Median : 53042  Median : 19.208  Median :34.02
          Mean   : 9475   Mean   :153.2   Mean   : 44646  Mean   : 63558  Mean   : 17.745  Mean   :33.66
          3rd Qu.:10987   3rd Qu.: 41.0   3rd Qu.: 65053  3rd Qu.: 78087  3rd Qu.: 21.825  3rd Qu.:34.80
          Max.   :12763   Max.   :3612.0   Max.   :274566  Max.   :348168  Max.   : 26.400  Max.   :38.20
                   NA's   : 14      NA's   : 14      NA's   :1561.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633   Min.    : 4   Min.    : 5   Min.    : 1259   Min.    : 2.400   Min.   :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.: 9.075   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :7.120e-09  Min.   :9.085e-09  Min.   :0.000e+00  Min.   :9.035e-07  Min.   :0.0000
1st Qu.: 9145  1st Qu.:3.686e-05  1st Qu.:1.908e-05  1st Qu.:0.000e+00  1st Qu.:7.474e-04  1st Qu.:0.0000
Median :11616  Median :4.309e-04  Median :2.248e-04  Median :0.000e+00  Median :3.451e-03  Median :0.0000
Mean   :11171  Mean   :4.014e-02  Mean   :1.252e-02  Mean   :3.626e-02  Mean   :9.821e-03  Mean   :0.2057
3rd Qu.:14088  3rd Qu.:7.990e-03  3rd Qu.:3.437e-03  3rd Qu.:0.000e+00  3rd Qu.:9.825e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :5.807e-01  Max.   :2.019e-01  Max.   :2.000e+00  Max.   :2.547e-01  Max.   :1.0000
      NA's :6.000e+00  NA's :6.000e+00  NA's :8.454e+03  NA's :8.454e+03
```

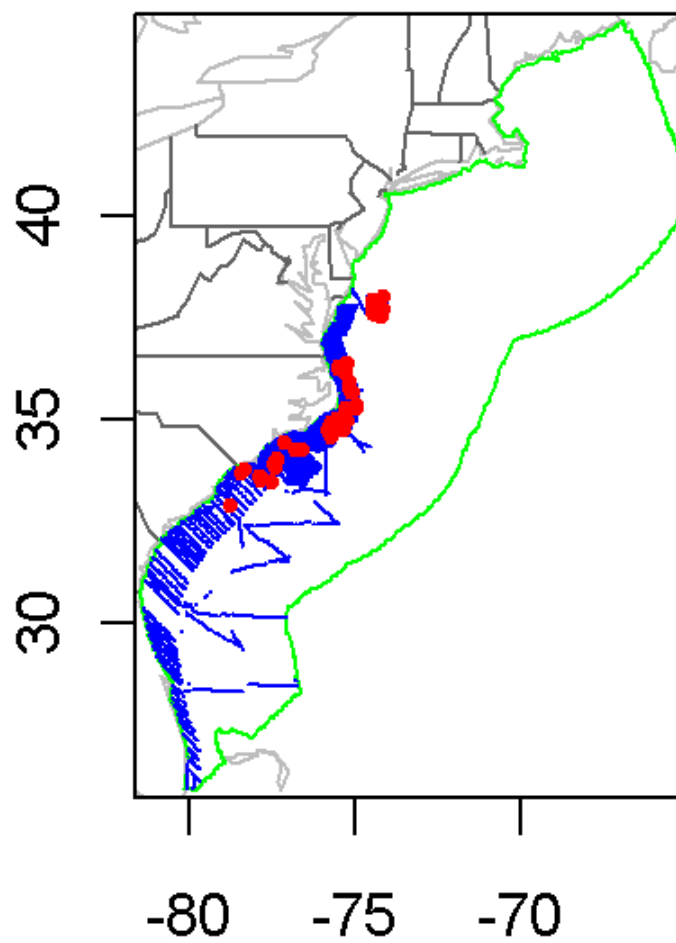



Figure 169: Map of points of observational sightings and tracks of survey effort for 'Delphinus' guild during 'winter' season in 'east2' region.

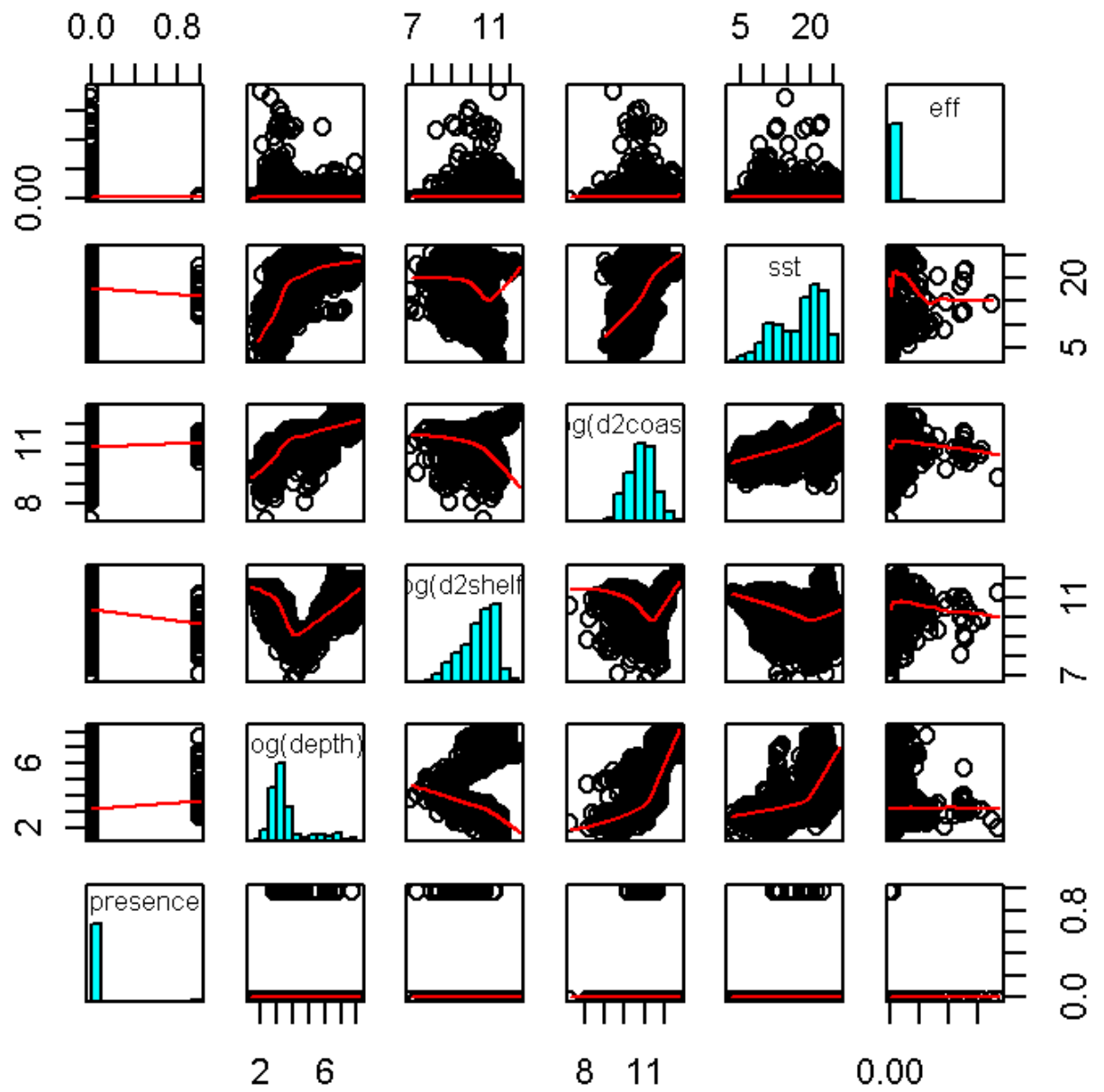


Figure 170: Pairs plot of input variables for 'Delphinus' guild during 'winter' season in 'east2' region.

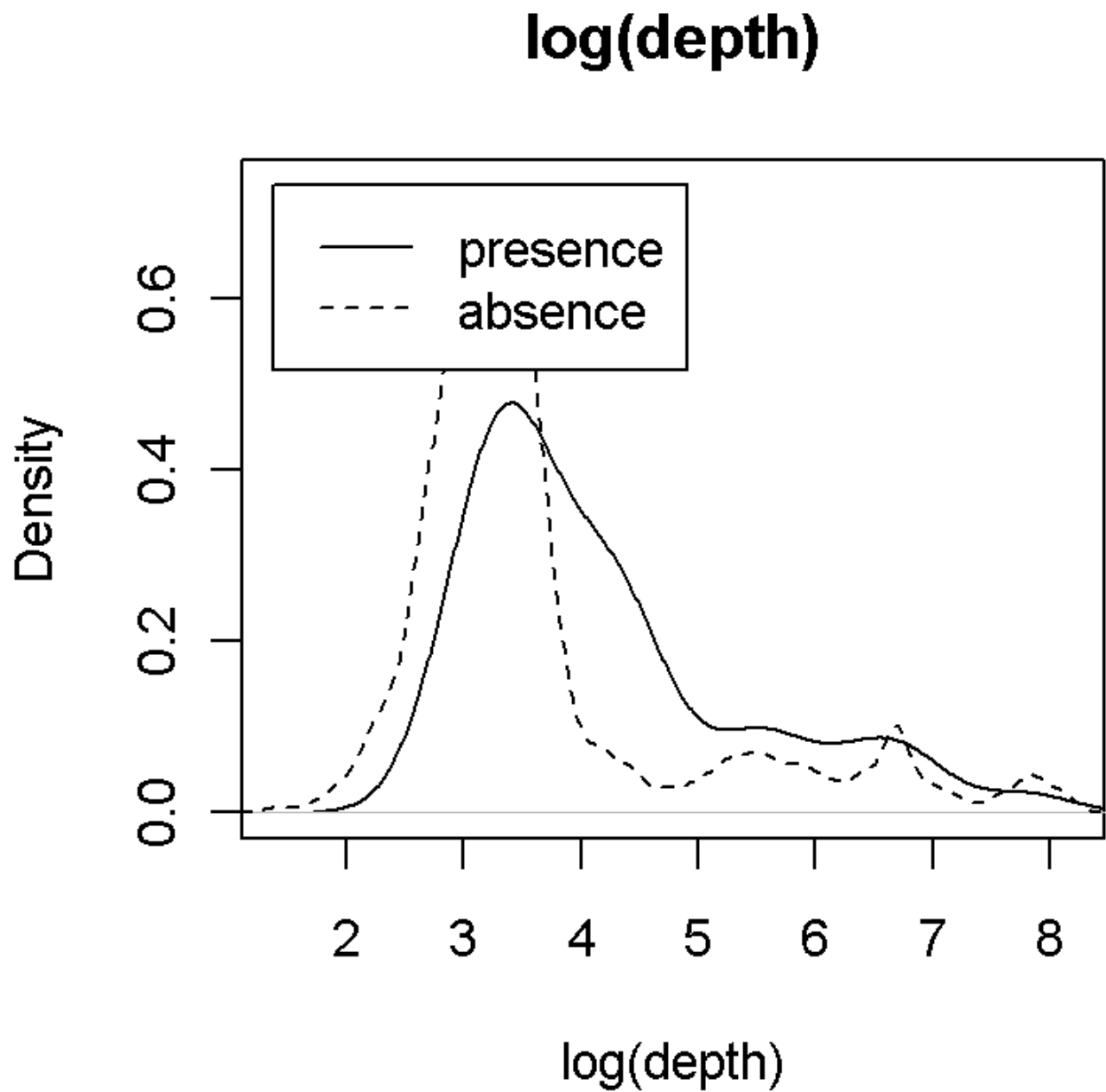


Figure 171: Density histogram of depth log(meters) for 'Delphinus' guild during 'winter' season in 'east2' region.

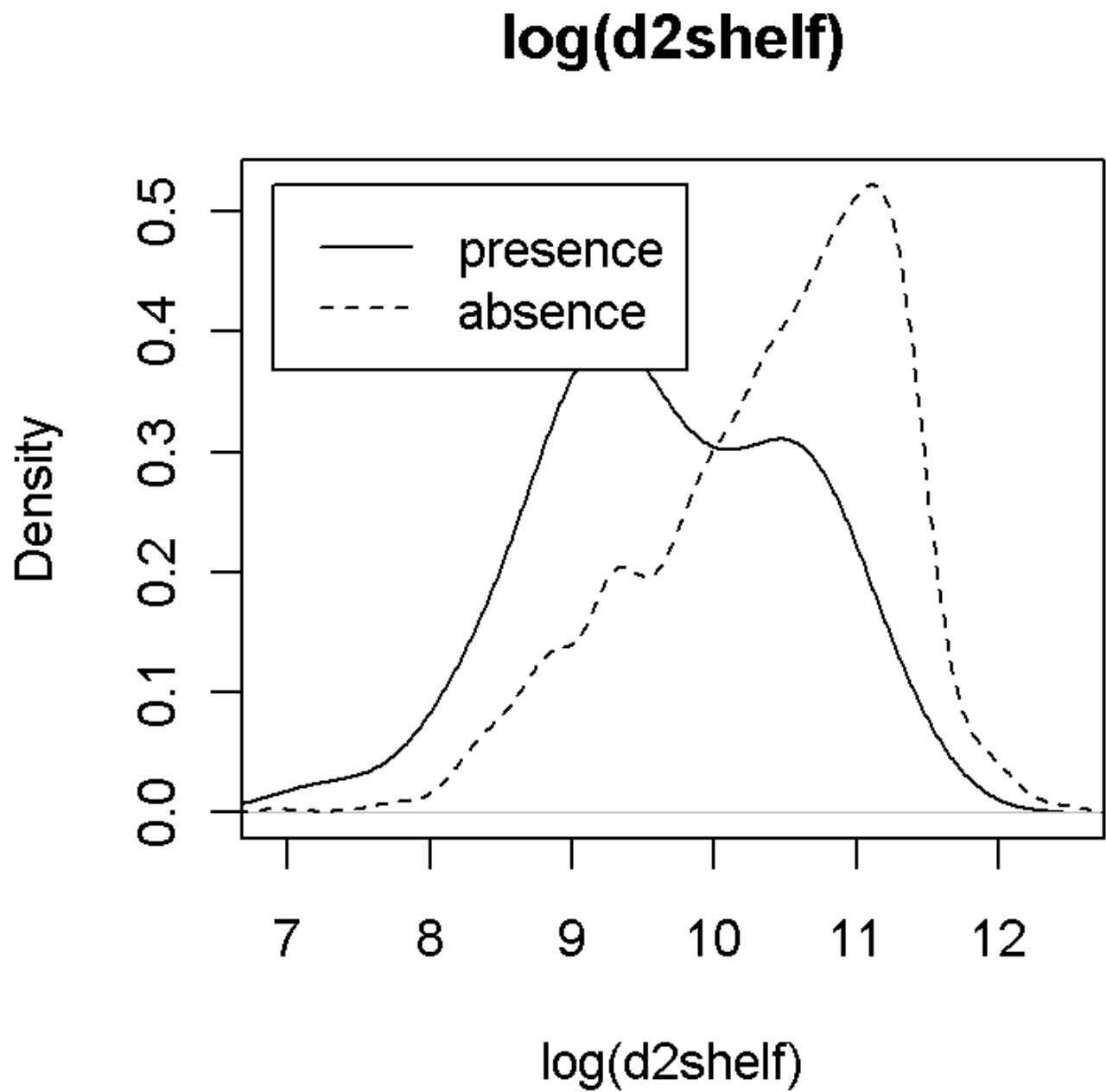


Figure 172: Density histogram of distance to shelf log(meters) for 'Delphinus' guild during 'winter' season in 'east2' region.

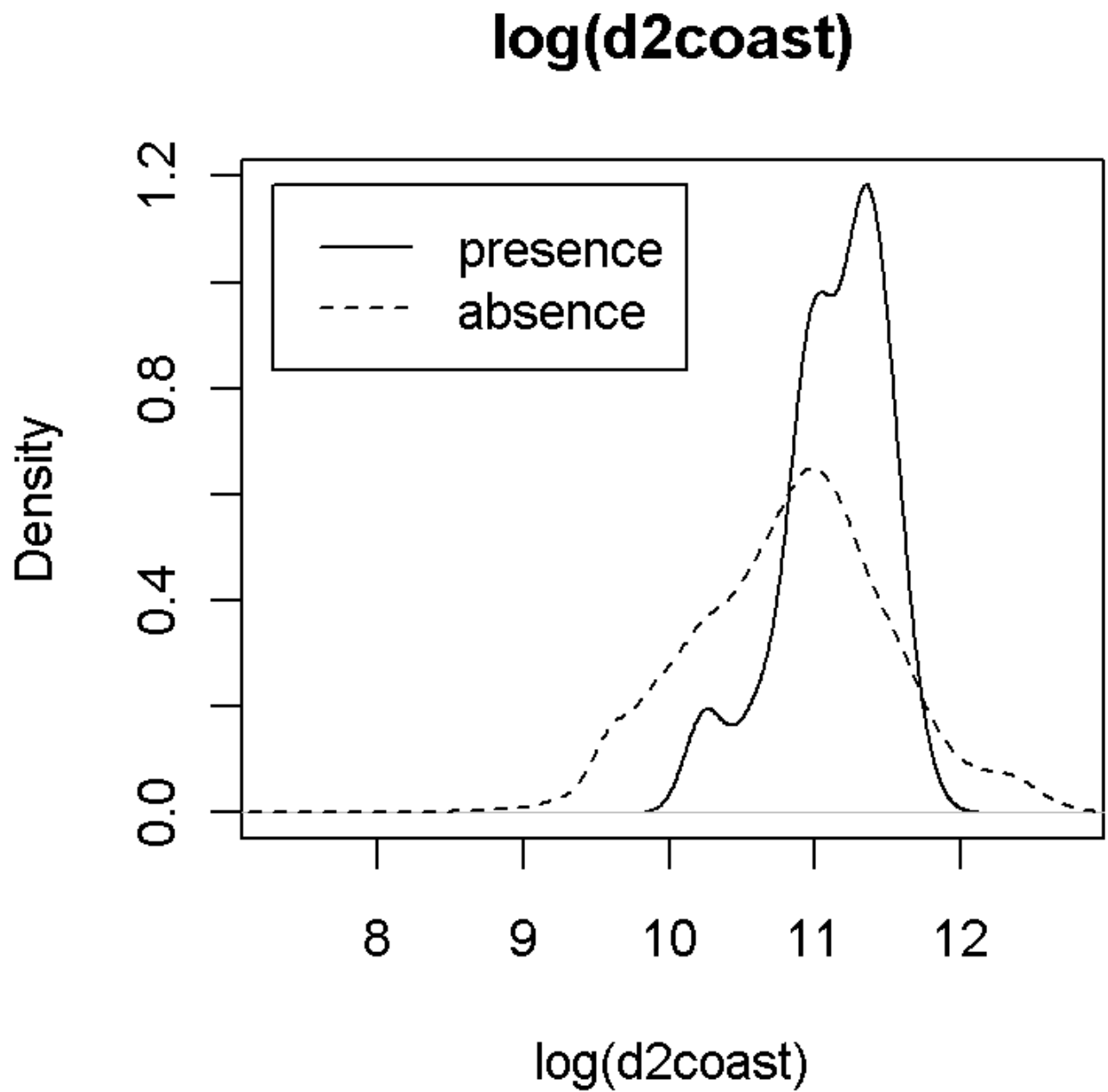


Figure 173: Density histogram of distance to coast log(meters) for 'Delphinus' guild during 'winter' season in 'east2' region.

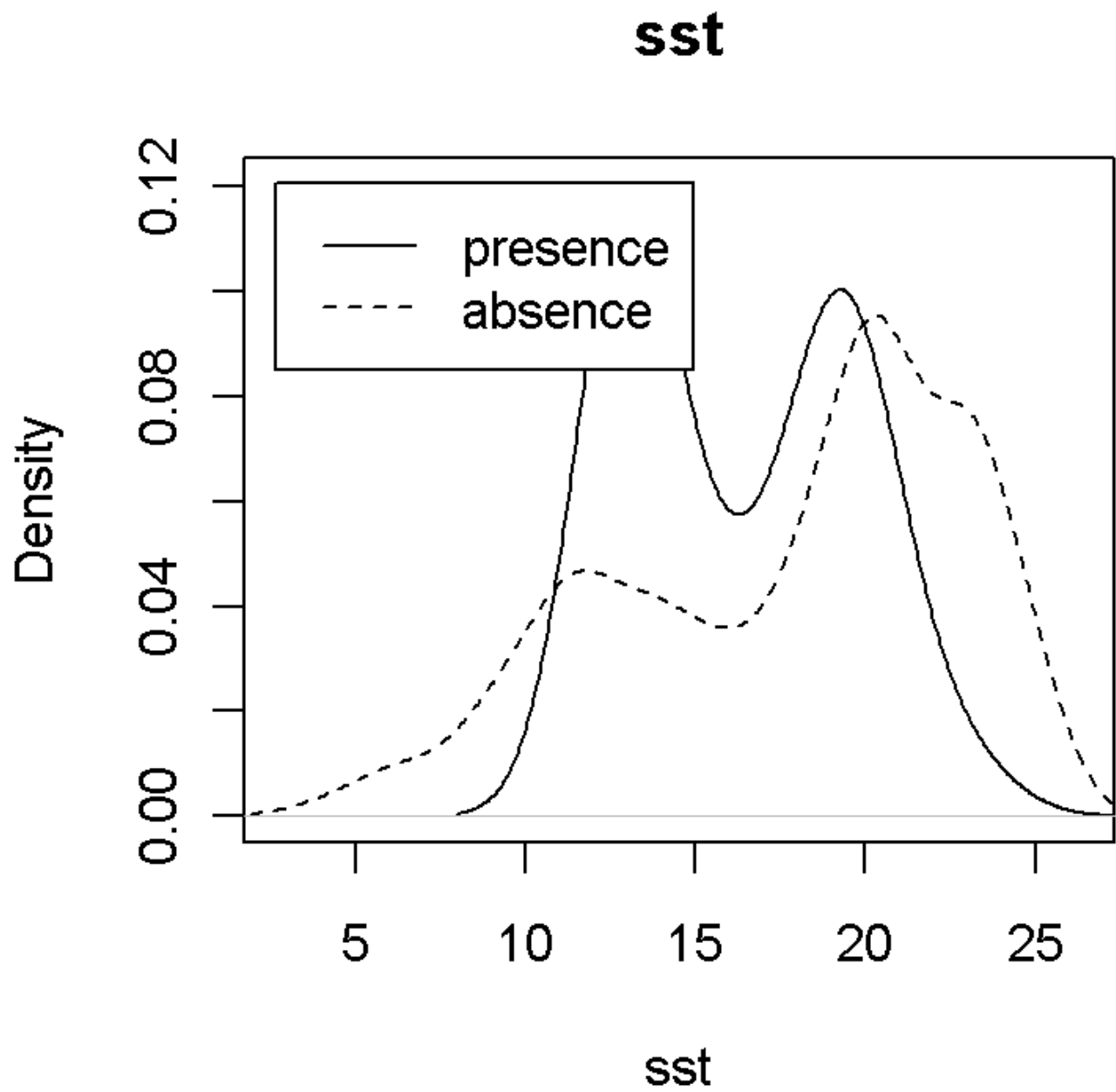


Figure 174: Density histogram of sea-surface temperature (degrees C) for 'Delphinus' guild during 'winter' season in 'east2' region.

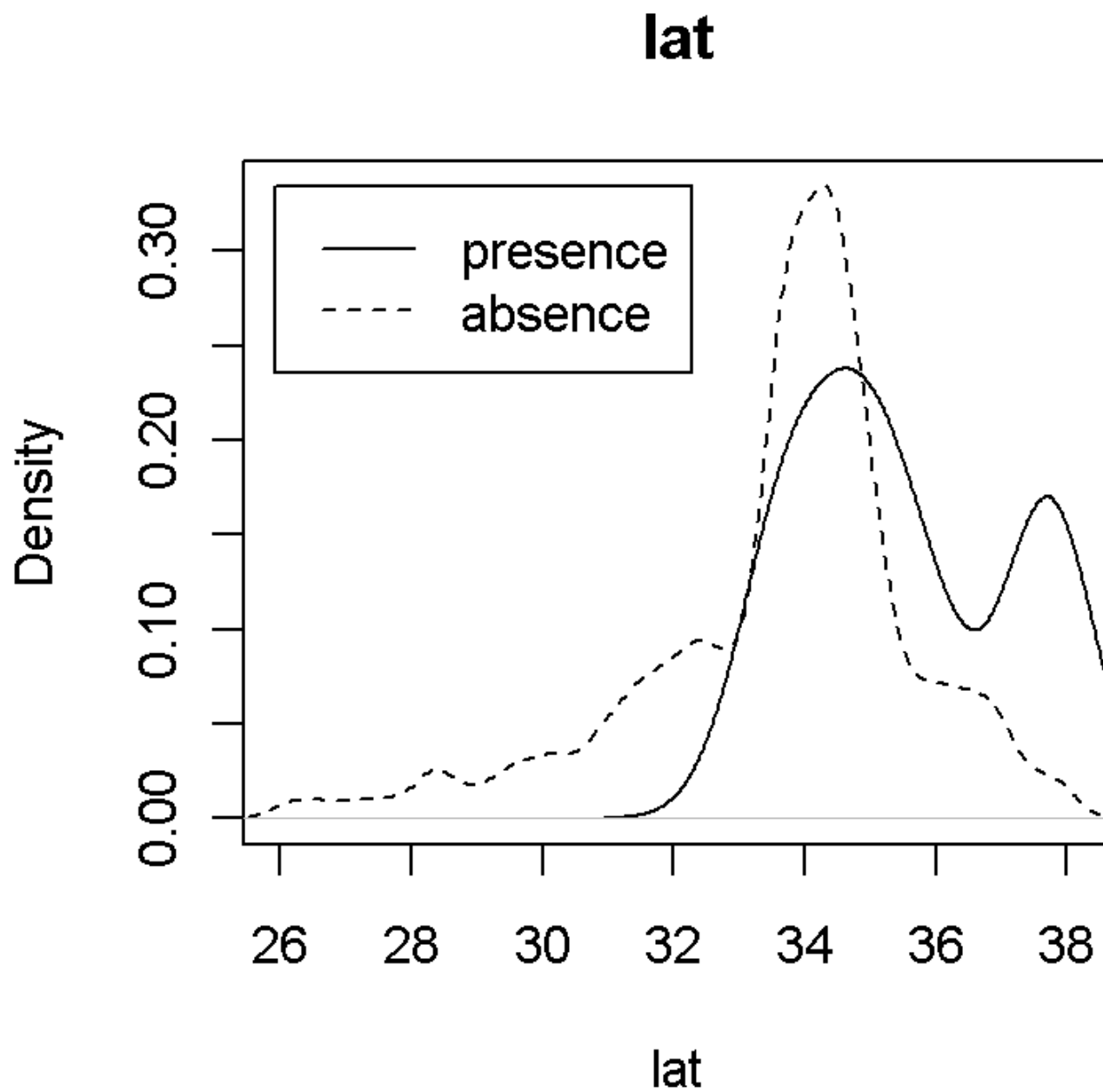


Figure 175: Density histogram of latitude (degrees) for 'Delphinus' guild during 'winter' season in 'east2' region.

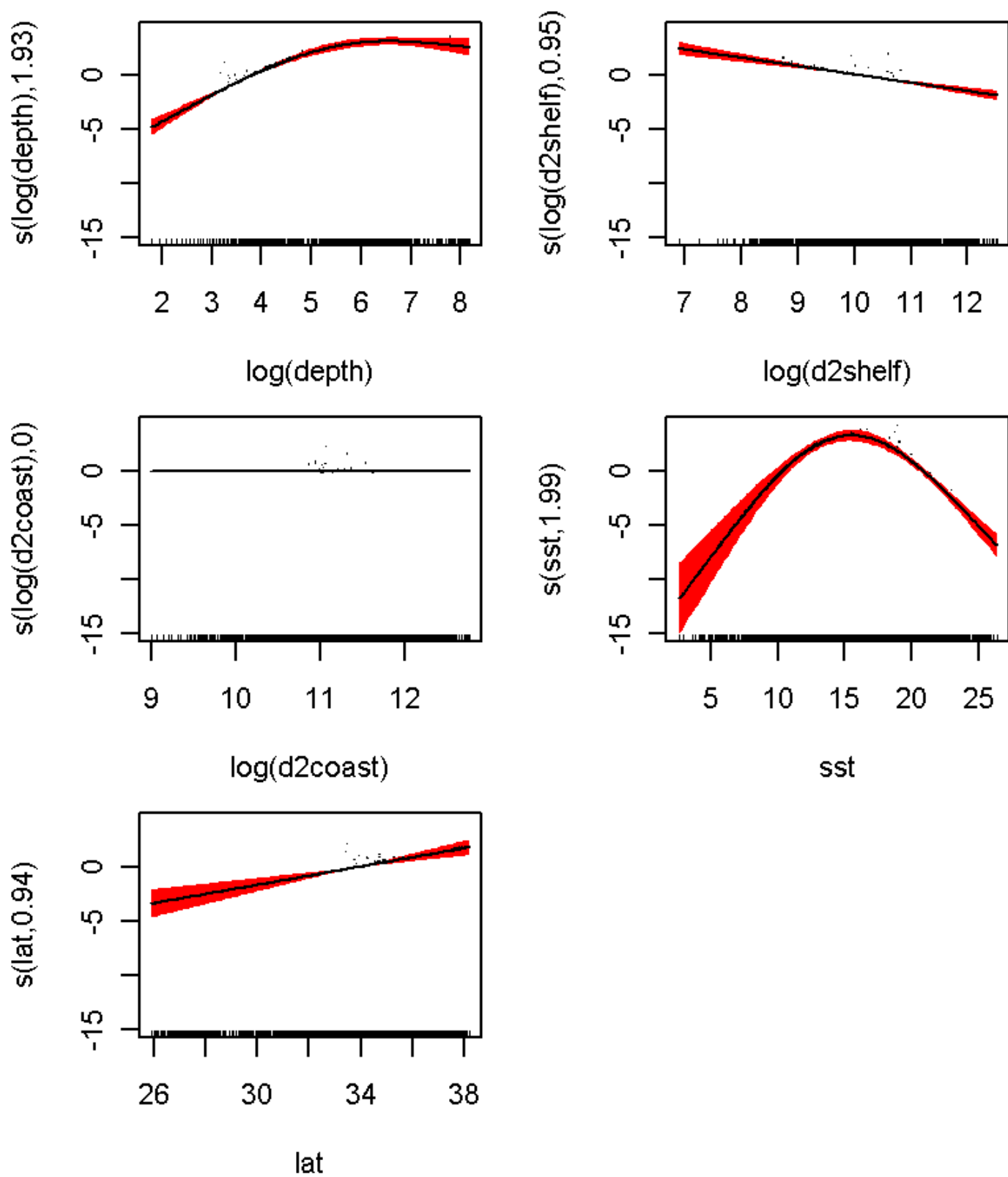


Figure 176: Terms plot of predictors to GAM model fit for 'Delphinus' guild during 'winter' season in 'east2' region.

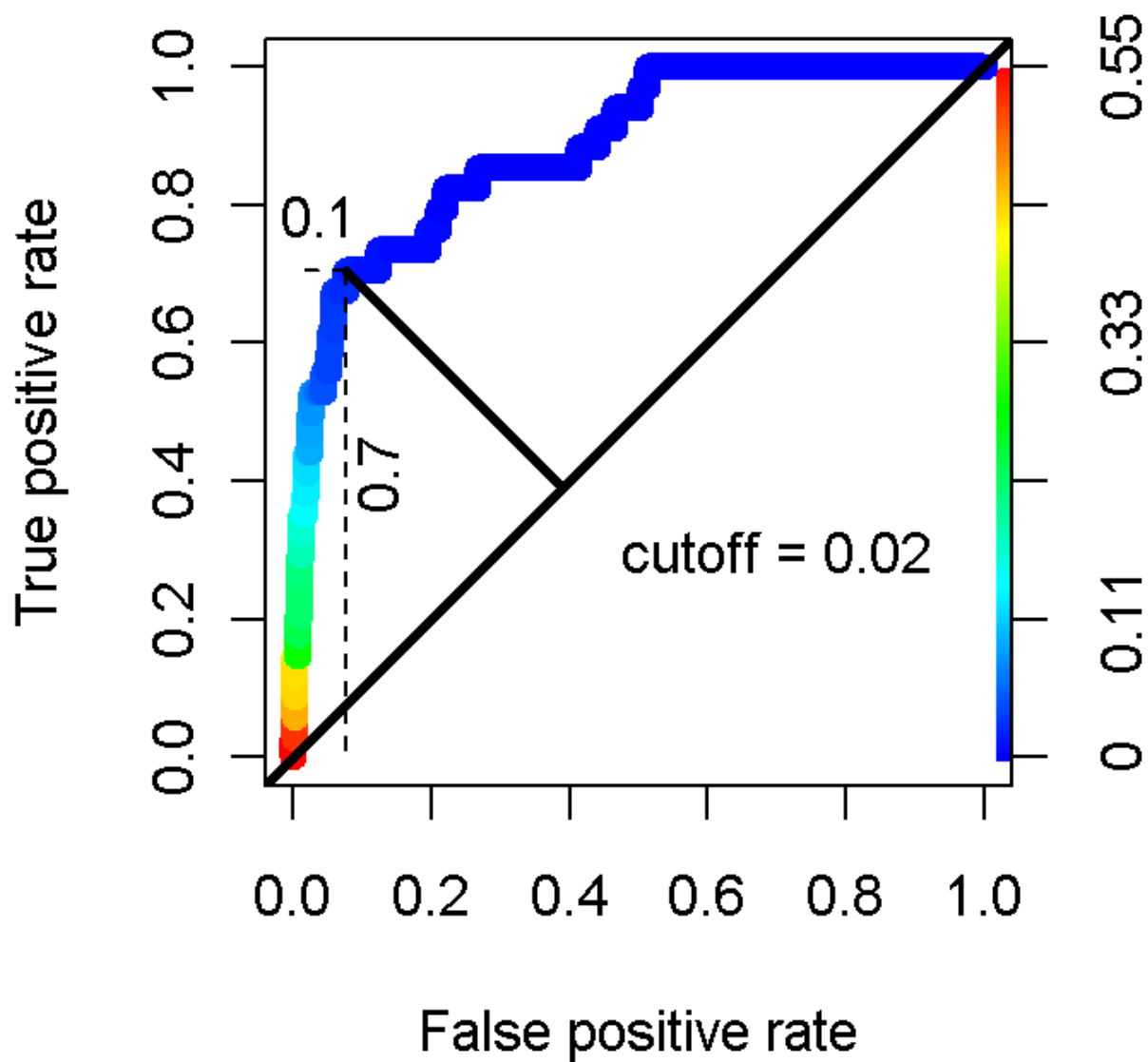


Figure 177: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Delphinus' guild during 'winter' season in 'east2' region.

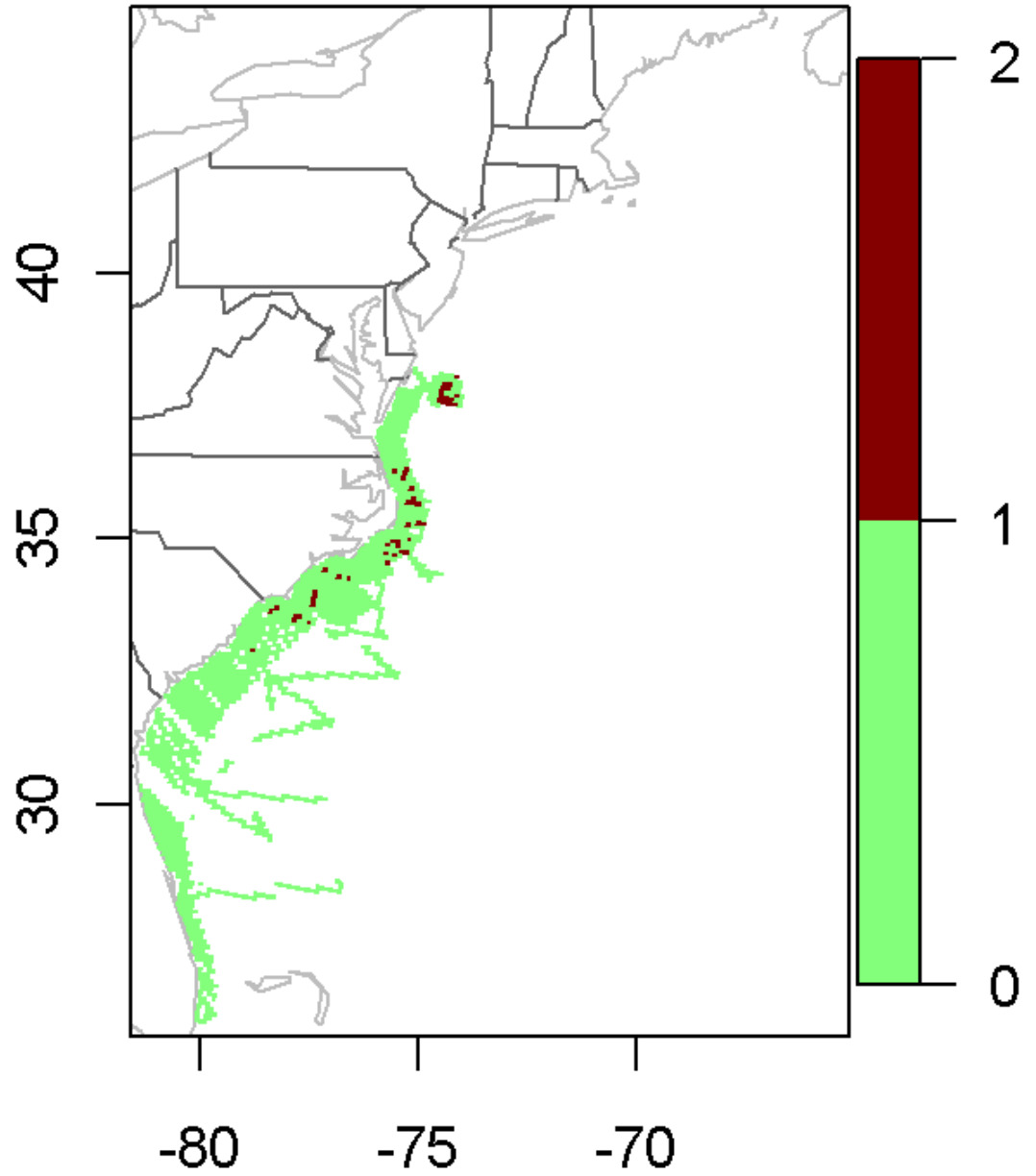


Figure 178: Map of presence and absence by cell summed through time for 'Delphinus' guild during 'winter' season in 'east2' region.

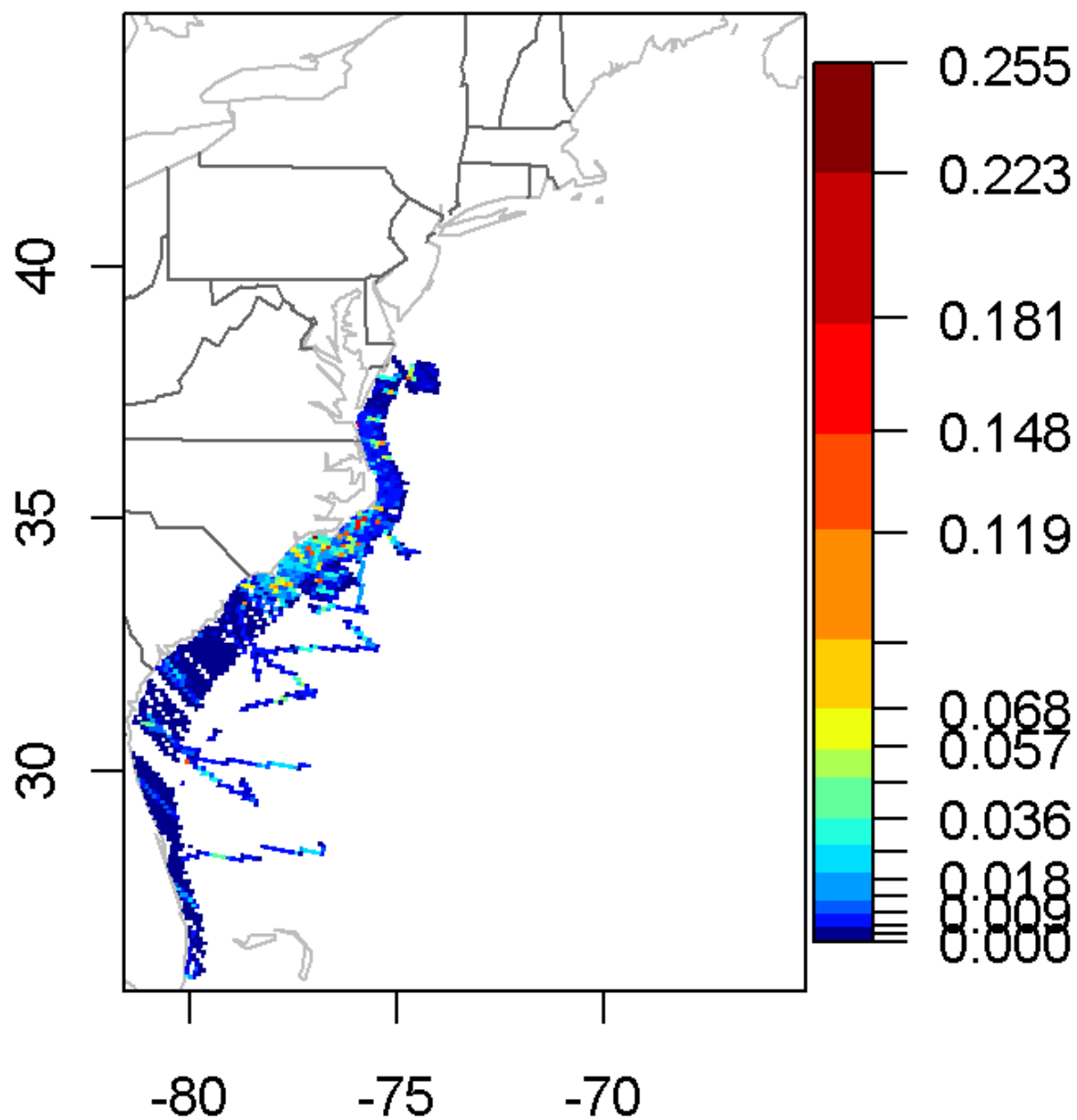


Figure 179: Map of effort(hours/km²) by cell summed through time for 'Delphinus' guild during 'winter' season in 'east2' region.

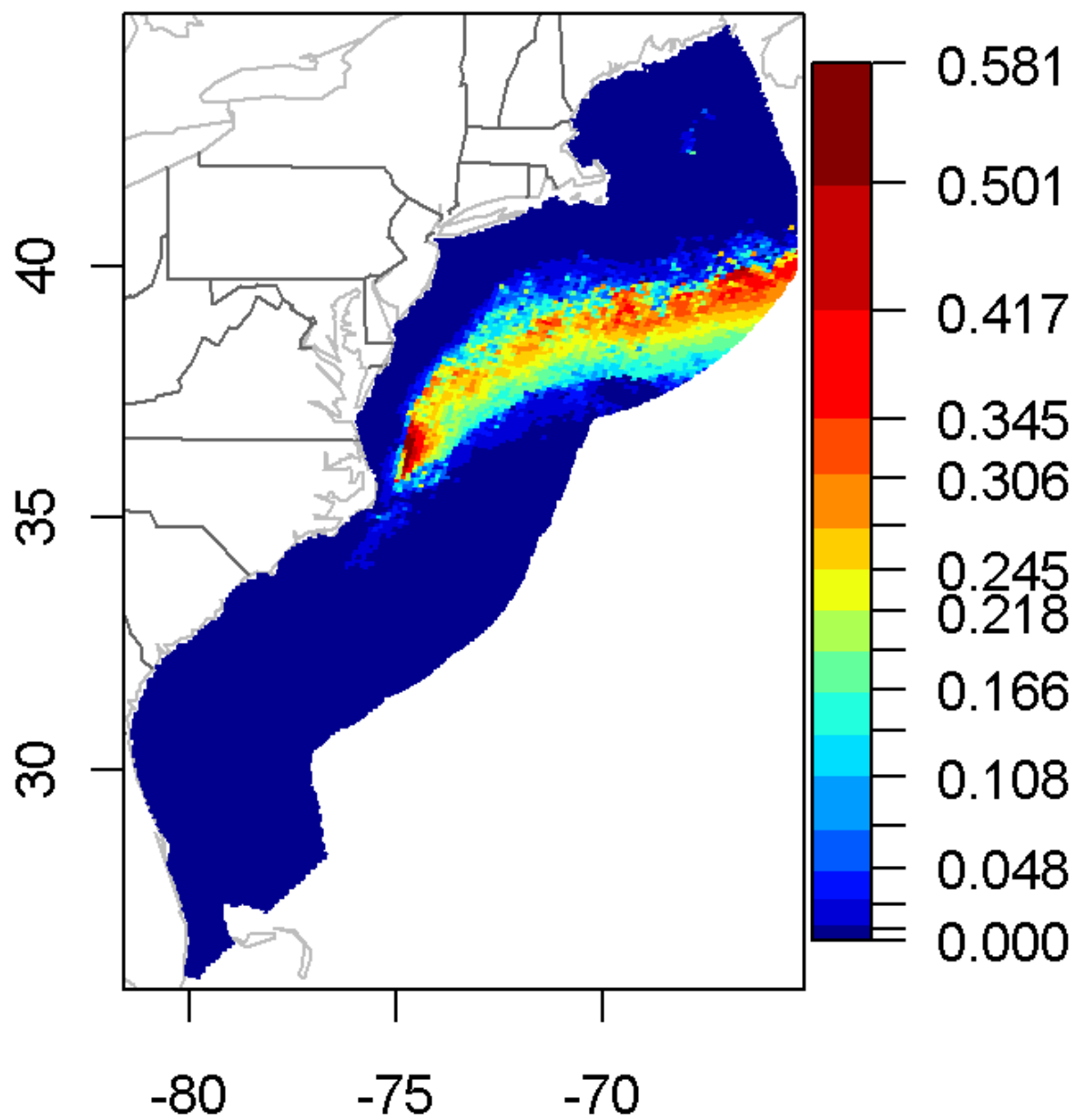


Figure 180: Map of mean predicted habitat for 'Delphinus' guild during 'winter' season in 'east2' region.

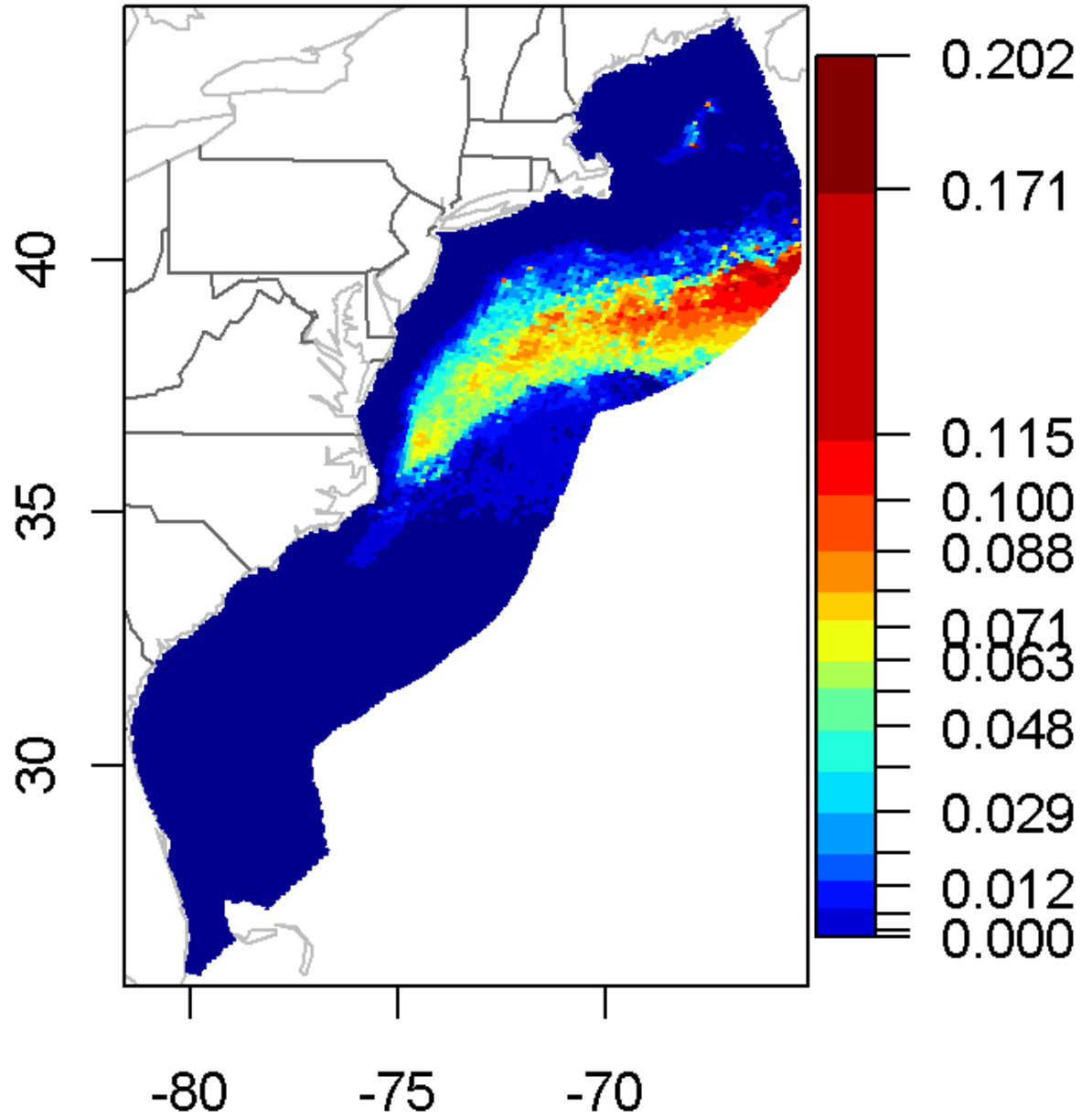


Figure 181: Map of standard error of habitat for 'Delphinus' guild during 'winter' season in 'east2' region.

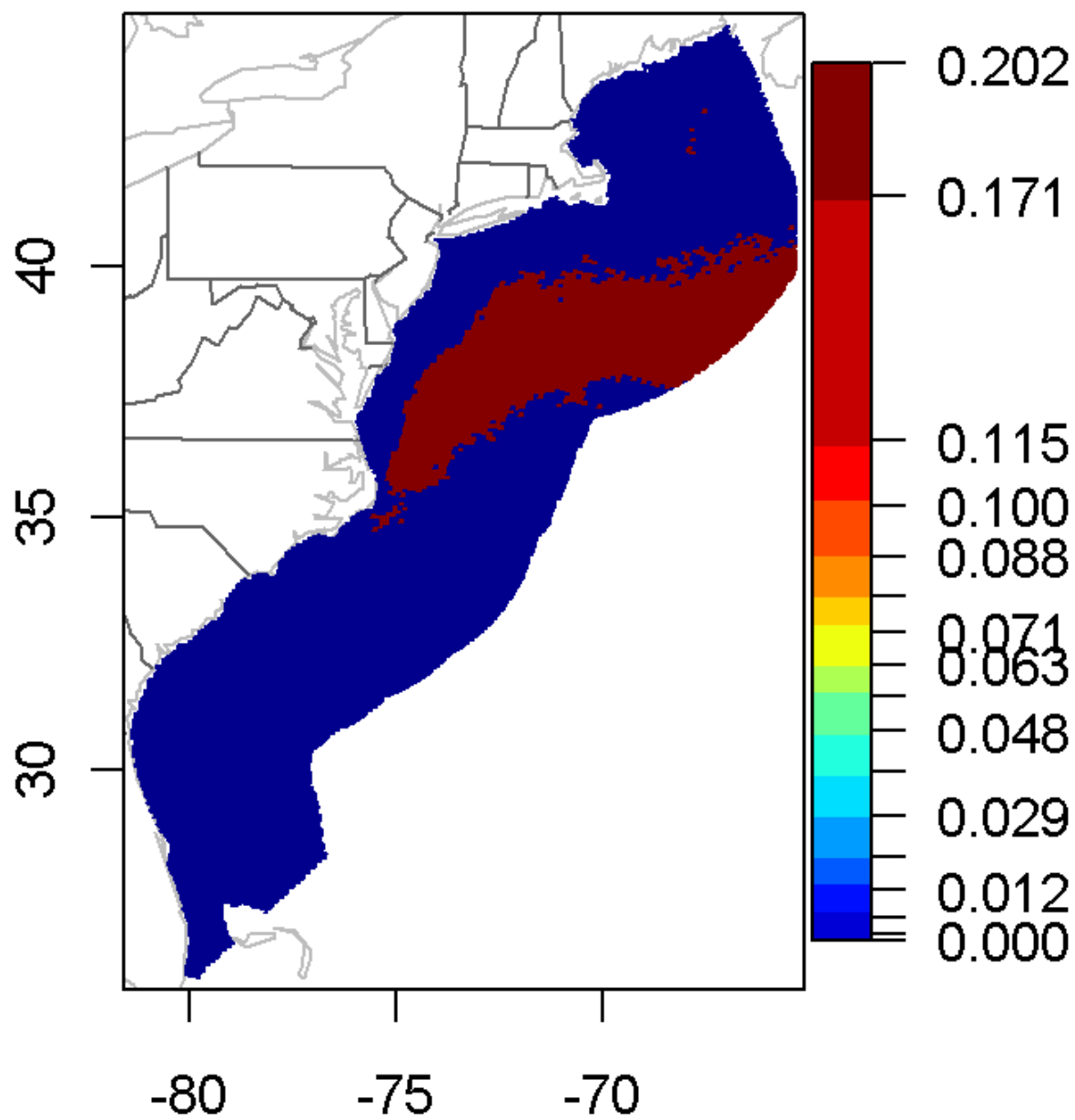


Figure 182: Map of binary habitat (cutoff determined by ROC) for 'Delphinus' guild during 'winter' season in 'east2' region.

4 Harbour porpoise

Guildid:hp3

Table 17: Taxonomic members of the "Harbour porpoise" guild.

	Scientific Name	Common Name	Taxonomic #
1	Phocoena phocoena	common porpoise	180473

4.1 fall

4.1.1 east2

Modelrun identifier: duke_06_hp3_fall_east2

Date generated: 2008-10-21 14:19:48

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 18: Summary for duke(6) GAM model: for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

	Value
Number.presences	46
Number.absences	1818
GAM.converged	TRUE
R.squared	0.00301817
Deviance.explained	0.503274
ROC.optimum	0.429185
Maximum.fit	0.0263741
Maximum.prediction	0.444009

Model text summary...

```
duke_06_hp3_fall_east2 run on Tue Oct 21 14:18:42 2008
  provider:duke, version:06, guild:Harbour porpoise (hp3), season:'fall', region:east2

max.fit:0.429185, max.prediction:0.444009, ROC.optimum:0.026374

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -9.0257      0.4154  -21.73   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  2.753e-07  0.500  3.83e-06  0.965
s(log(d2shelf)) 1.945e+00  2.445   76.19   <2e-16 ***
s(log(d2coast)) 1.962e+00  2.462   36.57   <2e-16 ***
s(sst)         1.739e-07  0.500  6.98e-05  0.929
s(lat)         9.955e-01  1.496  226.31   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.00302   Deviance explained = 50.3%
GCV score = 0.00040364   Scale est. = 0.0004013   n = 1826

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.   : 1654  Min.   :  6.0  Min.   :  10  Min.   : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0  1st Qu.:12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0  Median : 30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5  Mean   :47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.:197.0  3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
        NA's    :      1    NA's    :  1    NA's    :37.00

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :  5  Min.   :1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```


Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :3.063e-16	Min. :0.000e+00	Min. :1.290e-06	Min. :0.00000
1st Qu.: 9145	1st Qu.:9.429e-11	1st Qu.:1.137e-10	1st Qu.:0.000e+00	1st Qu.:5.348e-04	1st Qu.:0.00000
Median :11616	Median :2.366e-08	Median :2.293e-08	Median :0.000e+00	Median :2.645e-03	Median :0.00000
Mean :11171	Mean :1.125e-02	Mean :1.596e-03	Mean :4.152e-02	Mean :8.763e-03	Mean :0.06553
3rd Qu.:14088	3rd Qu.:1.477e-04	3rd Qu.:9.034e-05	3rd Qu.:0.000e+00	3rd Qu.:6.382e-03	3rd Qu.:0.00000
Max. :16560	Max. :4.440e-01	Max. :1.276e-01	Max. :1.000e+00	Max. :5.995e-01	Max. :1.00000
	NA's :5.000e+00	NA's :5.000e+00	NA's :8.780e+03	NA's :8.780e+03	

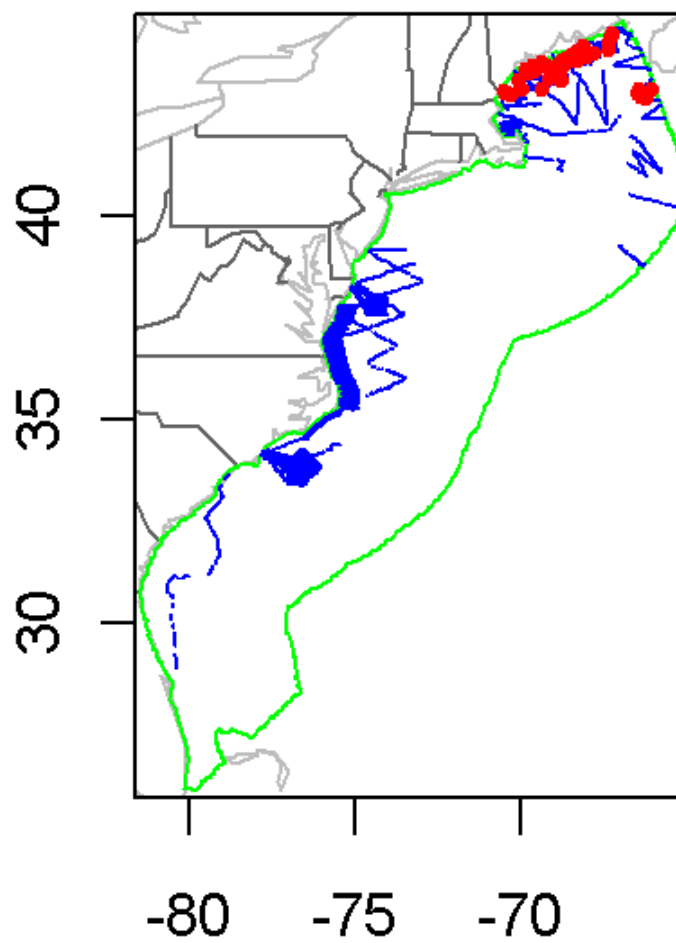


Figure 183: Map of points of observational sightings and tracks of survey effort for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

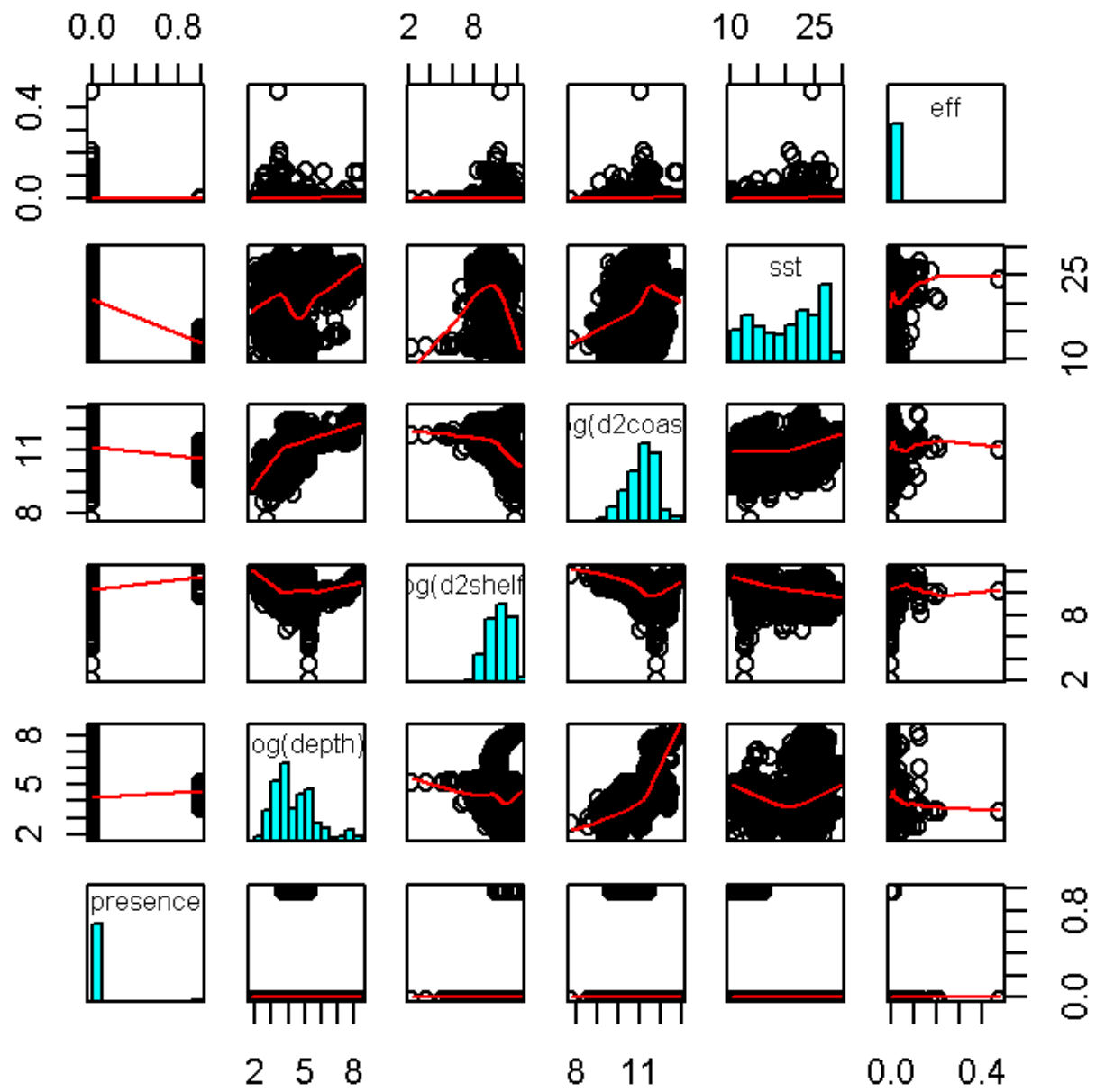


Figure 184: Pairs plot of input variables for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

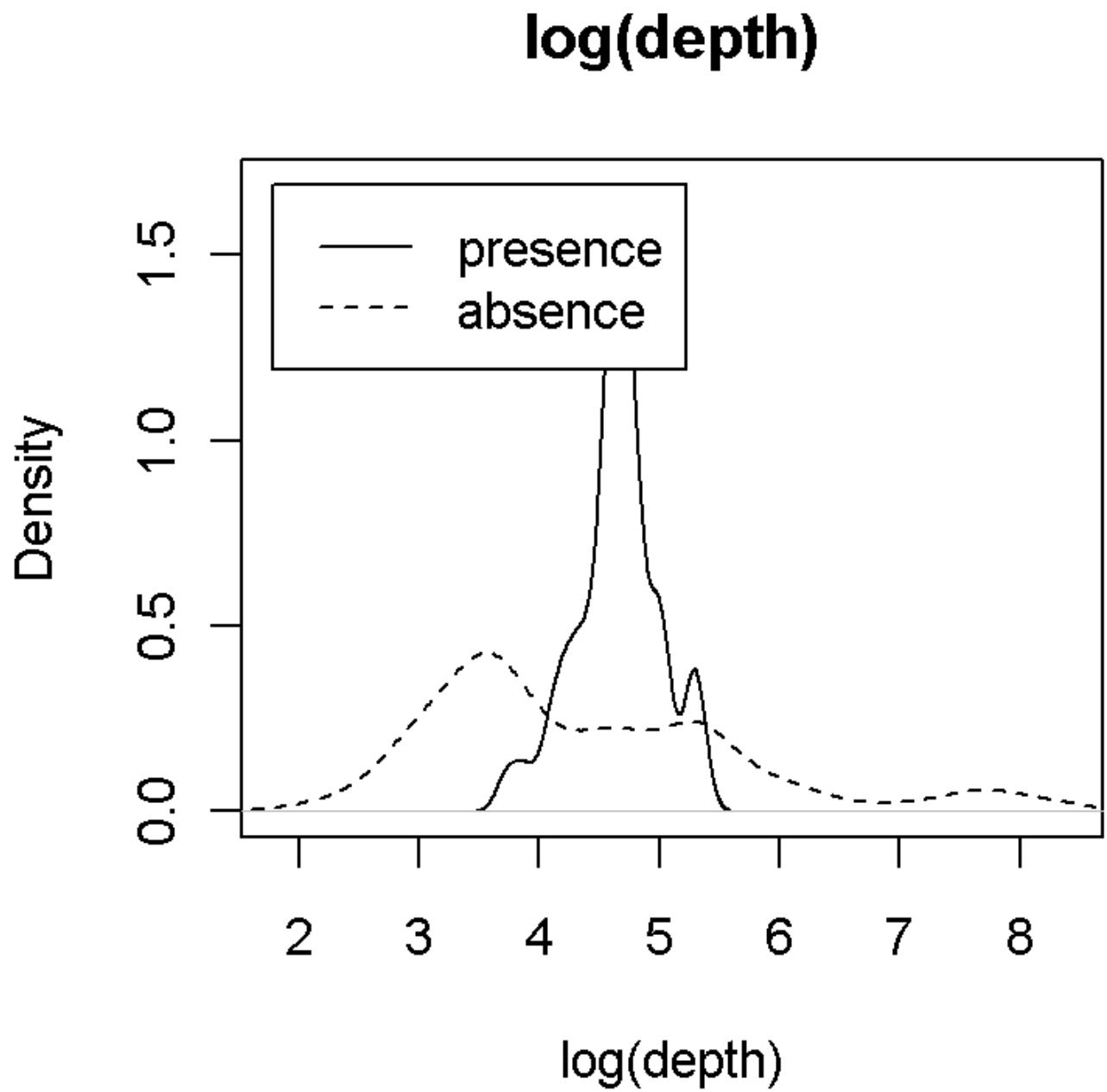


Figure 185: Density histogram of depth log(meters) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

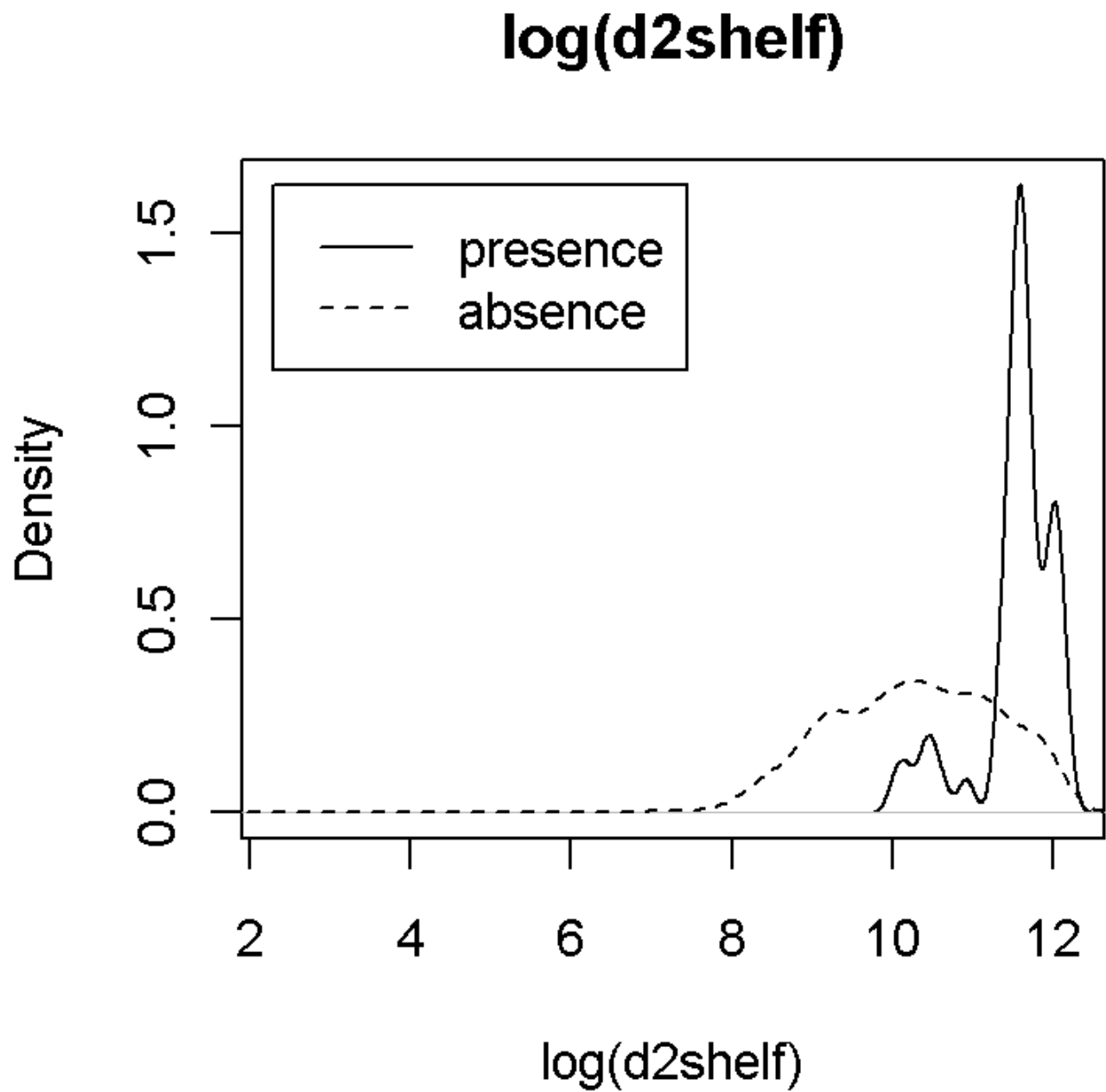


Figure 186: Density histogram of distance to shelf log(meters) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

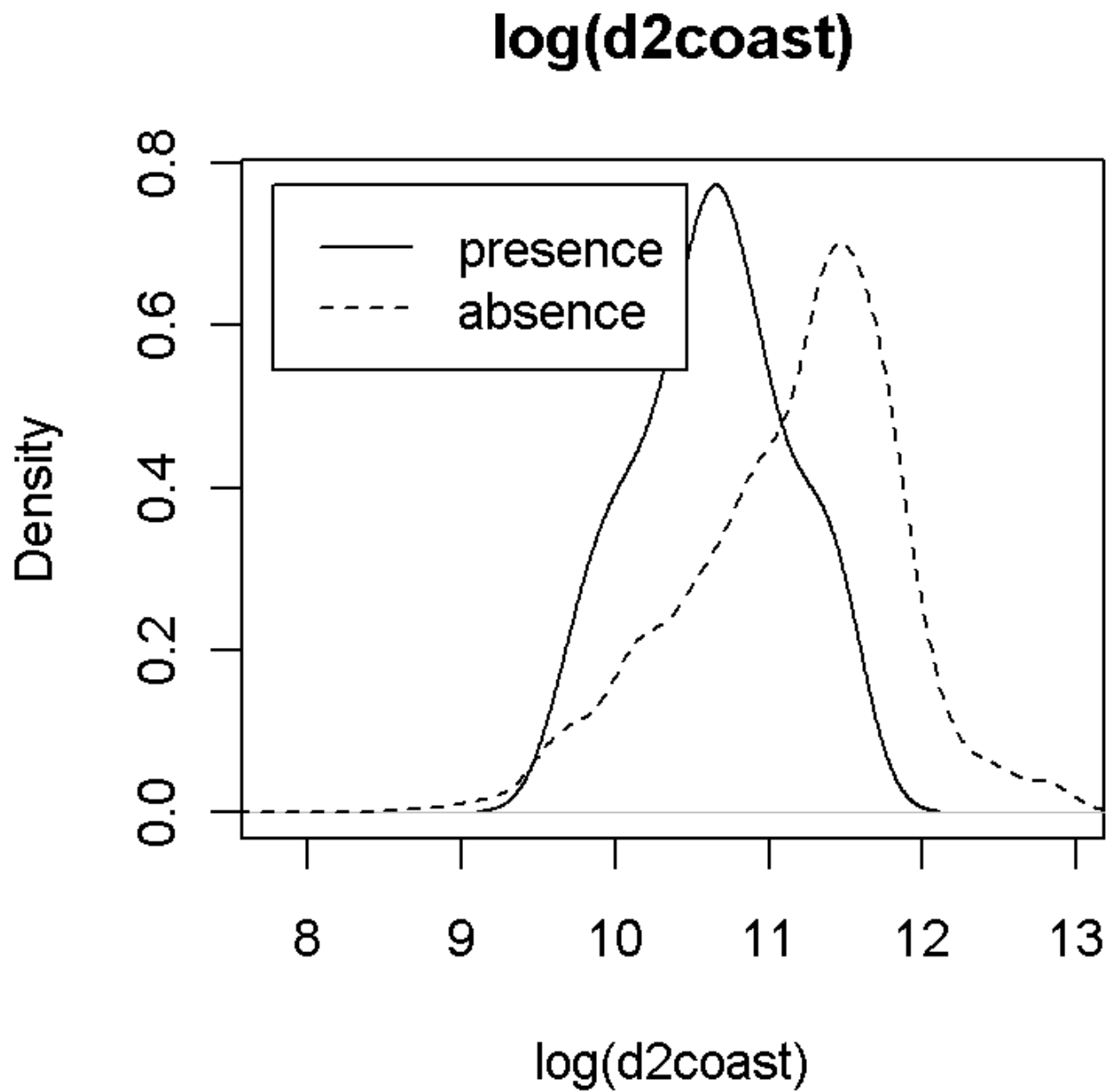


Figure 187: Density histogram of distance to coast log(meters) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

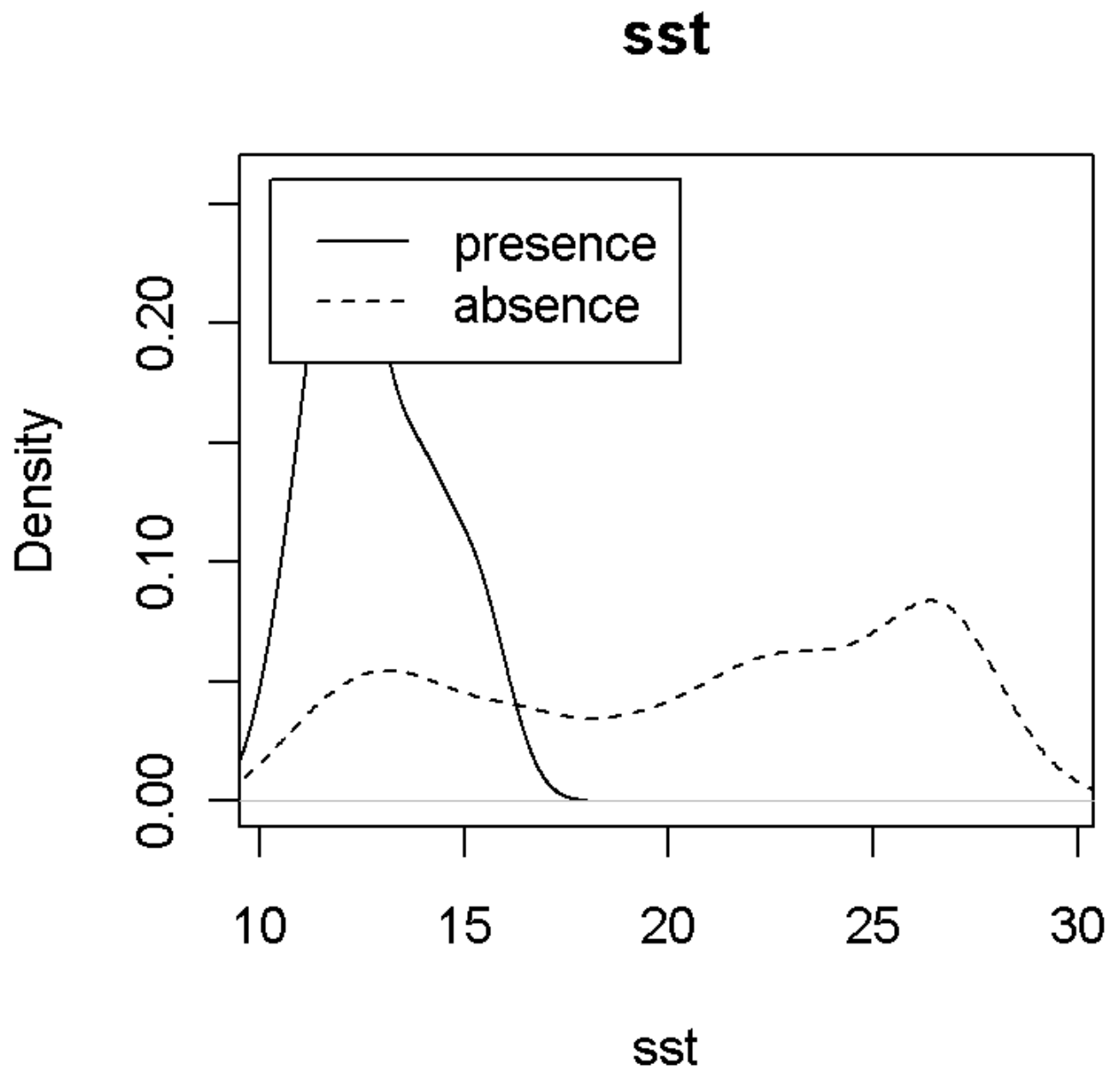


Figure 188: Density histogram of sea-surface temperature (degrees C) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

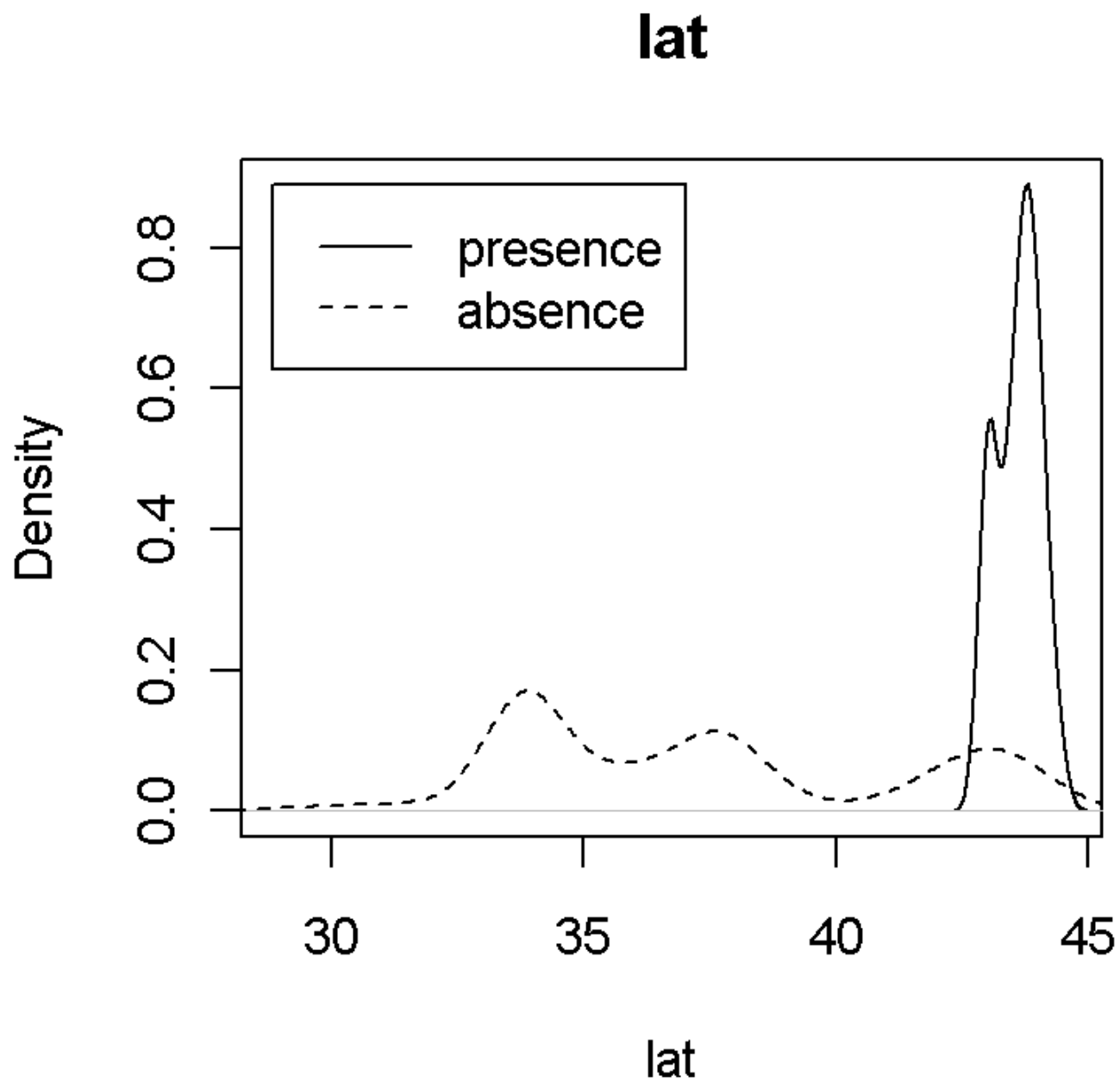


Figure 189: Density histogram of latitude (degrees) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

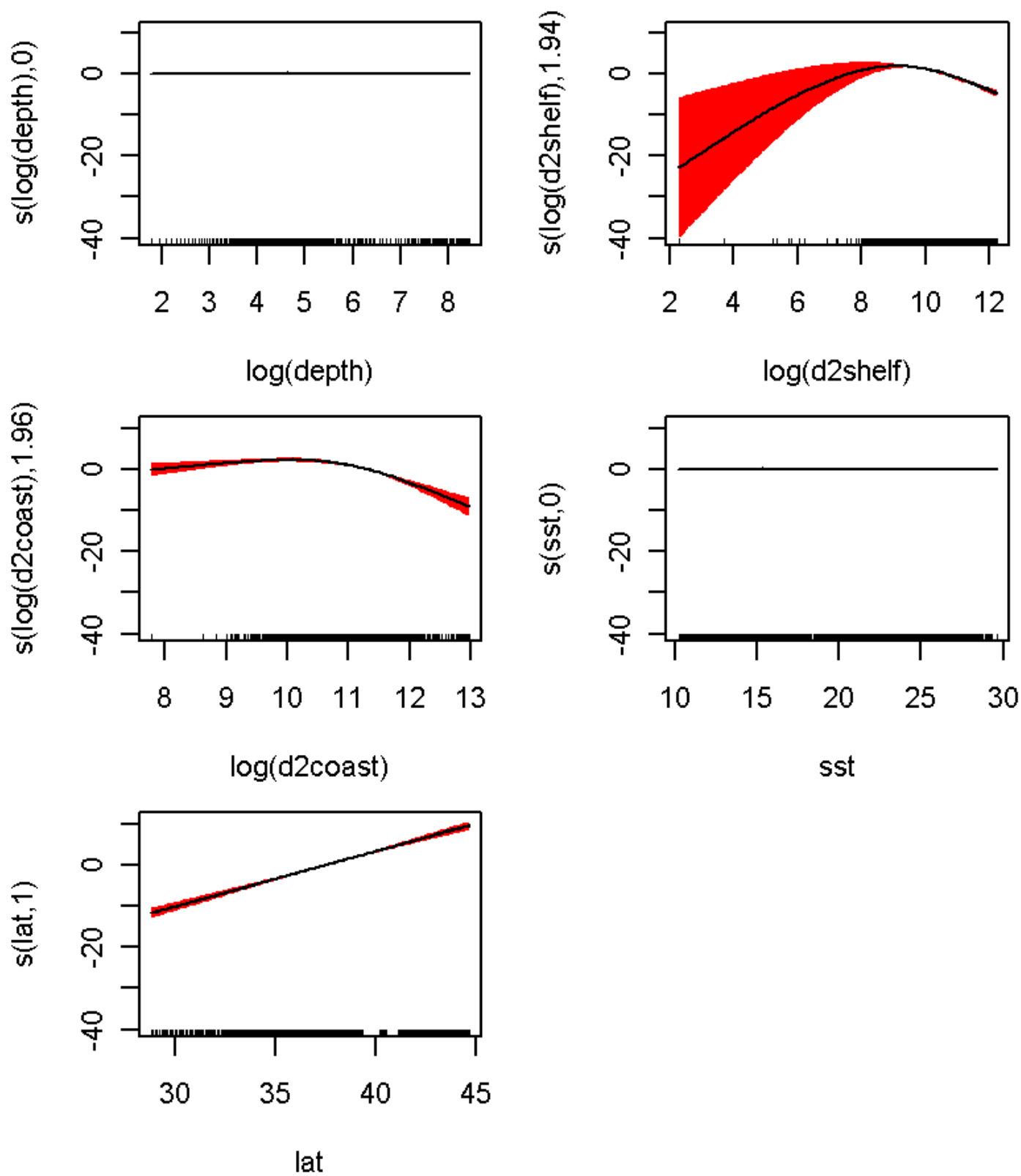


Figure 190: Terms plot of predictors to GAM model fit for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

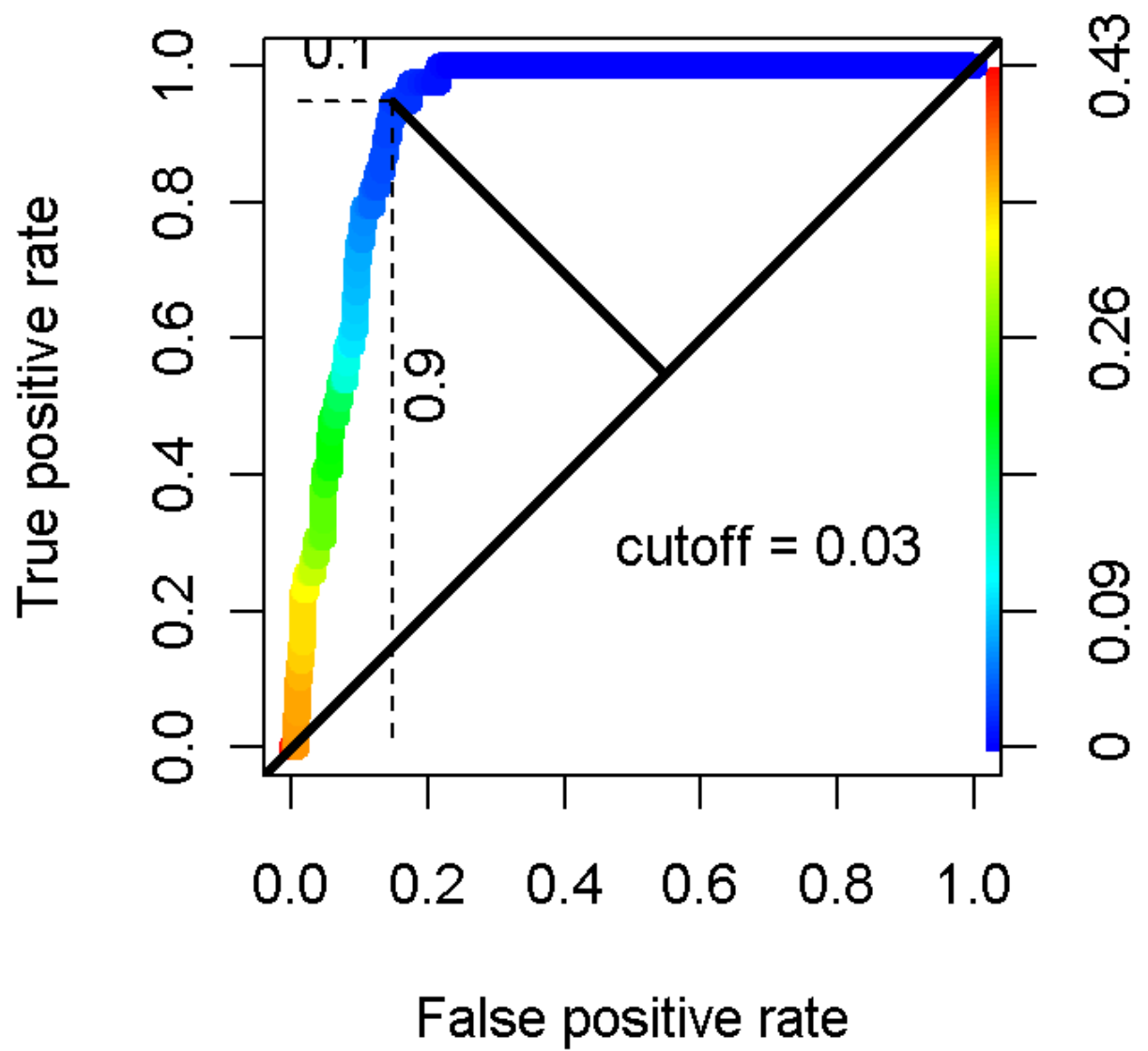


Figure 191: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

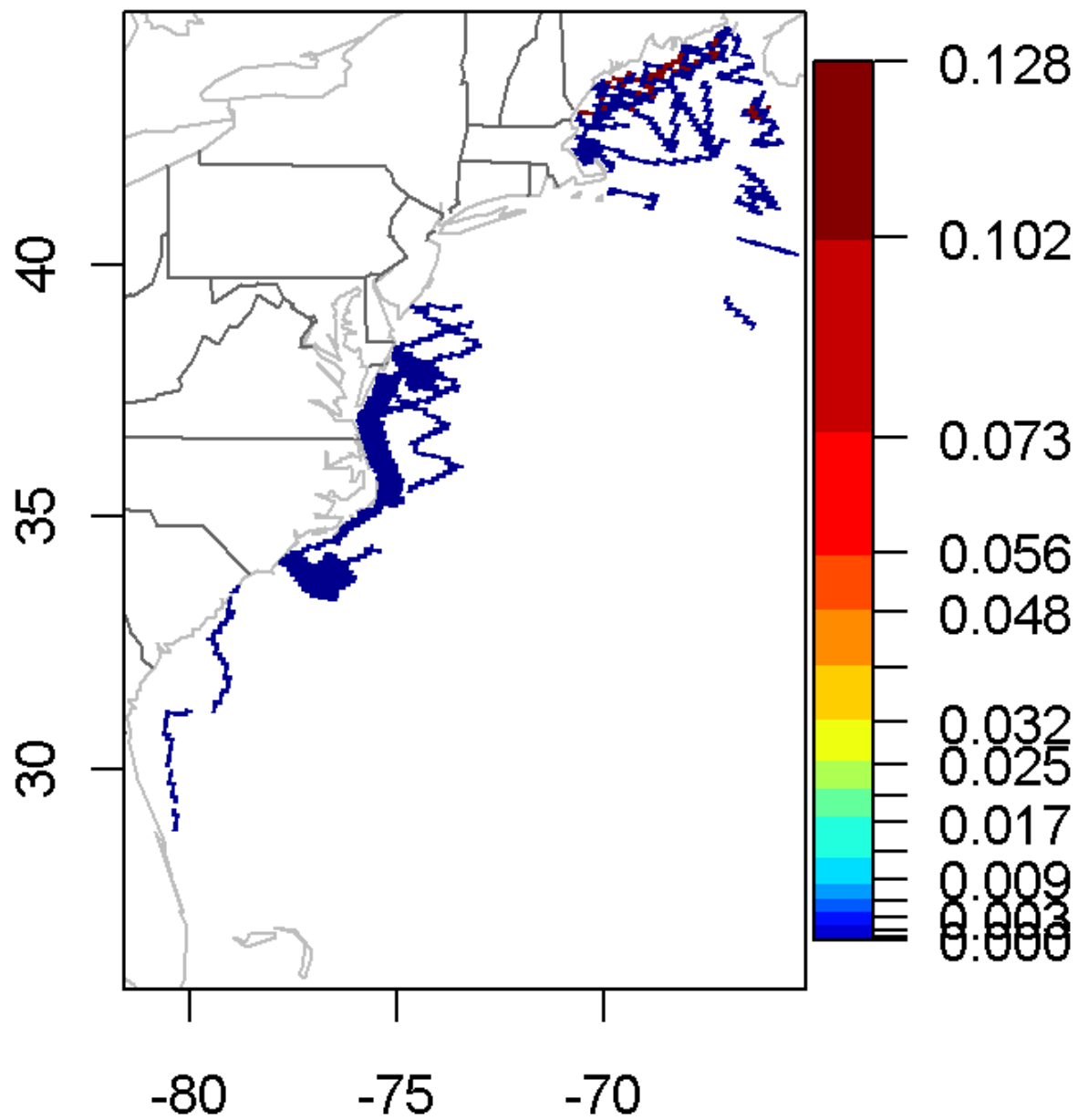


Figure 192: Map of presence and absence by cell summed through time for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

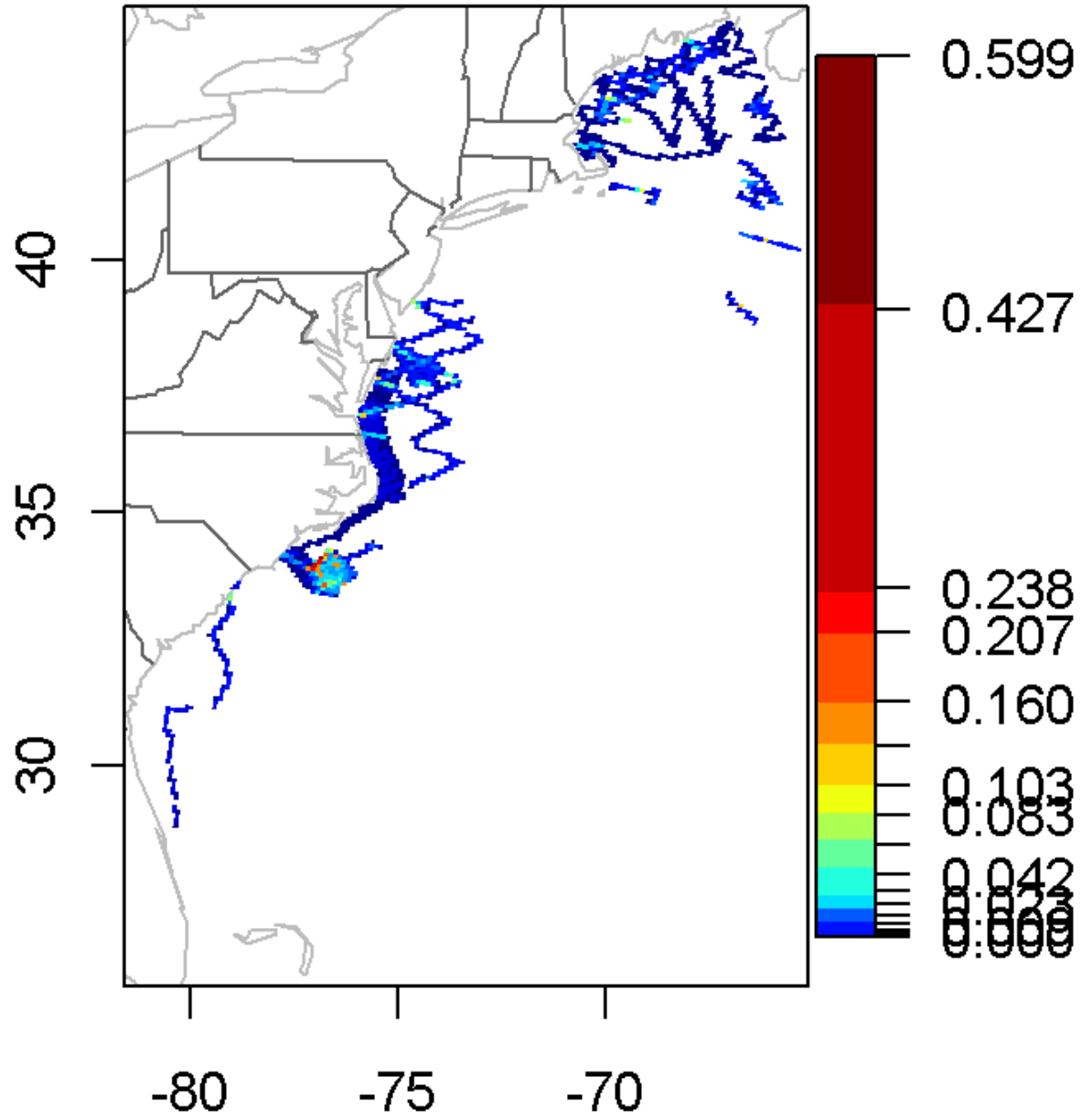


Figure 193: Map of effort(hours/km²) by cell summed through time for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

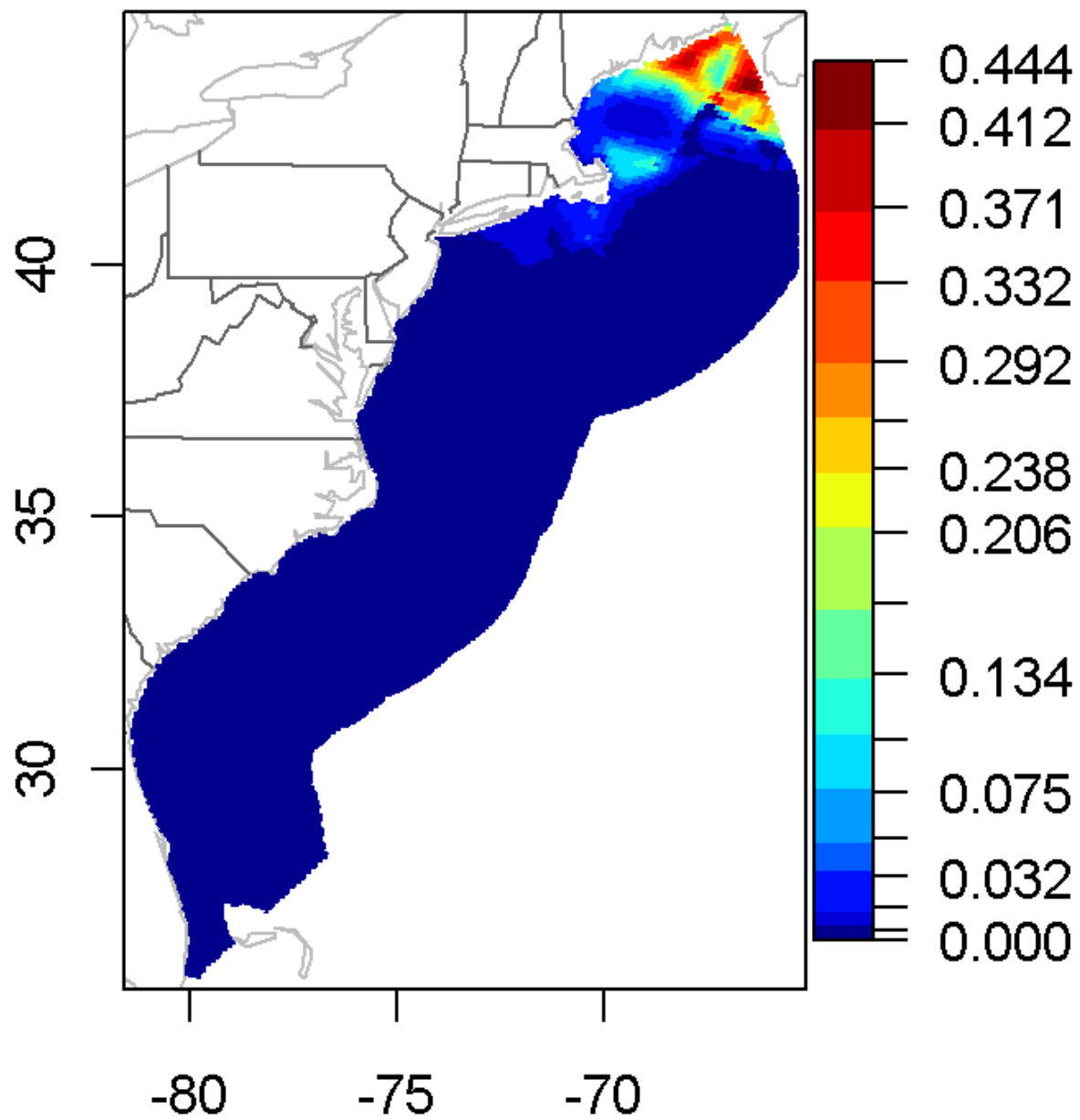


Figure 194: Map of mean predicted habitat for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

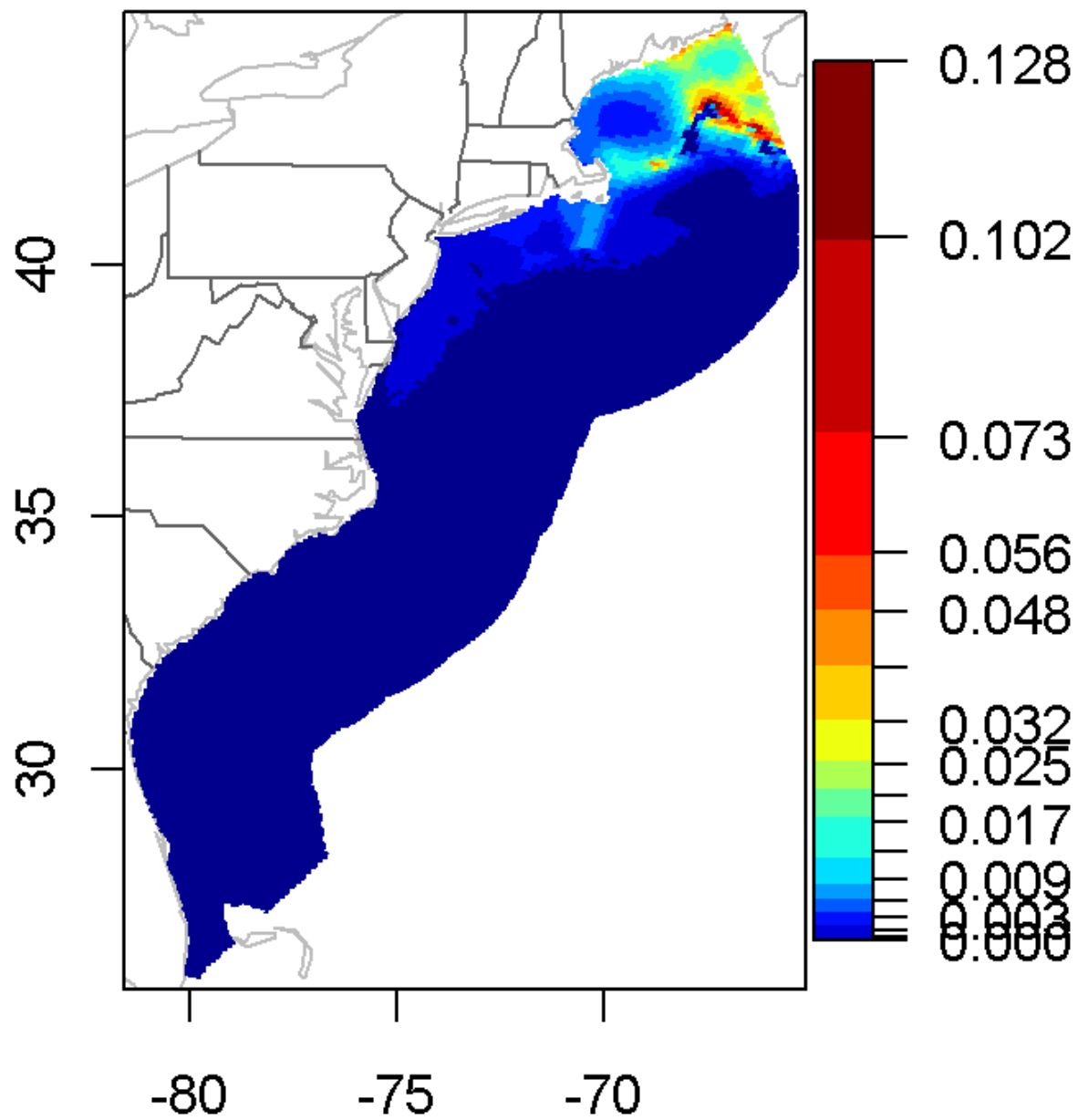


Figure 195: Map of standard error of habitat for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

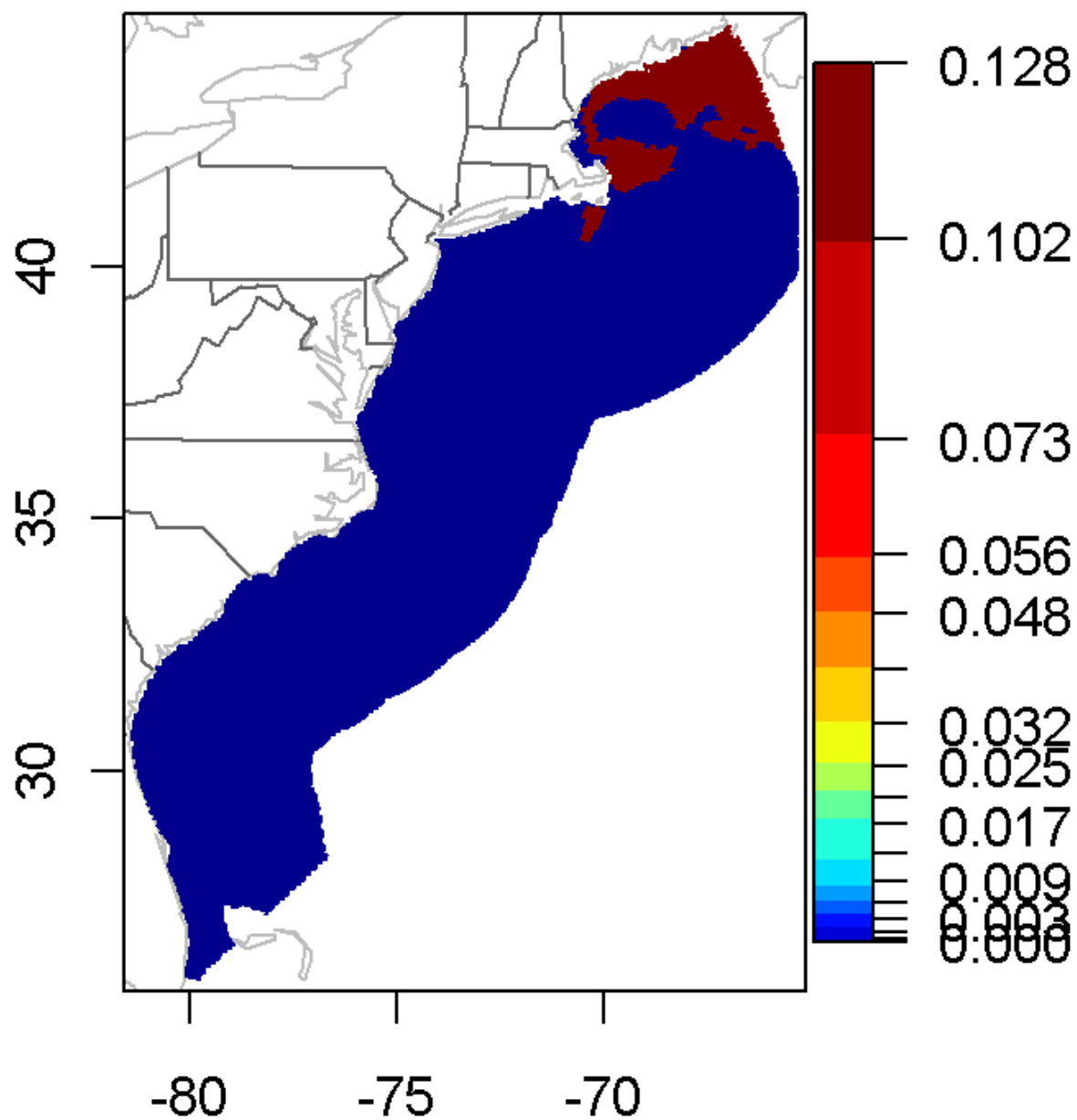


Figure 196: Map of binary habitat (cutoff determined by ROC) for 'Harbour porpoise' guild during 'fall' season in 'east2' region.

4.1.2 ne2

Modelrun identifier: duke_06_hp3_fall_ne2

Date generated: 2008-10-21 15:36:21

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 19: Summary for duke(6) GAM model: for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

	Value
Number.presences	46
Number.absences	1138
GAM.converged	TRUE
R.squared	0.553125
Deviance.explained	0.598956
ROC.optimum	0.931982
Maximum.fit	0.00103759
Maximum.prediction	0.382668

Model text summary...

```
duke_06_hp3_fall_ne2 run on Tue Oct 21 15:35:47 2008
  provider:duke, version:06, guild:Harbour porpoise (hp3), season:'fall', region:ne2

max.fit:0.931982, max.prediction:0.382668, ROC.optimum:0.001038

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -49.039      3.708   -13.23  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.9946  2.495  49.77  <2e-16 ***
s(log(d2shelf)) 1.9400  2.440  85.36  <2e-16 ***
s(log(d2coast)) 0.9927  1.493  70.52  <2e-16 ***
s(sst)         1.9799  2.480  84.41  <2e-16 ***
s(lat)         0.9970  1.497 102.91  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  0.553   Deviance explained = 59.9%
GCV score = 0.0004492   Scale est. = 0.00044295  n = 1151

summary(dat)...
  region   fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.    : 1654  Min.    :  6.0  Min.    :  10  Min.    : 2399  Min.   :10.27  Min.   :34.98
          1st Qu.:12167  1st Qu.: 31.0  1st Qu.: 17665  1st Qu.: 36814  1st Qu.:13.27  1st Qu.:37.32
          Median :12756  Median : 77.5  Median : 45345  Median : 61405  Median :16.58  Median :38.40
          Mean   :13153  Mean   :333.7  Mean   :59546  Mean   :82303  Mean   :17.22  Mean   :39.77
          3rd Qu.:15995  3rd Qu.:184.0  3rd Qu.:91400  3rd Qu.:104540  3rd Qu.:21.32  3rd Qu.:42.93
          Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :27.38  Max.   :44.66
                   NA's   :      1  NA's   :      1  NA's   :32.00

summary(newdat)...
  region   fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  6  Min.    :  5  Min.    :1259  Min.   :10.50  Min.   :34.27
          1st Qu.:12297  1st Qu.: 84  1st Qu.: 33503  1st Qu.: 94835  1st Qu.:15.38  1st Qu.:37.36
```


Median :13718	Median :1827	Median : 78620	Median :188836	Median :19.95	Median :39.16
Mean :13277	Mean :1832	Mean :102648	Mean :201021	Mean :19.13	Mean :39.20
3rd Qu.:15139	3rd Qu.:3517	3rd Qu.:154146	3rd Qu.:299808	3rd Qu.:22.50	3rd Qu.:40.92
Max. :16560	Max. :4752	Max. :354376	Max. :478082	Max. :26.70	Max. :44.74
		NA's : 2	NA's : 2		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :5.066e-16	Min. :0.000e+00	Min. :1.290e-06	Min. :0.00000
1st Qu.:12297	1st Qu.:2.220e-16	1st Qu.:2.219e-15	1st Qu.:0.000e+00	1st Qu.:5.190e-04	1st Qu.:0.00000
Median :13718	Median :2.220e-16	Median :3.749e-15	Median :0.000e+00	Median :2.266e-03	Median :0.00000
Mean :13277	Mean :1.696e-03	Mean :4.653e-04	Mean :5.281e-02	Mean :5.489e-03	Mean :0.07845
3rd Qu.:15139	3rd Qu.:1.223e-07	3rd Qu.:1.824e-07	3rd Qu.:0.000e+00	3rd Qu.:6.029e-03	3rd Qu.:0.00000
Max. :16560	Max. :3.827e-01	Max. :9.782e-02	Max. :1.000e+00	Max. :1.265e-01	Max. :1.00000
	NA's :2.000e+00	NA's :2.000e+00	NA's :4.814e+03	NA's :4.814e+03	

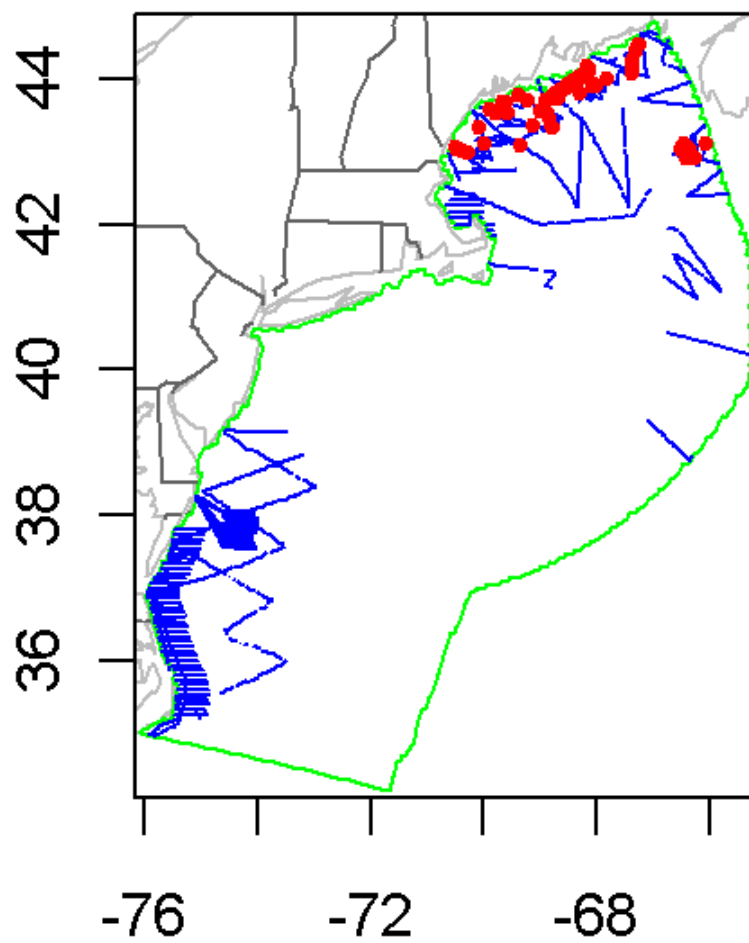


Figure 197: Map of points of observational sightings and tracks of survey effort for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

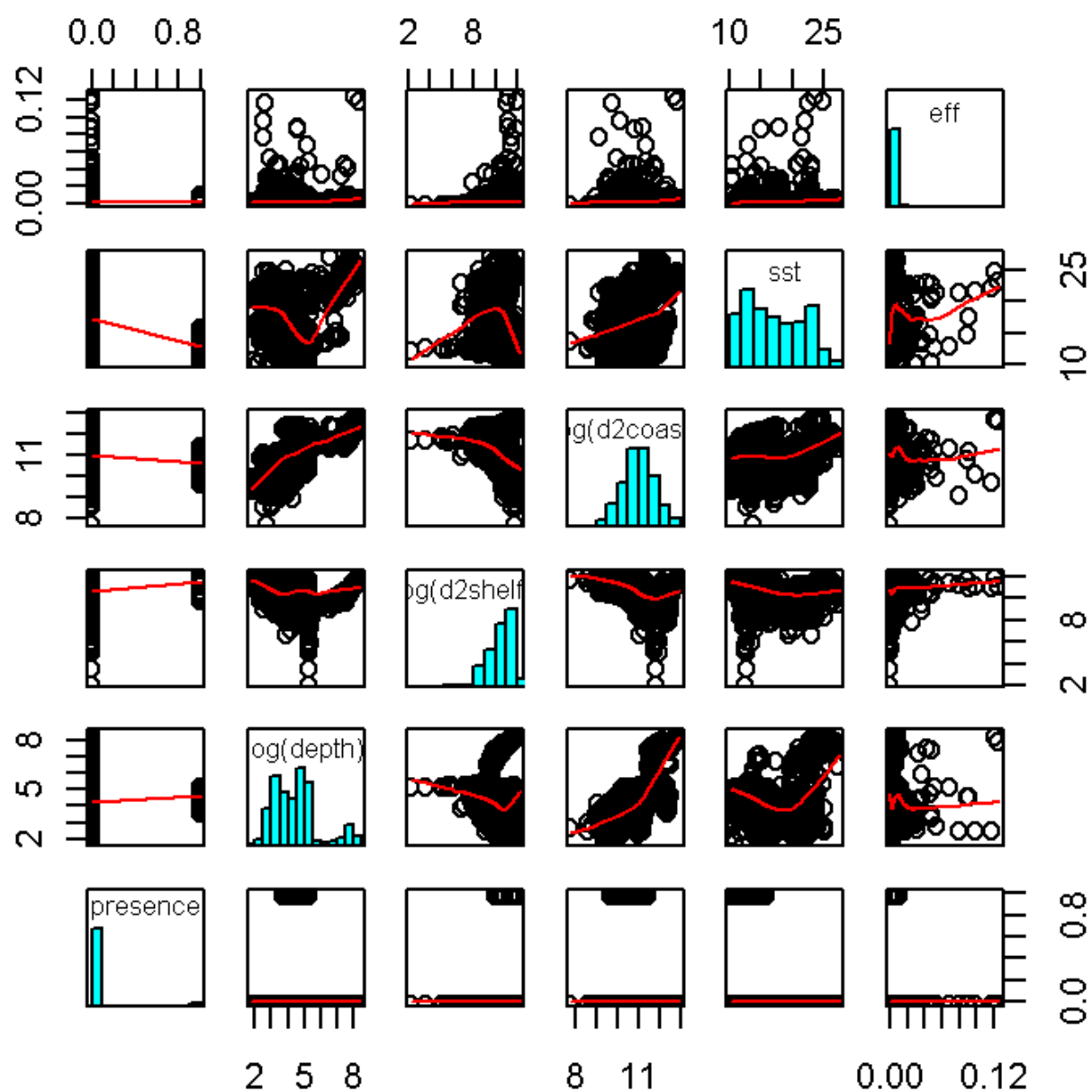


Figure 198: Pairs plot of input variables for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

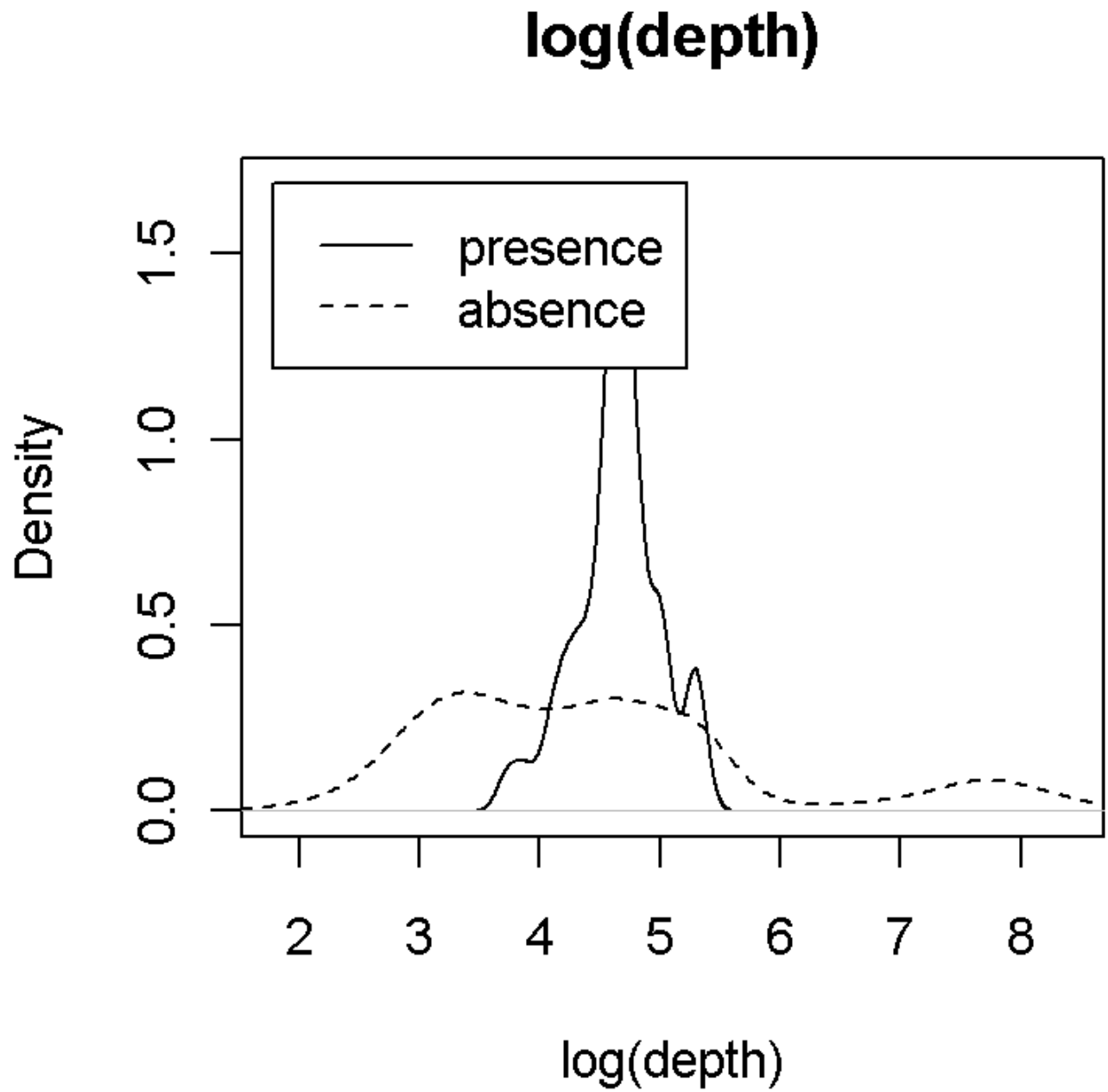


Figure 199: Density histogram of depth log(meters) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

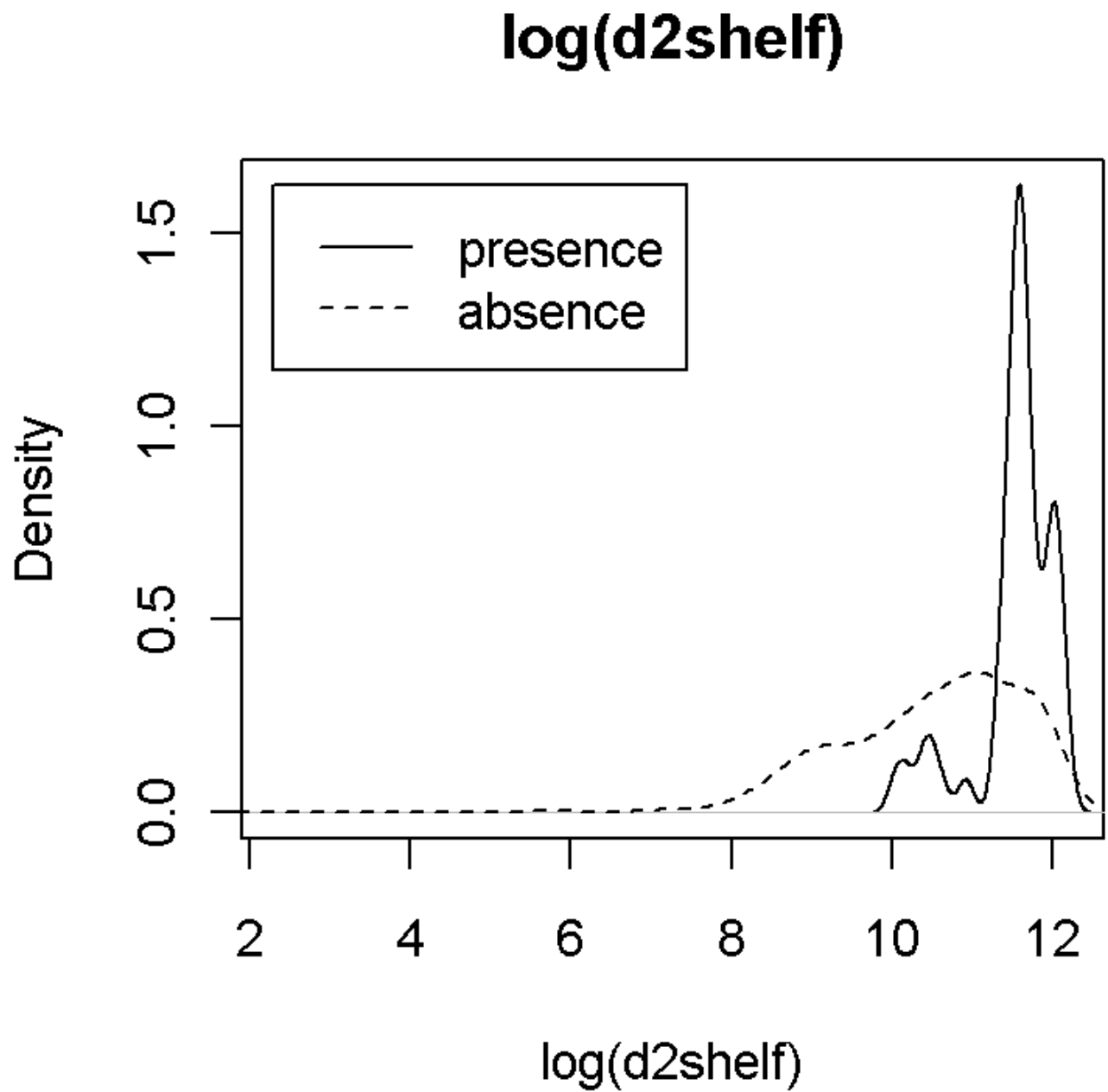


Figure 200: Density histogram of distance to shelf log(meters) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

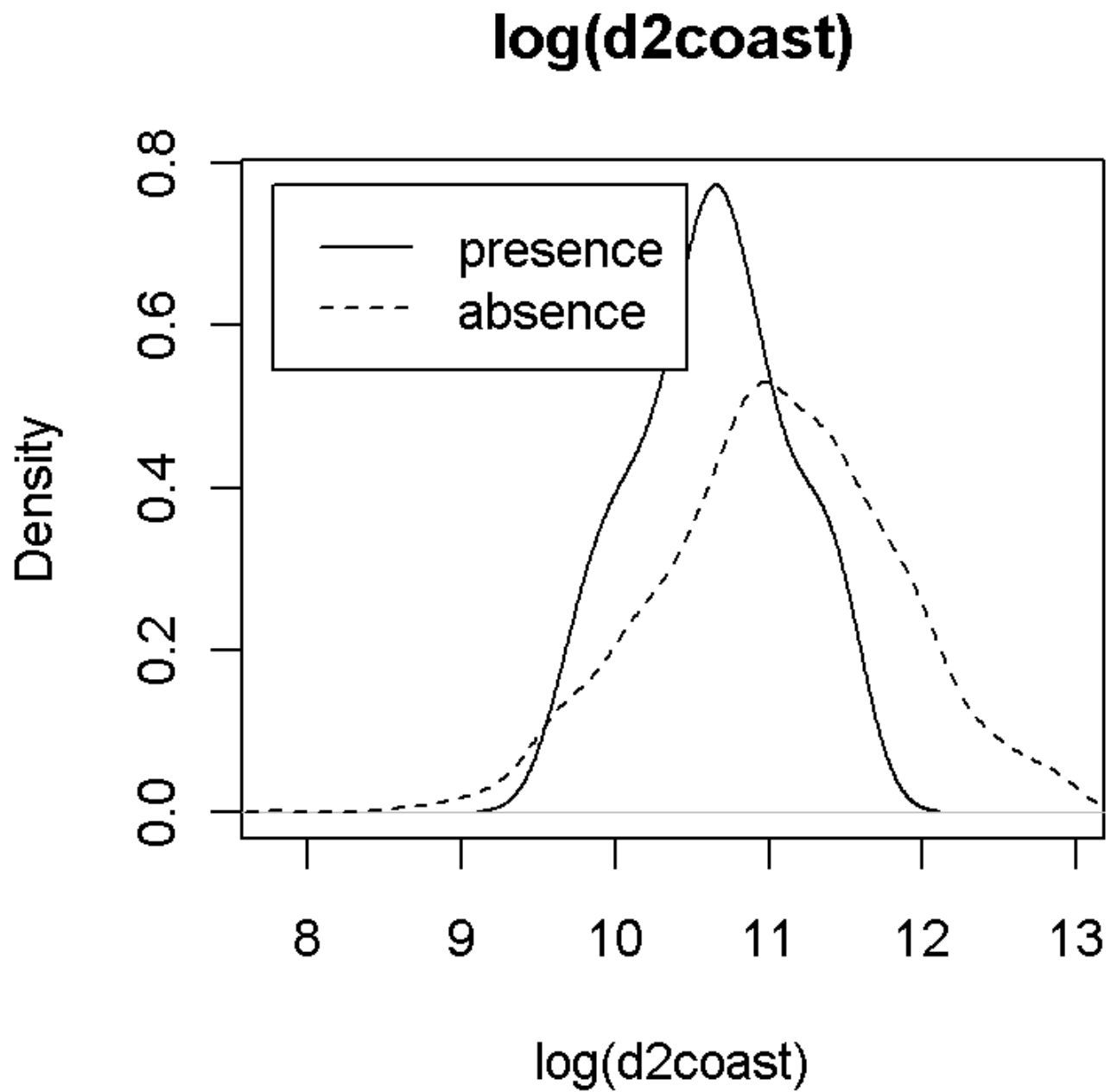


Figure 201: Density histogram of distance to coast log(meters) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

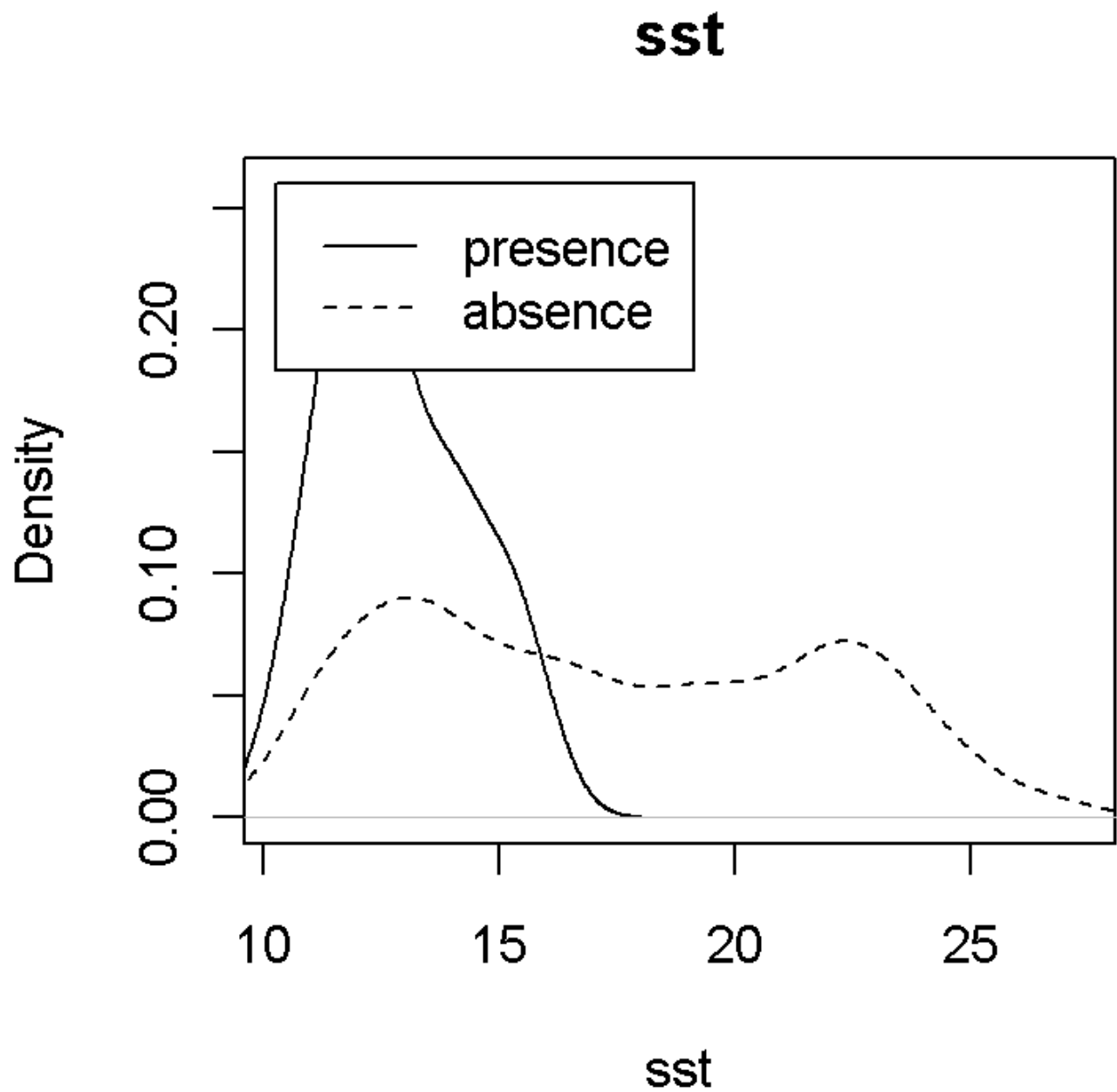


Figure 202: Density histogram of sea-surface temperature (degrees C) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

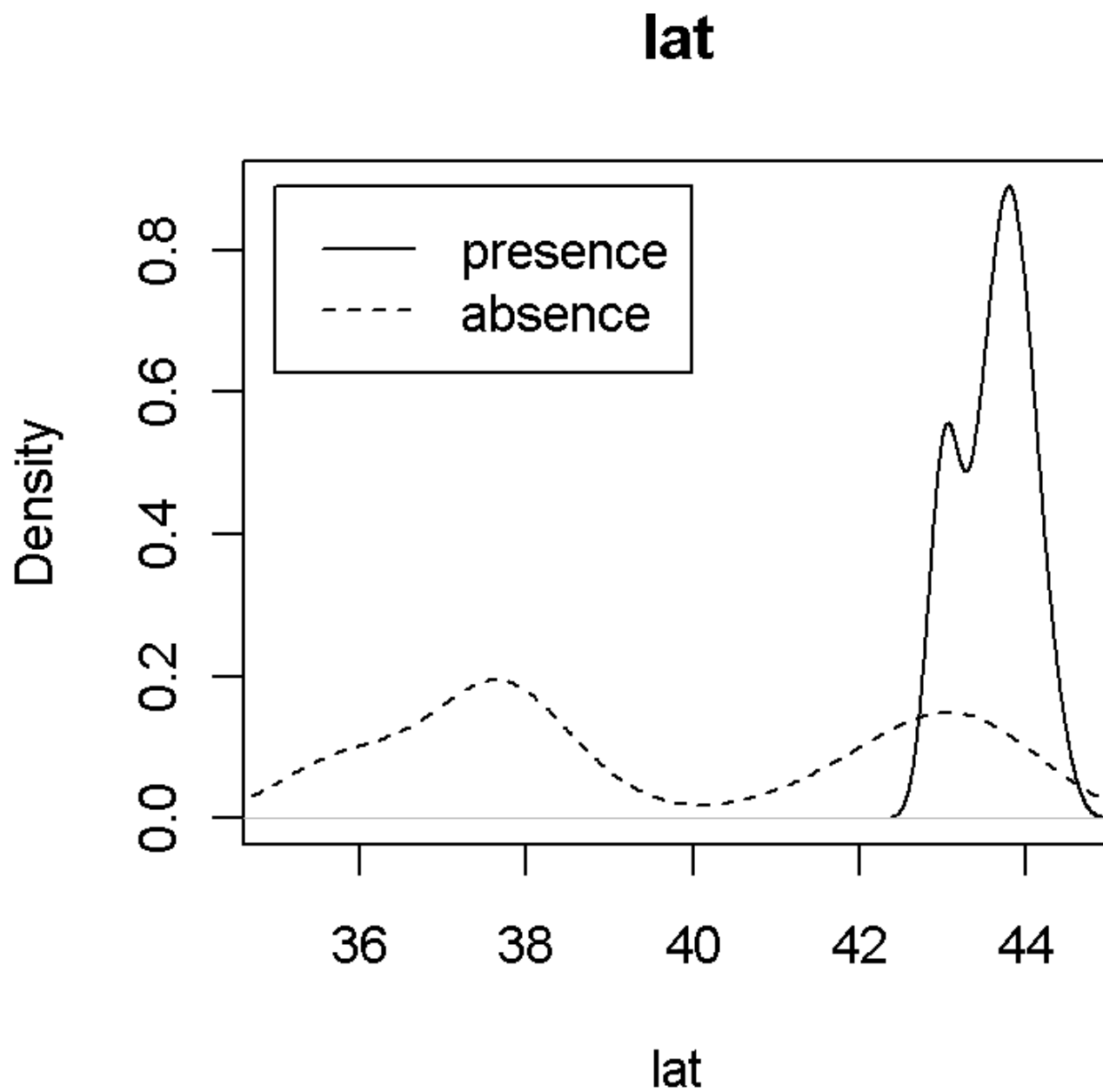


Figure 203: Density histogram of latitude (degrees) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

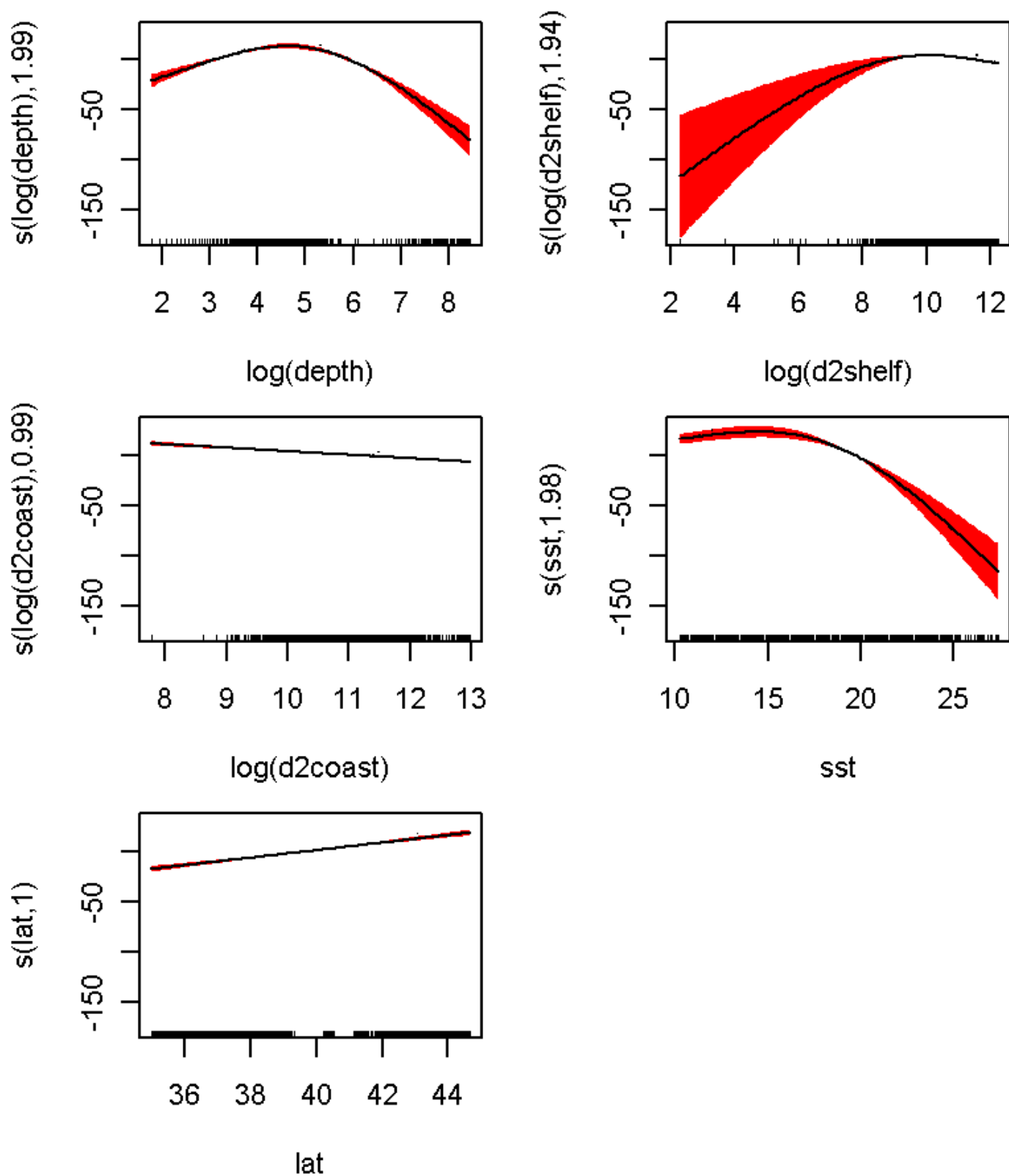


Figure 204: Terms plot of predictors to GAM model fit for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

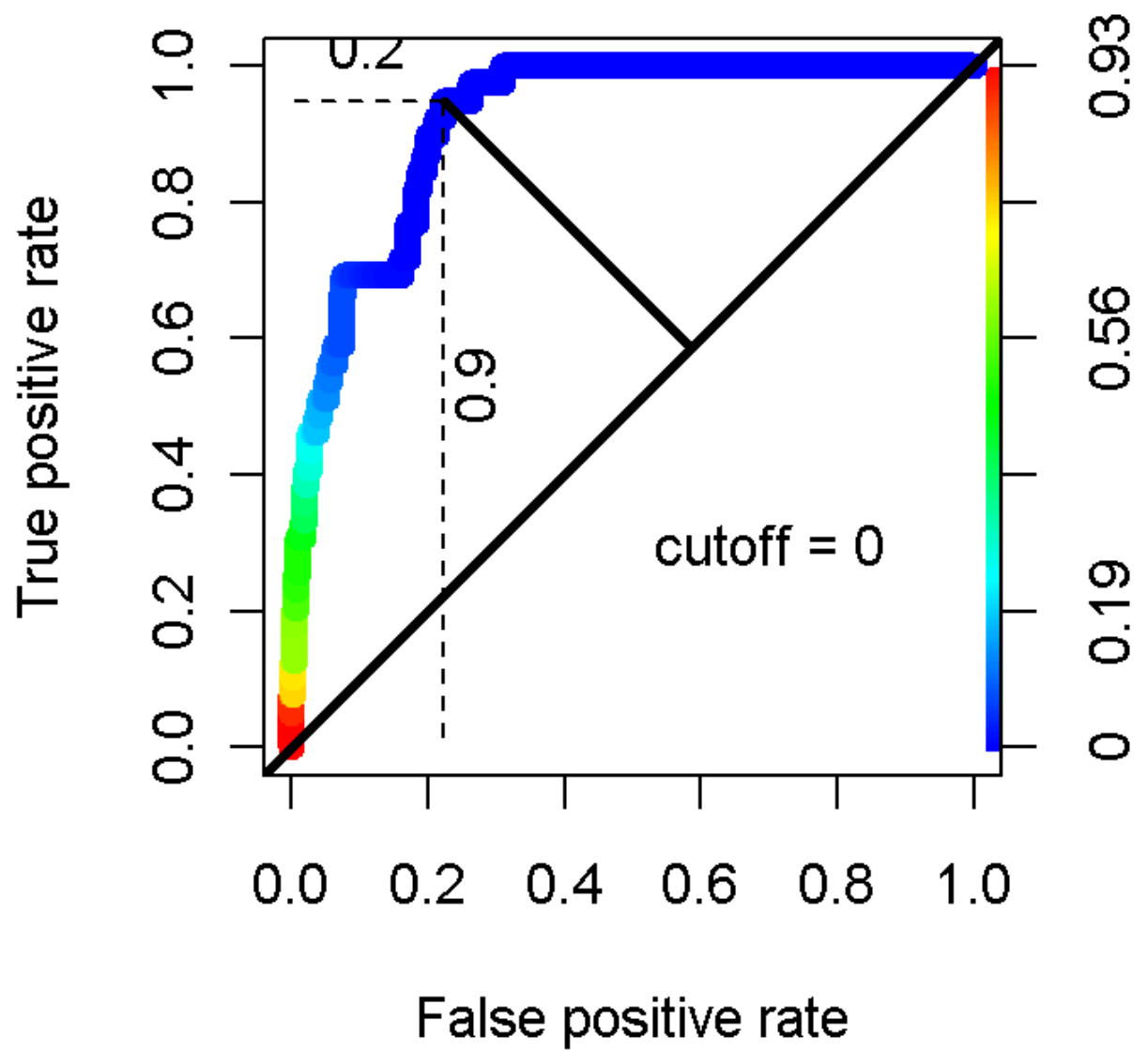


Figure 205: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

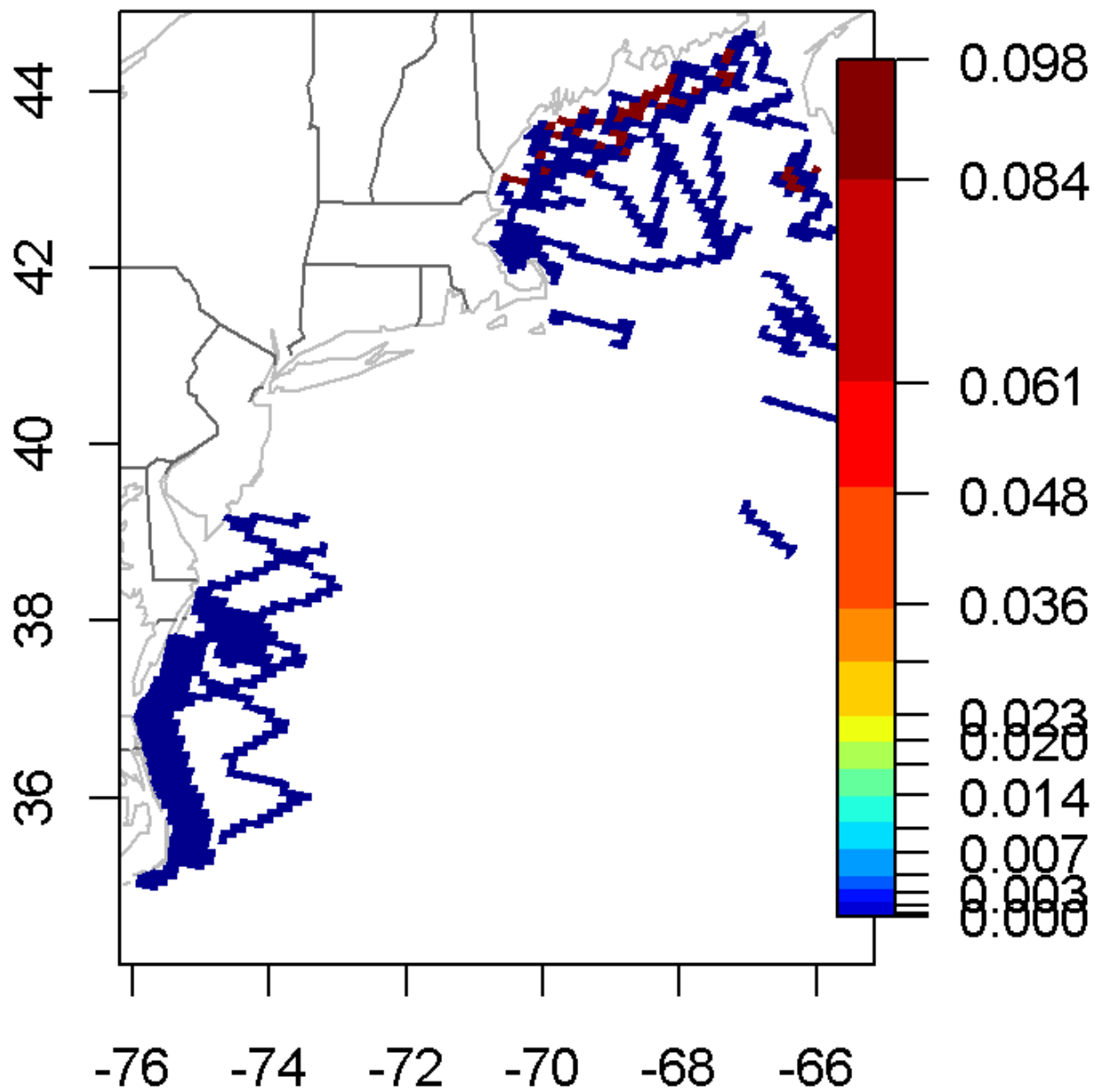


Figure 206: Map of presence and absence by cell summed through time for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

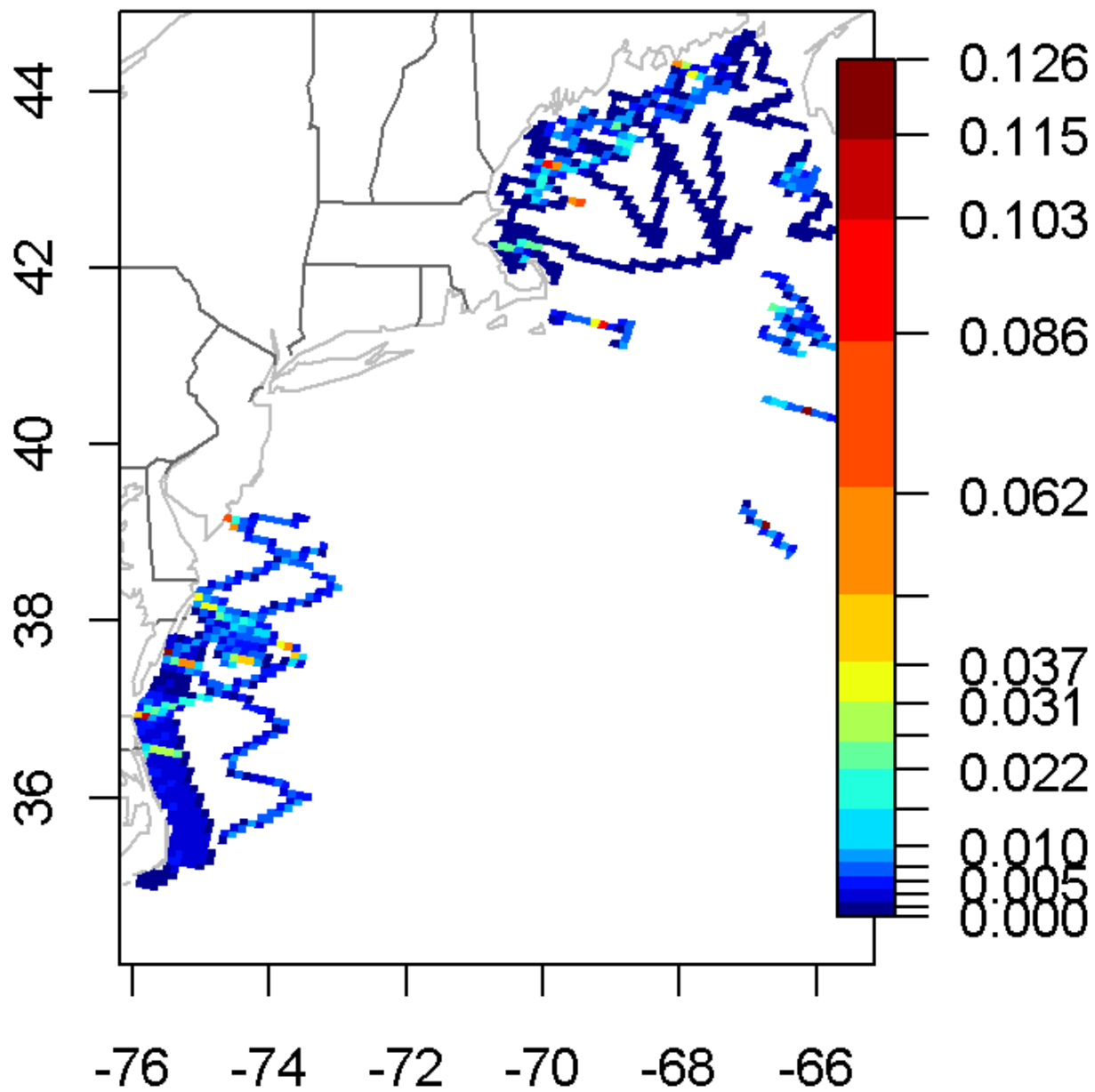


Figure 207: Map of effort(hours/km²) by cell summed through time for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

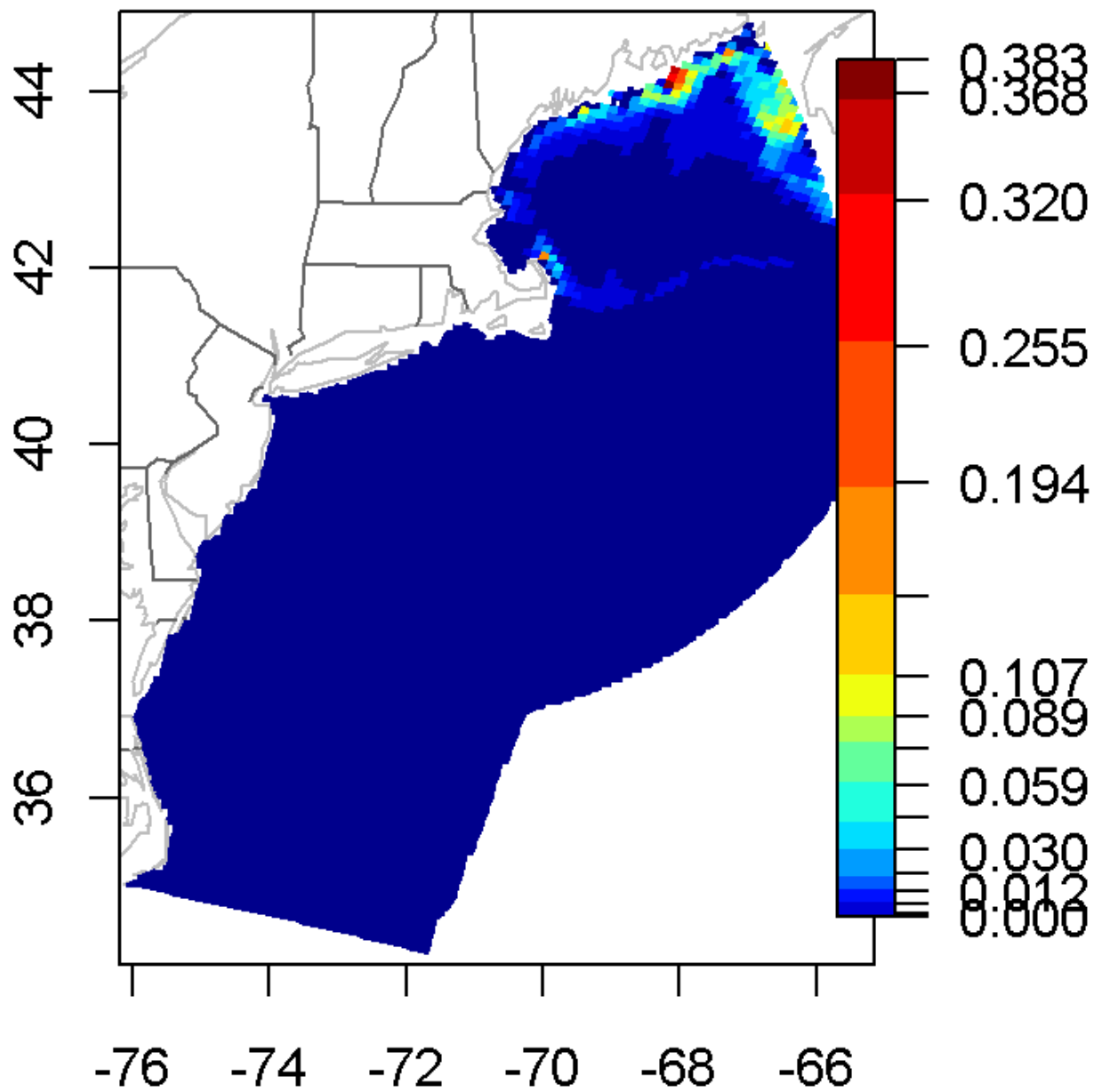


Figure 208: Map of mean predicted habitat for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

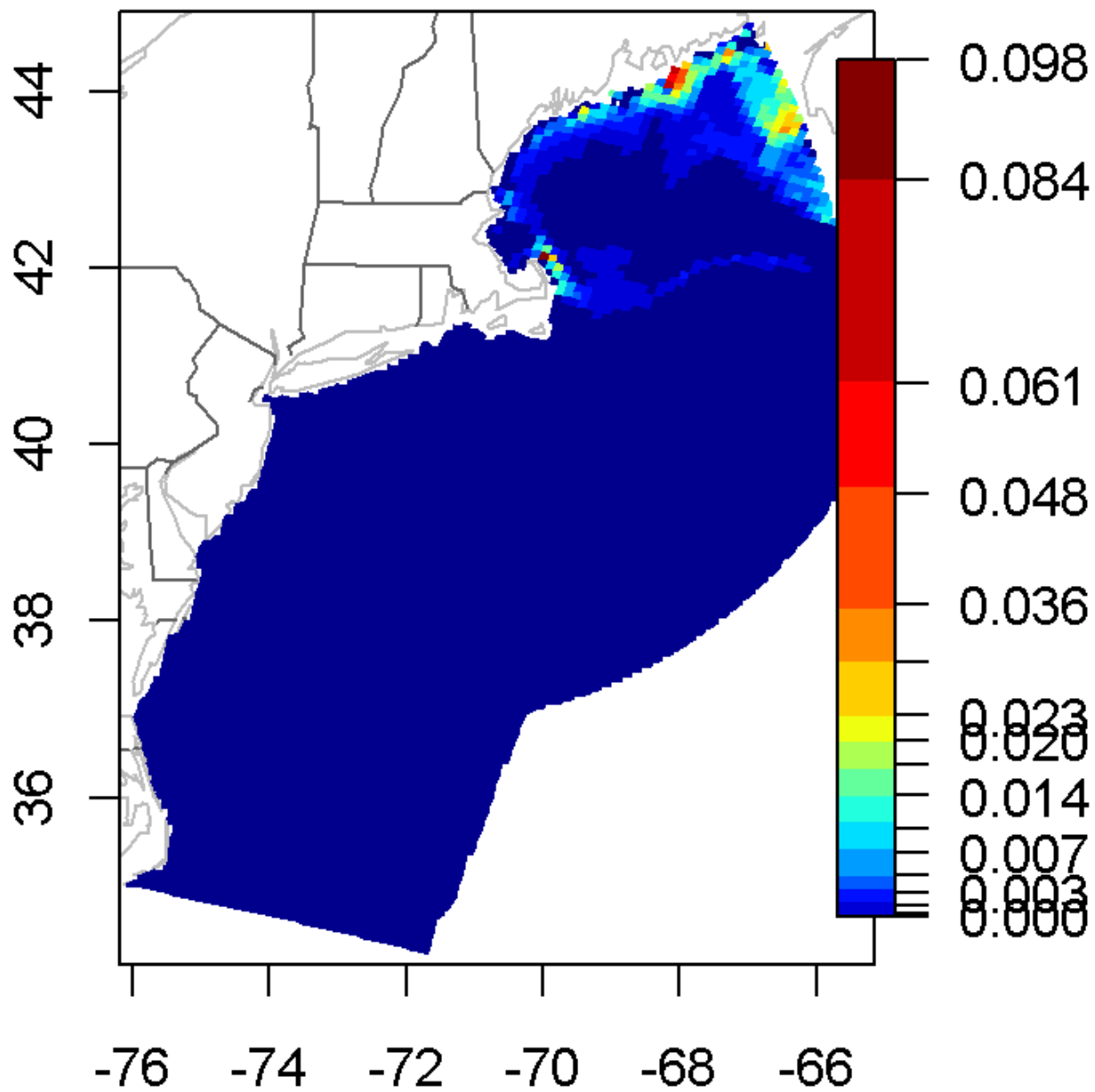


Figure 209: Map of standard error of habitat for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

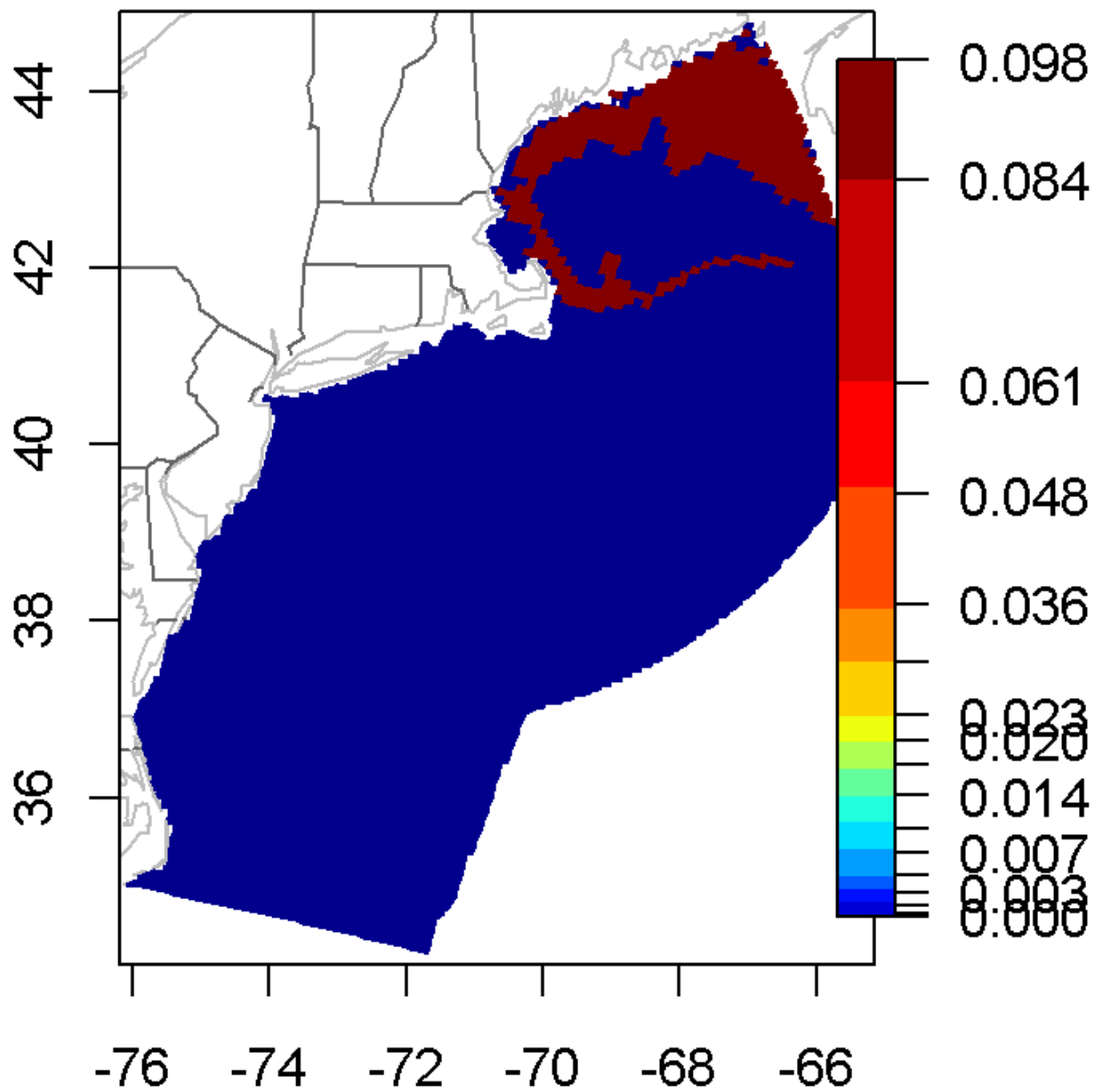


Figure 210: Map of binary habitat (cutoff determined by ROC) for 'Harbour porpoise' guild during 'fall' season in 'ne2' region.

4.2 spring

4.3 summer

4.3.1 east2

Modelrun identifier: duke_06_hp3_summer_east2

Date generated: 2008-10-21 13:01:39

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 20: Summary for duke(6) GAM model: for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

	Value
Number.presences	396
Number.absences	8682
GAM.converged	TRUE
R.squared	0.4744
Deviance.explained	0.554969
ROC.optimum	0.921746
Maximum.fit	0.0555273
Maximum.prediction	0.921743

Model text summary...

```
duke_06_hp3_summer_east2 run on Tue Oct 21 12:55:22 2008
  provider:duke, version:06, guild:Harbour porpoise (hp3), season:'summer', region:east2

max.fit:0.921746, max.prediction:0.921743, ROC.optimum:0.055527

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -12.0227      0.3337  -36.03   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  0.835467  1.3355    9.125 0.000878 ***
s(log(d2shelf)) 1.994297  2.4943  106.004 < 2e-16 ***
s(log(d2coast)) 0.969495  1.4695  124.083 < 2e-16 ***
s(sst)         0.001502  0.5015    0.003 0.821327
s(lat)         0.999233  1.4992  624.283 < 2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.474  Deviance explained = 55.5%
GCV score = 0.00096983  Scale est. = 0.00096866  n = 8663

summary(dat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.   : 5.0    Min.   : 5    Min.   : 1259  Min.   : 8.175  Min.   :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.: 20989  1st Qu.: 50865  1st Qu.: 17.025  1st Qu.:37.53
          Median :14008  Median : 111.5  Median : 52230  Median :102266  Median : 22.200  Median :40.18
          Mean   :13275  Mean   : 677.3  Mean   : 67623  Mean   :125197  Mean   : 21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.: 420.0  3rd Qu.: 99335  3rd Qu.:174835  3rd Qu.: 25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   : 30.900  Max.   :44.74
          NA's    :      7    NA's    : 7    NA's    :408.000

summary(newdat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   : 4    Min.   : 5    Min.   : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :1.979e-16	Min. :0.000e+00	Min. :7.209e-08	Min. :0.00000
1st Qu.: 9145	1st Qu.:2.220e-16	1st Qu.:2.778e-16	1st Qu.:0.000e+00	1st Qu.:1.220e-03	1st Qu.:0.00000
Median :11616	Median :3.848e-10	Median :2.635e-10	Median :0.000e+00	Median :4.368e-03	Median :0.00000
Mean :11171	Mean :1.230e-02	Mean :5.625e-04	Mean :8.588e-02	Mean :1.069e-02	Mean :0.04136
3rd Qu.:14088	3rd Qu.:7.443e-06	3rd Qu.:2.684e-06	3rd Qu.:0.000e+00	3rd Qu.:9.308e-03	3rd Qu.:0.00000
Max. :16560	Max. :9.217e-01	Max. :3.839e-02	Max. :6.000e+00	Max. :2.910e-01	Max. :1.00000
	NA's :5.000e+00	NA's :5.000e+00	NA's :5.277e+03	NA's :5.277e+03	

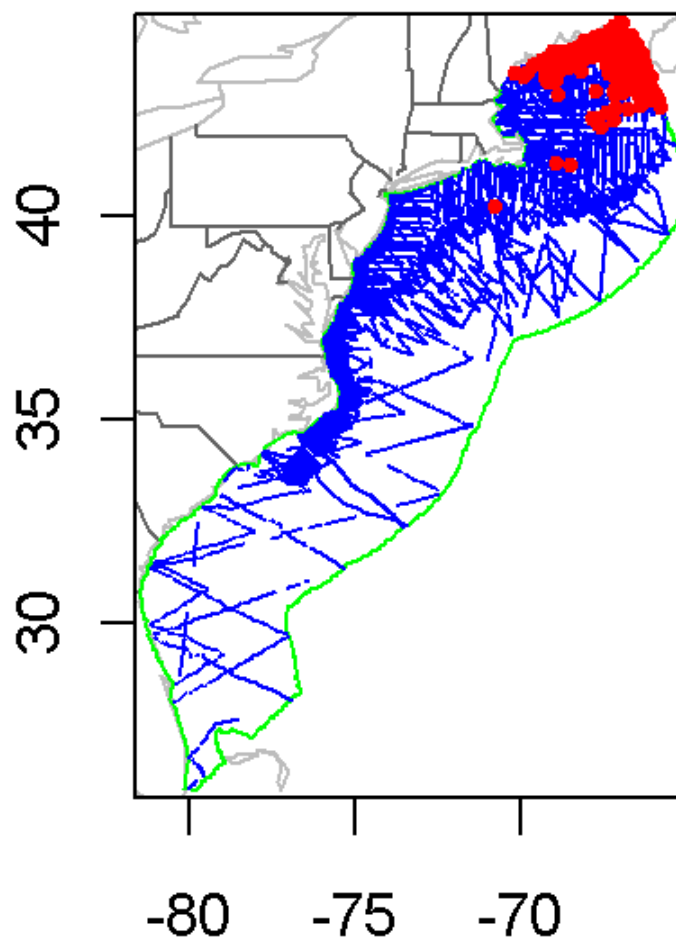


Figure 211: Map of points of observational sightings and tracks of survey effort for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

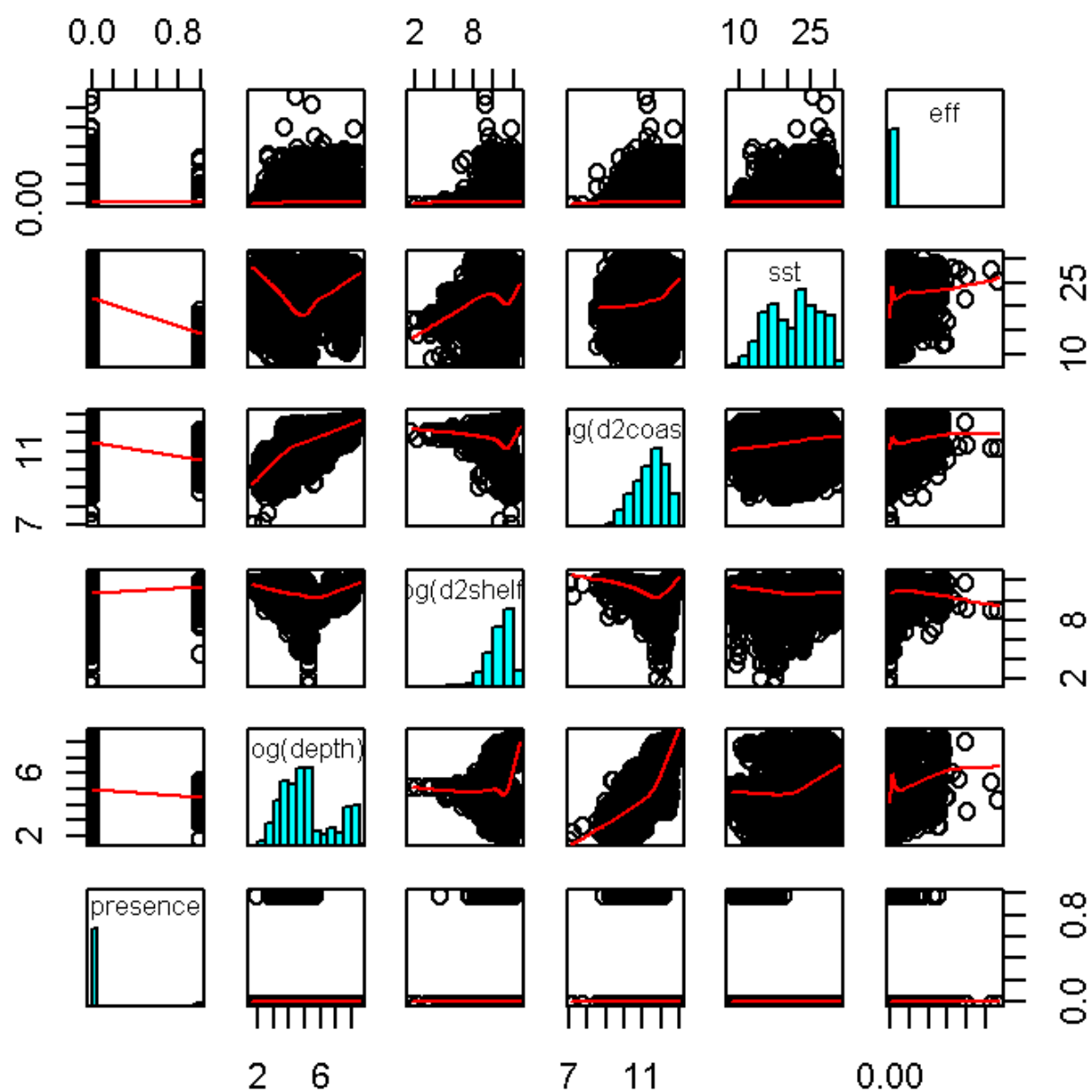


Figure 212: Pairs plot of input variables for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

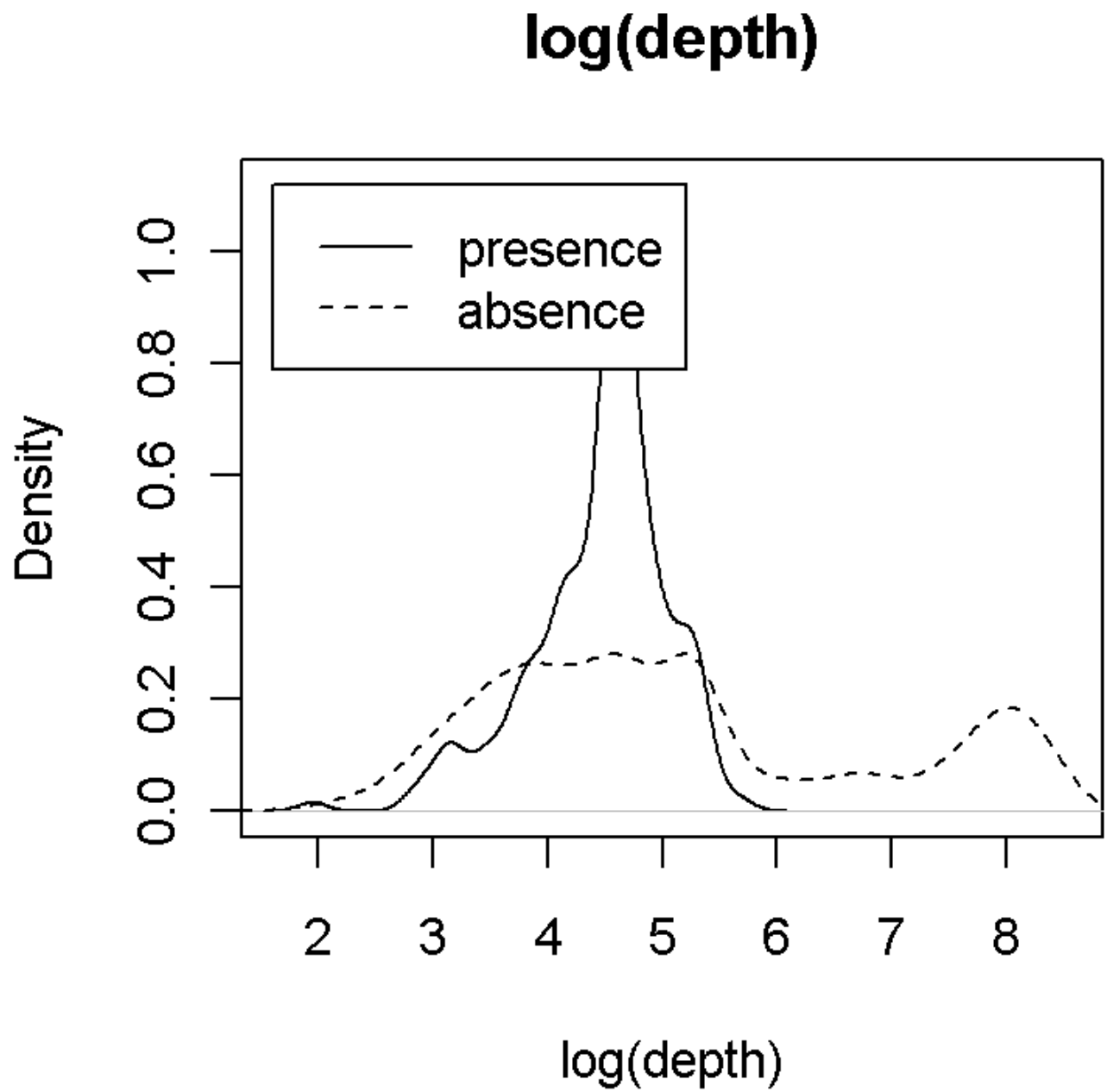


Figure 213: Density histogram of depth log(meters) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

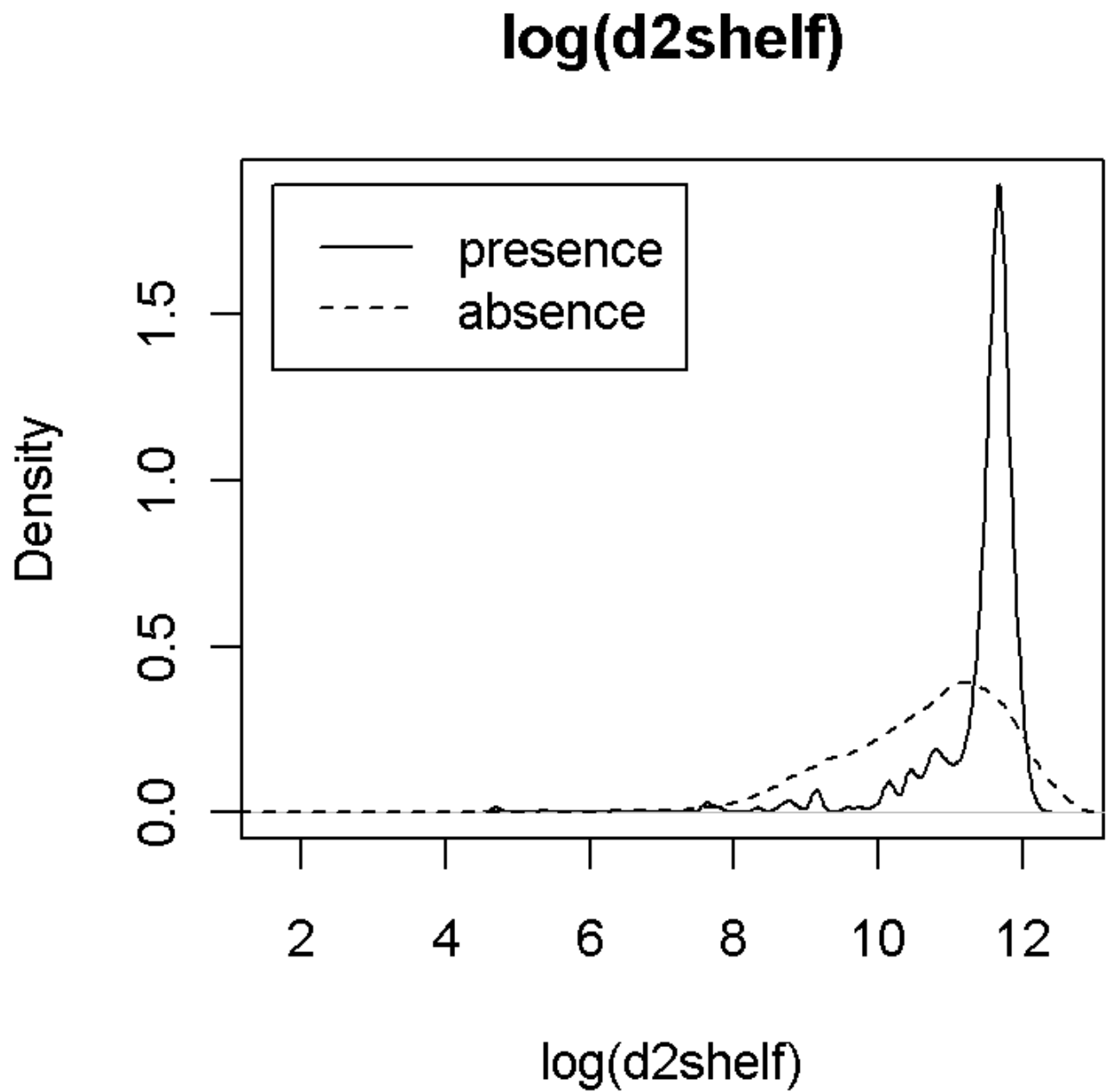


Figure 214: Density histogram of distance to shelf log(meters) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

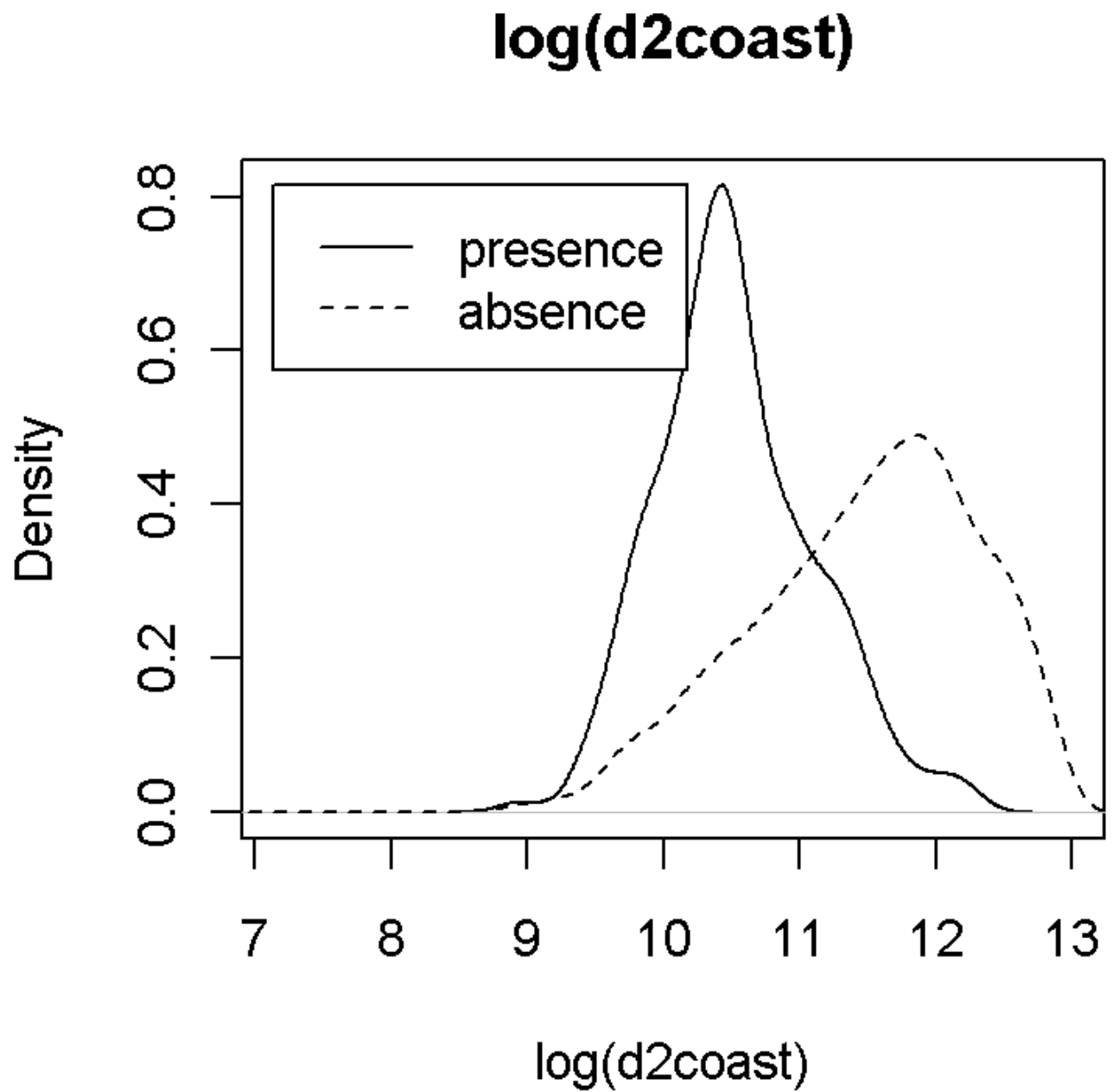


Figure 215: Density histogram of distance to coast log(meters) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

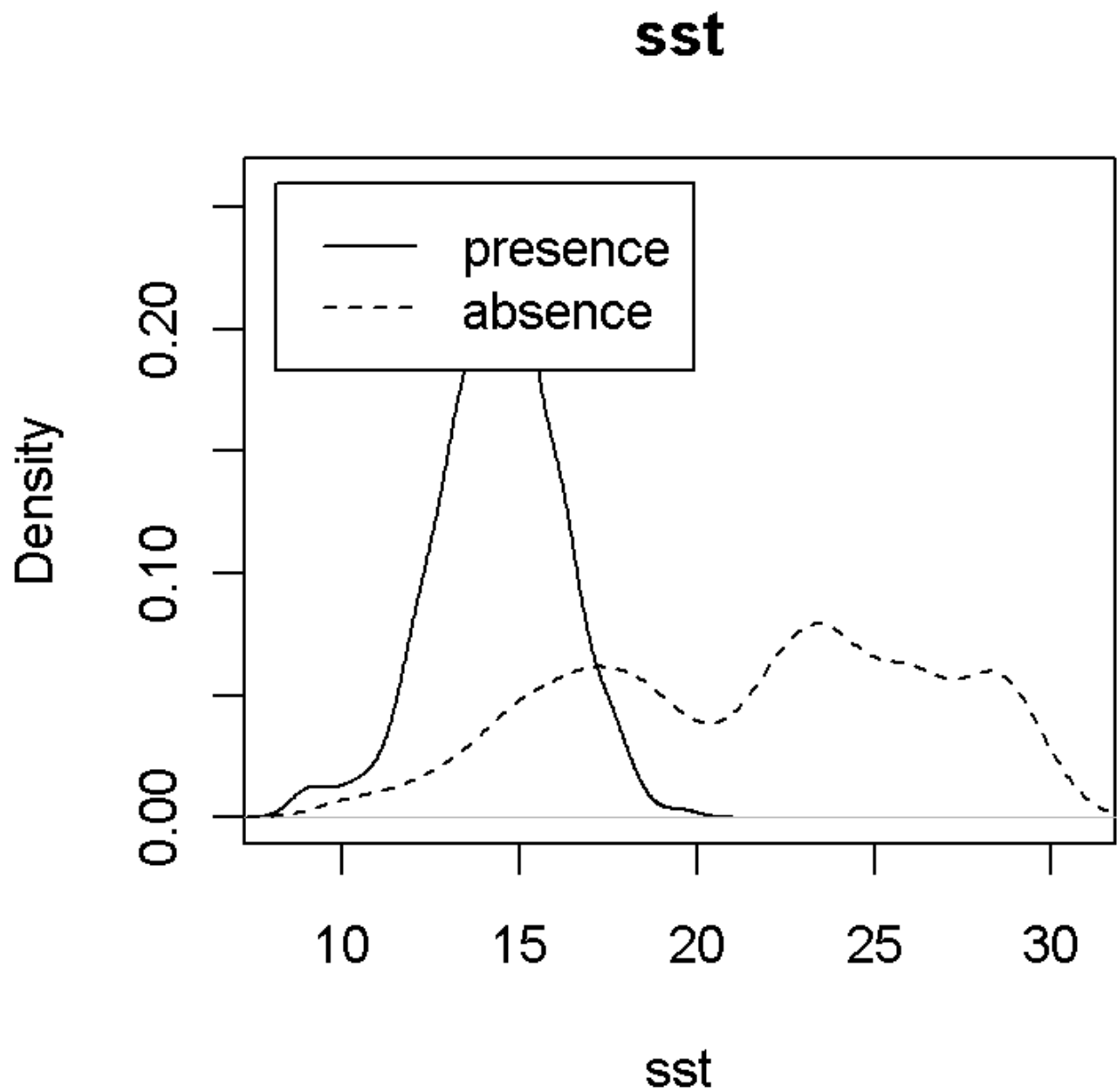


Figure 216: Density histogram of sea-surface temperature (degrees C) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

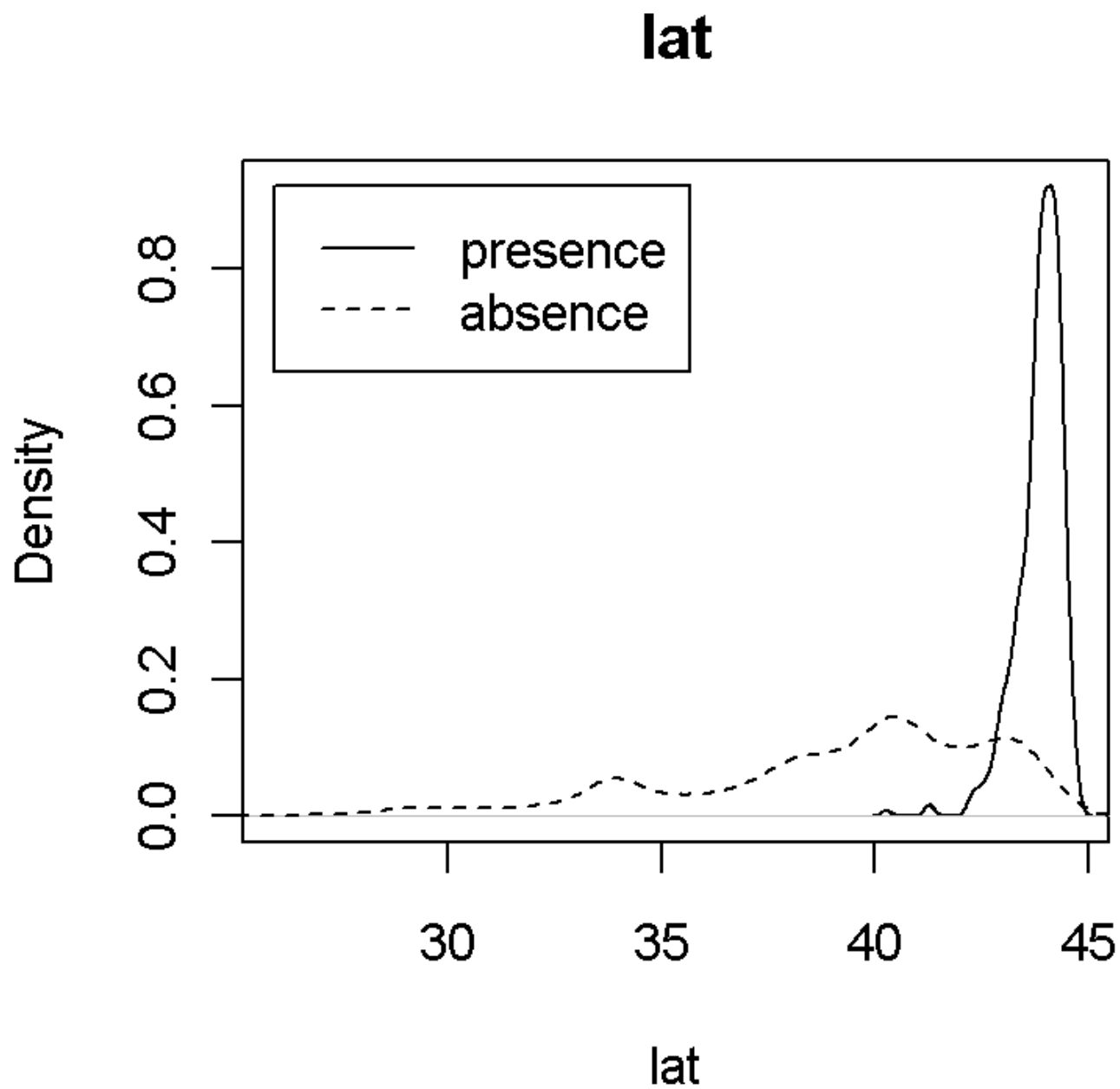


Figure 217: Density histogram of latitude (degrees) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

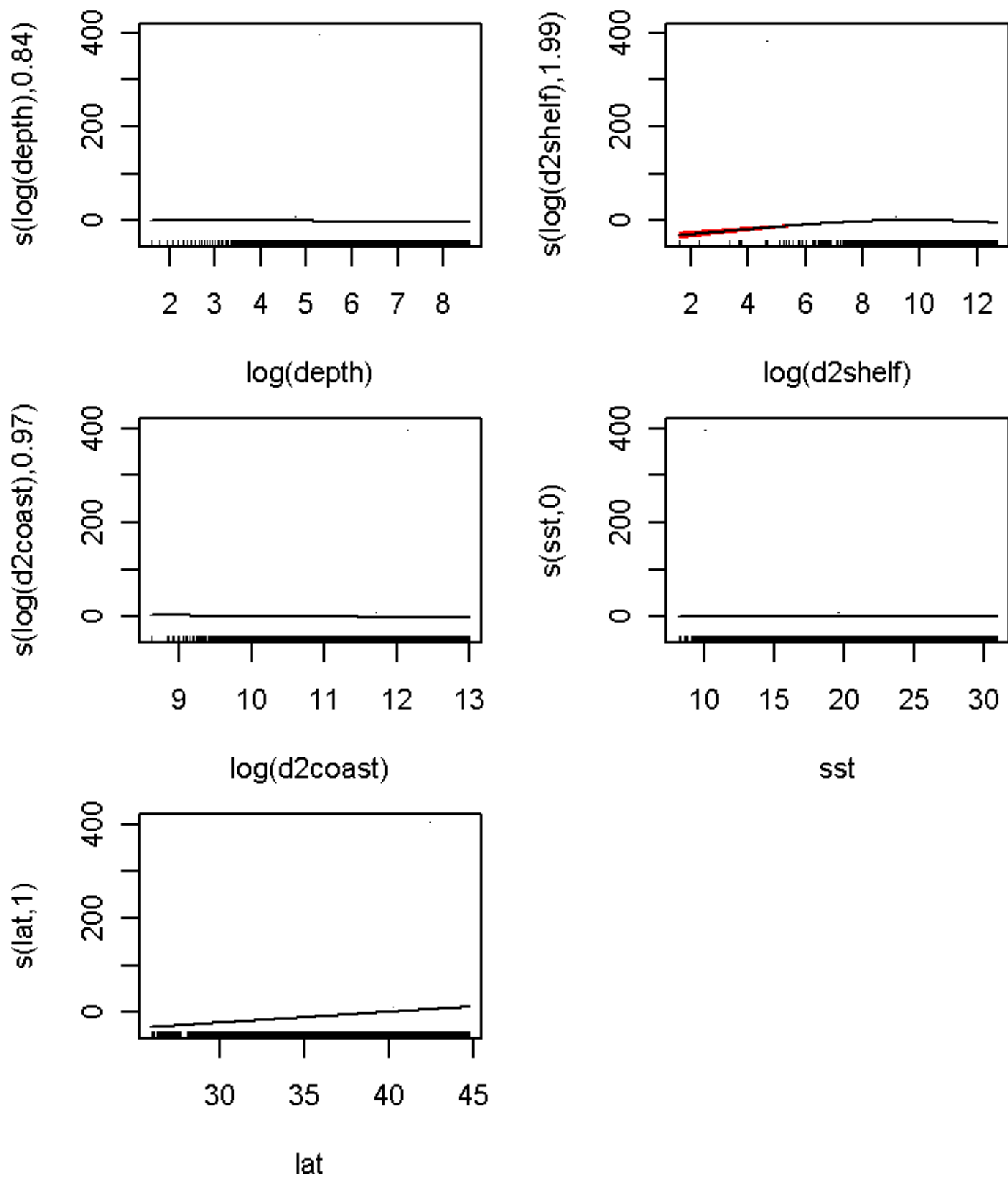


Figure 218: Terms plot of predictors to GAM model fit for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

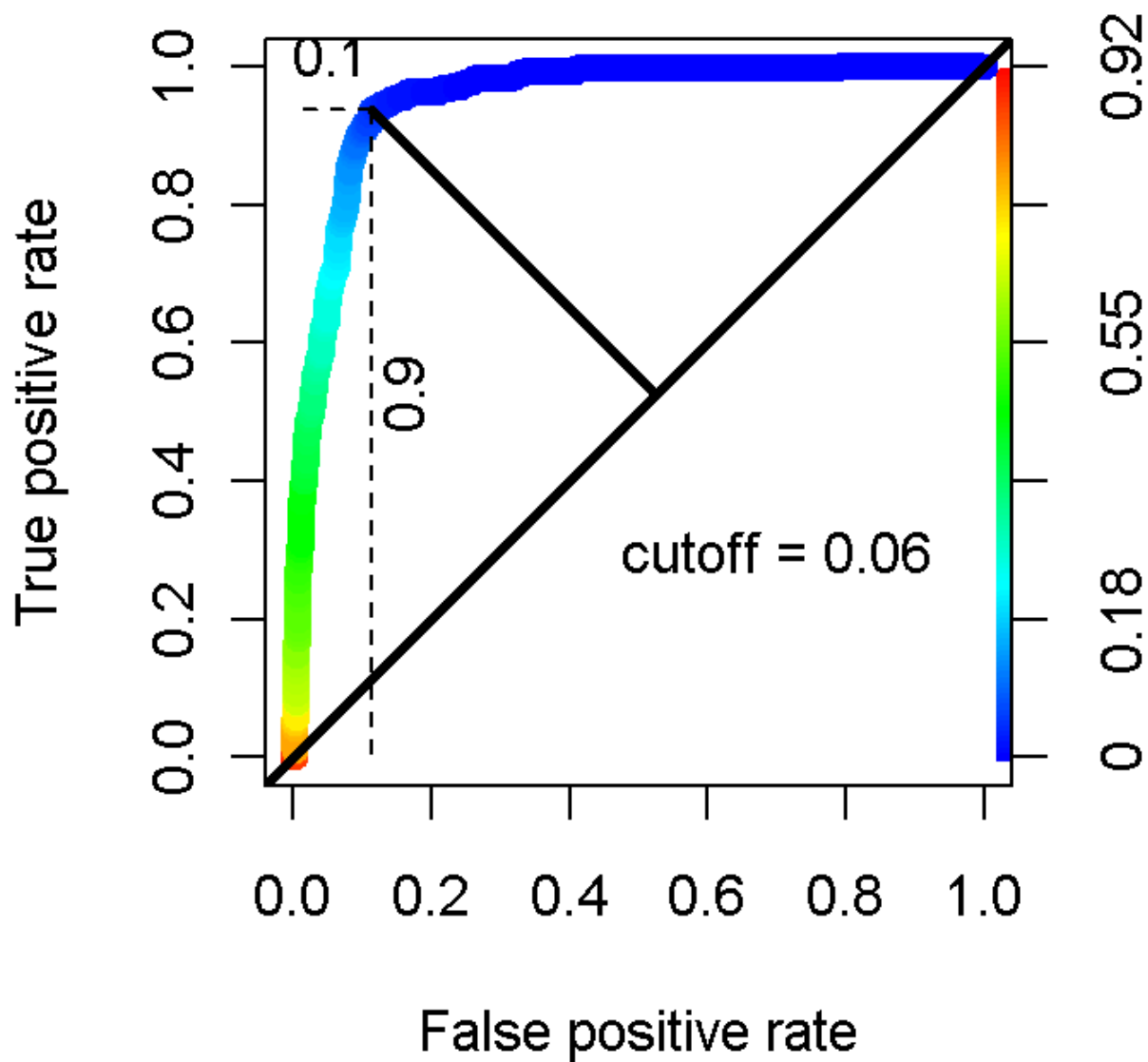


Figure 219: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

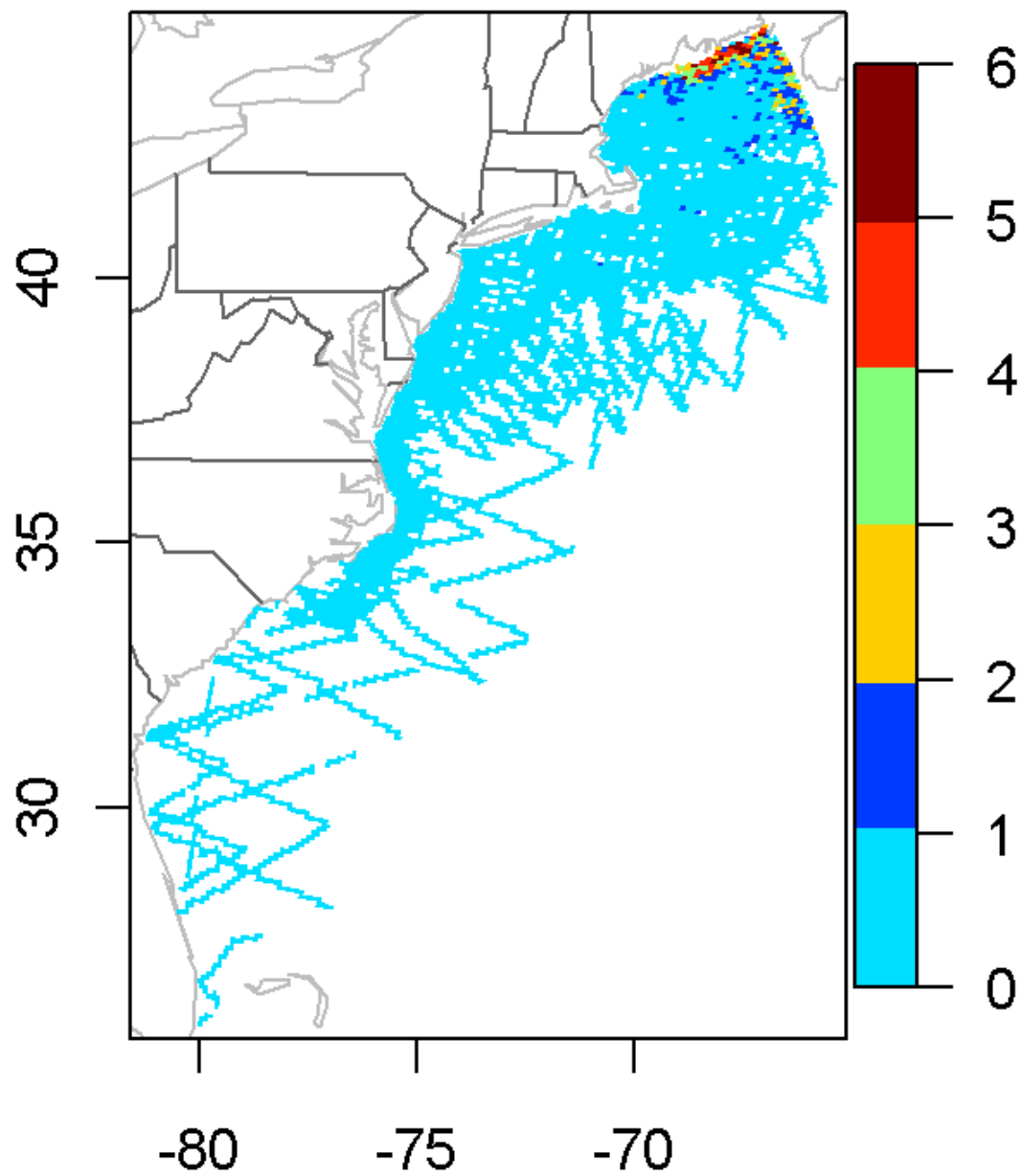


Figure 220: Map of presence and absence by cell summed through time for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

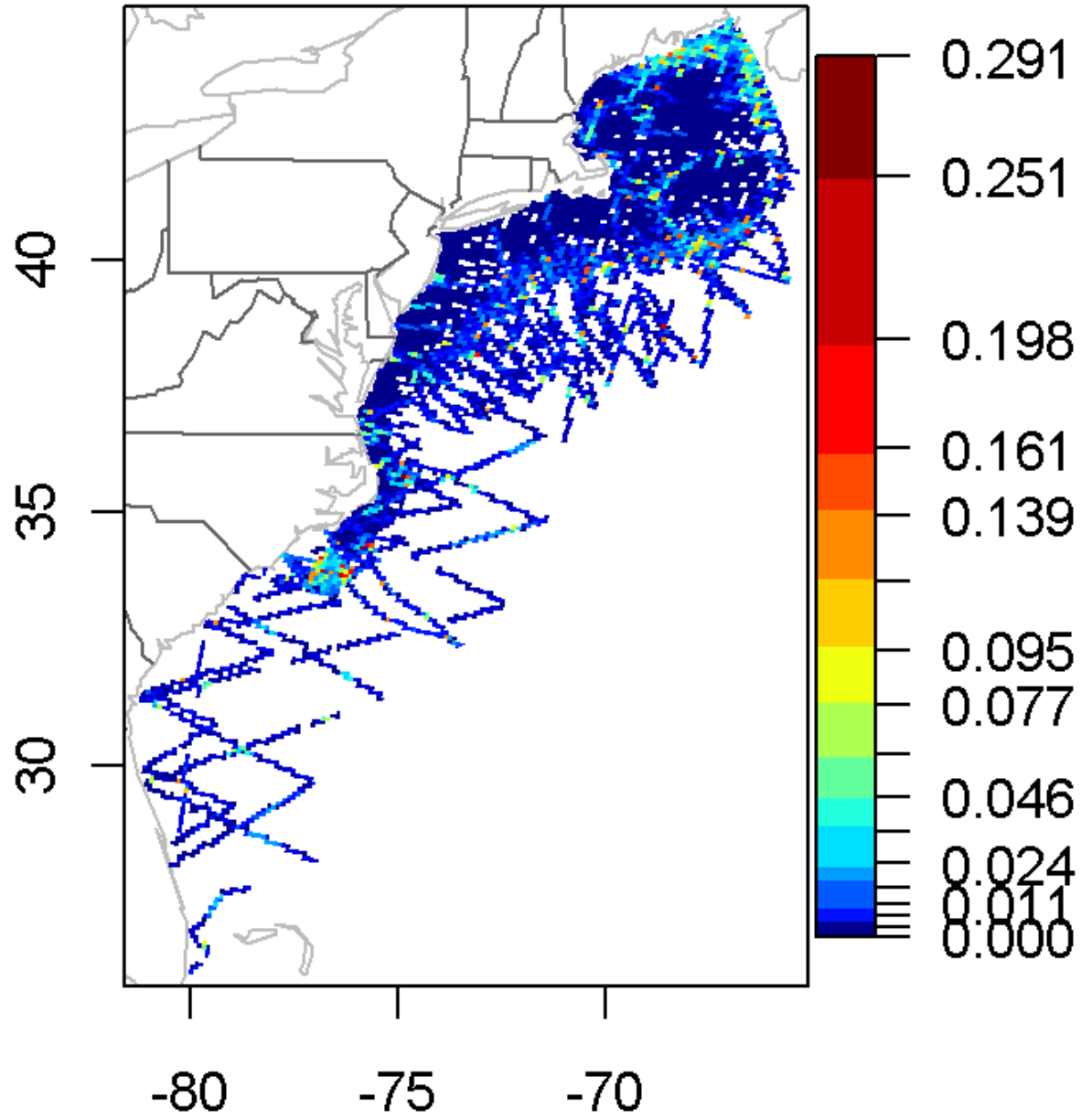


Figure 221: Map of effort(hours/km²) by cell summed through time for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

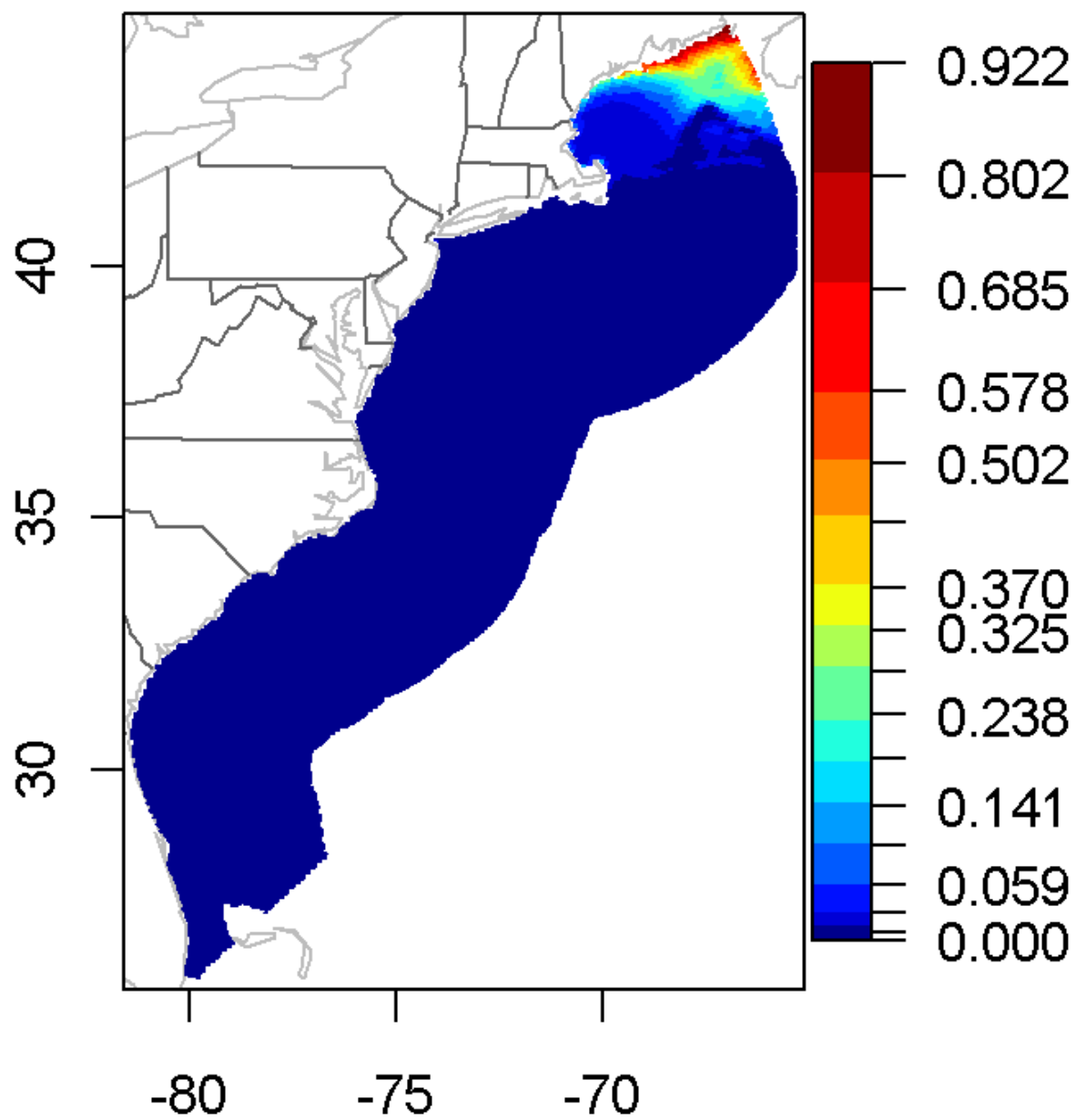


Figure 222: Map of mean predicted habitat for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

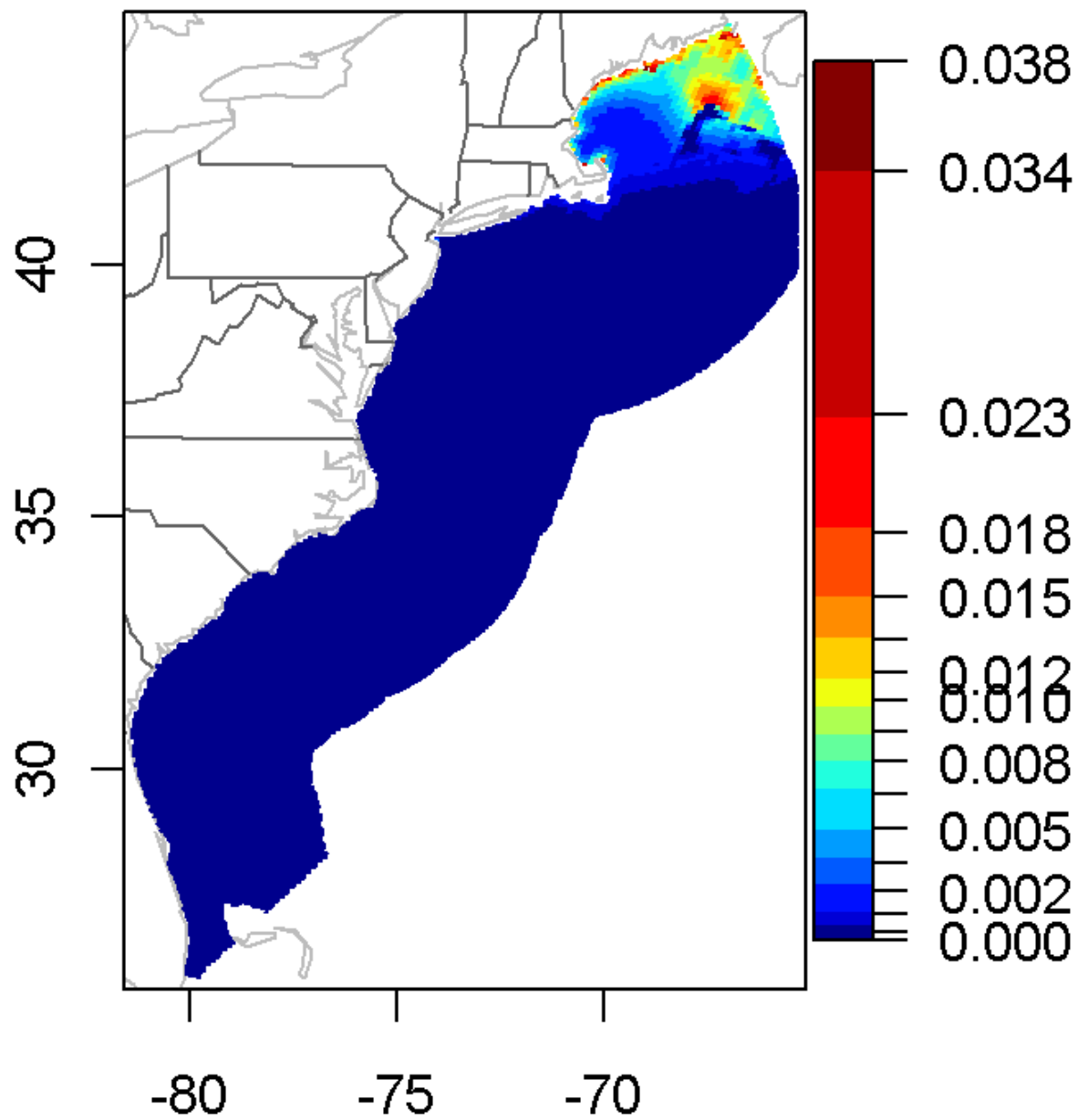


Figure 223: Map of standard error of habitat for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

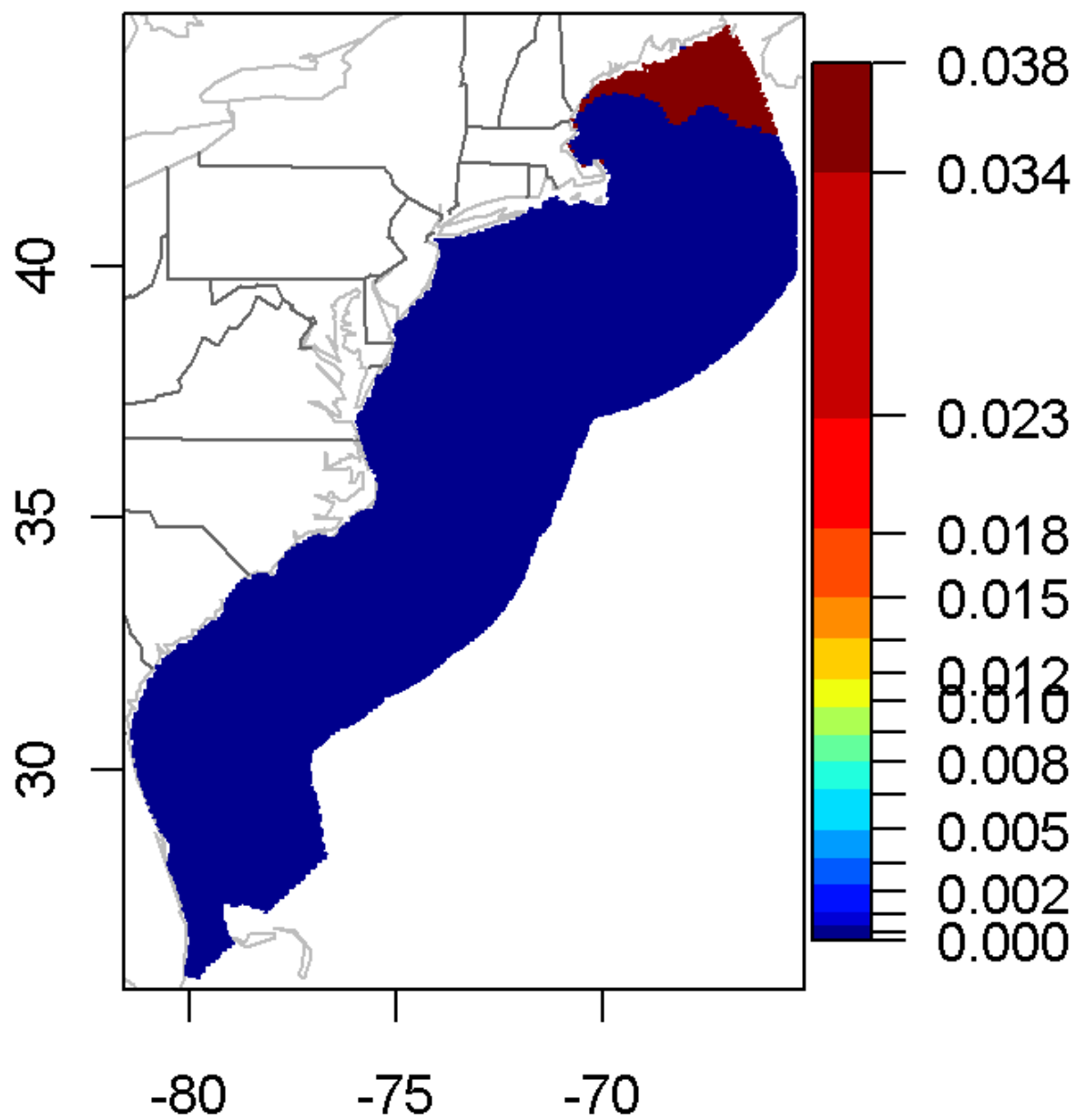


Figure 224: Map of binary habitat (cutoff determined by ROC) for 'Harbour porpoise' guild during 'summer' season in 'east2' region.

4.3.2 ne2

Modelrun identifier: duke_06_hp3_summer_ne2

Date generated: 2008-10-21 15:32:54

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 21: Summary for duke(6) GAM model: for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

	Value
Number.presences	396
Number.absences	7298
GAM.converged	TRUE
R.squared	0.47423
Deviance.explained	0.501926
ROC.optimum	0.885258
Maximum.fit	0.0484198
Maximum.prediction	0.885256

Model text summary...

```
duke_06_hp3_summer_ne2 run on Tue Oct 21 15:30:58 2008
  provider:duke, version:06, guild:Harbour porpoise (hp3), season:'summer', region:ne2

max.fit:0.885258, max.prediction:0.885256, ROC.optimum:0.048420

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -7.5617      0.1952  -38.74   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  8.700e-01 1.3700  18.948 7.80e-07 ***
s(log(d2shelf)) 2.704e-05 0.5000   0.004    0.80
s(log(d2coast)) 8.351e-01 1.3351  16.808 4.39e-06 ***
s(sst)         2.225e-03 0.5022   0.001    0.87
s(lat)         9.924e-01 1.4924 609.135 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = 0.474  Deviance explained = 50.2%
GCV score = 0.0011955  Scale est. = 0.0011944  n = 7282

summary(dat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.   : 6.0  Min.   : 5  Min.   : 1259  Min.   : 8.175  Min.   :34.50
          1st Qu.:12986  1st Qu.: 51.0  1st Qu.: 23233  1st Qu.: 46744  1st Qu.: 16.350  1st Qu.:38.89
          Median :14605  Median : 108.0  Median : 56551  Median :100131  Median : 20.250  Median :40.65
          Mean   :14089  Mean   : 652.7  Mean   : 68595  Mean   :124390  Mean   : 20.091  Mean   :40.60
          3rd Qu.:15848  3rd Qu.: 213.8  3rd Qu.:101066  3rd Qu.:177375  3rd Qu.: 23.850  3rd Qu.:42.71
          Max.   :16560  Max.   :4675.0  Max.   :319336  Max.   :445165  Max.   : 29.475  Max.   :44.74
                   NA's : 6      NA's : 6      NA's :406.000

summary(newdat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   : 6  Min.   : 5  Min.   : 1259  Min.   :11.18  Min.   :34.27
          1st Qu.:12297  1st Qu.: 84  1st Qu.: 33503  1st Qu.: 94835  1st Qu.:18.75  1st Qu.:37.36
```

Median :13718	Median :1827	Median : 78620	Median :188836	Median :23.48	Median :39.16
Mean :13277	Mean :1832	Mean :102648	Mean :201021	Mean :22.22	Mean :39.20
3rd Qu.:15139	3rd Qu.:3517	3rd Qu.:154146	3rd Qu.:299808	3rd Qu.:25.73	3rd Qu.:40.92
Max. :16560	Max. :4752	Max. :354376	Max. :478082	Max. :28.35	Max. :44.74
		NA's : 2	NA's : 2		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :7.534e-10	Min. :4.758e-10	Min. : 0.0000	Min. :6.130e-06	Min. :0.00000
1st Qu.:12297	1st Qu.:4.934e-07	1st Qu.:2.153e-07	1st Qu.: 0.0000	1st Qu.:1.046e-03	1st Qu.:0.00000
Median :13718	Median :1.740e-05	Median :5.747e-06	Median : 0.0000	Median :3.744e-03	Median :0.00000
Mean :13277	Mean :2.215e-02	Mean :9.007e-04	Mean : 0.1089	Mean :1.037e-02	Mean :0.08777
3rd Qu.:15139	3rd Qu.:1.562e-03	3rd Qu.:2.727e-04	3rd Qu.: 0.0000	3rd Qu.:9.521e-03	3rd Qu.:0.00000
Max. :16560	Max. :8.853e-01	Max. :3.838e-02	Max. : 6.0000	Max. :2.910e-01	Max. :1.00000
	NA's :2.000e+00	NA's :2.000e+00	NA's :2049.0000	NA's :2.049e+03	

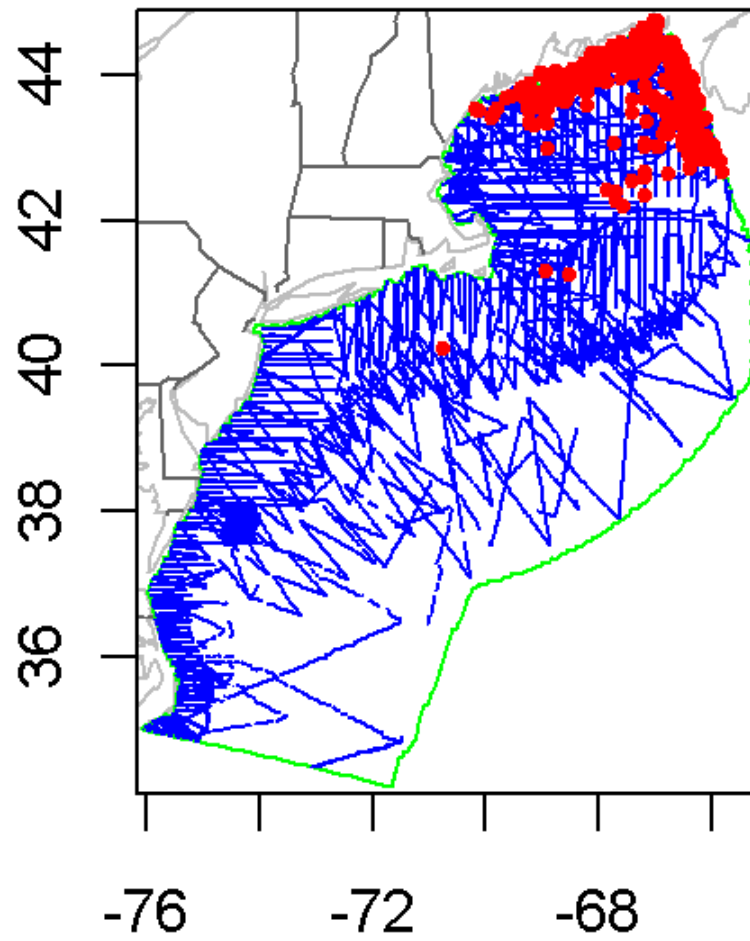


Figure 225: Map of points of observational sightings and tracks of survey effort for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

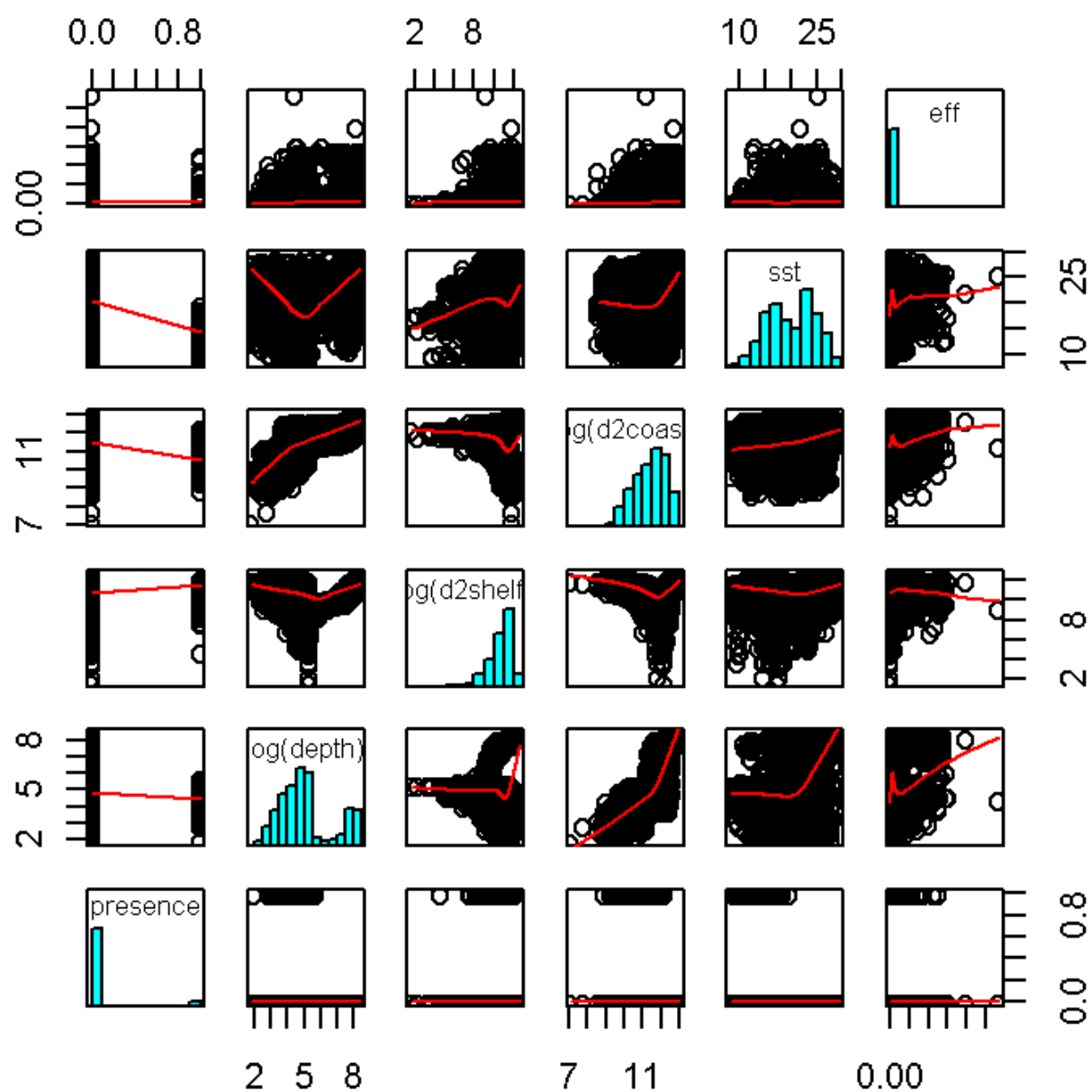


Figure 226: Pairs plot of input variables for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

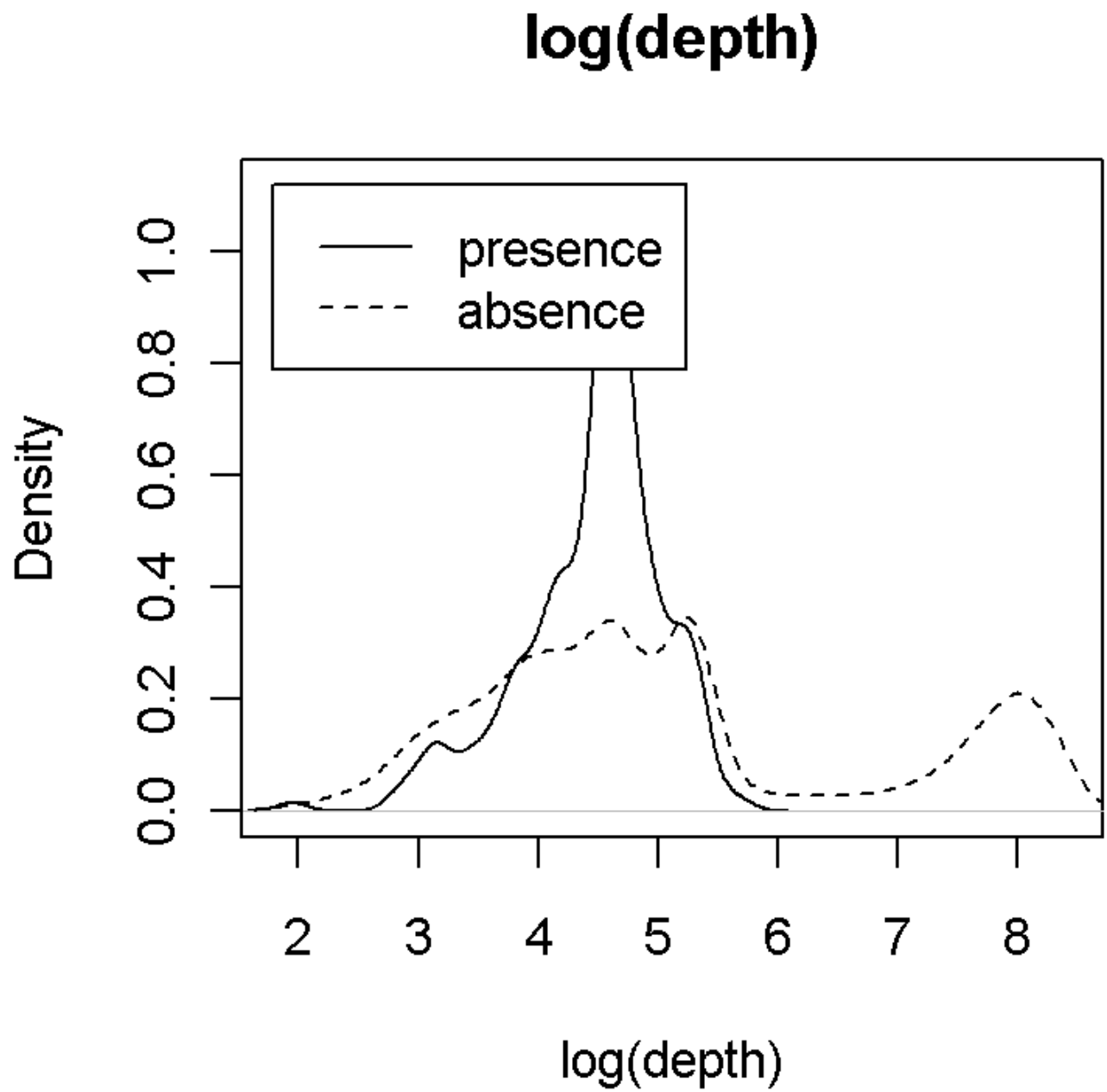


Figure 227: Density histogram of depth log(meters) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

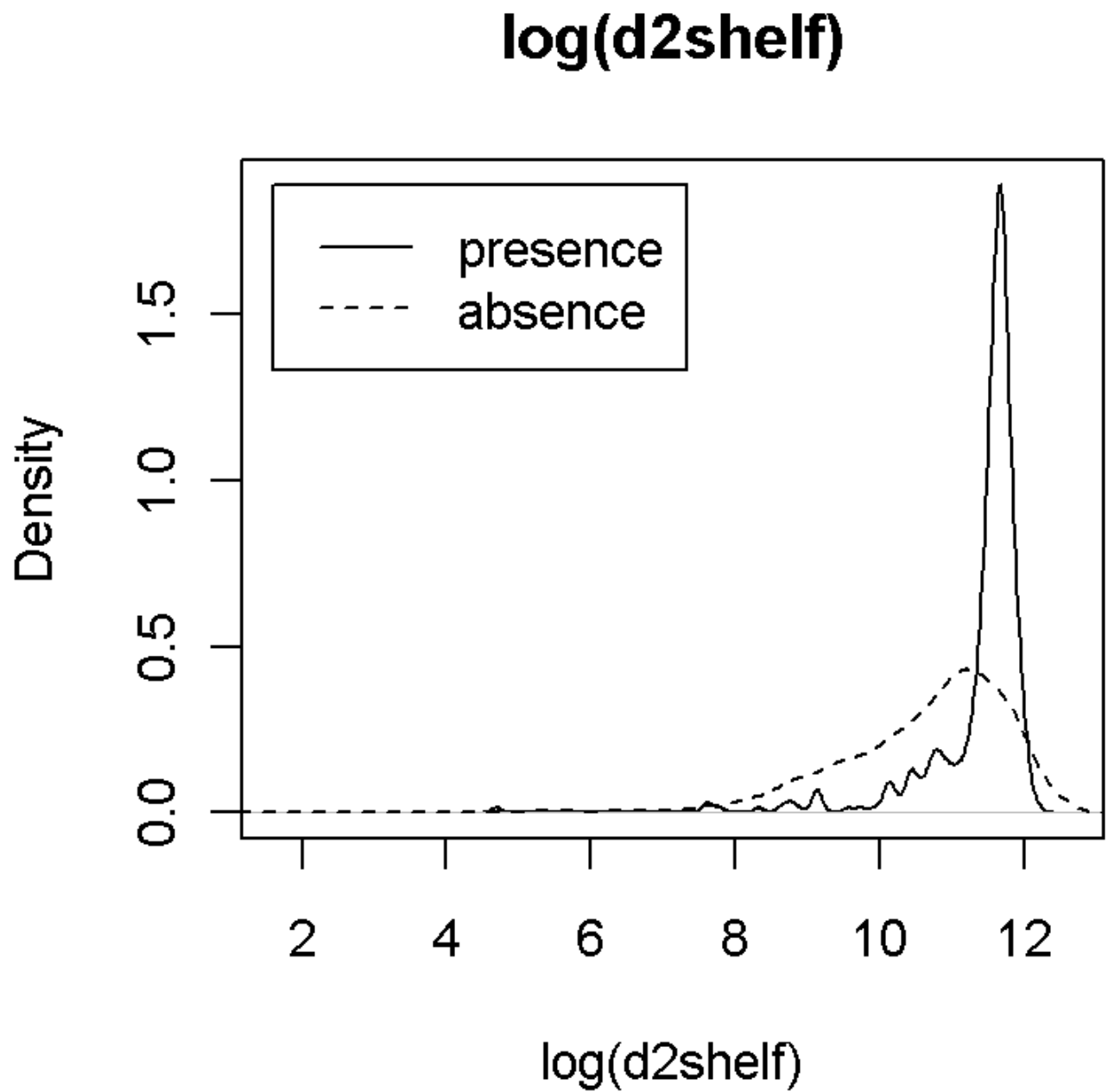


Figure 228: Density histogram of distance to shelf log(meters) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

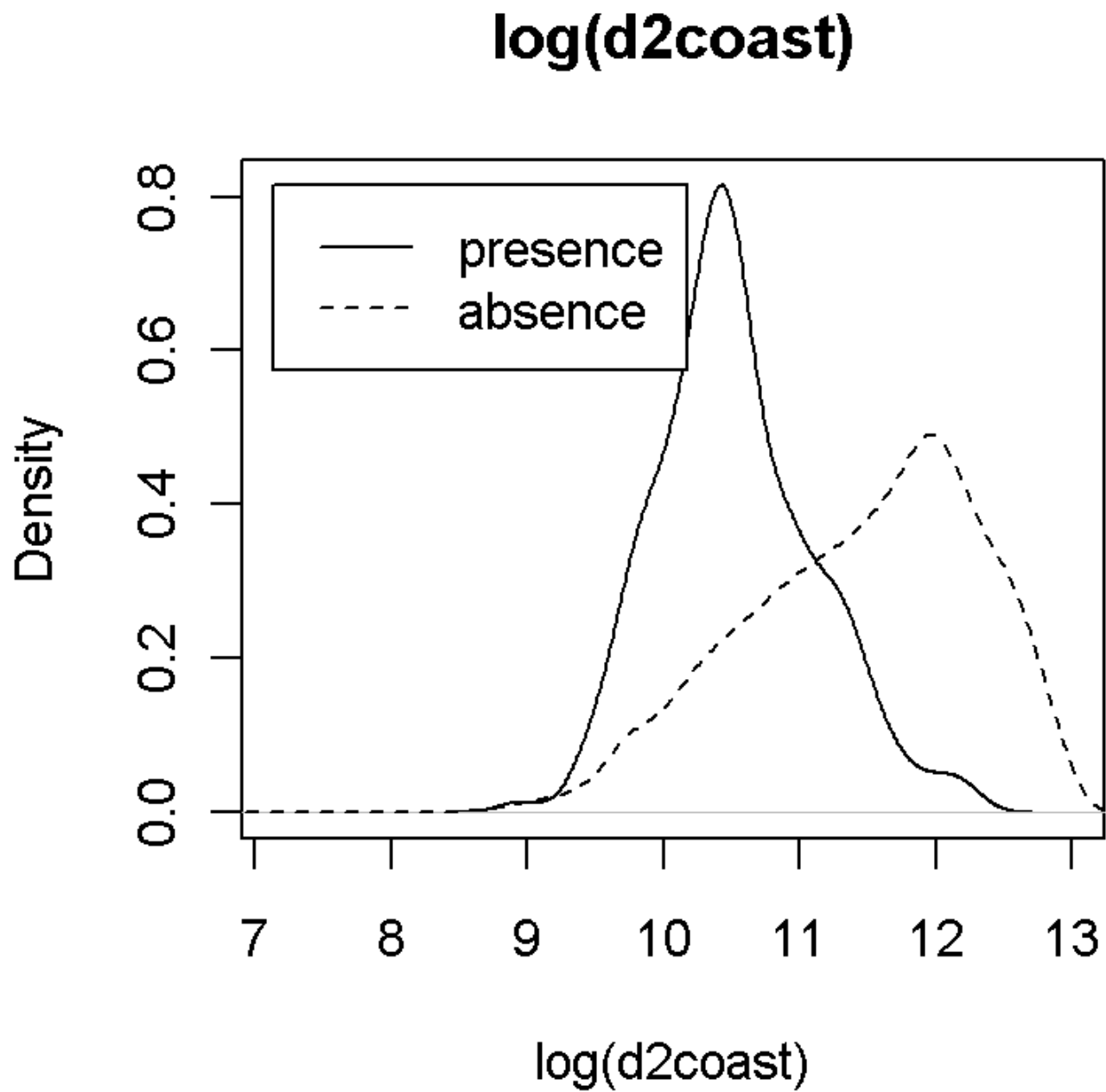


Figure 229: Density histogram of distance to coast log(meters) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

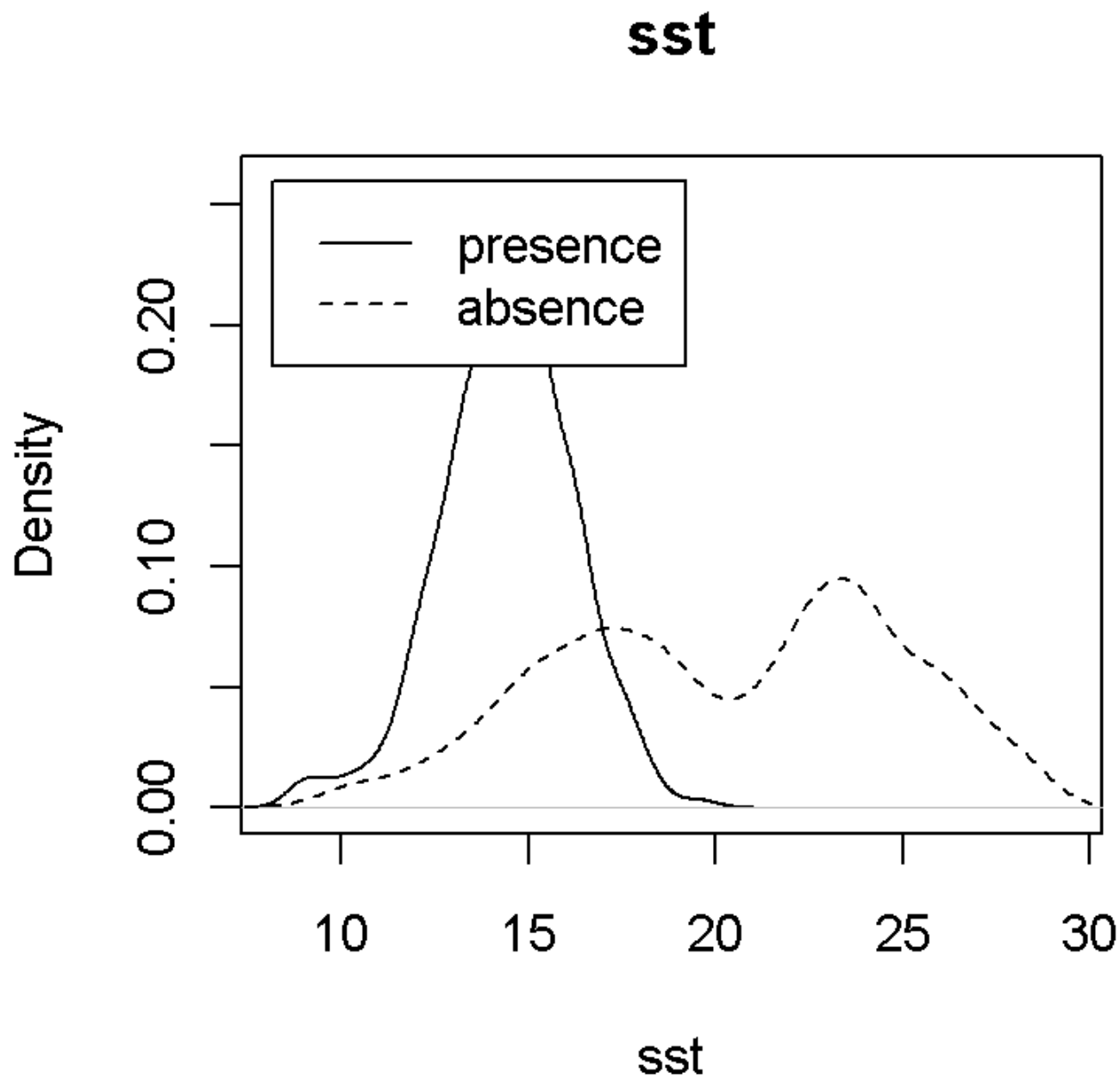


Figure 230: Density histogram of sea-surface temperature (degrees C) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

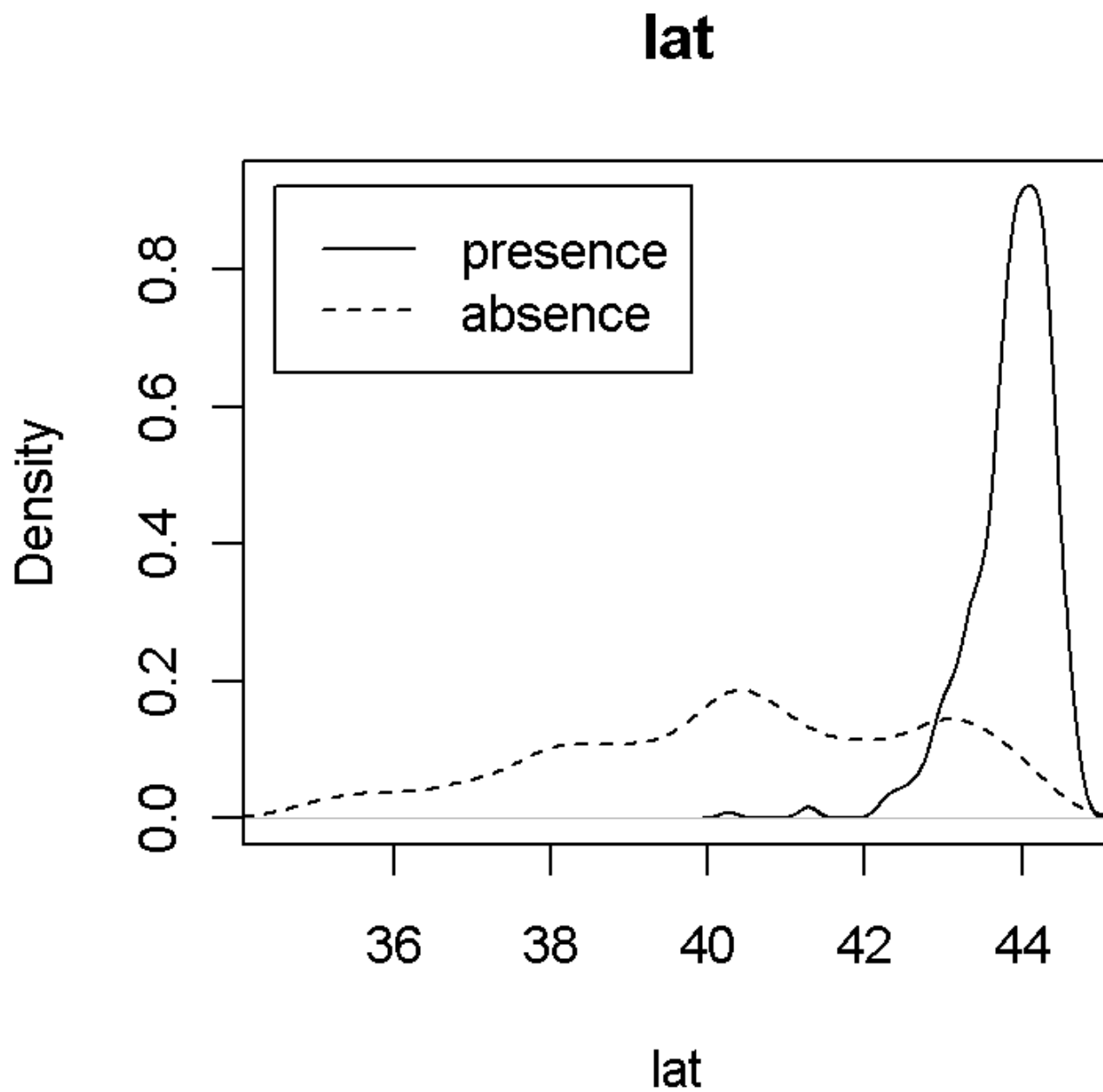


Figure 231: Density histogram of latitude (degrees) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

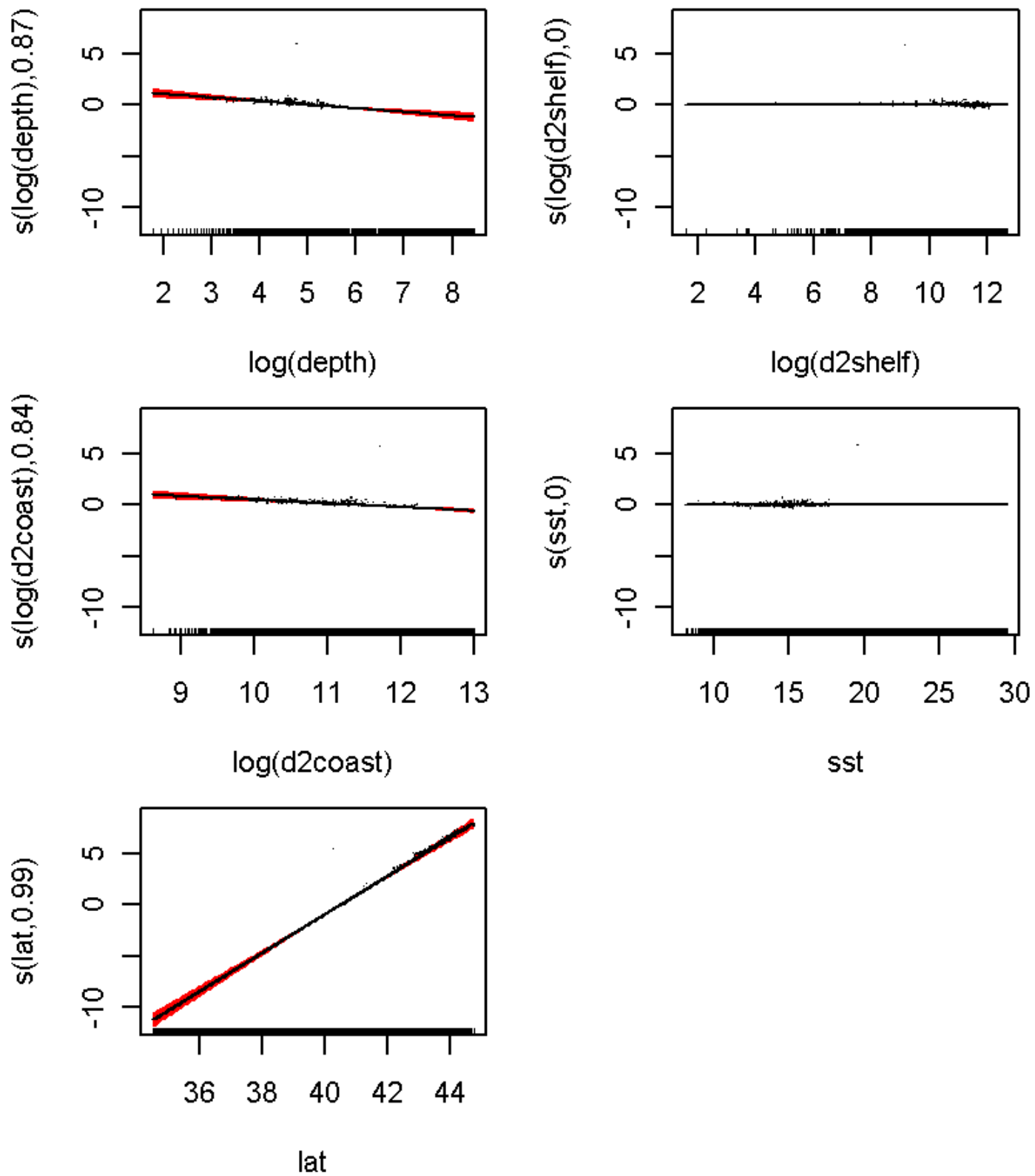


Figure 232: Terms plot of predictors to GAM model fit for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

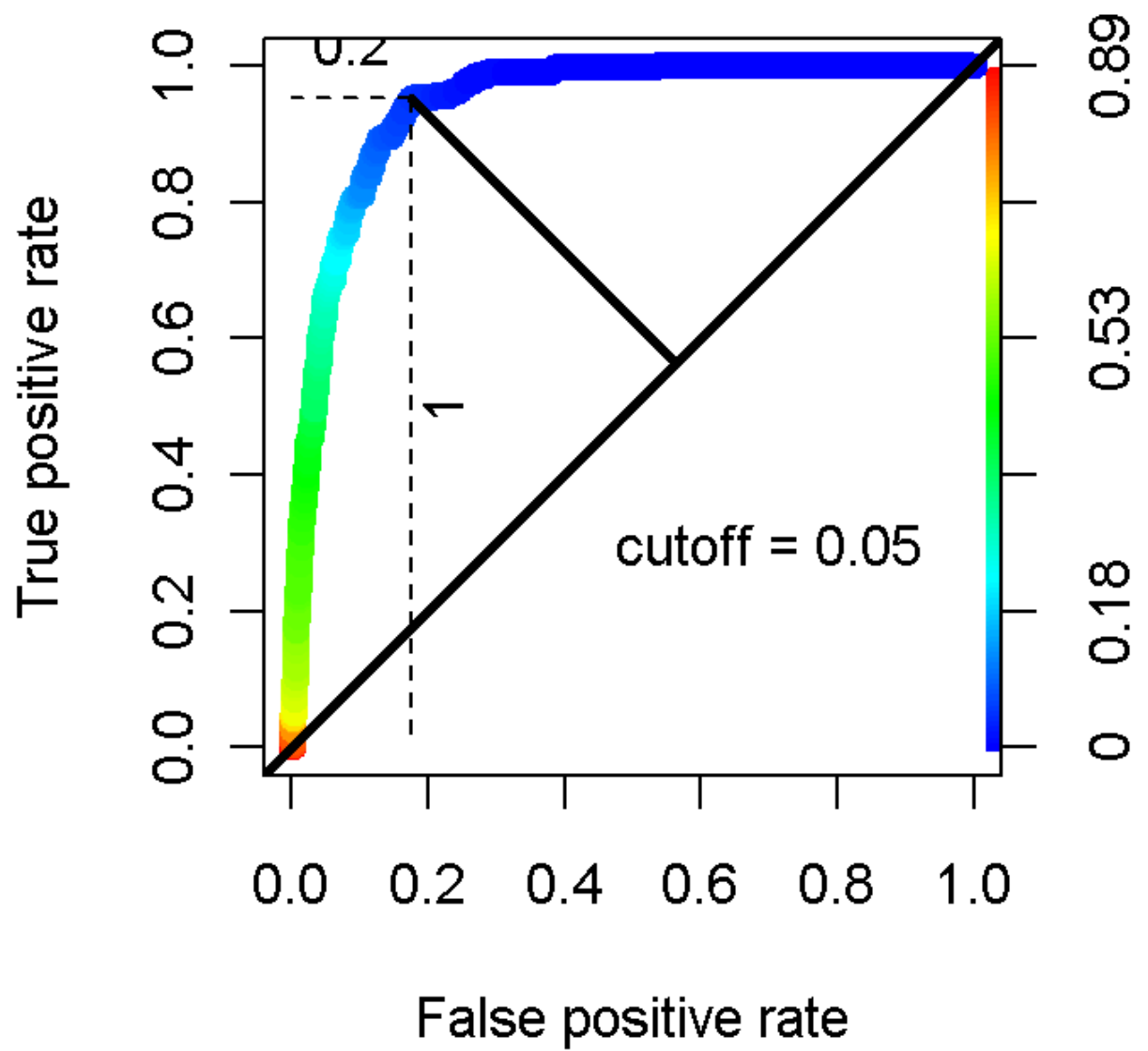


Figure 233: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

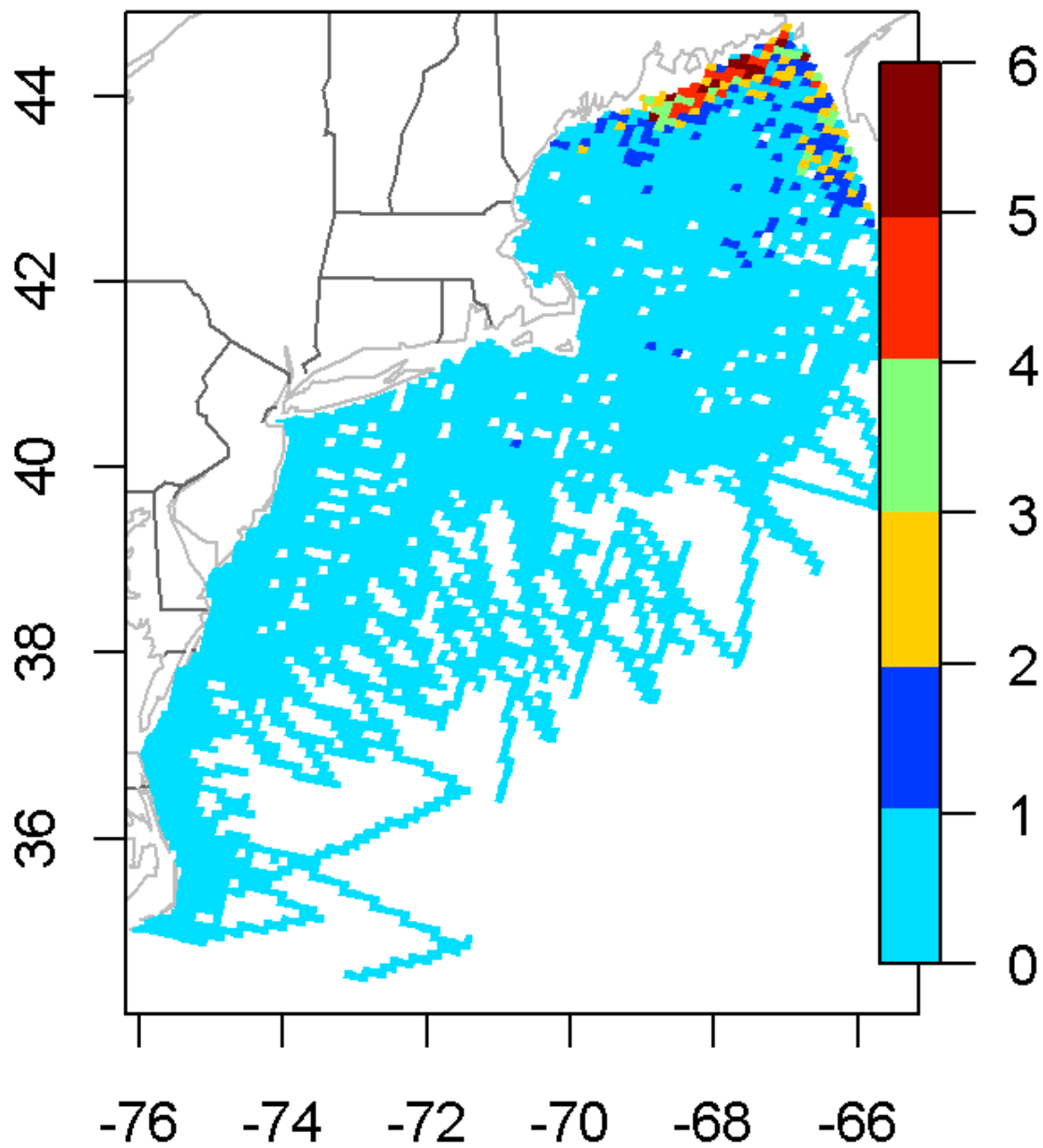


Figure 234: Map of presence and absence by cell summed through time for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

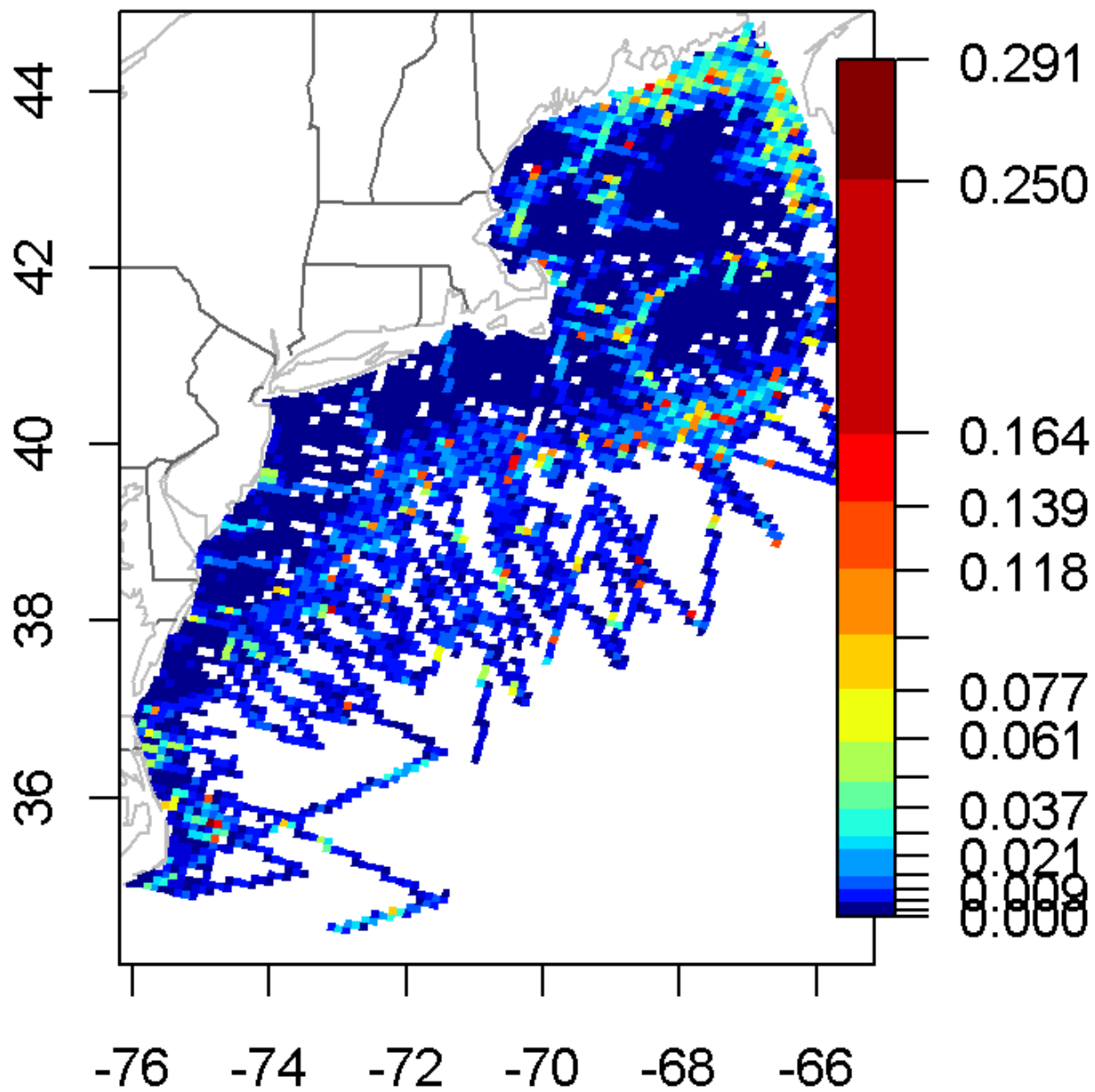


Figure 235: Map of effort(hours/km²) by cell summed through time for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

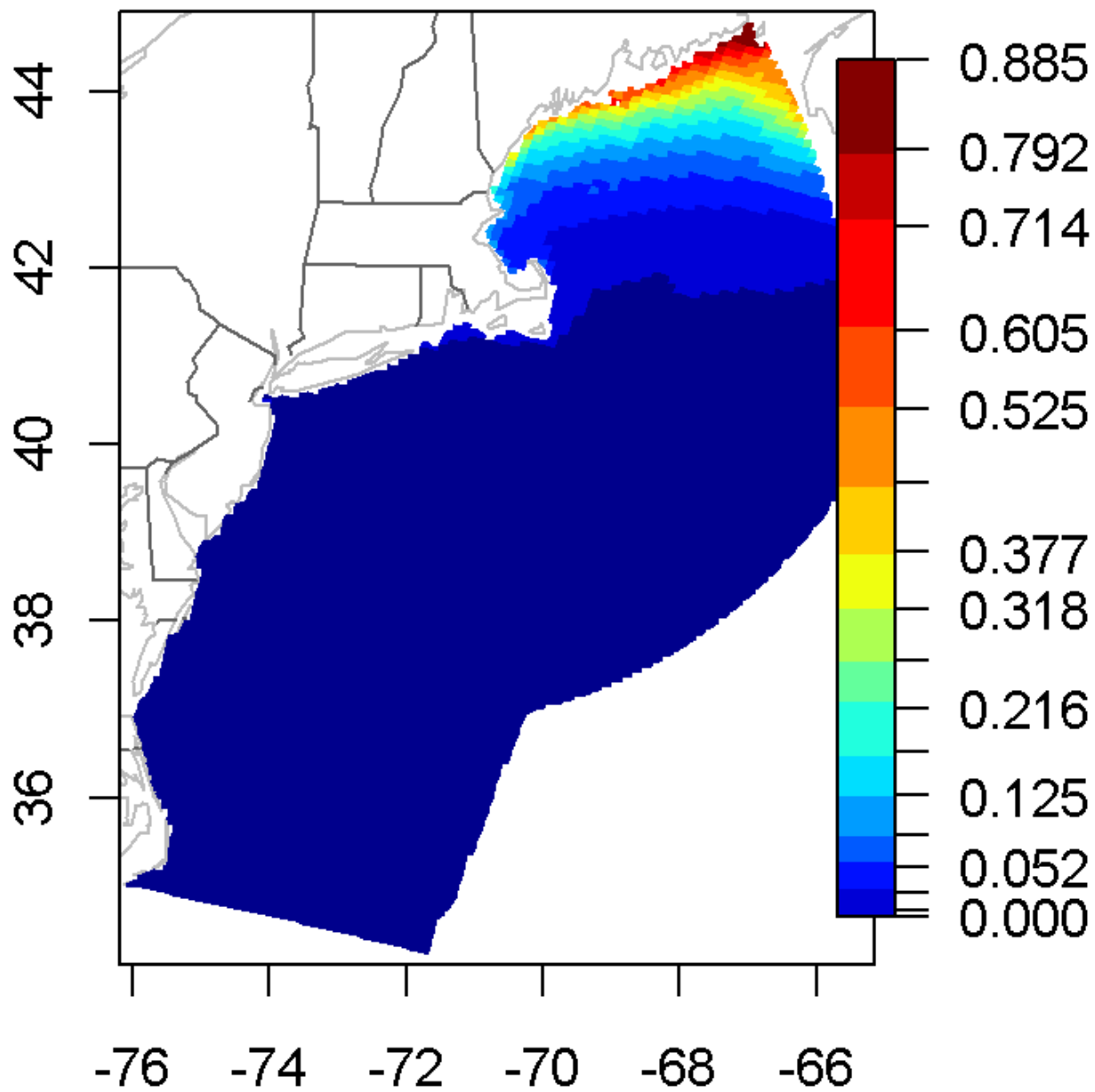


Figure 236: Map of mean predicted habitat for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

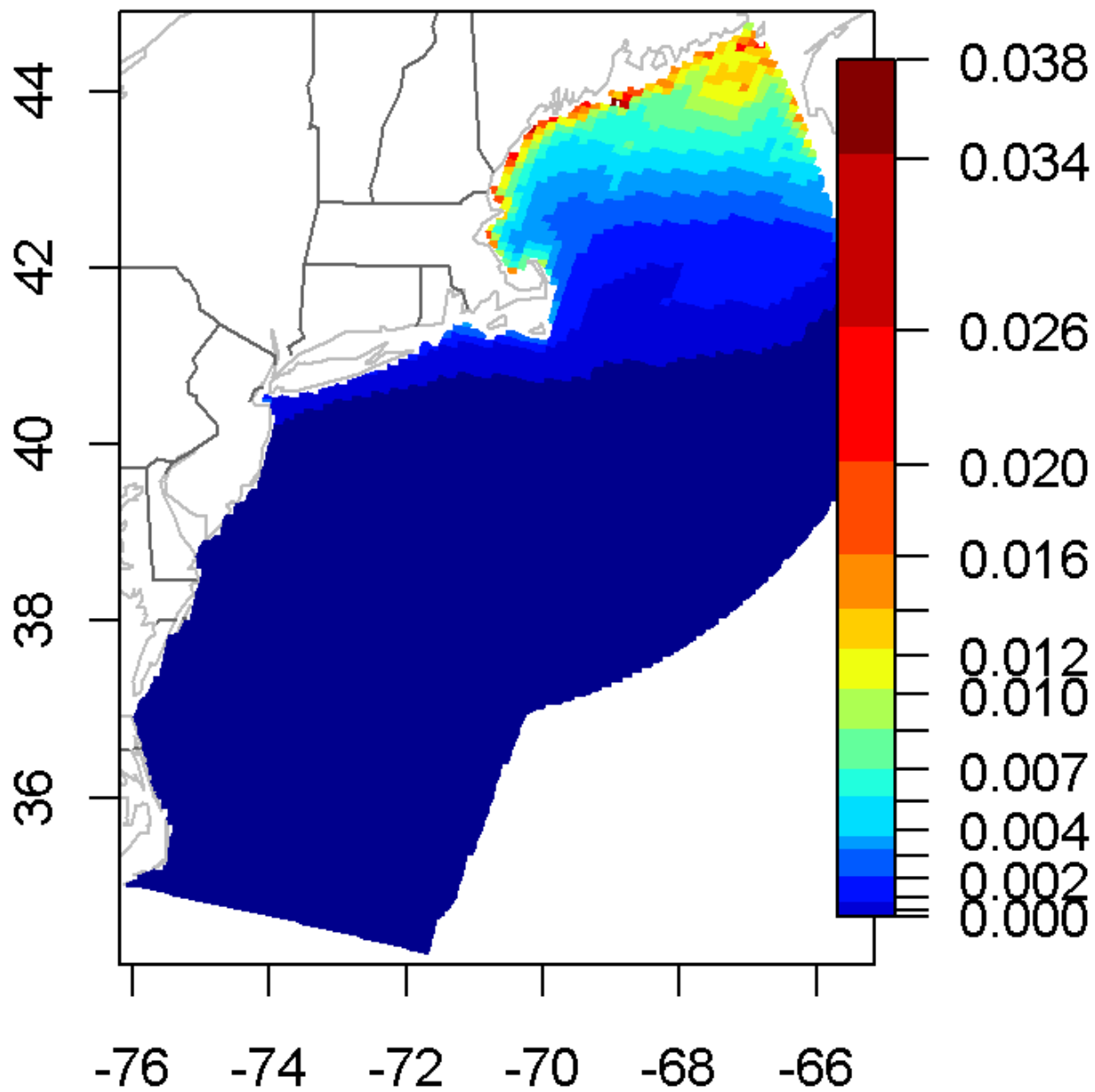


Figure 237: Map of standard error of habitat for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

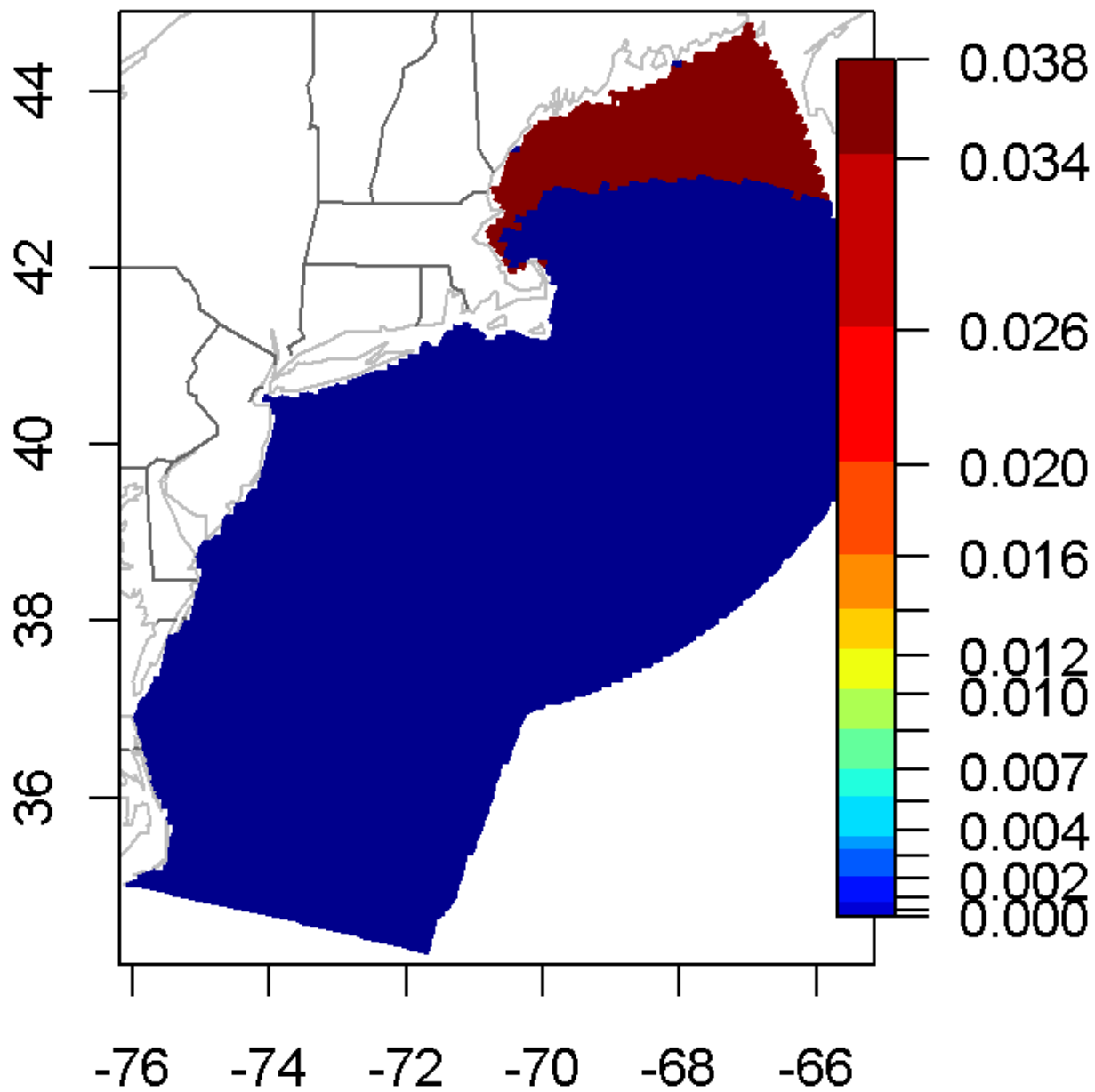


Figure 238: Map of binary habitat (cutoff determined by ROC) for 'Harbour porpoise' guild during 'summer' season in 'ne2' region.

4.4 winter

5 Humpback whales

Guildid:hw3

Table 22: Taxonomic members of the "Humpback whales" guild.

	Scientific Name	Common Name	Taxonomic #
1	Megaptera novaeangliae	humpback whale	180530

5.1 fall

5.1.1 east2

Modelrun identifier: duke_06_hw3_fall_east2

Date generated: 2008-10-21 14:22:04

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 23: Summary for duke(6) GAM model: for 'Humpback whales' guild during 'fall' season in 'east2' region.

	Value
Number.presences	27
Number.absences	1837
GAM.converged	TRUE
R.squared	0.694947
Deviance.explained	0.622913
ROC.optimum	0.776822
Maximum.fit	0.031984
Maximum.prediction	0.776822

Model text summary...

```
duke_06_hw3_fall_east2 run on Tue Oct 21 14:20:45 2008
provider:duke, version:06, guild:Humpback whales (hw3), season:'fall', region:east2

max.fit:0.776822, max.prediction:0.776822, ROC.optimum:0.031984

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -113.53      11.91   -9.533   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.997e+00  2.497   93.28 <2e-16 ***
s(log(d2shelf)) 9.819e-01  1.482   51.73 <2e-16 ***
s(log(d2coast)) 1.544e-06  0.500  0.000139  0.915
s(sst)         3.340e-06  0.500  0.000280  0.899
s(lat)         1.983e+00  2.483   72.53 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.695   Deviance explained = 62.3%
GCV score = 0.00063626   Scale est. = 0.00063253   n = 1826

summary(dat)...
  region   fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.    : 1654  Min.    :  6.0  Min.    :  10  Min.    : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0  1st Qu.: 12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0  Median : 30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5  Mean   : 47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.:197.0  3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
        NA's    :      NA's    :  1  NA's    :  1  NA's    :37.00

summary(newdat)...
  region   fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :  5  Min.    : 1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :4.415e-16	Min. :0.000e+00	Min. :1.290e-06	Min. :0.00000
1st Qu.: 9145	1st Qu.:2.220e-16	1st Qu.:2.726e-15	1st Qu.:0.000e+00	1st Qu.:5.348e-04	1st Qu.:0.00000
Median :11616	Median :2.220e-16	Median :7.104e-15	Median :0.000e+00	Median :2.645e-03	Median :0.00000
Mean :11171	Mean :1.242e-02	Mean :1.443e-03	Mean :2.437e-02	Mean :8.763e-03	Mean :0.05057
3rd Qu.:14088	3rd Qu.:2.220e-16	3rd Qu.:1.370e-14	3rd Qu.:0.000e+00	3rd Qu.:6.382e-03	3rd Qu.:0.00000
Max. :16560	Max. :7.768e-01	Max. :5.433e-02	Max. :2.000e+00	Max. :5.995e-01	Max. :1.00000
	NA's :5.000e+00	NA's :5.000e+00	NA's :8.780e+03	NA's :8.780e+03	

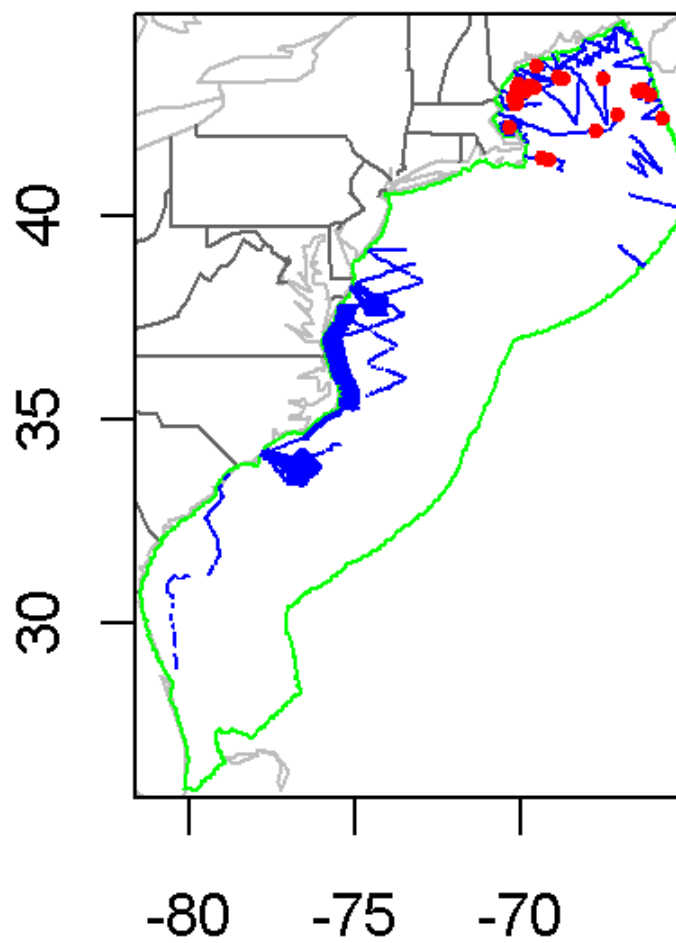


Figure 239: Map of points of observational sightings and tracks of survey effort for 'Humpback whales' guild during 'fall' season in 'east2' region.

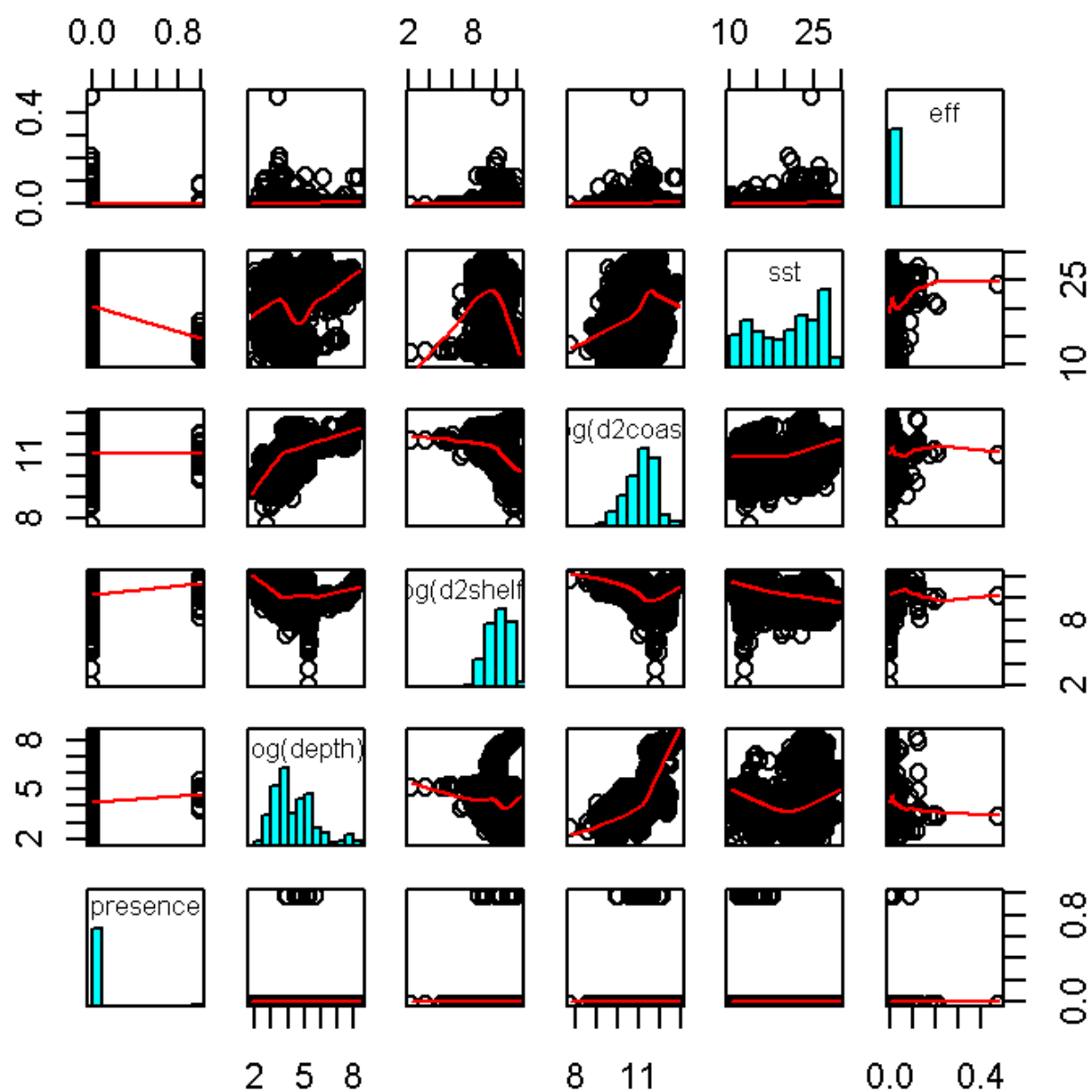


Figure 240: Pairs plot of input variables for 'Humpback whales' guild during 'fall' season in 'east2' region.

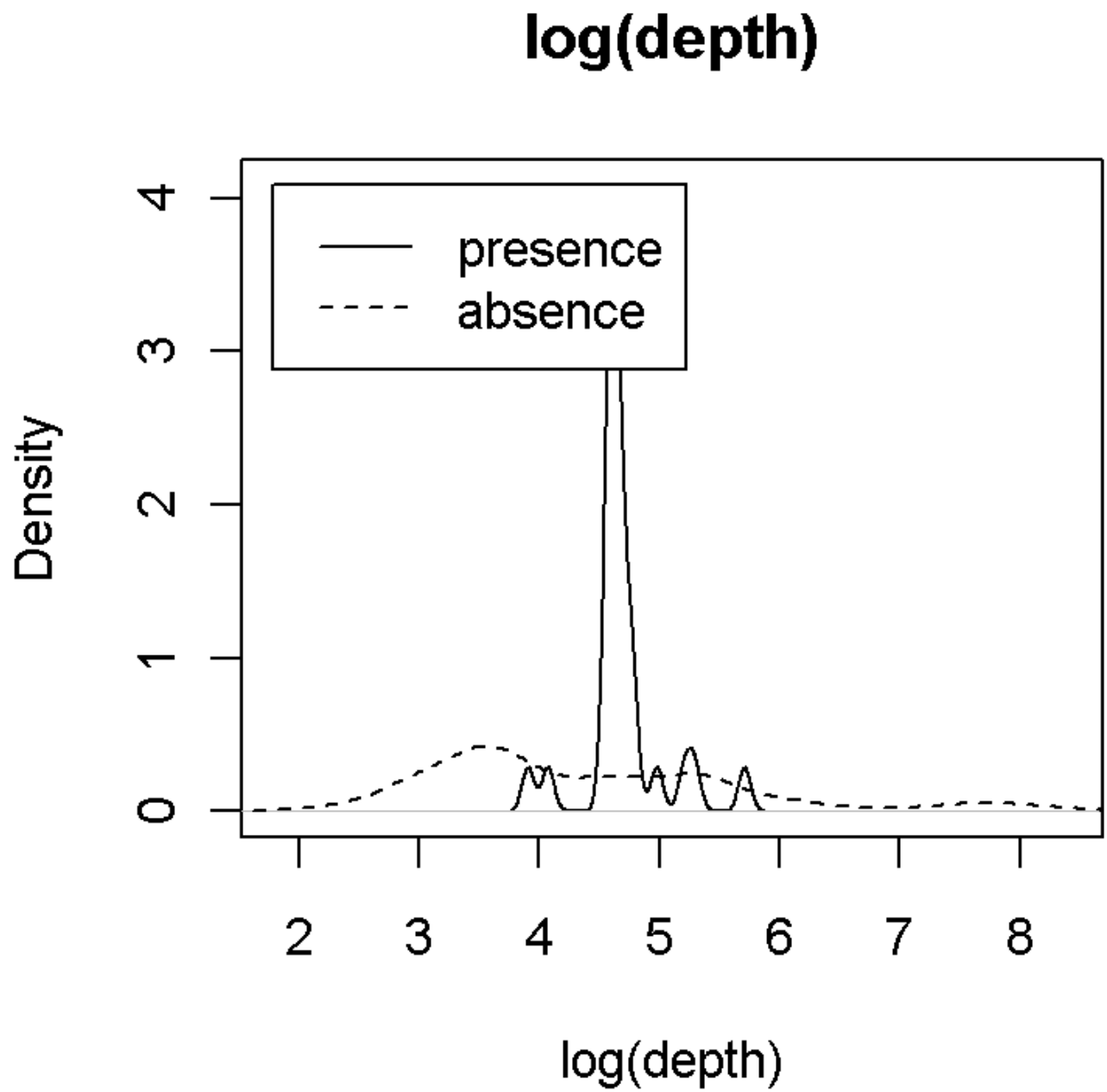


Figure 241: Density histogram of depth log(meters) for 'Humpback whales' guild during 'fall' season in 'east2' region.

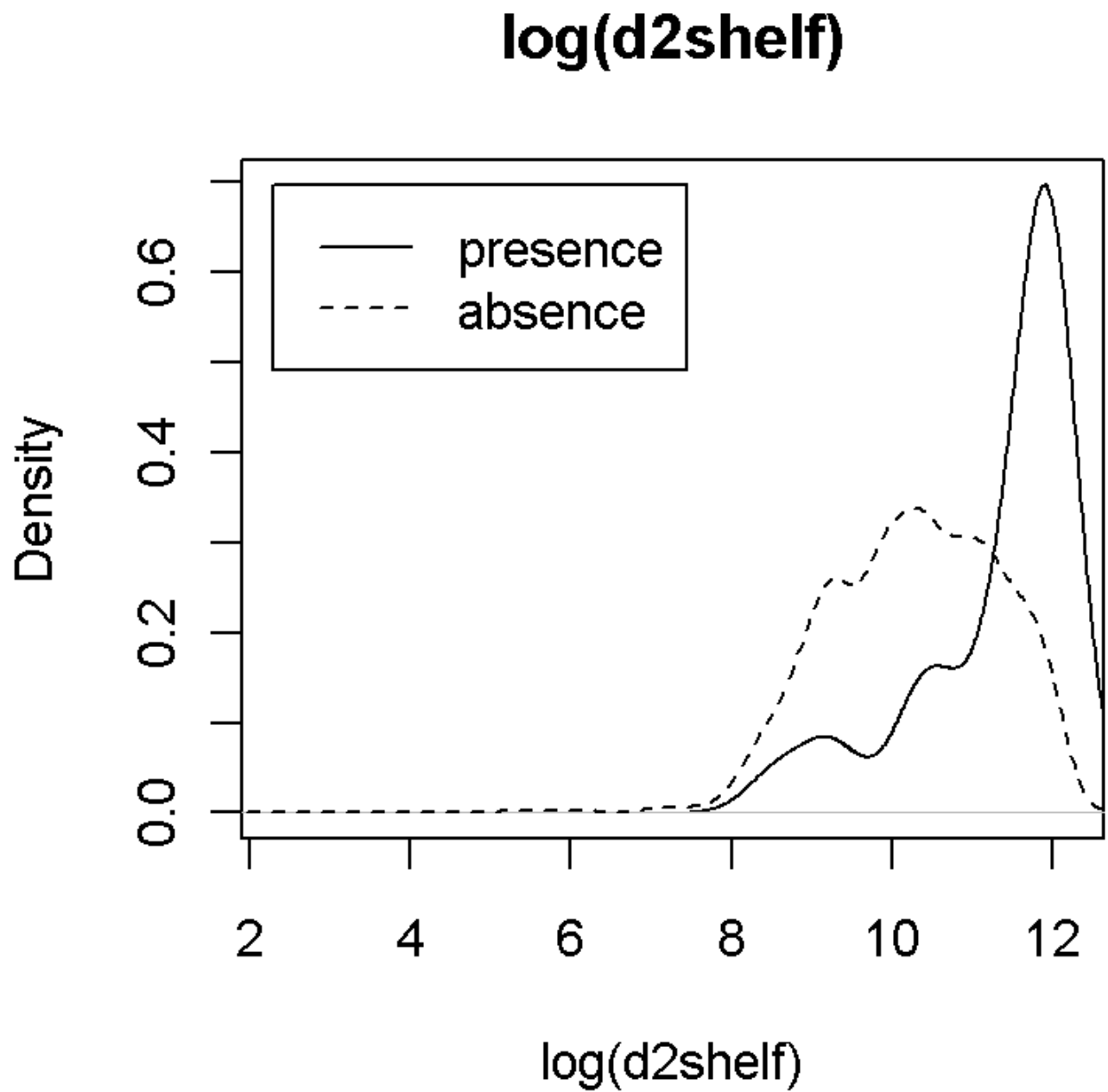


Figure 242: Density histogram of distance to shelf log(meters) for 'Humpback whales' guild during 'fall' season in 'east2' region.

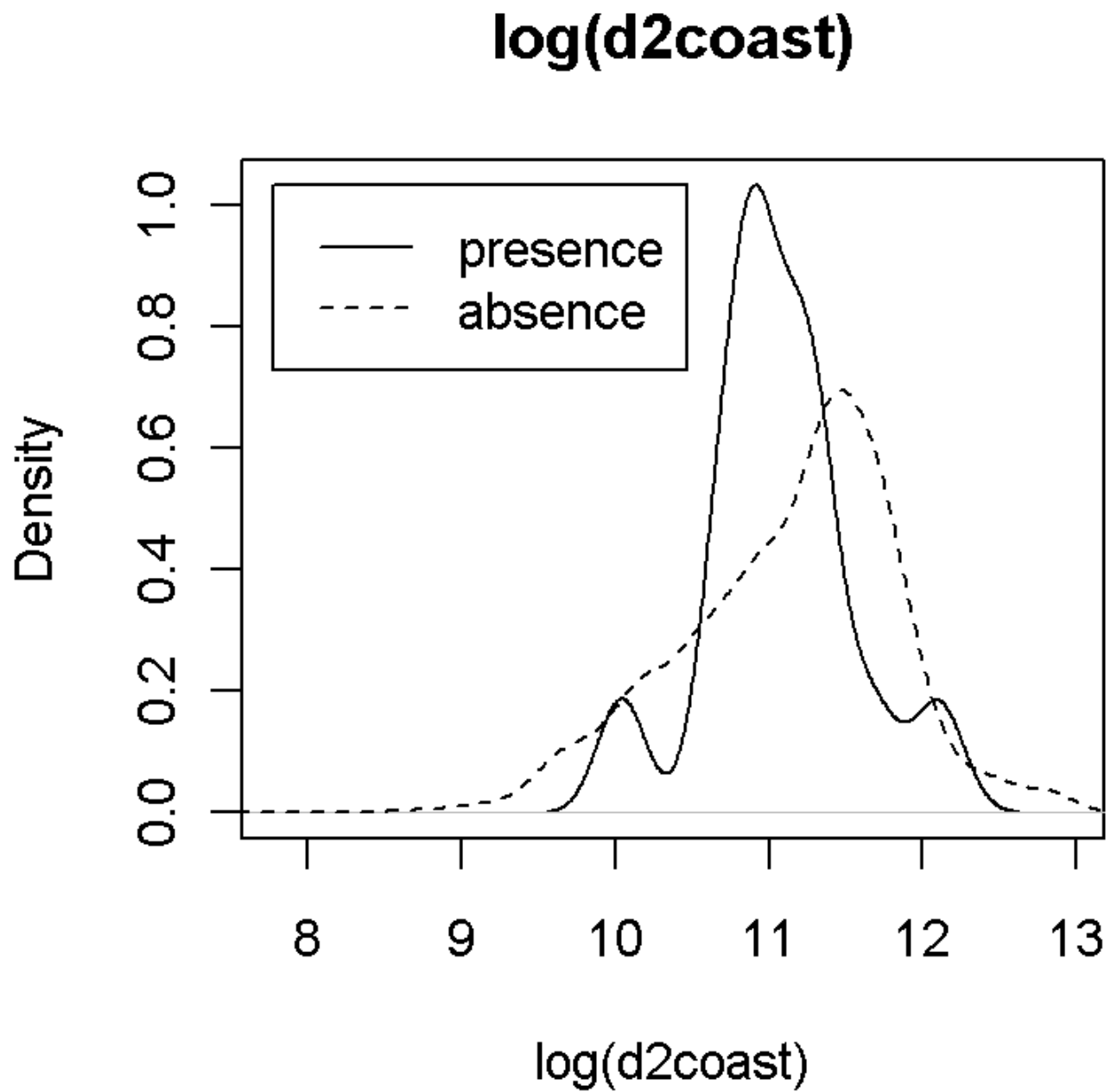


Figure 243: Density histogram of distance to coast log(meters) for 'Humpback whales' guild during 'fall' season in 'east2' region.

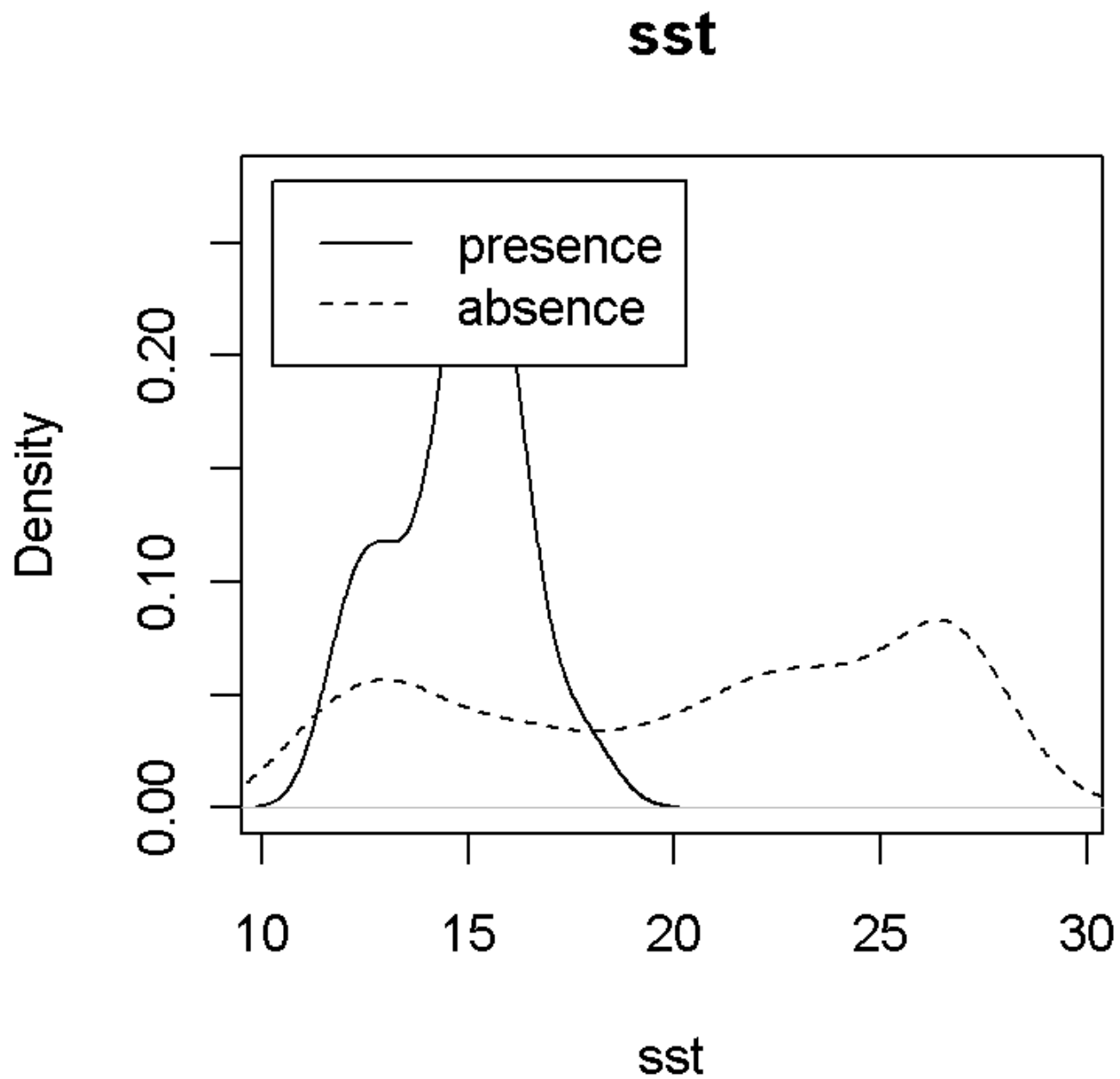


Figure 244: Density histogram of sea-surface temperature (degrees C) for 'Humpback whales' guild during 'fall' season in 'east2' region.

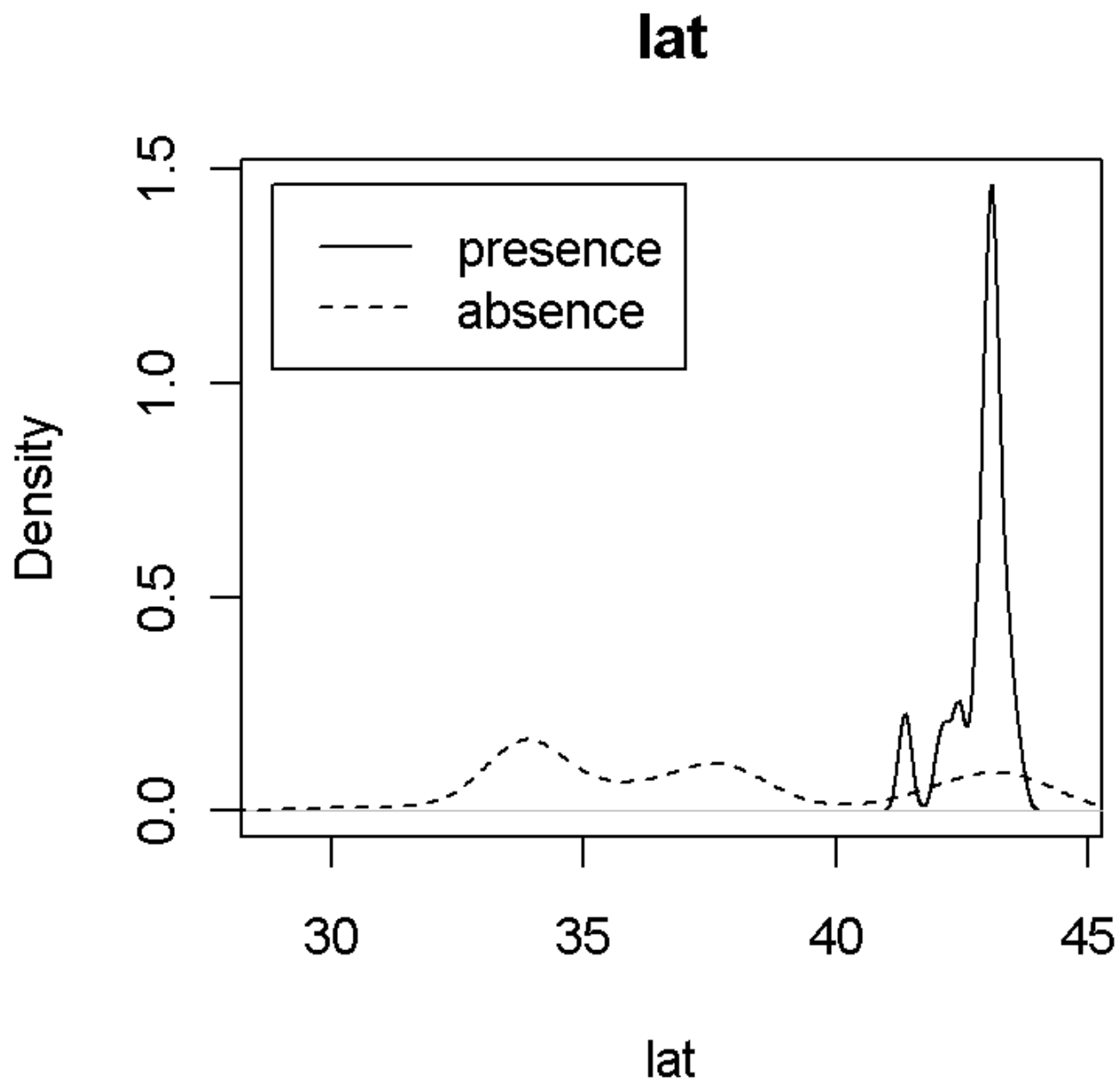


Figure 245: Density histogram of latitude (degrees) for 'Humpback whales' guild during 'fall' season in 'east2' region.

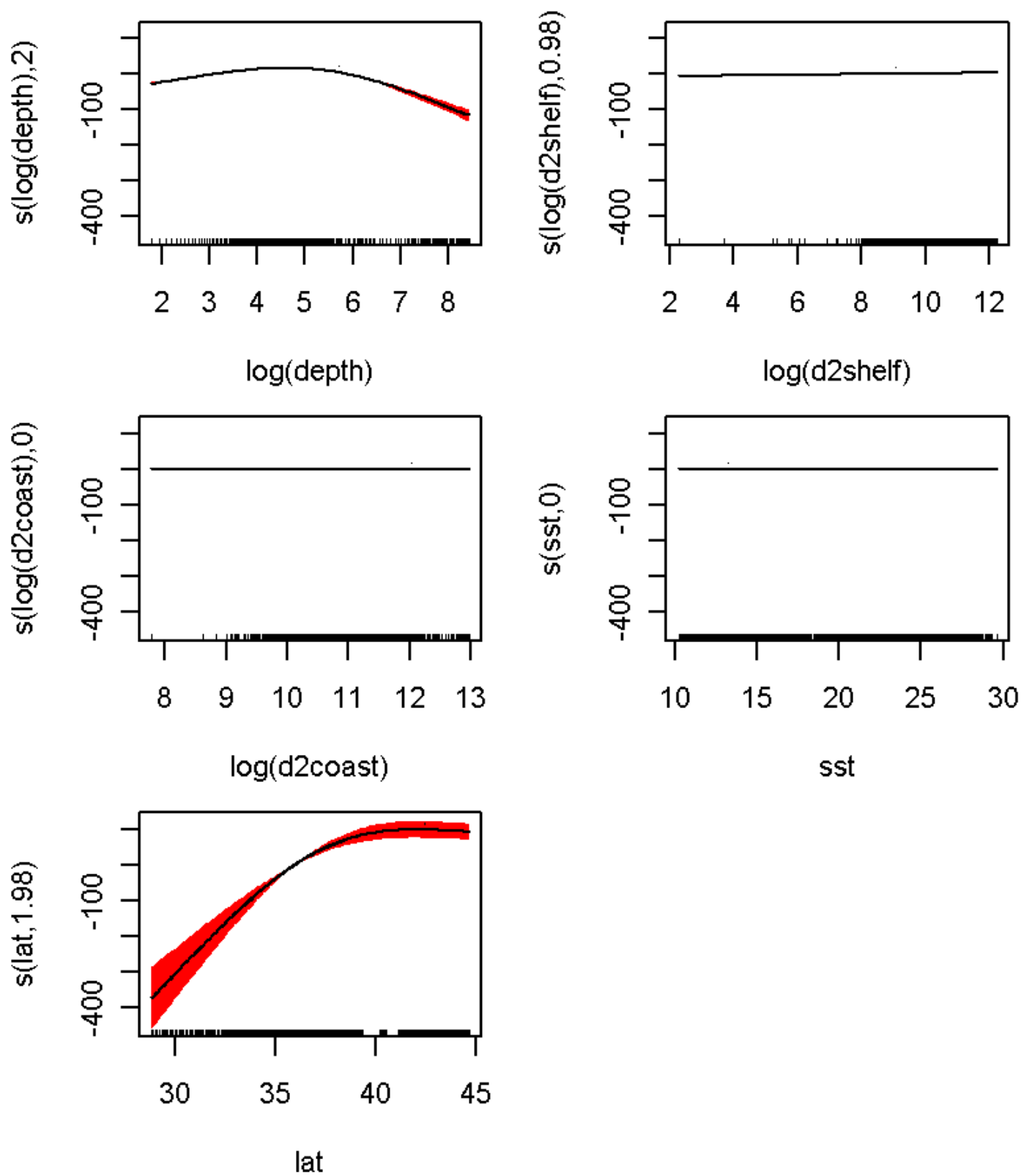


Figure 246: Terms plot of predictors to GAM model fit for 'Humpback whales' guild during 'fall' season in 'east2' region.

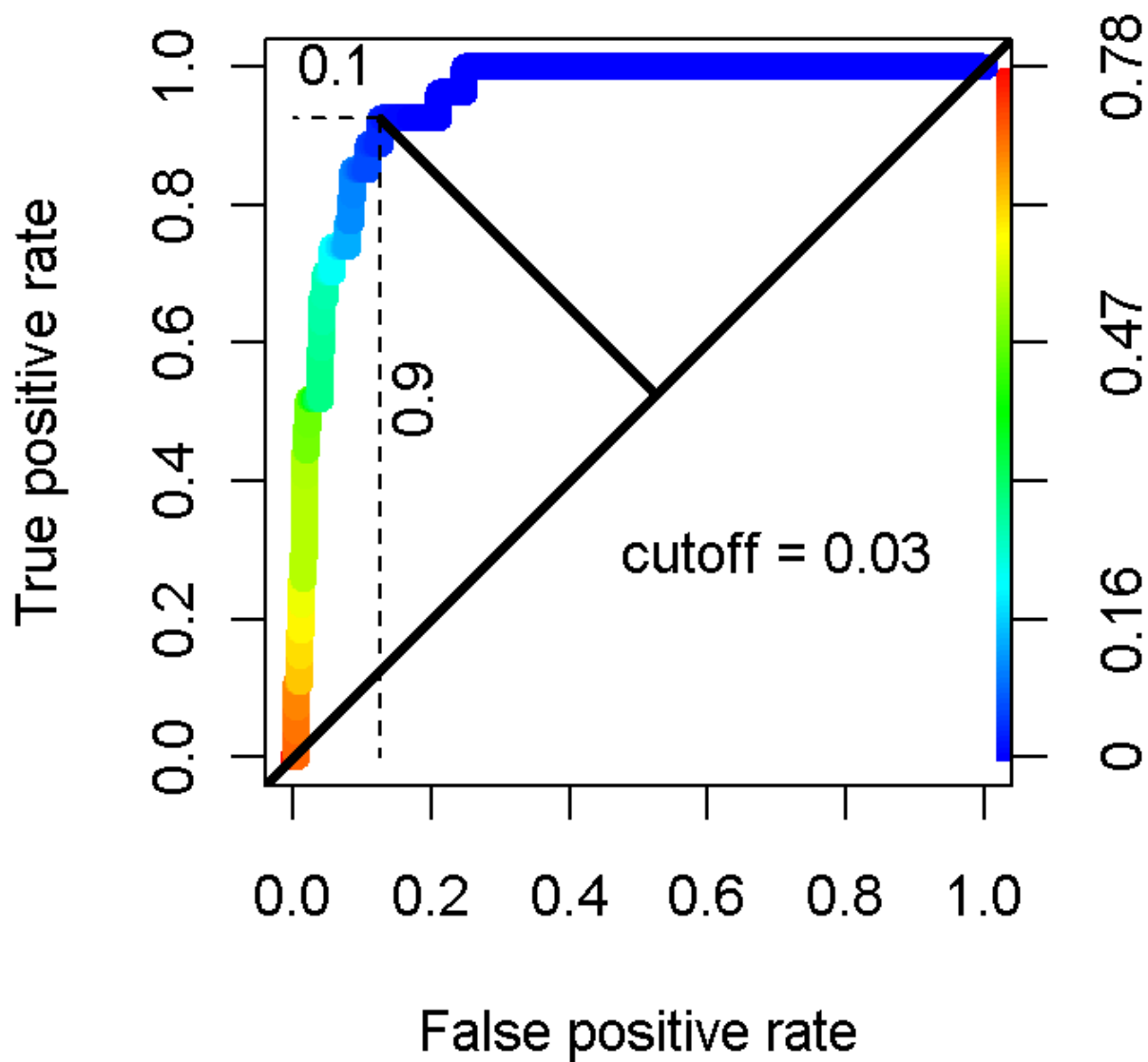


Figure 247: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Humpback whales' guild during 'fall' season in 'east2' region.

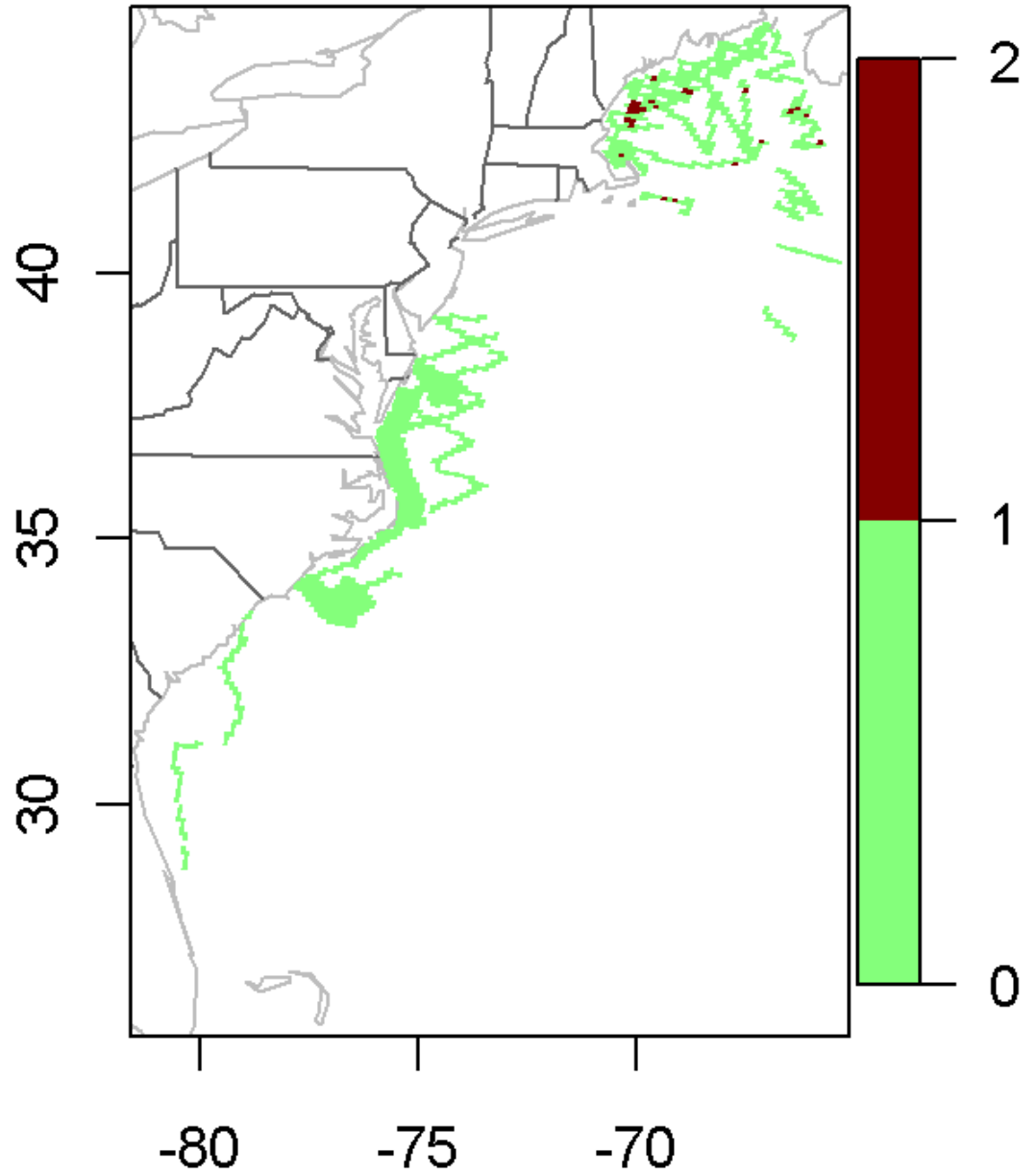


Figure 248: Map of presence and absence by cell summed through time for 'Humpback whales' guild during 'fall' season in 'east2' region.

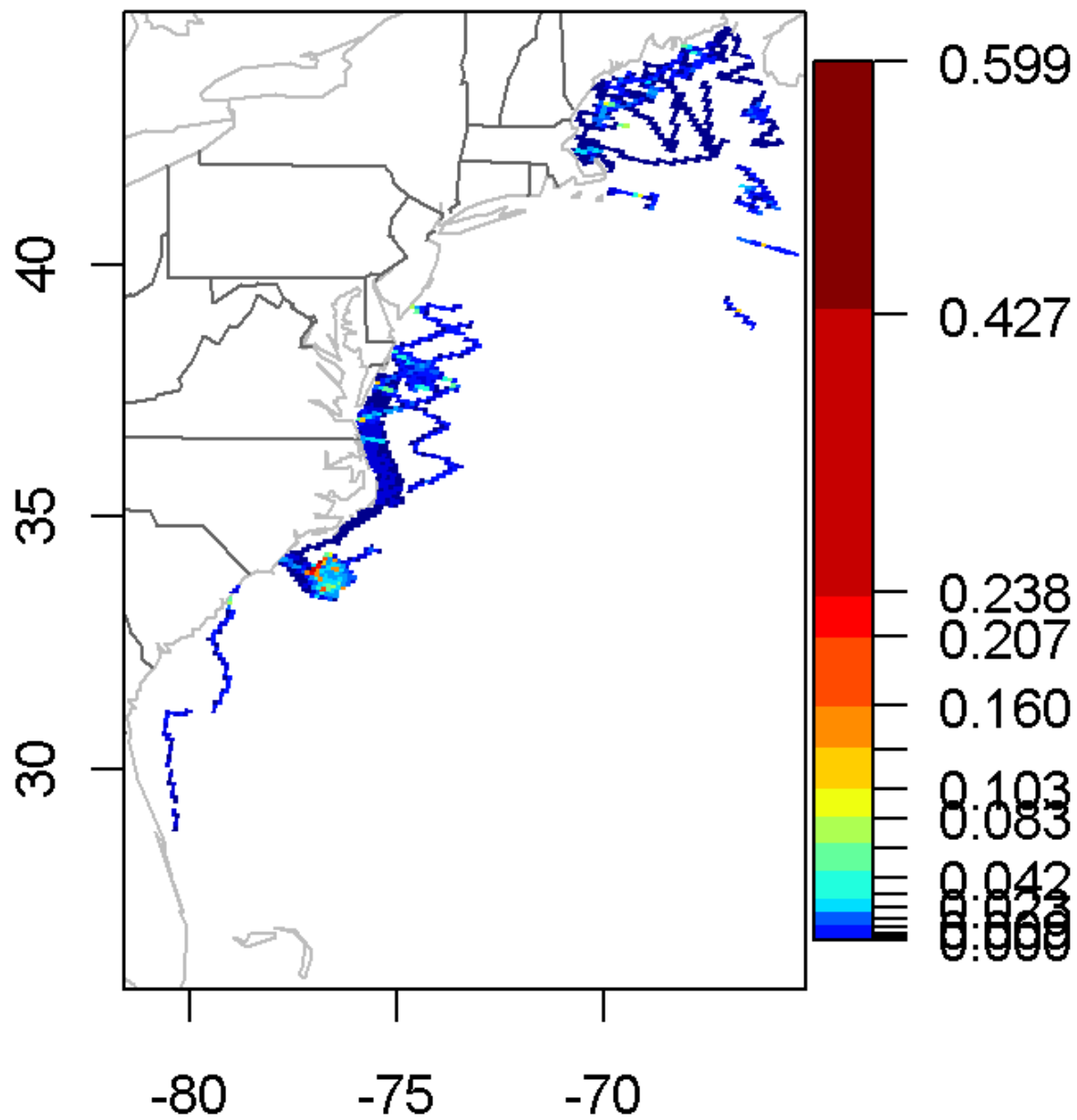


Figure 249: Map of effort(hours/km²) by cell summed through time for 'Humpback whales' guild during 'fall' season in 'east2' region.

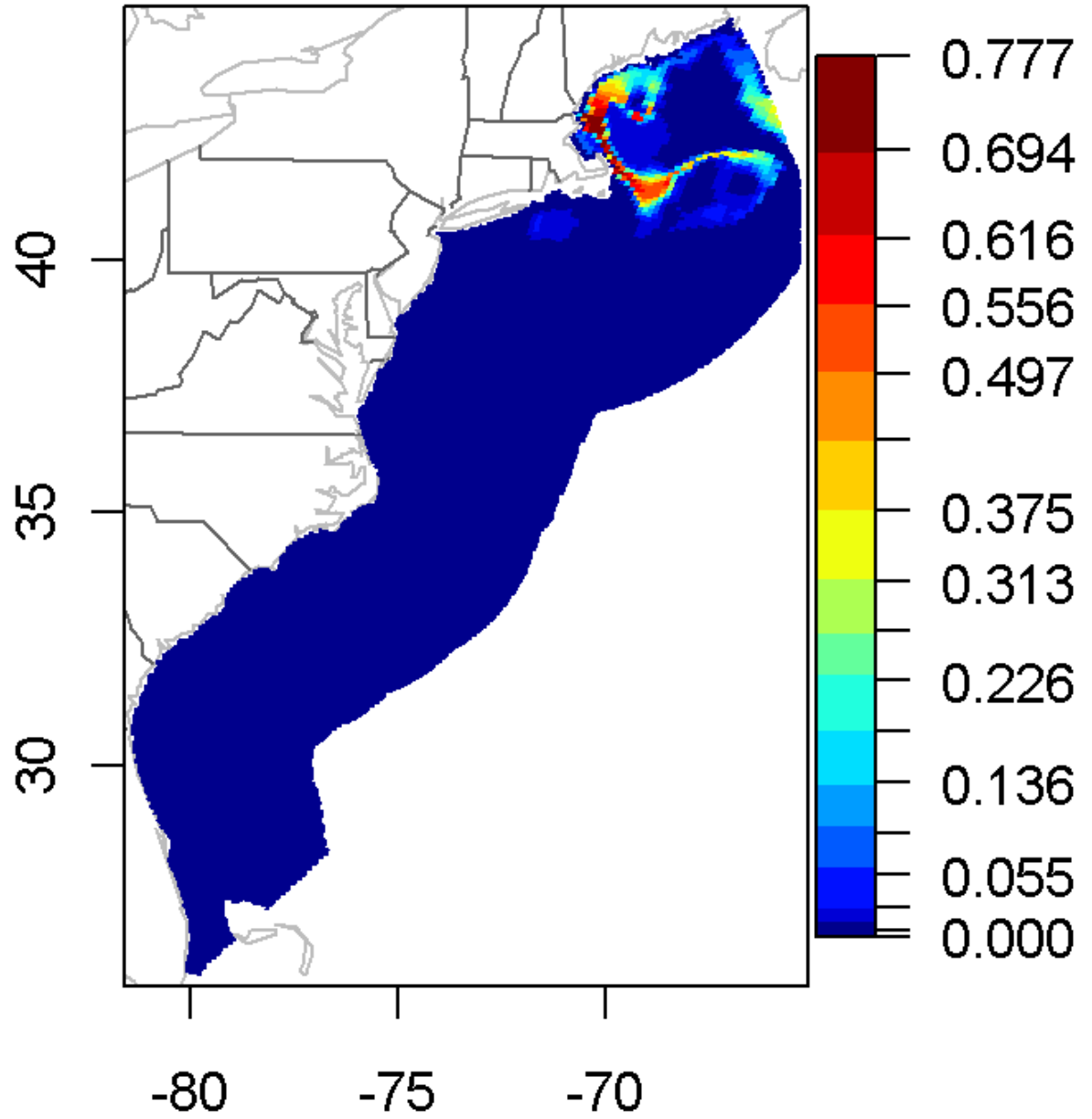


Figure 250: Map of mean predicted habitat for 'Humpback whales' guild during 'fall' season in 'east2' region.

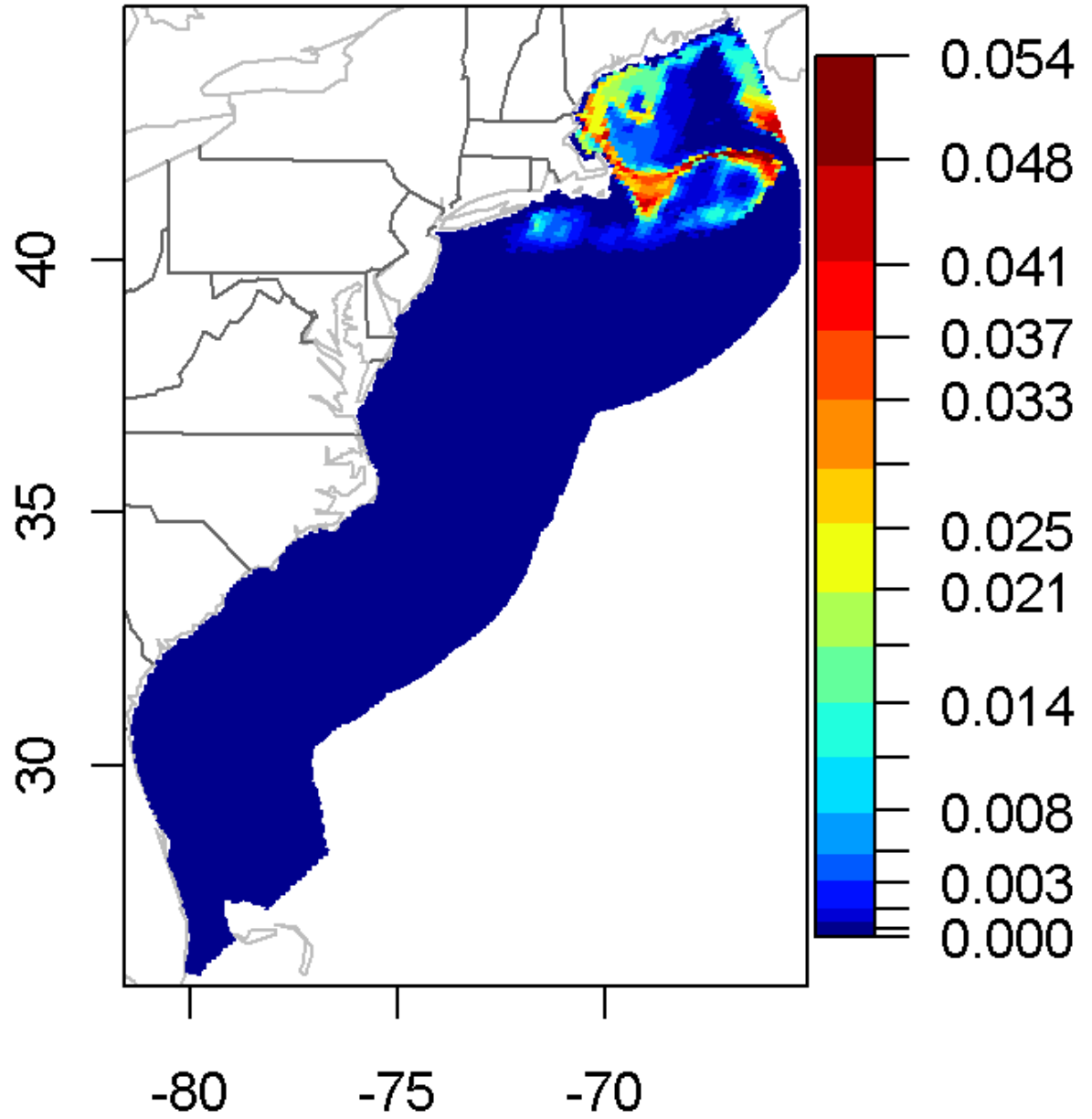


Figure 251: Map of standard error of habitat for 'Humpback whales' guild during 'fall' season in 'east2' region.

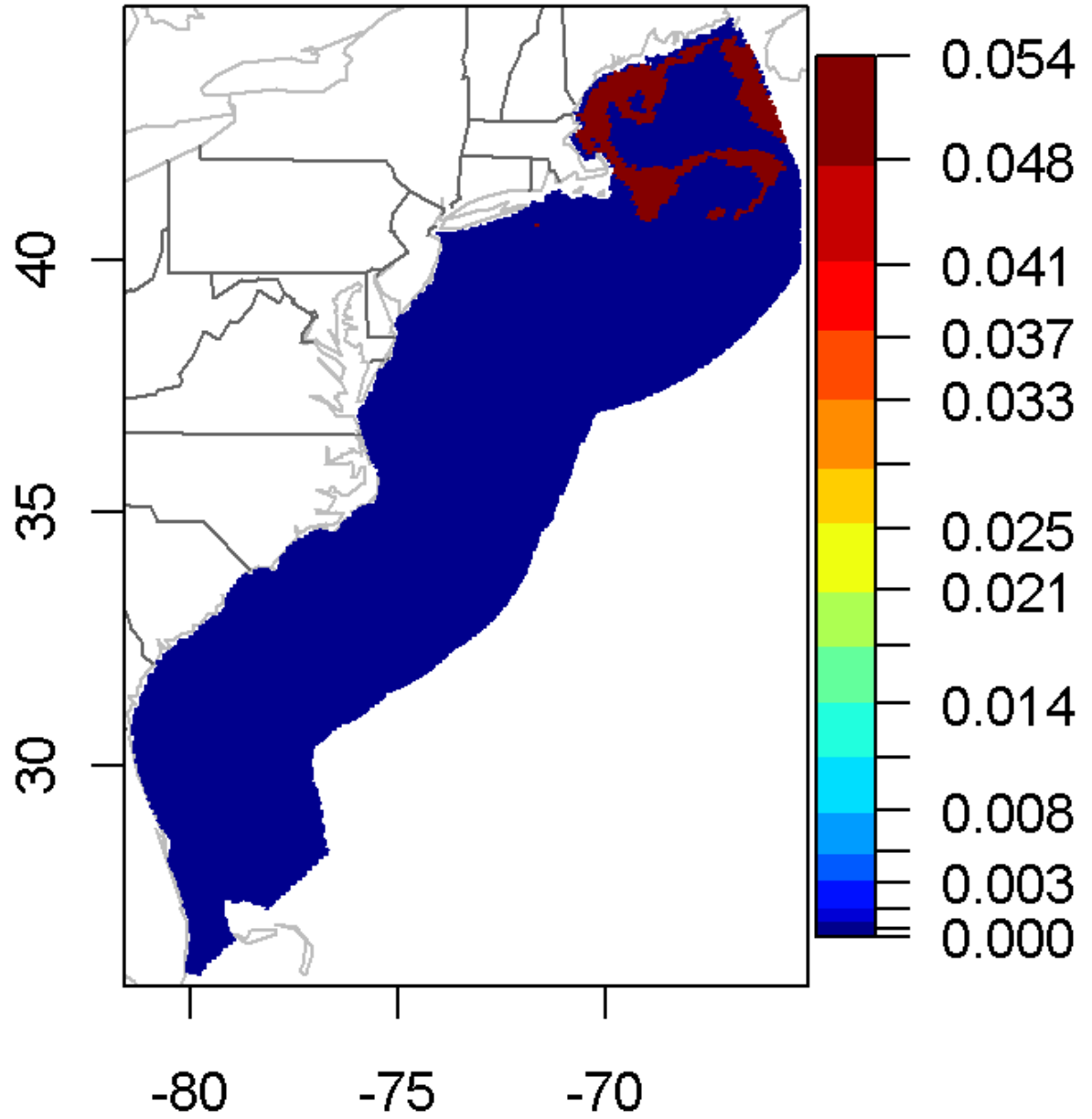


Figure 252: Map of binary habitat (cutoff determined by ROC) for 'Humpback whales' guild during 'fall' season in 'east2' region.

5.2 spring

5.2.1 east2

Modelrun identifier: duke_06_hw3_spring-east2

Date generated: 2008-10-21 14:43:15

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 24: Summary for duke(6) GAM model: for 'Humpback whales' guild during 'spring' season in 'east2' region.

	Value
Number.presences	11
Number.absences	2862
GAM.converged	TRUE
R.squared	0.00699171
Deviance.explained	0.134294
ROC.optimum	0.264141
Maximum.fit	0.00861759
Maximum.prediction	0.271858

Model text summary...

```
duke_06_hw3_spring-east2 run on Tue Oct 21 14:41:56 2008
provider:duke, version:06, guild:Humpback whales (hw3), season:'spring', region:east2

max.fit:0.264141, max.prediction:0.271858, ROC.optimum:0.008618

summary(mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.6076      0.1053  -53.24   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  0.9102  1.410   6.131 0.006367 **
s(log(d2shelf)) 0.8476  1.348   9.574 0.000624 ***
s(log(d2coast)) 0.8303  1.330   6.665 0.005043 **
s(sst)         1.9989  2.499  27.714 3.93e-15 ***
s(lat)         0.9762  1.476 140.826 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.00699   Deviance explained = 13.4%
GCV score = 0.00028967   Scale est. = 0.0002883   n = 2490

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1087  Min.   : 1654  Min.   :  4.0  Min.   :  995  Min.   : 1471  Min.   :  4.886  Min.   :26.17
se2:1786  1st Qu.:10323  1st Qu.: 20.0  1st Qu.:13946  1st Qu.:32021  1st Qu.:13.386  1st Qu.:33.83
          Median :10844  Median : 29.0  Median :31680  Median :52718  Median :17.732  Median :34.55
          Mean   : 9852  Mean   :236.4  Mean   :41188  Mean   :60965  Mean   :16.976  Mean   :34.44
          3rd Qu.:11293  3rd Qu.: 45.0  3rd Qu.:56624  3rd Qu.:75007  3rd Qu.:20.903  3rd Qu.:35.66
          Max.   :15889  Max.   :5270.0  Max.   :329182  Max.   :420801  Max.   :26.475  Max.   :42.39
                   NA's   :      6      NA's   :      6      NA's   :378.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :  5  Min.   :1259  Min.   :  2.850  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042  1st Qu.:89304  1st Qu.: 9.675  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :20.025	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.626	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.575	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :26.175	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :7.955e-06  Min.   :4.521e-06  Min.   :0.000e+00  Min.   :2.601e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:1.209e-03  1st Qu.:3.088e-04  1st Qu.:0.000e+00  1st Qu.:5.086e-04  1st Qu.:0.0000
Median :11616  Median :9.373e-03  Median :2.618e-03  Median :0.000e+00  Median :3.743e-03  Median :1.0000
Mean   :11171  Mean   :3.248e-02  Mean   :1.079e-02  Mean   :1.126e-02  Mean   :1.009e-02  Mean   :0.5209
3rd Qu.:14088  3rd Qu.:3.975e-02  3rd Qu.:1.220e-02  3rd Qu.:0.000e+00  3rd Qu.:9.634e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :2.719e-01  Max.   :9.039e-02  Max.   :1.000e+00  Max.   :2.202e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.911e+03  NA's :8.911e+03
```

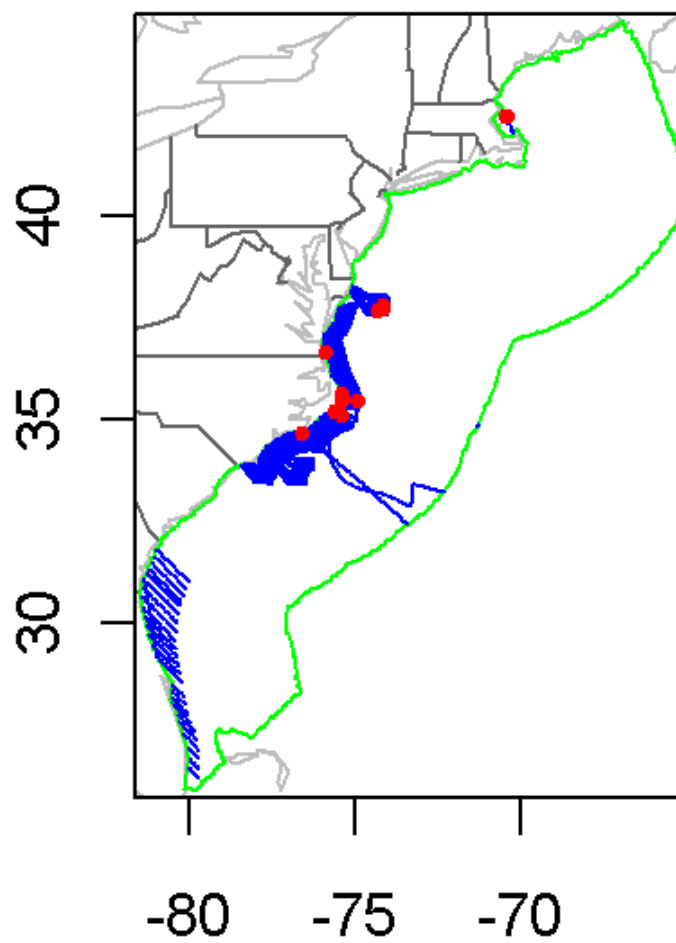


Figure 253: Map of points of observational sightings and tracks of survey effort for 'Humpback whales' guild during 'spring' season in 'east2' region.

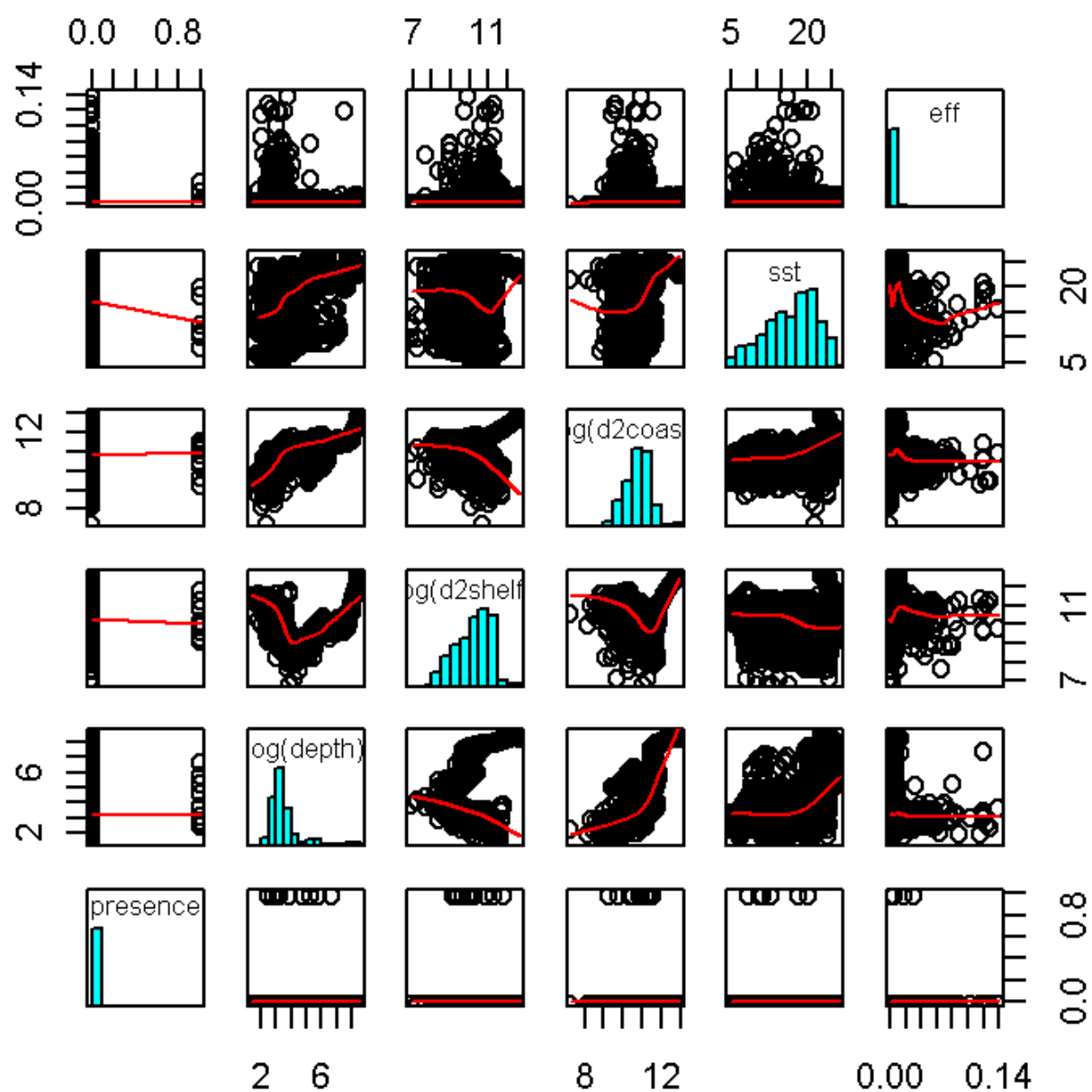


Figure 254: Pairs plot of input variables for 'Humpback whales' guild during 'spring' season in 'east2' region.

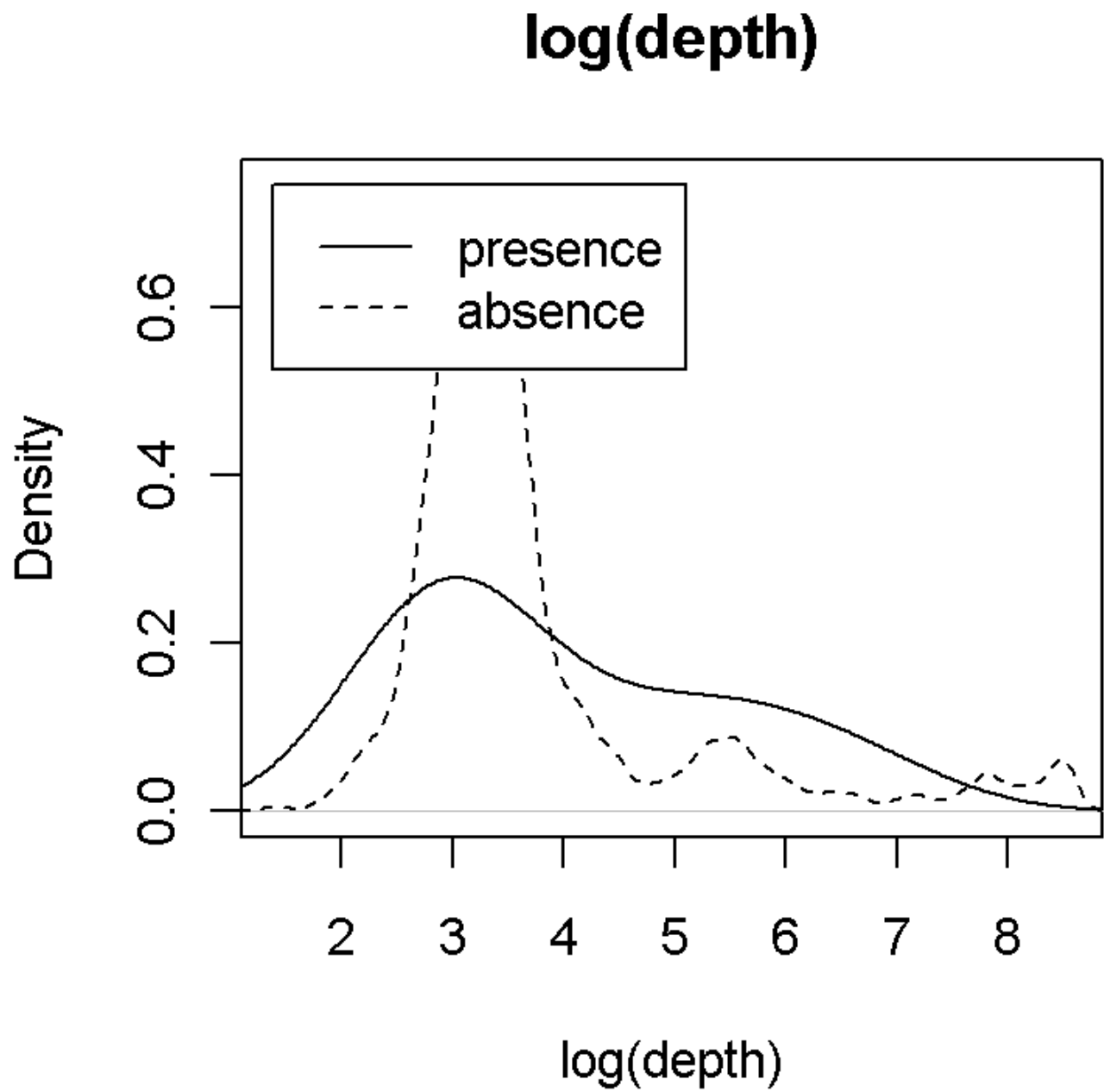


Figure 255: Density histogram of depth log(meters) for 'Humpback whales' guild during 'spring' season in 'east2' region.

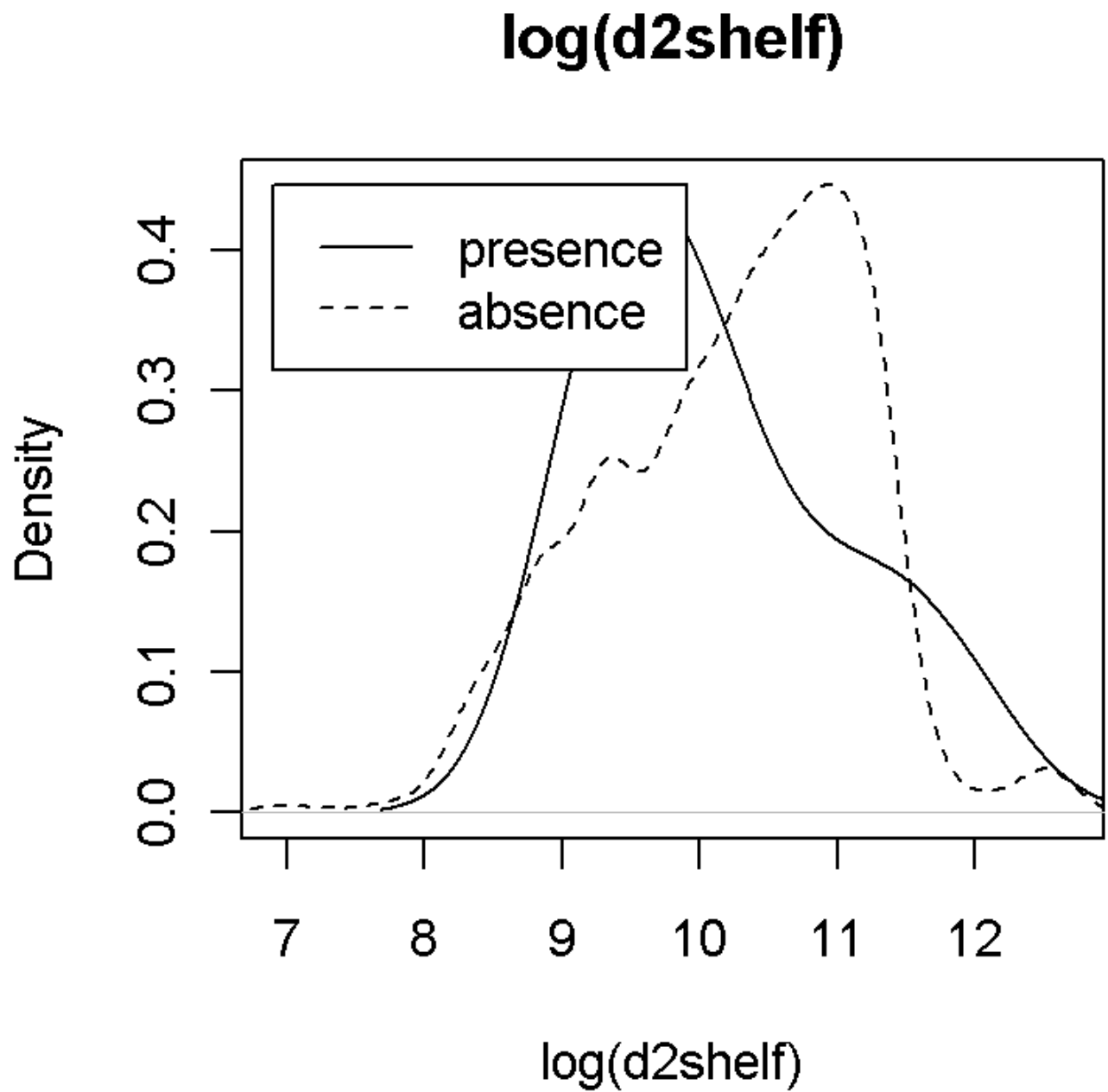


Figure 256: Density histogram of distance to shelf log(meters) for 'Humpback whales' guild during 'spring' season in 'east2' region.

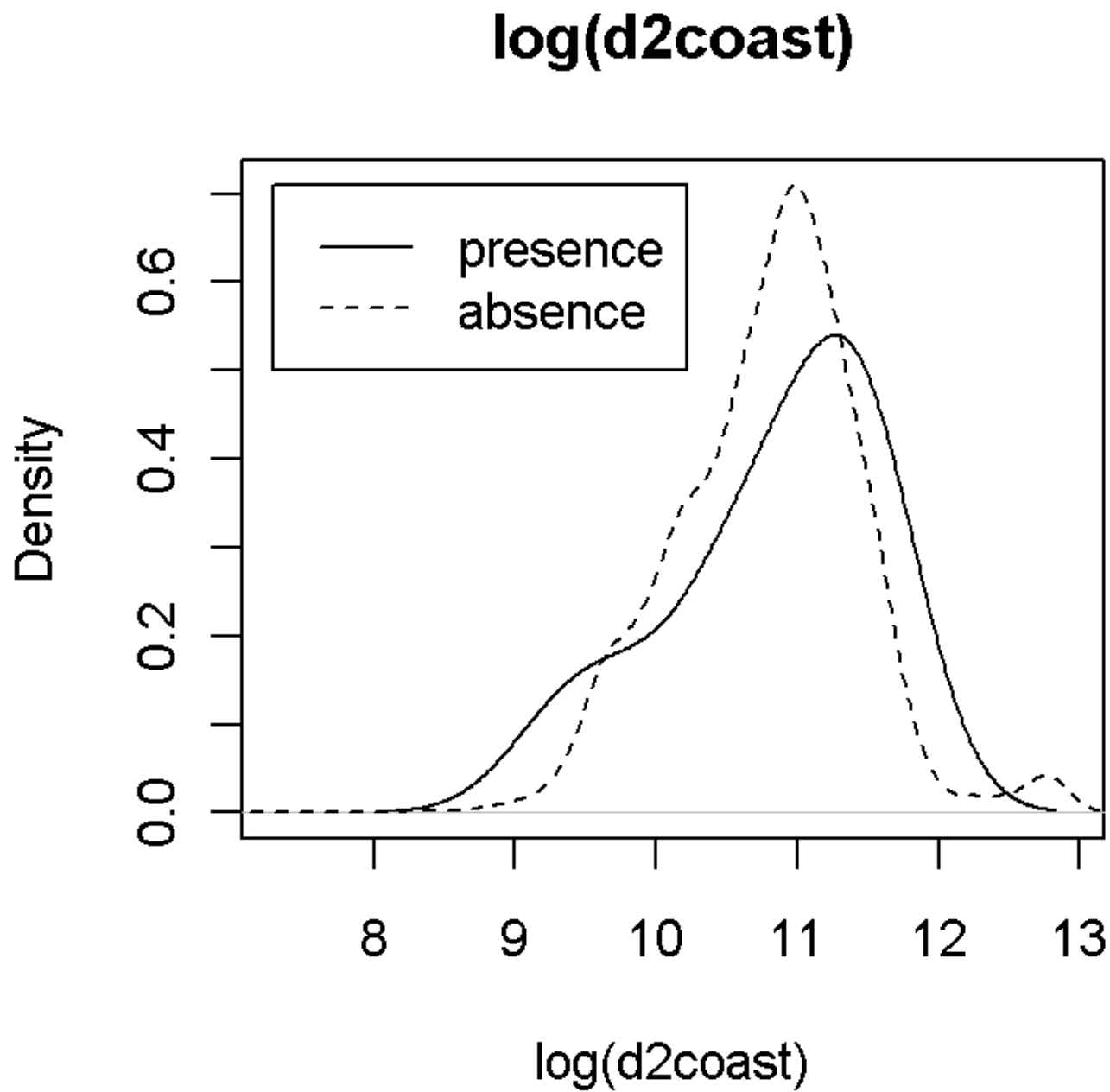


Figure 257: Density histogram of distance to coast log(meters) for 'Humpback whales' guild during 'spring' season in 'east2' region.

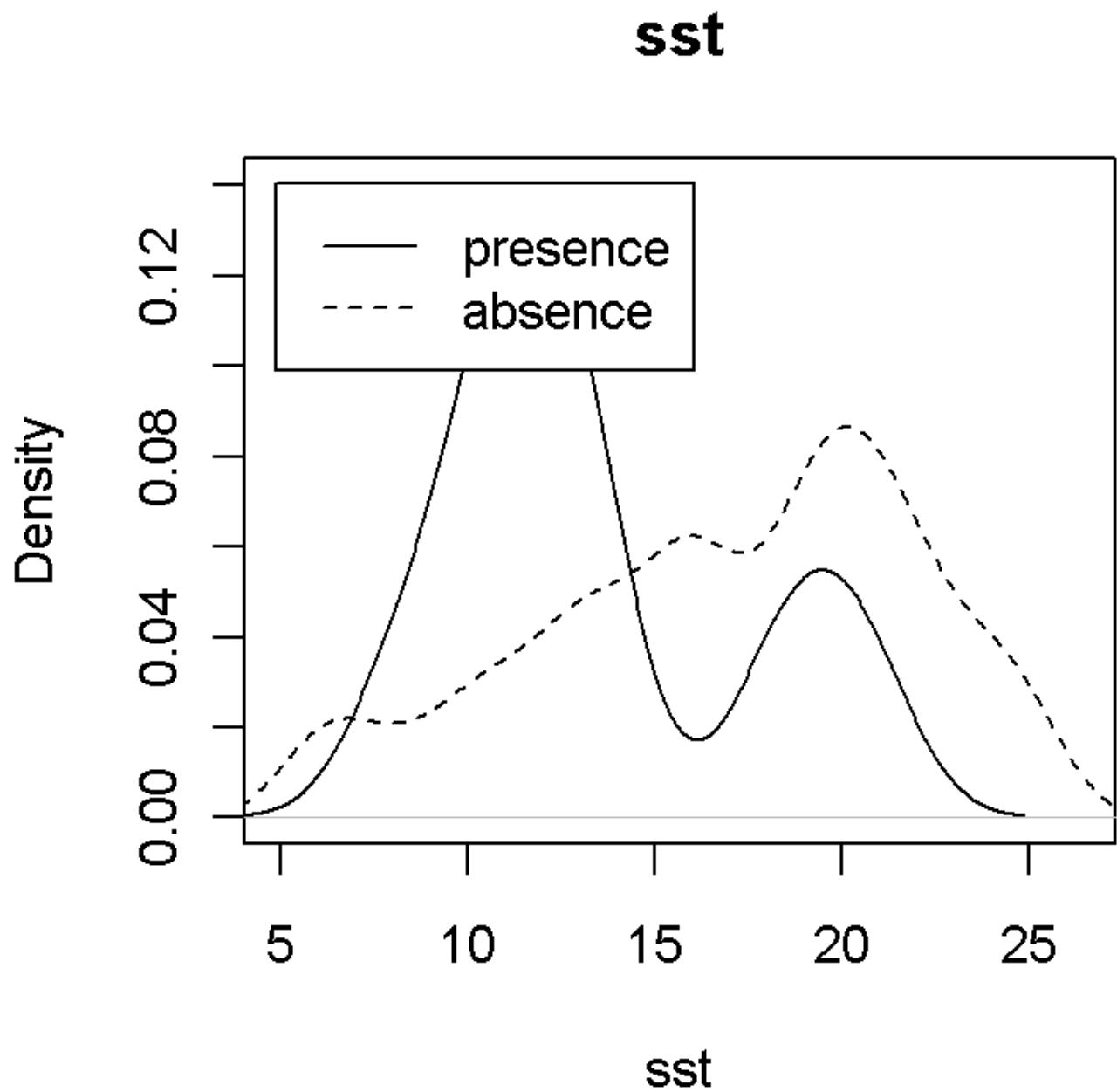


Figure 258: Density histogram of sea-surface temperature (degrees C) for 'Humpback whales' guild during 'spring' season in 'east2' region.

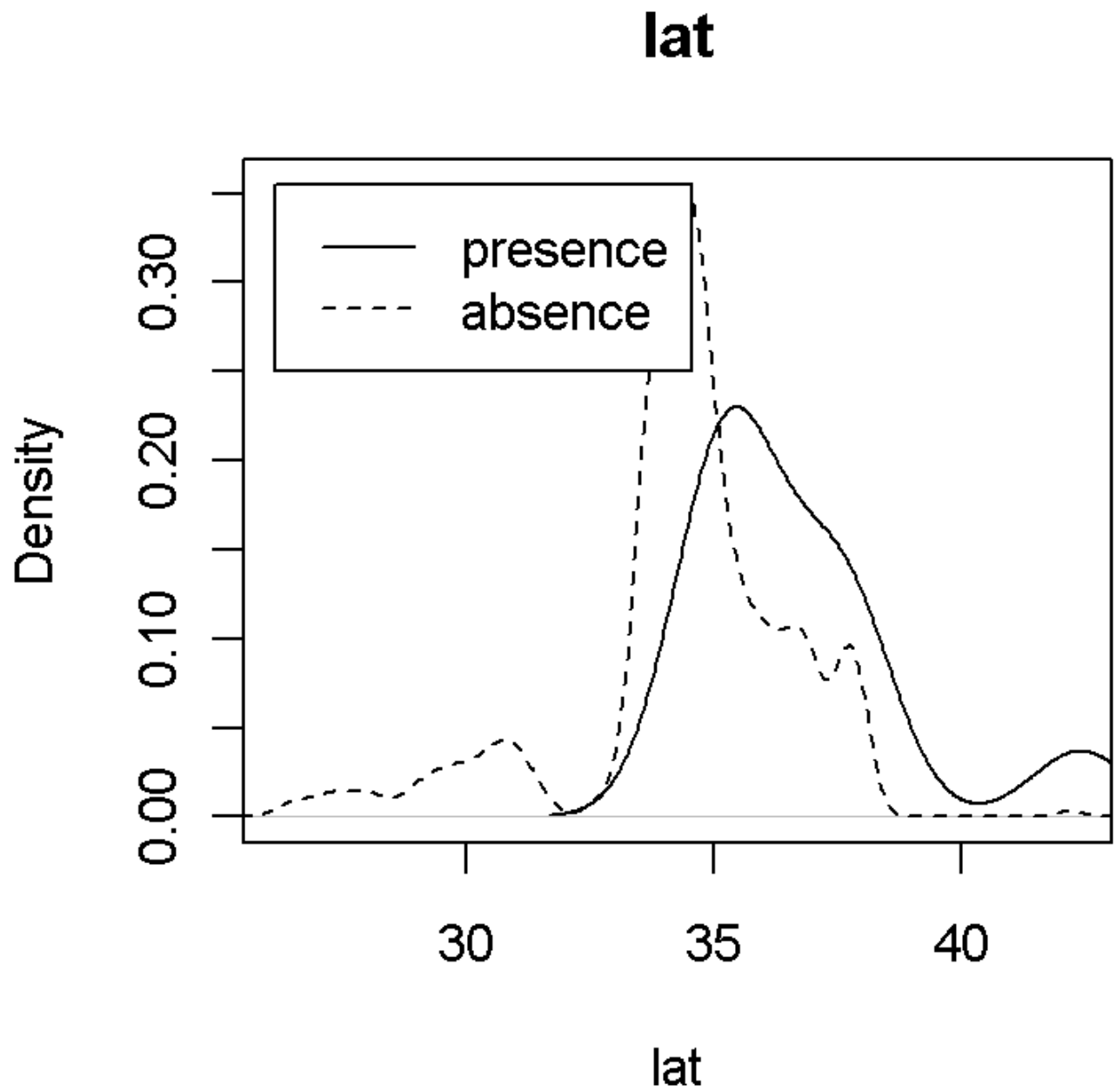


Figure 259: Density histogram of latitude (degrees) for 'Humpback whales' guild during 'spring' season in 'east2' region.

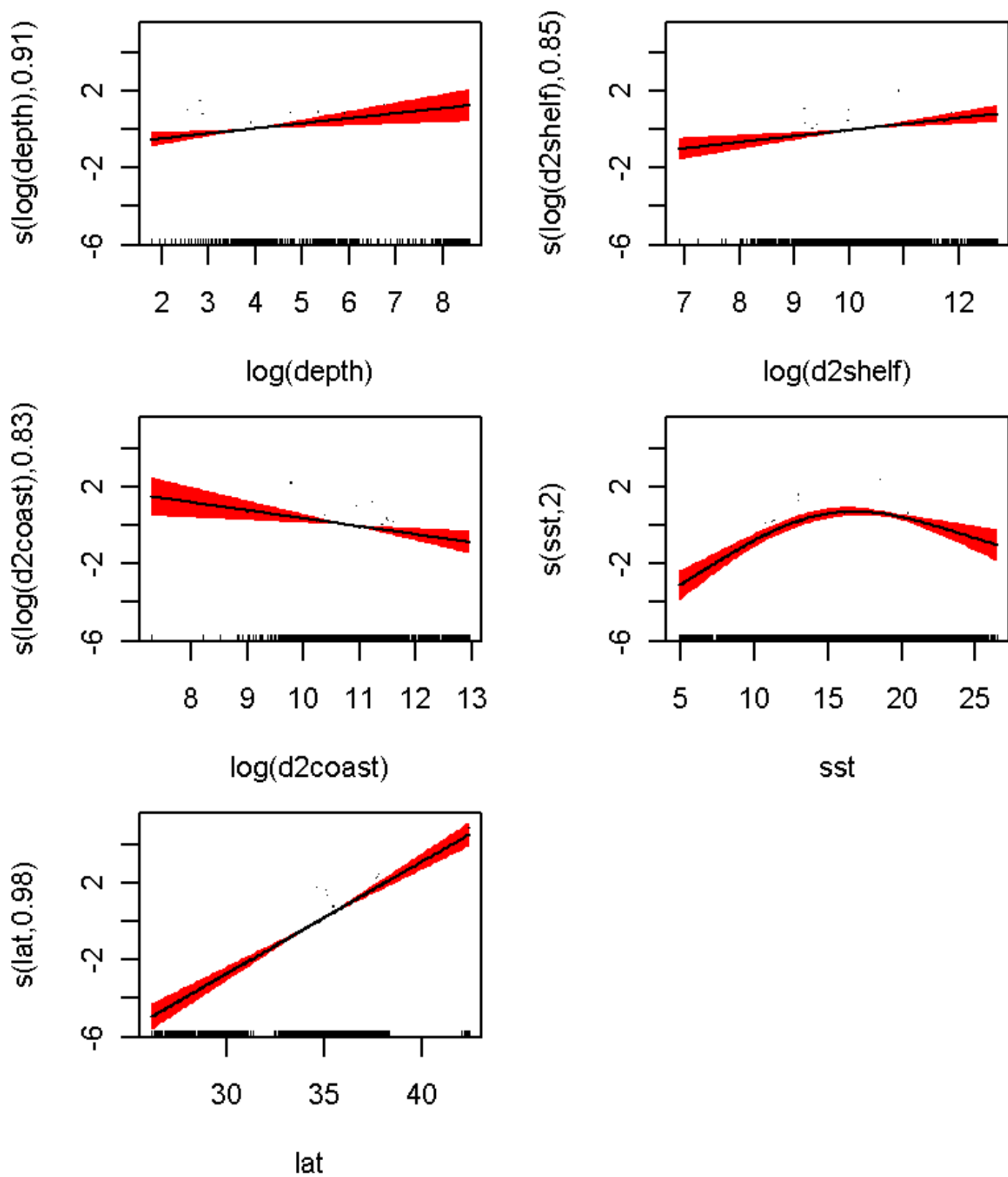


Figure 260: Terms plot of predictors to GAM model fit for 'Humpback whales' guild during 'spring' season in 'east2' region.

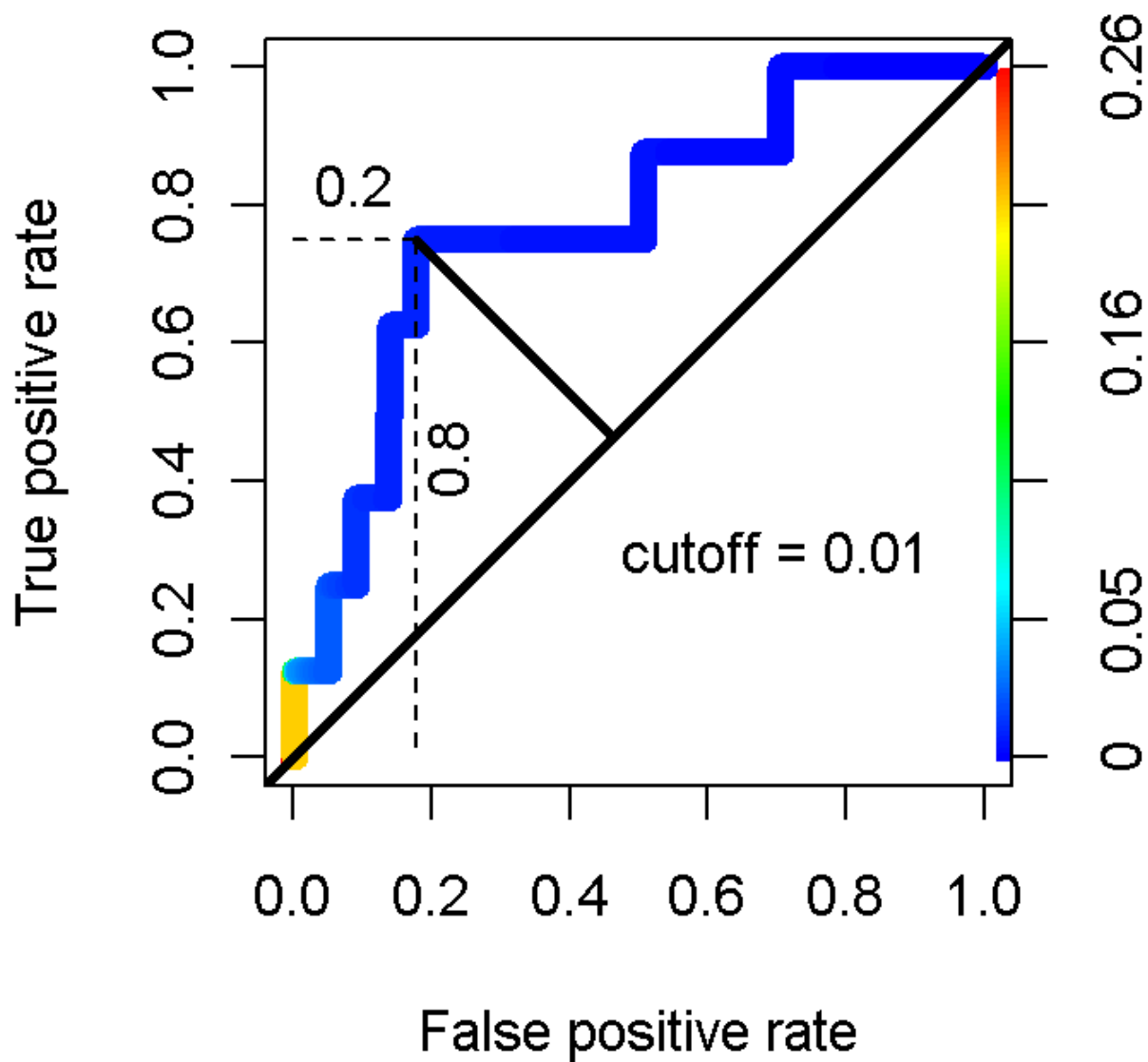


Figure 261: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Humpback whales' guild during 'spring' season in 'east2' region.

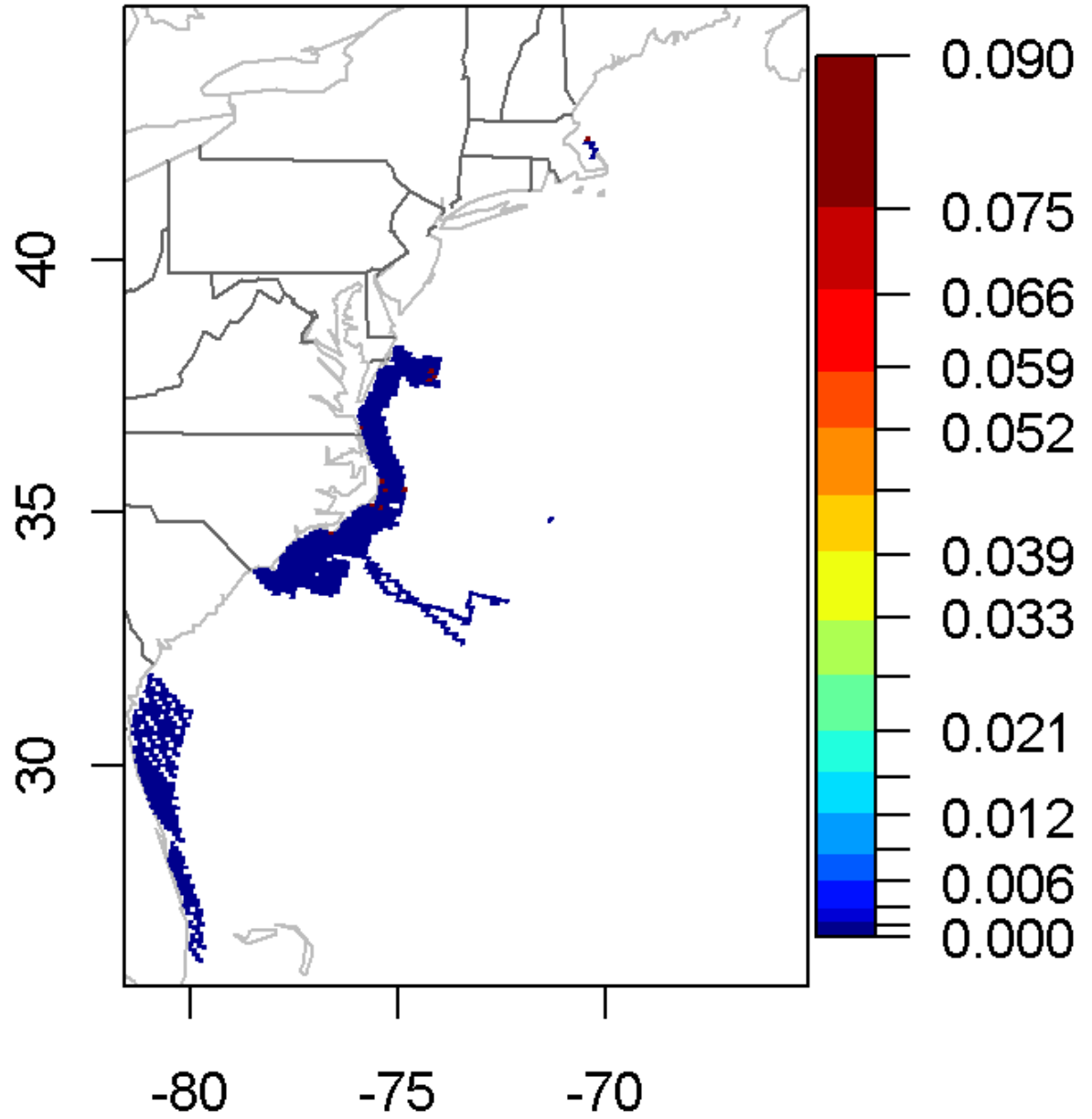


Figure 262: Map of presence and absence by cell summed through time for 'Humpback whales' guild during 'spring' season in 'east2' region.

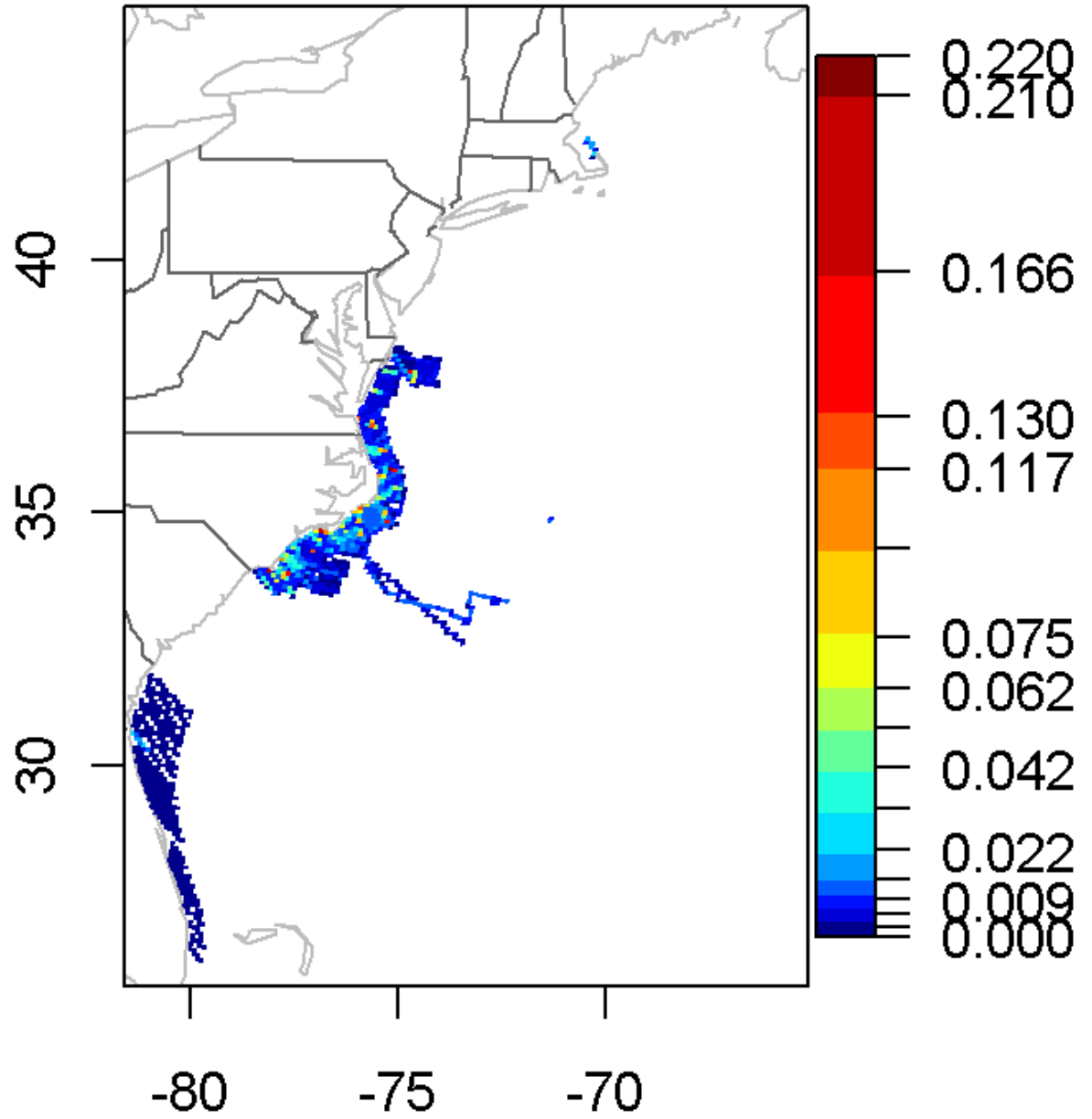


Figure 263: Map of effort(hours/km²) by cell summed through time for 'Humpback whales' guild during 'spring' season in 'east2' region.

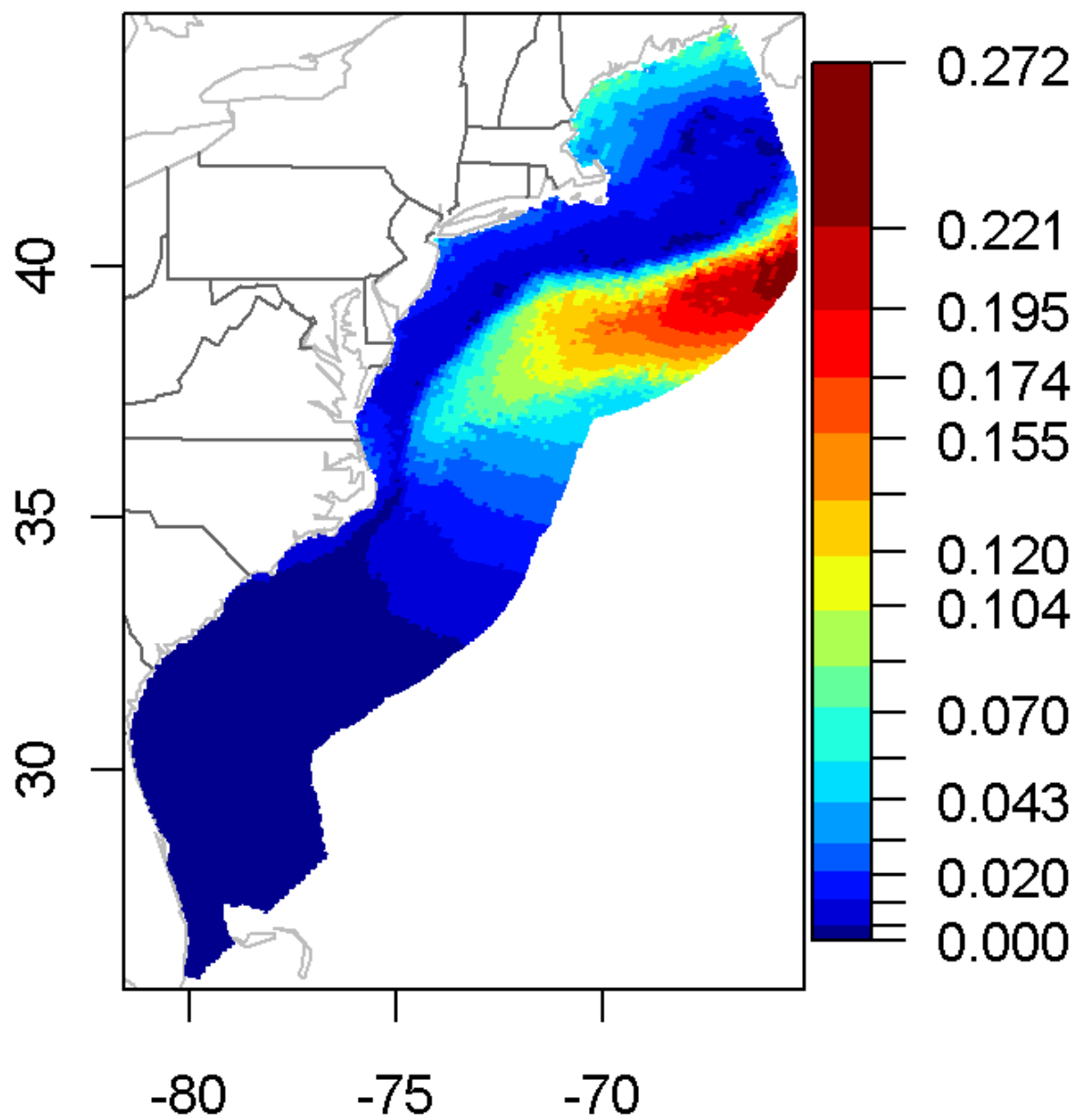


Figure 264: Map of mean predicted habitat for 'Humpback whales' guild during 'spring' season in 'east2' region.

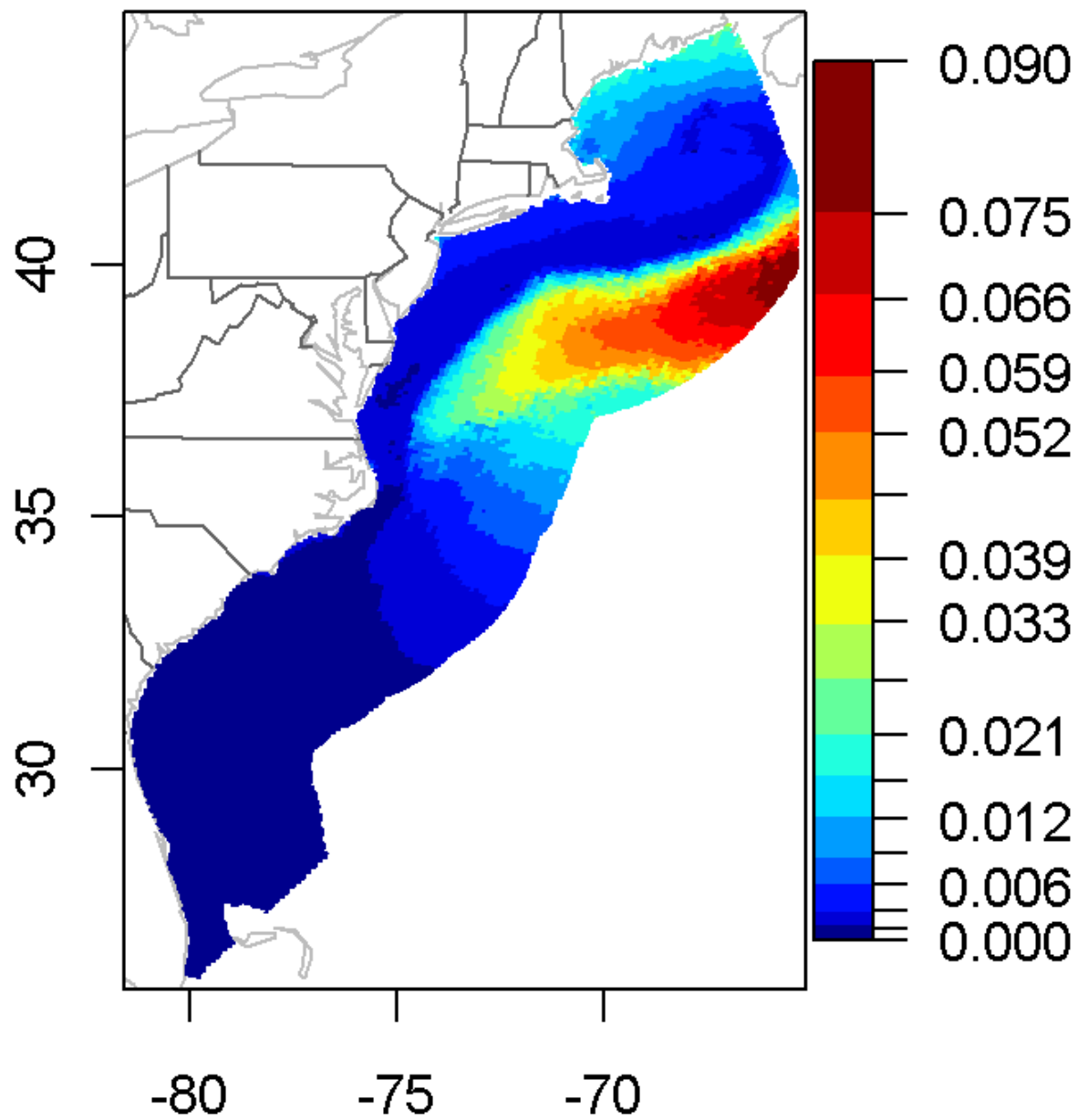


Figure 265: Map of standard error of habitat for 'Humpback whales' guild during 'spring' season in 'east2' region.

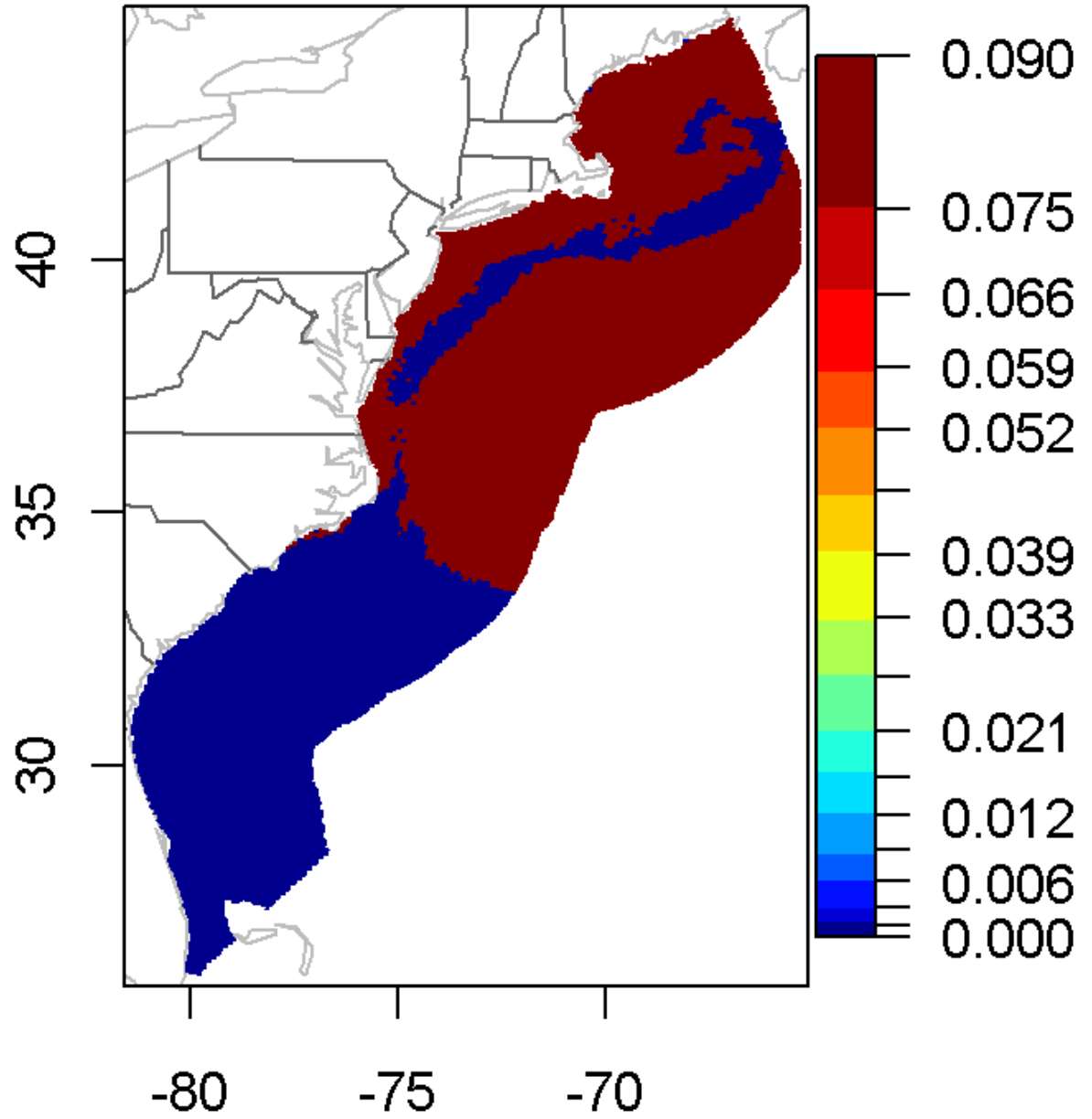


Figure 266: Map of binary habitat (cutoff determined by ROC) for 'Humpback whales' guild during 'spring' season in 'east2' region.

5.3 summer

5.3.1 east2

Modelrun identifier: duke_06_hw3_summer_east2

Date generated: 2008-10-21 13:06:03

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 25: Summary for duke(6) GAM model: for 'Humpback whales' guild during 'summer' season in 'east2' region.

	Value
Number.presences	153
Number.absences	8925
GAM.converged	TRUE
R.squared	0.379949
Deviance.explained	0.417218
ROC.optimum	0.569111
Maximum.fit	0.0319719
Maximum.prediction	0.555827

Model text summary...

```
duke_06_hw3_summer_east2 run on Tue Oct 21 13:02:35 2008
provider:duke, version:06, guild:Humpback whales (hw3), season:'summer', region:east2

max.fit:0.569111, max.prediction:0.555827, ROC.optimum:0.031972

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -48.853      2.316   -21.09  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.9935   2.493 157.26 < 2e-16 ***
s(log(d2shelf)) 0.9991   1.499 222.57 < 2e-16 ***
s(log(d2coast)) 0.9576   1.458  21.26 7.18e-08 ***
s(sst)         1.9533   2.453  70.77 < 2e-16 ***
s(lat)         1.9864   2.486 100.41 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.38   Deviance explained = 41.7%
GCV score = 0.0010055   Scale est. = 0.0010037   n = 8663

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:7694   Min.    : 1635   Min.    :  5.0   Min.    :    5   Min.    : 1259   Min.    :  8.175   Min.    :25.94
se2:1384   1st Qu.: 11866   1st Qu.: 48.0   1st Qu.: 20989   1st Qu.: 50865   1st Qu.: 17.025   1st Qu.:37.53
          Median :14008   Median : 111.5   Median : 52230   Median :102266   Median : 22.200   Median :40.18
          Mean   :13275   Mean   : 677.3   Mean   : 67623   Mean   :125197   Mean   : 21.378   Mean   :39.35
          3rd Qu.:15645   3rd Qu.: 420.0   3rd Qu.: 99335   3rd Qu.:174835   3rd Qu.: 25.650   3rd Qu.:42.31
          Max.    :16560   Max.    :5251.0   Max.    :324910   Max.    :445165   Max.    : 30.900   Max.    :44.74
          NA's    :      7      NA's    :      7      NA's    :408.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685   Min.    : 1633   Min.    :  4   Min.    :    5   Min.    : 1259   Min.    :11.18   Min.    :25.91
se2:4203   1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042   1st Qu.: 89304   1st Qu.:22.80   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :2.544e-16	Min. :0.000e+00	Min. :7.209e-08	Min. :0.00000
1st Qu.: 9145	1st Qu.:2.220e-16	1st Qu.:9.204e-16	1st Qu.:0.000e+00	1st Qu.:1.220e-03	1st Qu.:0.00000
Median :11616	Median :2.220e-16	Median :2.405e-15	Median :0.000e+00	Median :4.368e-03	Median :0.00000
Mean :11171	Mean :1.615e-02	Mean :1.170e-03	Mean :3.557e-02	Mean :1.069e-02	Mean :0.09719
3rd Qu.:14088	3rd Qu.:2.220e-16	3rd Qu.:5.355e-15	3rd Qu.:0.000e+00	3rd Qu.:9.308e-03	3rd Qu.:0.00000
Max. :16560	Max. :5.558e-01	Max. :3.230e-02	Max. :3.000e+00	Max. :2.910e-01	Max. :1.00000
	NA's :5.000e+00	NA's :5.000e+00	NA's :5.277e+03	NA's :5.277e+03	

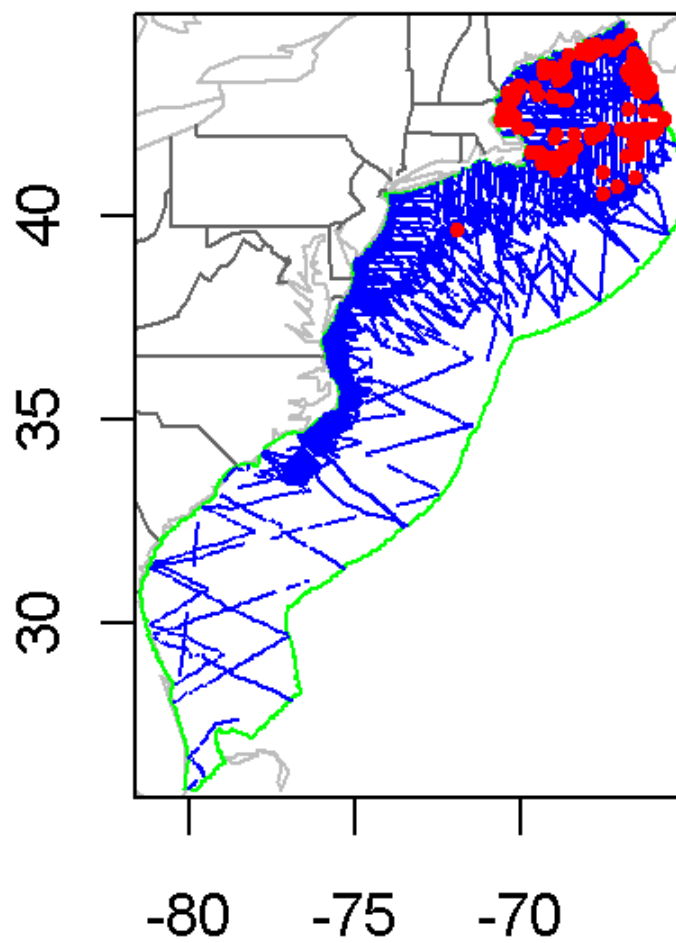


Figure 267: Map of points of observational sightings and tracks of survey effort for 'Humpback whales' guild during 'summer' season in 'east2' region.

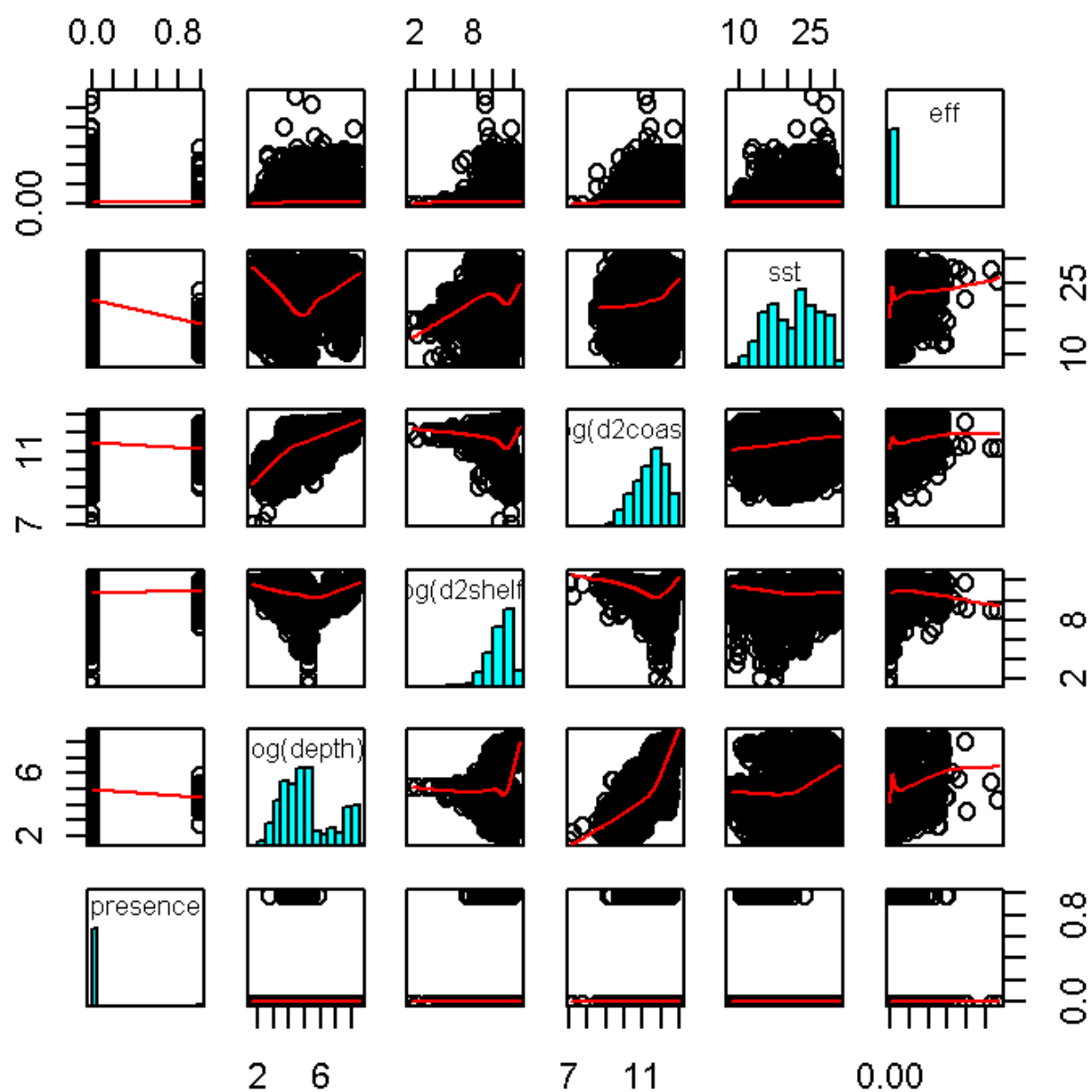


Figure 268: Pairs plot of input variables for 'Humpback whales' guild during 'summer' season in 'east2' region.

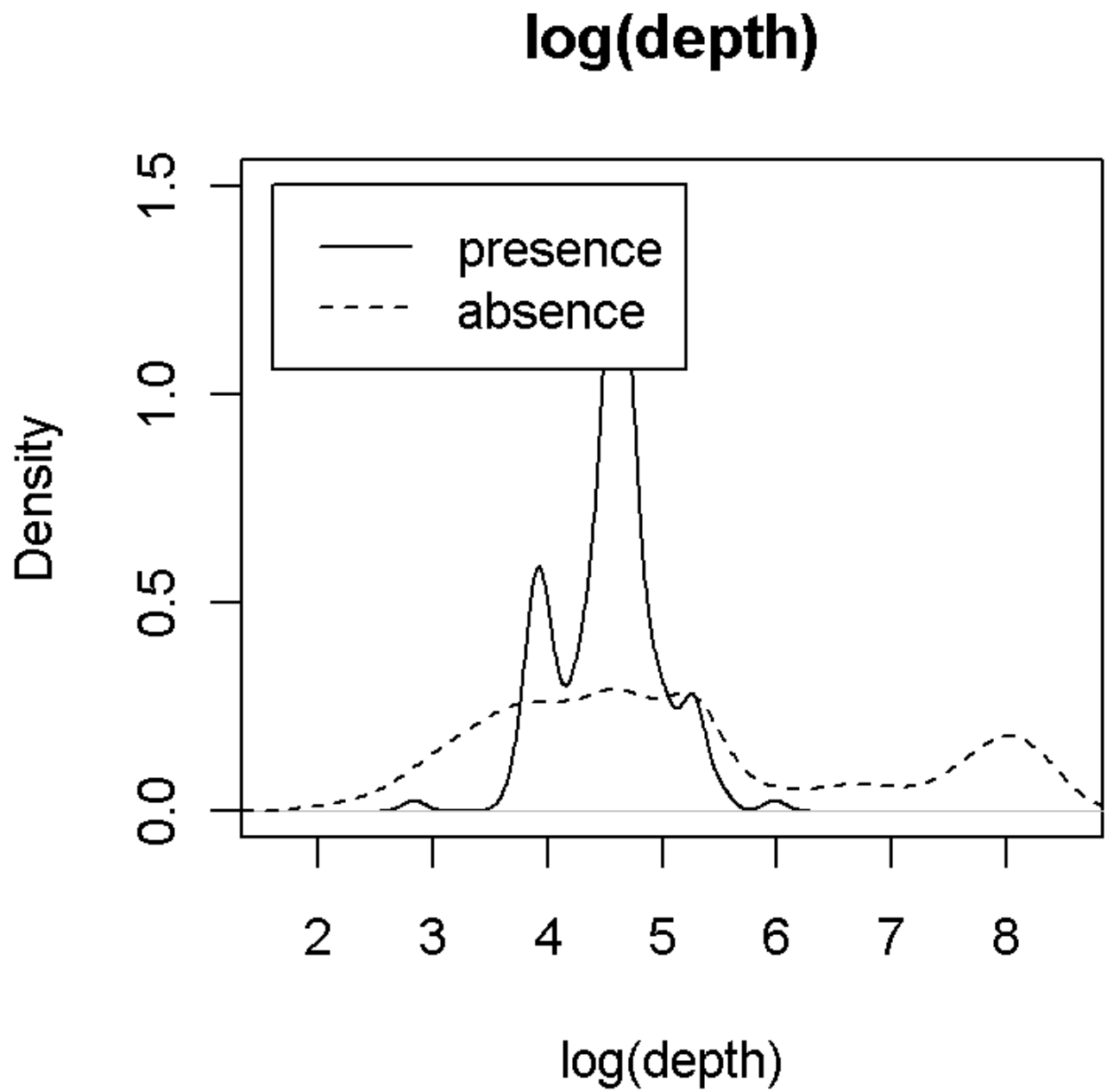


Figure 269: Density histogram of depth log(meters) for 'Humpback whales' guild during 'summer' season in 'east2' region.

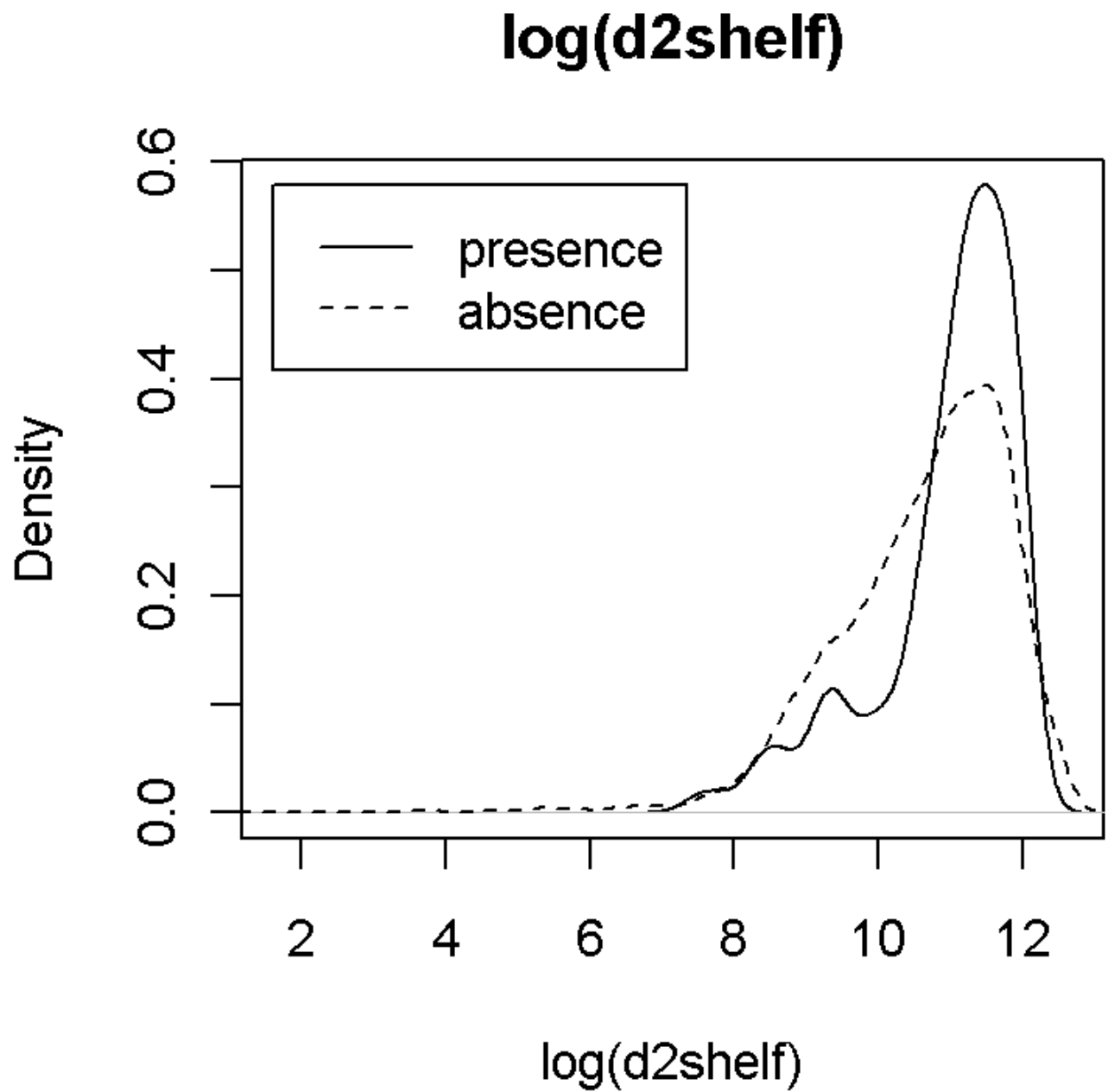


Figure 270: Density histogram of distance to shelf log(meters) for 'Humpback whales' guild during 'summer' season in 'east2' region.

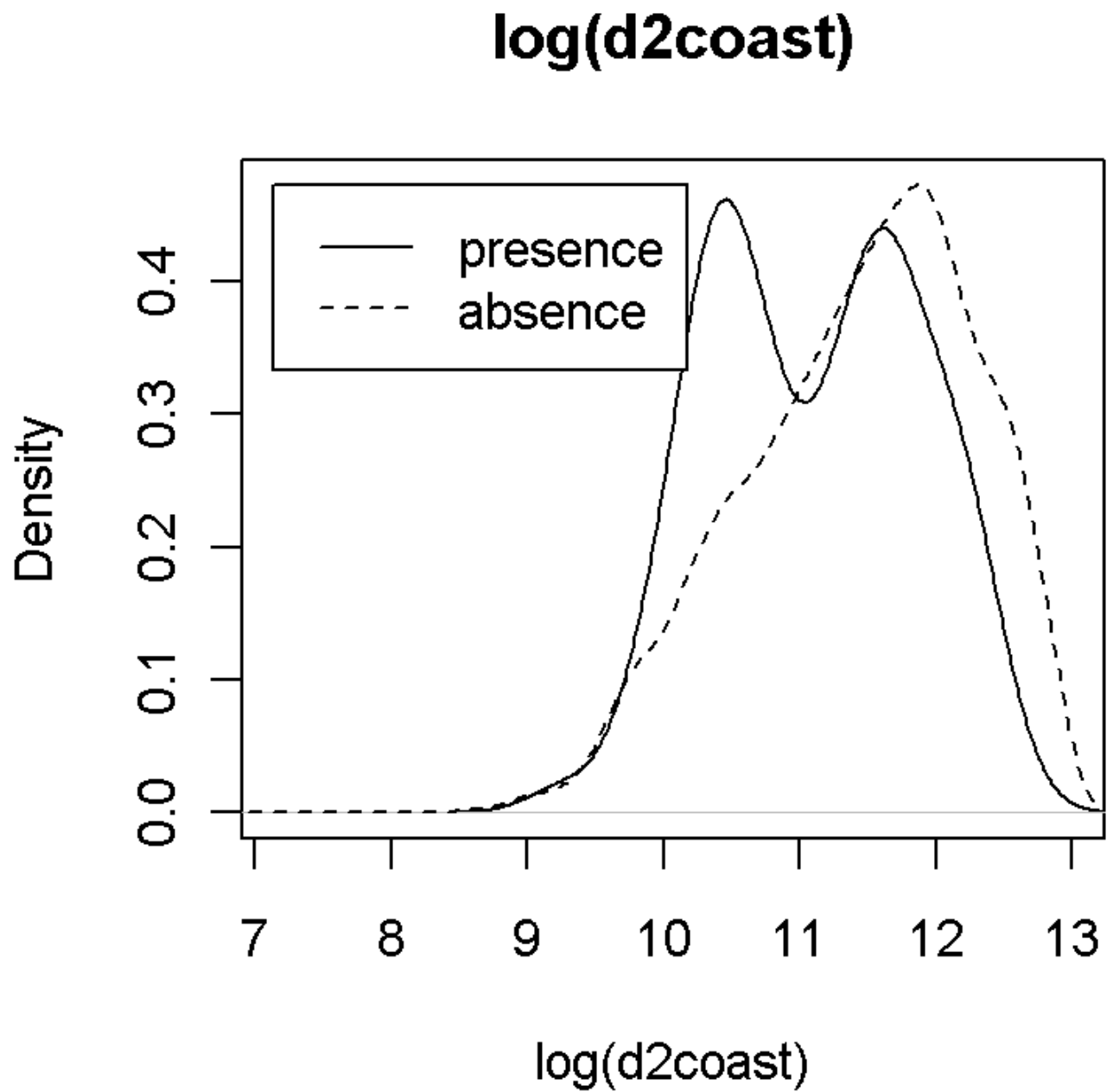


Figure 271: Density histogram of distance to coast log(meters) for 'Humpback whales' guild during 'summer' season in 'east2' region.

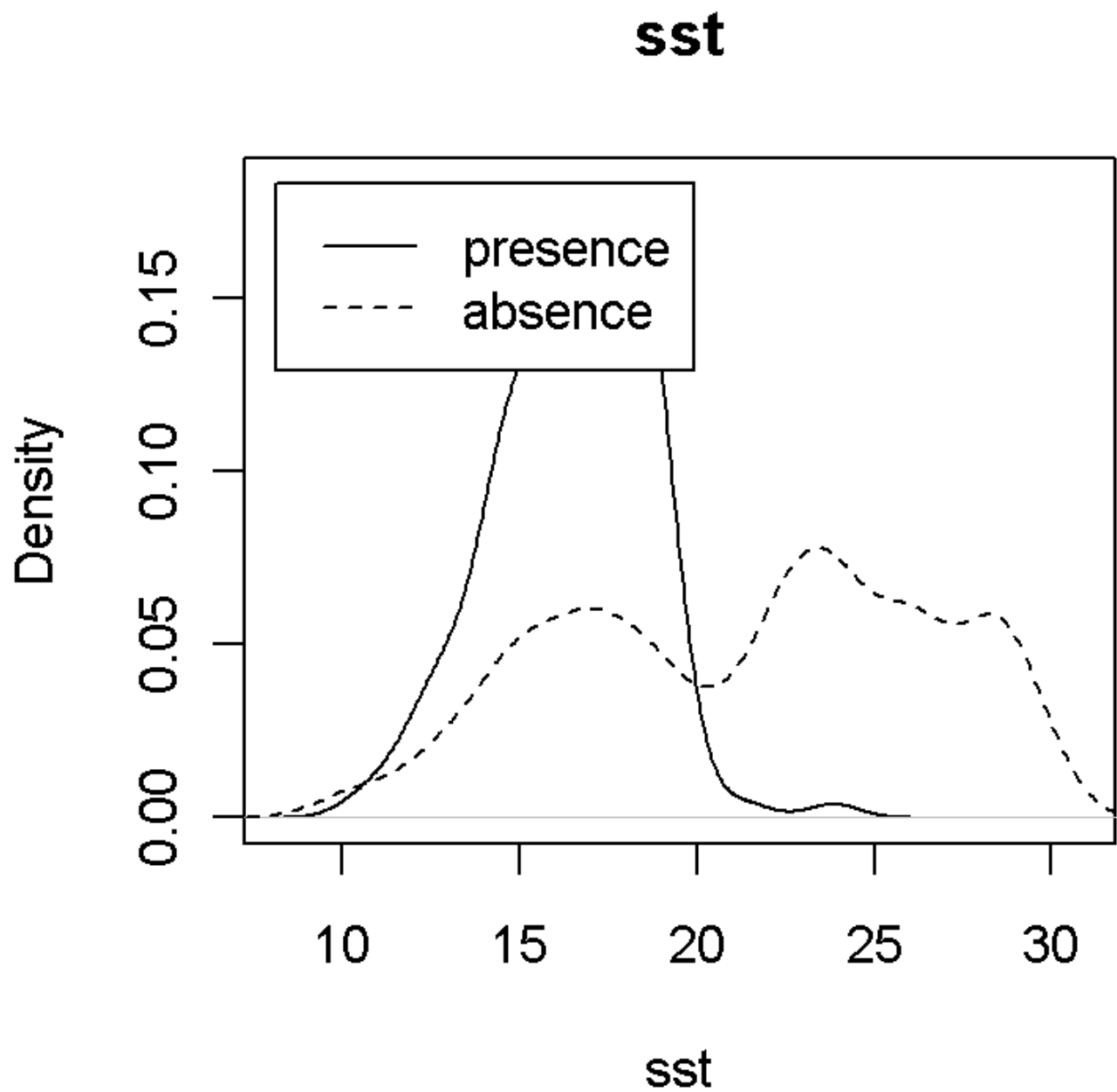


Figure 272: Density histogram of sea-surface temperature (degrees C) for 'Humpback whales' guild during 'summer' season in 'east2' region.

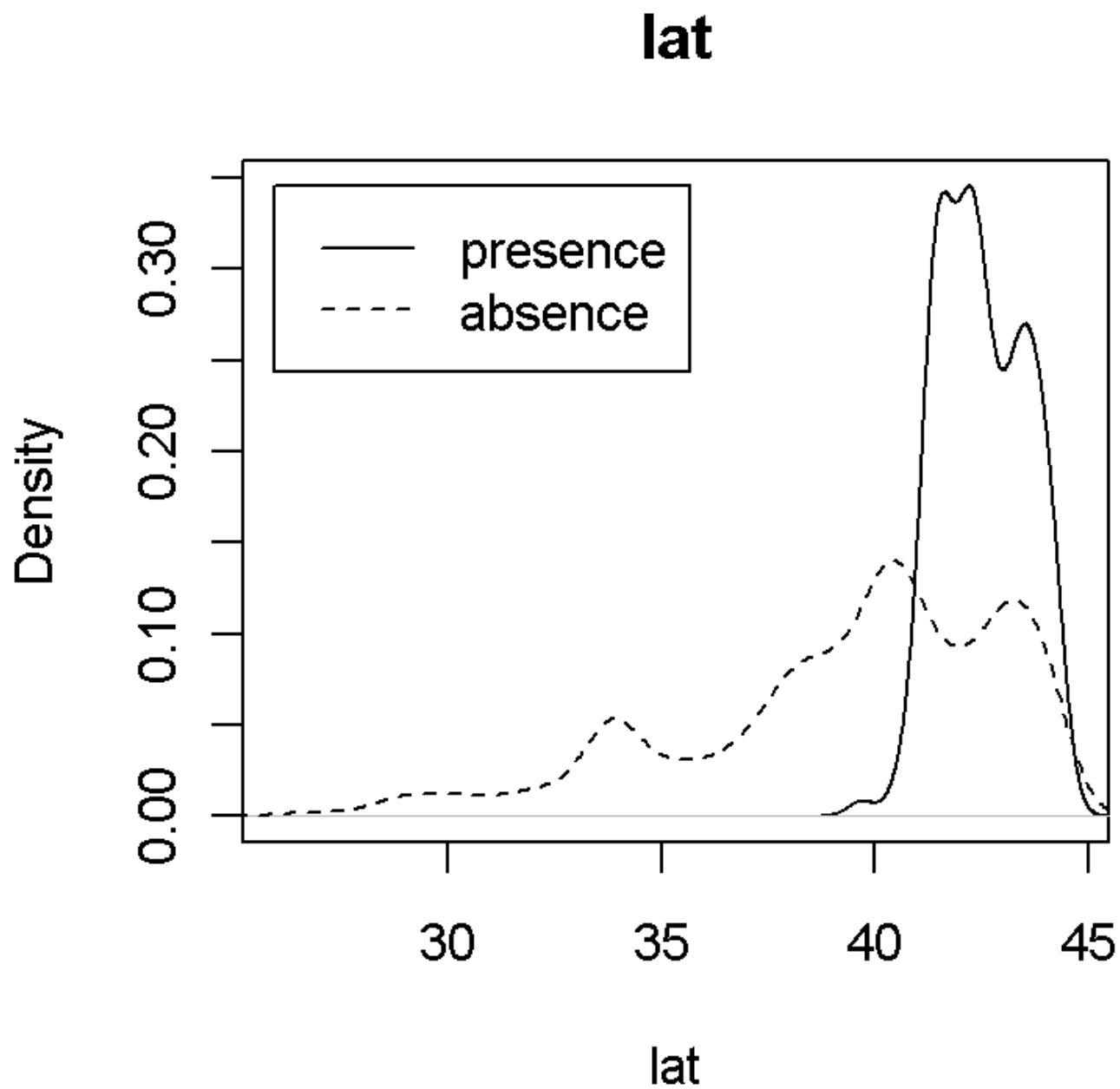


Figure 273: Density histogram of latitude (degrees) for 'Humpback whales' guild during 'summer' season in 'east2' region.

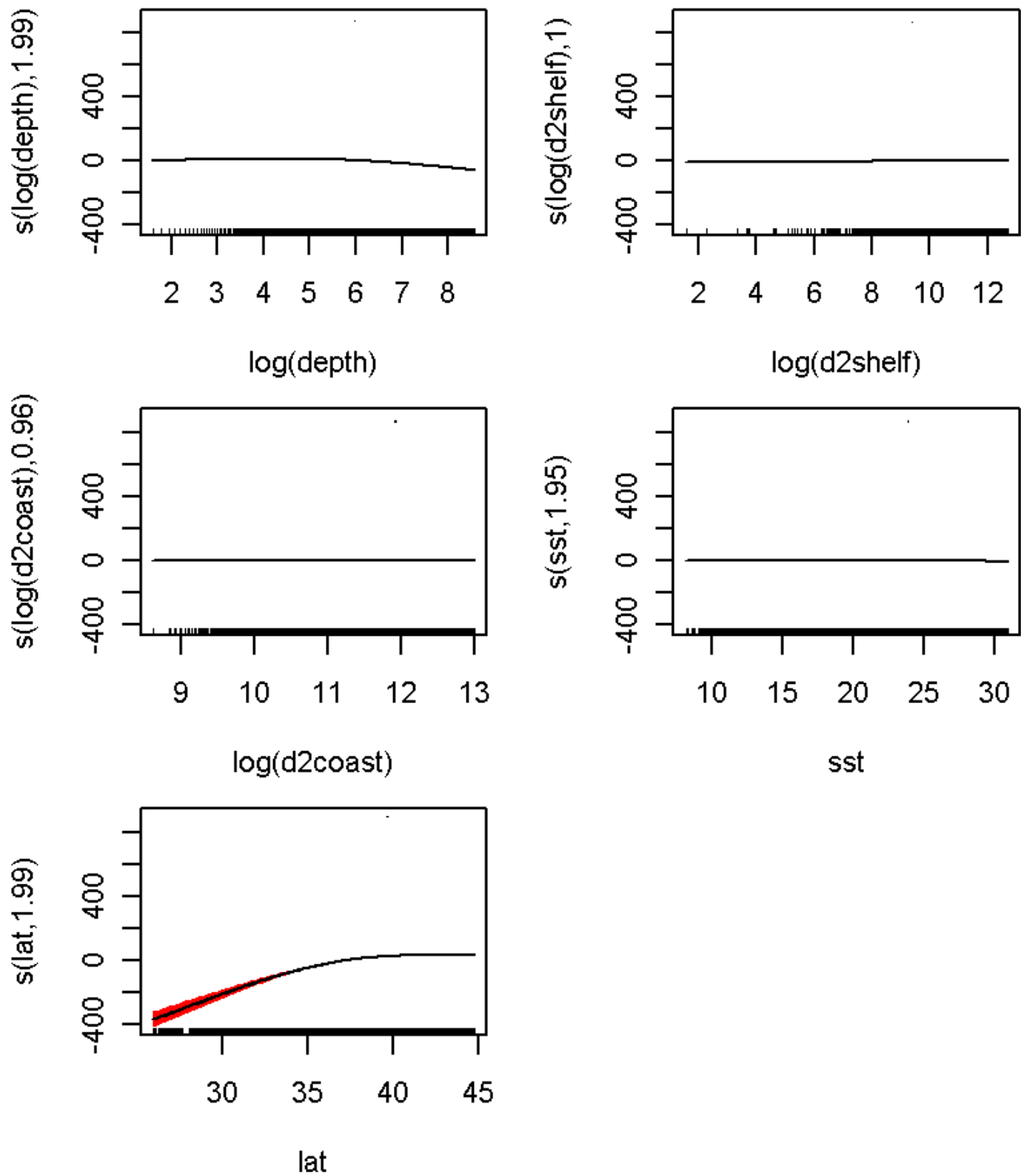


Figure 274: Terms plot of predictors to GAM model fit for 'Humpback whales' guild during 'summer' season in 'east2' region.

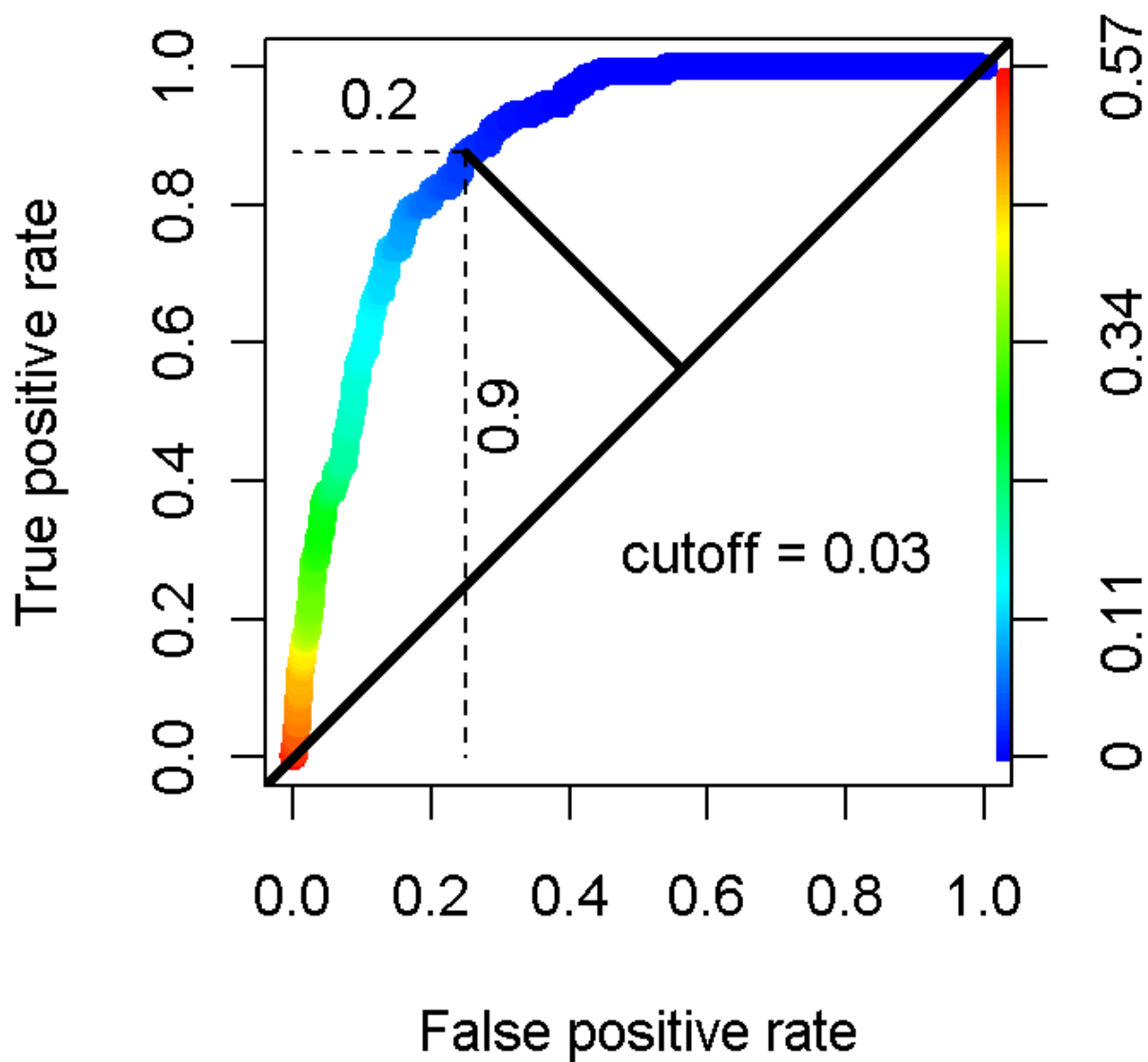


Figure 275: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Humpback whales' guild during 'summer' season in 'east2' region.

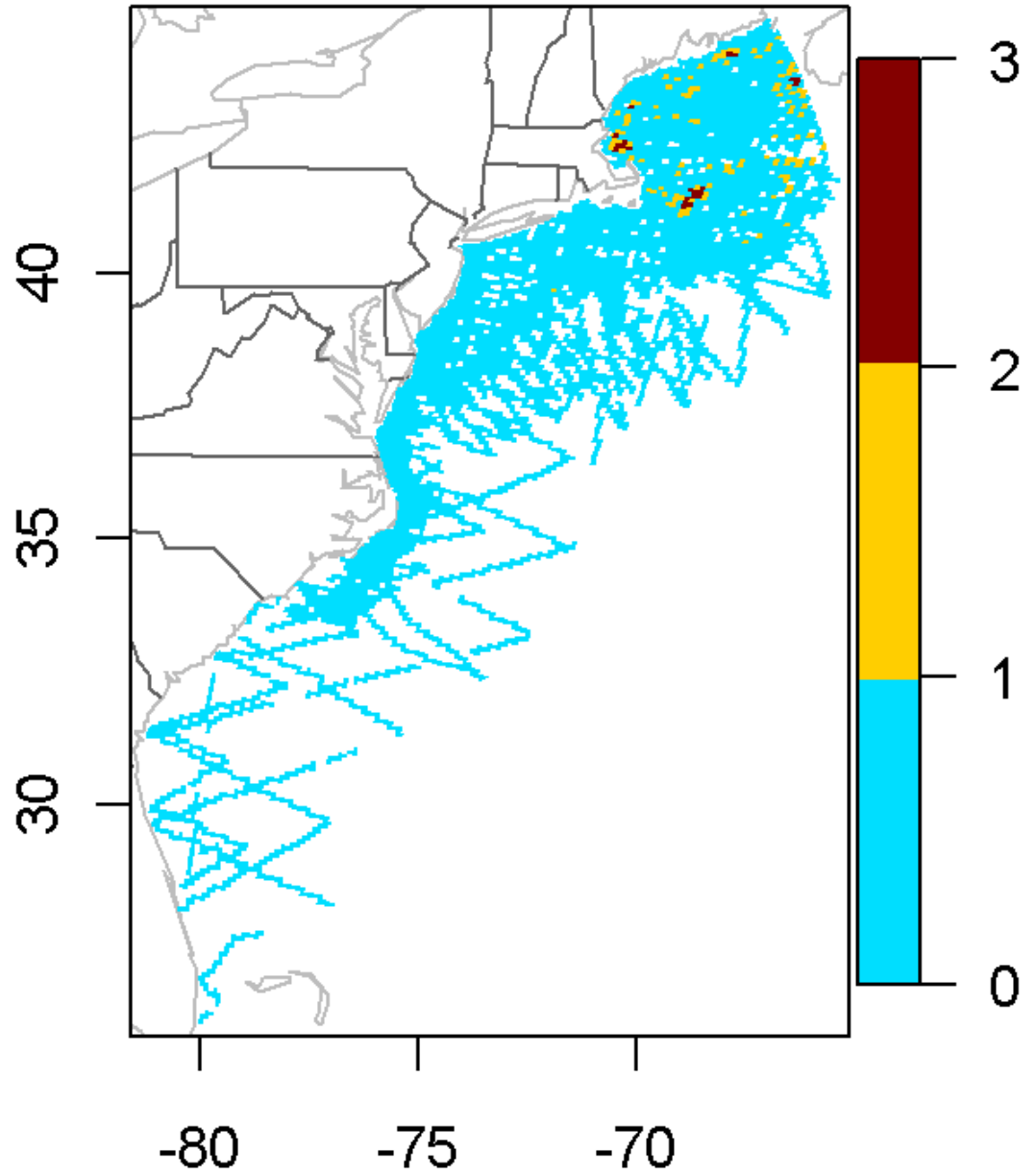


Figure 276: Map of presence and absence by cell summed through time for 'Humpback whales' guild during 'summer' season in 'east2' region.

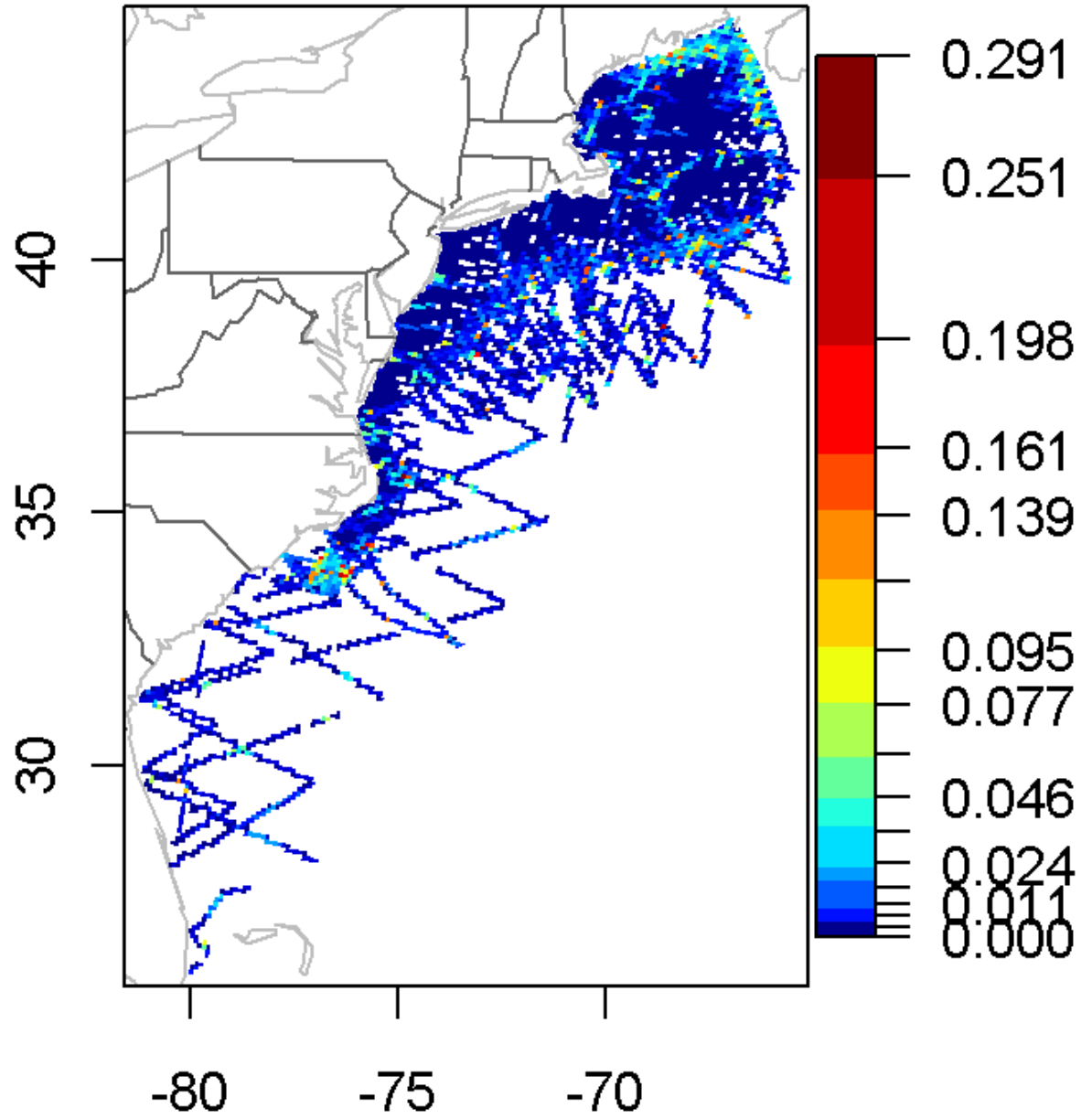


Figure 277: Map of effort(hours/km²) by cell summed through time for 'Humpback whales' guild during 'summer' season in 'east2' region.

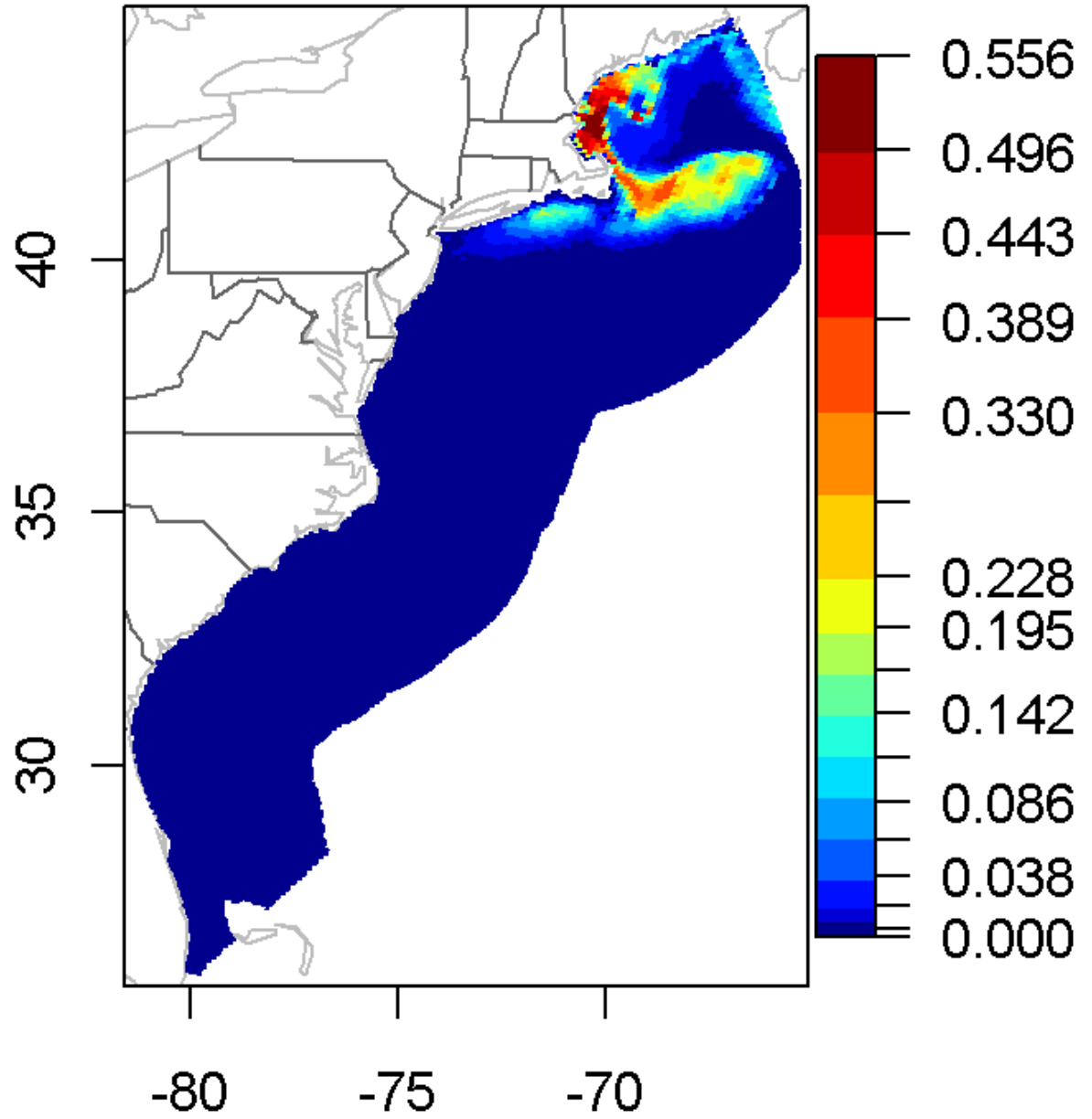


Figure 278: Map of mean predicted habitat for 'Humpback whales' guild during 'summer' season in 'east2' region.

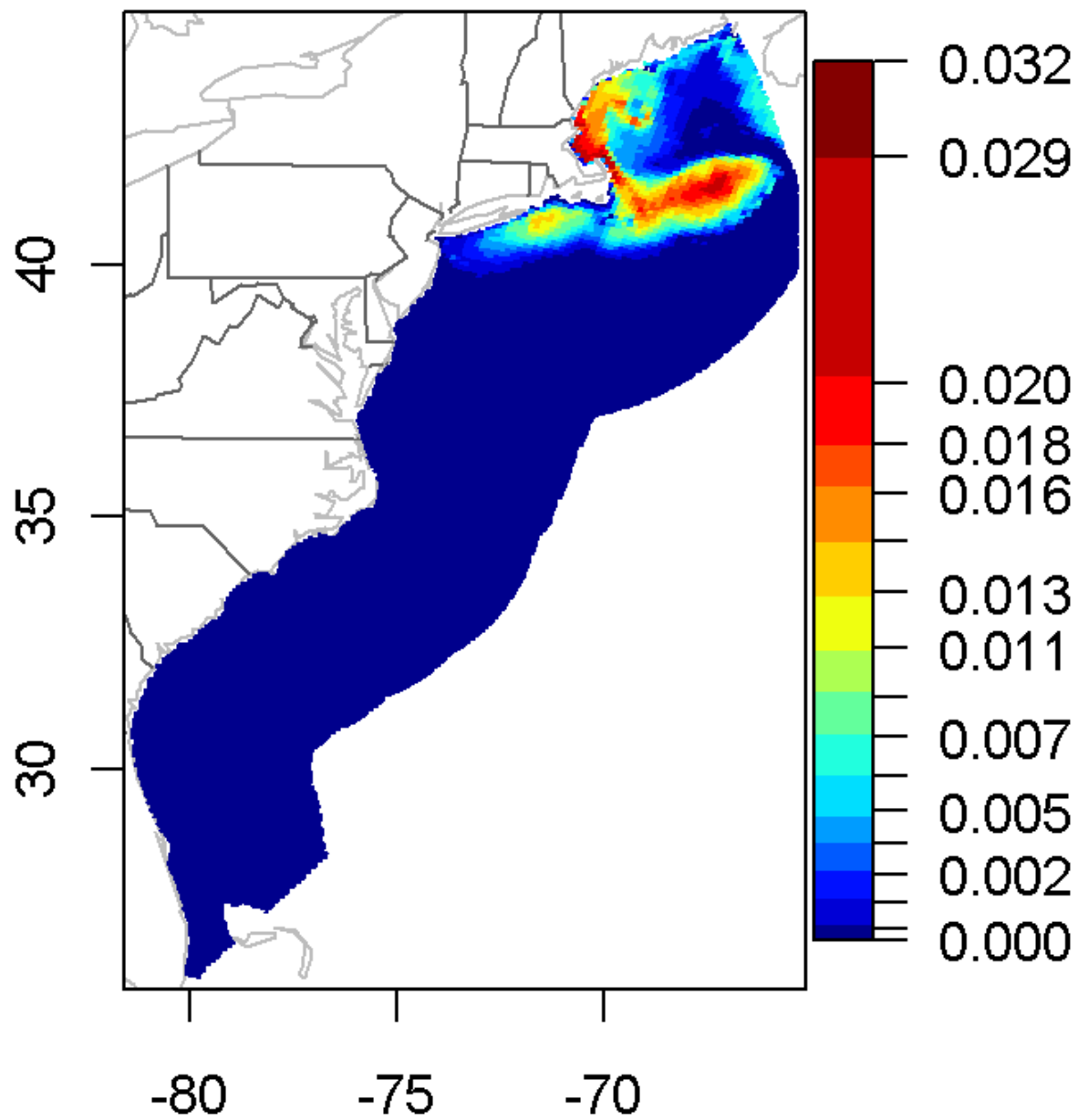


Figure 279: Map of standard error of habitat for 'Humpback whales' guild during 'summer' season in 'east2' region.

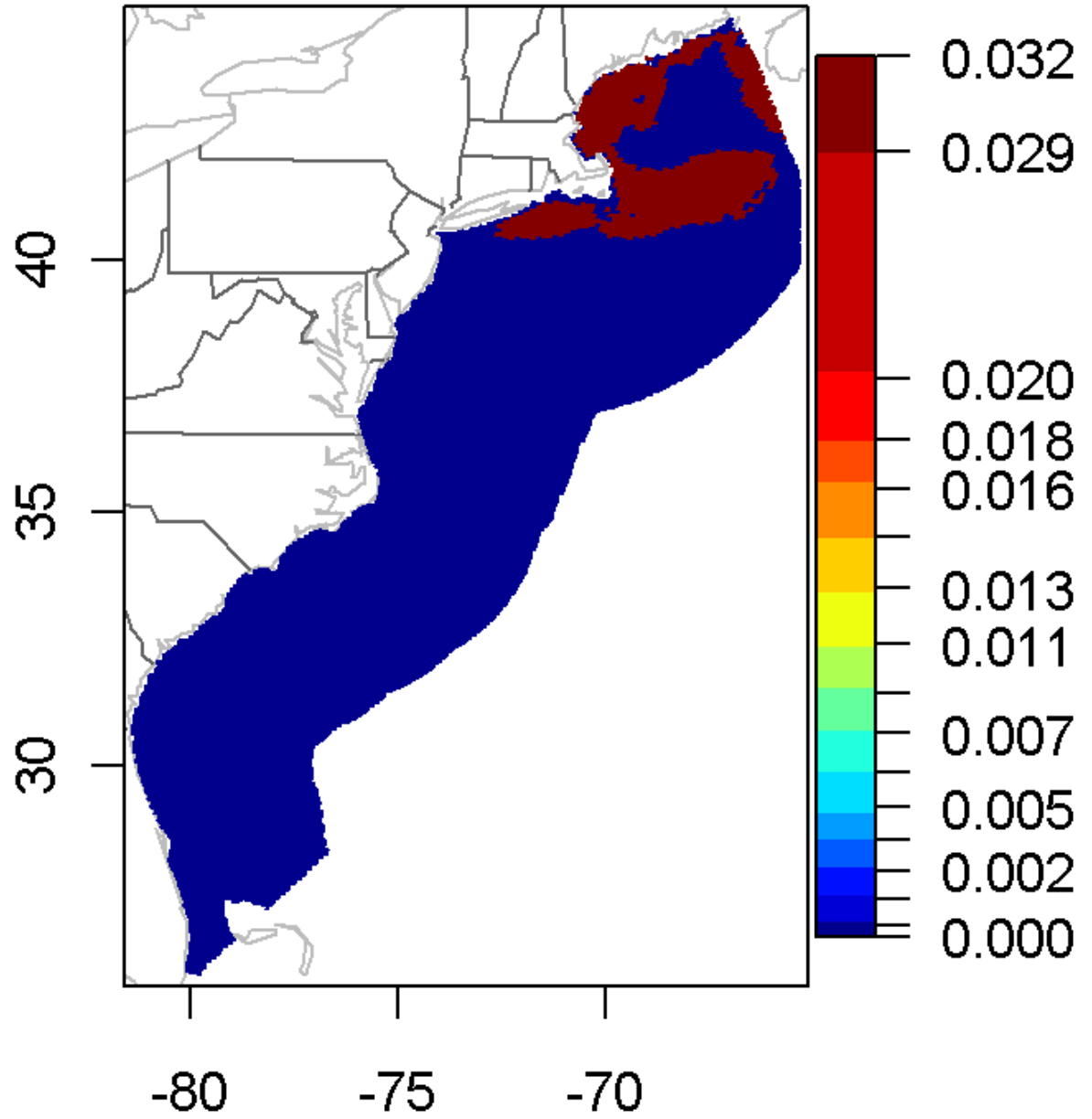


Figure 280: Map of binary habitat (cutoff determined by ROC) for 'Humpback whales' guild during 'summer' season in 'east2' region.

5.4 winter

5.4.1 east2

Modelrun identifier: duke_06_hw3_winter_east2

Date generated: 2008-10-21 15:08:26

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 26: Summary for duke(6) GAM model: for 'Humpback whales' guild during 'winter' season in 'east2' region.

	Value
Number.presences	11
Number.absences	3891
GAM.converged	TRUE
R.squared	0.456624
Deviance.explained	0.478758
ROC.optimum	0.599348
Maximum.fit	0.231581
Maximum.prediction	0.799905

Model text summary...

```
duke_06_hw3_winter_east2 run on Tue Oct 21 15:06:53 2008
provider:duke, version:06, guild:Humpback whales (hw3), season:'winter', region:east2

max.fit:0.599348, max.prediction:0.799905, ROC.optimum:0.231581

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -23.8600      0.9411  -25.35  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.293e-06  0.500  0.000273    0.90
s(log(d2shelf)) 1.995e+00  2.495  51.133  <2e-16 ***
s(log(d2coast)) 1.989e+00  2.489  102.684  <2e-16 ***
s(sst)          1.240e-06  0.500  0.001    0.87
s(lat)          1.998e+00  2.498  179.948  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = 0.457 Deviance explained = 47.9%
GCV score = 0.00031276 Scale est. = 0.00031107 n = 2337

summary(dat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2: 844   Min.    : 1654   Min.    : 4.0   Min.    : 995   Min.    : 1471   Min.    : 2.654   Min.    :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0  1st Qu.: 18575  1st Qu.: 32272  1st Qu.: 13.500  1st Qu.:32.77
          Median :10479 Median : 28.0  Median : 38452  Median : 53042  Median : 19.208  Median :34.02
          Mean   : 9475   Mean   :153.2  Mean   : 44646  Mean   : 63558  Mean   : 17.745  Mean   :33.66
          3rd Qu.:10987  3rd Qu.: 41.0  3rd Qu.: 65053  3rd Qu.: 78087  3rd Qu.: 21.825  3rd Qu.:34.80
          Max.    :12763  Max.    :3612.0 Max.    :274566 Max.    :348168 Max.    : 26.400 Max.    :38.20
                   NA's : 14      NA's : 14      NA's :1561.000

summary(newdat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685  Min.    : 1633   Min.    : 4   Min.    : 5   Min.    : 1259   Min.    : 2.400   Min.    :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.: 9.075   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :2.553e-16	Min. :0.000e+00	Min. :9.035e-07	Min. :0.00000
1st Qu.: 9145	1st Qu.:2.220e-16	1st Qu.:1.263e-15	1st Qu.:0.000e+00	1st Qu.:7.474e-04	1st Qu.:0.00000
Median :11616	Median :1.884e-07	Median :2.050e-07	Median :0.000e+00	Median :3.451e-03	Median :0.00000
Mean :11171	Mean :7.944e-03	Mean :1.961e-03	Mean :7.671e-03	Mean :9.821e-03	Mean :0.01092
3rd Qu.:14088	3rd Qu.:2.864e-05	3rd Qu.:3.841e-05	3rd Qu.:0.000e+00	3rd Qu.:9.825e-03	3rd Qu.:0.00000
Max. :16560	Max. :7.999e-01	Max. :1.867e-01	Max. :2.000e+00	Max. :2.547e-01	Max. :1.00000
	NA's :6.000e+00	NA's :6.000e+00	NA's :8.454e+03	NA's :8.454e+03	

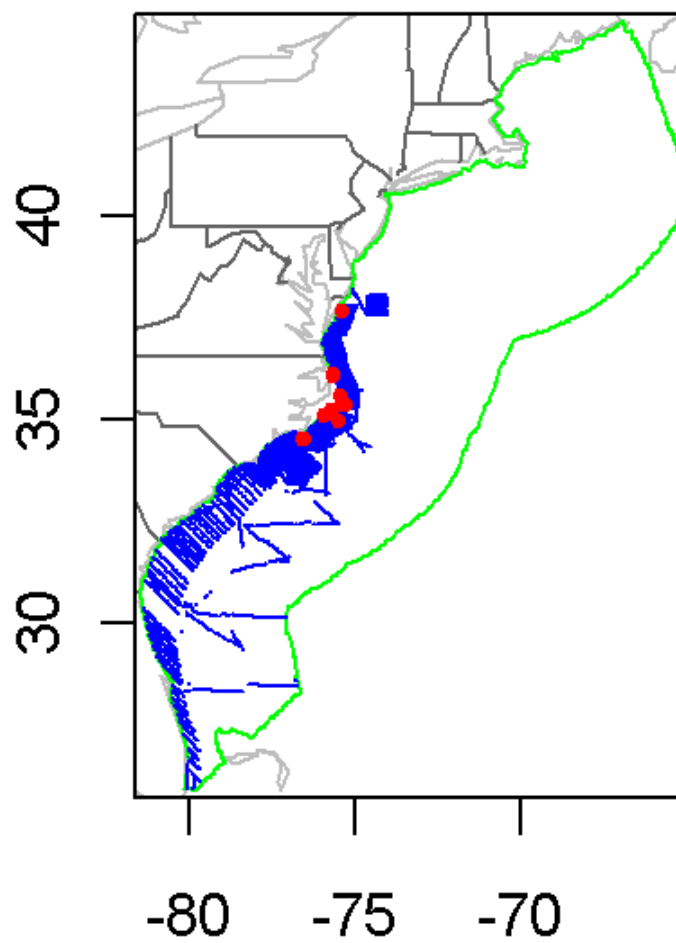


Figure 281: Map of points of observational sightings and tracks of survey effort for 'Humpback whales' guild during 'winter' season in 'east2' region.

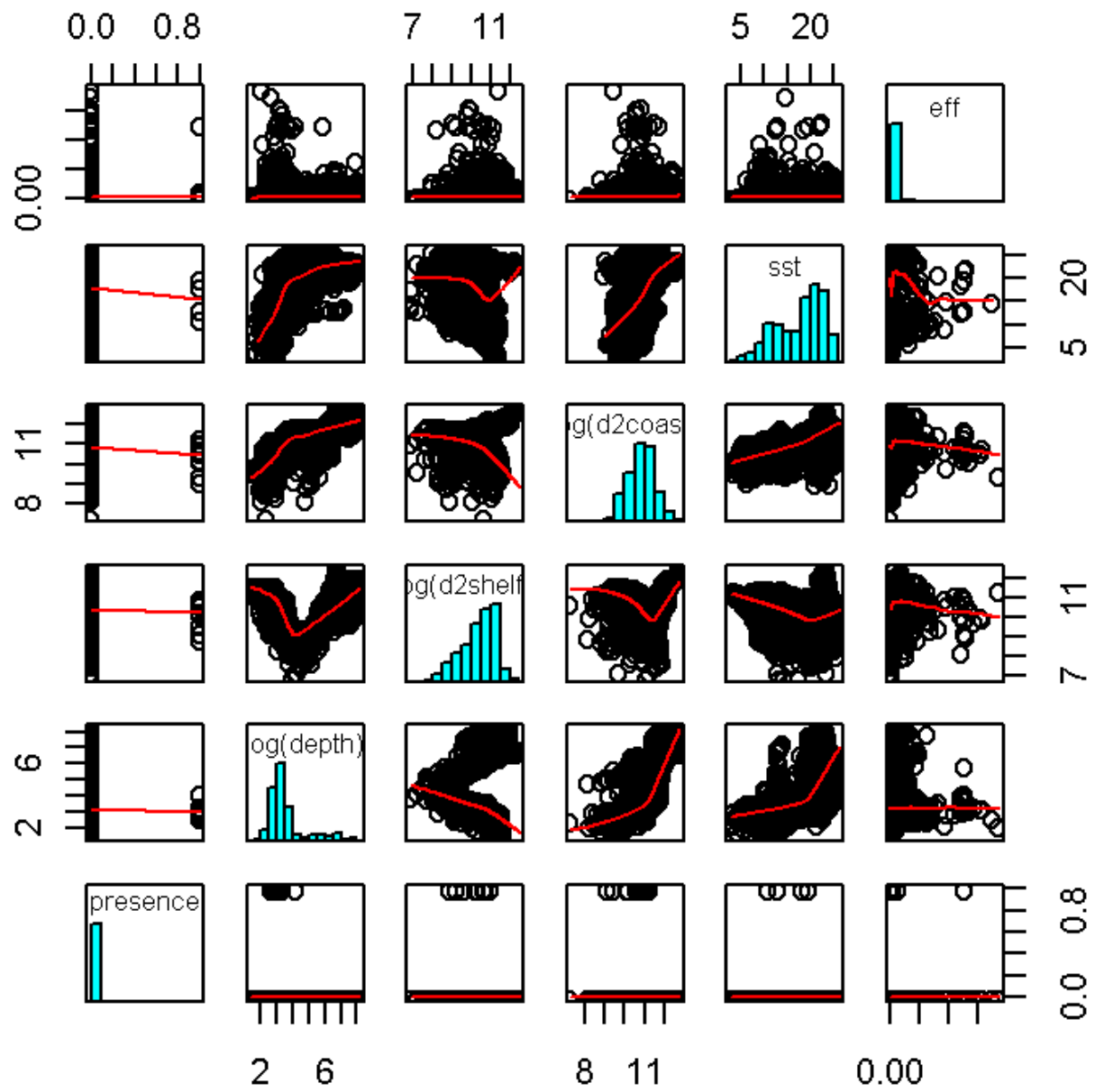


Figure 282: Pairs plot of input variables for 'Humpback whales' guild during 'winter' season in 'east2' region.

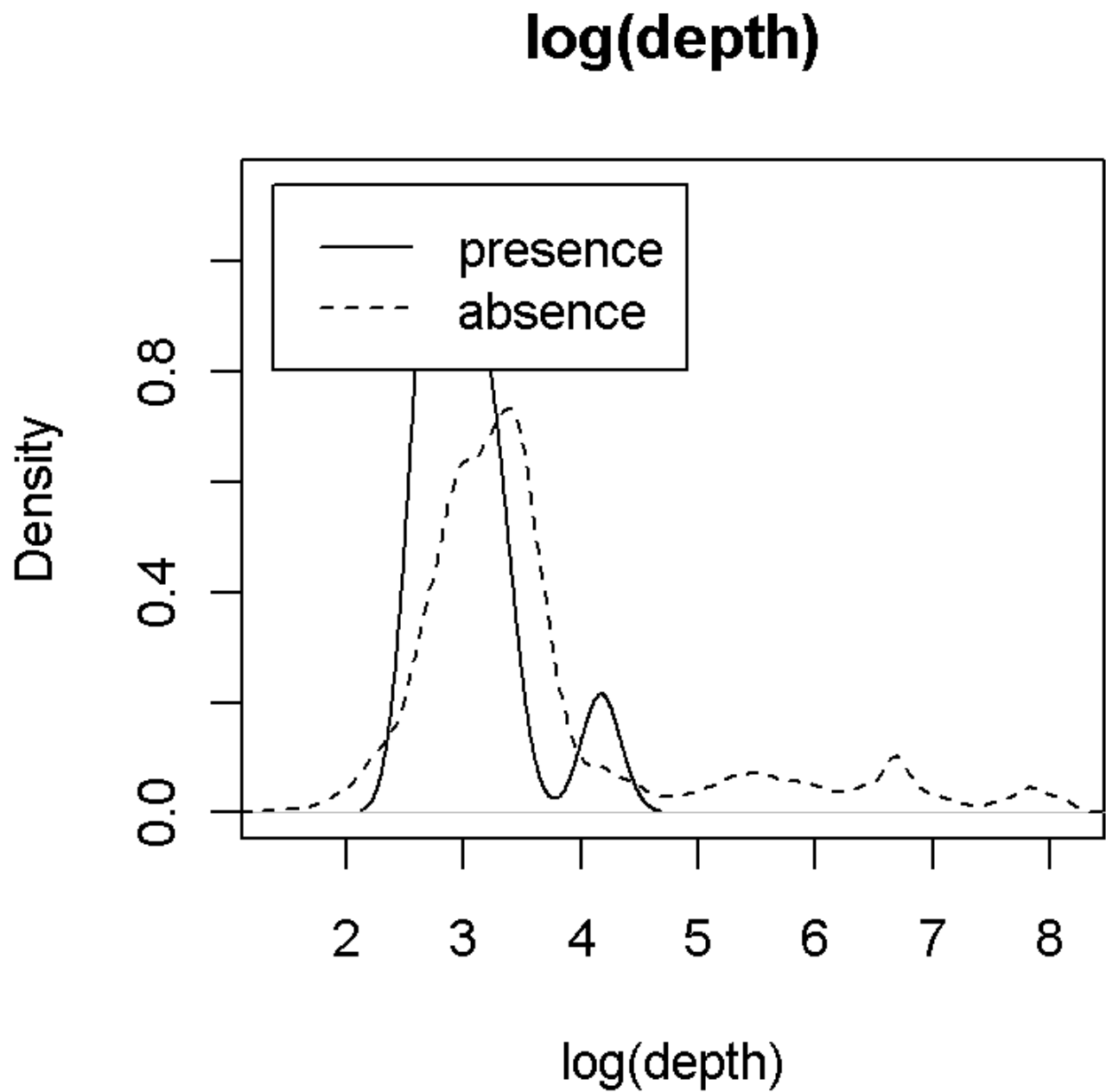


Figure 283: Density histogram of depth $\log(\text{meters})$ for 'Humpback whales' guild during 'winter' season in 'east2' region.

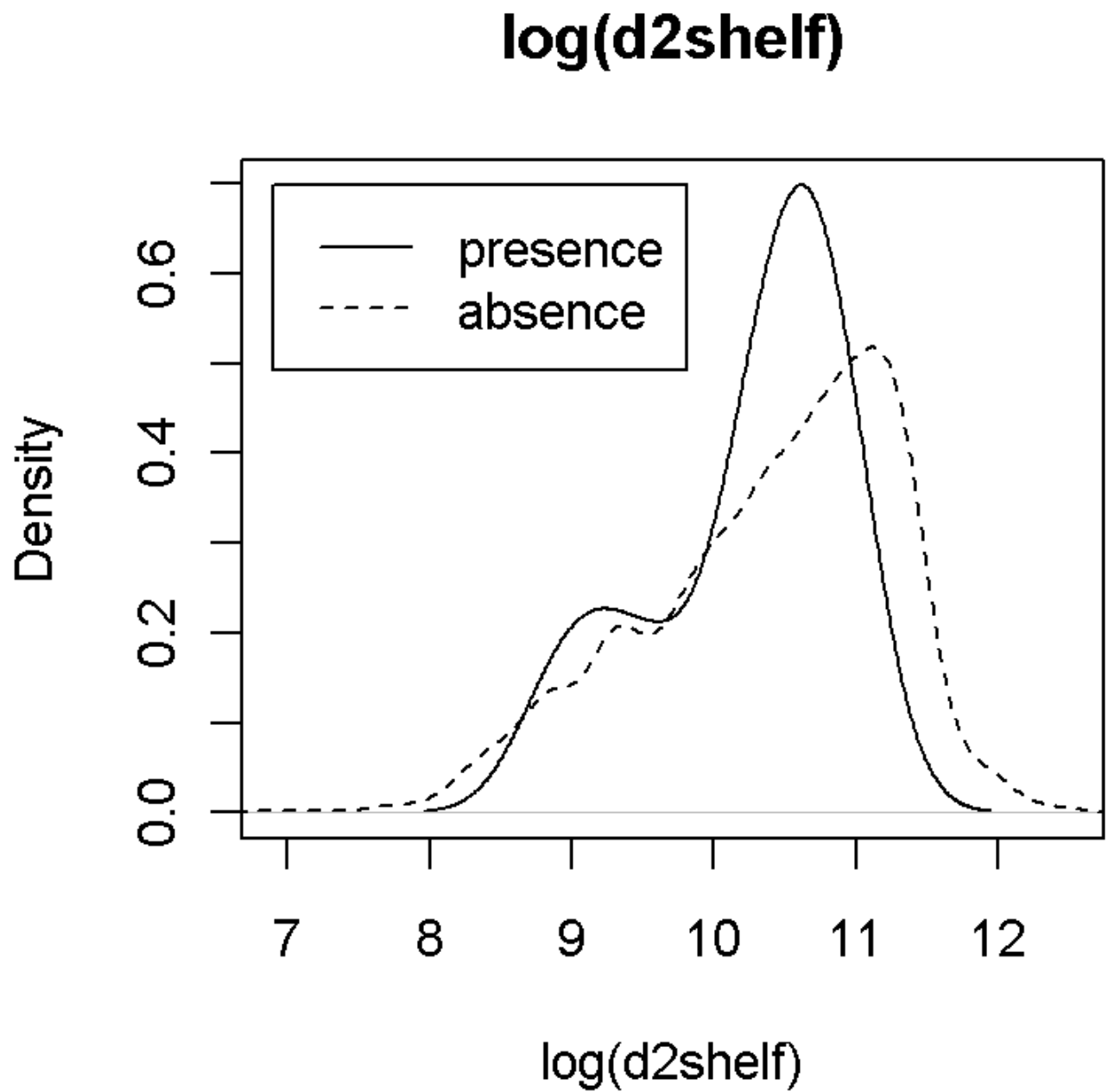


Figure 284: Density histogram of distance to shelf log(meters) for 'Humpback whales' guild during 'winter' season in 'east2' region.

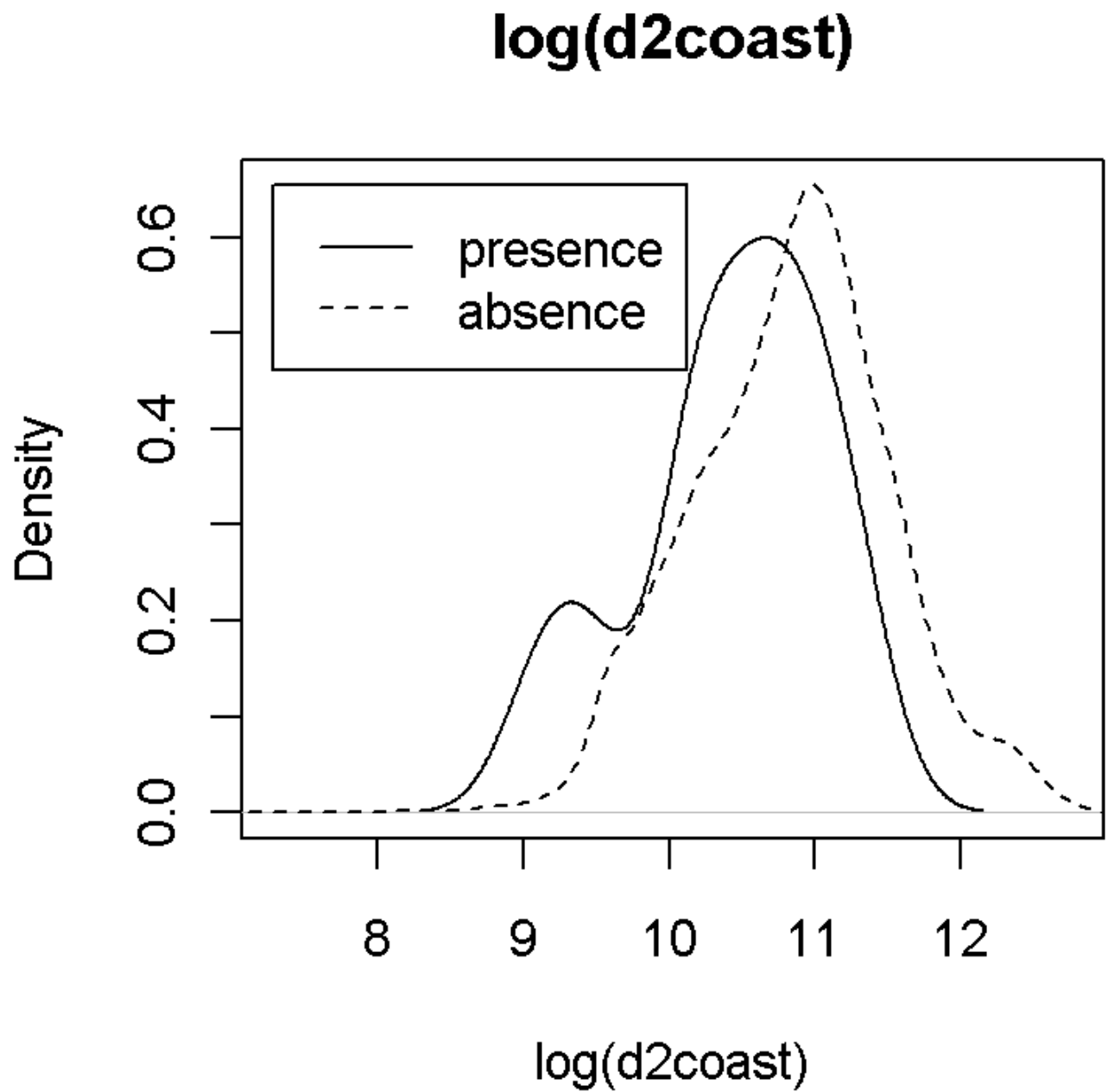


Figure 285: Density histogram of distance to coast log(meters) for 'Humpback whales' guild during 'winter' season in 'east2' region.

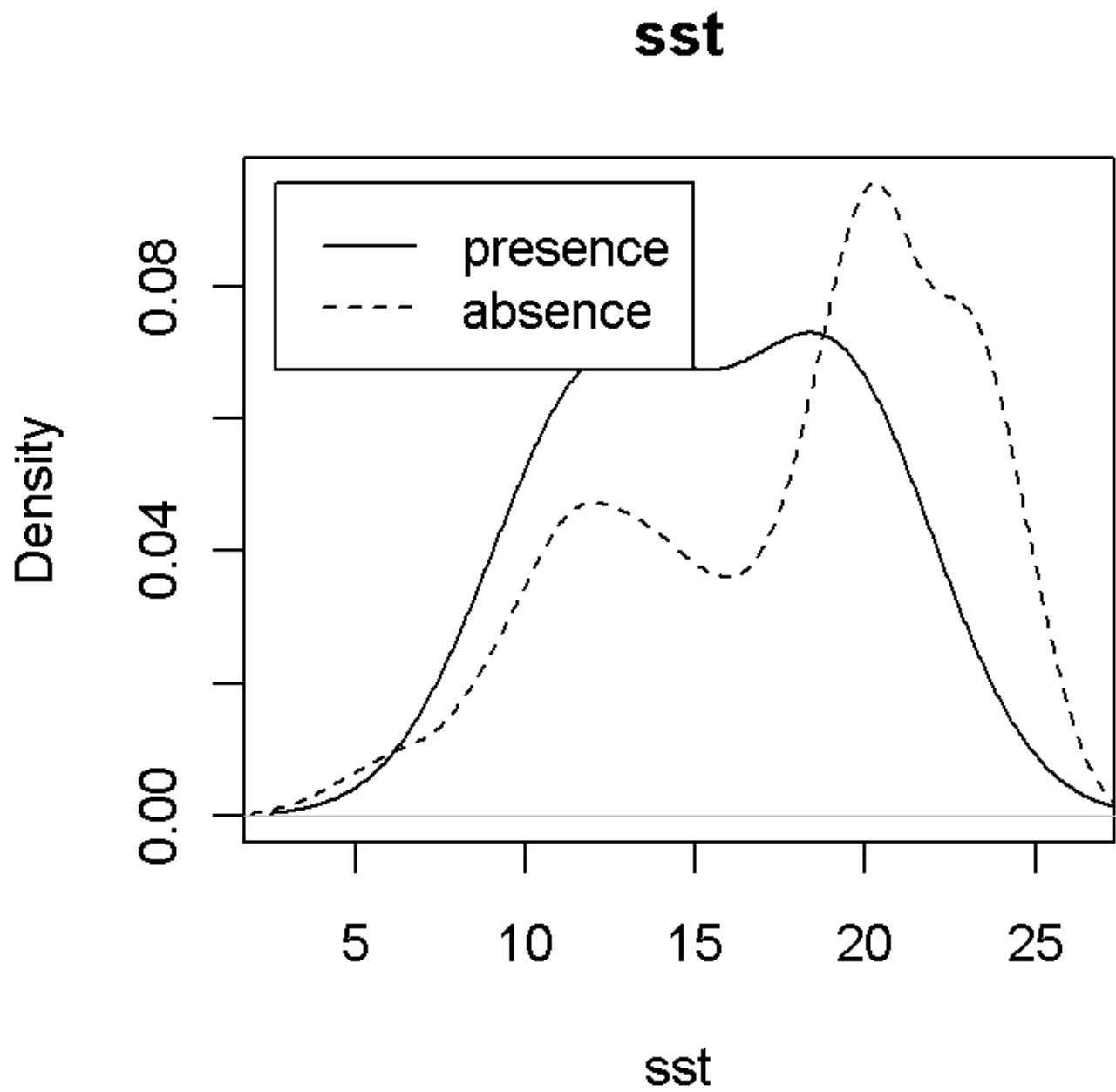


Figure 286: Density histogram of sea-surface temperature (degrees C) for 'Humpback whales' guild during 'winter' season in 'east2' region.

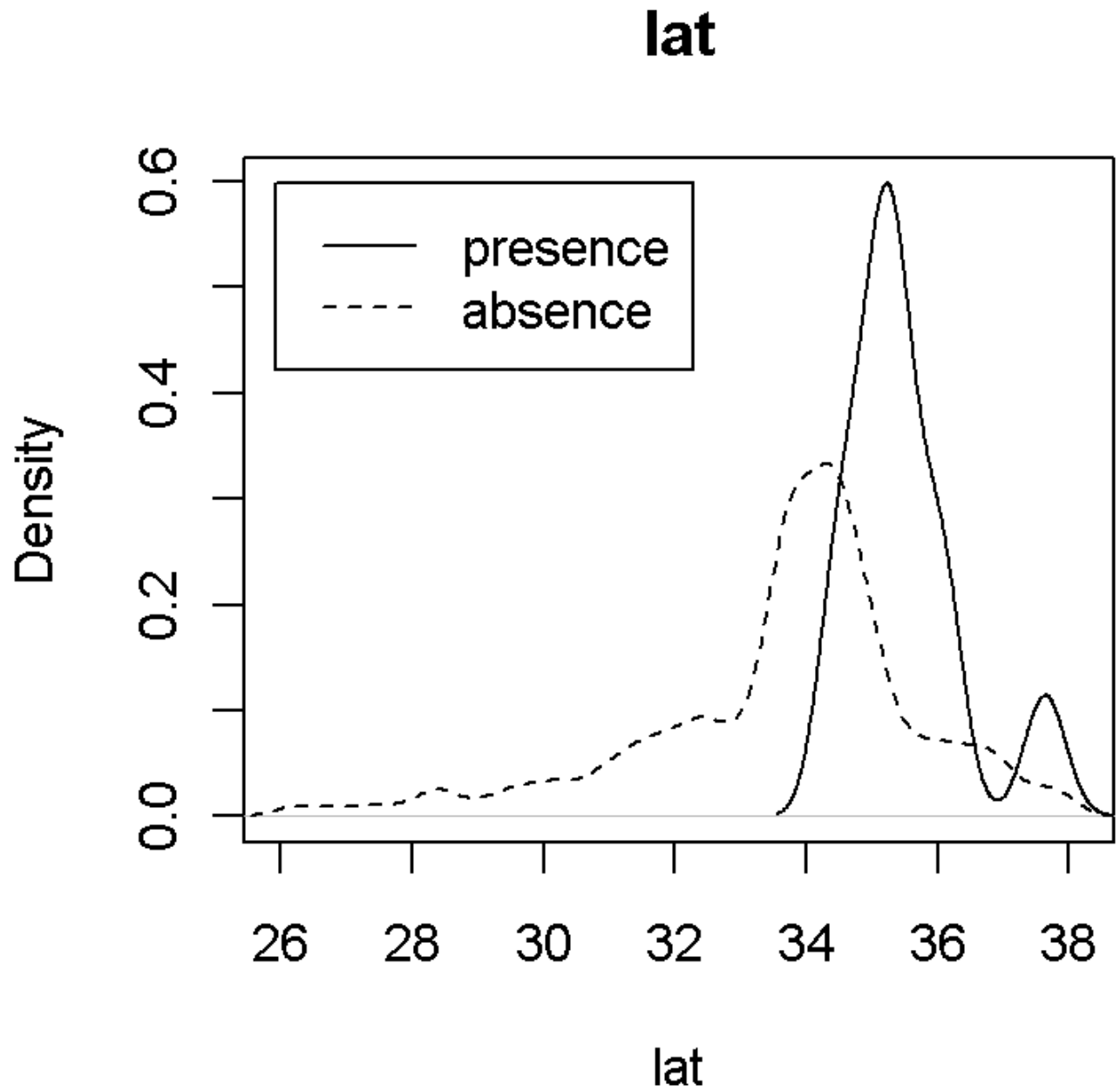


Figure 287: Density histogram of latitude (degrees) for 'Humpback whales' guild during 'winter' season in 'east2' region.

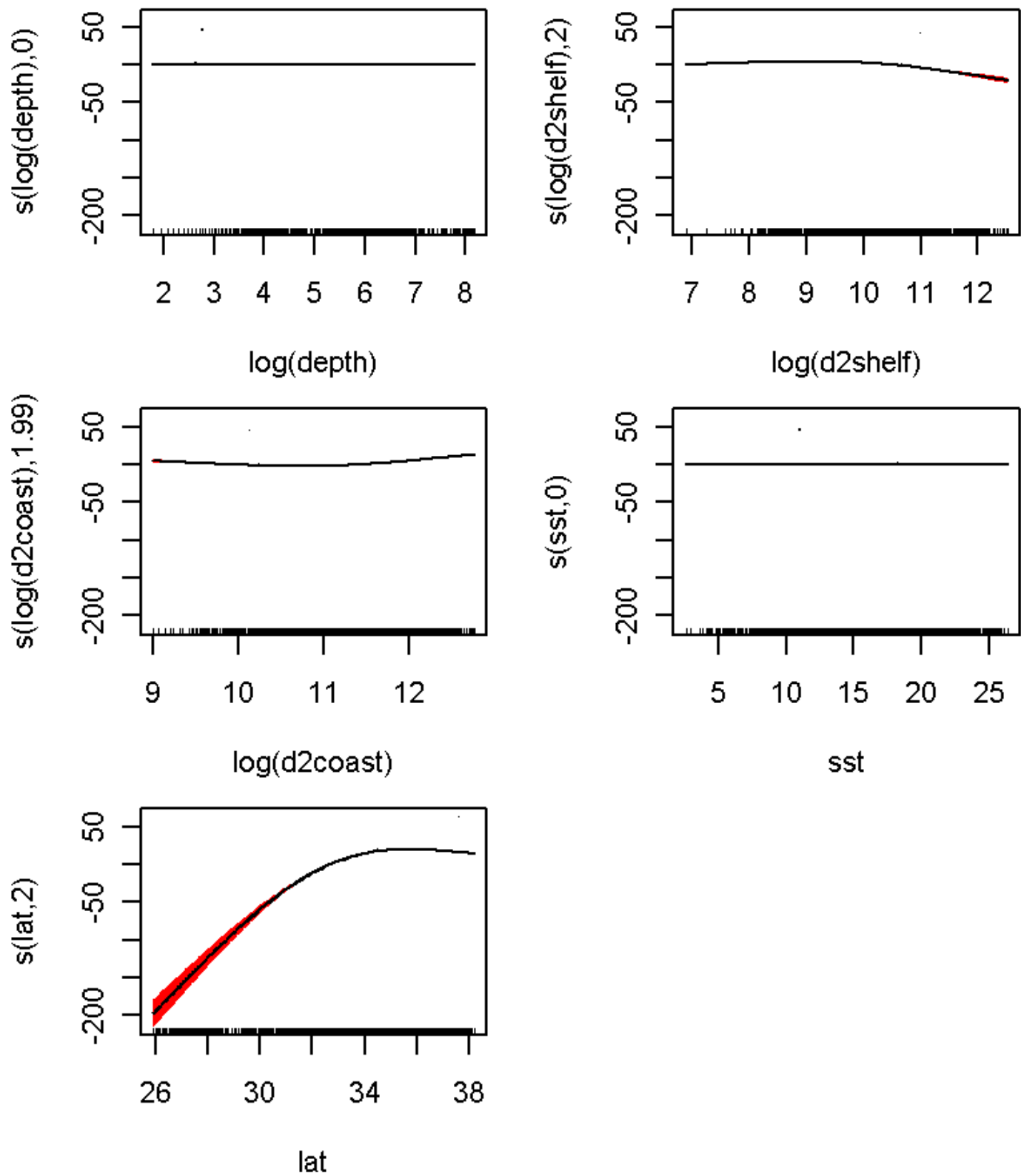


Figure 288: Terms plot of predictors to GAM model fit for 'Humpback whales' guild during 'winter' season in 'east2' region.

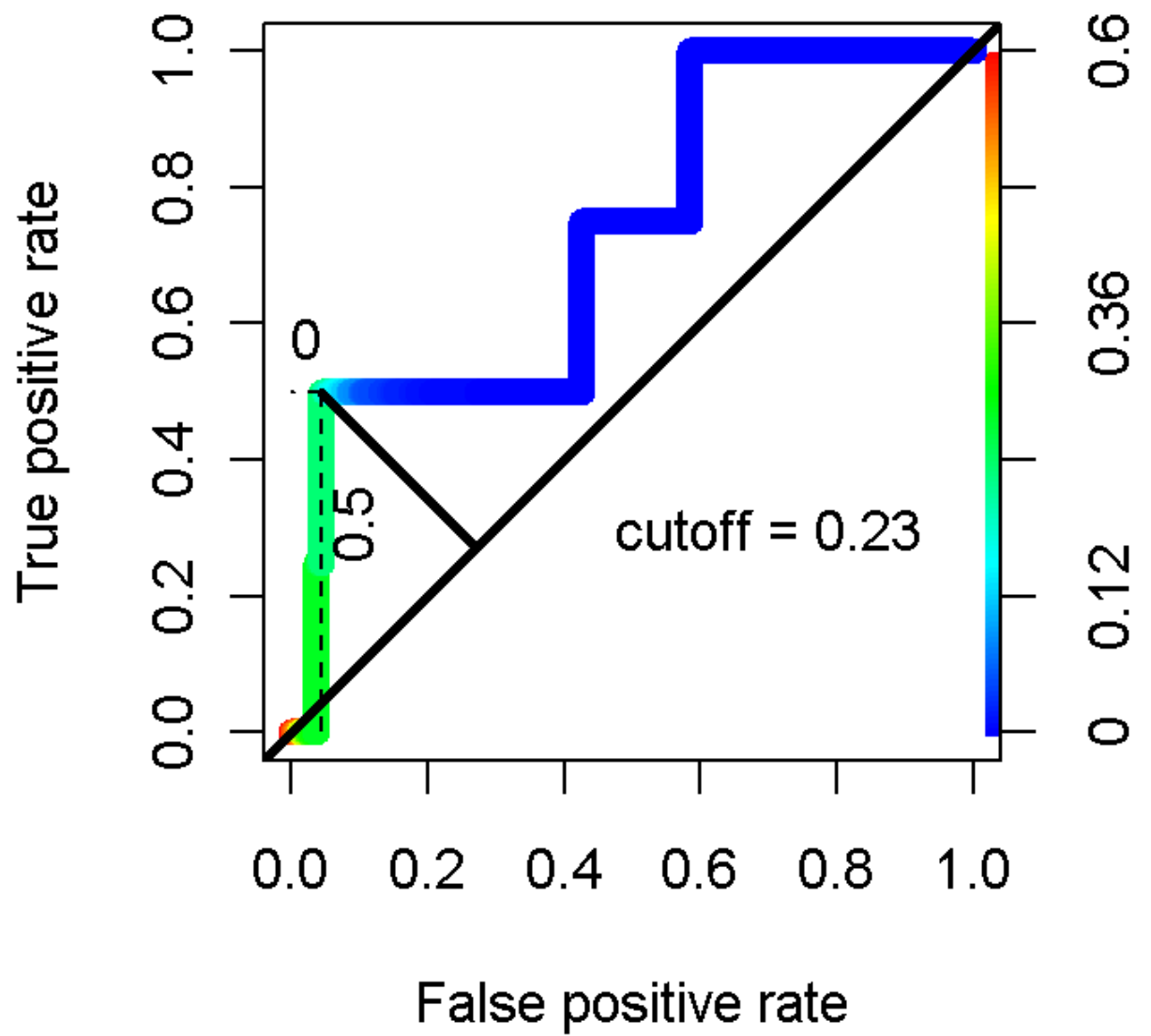


Figure 289: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Humpback whales' guild during 'winter' season in 'east2' region.

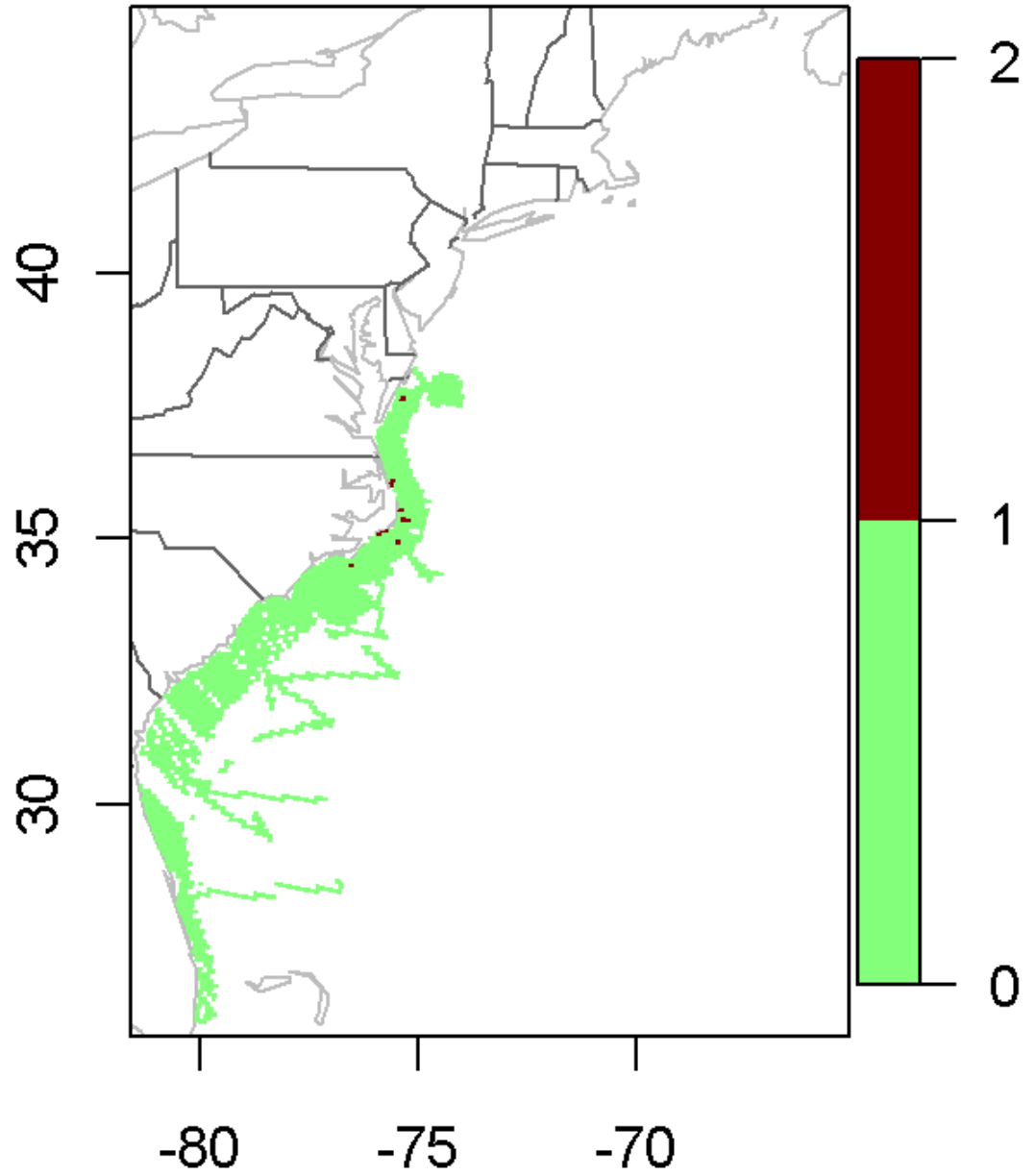


Figure 290: Map of presence and absence by cell summed through time for 'Humpback whales' guild during 'winter' season in 'east2' region.

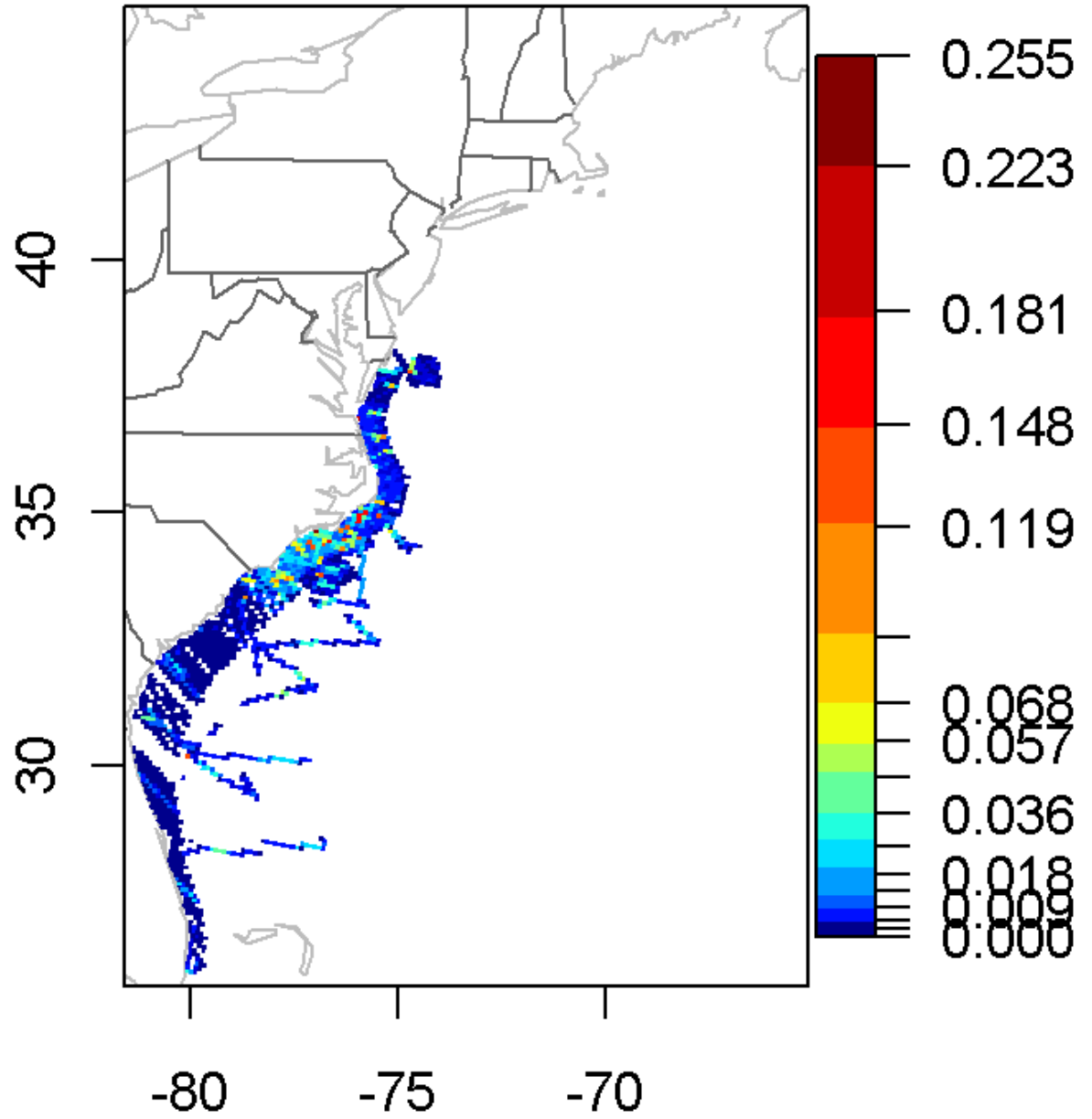


Figure 291: Map of effort(hours/km²) by cell summed through time for 'Humpback whales' guild during 'winter' season in 'east2' region.

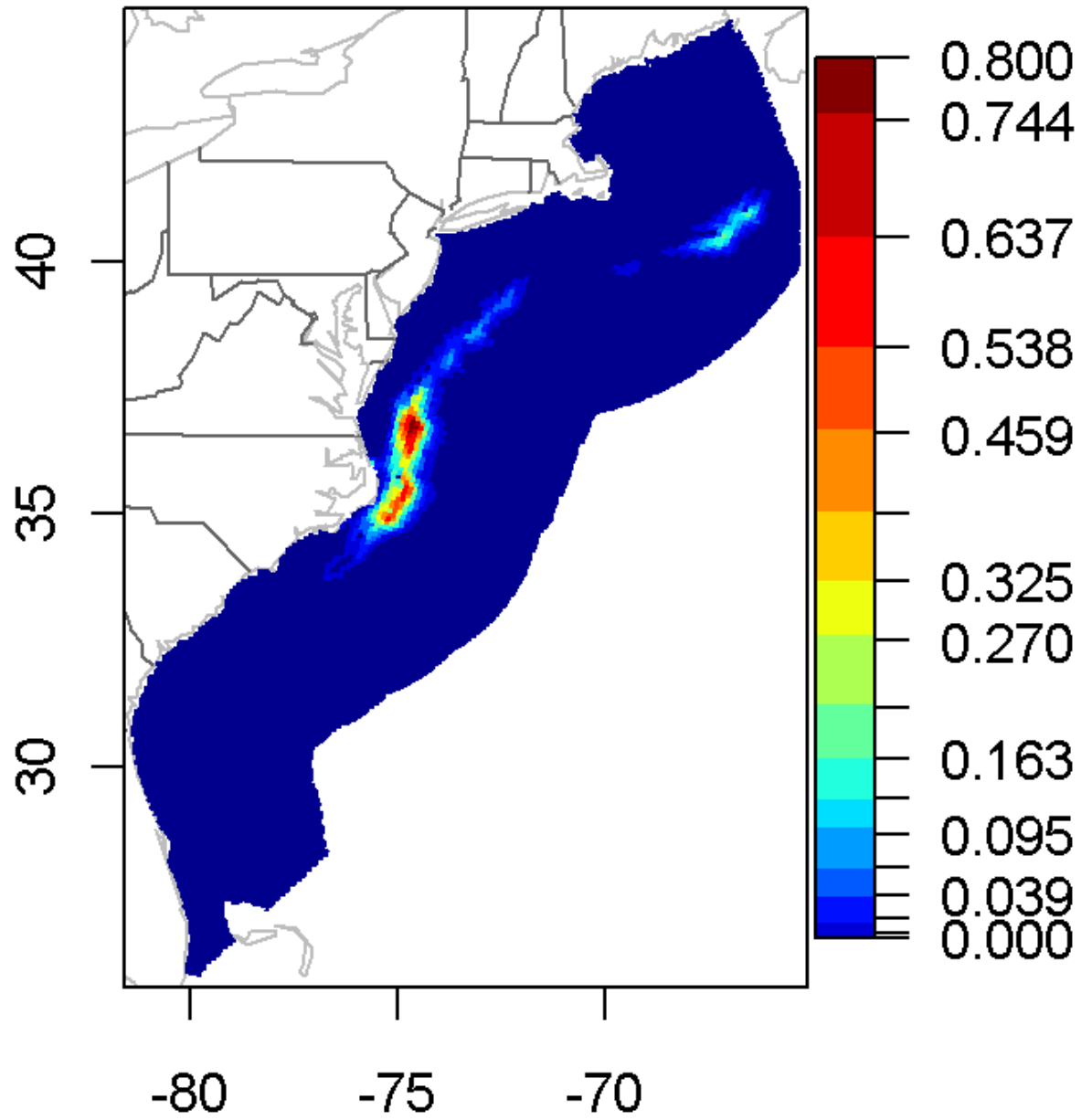


Figure 292: Map of mean predicted habitat for 'Humpback whales' guild during 'winter' season in 'east2' region.

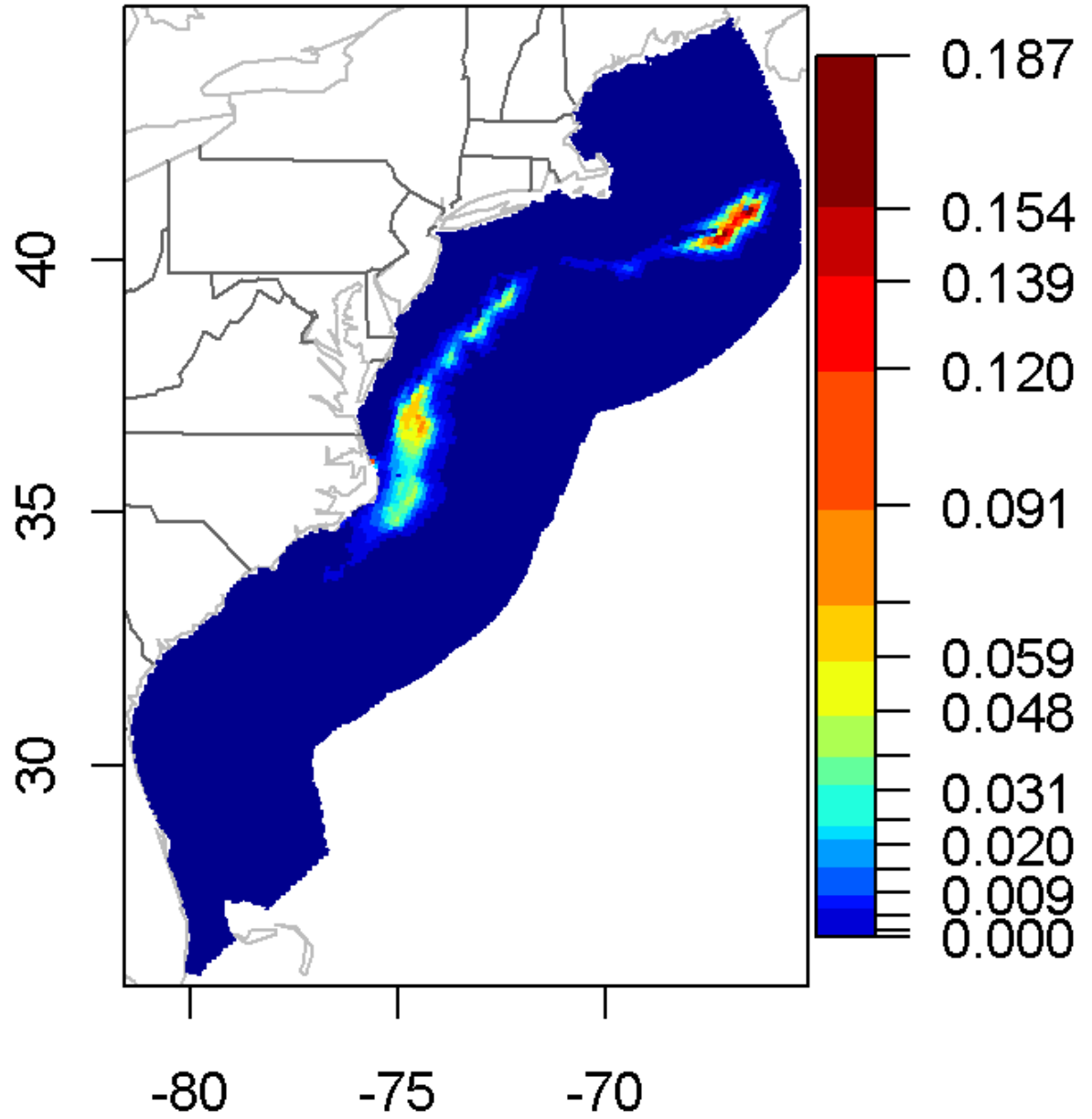


Figure 293: Map of standard error of habitat for 'Humpback whales' guild during 'winter' season in 'east2' region.

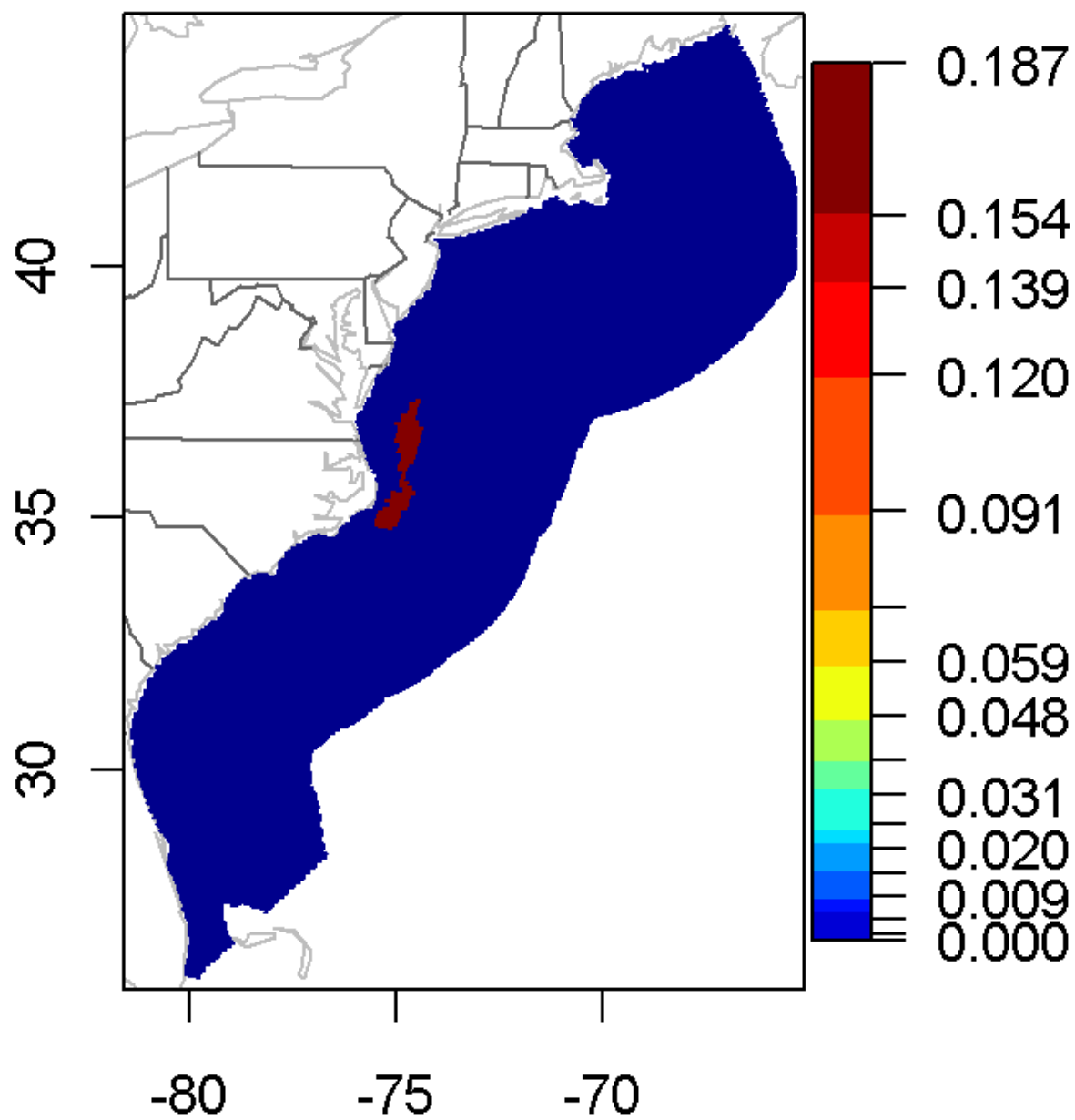


Figure 294: Map of binary habitat (cutoff determined by ROC) for 'Humpback whales' guild during 'winter' season in 'east2' region.

6 Killer whales

Guildid:kw3

Table 27: Taxonomic members of the "Killer whales" guild.

	Scientific Name	Common Name	Taxonomic #
1	<i>Feresa attenuata</i>	pygmy killer whale	180461
2	<i>Orcinus orca</i>	killer whale	180469
3	<i>Peponocephala electra</i>	melon-headed whale	180459
4	<i>Pseudorca</i>	false killer whales	180462
5	<i>Pseudorca crassidens</i>	false killer whale	180463

6.1 fall

6.2 spring

6.2.1 gomex2

Modelrun identifier: duke_06_kw3_spring_gomex2

Date generated: 2008-10-21 11:52:53

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 28: Summary for duke(6) GAM model: for 'Killer whales' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	31
Number.absences	4786
GAM.converged	TRUE
R.squared	0.2634
Deviance.explained	0.234294
ROC.optimum	0.226018
Maximum.fit	0.000854707
Maximum.prediction	0.0254614

Model text summary...

```
duke_06_kw3_spring_gomex2 run on Tue Oct 21 11:51:20 2008
provider:duke, version:06, guild:Killer whales (kw3), season:'spring', region:gomex2

max.fit:0.226018, max.prediction:0.025461, ROC.optimum:0.000855

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -9.635      0.385   -25.03  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.702  2.202  63.778 < 2e-16 ***
s(log(d2shelf)) 1.754  2.254   5.001 0.00485 **
s(log(d2coast)) 1.853  2.353  63.104 < 2e-16 ***
s(sst)         1.980  2.480  44.384 < 2e-16 ***
s(lat)         1.996  2.496 214.983 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.263   Deviance explained = 23.4%
GCV score = 0.00052512   Scale est. = 0.0005231   n = 4817

summary(dat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:4817  Min.   : 14  Min.   : 11  Min.   : 272  Min.   : 21187  Min.   :19.73  Min.   :24.05
              1st Qu.:2144 1st Qu.: 511 1st Qu.: 24696 1st Qu.:142982 1st Qu.:24.23 1st Qu.:26.38
              Median :4222 Median :1292 Median : 63128 Median :211670 Median :25.35 Median :27.38
              Mean   :3977 Mean   :1537 Mean   : 82827 Mean   :213952 Mean   :25.14 Mean   :27.25
              3rd Qu.:5932 3rd Qu.:2668 3rd Qu.:131568 3rd Qu.:276022 3rd Qu.:26.17 3rd Qu.:28.13
              Max.   :8191 Max.   :3523 Max.   :257870 Max.   :404358 Max.   :28.42 Max.   :30.06

summary(newdat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :19.95  Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0 1st Qu.: 31617 1st Qu.: 85289 1st Qu.:21.83 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :23.02 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:3.869e-16	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.00000
1st Qu.	:1861	1st Qu.	:2.220e-16	1st Qu.	:9.355e-16	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.00000
Median	:4110	Median	:1.247e-09	Median	:1.902e-09	Median	:0.000e+00	Median	:9.499e-03	Median	:0.00000
Mean	:3997	Mean	:6.847e-04	Mean	:1.089e-04	Mean	:1.854e-02	Mean	:2.365e-02	Mean	:0.09173
3rd Qu.	:6015	3rd Qu.	:1.590e-06	3rd Qu.	:1.284e-06	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:0.00000
Max.	:8351	Max.	:2.546e-02	Max.	:3.299e-03	Max.	:1.000e+00	Max.	:2.695e-01	Max.	:1.00000
						NA's	:4.838e+03	NA's	:4.838e+03		

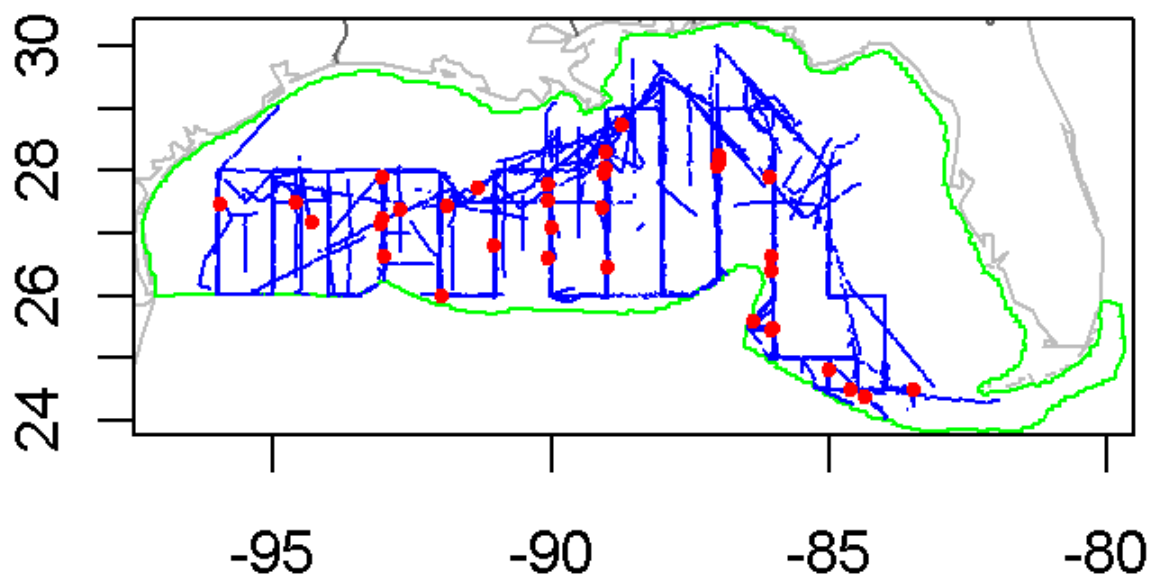


Figure 295: Map of points of observational sightings and tracks of survey effort for 'Killer whales' guild during 'spring' season in 'gomex2' region.

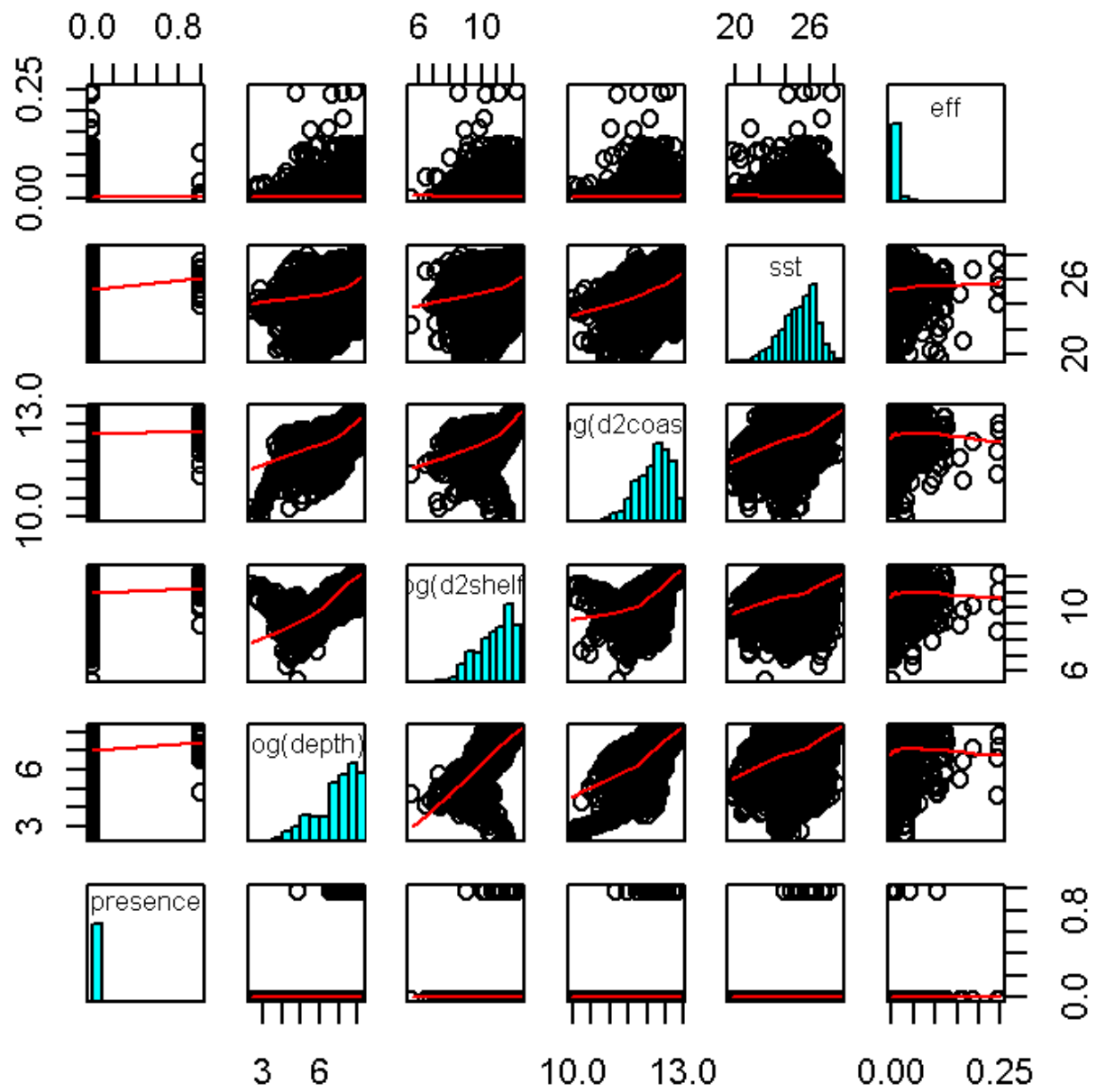


Figure 296: Pairs plot of input variables for 'Killer whales' guild during 'spring' season in 'gomex2' region.

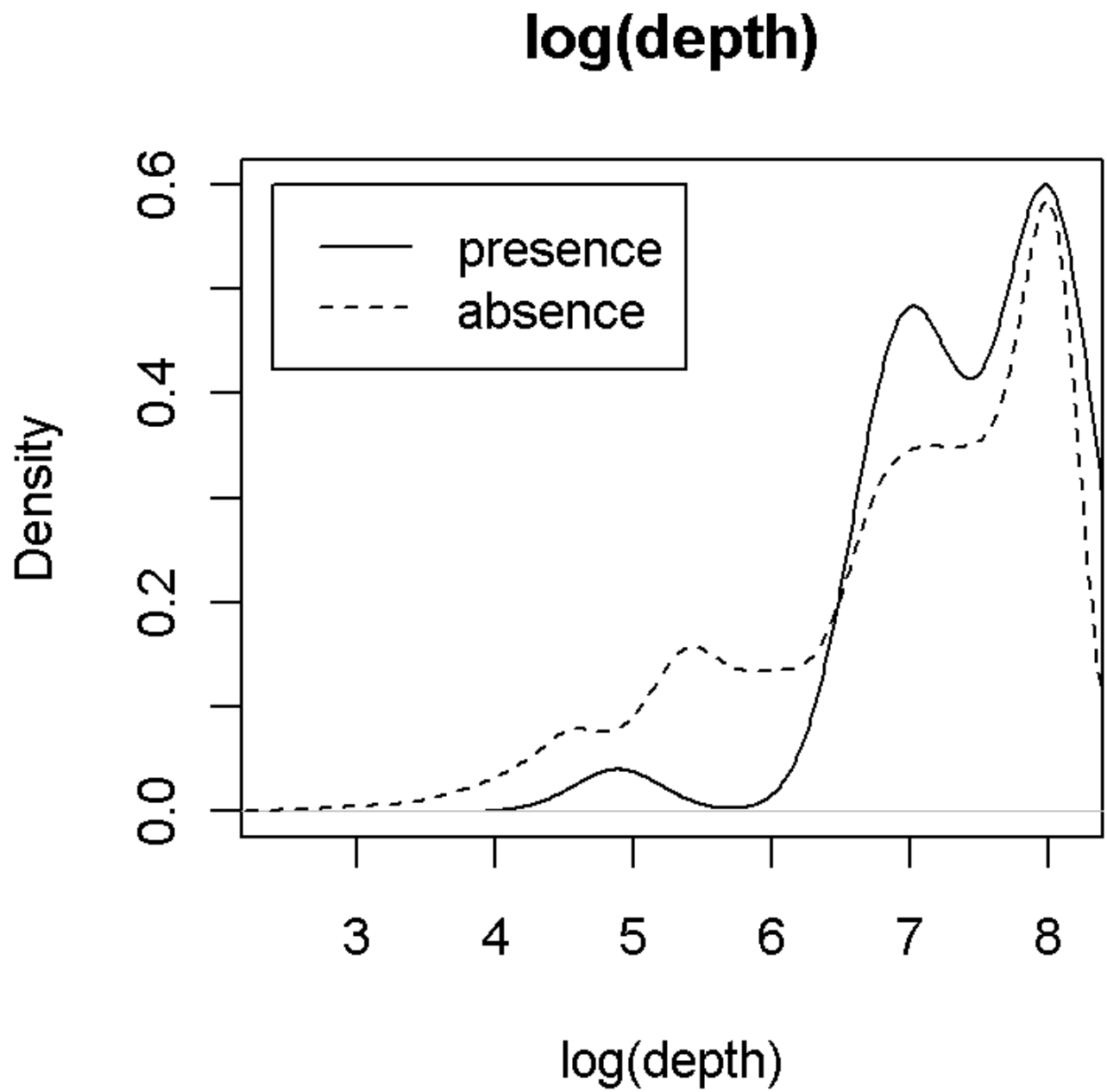


Figure 297: Density histogram of depth log(meters) for 'Killer whales' guild during 'spring' season in 'gomex2' region.

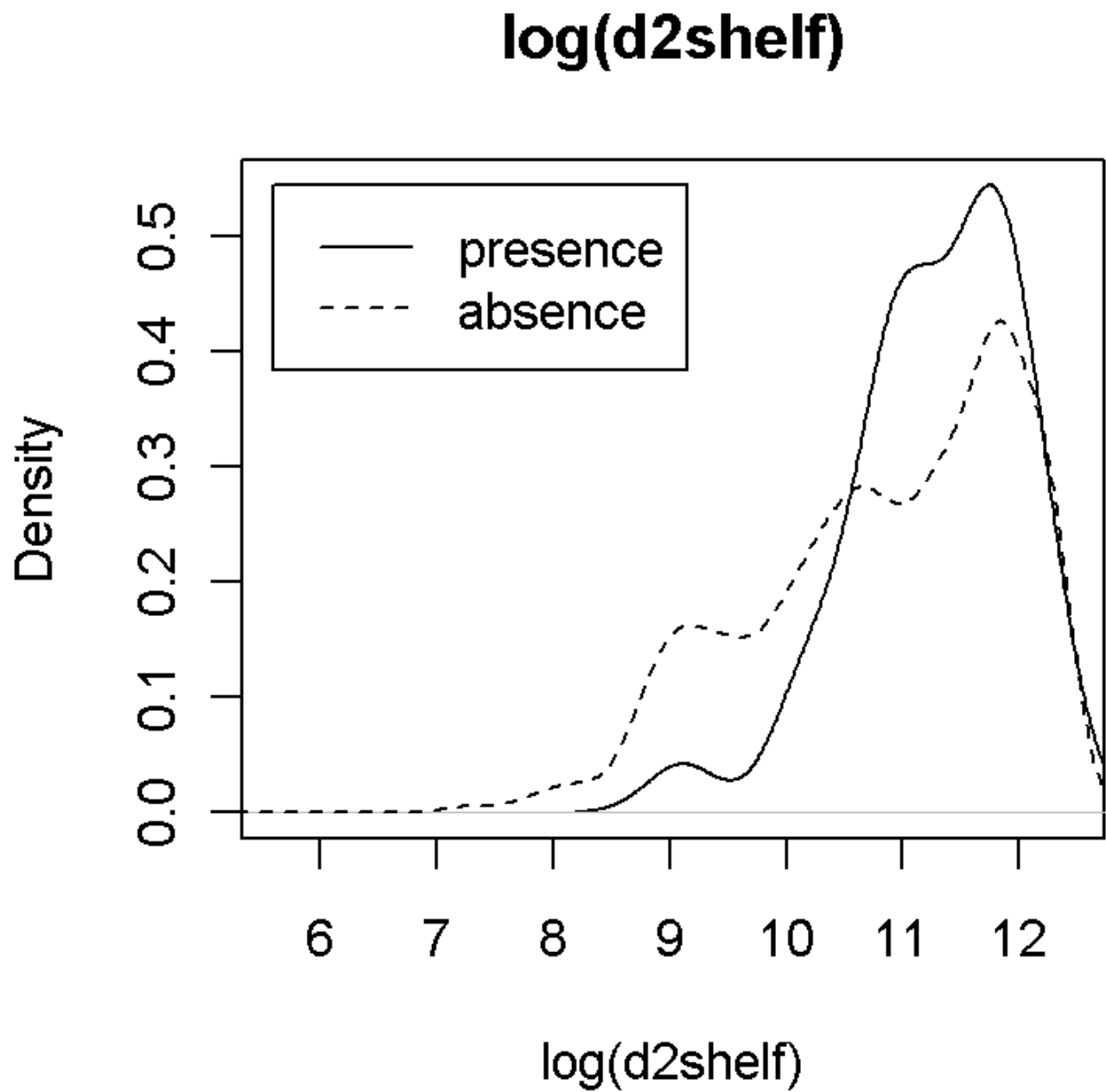


Figure 298: Density histogram of distance to shelf log(meters) for 'Killer whales' guild during 'spring' season in 'gomex2' region.

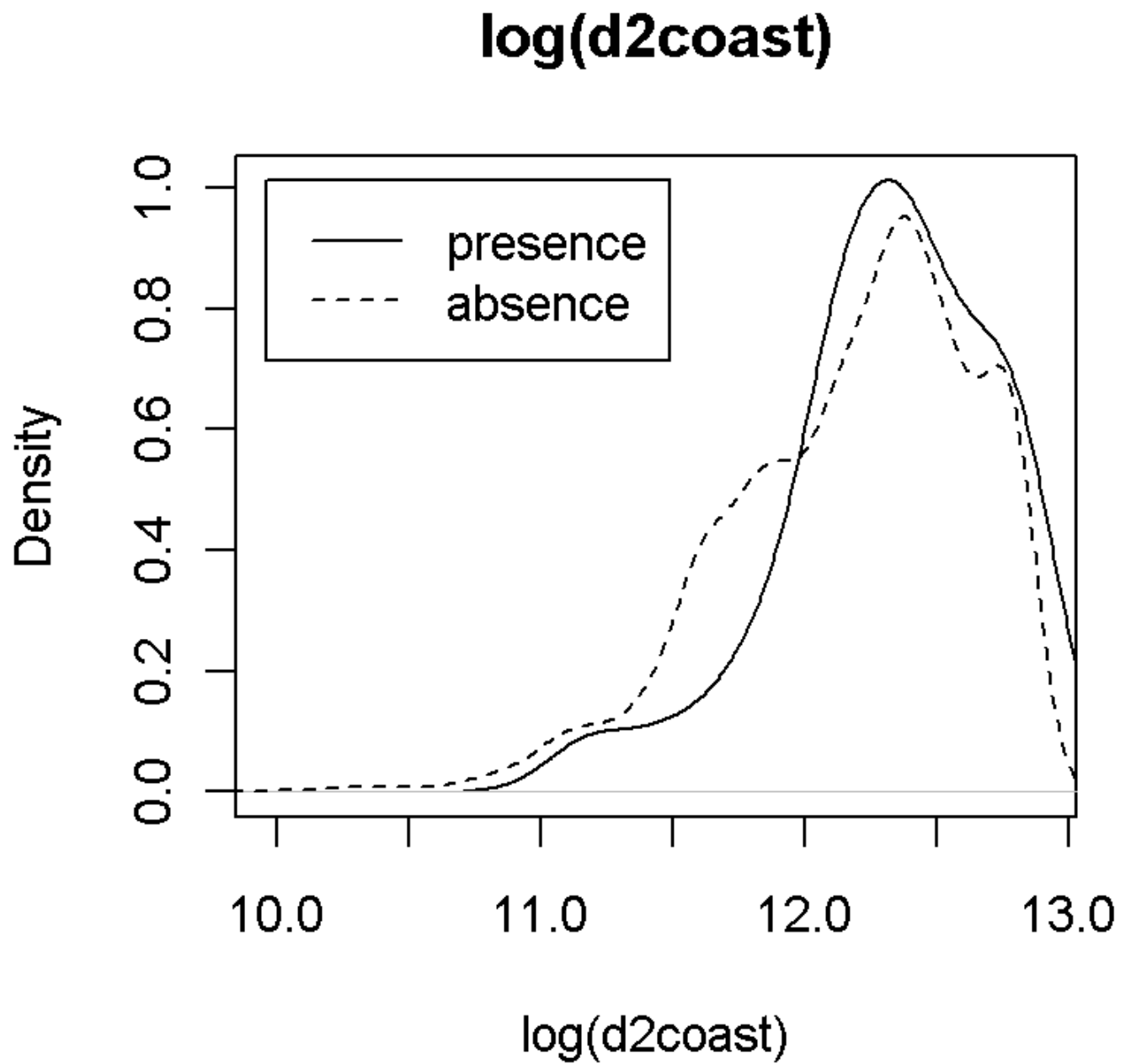


Figure 299: Density histogram of distance to coast log(meters) for 'Killer whales' guild during 'spring' season in 'gomex2' region.

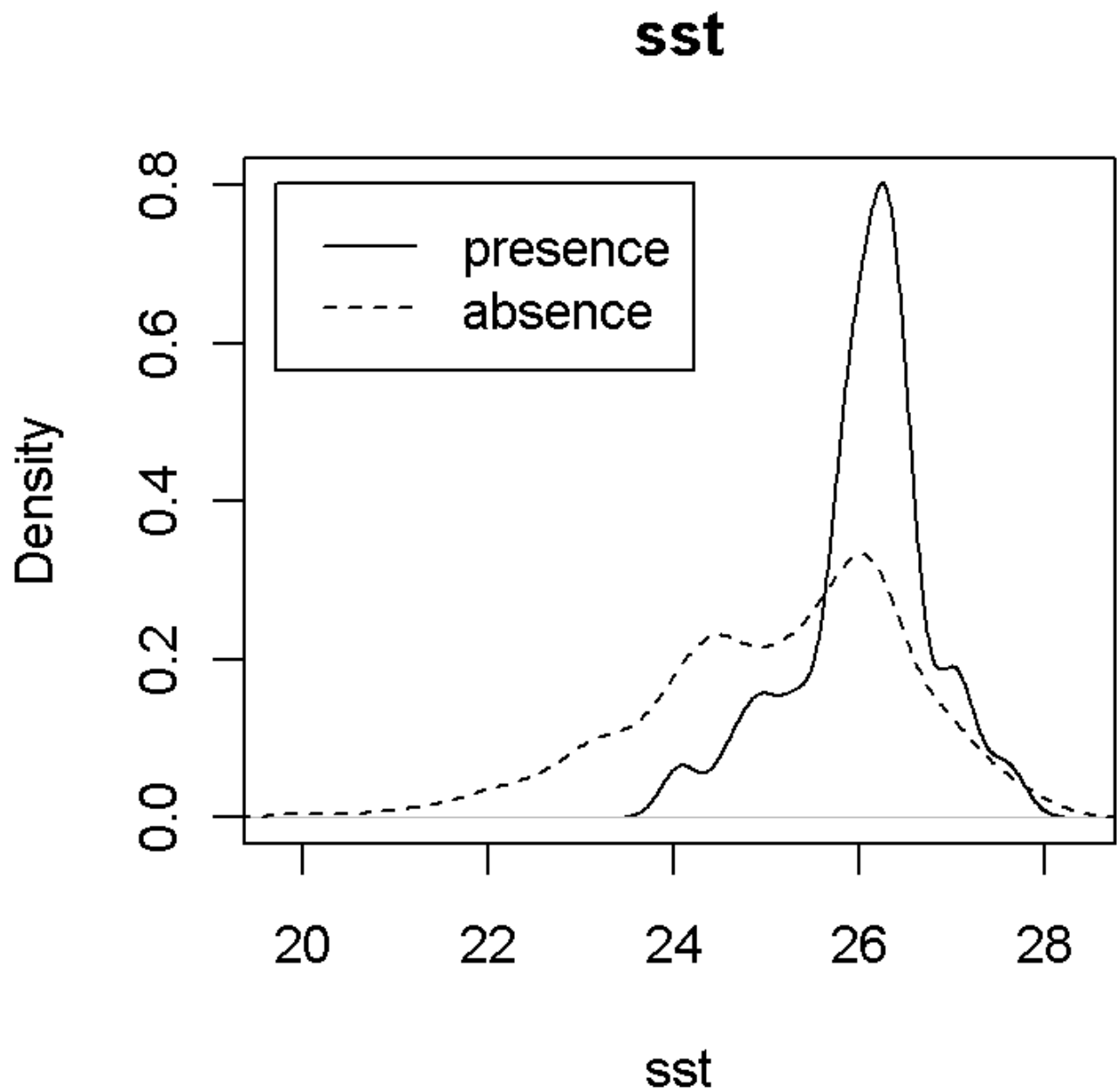


Figure 300: Density histogram of sea-surface temperature (degrees C) for 'Killer whales' guild during 'spring' season in 'gomex2' region.

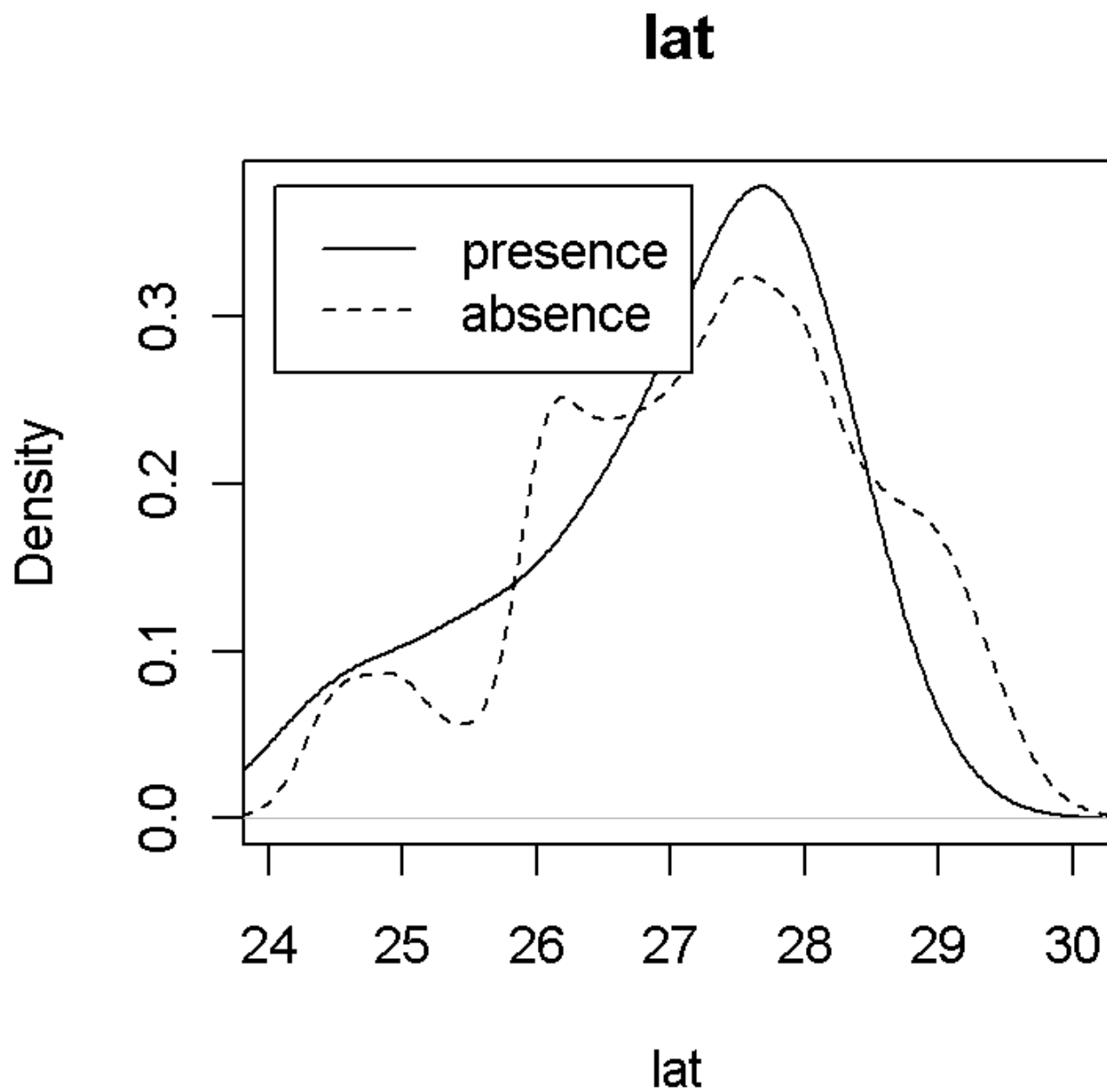


Figure 301: Density histogram of latitude (degrees) for 'Killer whales' guild during 'spring' season in 'gomex2' region.

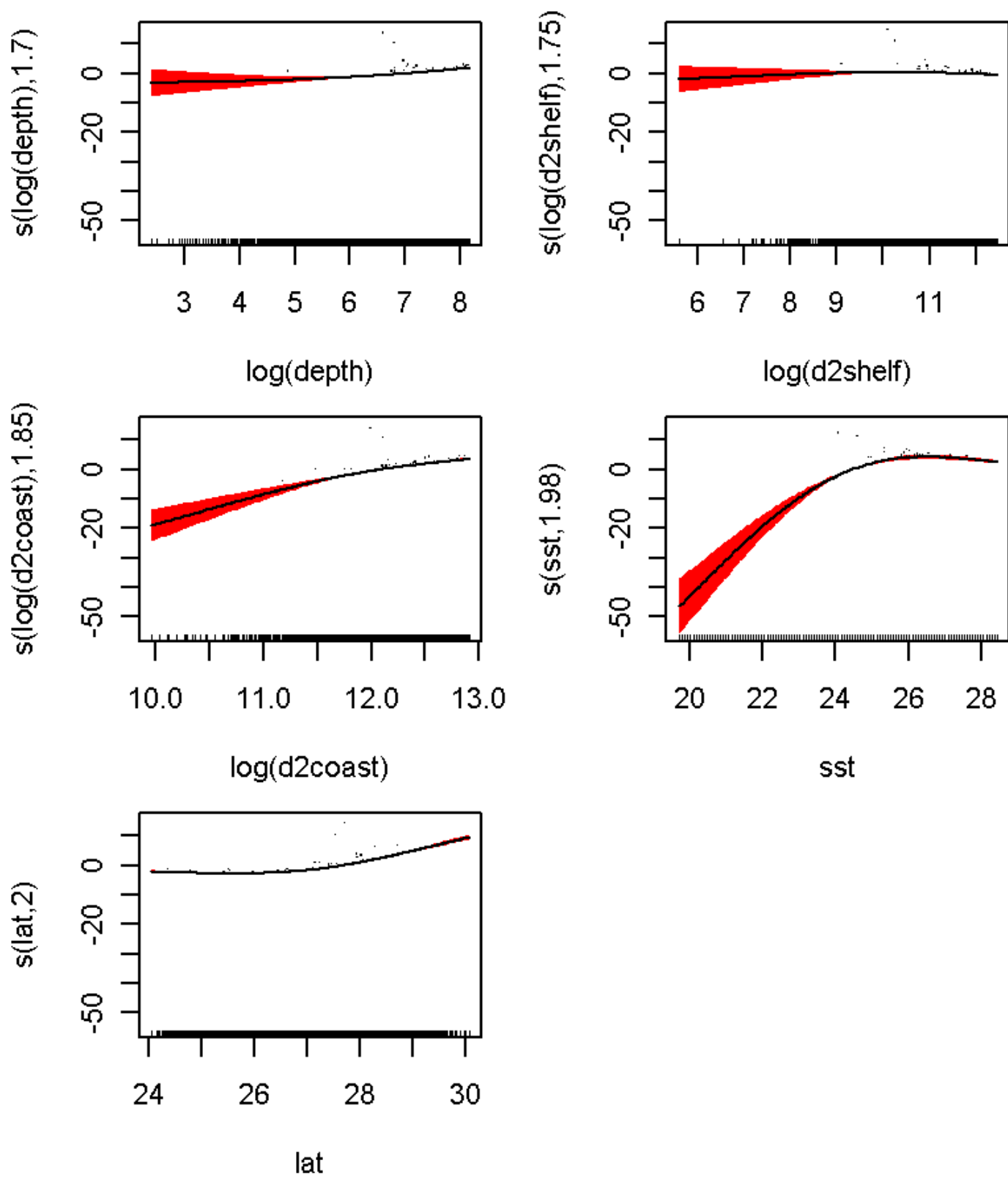


Figure 302: Terms plot of predictors to GAM model fit for 'Killer whales' guild during 'spring' season in 'gomex2' region.

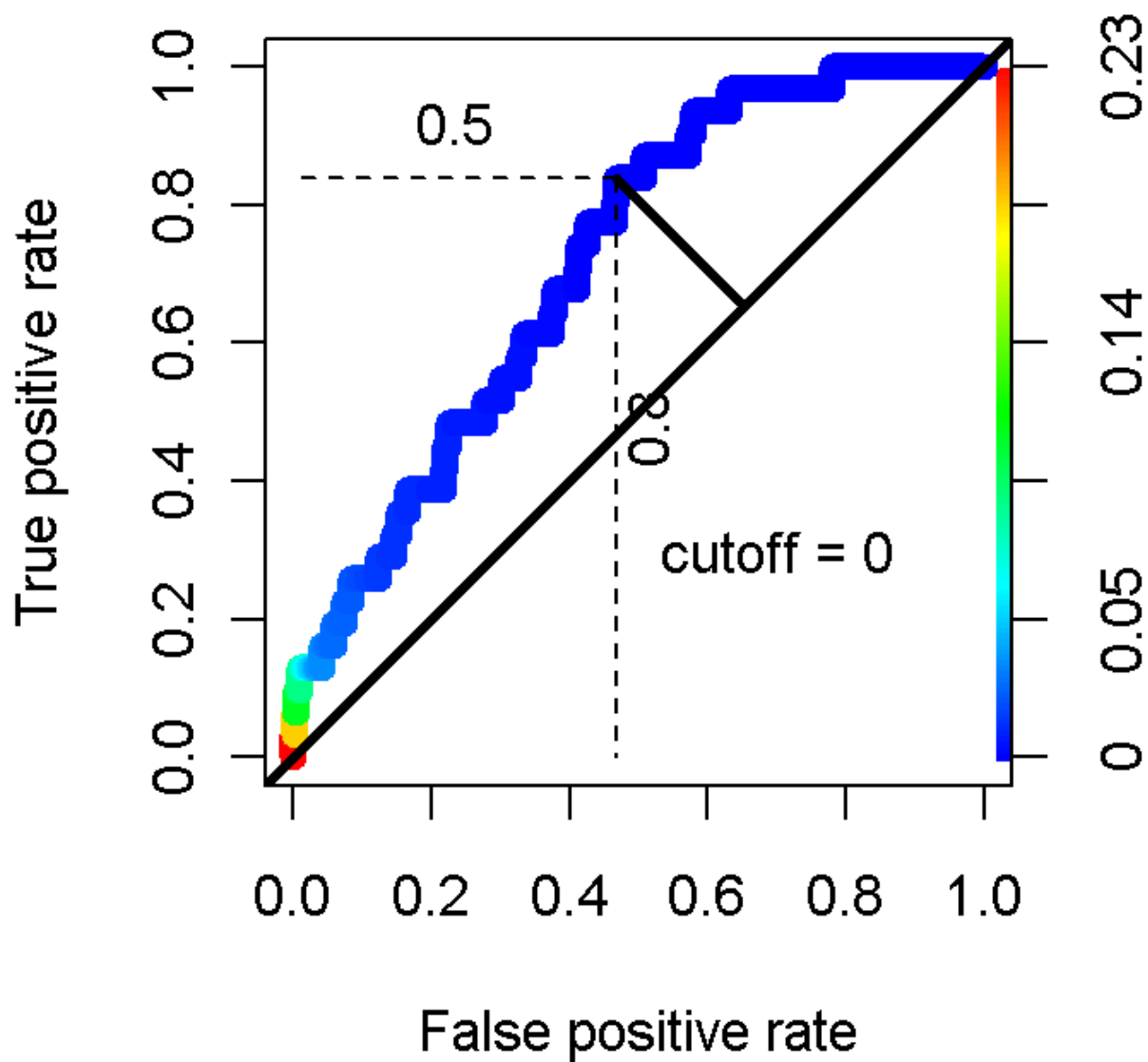


Figure 303: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Killer whales' guild during 'spring' season in 'gomex2' region.

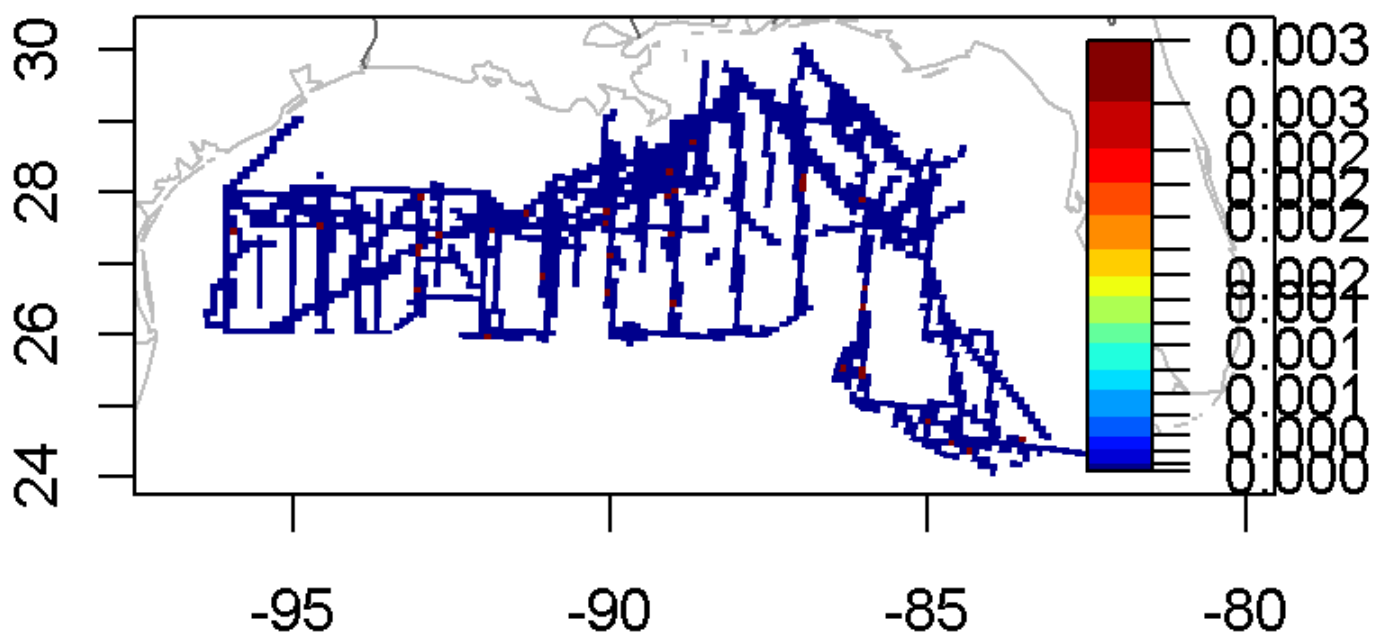


Figure 304: Map of presence and absence by cell summed through time for 'Killer whales' guild during 'spring' season in 'gomex2' region.

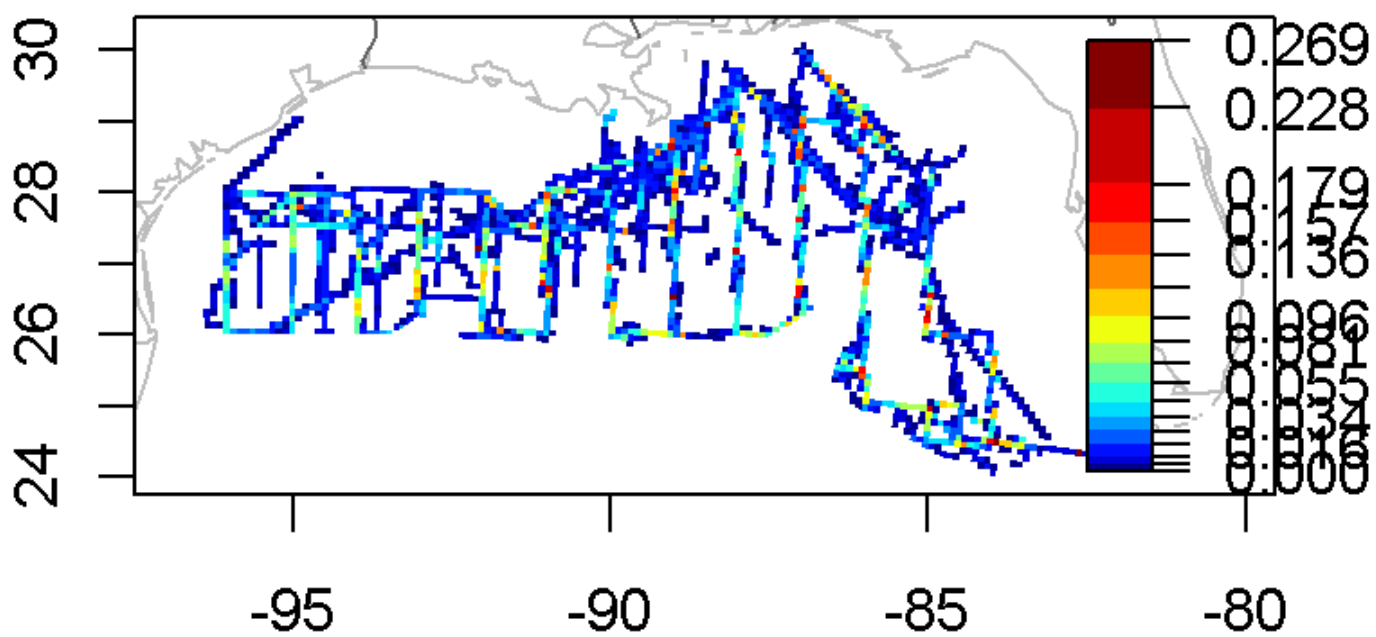


Figure 305: Map of effort(hours/km²) by cell summed through time for 'Killer whales' guild during 'spring' season in 'gomex2' region.

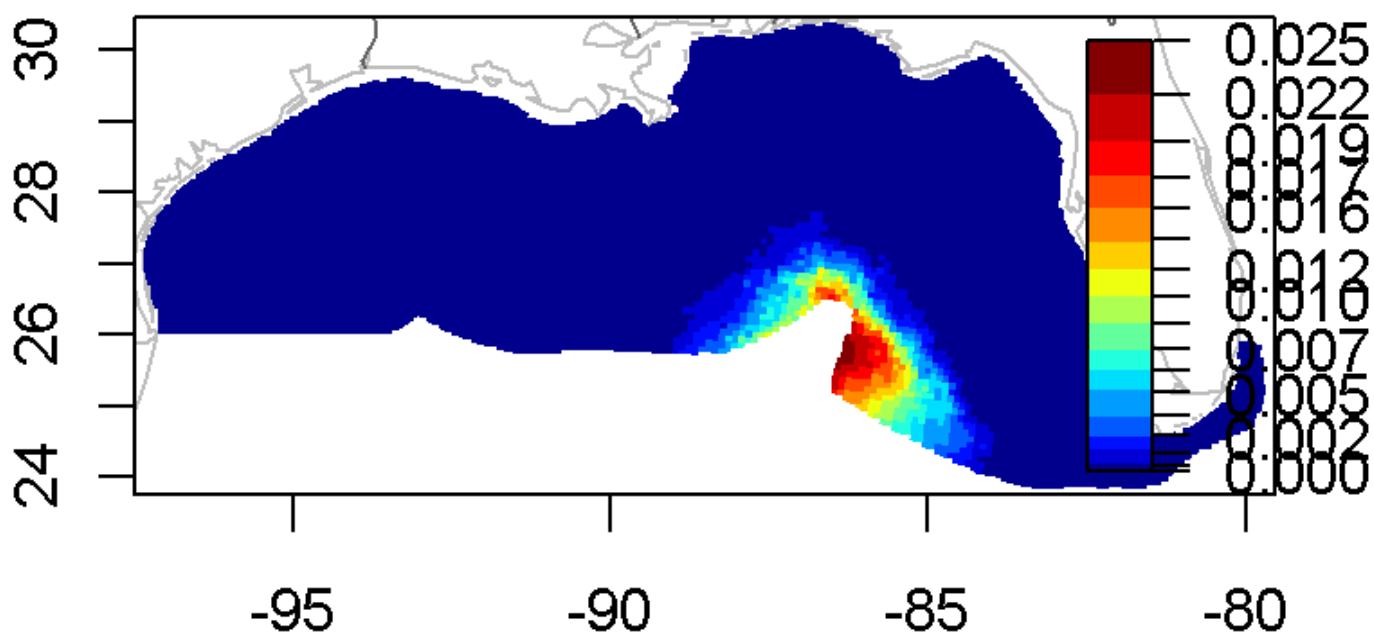


Figure 306: Map of mean predicted habitat for 'Killer whales' guild during 'spring' season in 'gomex2' region.

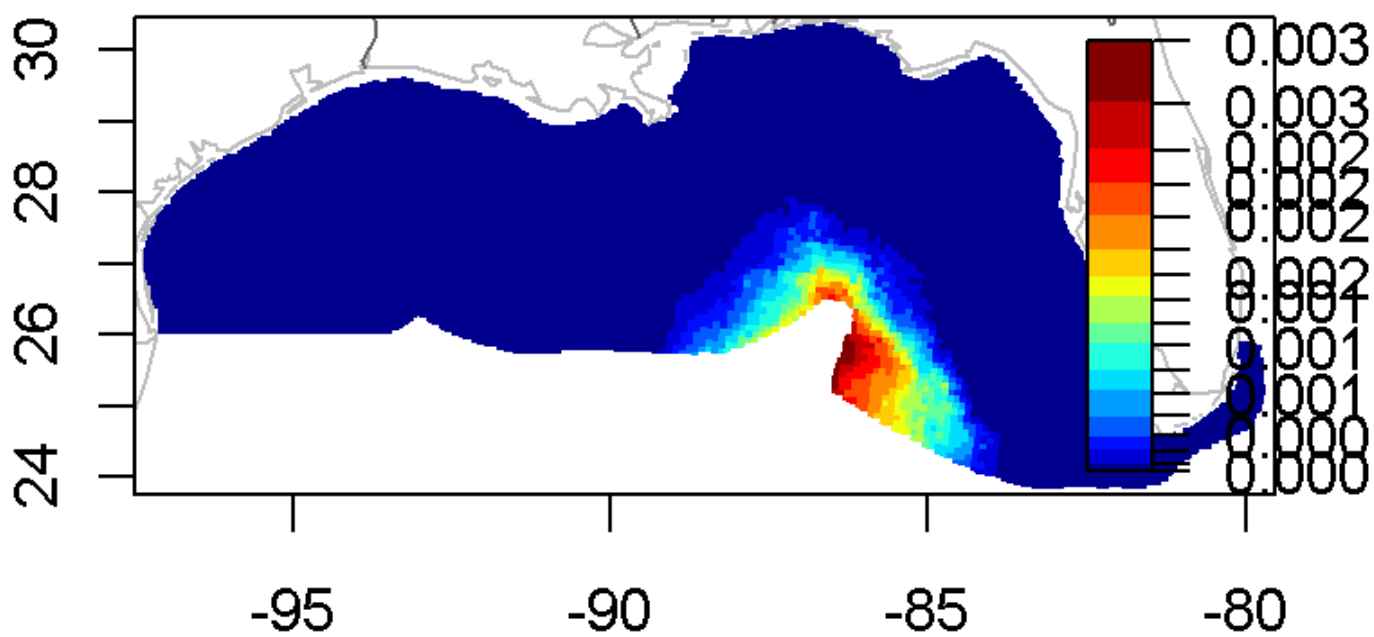


Figure 307: Map of standard error of habitat for 'Killer whales' guild during 'spring' season in 'gomex2' region.

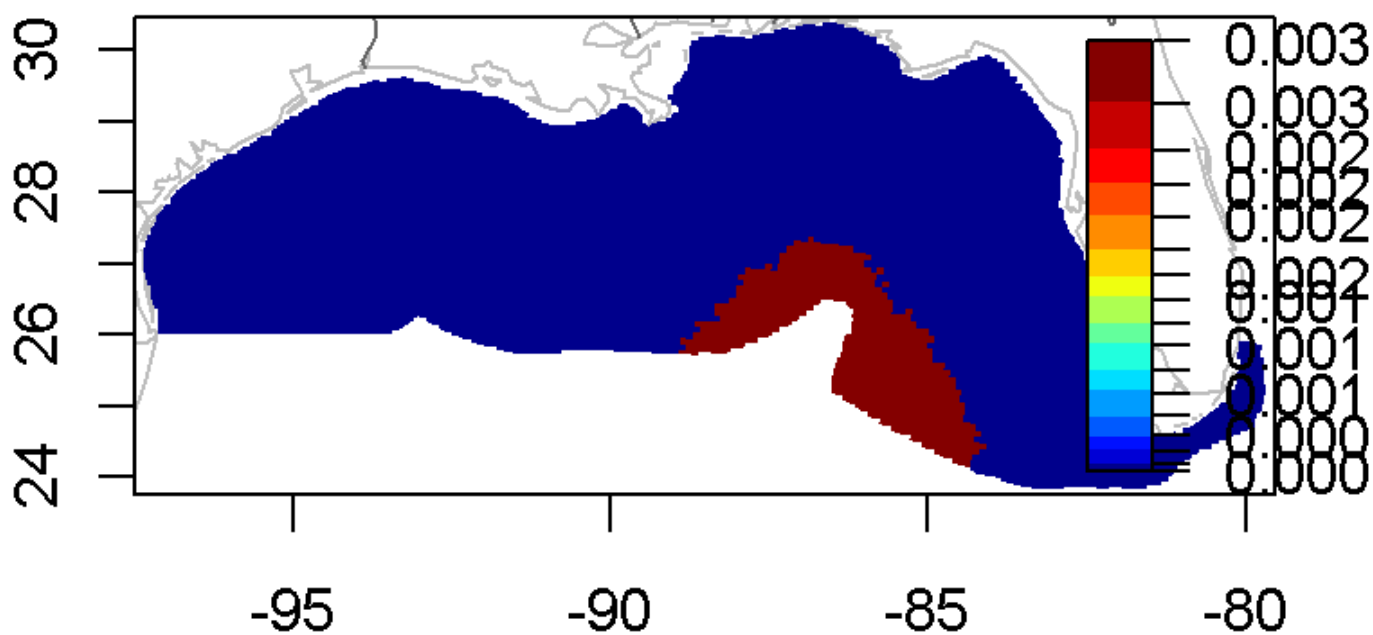


Figure 308: Map of binary habitat (cutoff determined by ROC) for 'Killer whales' guild during 'spring' season in 'gomex2' region.

6.3 summer

6.3.1 east2

Modelrun identifier: duke_06_kw3_summer_east2

Date generated: 2008-10-21 13:17:02

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 29: Summary for duke(6) GAM model: for 'Killer whales' guild during 'summer' season in 'east2' region.

	Value
Number.presences	7
Number.absences	9071
GAM.converged	TRUE
R.squared	-0.0132564
Deviance.explained	0.247561
ROC.optimum	0.0175441
Maximum.fit	0.00248232
Maximum.prediction	0.0216558

Model text summary...

```
duke_06_kw3_summer_east2 run on Tue Oct 21 13:13:48 2008
  provider:duke, version:06, guild:Killer whales (kw3), season:'summer', region:east2

max.fit:0.017544, max.prediction:0.021656, ROC.optimum:0.002482

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -730.02      36.78   -19.85   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  1.997e+00  2.497  170.685   < 2e-16 ***
s(log(d2shelf)) 5.501e-06  0.500    0.002    0.836
s(log(d2coast)) 9.785e-01  1.479   43.679  3.46e-15 ***
s(sst)         1.030e-07  0.500  2.73e-05    0.944
s(lat)         1.787e-07  0.500  1.42e-05    0.952
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  -0.0133  Deviance explained = 24.8%
GCV score = 4.9987e-05  Scale est. = 4.9945e-05  n = 8663

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.    :  5.0  Min.    :    5  Min.    : 1259  Min.    :  8.175  Min.    :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.: 20989  1st Qu.: 50865  1st Qu.: 17.025  1st Qu.:37.53
          Median :14008  Median : 111.5  Median : 52230  Median :102266  Median : 22.200  Median :40.18
          Mean   :13275  Mean   : 677.3  Mean   : 67623  Mean   :125197  Mean   : 21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.: 420.0  3rd Qu.: 99335  3rd Qu.:174835  3rd Qu.: 25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   : 30.900  Max.   :44.74
          NA's    :      7      NA's    :      7      NA's    :408.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.    :  4  Min.    :    5  Min.    : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :2.945e-16  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.220e-16  1st Qu.:5.358e-15  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :2.220e-16  Median :1.761e-14  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :9.921e-04  Mean   :6.837e-05  Mean   :1.518e-03  Mean   :1.069e-02  Mean   :0.1261
3rd Qu.:14088  3rd Qu.:9.198e-05  3rd Qu.:2.043e-05  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :2.166e-02  Max.   :2.480e-03  Max.   :1.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

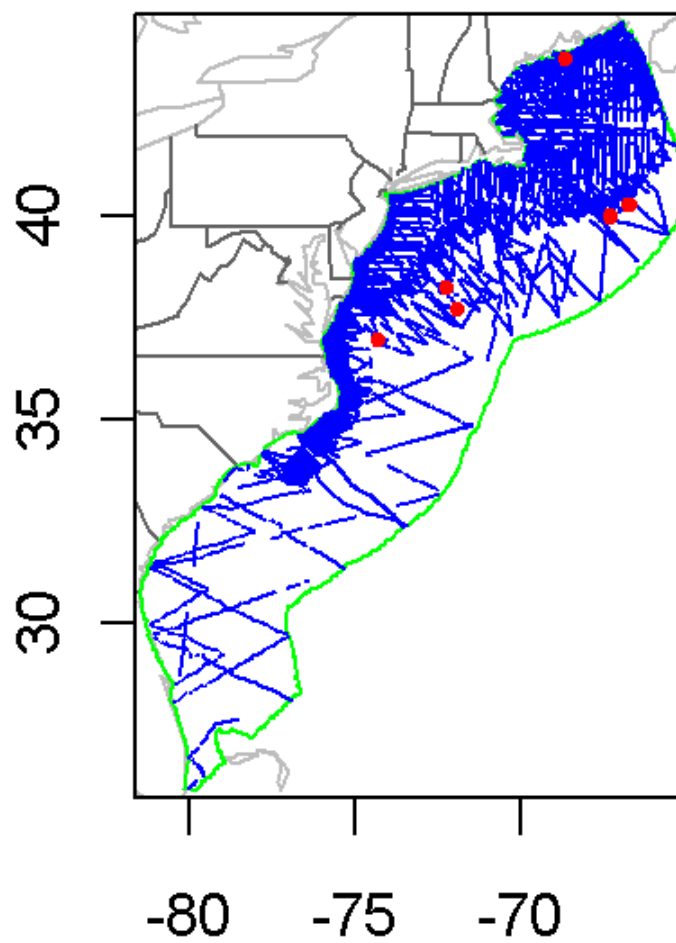


Figure 309: Map of points of observational sightings and tracks of survey effort for 'Killer whales' guild during 'summer' season in 'east2' region.

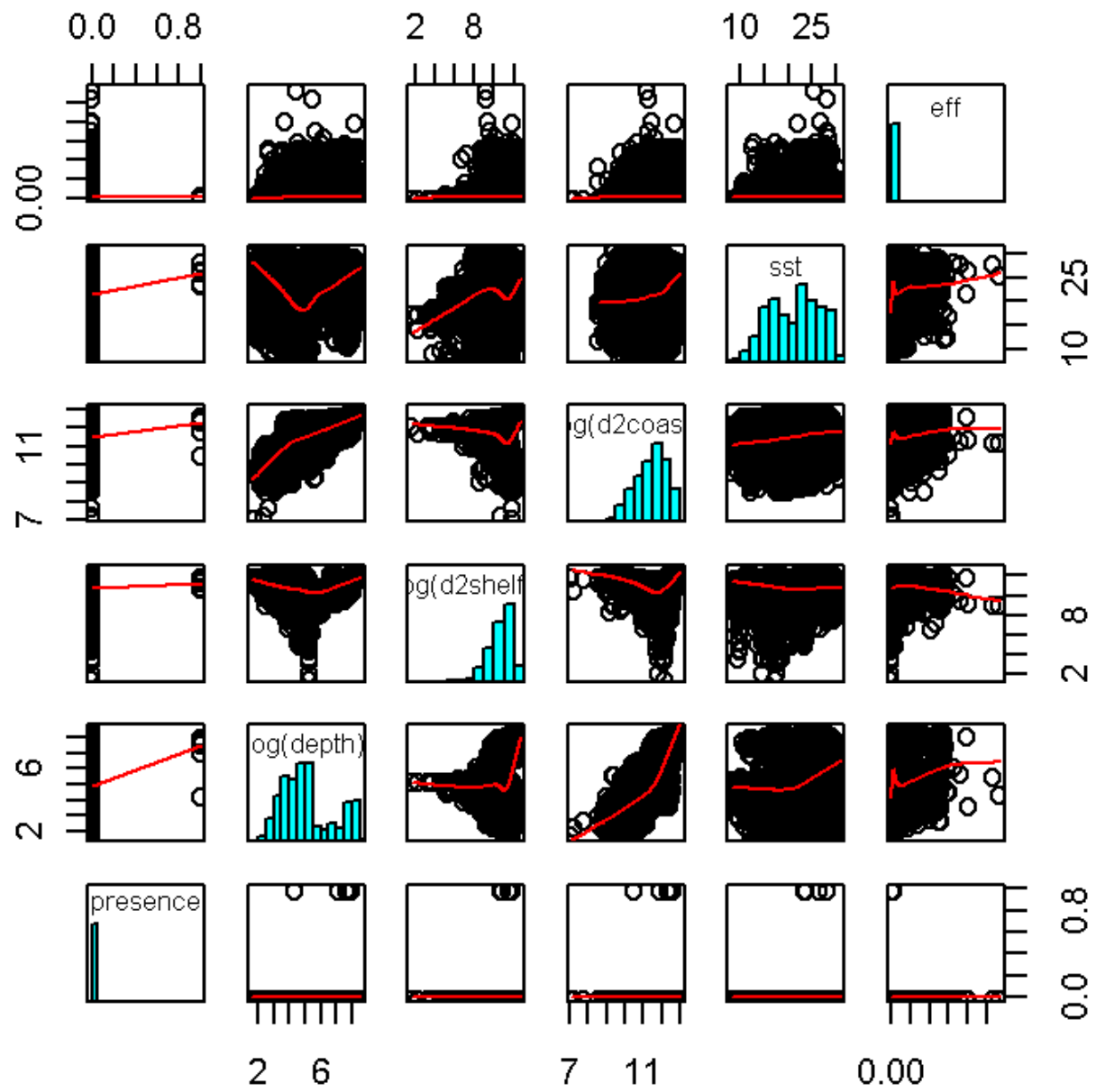


Figure 310: Pairs plot of input variables for 'Killer whales' guild during 'summer' season in 'east2' region.

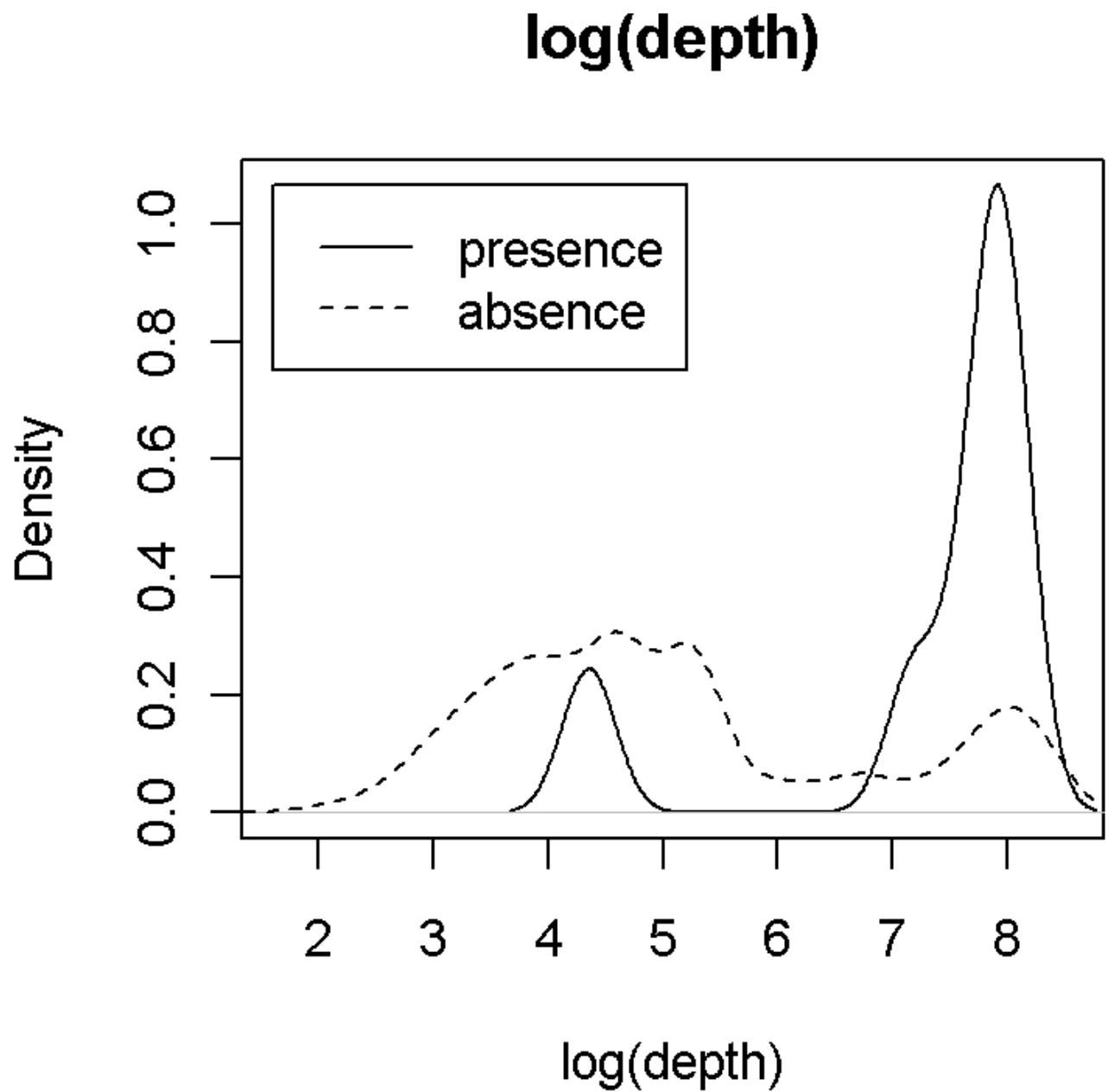


Figure 311: Density histogram of depth $\log(\text{meters})$ for 'Killer whales' guild during 'summer' season in 'east2' region.

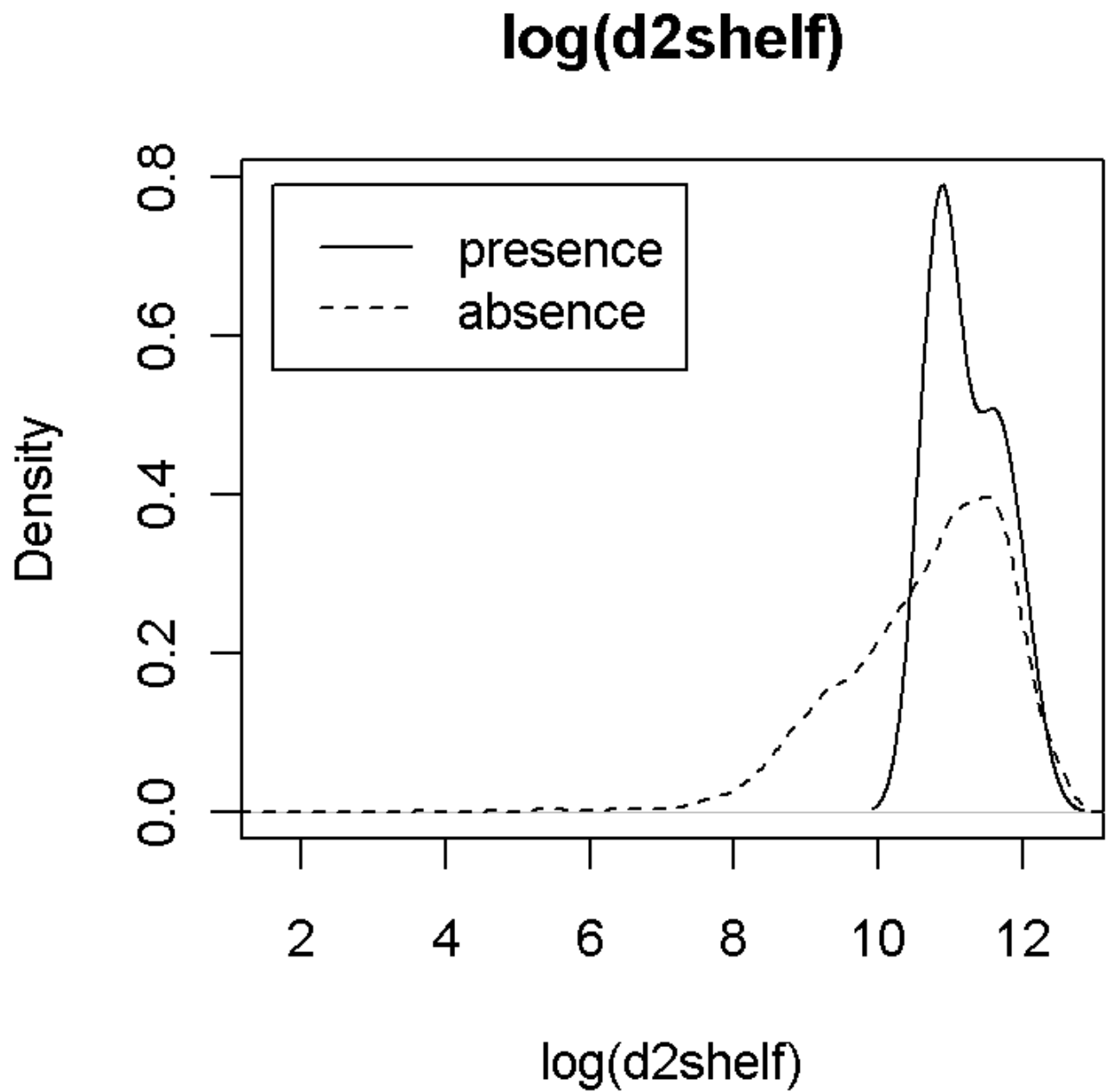


Figure 312: Density histogram of distance to shelf log(meters) for 'Killer whales' guild during 'summer' season in 'east2' region.

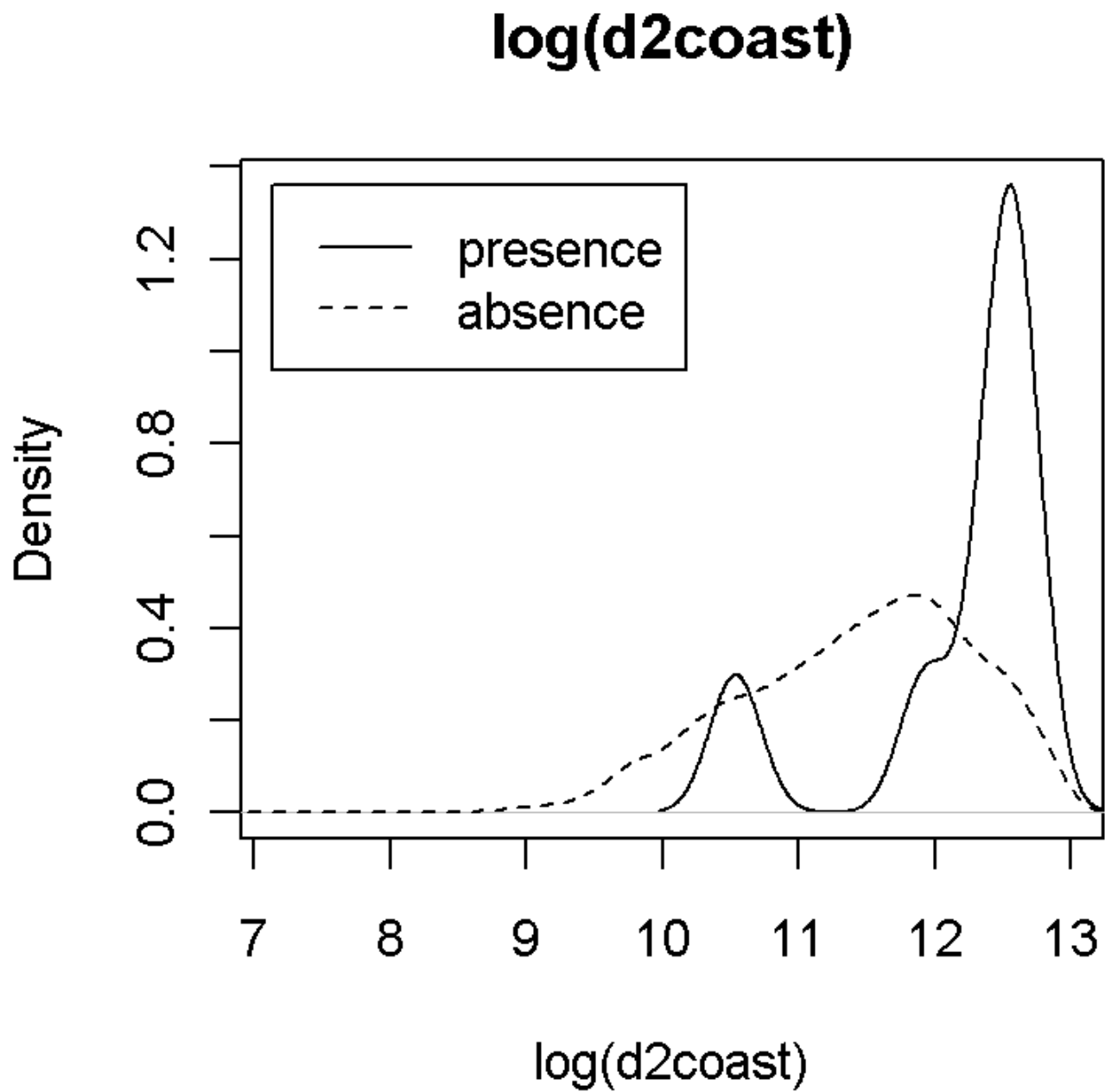


Figure 313: Density histogram of distance to coast log(meters) for 'Killer whales' guild during 'summer' season in 'east2' region.

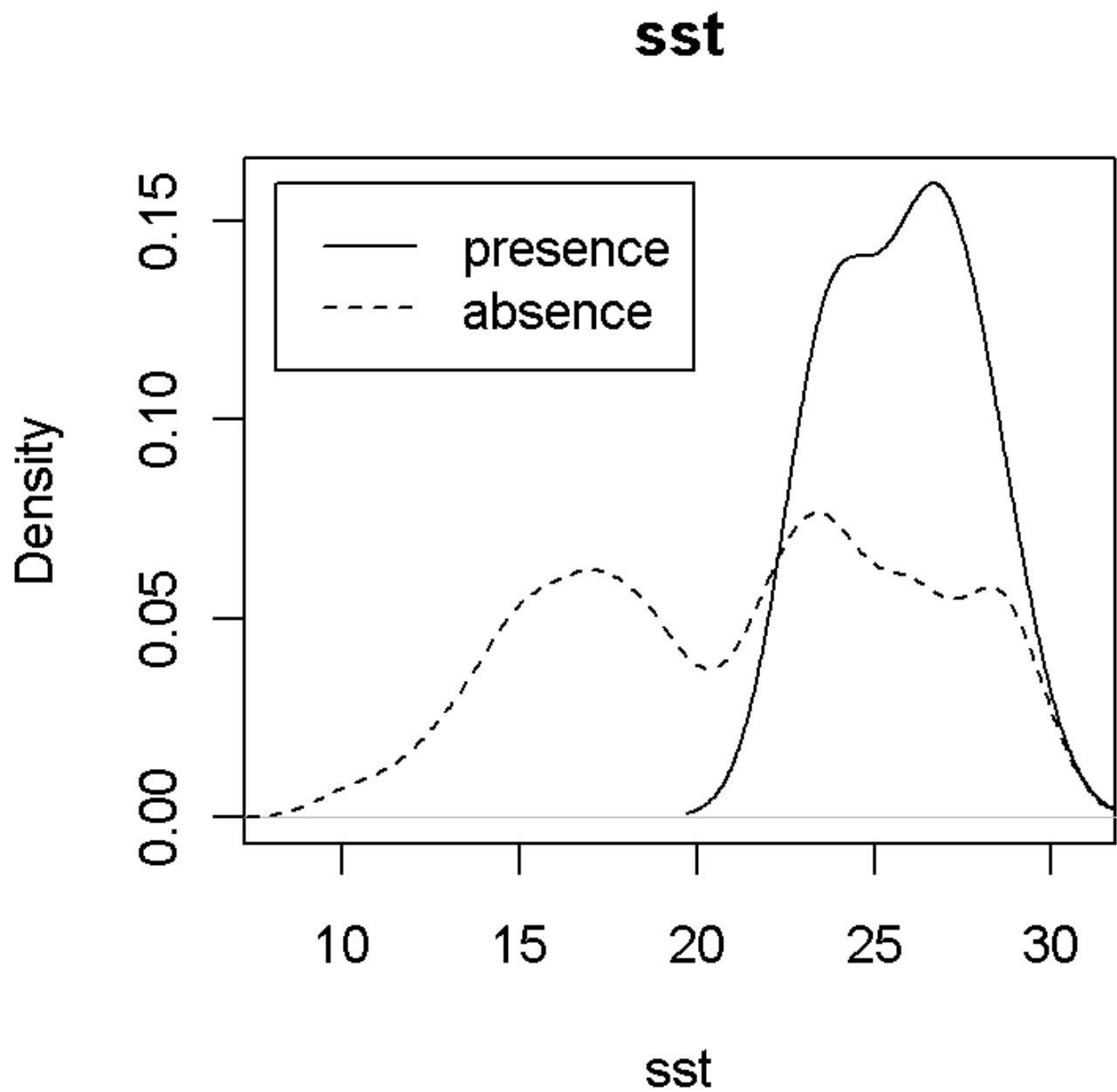


Figure 314: Density histogram of sea-surface temperature (degrees C) for 'Killer whales' guild during 'summer' season in 'east2' region.

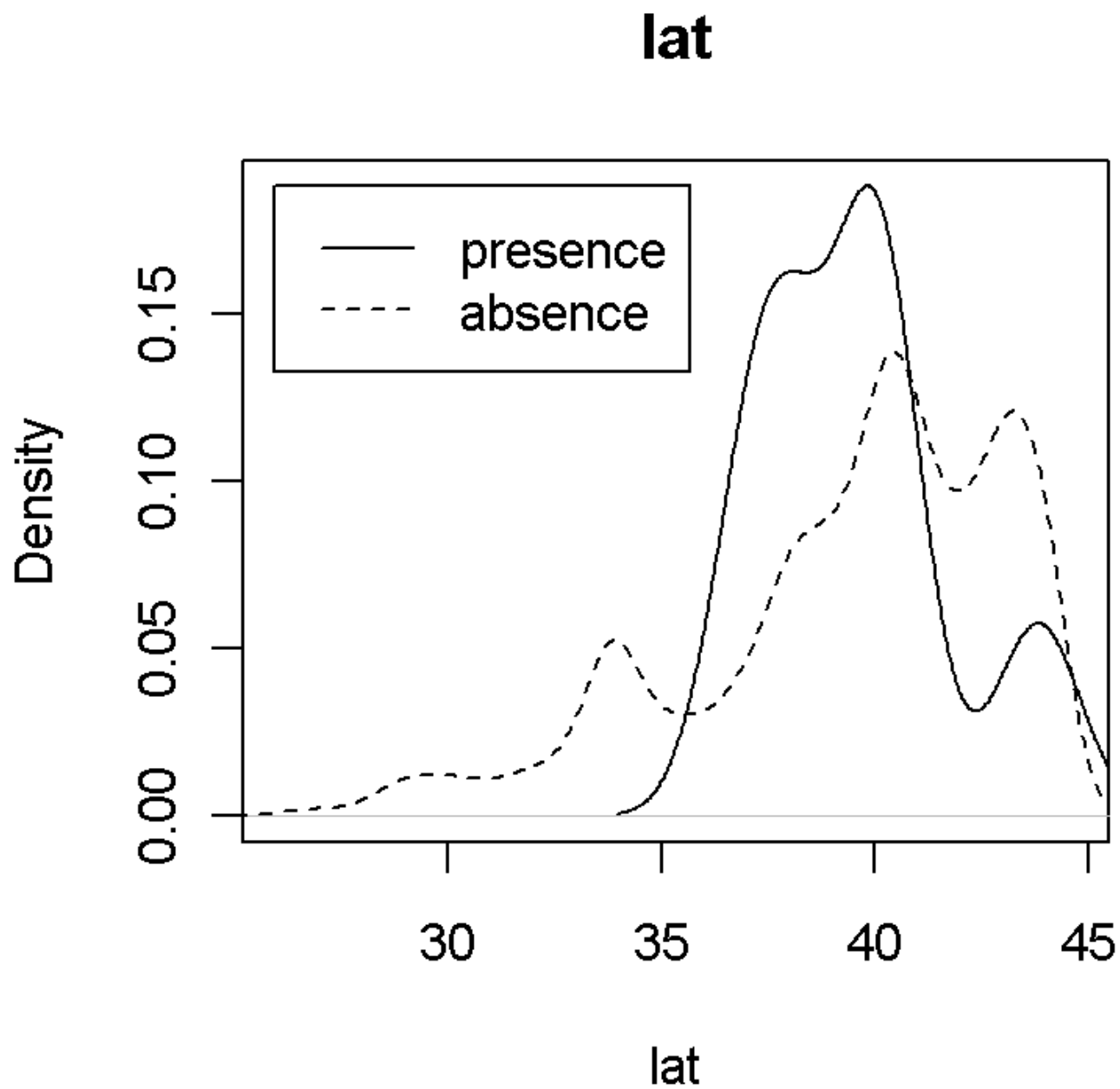


Figure 315: Density histogram of latitude (degrees) for 'Killer whales' guild during 'summer' season in 'east2' region.

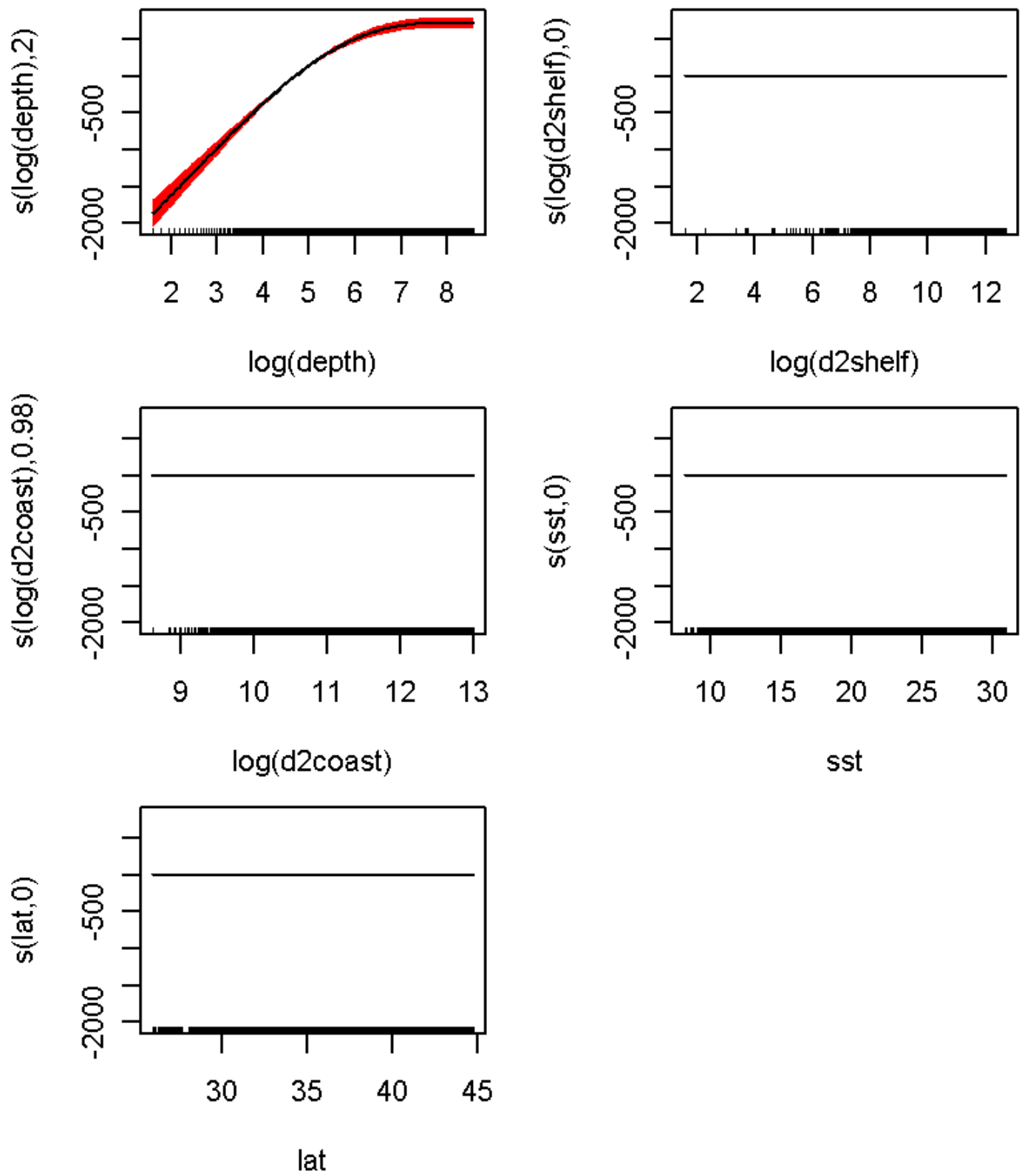


Figure 316: Terms plot of predictors to GAM model fit for 'Killer whales' guild during 'summer' season in 'east2' region.

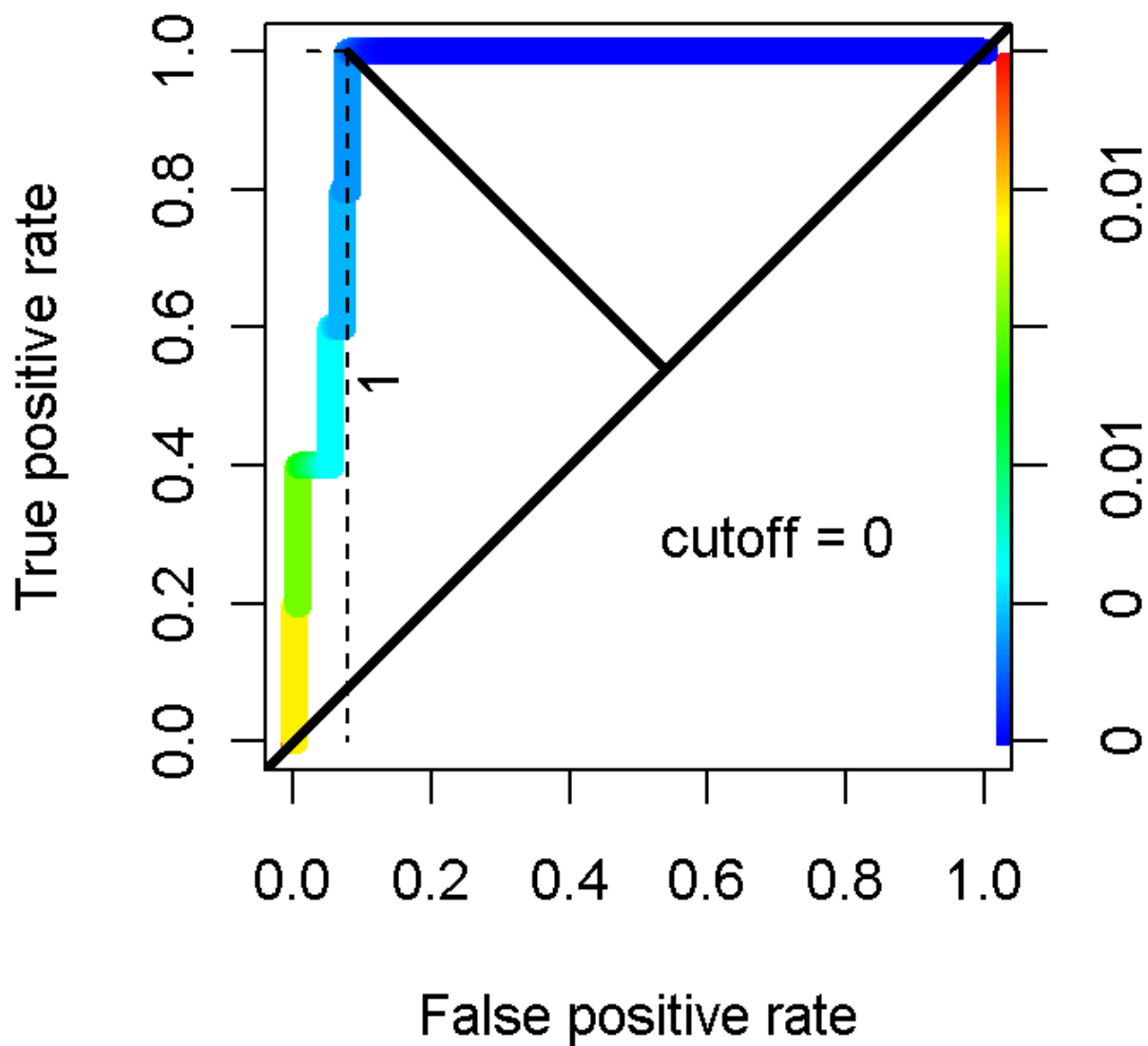


Figure 317: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Killer whales' guild during 'summer' season in 'east2' region.

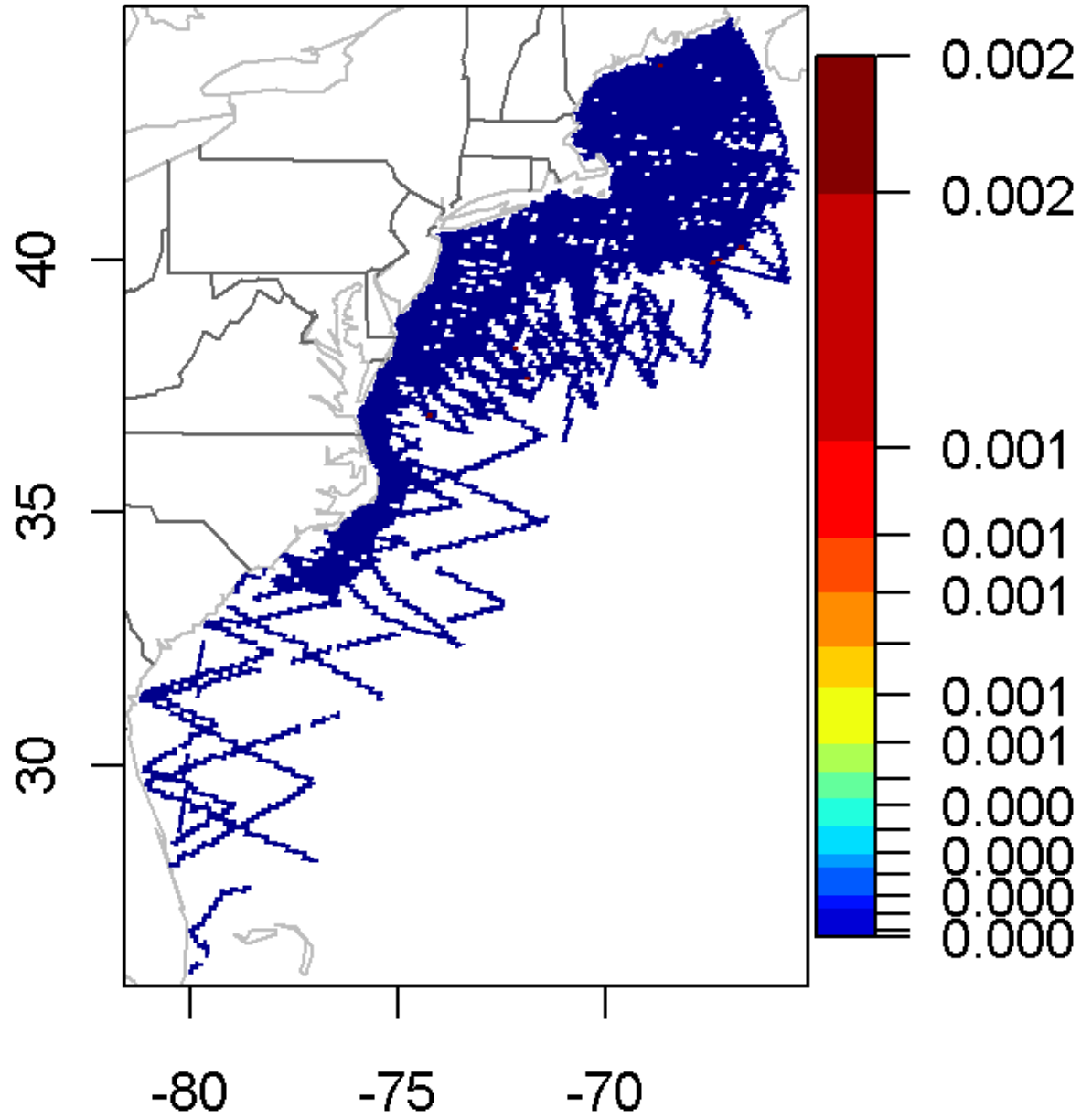


Figure 318: Map of presence and absence by cell summed through time for 'Killer whales' guild during 'summer' season in 'east2' region.

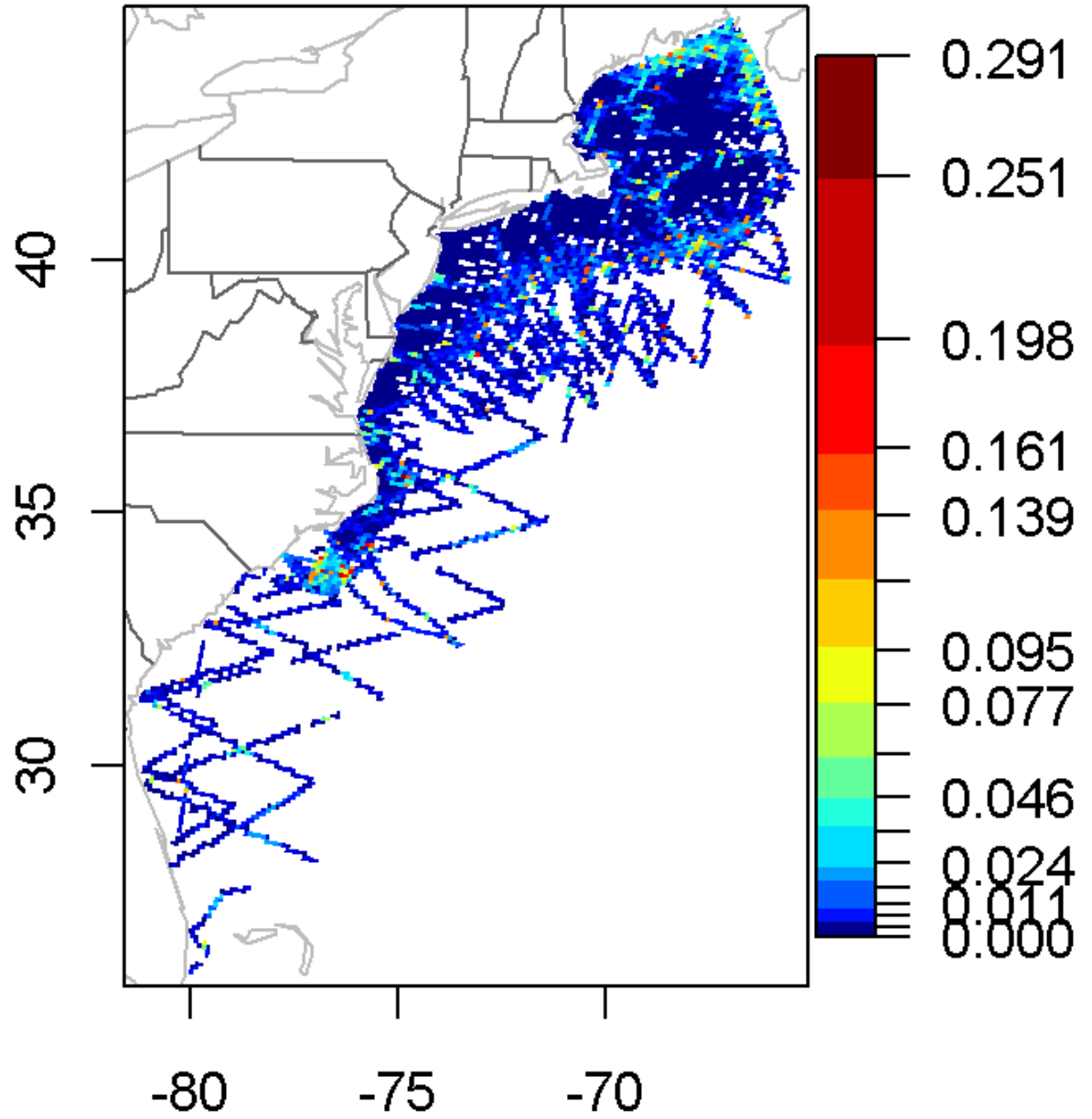


Figure 319: Map of effort(hours/km²) by cell summed through time for 'Killer whales' guild during 'summer' season in 'east2' region.

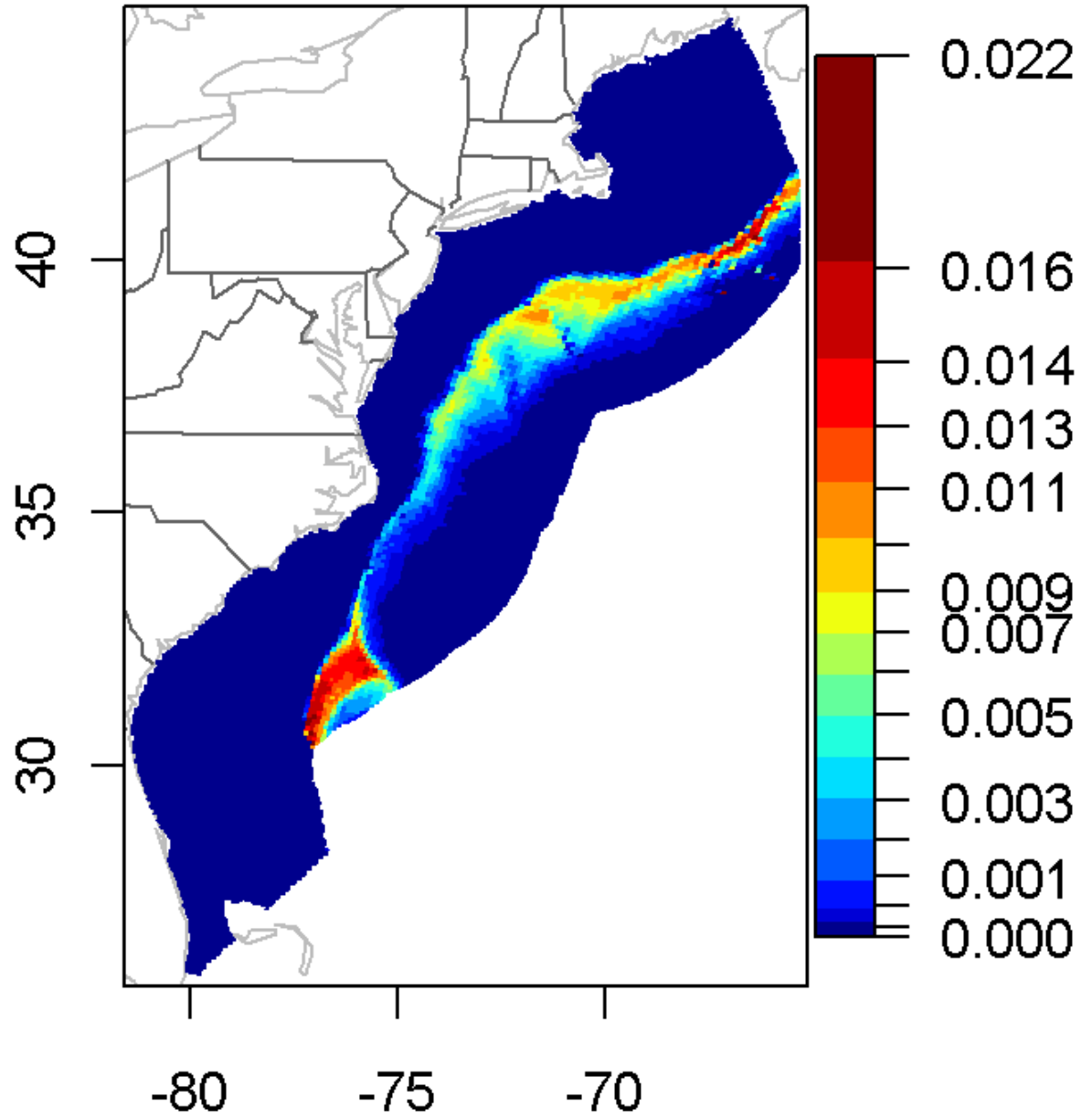


Figure 320: Map of mean predicted habitat for 'Killer whales' guild during 'summer' season in 'east2' region.

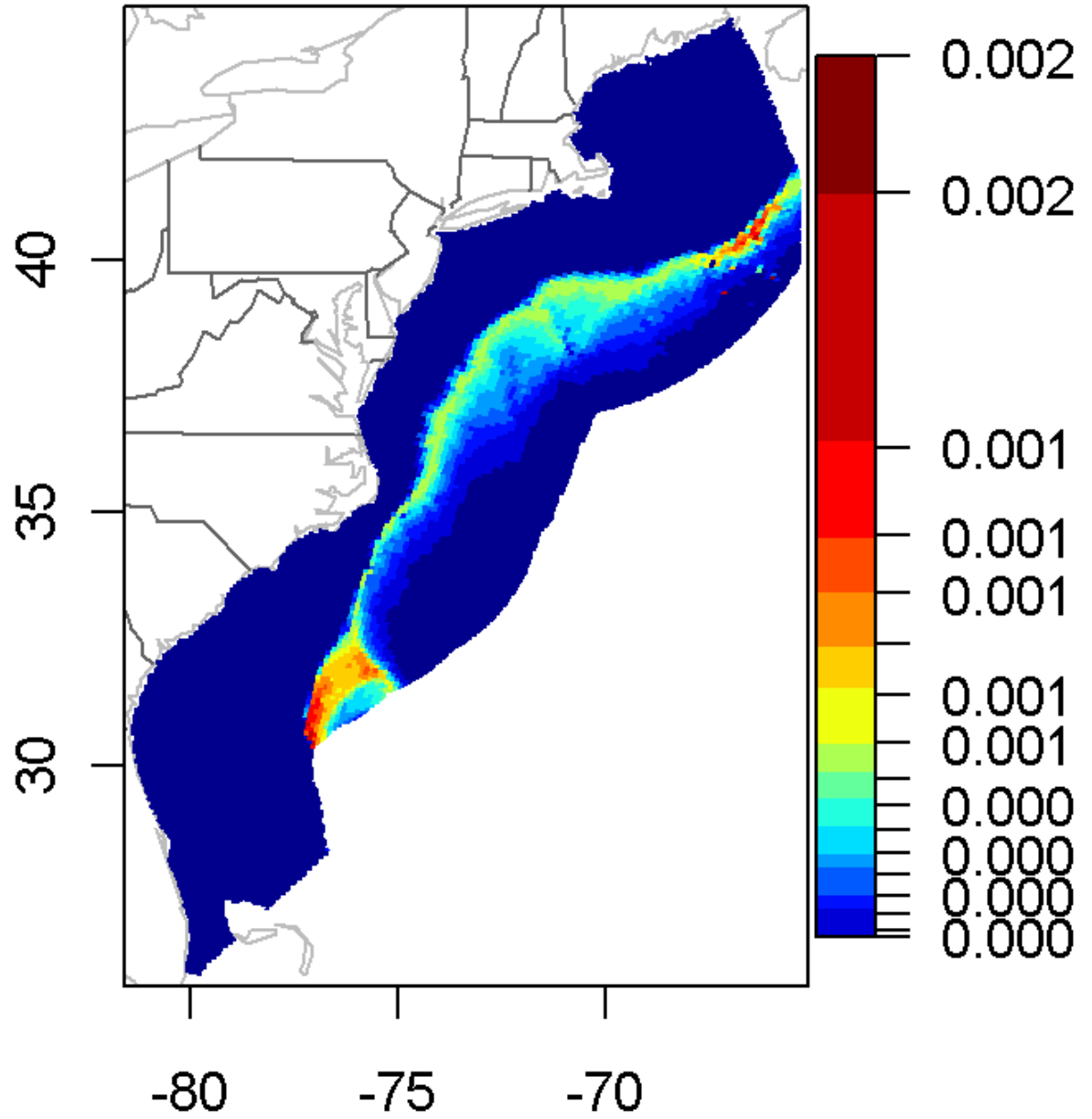


Figure 321: Map of standard error of habitat for 'Killer whales' guild during 'summer' season in 'east2' region.

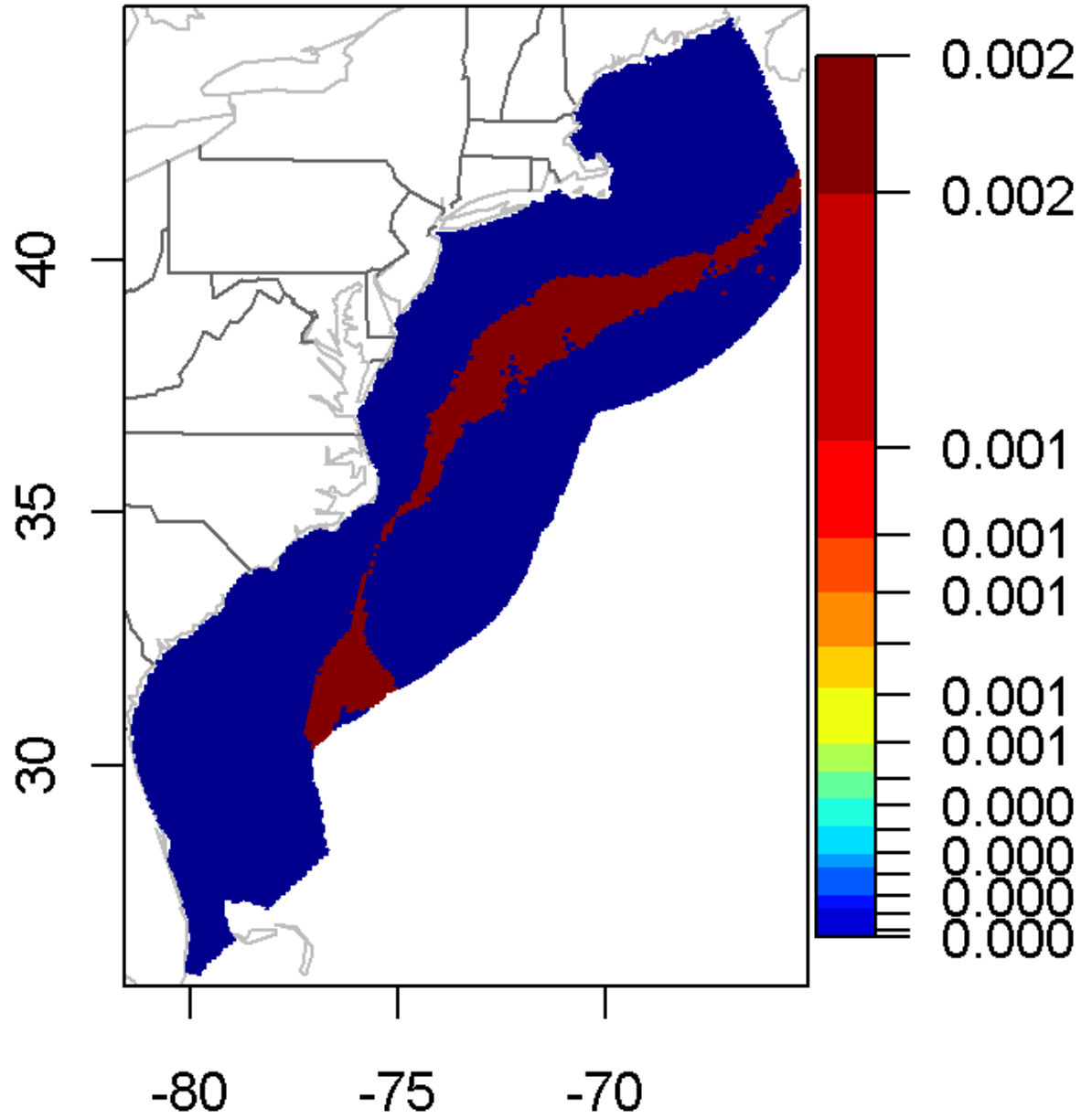


Figure 322: Map of binary habitat (cutoff determined by ROC) for 'Killer whales' guild during 'summer' season in 'east2' region.

6.3.2 gomex2

Modelrun identifier: duke_06_kw3_summer_gomex2

Date generated: 2008-10-21 11:28:46

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 30: Summary for duke(6) GAM model: for 'Killer whales' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	14
Number.absences	1390
GAM.converged	TRUE
R.squared	0.0313822
Deviance.explained	0.0973328
ROC.optimum	0.0611983
Maximum.fit	0.01223
Maximum.prediction	0.0400034

Model text summary...

```
duke_06_kw3_summer_gomex2 run on Tue Oct 21 11:28:06 2008
provider:duke, version:06, guild:Killer whales (kw3), season:'summer', region:gomex2

max.fit:0.061198, max.prediction:0.040003, ROC.optimum:0.012230

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.1302      0.1425    -36   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  9.318e-01 1.4318  35.053 6.15e-12 ***
s(log(d2shelf)) 8.615e-05 0.5001  7.01e-05 0.92866
s(log(d2coast)) 6.696e-01 1.1696   4.200 0.03445 *
s(sst)         8.579e-01 1.3579   7.763 0.00220 **
s(lat)         5.678e-06 0.5000  6.52e-06 0.96059
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = 0.0314 Deviance explained = 9.73%
GCV score = 0.0010354 Scale est. = 0.0010308 n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13    Min.   : 13.0    Min.   : 901    Min.   : 5700    Min.   :25.35    Min.   :24.04
              1st Qu.:2791  1st Qu.: 149.8    1st Qu.: 21595   1st Qu.: 99783   1st Qu.:27.75   1st Qu.:26.68
              Median :5134   Median : 654.0    Median : 45466   Median :146059   Median :28.50   Median :27.90
              Mean   :4686   Mean   : 899.5    Mean   : 59670   Mean   :161835   Mean   :28.50   Mean   :27.65
              3rd Qu.:6644   3rd Qu.:1292.0    3rd Qu.: 82981   3rd Qu.:213494   3rd Qu.:29.25   3rd Qu.:28.69
              Max.   :8257   Max.   :3505.0    Max.   :249222   Max.   :386037   Max.   :31.20   Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1    Min.   : 3.0    Min.   : 272    Min.   : 5317    Min.   :27.67    Min.   :23.85
              1st Qu.:1861  1st Qu.: 46.0    1st Qu.: 31617   1st Qu.: 85289   1st Qu.:29.48   1st Qu.:26.28
              Median :4110   Median : 433.5    Median : 71100   Median :157258   Median :29.55   Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.398e-05	Min.	:1.566e-05	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:5.175e-04	1st Qu.	:2.042e-04	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:4.432e-03	Median	:8.492e-04	Median	:0.000e+00	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:1.108e-02	Mean	:1.843e-03	Mean	:1.359e-02	Mean	:1.213e-02	Mean	:0.3608
3rd Qu.	:6015	3rd Qu.	:2.073e-02	3rd Qu.	:3.143e-03	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:4.000e-02	Max.	:7.129e-03	Max.	:1.000e+00	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5.568e+03	NA's	:5.568e+03		

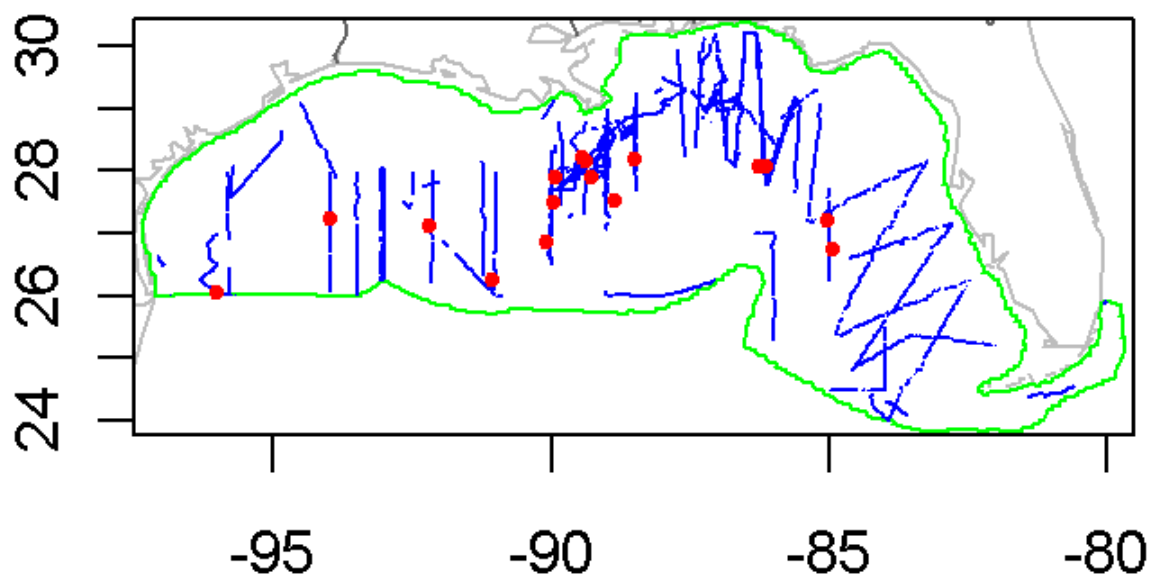


Figure 323: Map of points of observational sightings and tracks of survey effort for 'Killer whales' guild during 'summer' season in 'gomex2' region.

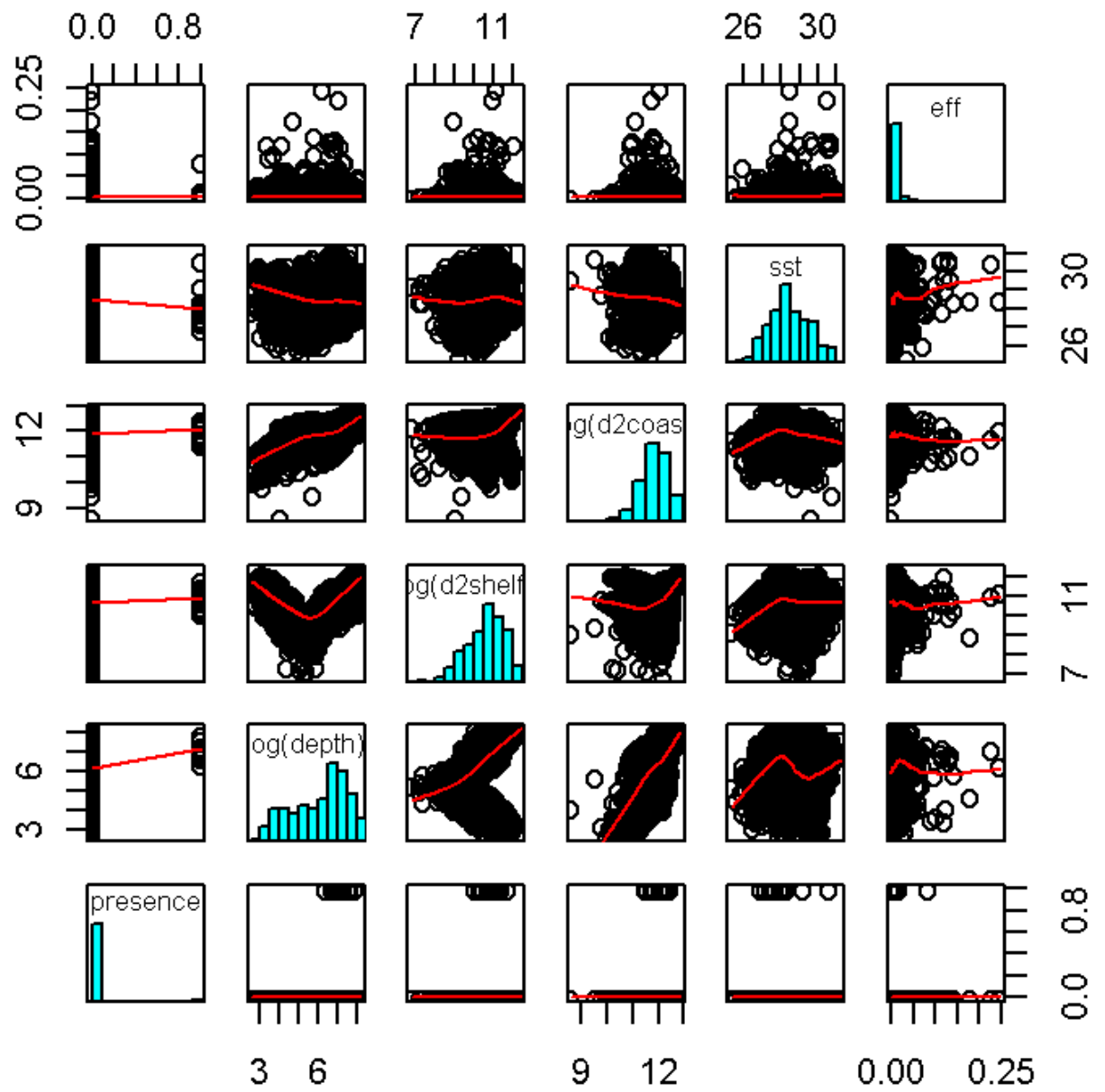


Figure 324: Pairs plot of input variables for 'Killer whales' guild during 'summer' season in 'gomex2' region.

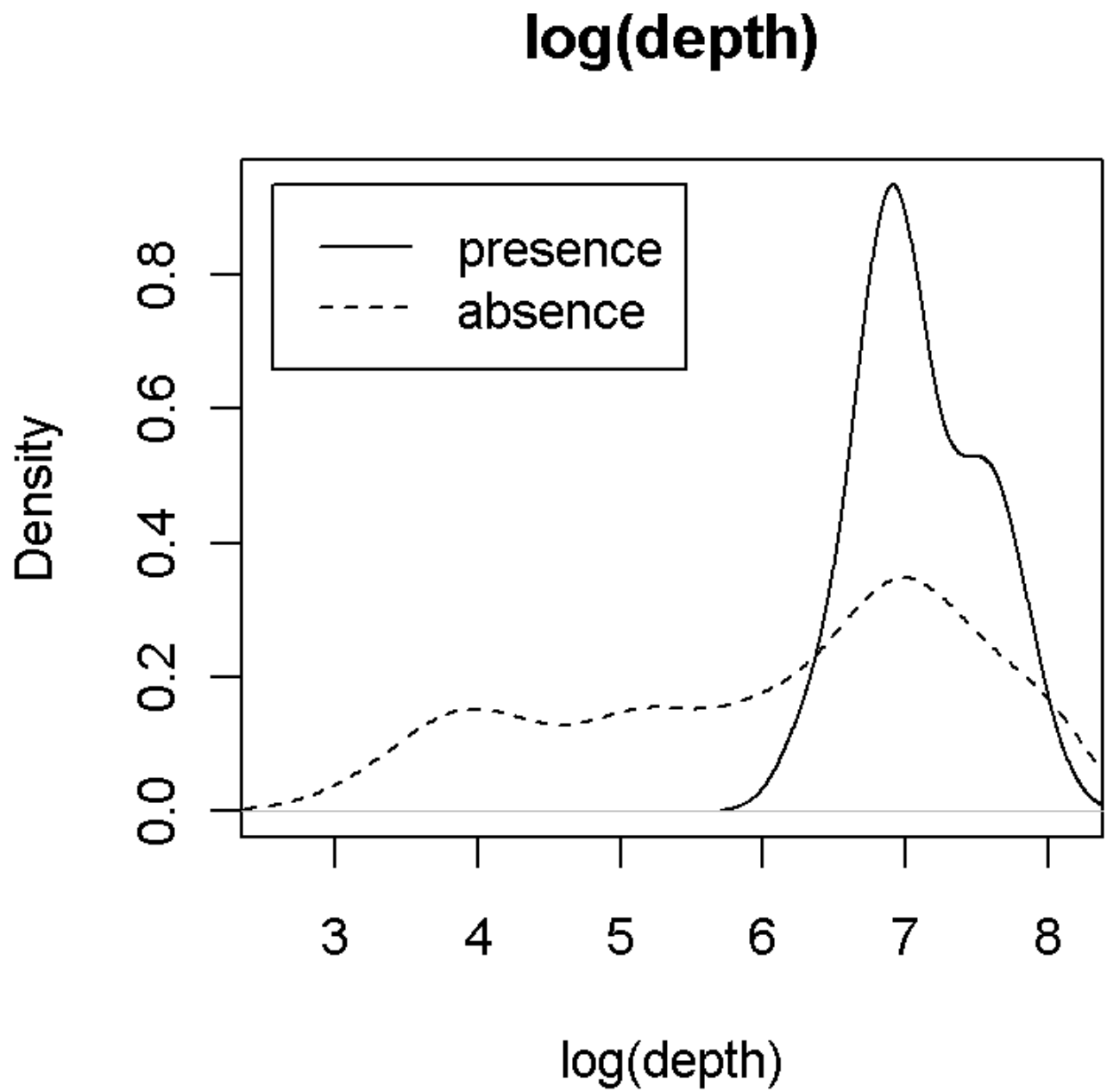


Figure 325: Density histogram of depth log(meters) for 'Killer whales' guild during 'summer' season in 'gomex2' region.

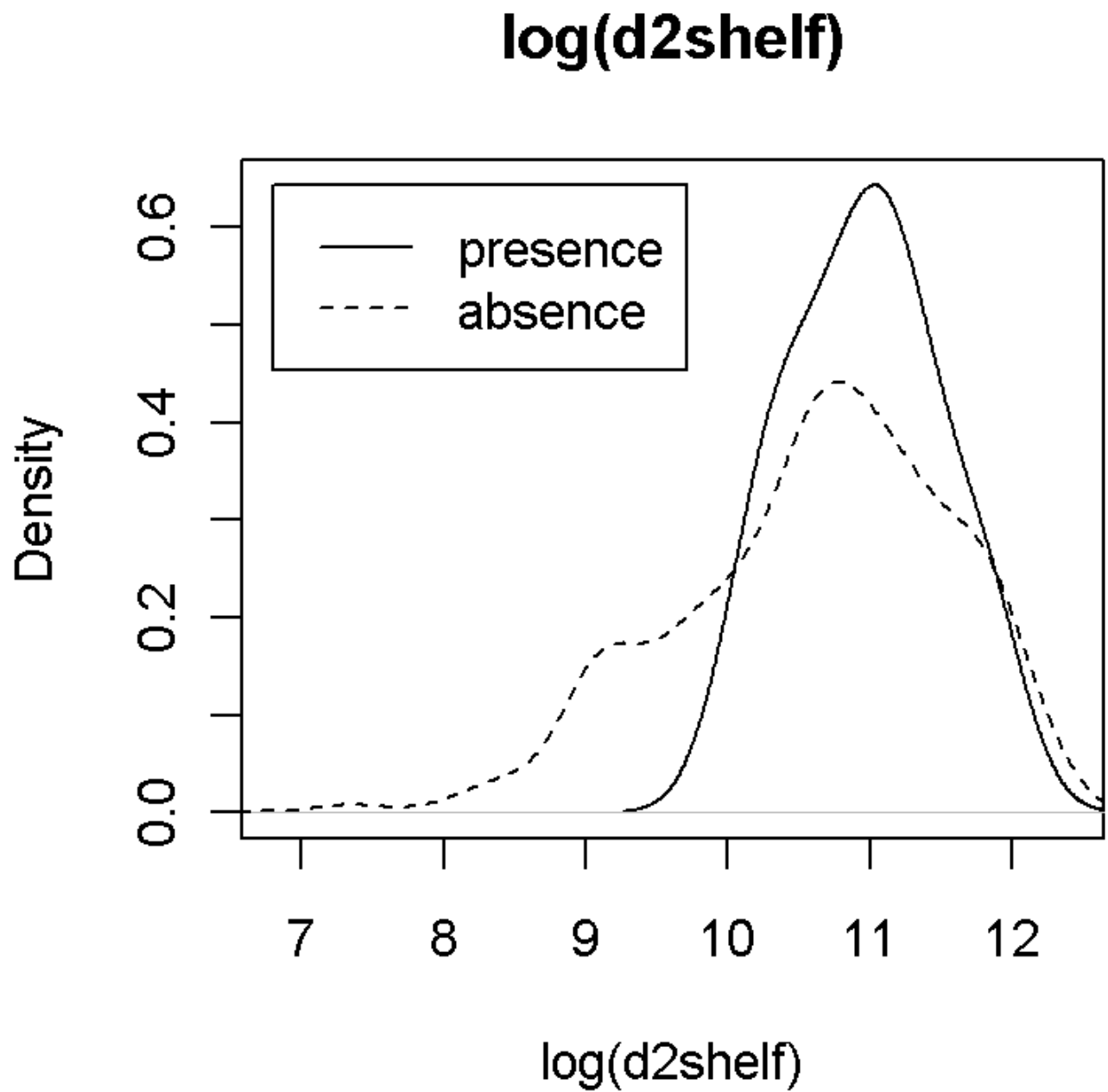


Figure 326: Density histogram of distance to shelf log(meters) for 'Killer whales' guild during 'summer' season in 'gomex2' region.

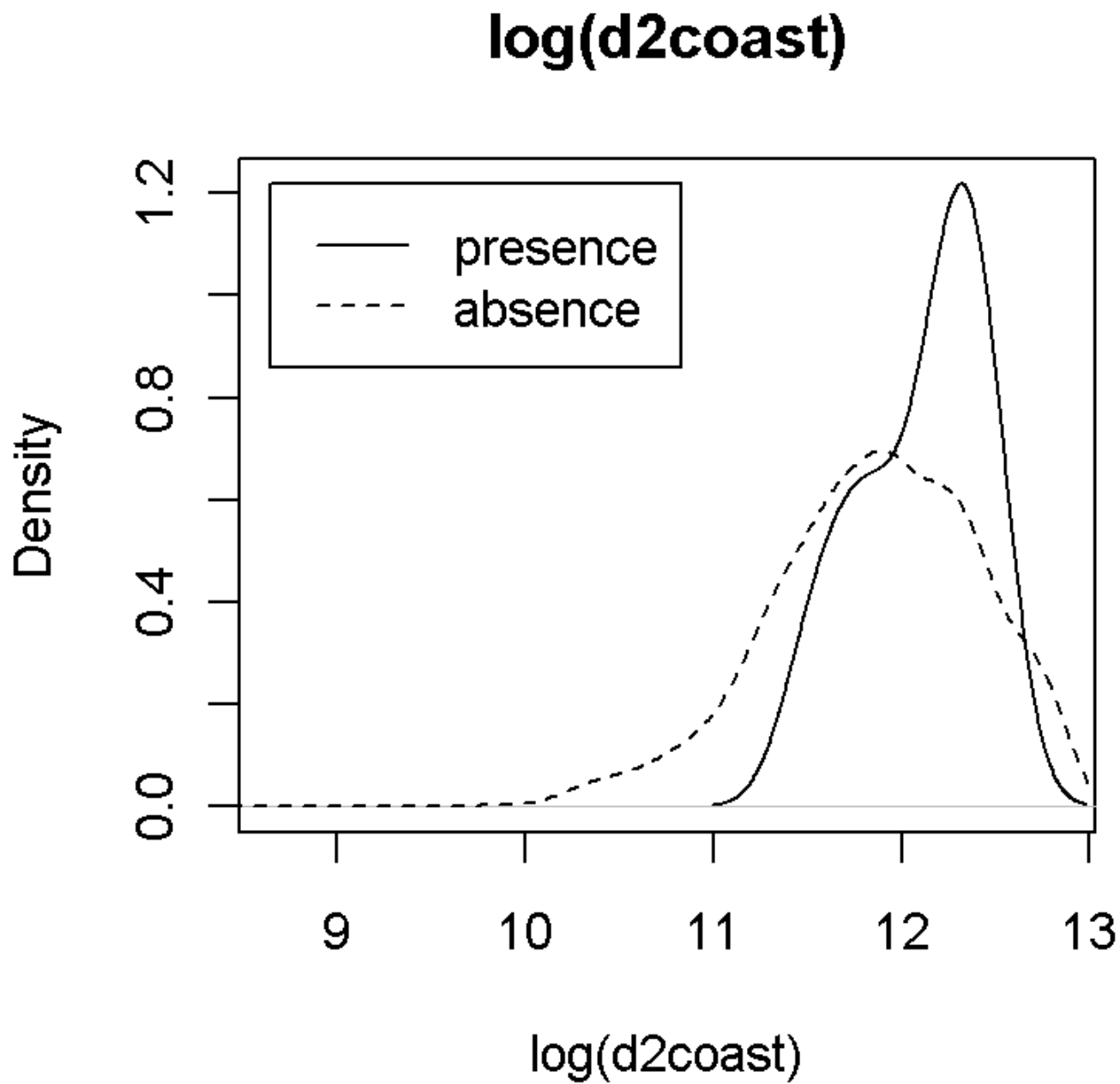


Figure 327: Density histogram of distance to coast log(meters) for 'Killer whales' guild during 'summer' season in 'gomex2' region.

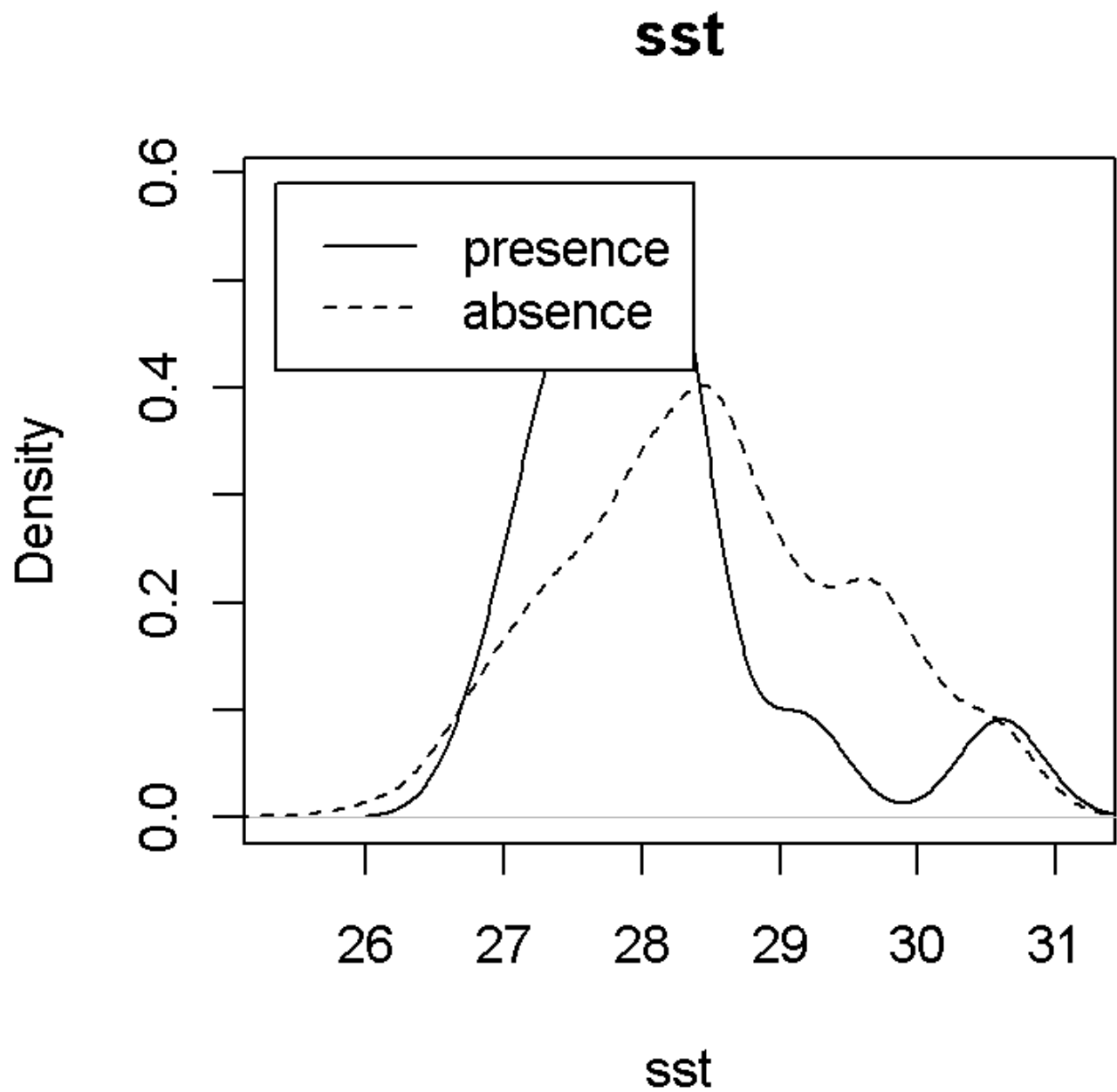


Figure 328: Density histogram of sea-surface temperature (degrees C) for 'Killer whales' guild during 'summer' season in 'gomex2' region.

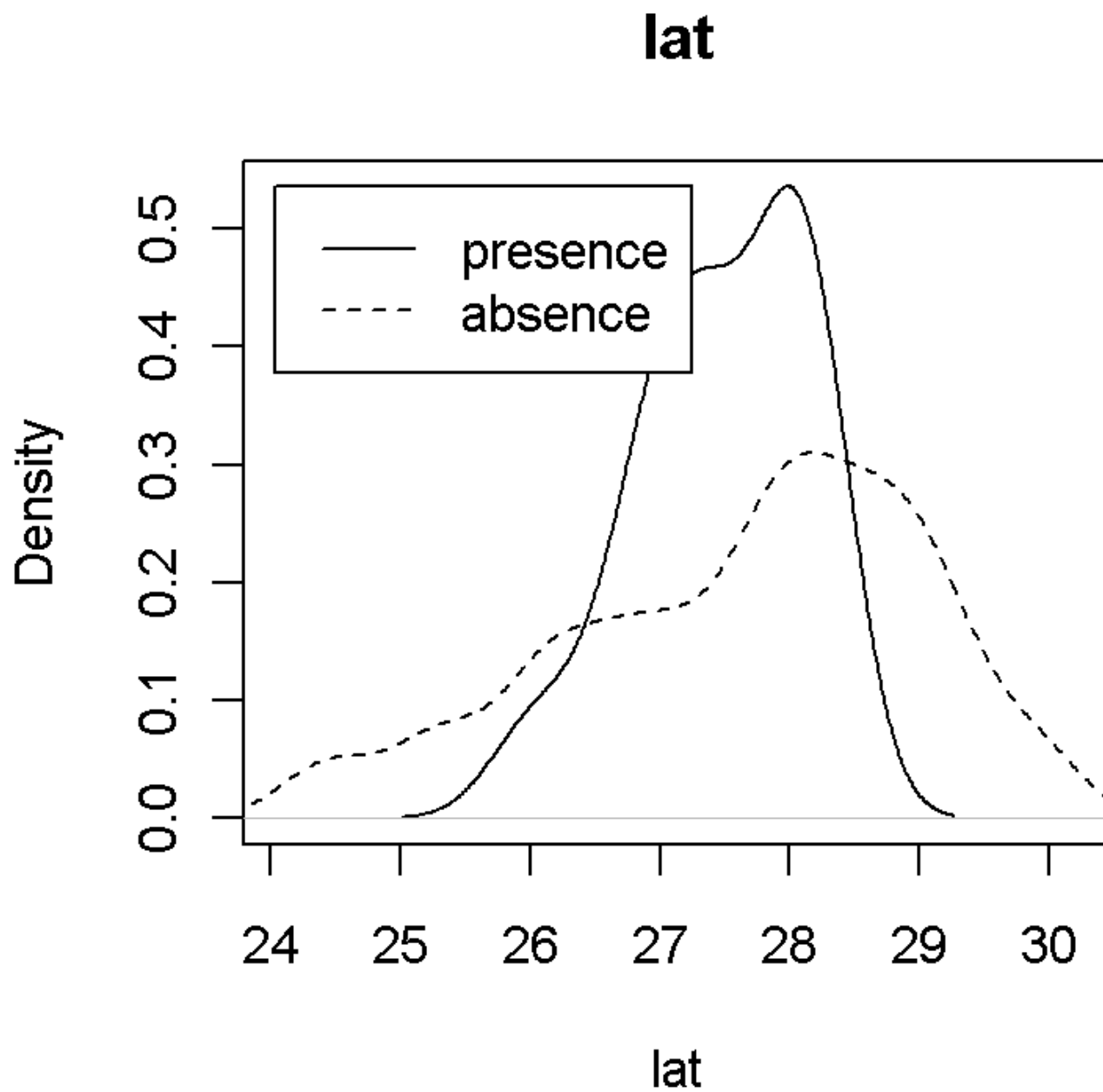


Figure 329: Density histogram of latitude (degrees) for 'Killer whales' guild during 'summer' season in 'gomex2' region.

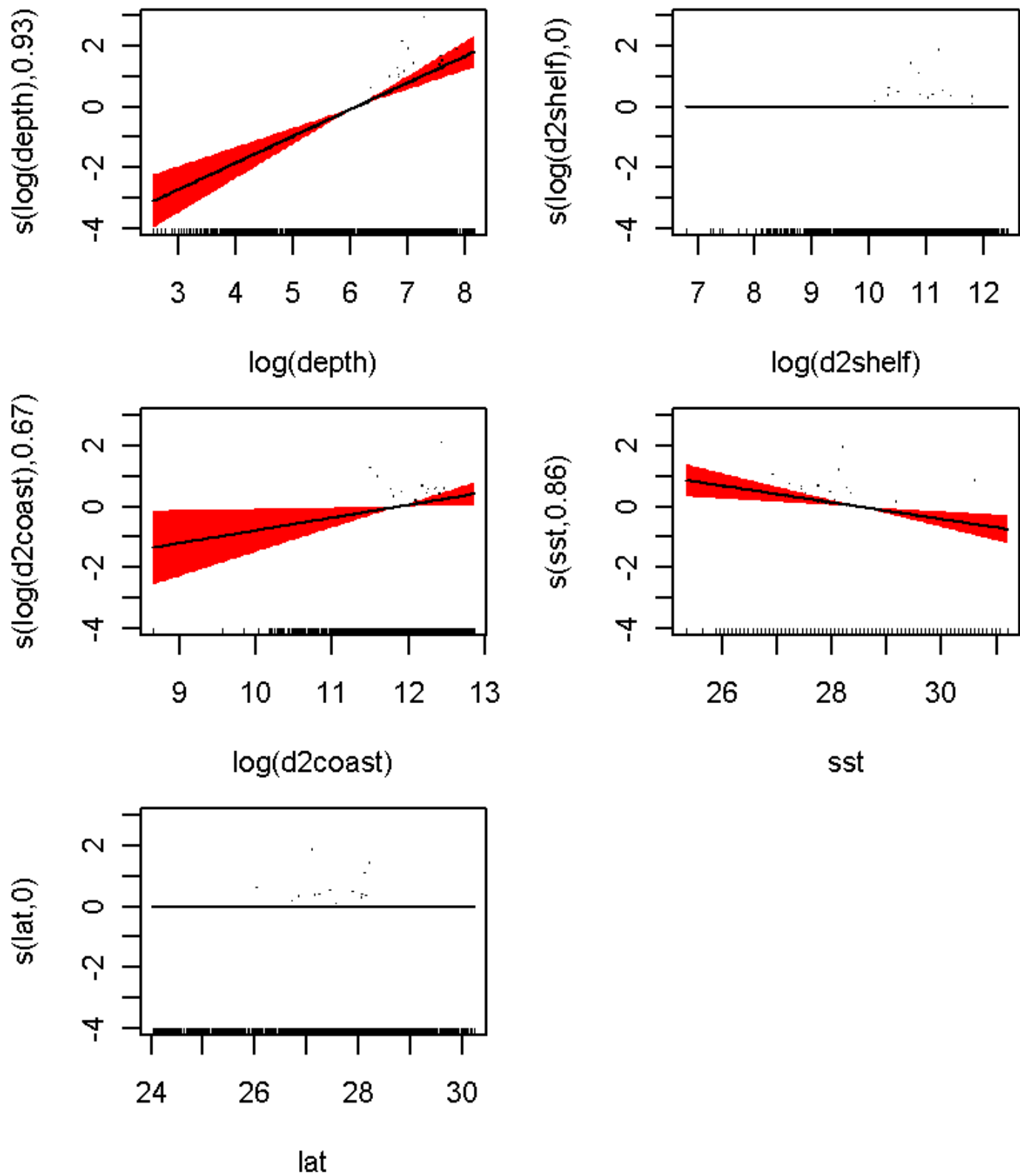


Figure 330: Terms plot of predictors to GAM model fit for 'Killer whales' guild during 'summer' season in 'gomex2' region.

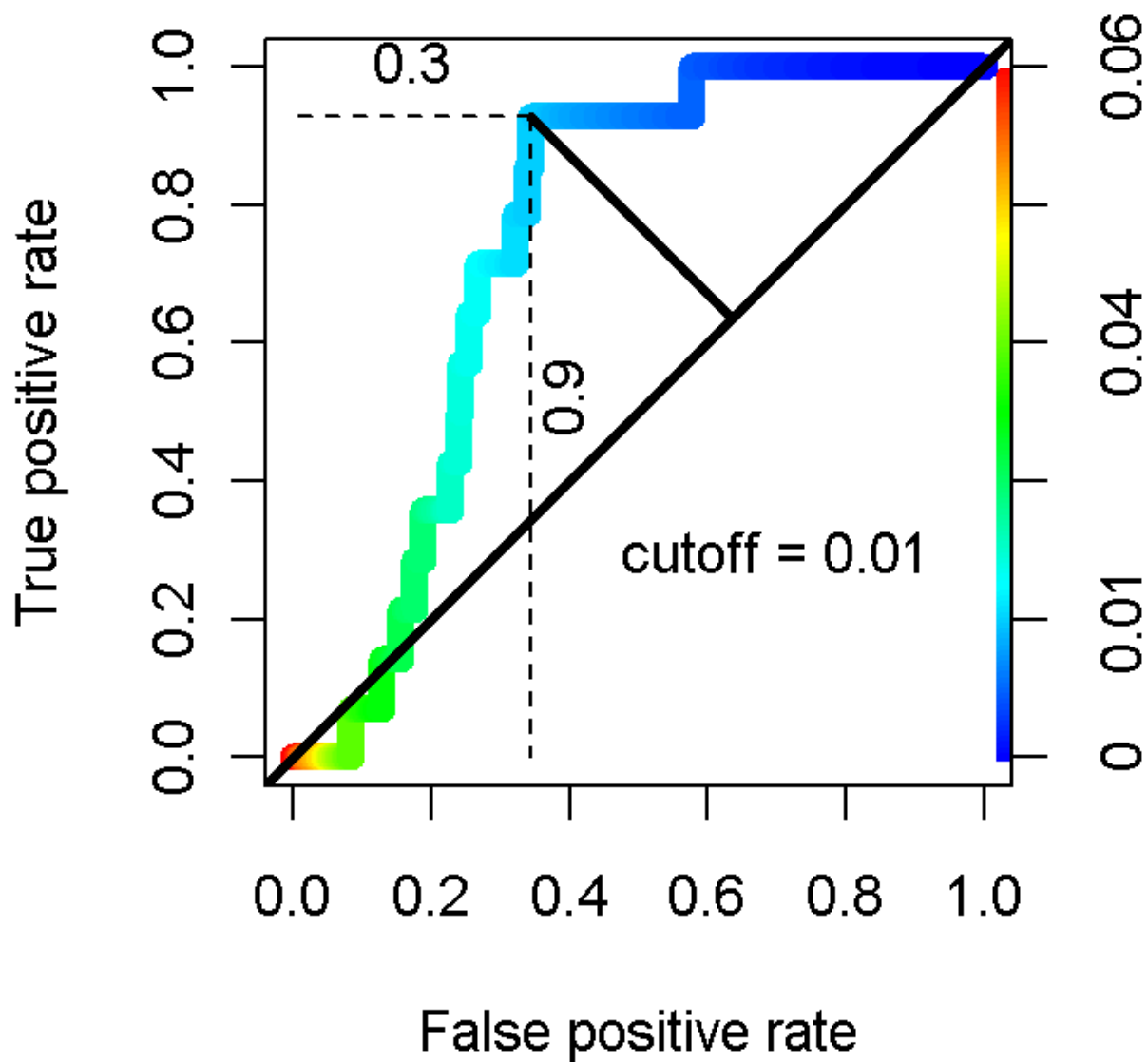


Figure 331: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Killer whales' guild during 'summer' season in 'gomex2' region.

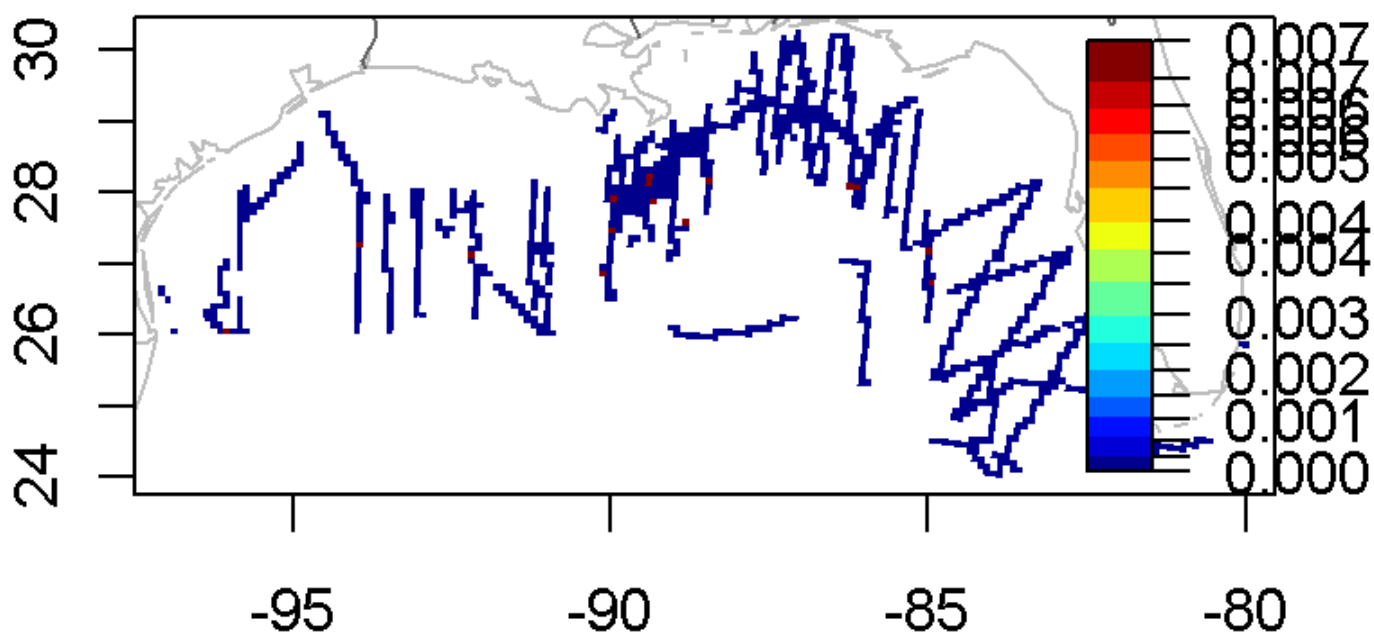


Figure 332: Map of presence and absence by cell summed through time for 'Killer whales' guild during 'summer' season in 'gomex2' region.

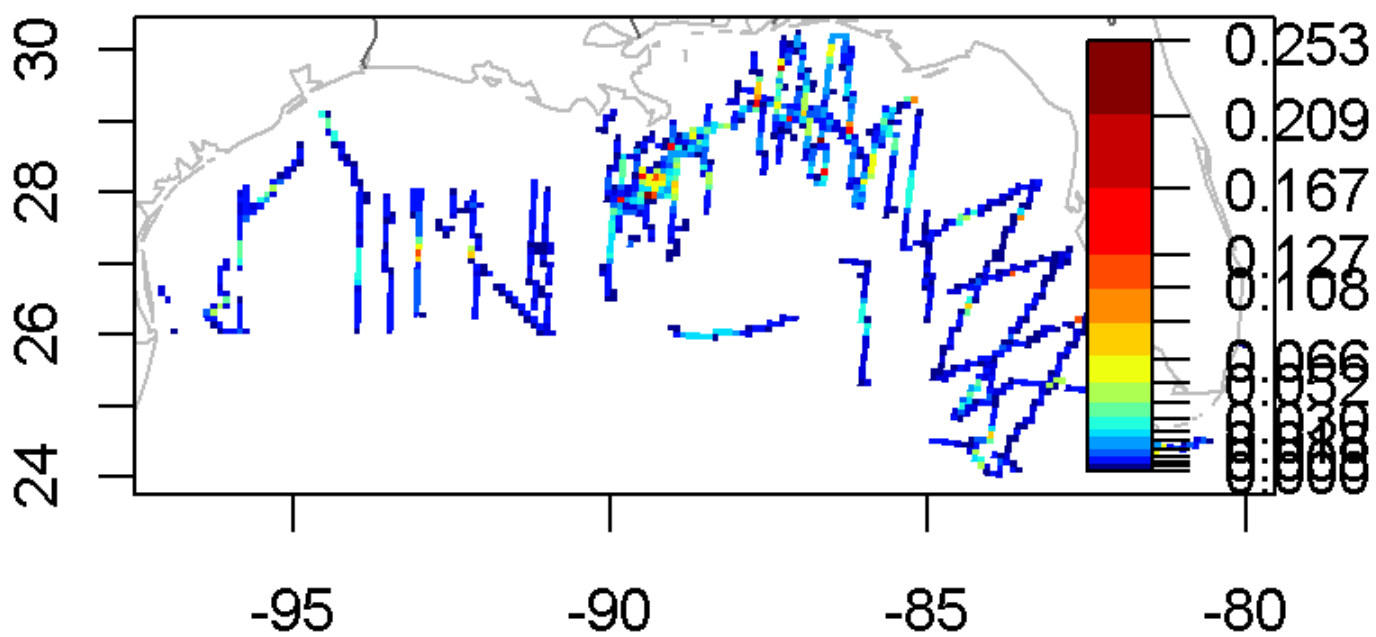


Figure 333: Map of effort(hours/km²) by cell summed through time for 'Killer whales' guild during 'summer' season in 'gomex2' region.

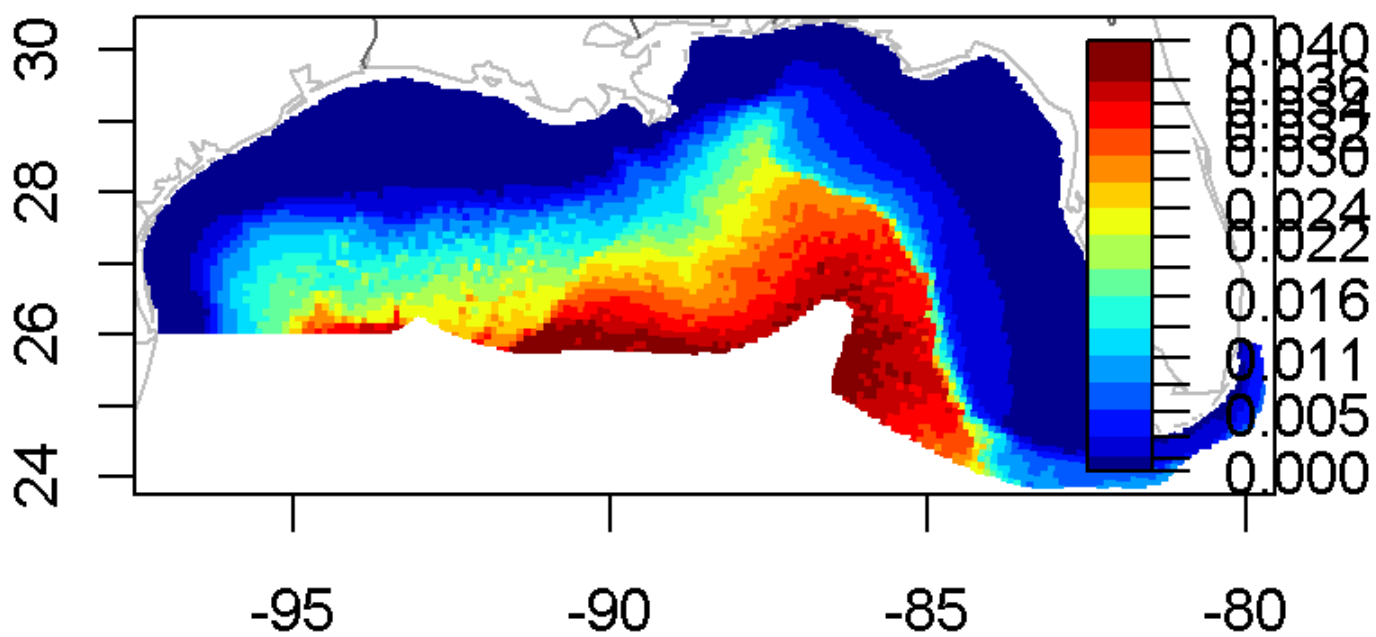


Figure 334: Map of mean predicted habitat for 'Killer whales' guild during 'summer' season in 'gomex2' region.



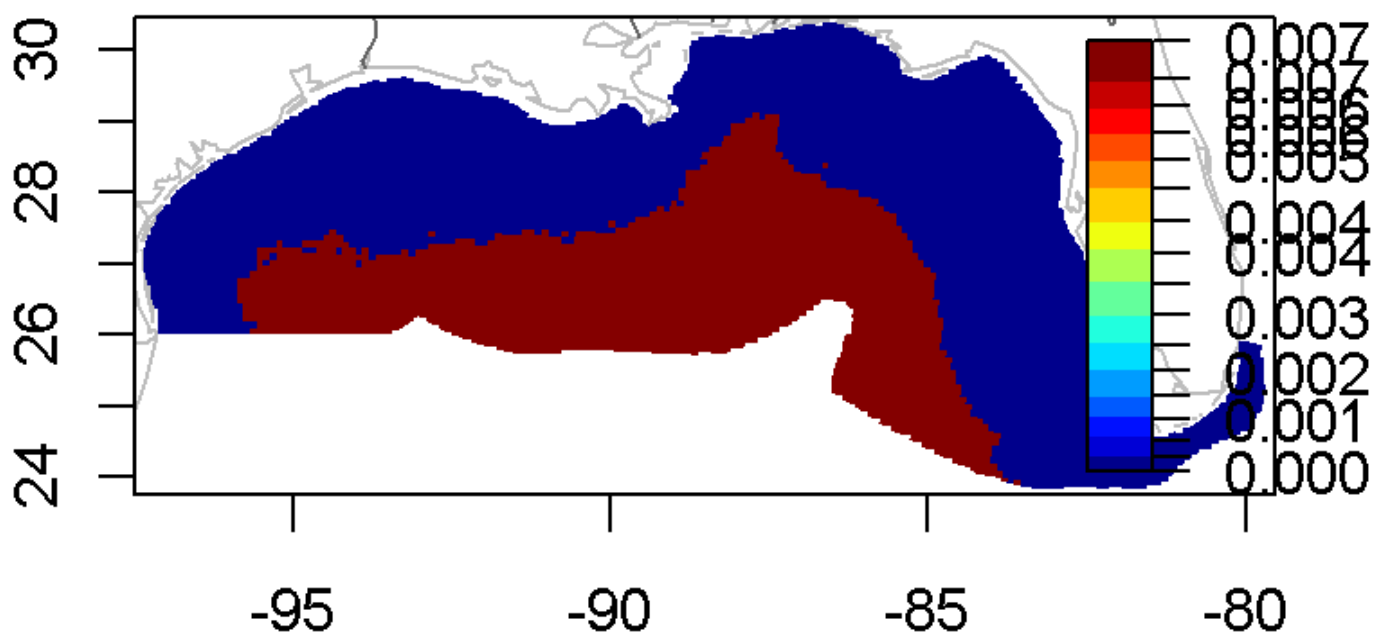


Figure 336: Map of binary habitat (cutoff determined by ROC) for 'Killer whales' guild during 'summer' season in 'gomex2' region.

6.4 winter

7 Kogia

Guildid:ko3

Table 31: Taxonomic members of the "Kogia" guild.

	Scientic Name	Common Name	Taxonomic #
1	Kogia	pygmy sperm whales	180490
2	Kogia breviceps	pygmy sperm whale	180491
3	Kogia sima	dwarf sperm whale	180492

7.1 fall

7.2 spring

7.2.1 gomex2

Modelrun identifier: duke_06_ko3_spring_gomex2

Date generated: 2008-10-21 11:50:40

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 32: Summary for duke(6) GAM model: for 'Kogia' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	91
Number.absences	4726
GAM.converged	TRUE
R.squared	0.0445514
Deviance.explained	0.0695283
ROC.optimum	0.18884
Maximum.fit	0.0298041
Maximum.prediction	0.108084

Model text summary...

```
duke_06_ko3_spring_gomex2 run on Tue Oct 21 11:49:21 2008
provider:duke, version:06, guild:Kogia (ko3), season:'spring', region:gomex2

max.fit:0.188840, max.prediction:0.108084, ROC.optimum:0.029804

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -4.45528    0.07131  -62.48   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.95340  2.4534 66.106 < 2e-16 ***
s(log(d2shelf)) 1.00252  1.5025 94.191 < 2e-16 ***
s(log(d2coast)) 0.90377  1.4038 13.438 3.14e-05 ***
s(sst)         1.93036  2.4304 15.276 1.93e-08 ***
s(lat)         0.00242  0.5024  0.009   0.76
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0446   Deviance explained = 6.95%
GCV score = 0.0015899   Scale est. = 0.0015859   n = 4817

summary(dat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:4817  Min.   : 14  Min.   : 11  Min.   : 272  Min.   : 21187  Min.   :19.73  Min.   :24.05
              1st Qu.:2144 1st Qu.: 511 1st Qu.: 24696 1st Qu.:142982 1st Qu.:24.23 1st Qu.:26.38
              Median :4222 Median :1292 Median : 63128 Median :211670 Median :25.35 Median :27.38
              Mean   :3977 Mean   :1537 Mean   : 82827 Mean   :213952 Mean   :25.14 Mean   :27.25
              3rd Qu.:5932 3rd Qu.:2668 3rd Qu.:131568 3rd Qu.:276022 3rd Qu.:26.17 3rd Qu.:28.13
              Max.   :8191 Max.   :3523 Max.   :257870 Max.   :404358 Max.   :28.42 Max.   :30.06

summary(newdat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :19.95  Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0 1st Qu.: 31617 1st Qu.: 85289 1st Qu.:21.83 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :23.02 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:5.215e-10	Min.	:8.491e-10	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.00000
1st Qu.	:1861	1st Qu.	:5.705e-06	1st Qu.	:4.040e-06	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.00000
Median	:4110	Median	:5.433e-03	Median	:8.293e-04	Median	:0.000e+00	Median	:9.499e-03	Median	:0.00000
Mean	:3997	Mean	:8.357e-03	Mean	:1.086e-03	Mean	:5.016e-02	Mean	:2.365e-02	Mean	:0.06745
3rd Qu.	:6015	3rd Qu.	:1.025e-02	3rd Qu.	:1.337e-03	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:0.00000
Max.	:8351	Max.	:1.081e-01	Max.	:2.635e-02	Max.	:2.000e+00	Max.	:2.695e-01	Max.	:1.00000
						NA's	:4.838e+03	NA's	:4.838e+03		

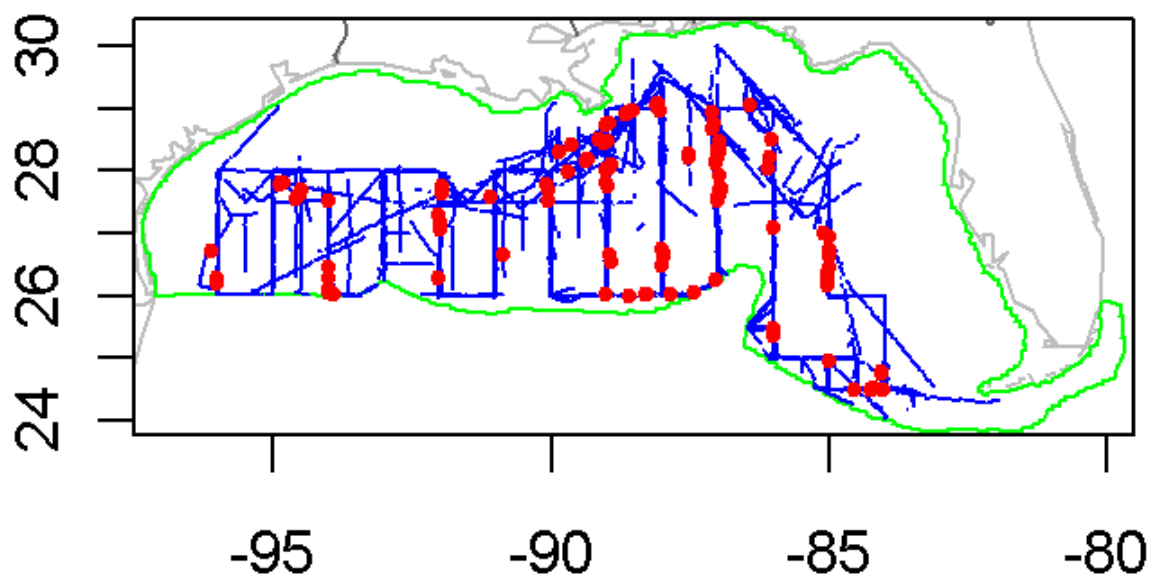


Figure 337: Map of points of observational sightings and tracks of survey effort for 'Kogia' guild during 'spring' season in 'gomex2' region.

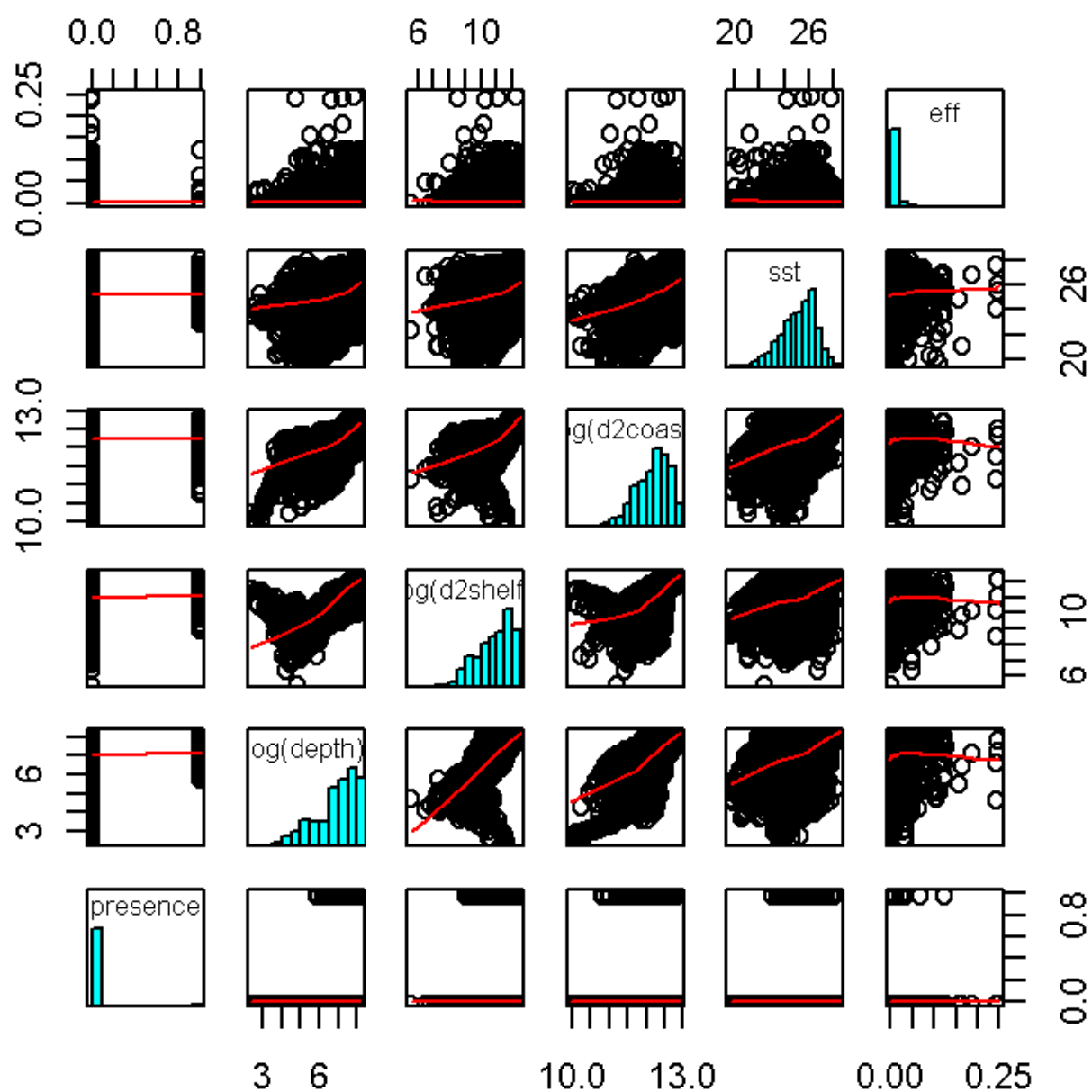


Figure 338: Pairs plot of input variables for 'Kogia' guild during 'spring' season in 'gomex2' region.

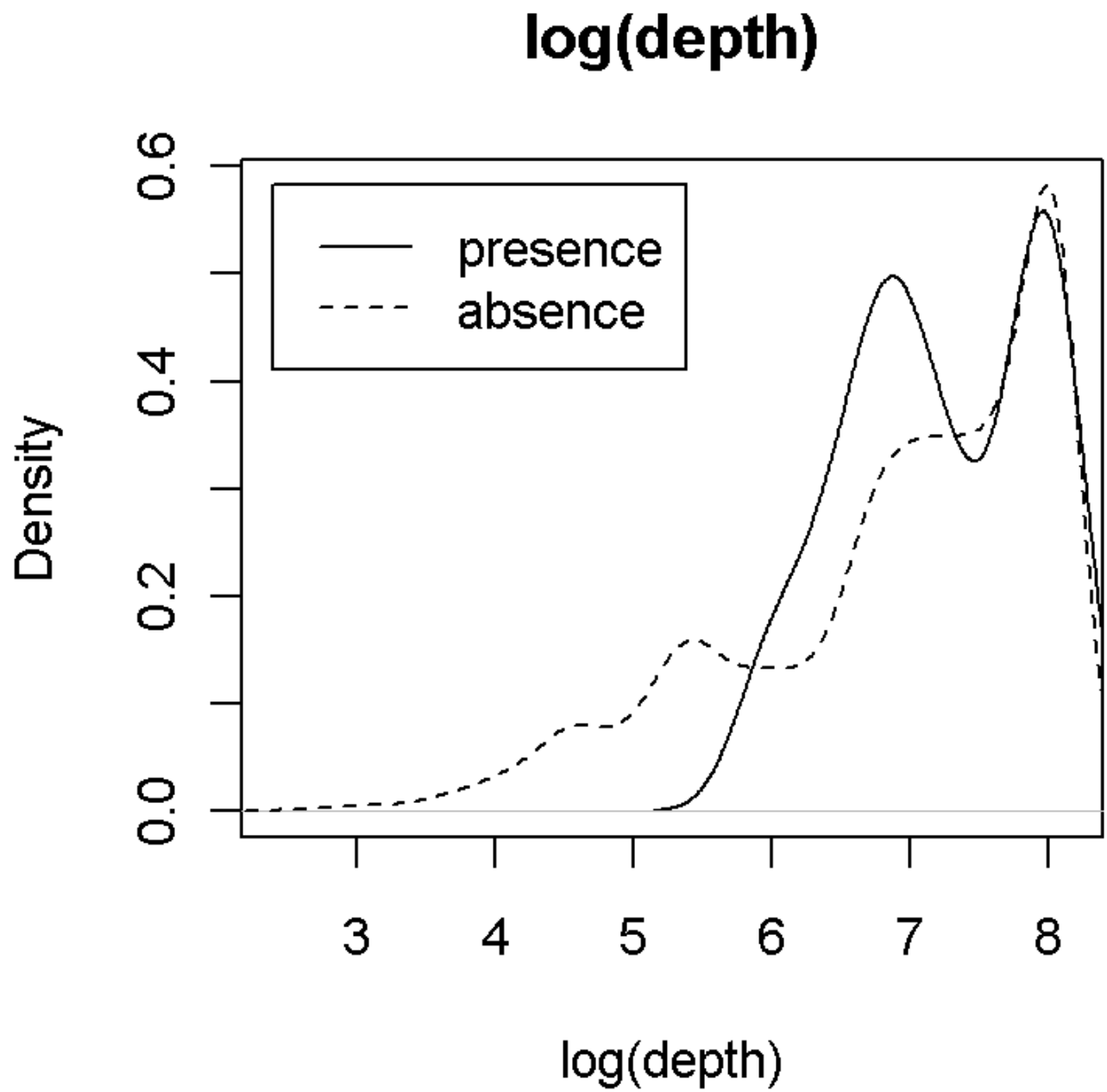


Figure 339: Density histogram of depth log(meters) for 'Kogia' guild during 'spring' season in 'gomex2' region.

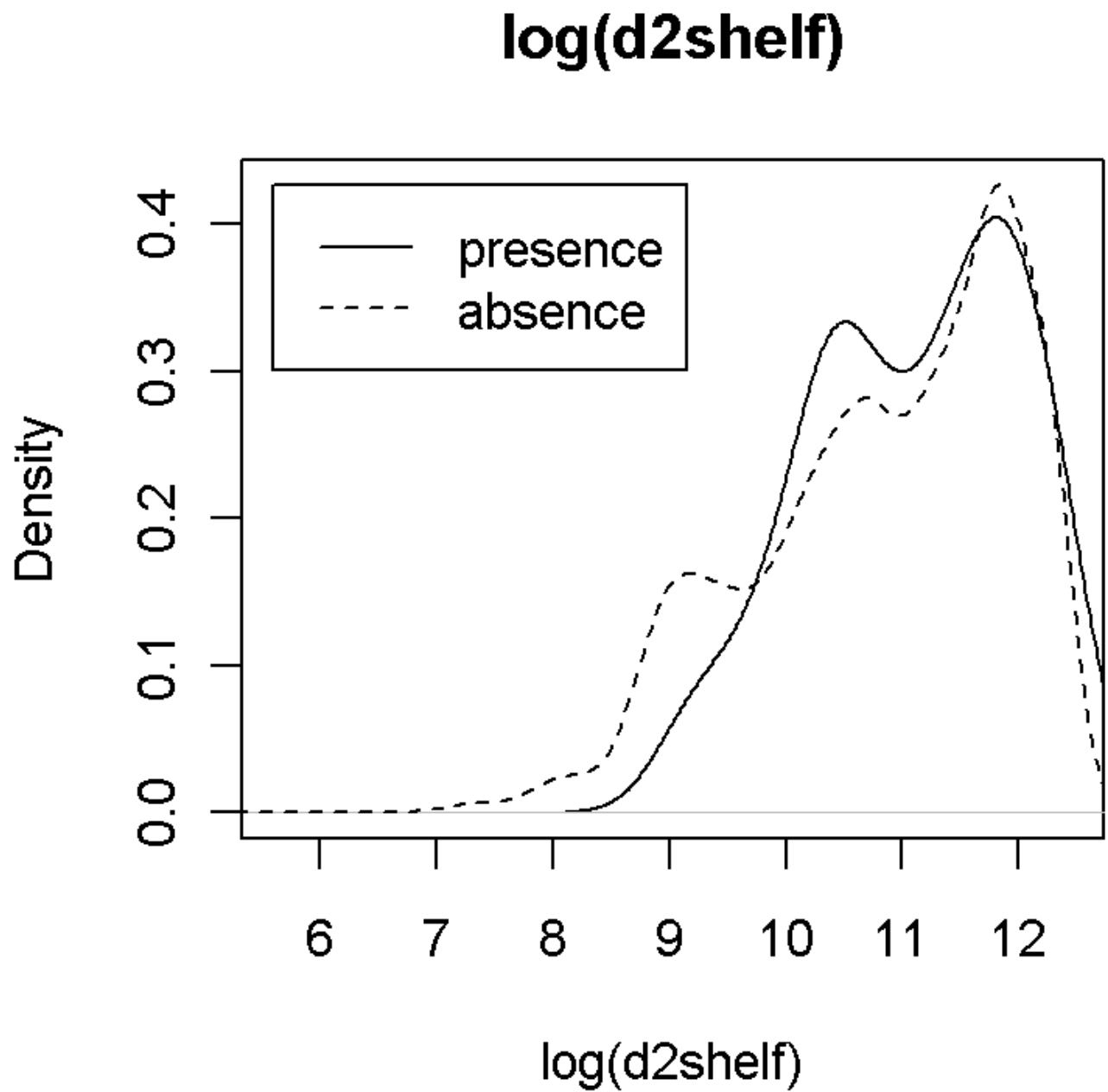


Figure 340: Density histogram of distance to shelf log(meters) for 'Kogia' guild during 'spring' season in 'gomex2' region.

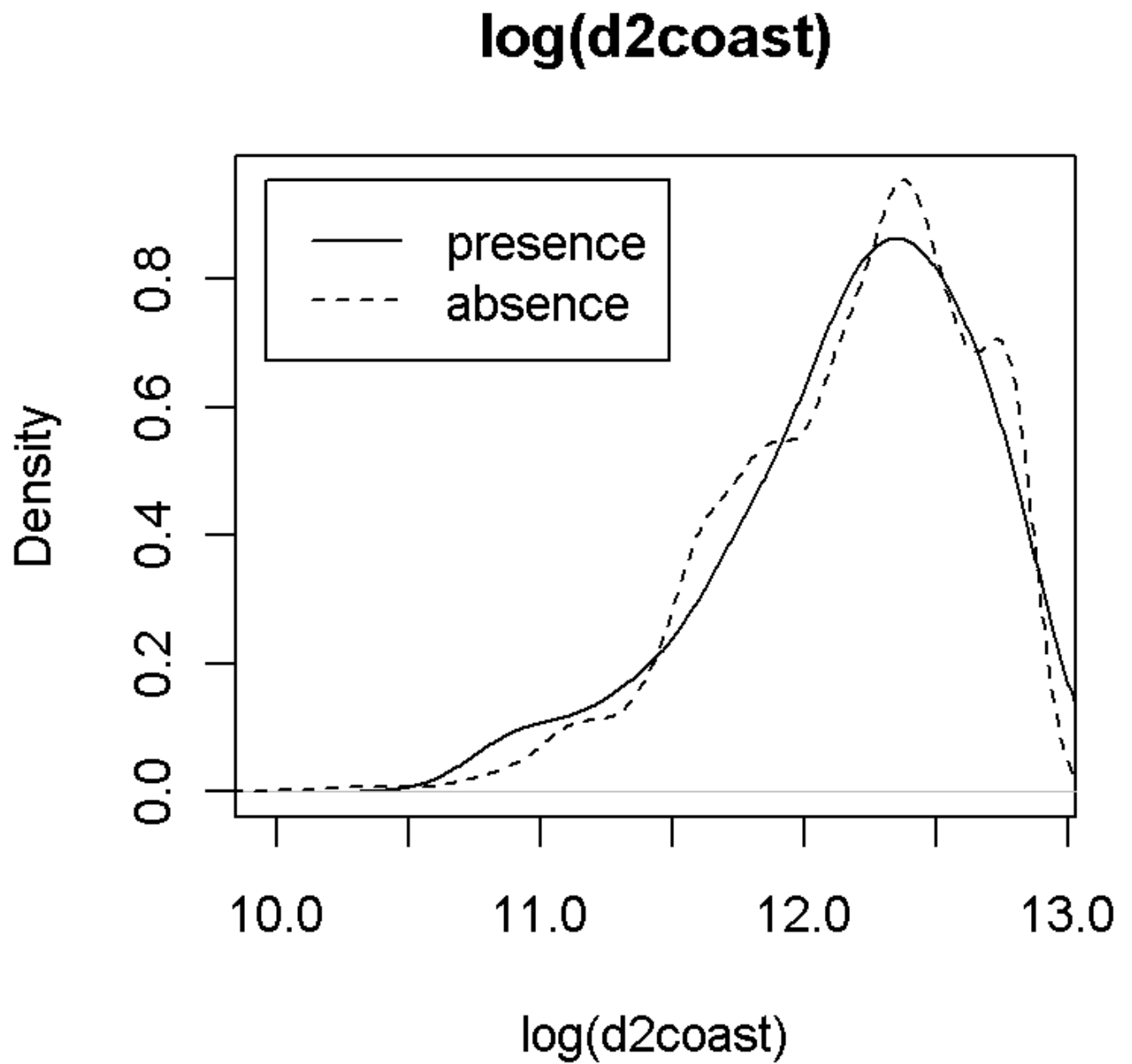


Figure 341: Density histogram of distance to coast log(meters) for 'Kogia' guild during 'spring' season in 'gomex2' region.

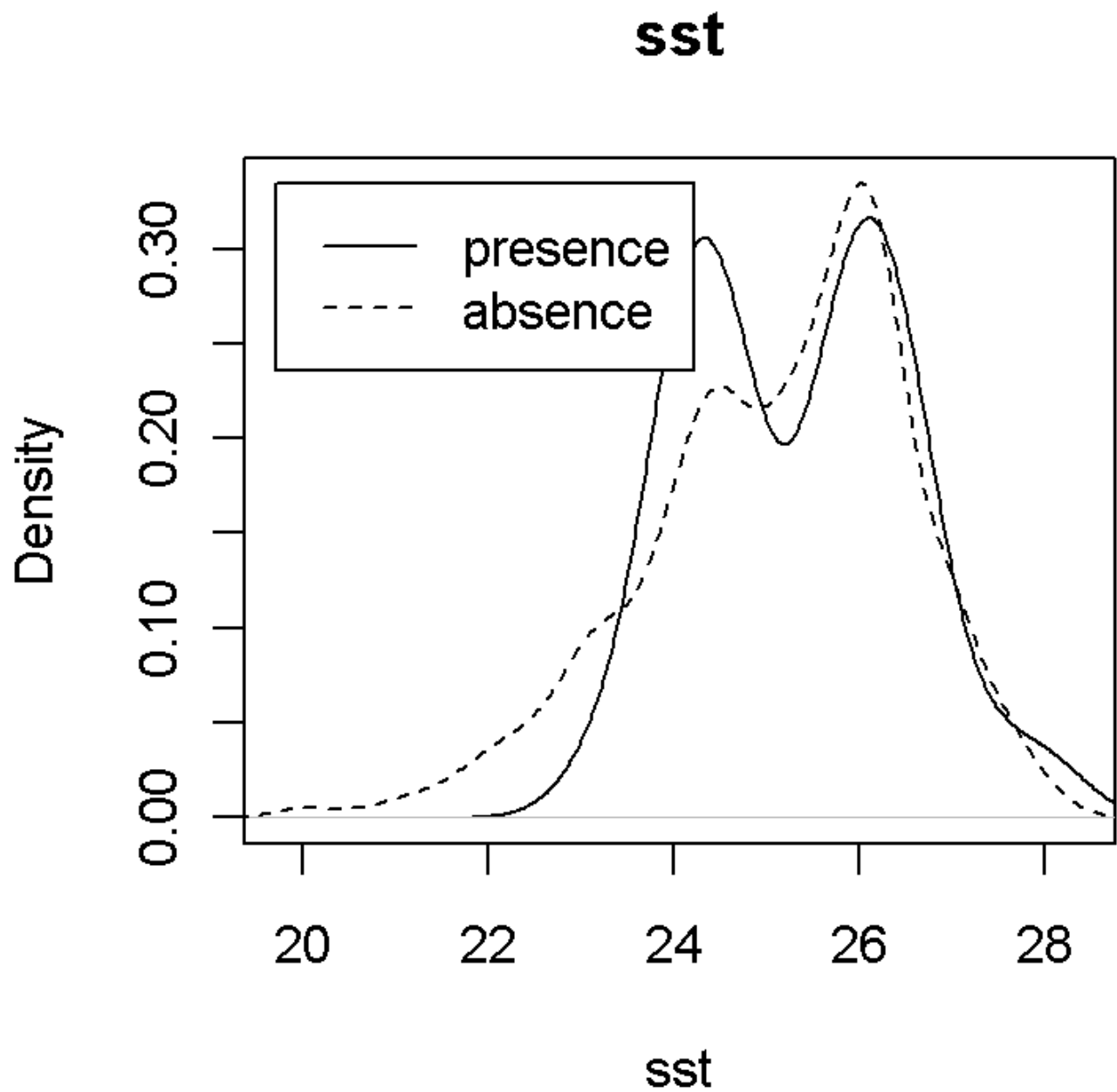


Figure 342: Density histogram of sea-surface temperature (degrees C) for 'Kogia' guild during 'spring' season in 'gomex2' region.

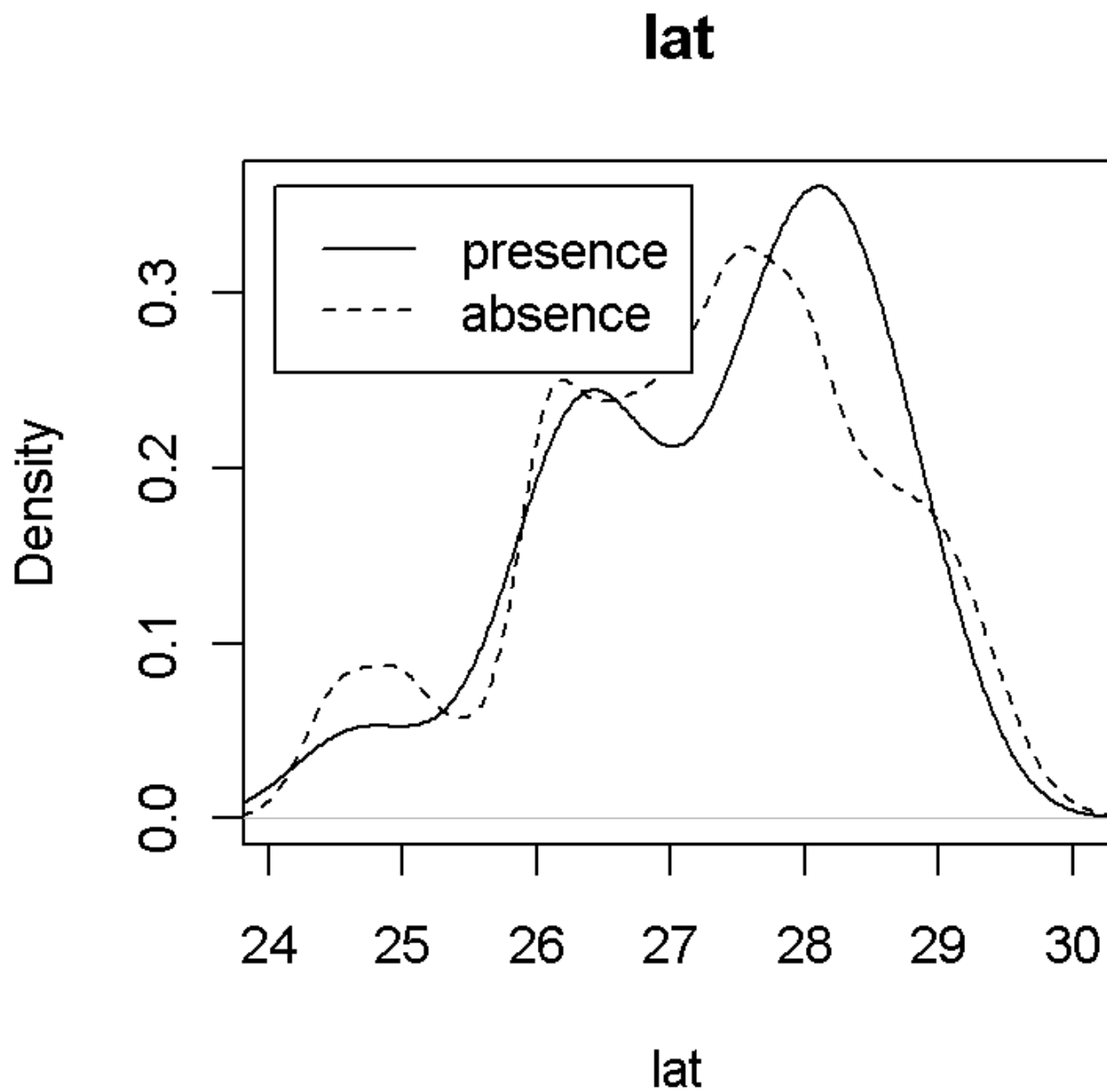


Figure 343: Density histogram of latitude (degrees) for 'Kogia' guild during 'spring' season in 'gomex2' region.

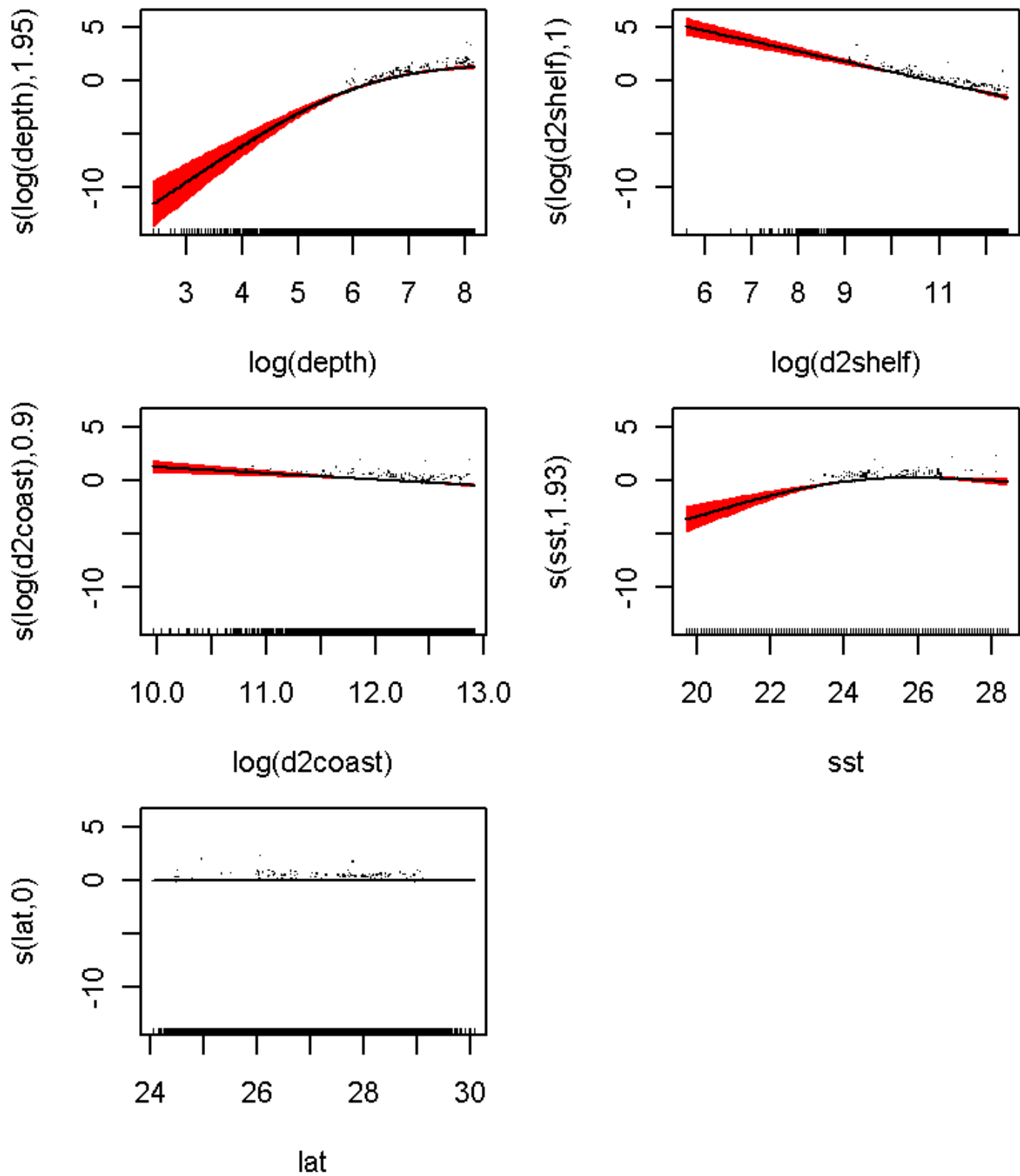


Figure 344: Terms plot of predictors to GAM model fit for 'Kogia' guild during 'spring' season in 'gomex2' region.

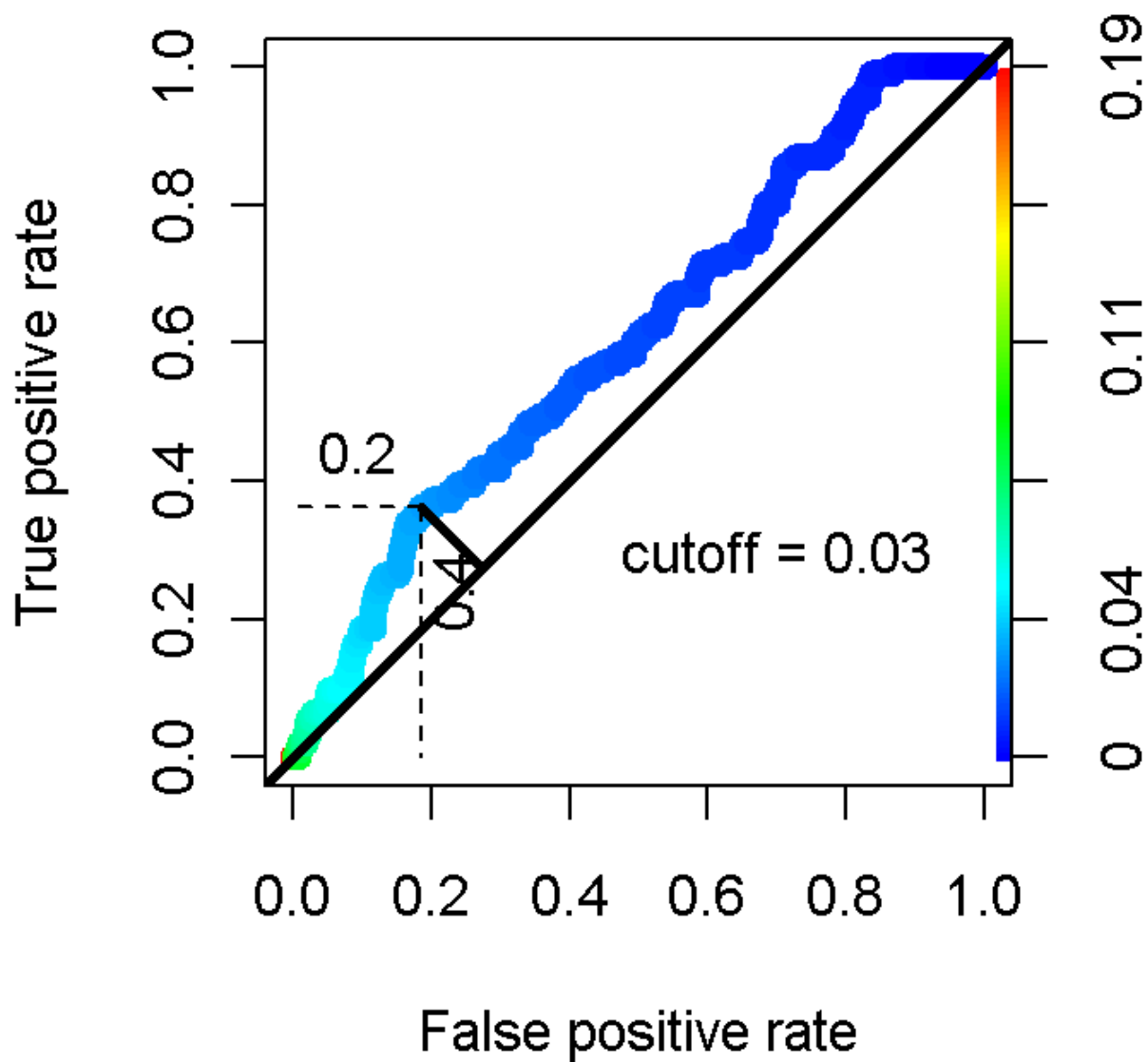


Figure 345: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Kogia' guild during 'spring' season in 'gomex2' region.

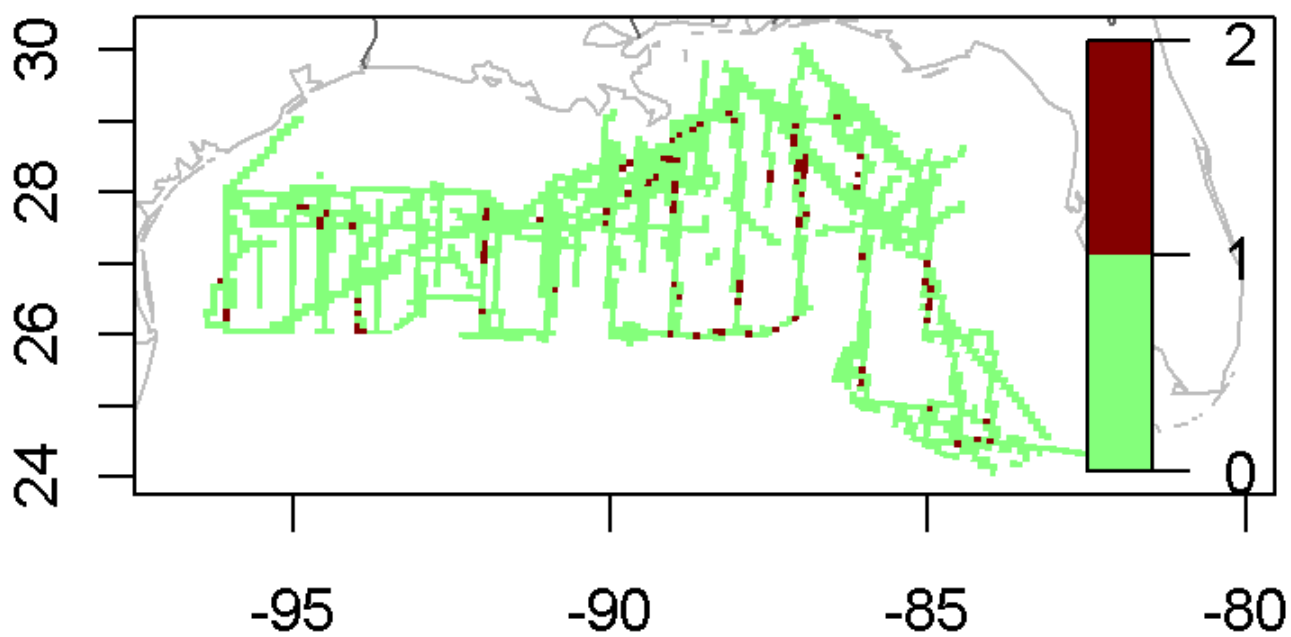


Figure 346: Map of presence and absence by cell summed through time for 'Kogia' guild during 'spring' season in 'gomex2' region.

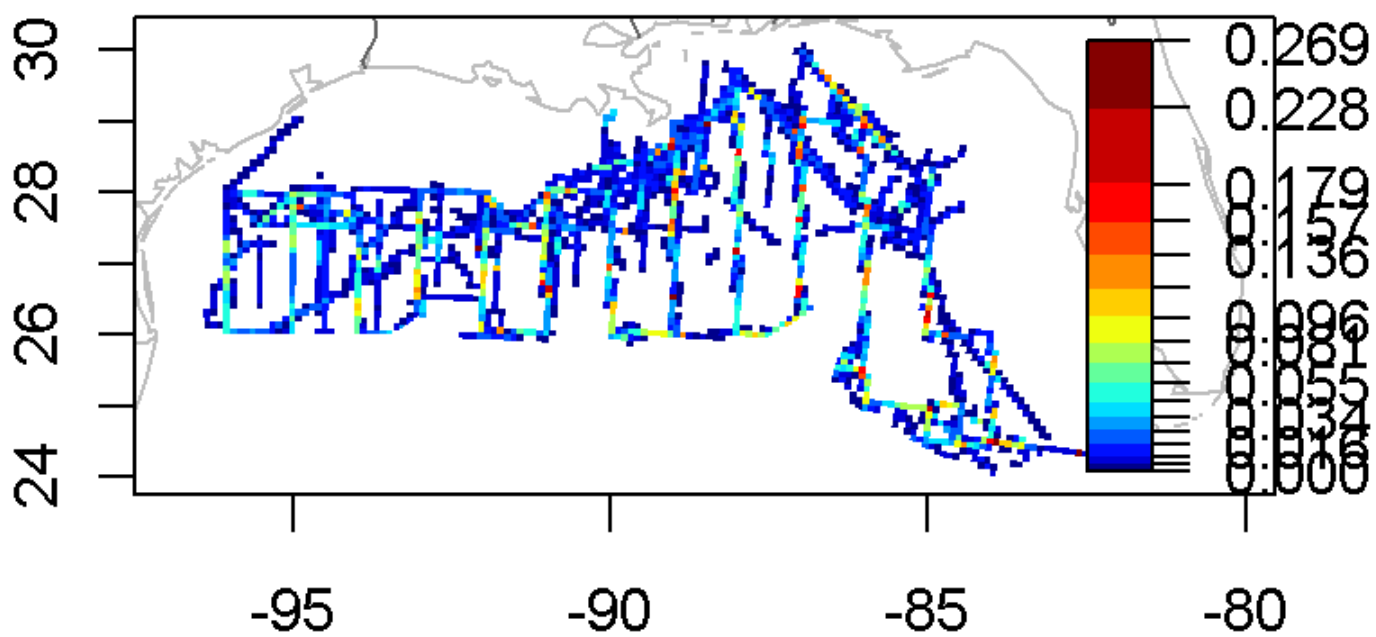


Figure 347: Map of effort(hours/km²) by cell summed through time for 'Kogia' guild during 'spring' season in 'gomex2' region.

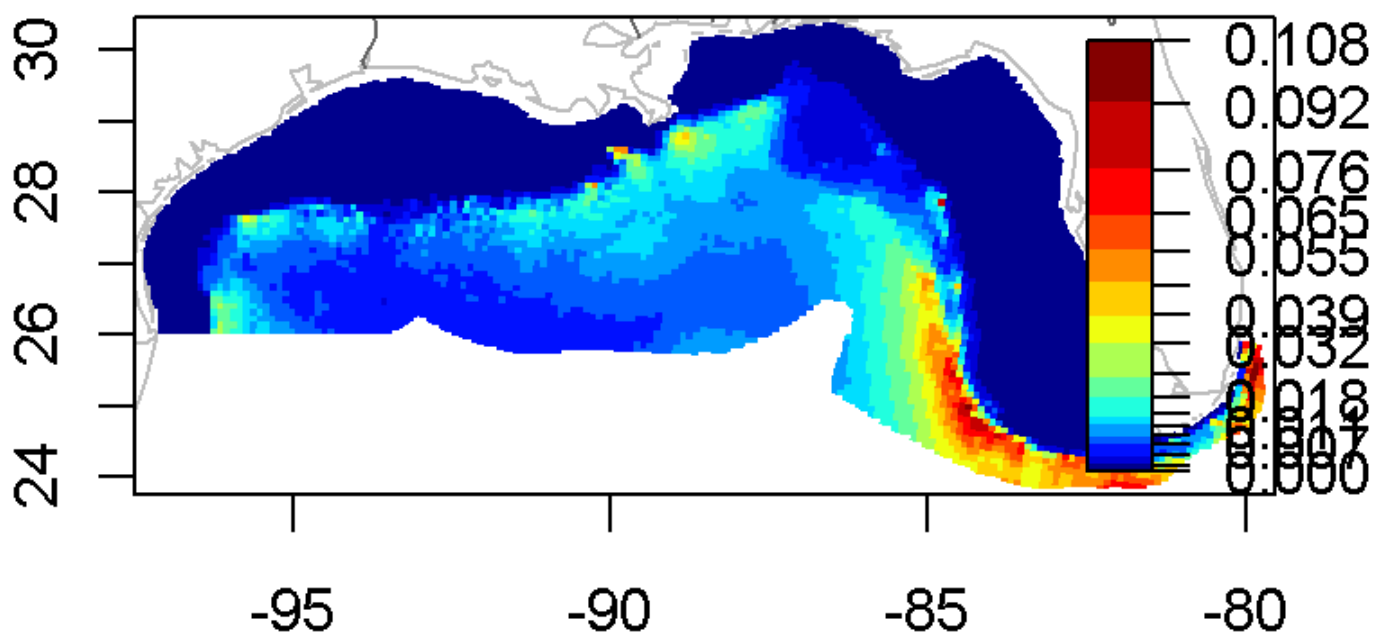


Figure 348: Map of mean predicted habitat for 'Kogia' guild during 'spring' season in 'gomex2' region.

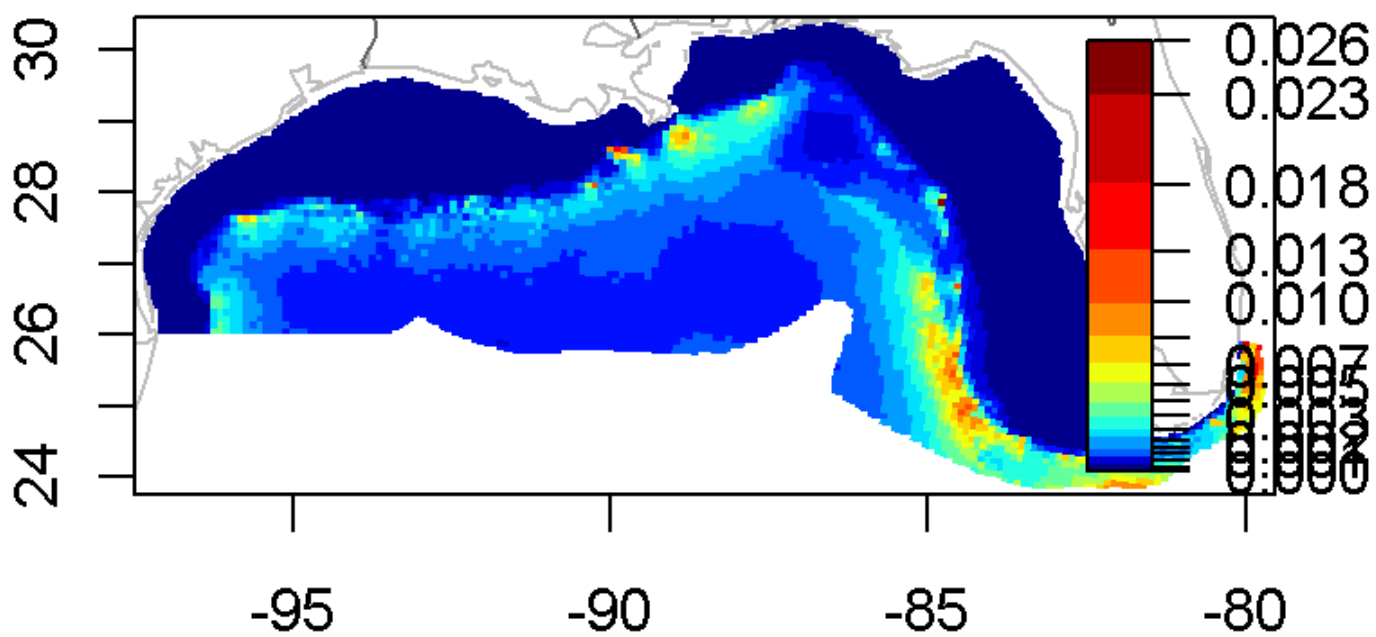


Figure 349: Map of standard error of habitat for 'Kogia' guild during 'spring' season in 'gomex2' region.

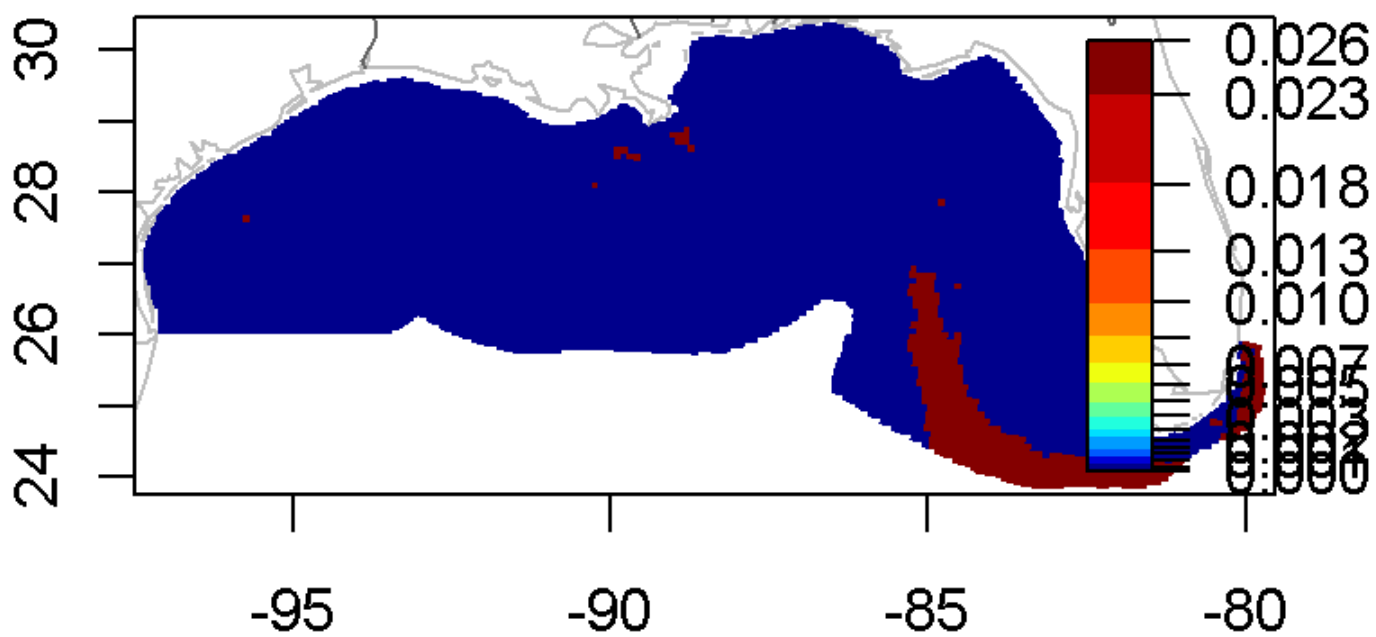


Figure 350: Map of binary habitat (cutoff determined by ROC) for 'Kogia' guild during 'spring' season in 'gomex2' region.

7.3 summer

7.3.1 east2

Modelrun identifier: duke_06_ko3_summer_east2

Date generated: 2008-10-21 13:12:50

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 33: Summary for duke(6) GAM model: for 'Kogia' guild during 'summer' season in 'east2' region.

	Value
Number.presences	26
Number.absences	9052
GAM.converged	TRUE
R.squared	0.0314248
Deviance.explained	0.168964
ROC.optimum	0.928304
Maximum.fit	0.00315911
Maximum.prediction	0.833653

Model text summary...

```
duke_06_ko3_summer_east2 run on Tue Oct 21 13:07:00 2008
provider:duke, version:06, guild:Kogia (ko3), season:'summer', region:east2

max.fit:0.928304, max.prediction:0.833653, ROC.optimum:0.003159

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -8.1100      0.2646  -30.65   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  9.900e-01  1.490  131.29 <2e-16 ***
s(log(d2shelf)) 1.995e+00  2.495  147.94 <2e-16 ***
s(log(d2coast)) 9.334e-07  0.500  0.000121  0.918
s(sst)         1.981e+00  2.481   31.74 <2e-16 ***
s(lat)         3.326e-06  0.500  0.000119  0.919
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0314   Deviance explained = 16.9%
GCV score = 0.00044147   Scale est. = 0.00044093   n = 8663

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:7694   Min.    : 1635   Min.    :  5.0   Min.    :    5   Min.    : 1259   Min.    :  8.175   Min.    :25.94
se2:1384   1st Qu.:11866   1st Qu.: 48.0   1st Qu.: 20989   1st Qu.: 50865   1st Qu.: 17.025   1st Qu.:37.53
          Median :14008   Median : 111.5   Median : 52230   Median :102266   Median : 22.200   Median :40.18
          Mean  :13275   Mean  : 677.3   Mean  : 67623   Mean  :125197   Mean  : 21.378   Mean  :39.35
          3rd Qu.:15645   3rd Qu.: 420.0   3rd Qu.: 99335   3rd Qu.:174835   3rd Qu.: 25.650   3rd Qu.:42.31
          Max.   :16560   Max.   :5251.0   Max.   :324910   Max.   :445165   Max.   : 30.900   Max.   :44.74
          NA's    :      7      NA's    :      7      NA's    :408.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685   Min.    : 1633   Min.    :  4   Min.    :    5   Min.    : 1259   Min.    :11.18   Min.    :25.91
se2:4203   1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042   1st Qu.: 89304   1st Qu.:22.80   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :1.831e-08  Min.   :2.117e-08  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:3.296e-04  1st Qu.:8.263e-05  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :5.808e-03  Median :5.754e-04  Median :0.000e+00  Median :4.368e-03  Median :1.0000
Mean   :11171  Mean   :1.397e-02  Mean   :8.699e-04  Mean   :5.639e-03  Mean   :1.069e-02  Mean   :0.6033
3rd Qu.:14088  3rd Qu.:2.720e-02  3rd Qu.:1.487e-03  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :8.337e-01  Max.   :8.893e-02  Max.   :2.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

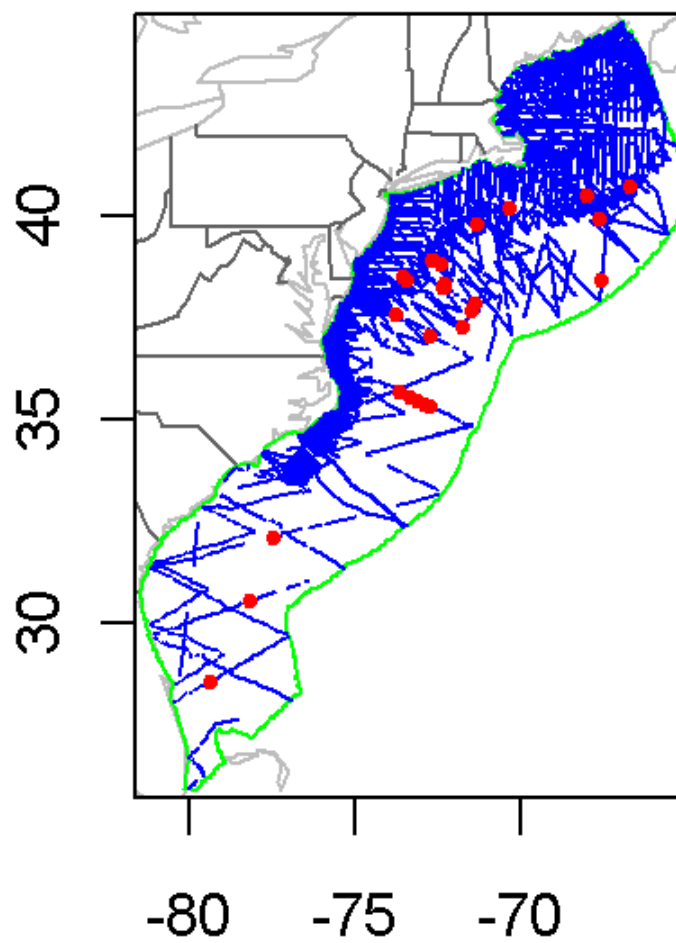


Figure 351: Map of points of observational sightings and tracks of survey effort for 'Kogia' guild during 'summer' season in 'east2' region.

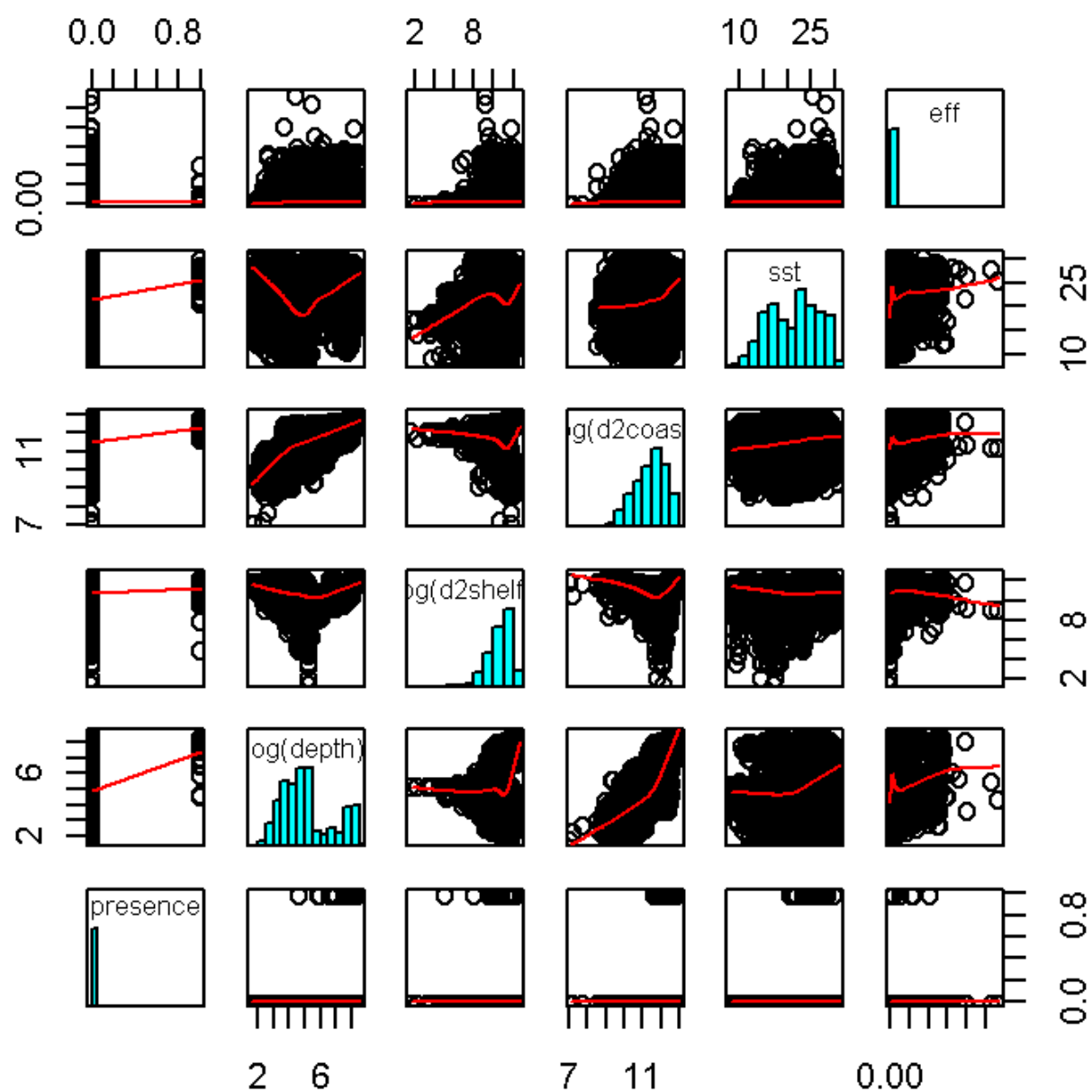


Figure 352: Pairs plot of input variables for 'Kogia' guild during 'summer' season in 'east2' region.

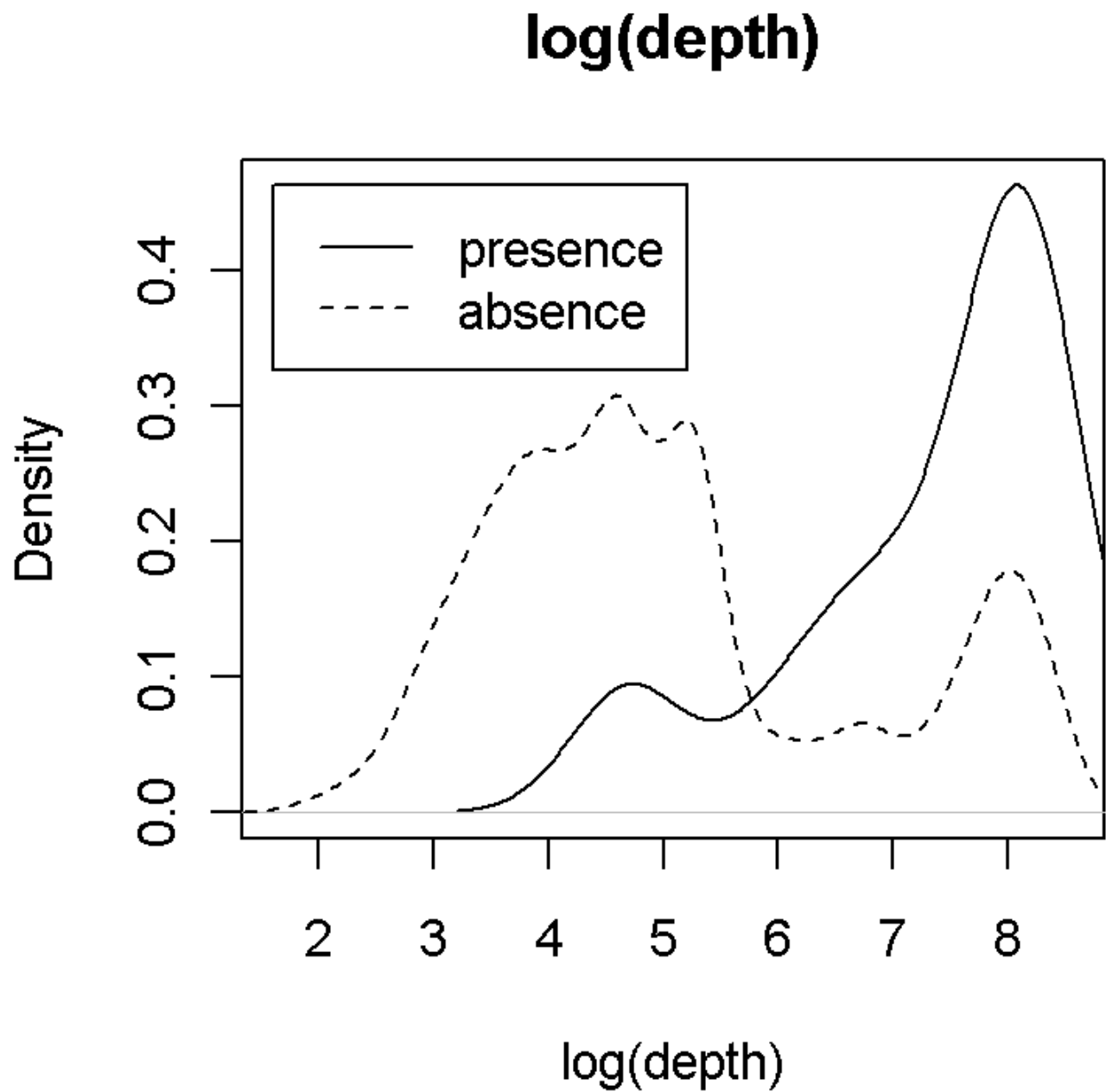


Figure 353: Density histogram of depth log(meters) for 'Kogia' guild during 'summer' season in 'east2' region.

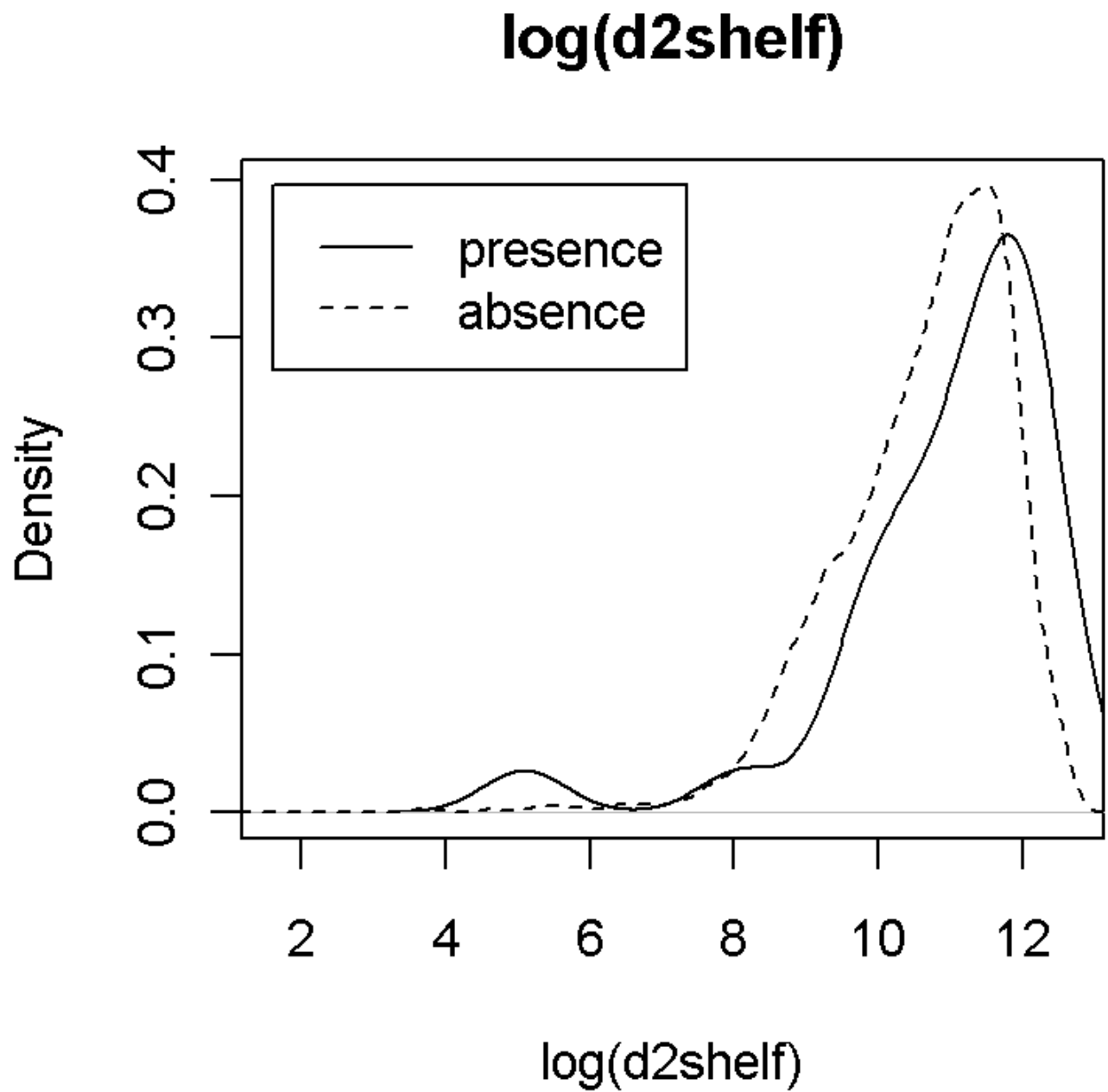


Figure 354: Density histogram of distance to shelf log(meters) for 'Kogia' guild during 'summer' season in 'east2' region.

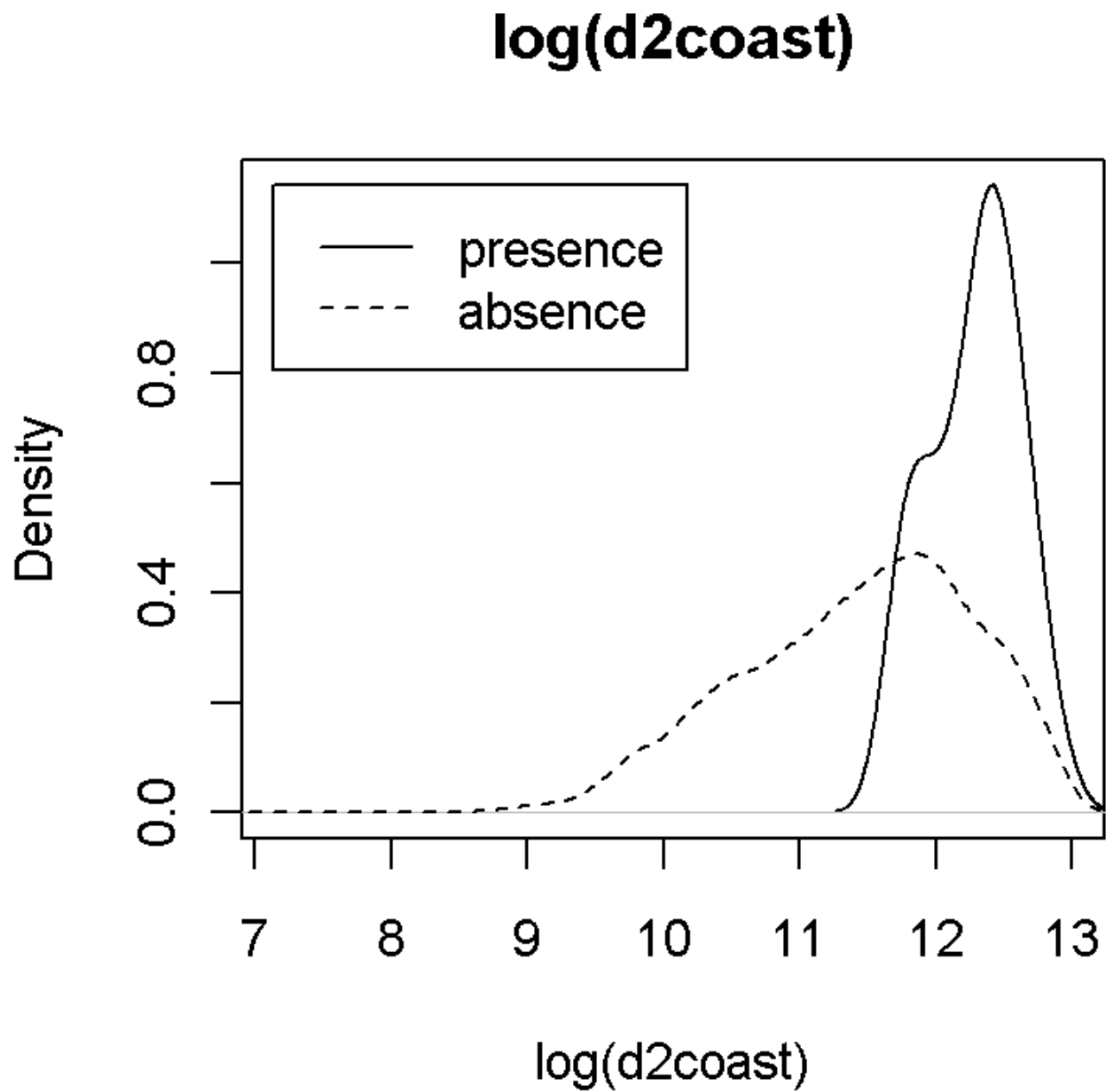


Figure 355: Density histogram of distance to coast log(meters) for 'Kogia' guild during 'summer' season in 'east2' region.

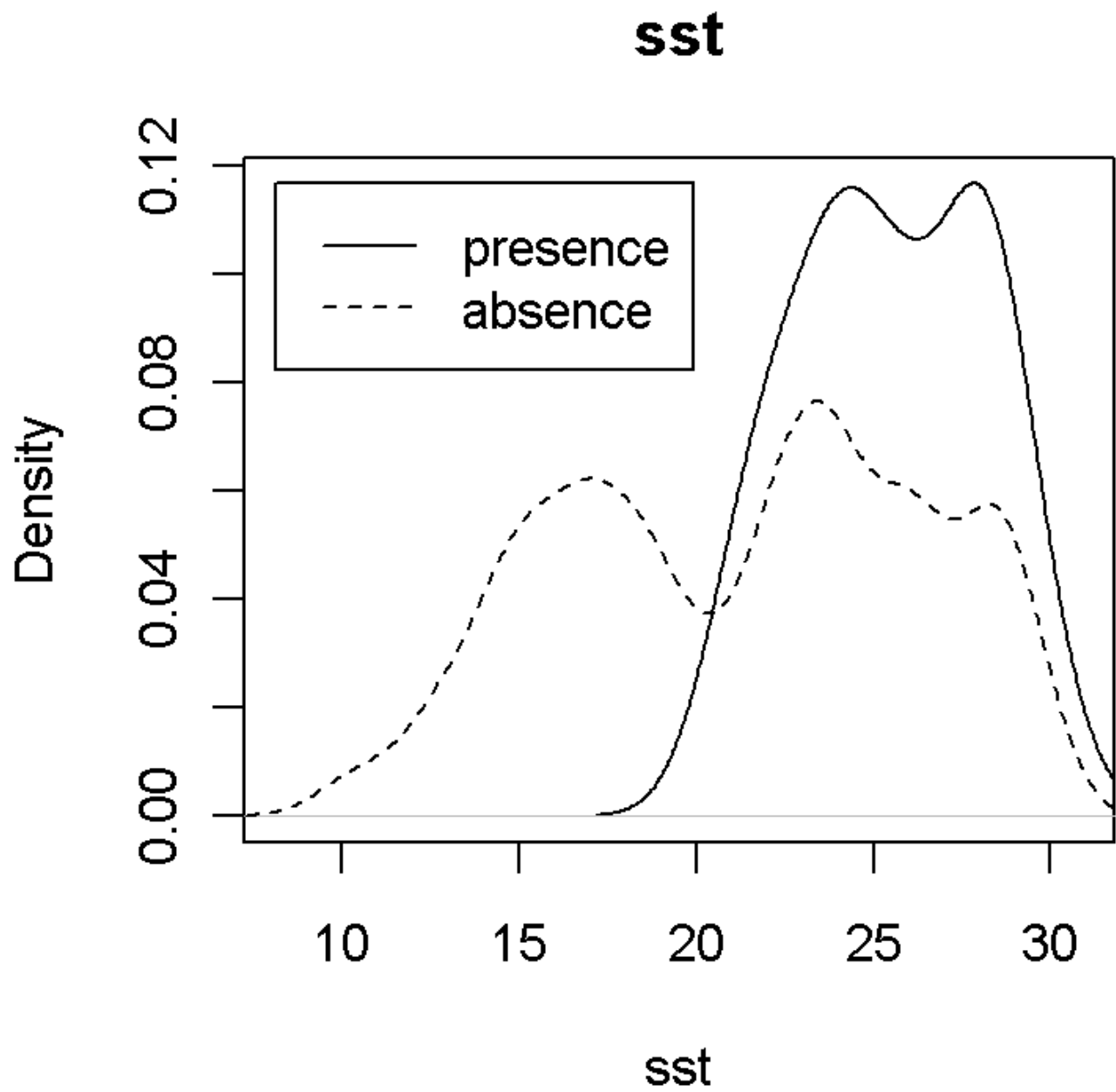


Figure 356: Density histogram of sea-surface temperature (degrees C) for 'Kogia' guild during 'summer' season in 'east2' region.

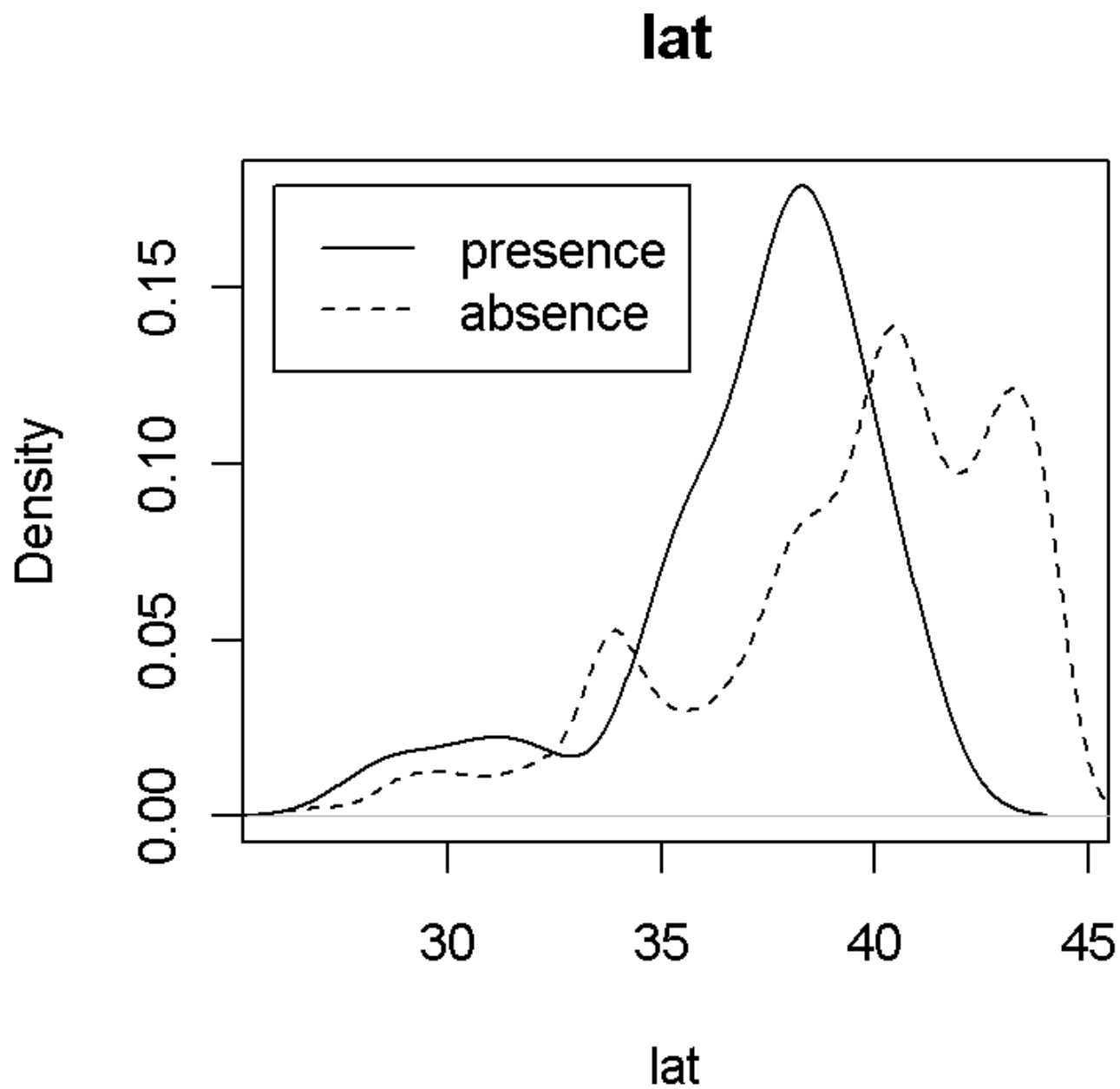


Figure 357: Density histogram of latitude (degrees) for 'Kogia' guild during 'summer' season in 'east2' region.

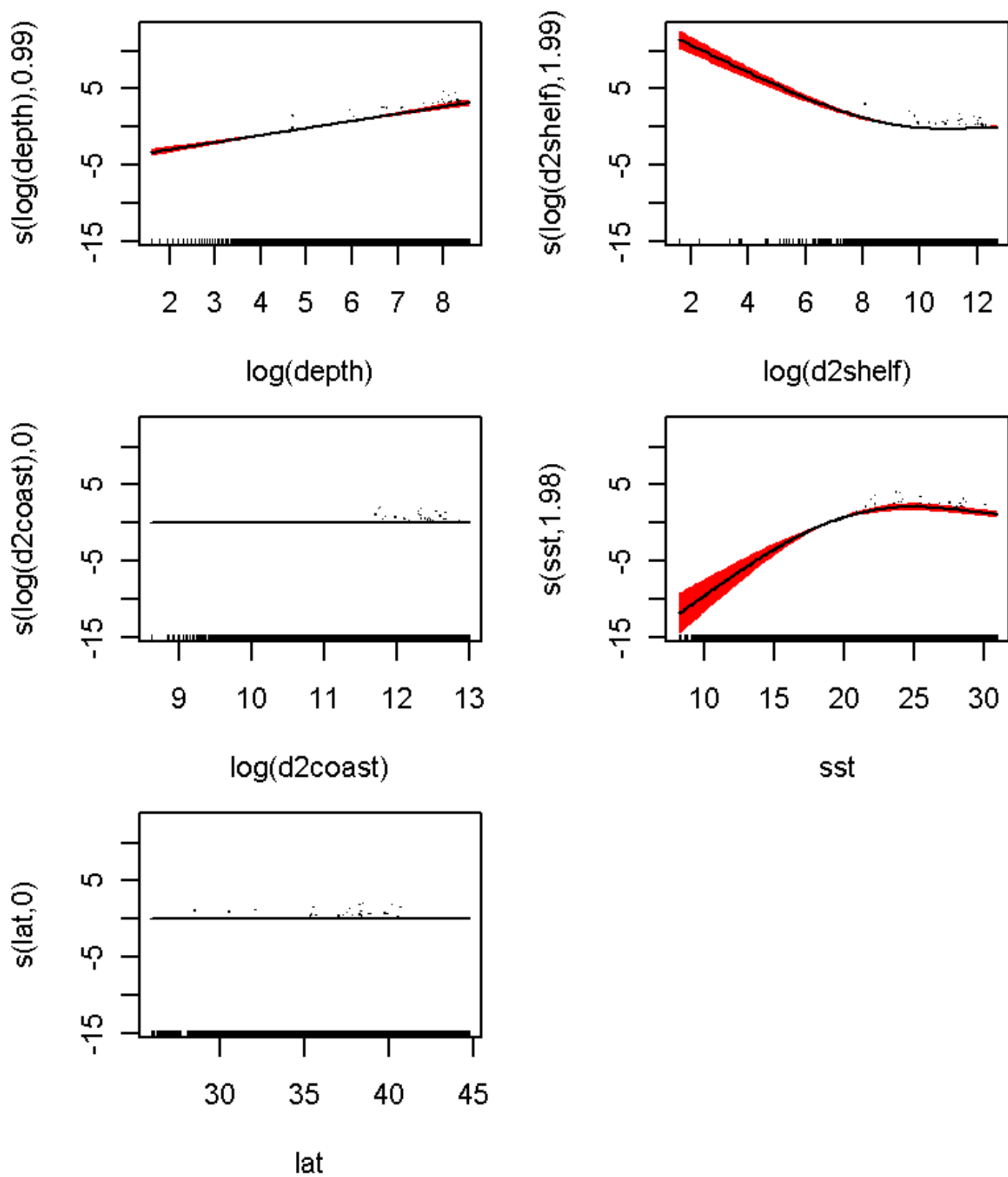


Figure 358: Terms plot of predictors to GAM model fit for 'Kogia' guild during 'summer' season in 'east2' region.

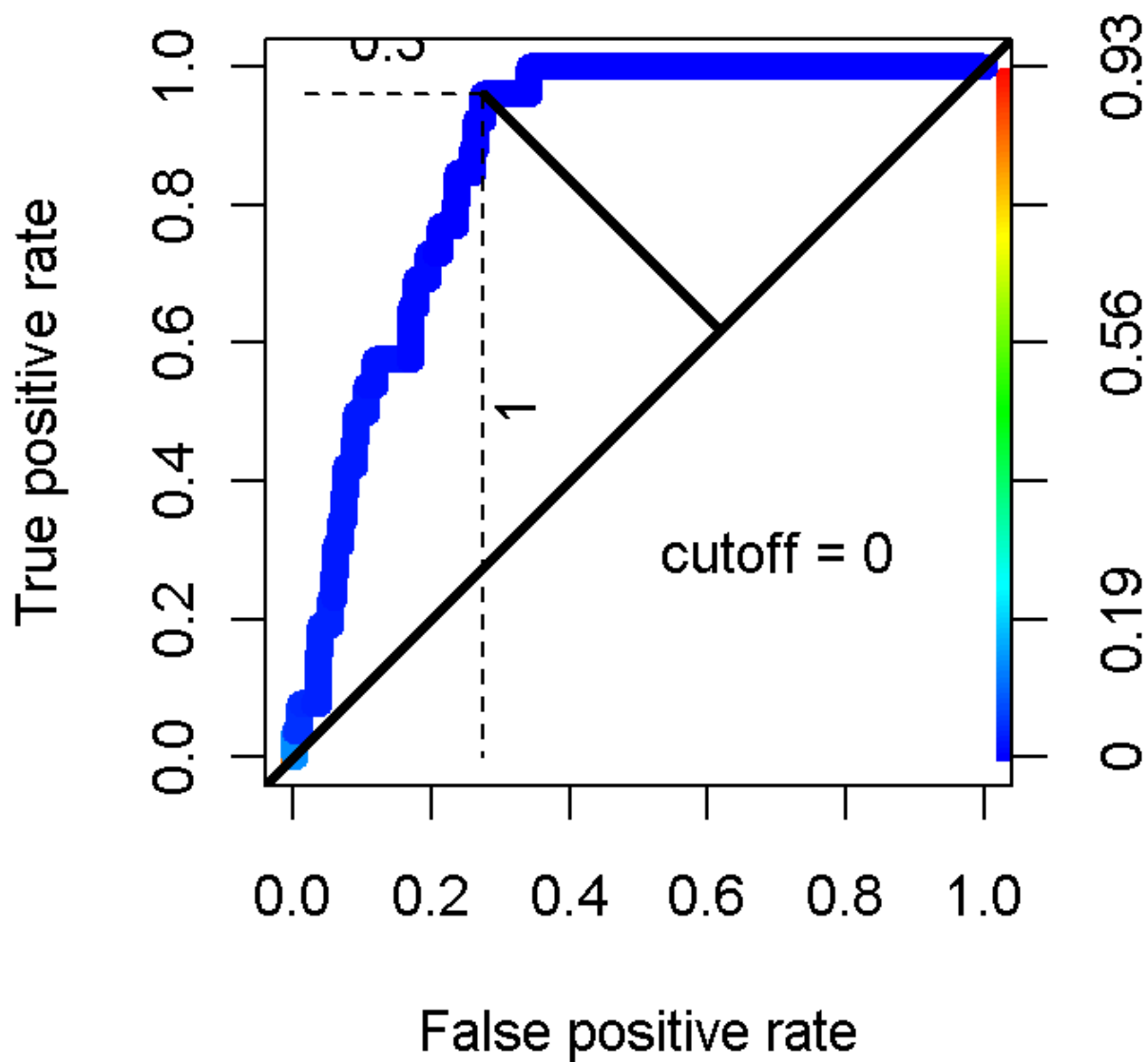


Figure 359: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Kogia' guild during 'summer' season in 'east2' region.

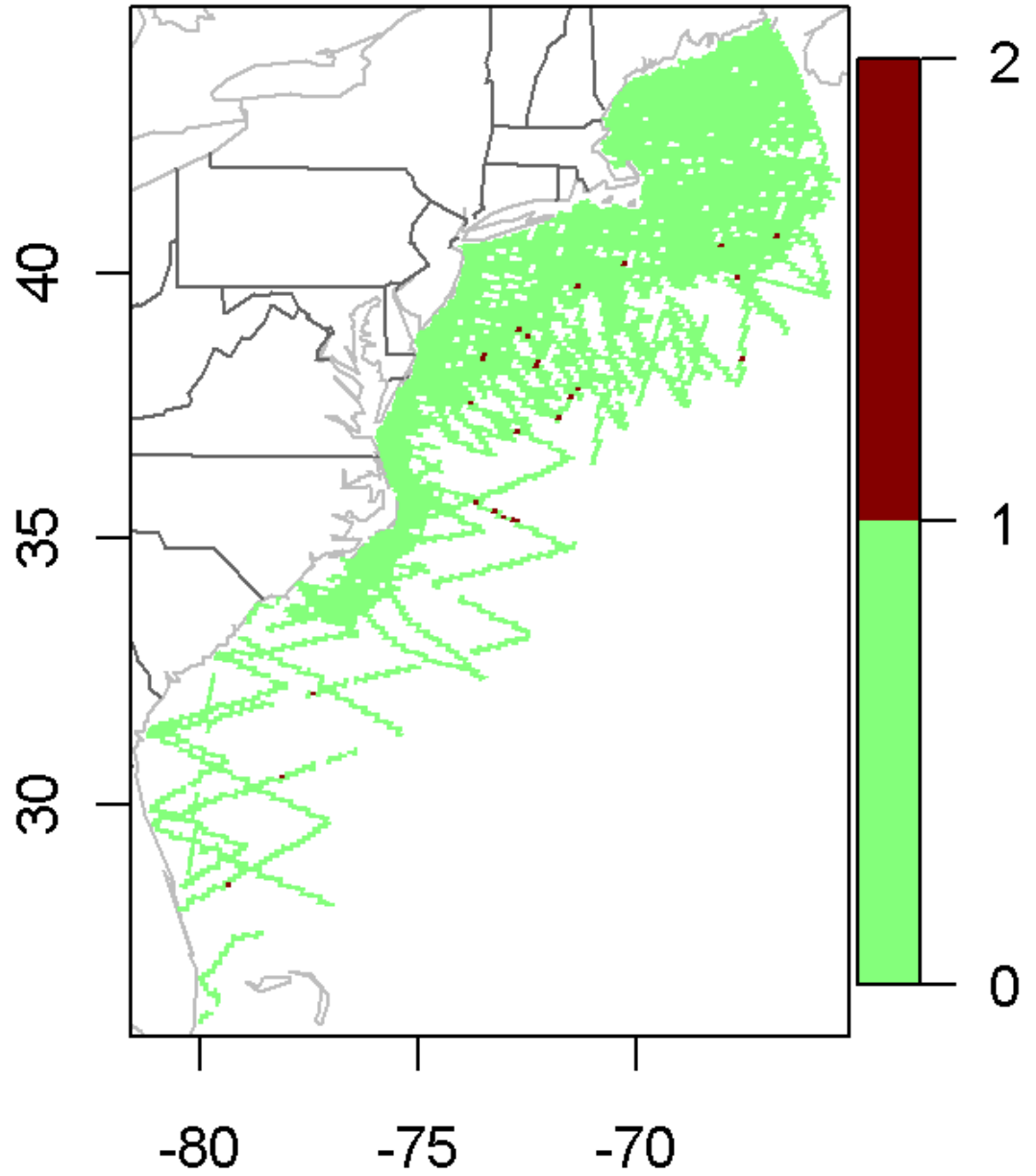


Figure 360: Map of presence and absence by cell summed through time for 'Kogia' guild during 'summer' season in 'east2' region.

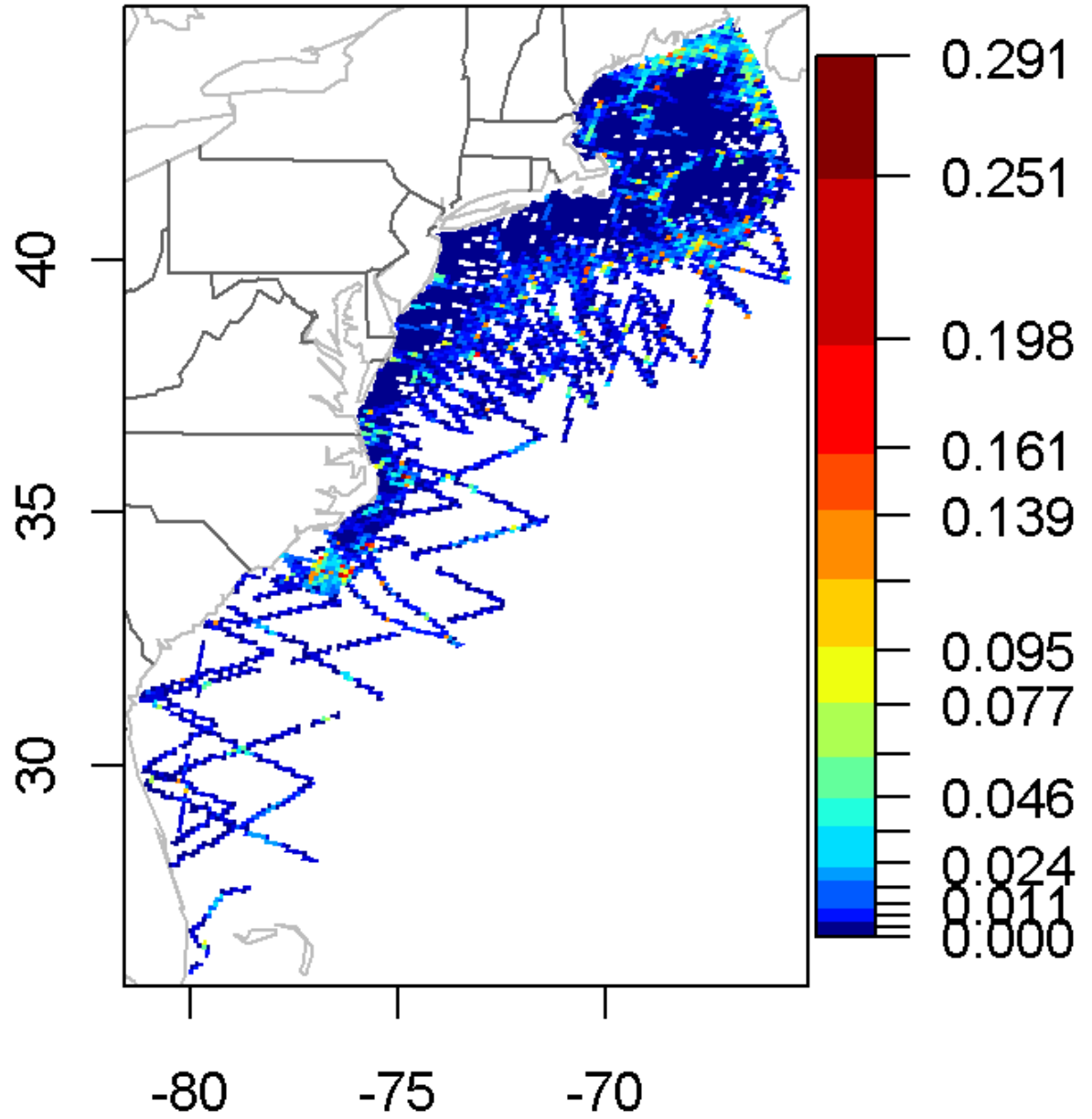


Figure 361: Map of effort(hours/km²) by cell summed through time for 'Kogia' guild during 'summer' season in 'east2' region.

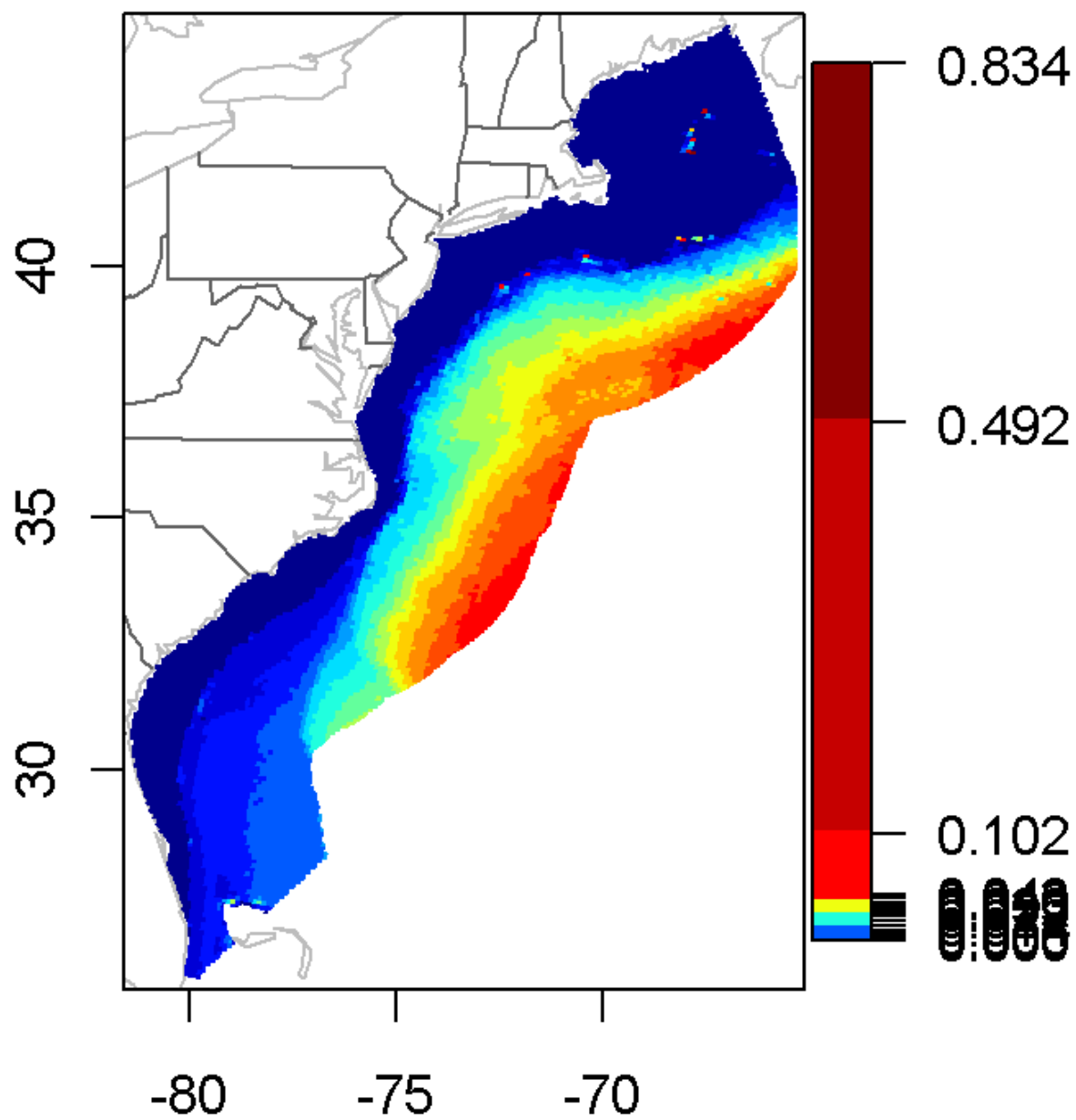


Figure 362: Map of mean predicted habitat for 'Kogia' guild during 'summer' season in 'east2' region.

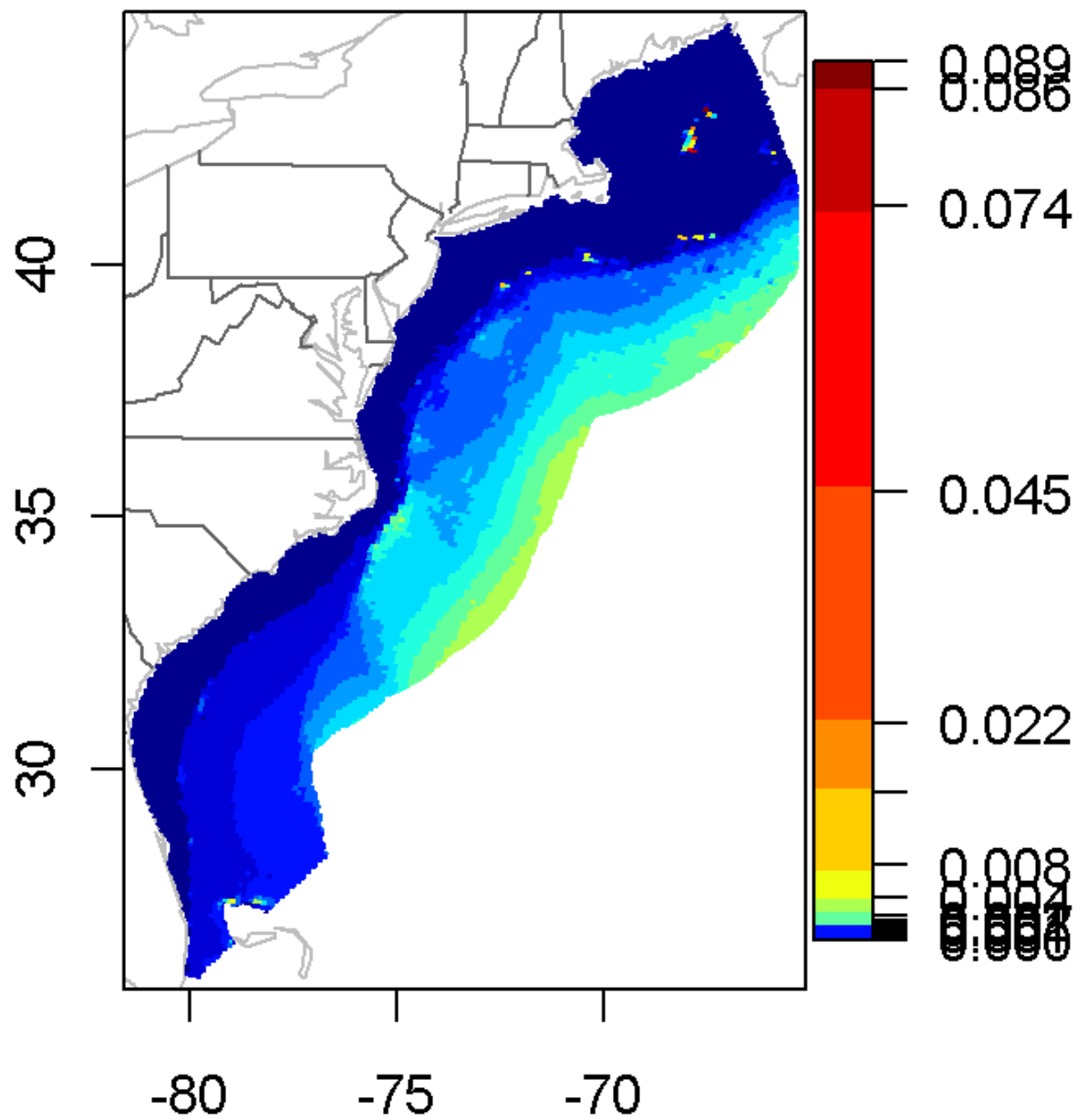


Figure 363: Map of standard error of habitat for 'Kogia' guild during 'summer' season in 'east2' region.

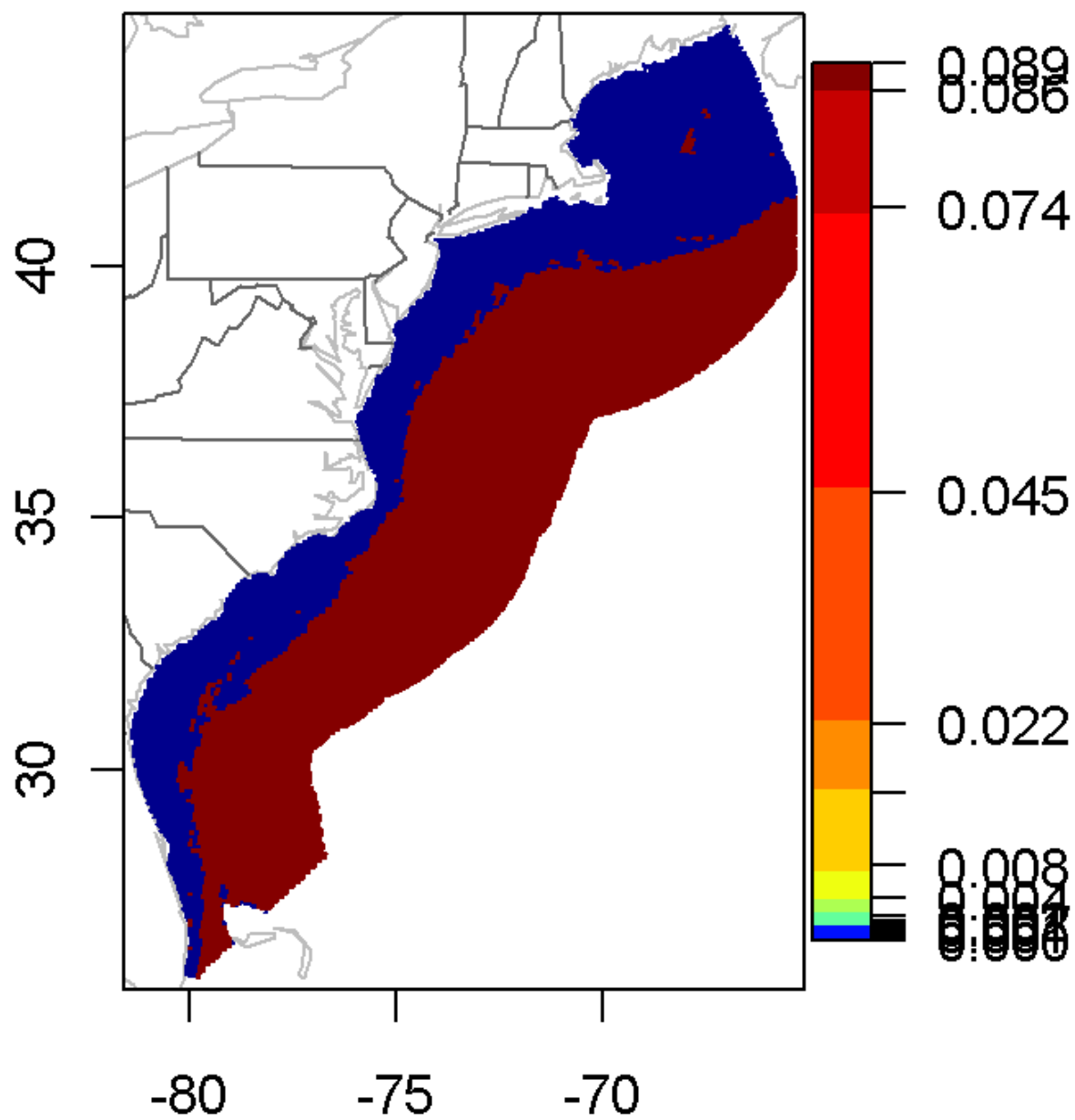


Figure 364: Map of binary habitat (cutoff determined by ROC) for 'Kogia' guild during 'summer' season in 'east2' region.

7.3.2 gomex2

Modelrun identifier: duke_06_ko3_summer_gomex2

Date generated: 2008-10-21 11:27:26

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 34: Summary for duke(6) GAM model: for 'Kogia' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	29
Number.absences	1375
GAM.converged	TRUE
R.squared	-0.0428955
Deviance.explained	0.0658001
ROC.optimum	0.0280834
Maximum.fit	0.0105476
Maximum.prediction	0.0280833

Model text summary...

```
duke_06_ko3_summer_gomex2 run on Tue Oct 21 11:26:43 2008
provider:duke, version:06, guild:Kogia (ko3), season:'summer', region:gomex2

max.fit:0.028083, max.prediction:0.028083, ROC.optimum:0.010548

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.6069      0.3417  -16.41  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  1.908e+00  2.408  10.452 7.09e-06 ***
s(log(d2shelf)) 3.559e-06  0.500  3.58e-06  0.966
s(log(d2coast)) 5.422e-06  0.500  2.87e-05  0.943
s(sst)          1.622e-05  0.500  1.29e-04  0.917
s(lat)          6.359e-01  1.136   2.454  0.113
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  -0.0429  Deviance explained = 6.58%
GCV score = 0.0013421  Scale est. = 0.001336  n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13   Min.   : 13.0   Min.   : 901   Min.   : 5700   Min.   :25.35   Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8 1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75 1st Qu.:26.68
              Median :5134 Median : 654.0 Median : 45466 Median :146059 Median :28.50 Median :27.90
              Mean   :4686 Mean   : 899.5 Mean   : 59670 Mean   :161835 Mean   :28.50 Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0 3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25 3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0 Max.   :249222 Max.   :386037 Max.   :31.20 Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :27.67   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :29.55 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:1.544e-10	Min.	:5.774e-10	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:2.551e-05	1st Qu.	:3.435e-05	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:8.573e-03	Median	:2.195e-03	Median	:0.000e+00	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:8.260e-03	Mean	:1.604e-03	Mean	:2.627e-02	Mean	:1.213e-02	Mean	:0.4054
3rd Qu.	:6015	3rd Qu.	:1.455e-02	3rd Qu.	:2.681e-03	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:2.808e-02	Max.	:4.883e-03	Max.	:1.000e+00	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5.568e+03	NA's	:5.568e+03		

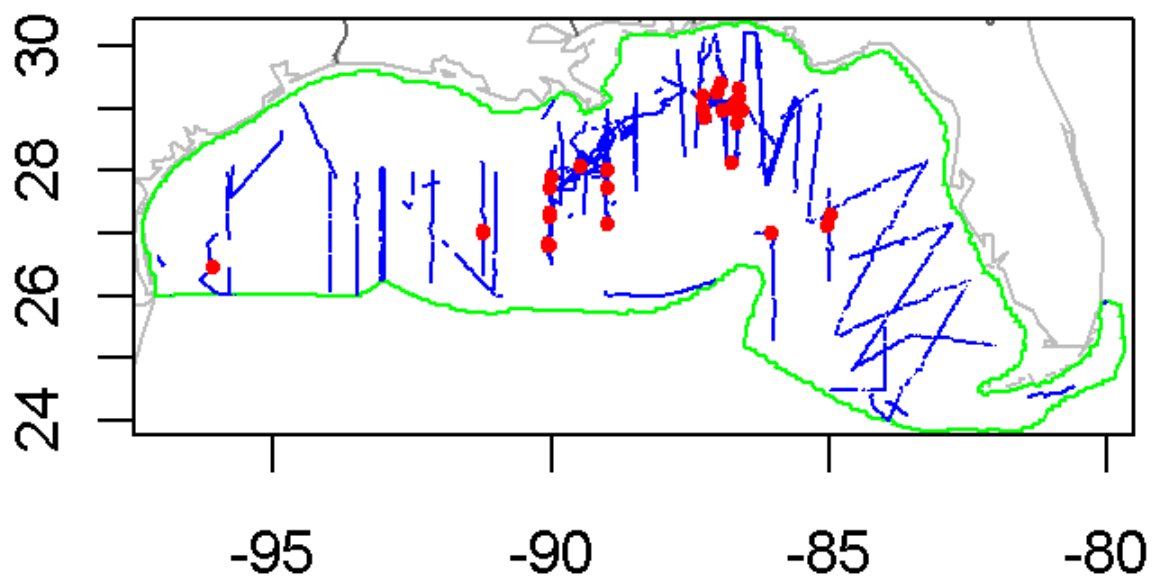


Figure 365: Map of points of observational sightings and tracks of survey effort for 'Kogia' guild during 'summer' season in 'gomex2' region.

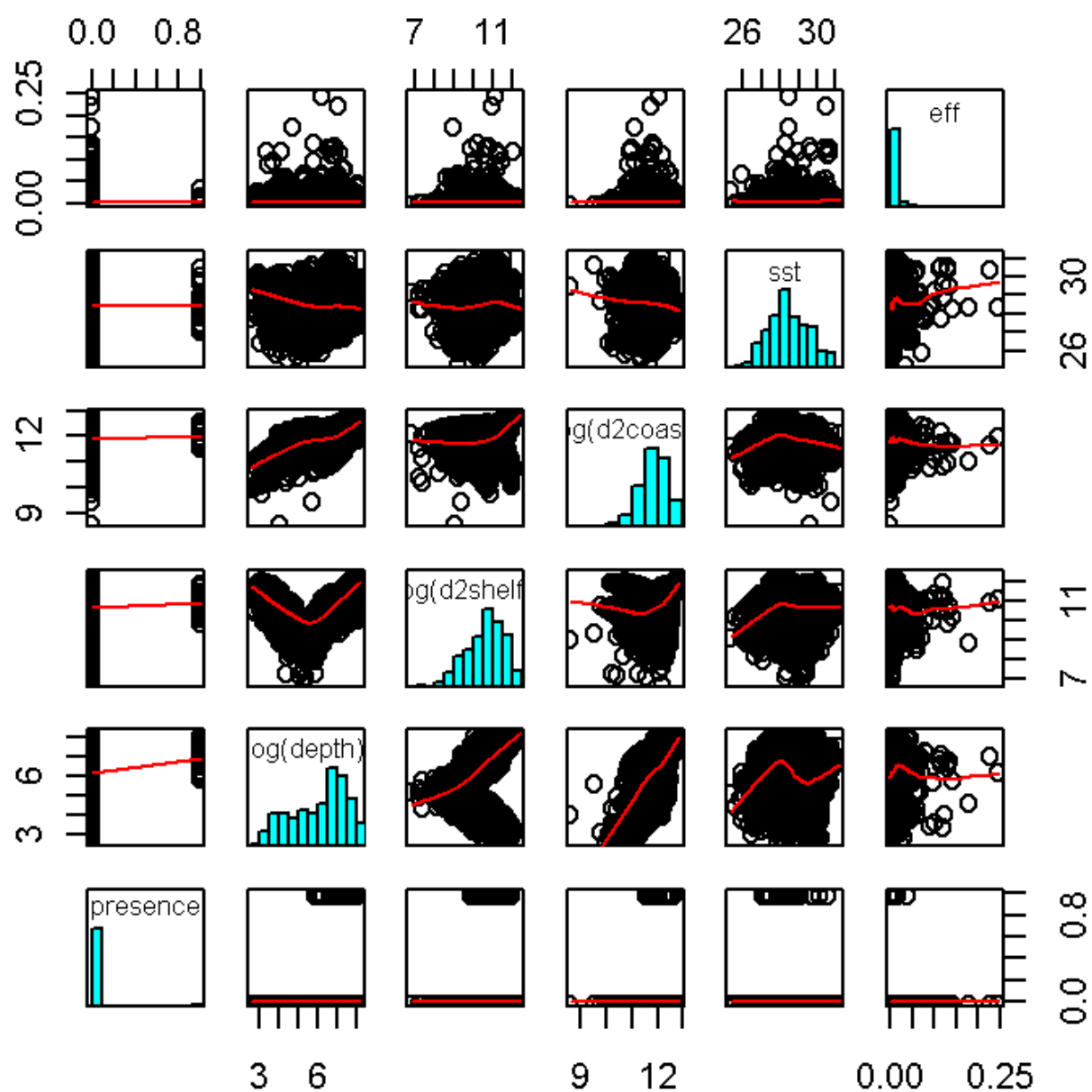


Figure 366: Pairs plot of input variables for 'Kogia' guild during 'summer' season in 'gomex2' region.

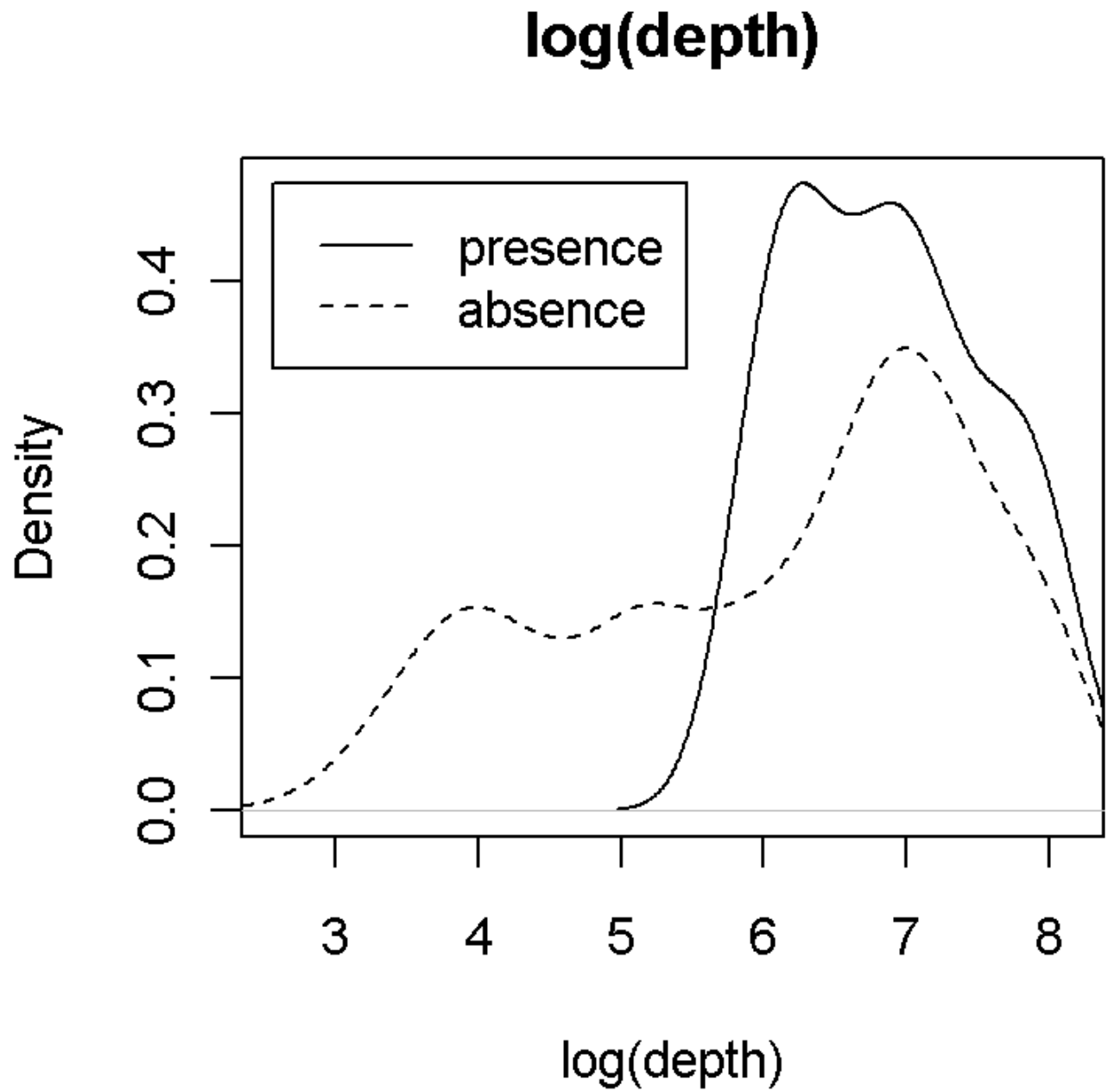


Figure 367: Density histogram of depth log(meters) for 'Kogia' guild during 'summer' season in 'gomex2' region.

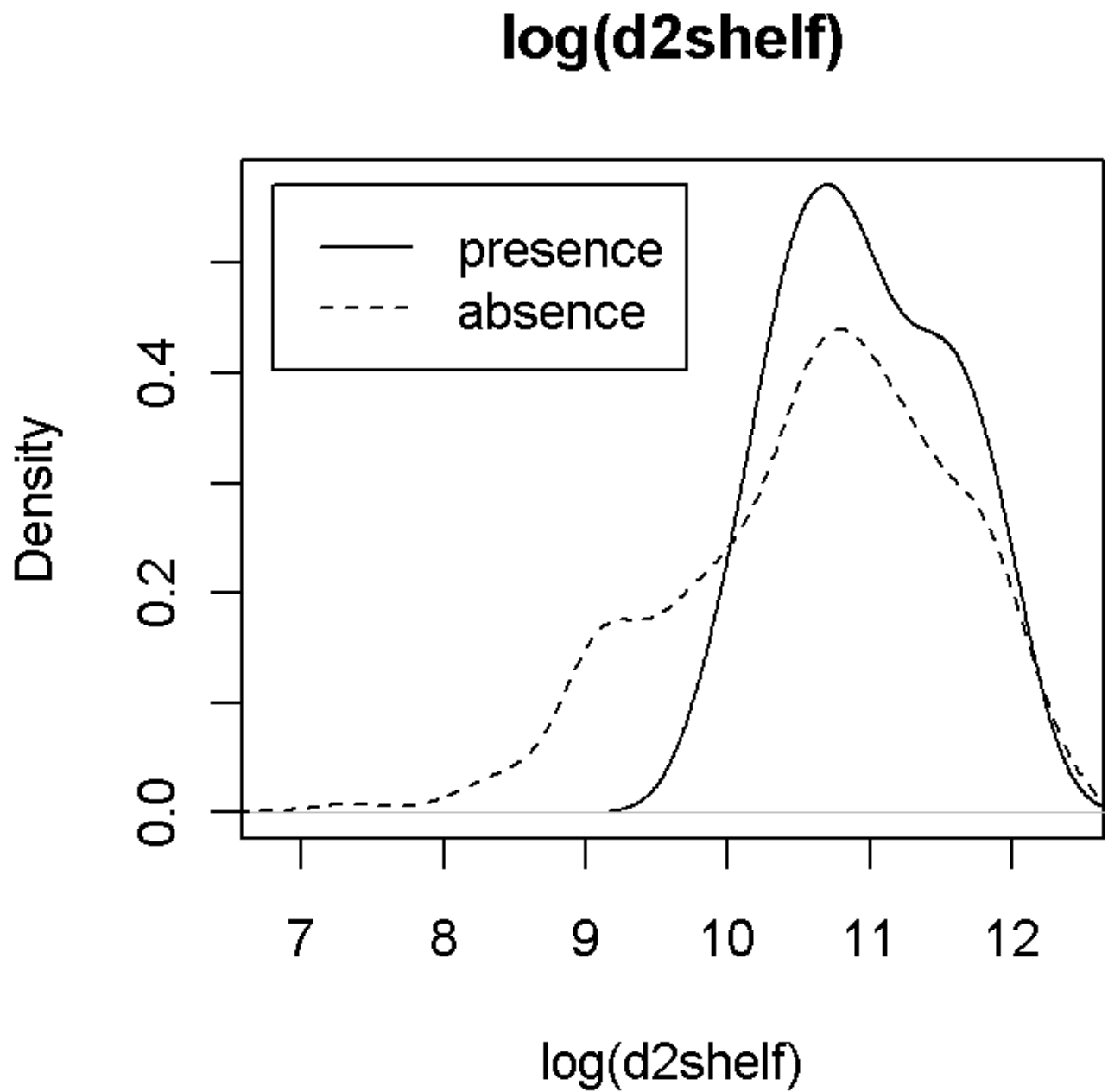


Figure 368: Density histogram of distance to shelf log(meters) for 'Kogia' guild during 'summer' season in 'gomex2' region.

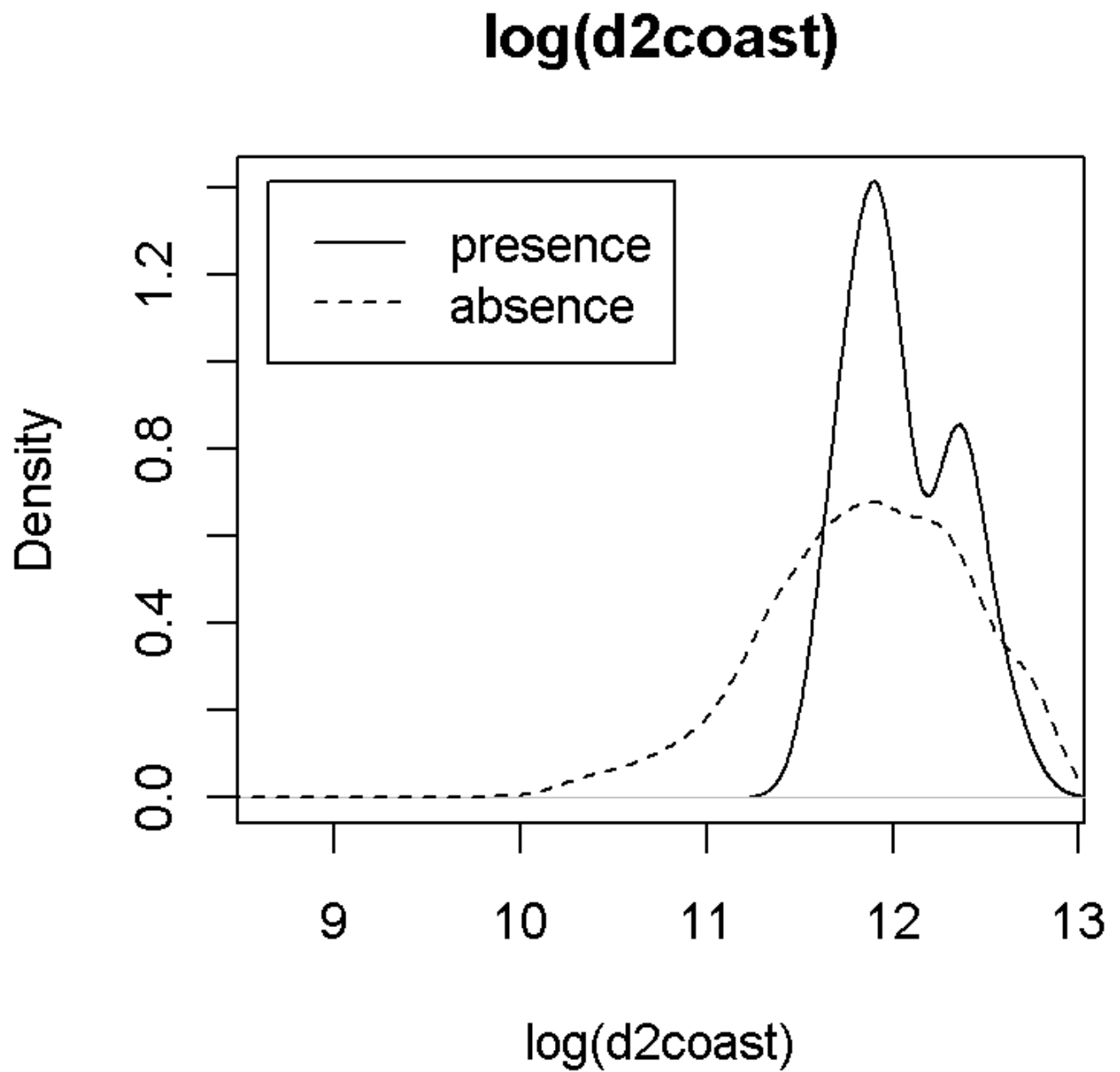


Figure 369: Density histogram of distance to coast log(meters) for 'Kogia' guild during 'summer' season in 'gomex2' region.

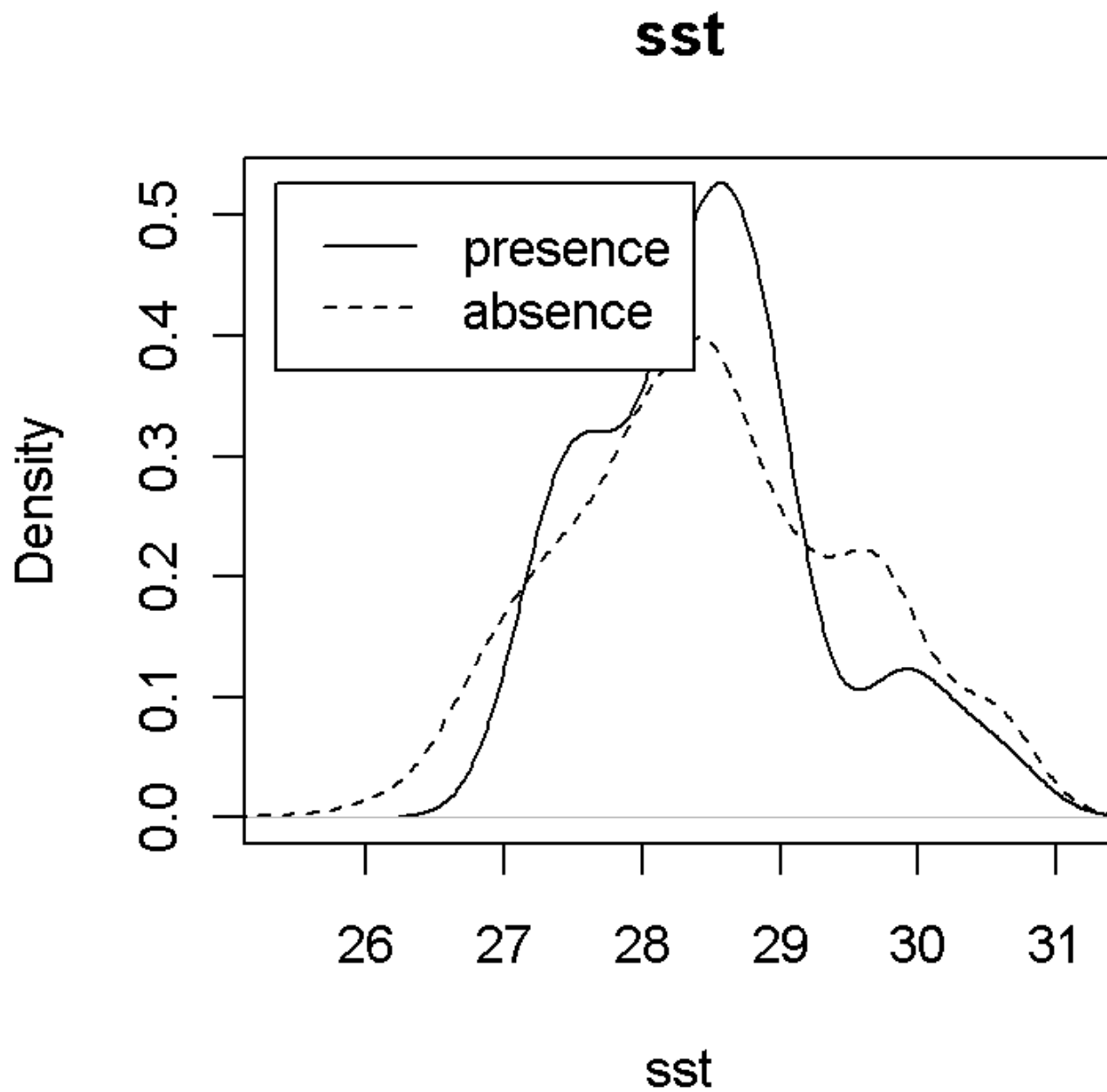


Figure 370: Density histogram of sea-surface temperature (degrees C) for 'Kogia' guild during 'summer' season in 'gomex2' region.

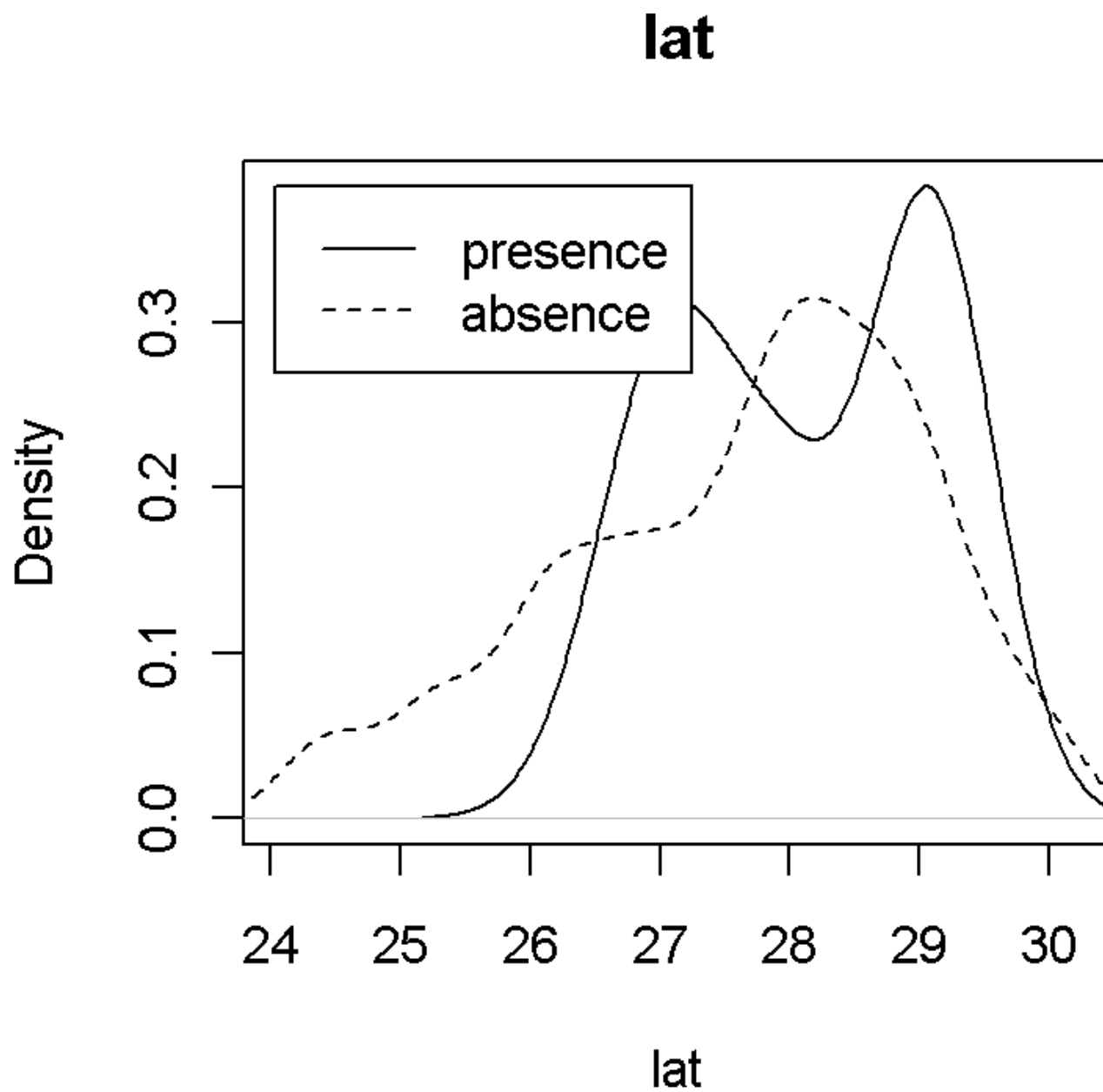


Figure 371: Density histogram of latitude (degrees) for 'Kogia' guild during 'summer' season in 'gomex2' region.

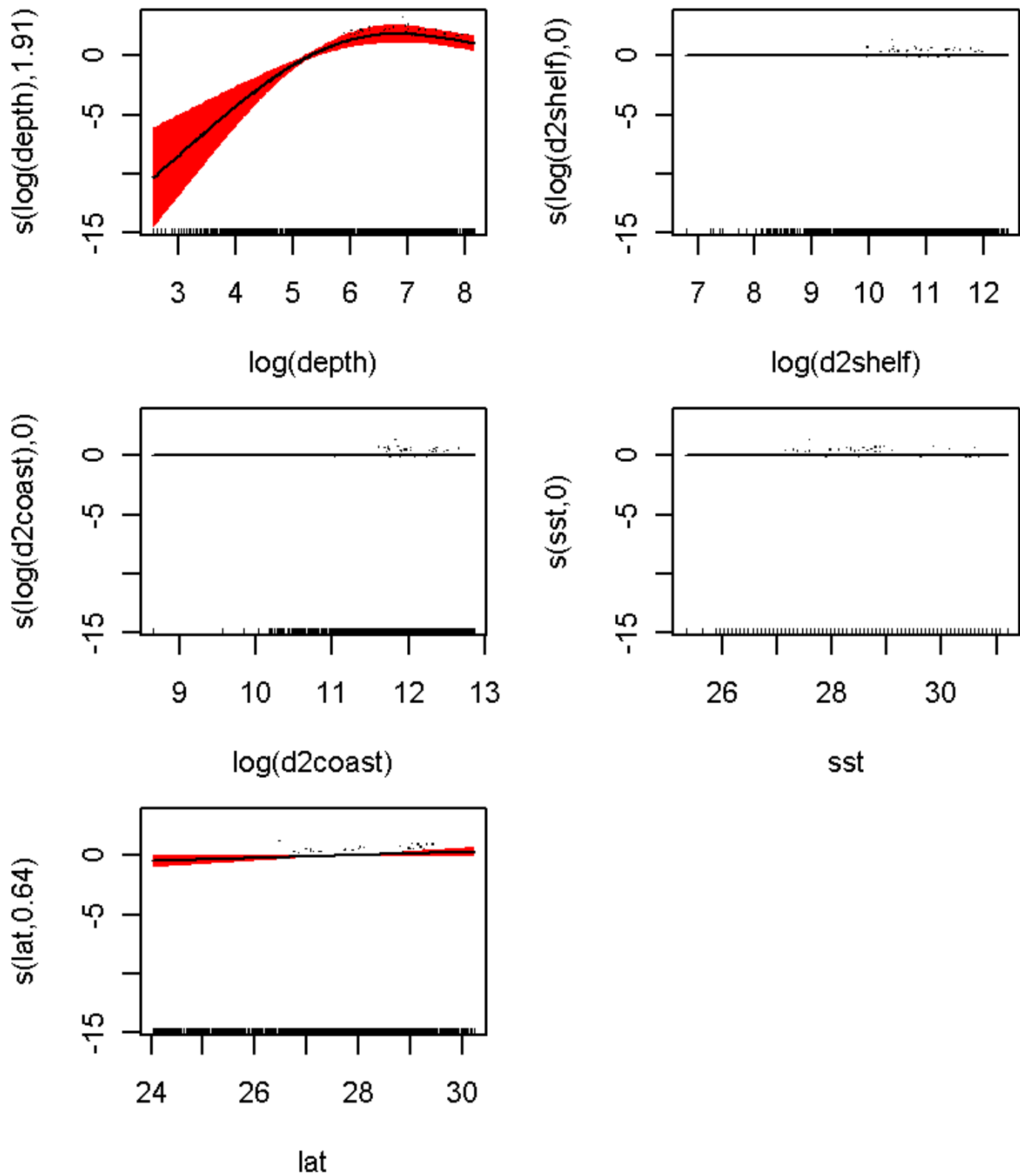


Figure 372: Terms plot of predictors to GAM model fit for 'Kogia' guild during 'summer' season in 'gomex2' region.

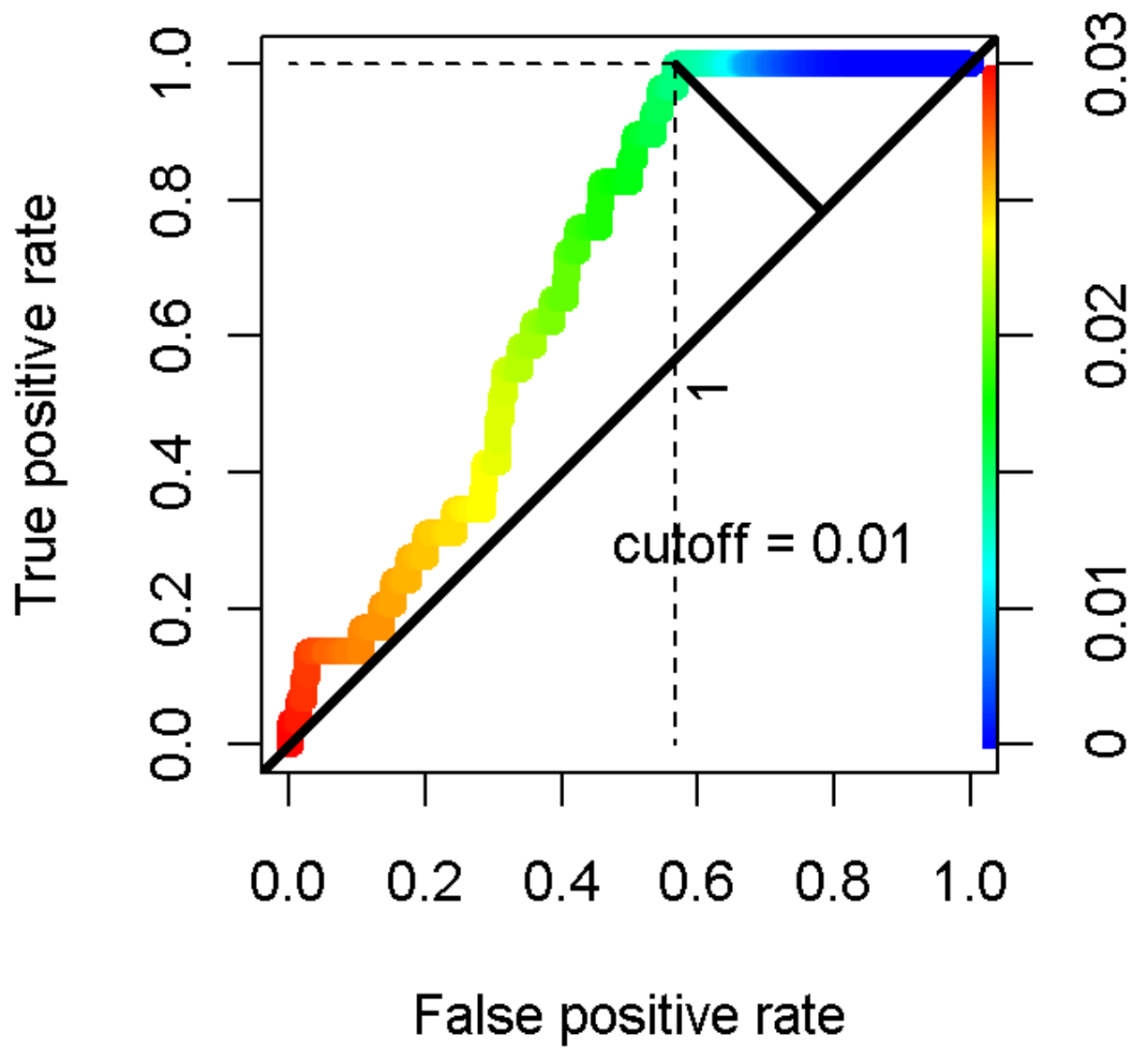


Figure 373: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Kogia' guild during 'summer' season in 'gomex2' region.

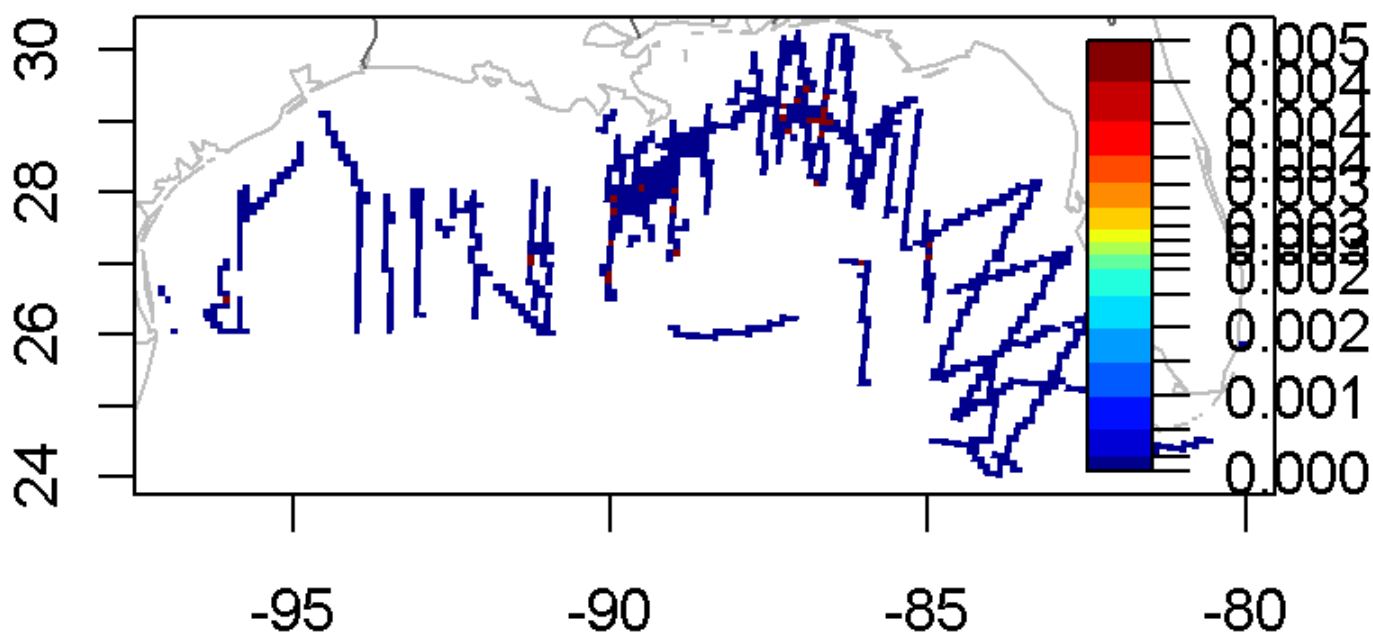


Figure 374: Map of presence and absence by cell summed through time for 'Kogia' guild during 'summer' season in 'gomex2' region.

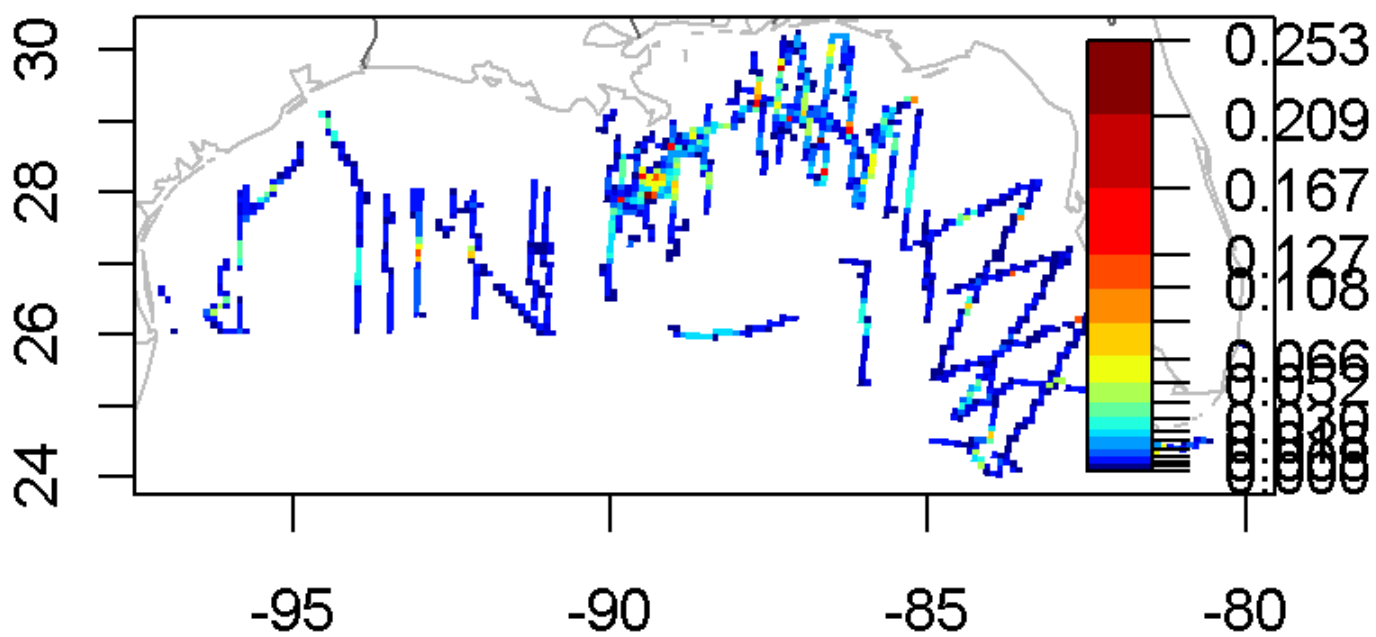


Figure 375: Map of effort(hours/km²) by cell summed through time for 'Kogia' guild during 'summer' season in 'gomex2' region.

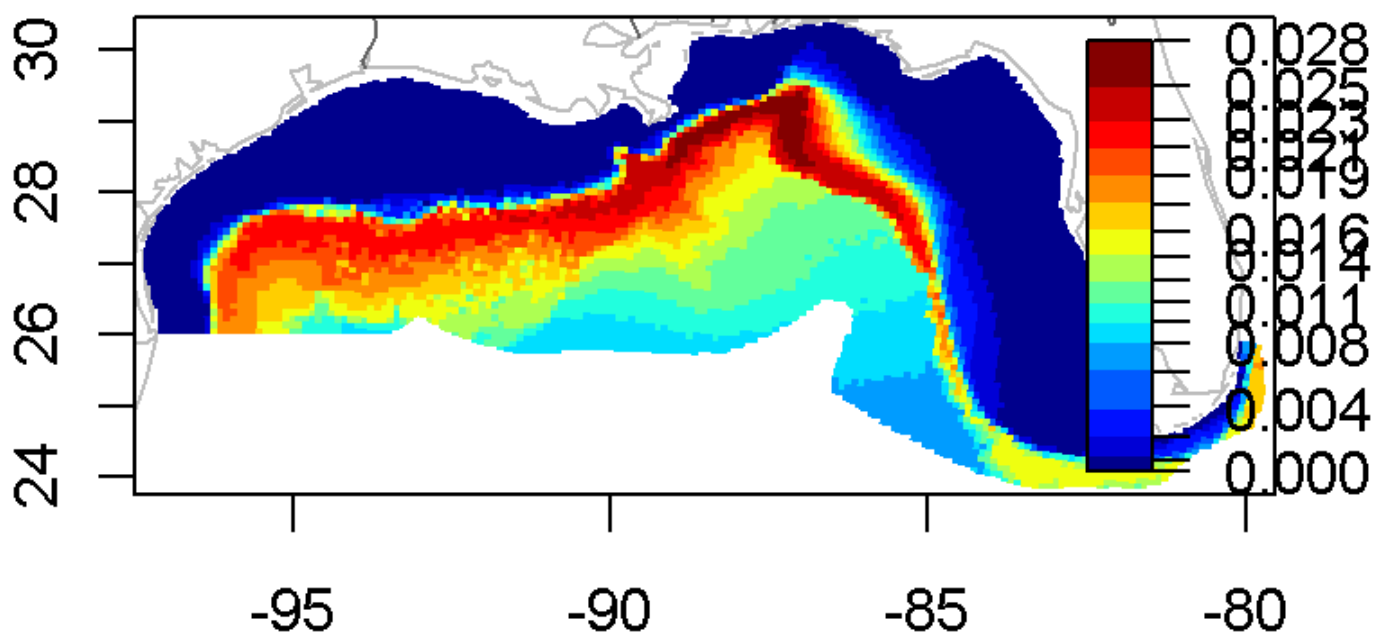


Figure 376: Map of mean predicted habitat for 'Kogia' guild during 'summer' season in 'gomex2' region.

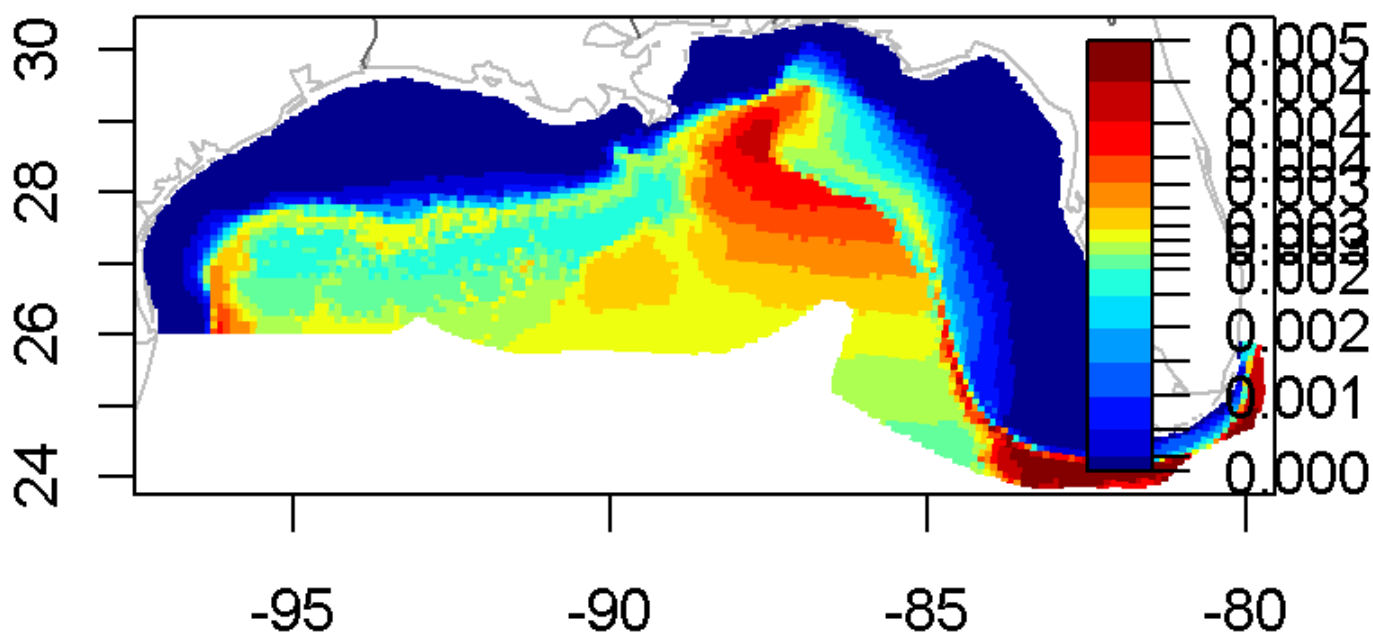


Figure 377: Map of standard error of habitat for 'Kogia' guild during 'summer' season in 'gomex2' region.

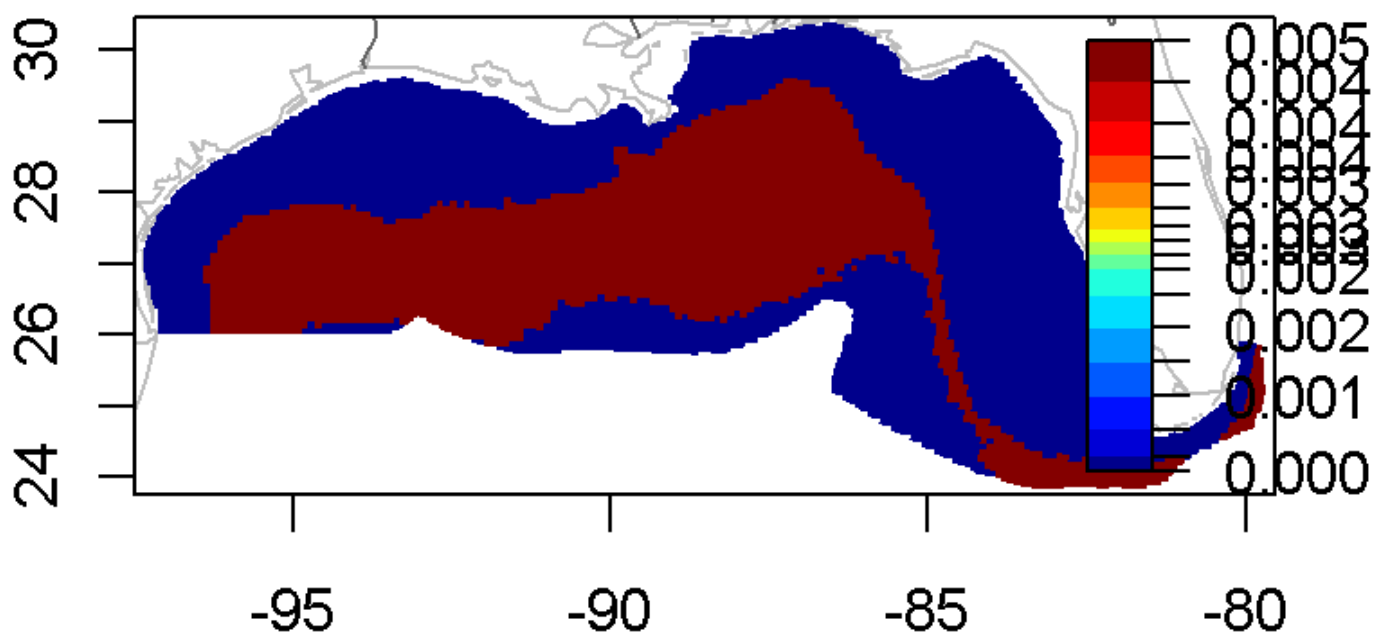


Figure 378: Map of binary habitat (cutoff determined by ROC) for 'Kogia' guild during 'summer' season in 'gomex2' region.

7.4 winter

8 Lags

Guildid:la3

Table 35: Taxonomic members of the "Lags" guild.

	Scientic Name	Common Name	Taxonomic #
1	Lagenorhynchus	white-beaked dolphins	180441
2	Lagenorhynchus acutus	Atlantic white-sided dolphin	180443
3	Lagenorhynchus albirostris	white-beaked dolphin	180442

8.1 fall

8.1.1 east2

Modelrun identifier: duke_06_la3_fall_east2

Date generated: 2008-10-21 14:24:52

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 36: Summary for duke(6) GAM model: for 'Lags' guild during 'fall' season in 'east2' region.

	Value
Number.presences	15
Number.absences	1849
GAM.converged	TRUE
R.squared	-0.0259787
Deviance.explained	0.352989
ROC.optimum	0.149931
Maximum.fit	0.00277007
Maximum.prediction	0.167065

Model text summary...

```
duke_06_la3_fall_east2 run on Tue Oct 21 14:23:42 2008
provider:duke, version:06, guild:Lags (la3), season:'fall', region:east2

max.fit:0.149931, max.prediction:0.167065, ROC.optimum:0.002770

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -13.2117      0.7316  -18.06  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  2.249e-07  0.500  4.38e-05  0.937
s(log(d2shelf)) 2.821e-07  0.500  3.59e-06  0.966
s(log(d2coast)) 4.146e-05  0.500  3.89e-06  0.965
s(sst)         1.022e-07  0.500  1.61e-05  0.951
s(lat)         9.915e-01  1.491  123.9  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = -0.026  Deviance explained = 35.3%
GCV score = 0.00015877  Scale est. = 0.00015845  n = 1826

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:1184   Min.    : 1654   Min.    :  6.0   Min.    :  10   Min.    : 2399   Min.    :10.27   Min.    :28.83
se2: 680   1st Qu.:10527   1st Qu.: 32.0   1st Qu.: 12630   1st Qu.: 44436   1st Qu.:15.00   1st Qu.:33.95
           Median :12004   Median : 60.0   Median : 30478   Median : 76904   Median :21.45   Median :37.10
           Mean   :11618   Mean   : 264.5   Mean   : 47224   Mean   : 85248   Mean   :20.38   Mean   :37.51
           3rd Qu.:13928   3rd Qu.: 197.0   3rd Qu.: 67358   3rd Qu.:110783   3rd Qu.:25.50   3rd Qu.:41.72
           Max.    :16558   Max.    :4580.0   Max.    :207447   Max.    :431156   Max.    :29.62   Max.    :44.66
                        NA's      :      1   NA's      :      1   NA's      :37.00

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685   Min.    : 1633   Min.    :  4   Min.    :  5   Min.    : 1259   Min.    :10.50   Min.    :25.91
se2:4203   1st Qu.: 9145   1st Qu.:  92   1st Qu.: 34042   1st Qu.: 89304   1st Qu.:18.90   1st Qu.:32.12
           Median :11616   Median : 844   Median : 82032   Median :178961   Median :24.67   Median :36.17
           Mean   :11171   Mean   :1683   Mean   :105970   Mean   :191155   Mean   :22.32   Mean   :35.84
```

3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :4.369e-16	Min. :0.000e+00	Min. :1.290e-06	Min. :0.00000
1st Qu.: 9145	1st Qu.:3.659e-10	1st Qu.:4.965e-10	1st Qu.:0.000e+00	1st Qu.:5.348e-04	1st Qu.:0.00000
Median :11616	Median :2.357e-07	Median :2.077e-07	Median :0.000e+00	Median :2.645e-03	Median :0.00000
Mean :11171	Mean :2.078e-03	Mean :2.063e-04	Mean :1.354e-02	Mean :8.763e-03	Mean :0.08799
3rd Qu.:14088	3rd Qu.:5.603e-05	3rd Qu.:2.698e-05	3rd Qu.:0.000e+00	3rd Qu.:6.382e-03	3rd Qu.:0.00000
Max. :16560	Max. :1.671e-01	Max. :1.996e-02	Max. :2.000e+00	Max. :5.995e-01	Max. :1.00000
	NA's :5.000e+00	NA's :5.000e+00	NA's :8.780e+03	NA's :8.780e+03	

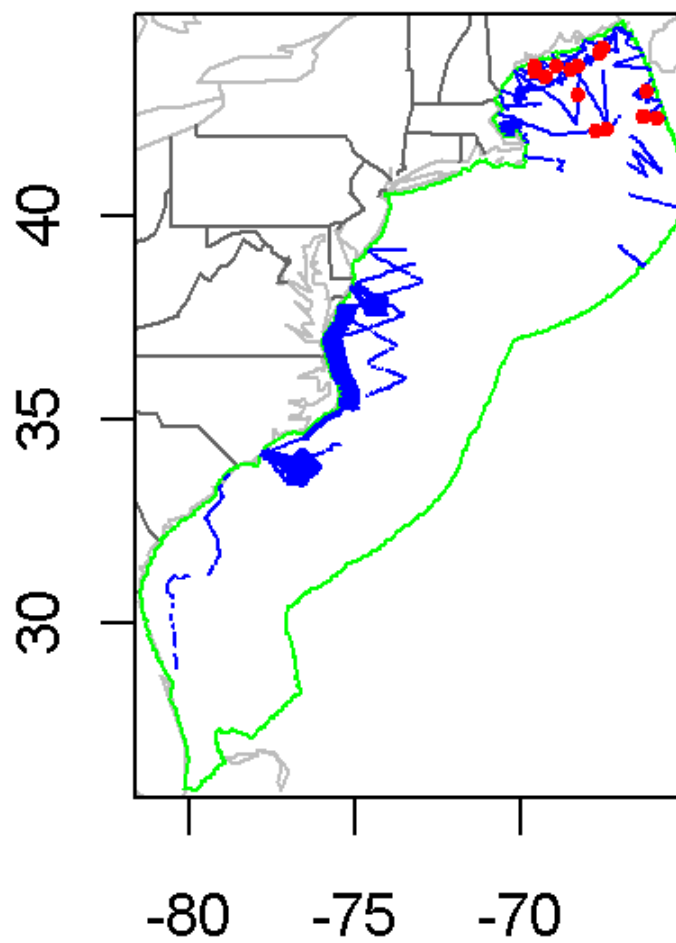


Figure 379: Map of points of observational sightings and tracks of survey effort for 'Lags' guild during 'fall' season in 'east2' region.

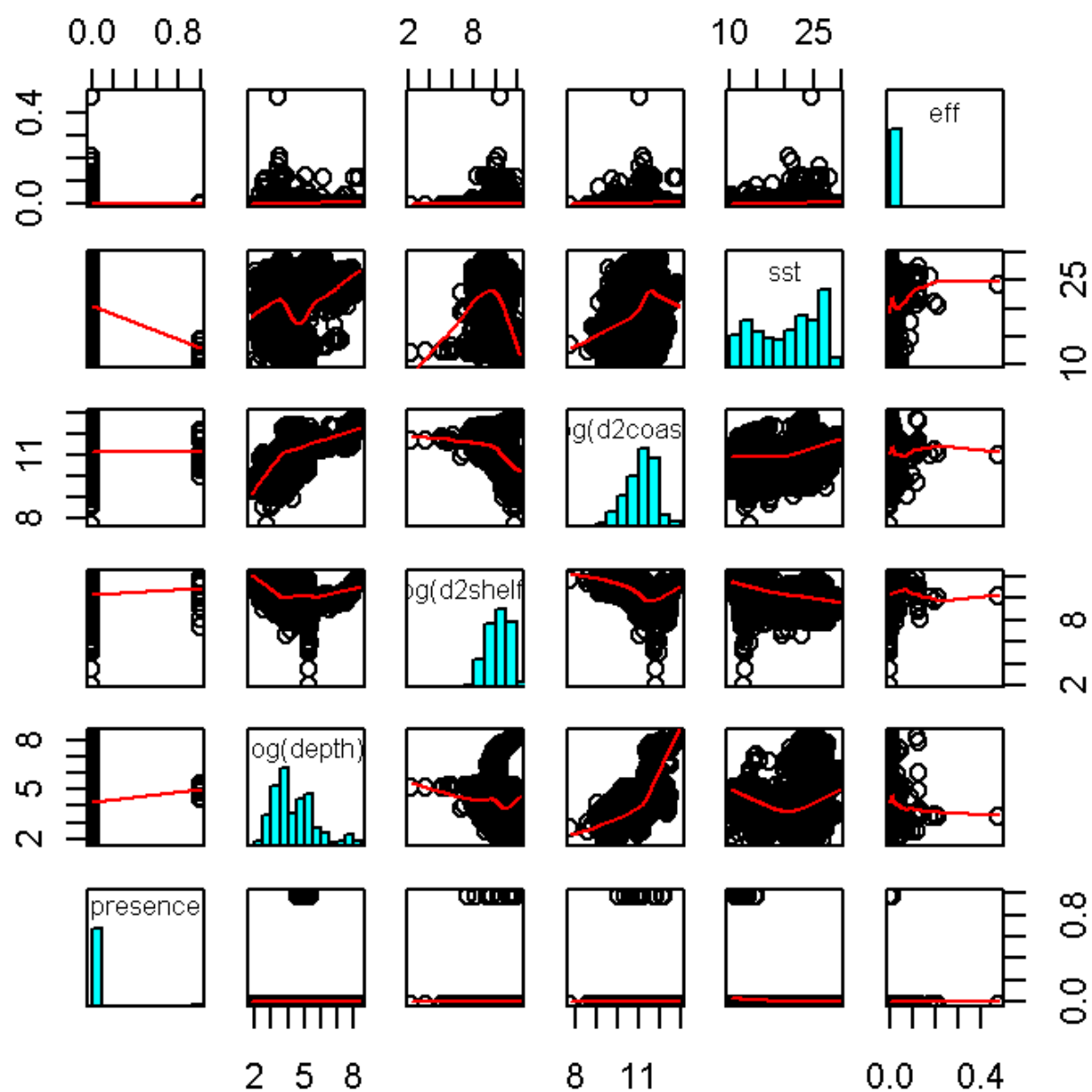


Figure 380: Pairs plot of input variables for 'Lags' guild during 'fall' season in 'east2' region.

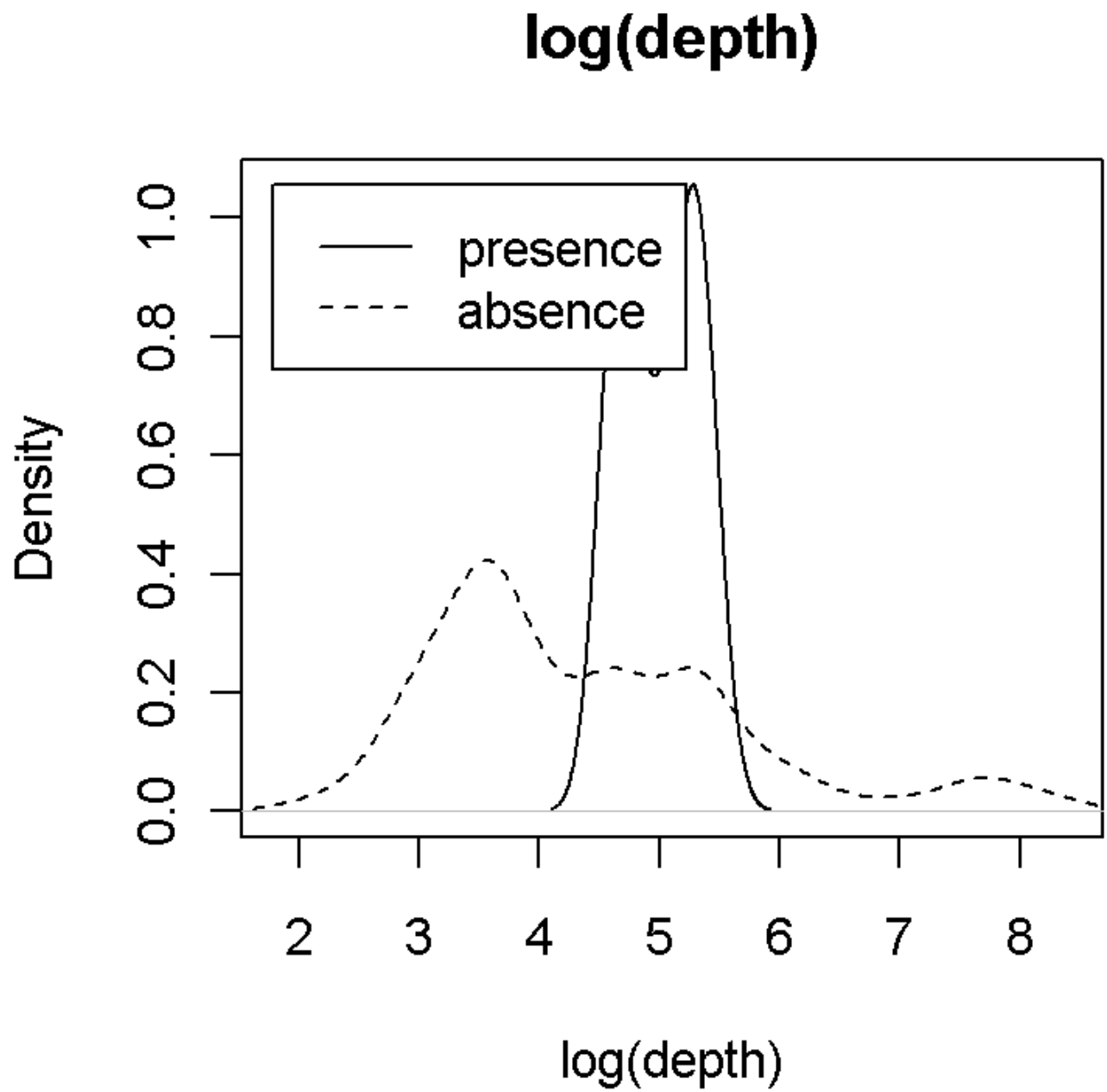


Figure 381: Density histogram of depth log(meters) for 'Lags' guild during 'fall' season in 'east2' region.

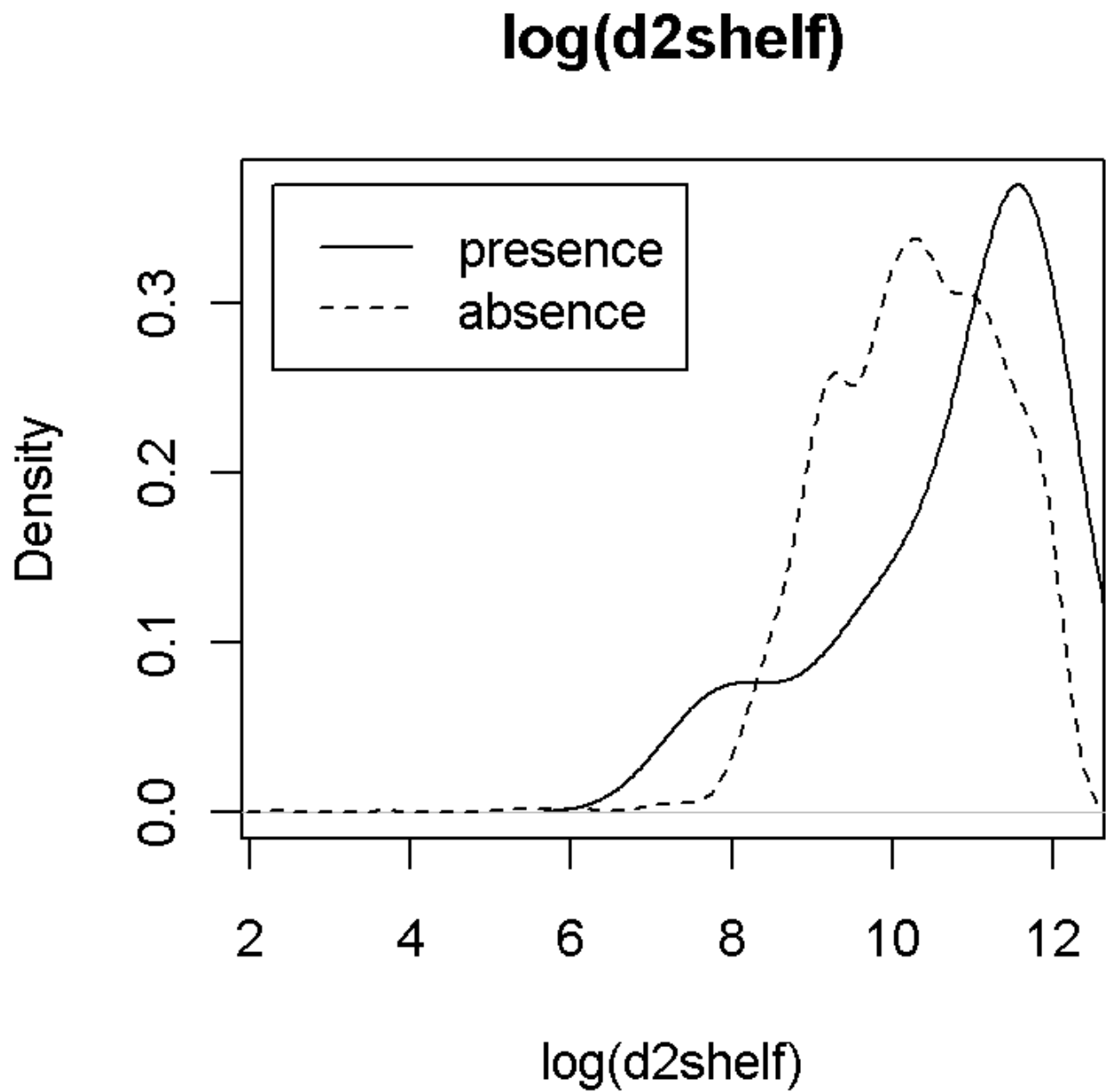


Figure 382: Density histogram of distance to shelf log(meters) for 'Lags' guild during 'fall' season in 'east2' region.

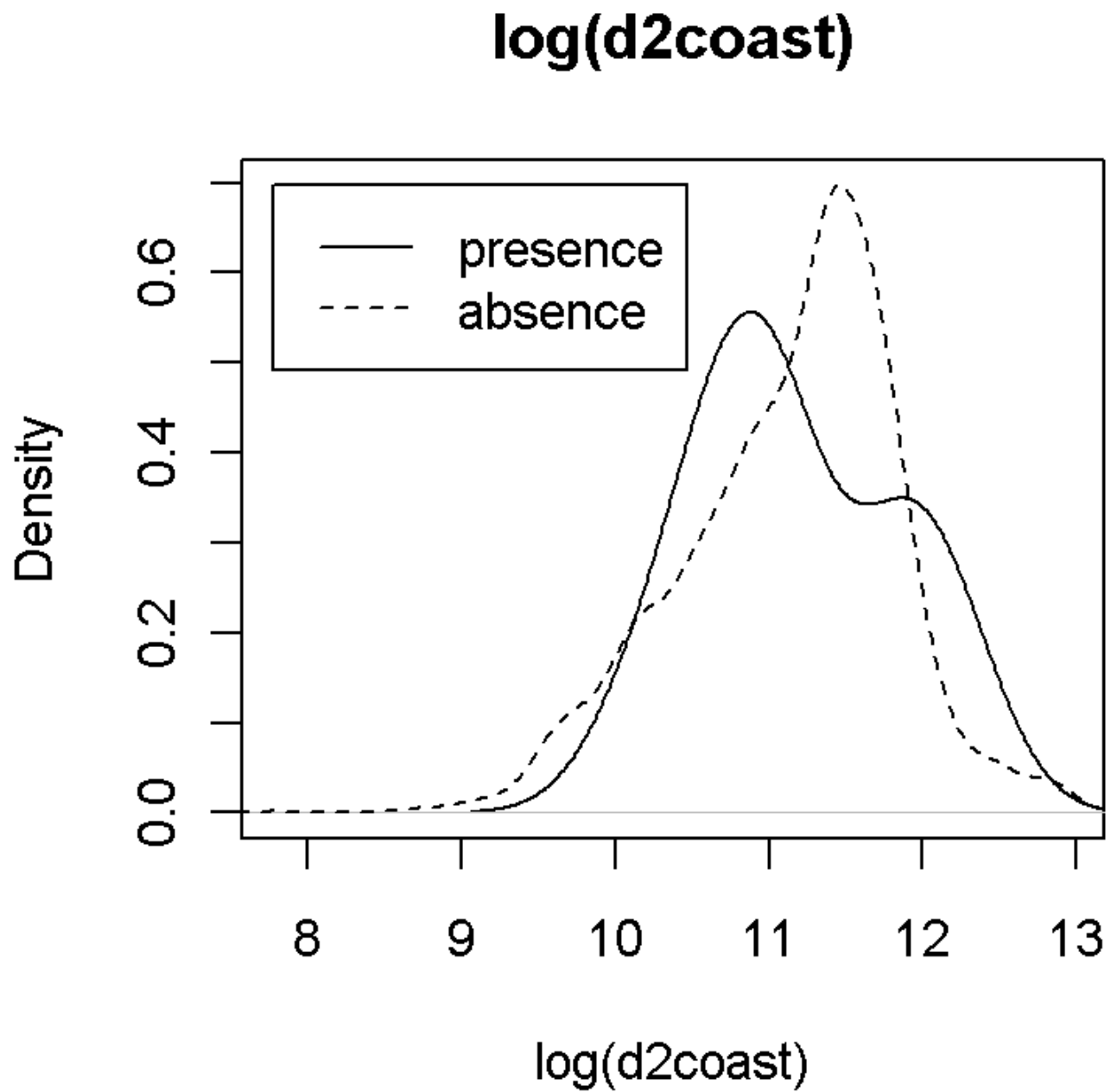


Figure 383: Density histogram of distance to coast log(meters) for 'Lags' guild during 'fall' season in 'east2' region.

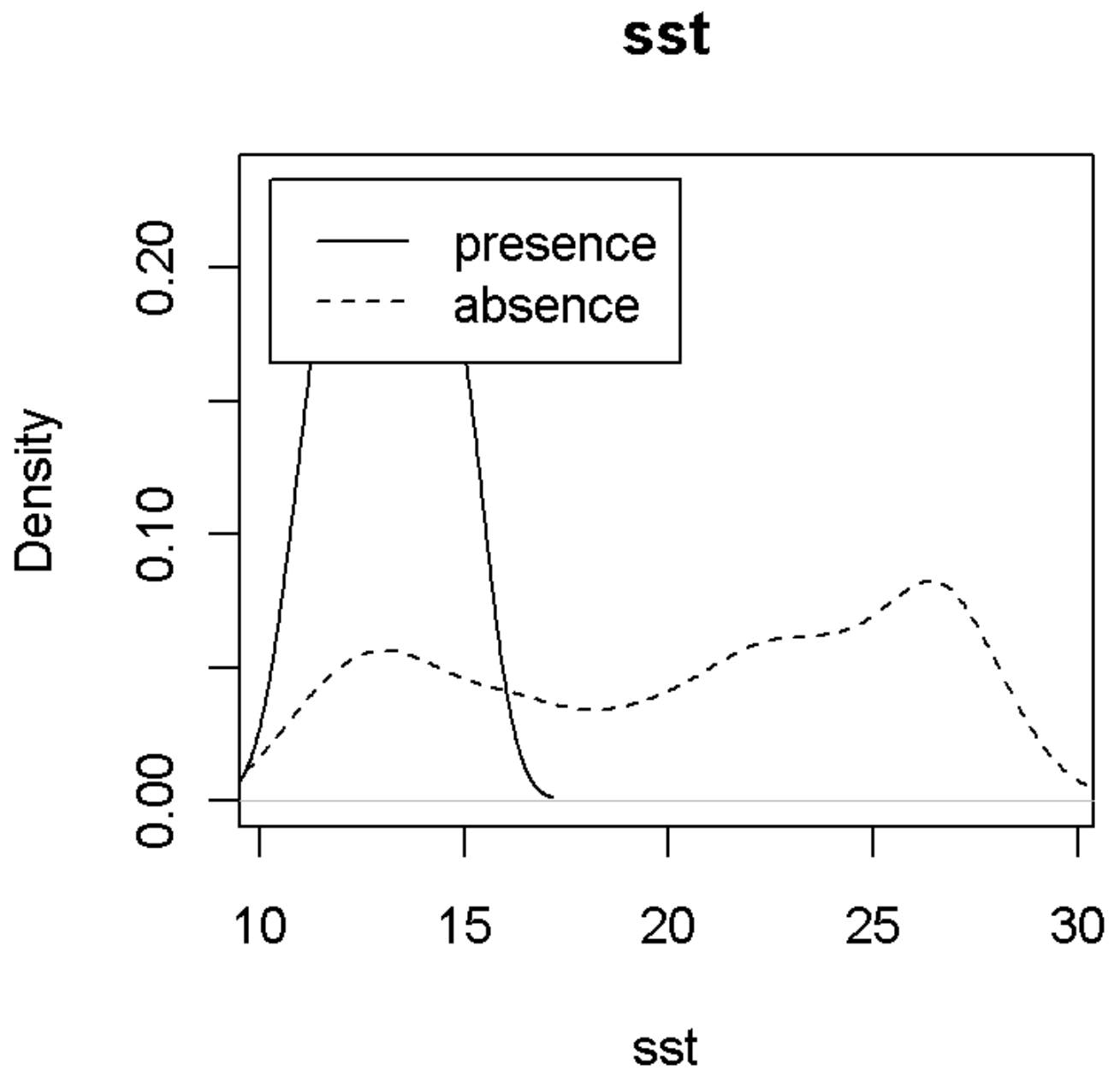


Figure 384: Density histogram of sea-surface temperature (degrees C) for 'Lags' guild during 'fall' season in 'east2' region.

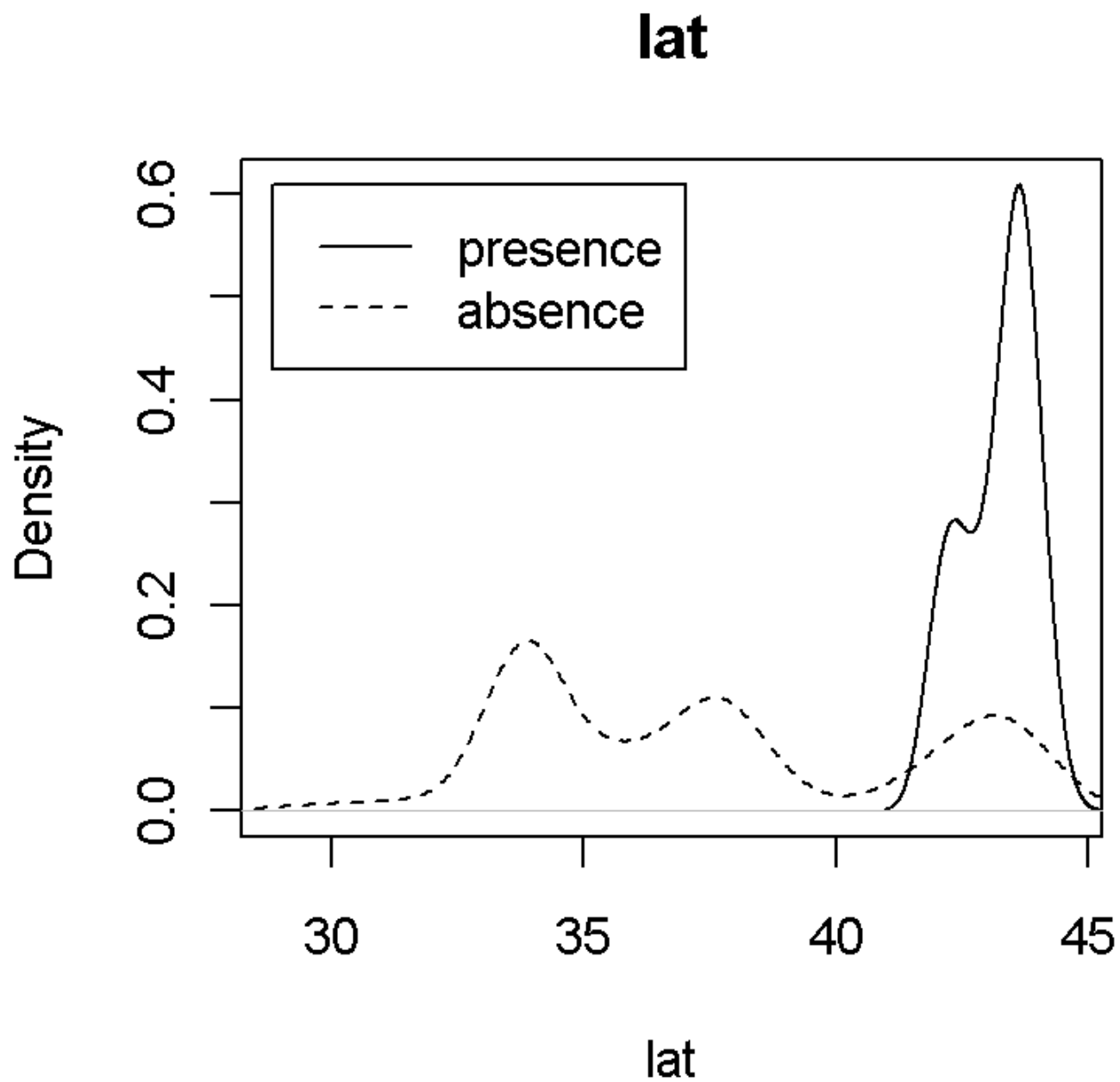


Figure 385: Density histogram of latitude (degrees) for 'Lags' guild during 'fall' season in 'east2' region.

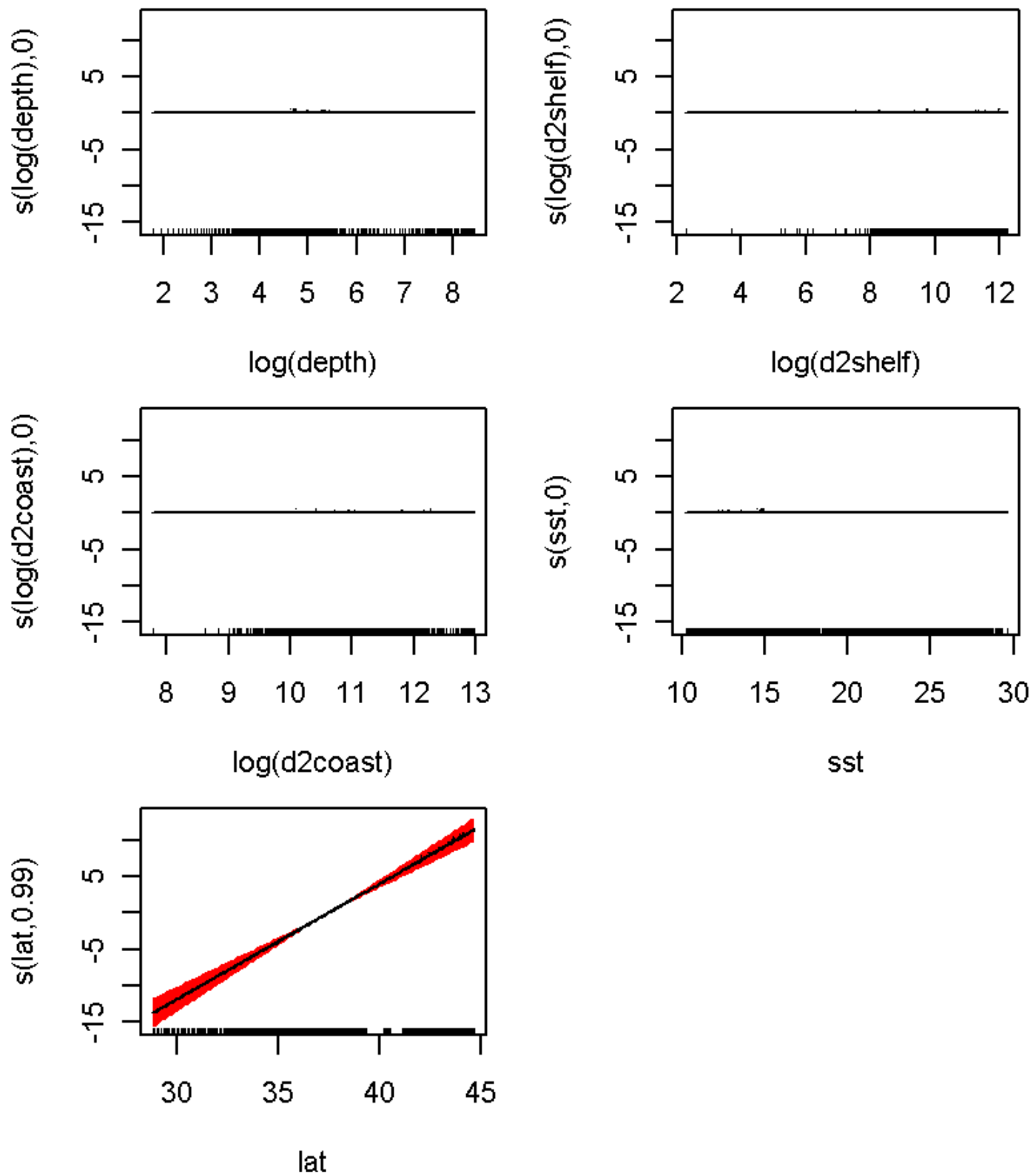


Figure 386: Terms plot of predictors to GAM model fit for 'Lags' guild during 'fall' season in 'east2' region.

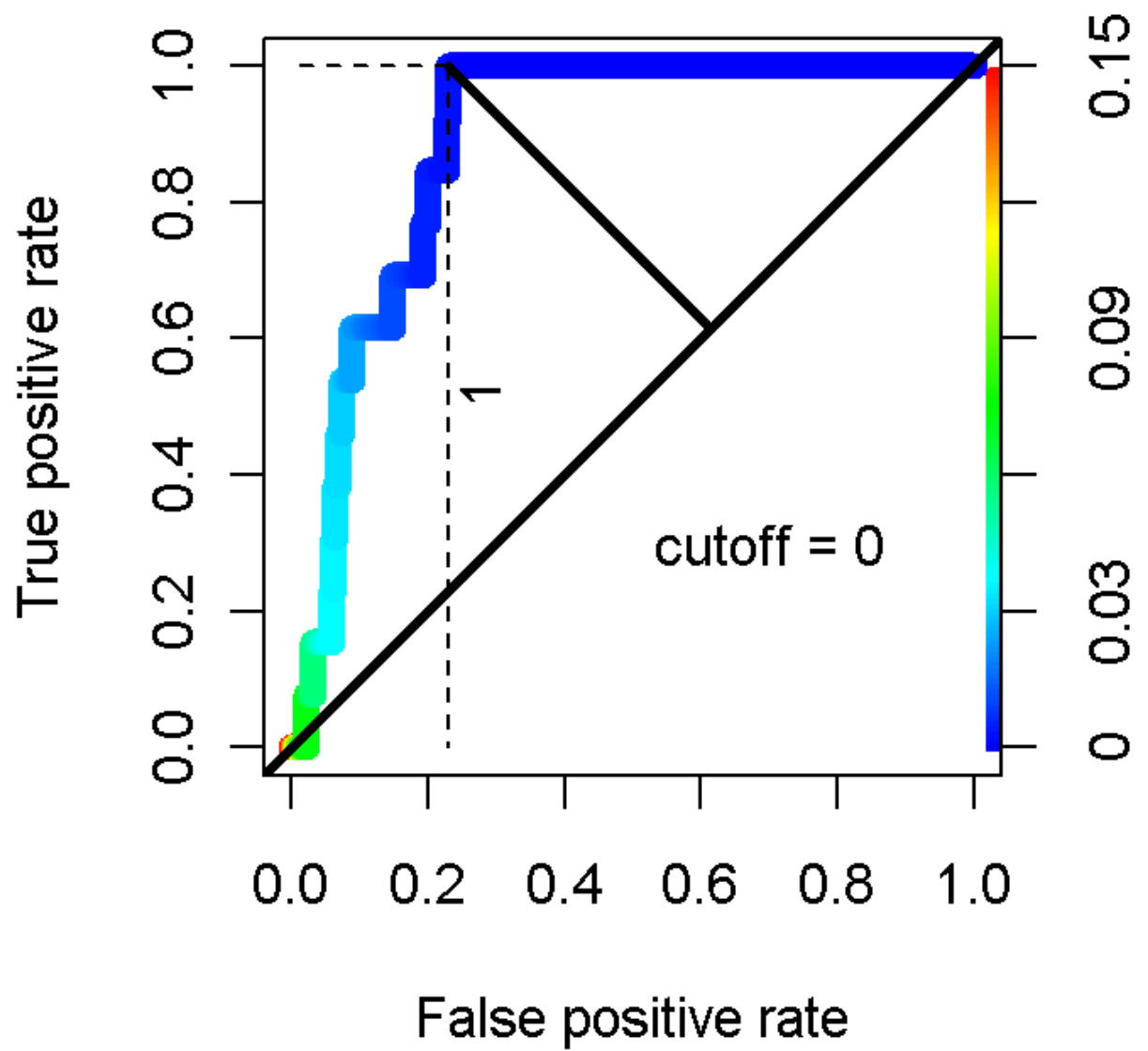


Figure 387: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Lags' guild during 'fall' season in 'east2' region.

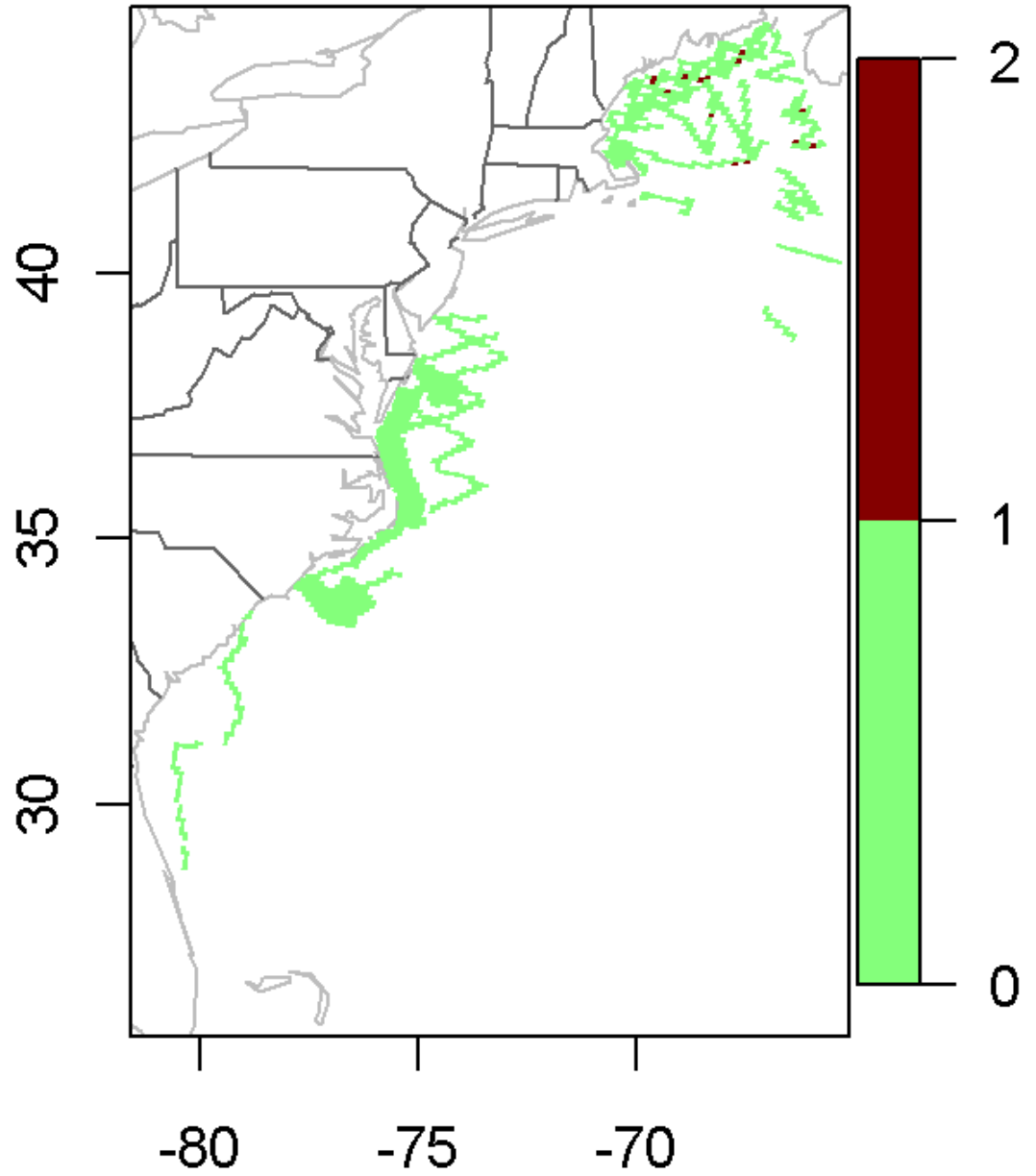


Figure 388: Map of presence and absence by cell summed through time for 'Lags' guild during 'fall' season in 'east2' region.

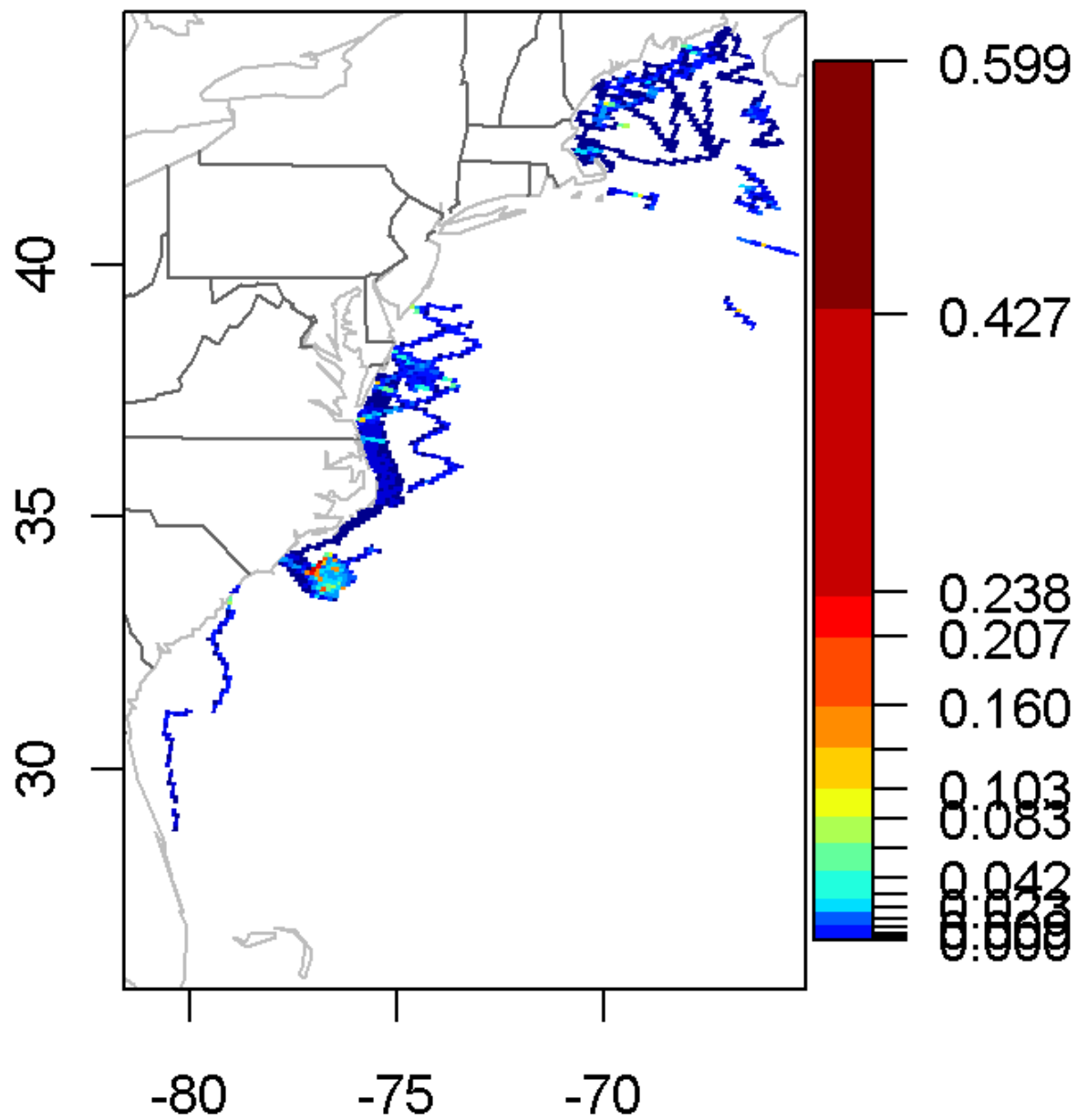


Figure 389: Map of effort(hours/km²) by cell summed through time for 'Lags' guild during 'fall' season in 'east2' region.

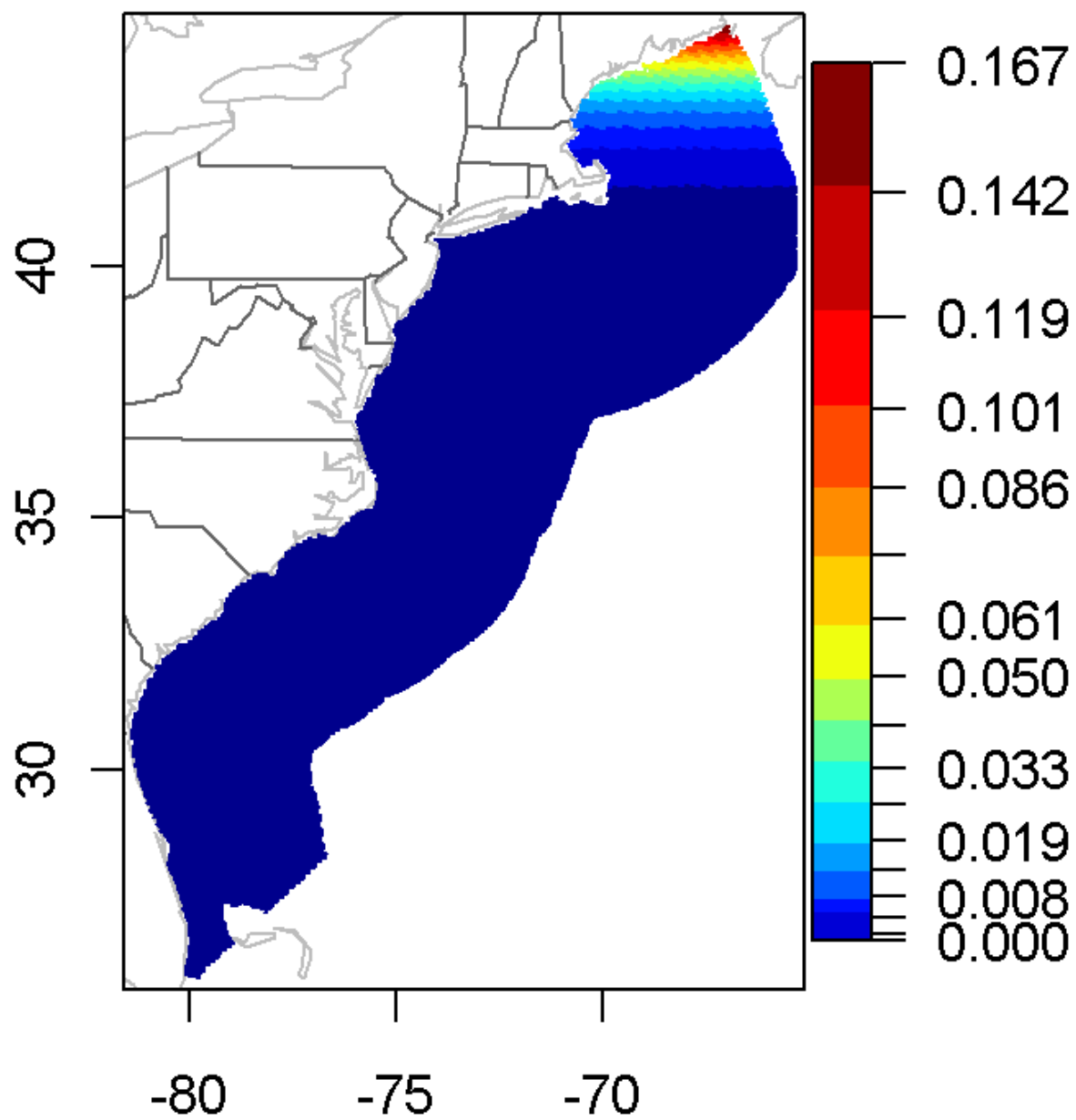


Figure 390: Map of mean predicted habitat for 'Lags' guild during 'fall' season in 'east2' region.

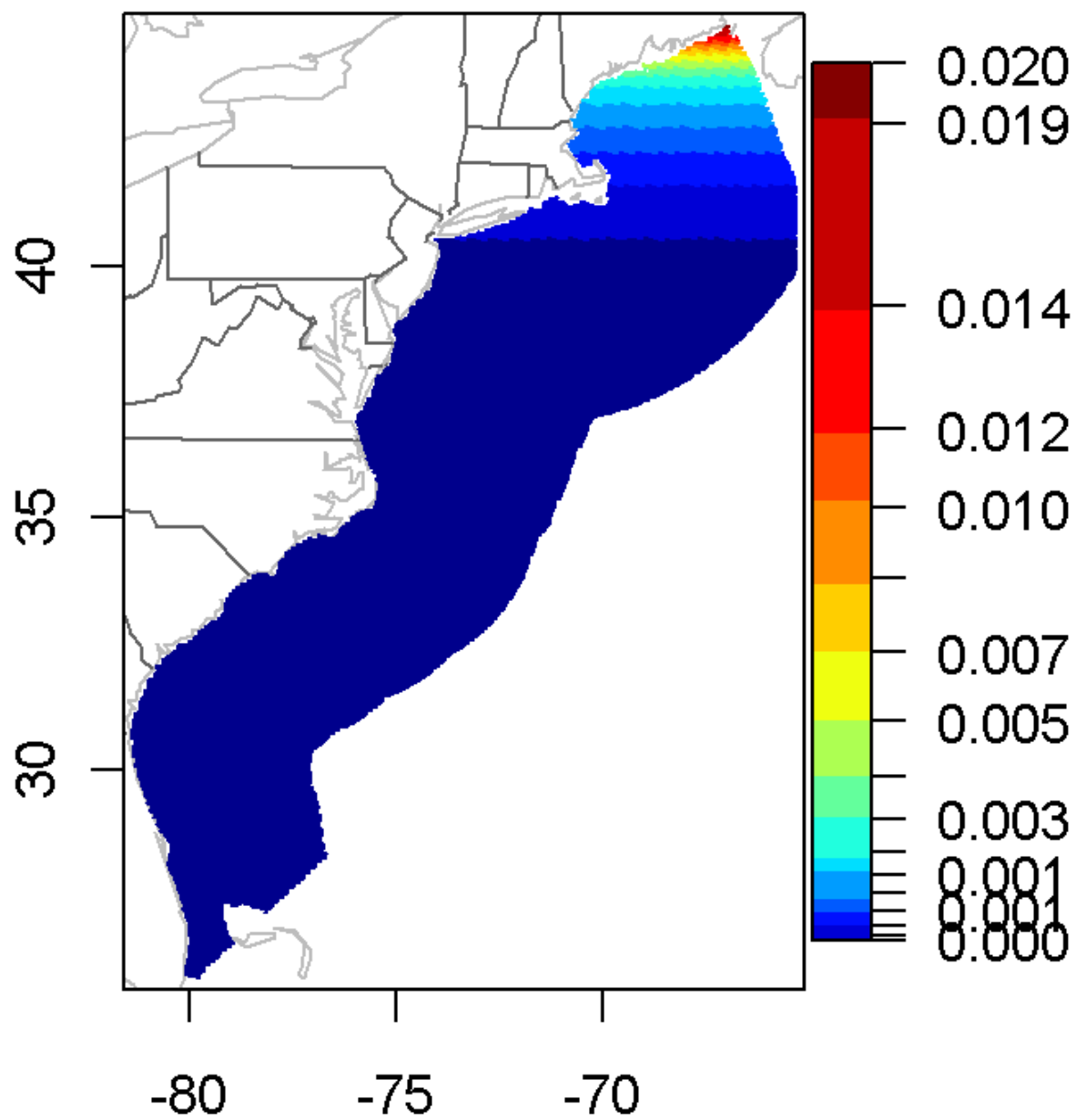


Figure 391: Map of standard error of habitat for 'Lags' guild during 'fall' season in 'east2' region.

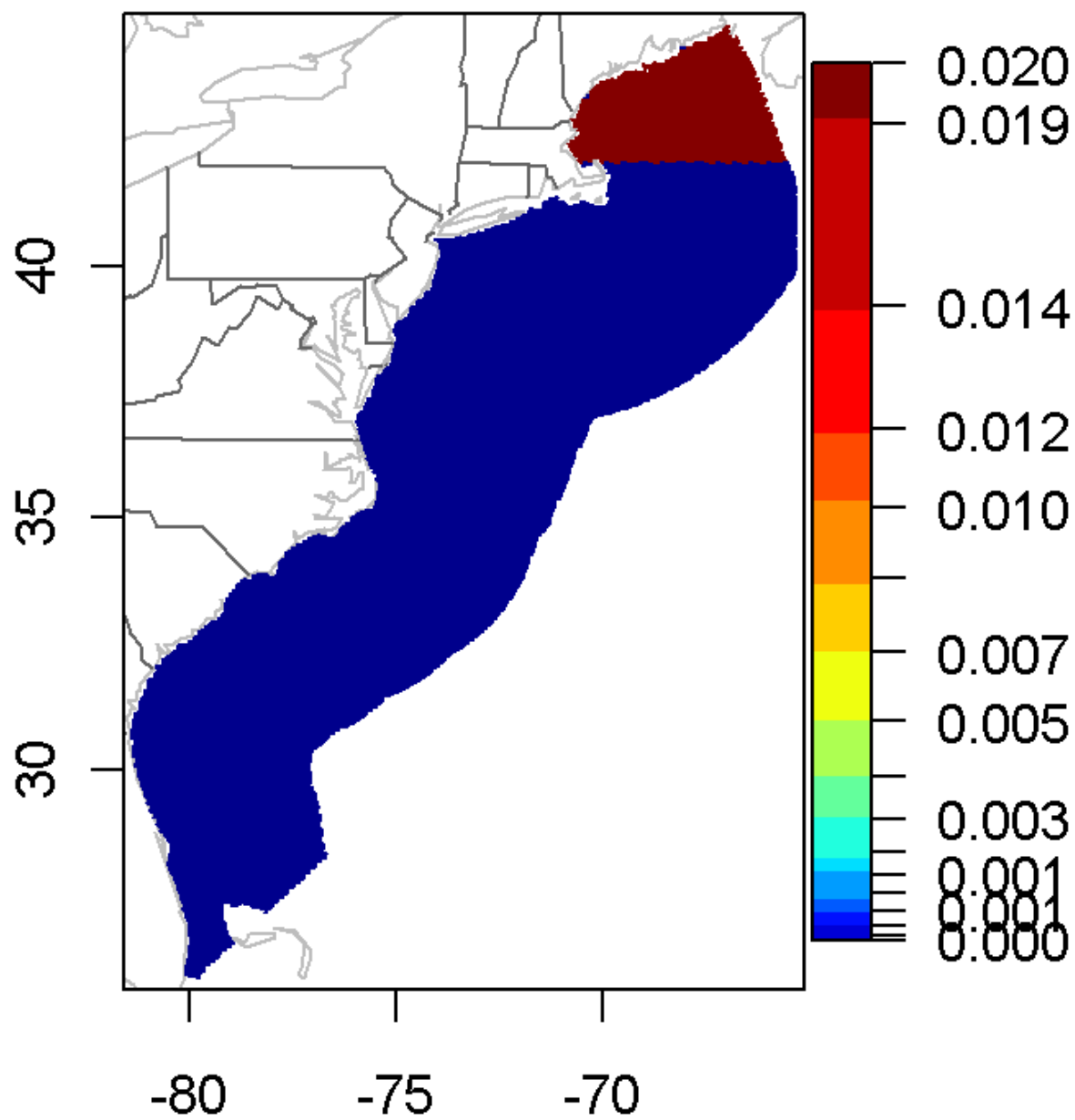


Figure 392: Map of binary habitat (cutoff determined by ROC) for 'Lags' guild during 'fall' season in 'east2' region.

8.2 spring

8.3 summer

8.3.1 east2

Modelrun identifier: duke_06_la3_summer_east2

Date generated: 2008-10-21 13:23:11

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 37: Summary for duke(6) GAM model: for 'Lags' guild during 'summer' season in 'east2' region.

	Value
Number.presences	151
Number.absences	8927
GAM.converged	TRUE
R.squared	0.146137
Deviance.explained	0.313246
ROC.optimum	0.238948
Maximum.fit	0.0198197
Maximum.prediction	0.166888

Model text summary...

```
duke_06_la3_summer_east2 run on Tue Oct 21 13:17:58 2008
provider:duke, version:06, guild:Lags (la3), season:'summer', region:east2

max.fit:0.238948, max.prediction:0.166888, ROC.optimum:0.019820

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -9.4389      0.4409  -21.41  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.946e+00  2.446 13.691 1.15e-07 ***
s(log(d2shelf)) 2.585e-06  0.500  0.001  0.852
s(log(d2coast)) 1.965e+00  2.465 21.815 5.43e-12 ***
s(sst)         1.975e+00  2.475 77.663  < 2e-16 ***
s(lat)         9.729e-01  1.473 65.291  < 2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.146 Deviance explained = 31.3%
GCV score = 0.0008083 Scale est. = 0.00080698 n = 8663

summary(dat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.   : 5.0  Min.   : 5  Min.   : 1259  Min.   : 8.175  Min.   :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.: 20989  1st Qu.: 50865  1st Qu.: 17.025  1st Qu.:37.53
          Median :14008  Median : 111.5  Median : 52230  Median :102266  Median : 22.200  Median :40.18
          Mean   :13275  Mean   : 677.3  Mean   : 67623  Mean   :125197  Mean   : 21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.: 420.0  3rd Qu.: 99335  3rd Qu.:174835  3rd Qu.: 25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   : 30.900  Max.   :44.74
          NA's   :      7      NA's   : 7      NA's   :408.000

summary(newdat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   : 4  Min.   : 5  Min.   : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :1.030e-12  Min.   :1.748e-12  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:8.054e-11  1st Qu.:1.176e-10  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :8.510e-09  Median :9.686e-09  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :7.997e-03  Mean   :7.266e-04  Mean   :3.275e-02  Mean   :1.069e-02  Mean   :0.1360
3rd Qu.:14088  3rd Qu.:4.469e-05  3rd Qu.:2.719e-05  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :1.669e-01  Max.   :1.184e-02  Max.   :3.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

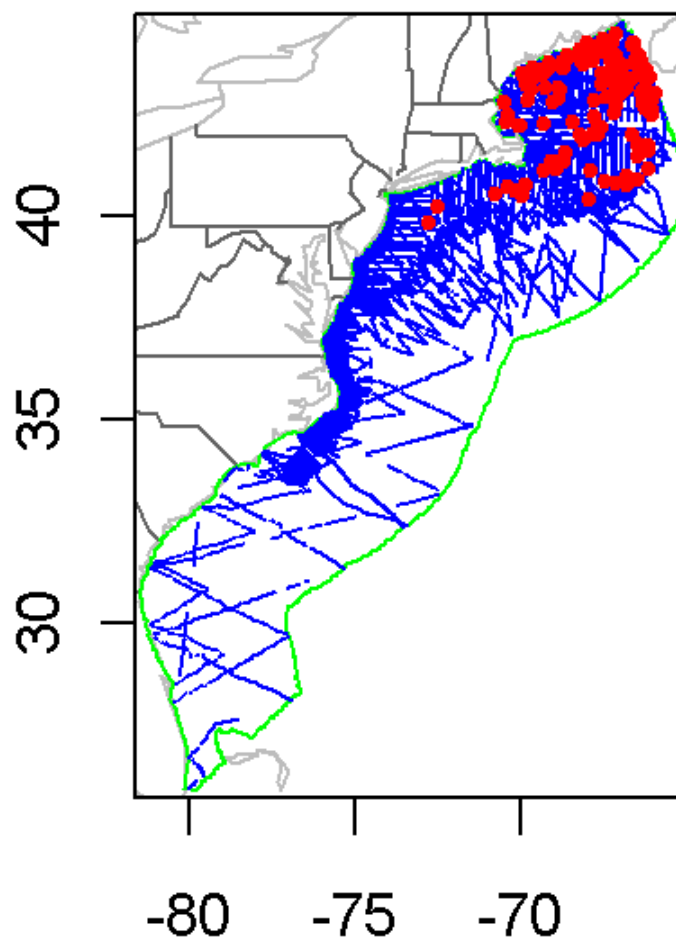


Figure 393: Map of points of observational sightings and tracks of survey effort for 'Lags' guild during 'summer' season in 'east2' region.

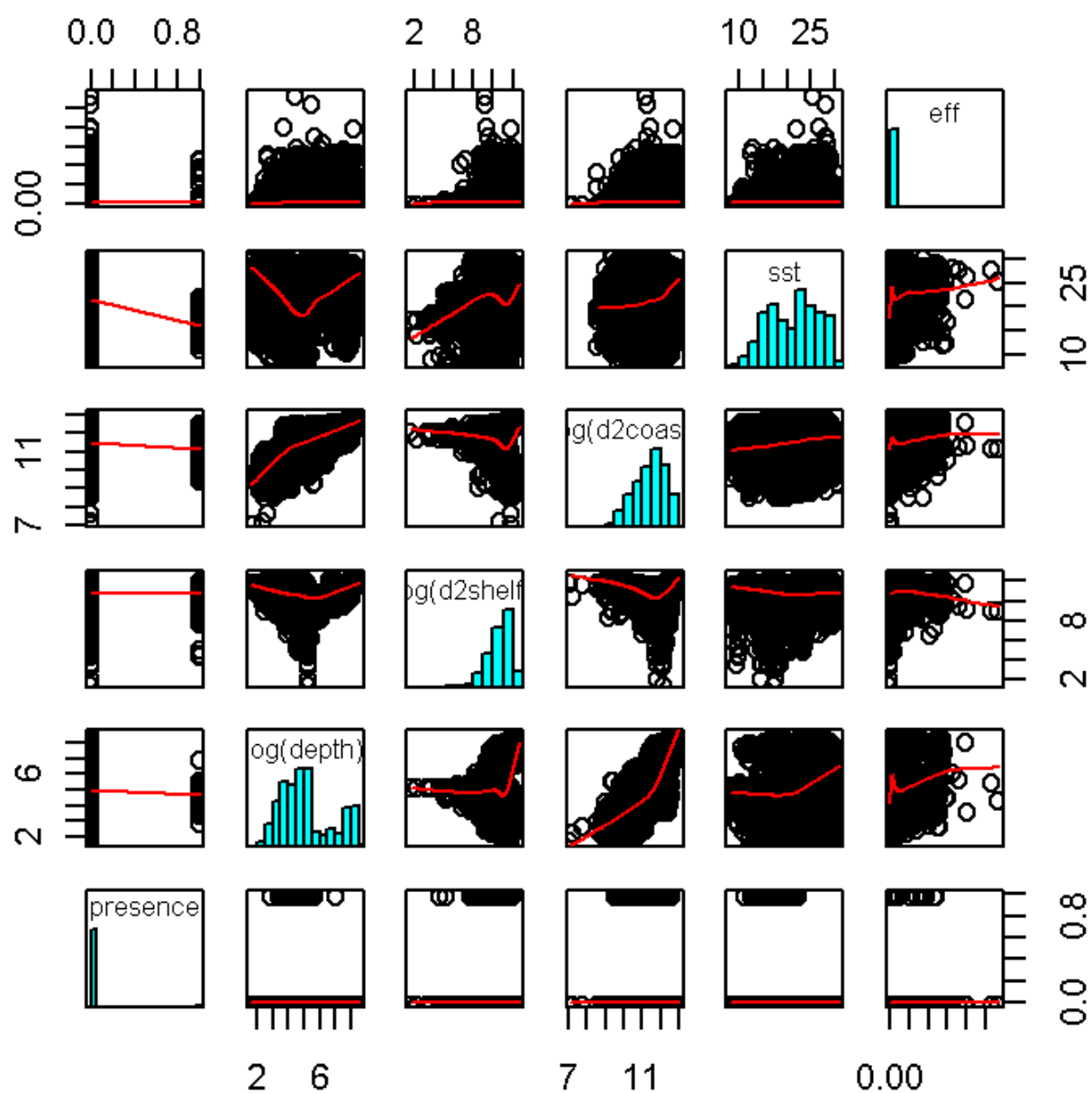


Figure 394: Pairs plot of input variables for 'Lags' guild during 'summer' season in 'east2' region.

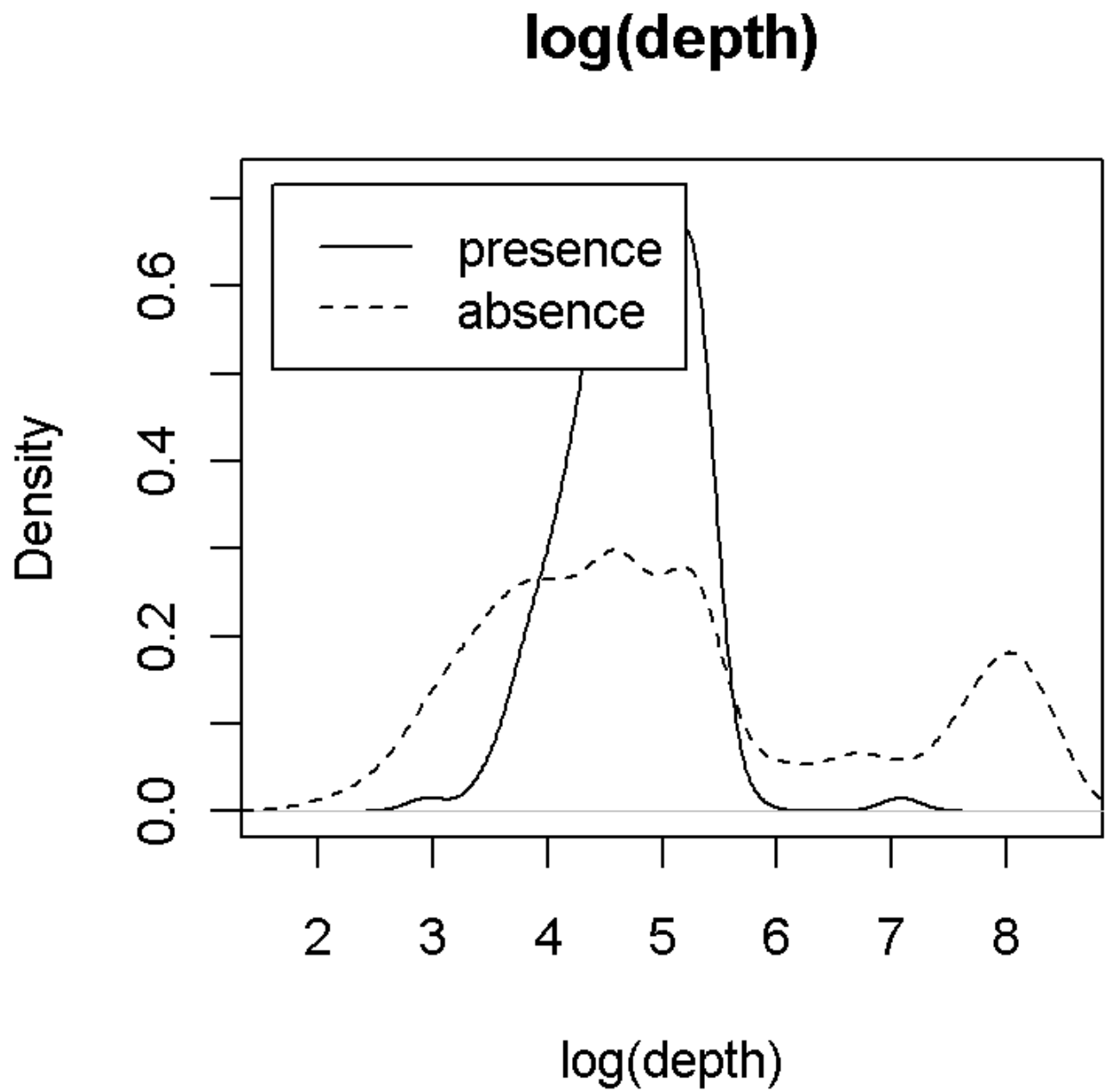


Figure 395: Density histogram of depth log(meters) for 'Lags' guild during 'summer' season in 'east2' region.

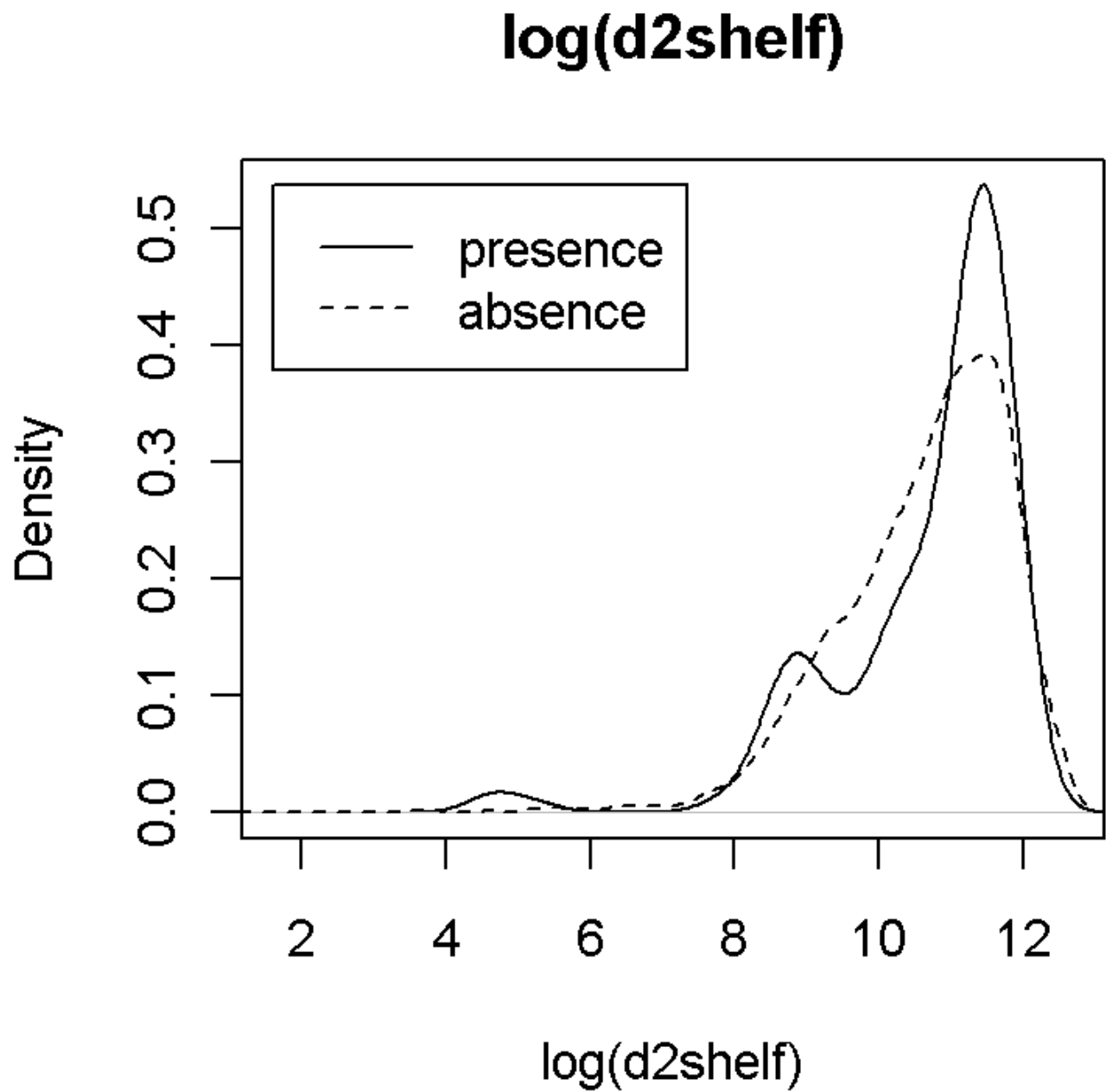


Figure 396: Density histogram of distance to shelf log(meters) for 'Lags' guild during 'summer' season in 'east2' region.

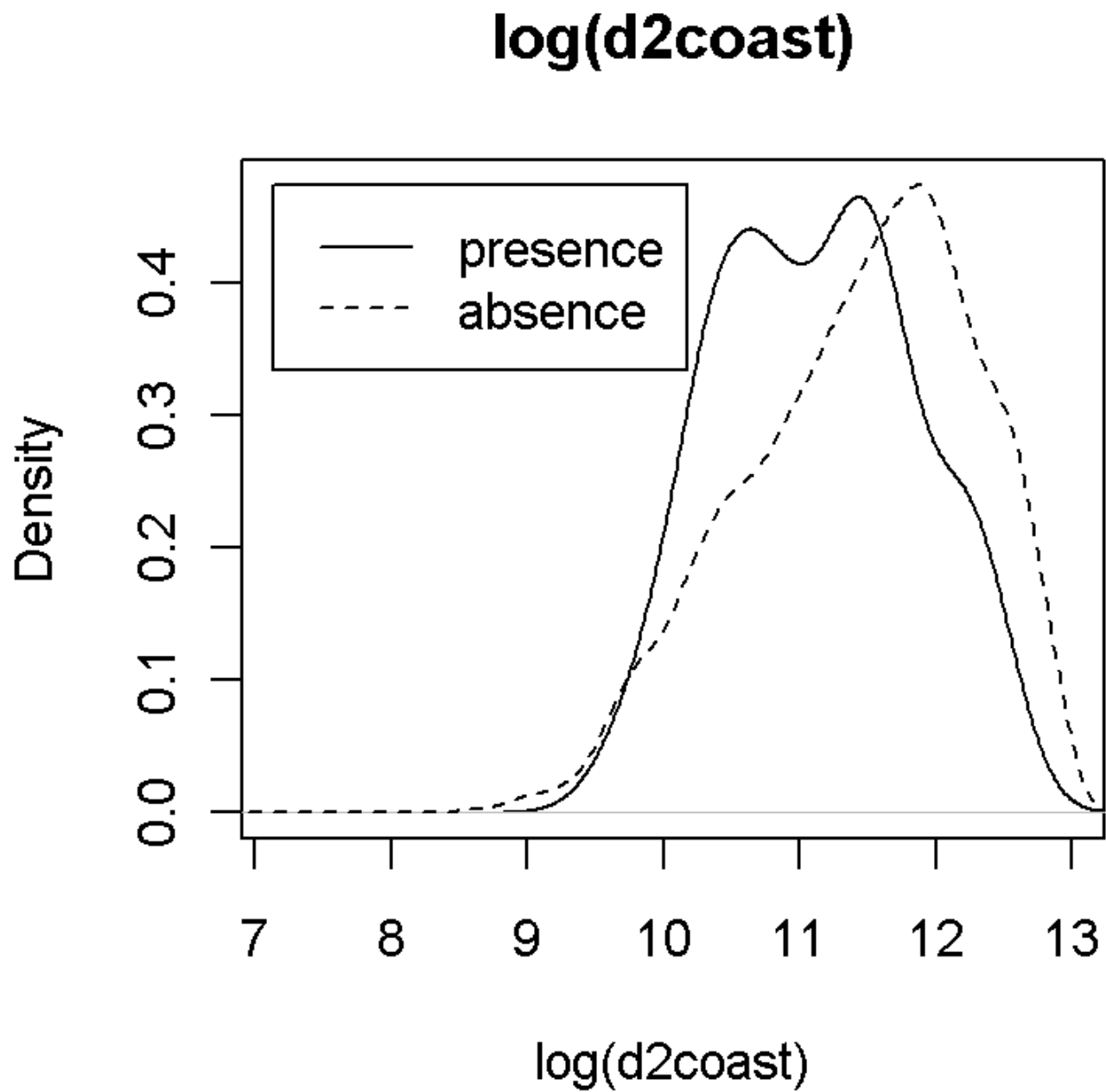


Figure 397: Density histogram of distance to coast log(meters) for 'Lags' guild during 'summer' season in 'east2' region.

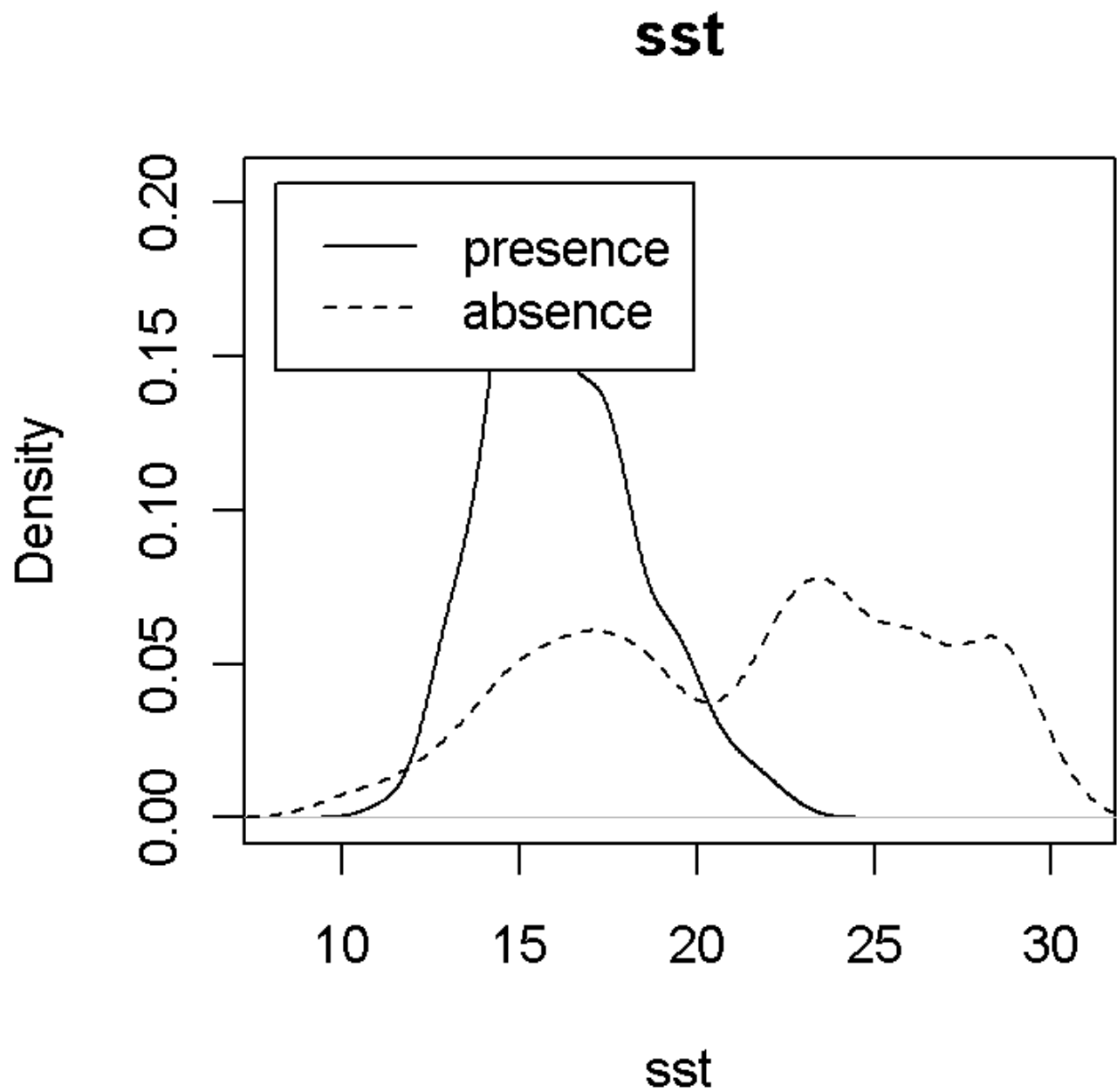


Figure 398: Density histogram of sea-surface temperature (degrees C) for 'Lags' guild during 'summer' season in 'east2' region.

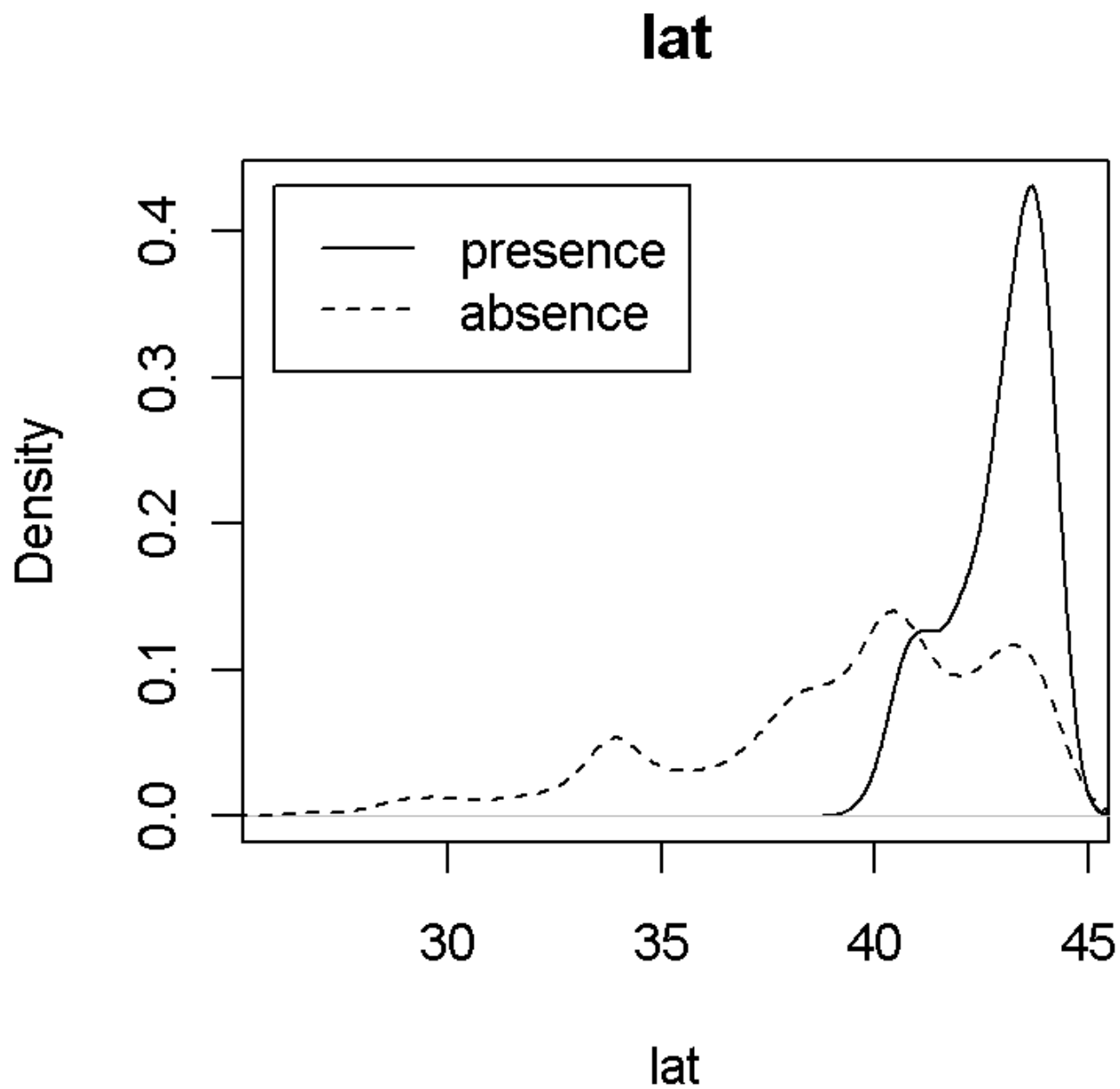


Figure 399: Density histogram of latitude (degrees) for 'Lags' guild during 'summer' season in 'east2' region.

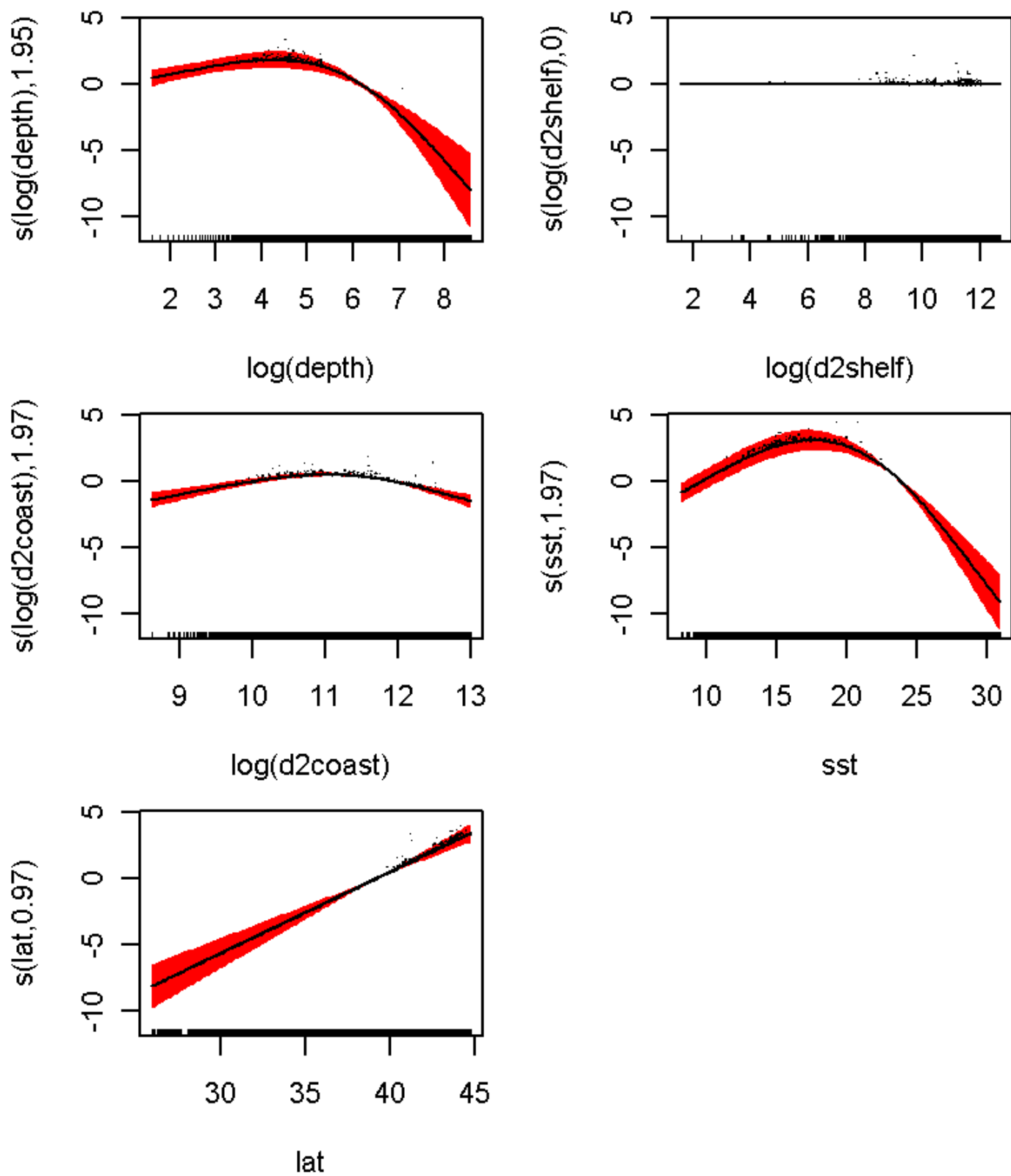


Figure 400: Terms plot of predictors to GAM model fit for 'Lags' guild during 'summer' season in 'east2' region.

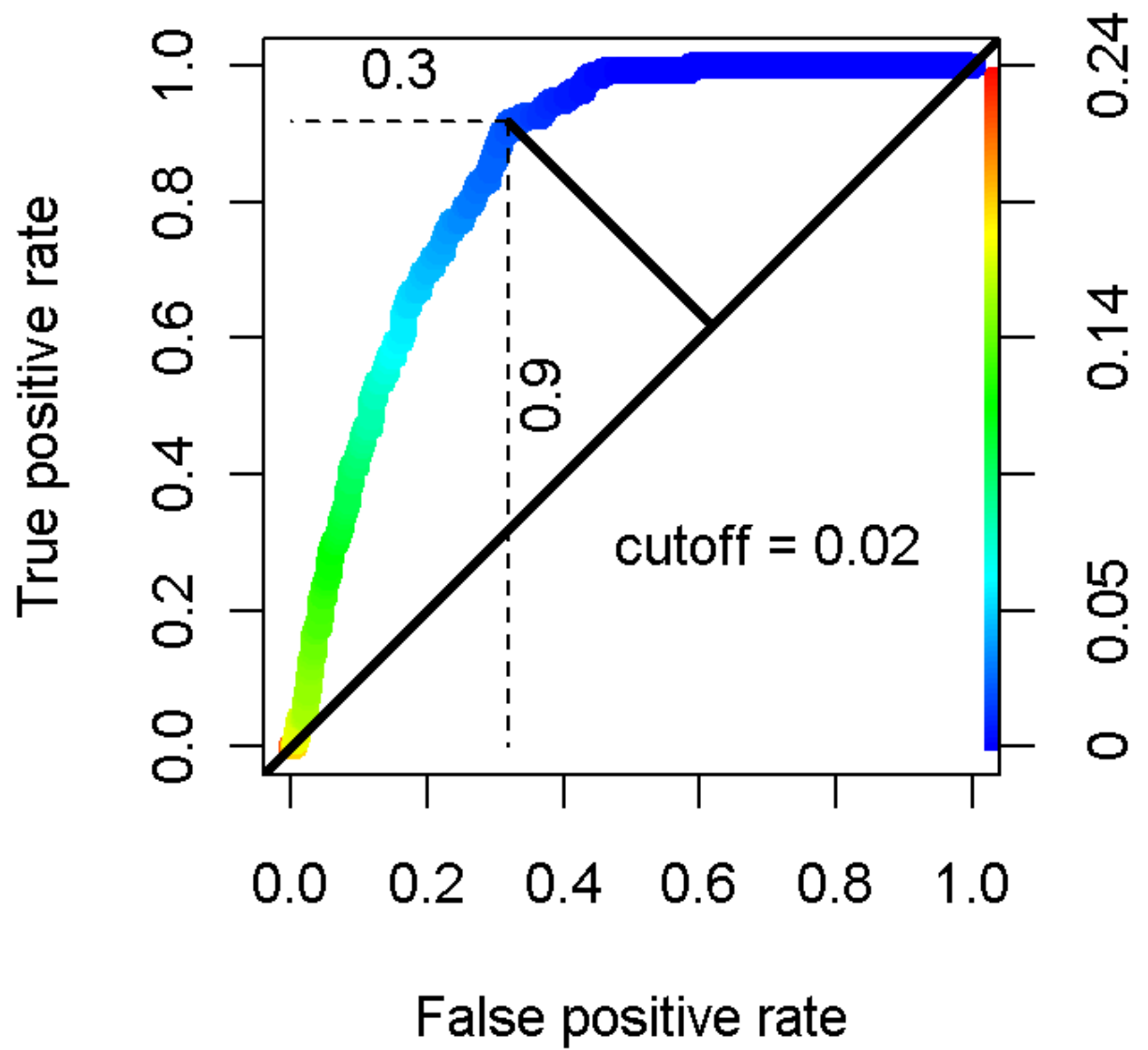


Figure 401: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Lags' guild during 'summer' season in 'east2' region.

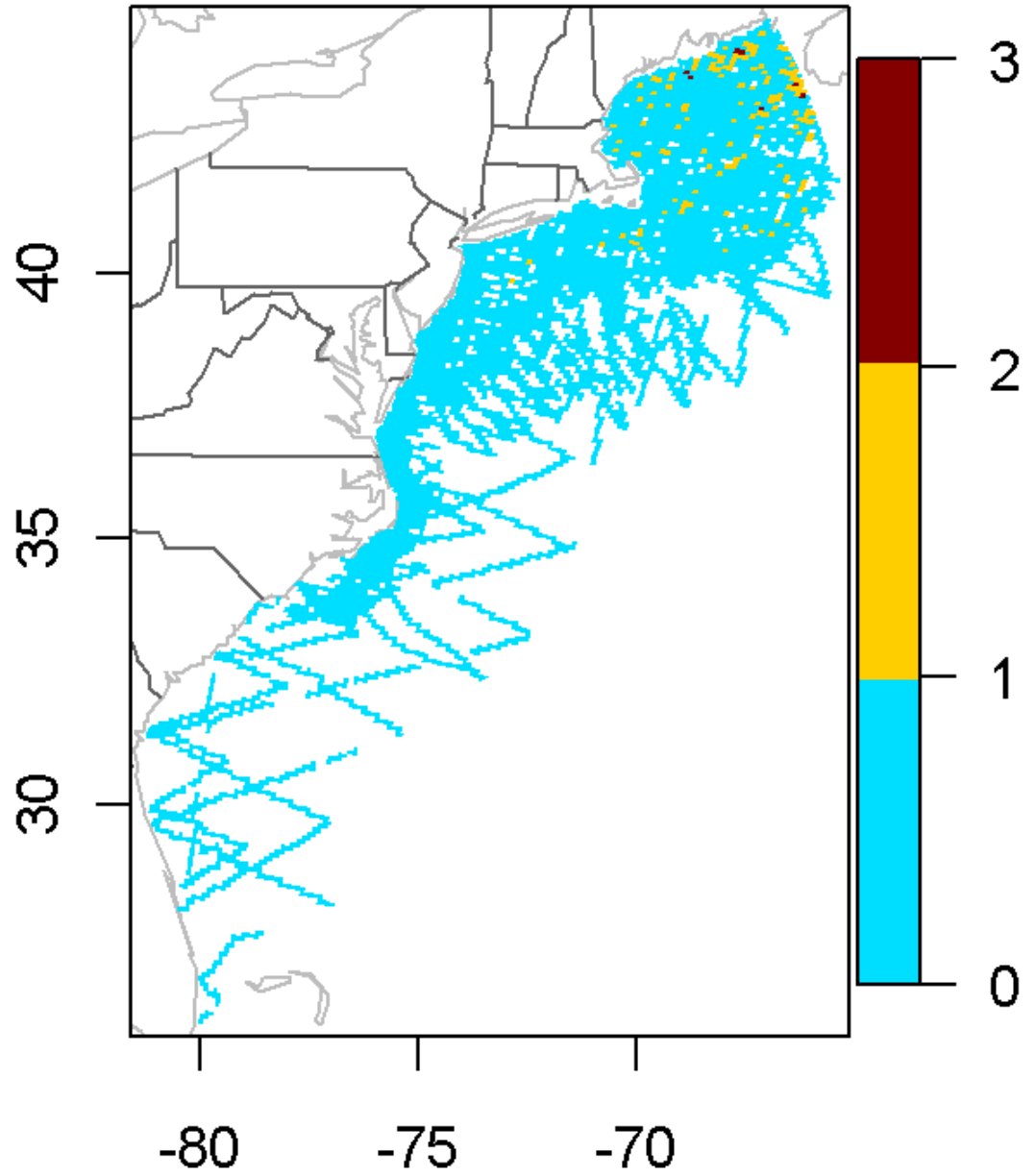


Figure 402: Map of presence and absence by cell summed through time for 'Lags' guild during 'summer' season in 'east2' region.

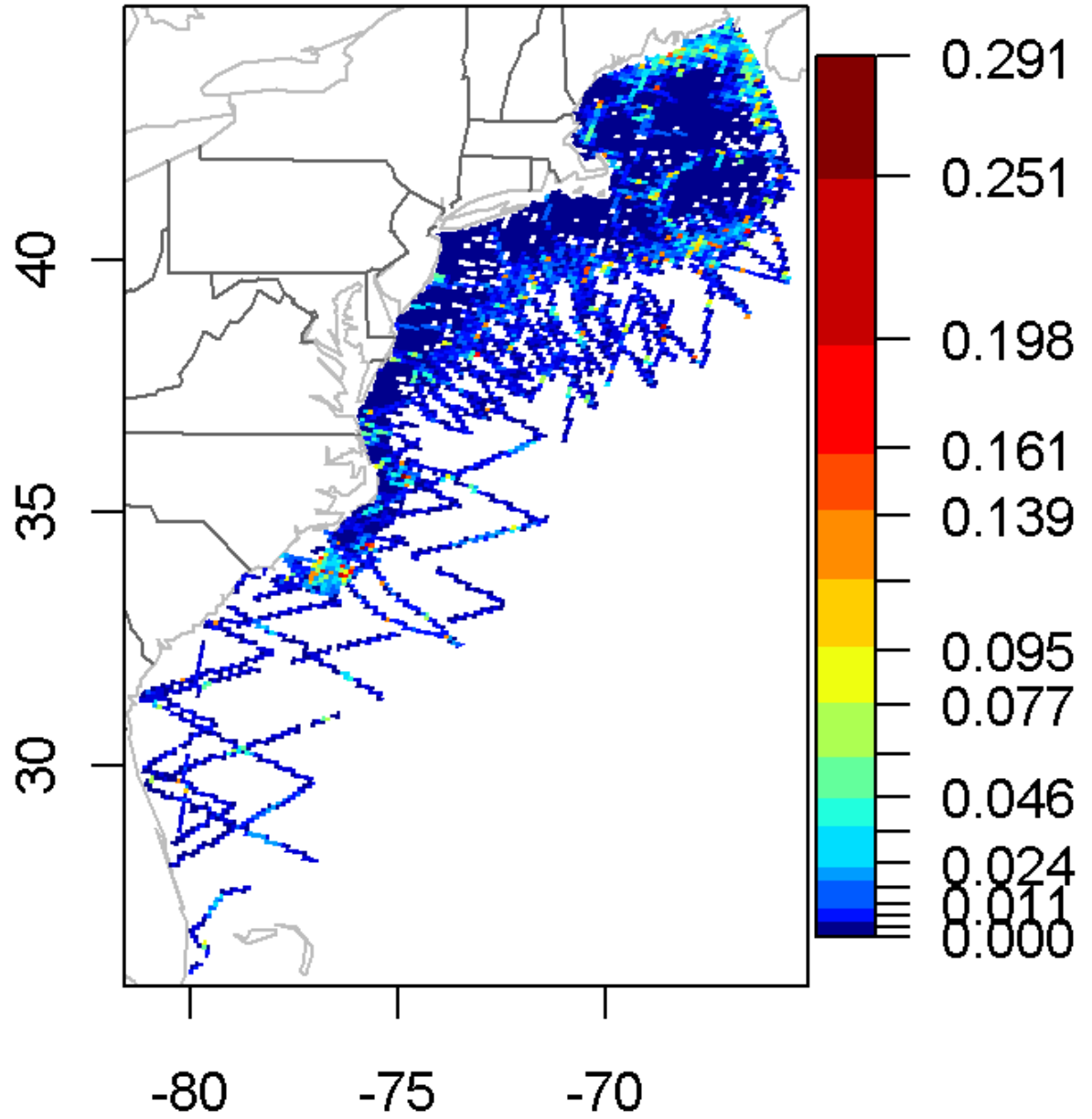


Figure 403: Map of effort(hours/km²) by cell summed through time for 'Lags' guild during 'summer' season in 'east2' region.

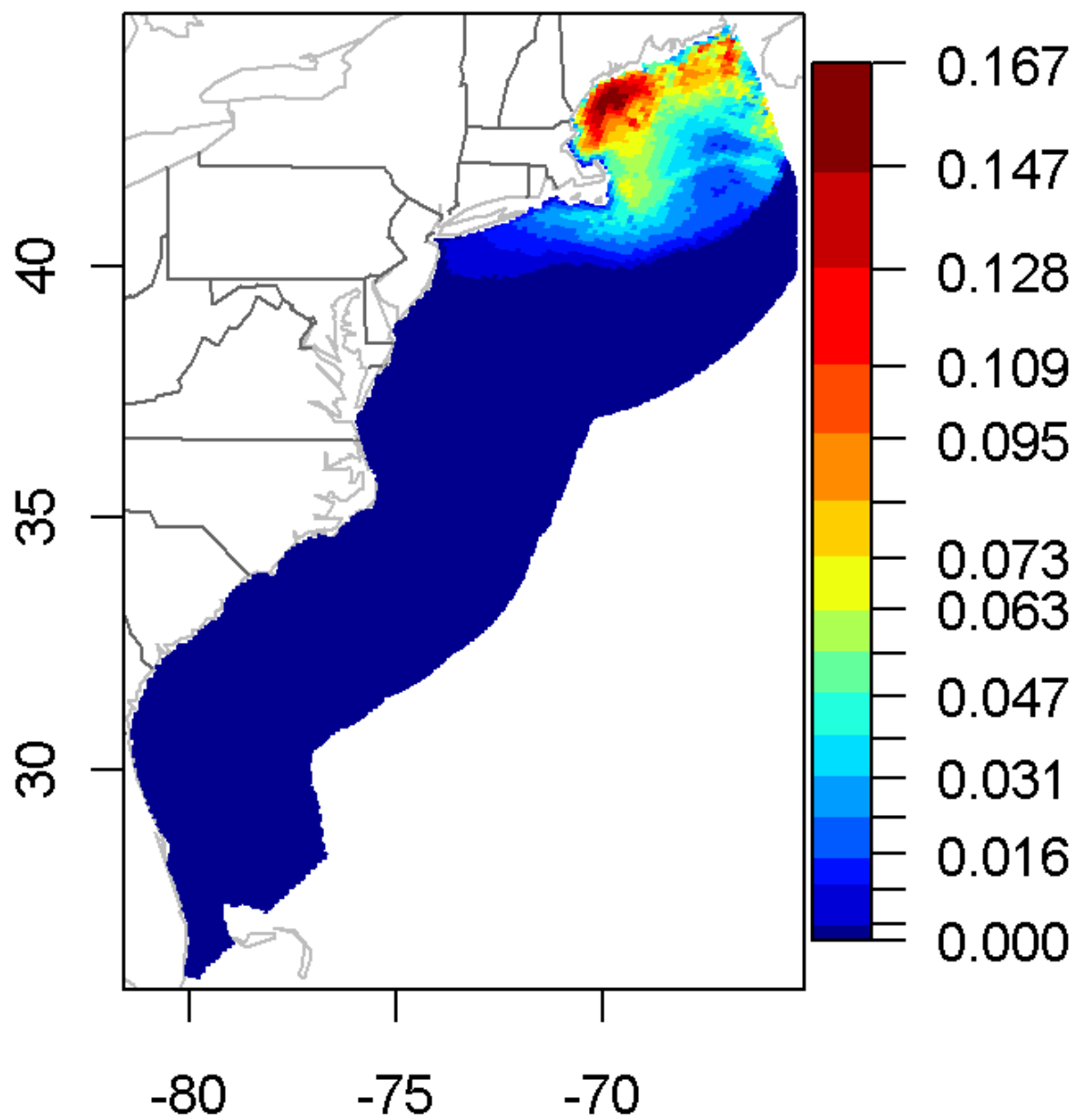


Figure 404: Map of mean predicted habitat for 'Lags' guild during 'summer' season in 'east2' region.

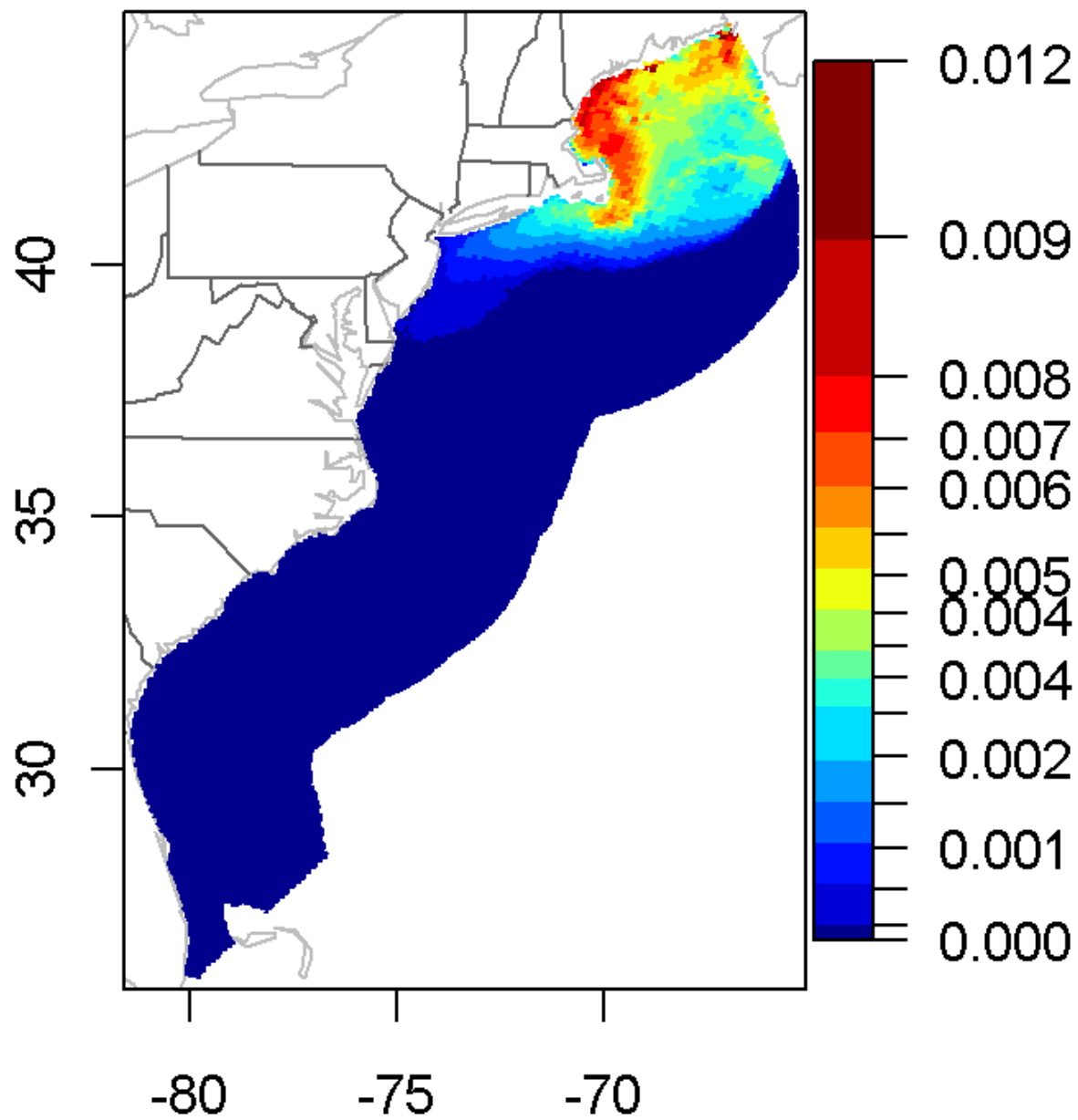


Figure 405: Map of standard error of habitat for 'Lags' guild during 'summer' season in 'east2' region.

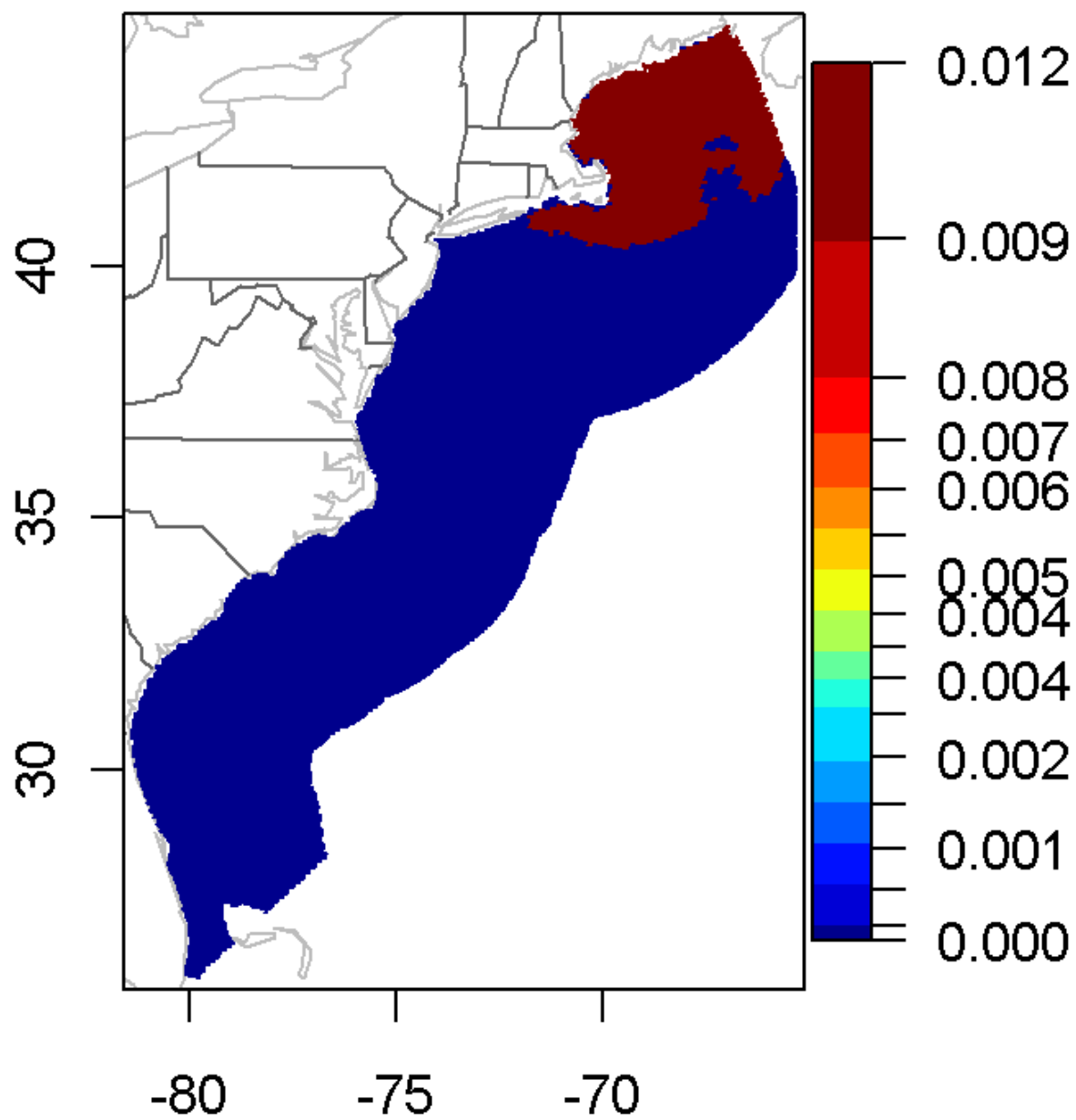


Figure 406: Map of binary habitat (cutoff determined by ROC) for 'Lags' guild during 'summer' season in 'east2' region.

8.4 winter

9 Pilot whales

Guildid:pw3

Table 38: Taxonomic members of the "Pilot whales" guild.

	Scientific Name	Common Name	Taxonomic #
1	Globicephala	pilot whales	180464
2	Globicephala macrorhynchus	short-finned pilot whale	180466
3	Globicephala melas	long-finned pilot whale	552461

9.1 fall

9.1.1 east2

Modelrun identifier: duke_06_pw3_fall_east2

Date generated: 2008-10-21 14:27:01

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 39: Summary for duke(6) GAM model: for 'Pilot whales' guild during 'fall' season in 'east2' region.

	Value
Number.presences	22
Number.absences	1842
GAM.converged	TRUE
R.squared	0.0451814
Deviance.explained	0.219679
ROC.optimum	0.14585
Maximum.fit	0.0050257
Maximum.prediction	0.155557

Model text summary...

```
duke_06_pw3_fall_east2 run on Tue Oct 21 14:25:48 2008
  provider:duke, version:06, guild:Pilot whales (pw3), season:'fall', region:east2

max.fit:0.145850, max.prediction:0.155557, ROC.optimum:0.005026

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.8938      0.2088  -28.23   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.501e+00  2.001   3.377  0.0343 *
s(log(d2shelf)) 2.256e-06  0.500  3.07e-06  0.9674
s(log(d2coast)) 1.992e+00  2.492  48.080 <2e-16 ***
s(sst)          4.660e-07  0.500  3.26e-06  0.9668
s(lat)          1.002e+00  1.502  115.879 <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  0.0452  Deviance explained =  22%
GCV score = 0.00051115  Scale est. = 0.00050838  n = 1826

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.   : 1654  Min.   :  6.0  Min.   :  10  Min.   : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0  1st Qu.:12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0  Median : 30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5  Mean   : 47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.:197.0  3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
        NA's    :      1    NA's    :      1    NA's    :37.00

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :  5  Min.   :1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :1.152e-13  Min.   :4.775e-13  Min.   :0.000e+00  Min.   :1.290e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:1.184e-03  1st Qu.:4.157e-04  1st Qu.:0.000e+00  1st Qu.:5.348e-04  1st Qu.:0.0000
Median :11616  Median :5.610e-03  Median :1.229e-03  Median :0.000e+00  Median :2.645e-03  Median :1.0000
Mean   :11171  Mean   :2.092e-02  Mean   :3.002e-03  Mean   :1.986e-02  Mean   :8.763e-03  Mean   :0.5146
3rd Qu.:14088  3rd Qu.:3.168e-02  3rd Qu.:4.433e-03  3rd Qu.:0.000e+00  3rd Qu.:6.382e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :1.556e-01  Max.   :2.342e-02  Max.   :1.000e+00  Max.   :5.995e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.780e+03  NA's :8.780e+03
```

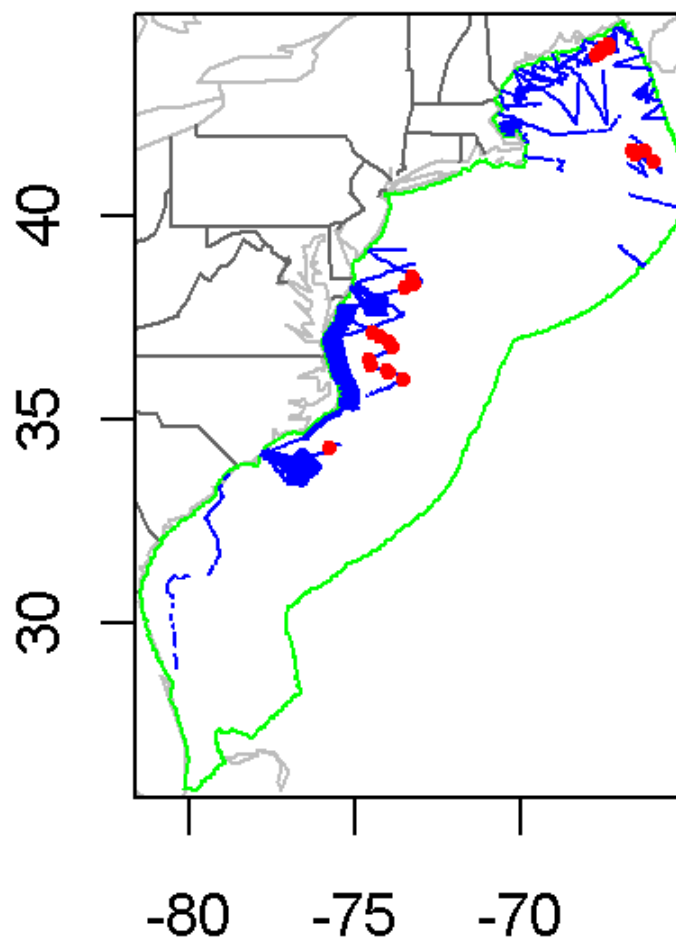



Figure 407: Map of points of observational sightings and tracks of survey effort for 'Pilot whales' guild during 'fall' season in 'east2' region.

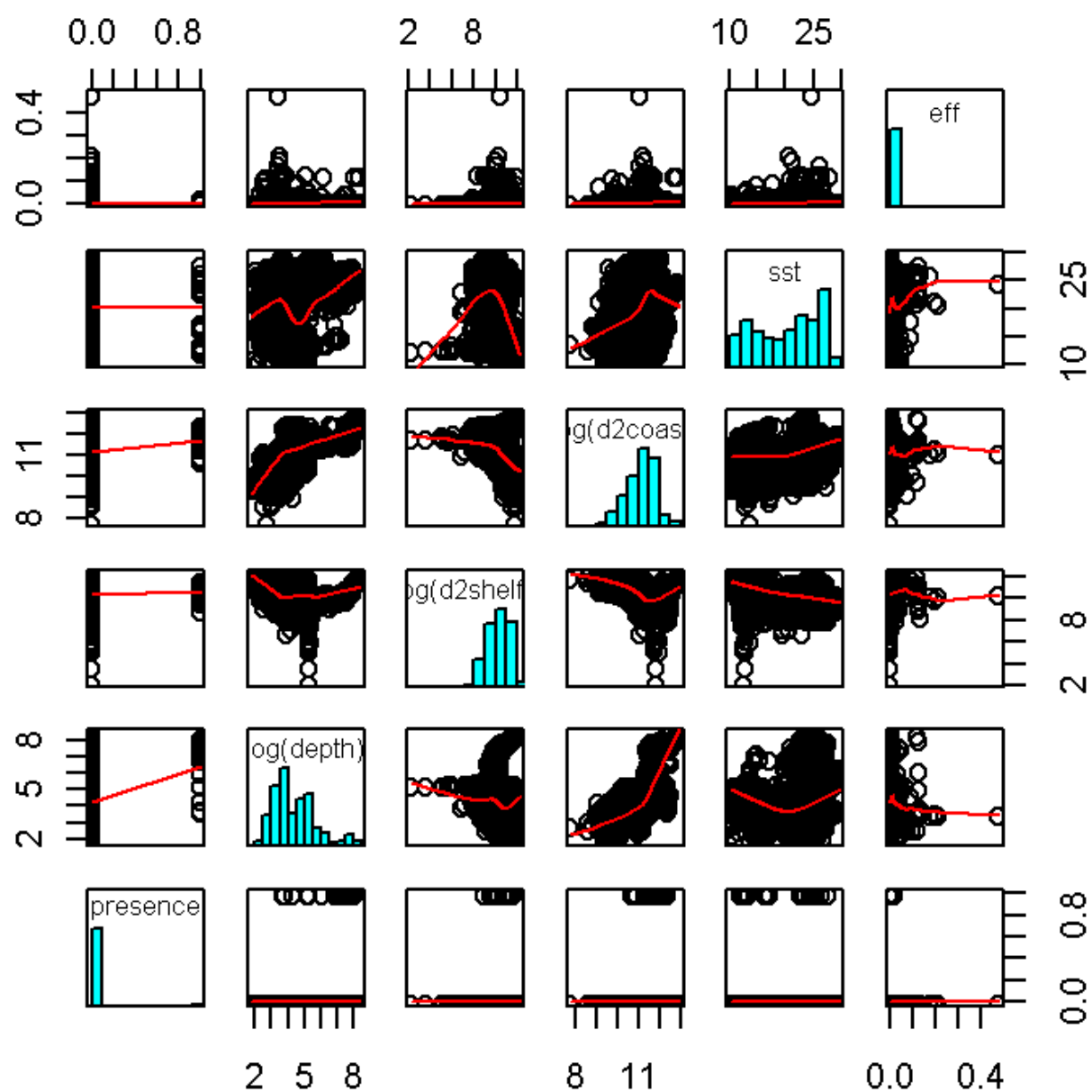


Figure 408: Pairs plot of input variables for 'Pilot whales' guild during 'fall' season in 'east2' region.

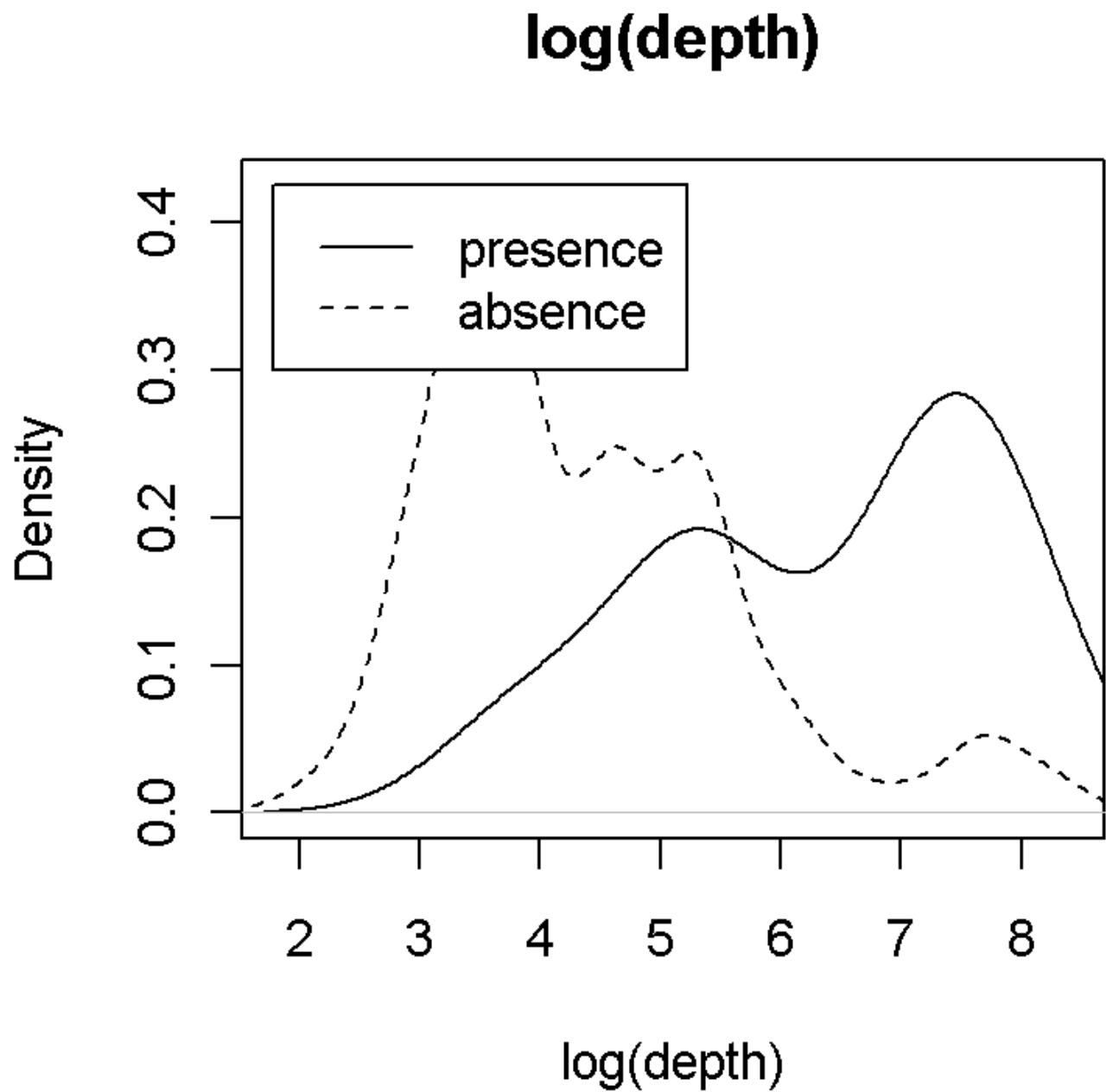


Figure 409: Density histogram of depth log(meters) for 'Pilot whales' guild during 'fall' season in 'east2' region.

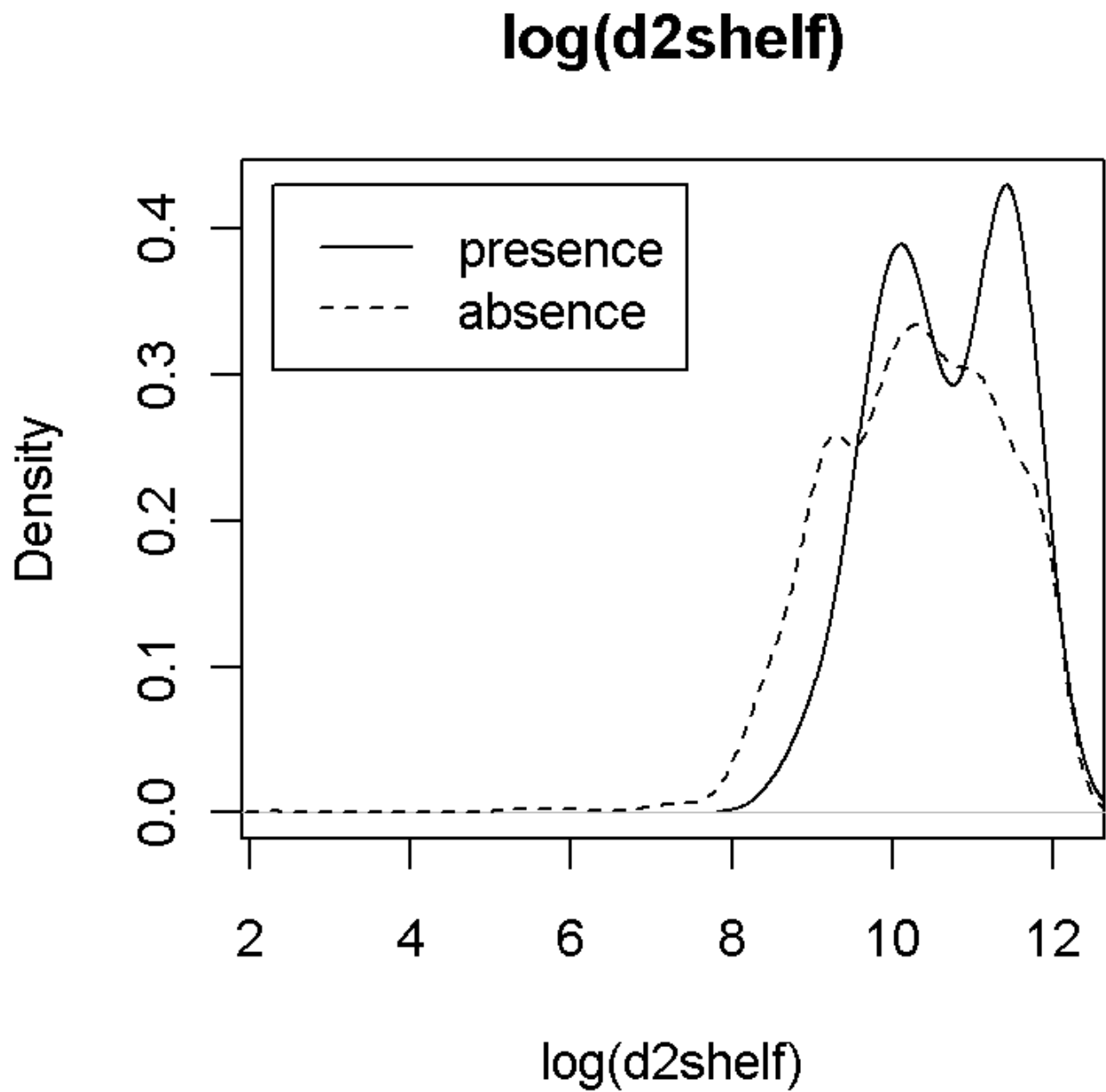


Figure 410: Density histogram of distance to shelf log(meters) for 'Pilot whales' guild during 'fall' season in 'east2' region.

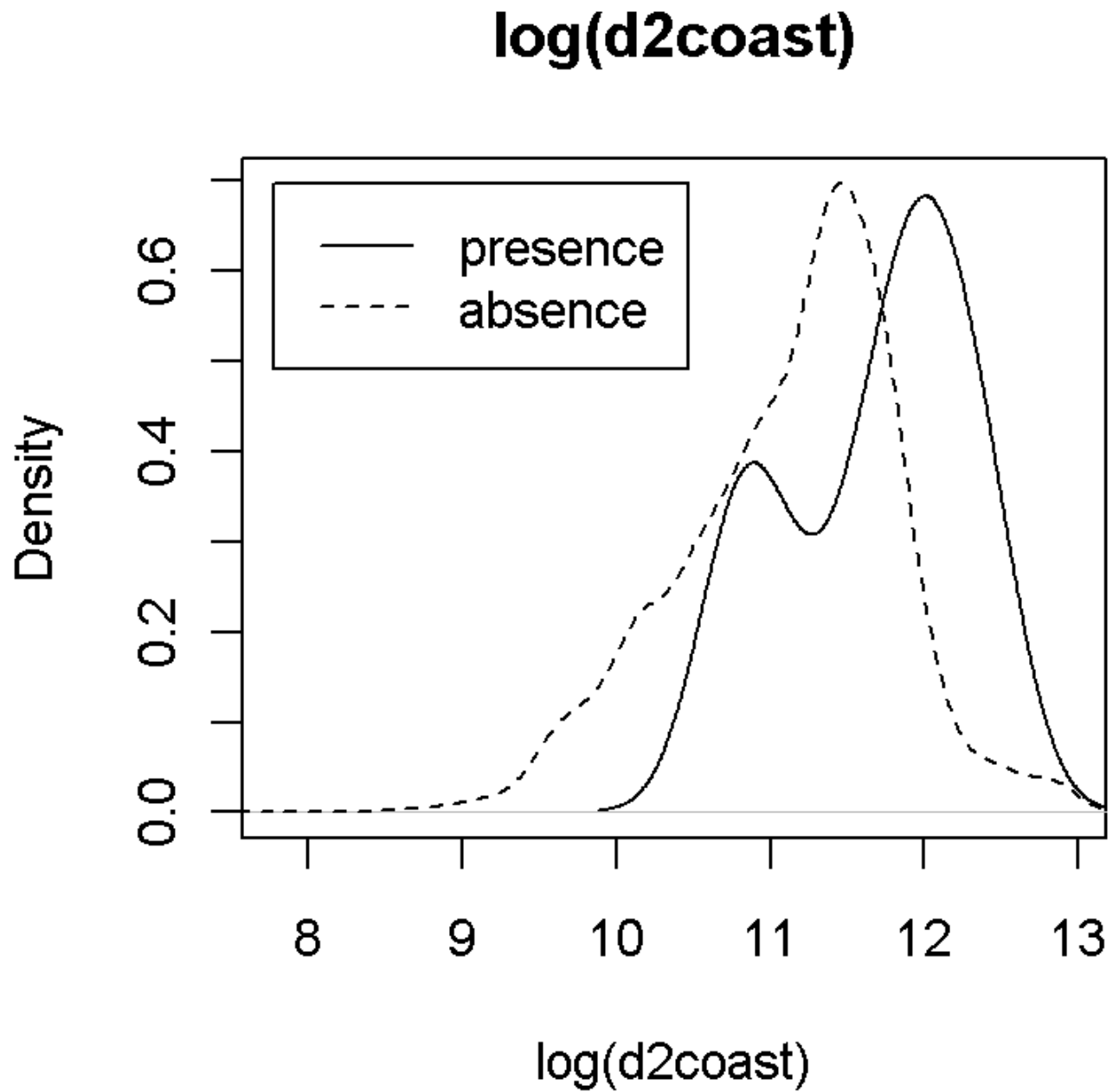


Figure 411: Density histogram of distance to coast log(meters) for 'Pilot whales' guild during 'fall' season in 'east2' region.

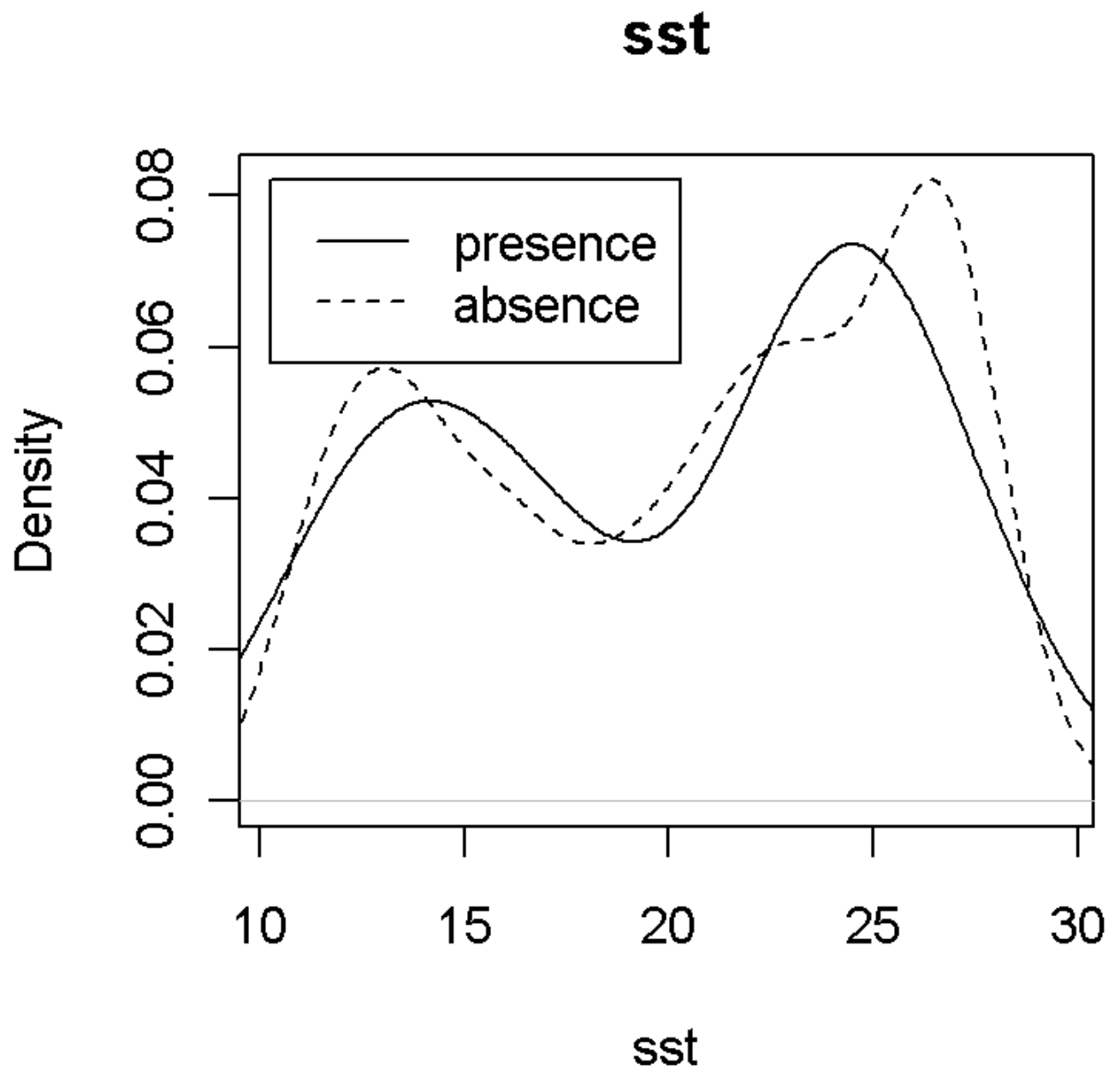


Figure 412: Density histogram of sea-surface temperature (degrees C) for 'Pilot whales' guild during 'fall' season in 'east2' region.

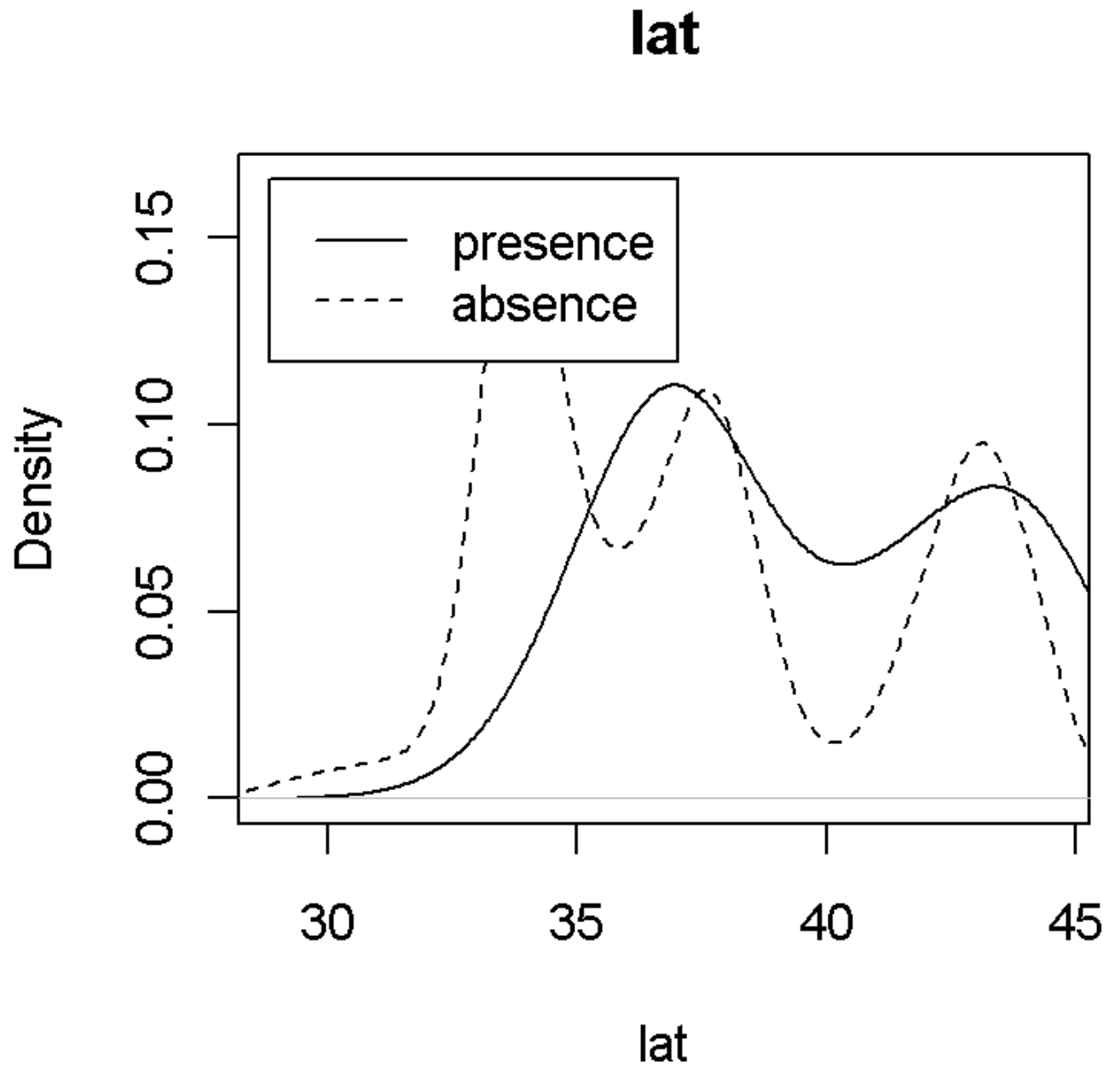


Figure 413: Density histogram of latitude (degrees) for 'Pilot whales' guild during 'fall' season in 'east2' region.

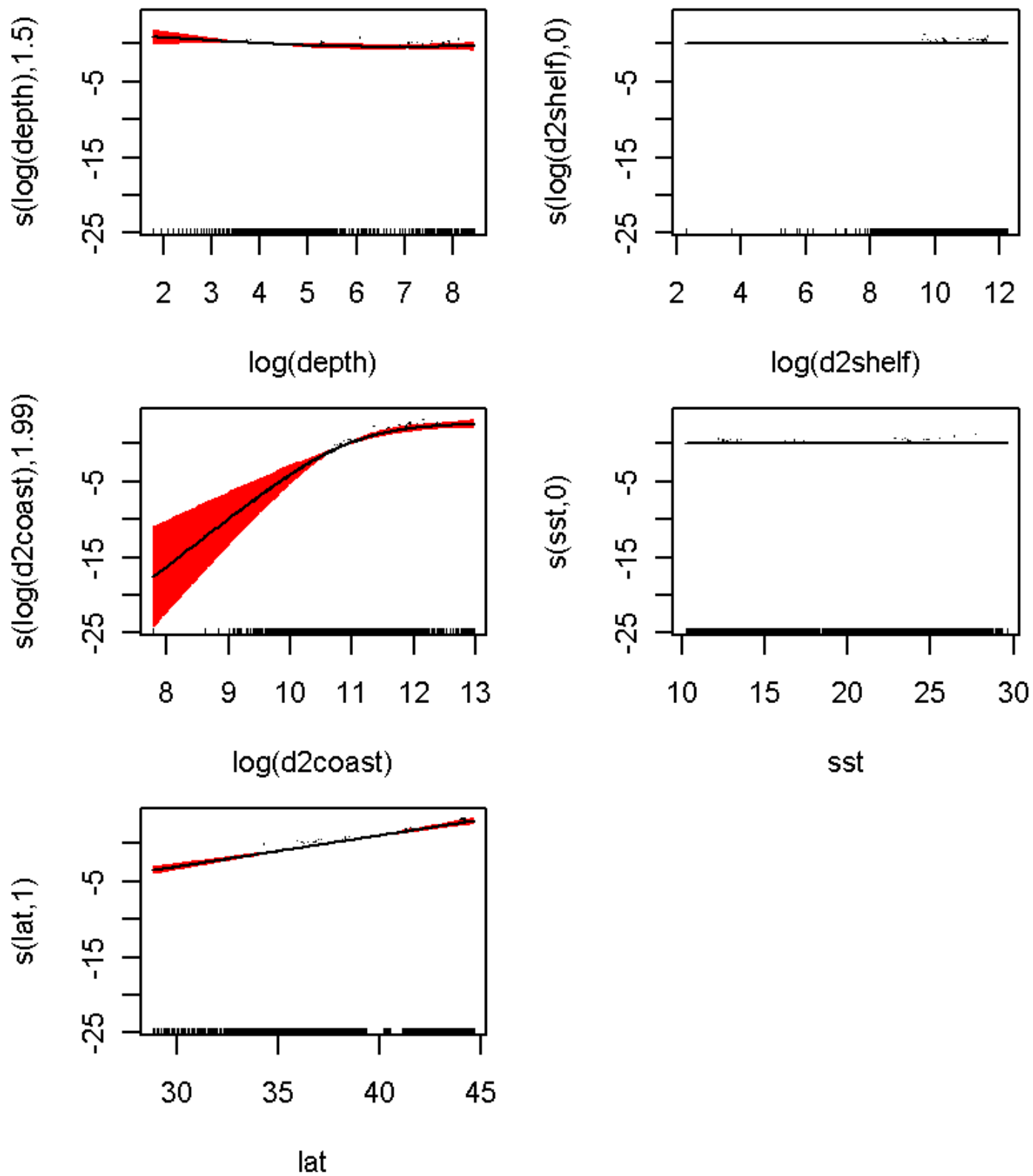


Figure 414: Terms plot of predictors to GAM model fit for 'Pilot whales' guild during 'fall' season in 'east2' region.

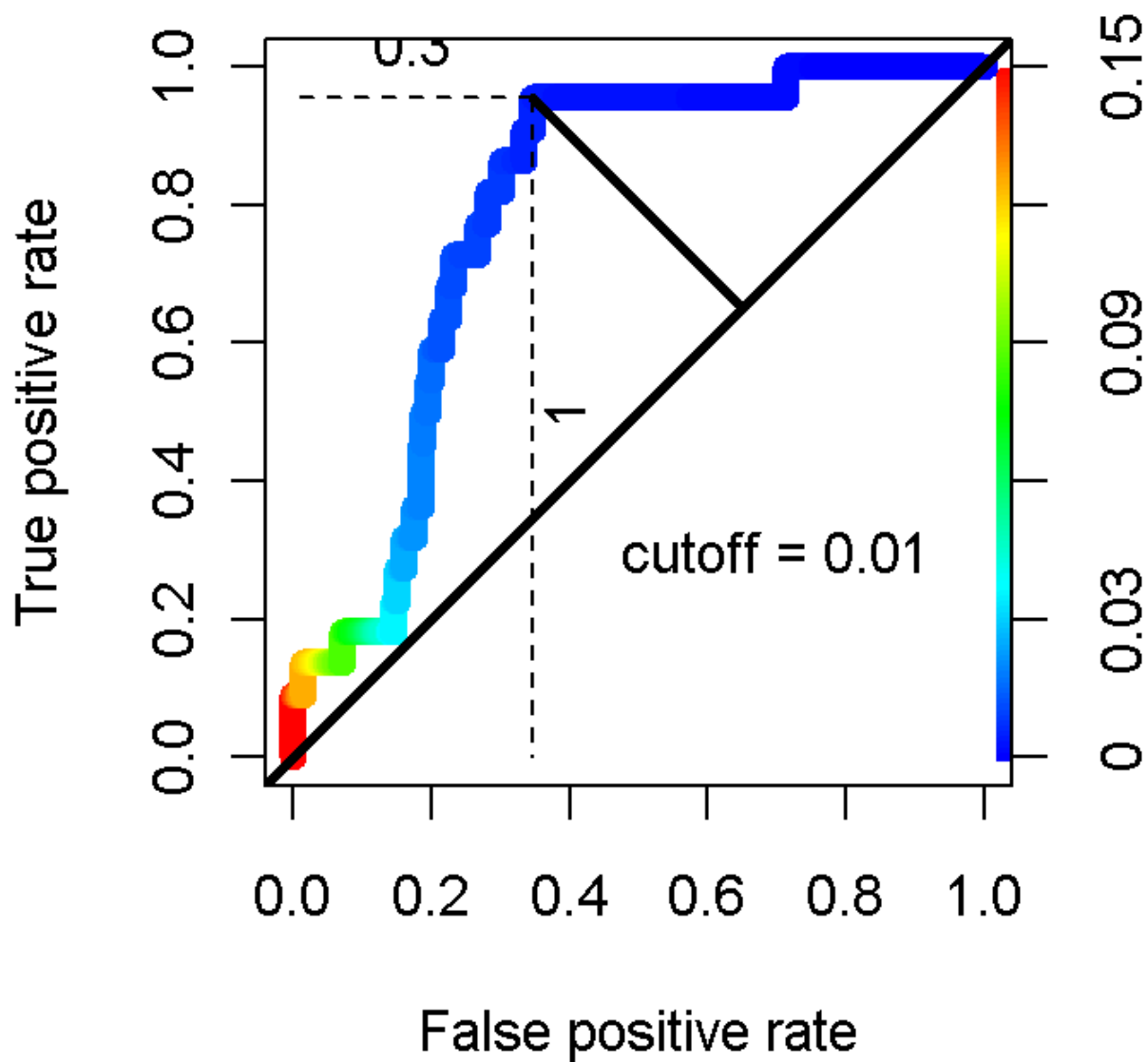


Figure 415: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Pilot whales' guild during 'fall' season in 'east2' region.

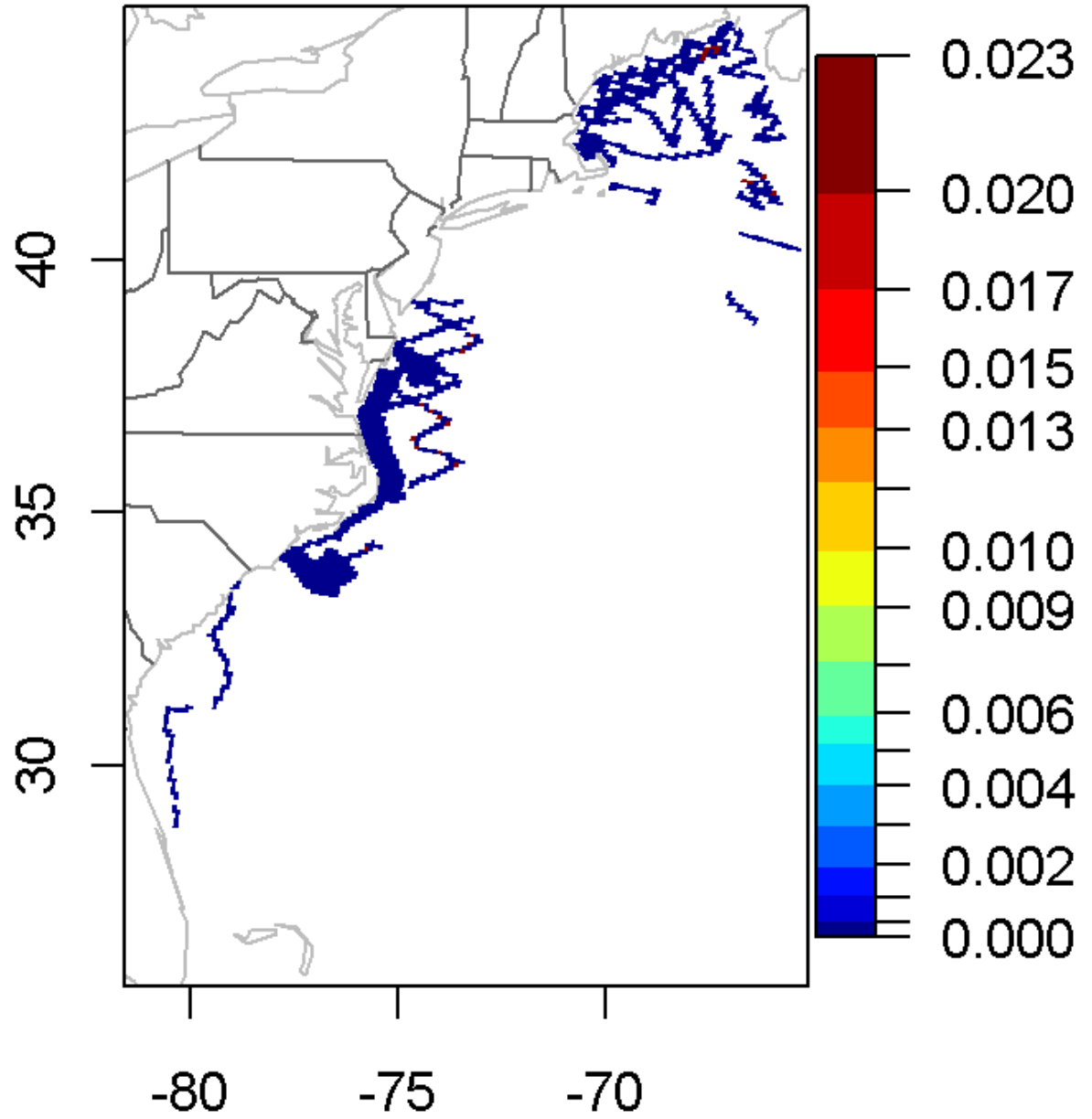


Figure 416: Map of presence and absence by cell summed through time for 'Pilot whales' guild during 'fall' season in 'east2' region.

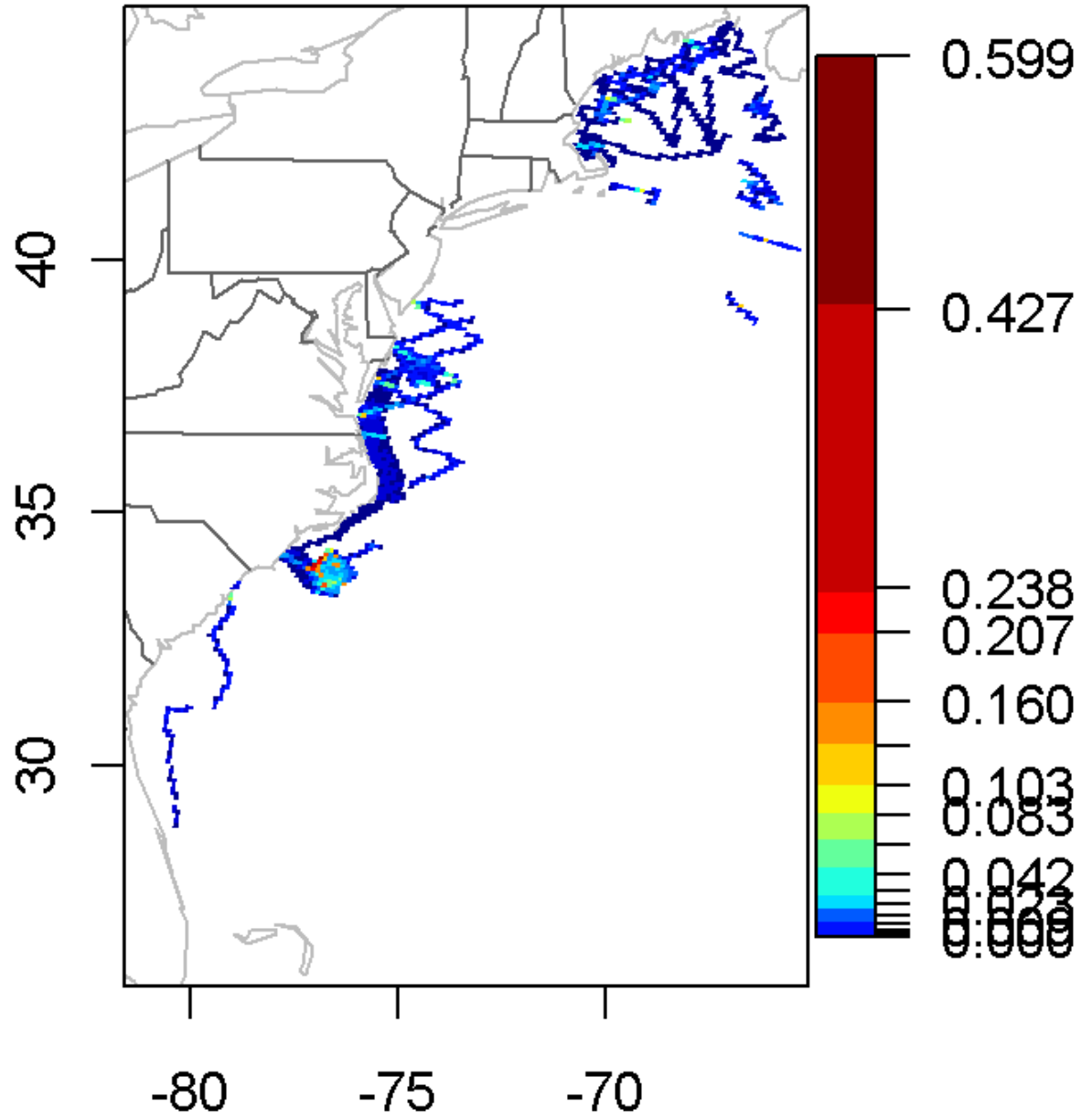


Figure 417: Map of effort(hours/km²) by cell summed through time for 'Pilot whales' guild during 'fall' season in 'east2' region.

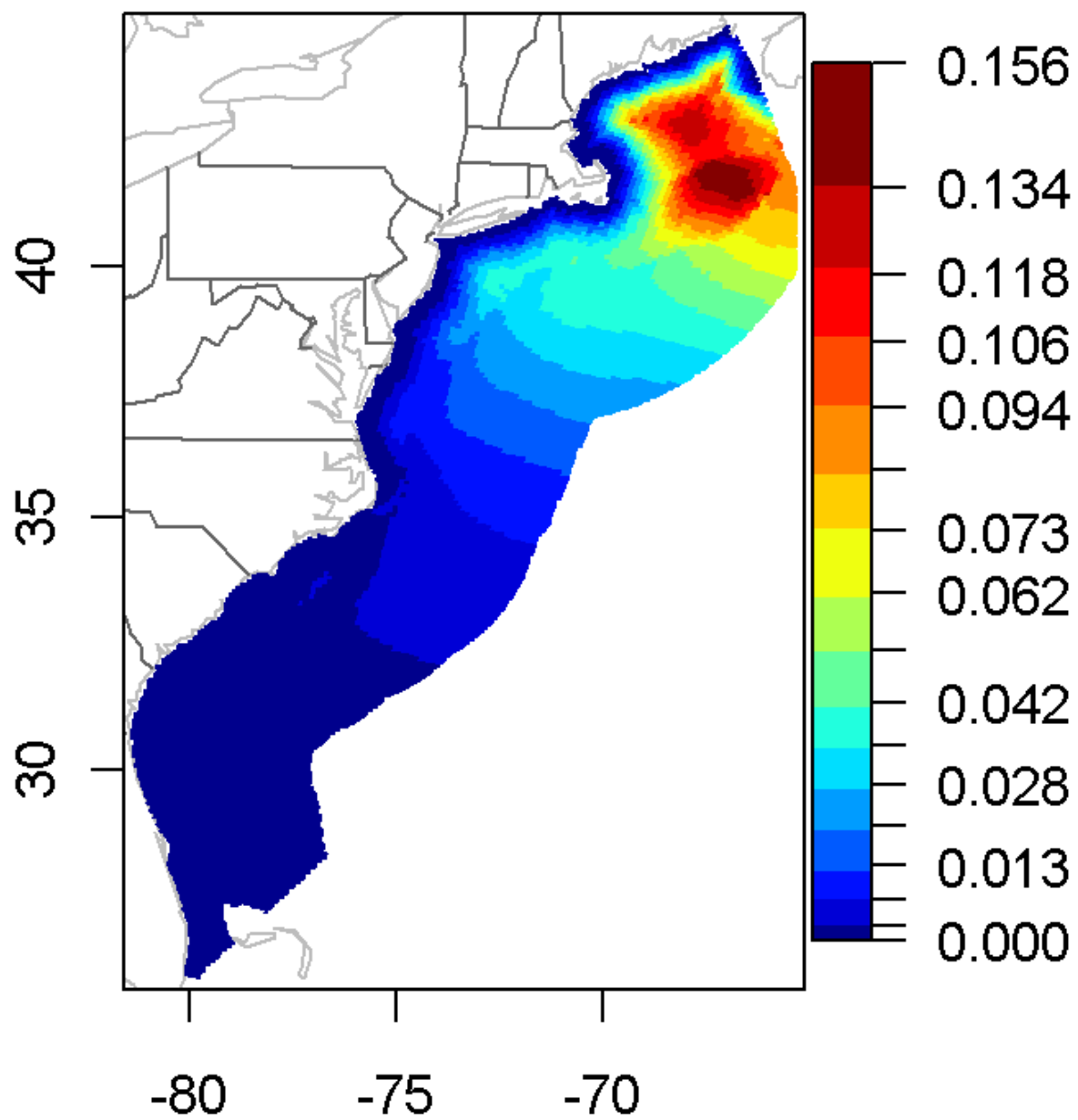


Figure 418: Map of mean predicted habitat for 'Pilot whales' guild during 'fall' season in 'east2' region.

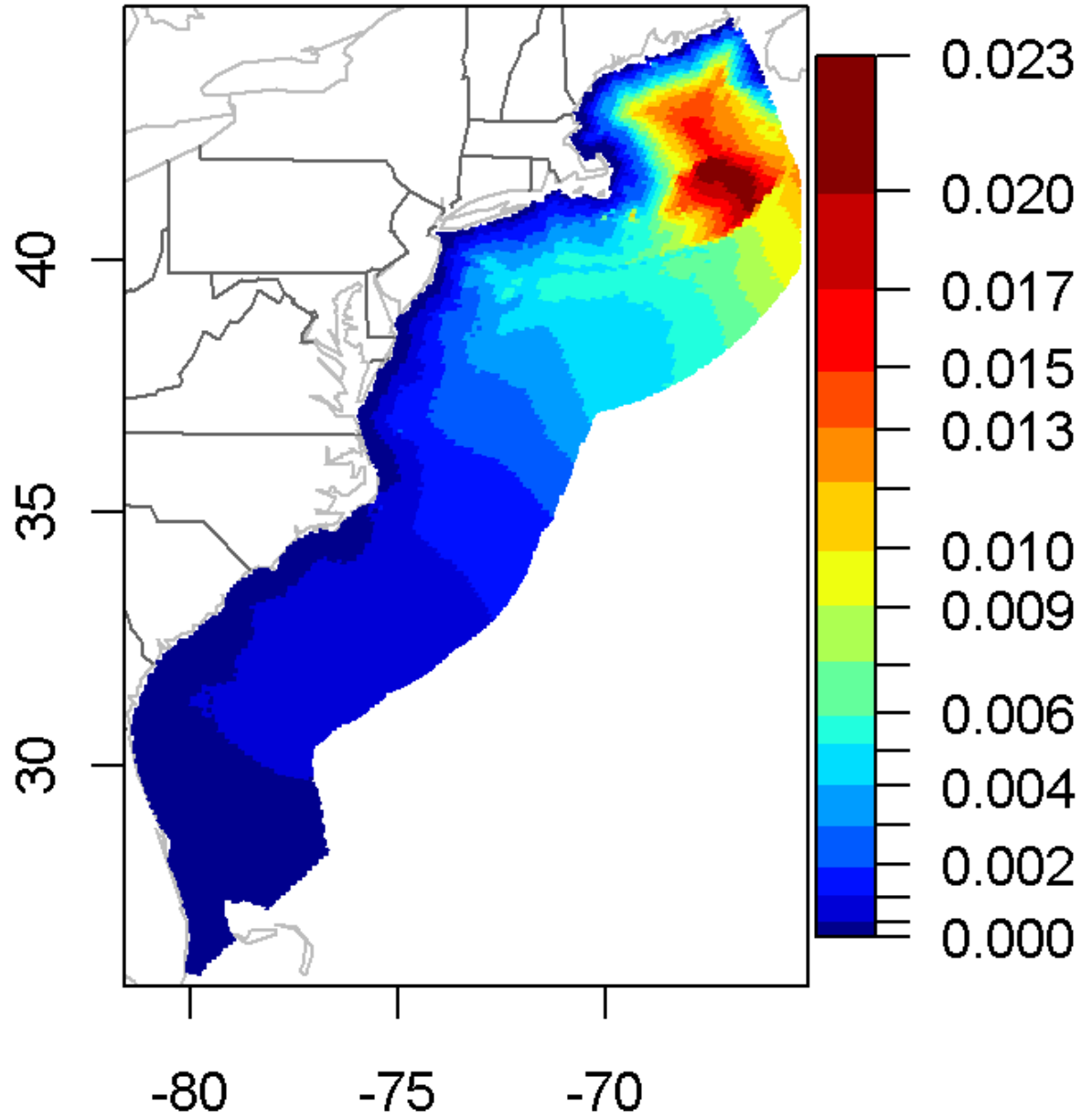


Figure 419: Map of standard error of habitat for 'Pilot whales' guild during 'fall' season in 'east2' region.

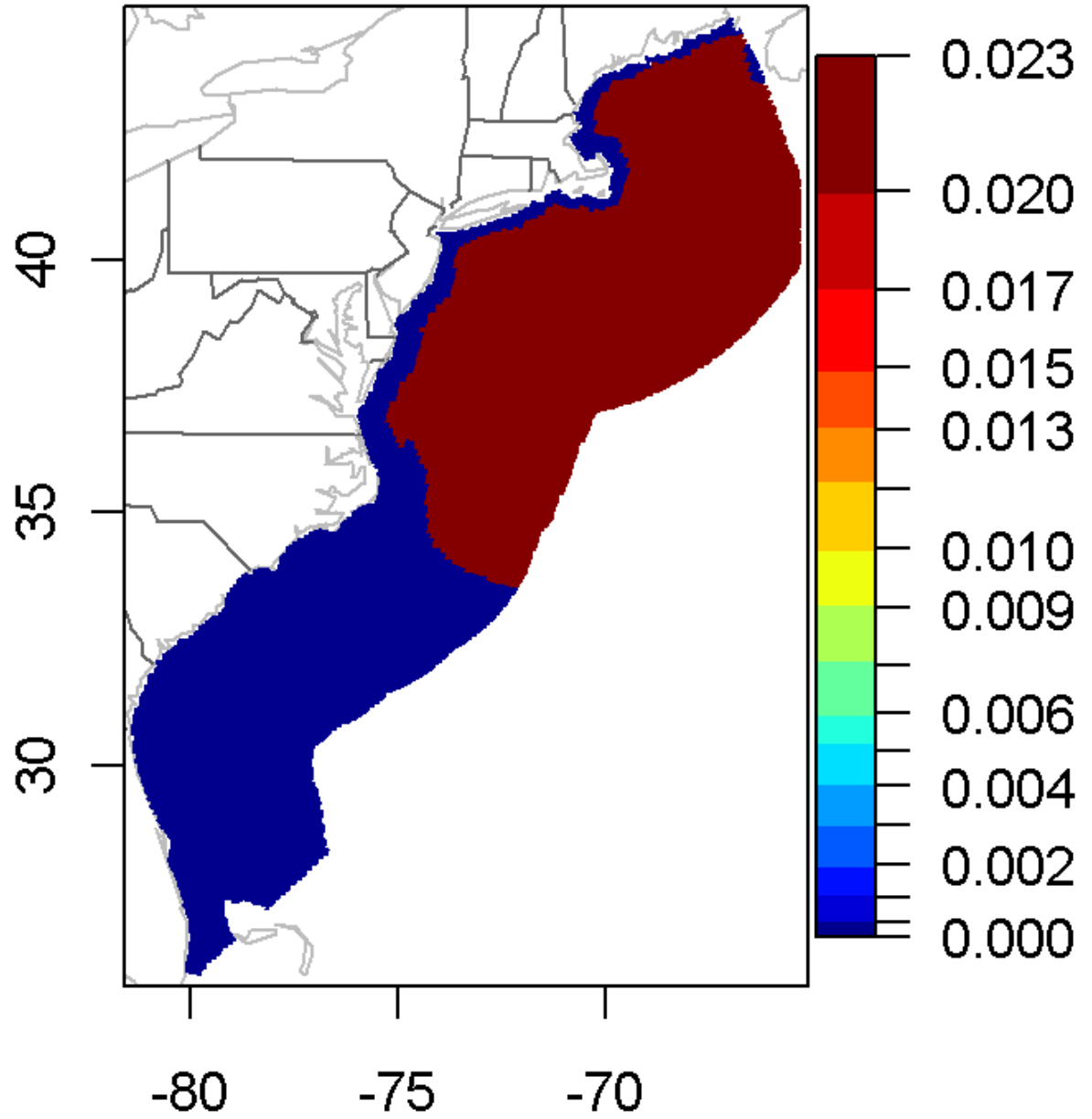


Figure 420: Map of binary habitat (cutoff determined by ROC) for 'Pilot whales' guild during 'fall' season in 'east2' region.

9.2 spring

9.2.1 gomex2

Modelrun identifier: duke_06_pw3_spring_gomex2

Date generated: 2008-10-21 11:55:07

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 40: Summary for duke(6) GAM model: for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	17
Number.absences	4800
GAM.converged	TRUE
R.squared	0.000776396
Deviance.explained	0.0637126
ROC.optimum	0.0166145
Maximum.fit	0.00292617
Maximum.prediction	0.00467803

Model text summary...

```
duke_06_pw3_spring_gomex2 run on Tue Oct 21 11:53:48 2008
  provider:duke, version:06, guild:Pilot whales (pw3), season:'spring', region:gomex2

max.fit:0.016615, max.prediction:0.004678, ROC.optimum:0.002926

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -6.36434    0.09497  -67.01   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.336e-06  0.500 0.000207  0.906
s(log(d2shelf)) 1.694e-06  0.500 0.000487  0.884
s(log(d2coast)) 6.358e-07  0.500 0.000161  0.912
s(sst)         1.674e+00  2.174  43.90   <2e-16 ***
s(lat)         1.977e+00  2.477  40.52   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = 0.000776 Deviance explained = 6.37%
GCV score = 0.00036734 Scale est. = 0.0003667 n = 4817

summary(dat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:4817  Min.   : 14    Min.   : 11    Min.   : 272    Min.   : 21187    Min.   :19.73    Min.   :24.05
              1st Qu.:2144  1st Qu.: 511  1st Qu.: 24696  1st Qu.:142982  1st Qu.:24.23  1st Qu.:26.38
              Median :4222  Median :1292  Median : 63128  Median :211670  Median :25.35  Median :27.38
              Mean   :3977  Mean   :1537  Mean   : 82827  Mean   :213952  Mean   :25.14  Mean   :27.25
              3rd Qu.:5932  3rd Qu.:2668  3rd Qu.:131568  3rd Qu.:276022  3rd Qu.:26.17  3rd Qu.:28.13
              Max.   :8191  Max.   :3523  Max.   :257870  Max.   :404358  Max.   :28.42  Max.   :30.06

summary(newdat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1    Min.   : 3.0    Min.   : 272    Min.   : 5317    Min.   :19.95    Min.   :23.85
              1st Qu.:1861  1st Qu.: 46.0  1st Qu.: 31617  1st Qu.: 85289  1st Qu.:21.83  1st Qu.:26.28
              Median :4110  Median : 433.5  Median : 71100  Median :157258  Median :23.02  Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:1.963e-06	Min.	:1.960e-06	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.00000
1st Qu.	:1861	1st Qu.	:1.077e-04	1st Qu.	:5.112e-05	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.00000
Median	:4110	Median	:4.891e-04	Median	:1.378e-04	Median	:0.000e+00	Median	:9.499e-03	Median	:0.00000
Mean	:3997	Mean	:7.602e-04	Mean	:1.463e-04	Mean	:9.815e-03	Mean	:2.365e-02	Mean	:0.03912
3rd Qu.	:6015	3rd Qu.	:1.049e-03	3rd Qu.	:2.334e-04	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:0.00000
Max.	:8351	Max.	:4.678e-03	Max.	:3.916e-04	Max.	:2.000e+00	Max.	:2.695e-01	Max.	:1.00000
						NA's	:4.838e+03	NA's	:4.838e+03		

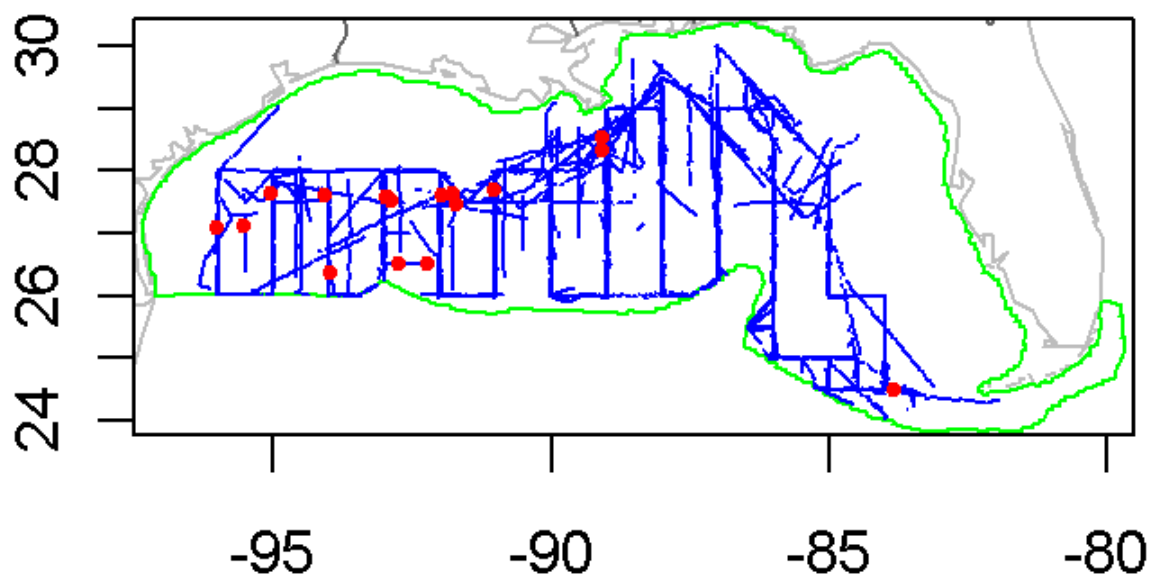


Figure 421: Map of points of observational sightings and tracks of survey effort for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

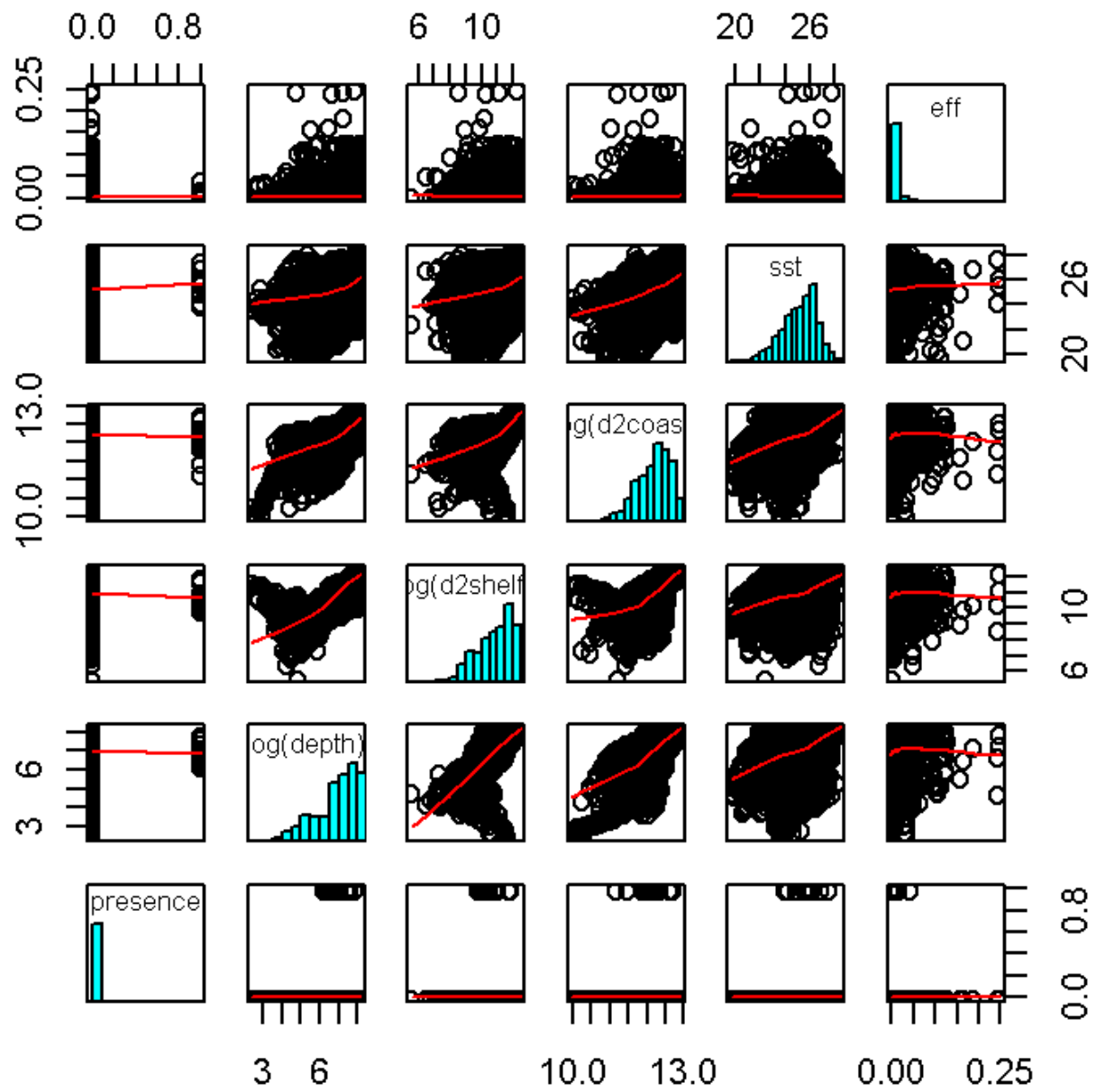


Figure 422: Pairs plot of input variables for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

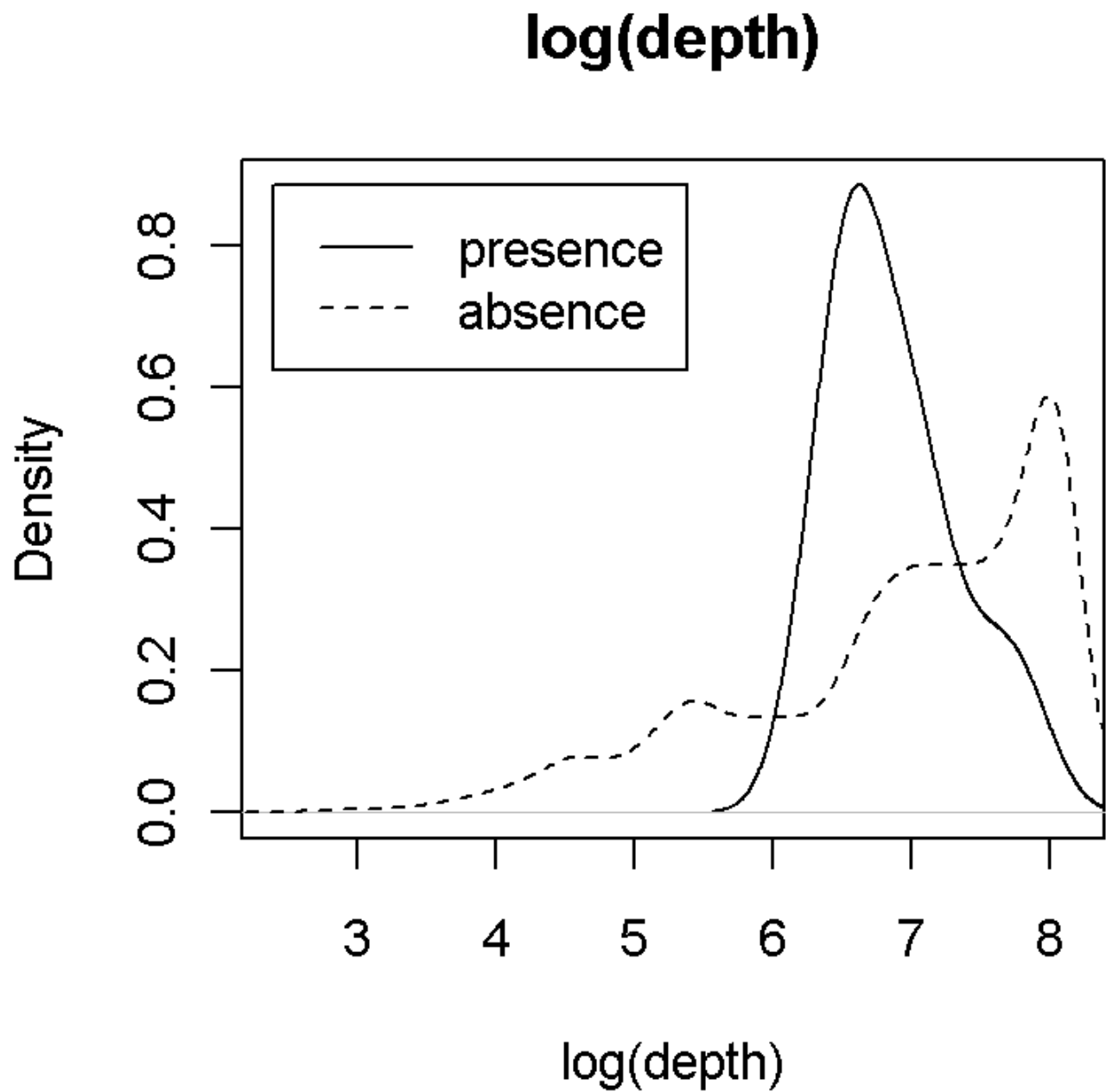


Figure 423: Density histogram of depth $\log(\text{meters})$ for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

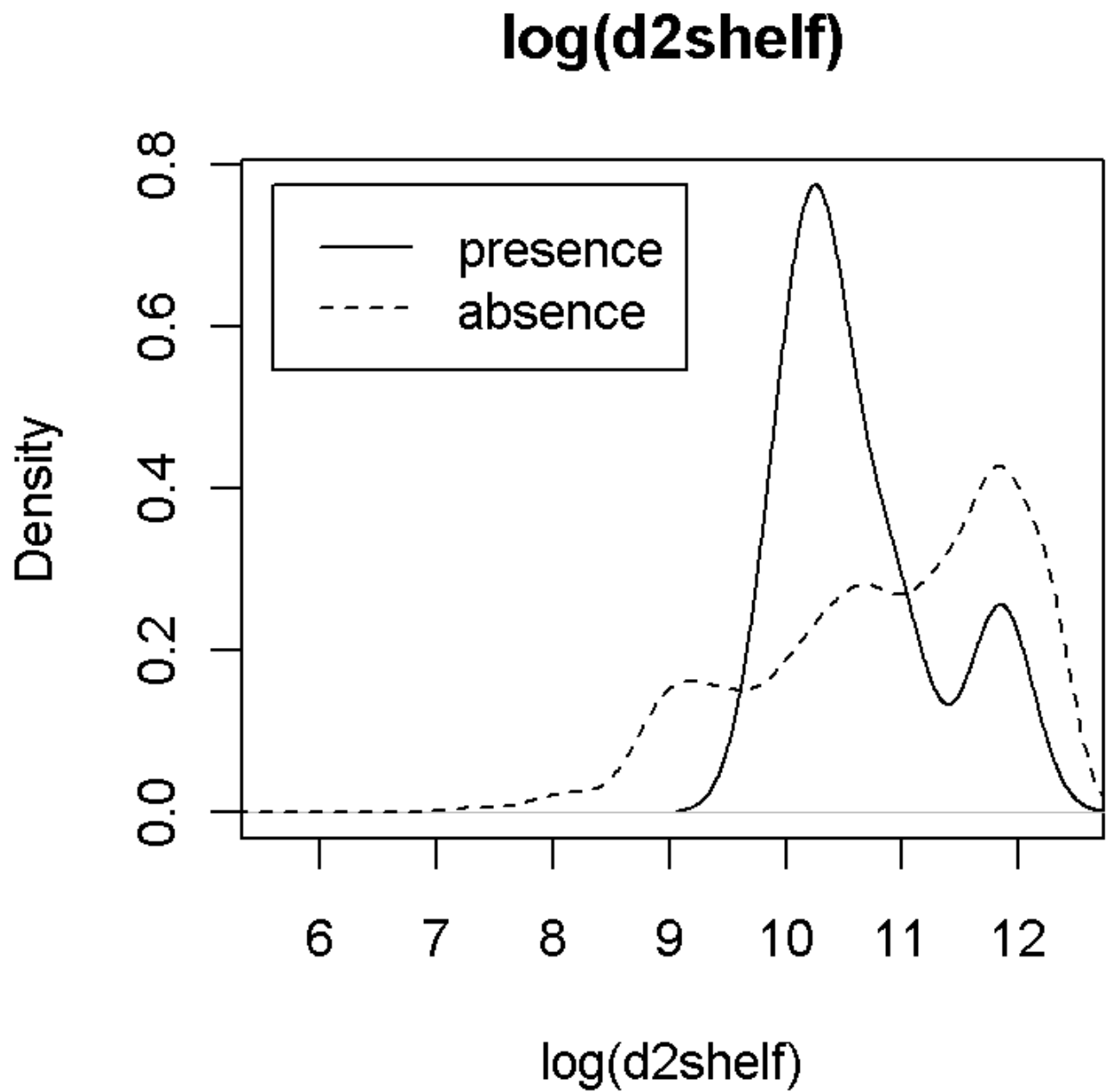


Figure 424: Density histogram of distance to shelf log(meters) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

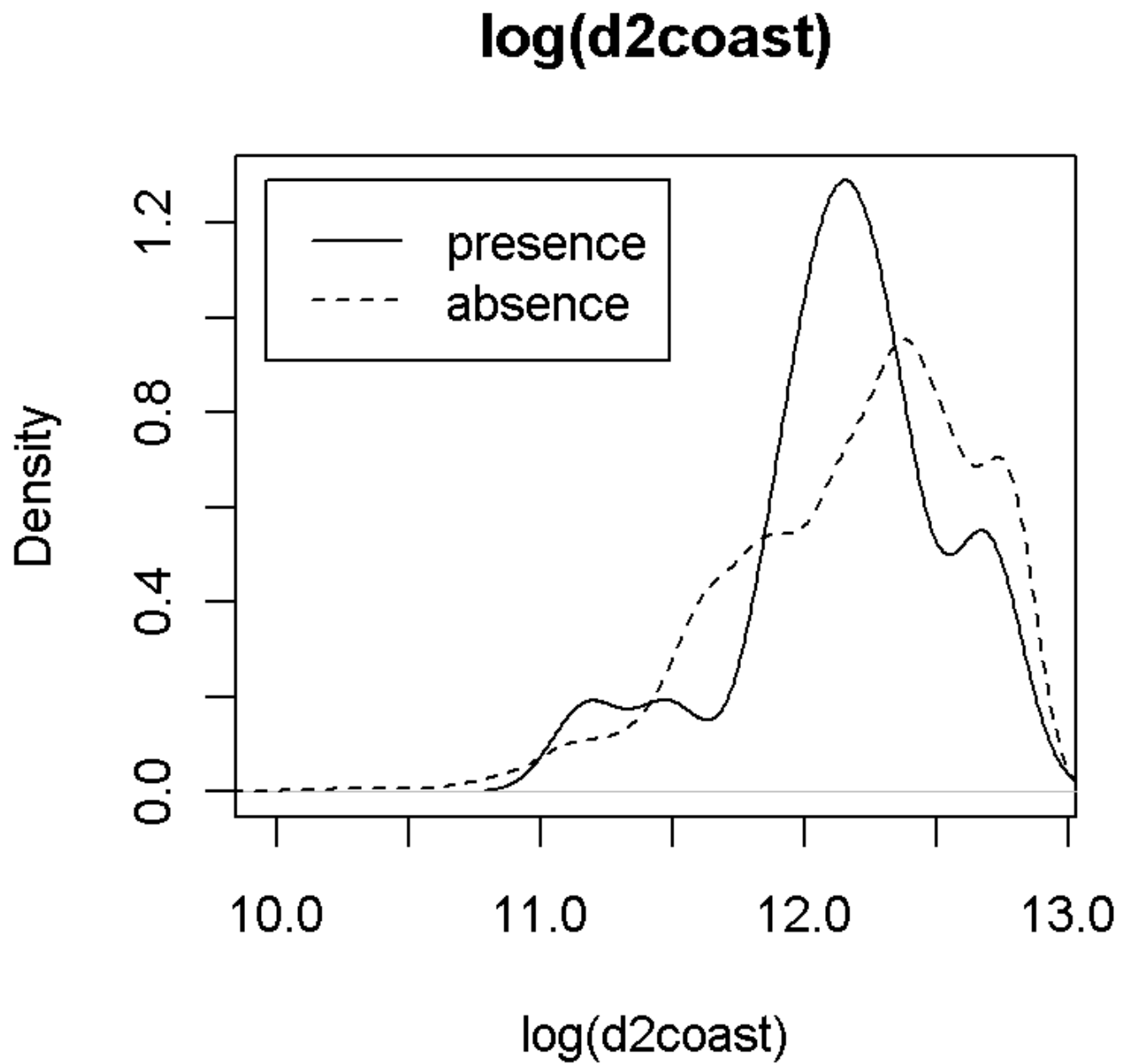


Figure 425: Density histogram of distance to coast log(meters) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

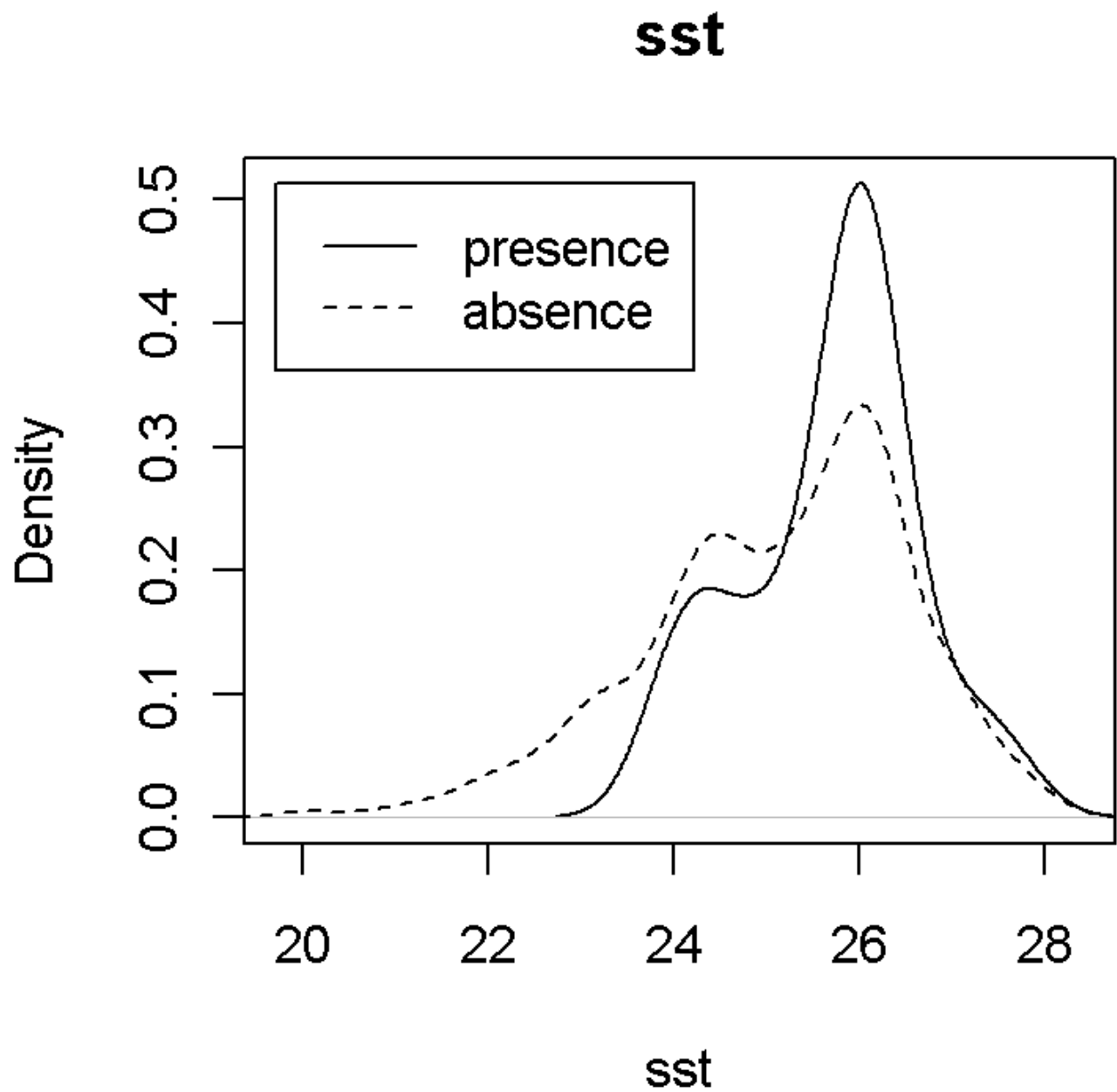


Figure 426: Density histogram of sea-surface temperature (degrees C) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

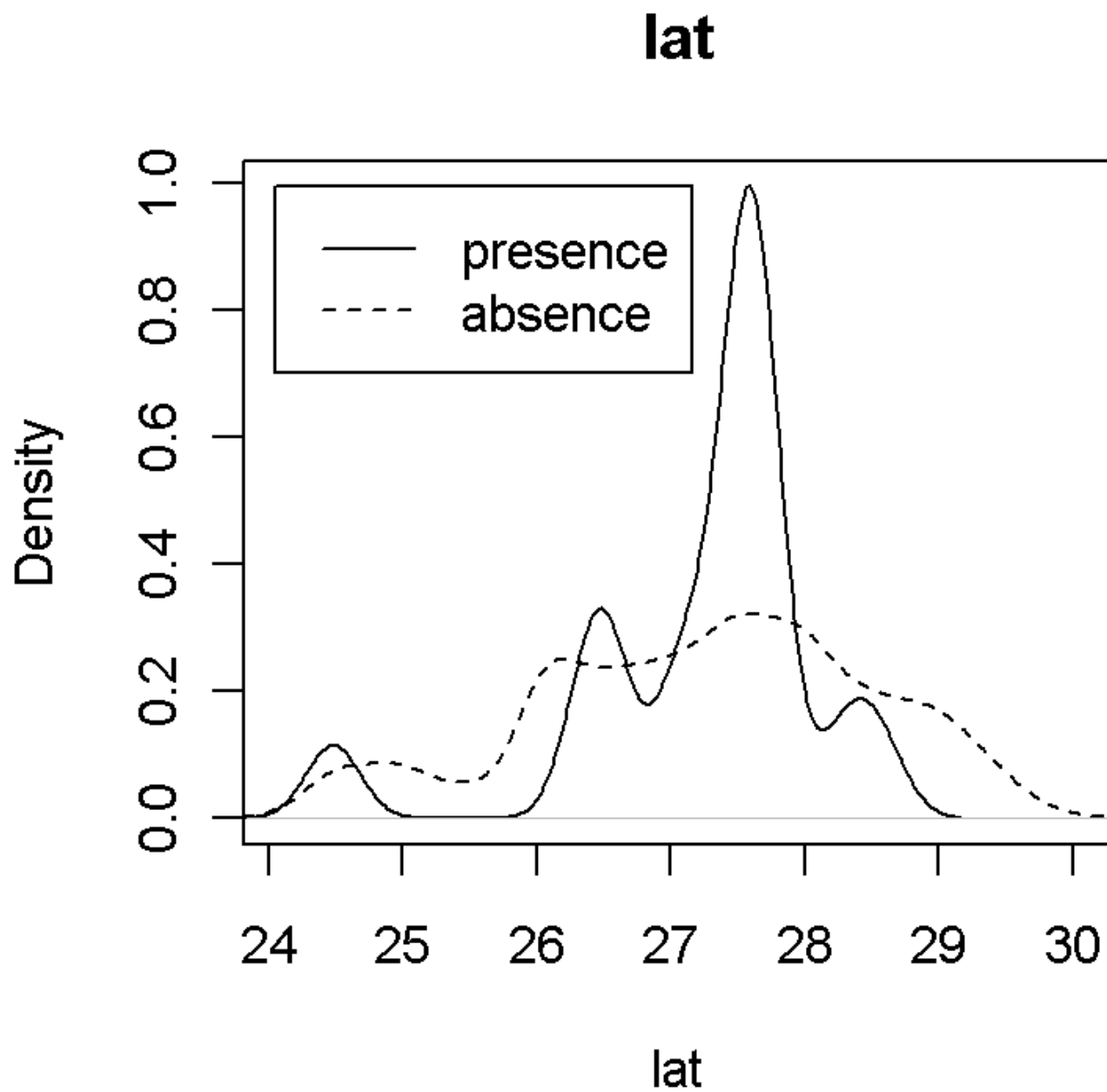


Figure 427: Density histogram of latitude (degrees) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

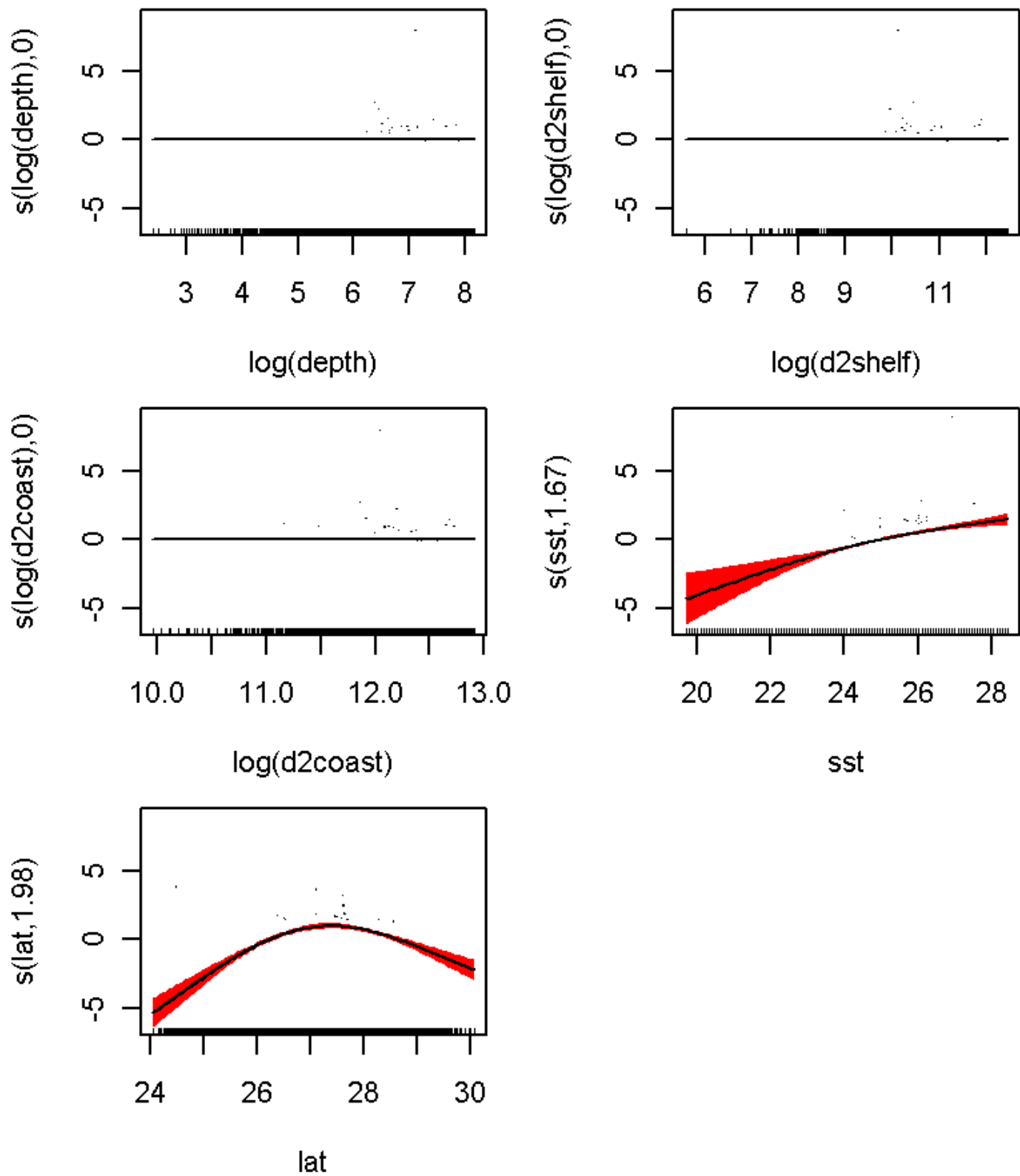


Figure 428: Terms plot of predictors to GAM model fit for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

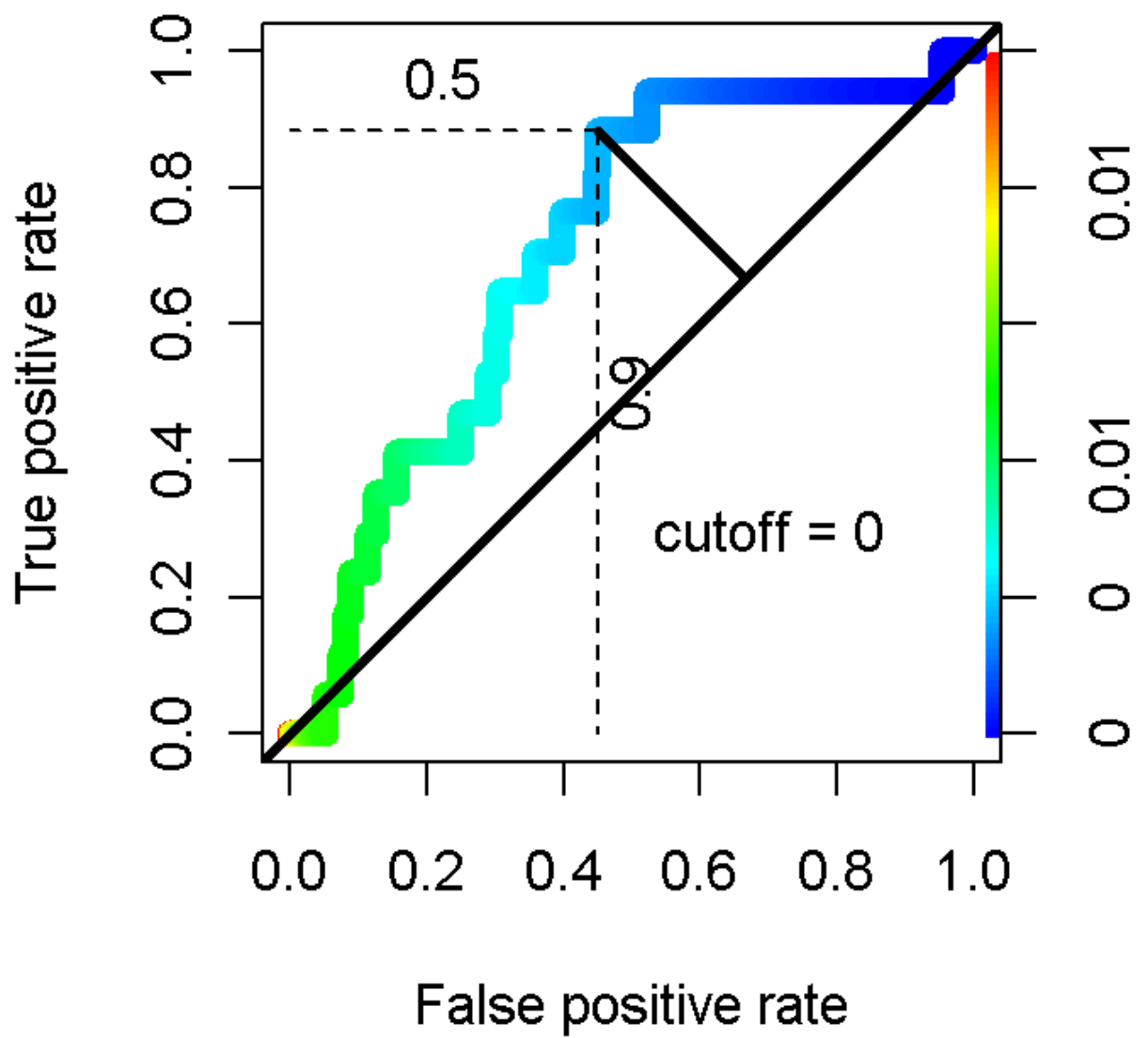


Figure 429: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

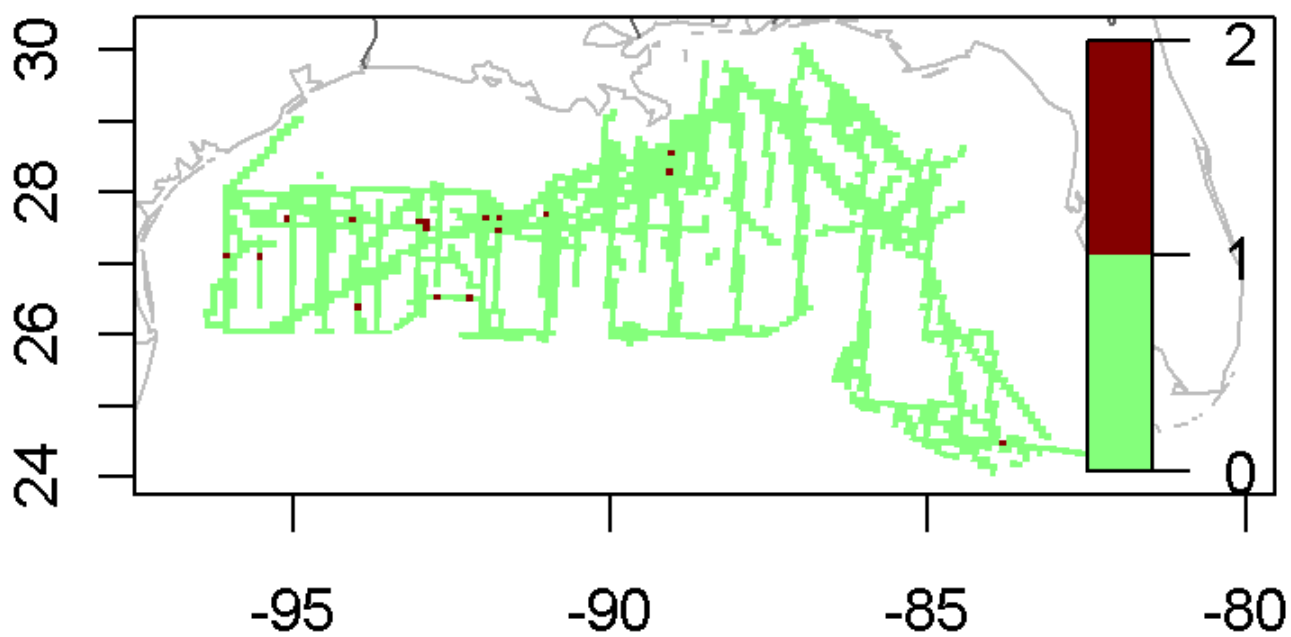


Figure 430: Map of presence and absence by cell summed through time for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

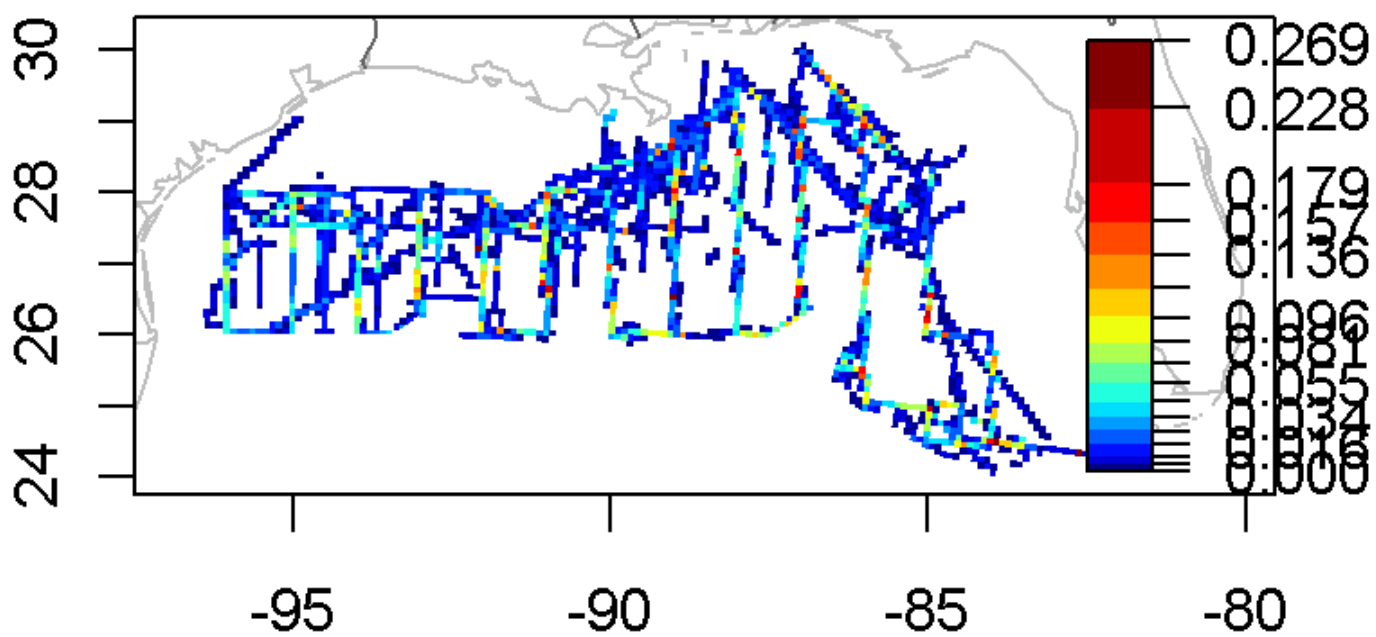


Figure 431: Map of effort(hours/km²) by cell summed through time for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

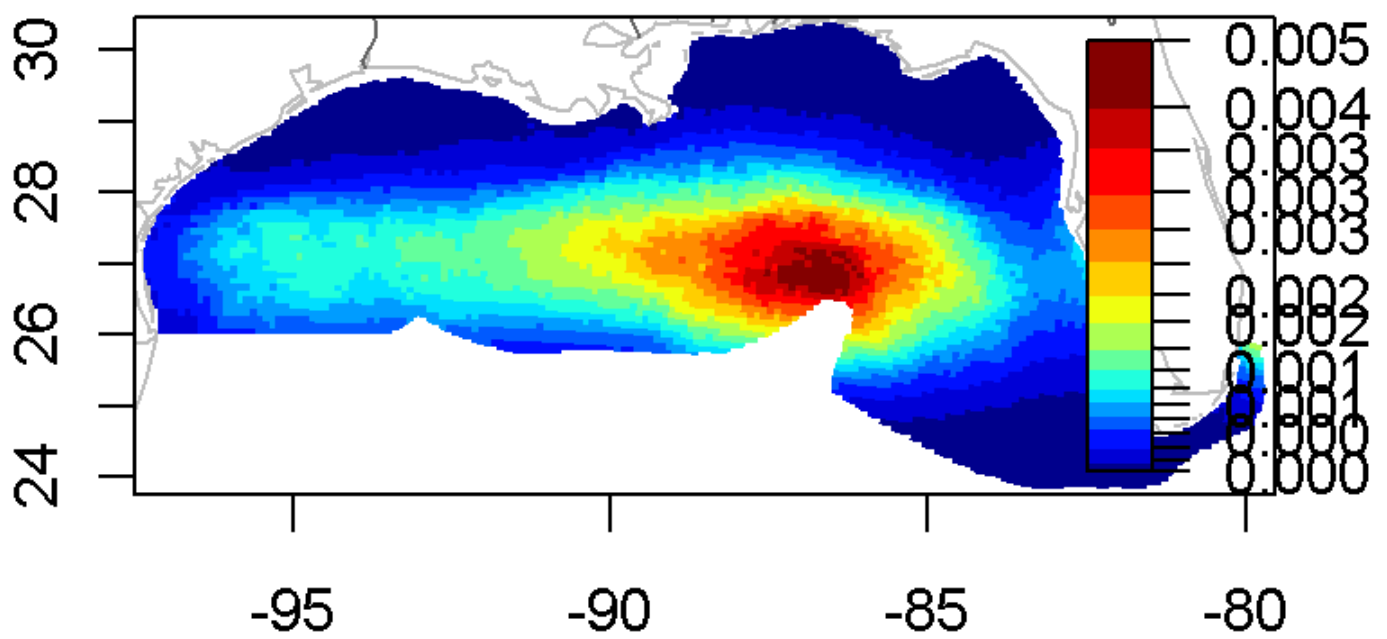


Figure 432: Map of mean predicted habitat for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

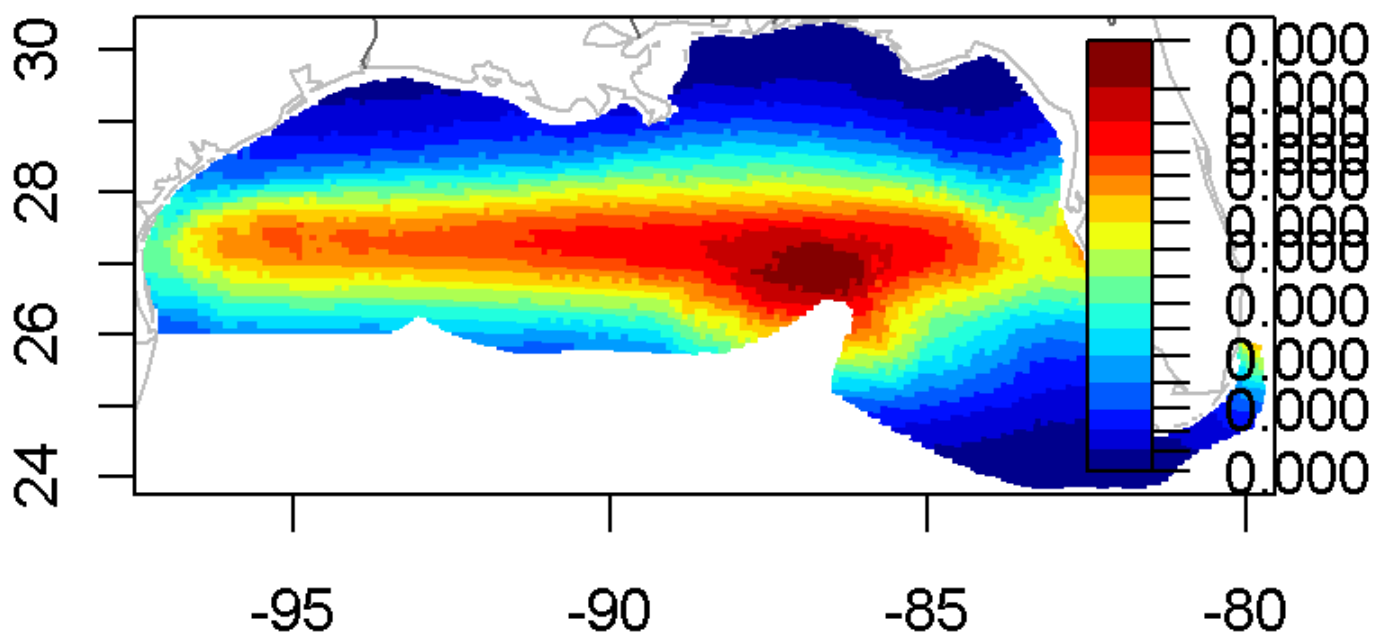


Figure 433: Map of standard error of habitat for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

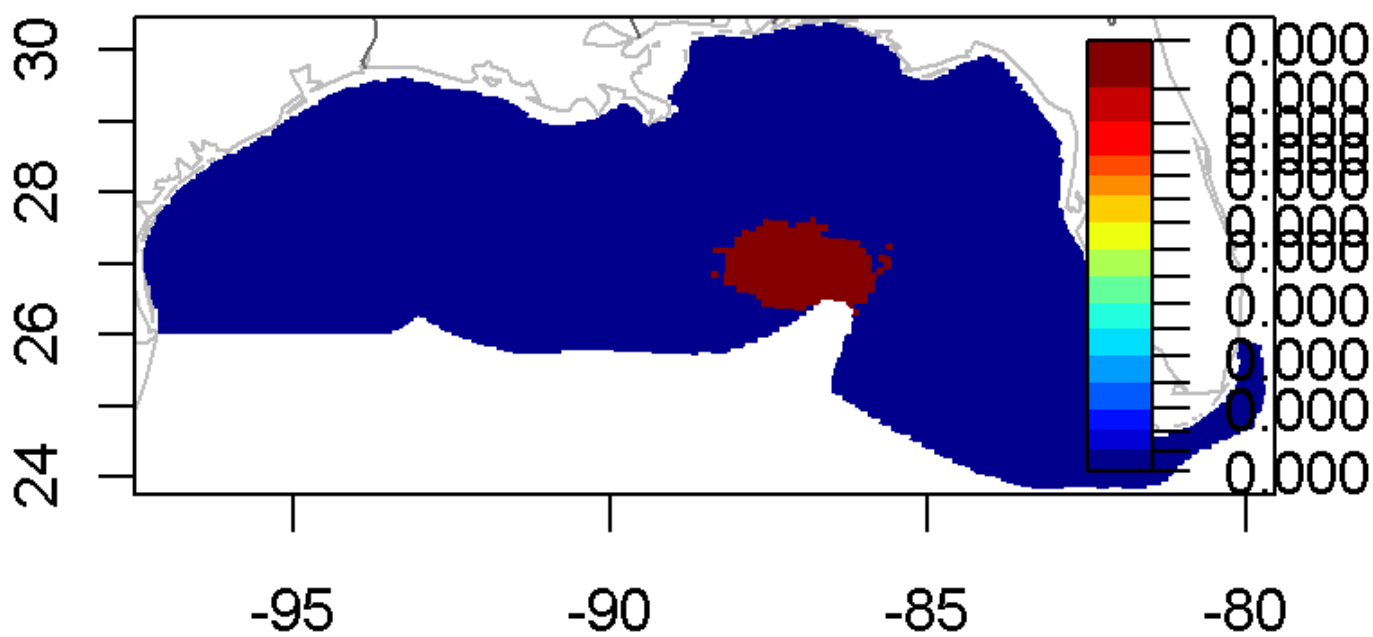


Figure 434: Map of binary habitat (cutoff determined by ROC) for 'Pilot whales' guild during 'spring' season in 'gomex2' region.

9.3 summer

9.3.1 east2

Modelrun identifier: duke_06_pw3_summer_east2

Date generated: 2008-10-21 13:27:20

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 41: Summary for duke(6) GAM model: for 'Pilot whales' guild during 'summer' season in 'east2' region.

	Value
Number.presences	156
Number.absences	8922
GAM.converged	TRUE
R.squared	0.0814251
Deviance.explained	0.0609991
ROC.optimum	0.150437
Maximum.fit	0.0665633
Maximum.prediction	0.139361

Model text summary...

```
duke_06_pw3_summer_east2 run on Tue Oct 21 13:24:09 2008
provider:duke, version:06, guild:Pilot whales (pw3), season:'summer', region:east2

max.fit:0.150437, max.prediction:0.139361, ROC.optimum:0.066563

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -3.49682    0.04698   -74.43   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  1.844e+00  2.344 125.121 < 2e-16 ***
s(log(d2shelf)) 1.957e+00  2.457  85.871 < 2e-16 ***
s(log(d2coast))  5.234e-06  0.500  3.39e-05 0.940466
s(sst)         8.875e-01  1.387   9.231 0.000691 ***
s(lat)         7.838e-06  0.500  1.28e-05 0.953353
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0814   Deviance explained =  6.1%
GCV score = 0.0019002   Scale est. = 0.001898   n = 8663

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:7694   Min.    : 1635   Min.    :  5.0   Min.    :    5   Min.    : 1259   Min.    :  8.175   Min.    :25.94
se2:1384   1st Qu.:11866   1st Qu.: 48.0   1st Qu.:20989   1st Qu.: 50865   1st Qu.:17.025   1st Qu.:37.53
              Median :14008   Median :111.5   Median :52230   Median :102266   Median :22.200   Median :40.18
              Mean   :13275   Mean   :677.3   Mean   :67623   Mean   :125197   Mean   :21.378   Mean   :39.35
              3rd Qu.:15645   3rd Qu.:420.0   3rd Qu.:99335   3rd Qu.:174835   3rd Qu.:25.650   3rd Qu.:42.31
              Max.    :16560   Max.    :5251.0   Max.    :324910   Max.    :445165   Max.    :30.900   Max.    :44.74
              NA's    :      7      NA's    :      7      NA's    :408.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685   Min.    : 1633   Min.    :  4   Min.    :    5   Min.    : 1259   Min.    :11.18   Min.    :25.91
se2:4203   1st Qu.: 9145   1st Qu.: 92   1st Qu.:34042   1st Qu.: 89304   1st Qu.:22.80   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :0.00147  Min.   :0.0003671  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:0.02147  1st Qu.:0.0020866  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :0.03120  Median :0.0024322  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :0.03884  Mean   :0.0027714  Mean   :3.405e-02  Mean   :1.069e-02  Mean   :0.1555
3rd Qu.:14088  3rd Qu.:0.05209  3rd Qu.:0.0031595  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :0.13936  Max.   :0.0218828  Max.   :2.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.00000  NA's :5.0000000  NA's :5.277e+03  NA's :5.277e+03
```

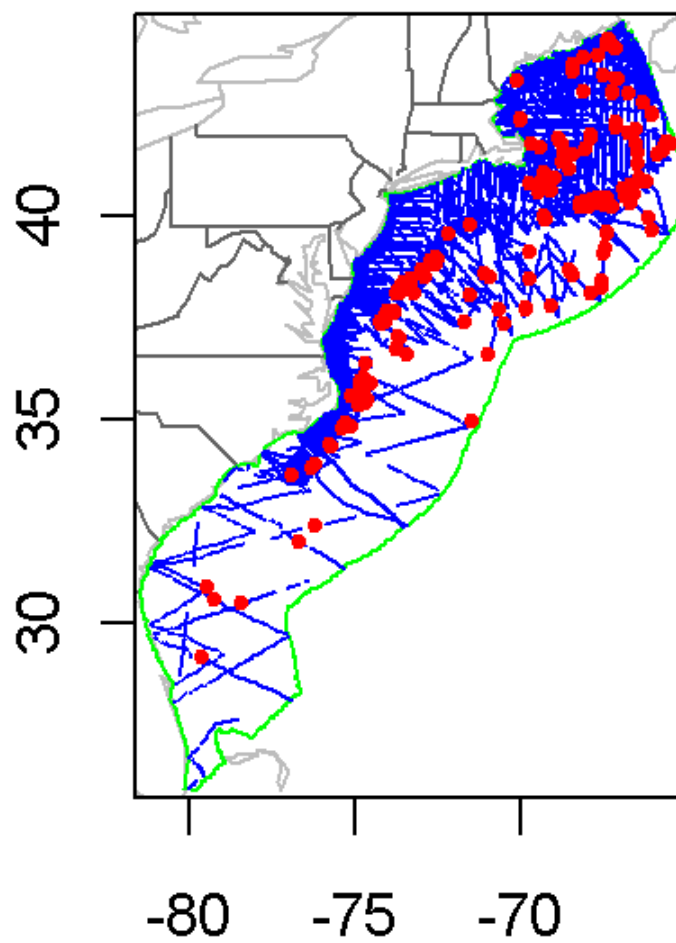



Figure 435: Map of points of observational sightings and tracks of survey effort for 'Pilot whales' guild during 'summer' season in 'east2' region.

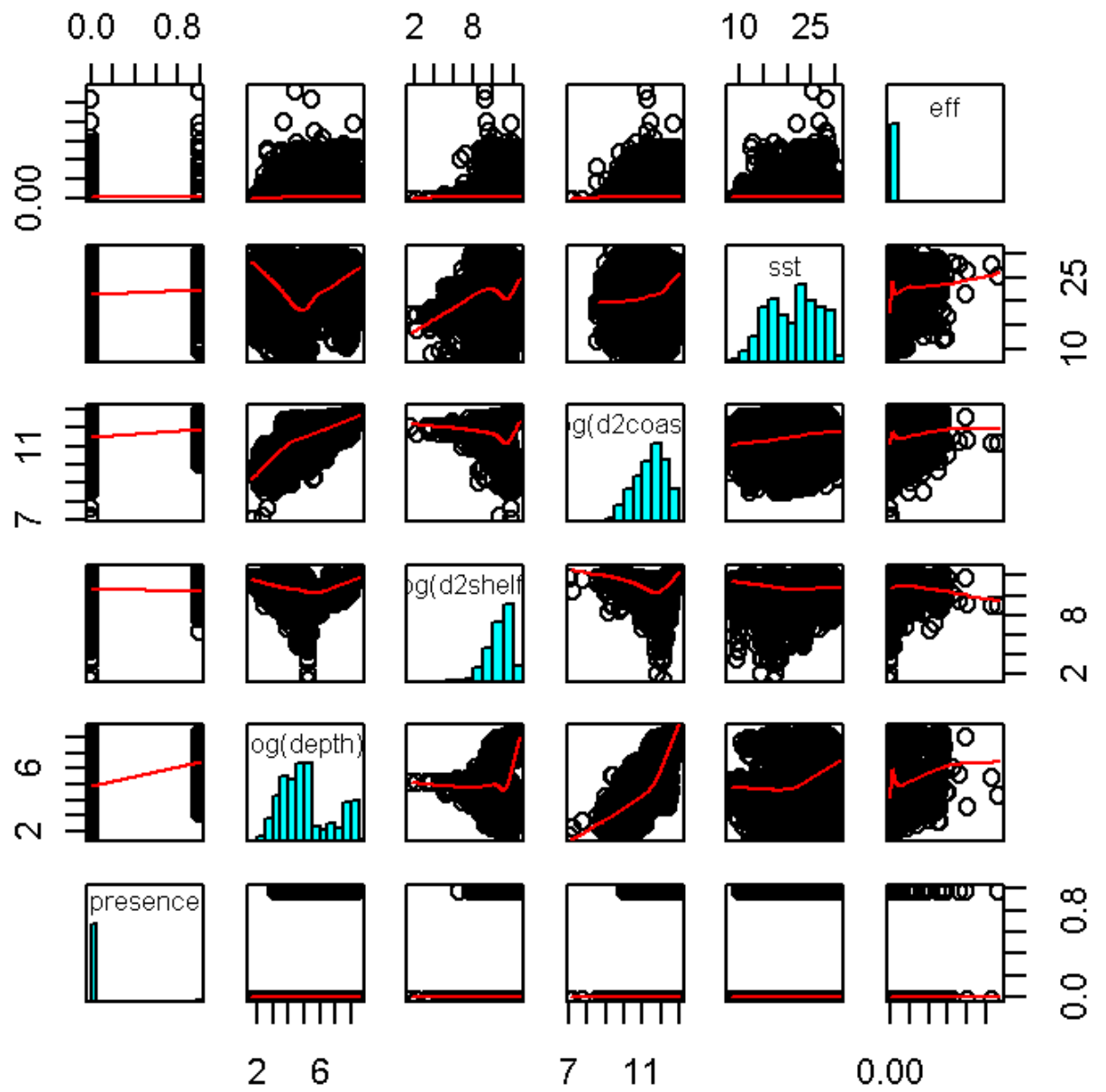


Figure 436: Pairs plot of input variables for 'Pilot whales' guild during 'summer' season in 'east2' region.

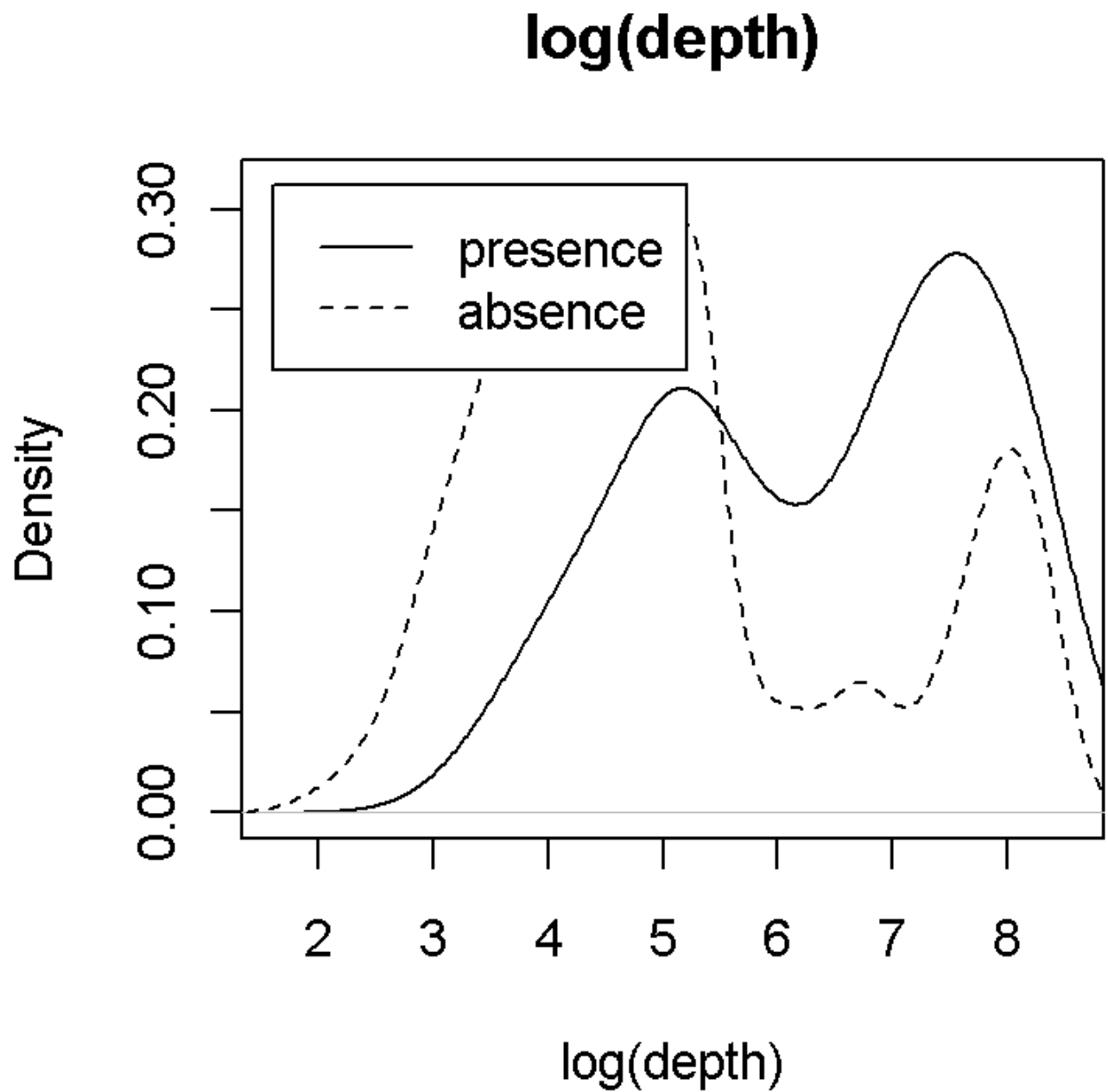


Figure 437: Density histogram of depth log(meters) for 'Pilot whales' guild during 'summer' season in 'east2' region.

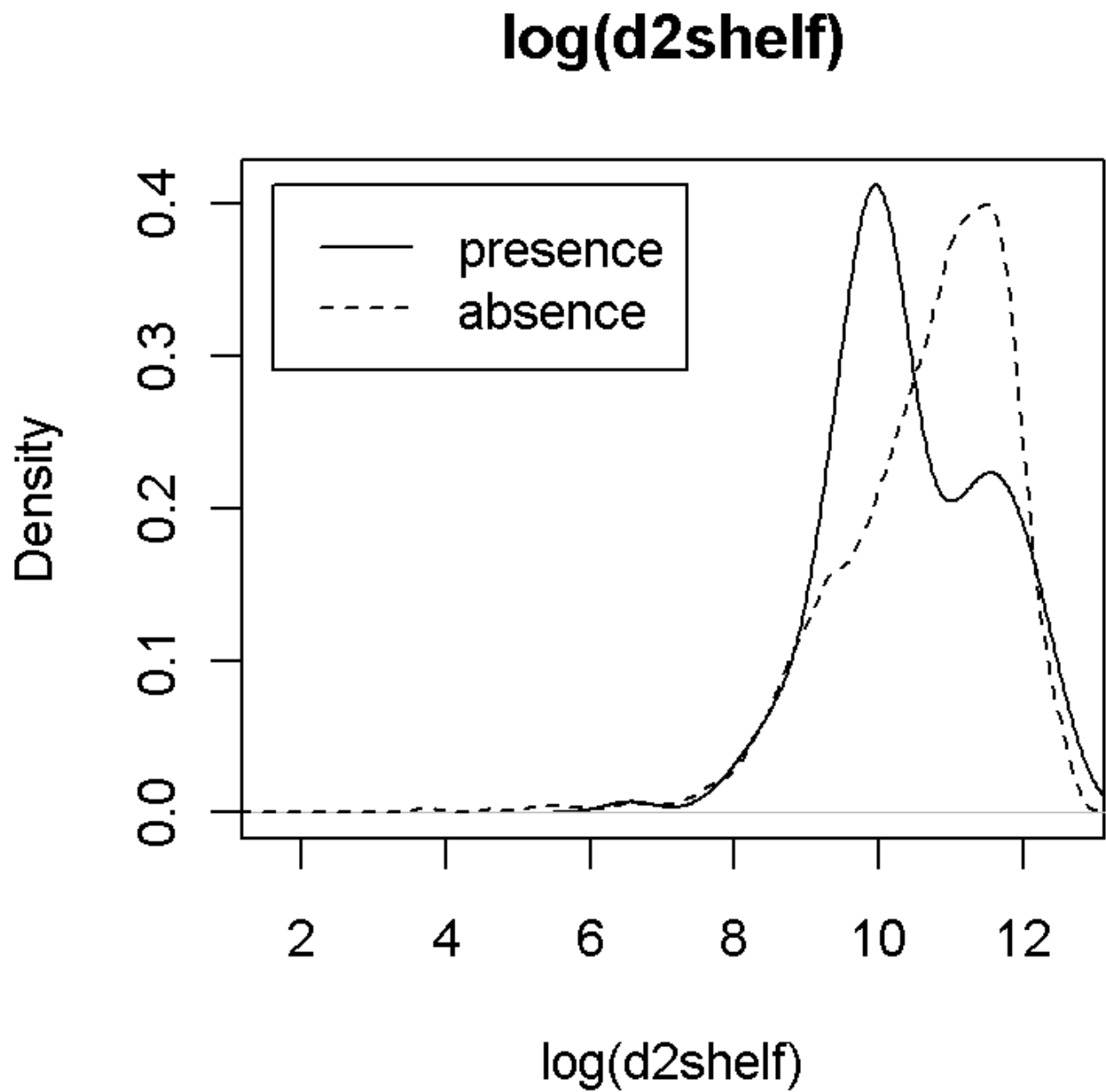


Figure 438: Density histogram of distance to shelf log(meters) for 'Pilot whales' guild during 'summer' season in 'east2' region.

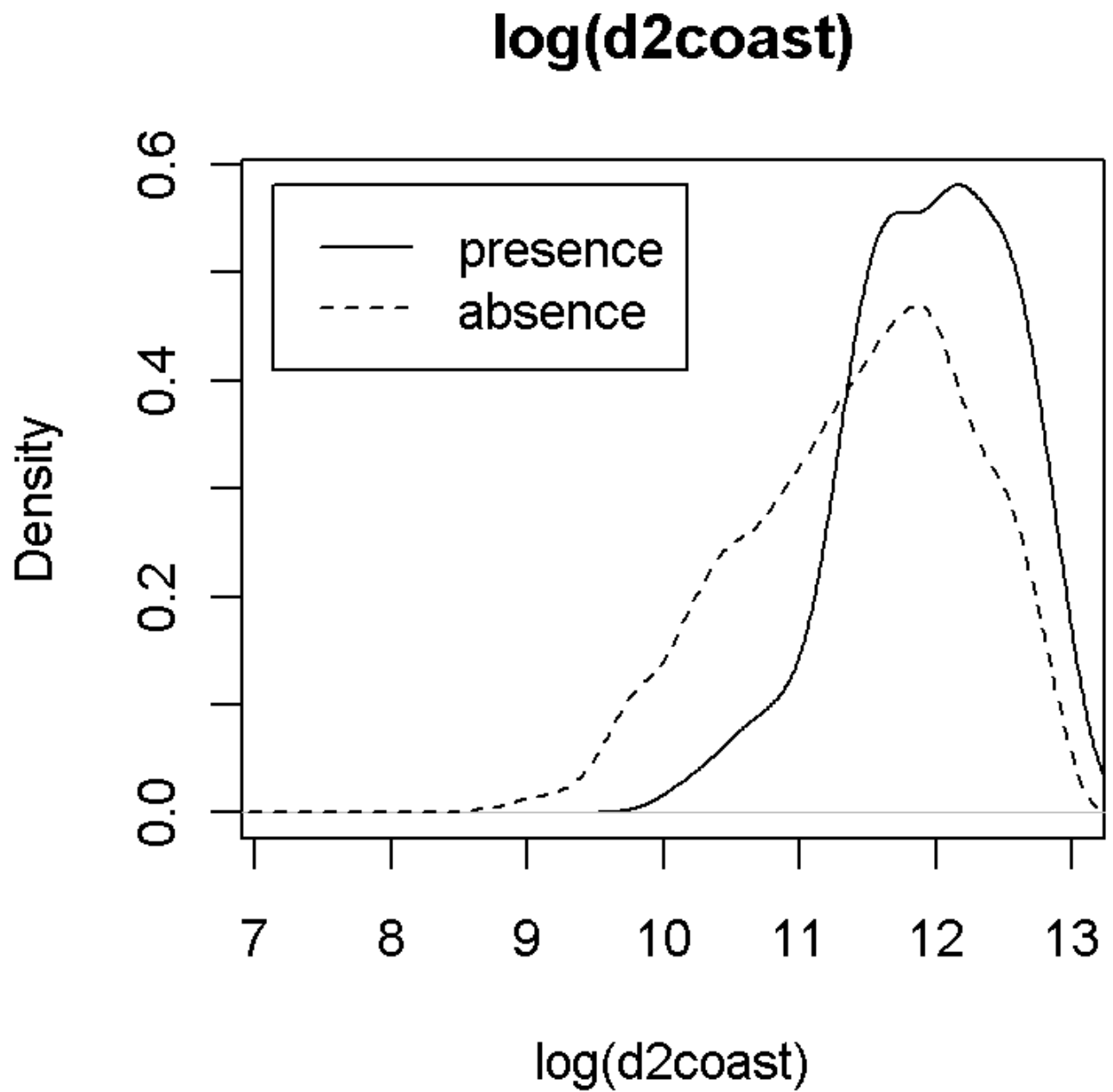


Figure 439: Density histogram of distance to coast log(meters) for 'Pilot whales' guild during 'summer' season in 'east2' region.

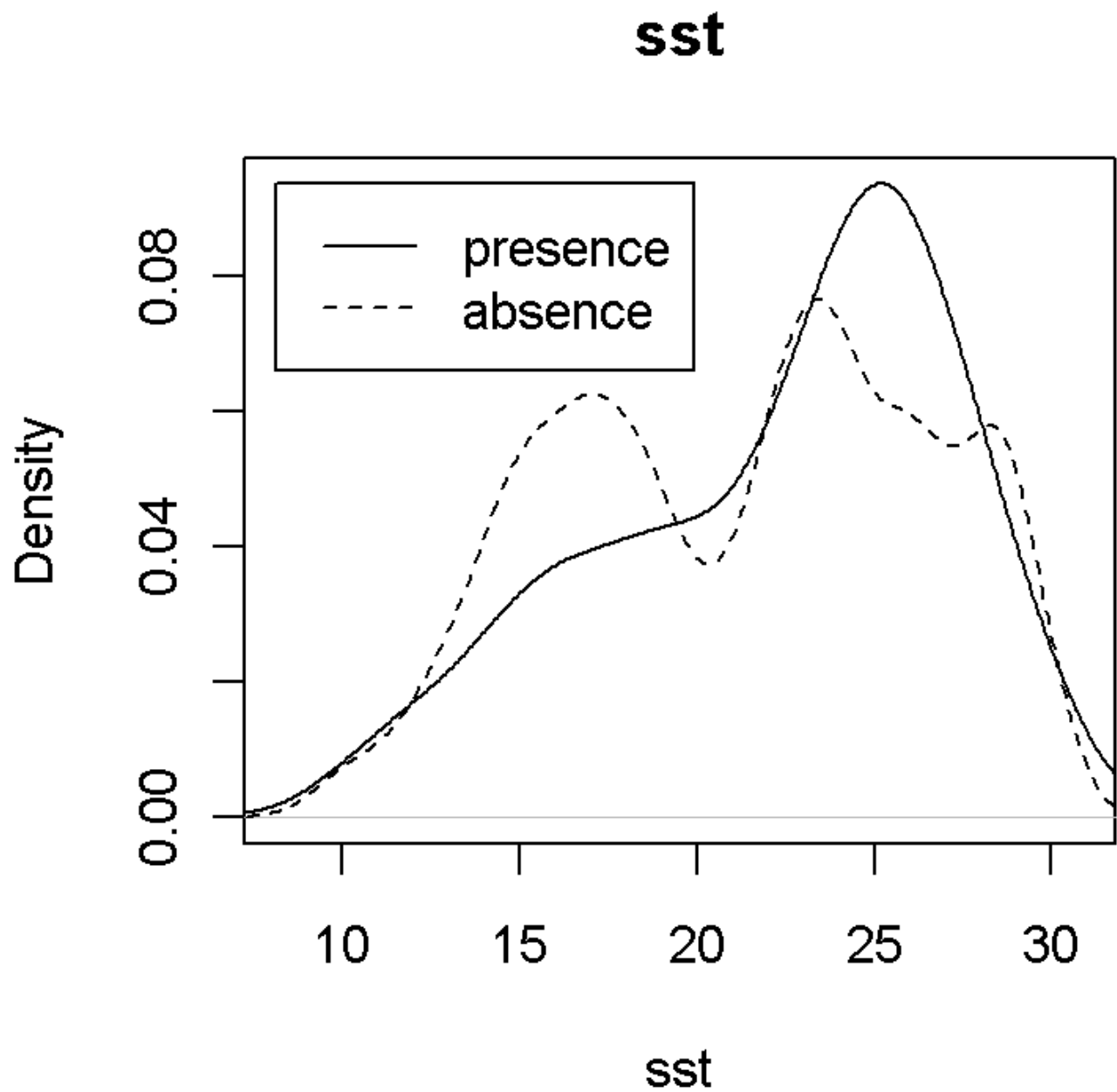


Figure 440: Density histogram of sea-surface temperature (degrees C) for 'Pilot whales' guild during 'summer' season in 'east2' region.

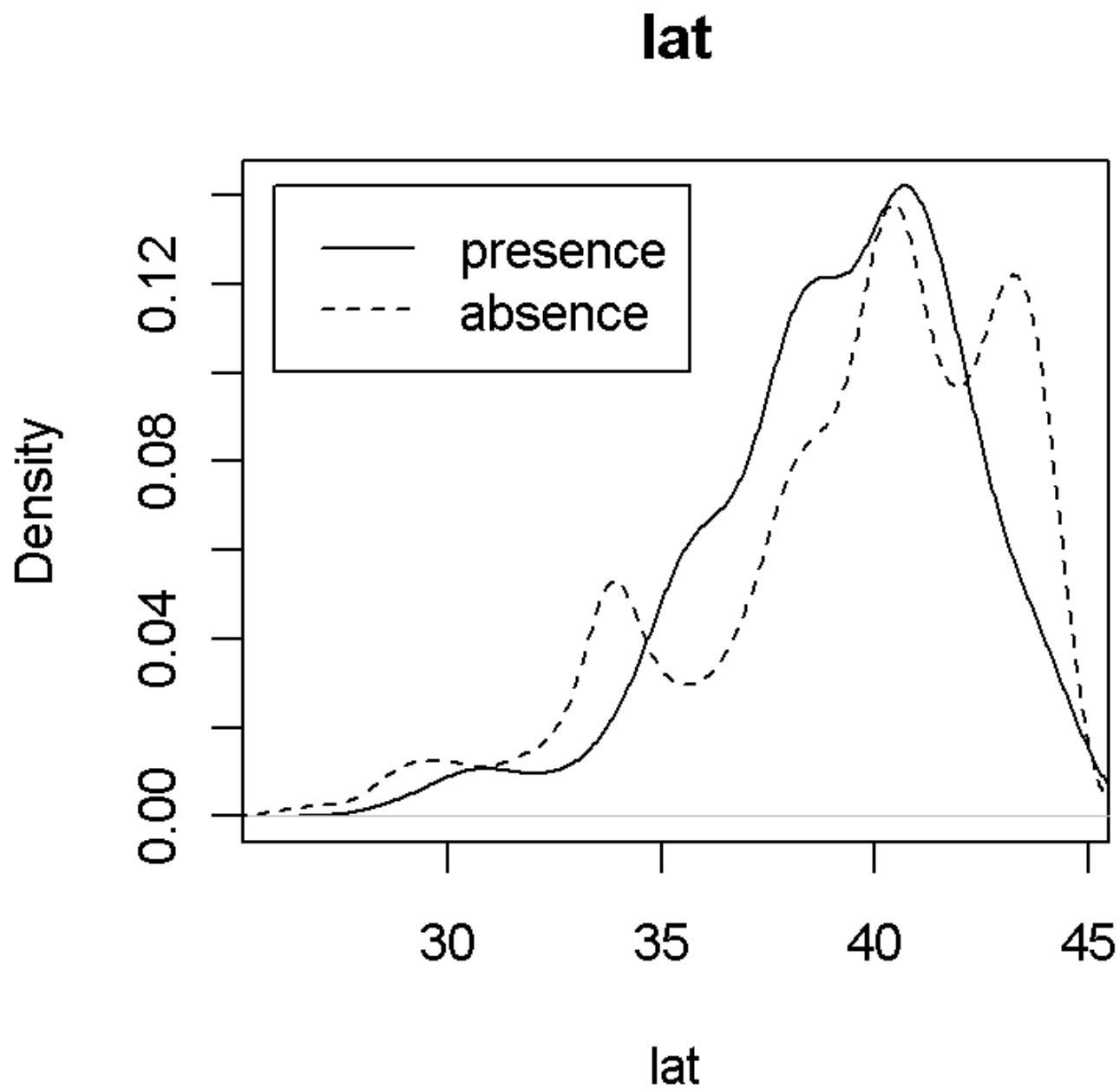


Figure 441: Density histogram of latitude (degrees) for 'Pilot whales' guild during 'summer' season in 'east2' region.

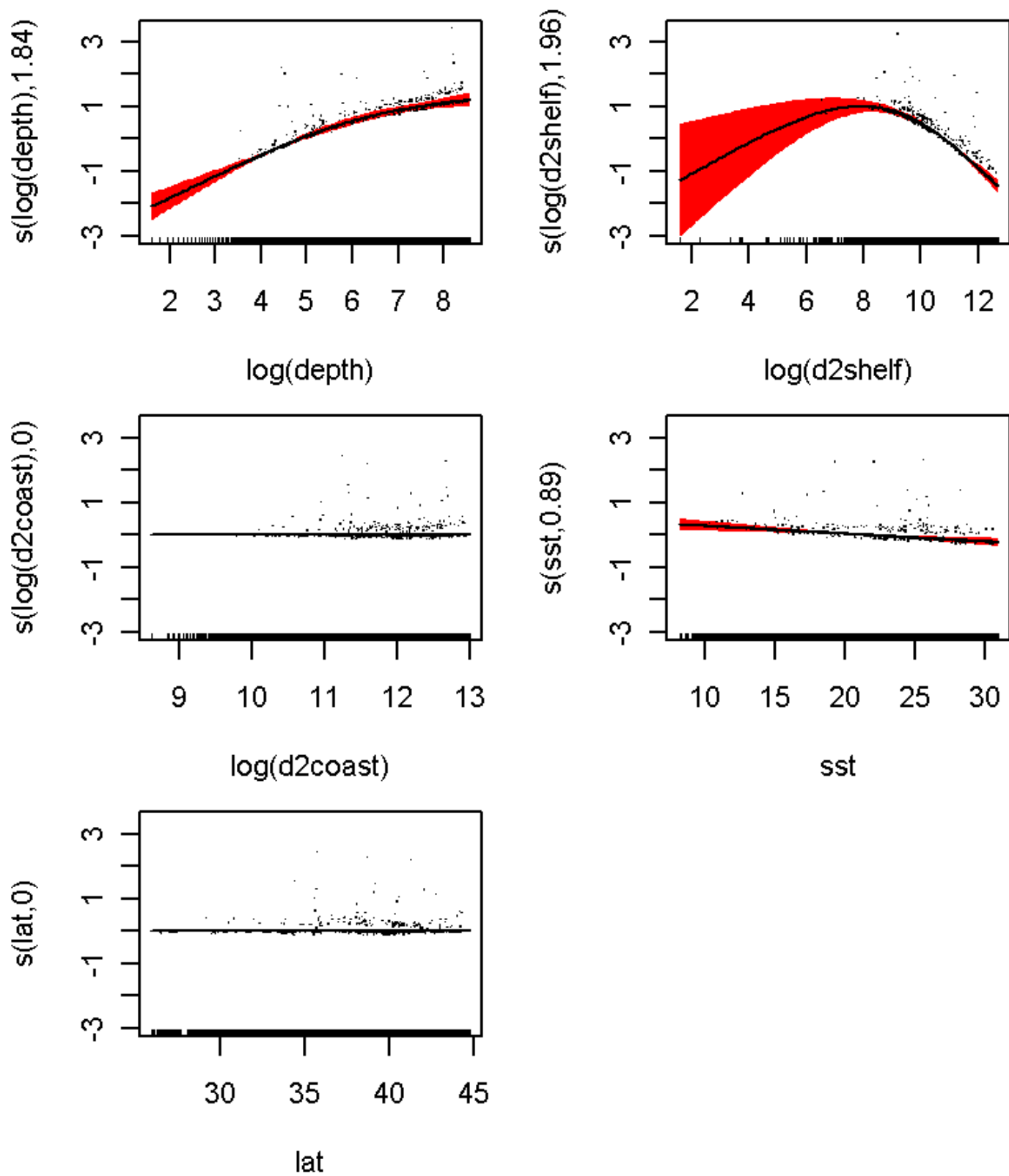


Figure 442: Terms plot of predictors to GAM model fit for 'Pilot whales' guild during 'summer' season in 'east2' region.

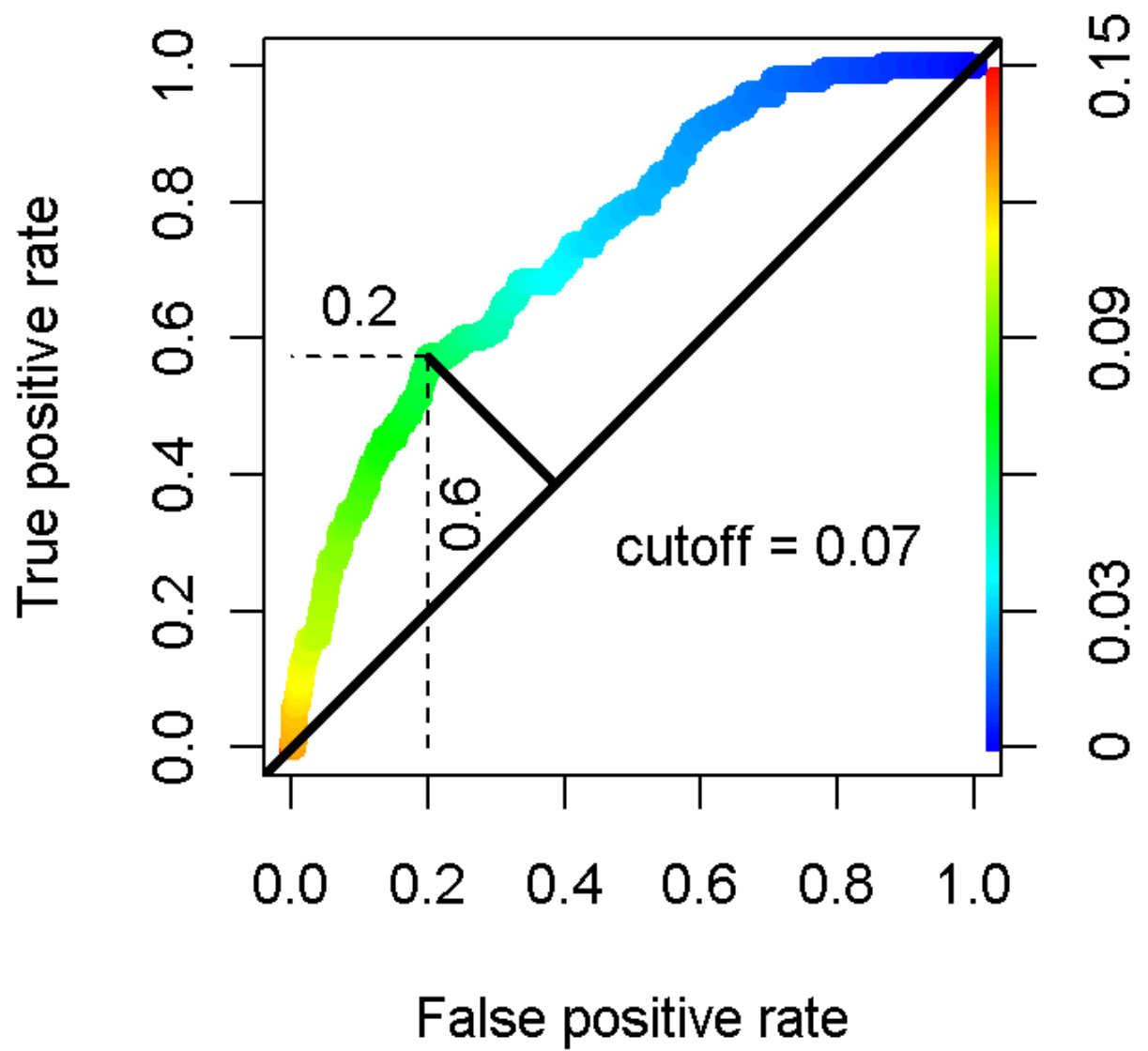


Figure 443: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Pilot whales' guild during 'summer' season in 'east2' region.

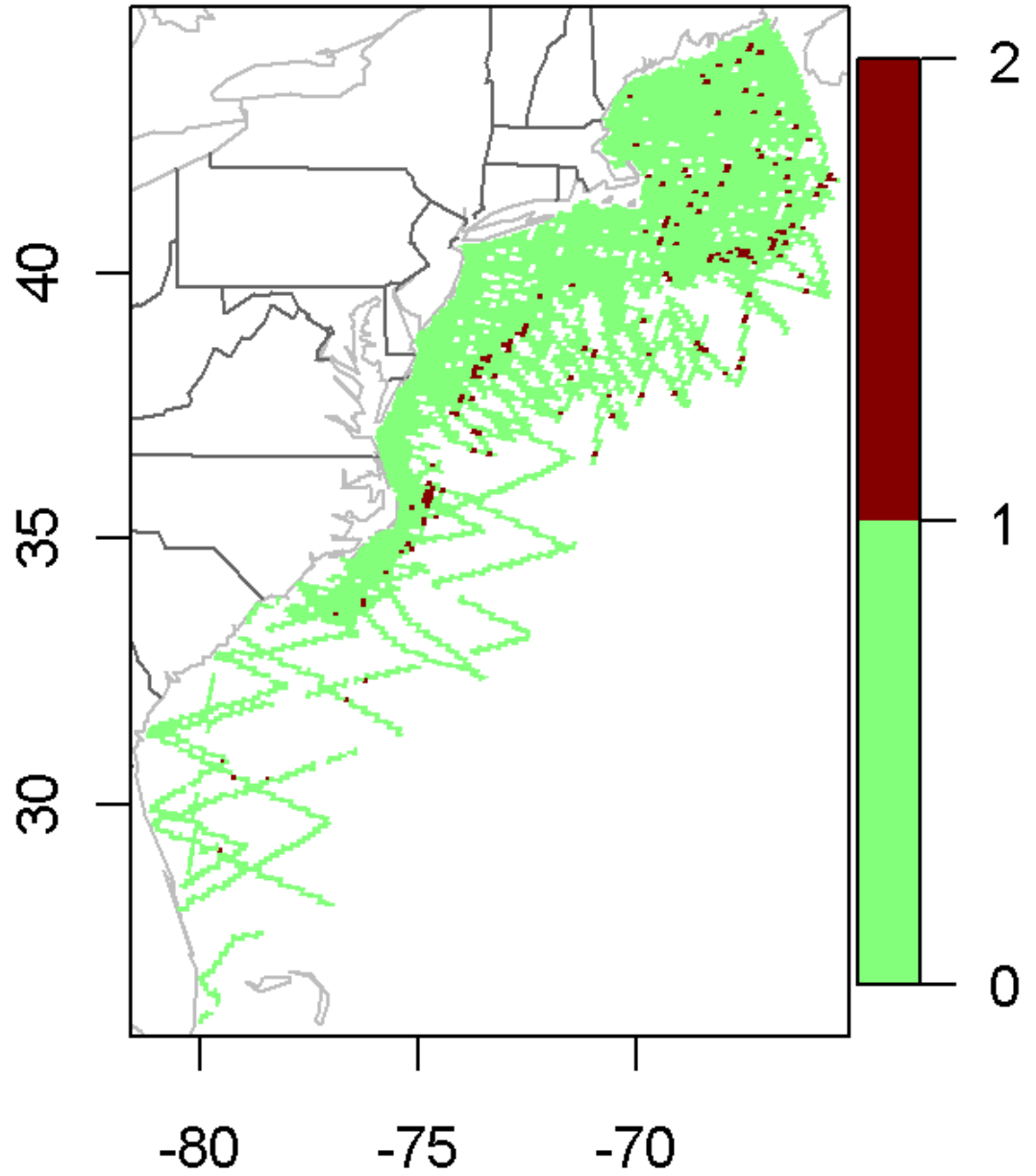


Figure 444: Map of presence and absence by cell summed through time for 'Pilot whales' guild during 'summer' season in 'east2' region.

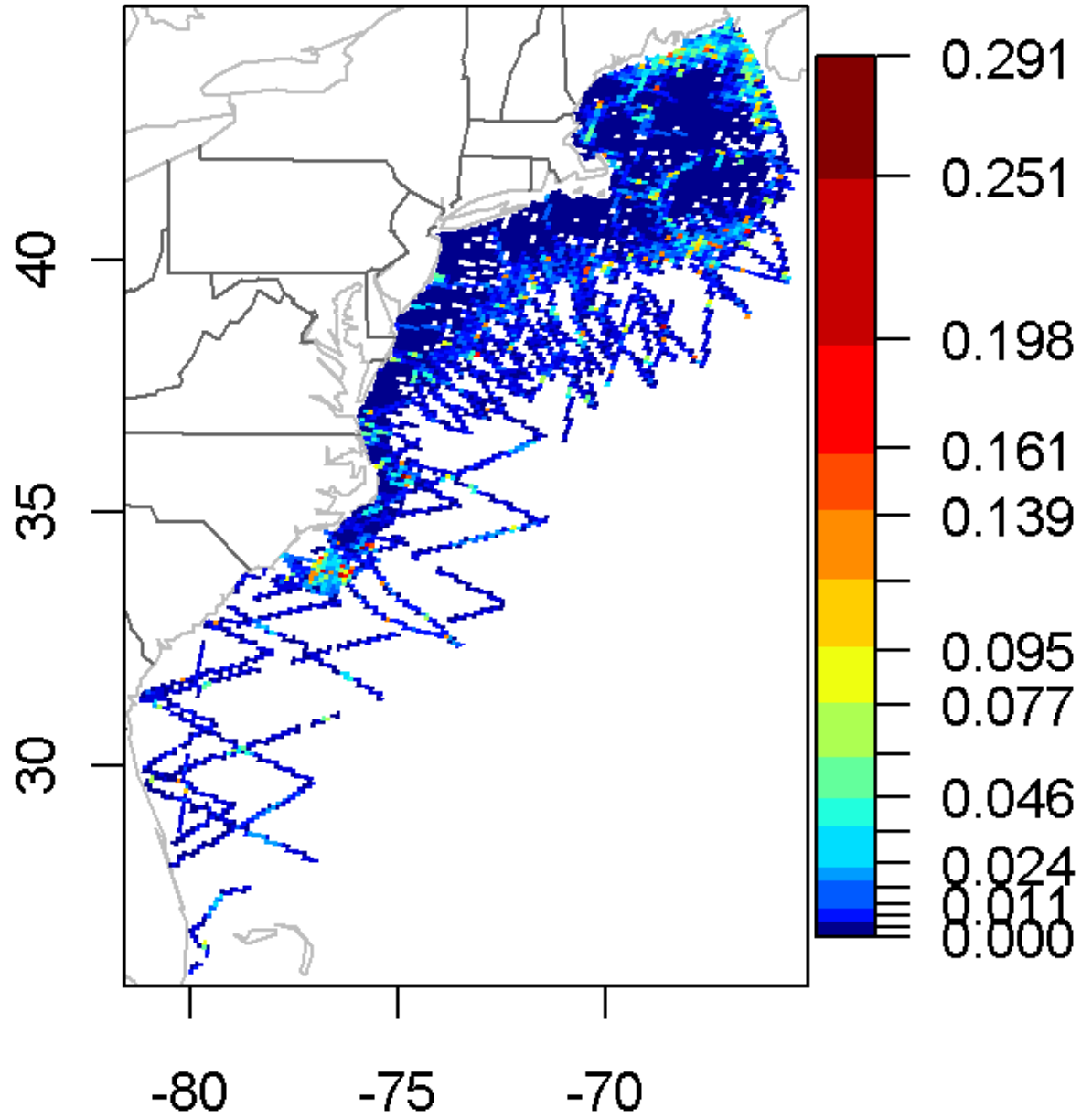


Figure 445: Map of effort(hours/km²) by cell summed through time for 'Pilot whales' guild during 'summer' season in 'east2' region.

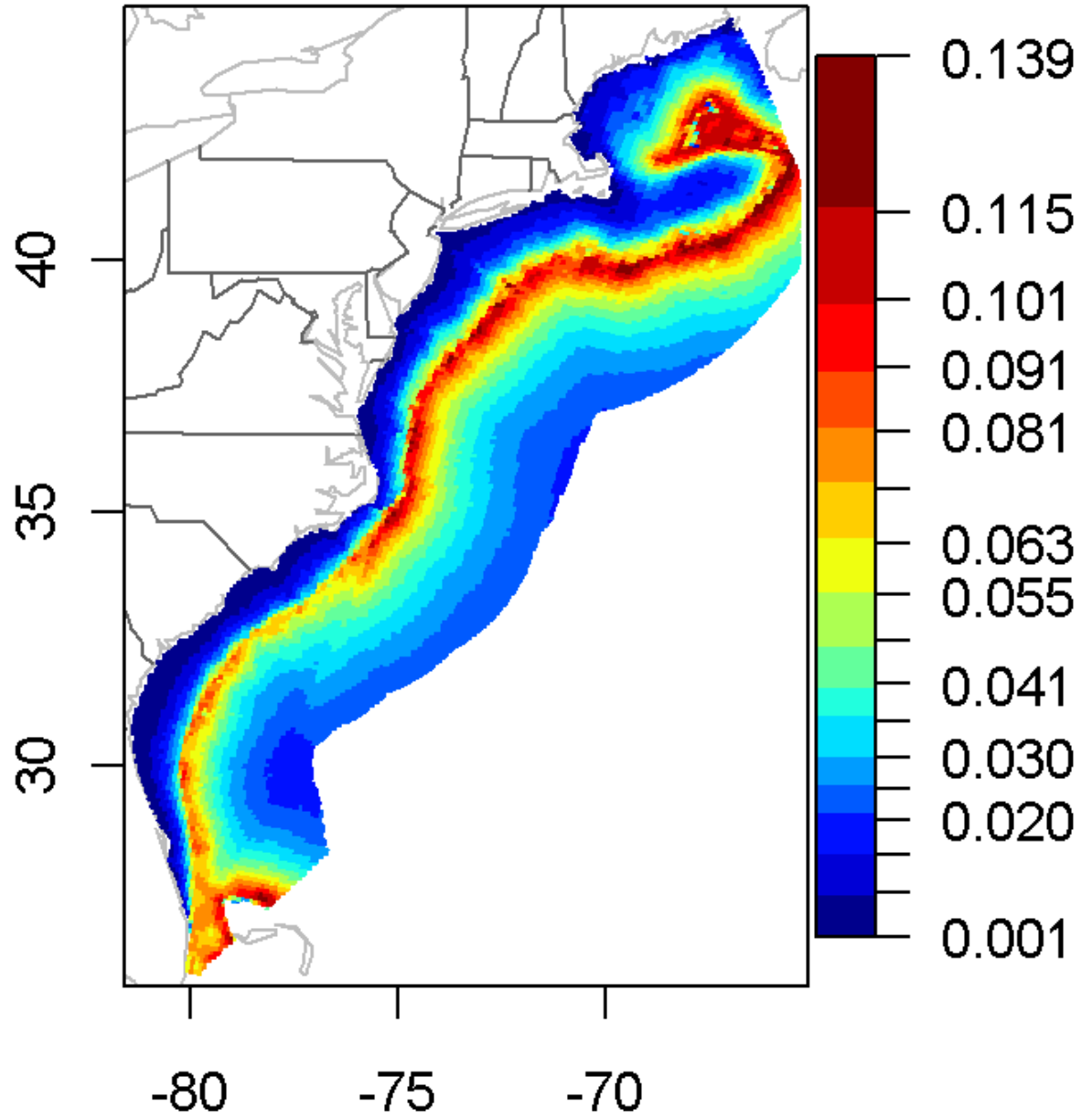


Figure 446: Map of mean predicted habitat for 'Pilot whales' guild during 'summer' season in 'east2' region.

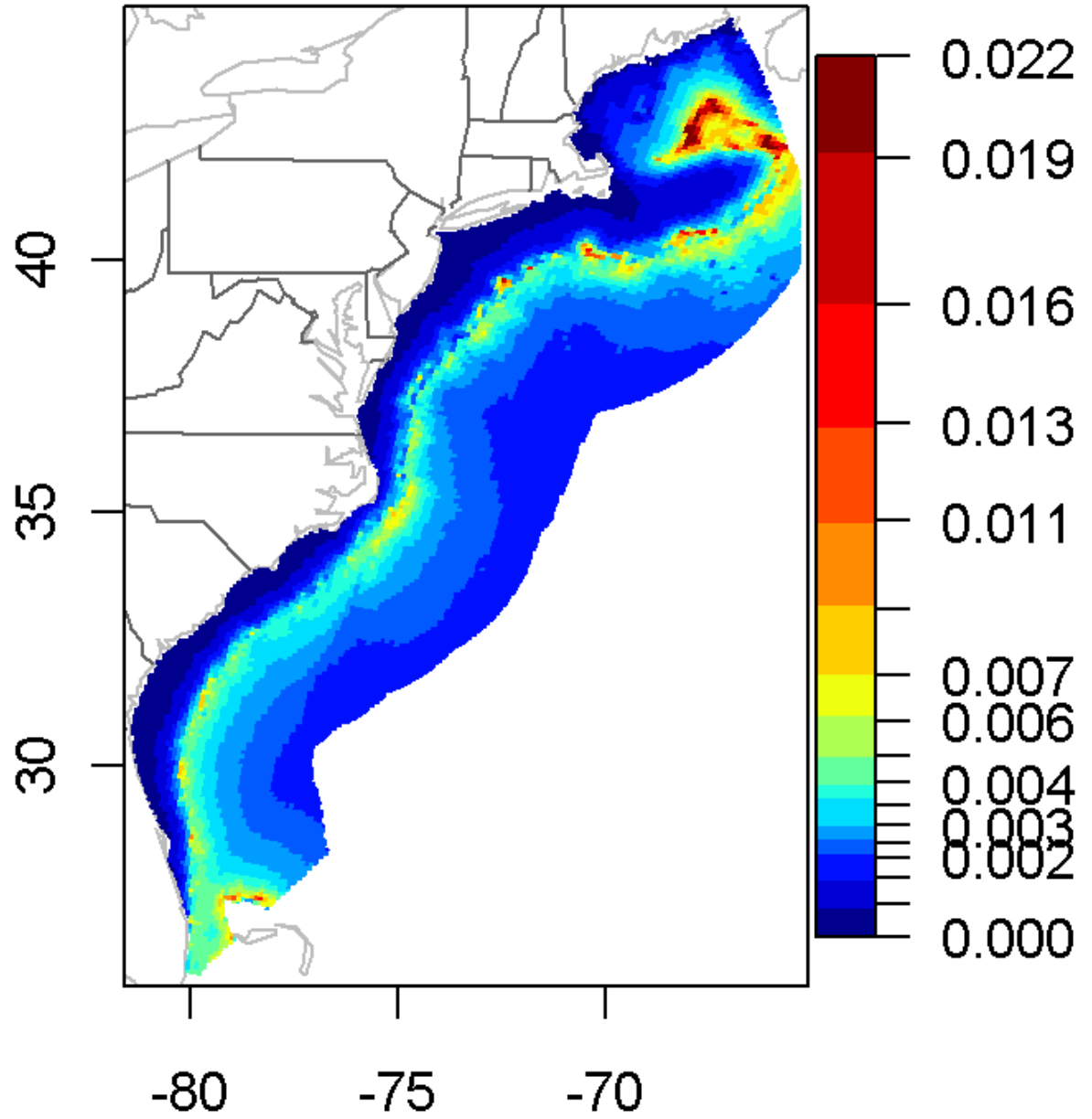


Figure 447: Map of standard error of habitat for 'Pilot whales' guild during 'summer' season in 'east2' region.

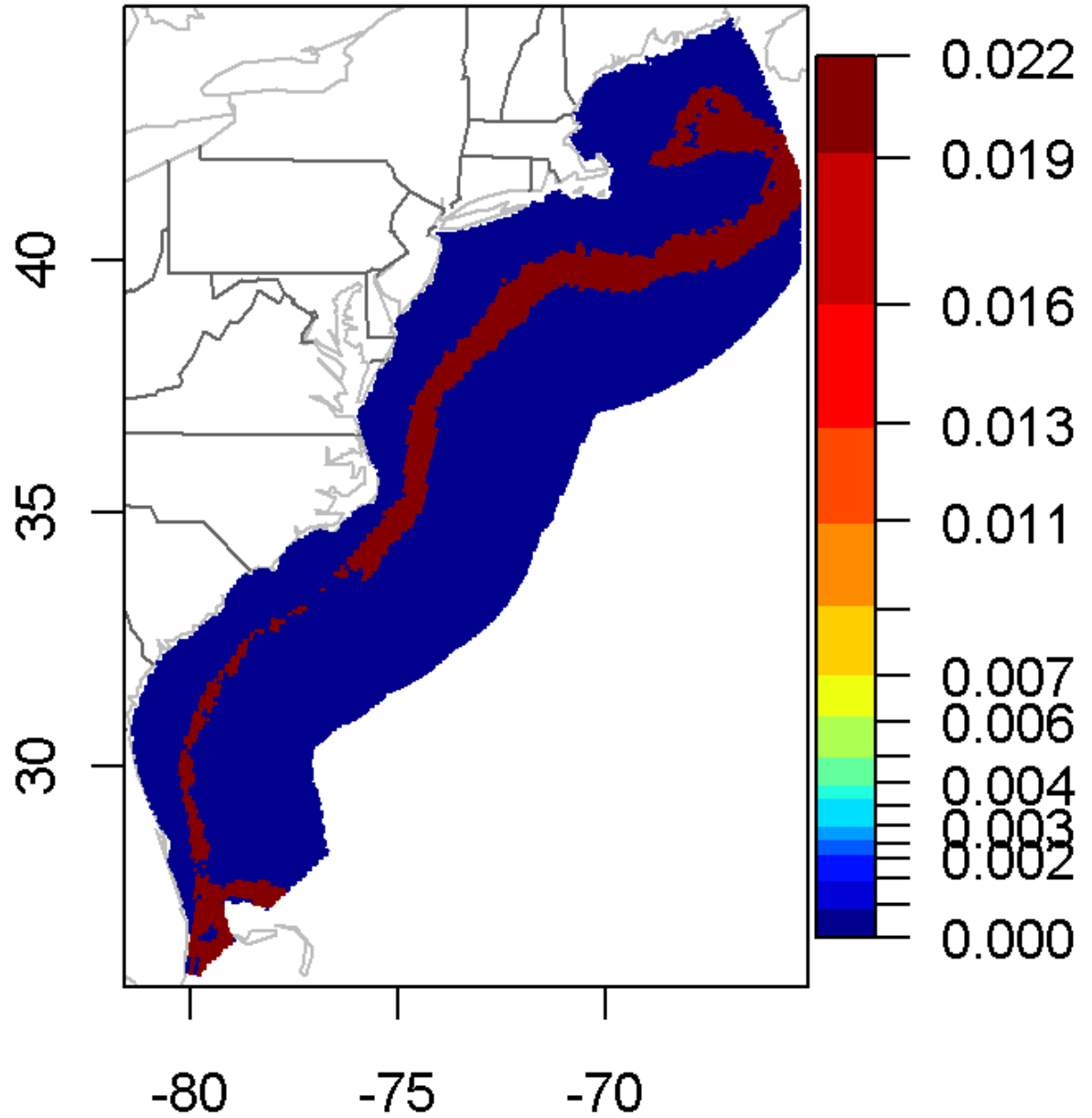


Figure 448: Map of binary habitat (cutoff determined by ROC) for 'Pilot whales' guild during 'summer' season in 'east2' region.

9.4 winter

9.4.1 east2

Modelrun identifier: duke_06_pw3_winter_east2

Date generated: 2008-10-21 15:12:23

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 42: Summary for duke(6) GAM model: for 'Pilot whales' guild during 'winter' season in 'east2' region.

	Value
Number.presences	7
Number.absences	3895
GAM.converged	TRUE
R.squared	0.00342482
Deviance.explained	0.306854
ROC.optimum	0.0677613
Maximum.fit	3.06132e-06
Maximum.prediction	0.0766173

Model text summary...

```
duke_06_pw3_winter_east2 run on Tue Oct 21 15:10:54 2008
  provider:duke, version:06, guild:Pilot whales (pw3), season:'winter', region:east2

max.fit:0.067761, max.prediction:0.076617, ROC.optimum:0.000003

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -59.094      4.703   -12.56  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth)) 1.974e+00  2.474   37.08 <2e-16 ***
s(log(d2shelf)) 1.267e-07  0.500  3.51e-07  0.981
s(log(d2coast)) 1.989e+00  2.489   51.97 <2e-16 ***
s(sst)         6.488e-08  0.500  3.69e-07  0.981
s(lat)         5.425e-07  0.500  6.05e-06  0.961
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.00342  Deviance explained = 30.7%
GCV score = 0.00013347  Scale est. = 0.00013296  n = 2337

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2: 844   Min.   : 1654   Min.    :  4.0   Min.    :  995   Min.    : 1471   Min.    :  2.654   Min.    :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0   1st Qu.: 18575  1st Qu.: 32272  1st Qu.: 13.500  1st Qu.:32.77
          Median :10479  Median : 28.0   Median : 38452  Median : 53042  Median : 19.208  Median :34.02
          Mean   : 9475   Mean   :153.2   Mean   : 44646  Mean   : 63558  Mean   : 17.745  Mean   :33.66
          3rd Qu.:10987  3rd Qu.: 41.0   3rd Qu.: 65053  3rd Qu.: 78087  3rd Qu.: 21.825  3rd Qu.:34.80
          Max.   :12763  Max.   :3612.0   Max.   :274566  Max.   :348168  Max.   : 26.400  Max.   :38.20
                   NA's   :    14    NA's   :    14    NA's   :1561.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633   Min.    :  4   Min.    :  5   Min.    : 1259   Min.    :  2.400   Min.    :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.:  9.075   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :4.966e-16  Min.   :0.000e+00  Min.   :9.035e-07  Min.   :0.0000
1st Qu.: 9145  1st Qu.:3.024e-13  1st Qu.:8.408e-13  1st Qu.:0.000e+00  1st Qu.:7.474e-04  1st Qu.:0.0000
Median :11616  Median :2.385e-05  Median :1.684e-05  Median :0.000e+00  Median :3.451e-03  Median :1.0000
Mean   :11171  Mean   :5.130e-03  Mean   :6.712e-04  Mean   :4.881e-03  Mean   :9.821e-03  Mean   :0.6242
3rd Qu.:14088  3rd Qu.:1.608e-03  3rd Qu.:4.929e-04  3rd Qu.:0.000e+00  3rd Qu.:9.825e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :7.662e-02  Max.   :7.907e-03  Max.   :2.000e+00  Max.   :2.547e-01  Max.   :1.0000
      NA's :6.000e+00  NA's :6.000e+00  NA's :8.454e+03  NA's :8.454e+03
```

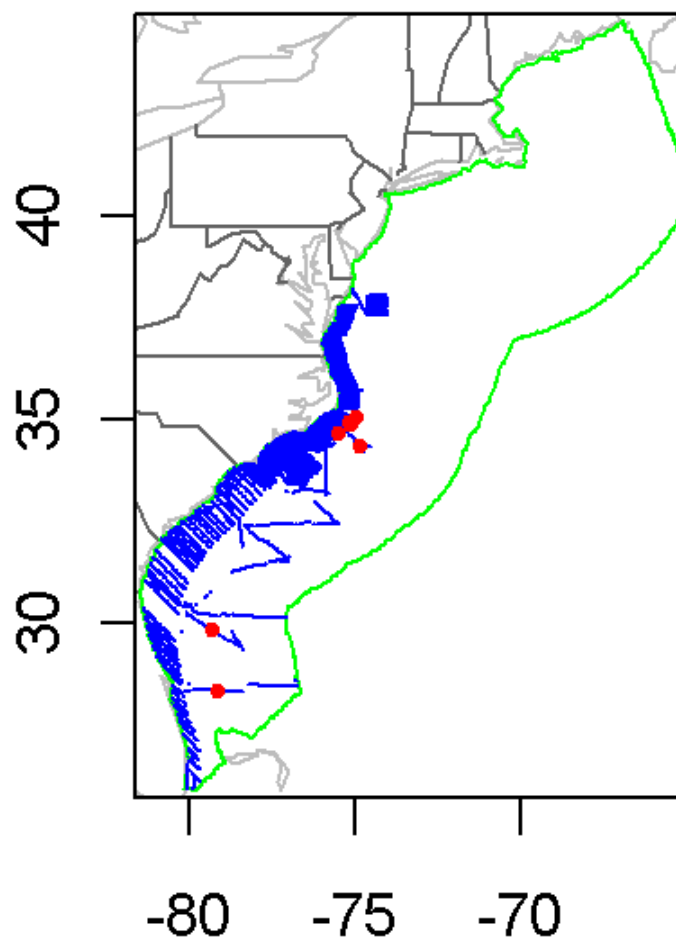



Figure 449: Map of points of observational sightings and tracks of survey effort for 'Pilot whales' guild during 'winter' season in 'east2' region.

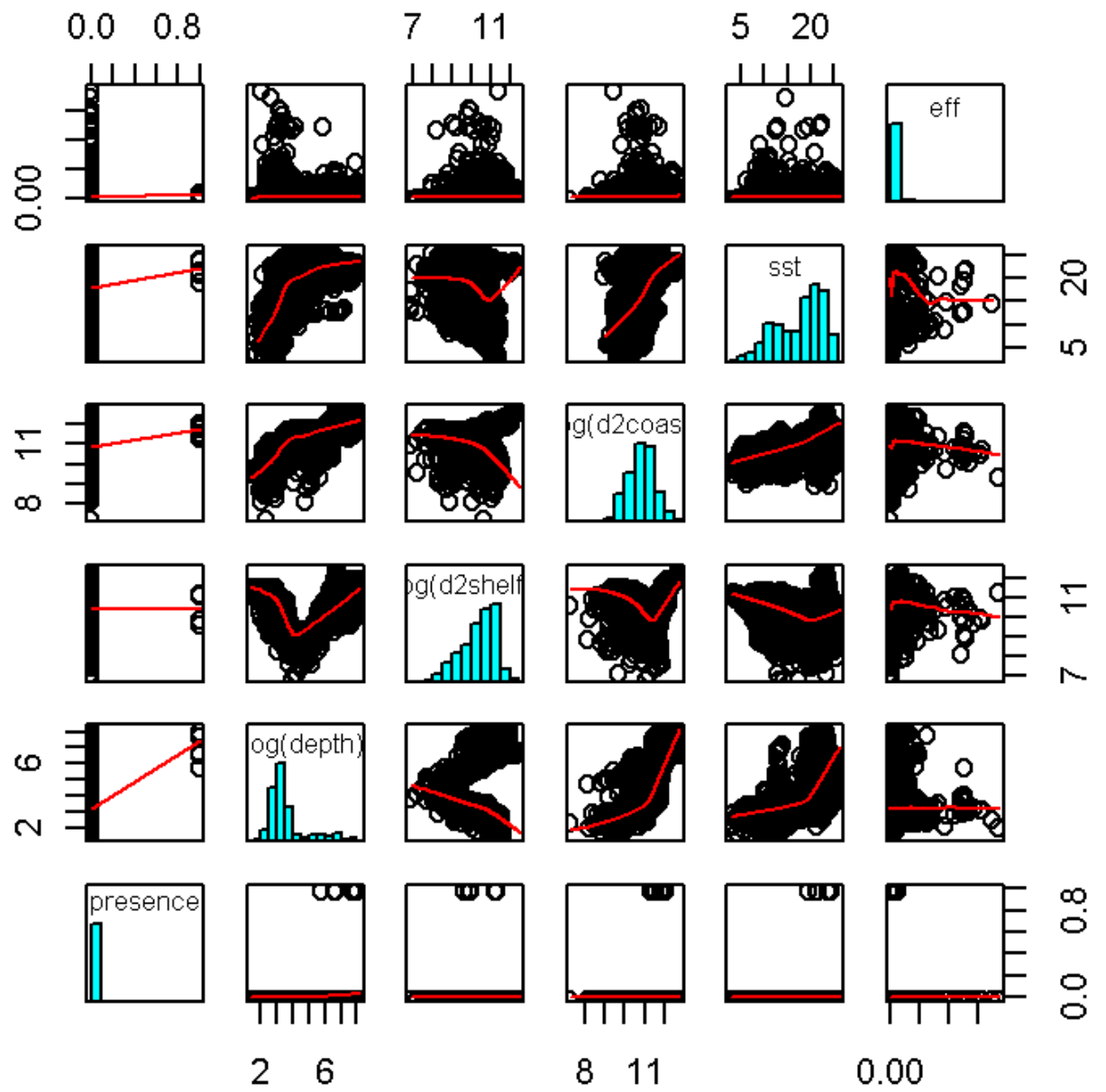


Figure 450: Pairs plot of input variables for 'Pilot whales' guild during 'winter' season in 'east2' region.

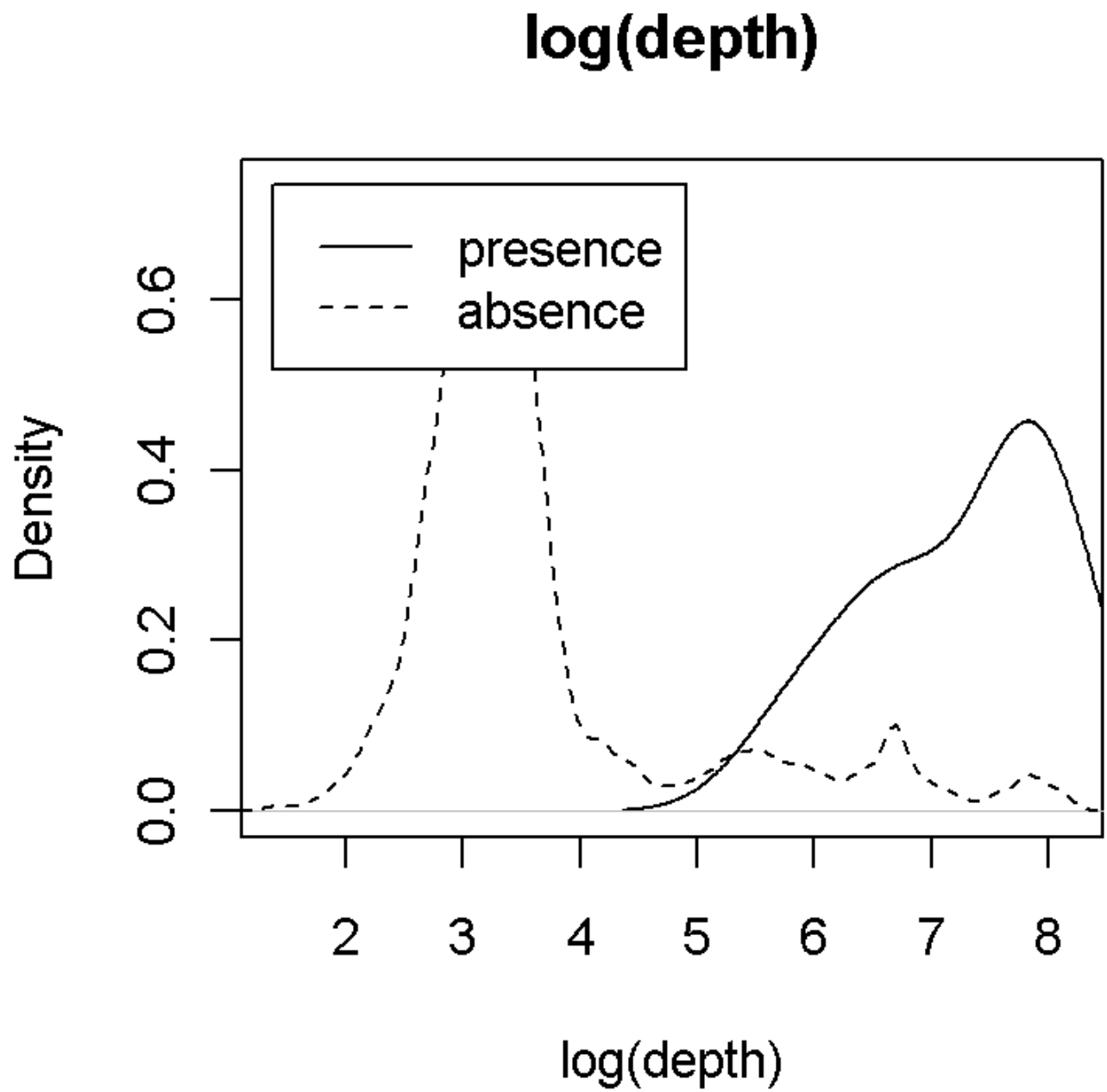


Figure 451: Density histogram of depth log(meters) for 'Pilot whales' guild during 'winter' season in 'east2' region.

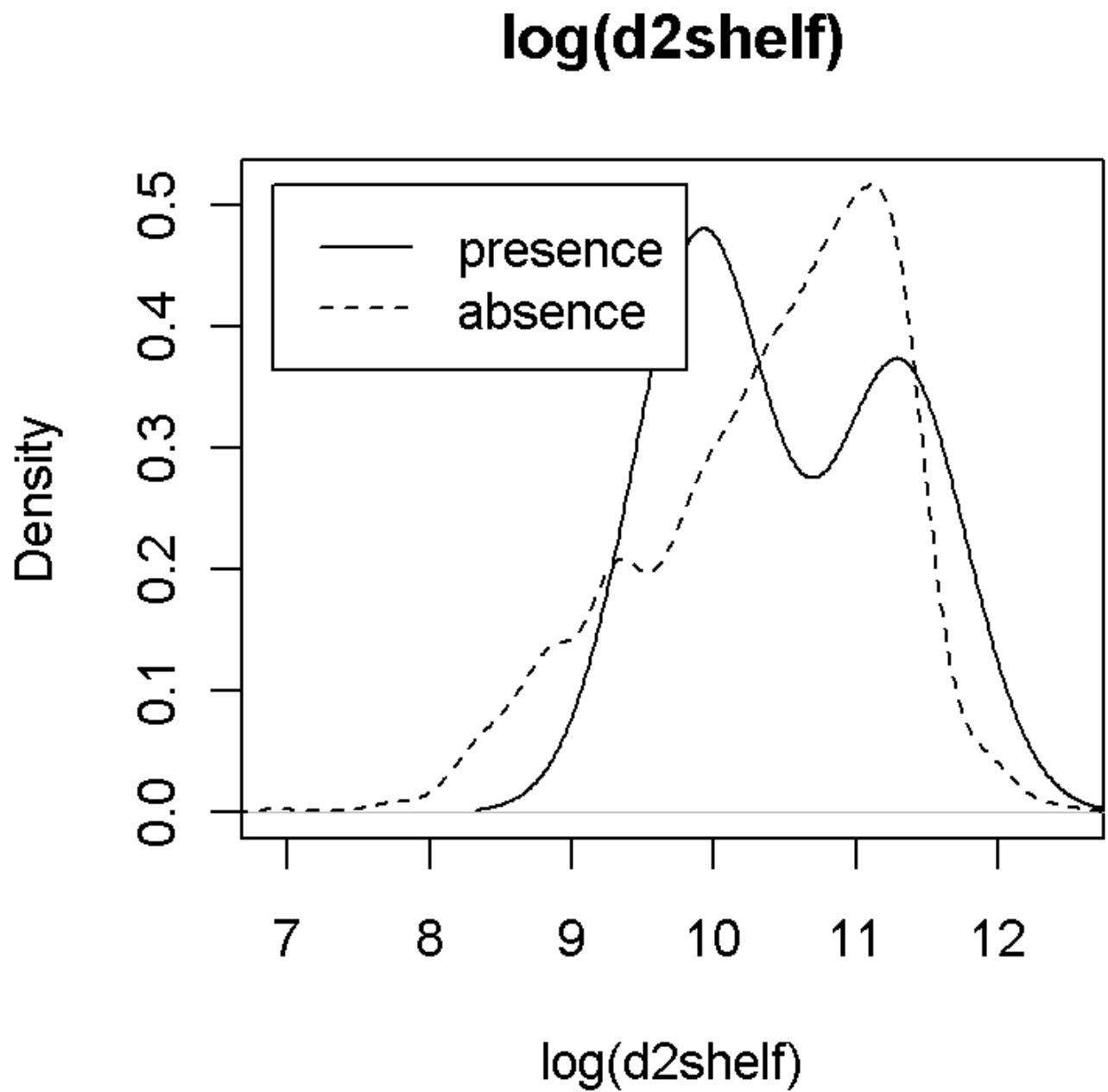


Figure 452: Density histogram of distance to shelf log(meters) for 'Pilot whales' guild during 'winter' season in 'east2' region.

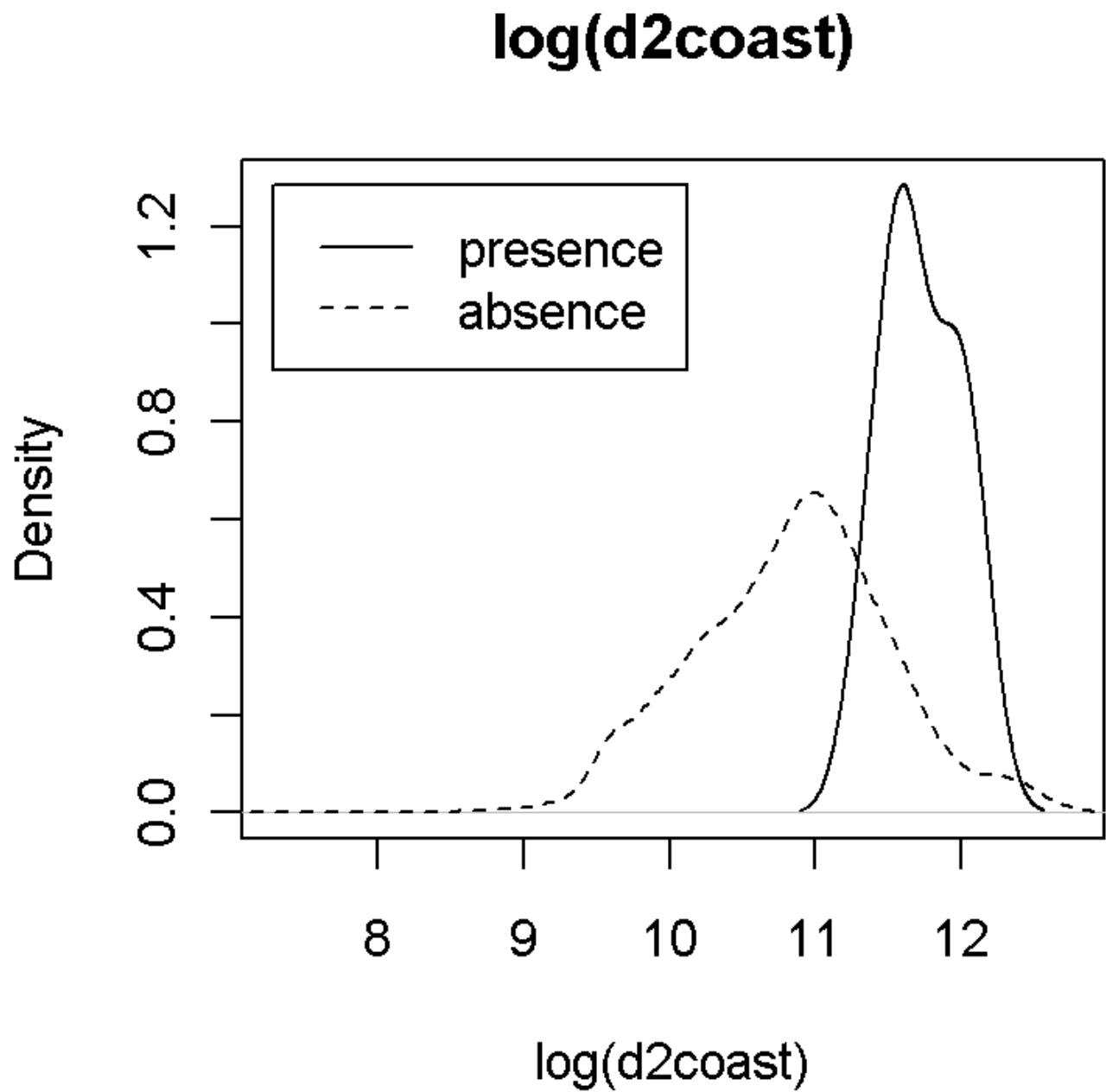


Figure 453: Density histogram of distance to coast log(meters) for 'Pilot whales' guild during 'winter' season in 'east2' region.

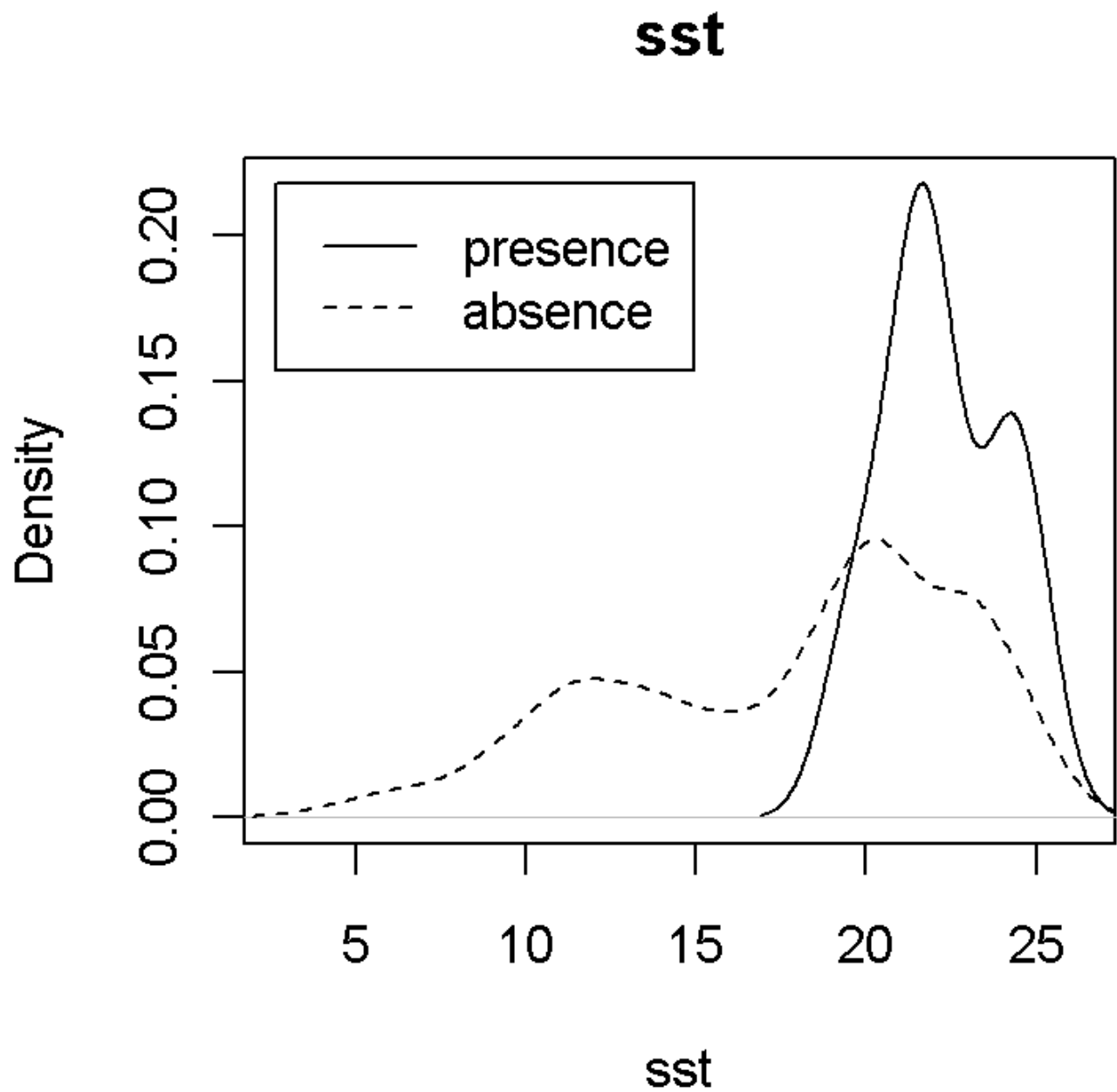


Figure 454: Density histogram of sea-surface temperature (degrees C) for 'Pilot whales' guild during 'winter' season in 'east2' region.

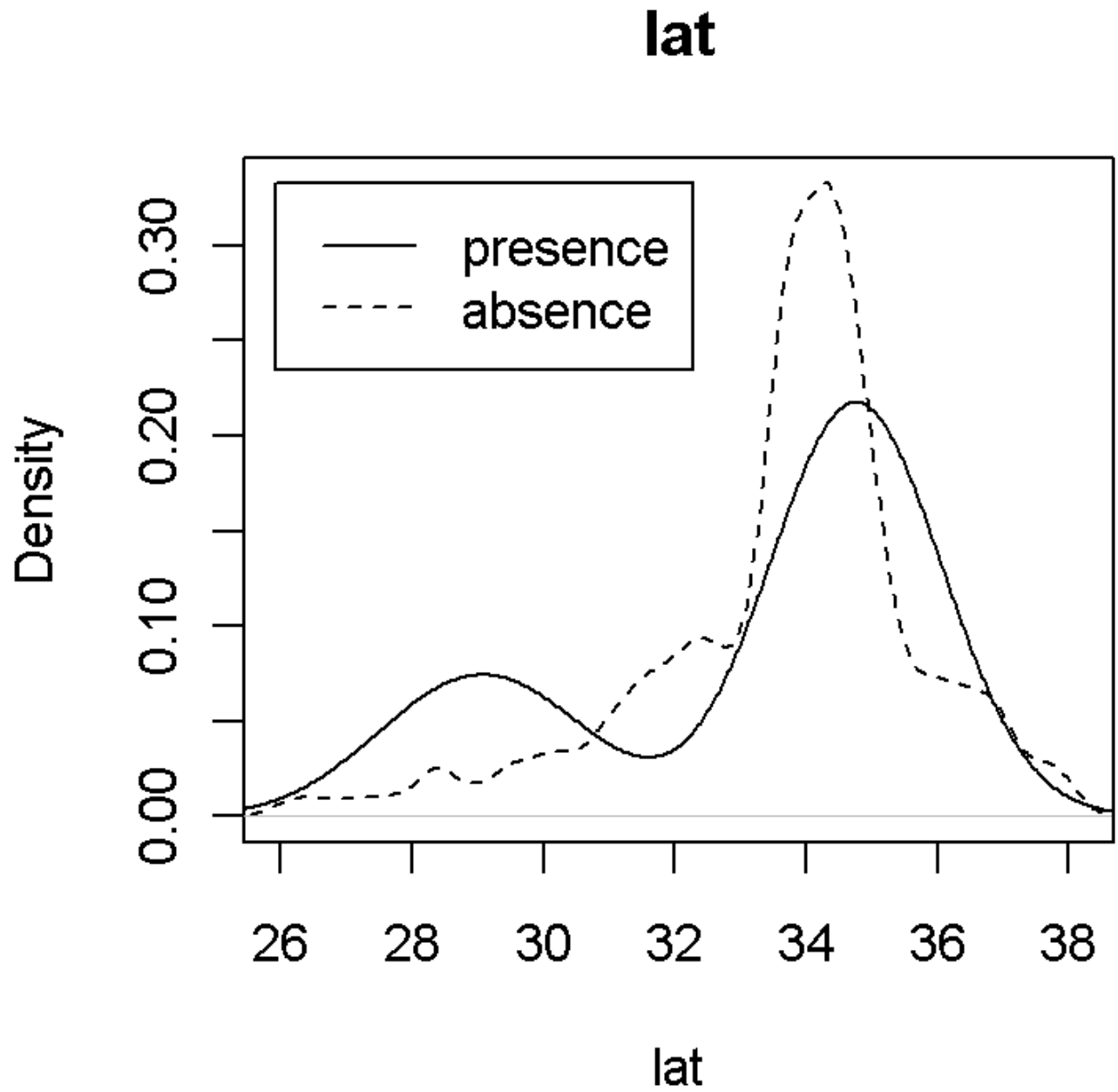


Figure 455: Density histogram of latitude (degrees) for 'Pilot whales' guild during 'winter' season in 'east2' region.

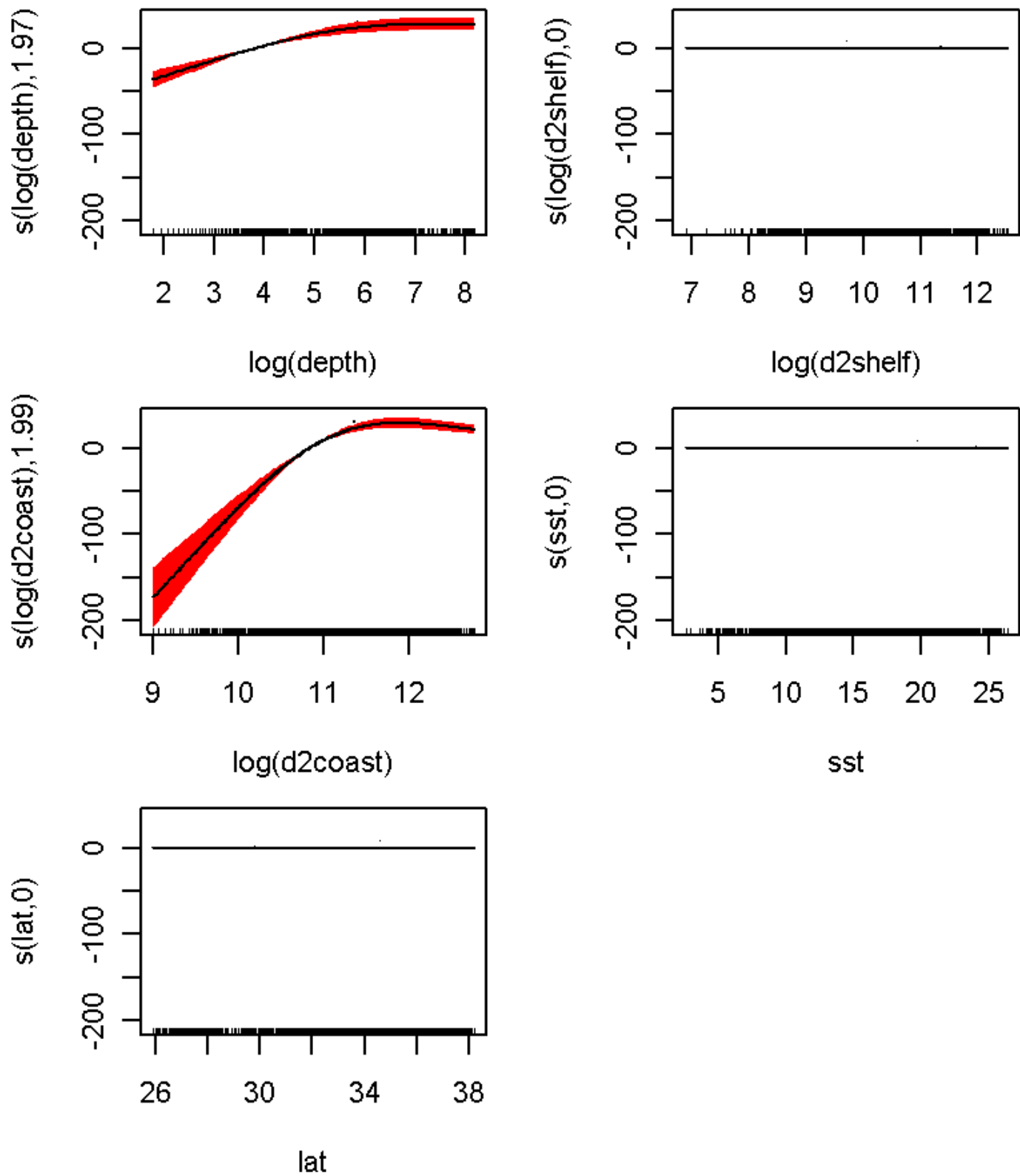


Figure 456: Terms plot of predictors to GAM model fit for 'Pilot whales' guild during 'winter' season in 'east2' region.

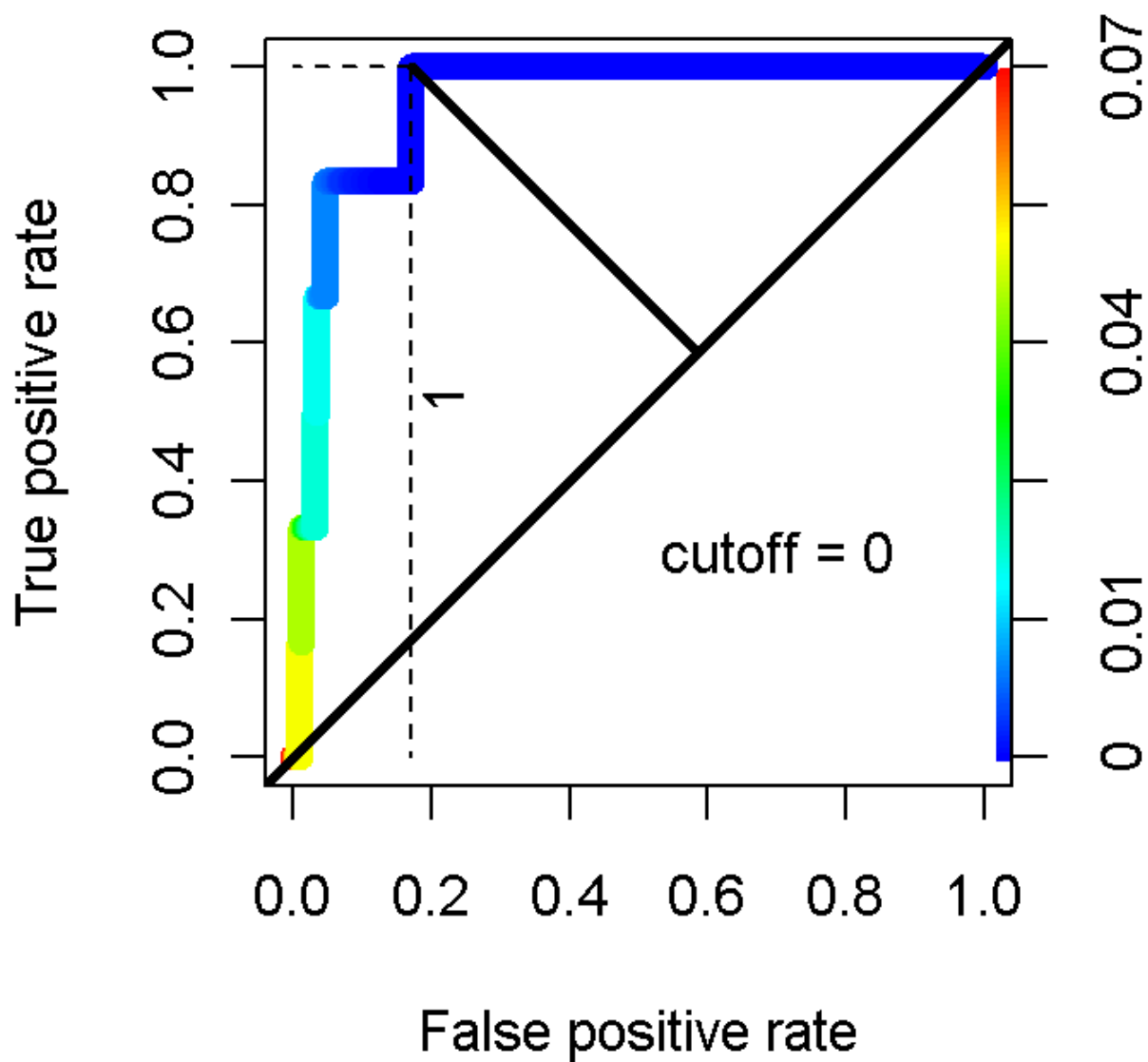


Figure 457: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Pilot whales' guild during 'winter' season in 'east2' region.

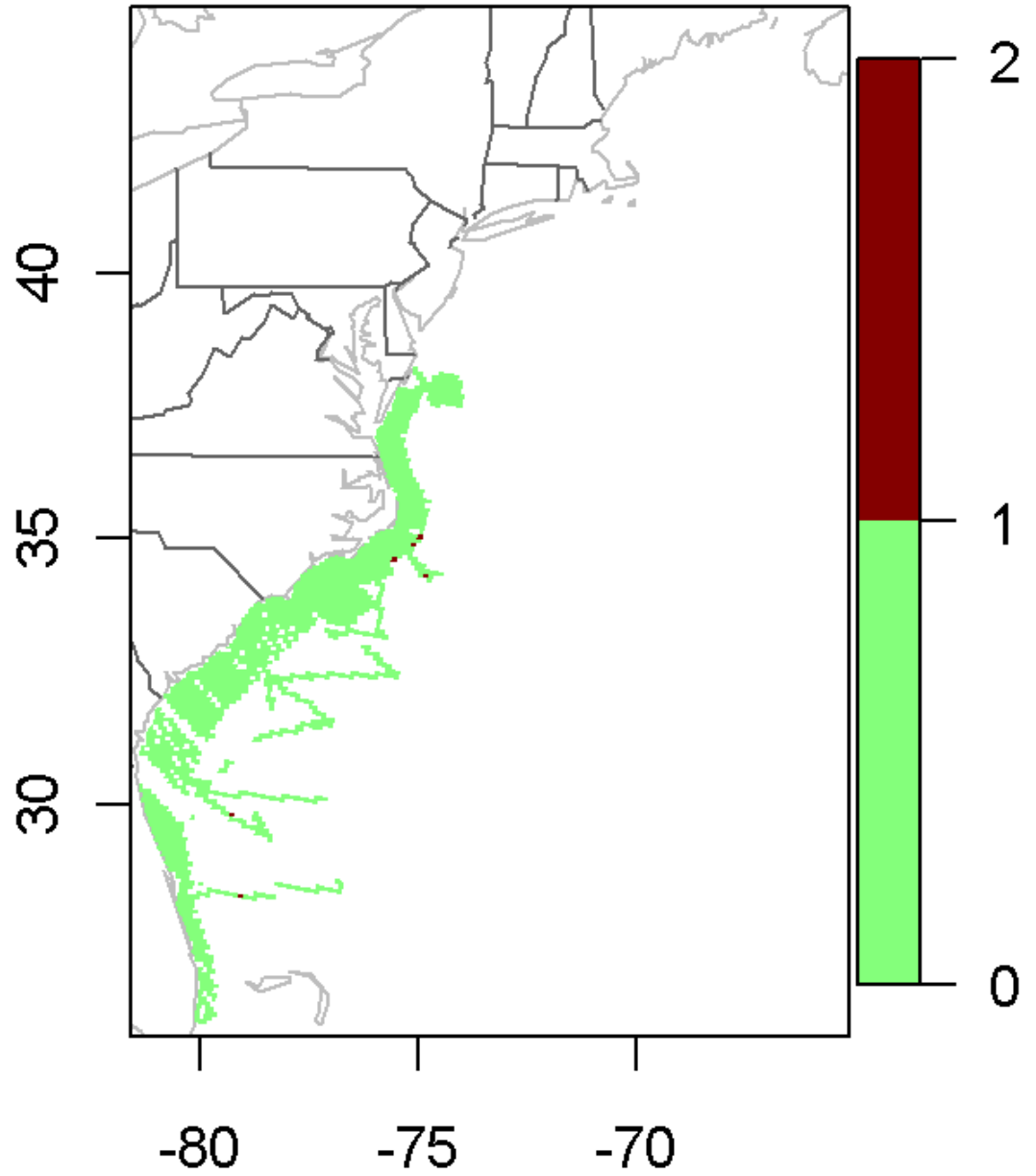


Figure 458: Map of presence and absence by cell summed through time for 'Pilot whales' guild during 'winter' season in 'east2' region.

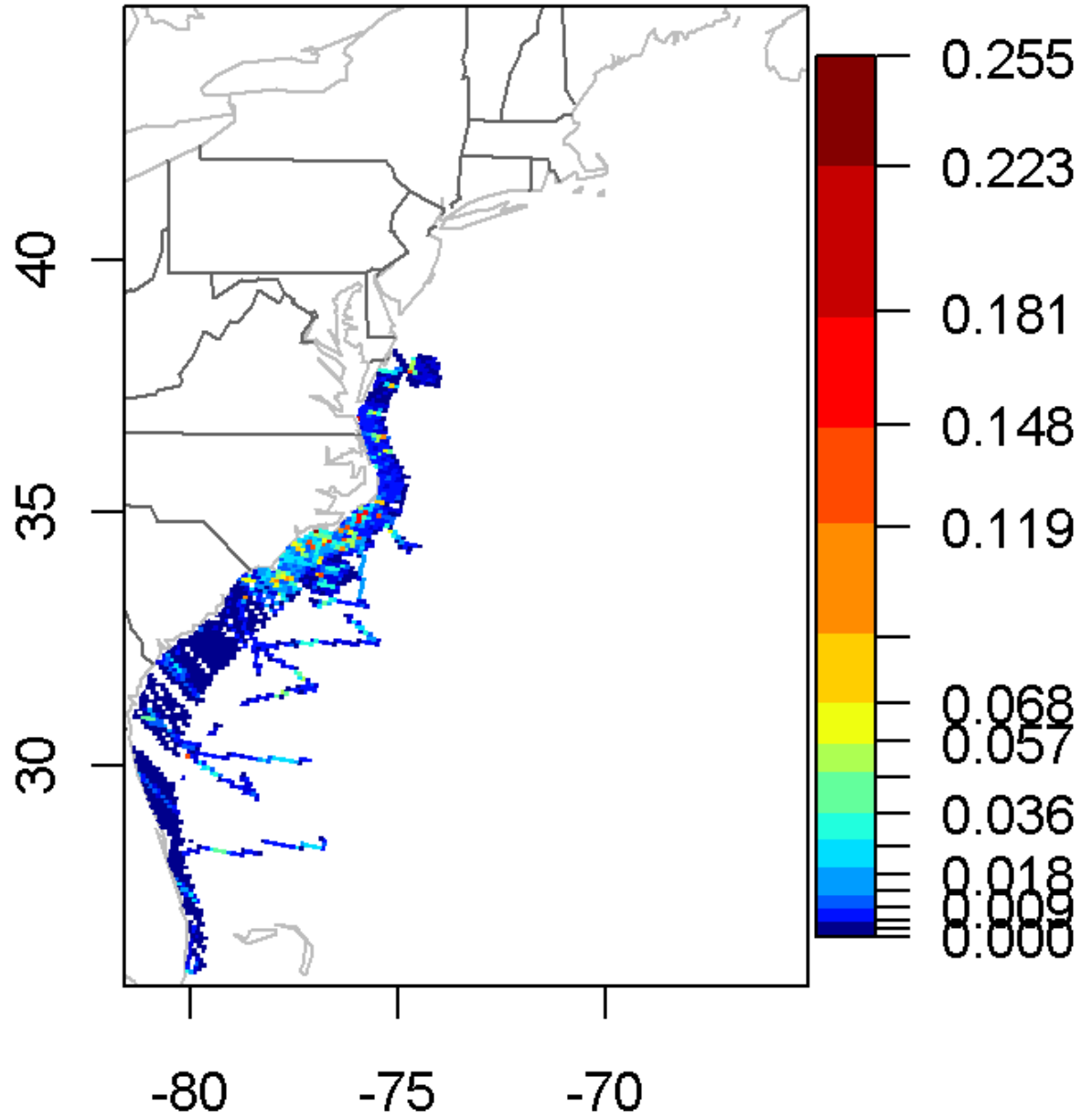


Figure 459: Map of effort(hours/km²) by cell summed through time for 'Pilot whales' guild during 'winter' season in 'east2' region.

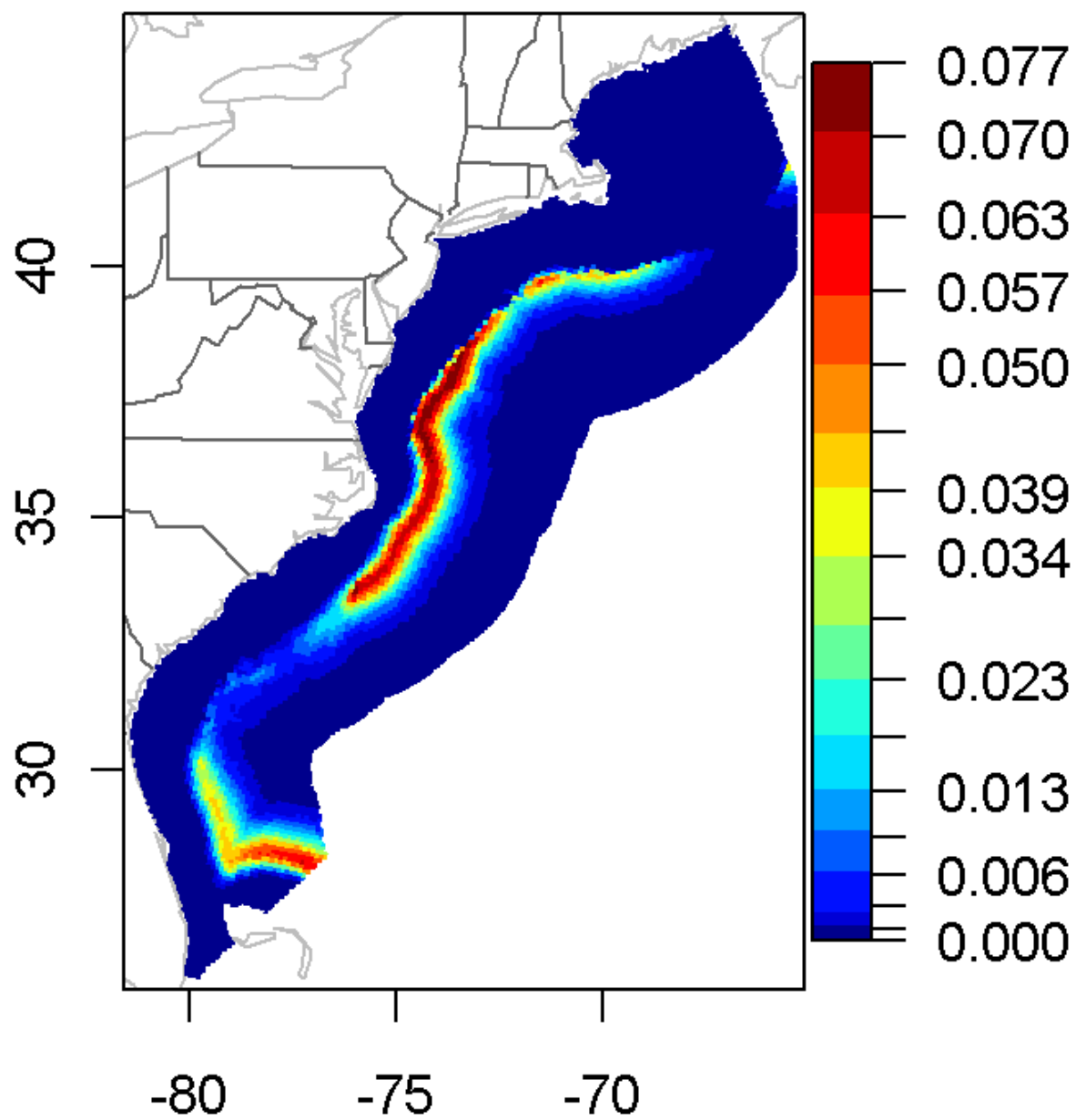


Figure 460: Map of mean predicted habitat for 'Pilot whales' guild during 'winter' season in 'east2' region.

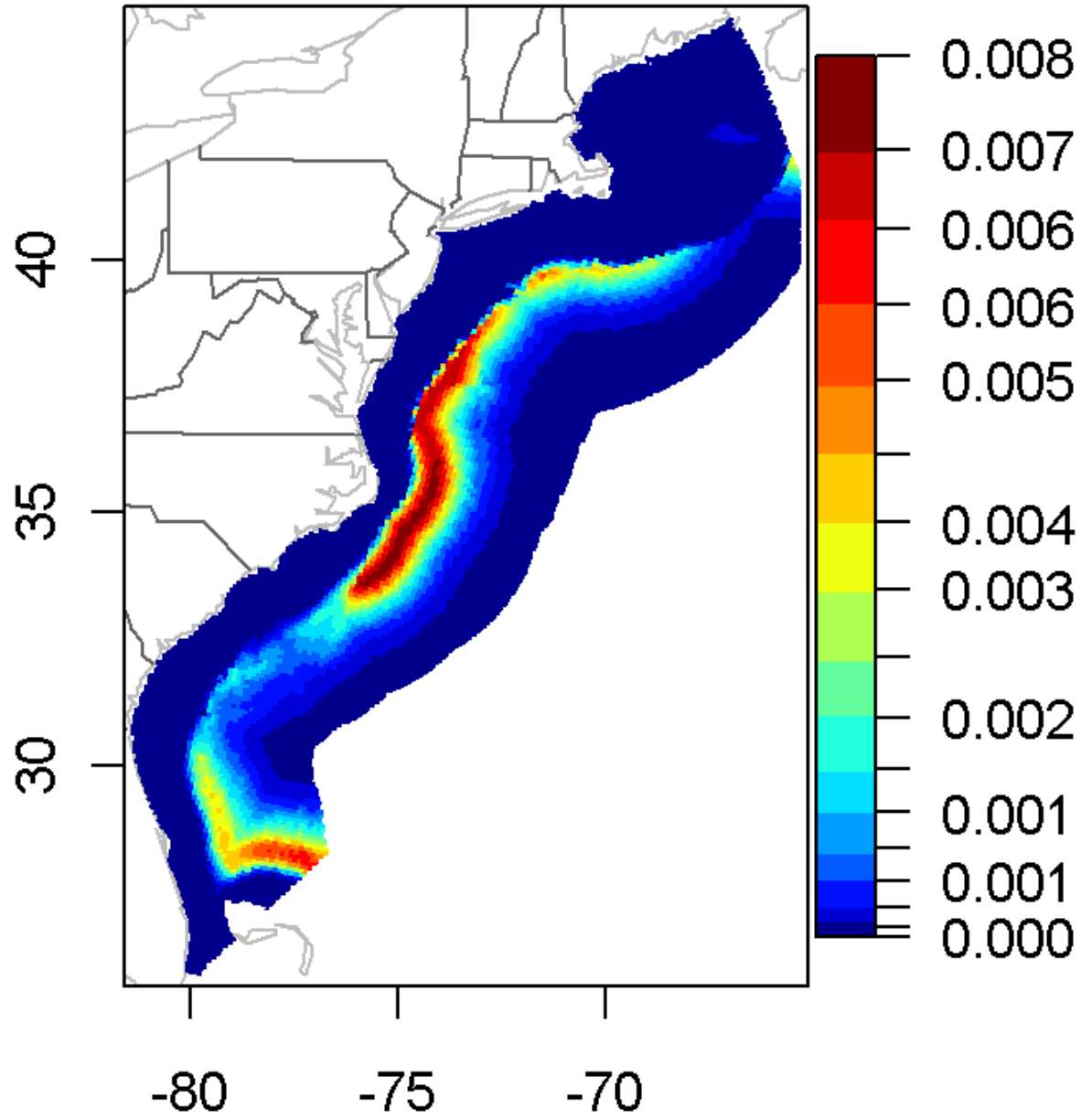


Figure 461: Map of standard error of habitat for 'Pilot whales' guild during 'winter' season in 'east2' region.

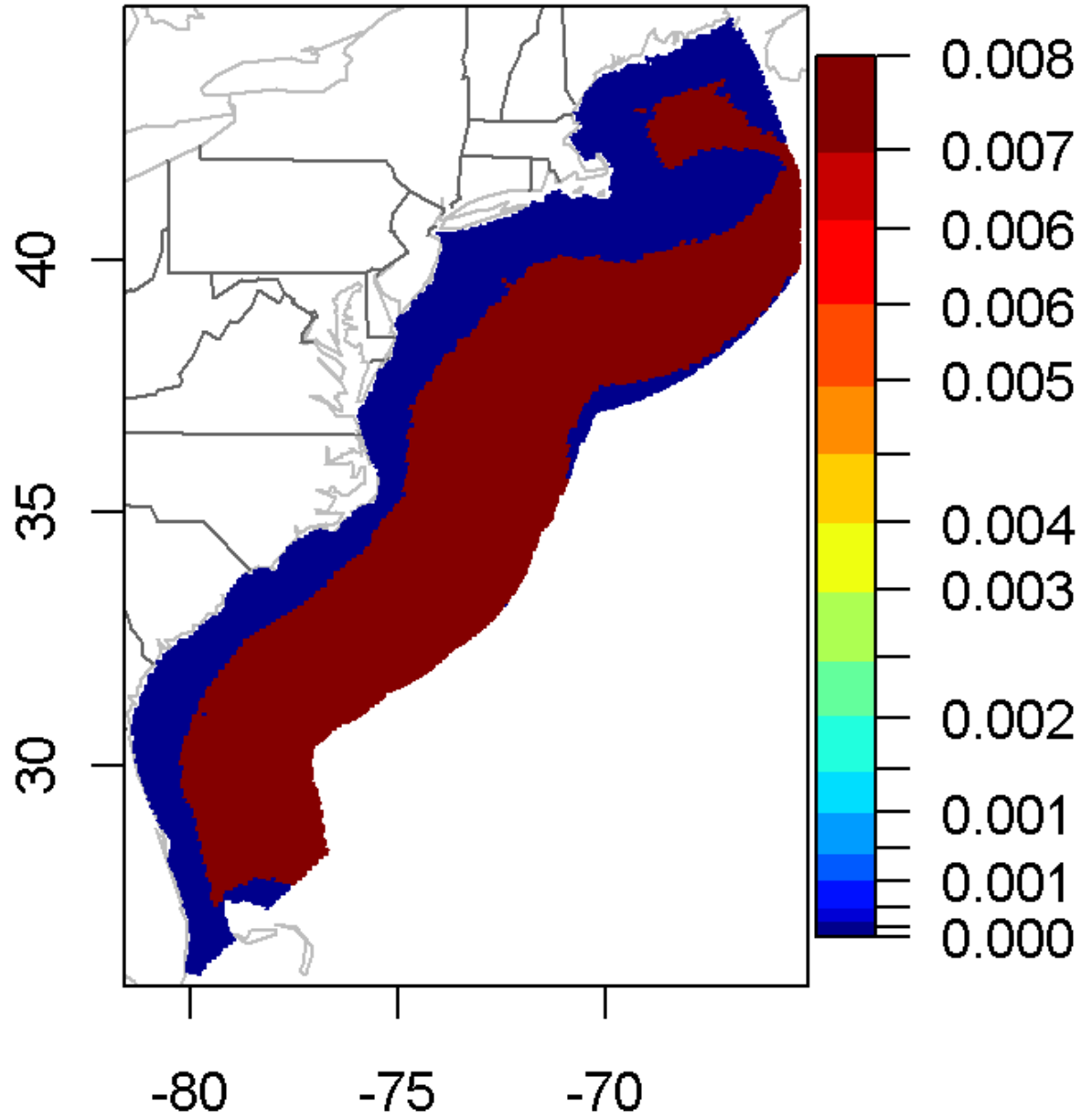


Figure 462: Map of binary habitat (cutoff determined by ROC) for 'Pilot whales' guild during 'winter' season in 'east2' region.

10 Right whales

Guildid:rw3

Table 43: Taxonomic members of the "Right whales" guild.

	Scientific Name	Common Name	Taxonomic #
1	<i>Eubalaena glacialis</i>	black right whale	180537

10.1 fall

10.2 spring

10.3 summer

10.3.1 east2

Modelrun identifier: duke_06_rw3_summer_east2

Date generated: 2008-10-21 13:31:54

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 44: Summary for duke(6) GAM model: for 'Right whales' guild during 'summer' season in 'east2' region.

	Value
Number.presences	17
Number.absences	9061
GAM.converged	TRUE
R.squared	0.0164802
Deviance.explained	0.323434
ROC.optimum	0.260051
Maximum.fit	1.85983e-05
Maximum.prediction	0.116522

Model text summary...

```
duke_06_rw3_summer_east2 run on Tue Oct 21 13:28:18 2008
  provider:duke, version:06, guild:Right whales (rw3), season:'summer', region:east2

max.fit:0.260051, max.prediction:0.116522, ROC.optimum:0.000019

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -26.367      1.293   -20.39  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.999927 2.4999    66.26 <2e-16 ***
s(log(d2shelf)) 0.003881 0.5039    0.000273  0.901
s(log(d2coast)) 1.872193 2.3722    58.17 <2e-16 ***
s(sst)         1.991079 2.4911   214.15 <2e-16 ***
s(lat)         0.999380 1.4994   385.41 <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  0.0165  Deviance explained = 32.3%
GCV score = 7.2929e-05  Scale est. = 7.281e-05  n = 8663

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.   :  5.0  Min.   :    5  Min.   : 1259  Min.   :  8.175  Min.   :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.:20989  1st Qu.: 50865  1st Qu.:17.025  1st Qu.:37.53
          Median :14008  Median :111.5  Median :52230  Median :102266  Median :22.200  Median :40.18
          Mean   :13275  Mean   :677.3  Mean   :67623  Mean :125197  Mean   :21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.:420.0  3rd Qu.:99335  3rd Qu.:174835  3rd Qu.:25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   :30.900  Max.   :44.74
                   NA's   :    7  NA's   :    7  NA's   :408.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :    5  Min.   : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```


Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :2.602e-16	Min. :0.000e+00	Min. :7.209e-08	Min. :0.00000
1st Qu.: 9145	1st Qu.:2.220e-16	1st Qu.:6.774e-16	1st Qu.:0.000e+00	1st Qu.:1.220e-03	1st Qu.:0.00000
Median :11616	Median :2.220e-16	Median :1.238e-15	Median :0.000e+00	Median :4.368e-03	Median :0.00000
Mean :11171	Mean :3.731e-04	Mean :3.121e-05	Mean :3.687e-03	Mean :1.069e-02	Mean :0.09426
3rd Qu.:14088	3rd Qu.:1.801e-10	3rd Qu.:1.860e-10	3rd Qu.:0.000e+00	3rd Qu.:9.308e-03	3rd Qu.:0.00000
Max. :16560	Max. :1.165e-01	Max. :1.016e-02	Max. :2.000e+00	Max. :2.910e-01	Max. :1.00000
	NA's :5.000e+00	NA's :5.000e+00	NA's :5.277e+03	NA's :5.277e+03	

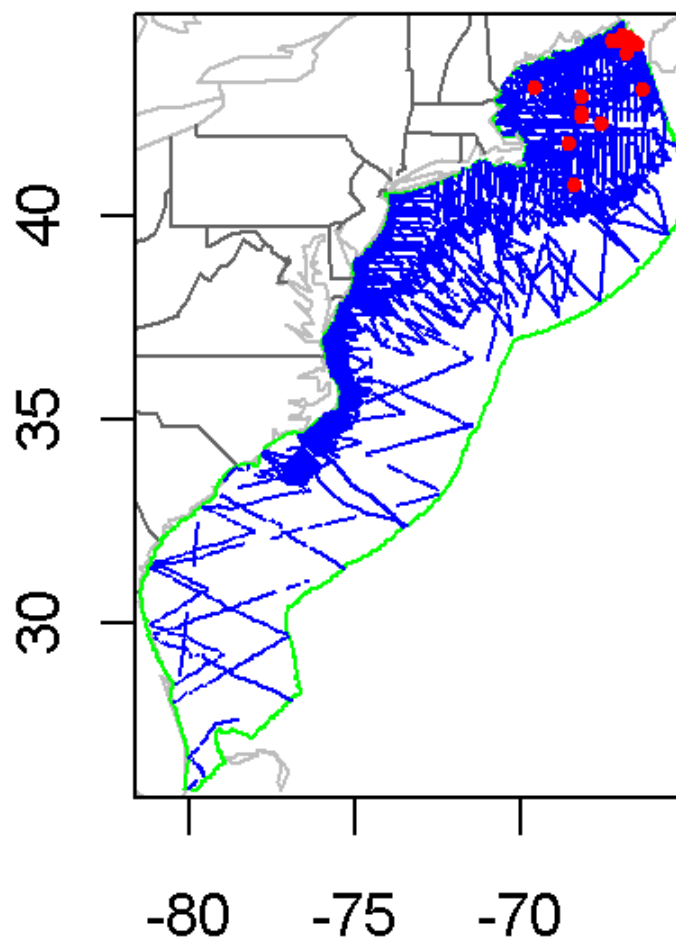


Figure 463: Map of points of observational sightings and tracks of survey effort for 'Right whales' guild during 'summer' season in 'east2' region.

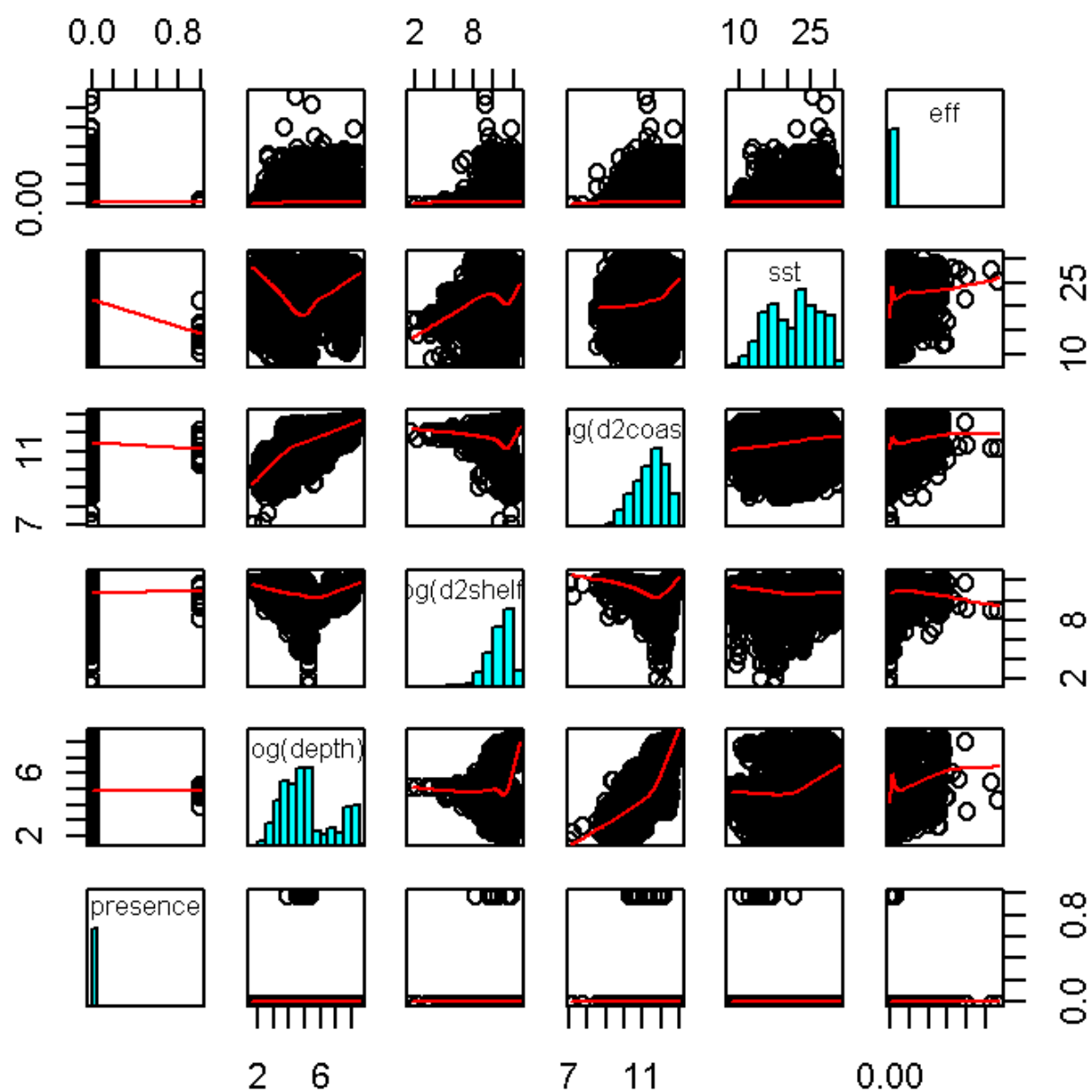


Figure 464: Pairs plot of input variables for 'Right whales' guild during 'summer' season in 'east2' region.

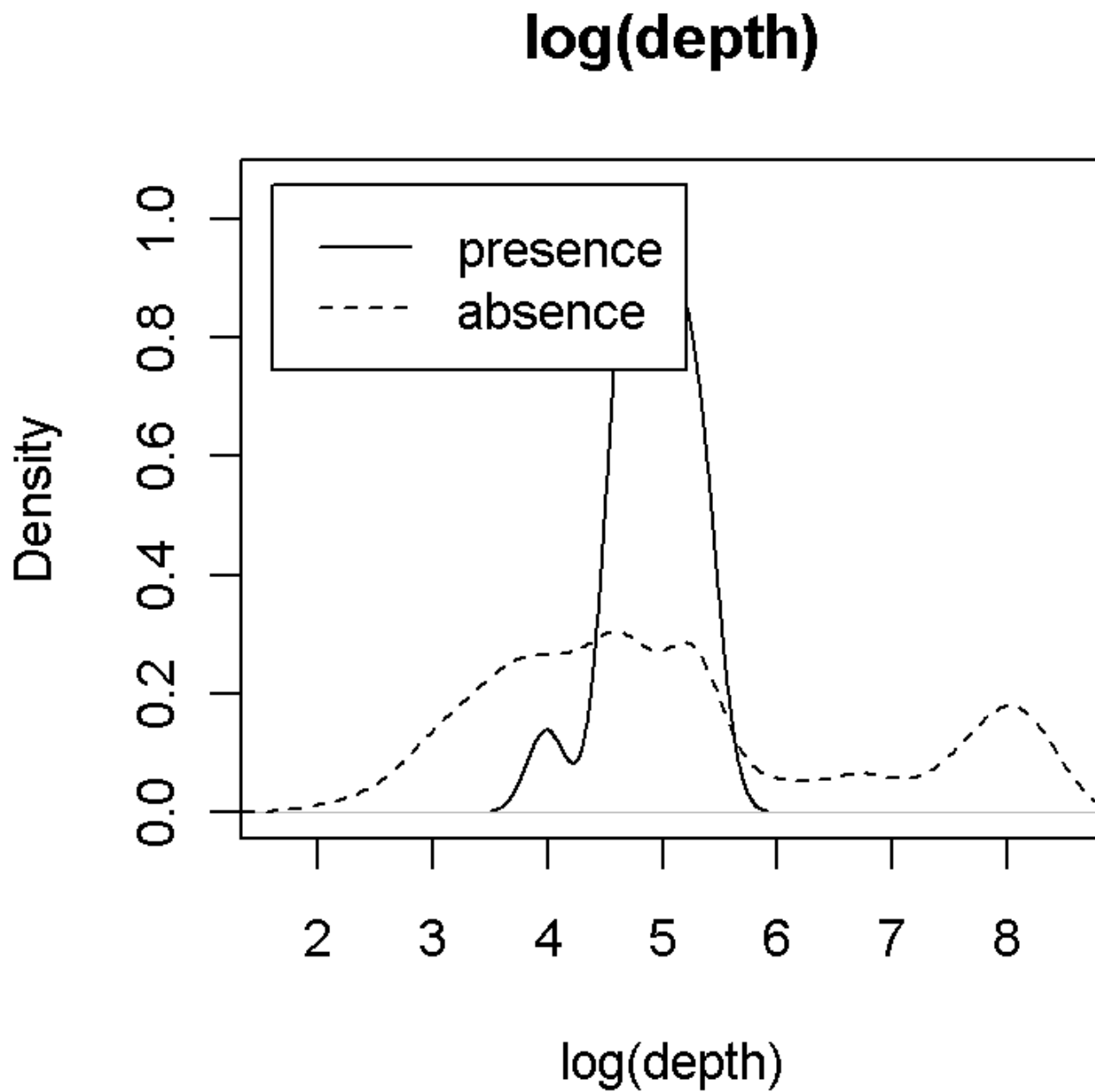


Figure 465: Density histogram of depth $\log(\text{meters})$ for 'Right whales' guild during 'summer' season in 'east2' region.

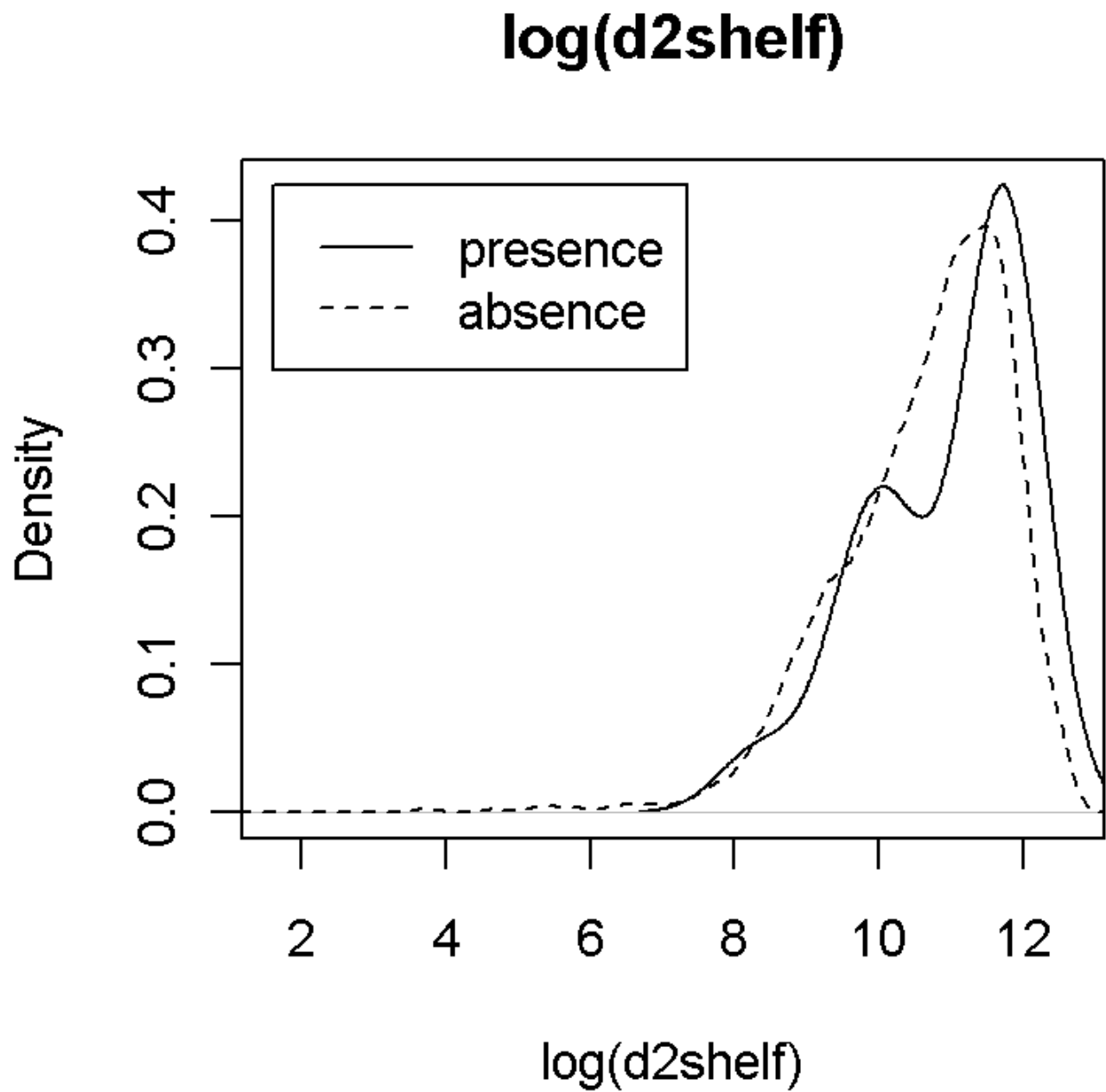


Figure 466: Density histogram of distance to shelf log(meters) for 'Right whales' guild during 'summer' season in 'east2' region.

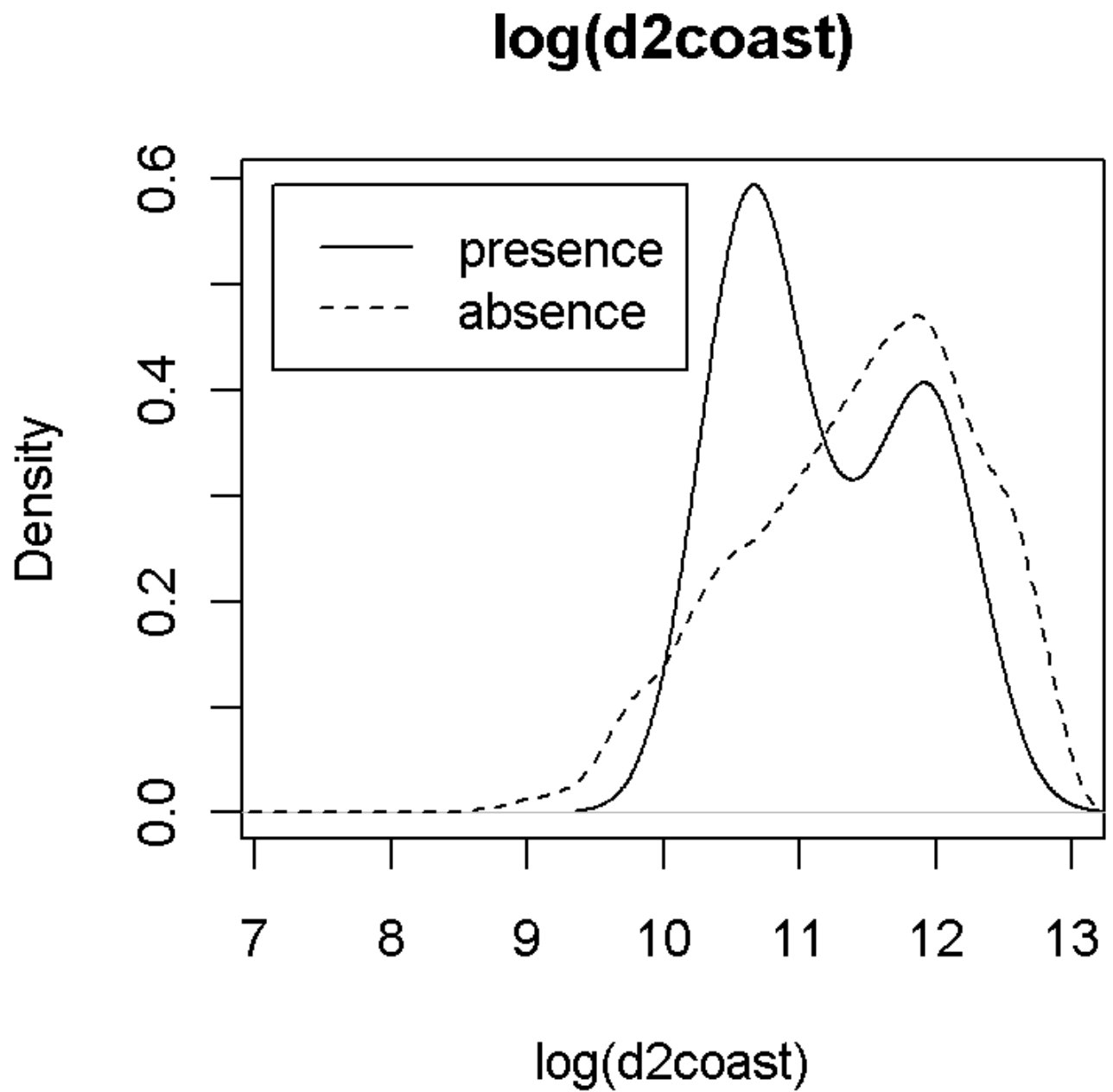


Figure 467: Density histogram of distance to coast log(meters) for 'Right whales' guild during 'summer' season in 'east2' region.

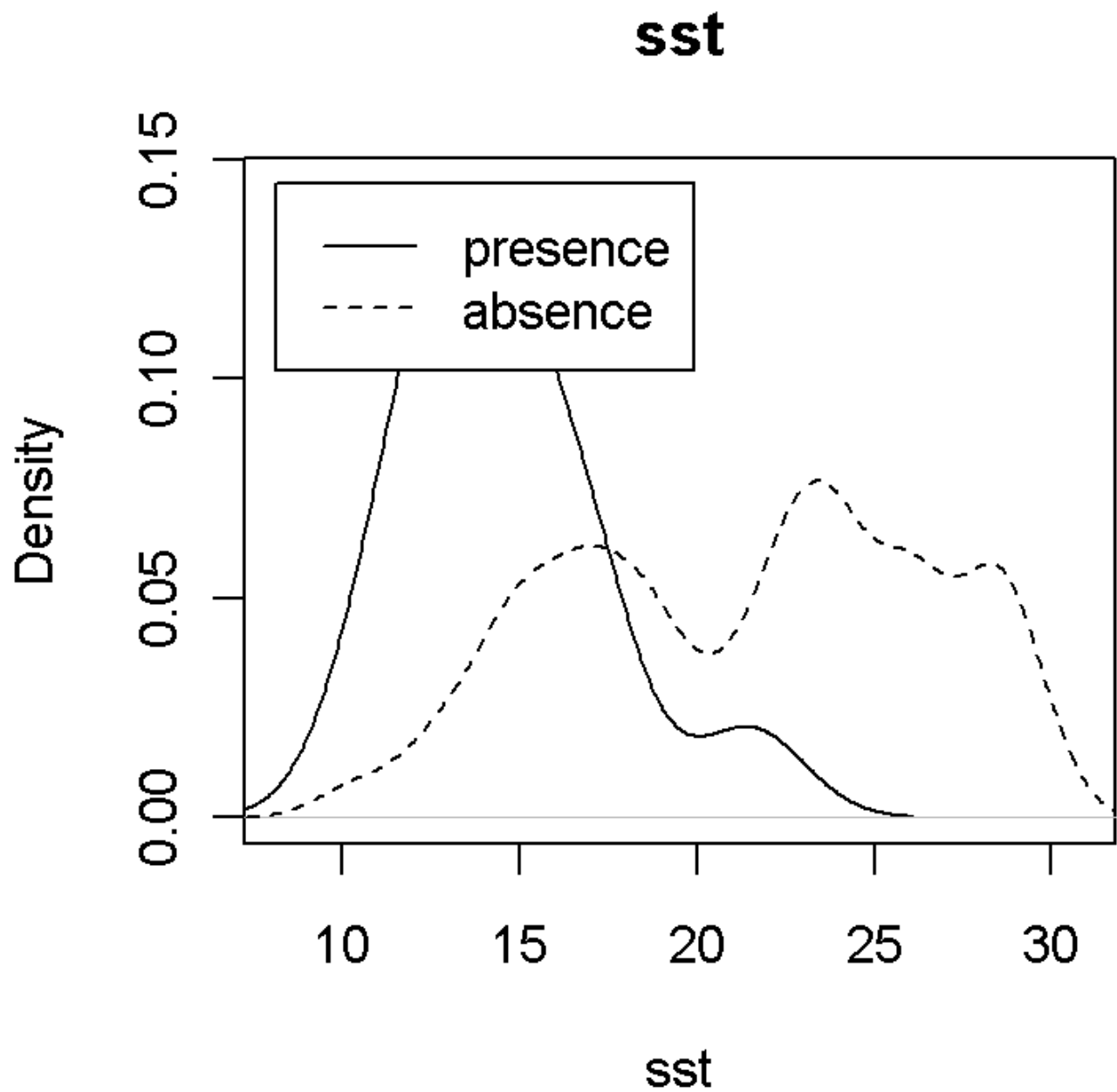


Figure 468: Density histogram of sea-surface temperature (degrees C) for 'Right whales' guild during 'summer' season in 'east2' region.

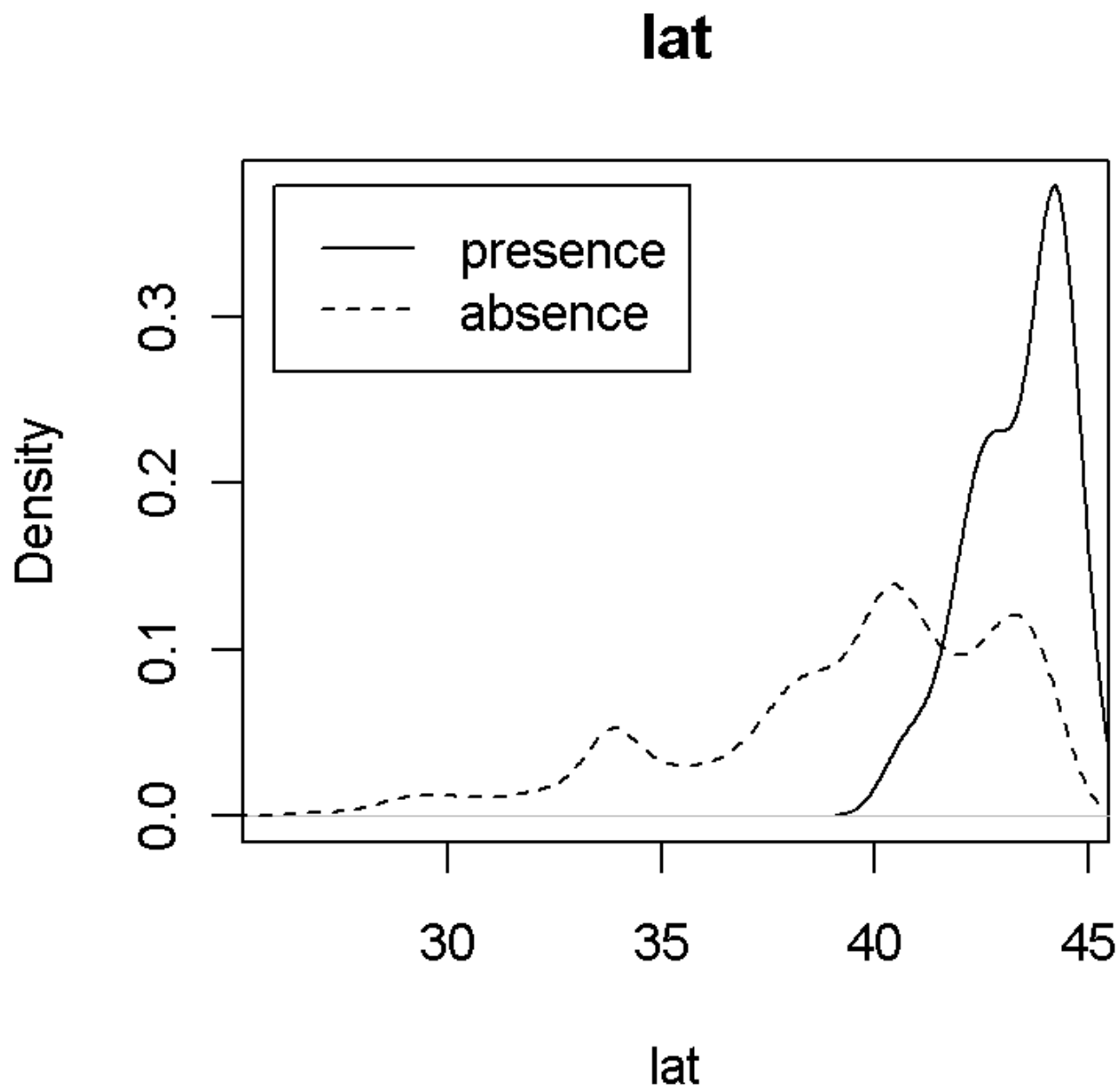


Figure 469: Density histogram of latitude (degrees) for 'Right whales' guild during 'summer' season in 'east2' region.

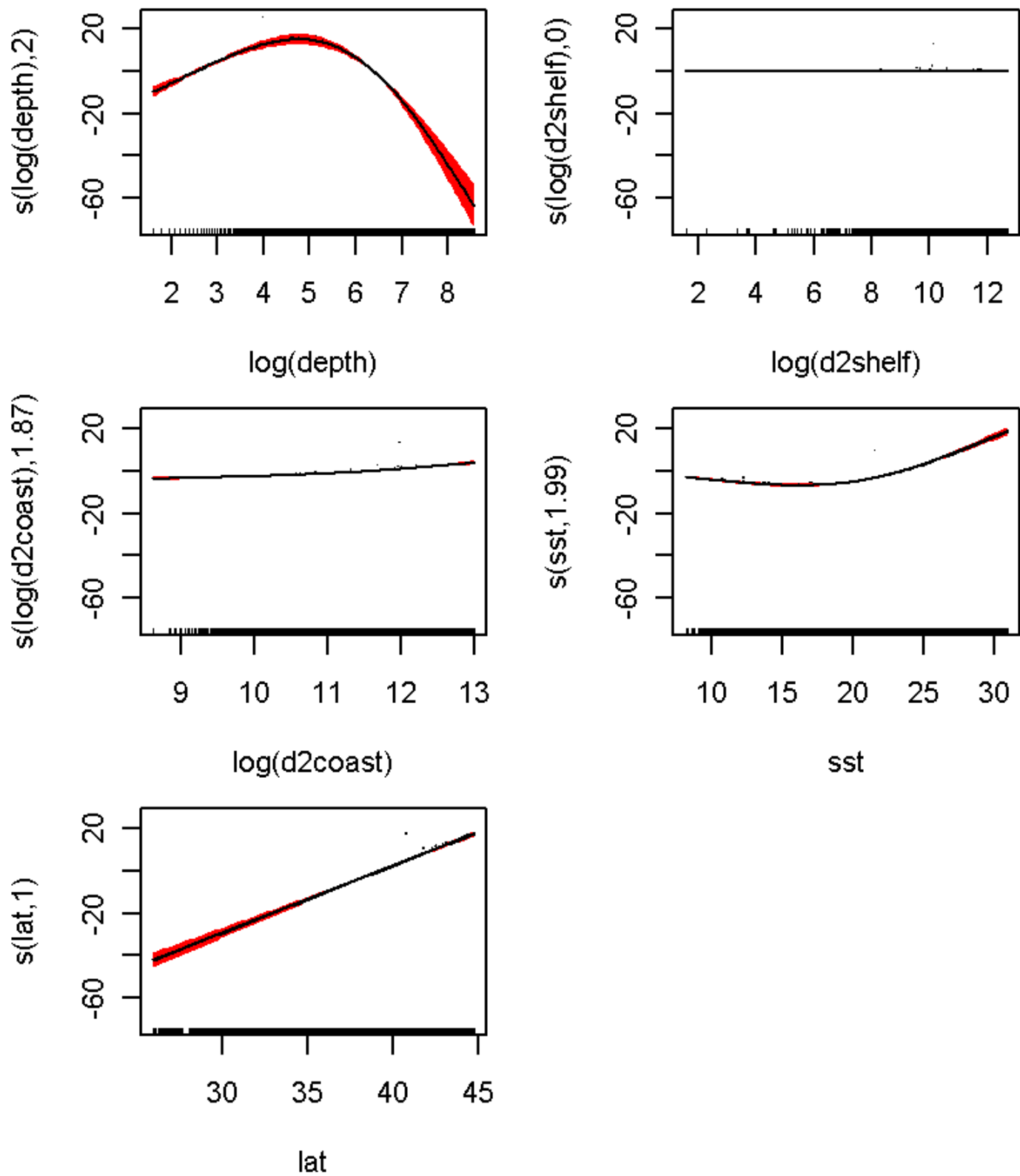


Figure 470: Terms plot of predictors to GAM model fit for 'Right whales' guild during 'summer' season in 'east2' region.

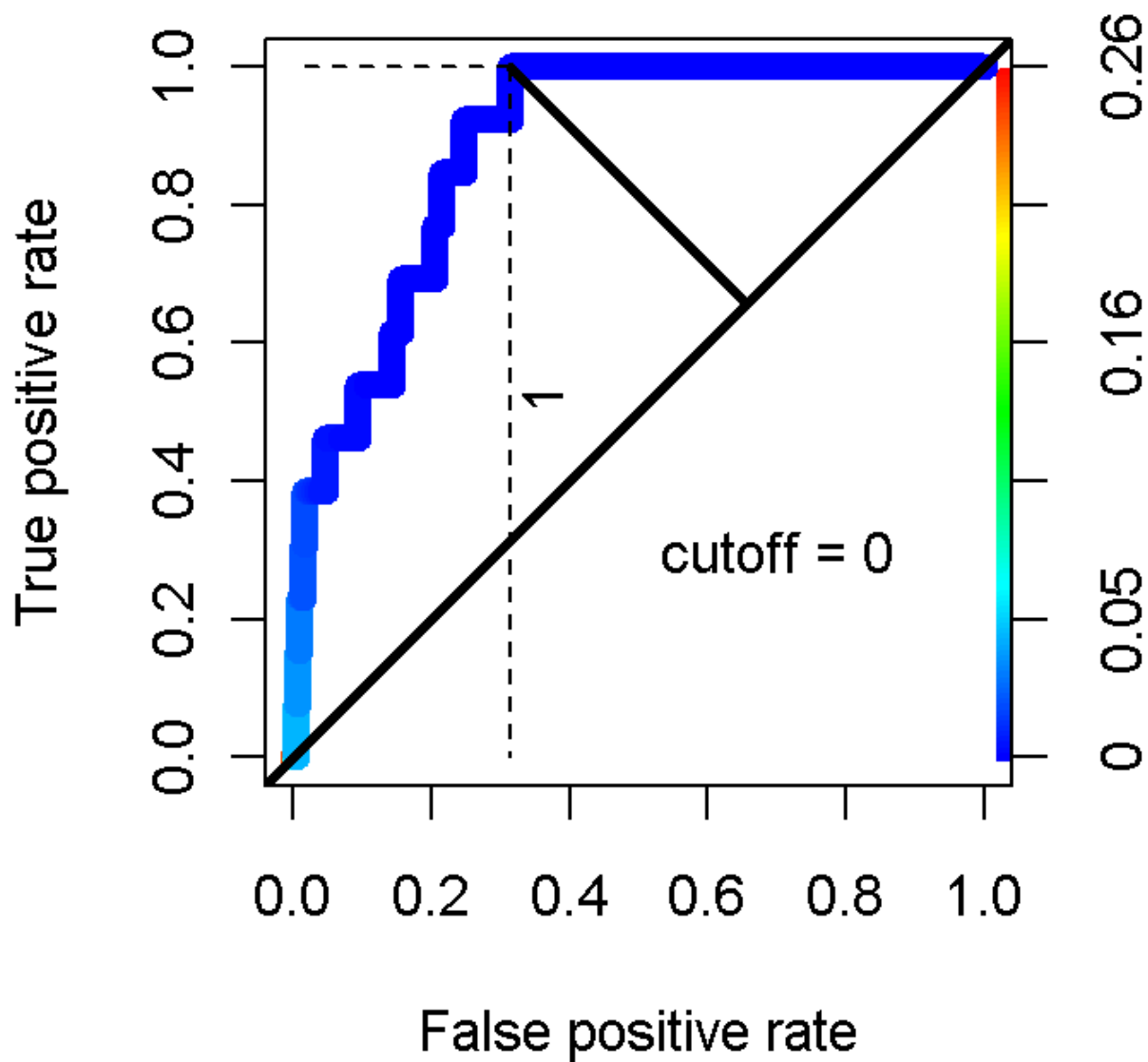


Figure 471: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Right whales' guild during 'summer' season in 'east2' region.

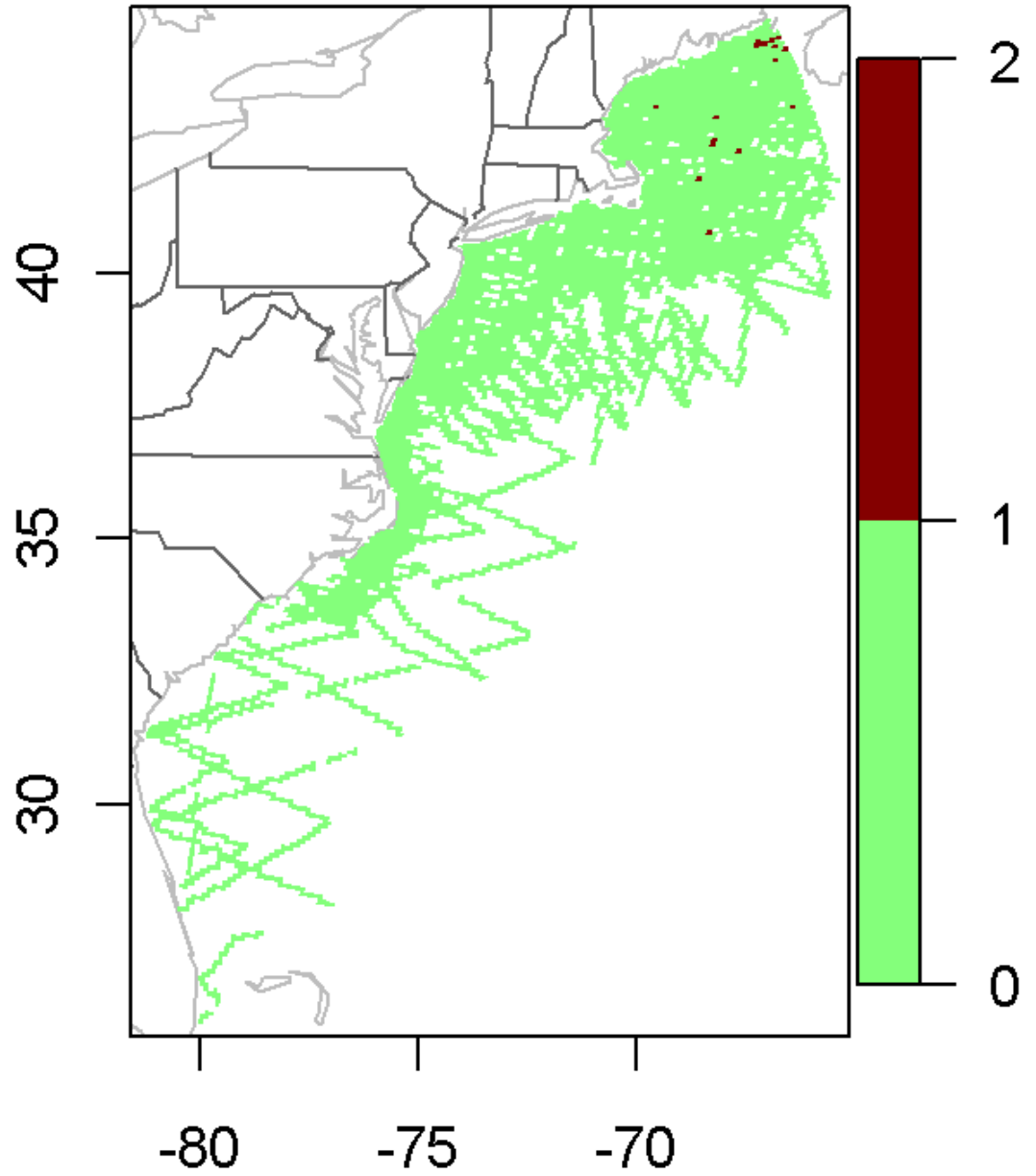


Figure 472: Map of presence and absence by cell summed through time for 'Right whales' guild during 'summer' season in 'east2' region.

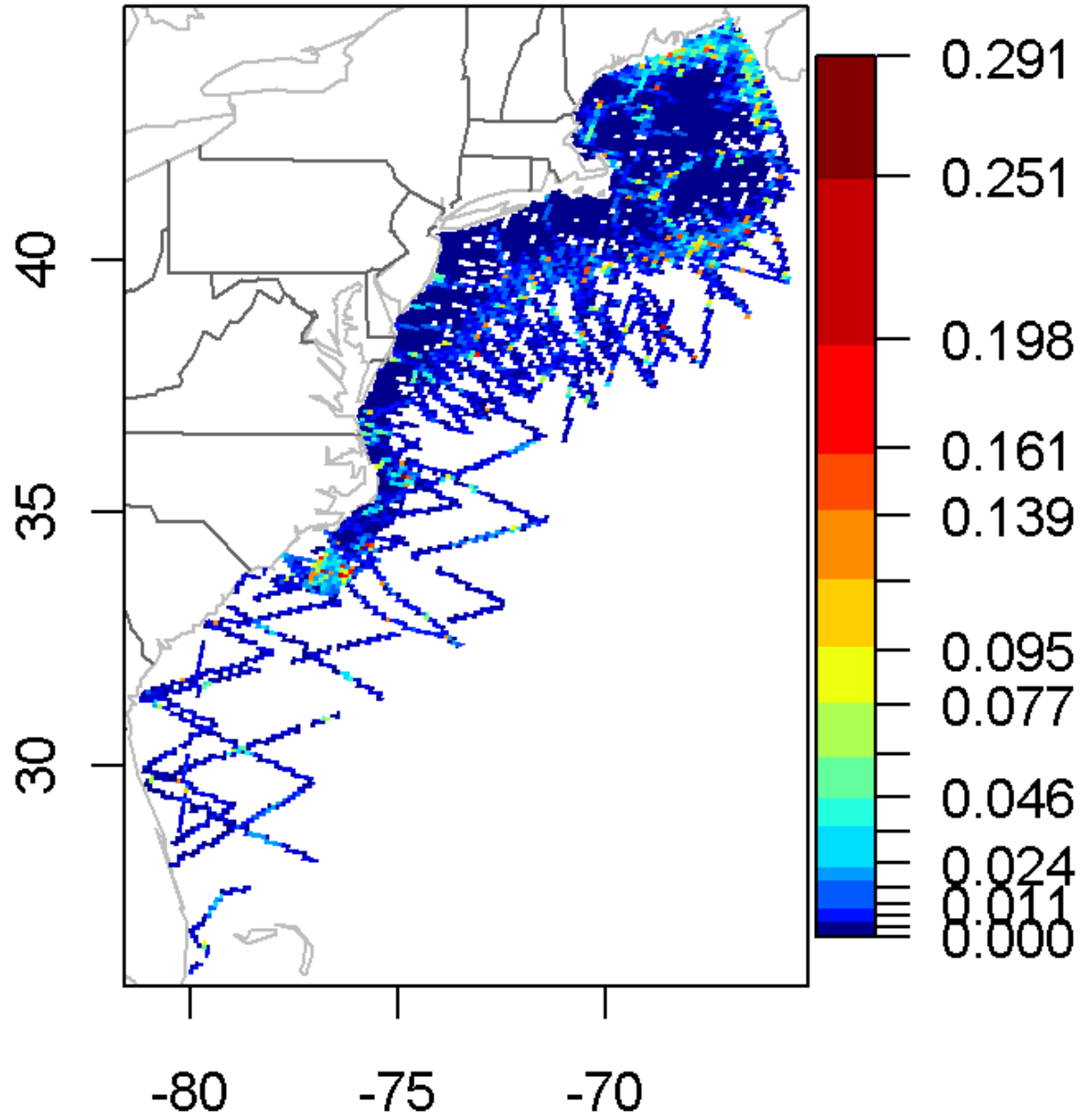


Figure 473: Map of effort(hours/km²) by cell summed through time for 'Right whales' guild during 'summer' season in 'east2' region.

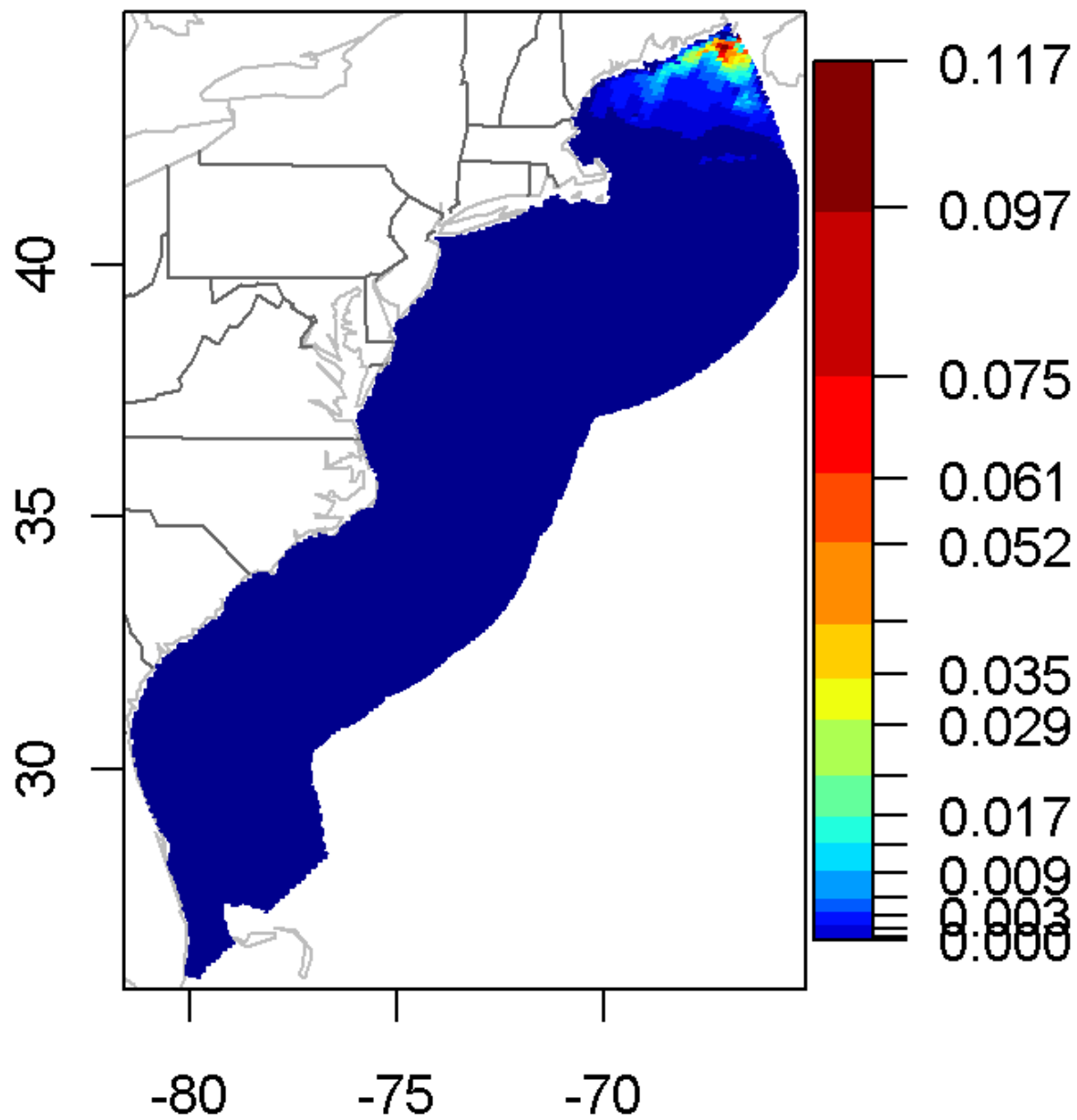


Figure 474: Map of mean predicted habitat for 'Right whales' guild during 'summer' season in 'east2' region.

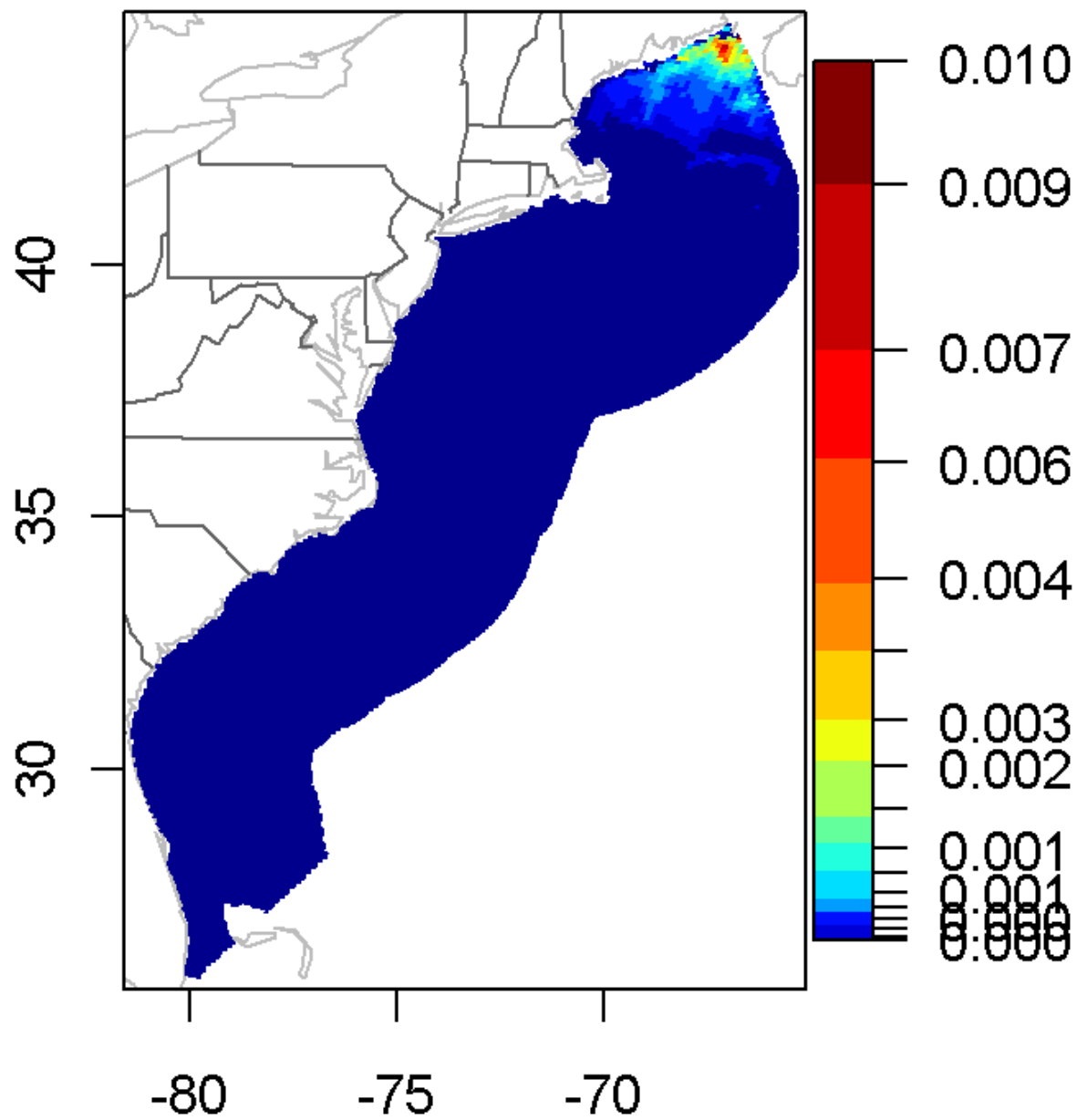


Figure 475: Map of standard error of habitat for 'Right whales' guild during 'summer' season in 'east2' region.

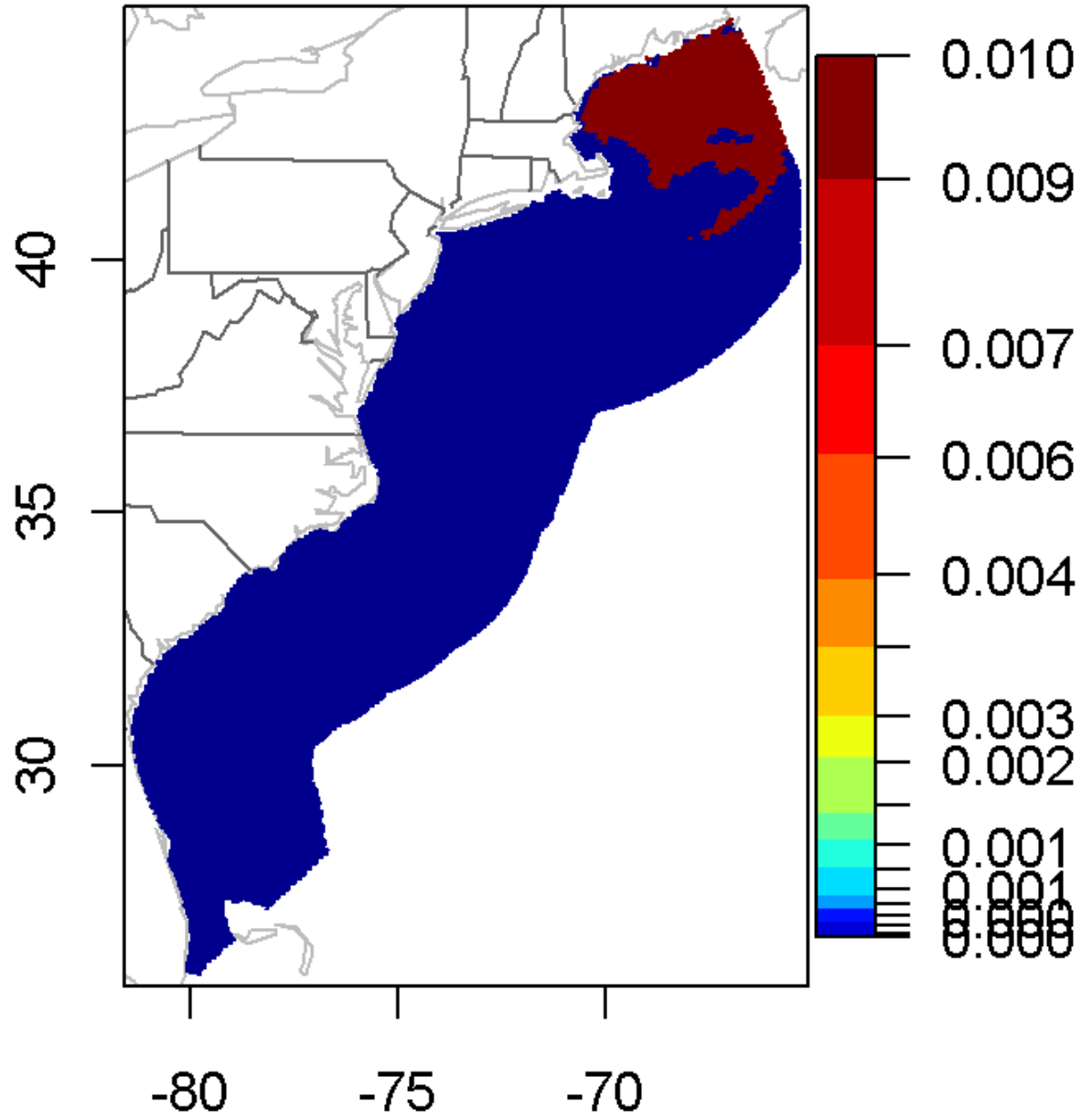


Figure 476: Map of binary habitat (cutoff determined by ROC) for 'Right whales' guild during 'summer' season in 'east2' region.

10.4 winter

10.4.1 east2

Modelrun identifier: duke_06_rw3_winter_east2

Date generated: 2008-10-21 15:15:01

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 45: Summary for duke(6) GAM model: for 'Right whales' guild during 'winter' season in 'east2' region.

	Value
Number.presences	16
Number.absences	3886
GAM.converged	TRUE
R.squared	0.975312
Deviance.explained	0.882656
ROC.optimum	0.998924
Maximum.fit	0.0542765
Maximum.prediction	0.6814

Model text summary...

```
duke_06_rw3_winter_east2 run on Tue Oct 21 15:13:23 2008
  provider:duke, version:06, guild:Right whales (rw3), season:'winter', region:east2

max.fit:0.998924, max.prediction:0.681400, ROC.optimum:0.054276

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -190.17      10.24   -18.58  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.892   2.392 165.6  <2e-16 ***
s(log(d2shelf)) 2.000   2.500 190.7  <2e-16 ***
s(log(d2coast)) 2.000   2.500 200.3  <2e-16 ***
s(sst)         1.993   2.493 133.5  <2e-16 ***
s(lat)         1.999   2.499 170.5  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.975   Deviance explained = 88.3%
GCV score = 5.2782e-05   Scale est. = 5.234e-05   n = 2337

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2: 844   Min.    : 1654   Min.    :  4.0   Min.    :  995   Min.    : 1471   Min.    :  2.654   Min.    :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0   1st Qu.: 18575  1st Qu.: 32272  1st Qu.: 13.500  1st Qu.:32.77
          Median :10479   Median : 28.0   Median : 38452   Median : 53042   Median : 19.208   Median :34.02
          Mean   : 9475   Mean   :153.2   Mean   : 44646   Mean   : 63558   Mean   : 17.745   Mean   :33.66
          3rd Qu.:10987   3rd Qu.: 41.0   3rd Qu.: 65053   3rd Qu.: 78087   3rd Qu.: 21.825   3rd Qu.:34.80
          Max.   :12763   Max.   :3612.0   Max.   :274566   Max.   :348168   Max.   : 26.400   Max.   :38.20
                   NA's   :    14    NA's   :    14    NA's   :1561.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633   Min.    :  4   Min.    :  5   Min.    : 1259   Min.    :  2.400   Min.    :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.:  9.075   1st Qu.:32.12
```


Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :2.686e-16	Min. :0.000e+00	Min. :9.035e-07	Min. :0.000000
1st Qu.: 9145	1st Qu.:2.220e-16	1st Qu.:3.916e-15	1st Qu.:0.000e+00	1st Qu.:7.474e-04	1st Qu.:0.000000
Median :11616	Median :2.220e-16	Median :1.024e-14	Median :0.000e+00	Median :3.451e-03	Median :0.000000
Mean :11171	Mean :2.057e-04	Mean :3.142e-05	Mean :1.116e-02	Mean :9.821e-03	Mean :0.001011
3rd Qu.:14088	3rd Qu.:2.220e-16	3rd Qu.:1.711e-14	3rd Qu.:0.000e+00	3rd Qu.:9.825e-03	3rd Qu.:0.000000
Max. :16560	Max. :6.814e-01	Max. :4.896e-02	Max. :1.000e+00	Max. :2.547e-01	Max. :1.000000
	NA's :6.000e+00	NA's :6.000e+00	NA's :8.454e+03	NA's :8.454e+03	

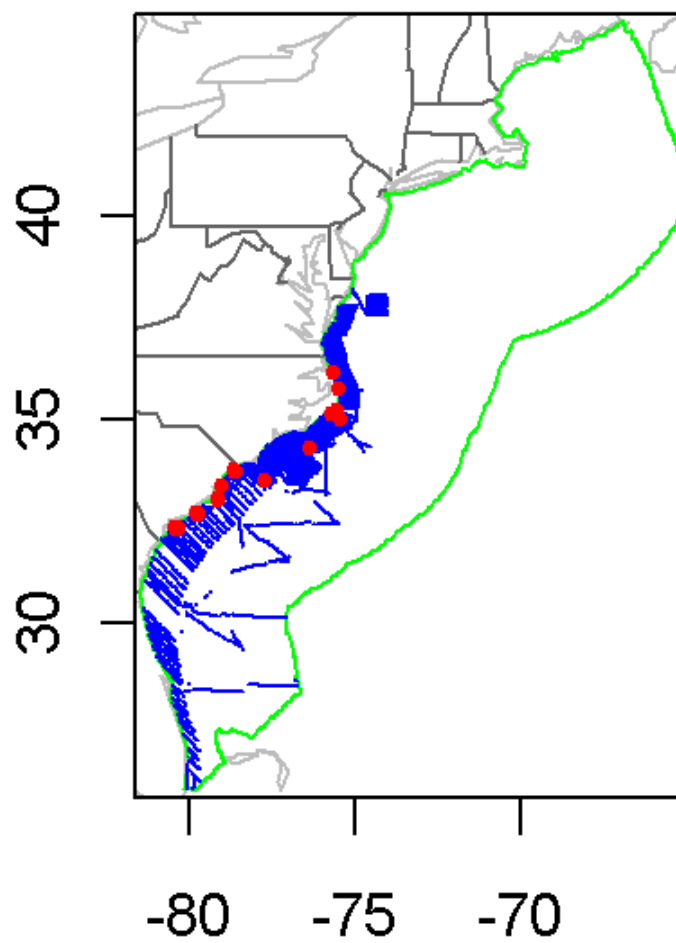


Figure 477: Map of points of observational sightings and tracks of survey effort for 'Right whales' guild during 'winter' season in 'east2' region.

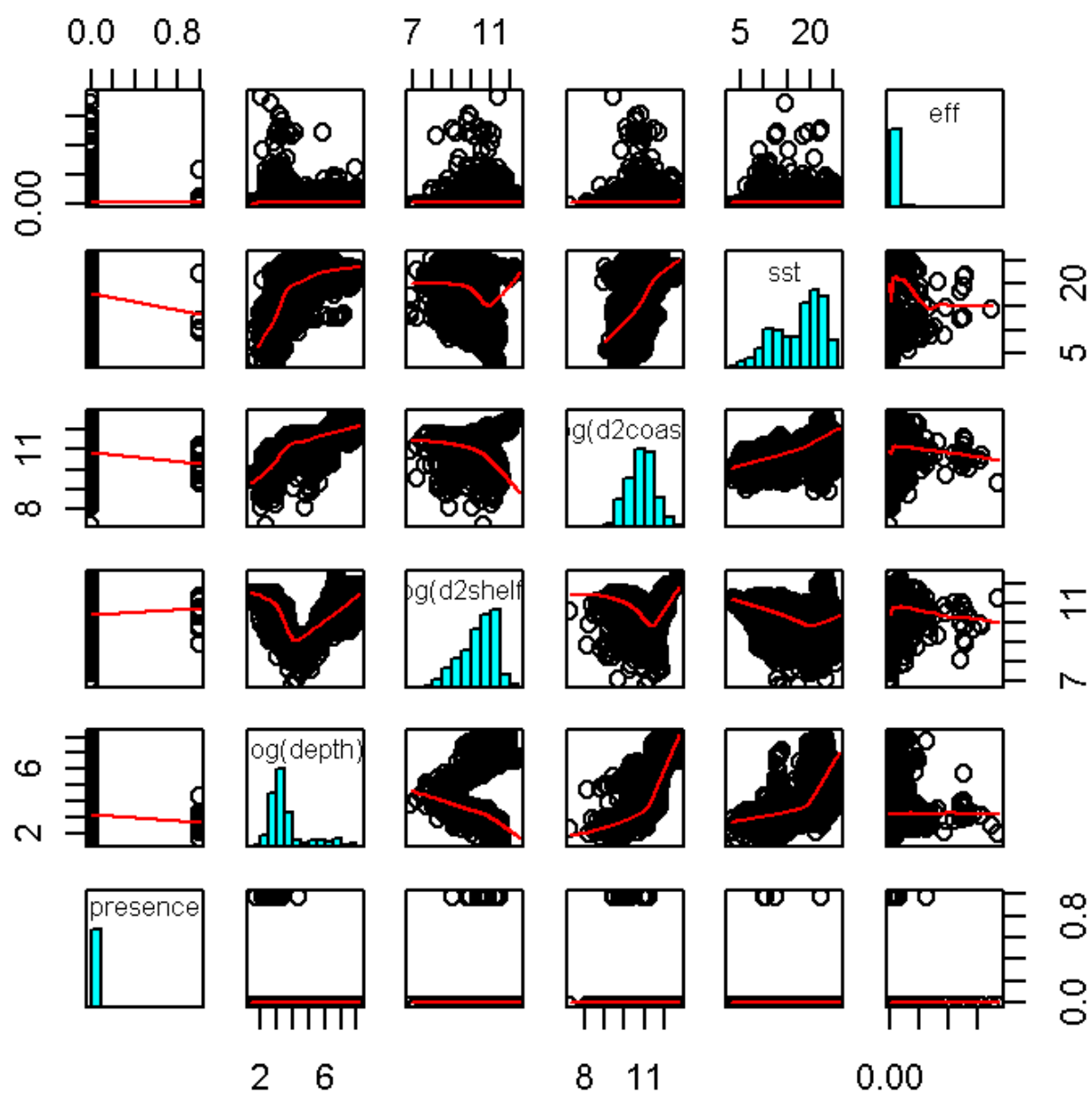


Figure 478: Pairs plot of input variables for 'Right whales' guild during 'winter' season in 'east2' region.

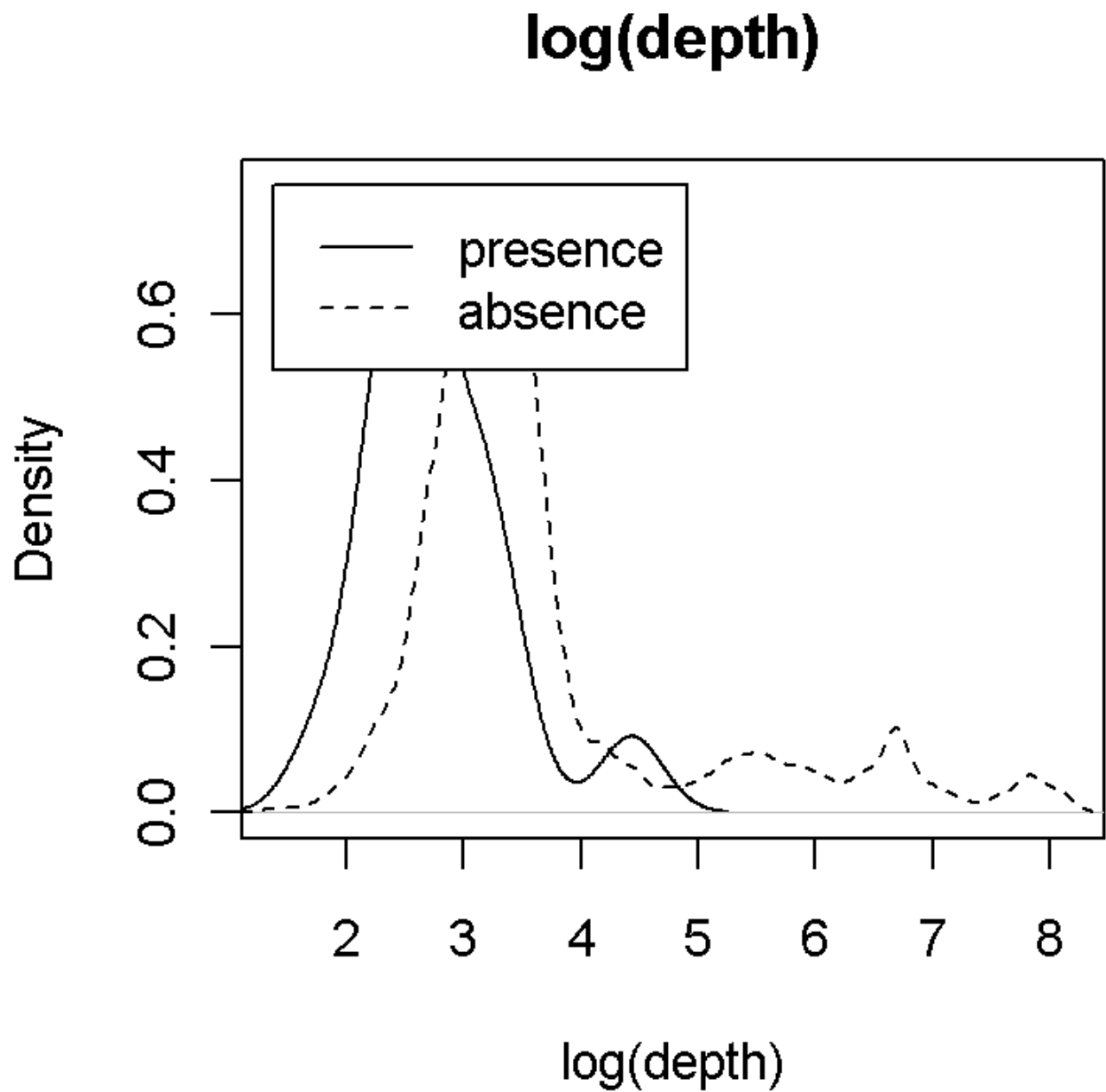


Figure 479: Density histogram of depth $\log(\text{meters})$ for 'Right whales' guild during 'winter' season in 'east2' region.

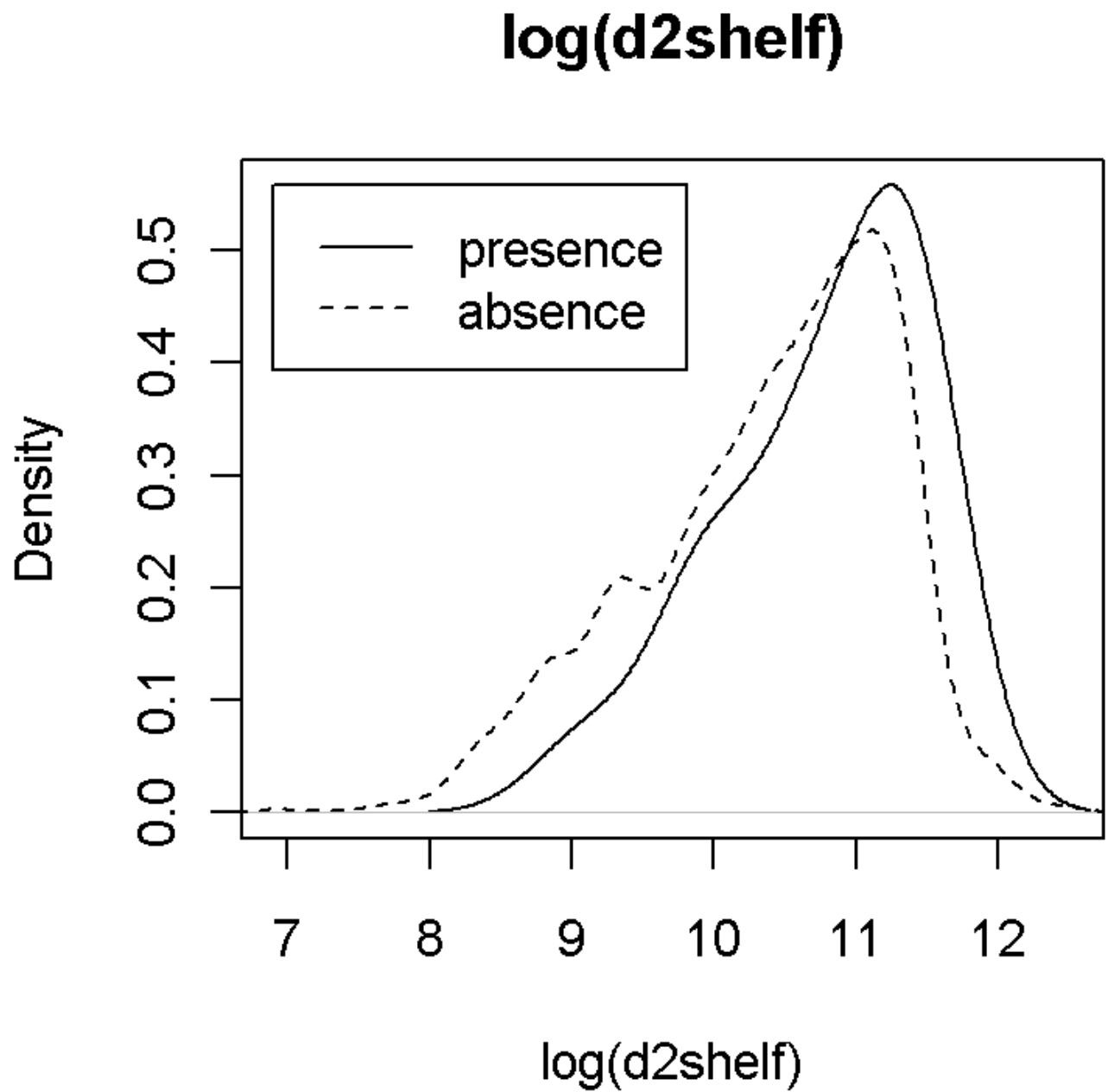


Figure 480: Density histogram of distance to shelf log(meters) for 'Right whales' guild during 'winter' season in 'east2' region.

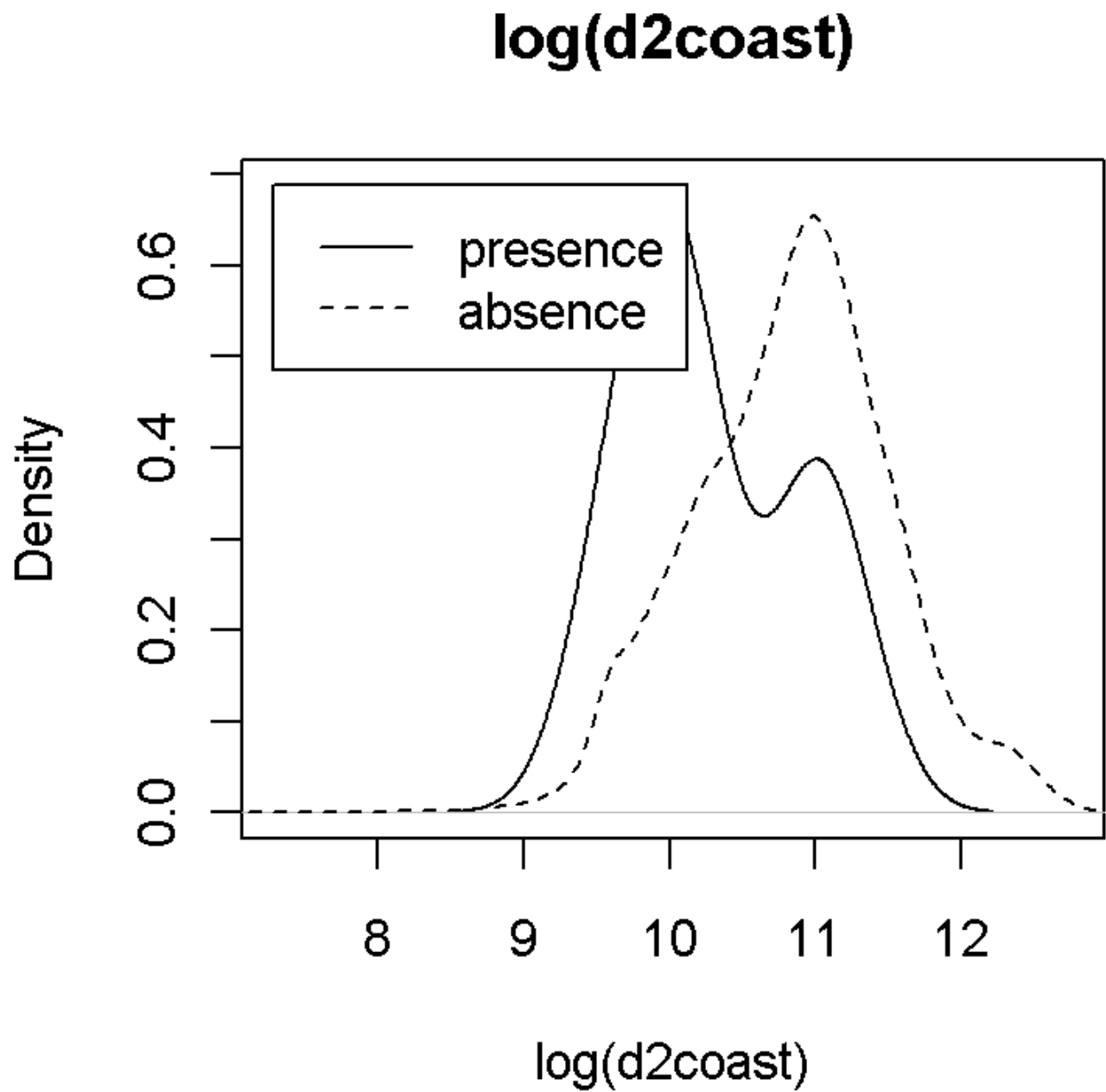


Figure 481: Density histogram of distance to coast log(meters) for 'Right whales' guild during 'winter' season in 'east2' region.

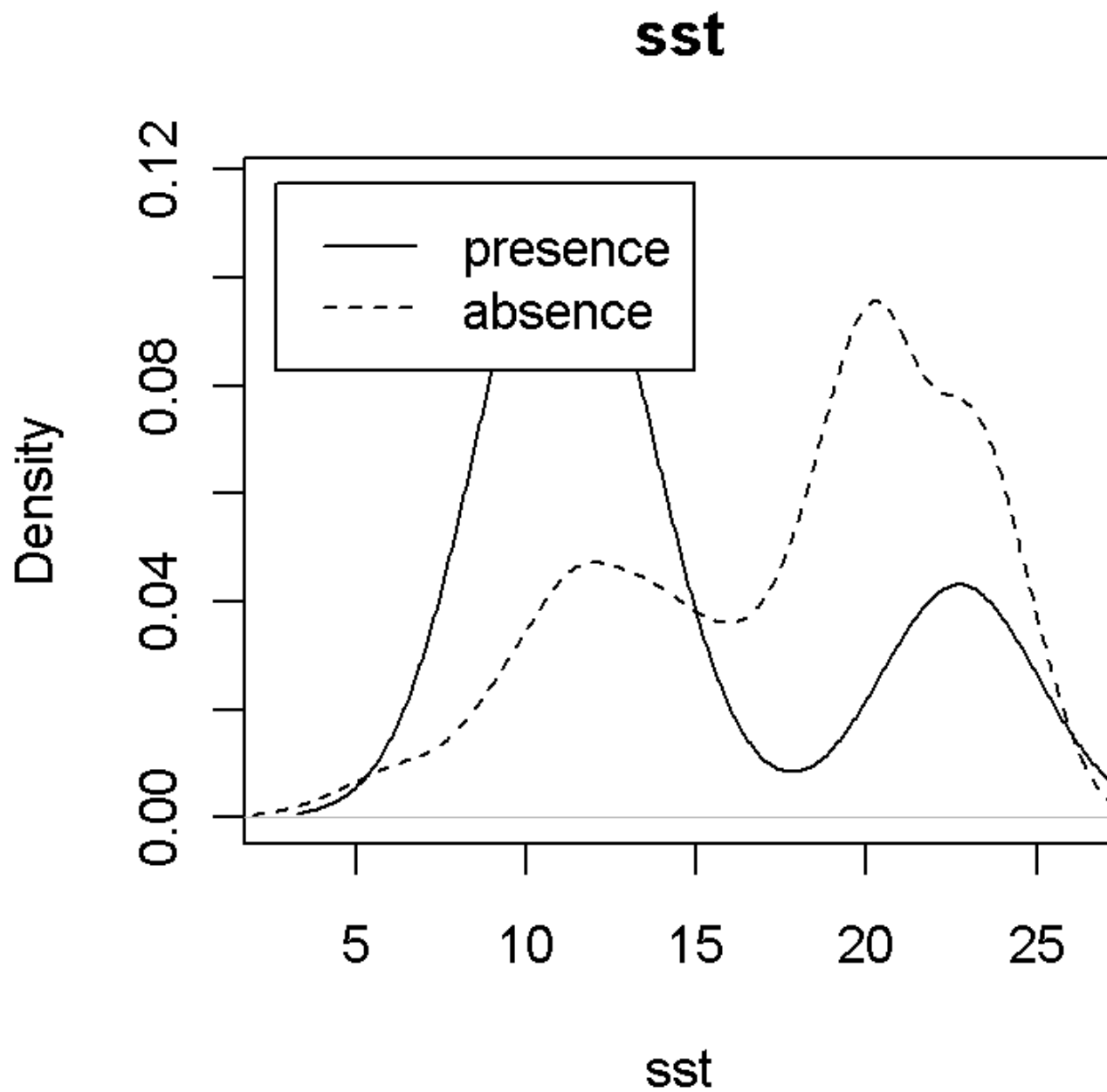


Figure 482: Density histogram of sea-surface temperature (degrees C) for 'Right whales' guild during 'winter' season in 'east2' region.

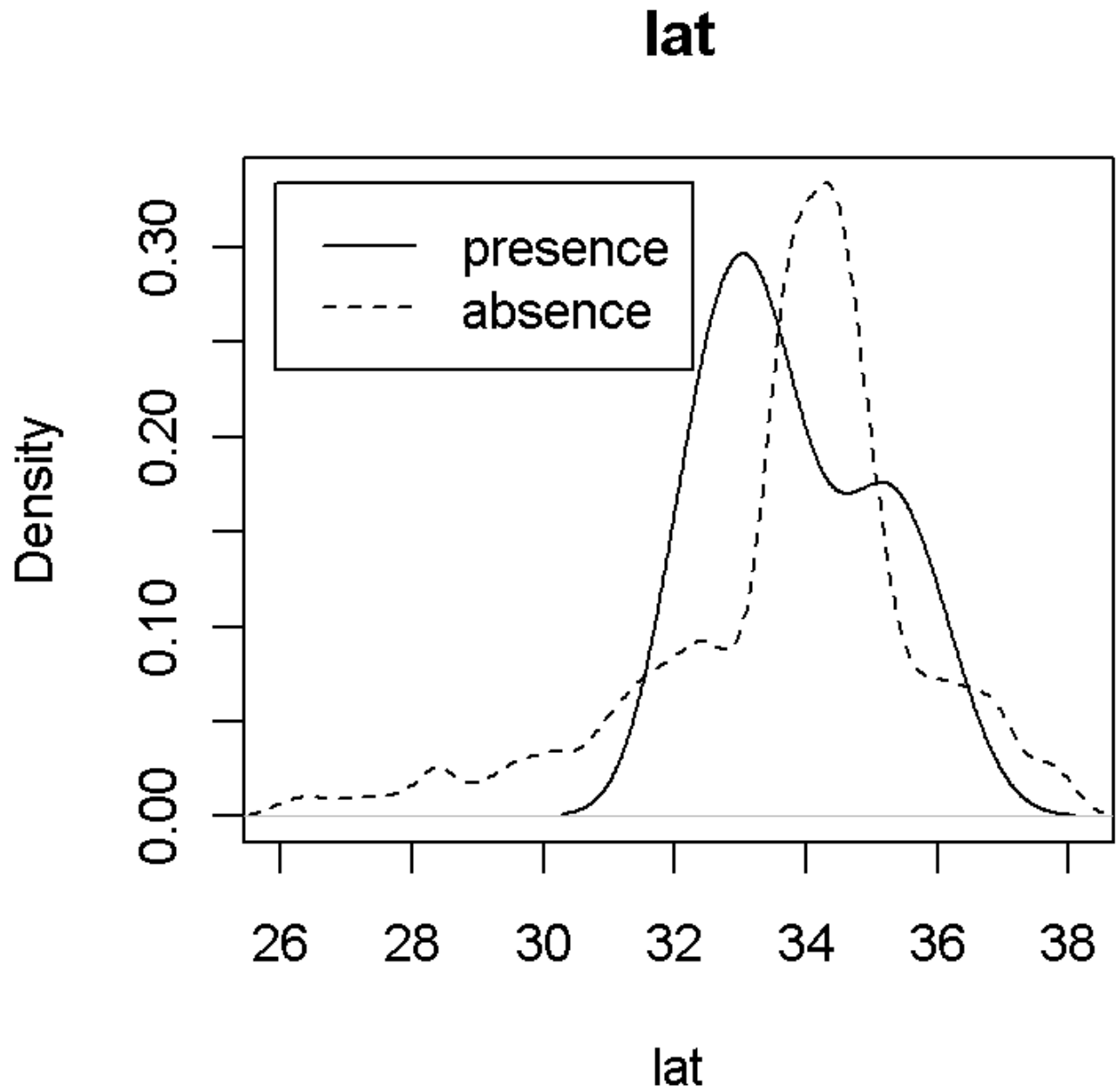


Figure 483: Density histogram of latitude (degrees) for 'Right whales' guild during 'winter' season in 'east2' region.

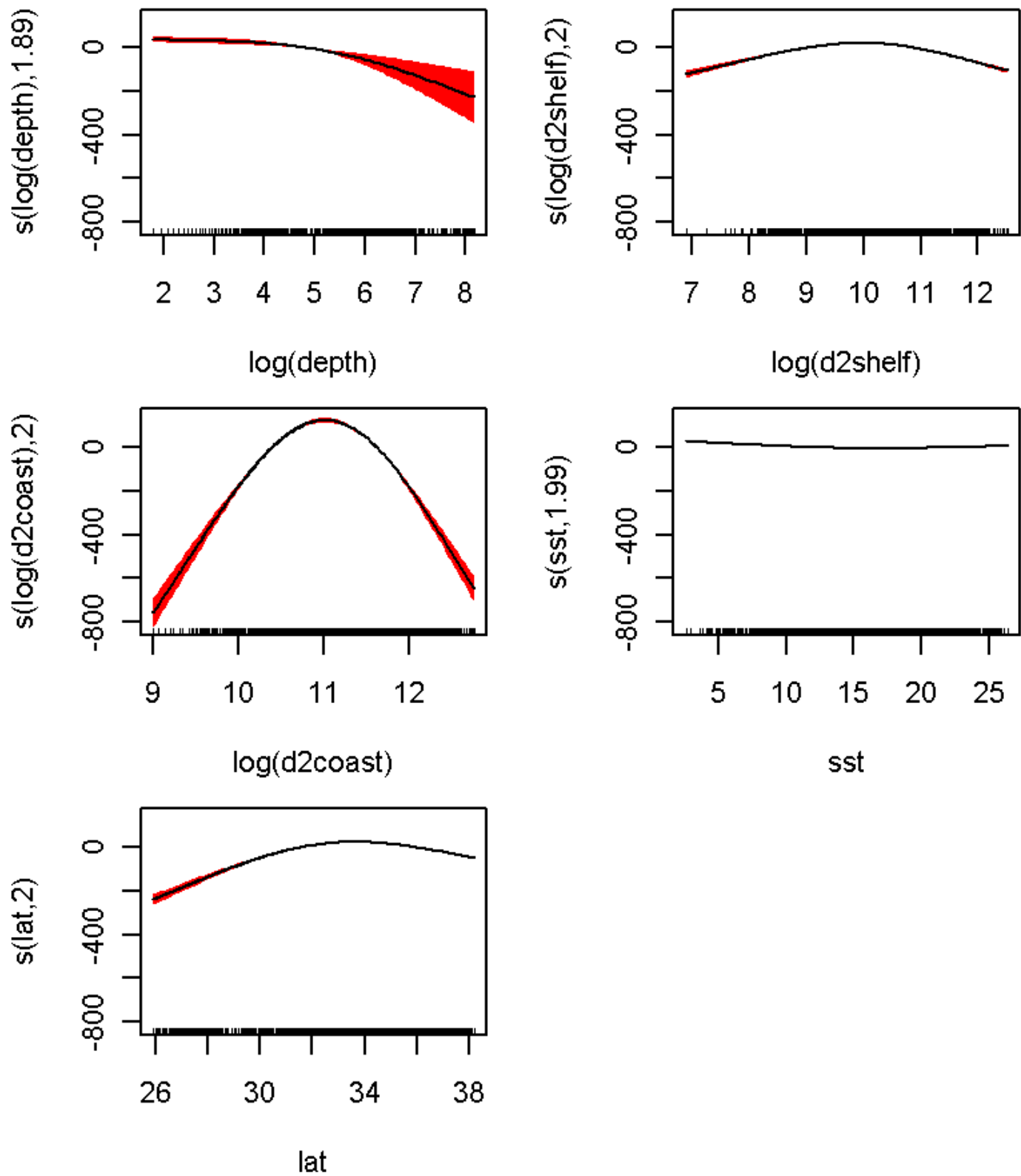


Figure 484: Terms plot of predictors to GAM model fit for 'Right whales' guild during 'winter' season in 'east2' region.

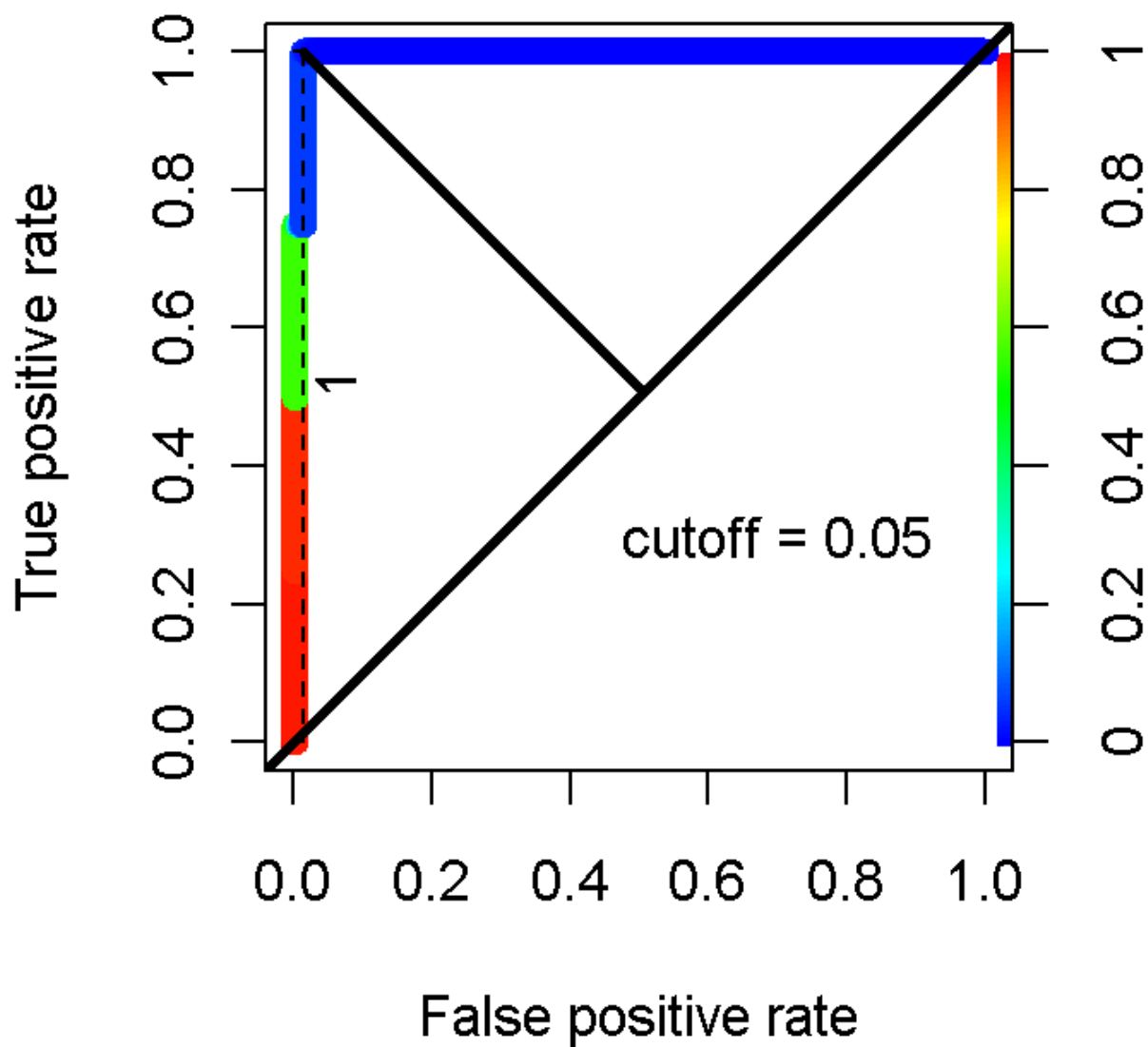


Figure 485: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Right whales' guild during 'winter' season in 'east2' region.

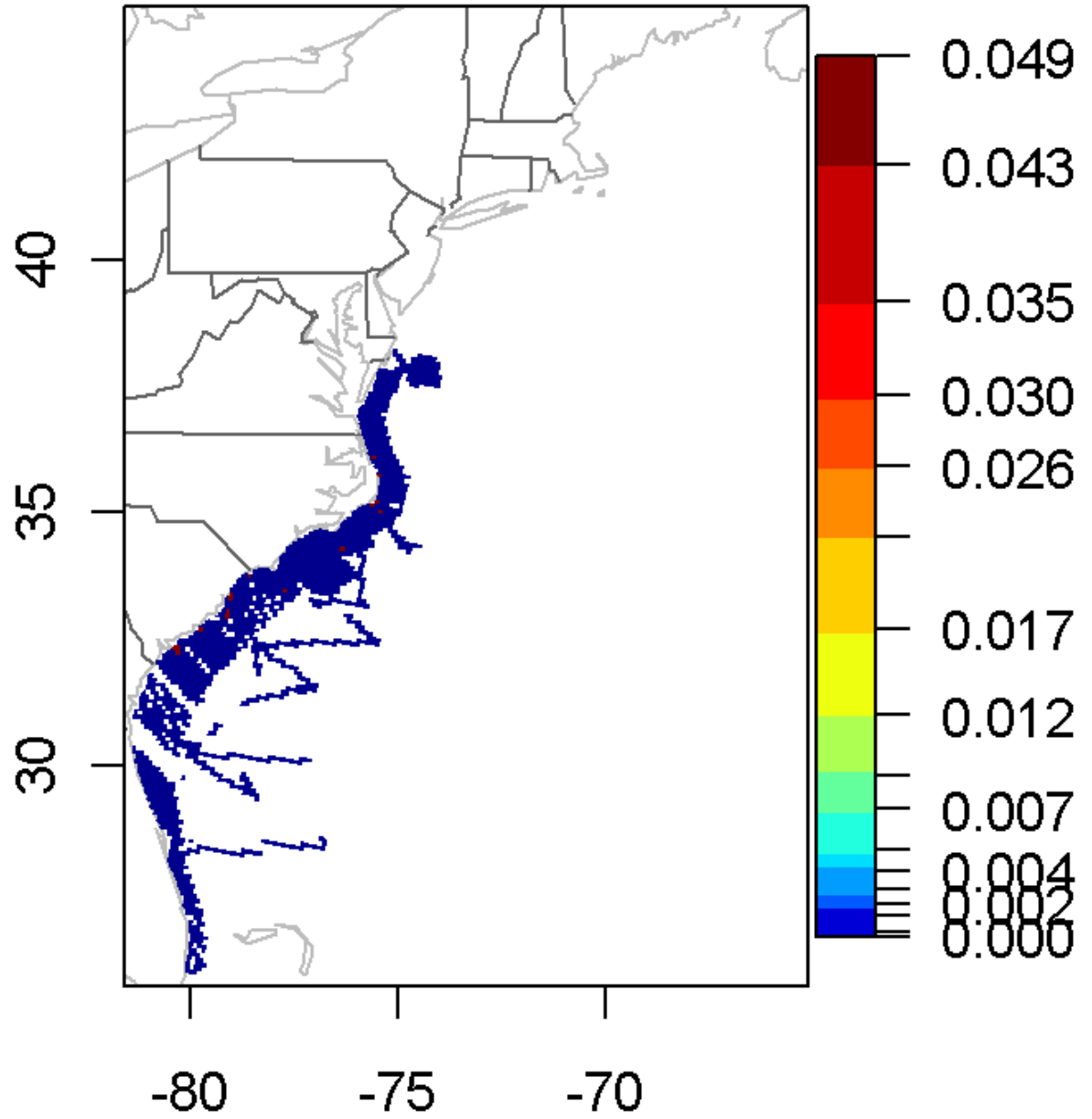


Figure 486: Map of presence and absence by cell summed through time for 'Right whales' guild during 'winter' season in 'east2' region.

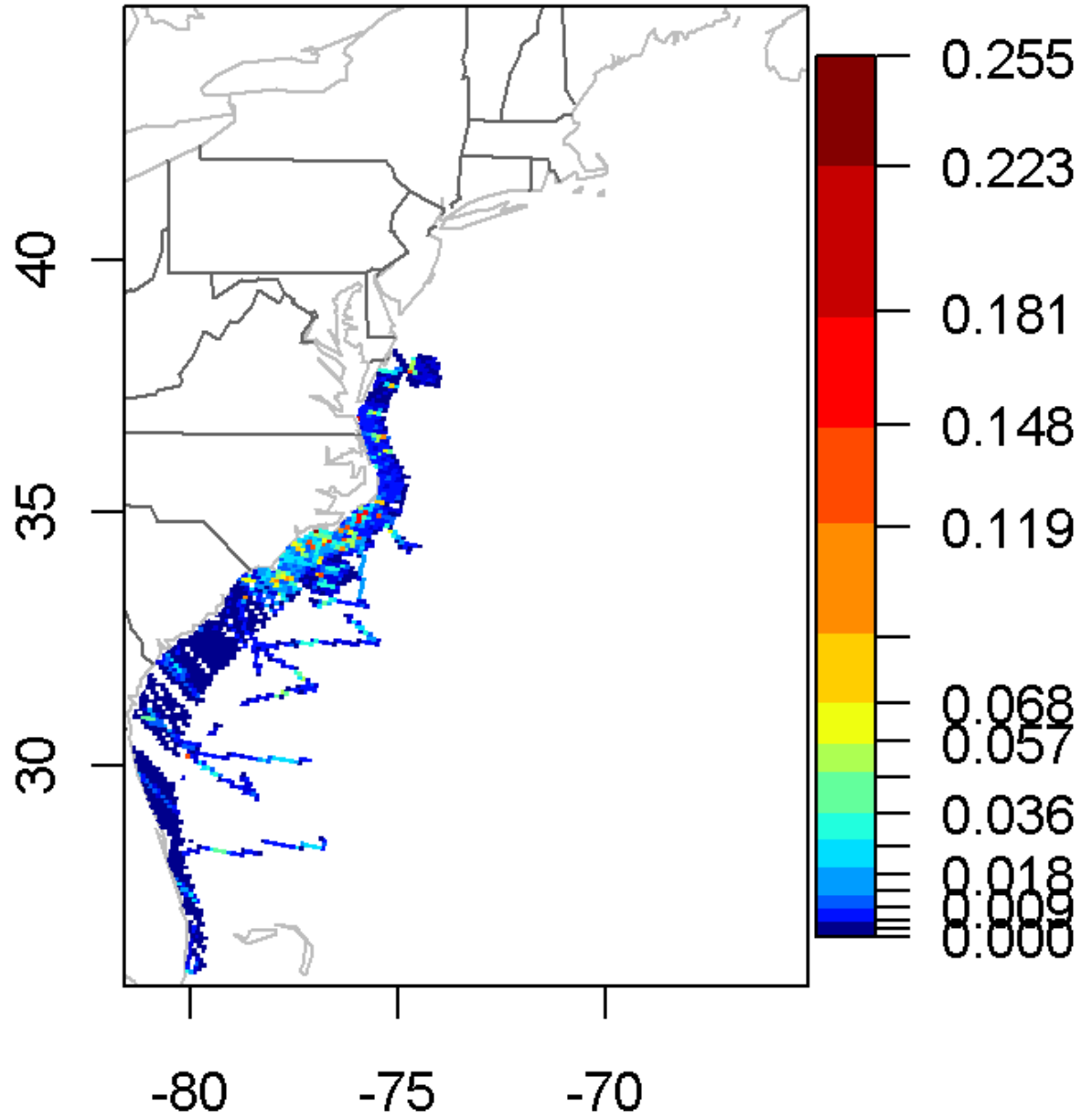


Figure 487: Map of effort(hours/km²) by cell summed through time for 'Right whales' guild during 'winter' season in 'east2' region.

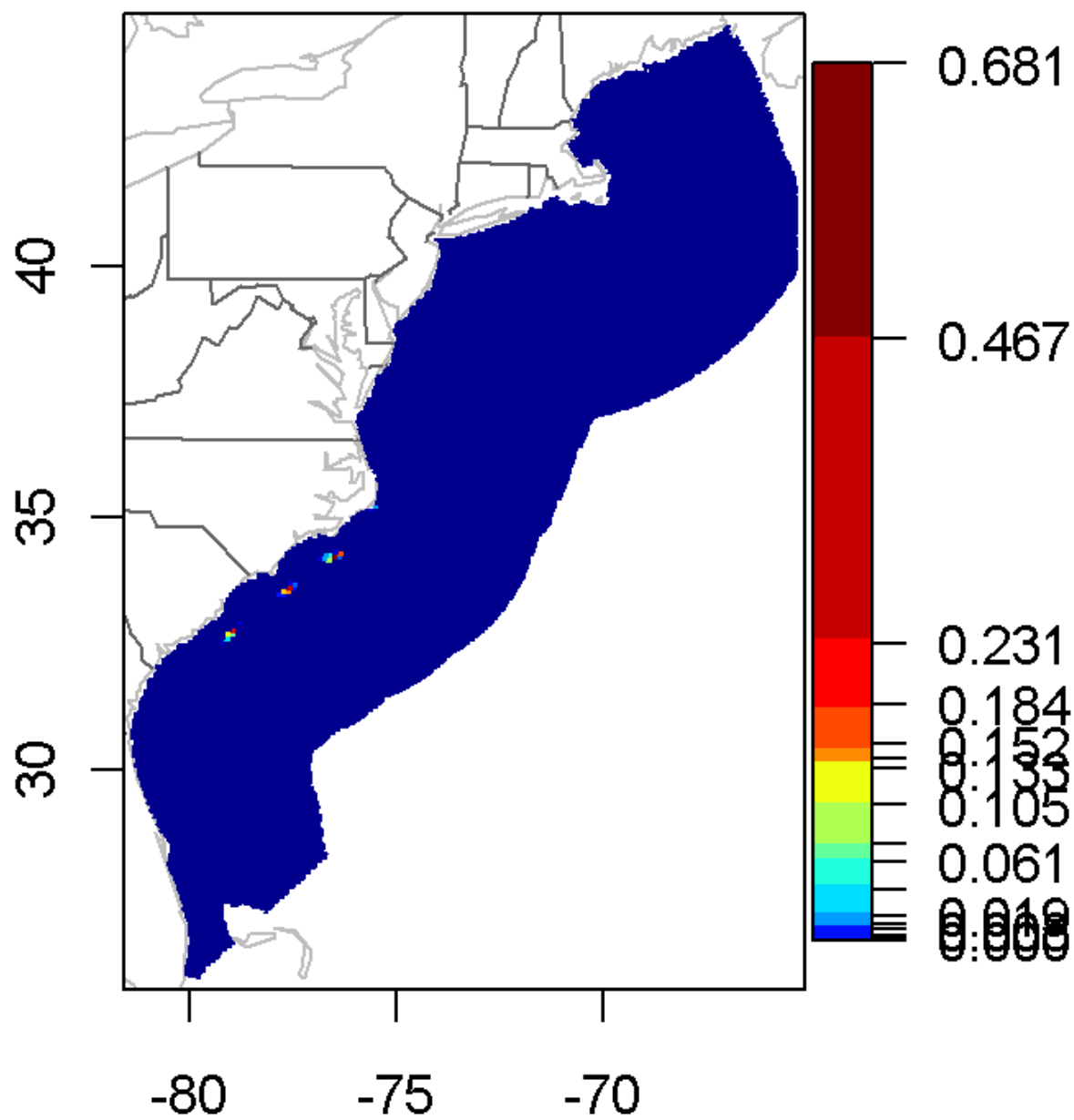


Figure 488: Map of mean predicted habitat for 'Right whales' guild during 'winter' season in 'east2' region.

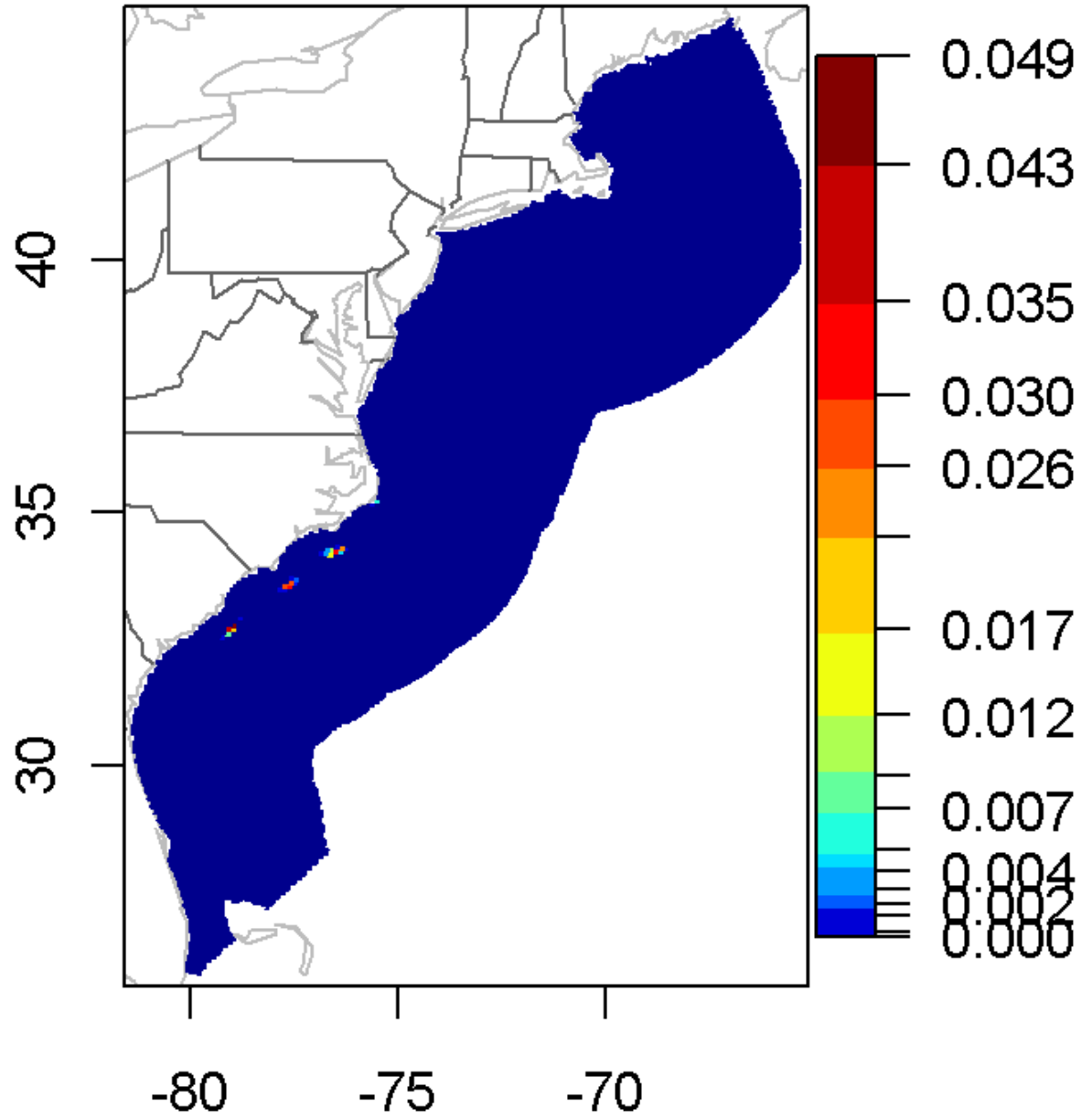


Figure 489: Map of standard error of habitat for 'Right whales' guild during 'winter' season in 'east2' region.

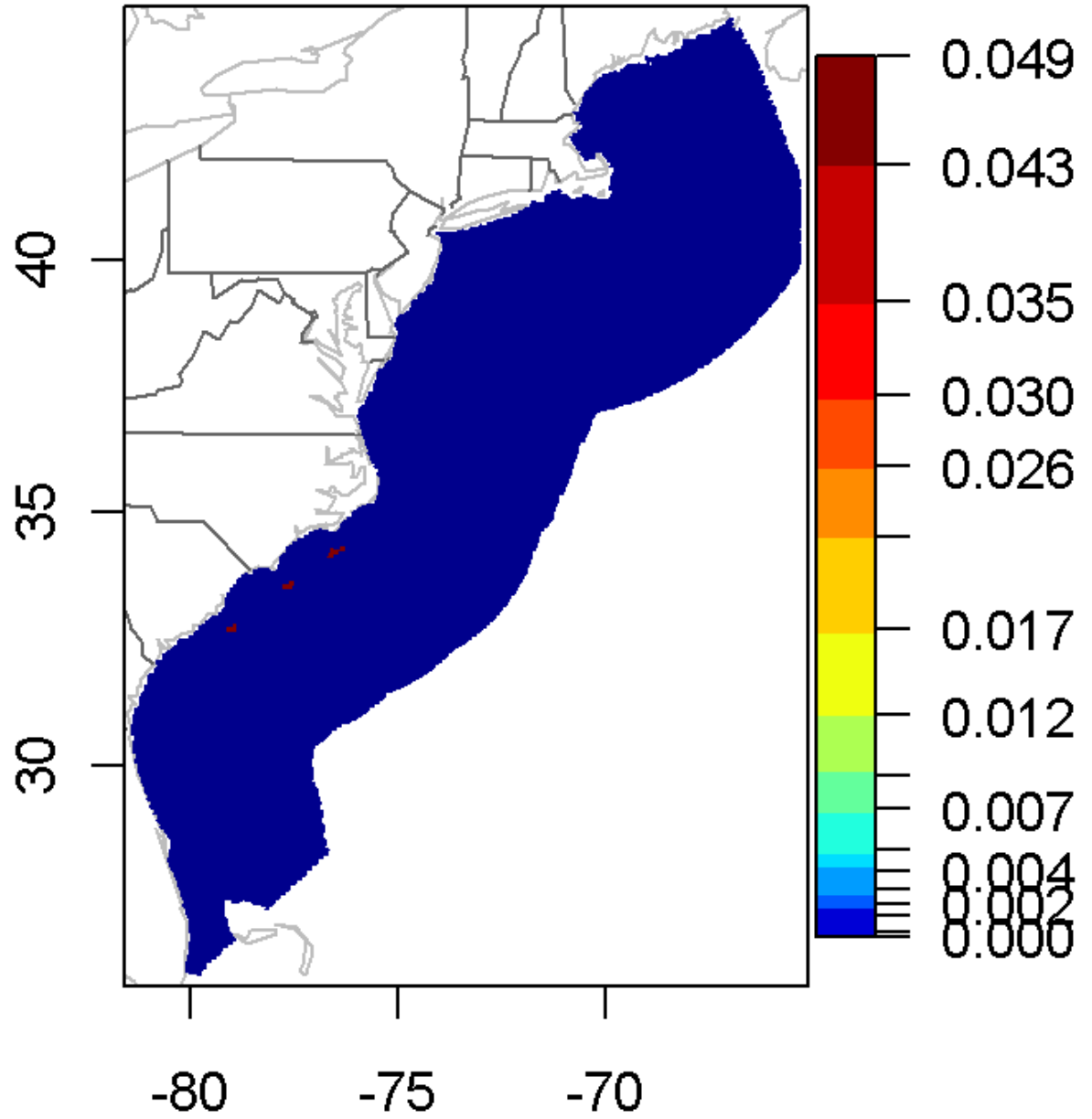


Figure 490: Map of binary habitat (cutoff determined by ROC) for 'Right whales' guild during 'winter' season in 'east2' region.

11 Risso's dolphin

Guildid:gg3

Table 46: Taxonomic members of the "Risso's dolphin" guild.

	Scientific Name	Common Name	Taxonomic #
1	Grampus griseus	Risso's dolphin	180457

11.1 fall

11.1.1 east2

Modelrun identifier: duke_06_gg3_fall_east2

Date generated: 2008-10-21 14:17:46

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 47: Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

	Value
Number.presences	7
Number.absences	1857
GAM.converged	TRUE
R.squared	0.836392
Deviance.explained	0.589099
ROC.optimum	0.825061
Maximum.fit	0.00378755
Maximum.prediction	0.150864

Model text summary...

```
duke_06_gg3_fall_east2 run on Tue Oct 21 14:16:38 2008
  provider:duke, version:06, guild:Risso's dolphin (gg3), season:'fall', region:east2

max.fit:0.825061, max.prediction:0.150864, ROC.optimum:0.003788

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -13.5891      0.8088   -16.8   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.995e+00  2.495   53.16 < 2e-16 ***
s(log(d2shelf)) 3.309e-07  0.500   1.08e-05  0.955
s(log(d2coast)) 9.315e-01  1.431   11.91 8.6e-05 ***
s(sst)         1.995e+00  2.495  140.97 < 2e-16 ***
s(lat)         1.989e+00  2.489   70.06 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.836   Deviance explained = 58.9%
GCV score = 0.0001756   Scale est. = 0.00017423   n = 1826

summary(dat)...
  region   fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.    : 1654  Min.    :  6.0  Min.    :  10  Min.    : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0  1st Qu.: 12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0  Median : 30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5  Mean   : 47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.:197.0  3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
        NA's    :      NA's    :  1  NA's    :  1  NA's    :37.00

summary(newdat)...
  region   fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :  5  Min.    : 1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :4.940e-16  Min.   :0.000e+00  Min.   :1.290e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.660e-05  1st Qu.:2.130e-05  1st Qu.:0.000e+00  1st Qu.:5.348e-04  1st Qu.:0.0000
Median :11616  Median :4.482e-03  Median :2.023e-03  Median :0.000e+00  Median :2.645e-03  Median :1.0000
Mean   :11171  Mean   :8.470e-03  Mean   :2.633e-03  Mean   :6.318e-03  Mean   :8.763e-03  Mean   :0.5206
3rd Qu.:14088  3rd Qu.:1.300e-02  3rd Qu.:3.978e-03  3rd Qu.:0.000e+00  3rd Qu.:6.382e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :1.509e-01  Max.   :4.020e-02  Max.   :1.000e+00  Max.   :5.995e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.780e+03  NA's :8.780e+03
```

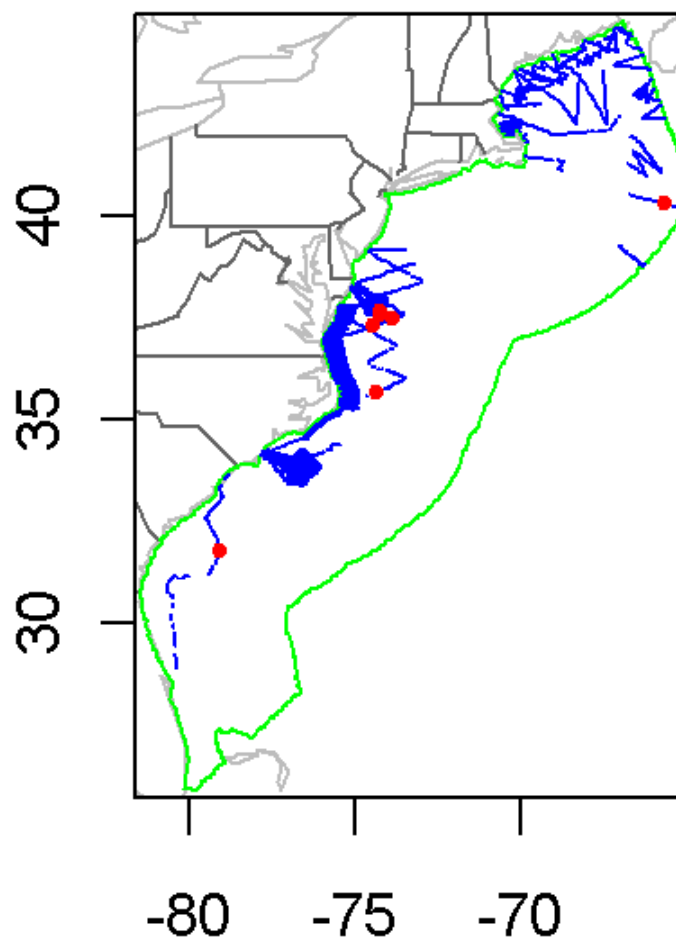


Figure 491: Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

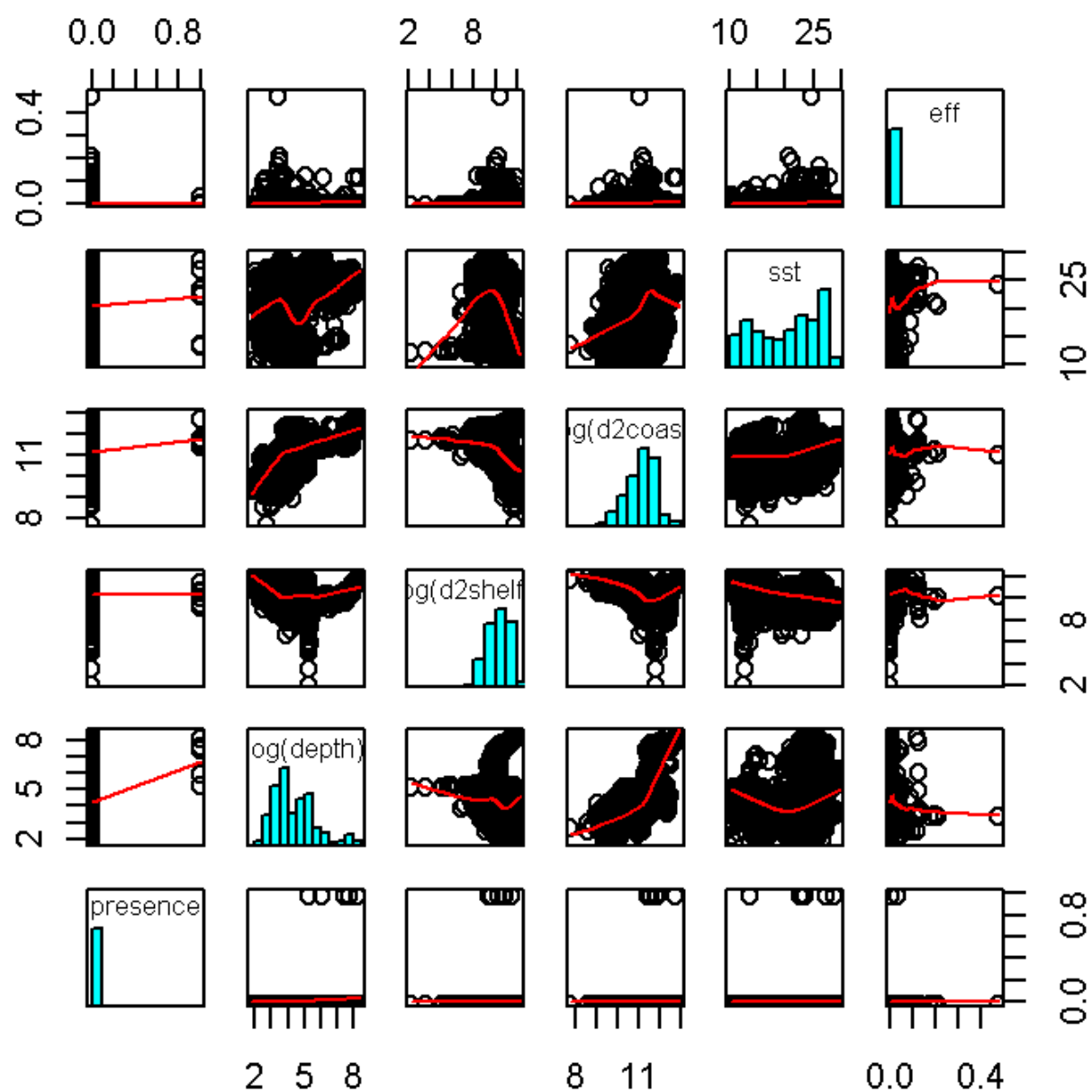


Figure 492: Pairs plot of input variables for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

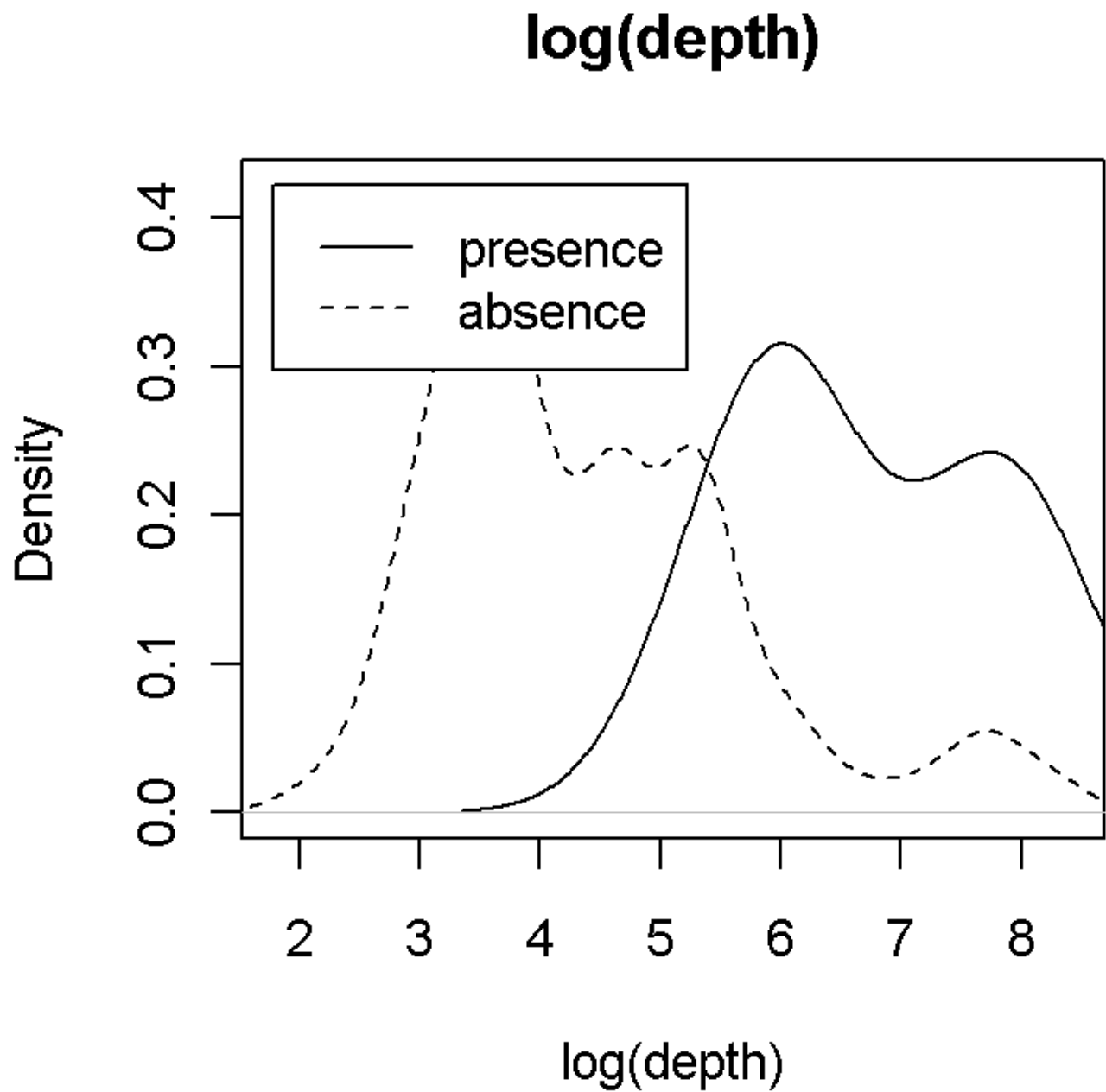


Figure 493: Density histogram of depth log(meters) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

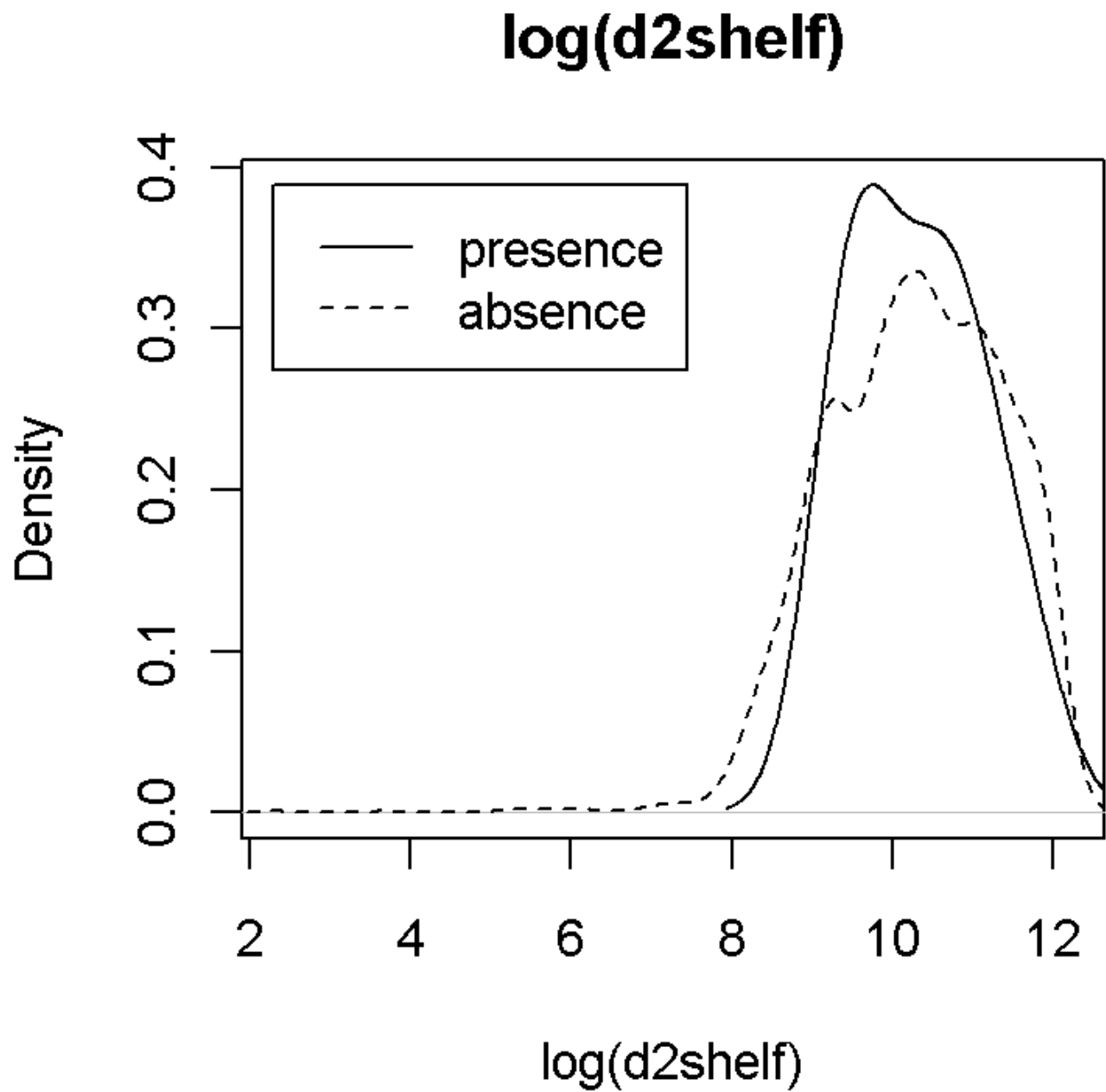


Figure 494: Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

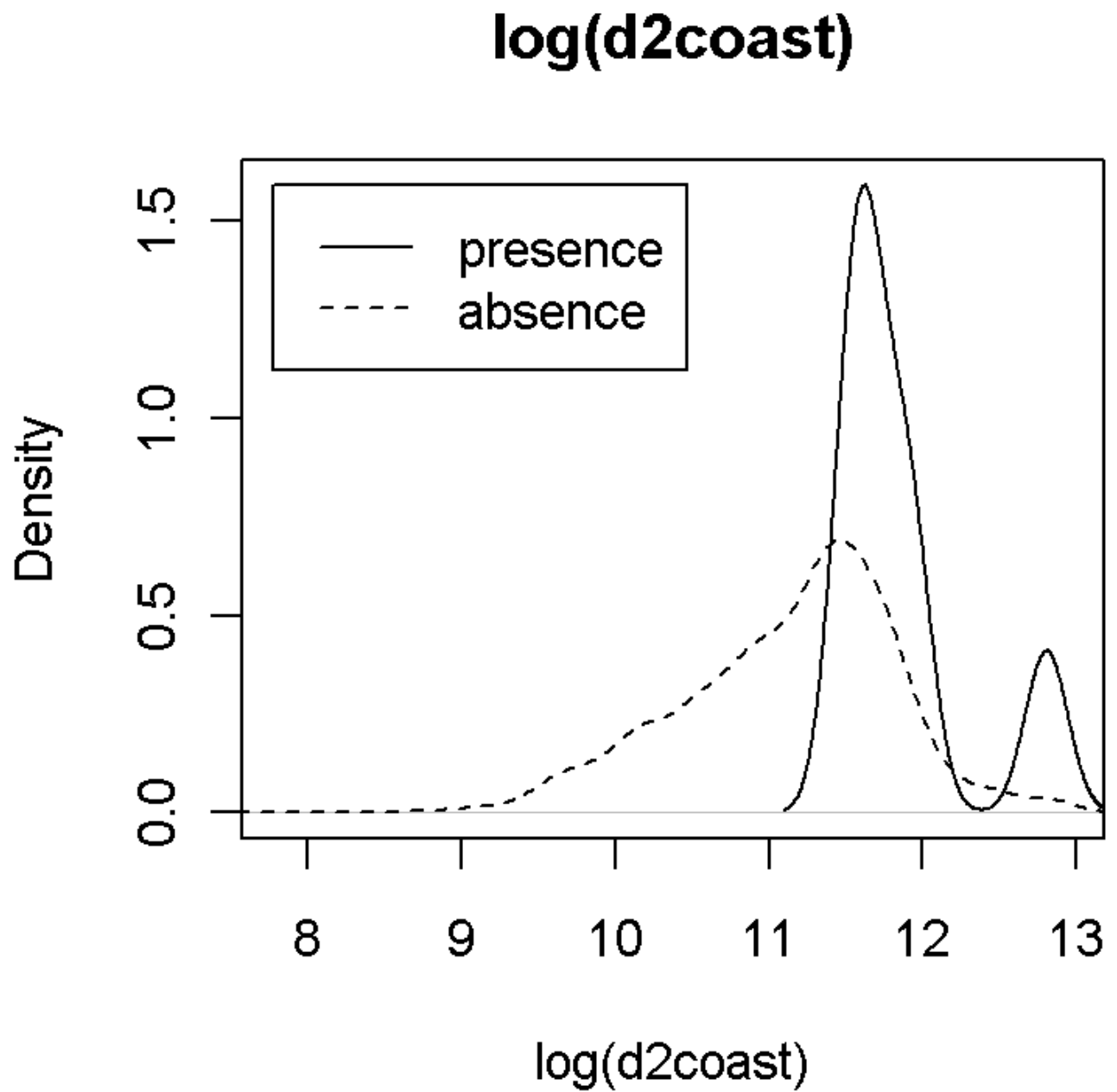


Figure 495: Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

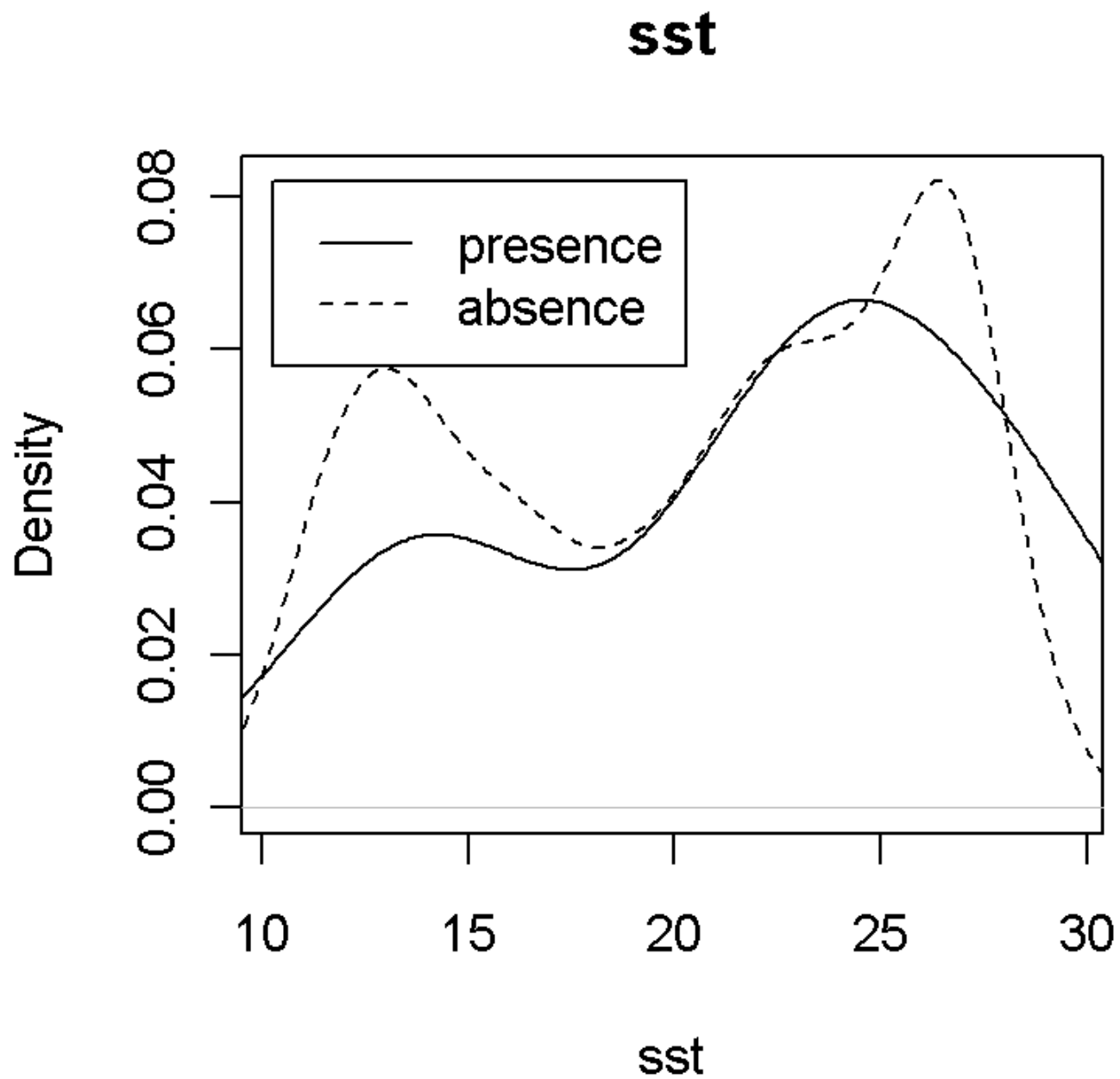


Figure 496: Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

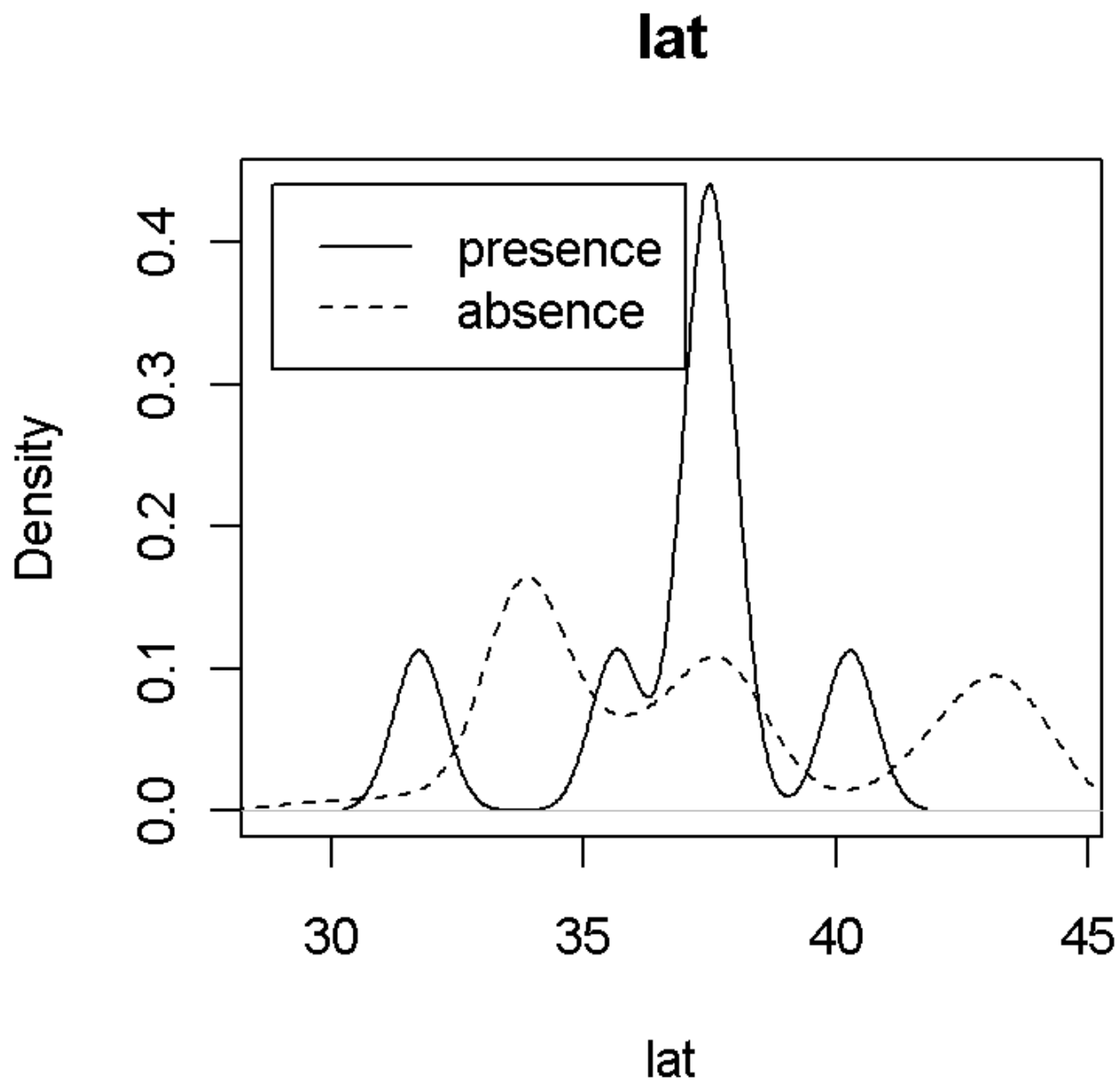


Figure 497: Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

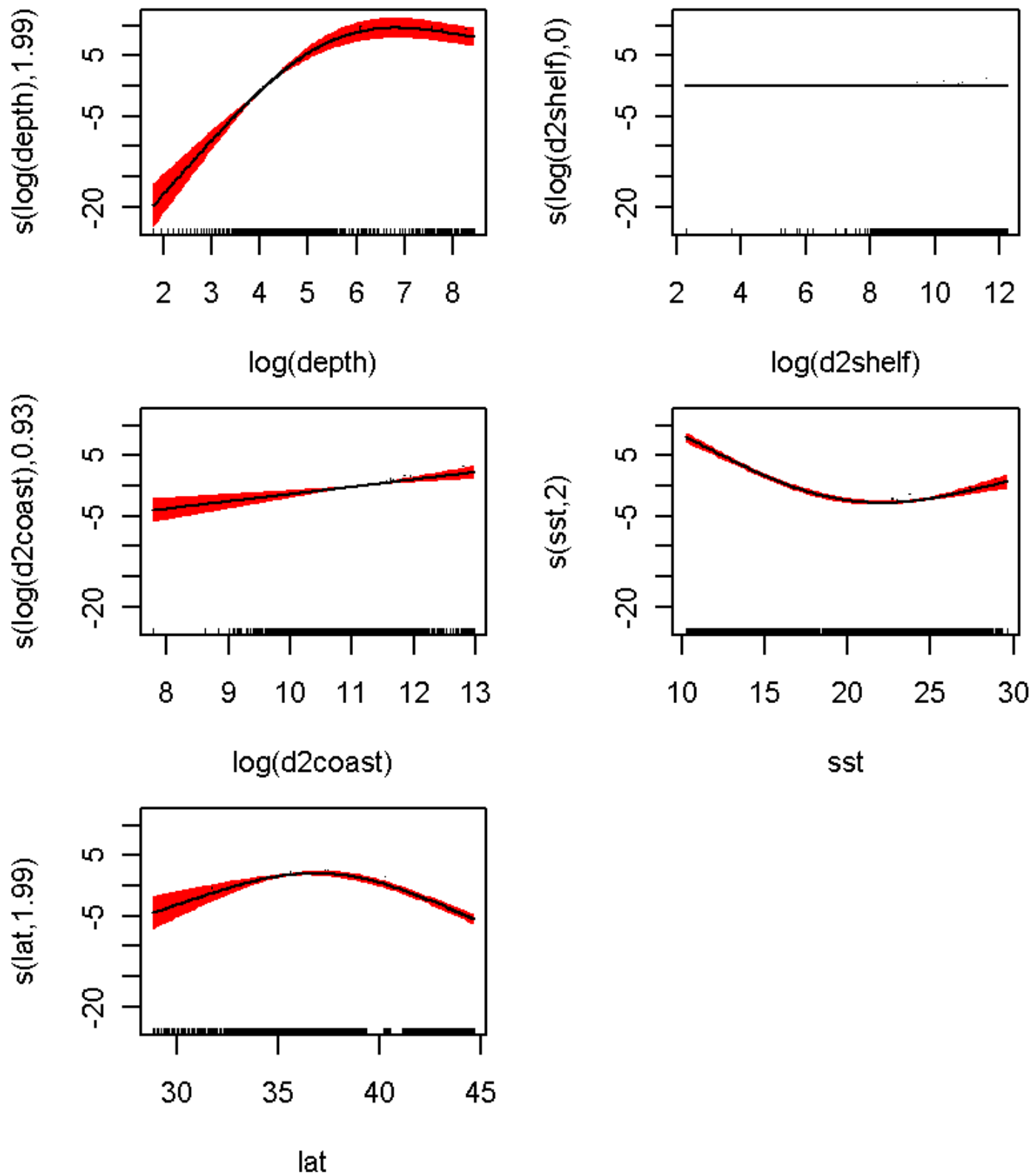


Figure 498: Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

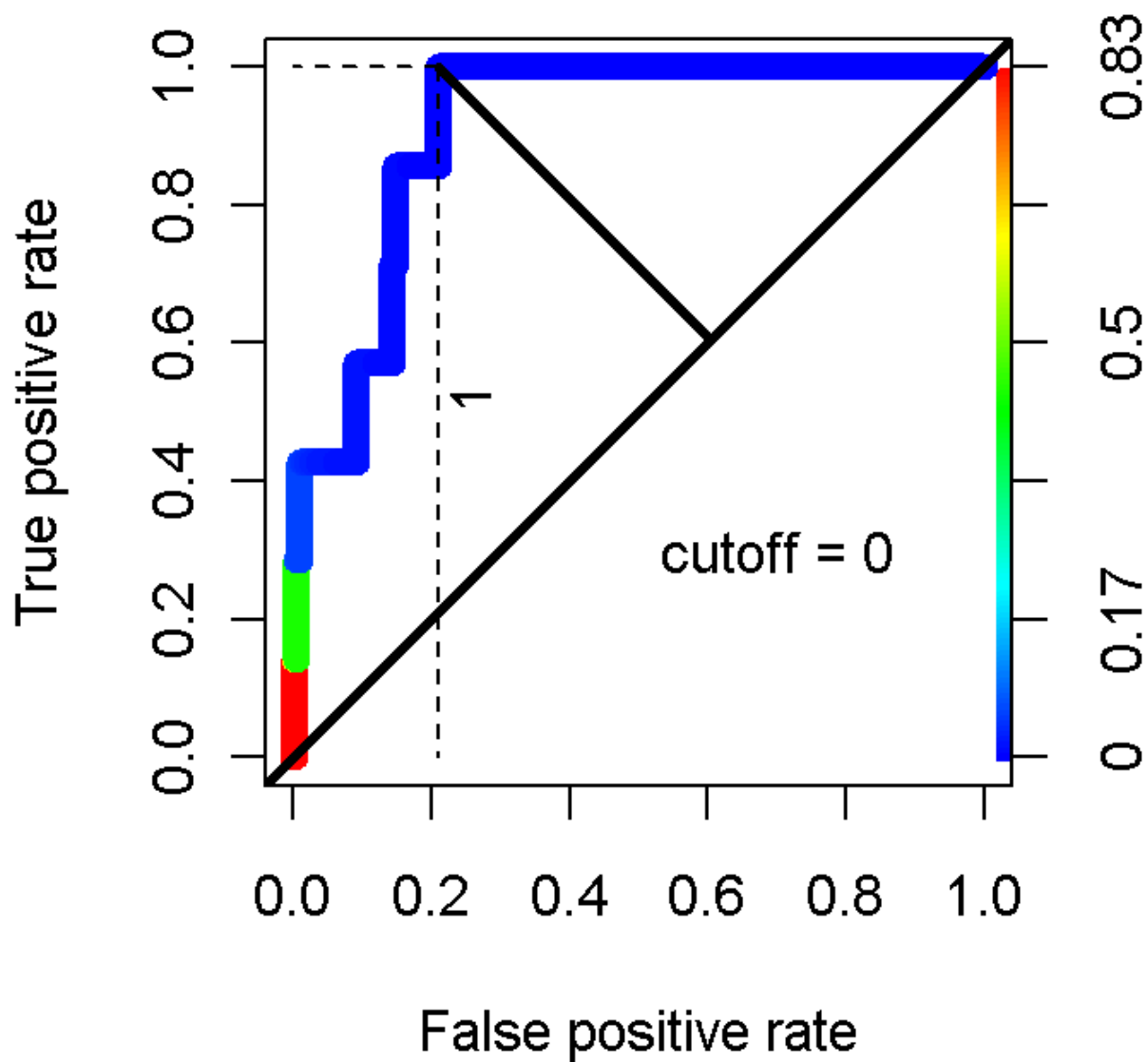


Figure 499: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

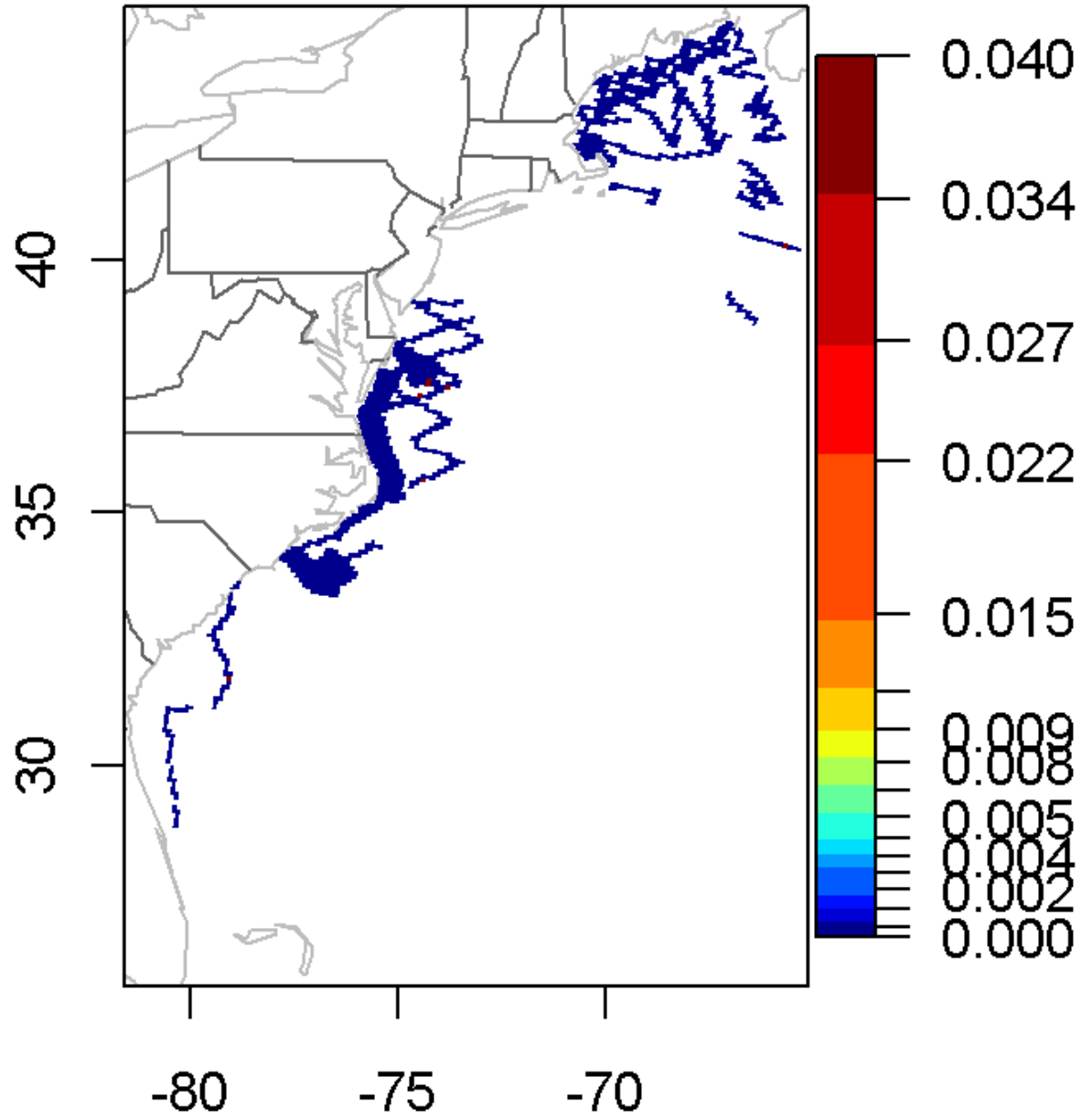


Figure 500: Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

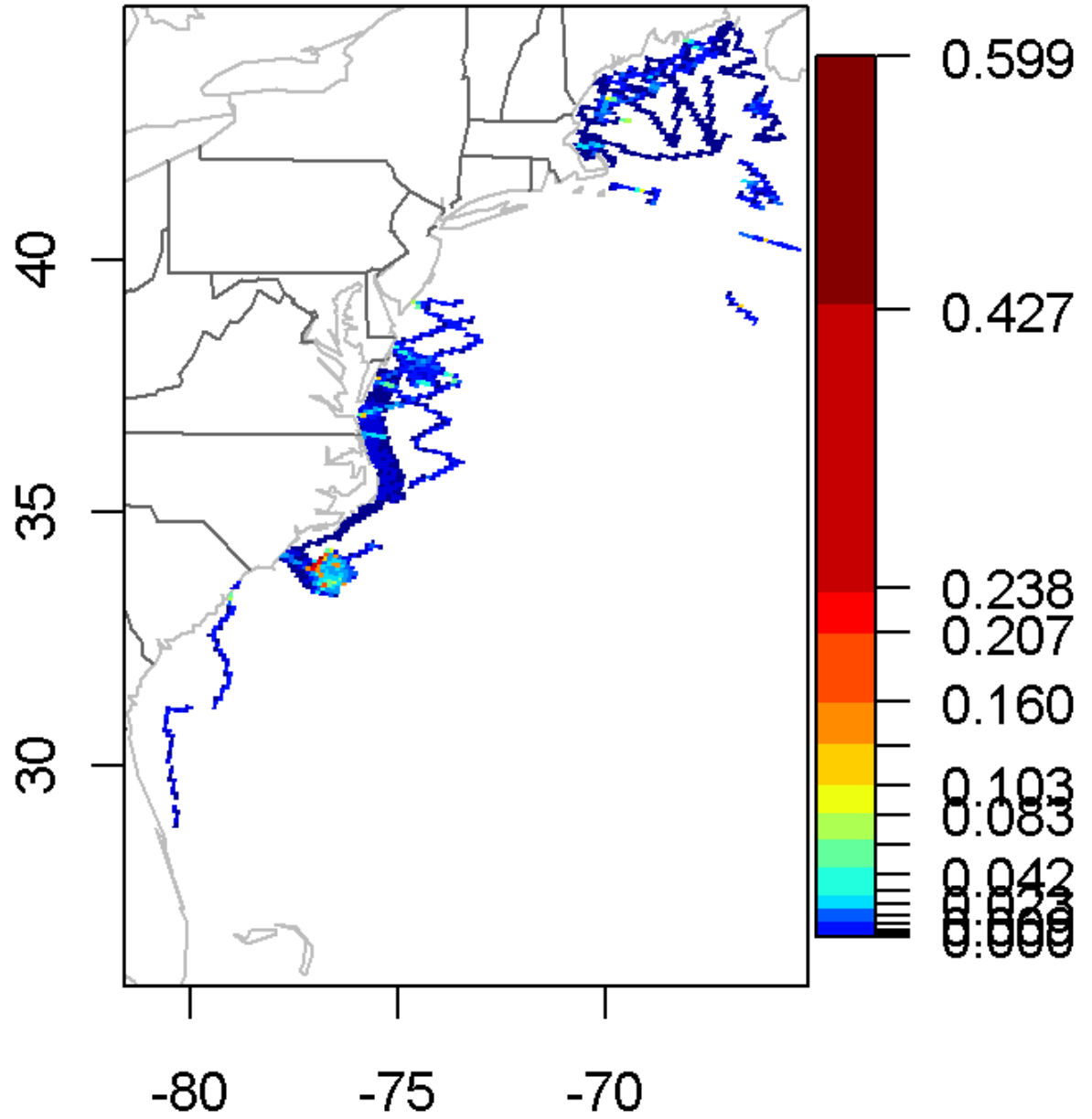


Figure 501: Map of effort(hours/km²) by cell summed through time for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

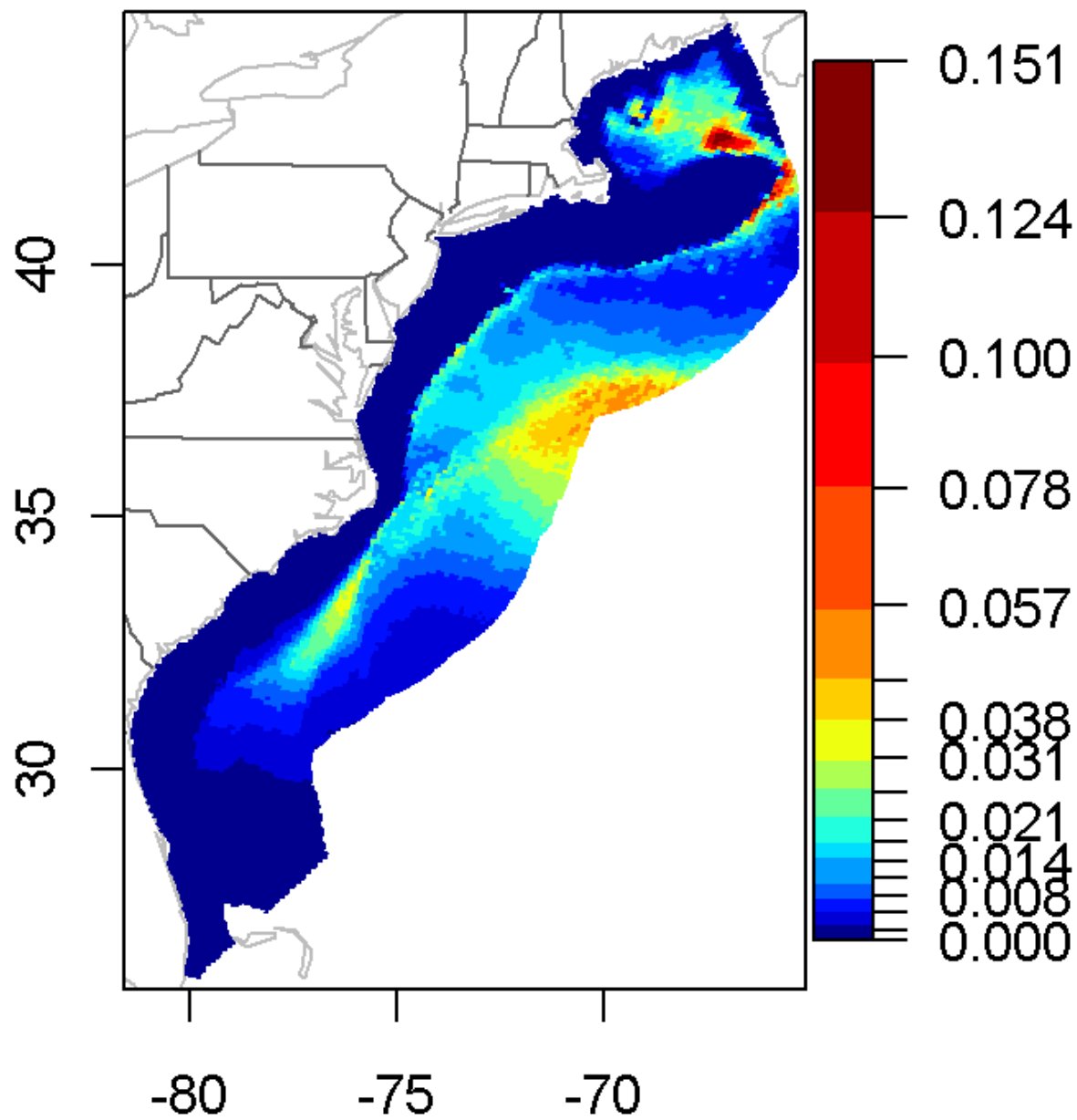


Figure 502: Map of mean predicted habitat for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

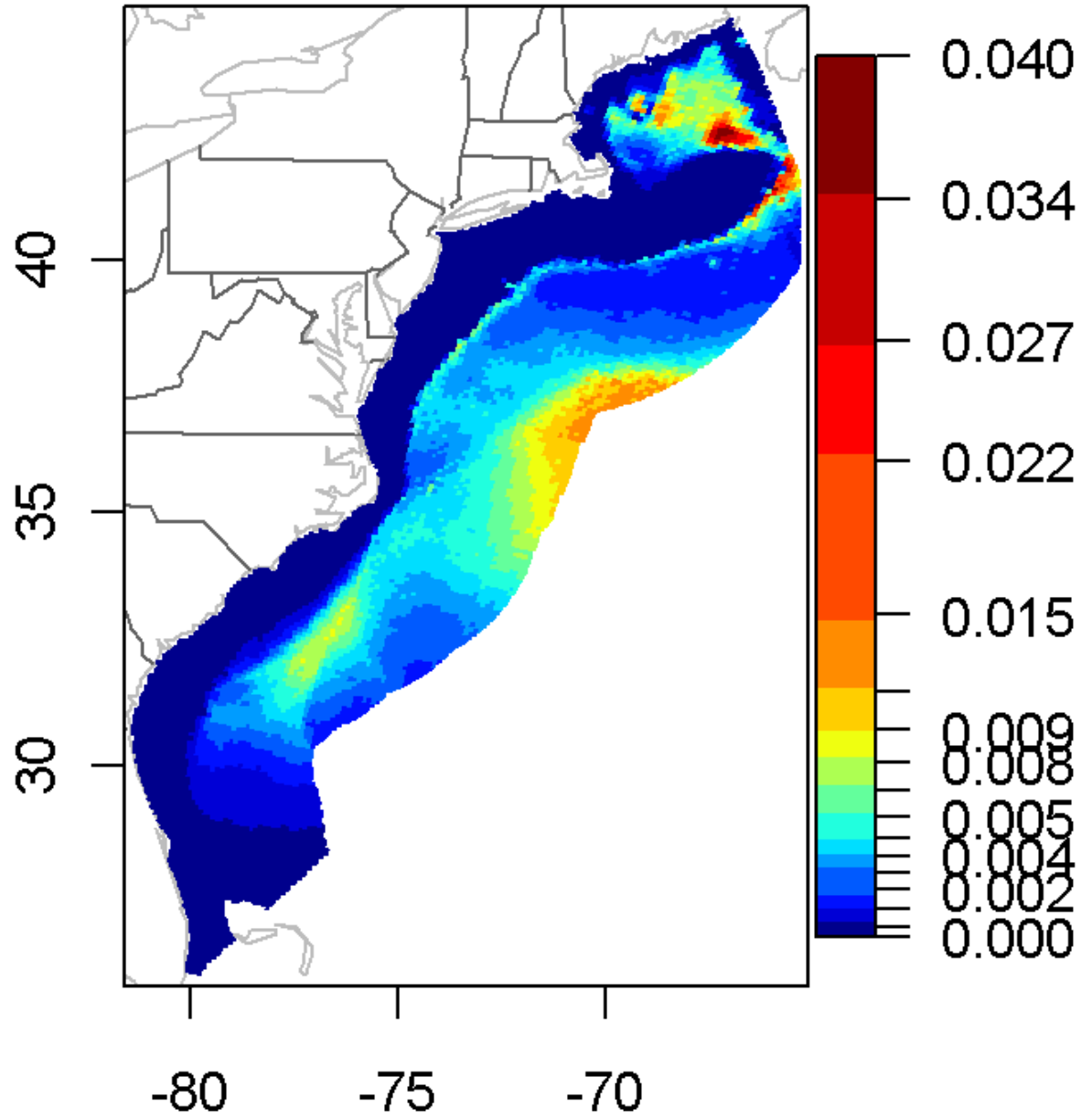


Figure 503: Map of standard error of habitat for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

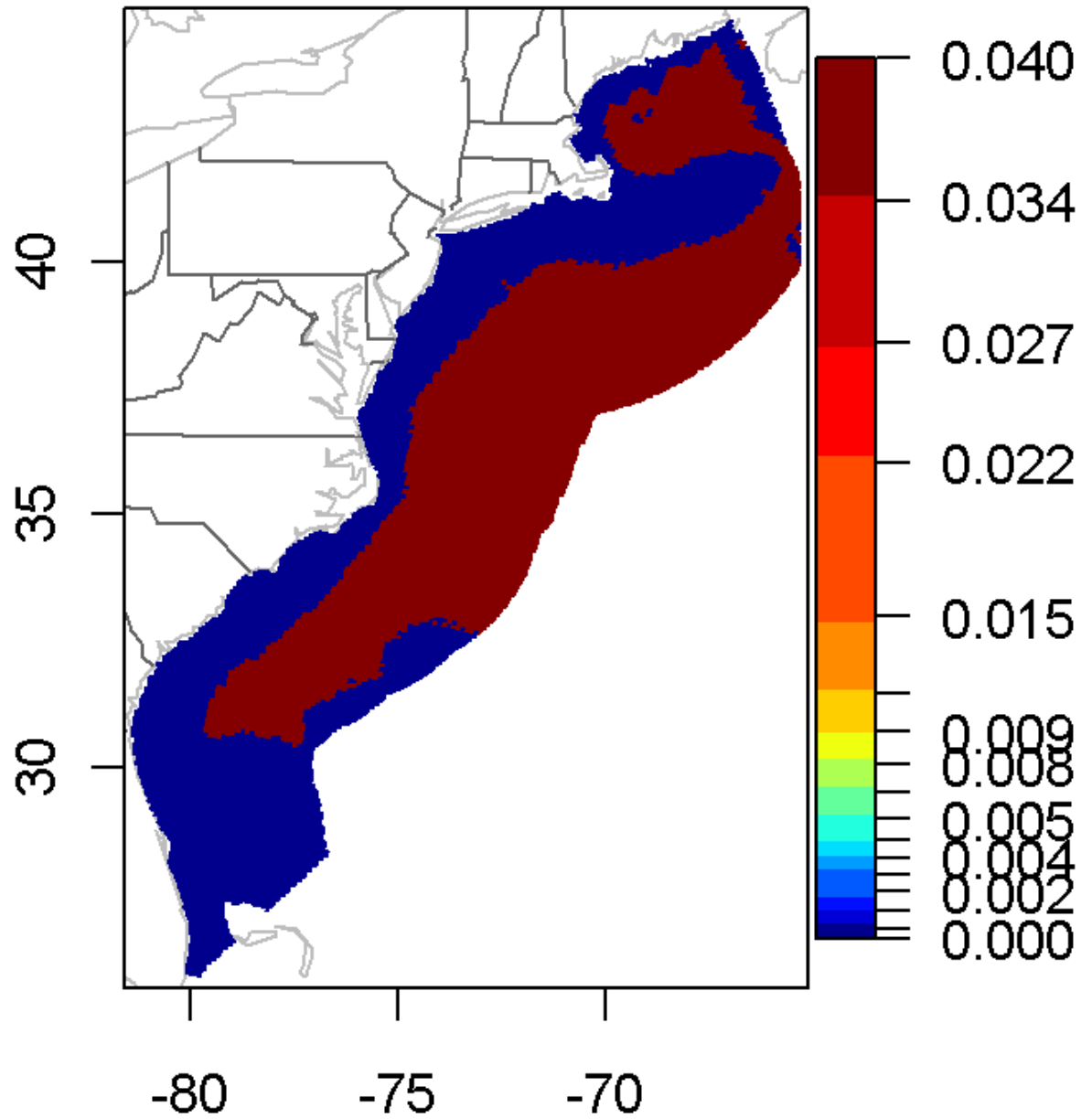


Figure 504: Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'fall' season in 'east2' region.

11.2 spring

11.2.1 gomex2

Modelrun identifier: duke_06_gg3_spring_gomex2

Date generated: 2008-10-21 11:48:22

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 48: Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	117
Number.absences	4700
GAM.converged	TRUE
R.squared	0.0891906
Deviance.explained	0.118687
ROC.optimum	0.401219
Maximum.fit	0.0643829
Maximum.prediction	0.986087

Model text summary...

```
duke_06_gg3_spring_gomex2 run on Tue Oct 21 11:47:04 2008
  provider:duke, version:06, guild:Risso's dolphin (gg3), season:'spring', region:gomex2

max.fit:0.401219, max.prediction:0.986087, ROC.optimum:0.064383

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -3.9224      0.0652  -60.16   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F p-value
s(log(depth))  1.9781154 2.4781   32.880 <2e-16 ***
s(log(d2shelf)) 1.9981539 2.4982   83.901 <2e-16 ***
s(log(d2coast)) 1.9904520 2.4905   80.035 <2e-16 ***
s(sst)          0.0001594 0.5002    0.002  0.839
s(lat)          0.0001084 0.5001   7.18e-06  0.960
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0892   Deviance explained = 11.9%
GCV score = 0.002368   Scale est. = 0.0023618   n = 4817

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:4817  Min.   : 14   Min.   : 11   Min.   : 272   Min.   : 21187   Min.   :19.73   Min.   :24.05
              1st Qu.:2144 1st Qu.: 511 1st Qu.: 24696 1st Qu.:142982 1st Qu.:24.23 1st Qu.:26.38
              Median :4222 Median :1292 Median : 63128 Median :211670 Median :25.35 Median :27.38
              Mean   :3977 Mean   :1537 Mean : 82827 Mean :213952 Mean :25.14 Mean :27.25
              3rd Qu.:5932 3rd Qu.:2668 3rd Qu.:131568 3rd Qu.:276022 3rd Qu.:26.17 3rd Qu.:28.13
              Max.   :8191 Max.   :3523 Max.   :257870 Max.   :404358 Max.   :28.42 Max.   :30.06

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :19.95   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:21.83 1st Qu.:26.28
              Median :4110 Median : 433.5   Median : 71100 Median :157258 Median :23.02 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:1.805e-08	Min.	:3.011e-08	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.00000
1st Qu.	:1861	1st Qu.	:3.217e-04	1st Qu.	:2.133e-04	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.00000
Median	:4110	Median	:8.855e-03	Median	:1.271e-03	Median	:0.000e+00	Median	:9.499e-03	Median	:0.00000
Mean	:3997	Mean	:2.176e-02	Mean	:2.353e-03	Mean	:6.489e-02	Mean	:2.365e-02	Mean	:0.07344
3rd Qu.	:6015	3rd Qu.	:2.637e-02	3rd Qu.	:2.725e-03	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:0.00000
Max.	:8351	Max.	:9.861e-01	Max.	:1.153e-01	Max.	:4.000e+00	Max.	:2.695e-01	Max.	:1.00000
						NA's	:4.838e+03	NA's	:4.838e+03		

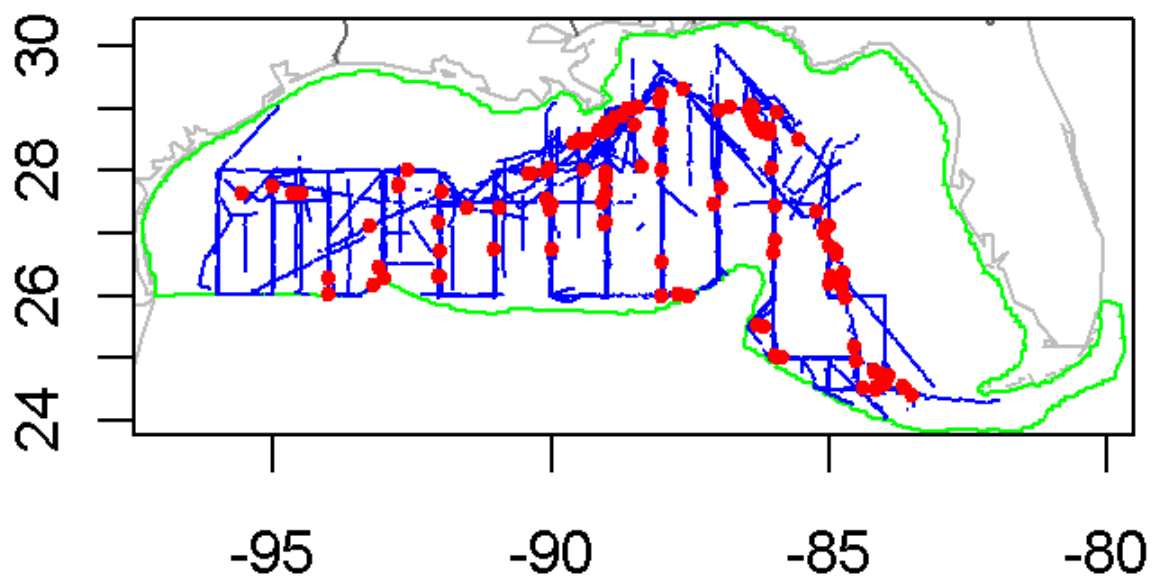


Figure 505: Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

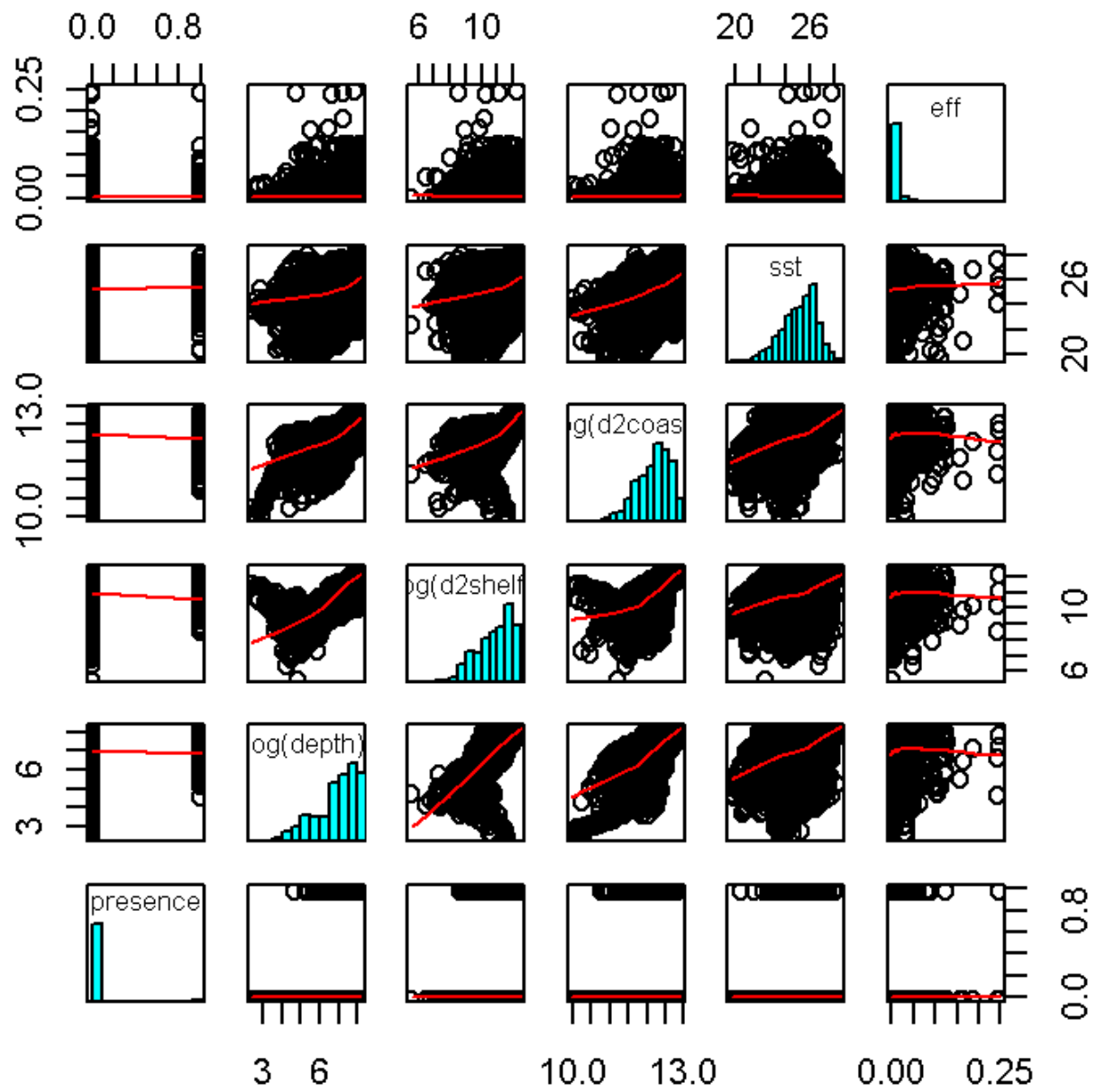


Figure 506: Pairs plot of input variables for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

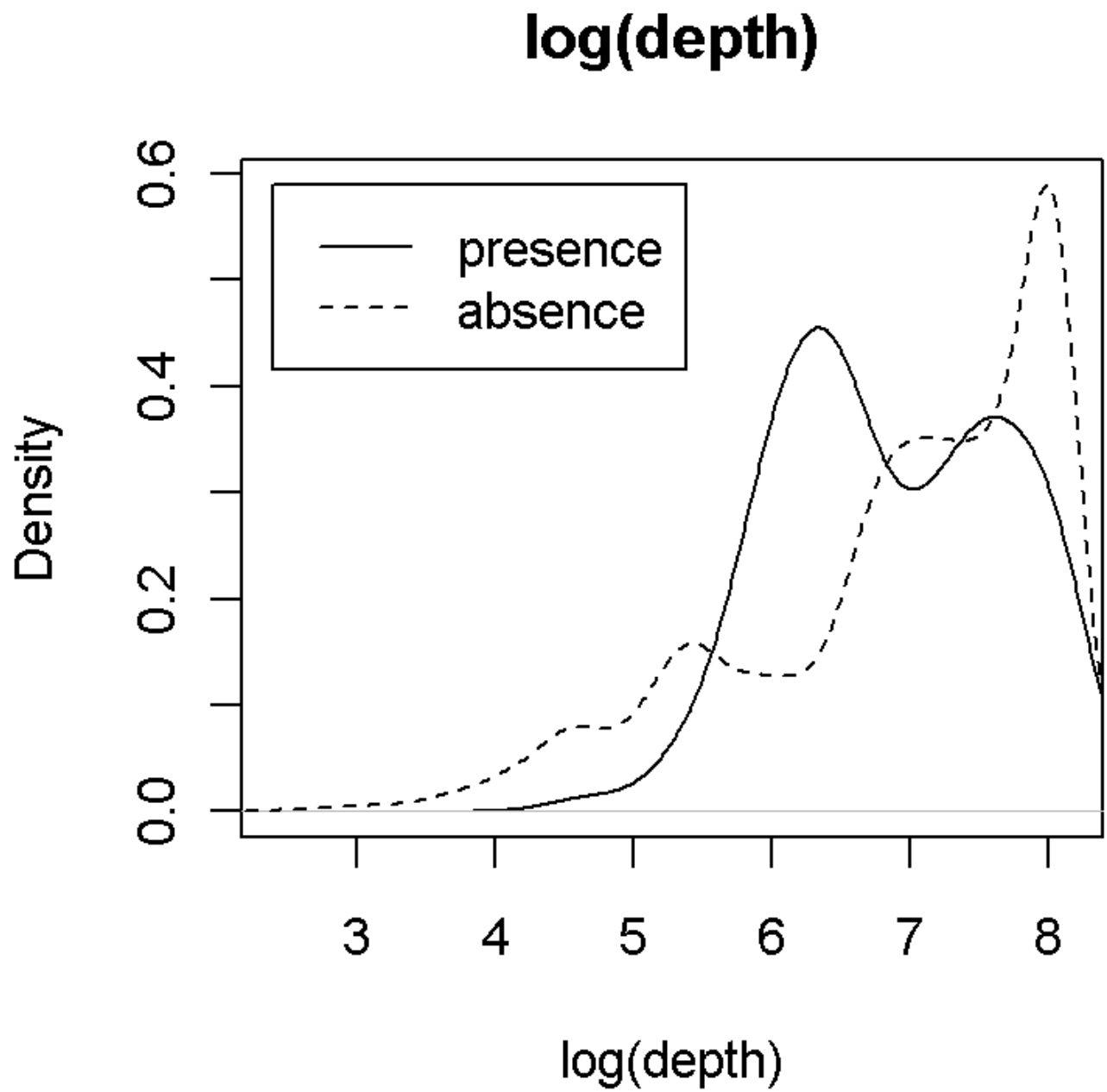


Figure 507: Density histogram of depth $\log(\text{meters})$ for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

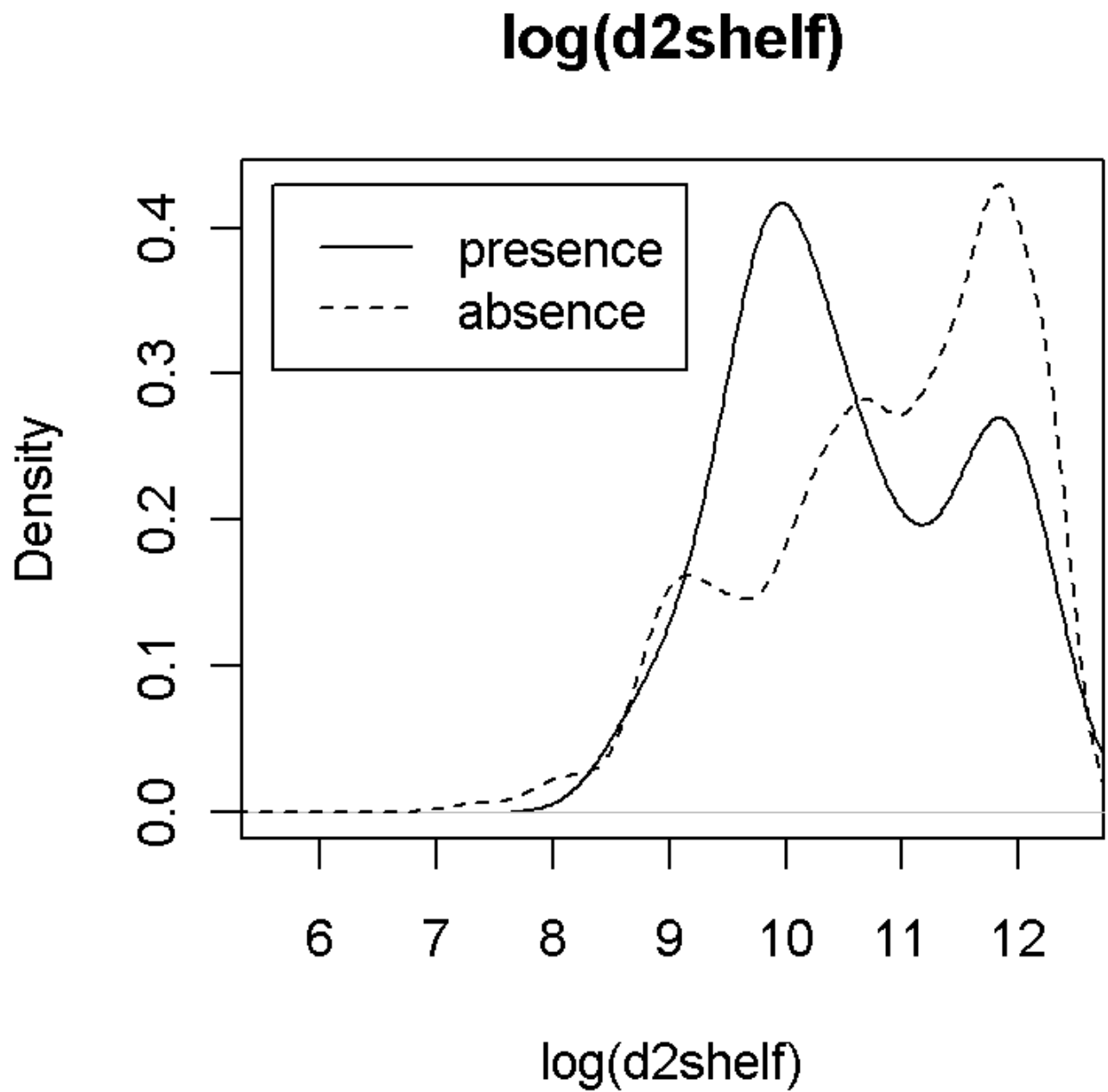


Figure 508: Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

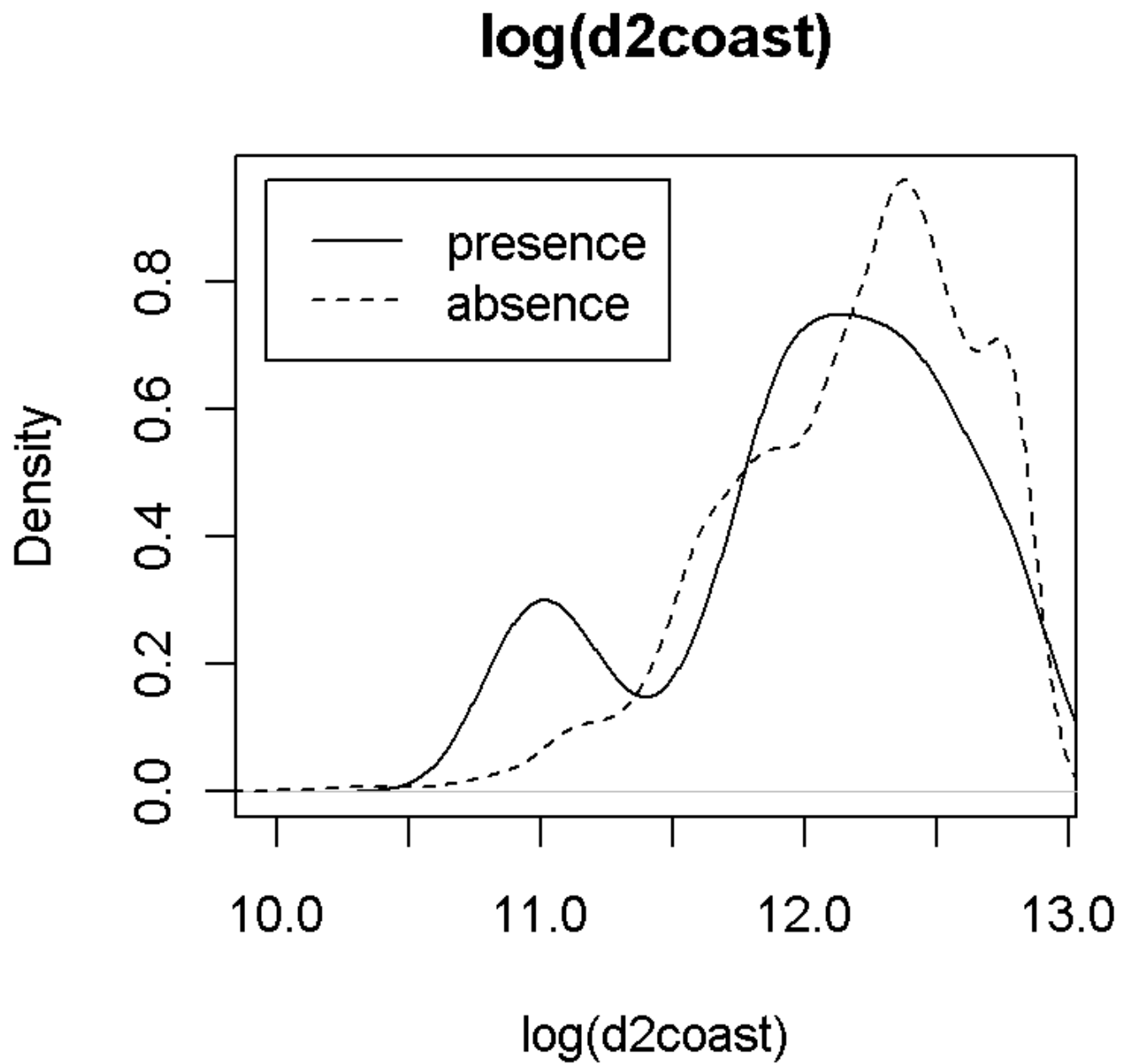


Figure 509: Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

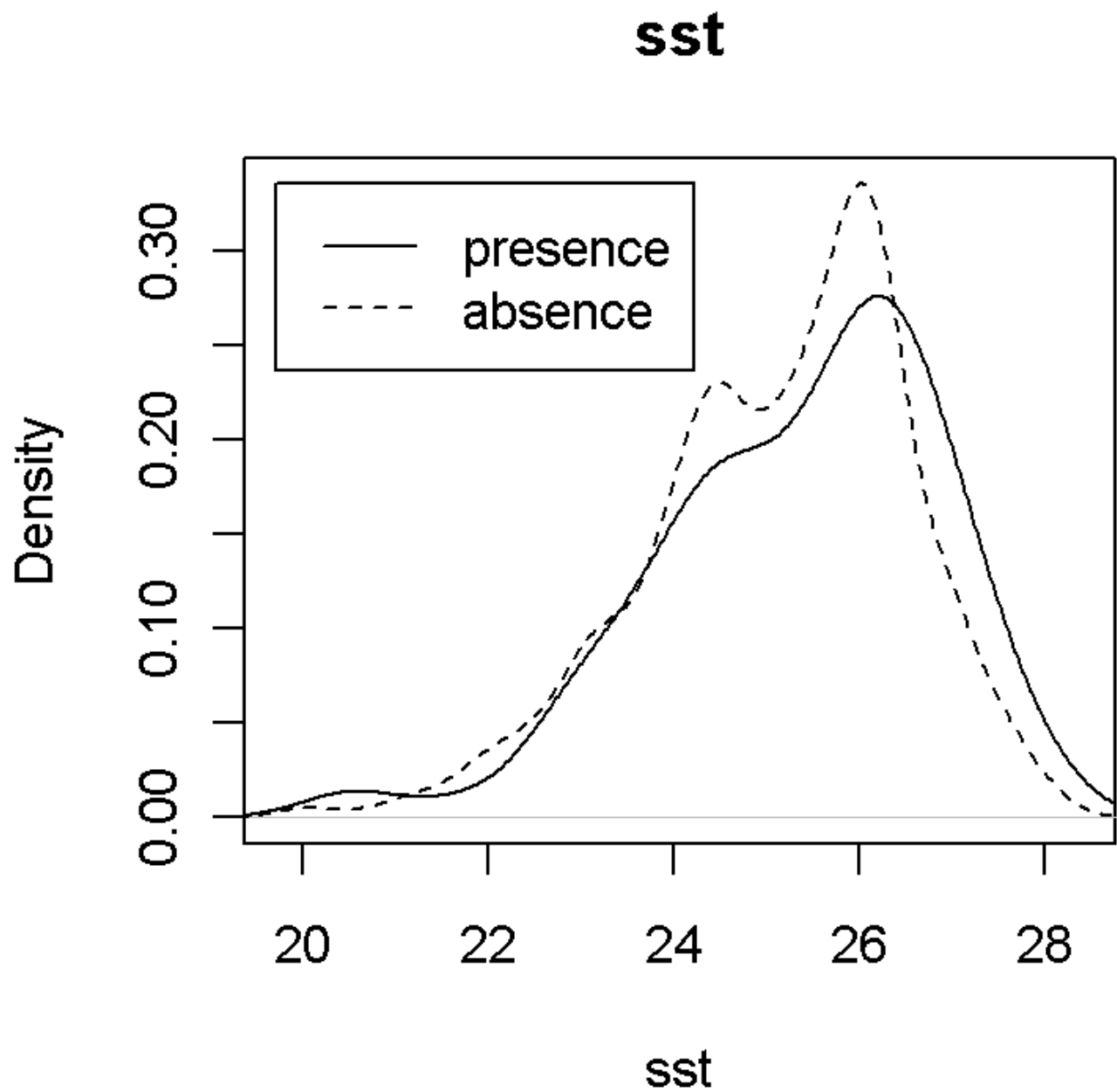


Figure 510: Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

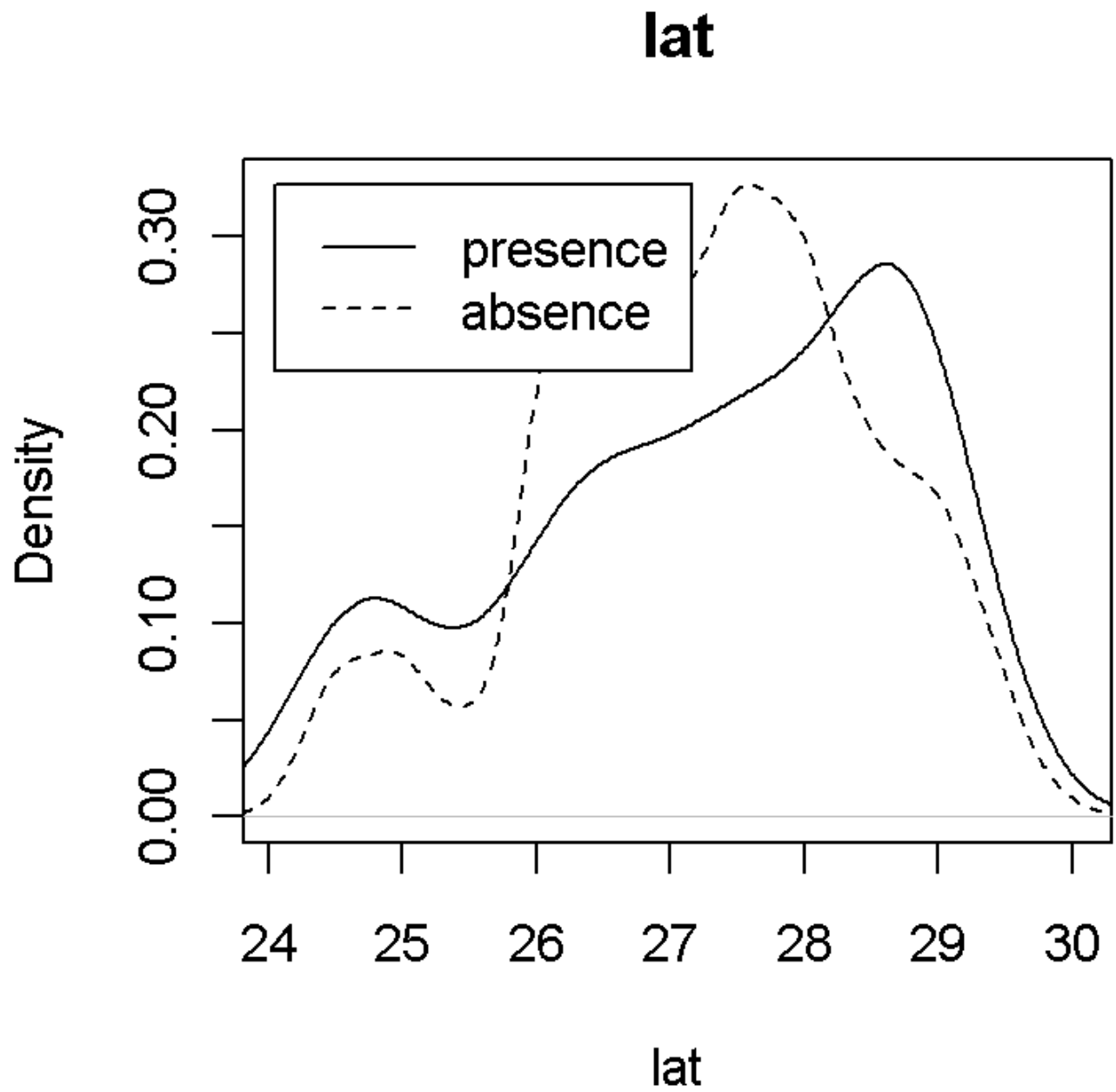


Figure 511: Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

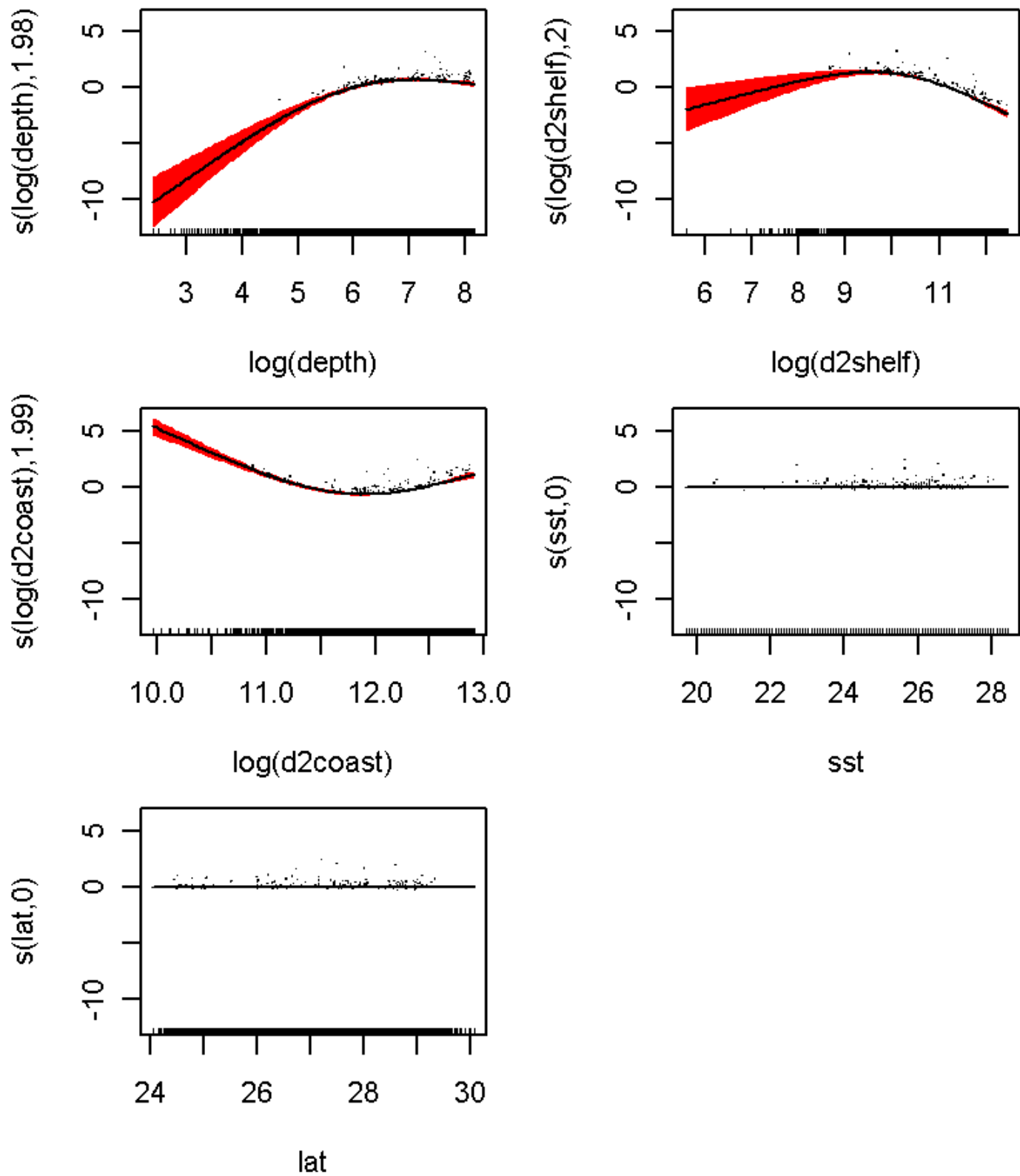


Figure 512: Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

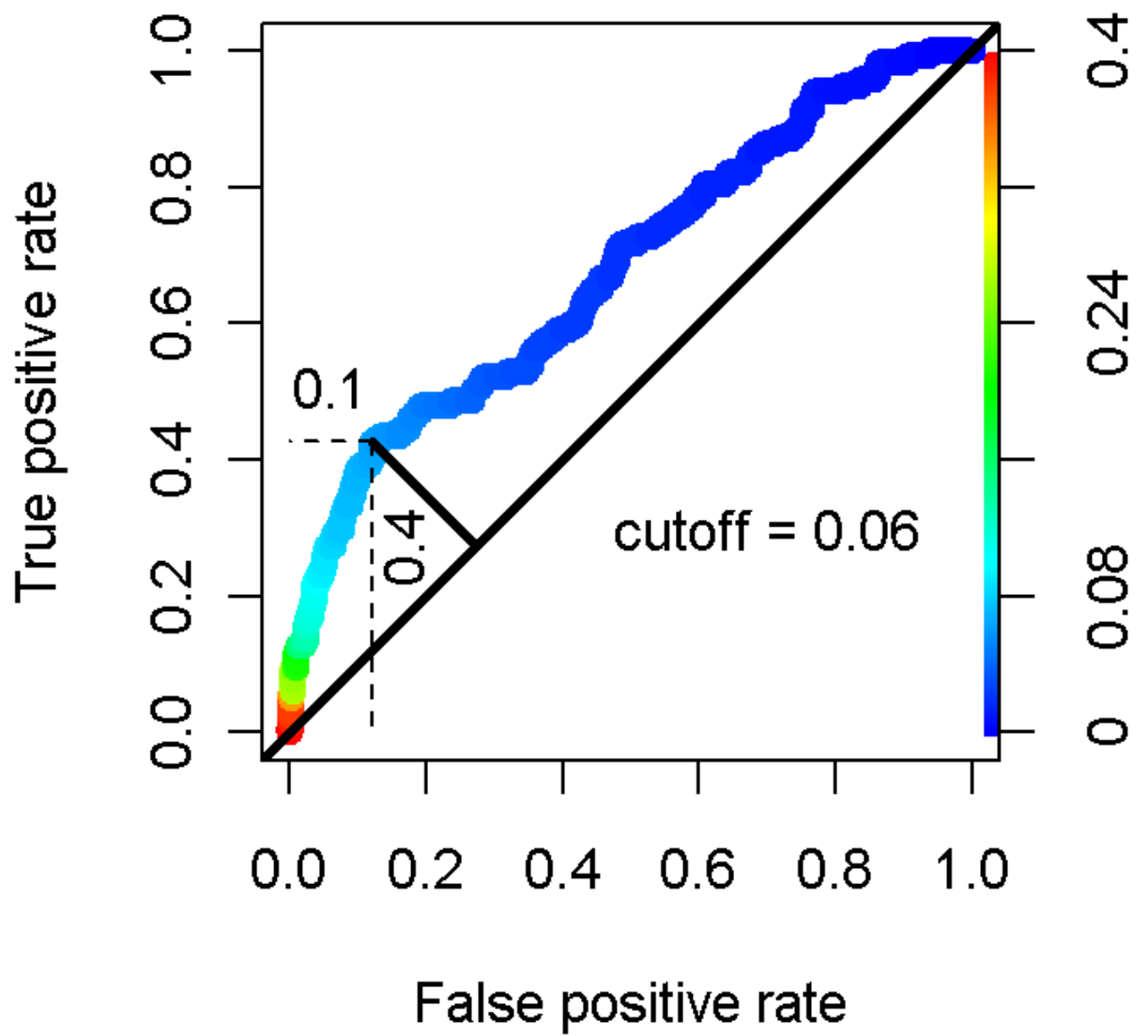


Figure 513: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

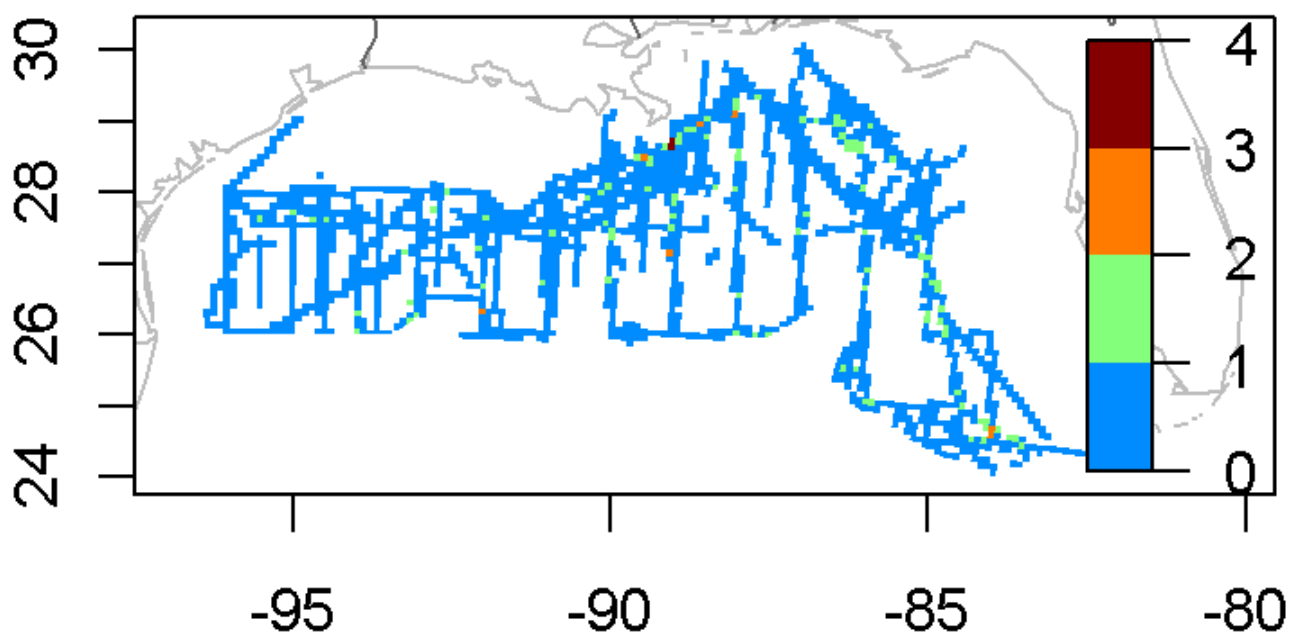


Figure 514: Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

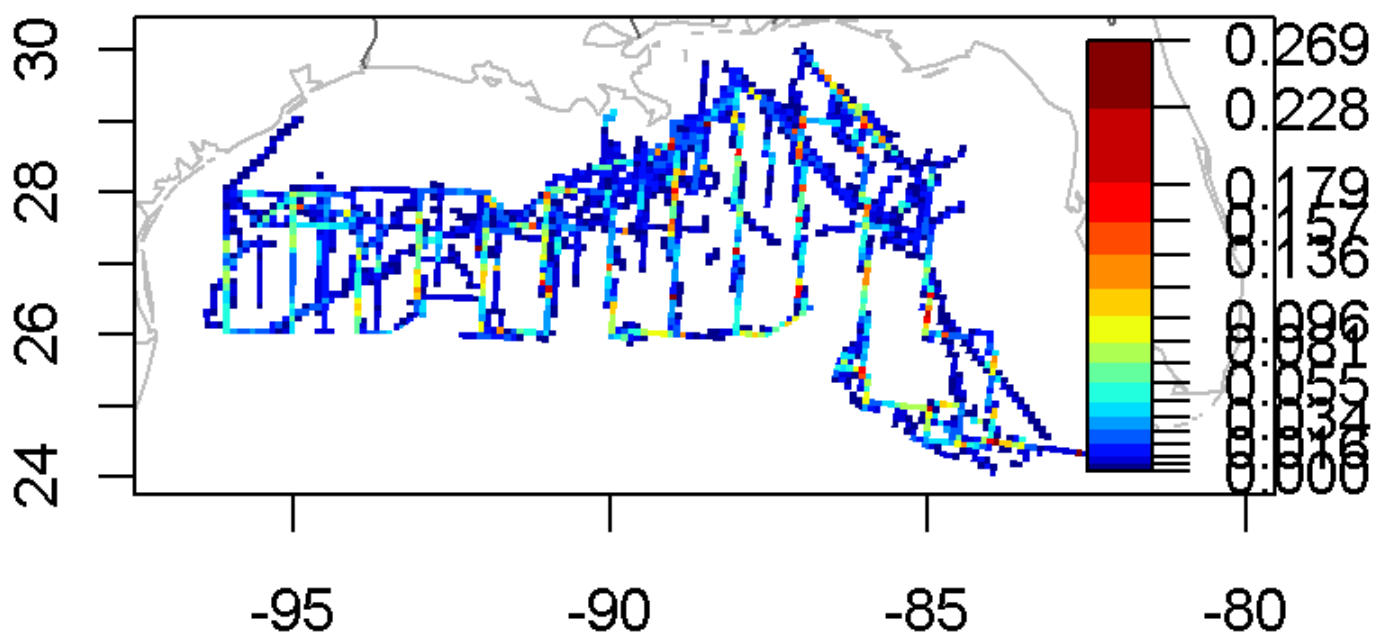


Figure 515: Map of effort(hours/km²) by cell summed through time for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

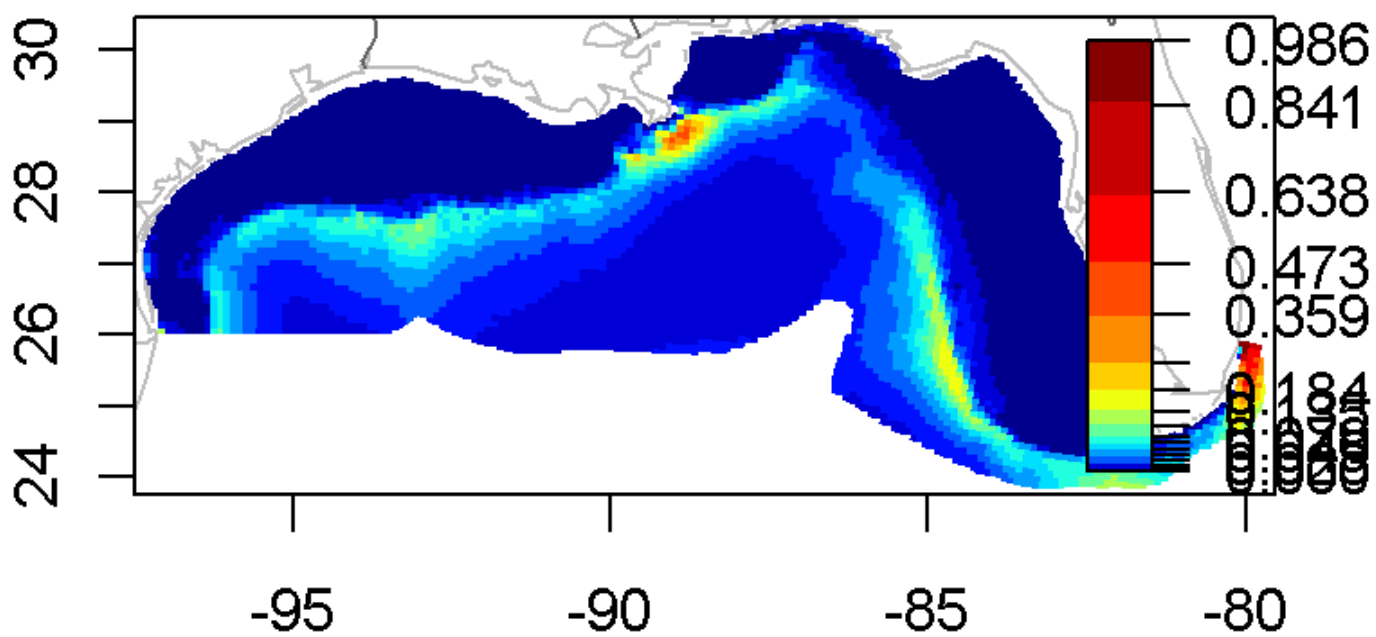


Figure 516: Map of mean predicted habitat for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

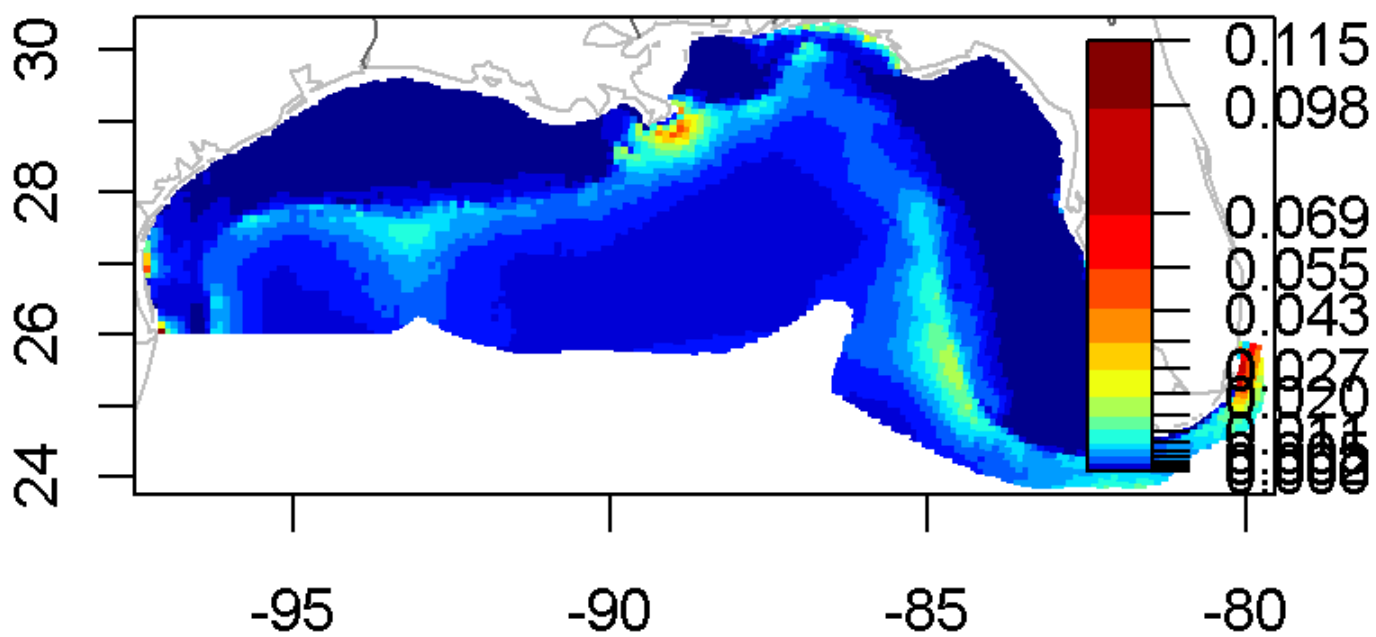


Figure 517: Map of standard error of habitat for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

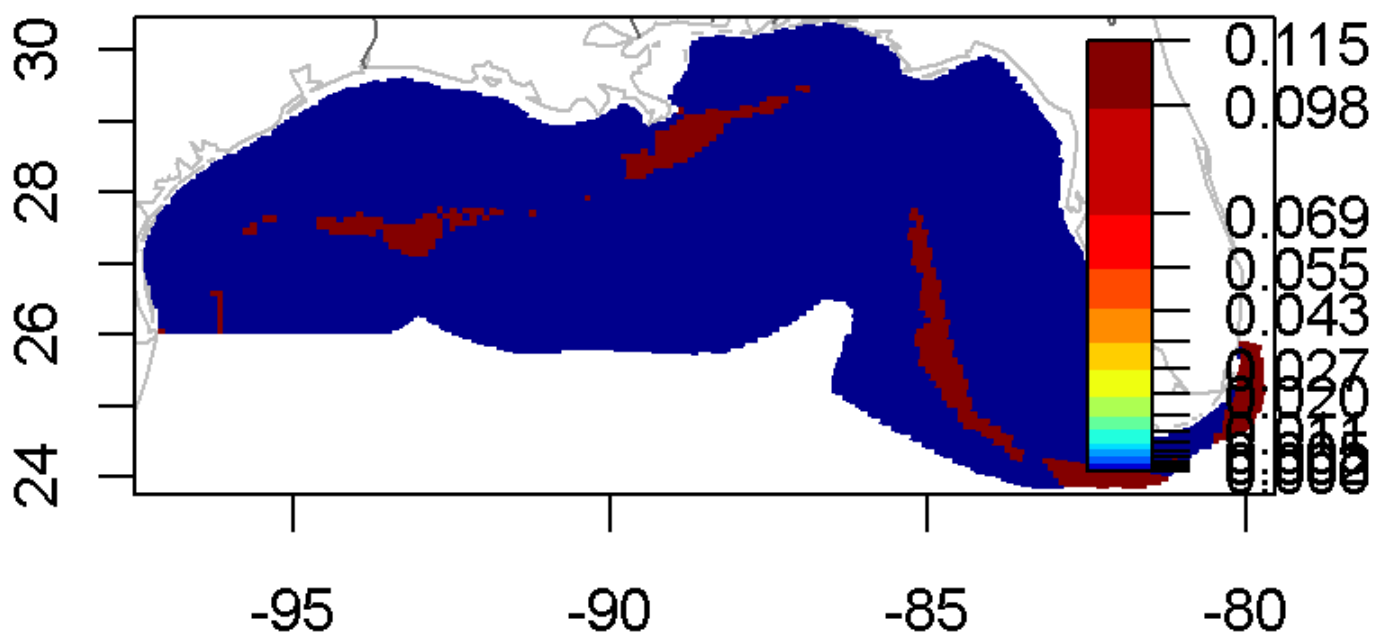


Figure 518: Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'spring' season in 'gomex2' region.

11.3 summer

11.3.1 east2

Modelrun identifier: duke_06_gg3_summer_east2

Date generated: 2008-10-21 12:54:20

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 49: Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

	Value
Number.presences	231
Number.absences	8847
GAM.converged	TRUE
R.squared	0.2484
Deviance.explained	0.273478
ROC.optimum	0.976472
Maximum.fit	0.0624244
Maximum.prediction	0.975572

Model text summary...

```
duke_06_gg3_summer_east2 run on Tue Oct 21 12:49:31 2008
  provider:duke, version:06, guild:Risso's dolphin (gg3), season:'summer', region:east2

max.fit:0.976472, max.prediction:0.975572, ROC.optimum:0.062424

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -8.826      0.383   -23.05   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.995   2.495 133.48 <2e-16 ***
s(log(d2shelf)) 1.998   2.498  51.24 <2e-16 ***
s(log(d2coast)) 1.983   2.483  63.25 <2e-16 ***
s(sst)         1.979   2.479  64.63 <2e-16 ***
s(lat)         1.996   2.496 122.83 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.248   Deviance explained = 27.3%
GCV score = 0.0017935   Scale est. = 0.0017894   n = 8663

summary(dat)...
  region   fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.    : 1635  Min.    :  5.0  Min.    :    5  Min.    : 1259  Min.    :  8.175  Min.    :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.: 20989  1st Qu.: 50865  1st Qu.: 17.025  1st Qu.:37.53
          Median :14008  Median : 111.5  Median : 52230  Median :102266  Median : 22.200  Median :40.18
          Mean   :13275  Mean   : 677.3  Mean   : 67623  Mean   :125197  Mean   : 21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.: 420.0  3rd Qu.: 99335  3rd Qu.:174835  3rd Qu.: 25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   : 30.900  Max.   :44.74
          NA's    :      7      NA's    :    7      NA's    :408.000

summary(newdat)...
  region   fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :    5  Min.    : 1259  Min.    :11.18  Min.    :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :3.164e-16  Min.   : 0.0000  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:1.788e-04  1st Qu.:7.243e-05  1st Qu.: 0.0000  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :1.098e-02  Median :1.995e-03  Median : 0.0000  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :4.304e-02  Mean   :3.312e-03  Mean   : 0.0501  Mean   :1.069e-02  Mean   :0.2474
3rd Qu.:14088  3rd Qu.:6.191e-02  3rd Qu.:5.440e-03  3rd Qu.: 0.0000  3rd Qu.:9.308e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :9.756e-01  Max.   :1.217e-01  Max.   : 2.0000  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5277.0000  NA's :5.277e+03
```

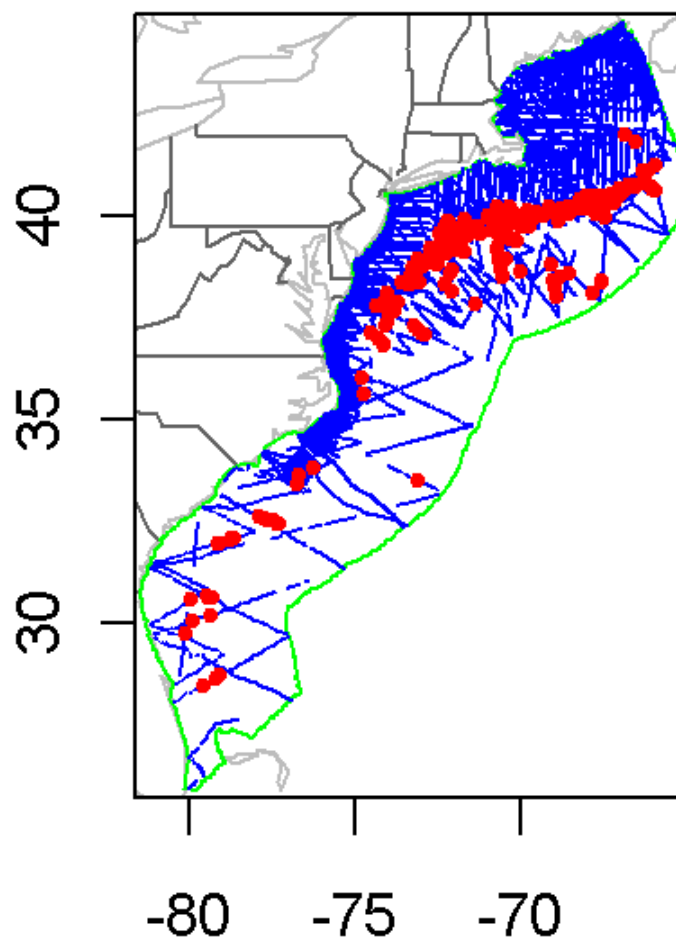


Figure 519: Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

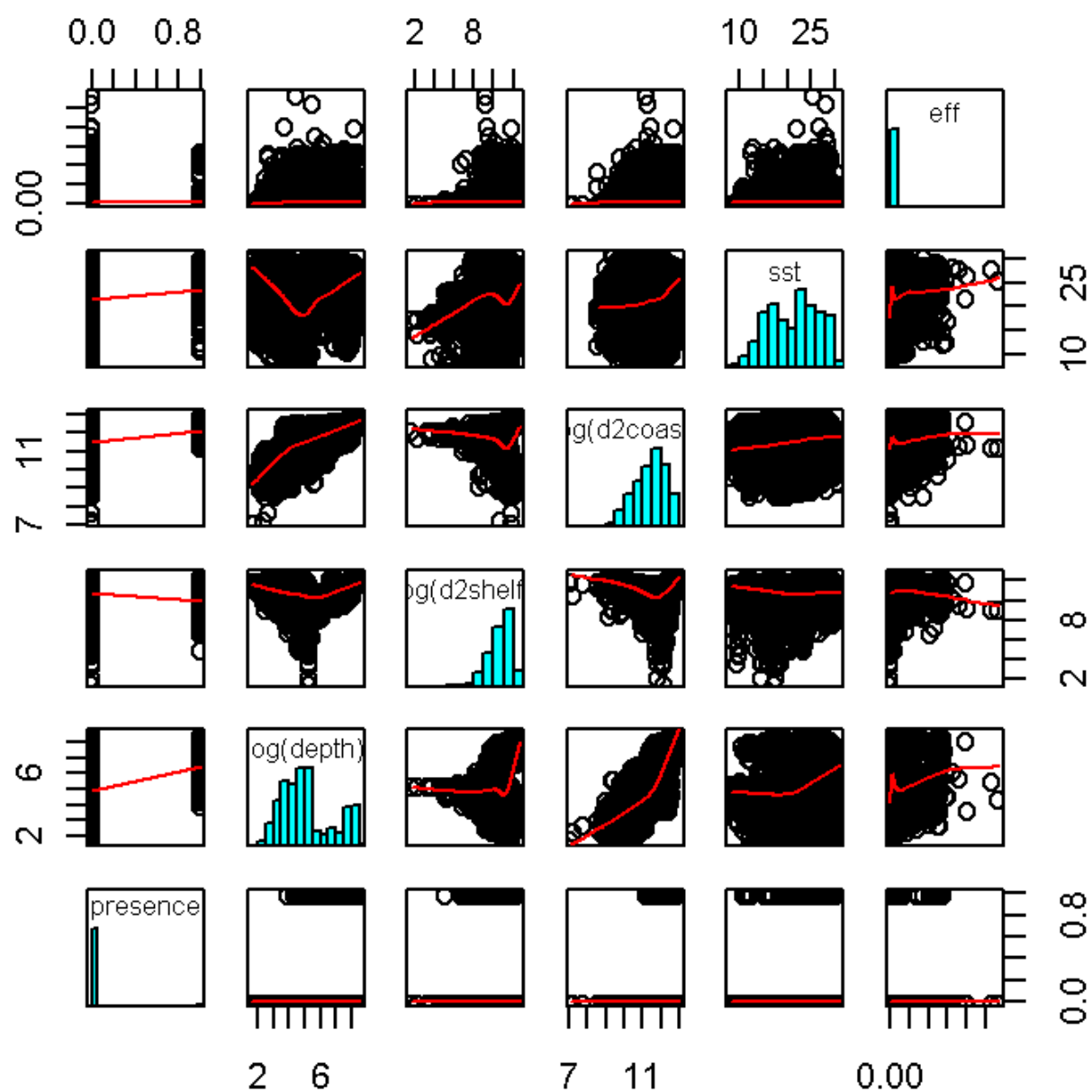


Figure 520: Pairs plot of input variables for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

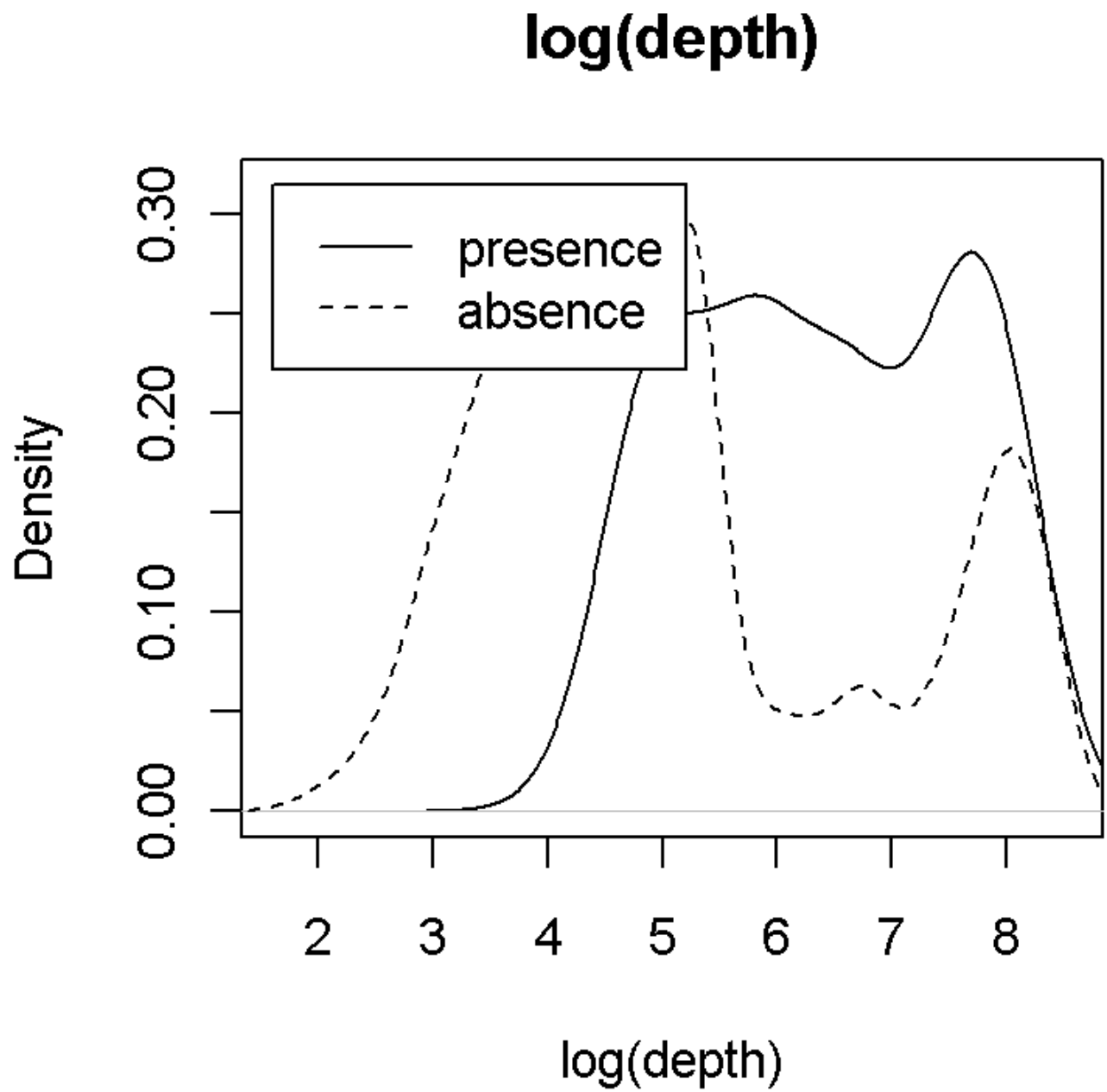


Figure 521: Density histogram of depth log(meters) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

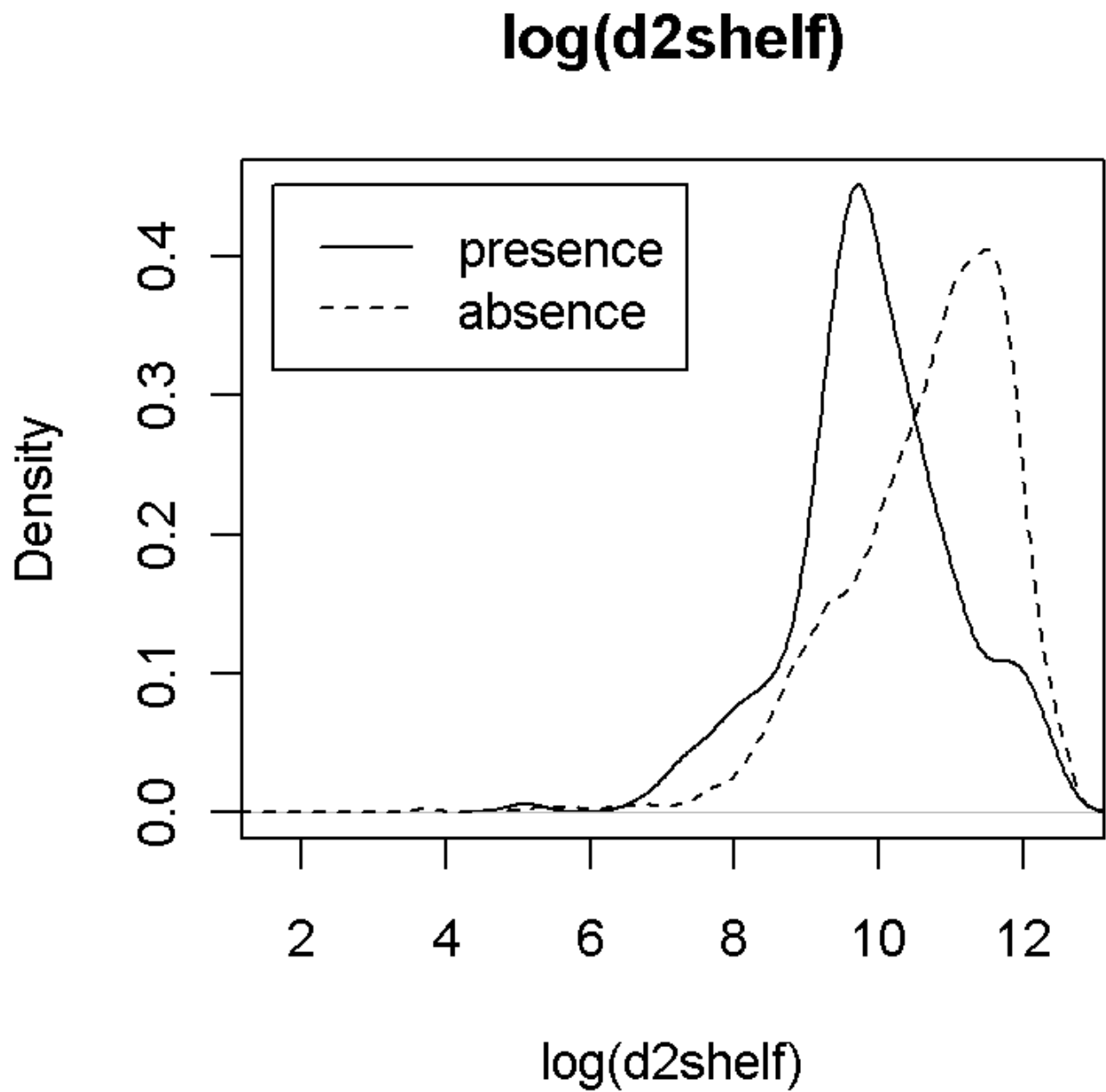


Figure 522: Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

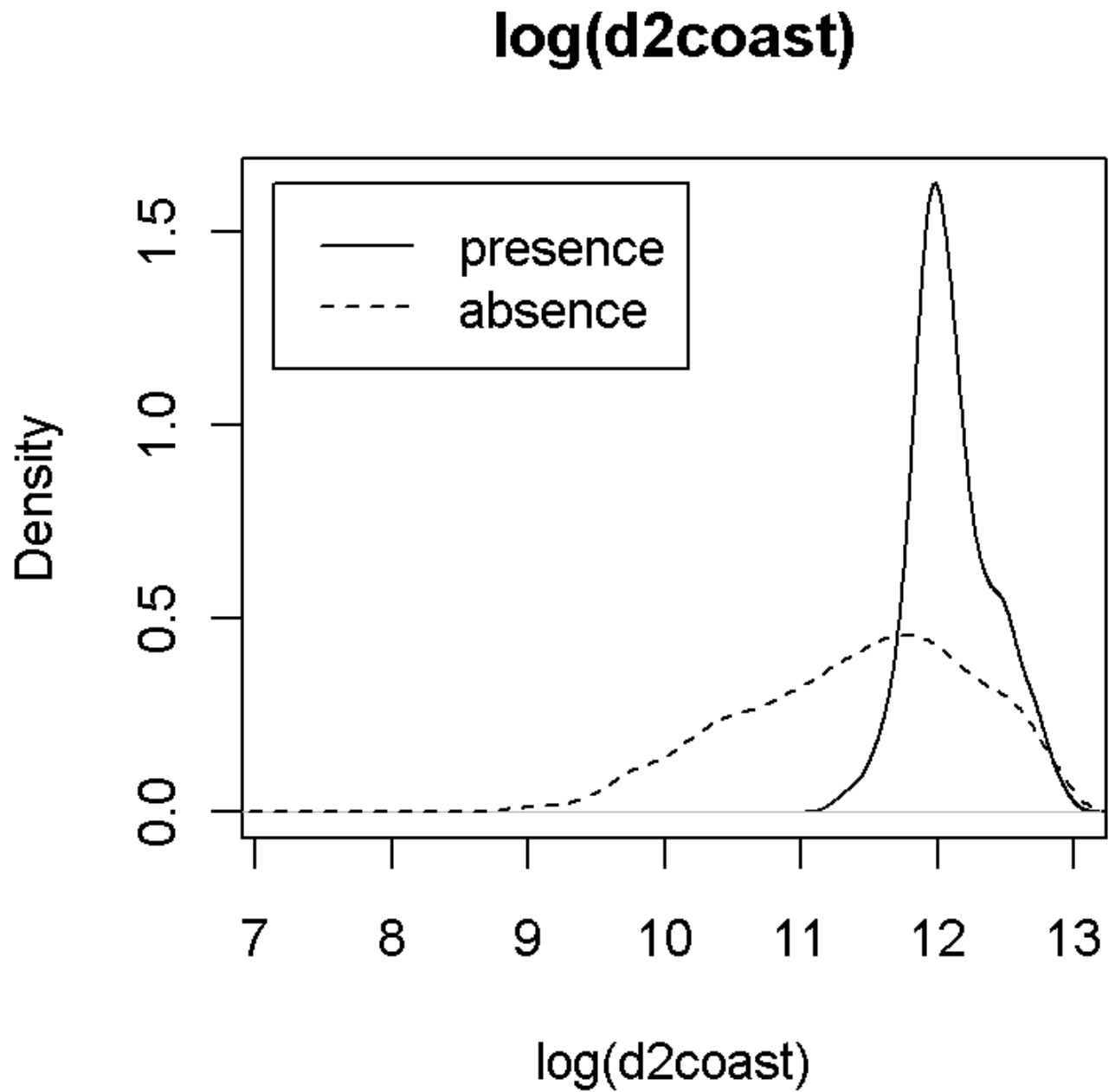


Figure 523: Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

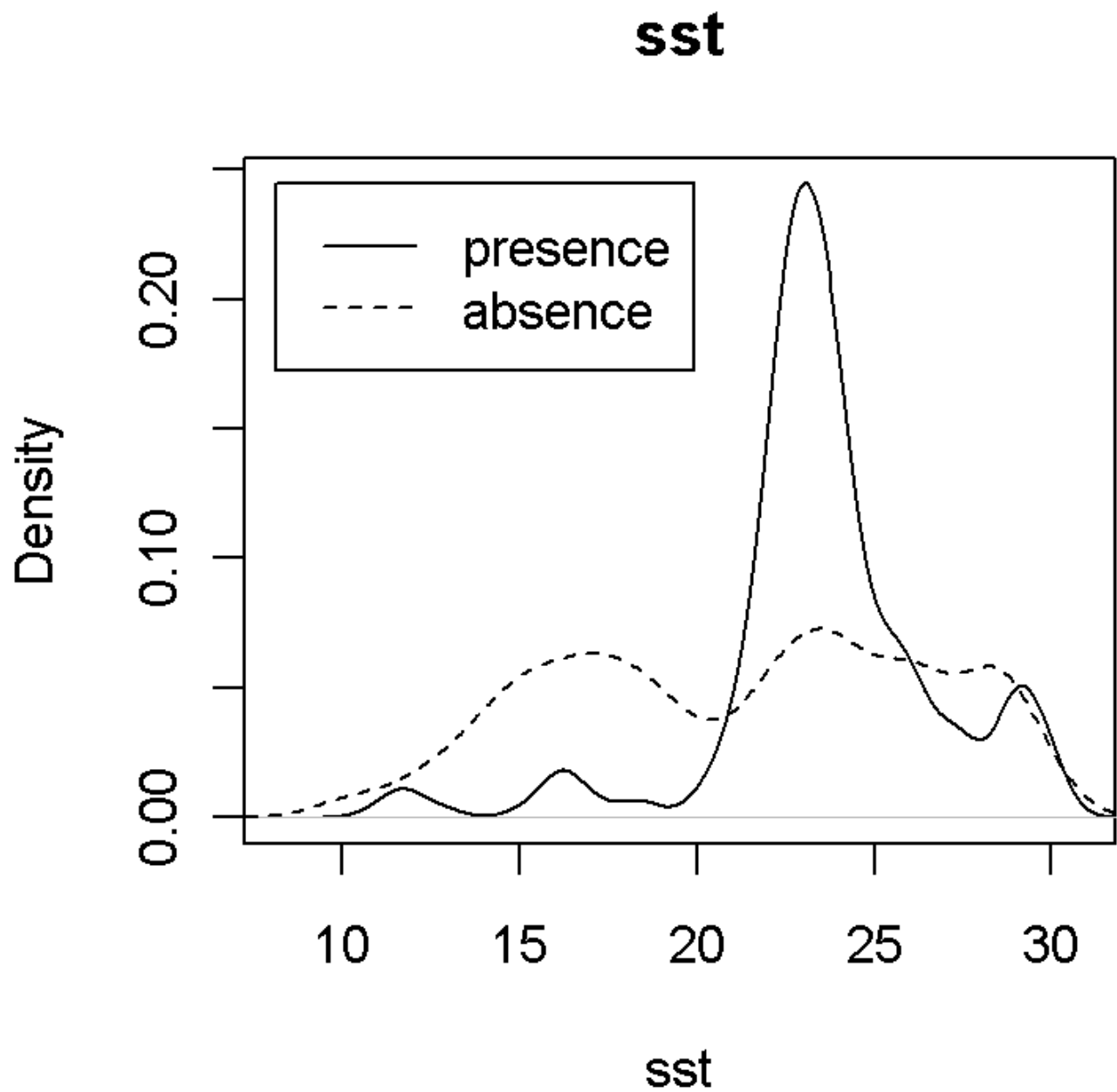


Figure 524: Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

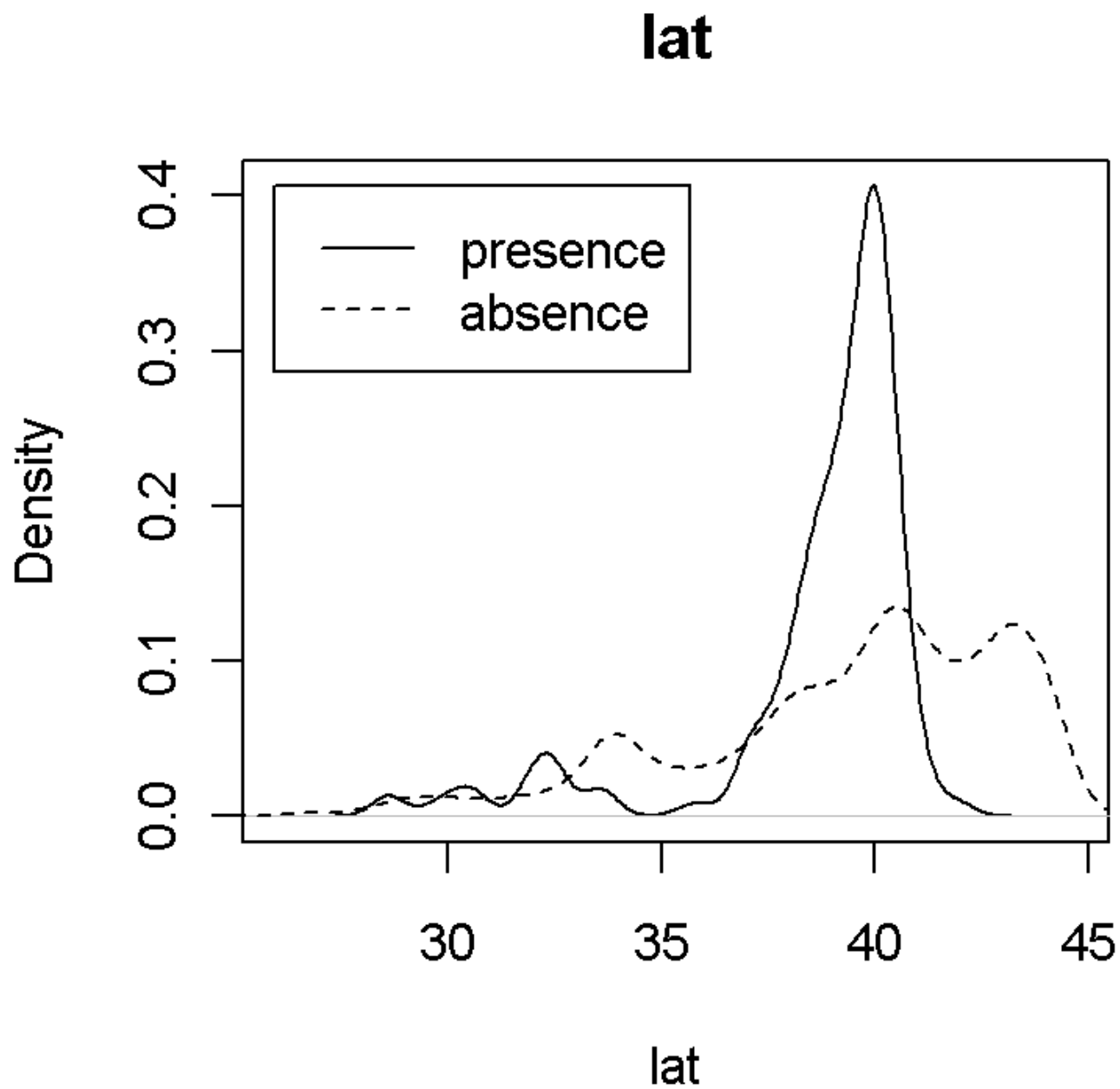


Figure 525: Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

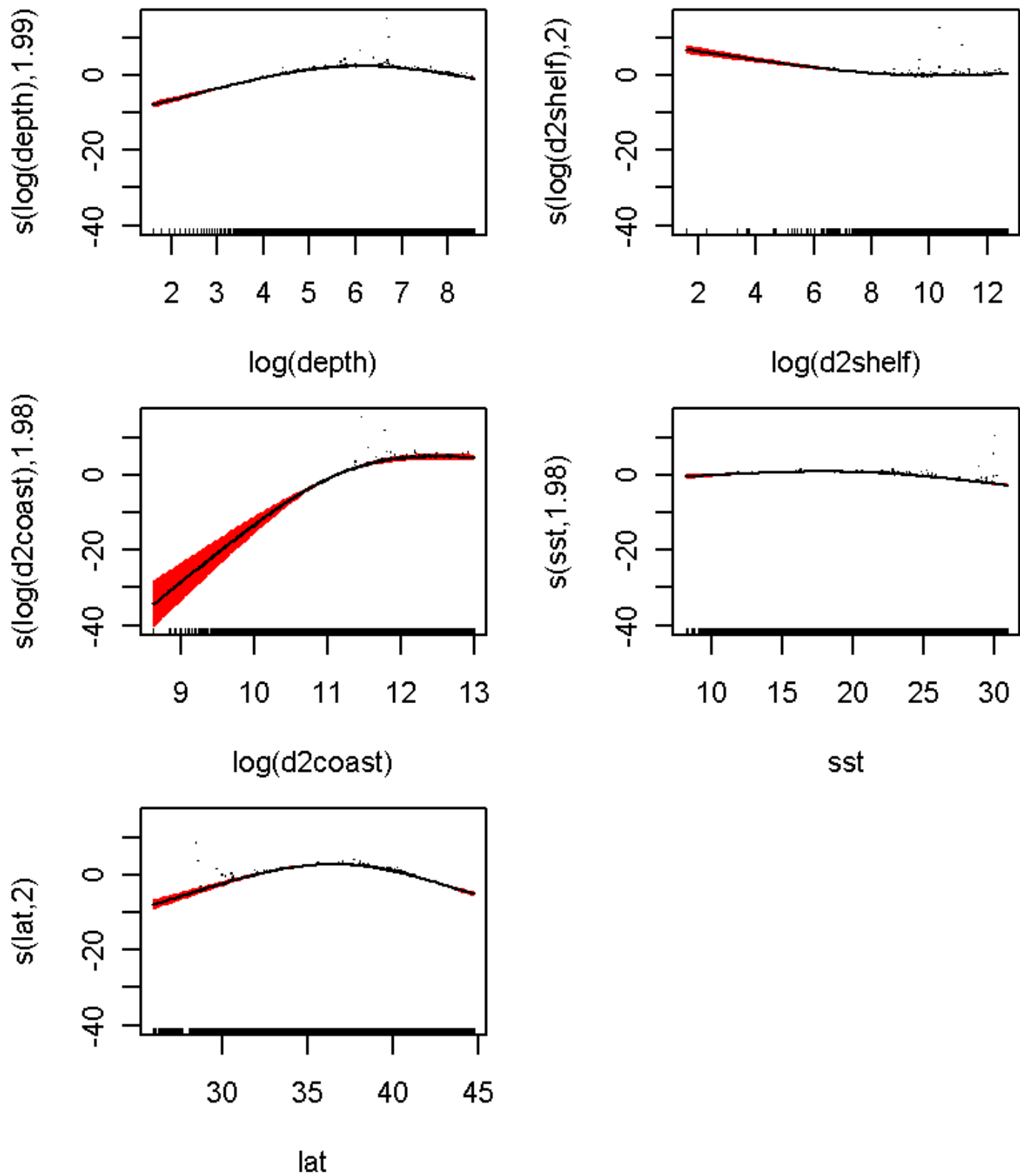


Figure 526: Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

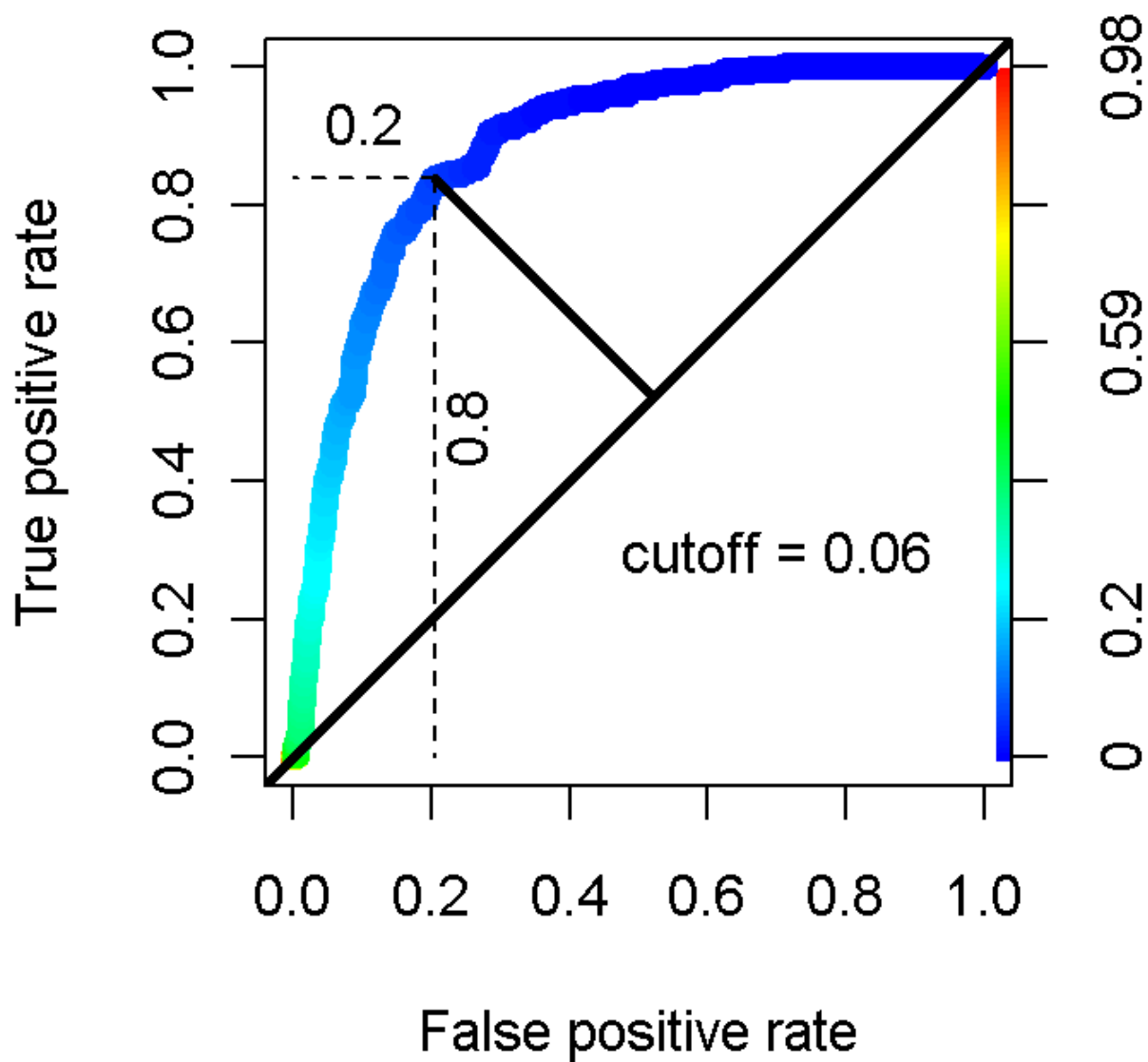


Figure 527: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

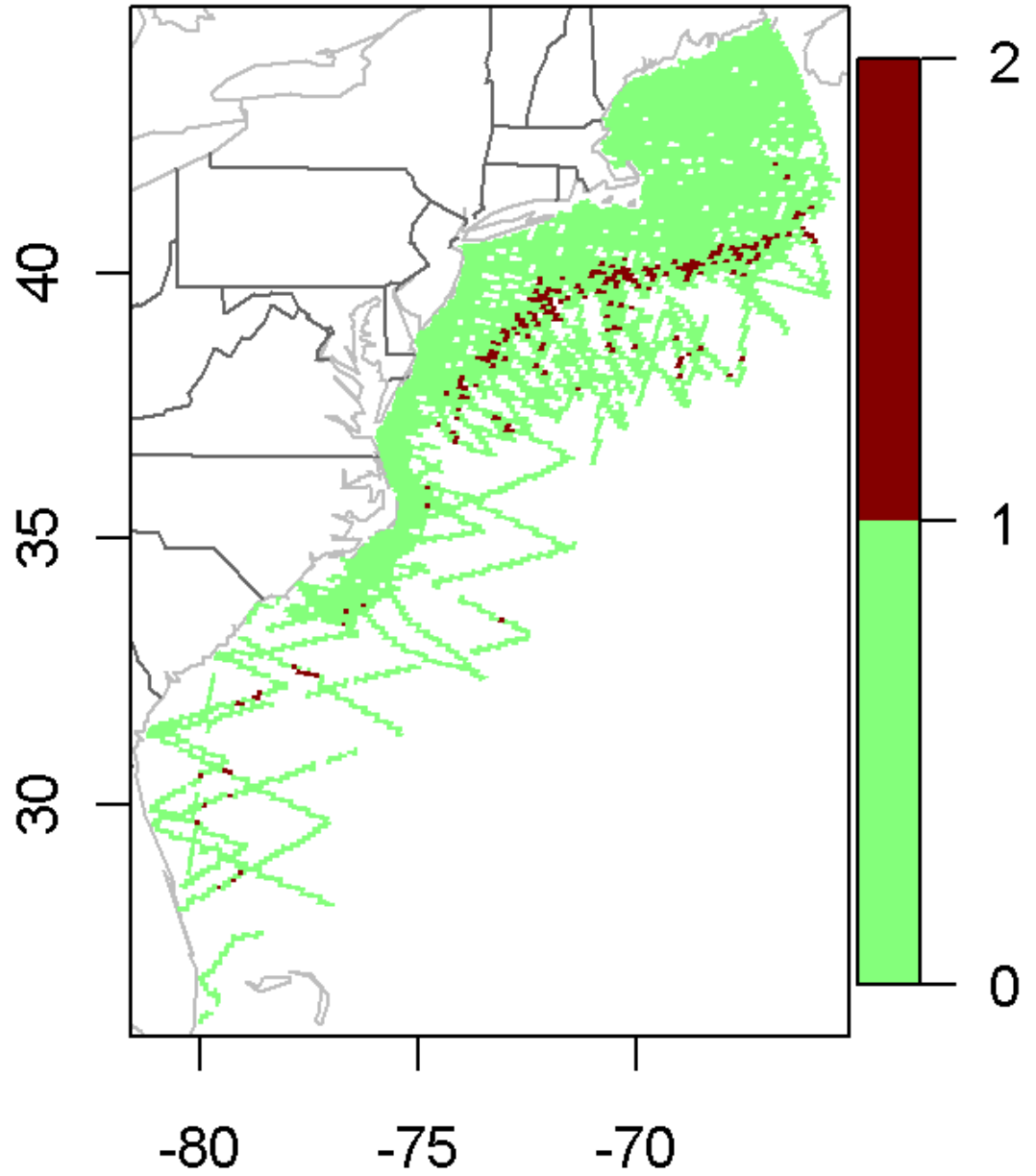


Figure 528: Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

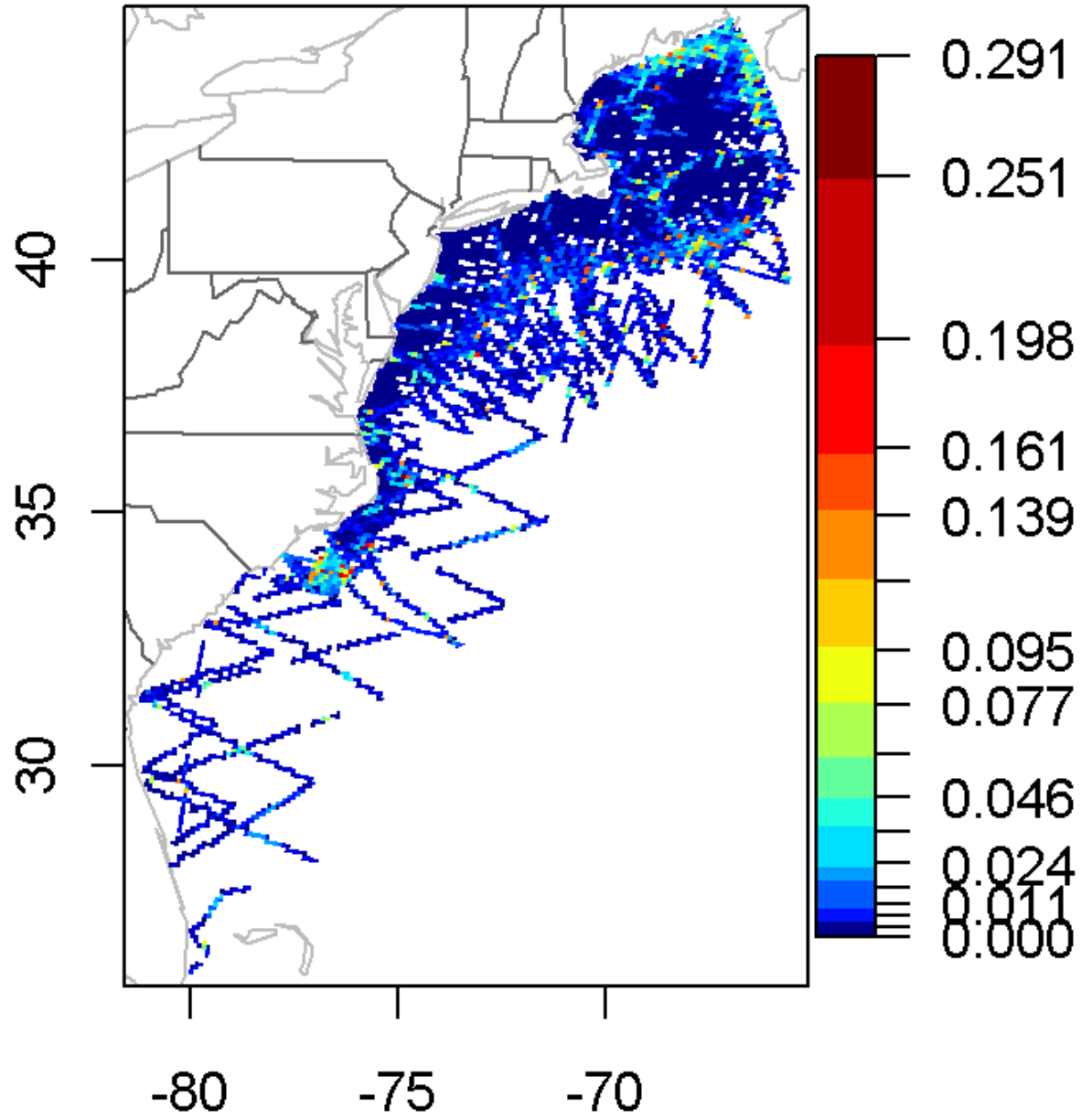


Figure 529: Map of effort(hours/km²) by cell summed through time for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

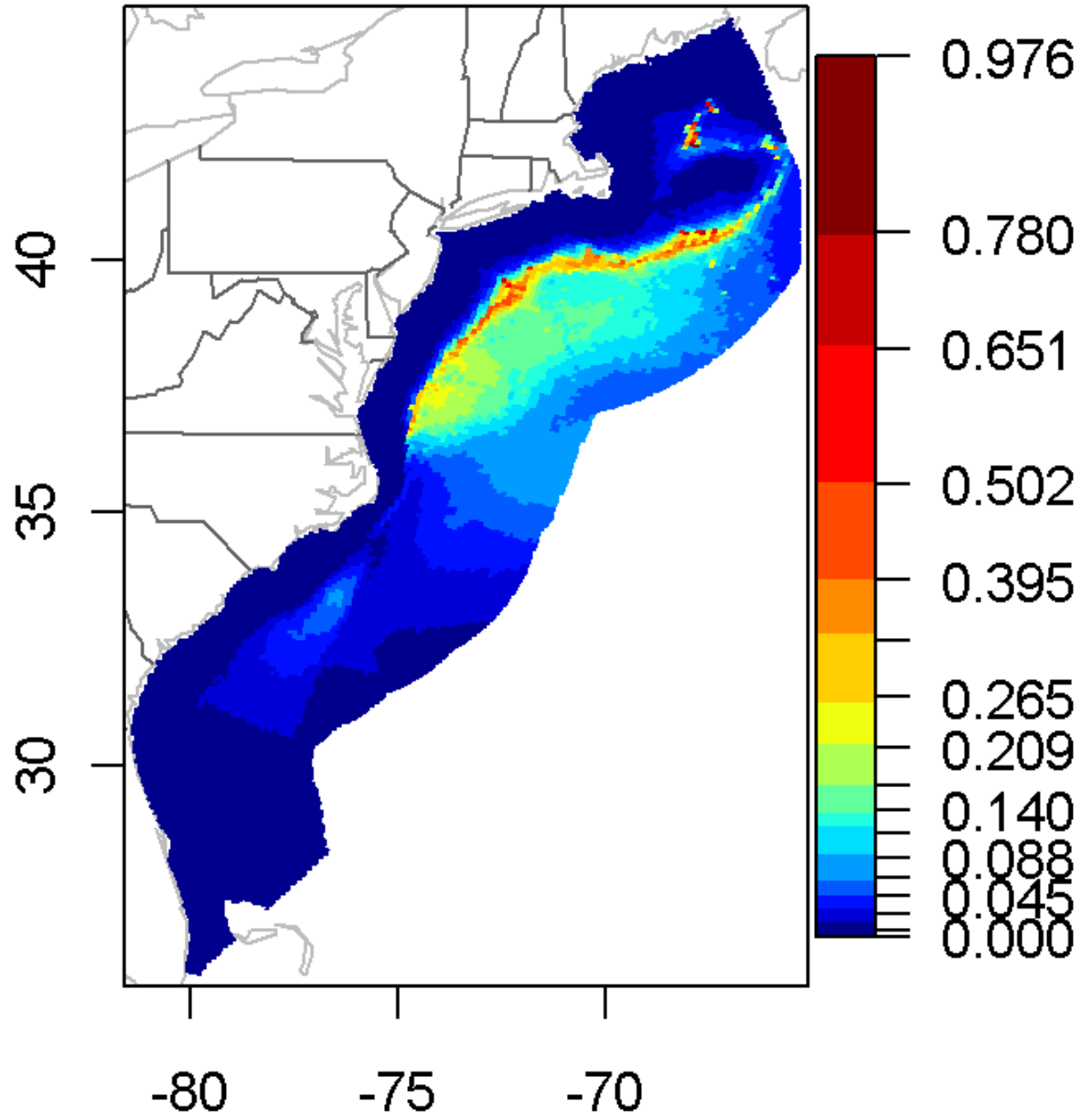


Figure 530: Map of mean predicted habitat for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

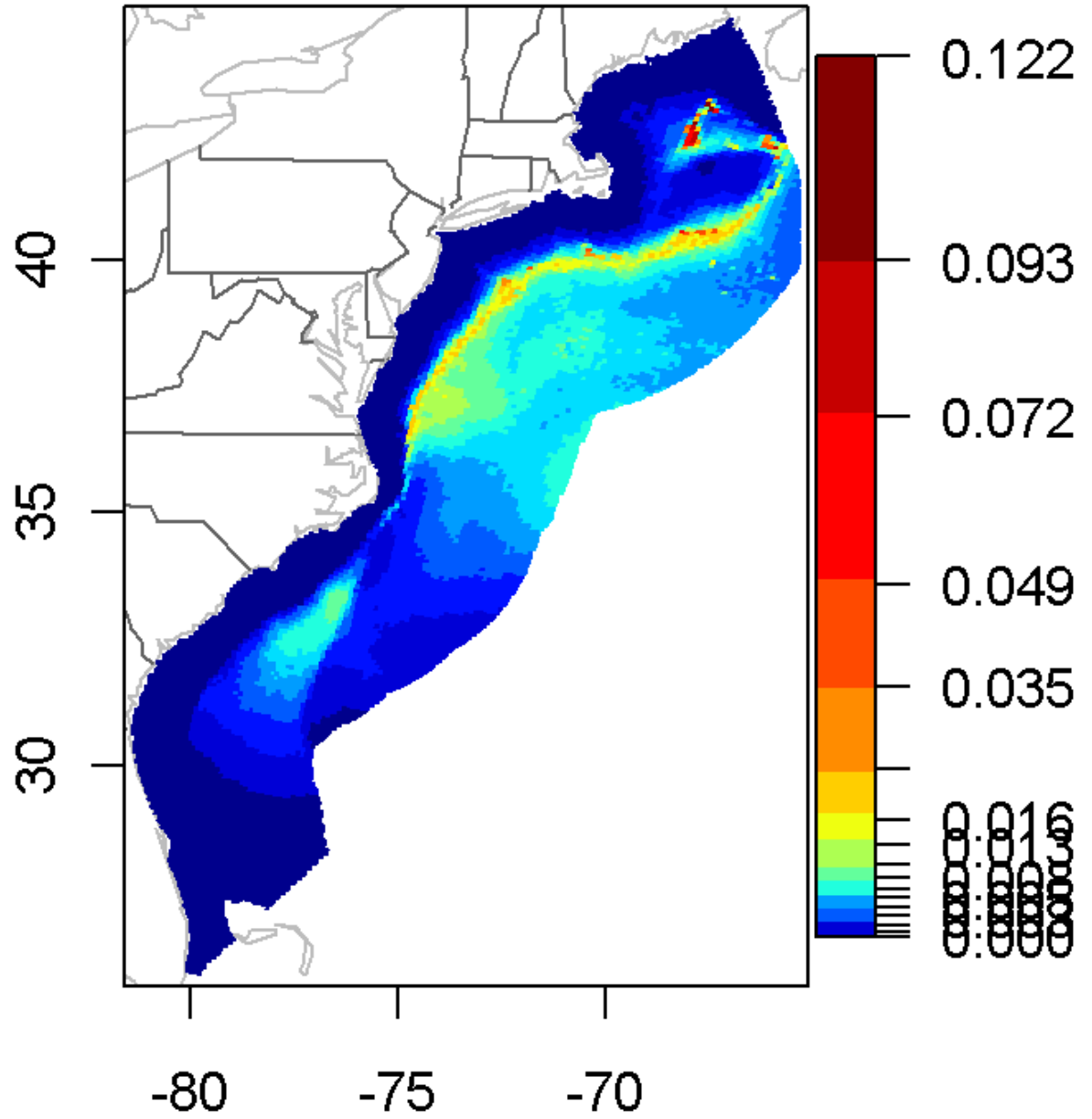


Figure 531: Map of standard error of habitat for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

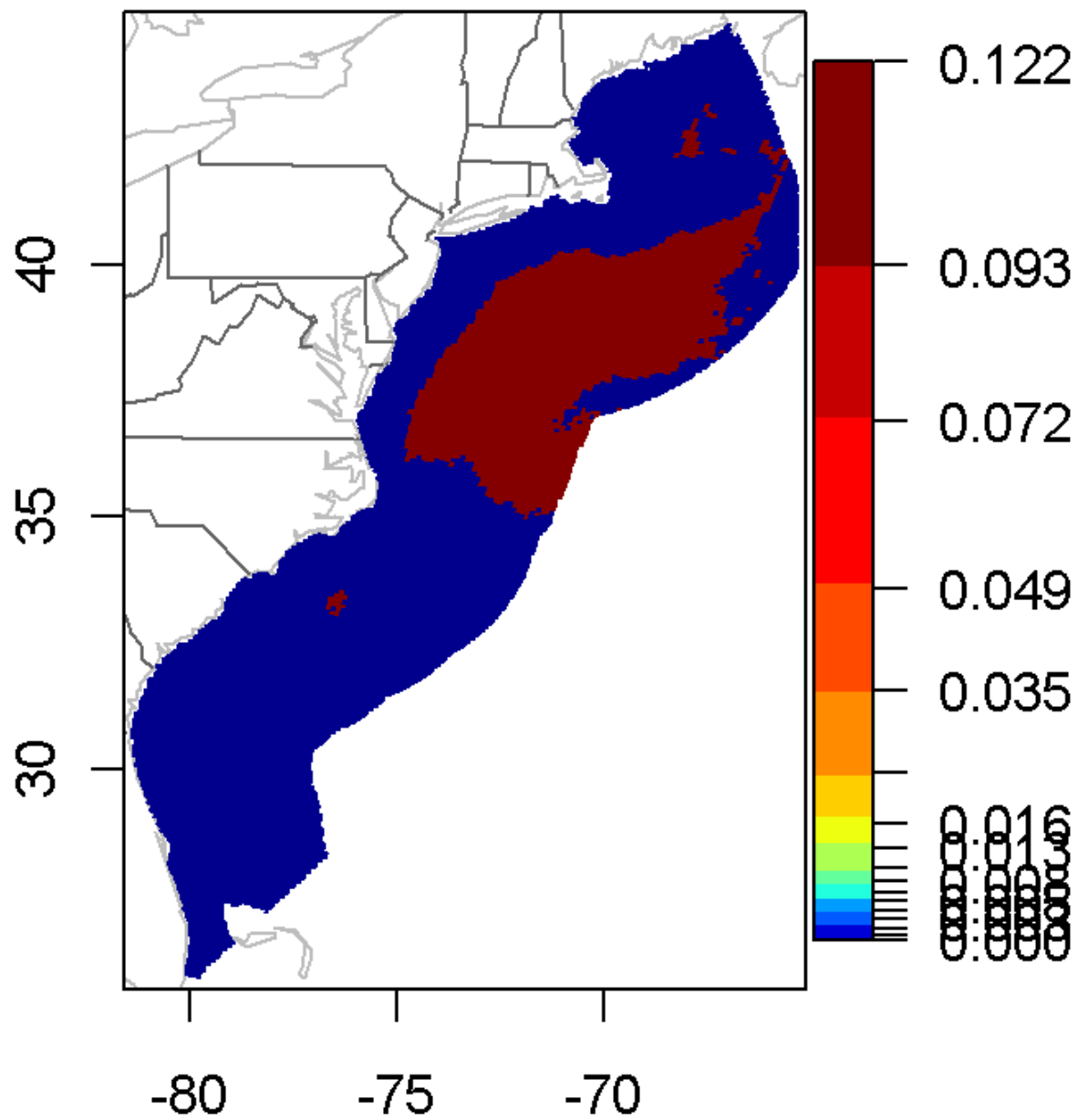


Figure 532: Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'summer' season in 'east2' region.

11.3.2 gomex2

Modelrun identifier: duke_06_gg3_summer_gomex2

Date generated: 2008-10-21 11:26:32

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 50: Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	31
Number.absences	1373
GAM.converged	TRUE
R.squared	0.319821
Deviance.explained	0.180552
ROC.optimum	0.271312
Maximum.fit	0.00430152
Maximum.prediction	0.465074

Model text summary...

```
duke_06_gg3_summer_gomex2 run on Tue Oct 21 11:21:34 2008
  provider:duke, version:06, guild:Risso's dolphin (gg3), season:'summer', region:gomex2

max.fit:0.271312, max.prediction:0.465074, ROC.optimum:0.004302

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -4.457      0.143   -31.17   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  0.8973   1.397  7.328  0.00273 **
s(log(d2shelf)) 1.7808   2.281 27.498  8.25e-14 ***
s(log(d2coast)) 1.9750   2.475 32.780   < 2e-16 ***
s(sst)         0.8501   1.350  5.025  0.01582 *
s(lat)         1.9481   2.448 68.511   < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.32   Deviance explained = 18.1%
GCV score = 0.0023582   Scale est. = 0.0023326   n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13   Min.   : 13.0   Min.   : 901   Min.   : 5700   Min.   :25.35   Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8   1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75   1st Qu.:26.68
              Median :5134 Median : 654.0   Median : 45466 Median :146059 Median :28.50   Median :27.90
              Mean   :4686 Mean   : 899.5   Mean   : 59670 Mean   :161835 Mean   :28.50   Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0   3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25   3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0   Max.   :249222 Max.   :386037 Max.   :31.20   Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :27.67   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48   1st Qu.:26.28
              Median :4110 Median : 433.5   Median : 71100 Median :157258 Median :29.55   Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:7.438e-16	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.000
1st Qu.	:1861	1st Qu.	:3.926e-03	1st Qu.	:1.800e-03	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.000
Median	:4110	Median	:1.748e-02	Median	:5.276e-03	Median	:0.000e+00	Median	:5.100e-03	Median	:1.000
Mean	:3997	Mean	:3.726e-02	Mean	:9.929e-03	Mean	:2.899e-02	Mean	:1.213e-02	Mean	:0.742
3rd Qu.	:6015	3rd Qu.	:4.656e-02	3rd Qu.	:1.298e-02	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.000
Max.	:8351	Max.	:4.651e-01	Max.	:1.109e-01	Max.	:1.000e+00	Max.	:2.534e-01	Max.	:1.000
						NA's	:5.568e+03	NA's	:5.568e+03		

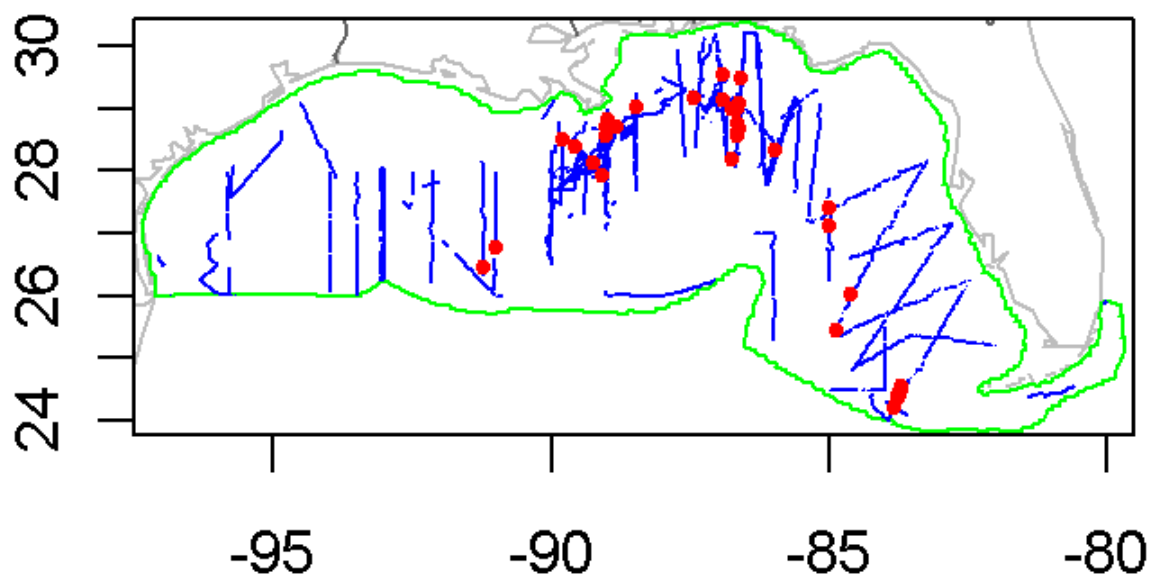


Figure 533: Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

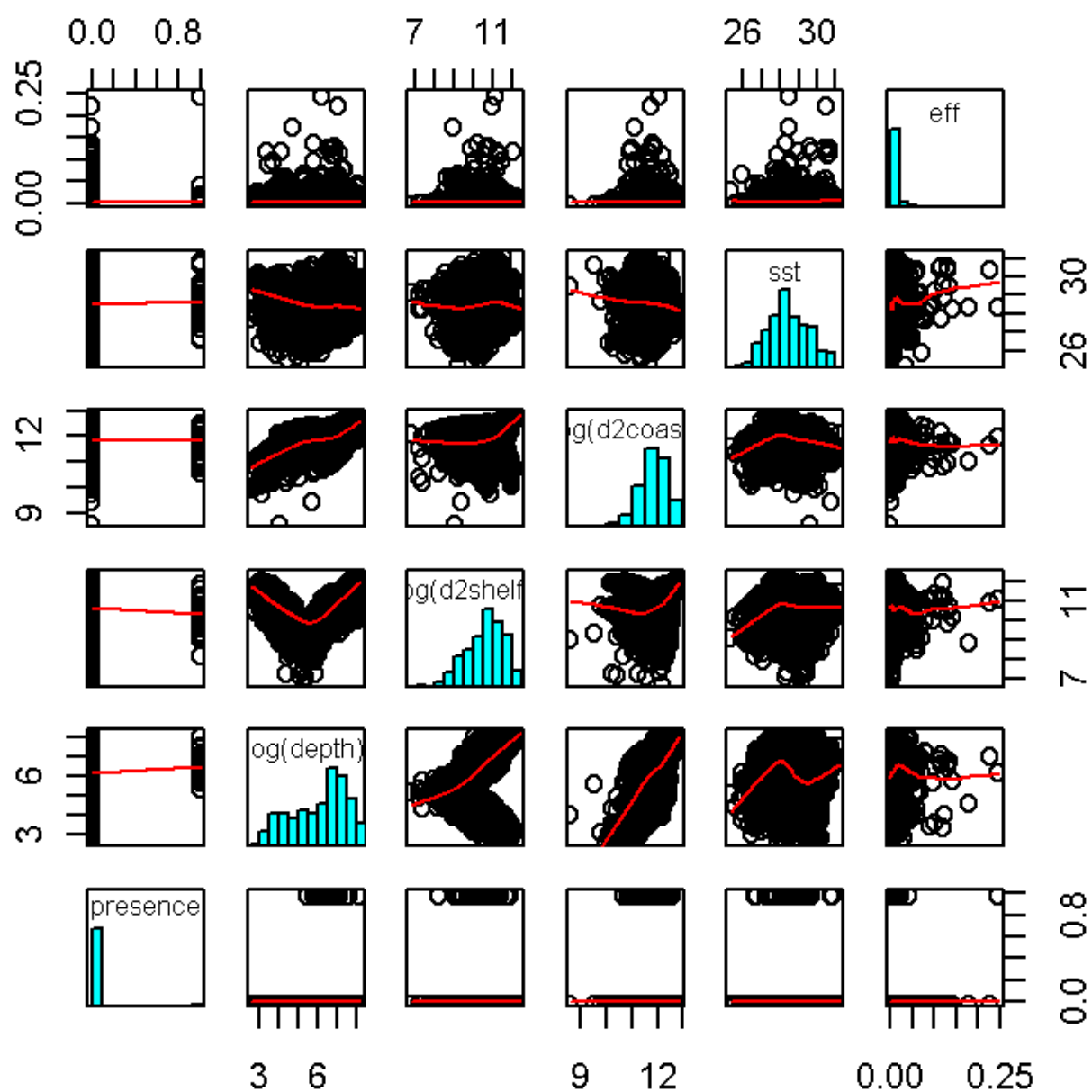


Figure 534: Pairs plot of input variables for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

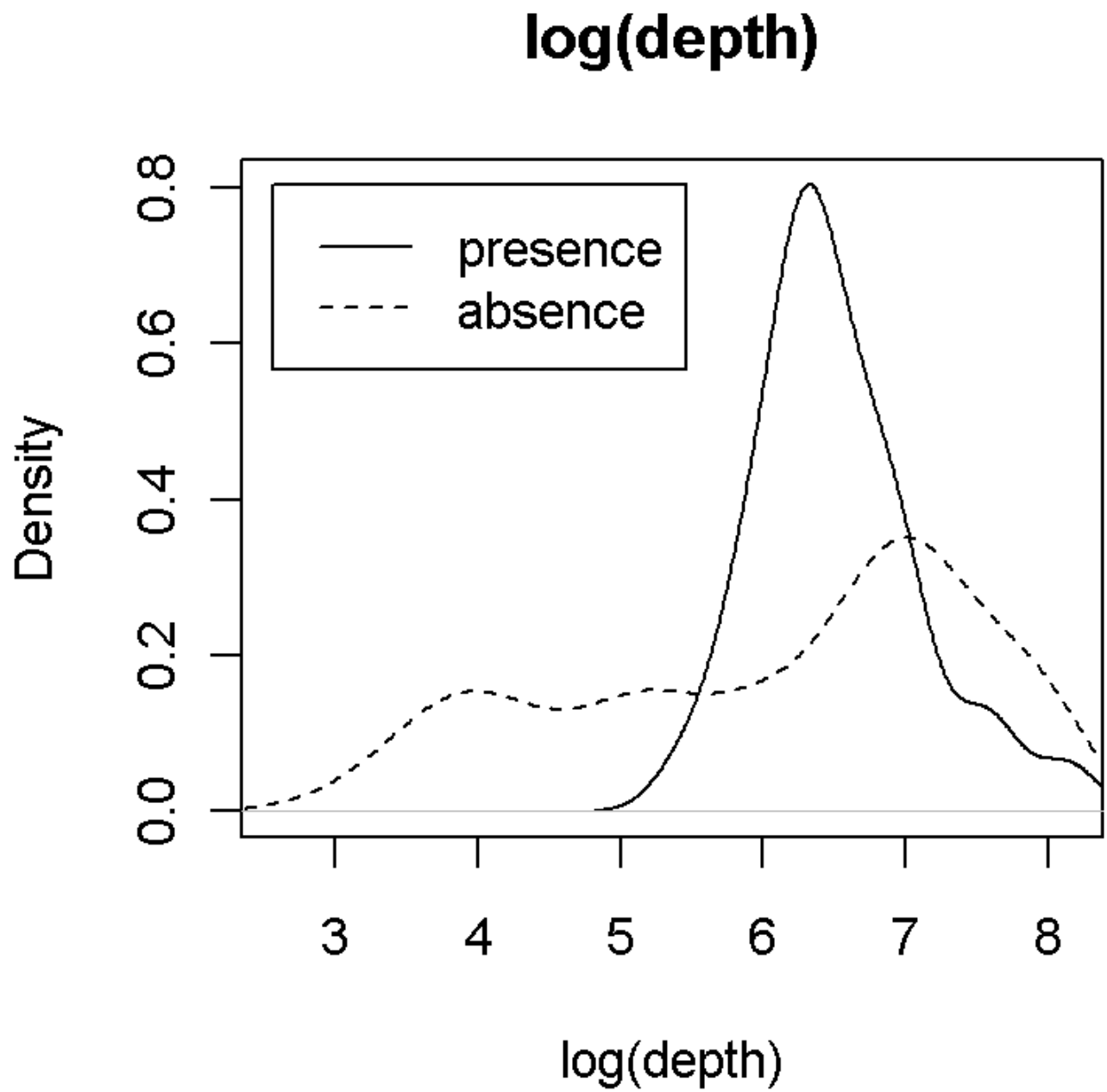


Figure 535: Density histogram of depth log(meters) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

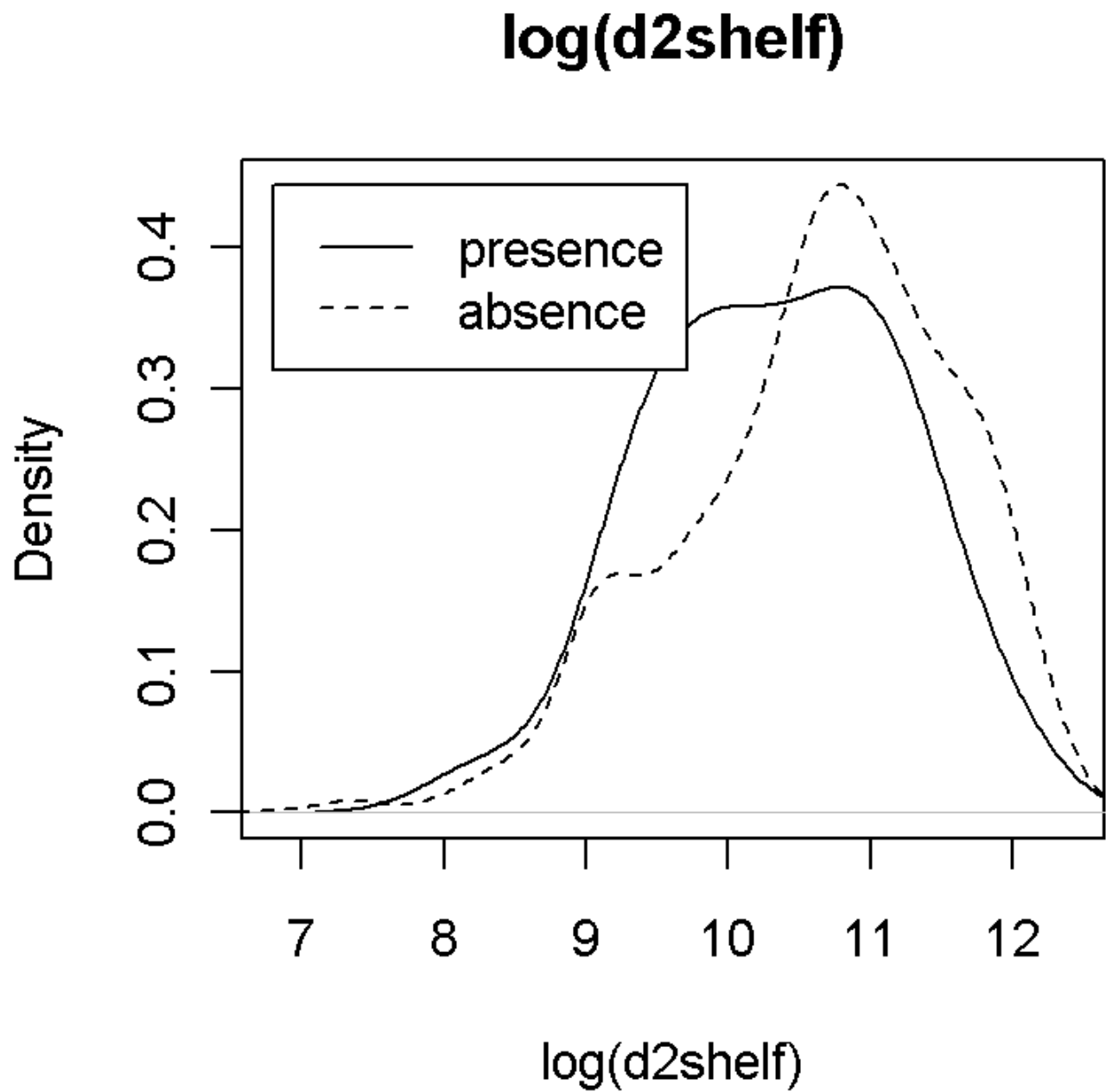


Figure 536: Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

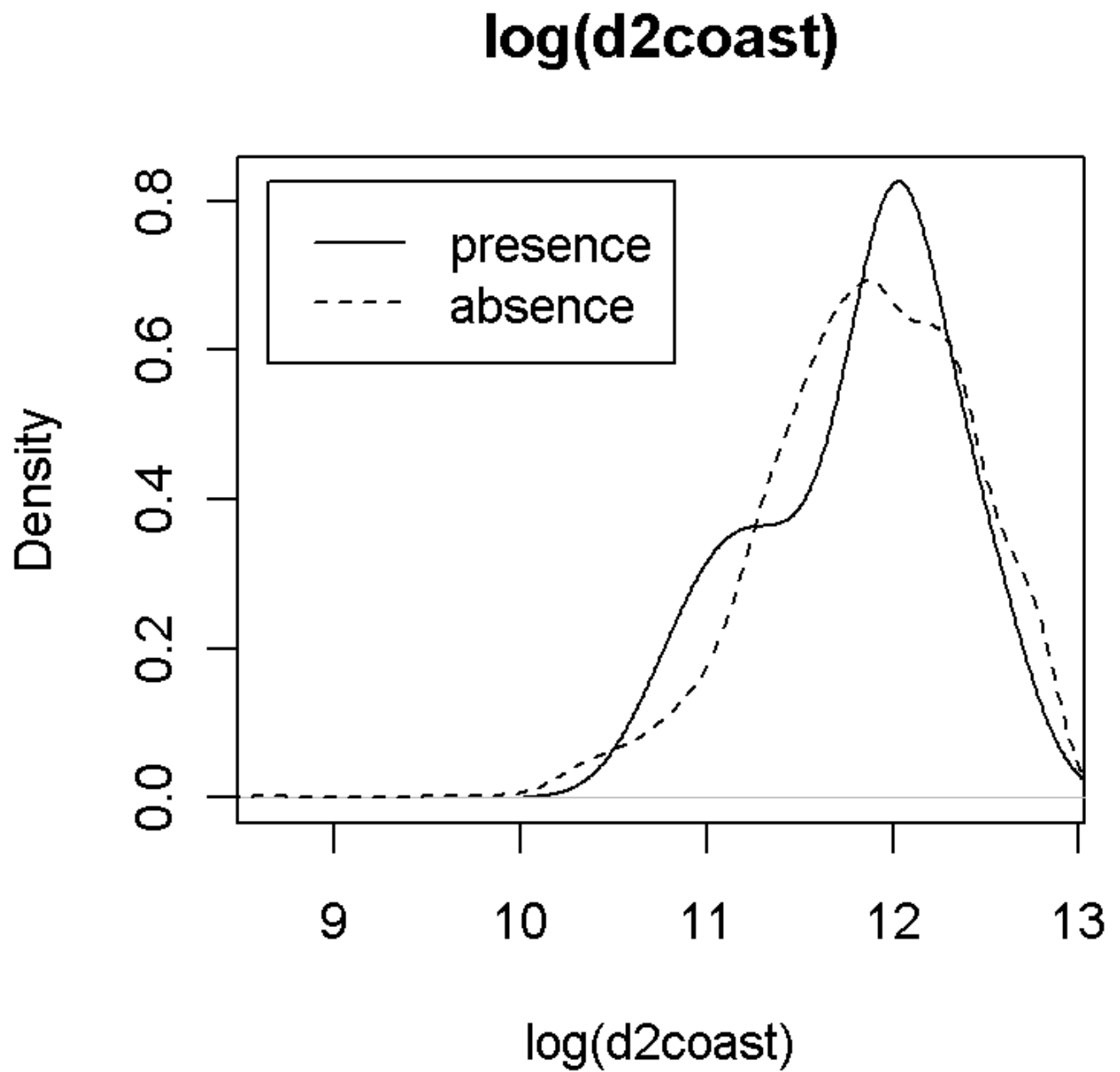


Figure 537: Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

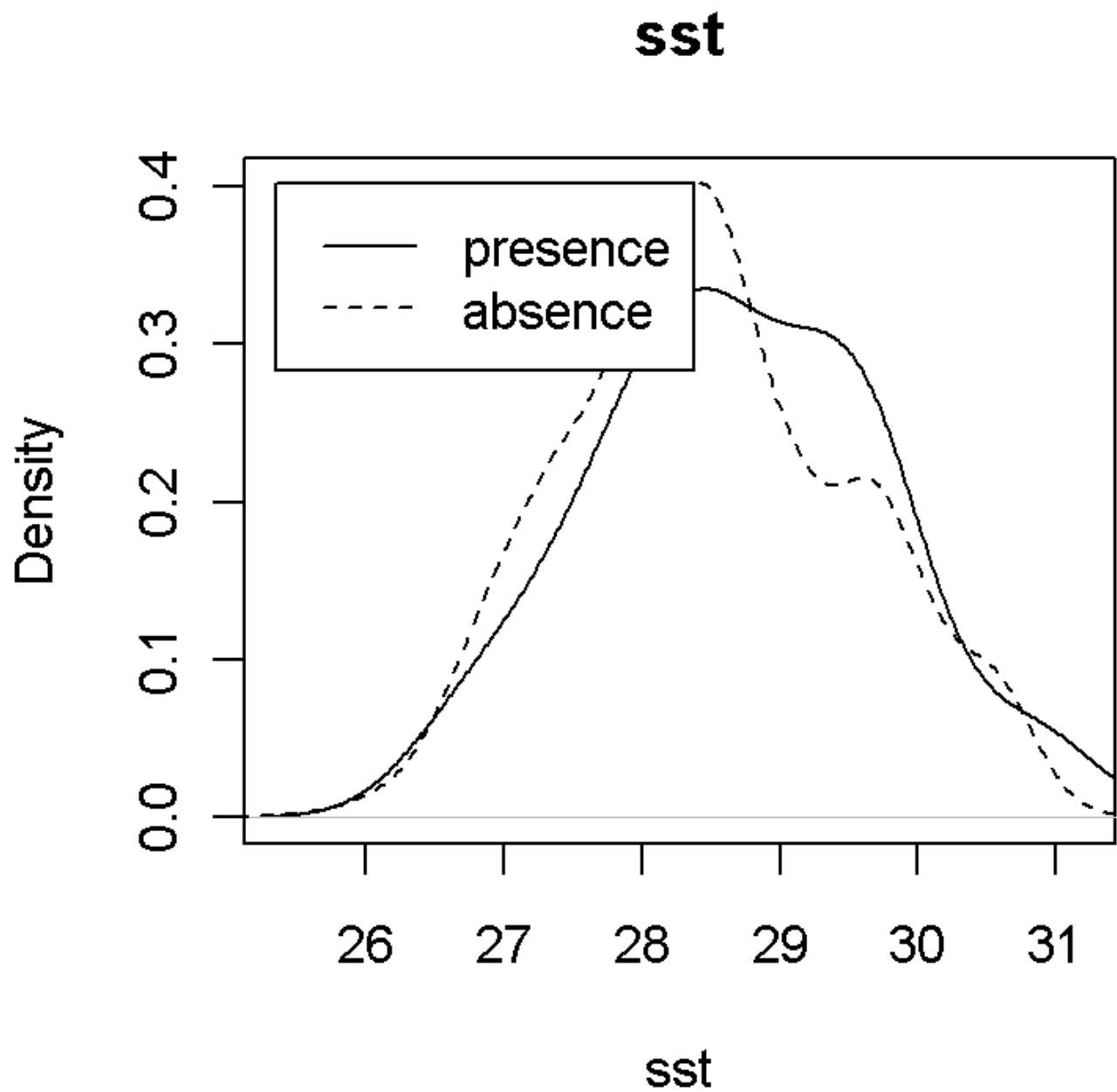


Figure 538: Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

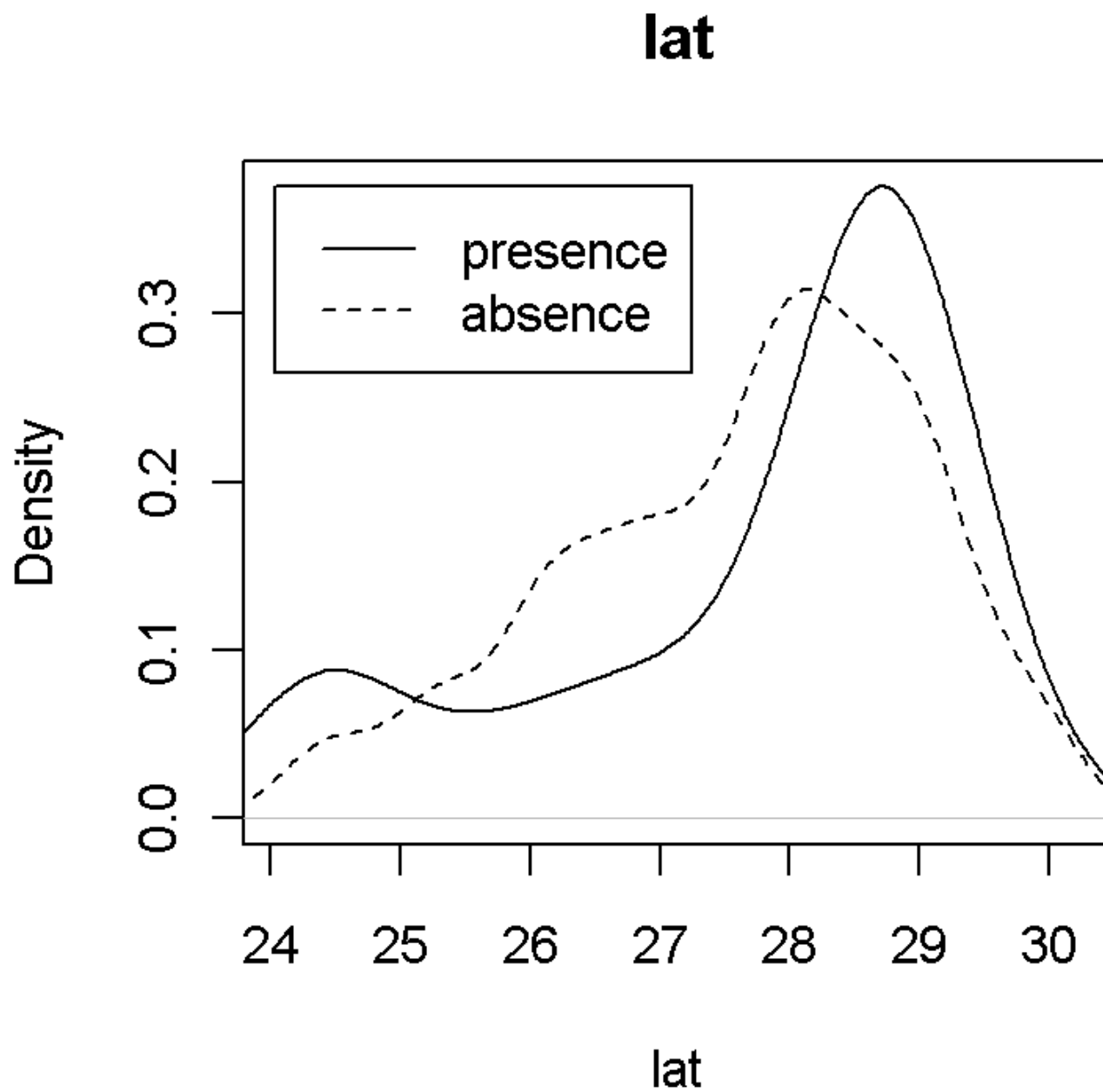


Figure 539: Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

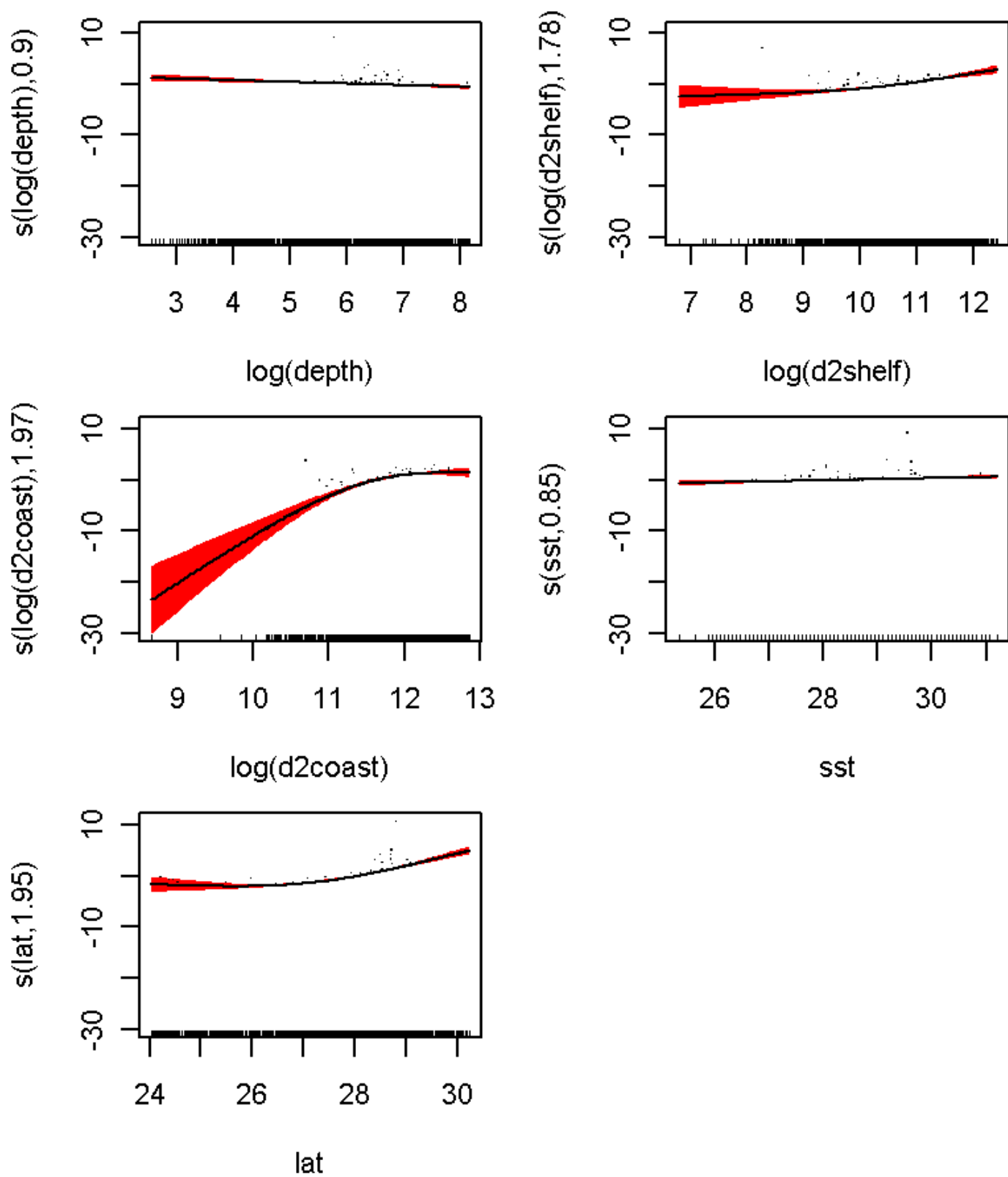


Figure 540: Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

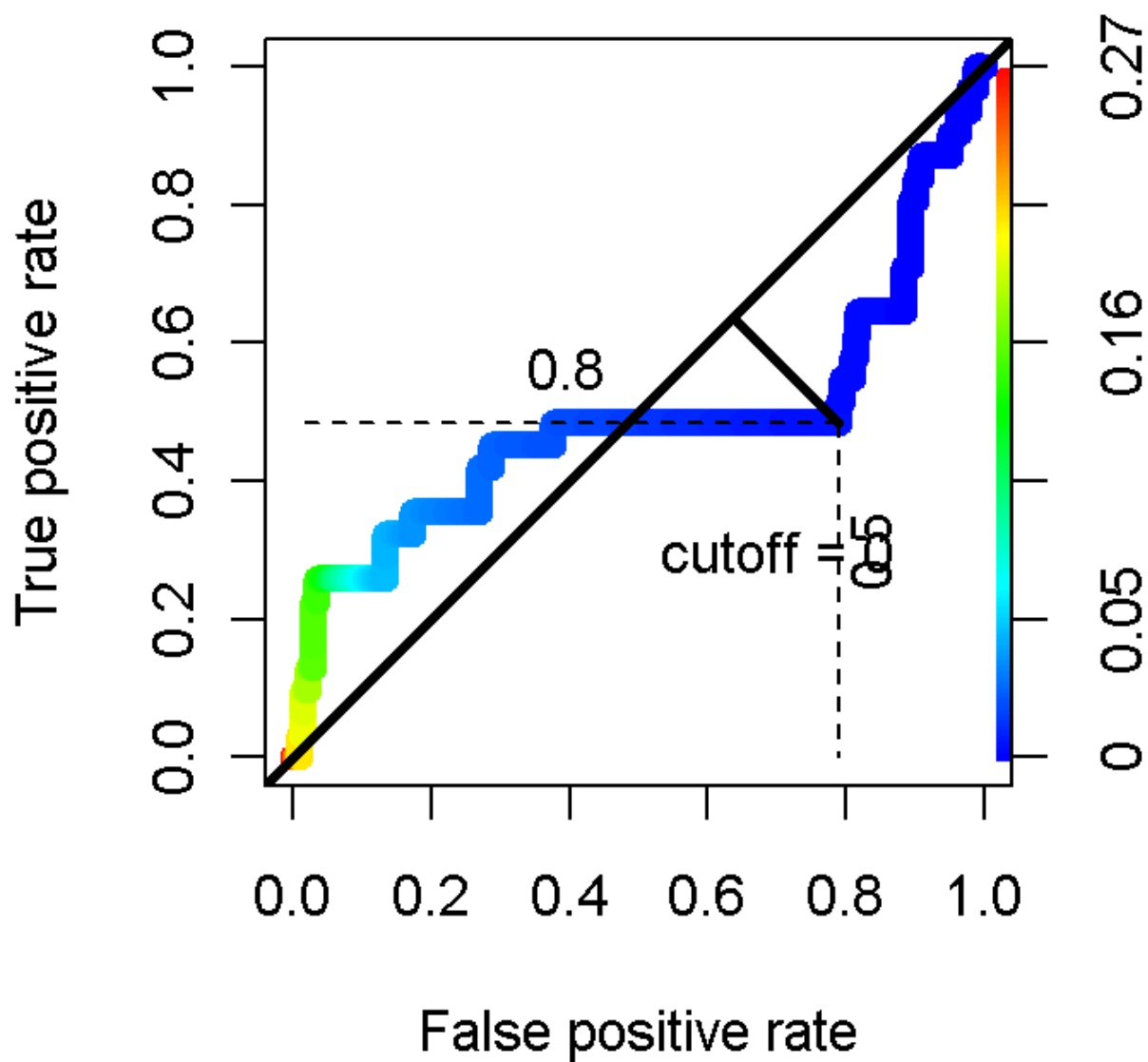


Figure 541: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

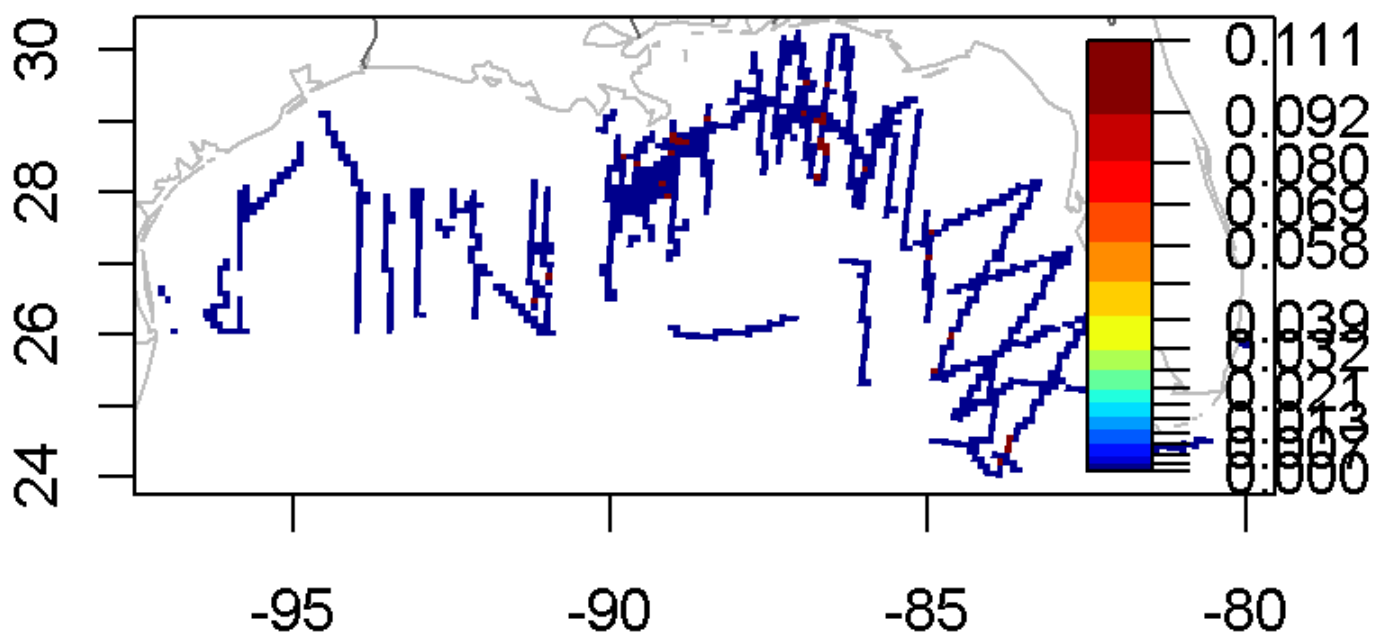


Figure 542: Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

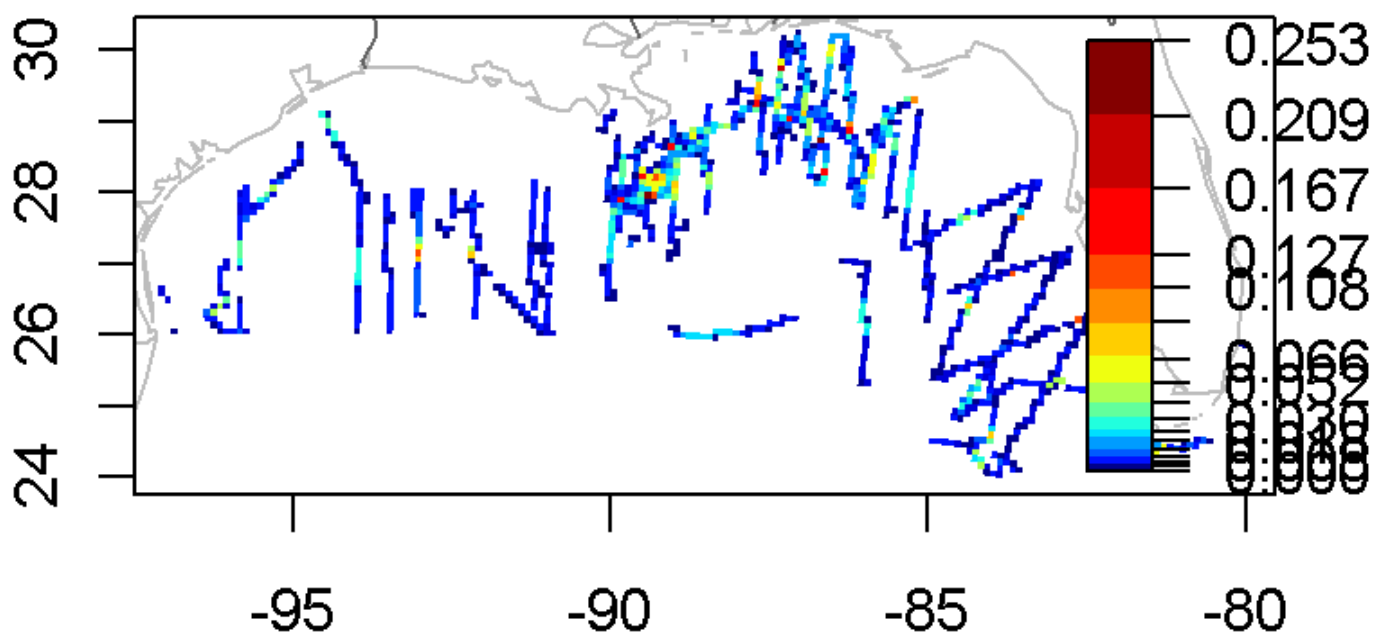


Figure 543: Map of effort(hours/km²) by cell summed through time for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

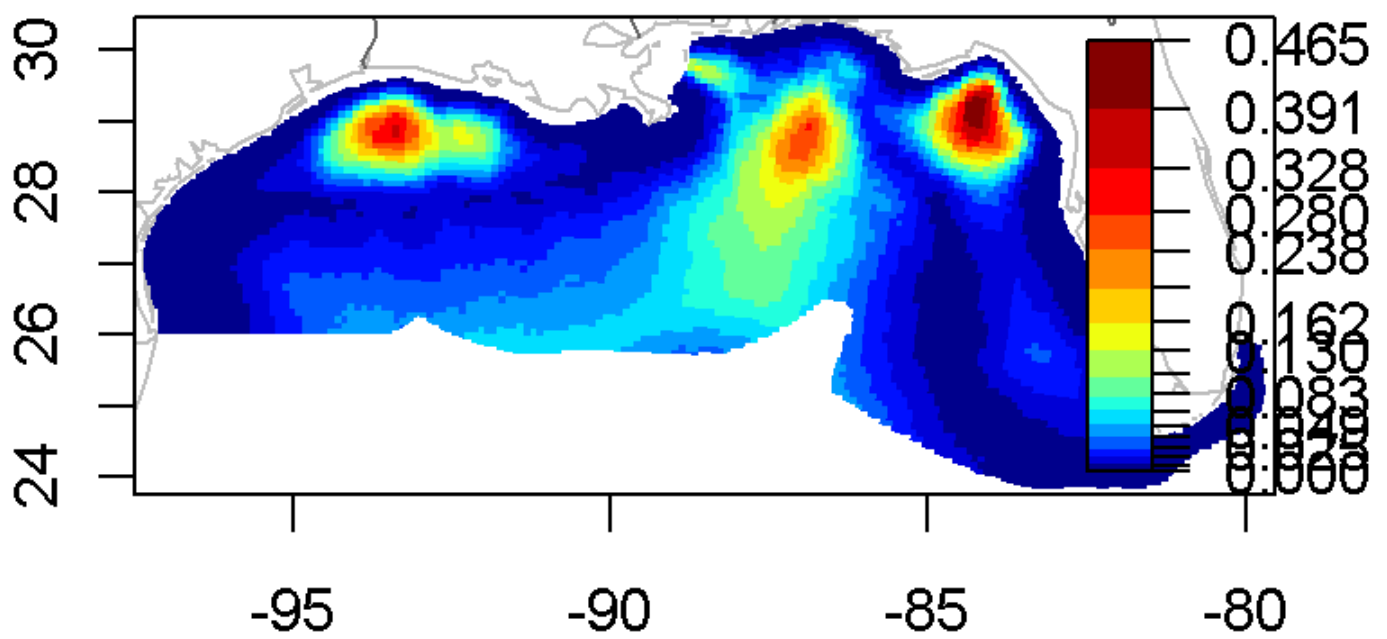


Figure 544: Map of mean predicted habitat for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

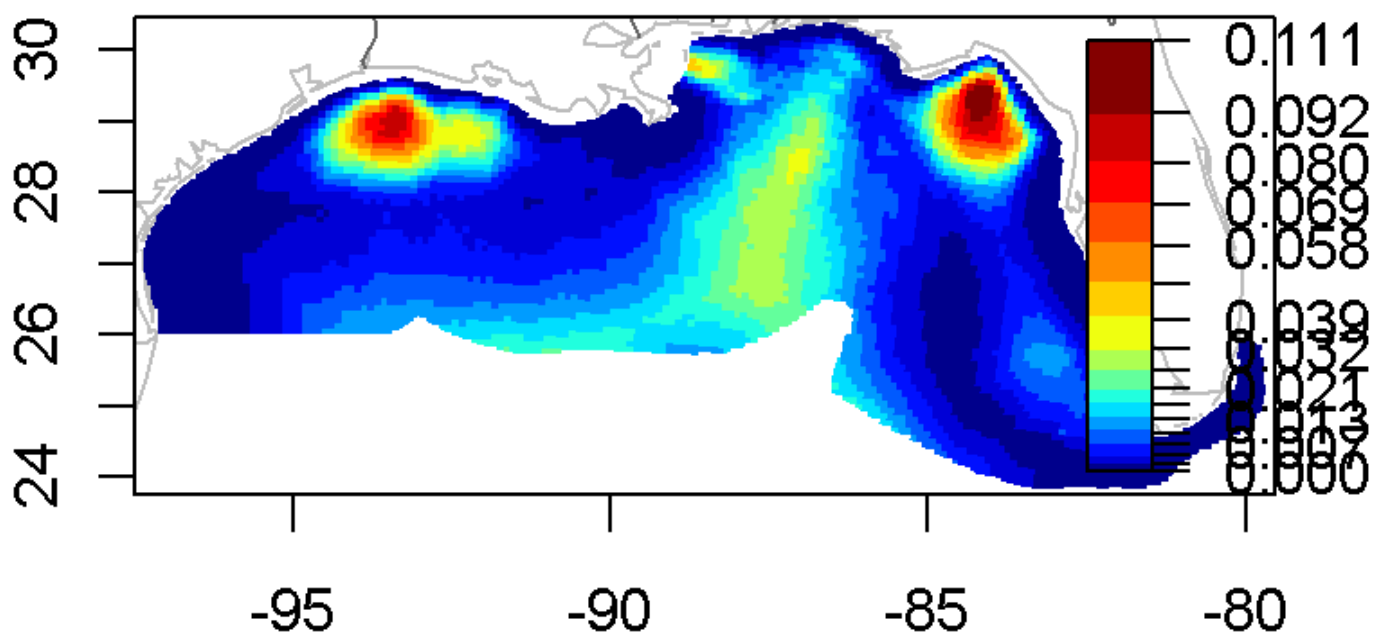


Figure 545: Map of standard error of habitat for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

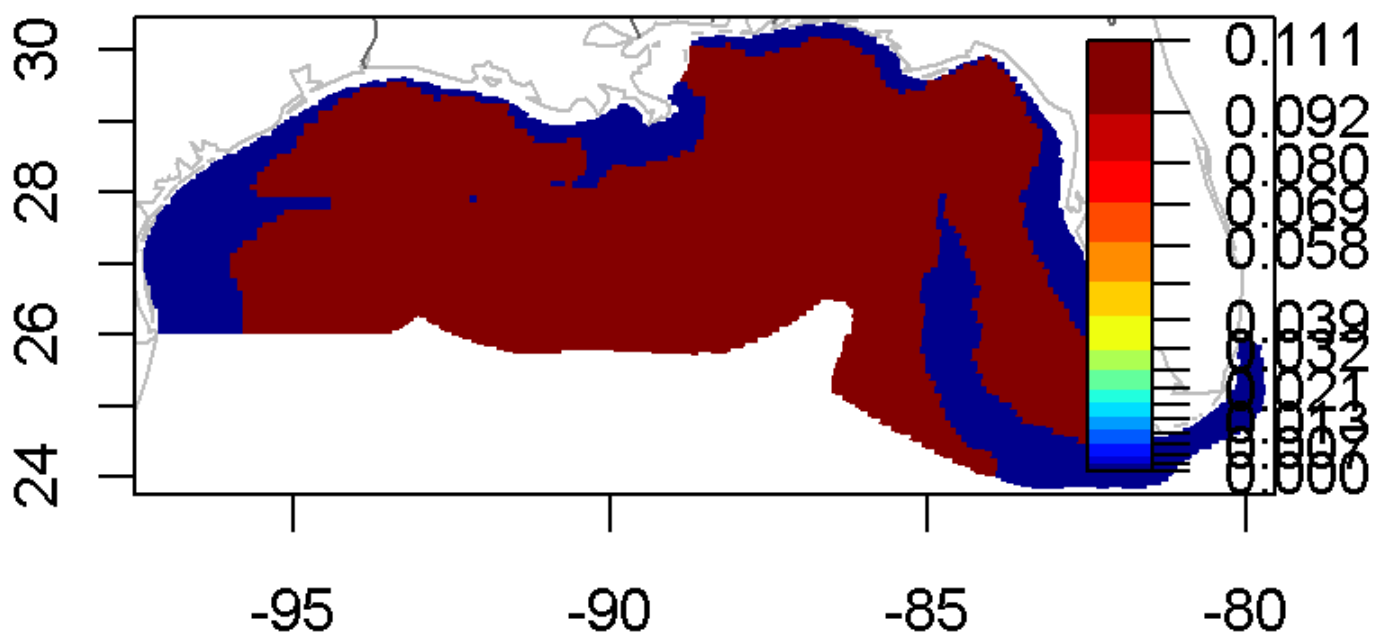


Figure 546: Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'summer' season in 'gomex2' region.

11.4 winter

11.4.1 east2

Modelrun identifier: duke_06_gg3_winter_east2

Date generated: 2008-10-21 15:05:22

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 51: Summary for duke(6) GAM model: for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

	Value
Number.presences	7
Number.absences	3895
GAM.converged	TRUE
R.squared	0.992138
Deviance.explained	0.937588
ROC.optimum	0.999805
Maximum.fit	0.00298052
Maximum.prediction	1

Model text summary...

```
duke_06_gg3_winter_east2 run on Tue Oct 21 15:03:32 2008
  provider:duke, version:06, guild:Risso's dolphin (gg3), season:'winter', region:east2

max.fit:0.999805, max.prediction:1.000000, ROC.optimum:0.002981

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -12605.7      623.9   -20.20  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.999e+00  2.499   585.9 <2e-16 ***
s(log(d2shelf)) 5.857e-08  0.500  4.16e-05  0.937
s(log(d2coast)) 2.688e-07  0.500  2.70e-05  0.944
s(sst)         1.988e+00  2.488   270.0 <2e-16 ***
s(lat)         1.653e+00  2.153   186.9 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.992   Deviance explained = 93.8%
GCV score = 3.8672e-05   Scale est. = 3.8475e-05   n = 2337

summary(dat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2: 844    Min.    : 1654    Min.    :  4.0    Min.    :  995    Min.    : 1471    Min.    :  2.654    Min.    :25.93
se2:3058    1st Qu.: 9280    1st Qu.: 19.0    1st Qu.: 18575    1st Qu.: 32272    1st Qu.: 13.500    1st Qu.:32.77
              Median :10479    Median : 28.0    Median : 38452    Median : 53042    Median : 19.208    Median :34.02
              Mean   : 9475    Mean   :153.2    Mean   :44646    Mean   :63558    Mean   :17.745    Mean   :33.66
              3rd Qu.:10987    3rd Qu.: 41.0    3rd Qu.: 65053    3rd Qu.: 78087    3rd Qu.: 21.825    3rd Qu.:34.80
              Max.   :12763    Max.   :3612.0    Max.   :274566    Max.   :348168    Max.   :26.400    Max.   :38.20
              NA's    :      14    NA's    :  14    NA's    :1561.000

summary(newdat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685    Min.    : 1633    Min.    :  4    Min.    :  5    Min.    : 1259    Min.    :  2.400    Min.    :25.91
se2:4203    1st Qu.: 9145    1st Qu.: 92    1st Qu.: 34042    1st Qu.: 89304    1st Qu.:  9.075    1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :2.194e-16	Min. :0.000e+00	Min. :9.035e-07	Min. :0.00000
1st Qu.: 9145	1st Qu.:2.220e-16	1st Qu.:9.351e-15	1st Qu.:0.000e+00	1st Qu.:7.474e-04	1st Qu.:0.00000
Median :11616	Median :2.220e-16	Median :2.987e-14	Median :0.000e+00	Median :3.451e-03	Median :0.00000
Mean :11171	Mean :2.718e-02	Mean :7.921e-04	Mean :4.881e-03	Mean :9.821e-03	Mean :0.03085
3rd Qu.:14088	3rd Qu.:2.220e-16	3rd Qu.:2.718e-13	3rd Qu.:0.000e+00	3rd Qu.:9.825e-03	3rd Qu.:0.00000
Max. :16560	Max. :1.000e+00	Max. :5.025e-01	Max. :1.000e+00	Max. :2.547e-01	Max. :1.00000
	NA's :6.000e+00	NA's :6.000e+00	NA's :8.454e+03	NA's :8.454e+03	

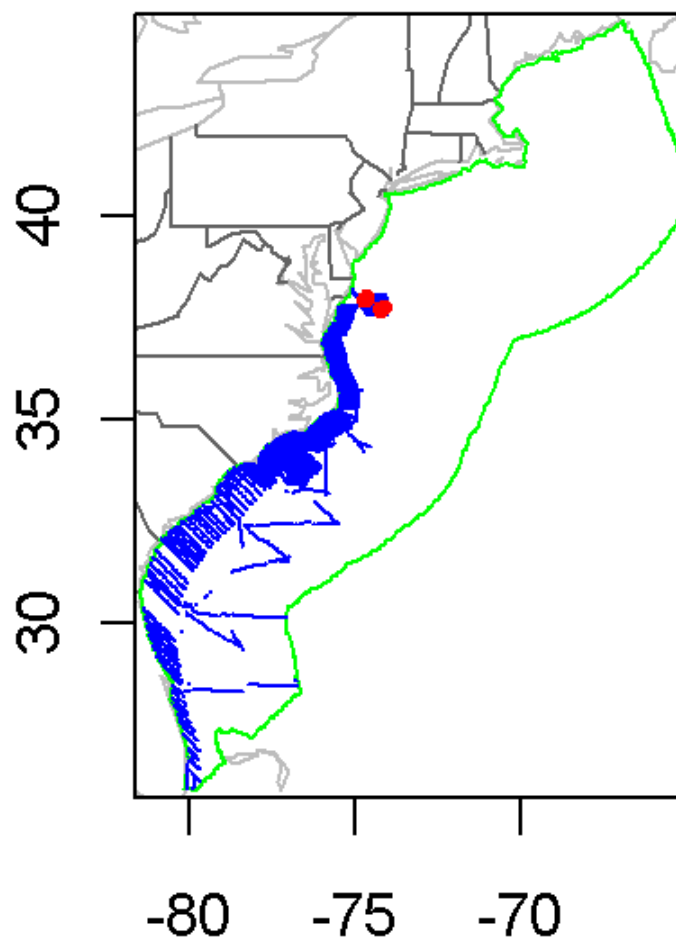


Figure 547: Map of points of observational sightings and tracks of survey effort for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

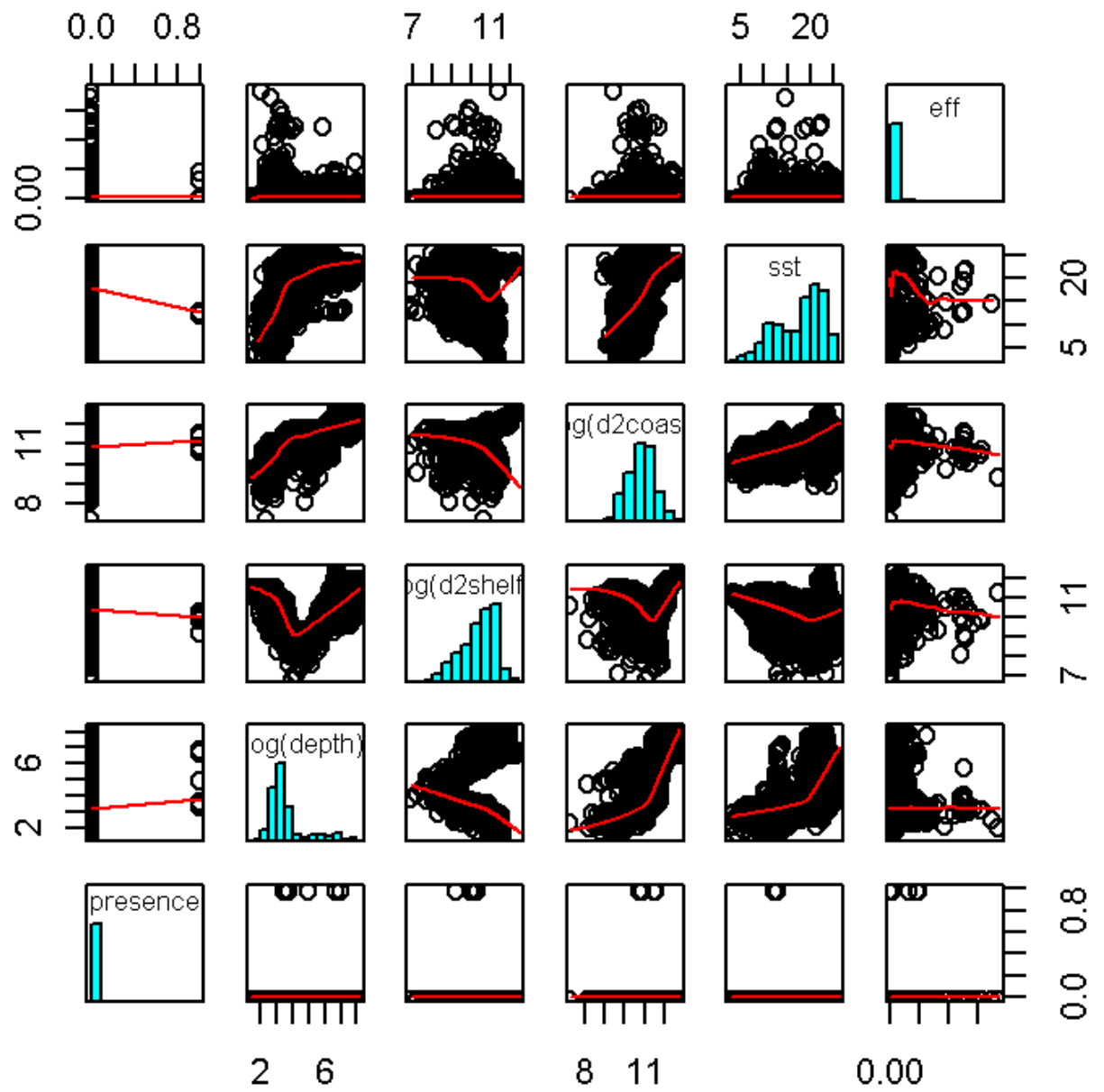


Figure 548: Pairs plot of input variables for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

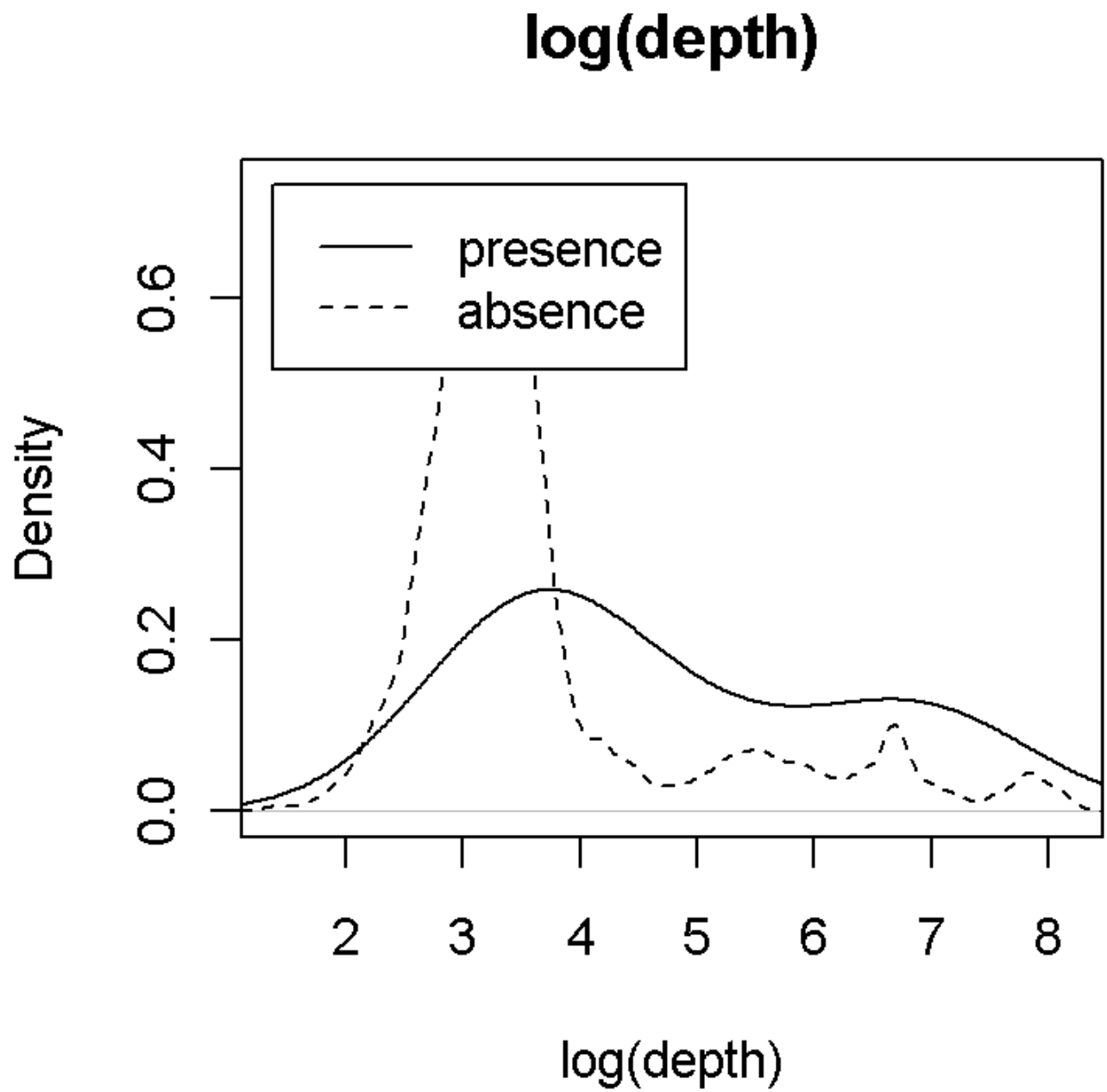


Figure 549: Density histogram of depth $\log(\text{meters})$ for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

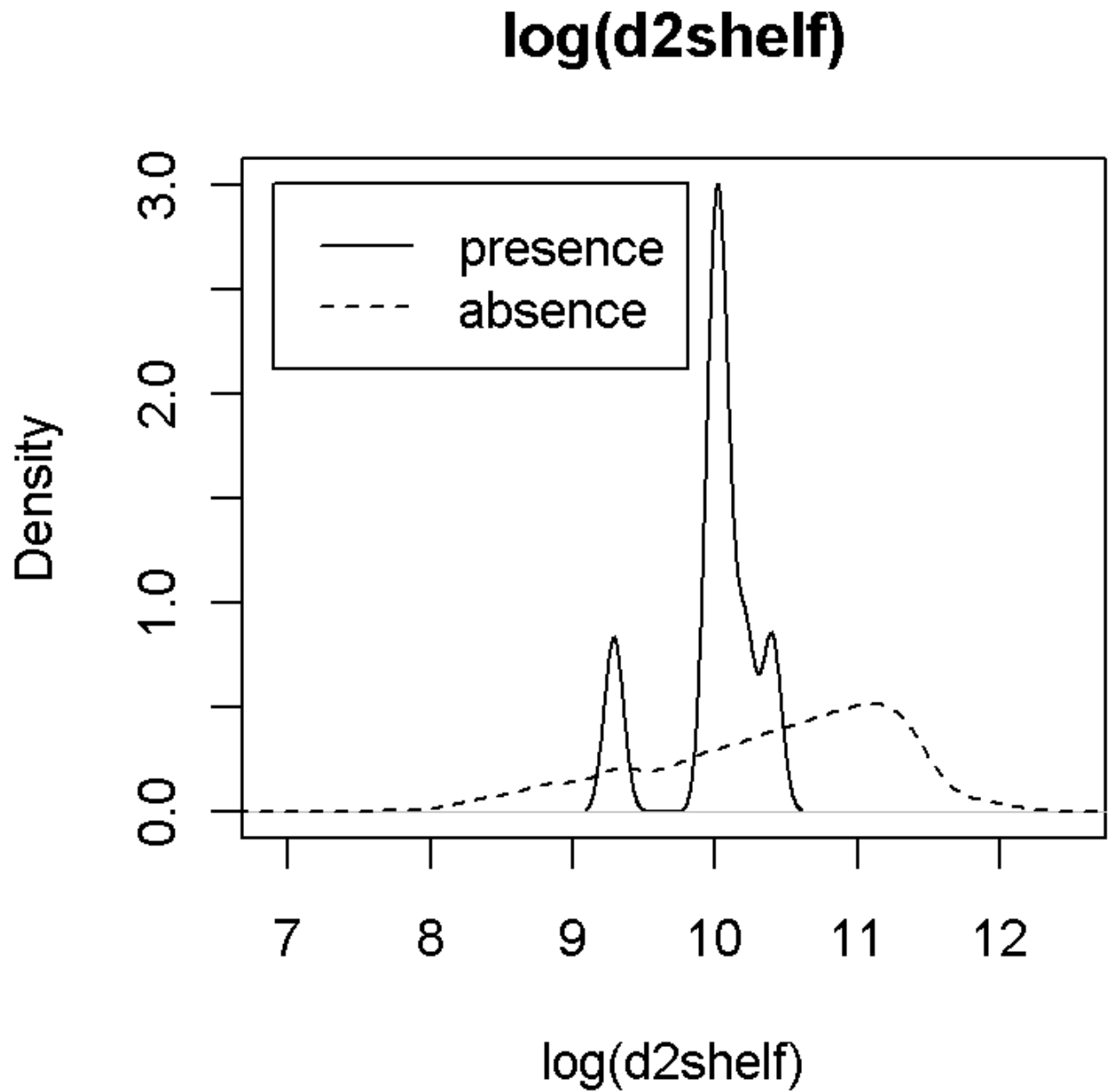


Figure 550: Density histogram of distance to shelf log(meters) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

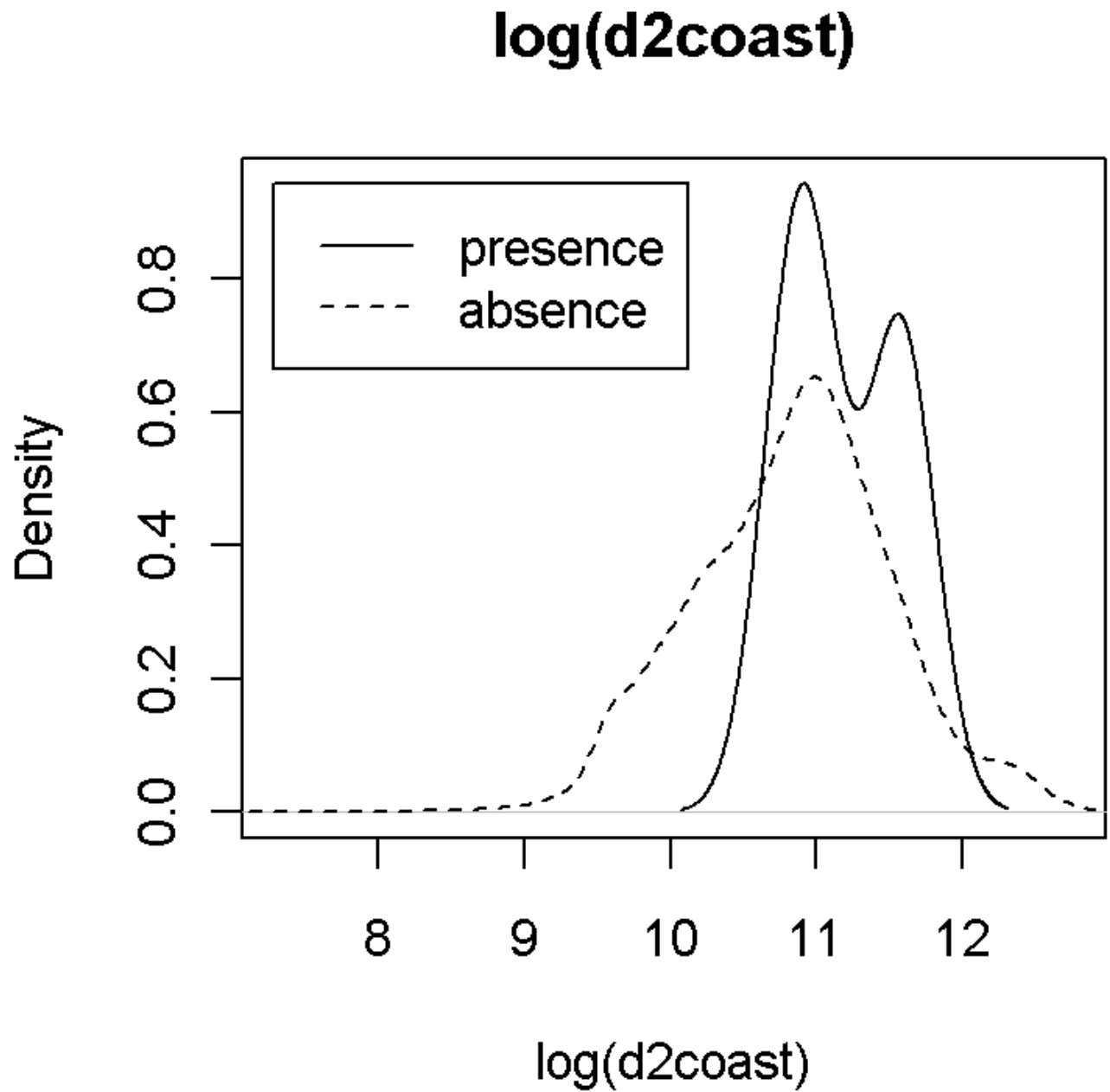


Figure 551: Density histogram of distance to coast log(meters) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

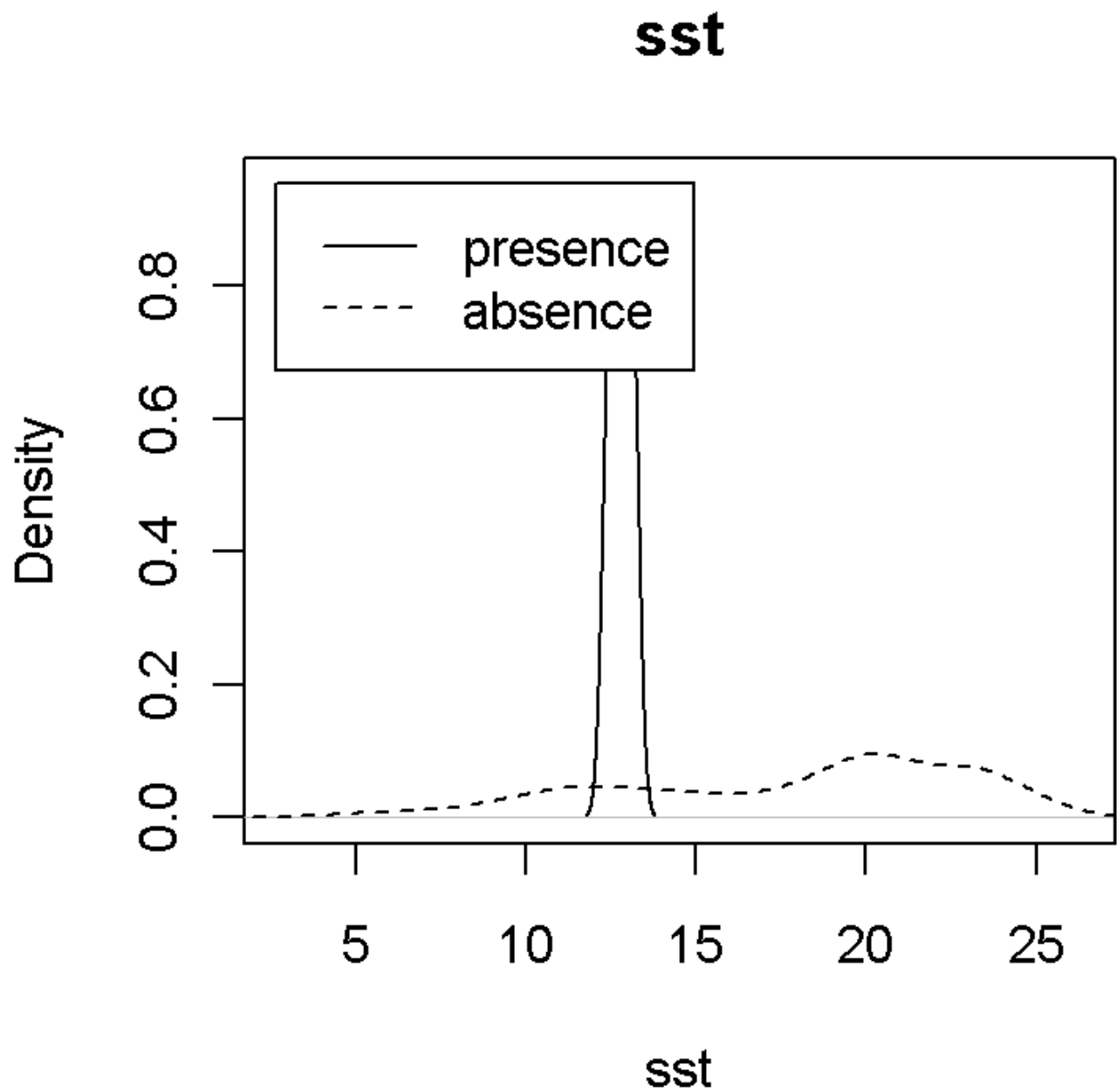


Figure 552: Density histogram of sea-surface temperature (degrees C) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

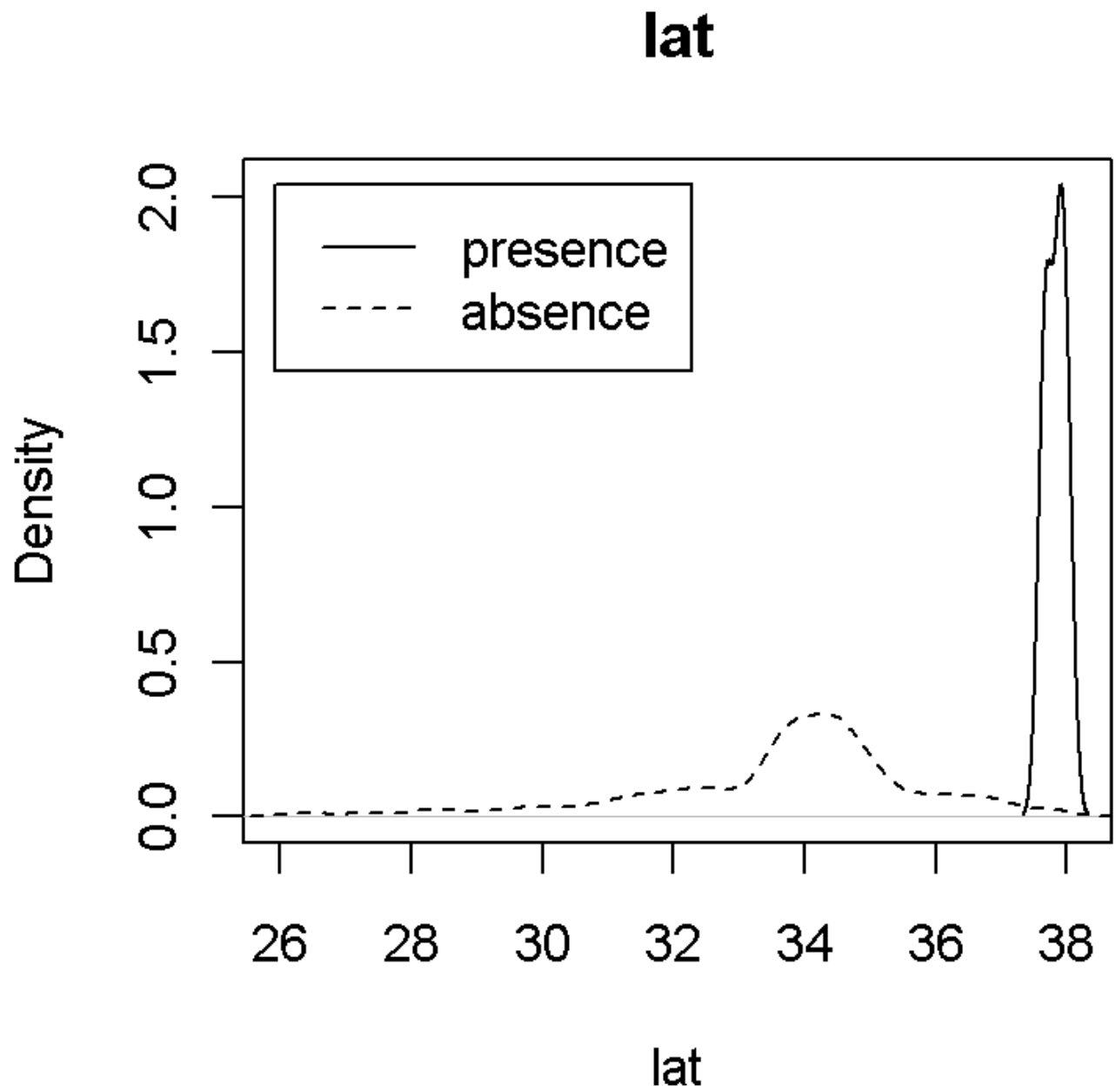


Figure 553: Density histogram of latitude (degrees) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

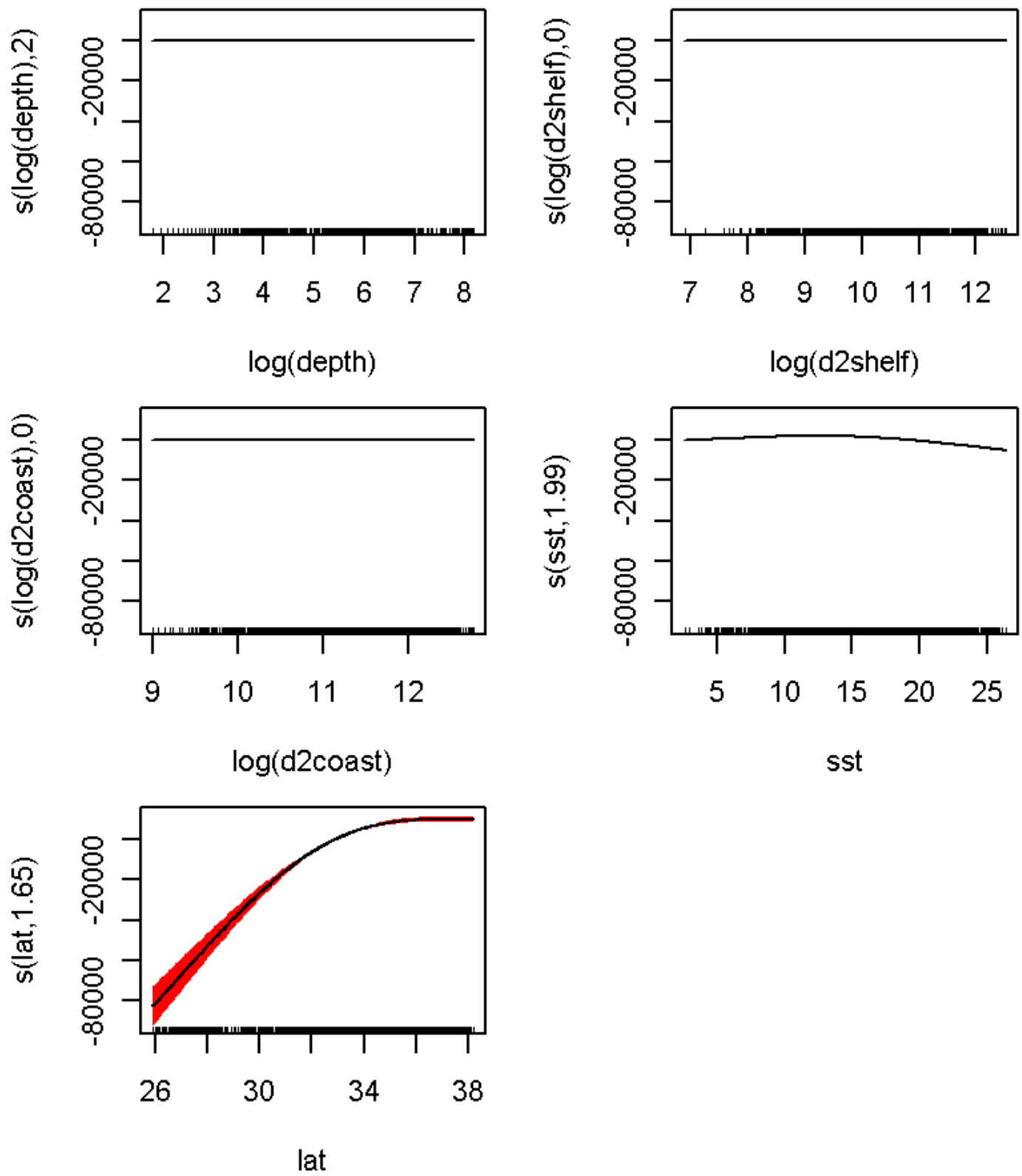


Figure 554: Terms plot of predictors to GAM model fit for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

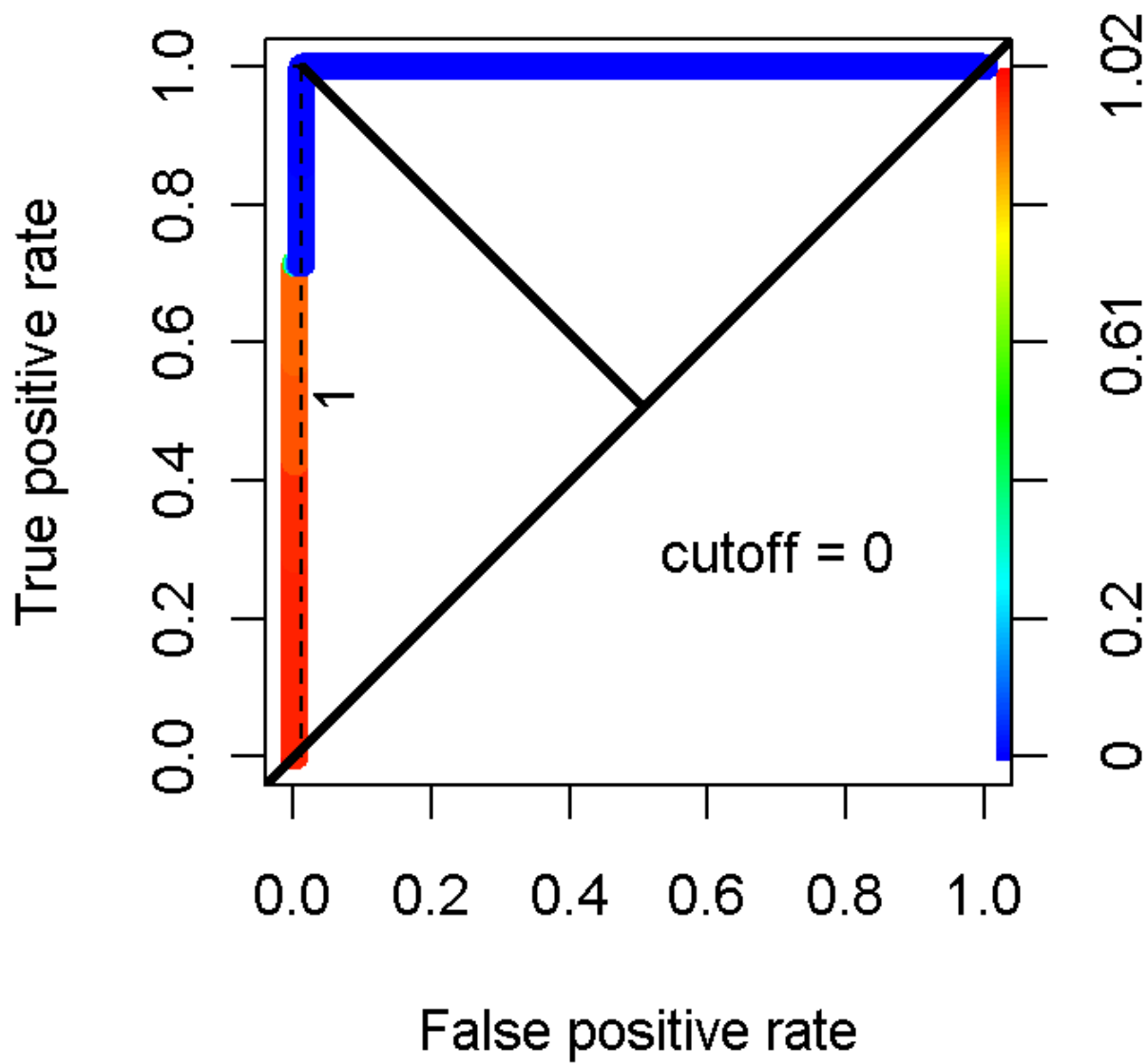


Figure 555: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

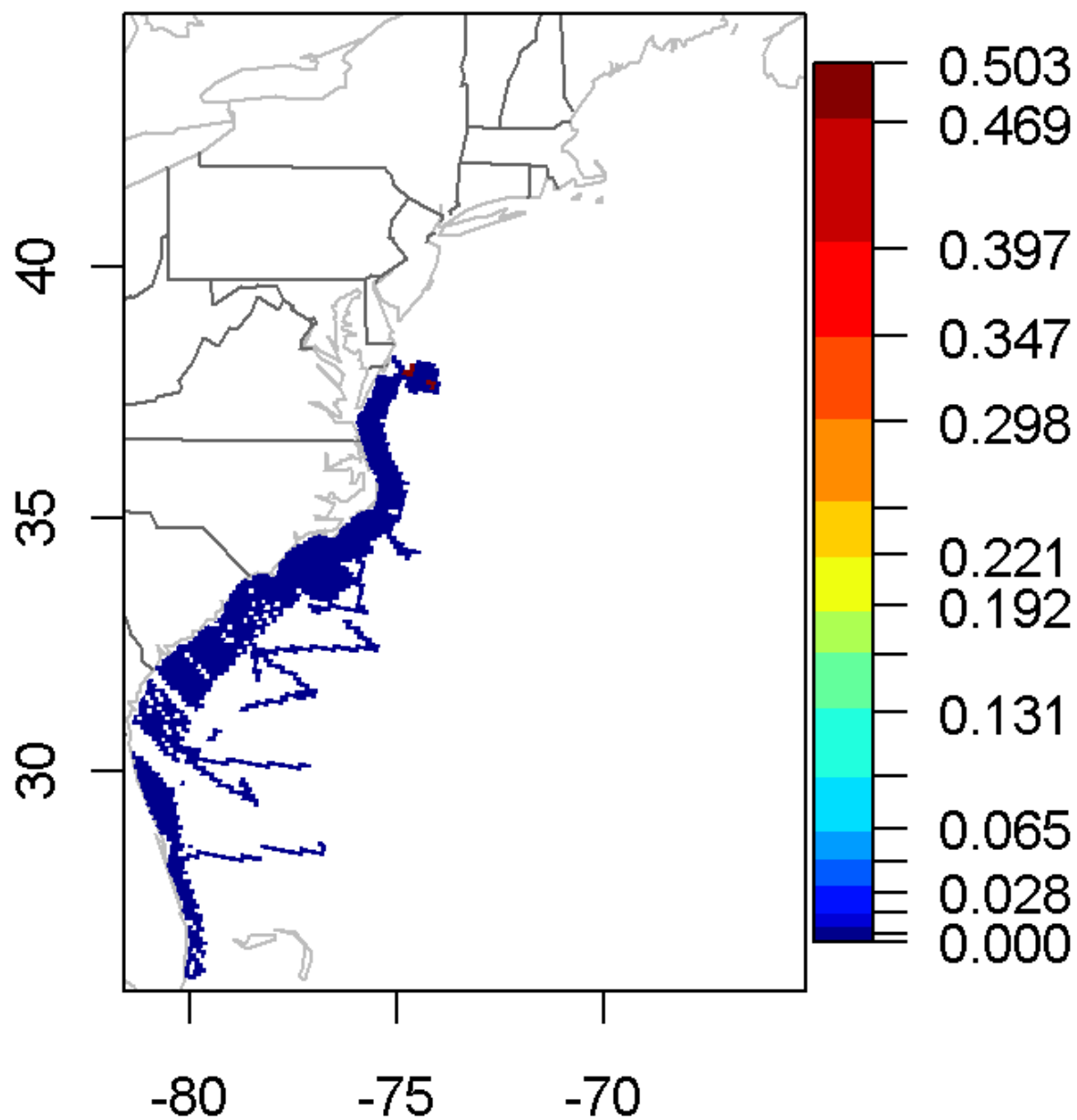


Figure 556: Map of presence and absence by cell summed through time for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

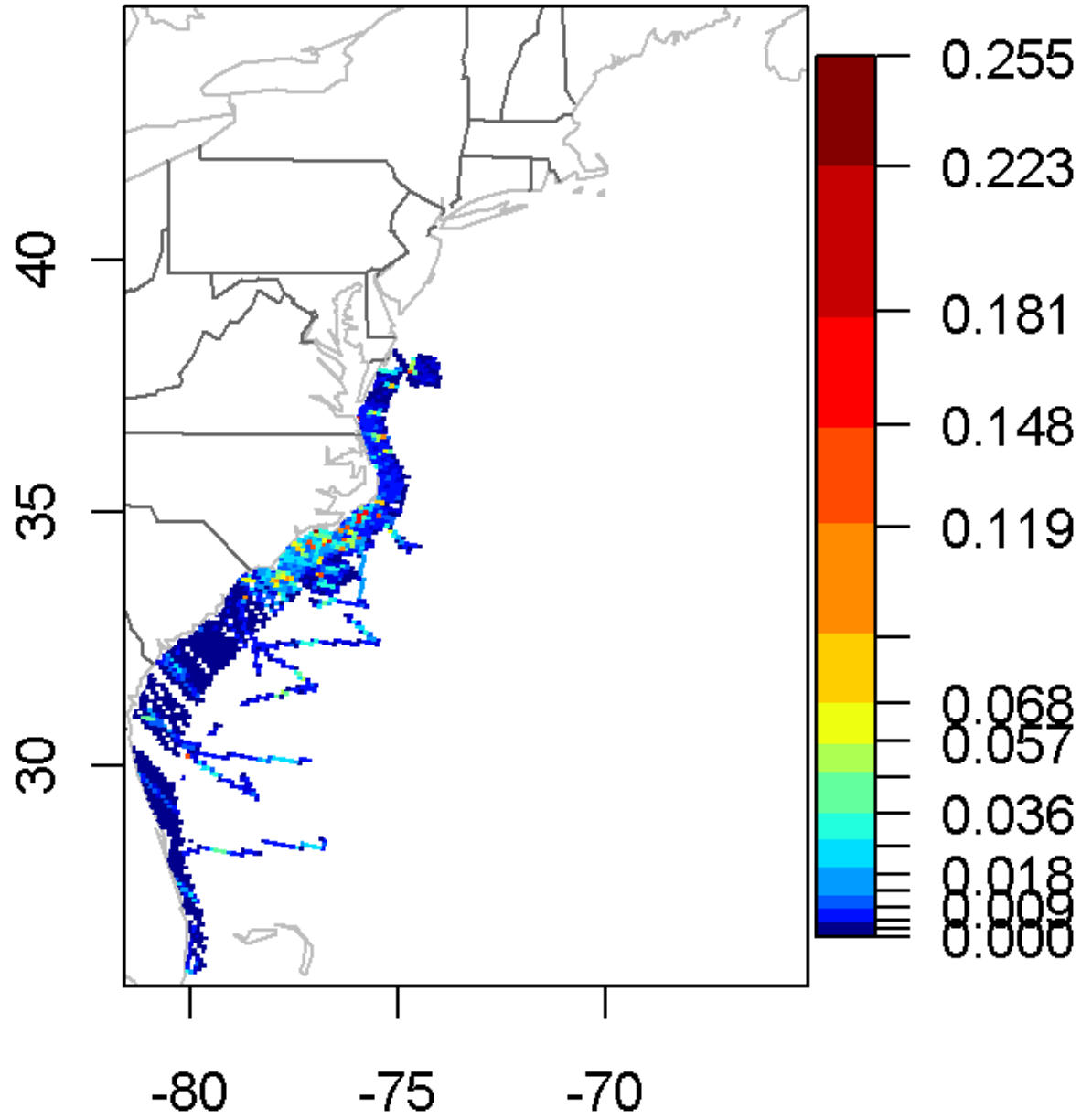


Figure 557: Map of effort(hours/km²) by cell summed through time for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

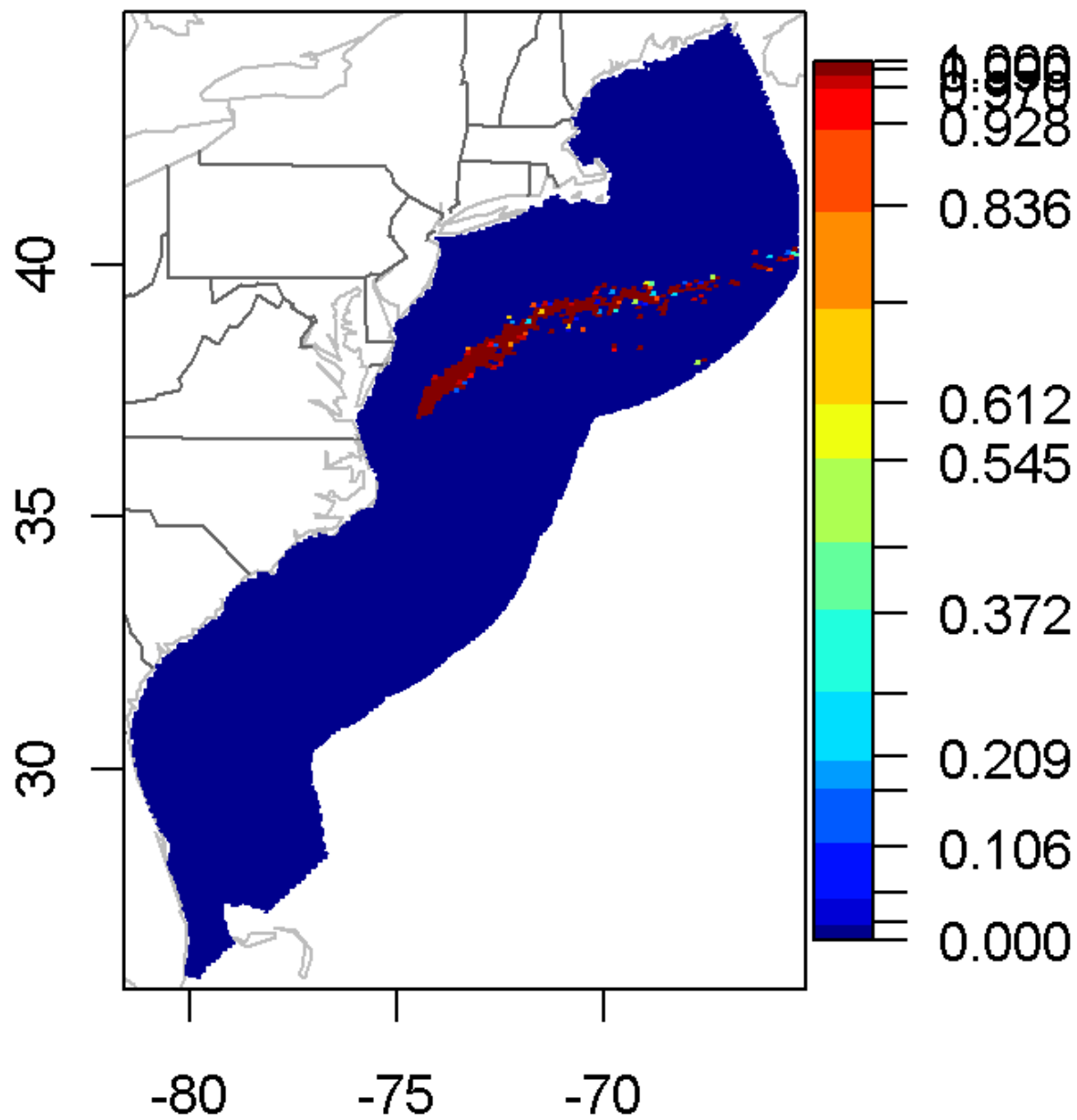


Figure 558: Map of mean predicted habitat for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

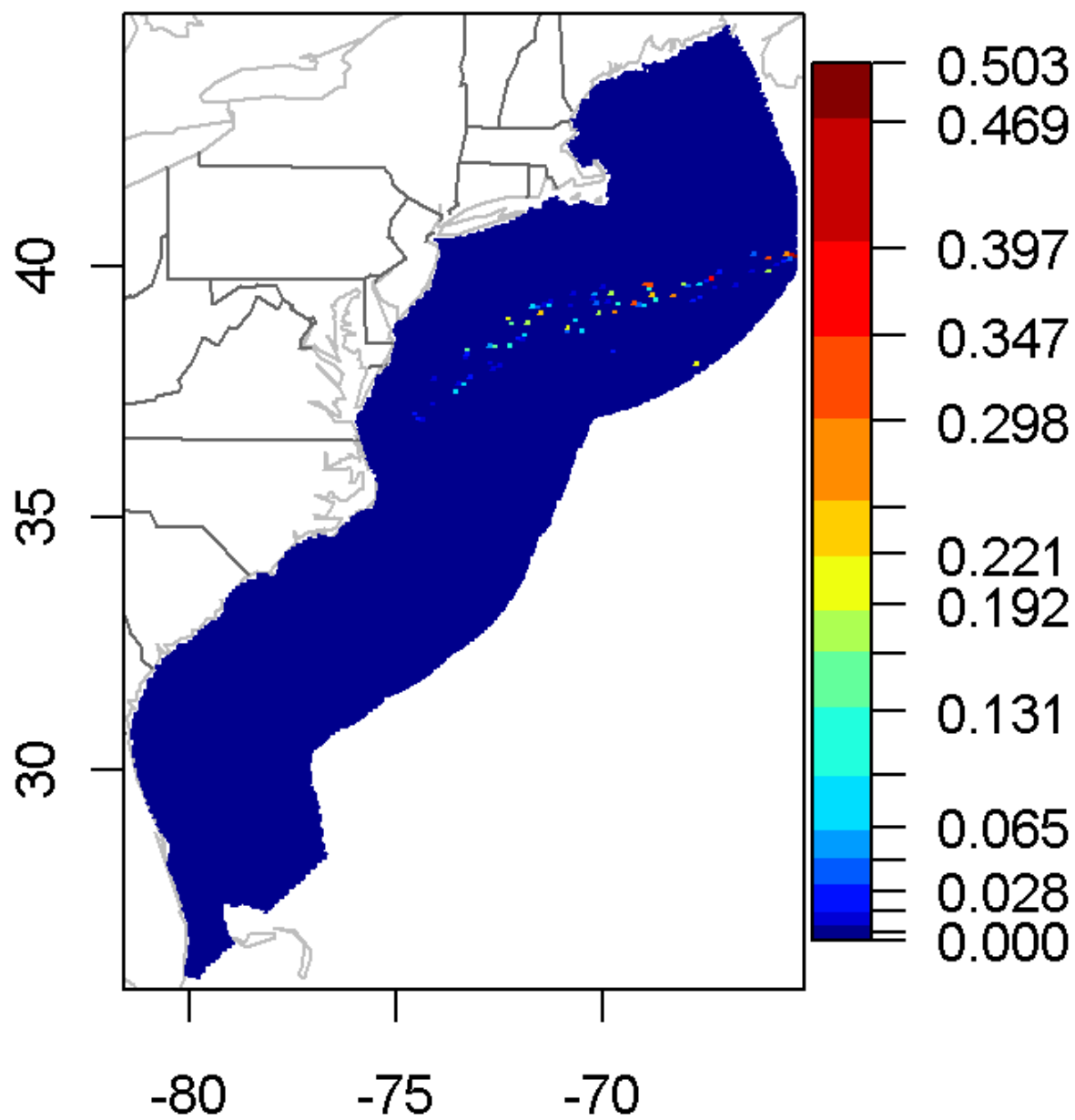


Figure 559: Map of standard error of habitat for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

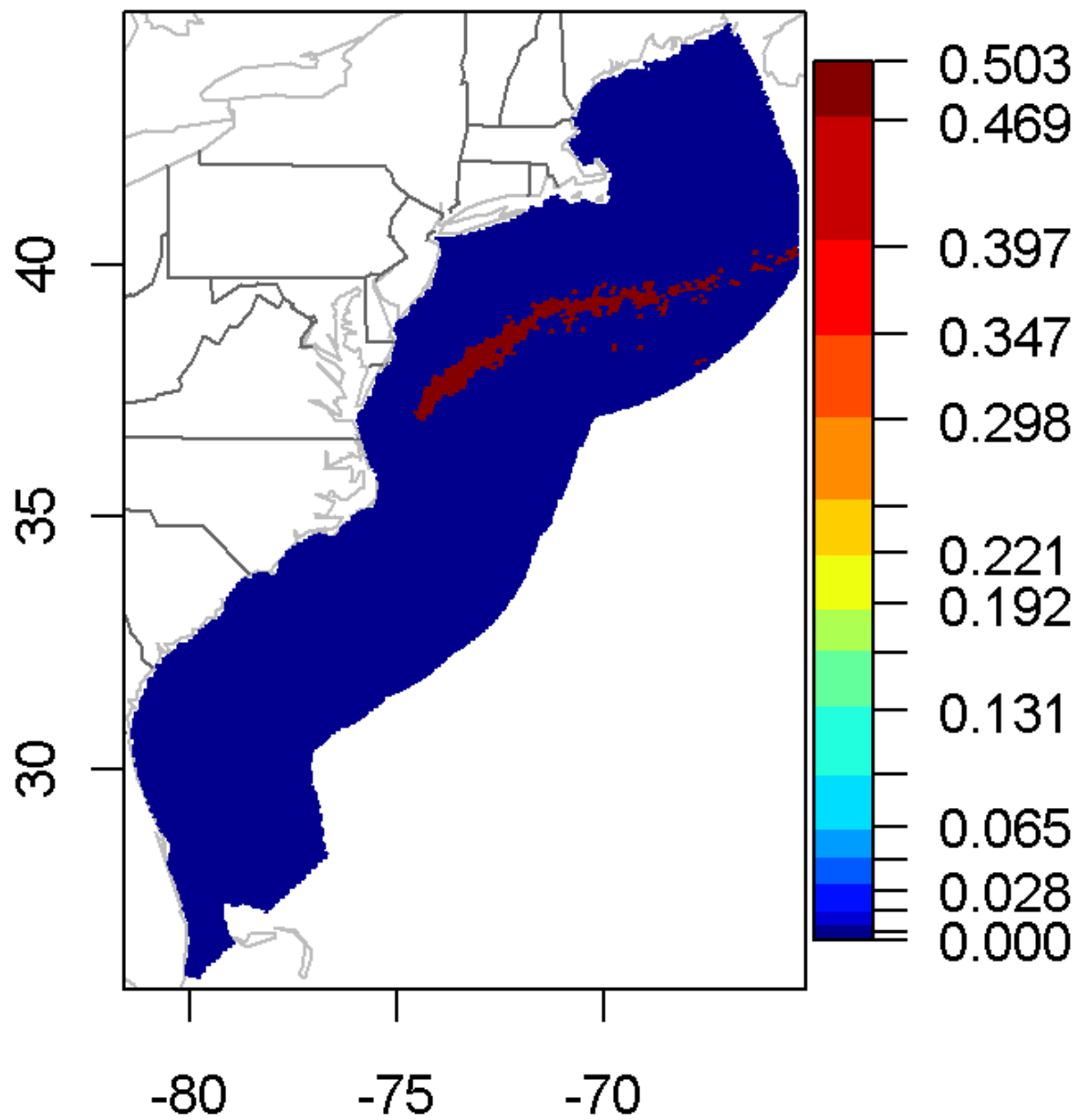


Figure 560: Map of binary habitat (cutoff determined by ROC) for 'Risso's dolphin' guild during 'winter' season in 'east2' region.

12 Rough-toothed dolphin

Guildid:sb3

Table 52: Taxonomic members of the "Rough-toothed dolphin" guild.

	Scientic Name	Common Name	Taxonomic #
1	Steno bredanensis	rough-toothed dolphin	180417

12.1 fall

12.2 spring

12.3 summer

12.3.1 gomex2

Modelrun identifier: duke_06_sb3_summer_gomex2

Date generated: 2008-10-21 11:31:31

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 53: Summary for duke(6) GAM model: for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	9
Number.absences	1395
GAM.converged	TRUE
R.squared	0.0300251
Deviance.explained	0.0709476
ROC.optimum	0.0535292
Maximum.fit	0.00937074
Maximum.prediction	0.0540118

Model text summary...

```
duke_06_sb3_summer_gomex2 run on Tue Oct 21 11:30:54 2008
provider:duke, version:06, guild:Rough-toothed dolphin (sb3), season:'summer', region:gomex2

max.fit:0.053529, max.prediction:0.054012, ROC.optimum:0.009371

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -4.8180      0.1138  -42.33   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  7.875e-01  1.288    10.43 0.000437 ***
s(log(d2shelf)) 5.121e-01  1.012     2.94 0.086192 .
s(log(d2coast)) 8.189e-01  1.319    13.61 4.5e-05 ***
s(sst)         8.416e-06  0.500 5.00e-05 0.934421
s(lat)         6.165e-06  0.500 1.07e-05 0.955425
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.03  Deviance explained = 7.09%
GCV score = 0.0010862  Scale est. = 0.0010818  n = 1404

summary(dat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:1404  Min.   : 13  Min.   : 13.0  Min.   : 901  Min.   : 5700  Min.   :25.35  Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8 1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75 1st Qu.:26.68
              Median :5134 Median : 654.0 Median : 45466 Median :146059 Median :28.50 Median :27.90
              Mean   :4686 Mean   : 899.5 Mean   : 59670 Mean   :161835 Mean   :28.50 Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0 3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25 3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0 Max.   :249222 Max.   :386037 Max.   :31.20 Max.   :30.24

summary(newdat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :27.67  Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0 1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :29.55 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:0.0001276	Min.	:9.982e-05	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:0.0023726	1st Qu.	:7.230e-04	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:0.0071087	Median	:1.252e-03	Median	:0.000e+00	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:0.0150443	Mean	:2.203e-03	Mean	:8.152e-03	Mean	:1.213e-02	Mean	:0.4517
3rd Qu.	:6015	3rd Qu.	:0.0270977	3rd Qu.	:3.293e-03	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:0.0540118	Max.	:8.649e-03	Max.	:1.000e+00	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5.568e+03	NA's	:5.568e+03		

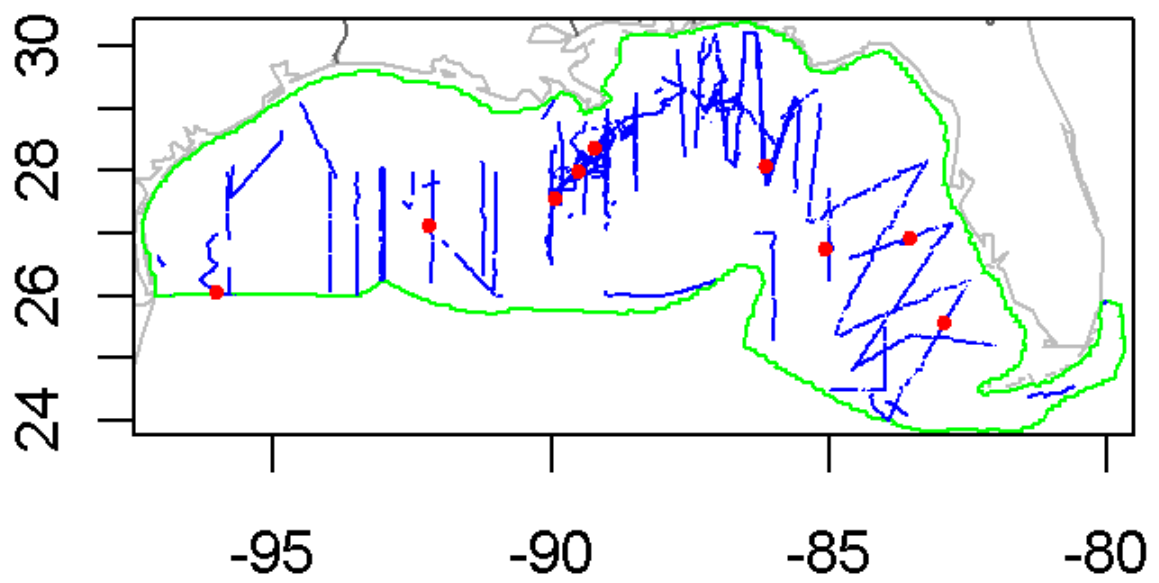


Figure 561: Map of points of observational sightings and tracks of survey effort for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

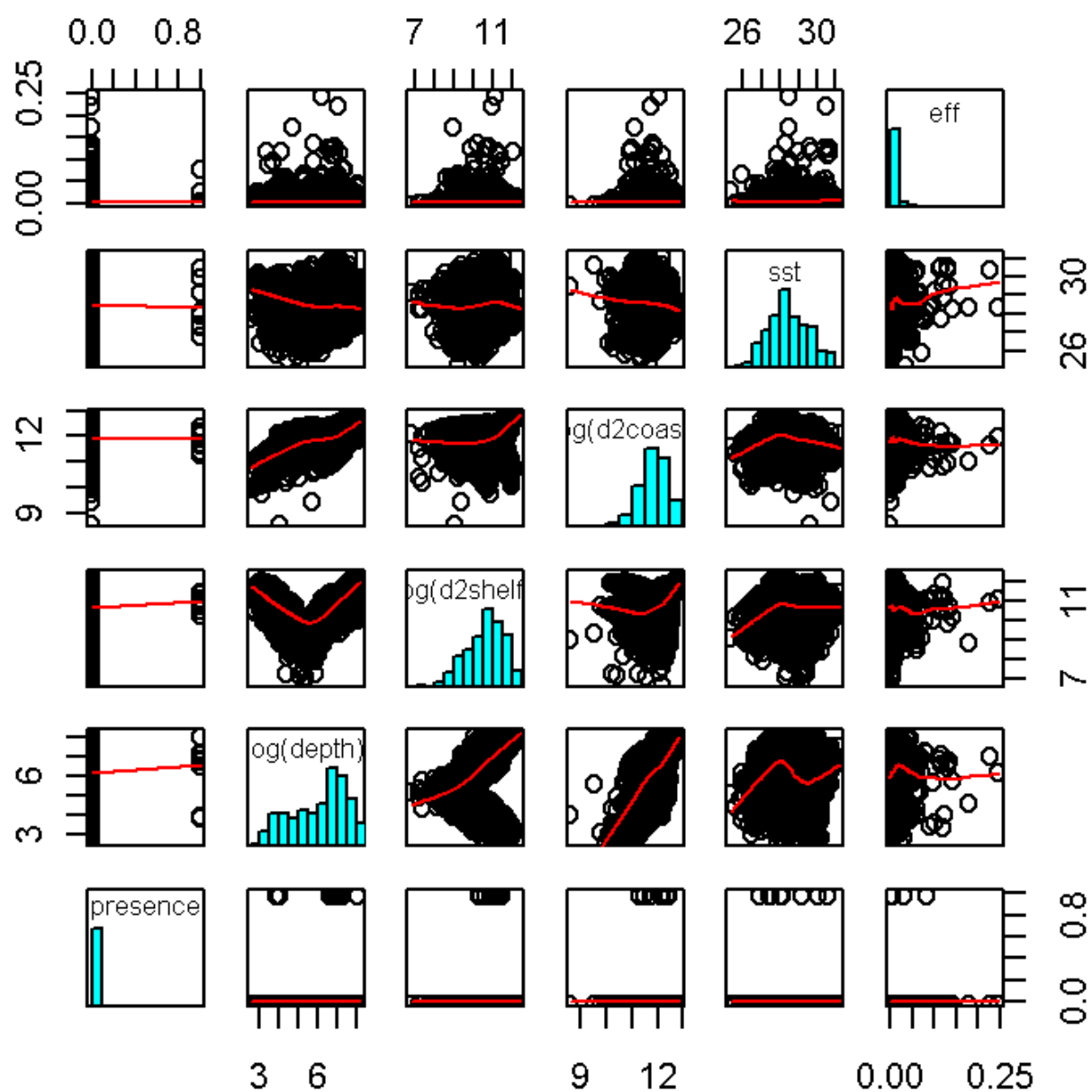


Figure 562: Pairs plot of input variables for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

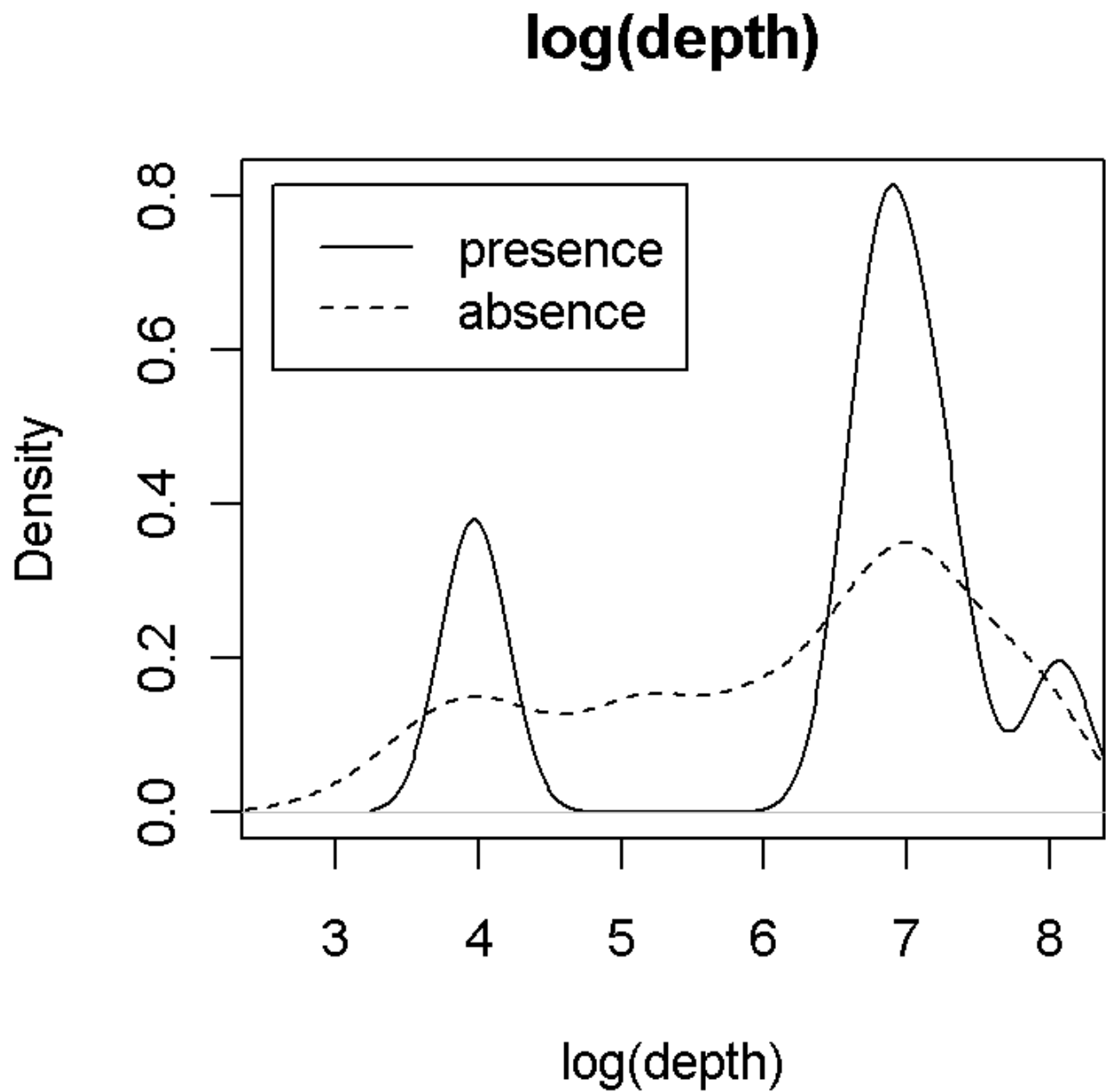


Figure 563: Density histogram of depth $\log(\text{meters})$ for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

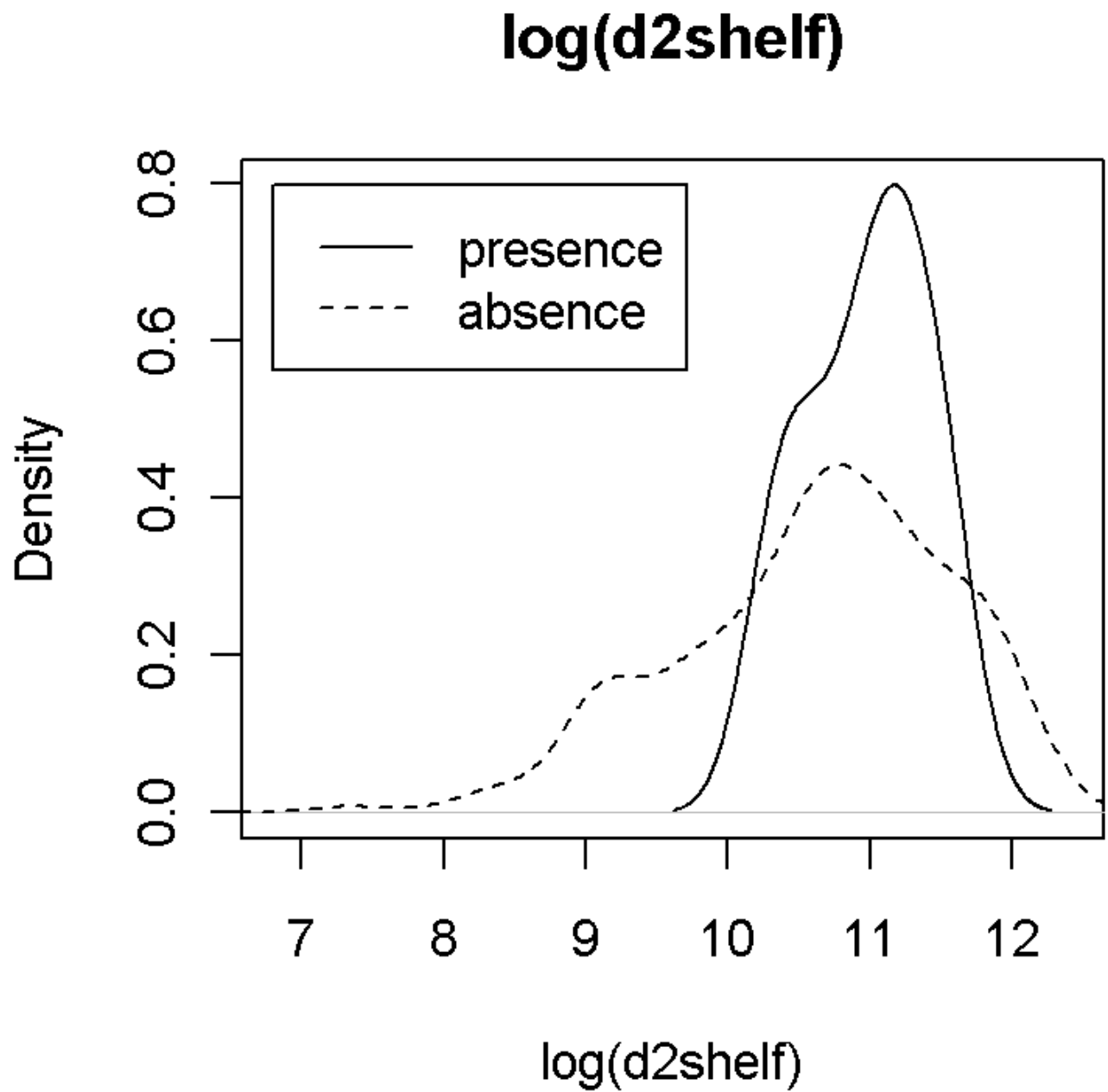


Figure 564: Density histogram of distance to shelf log(meters) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

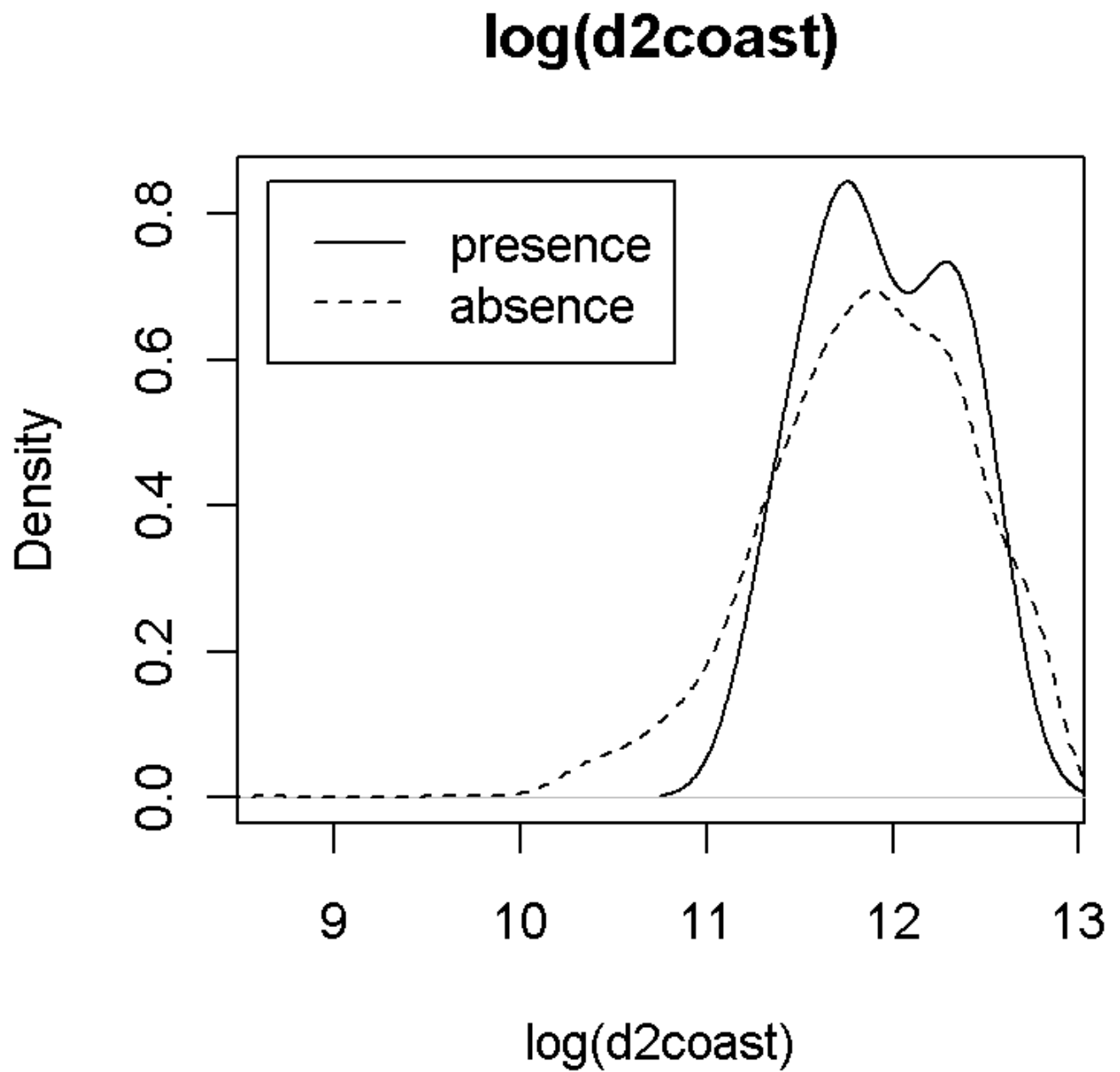


Figure 565: Density histogram of distance to coast log(meters) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

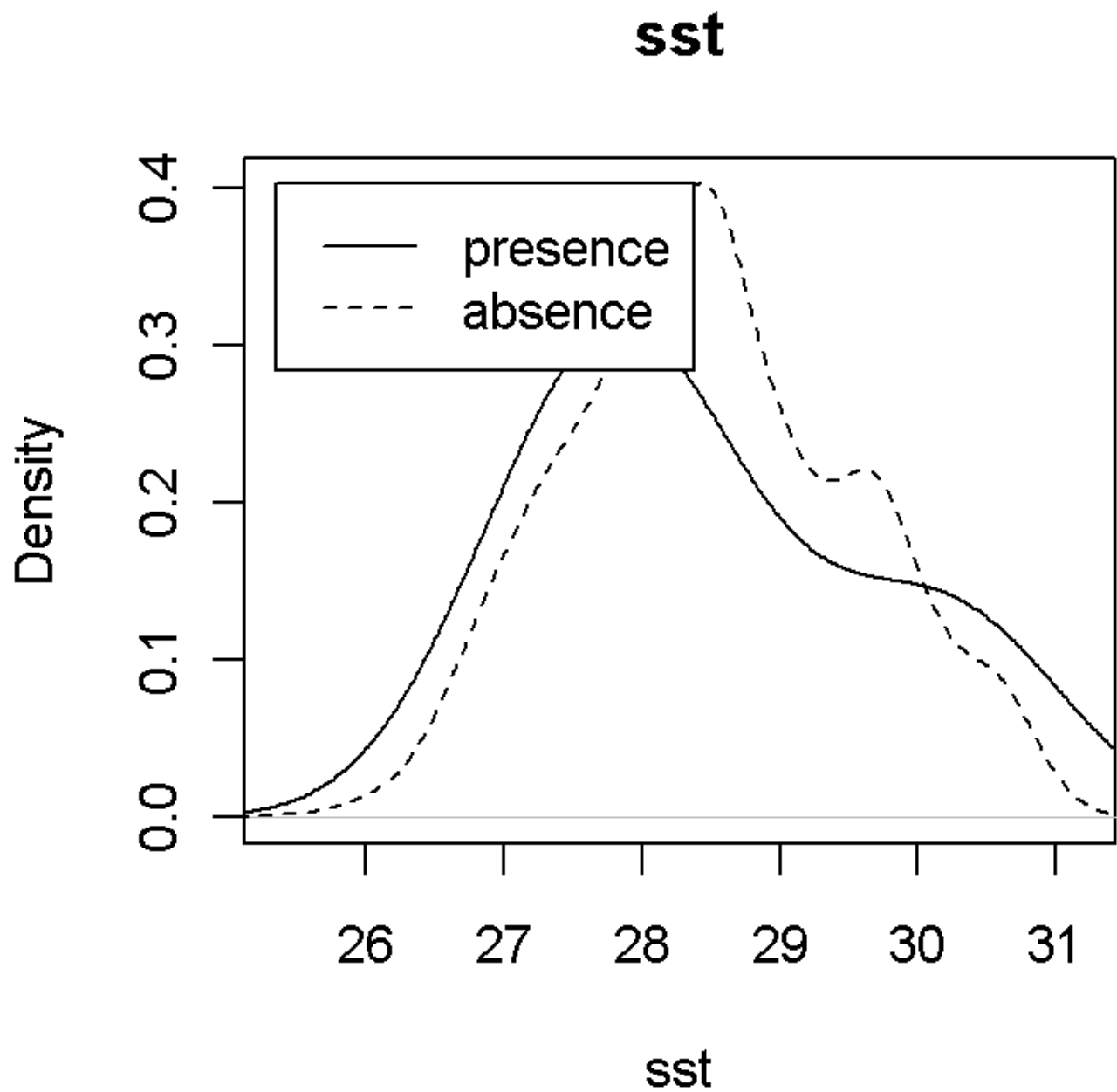


Figure 566: Density histogram of sea-surface temperature (degrees C) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

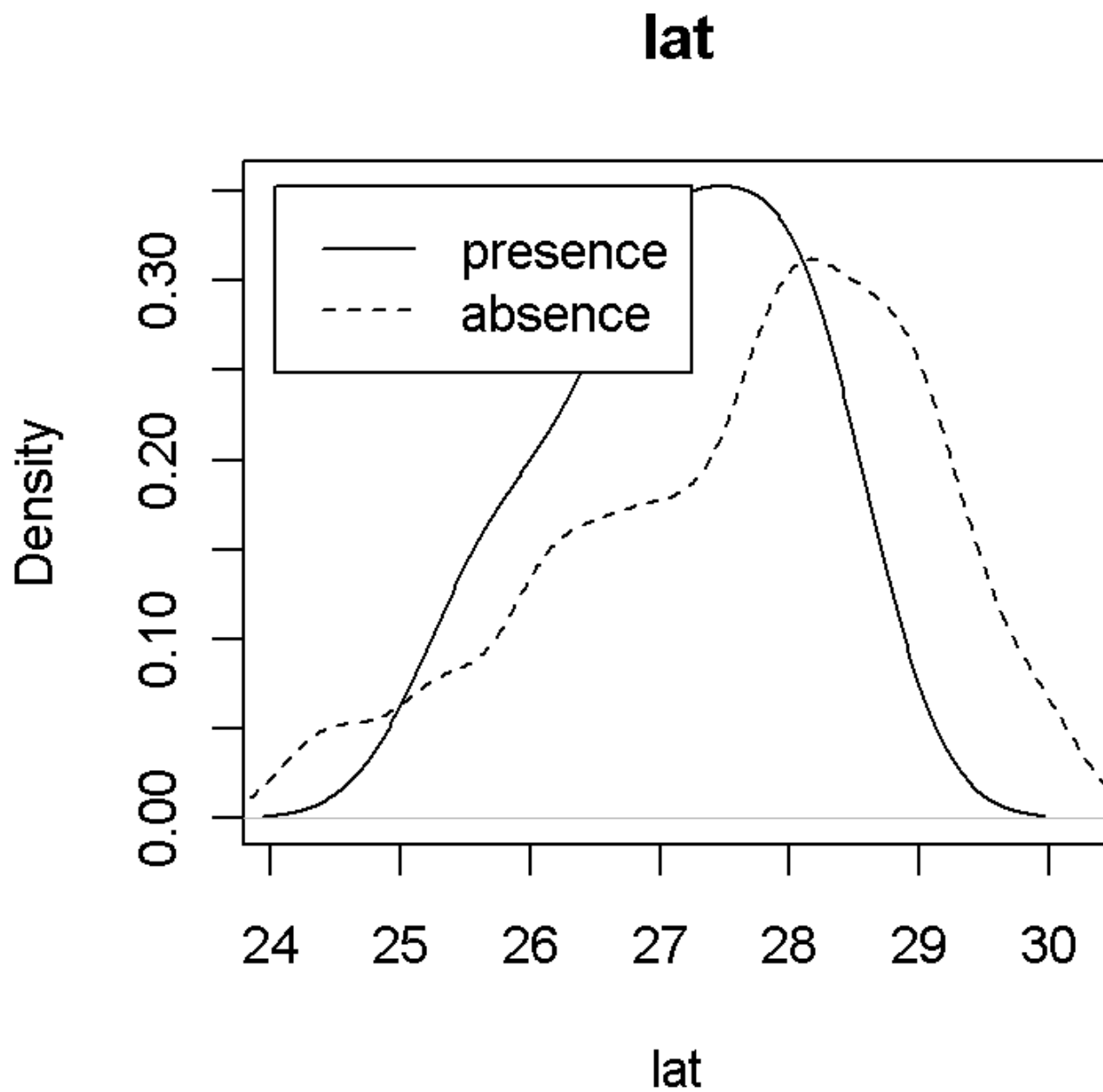


Figure 567: Density histogram of latitude (degrees) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

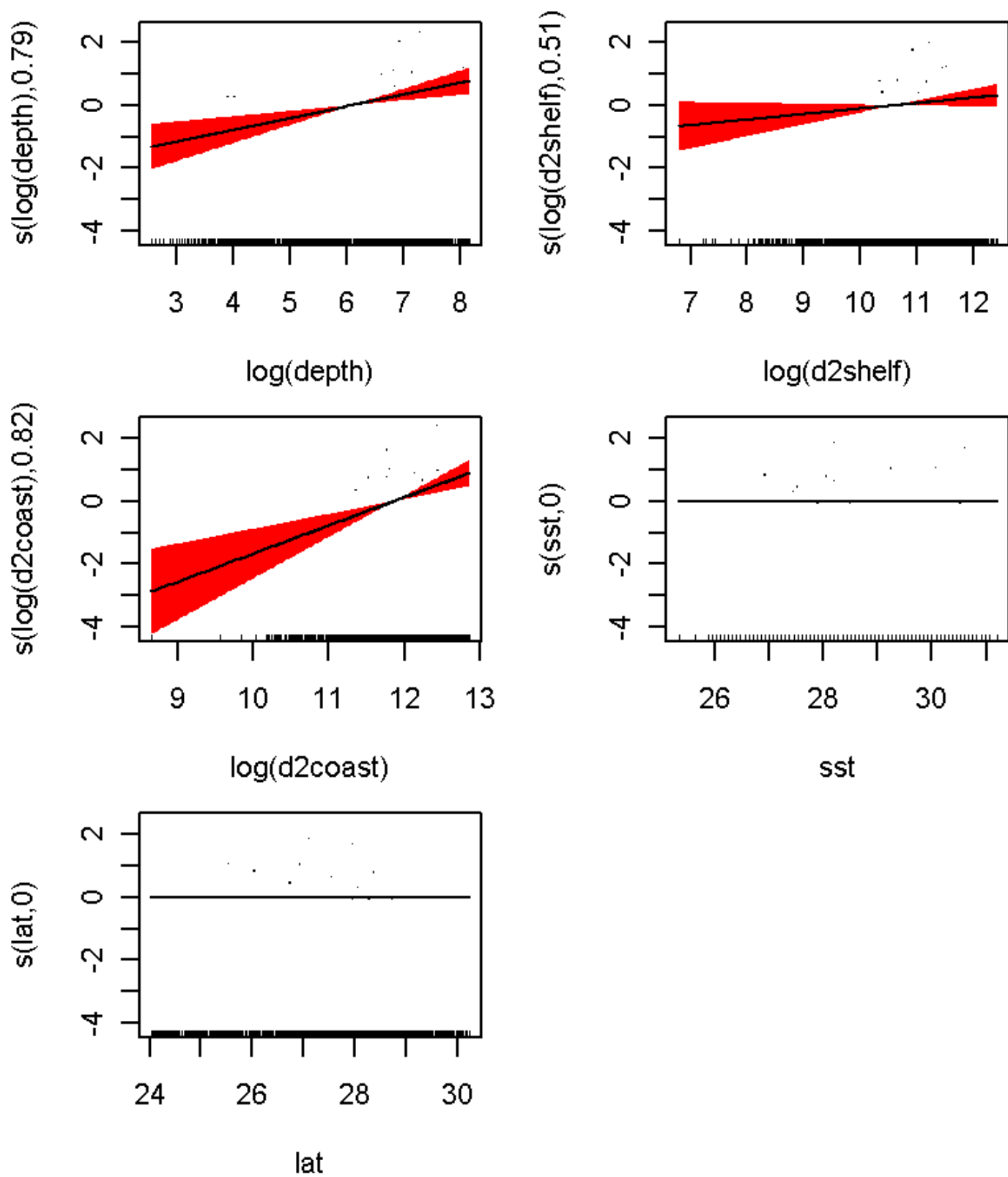


Figure 568: Terms plot of predictors to GAM model fit for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

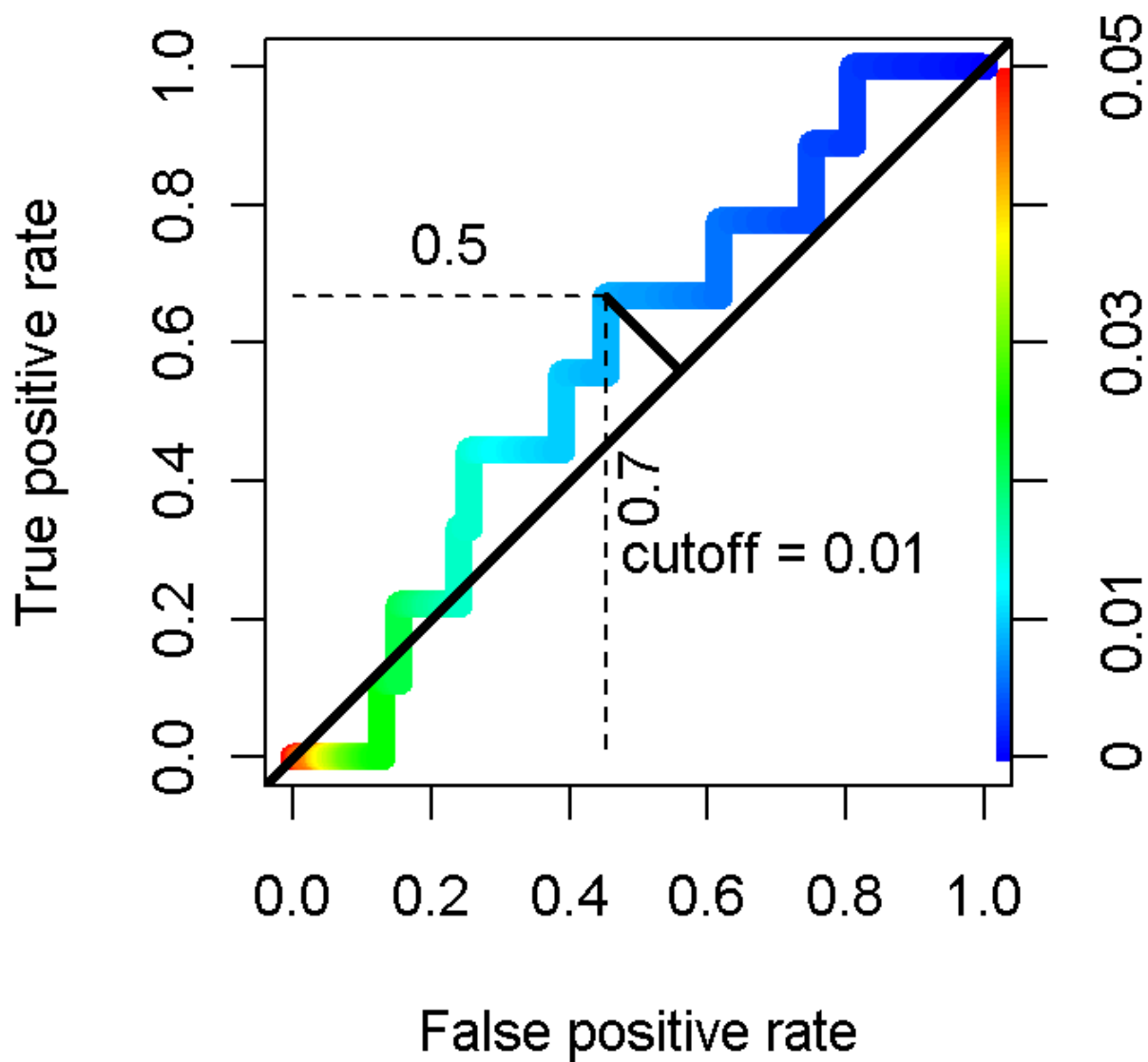


Figure 569: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

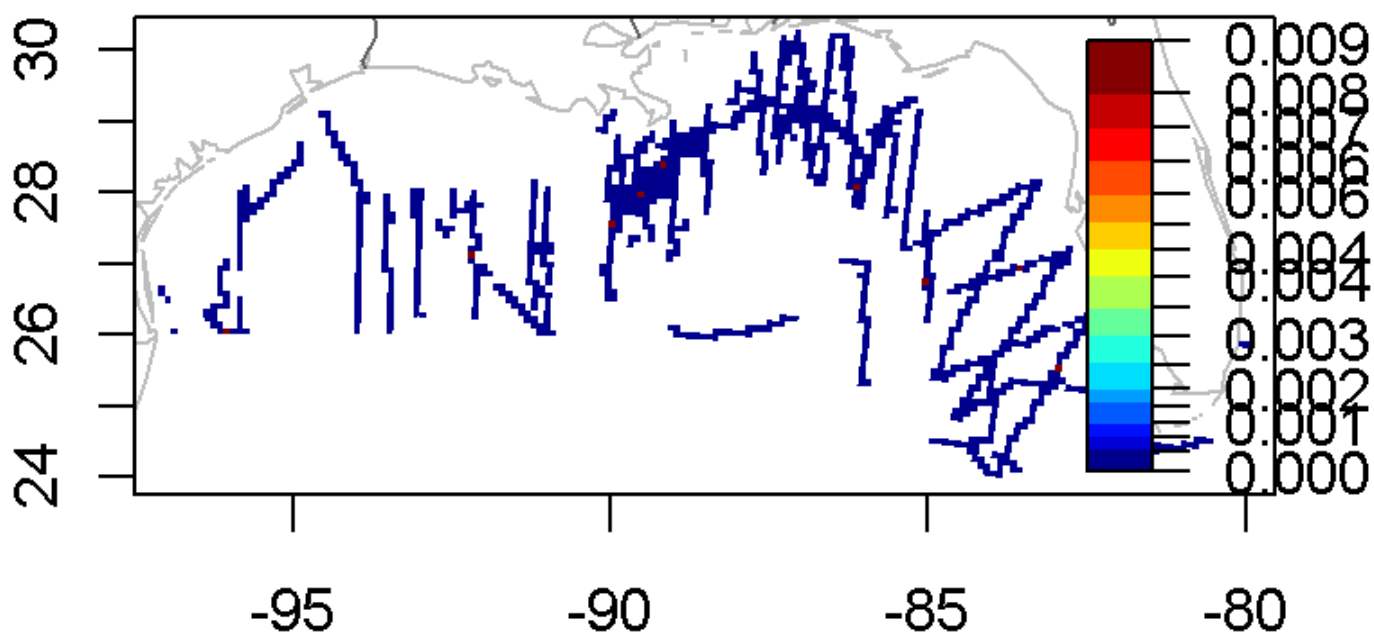


Figure 570: Map of presence and absence by cell summed through time for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

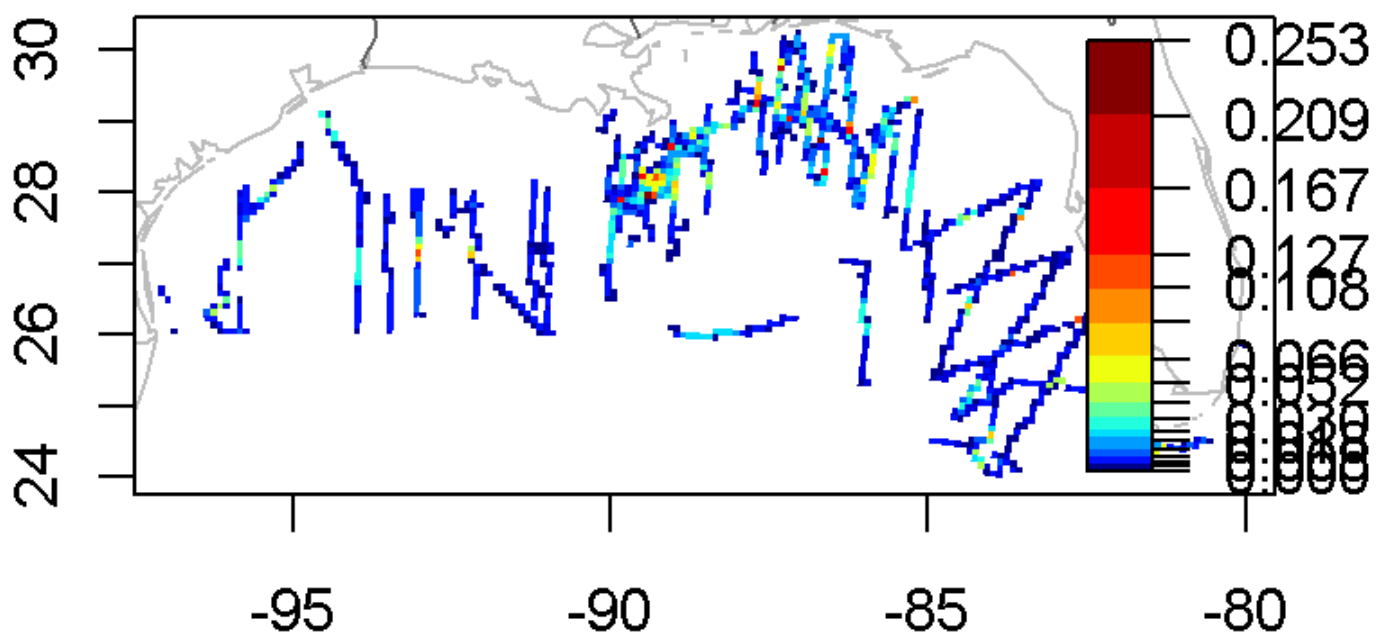


Figure 571: Map of effort(hours/km²) by cell summed through time for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

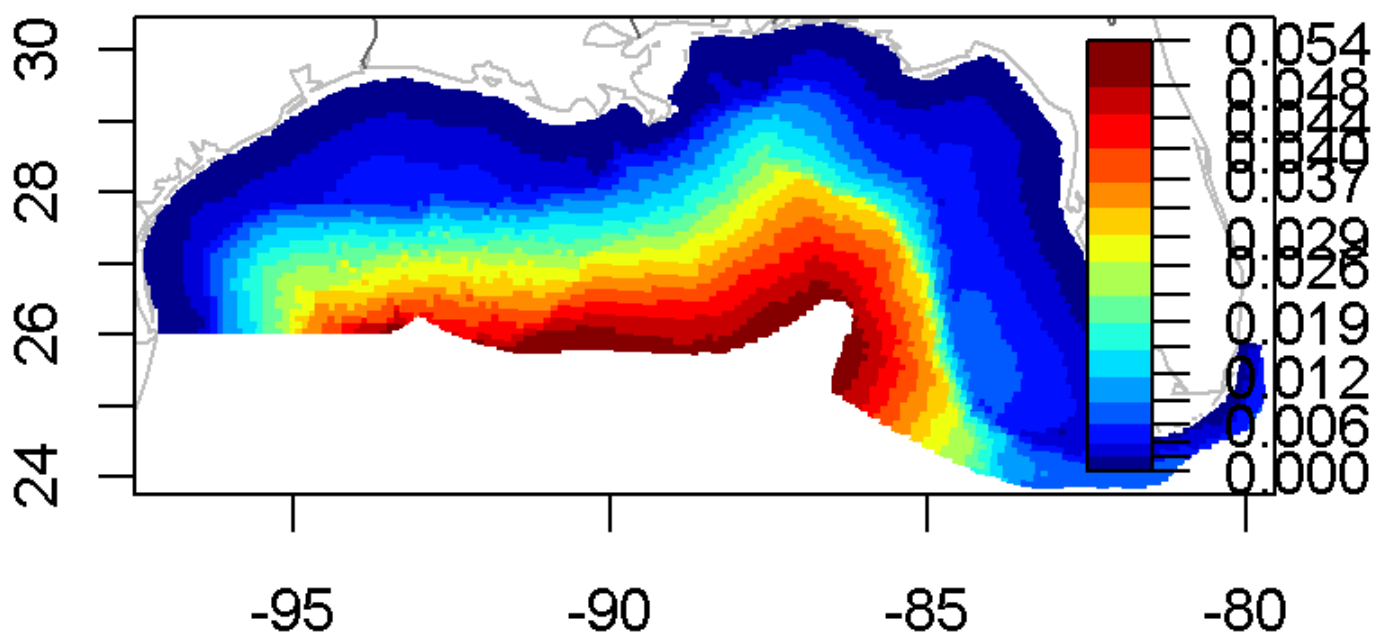


Figure 572: Map of mean predicted habitat for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

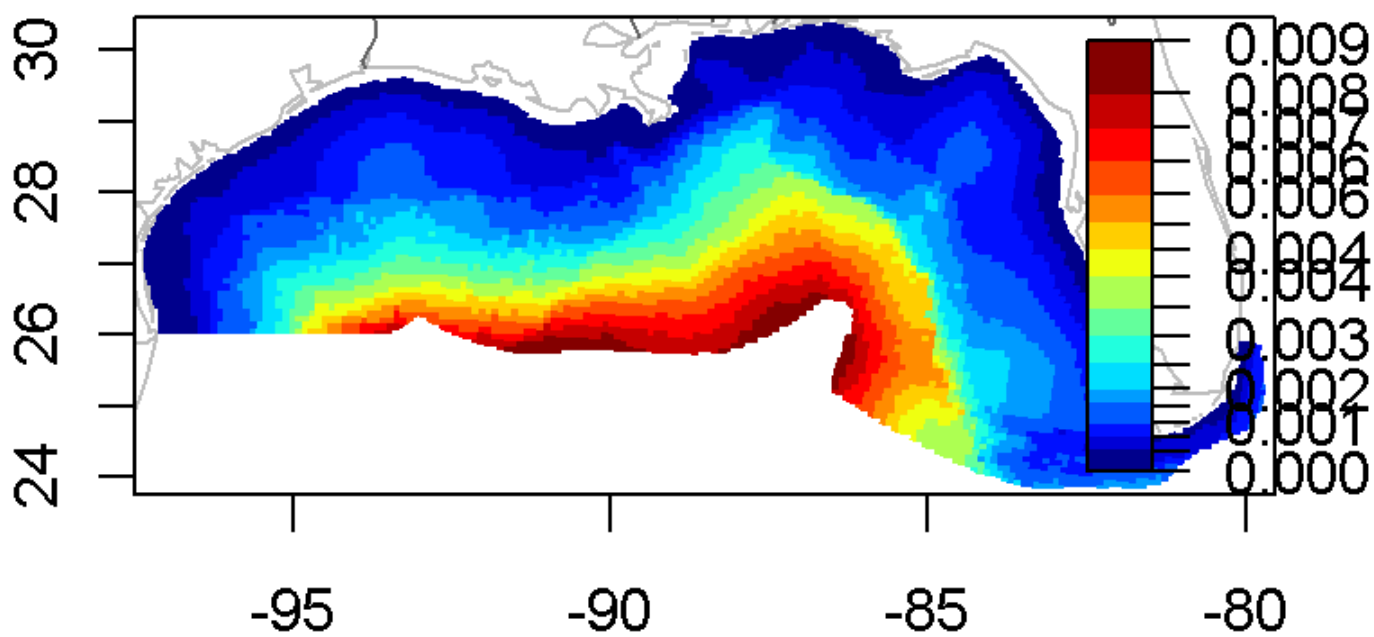


Figure 573: Map of standard error of habitat for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

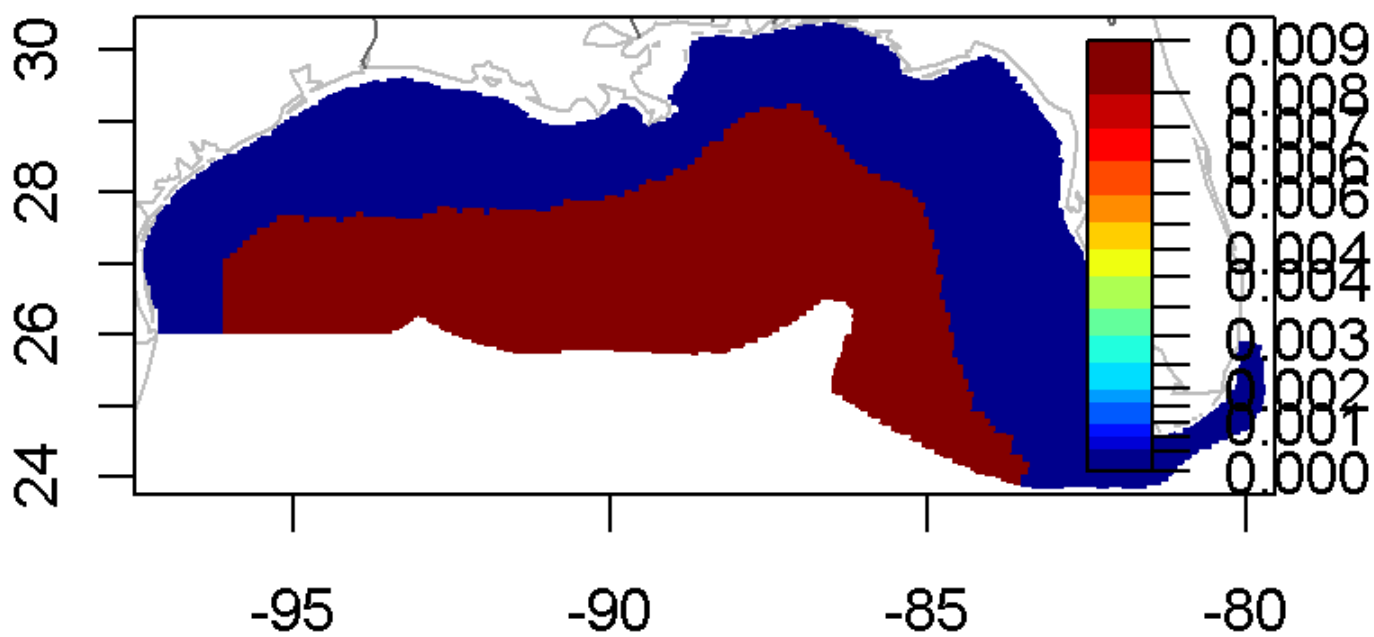


Figure 574: Map of binary habitat (cutoff determined by ROC) for 'Rough-toothed dolphin' guild during 'summer' season in 'gomex2' region.

12.4 winter

13 Sperm whales

Guildid:sw3

Table 54: Taxonomic members of the "Sperm whales" guild.

	Scientic Name	Common Name	Taxonomic #
1	Physeter catodon	sperm whale	180489

13.1 fall

13.1.1 east2

Modelrun identifier: duke_06_sw3_fall_east2

Date generated: 2008-10-21 14:32:59

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 55: Summary for duke(6) GAM model: for 'Sperm whales' guild during 'fall' season in 'east2' region.

	Value
Number.presences	7
Number.absences	1857
GAM.converged	TRUE
R.squared	0.256727
Deviance.explained	0.541766
ROC.optimum	0.367947
Maximum.fit	6.55695e-08
Maximum.prediction	0.587177

Model text summary...

```
duke_06_sw3_fall_east2 run on Tue Oct 21 14:31:50 2008
  provider:duke, version:06, guild:Sperm whales (sw3), season:'fall', region:east2

max.fit:0.367947, max.prediction:0.587177, ROC.optimum:0.000000

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -1911.3      138.4    -13.81  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F p-value
s(log(depth))  1.994e+00  2.494   98.63  <2e-16 ***
s(log(d2shelf)) 3.847e-08  0.500  3.43e-06  0.966
s(log(d2coast)) 1.991e+00  2.491   55.56  <2e-16 ***
s(sst)         3.324e-08  0.500  2.78e-05  0.943
s(lat)         2.332e-08  0.500  4.54e-06  0.964
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.257   Deviance explained = 54.2%
GCV score = 0.00013594   Scale est. = 0.00013528   n = 1826

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.   : 1654  Min.   : 6.0   Min.   : 10   Min.   : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0   1st Qu.:12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0   Median : 30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5   Mean   : 47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.:197.0   3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0   Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
        NA's    :      1    NA's    : 1    NA's    :37.00

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   : 4   Min.   : 5   Min.   :1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92   1st Qu.:34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :4.866e-16  Min.   :0.000e+00  Min.   :1.290e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.220e-16  1st Qu.:1.297e-14  1st Qu.:0.000e+00  1st Qu.:5.348e-04  1st Qu.:0.0000
Median :11616  Median :2.220e-16  Median :5.170e-14  Median :0.000e+00  Median :2.645e-03  Median :0.0000
Mean   :11171  Mean   :1.418e-02  Mean   :1.476e-03  Mean   :6.318e-03  Mean   :8.763e-03  Mean   :0.4253
3rd Qu.:14088  3rd Qu.:2.365e-04  3rd Qu.:1.103e-04  3rd Qu.:0.000e+00  3rd Qu.:6.382e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :5.872e-01  Max.   :4.416e-02  Max.   :1.000e+00  Max.   :5.995e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.780e+03  NA's :8.780e+03
```

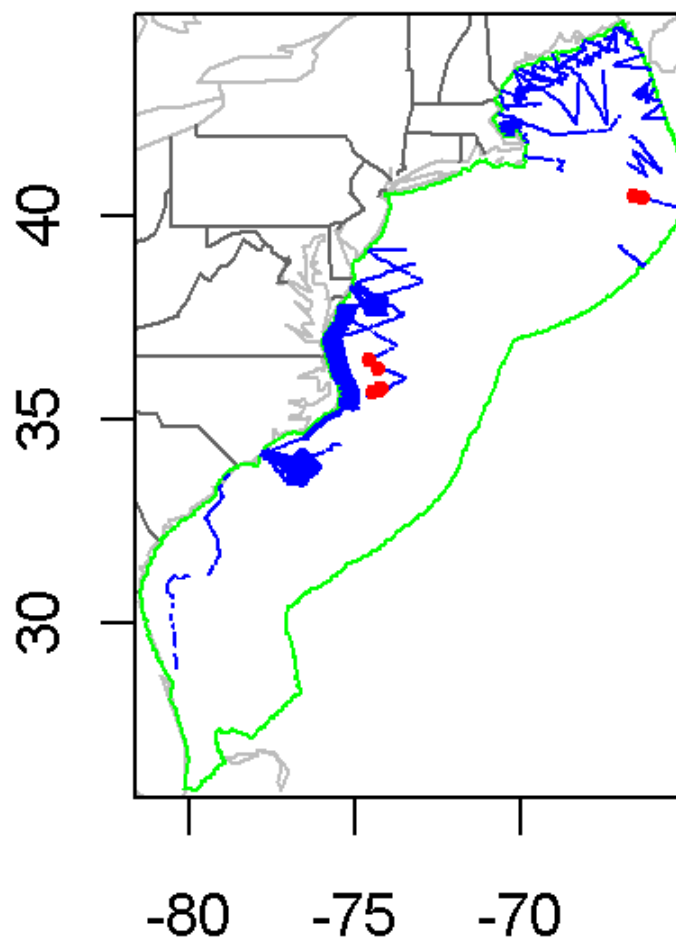


Figure 575: Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'fall' season in 'east2' region.

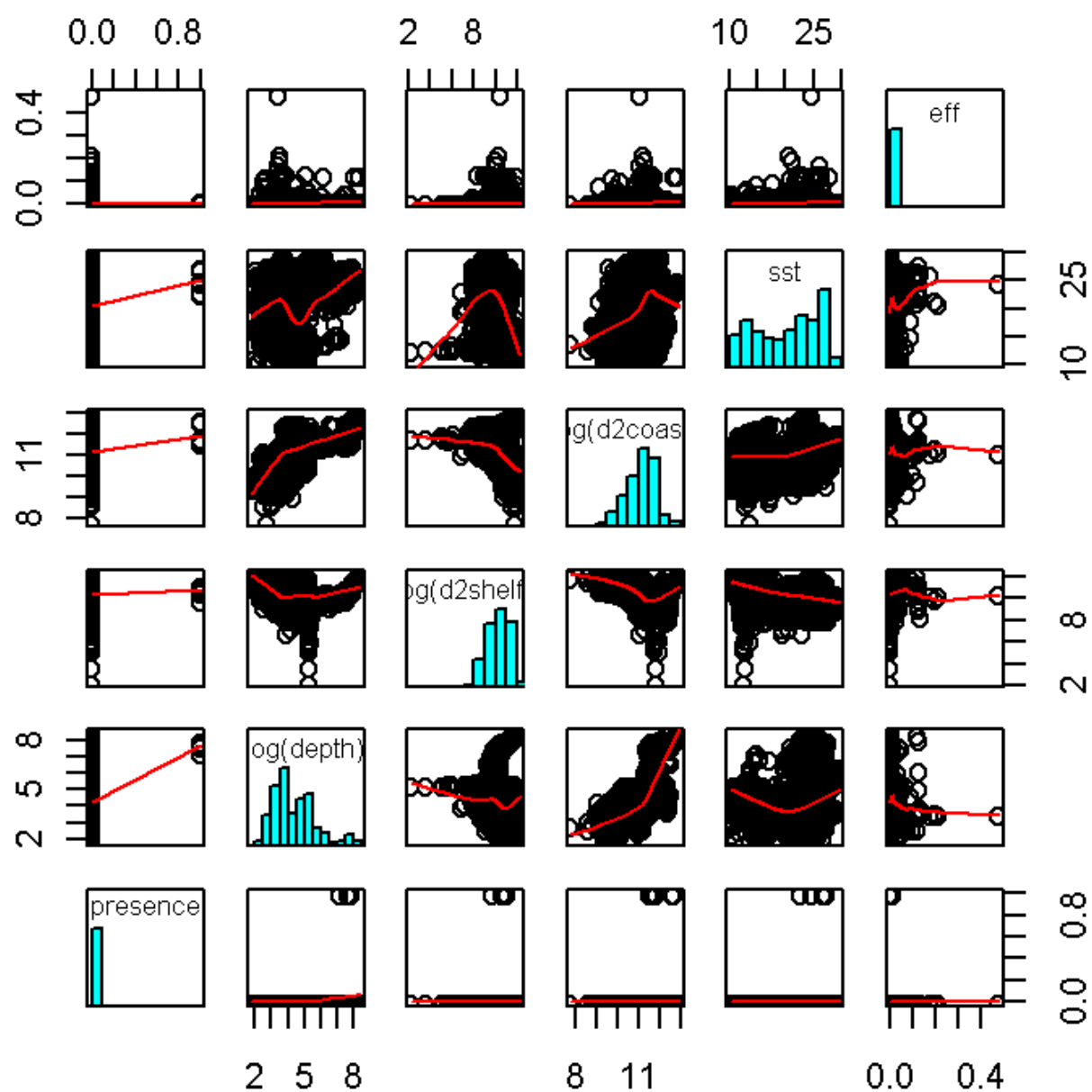


Figure 576: Pairs plot of input variables for 'Sperm whales' guild during 'fall' season in 'east2' region.

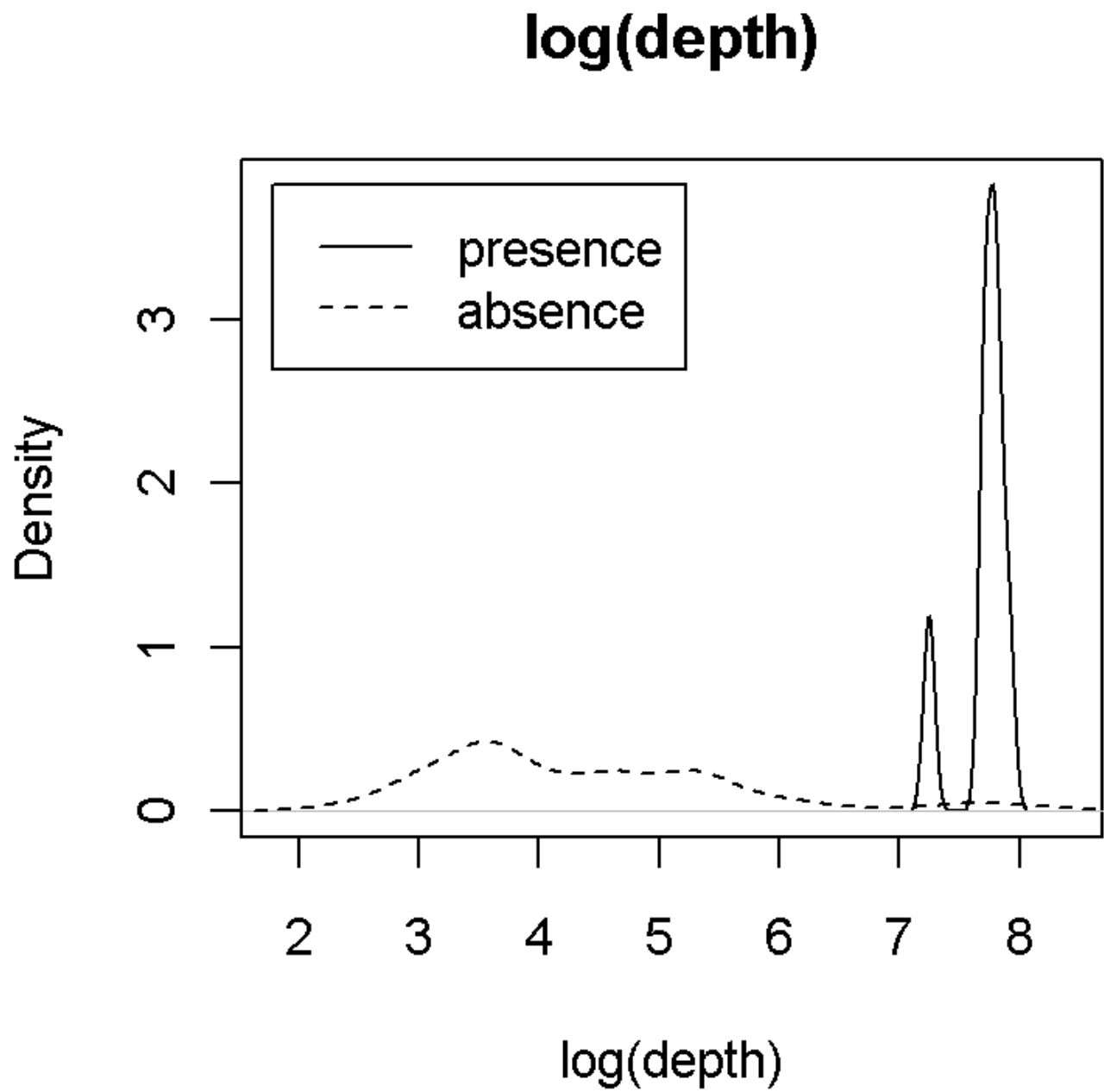


Figure 577: Density histogram of depth log(meters) for 'Sperm whales' guild during 'fall' season in 'east2' region.

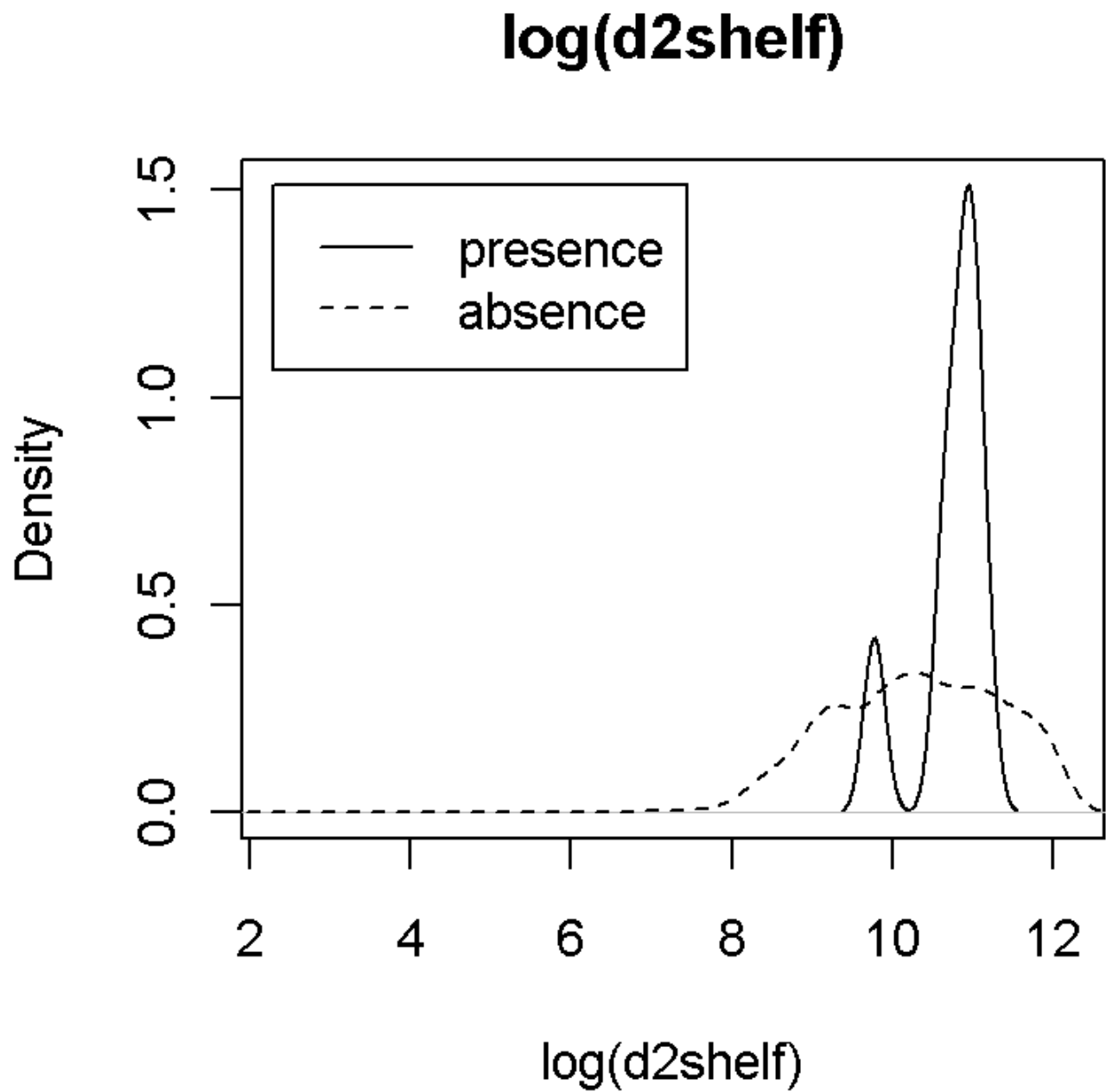


Figure 578: Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'fall' season in 'east2' region.

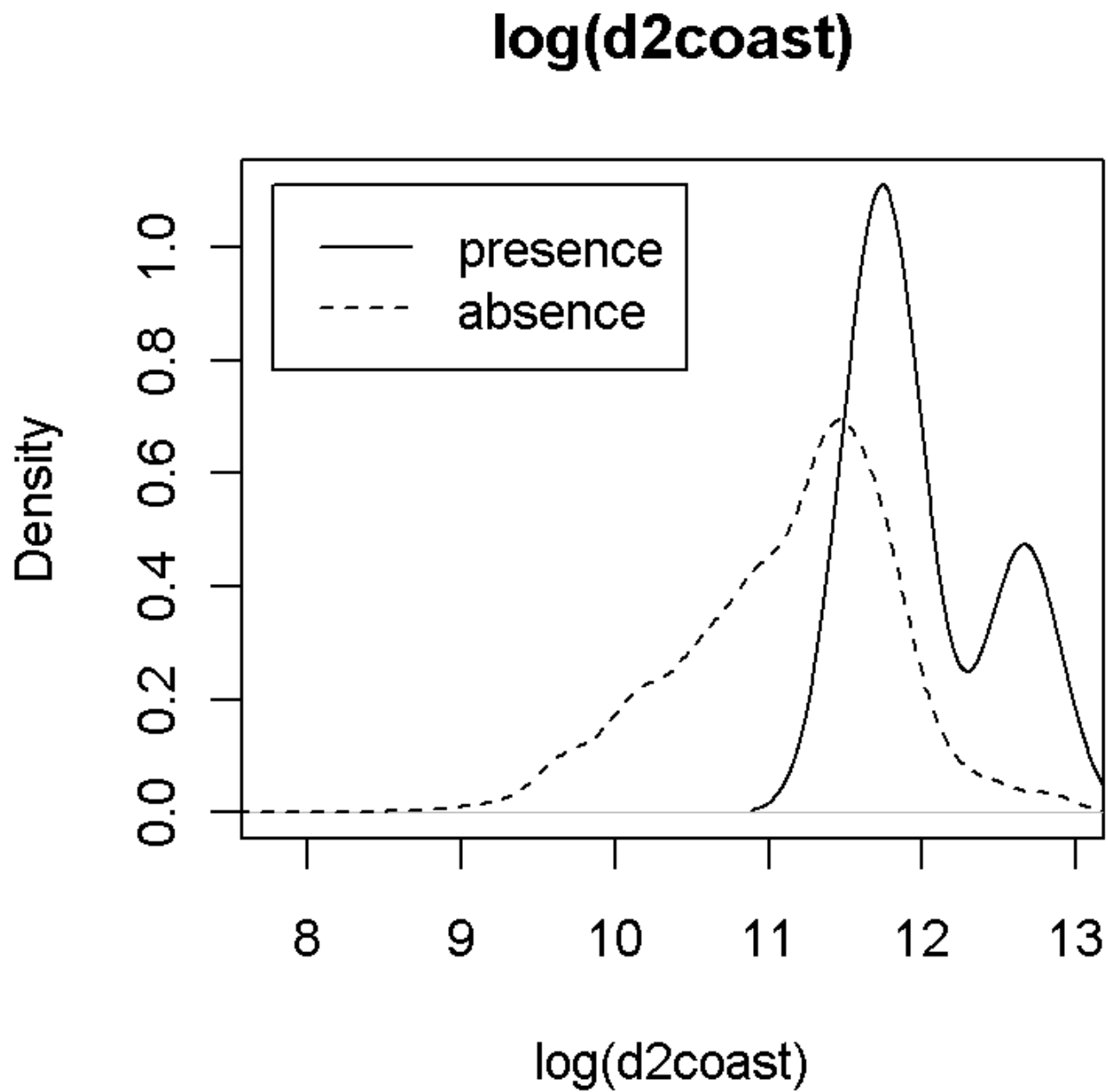


Figure 579: Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'fall' season in 'east2' region.

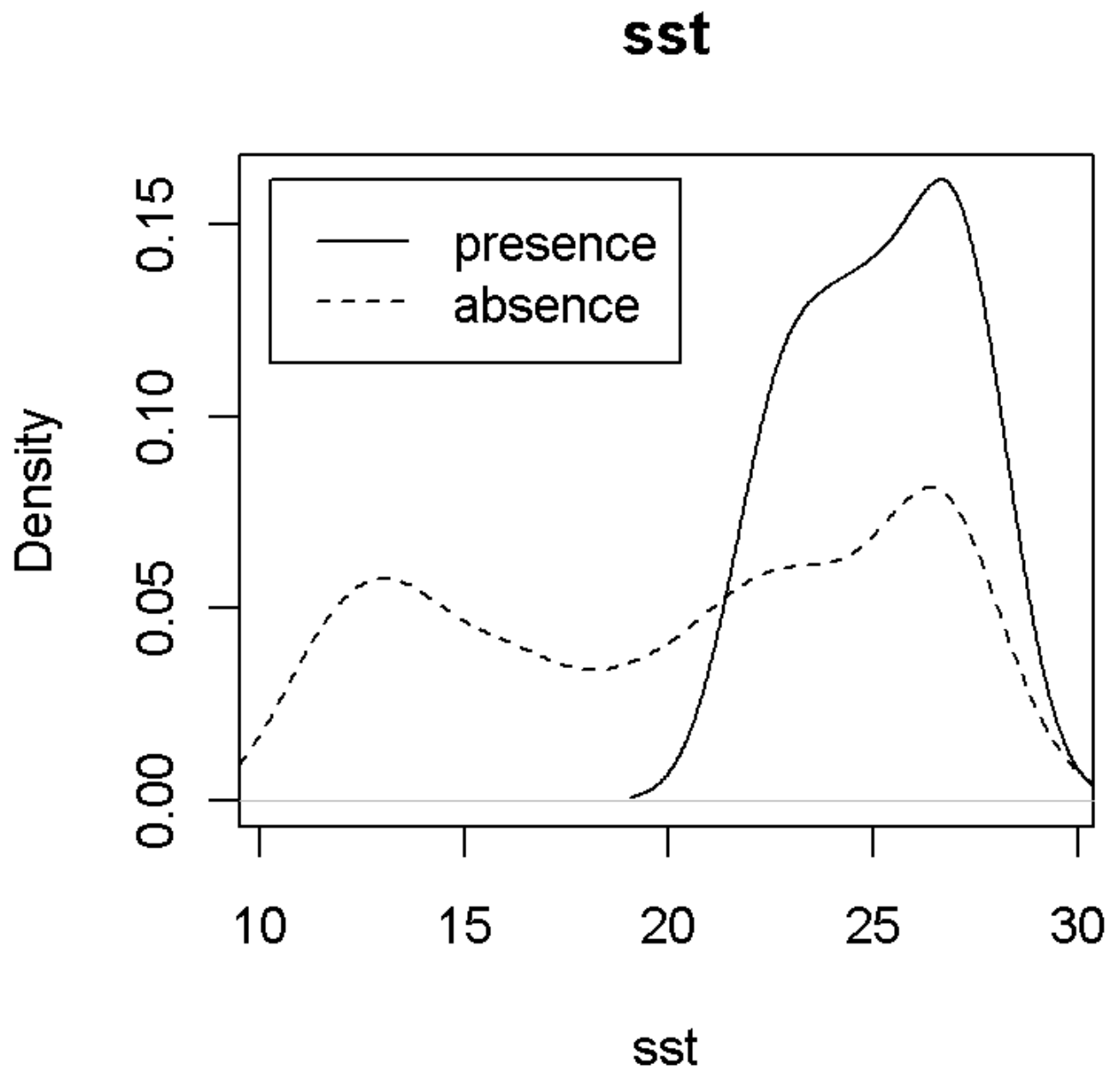


Figure 580: Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'fall' season in 'east2' region.

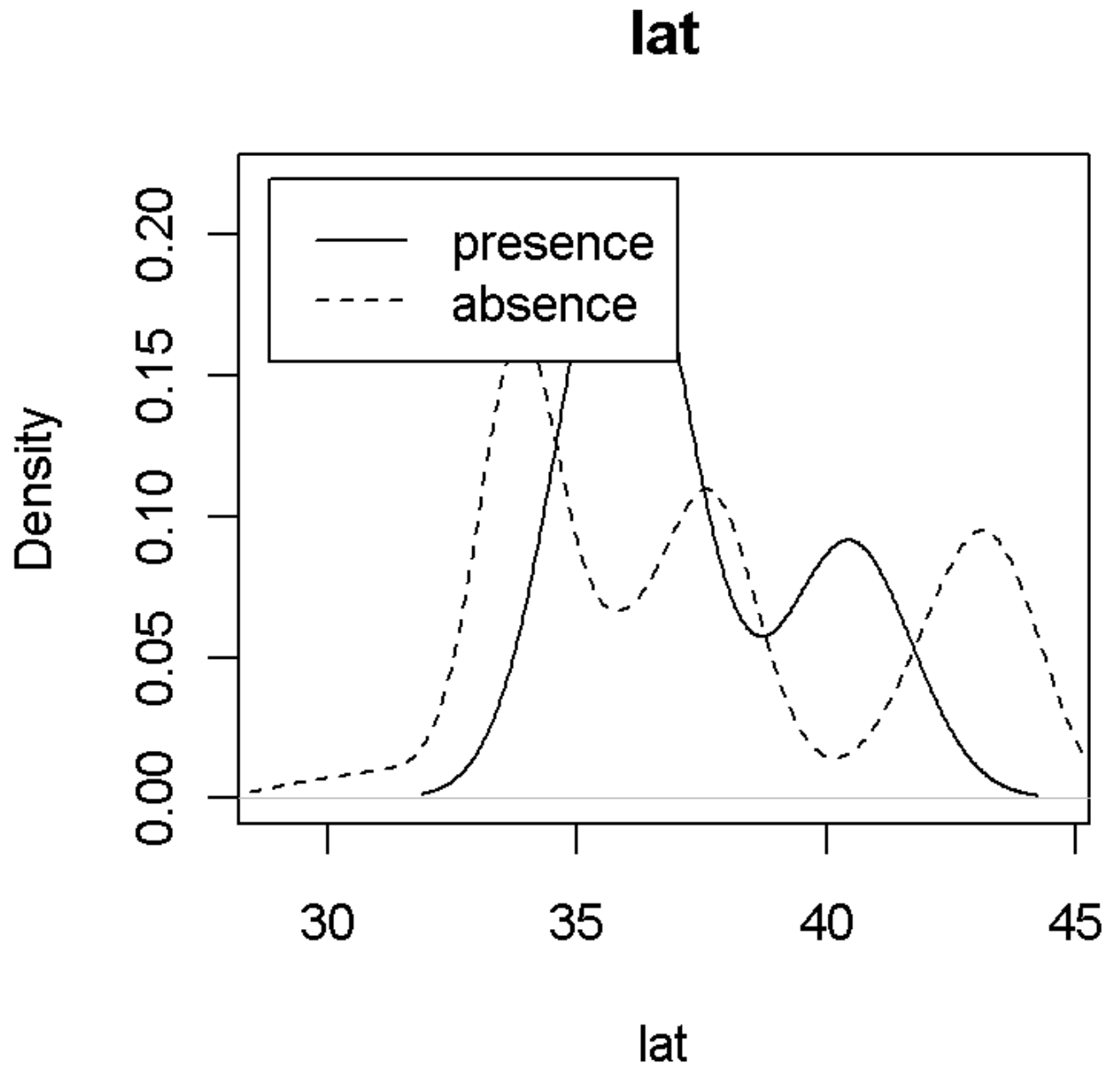


Figure 581: Density histogram of latitude (degrees) for 'Sperm whales' guild during 'fall' season in 'east2' region.

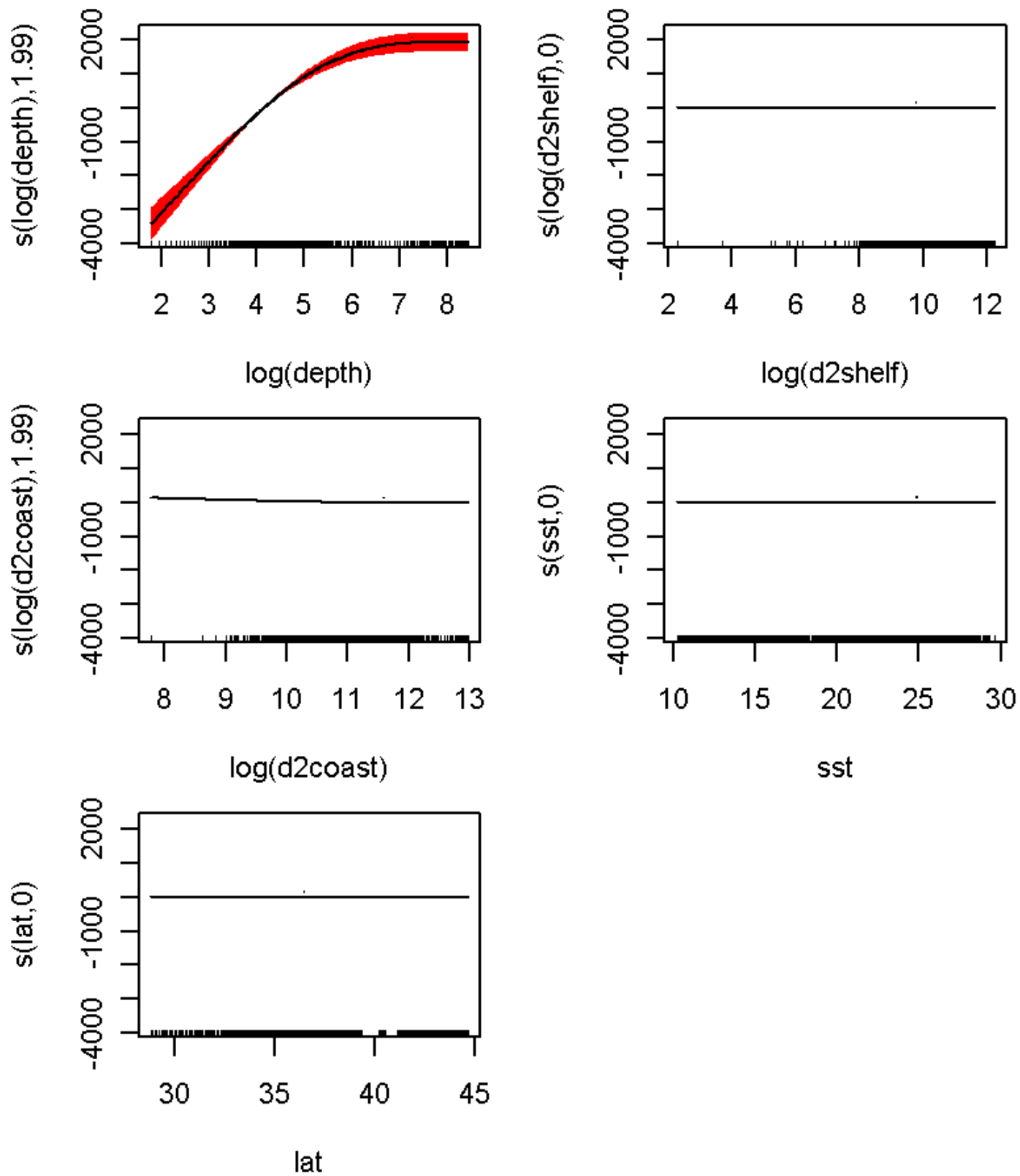


Figure 582: Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'fall' season in 'east2' region.

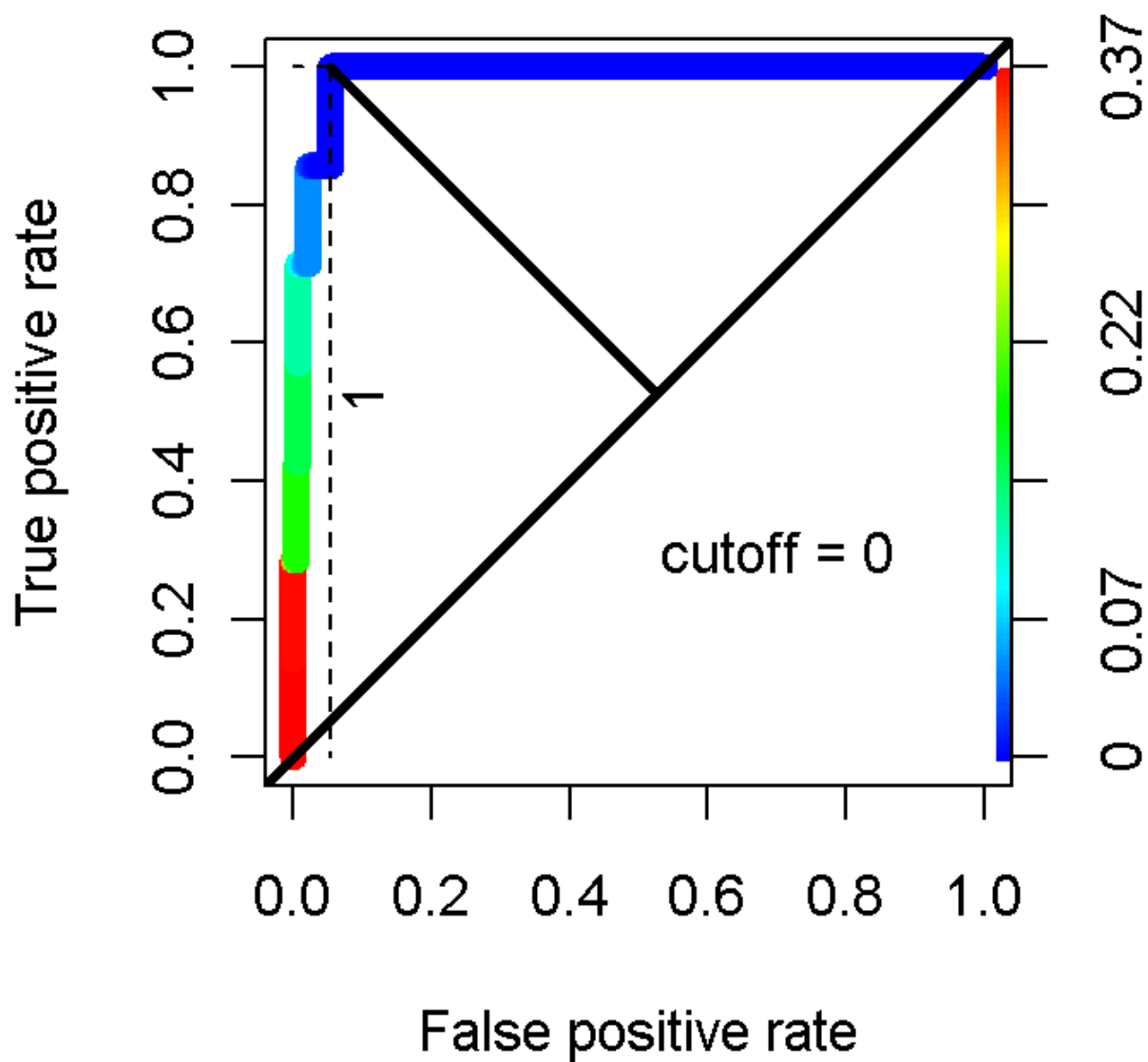


Figure 583: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'fall' season in 'east2' region.

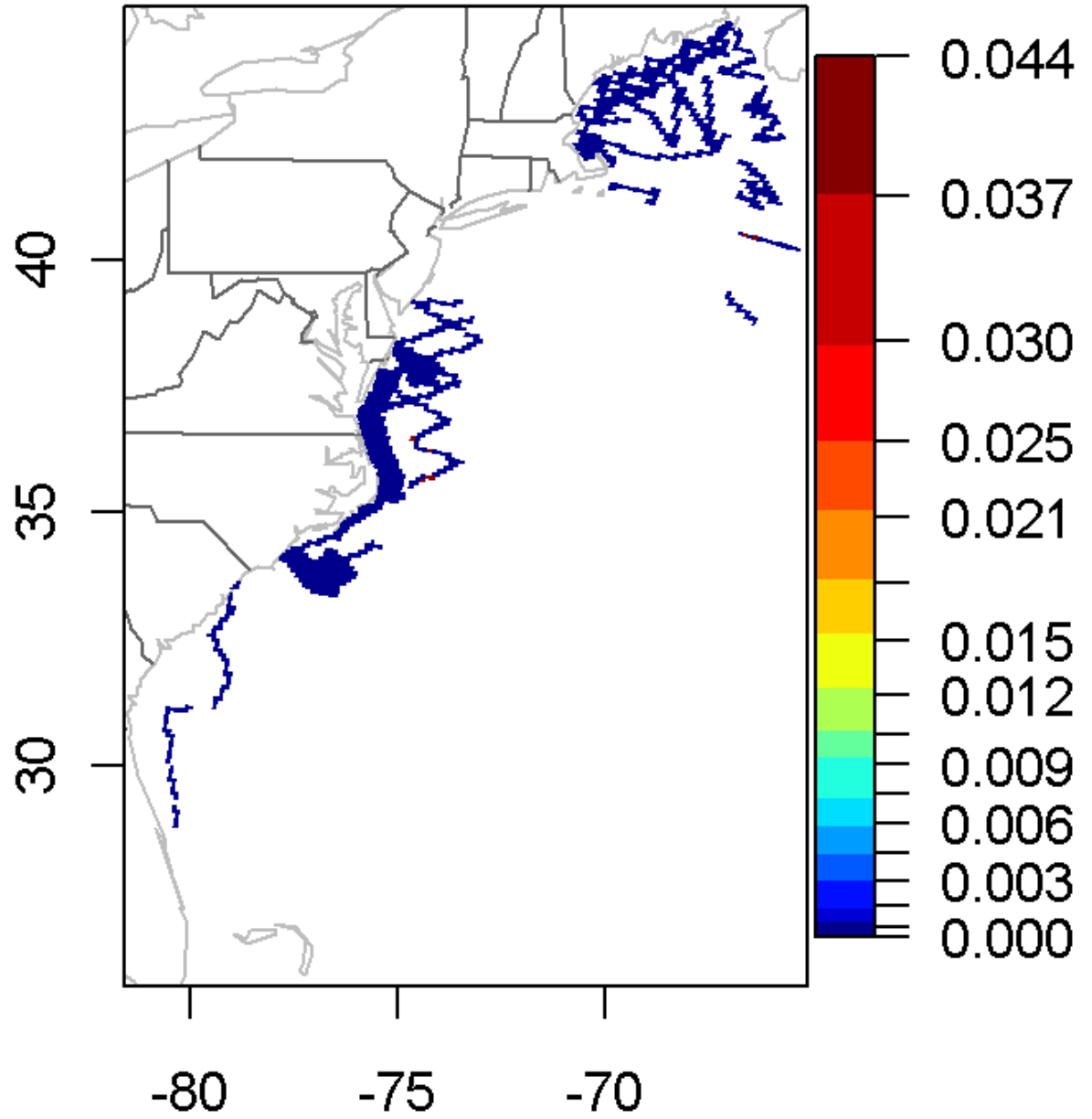


Figure 584: Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'fall' season in 'east2' region.

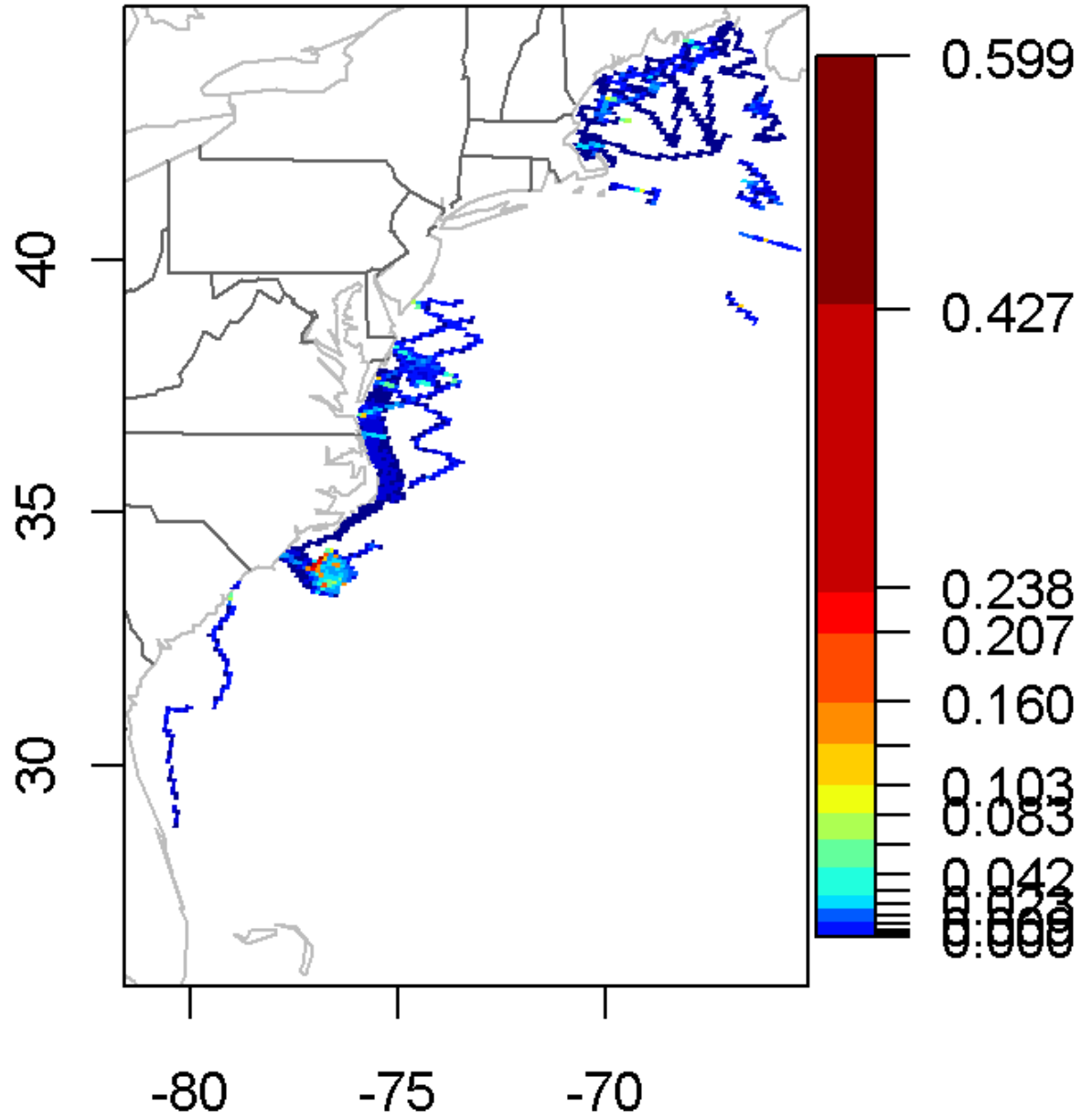


Figure 585: Map of effort(hours/km²) by cell summed through time for 'Sperm whales' guild during 'fall' season in 'east2' region.

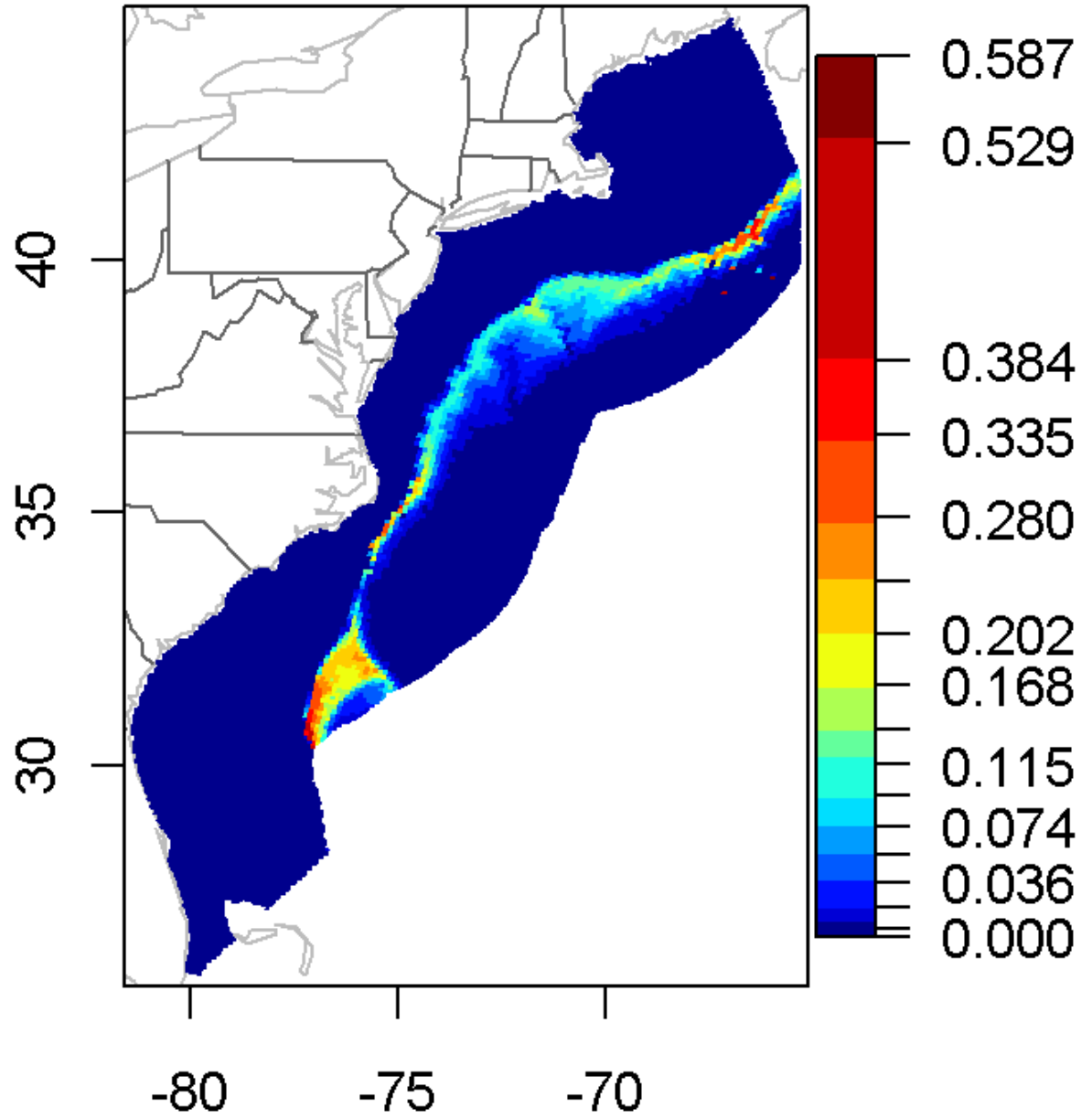


Figure 586: Map of mean predicted habitat for 'Sperm whales' guild during 'fall' season in 'east2' region.

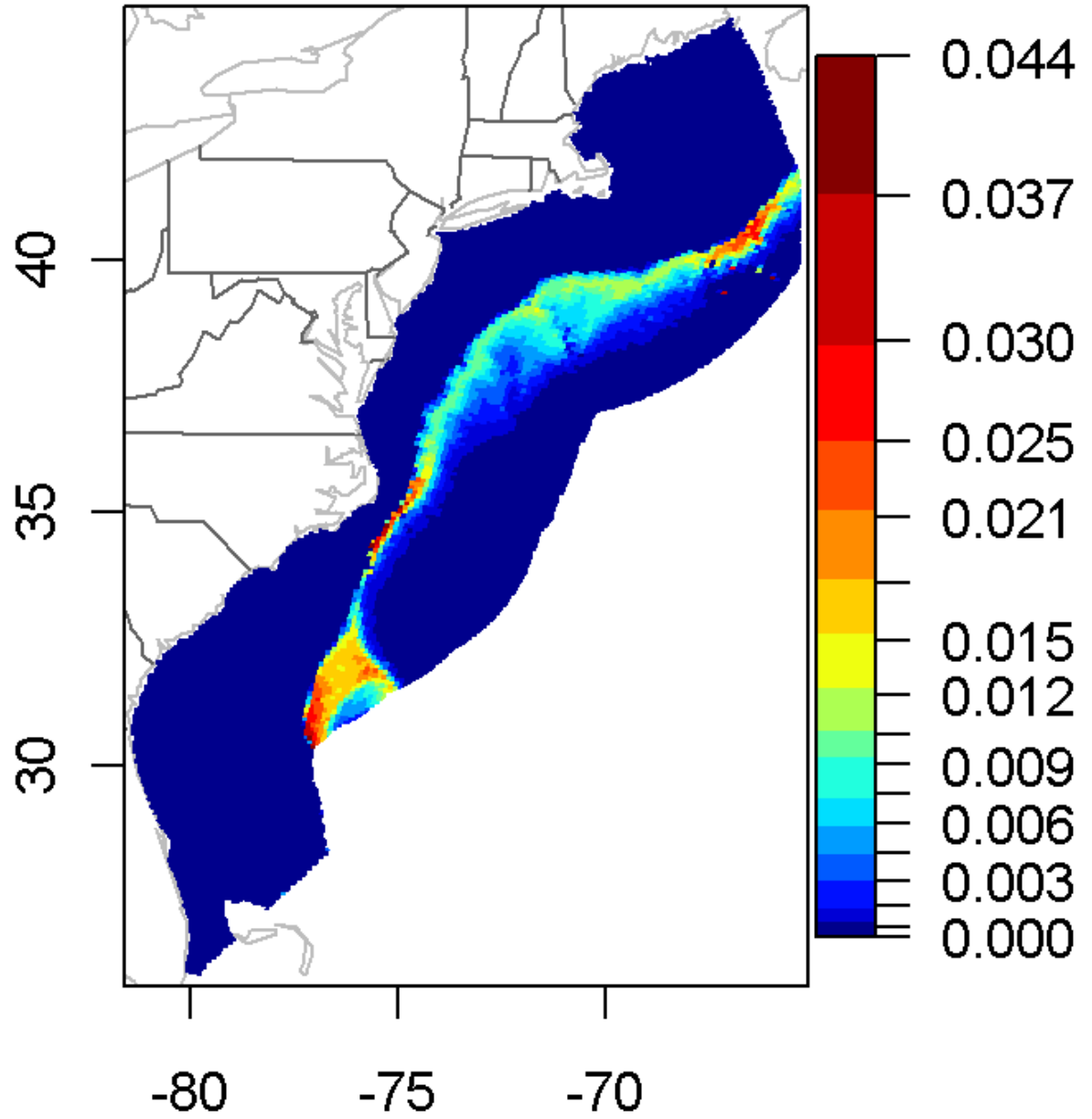


Figure 587: Map of standard error of habitat for 'Sperm whales' guild during 'fall' season in 'east2' region.

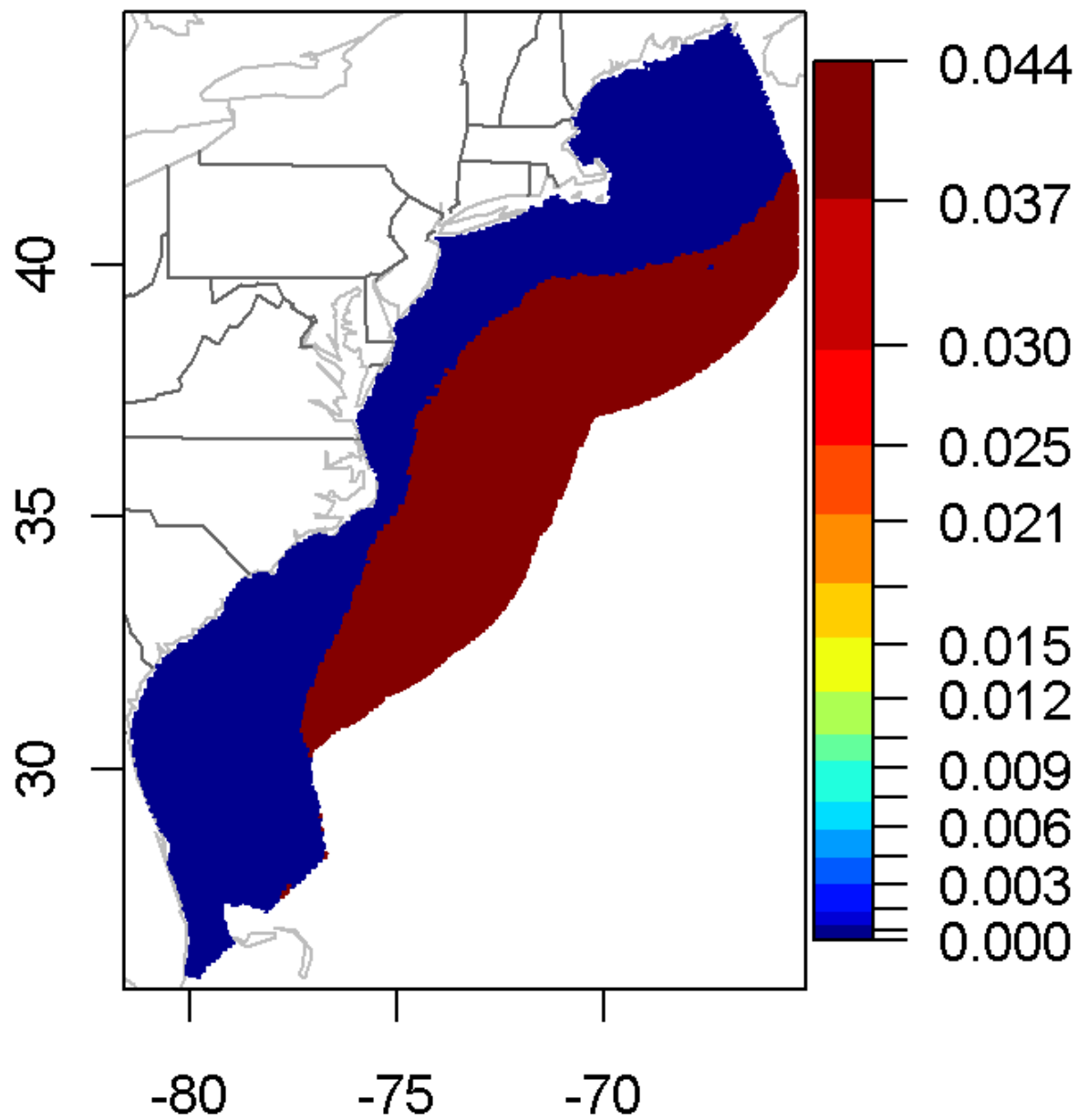


Figure 588: Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'fall' season in 'east2' region.

13.1.2 gomex2

Modelrun identifier: duke_06_sw3_fall_gomex2

Date generated: 2008-10-21 11:41:13

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 56: Summary for duke(6) GAM model: for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

	Value
Number.presences	7
Number.absences	938
GAM.converged	TRUE
R.squared	0.031616
Deviance.explained	0.486829
ROC.optimum	0.271424
Maximum.fit	0.00468359
Maximum.prediction	0.271744

Model text summary...

```
duke_06_sw3_fall_gomex2 run on Tue Oct 21 11:40:39 2008
  provider:duke, version:06, guild:Sperm whales (sw3), season:'fall', region:gomex2

max.fit:0.271424, max.prediction:0.271744, ROC.optimum:0.004684

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -169.74      18.38   -9.234   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F  p-value
s(log(depth))  1.982e+00  2.482   30.57 3.72e-16 ***
s(log(d2shelf)) 2.234e-07  0.500  2.71e-05   0.944
s(log(d2coast)) 1.986e+00  2.486   37.13 < 2e-16 ***
s(sst)         1.519e-06  0.500  9.57e-05   0.923
s(lat)         1.912e-06  0.500  1.26e-07   0.985
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0316   Deviance explained = 48.7%
GCV score = 0.00019451   Scale est. = 0.00019267   n = 945

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:945  Min.   : 445  Min.   :  5.0  Min.   : 272  Min.   : 7624  Min.   :26.55  Min.   :24.99
             1st Qu.:4911 1st Qu.: 34.0  1st Qu.: 16509 1st Qu.: 58082 1st Qu.:28.35 1st Qu.:27.82
             Median :6184 Median : 78.0  Median : 35259  Median : 96847 Median :28.73 Median :28.52
             Mean   :5818 Mean   :271.2  Mean   : 48230  Mean   :104429 Mean   :28.76 Mean   :28.43
             3rd Qu.:7227 3rd Qu.:292.0  3rd Qu.: 69013 3rd Qu.:142239 3rd Qu.:29.17 3rd Qu.:29.18
             Max.   :8350 Max.   :3301.0  Max.   :185683  Max.   :276406 Max.   :30.52 Max.   :30.35

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   :  1  Min.   :  3.0  Min.   : 272  Min.   : 5317  Min.   :24.52  Min.   :23.85
             1st Qu.:1861 1st Qu.: 46.0  1st Qu.: 31617 1st Qu.: 85289 1st Qu.:26.62 1st Qu.:26.28
             Median :4110 Median : 433.5  Median : 71100  Median :157258 Median :27.23 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:27.10	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:27.60	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:28.80	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:5.562e-16	Min.	:0.000e+00	Min.	:8.387e-06	Min.	:0.00000
1st Qu.	:1861	1st Qu.	:2.220e-16	1st Qu.	:5.950e-15	1st Qu.	:0.000e+00	1st Qu.	:2.380e-03	1st Qu.	:0.00000
Median	:4110	Median	:2.502e-10	Median	:4.540e-10	Median	:0.000e+00	Median	:4.635e-03	Median	:0.00000
Mean	:3997	Mean	:6.018e-03	Mean	:1.003e-03	Mean	:8.444e-03	Mean	:8.436e-03	Mean	:0.08753
3rd Qu.	:6015	3rd Qu.	:2.880e-06	3rd Qu.	:3.012e-06	3rd Qu.	:0.000e+00	3rd Qu.	:6.374e-03	3rd Qu.	:0.00000
Max.	:8351	Max.	:2.717e-01	Max.	:2.883e-02	Max.	:1.000e+00	Max.	:1.241e-01	Max.	:1.00000
						NA's	:5.843e+03	NA's	:5.843e+03		

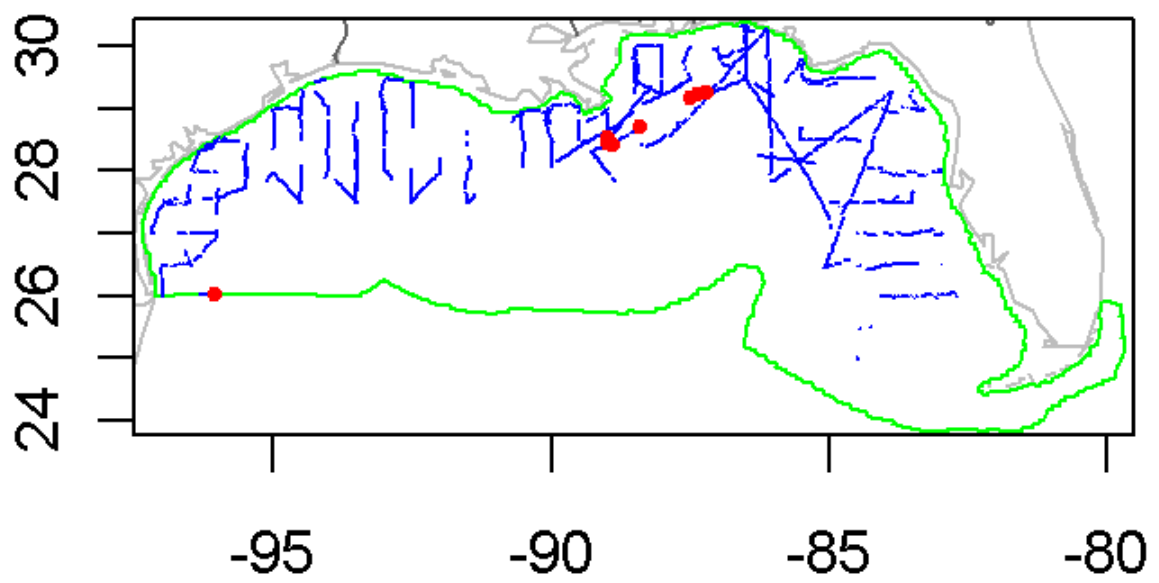


Figure 589: Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

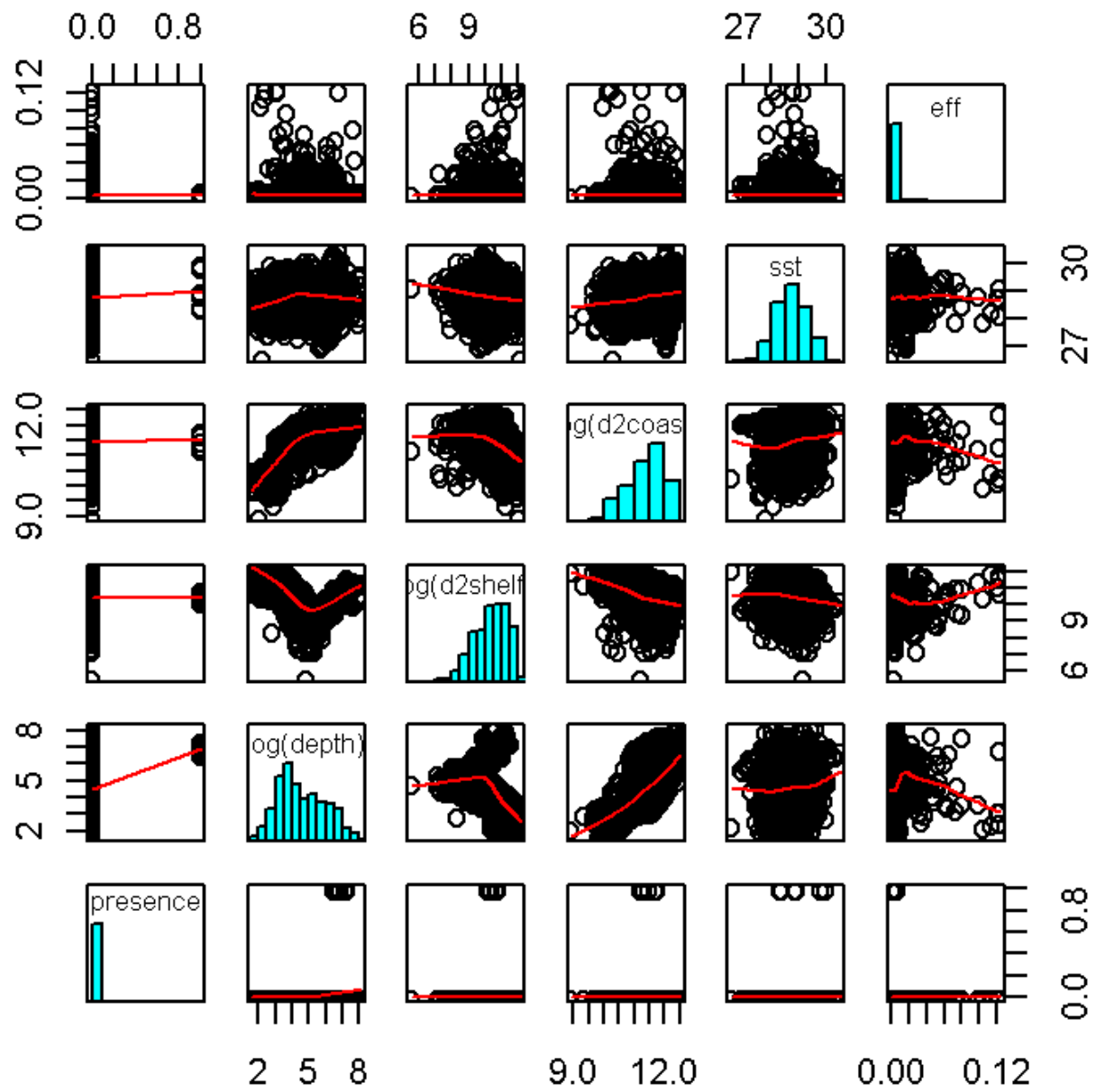


Figure 590: Pairs plot of input variables for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

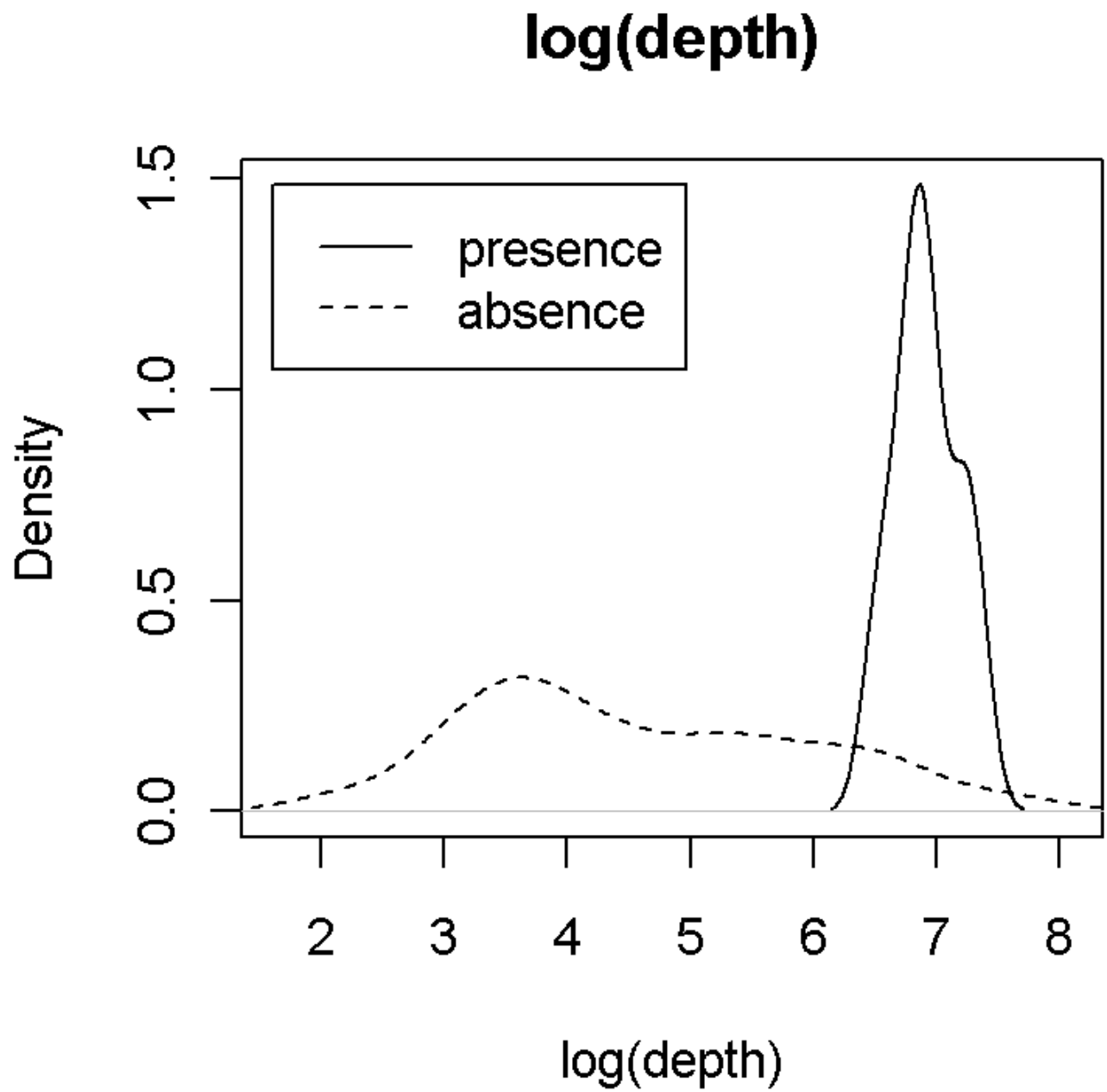


Figure 591: Density histogram of depth log(meters) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

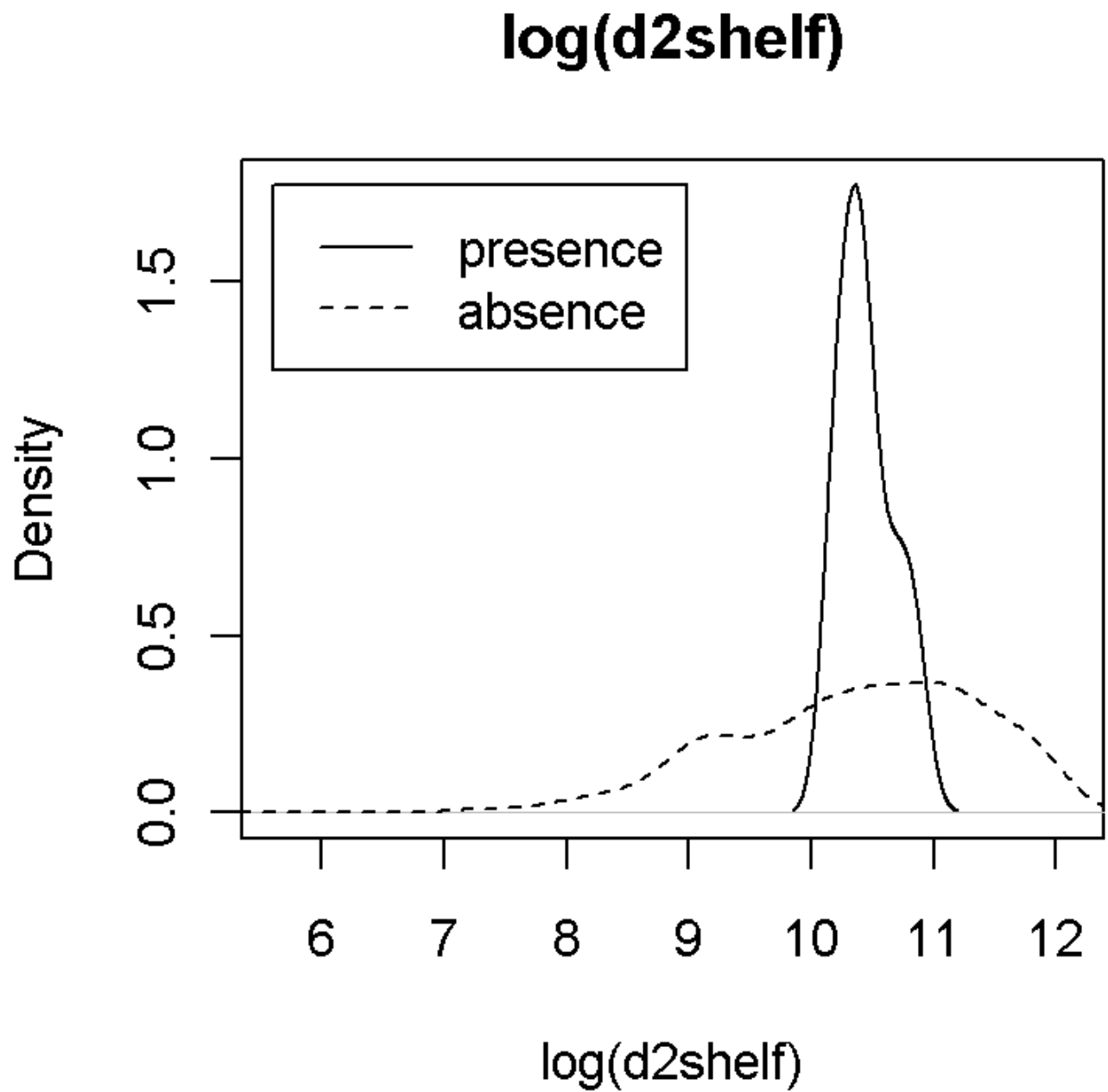


Figure 592: Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

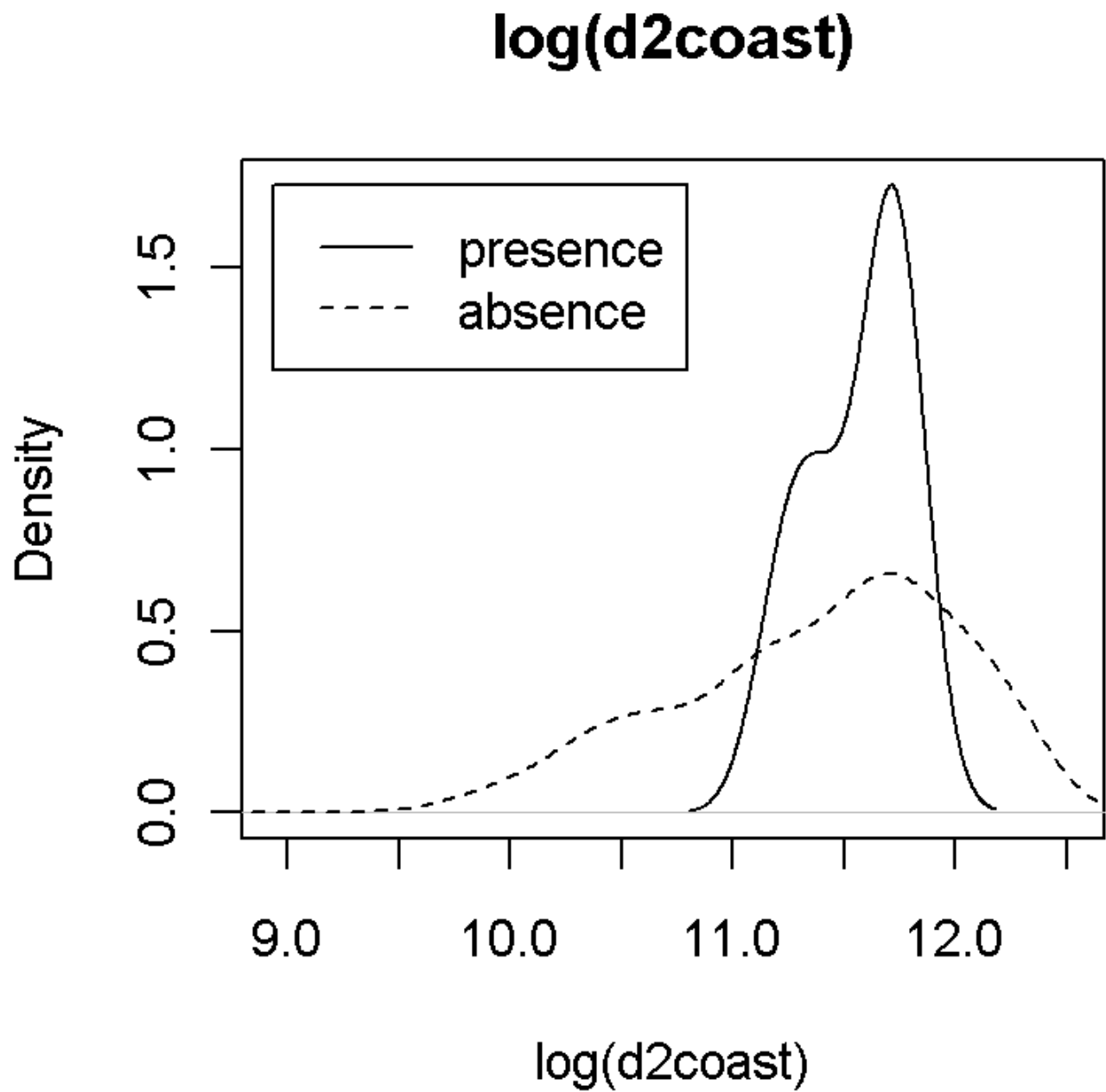


Figure 593: Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

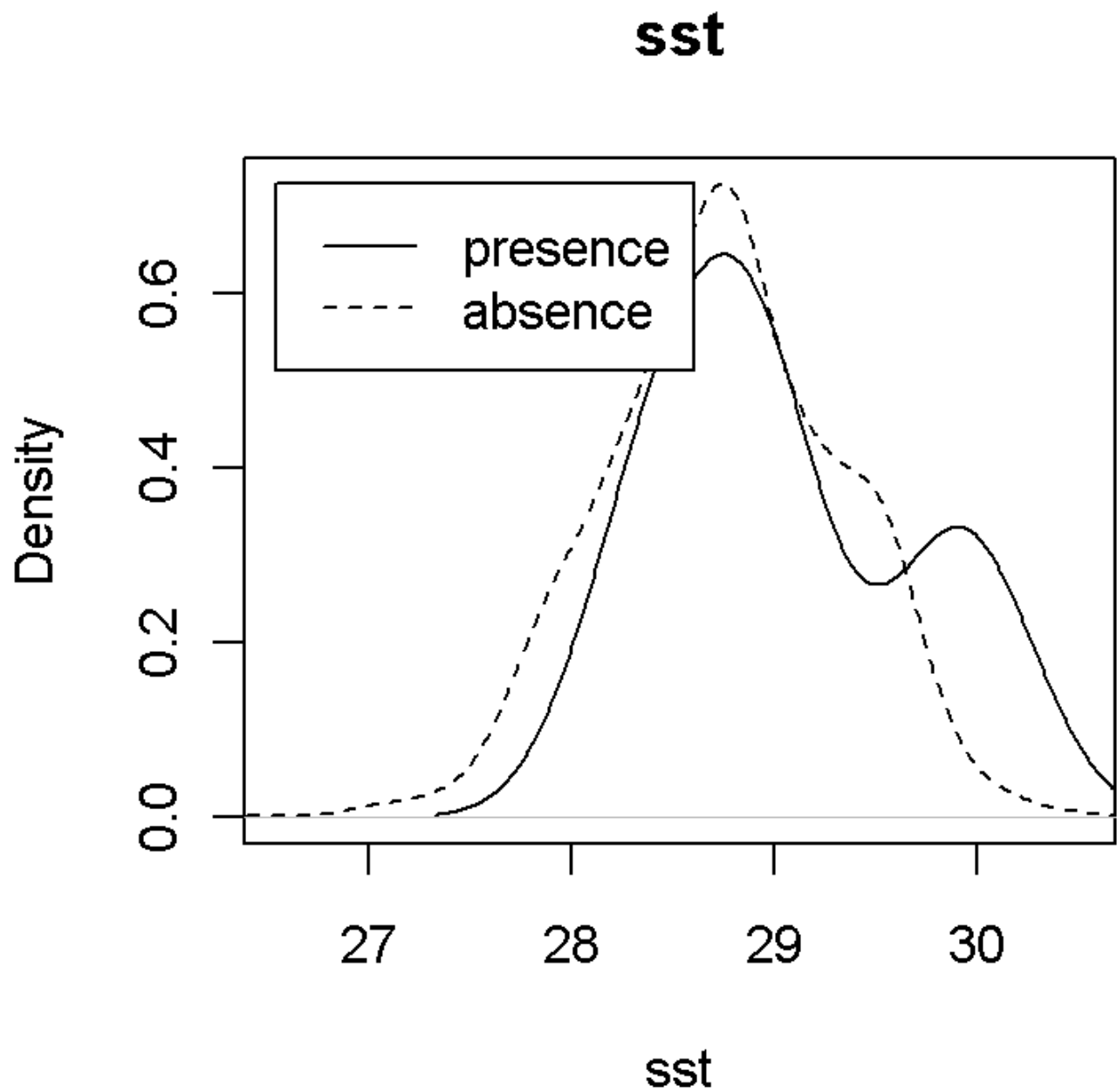


Figure 594: Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

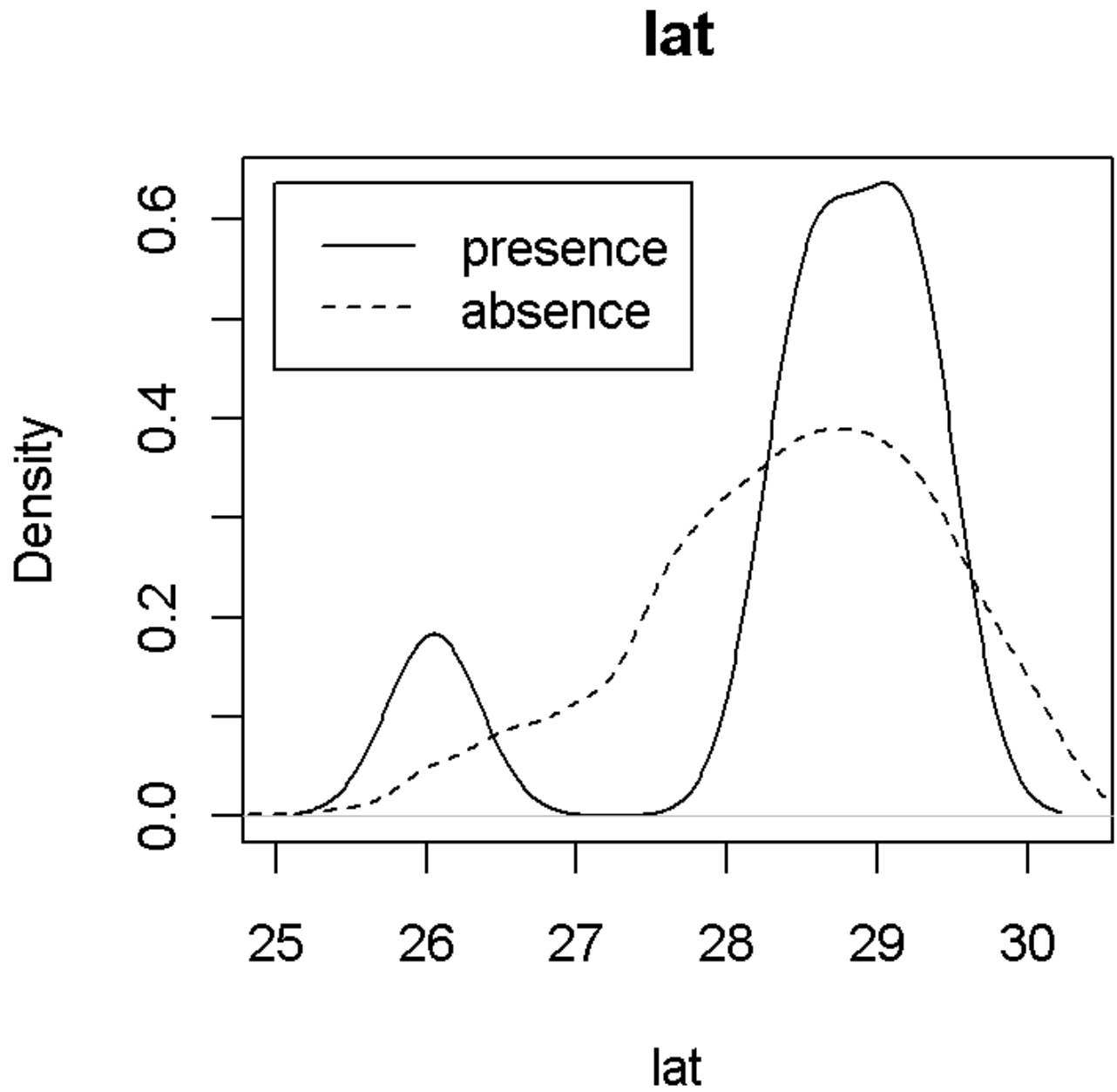


Figure 595: Density histogram of latitude (degrees) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

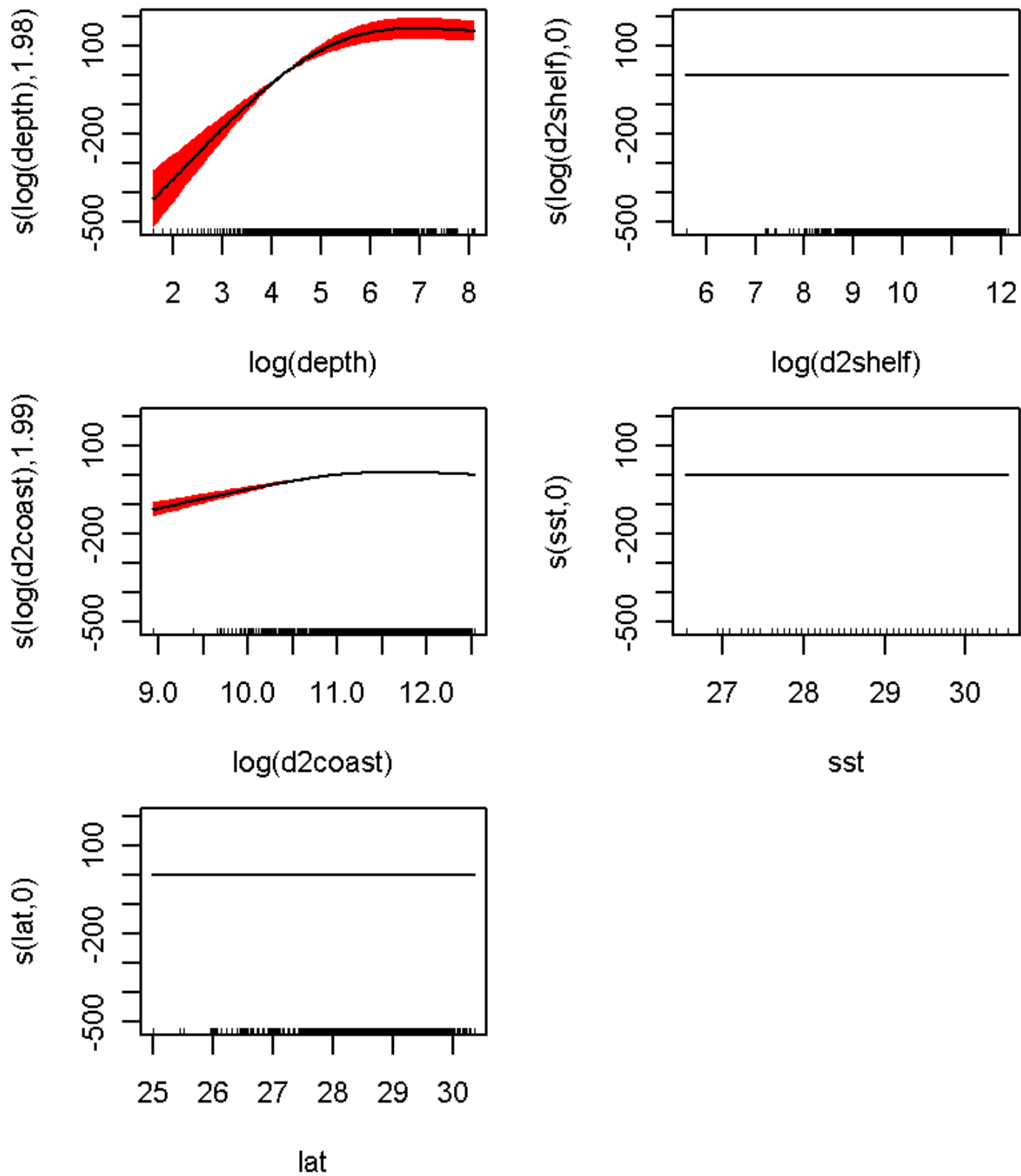


Figure 596: Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

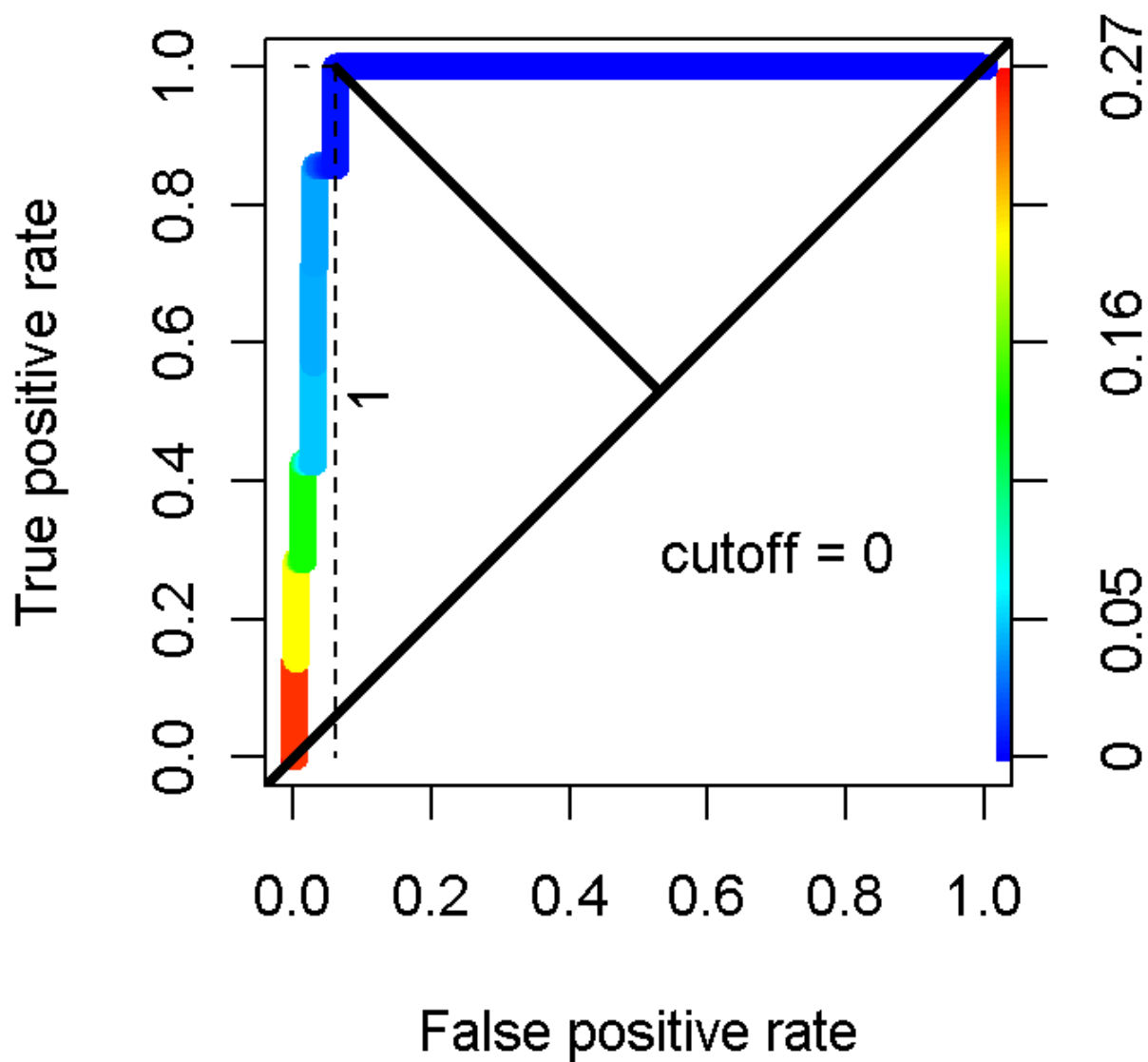


Figure 597: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

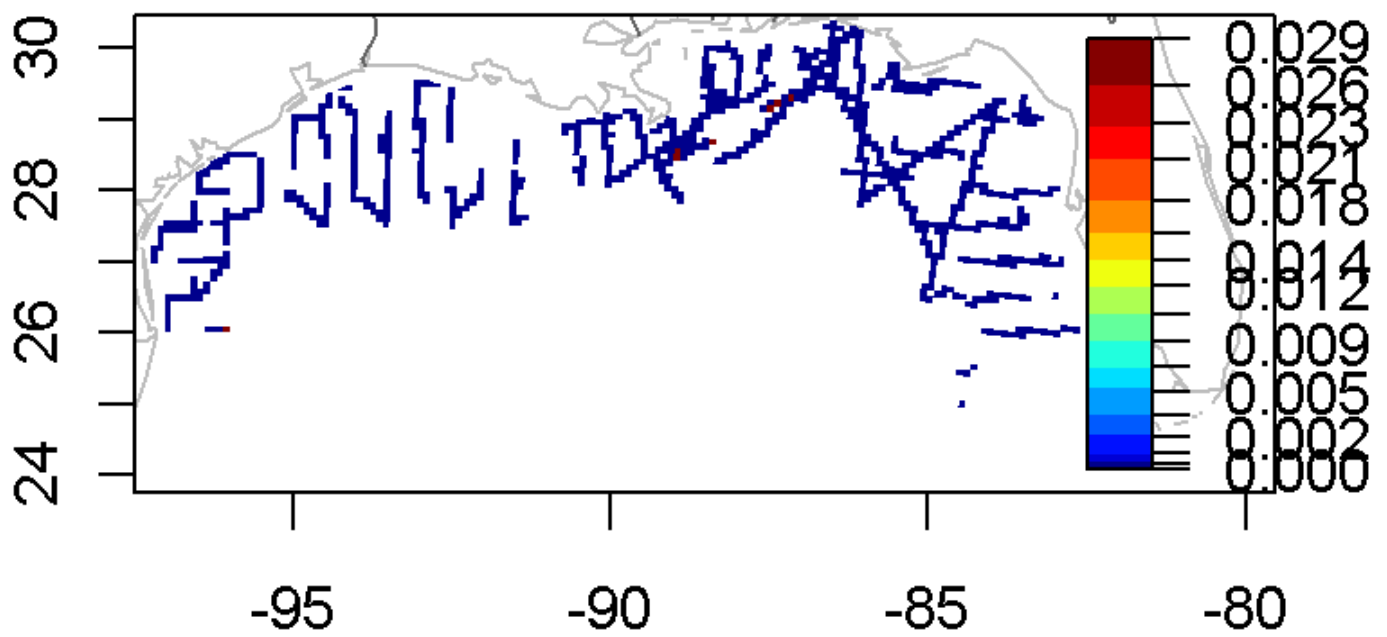


Figure 598: Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

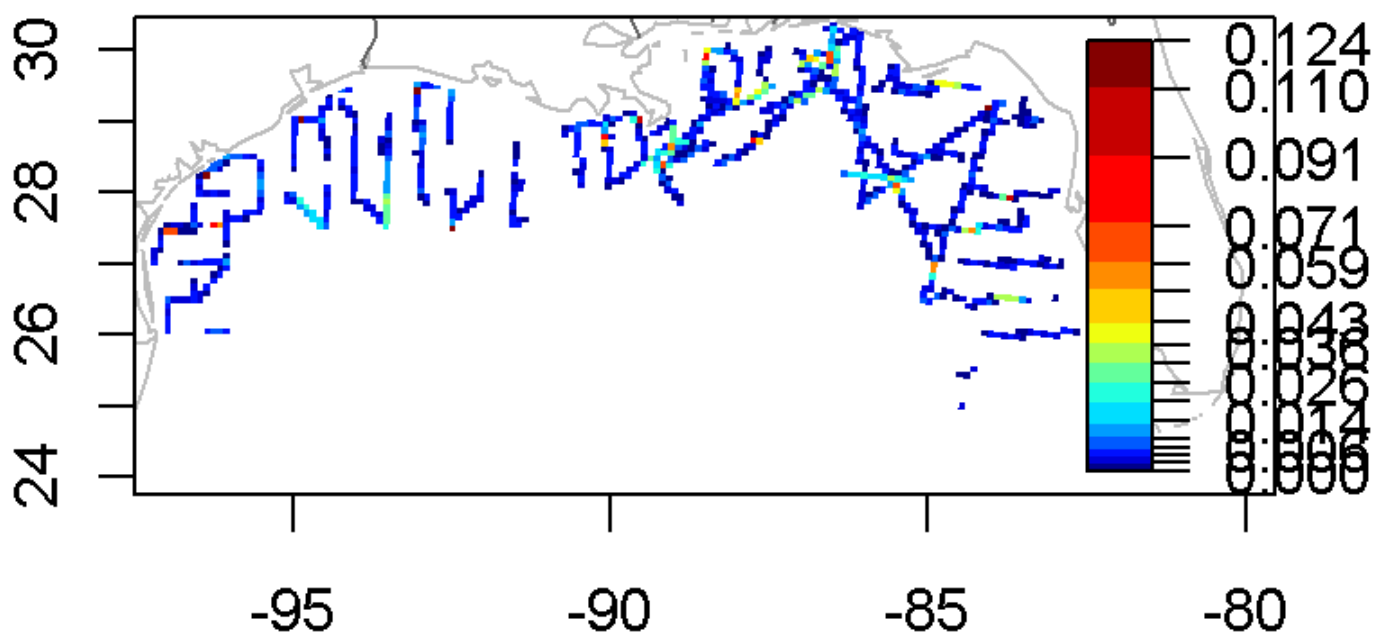


Figure 599: Map of effort(hours/km²) by cell summed through time for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

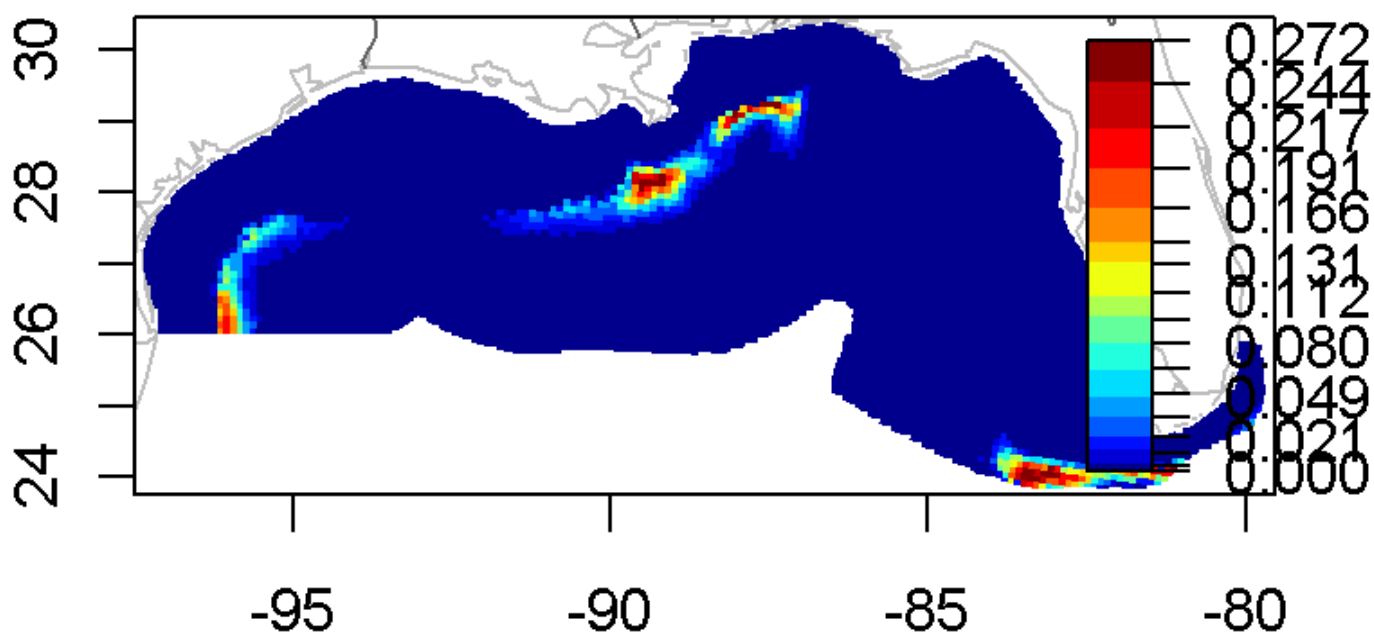


Figure 600: Map of mean predicted habitat for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

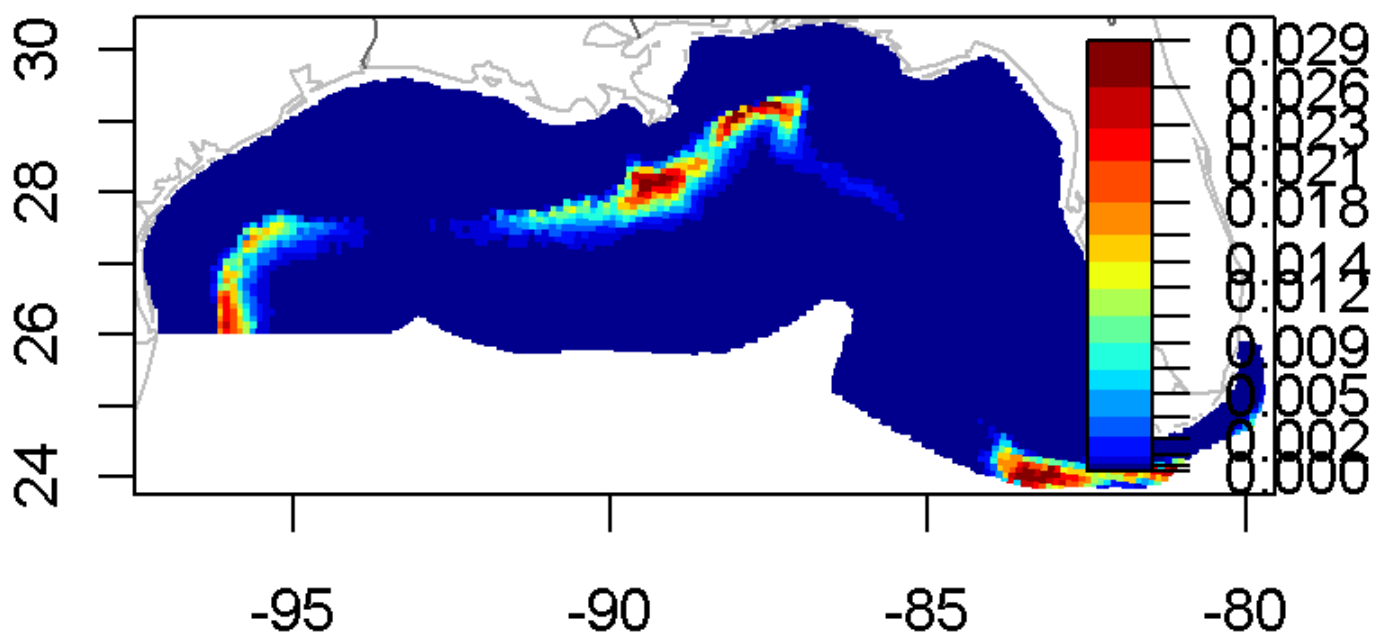


Figure 601: Map of standard error of habitat for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

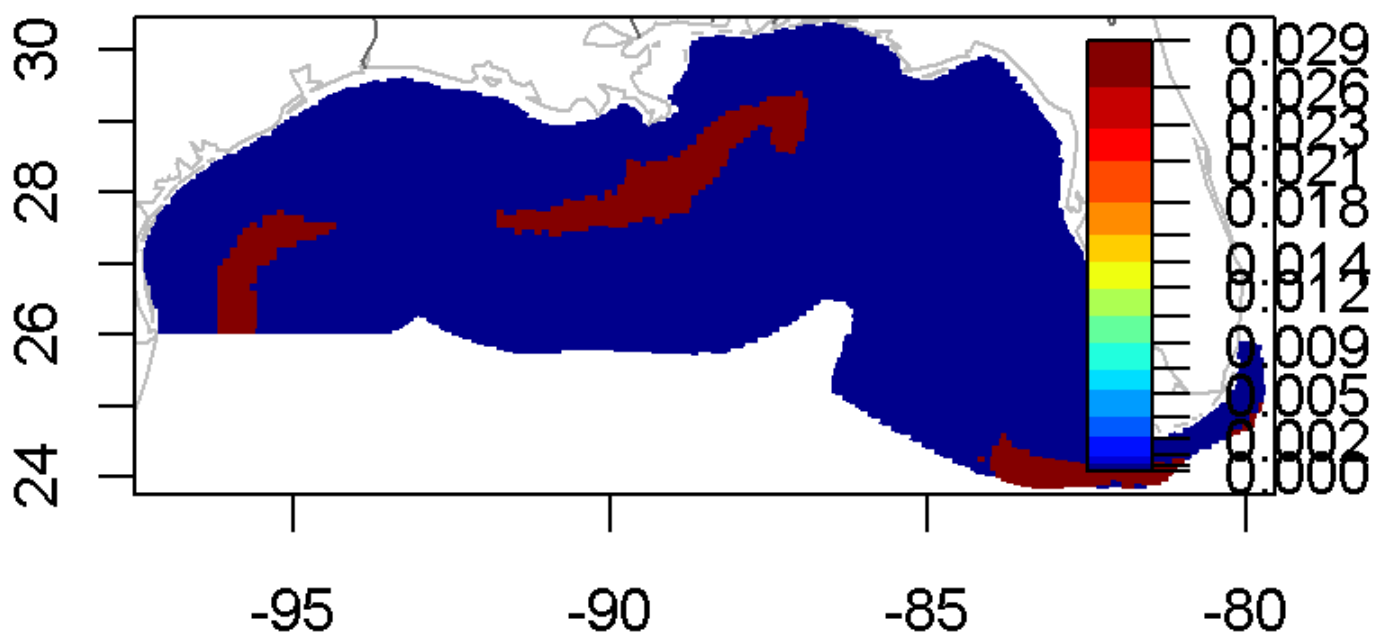


Figure 602: Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'fall' season in 'gomex2' region.

13.2 spring

13.2.1 east2

Modelrun identifier: duke_06_sw3_spring_east2

Date generated: 2008-10-21 14:52:12

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 57: Summary for duke(6) GAM model: for 'Sperm whales' guild during 'spring' season in 'east2' region.

	Value
Number.presences	8
Number.absences	2865
GAM.converged	TRUE
R.squared	-0.620905
Deviance.explained	0.419754
ROC.optimum	0.18516
Maximum.fit	0.0206627
Maximum.prediction	0.685671

Model text summary...

```
duke_06_sw3_spring_east2 run on Tue Oct 21 14:50:49 2008
provider:duke, version:06, guild:Sperm whales (sw3), season:'spring', region:east2

max.fit:0.185160, max.prediction:0.685671, ROC.optimum:0.020663

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -11.0309      0.4657  -23.69  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F  p-value
s(log(depth))  1.981e+00 2.4809 106.169  < 2e-16 ***
s(log(d2shelf)) 1.955e+00 2.4548  13.232 2.05e-07 ***
s(log(d2coast)) 1.581e-03 0.5016   0.001   0.851
s(sst)          8.829e-08 0.5000   4e-06   0.965
s(lat)          9.828e-01 1.4828  71.724  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = -0.621  Deviance explained = 42%
GCV score = 7.2827e-05  Scale est. = 7.2515e-05  n = 2490

summary(dat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1087  Min.    : 1654  Min.    : 4.0  Min.    : 995  Min.    : 1471  Min.    : 4.886  Min.    :26.17
se2:1786  1st Qu.:10323  1st Qu.: 20.0  1st Qu.: 13946  1st Qu.: 32021  1st Qu.: 13.386  1st Qu.:33.83
          Median :10844  Median : 29.0  Median : 31680  Median : 52718  Median : 17.732  Median :34.55
          Mean   : 9852  Mean   : 236.4  Mean   : 41188  Mean   : 60965  Mean   : 16.976  Mean   :34.44
          3rd Qu.:11293  3rd Qu.: 45.0  3rd Qu.: 56624  3rd Qu.: 75007  3rd Qu.: 20.903  3rd Qu.:35.66
          Max.    :15889  Max.    :5270.0  Max.    :329182  Max.    :420801  Max.    : 26.475  Max.    :42.39
                   NA's      : 6      NA's      : 6      NA's      :378.000

summary(newdat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    : 4  Min.    : 5  Min.    : 1259  Min.    : 2.850  Min.    :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.: 9.675  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :20.025	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.626	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.575	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :26.175	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :1.386e-15  Min.   :0.000e+00  Min.   :2.601e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:7.613e-08  1st Qu.:1.444e-07  1st Qu.:0.000e+00  1st Qu.:5.086e-04  1st Qu.:0.0000
Median :11616  Median :1.348e-05  Median :1.335e-05  Median :0.000e+00  Median :3.743e-03  Median :0.0000
Mean   :11171  Mean   :1.930e-02  Mean   :4.459e-03  Mean   :8.188e-03  Mean   :1.009e-02  Mean   :0.1104
3rd Qu.:14088  3rd Qu.:1.135e-03  3rd Qu.:6.469e-04  3rd Qu.:0.000e+00  3rd Qu.:9.634e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :6.857e-01  Max.   :9.077e-02  Max.   :1.000e+00  Max.   :2.202e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.911e+03  NA's :8.911e+03
```

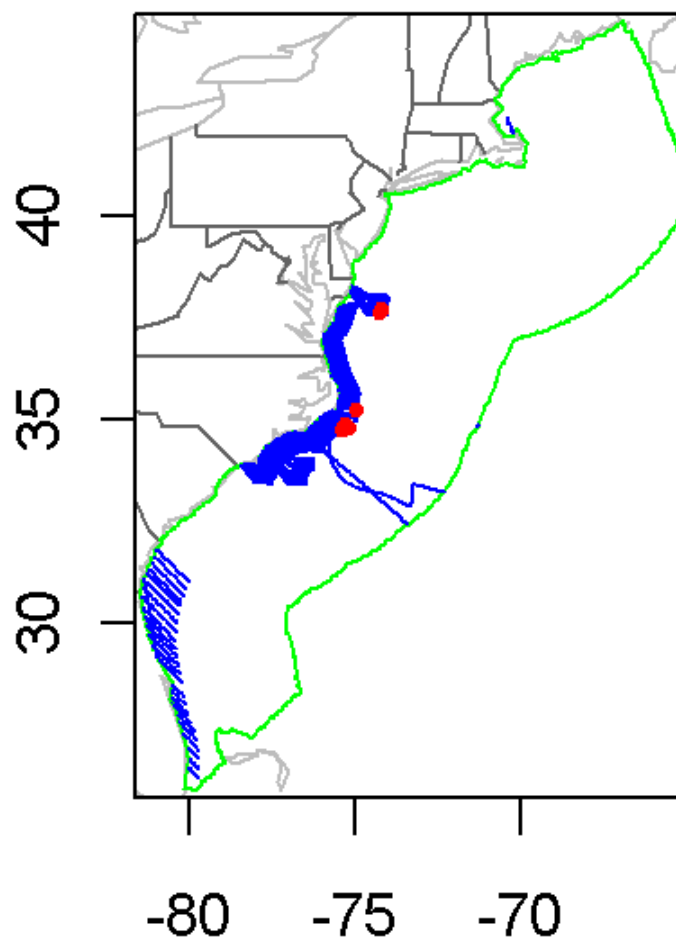


Figure 603: Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'spring' season in 'east2' region.

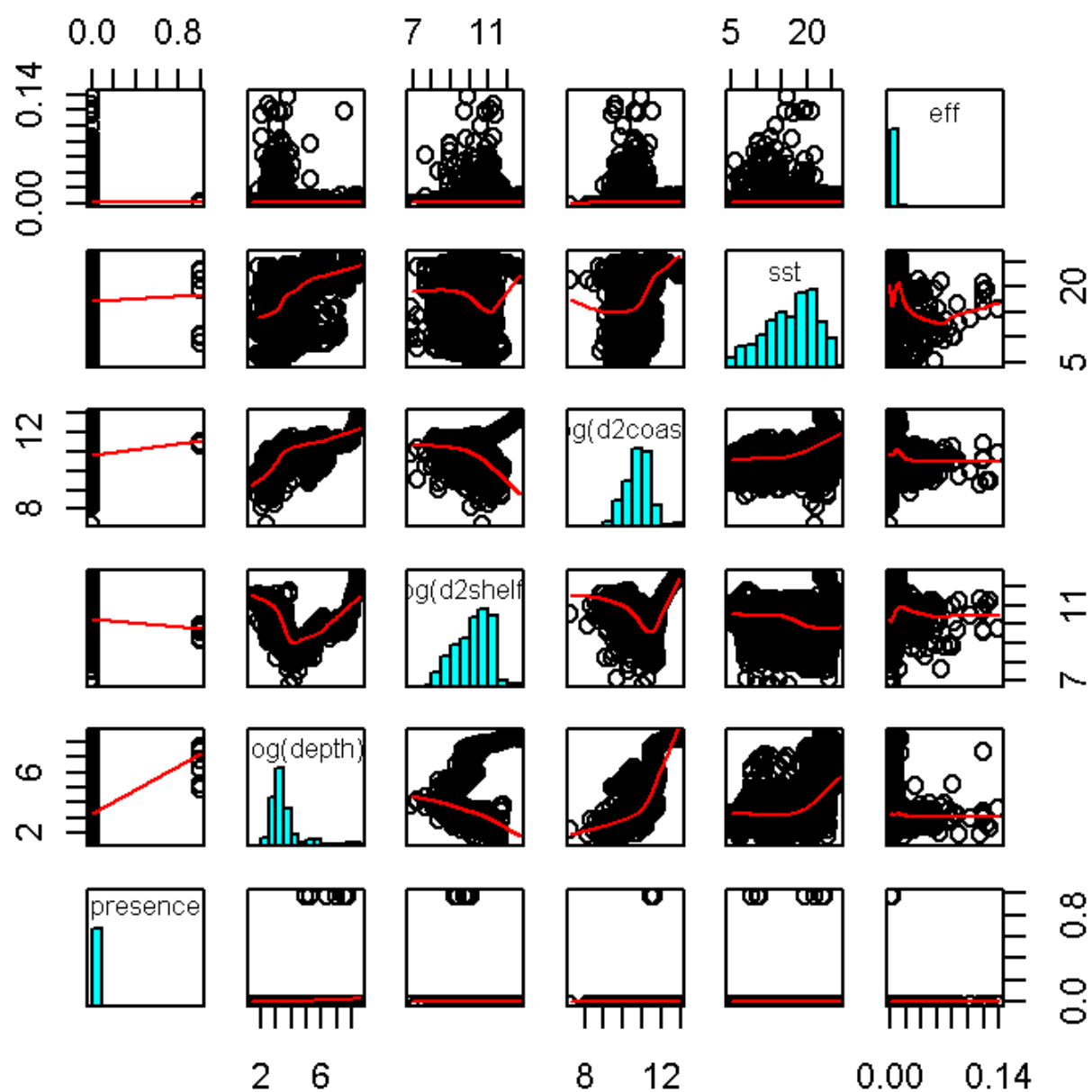


Figure 604: Pairs plot of input variables for 'Sperm whales' guild during 'spring' season in 'east2' region.

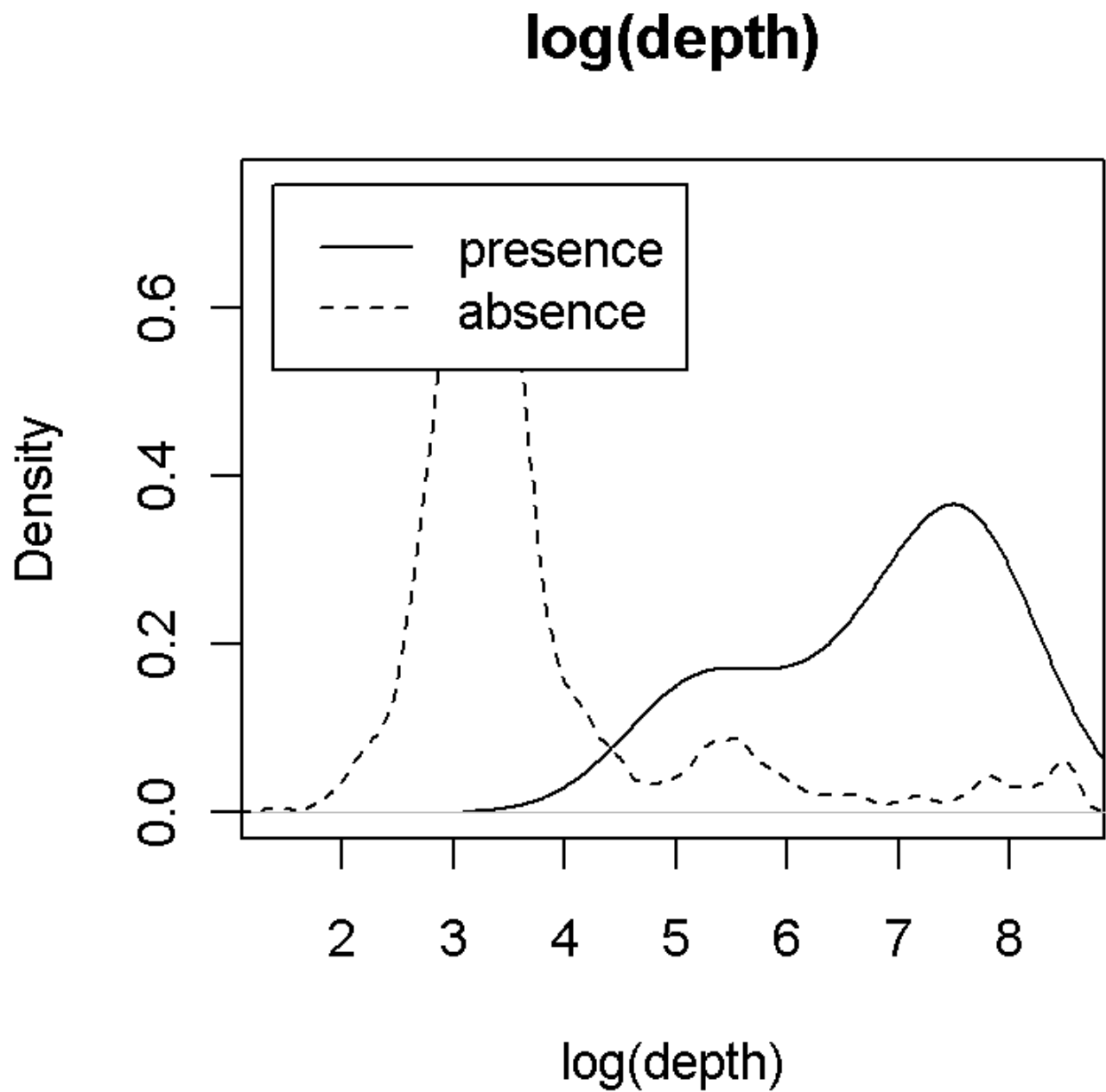


Figure 605: Density histogram of depth log(meters) for 'Sperm whales' guild during 'spring' season in 'east2' region.

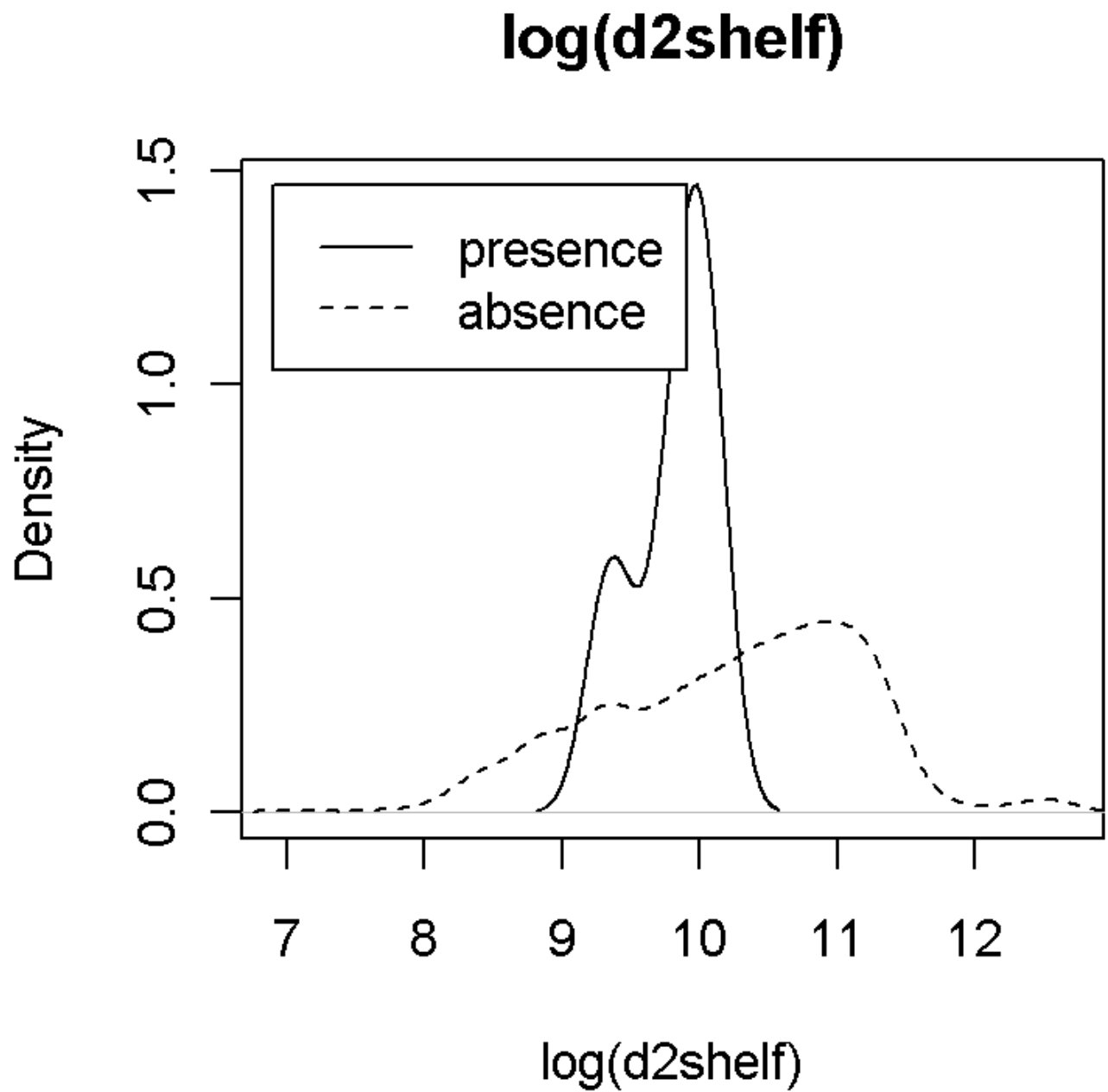


Figure 606: Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'spring' season in 'east2' region.

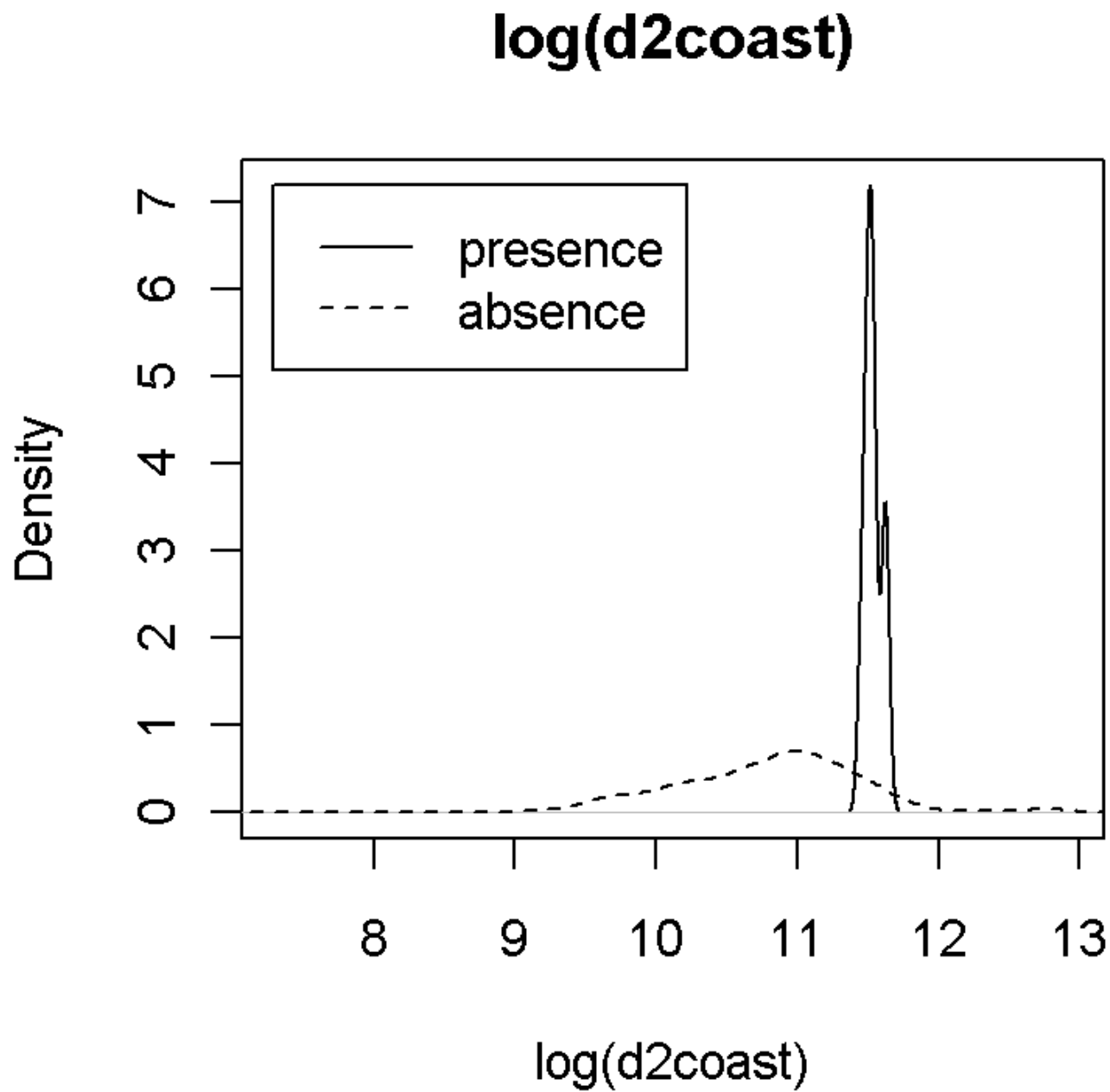


Figure 607: Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'spring' season in 'east2' region.

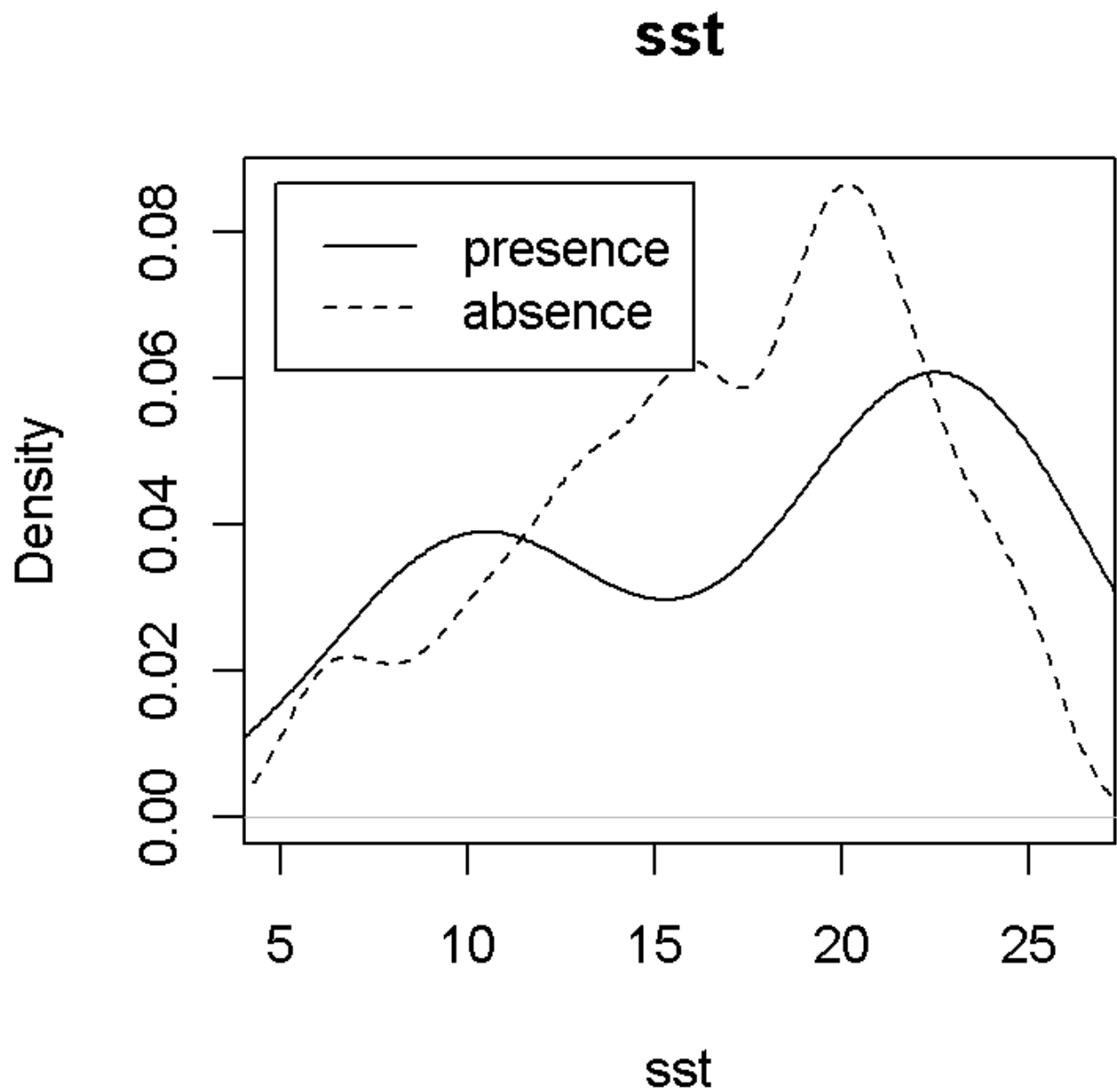


Figure 608: Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'spring' season in 'east2' region.

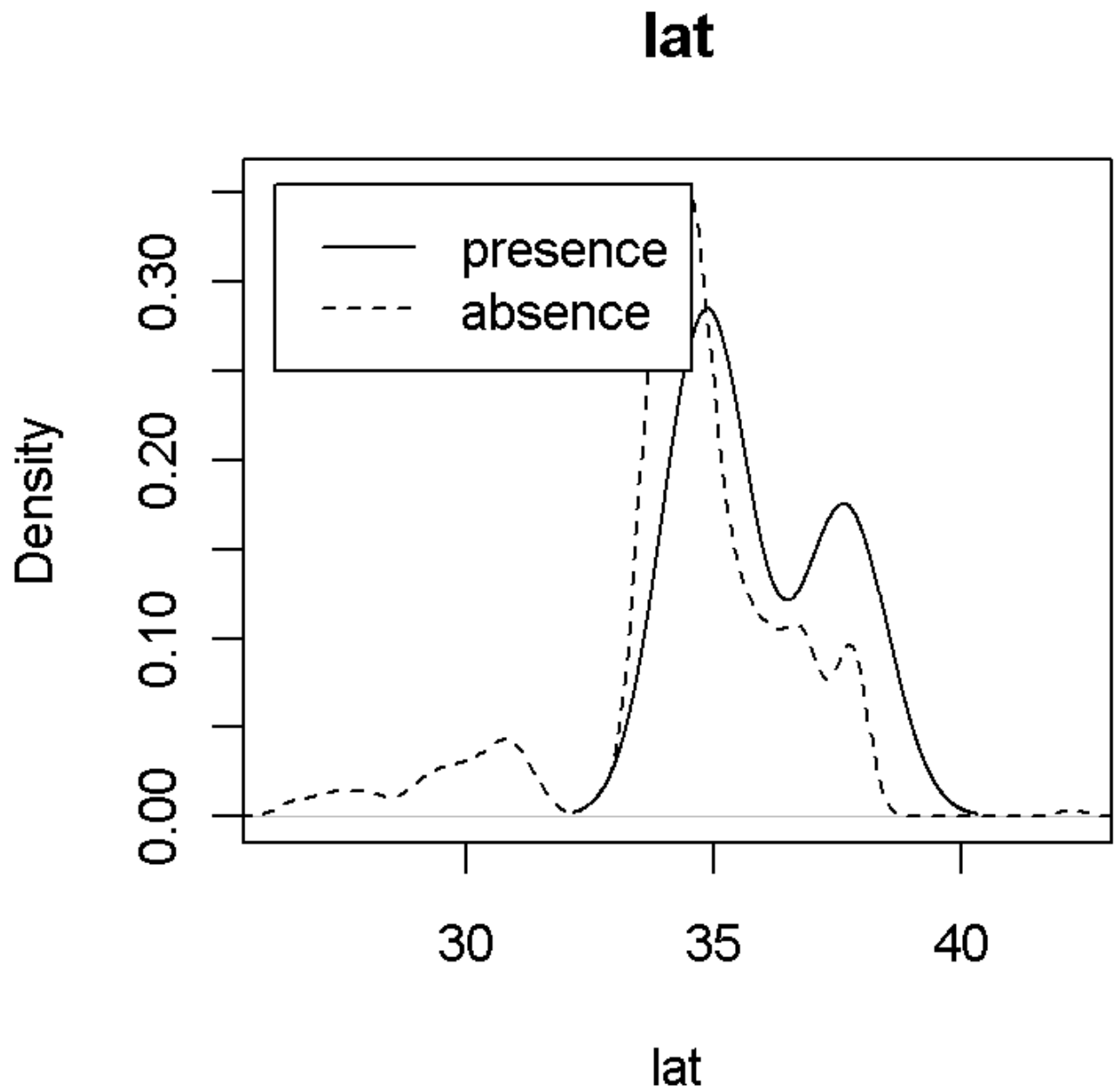


Figure 609: Density histogram of latitude (degrees) for 'Sperm whales' guild during 'spring' season in 'east2' region.

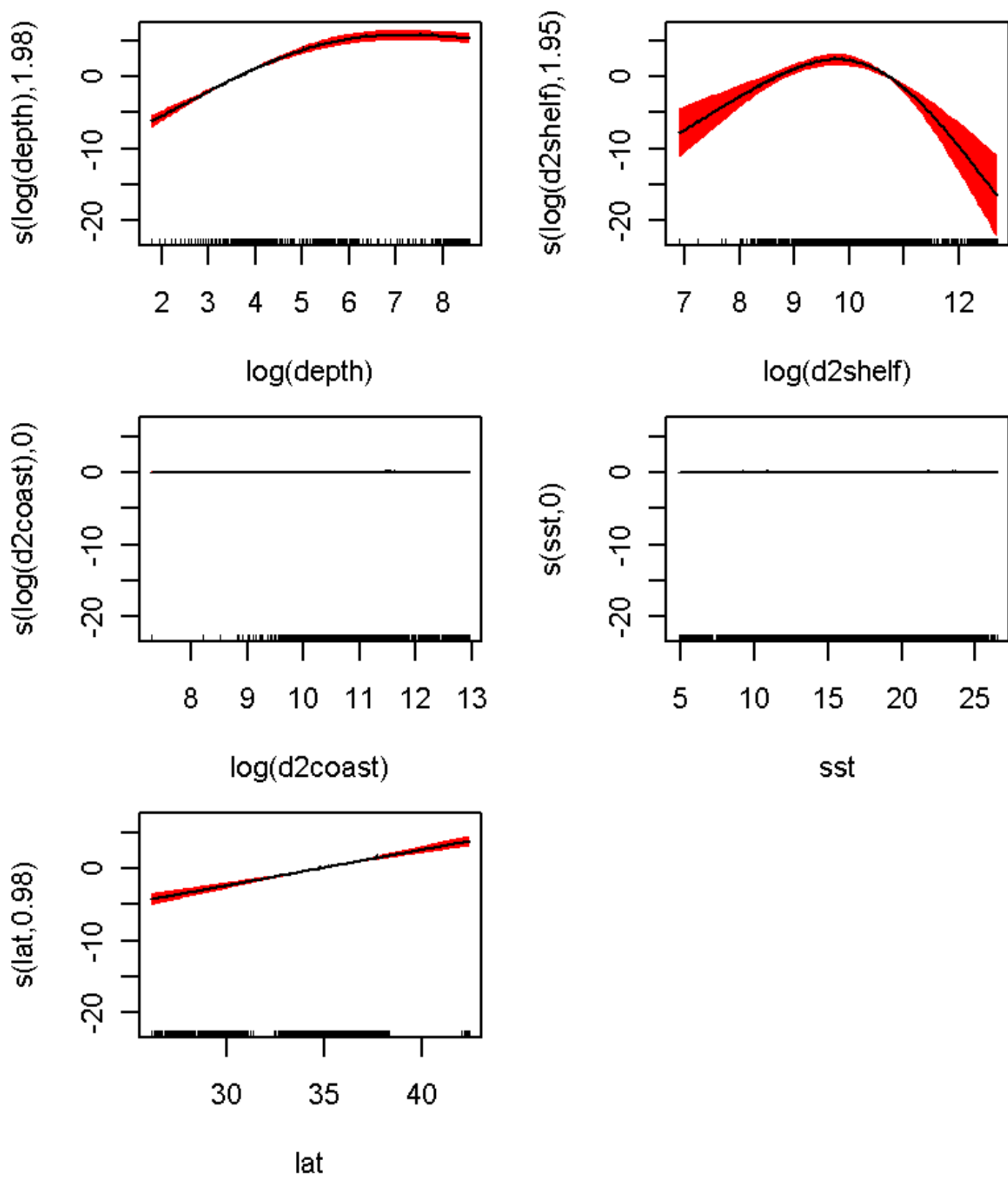


Figure 610: Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'spring' season in 'east2' region.

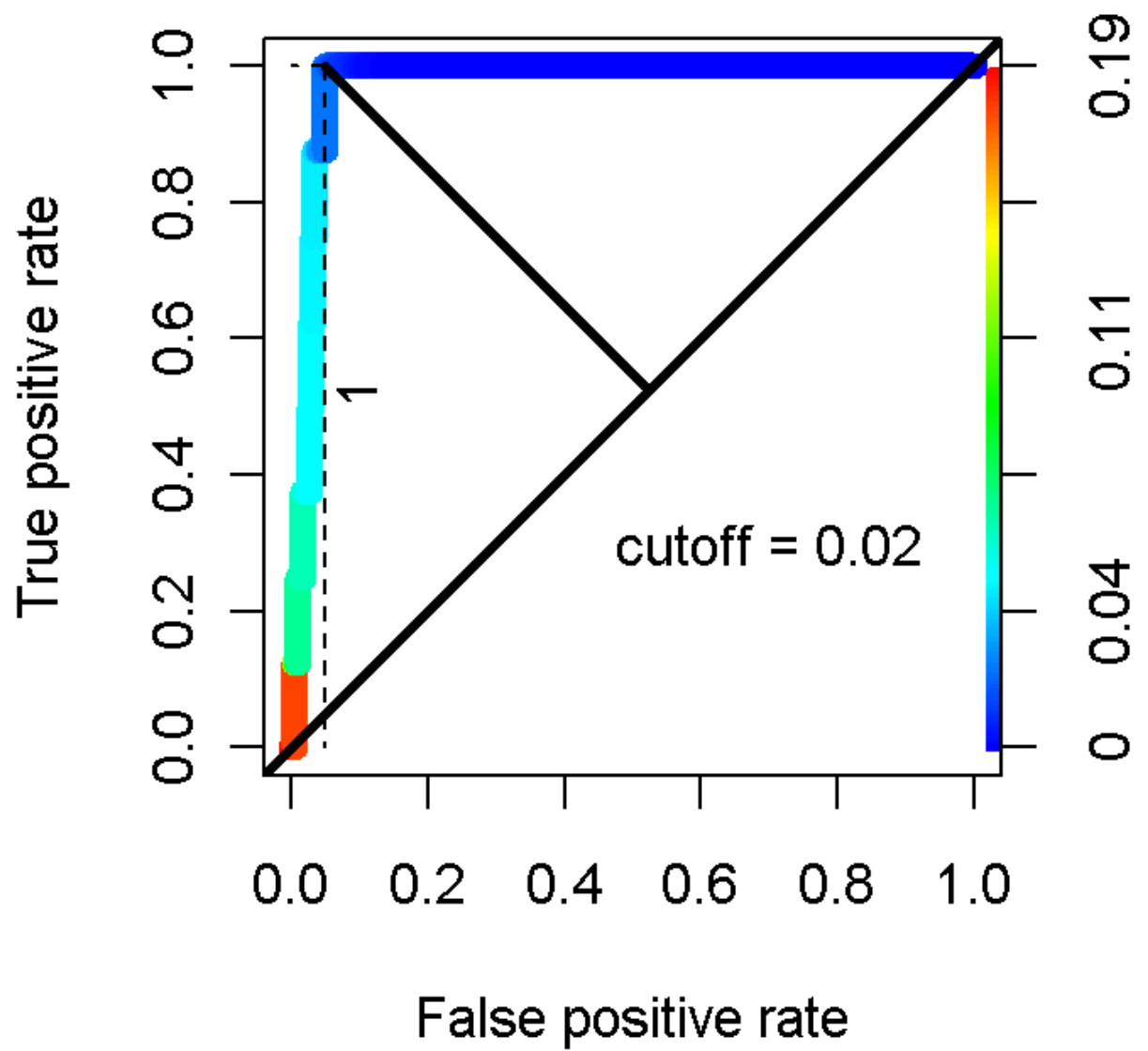


Figure 611: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'spring' season in 'east2' region.

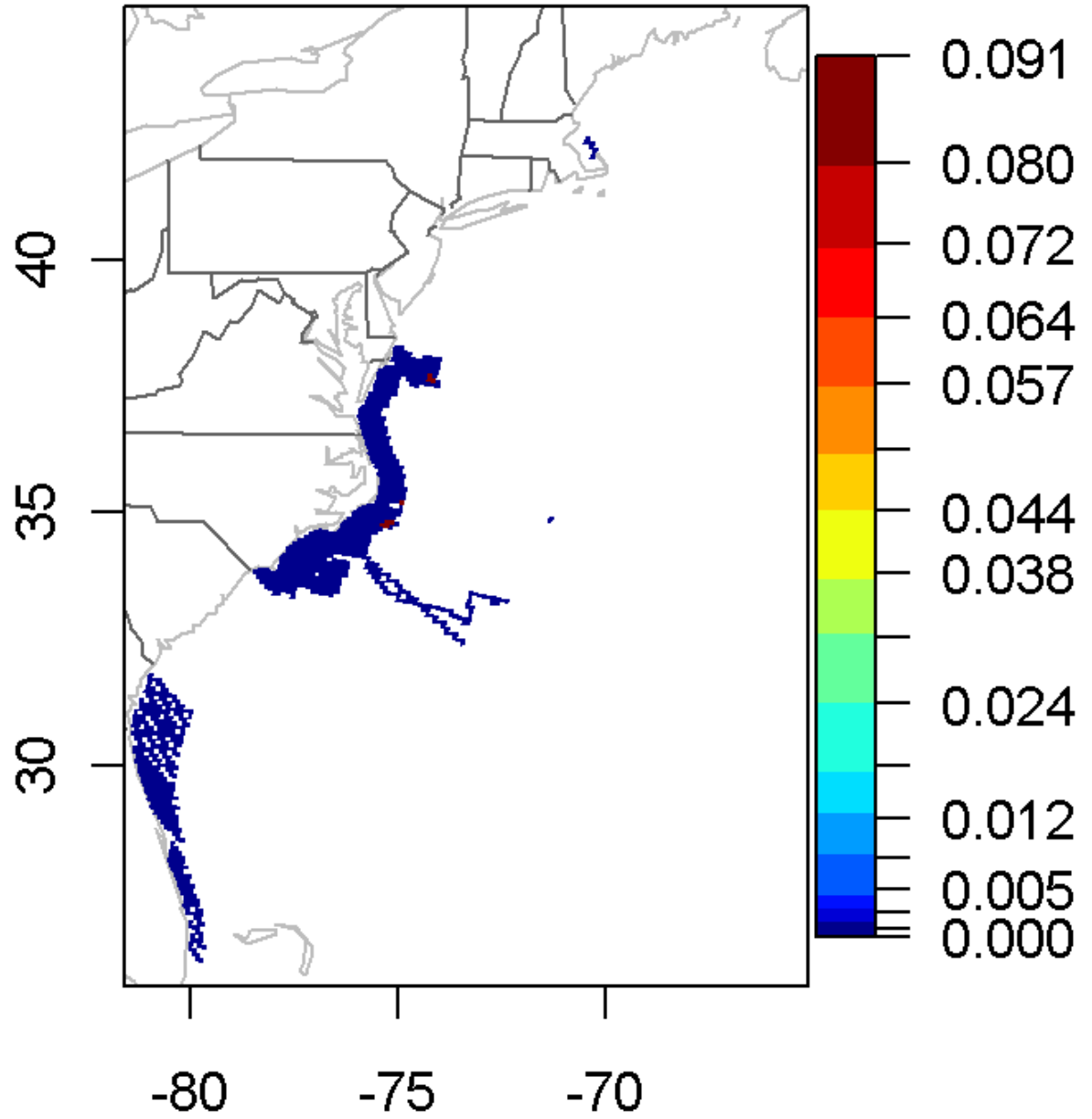


Figure 612: Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'spring' season in 'east2' region.

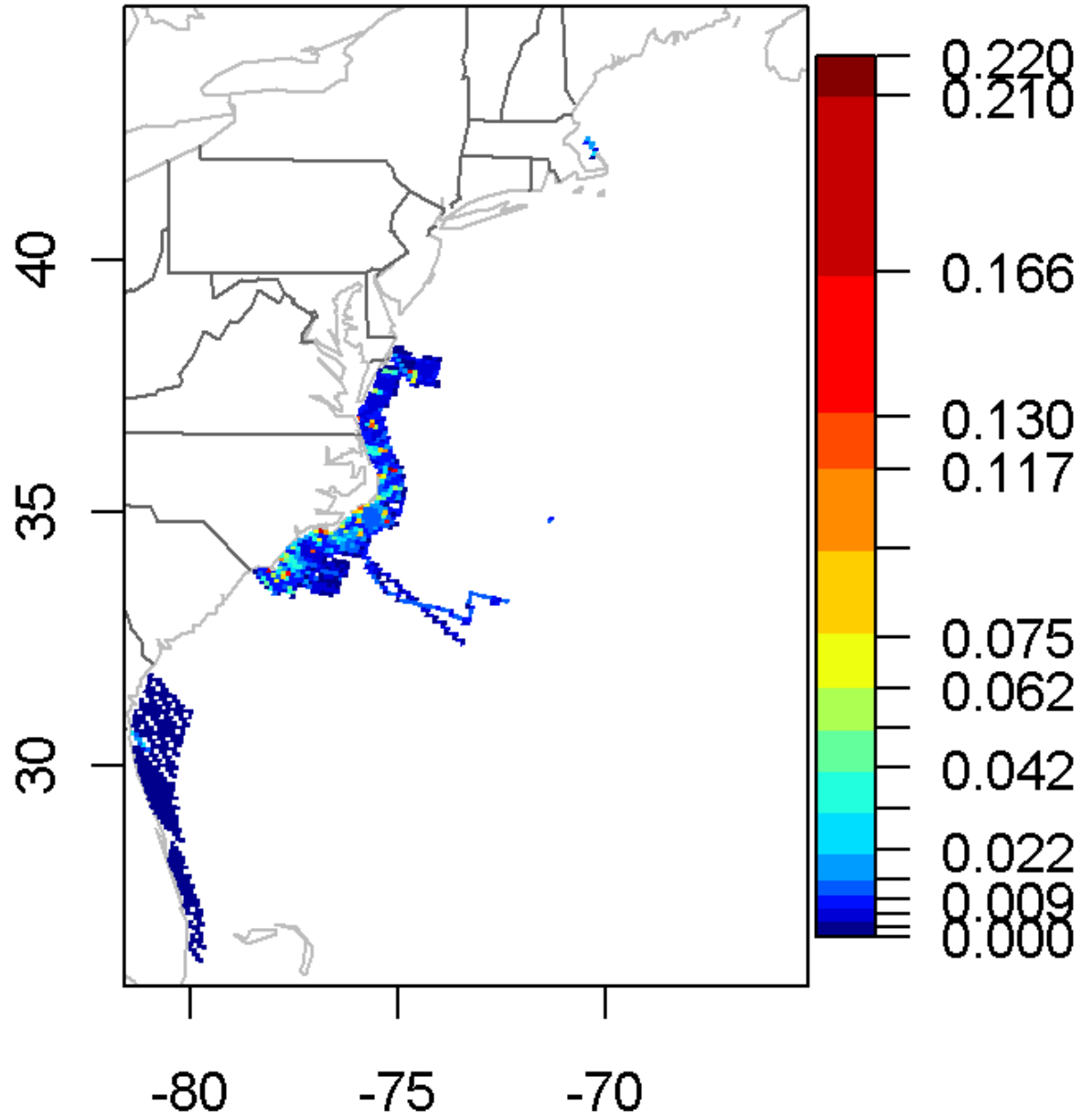


Figure 613: Map of effort(hours/km²) by cell summed through time for 'Sperm whales' guild during 'spring' season in 'east2' region.

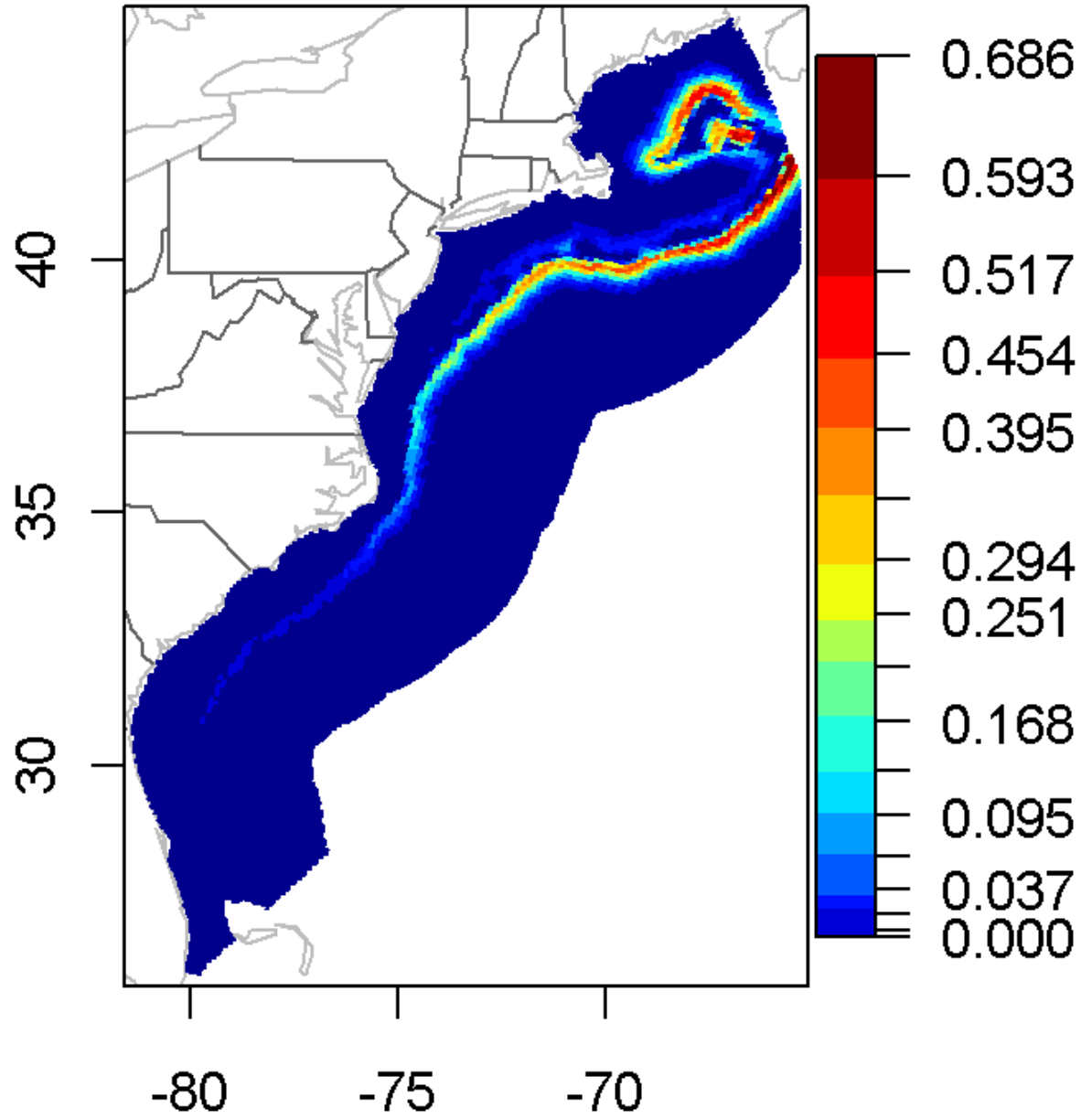


Figure 614: Map of mean predicted habitat for 'Sperm whales' guild during 'spring' season in 'east2' region.

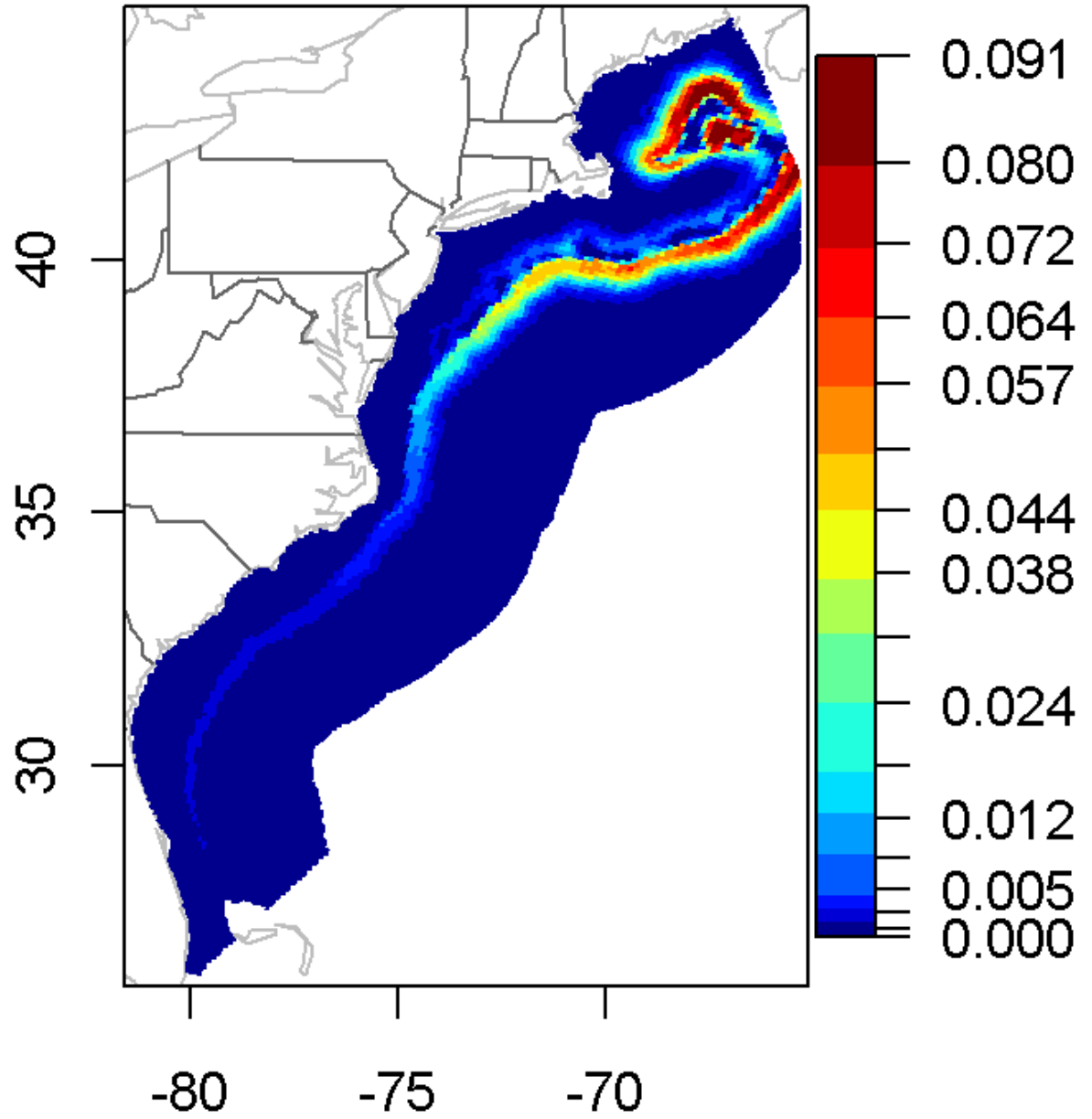


Figure 615: Map of standard error of habitat for 'Sperm whales' guild during 'spring' season in 'east2' region.

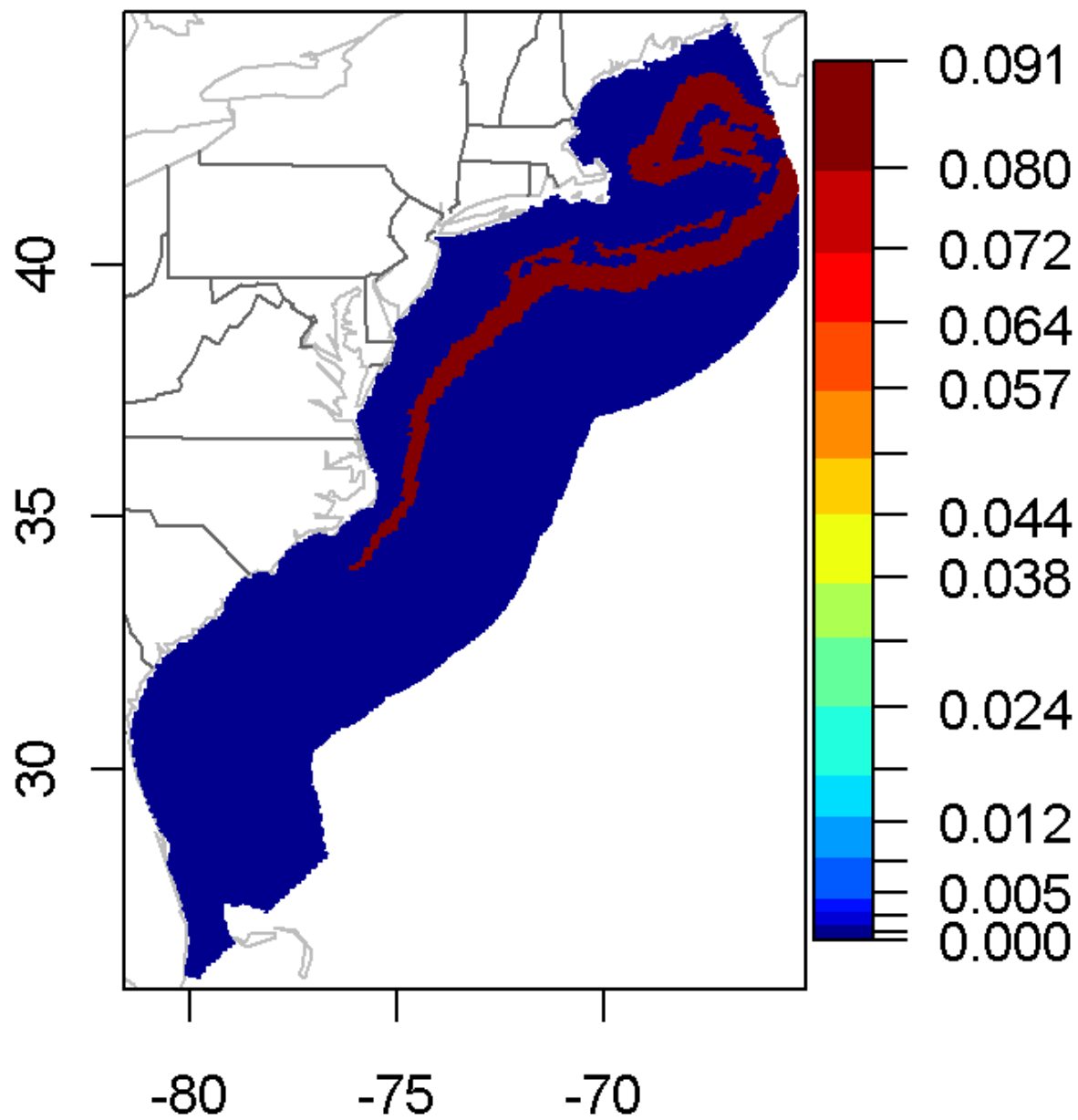


Figure 616: Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'spring' season in 'east2' region.

13.3 summer

13.3.1 east2

Modelrun identifier: duke_06_sw3_summer_east2

Date generated: 2008-10-21 14:06:51

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 58: Summary for duke(6) GAM model: for 'Sperm whales' guild during 'summer' season in 'east2' region.

	Value
Number.presences	224
Number.absences	8854
GAM.converged	TRUE
R.squared	0.222786
Deviance.explained	0.289096
ROC.optimum	0.311711
Maximum.fit	0.0183464
Maximum.prediction	0.298253

Model text summary...

```
duke_06_sw3_summer_east2 run on Tue Oct 21 14:03:43 2008
provider:duke, version:06, guild:Sperm whales (sw3), season:'summer', region:east2

max.fit:0.311711, max.prediction:0.298253, ROC.optimum:0.018346

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -10.210      0.601  -16.99  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  1.0590  1.559 130.619  < 2e-16 ***
s(log(d2shelf)) 0.8499  1.350   5.455   0.0115 *
s(log(d2coast)) 1.9871  2.487  62.806  < 2e-16 ***
s(sst)         1.9687  2.469  22.693  1.81e-12 ***
s(lat)         1.9908  2.491  58.023  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.223   Deviance explained = 28.9%
GCV score = 0.0014359   Scale est. = 0.0014332   n = 8663

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:7694   Min.    : 1635   Min.    :  5.0   Min.    :    5   Min.    : 1259   Min.    :  8.175   Min.    :25.94
se2:1384   1st Qu.:11866   1st Qu.: 48.0   1st Qu.:20989   1st Qu.: 50865   1st Qu.: 17.025   1st Qu.:37.53
              Median :14008   Median :111.5   Median :52230   Median :102266   Median :22.200   Median :40.18
              Mean   :13275   Mean   :677.3   Mean   :67623   Mean   :125197   Mean   :21.378   Mean   :39.35
              3rd Qu.:15645   3rd Qu.:420.0   3rd Qu.:99335   3rd Qu.:174835   3rd Qu.:25.650   3rd Qu.:42.31
              Max.    :16560   Max.    :5251.0   Max.    :324910   Max.    :445165   Max.    :30.900   Max.    :44.74
              NA's    :      7      NA's    :      7      NA's    :408.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685   Min.    : 1633   Min.    :  4   Min.    :    5   Min.    : 1259   Min.    :11.18   Min.    :25.91
se2:4203   1st Qu.: 9145   1st Qu.: 92   1st Qu.:34042   1st Qu.: 89304   1st Qu.:22.80   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :4.262e-16  Min.   : 0.0000  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:1.912e-05  1st Qu.:1.159e-05  1st Qu.: 0.0000  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :2.301e-03  Median :6.326e-04  Median : 0.0000  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :4.288e-02  Mean   :2.722e-03  Mean   : 0.0488  Mean   :1.069e-02  Mean   :0.3611
3rd Qu.:14088  3rd Qu.:6.547e-02  3rd Qu.:5.635e-03  3rd Qu.: 0.0000  3rd Qu.:9.308e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :2.983e-01  Max.   :1.485e-02  Max.   : 3.0000  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5277.0000  NA's :5.277e+03
```

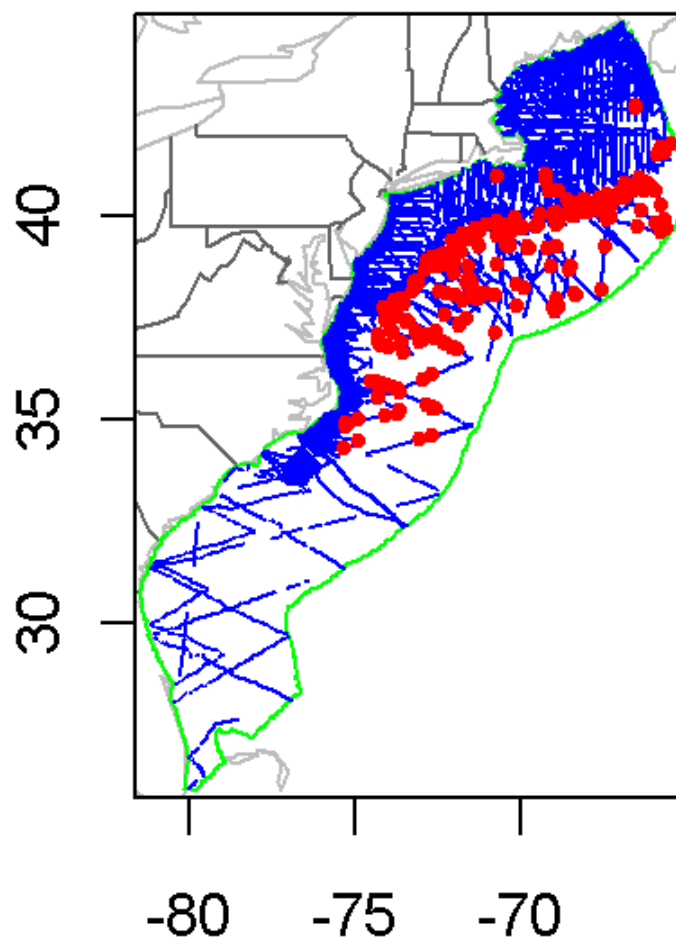


Figure 617: Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'summer' season in 'east2' region.

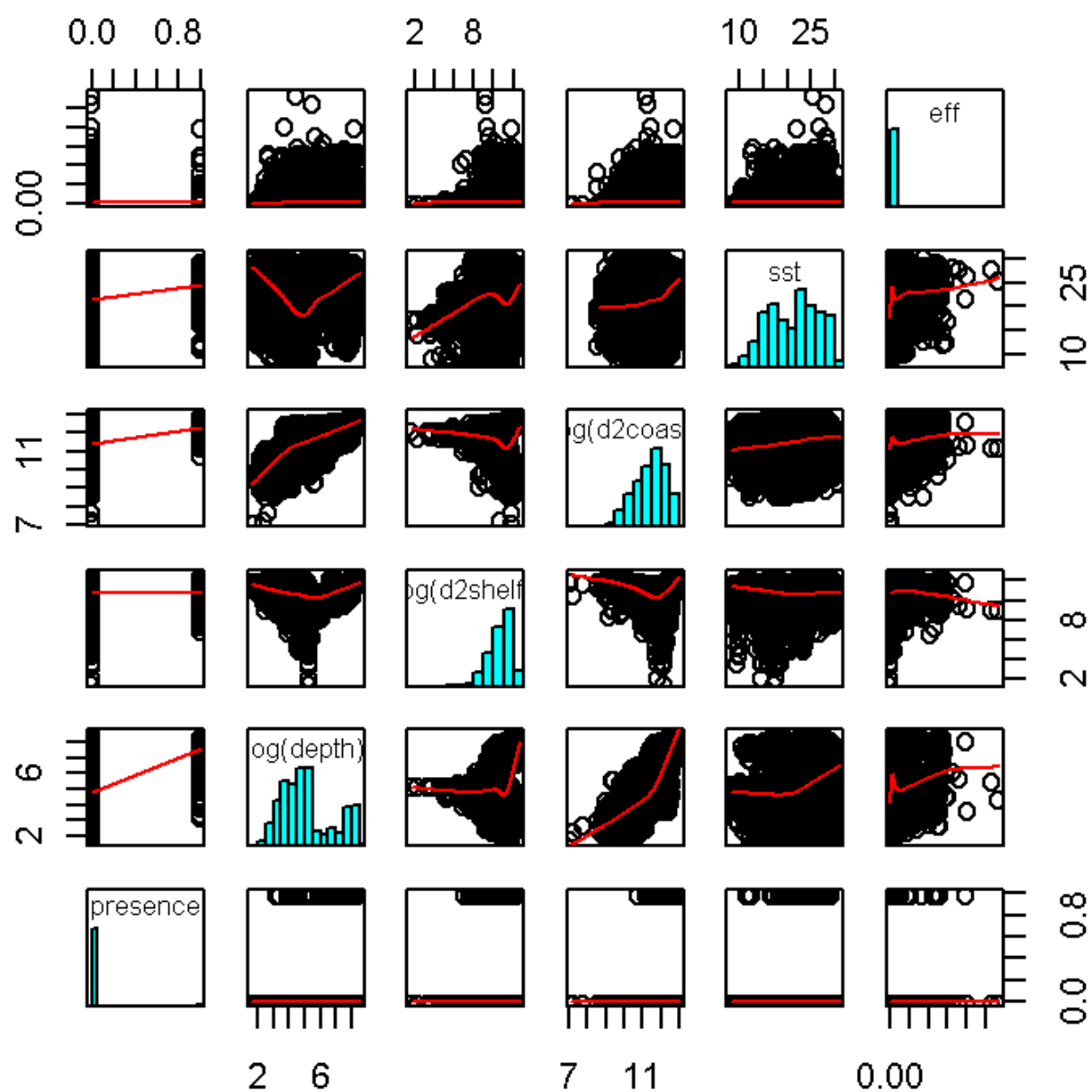


Figure 618: Pairs plot of input variables for 'Sperm whales' guild during 'summer' season in 'east2' region.

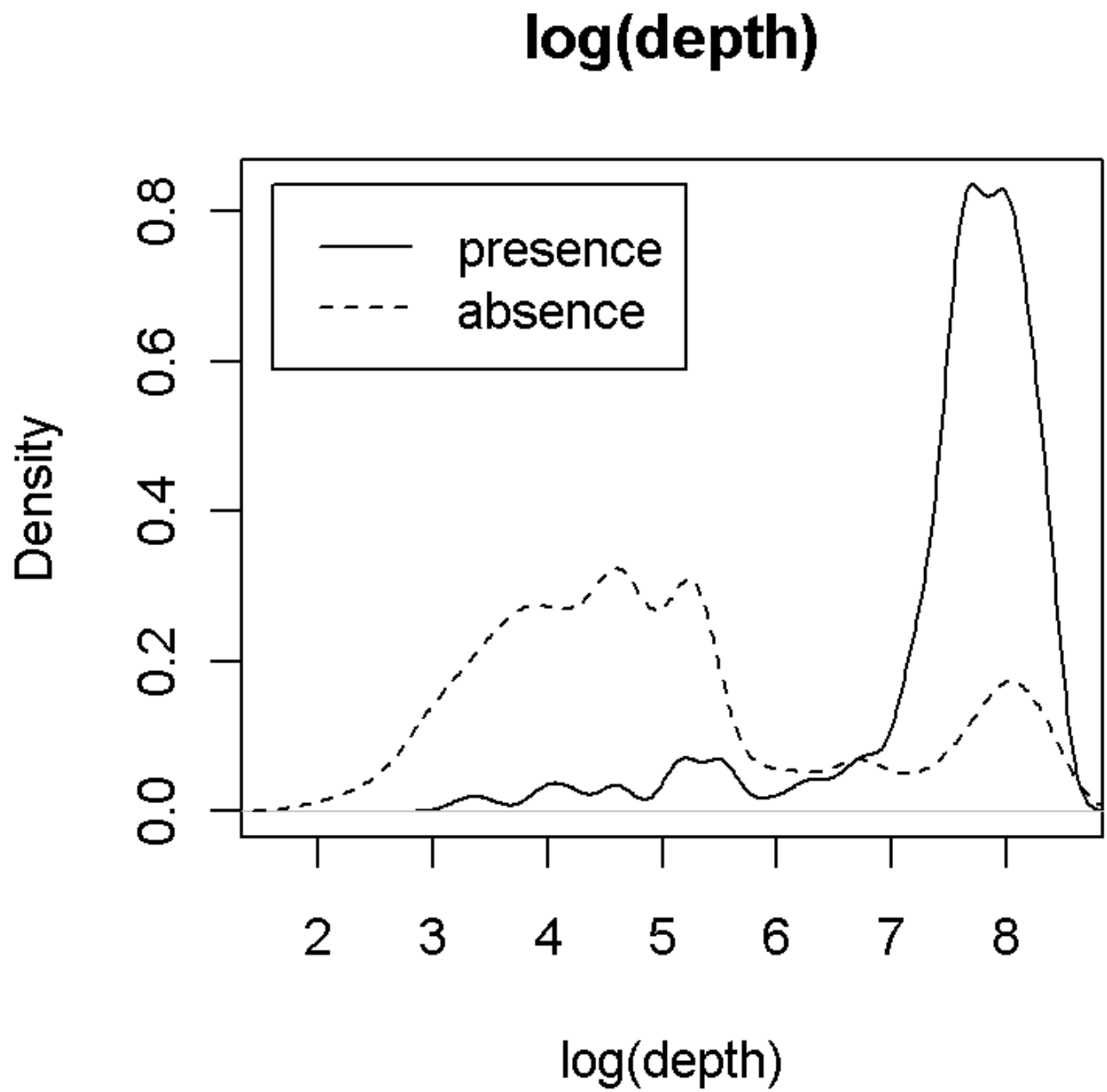


Figure 619: Density histogram of depth log(meters) for 'Sperm whales' guild during 'summer' season in 'east2' region.

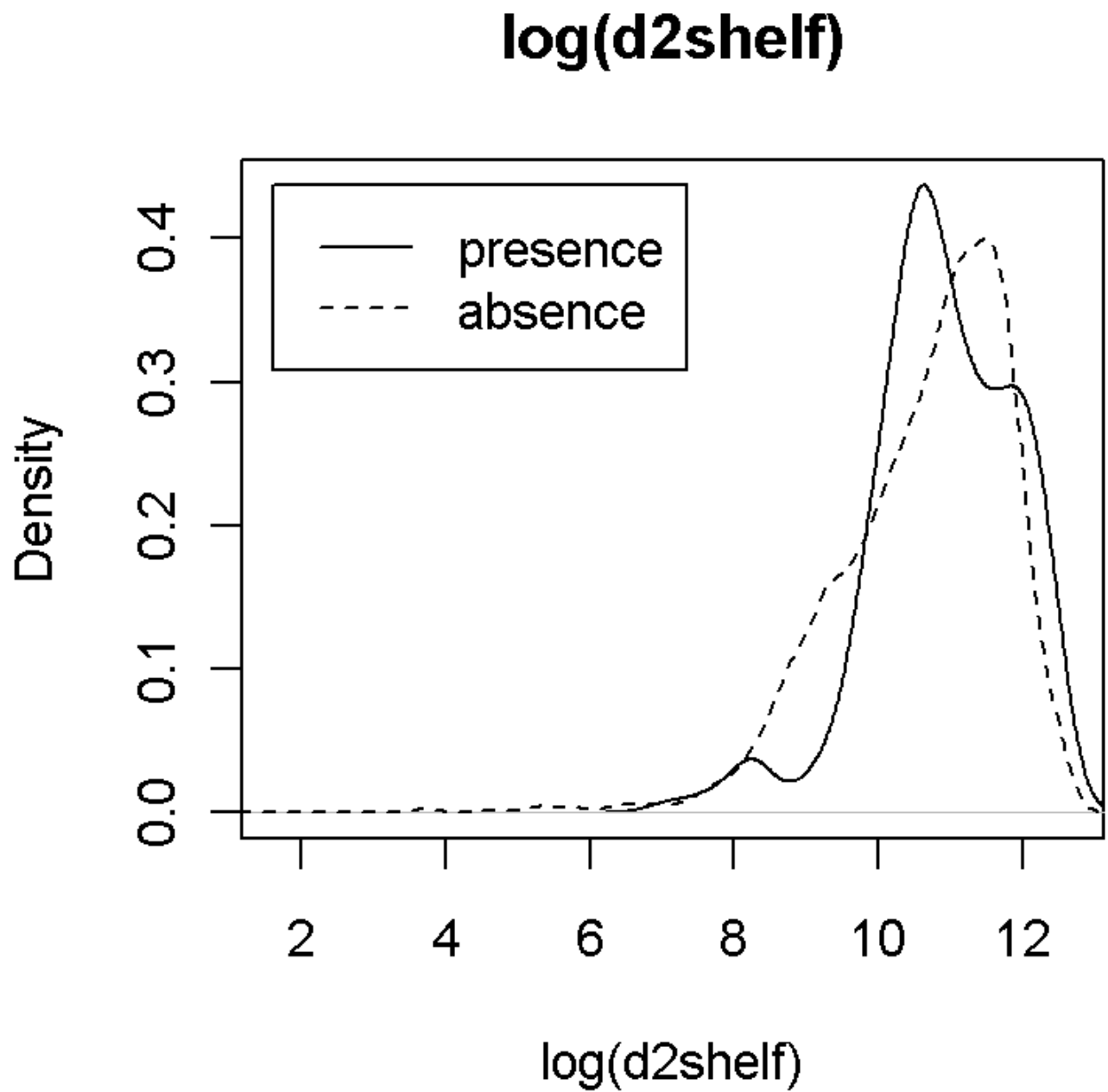


Figure 620: Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'summer' season in 'east2' region.

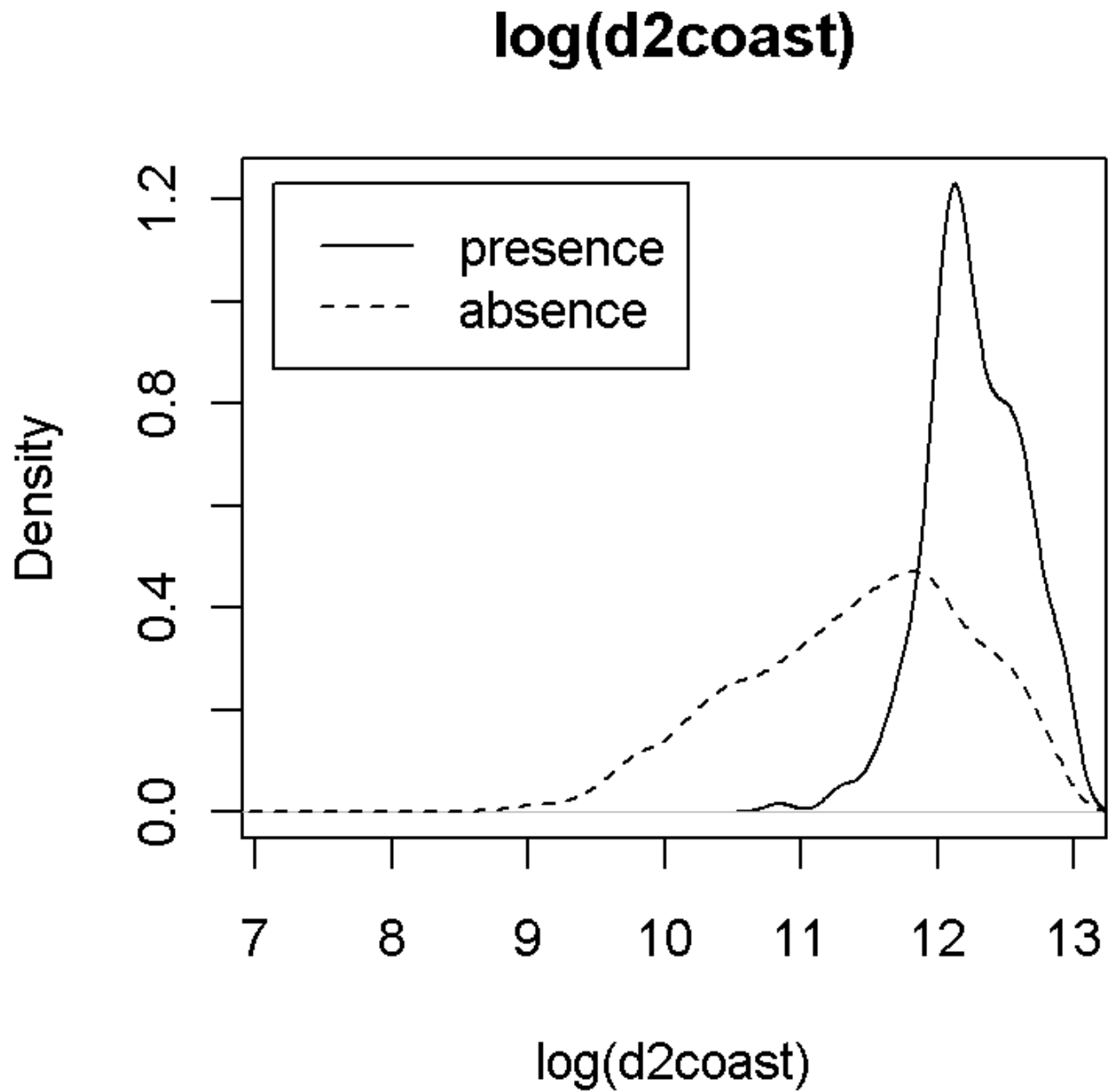


Figure 621: Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'summer' season in 'east2' region.

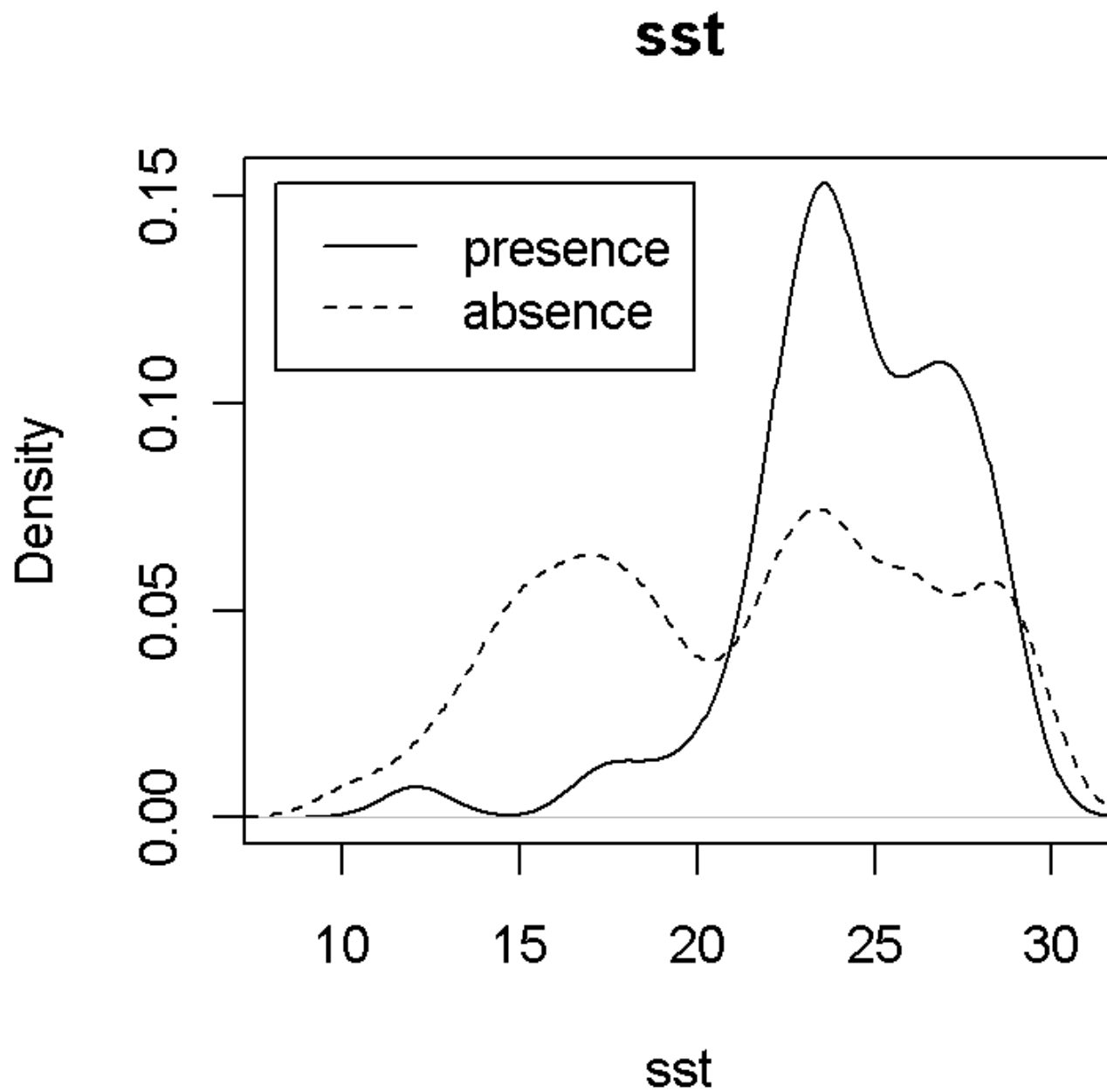


Figure 622: Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'summer' season in 'east2' region.

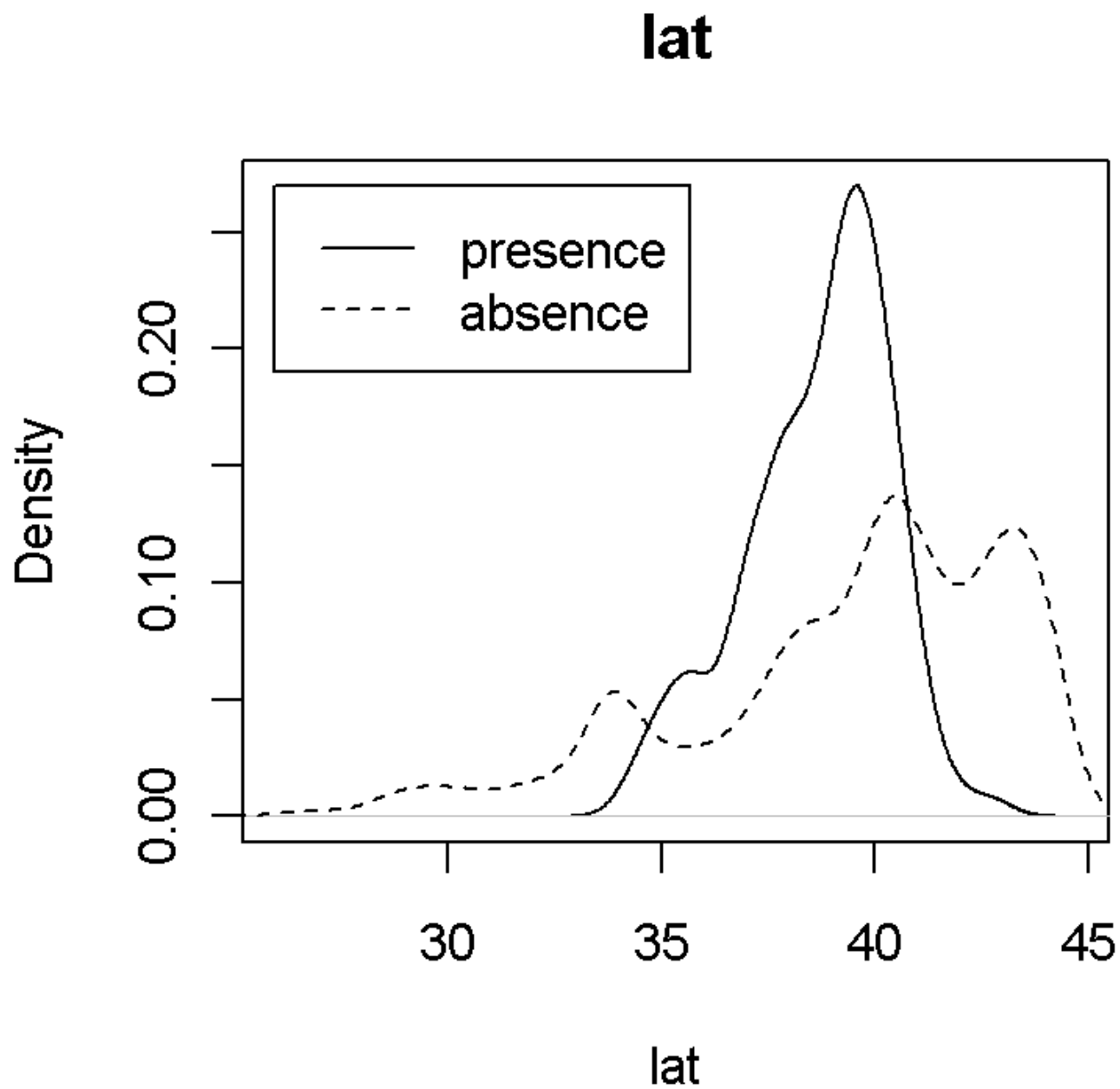


Figure 623: Density histogram of latitude (degrees) for 'Sperm whales' guild during 'summer' season in 'east2' region.

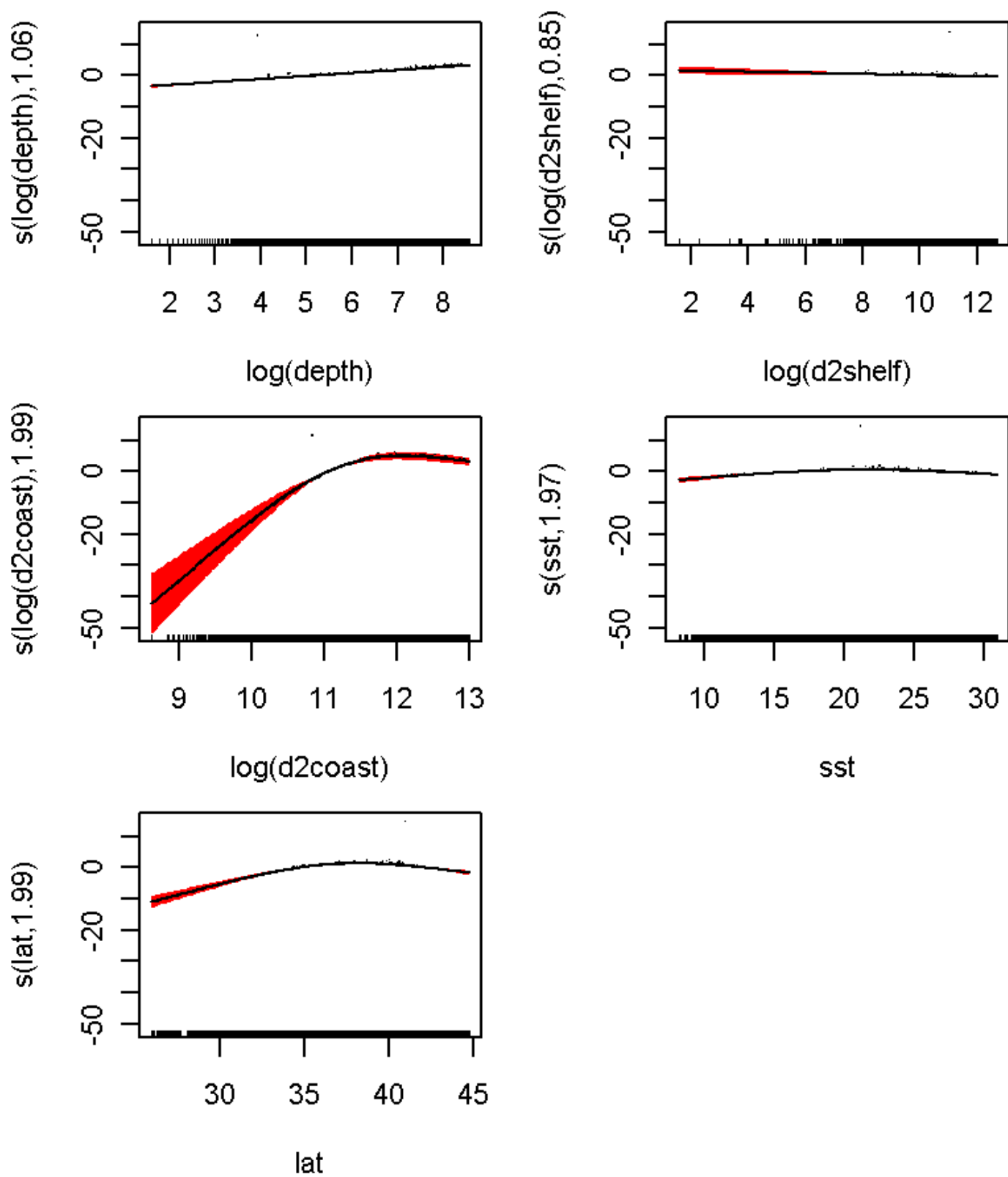


Figure 624: Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'summer' season in 'east2' region.

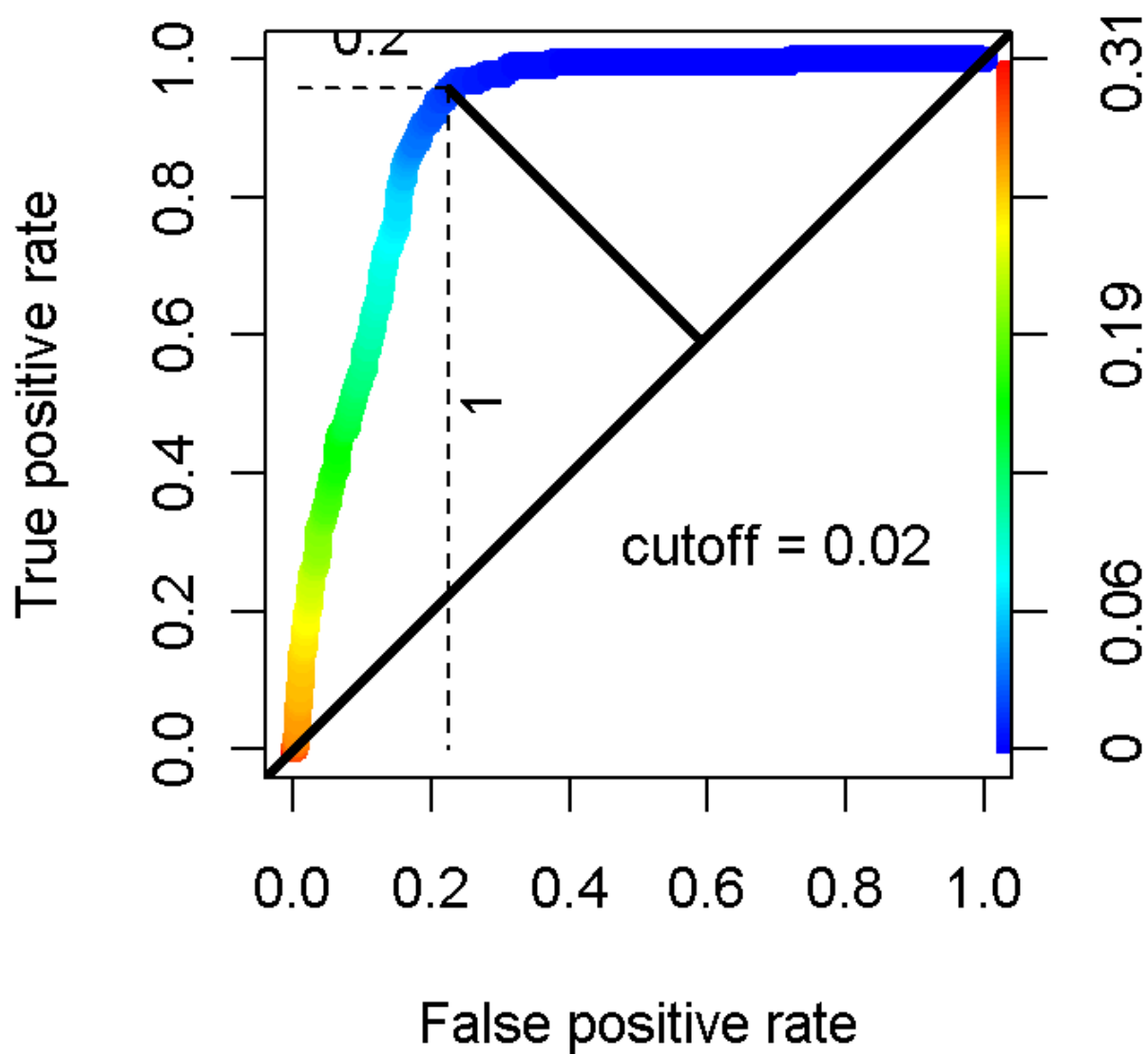


Figure 625: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'summer' season in 'east2' region.

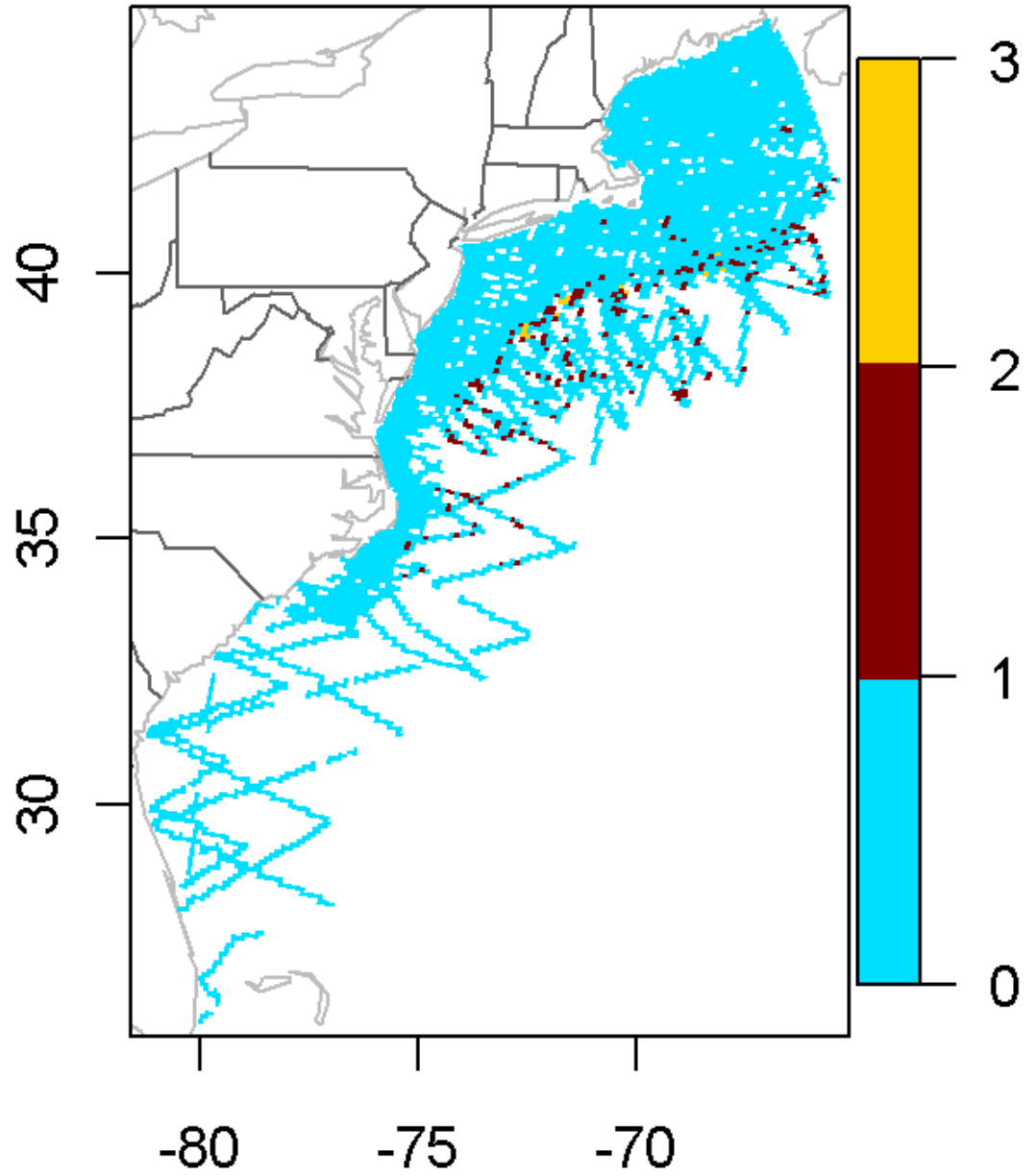


Figure 626: Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'summer' season in 'east2' region.

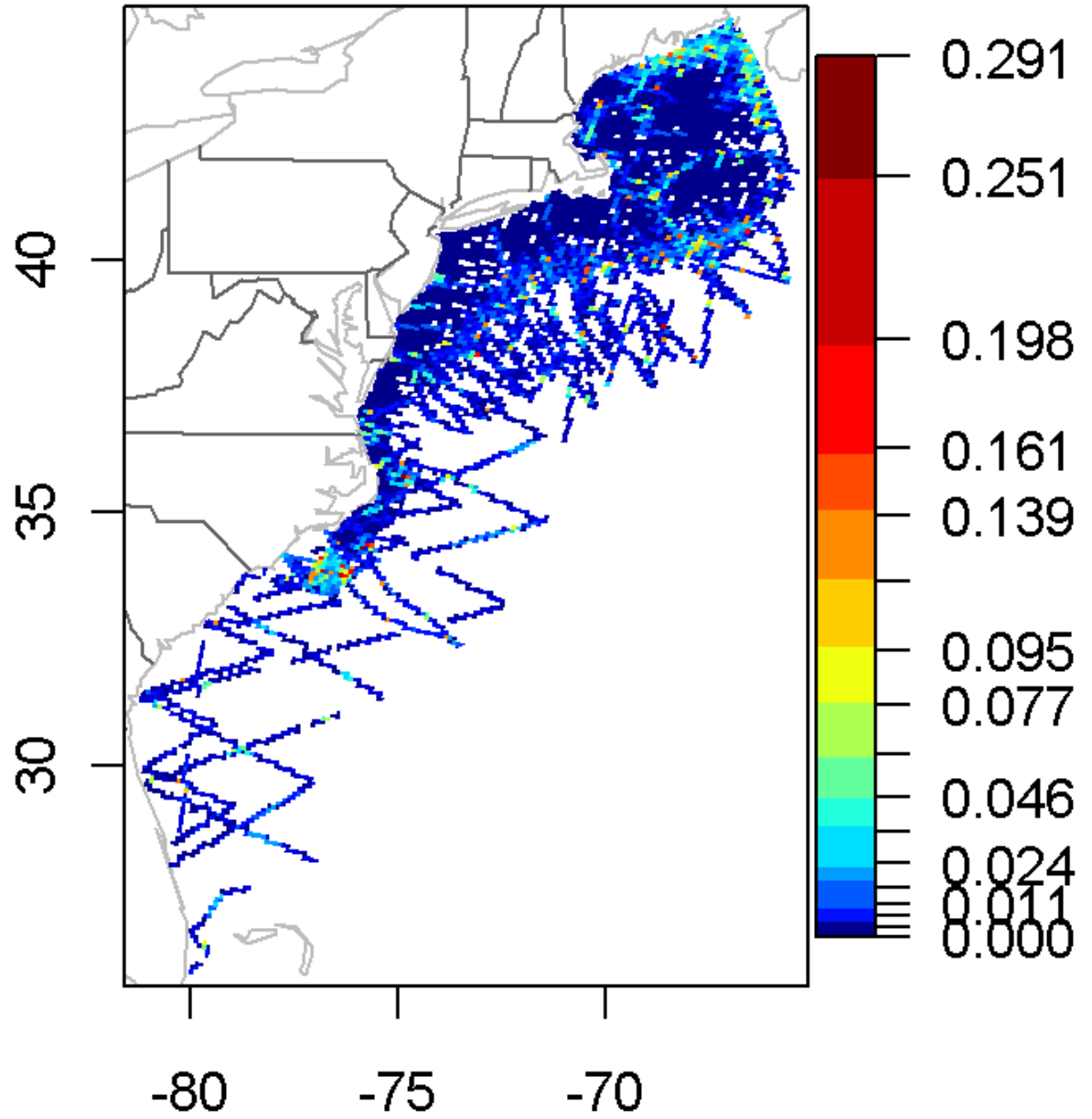


Figure 627: Map of effort(hours/km²) by cell summed through time for 'Sperm whales' guild during 'summer' season in 'east2' region.

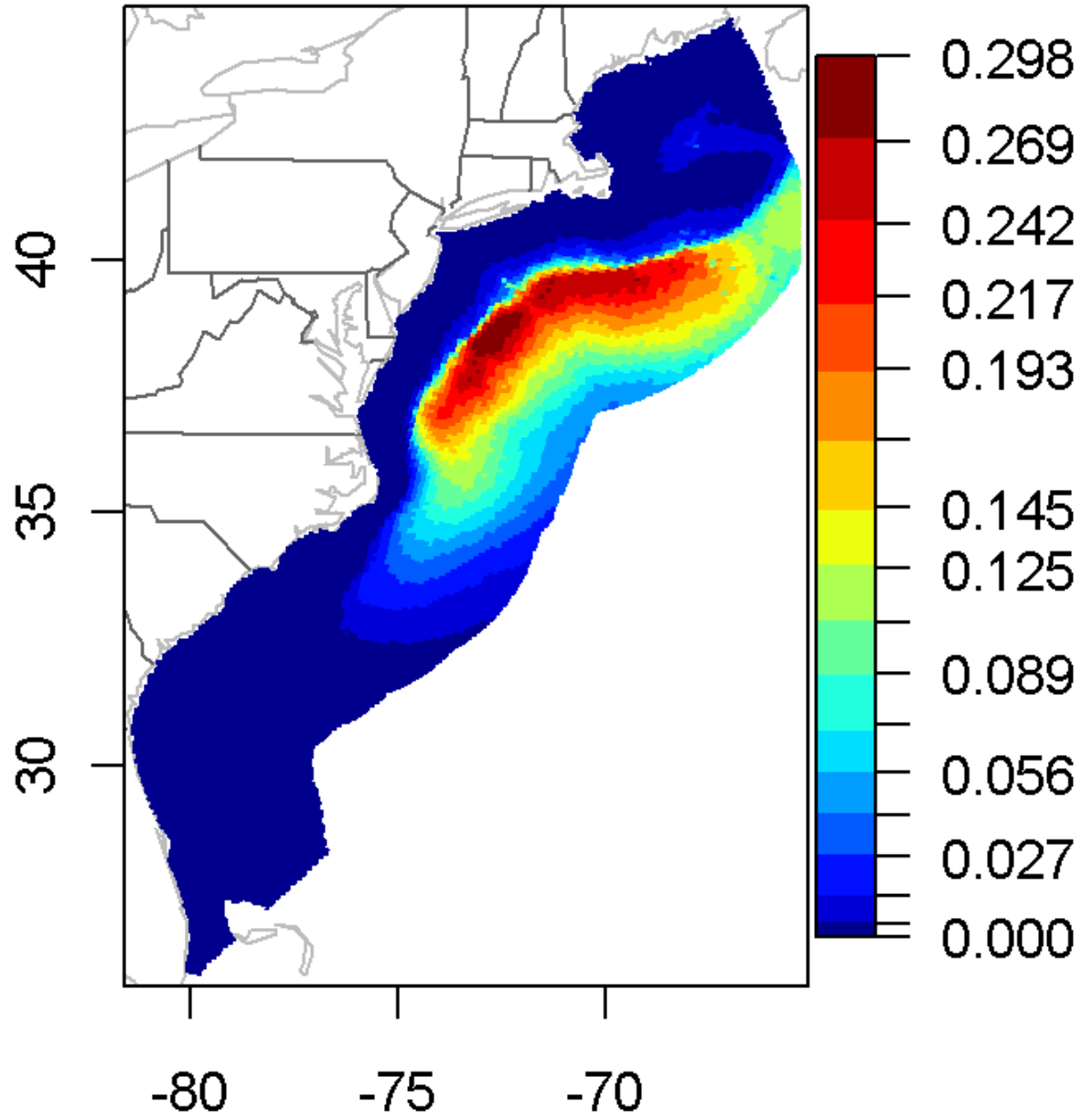


Figure 628: Map of mean predicted habitat for 'Sperm whales' guild during 'summer' season in 'east2' region.

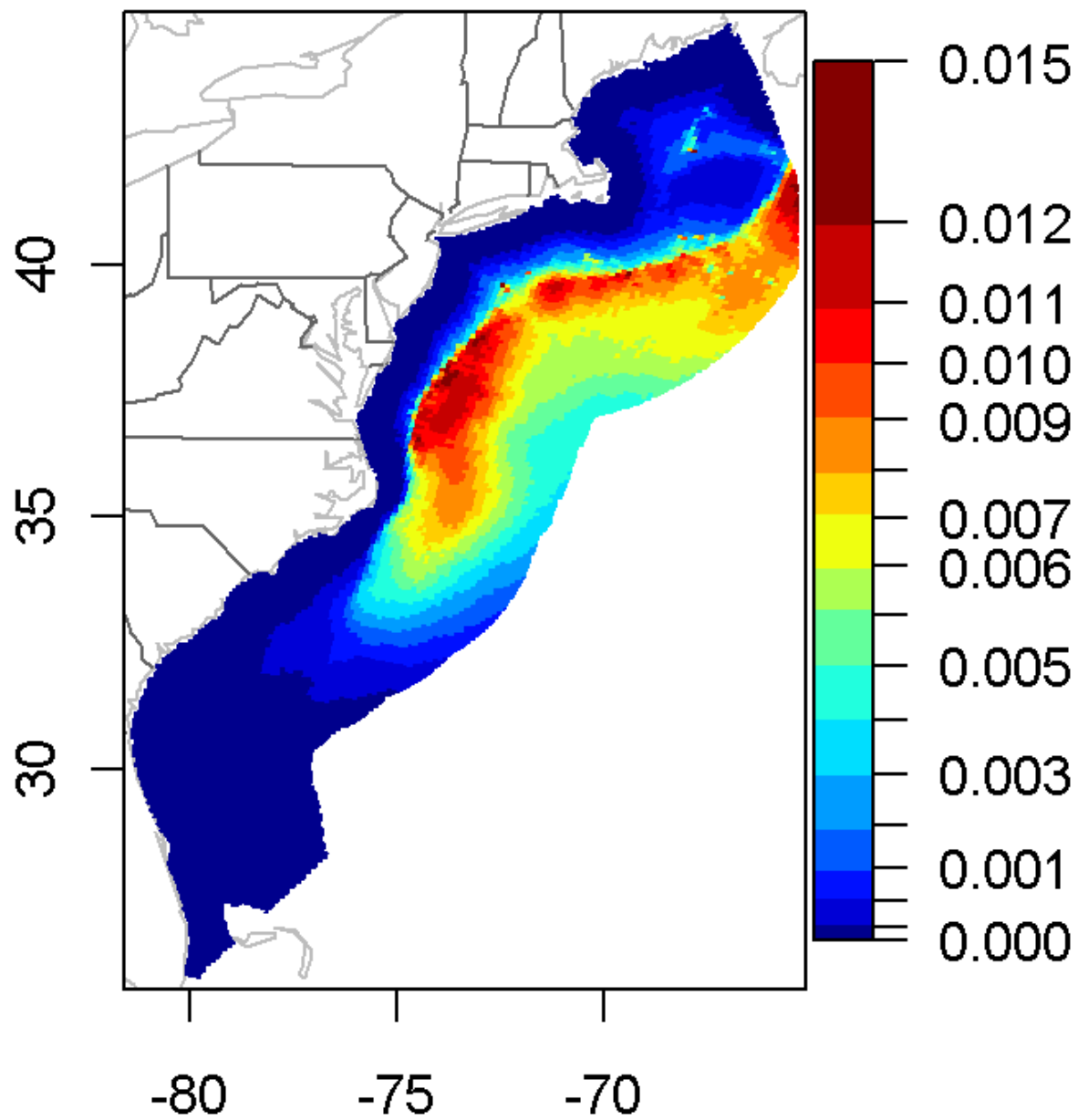


Figure 629: Map of standard error of habitat for 'Sperm whales' guild during 'summer' season in 'east2' region.

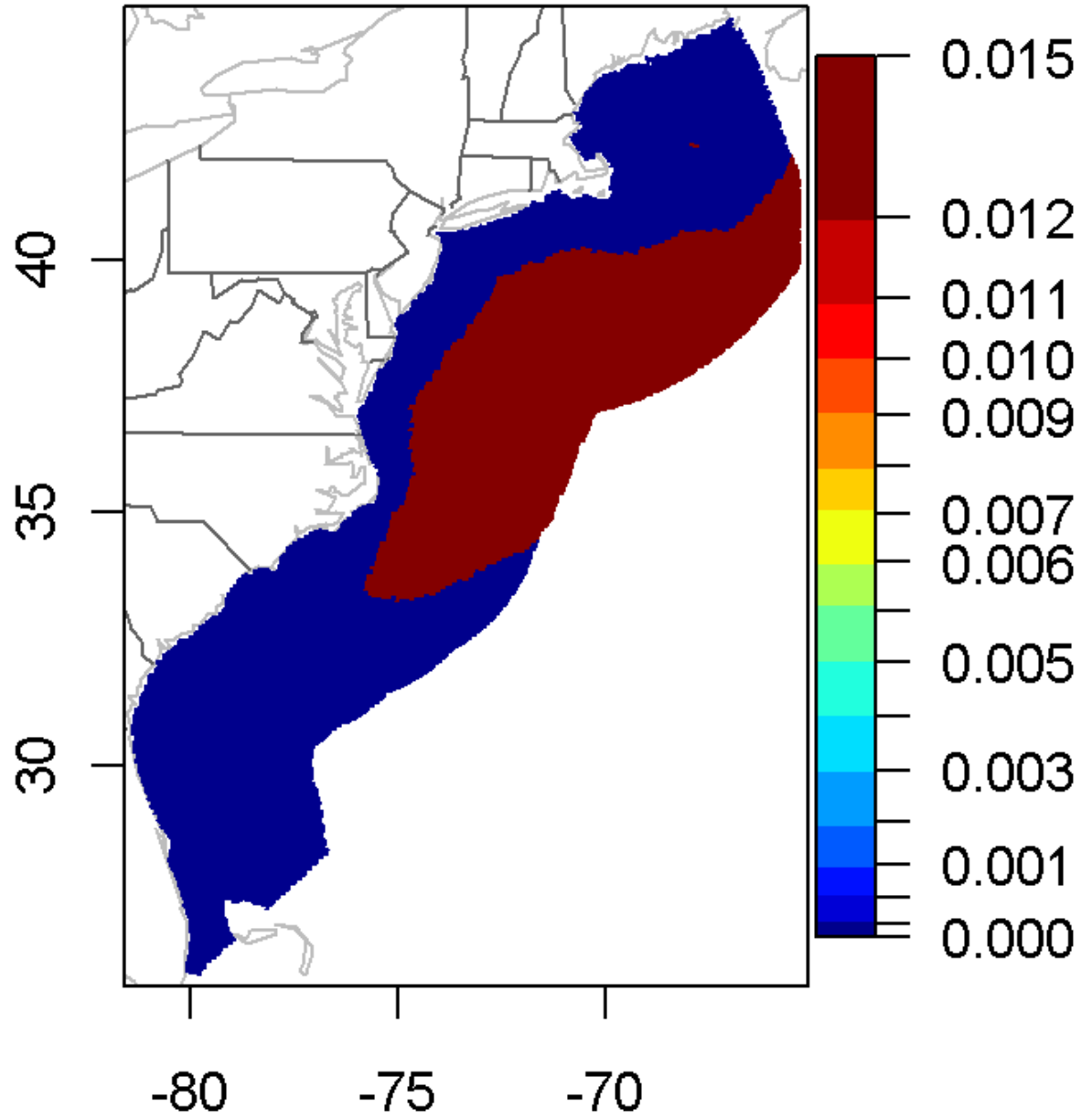


Figure 630: Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'summer' season in 'east2' region.

13.3.2 gomex2

Modelrun identifier: duke_06_sw3_summer_gomex2

Date generated: 2008-10-21 11:36:13

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 59: Summary for duke(6) GAM model: for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	40
Number.absences	1364
GAM.converged	TRUE
R.squared	0.247522
Deviance.explained	0.290869
ROC.optimum	0.50429
Maximum.fit	0.0281774
Maximum.prediction	0.435584

Model text summary...

```
duke_06_sw3_summer_gomex2 run on Tue Oct 21 02:34:04 2008
provider:duke, version:06, guild:Sperm whales (sw3), season:'summer', region:gomex2

max.fit:0.504290, max.prediction:0.435584, ROC.optimum:0.028177

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -4.7000      0.2256  -20.83   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  9.322e-01  1.432  31.349 8.20e-11 ***
s(log(d2shelf)) 6.975e-01  1.198   3.918  0.0405 *
s(log(d2coast)) 8.073e-06  0.500  5.13e-06  0.9629
s(sst)         9.863e-01  1.486  123.017 < 2e-16 ***
s(lat)         1.770e+00  2.270  18.990 9.78e-10 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.248 Deviance explained = 29.1%
GCV score = 0.0031407 Scale est. = 0.0031191 n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13    Min.   : 13.0    Min.   : 901    Min.   : 5700    Min.   :25.35    Min.   :24.04
              1st Qu.:2791  1st Qu.: 149.8    1st Qu.: 21595   1st Qu.: 99783   1st Qu.:27.75   1st Qu.:26.68
              Median :5134  Median : 654.0    Median : 45466   Median :146059   Median :28.50   Median :27.90
              Mean   :4686  Mean   : 899.5    Mean   : 59670   Mean   :161835   Mean   :28.50   Mean   :27.65
              3rd Qu.:6644  3rd Qu.:1292.0    3rd Qu.: 82981   3rd Qu.:213494   3rd Qu.:29.25   3rd Qu.:28.69
              Max.   :8257  Max.   :3505.0    Max.   :249222   Max.   :386037   Max.   :31.20   Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1    Min.   : 3.0    Min.   : 272    Min.   : 5317    Min.   :27.67    Min.   :23.85
              1st Qu.:1861  1st Qu.: 46.0    1st Qu.: 31617   1st Qu.: 85289   1st Qu.:29.48   1st Qu.:26.28
              Median :4110  Median : 433.5    Median : 71100   Median :157258   Median :29.55   Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:1.109e-06	Min.	:1.617e-06	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:2.800e-03	1st Qu.	:1.801e-03	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:1.047e-02	Median	:4.566e-03	Median	:0.000e+00	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:5.778e-02	Mean	:1.035e-02	Mean	:3.714e-02	Mean	:1.213e-02	Mean	:0.4314
3rd Qu.	:6015	3rd Qu.	:8.044e-02	3rd Qu.	:1.708e-02	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:4.356e-01	Max.	:4.450e-02	Max.	:2.000e+00	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5.568e+03	NA's	:5.568e+03		

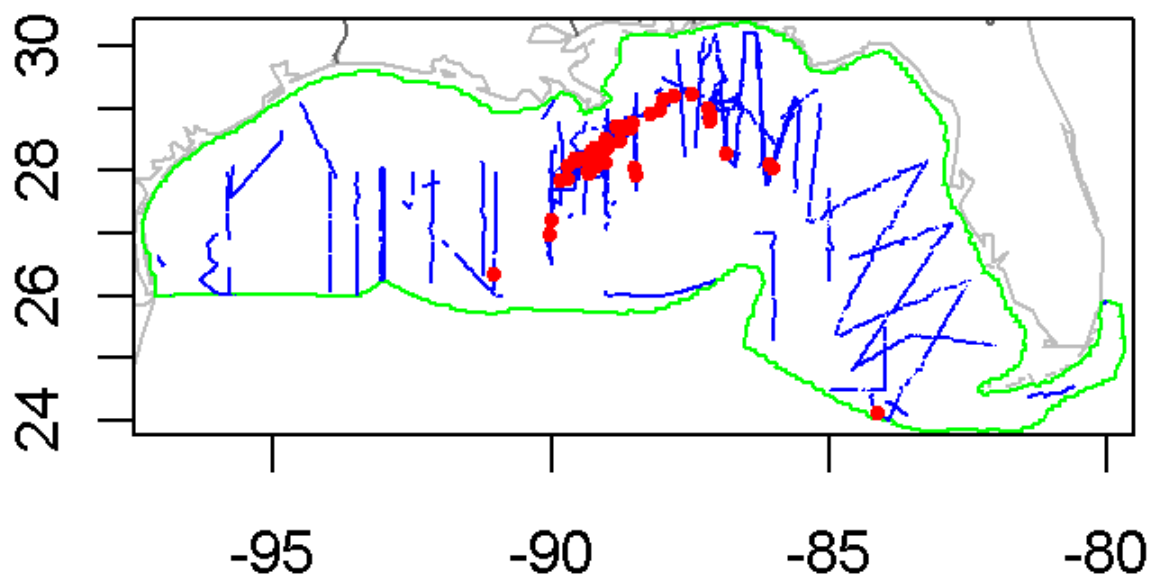


Figure 631: Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

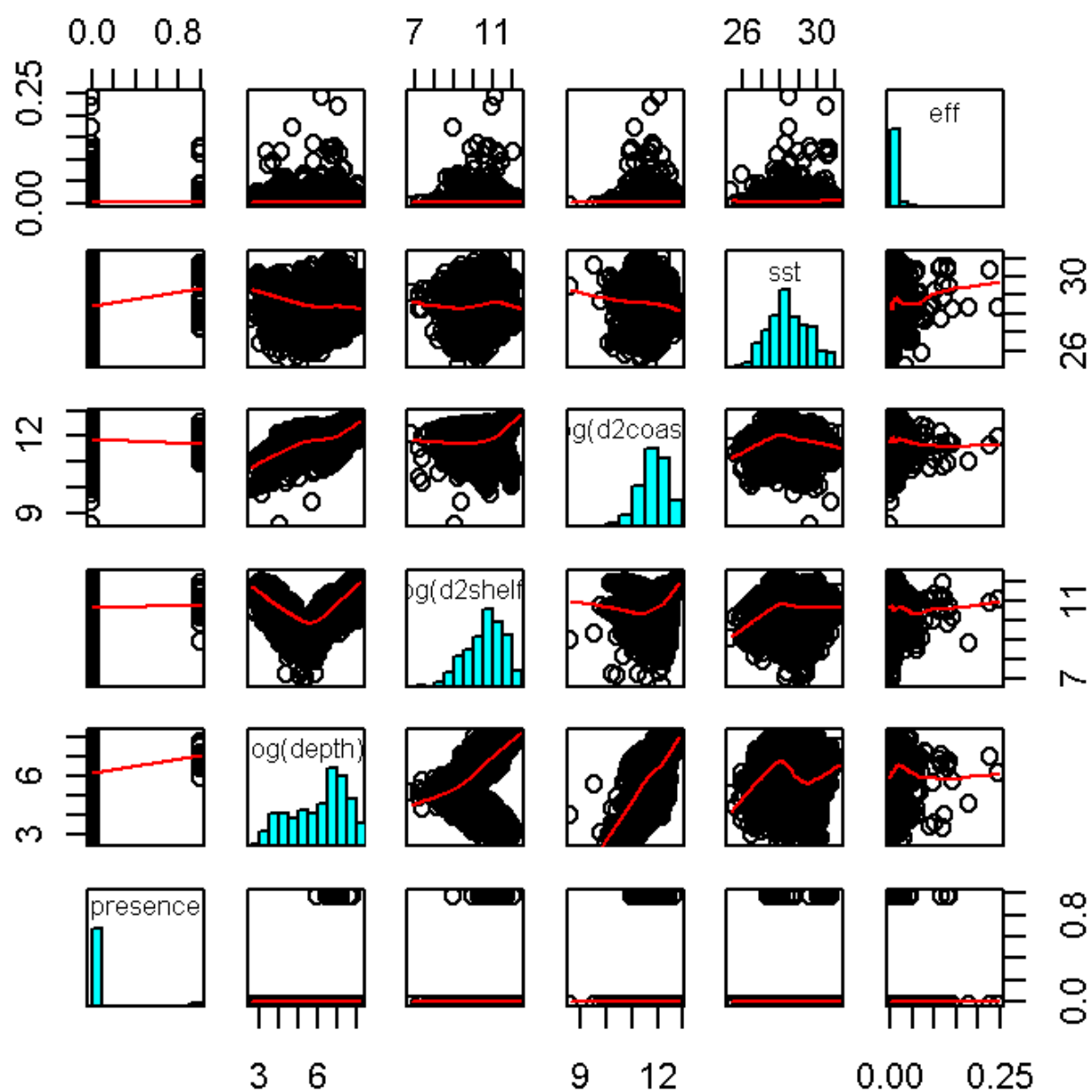


Figure 632: Pairs plot of input variables for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

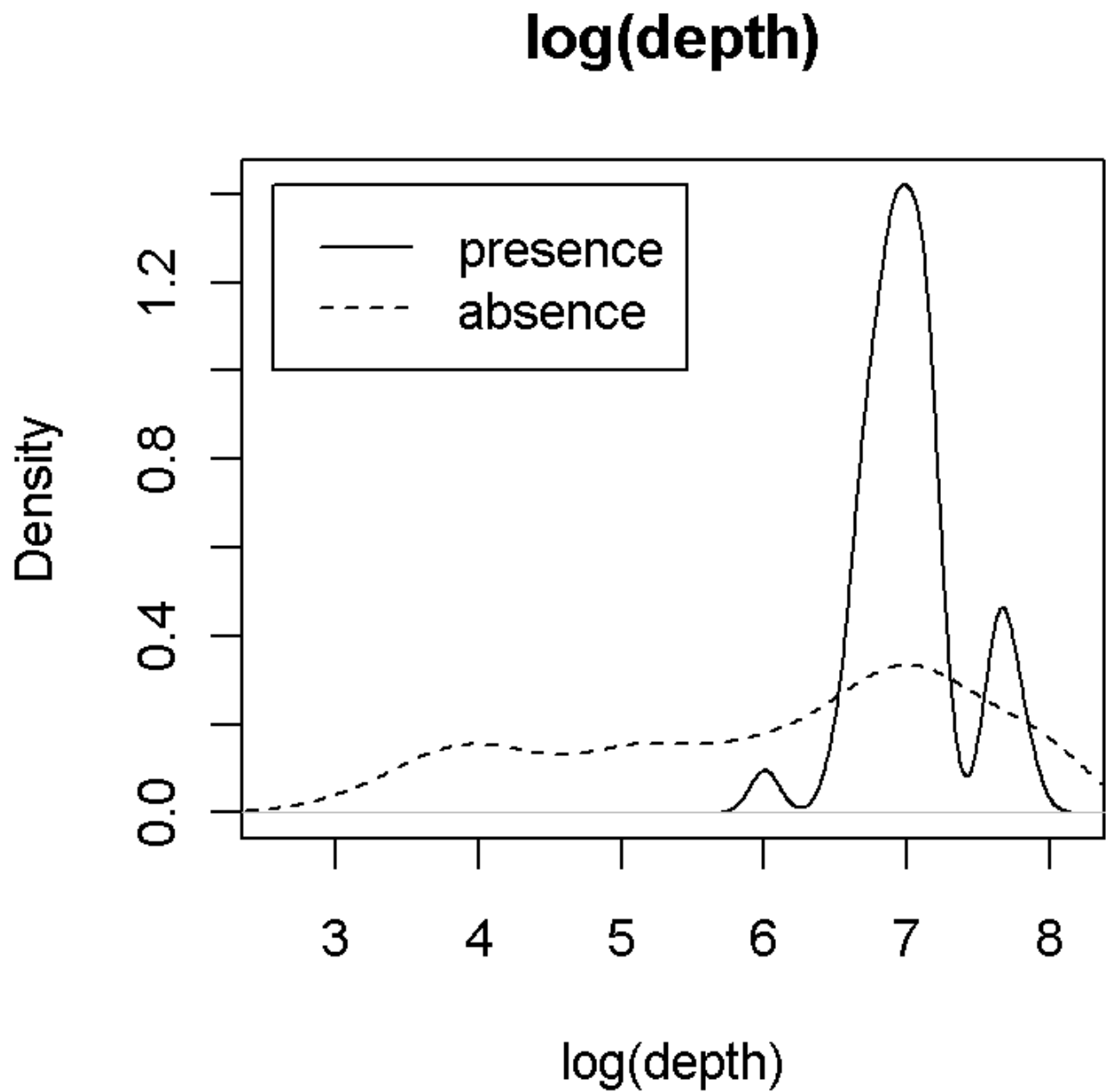


Figure 633: Density histogram of depth log(meters) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

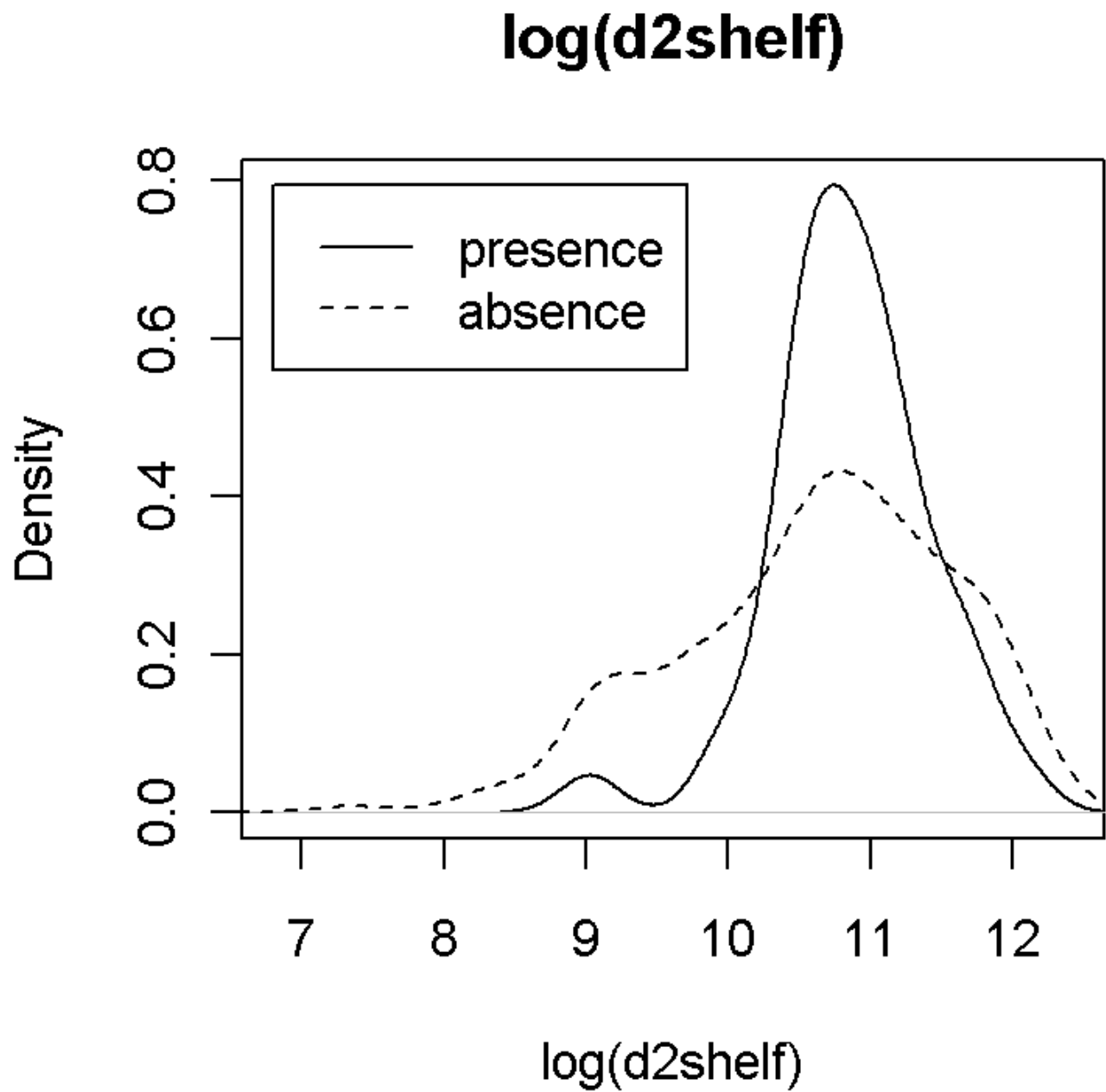


Figure 634: Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

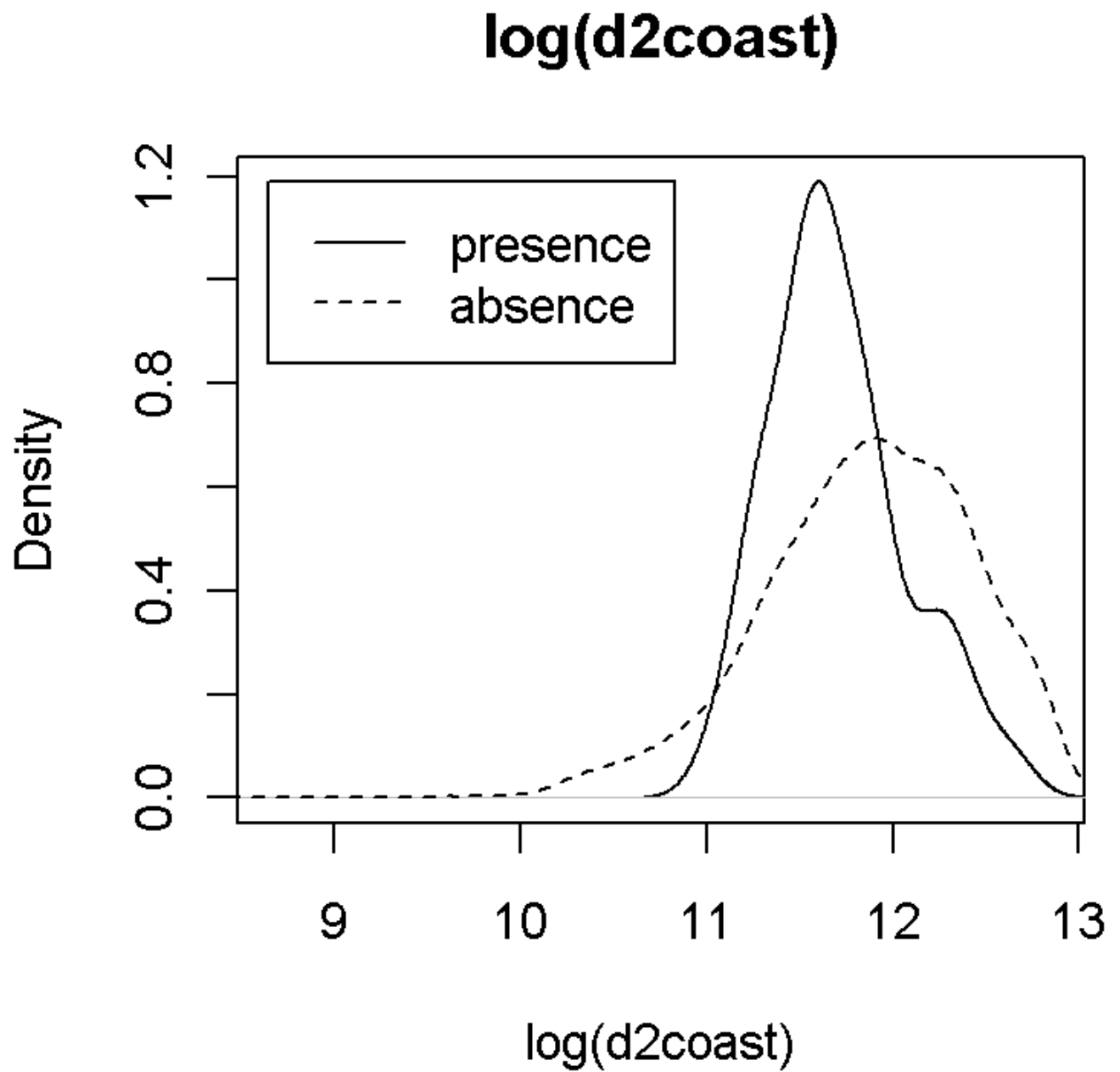


Figure 635: Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

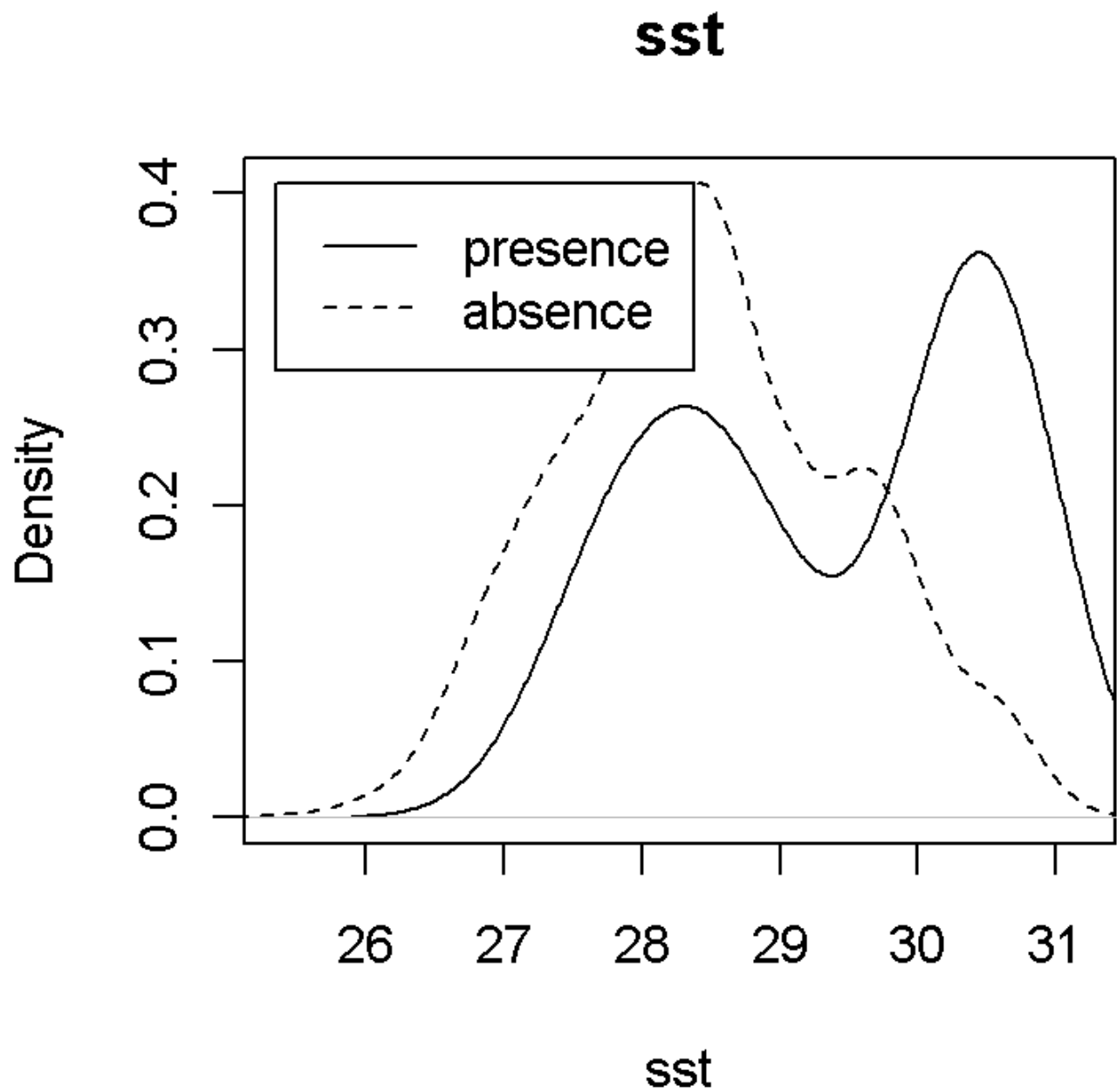


Figure 636: Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

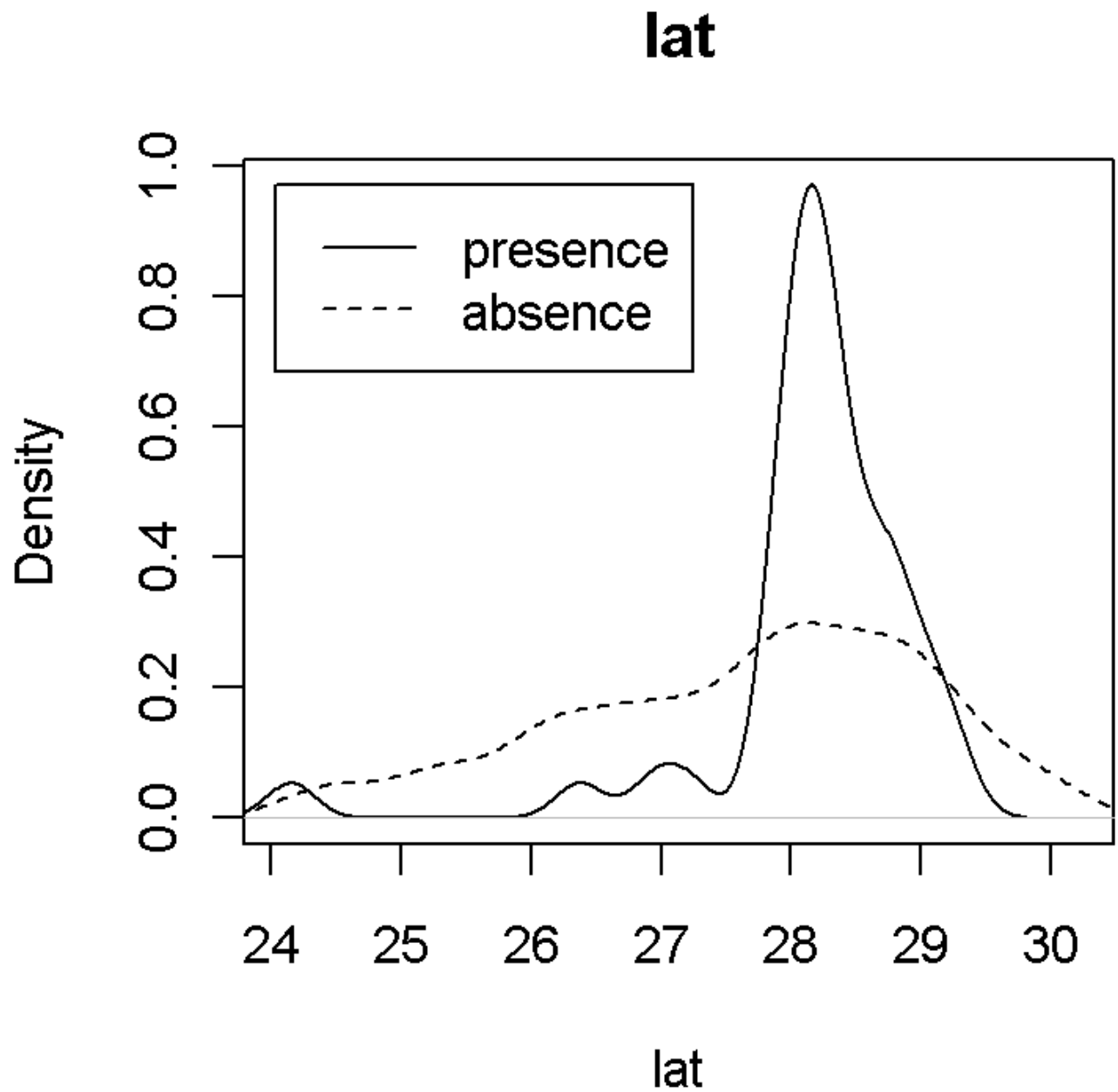


Figure 637: Density histogram of latitude (degrees) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

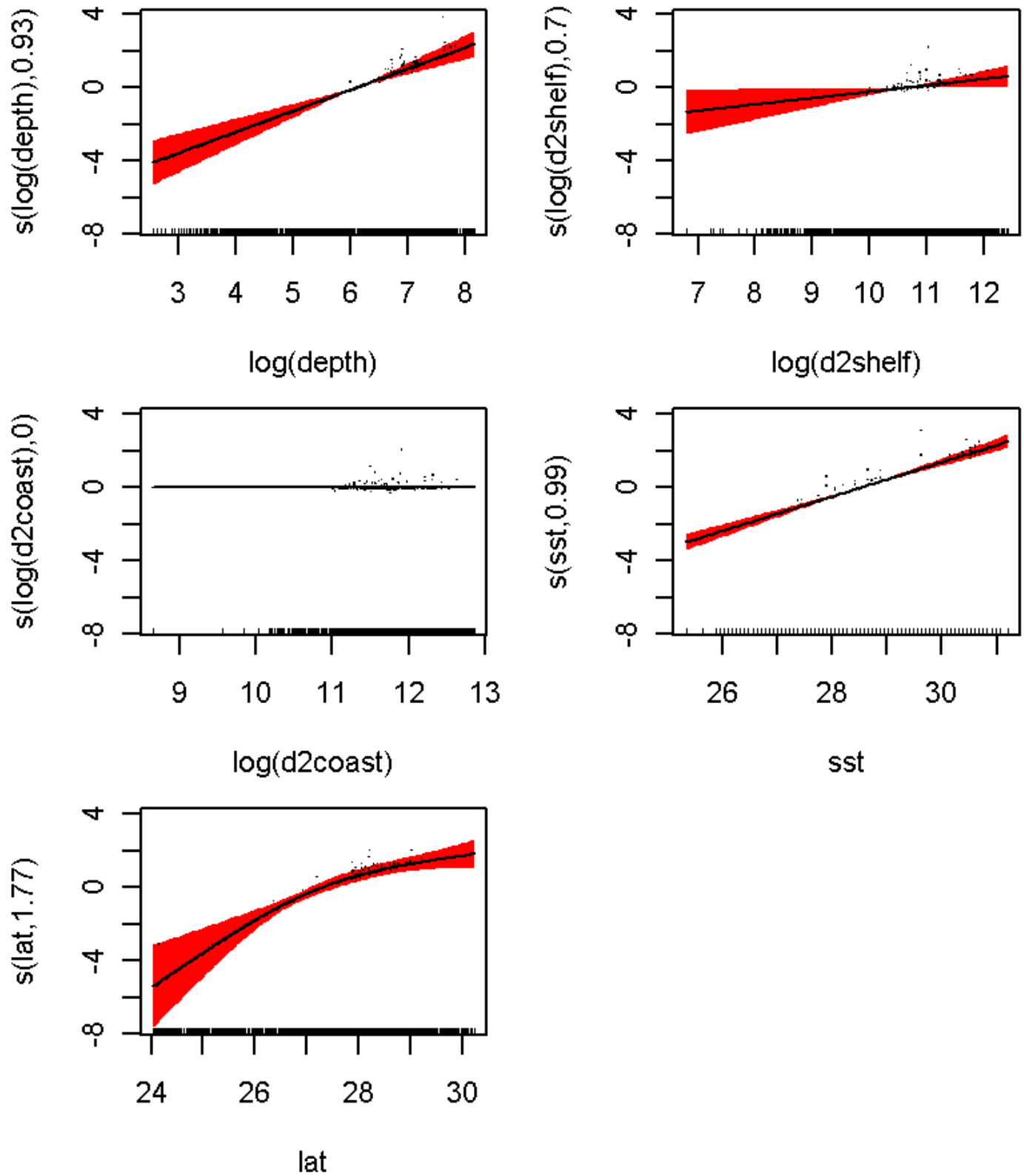


Figure 638: Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

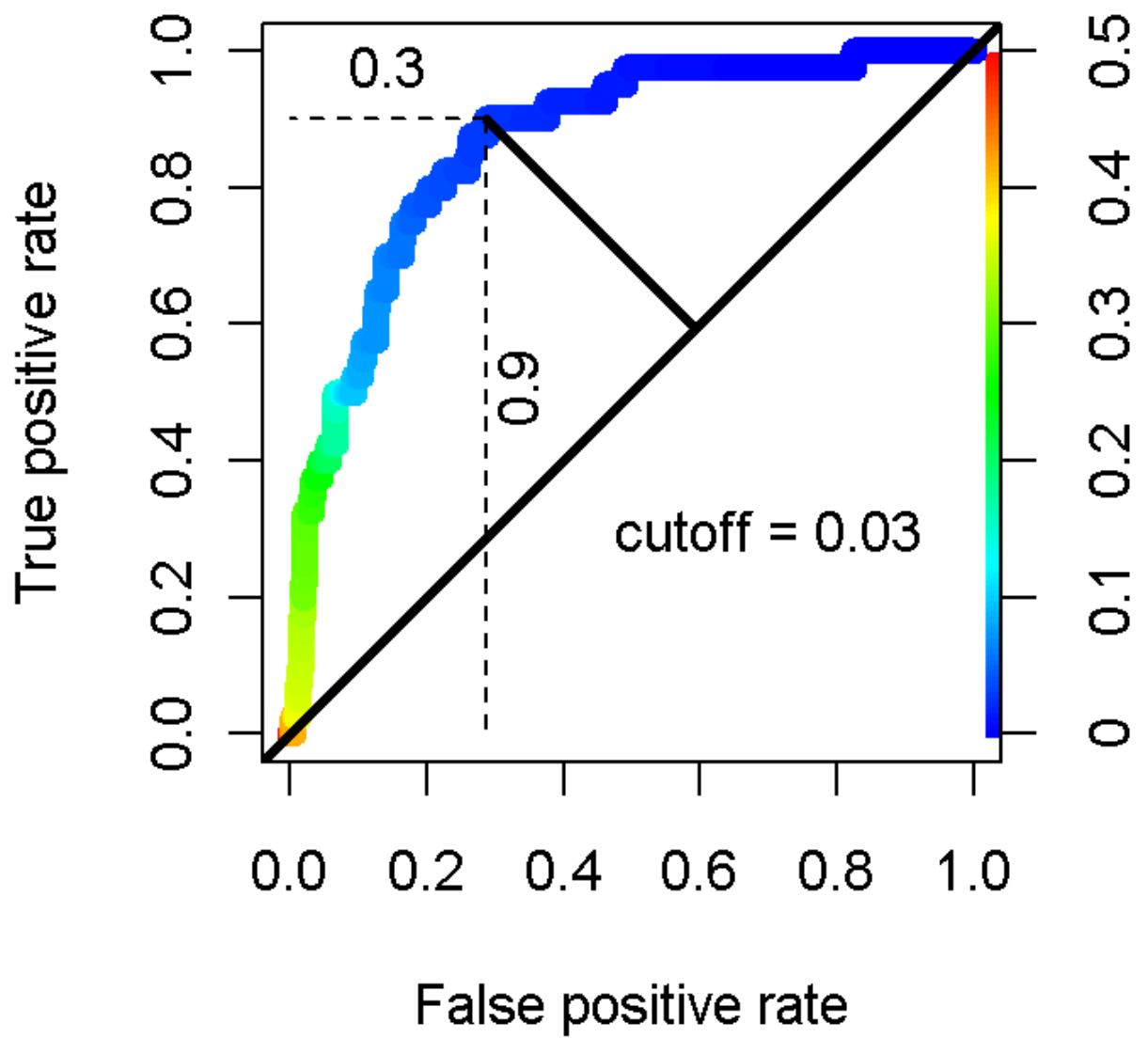


Figure 639: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

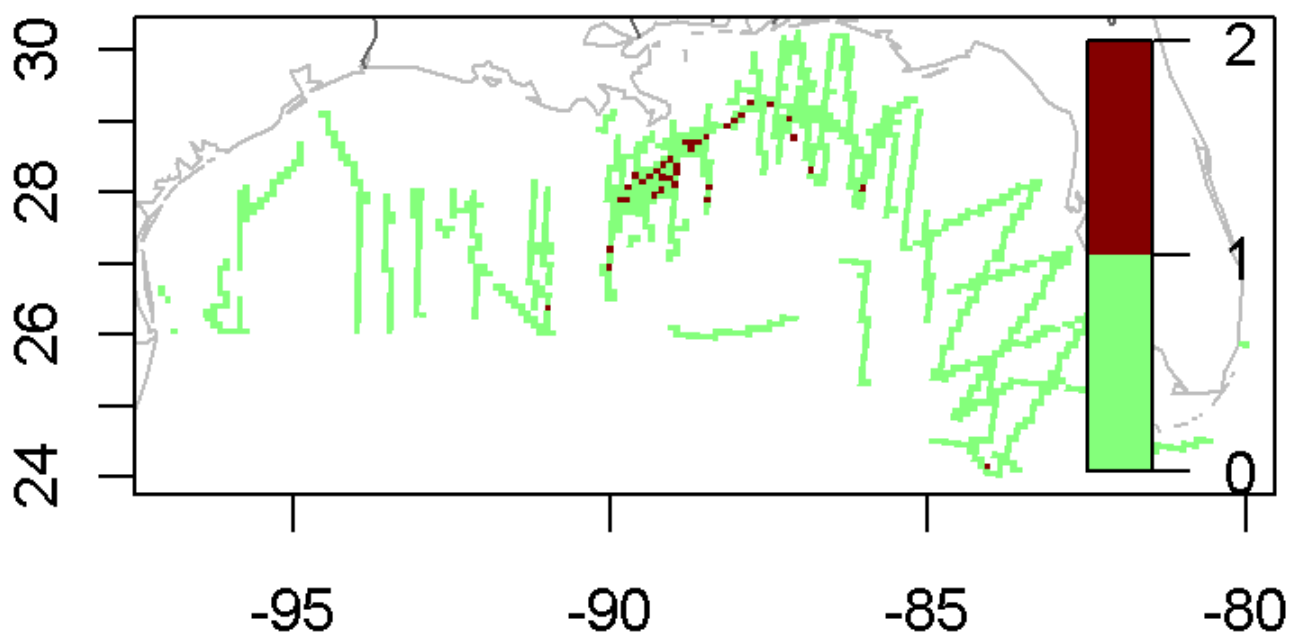


Figure 640: Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

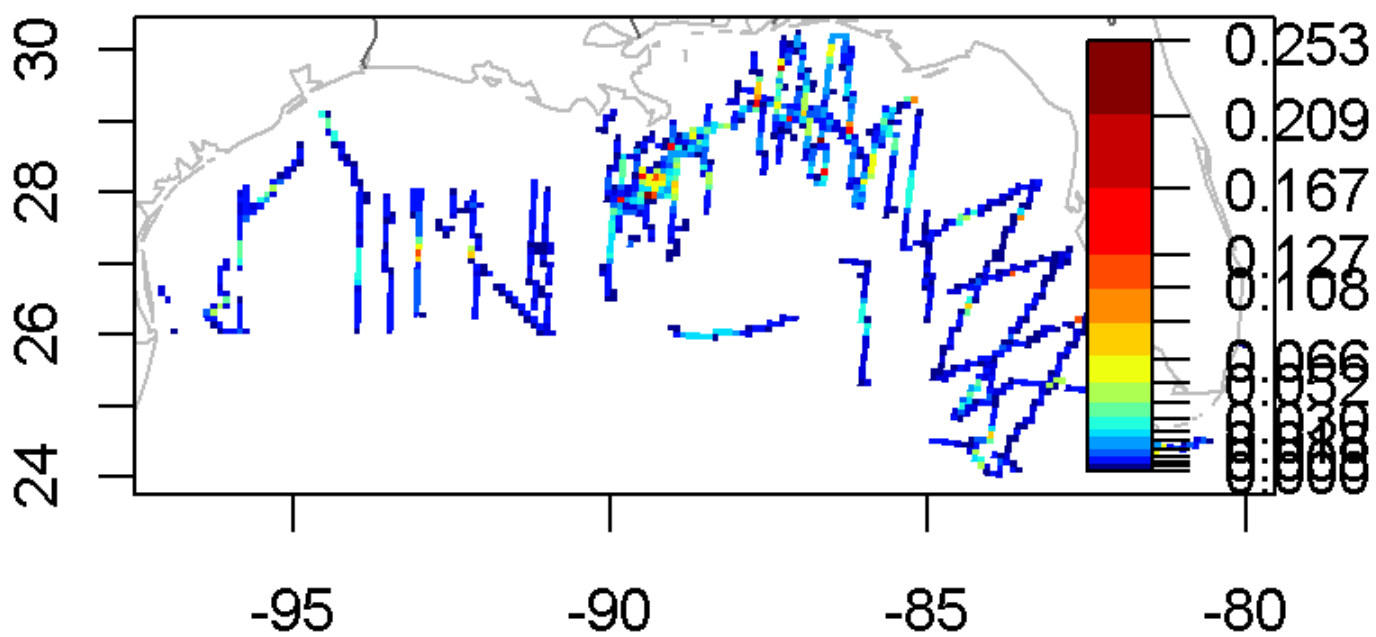


Figure 641: Map of effort(hours/km²) by cell summed through time for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

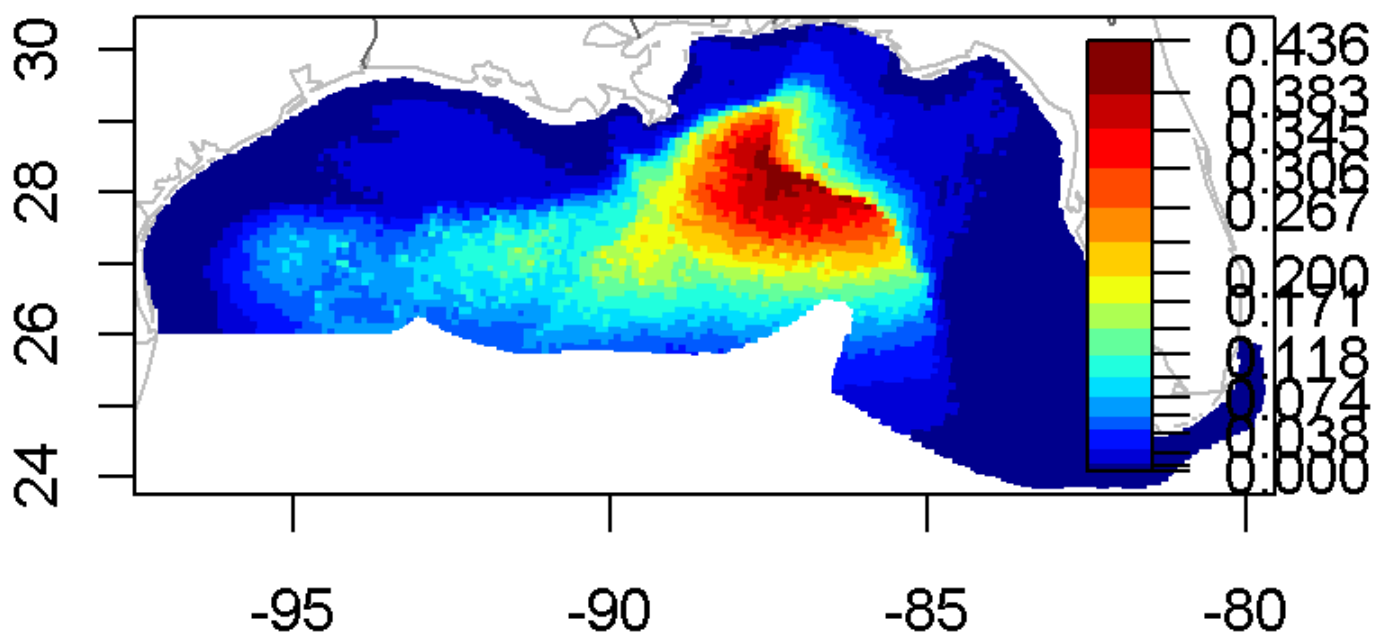


Figure 642: Map of mean predicted habitat for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

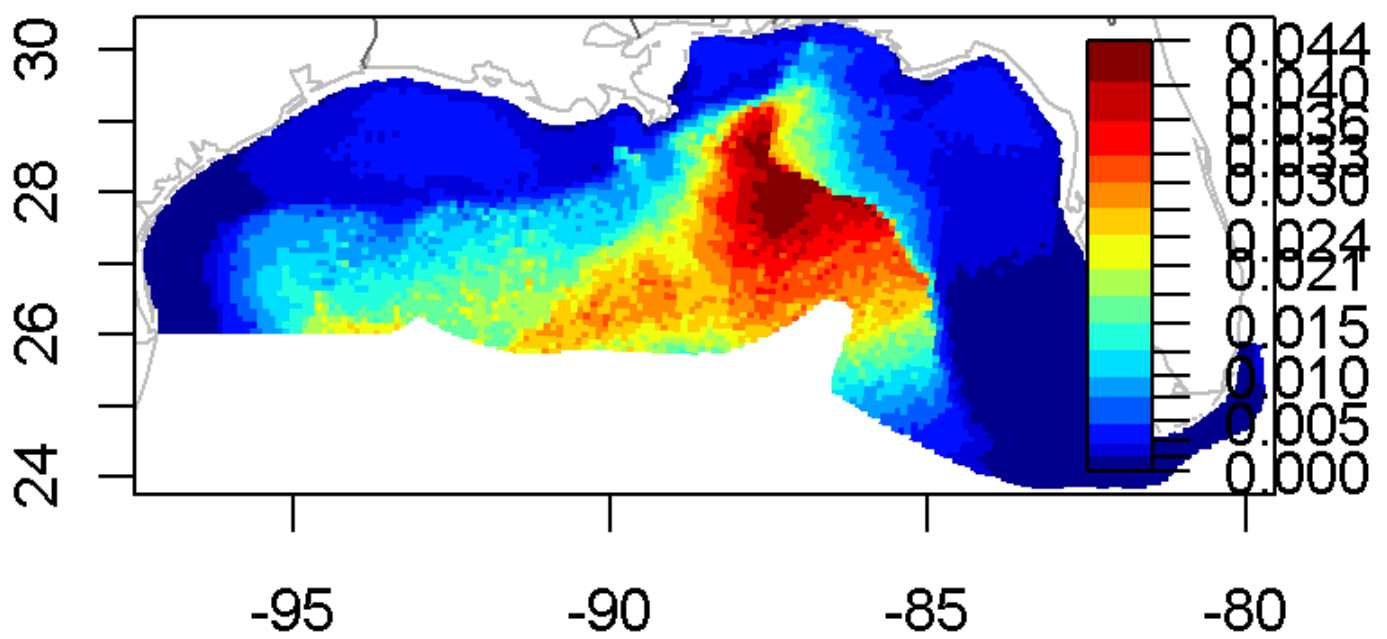


Figure 643: Map of standard error of habitat for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

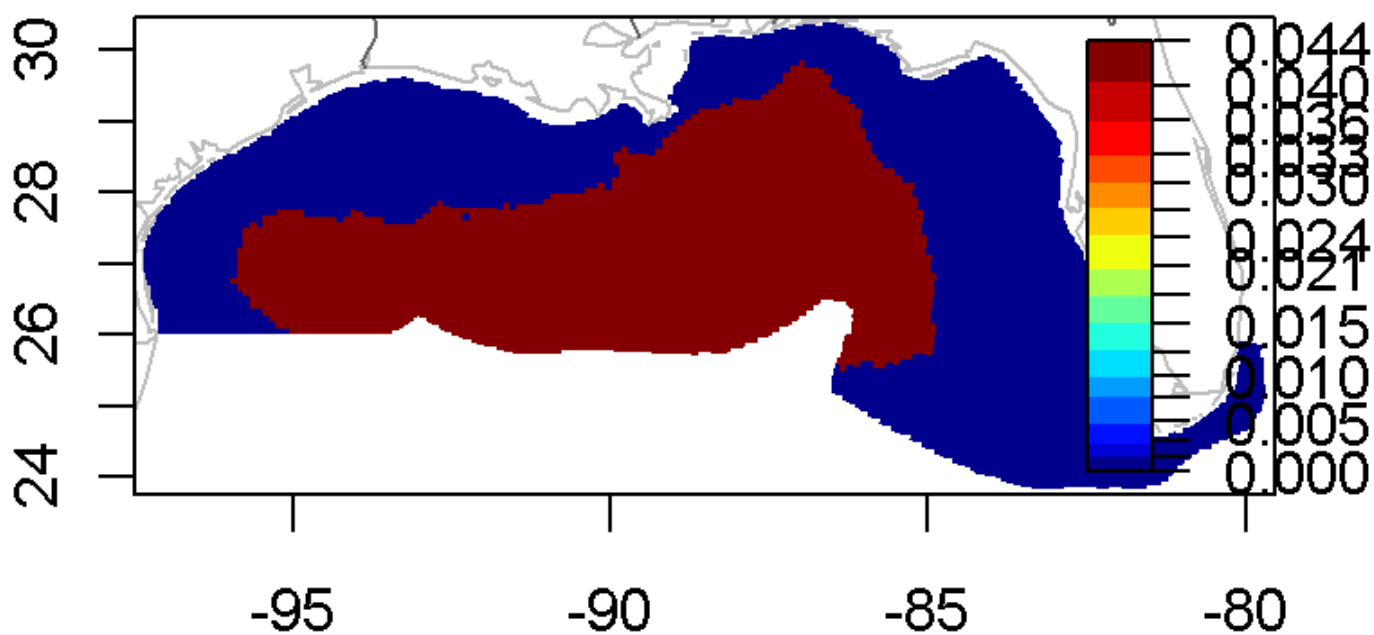


Figure 644: Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'summer' season in 'gomex2' region.

13.4 winter

13.4.1 east2

Modelrun identifier: duke_06_sw3_winter_east2

Date generated: 2008-10-21 15:23:15

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 60: Summary for duke(6) GAM model: for 'Sperm whales' guild during 'winter' season in 'east2' region.

	Value
Number.presences	5
Number.absences	3897
GAM.converged	TRUE
R.squared	0.706191
Deviance.explained	0.766709
ROC.optimum	0.901291
Maximum.fit	0.0191002
Maximum.prediction	1

Model text summary...

```
duke_06_sw3_winter_east2 run on Tue Oct 21 15:21:14 2008
  provider:duke, version:06, guild:Sperm whales (sw3), season:'winter', region:east2

max.fit:0.901291, max.prediction:1.000000, ROC.optimum:0.019100

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -18984      1117    -16.99  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.594e+00  2.094 308.366 <2e-16 ***
s(log(d2shelf)) 2.000e+00  2.500 280.136 <2e-16 ***
s(log(d2coast)) 2.349e-10  0.500  6.11e-08  0.988
s(sst)         2.000e+00  2.500 212.191 <2e-16 ***
s(lat)         8.210e-01  1.321   4.747  0.020 *
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  0.706   Deviance explained = 76.7%
GCV score = 2.7173e-05   Scale est. = 2.7018e-05   n = 2337

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2: 844   Min.   : 1654   Min.    :  4.0   Min.    :  995   Min.    : 1471   Min.    :  2.654   Min.    :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0   1st Qu.: 18575  1st Qu.: 32272  1st Qu.: 13.500  1st Qu.:32.77
          Median :10479   Median : 28.0   Median : 38452   Median : 53042   Median : 19.208   Median :34.02
          Mean   : 9475   Mean   :153.2   Mean   : 44646   Mean   : 63558   Mean   : 17.745   Mean   :33.66
          3rd Qu.:10987   3rd Qu.: 41.0   3rd Qu.: 65053   3rd Qu.: 78087   3rd Qu.: 21.825   3rd Qu.:34.80
          Max.   :12763   Max.   :3612.0   Max.   :274566   Max.   :348168   Max.   : 26.400   Max.   :38.20
                   NA's   :    14    NA's   :    14    NA's   :1561.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633   Min.    :  4   Min.    :  5   Min.    : 1259   Min.    :  2.400   Min.    :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.:  9.075   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :2.133e-16  Min.   :0.000e+00  Min.   :9.035e-07  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.220e-16  1st Qu.:7.172e-15  1st Qu.:0.000e+00  1st Qu.:7.474e-04  1st Qu.:0.0000
Median :11616  Median :2.220e-16  Median :1.415e-13  Median :0.000e+00  Median :3.451e-03  Median :0.0000
Mean   :11171  Mean   :3.241e-01  Mean   :1.425e-02  Mean   :3.487e-03  Mean   :9.821e-03  Mean   :0.3473
3rd Qu.:14088  3rd Qu.:9.999e-01  3rd Qu.:4.299e-13  3rd Qu.:0.000e+00  3rd Qu.:9.825e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :1.000e+00  Max.   :1.107e+00  Max.   :2.000e+00  Max.   :2.547e-01  Max.   :1.0000
      NA's :6.000e+00  NA's :6.000e+00  NA's :8.454e+03  NA's :8.454e+03
```

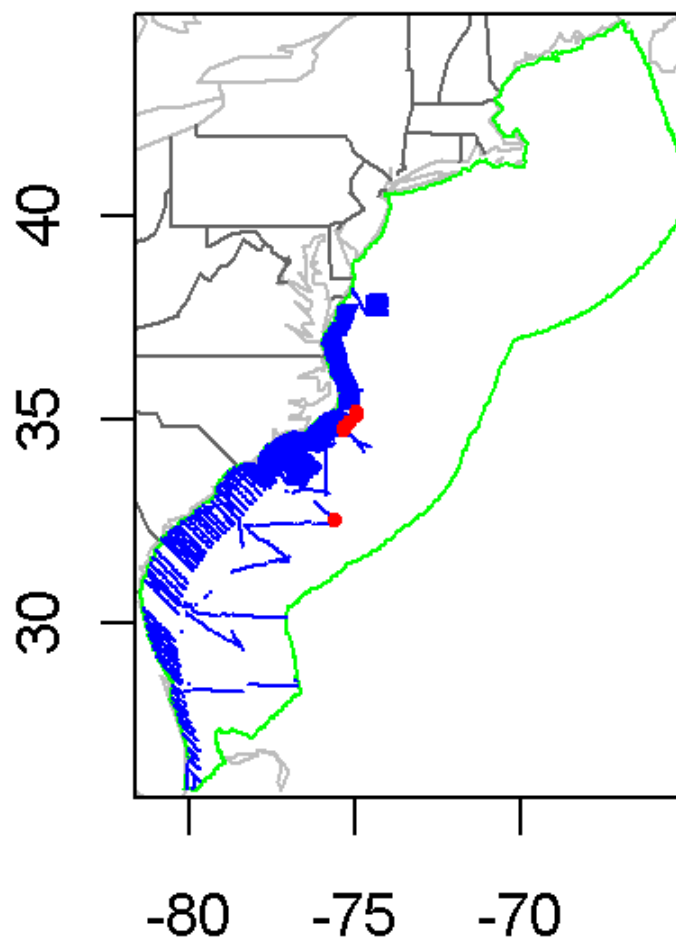


Figure 645: Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'winter' season in 'east2' region.

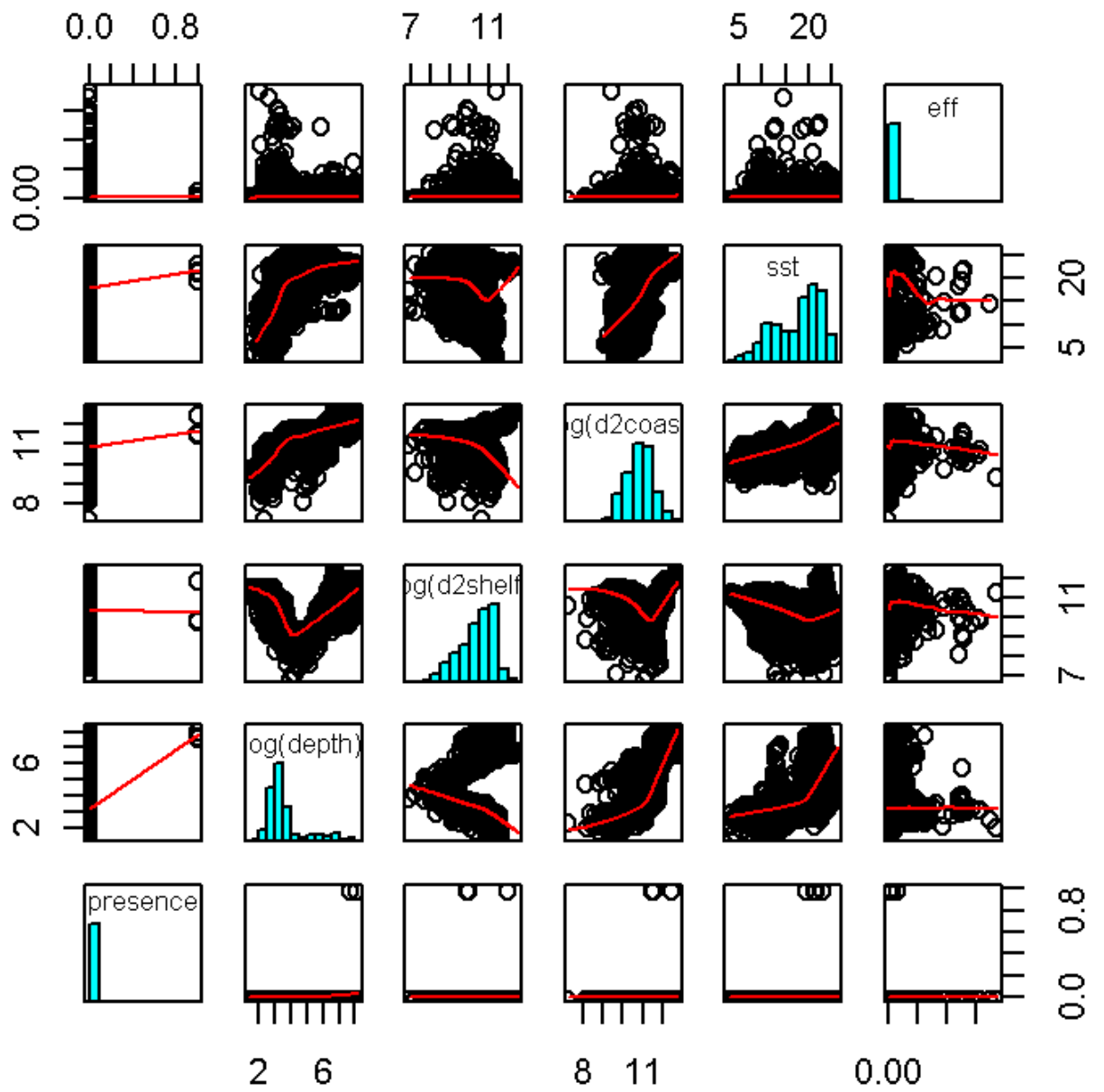


Figure 646: Pairs plot of input variables for 'Sperm whales' guild during 'winter' season in 'east2' region.

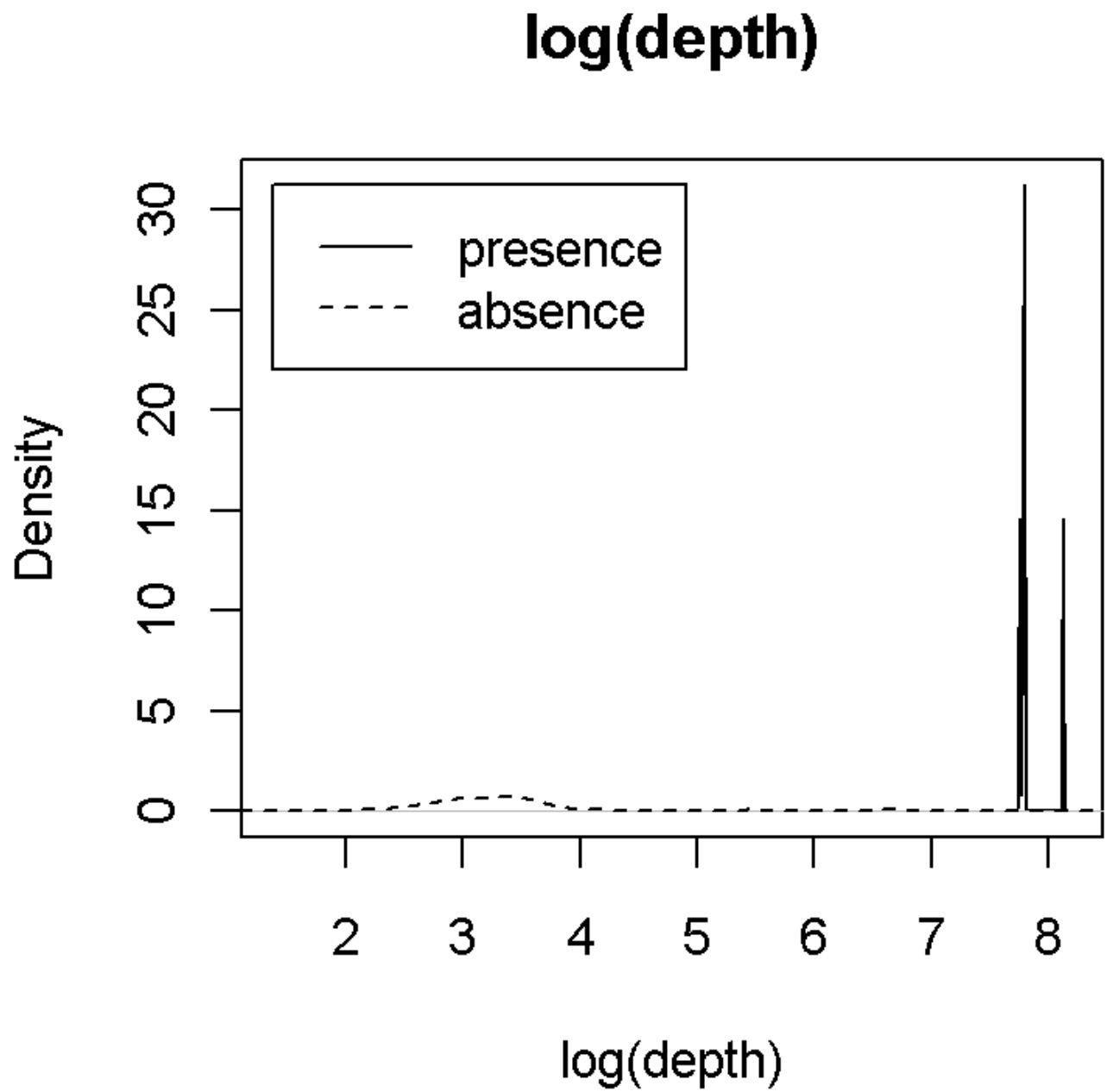


Figure 647: Density histogram of depth log(meters) for 'Sperm whales' guild during 'winter' season in 'east2' region.

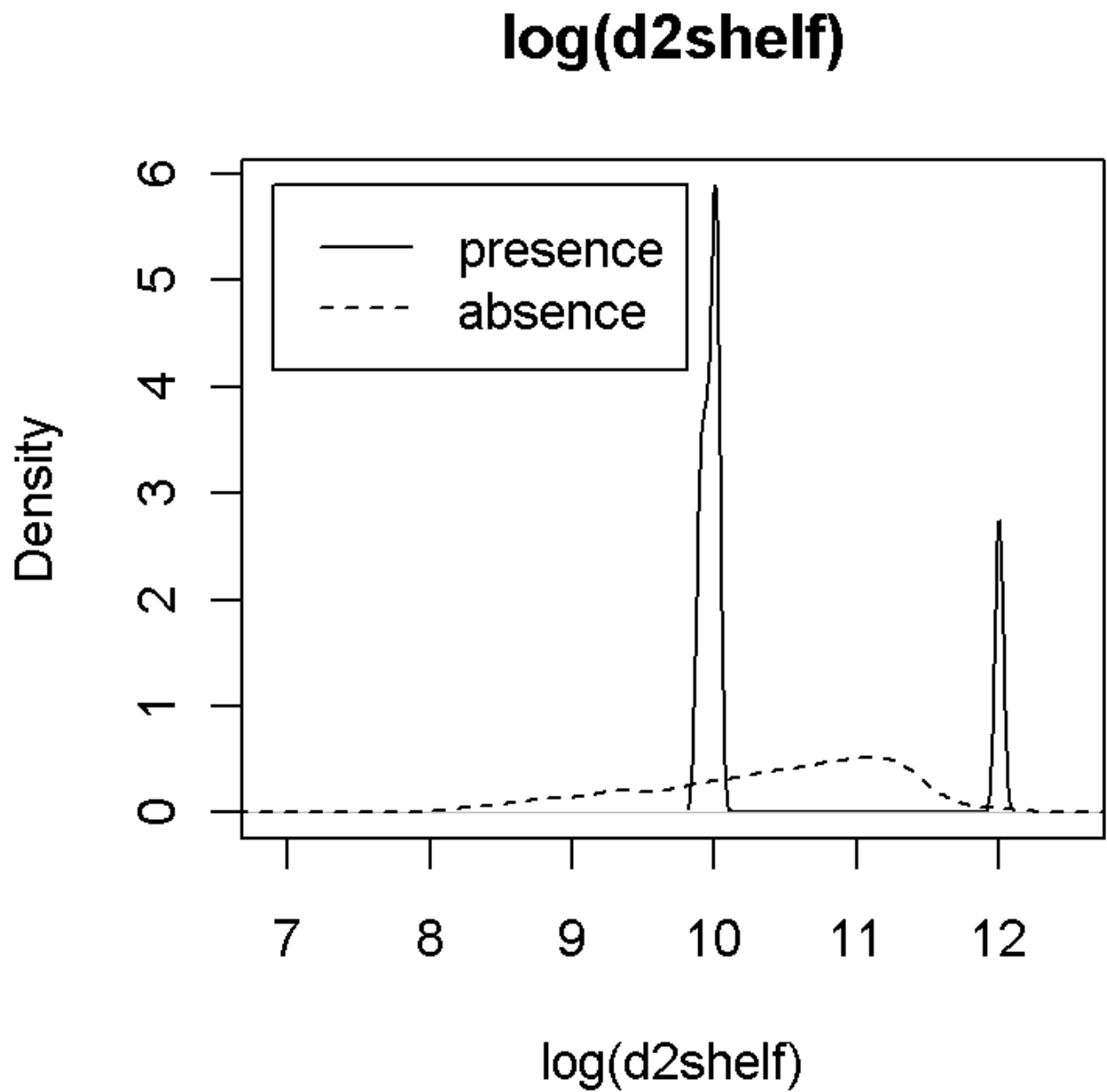


Figure 648: Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'winter' season in 'east2' region.

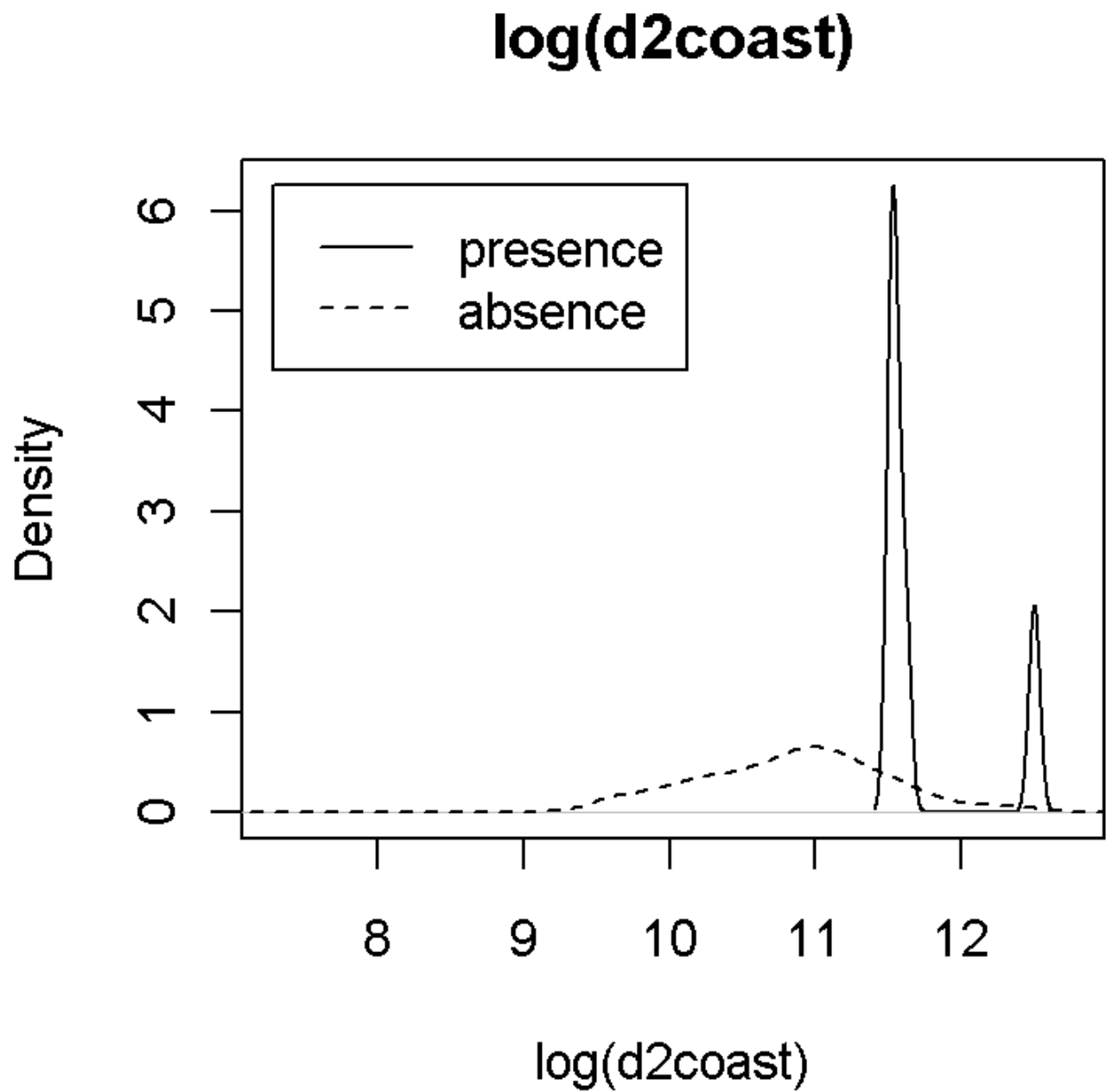


Figure 649: Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'winter' season in 'east2' region.

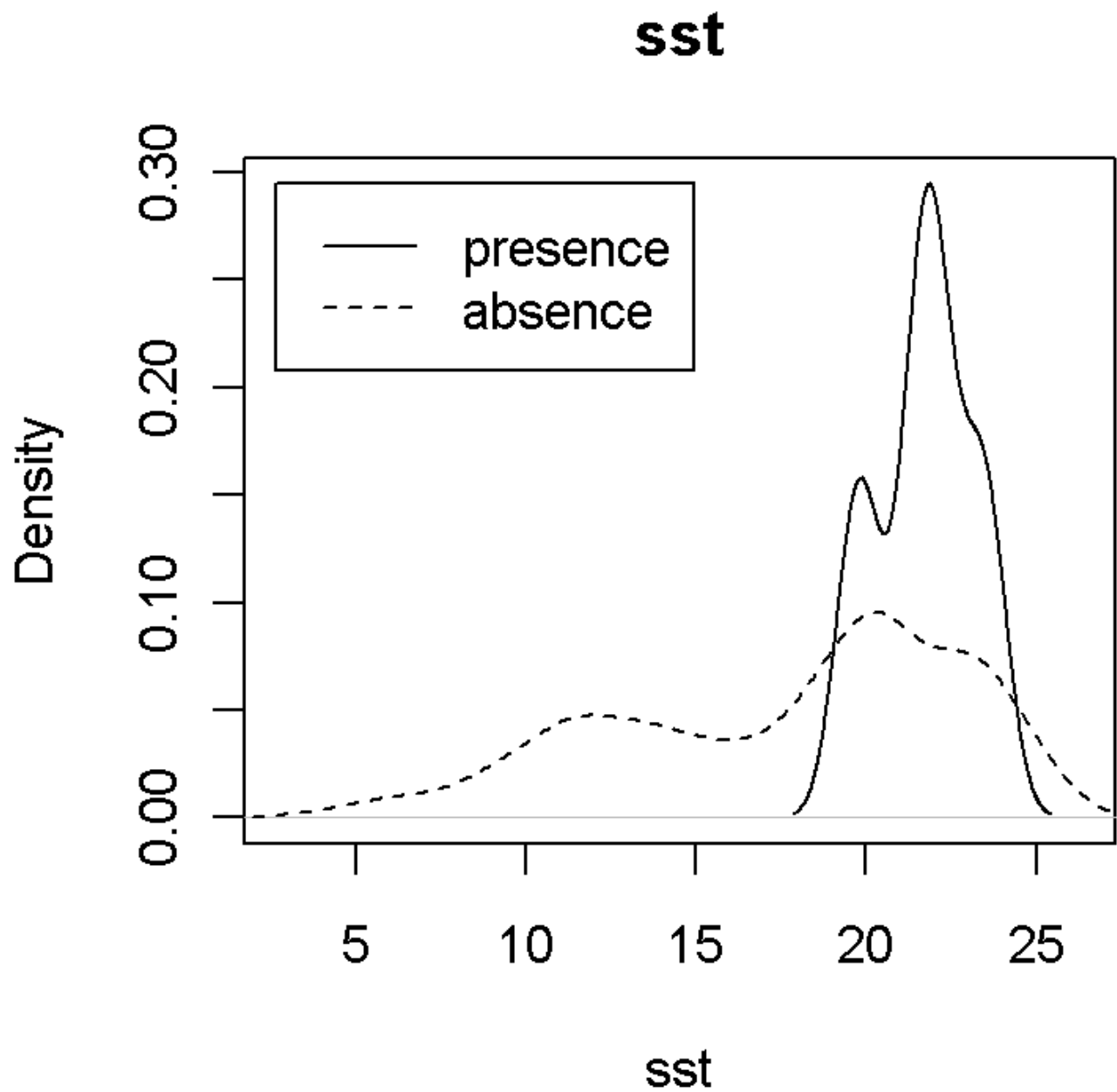


Figure 650: Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'winter' season in 'east2' region.

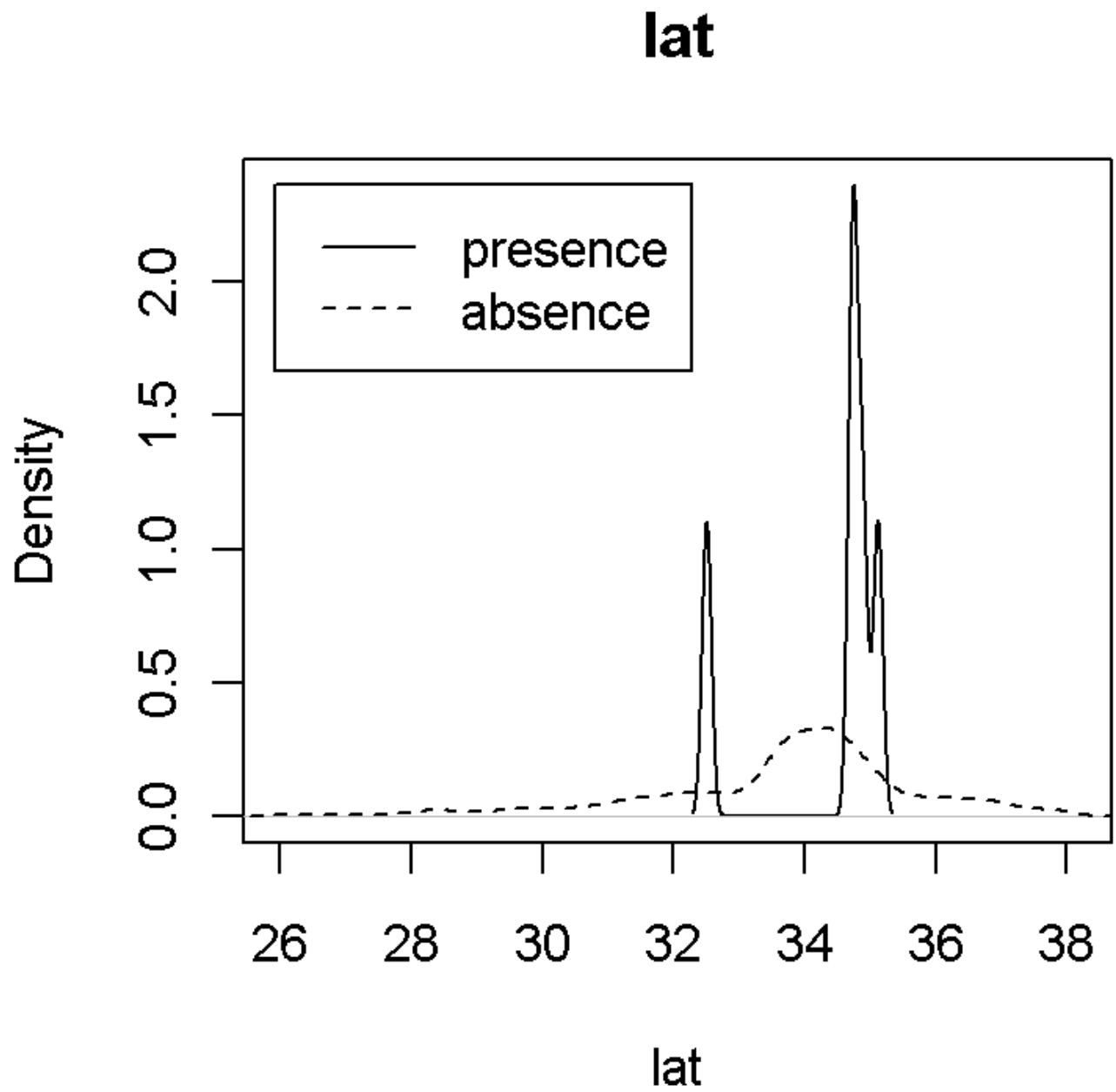


Figure 651: Density histogram of latitude (degrees) for 'Sperm whales' guild during 'winter' season in 'east2' region.

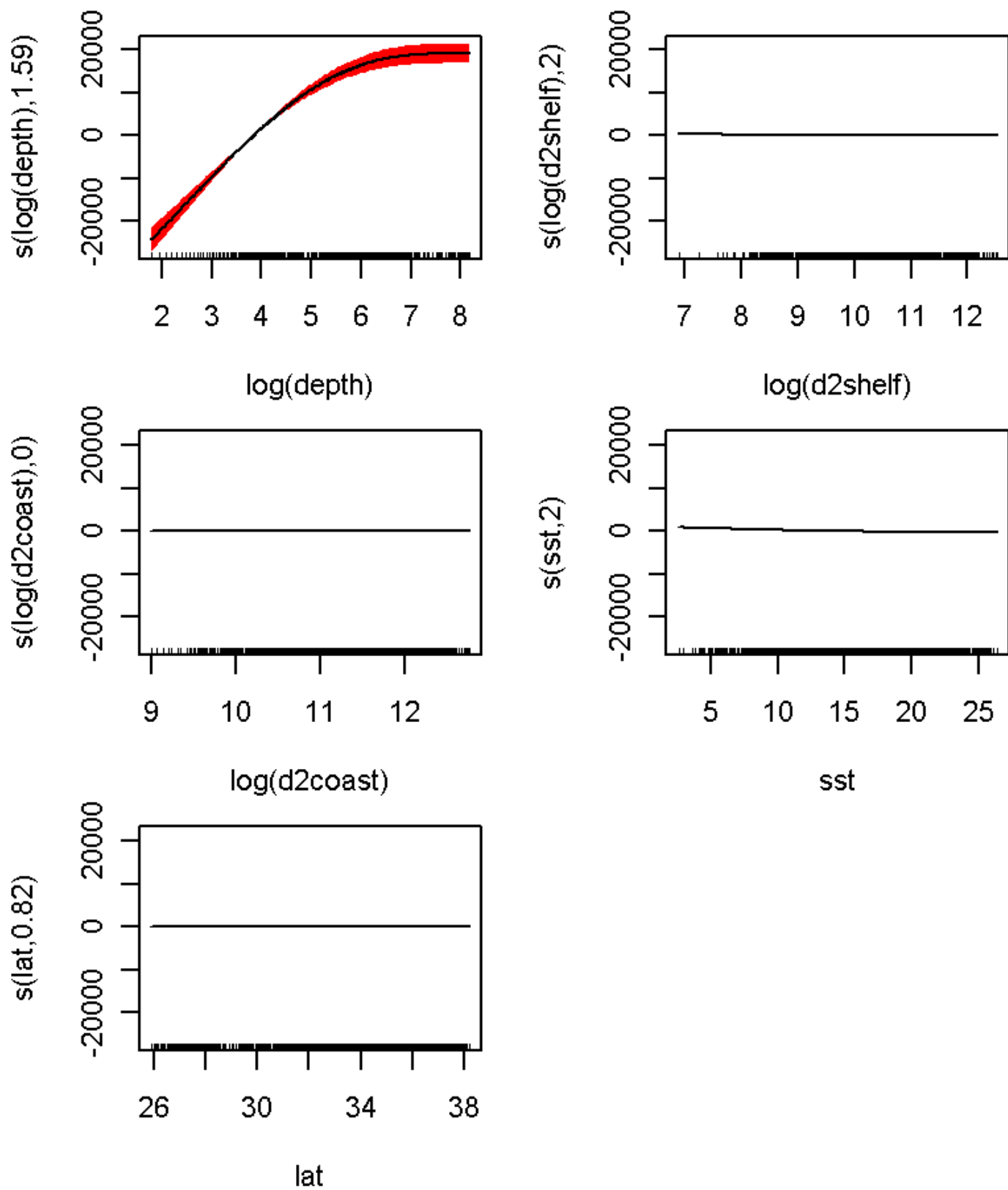


Figure 652: Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'winter' season in 'east2' region.

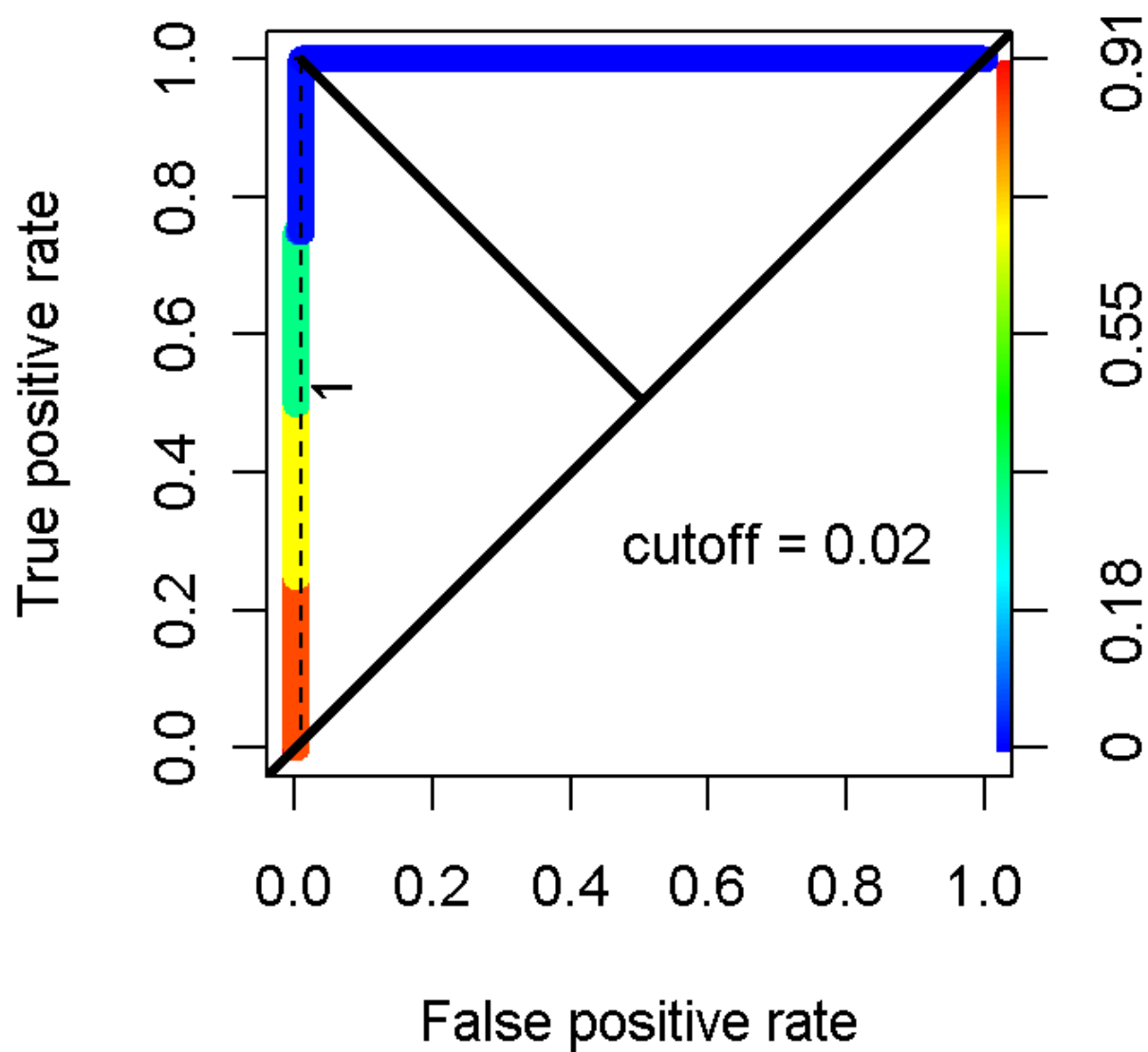


Figure 653: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'winter' season in 'east2' region.

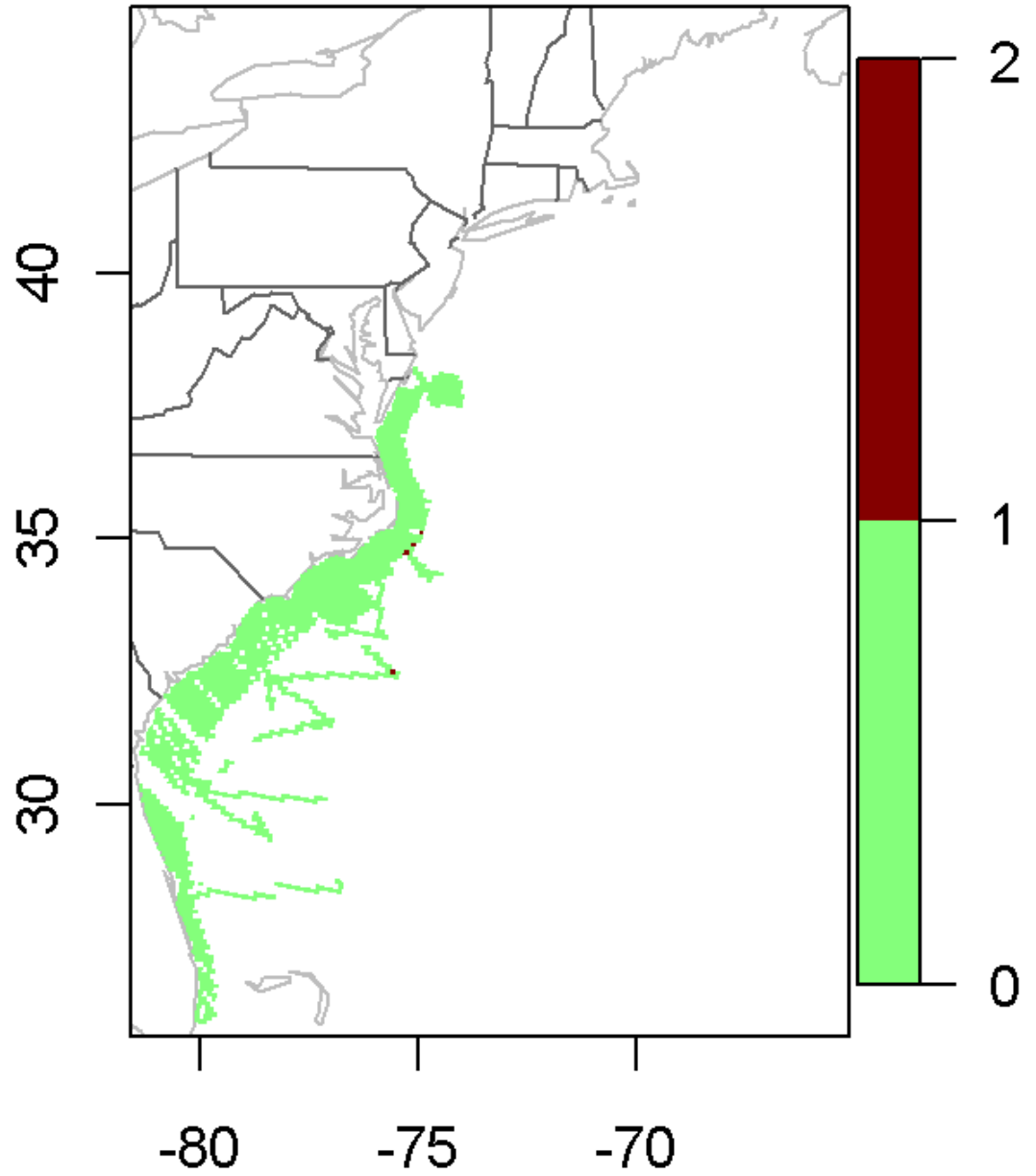


Figure 654: Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'winter' season in 'east2' region.

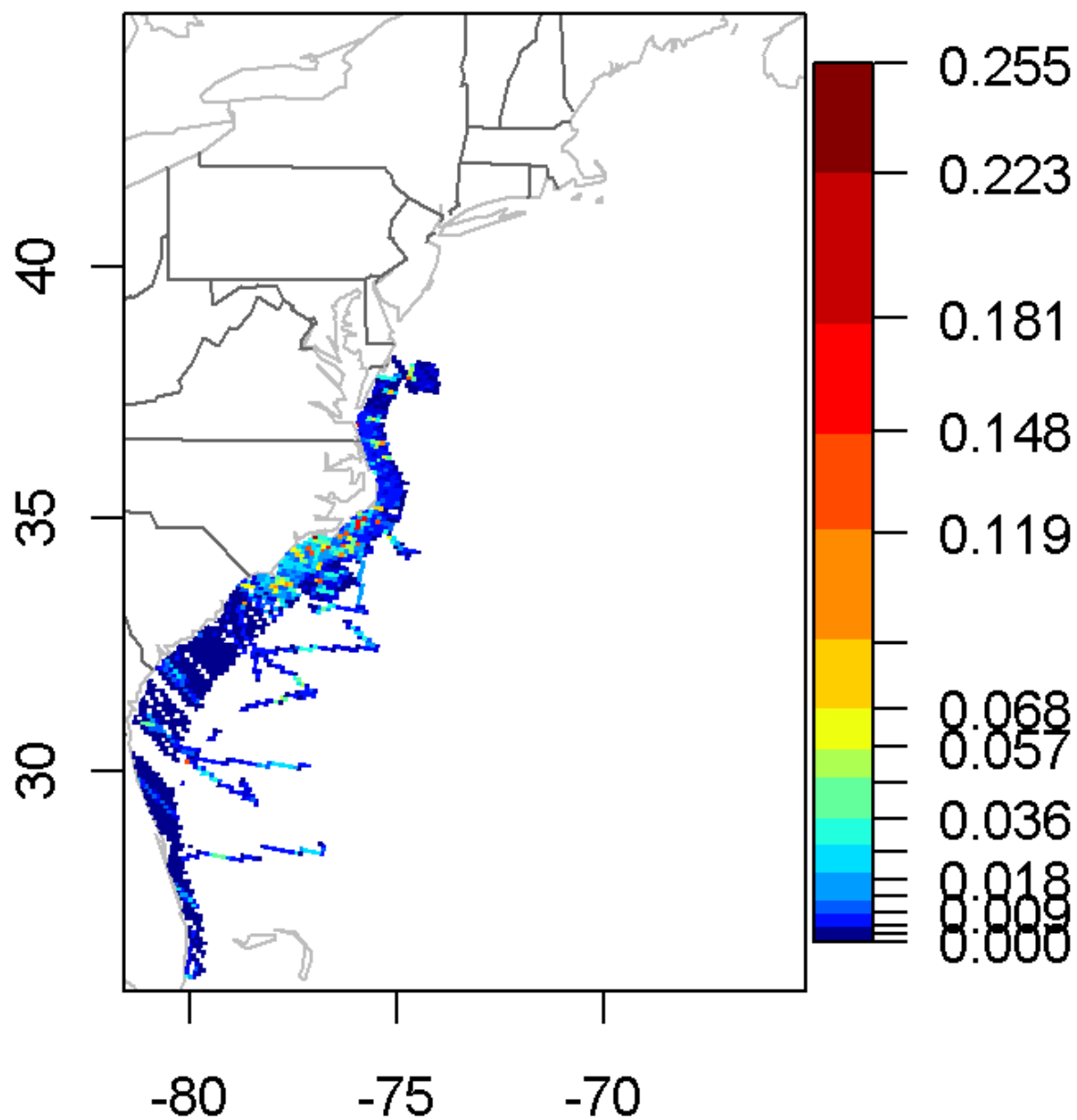


Figure 655: Map of effort(hours/km²) by cell summed through time for 'Sperm whales' guild during 'winter' season in 'east2' region.

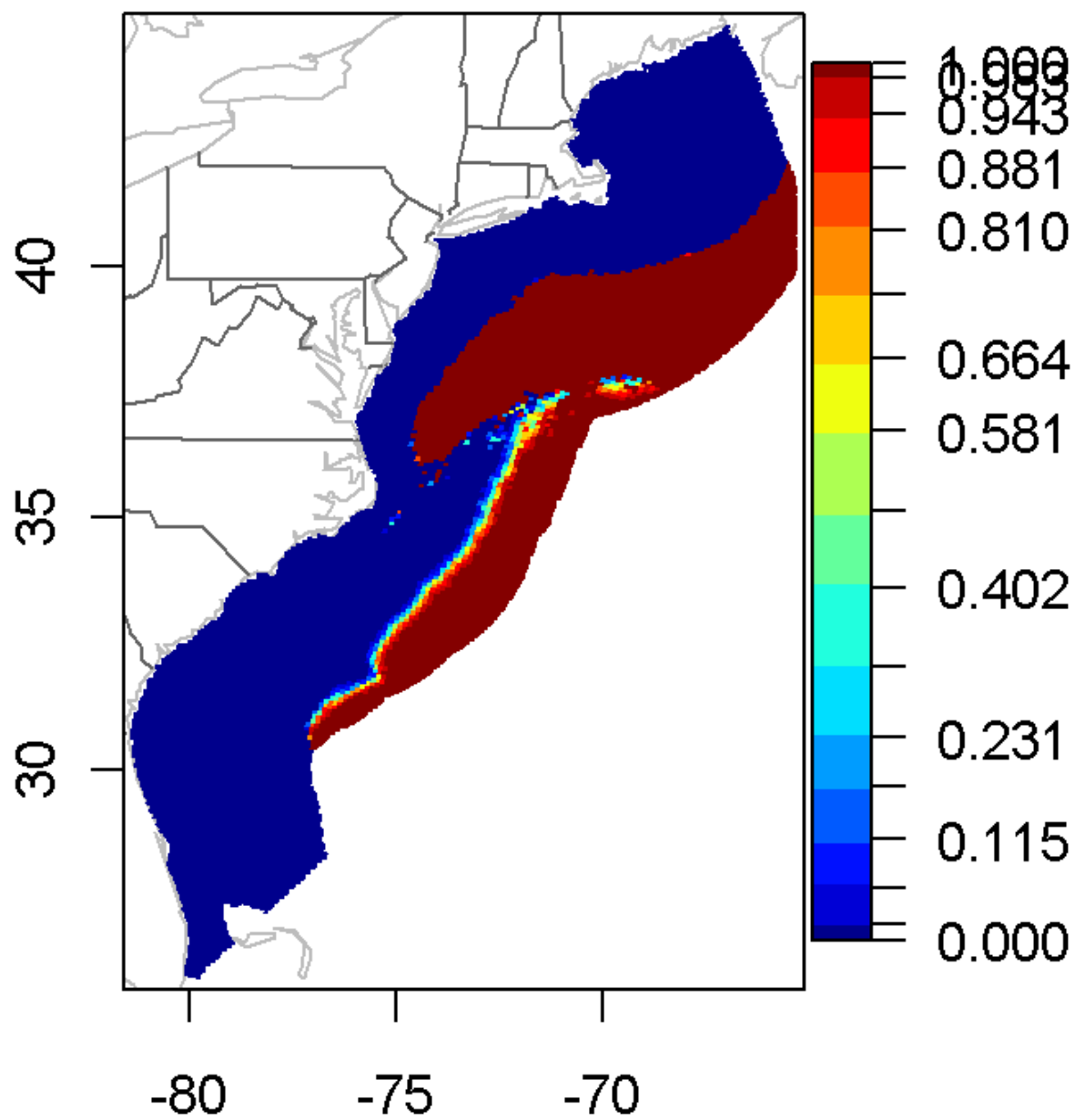


Figure 656: Map of mean predicted habitat for 'Sperm whales' guild during 'winter' season in 'east2' region.

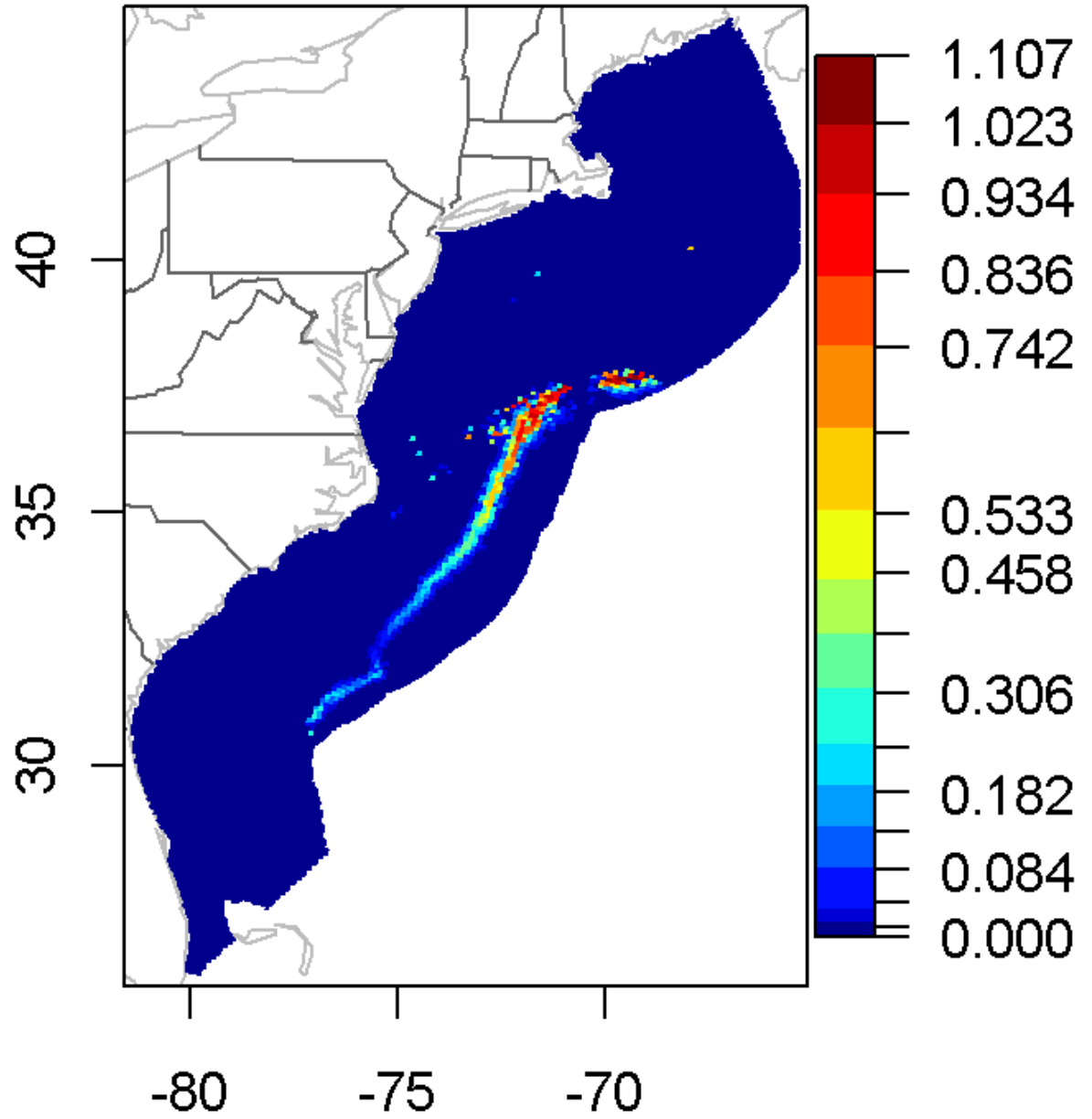


Figure 657: Map of standard error of habitat for 'Sperm whales' guild during 'winter' season in 'east2' region.

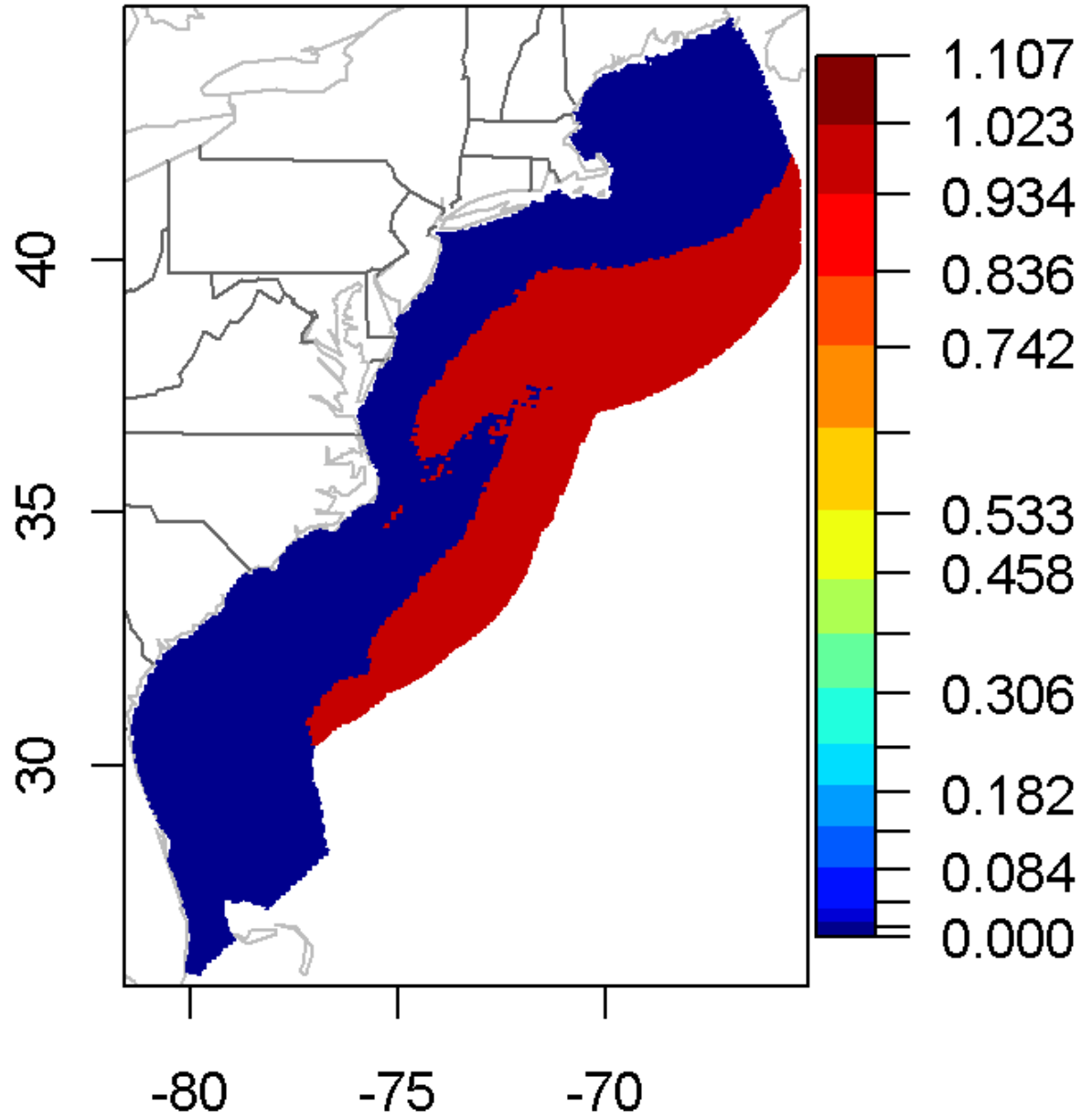


Figure 658: Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'winter' season in 'east2' region.

13.4.2 gomex2

Modelrun identifier: duke_06_sw3_winter_gomex2

Date generated: 2008-10-21 12:07:20

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 61: Summary for duke(6) GAM model: for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

	Value
Number.presences	7
Number.absences	598
GAM.converged	TRUE
R.squared	-0.0269184
Deviance.explained	0.0861895
ROC.optimum	0.0504685
Maximum.fit	0.0143159
Maximum.prediction	0.056614

Model text summary...

```
duke_06_sw3_winter_gomex2 run on Tue Oct 21 12:06:46 2008
  provider:duke, version:06, guild:Sperm whales (sw3), season:'winter', region:gomex2

max.fit:0.050469, max.prediction:0.056614, ROC.optimum:0.014316

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.243      0.222   -23.62  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F  p-value
s(log(depth))  2.521e-06  0.500  1.86e-06   0.971
s(log(d2shelf)) 2.393e-06  0.500  1.82e-05   0.949
s(log(d2coast)) 9.649e-01  1.465   17.52  1.41e-06 ***
s(sst)         9.688e-01  1.469   19.18  4.15e-07 ***
s(lat)         9.735e-07  0.500  6.21e-05   0.931
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  -0.0269  Deviance explained = 8.62%
GCV score = 0.00064022  Scale est. = 0.00063455  n = 596

summary(dat)...
      region  fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:605  Min.   : 161  Min.   :  42  Min.   : 1427  Min.   : 14193  Min.   :17.10  Min.   :24.23
             1st Qu.:3257  1st Qu.: 415  1st Qu.: 17134  1st Qu.:136665  1st Qu.:21.38  1st Qu.:26.95
             Median :4493  Median :1087  Median : 54348  Median :181008  Median :22.05  Median :27.54
             Mean   :4224  Mean   :1200  Mean   : 59634  Mean   :187275  Mean   :22.14  Mean   :27.38
             3rd Qu.:5338  3rd Qu.:1712  3rd Qu.: 96839  3rd Qu.:241267  3rd Qu.:22.80  3rd Qu.:27.98
             Max.   :7531  Max.   :3350  Max.   :164995  Max.   :356233  Max.   :25.50  Max.   :29.35
             NA's   : 9.00

summary(newdat)...
      region  fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   :  1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :15.07  Min.   :23.85
             1st Qu.:1861  1st Qu.: 46.0  1st Qu.: 31617  1st Qu.: 85289  1st Qu.:20.33  1st Qu.:26.28
```

Median :4110	Median : 433.5	Median : 71100	Median :157258	Median :21.90	Median :27.29
Mean :3997	Mean :1057.7	Mean : 86278	Mean :170790	Mean :21.52	Mean :27.26
3rd Qu.:6015	3rd Qu.:2026.0	3rd Qu.:131962	3rd Qu.:249983	3rd Qu.:22.88	3rd Qu.:28.38
Max. :8351	Max. :3643.0	Max. :267519	Max. :408116	Max. :25.80	Max. :30.36

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1  Min.   :1.623e-07  Min.   :3.365e-07  Min.   :0.000e+00  Min.   :3.813e-06  Min.   :0.0000
1st Qu.:1861 1st Qu.:2.867e-03  1st Qu.:1.116e-03  1st Qu.:0.000e+00  1st Qu.:3.727e-03  1st Qu.:0.0000
Median :4110 Median :6.707e-03  Median :1.711e-03  Median :0.000e+00  Median :5.454e-03  Median :0.0000
Mean   :3997 Mean   :8.255e-03  Mean   :2.920e-03  Mean   :1.203e-02  Mean   :6.586e-03  Mean   :0.1520
3rd Qu.:6015 3rd Qu.:1.133e-02  3rd Qu.:2.806e-03  3rd Qu.:0.000e+00  3rd Qu.:6.028e-03  3rd Qu.:0.0000
Max.   :8351 Max.   :5.661e-02  Max.   :3.462e-02  Max.   :1.000e+00  Max.   :9.493e-02  Max.   :1.0000
NA's   :6.090e+03  NA's   :6.090e+03
```

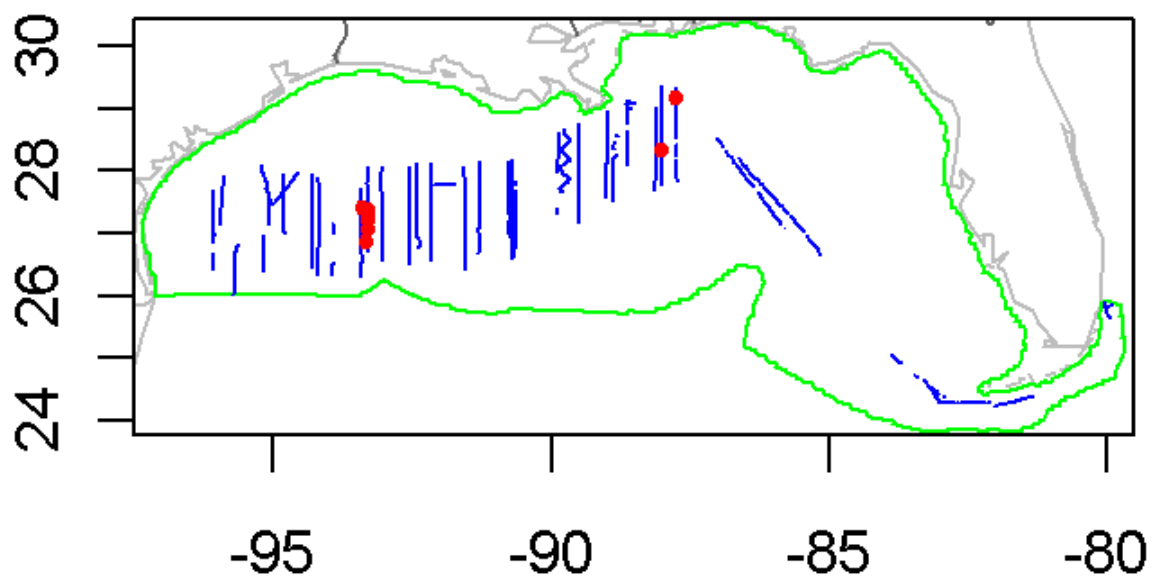


Figure 659: Map of points of observational sightings and tracks of survey effort for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

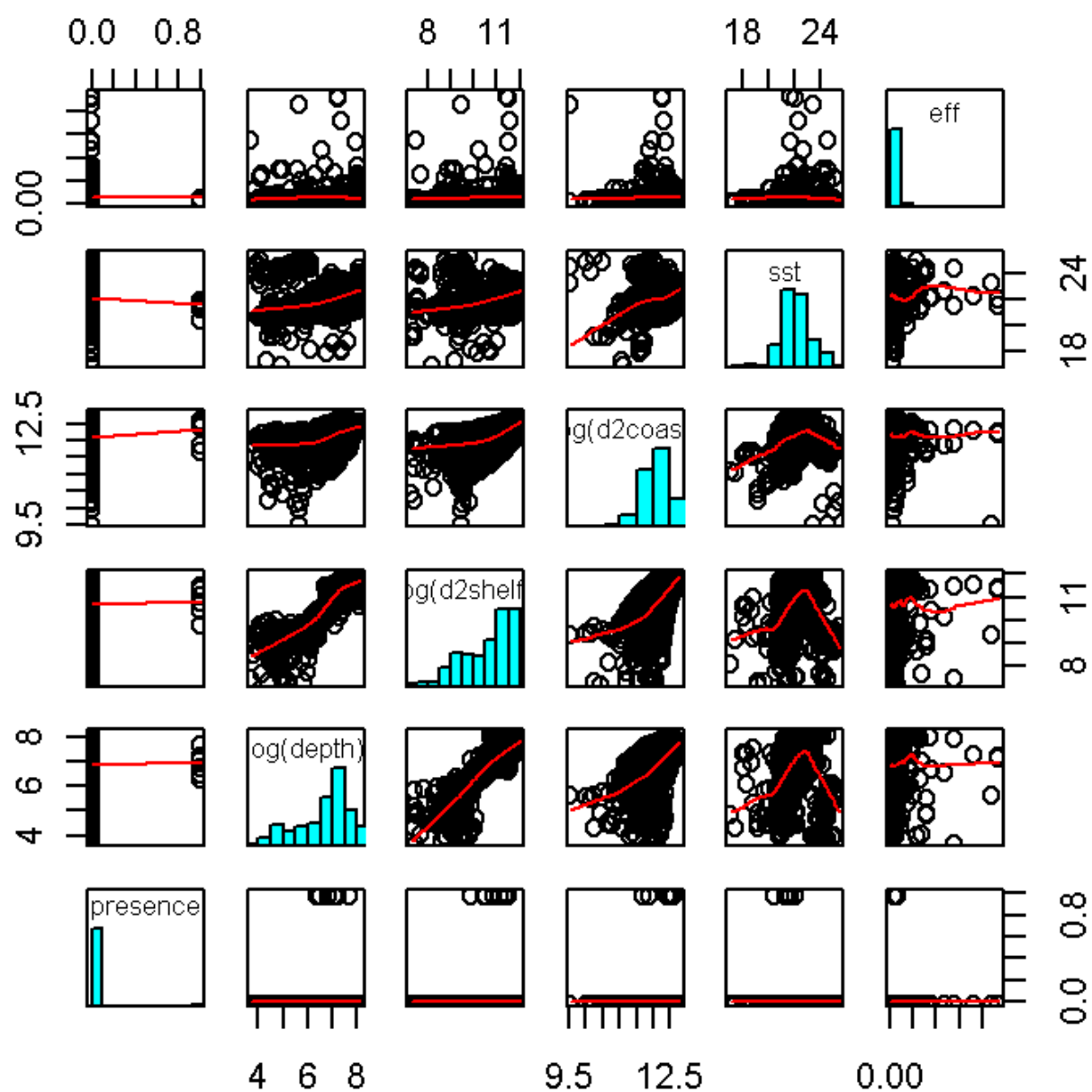


Figure 660: Pairs plot of input variables for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

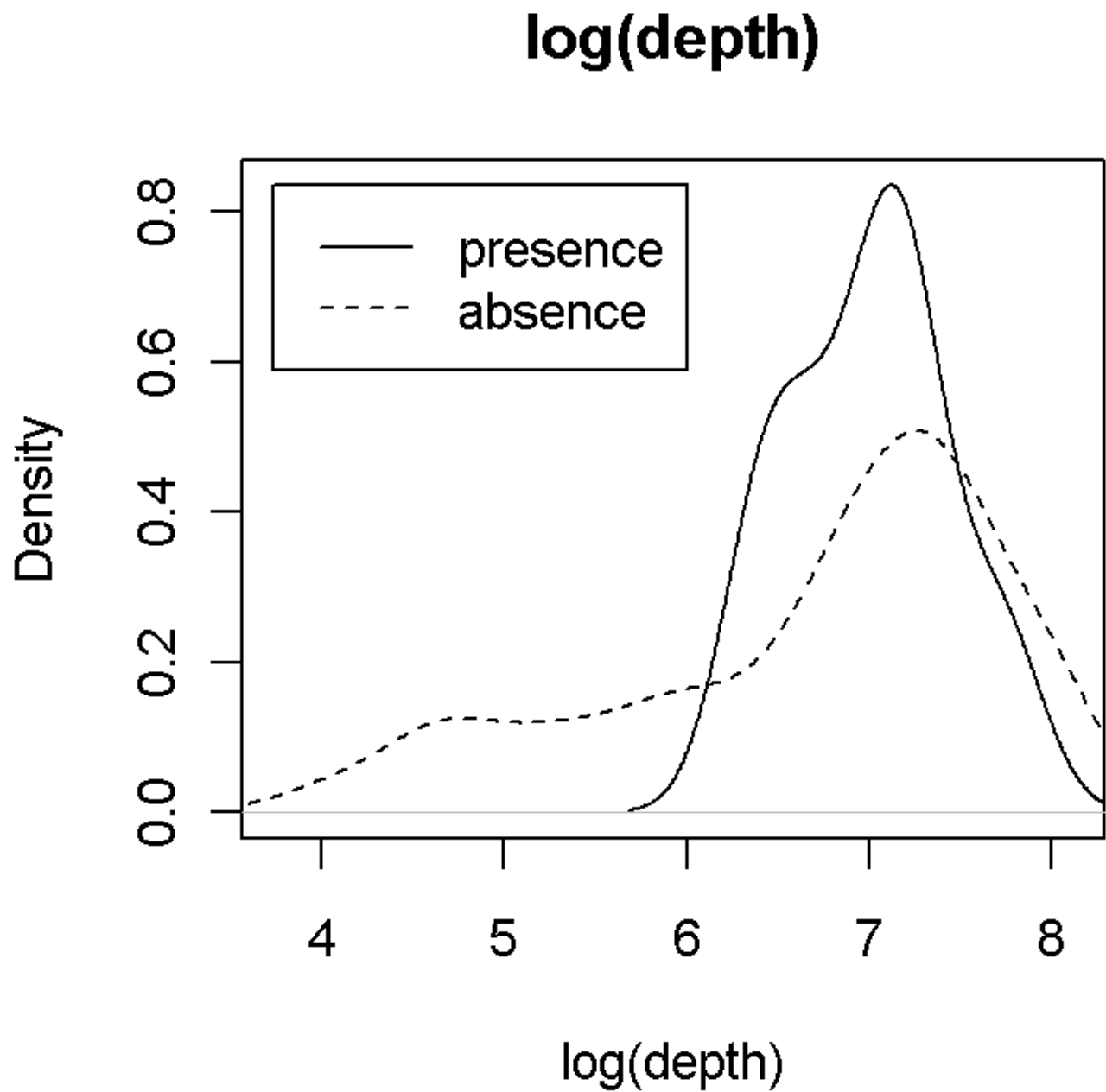


Figure 661: Density histogram of depth log(meters) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

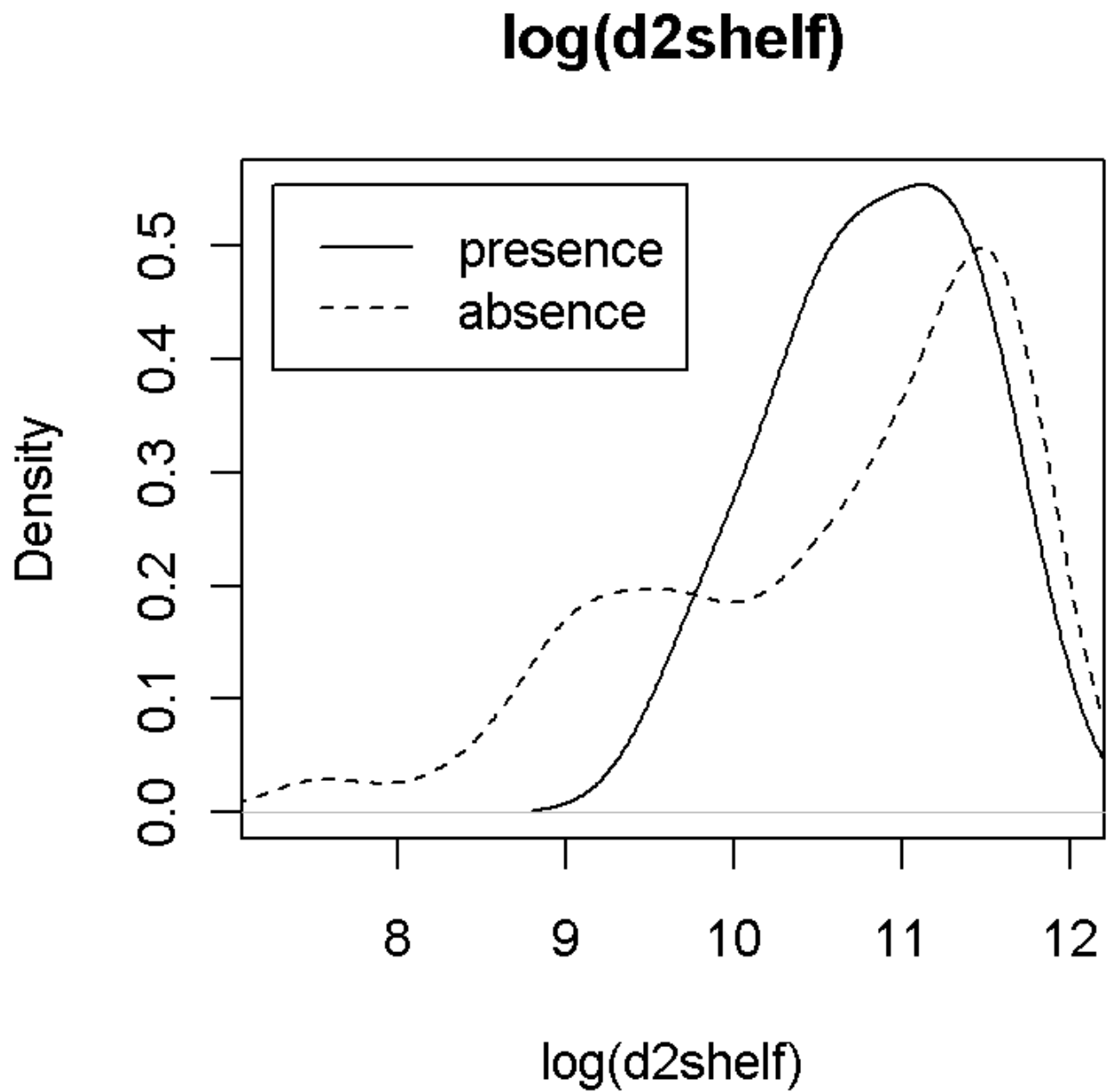


Figure 662: Density histogram of distance to shelf log(meters) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

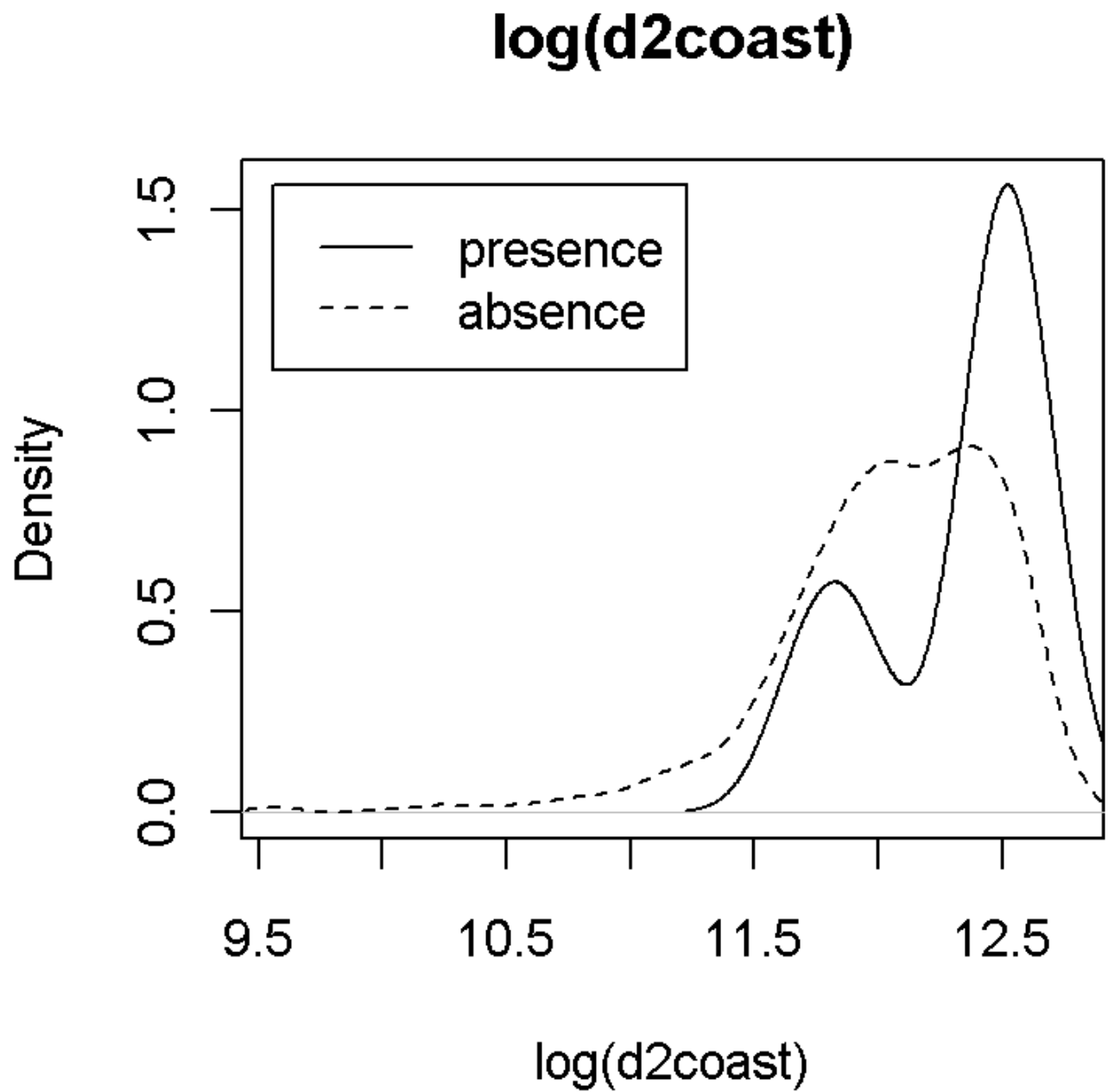


Figure 663: Density histogram of distance to coast log(meters) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

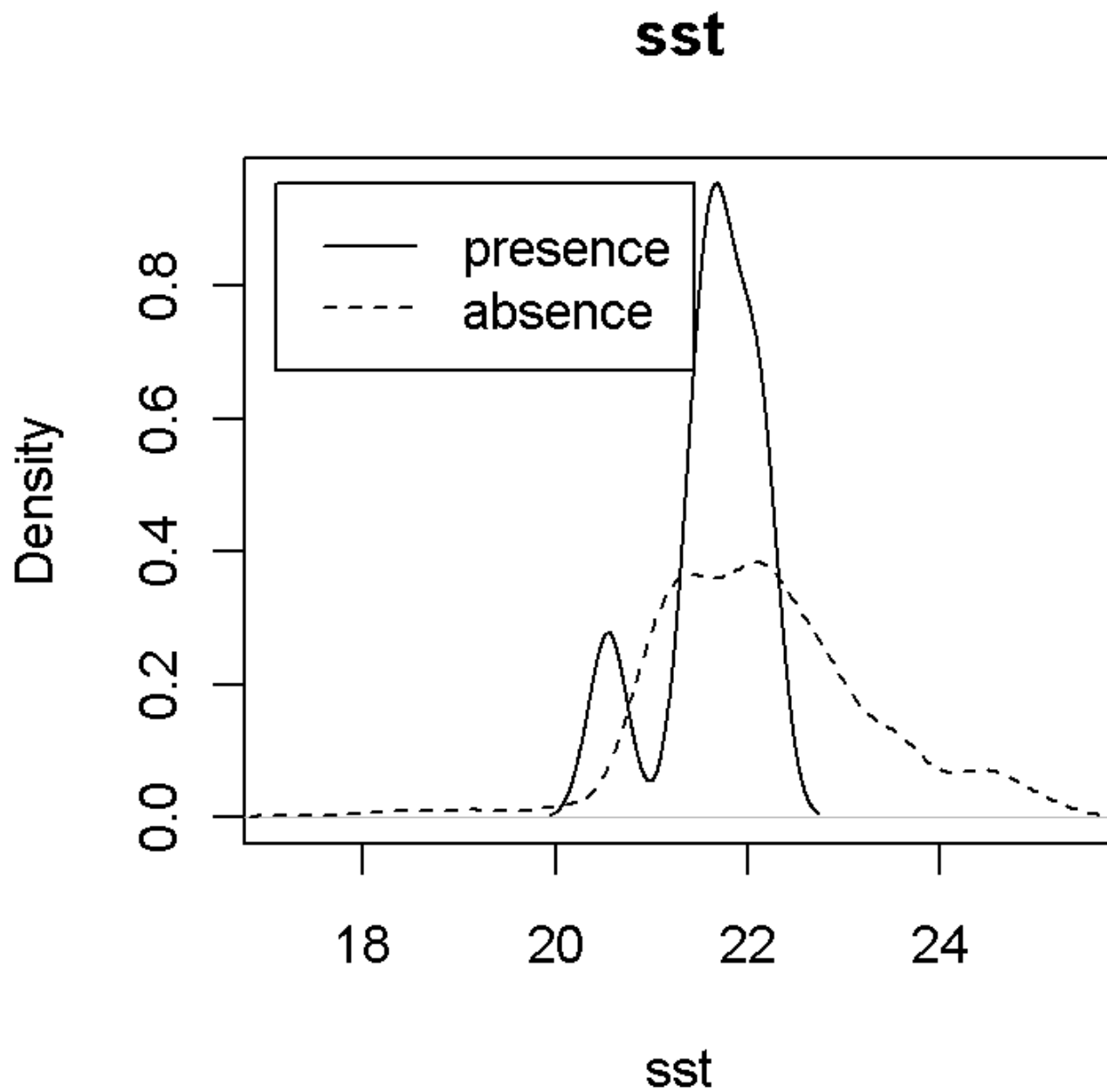


Figure 664: Density histogram of sea-surface temperature (degrees C) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

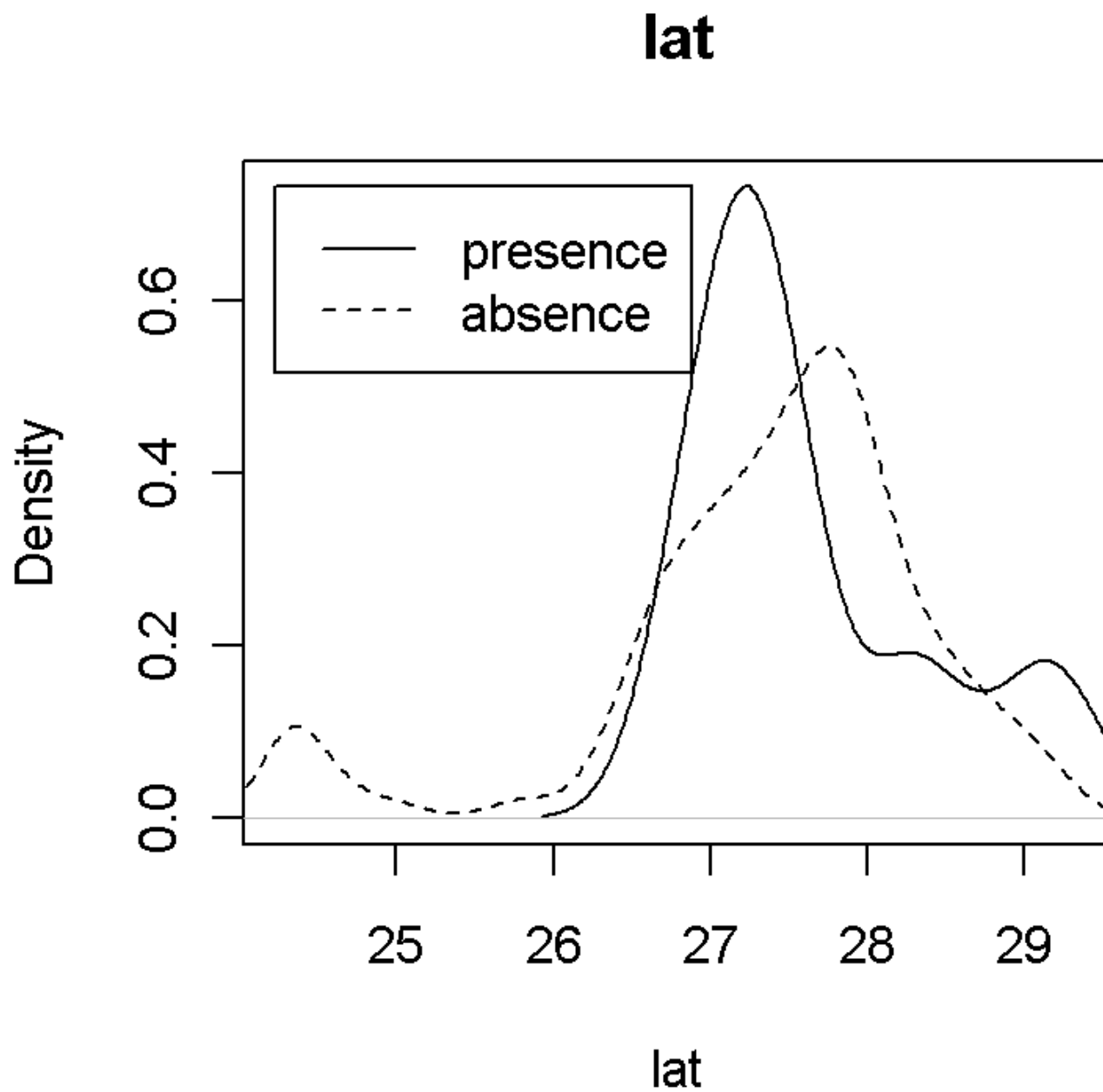


Figure 665: Density histogram of latitude (degrees) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

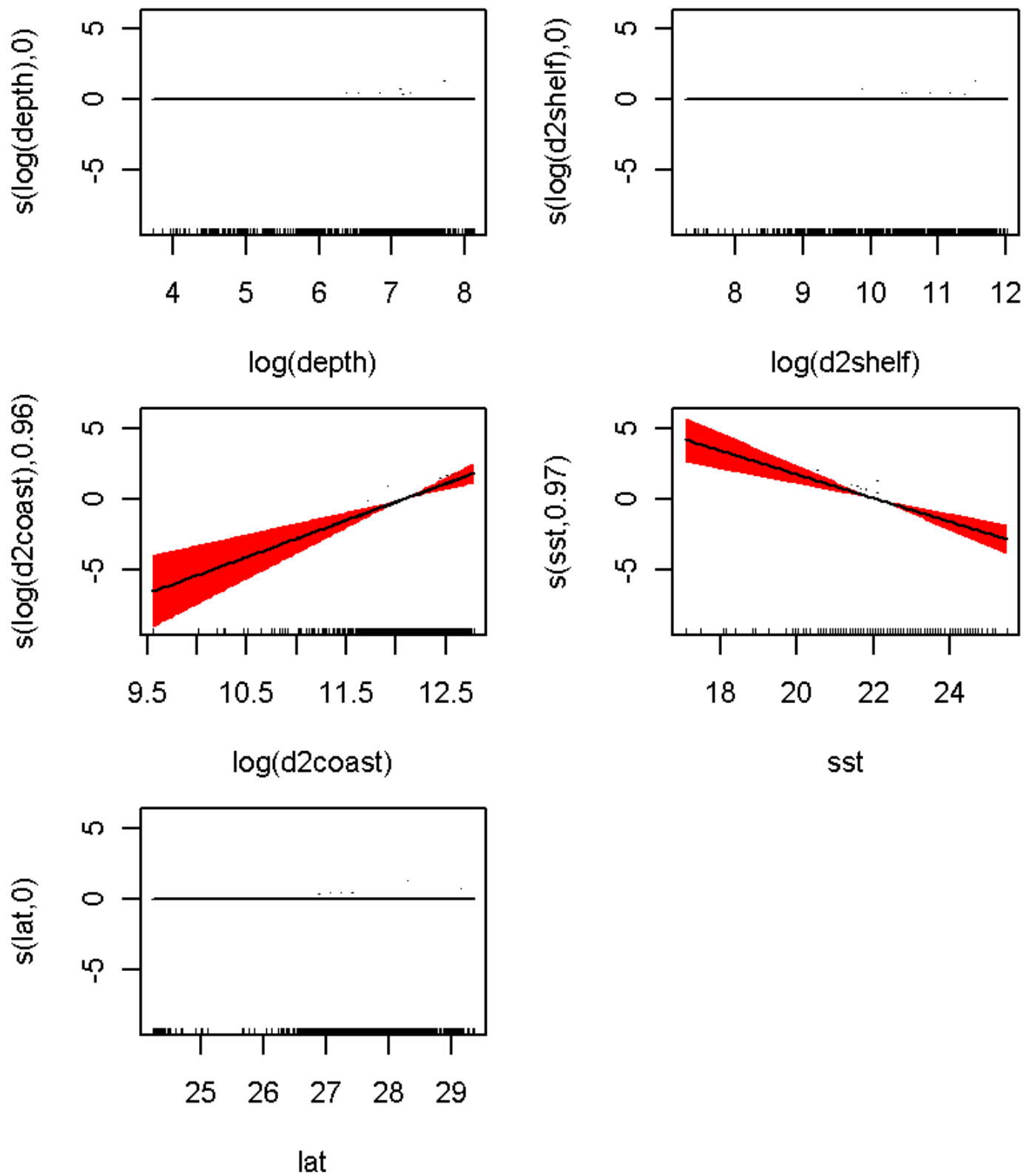


Figure 666: Terms plot of predictors to GAM model fit for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

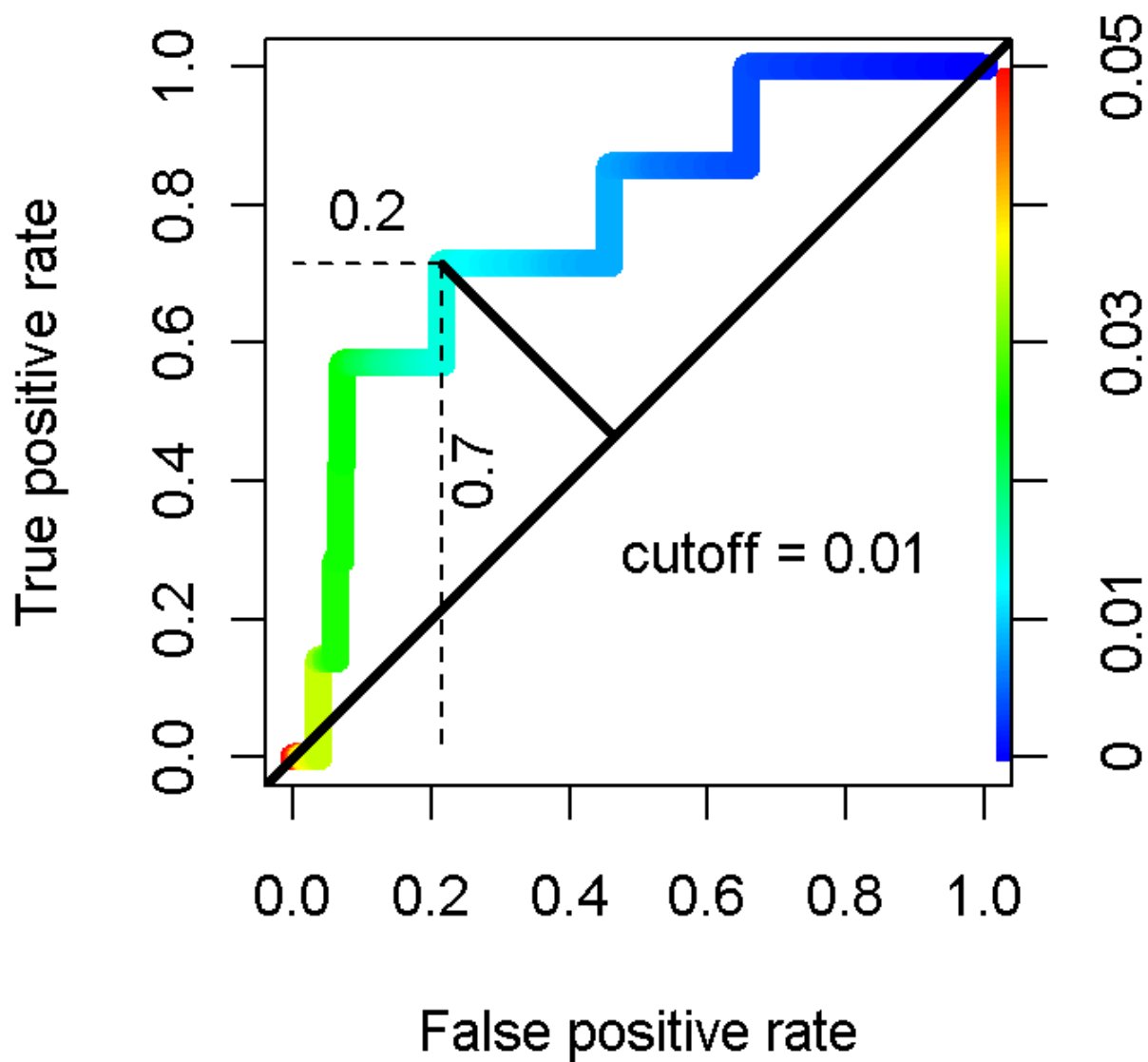


Figure 667: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

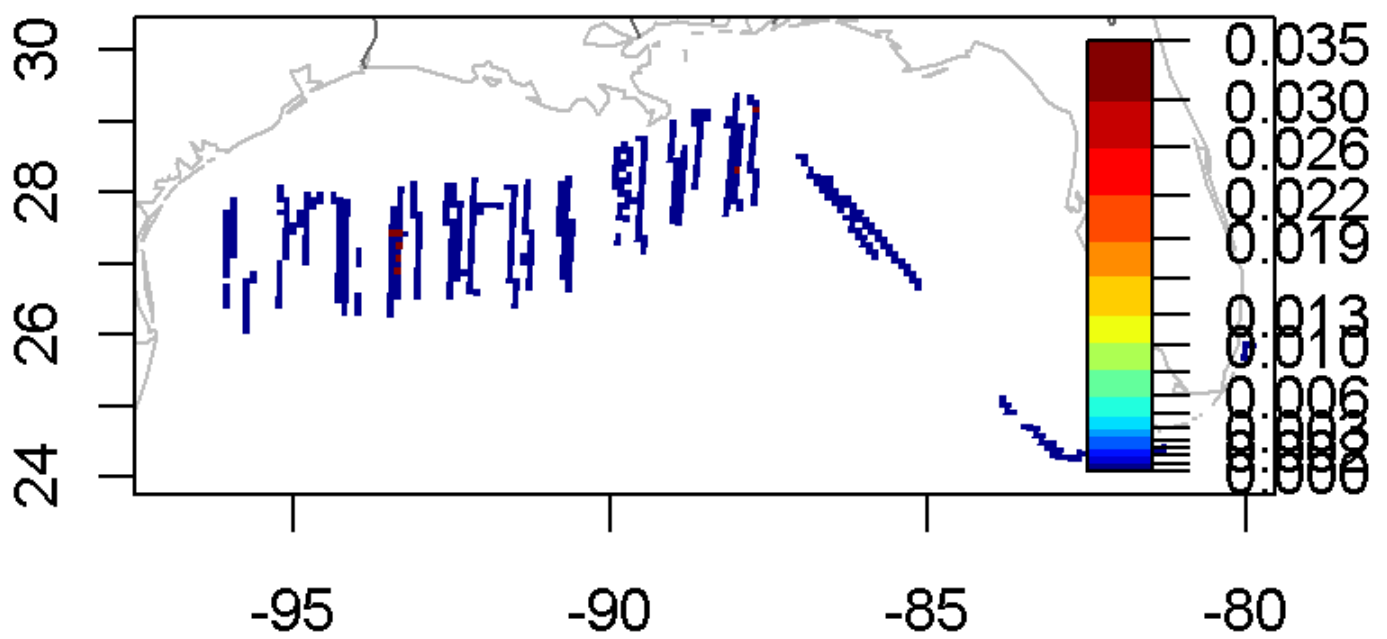


Figure 668: Map of presence and absence by cell summed through time for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

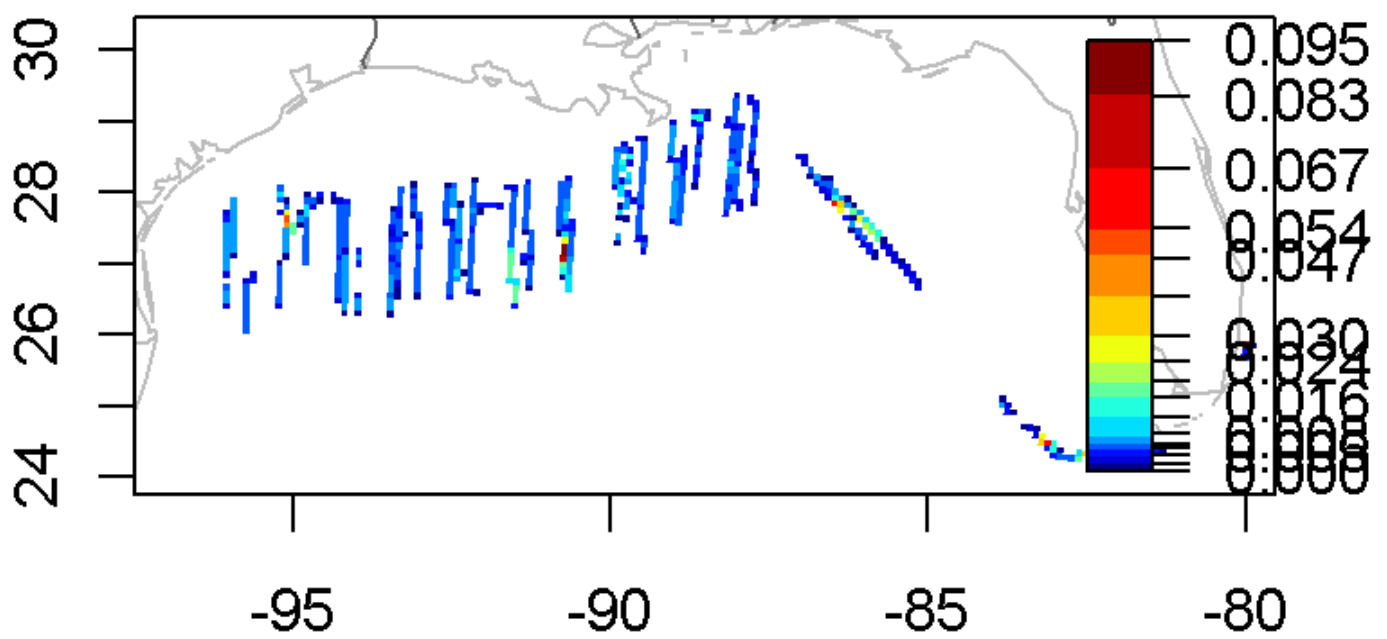


Figure 669: Map of effort(hours/km²) by cell summed through time for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

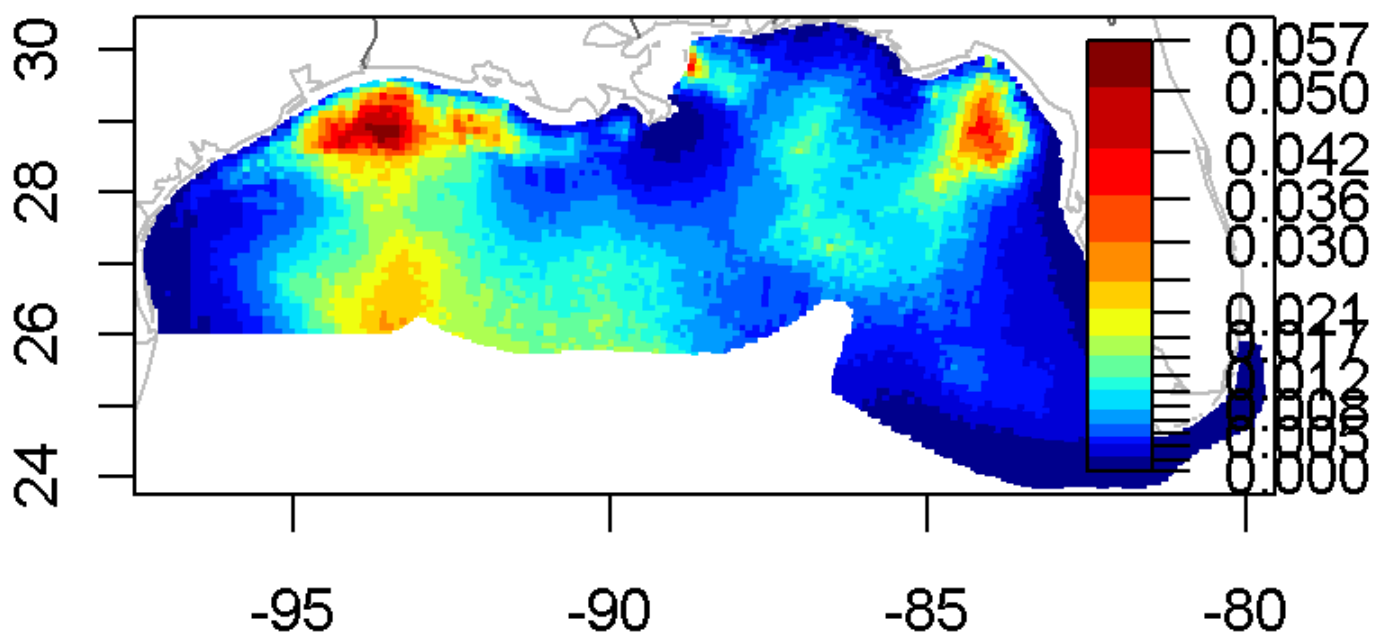


Figure 670: Map of mean predicted habitat for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

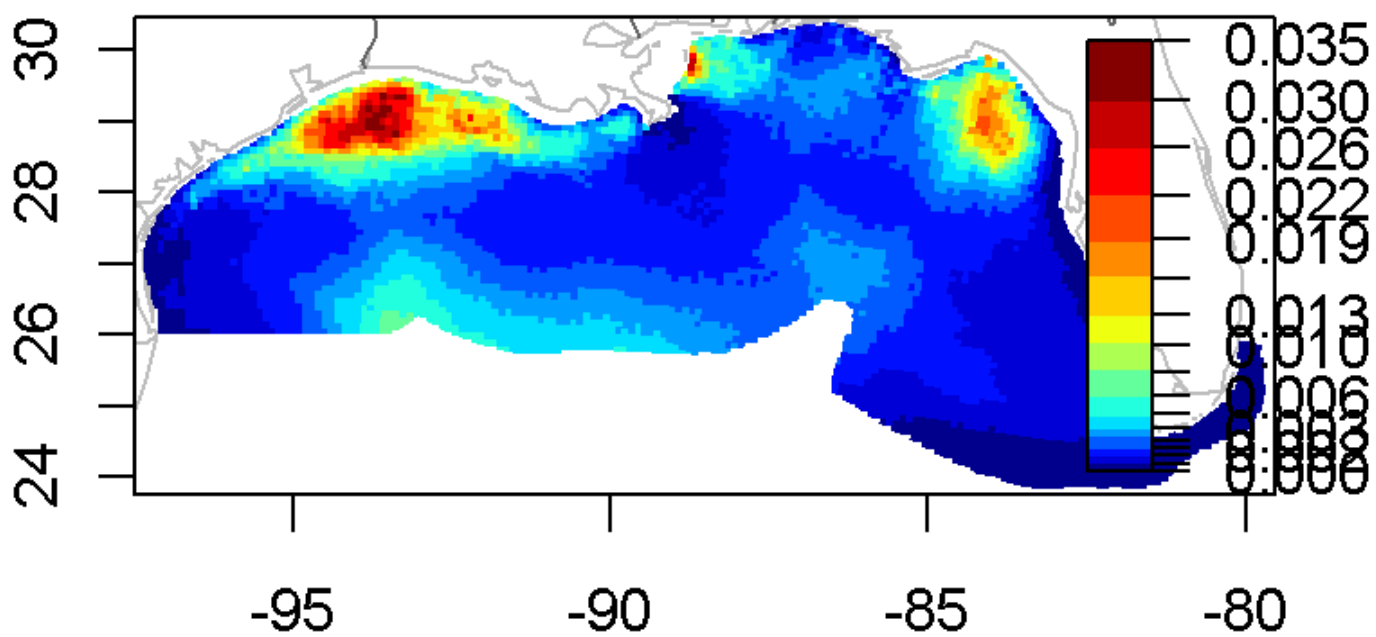


Figure 671: Map of standard error of habitat for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

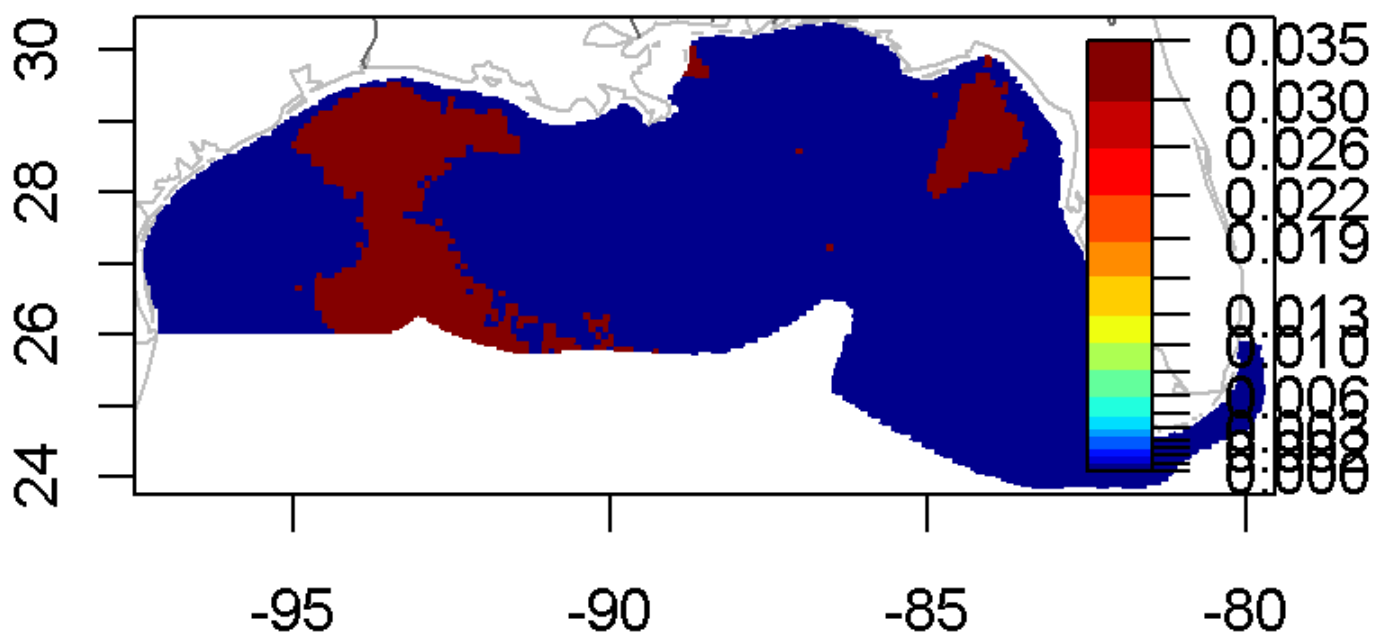


Figure 672: Map of binary habitat (cutoff determined by ROC) for 'Sperm whales' guild during 'winter' season in 'gomex2' region.

14 *Stenella attenuata*

Guildid:sa3

Table 62: Taxonomic members of the "Stenella attenuata" guild.

	Scientific Name	Common Name	Taxonomic #
1	<i>Stenella attenuata</i>	pantropical spotted dolphin	180430
2	<i>Stenella attenuata graffmani</i>	coastal spotted dolphin	180431

14.1 fall

14.1.1 gomex2

Modelrun identifier: duke_06_sa3_fall_gomex2

Date generated: 2008-10-21 11:38:45

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 63: Summary for duke(6) GAM model: for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

	Value
Number.presences	15
Number.absences	930
GAM.converged	TRUE
R.squared	-0.175948
Deviance.explained	0.262556
ROC.optimum	0.156141
Maximum.fit	0.00429843
Maximum.prediction	0.317466

Model text summary...

```

duke_06_sa3_fall_gomex2 run on Tue Oct 21 11:38:11 2008
provider:duke, version:06, guild:Stenella attenuata (sa3), season:'fall', region:gomex2

max.fit:0.156141, max.prediction:0.317466, ROC.optimum:0.004298

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -8.915      1.200    -7.429 2.45e-13 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  1.931e+00  2.431    9.076 3.42e-05 ***
s(log(d2shelf)) 9.641e-01  1.464   14.965 8.21e-06 ***
s(log(d2coast)) 8.017e-01  1.302    4.183 0.0307 *
s(sst)         6.224e-06  0.500  2.84e-06 0.9680
s(lat)         6.876e-06  0.500  4.34e-04 0.8874
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  -0.176   Deviance explained = 26.3%
GCV score = 0.00058176   Scale est. = 0.00057656   n = 945

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:945  Min.   : 445  Min.   :  5.0  Min.   : 272  Min.   : 7624  Min.   :26.55  Min.   :24.99
             1st Qu.:4911 1st Qu.: 34.0  1st Qu.: 16509 1st Qu.: 58082 1st Qu.:28.35 1st Qu.:27.82
             Median :6184 Median : 78.0  Median : 35259  Median : 96847  Median :28.73  Median :28.52
             Mean   :5818 Mean   :271.2  Mean   : 48230  Mean   :104429  Mean   :28.76  Mean   :28.43
             3rd Qu.:7227 3rd Qu.:292.0  3rd Qu.: 69013 3rd Qu.:142239 3rd Qu.:29.17 3rd Qu.:29.18
             Max.   :8350 Max.   :3301.0  Max.   :185683  Max.   :276406  Max.   :30.52  Max.   :30.35

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   :  1  Min.   :  3.0  Min.   : 272  Min.   : 5317  Min.   :24.52  Min.   :23.85
             1st Qu.:1861 1st Qu.: 46.0  1st Qu.: 31617 1st Qu.: 85289 1st Qu.:26.62 1st Qu.:26.28
             Median :4110 Median : 433.5  Median : 71100  Median :157258  Median :27.23  Median :27.29

```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:27.10	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:27.60	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:28.80	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:1.073e-12	Min.	:5.667e-12	Min.	:0.000e+00	Min.	:8.387e-06	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:3.274e-05	1st Qu.	:5.120e-05	1st Qu.	:0.000e+00	1st Qu.	:2.380e-03	1st Qu.	:0.0000
Median	:4110	Median	:8.699e-03	Median	:1.998e-03	Median	:0.000e+00	Median	:4.635e-03	Median	:1.0000
Mean	:3997	Mean	:6.382e-02	Mean	:1.633e-02	Mean	:1.809e-02	Mean	:8.436e-03	Mean	:0.5184
3rd Qu.	:6015	3rd Qu.	:1.175e-01	3rd Qu.	:2.650e-02	3rd Qu.	:0.000e+00	3rd Qu.	:6.374e-03	3rd Qu.	:1.0000
Max.	:8351	Max.	:3.175e-01	Max.	:9.549e-02	Max.	:1.000e+00	Max.	:1.241e-01	Max.	:1.0000
						NA's	:5.843e+03	NA's	:5.843e+03		

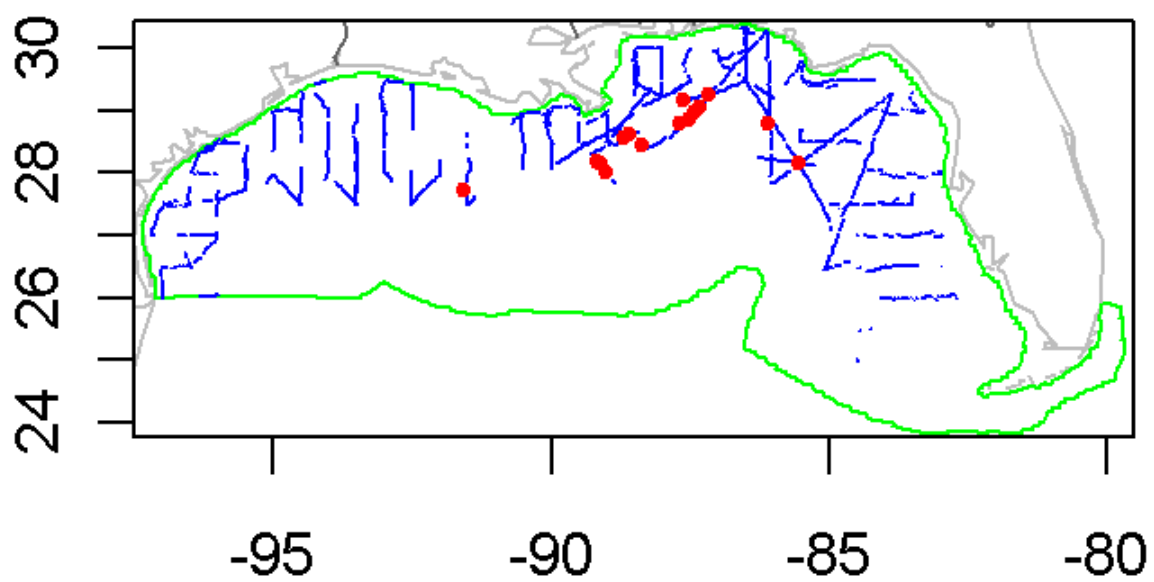


Figure 673: Map of points of observational sightings and tracks of survey effort for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

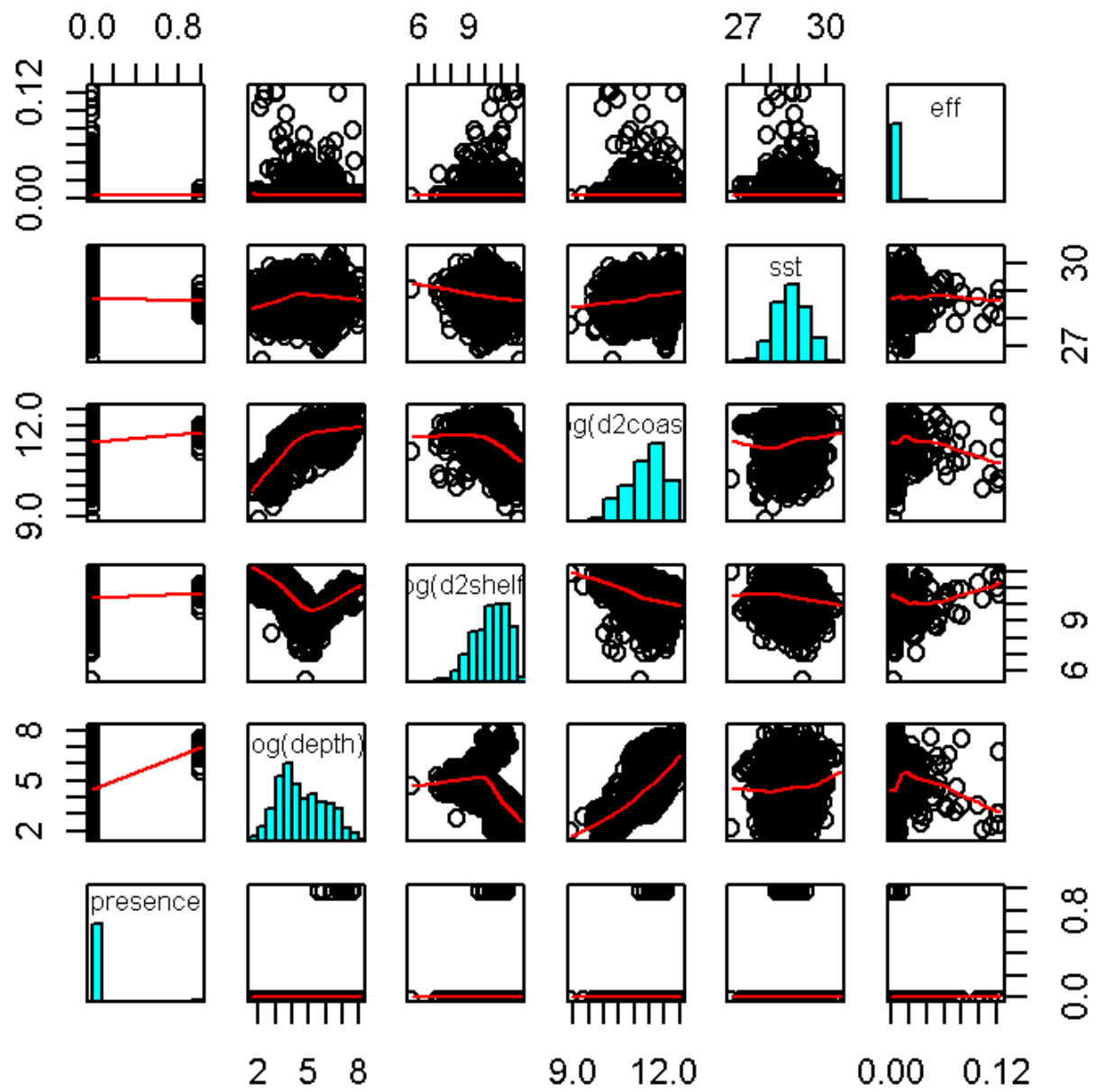


Figure 674: Pairs plot of input variables for '*Stenella attenuata*' guild during 'fall' season in 'gomex2' region.

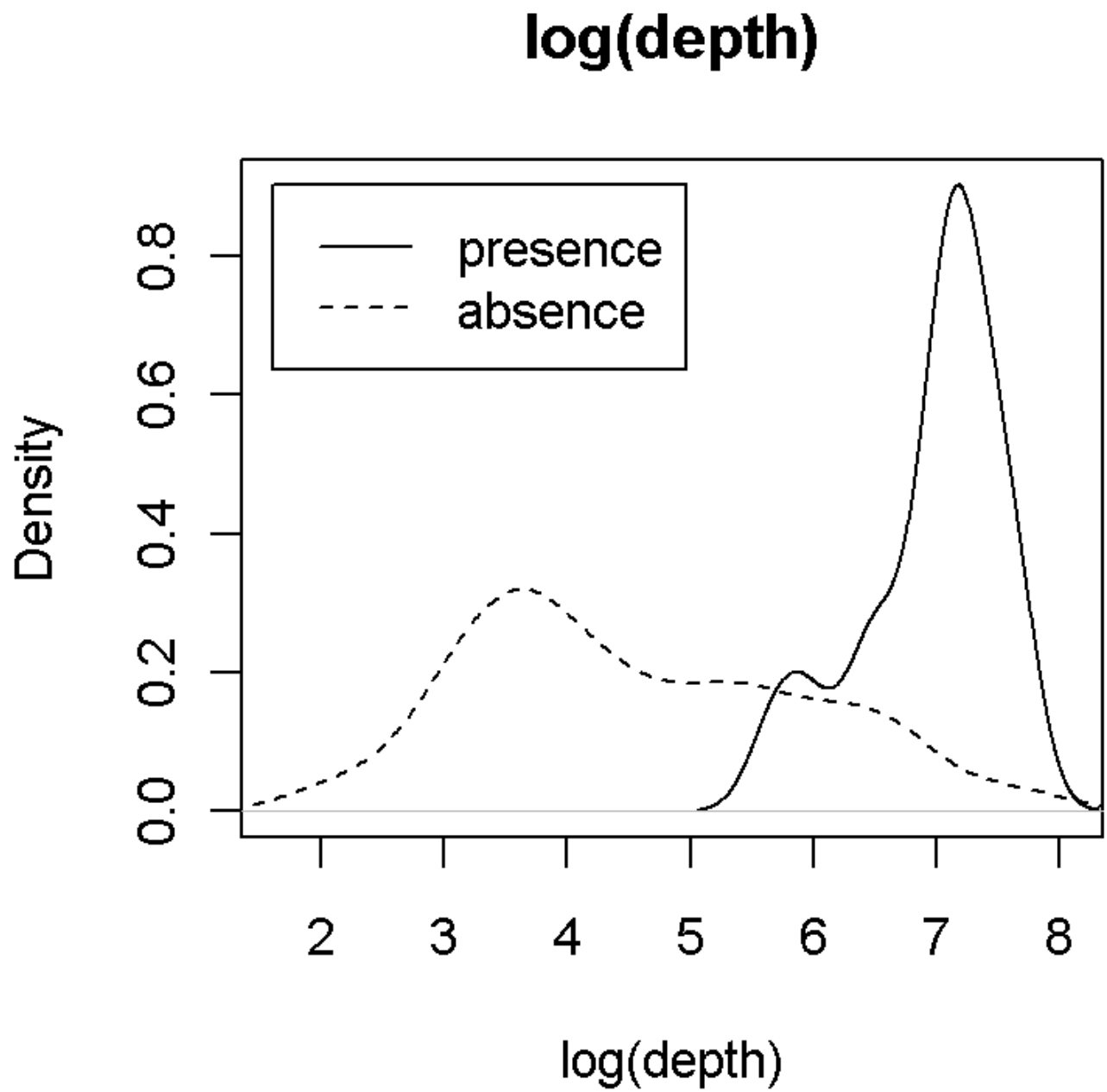


Figure 675: Density histogram of depth log(meters) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

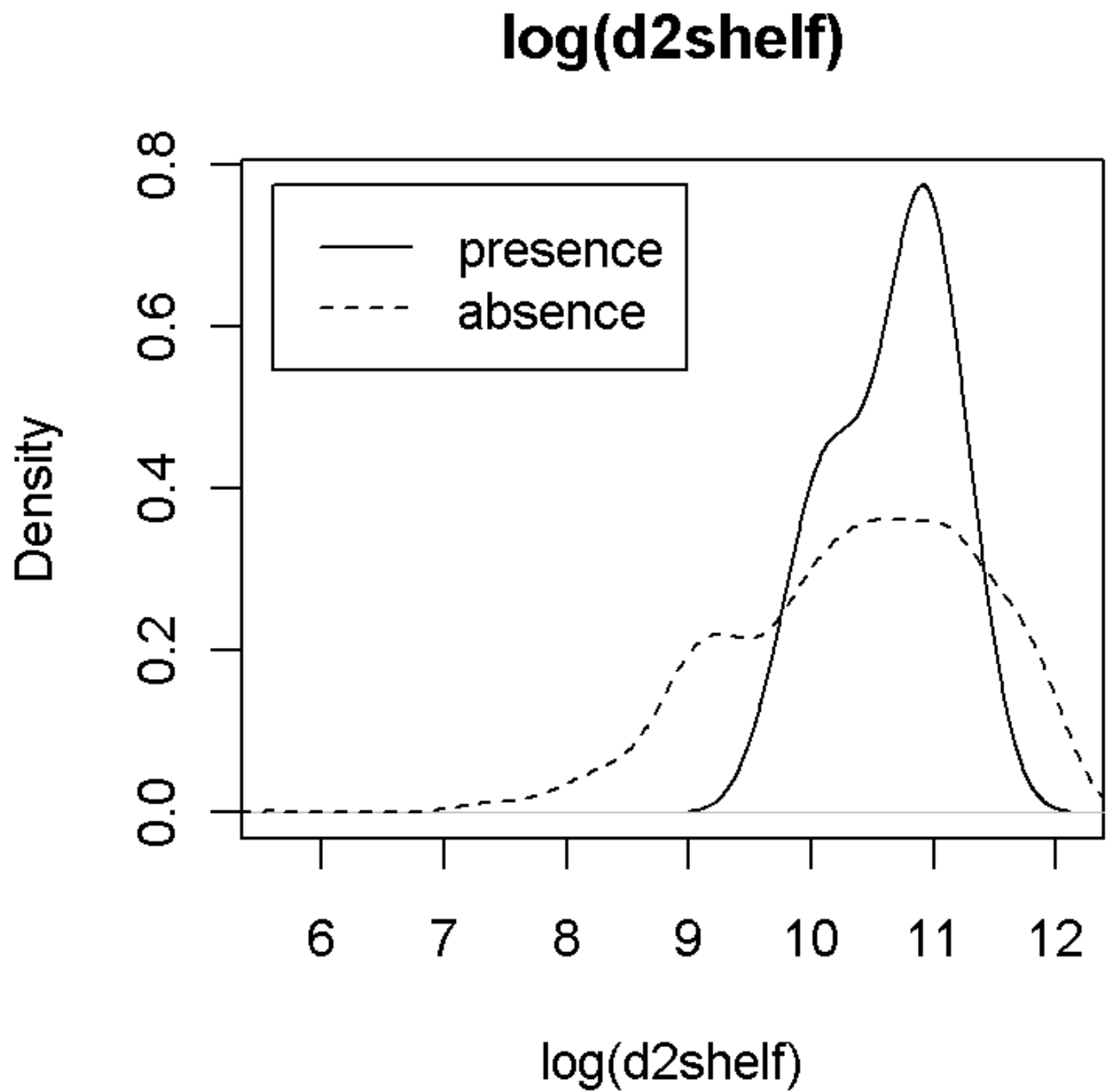


Figure 676: Density histogram of distance to shelf log(meters) for '*Stenella attenuata*' guild during 'fall' season in 'gomex2' region.

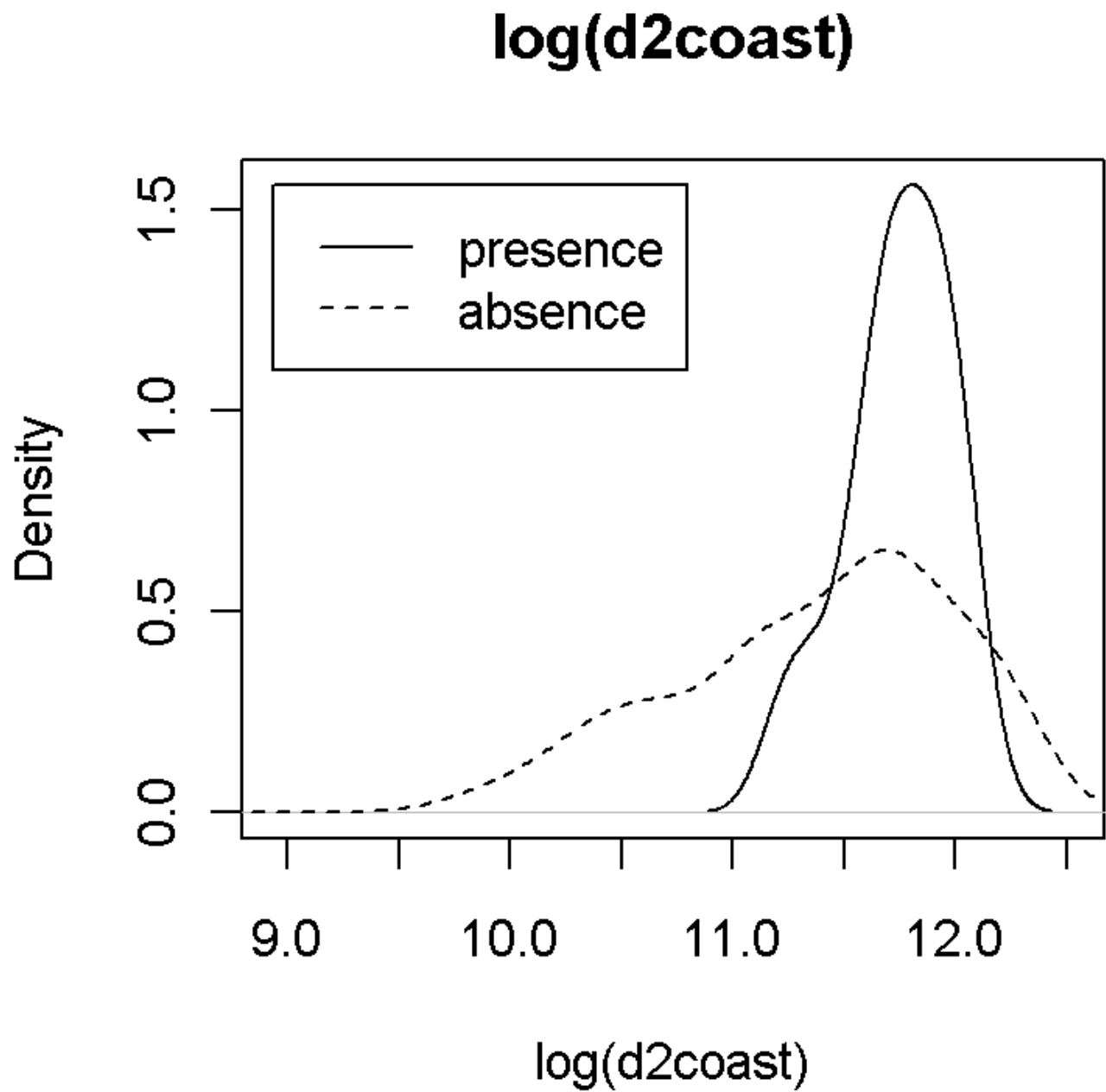


Figure 677: Density histogram of distance to coast log(meters) for '*Stenella attenuata*' guild during 'fall' season in 'gomex2' region.

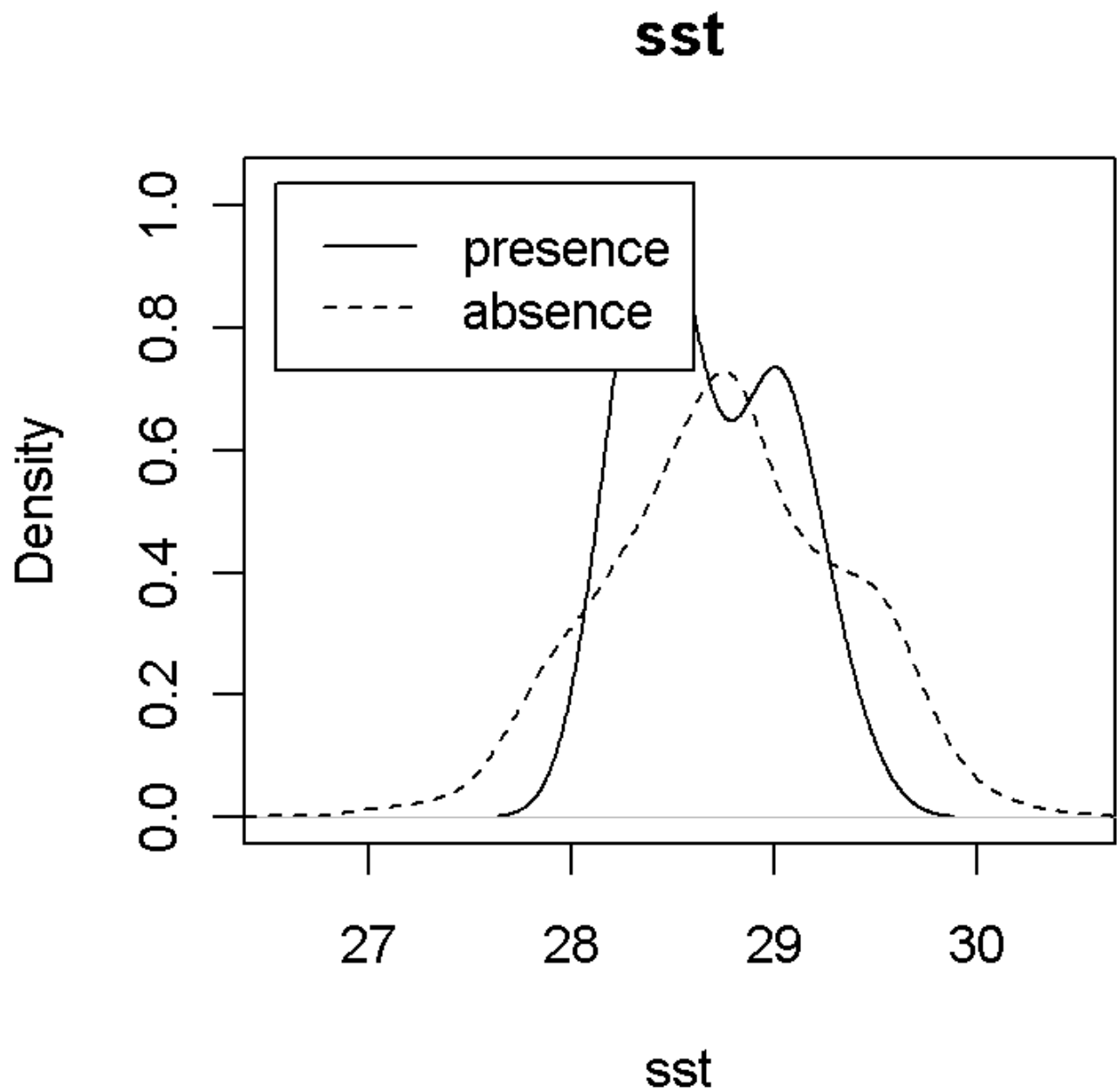


Figure 678: Density histogram of sea-surface temperature (degrees C) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

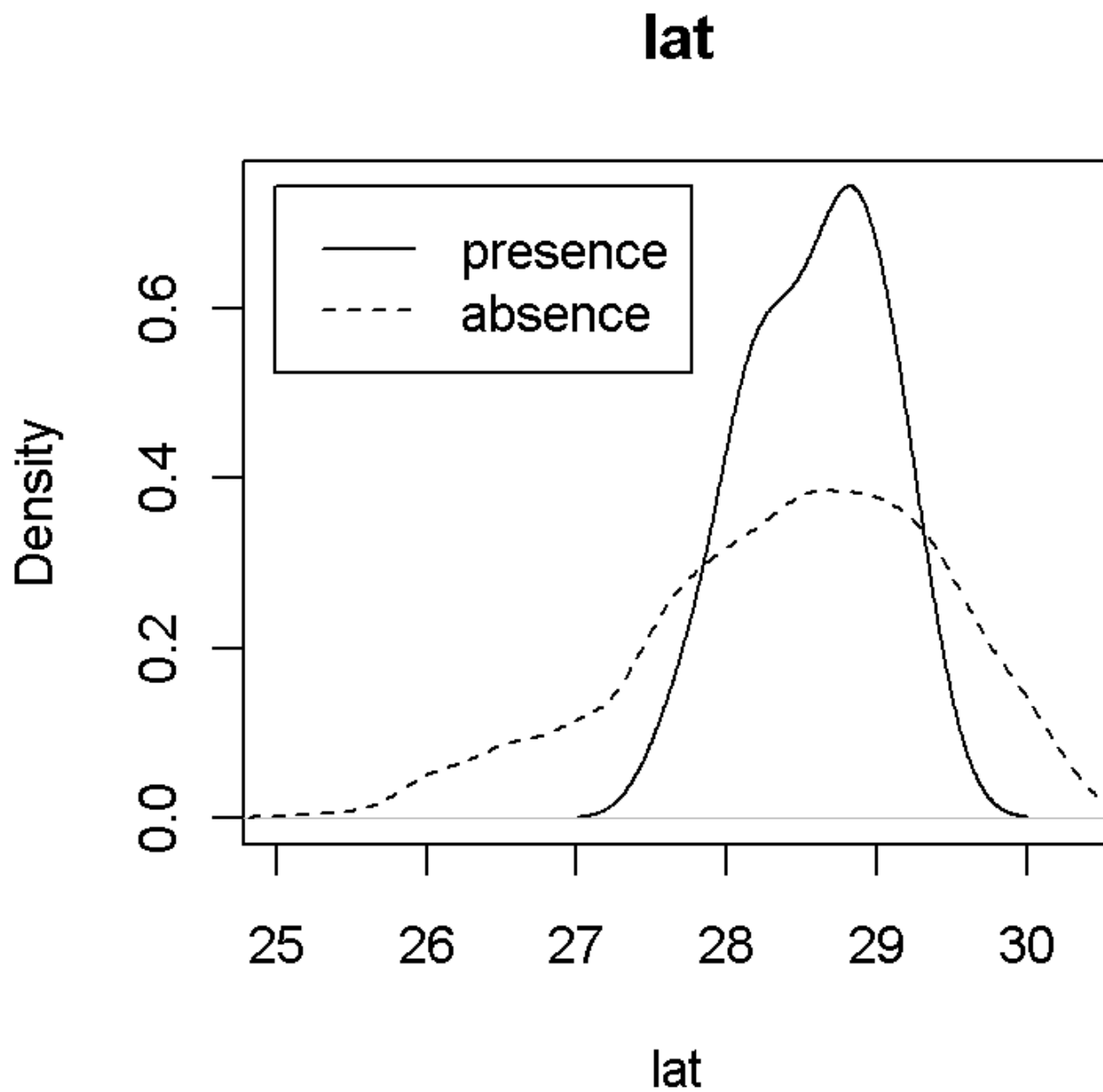


Figure 679: Density histogram of latitude (degrees) for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

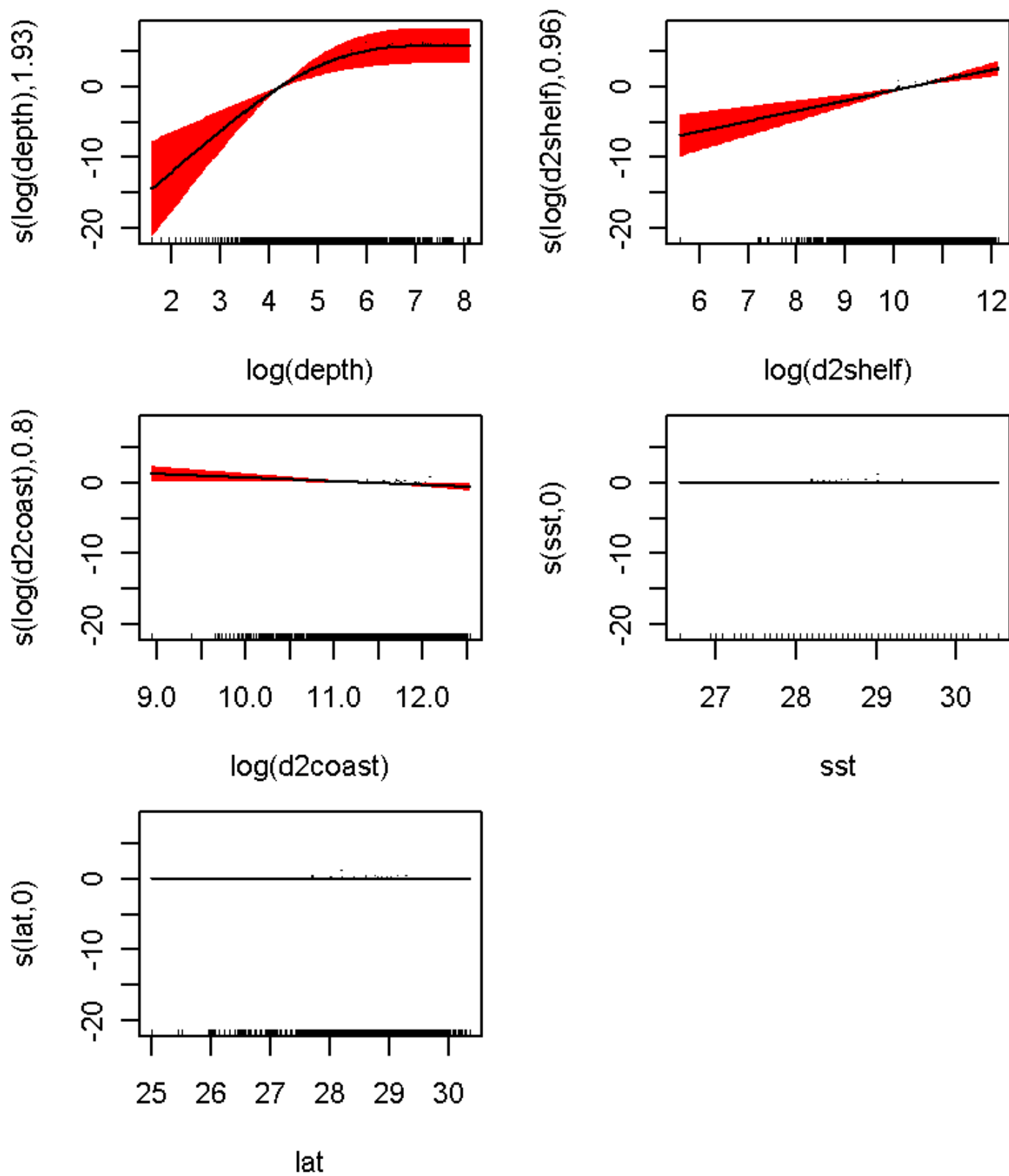


Figure 680: Terms plot of predictors to GAM model fit for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

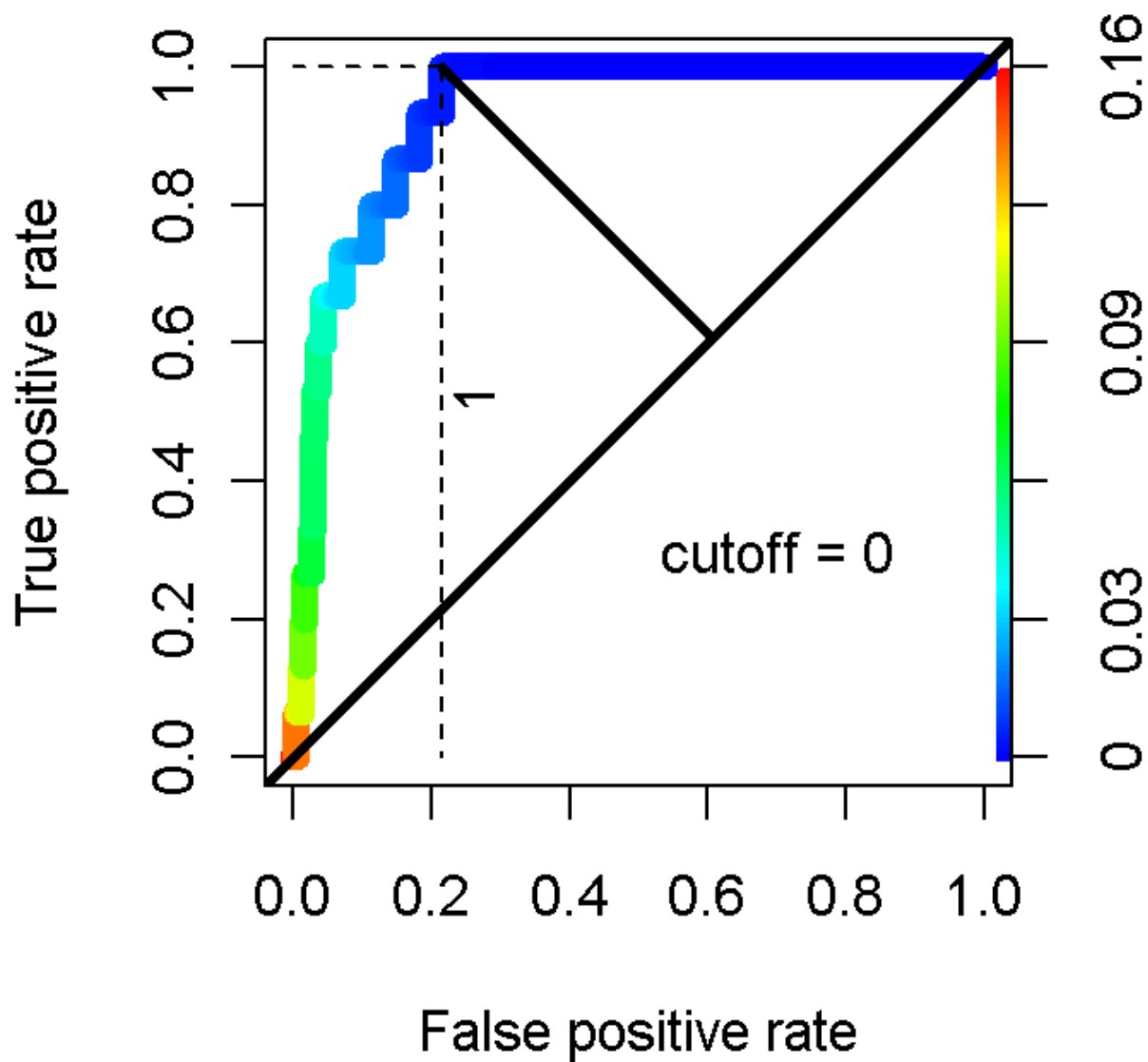


Figure 681: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella attenuata*' guild during 'fall' season in 'gomex2' region.

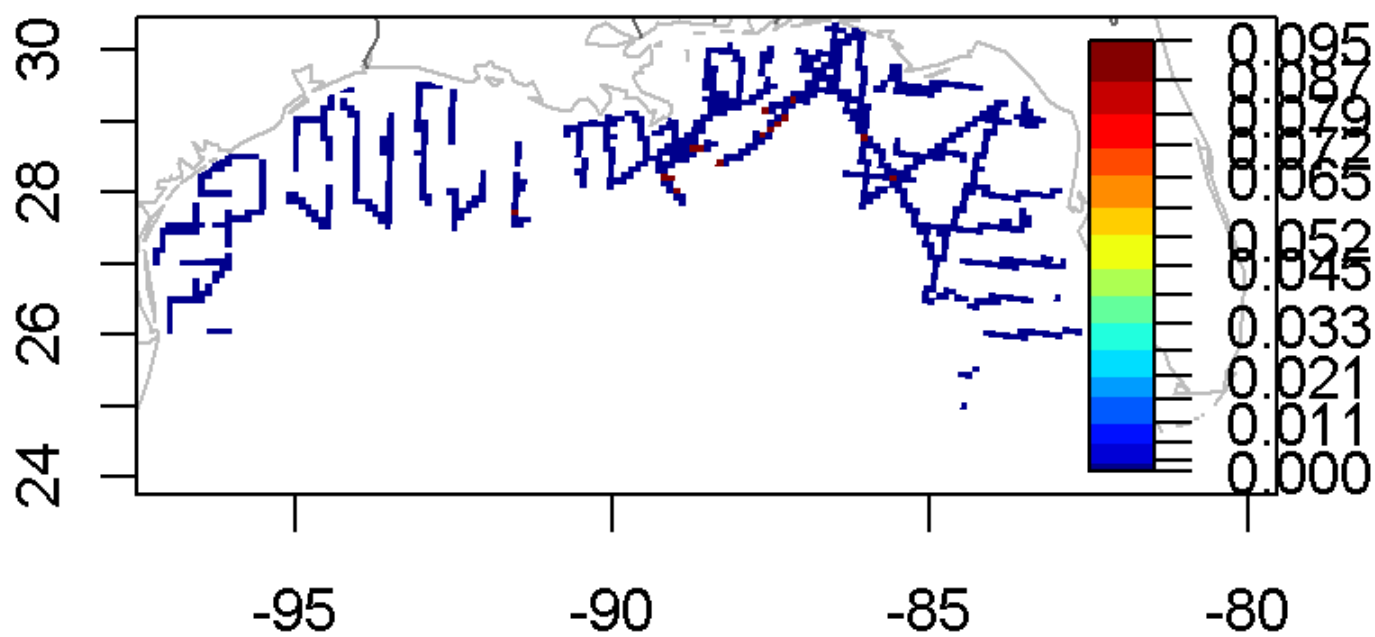


Figure 682: Map of presence and absence by cell summed through time for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

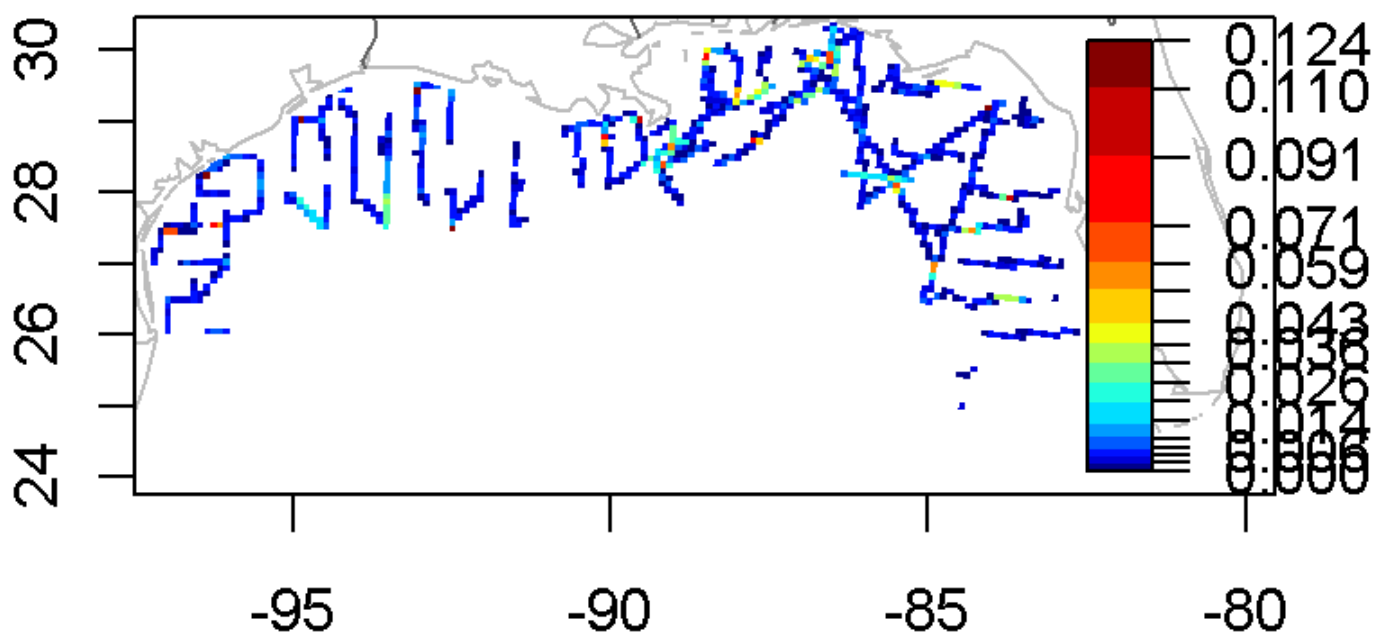


Figure 683: Map of effort(hours/km²) by cell summed through time for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

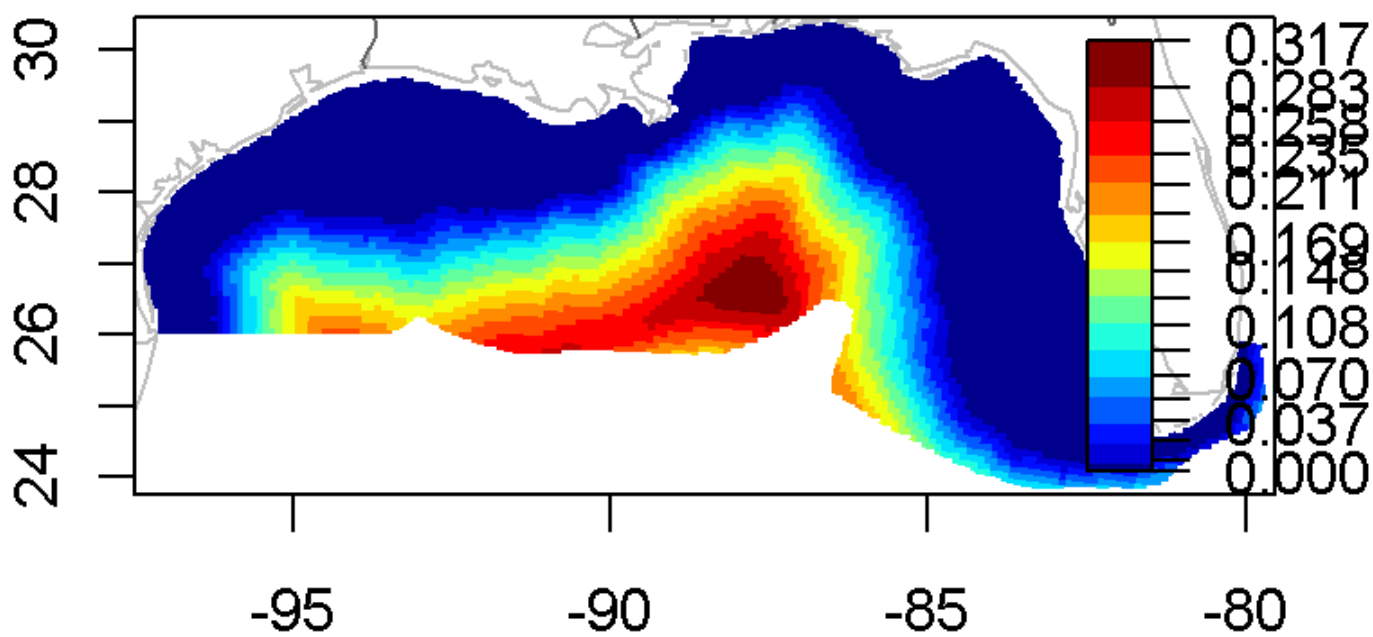


Figure 684: Map of mean predicted habitat for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

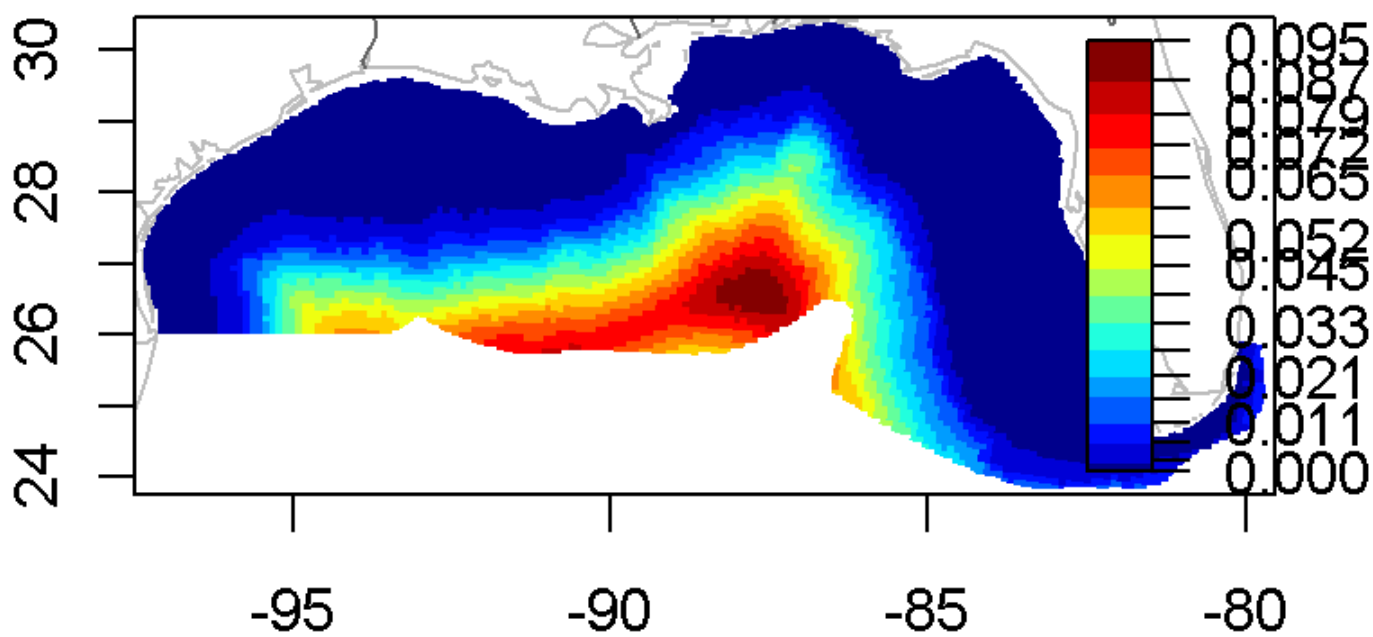


Figure 685: Map of standard error of habitat for 'Stenella attenuata' guild during 'fall' season in 'gomex2' region.

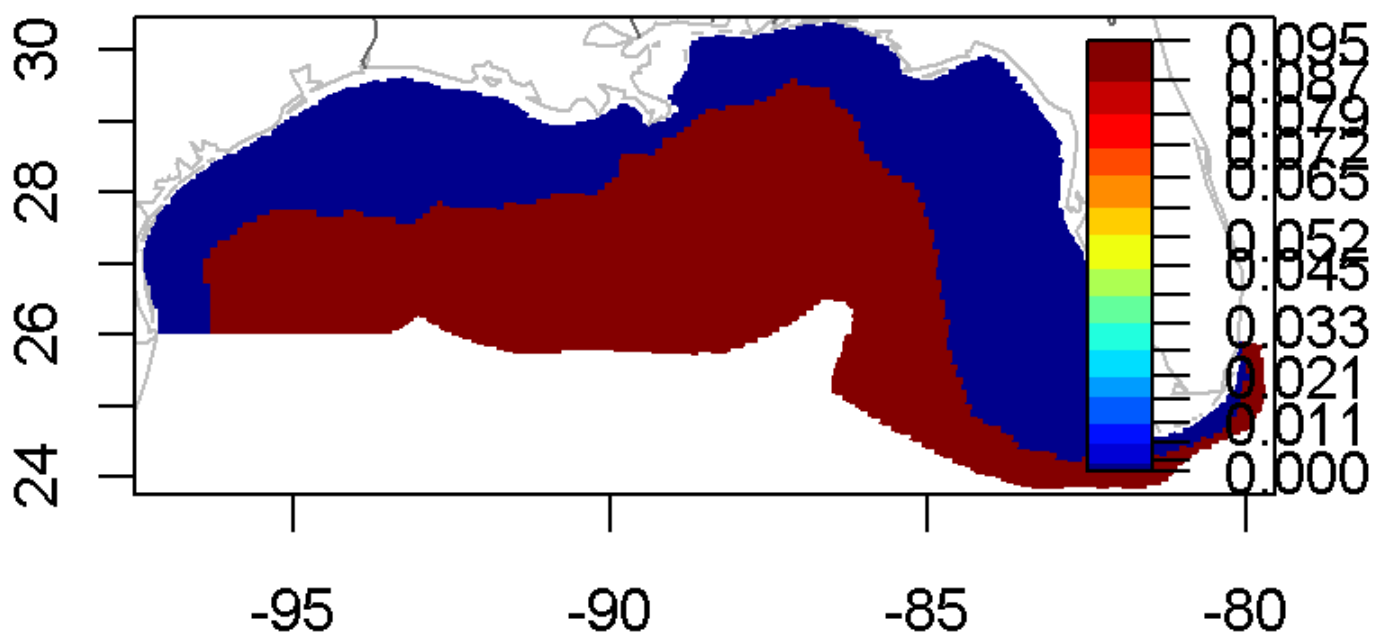


Figure 686: Map of binary habitat (cutoff determined by ROC) for '*Stenella attenuata*' guild during 'fall' season in 'gomex2' region.

14.2 spring

14.2.1 gomex2

Modelrun identifier: duke_06_sa3_spring_gomex2

Date generated: 2008-10-21 11:57:20

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 64: Summary for duke(6) GAM model: for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	342
Number.absences	4475
GAM.converged	TRUE
R.squared	0.145962
Deviance.explained	0.092725
ROC.optimum	0.231307
Maximum.fit	0.041286
Maximum.prediction	0.164674

Model text summary...

```
duke_06_sa3_spring_gomex2 run on Tue Oct 21 11:55:56 2008
provider:duke, version:06, guild:Stenella attenuata (sa3), season:'spring', region:gomex2

max.fit:0.231307, max.prediction:0.164674, ROC.optimum:0.041286

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -3.2779      0.1079  -30.37   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth)) 1.862e+00  2.362  87.951 < 2e-16 ***
s(log(d2shelf)) 8.613e-06  0.500  1.25e-05 0.953614
s(log(d2coast)) 9.521e-01  1.452  37.775 4.57e-13 ***
s(sst)         9.885e-01  1.489  14.421 9.67e-06 ***
s(lat)         8.718e-01  1.372   9.544 0.000583 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.146   Deviance explained = 9.27%
GCV score = 0.0042787   Scale est. = 0.0042697   n = 4817

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:4817  Min.   : 14   Min.   : 11   Min.   : 272   Min.   : 21187   Min.   :19.73   Min.   :24.05
              1st Qu.:2144 1st Qu.: 511 1st Qu.: 24696 1st Qu.:142982 1st Qu.:24.23 1st Qu.:26.38
              Median :4222 Median :1292 Median : 63128 Median :211670 Median :25.35 Median :27.38
              Mean   :3977 Mean   :1537 Mean : 82827 Mean :213952 Mean :25.14 Mean :27.25
              3rd Qu.:5932 3rd Qu.:2668 3rd Qu.:131568 3rd Qu.:276022 3rd Qu.:26.17 3rd Qu.:28.13
              Max.   :8191 Max.   :3523 Max.   :257870 Max.   :404358 Max.   :28.42 Max.   :30.06

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :19.95   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:21.83 1st Qu.:26.28
              Median :4110 Median : 433.5   Median : 71100 Median :157258 Median :23.02 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:3.242e-09	Min.	:8.749e-09	Min.	: 0.0000	Min.	:7.296e-06	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:4.856e-05	1st Qu.	:5.155e-05	1st Qu.	: 0.0000	1st Qu.	:4.063e-03	1st Qu.	:0.0000
Median	:4110	Median	:1.394e-02	Median	:2.256e-03	Median	: 0.0000	Median	:9.499e-03	Median	:0.0000
Mean	:3997	Mean	:3.853e-02	Mean	:3.441e-03	Mean	: 0.1957	Mean	:2.365e-02	Mean	:0.4059
3rd Qu.	:6015	3rd Qu.	:7.865e-02	3rd Qu.	:5.842e-03	3rd Qu.	: 0.0000	3rd Qu.	:2.987e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:1.647e-01	Max.	:2.823e-02	Max.	: 4.0000	Max.	:2.695e-01	Max.	:1.0000
						NA's	:4838.0000	NA's	:4.838e+03		

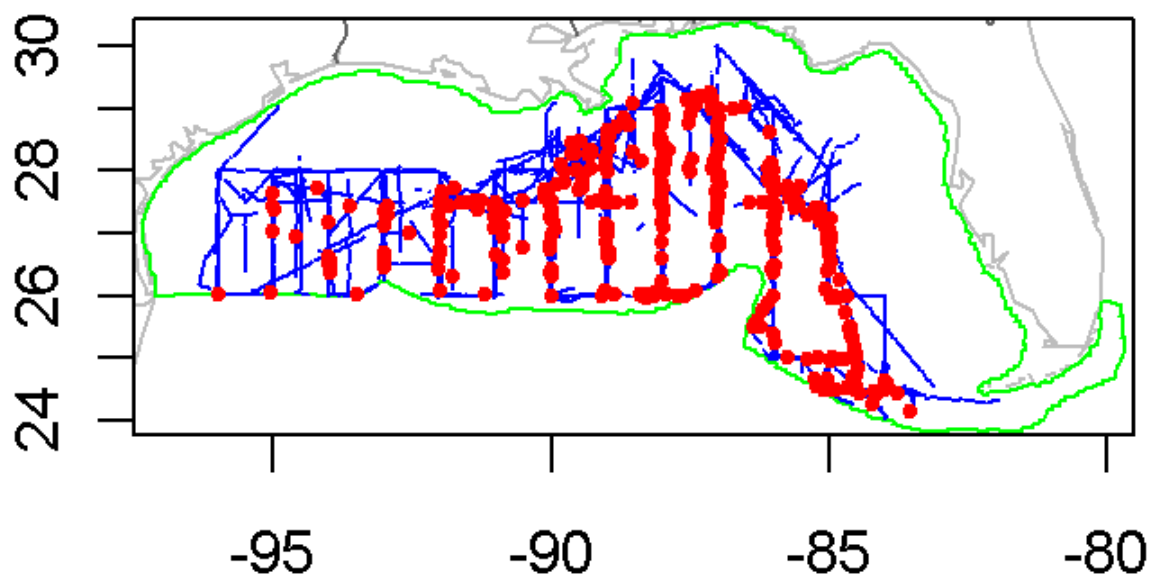


Figure 687: Map of points of observational sightings and tracks of survey effort for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

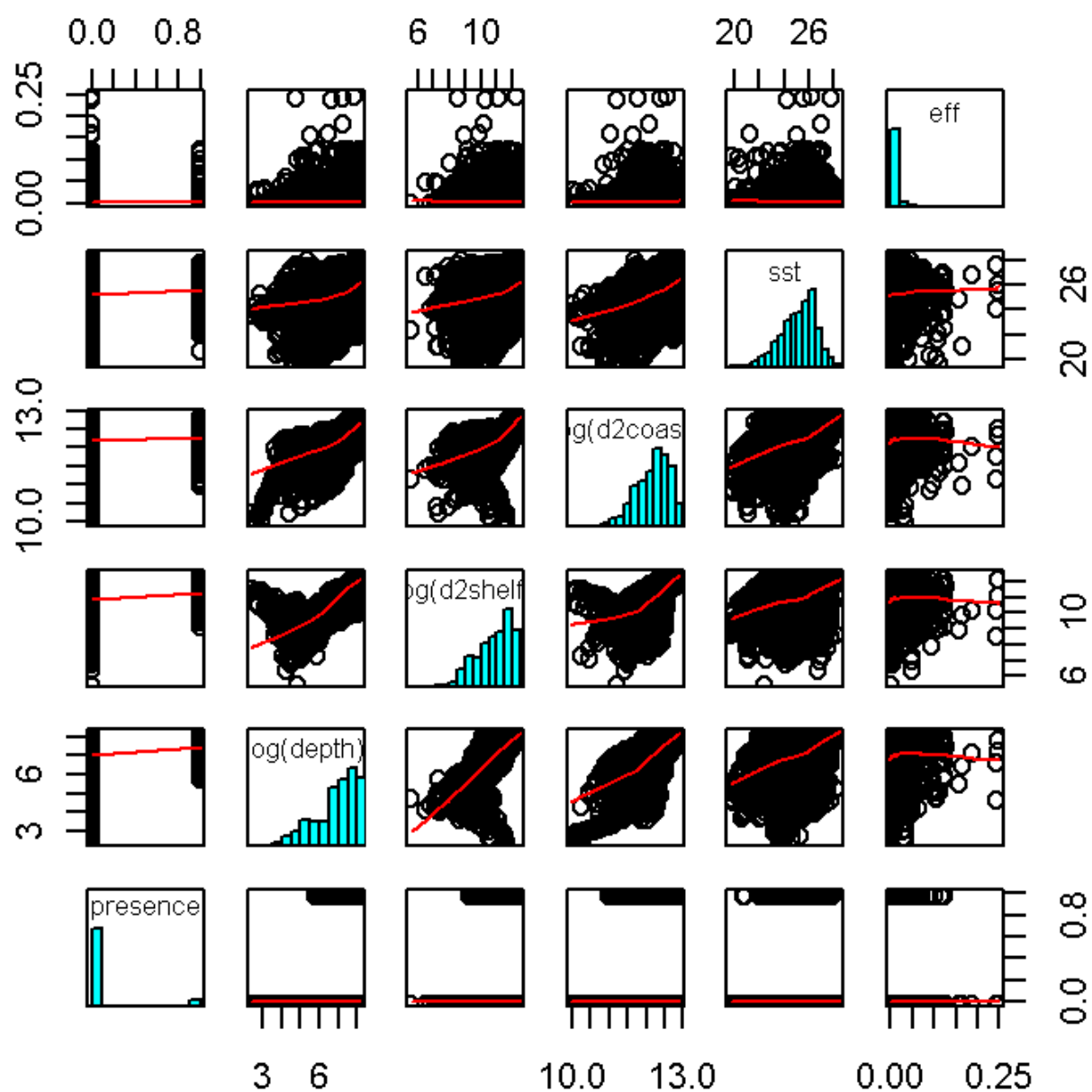


Figure 688: Pairs plot of input variables for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

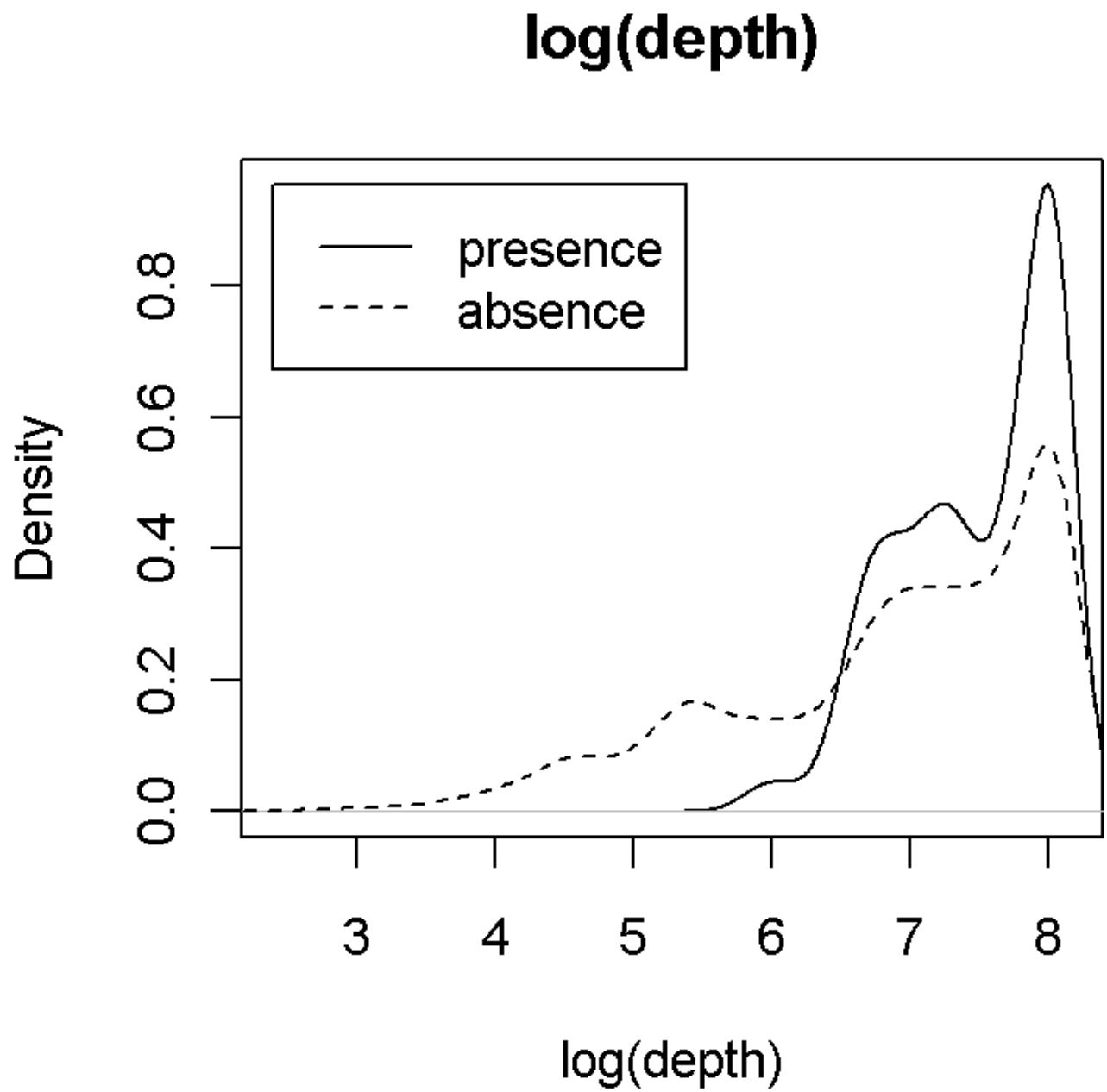


Figure 689: Density histogram of depth log(meters) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

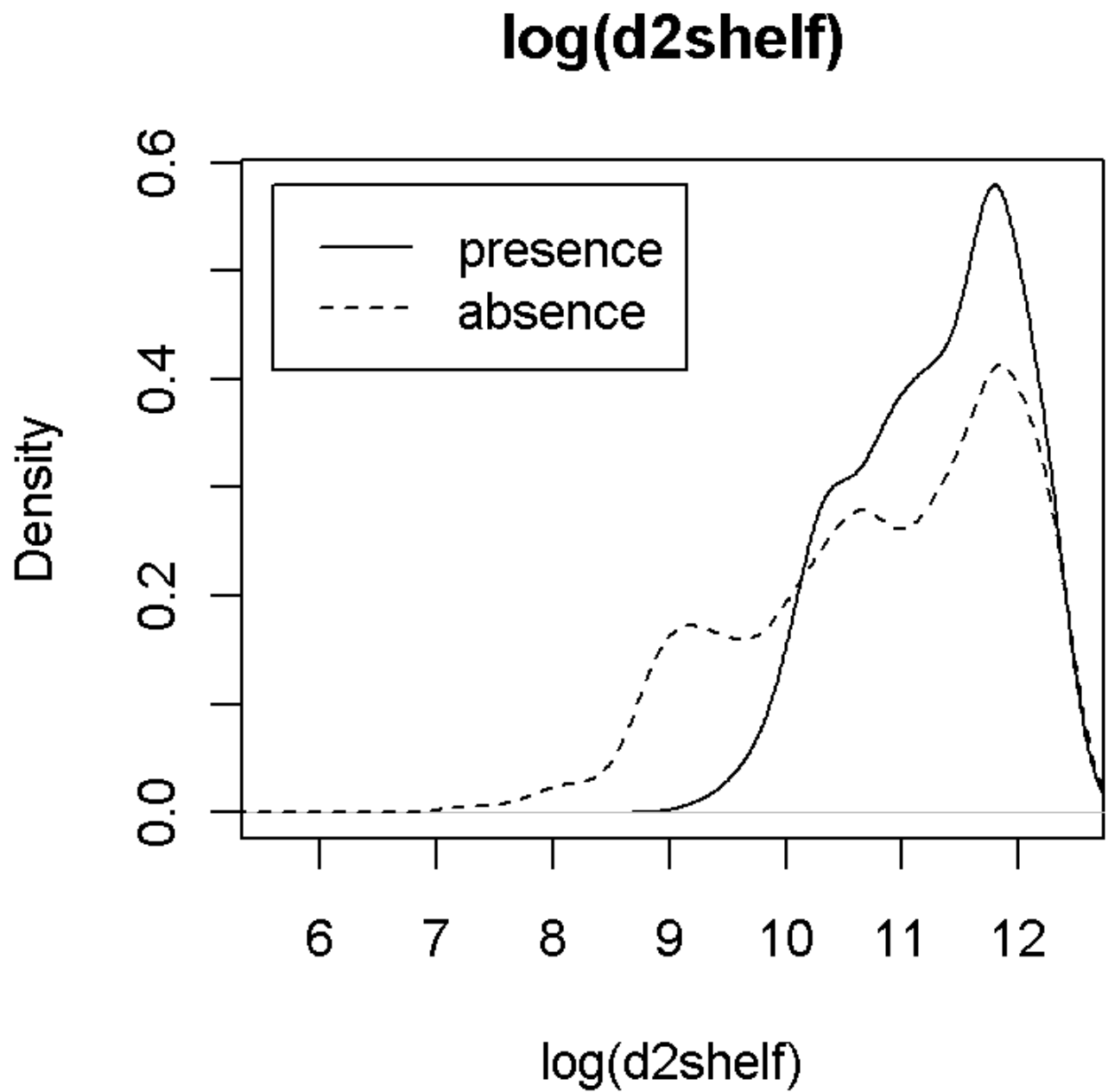


Figure 690: Density histogram of distance to shelf log(meters) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

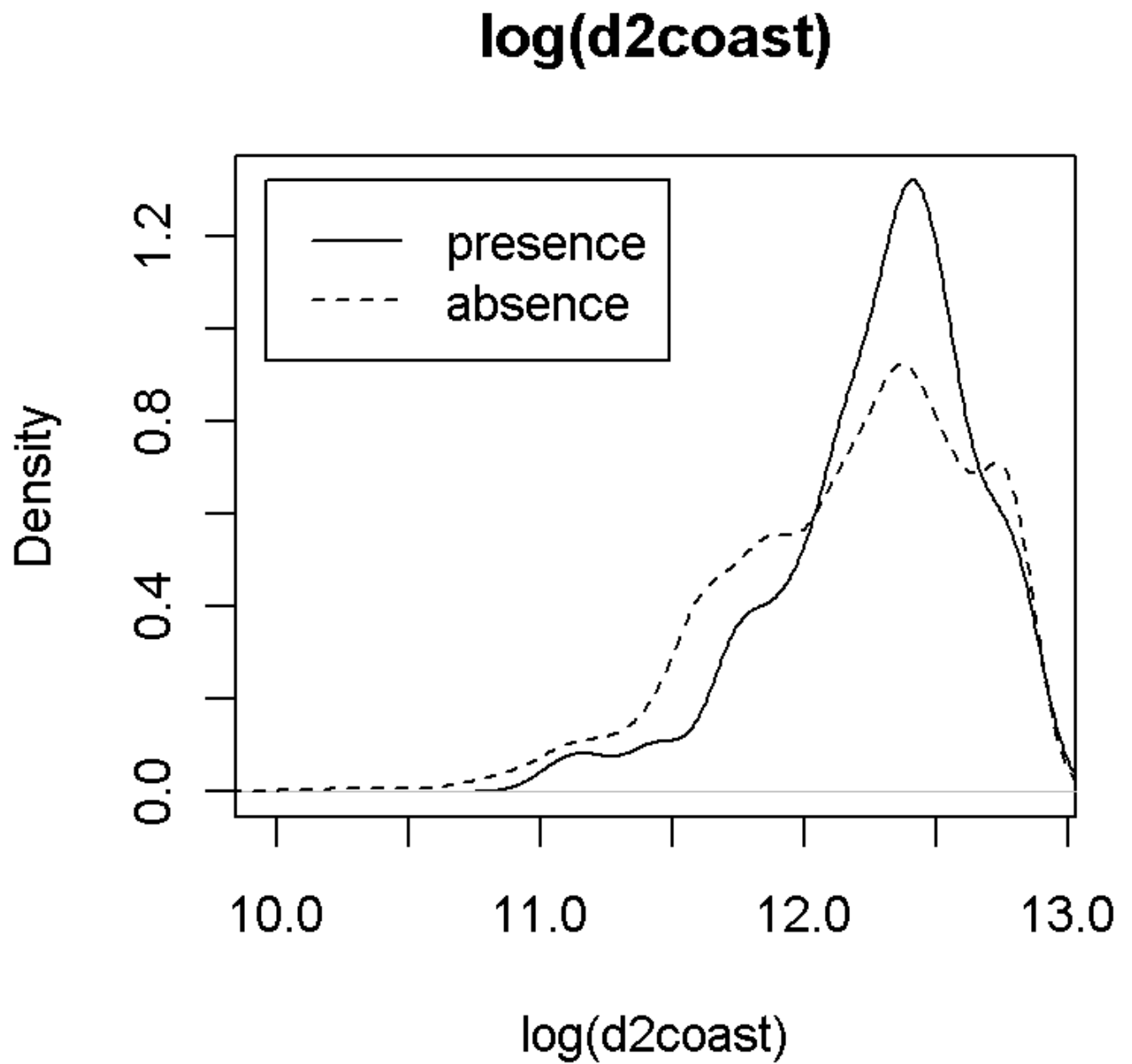


Figure 691: Density histogram of distance to coast log(meters) for '*Stenella attenuata*' guild during 'spring' season in 'gomex2' region.

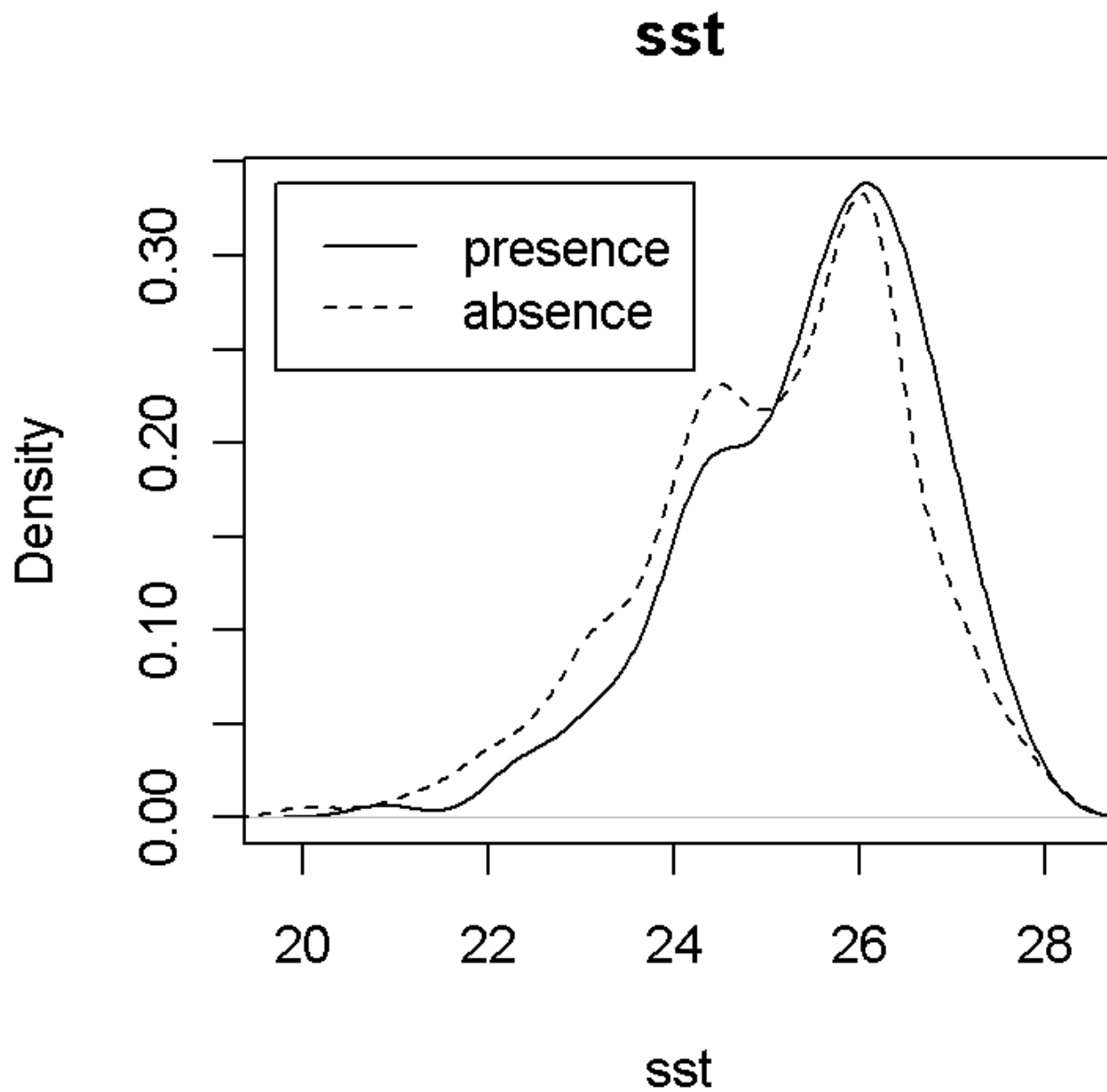


Figure 692: Density histogram of sea-surface temperature (degrees C) for '*Stenella attenuata*' guild during 'spring' season in 'gomex2' region.

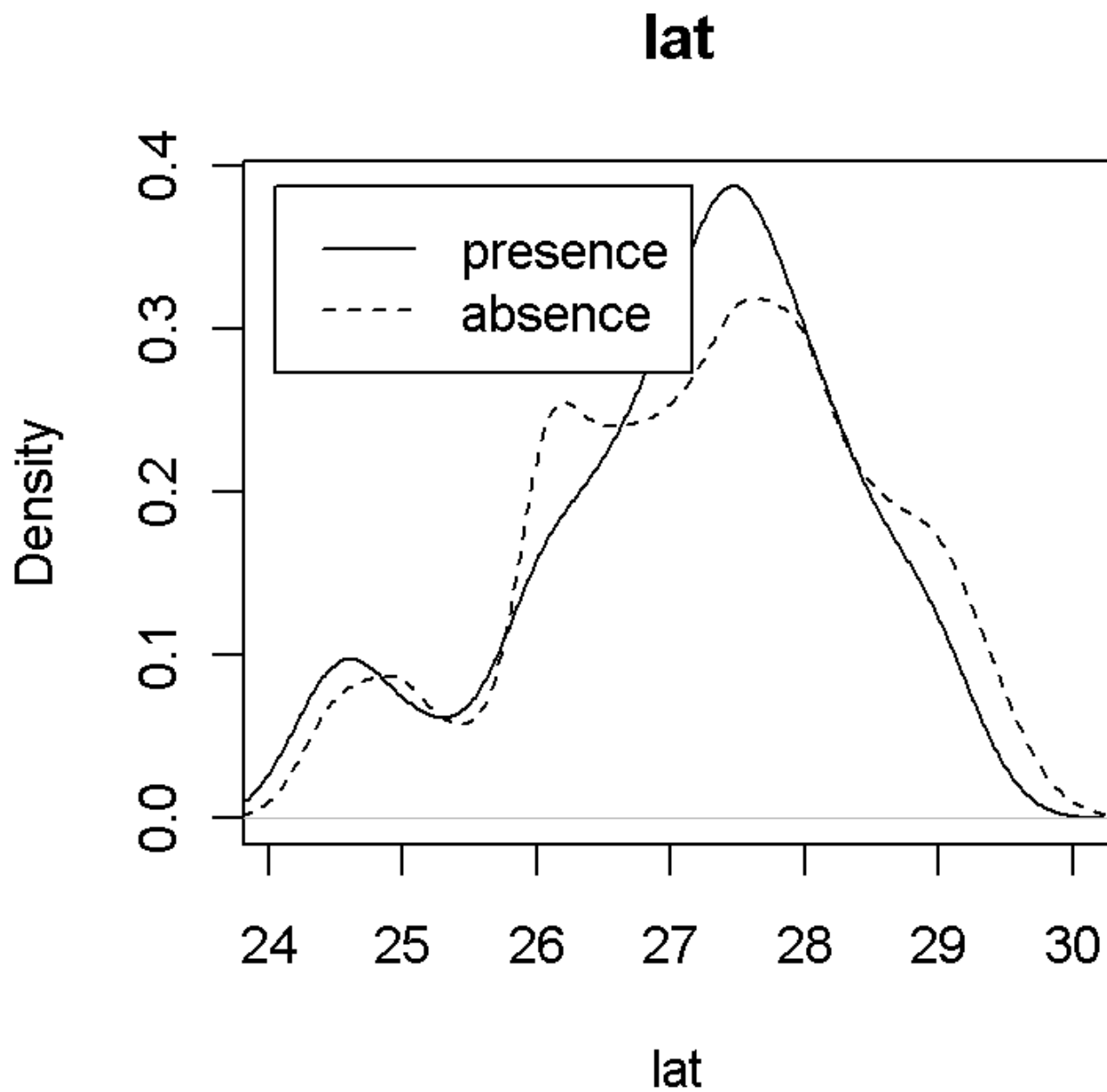


Figure 693: Density histogram of latitude (degrees) for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

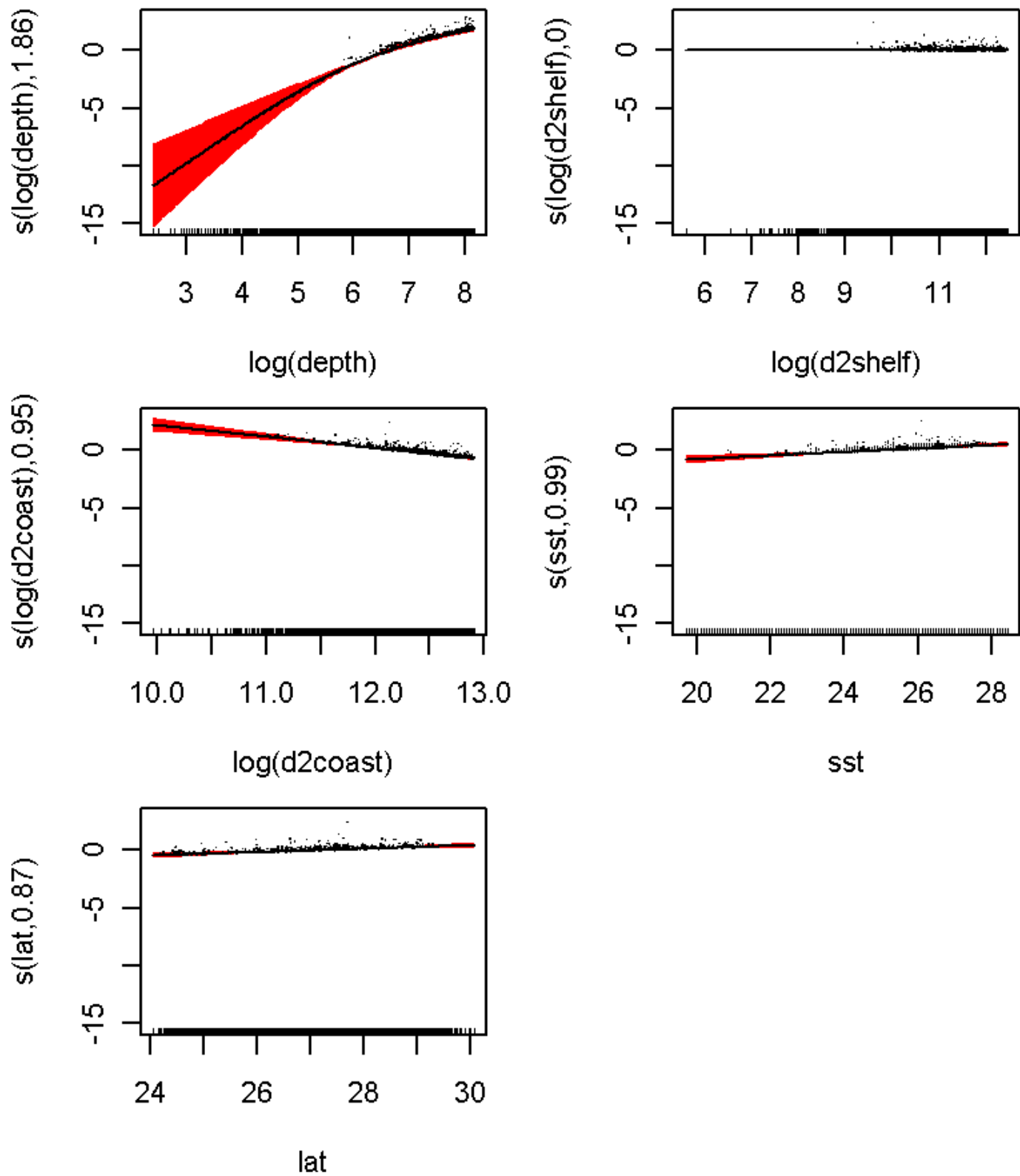


Figure 694: Terms plot of predictors to GAM model fit for '*Stenella attenuata*' guild during 'spring' season in 'gomex2' region.

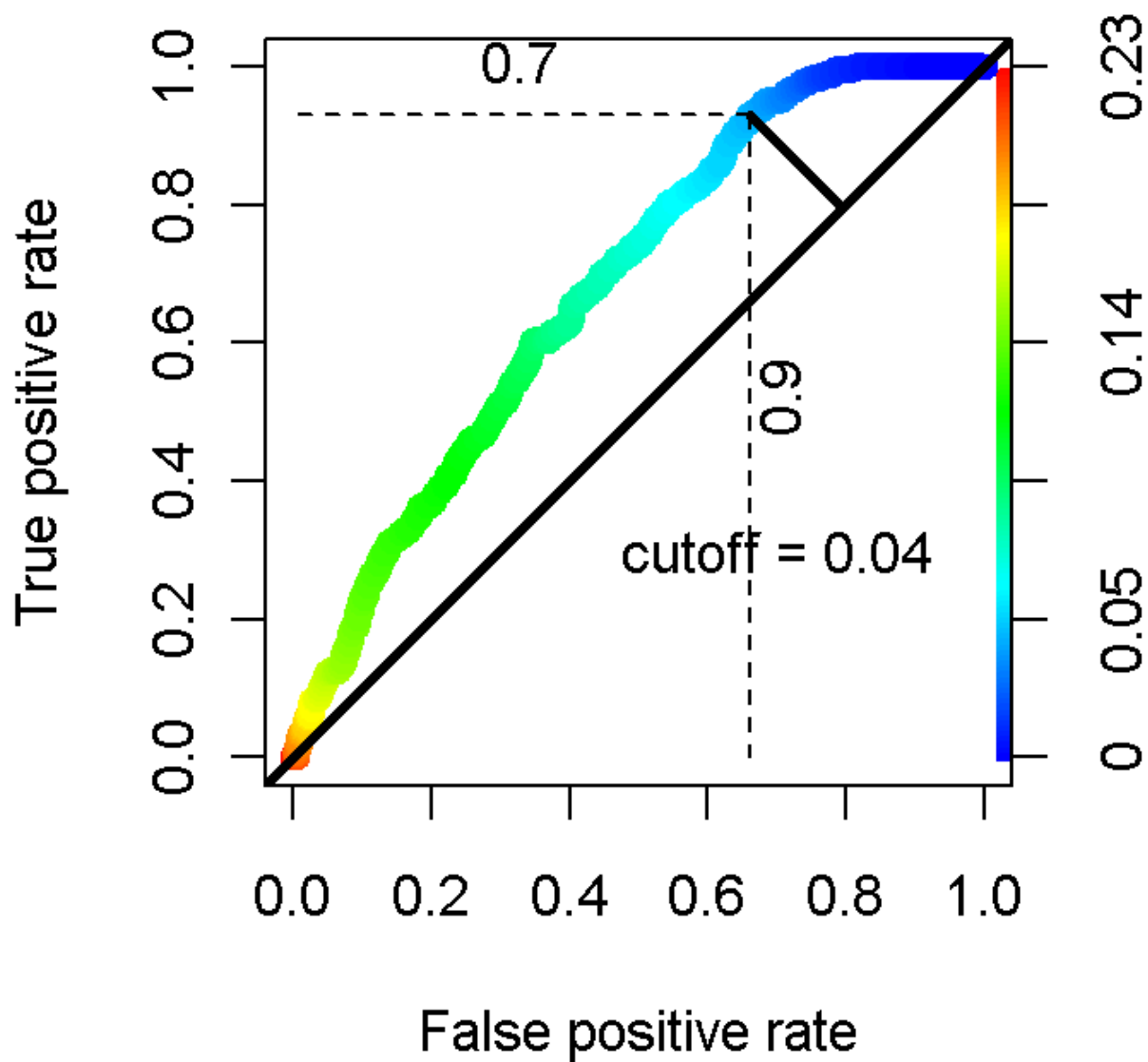


Figure 695: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella attenuata*' guild during 'spring' season in 'gomex2' region.

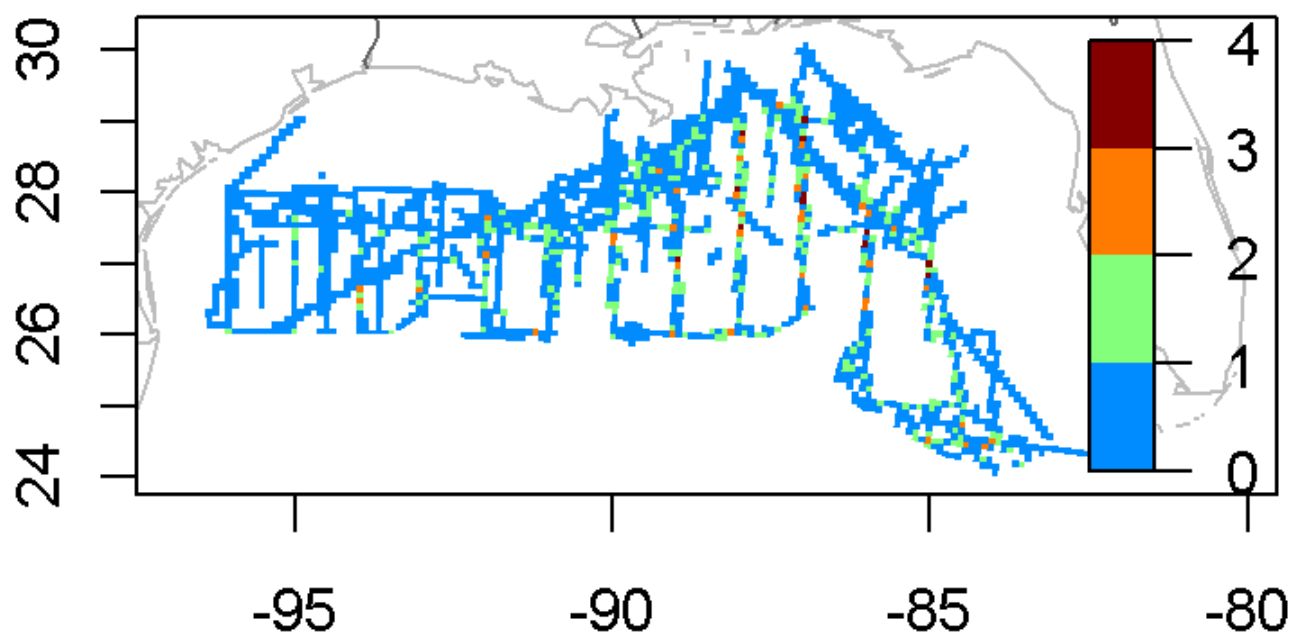


Figure 696: Map of presence and absence by cell summed through time for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

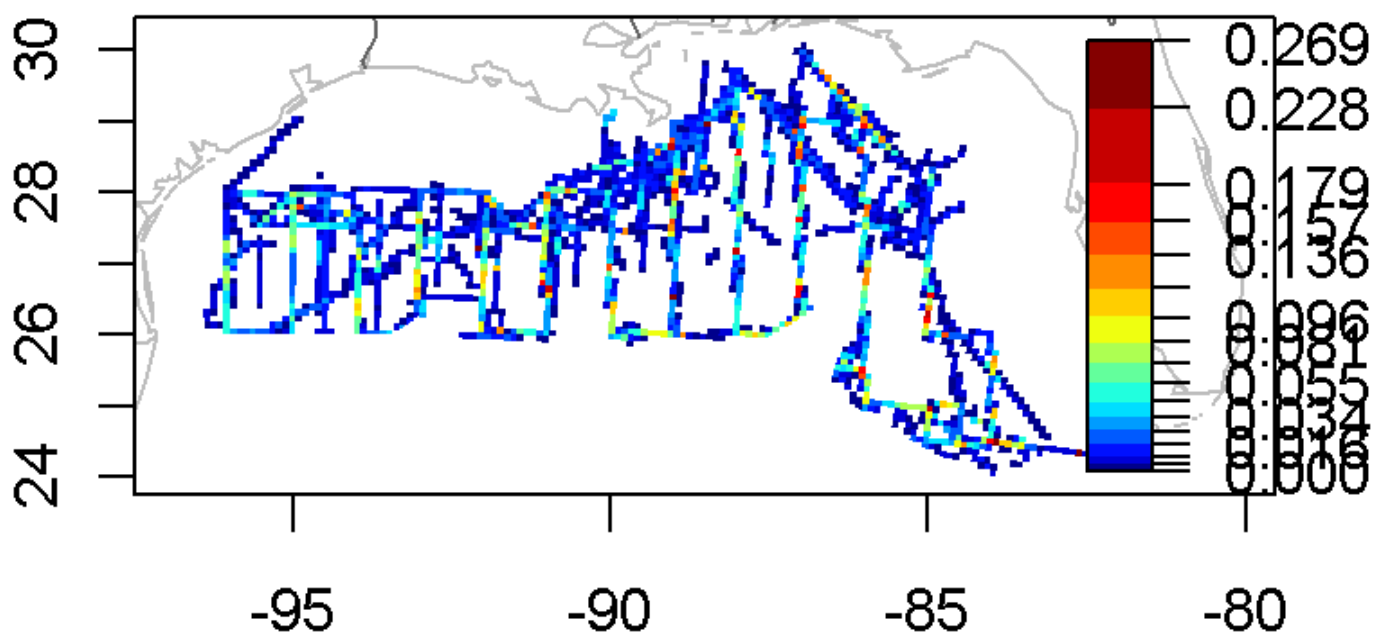


Figure 697: Map of effort(hours/km²) by cell summed through time for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

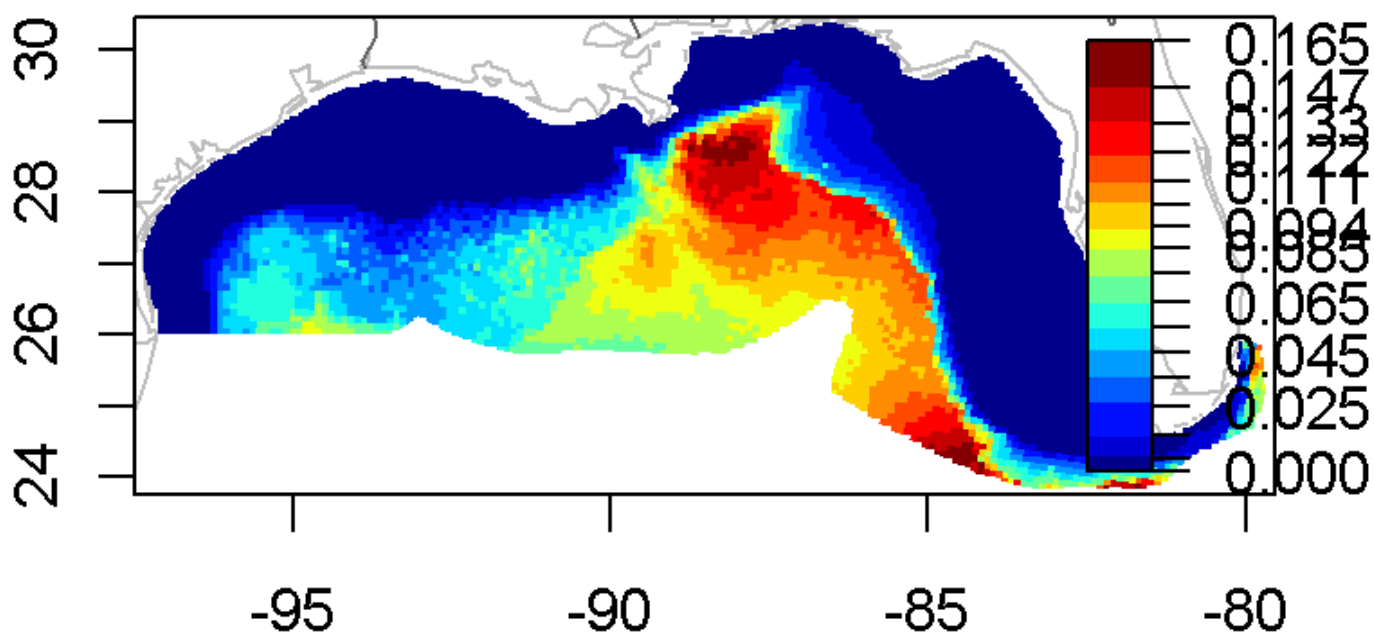


Figure 698: Map of mean predicted habitat for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

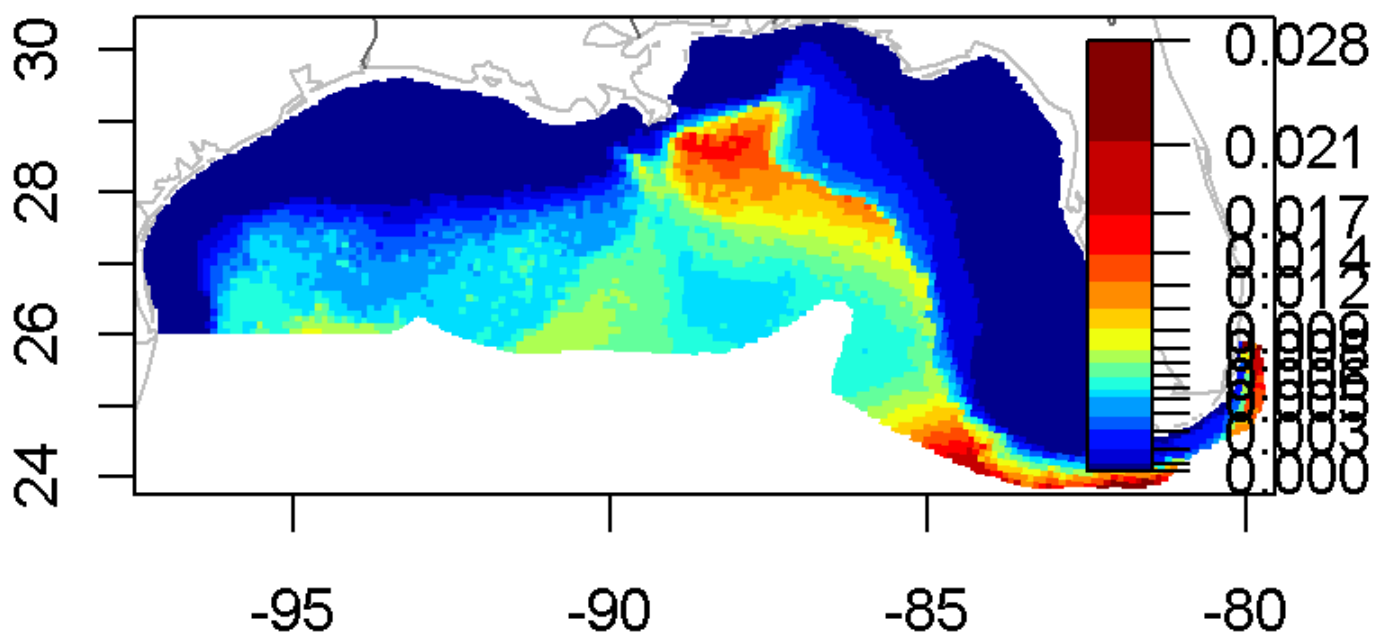


Figure 699: Map of standard error of habitat for 'Stenella attenuata' guild during 'spring' season in 'gomex2' region.

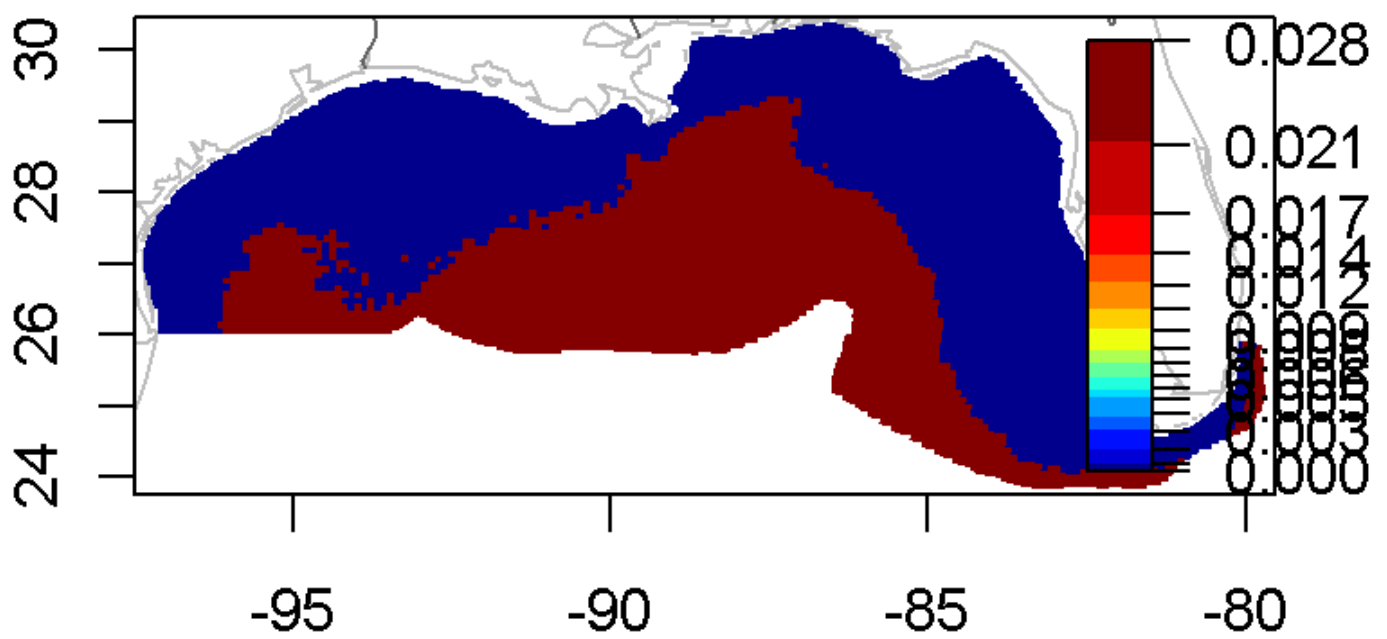


Figure 700: Map of binary habitat (cutoff determined by ROC) for '*Stenella attenuata*' guild during 'spring' season in 'gomex2' region.

14.3 summer

14.3.1 east2

Modelrun identifier: duke_06_sa3_summer_east2

Date generated: 2008-10-21 13:36:58

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 65: Summary for duke(6) GAM model: for 'Stenella attenuata' guild during 'summer' season in 'east2' region.

	Value
Number.presences	11
Number.absences	9067
GAM.converged	TRUE
R.squared	-0.0226869
Deviance.explained	0.236187
ROC.optimum	0.056603
Maximum.fit	0.00153226
Maximum.prediction	0.0440541

Model text summary...

```
duke_06_sa3_summer_east2 run on Tue Oct 21 13:32:51 2008
provider:duke, version:06, guild:Stenella attenuata (sa3), season:'summer', region:east2

max.fit:0.056603, max.prediction:0.044054, ROC.optimum:0.001532

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -11.0925      0.2184  -50.78  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.847e+00  2.347   5.837 0.00164 **
s(log(d2shelf)) 1.263e-07  0.500  3.86e-05 0.93851
s(log(d2coast)) 1.983e+00  2.483 128.958 < 2e-16 ***
s(sst)          1.950e+00  2.450  59.789 < 2e-16 ***
s(lat)          2.000e+00  2.500 220.777 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = -0.0227 Deviance explained = 23.6%
GCV score = 6.3923e-05 Scale est. = 6.3807e-05 n = 8663

summary(dat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.   : 5.0  Min.   : 5  Min.   : 1259  Min.   : 8.175  Min.   :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.: 20989  1st Qu.: 50865  1st Qu.: 17.025  1st Qu.:37.53
          Median :14008  Median : 111.5  Median : 52230  Median :102266  Median : 22.200  Median :40.18
          Mean   :13275  Mean   : 677.3  Mean   : 67623  Mean   :125197  Mean   : 21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.: 420.0  3rd Qu.: 99335  3rd Qu.:174835  3rd Qu.: 25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   : 30.900  Max.   :44.74
          NA's   :      7      NA's   : 7      NA's   :408.000

summary(newdat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   : 4  Min.   : 5  Min.   : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :3.212e-16  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:7.049e-05  1st Qu.:1.743e-05  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :2.866e-04  Median :4.574e-05  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :2.249e-03  Mean   :2.632e-04  Mean   :2.386e-03  Mean   :1.069e-02  Mean   :0.1643
3rd Qu.:14088  3rd Qu.:7.718e-04  3rd Qu.:1.078e-04  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :4.405e-02  Max.   :6.664e-03  Max.   :1.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

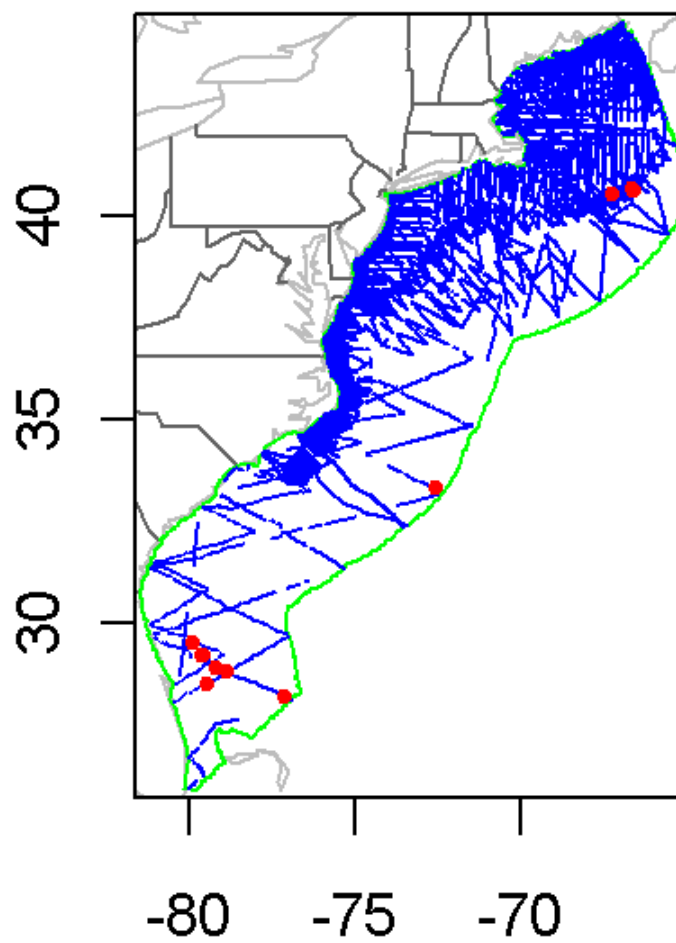


Figure 701: Map of points of observational sightings and tracks of survey effort for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

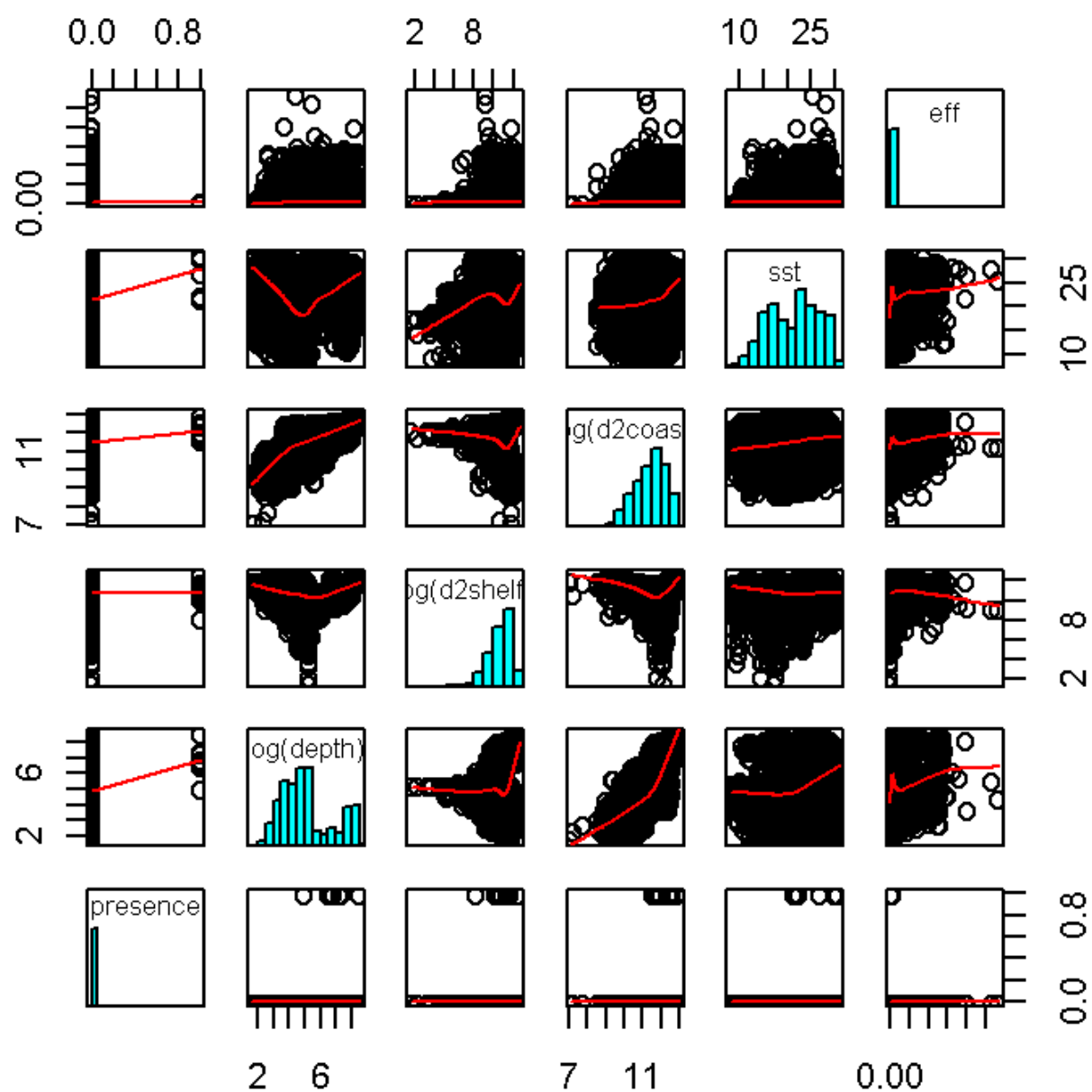


Figure 702: Pairs plot of input variables for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

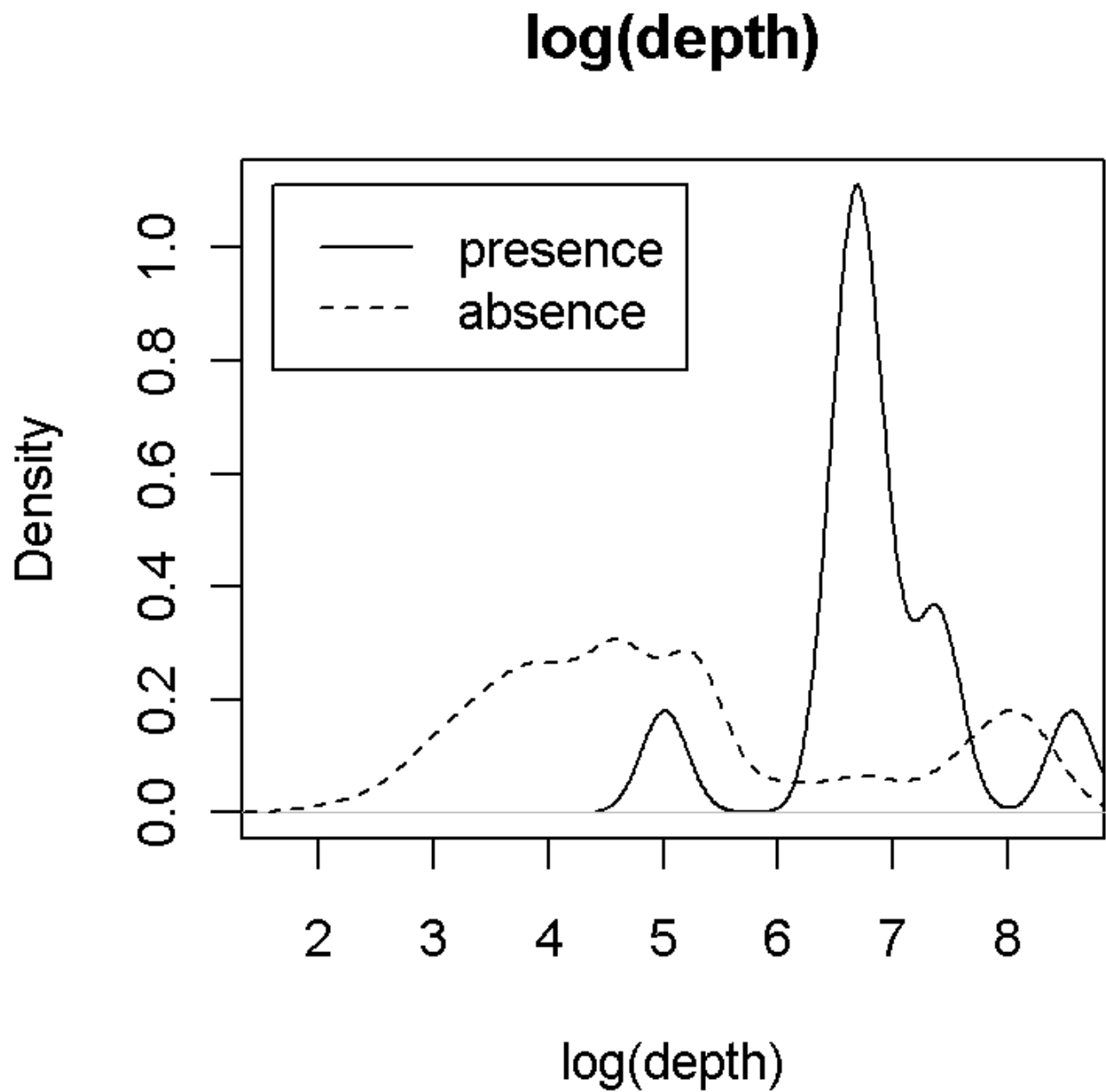


Figure 703: Density histogram of depth log(meters) for 'Stenella attenuata' guild during 'summer' season in 'east2' region.

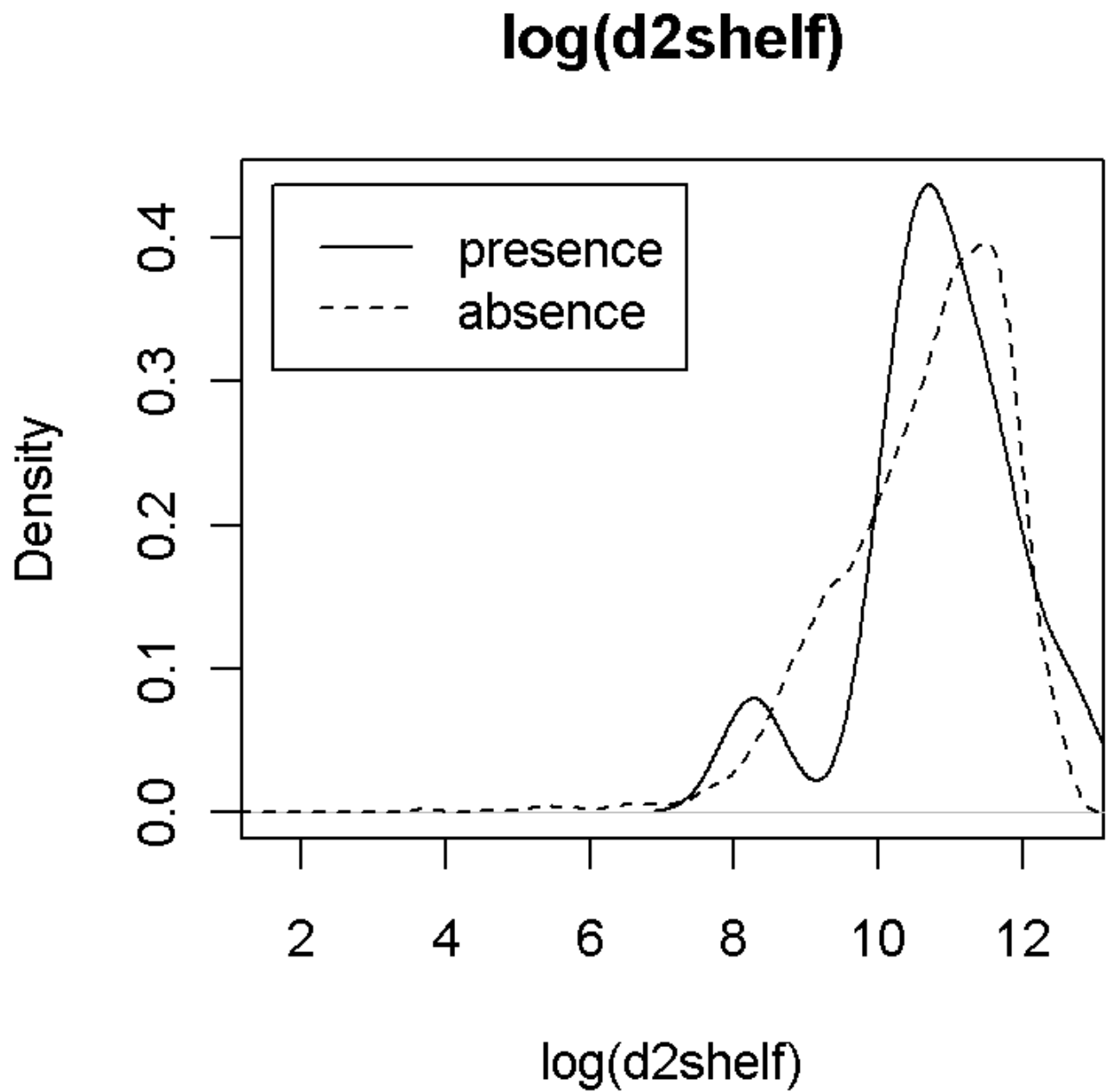


Figure 704: Density histogram of distance to shelf log(meters) for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

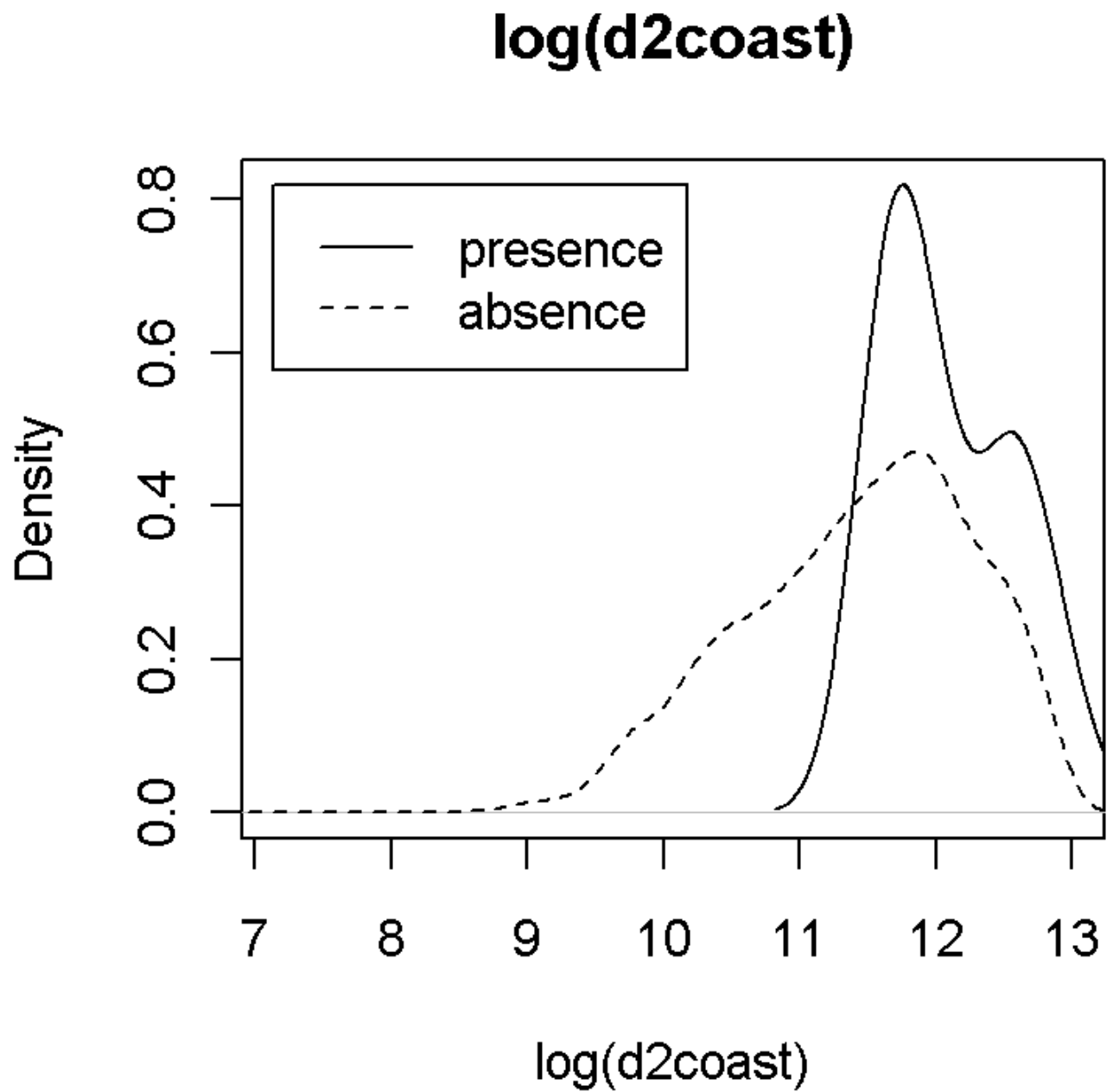


Figure 705: Density histogram of distance to coast log(meters) for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

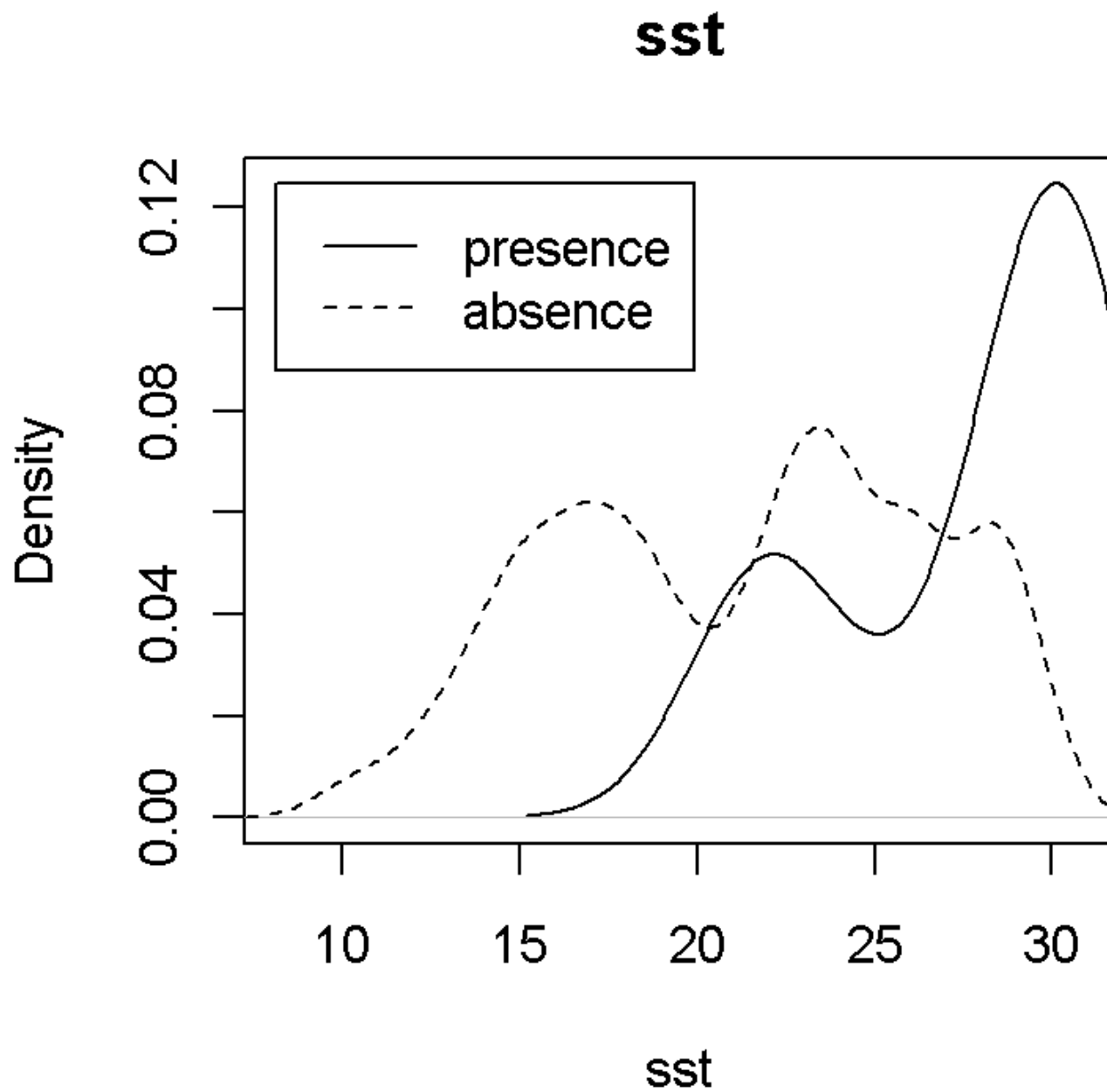


Figure 706: Density histogram of sea-surface temperature (degrees C) for 'Stenella attenuata' guild during 'summer' season in 'east2' region.

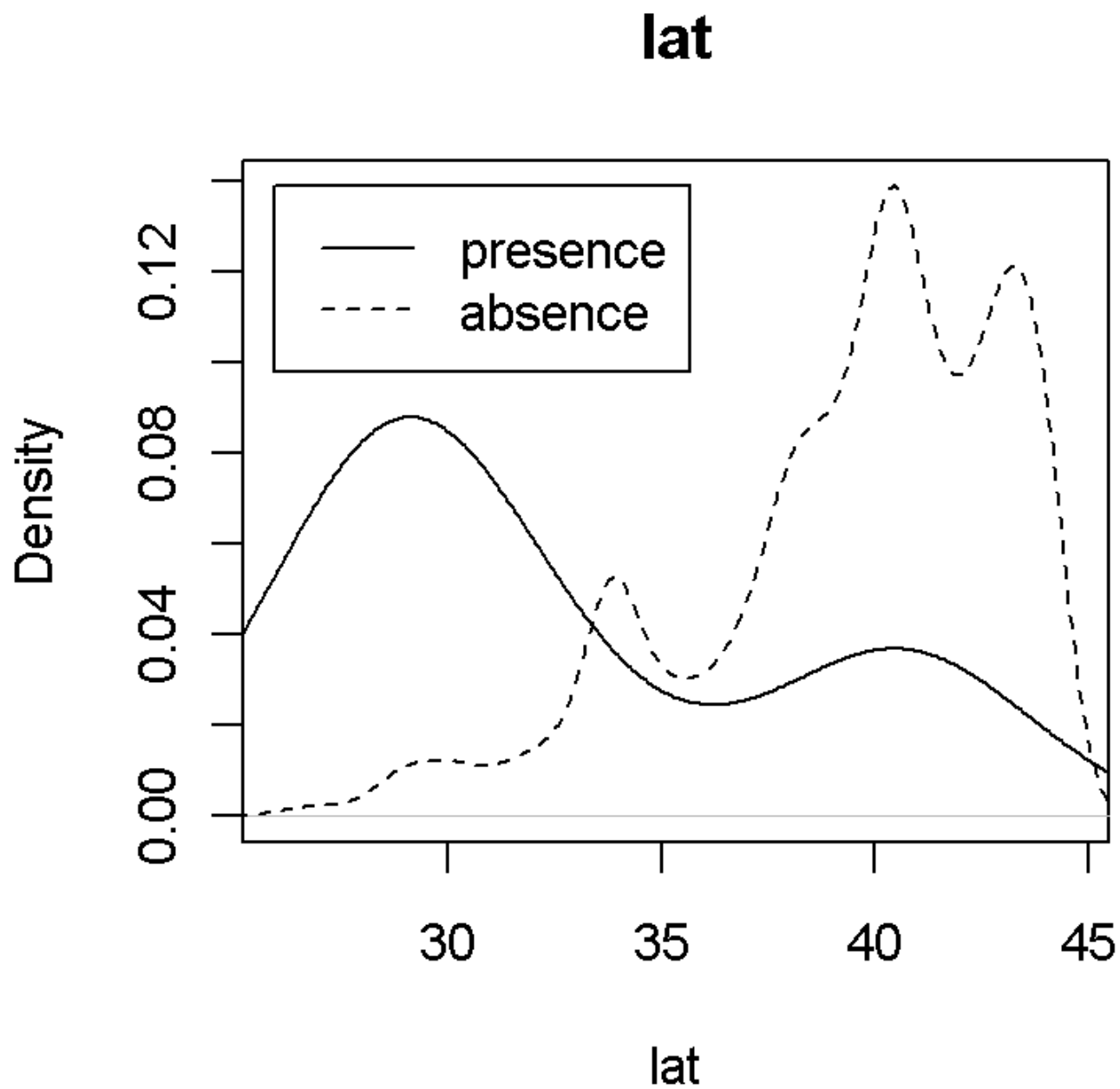


Figure 707: Density histogram of latitude (degrees) for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

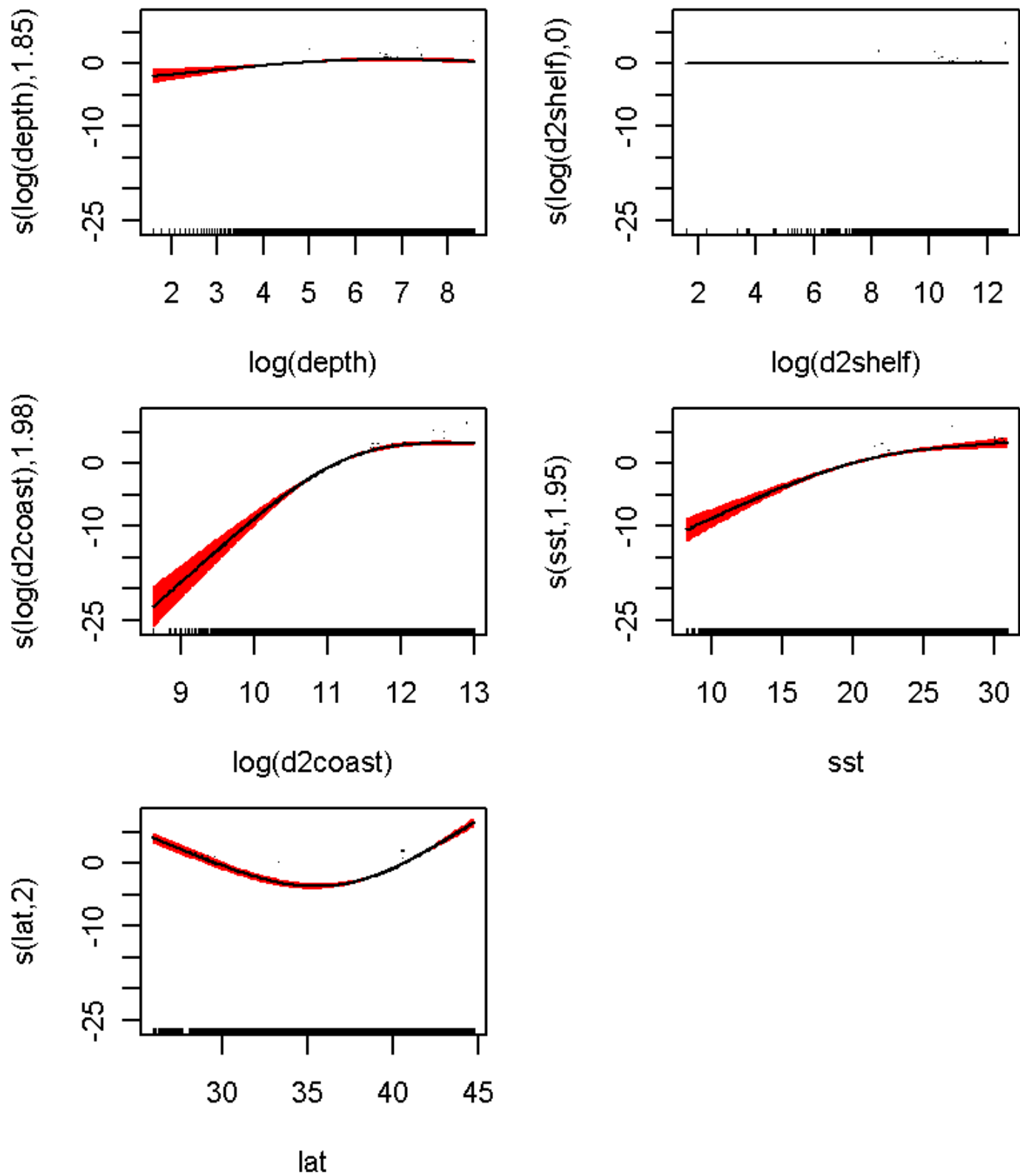


Figure 708: Terms plot of predictors to GAM model fit for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

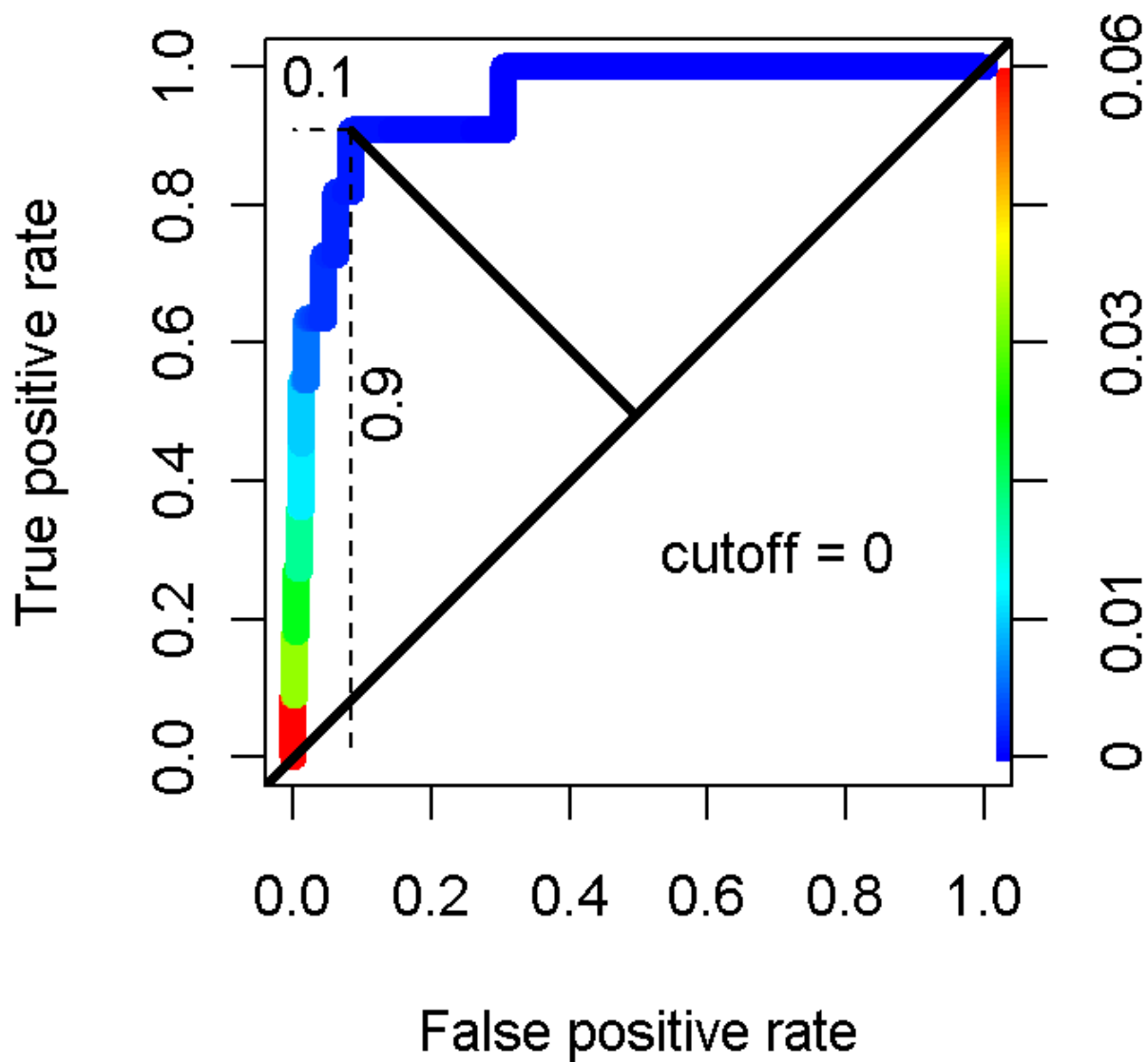


Figure 709: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

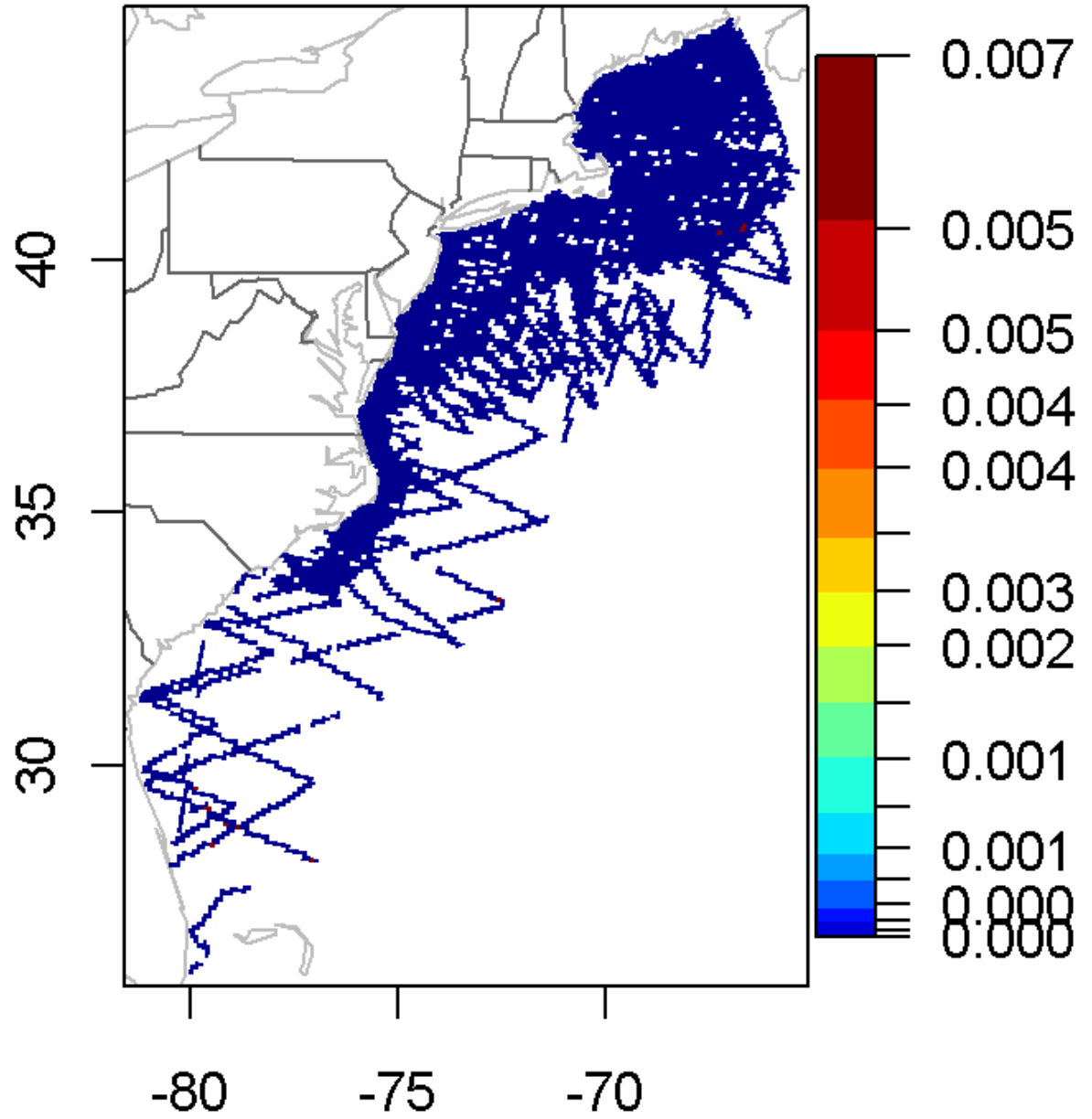


Figure 710: Map of presence and absence by cell summed through time for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

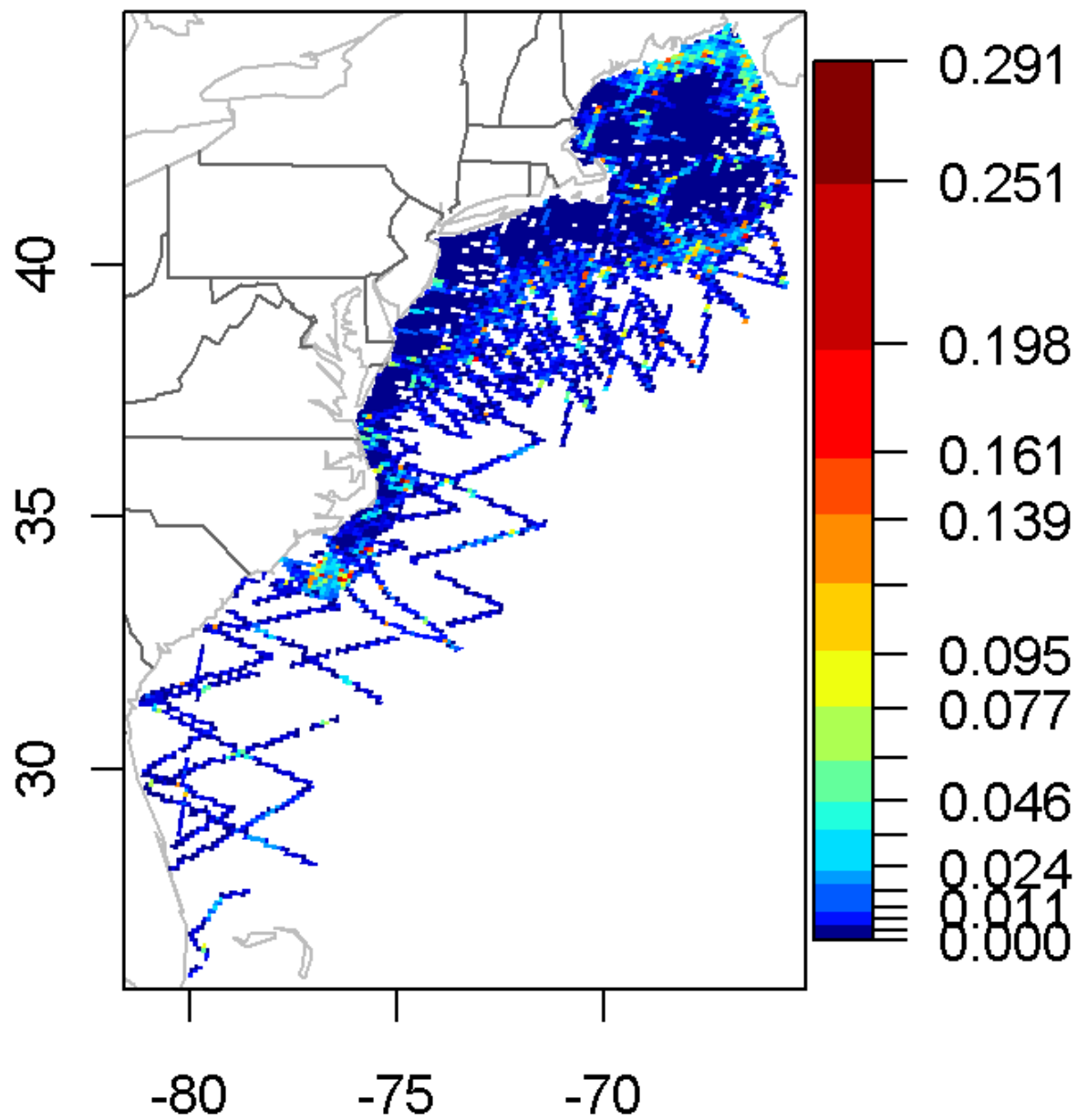


Figure 711: Map of effort(hours/km²) by cell summed through time for 'Stenella attenuata' guild during 'summer' season in 'east2' region.

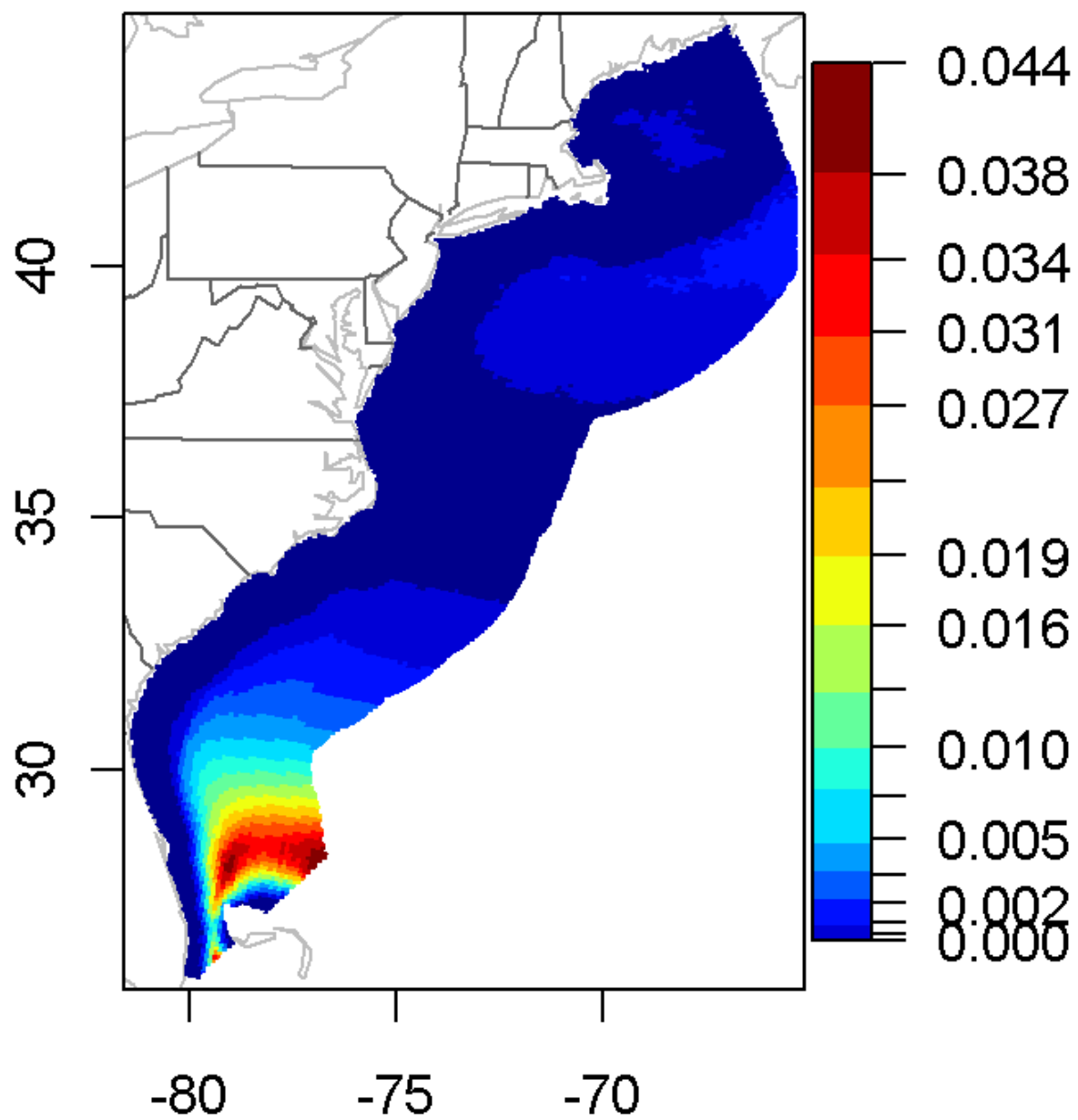


Figure 712: Map of mean predicted habitat for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

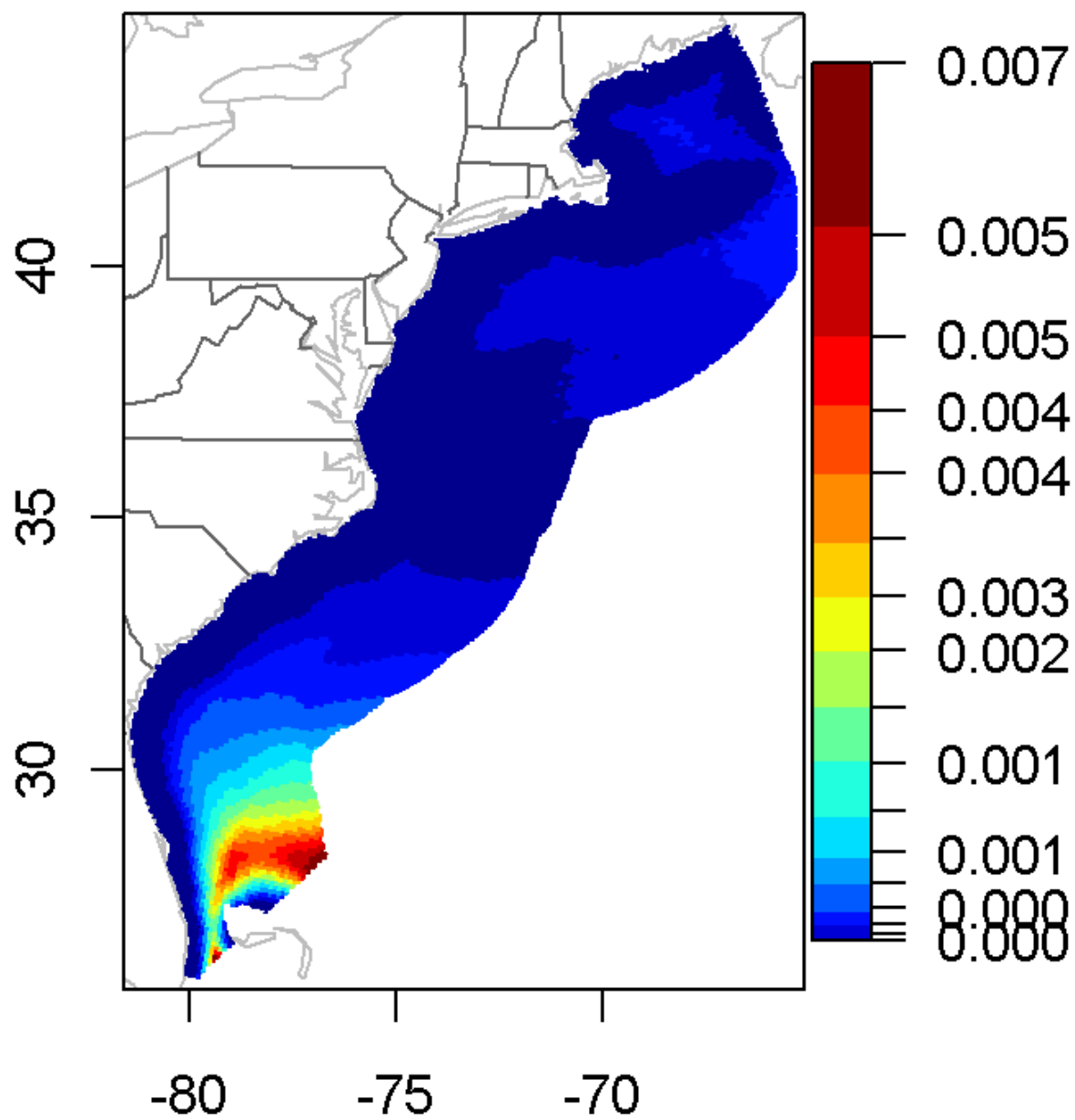


Figure 713: Map of standard error of habitat for 'Stenella attenuata' guild during 'summer' season in 'east2' region.

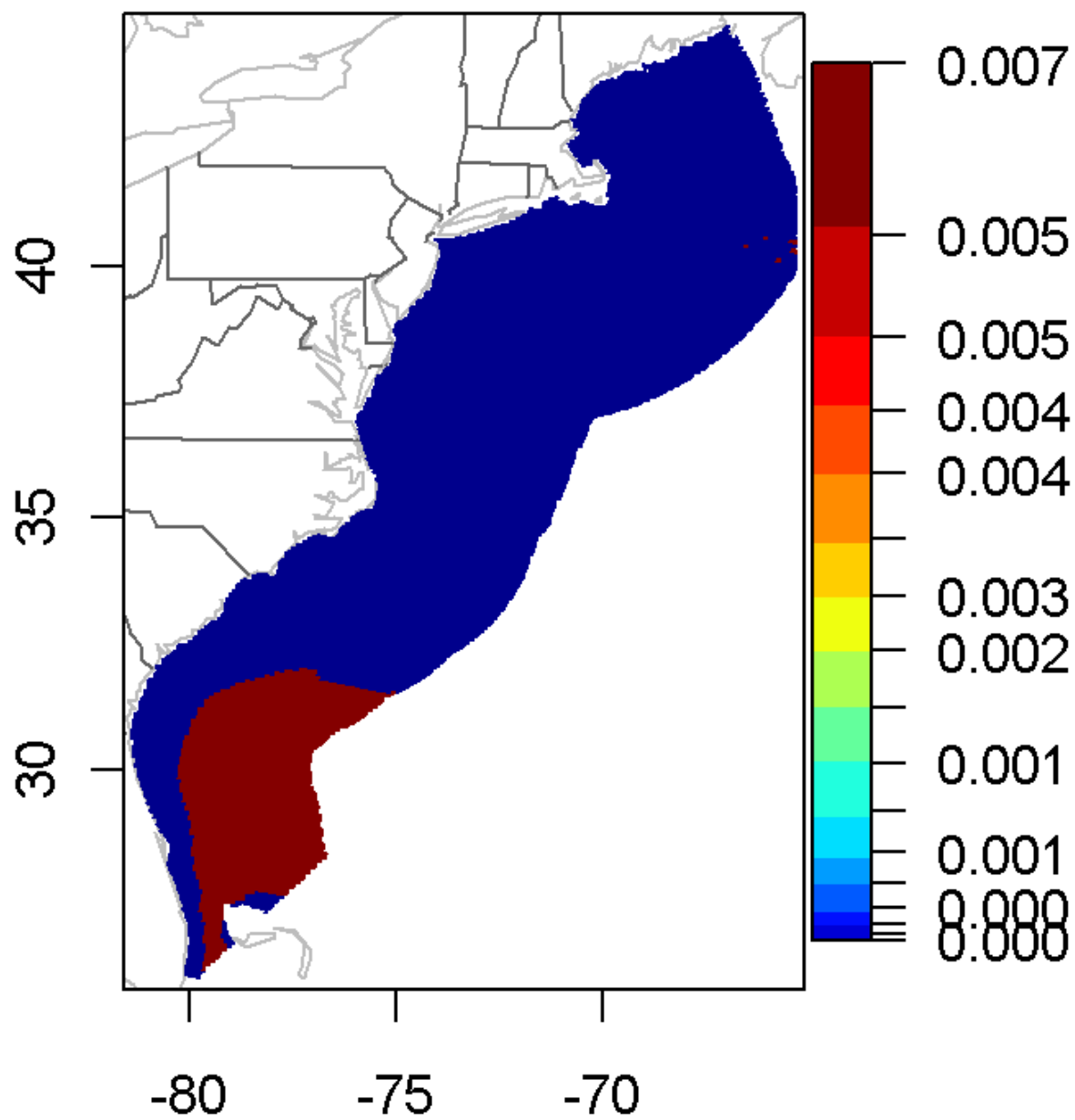


Figure 714: Map of binary habitat (cutoff determined by ROC) for '*Stenella attenuata*' guild during 'summer' season in 'east2' region.

14.3.2 gomex2

Modelrun identifier: duke_06_sa3_summer_gomex2

Date generated: 2008-10-21 11:30:17

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 66: Summary for duke(6) GAM model: for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	71
Number.absences	1333
GAM.converged	TRUE
R.squared	0.241924
Deviance.explained	0.189155
ROC.optimum	0.266036
Maximum.fit	0.011415
Maximum.prediction	0.266041

Model text summary...

```
duke_06_sa3_summer_gomex2 run on Tue Oct 21 11:29:38 2008
provider:duke, version:06, guild:Stenella attenuata (sa3), season:'summer', region:gomex2

max.fit:0.266036, max.prediction:0.266041, ROC.optimum:0.011415

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -12.101      1.243   -9.732  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  1.978e+00  2.4778   25.734  7.24e-14 ***
s(log(d2shelf)) 6.029e-06  0.5000   3.88e-05   0.938
s(log(d2coast)) 1.081e-05  0.5000   0.001   0.847
s(sst)         1.302e-03  0.5013   0.001   0.858
s(lat)         1.985e+00  2.4846   32.574  < 2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.242  Deviance explained = 18.9%
GCV score = 0.0026964  Scale est. = 0.0026793  n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13   Min.   : 13.0   Min.   : 901   Min.   : 5700   Min.   :25.35   Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8   1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75   1st Qu.:26.68
              Median :5134 Median : 654.0   Median : 45466 Median :146059 Median :28.50   Median :27.90
              Mean   :4686 Mean   : 899.5   Mean   : 59670 Mean   :161835 Mean   :28.50   Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0   3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25   3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0   Max.   :249222 Max.   :386037 Max.   :31.20   Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :27.67   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48   1st Qu.:26.28
              Median :4110 Median : 433.5   Median : 71100 Median :157258 Median :29.55   Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:7.720e-16	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:2.220e-16	1st Qu.	:1.555e-15	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:3.801e-03	Median	:1.497e-03	Median	:0.000e+00	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:1.910e-02	Mean	:3.964e-03	Mean	:6.612e-02	Mean	:1.213e-02	Mean	:0.4648
3rd Qu.	:6015	3rd Qu.	:2.636e-02	3rd Qu.	:5.121e-03	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:2.660e-01	Max.	:6.792e-02	Max.	:2.000e+00	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5.568e+03	NA's	:5.568e+03		

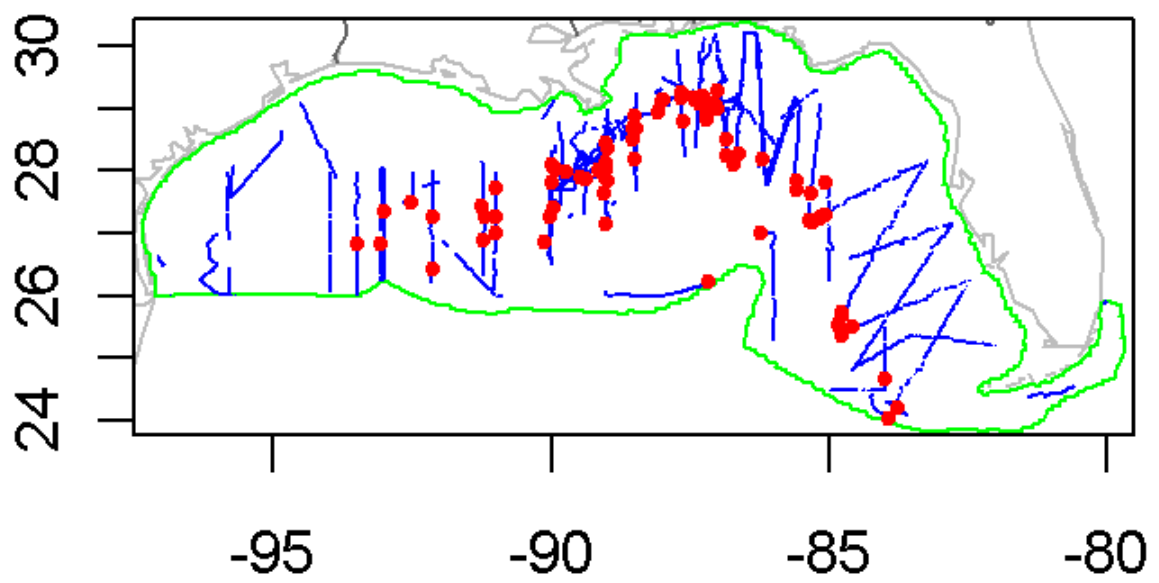


Figure 715: Map of points of observational sightings and tracks of survey effort for '*Stenella attenuata*' guild during 'summer' season in 'gomex2' region.

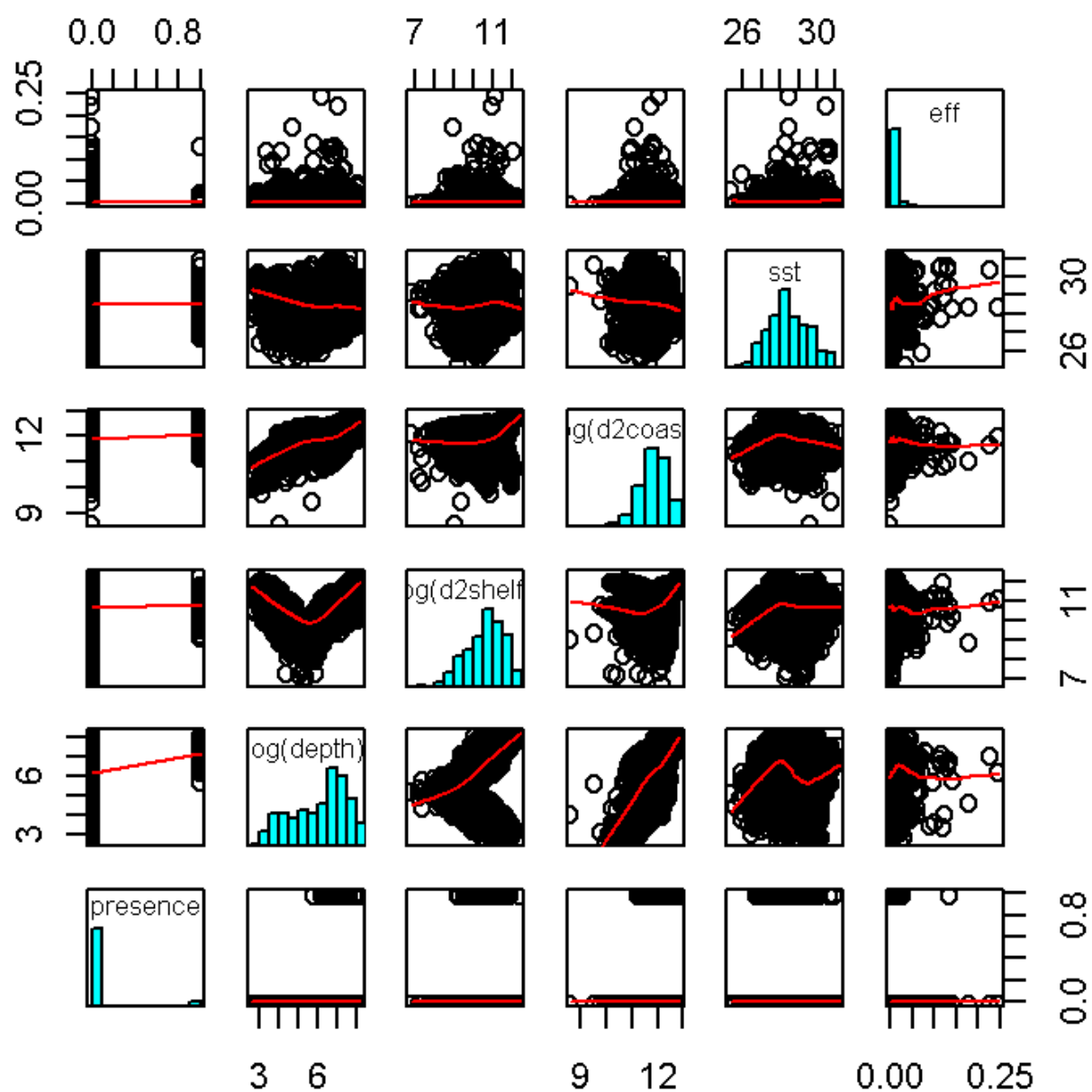


Figure 716: Pairs plot of input variables for '*Stenella attenuata*' guild during 'summer' season in 'gomex2' region.

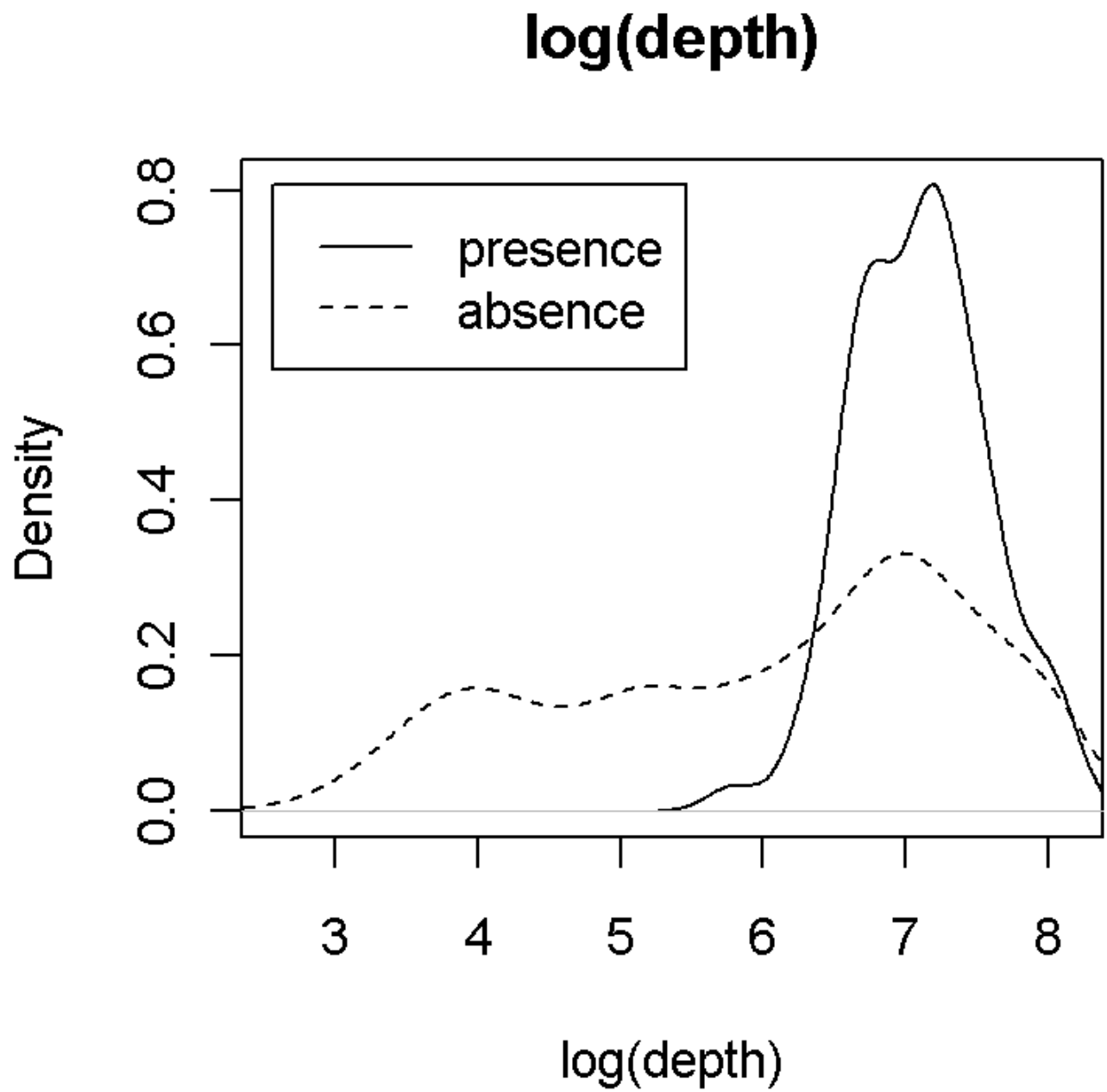


Figure 717: Density histogram of depth log(meters) for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.

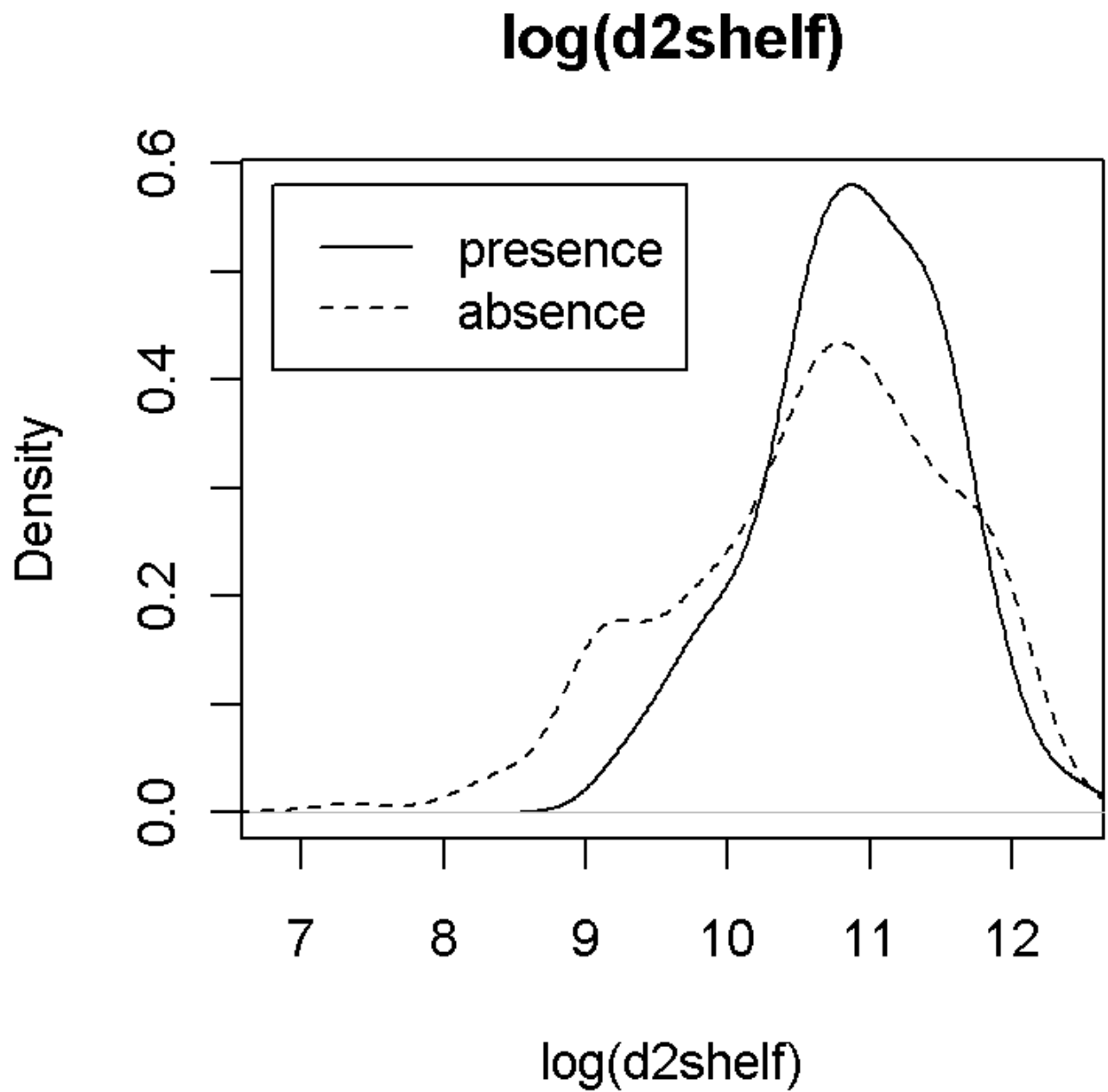


Figure 718: Density histogram of distance to shelf log(meters) for '*Stenella attenuata*' guild during 'summer' season in 'gomex2' region.

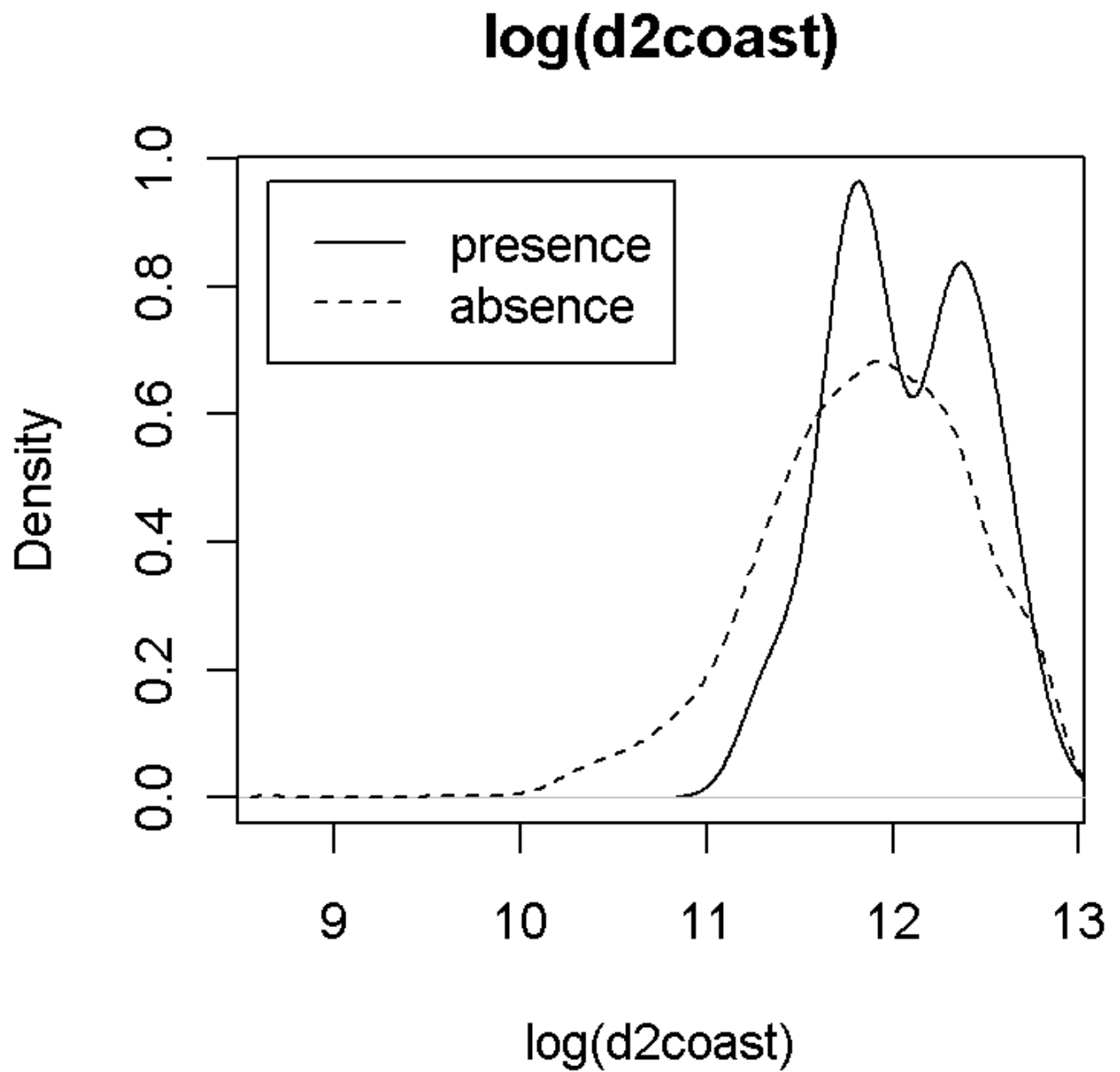


Figure 719: Density histogram of distance to coast log(meters) for '*Stenella attenuata*' guild during 'summer' season in 'gomex2' region.

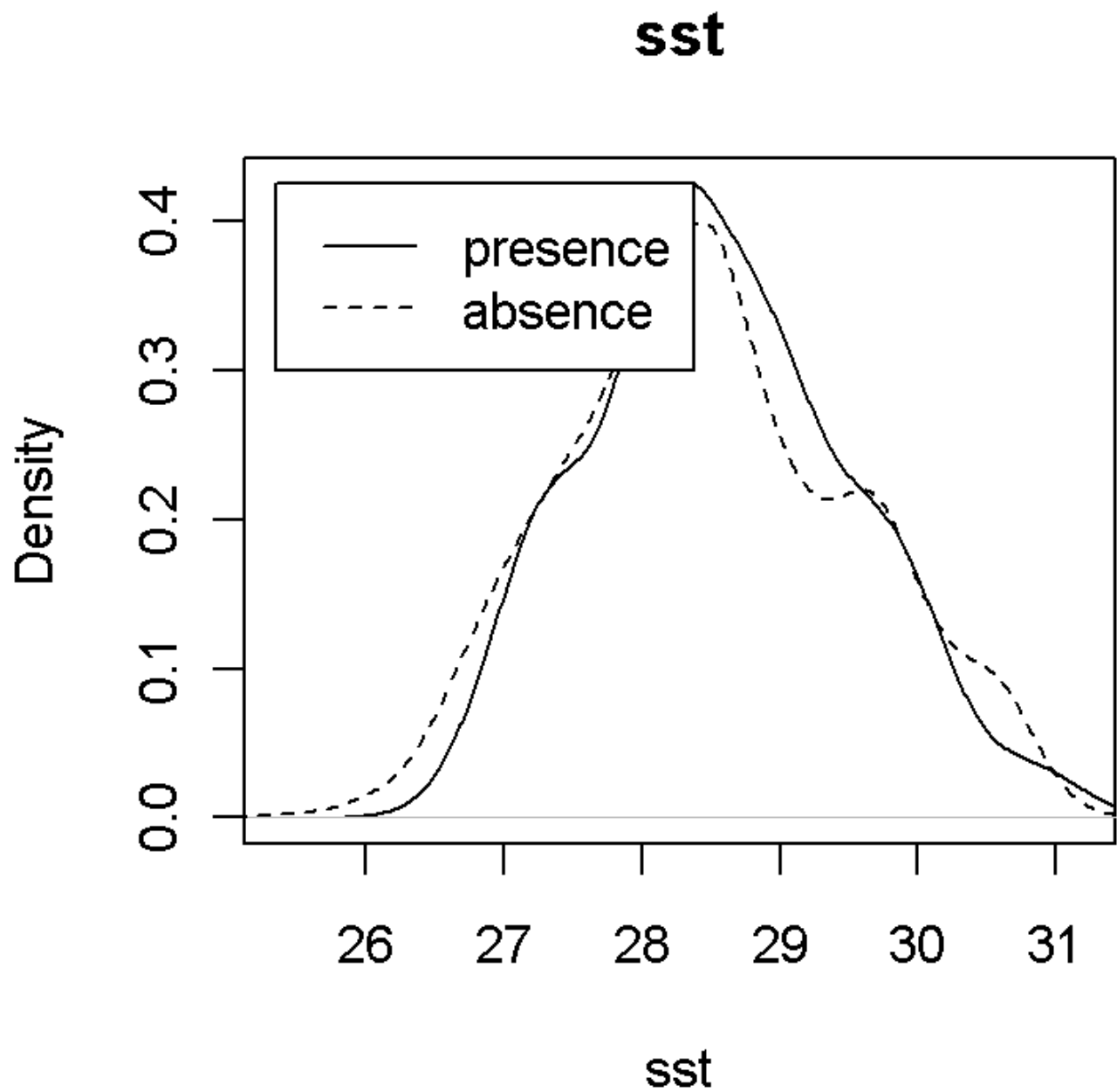


Figure 720: Density histogram of sea-surface temperature (degrees C) for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.

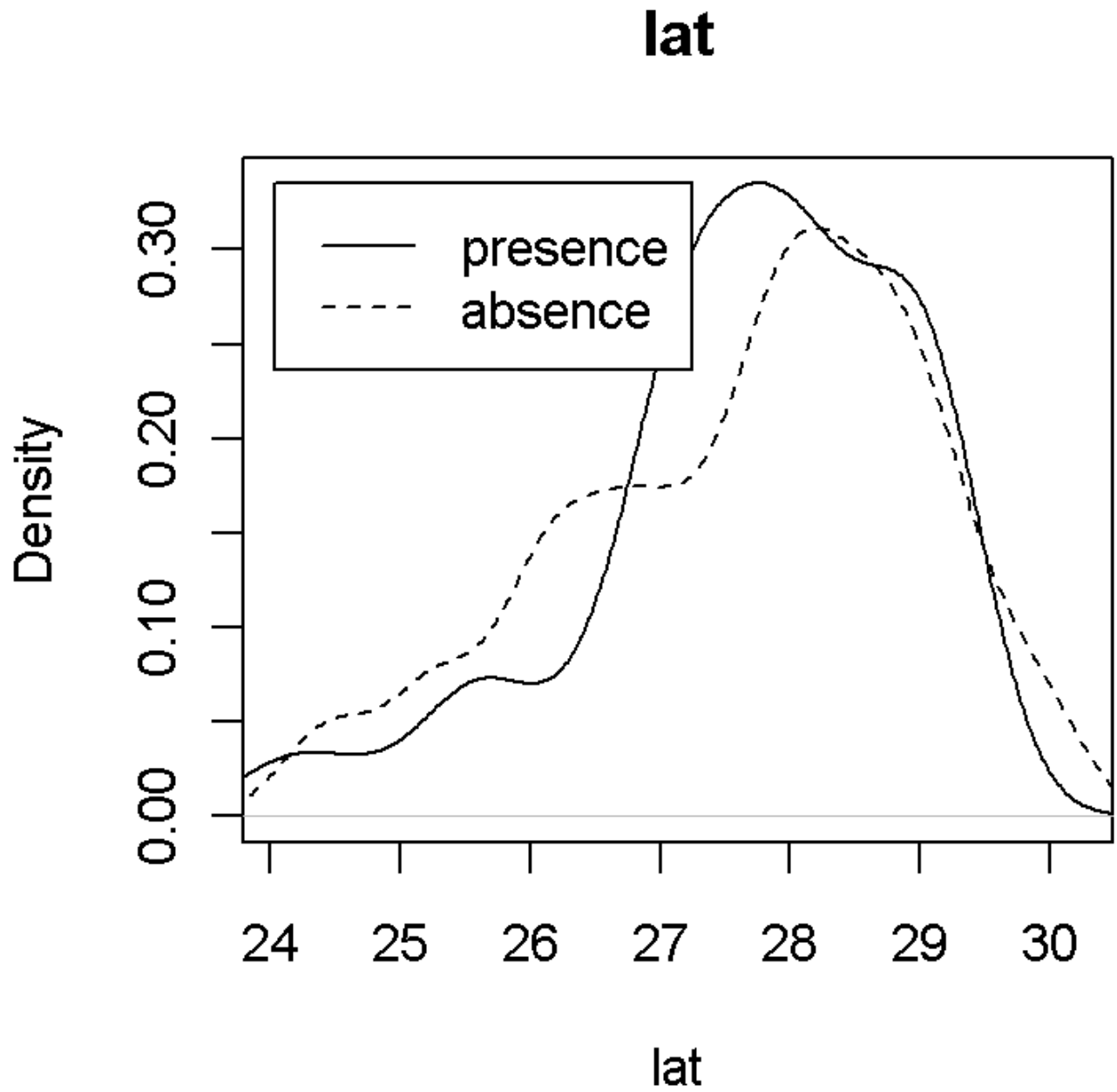


Figure 721: Density histogram of latitude (degrees) for '*Stenella attenuata*' guild during 'summer' season in 'gomex2' region.

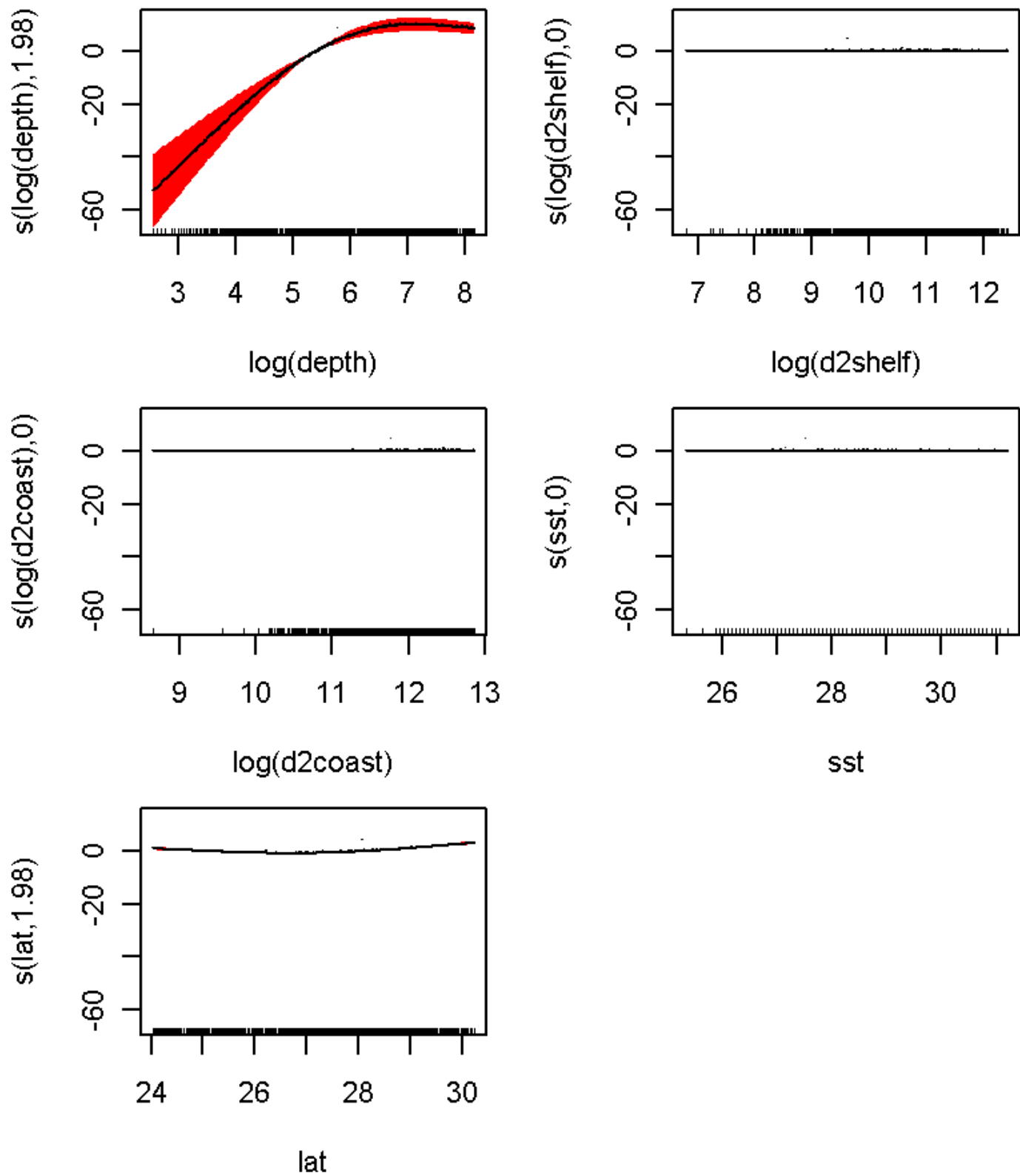


Figure 722: Terms plot of predictors to GAM model fit for '*Stenella attenuata*' guild during 'summer' season in 'gomex2' region.

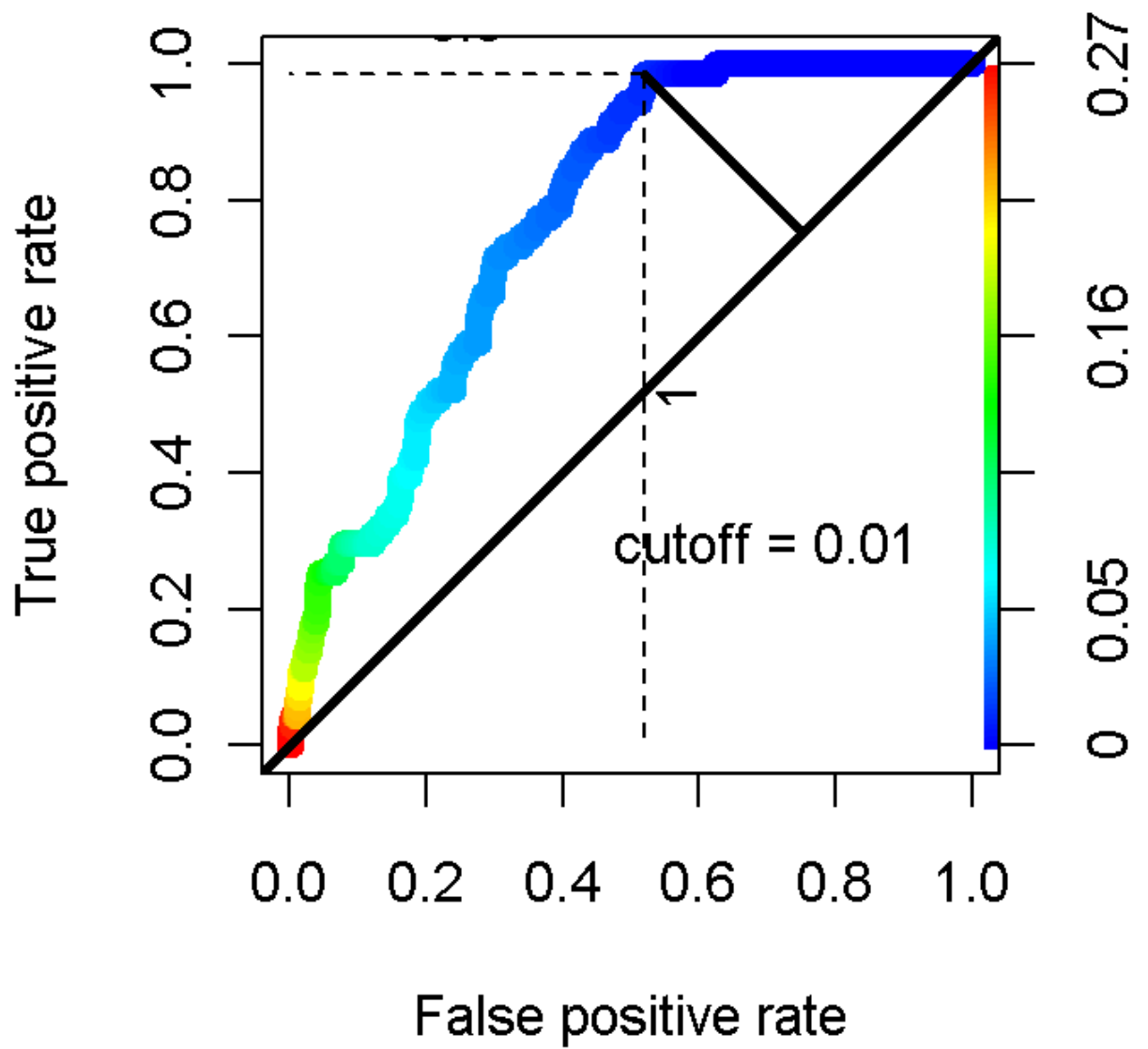


Figure 723: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella attenuata*' guild during 'summer' season in 'gomex2' region.

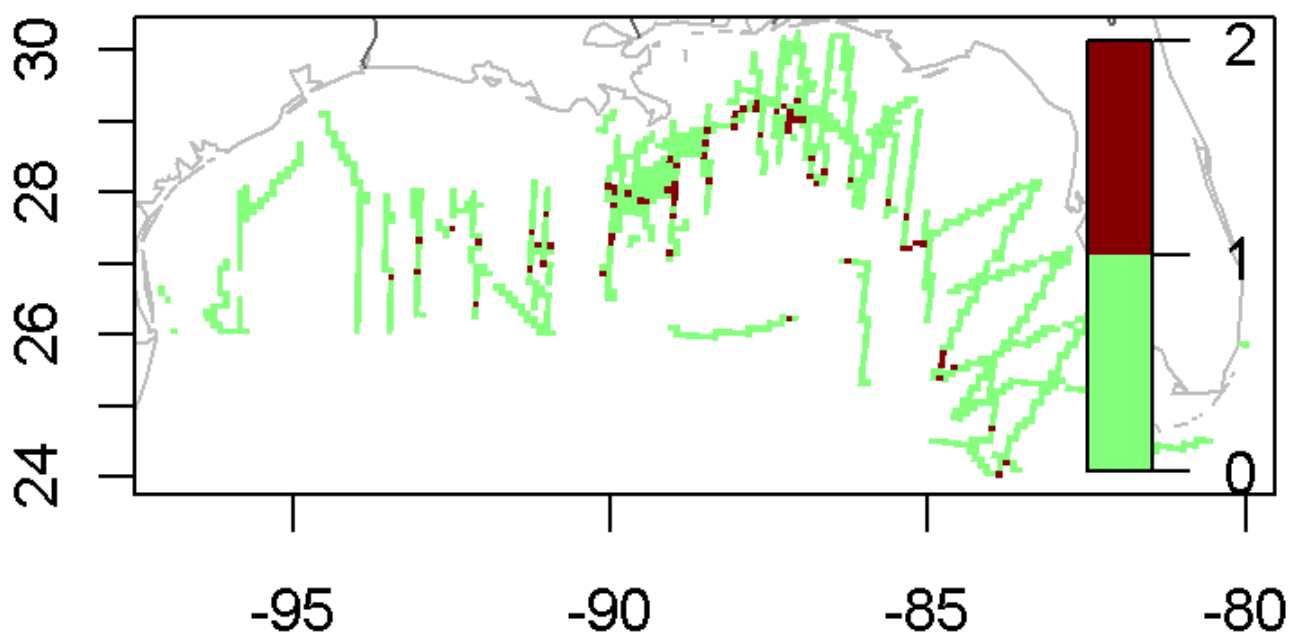


Figure 724: Map of presence and absence by cell summed through time for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.

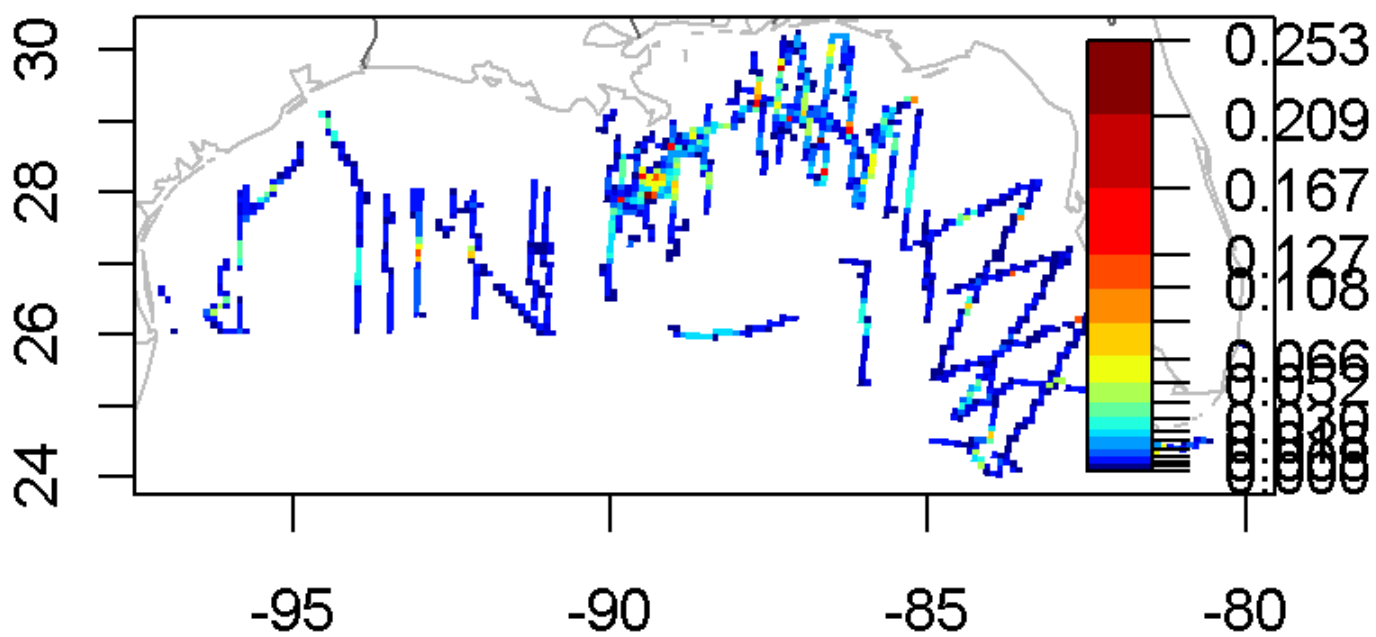


Figure 725: Map of effort(hours/km²) by cell summed through time for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.

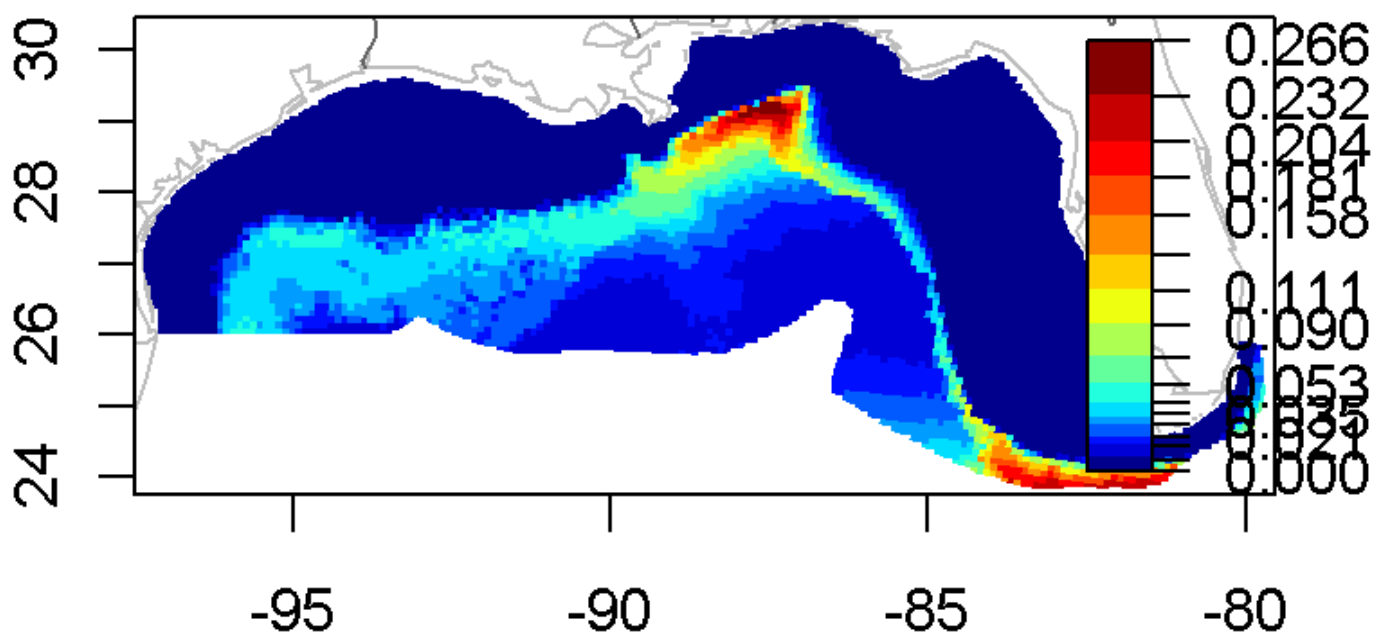


Figure 726: Map of mean predicted habitat for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.

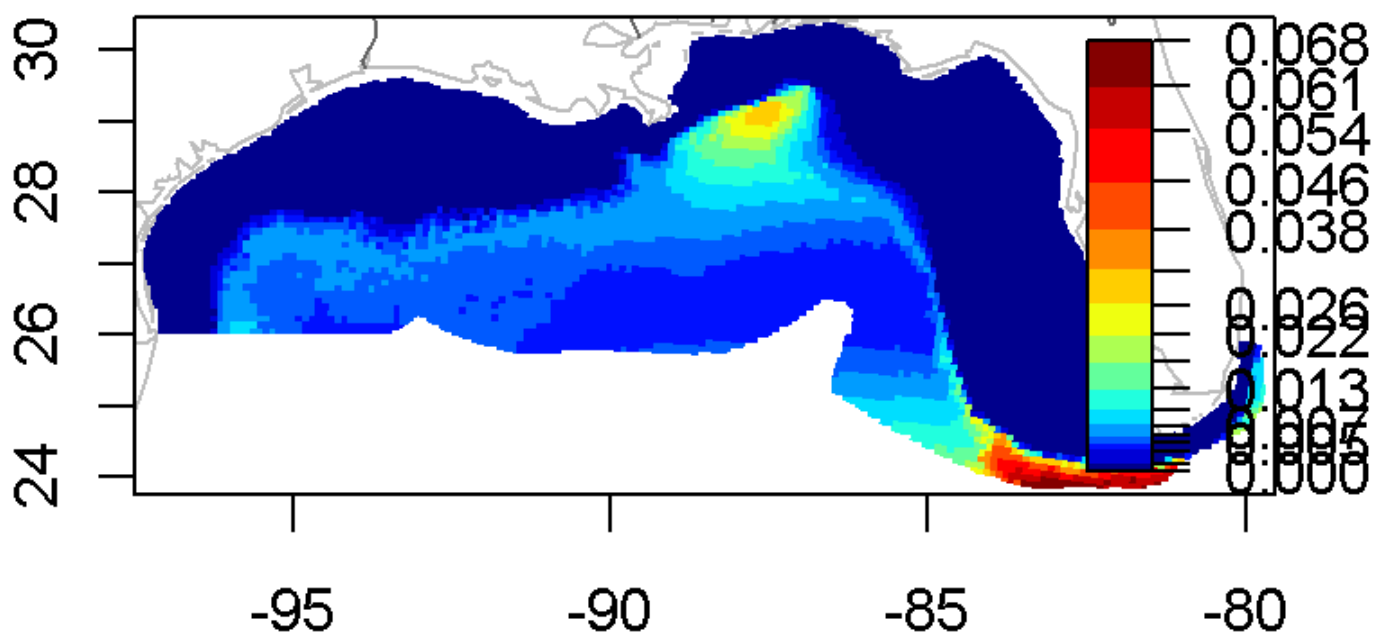


Figure 727: Map of standard error of habitat for 'Stenella attenuata' guild during 'summer' season in 'gomex2' region.

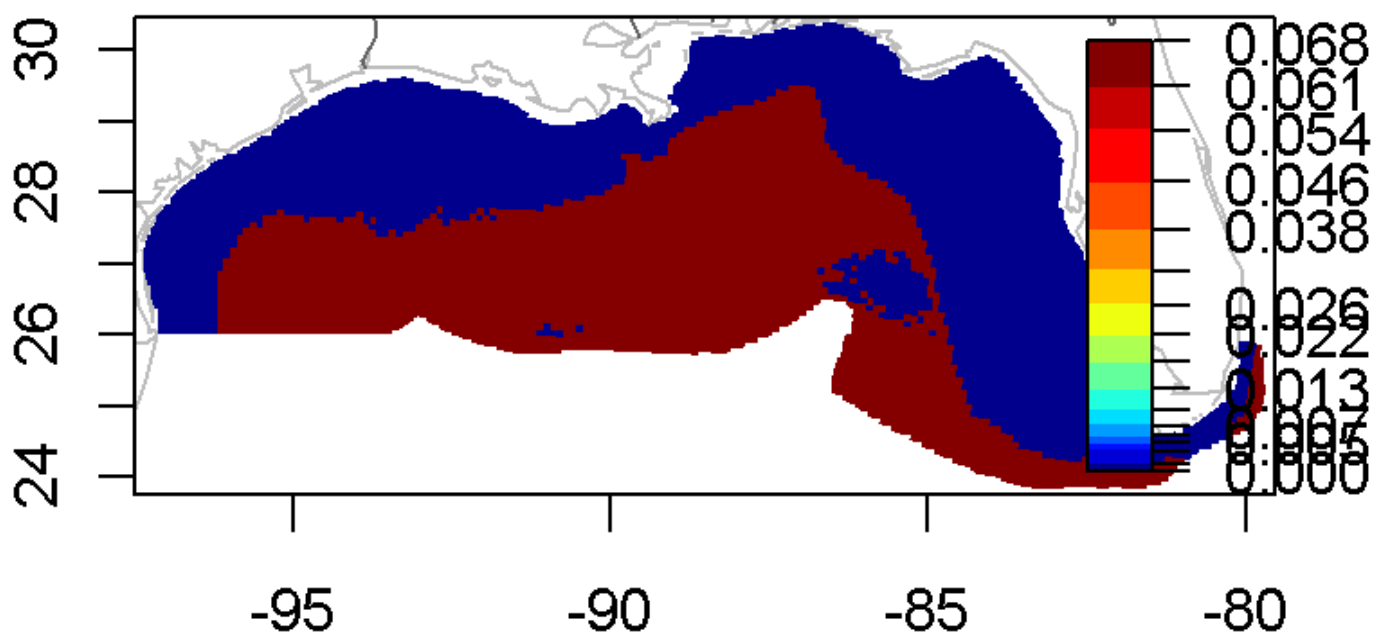


Figure 728: Map of binary habitat (cutoff determined by ROC) for '*Stenella attenuata*' guild during 'summer' season in 'gomex2' region.

14.4 winter

15 *Stenella frontalis*

Guildid:sf3

Table 67: Taxonomic members of the "Stenella frontalis" guild.

	Scientific Name	Common Name	Taxonomic #
1	<i>Stenella frontalis</i>	Atlantic spotted dolphin	552460

15.1 fall

15.1.1 east2

Modelrun identifier: duke_06_sf3_fall_east2

Date generated: 2008-10-21 14:30:35

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 68: Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

	Value
Number.presences	22
Number.absences	1842
GAM.converged	TRUE
R.squared	0.513545
Deviance.explained	0.456245
ROC.optimum	0.629792
Maximum.fit	0.0261004
Maximum.prediction	0.933162

Model text summary...

```
duke_06_sf3_fall_east2 run on Tue Oct 21 14:29:17 2008
provider:duke, version:06, guild:Stenella frontalis (sf3), season:'fall', region:east2

max.fit:0.629792, max.prediction:0.933162, ROC.optimum:0.026100

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -9.160      1.039   -8.817  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  2.000e+00  2.500   73.14 < 2e-16 ***
s(log(d2shelf)) 1.972e+00  2.472   43.26 < 2e-16 ***
s(log(d2coast))  9.730e-07  0.500   2.33e-05  0.946
s(sst)          2.000e+00  2.500   62.59 < 2e-16 ***
s(lat)          1.837e+00  2.337   27.55 3.54e-14 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.514   Deviance explained = 45.6%
GCV score = 0.00035396   Scale est. = 0.00035089   n = 1826

summary(dat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:1184  Min.    : 1654  Min.    :  6.0  Min.    :  10  Min.    : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0  1st Qu.:12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0  Median :30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5  Mean   :47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.:197.0  3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
        NA's    :      1      NA's    :      1      NA's    :37.00

summary(newdat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :  5  Min.    :1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.220e-16	Min. :1.070e-15	Min. :0.000e+00	Min. :1.290e-06	Min. :0.00000
1st Qu.: 9145	1st Qu.:5.588e-06	1st Qu.:8.278e-06	1st Qu.:0.000e+00	1st Qu.:5.348e-04	1st Qu.:0.00000
Median :11616	Median :1.289e-04	Median :1.204e-04	Median :0.000e+00	Median :2.645e-03	Median :0.00000
Mean :11171	Mean :2.453e-02	Mean :6.118e-03	Mean :1.986e-02	Mean :8.763e-03	Mean :0.09962
3rd Qu.:14088	3rd Qu.:2.026e-03	3rd Qu.:1.097e-03	3rd Qu.:0.000e+00	3rd Qu.:6.382e-03	3rd Qu.:0.00000
Max. :16560	Max. :9.332e-01	Max. :1.807e-01	Max. :1.000e+00	Max. :5.995e-01	Max. :1.00000
	NA's :5.000e+00	NA's :5.000e+00	NA's :8.780e+03	NA's :8.780e+03	

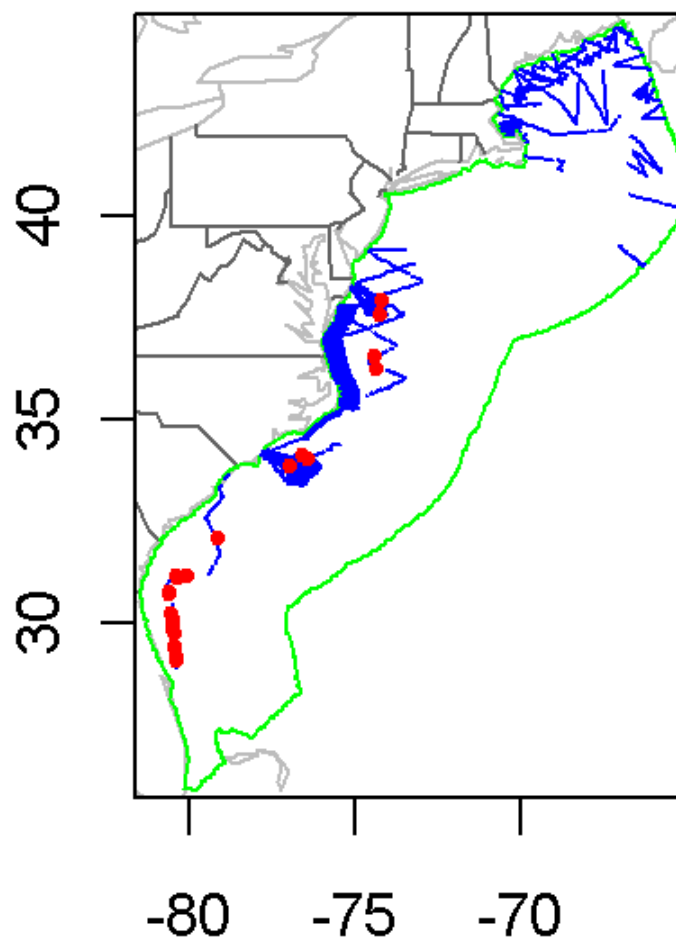


Figure 729: Map of points of observational sightings and tracks of survey effort for '*Stenella frontalis*' guild during 'fall' season in 'east2' region.

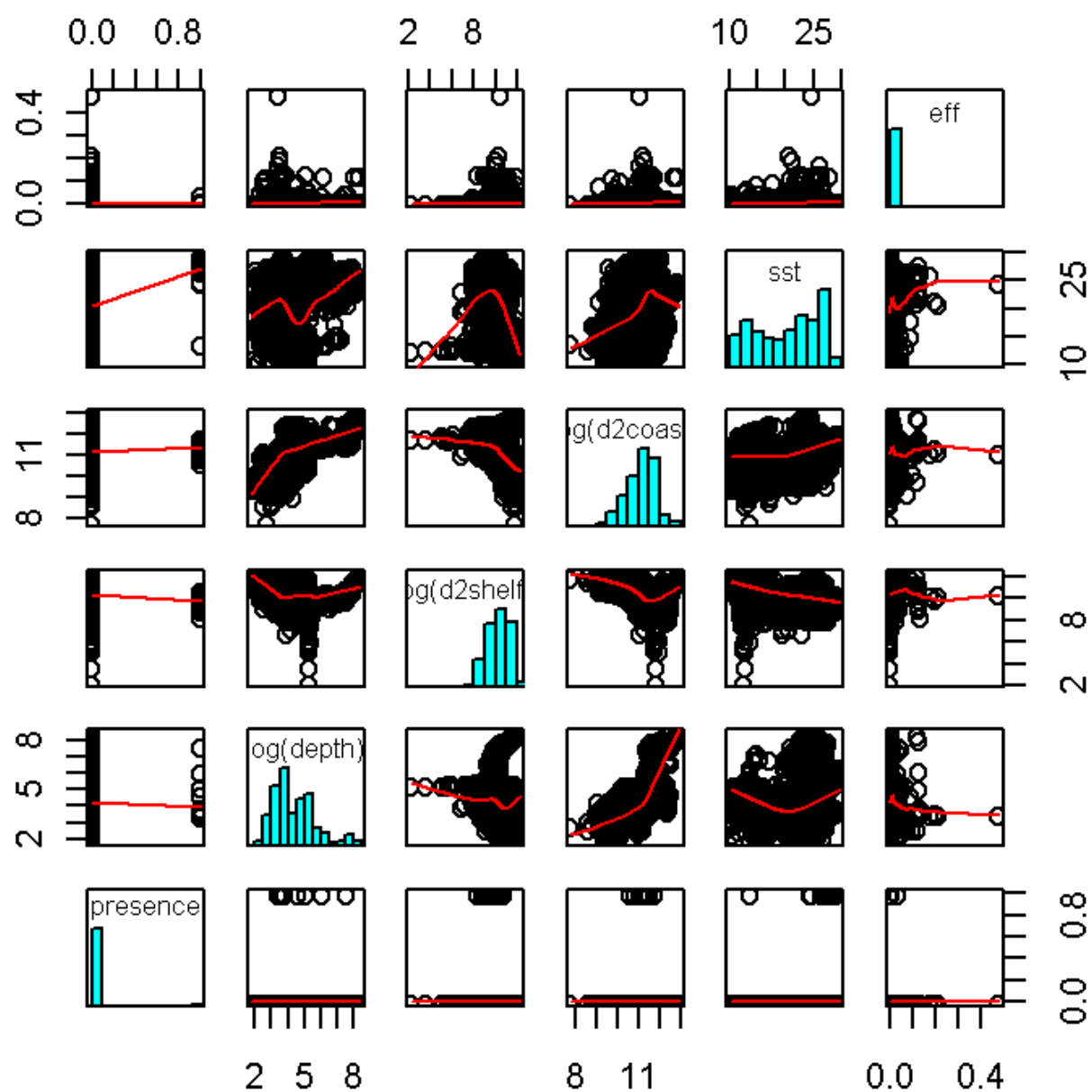


Figure 730: Pairs plot of input variables for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

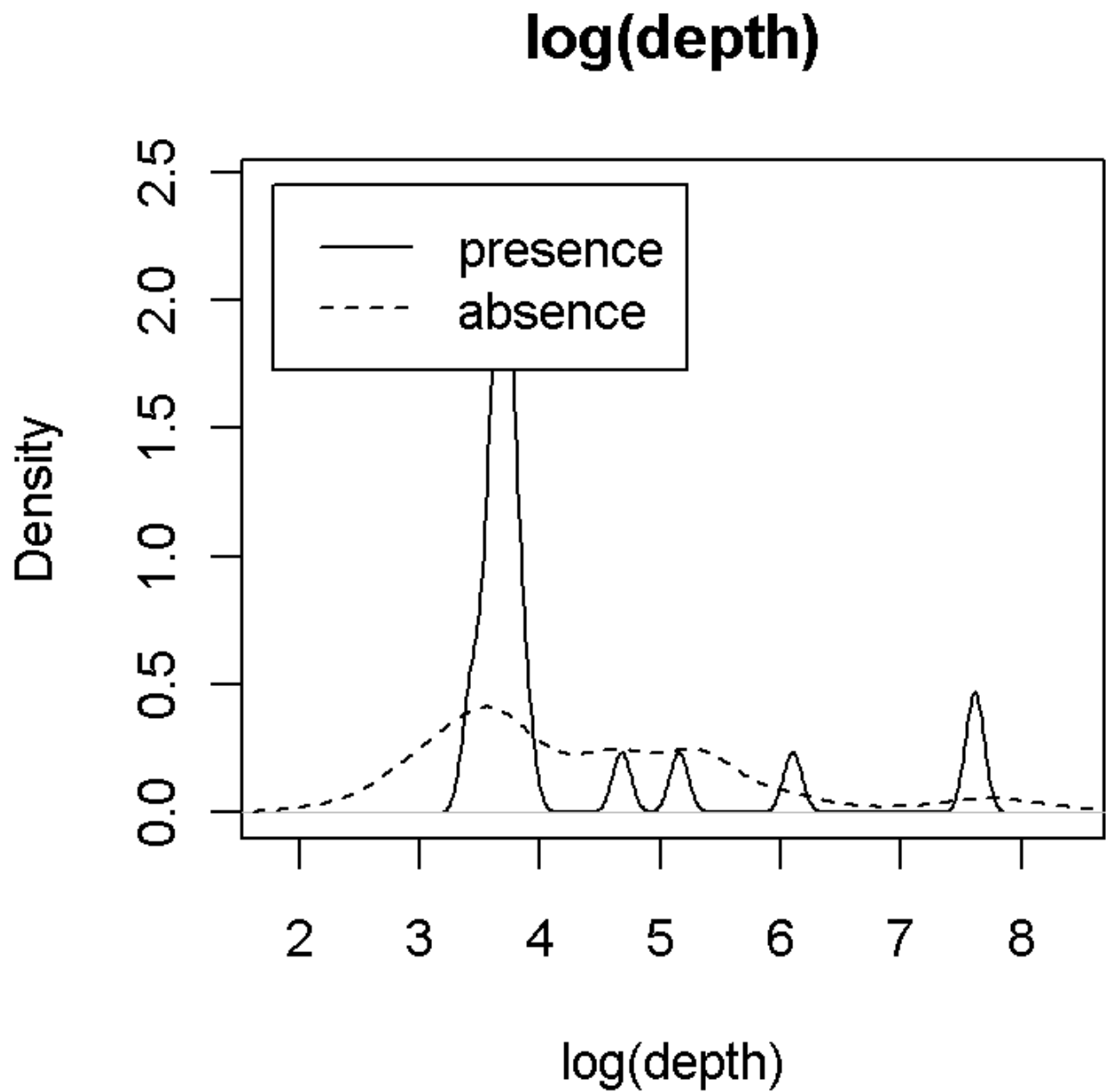


Figure 731: Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

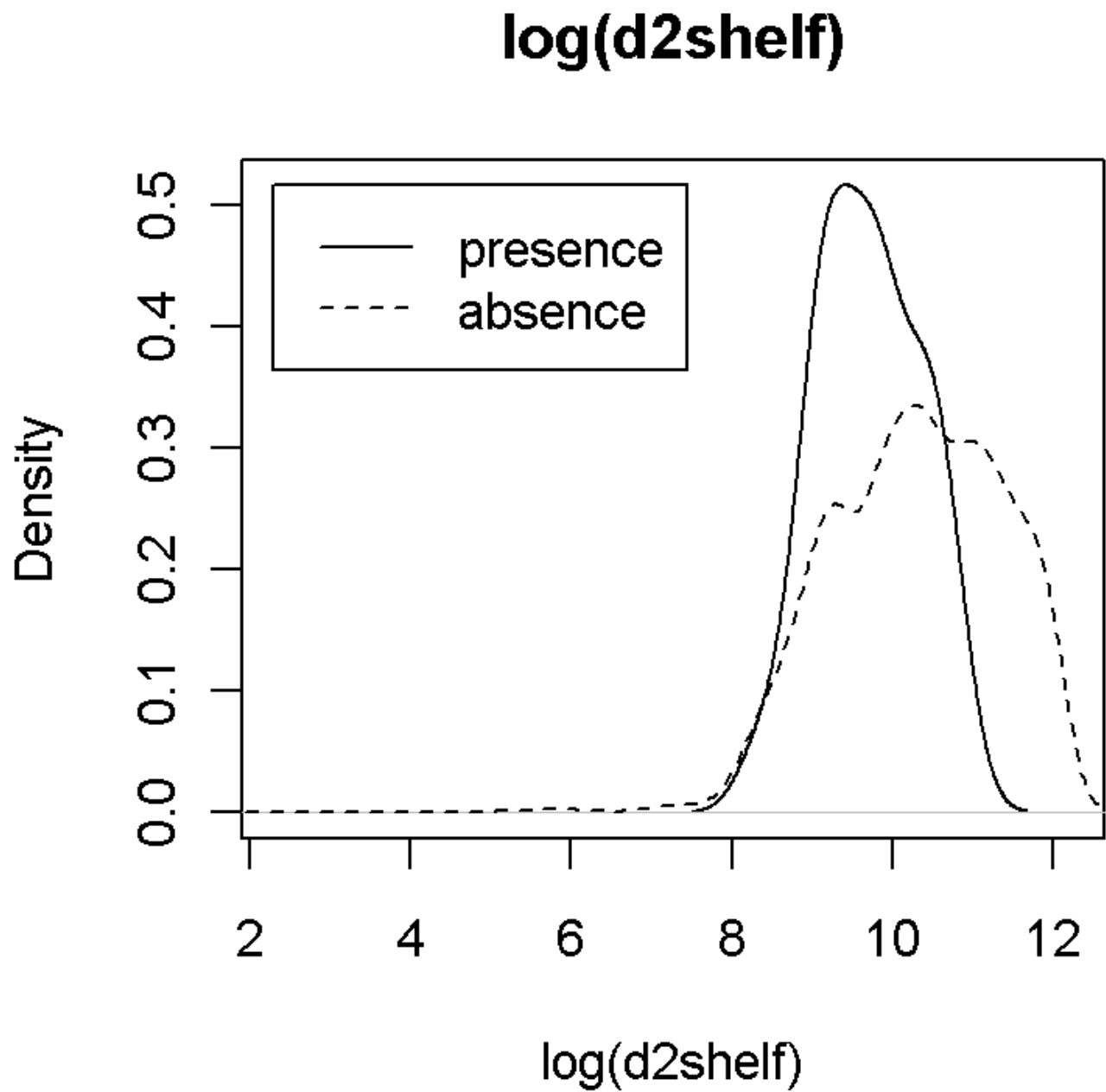


Figure 732: Density histogram of distance to shelf log(meters) for '*Stenella frontalis*' guild during 'fall' season in 'east2' region.

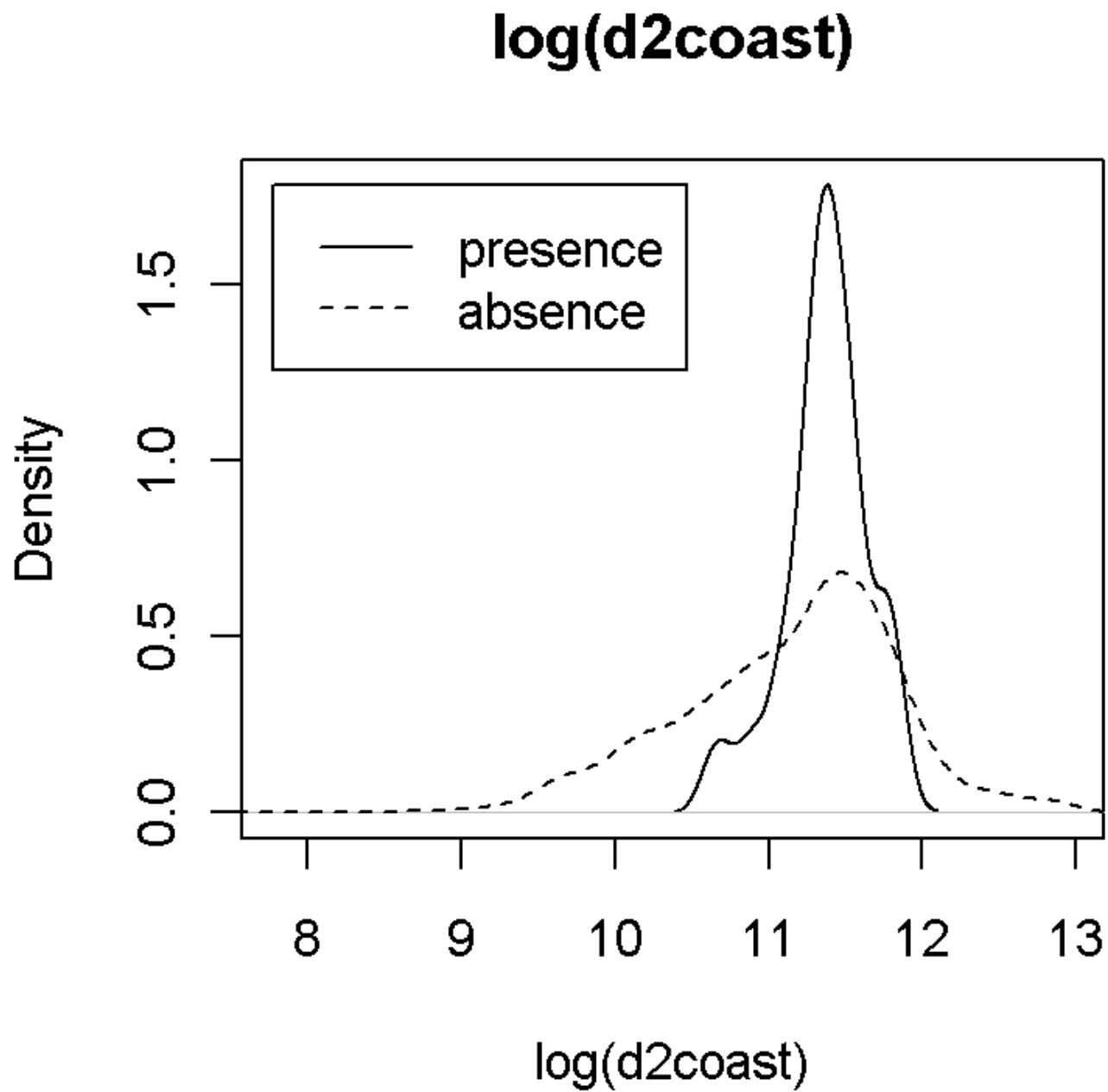


Figure 733: Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

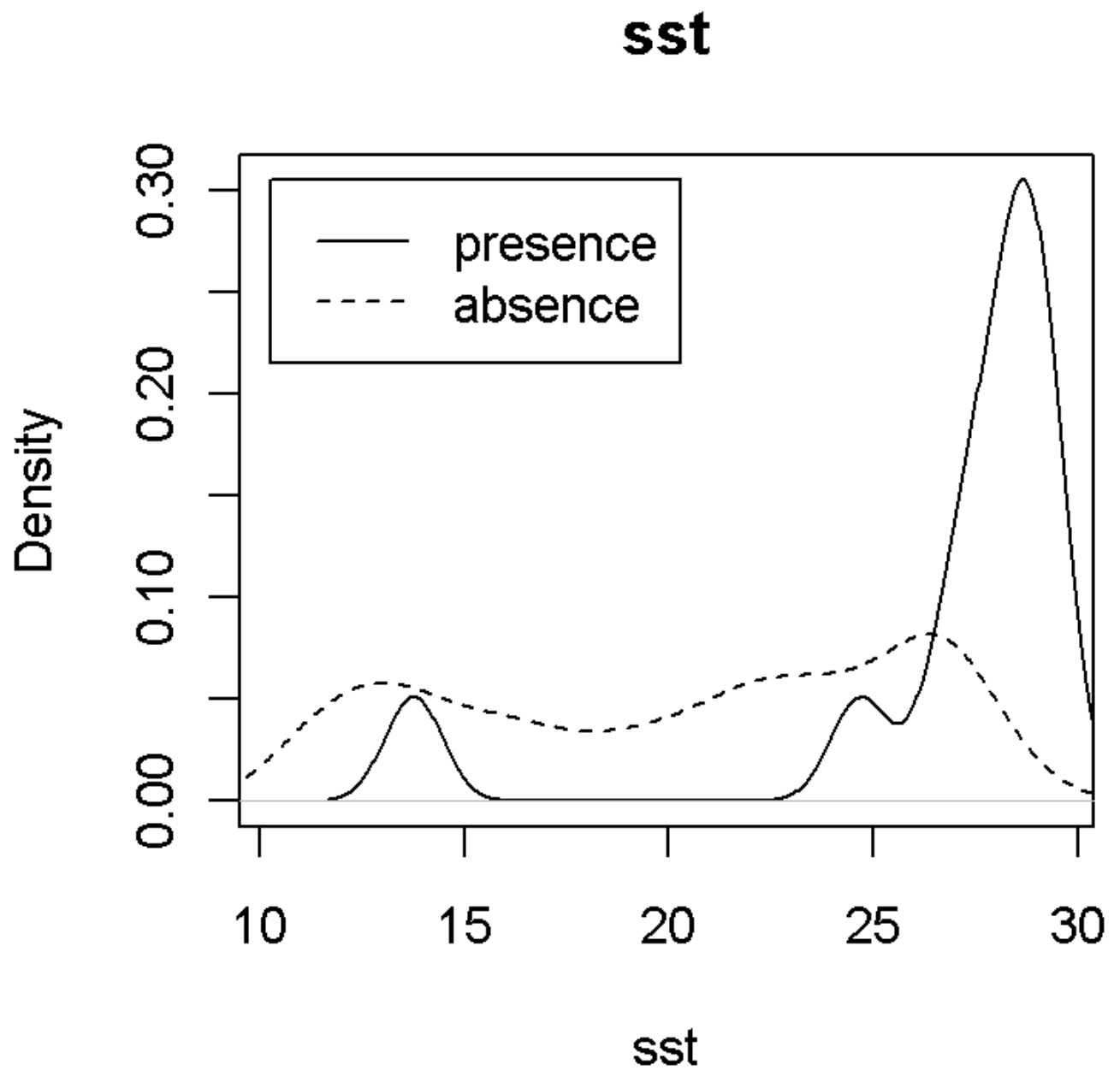


Figure 734: Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

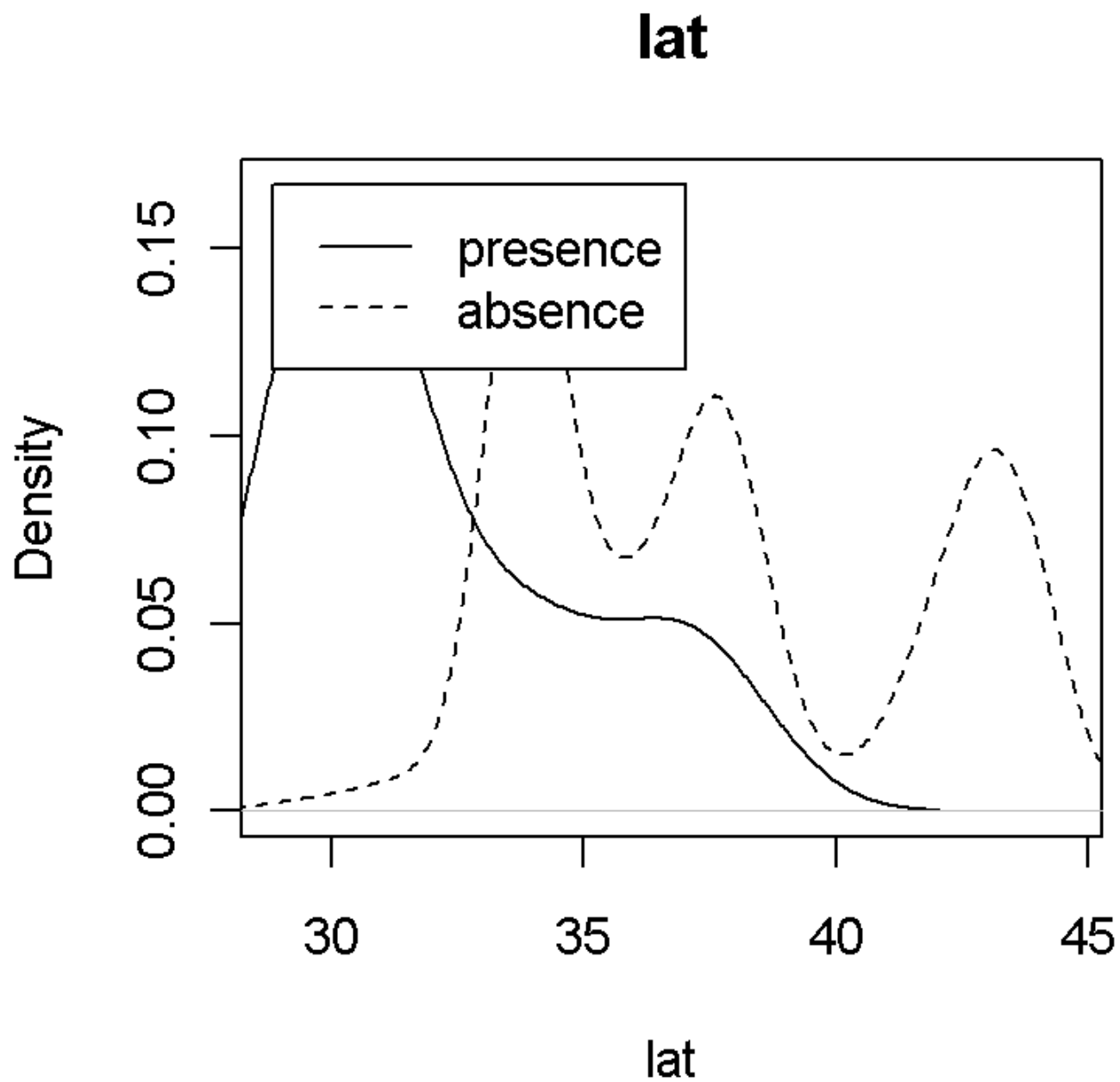


Figure 735: Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

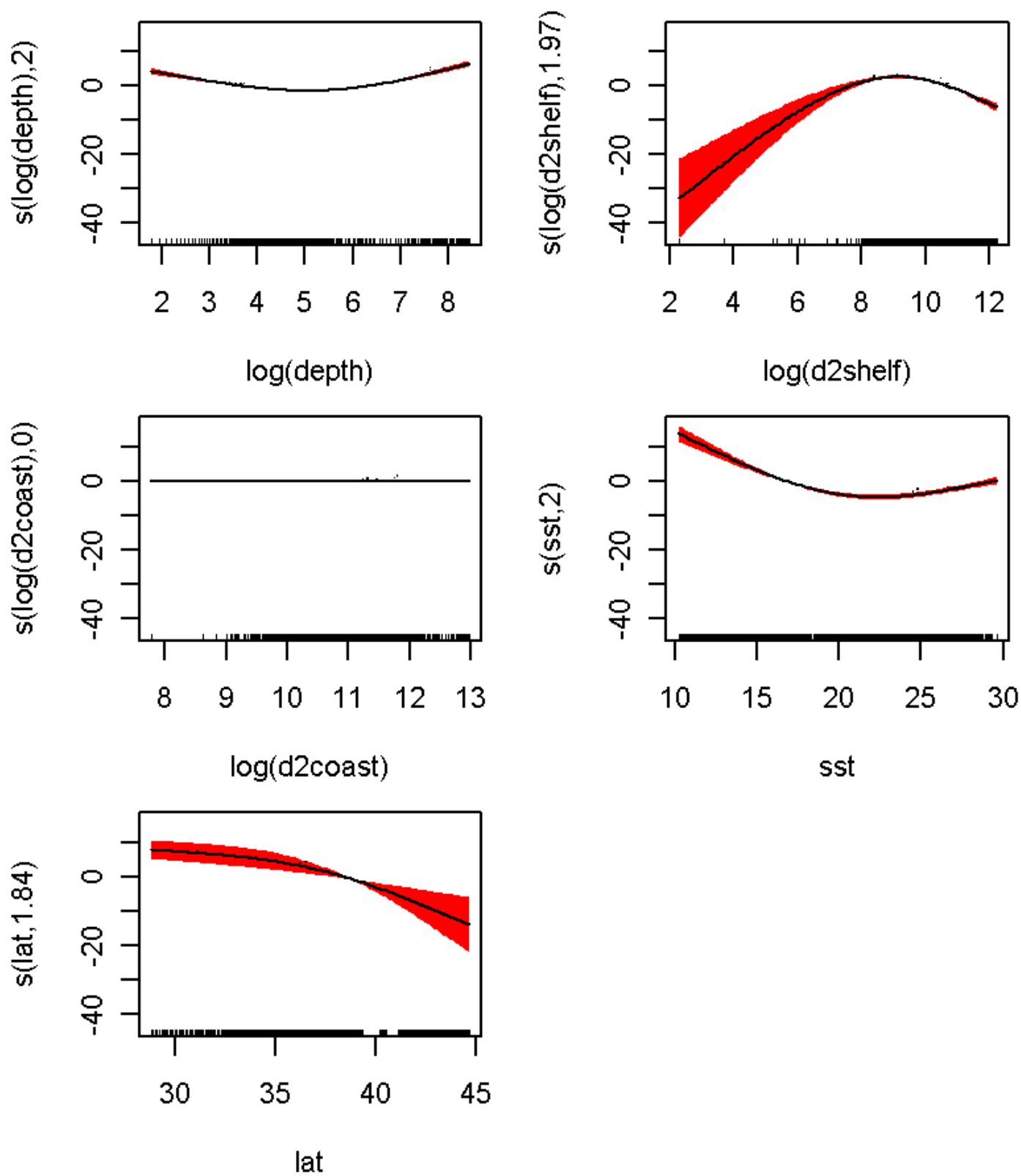


Figure 736: Terms plot of predictors to GAM model fit for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

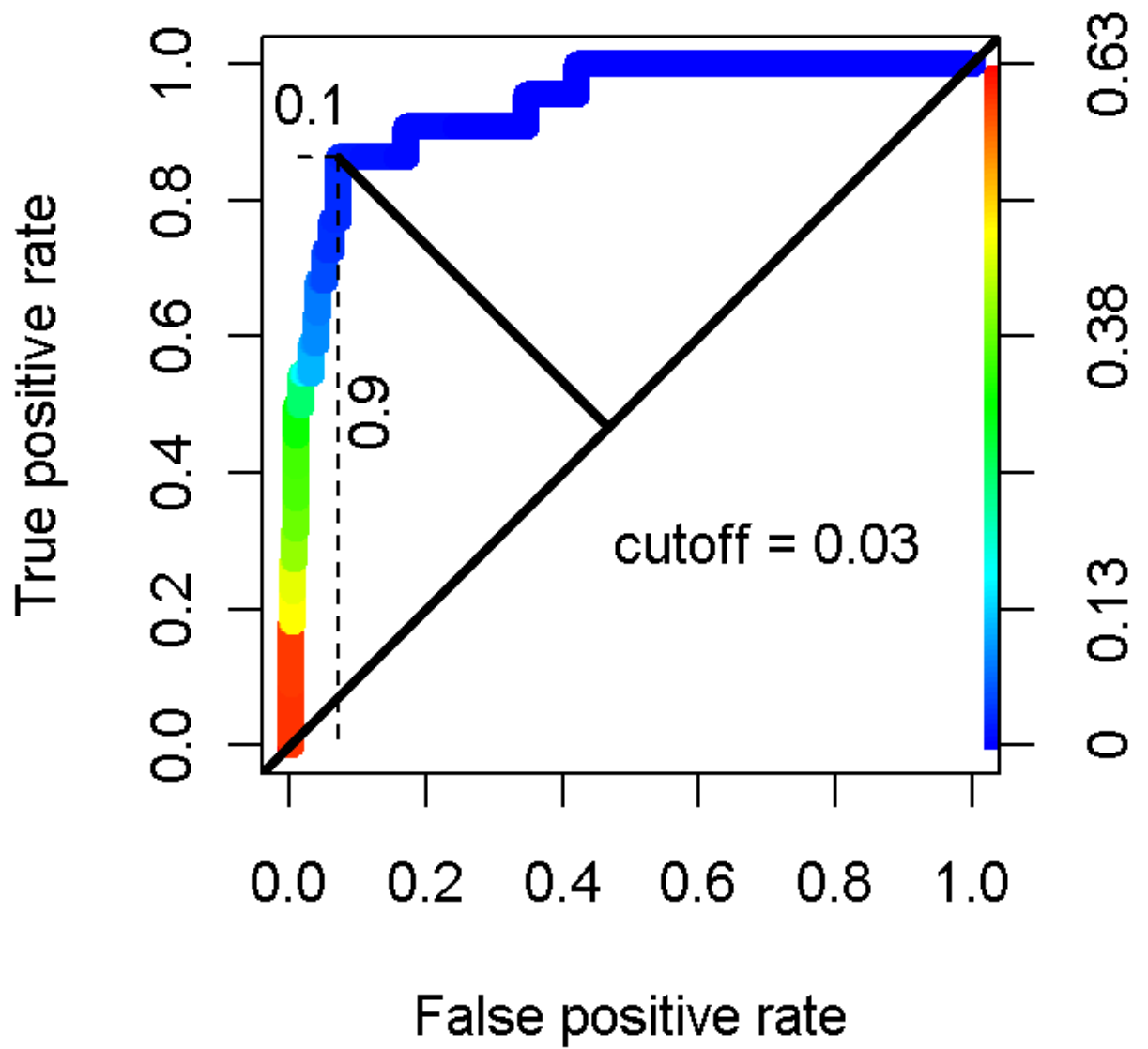


Figure 737: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella frontalis*' guild during 'fall' season in 'east2' region.

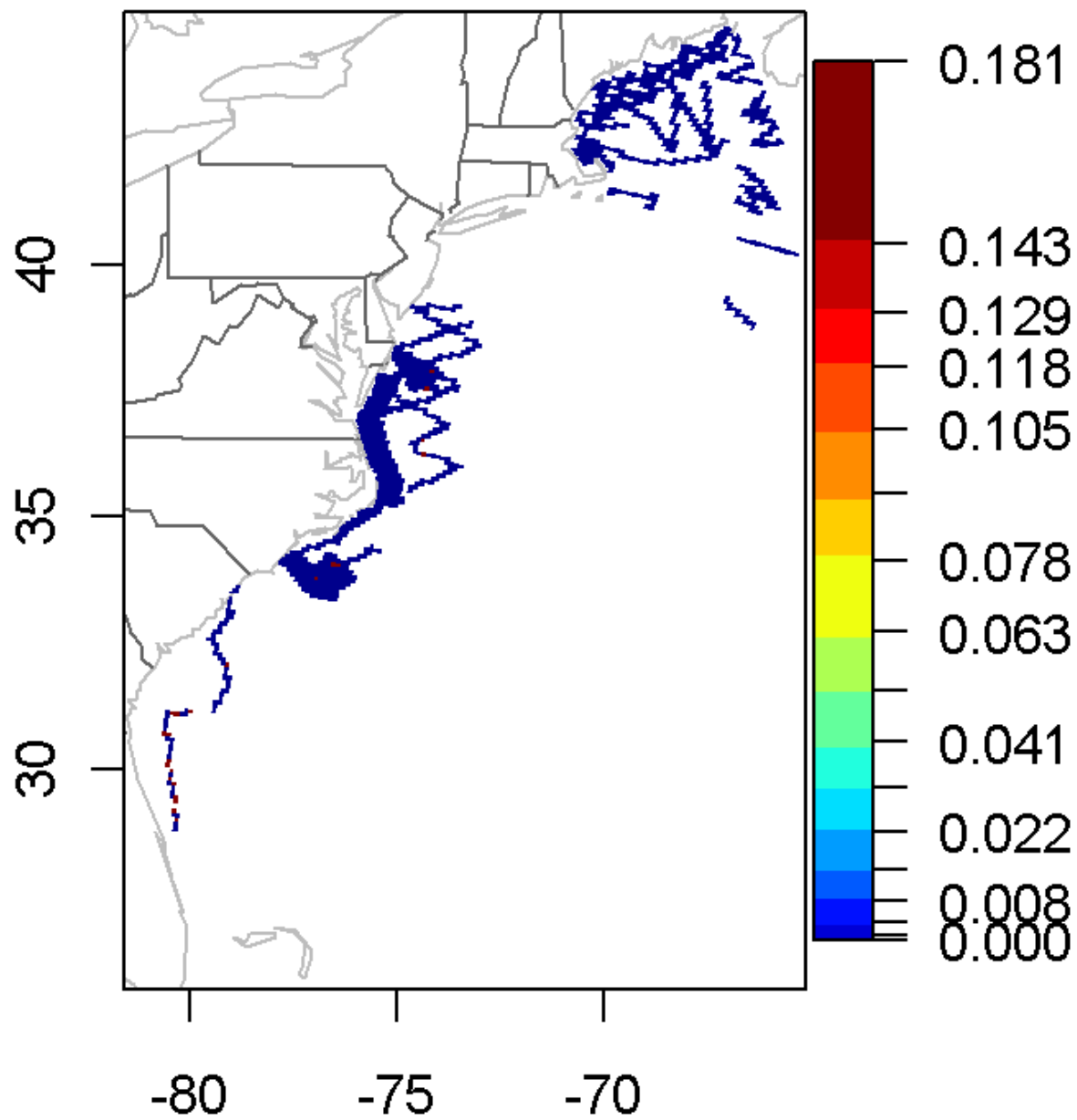


Figure 738: Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

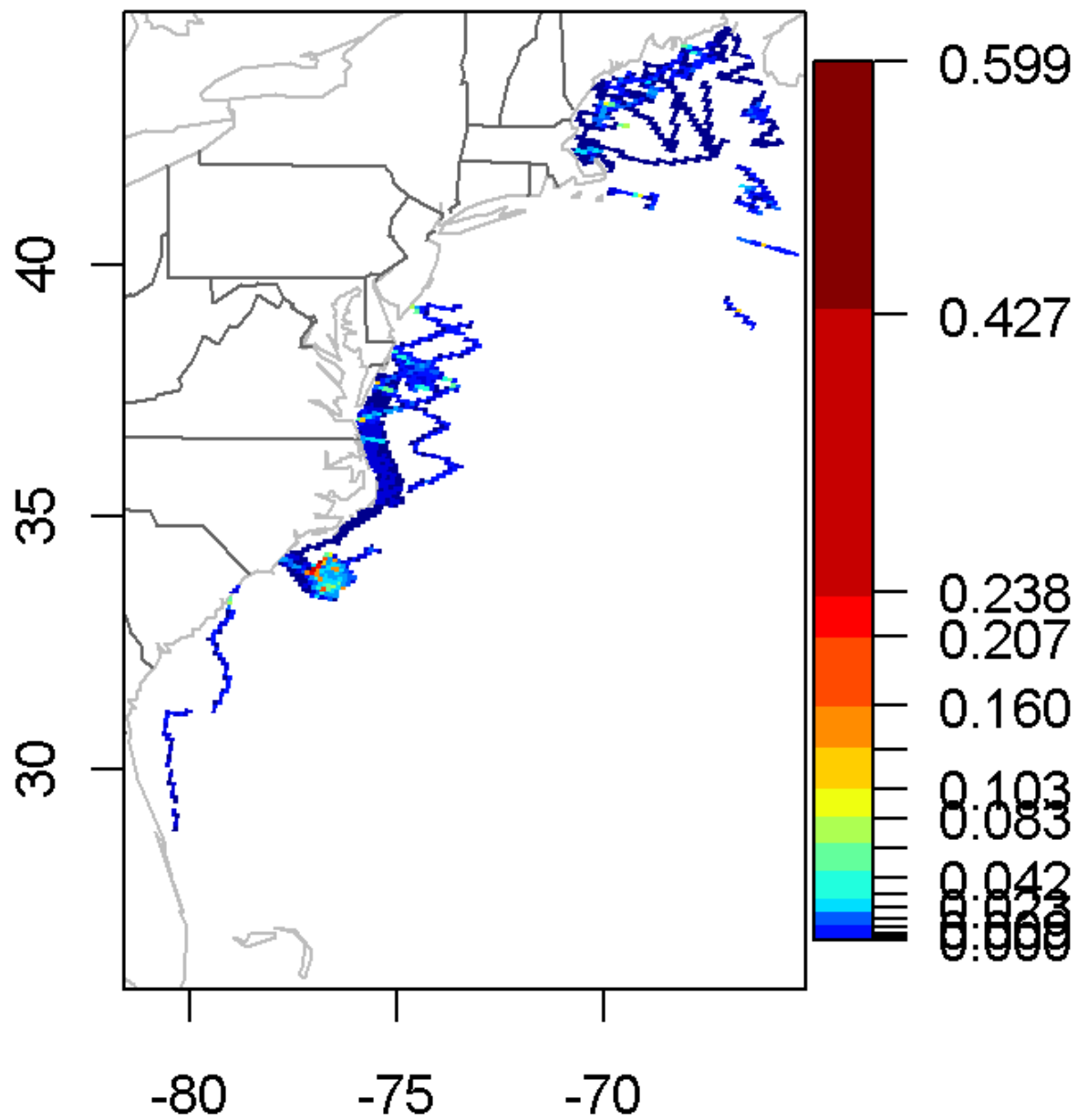


Figure 739: Map of effort(hours/km²) by cell summed through time for 'Stenella frontalis' guild during 'fall' season in 'east2' region.

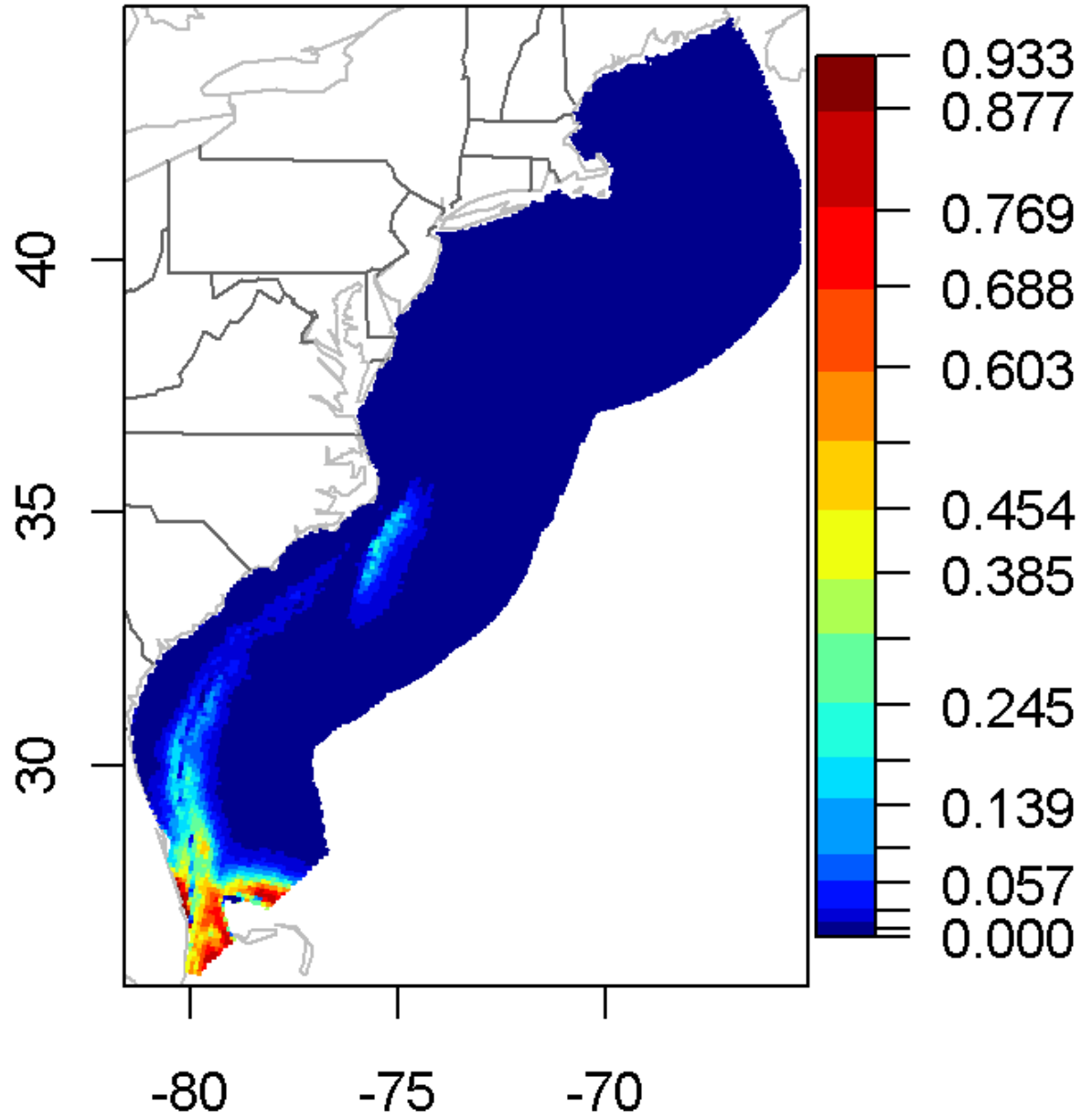


Figure 740: Map of mean predicted habitat for '*Stenella frontalis*' guild during 'fall' season in 'east2' region.

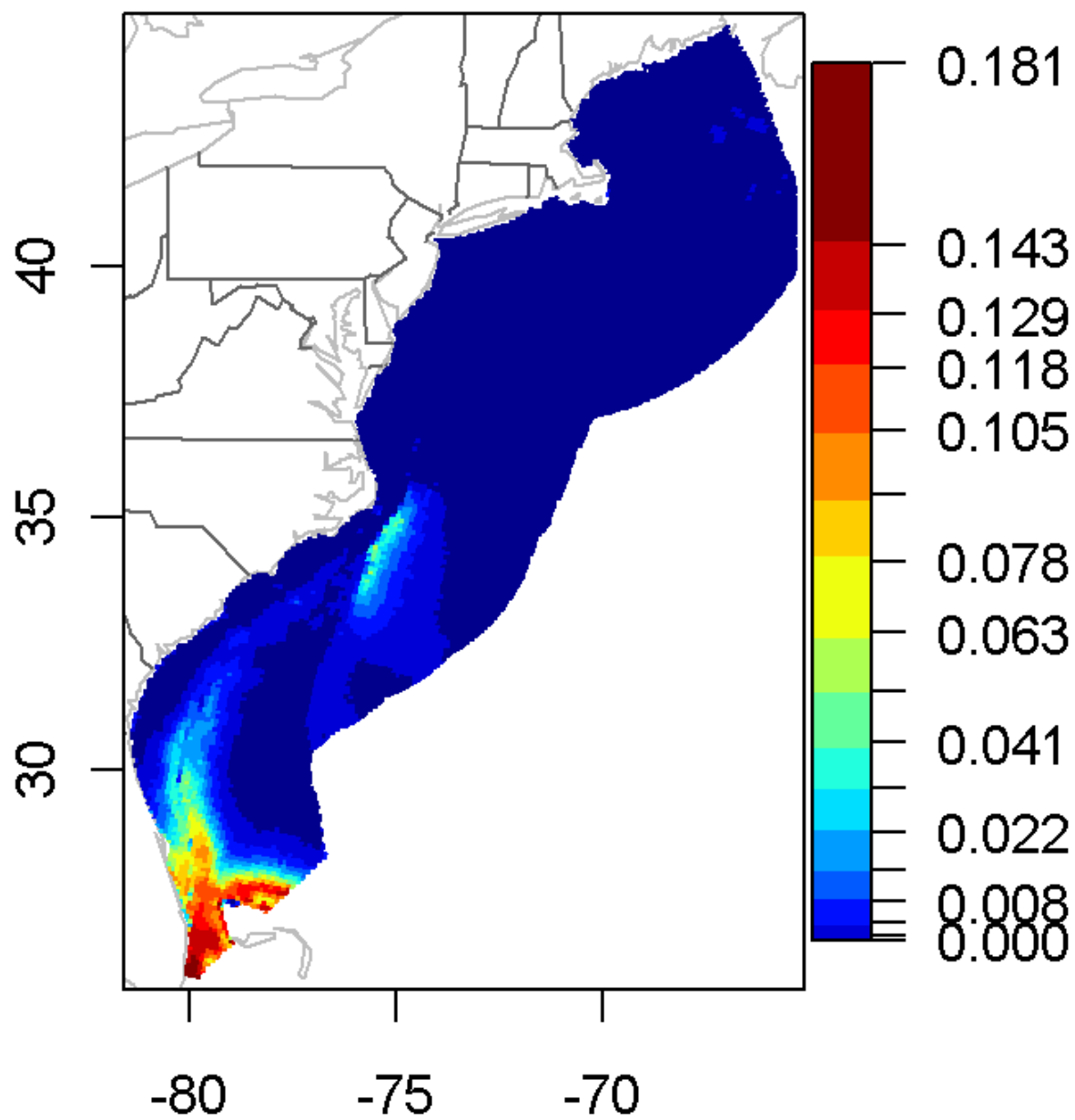


Figure 741: Map of standard error of habitat for '*Stenella frontalis*' guild during 'fall' season in 'east2' region.

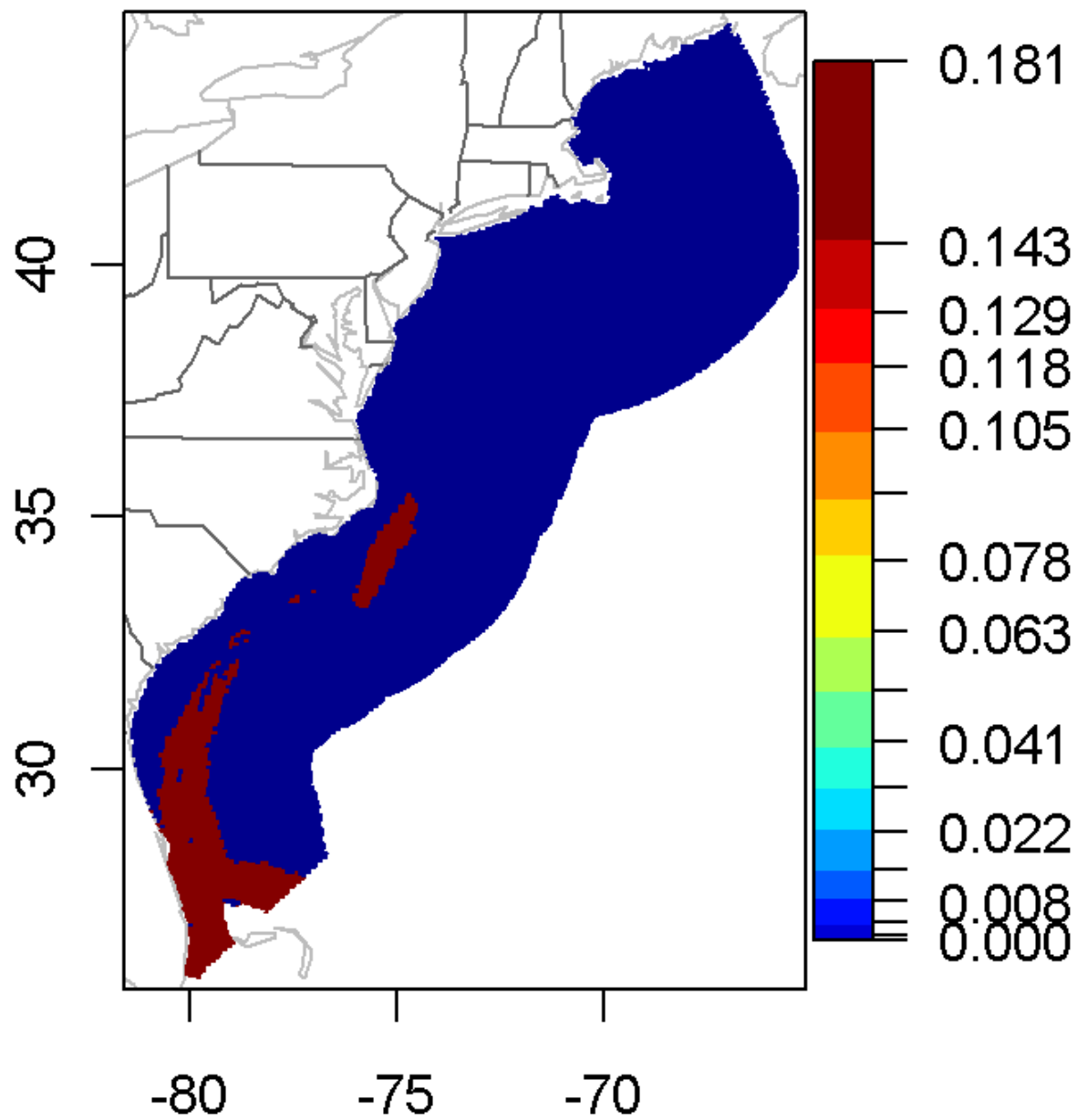


Figure 742: Map of binary habitat (cutoff determined by ROC) for '*Stenella frontalis*' guild during 'fall' season in 'east2' region.

15.1.2 gomex2

Modelrun identifier: duke_06_sf3_fall_gomex2

Date generated: 2008-10-21 11:40:00

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 69: Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

	Value
Number.presences	73
Number.absences	872
GAM.converged	TRUE
R.squared	-0.293357
Deviance.explained	0.153402
ROC.optimum	0.146437
Maximum.fit	0.0256421
Maximum.prediction	0.196969

Model text summary...

```

duke_06_sf3_fall_gomex2 run on Tue Oct 21 11:39:27 2008
  provider:duke, version:06, guild:Stenella frontalis (sf3), season:'fall', region:gomex2

max.fit:0.146437, max.prediction:0.196969, ROC.optimum:0.025642

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.3545      0.4178  -12.81   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  1.941e+00  2.441  15.774  1.35e-08 ***
s(log(d2shelf)) 9.537e-06  0.500  4.52e-05  0.9361
s(log(d2coast)) 7.128e-01  1.213   4.023  0.0373 *
s(sst)         1.359e-05  0.500  4.04e-04  0.8894
s(lat)         7.059e-01  1.206   3.912  0.0405 *
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  -0.293  Deviance explained = 15.3%
GCV score = 0.001768  Scale est. = 0.0017533  n = 945

summary(dat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:945  Min.   : 445  Min.   : 5.0  Min.   : 272  Min.   : 7624  Min.   :26.55  Min.   :24.99
      1st Qu.:4911  1st Qu.: 34.0  1st Qu.: 16509  1st Qu.: 58082  1st Qu.:28.35  1st Qu.:27.82
      Median :6184  Median : 78.0  Median : 35259  Median : 96847  Median :28.73  Median :28.52
      Mean   :5818  Mean   :271.2  Mean   : 48230  Mean   :104429  Mean   :28.76  Mean   :28.43
      3rd Qu.:7227  3rd Qu.:292.0  3rd Qu.: 69013  3rd Qu.:142239  3rd Qu.:29.17  3rd Qu.:29.18
      Max.   :8350  Max.   :3301.0  Max.   :185683  Max.   :276406  Max.   :30.52  Max.   :30.35

summary(newdat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :24.52  Min.   :23.85
      1st Qu.:1861  1st Qu.: 46.0  1st Qu.: 31617  1st Qu.: 85289  1st Qu.:26.62  1st Qu.:26.28
      Median :4110  Median : 433.5  Median : 71100  Median :157258  Median :27.23  Median :27.29

```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:27.10	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:27.60	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:28.80	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:1.092e-10	Min.	:3.778e-10	Min.	:0.000e+00	Min.	:8.387e-06	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:8.757e-09	1st Qu.	:2.357e-08	1st Qu.	:0.000e+00	1st Qu.	:2.380e-03	1st Qu.	:0.0000
Median	:4110	Median	:4.233e-04	Median	:3.697e-04	Median	:0.000e+00	Median	:4.635e-03	Median	:0.0000
Mean	:3997	Mean	:2.669e-02	Mean	:5.044e-03	Mean	:9.047e-02	Mean	:8.436e-03	Mean	:0.3216
3rd Qu.	:6015	3rd Qu.	:4.532e-02	3rd Qu.	:8.116e-03	3rd Qu.	:0.000e+00	3rd Qu.	:6.374e-03	3rd Qu.	:1.0000
Max.	:8351	Max.	:1.970e-01	Max.	:4.654e-02	Max.	:2.000e+00	Max.	:1.241e-01	Max.	:1.0000
						NA's	:5.843e+03	NA's	:5.843e+03		

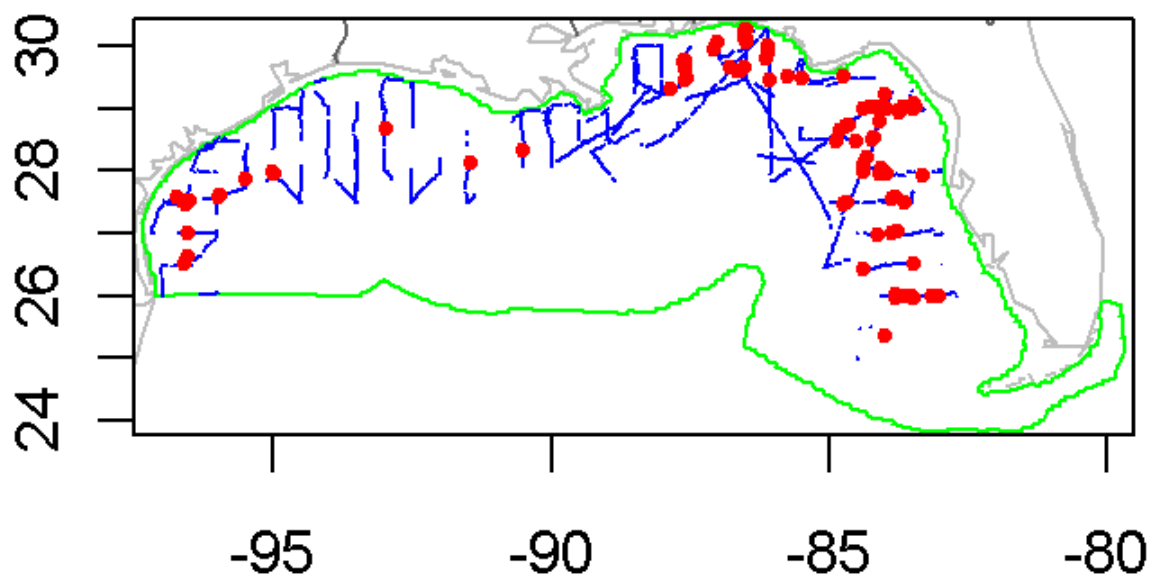


Figure 743: Map of points of observational sightings and tracks of survey effort for '*Stenella frontalis*' guild during 'fall' season in 'gomex2' region.

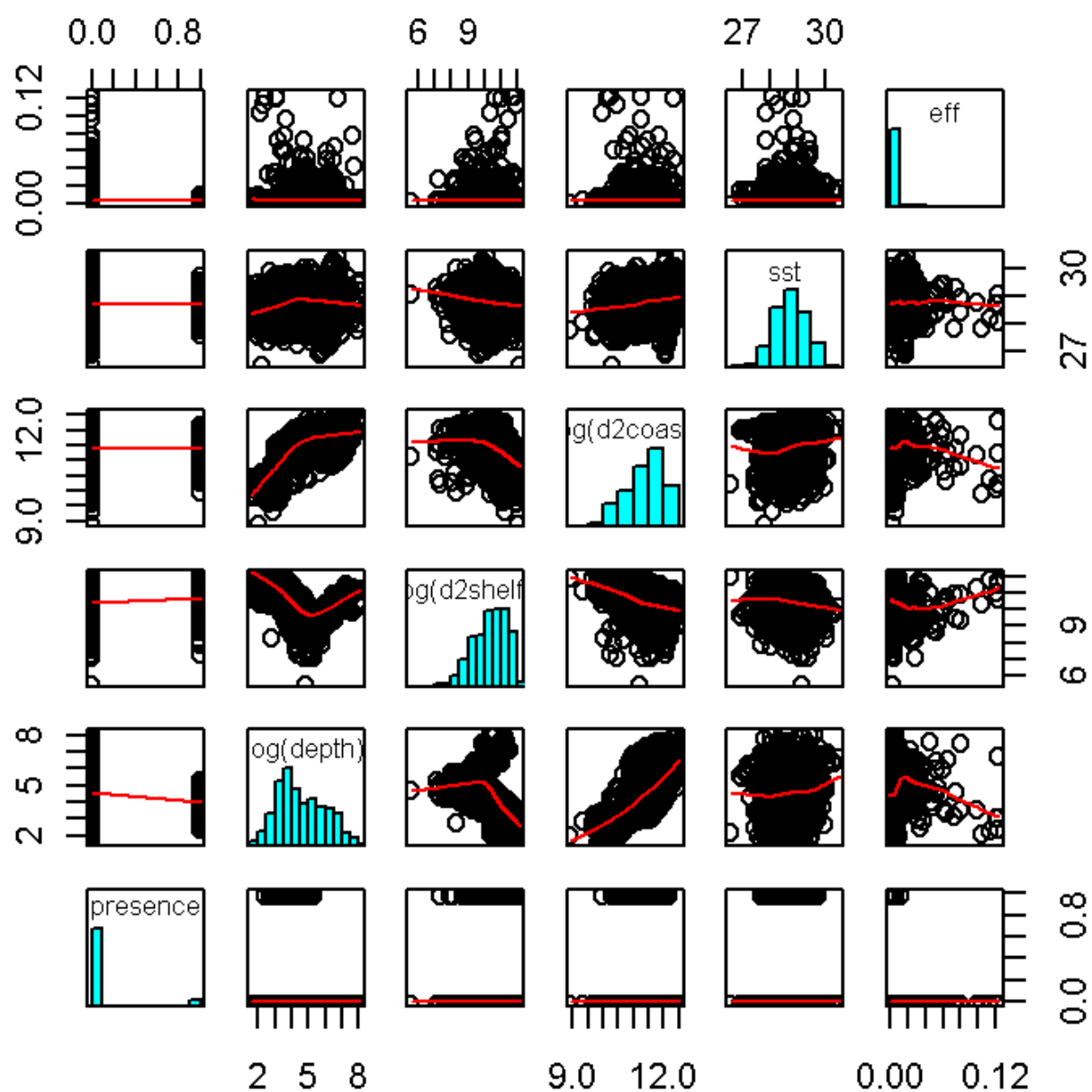


Figure 744: Pairs plot of input variables for '*Stenella frontalis*' guild during 'fall' season in 'gomex2' region.

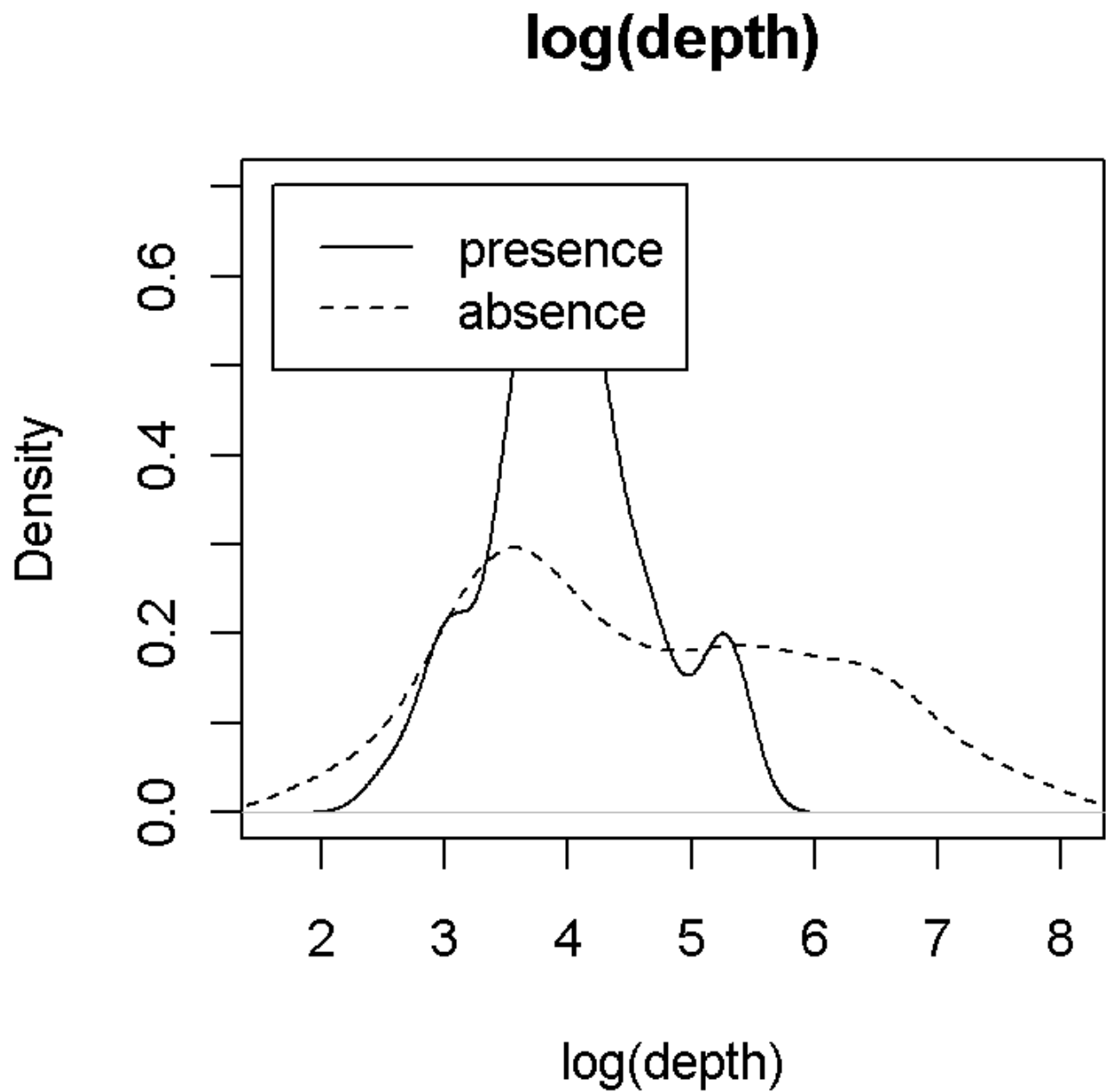


Figure 745: Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

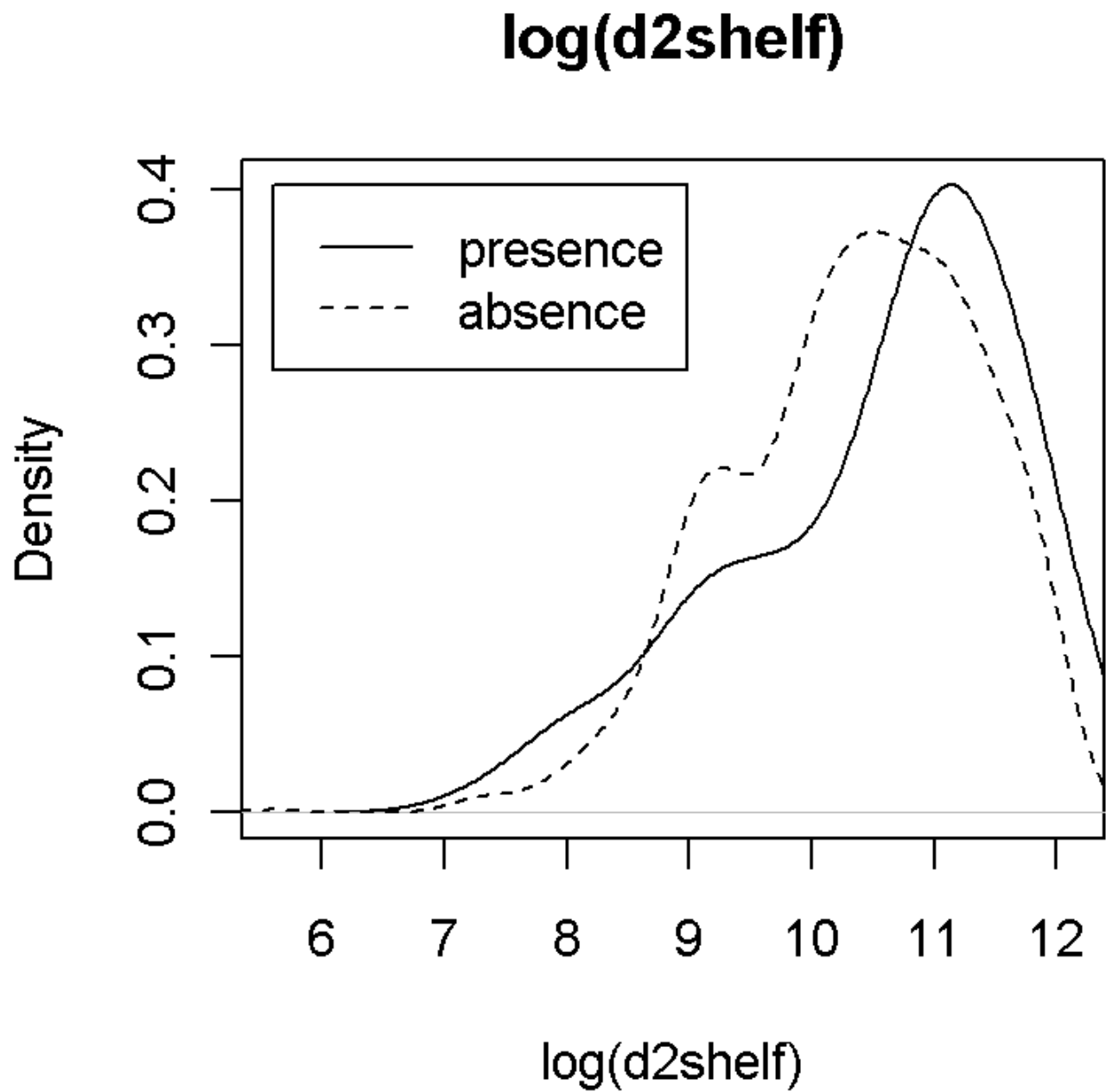


Figure 746: Density histogram of distance to shelf log(meters) for '*Stenella frontalis*' guild during 'fall' season in 'gomex2' region.

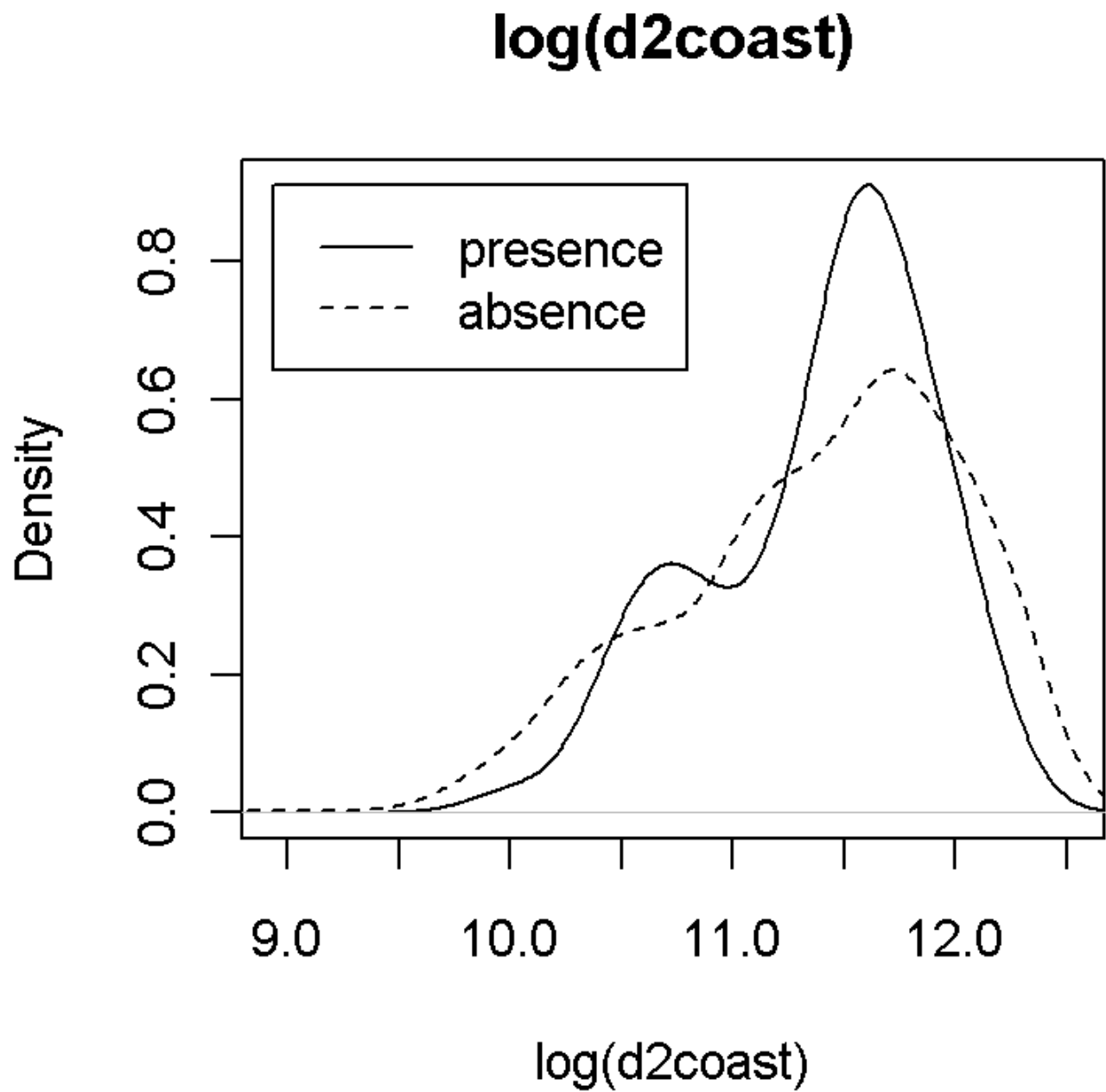


Figure 747: Density histogram of distance to coast log(meters) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

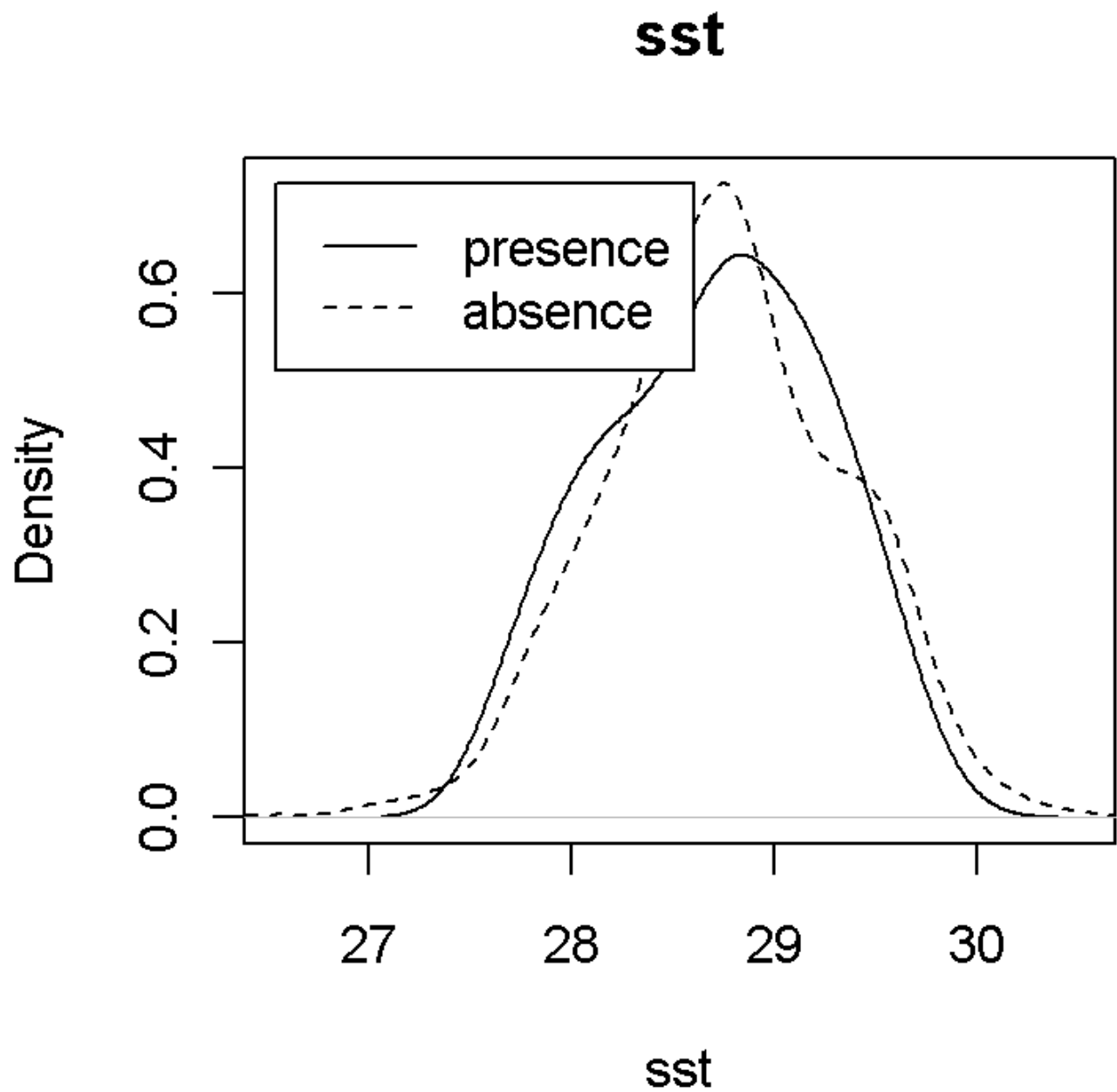


Figure 748: Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

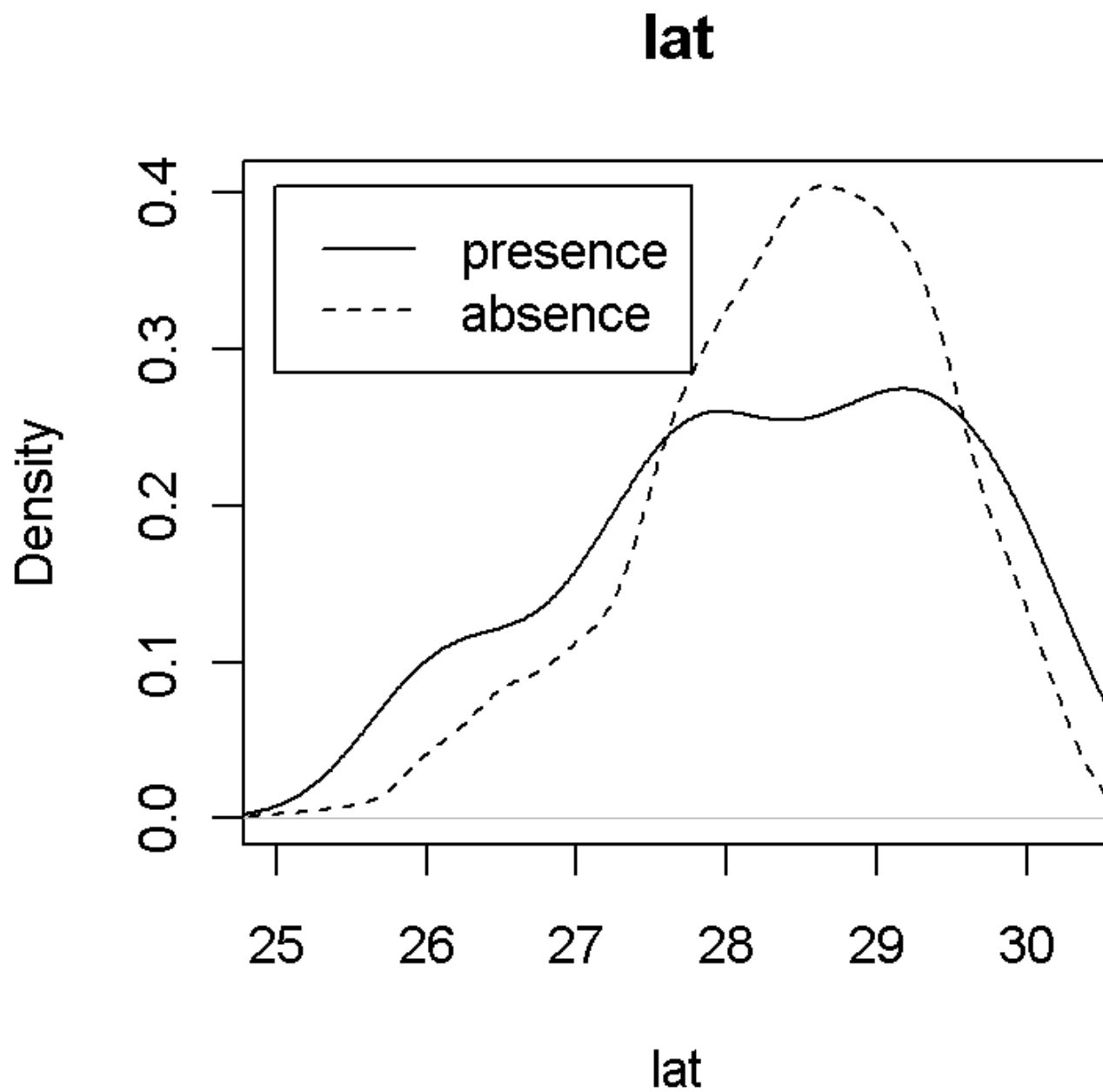


Figure 749: Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

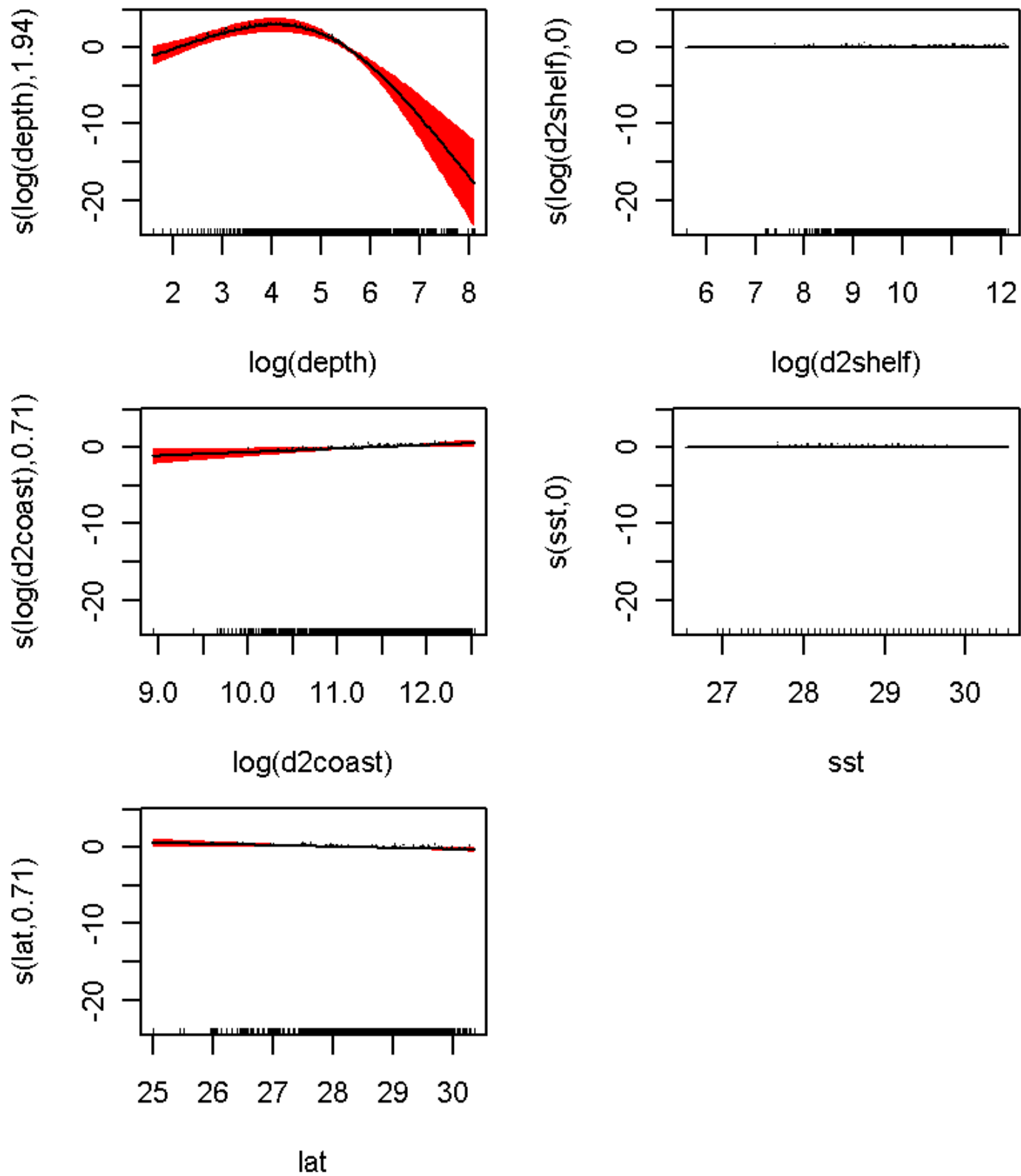


Figure 750: Terms plot of predictors to GAM model fit for '*Stenella frontalis*' guild during 'fall' season in 'gomex2' region.

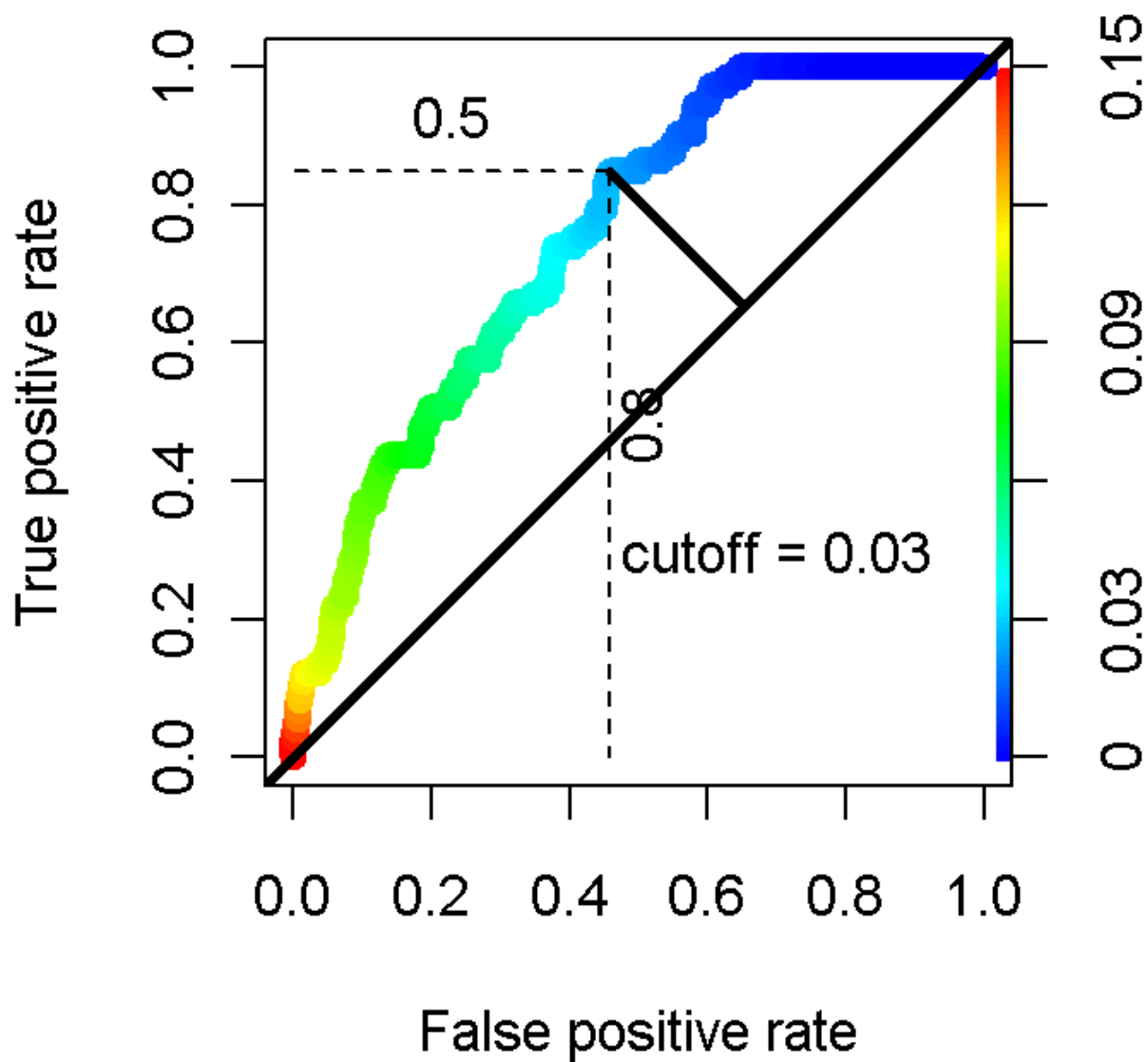


Figure 751: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella frontalis*' guild during 'fall' season in 'gomex2' region.

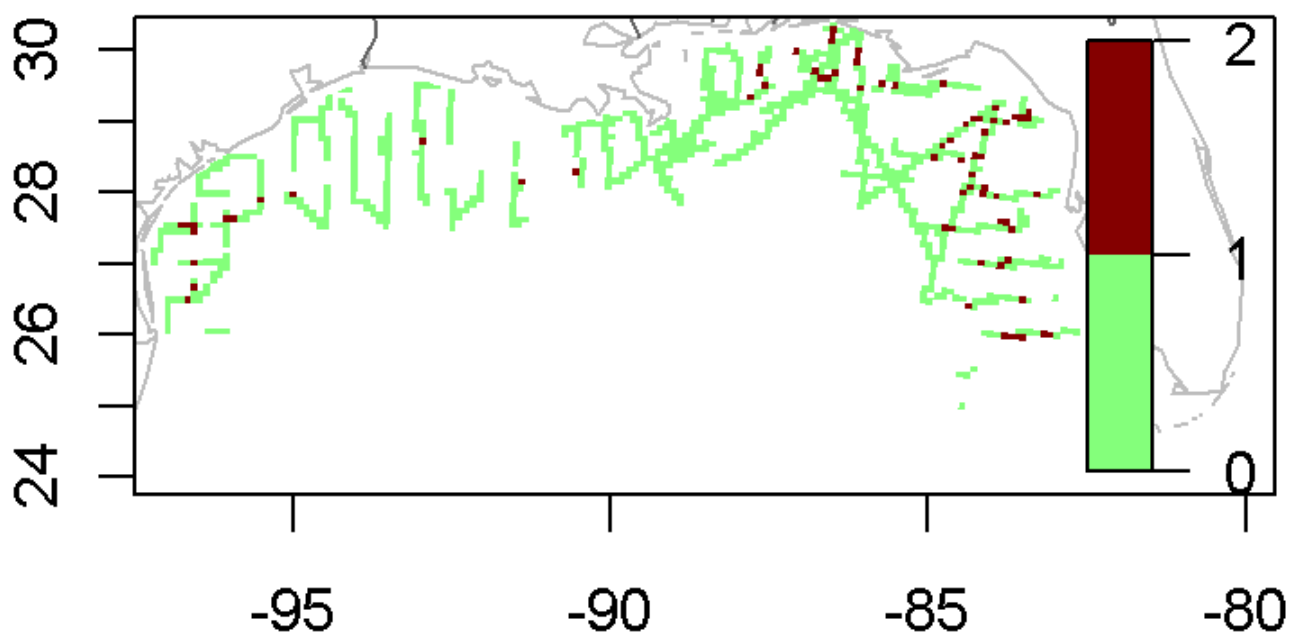


Figure 752: Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

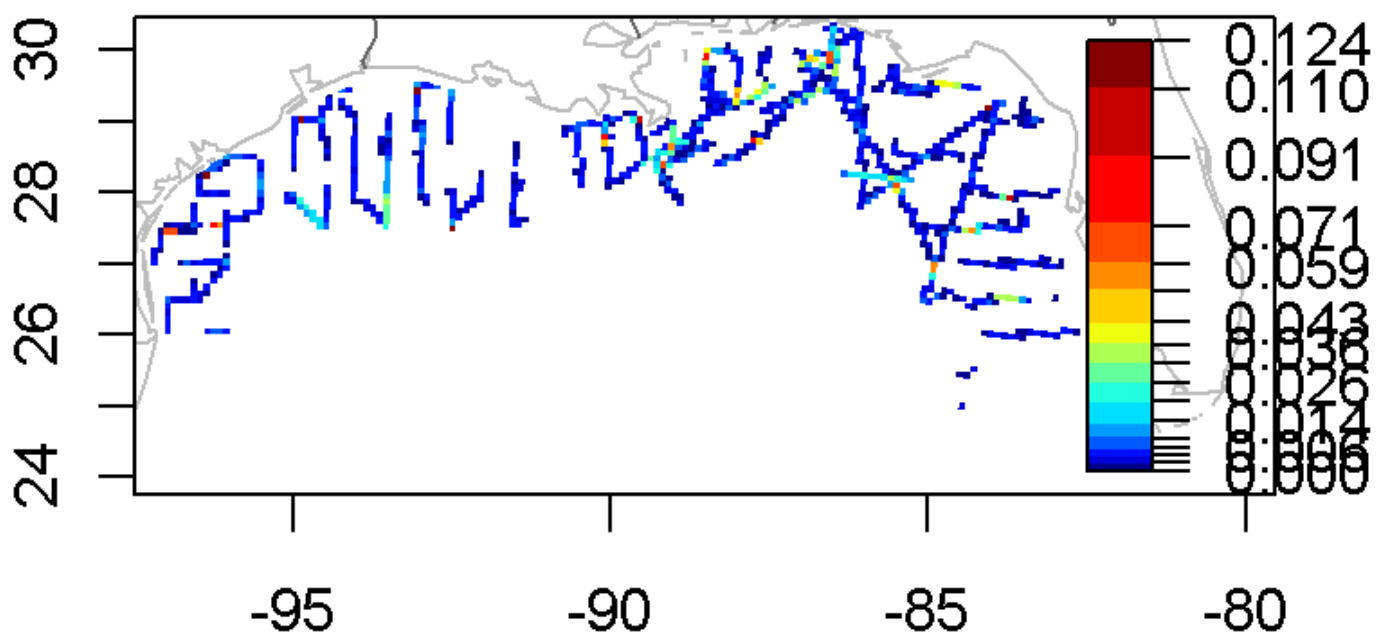


Figure 753: Map of effort(hours/km²) by cell summed through time for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

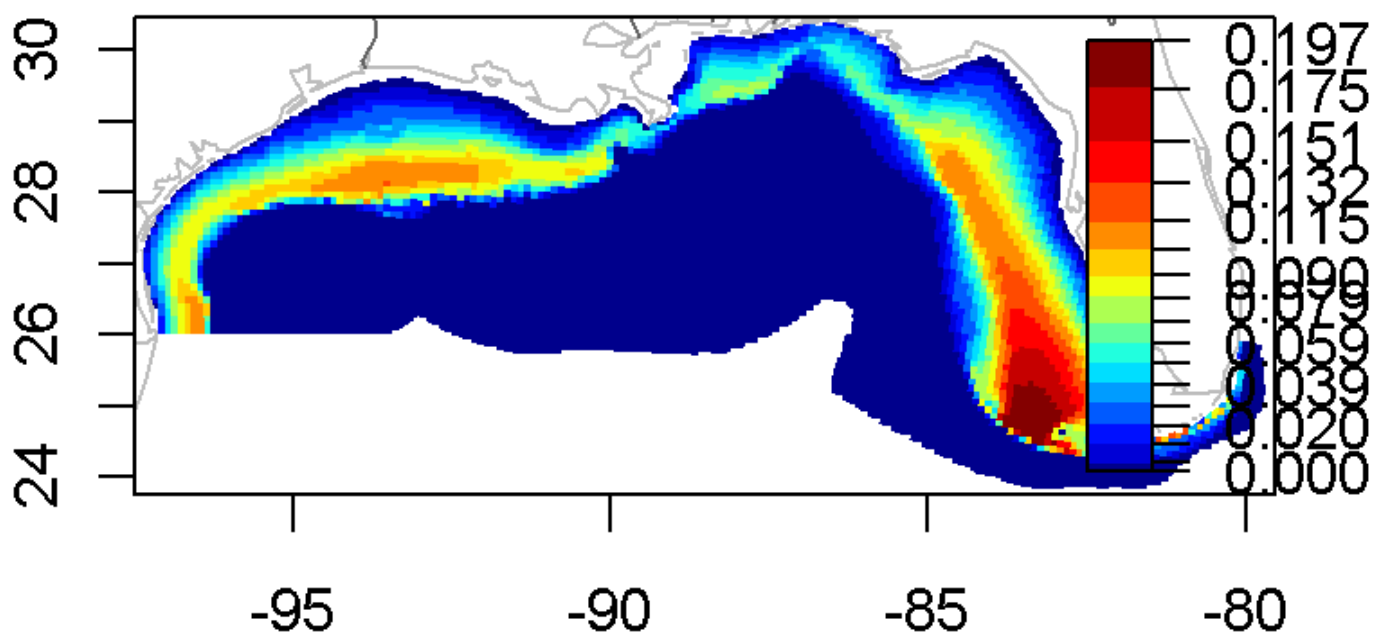


Figure 754: Map of mean predicted habitat for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

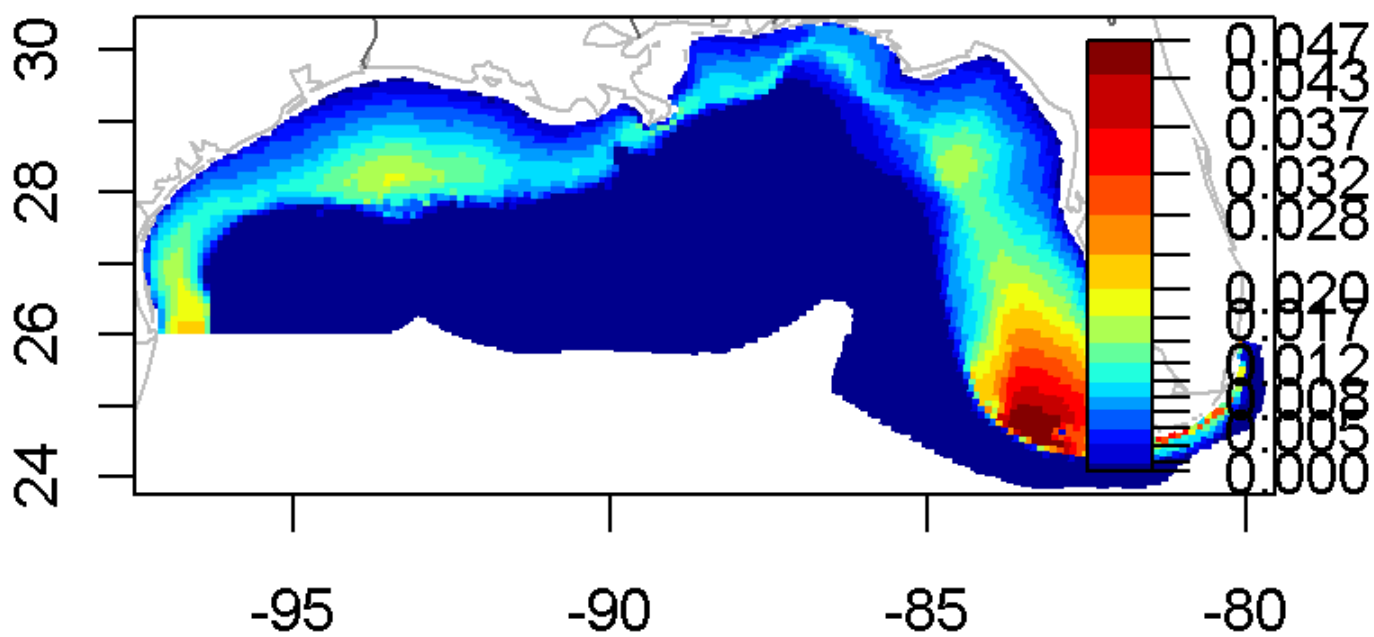


Figure 755: Map of standard error of habitat for 'Stenella frontalis' guild during 'fall' season in 'gomex2' region.

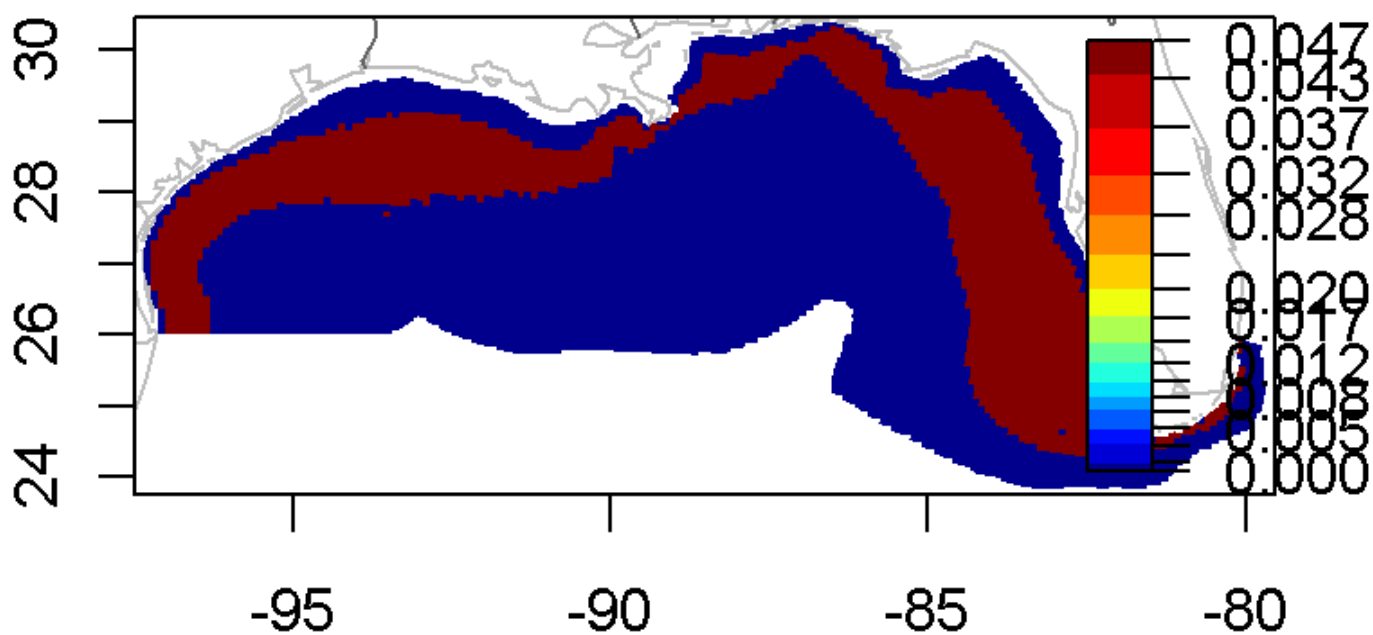


Figure 756: Map of binary habitat (cutoff determined by ROC) for '*Stenella frontalis*' guild during 'fall' season in 'gomex2' region.

15.2 spring

15.2.1 east2

Modelrun identifier: duke_06_sf3_spring_east2

Date generated: 2008-10-21 14:49:21

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 70: Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'spring' season in 'east2' region.

	Value
Number.presences	6
Number.absences	2867
GAM.converged	TRUE
R.squared	-0.0119318
Deviance.explained	0.0537107
ROC.optimum	0.0299423
Maximum.fit	0.00107772
Maximum.prediction	0.0343284

Model text summary...

```
duke_06_sf3_spring_east2 run on Tue Oct 21 14:47:54 2008
provider:duke, version:06, guild:Stenella frontalis (sf3), season:'spring', region:east2

max.fit:0.029942, max.prediction:0.034328, ROC.optimum:0.001078

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -6.96364    0.08908  -78.18   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  4.854e-07  0.500  1.53e-06    0.973
s(log(d2shelf)) 4.988e-07  0.500  1.41e-05    0.952
s(log(d2coast)) 4.088e-07  0.500  3.76e-06    0.966
s(sst)          8.986e-01  1.399   15.08  1.02e-05 ***
s(lat)          9.464e-01  1.446   40.78  6.77e-14 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  -0.0119  Deviance explained = 5.37%
GCV score = 5.2802e-05  Scale est. = 5.2694e-05  n = 2490

summary(dat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1087  Min.    : 1654  Min.    :  4.0  Min.    :  995  Min.    : 1471  Min.    :  4.886  Min.    :26.17
se2:1786  1st Qu.:10323  1st Qu.: 20.0  1st Qu.:13946  1st Qu.:32021  1st Qu.:13.386  1st Qu.:33.83
          Median :10844  Median : 29.0  Median :31680  Median :52718  Median :17.732  Median :34.55
          Mean   : 9852  Mean   :236.4  Mean   :41188  Mean   :60965  Mean   :16.976  Mean   :34.44
          3rd Qu.:11293  3rd Qu.: 45.0  3rd Qu.:56624  3rd Qu.:75007  3rd Qu.:20.903  3rd Qu.:35.66
          Max.    :15889  Max.    :5270.0  Max.    :329182  Max.    :420801  Max.    :26.475  Max.    :42.39
                   NA's      : 6      NA's      : 6      NA's      :378.000

summary(newdat)...
region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.    : 1633  Min.    :  4  Min.    :  5  Min.    :1259  Min.    : 2.850  Min.    :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042  1st Qu.:89304  1st Qu.: 9.675  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :20.025	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.626	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.575	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :26.175	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :1.097e-05  Min.   :4.563e-06  Min.   :0.000e+00  Min.   :2.601e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:1.107e-04  1st Qu.:2.579e-05  1st Qu.:0.000e+00  1st Qu.:5.086e-04  1st Qu.:0.0000
Median :11616  Median :7.536e-04  Median :1.025e-04  Median :0.000e+00  Median :3.743e-03  Median :0.0000
Mean   :11171  Mean   :2.929e-03  Mean   :5.301e-04  Mean   :6.141e-03  Mean   :1.009e-02  Mean   :0.4563
3rd Qu.:14088  3rd Qu.:3.398e-03  3rd Qu.:3.618e-04  3rd Qu.:0.000e+00  3rd Qu.:9.634e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :3.433e-02  Max.   :1.008e-02  Max.   :1.000e+00  Max.   :2.202e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.911e+03  NA's :8.911e+03
```

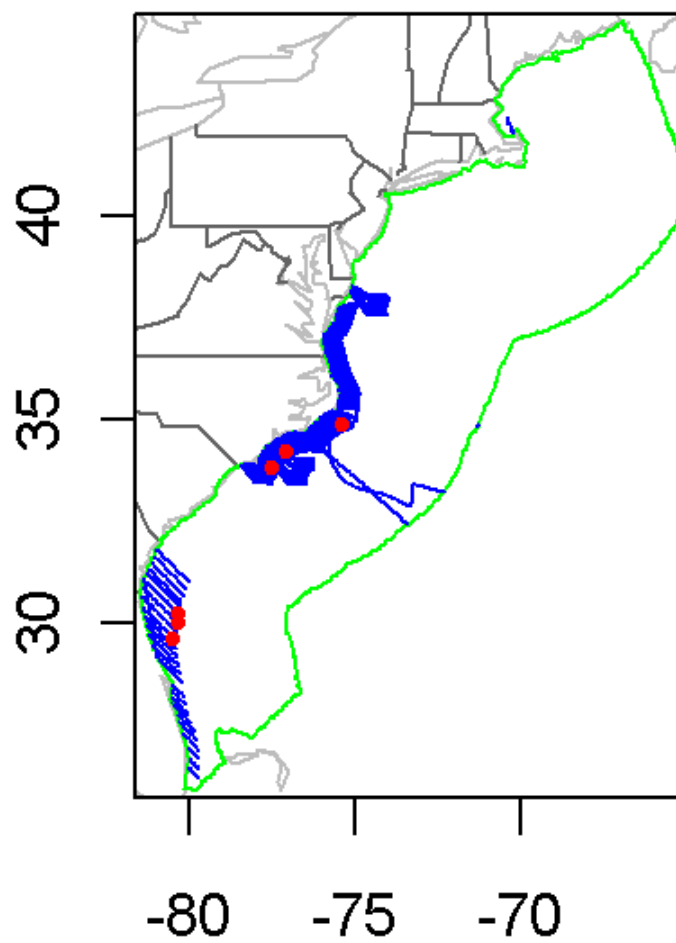


Figure 757: Map of points of observational sightings and tracks of survey effort for '*Stenella frontalis*' guild during 'spring' season in 'east2' region.

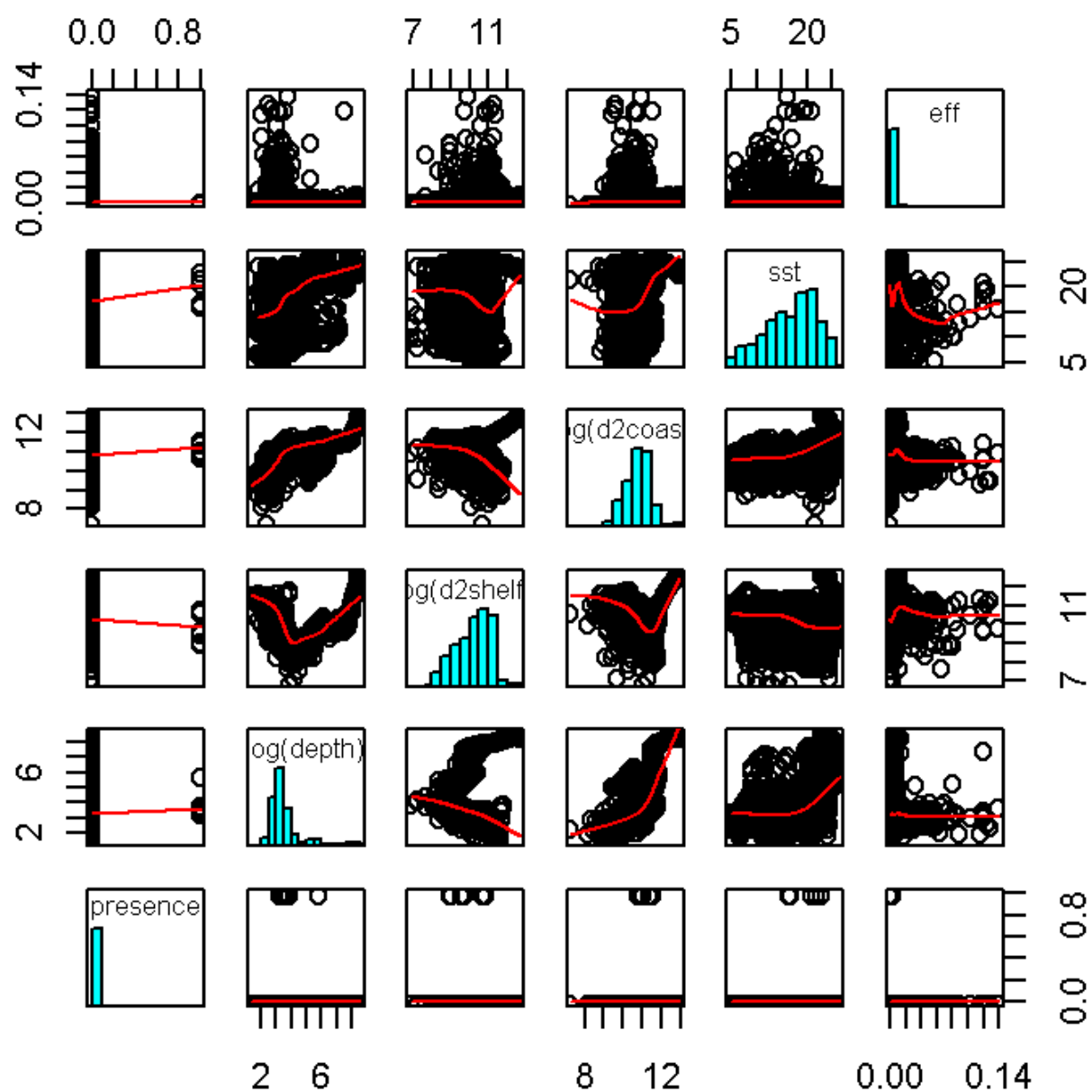


Figure 758: Pairs plot of input variables for 'Stenella frontalis' guild during 'spring' season in 'east2' region.

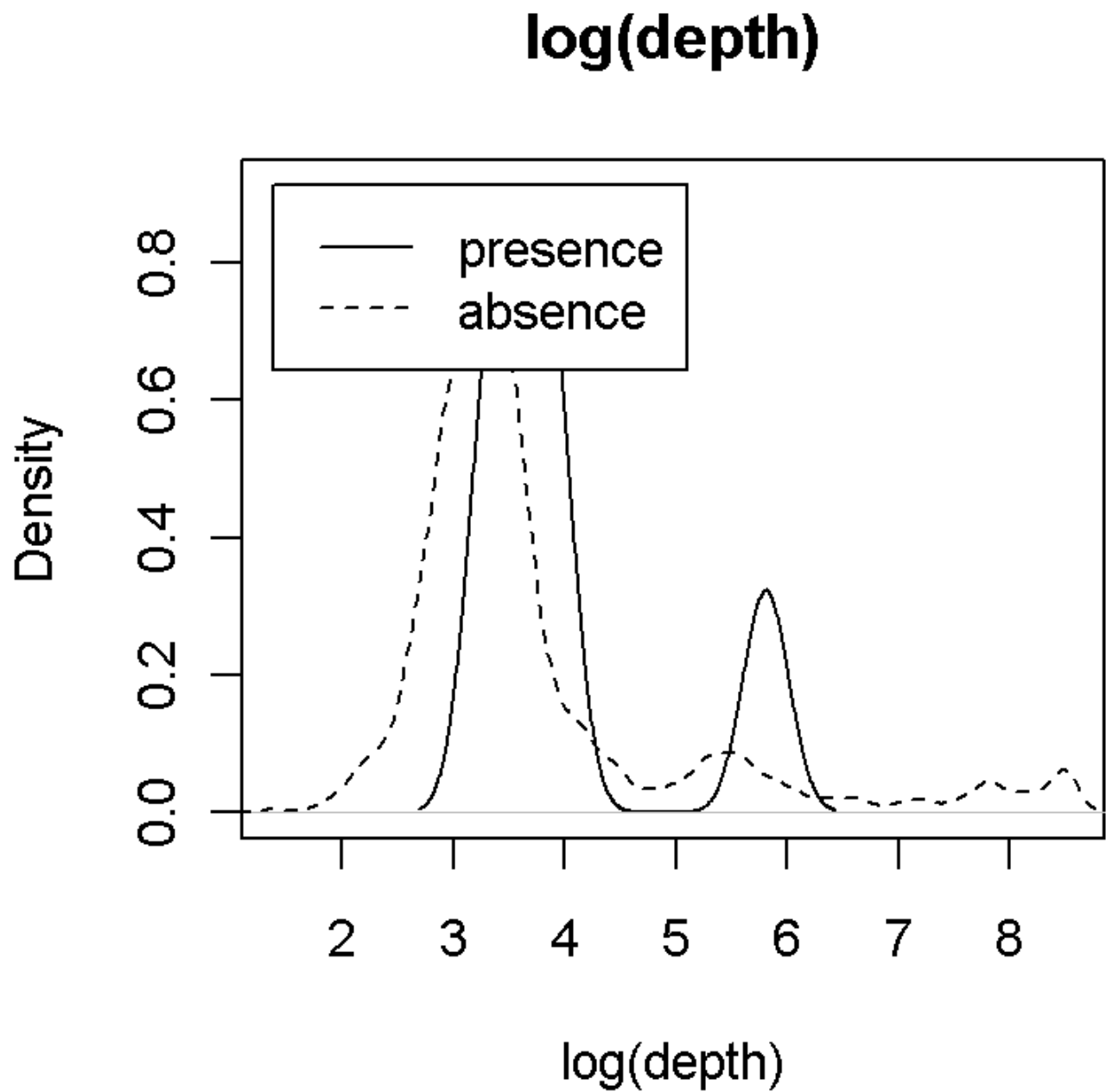


Figure 759: Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.

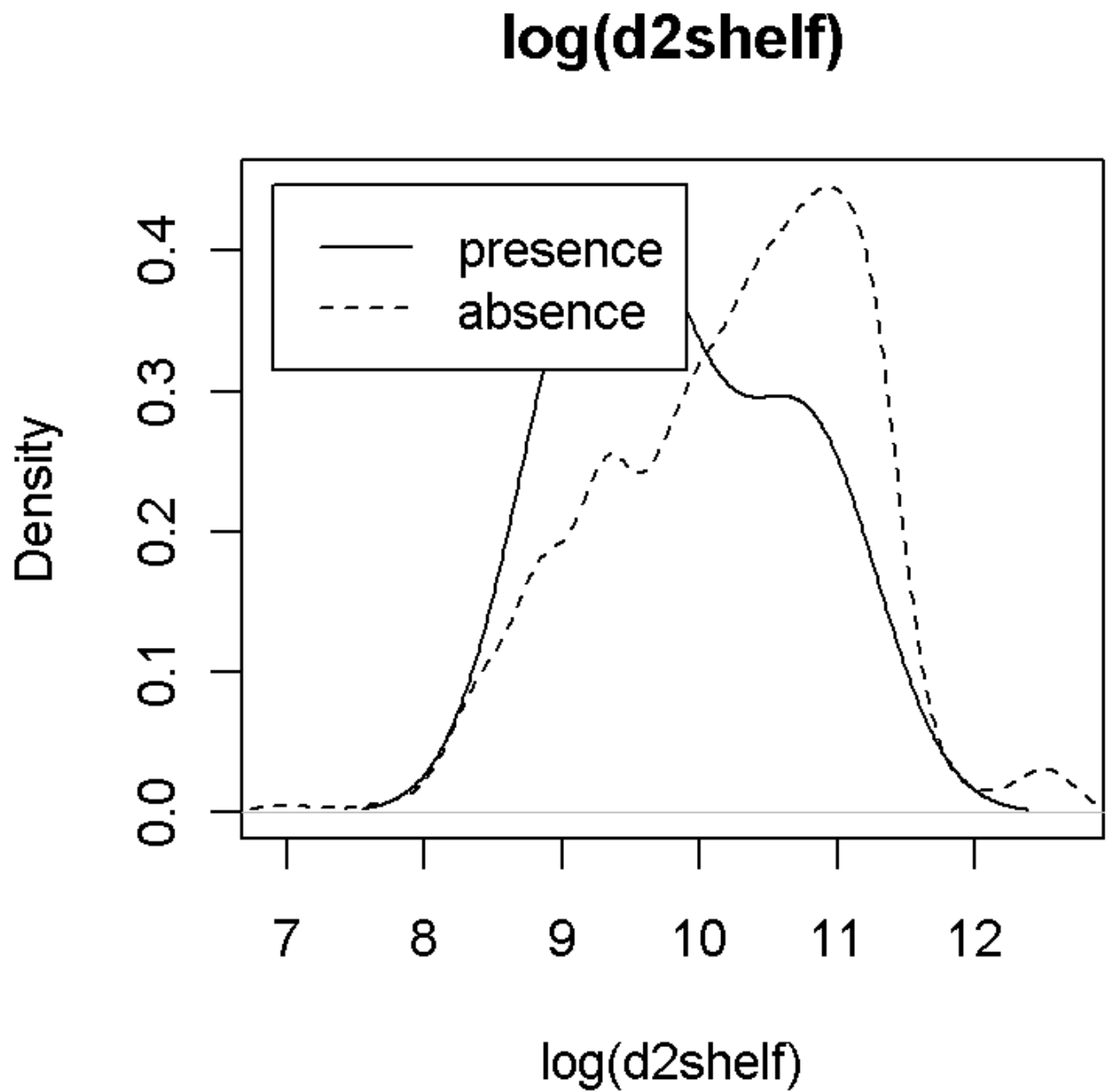


Figure 760: Density histogram of distance to shelf log(meters) for '*Stenella frontalis*' guild during 'spring' season in 'east2' region.

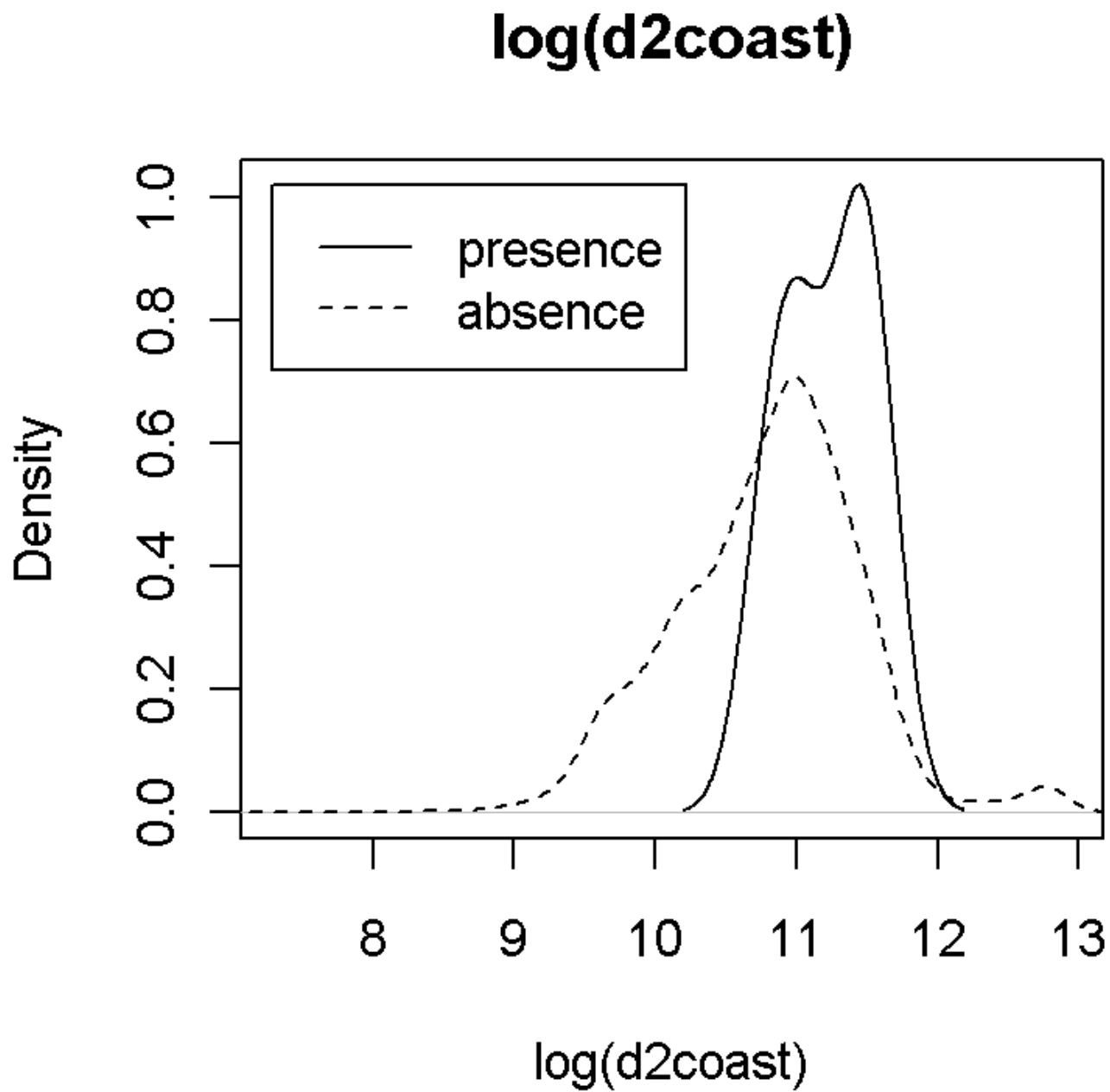


Figure 761: Density histogram of distance to coast log(meters) for '*Stenella frontalis*' guild during 'spring' season in 'east2' region.

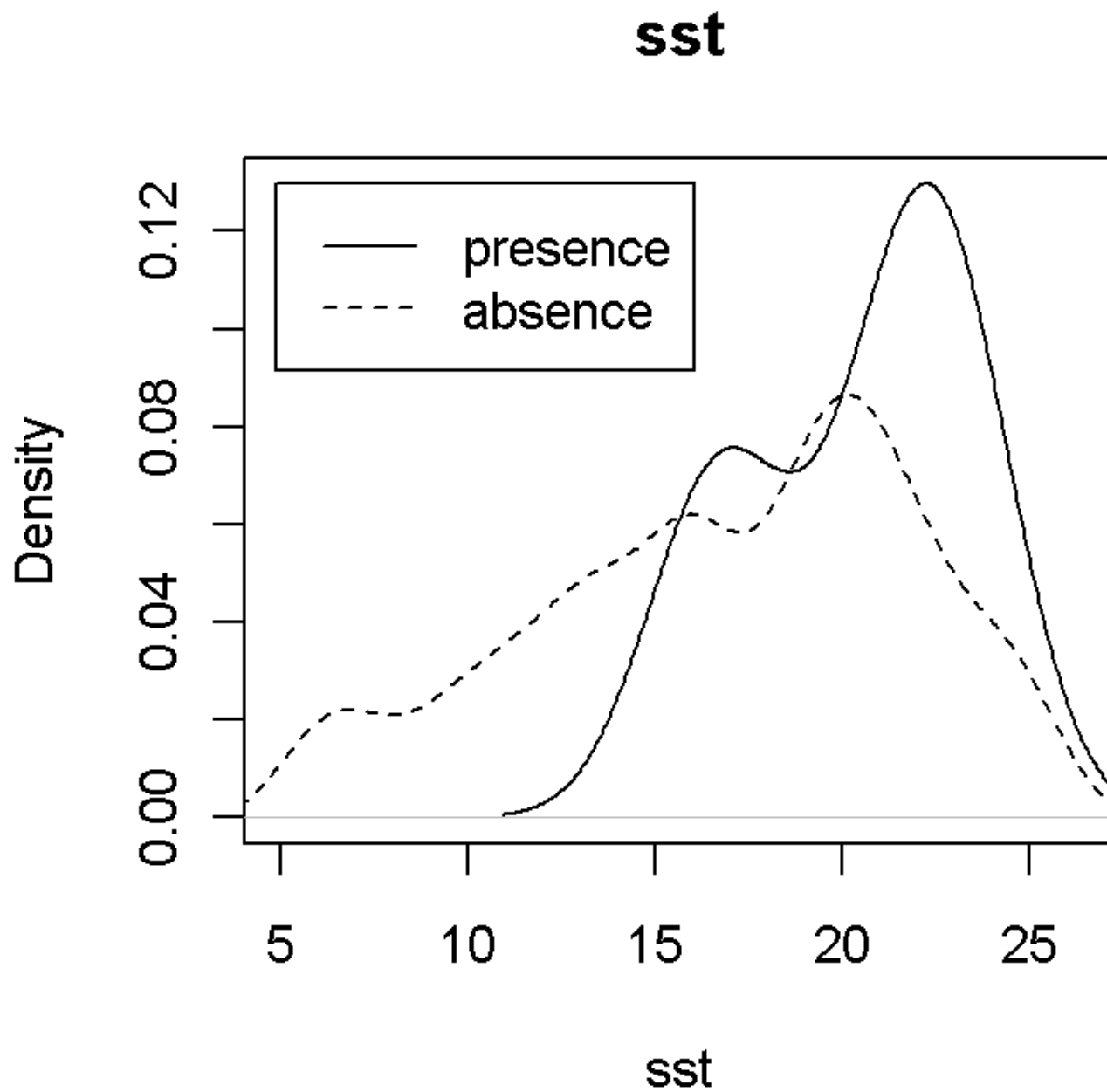


Figure 762: Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.

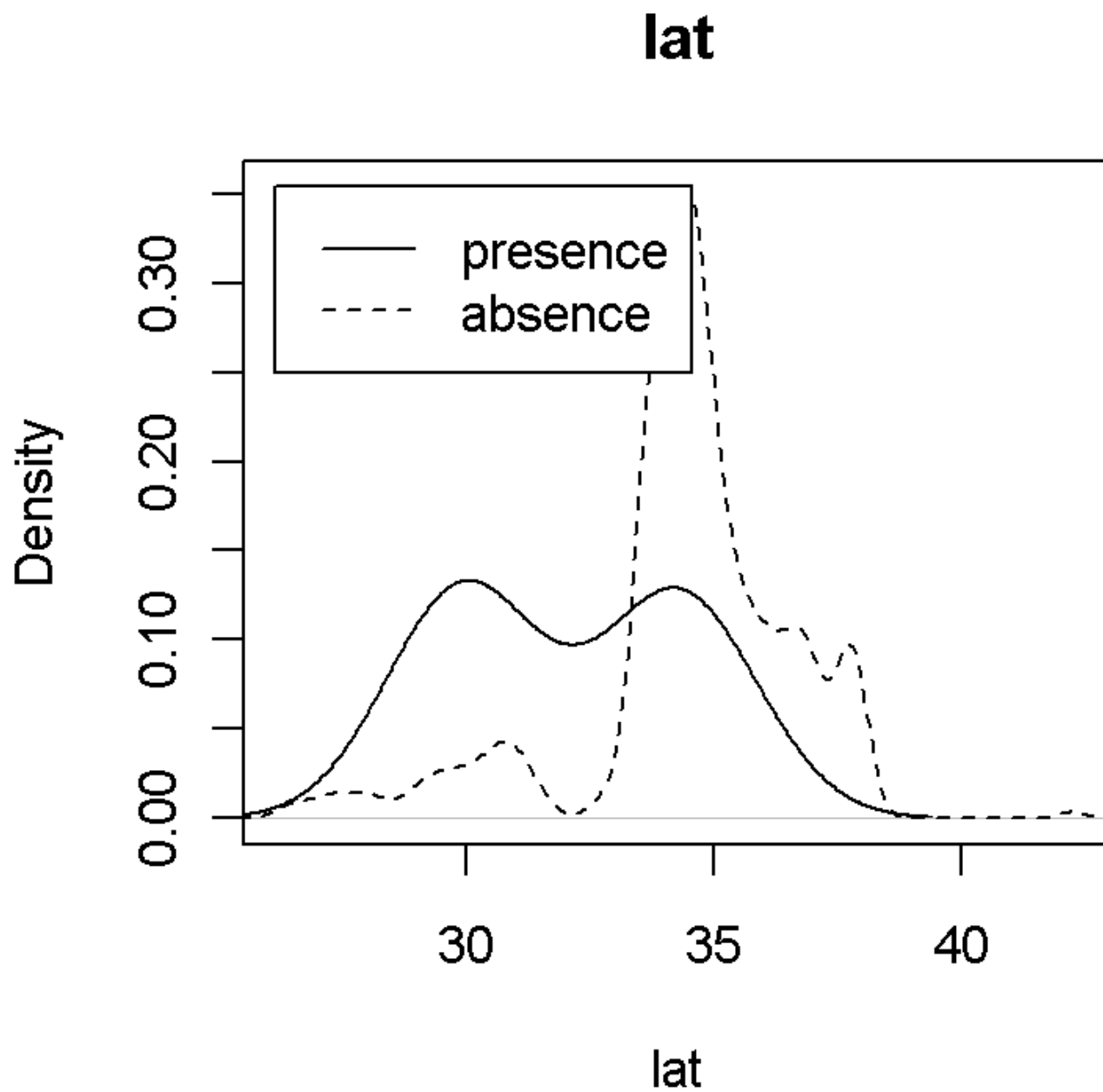


Figure 763: Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'spring' season in 'east2' region.

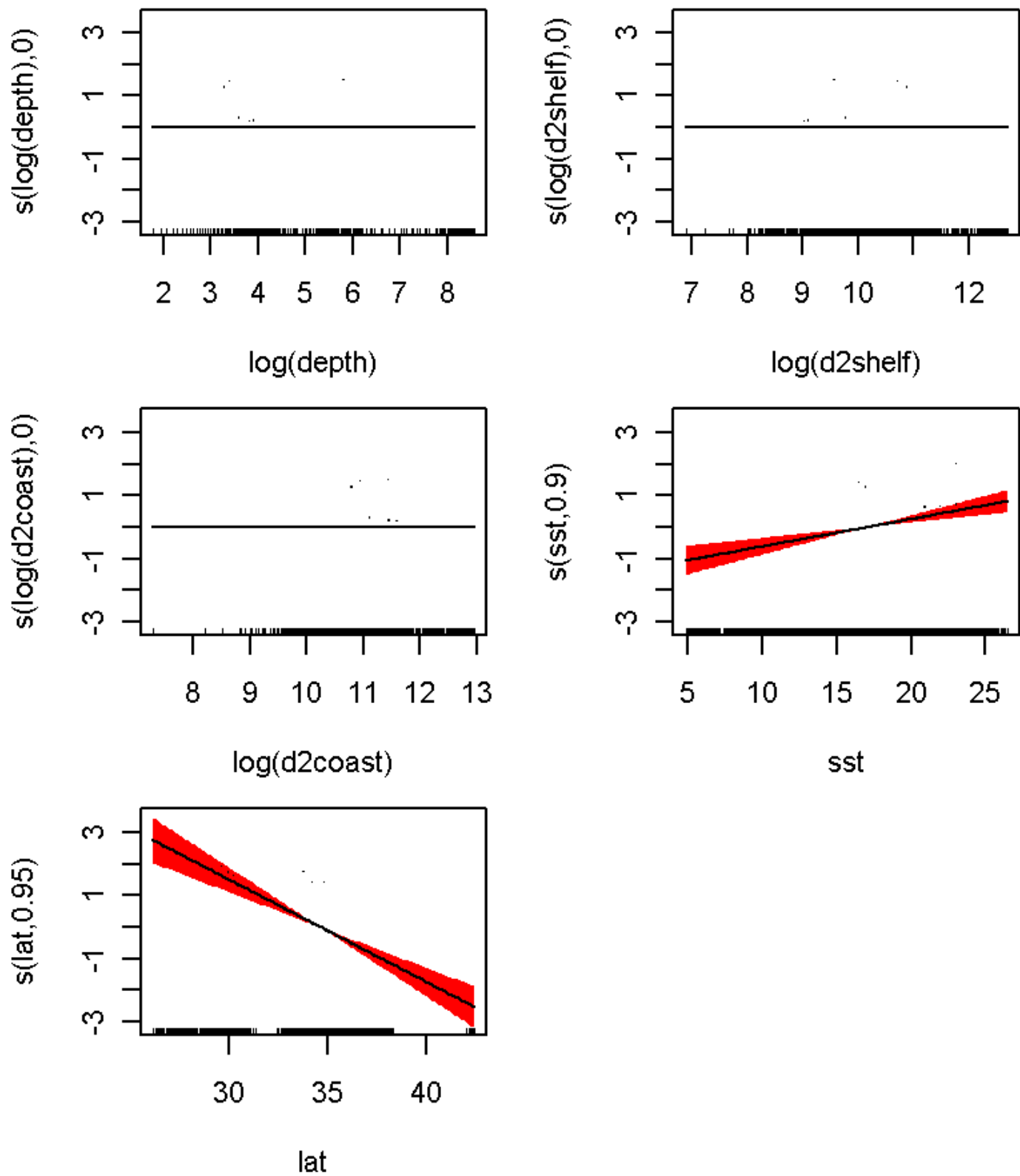


Figure 764: Terms plot of predictors to GAM model fit for '*Stenella frontalis*' guild during 'spring' season in 'east2' region.

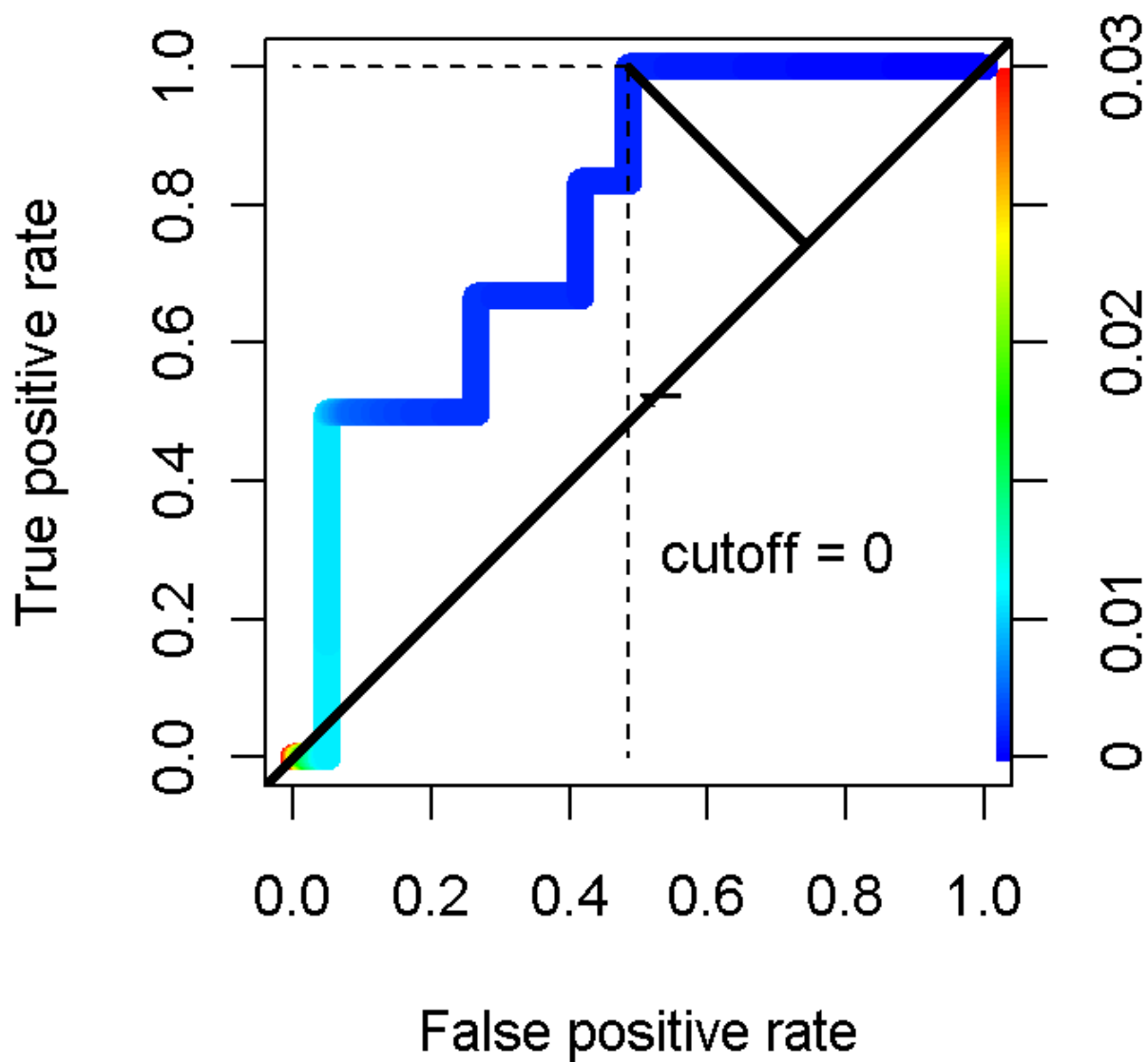


Figure 765: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella frontalis*' guild during 'spring' season in 'east2' region.

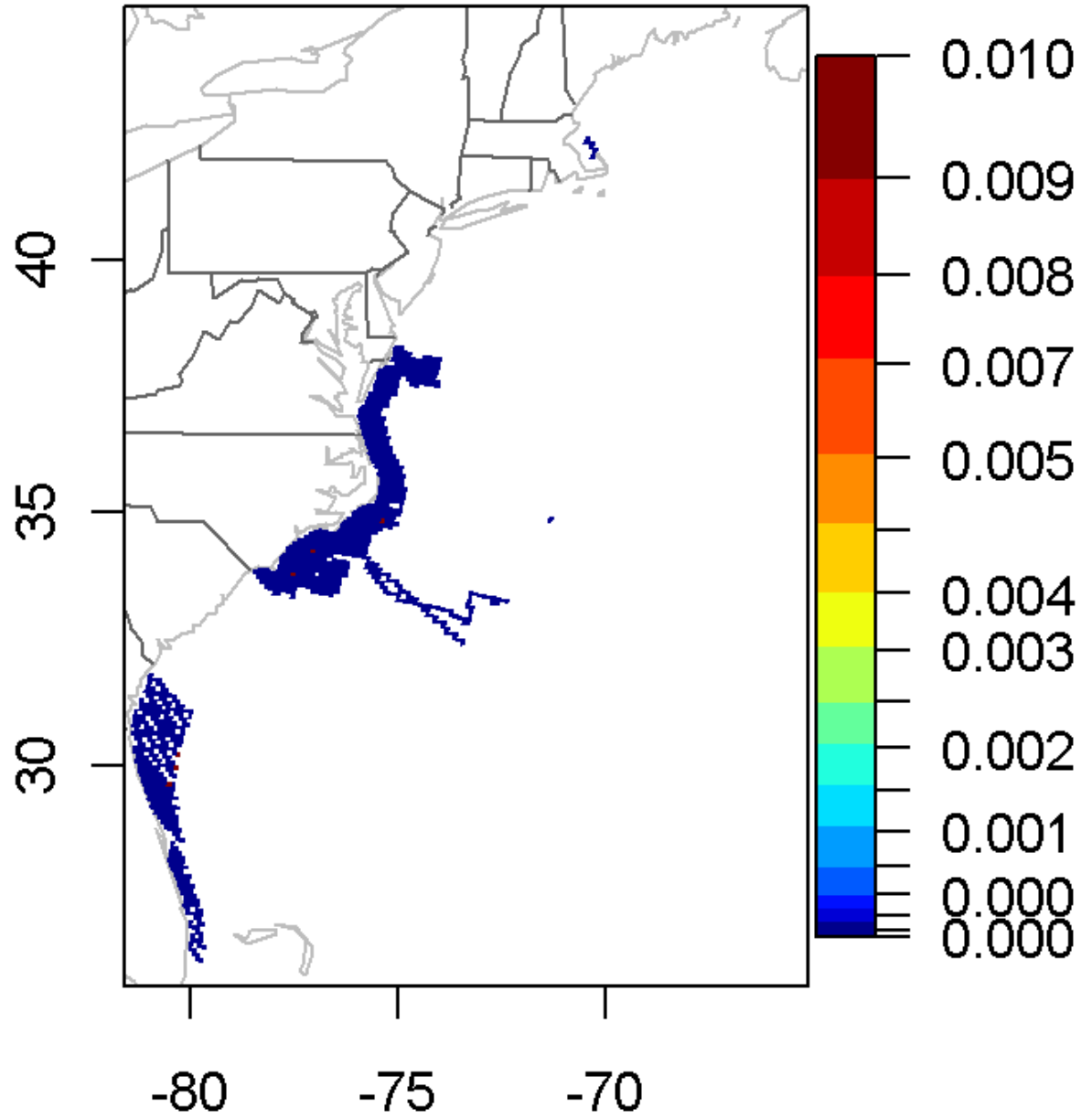


Figure 766: Map of presence and absence by cell summed through time for '*Stenella frontalis*' guild during 'spring' season in 'east2' region.

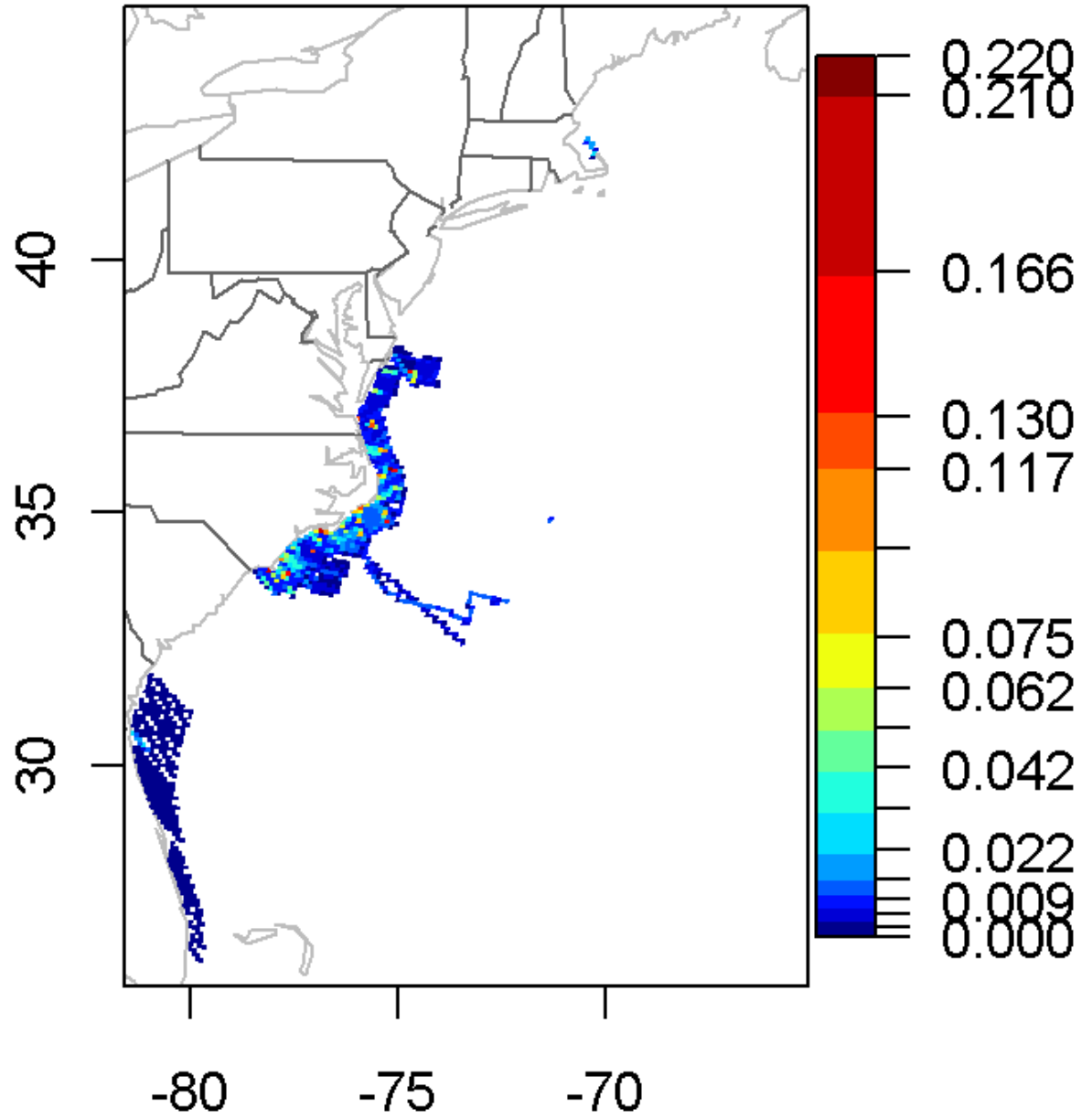


Figure 767: Map of effort(hours/km²) by cell summed through time for 'Stenella frontalis' guild during 'spring' season in 'east2' region.

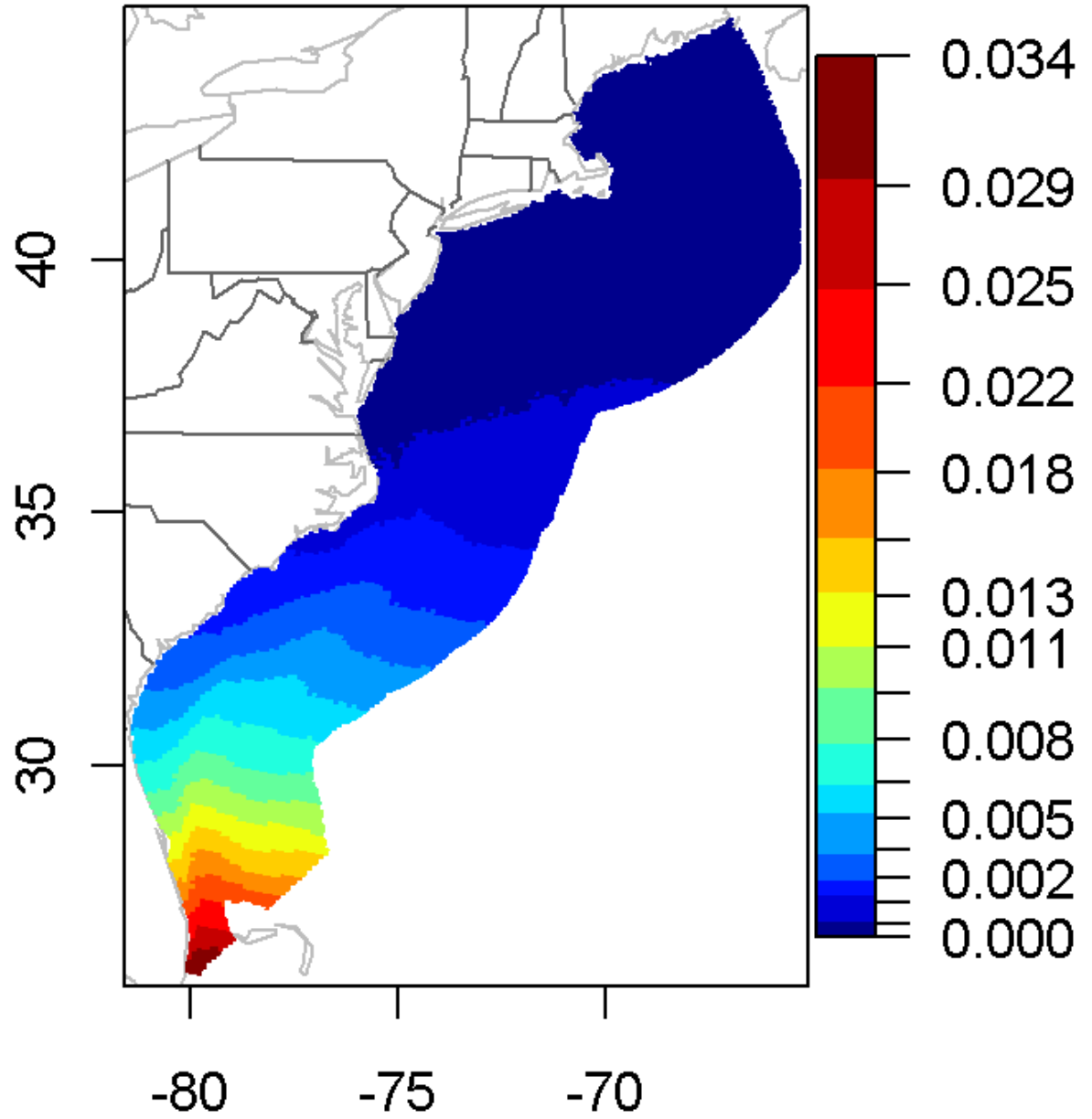


Figure 768: Map of mean predicted habitat for '*Stenella frontalis*' guild during 'spring' season in 'east2' region.

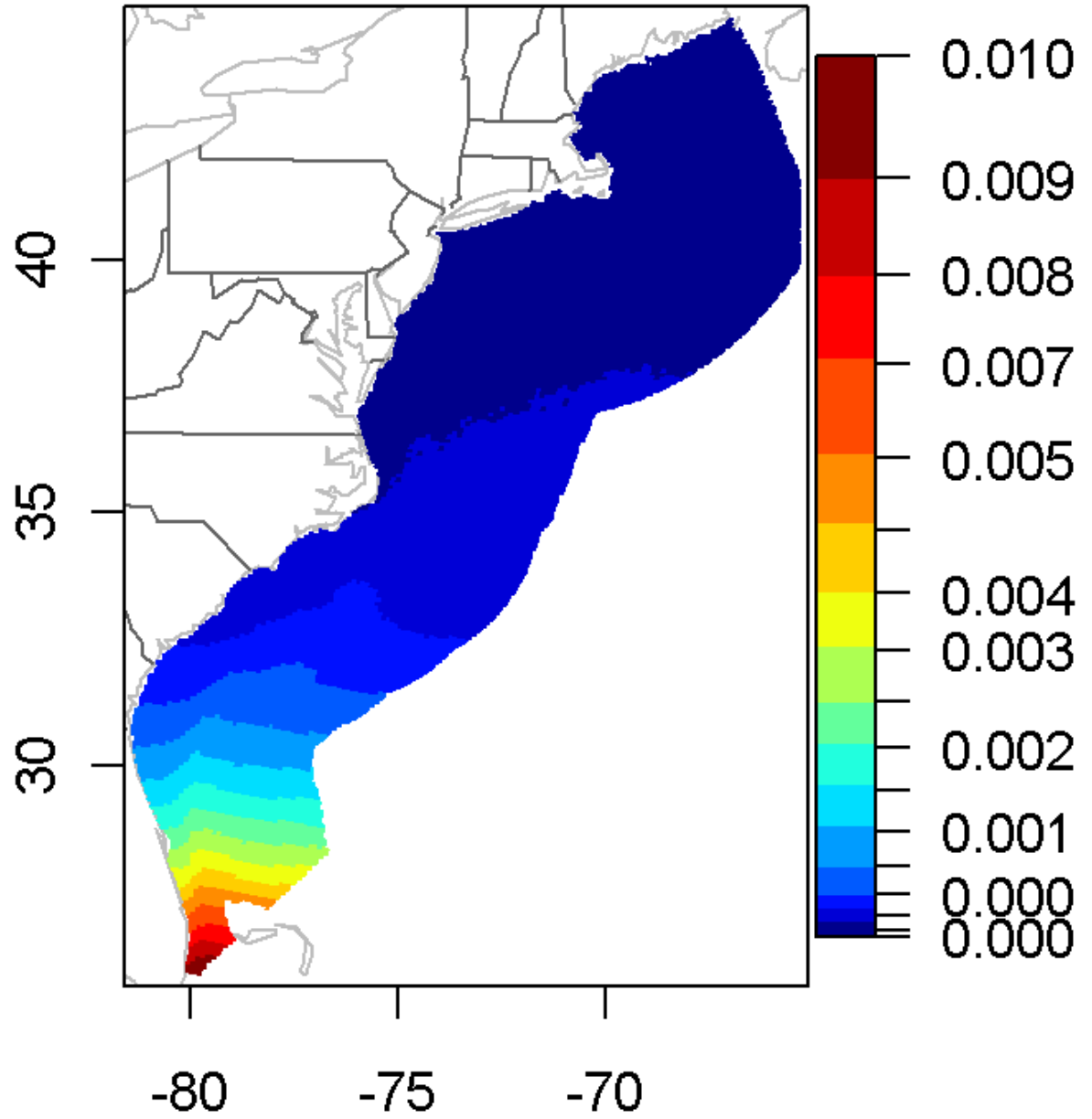


Figure 769: Map of standard error of habitat for 'Stenella frontalis' guild during 'spring' season in 'east2' region.

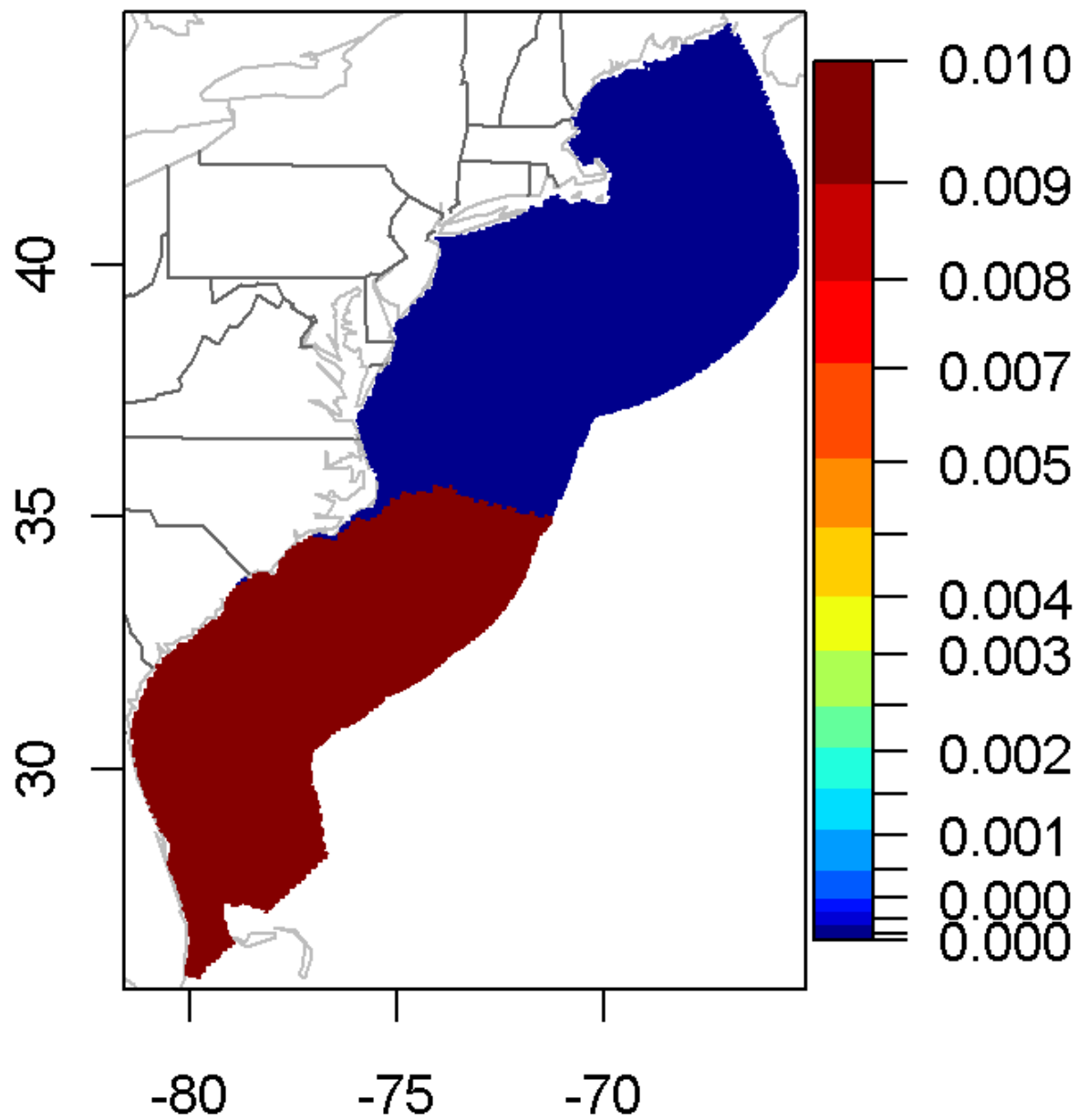


Figure 770: Map of binary habitat (cutoff determined by ROC) for '*Stenella frontalis*' guild during 'spring' season in 'east2' region.

15.2.2 gomex2

Modelrun identifier: duke_06_sf3_spring_gomex2

Date generated: 2008-10-21 12:01:30

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 71: Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	43
Number.absences	4774
GAM.converged	TRUE
R.squared	0.188883
Deviance.explained	0.369799
ROC.optimum	0.242346
Maximum.fit	0.00540961
Maximum.prediction	0.242433

Model text summary...

```

duke_06_sf3_spring_gomex2 run on Tue Oct 21 12:00:13 2008
provider:duke, version:06, guild:Stenella frontalis (sf3), season:'spring', region:gomex2

max.fit:0.242346, max.prediction:0.242433, ROC.optimum:0.005410

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -12.1936      0.6565  -18.57  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  1.968251  2.468 143.752 < 2e-16 ***
s(log(d2shelf)) 0.925370  1.425  16.525 2.98e-06 ***
s(log(d2coast)) 1.999714  2.500  31.624 < 2e-16 ***
s(sst)          0.005962  0.506   0.011  0.749
s(lat)          1.999409  2.499  49.194 < 2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.189  Deviance explained = 37%
GCV score = 0.00055813  Scale est. = 0.00055649  n = 4817

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:4817  Min.   : 14  Min.   : 11  Min.   : 272  Min.   : 21187  Min.   :19.73  Min.   :24.05
              1st Qu.:2144 1st Qu.: 511 1st Qu.: 24696 1st Qu.:142982 1st Qu.:24.23 1st Qu.:26.38
              Median :4222 Median :1292 Median : 63128 Median :211670 Median :25.35 Median :27.38
              Mean   :3977 Mean   :1537 Mean   : 82827 Mean   :213952 Mean   :25.14 Mean   :27.25
              3rd Qu.:5932 3rd Qu.:2668 3rd Qu.:131568 3rd Qu.:276022 3rd Qu.:26.17 3rd Qu.:28.13
              Max.   :8191 Max.   :3523 Max.   :257870 Max.   :404358 Max.   :28.42 Max.   :30.06

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :19.95  Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0 1st Qu.: 31617 1st Qu.: 85289 1st Qu.:21.83 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :23.02 Median :27.29

```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:3.465e-11	Min.	:5.273e-11	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:9.938e-08	1st Qu.	:1.027e-07	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.0000
Median	:4110	Median	:4.667e-05	Median	:2.999e-05	Median	:0.000e+00	Median	:9.499e-03	Median	:0.0000
Mean	:3997	Mean	:1.235e-02	Mean	:1.602e-03	Mean	:2.399e-02	Mean	:2.365e-02	Mean	:0.2513
3rd Qu.	:6015	3rd Qu.	:5.503e-03	3rd Qu.	:1.531e-03	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:2.424e-01	Max.	:3.627e-02	Max.	:3.000e+00	Max.	:2.695e-01	Max.	:1.0000
						NA's	:4.838e+03	NA's	:4.838e+03		

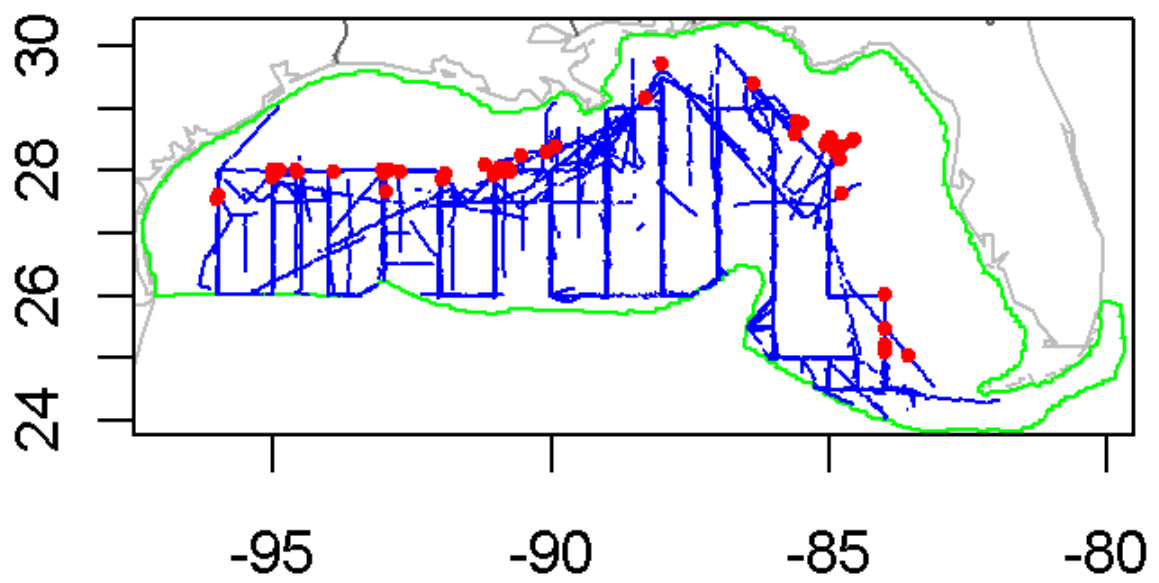


Figure 771: Map of points of observational sightings and tracks of survey effort for '*Stenella frontalis*' guild during 'spring' season in 'gomex2' region.

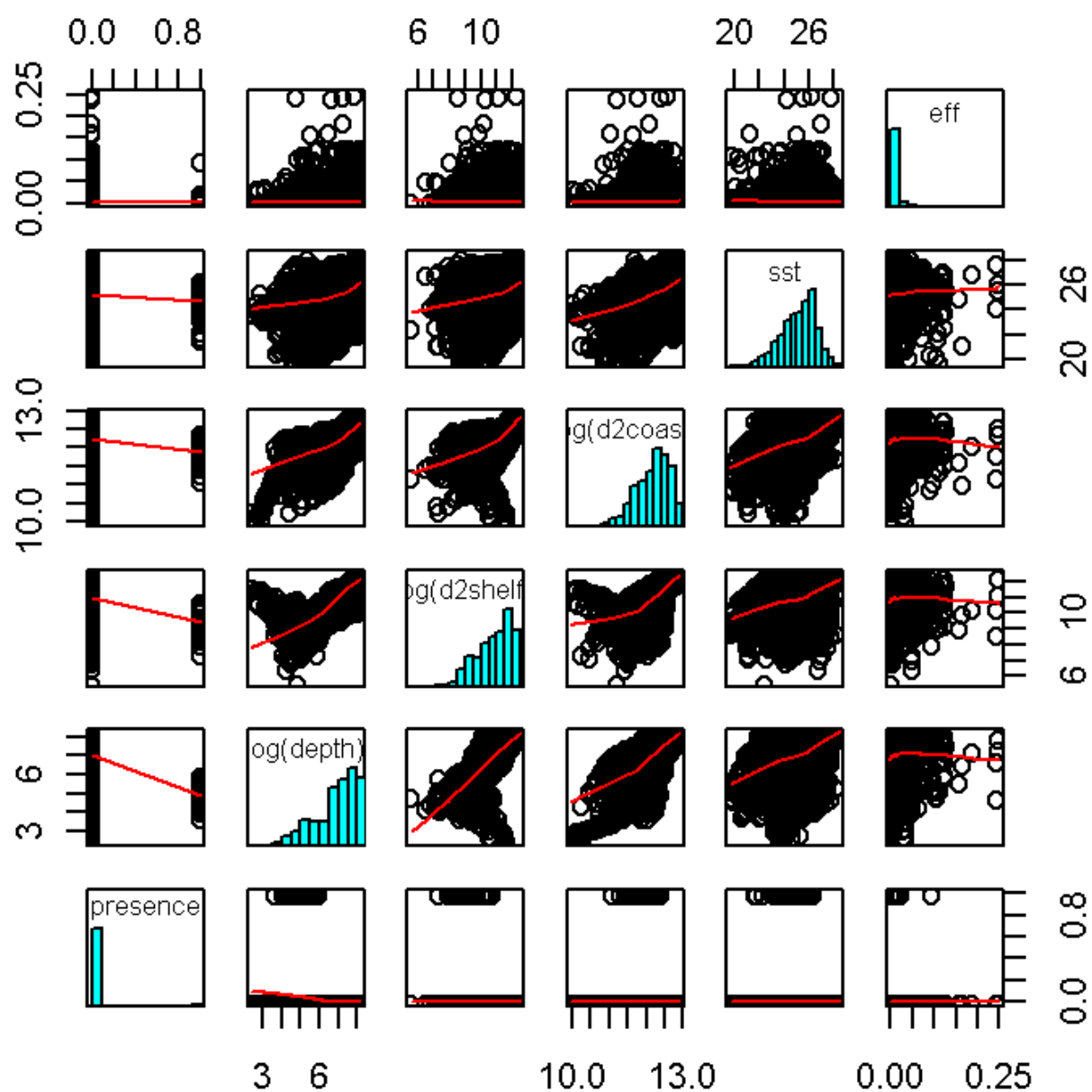


Figure 772: Pairs plot of input variables for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.

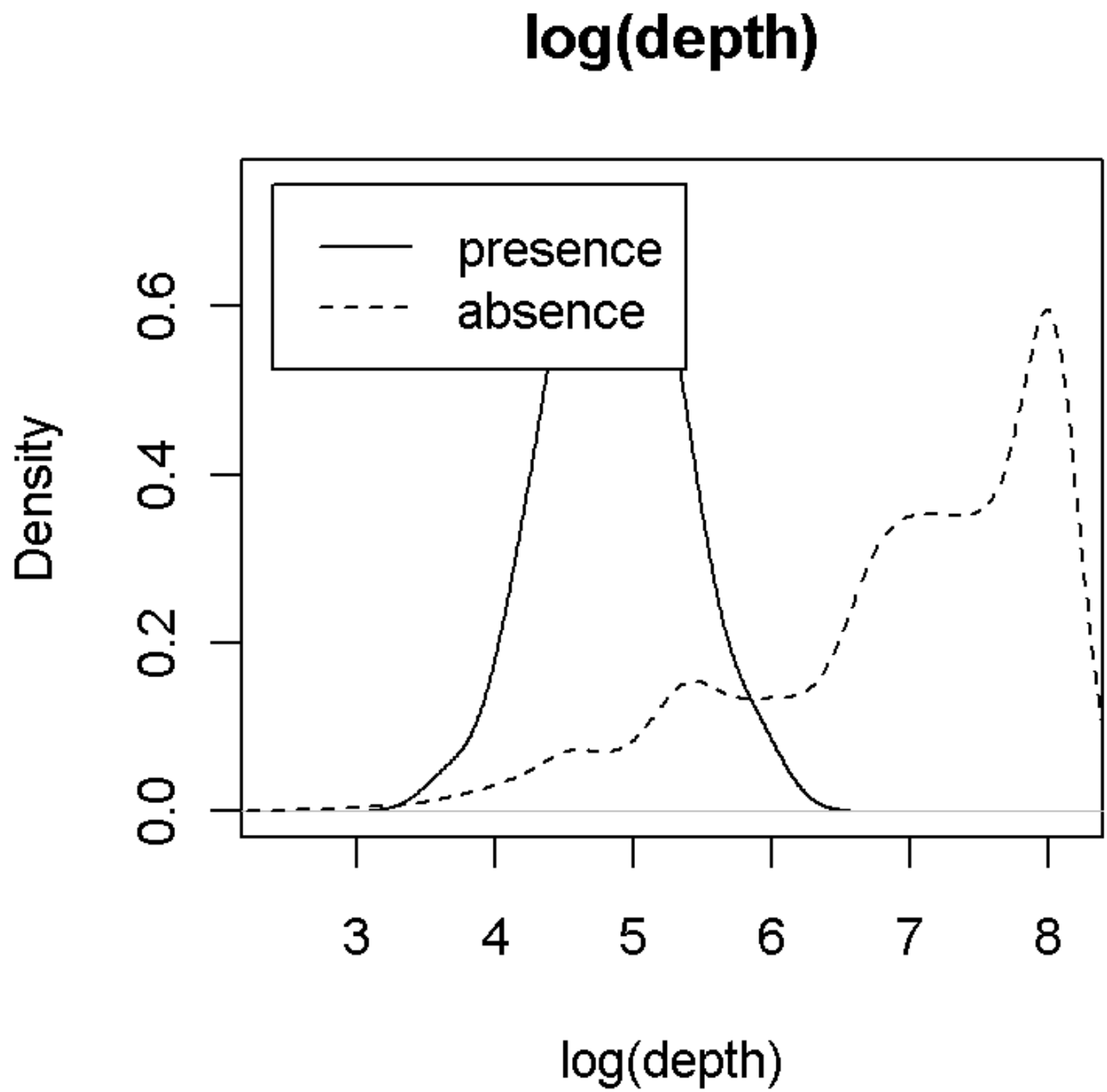


Figure 773: Density histogram of depth $\log(\text{meters})$ for '*Stenella frontalis*' guild during 'spring' season in 'gomex2' region.

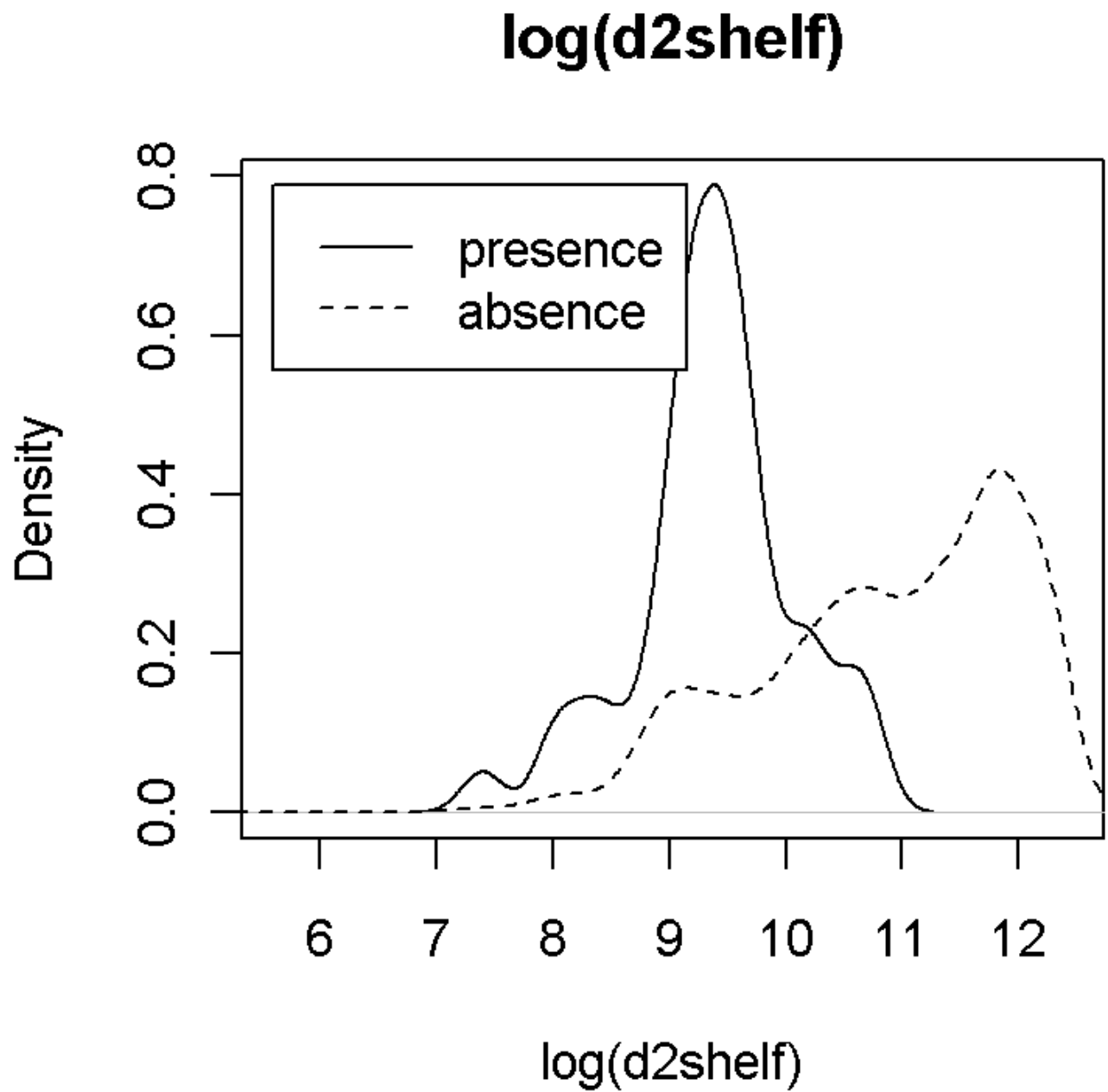


Figure 774: Density histogram of distance to shelf $\log(\text{meters})$ for '*Stenella frontalis*' guild during 'spring' season in 'gomex2' region.

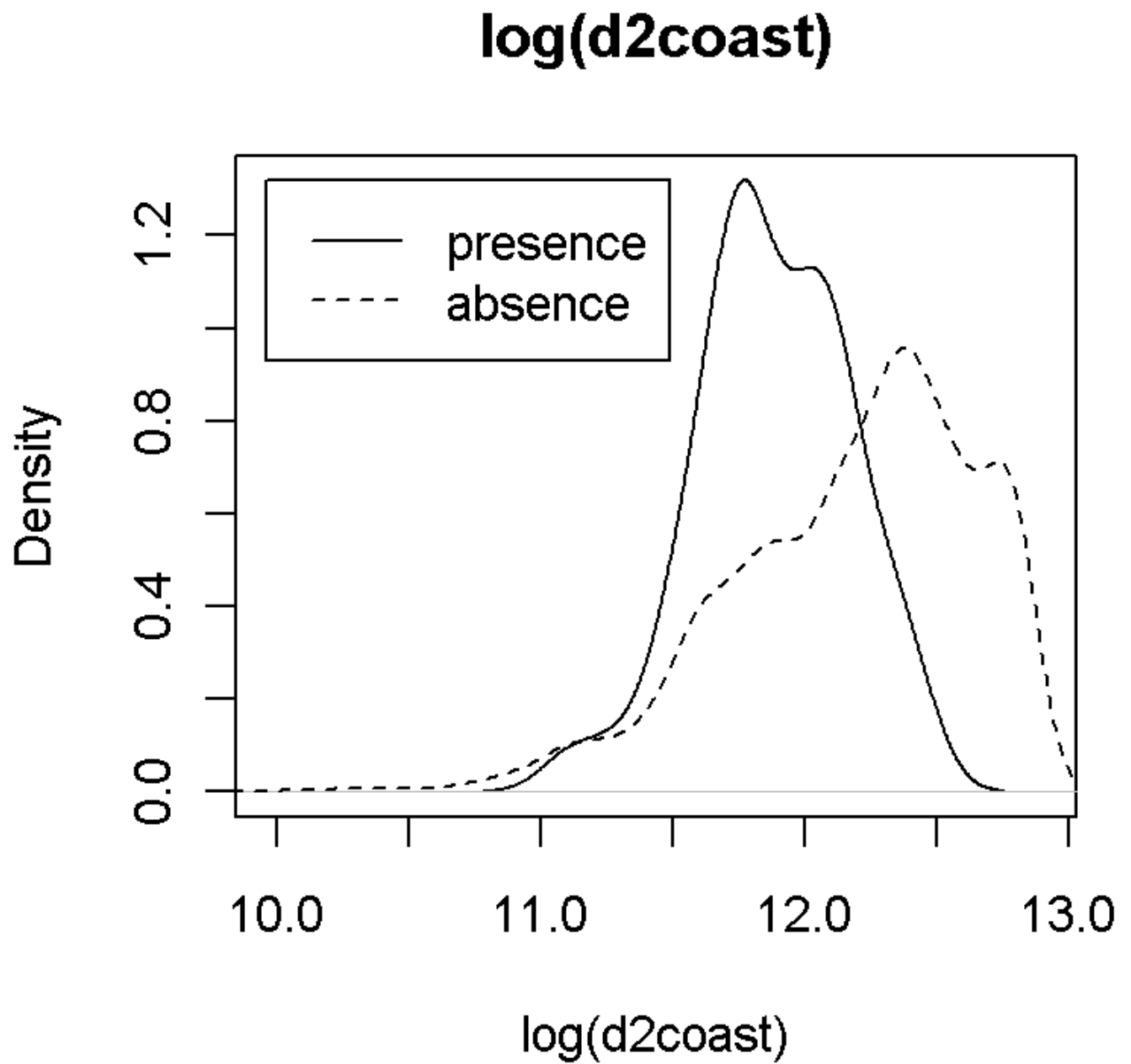


Figure 775: Density histogram of distance to coast log(meters) for '*Stenella frontalis*' guild during 'spring' season in 'gomex2' region.

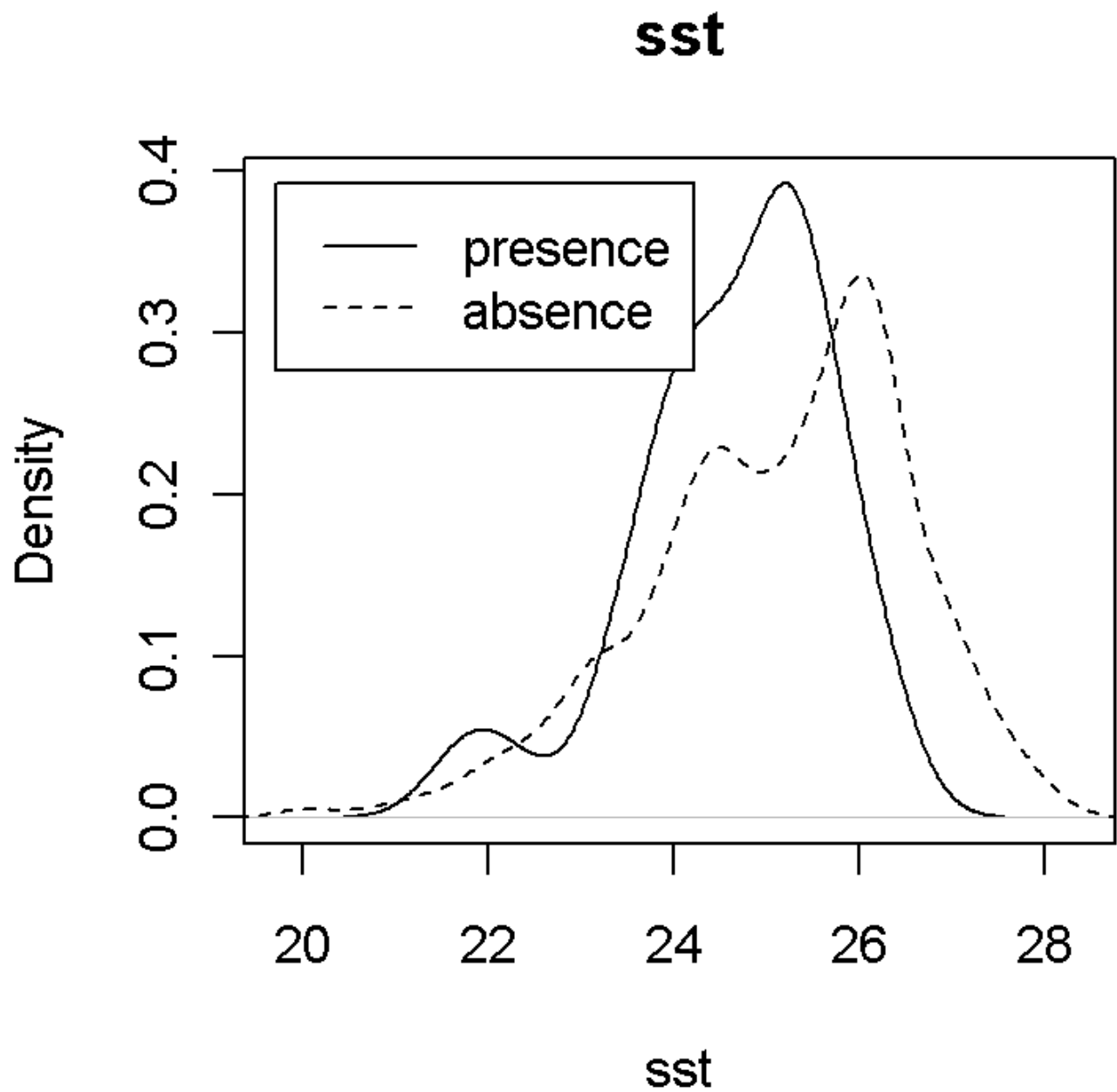


Figure 776: Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.

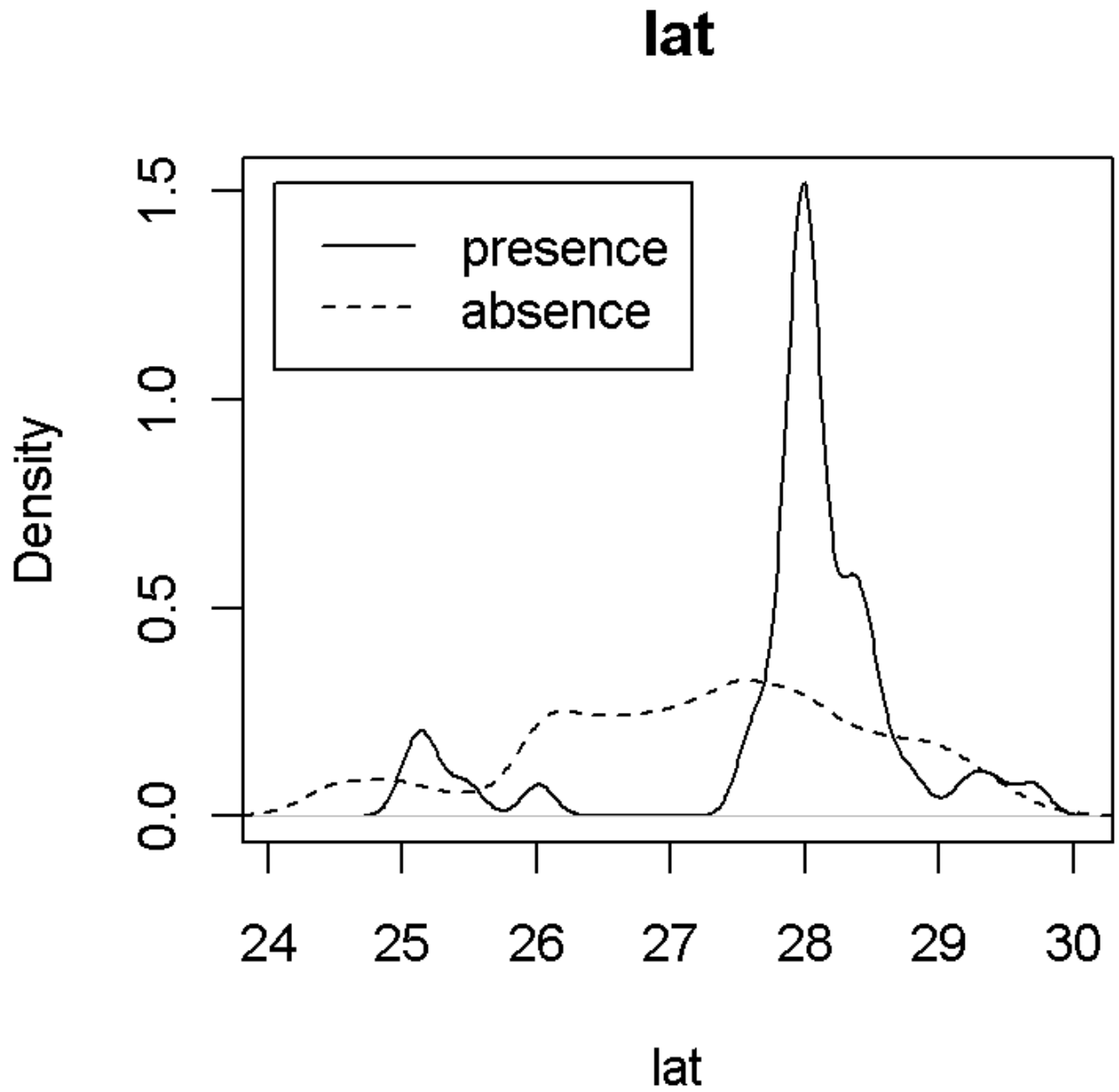


Figure 777: Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.

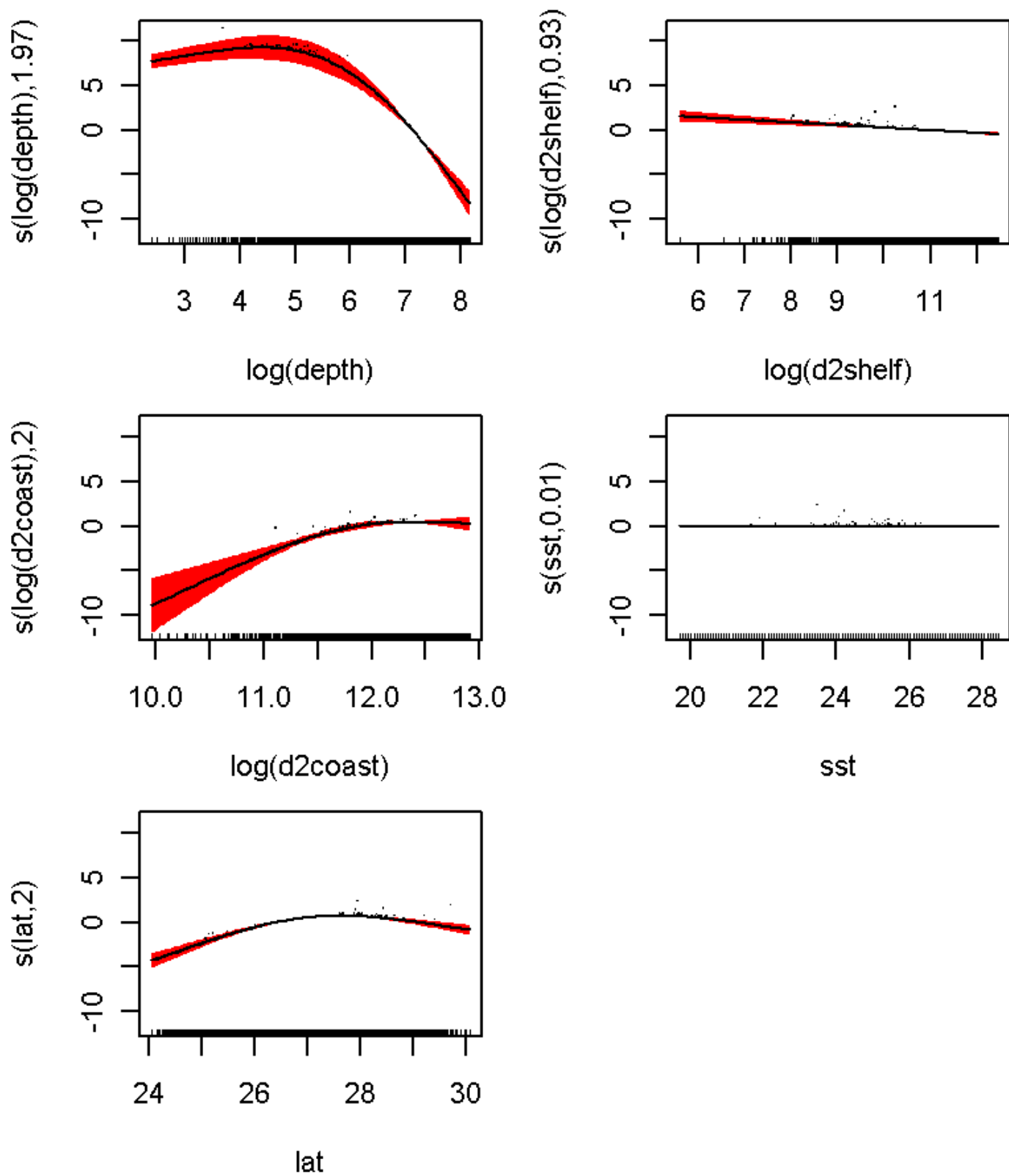


Figure 778: Terms plot of predictors to GAM model fit for '*Stenella frontalis*' guild during 'spring' season in 'gomex2' region.

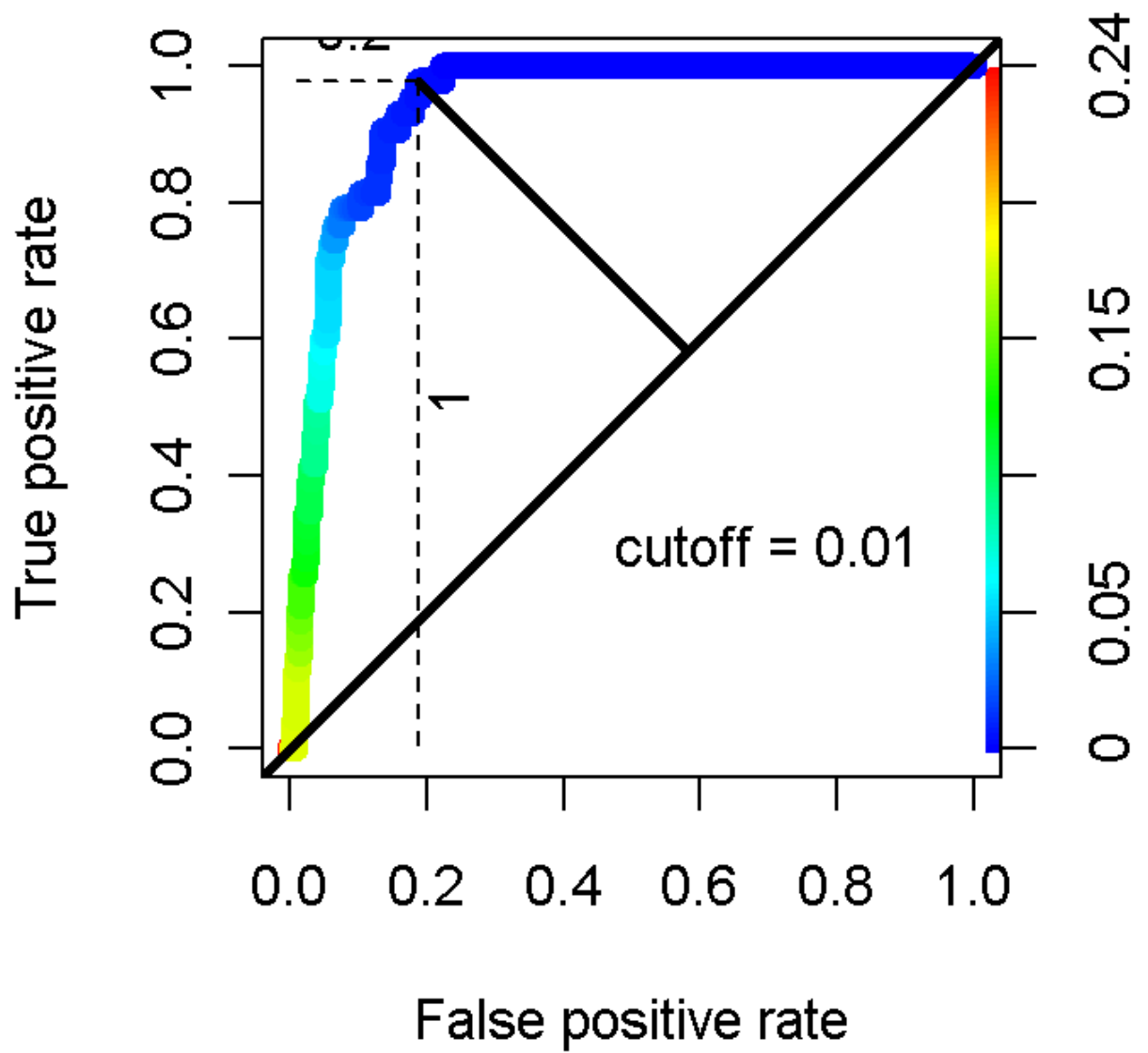


Figure 779: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella frontalis*' guild during 'spring' season in 'gomex2' region.

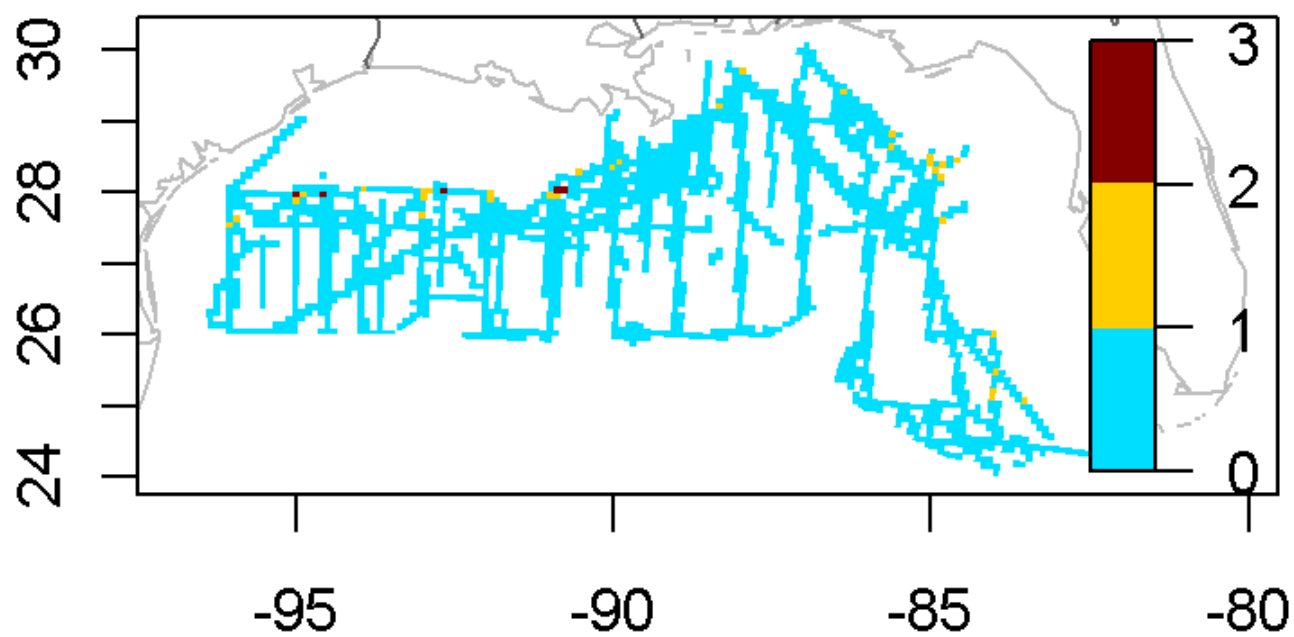


Figure 780: Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.

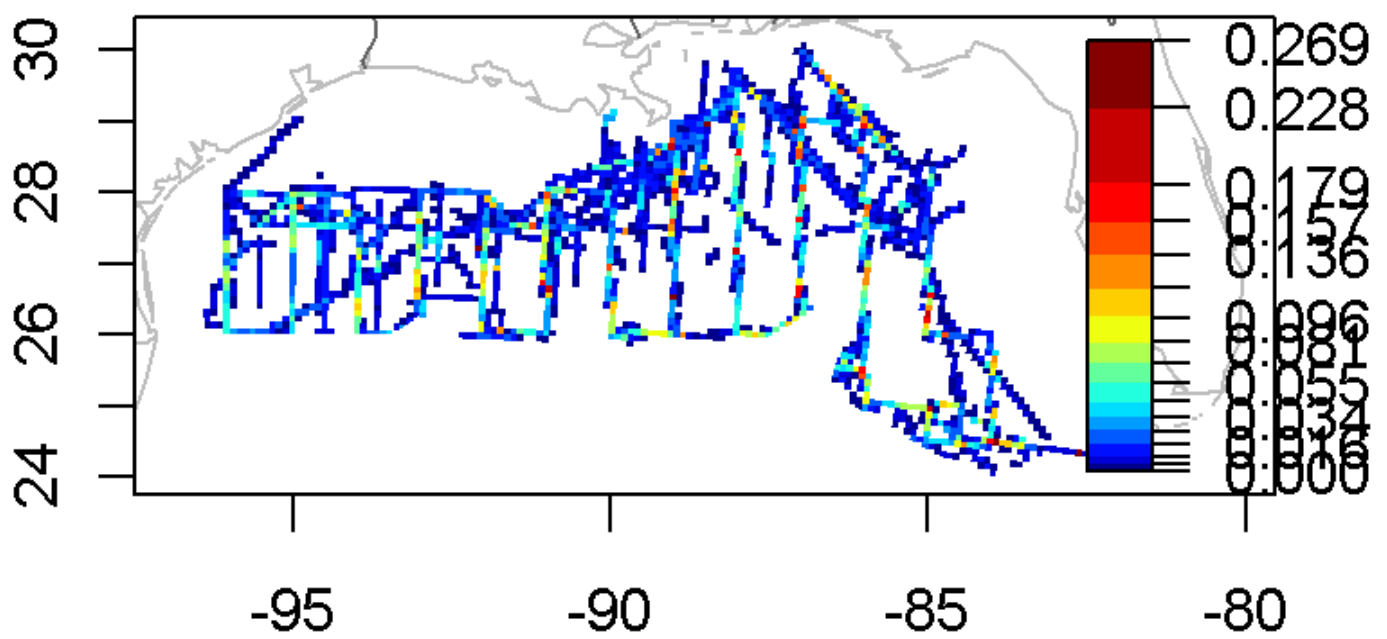


Figure 781: Map of effort(hours/km²) by cell summed through time for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.

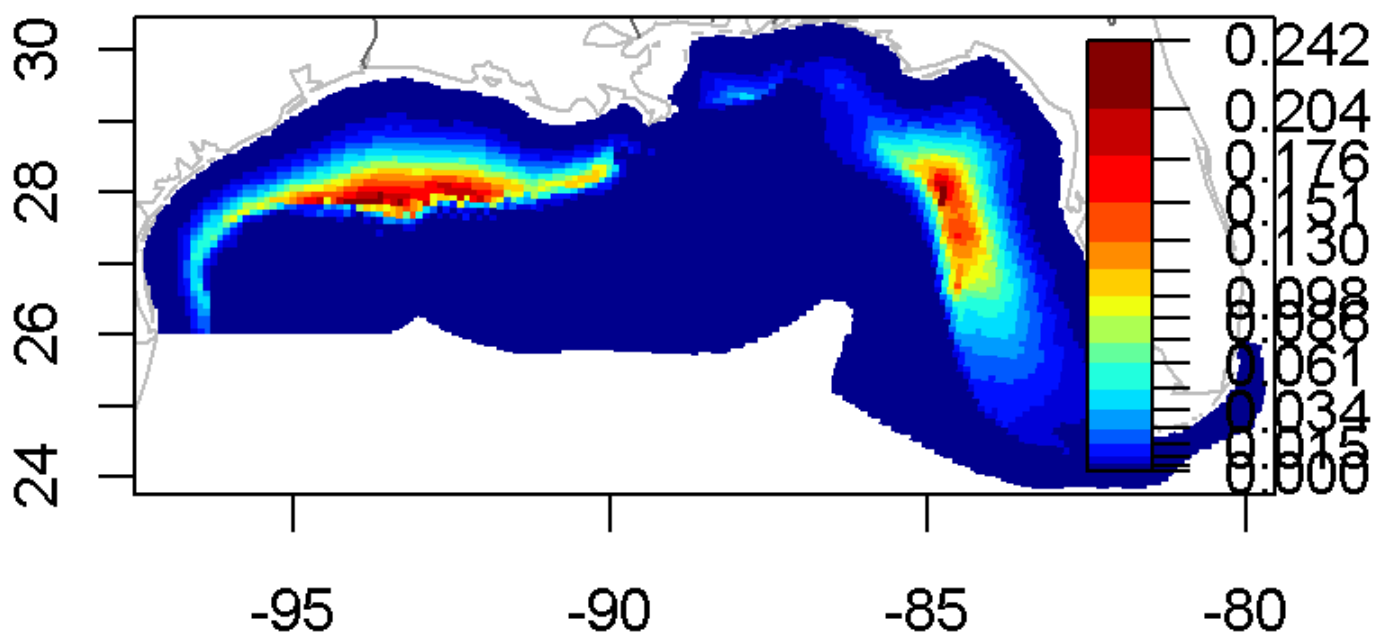


Figure 782: Map of mean predicted habitat for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.

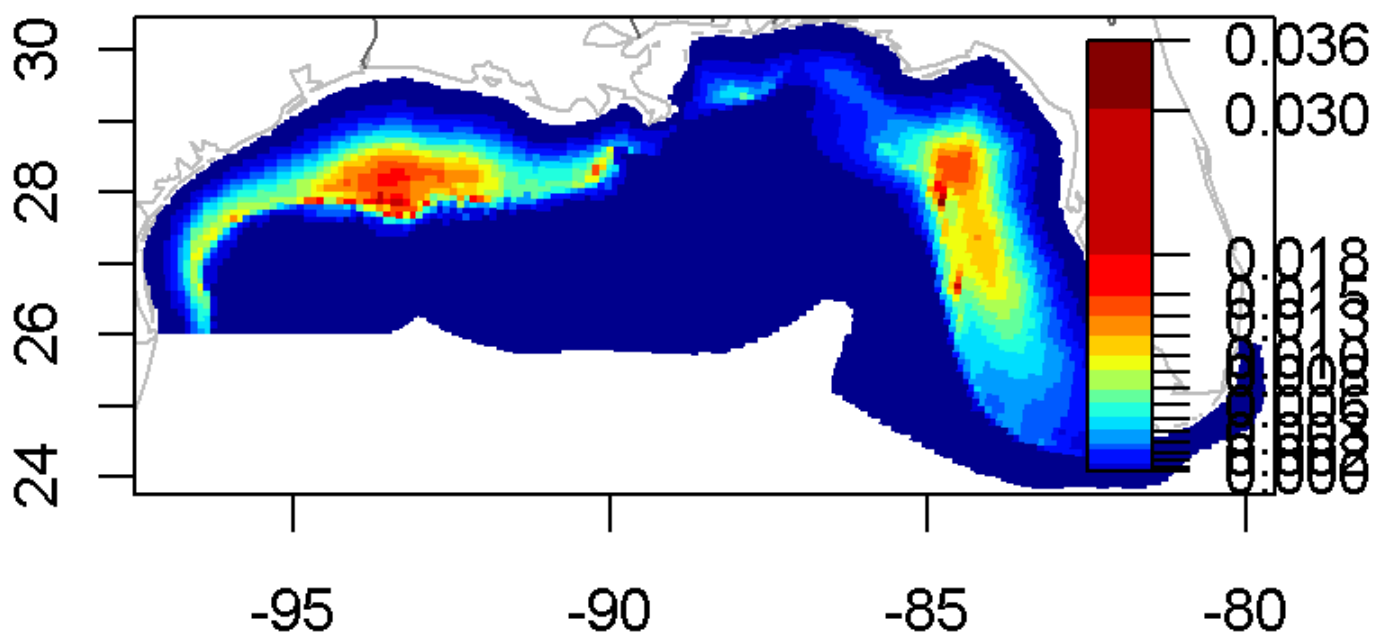


Figure 783: Map of standard error of habitat for 'Stenella frontalis' guild during 'spring' season in 'gomex2' region.

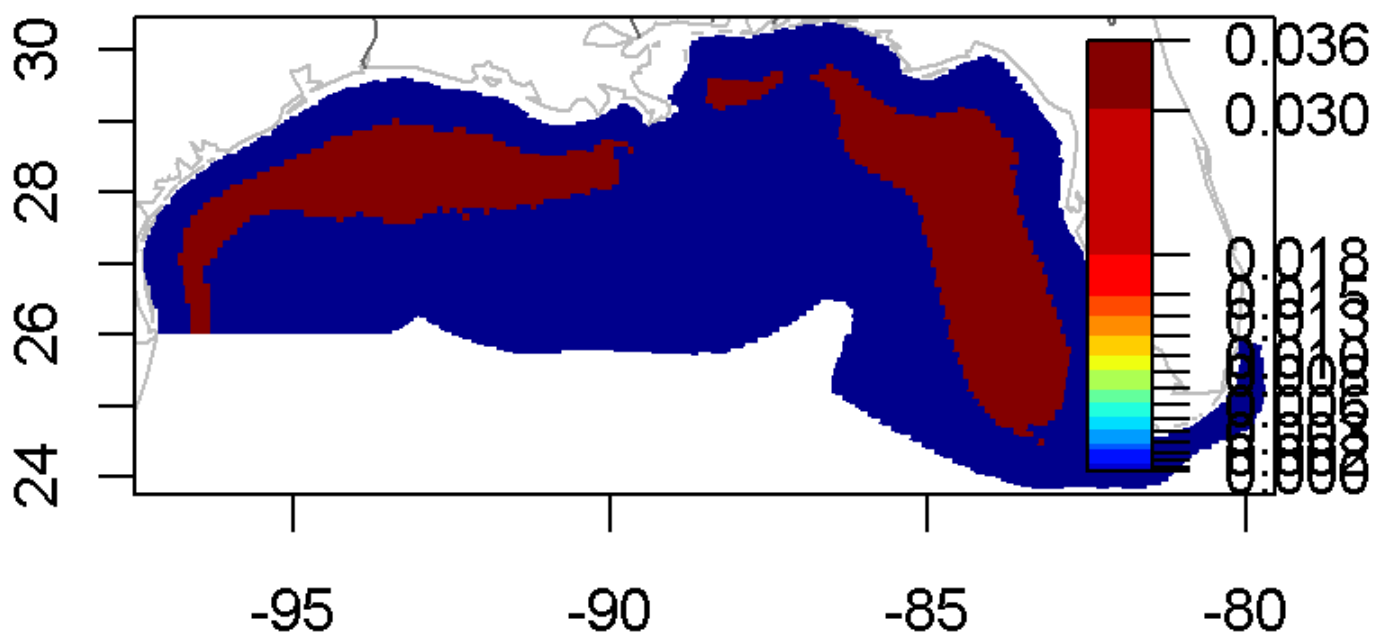


Figure 784: Map of binary habitat (cutoff determined by ROC) for '*Stenella frontalis*' guild during 'spring' season in 'gomex2' region.

15.3 summer

15.3.1 east2

Modelrun identifier: duke_06_sf3_summer_east2

Date generated: 2008-10-21 13:56:32

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 72: Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'summer' season in 'east2' region.

	Value
Number.presences	107
Number.absences	8971
GAM.converged	TRUE
R.squared	0.104447
Deviance.explained	0.250347
ROC.optimum	0.668732
Maximum.fit	0.0141776
Maximum.prediction	0.933221

Model text summary...

```
duke_06_sf3_summer_east2 run on Tue Oct 21 13:51:07 2008
provider:duke, version:06, guild:Stenella frontalis (sf3), season:'summer', region:east2

max.fit:0.668732, max.prediction:0.933221, ROC.optimum:0.014178

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -8.1540      0.4371  -18.66   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.9938  2.494 341.30 <2e-16 ***
s(log(d2shelf)) 1.9774  2.477  66.15 <2e-16 ***
s(log(d2coast)) 0.9968  1.497  226.35 <2e-16 ***
s(sst)         1.9746  2.475   38.60 <2e-16 ***
s(lat)         1.9978  2.498  138.78 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.104  Deviance explained =  25%
GCV score = 0.00071698  Scale est. = 0.0007155  n = 8663

summary(dat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:7694  Min.   : 1635  Min.   :  5.0  Min.   :    5  Min.   : 1259  Min.   :  8.175  Min.   :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.:20989  1st Qu.: 50865  1st Qu.: 17.025  1st Qu.:37.53
          Median :14008  Median :111.5  Median :52230  Median :102266  Median : 22.200  Median :40.18
          Mean   :13275  Mean   : 677.3  Mean   :67623  Mean   :125197  Mean   : 21.378  Mean   :39.35
          3rd Qu.:15645  3rd Qu.: 420.0  3rd Qu.:99335  3rd Qu.:174835  3rd Qu.: 25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   : 30.900  Max.   :44.74
          NA's   :      7      NA's   :      7      NA's   :408.000

summary(newdat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :    5  Min.   : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.533e-10  Min.   :5.285e-10  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.524e-03  1st Qu.:3.409e-04  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :1.361e-02  Median :1.233e-03  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :3.342e-02  Mean   :2.713e-03  Mean   :2.342e-02  Mean   :1.069e-02  Mean   :0.4907
3rd Qu.:14088  3rd Qu.:3.816e-02  3rd Qu.:3.254e-03  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :9.332e-01  Max.   :5.708e-02  Max.   :2.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

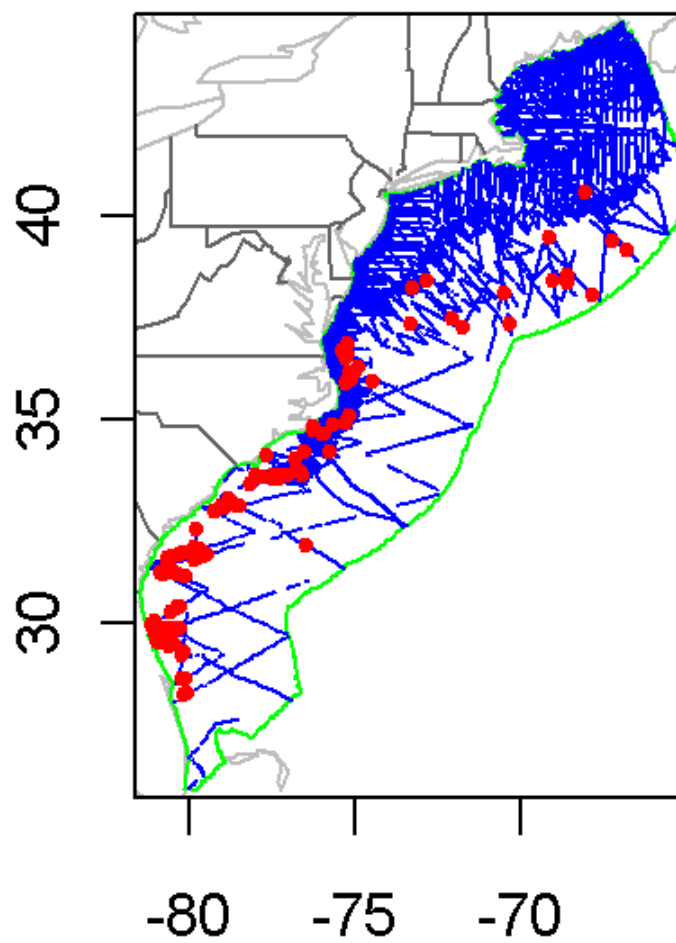


Figure 785: Map of points of observational sightings and tracks of survey effort for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

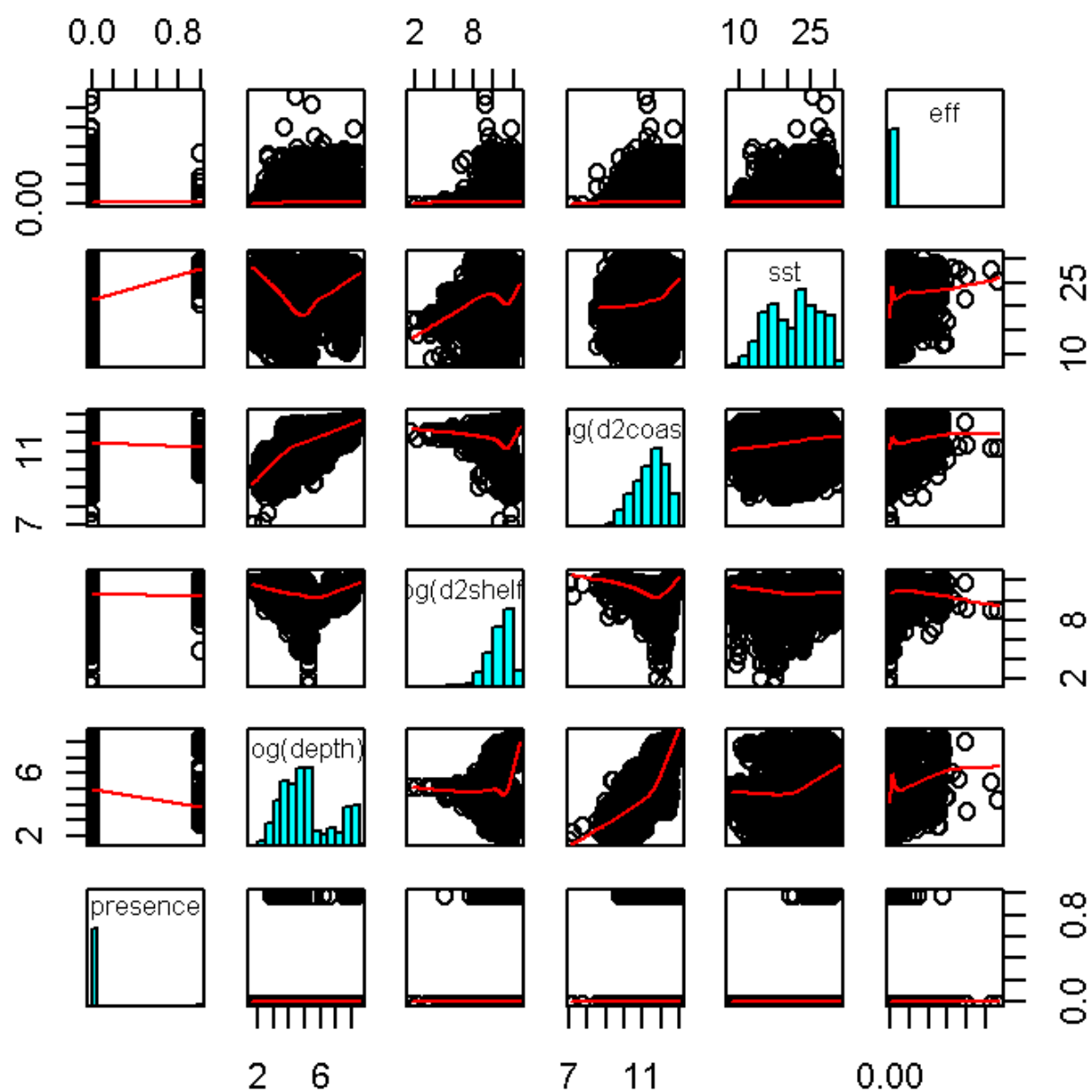


Figure 786: Pairs plot of input variables for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

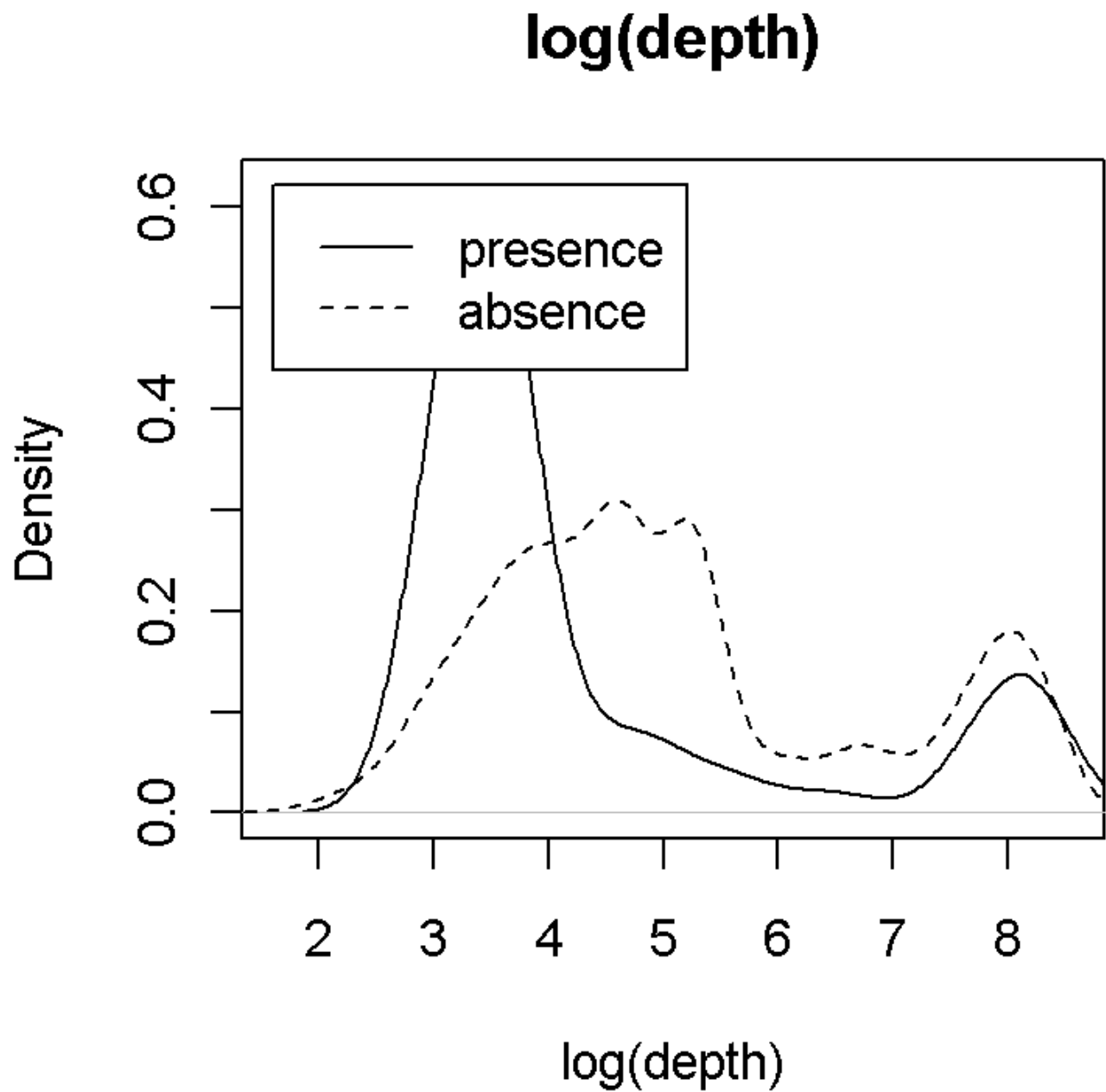


Figure 787: Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'summer' season in 'east2' region.

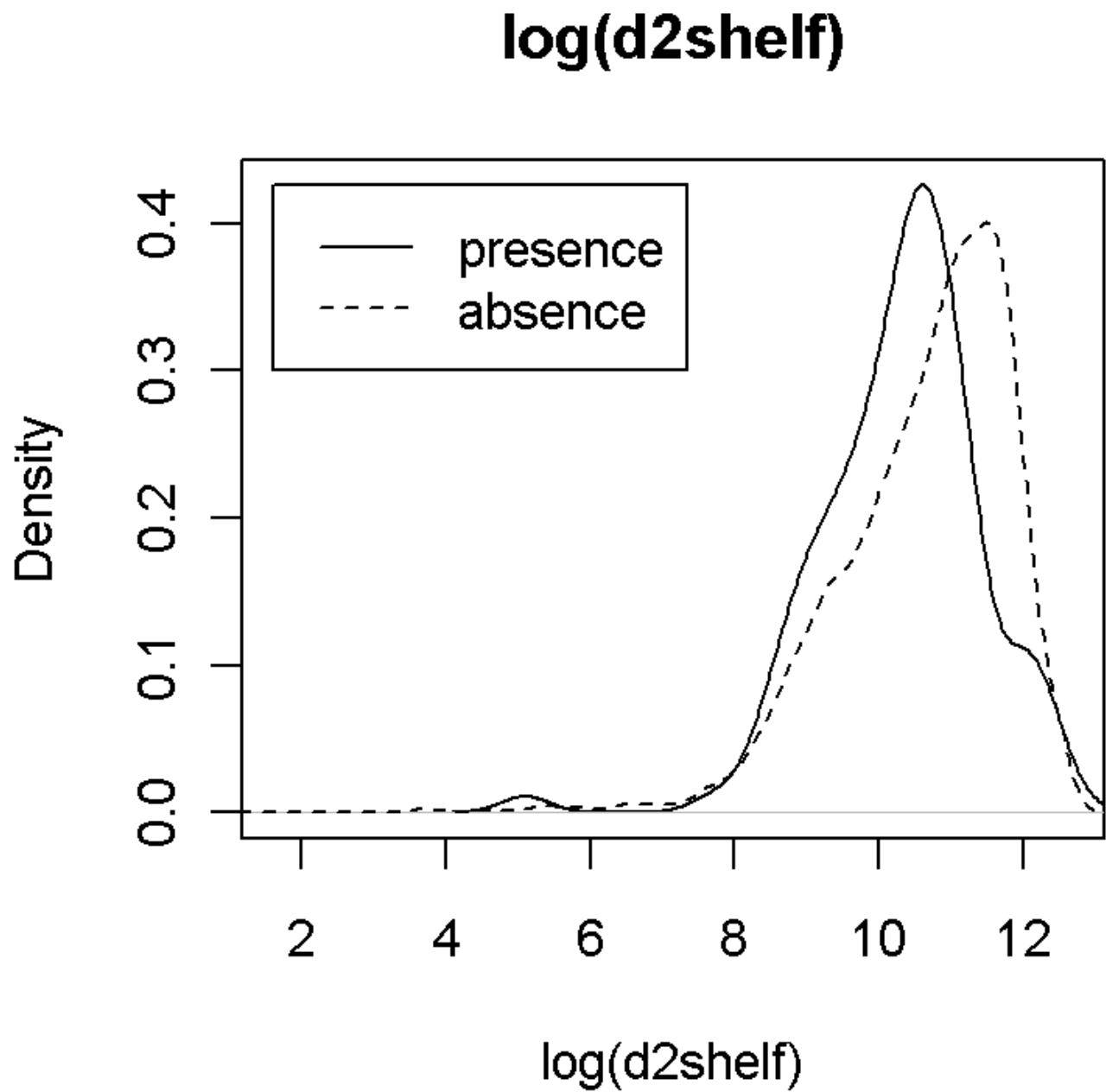


Figure 788: Density histogram of distance to shelf log(meters) for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

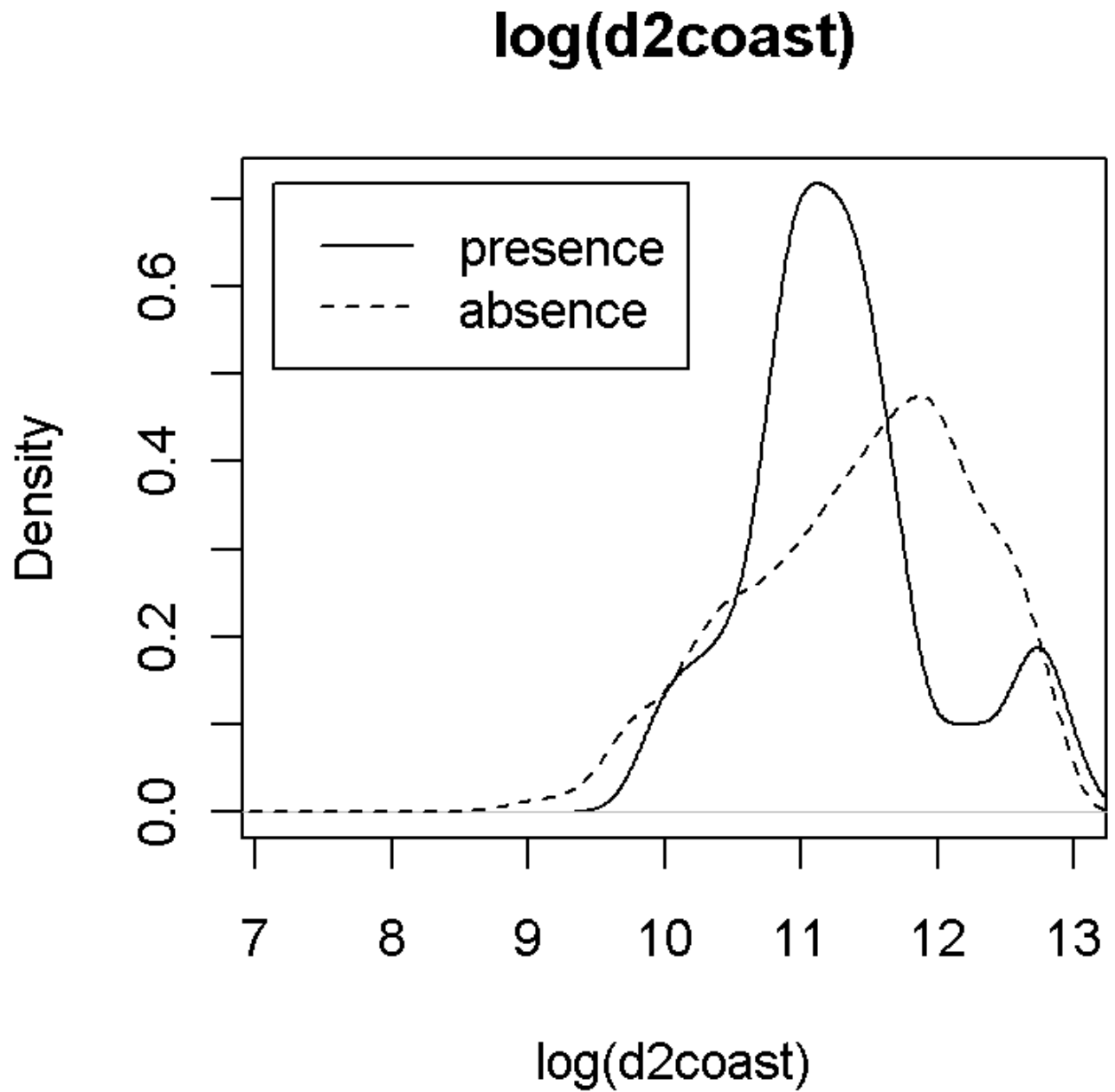


Figure 789: Density histogram of distance to coast log(meters) for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

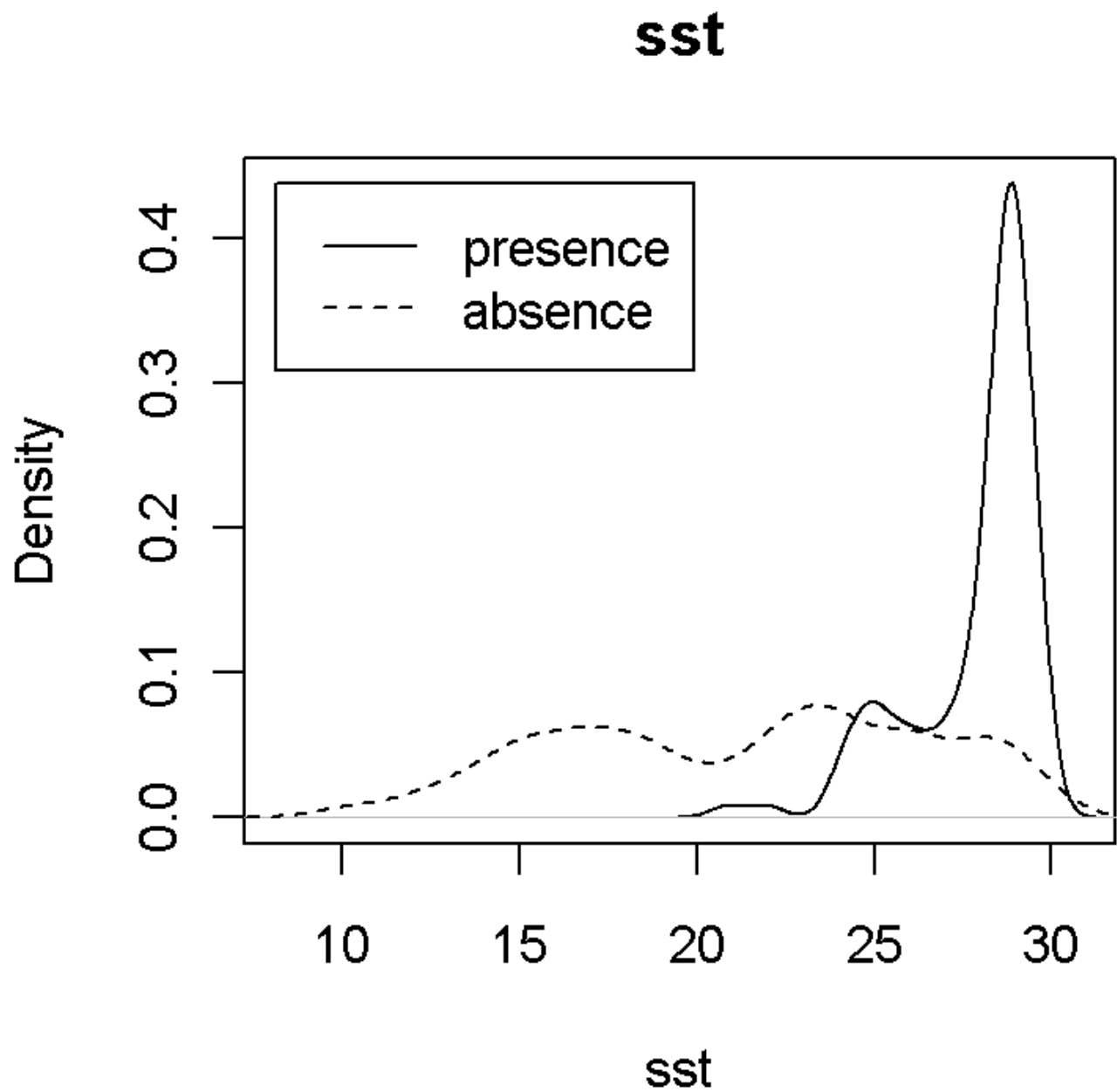


Figure 790: Density histogram of sea-surface temperature (degrees C) for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

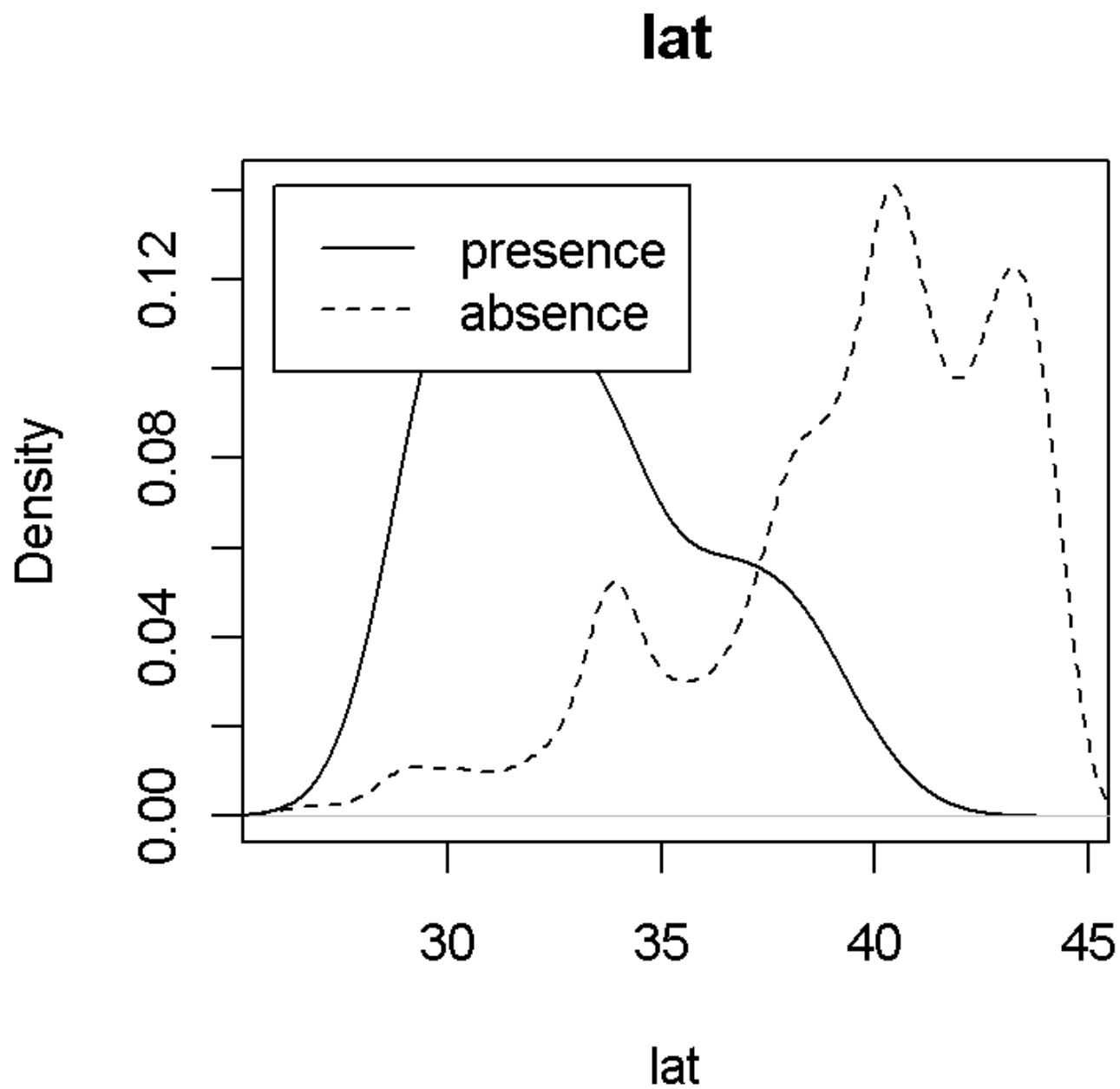


Figure 791: Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'summer' season in 'east2' region.

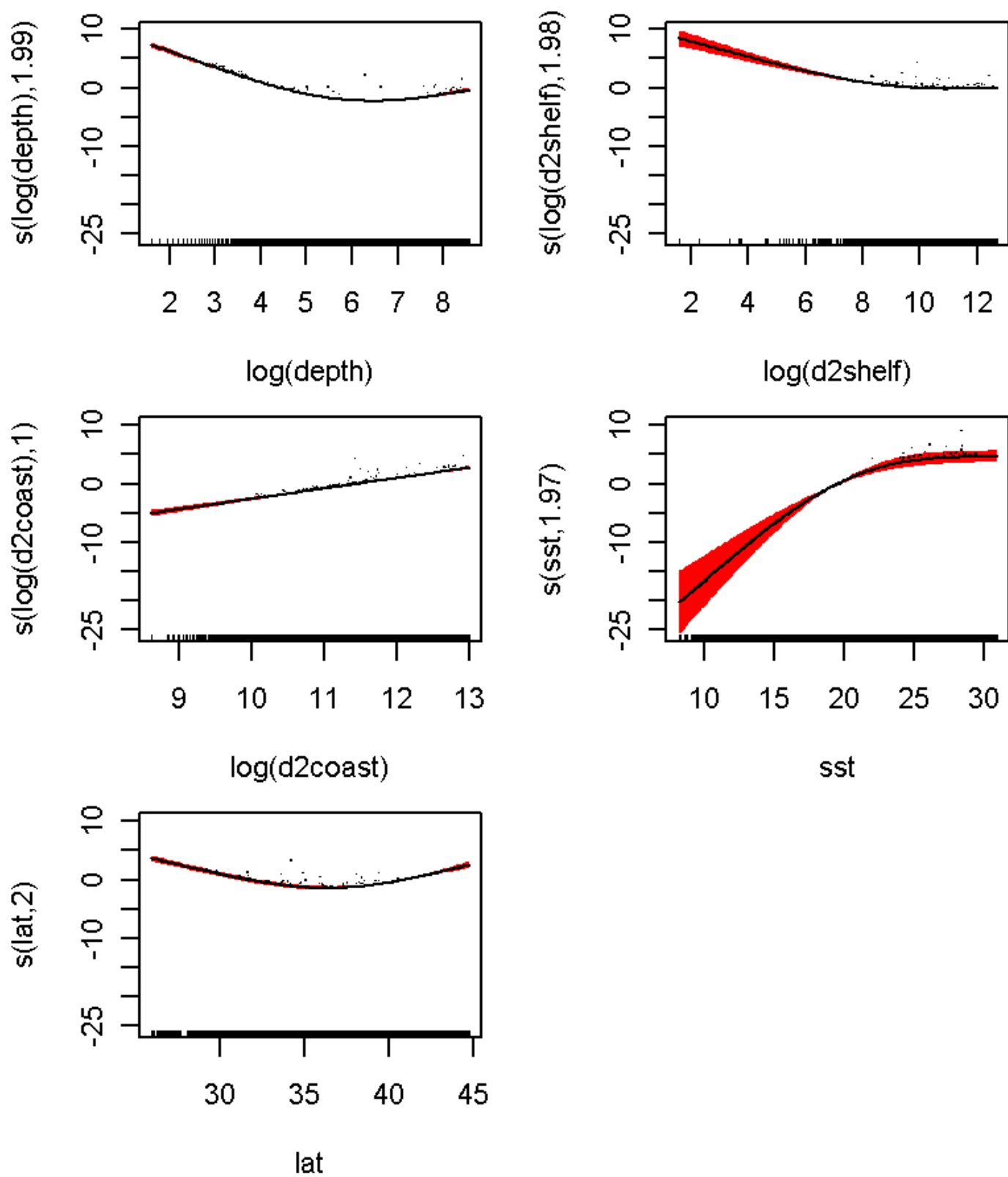


Figure 792: Terms plot of predictors to GAM model fit for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

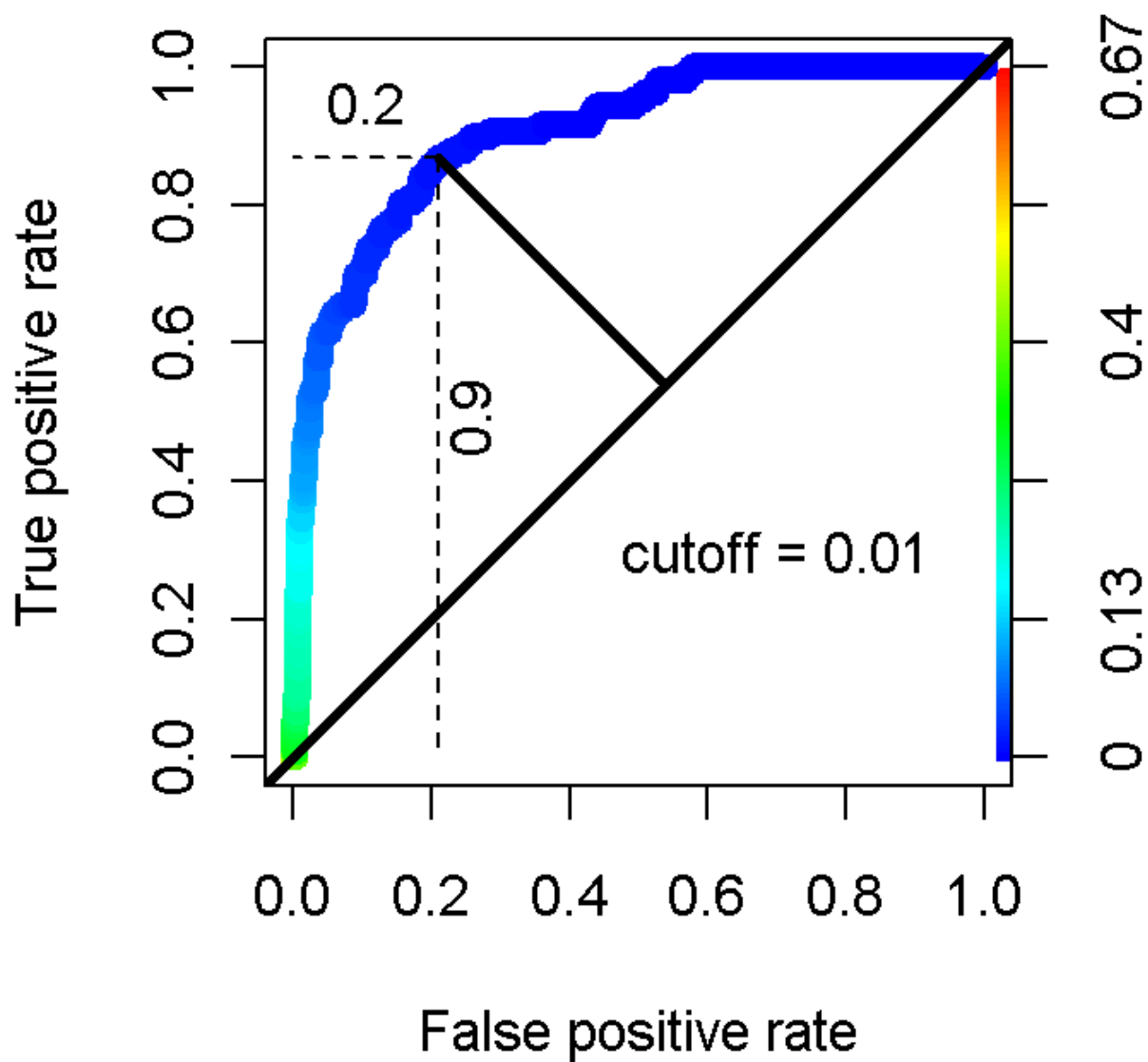


Figure 793: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

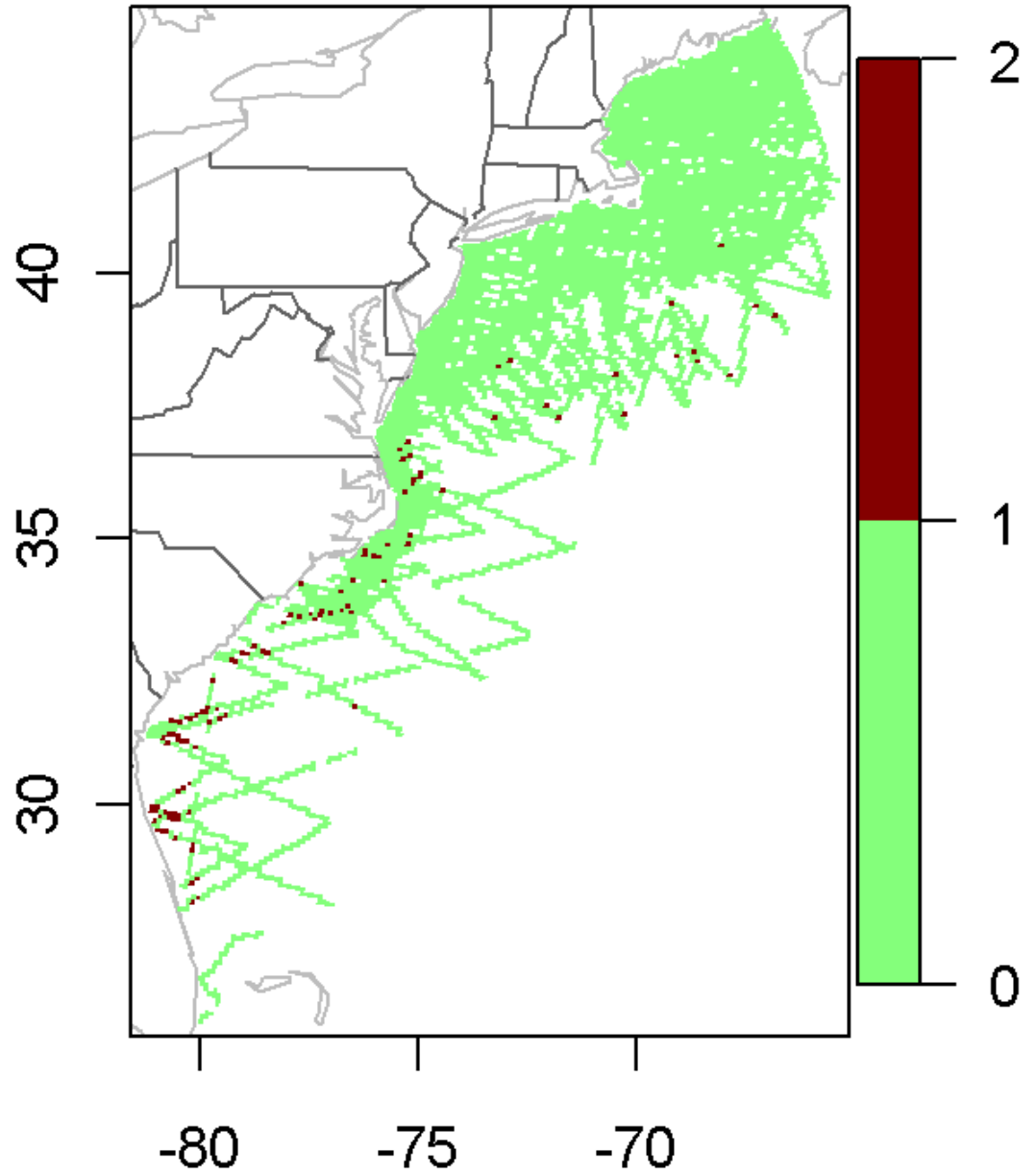


Figure 794: Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'summer' season in 'east2' region.

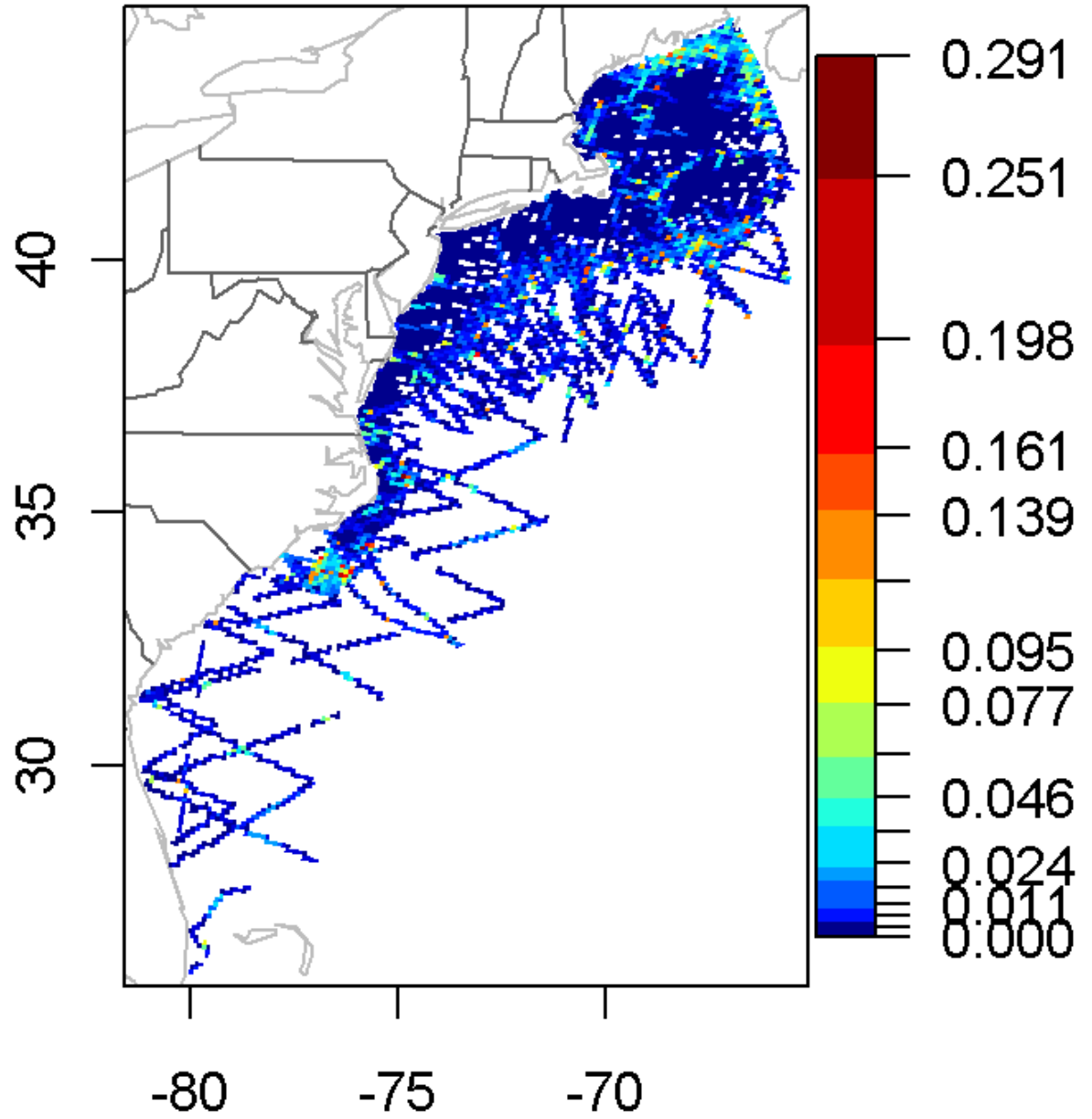


Figure 795: Map of effort(hours/km²) by cell summed through time for 'Stenella frontalis' guild during 'summer' season in 'east2' region.

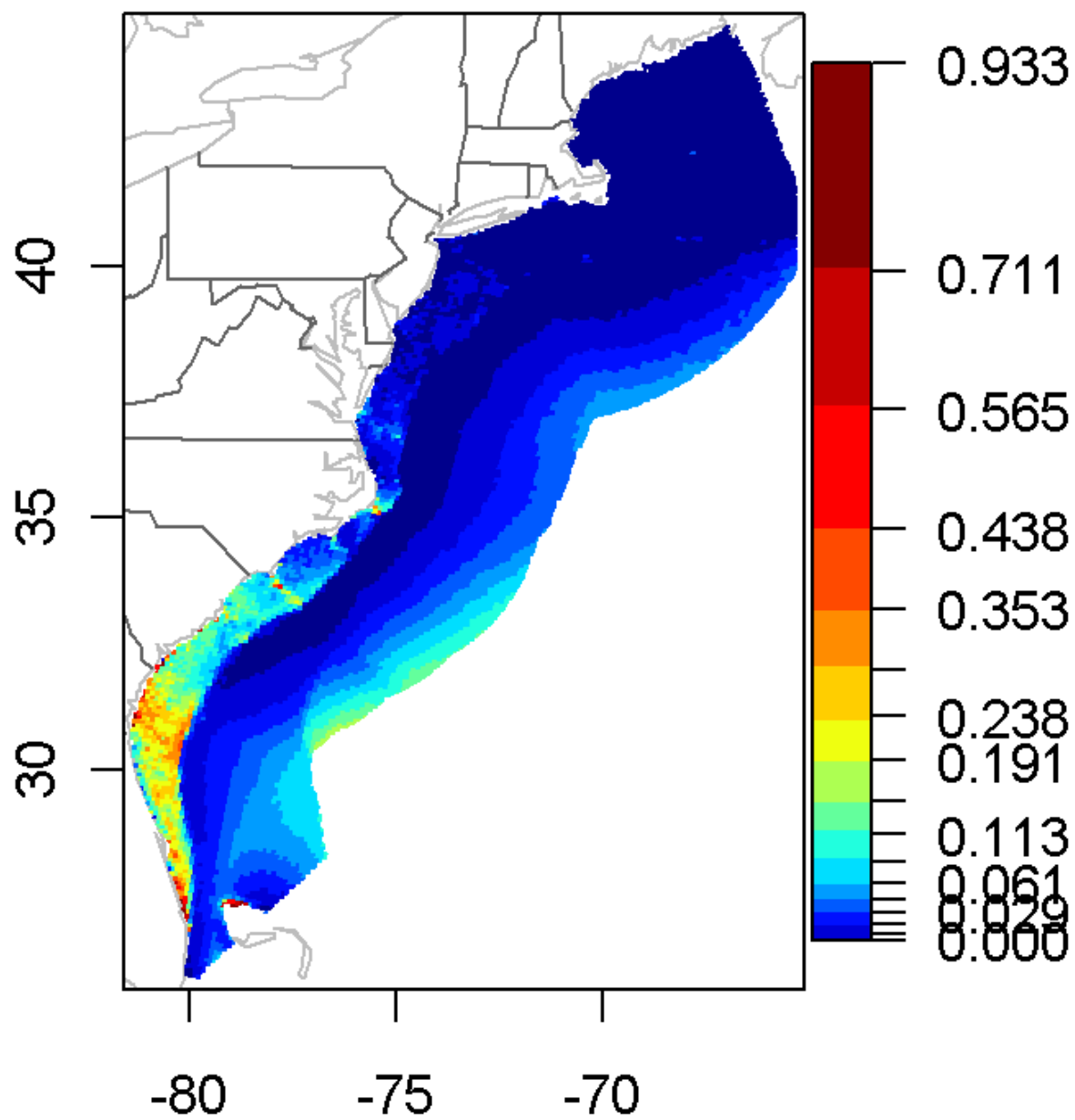


Figure 796: Map of mean predicted habitat for 'Stenella frontalis' guild during 'summer' season in 'east2' region.

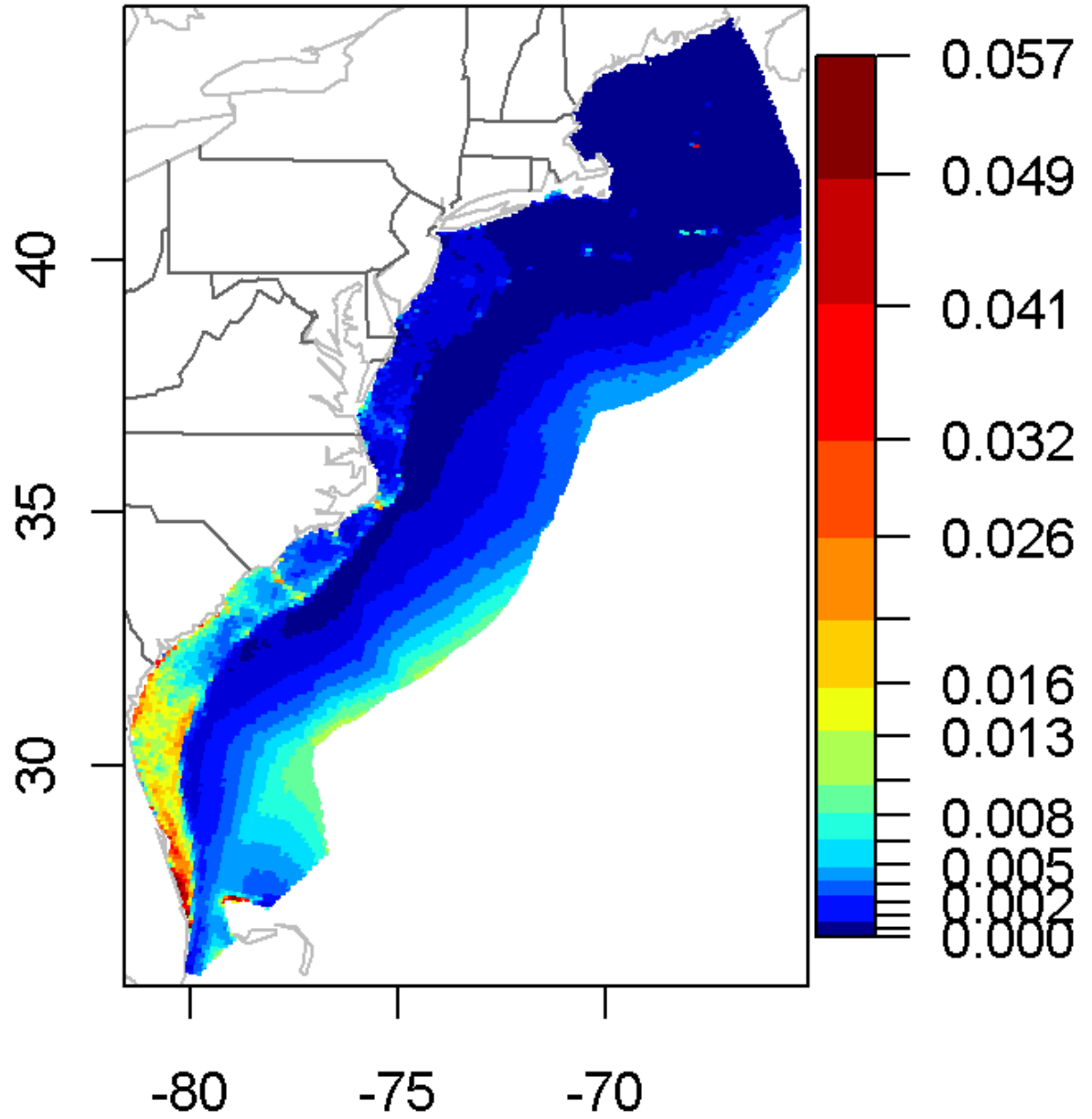


Figure 797: Map of standard error of habitat for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

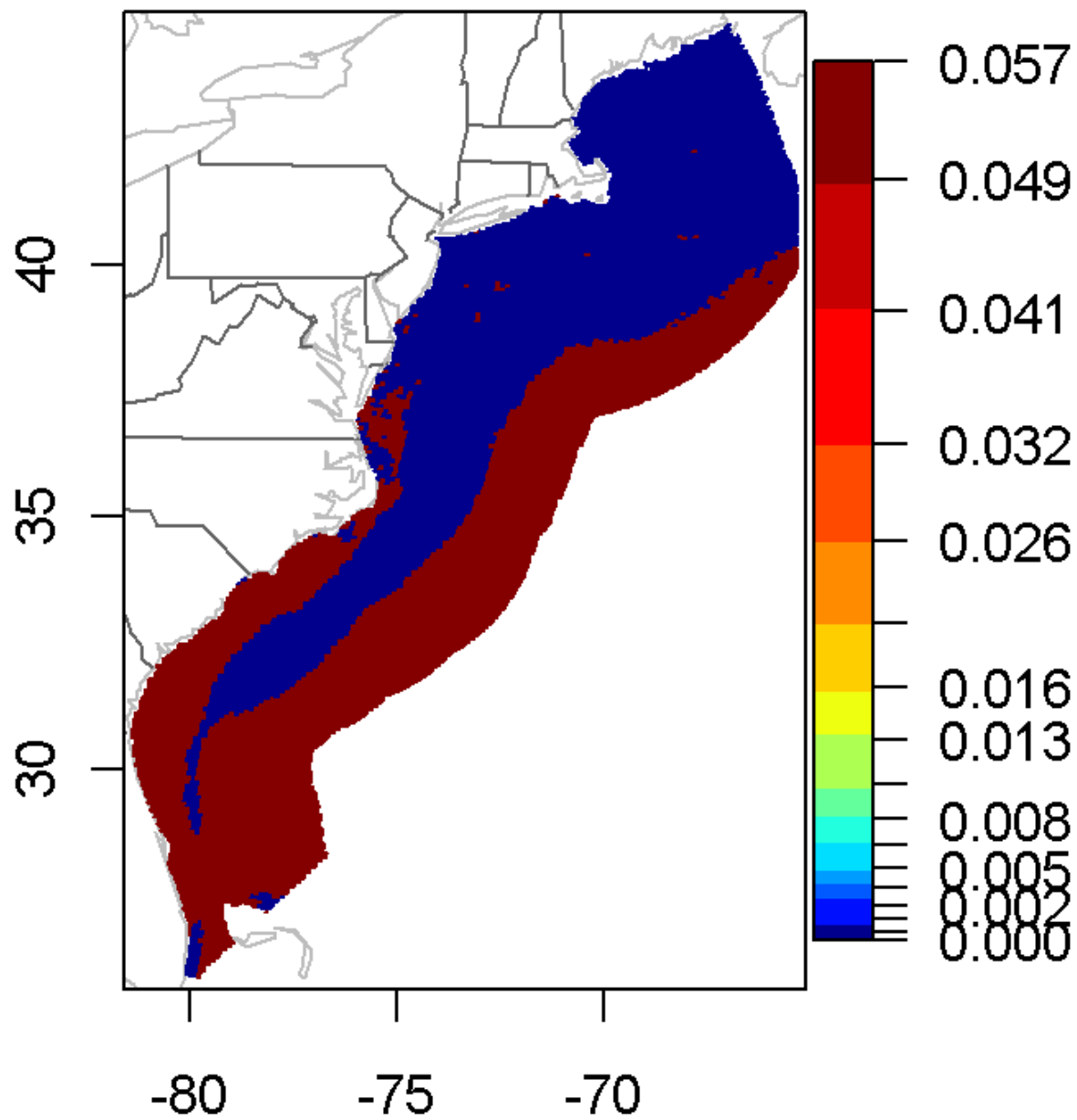


Figure 798: Map of binary habitat (cutoff determined by ROC) for '*Stenella frontalis*' guild during 'summer' season in 'east2' region.

15.3.2 gomex2

Modelrun identifier: duke_06_sf3_summer_gomex2

Date generated: 2008-10-21 11:34:04

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 73: Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	69
Number.absences	1335
GAM.converged	TRUE
R.squared	0.491978
Deviance.explained	0.413624
ROC.optimum	0.425924
Maximum.fit	0.0128391
Maximum.prediction	0.429672

Model text summary...

```
duke_06_sf3_summer_gomex2 run on Tue Oct 21 11:33:24 2008
provider:duke, version:06, guild:Stenella frontalis (sf3), season:'summer', region:gomex2

max.fit:0.425924, max.prediction:0.429672, ROC.optimum:0.012839

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -18.792      2.005   -9.374  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.988e+00  2.488  41.513  < 2e-16 ***
s(log(d2shelf)) 9.733e-01  1.473  41.008  4.71e-14 ***
s(log(d2coast)) 2.769e-06  0.500  2.90e-06    0.968
s(sst)         8.423e-06  0.500  6.88e-05    0.929
s(lat)         1.920e+00  2.420   9.424  2.26e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.492   Deviance explained = 41.4%
GCV score = 0.0015603   Scale est. = 0.0015485   n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13   Min.   : 13.0   Min.   : 901   Min.   : 5700   Min.   :25.35   Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8   1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75   1st Qu.:26.68
              Median :5134 Median : 654.0   Median : 45466 Median :146059 Median :28.50   Median :27.90
              Mean   :4686 Mean   : 899.5   Mean   : 59670 Mean   :161835 Mean   :28.50   Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0   3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25   3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0   Max.   :249222 Max.   :386037 Max.   :31.20   Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :27.67   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48   1st Qu.:26.28
              Median :4110 Median : 433.5   Median : 71100 Median :157258 Median :29.55   Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:7.054e-16	Min.	: 0.0000	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:2.220e-16	1st Qu.	:1.224e-15	1st Qu.	: 0.0000	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:8.797e-06	Median	:9.895e-06	Median	: 0.0000	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:4.509e-02	Mean	:5.594e-03	Mean	: 0.0634	Mean	:1.213e-02	Mean	:0.3423
3rd Qu.	:6015	3rd Qu.	:4.826e-02	3rd Qu.	:1.044e-02	3rd Qu.	: 0.0000	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:4.297e-01	Max.	:3.633e-02	Max.	: 2.0000	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5568.0000	NA's	:5.568e+03		

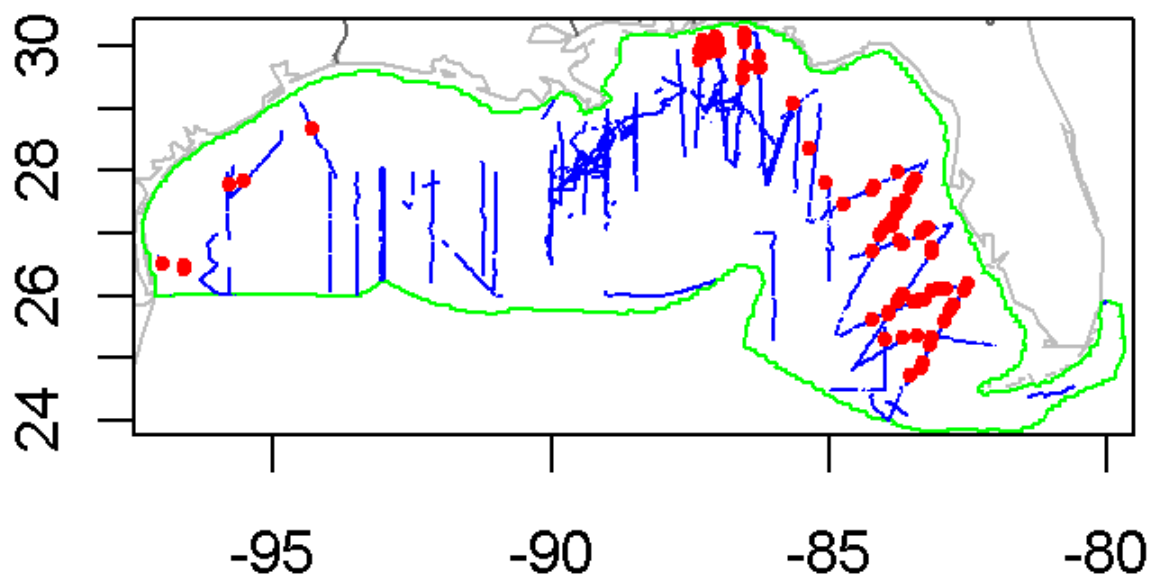


Figure 799: Map of points of observational sightings and tracks of survey effort for '*Stenella frontalis*' guild during 'summer' season in 'gomex2' region.

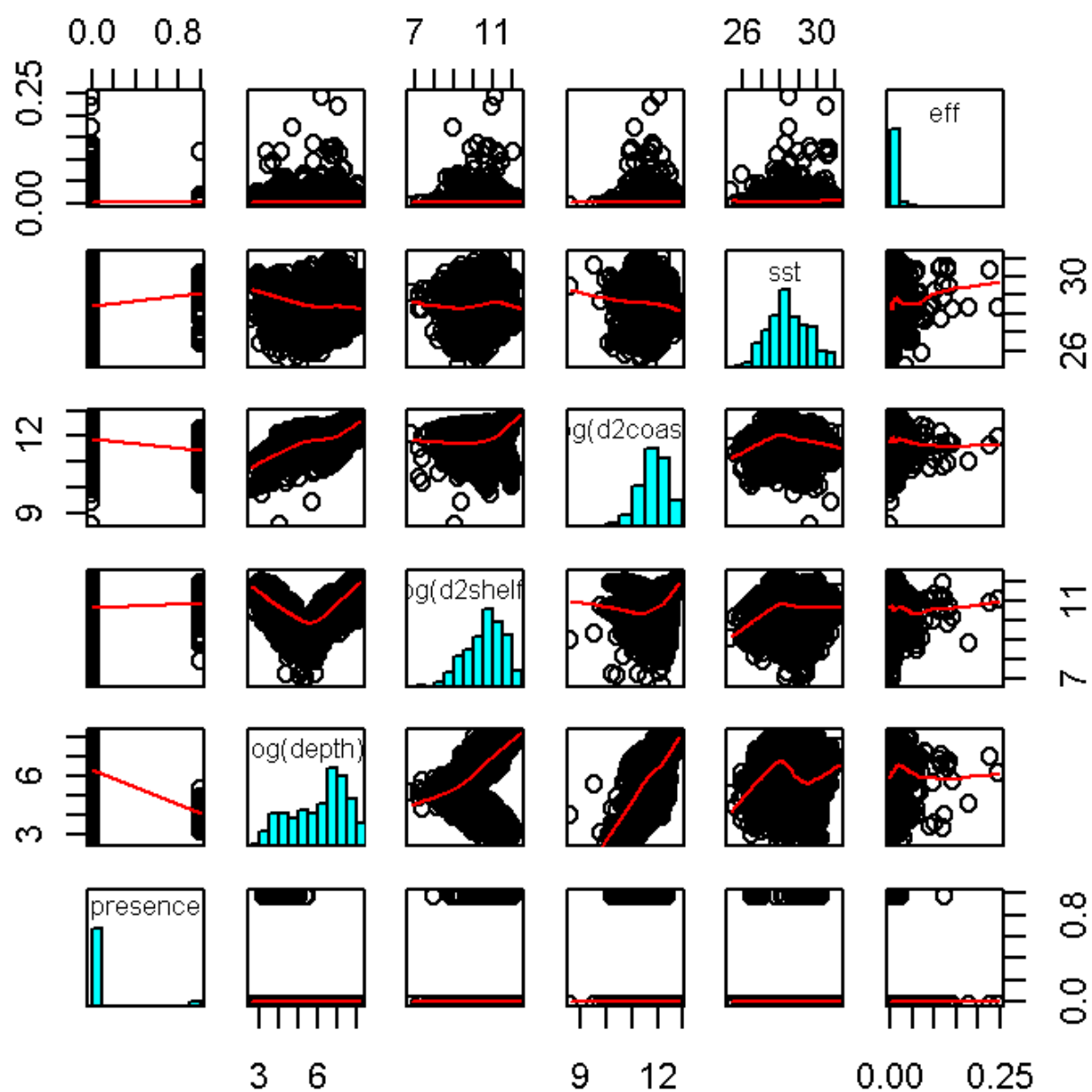


Figure 800: Pairs plot of input variables for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

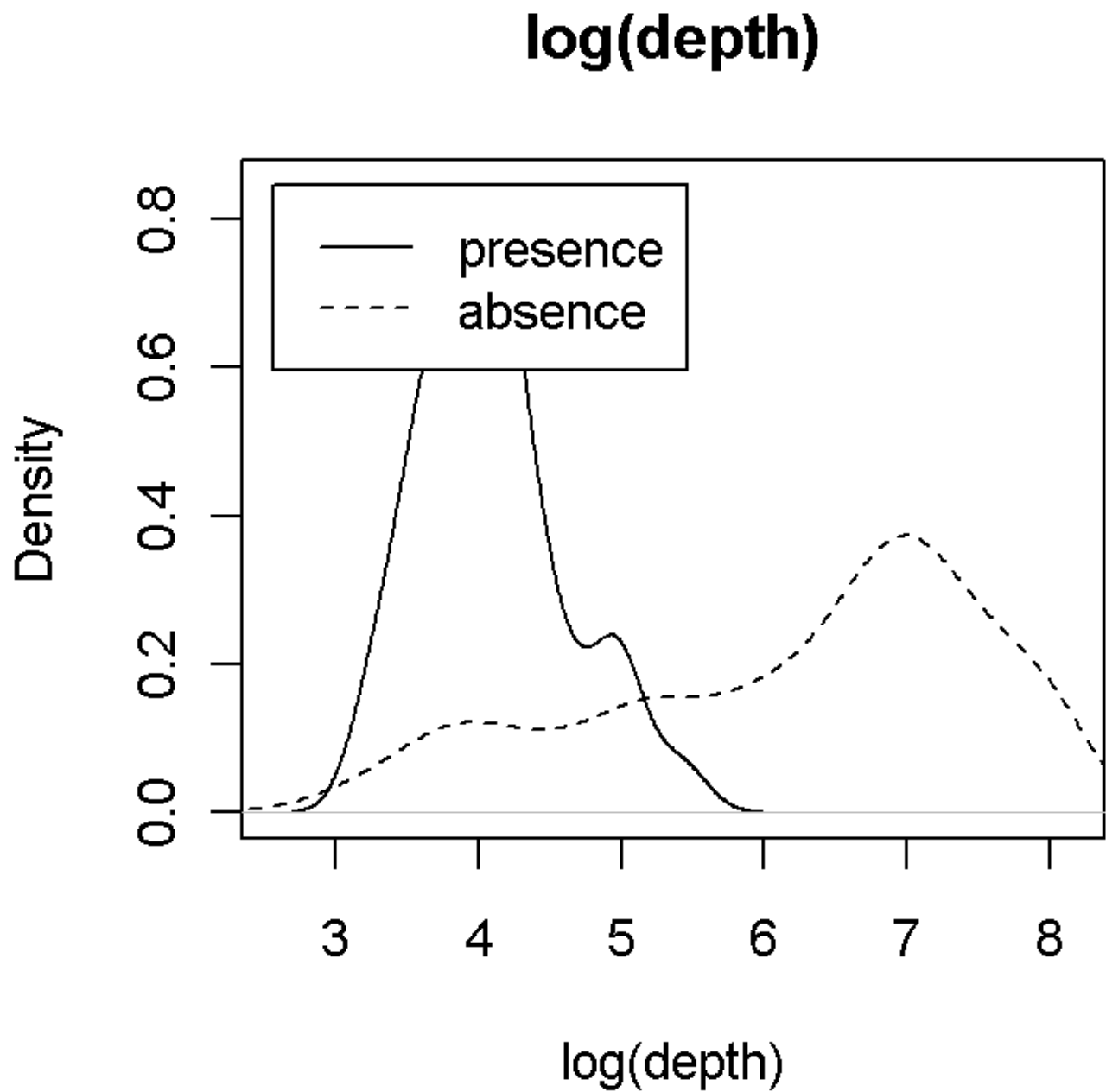


Figure 801: Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

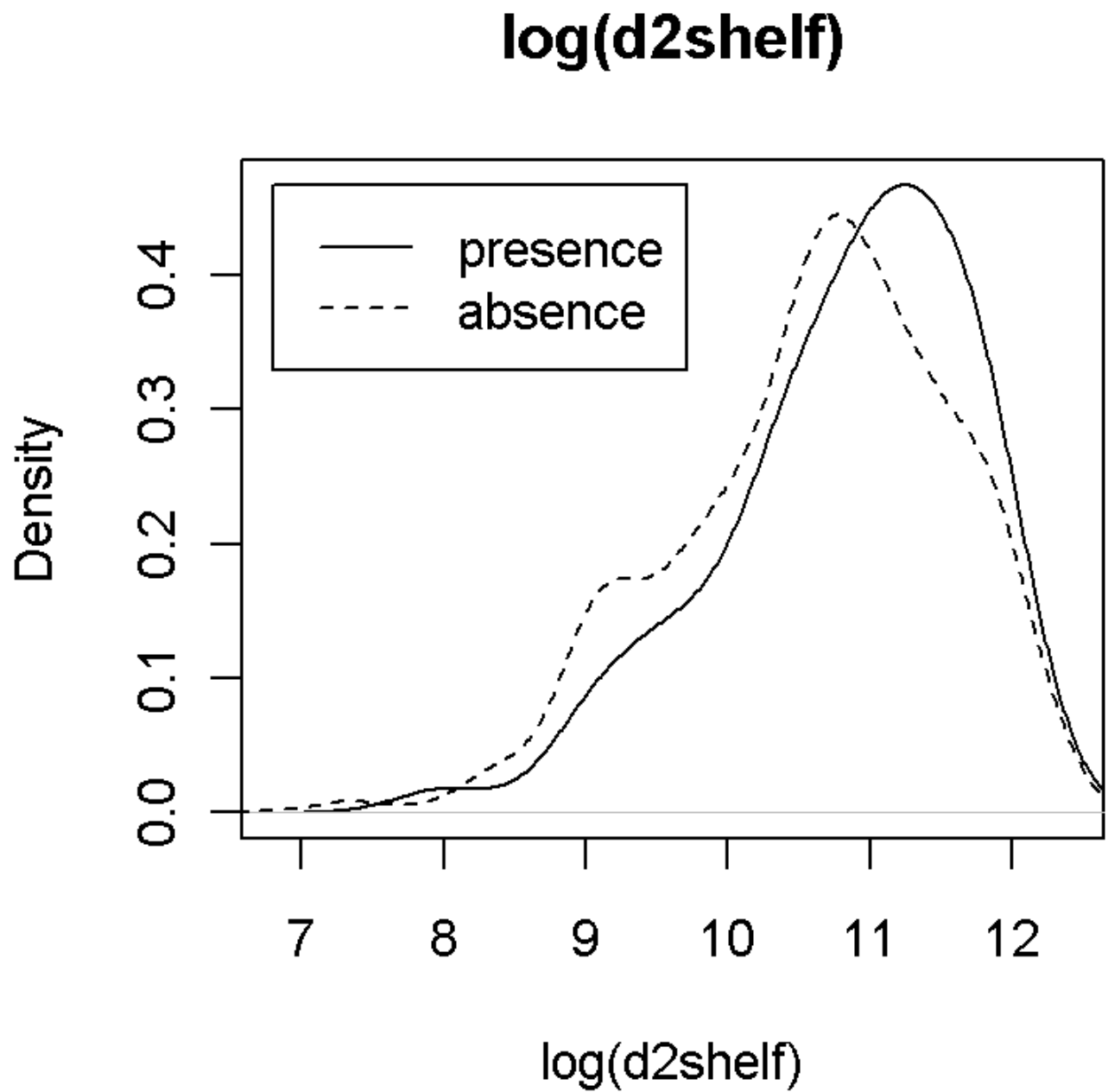


Figure 802: Density histogram of distance to shelf log(meters) for '*Stenella frontalis*' guild during 'summer' season in 'gomex2' region.

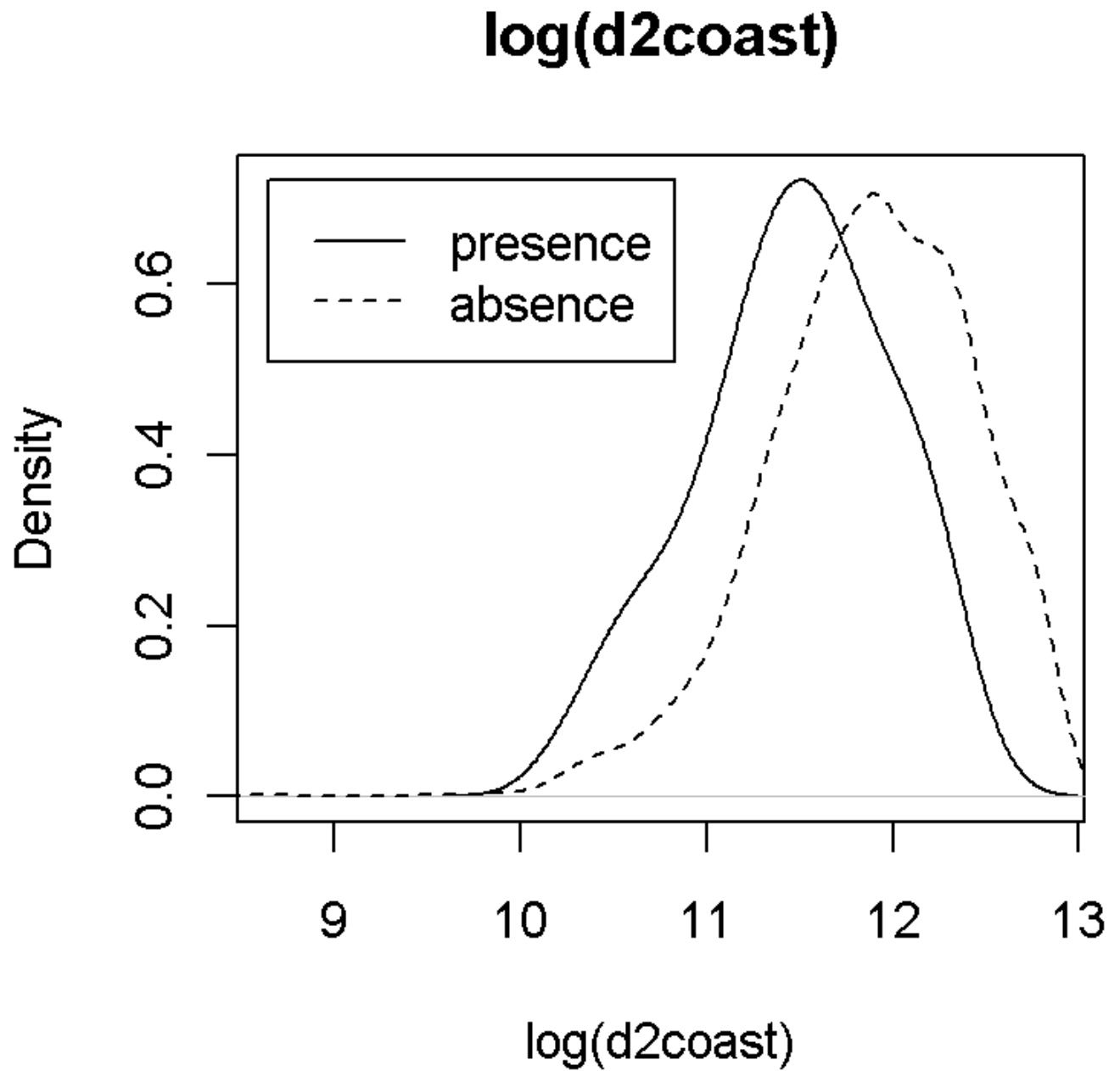


Figure 803: Density histogram of distance to coast log(meters) for '*Stenella frontalis*' guild during 'summer' season in 'gomex2' region.

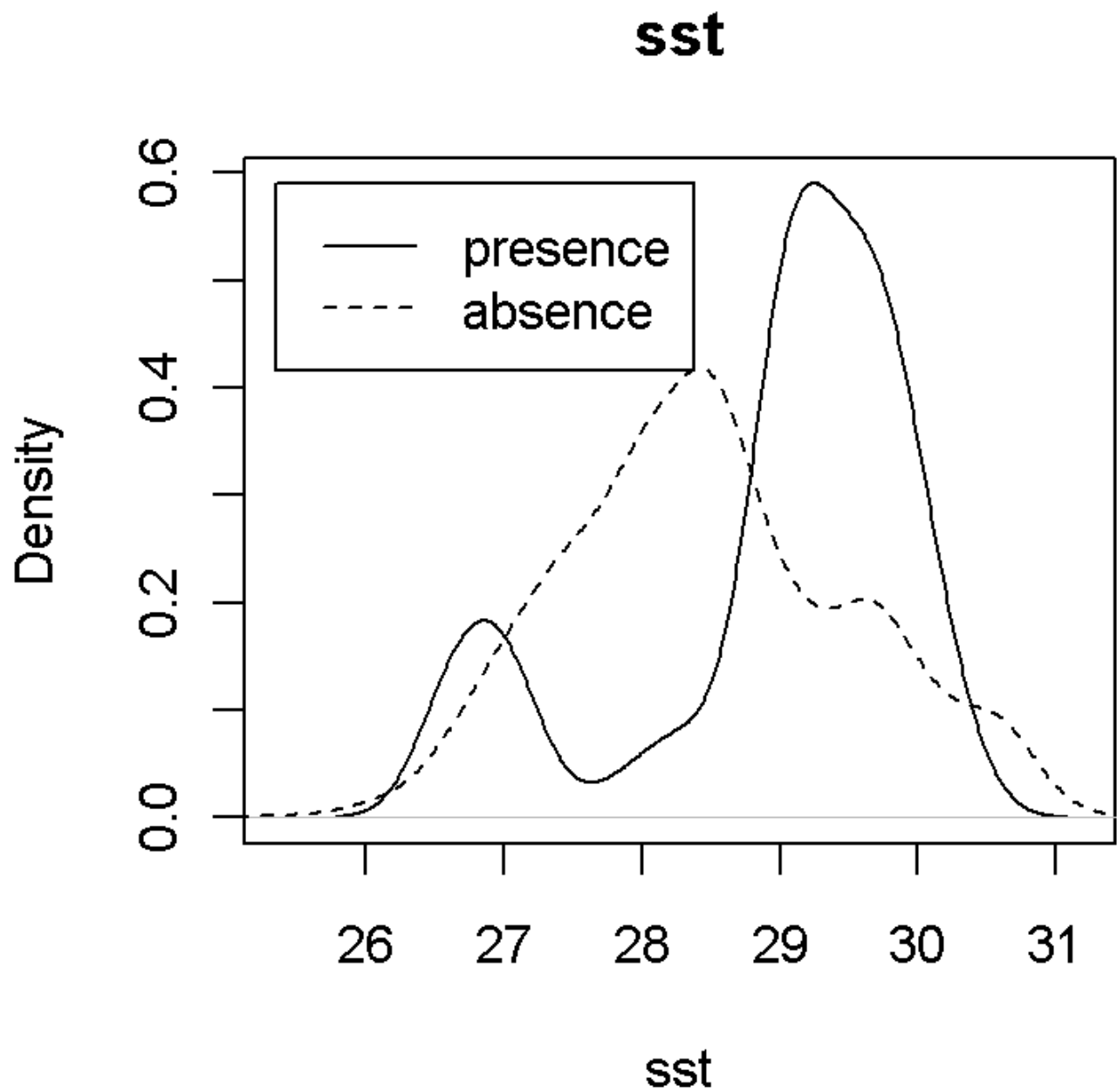


Figure 804: Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

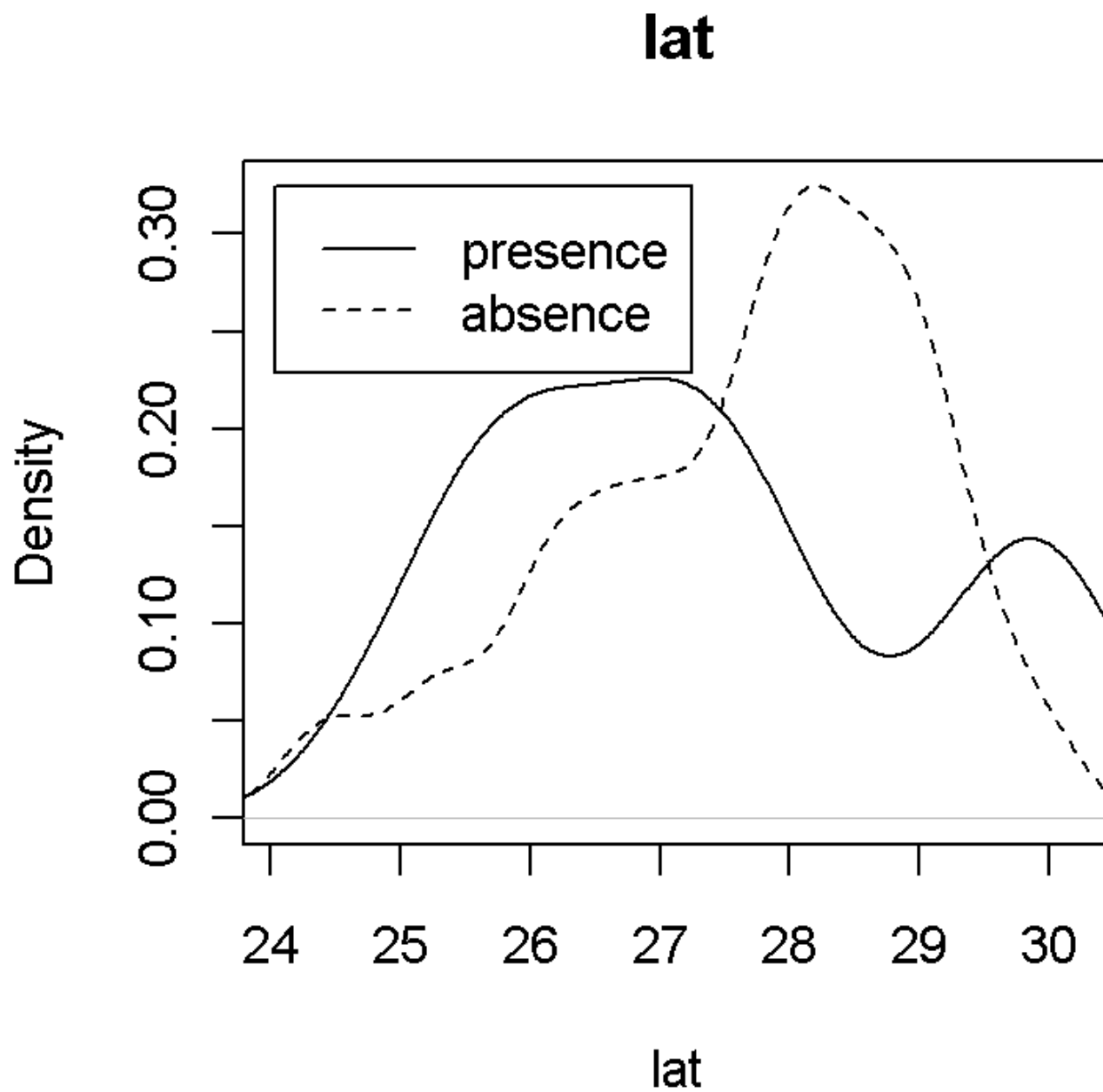


Figure 805: Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

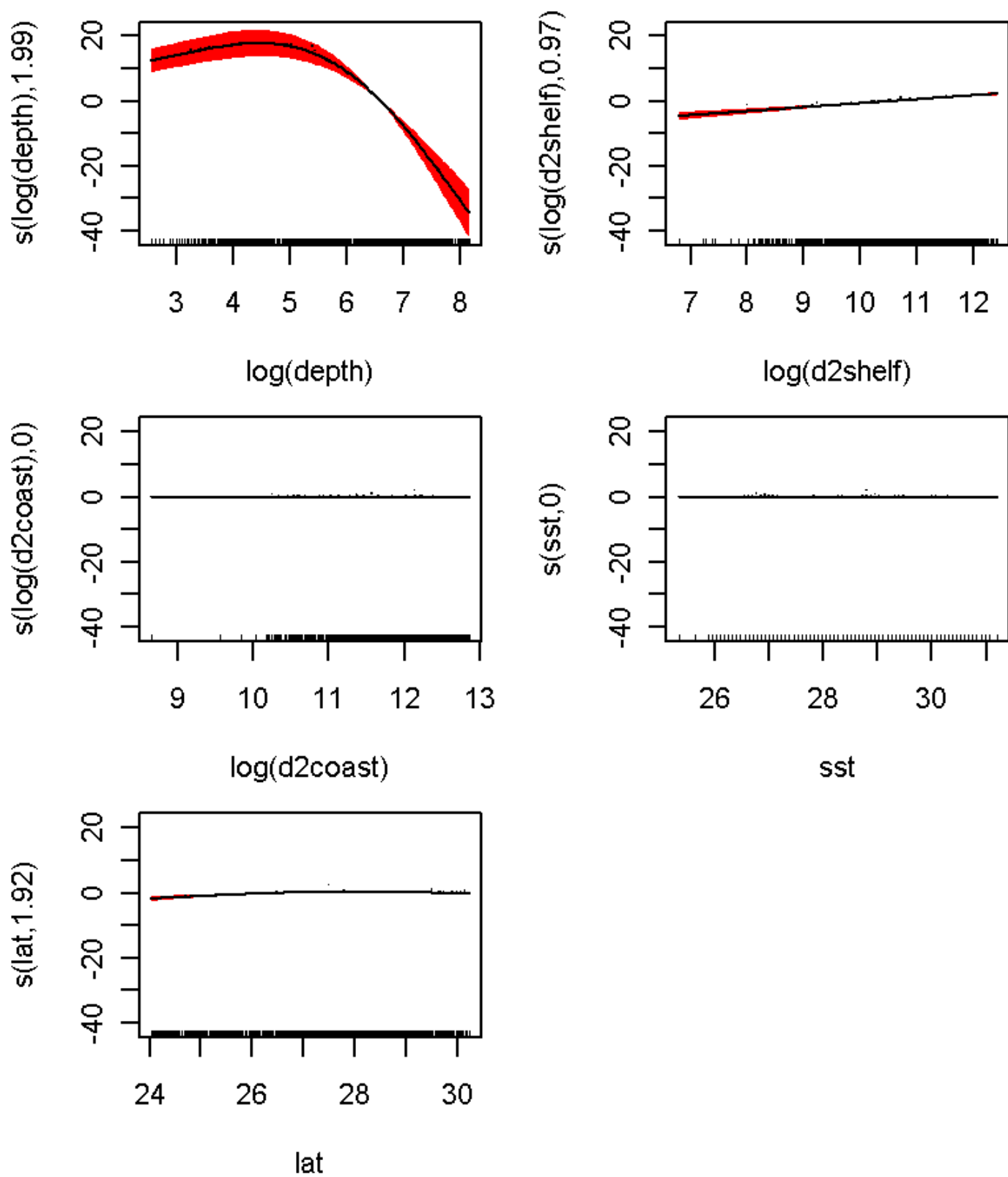


Figure 806: Terms plot of predictors to GAM model fit for '*Stenella frontalis*' guild during 'summer' season in 'gomex2' region.

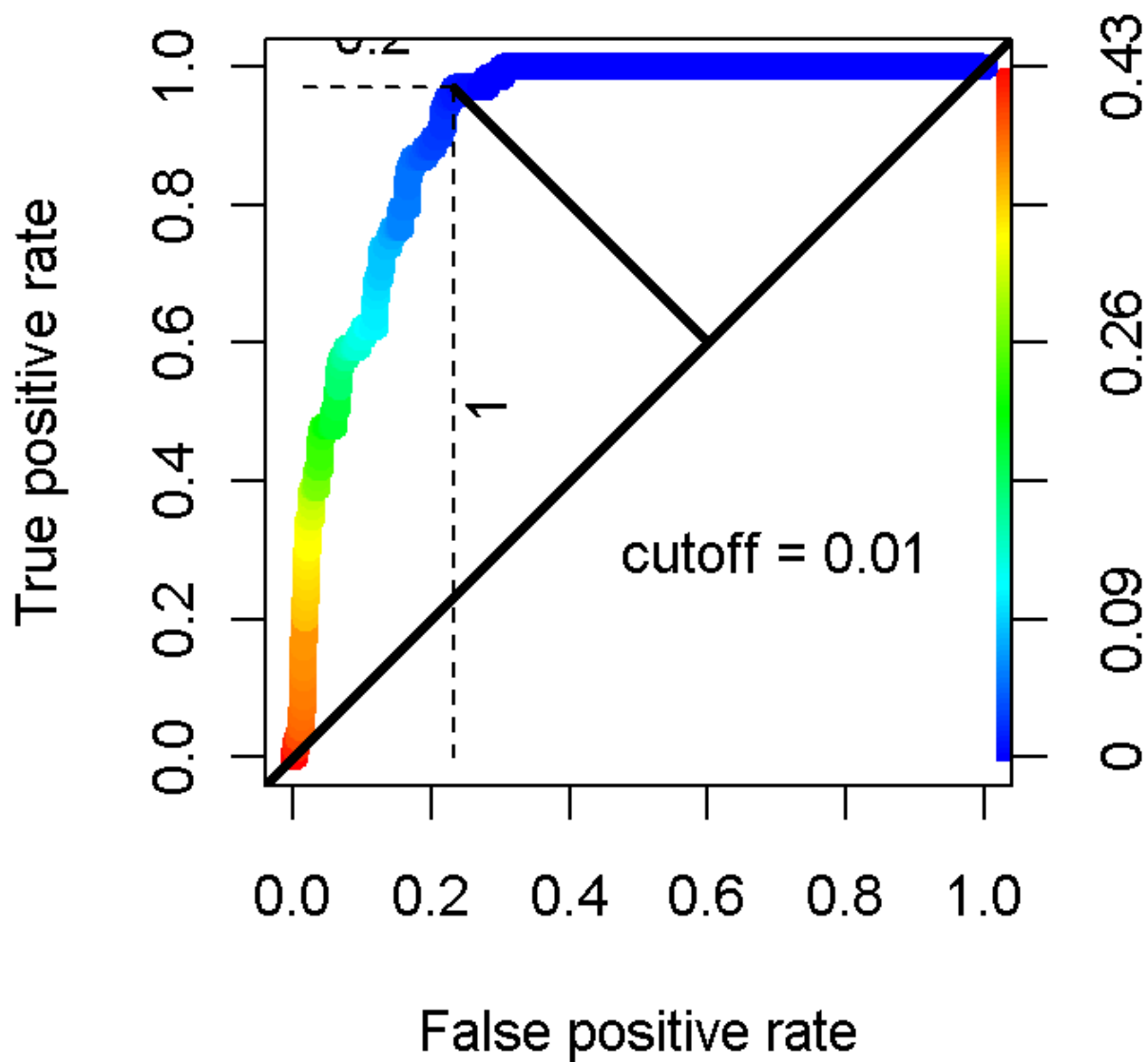


Figure 807: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella frontalis*' guild during 'summer' season in 'gomex2' region.

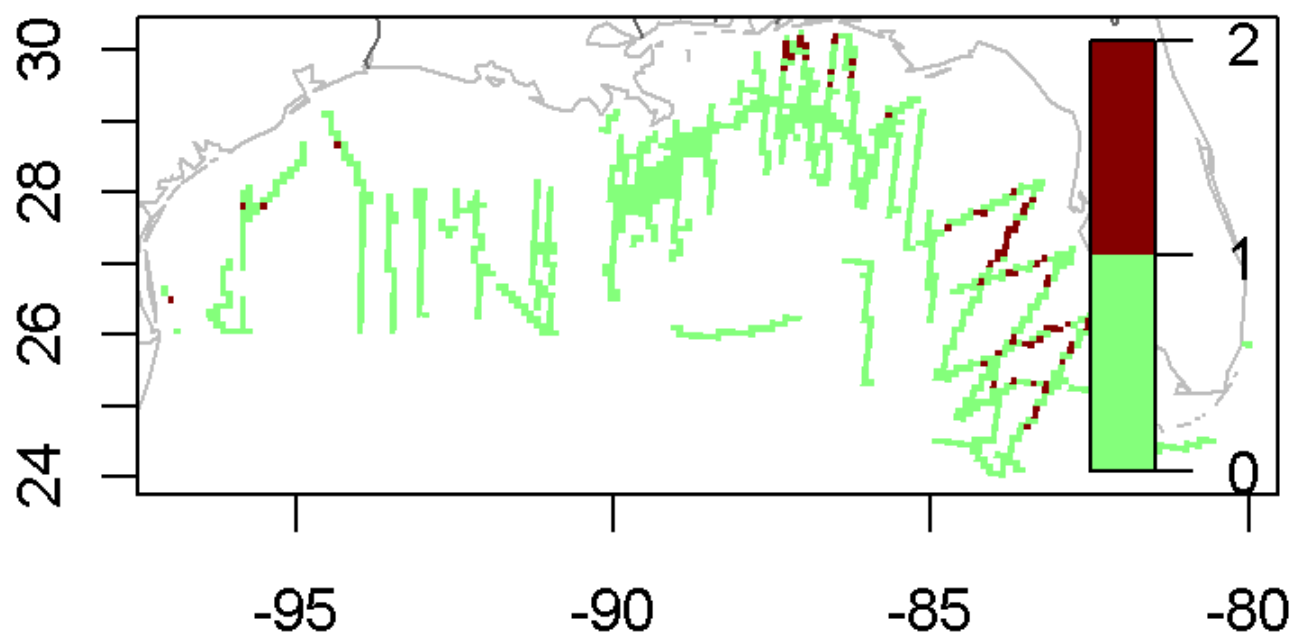


Figure 808: Map of presence and absence by cell summed through time for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

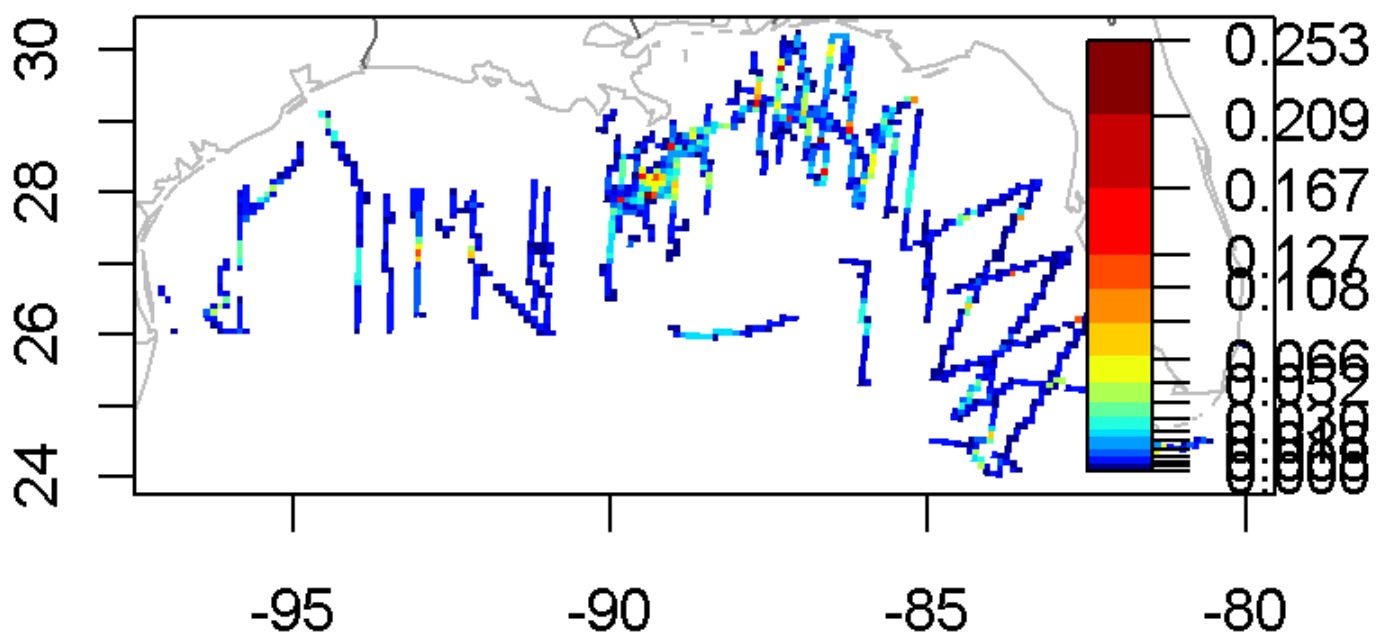


Figure 809: Map of effort(hours/km²) by cell summed through time for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

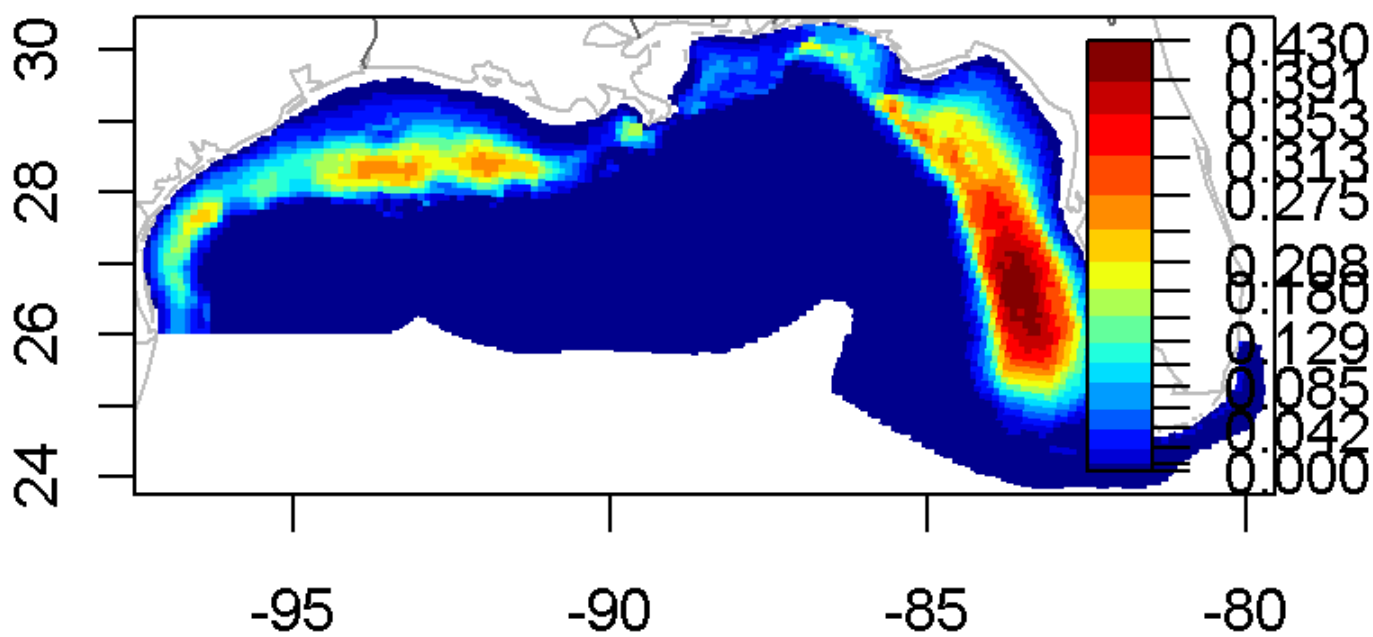


Figure 810: Map of mean predicted habitat for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

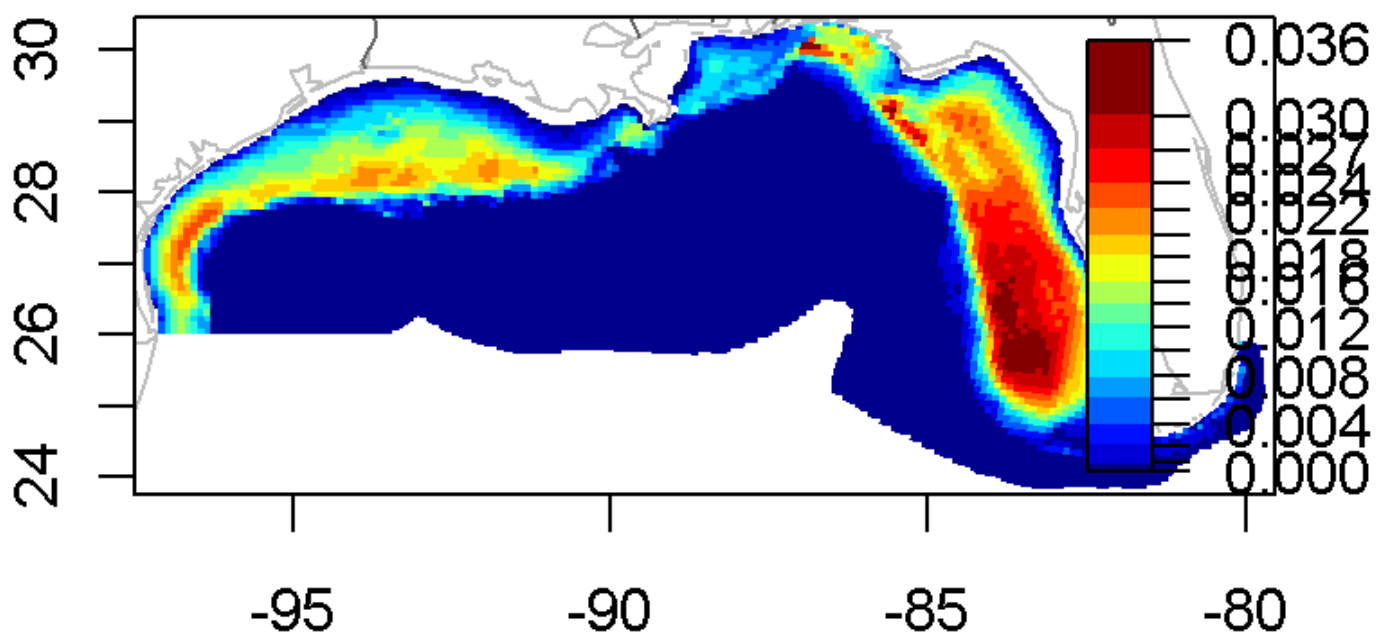


Figure 811: Map of standard error of habitat for 'Stenella frontalis' guild during 'summer' season in 'gomex2' region.

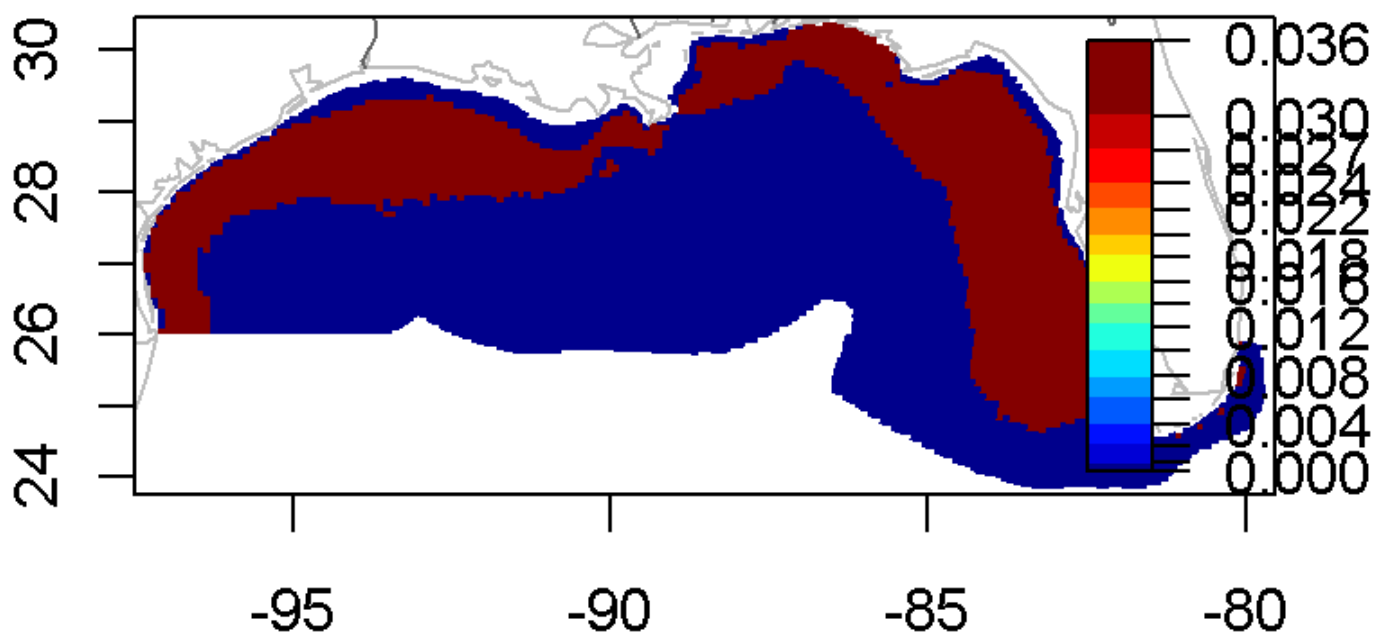


Figure 812: Map of binary habitat (cutoff determined by ROC) for '*Stenella frontalis*' guild during 'summer' season in 'gomex2' region.

15.4 winter

15.4.1 east2

Modelrun identifier: duke_06_sf3_winter_east2

Date generated: 2008-10-21 15:19:45

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 74: Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'winter' season in 'east2' region.

	Value
Number.presences	23
Number.absences	3879
GAM.converged	TRUE
R.squared	-0.0152206
Deviance.explained	0.0659524
ROC.optimum	0.0323934
Maximum.fit	0.00367143
Maximum.prediction	0.032918

Model text summary...

```
duke_06_sf3_winter_east2 run on Tue Oct 21 15:17:32 2008
provider:duke, version:06, guild:Stenella frontalis (sf3), season:'winter', region:east2

max.fit:0.032393, max.prediction:0.032918, ROC.optimum:0.003671

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.7458      0.1031  -55.7   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  8.942e-01  1.394   12.73 5.57e-05 ***
s(log(d2shelf)) 1.814e-06  0.500  5.75e-06   0.962
s(log(d2coast)) 1.277e-06  0.500  1.02e-05   0.956
s(sst)          4.839e-07  0.500  1.65e-05   0.950
s(lat)          9.585e-01  1.459   49.26 < 2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = -0.0152 Deviance explained = 6.6%
GCV score = 0.00022456 Scale est. = 0.00022406 n = 2337

summary(dat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2: 844   Min.    : 1654   Min.    : 4.0   Min.    : 995   Min.    : 1471   Min.    : 2.654   Min.    :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0   1st Qu.: 18575  1st Qu.: 32272  1st Qu.: 13.500  1st Qu.:32.77
          Median :10479 Median : 28.0   Median : 38452  Median : 53042  Median : 19.208  Median :34.02
          Mean   : 9475   Mean   :153.2   Mean   : 44646  Mean   : 63558  Mean   : 17.745  Mean   :33.66
          3rd Qu.:10987  3rd Qu.: 41.0   3rd Qu.: 65053  3rd Qu.: 78087  3rd Qu.: 21.825  3rd Qu.:34.80
          Max.    :12763  Max.    :3612.0  Max.    :274566  Max.    :348168  Max.    : 26.400  Max.    :38.20
                   NA's : 14      NA's : 14      NA's :1561.000

summary(newdat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685  Min.    : 1633   Min.    : 4   Min.    : 5   Min.    : 1259   Min.    : 2.400   Min.    :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.: 9.075   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :0.0001642  Min.   :5.652e-05  Min.   :0.000e+00  Min.   :9.035e-07  Min.   :0.0000
1st Qu.: 9145  1st Qu.:0.0012349  1st Qu.:2.441e-04  1st Qu.:0.000e+00  1st Qu.:7.474e-04  1st Qu.:0.0000
Median :11616  Median :0.0031563  Median :6.593e-04  Median :0.000e+00  Median :3.451e-03  Median :0.0000
Mean   :11171  Mean   :0.0055341  Mean   :8.104e-04  Mean   :1.743e-02  Mean   :9.821e-03  Mean   :0.4605
3rd Qu.:14088  3rd Qu.:0.0080538  3rd Qu.:1.135e-03  3rd Qu.:0.000e+00  3rd Qu.:9.825e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :0.0329180  Max.   :5.018e-03  Max.   :2.000e+00  Max.   :2.547e-01  Max.   :1.0000
      NA's :6.0000000  NA's :6.000e+00  NA's :8.454e+03  NA's :8.454e+03
```

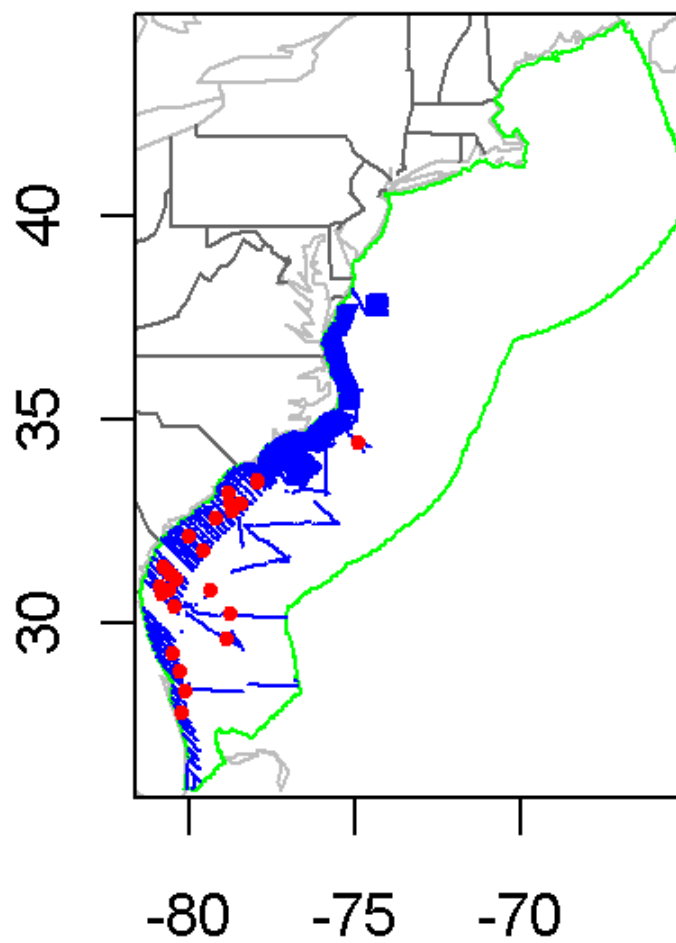


Figure 813: Map of points of observational sightings and tracks of survey effort for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

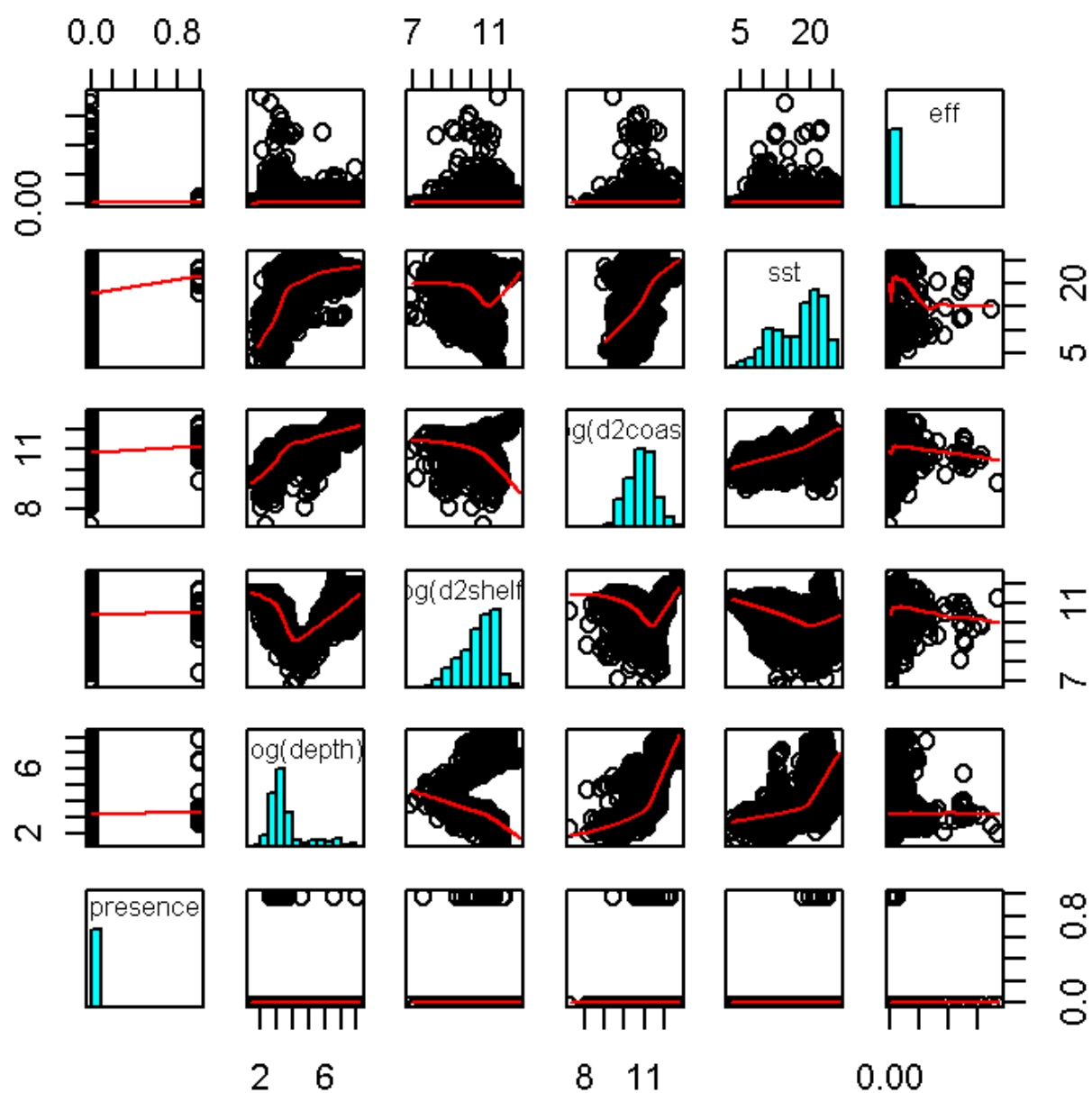


Figure 814: Pairs plot of input variables for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

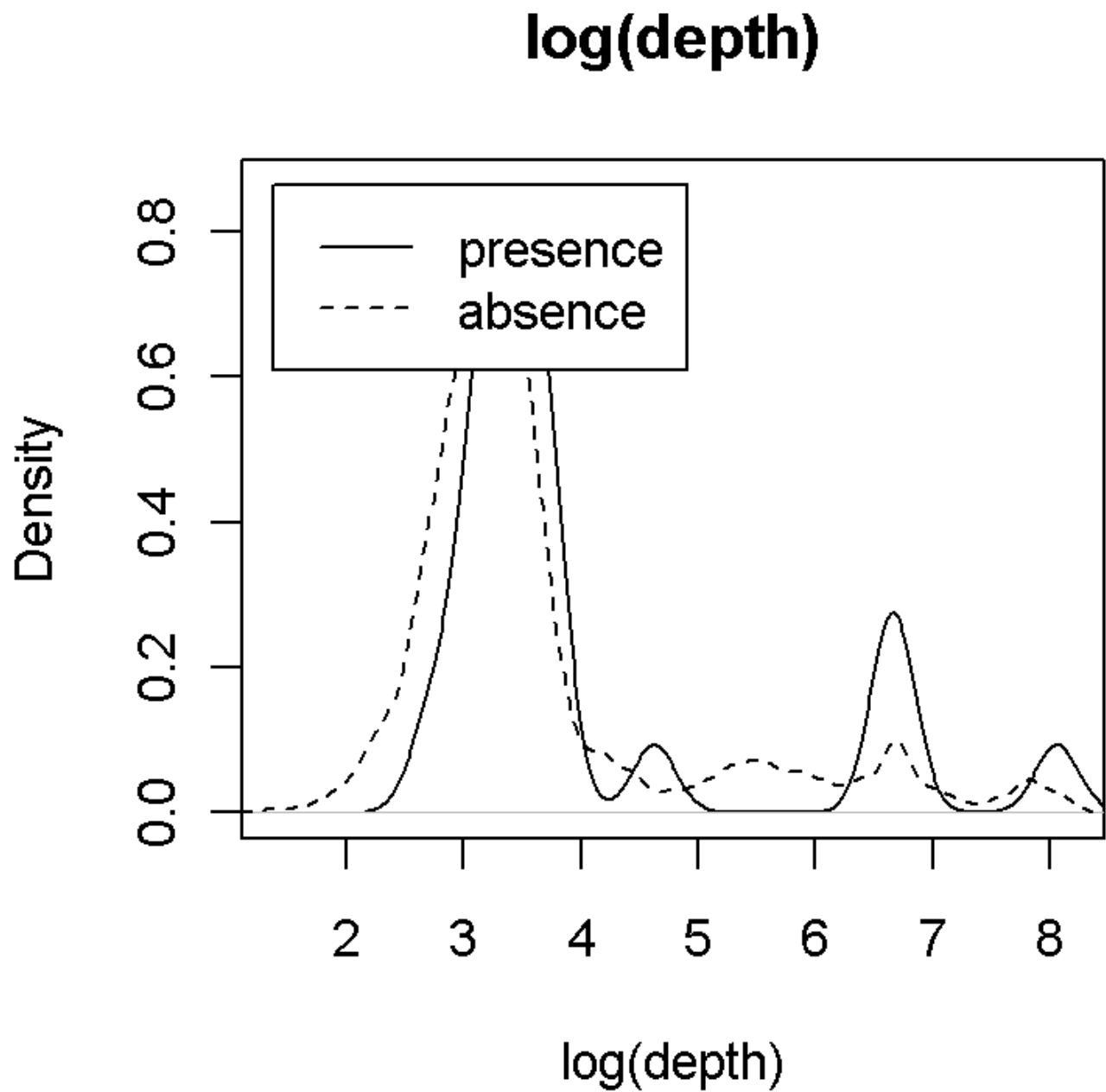


Figure 815: Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'winter' season in 'east2' region.

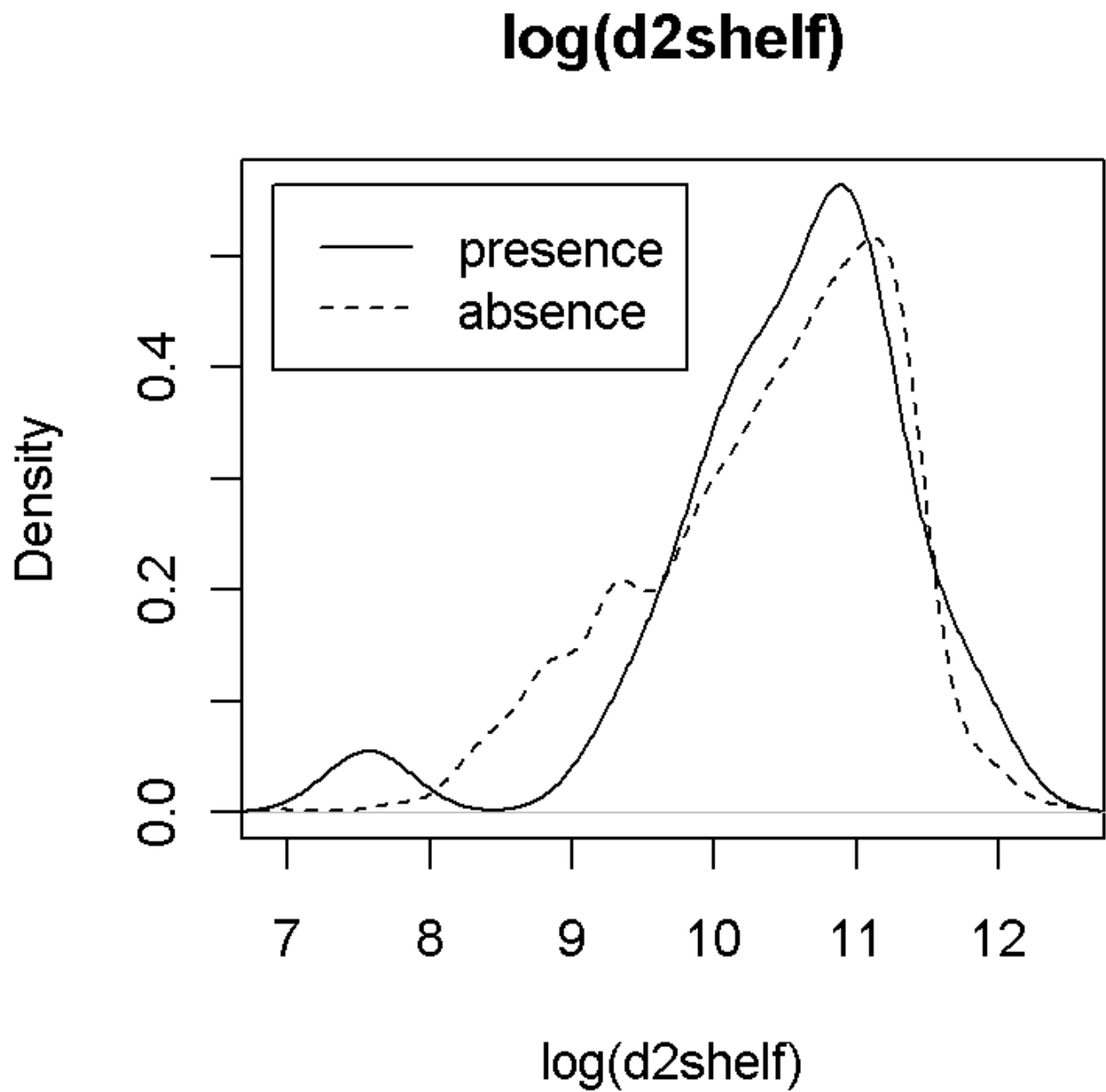


Figure 816: Density histogram of distance to shelf log(meters) for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

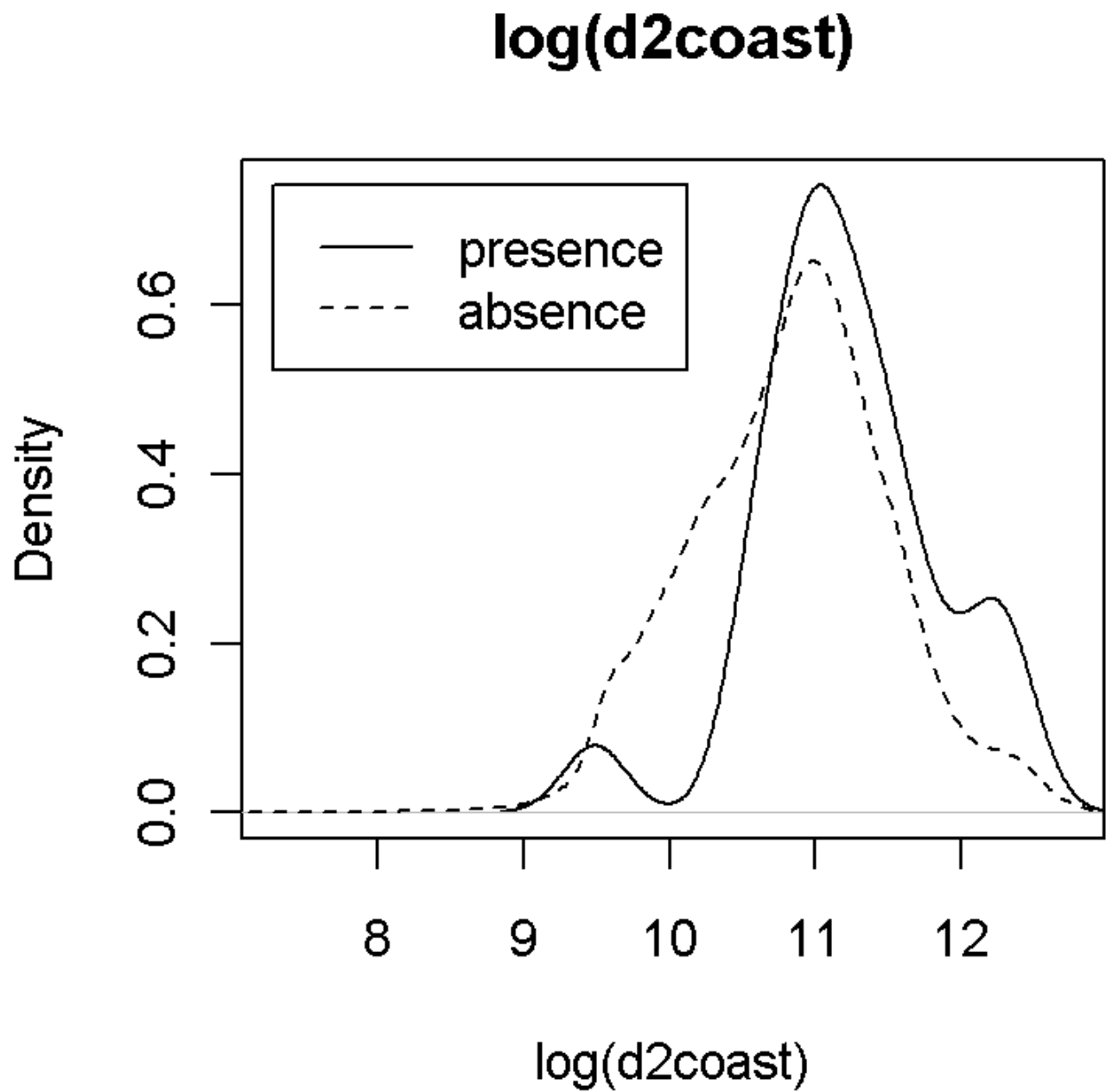


Figure 817: Density histogram of distance to coast log(meters) for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

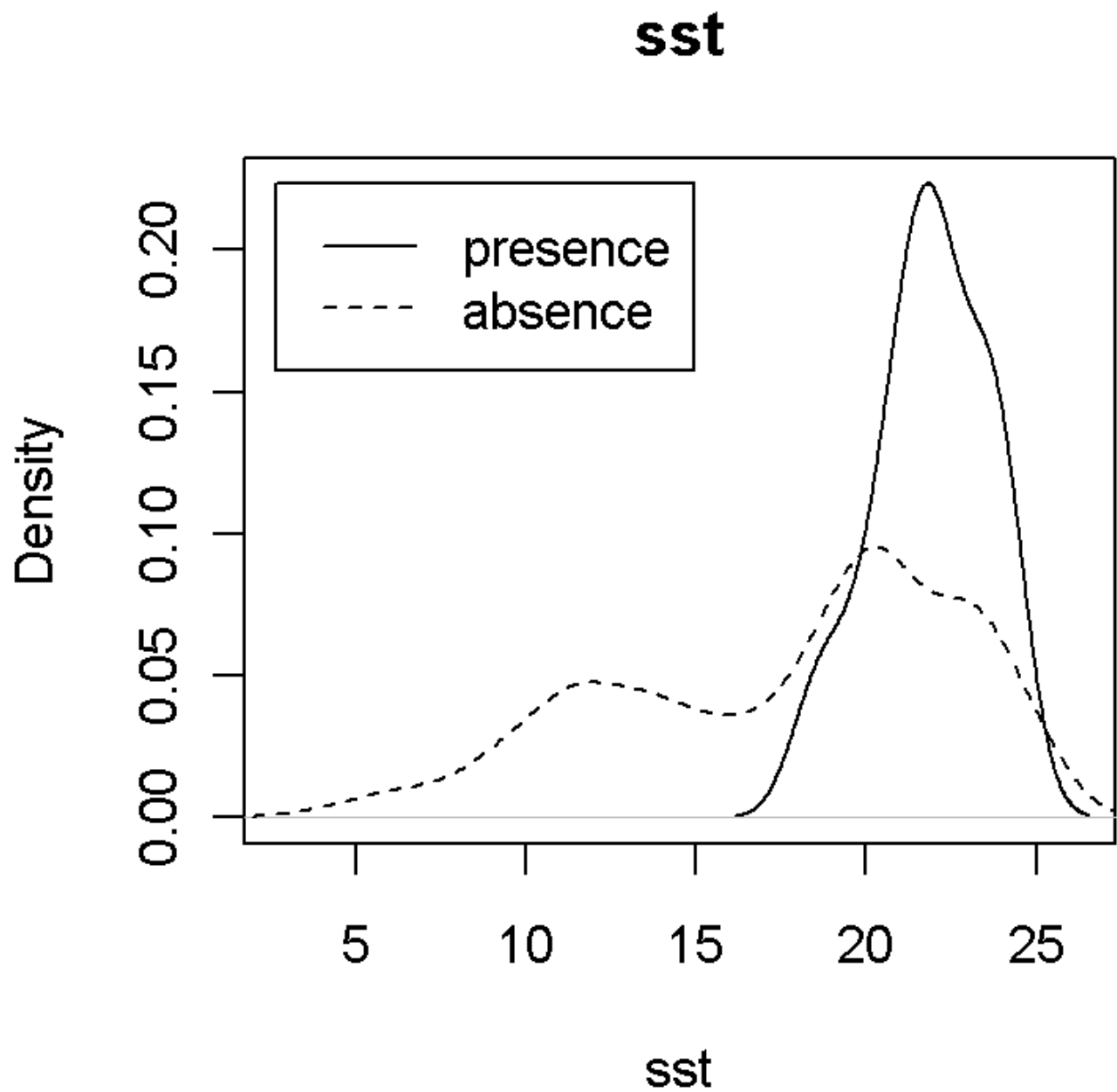


Figure 818: Density histogram of sea-surface temperature (degrees C) for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

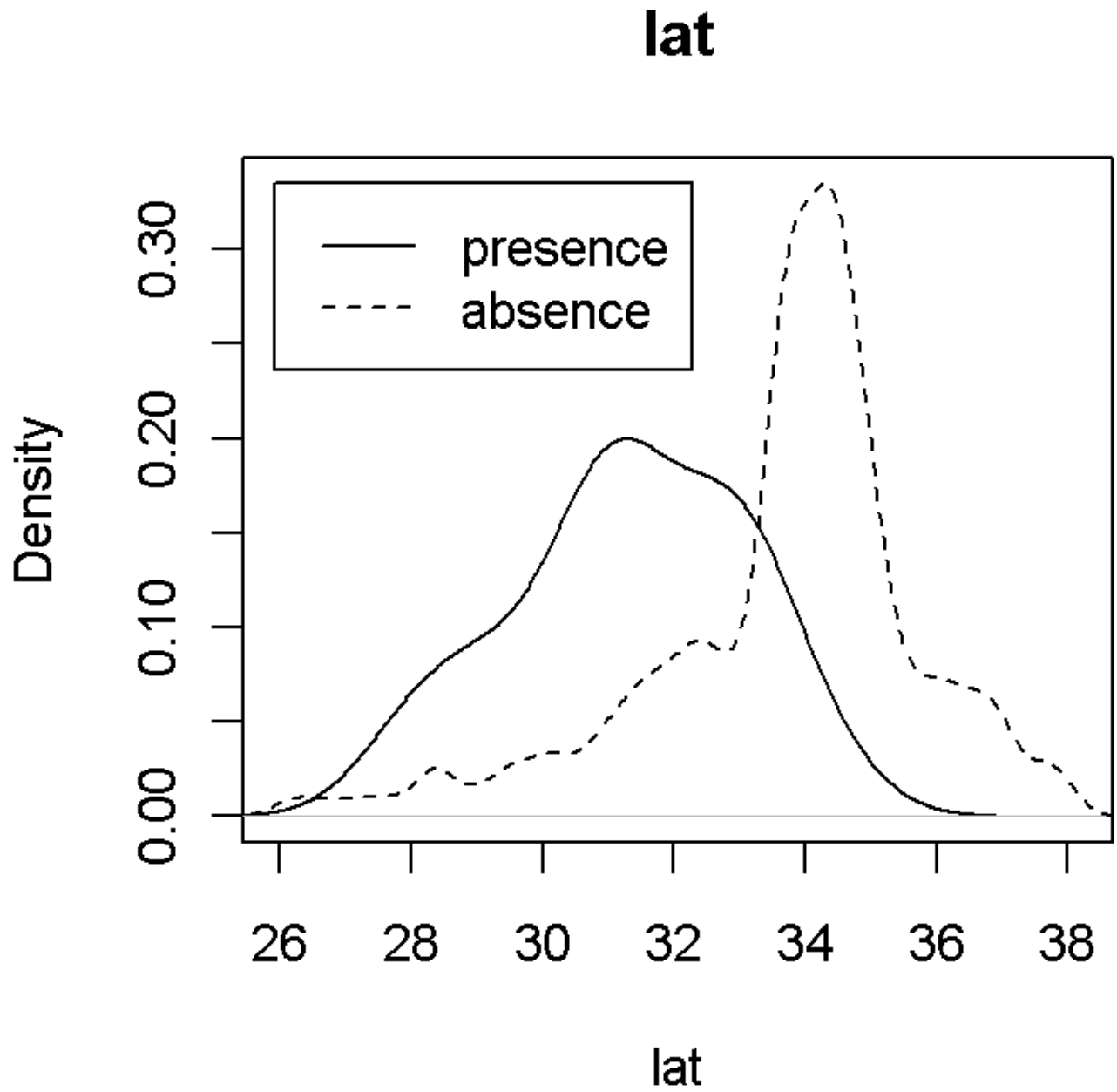


Figure 819: Density histogram of latitude (degrees) for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

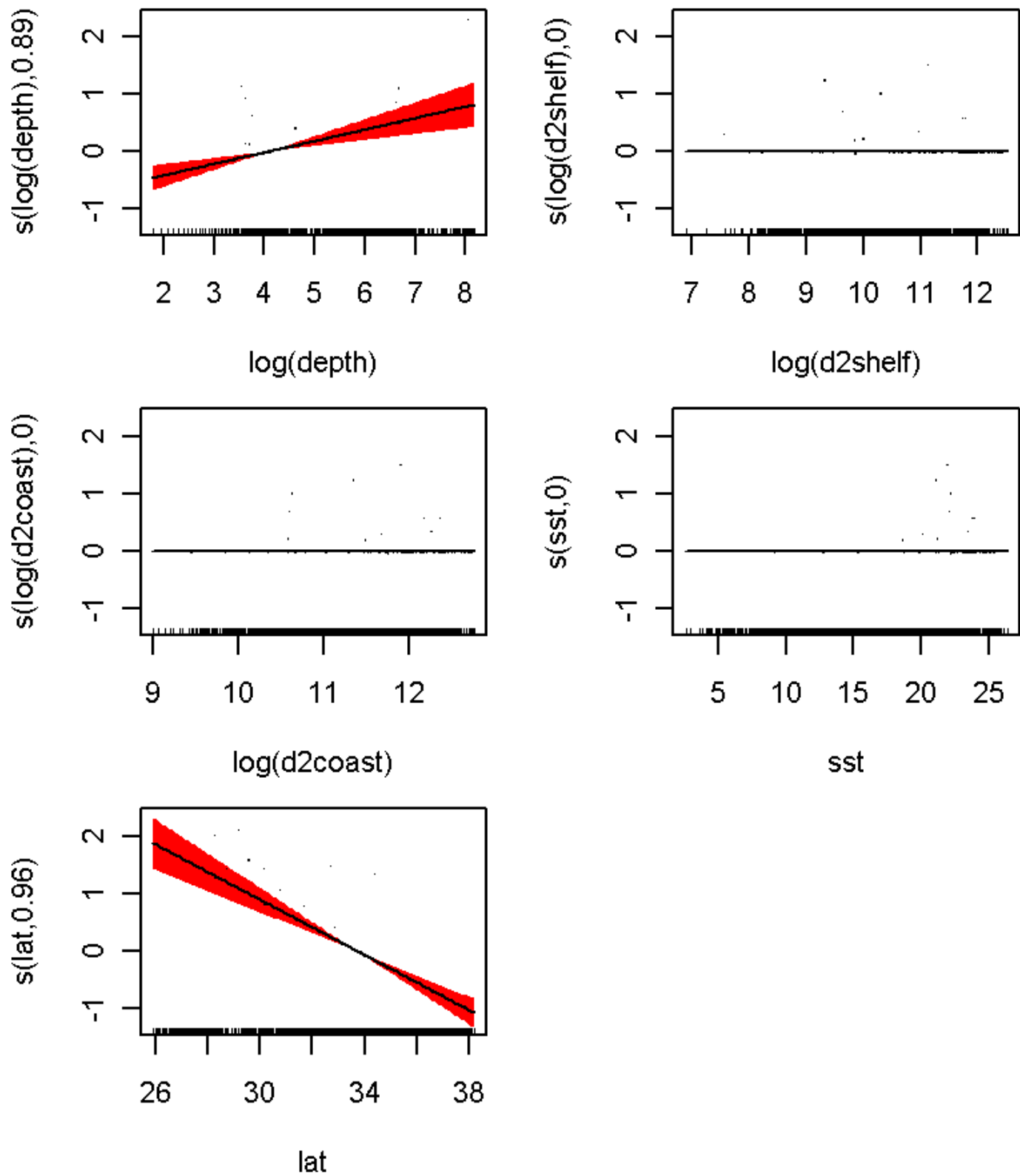


Figure 820: Terms plot of predictors to GAM model fit for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

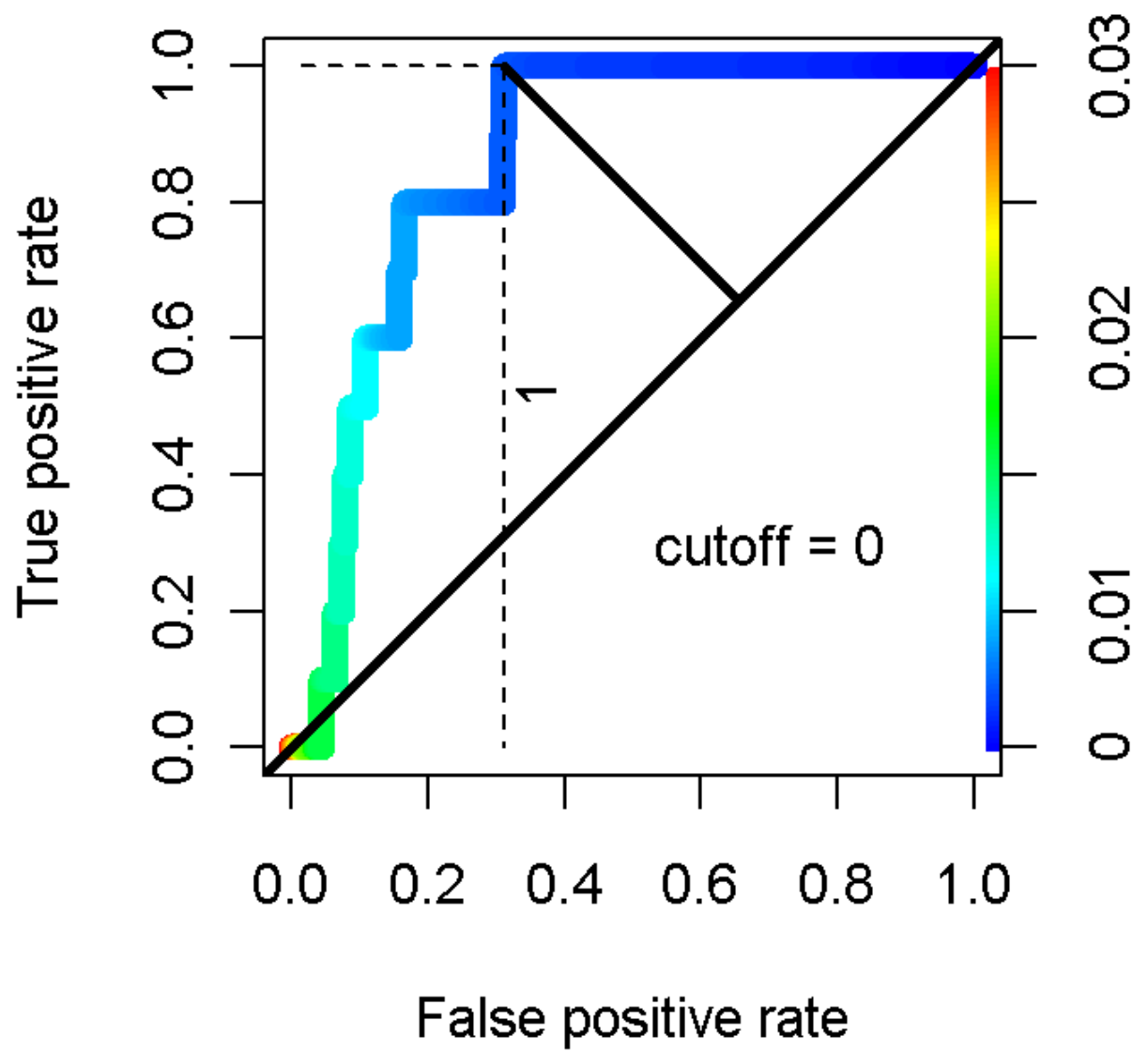


Figure 821: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

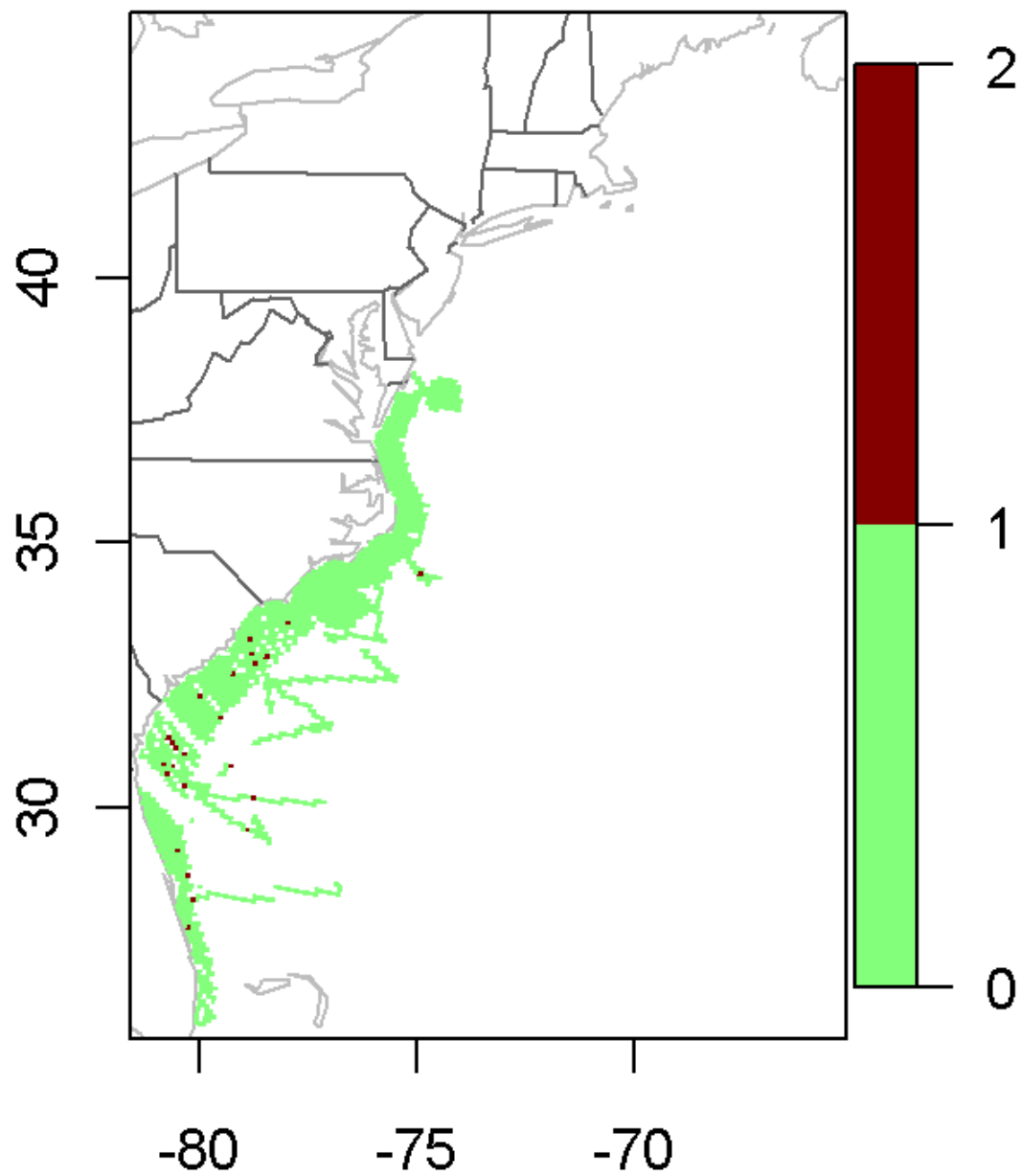


Figure 822: Map of presence and absence by cell summed through time for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

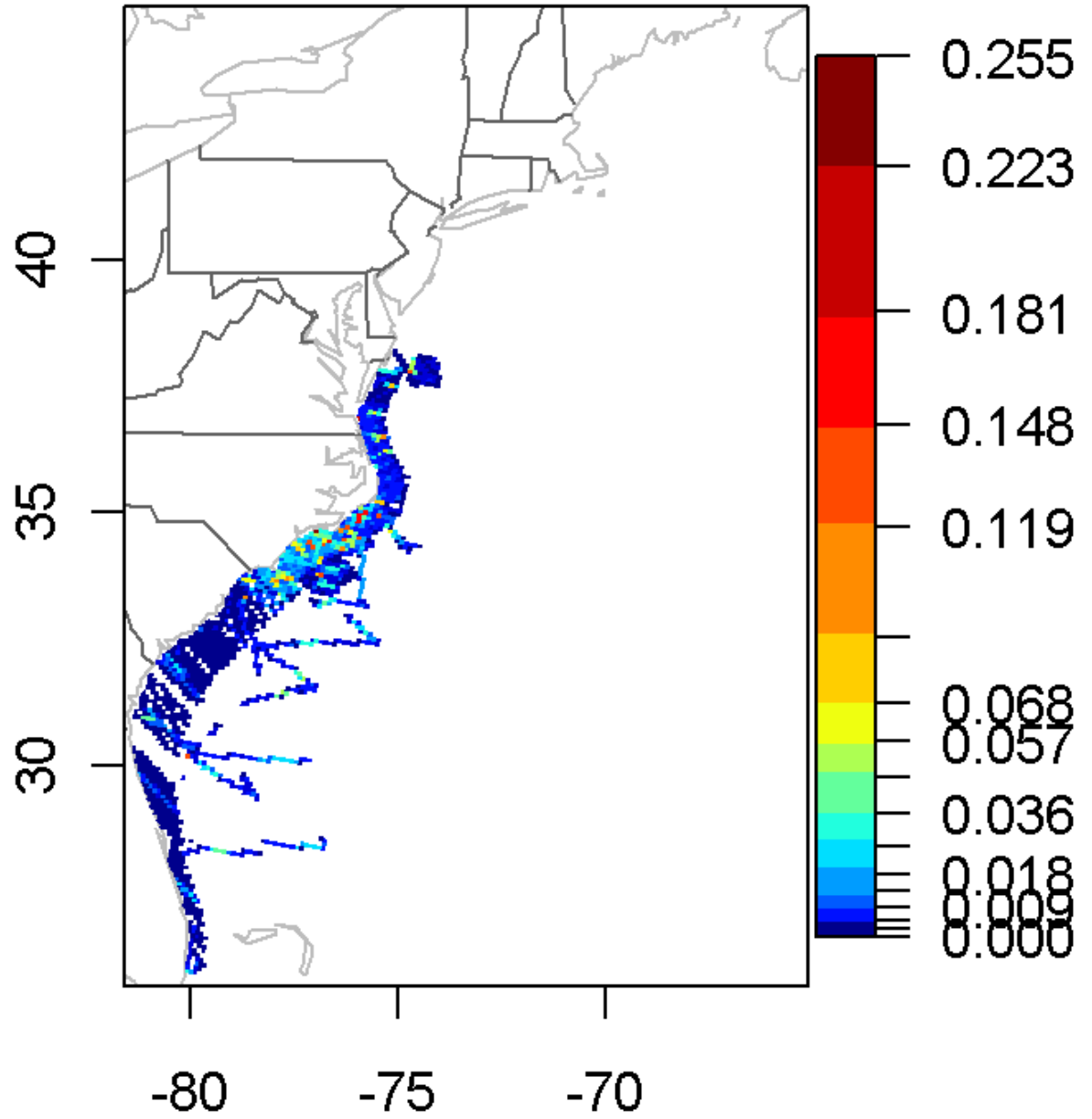


Figure 823: Map of effort(hours/km²) by cell summed through time for 'Stenella frontalis' guild during 'winter' season in 'east2' region.

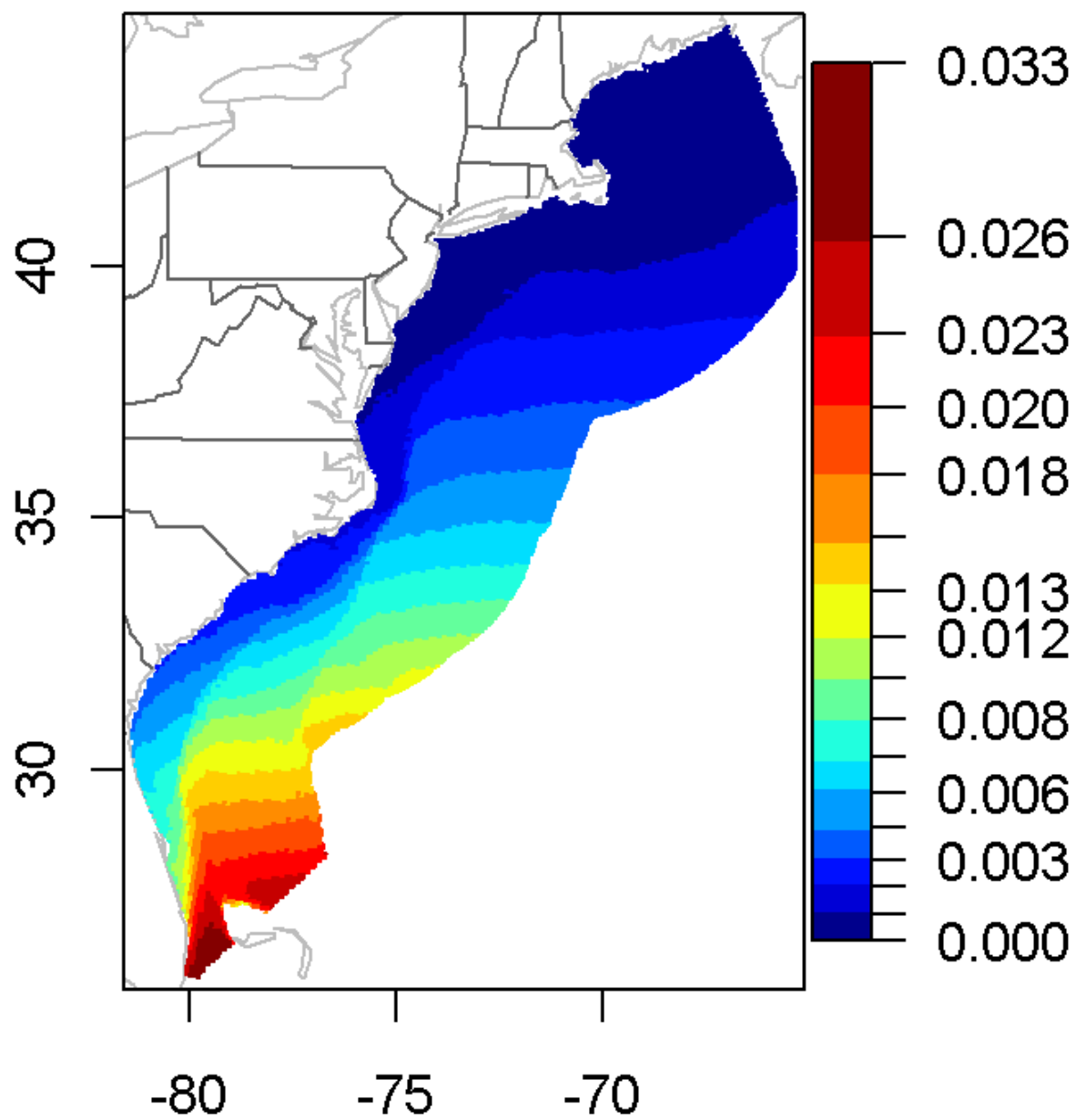


Figure 824: Map of mean predicted habitat for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

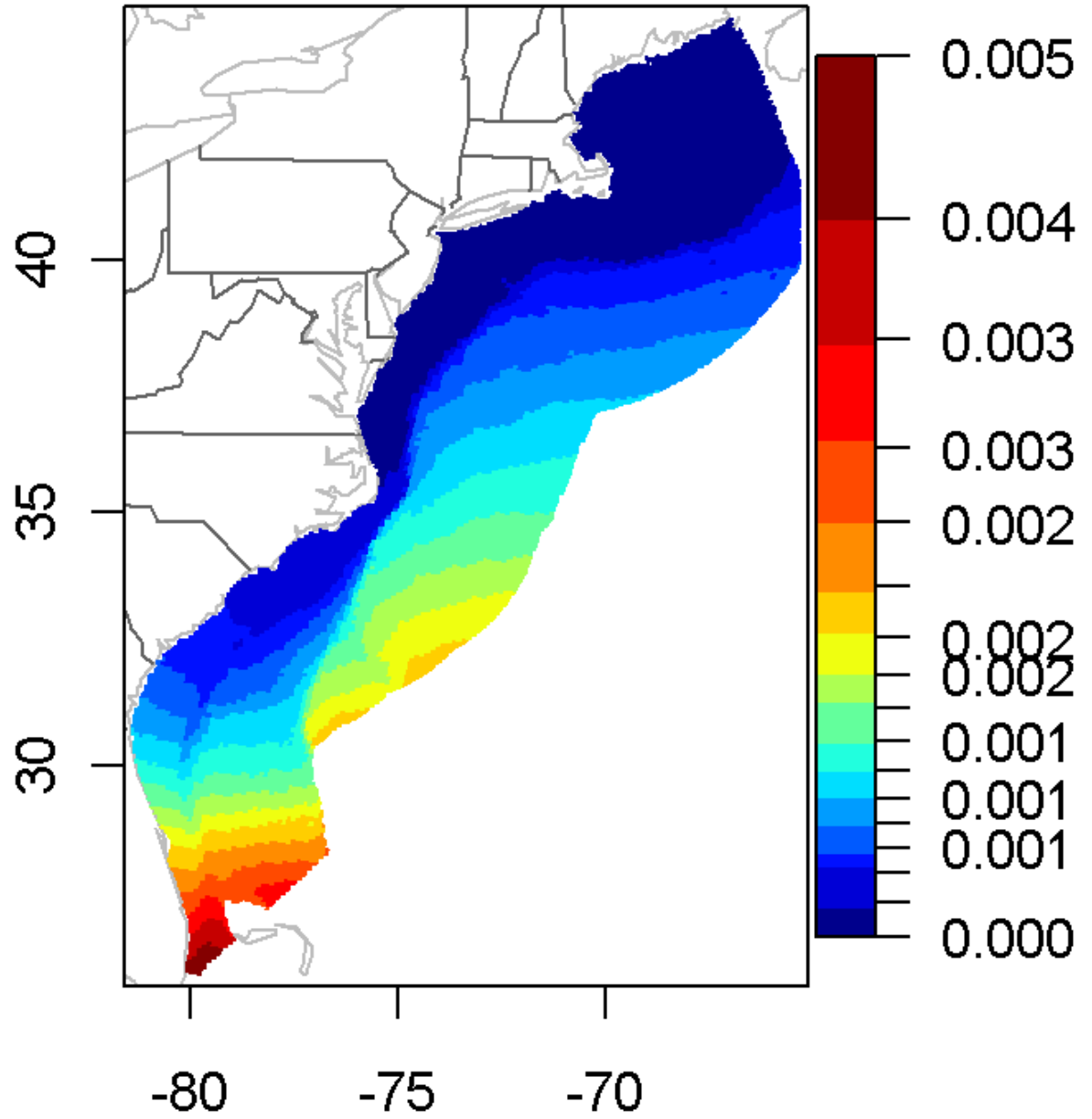


Figure 825: Map of standard error of habitat for 'Stenella frontalis' guild during 'winter' season in 'east2' region.

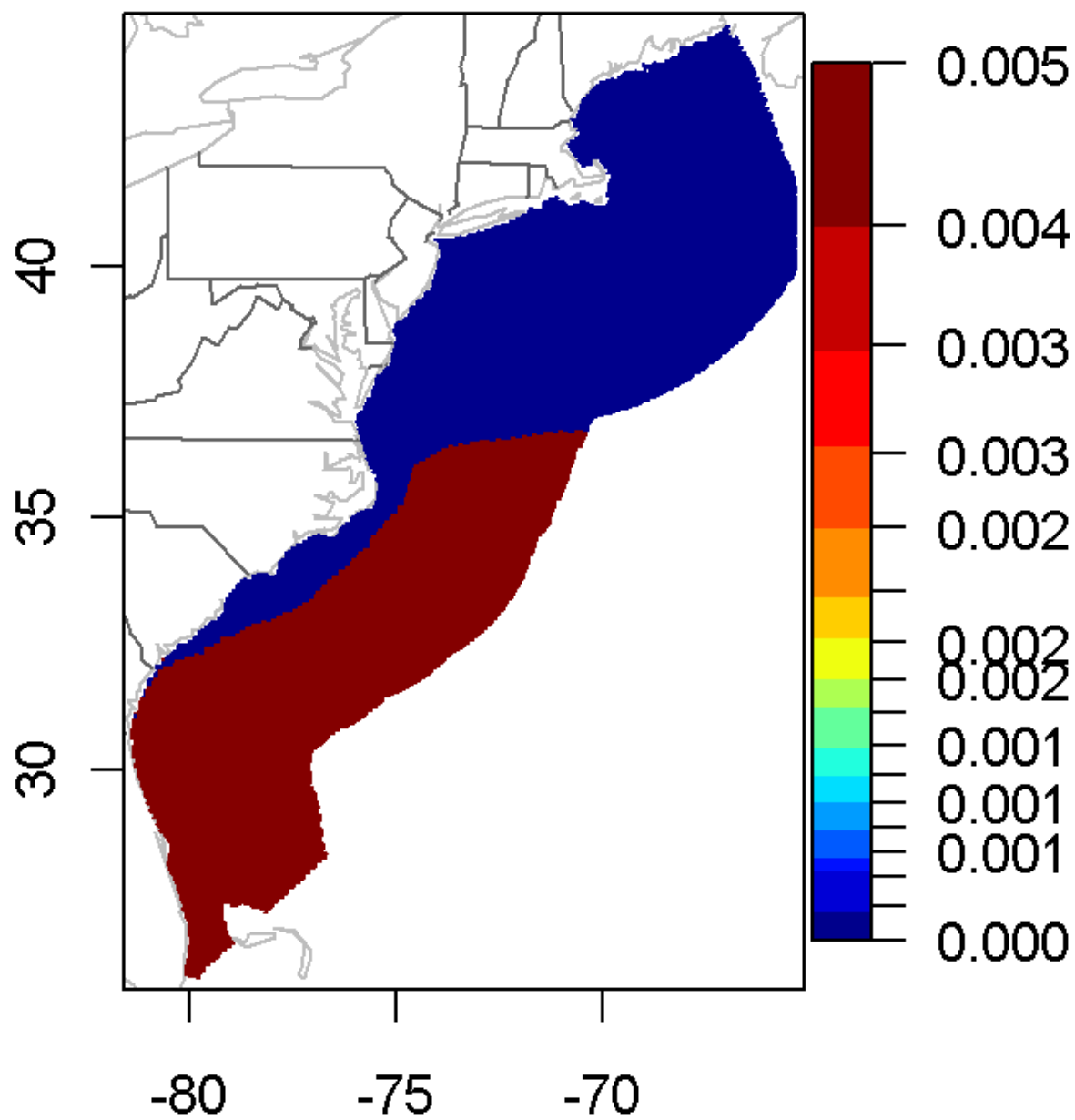


Figure 826: Map of binary habitat (cutoff determined by ROC) for '*Stenella frontalis*' guild during 'winter' season in 'east2' region.

15.4.2 gomex2

Modelrun identifier: duke_06_sf3_winter_gomex2

Date generated: 2008-10-21 12:06:07

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 75: Summary for duke(6) GAM model: for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.

	Value
Number.presences	6
Number.absences	599
GAM.converged	TRUE
R.squared	0.0183525
Deviance.explained	0.257744
ROC.optimum	0.276377
Maximum.fit	0.018439
Maximum.prediction	0.62249

Model text summary...

```
duke_06_sf3_winter_gomex2 run on Tue Oct 21 12:05:36 2008
provider:duke, version:06, guild:Stenella frontalis (sf3), season:'winter', region:gomex2

max.fit:0.276377, max.prediction:0.622490, ROC.optimum:0.018439

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -6.3317      0.2433  -26.03   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.310e-06  0.500  4.39e-05    0.937
s(log(d2shelf)) 9.875e-01  1.488   68.91   < 2e-16 ***
s(log(d2coast)) 3.222e-06  0.500  3.78e-05    0.939
s(sst)         1.908e-06  0.500  1.05e-04    0.921
s(lat)         9.703e-01  1.470   30.31  1.66e-10 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0184   Deviance explained = 25.8%
GCV score = 0.00035249   Scale est. = 0.00034934   n = 596

summary(dat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:605  Min.   : 161  Min.   :  42  Min.   : 1427  Min.   : 14193  Min.   :17.10  Min.   :24.23
             1st Qu.:3257  1st Qu.: 415  1st Qu.: 17134  1st Qu.:136665  1st Qu.:21.38  1st Qu.:26.95
             Median :4493  Median :1087  Median : 54348  Median :181008  Median :22.05  Median :27.54
             Mean   :4224  Mean   :1200  Mean   : 59634  Mean   :187275  Mean   :22.14  Mean   :27.38
             3rd Qu.:5338  3rd Qu.:1712  3rd Qu.: 96839  3rd Qu.:241267  3rd Qu.:22.80  3rd Qu.:27.98
             Max.   :7531  Max.   :3350  Max.   :164995  Max.   :356233  Max.   :25.50  Max.   :29.35
             NA's   : 9.00

summary(newdat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:6672  Min.   :  1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :15.07  Min.   :23.85
             1st Qu.:1861  1st Qu.: 46.0  1st Qu.: 31617  1st Qu.: 85289  1st Qu.:20.33  1st Qu.:26.28
```

Median :4110	Median : 433.5	Median : 71100	Median :157258	Median :21.90	Median :27.29
Mean :3997	Mean :1057.7	Mean : 86278	Mean :170790	Mean :21.52	Mean :27.26
3rd Qu.:6015	3rd Qu.:2026.0	3rd Qu.:131962	3rd Qu.:249983	3rd Qu.:22.88	3rd Qu.:28.38
Max. :8351	Max. :3643.0	Max. :267519	Max. :408116	Max. :25.80	Max. :30.36

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1  Min.   :1.874e-05  Min.   :1.364e-05  Min.   :0.000e+00  Min.   :3.813e-06  Min.   :0.00000
1st Qu.:1861 1st Qu.:1.686e-04  1st Qu.:7.587e-05  1st Qu.:0.000e+00  1st Qu.:3.727e-03  1st Qu.:0.00000
Median :4110 Median :9.271e-04  Median :3.001e-04  Median :0.000e+00  Median :5.454e-03  Median :0.00000
Mean   :3997 Mean   :7.223e-03  Mean   :1.710e-03  Mean   :1.031e-02  Mean   :6.586e-03  Mean   :0.09397
3rd Qu.:6015 3rd Qu.:4.458e-03  3rd Qu.:1.239e-03  3rd Qu.:0.000e+00  3rd Qu.:6.028e-03  3rd Qu.:0.00000
Max.   :8351 Max.   :6.225e-01  Max.   :9.562e-02  Max.   :1.000e+00  Max.   :9.493e-02  Max.   :1.00000
NA's   :6.090e+03  NA's   :6.090e+03
```

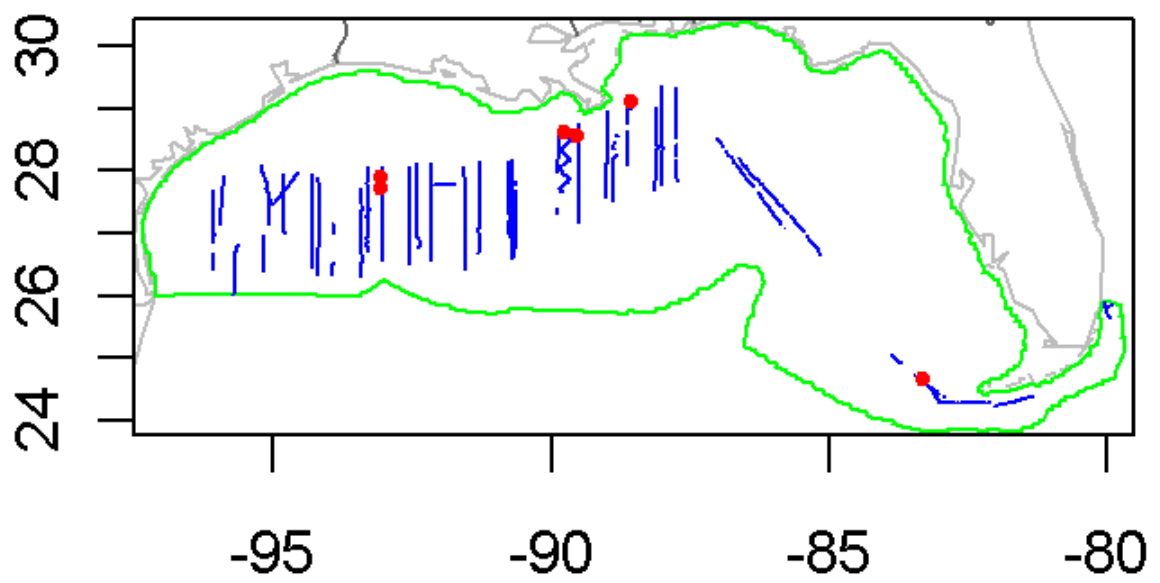


Figure 827: Map of points of observational sightings and tracks of survey effort for '*Stenella frontalis*' guild during 'winter' season in 'gomex2' region.

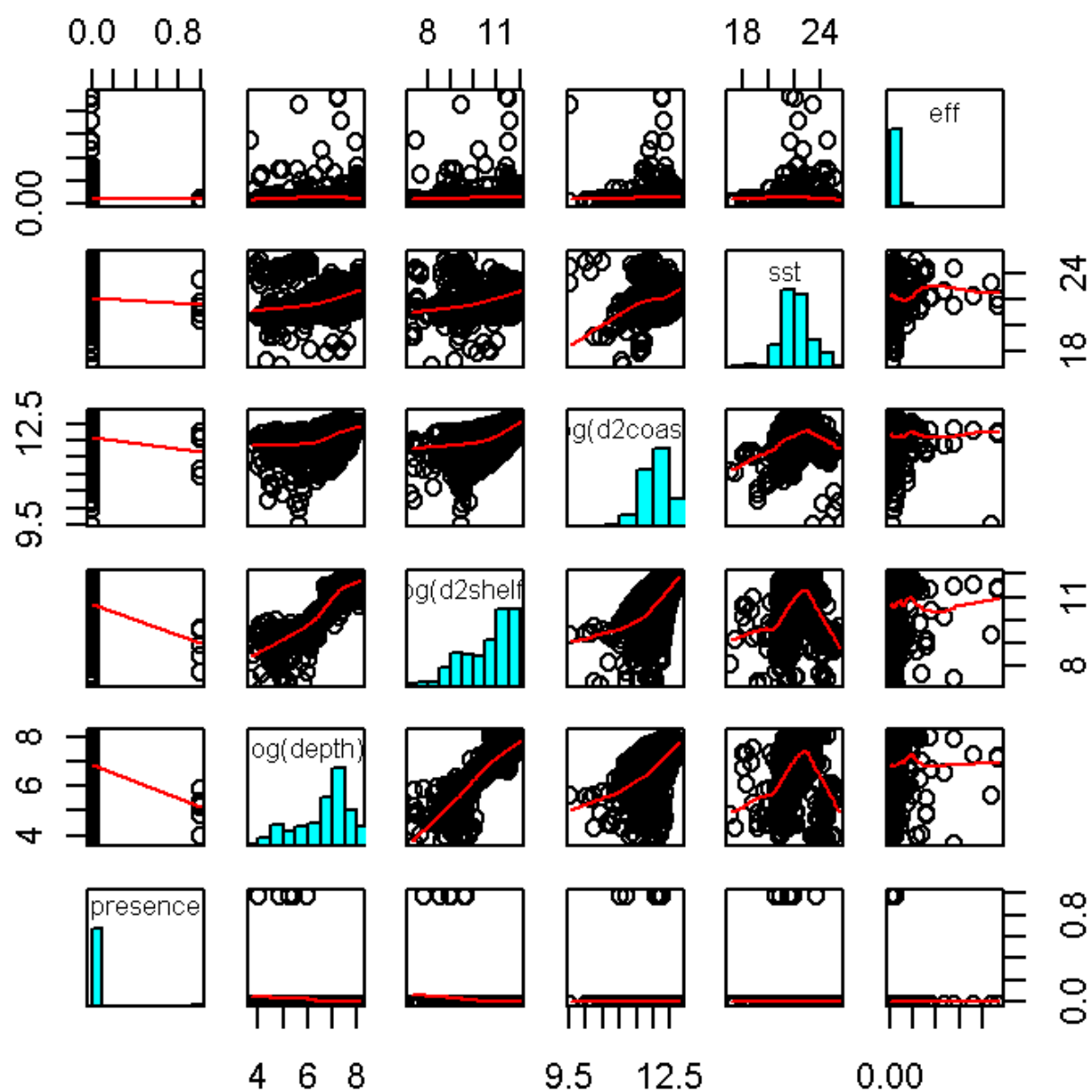


Figure 828: Pairs plot of input variables for '*Stenella frontalis*' guild during 'winter' season in 'gomex2' region.

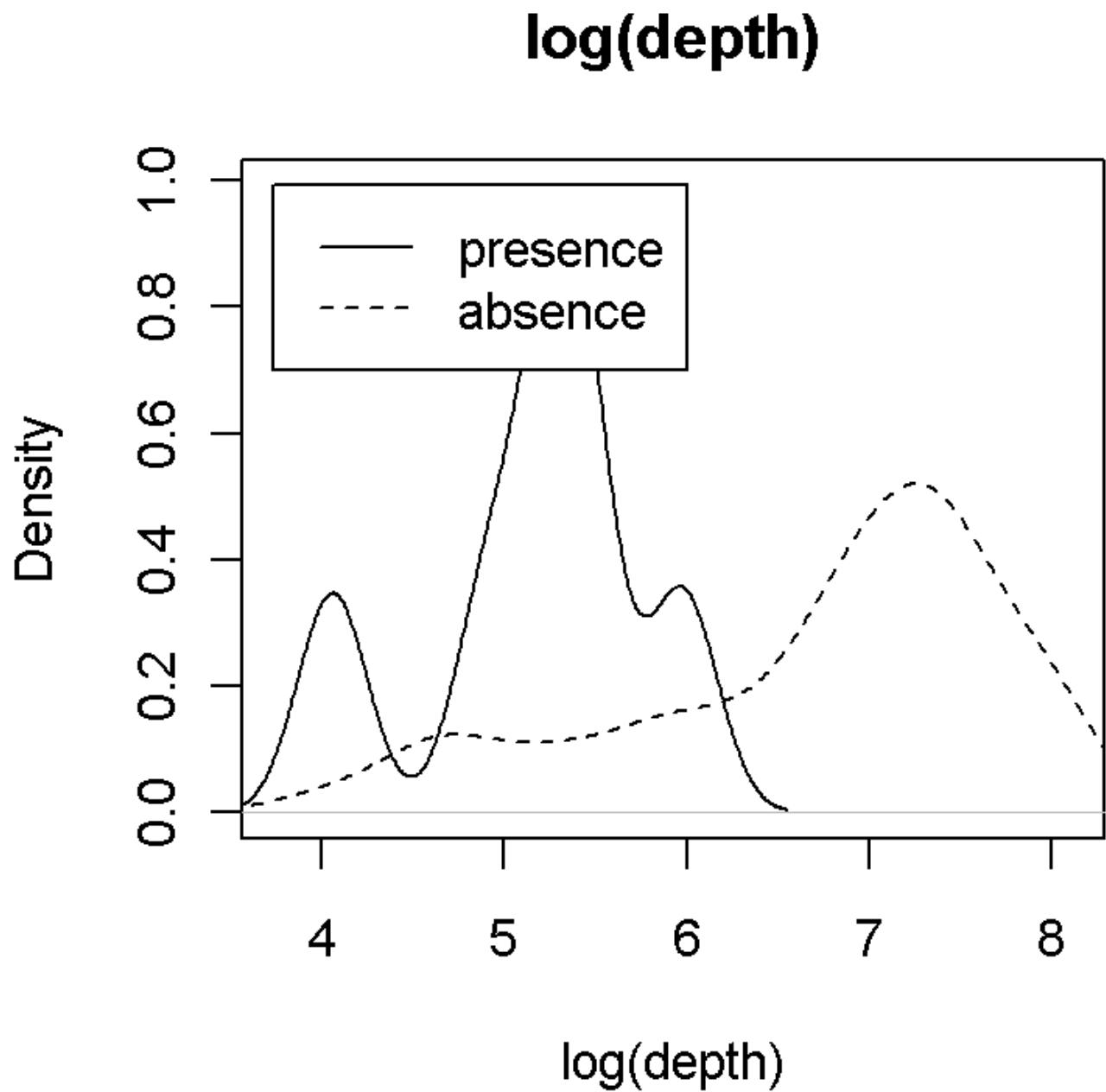


Figure 829: Density histogram of depth log(meters) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.

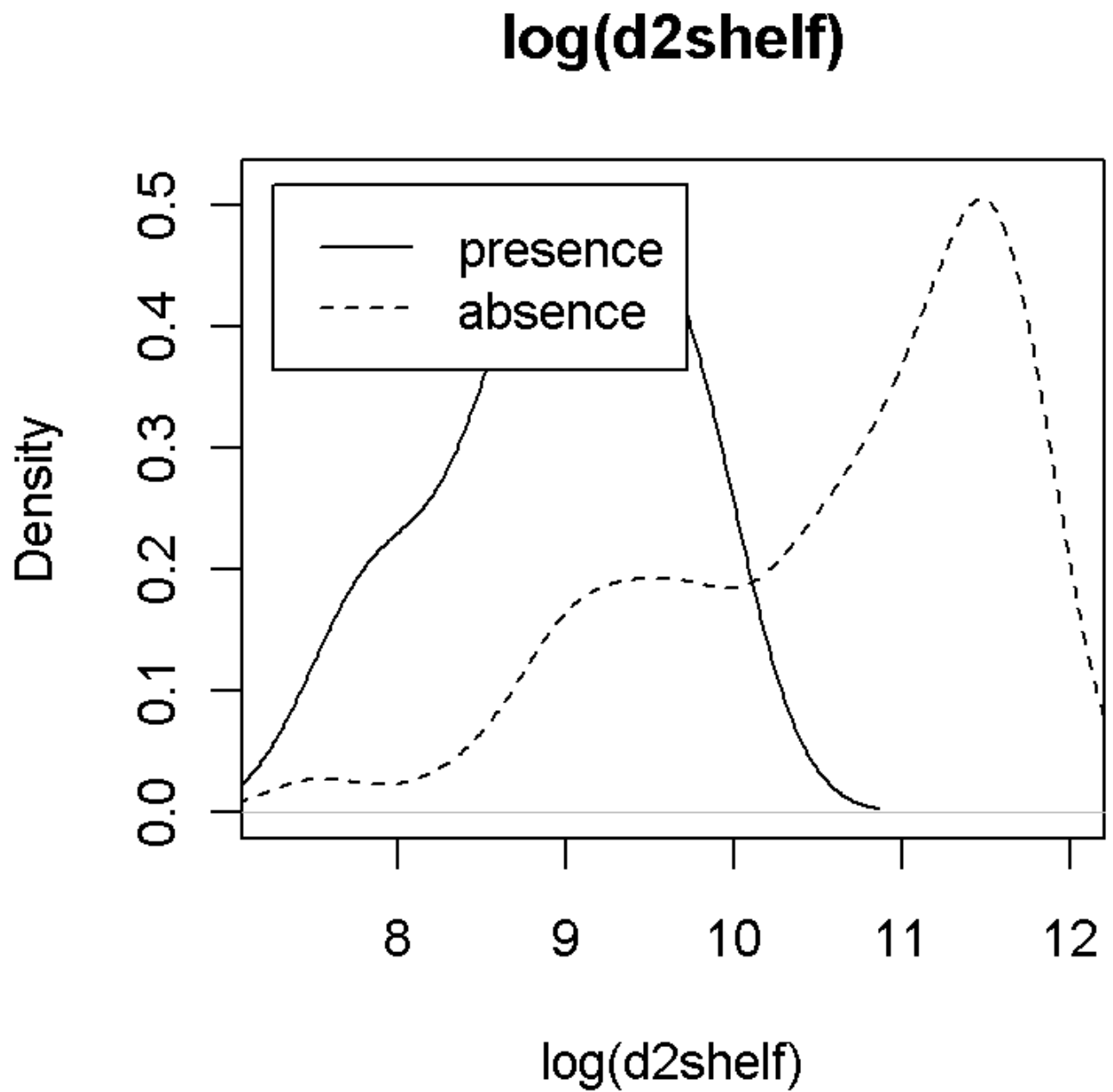


Figure 830: Density histogram of distance to shelf log(meters) for '*Stenella frontalis*' guild during 'winter' season in 'gomex2' region.

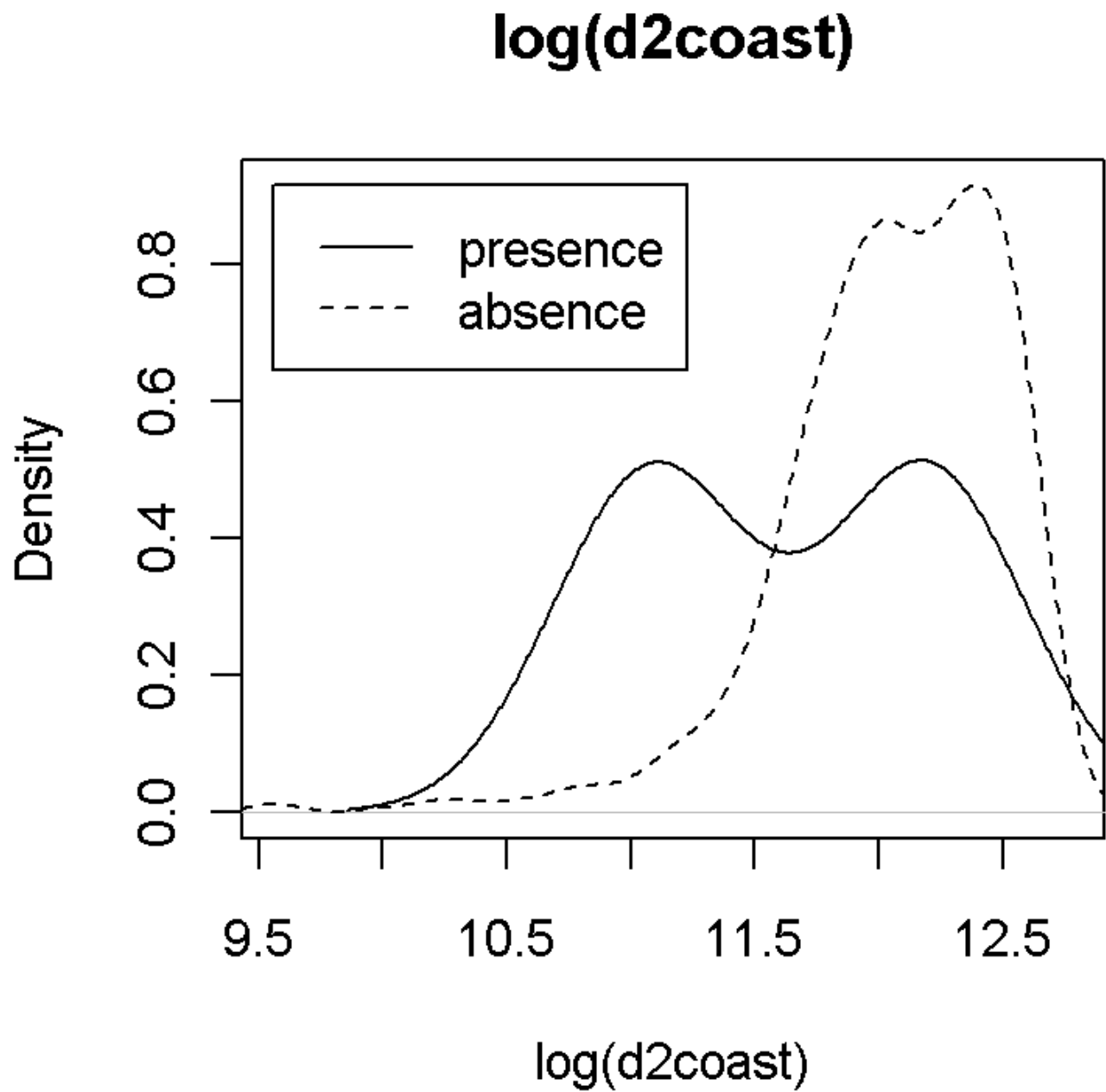


Figure 831: Density histogram of distance to coast log(meters) for '*Stenella frontalis*' guild during 'winter' season in 'gomex2' region.

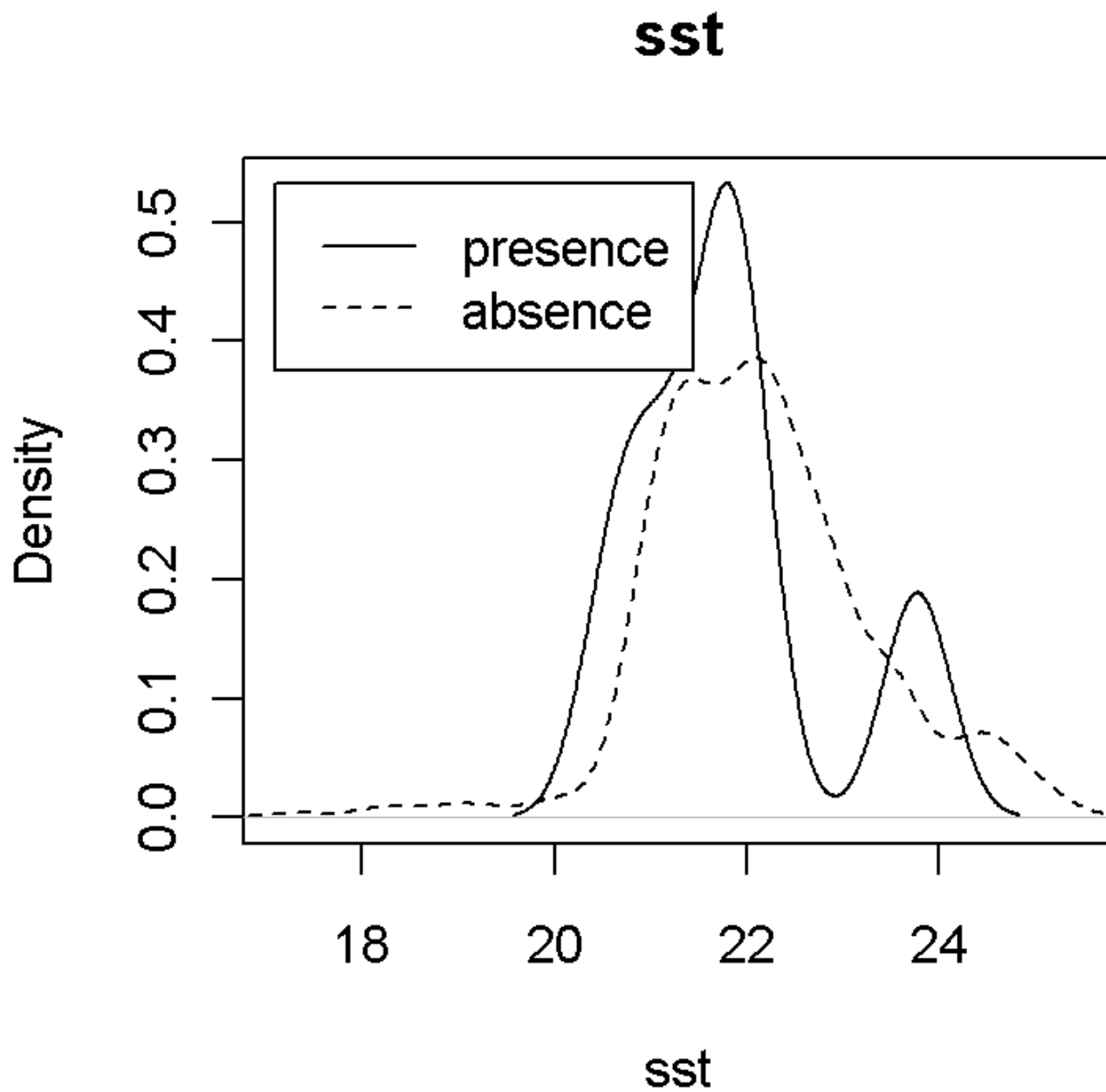


Figure 832: Density histogram of sea-surface temperature (degrees C) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.

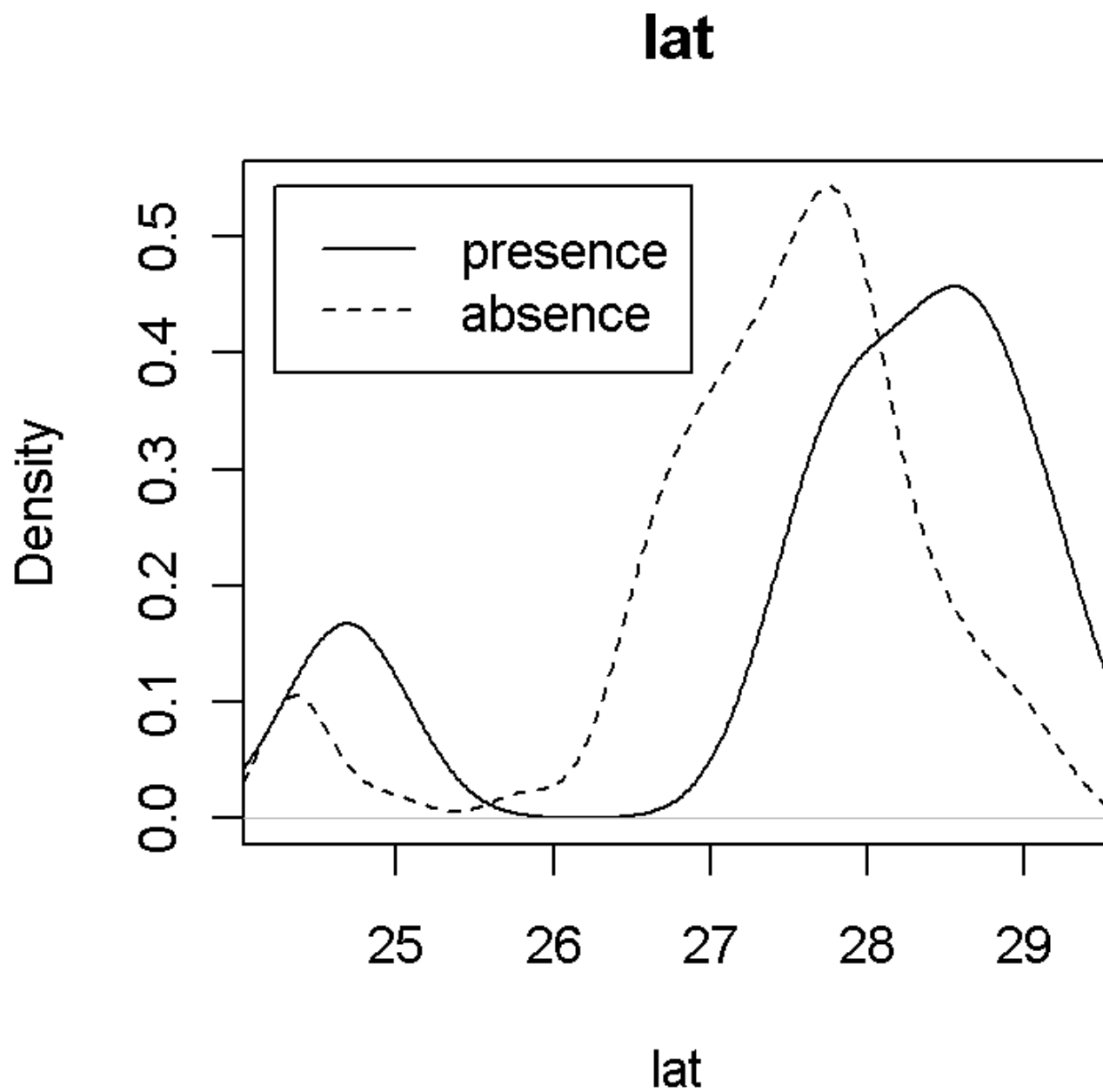


Figure 833: Density histogram of latitude (degrees) for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.

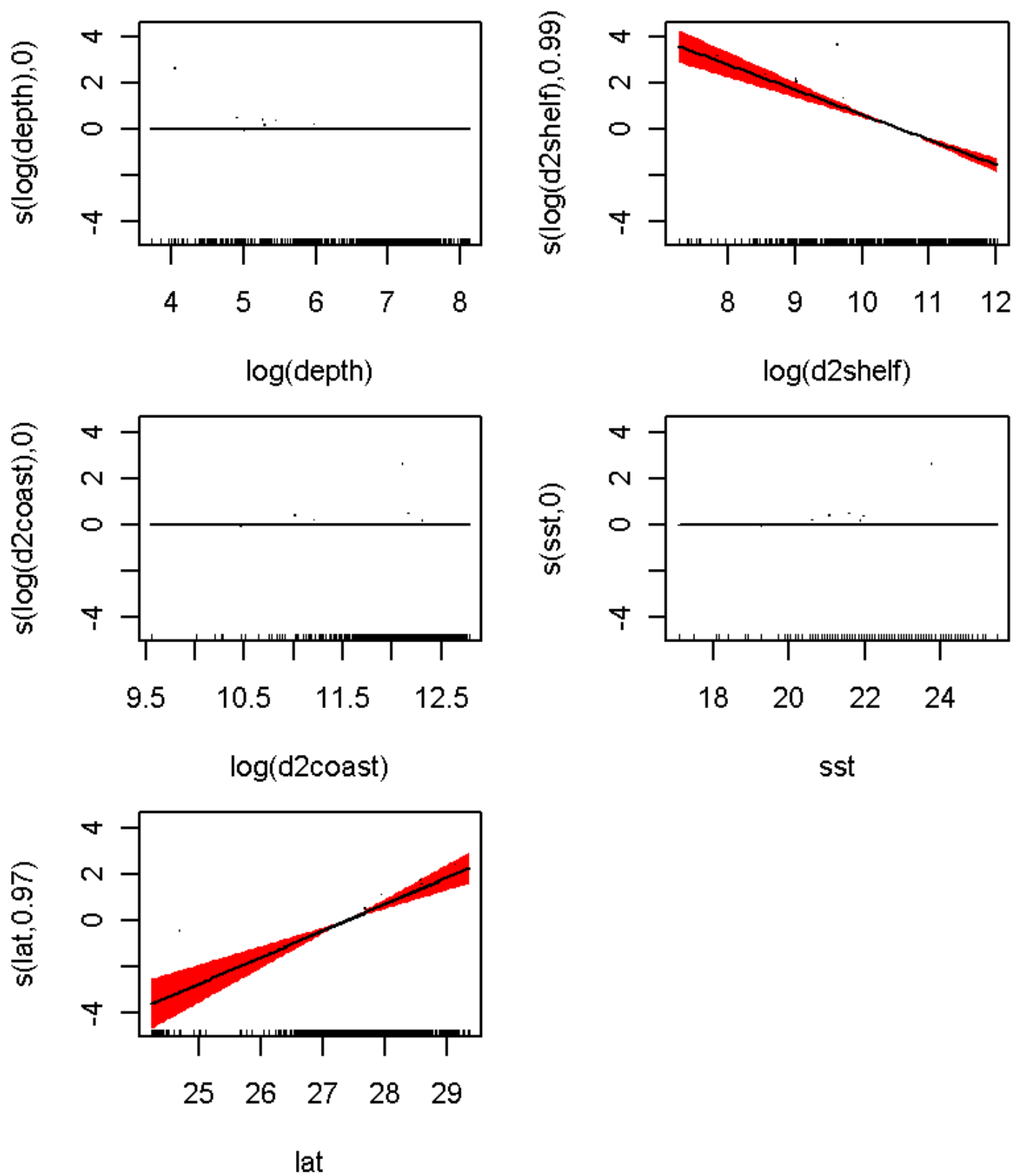


Figure 834: Terms plot of predictors to GAM model fit for '*Stenella frontalis*' guild during 'winter' season in 'gomex2' region.

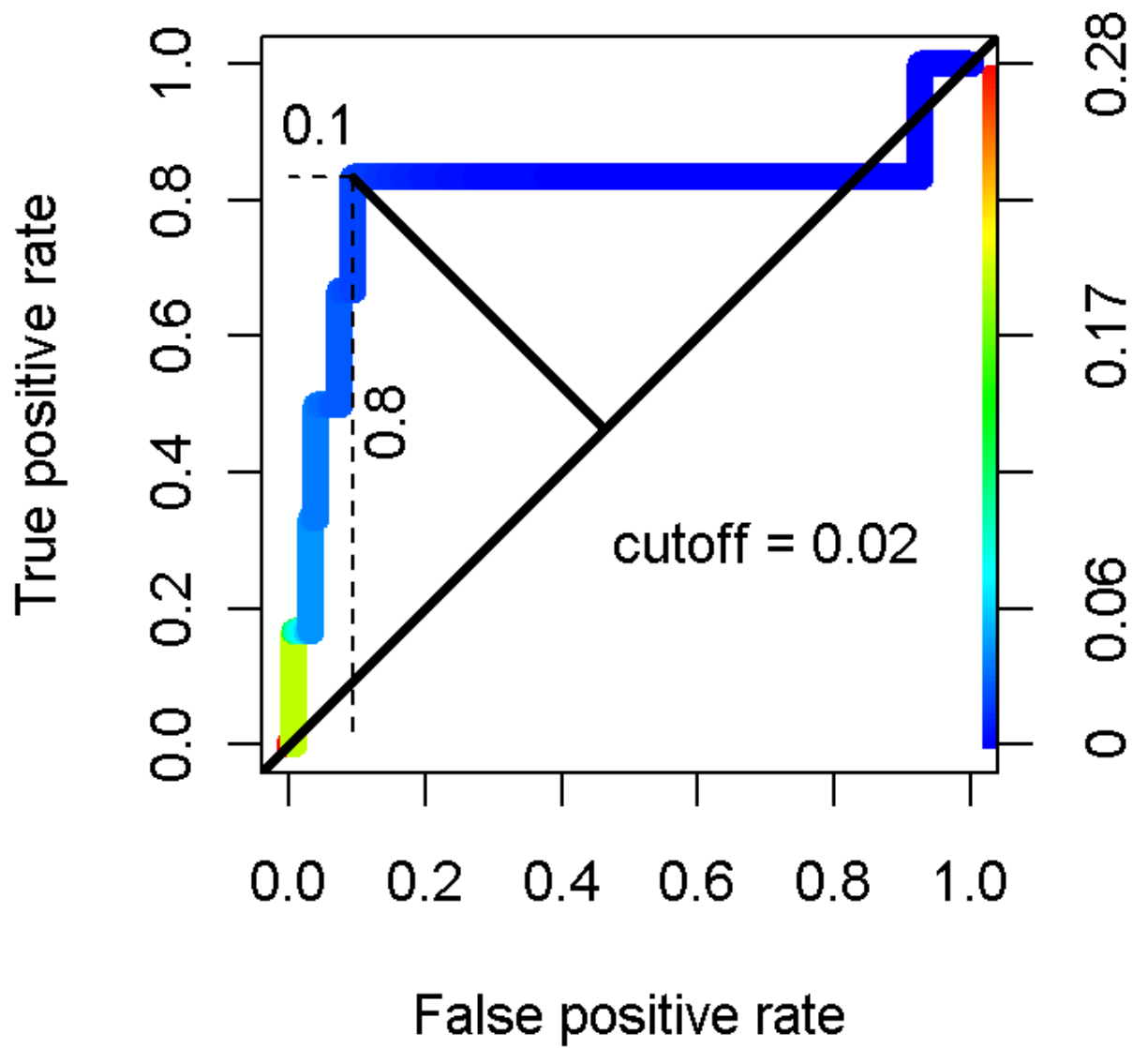


Figure 835: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for '*Stenella frontalis*' guild during 'winter' season in 'gomex2' region.

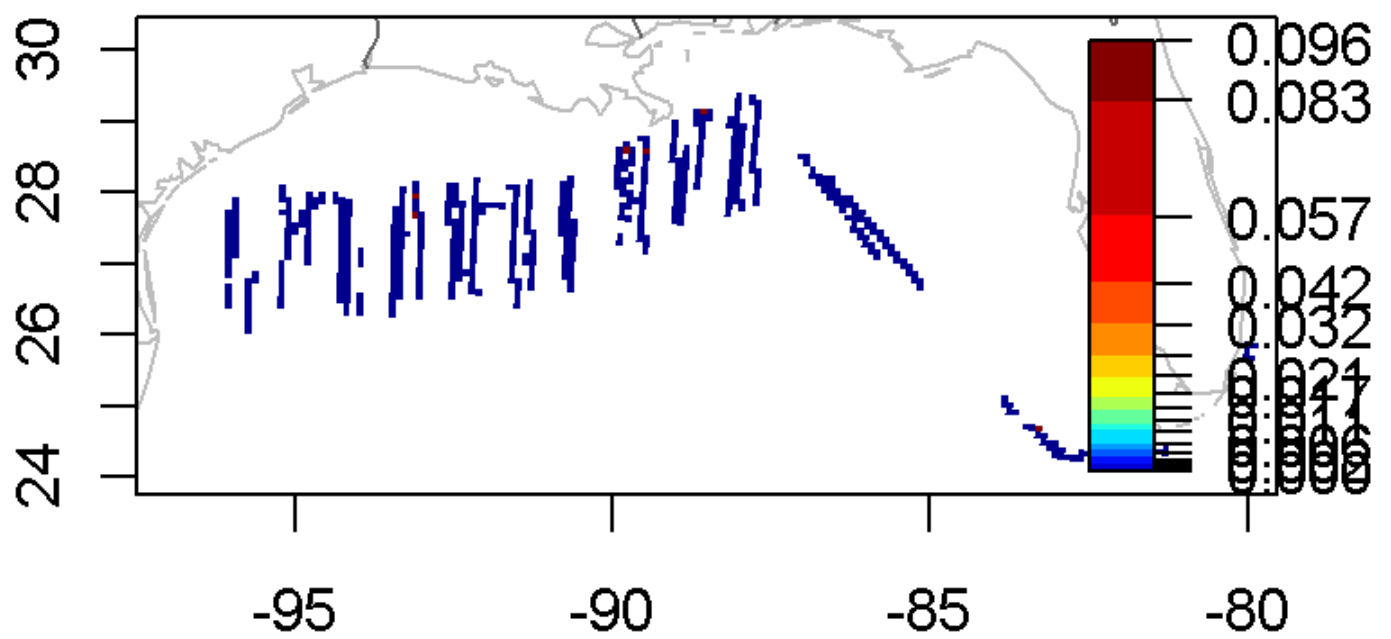


Figure 836: Map of presence and absence by cell summed through time for '*Stenella frontalis*' guild during 'winter' season in 'gomex2' region.

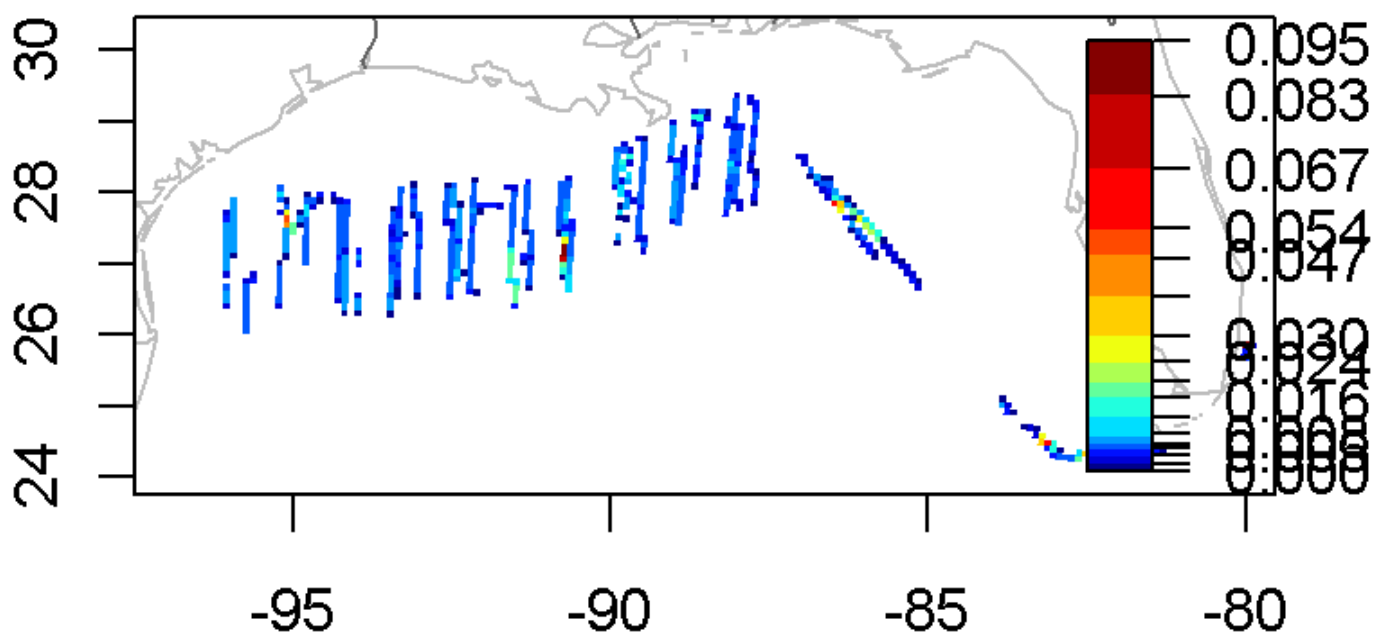


Figure 837: Map of effort(hours/km²) by cell summed through time for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.

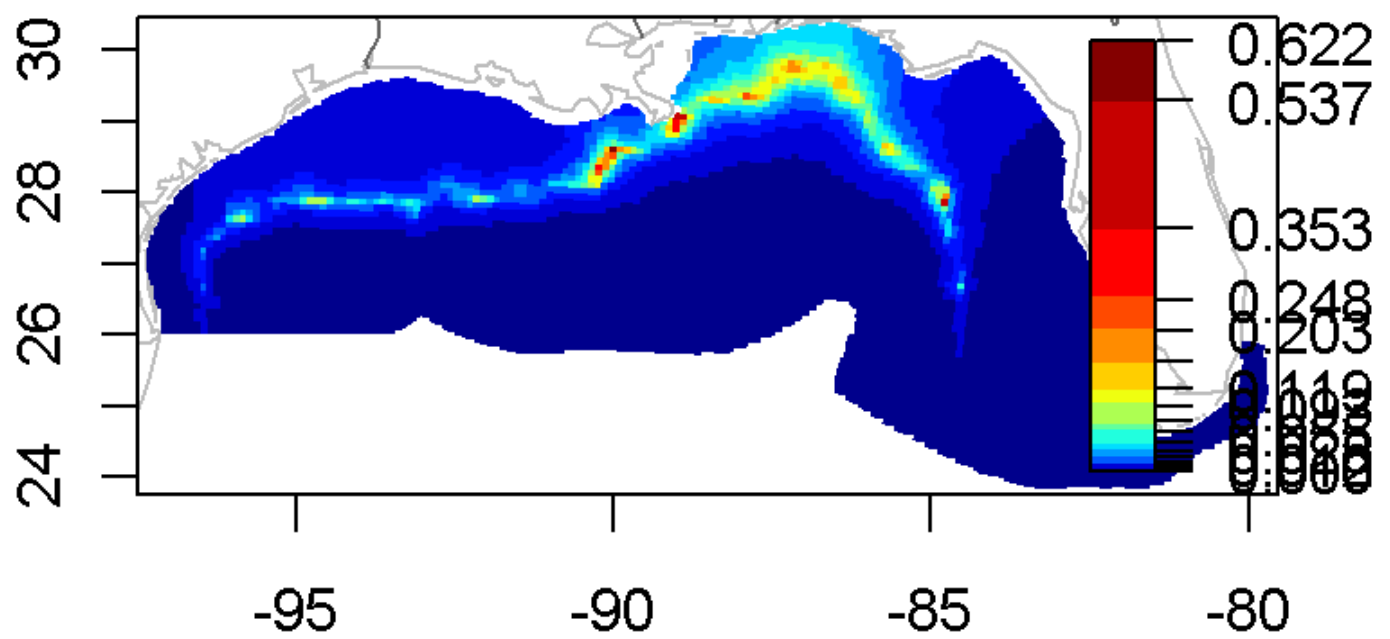


Figure 838: Map of mean predicted habitat for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.

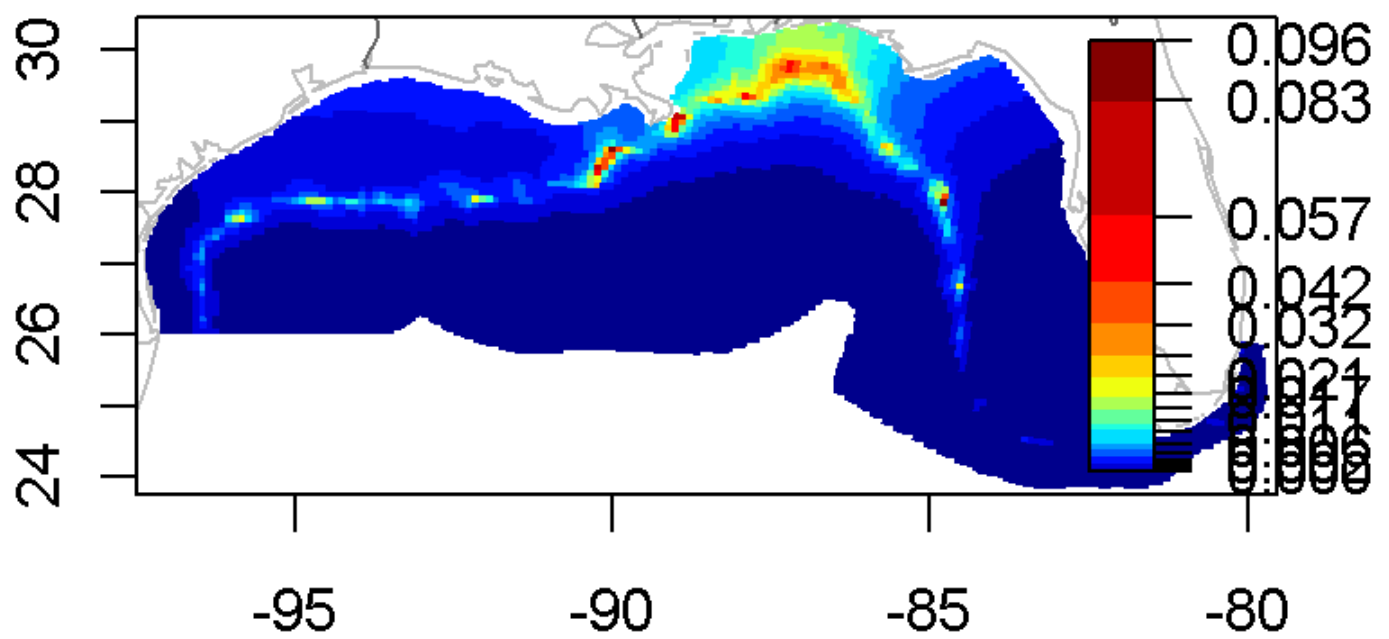


Figure 839: Map of standard error of habitat for 'Stenella frontalis' guild during 'winter' season in 'gomex2' region.

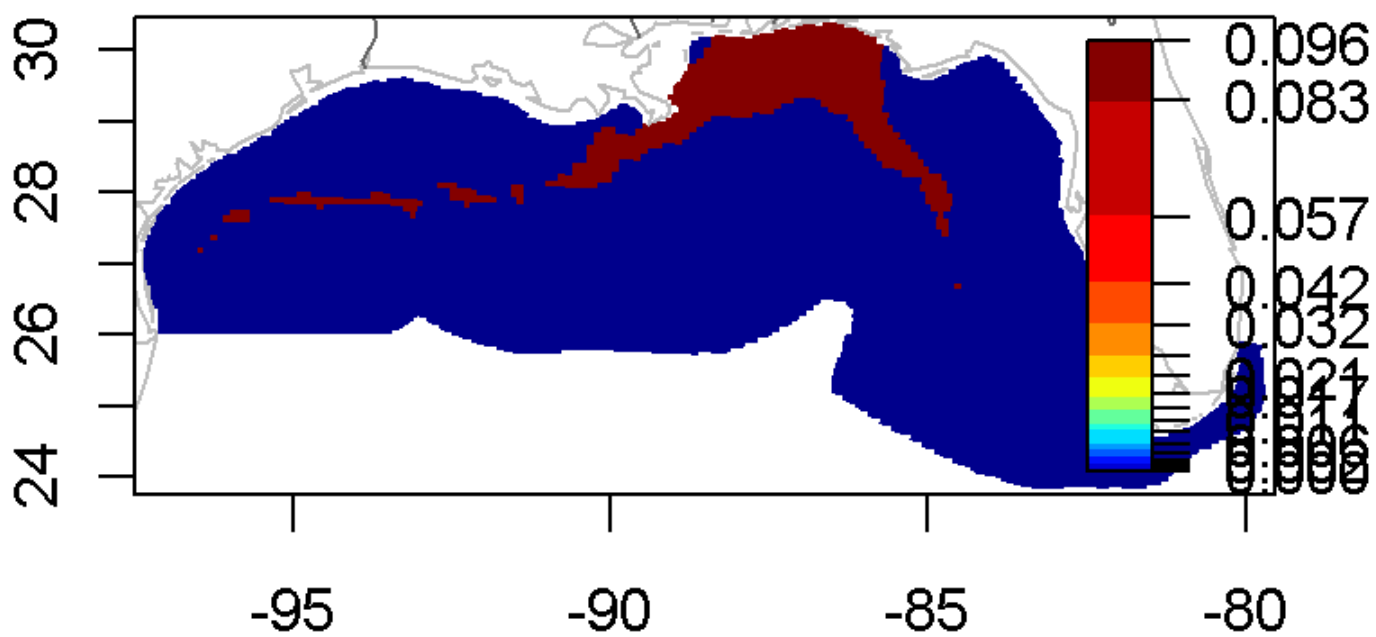


Figure 840: Map of binary habitat (cutoff determined by ROC) for '*Stenella frontalis*' guild during 'winter' season in 'gomex2' region.

16 Stenella species

Guildid:sl3

Table 76: Taxonomic members of the "Stenella species" guild.

	Scientific Name	Common Name	Taxonomic #
1	<i>Stenella clymene</i>	Clymene dolphin	180435
2	<i>Stenella longirostris</i>	long-snouted spinner dolphin	180429
3	<i>Stenella longirostris centroamerica</i>		612613
4	<i>Stenella longirostris orientalis</i>		612612

16.1 fall

16.2 spring

16.3 summer

16.3.1 east2

Modelrun identifier: duke_06_sl3_summer_east2

Date generated: 2008-10-21 14:02:46

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 77: Summary for duke(6) GAM model: for 'Stenella species' guild during 'summer' season in 'east2' region.

	Value
Number.presences	6
Number.absences	9072
GAM.converged	TRUE
R.squared	-0.00523904
Deviance.explained	0.120413
ROC.optimum	0.00610754
Maximum.fit	0.000367882
Maximum.prediction	0.00937772

Model text summary...

```
duke_06_sl3_summer_east2 run on Tue Oct 21 13:57:30 2008
provider:duke, version:06, guild:Stenella species (sl3), season:'summer', region:east2

max.fit:0.006108, max.prediction:0.009378, ROC.optimum:0.000368

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -11.9948      0.5908  -20.30   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.988e+00  2.488   91.87 <2e-16 ***
s(log(d2shelf)) 6.060e-08  0.500  3.58e-05  0.940
s(log(d2coast)) 1.501e+00  2.001   39.65 <2e-16 ***
s(sst)         1.491e-07  0.500  1.65e-07  0.984
s(lat)         2.530e-07  0.500  9.72e-05  0.923
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = -0.00524 Deviance explained = 12%
GCV score = 6.5856e-05 Scale est. = 6.5795e-05 n = 8663

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:7694   Min.    : 1635   Min.    : 5.0   Min.    : 5   Min.    : 1259   Min.    : 8.175   Min.    :25.94
se2:1384   1st Qu.:11866   1st Qu.: 48.0   1st Qu.: 20989   1st Qu.: 50865   1st Qu.: 17.025   1st Qu.:37.53
              Median :14008   Median : 111.5   Median : 52230   Median :102266   Median : 22.200   Median :40.18
              Mean   :13275   Mean   : 677.3   Mean   : 67623   Mean   :125197   Mean   : 21.378   Mean   :39.35
              3rd Qu.:15645   3rd Qu.: 420.0   3rd Qu.: 99335   3rd Qu.:174835   3rd Qu.: 25.650   3rd Qu.:42.31
              Max.    :16560   Max.    :5251.0   Max.    :324910   Max.    :445165   Max.    : 30.900   Max.    :44.74
              NA's    :      7      NA's    : 7      NA's    :408.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685   Min.    : 1633   Min.    : 4   Min.    : 5   Min.    : 1259   Min.    :11.18   Min.    :25.91
se2:4203   1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042   1st Qu.: 89304   1st Qu.:22.80   1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :3.607e-12  Min.   :8.866e-12  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:1.824e-06  1st Qu.:1.221e-06  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :8.919e-04  Median :9.536e-05  Median :0.000e+00  Median :4.368e-03  Median :1.0000
Mean   :11171  Mean   :1.309e-03  Mean   :1.017e-04  Mean   :1.301e-03  Mean   :1.069e-02  Mean   :0.5939
3rd Qu.:14088  3rd Qu.:2.326e-03  3rd Qu.:1.524e-04  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :9.378e-03  Max.   :2.975e-03  Max.   :1.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

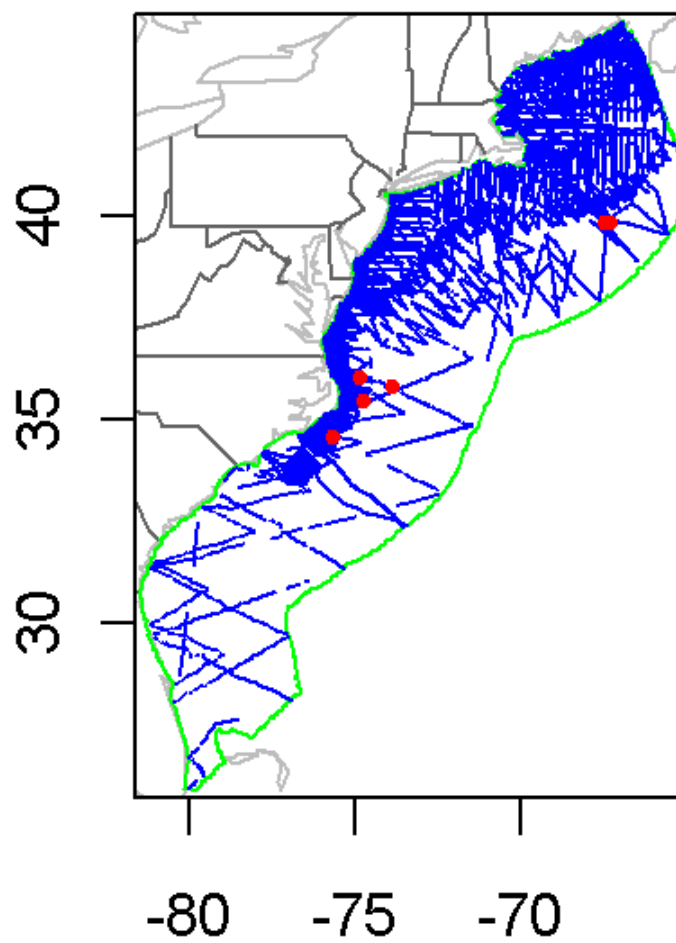


Figure 841: Map of points of observational sightings and tracks of survey effort for 'Stenella species' guild during 'summer' season in 'east2' region.

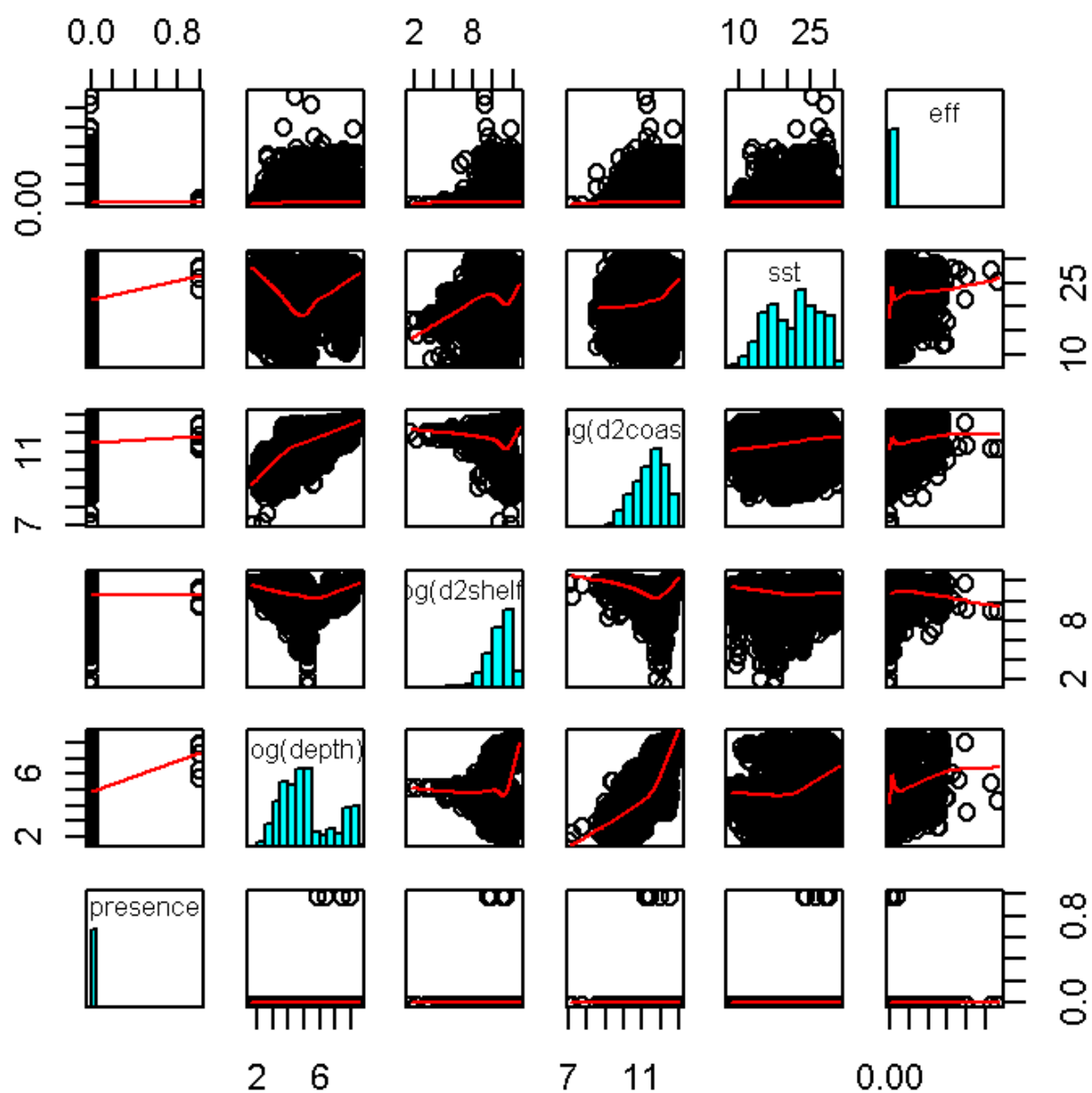


Figure 842: Pairs plot of input variables for 'Stenella species' guild during 'summer' season in 'east2' region.

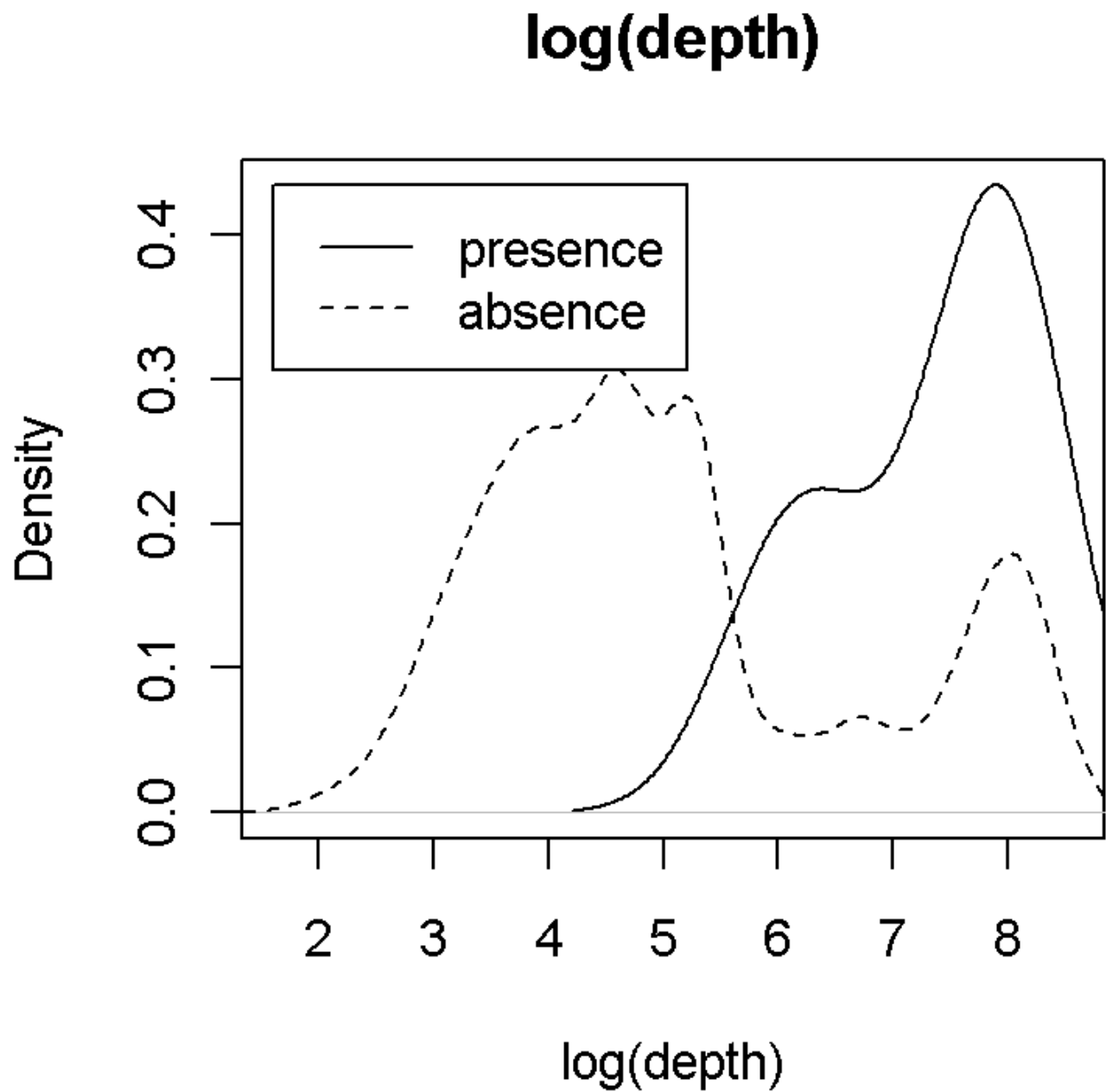


Figure 843: Density histogram of depth log(meters) for 'Stenella species' guild during 'summer' season in 'east2' region.

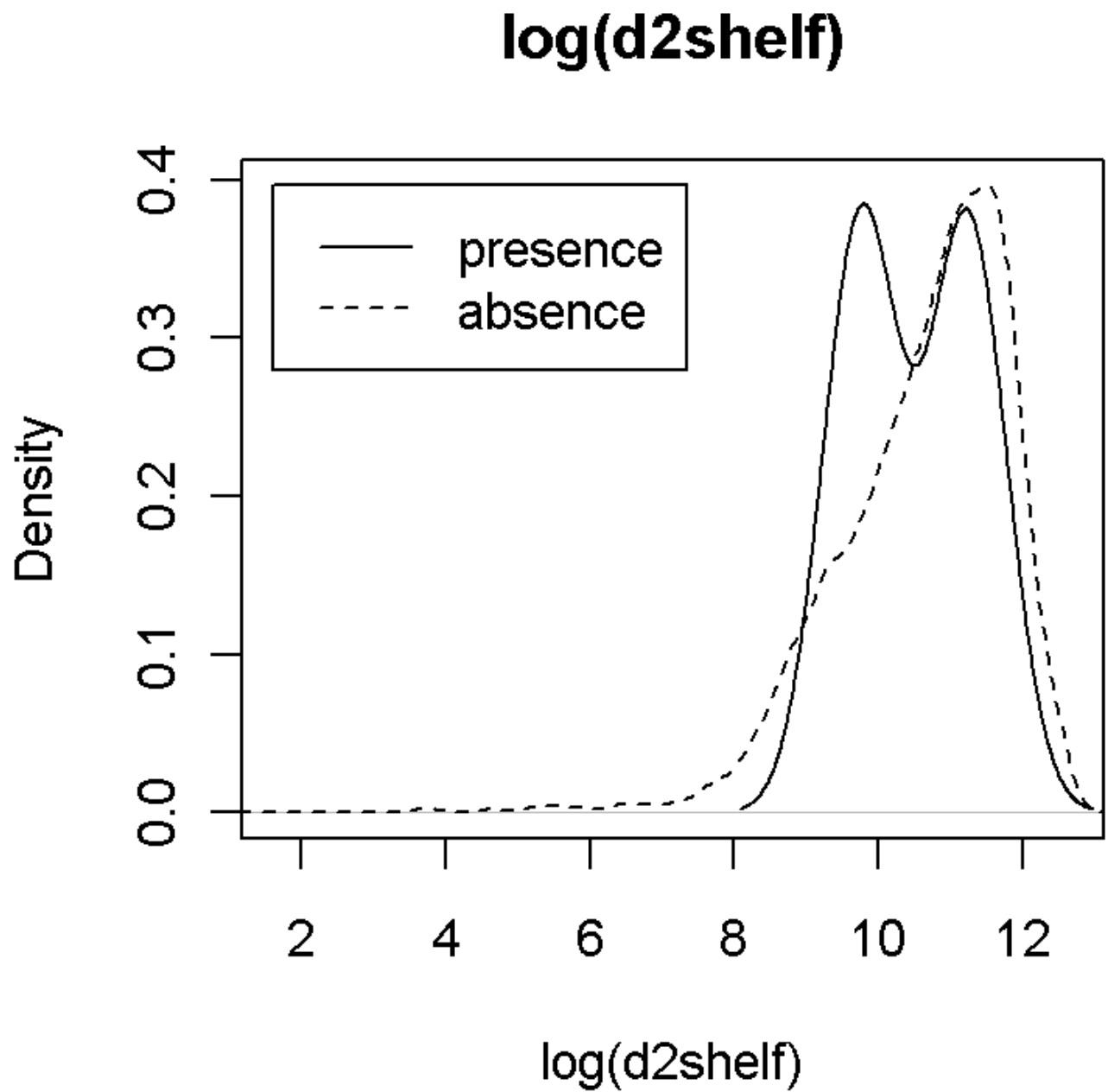


Figure 844: Density histogram of distance to shelf log(meters) for 'Stenella species' guild during 'summer' season in 'east2' region.

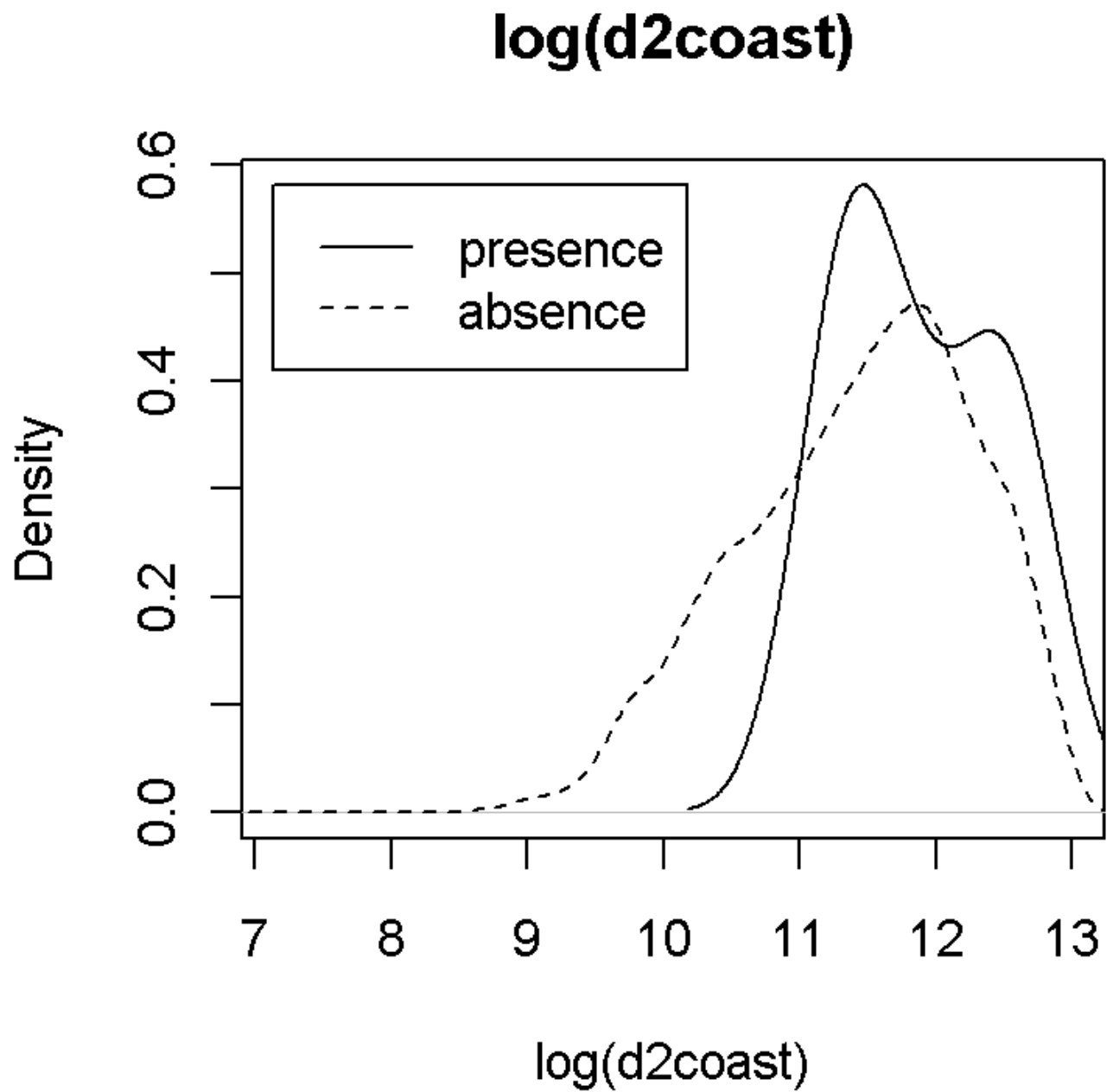


Figure 845: Density histogram of distance to coast log(meters) for 'Stenella species' guild during 'summer' season in 'east2' region.

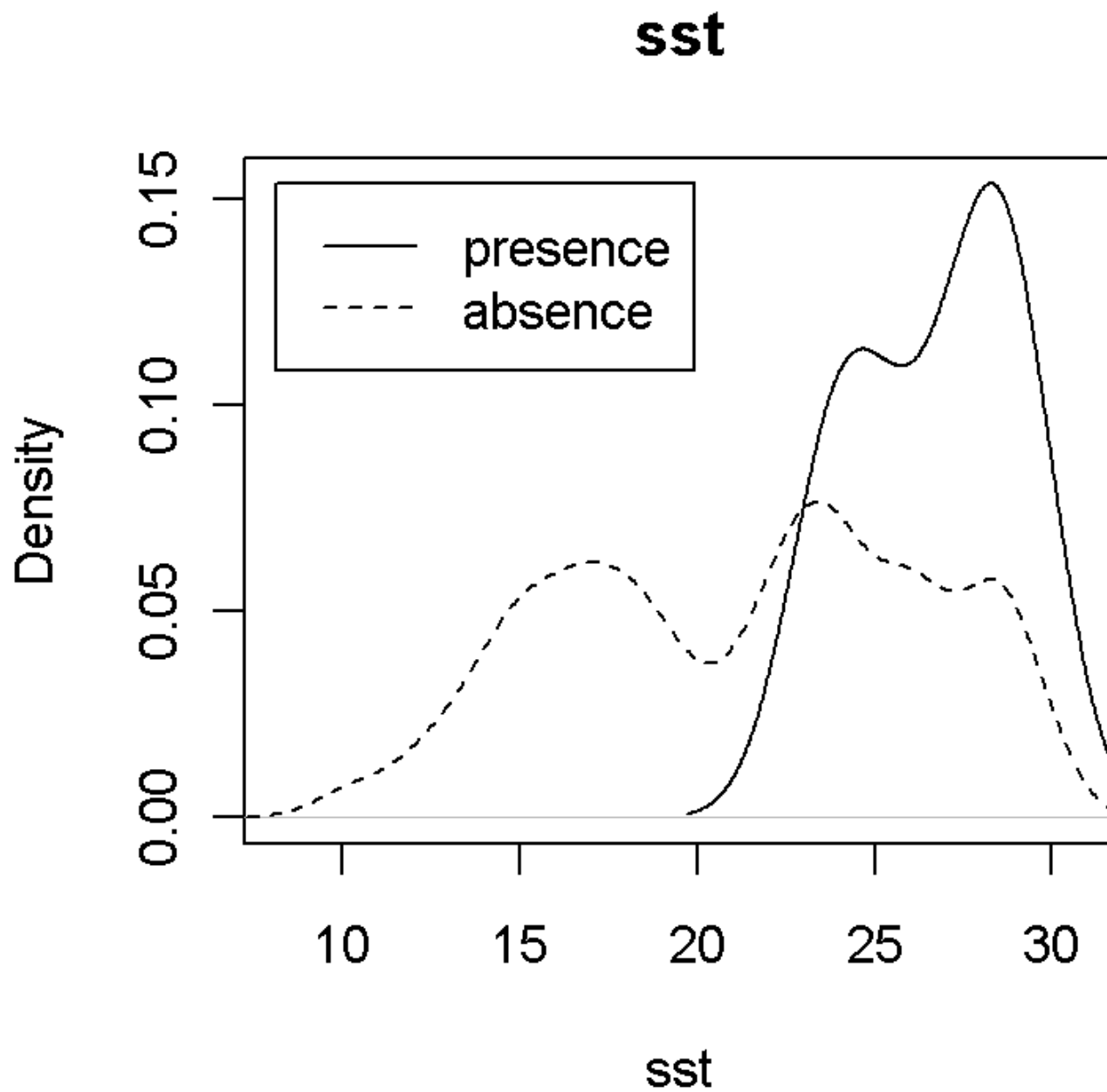


Figure 846: Density histogram of sea-surface temperature (degrees C) for 'Stenella species' guild during 'summer' season in 'east2' region.

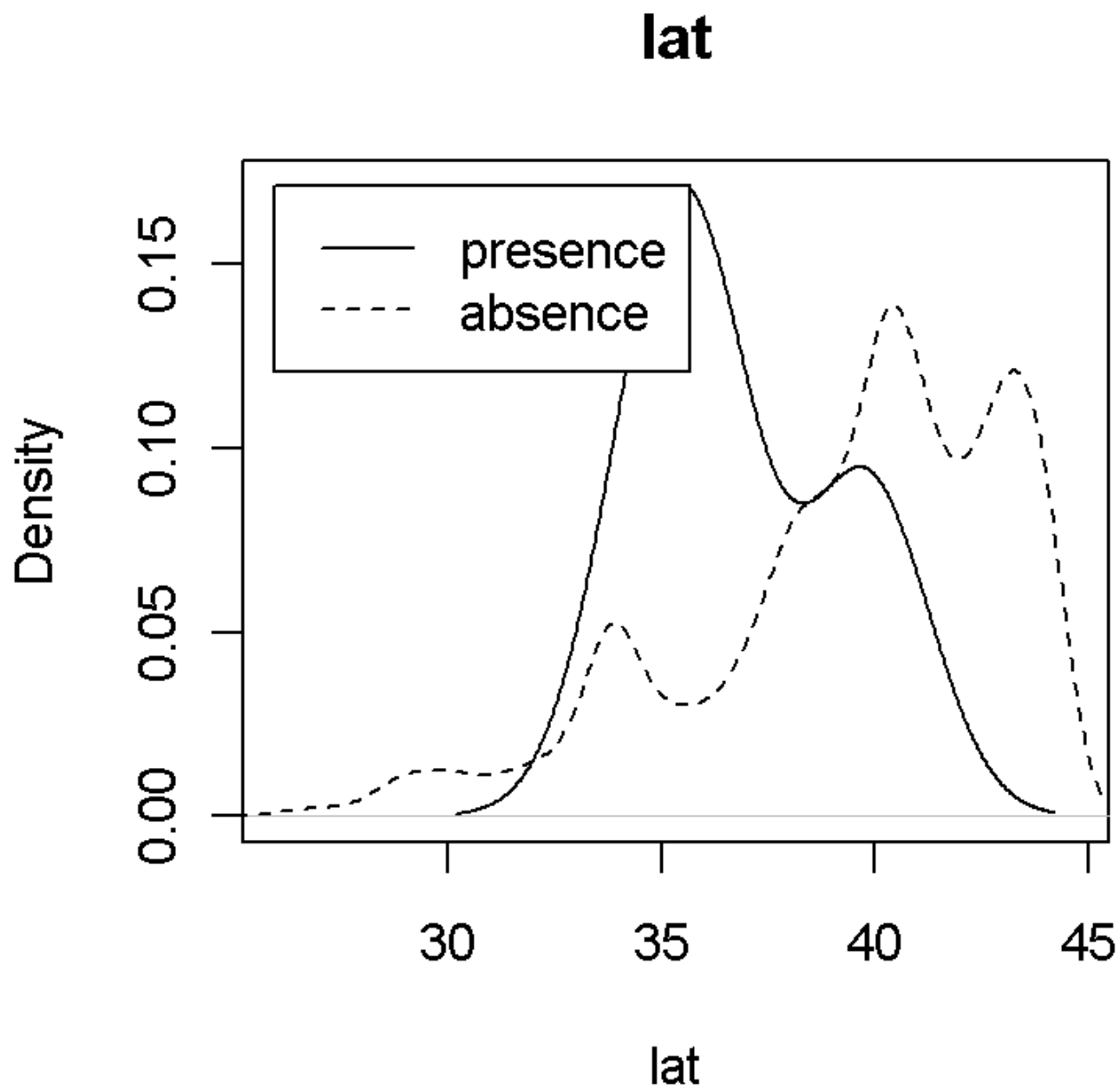


Figure 847: Density histogram of latitude (degrees) for 'Stenella species' guild during 'summer' season in 'east2' region.

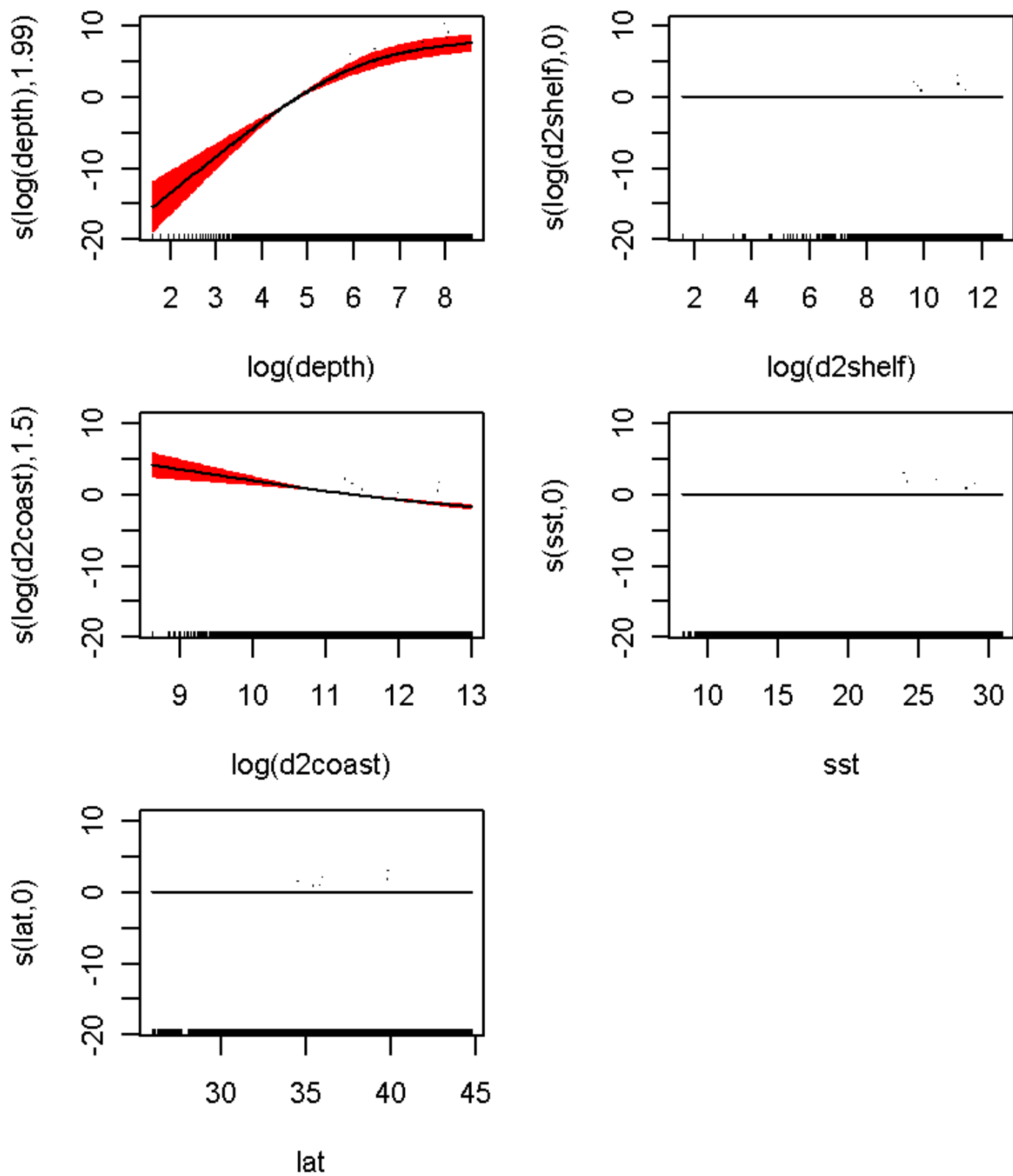


Figure 848: Terms plot of predictors to GAM model fit for 'Stenella species' guild during 'summer' season in 'east2' region.

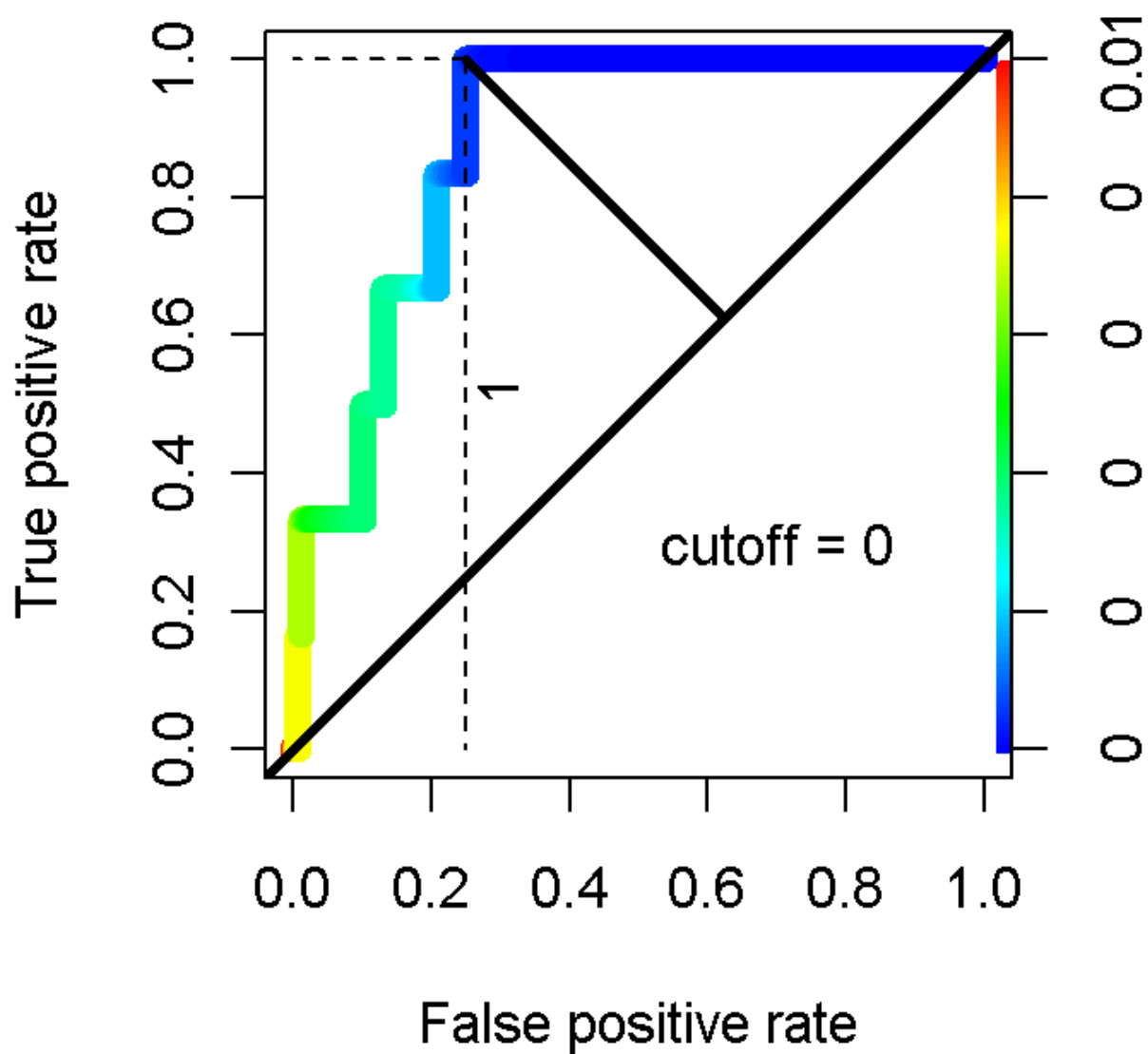


Figure 849: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella species' guild during 'summer' season in 'east2' region.

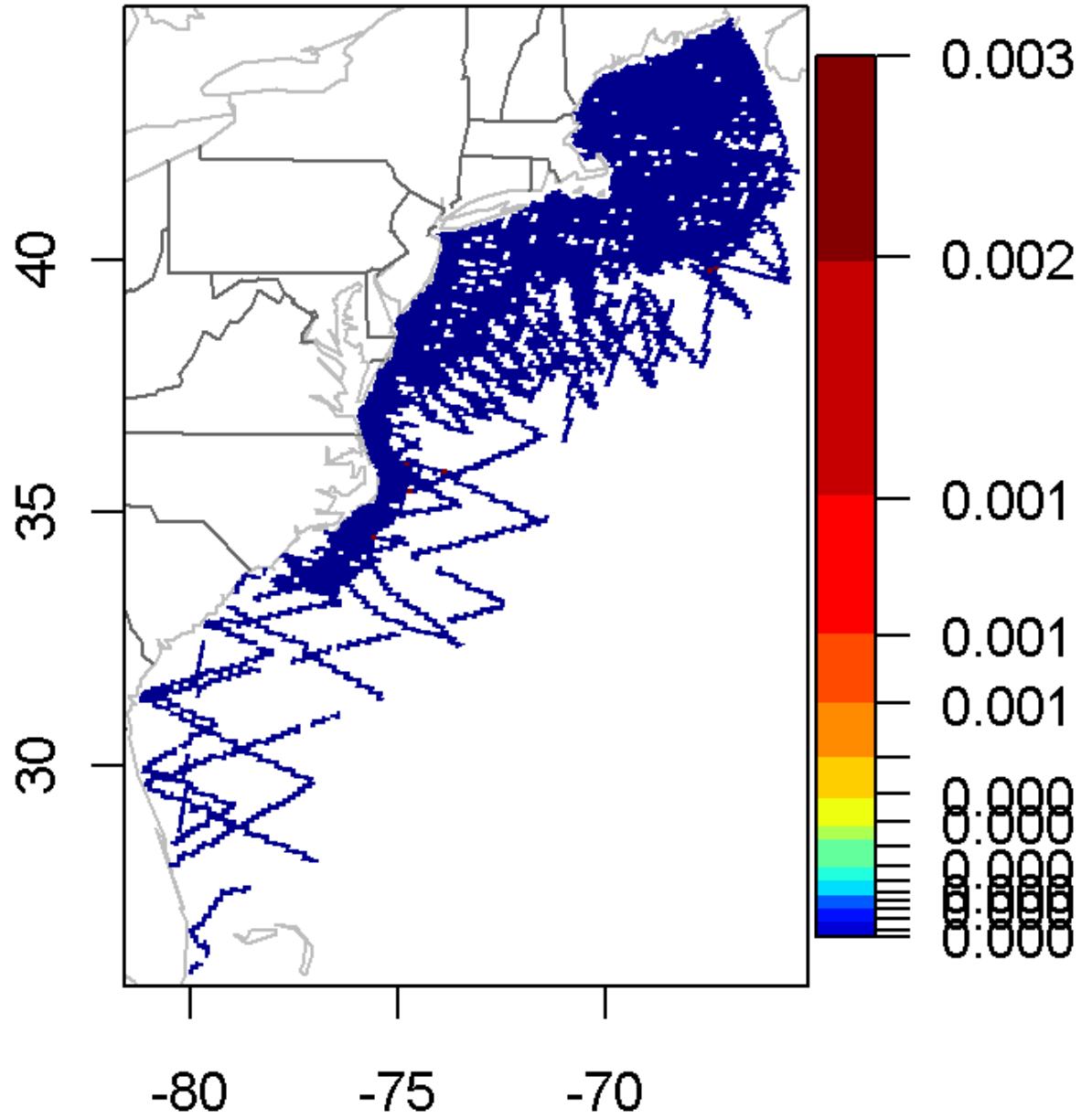


Figure 850: Map of presence and absence by cell summed through time for 'Stenella species' guild during 'summer' season in 'east2' region.

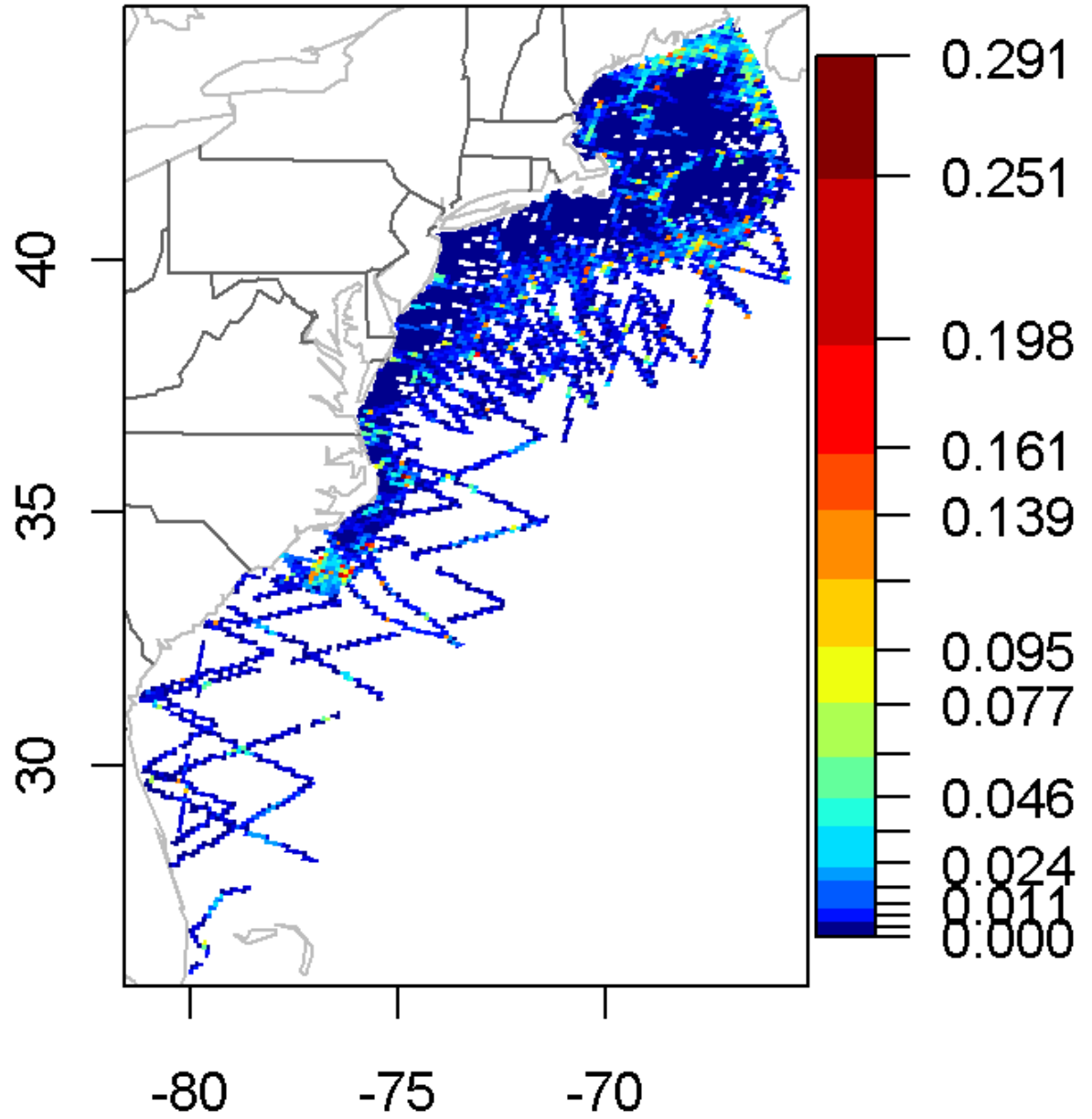


Figure 851: Map of effort(hours/km²) by cell summed through time for 'Stenella species' guild during 'summer' season in 'east2' region.

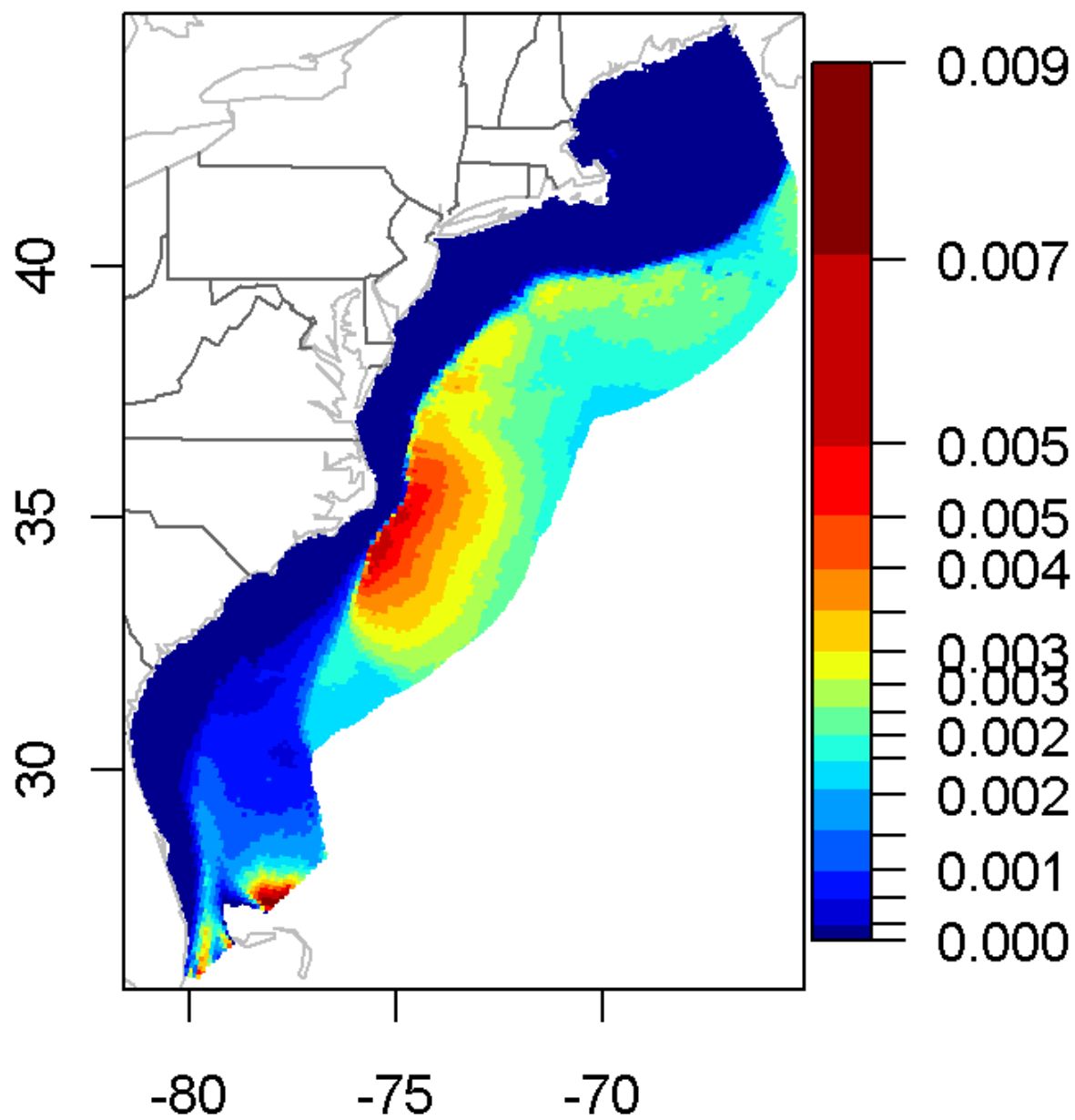


Figure 852: Map of mean predicted habitat for 'Stenella species' guild during 'summer' season in 'east2' region.

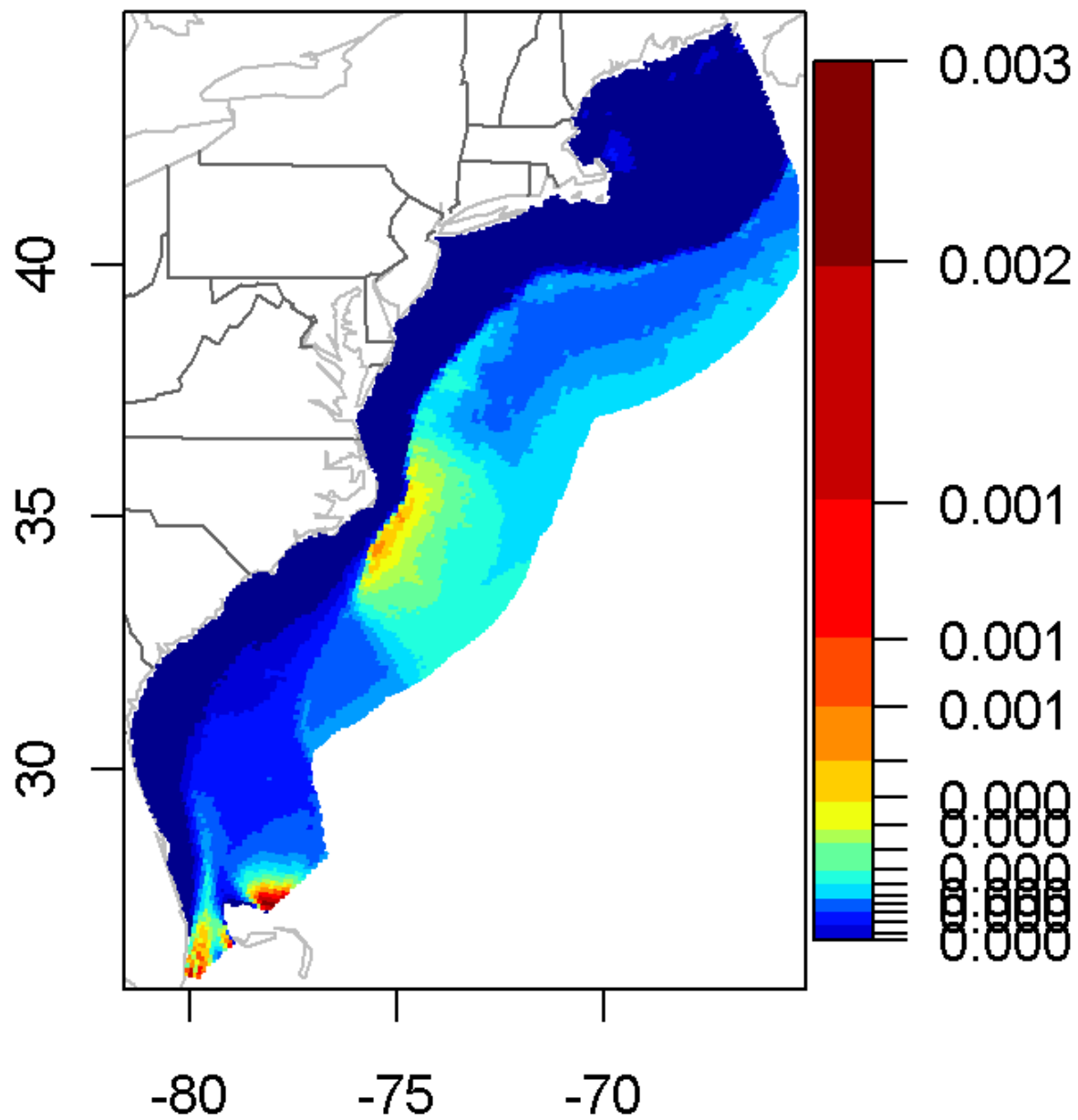


Figure 853: Map of standard error of habitat for 'Stenella species' guild during 'summer' season in 'east2' region.

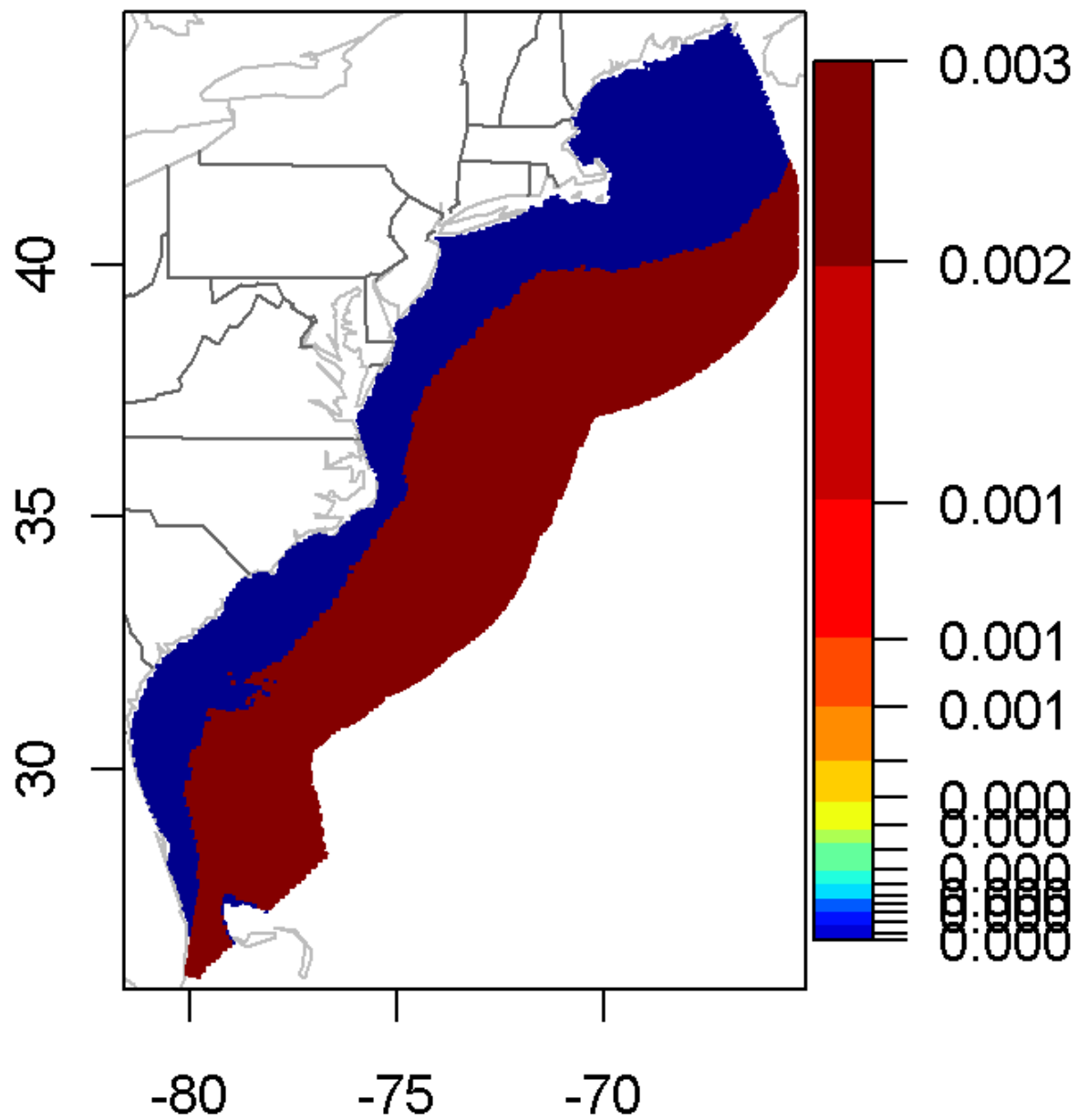


Figure 854: Map of binary habitat (cutoff determined by ROC) for 'Stenella species' guild during 'summer' season in 'east2' region.

16.3.2 gomex2

Modelrun identifier: duke_06_sl3_summer_gomex2

Date generated: 2008-10-21 11:35:21

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 78: Summary for duke(6) GAM model: for 'Stenella species' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	15
Number.absences	1389
GAM.converged	TRUE
R.squared	0.260497
Deviance.explained	0.262424
ROC.optimum	0.329093
Maximum.fit	0.00203911
Maximum.prediction	0.251118

Model text summary...

```
duke_06_sl3_summer_gomex2 run on Tue Oct 21 11:34:40 2008
provider:duke, version:06, guild:Stenella species (sl3), season:'summer', region:gomex2

max.fit:0.329093, max.prediction:0.251118, ROC.optimum:0.002039

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -6.5404      0.3812   -17.16  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  9.616e-01  1.462   24.49  7.70e-09 ***
s(log(d2shelf)) 2.042e-06  0.500  1.02e-08   0.992
s(log(d2coast)) 2.760e-05  0.500  9.47e-05   0.923
s(sst)         9.788e-01  1.479   78.06  < 2e-16 ***
s(lat)         1.950e+00  2.450   14.16  7.59e-08 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.26   Deviance explained = 26.2%
GCV score = 0.0015767   Scale est. = 0.0015668   n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13   Min.   : 13.0   Min.   : 901   Min.   : 5700   Min.   :25.35   Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8   1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75   1st Qu.:26.68
              Median :5134 Median : 654.0   Median : 45466 Median :146059 Median :28.50   Median :27.90
              Mean   :4686 Mean   : 899.5   Mean   : 59670 Mean   :161835 Mean   :28.50   Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0   3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25   3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0   Max.   :249222 Max.   :386037 Max.   :31.20   Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :27.67   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48   1st Qu.:26.28
              Median :4110 Median : 433.5   Median : 71100 Median :157258 Median :29.55   Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.008e-09	Min.	:4.991e-09	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:1.976e-04	1st Qu.	:1.593e-04	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:3.021e-03	Median	:1.680e-03	Median	:0.000e+00	Median	:5.100e-03	Median	:1.0000
Mean	:3997	Mean	:2.412e-02	Mean	:5.039e-03	Mean	:1.359e-02	Mean	:1.213e-02	Mean	:0.5424
3rd Qu.	:6015	3rd Qu.	:3.053e-02	3rd Qu.	:7.295e-03	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:2.511e-01	Max.	:3.858e-02	Max.	:1.000e+00	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5.568e+03	NA's	:5.568e+03		

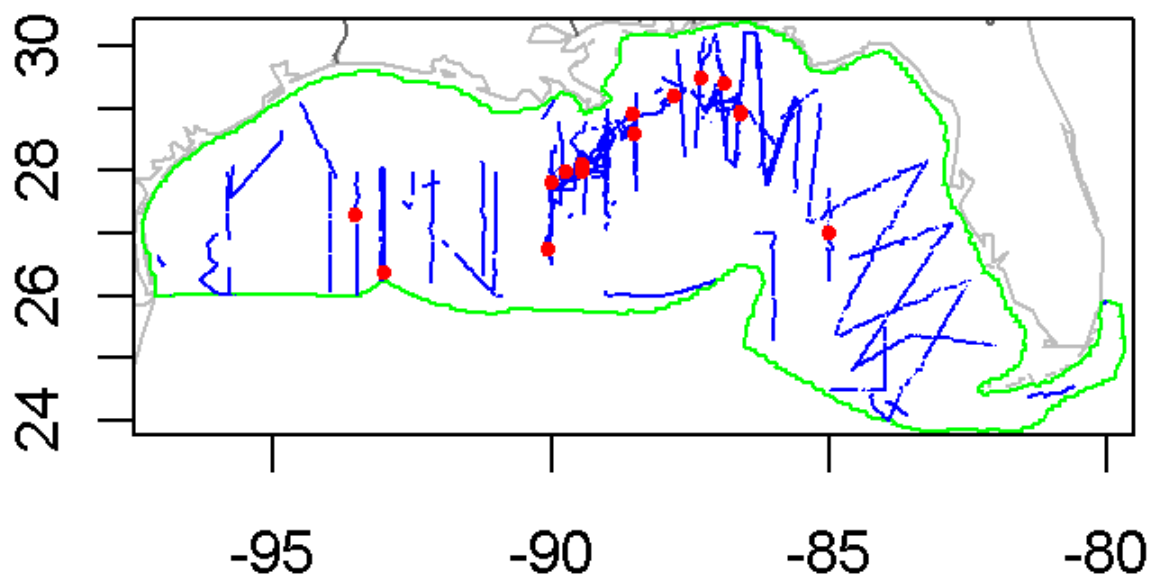


Figure 855: Map of points of observational sightings and tracks of survey effort for 'Stenella species' guild during 'summer' season in 'gomex2' region.

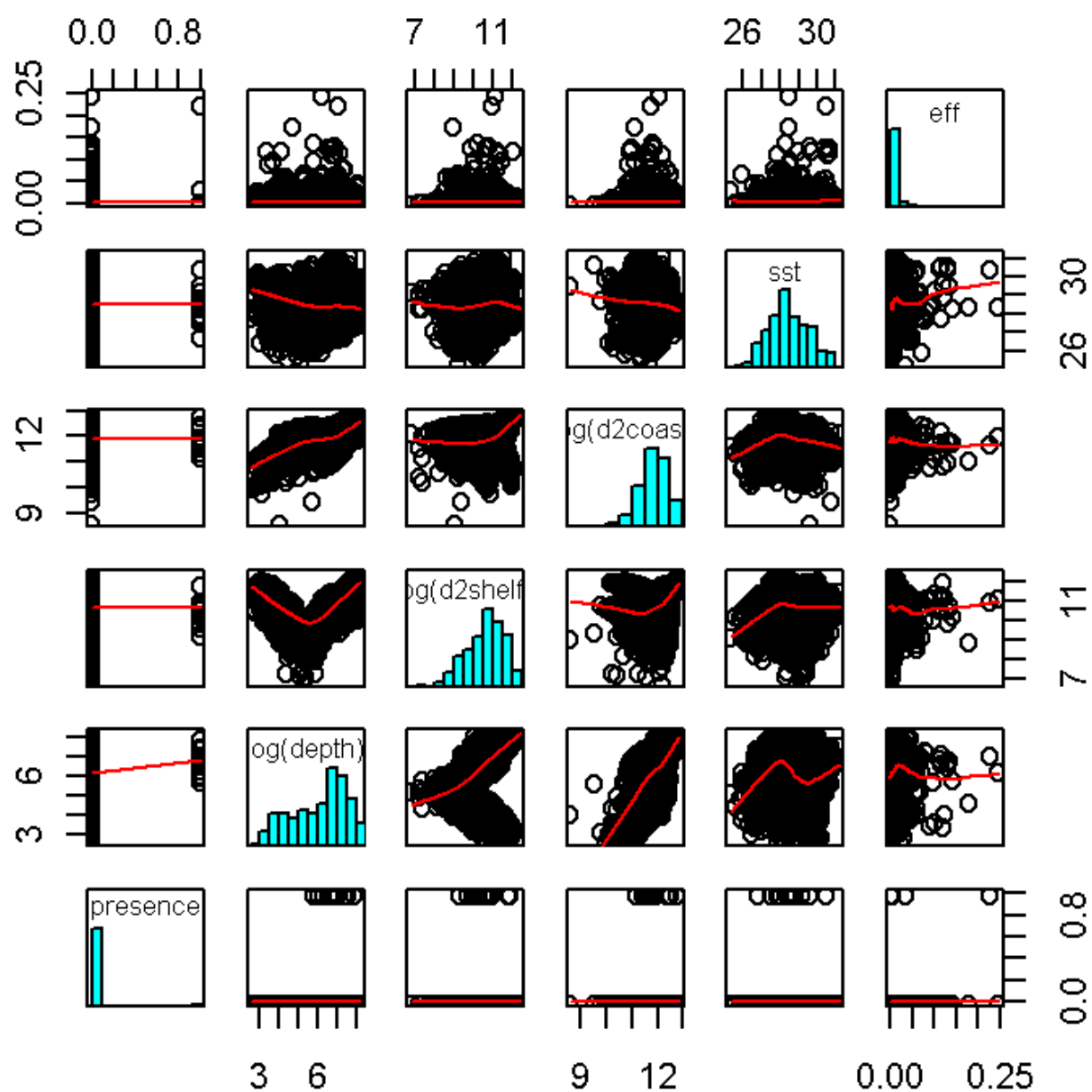


Figure 856: Pairs plot of input variables for 'Stenella species' guild during 'summer' season in 'gomex2' region.

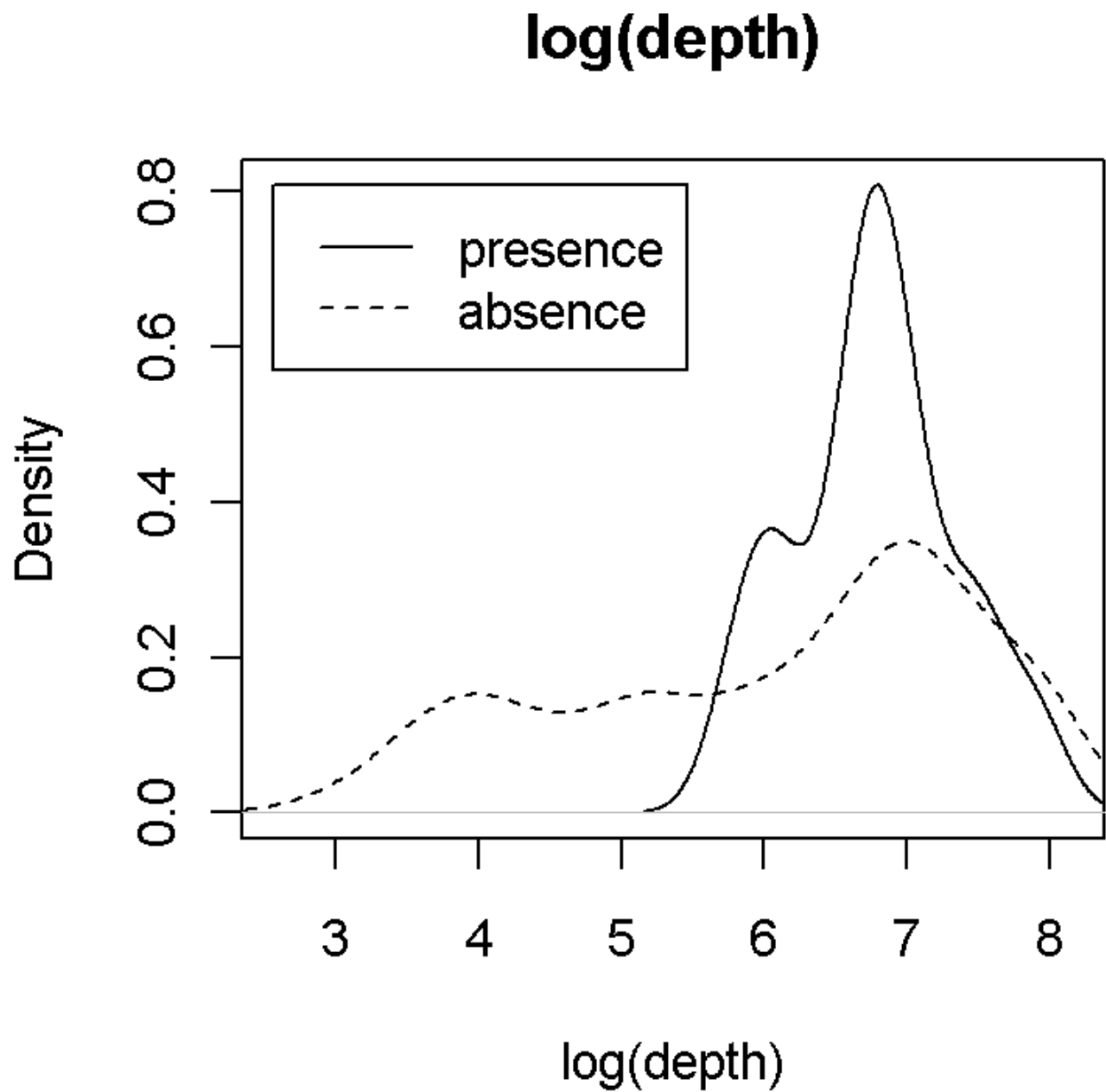


Figure 857: Density histogram of depth log(meters) for 'Stenella species' guild during 'summer' season in 'gomex2' region.

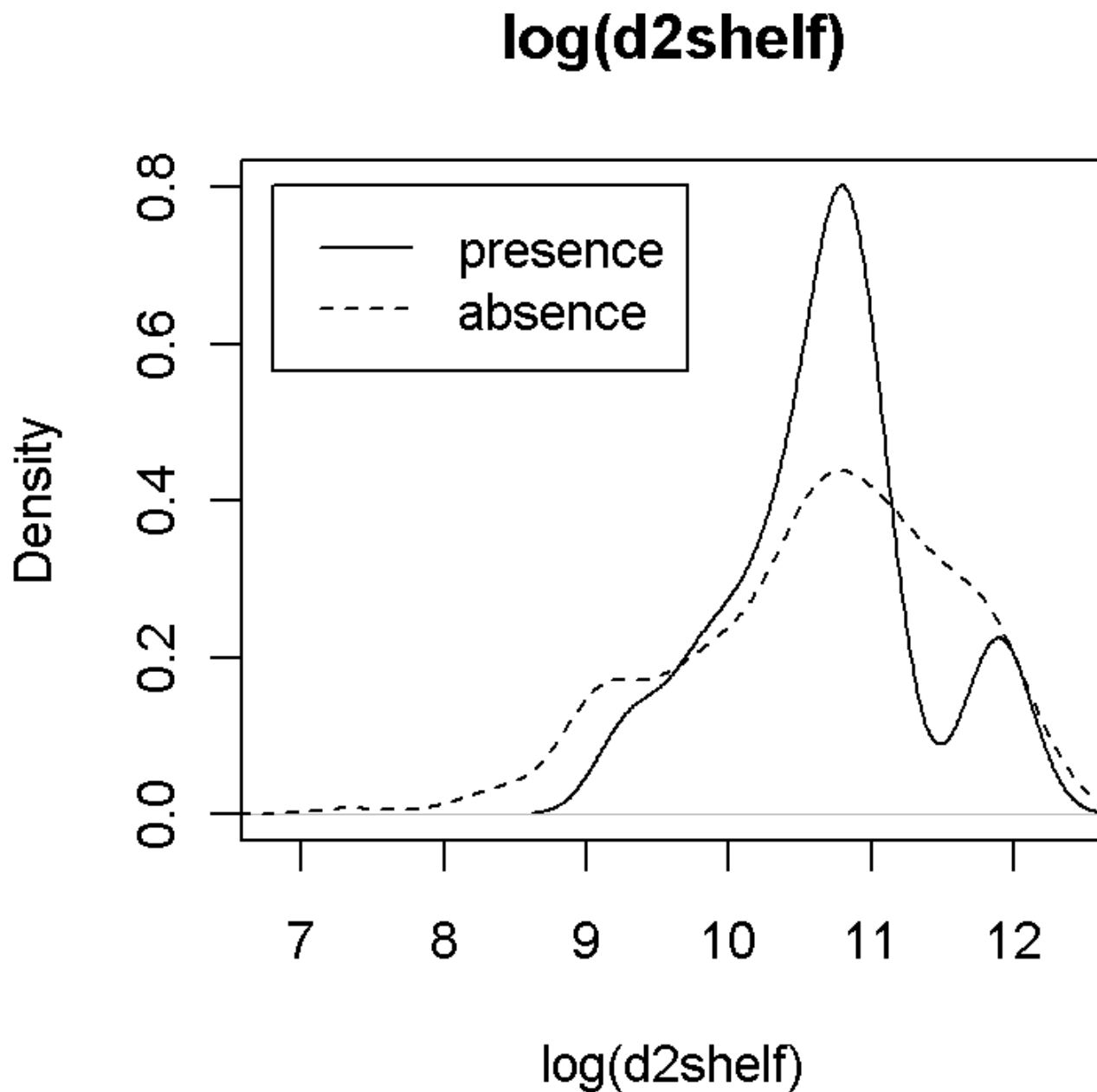


Figure 858: Density histogram of distance to shelf log(meters) for 'Stenella species' guild during 'summer' season in 'gomex2' region.

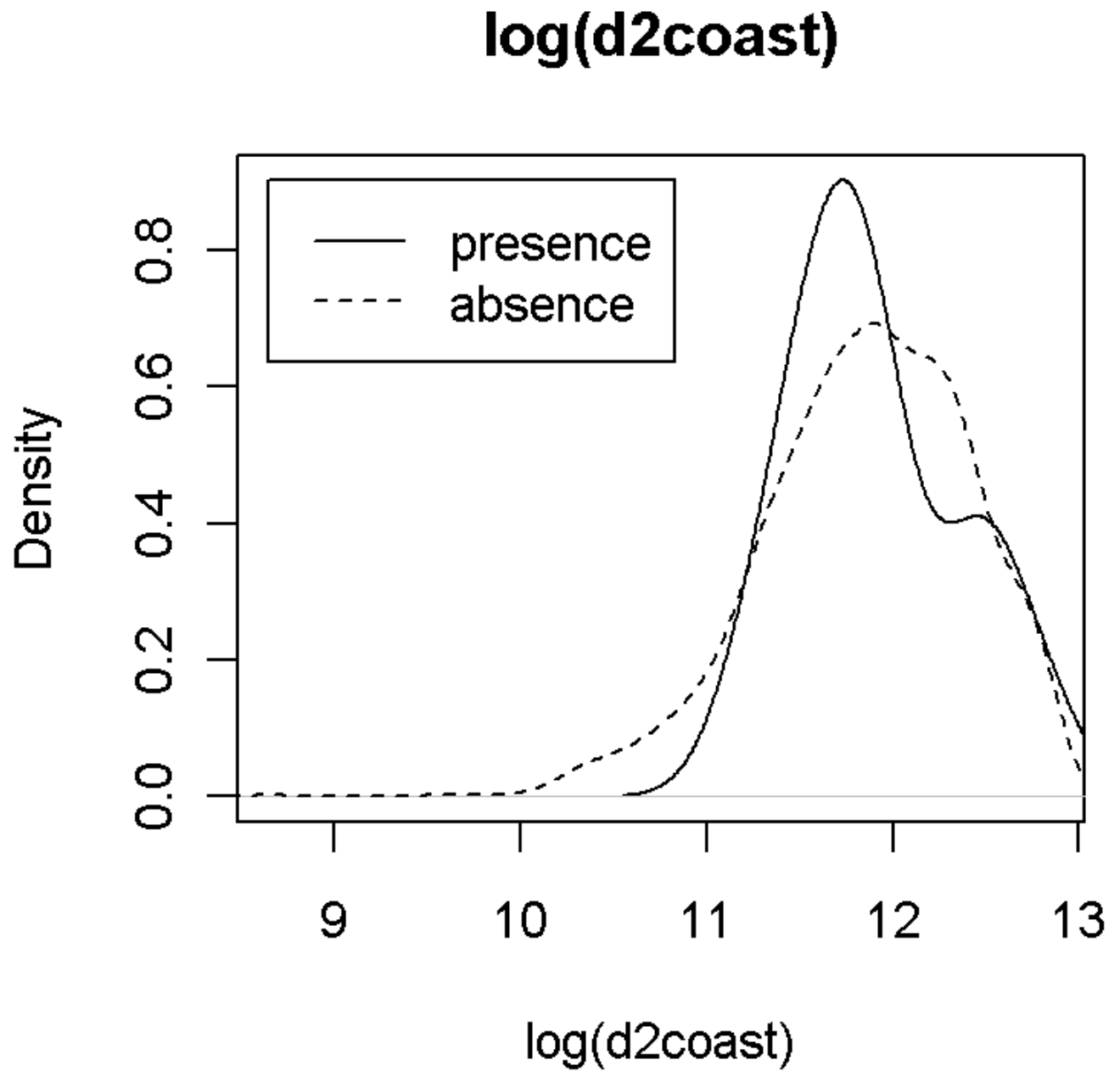


Figure 859: Density histogram of distance to coast log(meters) for 'Stenella species' guild during 'summer' season in 'gomex2' region.

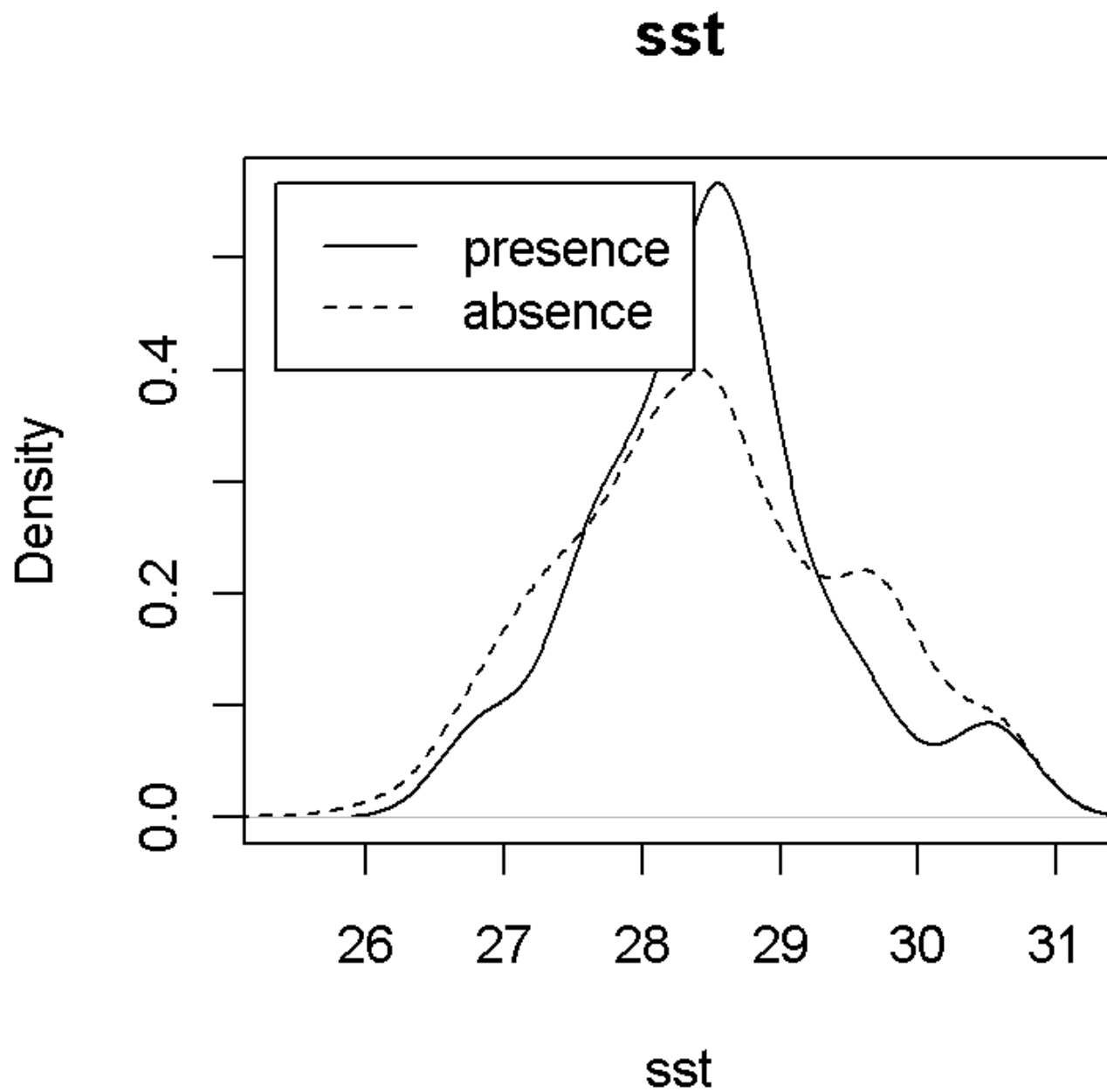


Figure 860: Density histogram of sea-surface temperature (degrees C) for 'Stenella species' guild during 'summer' season in 'gomex2' region.

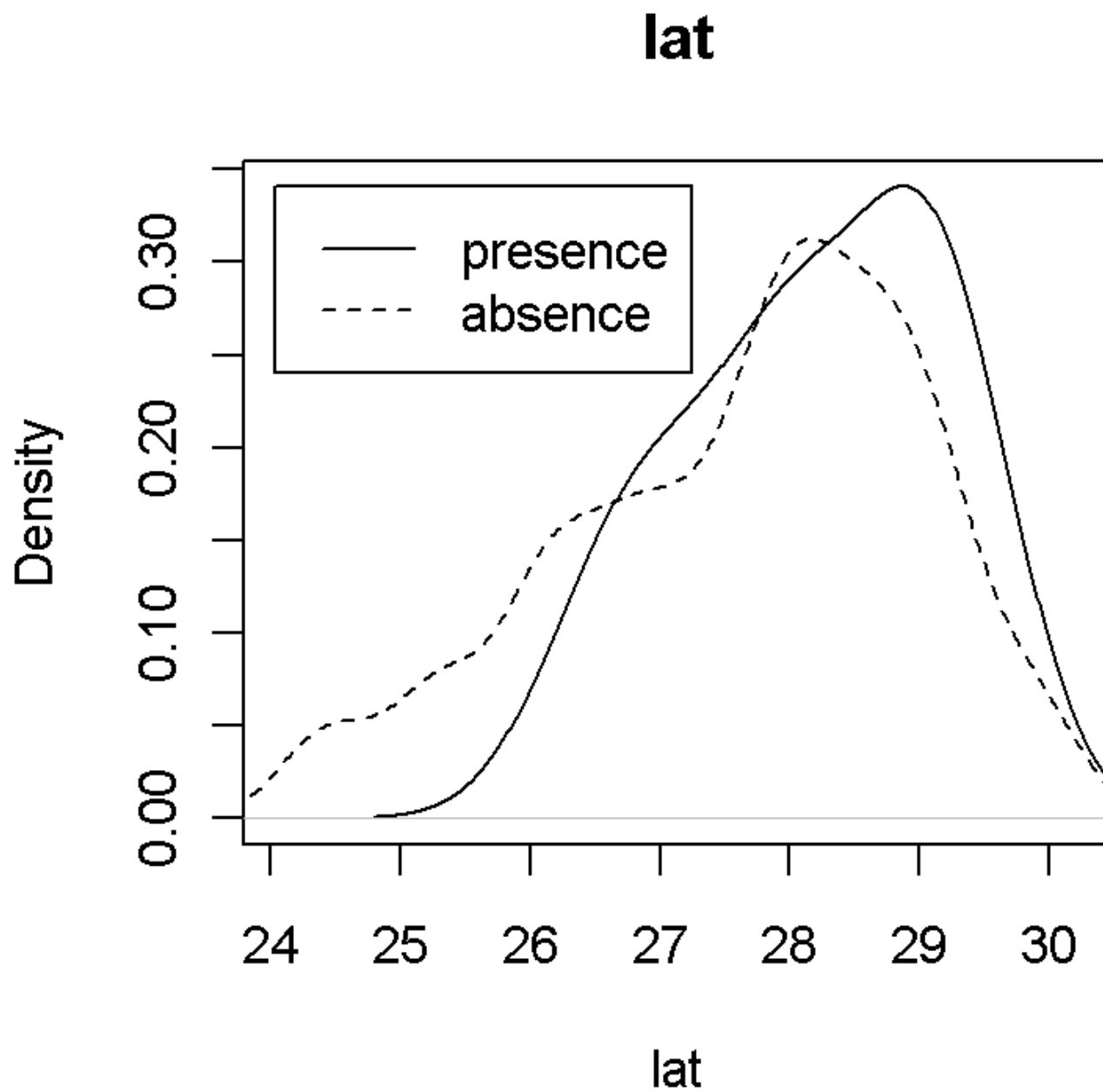


Figure 861: Density histogram of latitude (degrees) for 'Stenella species' guild during 'summer' season in 'gomex2' region.

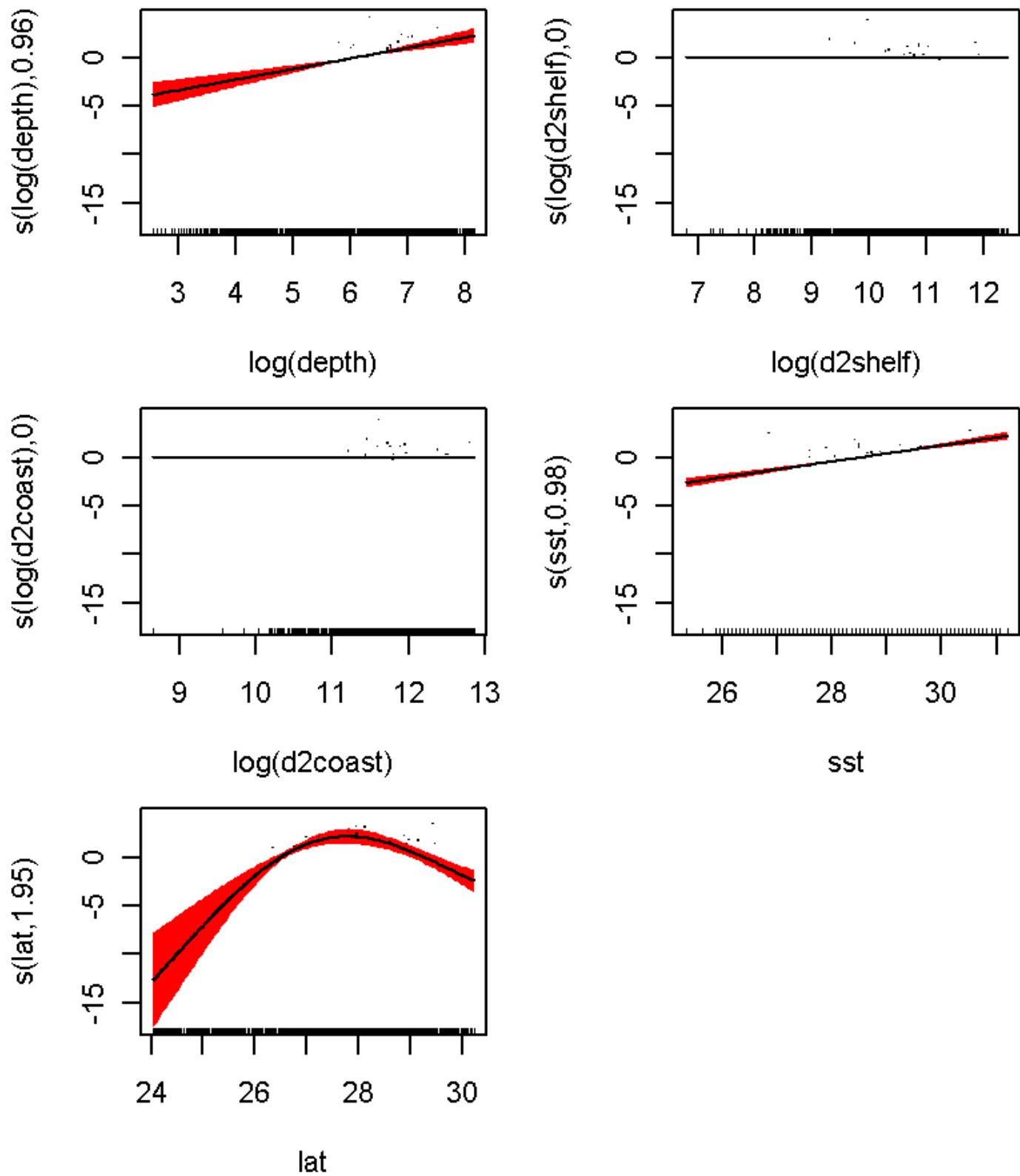


Figure 862: Terms plot of predictors to GAM model fit for 'Stenella species' guild during 'summer' season in 'gomex2' region.

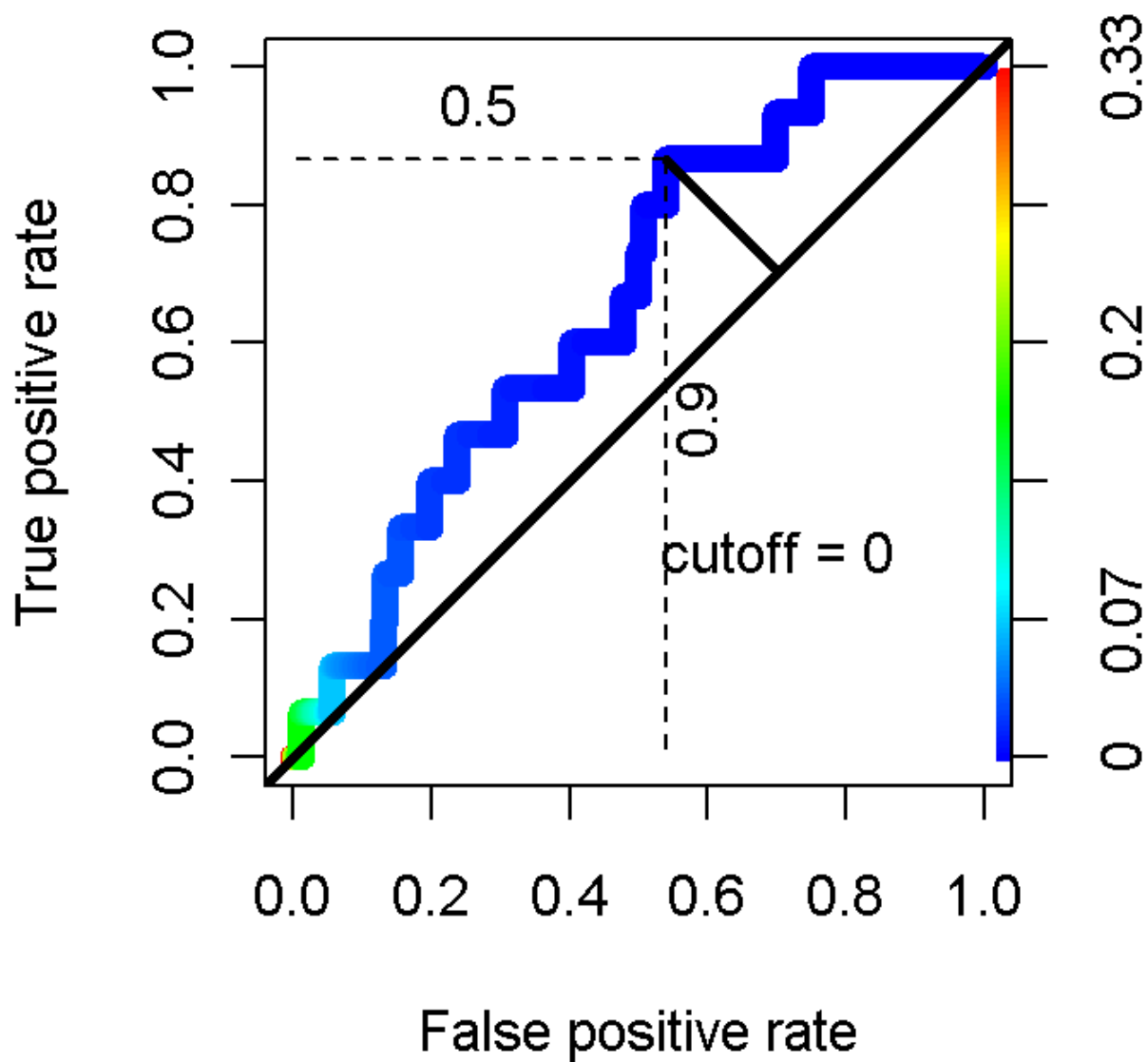


Figure 863: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Stenella species' guild during 'summer' season in 'gomex2' region.

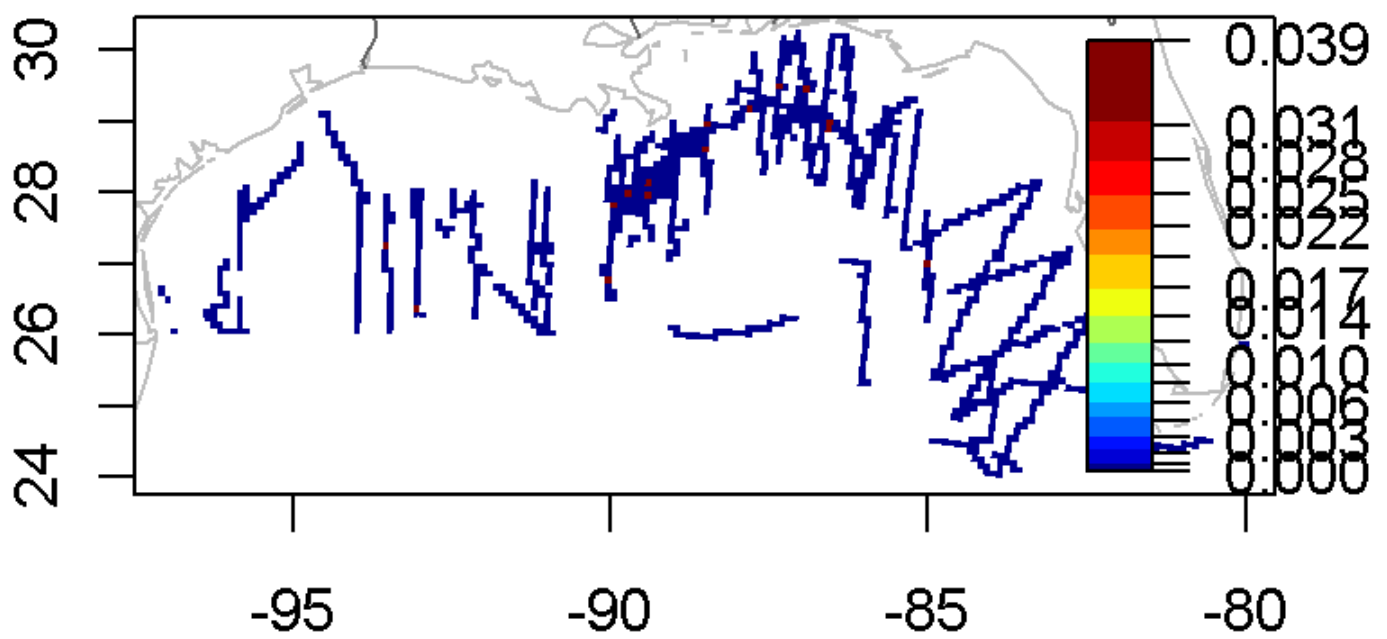


Figure 864: Map of presence and absence by cell summed through time for 'Stenella species' guild during 'summer' season in 'gomex2' region.

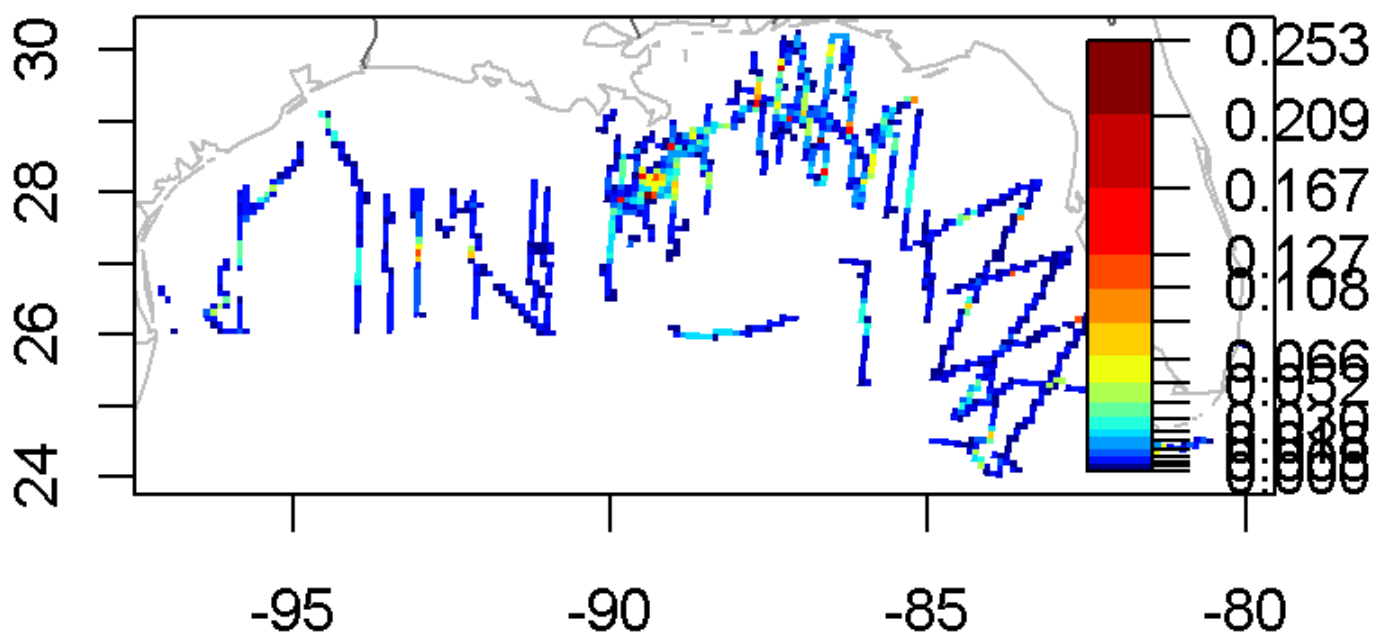


Figure 865: Map of effort(hours/km²) by cell summed through time for 'Stenella species' guild during 'summer' season in 'gomex2' region.

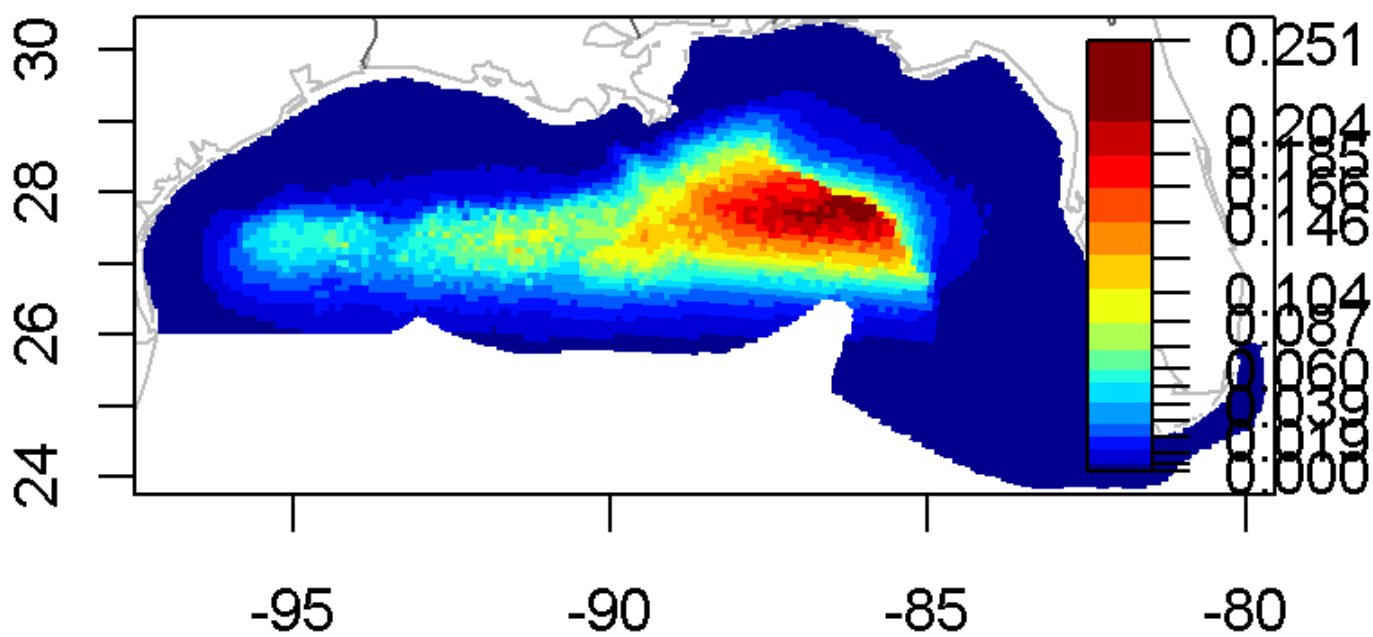


Figure 866: Map of mean predicted habitat for 'Stenella species' guild during 'summer' season in 'gomex2' region.

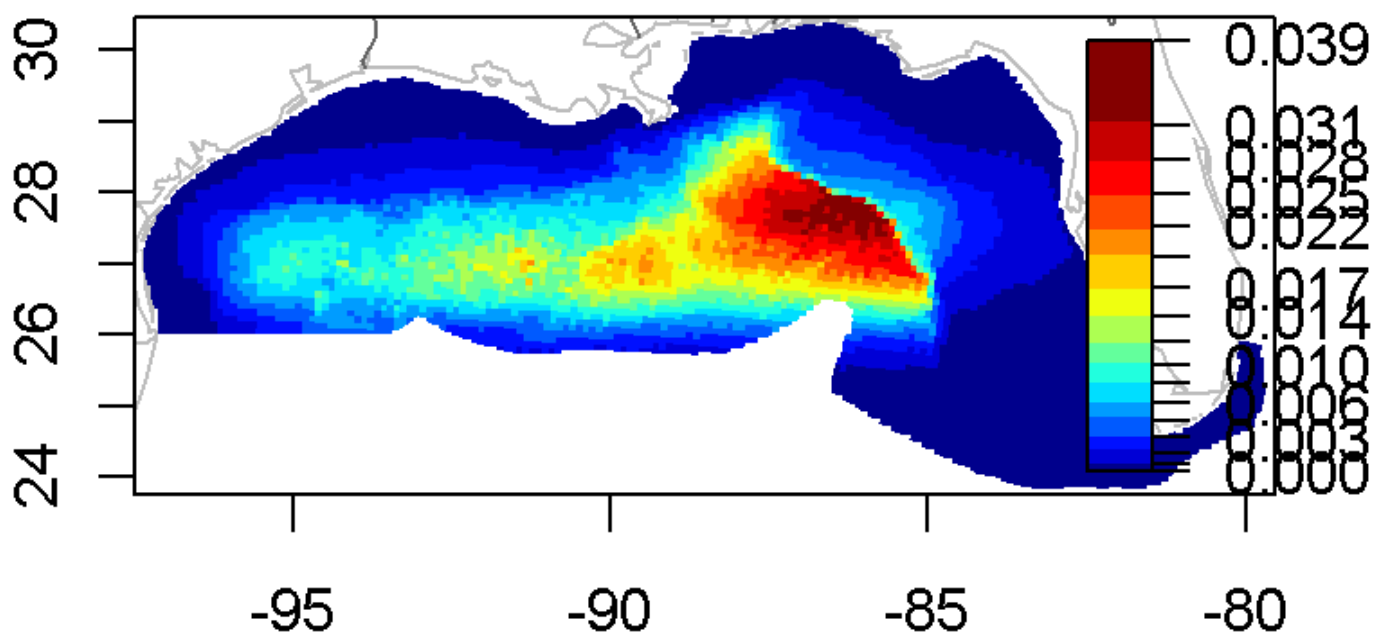


Figure 867: Map of standard error of habitat for 'Stenella species' guild during 'summer' season in 'gomex2' region.

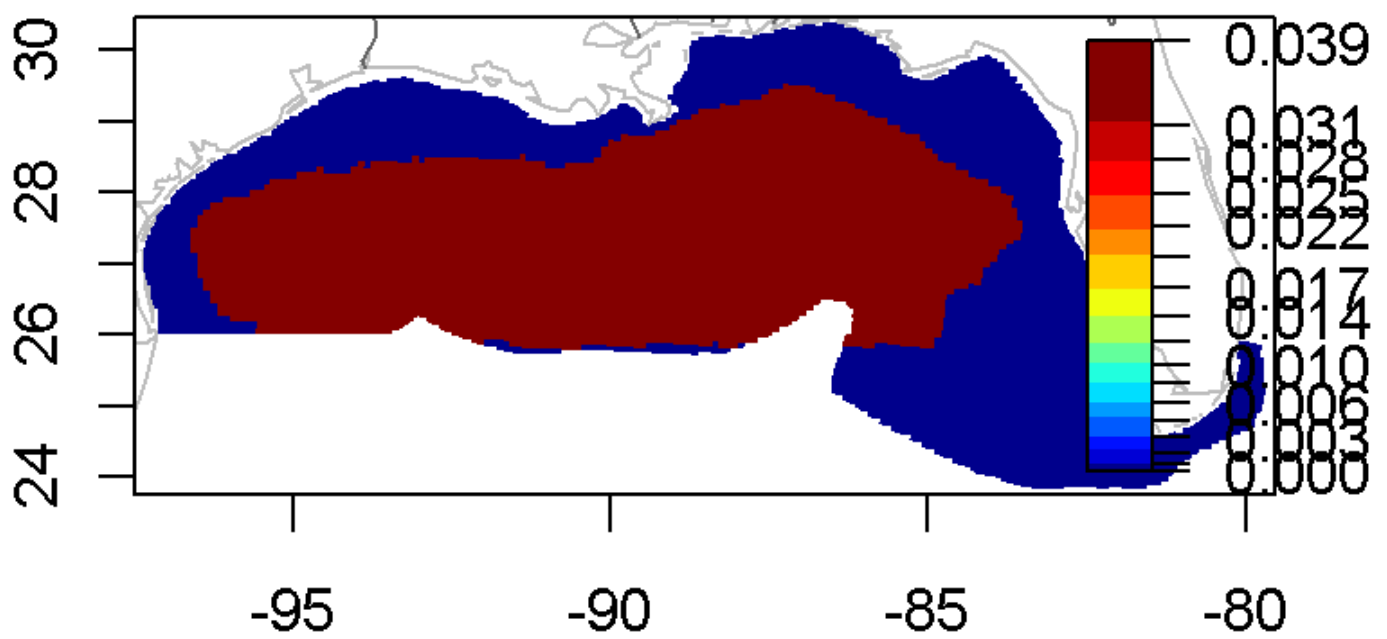


Figure 868: Map of binary habitat (cutoff determined by ROC) for 'Stenella species' guild during 'summer' season in 'gomex2' region.

16.4 winter

17 Striped dolphin

Guildid:sc3

Table 79: Taxonomic members of the "Striped dolphin" guild.

	Scientific Name	Common Name	Taxonomic #
1	<i>Stenella coeruleoalba</i>	striped dolphin	180434

17.1 fall

17.2 spring

17.2.1 gomex2

Modelrun identifier: duke_06_sc3_spring_gomex2

Date generated: 2008-10-21 11:59:37

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 80: Summary for duke(6) GAM model: for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	44
Number.absences	4773
GAM.converged	TRUE
R.squared	0.0206732
Deviance.explained	0.0899671
ROC.optimum	0.0452036
Maximum.fit	0.00522252
Maximum.prediction	0.0481869

Model text summary...

```
duke_06_sc3_spring_gomex2 run on Tue Oct 21 11:58:20 2008
  provider:duke, version:06, guild:Striped dolphin (sc3), season:'spring', region:gomex2

max.fit:0.045204, max.prediction:0.048187, ROC.optimum:0.005223

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -5.49934    0.07374  -74.58   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth)) 1.075e-06  0.500 2.59e-07 0.982410
s(log(d2shelf)) 9.330e-01  1.433   53.40 < 2e-16 ***
s(log(d2coast)) 8.237e-01  1.324   10.95 0.000260 ***
s(sst)         1.975e+00  2.475   68.59 < 2e-16 ***
s(lat)         1.983e-06  0.500 7.23e-05 0.928056
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0207  Deviance explained =   9%
GCV score = 0.00069814  Scale est. = 0.0006969  n = 4817

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:4817  Min.   : 14  Min.   : 11  Min.   : 272  Min.   : 21187  Min.   :19.73  Min.   :24.05
              1st Qu.:2144 1st Qu.: 511 1st Qu.: 24696 1st Qu.:142982 1st Qu.:24.23 1st Qu.:26.38
              Median :4222 Median :1292 Median : 63128 Median :211670 Median :25.35 Median :27.38
              Mean   :3977 Mean   :1537 Mean : 82827 Mean :213952 Mean :25.14 Mean :27.25
              3rd Qu.:5932 3rd Qu.:2668 3rd Qu.:131568 3rd Qu.:276022 3rd Qu.:26.17 3rd Qu.:28.13
              Max.   :8191 Max.   :3523 Max.   :257870 Max.   :404358 Max.   :28.42 Max.   :30.06

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :19.95  Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0 1st Qu.: 31617 1st Qu.: 85289 1st Qu.:21.83 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :23.02 Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:5.658e-05	Min.	:2.348e-05	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.000
1st Qu.	:1861	1st Qu.	:1.962e-03	1st Qu.	:4.846e-04	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.000
Median	:4110	Median	:5.133e-03	Median	:9.216e-04	Median	:0.000e+00	Median	:9.499e-03	Median	:0.000
Mean	:3997	Mean	:1.014e-02	Mean	:1.113e-03	Mean	:2.399e-02	Mean	:2.365e-02	Mean	:0.497
3rd Qu.	:6015	3rd Qu.	:1.517e-02	3rd Qu.	:1.523e-03	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:1.000
Max.	:8351	Max.	:4.819e-02	Max.	:4.216e-03	Max.	:2.000e+00	Max.	:2.695e-01	Max.	:1.000
						NA's	:4.838e+03	NA's	:4.838e+03		

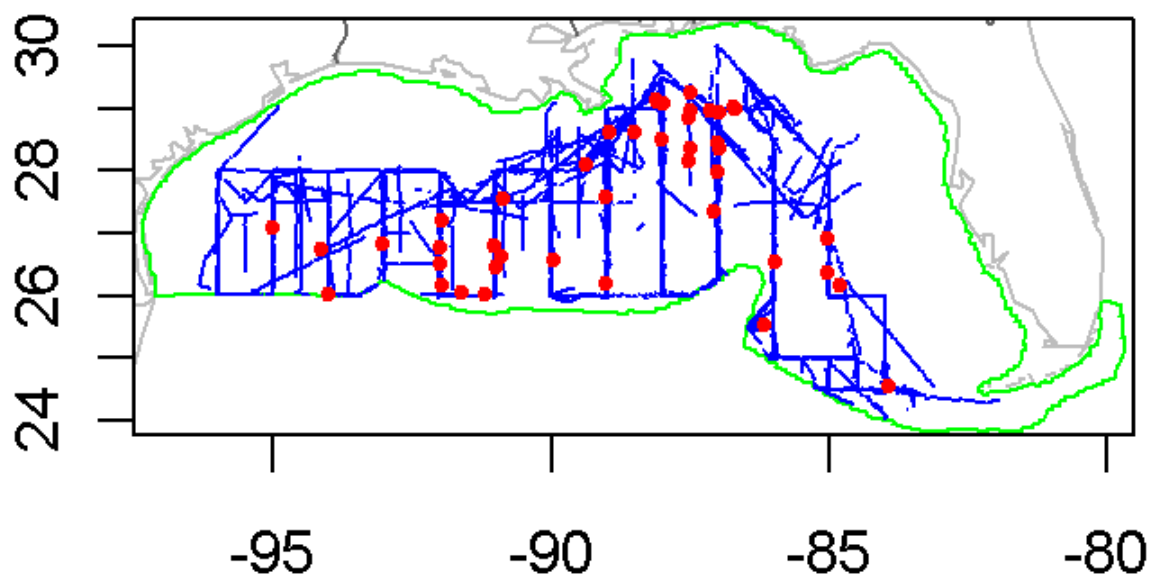


Figure 869: Map of points of observational sightings and tracks of survey effort for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

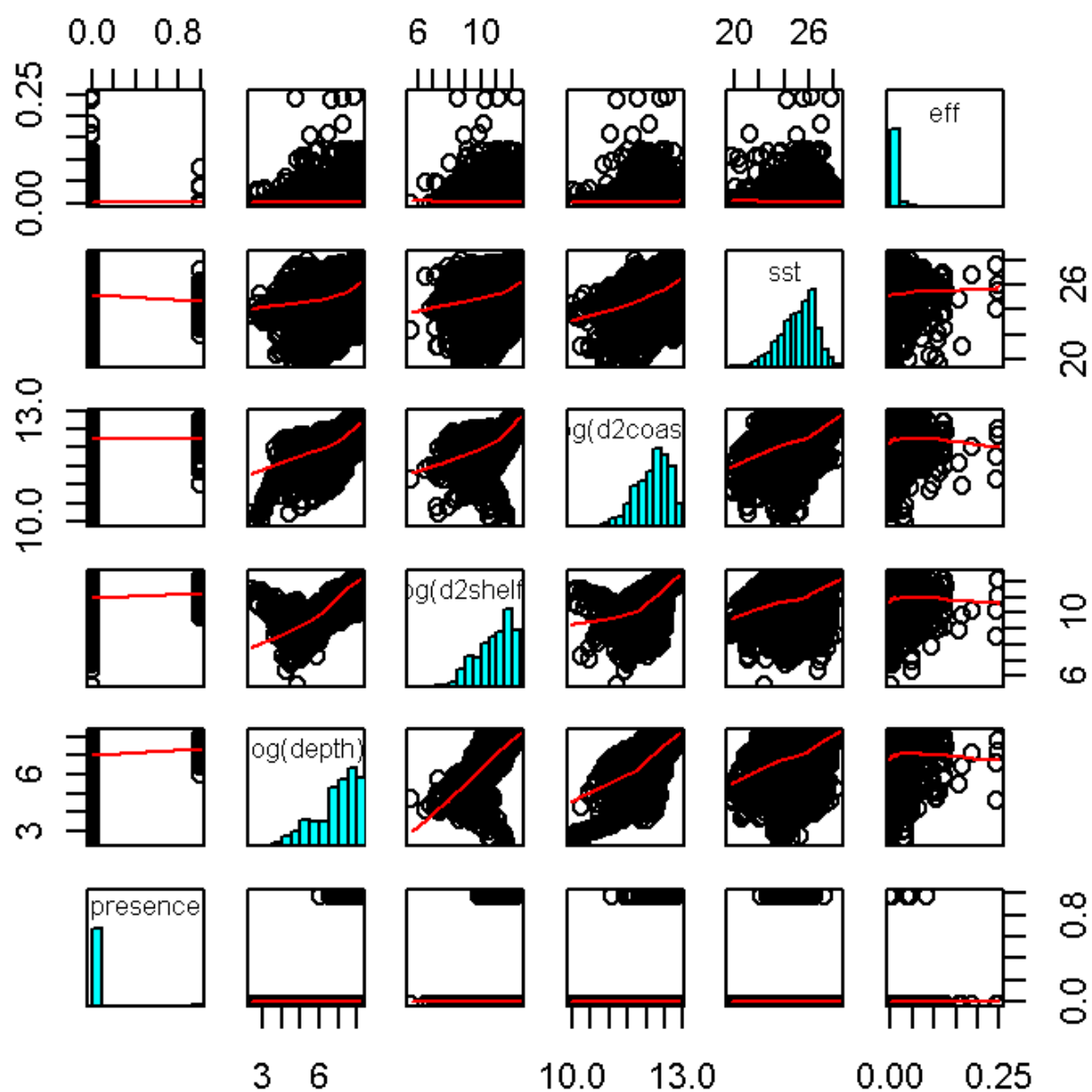


Figure 870: Pairs plot of input variables for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

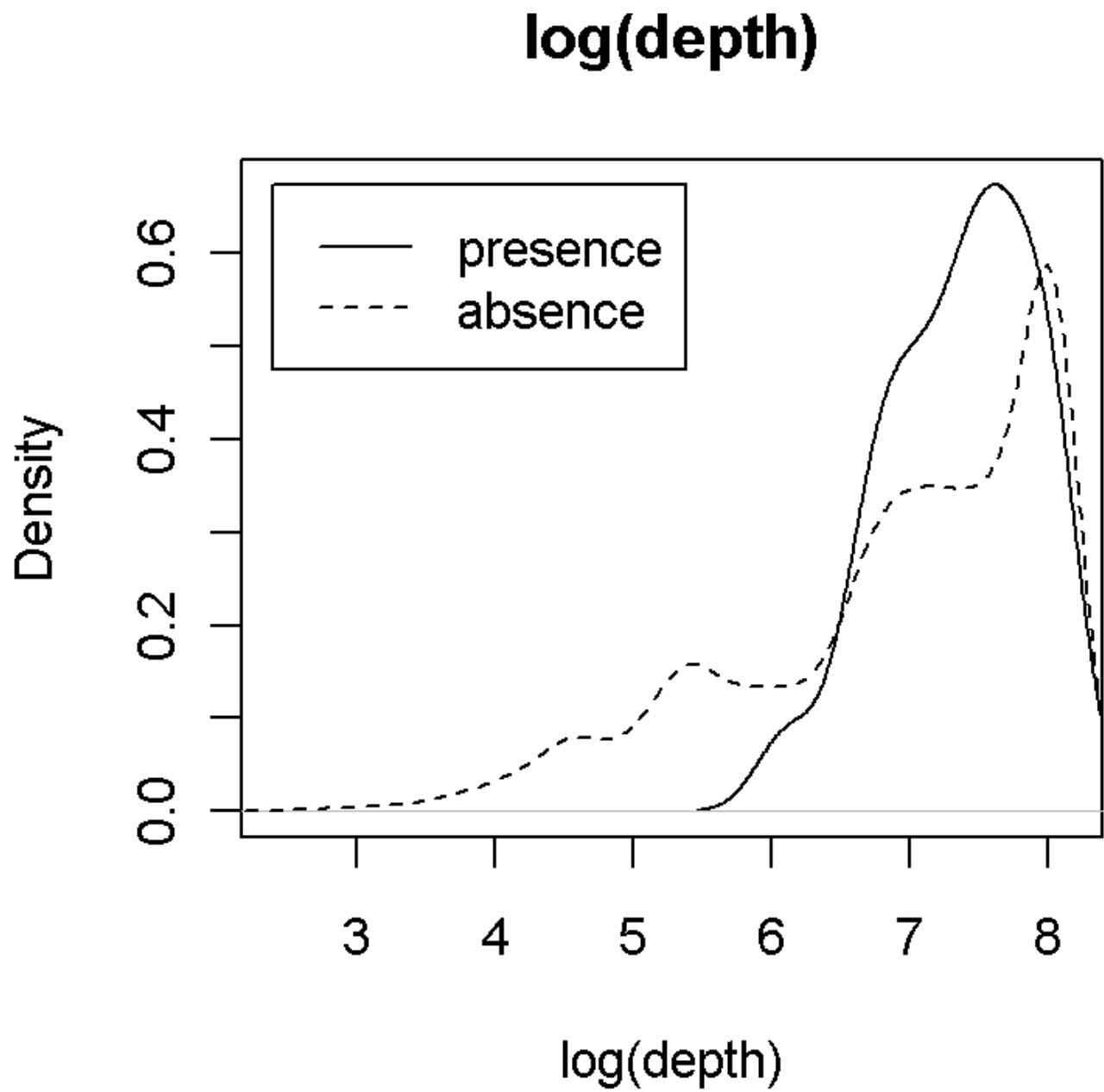


Figure 871: Density histogram of depth $\log(\text{meters})$ for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

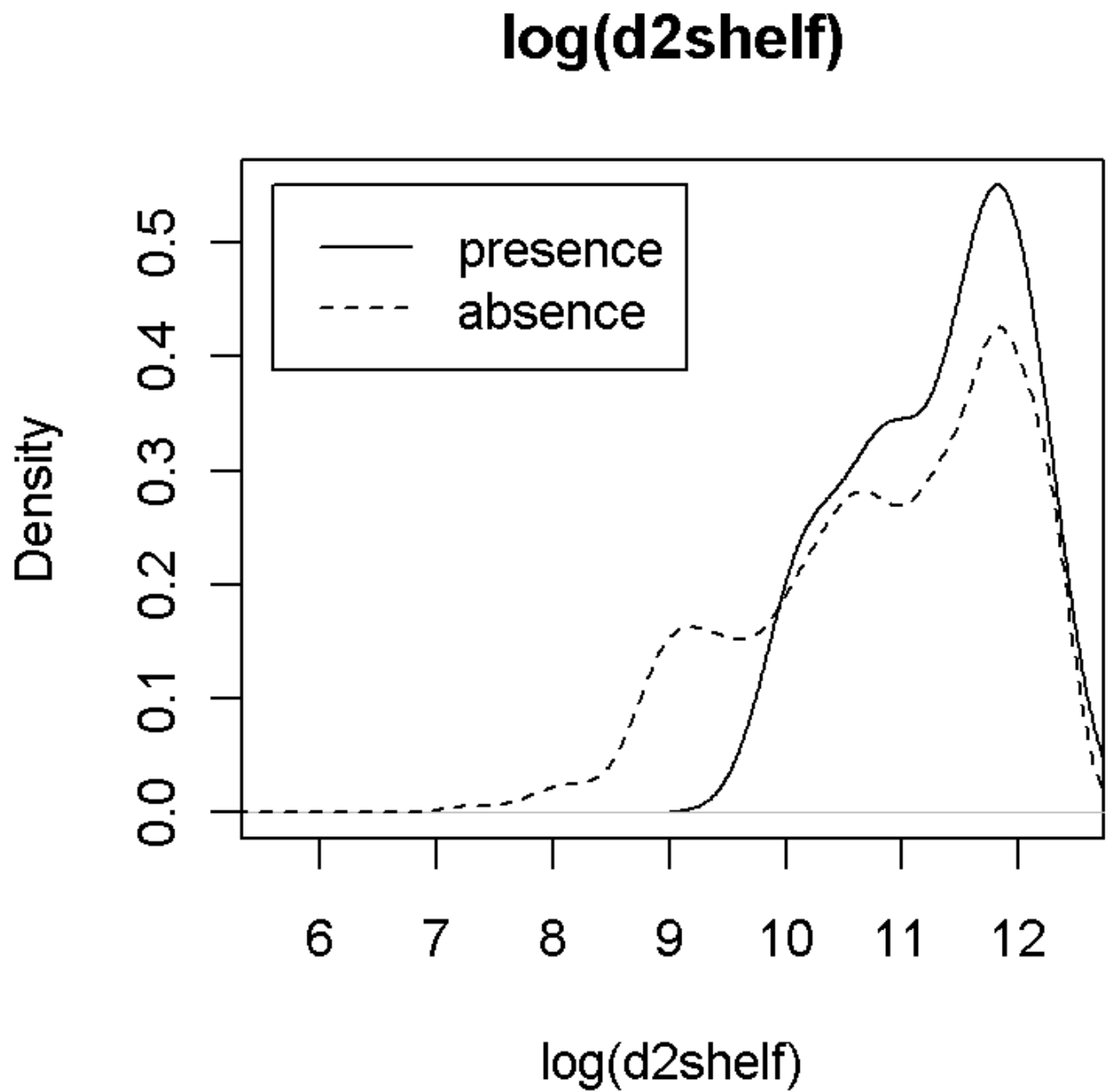


Figure 872: Density histogram of distance to shelf log(meters) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

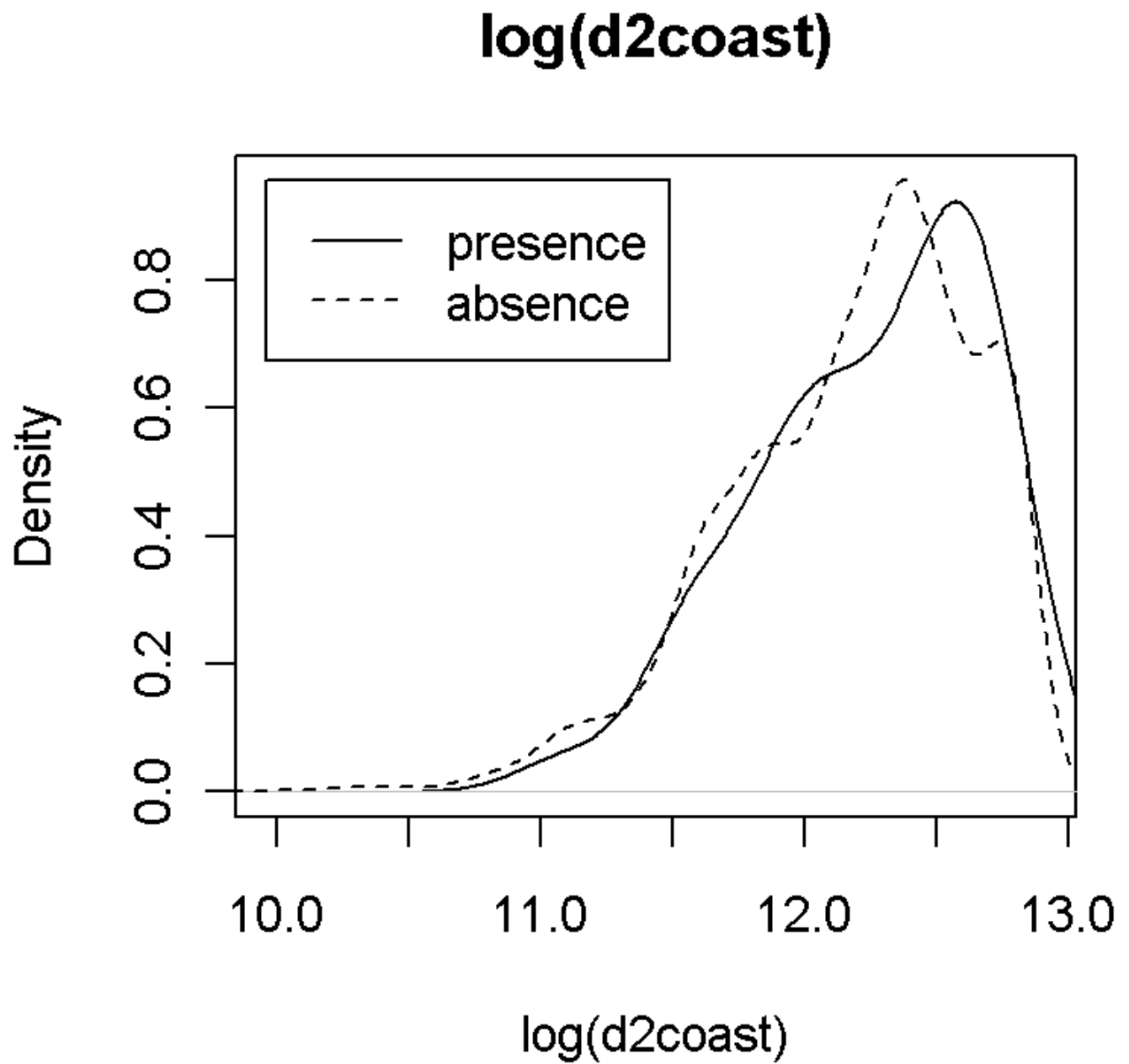


Figure 873: Density histogram of distance to coast log(meters) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

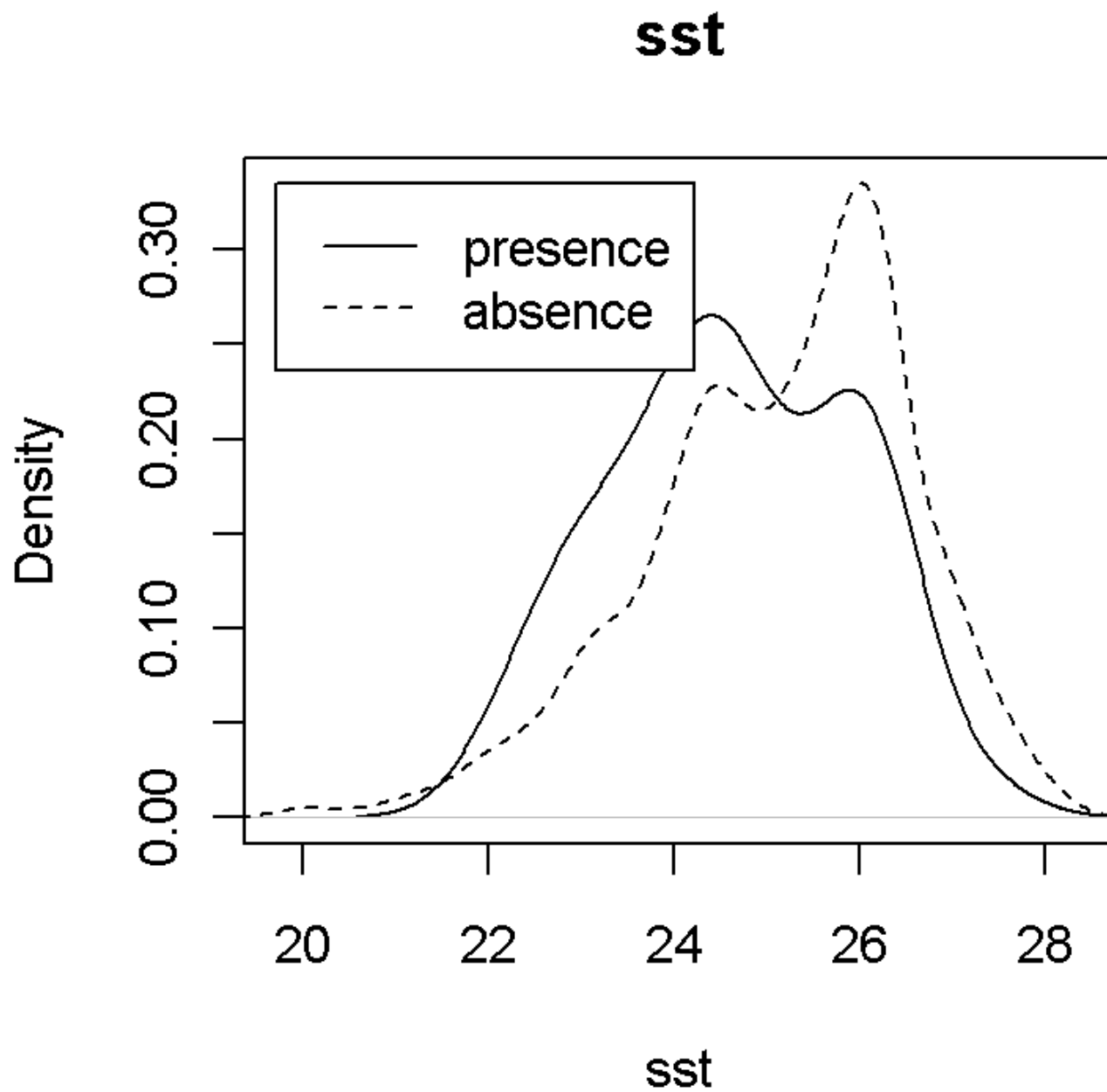


Figure 874: Density histogram of sea-surface temperature (degrees C) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

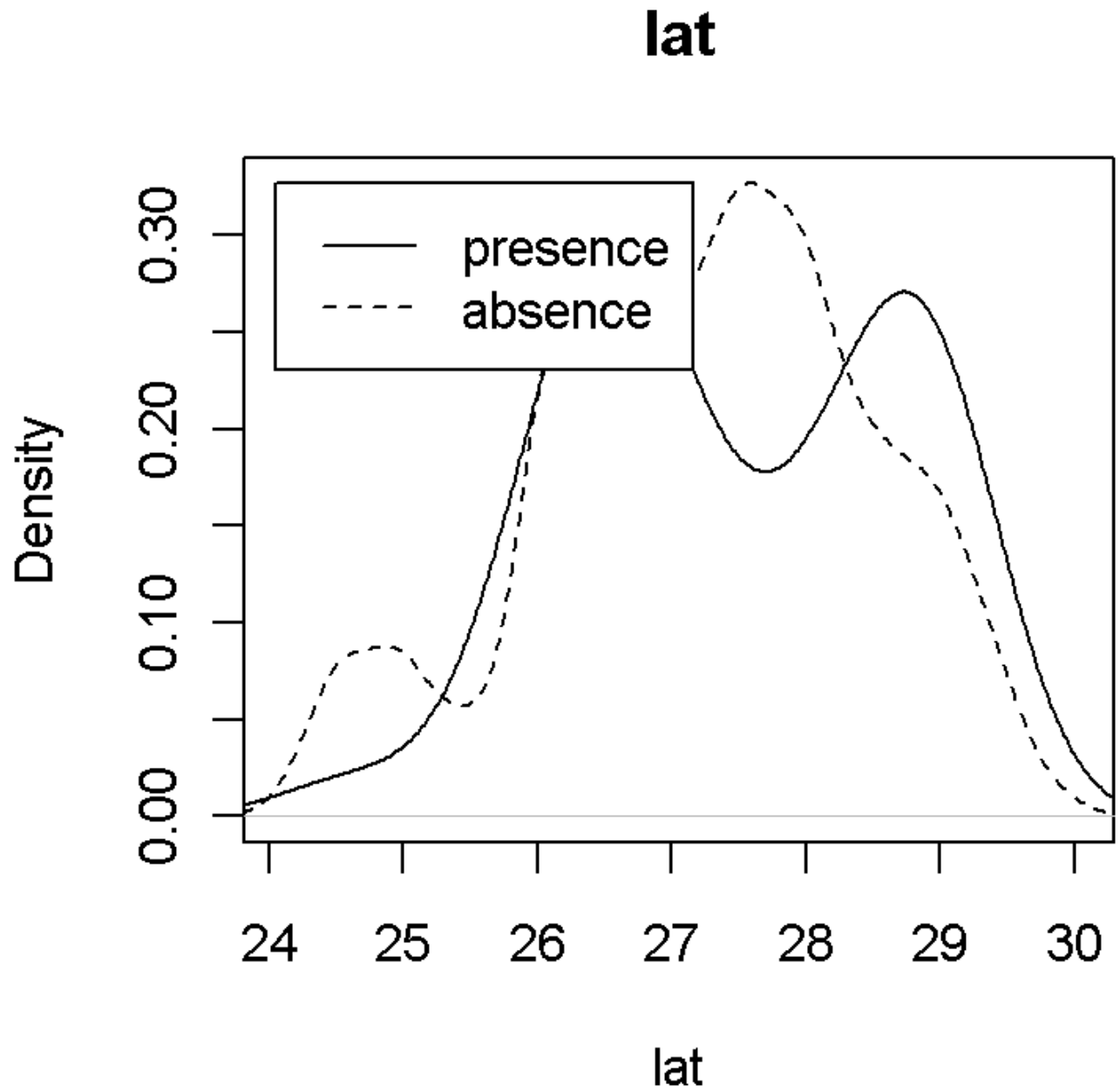


Figure 875: Density histogram of latitude (degrees) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

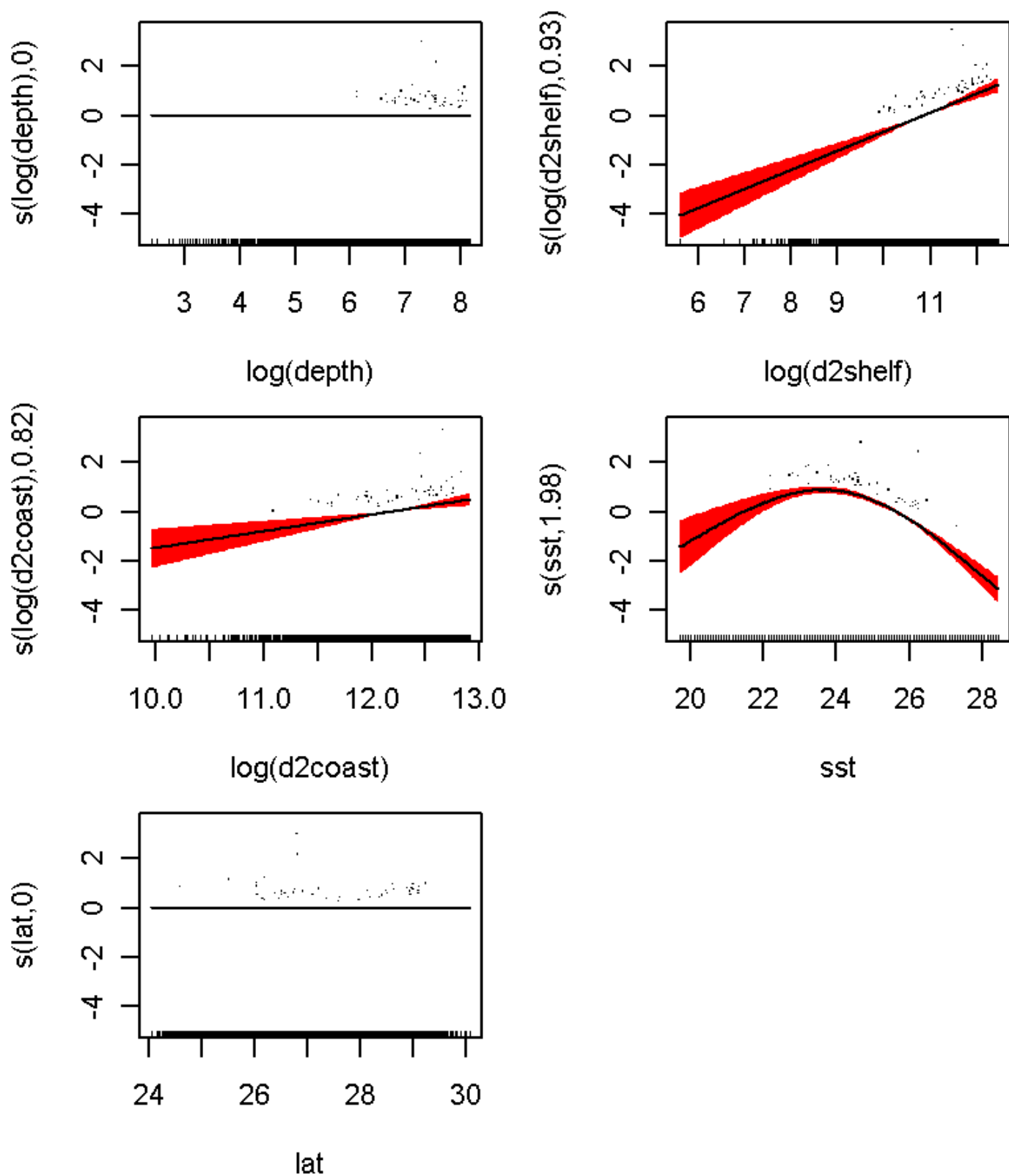


Figure 876: Terms plot of predictors to GAM model fit for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

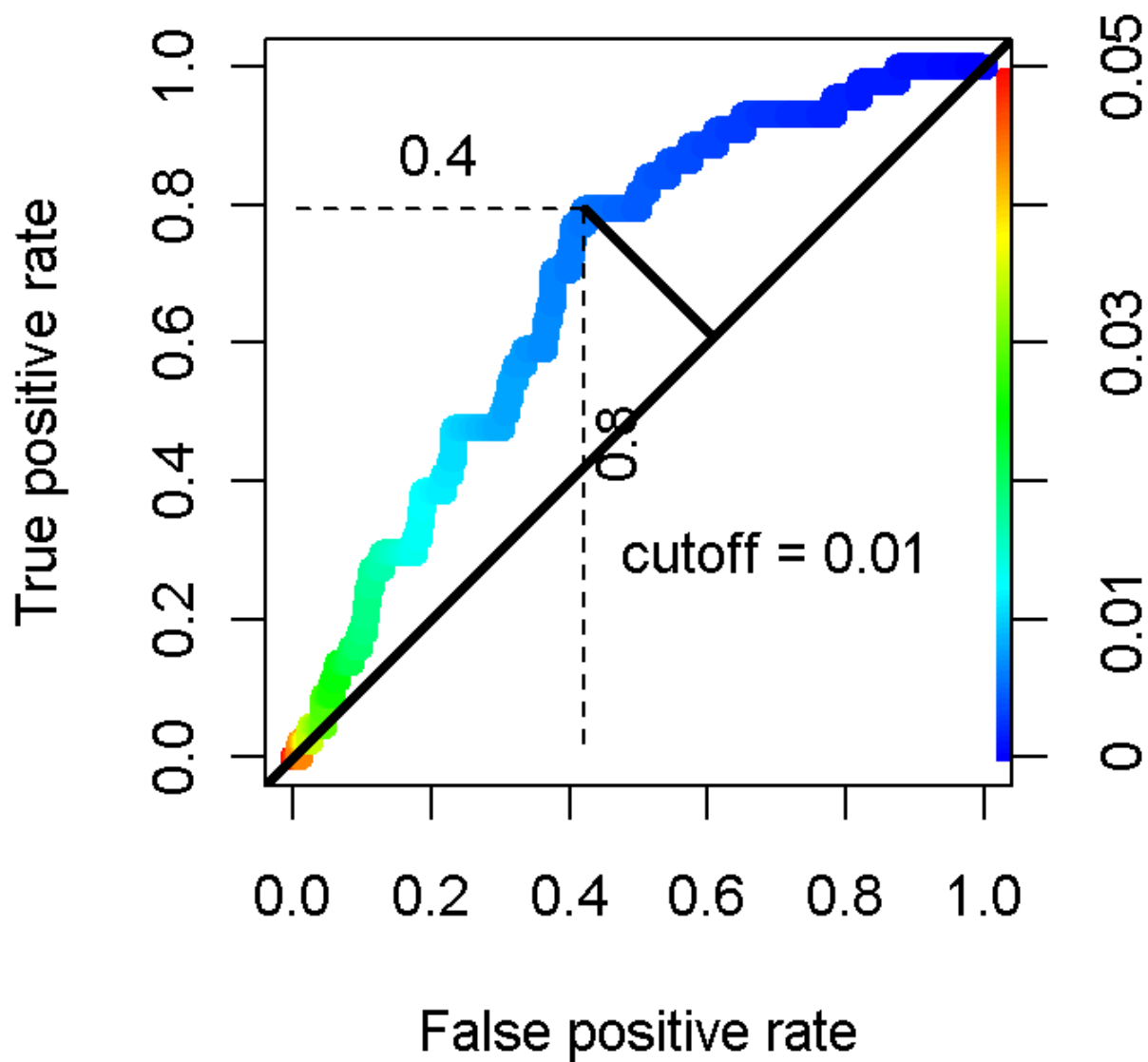


Figure 877: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

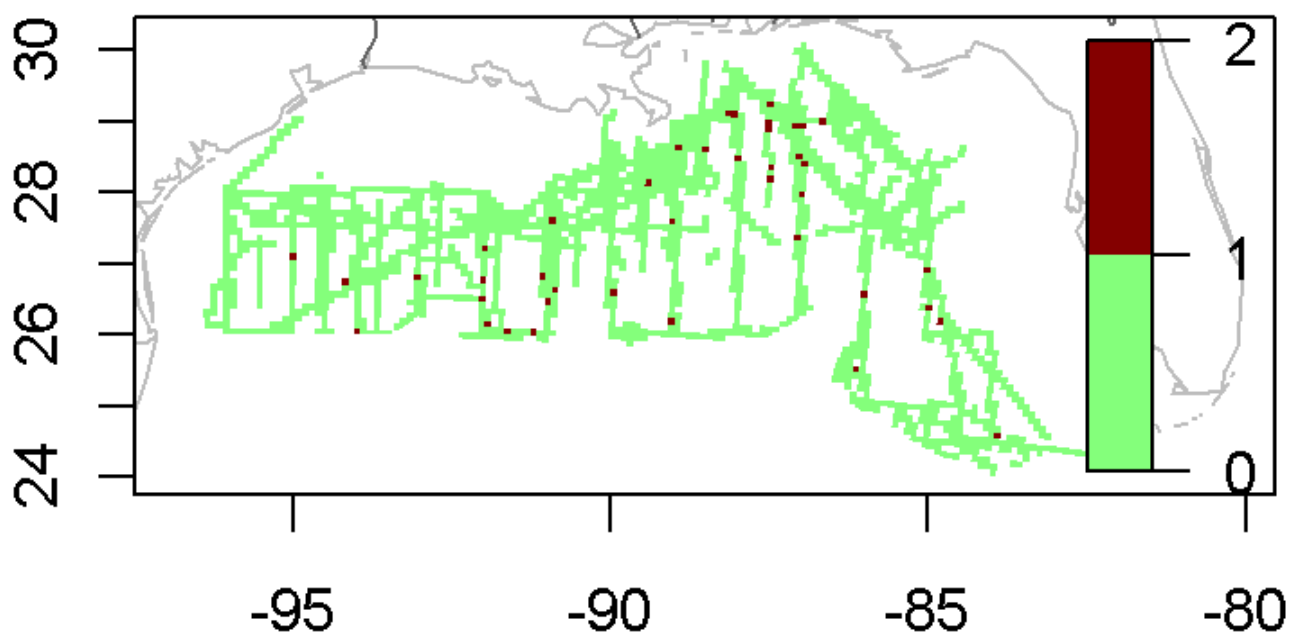


Figure 878: Map of presence and absence by cell summed through time for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

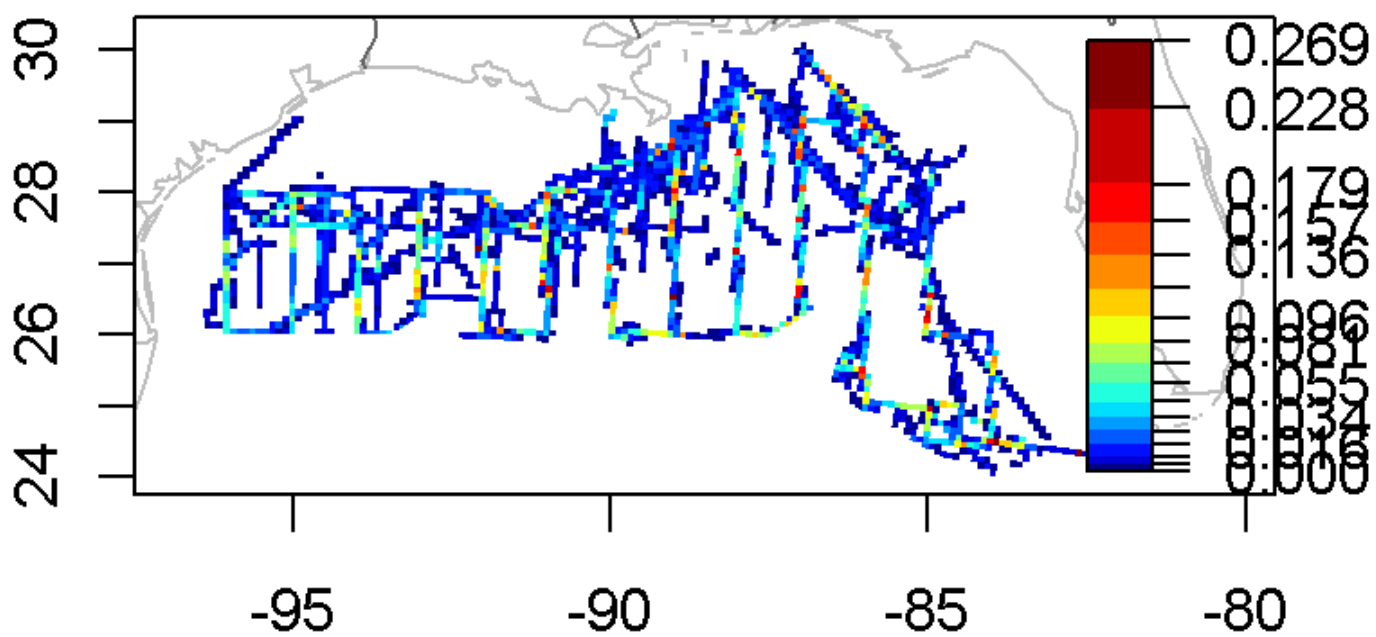


Figure 879: Map of effort(hours/km²) by cell summed through time for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

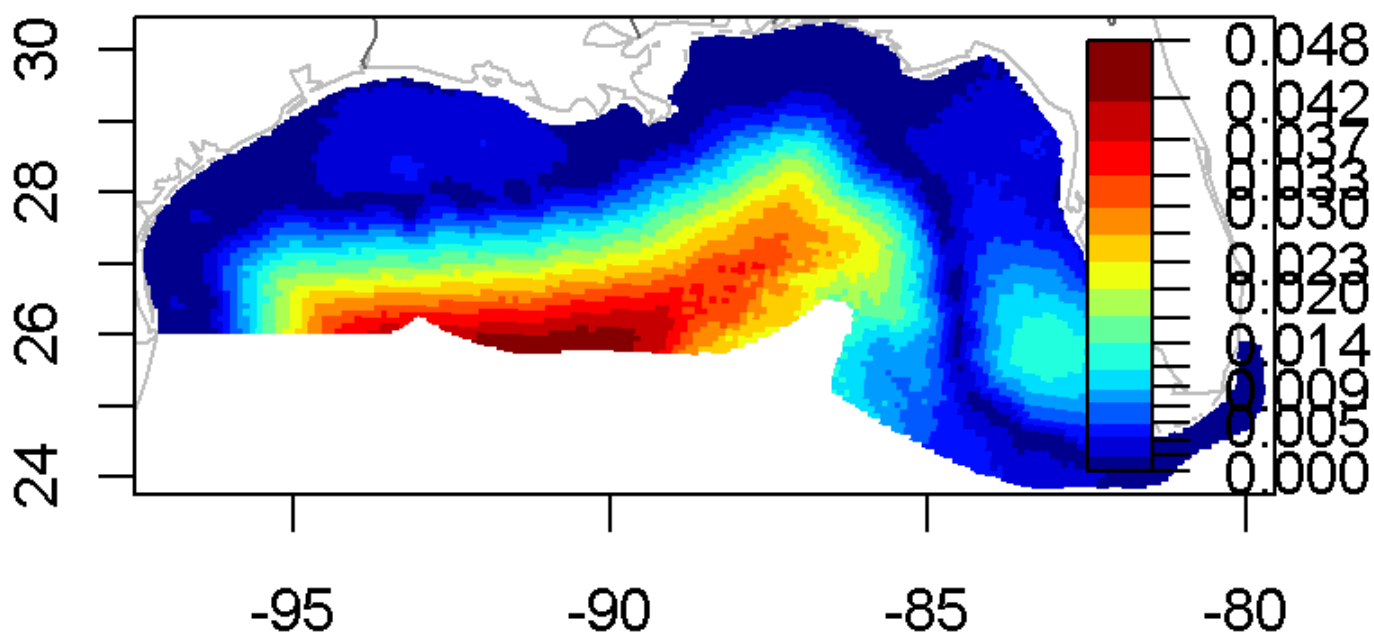


Figure 880: Map of mean predicted habitat for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

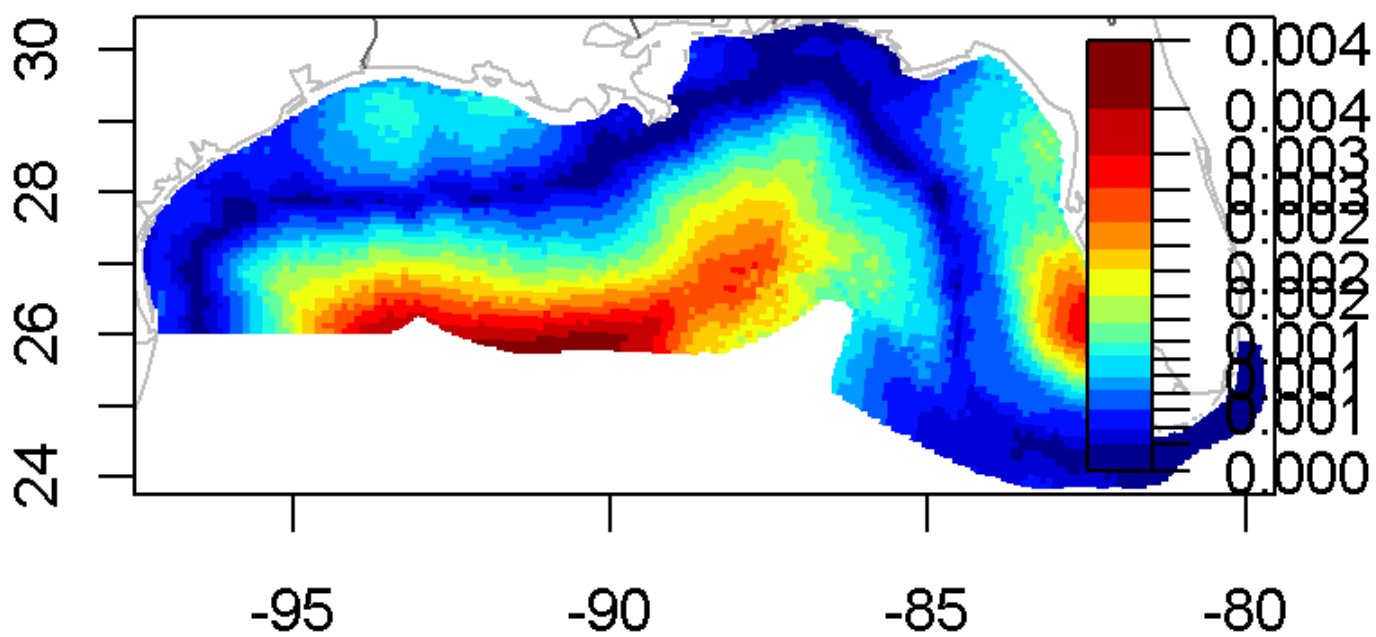


Figure 881: Map of standard error of habitat for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

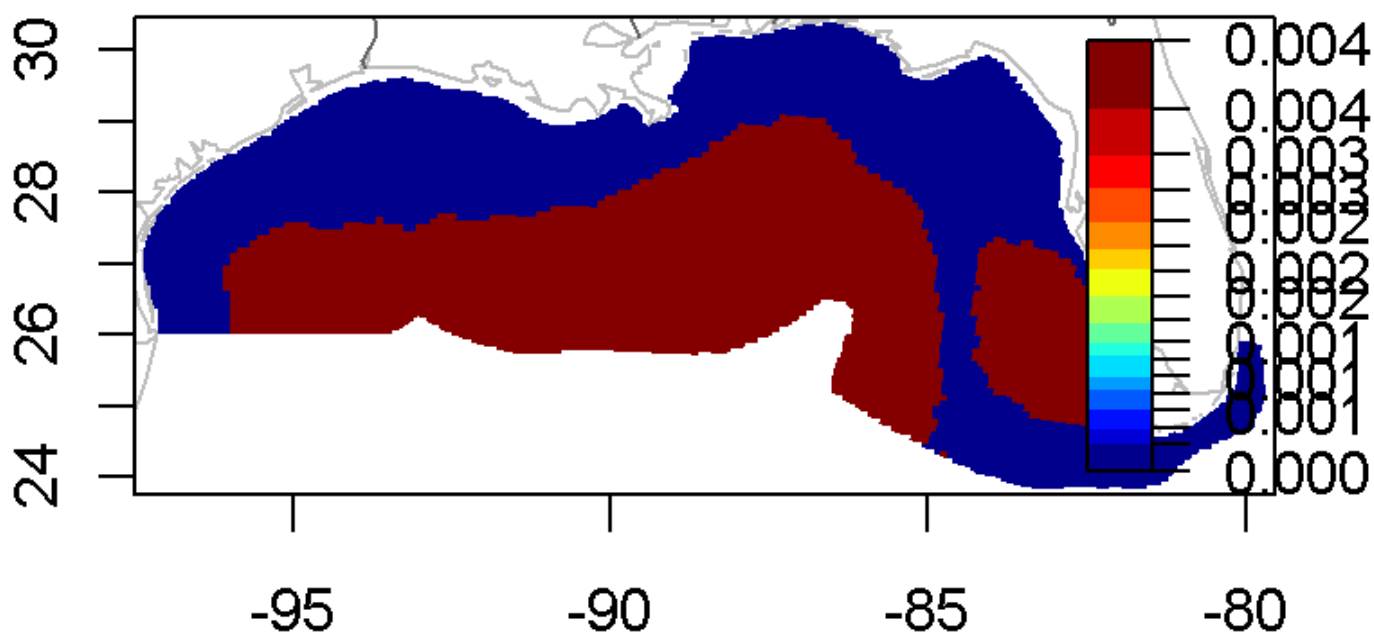


Figure 882: Map of binary habitat (cutoff determined by ROC) for 'Striped dolphin' guild during 'spring' season in 'gomex2' region.

17.3 summer

17.3.1 east2

Modelrun identifier: duke_06_sc3_summer_east2

Date generated: 2008-10-21 13:50:01

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 81: Summary for duke(6) GAM model: for 'Striped dolphin' guild during 'summer' season in 'east2' region.

	Value
Number.presences	115
Number.absences	8963
GAM.converged	TRUE
R.squared	0.20261
Deviance.explained	0.288715
ROC.optimum	0.429463
Maximum.fit	0.0267239
Maximum.prediction	0.128321

Model text summary...

```
duke_06_sc3_summer_east2 run on Tue Oct 21 13:38:49 2008
  provider:duke, version:06, guild:Striped dolphin (sc3), season:'summer', region:east2

max.fit:0.429463, max.prediction:0.128321, ROC.optimum:0.026724

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -8.3534      0.3645  -22.92   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.998444  2.4984  55.984   < 2e-16 ***
s(log(d2shelf)) 1.999386  2.4994  16.863  1.77e-09 ***
s(log(d2coast)) 0.005406  0.5054   0.001    0.885
s(sst)         1.896727  2.3967  81.282   < 2e-16 ***
s(lat)         1.991887  2.4919  47.945   < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.203   Deviance explained = 28.9%
GCV score = 0.00094318   Scale est. = 0.00094144   n = 8663

summary(dat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.   :  5.0  Min.   :  5  Min.   : 1259  Min.   :  8.175  Min.   :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.:20989 1st Qu.: 50865 1st Qu.: 17.025 1st Qu.:37.53
          Median :14008  Median :111.5  Median :52230 Median :102266 Median :22.200 Median :40.18
          Mean   :13275  Mean   :677.3  Mean   :67623 Mean :125197  Mean :21.378  Mean :39.35
          3rd Qu.:15645  3rd Qu.:420.0  3rd Qu.:99335 3rd Qu.:174835 3rd Qu.:25.650 3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910 Max.   :445165  Max.   :30.900  Max.   :44.74
                   NA's   :      7      NA's   :      7      NA's   :408.000

summary(newdat)...
  region    fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :  5  Min.   : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042 1st Qu.: 89304 1st Qu.:22.80 1st Qu.:32.12
```

Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :3.578e-16  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:3.206e-06  1st Qu.:2.863e-06  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :3.176e-04  Median :1.519e-04  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :2.077e-02  Mean   :1.436e-03  Mean   :2.516e-02  Mean   :1.069e-02  Mean   :0.2464
3rd Qu.:14088  3rd Qu.:2.503e-02  3rd Qu.:2.816e-03  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :1.283e-01  Max.   :1.017e-02  Max.   :1.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

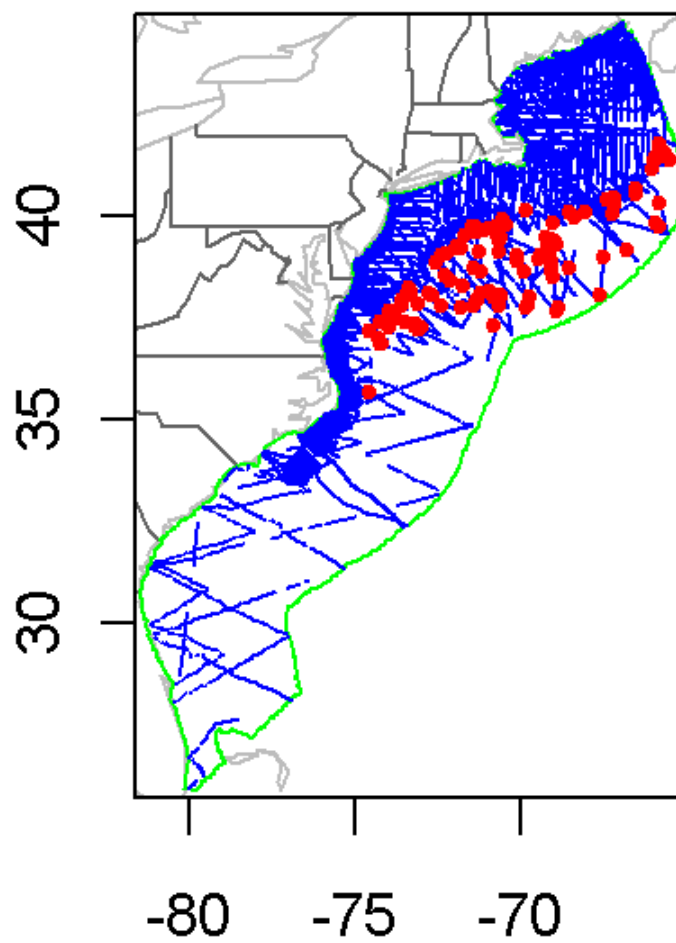



Figure 883: Map of points of observational sightings and tracks of survey effort for 'Striped dolphin' guild during 'summer' season in 'east2' region.

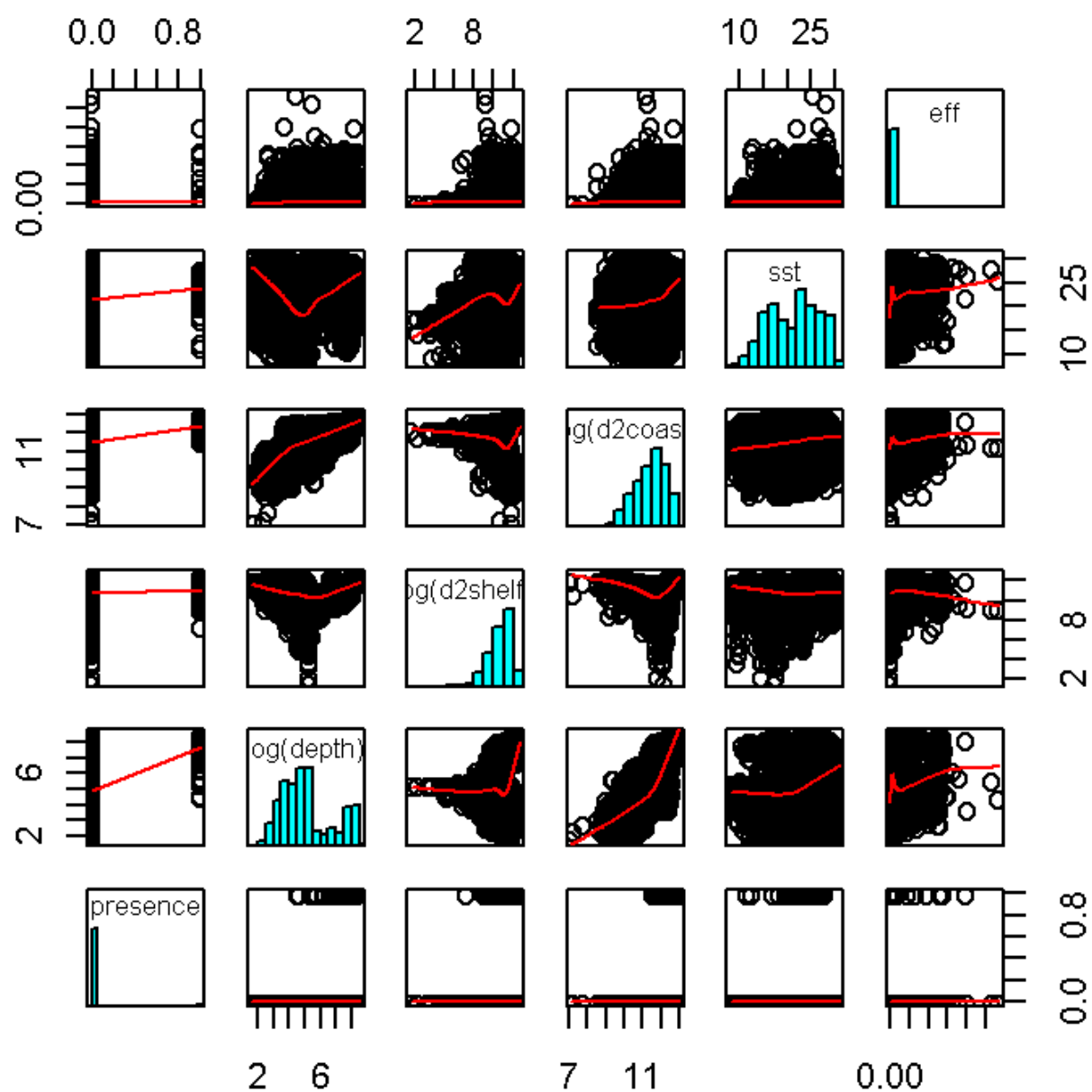


Figure 884: Pairs plot of input variables for 'Striped dolphin' guild during 'summer' season in 'east2' region.

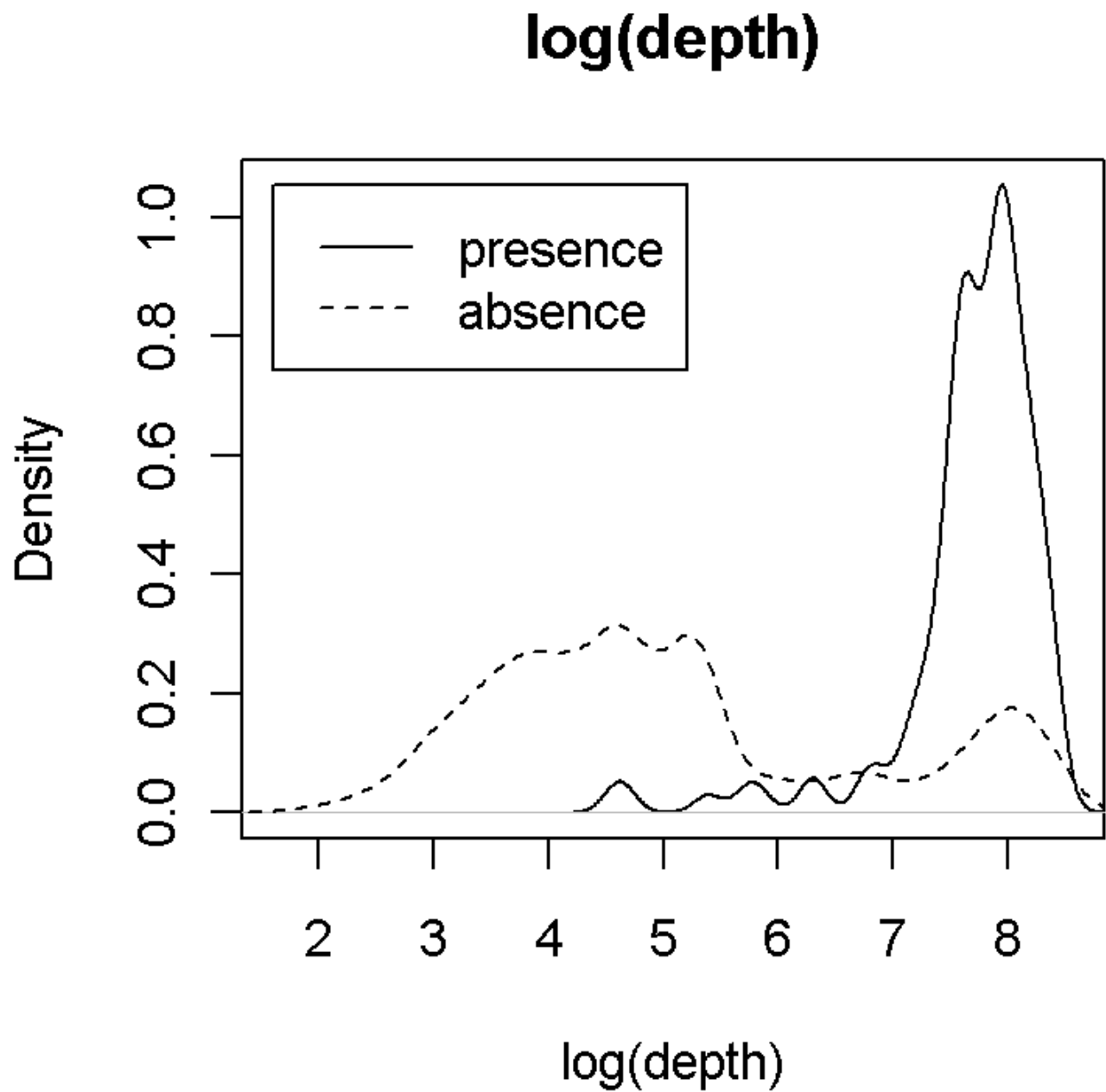


Figure 885: Density histogram of depth $\log(\text{meters})$ for 'Striped dolphin' guild during 'summer' season in 'east2' region.

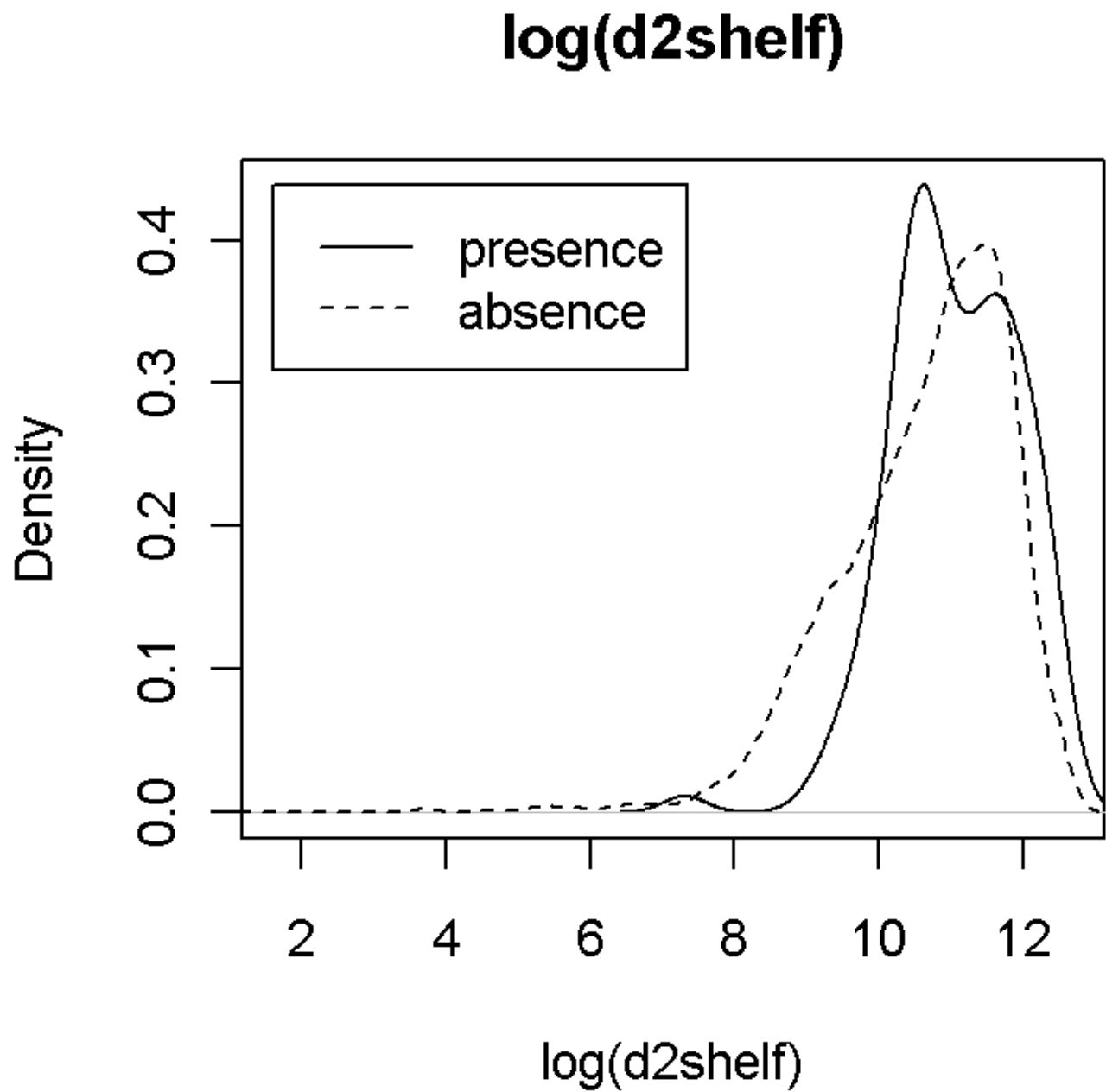


Figure 886: Density histogram of distance to shelf log(meters) for 'Striped dolphin' guild during 'summer' season in 'east2' region.

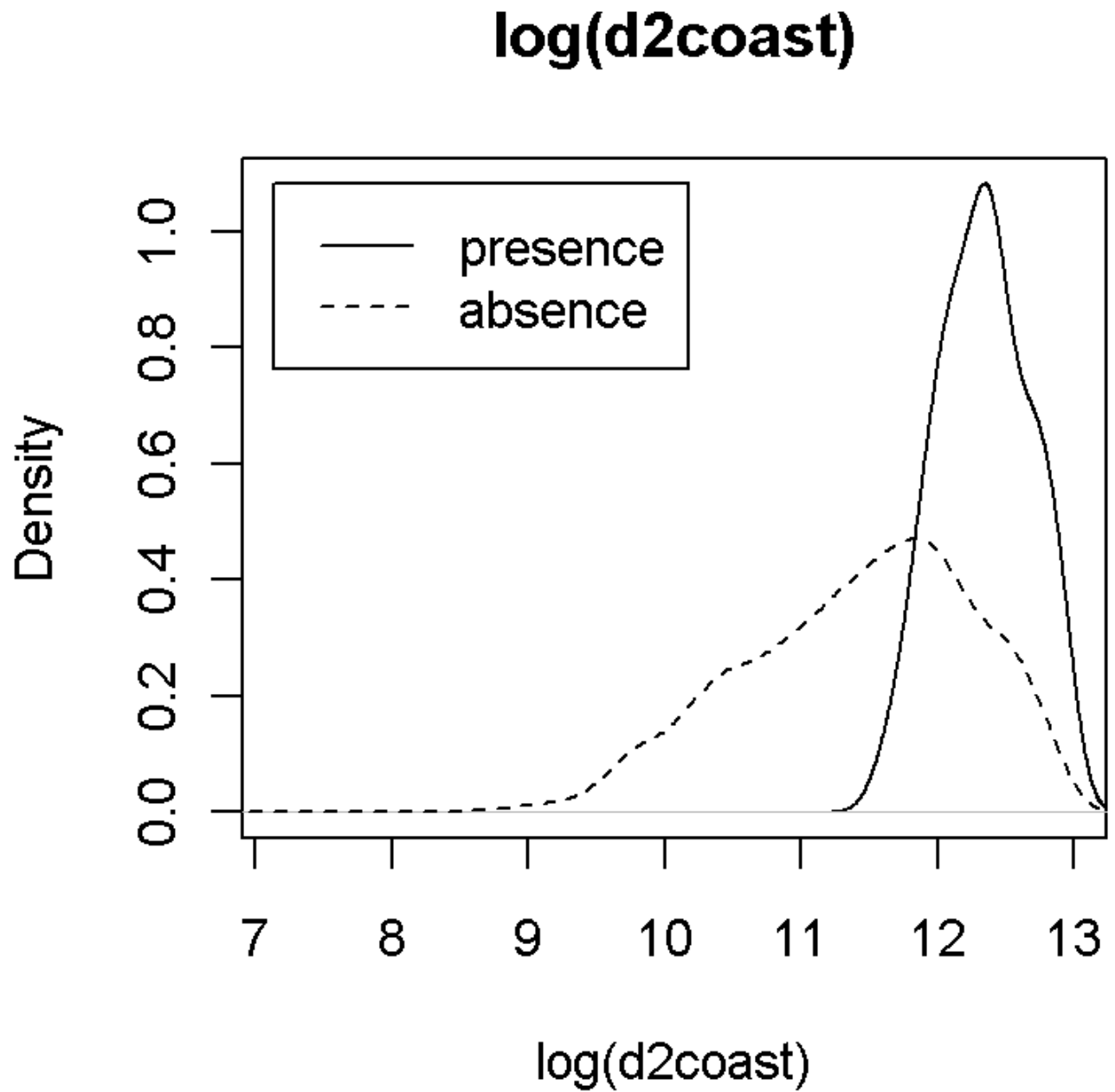


Figure 887: Density histogram of distance to coast log(meters) for 'Striped dolphin' guild during 'summer' season in 'east2' region.

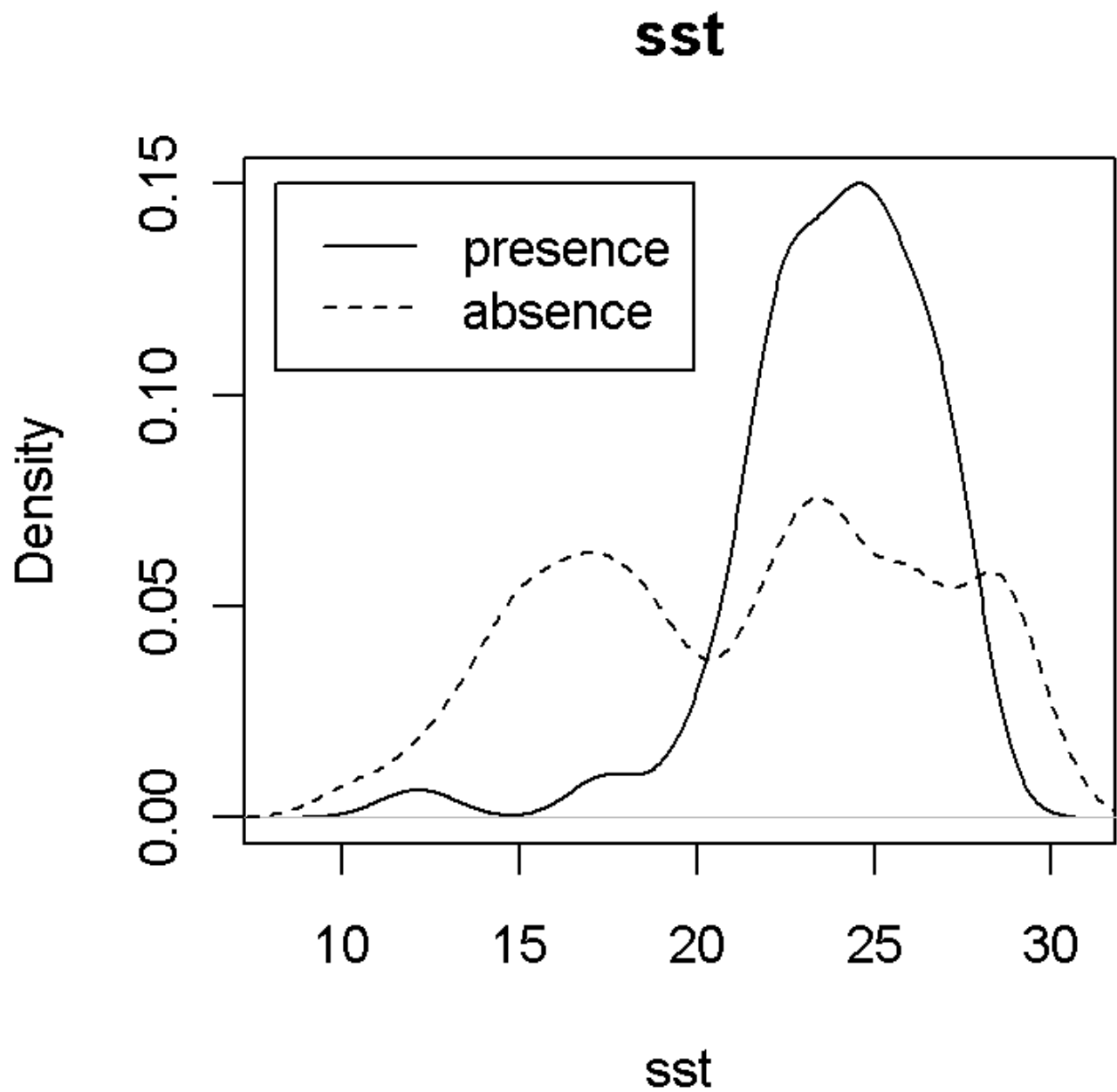


Figure 888: Density histogram of sea-surface temperature (degrees C) for 'Striped dolphin' guild during 'summer' season in 'east2' region.

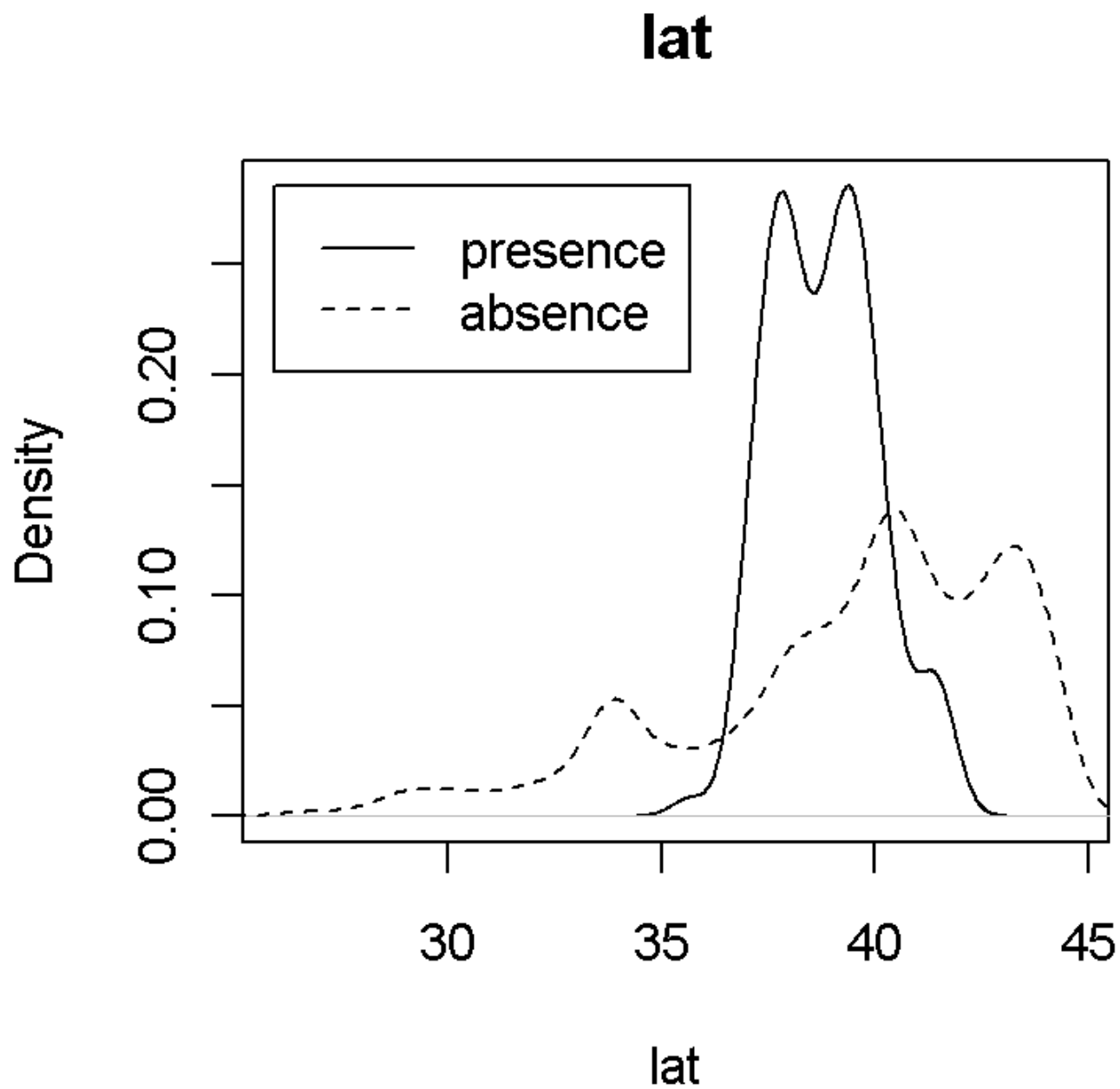


Figure 889: Density histogram of latitude (degrees) for 'Striped dolphin' guild during 'summer' season in 'east2' region.

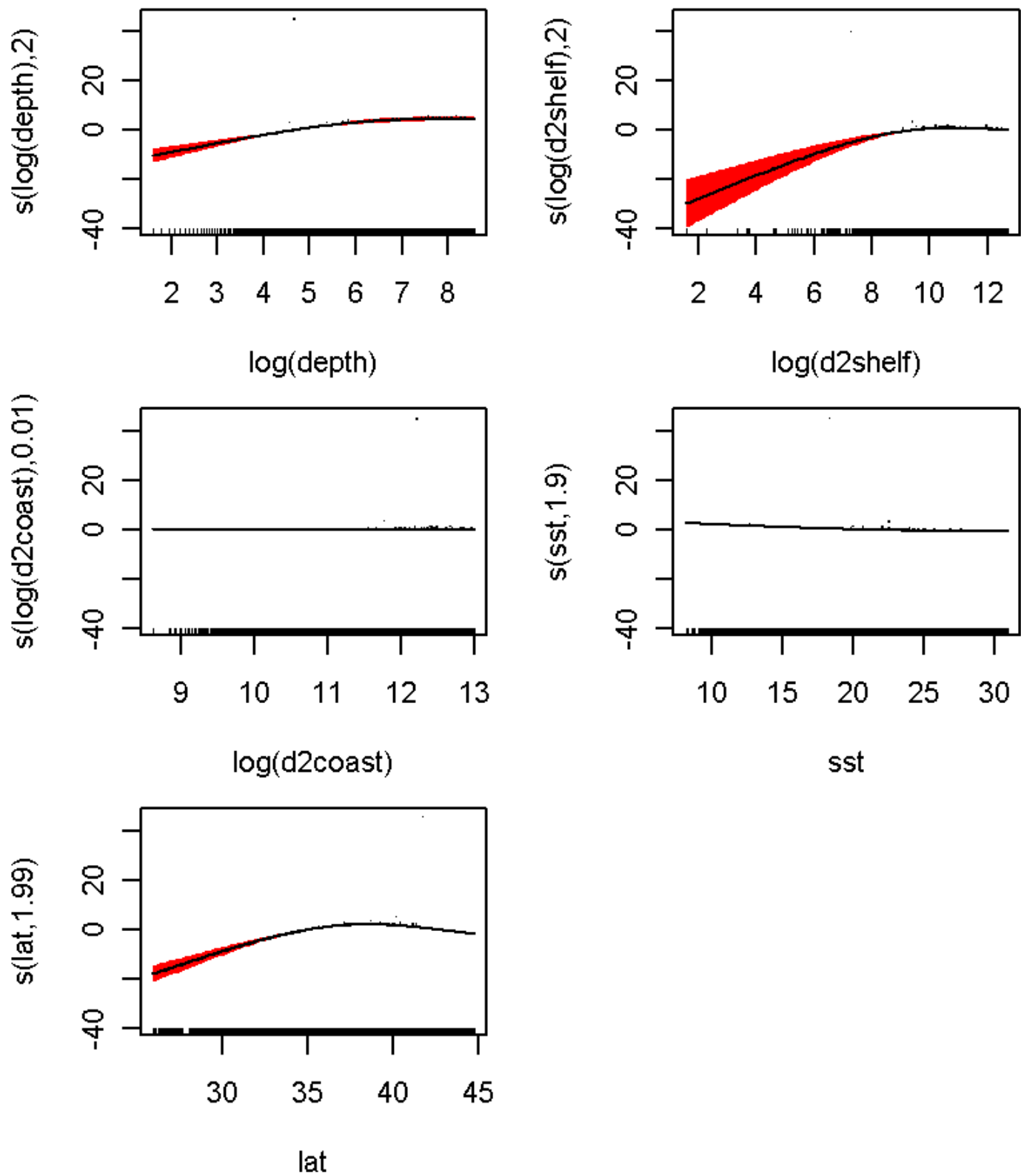


Figure 890: Terms plot of predictors to GAM model fit for 'Striped dolphin' guild during 'summer' season in 'east2' region.

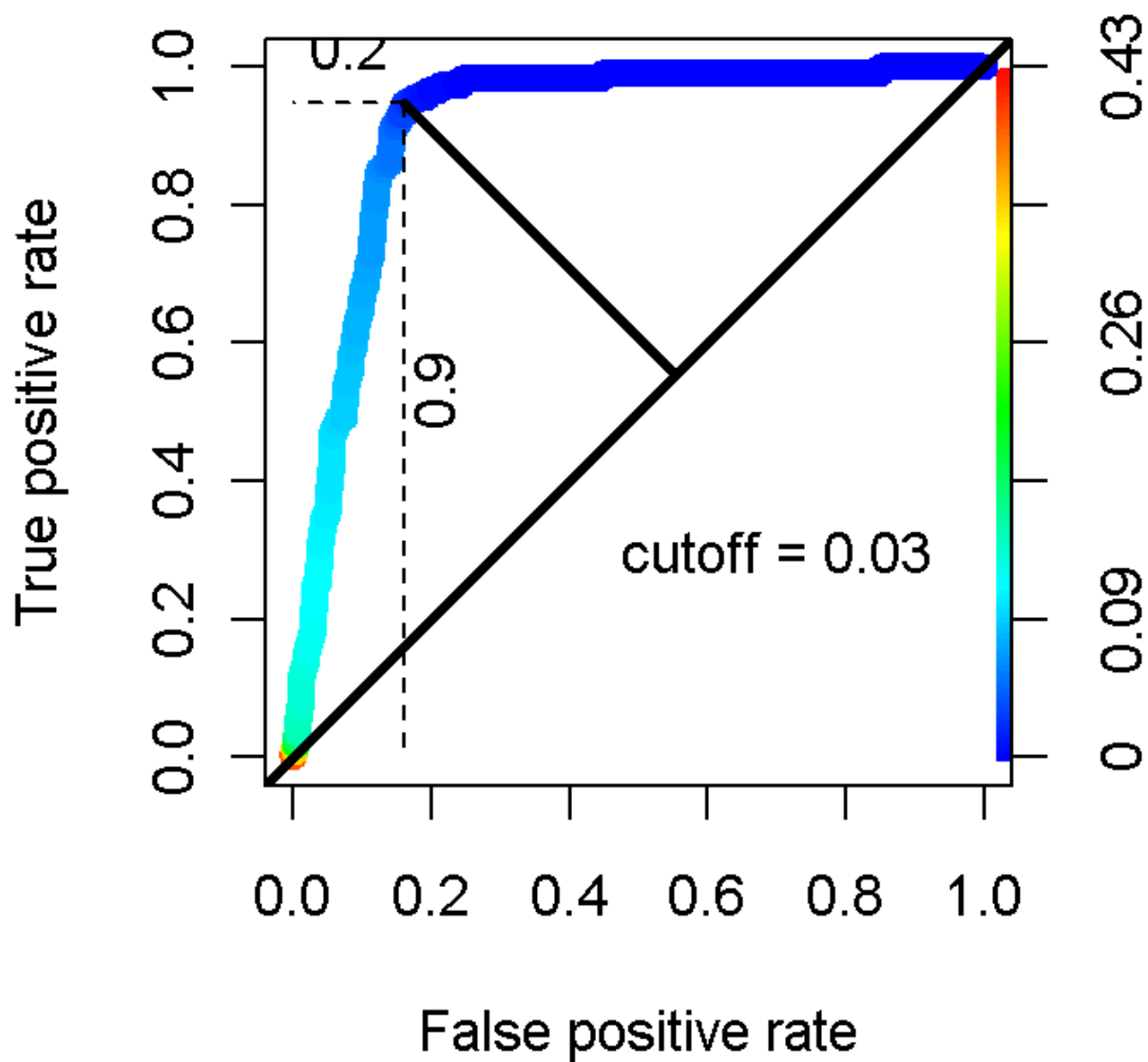


Figure 891: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Striped dolphin' guild during 'summer' season in 'east2' region.

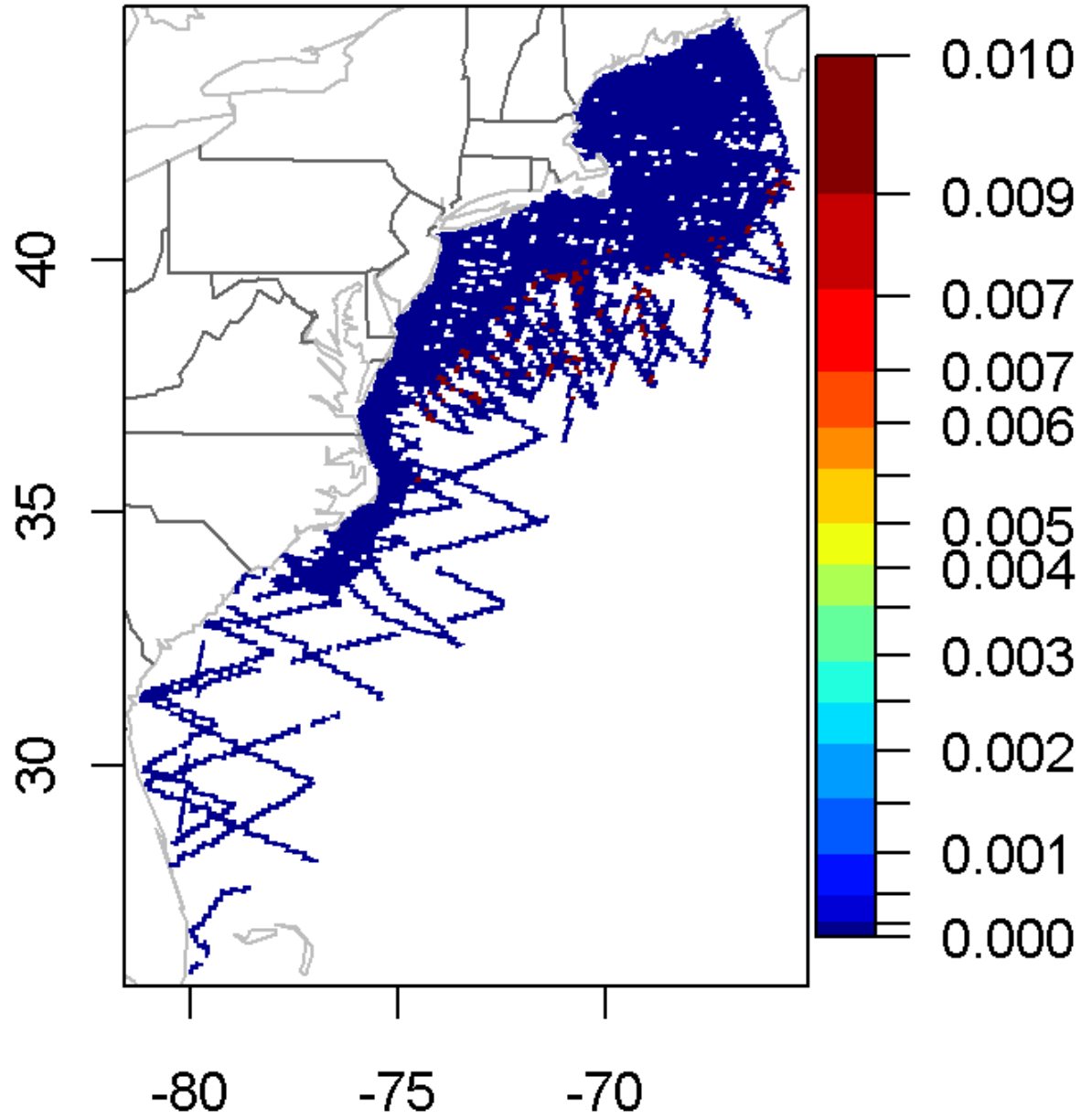


Figure 892: Map of presence and absence by cell summed through time for 'Striped dolphin' guild during 'summer' season in 'east2' region.

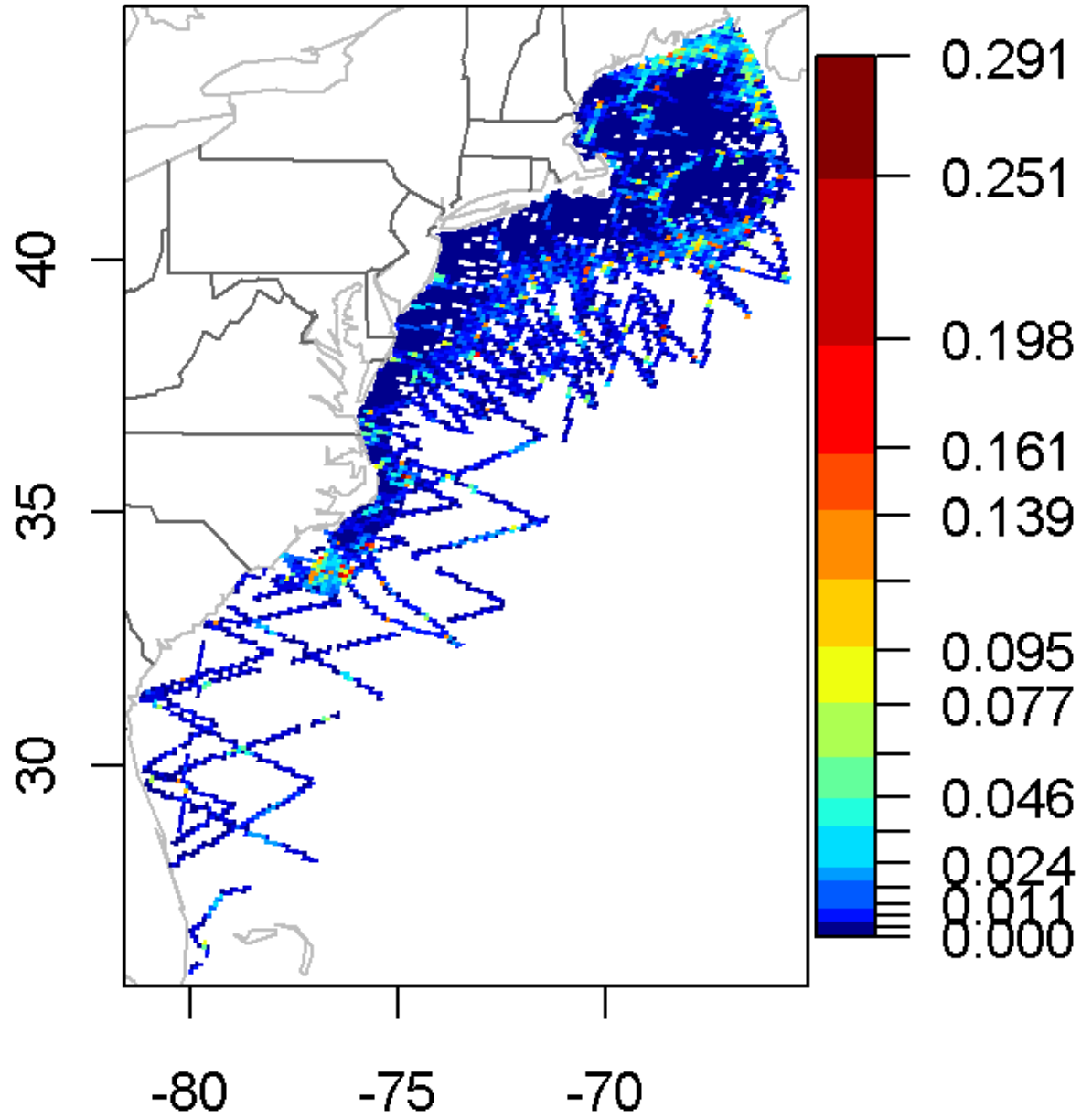


Figure 893: Map of effort(hours/km²) by cell summed through time for 'Striped dolphin' guild during 'summer' season in 'east2' region.

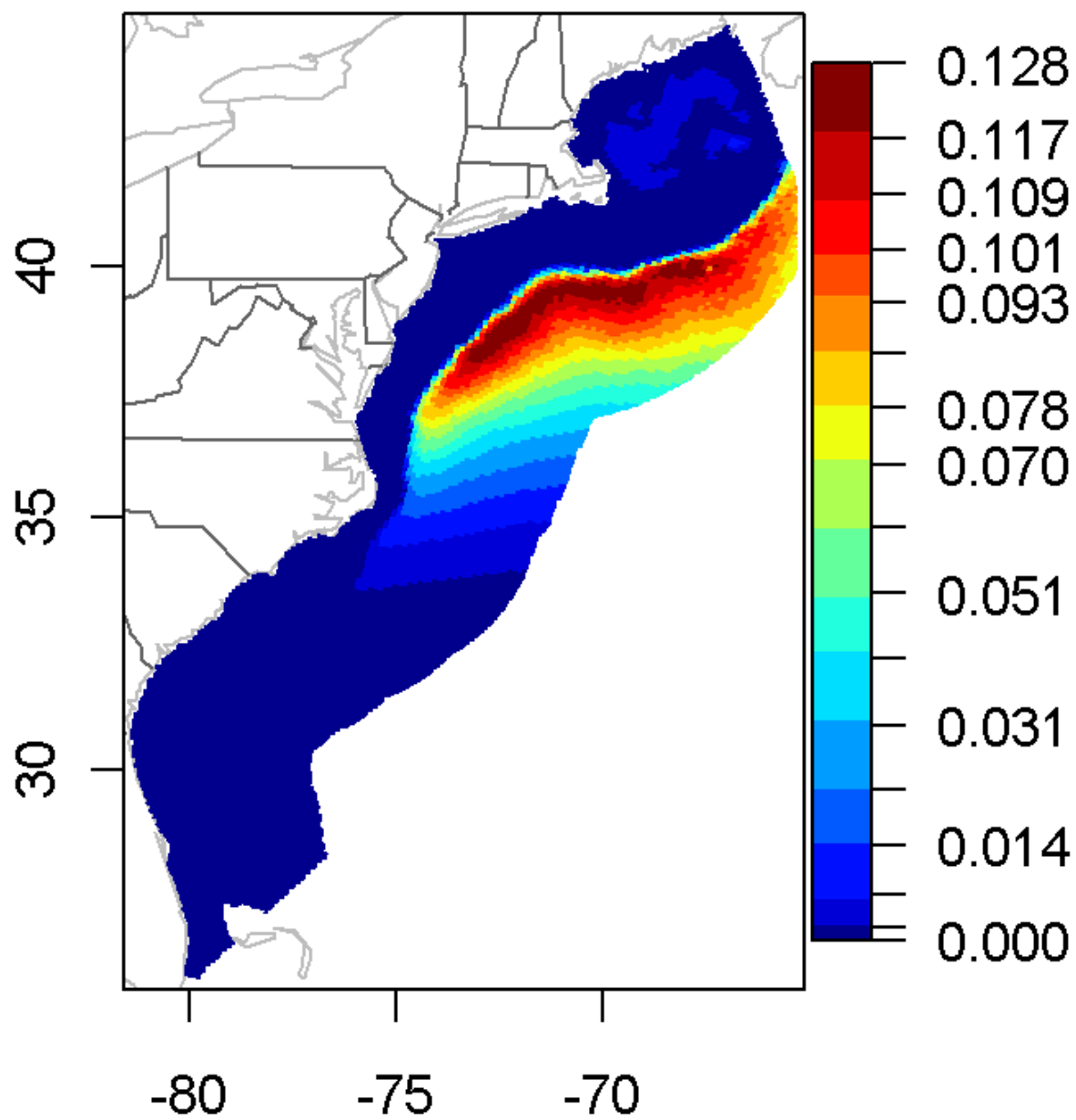


Figure 894: Map of mean predicted habitat for 'Striped dolphin' guild during 'summer' season in 'east2' region.

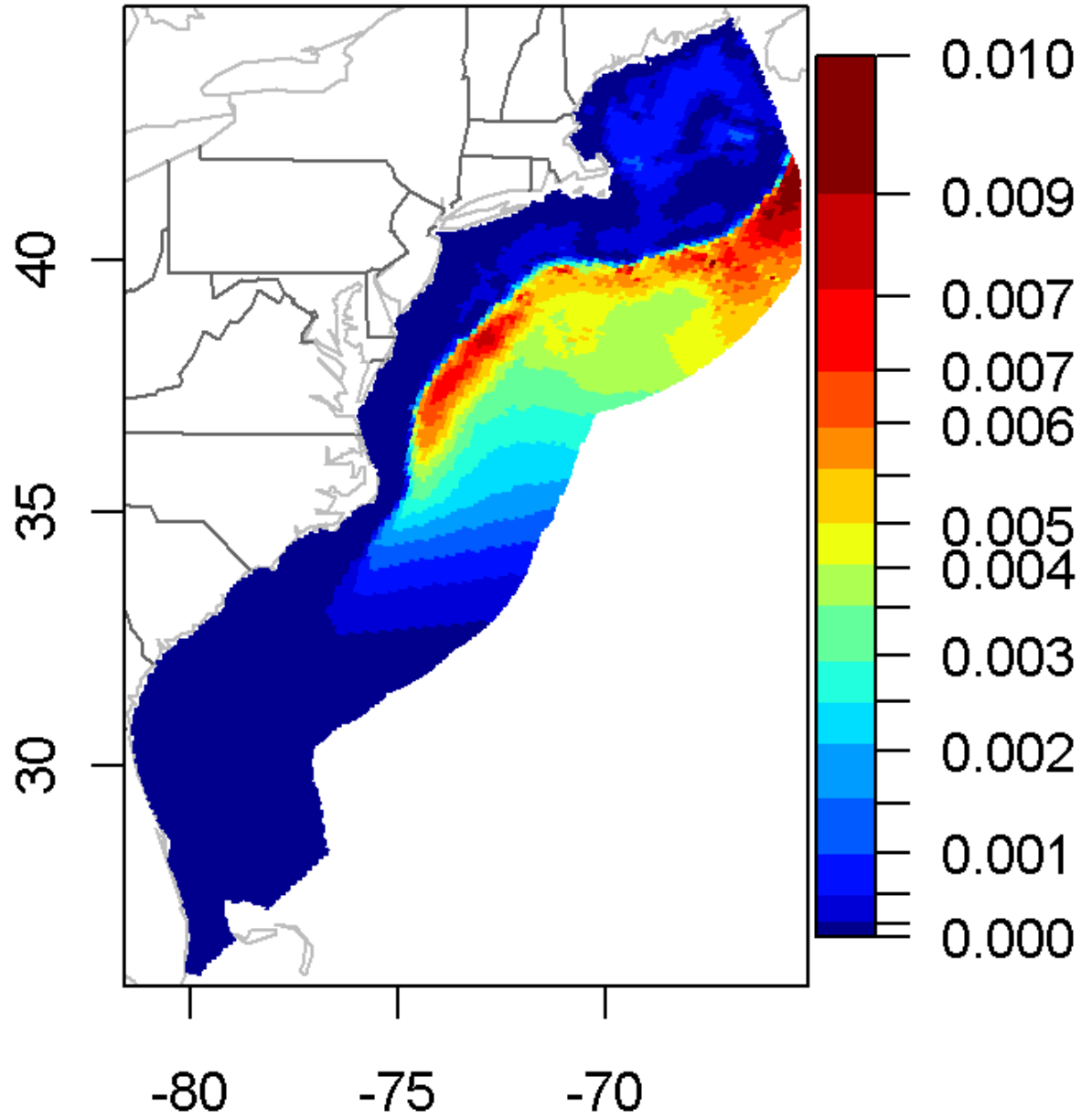


Figure 895: Map of standard error of habitat for 'Striped dolphin' guild during 'summer' season in 'east2' region.

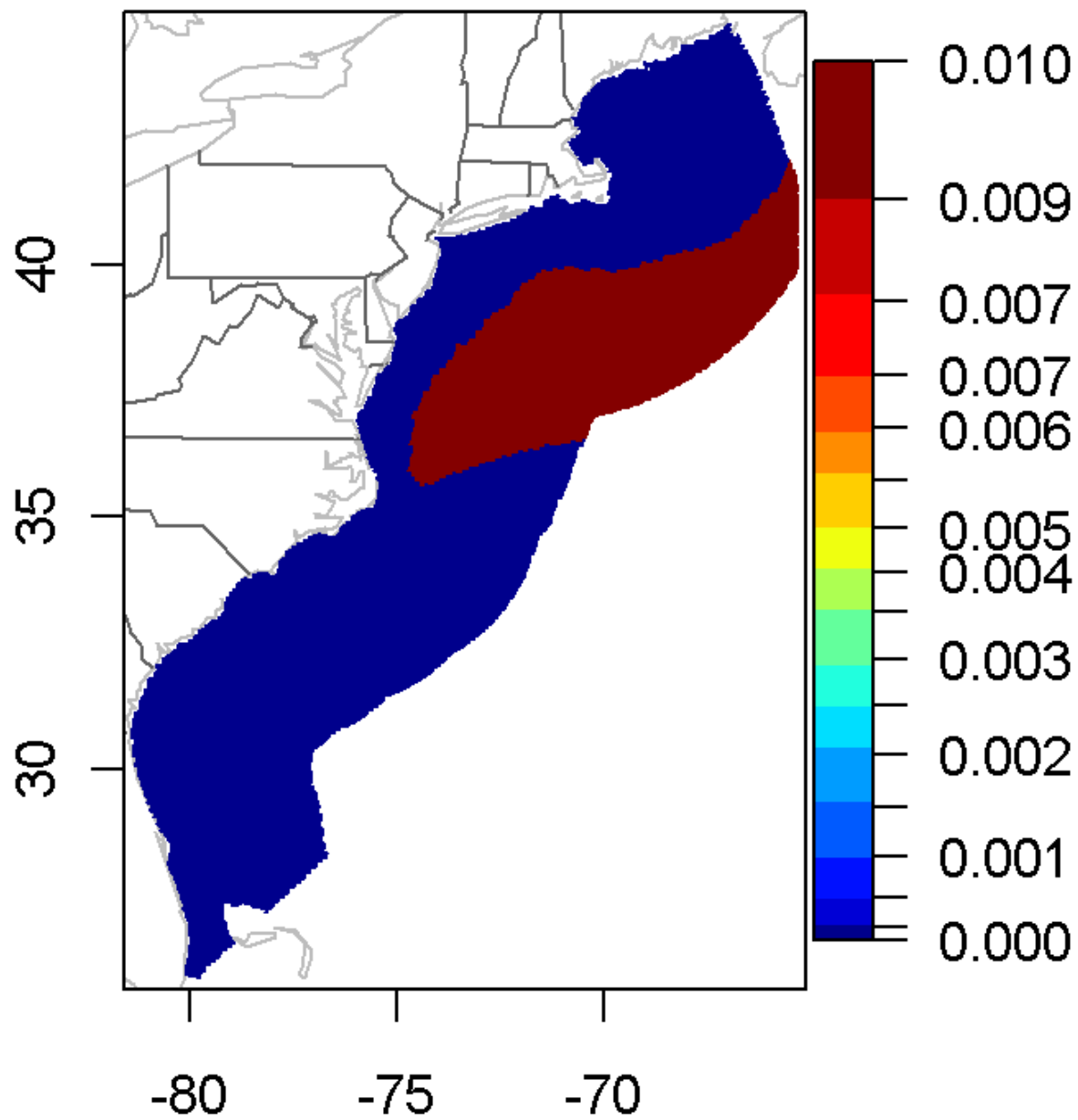


Figure 896: Map of binary habitat (cutoff determined by ROC) for 'Striped dolphin' guild during 'summer' season in 'east2' region.

17.3.2 gomex2

Modelrun identifier: duke_06_sc3_summer_gomex2

Date generated: 2008-10-21 11:32:48

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 82: Summary for duke(6) GAM model: for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	10
Number.absences	1394
GAM.converged	TRUE
R.squared	0.696507
Deviance.explained	0.542882
ROC.optimum	0.580625
Maximum.fit	0.000322356
Maximum.prediction	0.742195

Model text summary...

```
duke_06_sc3_summer_gomex2 run on Tue Oct 21 11:32:08 2008
  provider:duke, version:06, guild:Striped dolphin (sc3), season:'summer', region:gomex2

max.fit:0.580625, max.prediction:0.742195, ROC.optimum:0.000322

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -21.42      1.34    -15.99  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.919   2.419  63.49  < 2e-16 ***
s(log(d2shelf)) 1.931   2.431  19.04  2.81e-10 ***
s(log(d2coast)) 1.882   2.382  19.25  3.15e-10 ***
s(sst)         1.950   2.450  20.43  4.72e-11 ***
s(lat)         1.958   2.458  74.06  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.697   Deviance explained = 54.3%
GCV score = 0.00061761   Scale est. = 0.00060919   n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13   Min.   : 13.0   Min.   : 901   Min.   : 5700   Min.   :25.35   Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8   1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75   1st Qu.:26.68
              Median :5134 Median : 654.0   Median : 45466 Median :146059 Median :28.50   Median :27.90
              Mean   :4686 Mean   : 899.5   Mean   : 59670 Mean   :161835 Mean   :28.50   Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0   3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25   3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0   Max.   :249222 Max.   :386037 Max.   :31.20   Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :27.67   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48   1st Qu.:26.28
              Median :4110 Median : 433.5   Median : 71100 Median :157258 Median :29.55   Median :27.29
```

Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:2.220e-16	Min.	:4.115e-16	Min.	:0.000e+00	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:2.220e-16	1st Qu.	:1.742e-15	1st Qu.	:0.000e+00	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:1.734e-07	Median	:2.581e-07	Median	:0.000e+00	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:6.476e-03	Mean	:1.587e-03	Mean	:9.058e-03	Mean	:1.213e-02	Mean	:0.2503
3rd Qu.	:6015	3rd Qu.	:3.252e-04	3rd Qu.	:2.365e-04	3rd Qu.	:0.000e+00	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:7.422e-01	Max.	:7.591e-02	Max.	:2.000e+00	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5.568e+03	NA's	:5.568e+03		

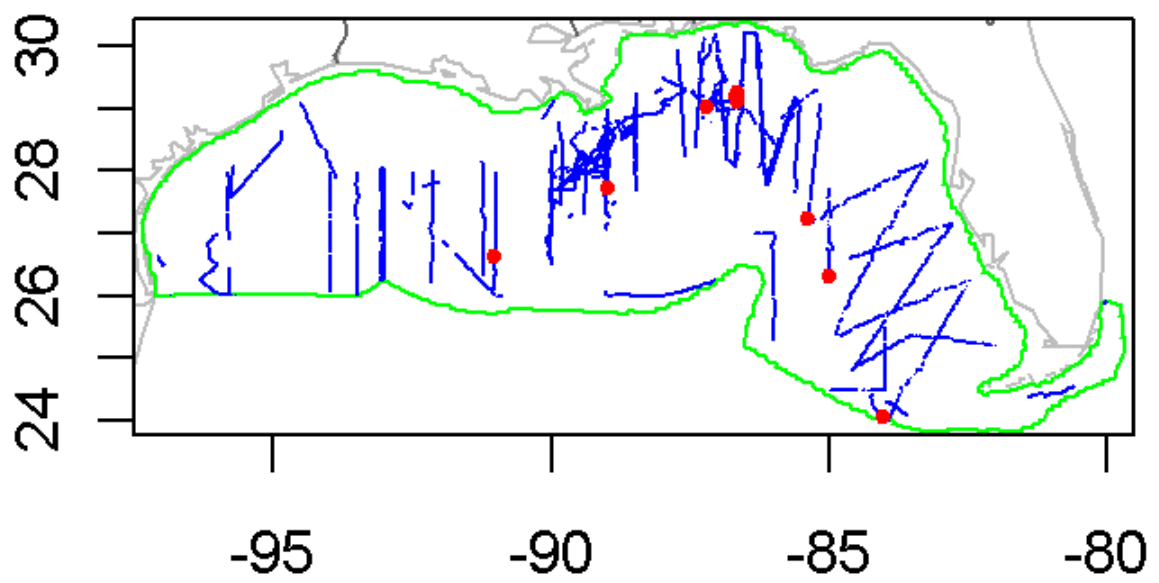


Figure 897: Map of points of observational sightings and tracks of survey effort for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

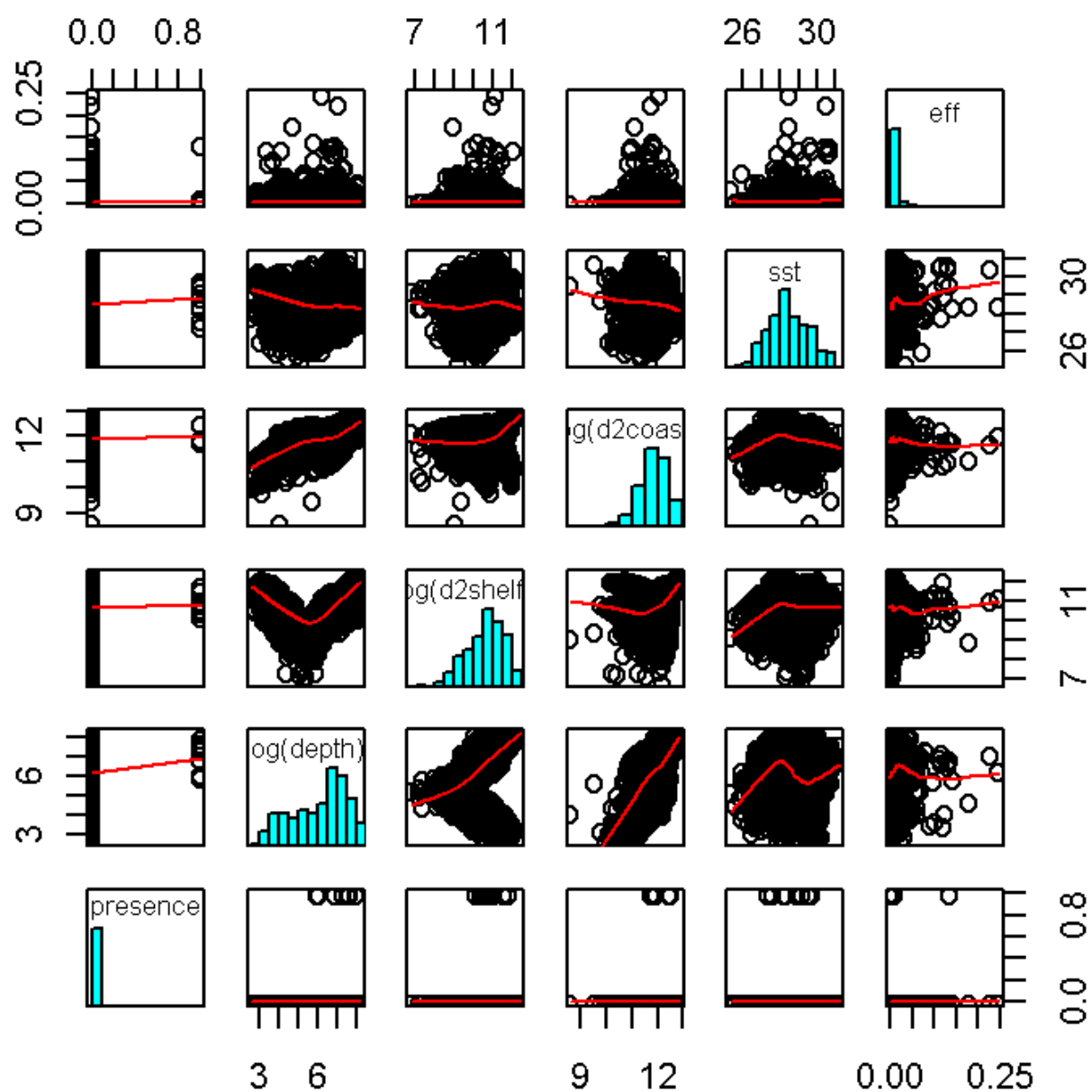


Figure 898: Pairs plot of input variables for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

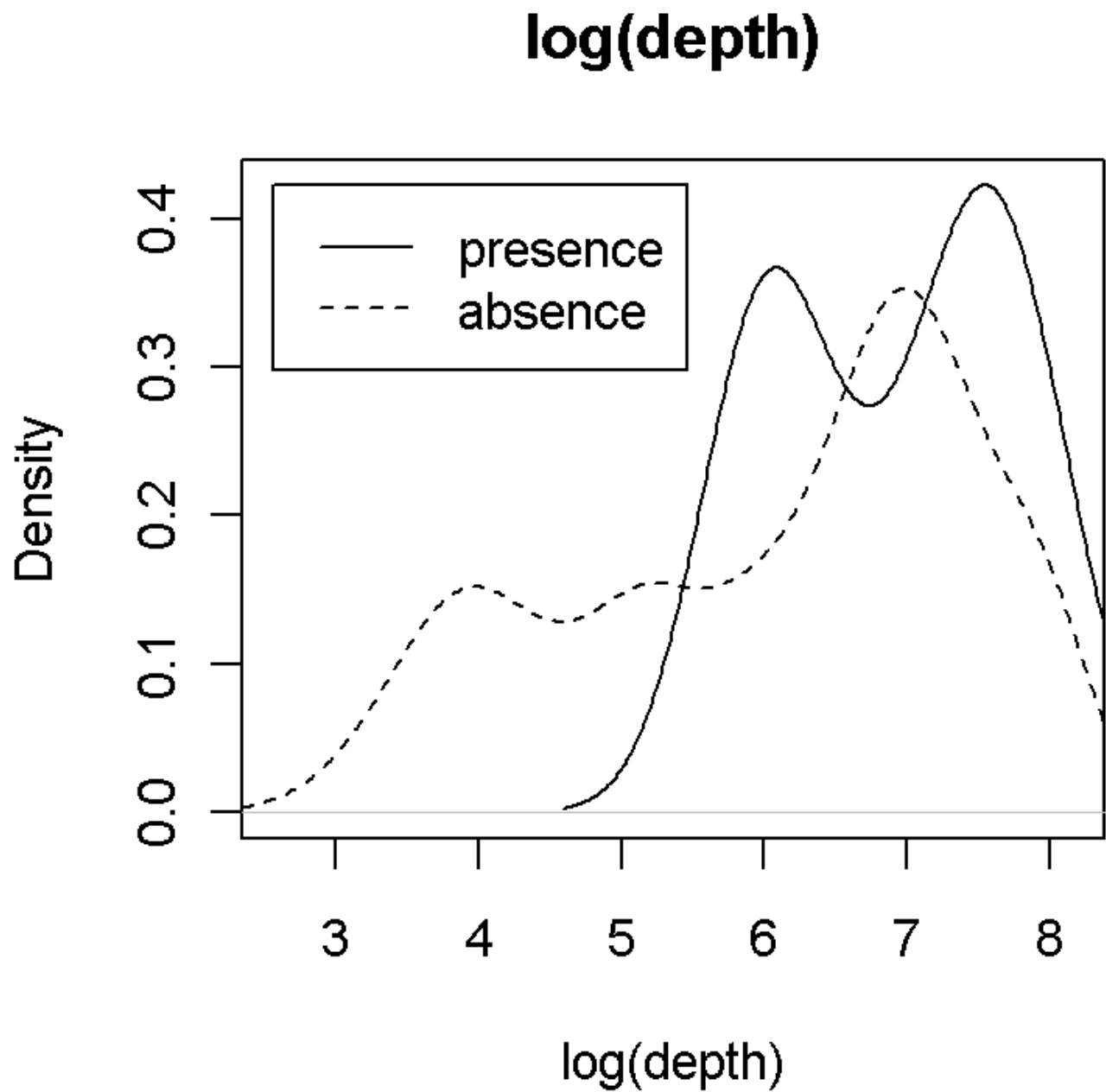


Figure 899: Density histogram of depth log(meters) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

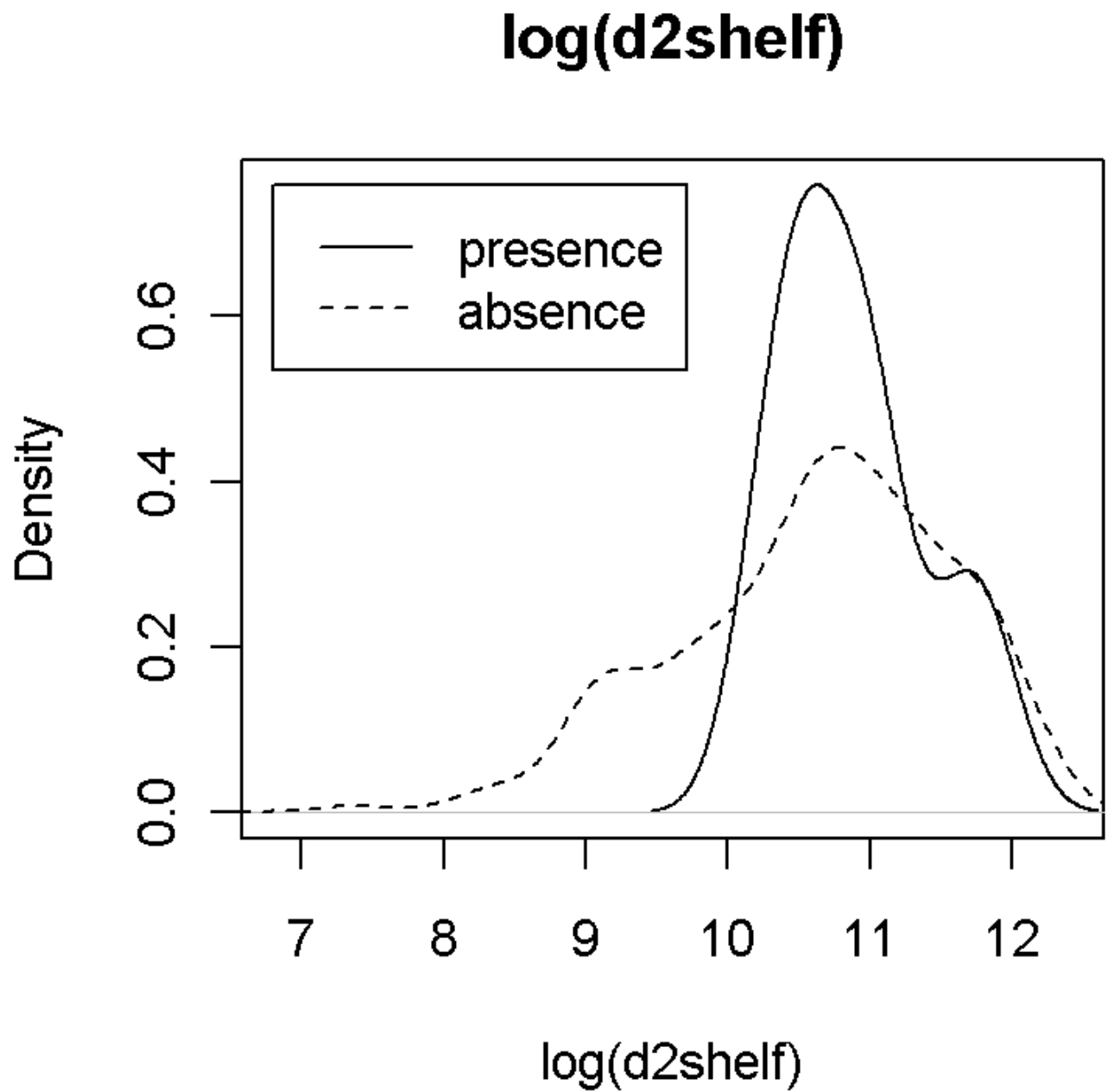


Figure 900: Density histogram of distance to shelf log(meters) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

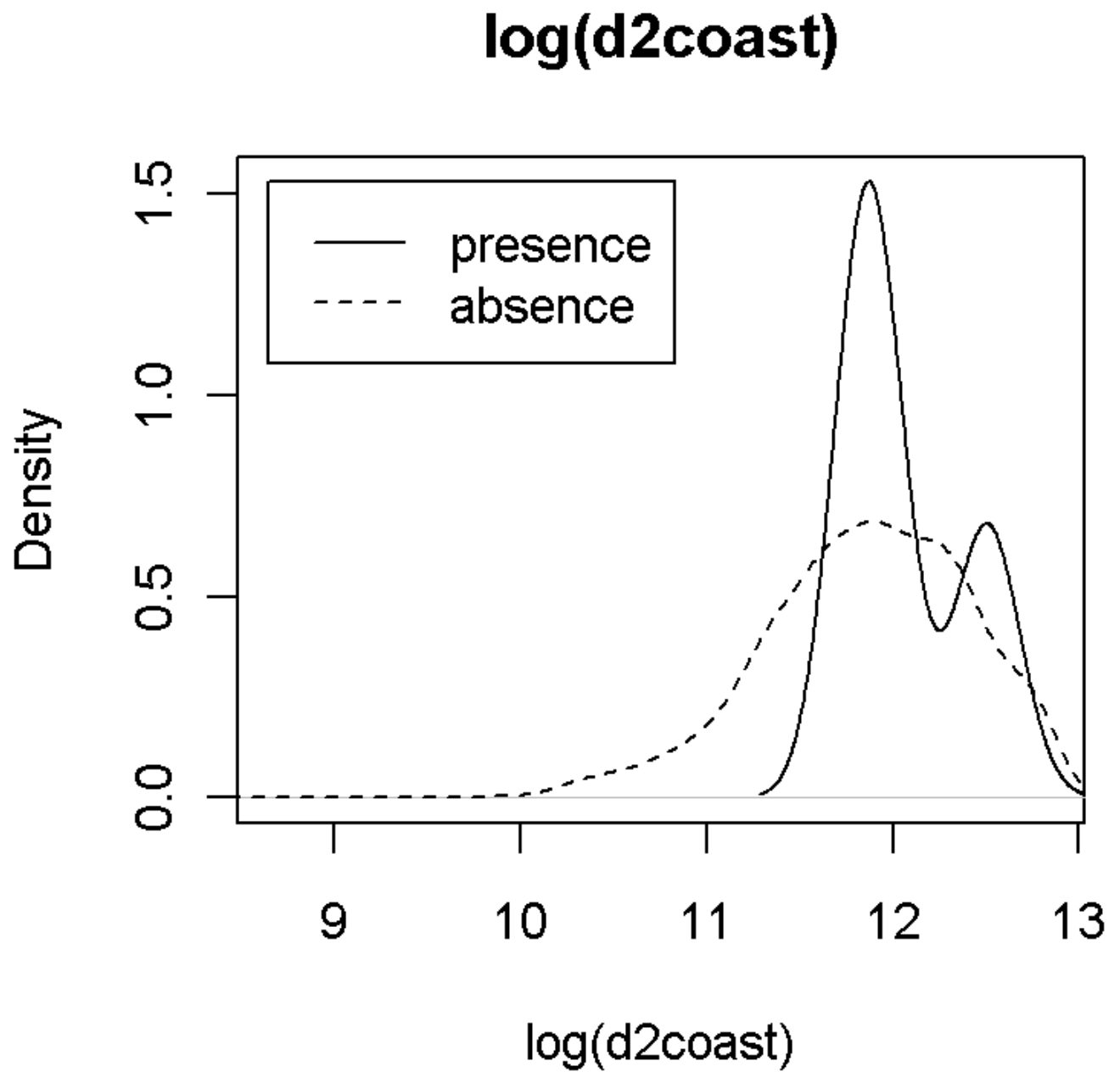


Figure 901: Density histogram of distance to coast log(meters) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

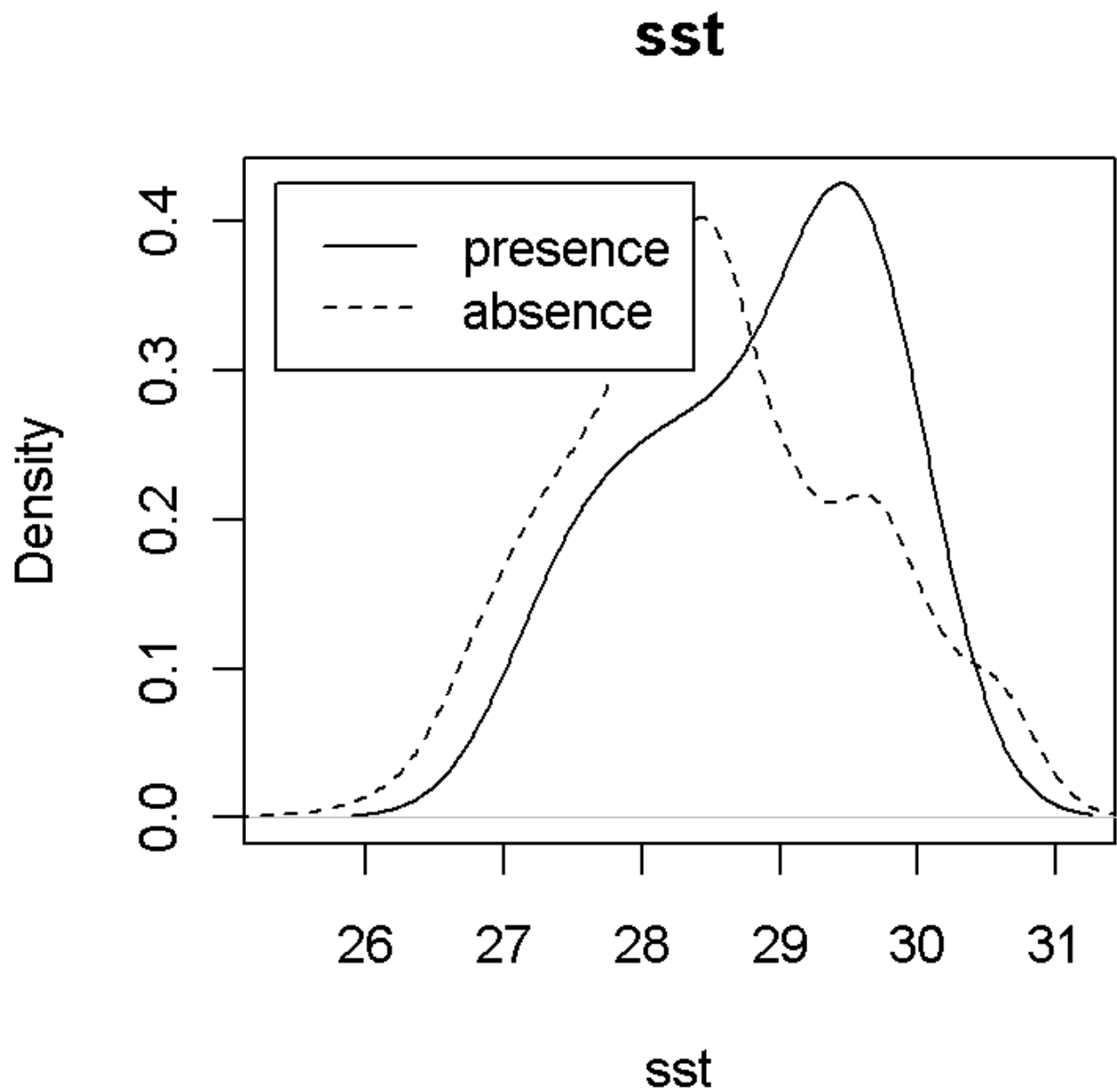


Figure 902: Density histogram of sea-surface temperature (degrees C) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

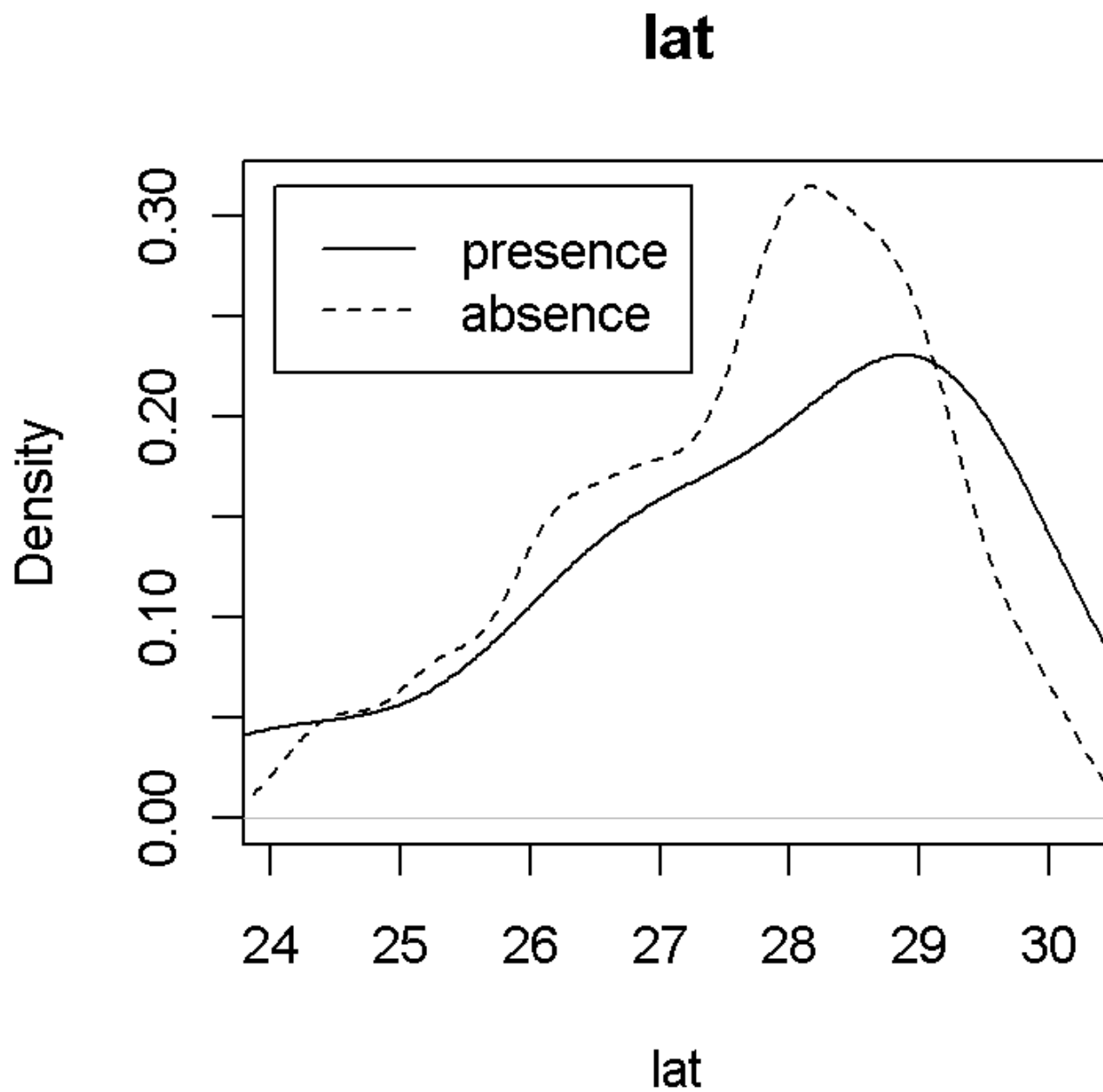


Figure 903: Density histogram of latitude (degrees) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

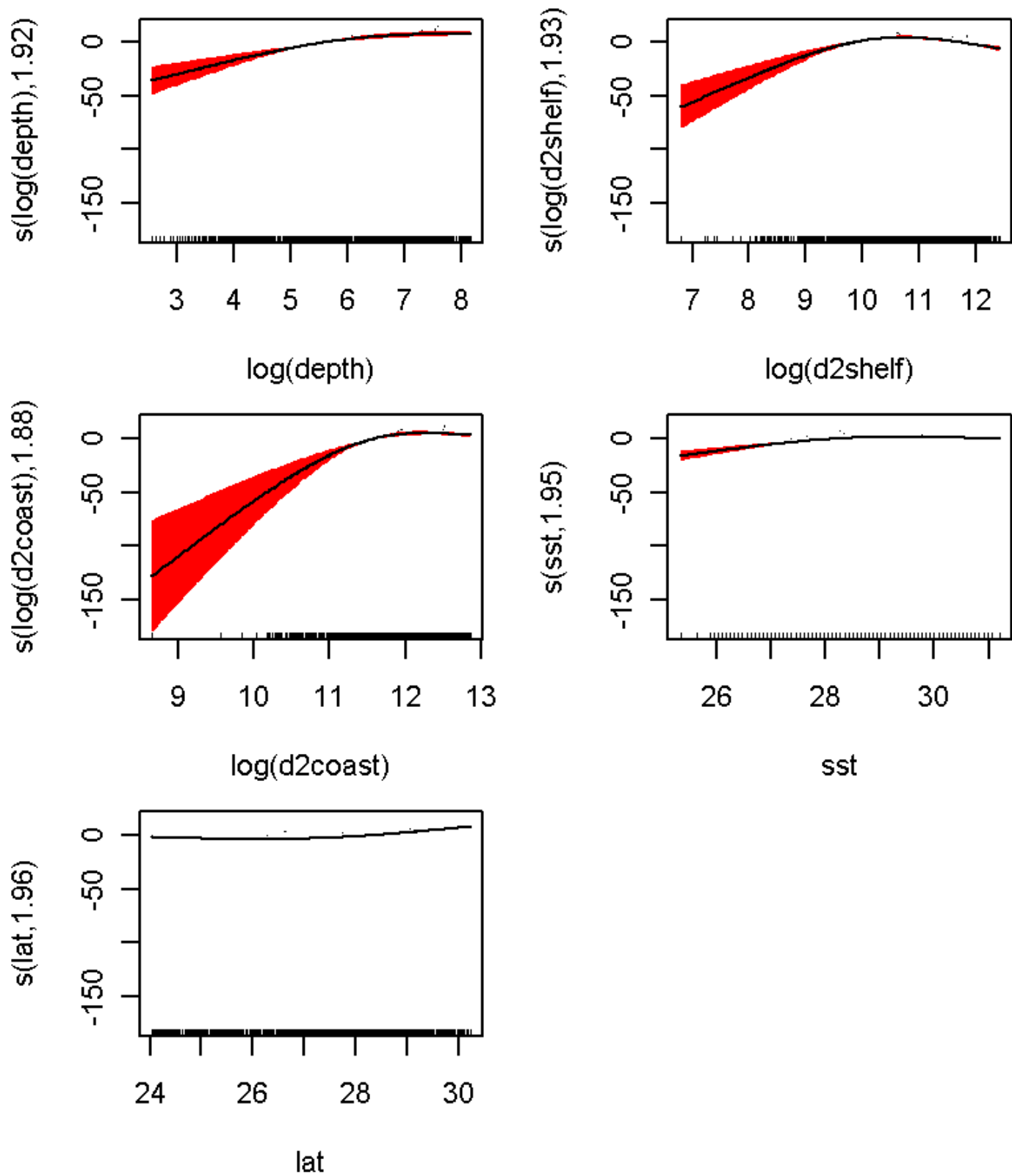


Figure 904: Terms plot of predictors to GAM model fit for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

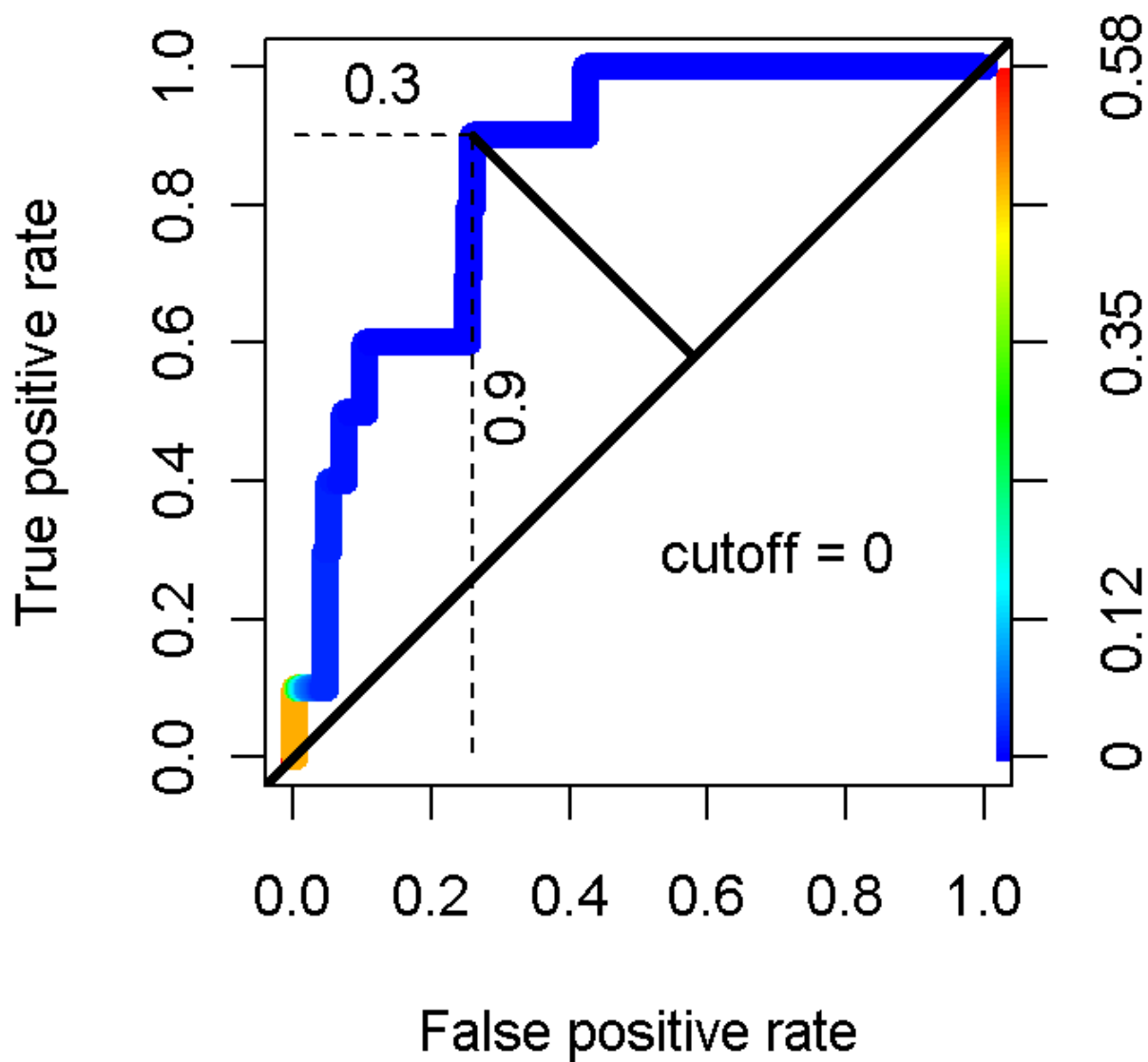


Figure 905: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

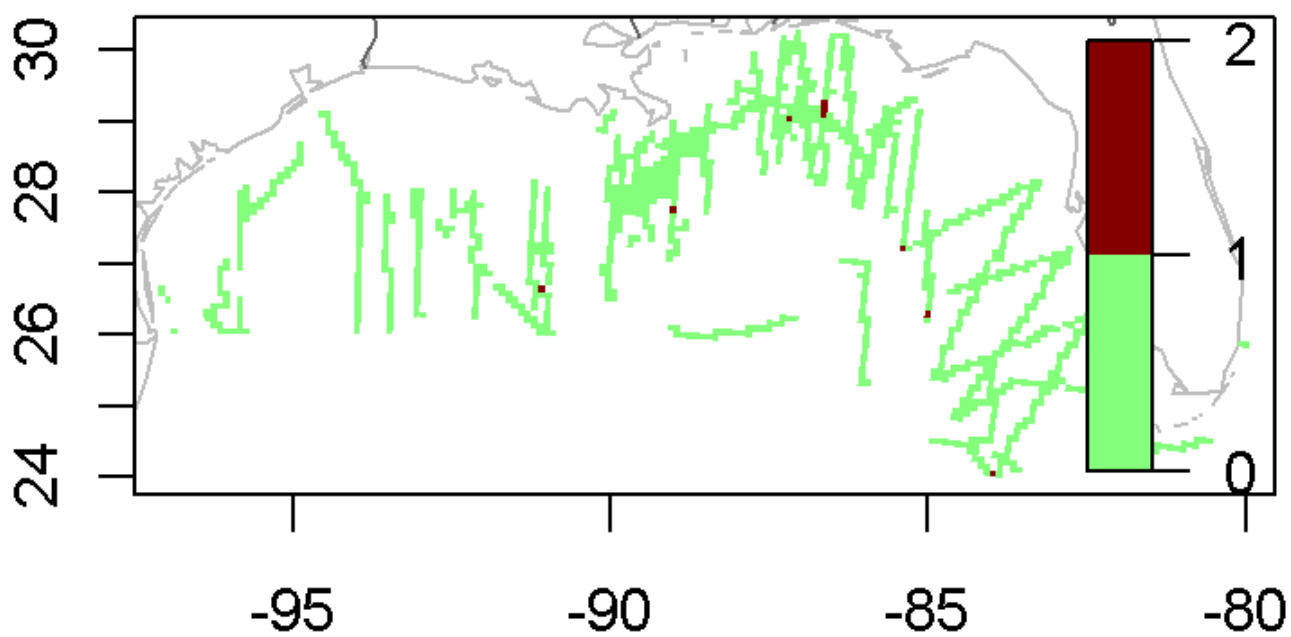


Figure 906: Map of presence and absence by cell summed through time for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

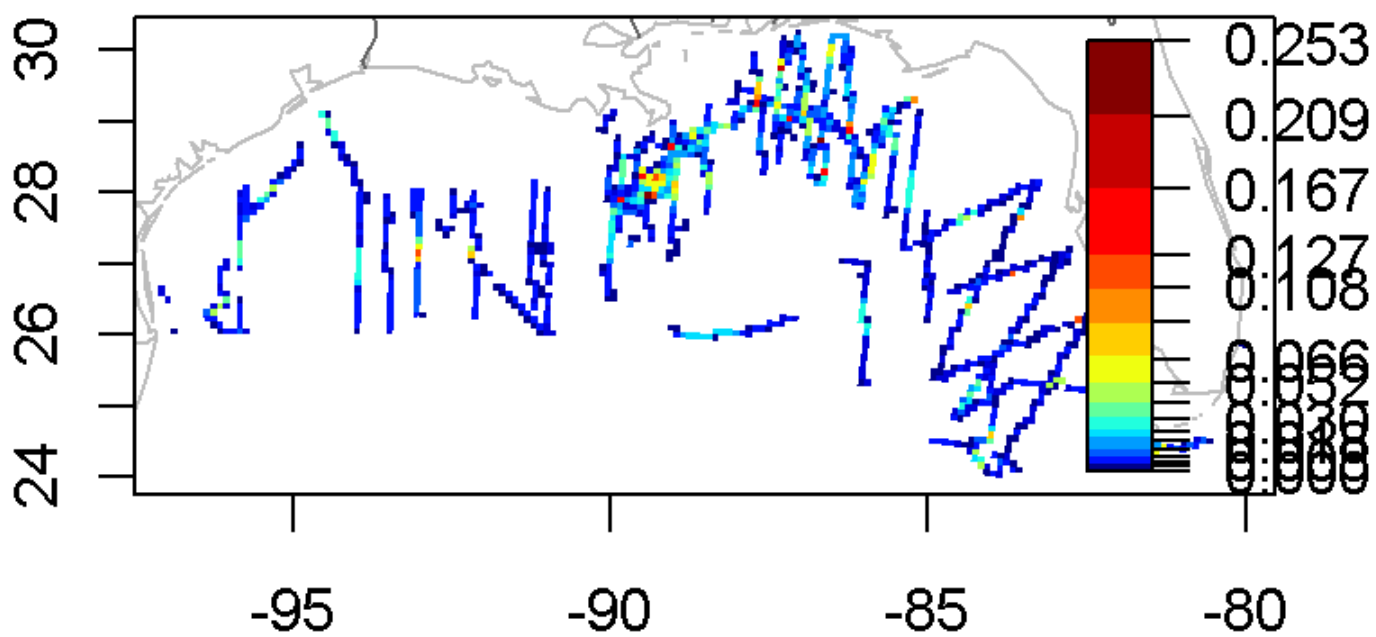


Figure 907: Map of effort(hours/km²) by cell summed through time for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

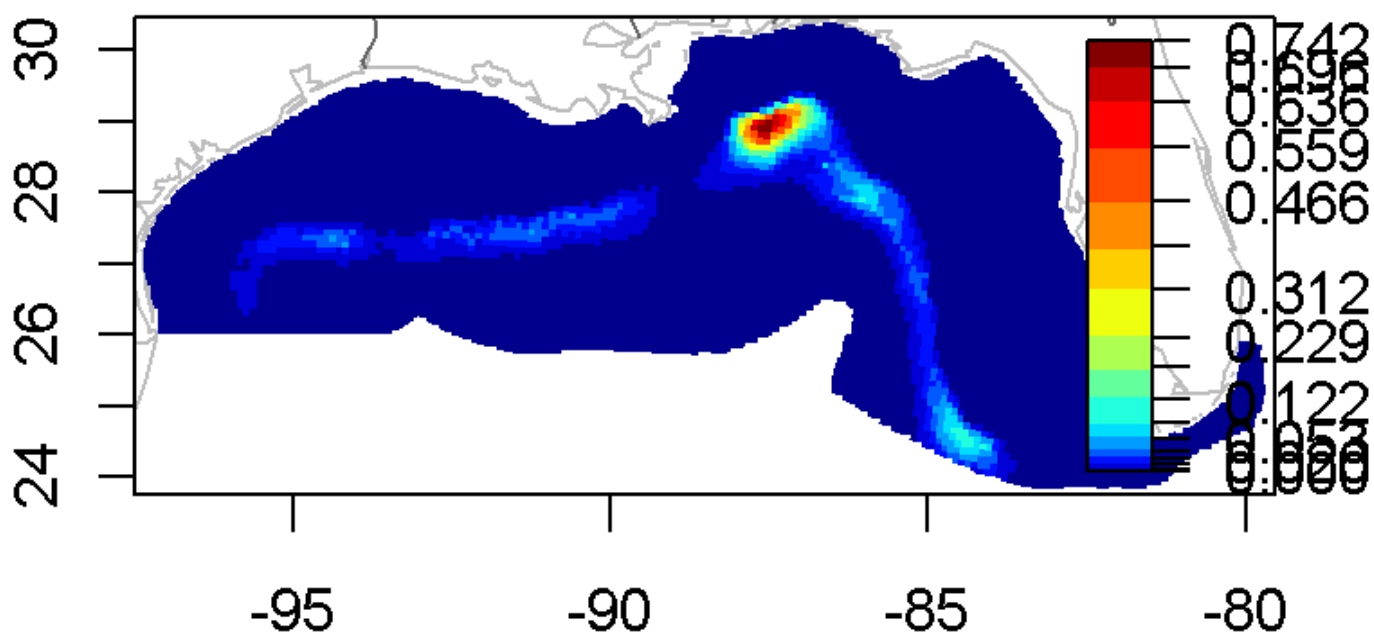


Figure 908: Map of mean predicted habitat for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

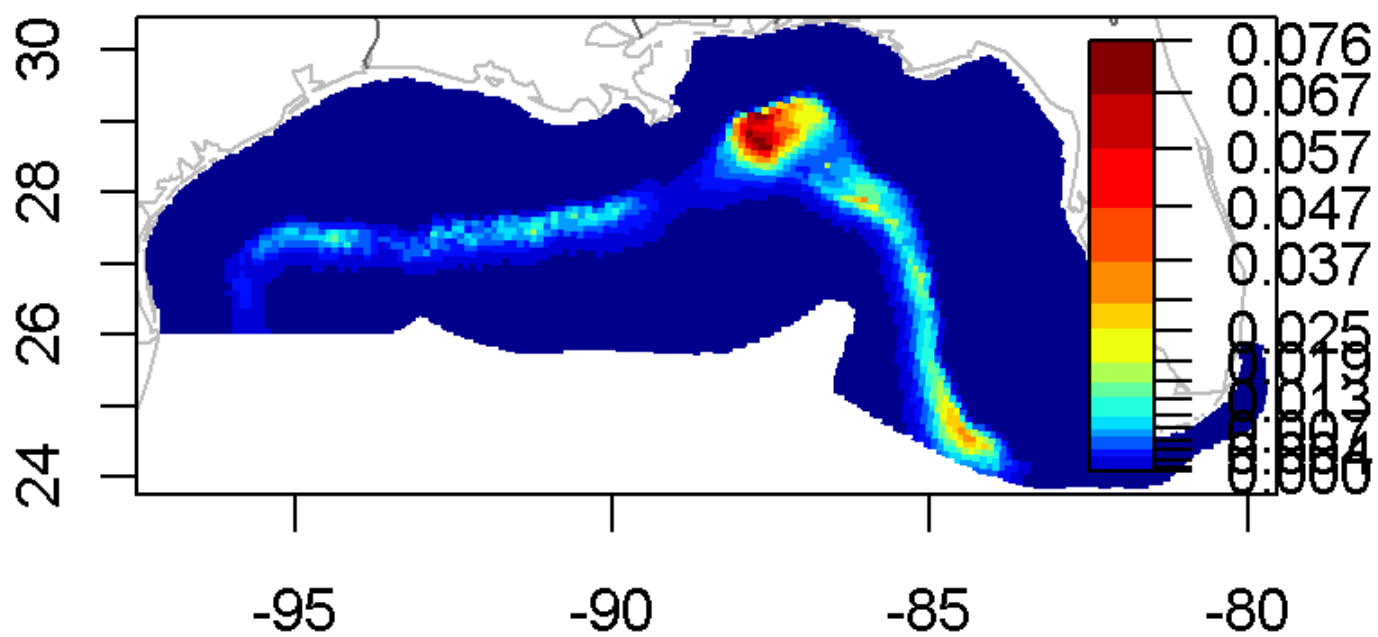


Figure 909: Map of standard error of habitat for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

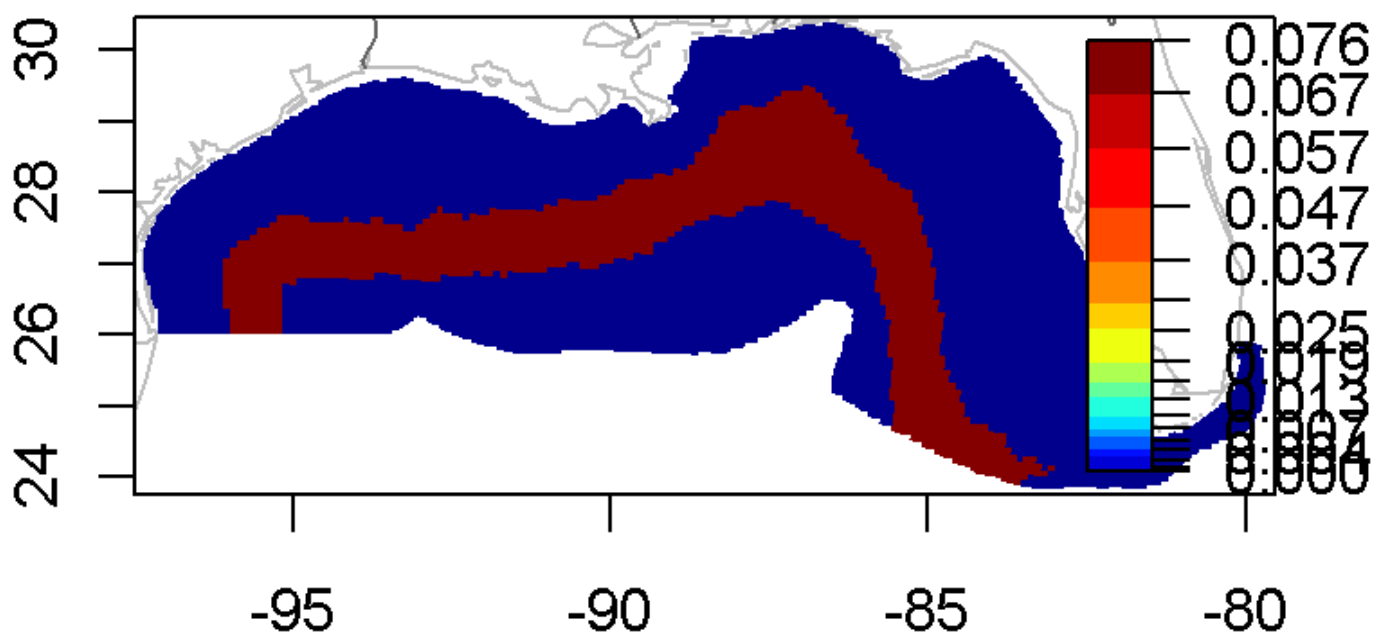


Figure 910: Map of binary habitat (cutoff determined by ROC) for 'Striped dolphin' guild during 'summer' season in 'gomex2' region.

17.4 winter

18 Tursiops

Guildid:tu3

Table 83: Taxonomic members of the "Tursiops" guild.

	Scientific Name	Common Name	Taxonomic #
1	Tursiops	bottlenose dolphins	180425
2	Tursiops truncatus	bottlenose dolphin	180426

18.1 fall

18.1.1 east2

Modelrun identifier: duke_06_tu3_fall_east2

Date generated: 2008-10-21 14:35:04

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 84: Summary for duke(6) GAM model: for 'Tursiops' guild during 'fall' season in 'east2' region.

	Value
Number.presences	80
Number.absences	1784
GAM.converged	TRUE
R.squared	0.155511
Deviance.explained	0.188498
ROC.optimum	0.999743
Maximum.fit	0.035159
Maximum.prediction	1

Model text summary...

```
duke_06_tu3_fall_east2 run on Tue Oct 21 14:33:54 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'fall', region:east2

max.fit:0.999743, max.prediction:1.000000, ROC.optimum:0.035159

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -4.0169      0.1623  -24.75   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.9993095 2.4993   5.595 0.00174 **
s(log(d2shelf)) 1.9729084 2.4729  35.753 < 2e-16 ***
s(log(d2coast)) 1.9993433 2.4993 104.290 < 2e-16 ***
s(sst)          0.0007472 0.5007   0.002 0.84652
s(lat)          0.9483506 1.4484  18.140 8.3e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.156   Deviance explained = 18.8%
GCV score = 0.001766   Scale est. = 0.0017522   n = 1826

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1184  Min.   : 1654  Min.   : 6.0  Min.   : 10  Min.   : 2399  Min.   :10.27  Min.   :28.83
se2: 680  1st Qu.:10527  1st Qu.: 32.0  1st Qu.: 12630  1st Qu.: 44436  1st Qu.:15.00  1st Qu.:33.95
        Median :12004  Median : 60.0  Median : 30478  Median : 76904  Median :21.45  Median :37.10
        Mean   :11618  Mean   :264.5  Mean   : 47224  Mean   : 85248  Mean   :20.38  Mean   :37.51
        3rd Qu.:13928  3rd Qu.: 197.0  3rd Qu.: 67358  3rd Qu.:110783  3rd Qu.:25.50  3rd Qu.:41.72
        Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :29.62  Max.   :44.66
              NA's   :      1  NA's   :      1  NA's   :37.00

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   : 4  Min.   : 5  Min.   : 1259  Min.   :10.50  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.: 34042  1st Qu.: 89304  1st Qu.:18.90  1st Qu.:32.12
```


Median :11616	Median : 844	Median : 82032	Median :178961	Median :24.67	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :22.32	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:26.48	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :28.65	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :1.221e-15  Min.   :0.00e+00  Min.   :1.290e-06  Min.   :0.0000
1st Qu.: 9145  1st Qu.:1.010e-03  1st Qu.:6.386e-04  1st Qu.:0.00e+00  1st Qu.:5.348e-04  1st Qu.:0.0000
Median :11616  Median :4.411e-03  Median :1.849e-03  Median :0.00e+00  Median :2.645e-03  Median :0.0000
Mean   :11171  Mean   :4.748e-02  Mean   :7.914e-03  Mean   :7.22e-02  Mean   :8.763e-03  Mean   :0.2506
3rd Qu.:14088  3rd Qu.:3.541e-02  3rd Qu.:8.459e-03  3rd Qu.:0.00e+00  3rd Qu.:6.382e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :1.000e+00  Max.   :1.919e-01  Max.   :2.00e+00  Max.   :5.995e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :8.78e+03  NA's :8.780e+03
```

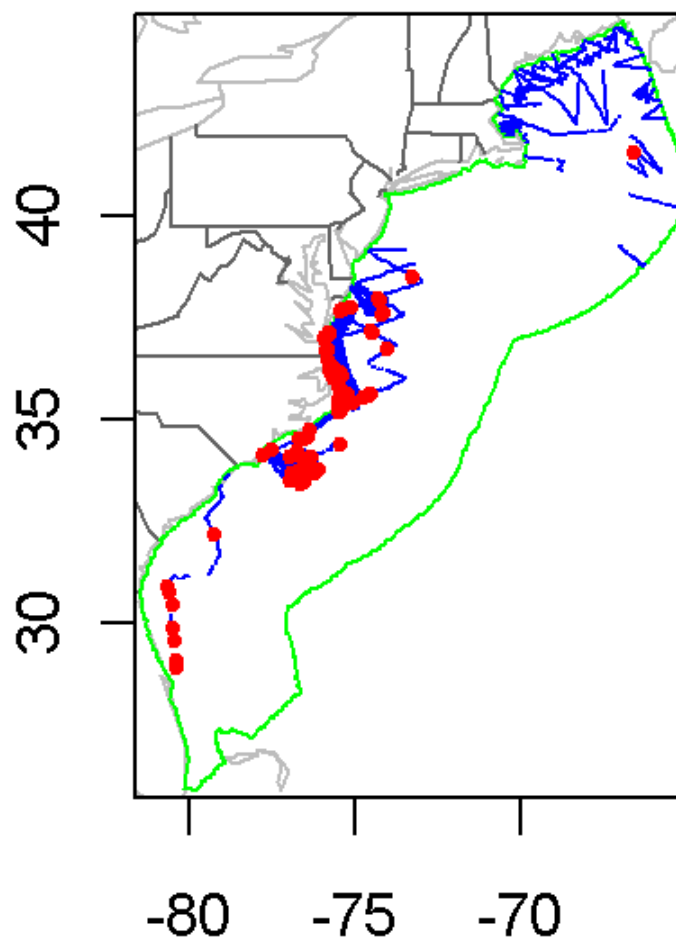


Figure 911: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'fall' season in 'east2' region.

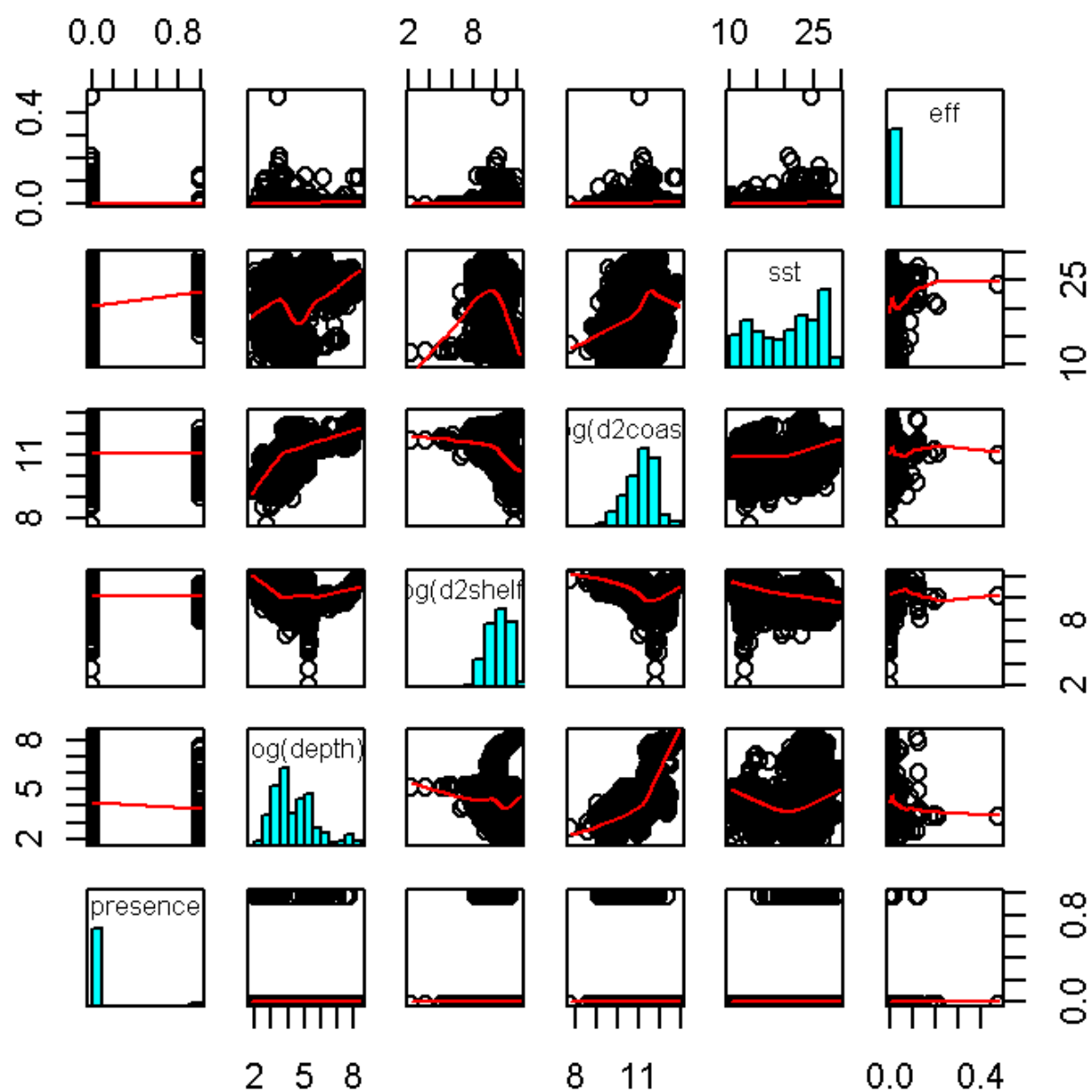


Figure 912: Pairs plot of input variables for 'Tursiops' guild during 'fall' season in 'east2' region.

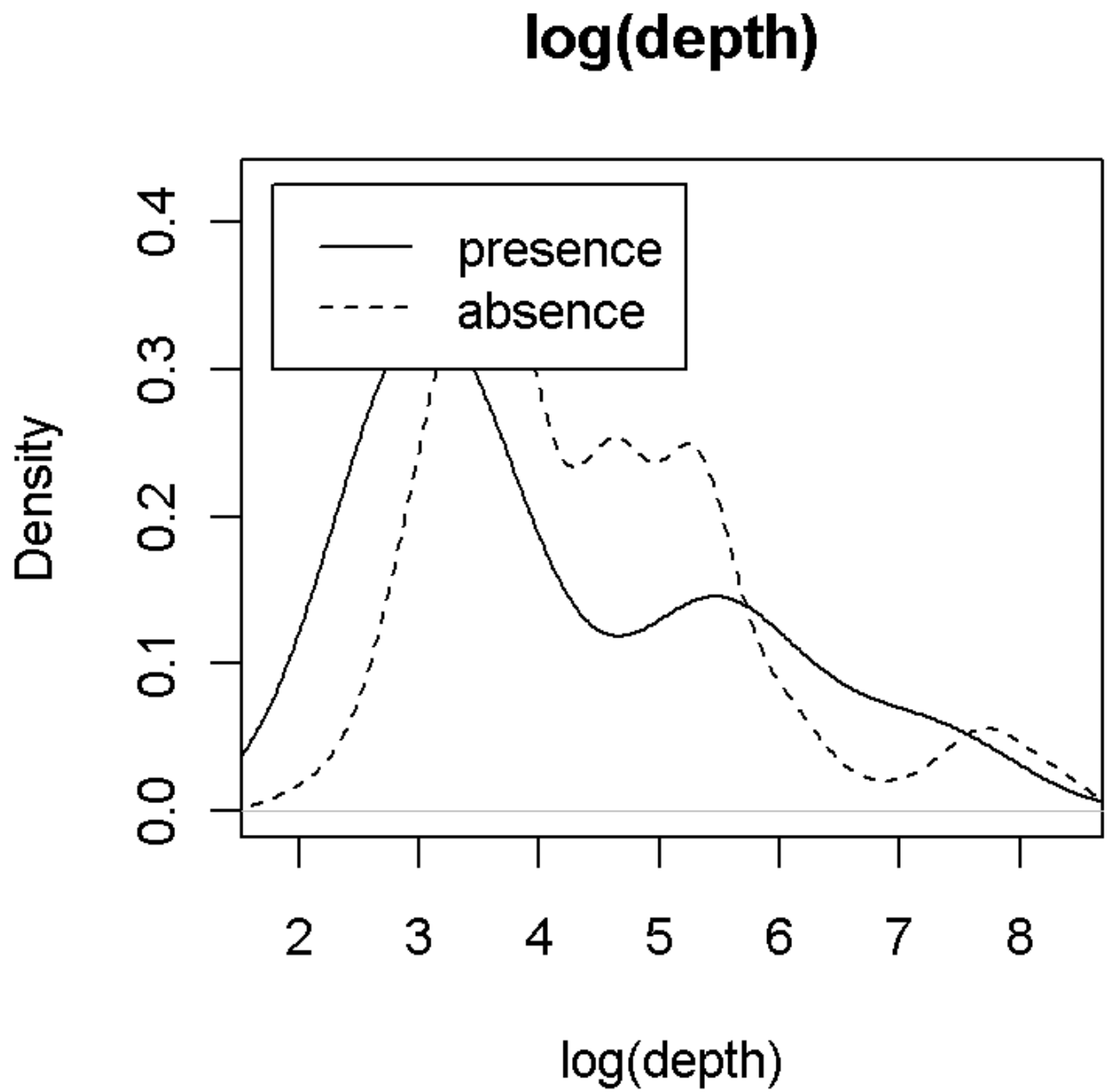


Figure 913: Density histogram of depth $\log(\text{meters})$ for 'Tursiops' guild during 'fall' season in 'east2' region.

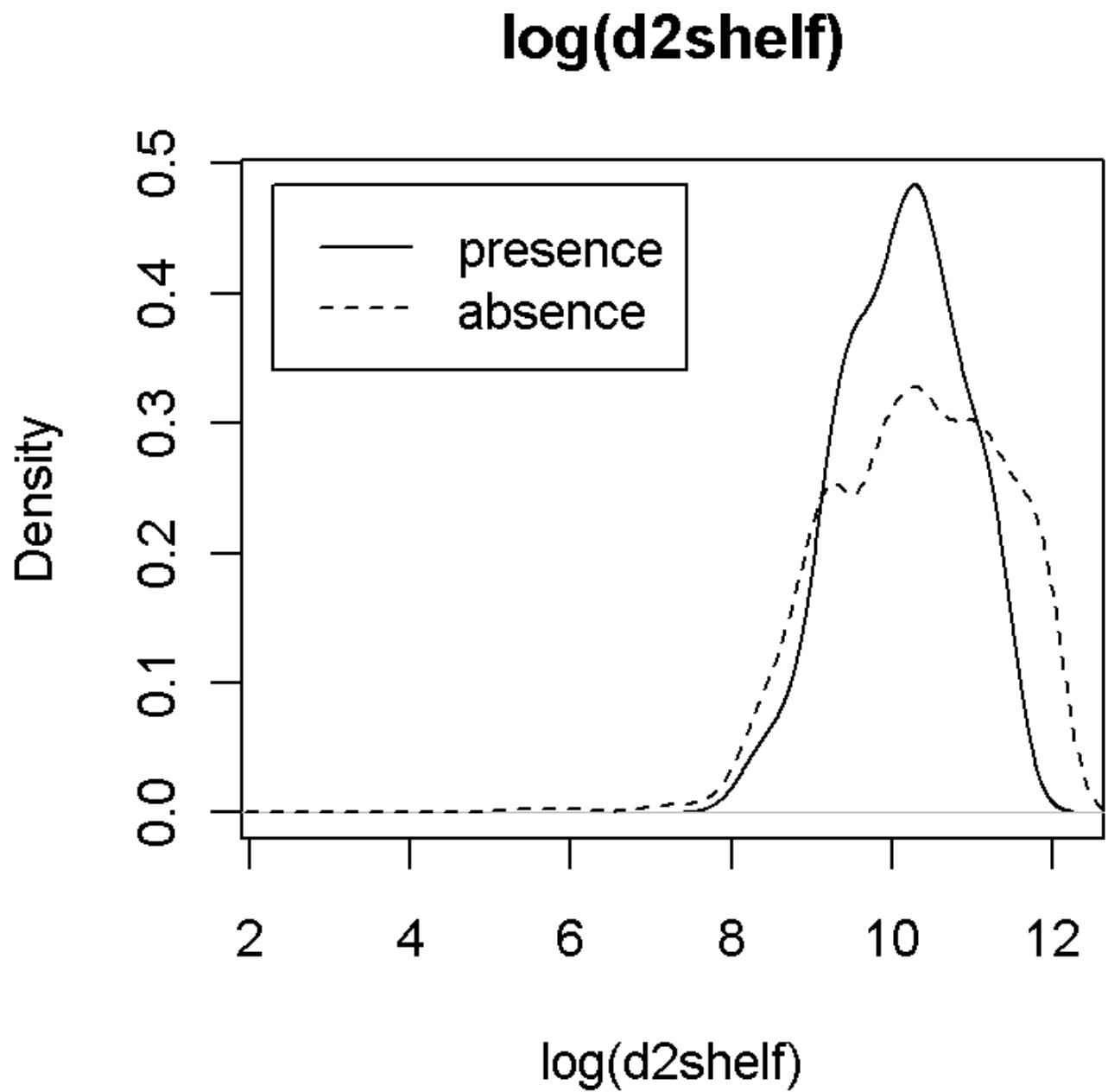


Figure 914: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'fall' season in 'east2' region.

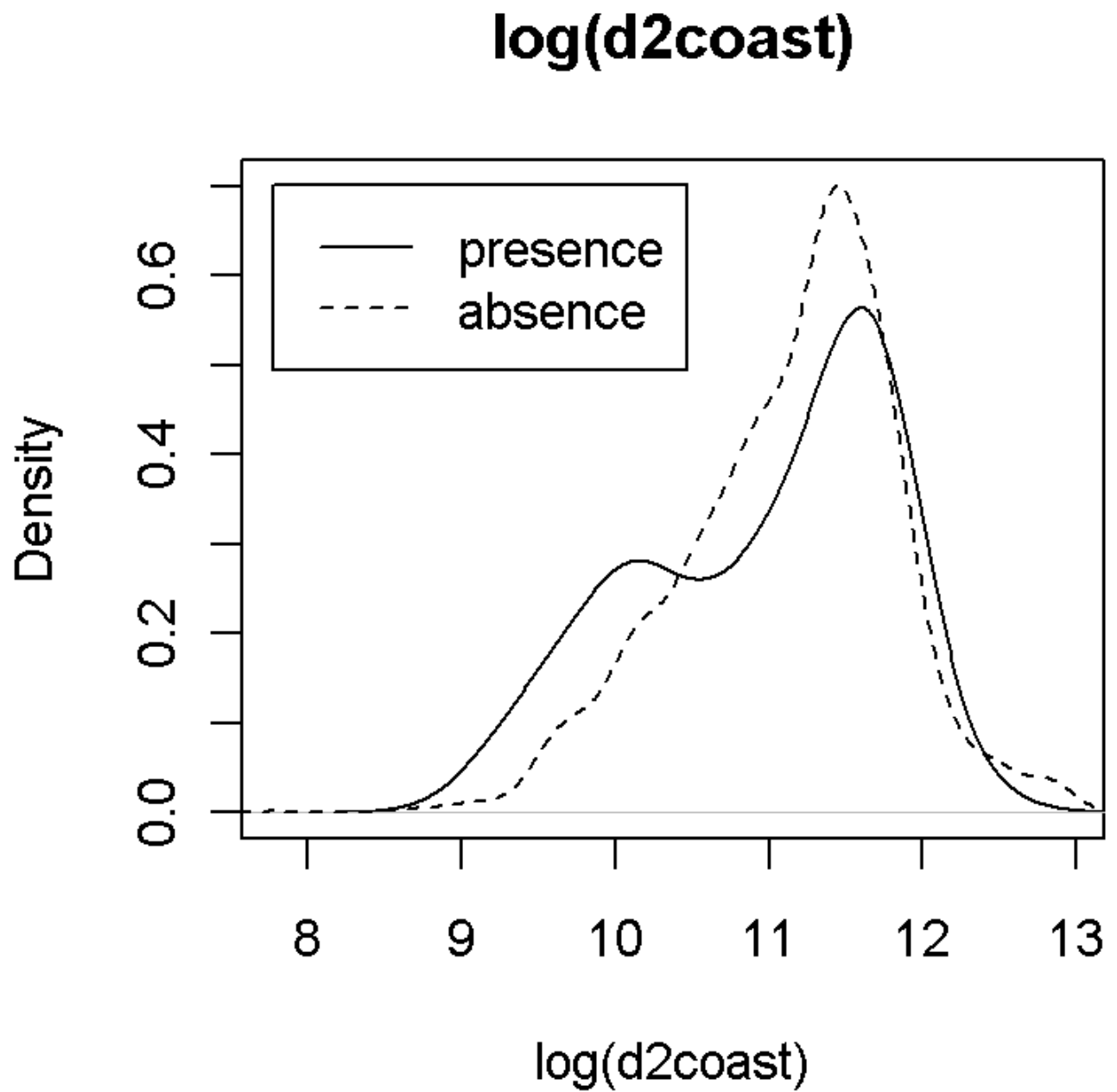


Figure 915: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'fall' season in 'east2' region.

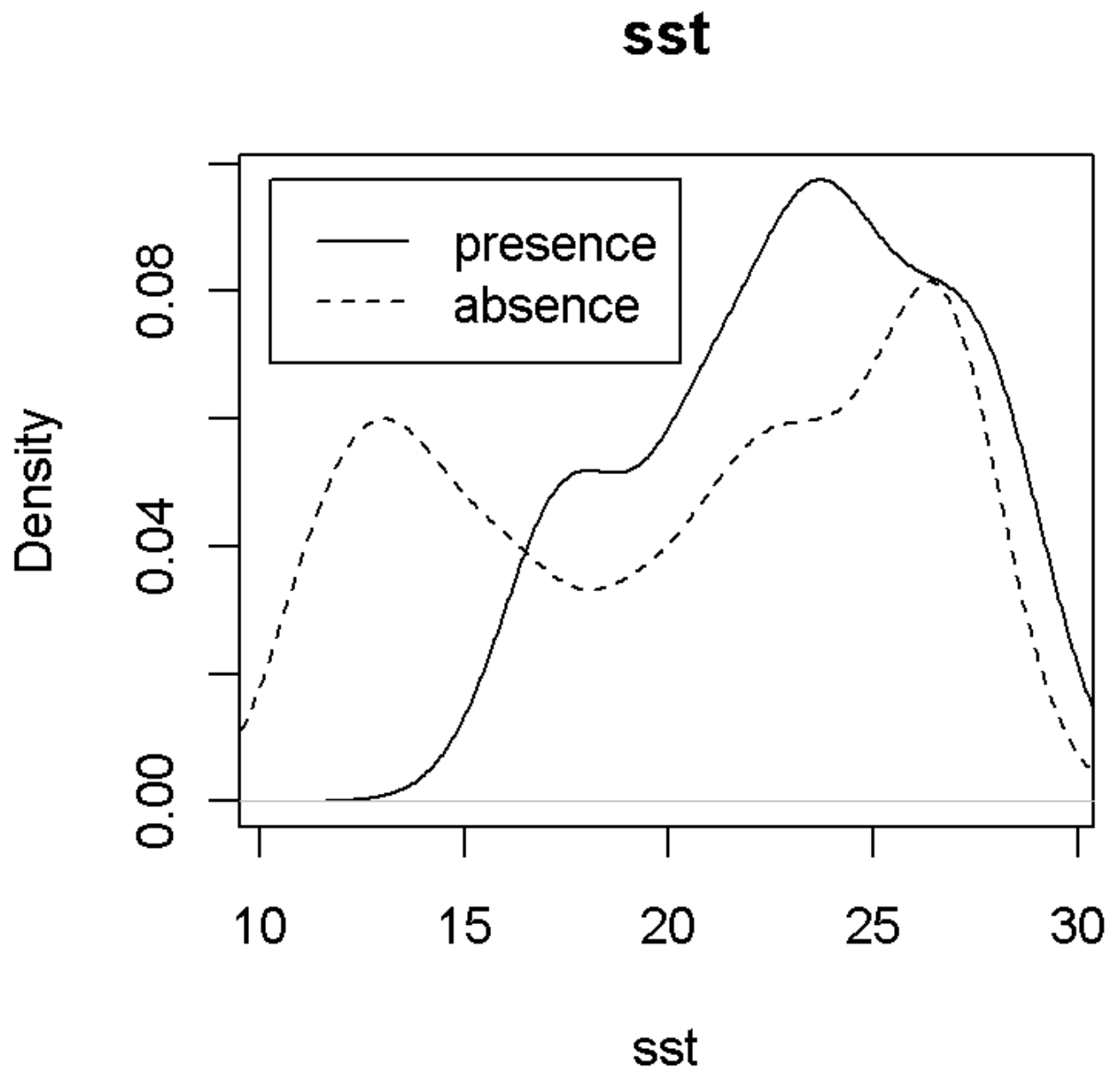


Figure 916: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'fall' season in 'east2' region.

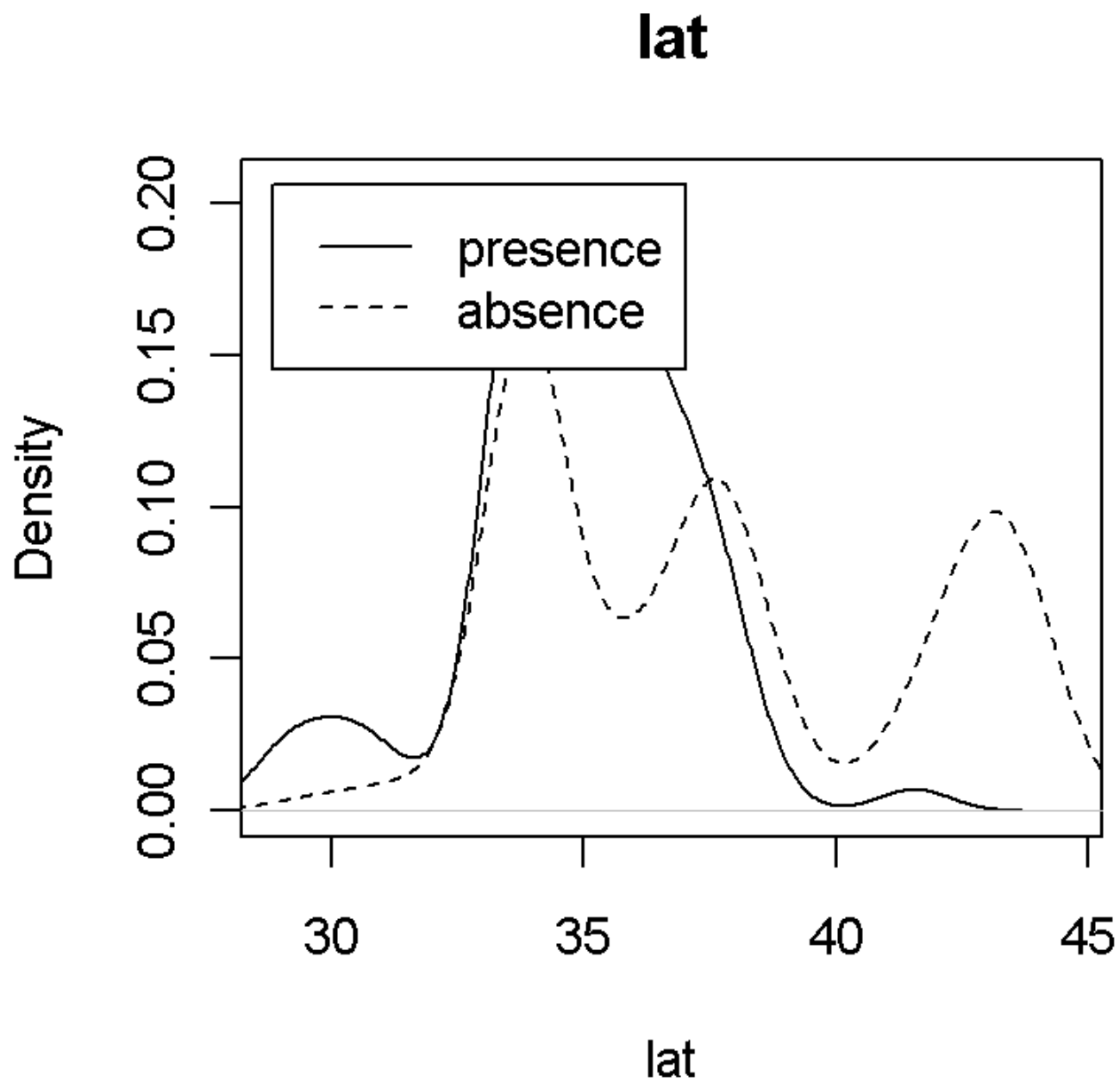


Figure 917: Density histogram of latitude (degrees) for 'Tursiops' guild during 'fall' season in 'east2' region.

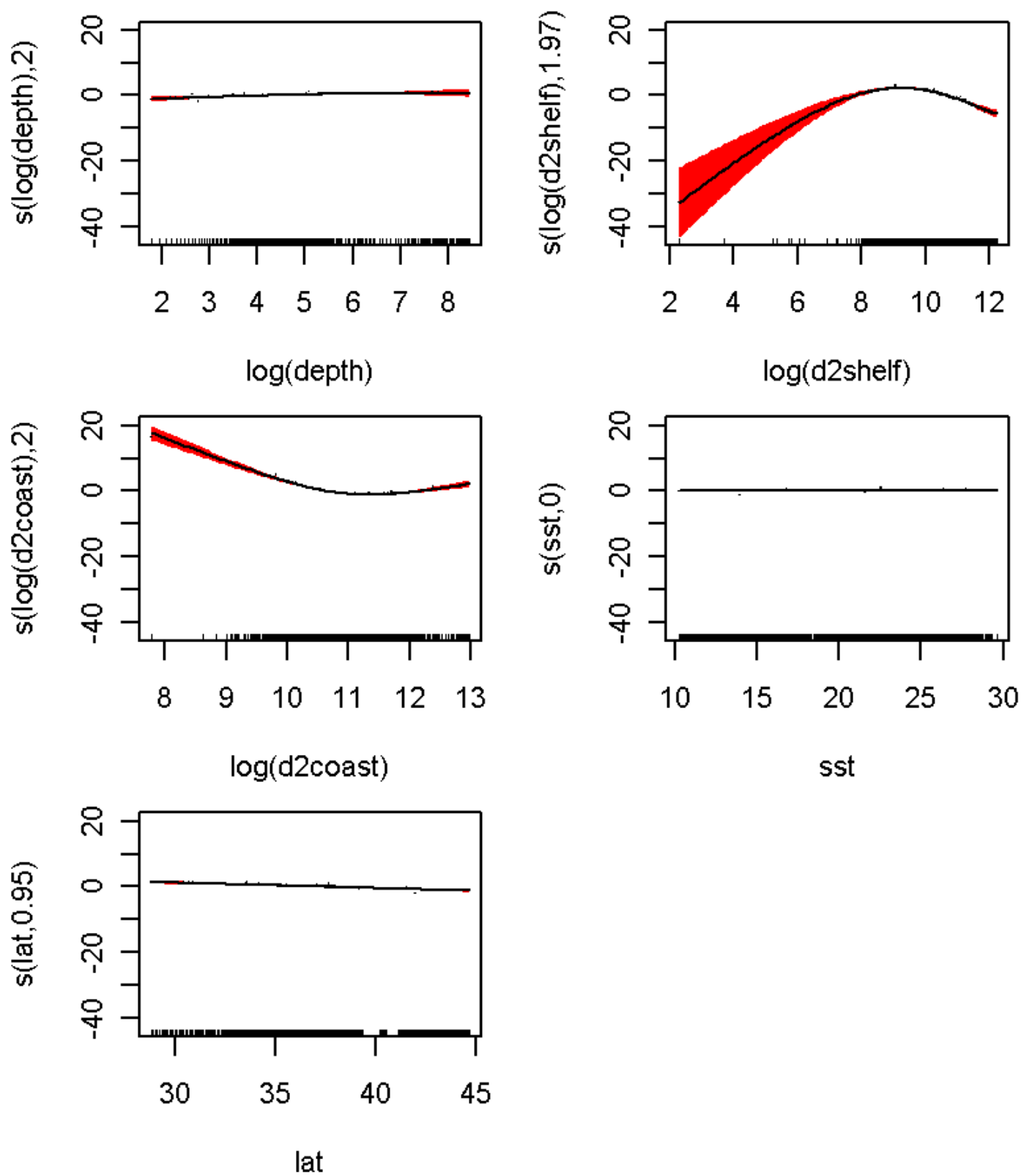


Figure 918: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'fall' season in 'east2' region.

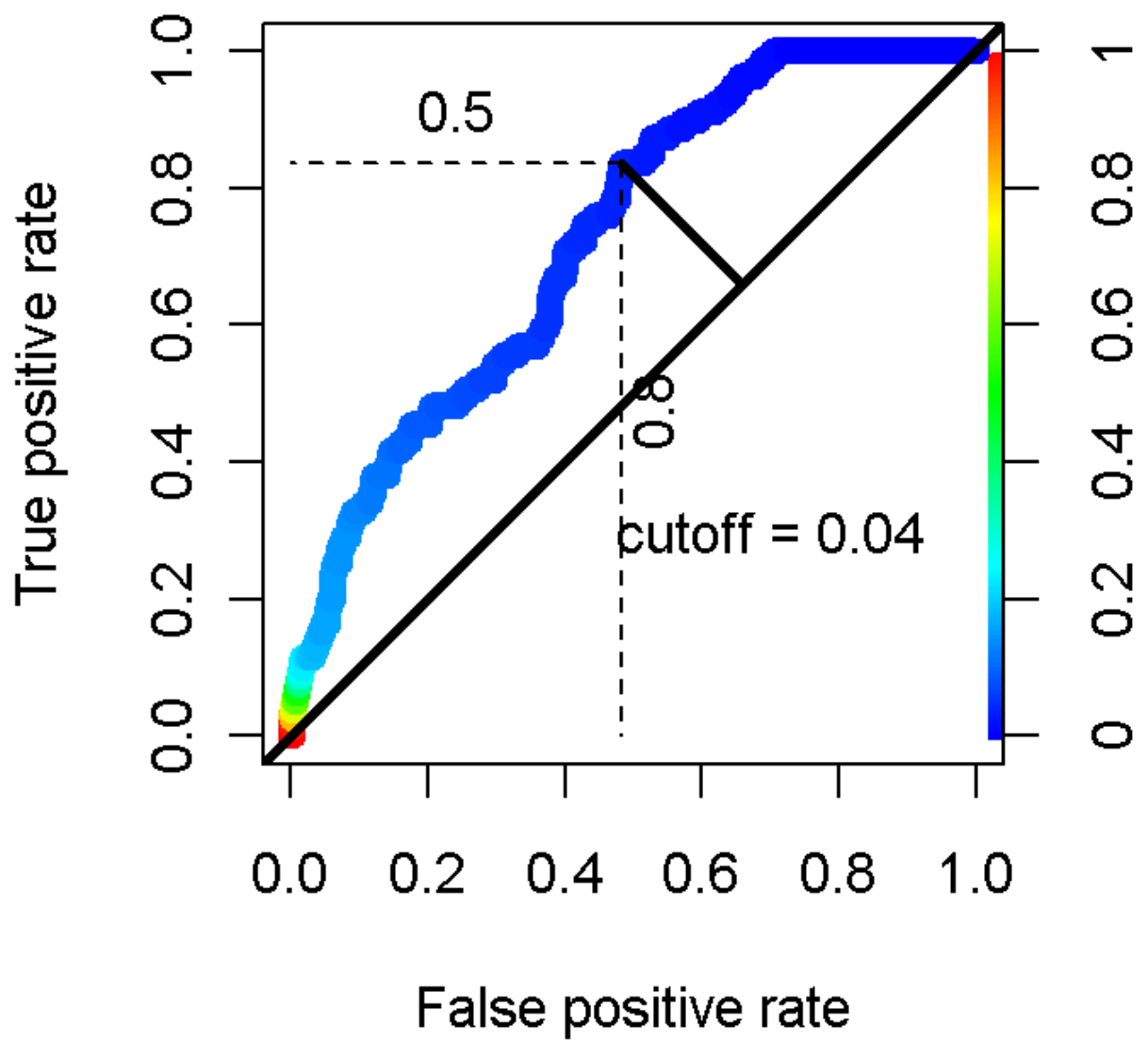


Figure 919: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'fall' season in 'east2' region.

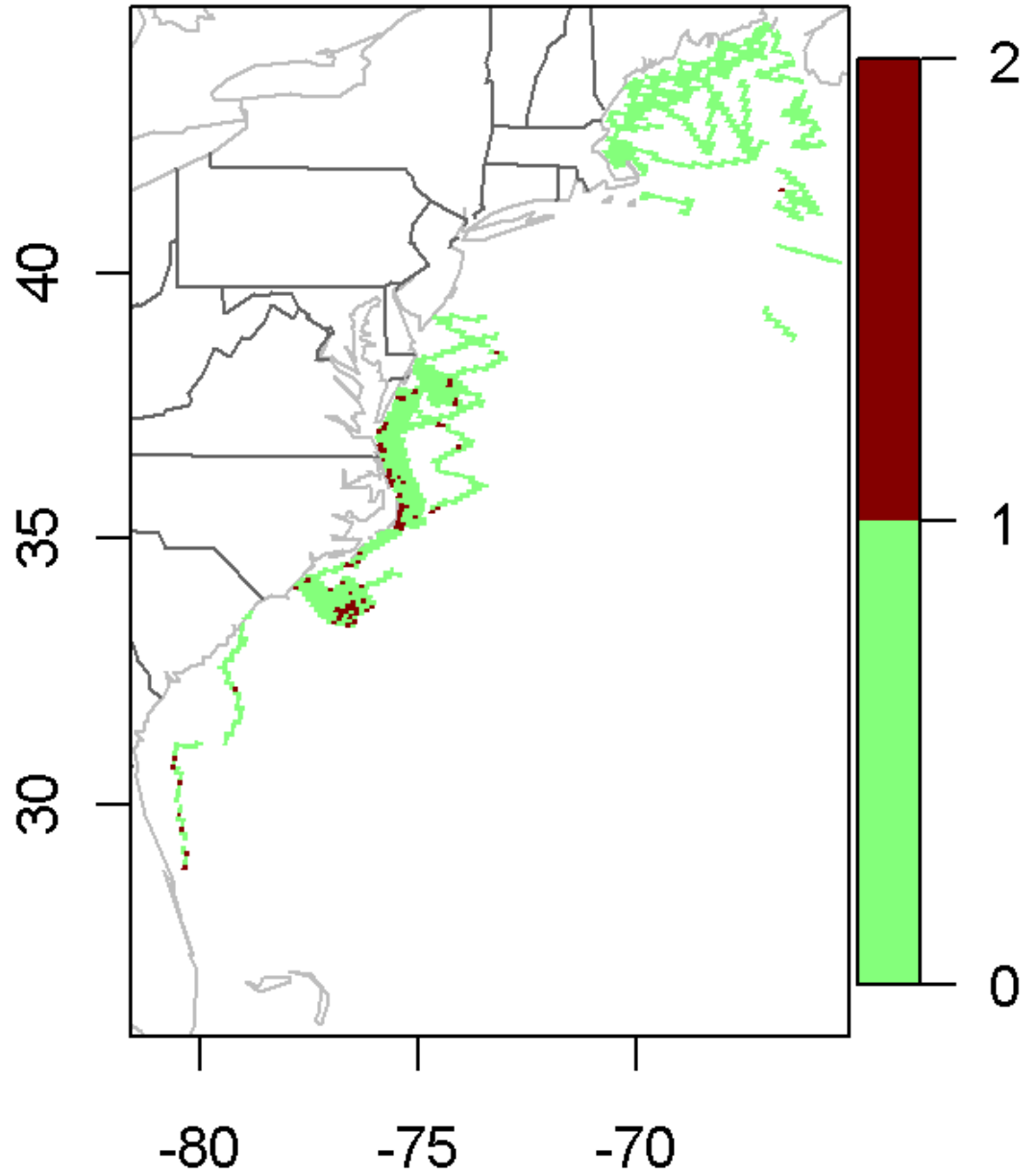


Figure 920: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'fall' season in 'east2' region.

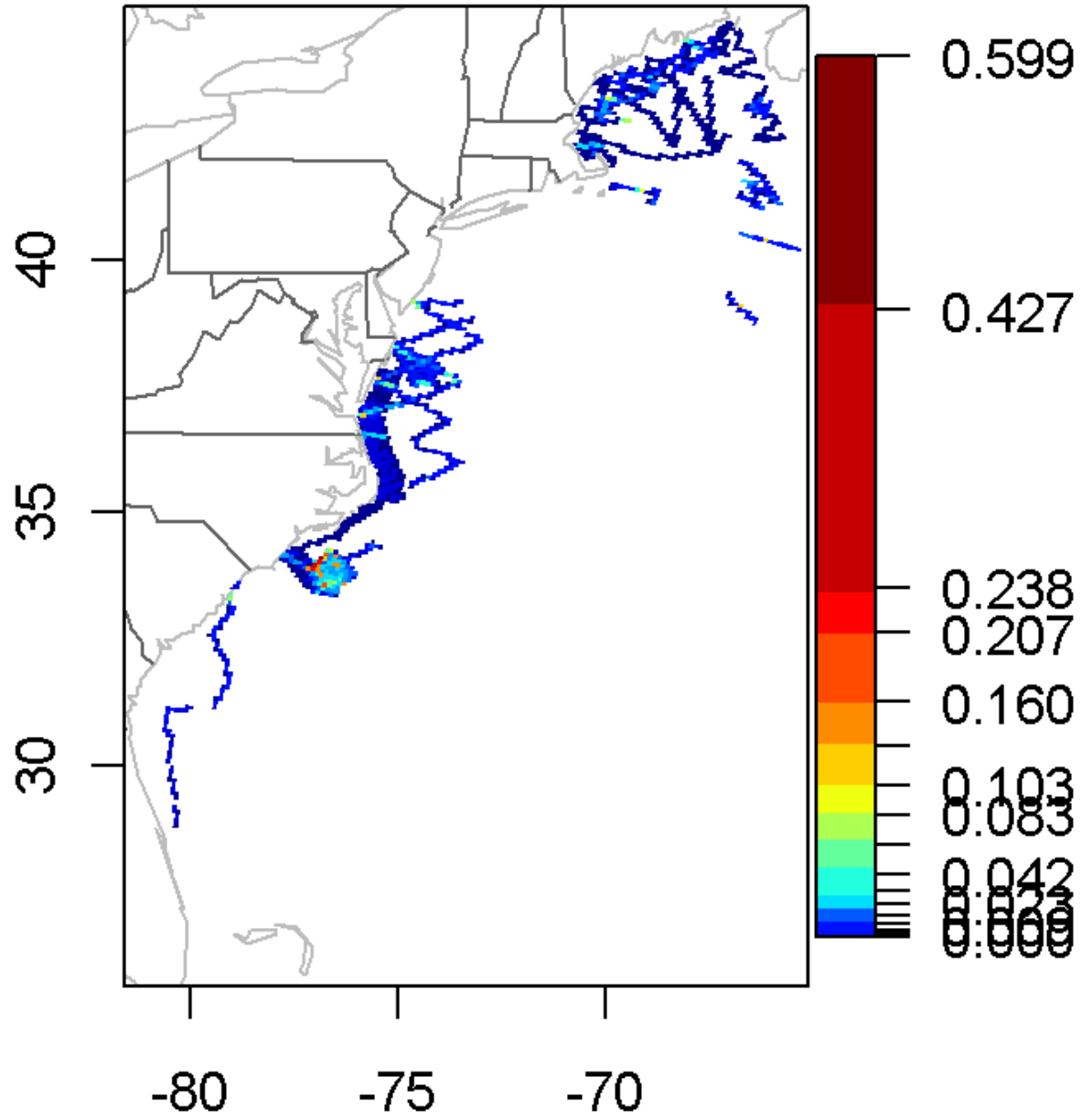


Figure 921: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'fall' season in 'east2' region.

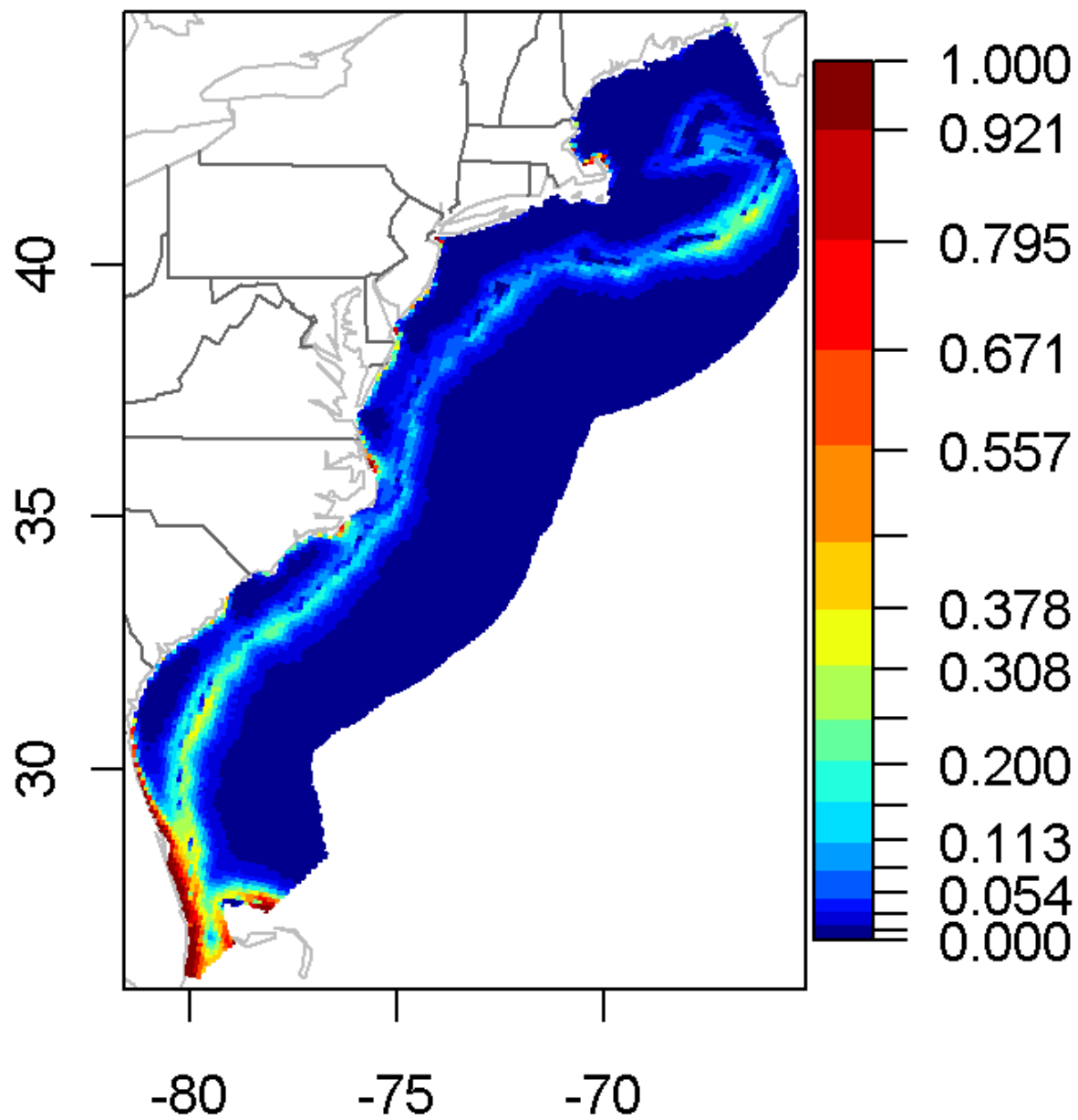


Figure 922: Map of mean predicted habitat for 'Tursiops' guild during 'fall' season in 'east2' region.

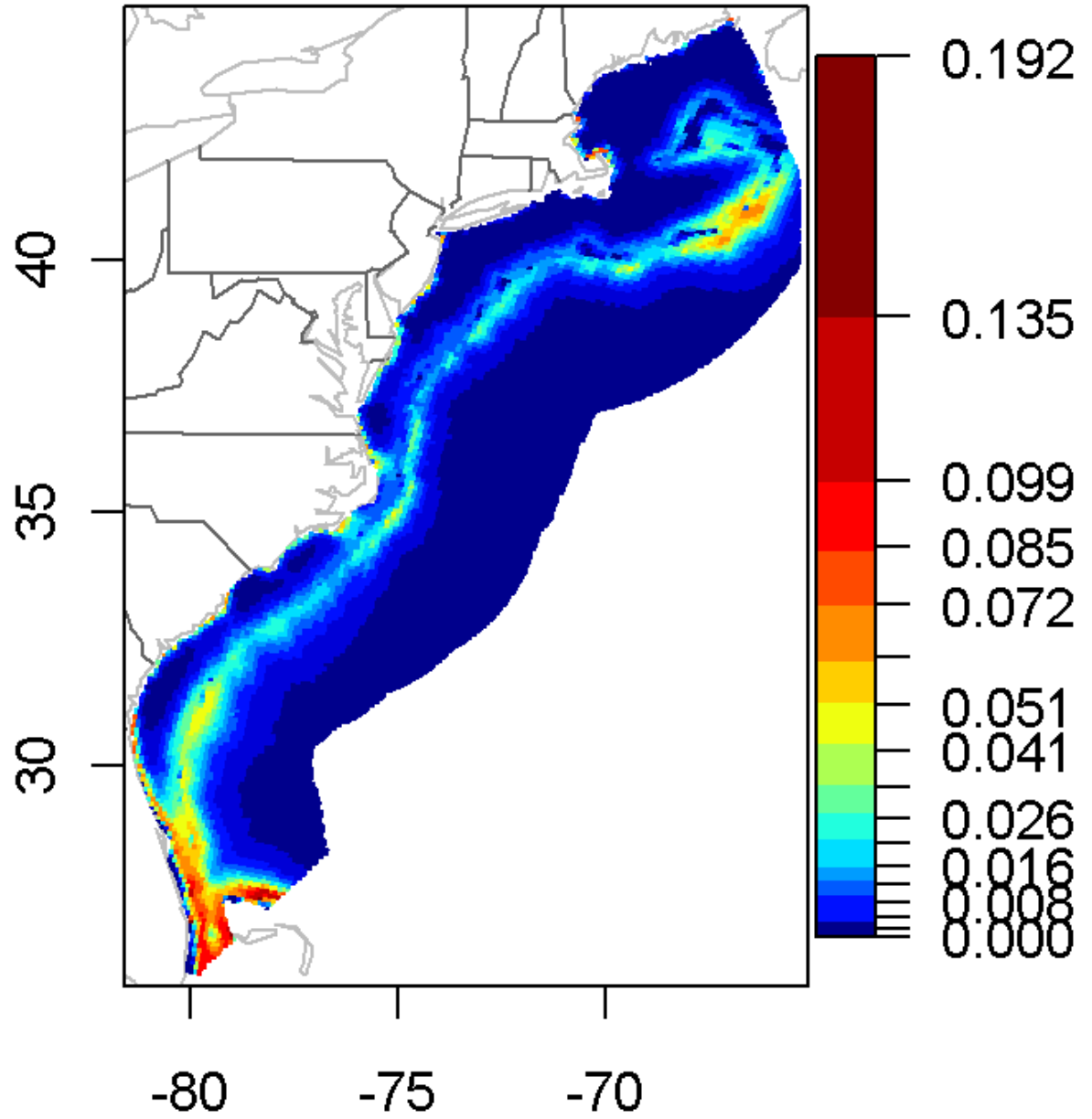


Figure 923: Map of standard error of habitat for 'Tursiops' guild during 'fall' season in 'east2' region.

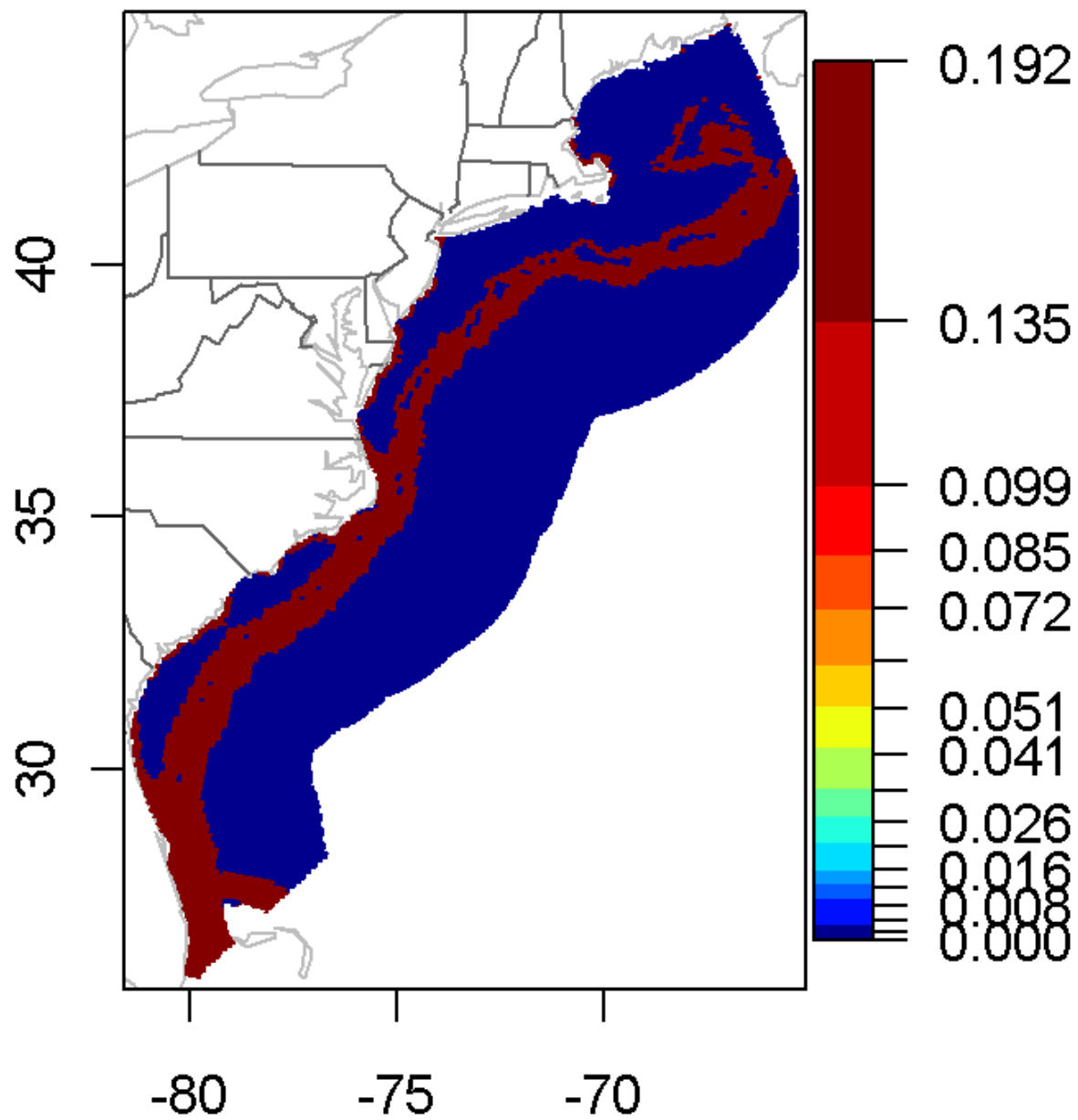


Figure 924: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'fall' season in 'east2' region.

18.1.2 gomex2

Modelrun identifier: duke_06_tu3_fall_gomex2

Date generated: 2008-10-21 11:42:23

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 85: Summary for duke(6) GAM model: for 'Tursiops' guild during 'fall' season in 'gomex2' region.

	Value
Number.presences	160
Number.absences	785
GAM.converged	TRUE
R.squared	0.707445
Deviance.explained	0.301947
ROC.optimum	0.929315
Maximum.fit	0.160285
Maximum.prediction	0.989978

Model text summary...

```
duke_06_tu3_fall_gomex2 run on Tue Oct 21 11:41:49 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'fall', region:gomex2

max.fit:0.929315, max.prediction:0.989978, ROC.optimum:0.160285

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -2.0266      0.1134  -17.88   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  0.9630687 1.4631 92.825   < 2e-16 ***
s(log(d2shelf)) 0.0004748 0.5005  0.001    0.869
s(log(d2coast)) 0.4377039 0.9377  1.623    0.202
s(sst)          0.9605369 1.4605 15.047 7.89e-06 ***
s(lat)          1.8932847 2.3933 11.797 1.68e-06 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.707   Deviance explained = 30.2%
GCV score = 0.005287   Scale est. = 0.0052341   n = 945

summary(dat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:945  Min.   : 445  Min.   : 5.0  Min.   : 272  Min.   : 7624  Min.   :26.55  Min.   :24.99
      1st Qu.:4911  1st Qu.: 34.0  1st Qu.: 16509  1st Qu.: 58082  1st Qu.:28.35  1st Qu.:27.82
      Median :6184  Median : 78.0  Median : 35259  Median : 96847  Median :28.73  Median :28.52
      Mean   :5818  Mean   :271.2  Mean   : 48230  Mean   :104429  Mean   :28.76  Mean   :28.43
      3rd Qu.:7227  3rd Qu.:292.0  3rd Qu.: 69013  3rd Qu.:142239  3rd Qu.:29.17  3rd Qu.:29.18
      Max.   :8350  Max.   :3301.0  Max.   :185683  Max.   :276406  Max.   :30.52  Max.   :30.35

summary(newdat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :24.52  Min.   :23.85
      1st Qu.:1861  1st Qu.:46.0  1st Qu.:31617  1st Qu.: 85289  1st Qu.:26.62  1st Qu.:26.28
      Median :4110  Median :433.5  Median : 71100  Median :157258  Median :27.23  Median :27.29
```


Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:27.10	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:27.60	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:28.80	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:0.001204	Min.	:0.001050	Min.	: 0.0000	Min.	:8.387e-06	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:0.012995	1st Qu.	:0.006438	1st Qu.	: 0.0000	1st Qu.	:2.380e-03	1st Qu.	:0.0000
Median	:4110	Median	:0.080392	Median	:0.023894	Median	: 0.0000	Median	:4.635e-03	Median	:0.0000
Mean	:3997	Mean	:0.300718	Mean	:0.042222	Mean	: 0.1954	Mean	:8.436e-03	Mean	:0.4448
3rd Qu.	:6015	3rd Qu.	:0.628404	3rd Qu.	:0.075889	3rd Qu.	: 0.0000	3rd Qu.	:6.374e-03	3rd Qu.	:1.0000
Max.	:8351	Max.	:0.989978	Max.	:0.222372	Max.	: 2.0000	Max.	:1.241e-01	Max.	:1.0000
						NA's	:5843.0000	NA's	:5.843e+03		

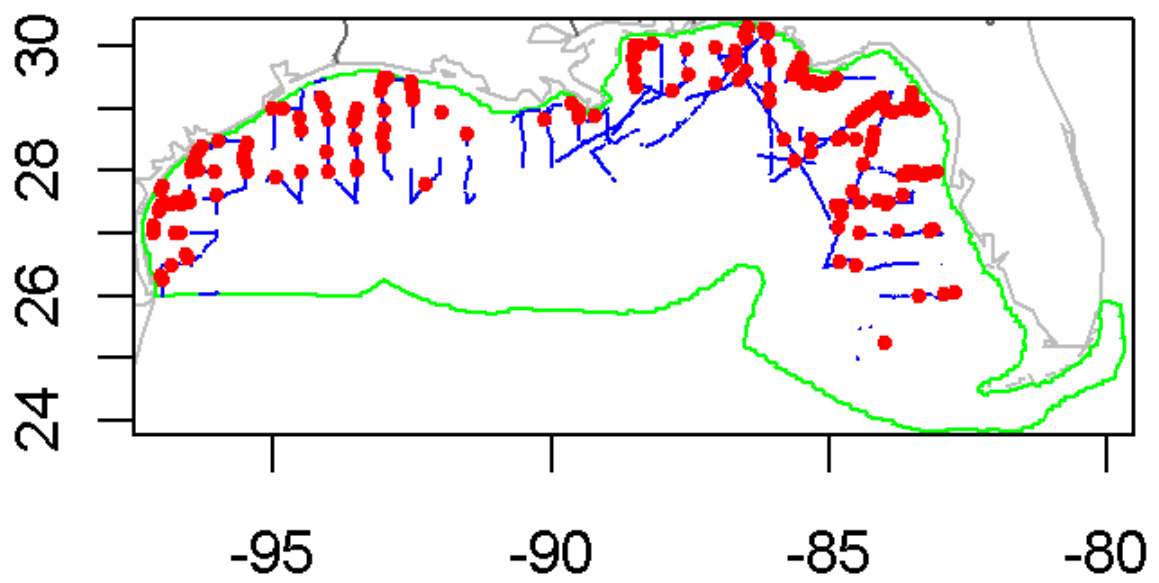


Figure 925: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'fall' season in 'gomex2' region.

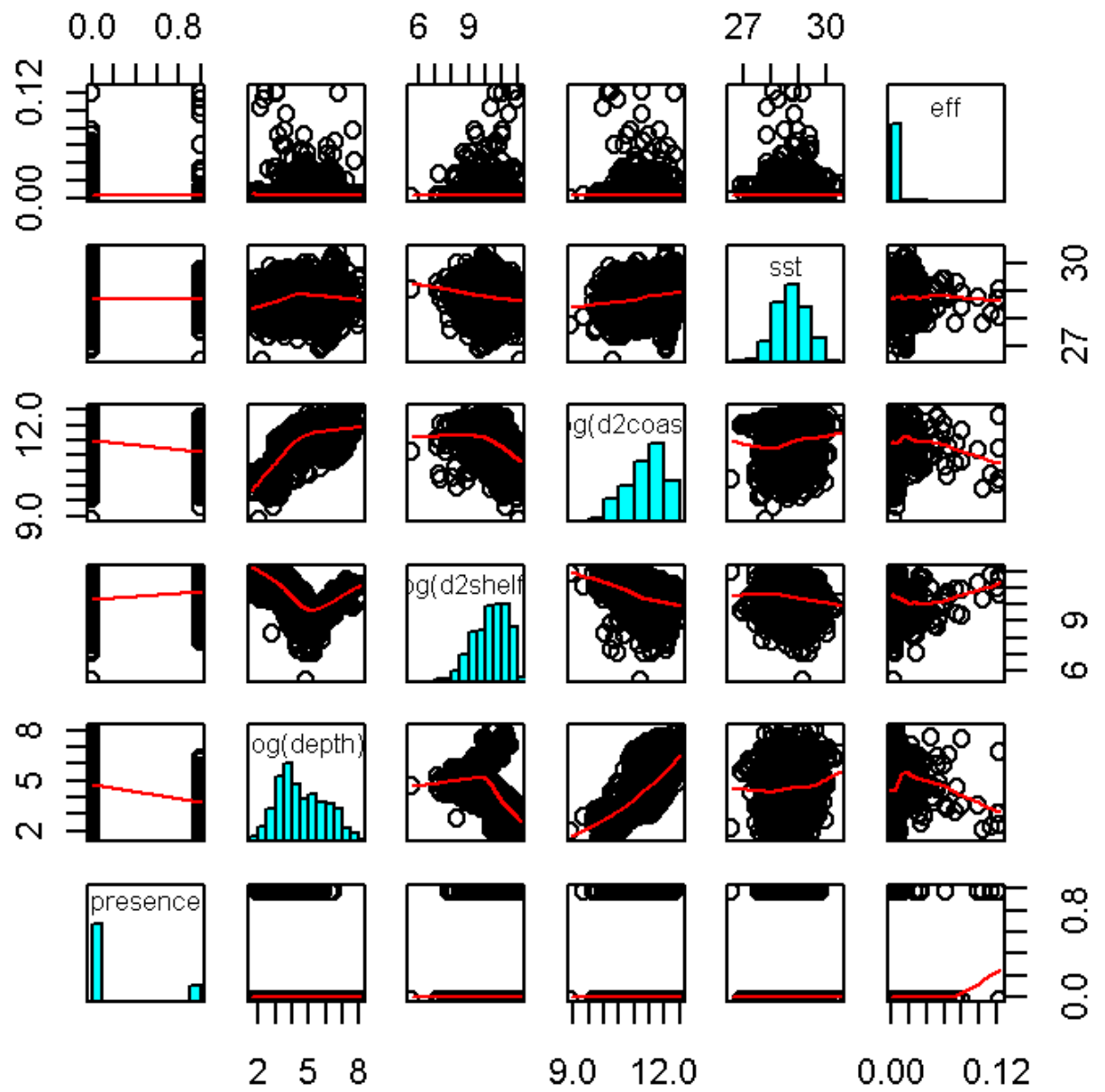


Figure 926: Pairs plot of input variables for 'Tursiops' guild during 'fall' season in 'gomex2' region.

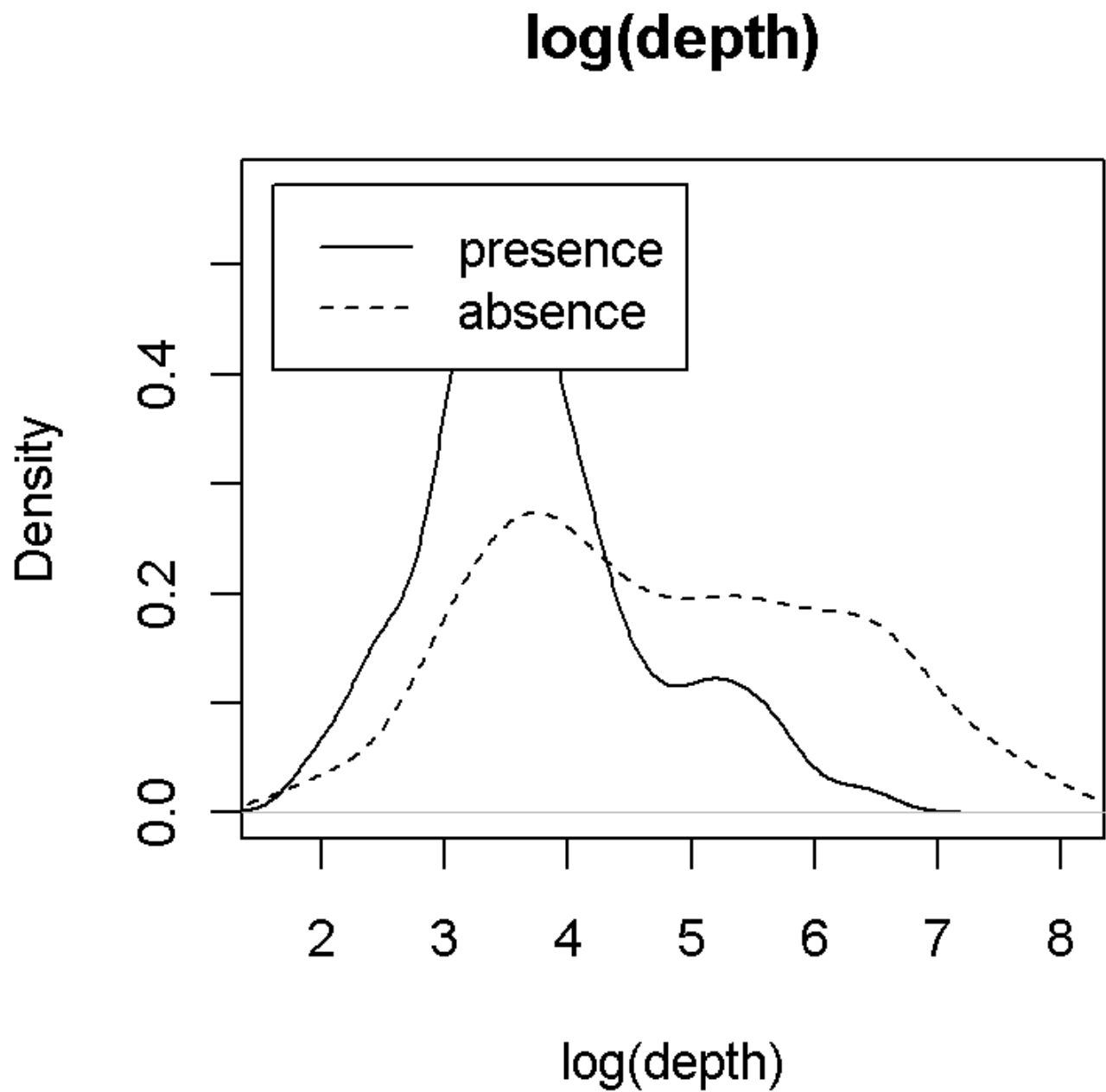


Figure 927: Density histogram of depth $\log(\text{meters})$ for 'Tursiops' guild during 'fall' season in 'gomex2' region.

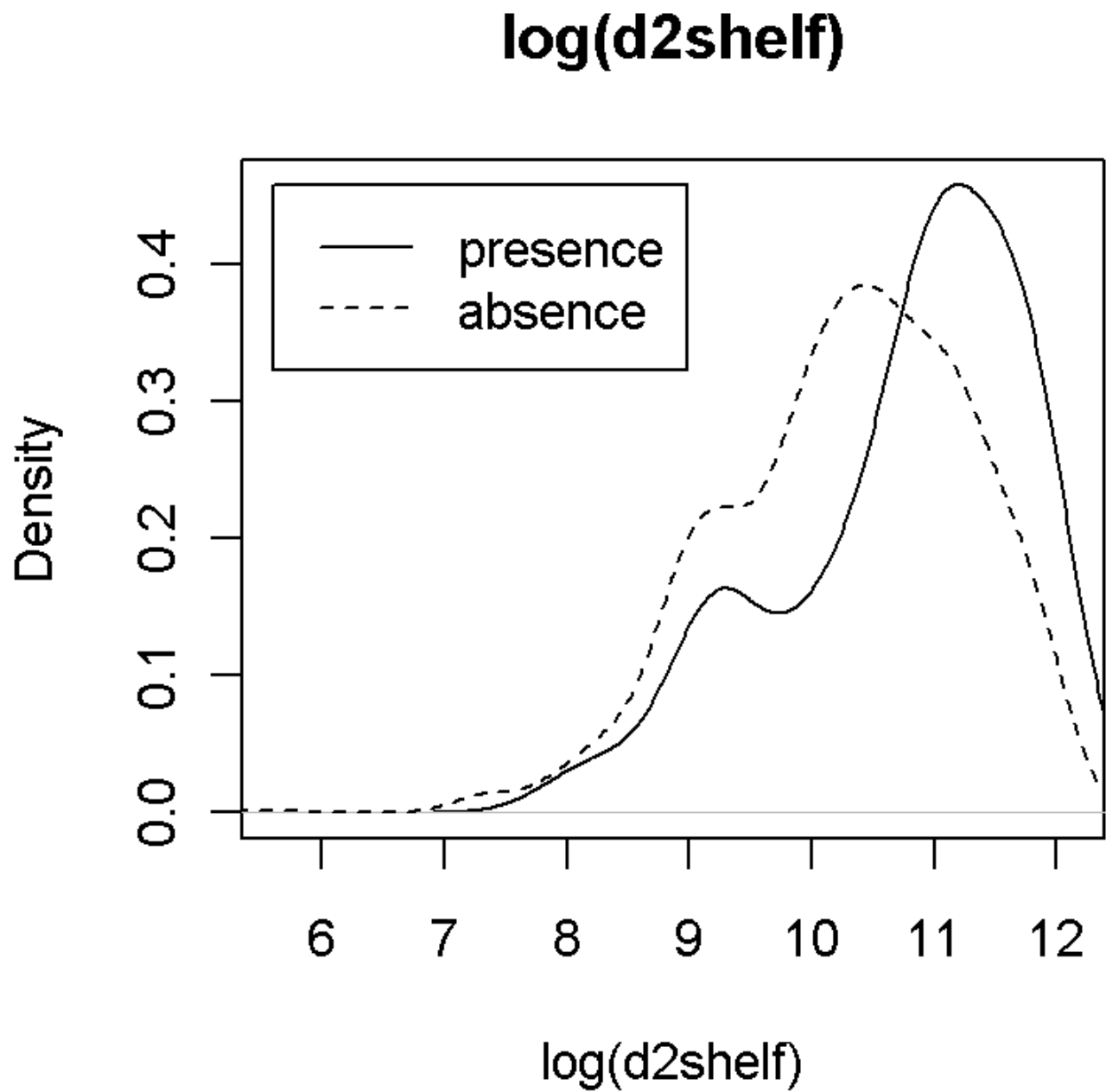


Figure 928: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'fall' season in 'gomex2' region.

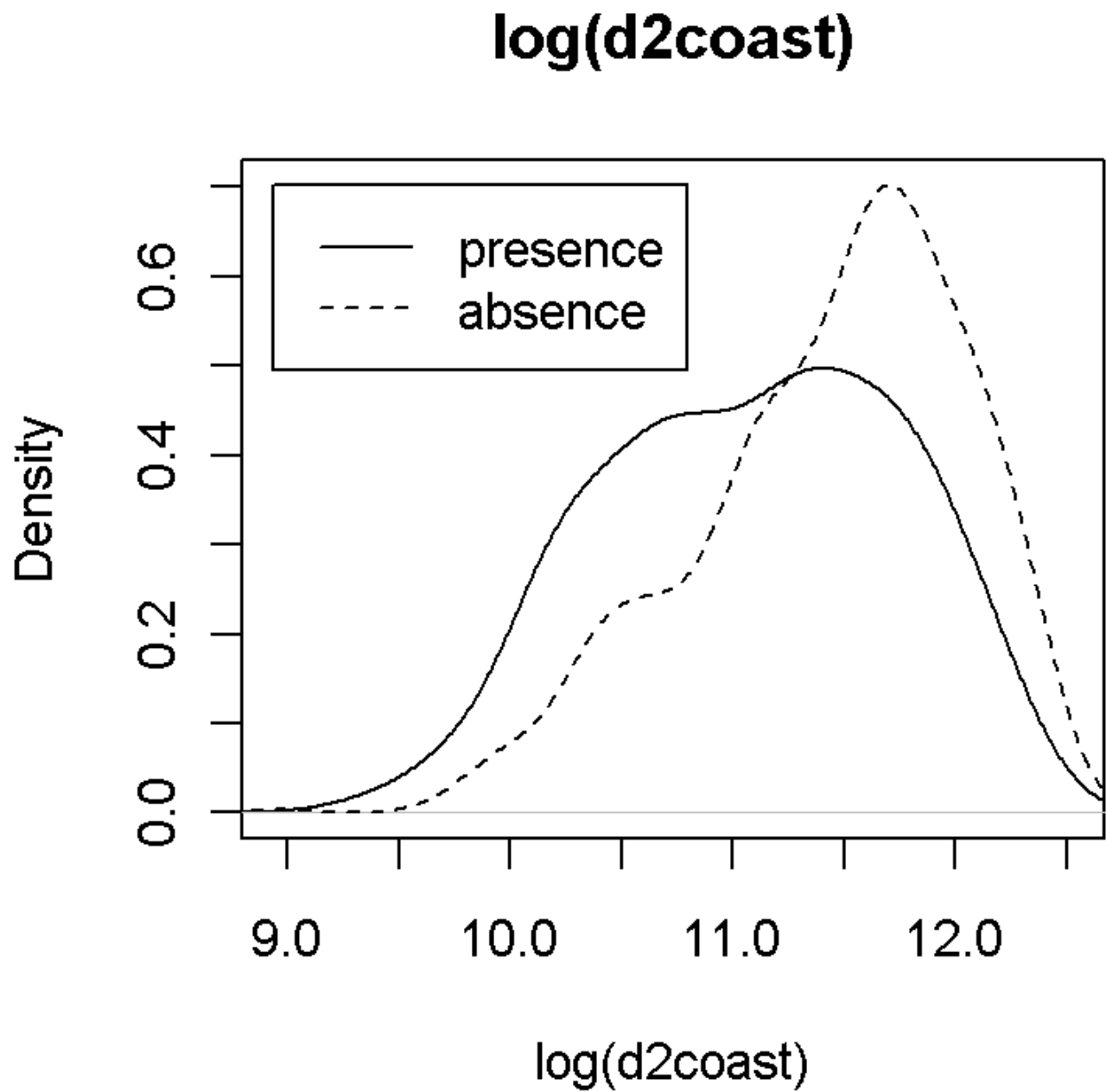


Figure 929: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'fall' season in 'gomex2' region.

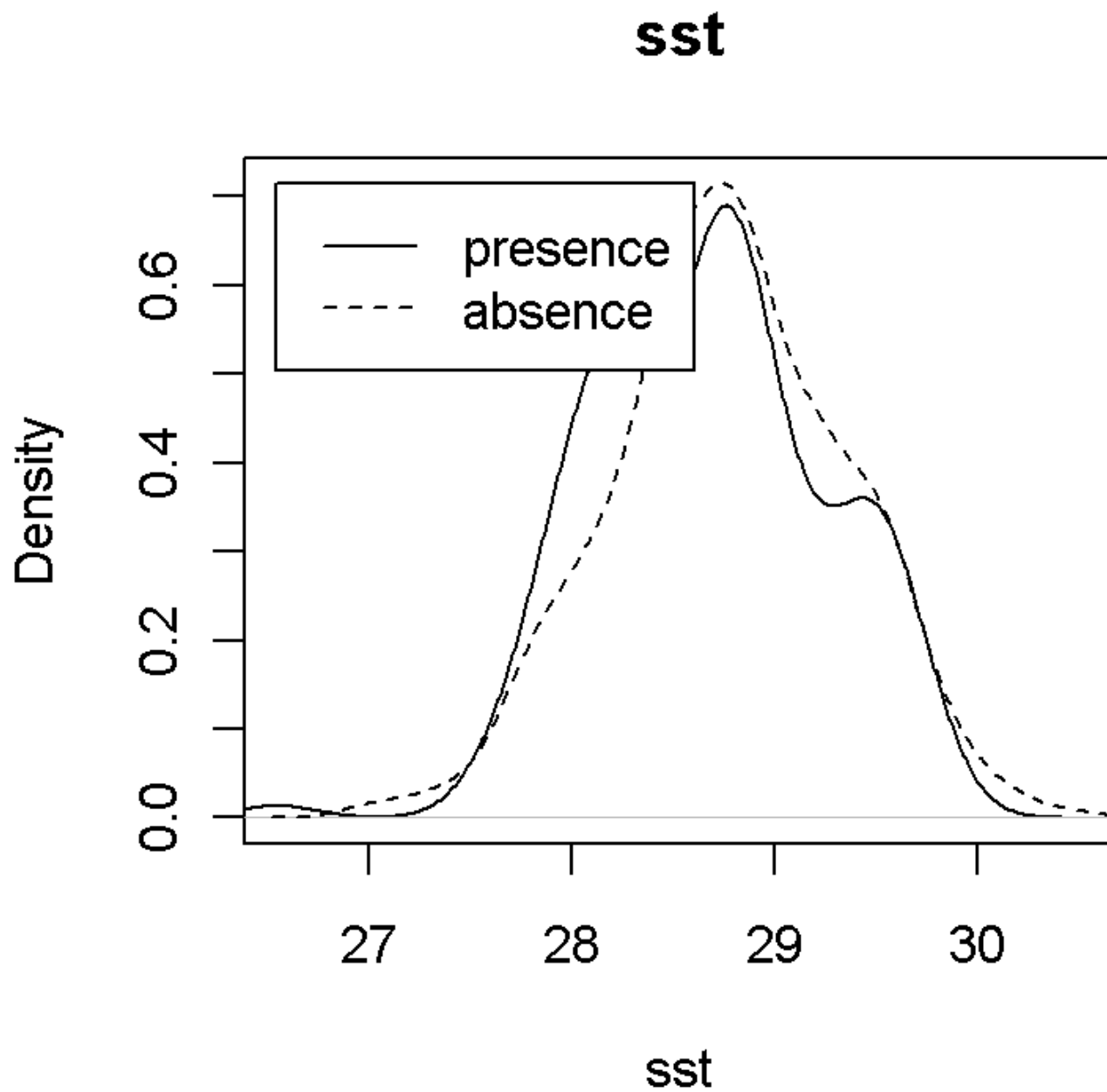


Figure 930: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'fall' season in 'gomex2' region.

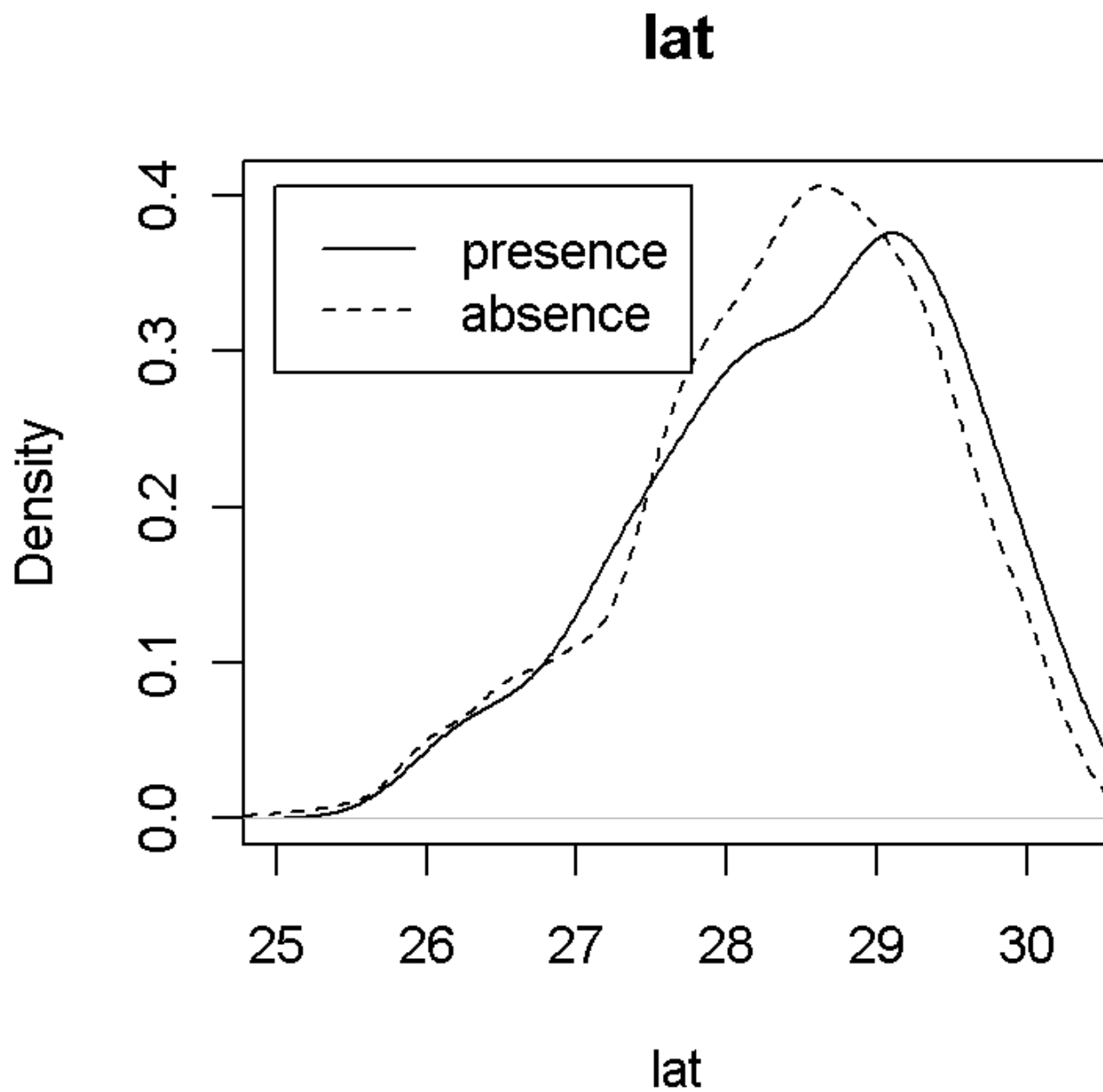


Figure 931: Density histogram of latitude (degrees) for 'Tursiops' guild during 'fall' season in 'gomex2' region.

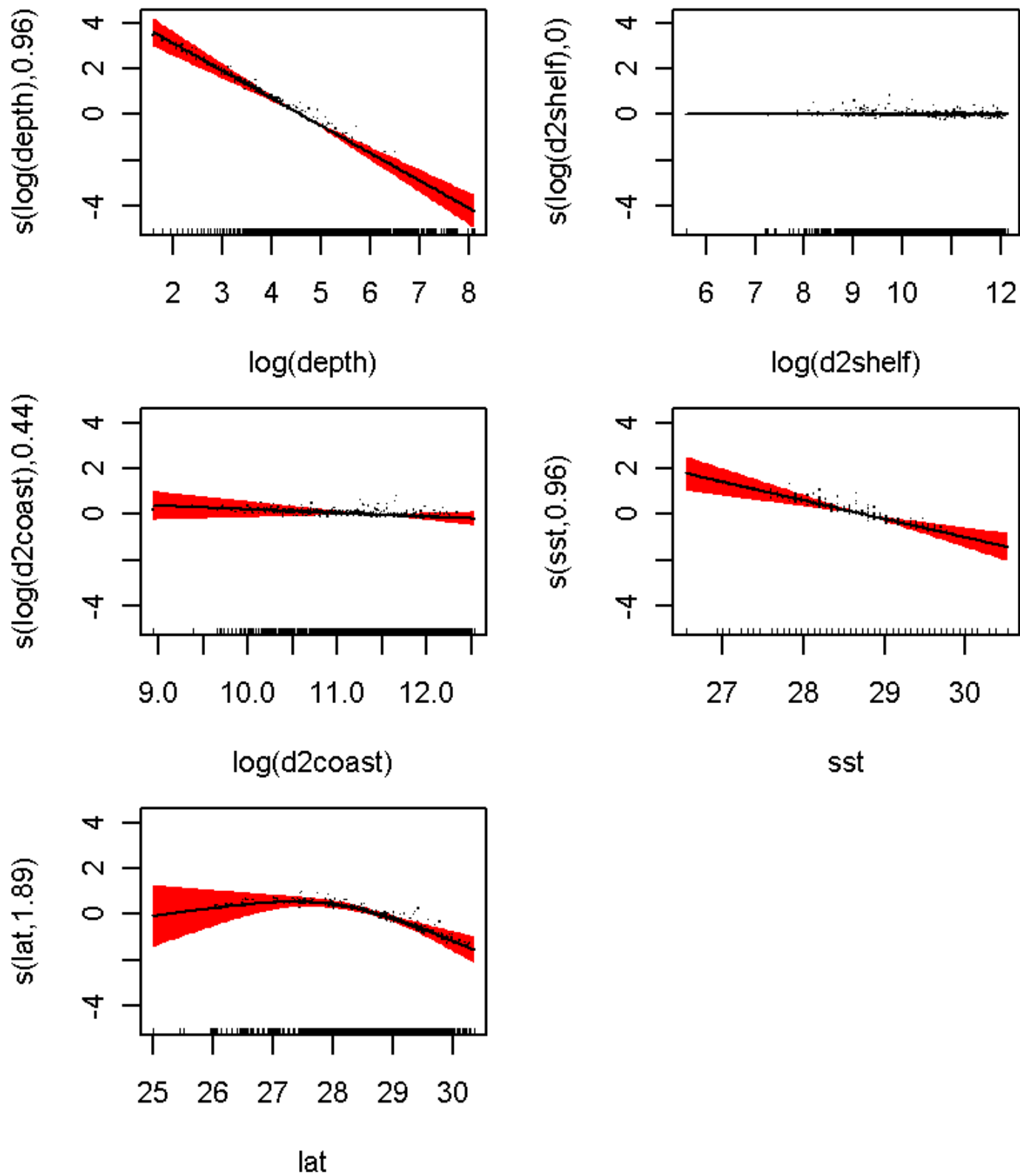


Figure 932: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'fall' season in 'gomex2' region.

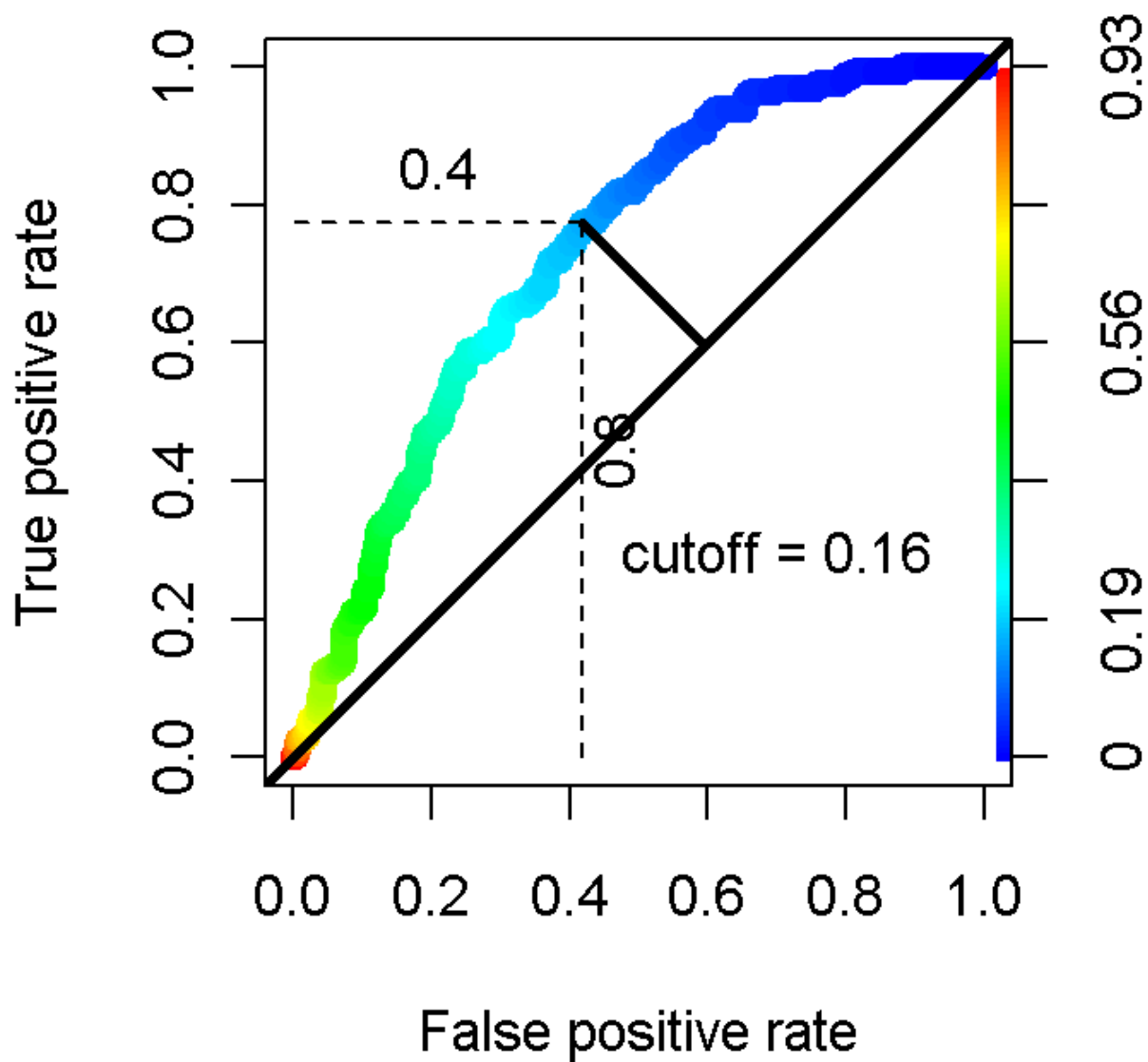


Figure 933: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'fall' season in 'gomex2' region.

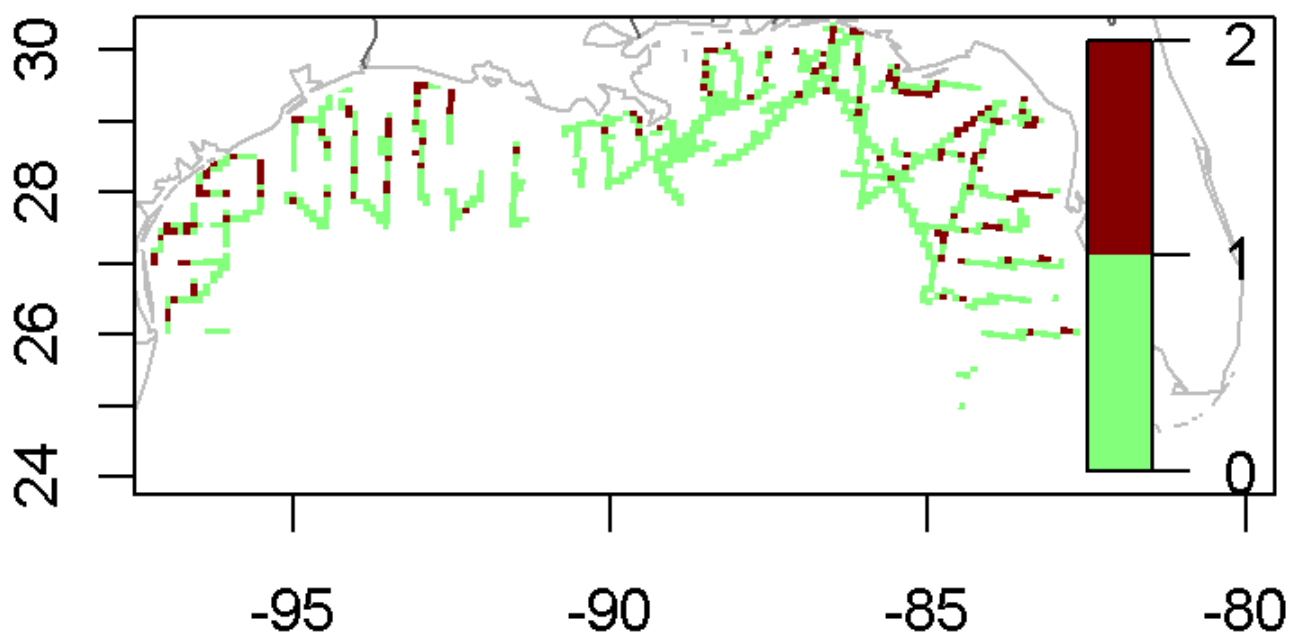


Figure 934: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'fall' season in 'gomex2' region.

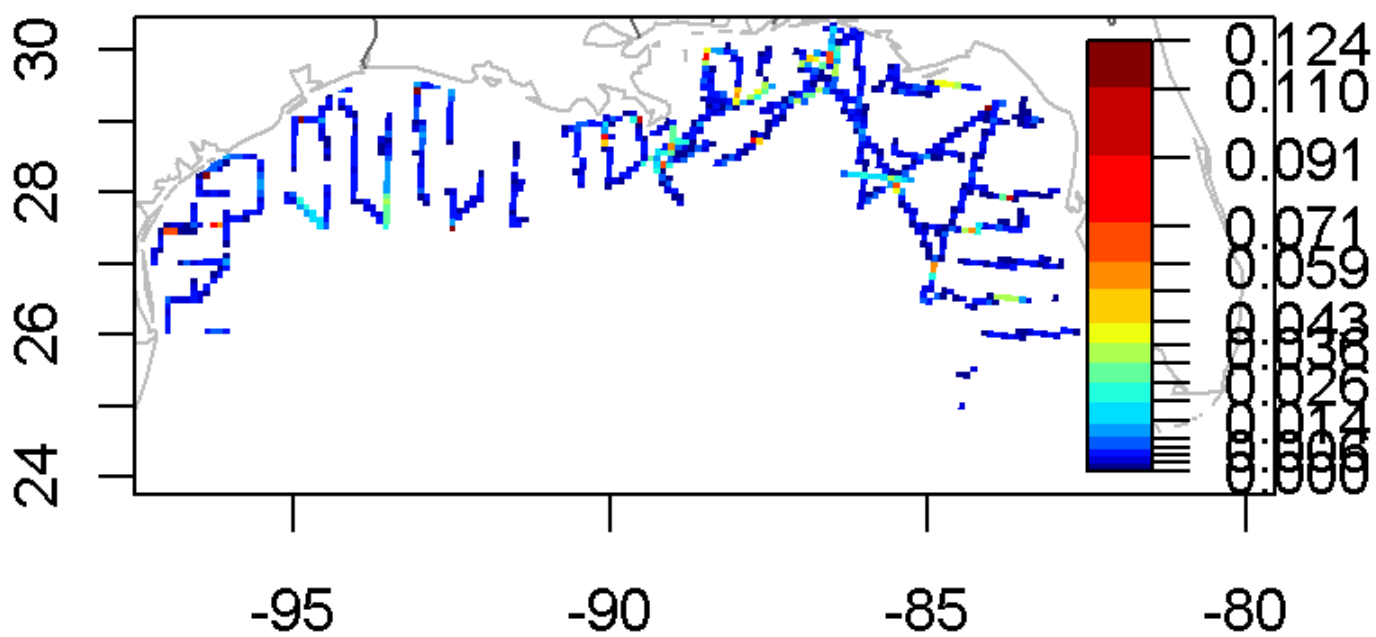


Figure 935: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'fall' season in 'gomex2' region.

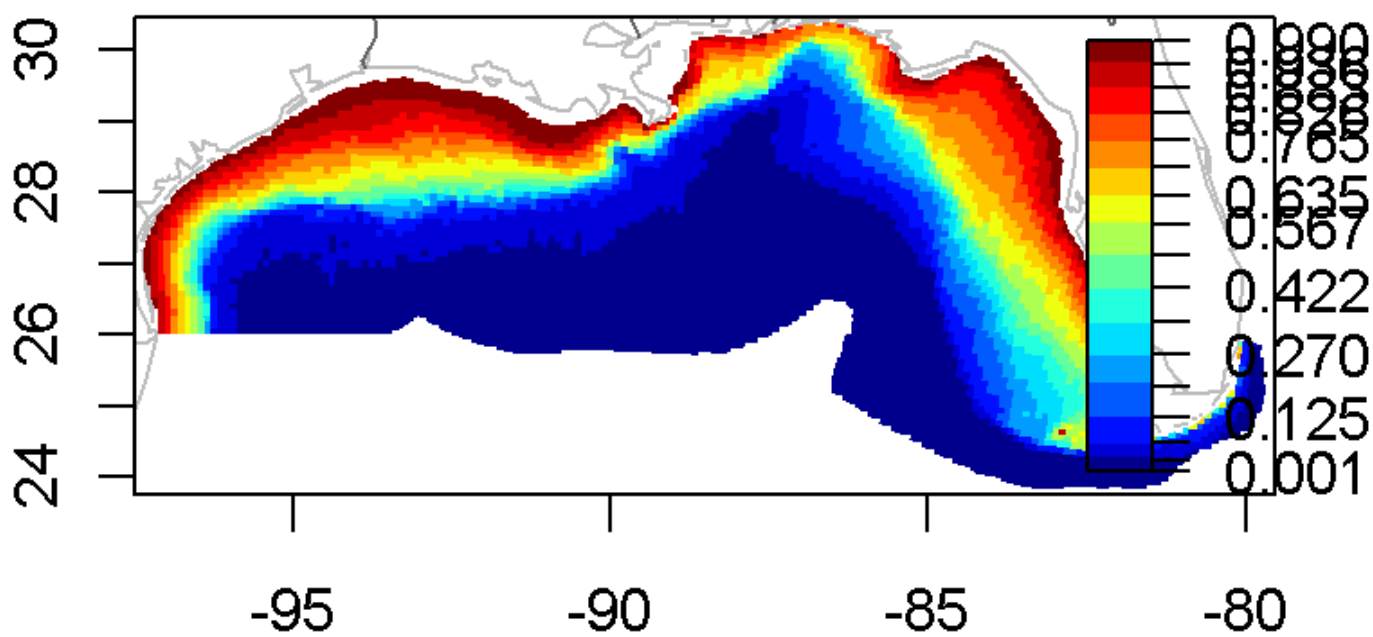


Figure 936: Map of mean predicted habitat for 'Tursiops' guild during 'fall' season in 'gomex2' region.

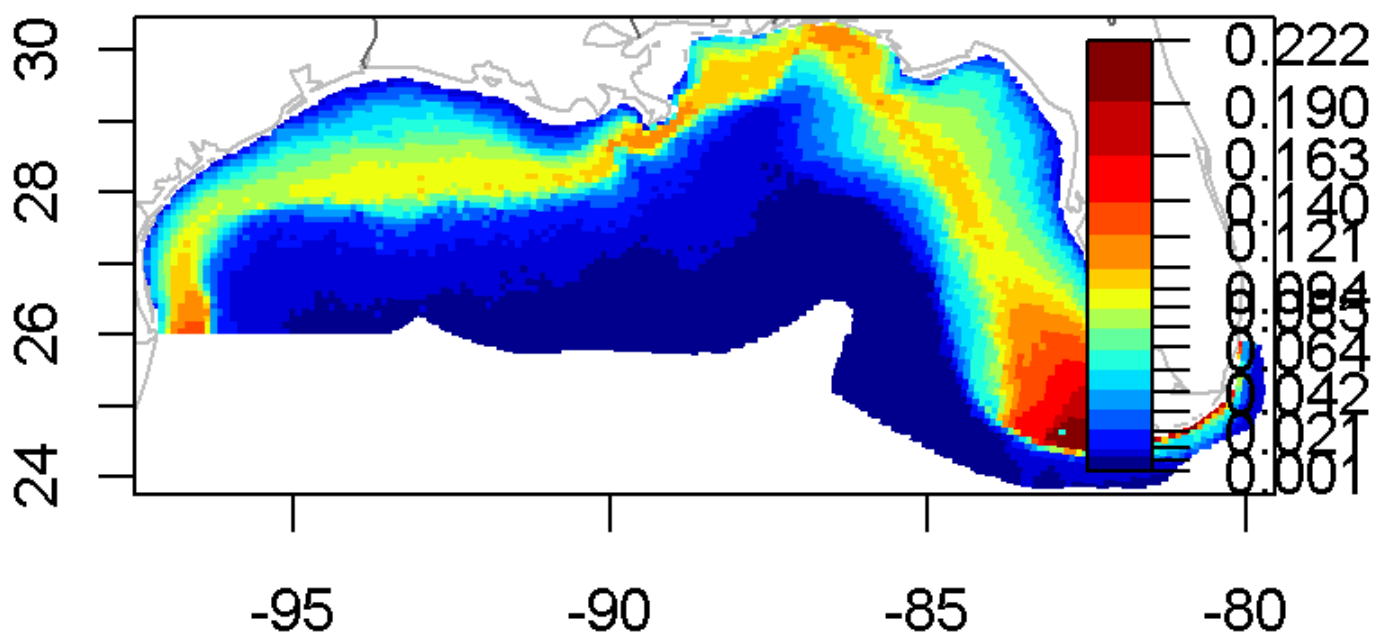


Figure 937: Map of standard error of habitat for 'Tursiops' guild during 'fall' season in 'gomex2' region.

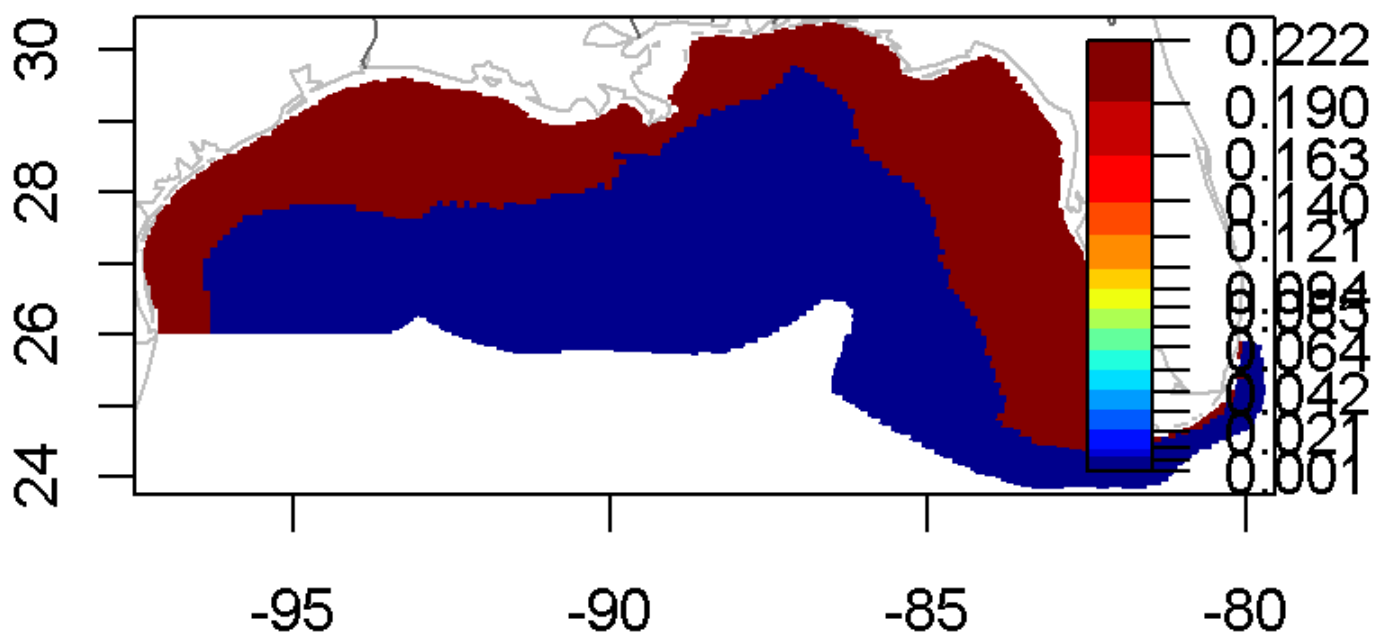


Figure 938: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'fall' season in 'gomex2' region.

18.1.3 ne2

Modelrun identifier: duke_06_tu3_fall_ne2

Date generated: 2008-10-21 15:37:24

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 86: Summary for duke(6) GAM model: for 'Tursiops' guild during 'fall' season in 'ne2' region.

	Value
Number.presences	41
Number.absences	1143
GAM.converged	TRUE
R.squared	0.329845
Deviance.explained	0.21473
ROC.optimum	0.35694
Maximum.fit	0.0937174
Maximum.prediction	0.359095

Model text summary...

```
duke_06_tu3_fall_ne2 run on Tue Oct 21 15:36:48 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'fall', region:ne2

max.fit:0.356940, max.prediction:0.359095, ROC.optimum:0.093717

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -4.2077      0.1883  -22.34   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  7.471e-01  1.247   8.264  0.00210 **
s(log(d2shelf)) 3.908e-06  0.500  3.08e-05  0.94188
s(log(d2coast)) 8.700e-01  1.370  21.801  1.26e-07 ***
s(sst)         9.694e-01  1.469  24.166  9.47e-09 ***
s(lat)         9.239e-01  1.424  14.875  1.08e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.33  Deviance explained = 21.5%
GCV score = 0.0012847  Scale est. = 0.0012756  n = 1151

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:1184  Min.       : 1654  Min.       : 6.0  Min.       : 10  Min.       : 2399  Min.       :10.27  Min.       :34.98
          1st Qu.:12167  1st Qu.: 31.0  1st Qu.: 17665  1st Qu.: 36814  1st Qu.:13.27  1st Qu.:37.32
          Median :12756  Median : 77.5  Median : 45345  Median : 61405  Median :16.58  Median :38.40
          Mean   :13153  Mean   : 333.7  Mean   : 59546  Mean   : 82303  Mean   :17.22  Mean   :39.77
          3rd Qu.:15995  3rd Qu.:184.0  3rd Qu.: 91400  3rd Qu.:104540  3rd Qu.:21.32  3rd Qu.:42.93
          Max.   :16558  Max.   :4580.0  Max.   :207447  Max.   :431156  Max.   :27.38  Max.   :44.66
                   NA's      : 1  NA's      : 1  NA's      :32.00

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685  Min.       : 1633  Min.       : 6  Min.       : 5  Min.       : 1259  Min.       :10.50  Min.       :34.27
          1st Qu.:12297  1st Qu.: 84  1st Qu.: 33503  1st Qu.: 94835  1st Qu.:15.38  1st Qu.:37.36
          Median :13718  Median :1827  Median : 78620  Median :188836  Median :19.95  Median :39.16
          Mean   :13277  Mean   :1832  Mean   :102648  Mean   :201021  Mean   :19.13  Mean   :39.20
```


3rd Qu.:15139	3rd Qu.:3517	3rd Qu.:154146	3rd Qu.:299808	3rd Qu.:22.50	3rd Qu.:40.92
Max. :16560	Max. :4752	Max. :354376	Max. :478082	Max. :26.70	Max. :44.74
		NA's : 2	NA's : 2		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :0.0009024	Min. :0.0003449	Min. :0.000e+00	Min. :1.290e-06	Min. :0.00000
1st Qu.:12297	1st Qu.:0.0030939	1st Qu.:0.0010234	1st Qu.:0.000e+00	1st Qu.:5.190e-04	1st Qu.:0.00000
Median :13718	Median :0.0060737	Median :0.0016976	Median :0.000e+00	Median :2.266e-03	Median :0.00000
Mean :13277	Mean :0.0154416	Mean :0.0033245	Mean :4.707e-02	Mean :5.489e-03	Mean :0.02938
3rd Qu.:15139	3rd Qu.:0.0146954	3rd Qu.:0.0037930	3rd Qu.:0.000e+00	3rd Qu.:6.029e-03	3rd Qu.:0.00000
Max. :16560	Max. :0.3590950	Max. :0.0931376	Max. :2.000e+00	Max. :1.265e-01	Max. :1.00000
	NA's :2.0000000	NA's :2.0000000	NA's :4.814e+03	NA's :4.814e+03	

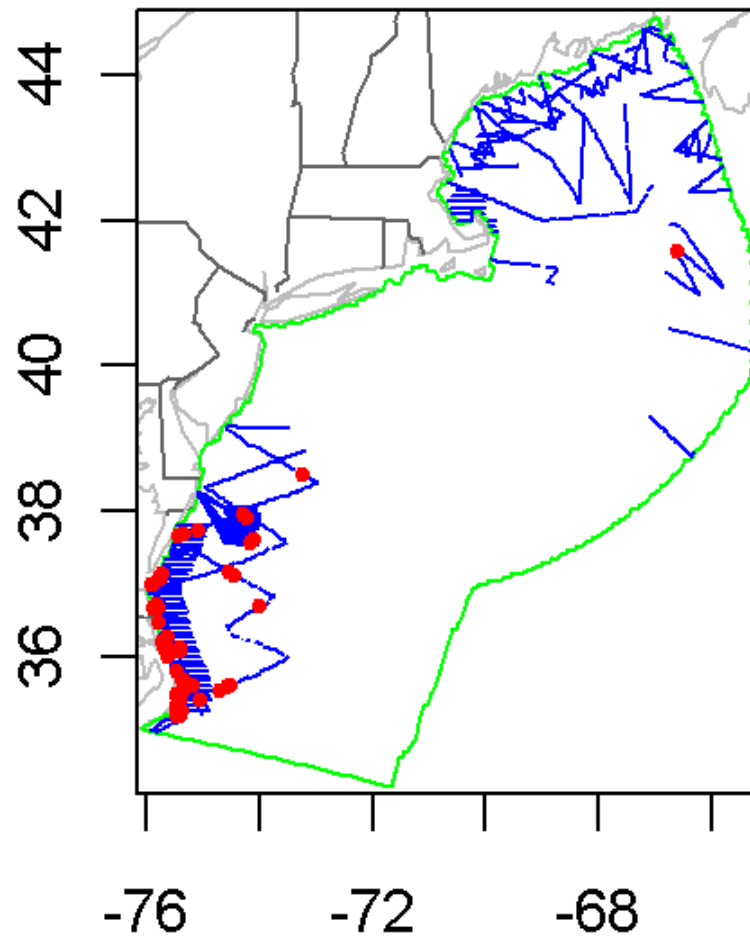


Figure 939: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'fall' season in 'ne2' region.

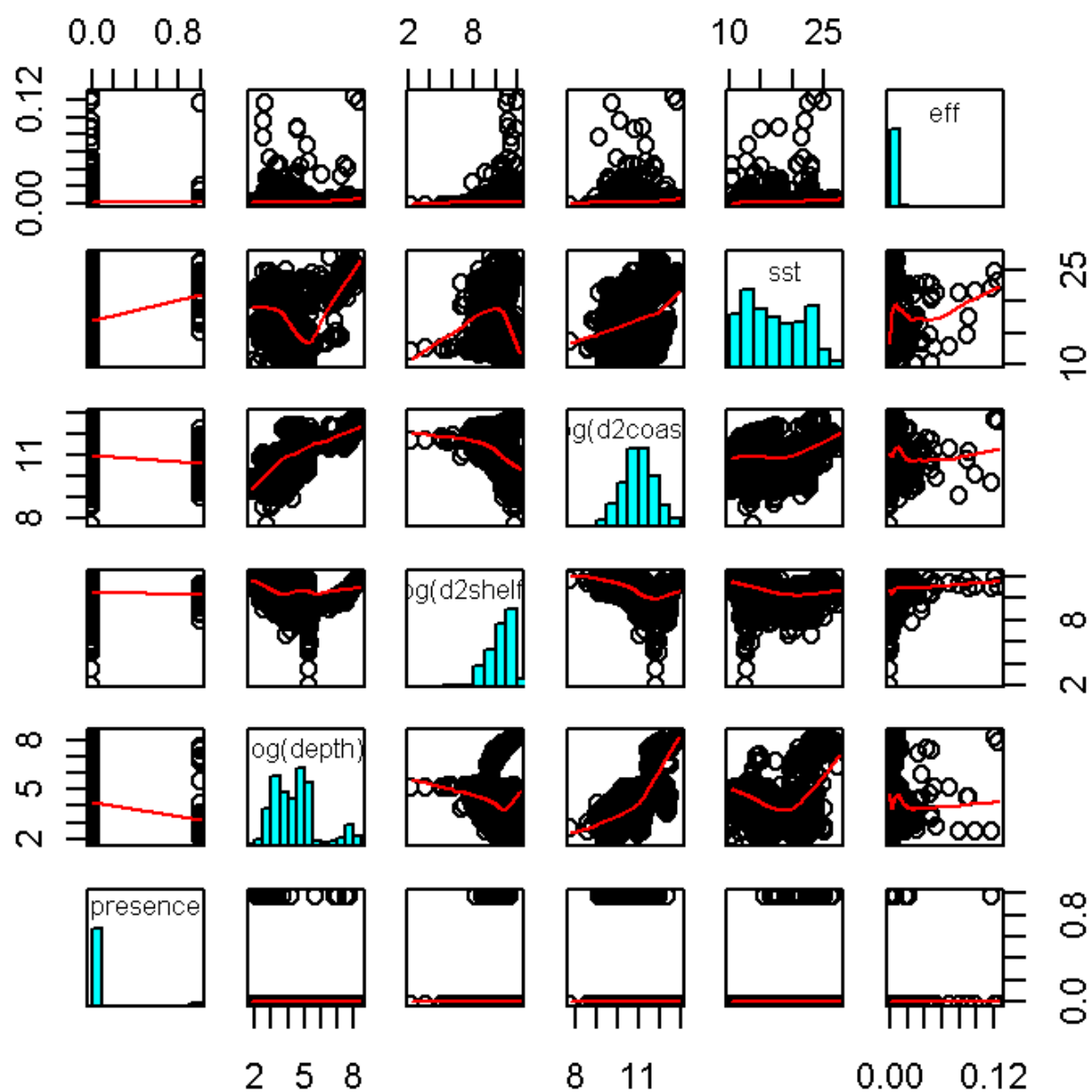


Figure 940: Pairs plot of input variables for 'Tursiops' guild during 'fall' season in 'ne2' region.

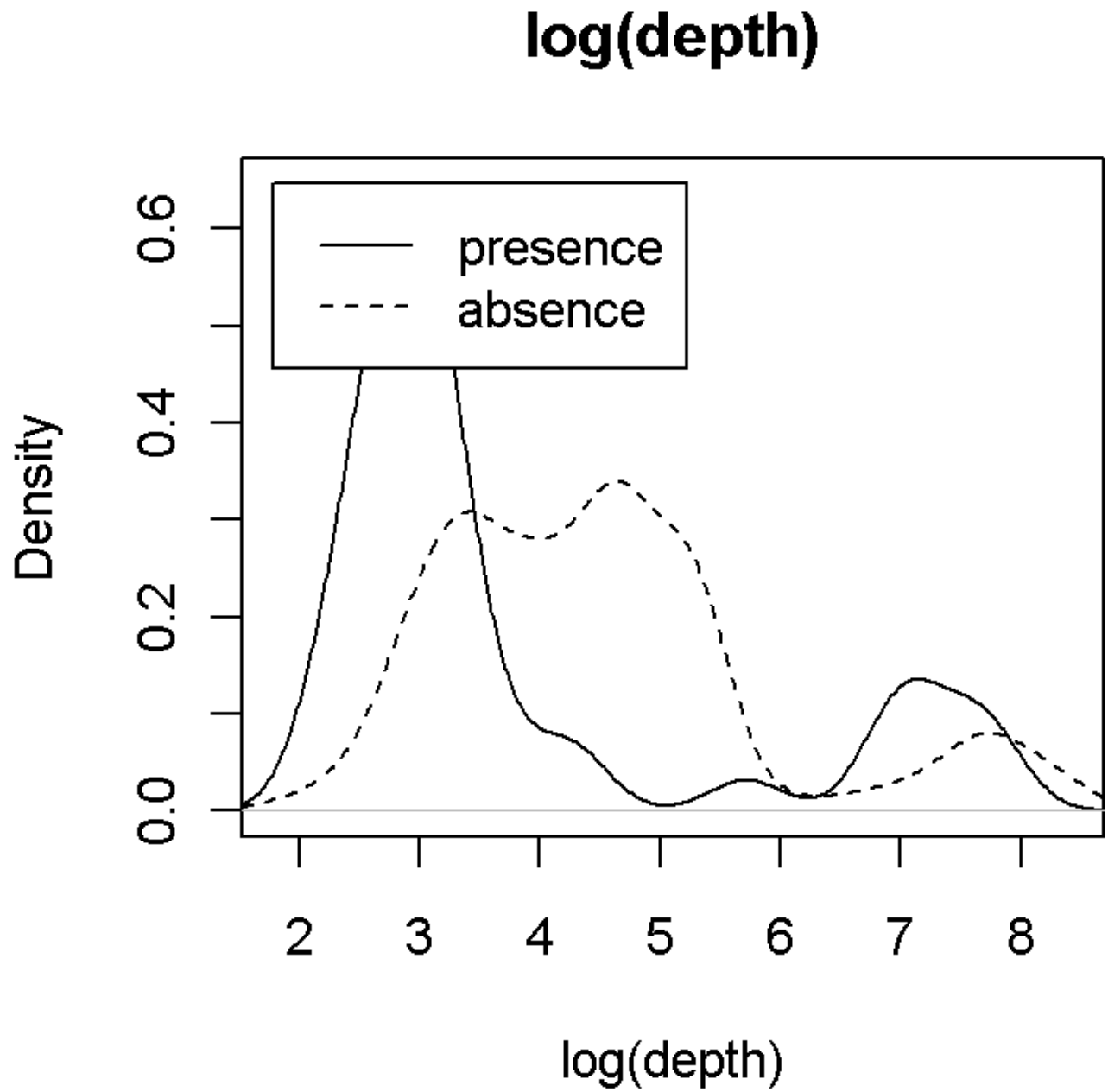


Figure 941: Density histogram of depth log(meters) for 'Tursiops' guild during 'fall' season in 'ne2' region.

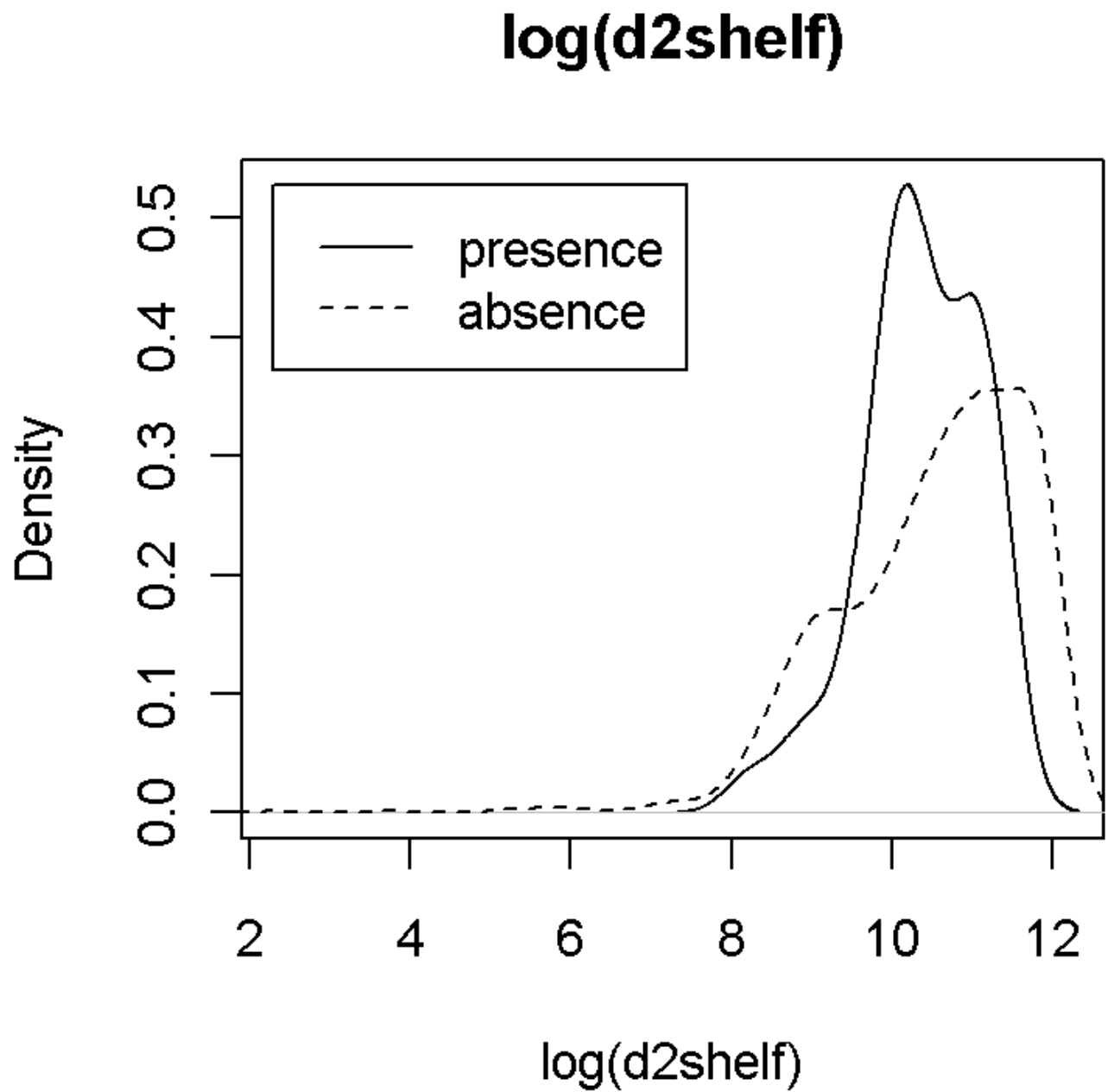


Figure 942: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'fall' season in 'ne2' region.

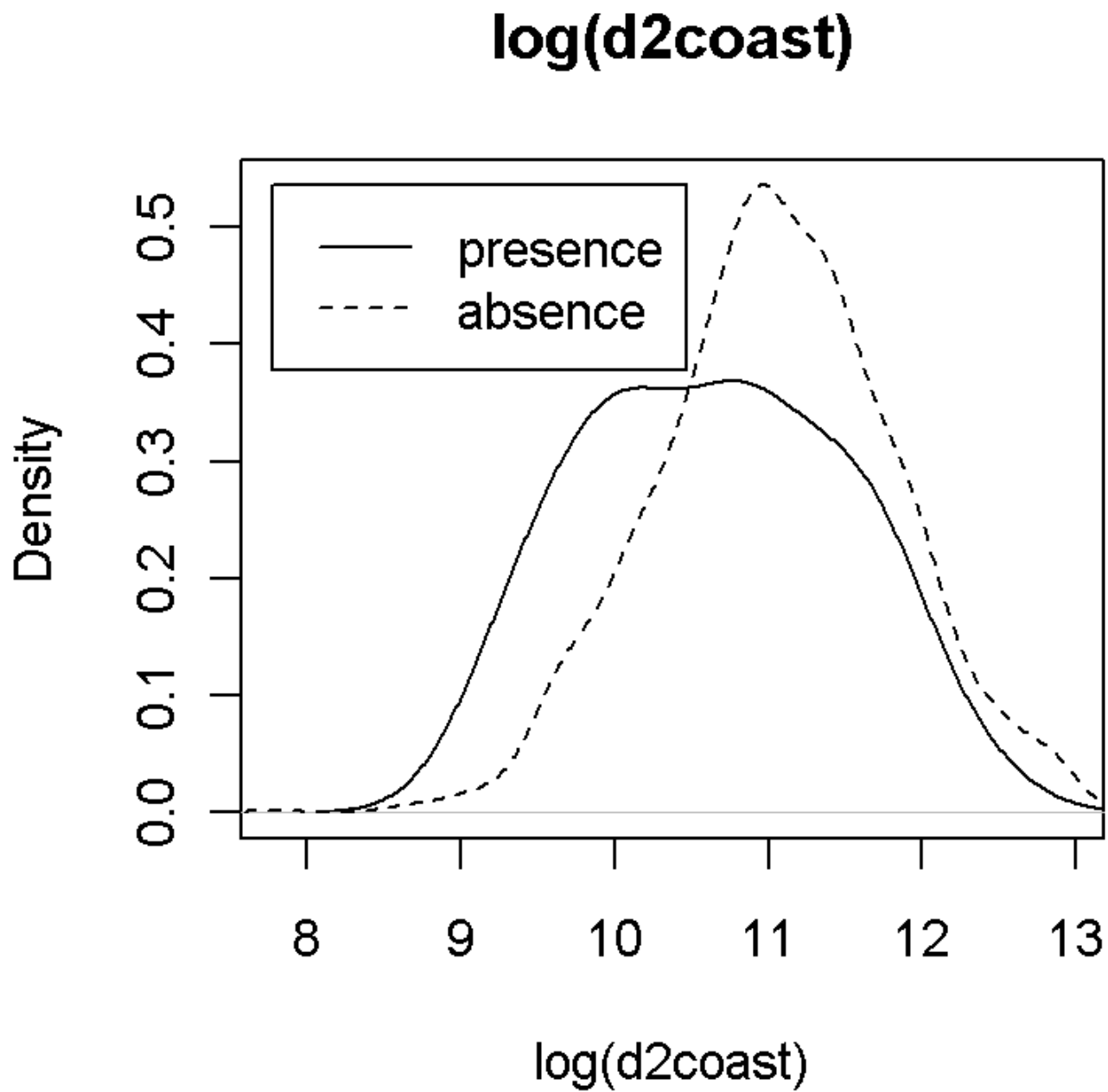


Figure 943: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'fall' season in 'ne2' region.

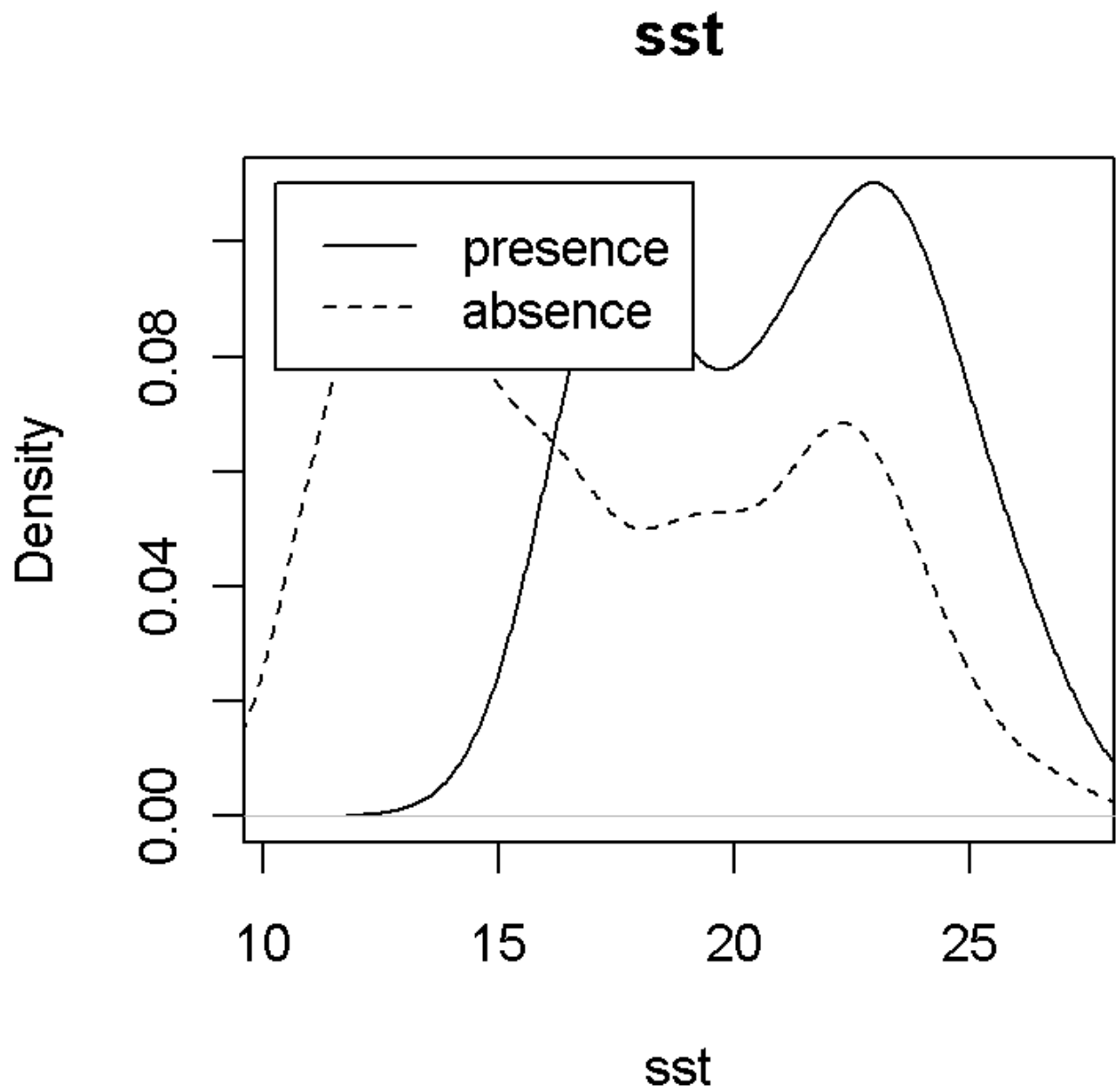


Figure 944: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'fall' season in 'ne2' region.

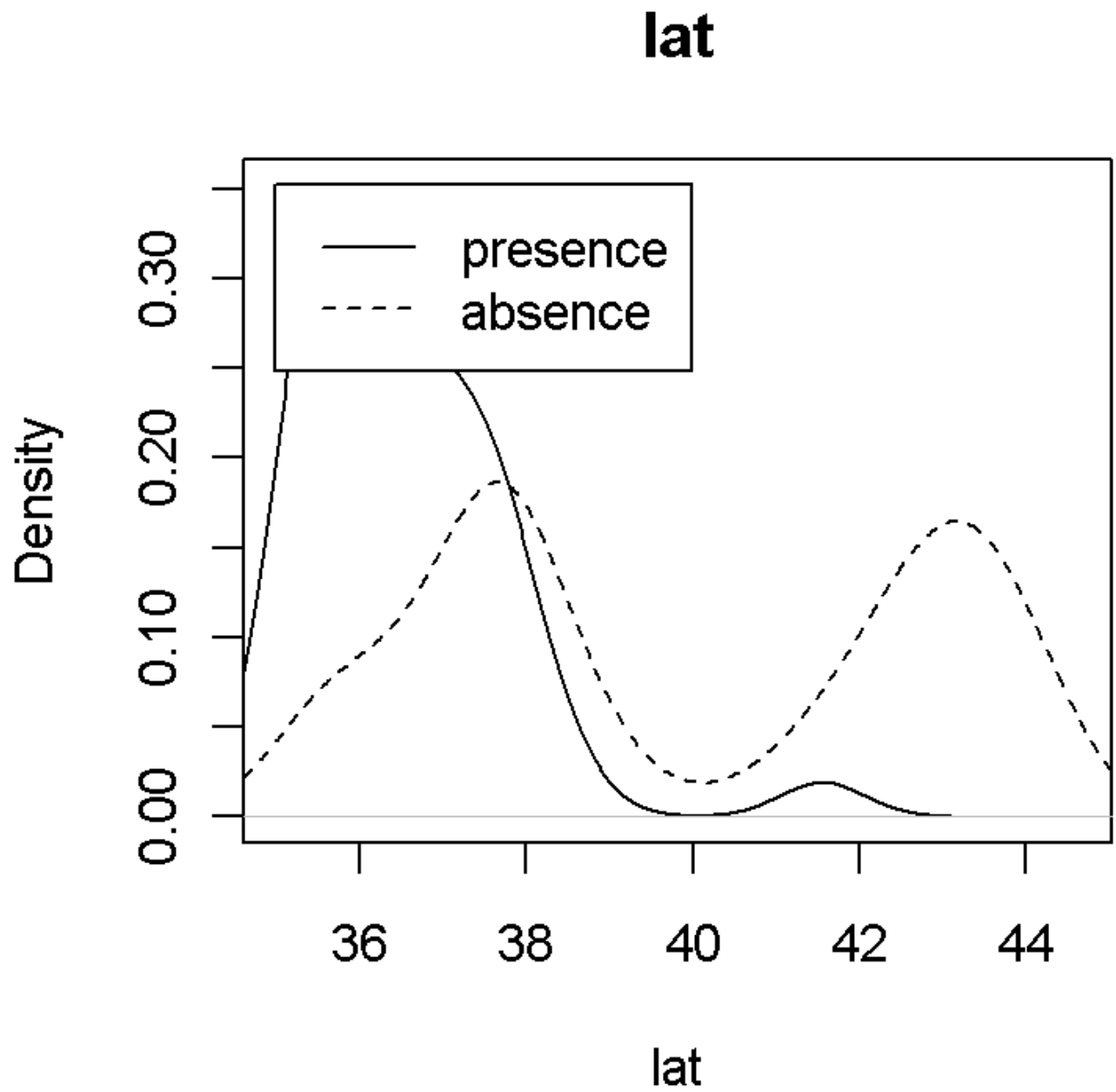


Figure 945: Density histogram of latitude (degrees) for 'Tursiops' guild during 'fall' season in 'ne2' region.

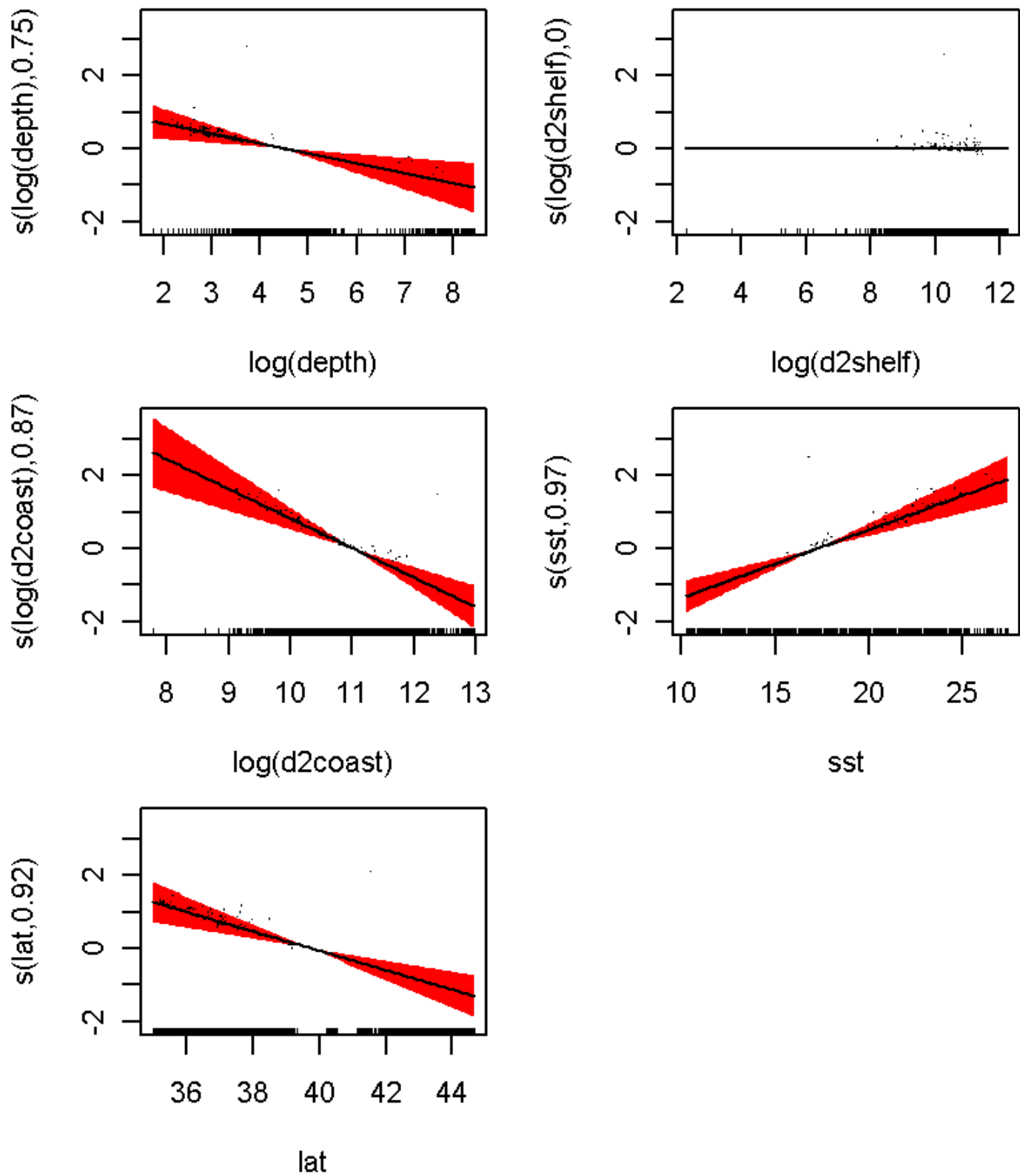


Figure 946: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'fall' season in 'ne2' region.

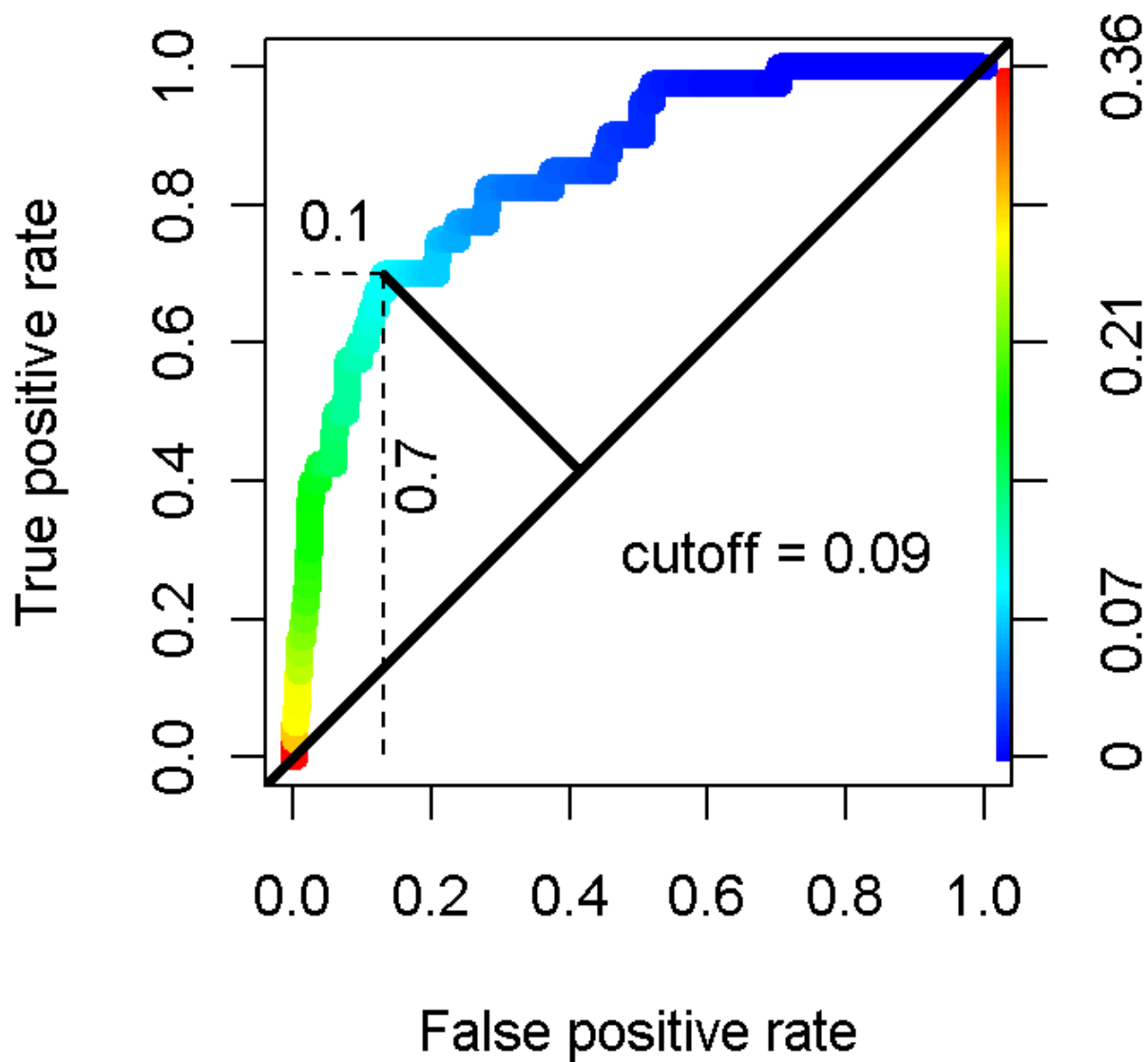


Figure 947: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'fall' season in 'ne2' region.

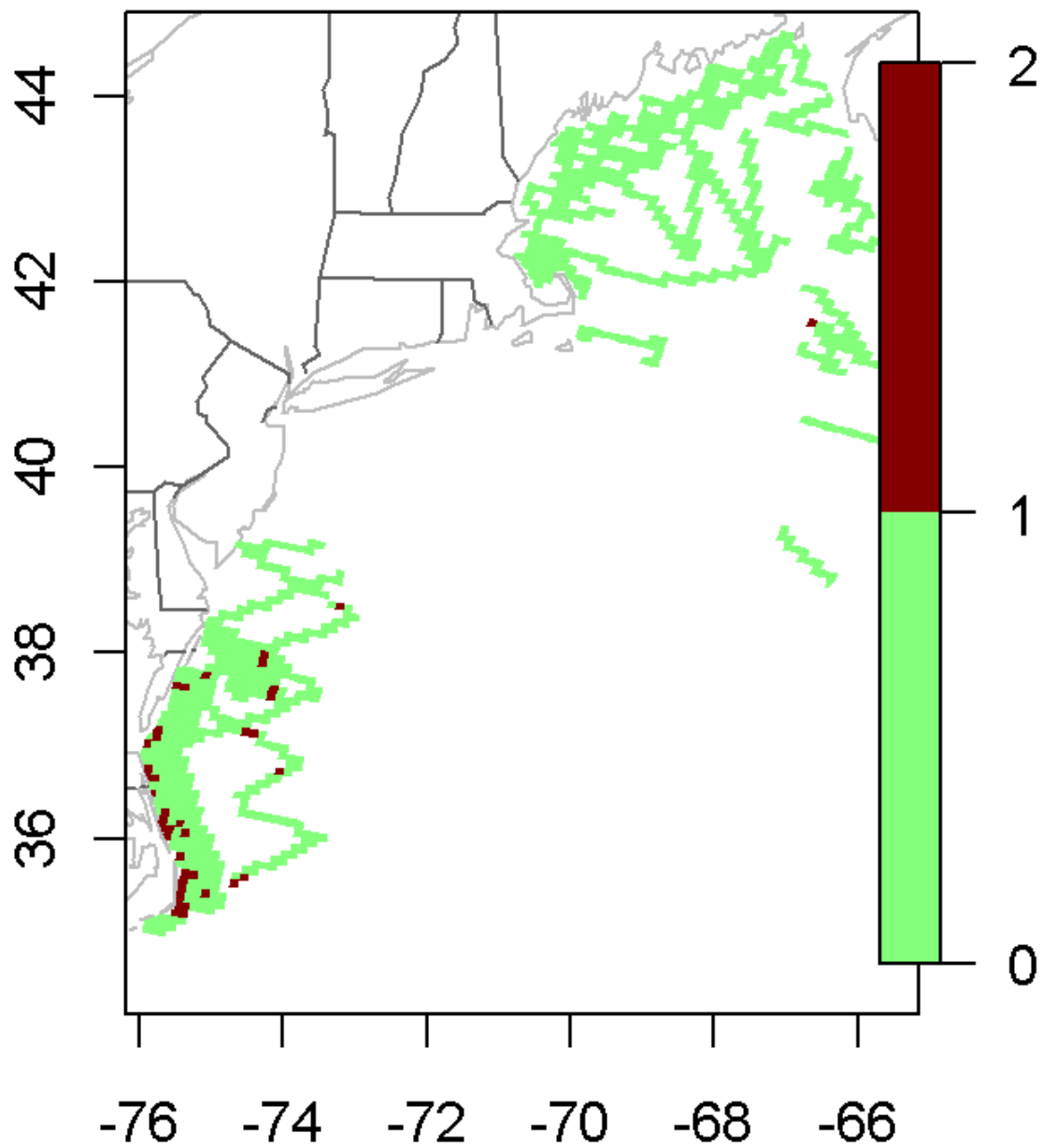


Figure 948: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'fall' season in 'ne2' region.

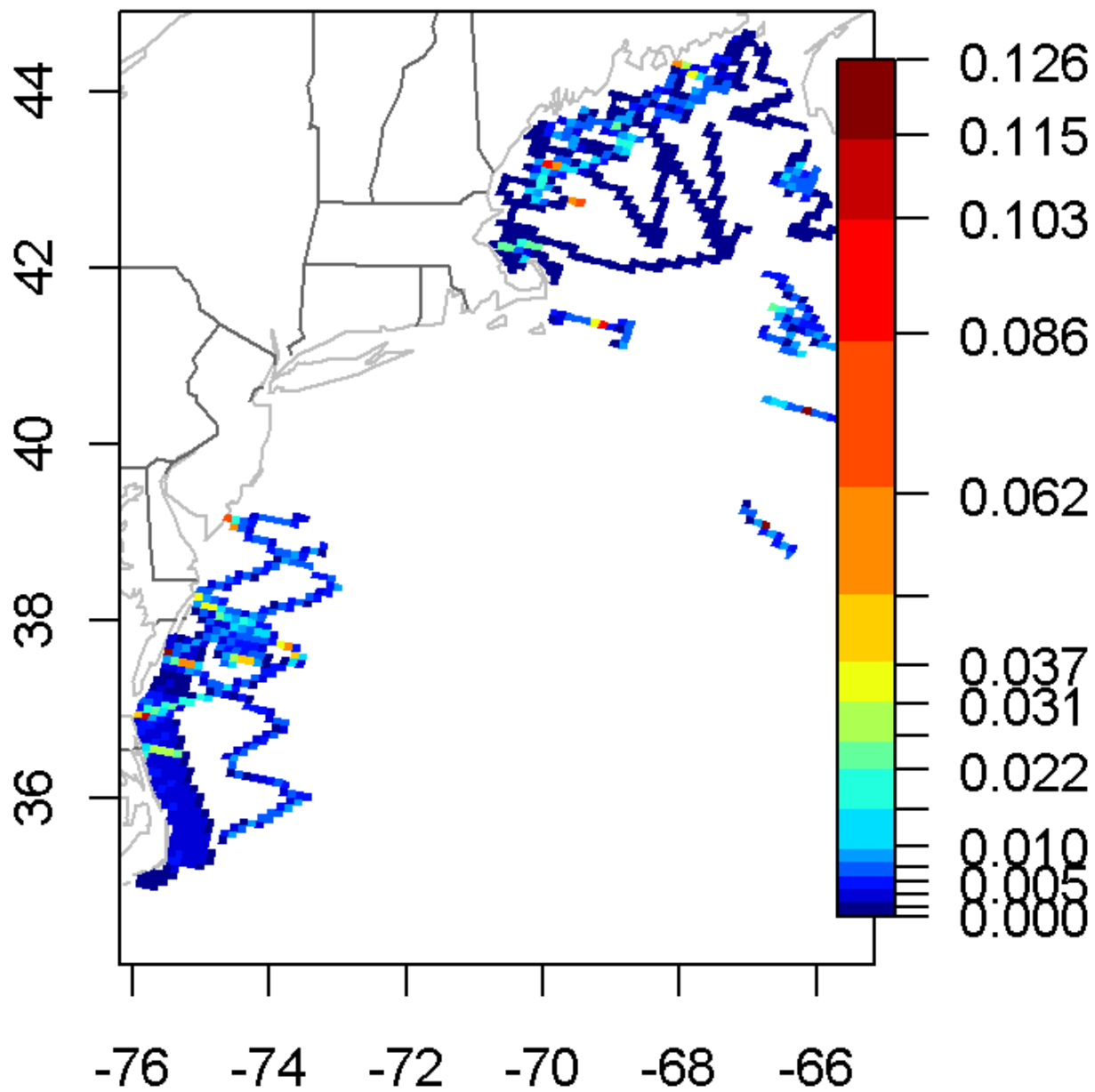


Figure 949: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'fall' season in 'ne2' region.

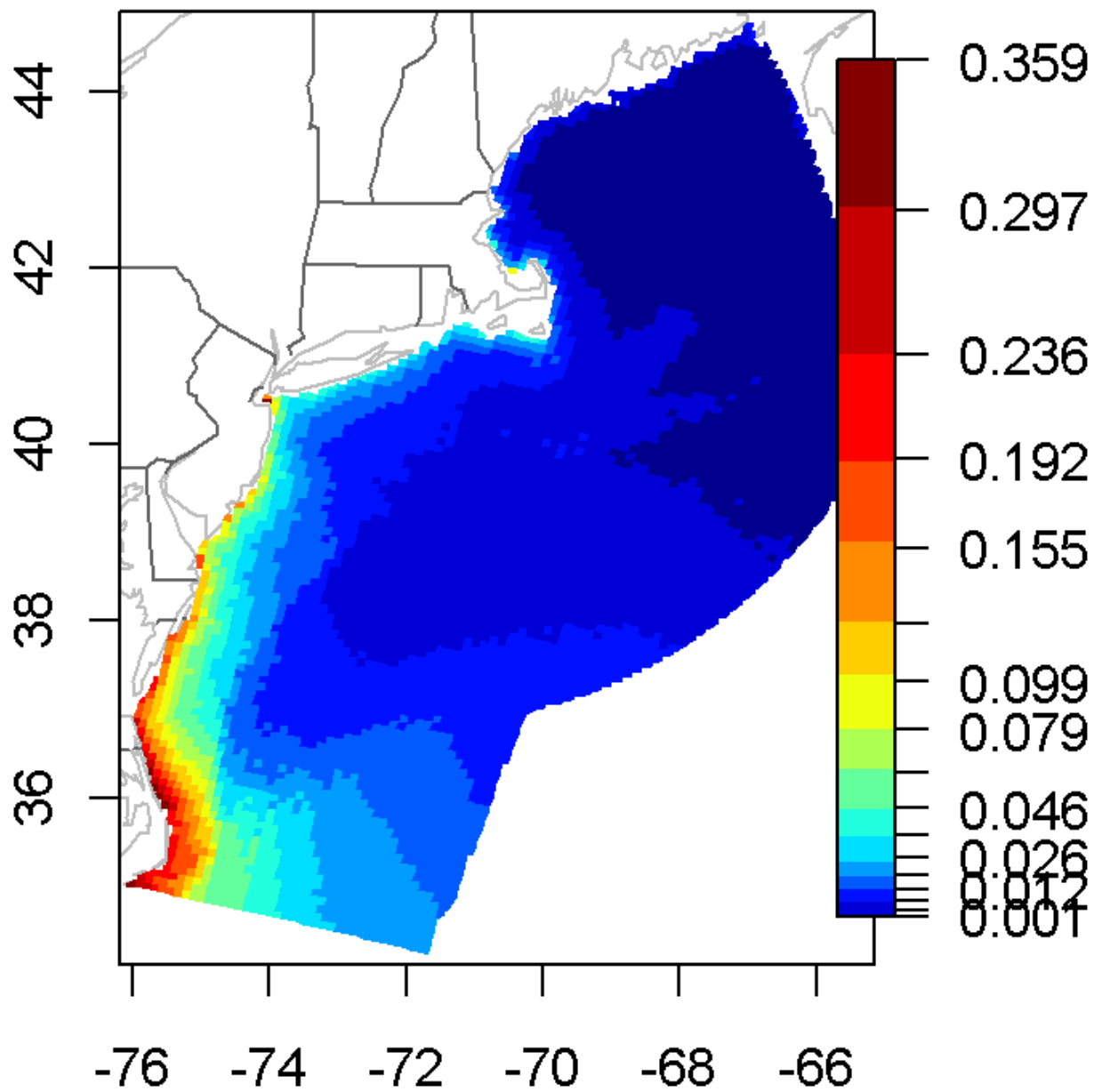


Figure 950: Map of mean predicted habitat for 'Tursiops' guild during 'fall' season in 'ne2' region.

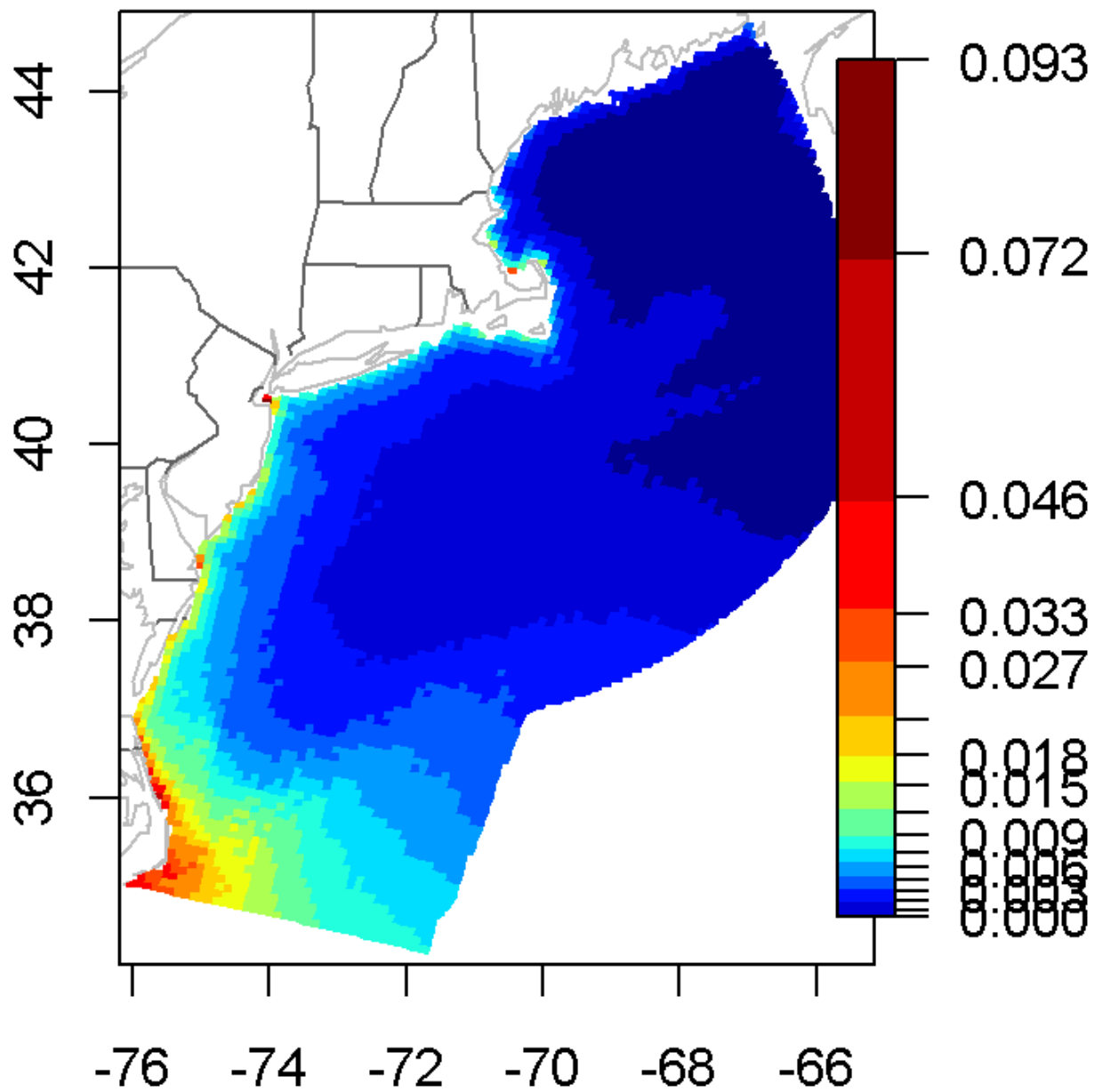


Figure 951: Map of standard error of habitat for 'Tursiops' guild during 'fall' season in 'ne2' region.

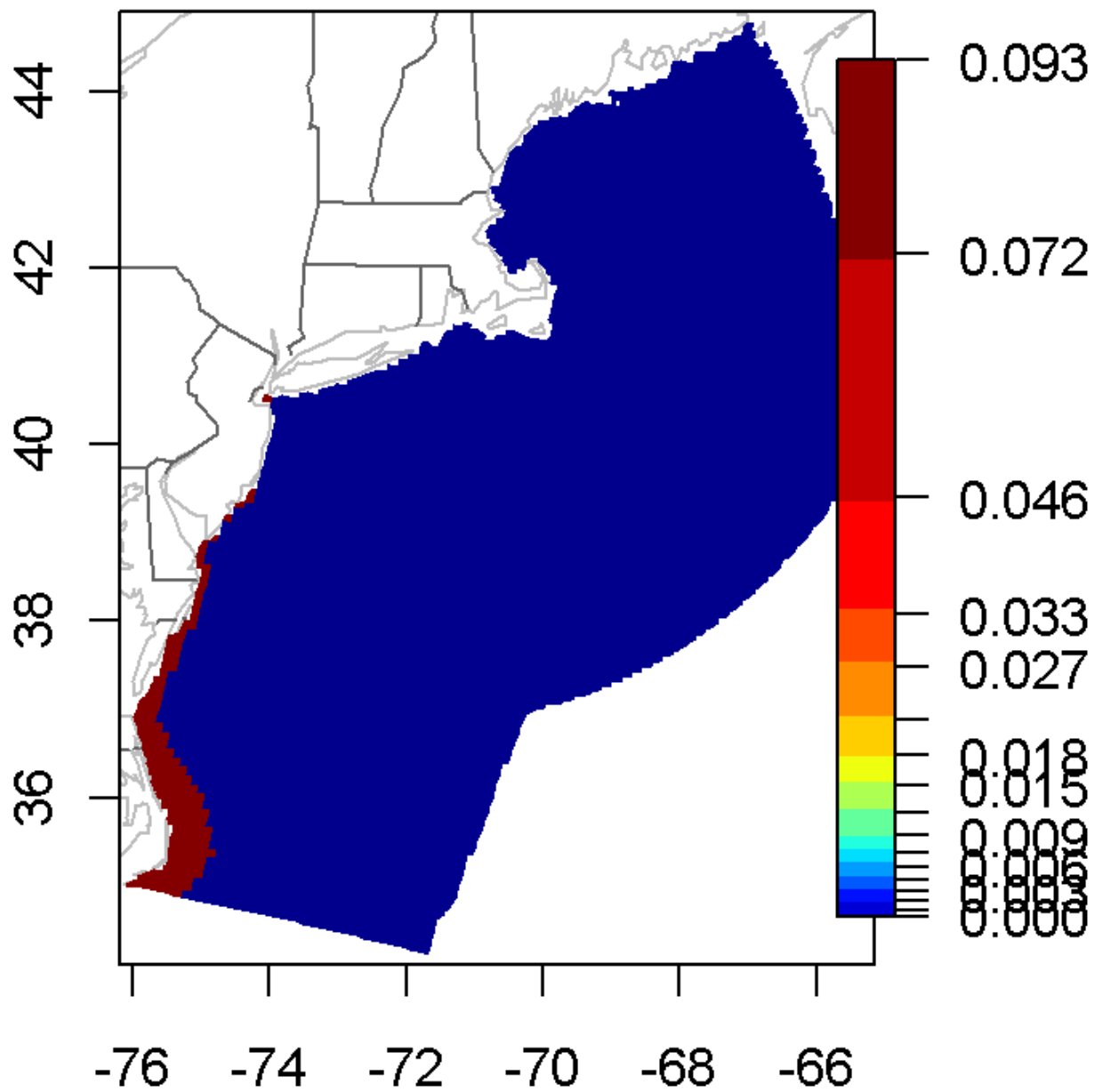


Figure 952: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'fall' season in 'ne2' region.

18.1.4 se2

Modelrun identifier: duke_06_tu3_fall_se2

Date generated: 2008-10-21 15:48:30

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 87: Summary for duke(6) GAM model: for 'Tursiops' guild during 'fall' season in 'se2' region.

	Value
Number.presences	39
Number.absences	641
GAM.converged	TRUE
R.squared	0.471249
Deviance.explained	0.342884
ROC.optimum	0.569138
Maximum.fit	0.0724544
Maximum.prediction	0.999306

Model text summary...

duke_06_tu3_fall_se2 run on Tue Oct 21 15:47:58 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'fall', region:se2

max.fit:0.569138, max.prediction:0.999306, ROC.optimum:0.072454

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) -4.7162 0.2594 -18.18 <2e-16 ***

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

Approximate significance of smooth terms:

	edf	Ref.df	F	p-value
s(log(depth))	1.996e+00	2.4960	67.75	< 2e-16 ***
s(log(d2shelf))	5.987e-05	0.5001	5.16e-06	0.963
s(log(d2coast))	3.840e-05	0.5000	1.28e-05	0.953
s(sst)	9.617e-01	1.4617	20.73	1.41e-07 ***
s(lat)	9.971e-01	1.4971	39.06	2.36e-13 ***

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

R-sq.(adj) = 0.471 Deviance explained = 34.3%
GCV score = 0.0020503 Scale est. = 0.0020232 n = 675

summary(dat)...

region	fid_c10	depth	d2shelf	d2coast	sst	lat
se2:680	Min. : 1821	Min. : 7.0	Min. : 3104	Min. : 14606	Min. :19.60	Min. :28.83
	1st Qu.: 9277	1st Qu.: 34.0	1st Qu.: 10509	1st Qu.: 71021	1st Qu.:24.75	1st Qu.:33.58
	Median :10482	Median : 41.0	Median : 19500	Median : 93062	Median :26.33	Median :33.81
	Mean : 8945	Mean : 144.1	Mean : 25786	Mean : 90370	Mean :25.78	Mean :33.58
	3rd Qu.:10583	3rd Qu.: 220.0	3rd Qu.: 33067	3rd Qu.:114808	3rd Qu.:27.15	3rd Qu.:34.01
	Max. :11148	Max. :2886.0	Max. :105646	Max. :178105	Max. :29.62	Max. :34.95
				NA's : 5.00		

summary(newdat)...

region	fid_c10	depth	d2shelf	d2coast	sst	lat
se2:4203	Min. : 1695	Min. : 4.0	Min. : 589	Min. : 1471	Min. :23.10	Min. :25.91
	1st Qu.: 7760	1st Qu.: 183.5	1st Qu.: 34886	1st Qu.: 82859	1st Qu.:25.80	1st Qu.:29.60
	Median : 9083	Median : 812.0	Median : 86547	Median :167727	Median :26.85	Median :31.59
	Mean : 8321	Mean :1482.5	Mean :110466	Mean :177806	Mean :26.63	Mean :31.28

3rd Qu.:10134	3rd Qu.:2729.5	3rd Qu.:177072	3rd Qu.:262857	3rd Qu.:27.45	3rd Qu.:33.06
Max. :11184	Max. :5300.0	Max. :331253	Max. :422789	Max. :28.65	Max. :34.95
		NA's : 3	NA's : 3		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1695	Min. :3.640e-10	Min. :7.227e-10	Min. : 0.0000	Min. :1.737e-05	Min. :0.000
1st Qu.: 7760	1st Qu.:3.398e-07	1st Qu.:5.622e-07	1st Qu.: 0.0000	1st Qu.:1.236e-03	1st Qu.:0.000
Median : 9083	Median :8.681e-03	Median :4.335e-03	Median : 0.0000	Median :4.414e-03	Median :0.000
Mean : 8321	Mean :1.133e-01	Mean :2.387e-02	Mean : 0.1646	Mean :2.079e-02	Mean :0.236
3rd Qu.:10134	3rd Qu.:6.338e-02	3rd Qu.:3.180e-02	3rd Qu.: 0.0000	3rd Qu.:1.676e-02	3rd Qu.:0.000
Max. :11184	Max. :9.993e-01	Max. :2.511e-01	Max. : 2.0000	Max. :5.995e-01	Max. :1.000
	NA's :3.000e+00	NA's :3.000e+00	NA's :3966.0000	NA's :3.966e+03	

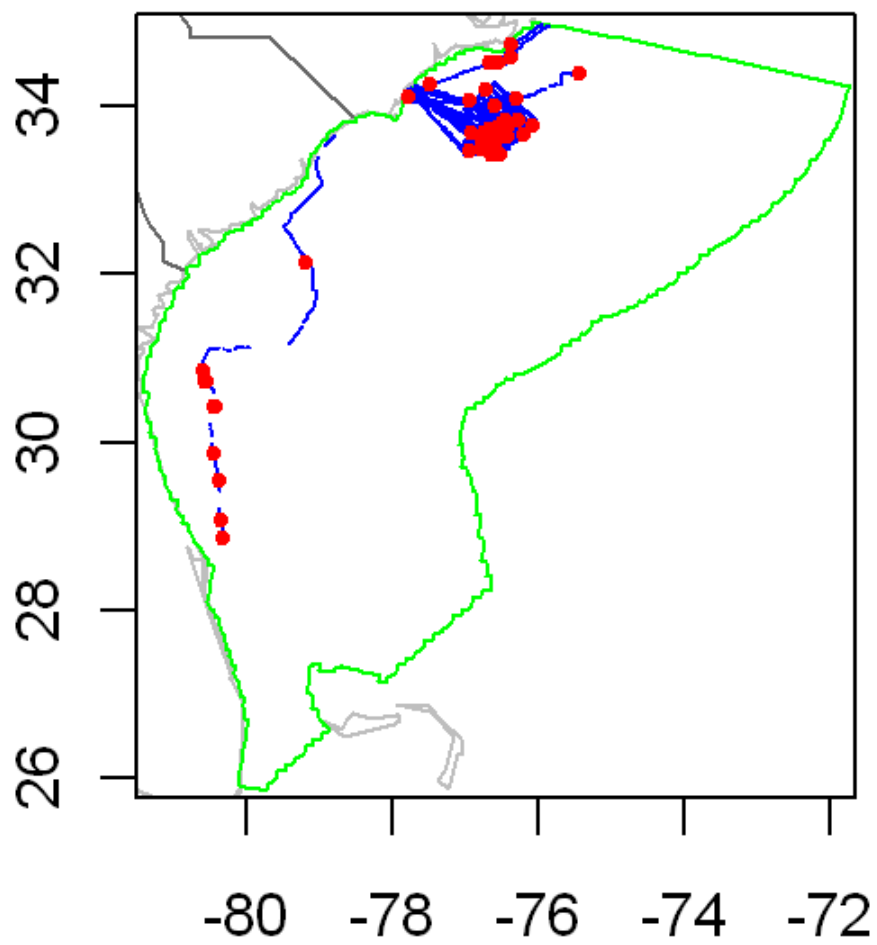


Figure 953: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'fall' season in 'se2' region.

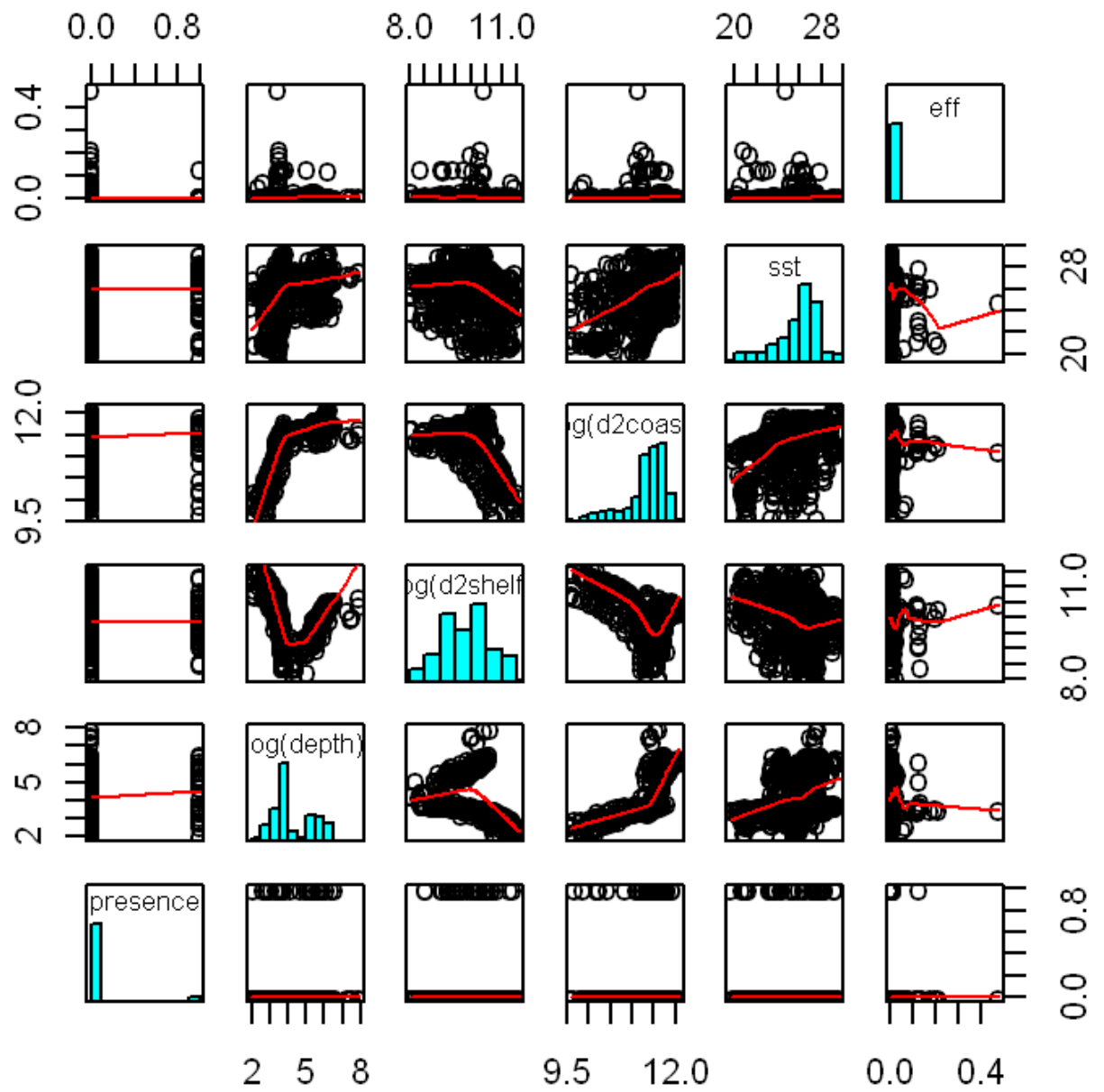


Figure 954: Pairs plot of input variables for 'Tursiops' guild during 'fall' season in 'se2' region.

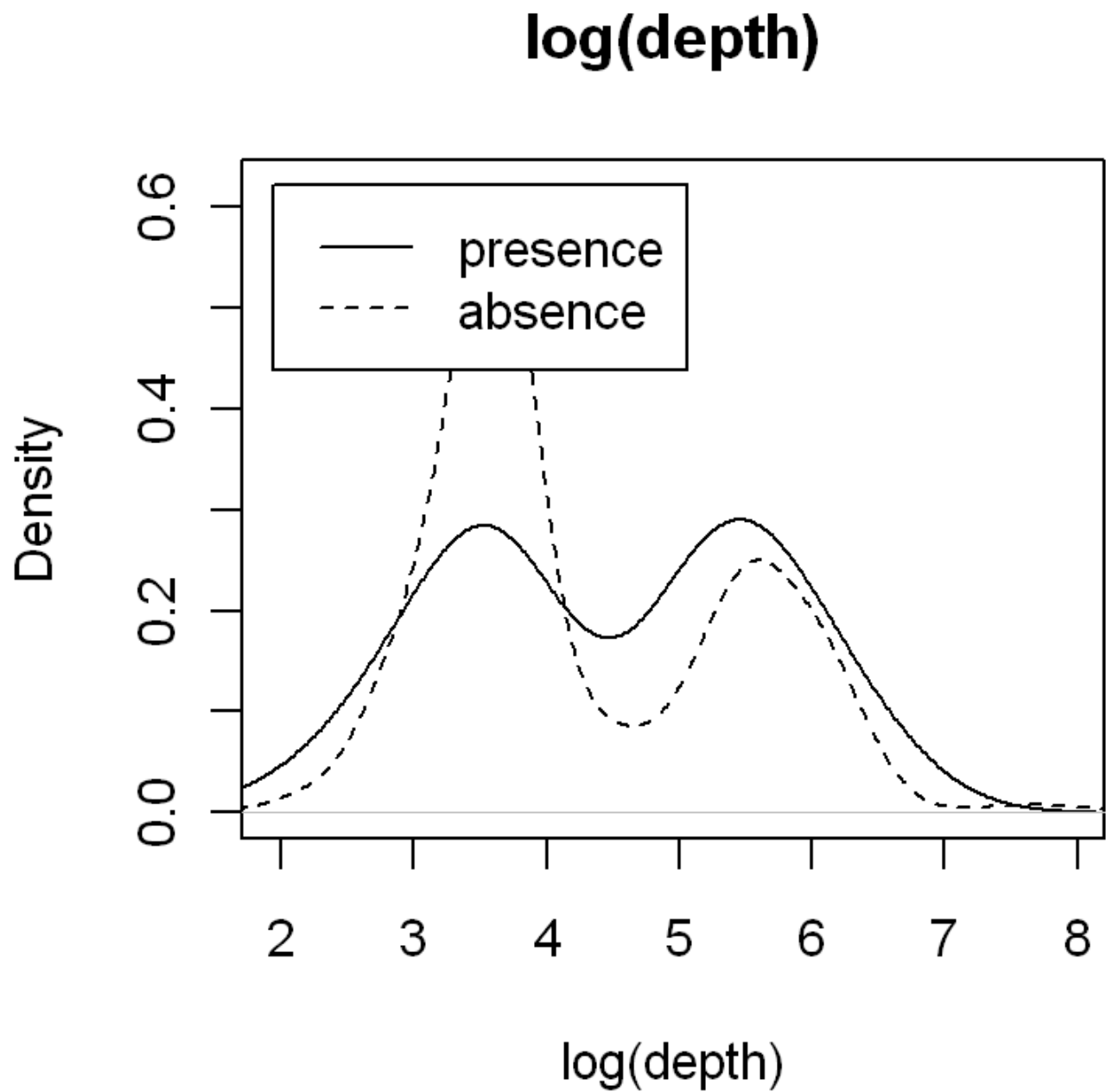


Figure 955: Density histogram of depth log(meters) for 'Tursiops' guild during 'fall' season in 'se2' region.

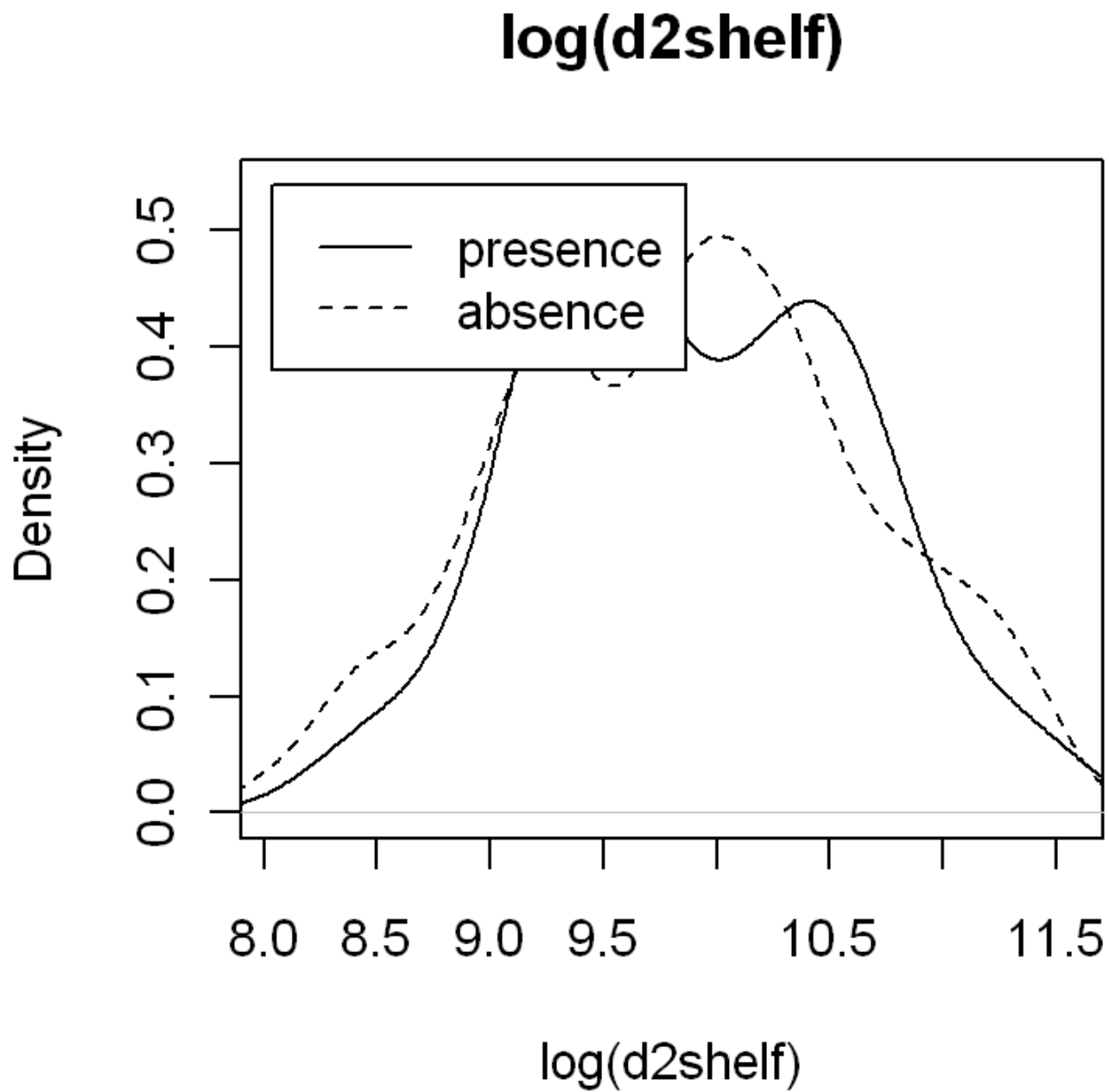


Figure 956: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'fall' season in 'se2' region.

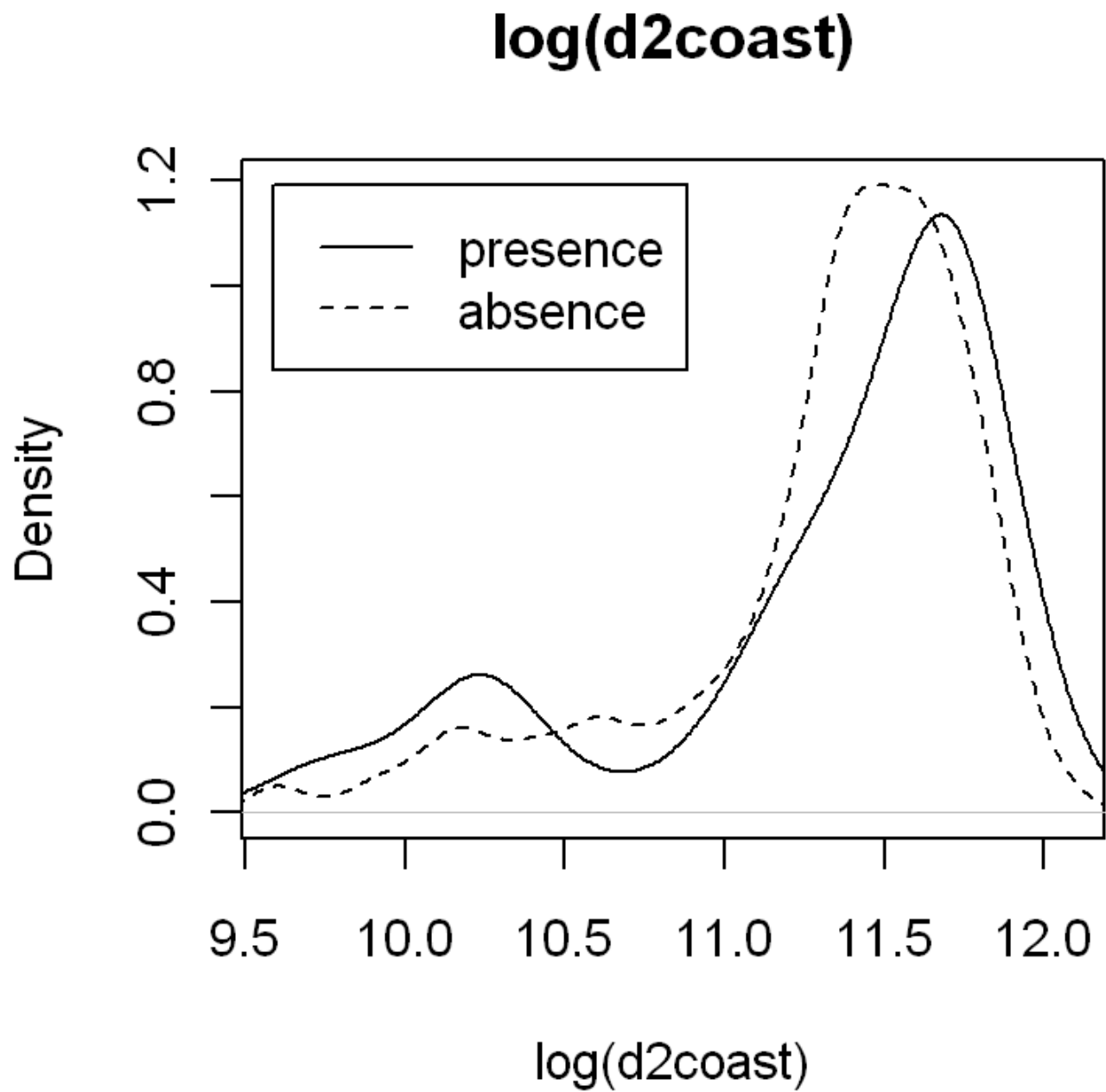


Figure 957: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'fall' season in 'se2' region.

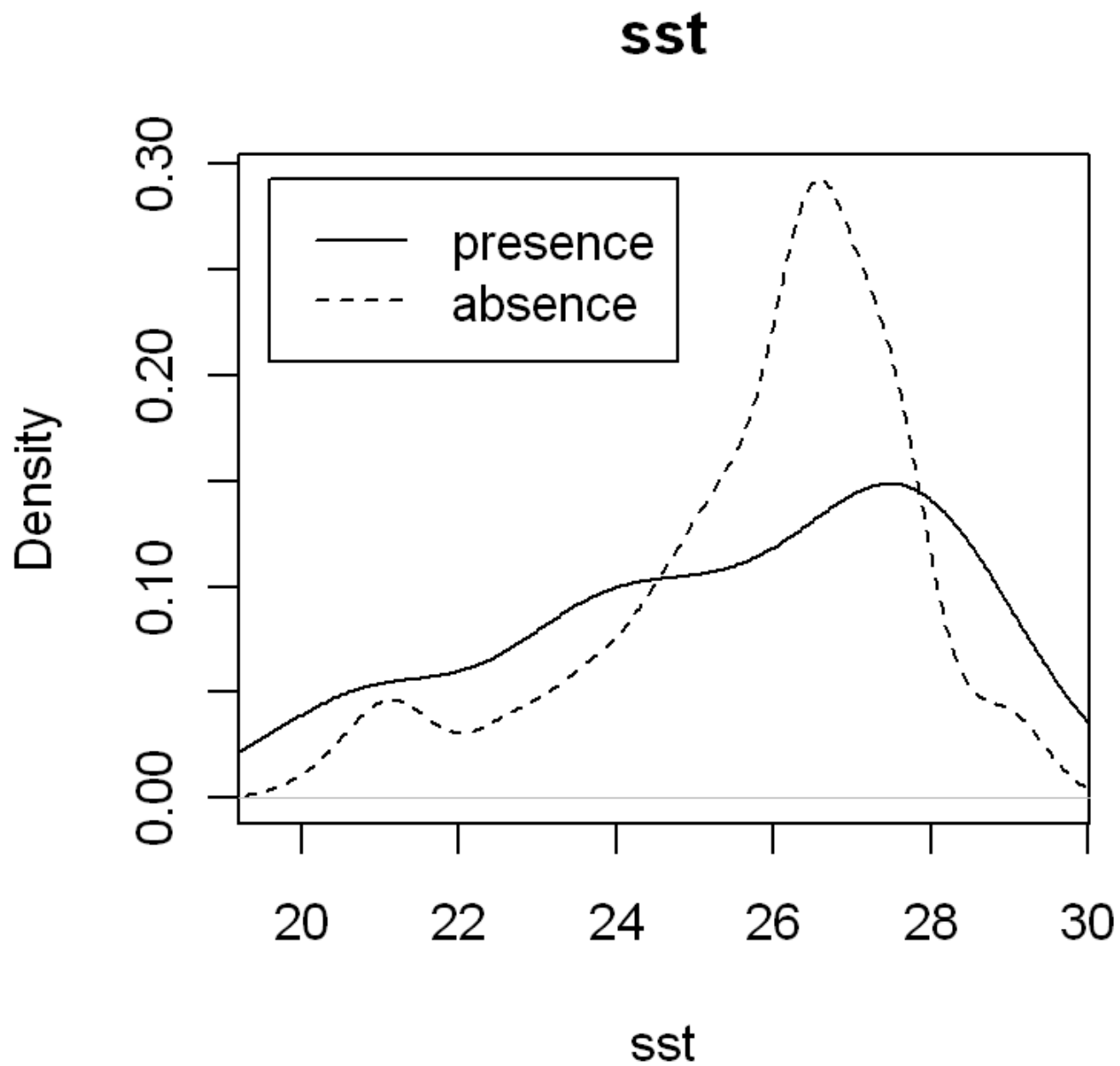


Figure 958: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'fall' season in 'se2' region.

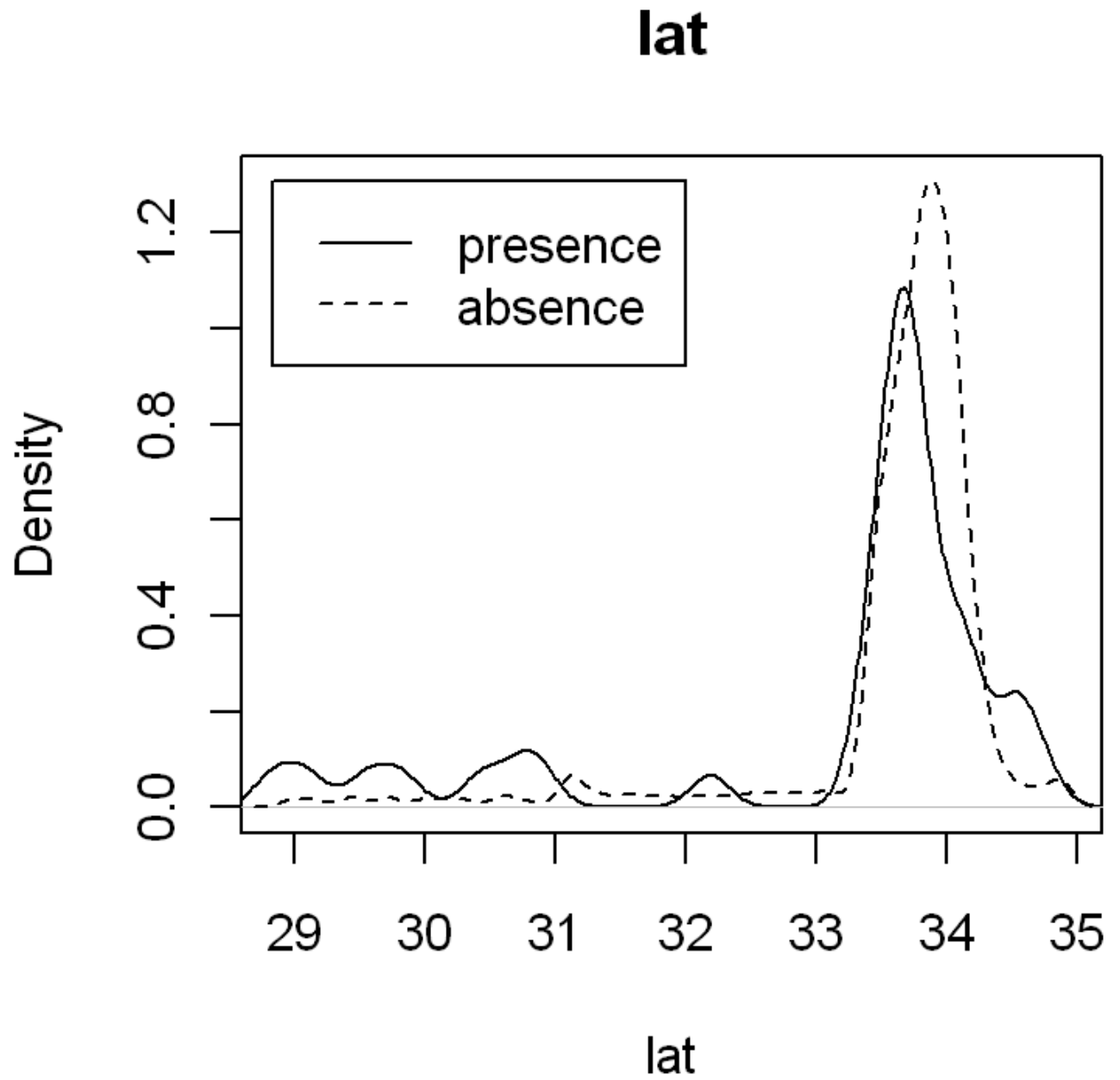


Figure 959: Density histogram of latitude (degrees) for 'Tursiops' guild during 'fall' season in 'se2' region.

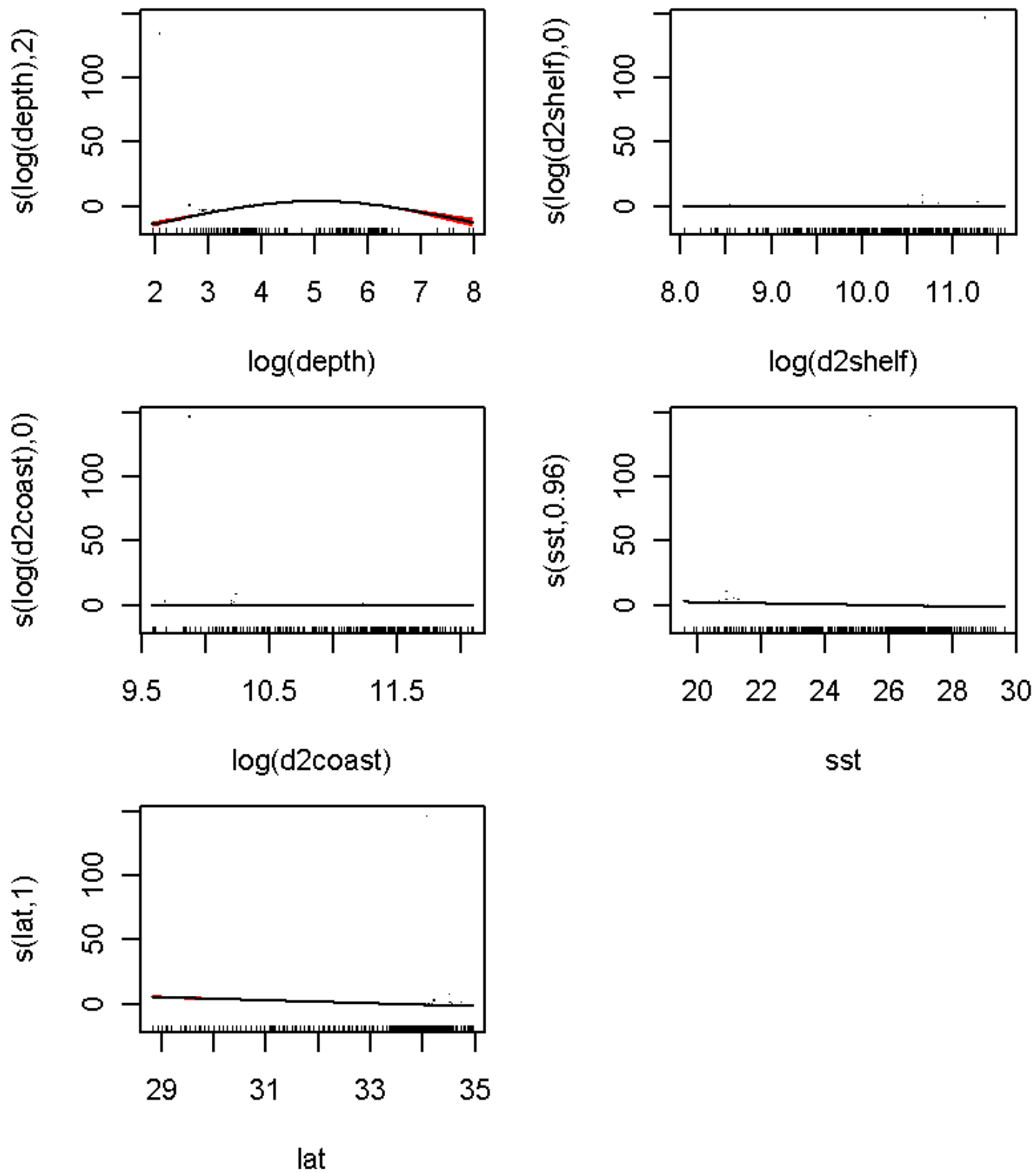


Figure 960: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'fall' season in 'se2' region.

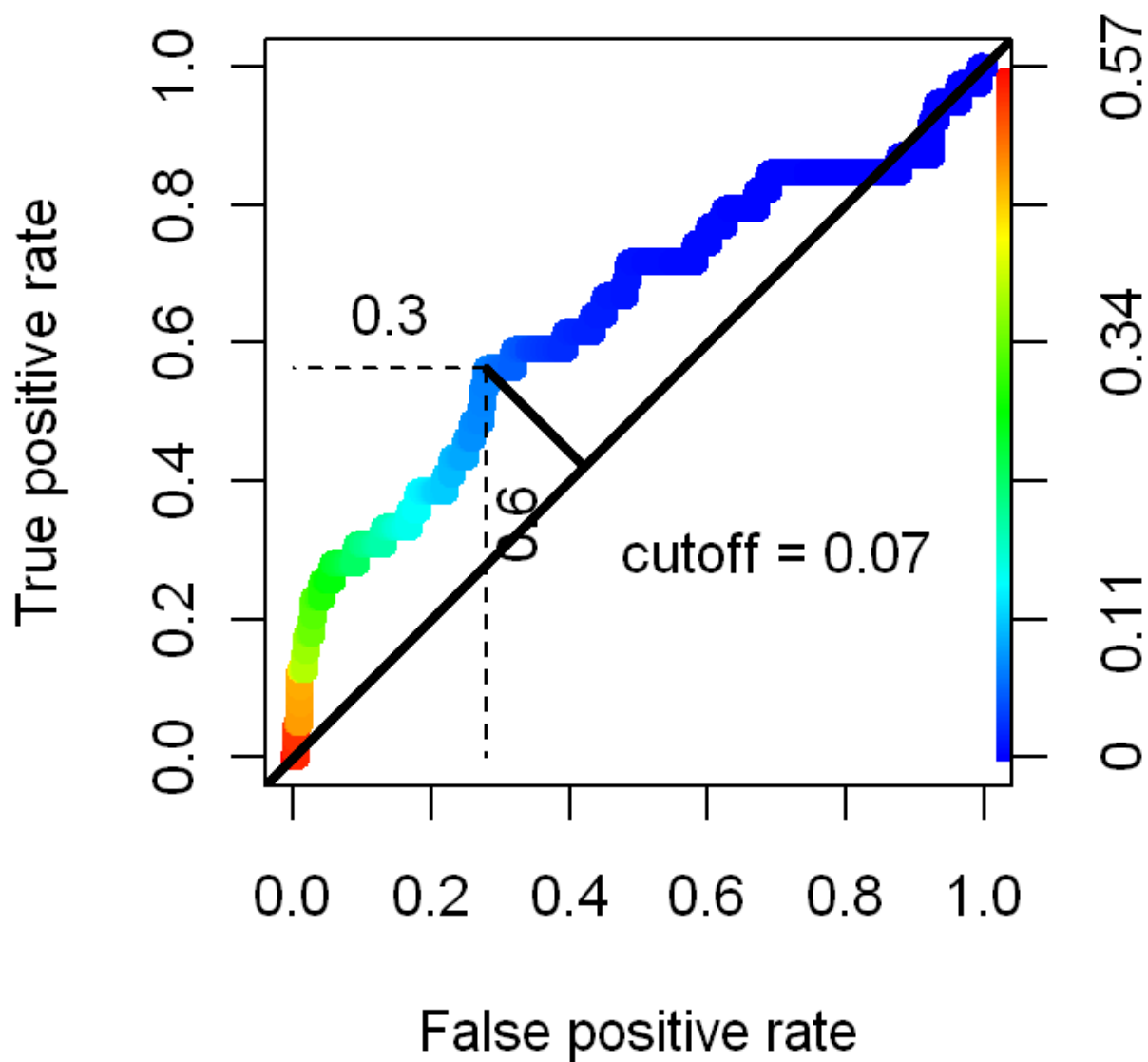


Figure 961: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'fall' season in 'se2' region.

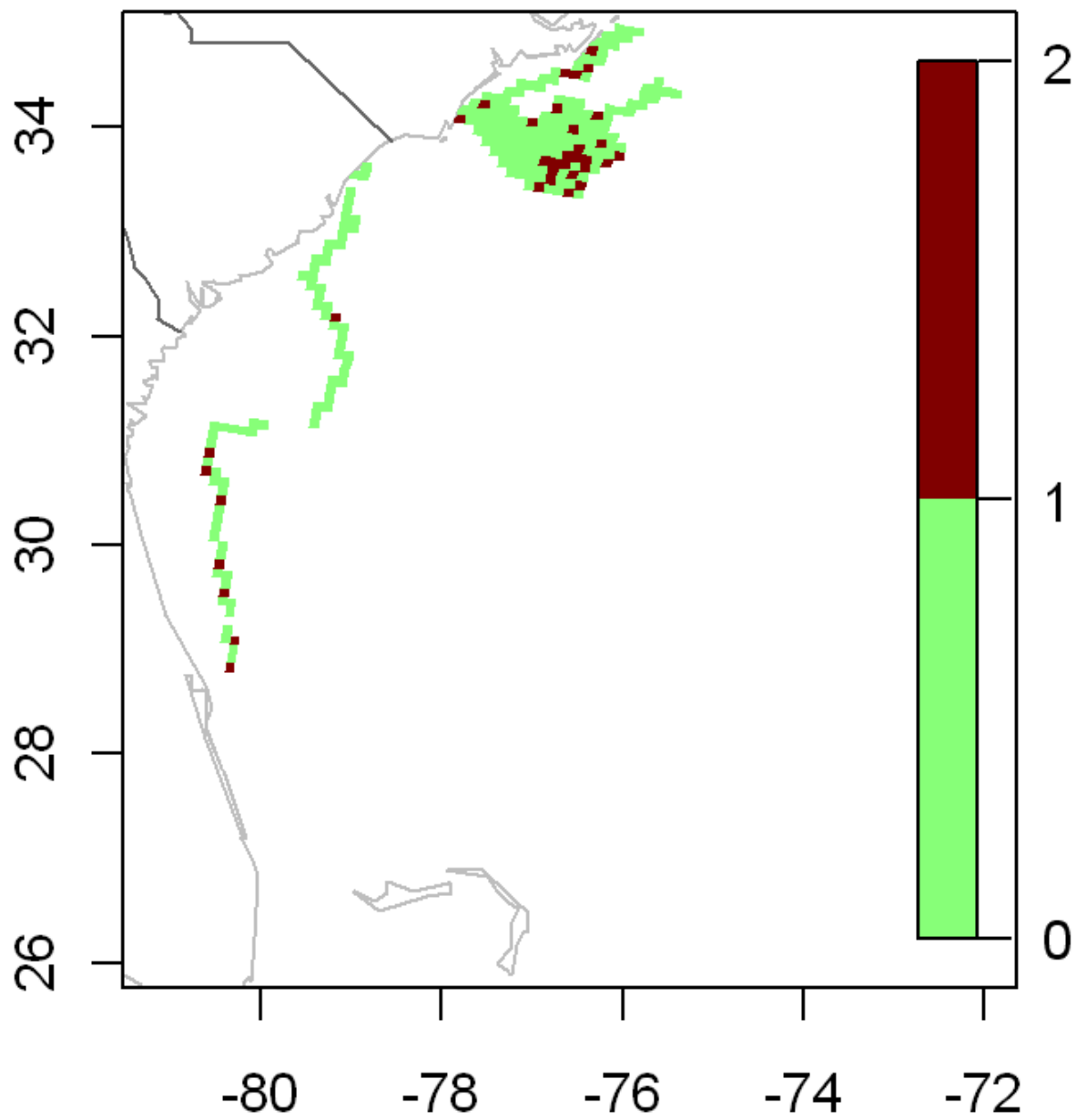


Figure 962: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'fall' season in 'se2' region.

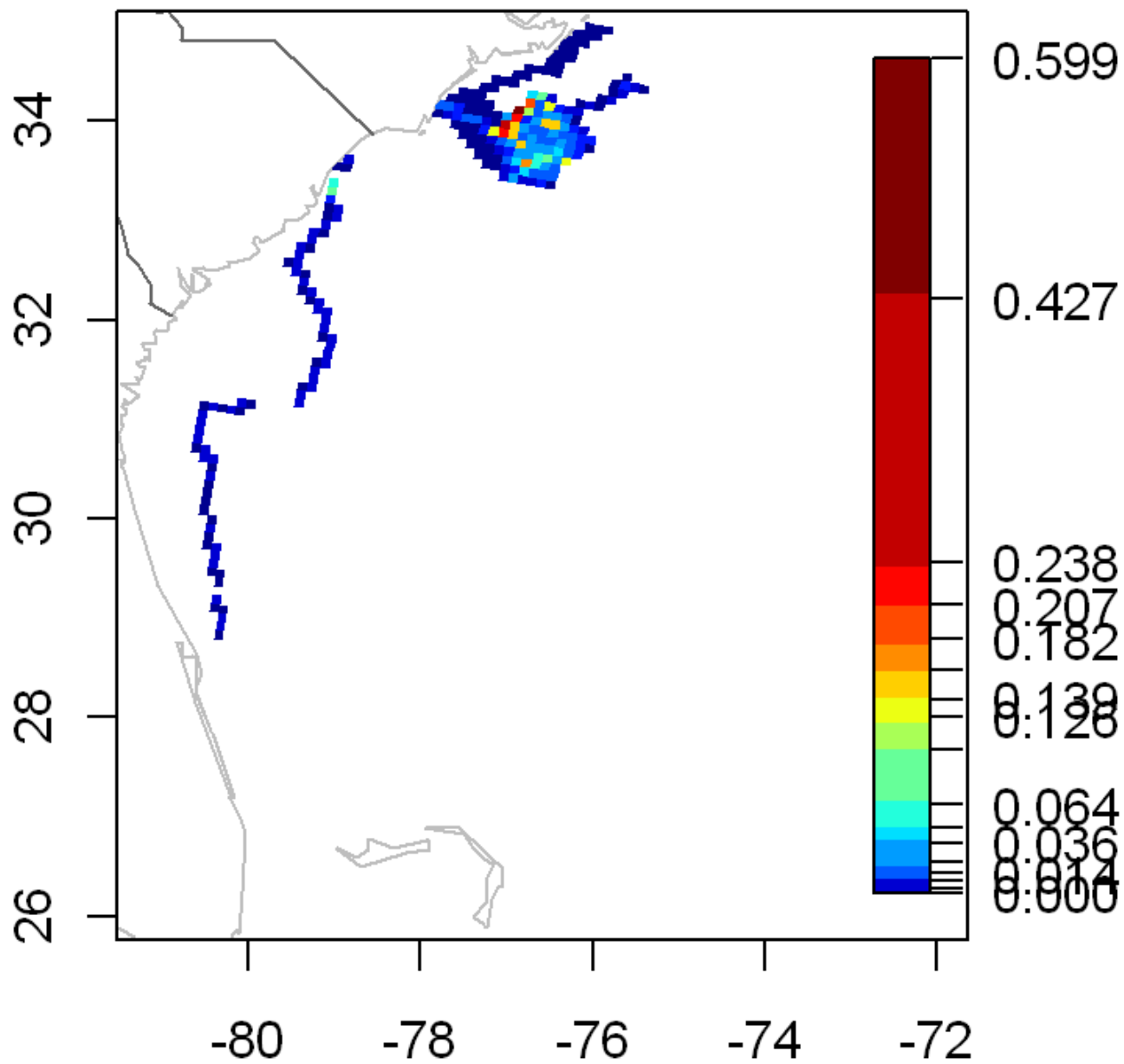


Figure 963: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'fall' season in 'se2' region.

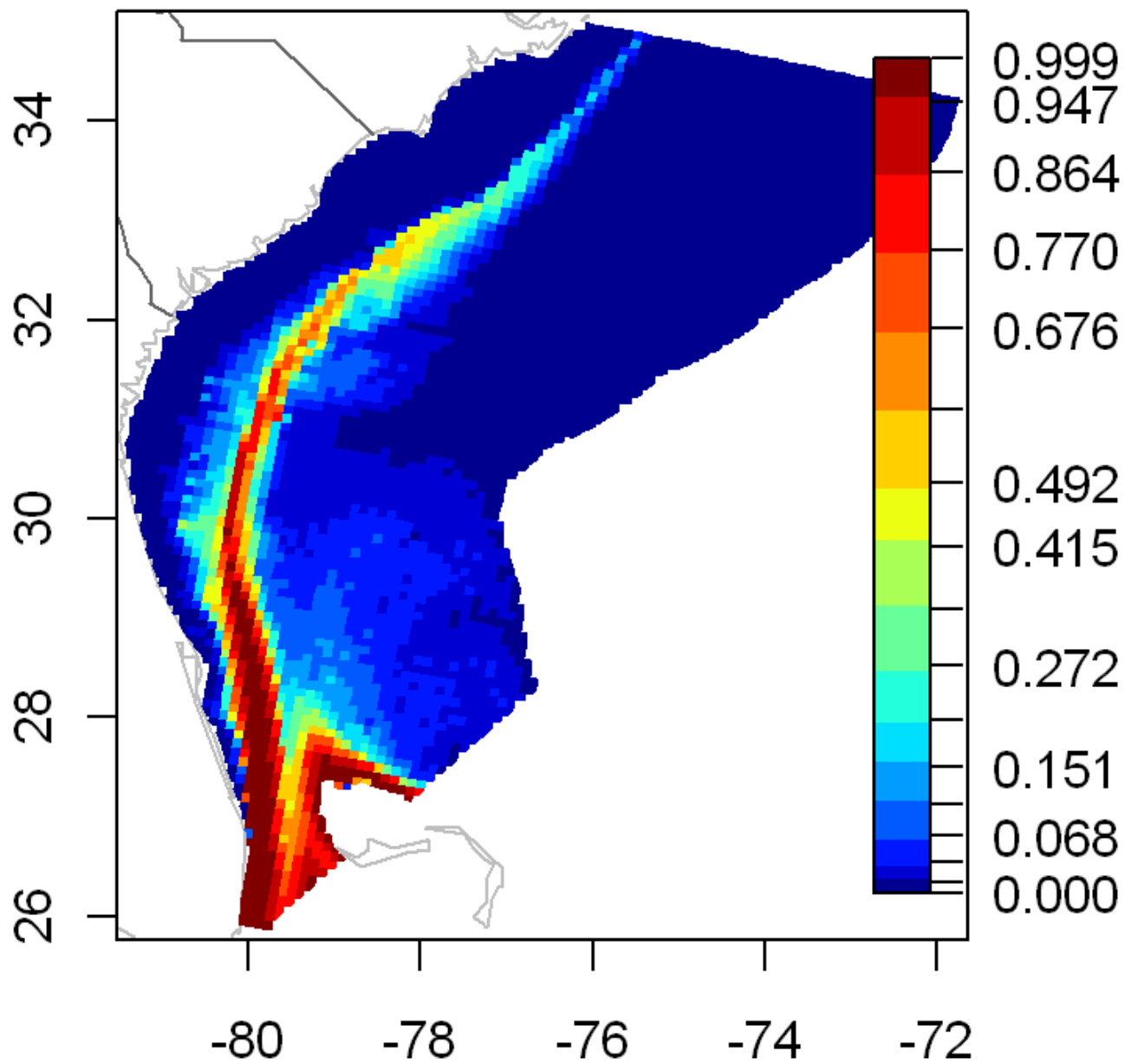


Figure 964: Map of mean predicted habitat for 'Tursiops' guild during 'fall' season in 'se2' region.

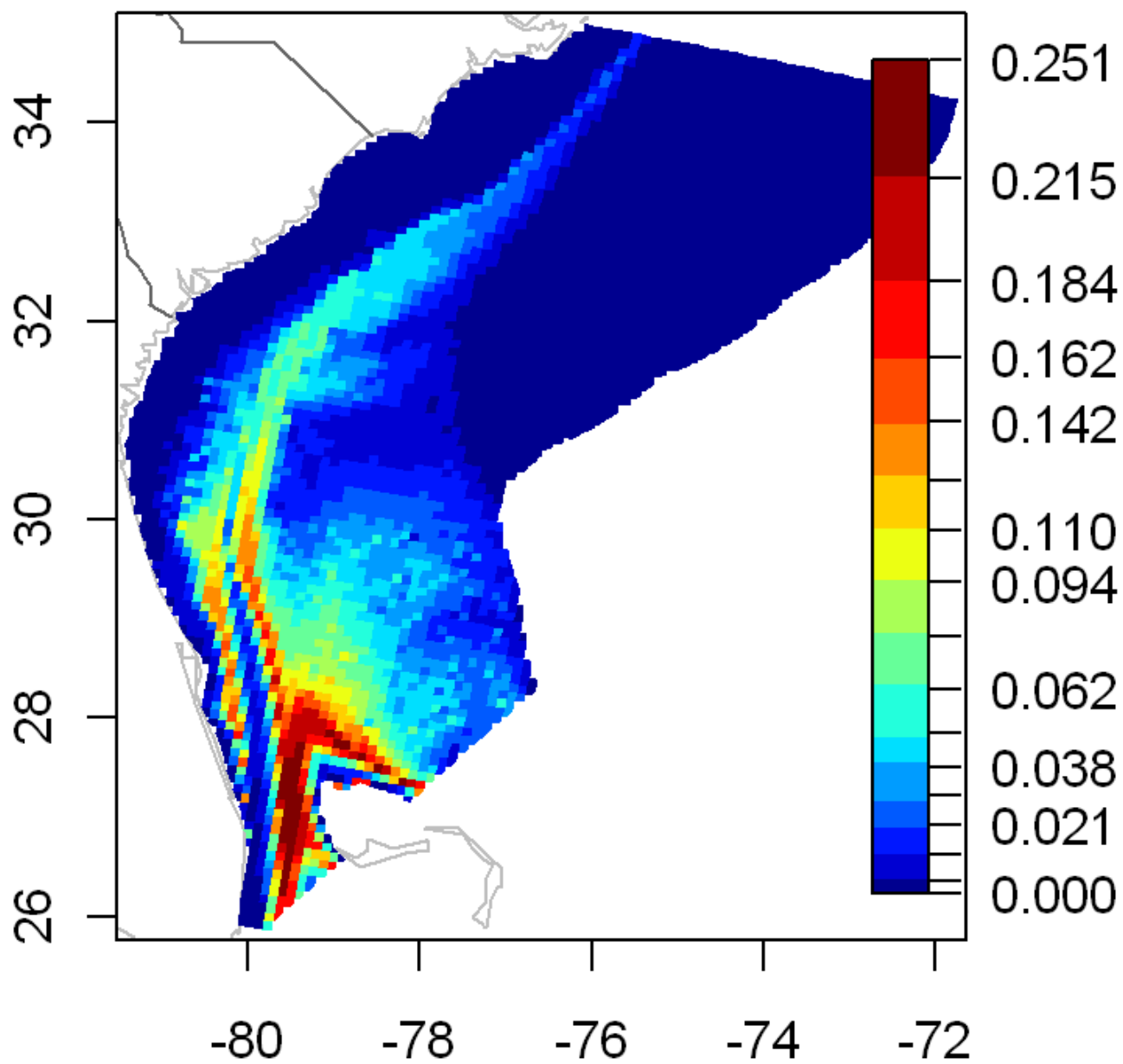


Figure 965: Map of standard error of habitat for 'Tursiops' guild during 'fall' season in 'se2' region.

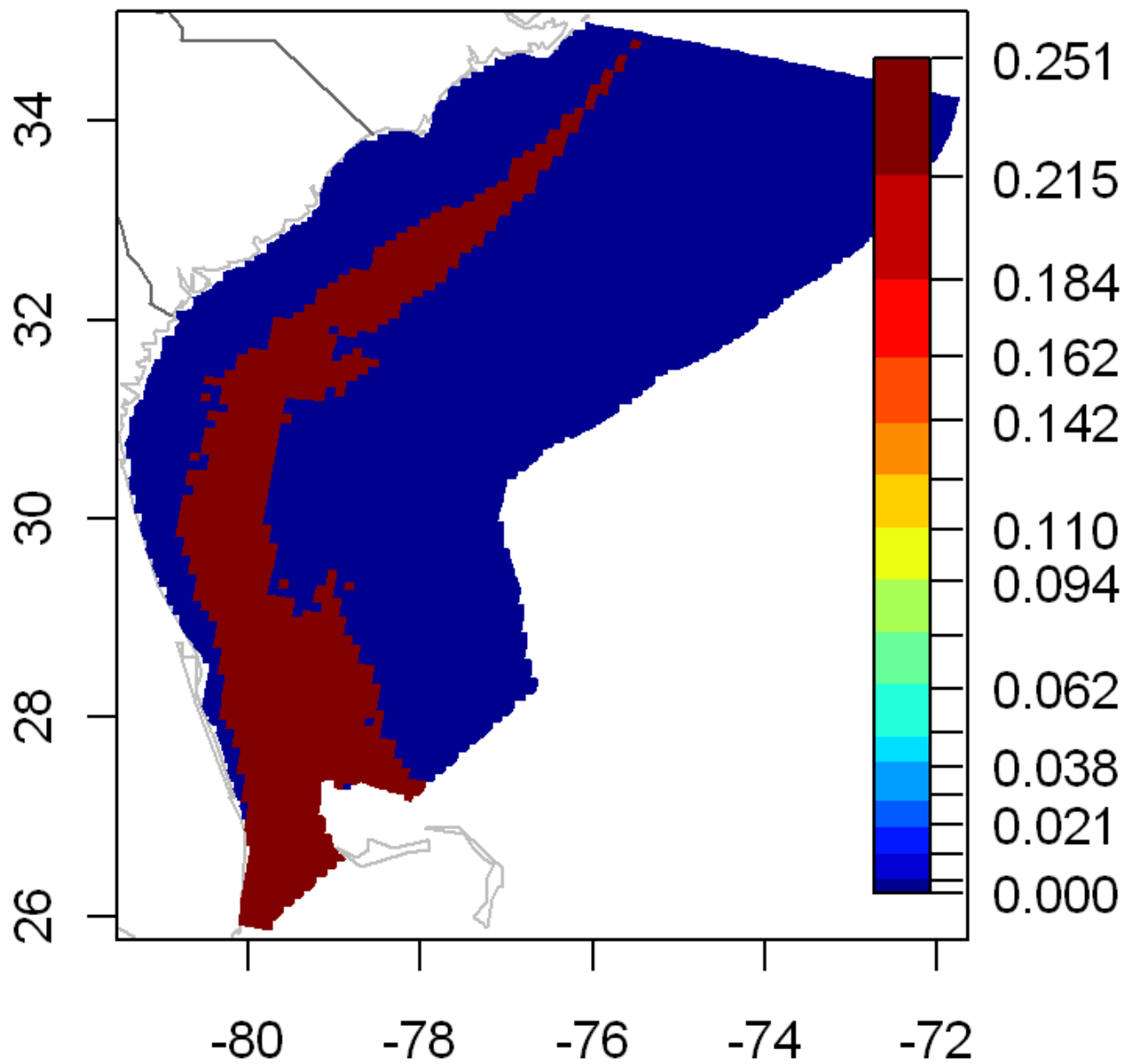


Figure 966: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'fall' season in 'se2' region.

18.2 spring

18.2.1 east2

Modelrun identifier: duke_06_tu3_spring_east2

Date generated: 2008-10-21 14:54:34

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 88: Summary for duke(6) GAM model: for 'Tursiops' guild during 'spring' season in 'east2' region.

	Value
Number.presences	429
Number.absences	2444
GAM.converged	TRUE
R.squared	0.354871
Deviance.explained	0.195124
ROC.optimum	0.97593
Maximum.fit	0.245589
Maximum.prediction	0.97593

Model text summary...

```
duke_06_tu3_spring_east2 run on Tue Oct 21 14:53:09 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'spring', region:east2

max.fit:0.975930, max.prediction:0.975930, ROC.optimum:0.245589

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -2.0730      0.1045  -19.85   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  1.9675859 2.4676   99.73 < 2e-16 ***
s(log(d2shelf)) 1.9906661 2.4907   73.29 < 2e-16 ***
s(log(d2coast)) 0.0008557 0.5009  4.55e-06   0.964
s(sst)         0.0007284 0.5007  1.93e-04   0.908
s(lat)         0.9397875 1.4398   15.03 8.32e-06 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.355   Deviance explained = 19.5%
GCV score = 0.0028461   Scale est. = 0.002834   n = 2490

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:1087   Min.    : 1654   Min.    : 4.0   Min.    : 995   Min.    : 1471   Min.    : 4.886   Min.    :26.17
se2:1786   1st Qu.:10323   1st Qu.: 20.0   1st Qu.: 13946   1st Qu.: 32021   1st Qu.: 13.386   1st Qu.:33.83
              Median :10844   Median : 29.0   Median : 31680   Median : 52718   Median : 17.732   Median :34.55
              Mean   : 9852   Mean   : 236.4   Mean   : 41188   Mean   : 60965   Mean   : 16.976   Mean   :34.44
              3rd Qu.:11293   3rd Qu.: 45.0   3rd Qu.: 56624   3rd Qu.: 75007   3rd Qu.: 20.903   3rd Qu.:35.66
              Max.    :15889   Max.    :5270.0   Max.    :329182   Max.    :420801   Max.    : 26.475   Max.    :42.39
              NA's    :      6      NA's    :      6      NA's    :378.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685   Min.    : 1633   Min.    : 4   Min.    : 5   Min.    : 1259   Min.    : 2.850   Min.    :25.91
se2:4203   1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042   1st Qu.: 89304   1st Qu.: 9.675   1st Qu.:32.12
```


Median :11616	Median : 844	Median : 82032	Median :178961	Median :20.025	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.626	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.575	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :26.175	Max. :44.74
		NA's : 5	NA's : 5		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :2.043e-09	Min. :4.435e-09	Min. : 0.0000	Min. :2.601e-06	Min. :0.00000
1st Qu.: 9145	1st Qu.:1.360e-04	1st Qu.:1.171e-04	1st Qu.: 0.0000	1st Qu.:5.086e-04	1st Qu.:0.00000
Median :11616	Median :1.555e-03	Median :9.210e-04	Median : 0.0000	Median :3.743e-03	Median :0.00000
Mean :11171	Mean :3.834e-02	Mean :5.249e-03	Mean : 0.4391	Mean :1.009e-02	Mean :0.05512
3rd Qu.:14088	3rd Qu.:1.354e-02	3rd Qu.:4.647e-03	3rd Qu.: 1.0000	3rd Qu.:9.634e-03	3rd Qu.:0.00000
Max. :16560	Max. :9.759e-01	Max. :1.075e-01	Max. : 7.0000	Max. :2.202e-01	Max. :1.00000
	NA's :5.000e+00	NA's :5.000e+00	NA's :8911.0000	NA's :8.911e+03	

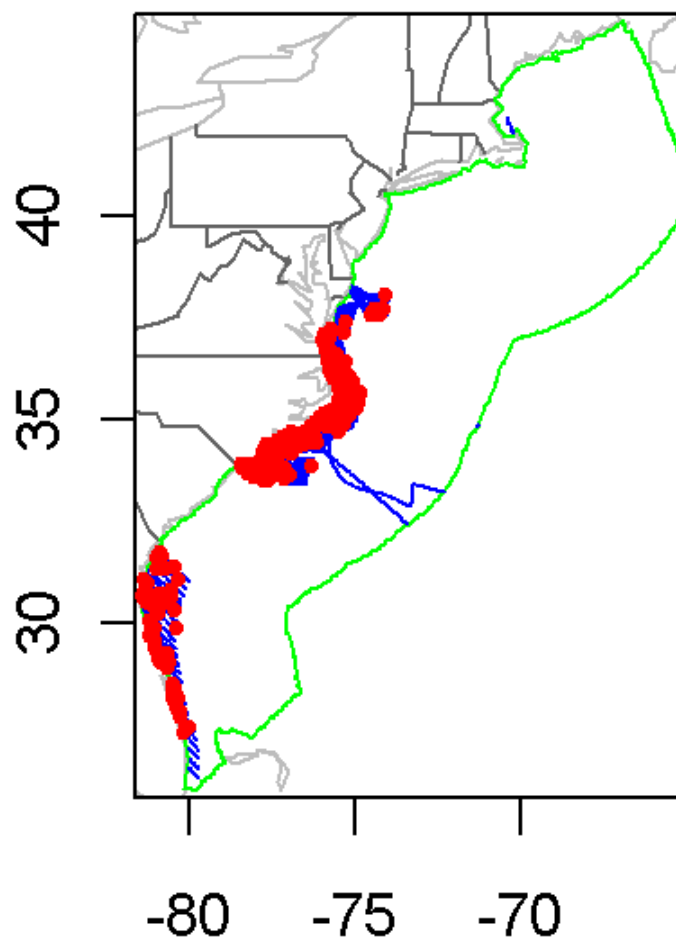


Figure 967: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'spring' season in 'east2' region.

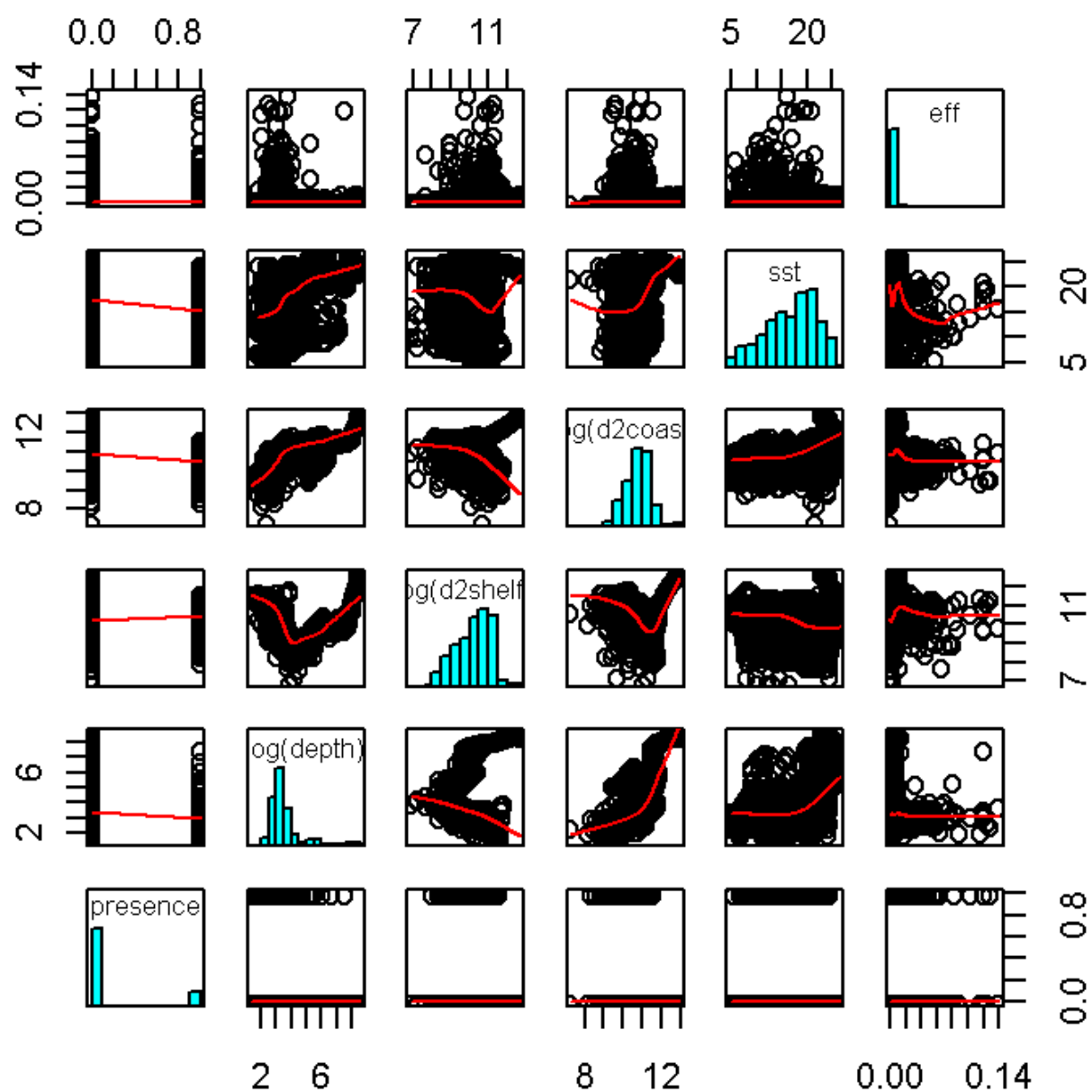


Figure 968: Pairs plot of input variables for 'Tursiops' guild during 'spring' season in 'east2' region.

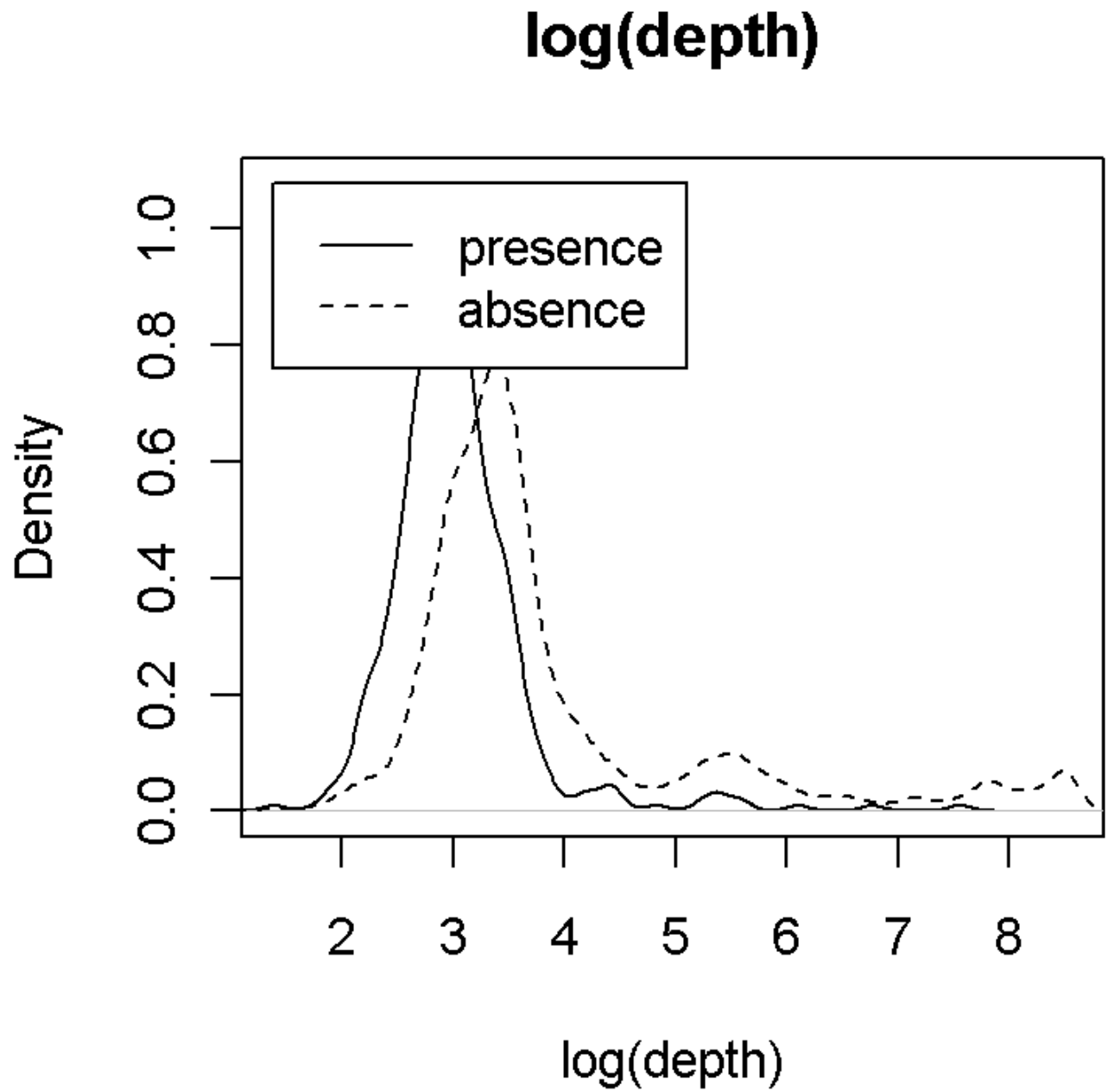


Figure 969: Density histogram of depth log(meters) for 'Tursiops' guild during 'spring' season in 'east2' region.

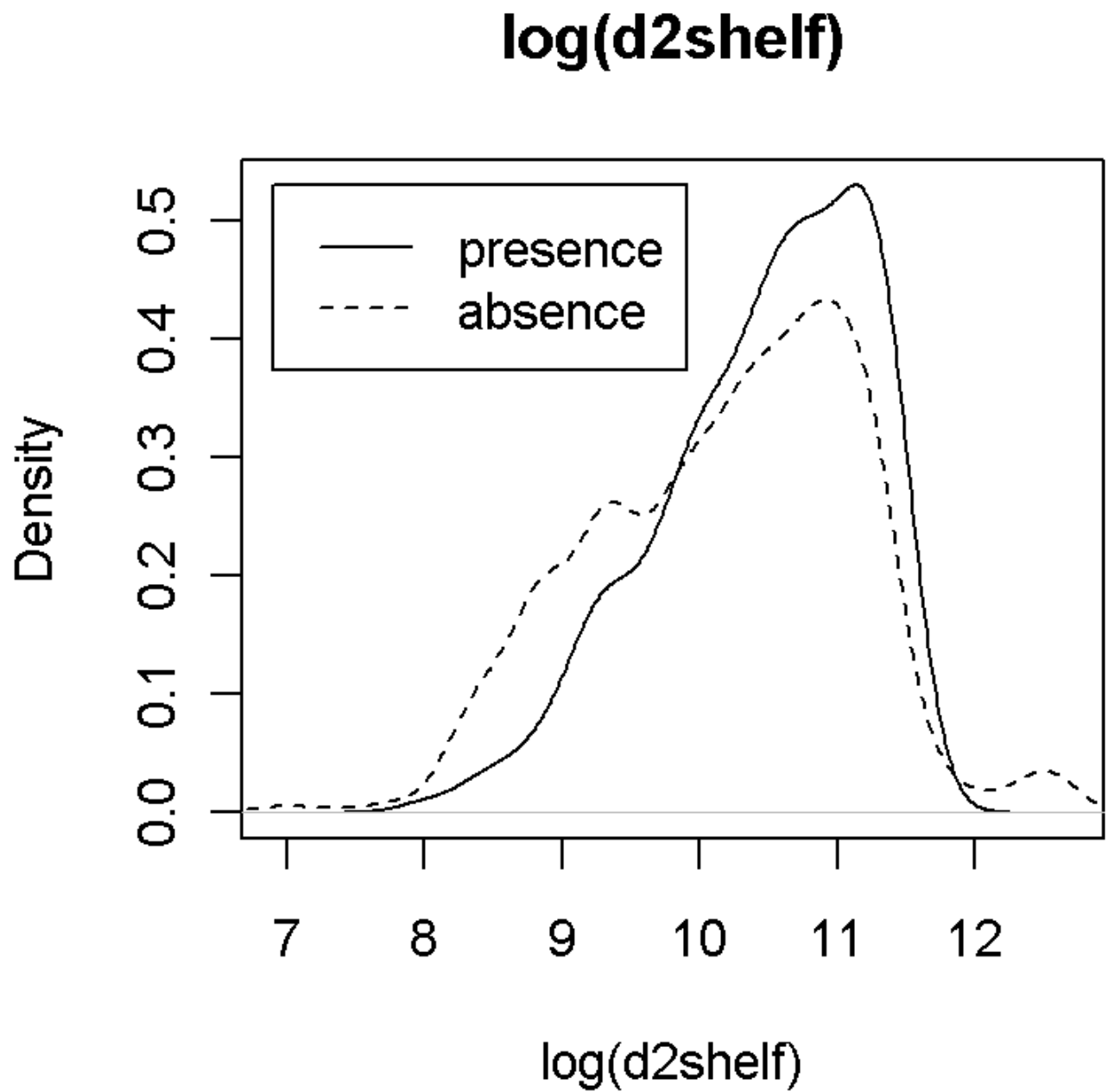


Figure 970: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'spring' season in 'east2' region.

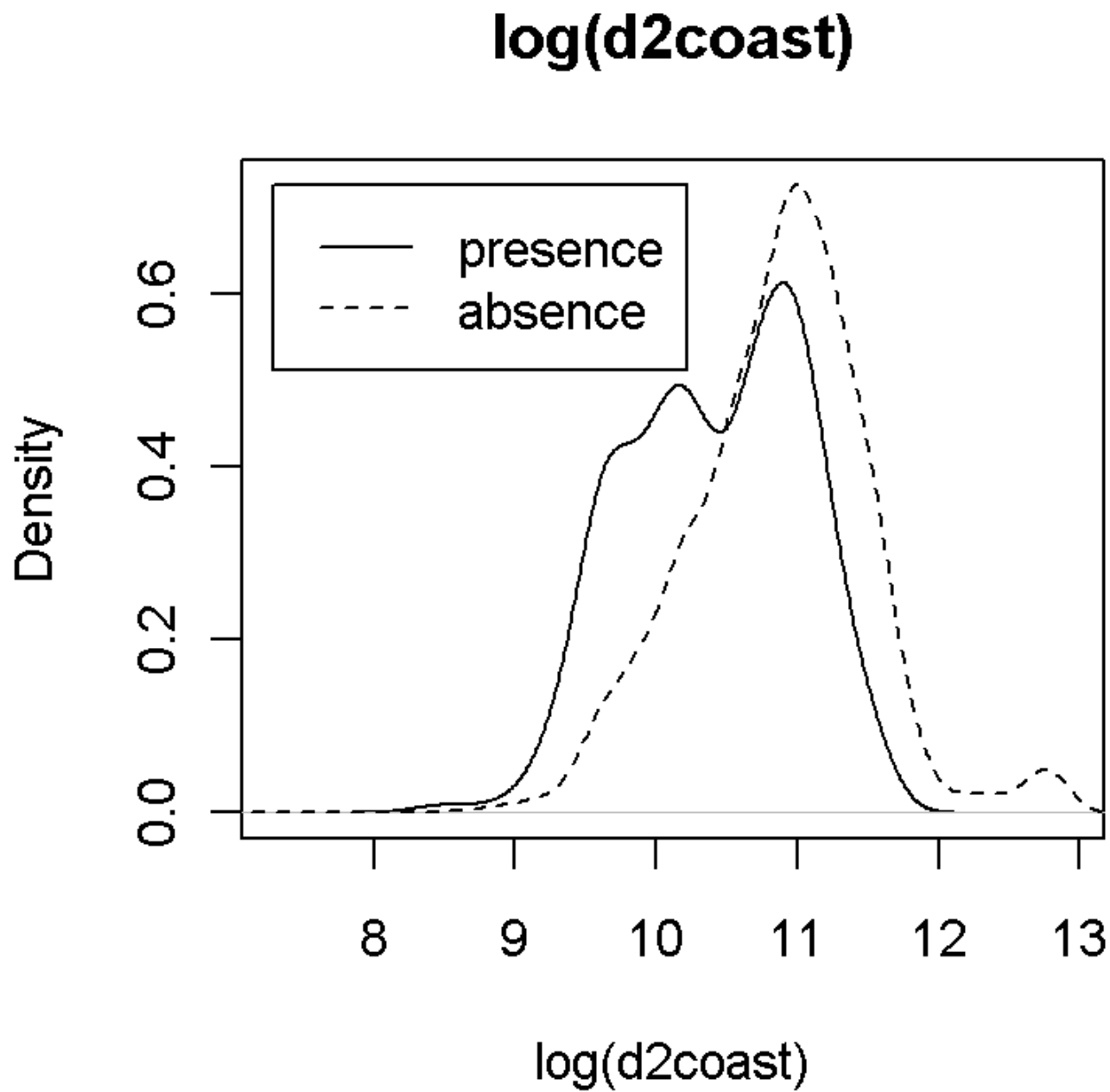


Figure 971: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'spring' season in 'east2' region.

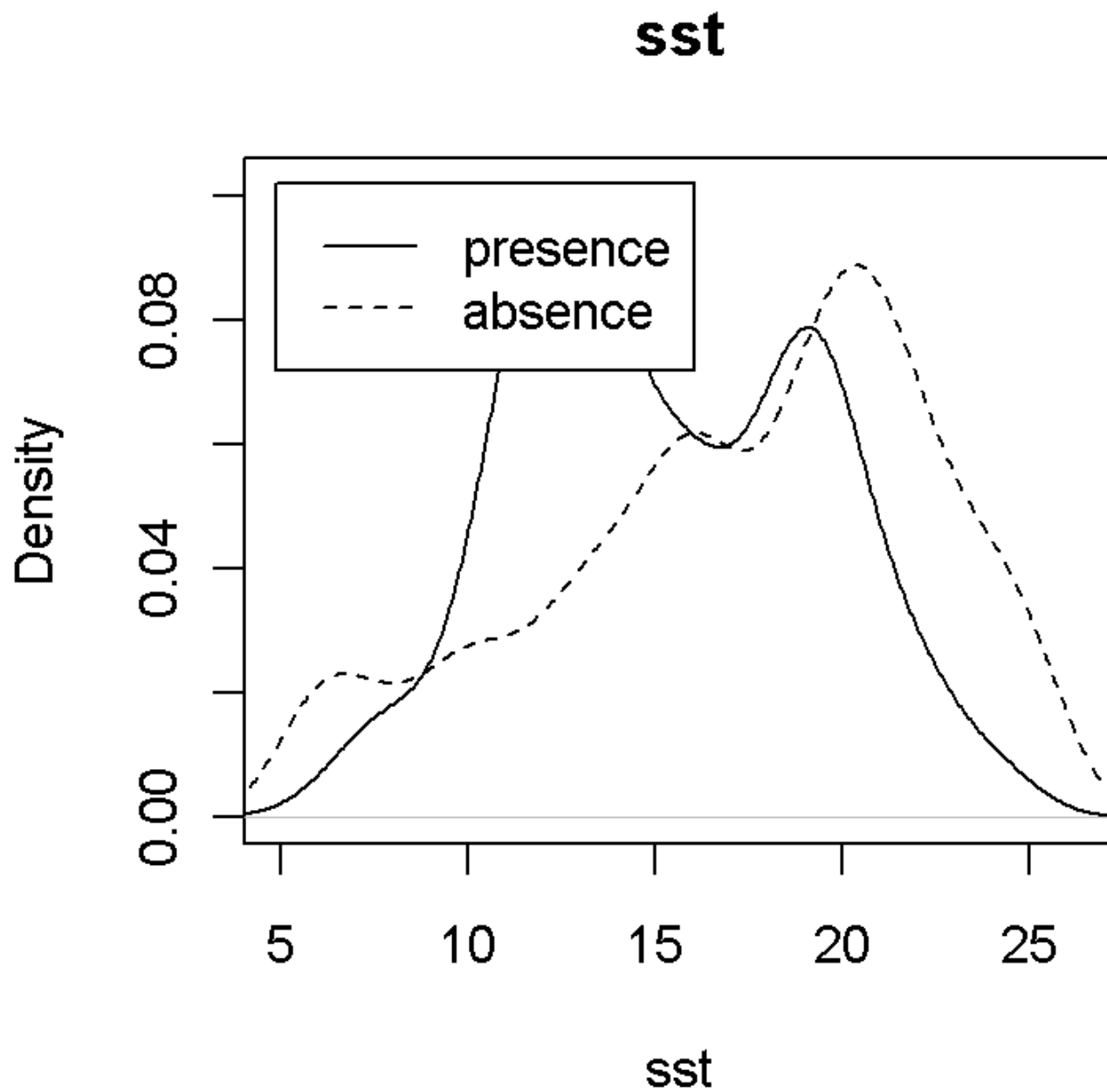


Figure 972: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'spring' season in 'east2' region.

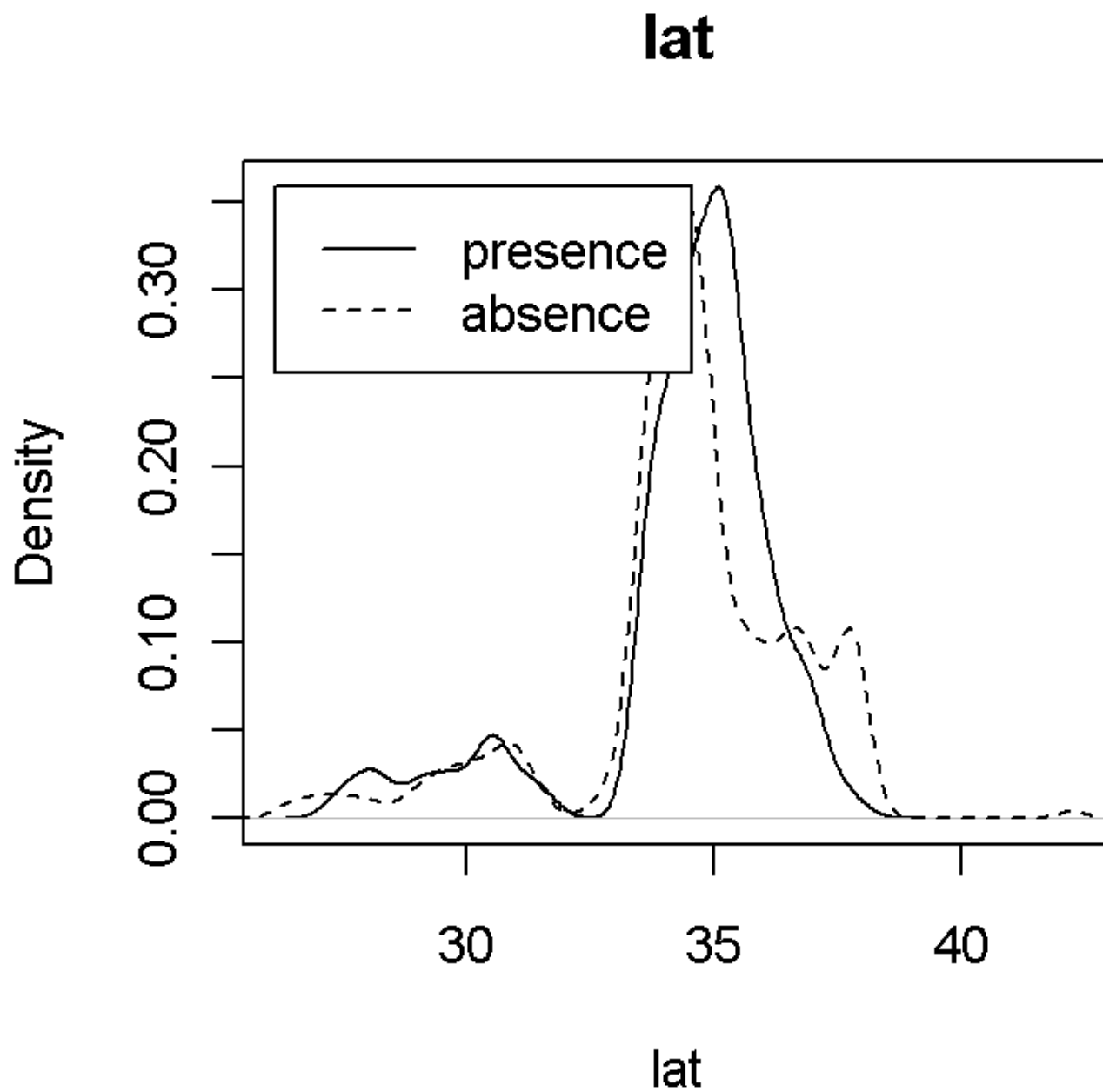


Figure 973: Density histogram of latitude (degrees) for 'Tursiops' guild during 'spring' season in 'east2' region.

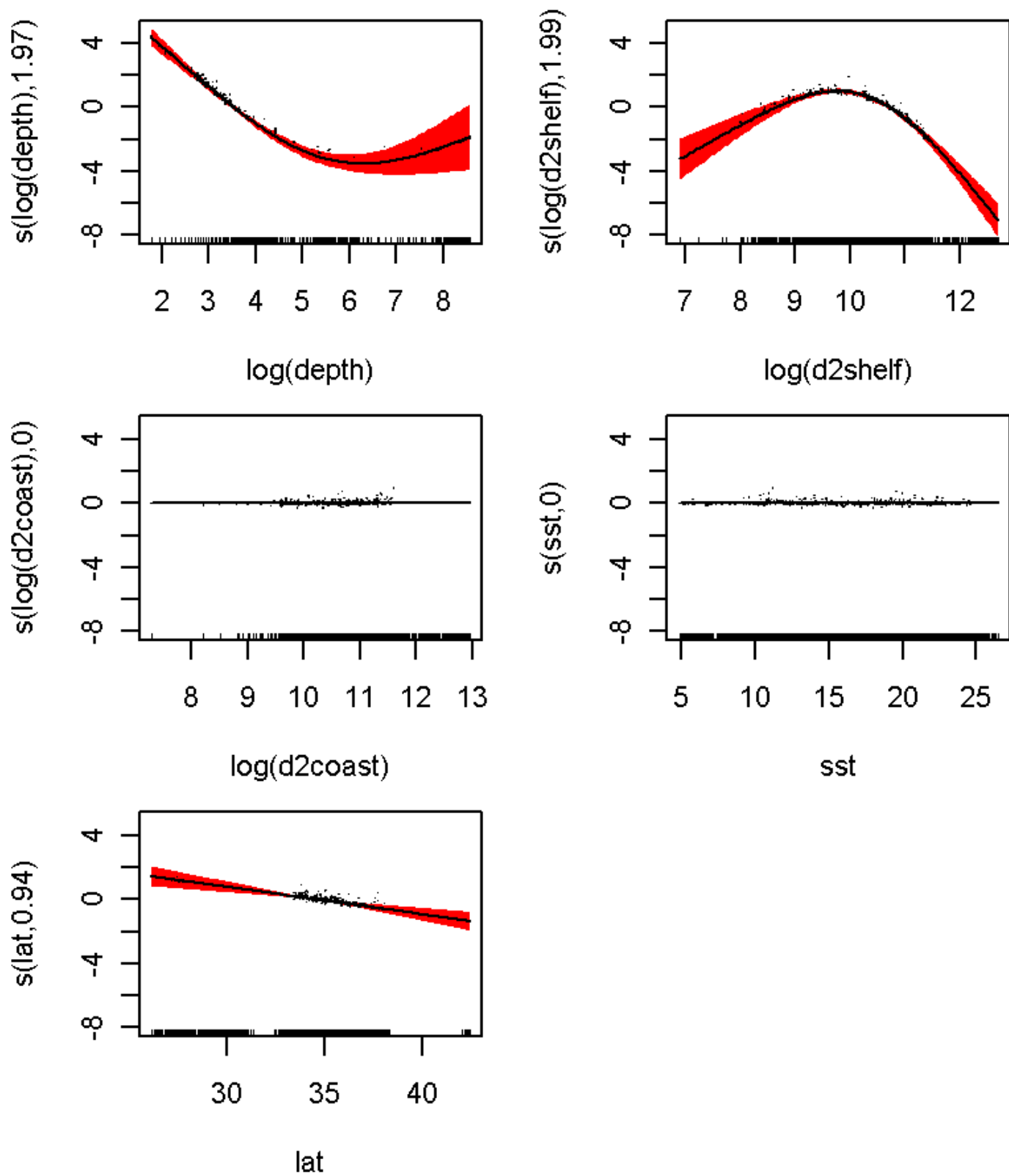


Figure 974: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'spring' season in 'east2' region.

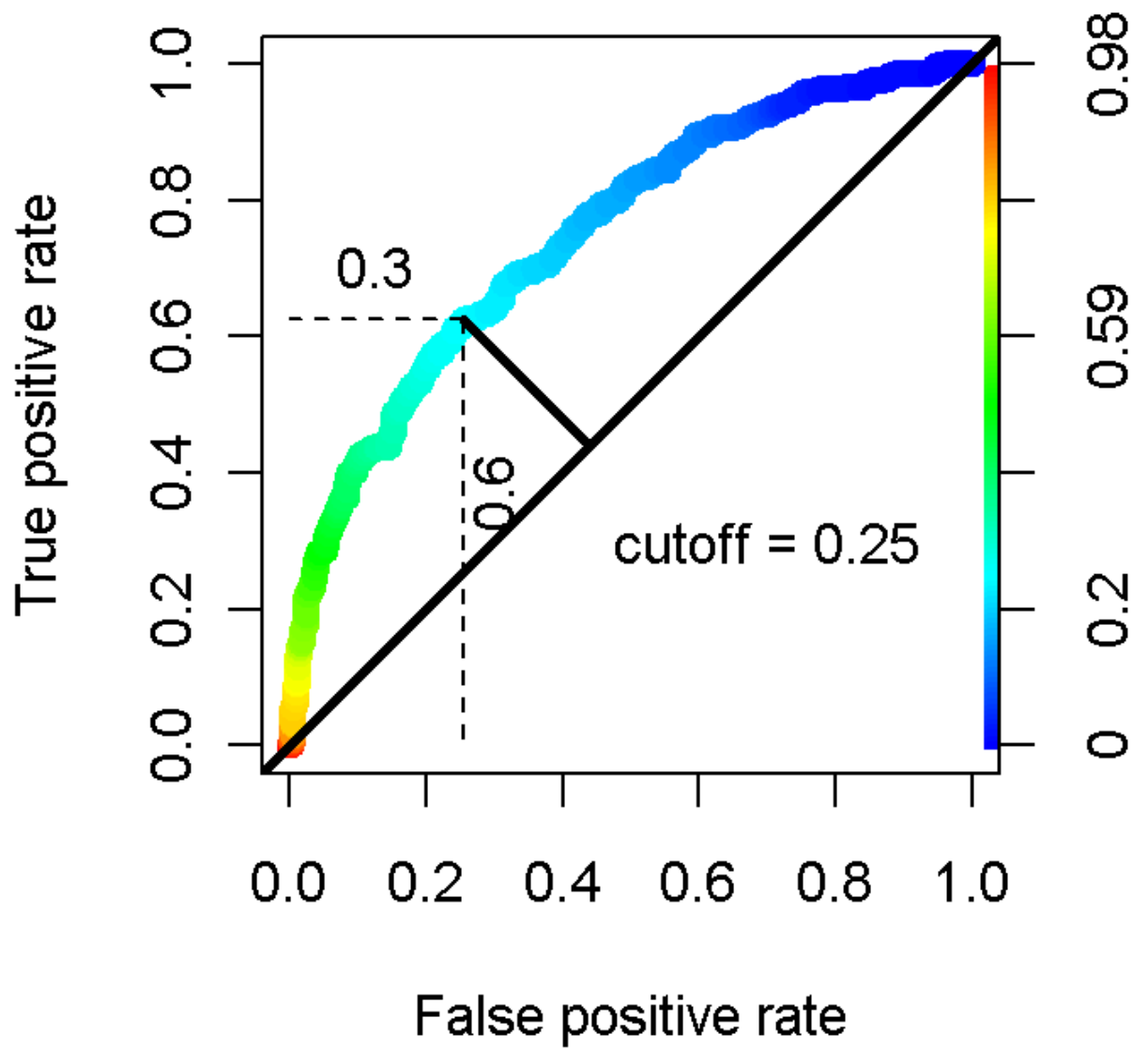


Figure 975: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'spring' season in 'east2' region.

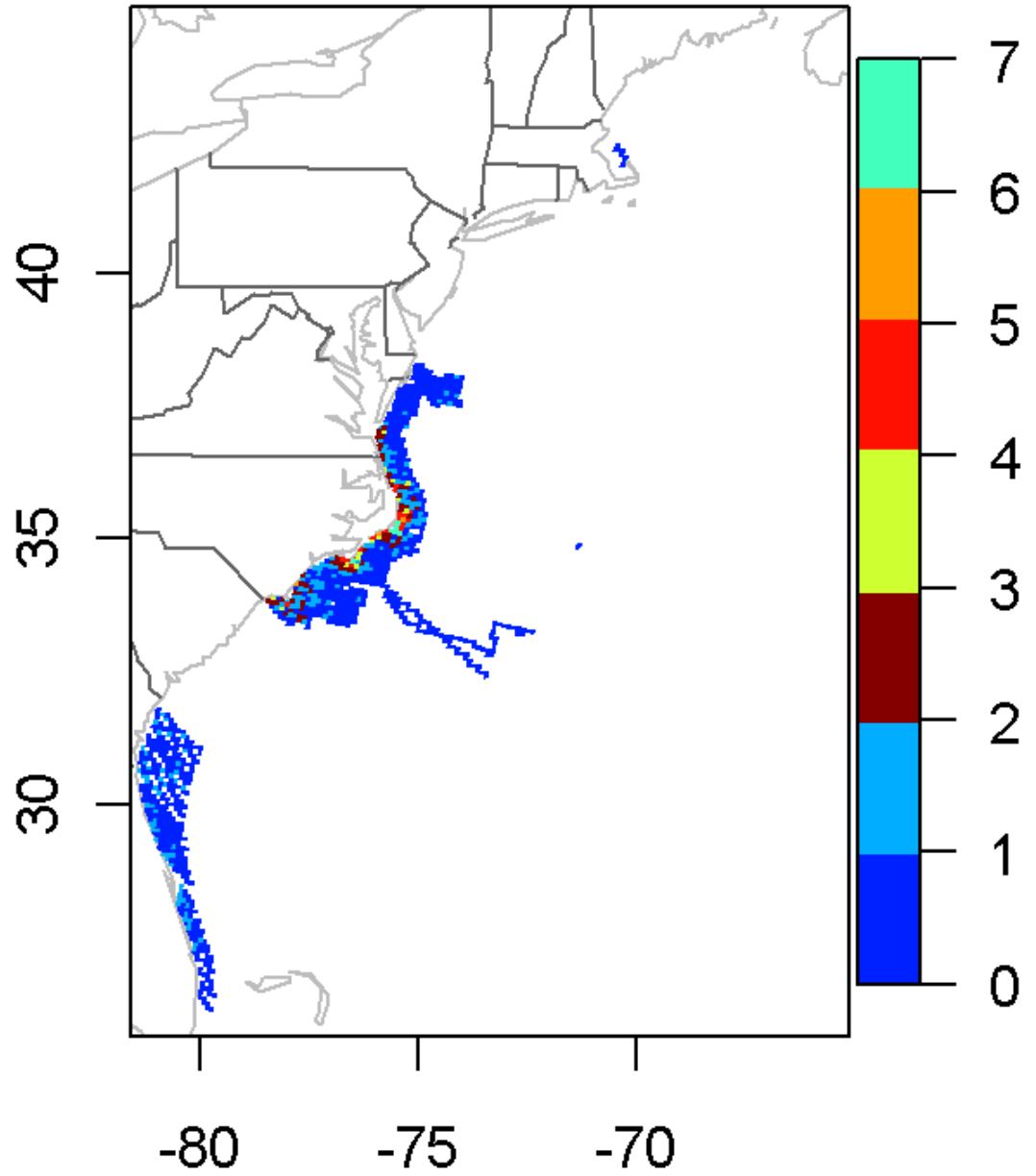


Figure 976: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'spring' season in 'east2' region.

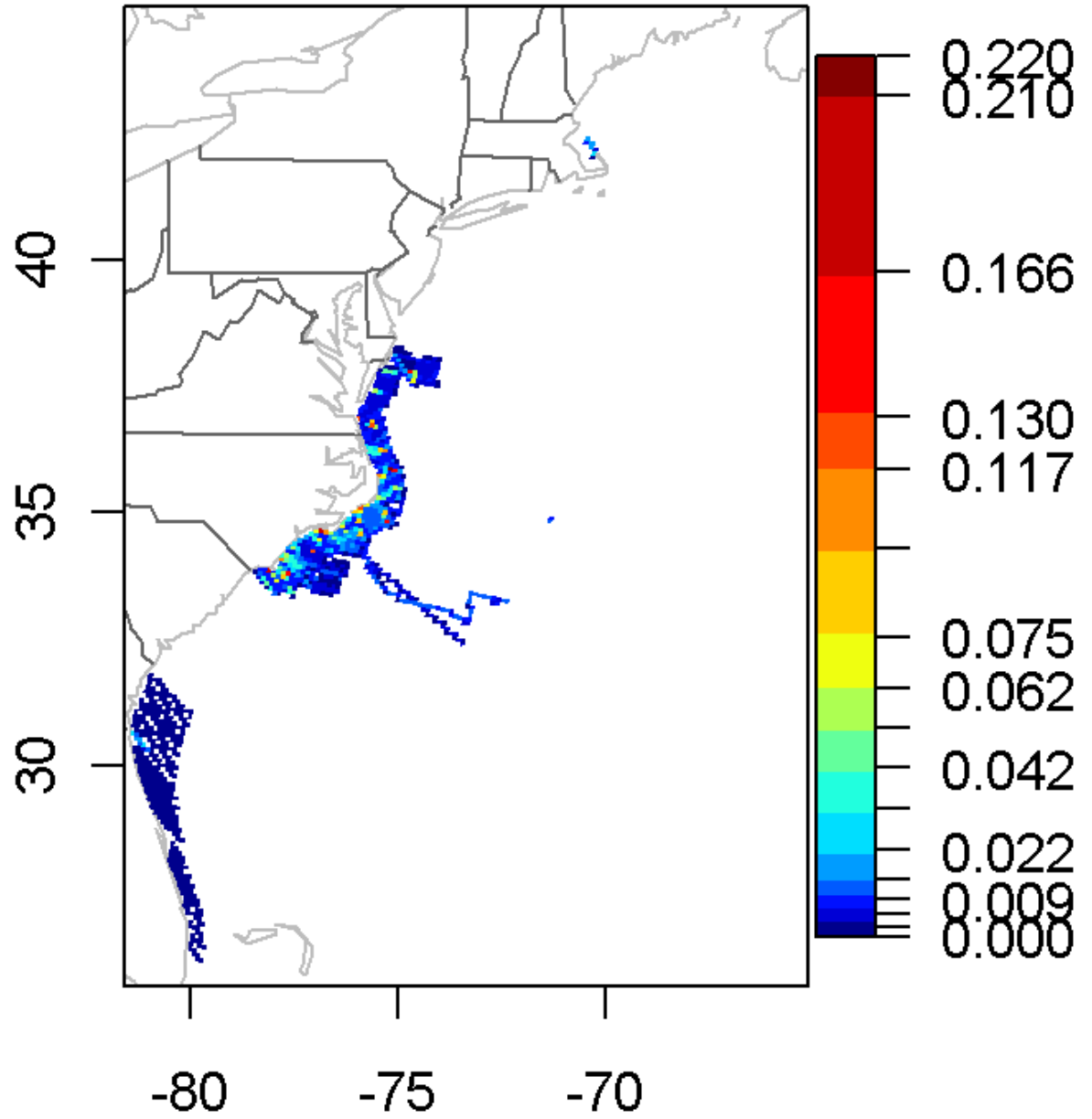


Figure 977: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'spring' season in 'east2' region.

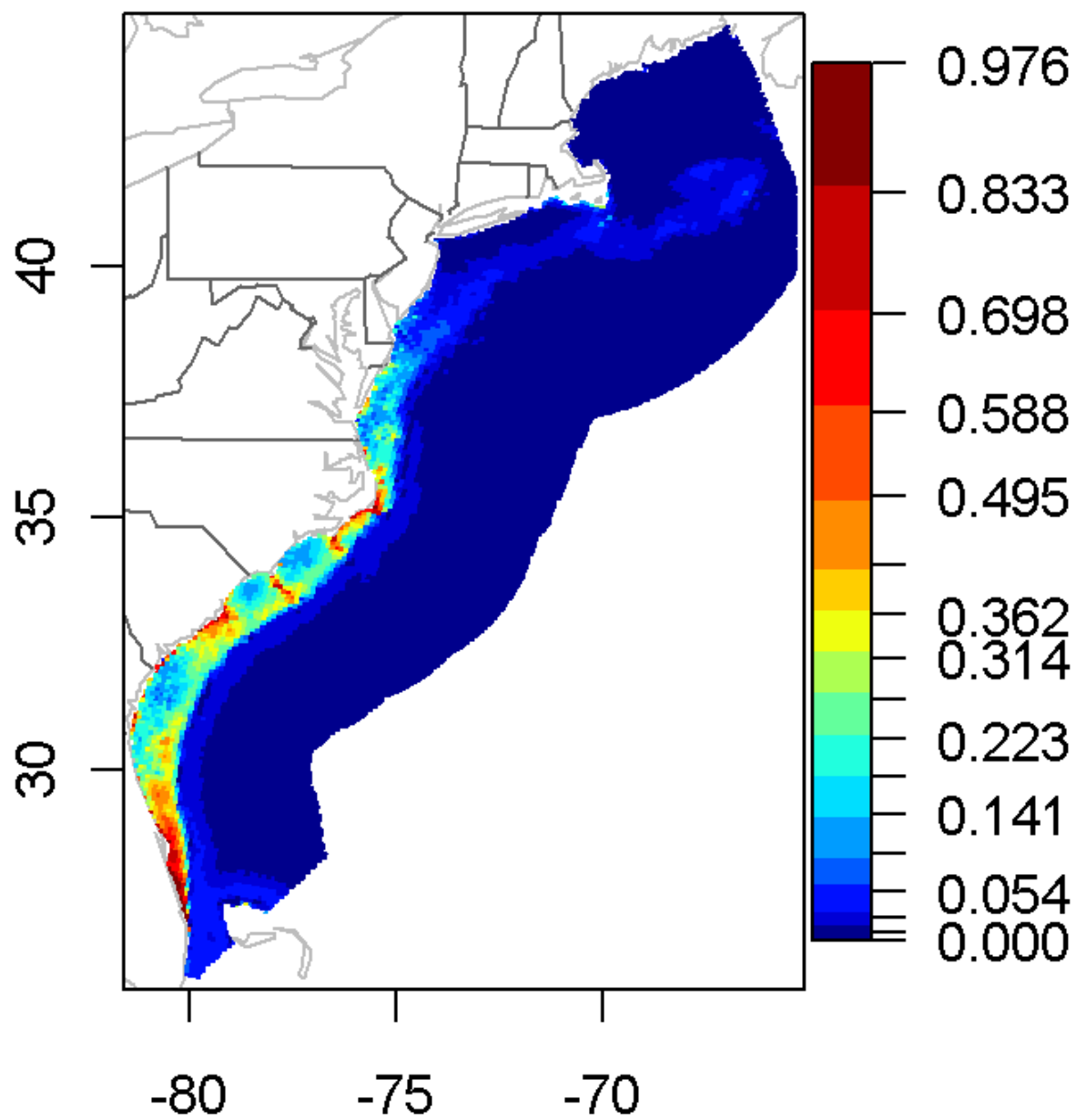


Figure 978: Map of mean predicted habitat for 'Tursiops' guild during 'spring' season in 'east2' region.

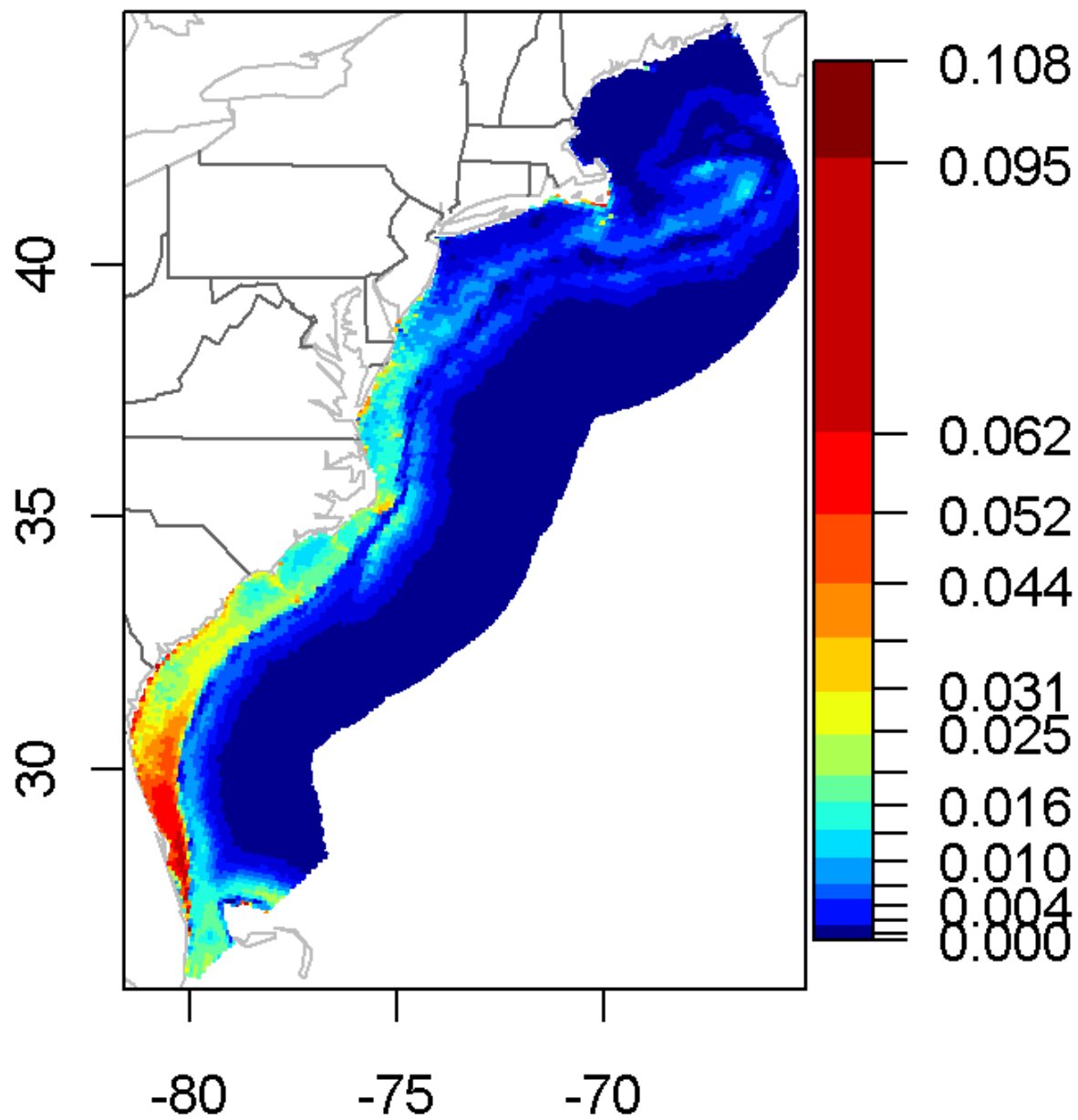


Figure 979: Map of standard error of habitat for 'Tursiops' guild during 'spring' season in 'east2' region.

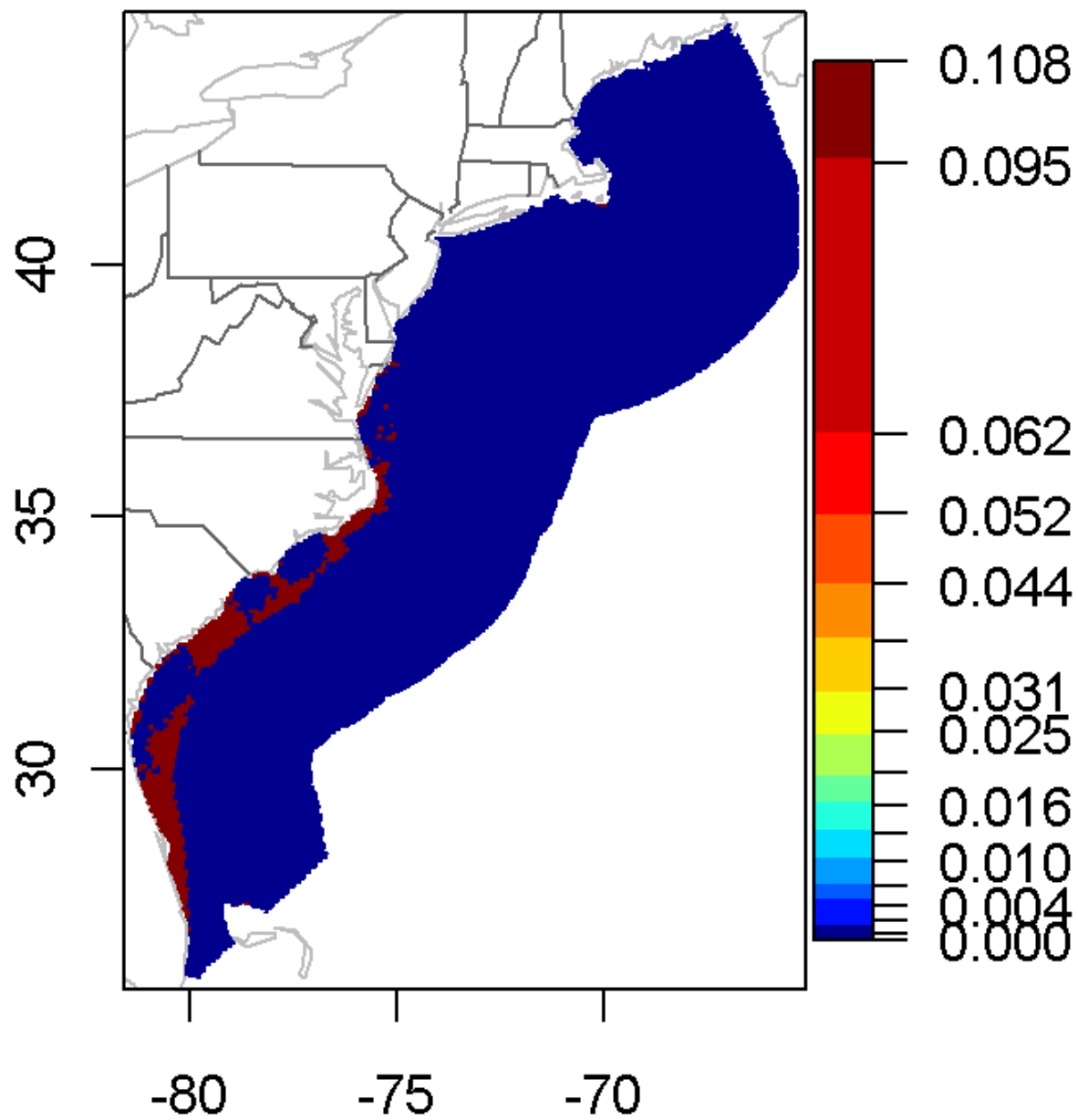


Figure 980: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'spring' season in 'east2' region.

18.2.2 gomex2

Modelrun identifier: duke_06_tu3_spring_gomex2

Date generated: 2008-10-21 12:04:18

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 89: Summary for duke(6) GAM model: for 'Tursiops' guild during 'spring' season in 'gomex2' region.

	Value
Number.presences	157
Number.absences	4660
GAM.converged	TRUE
R.squared	0.0506271
Deviance.explained	0.278152
ROC.optimum	0.330811
Maximum.fit	0.0337484
Maximum.prediction	0.647656

Model text summary...

```
duke_06_tu3_spring_gomex2 run on Tue Oct 21 12:02:57 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'spring', region:gomex2

max.fit:0.330811, max.prediction:0.647656, ROC.optimum:0.033748

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -6.7769      0.2341  -28.94   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  9.695e-01 1.4695  51.319 < 2e-16 ***
s(log(d2shelf)) 1.990e+00 2.4897  96.830 < 2e-16 ***
s(log(d2coast)) 9.522e-01 1.4522  27.142 1.04e-09 ***
s(sst)         3.054e-05 0.5000  0.000287  0.898
s(lat)         1.847e-03 0.5018   0.001   0.883
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.0506   Deviance explained = 27.8%
GCV score = 0.001768   Scale est. = 0.0017647   n = 4817

summary(dat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:4817  Min.   : 14  Min.   : 11  Min.   : 272  Min.   : 21187  Min.   :19.73  Min.   :24.05
              1st Qu.:2144 1st Qu.: 511 1st Qu.: 24696 1st Qu.:142982 1st Qu.:24.23 1st Qu.:26.38
              Median :4222 Median :1292 Median : 63128 Median :211670 Median :25.35 Median :27.38
              Mean   :3977 Mean   :1537 Mean   : 82827 Mean   :213952 Mean   :25.14 Mean   :27.25
              3rd Qu.:5932 3rd Qu.:2668 3rd Qu.:131568 3rd Qu.:276022 3rd Qu.:26.17 3rd Qu.:28.13
              Max.   :8191 Max.   :3523 Max.   :257870 Max.   :404358 Max.   :28.42 Max.   :30.06

summary(newdat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :19.95  Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0 1st Qu.: 31617 1st Qu.: 85289 1st Qu.:21.83 1st Qu.:26.28
              Median :4110 Median : 433.5 Median : 71100 Median :157258 Median :23.02 Median :27.29
```


Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:23.04	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:24.00	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:26.25	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:1.127e-06	Min.	:7.218e-07	Min.	:0.000e+00	Min.	:7.296e-06	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:1.491e-04	1st Qu.	:4.923e-05	1st Qu.	:0.000e+00	1st Qu.	:4.063e-03	1st Qu.	:0.0000
Median	:4110	Median	:2.637e-03	Median	:6.912e-04	Median	:0.000e+00	Median	:9.499e-03	Median	:0.0000
Mean	:3997	Mean	:3.505e-02	Mean	:3.322e-03	Mean	:8.833e-02	Mean	:2.365e-02	Mean	:0.2734
3rd Qu.	:6015	3rd Qu.	:4.164e-02	3rd Qu.	:4.964e-03	3rd Qu.	:0.000e+00	3rd Qu.	:2.987e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:6.477e-01	Max.	:6.587e-02	Max.	:5.000e+00	Max.	:2.695e-01	Max.	:1.0000
						NA's	:4.838e+03	NA's	:4.838e+03		

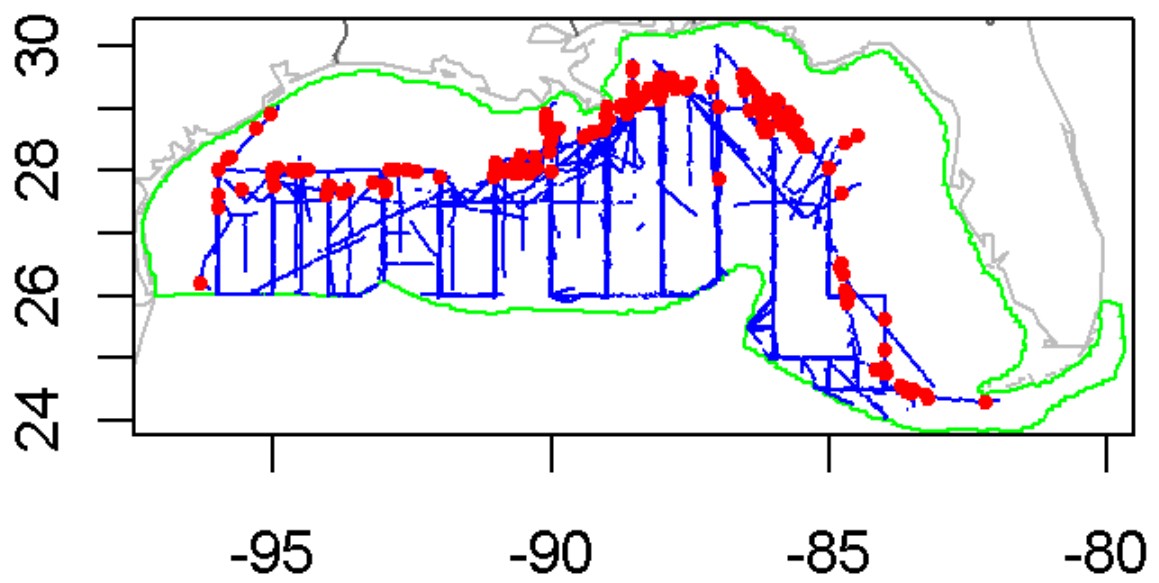


Figure 981: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'spring' season in 'gomex2' region.

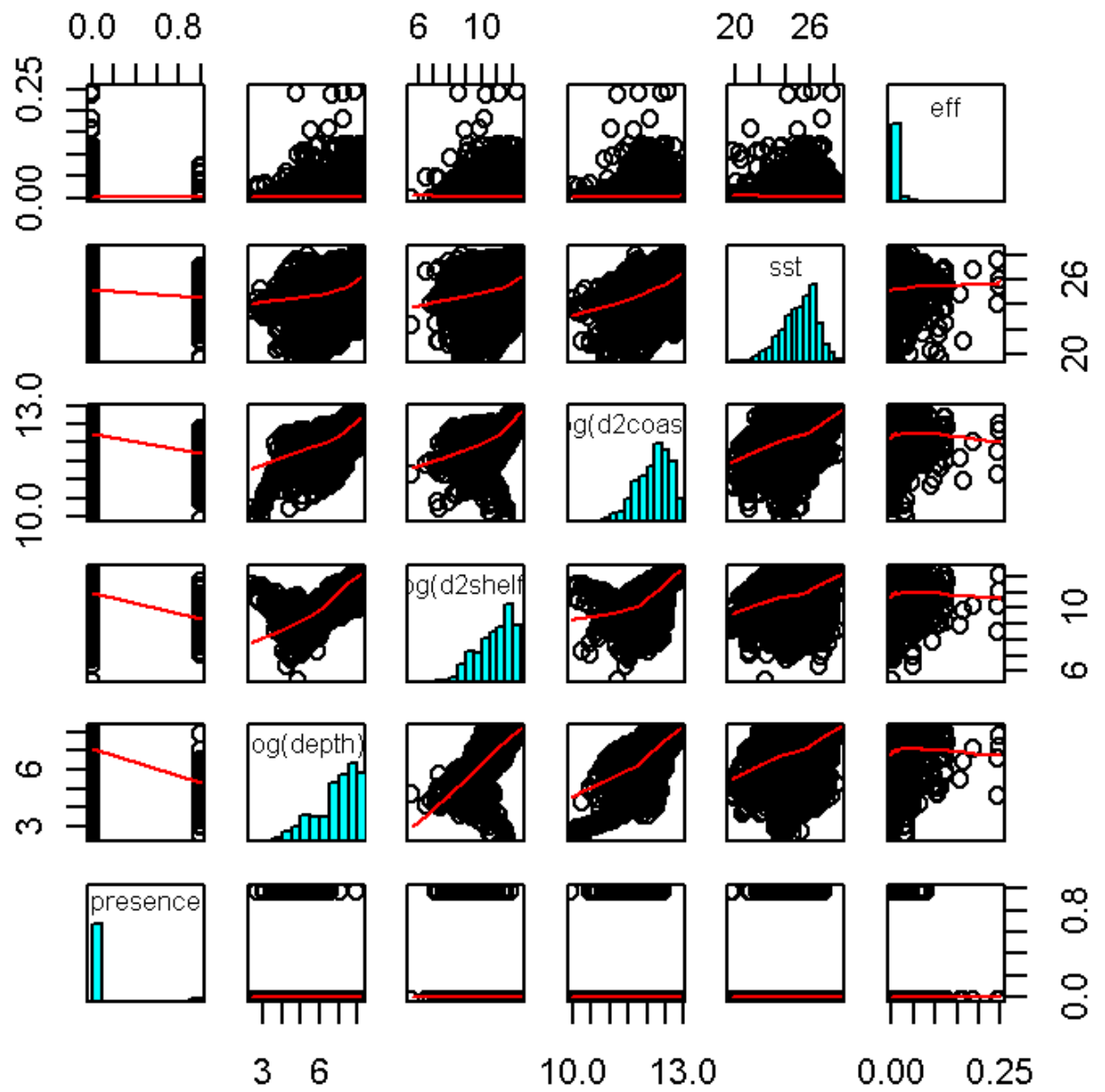


Figure 982: Pairs plot of input variables for 'Tursiops' guild during 'spring' season in 'gomex2' region.

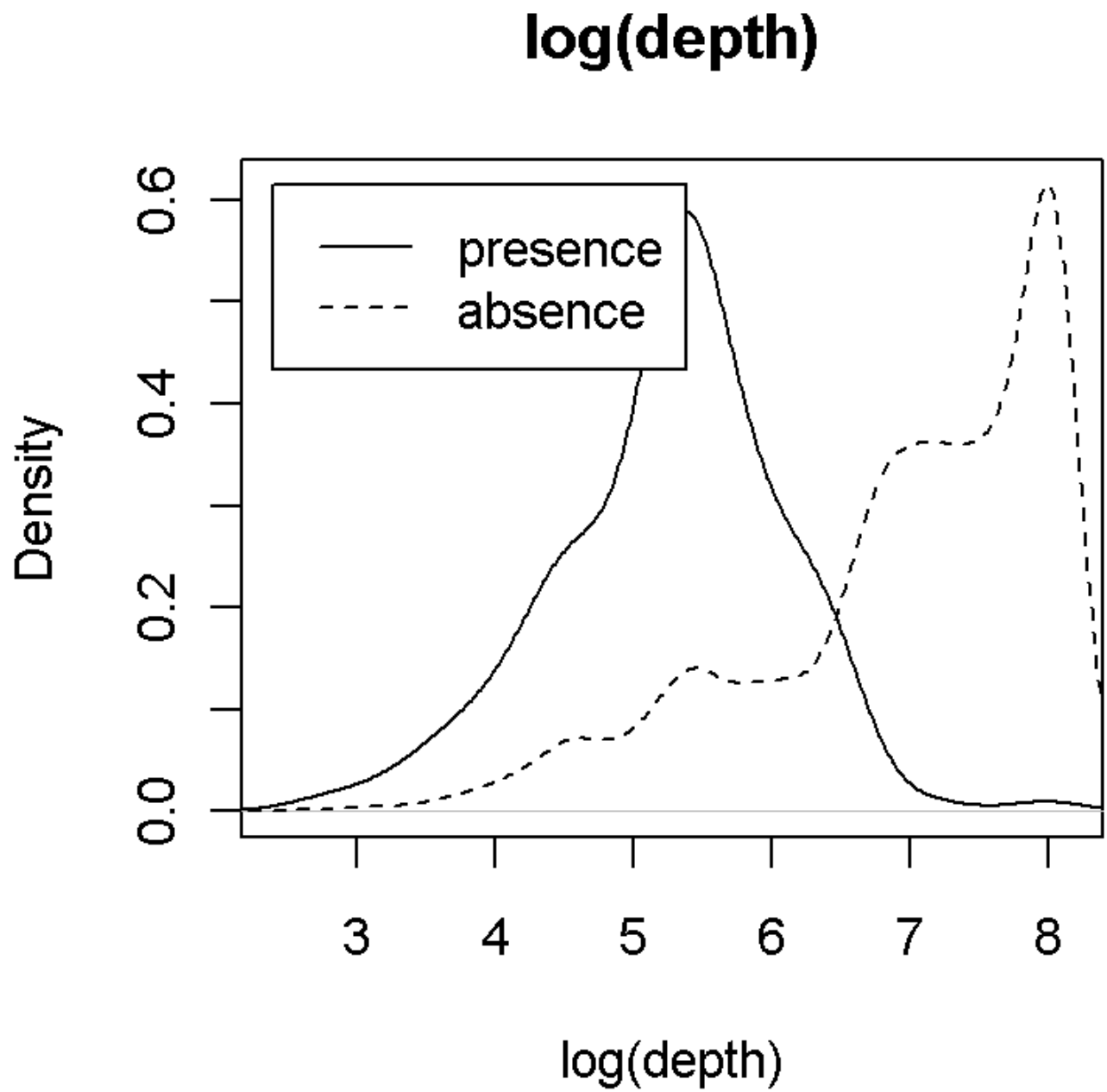


Figure 983: Density histogram of depth $\log(\text{meters})$ for 'Tursiops' guild during 'spring' season in 'gomex2' region.

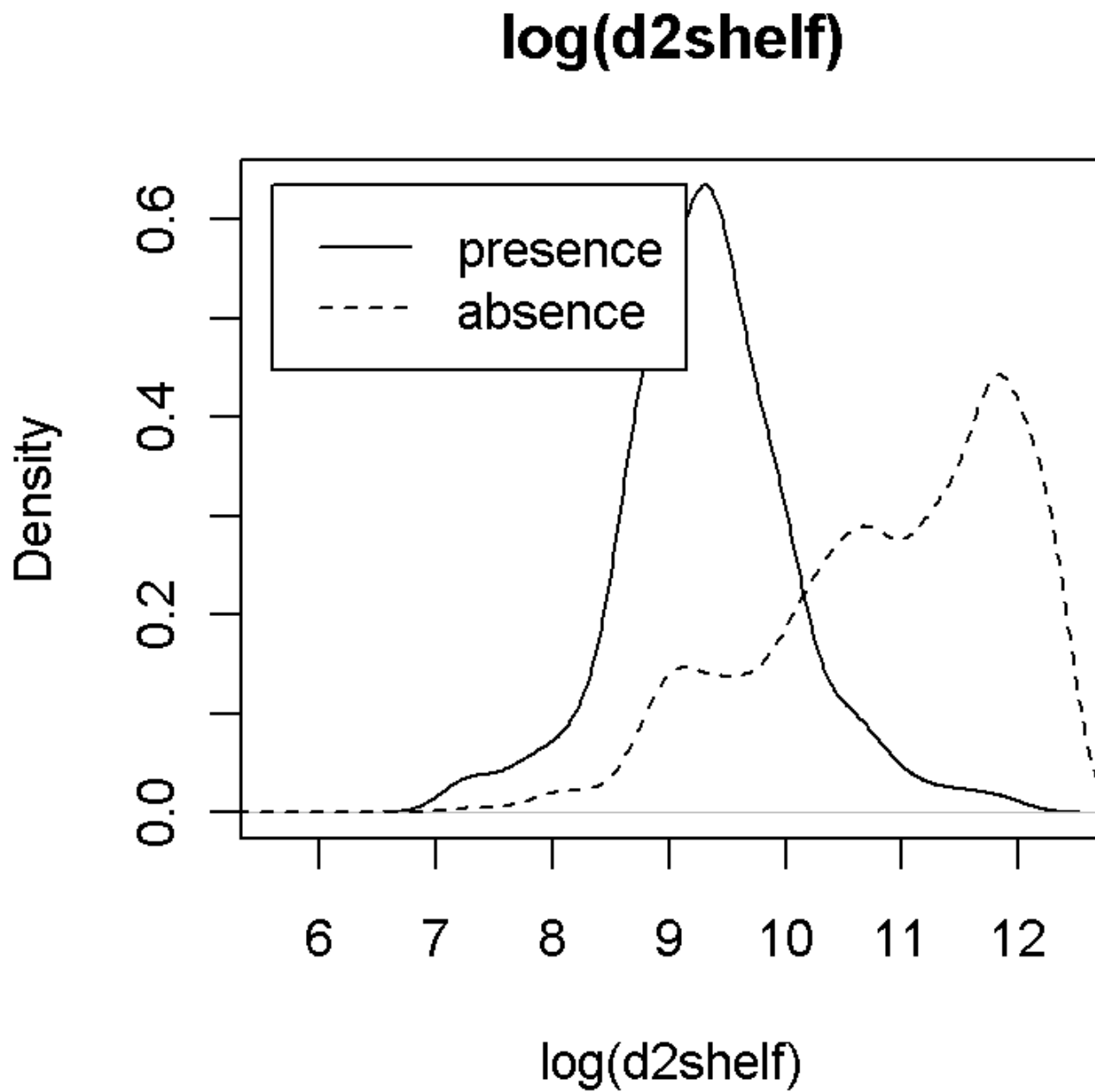


Figure 984: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'spring' season in 'gomex2' region.

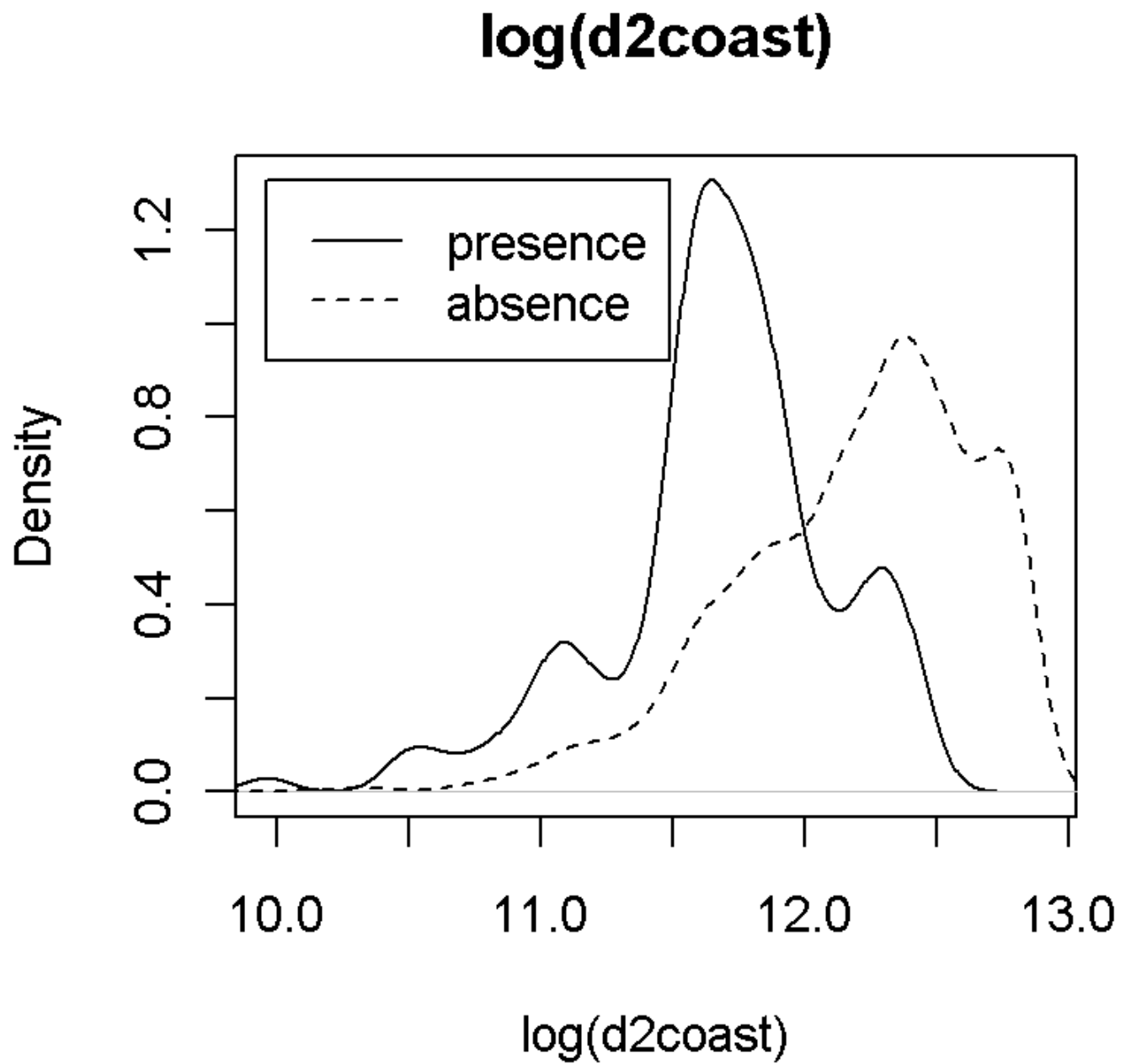


Figure 985: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'spring' season in 'gomex2' region.

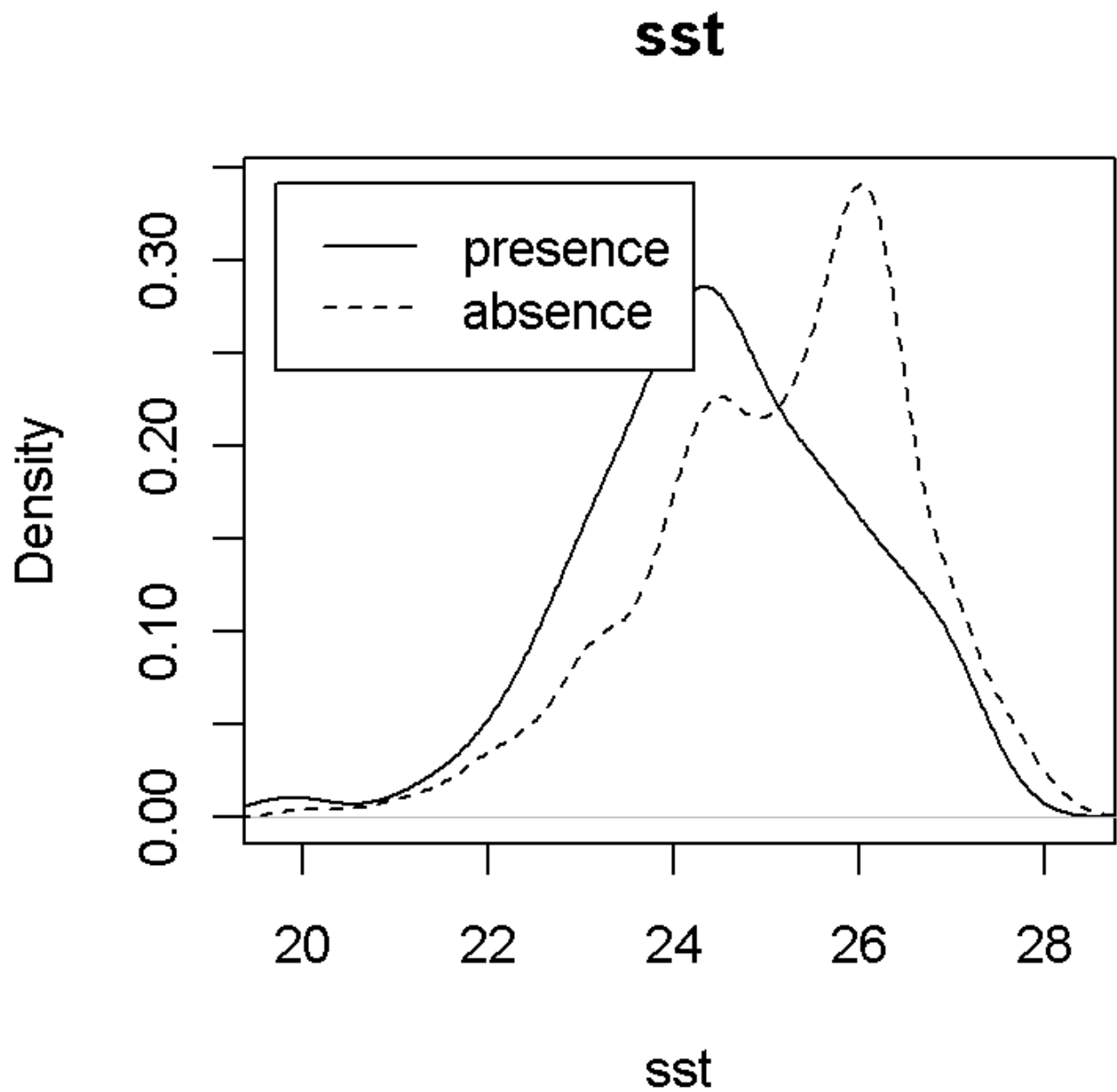


Figure 986: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'spring' season in 'gomex2' region.

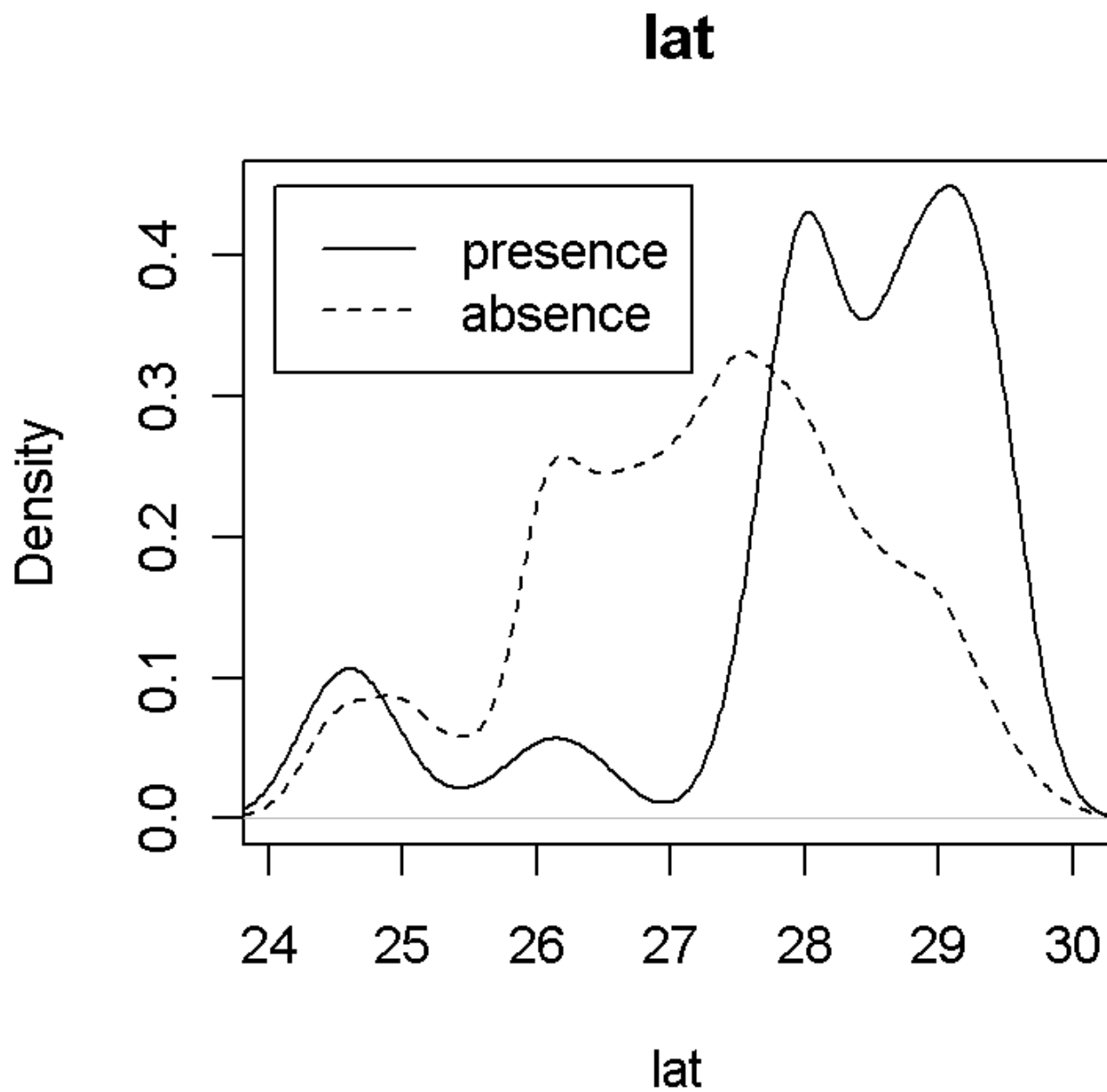


Figure 987: Density histogram of latitude (degrees) for 'Tursiops' guild during 'spring' season in 'gomex2' region.

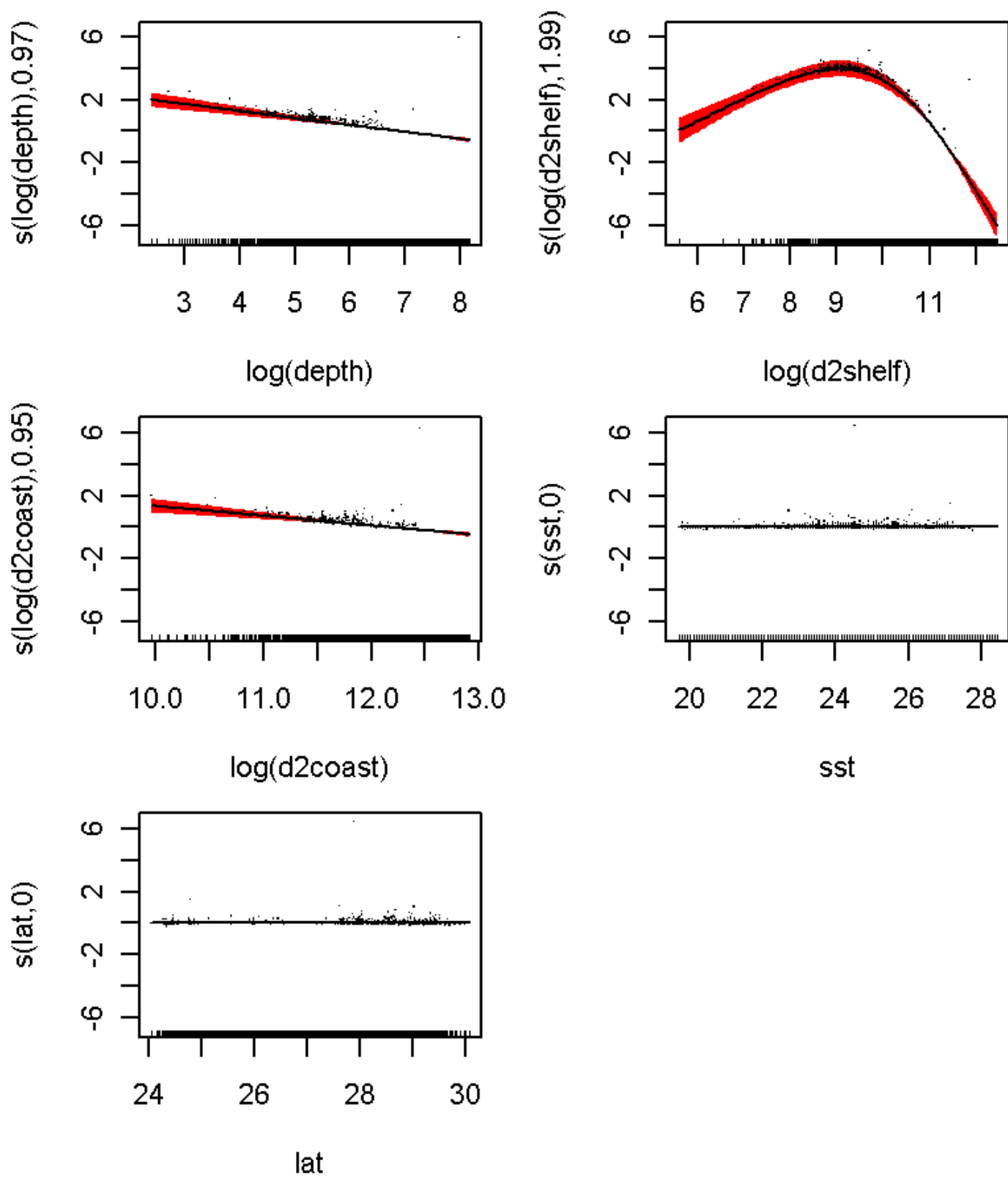


Figure 988: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'spring' season in 'gomex2' region.

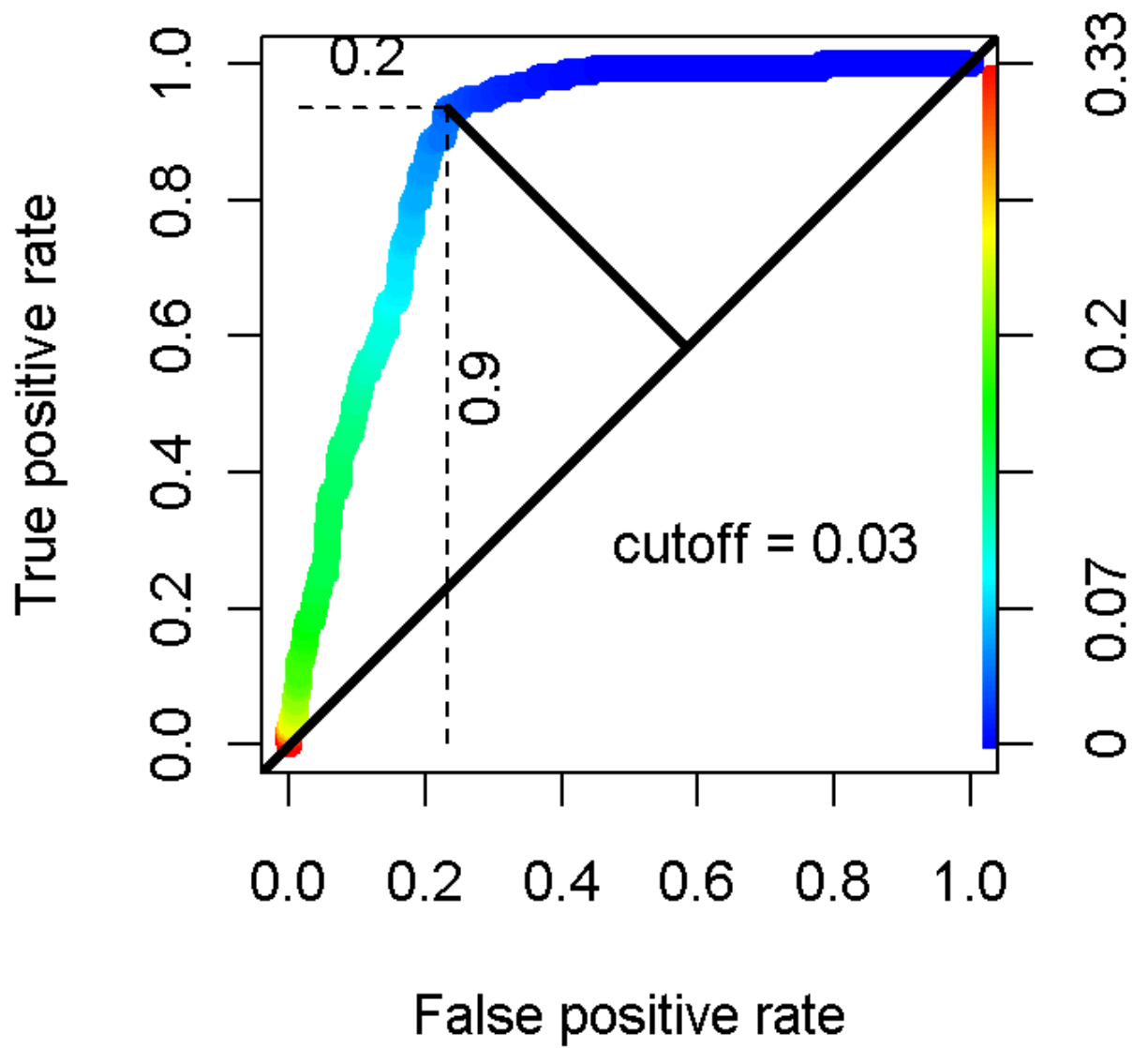


Figure 989: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'spring' season in 'gomex2' region.

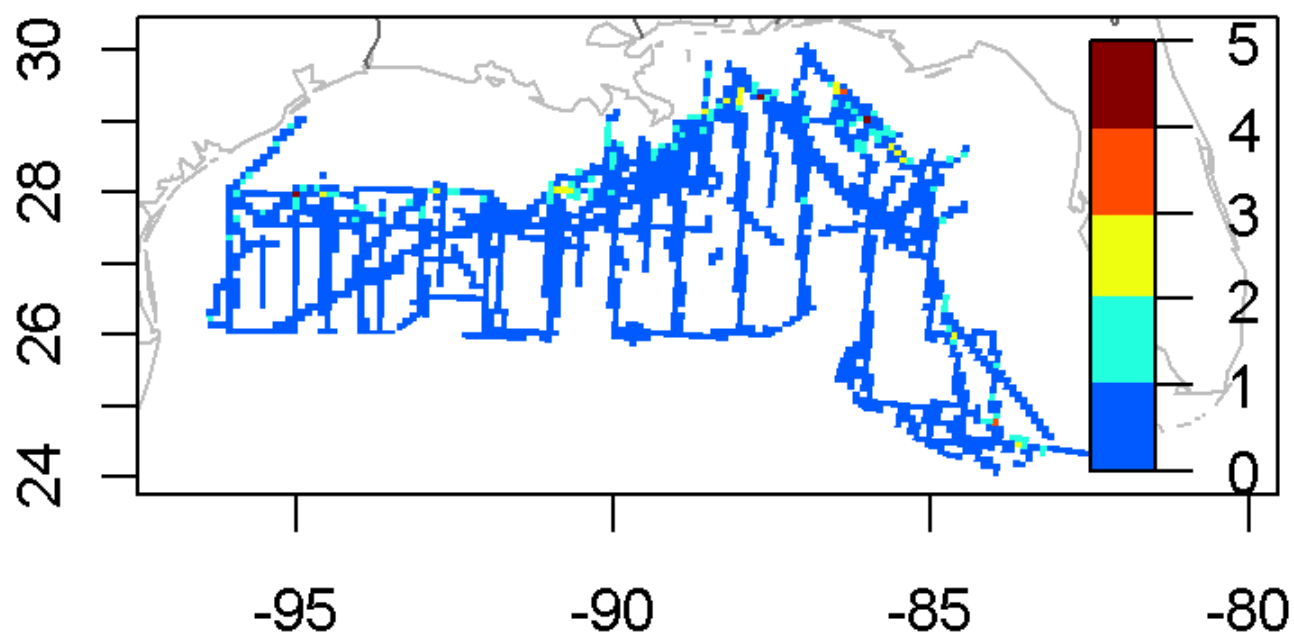


Figure 990: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'spring' season in 'gomex2' region.

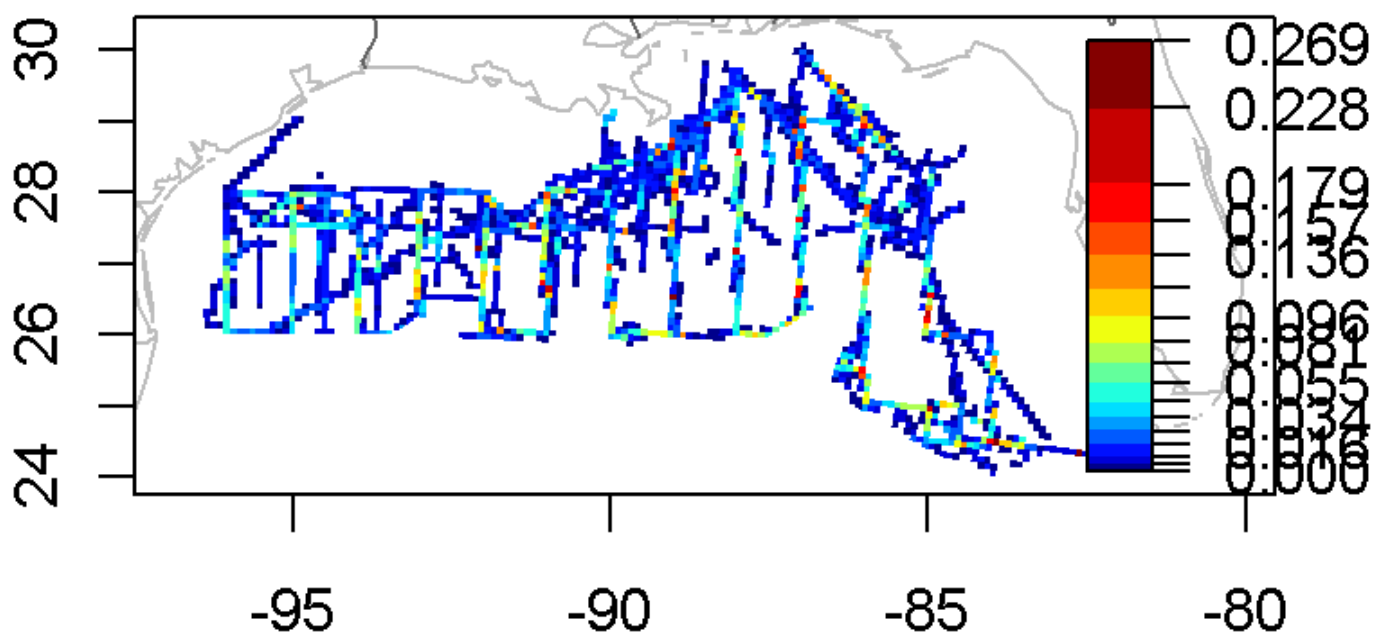


Figure 991: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'spring' season in 'gomex2' region.

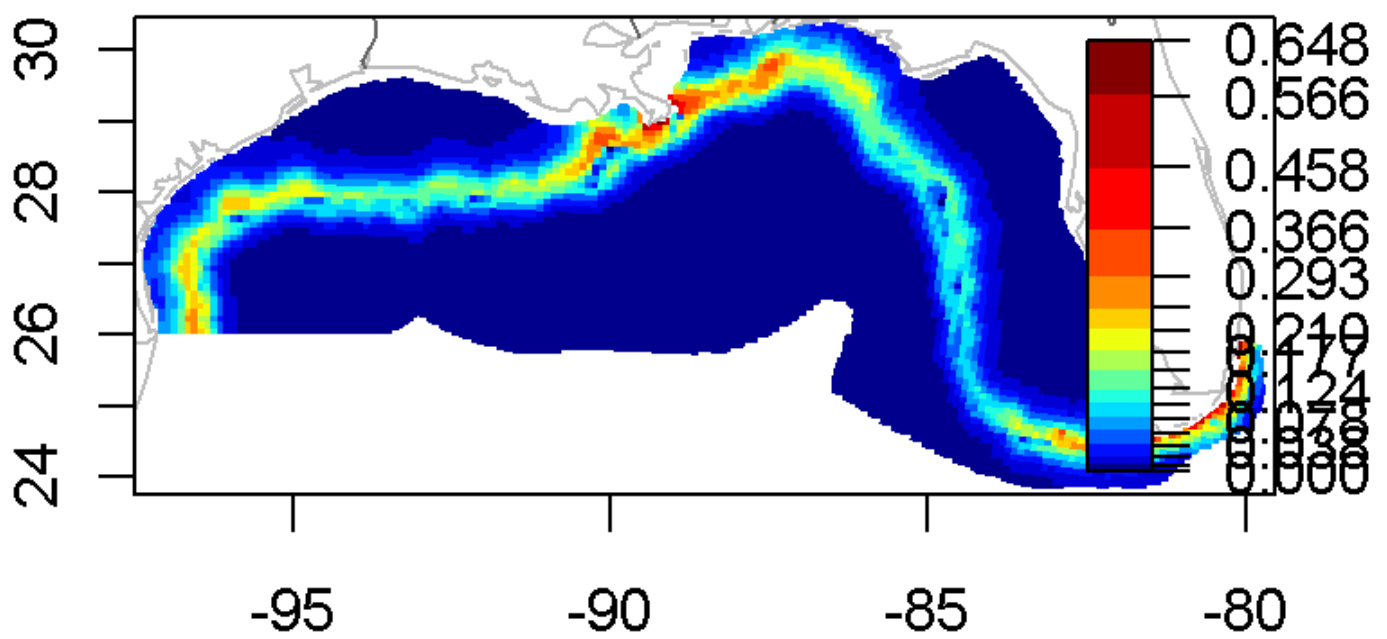


Figure 992: Map of mean predicted habitat for 'Tursiops' guild during 'spring' season in 'gomex2' region.

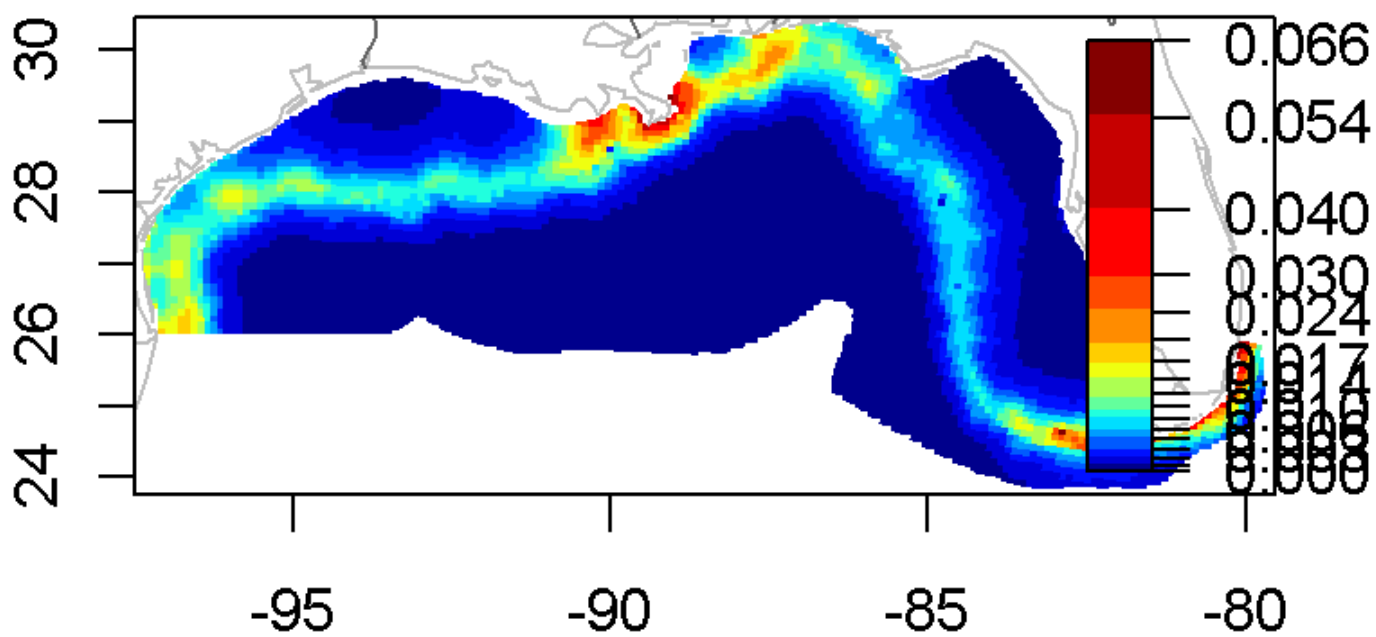


Figure 993: Map of standard error of habitat for 'Tursiops' guild during 'spring' season in 'gomex2' region.

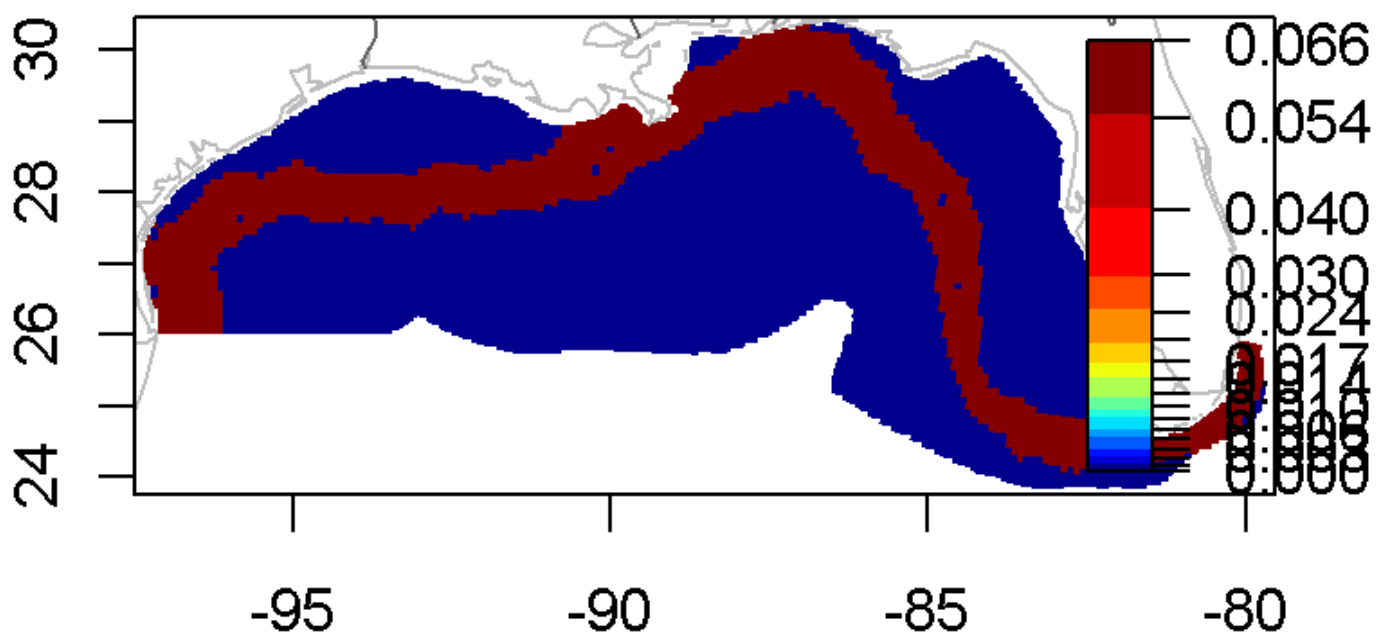


Figure 994: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'spring' season in 'gomex2' region.

18.2.3 ne2

Modelrun identifier: duke_06_tu3_spring_ne2

Date generated: 2008-10-21 15:38:39

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 90: Summary for duke(6) GAM model: for 'Tursiops' guild during 'spring' season in 'ne2' region.

	Value
Number.presences	204
Number.absences	883
GAM.converged	TRUE
R.squared	0.534618
Deviance.explained	0.307366
ROC.optimum	0.879142
Maximum.fit	0.198772
Maximum.prediction	0.879141

Model text summary...

```
duke_06_tu3_spring_ne2 run on Tue Oct 21 15:38:05 2008
  provider:duke, version:06, guild:Tursiops (tu3), season:'spring', region:ne2

max.fit:0.879142, max.prediction:0.879141, ROC.optimum:0.198772

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -2.1827      0.1316  -16.58   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  9.301e-01  1.430  30.739 1.48e-10 ***
s(log(d2shelf)) 7.443e-01  1.244   5.492  0.0133 *
s(log(d2coast)) 1.418e-05  0.500  2.49e-05  0.9449
s(sst)         2.307e-05  0.500  8.92e-05  0.9242
s(lat)         1.000e+00  1.500 100.368 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.535   Deviance explained = 30.7%
GCV score = 0.0032111   Scale est. = 0.0031898   n = 996

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:1087  Min.   : 1654  Min.   :  6.0  Min.   :  995  Min.   : 6913  Min.   :  4.886  Min.   :34.82
          1st Qu.:11228  1st Qu.: 20.0  1st Qu.:11693  1st Qu.: 34115  1st Qu.:  9.600  1st Qu.:35.43
          Median :11478  Median : 28.0  Median :25816  Median : 51825  Median :12.563  Median :36.21
          Mean   :10257  Mean   :130.2  Mean   :32924  Mean   : 54375  Mean   :12.885  Mean   :36.35
          3rd Qu.:12121  3rd Qu.: 44.5  3rd Qu.: 48491  3rd Qu.: 69803  3rd Qu.:15.845  3rd Qu.:37.10
          Max.   :15889  Max.   :4486.0  Max.   :329182  Max.   :407437  Max.   :23.806  Max.   :42.39
                   NA's   :91.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  6  Min.   :  5  Min.   : 1259  Min.   :  2.850  Min.   :34.27
          1st Qu.:12297  1st Qu.: 84  1st Qu.: 33503  1st Qu.: 94835  1st Qu.:  6.225  1st Qu.:37.36
```


Median :13718	Median :1827	Median : 78620	Median :188836	Median :11.925	Median :39.16
Mean :13277	Mean :1832	Mean :102648	Mean :201021	Mean :12.050	Mean :39.20
3rd Qu.:15139	3rd Qu.:3517	3rd Qu.:154146	3rd Qu.:299808	3rd Qu.:17.025	3rd Qu.:40.92
Max. :16560	Max. :4752	Max. :354376	Max. :478082	Max. :23.025	Max. :44.74
		NA's : 2	NA's : 2		

summary(pred)...

fid_c10	fit	se.fit	presence	effort	roc
Min. : 1633	Min. :5.147e-09	Min. :9.110e-09	Min. : 0.0000	Min. :4.030e-05	Min. :0.00000
1st Qu.:12297	1st Qu.:2.735e-06	1st Qu.:2.650e-06	1st Qu.: 0.0000	1st Qu.:4.012e-03	1st Qu.:0.00000
Median :13718	Median :3.058e-05	Median :2.442e-05	Median : 0.0000	Median :6.262e-03	Median :0.00000
Mean :13277	Mean :9.803e-03	Mean :1.943e-03	Mean : 0.7391	Mean :1.548e-02	Mean :0.01478
3rd Qu.:15139	3rd Qu.:5.412e-04	3rd Qu.:4.347e-04	3rd Qu.: 1.0000	3rd Qu.:1.181e-02	3rd Qu.:0.00000
Max. :16560	Max. :8.791e-01	Max. :5.957e-02	Max. : 7.0000	Max. :2.202e-01	Max. :1.00000
	NA's :2.000e+00	NA's :2.000e+00	NA's :5409.0000	NA's :5.409e+03	

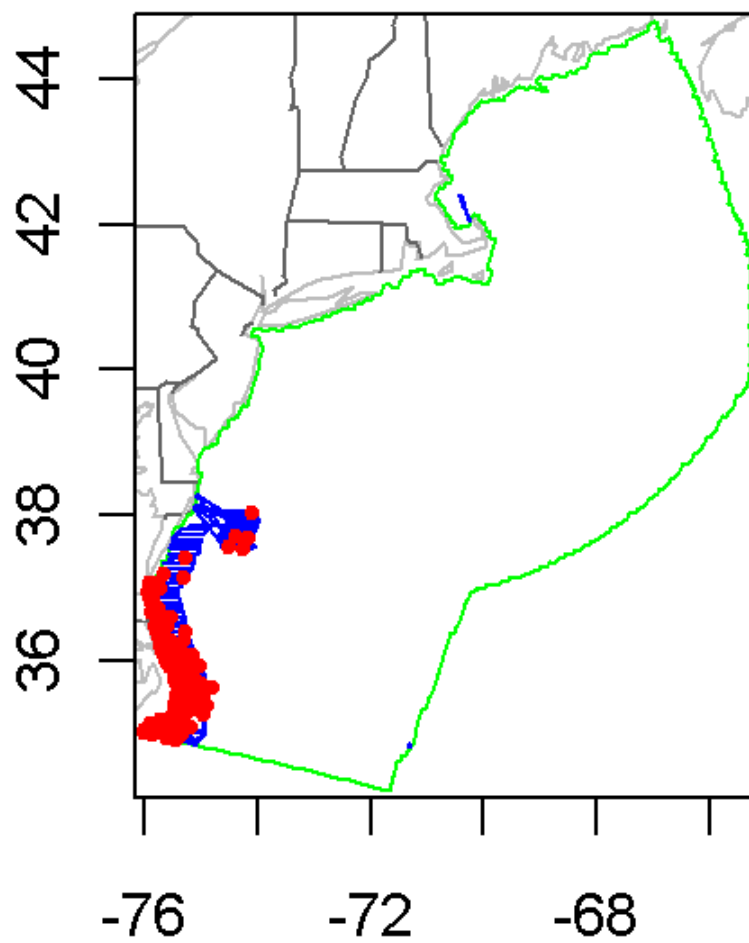


Figure 995: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'spring' season in 'ne2' region.

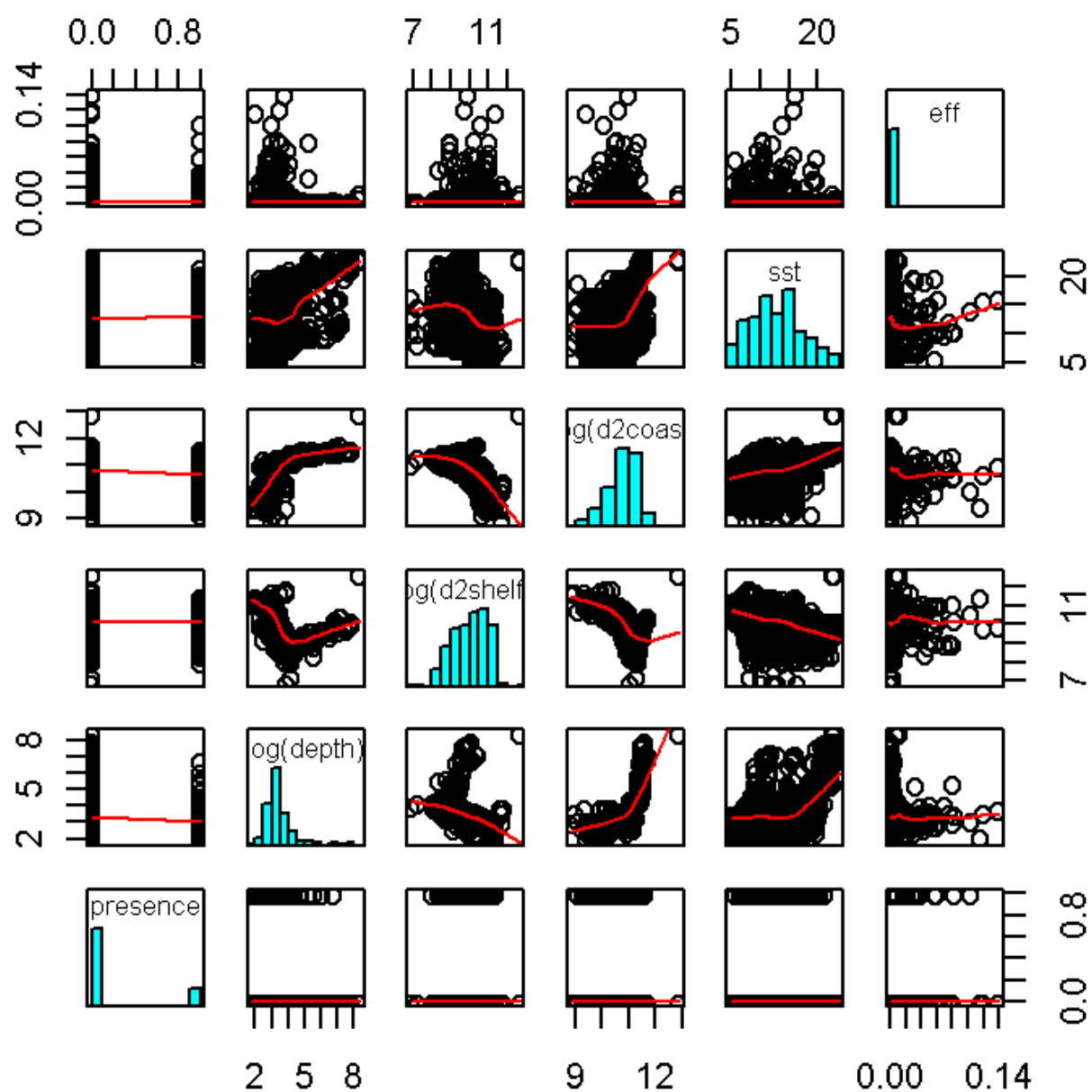


Figure 996: Pairs plot of input variables for 'Tursiops' guild during 'spring' season in 'ne2' region.

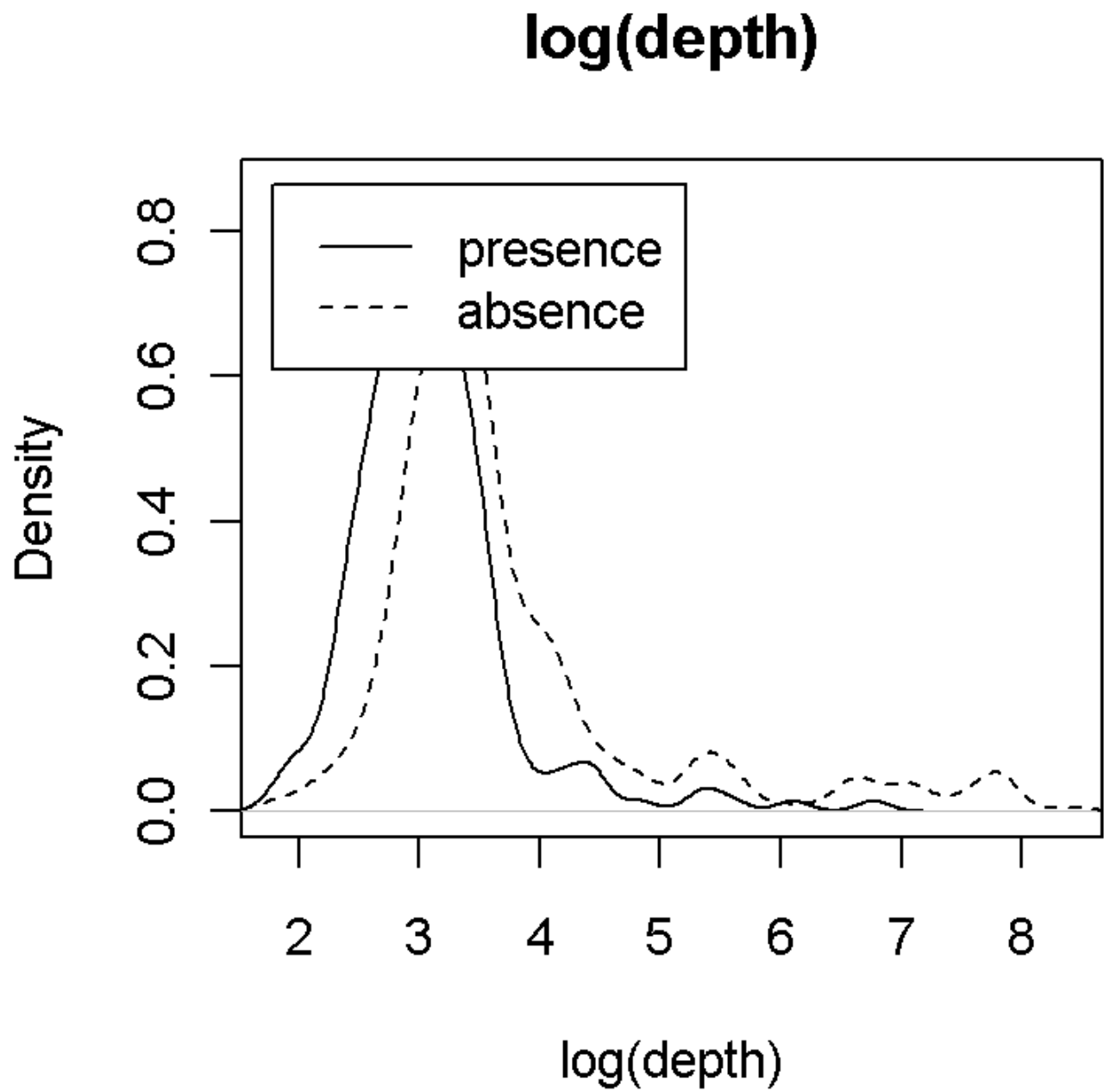


Figure 997: Density histogram of depth log(meters) for 'Tursiops' guild during 'spring' season in 'ne2' region.

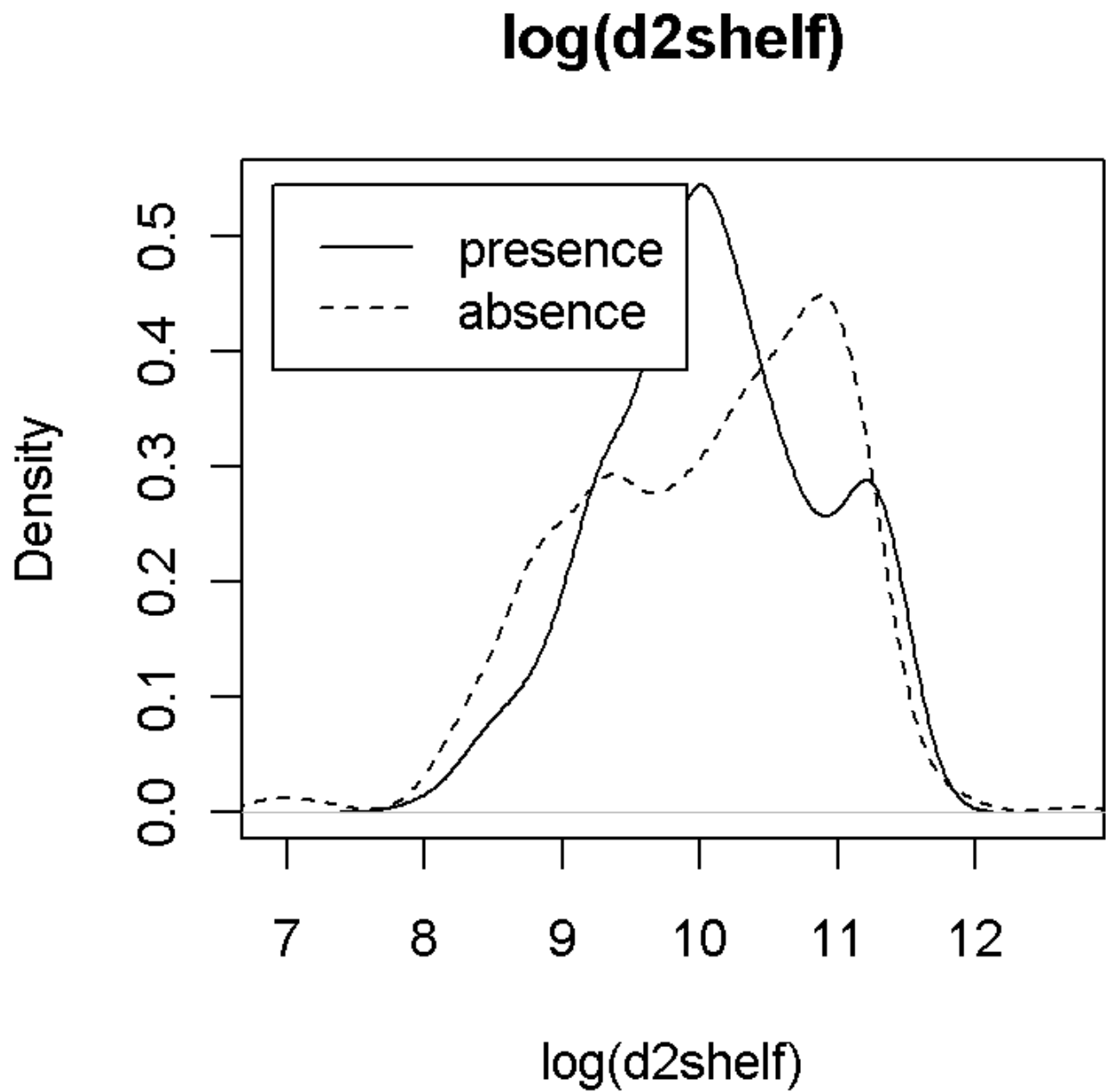


Figure 998: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'spring' season in 'ne2' region.

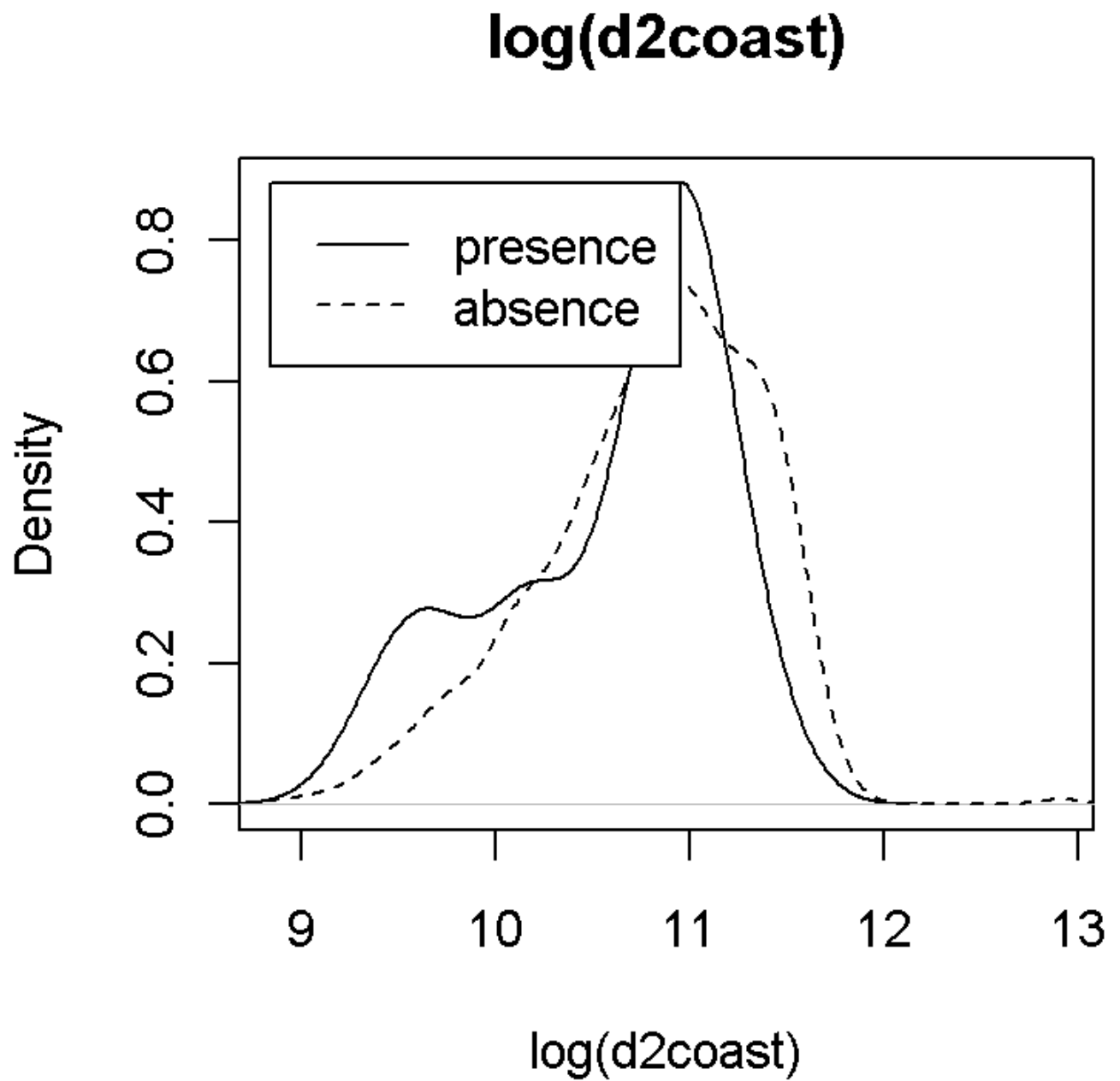


Figure 999: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'spring' season in 'ne2' region.

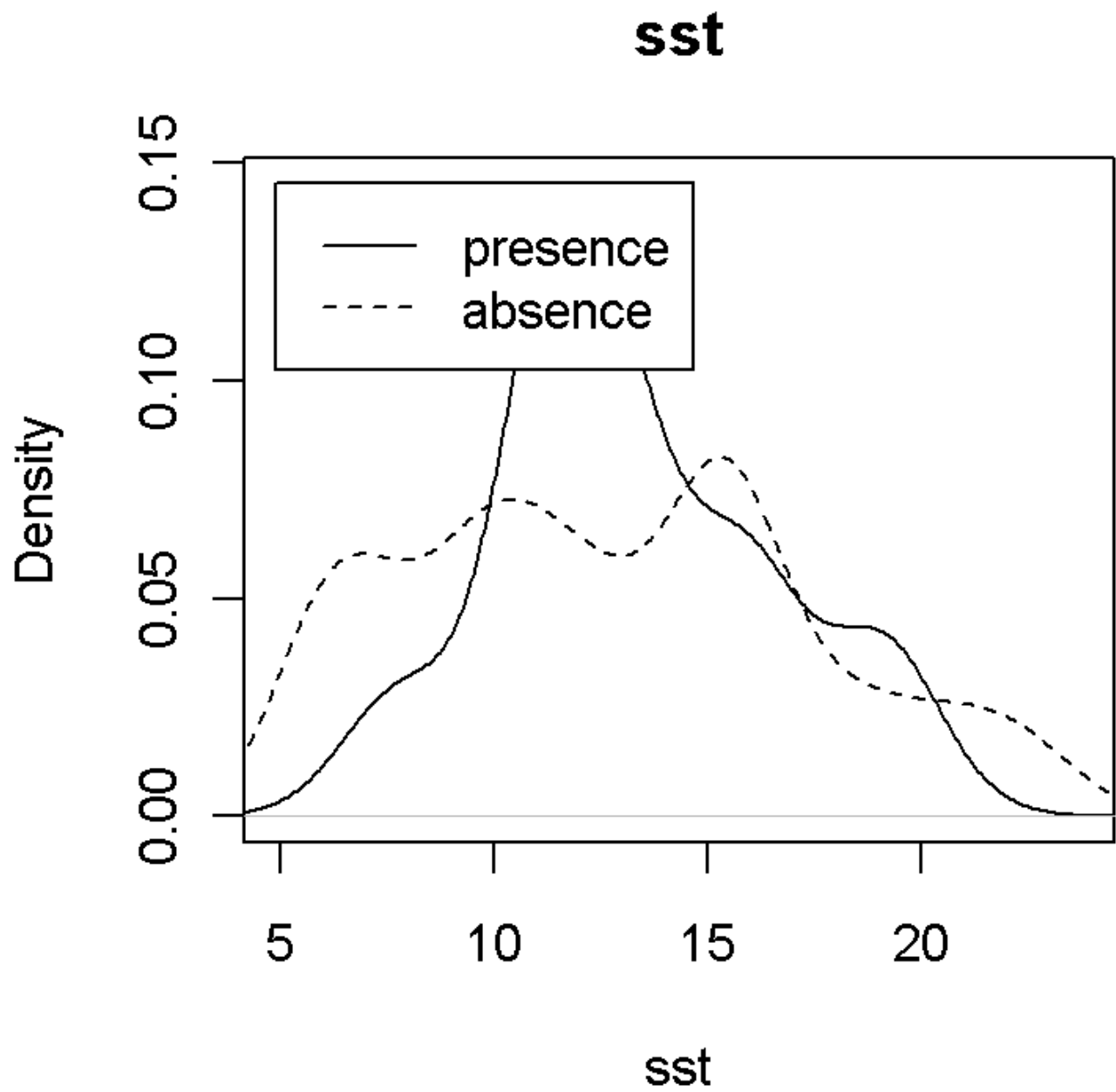


Figure 1000: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'spring' season in 'ne2' region.

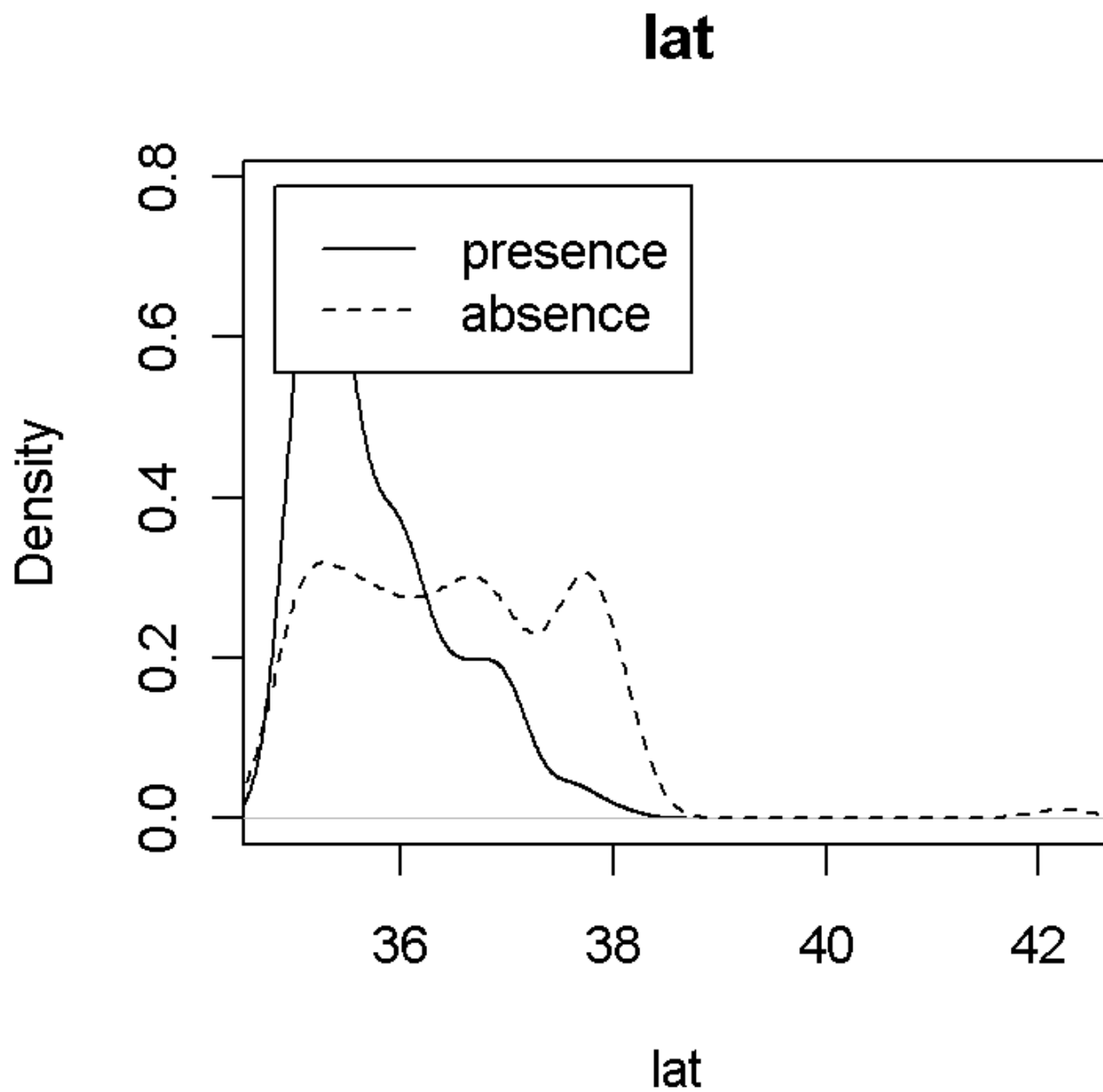


Figure 1001: Density histogram of latitude (degrees) for 'Tursiops' guild during 'spring' season in 'ne2' region.

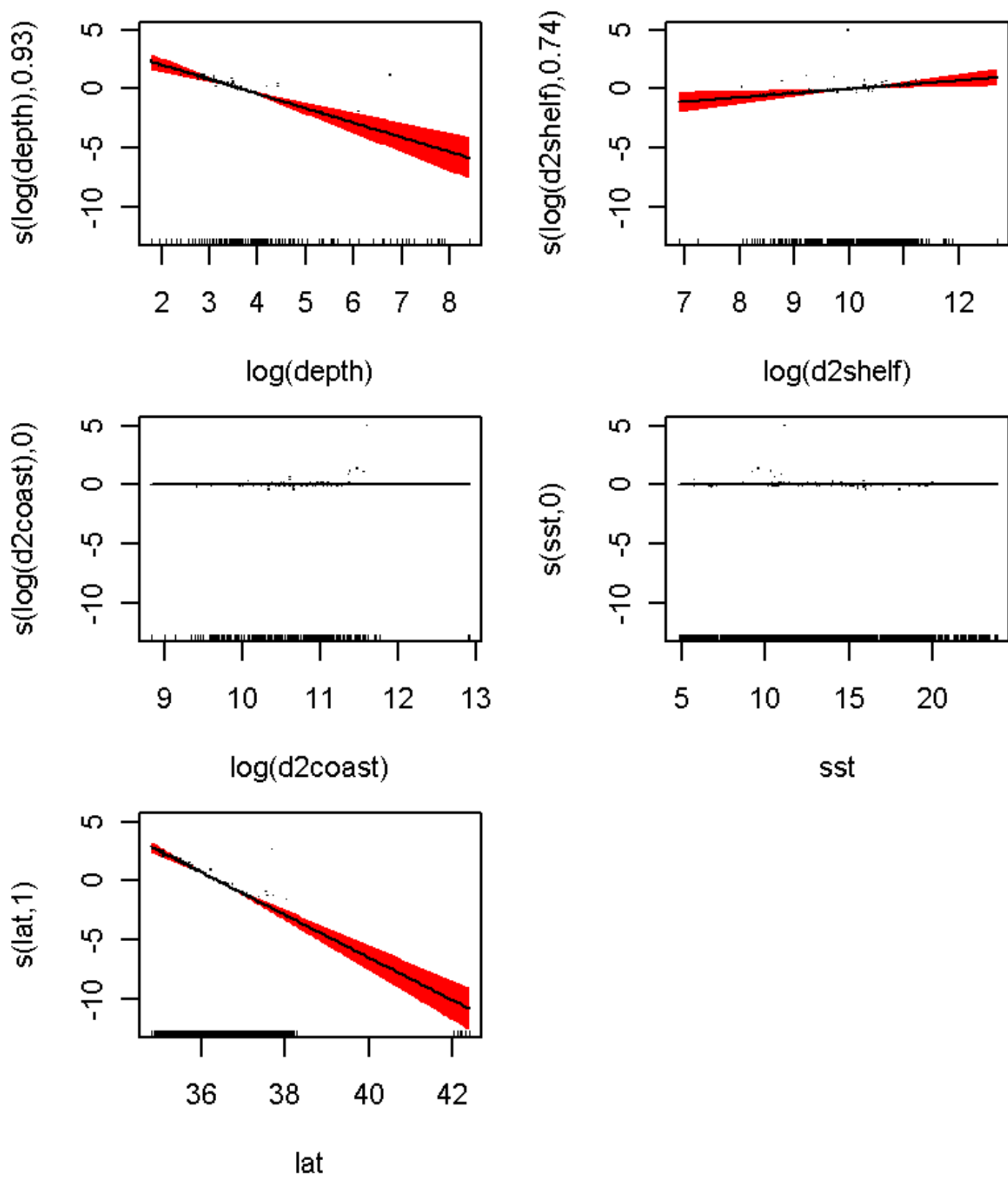


Figure 1002: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'spring' season in 'ne2' region.

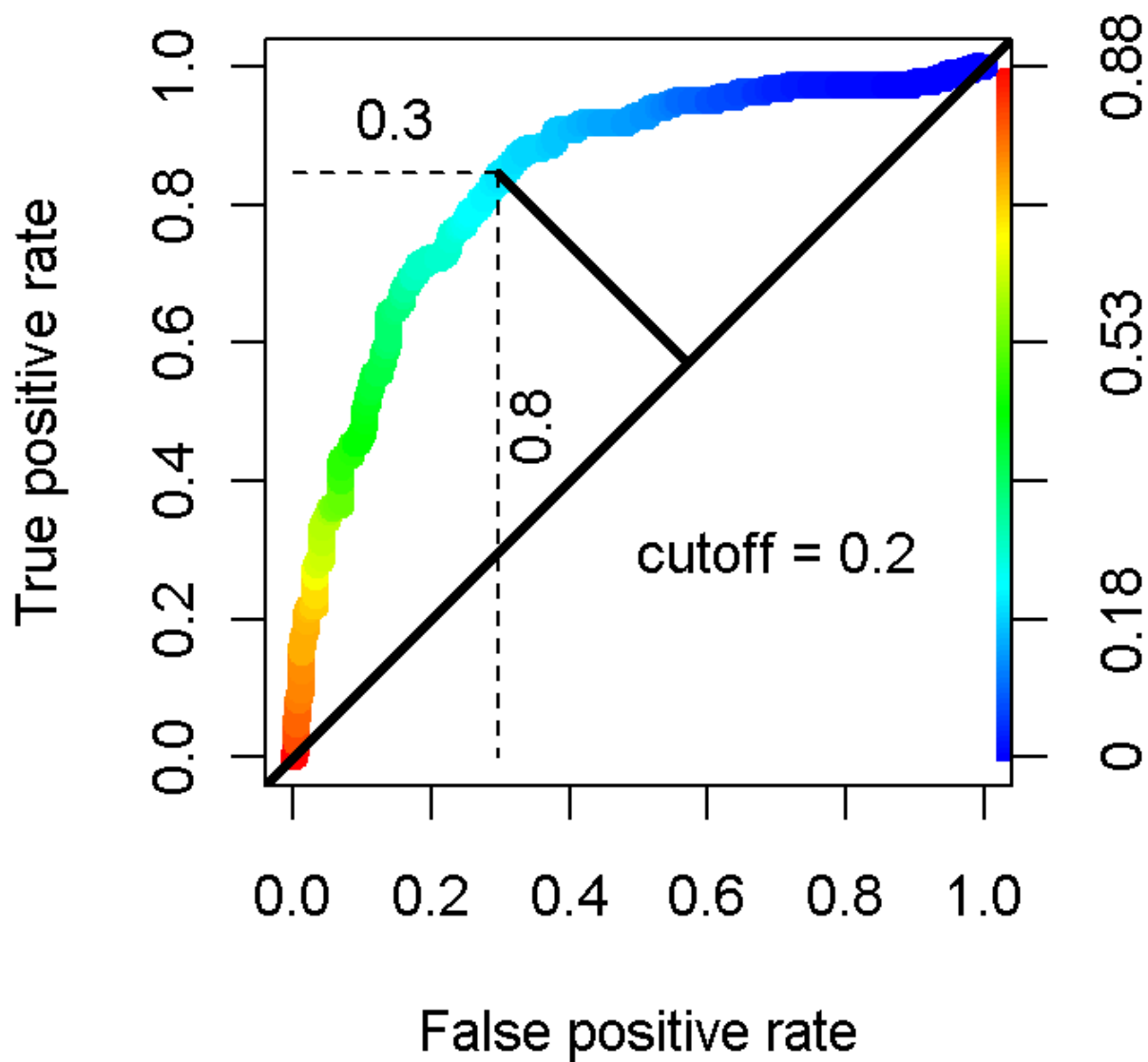


Figure 1003: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'spring' season in 'ne2' region.

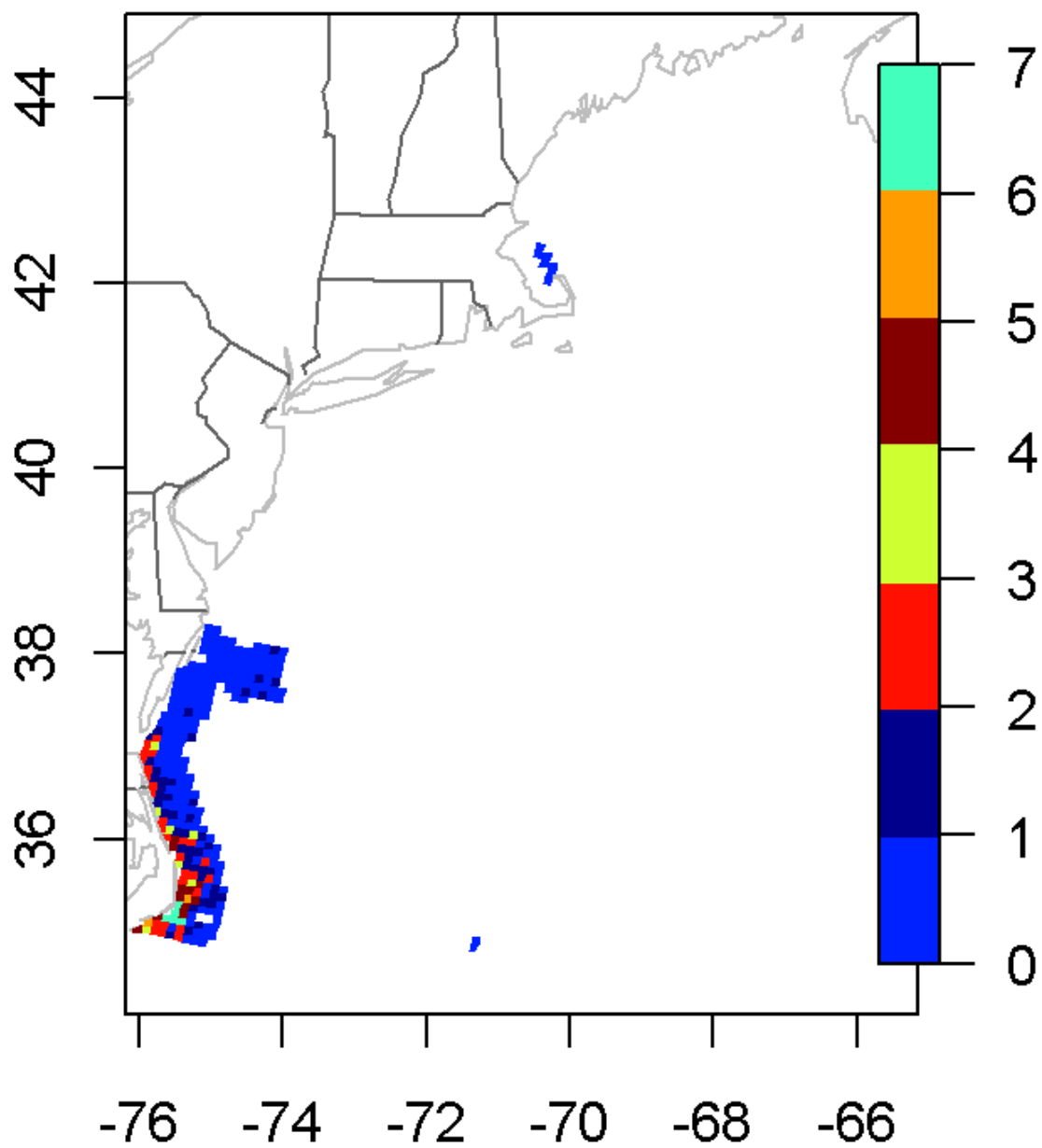


Figure 1004: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'spring' season in 'ne2' region.

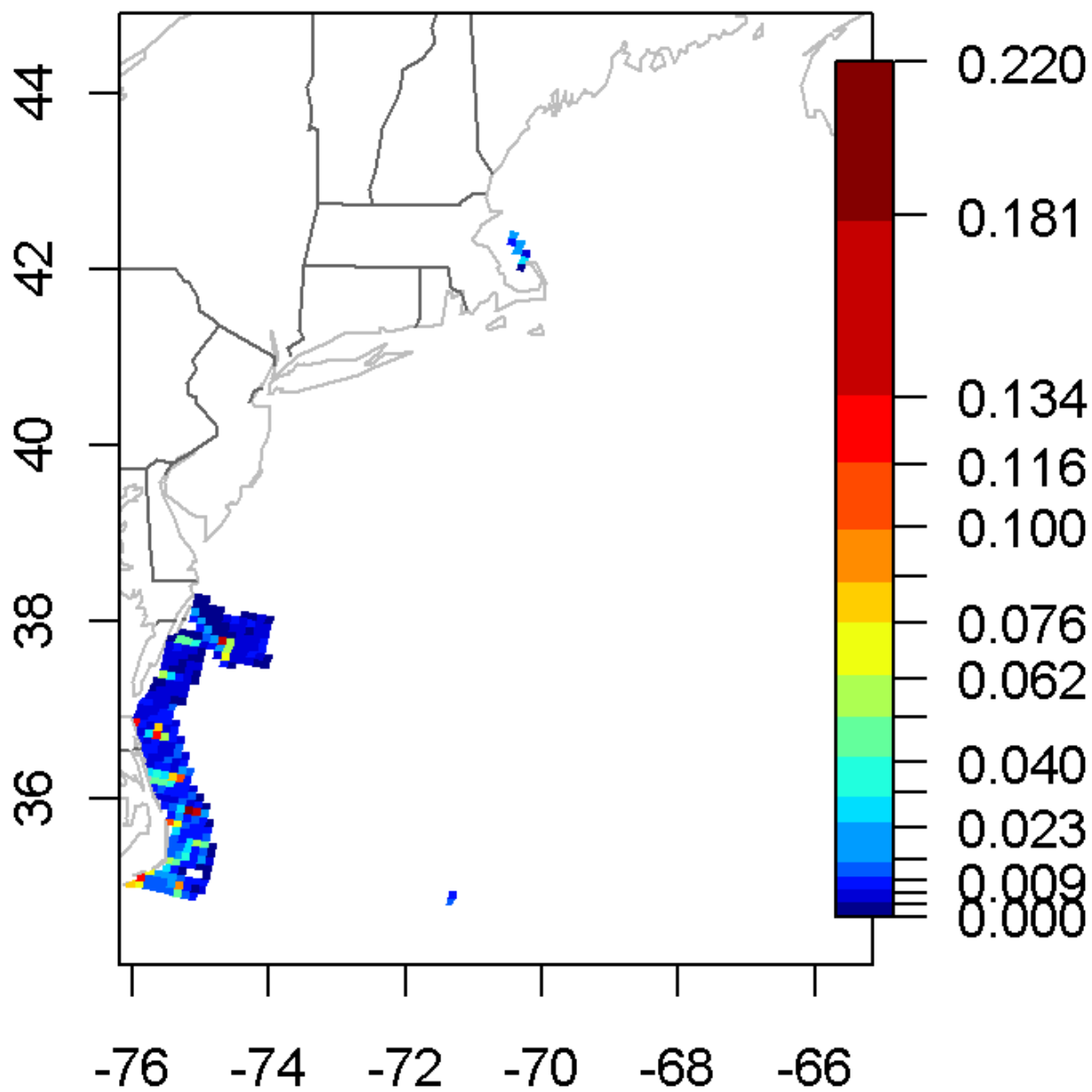


Figure 1005: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'spring' season in 'ne2' region.

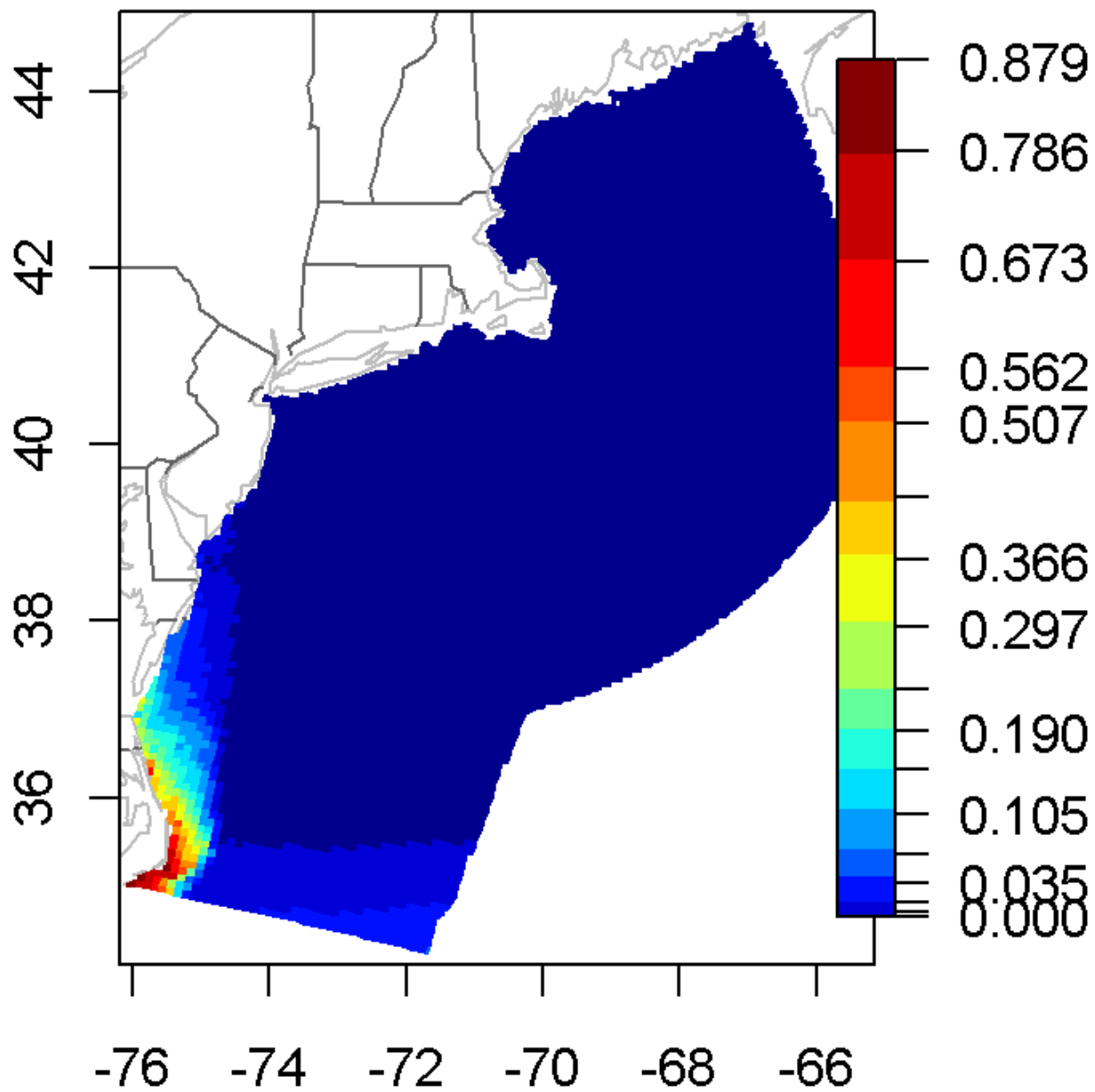


Figure 1006: Map of mean predicted habitat for 'Tursiops' guild during 'spring' season in 'ne2' region.

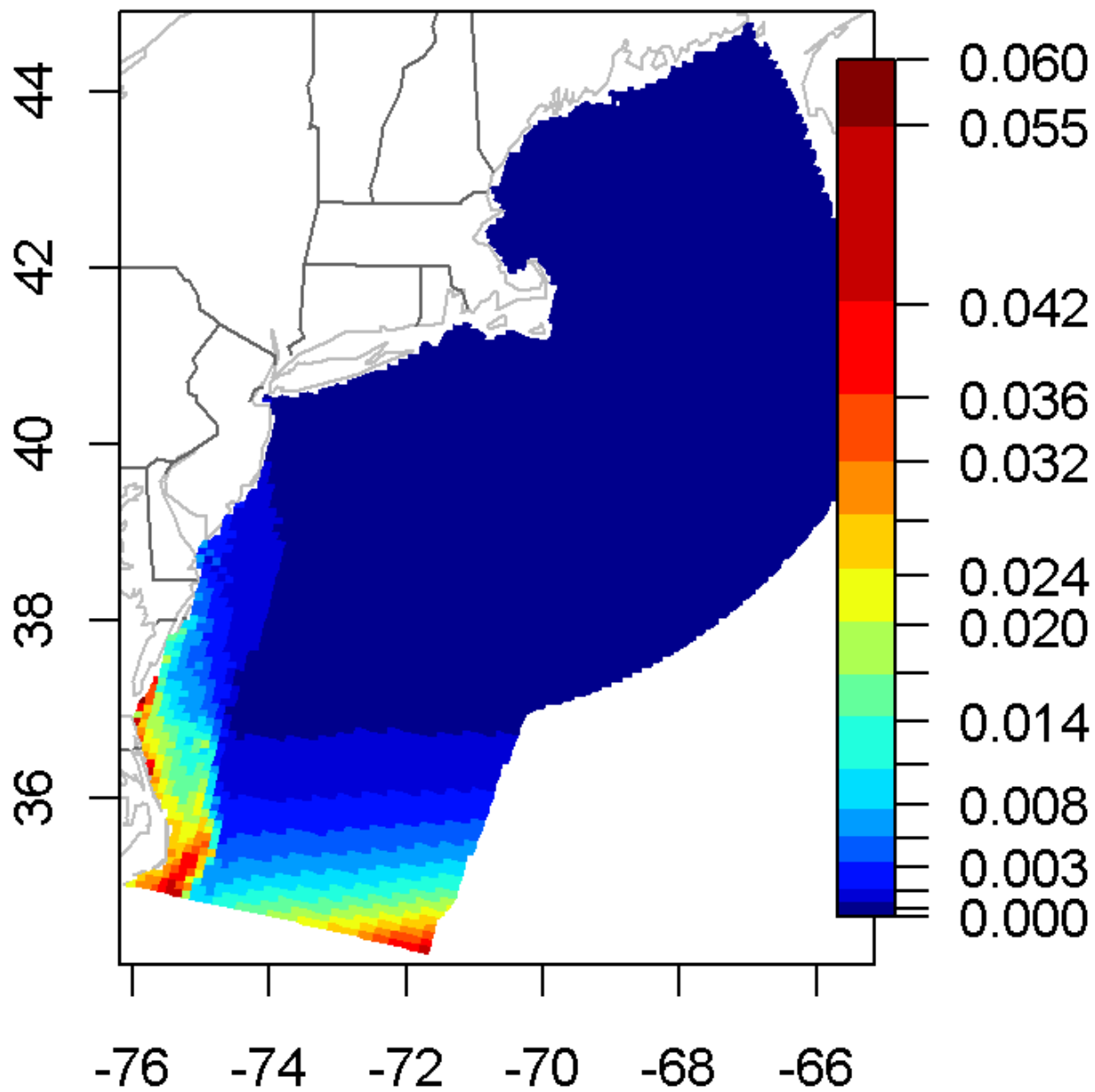


Figure 1007: Map of standard error of habitat for 'Tursiops' guild during 'spring' season in 'ne2' region.

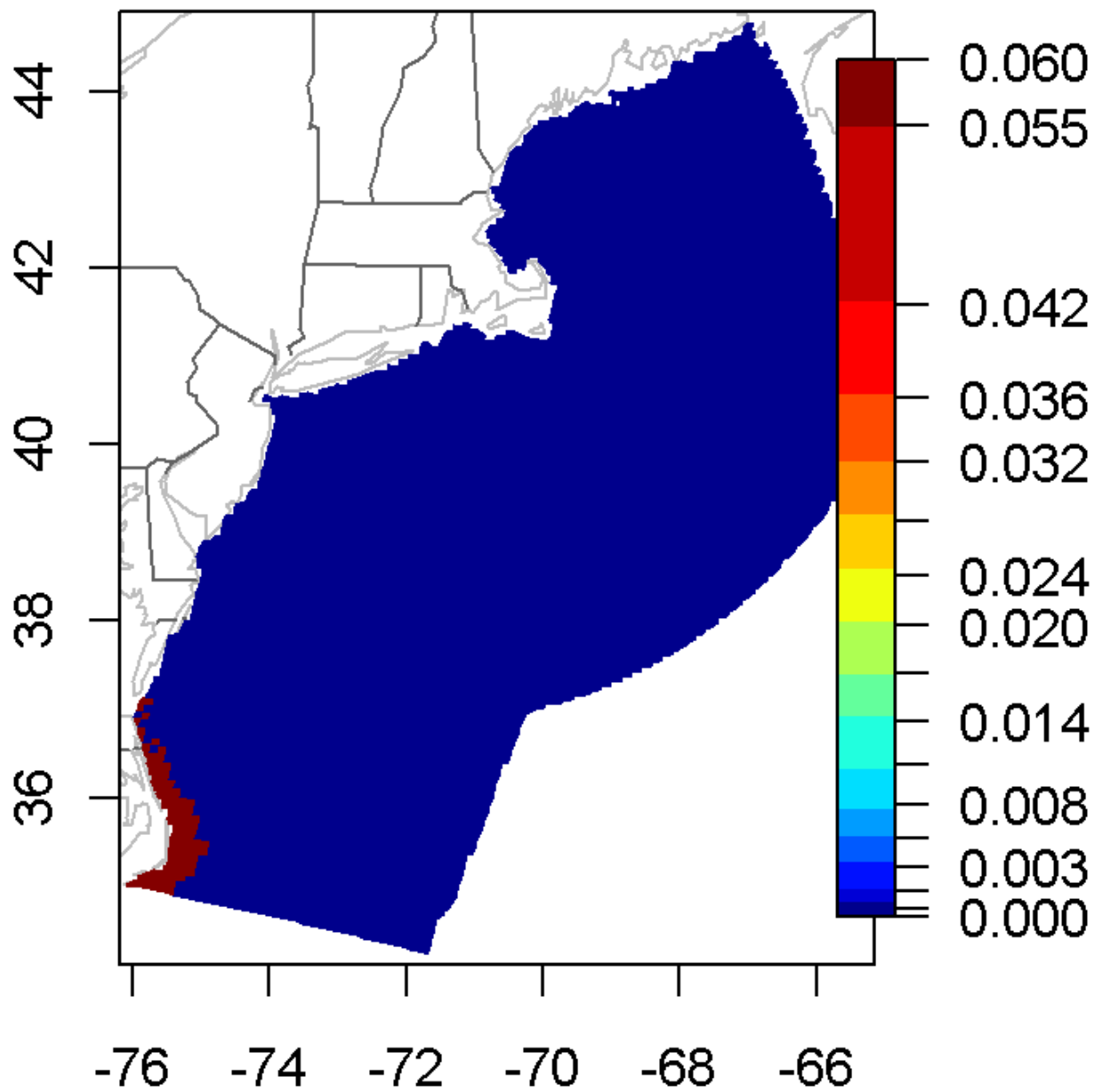


Figure 1008: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'spring' season in 'ne2' region.

18.2.4 se2

Modelrun identifier: duke_06_tu3_spring_se2

Date generated: 2008-10-21 15:49:29

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 91: Summary for duke(6) GAM model: for 'Tursiops' guild during 'spring' season in 'se2' region.

	Value
Number.presences	225
Number.absences	1561
GAM.converged	TRUE
R.squared	0.245593
Deviance.explained	0.171944
ROC.optimum	0.683688
Maximum.fit	0.143033
Maximum.prediction	0.831208

Model text summary...

```
duke_06_tu3_spring_se2 run on Tue Oct 21 15:48:48 2008
  provider:duke, version:06, guild:Tursiops (tu3), season:'spring', region:se2

max.fit:0.683688, max.prediction:0.831208, ROC.optimum:0.143033

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -2.4201      0.1512  -16.01  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  9.463e-01  1.446   28.87 3.87e-10 ***
s(log(d2shelf)) 9.084e-01  1.408   15.06 1.01e-05 ***
s(log(d2coast)) 1.146e-05  0.500  2.91e-05   0.943
s(sst)         1.966e+00  2.466   27.16 1.47e-14 ***
s(lat)         5.240e-06  0.500  6.17e-05   0.931
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.246   Deviance explained = 17.2%
GCV score = 0.0022768   Scale est. = 0.0022636   n = 1494

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
se2:1786  Min.   : 1695  Min.   :  4.0  Min.   : 1395  Min.   : 1471  Min.   : 11.62  Min.   :26.17
          1st Qu.: 9091  1st Qu.: 20.0  1st Qu.: 16380  1st Qu.: 31069  1st Qu.: 17.47  1st Qu.:33.46
          Median :10579  Median : 30.0  Median : 35177  Median : 52762  Median : 20.00  Median :34.02
          Mean   : 9605  Mean   : 301.0  Mean   : 46234  Mean   : 64990  Mean   : 19.69  Mean   :33.28
          3rd Qu.:10892  3rd Qu.: 46.0  3rd Qu.: 62382  3rd Qu.: 76073  3rd Qu.: 22.05  3rd Qu.:34.47
          Max.   :11155  Max.   :5270.0  Max.   :328563  Max.   :420801  Max.   : 26.48  Max.   :34.95
                   NA's   :      6      NA's   :      6      NA's   :287.00

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
se2:4203  Min.   : 1695  Min.   :  4.0  Min.   :  589  Min.   : 1471  Min.   :17.40  Min.   :25.91
          1st Qu.: 7760  1st Qu.: 183.5  1st Qu.: 34886  1st Qu.: 82859  1st Qu.:21.45  1st Qu.:29.60
```


Median : 9083	Median : 812.0	Median : 86547	Median :167727	Median :23.02	Median :31.59
Mean : 8321	Mean :1482.5	Mean :110466	Mean :177806	Mean :22.82	Mean :31.28
3rd Qu.:10134	3rd Qu.:2729.5	3rd Qu.:177072	3rd Qu.:262857	3rd Qu.:24.08	3rd Qu.:33.06
Max. :11184	Max. :5300.0	Max. :331253	Max. :422789	Max. :26.17	Max. :34.95
		NA's : 3	NA's : 3		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1695  Min.   :0.0006991  Min.   :0.0004028  Min.   : 0.000  Min.   :2.601e-06  Min.   :0.0000
1st Qu.: 7760  1st Qu.:0.0038186  1st Qu.:0.0029719  1st Qu.: 0.000  1st Qu.:3.505e-04  1st Qu.:0.0000
Median : 9083  Median :0.0057672  Median :0.0043235  Median : 0.000  Median :1.014e-03  Median :0.0000
Mean   : 8321  Mean   :0.0648321  Mean   :0.0084410  Mean   : 0.321  Mean   :7.966e-03  Mean   :0.1547
3rd Qu.:10134 3rd Qu.:0.0131200  3rd Qu.:0.0082903  3rd Qu.: 0.000  3rd Qu.:8.579e-03  3rd Qu.:0.0000
Max.   :11184  Max.   :0.8312080  Max.   :0.0822751  Max.   : 6.000  Max.   :2.004e-01  Max.   :1.0000
      NA's :3.0000000  NA's :3.0000000  NA's :3502.000  NA's :3.502e+03
```

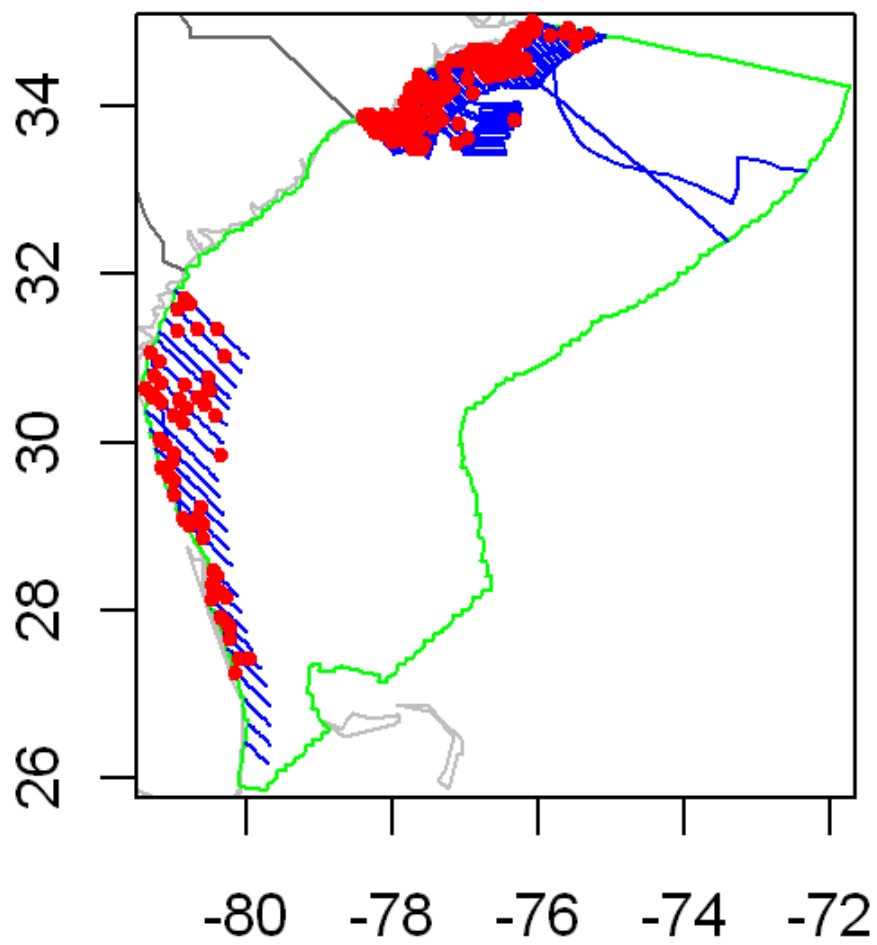


Figure 1009: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'spring' season in 'se2' region.

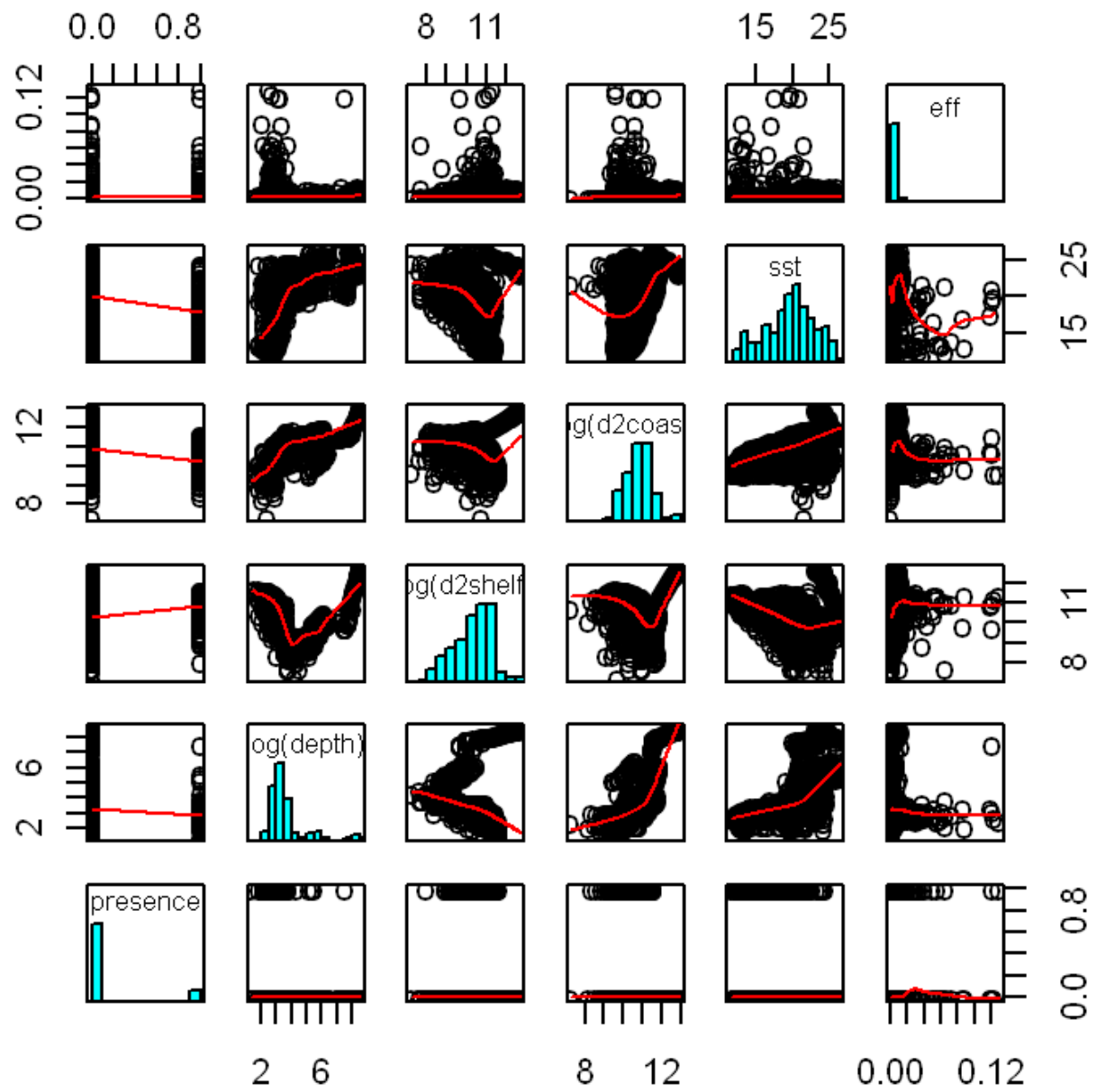


Figure 1010: Pairs plot of input variables for 'Tursiops' guild during 'spring' season in 'se2' region.

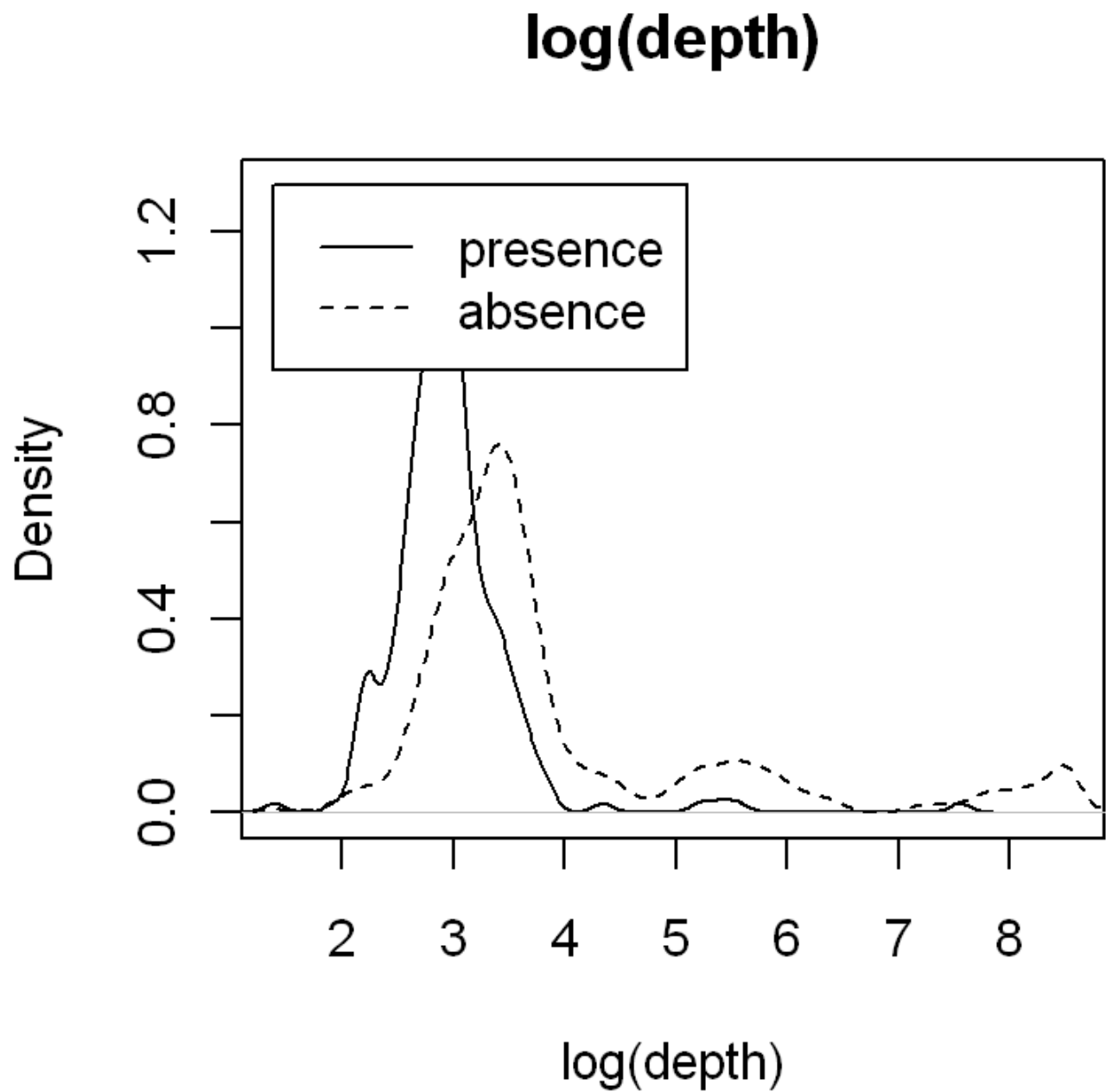


Figure 1011: Density histogram of depth $\log(\text{meters})$ for 'Tursiops' guild during 'spring' season in 'se2' region.

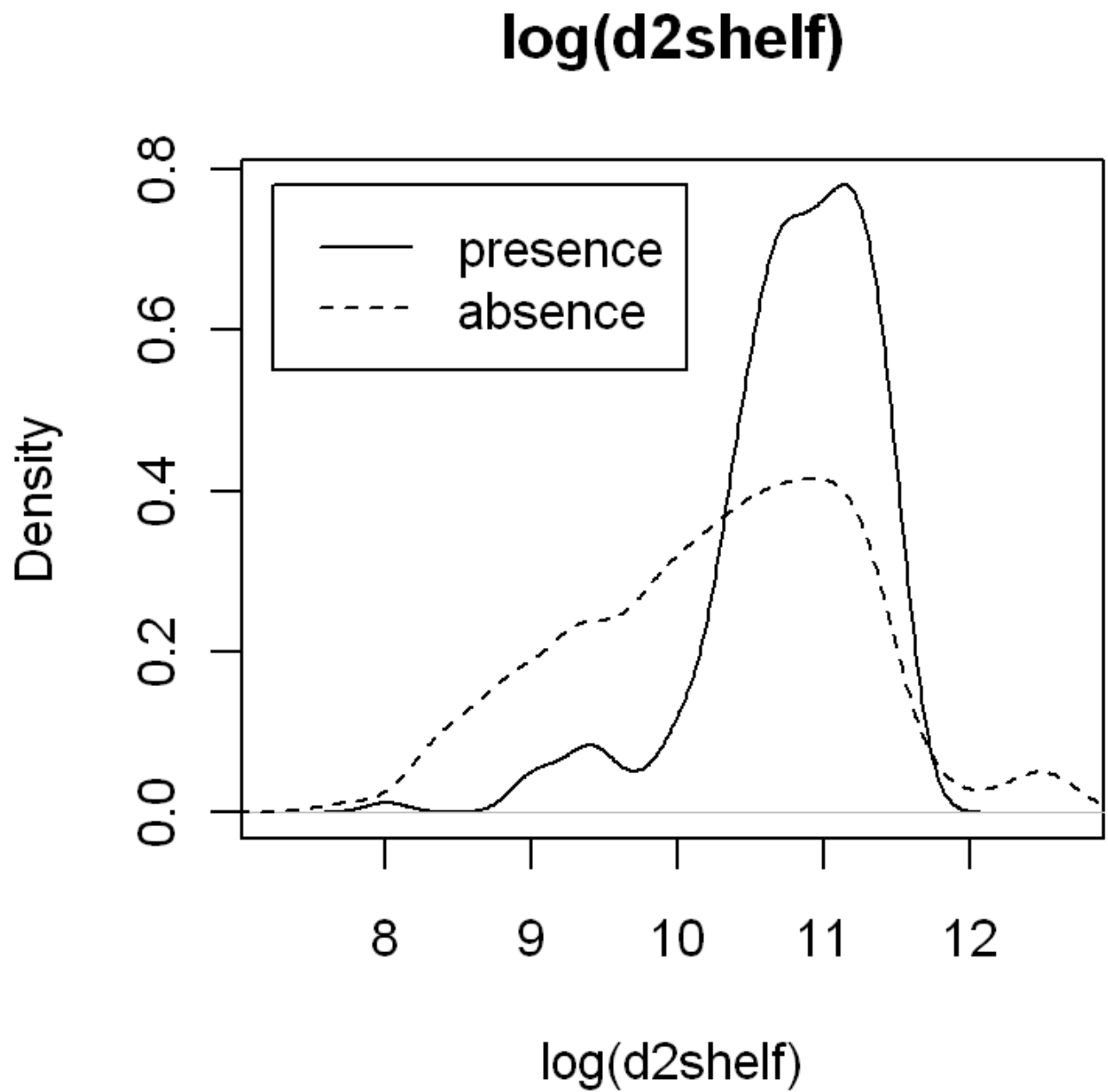


Figure 1012: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'spring' season in 'se2' region.

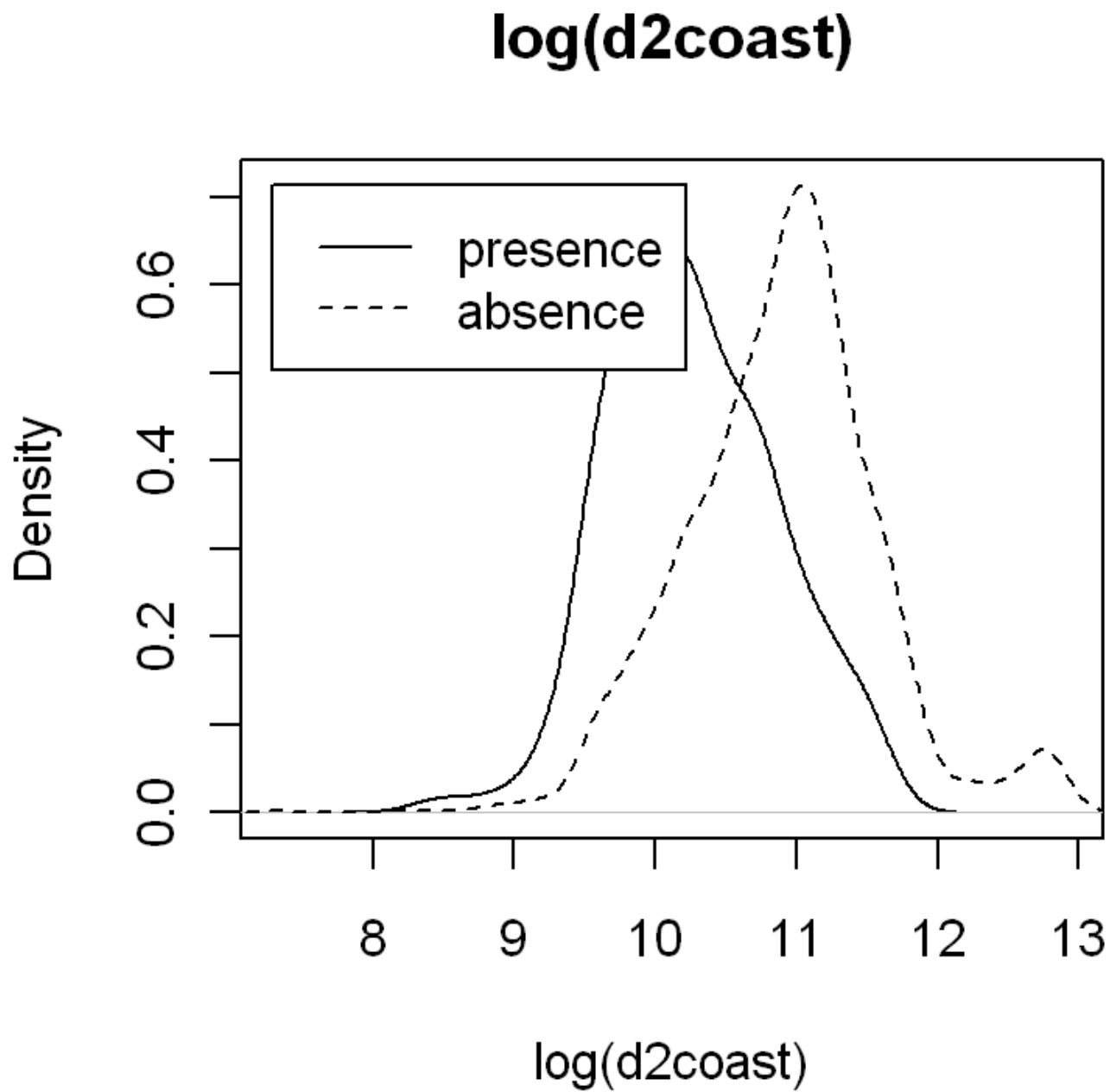


Figure 1013: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'spring' season in 'se2' region.

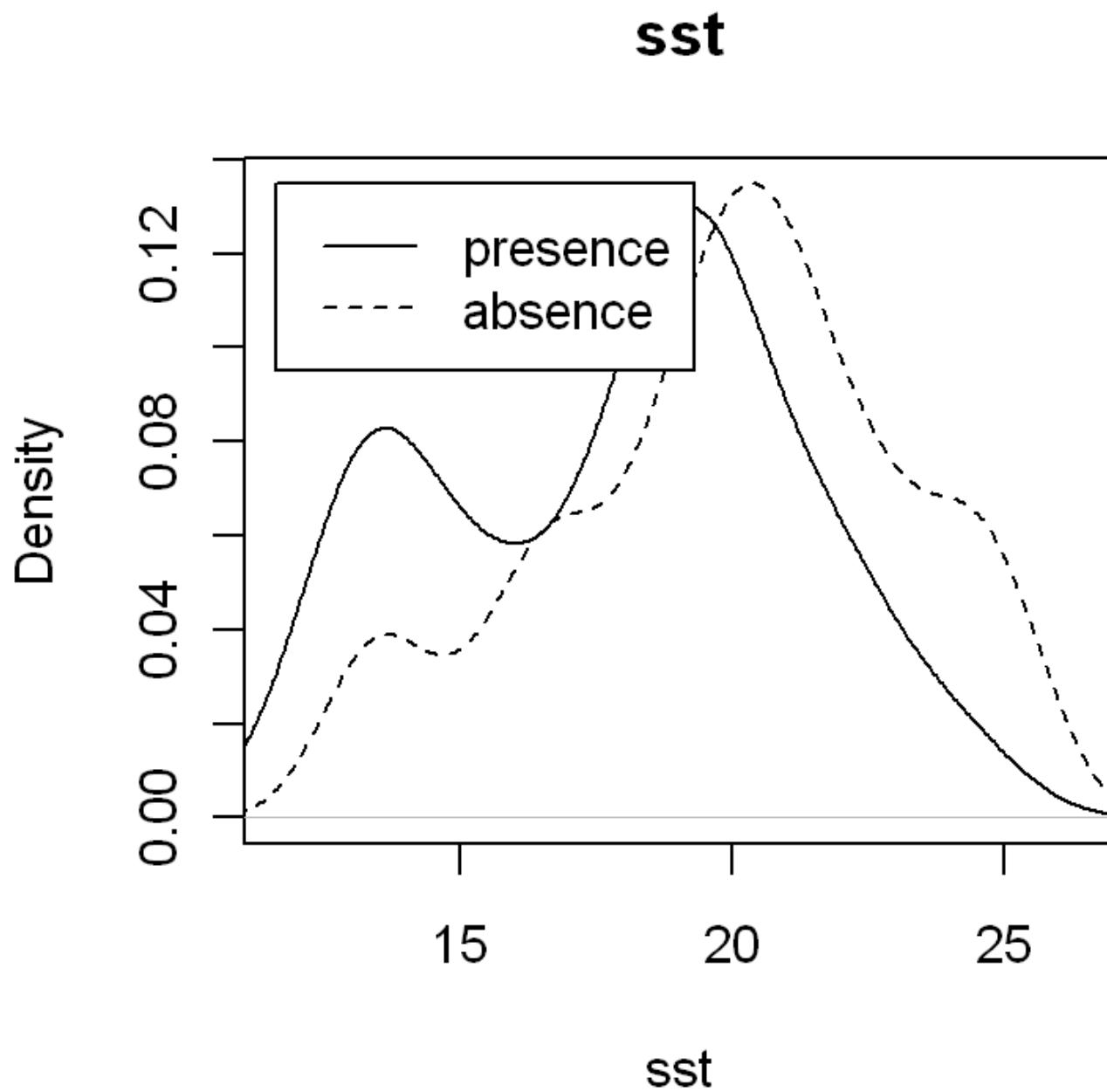


Figure 1014: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'spring' season in 'se2' region.

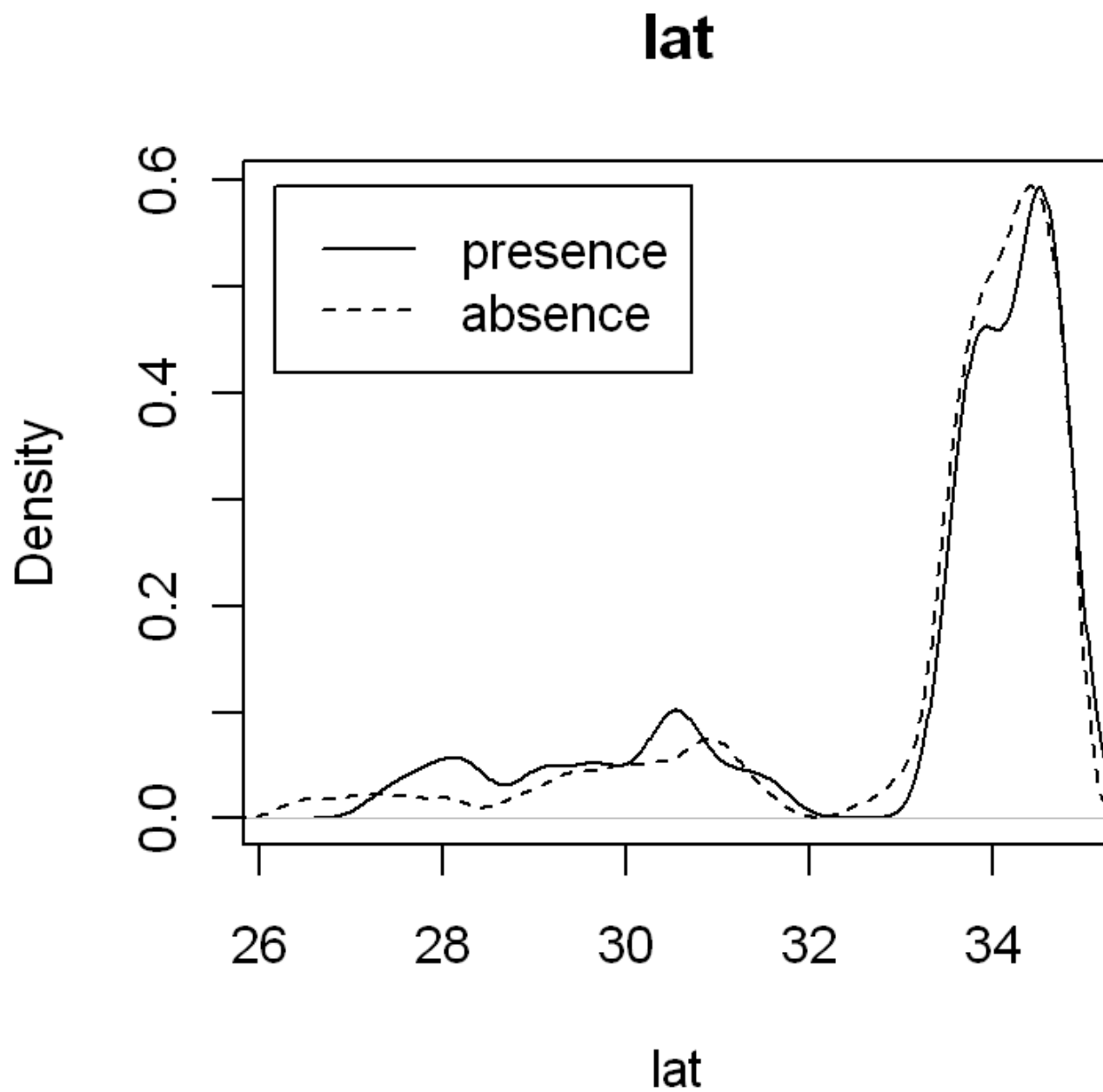


Figure 1015: Density histogram of latitude (degrees) for 'Tursiops' guild during 'spring' season in 'se2' region.

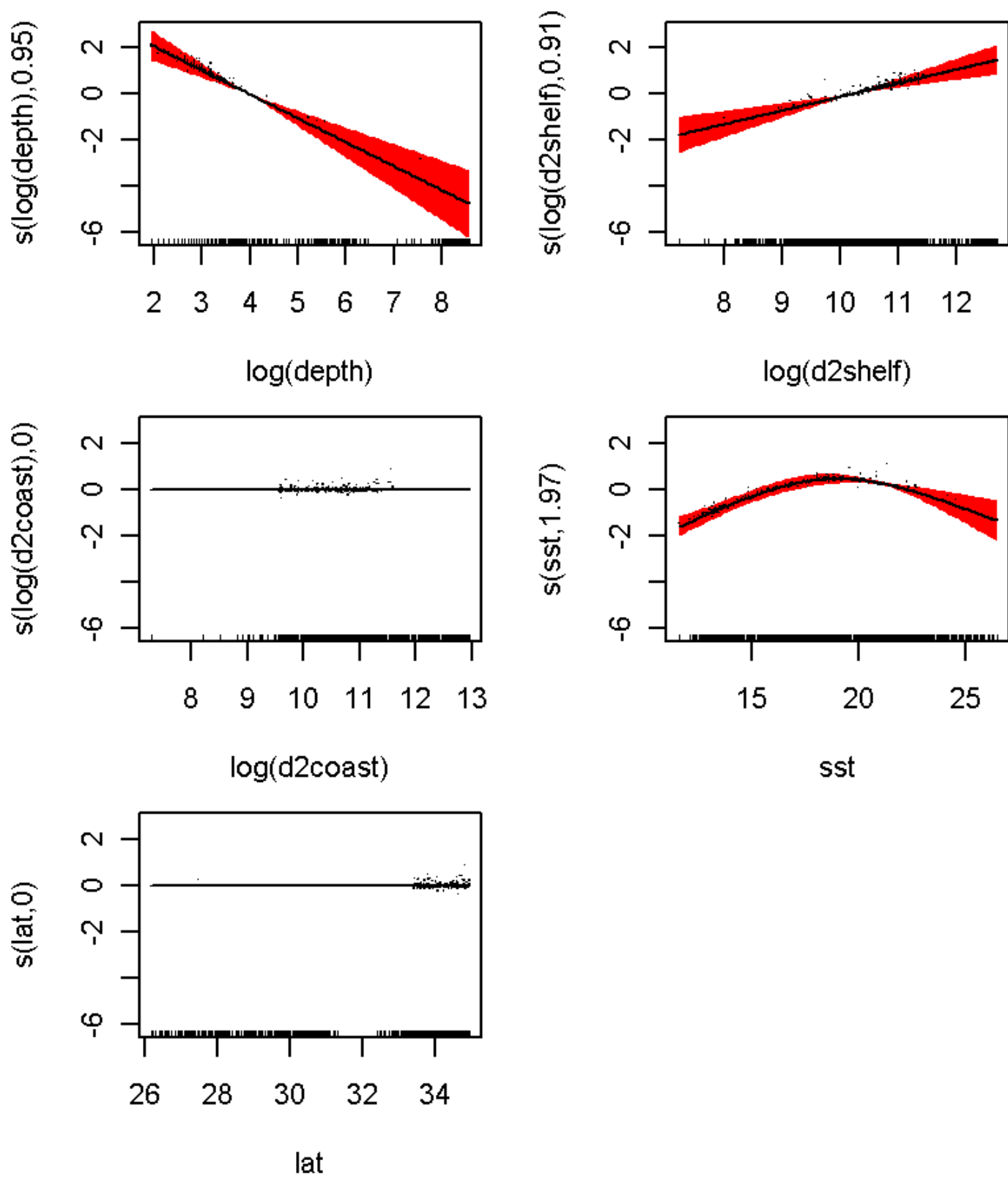


Figure 1016: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'spring' season in 'se2' region.

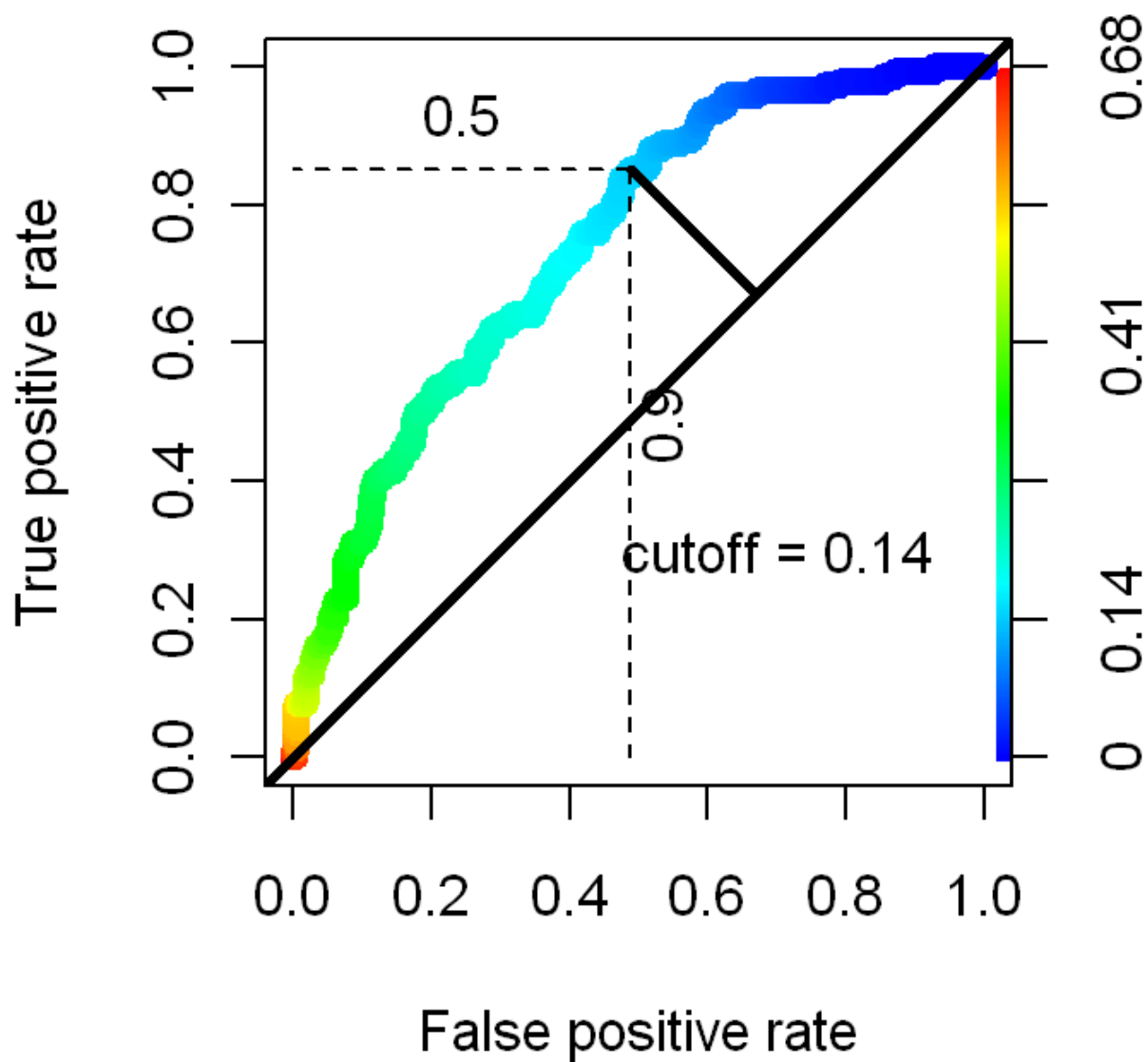


Figure 1017: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'spring' season in 'se2' region.

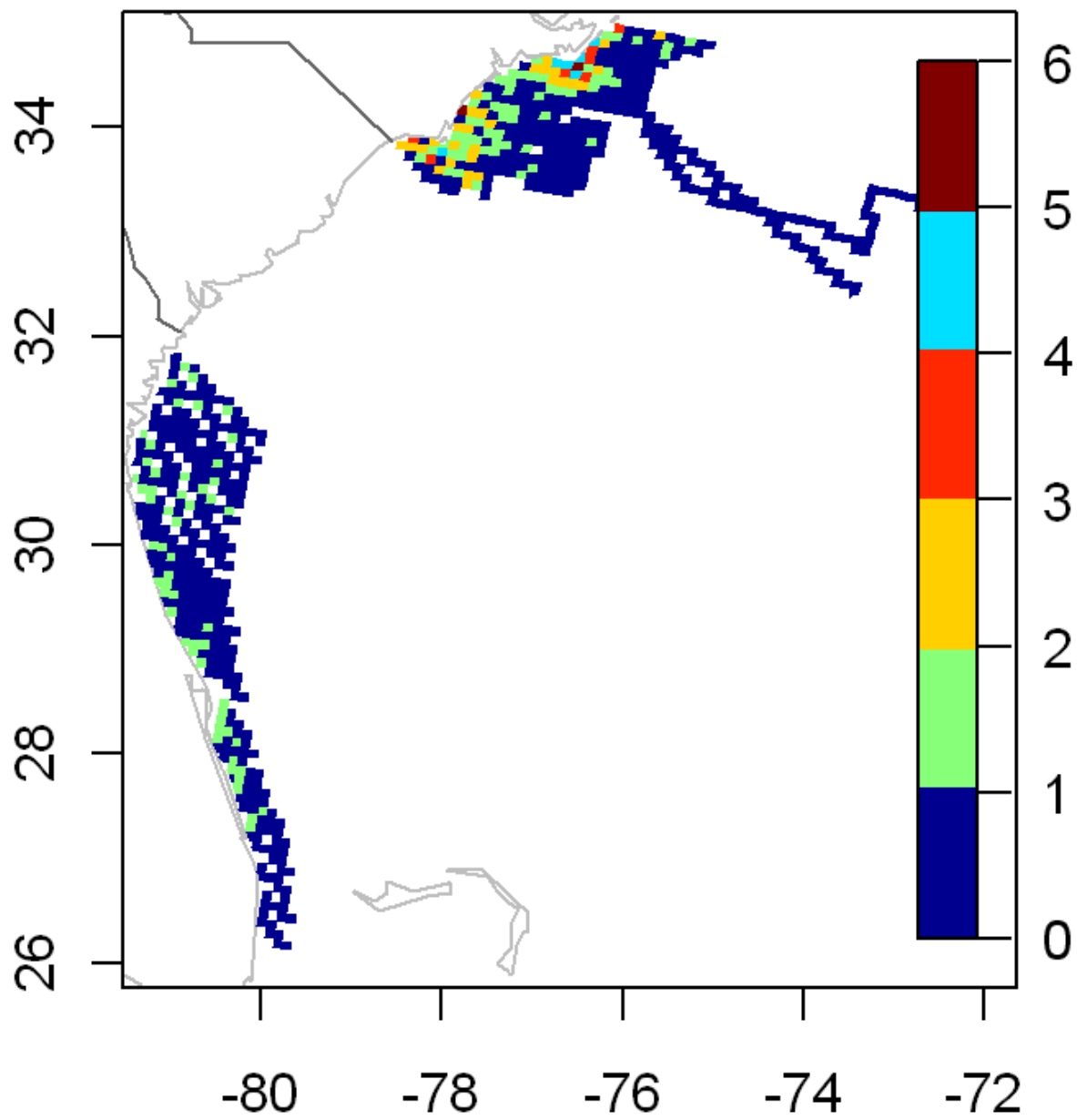


Figure 1018: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'spring' season in 'se2' region.

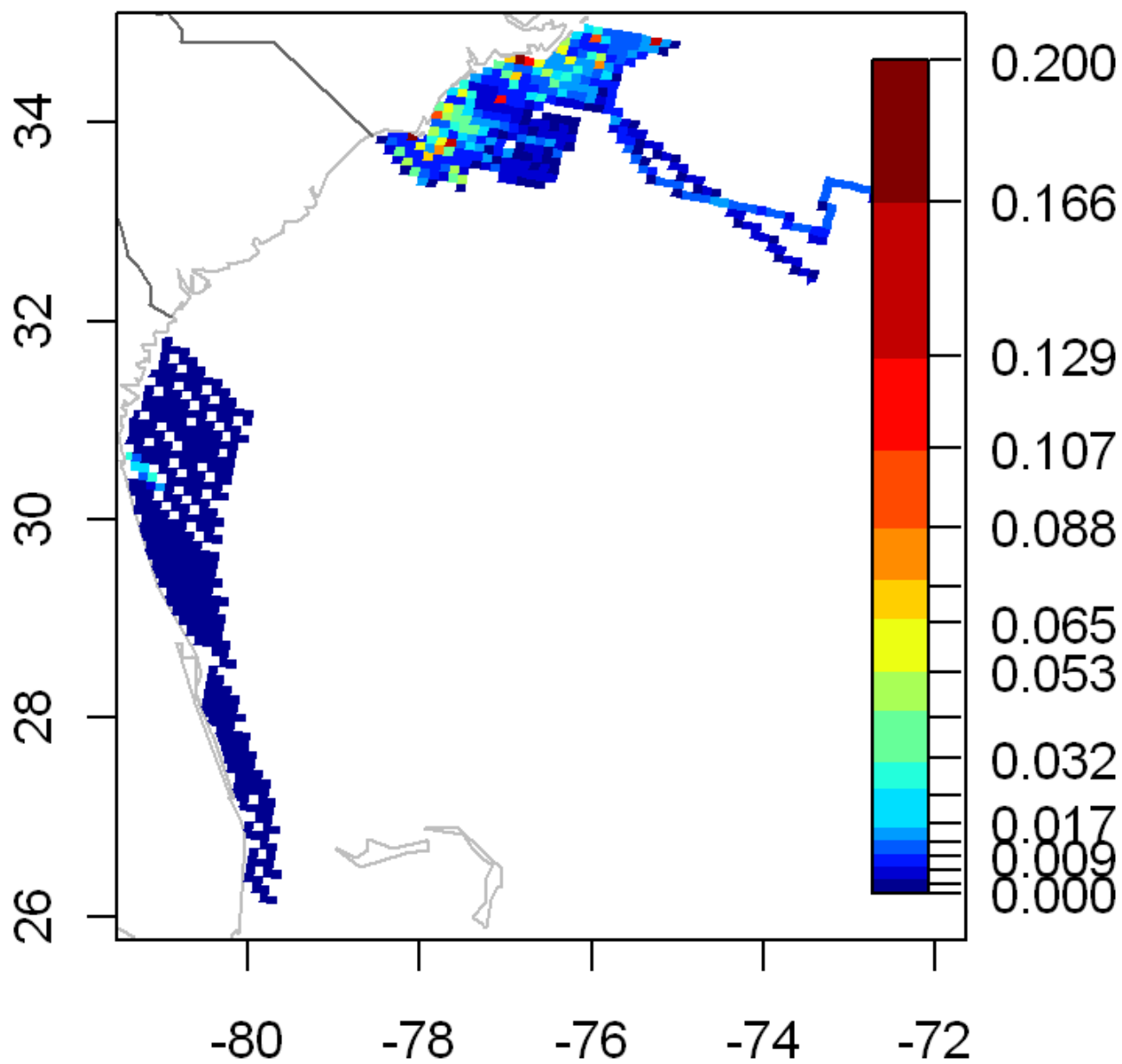


Figure 1019: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'spring' season in 'se2' region.

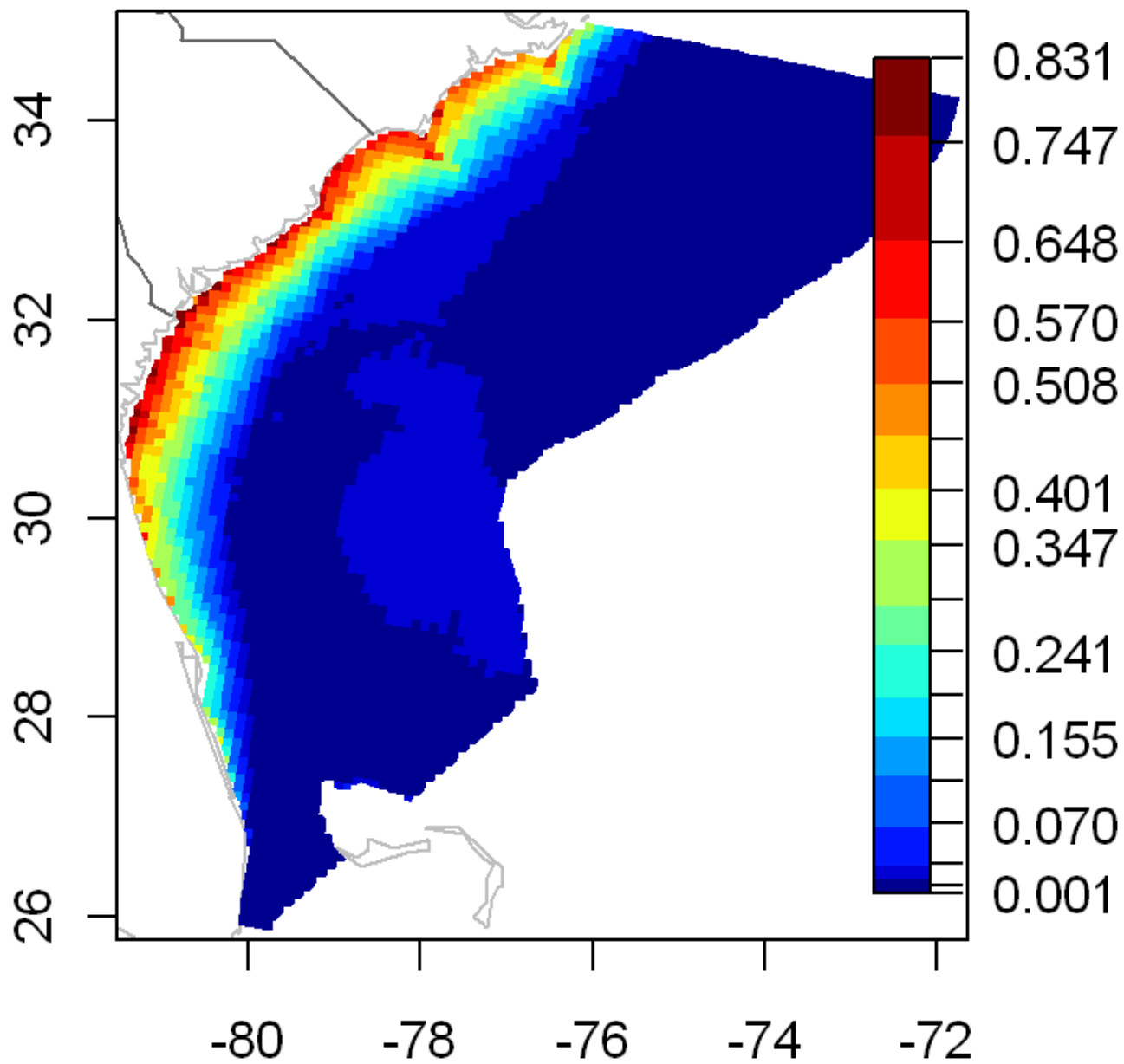


Figure 1020: Map of mean predicted habitat for 'Tursiops' guild during 'spring' season in 'se2' region.

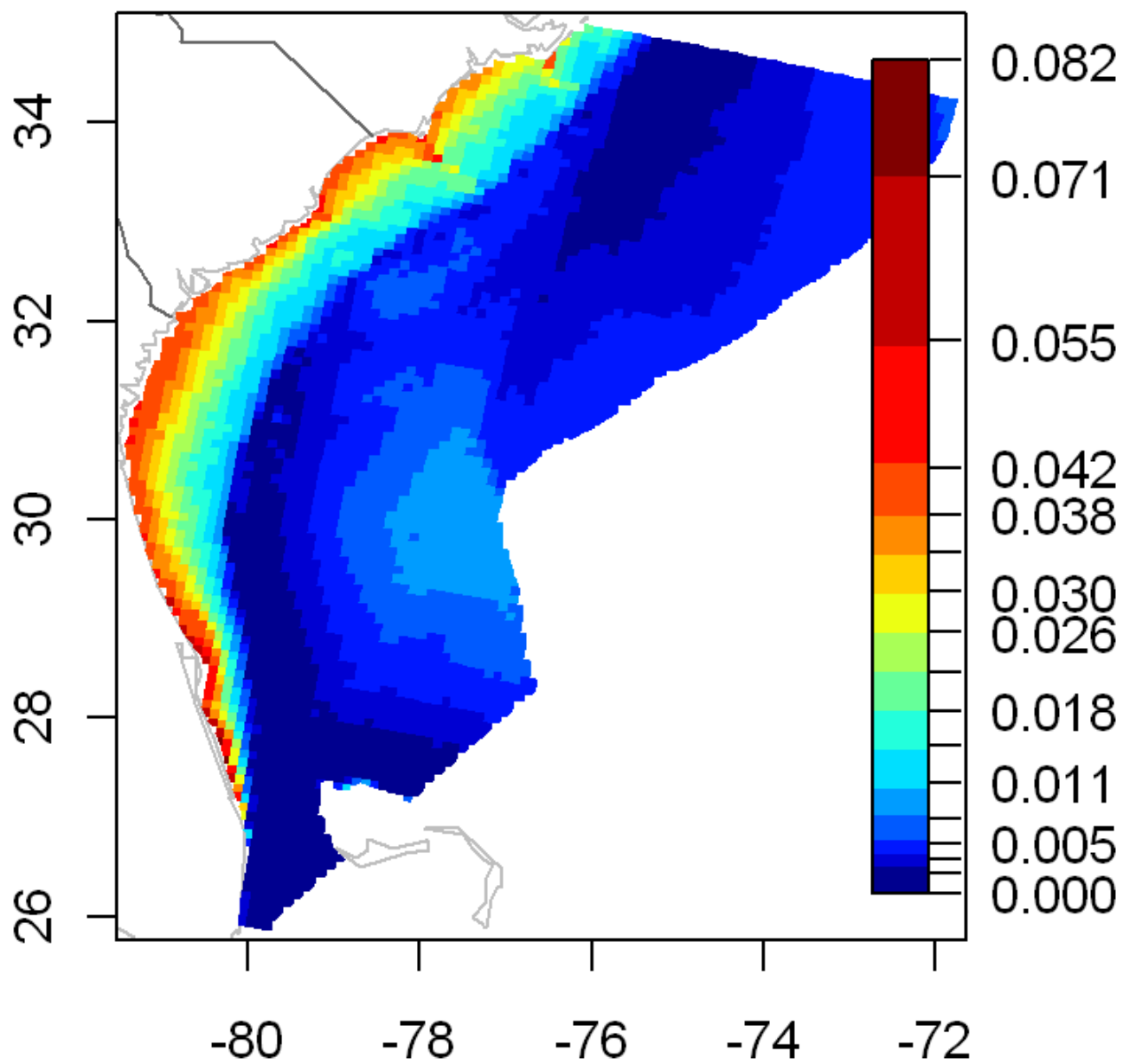


Figure 1021: Map of standard error of habitat for 'Tursiops' guild during 'spring' season in 'se2' region.

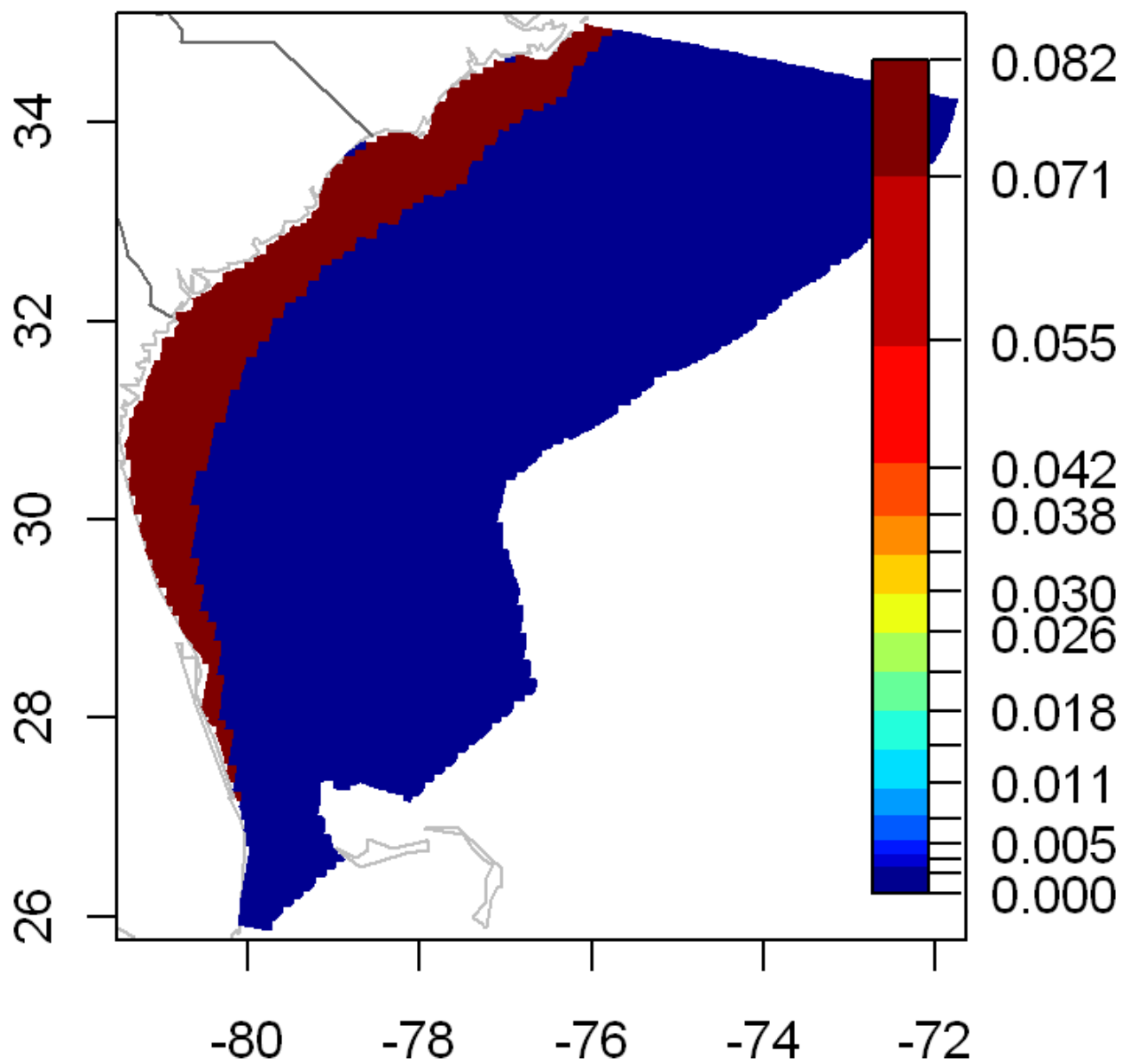


Figure 1022: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'spring' season in 'se2' region.

18.3 summer

18.3.1 east2

Modelrun identifier: duke_06_tu3_summer_east2

Date generated: 2008-10-21 14:10:53

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 92: Summary for duke(6) GAM model: for 'Tursiops' guild during 'summer' season in 'east2' region.

	Value
Number.presences	298
Number.absences	8780
GAM.converged	TRUE
R.squared	0.375134
Deviance.explained	0.257353
ROC.optimum	0.943095
Maximum.fit	0.0373181
Maximum.prediction	0.996264

Model text summary...

```
duke_06_tu3_summer_east2 run on Tue Oct 21 14:07:47 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'summer', region:east2

max.fit:0.943095, max.prediction:0.996264, ROC.optimum:0.037318

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -5.1004      0.1469  -34.71   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.9948564 2.4949   190.6 <2e-16 ***
s(log(d2shelf)) 0.9890990 1.4891   110.4 <2e-16 ***
s(log(d2coast)) 1.9420681 2.4421   265.8 <2e-16 ***
s(sst)         1.9970341 2.4970   134.4 <2e-16 ***
s(lat)         0.0001264 0.5001  3.03e-05   0.942
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.375   Deviance explained = 25.7%
GCV score = 0.0019962   Scale est. = 0.0019929   n = 8663

summary(dat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:7694  Min.   : 1635  Min.   :  5.0  Min.   :    5  Min.   : 1259  Min.   :  8.175  Min.   :25.94
se2:1384  1st Qu.:11866  1st Qu.: 48.0  1st Qu.:20989  1st Qu.: 50865  1st Qu.:17.025  1st Qu.:37.53
          Median :14008  Median :111.5  Median :52230  Median :102266  Median :22.200  Median :40.18
          Mean   :13275  Mean   :677.3  Mean   :67623  Mean :125197  Mean :21.378  Mean :39.35
          3rd Qu.:15645  3rd Qu.:420.0  3rd Qu.:99335  3rd Qu.:174835  3rd Qu.:25.650  3rd Qu.:42.31
          Max.   :16560  Max.   :5251.0  Max.   :324910  Max.   :445165  Max.   :30.900  Max.   :44.74
                   NA's   :      7  NA's   :      7  NA's   :408.000

summary(newdat)...
  region  fid_c10    depth    d2shelf    d2coast    sst    lat
ne2:5685  Min.   : 1633  Min.   :  4  Min.   :    5  Min.   : 1259  Min.   :11.18  Min.   :25.91
se2:4203  1st Qu.: 9145  1st Qu.: 92  1st Qu.:34042  1st Qu.: 89304  1st Qu.:22.80  1st Qu.:32.12
```


Median :11616	Median : 844	Median : 82032	Median :178961	Median :26.70	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :24.80	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:28.27	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :29.62	Max. :44.74
		NA's : 5	NA's : 5		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :1.687e-07  Min.   :1.268e-07  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.0000
1st Qu.: 9145  1st Qu.:2.933e-03  1st Qu.:4.625e-04  1st Qu.:0.000e+00  1st Qu.:1.220e-03  1st Qu.:0.0000
Median :11616  Median :1.274e-02  Median :1.537e-03  Median :0.000e+00  Median :4.368e-03  Median :0.0000
Mean   :11171  Mean   :5.376e-02  Mean   :3.402e-03  Mean   :6.484e-02  Mean   :1.069e-02  Mean   :0.3265
3rd Qu.:14088  3rd Qu.:5.498e-02  3rd Qu.:4.430e-03  3rd Qu.:0.000e+00  3rd Qu.:9.308e-03  3rd Qu.:1.0000
Max.   :16560  Max.   :9.963e-01  Max.   :7.366e-02  Max.   :3.000e+00  Max.   :2.910e-01  Max.   :1.0000
      NA's :5.000e+00  NA's :5.000e+00  NA's :5.277e+03  NA's :5.277e+03
```

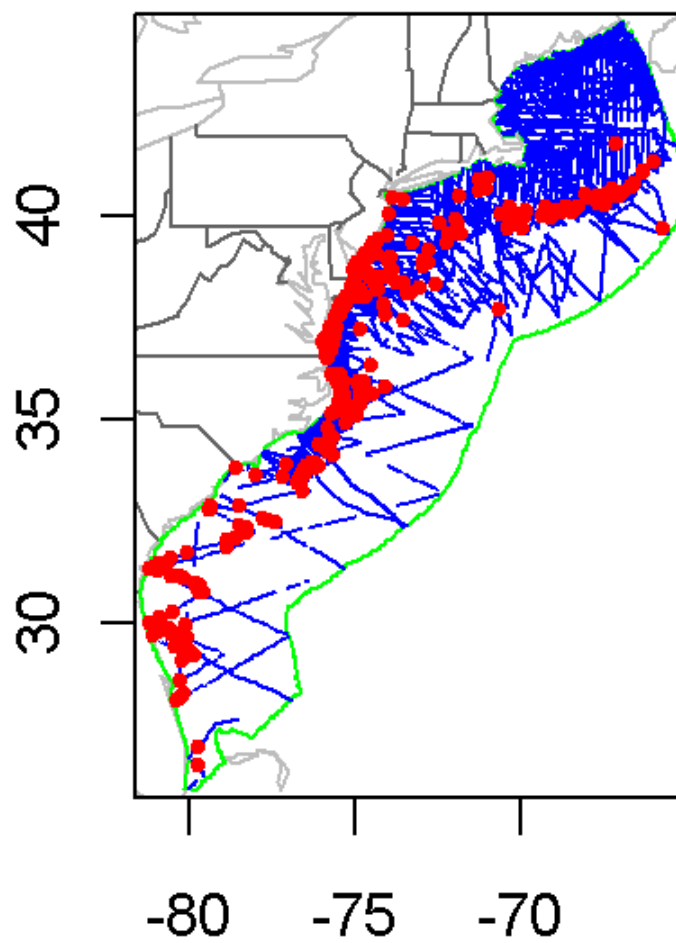


Figure 1023: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'summer' season in 'east2' region.

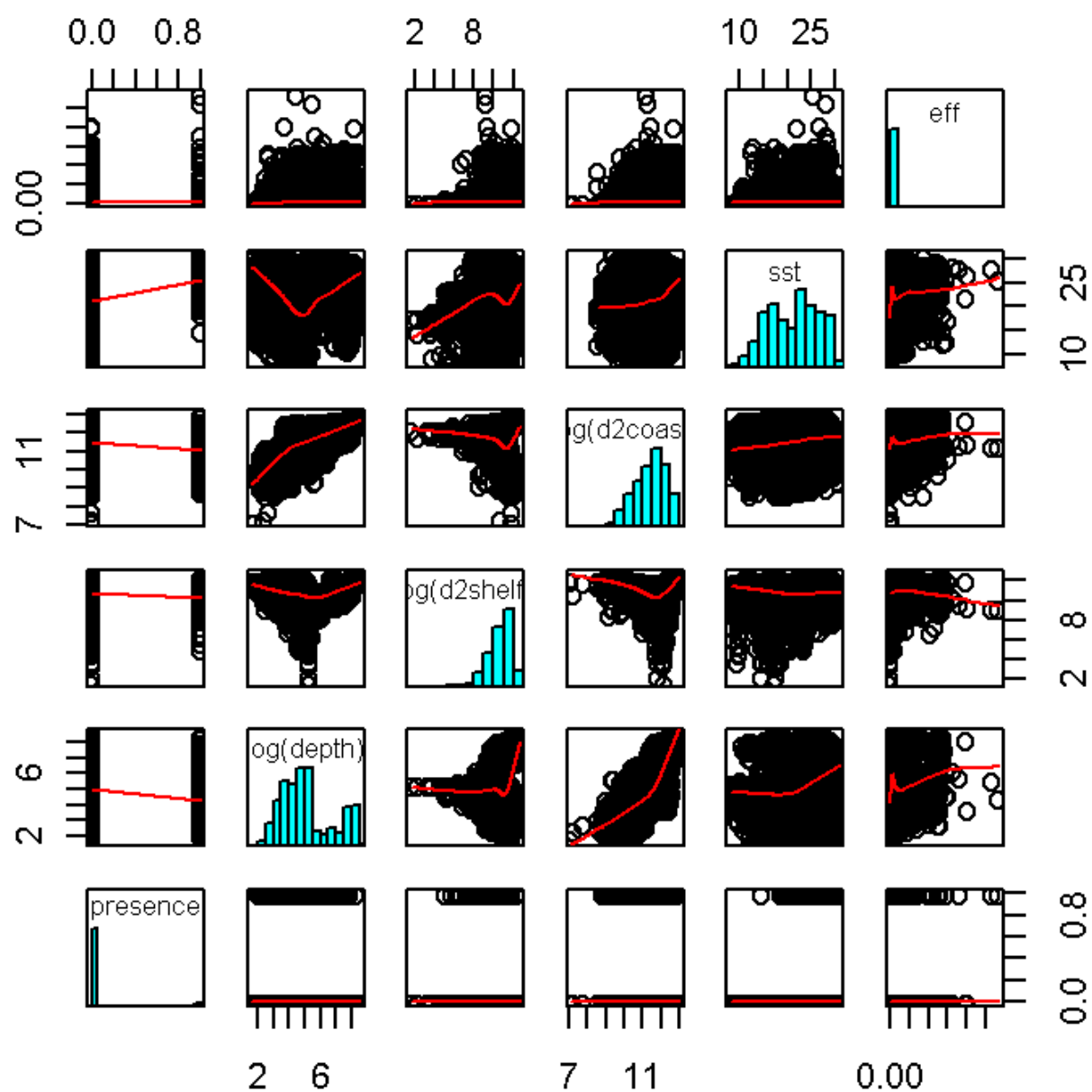


Figure 1024: Pairs plot of input variables for 'Tursiops' guild during 'summer' season in 'east2' region.

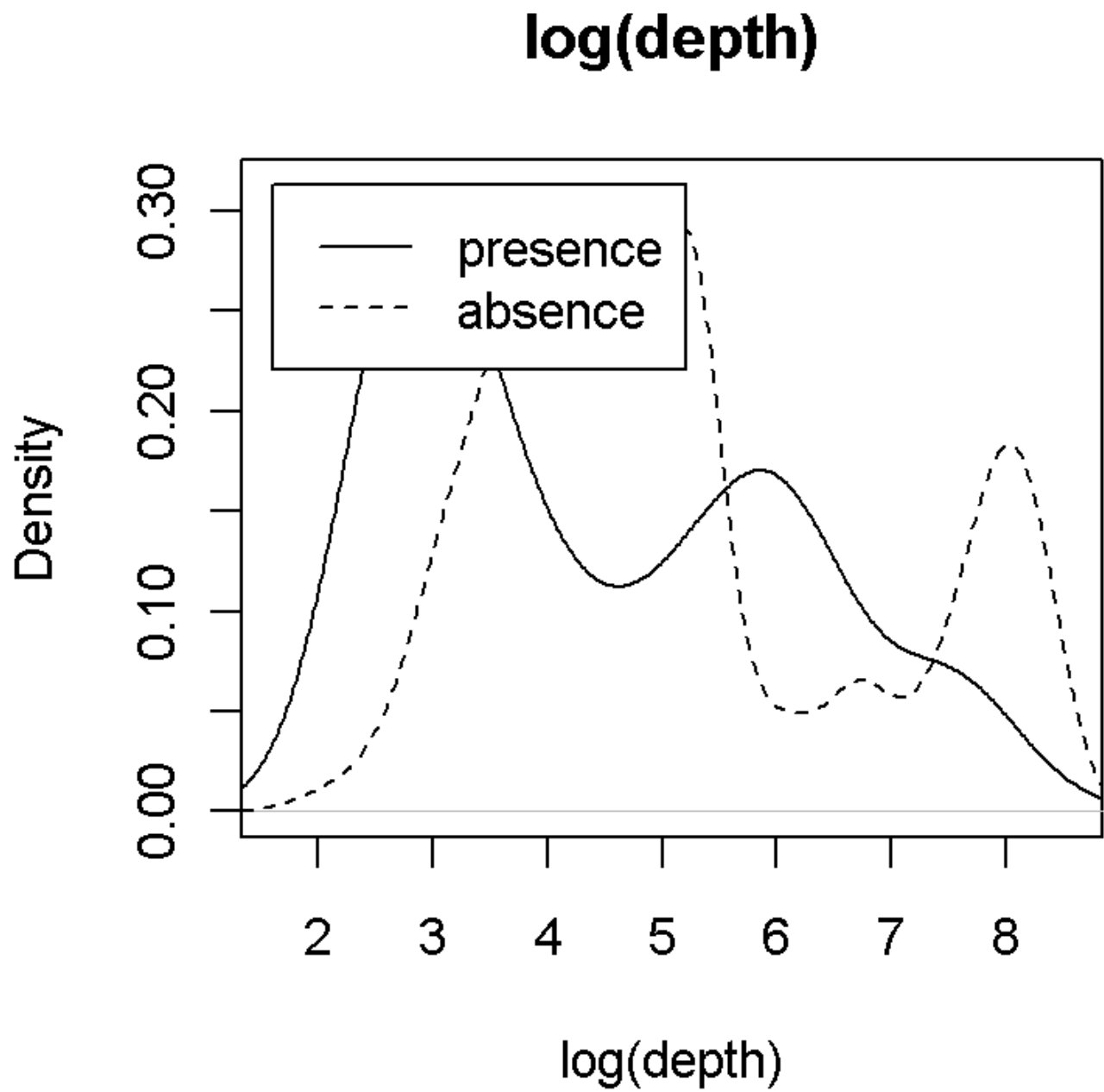


Figure 1025: Density histogram of depth $\log(\text{meters})$ for 'Tursiops' guild during 'summer' season in 'east2' region.

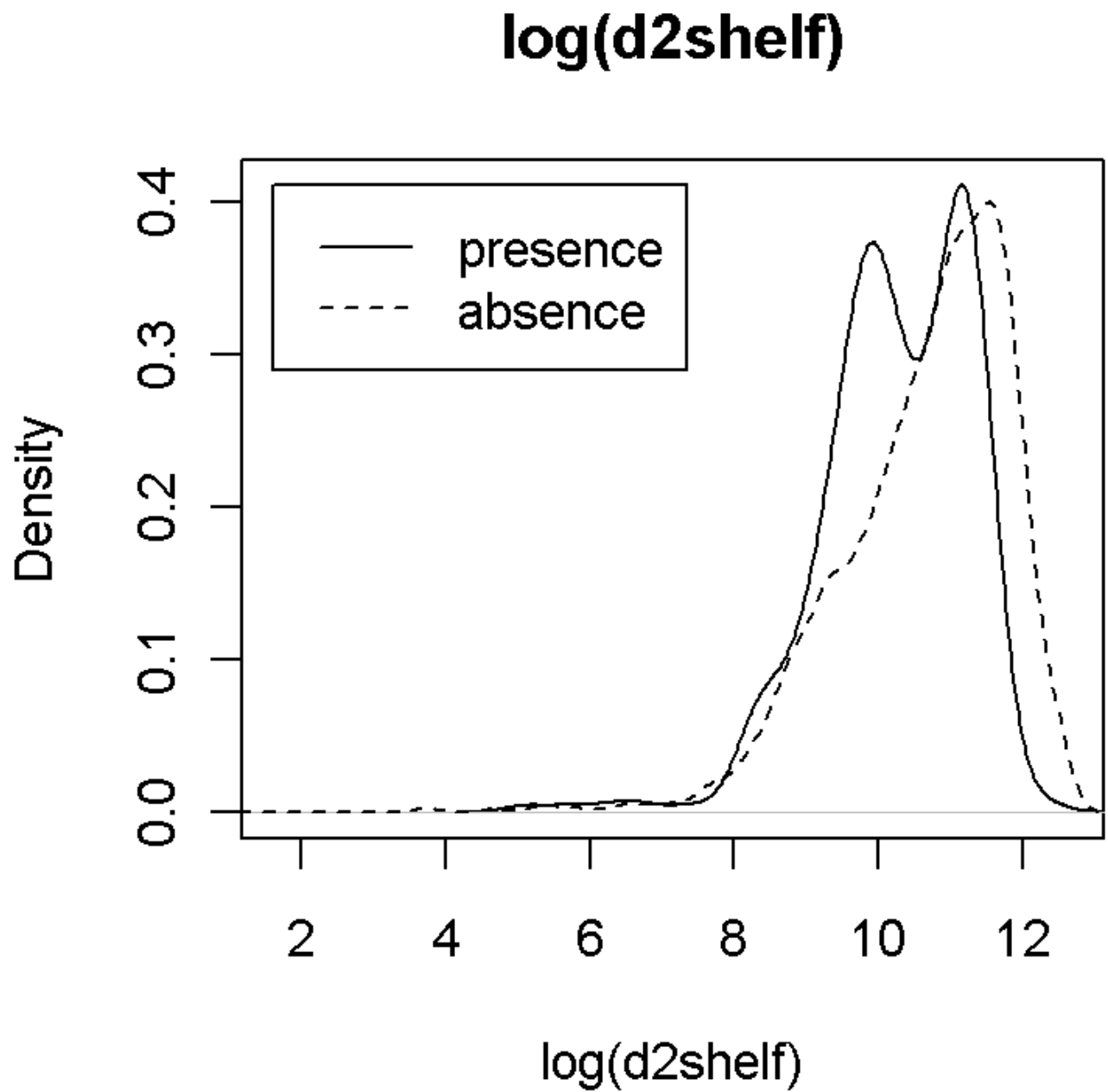


Figure 1026: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'summer' season in 'east2' region.

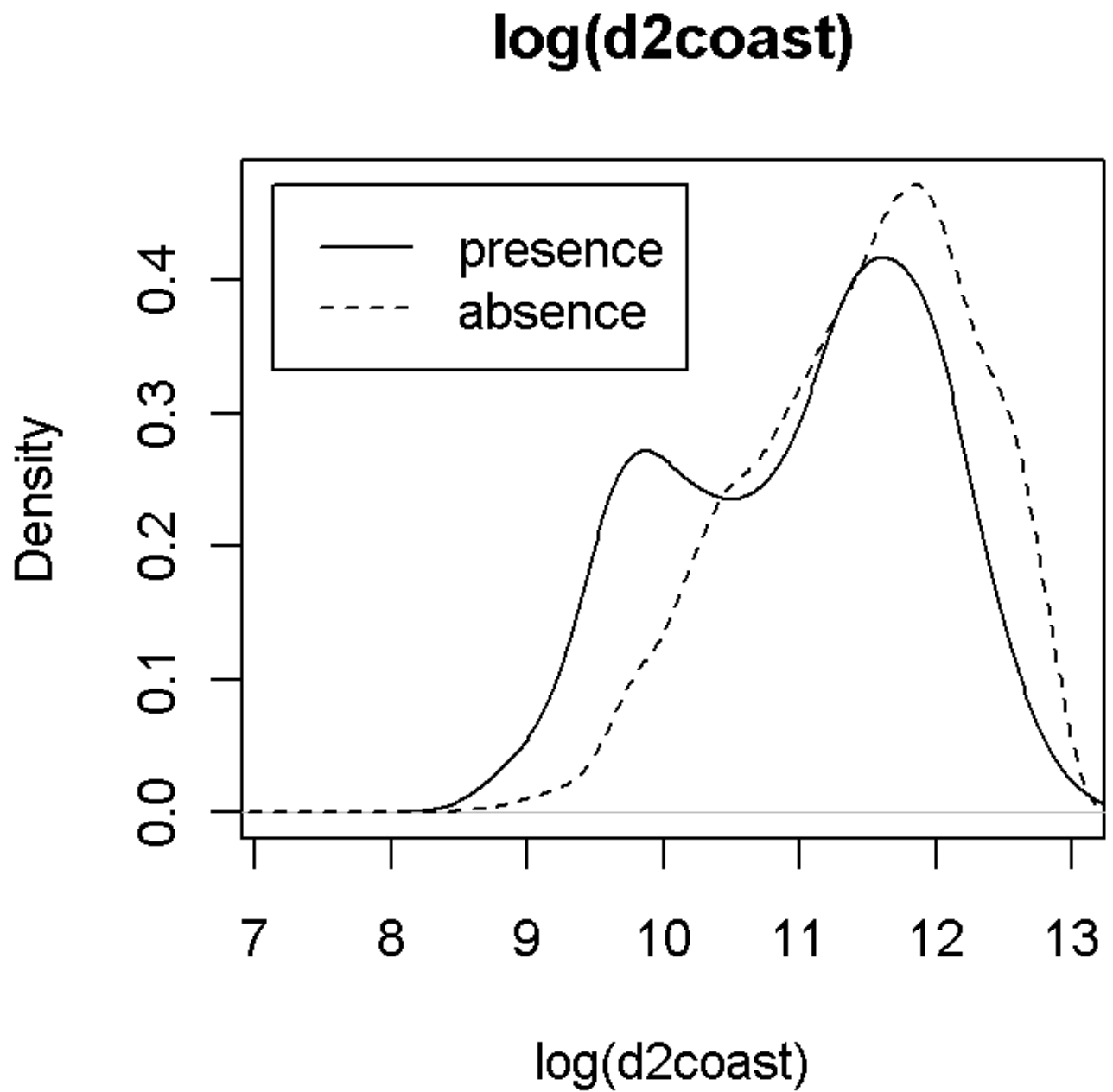


Figure 1027: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'summer' season in 'east2' region.

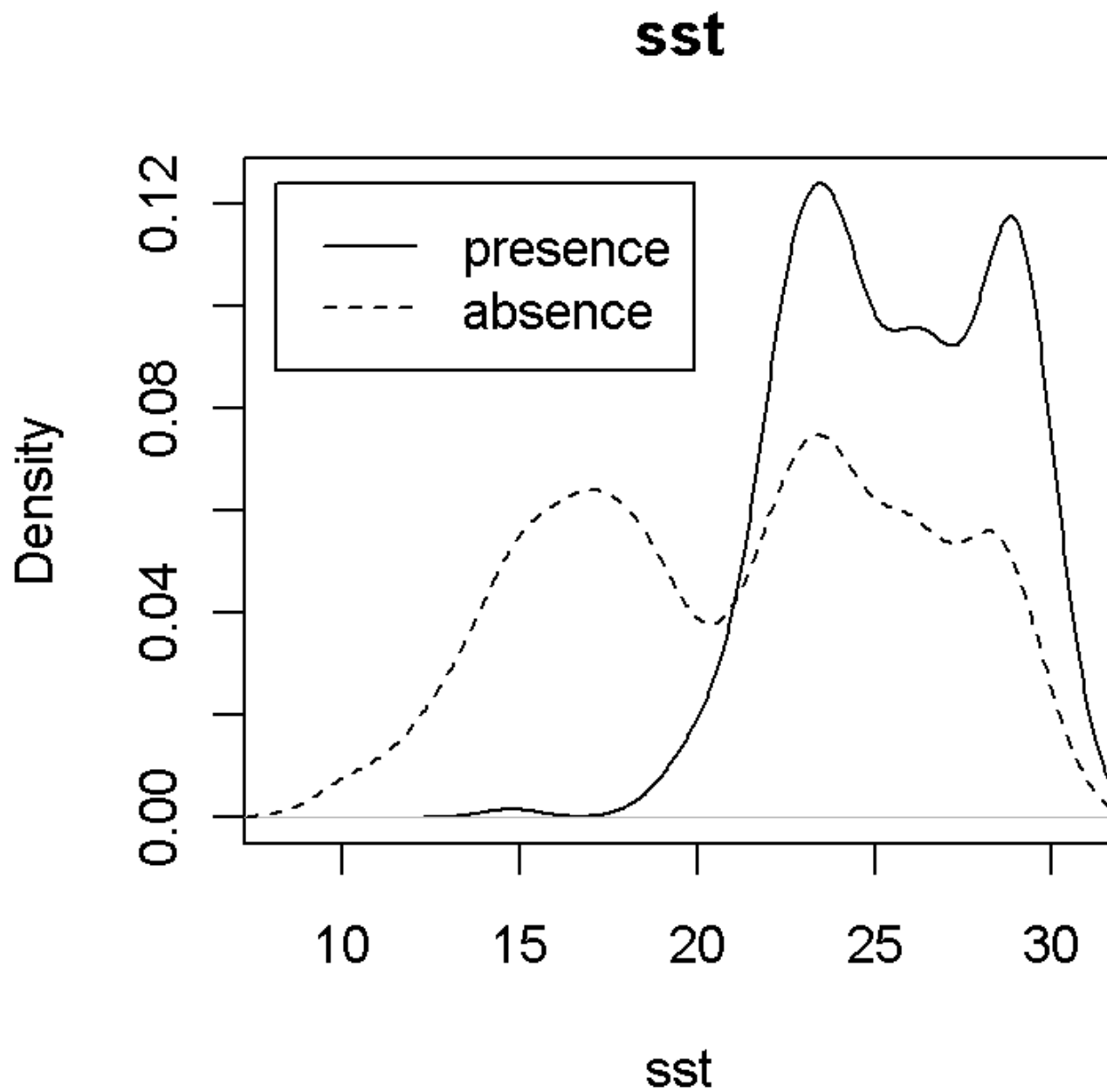


Figure 1028: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'summer' season in 'east2' region.

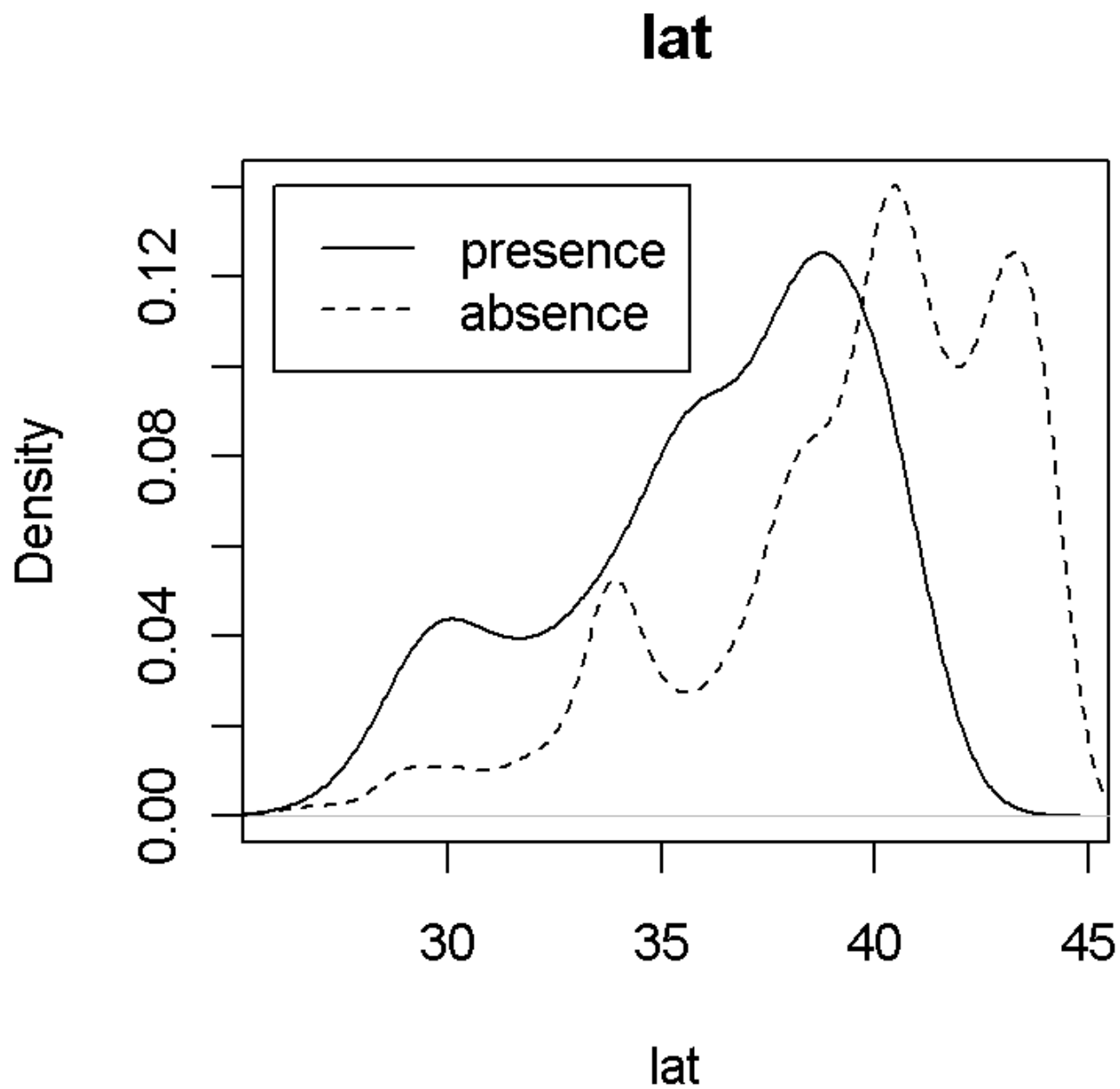


Figure 1029: Density histogram of latitude (degrees) for 'Tursiops' guild during 'summer' season in 'east2' region.

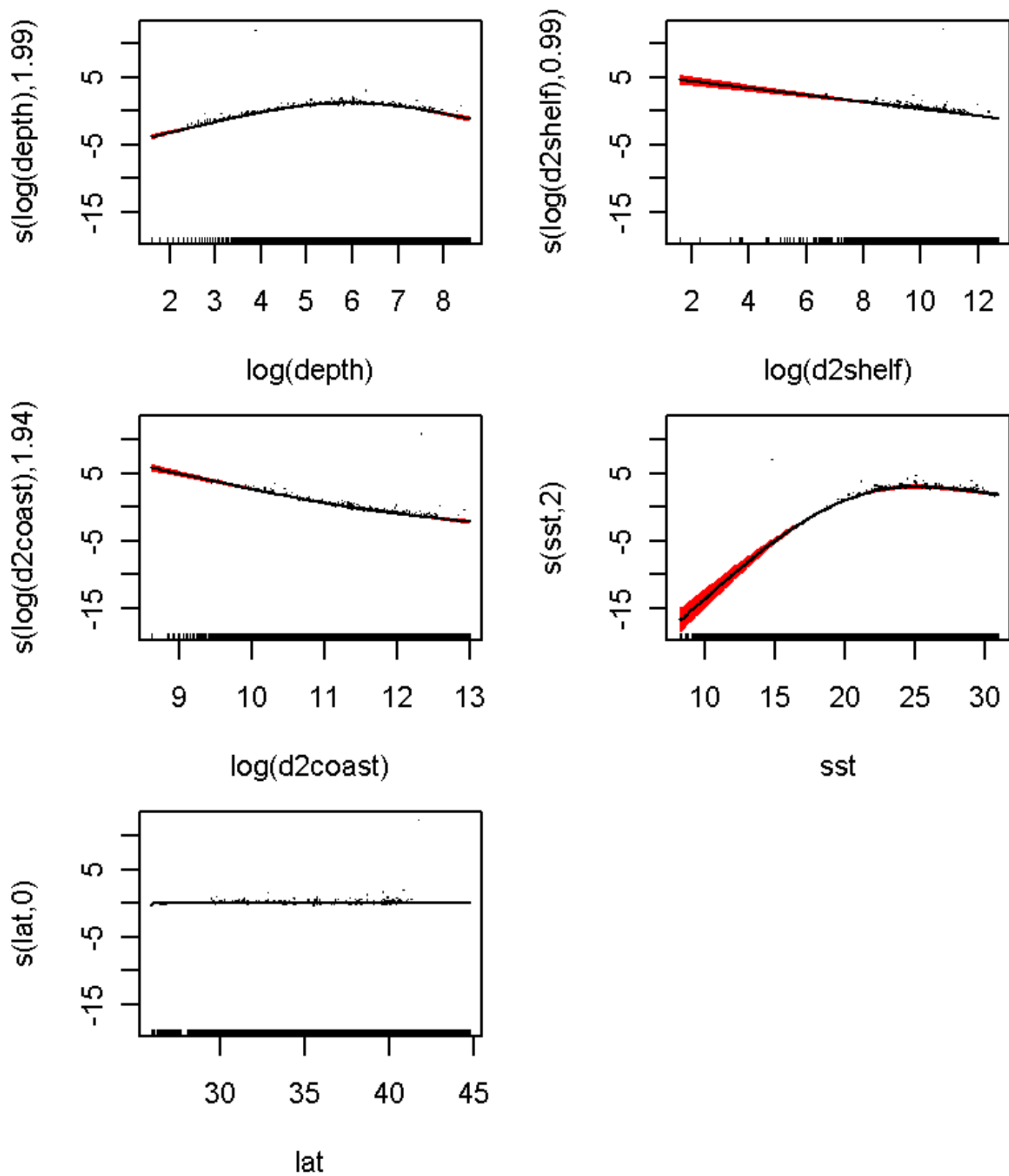


Figure 1030: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'summer' season in 'east2' region.

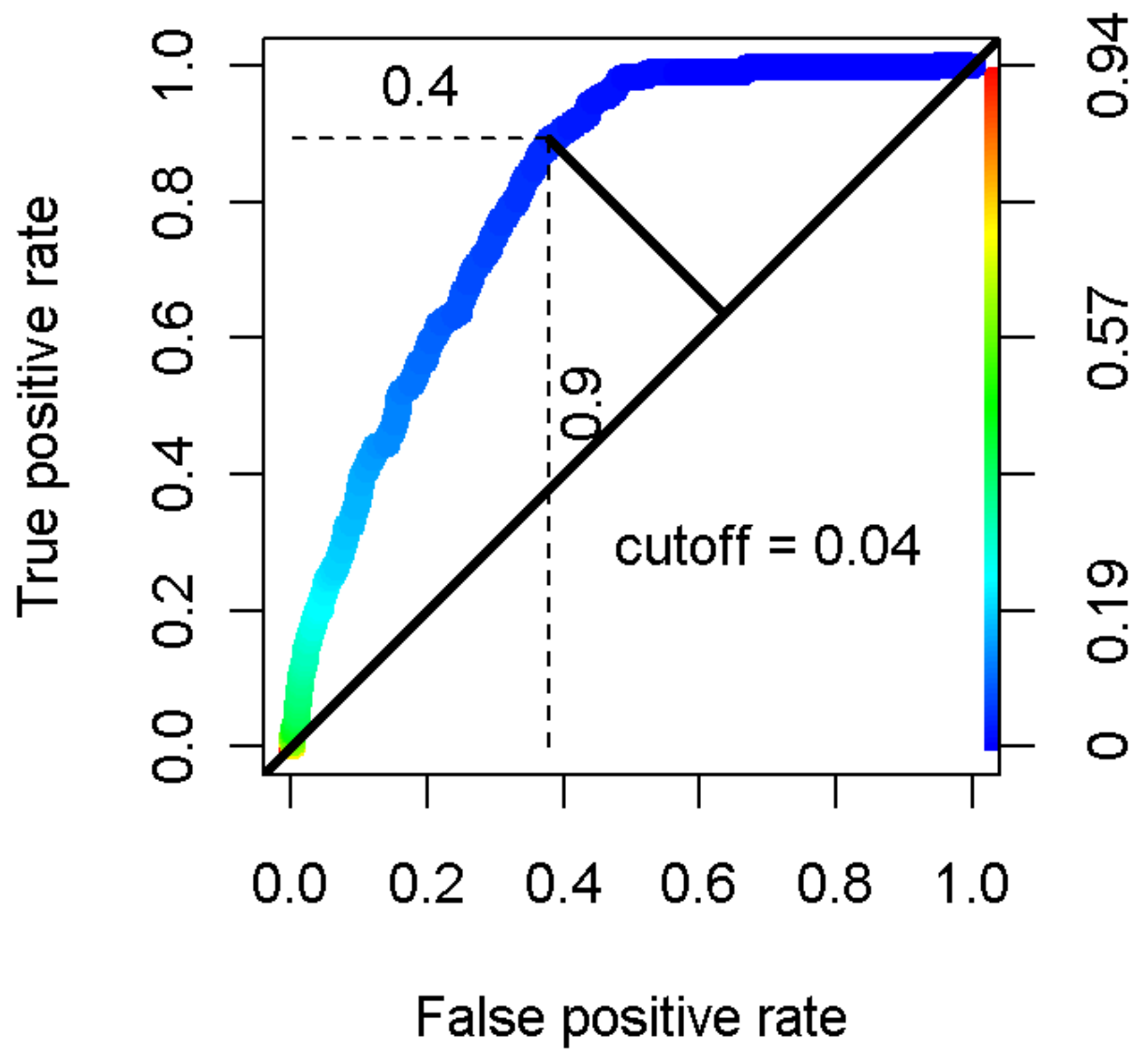


Figure 1031: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'summer' season in 'east2' region.

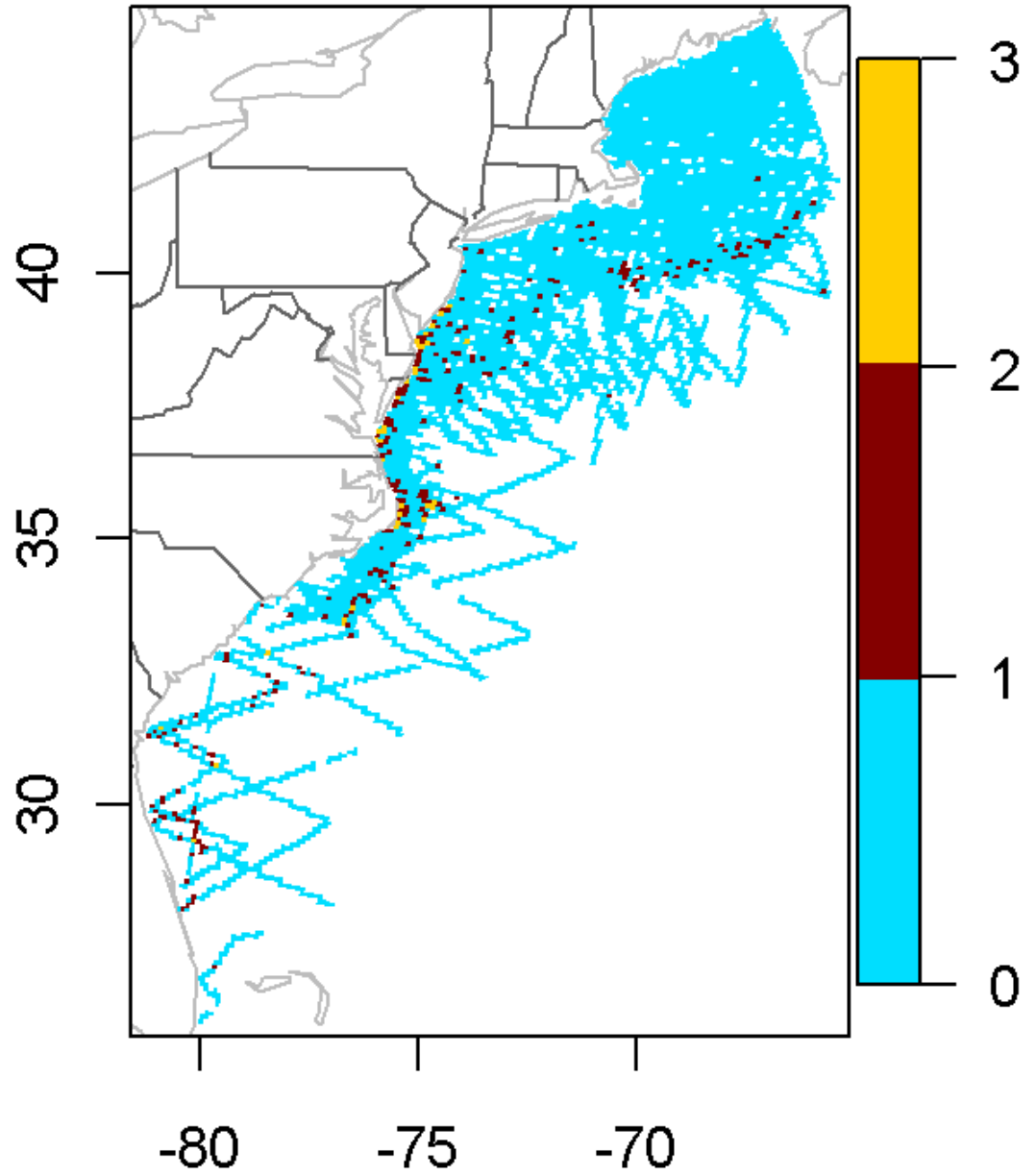


Figure 1032: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'summer' season in 'east2' region.

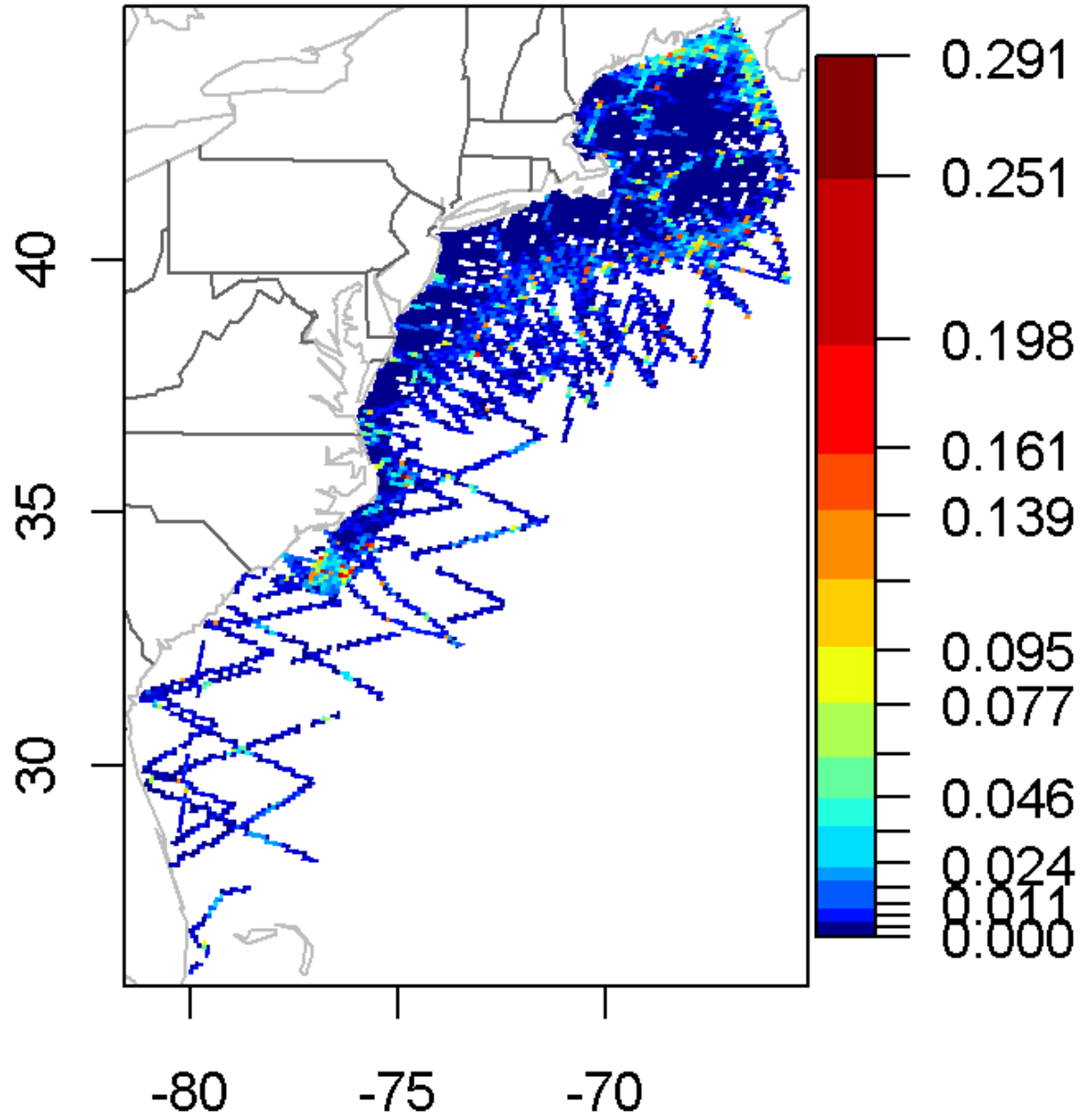


Figure 1033: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'summer' season in 'east2' region.

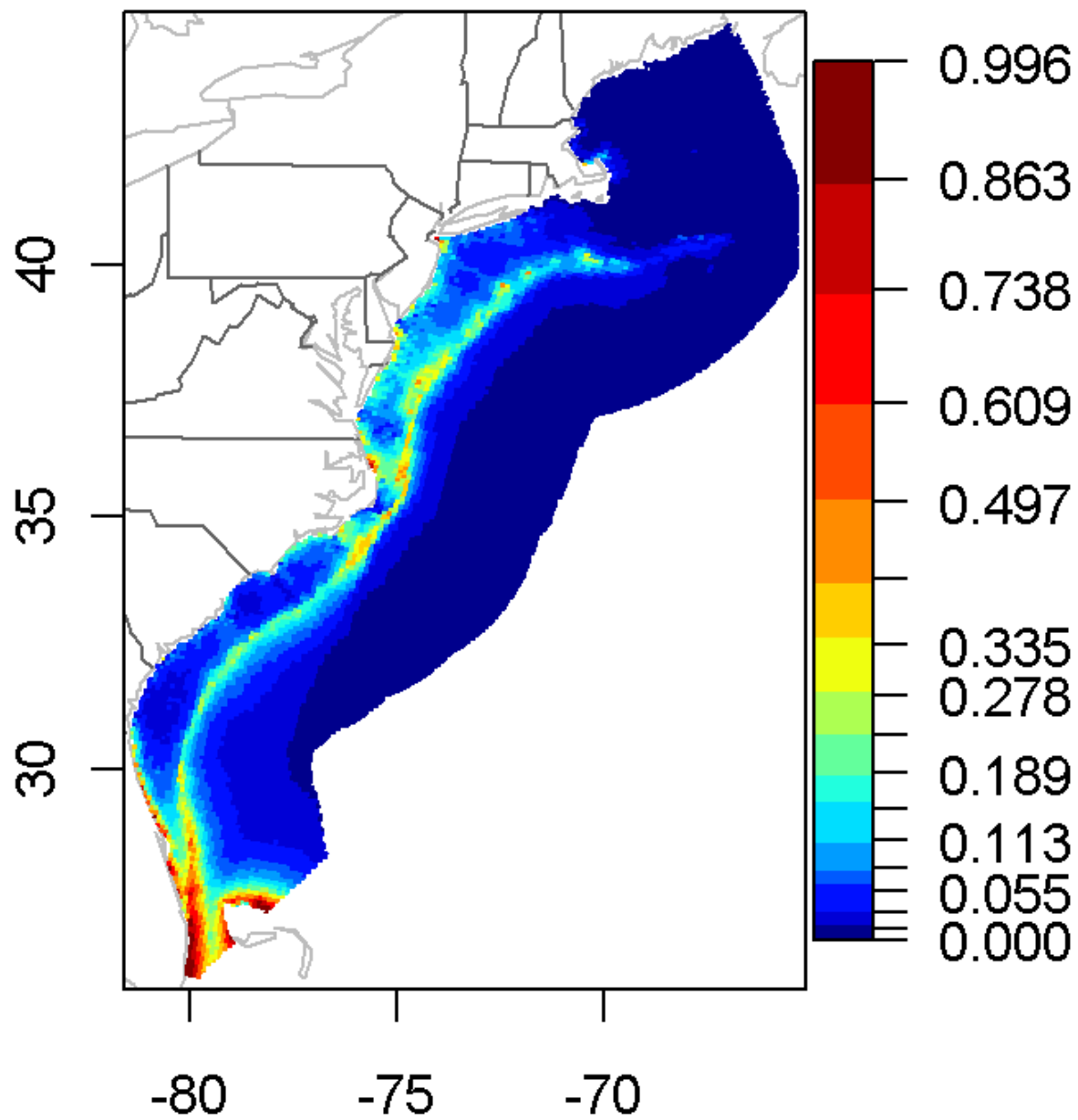


Figure 1034: Map of mean predicted habitat for 'Tursiops' guild during 'summer' season in 'east2' region.

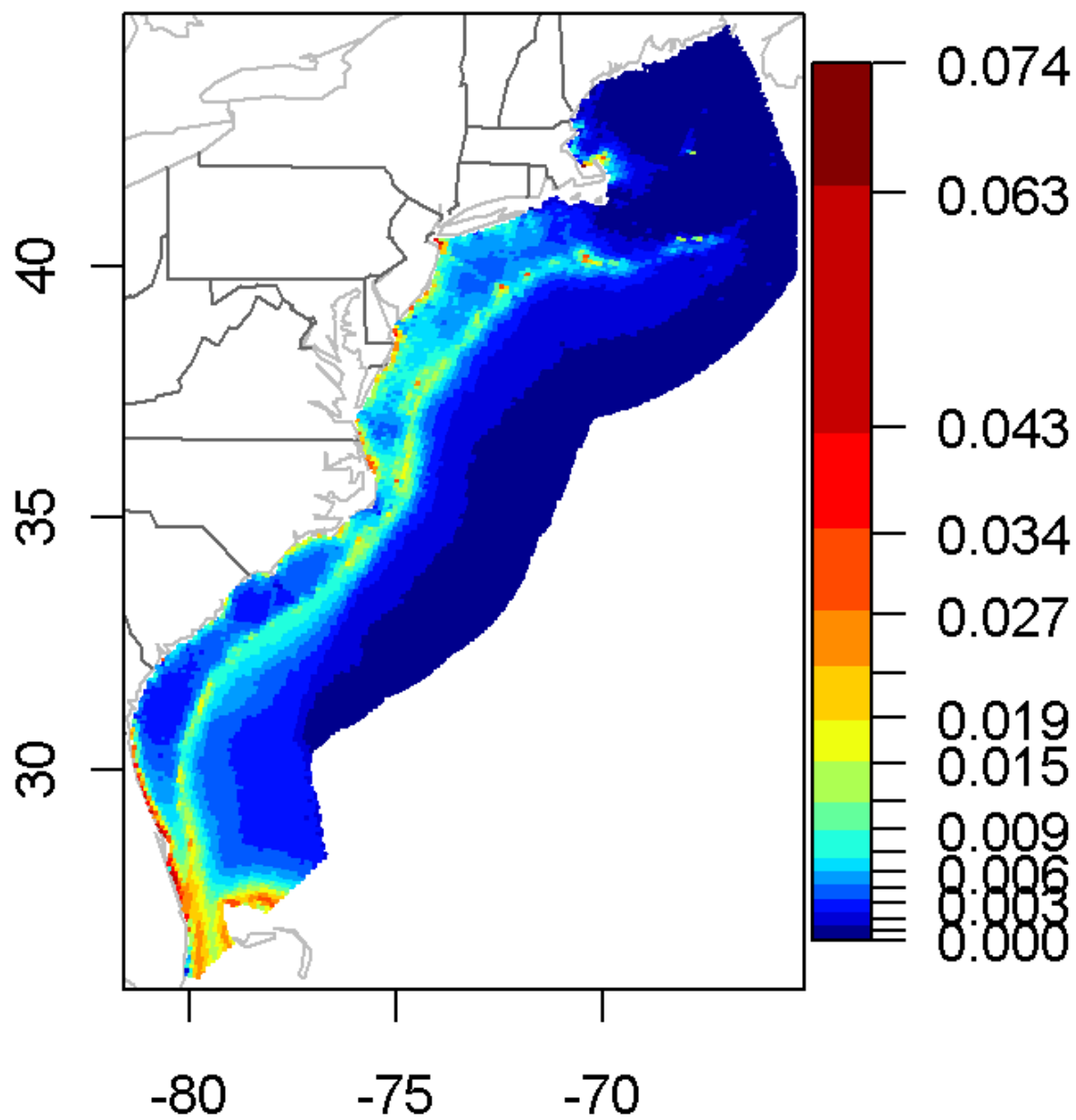


Figure 1035: Map of standard error of habitat for 'Tursiops' guild during 'summer' season in 'east2' region.

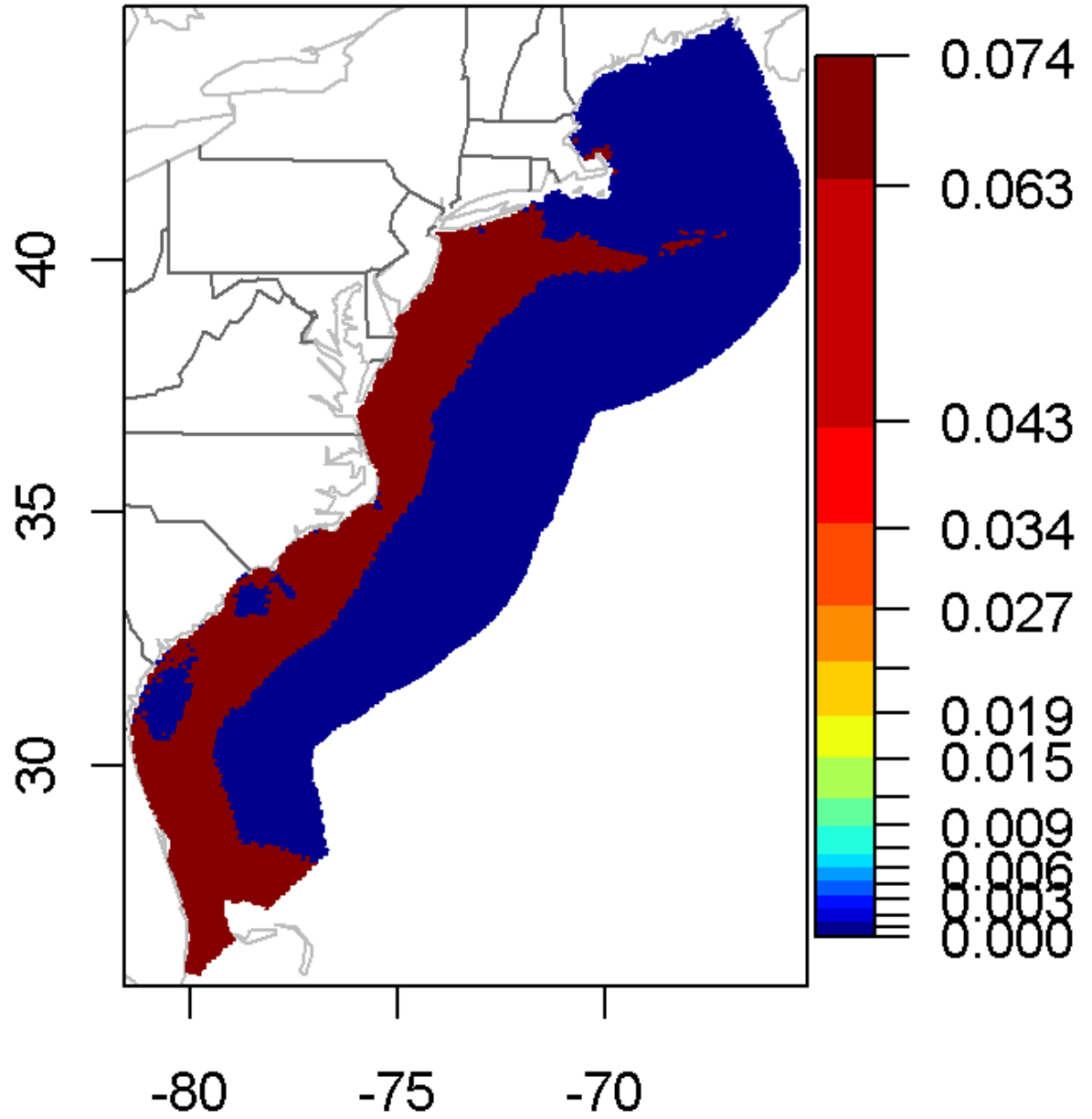


Figure 1036: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'summer' season in 'east2' region.

18.3.2 gomex2

Modelrun identifier: duke_06_tu3_summer_gomex2

Date generated: 2008-10-21 11:37:00

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 93: Summary for duke(6) GAM model: for 'Tursiops' guild during 'summer' season in 'gomex2' region.

	Value
Number.presences	102
Number.absences	1302
GAM.converged	TRUE
R.squared	0.220096
Deviance.explained	0.239817
ROC.optimum	0.560228
Maximum.fit	0.0523544
Maximum.prediction	0.572905

Model text summary...

```
duke_06_tu3_summer_gomex2 run on Tue Oct 21 11:36:14 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'summer', region:gomex2

max.fit:0.560228, max.prediction:0.572905, ROC.optimum:0.052354

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -3.8493      0.1619  -23.78  <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F  p-value
s(log(depth))  1.999e+00  2.499   70.60 < 2e-16 ***
s(log(d2shelf)) 1.971e+00  2.471   57.80 < 2e-16 ***
s(log(d2coast)) 1.573e-05  0.500  1.52e-05  0.951
s(sst)         9.405e-01  1.441   13.23 3.18e-05 ***
s(lat)         2.953e-05  0.500  2.82e-04  0.899
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  0.22  Deviance explained =  24%
GCV score = 0.0034859  Scale est. = 0.0034595  n = 1404

summary(dat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:1404  Min.   : 13   Min.   : 13.0   Min.   : 901   Min.   : 5700   Min.   :25.35   Min.   :24.04
              1st Qu.:2791 1st Qu.: 149.8   1st Qu.: 21595 1st Qu.: 99783 1st Qu.:27.75   1st Qu.:26.68
              Median :5134 Median : 654.0   Median : 45466 Median :146059 Median :28.50   Median :27.90
              Mean   :4686 Mean   : 899.5   Mean   : 59670 Mean   :161835 Mean   :28.50   Mean   :27.65
              3rd Qu.:6644 3rd Qu.:1292.0   3rd Qu.: 82981 3rd Qu.:213494 3rd Qu.:29.25   3rd Qu.:28.69
              Max.   :8257 Max.   :3505.0   Max.   :249222 Max.   :386037 Max.   :31.20   Max.   :30.24

summary(newdat)...
      region    fid_c10    depth    d2shelf    d2coast    sst    lat
gomex2:6672  Min.   : 1   Min.   : 3.0   Min.   : 272   Min.   : 5317   Min.   :27.67   Min.   :23.85
              1st Qu.:1861 1st Qu.: 46.0   1st Qu.: 31617 1st Qu.: 85289 1st Qu.:29.48   1st Qu.:26.28
              Median :4110 Median : 433.5   Median : 71100 Median :157258 Median :29.55   Median :27.29
```


Mean	:3997	Mean	:1057.7	Mean	: 86278	Mean	:170790	Mean	:29.56	Mean	:27.26
3rd Qu.	:6015	3rd Qu.	:2026.0	3rd Qu.	:131962	3rd Qu.	:249983	3rd Qu.	:29.70	3rd Qu.	:28.38
Max.	:8351	Max.	:3643.0	Max.	:267519	Max.	:408116	Max.	:30.38	Max.	:30.36

summary(pred)...

fid_c10		fit		se.fit		presence		effort		roc	
Min.	: 1	Min.	:1.067e-05	Min.	:7.889e-06	Min.	: 0.0000	Min.	:1.186e-05	Min.	:0.0000
1st Qu.	:1861	1st Qu.	:3.032e-03	1st Qu.	:1.138e-03	1st Qu.	: 0.0000	1st Qu.	:2.888e-03	1st Qu.	:0.0000
Median	:4110	Median	:1.889e-02	Median	:4.139e-03	Median	: 0.0000	Median	:5.100e-03	Median	:0.0000
Mean	:3997	Mean	:6.317e-02	Mean	:9.226e-03	Mean	: 0.0924	Mean	:1.213e-02	Mean	:0.3219
3rd Qu.	:6015	3rd Qu.	:7.279e-02	3rd Qu.	:1.374e-02	3rd Qu.	: 0.0000	3rd Qu.	:1.167e-02	3rd Qu.	:1.0000
Max.	:8351	Max.	:5.729e-01	Max.	:1.043e-01	Max.	: 2.0000	Max.	:2.534e-01	Max.	:1.0000
						NA's	:5568.0000	NA's		:5.568e+03	

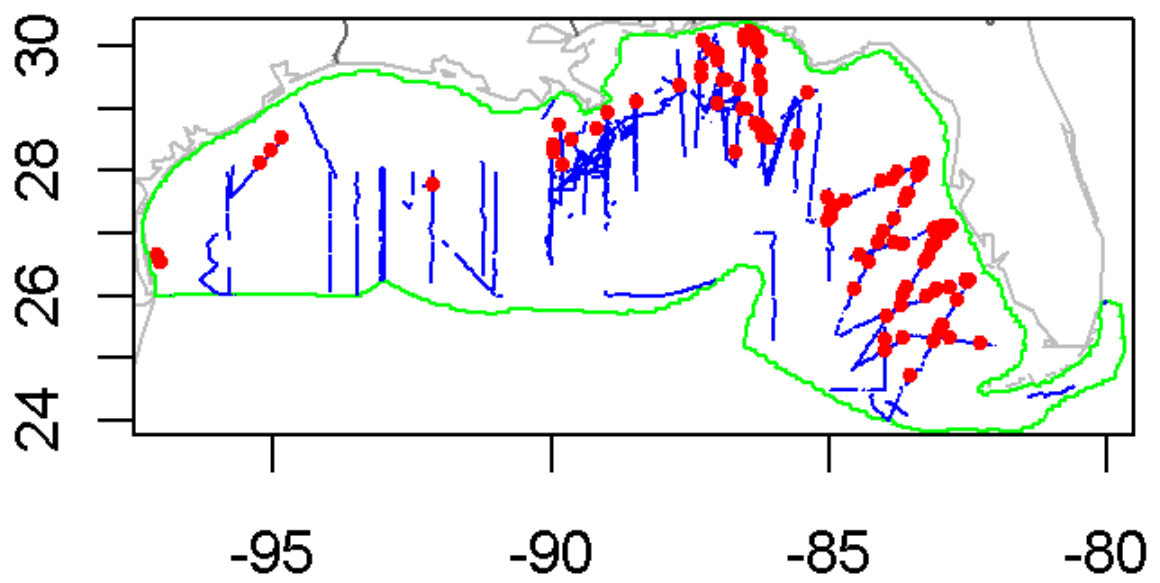


Figure 1037: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'summer' season in 'gomex2' region.

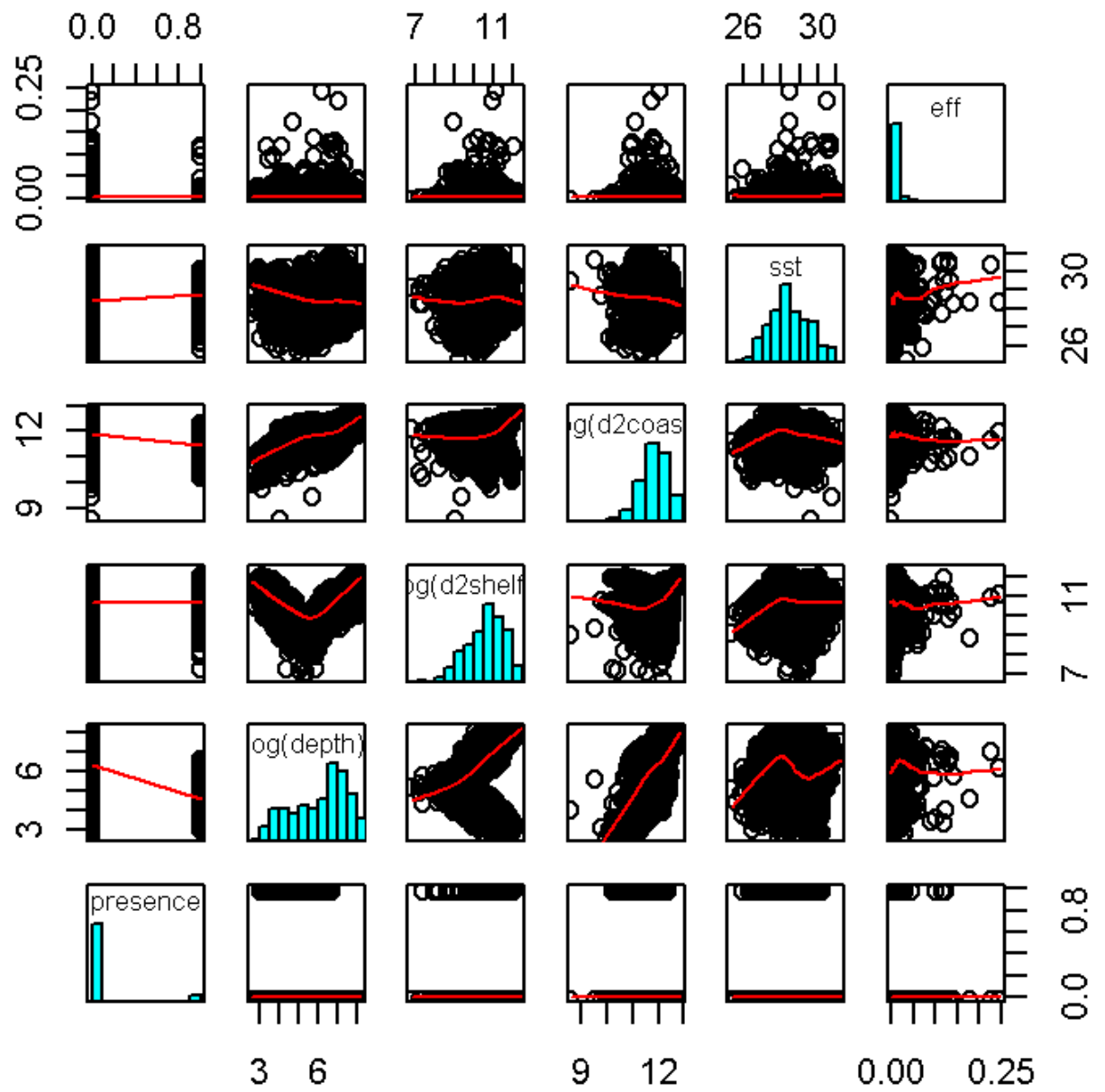


Figure 1038: Pairs plot of input variables for 'Tursiops' guild during 'summer' season in 'gomex2' region.

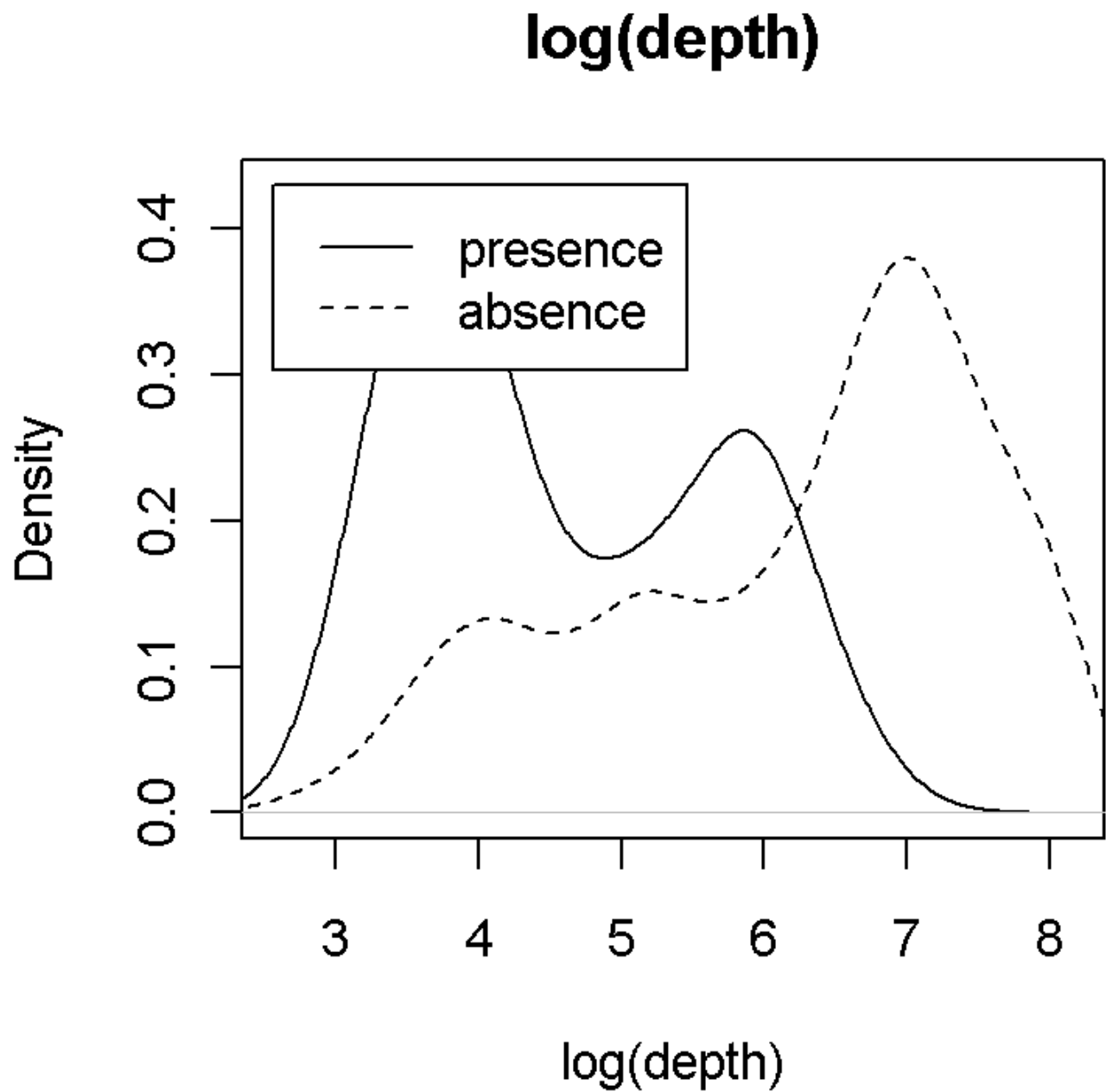


Figure 1039: Density histogram of depth log(meters) for 'Tursiops' guild during 'summer' season in 'gomex2' region.

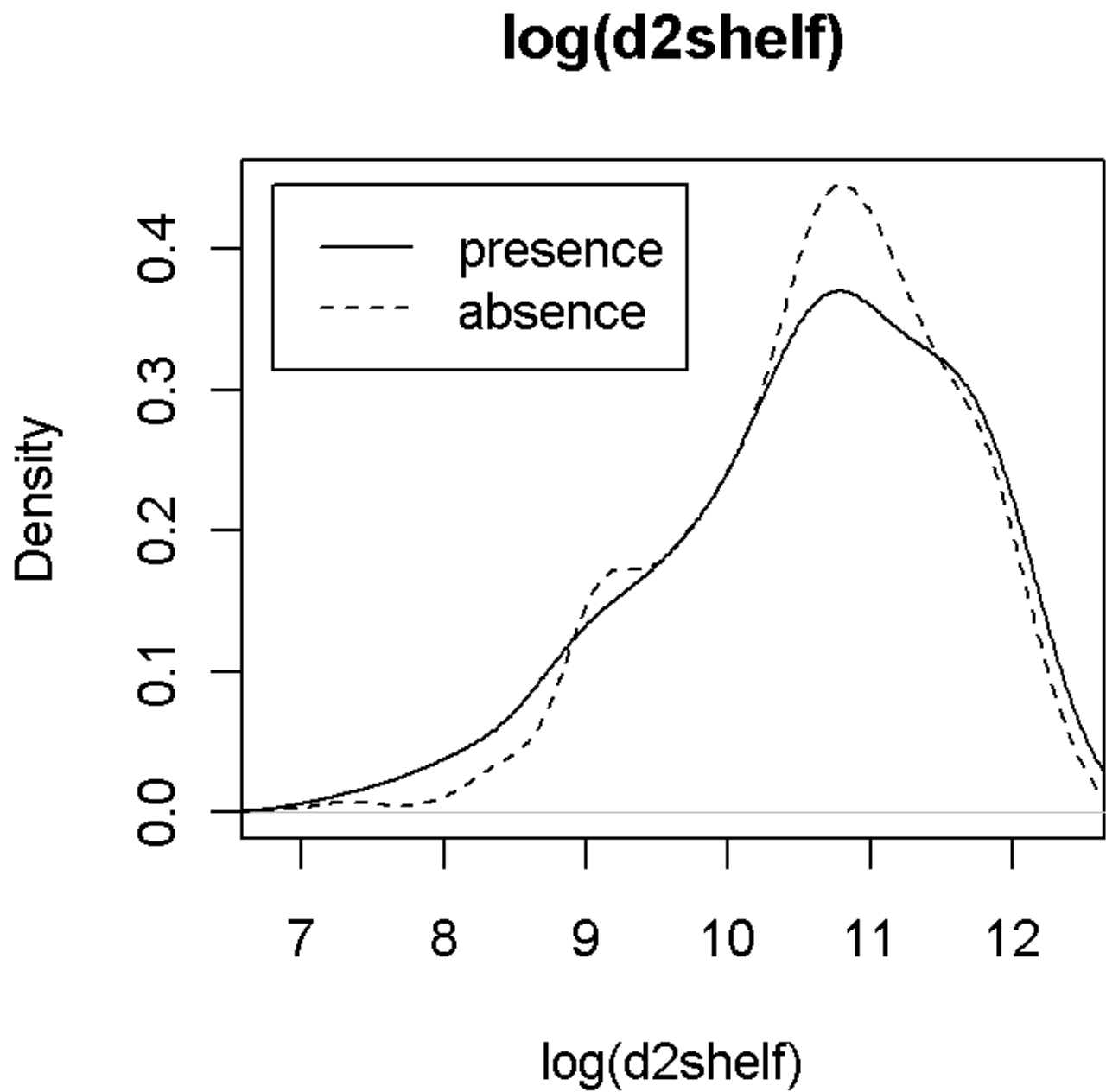


Figure 1040: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'summer' season in 'gomex2' region.

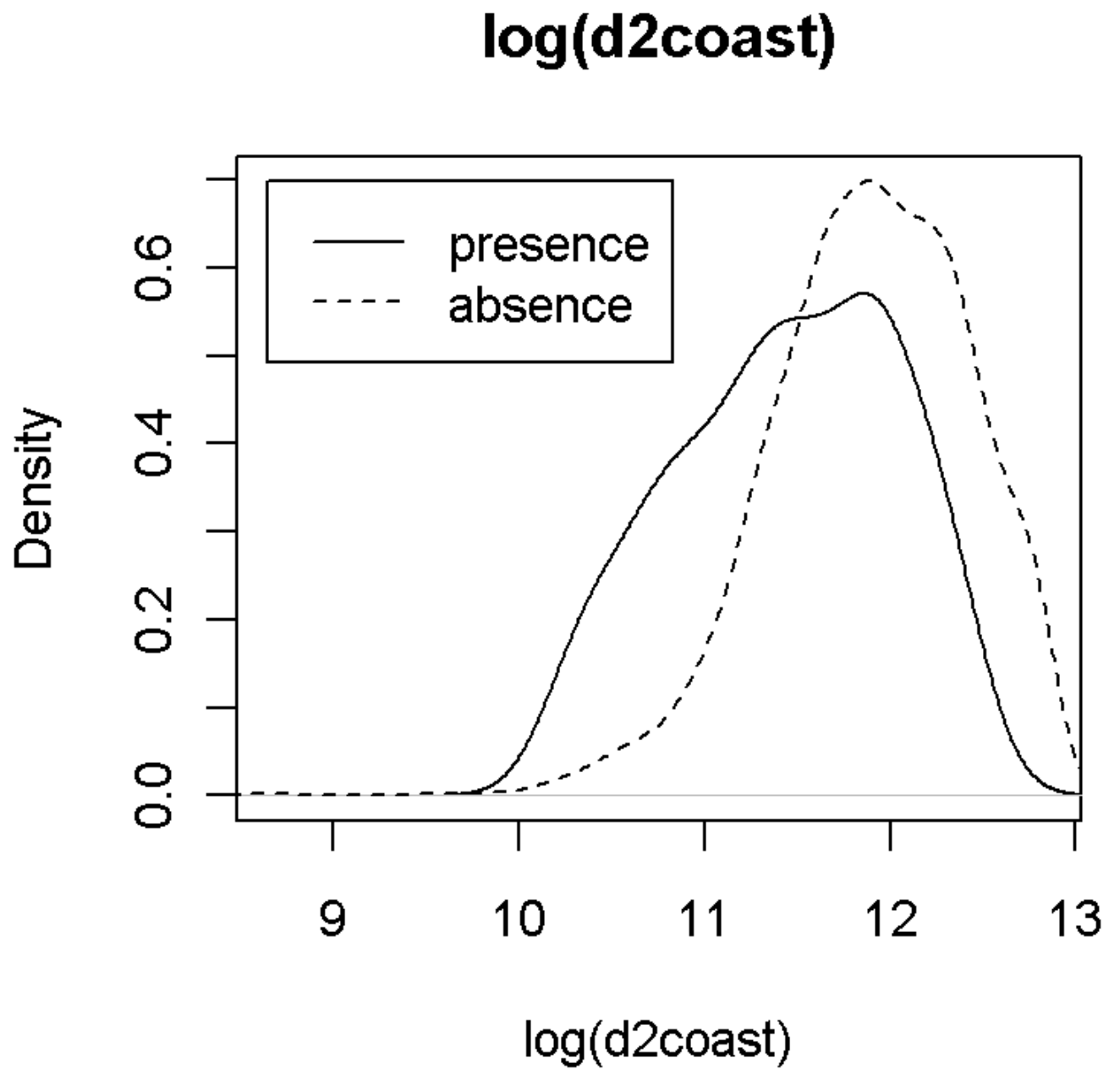


Figure 1041: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'summer' season in 'gomex2' region.

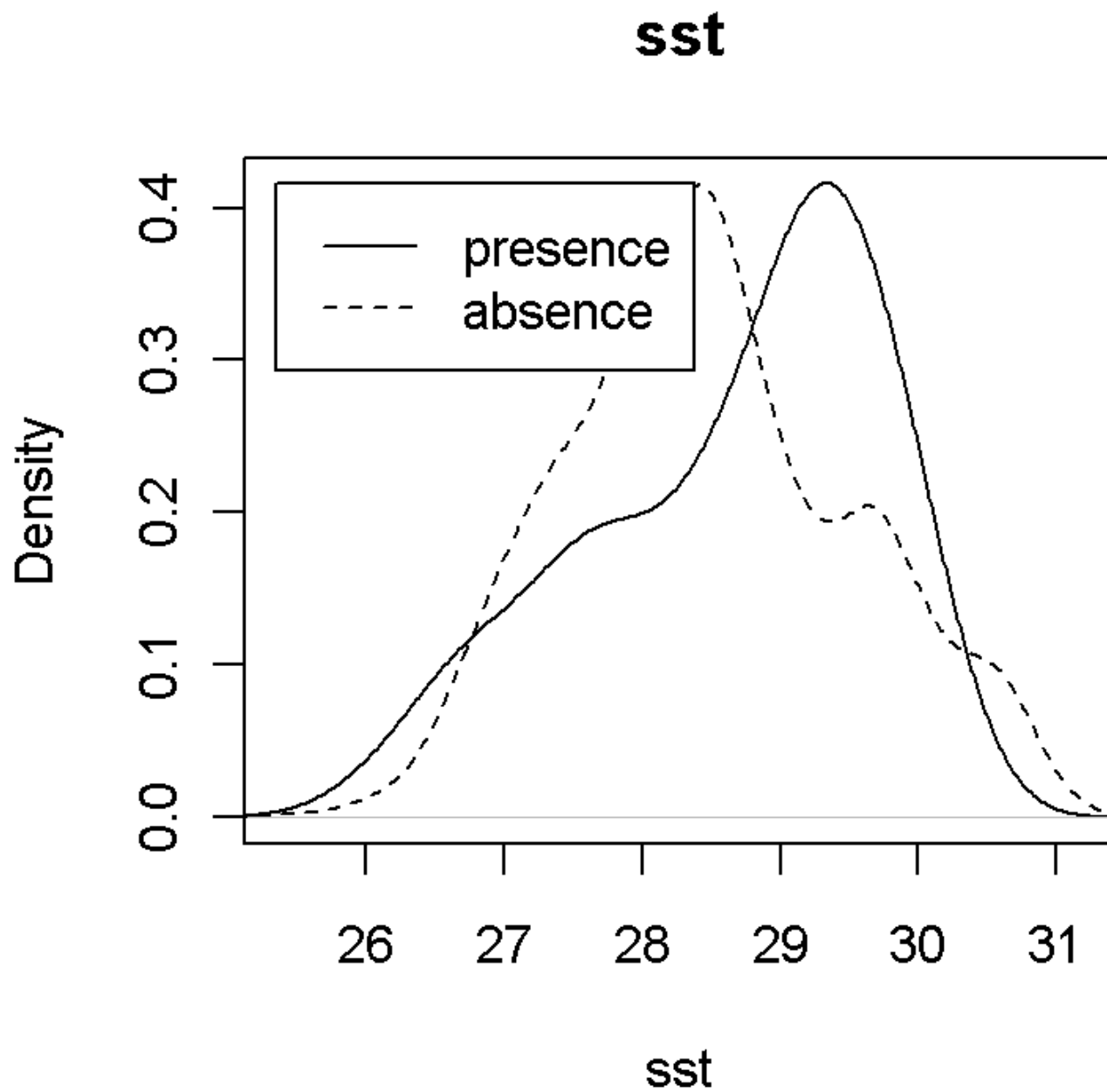


Figure 1042: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'summer' season in 'gomex2' region.

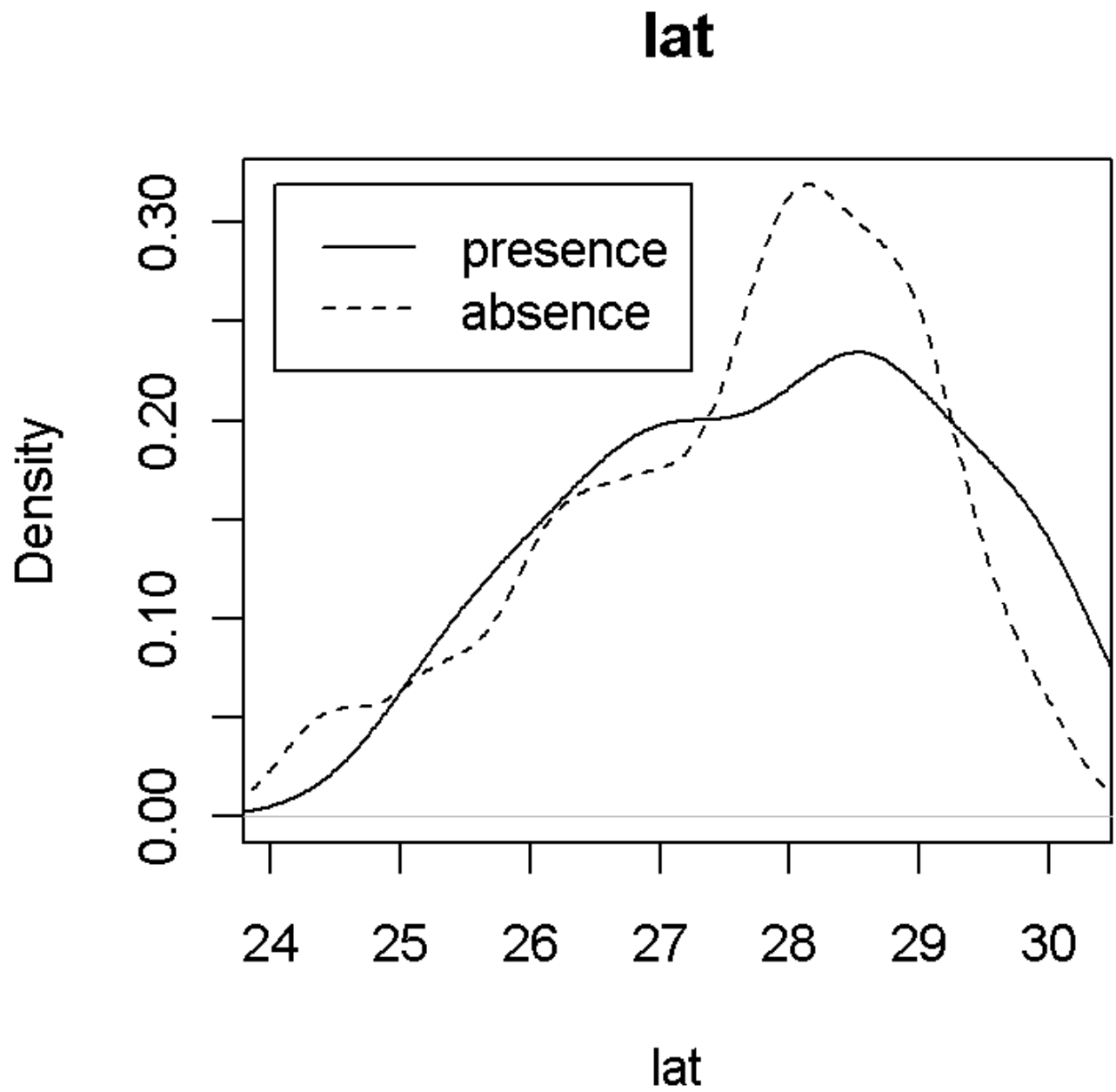


Figure 1043: Density histogram of latitude (degrees) for 'Tursiops' guild during 'summer' season in 'gomex2' region.

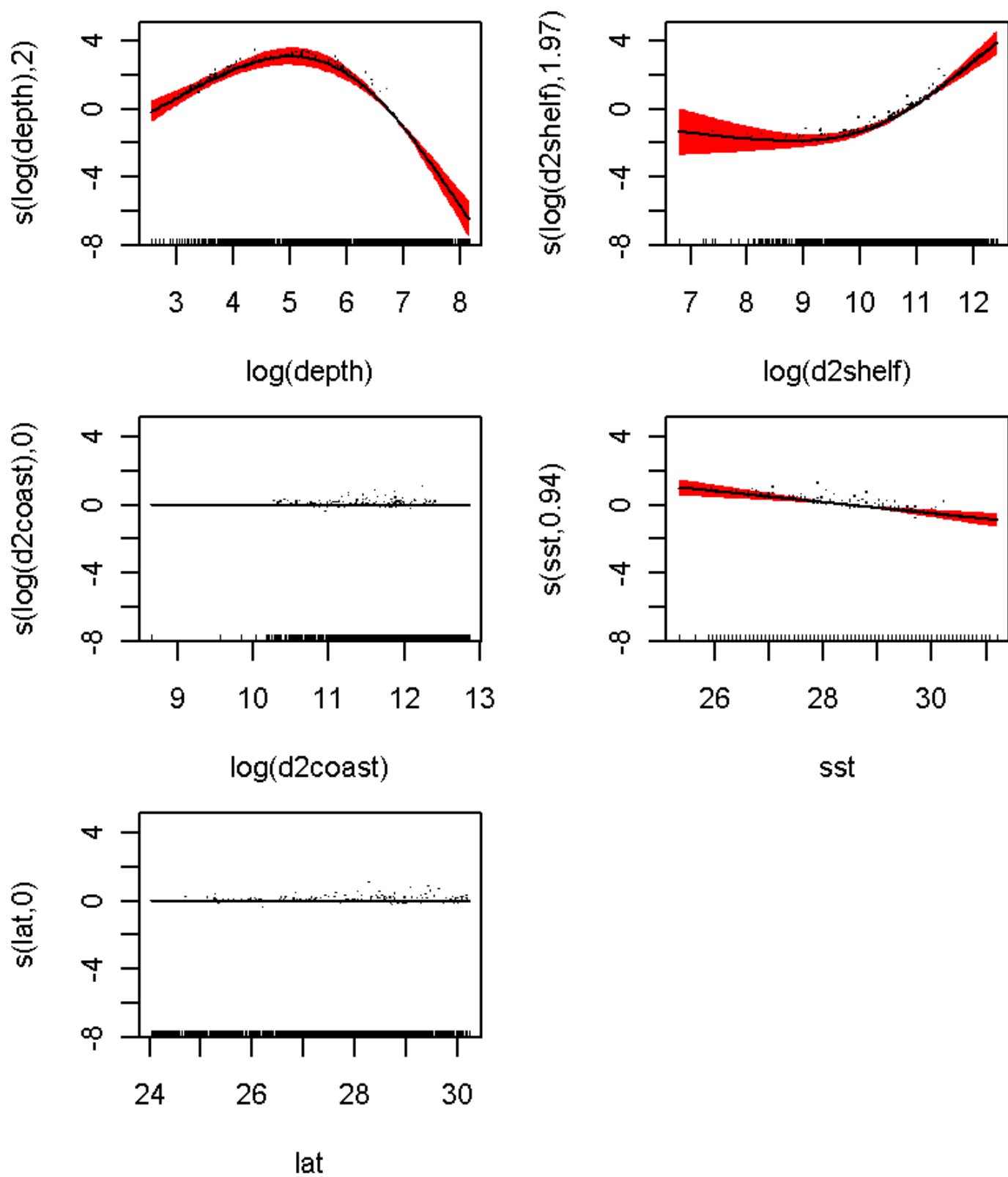


Figure 1044: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'summer' season in 'gomex2' region.

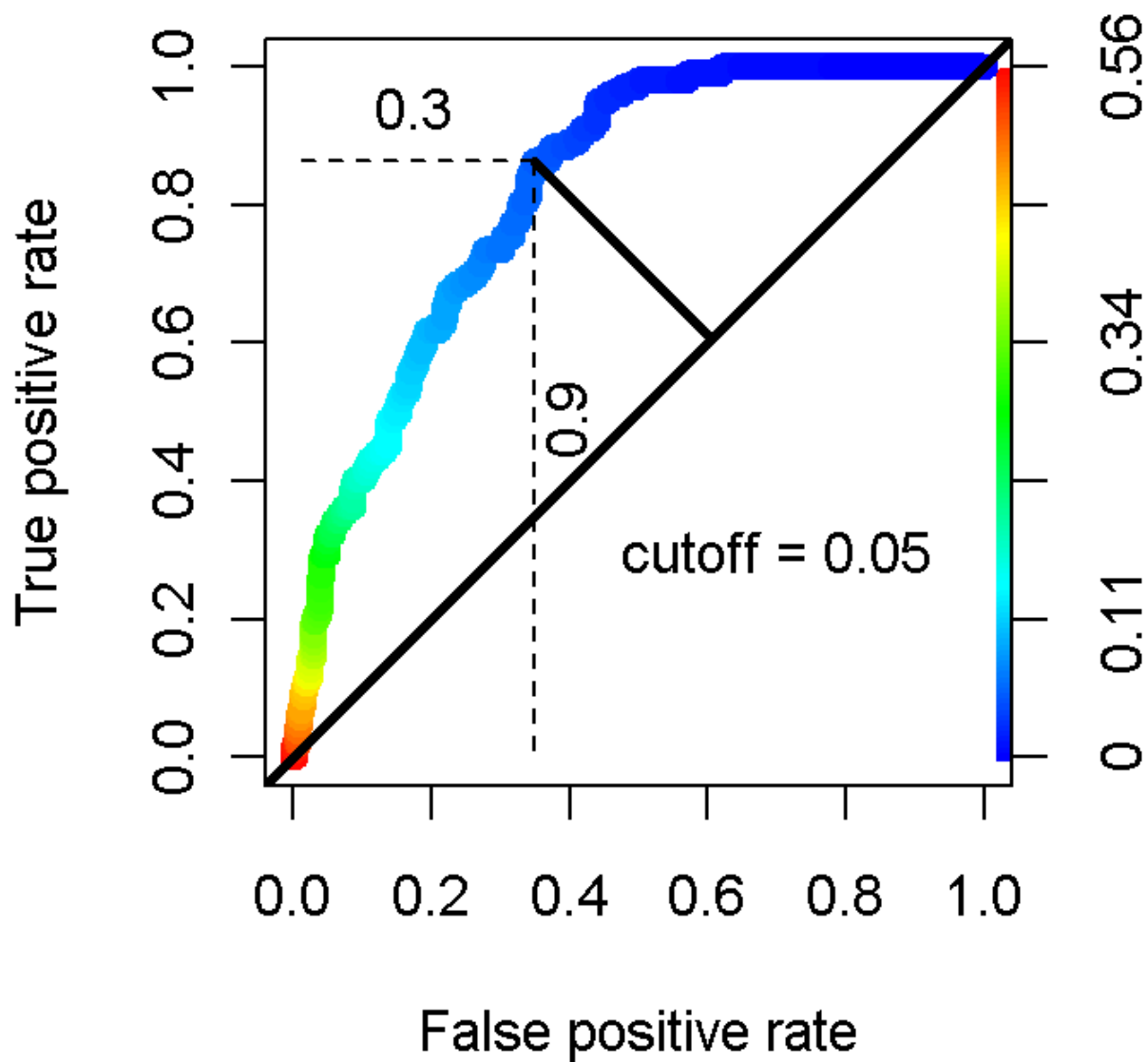


Figure 1045: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'summer' season in 'gomex2' region.

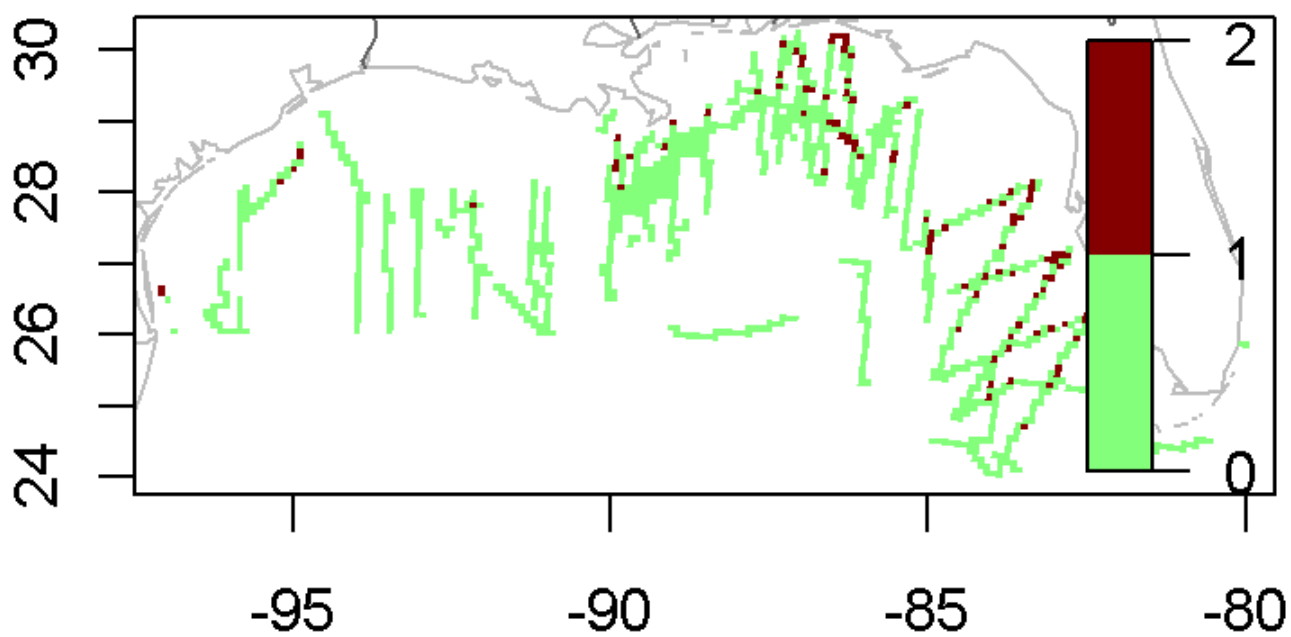


Figure 1046: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'summer' season in 'gomex2' region.

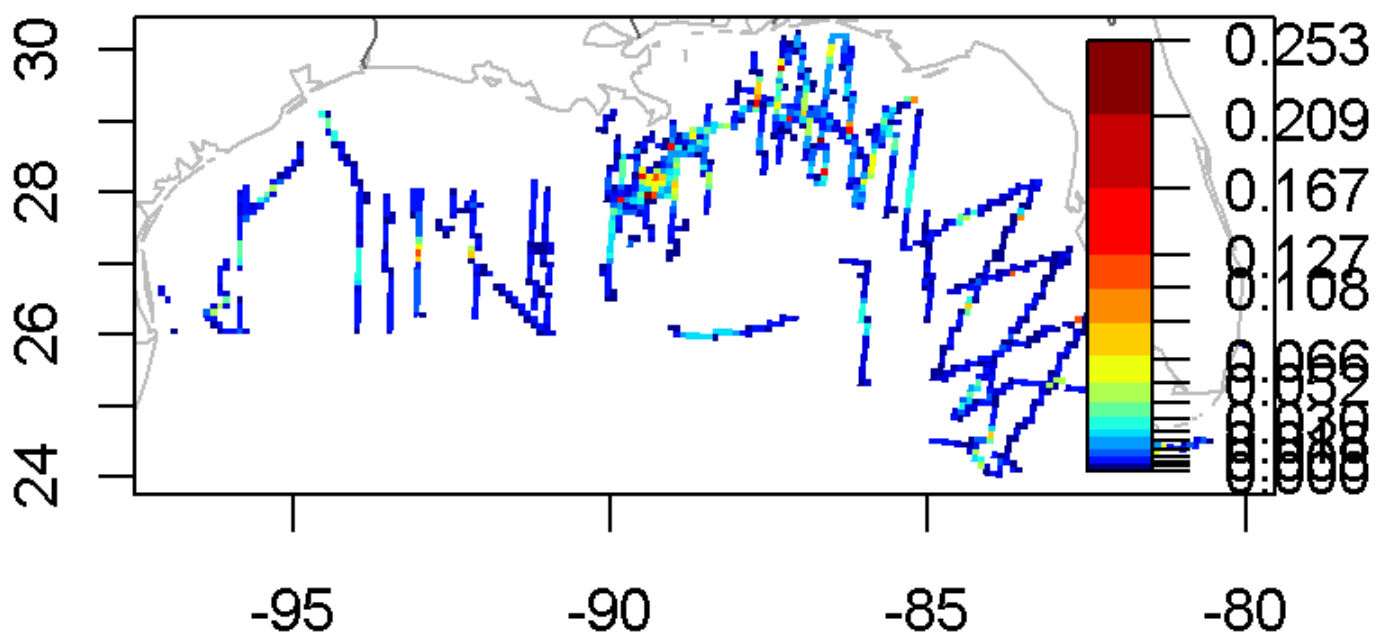


Figure 1047: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'summer' season in 'gomex2' region.

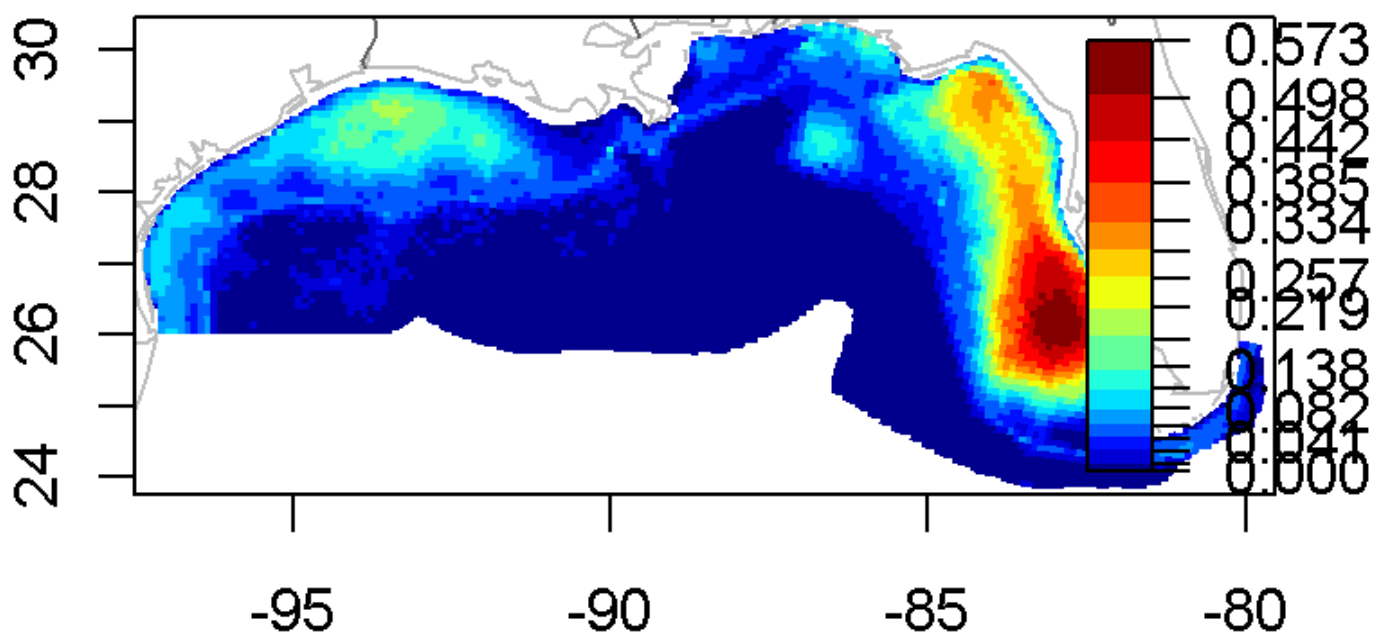


Figure 1048: Map of mean predicted habitat for 'Tursiops' guild during 'summer' season in 'gomex2' region.

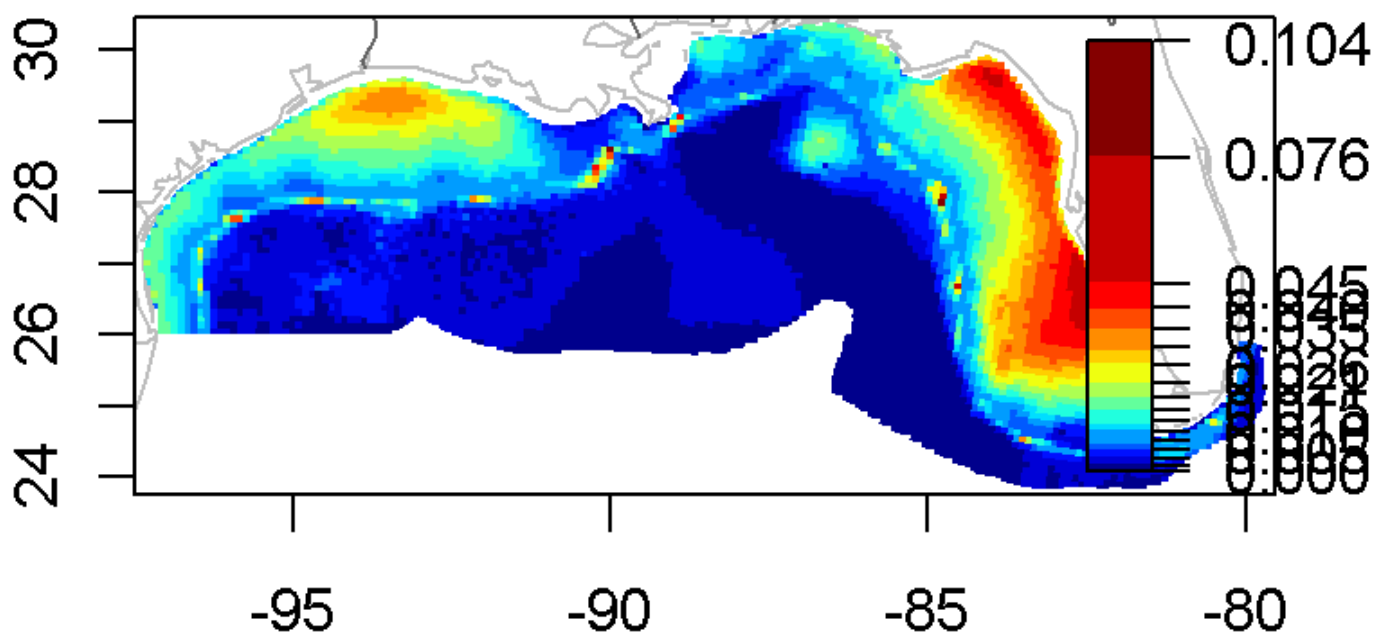


Figure 1049: Map of standard error of habitat for 'Tursiops' guild during 'summer' season in 'gomex2' region.

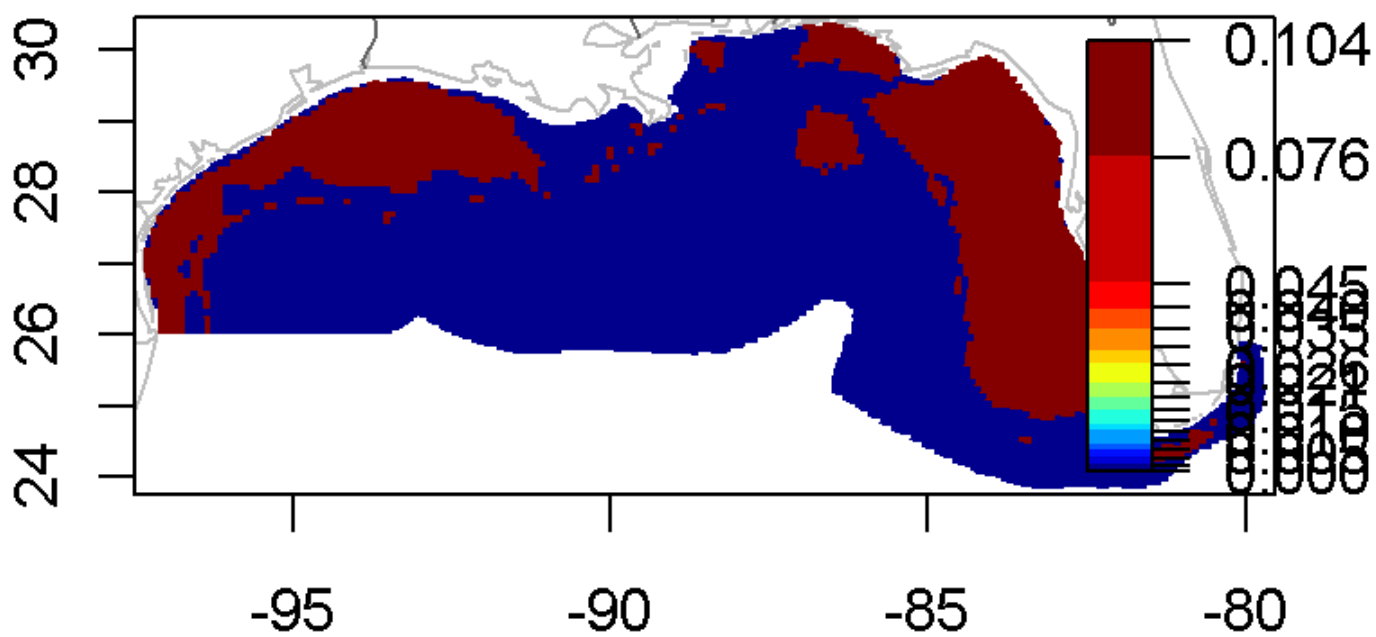


Figure 1050: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'summer' season in 'gomex2' region.

18.3.3 ne2

Modelrun identifier: duke_06_tu3_summer_ne2

Date generated: 2008-10-21 15:35:19

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 94: Summary for duke(6) GAM model: for 'Tursiops' guild during 'summer' season in 'ne2' region.

	Value
Number.presences	210
Number.absences	7484
GAM.converged	TRUE
R.squared	0.468632
Deviance.explained	0.345042
ROC.optimum	0.955331
Maximum.fit	0.0214437
Maximum.prediction	0.990352

Model text summary...

```
duke_06_tu3_summer_ne2 run on Tue Oct 21 15:33:22 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'summer', region:ne2

max.fit:0.955331, max.prediction:0.990352, ROC.optimum:0.021444

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -7.2785      0.2594  -28.06   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  2.000   2.500 132.35 <2e-16 ***
s(log(d2shelf)) 1.685   2.185   68.11 <2e-16 ***
s(log(d2coast)) 1.995   2.495  190.27 <2e-16 ***
s(sst)          1.991   2.491  113.92 <2e-16 ***
s(lat)          1.993   2.493  157.12 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.469   Deviance explained = 34.5%
GCV score = 0.0013705   Scale est. = 0.0013669   n = 7282

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:7694  Min.   : 1635  Min.   :  6.0  Min.   :    5  Min.   : 1259  Min.   :  8.175  Min.   :34.50
      1st Qu.:12986  1st Qu.: 51.0  1st Qu.: 23233  1st Qu.: 46744  1st Qu.: 16.350  1st Qu.:38.89
      Median :14605  Median :108.0  Median : 56551  Median :100131  Median : 20.250  Median :40.65
      Mean   :14089  Mean   : 652.7  Mean   : 68595  Mean   :124390  Mean   : 20.091  Mean   :40.60
      3rd Qu.:15848  3rd Qu.: 213.8  3rd Qu.:101066  3rd Qu.:177375  3rd Qu.: 23.850  3rd Qu.:42.71
      Max.   :16560  Max.   :4675.0  Max.   :319336  Max.   :445165  Max.   : 29.475  Max.   :44.74
      NA's   :      NA's   :      NA's   :406.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685  Min.   : 1633  Min.   :  6  Min.   :    5  Min.   : 1259  Min.   :11.18  Min.   :34.27
      1st Qu.:12297  1st Qu.: 84  1st Qu.: 33503  1st Qu.: 94835  1st Qu.:18.75  1st Qu.:37.36
```


Median :13718	Median :1827	Median : 78620	Median :188836	Median :23.48	Median :39.16
Mean :13277	Mean :1832	Mean :102648	Mean :201021	Mean :22.22	Mean :39.20
3rd Qu.:15139	3rd Qu.:3517	3rd Qu.:154146	3rd Qu.:299808	3rd Qu.:25.73	3rd Qu.:40.92
Max. :16560	Max. :4752	Max. :354376	Max. :478082	Max. :28.35	Max. :44.74
		NA's : 2	NA's : 2		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :8.593e-12  Min.   :1.127e-11  Min.   :0.000e+00  Min.   :6.130e-06  Min.   :0.000
1st Qu.:12297  1st Qu.:2.327e-03  1st Qu.:4.978e-04  1st Qu.:0.000e+00  1st Qu.:1.046e-03  1st Qu.:0.000
Median :13718  Median :1.053e-02  Median :1.381e-03  Median :0.000e+00  Median :3.744e-03  Median :0.000
Mean   :13277  Mean   :3.316e-02  Mean   :2.862e-03  Mean   :5.776e-02  Mean   :1.037e-02  Mean   :0.305
3rd Qu.:15139  3rd Qu.:2.702e-02  3rd Qu.:3.380e-03  3rd Qu.:0.000e+00  3rd Qu.:9.521e-03  3rd Qu.:1.000
Max.   :16560  Max.   :9.904e-01  Max.   :7.416e-02  Max.   :3.000e+00  Max.   :2.910e-01  Max.   :1.000
      NA's :2.000e+00  NA's :2.000e+00  NA's :2.049e+03  NA's :2.049e+03
```

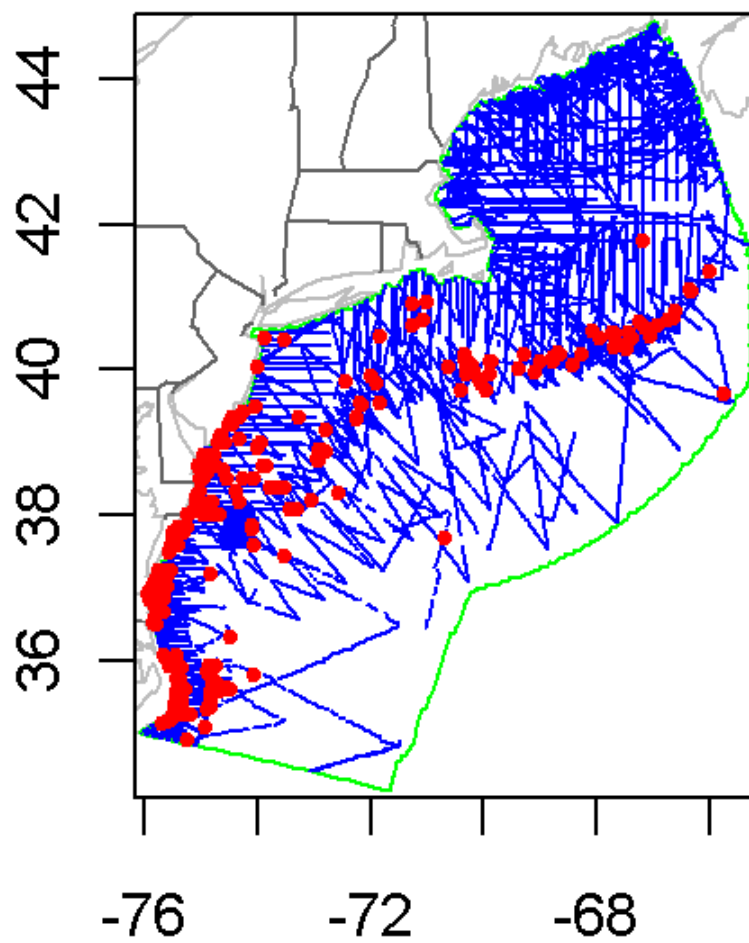


Figure 1051: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'summer' season in 'ne2' region.

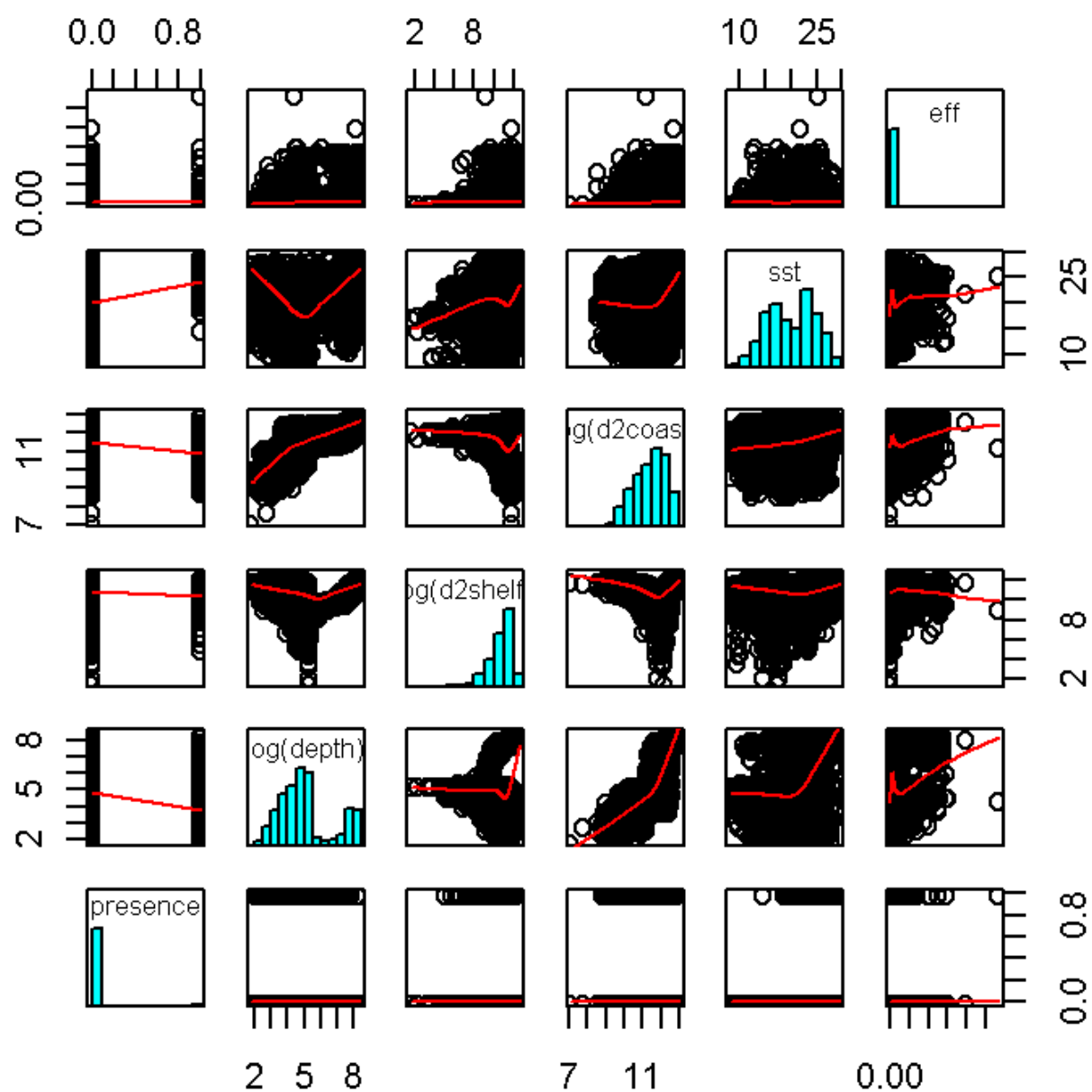


Figure 1052: Pairs plot of input variables for 'Tursiops' guild during 'summer' season in 'ne2' region.

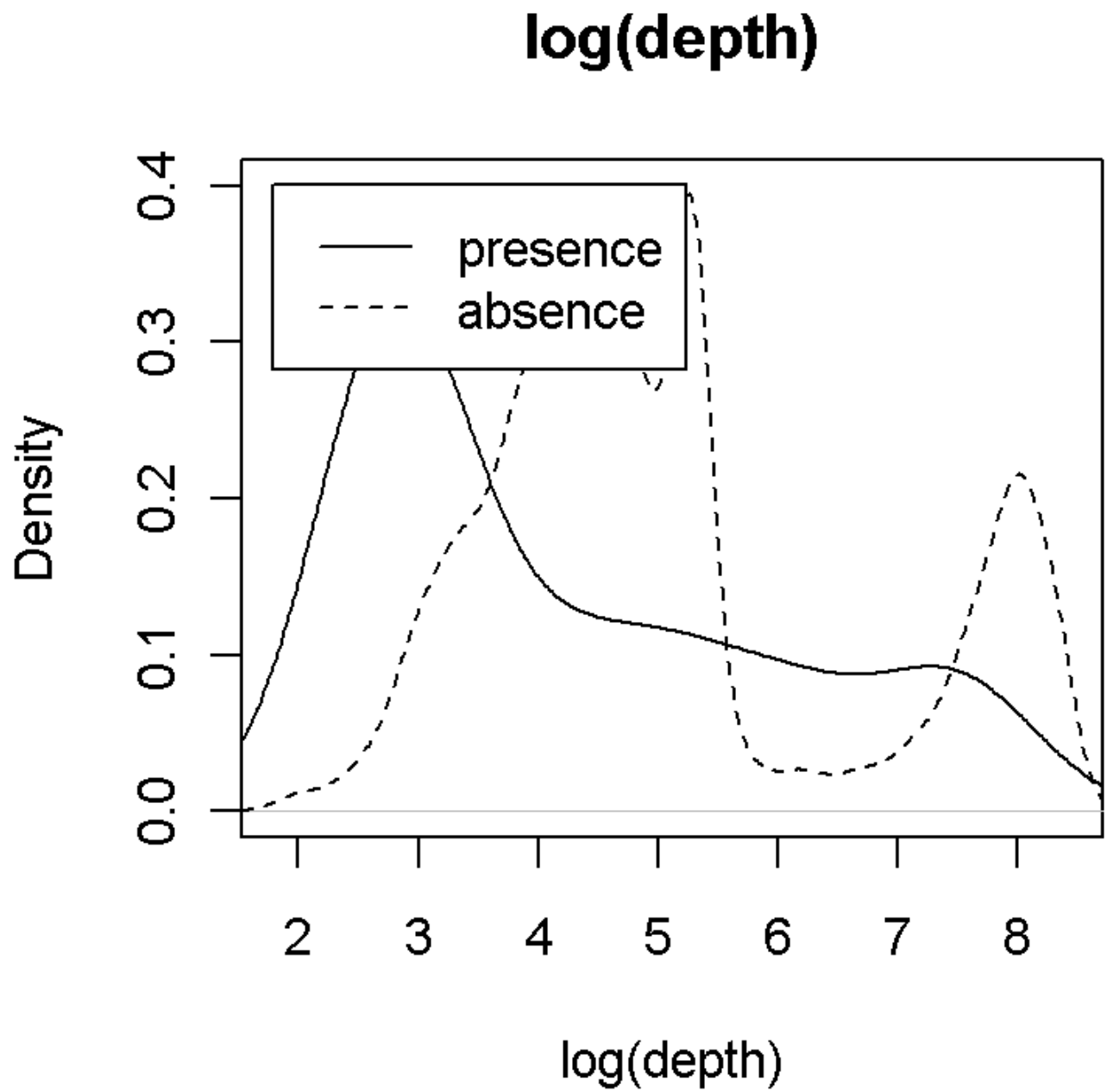


Figure 1053: Density histogram of depth log(meters) for 'Tursiops' guild during 'summer' season in 'ne2' region.

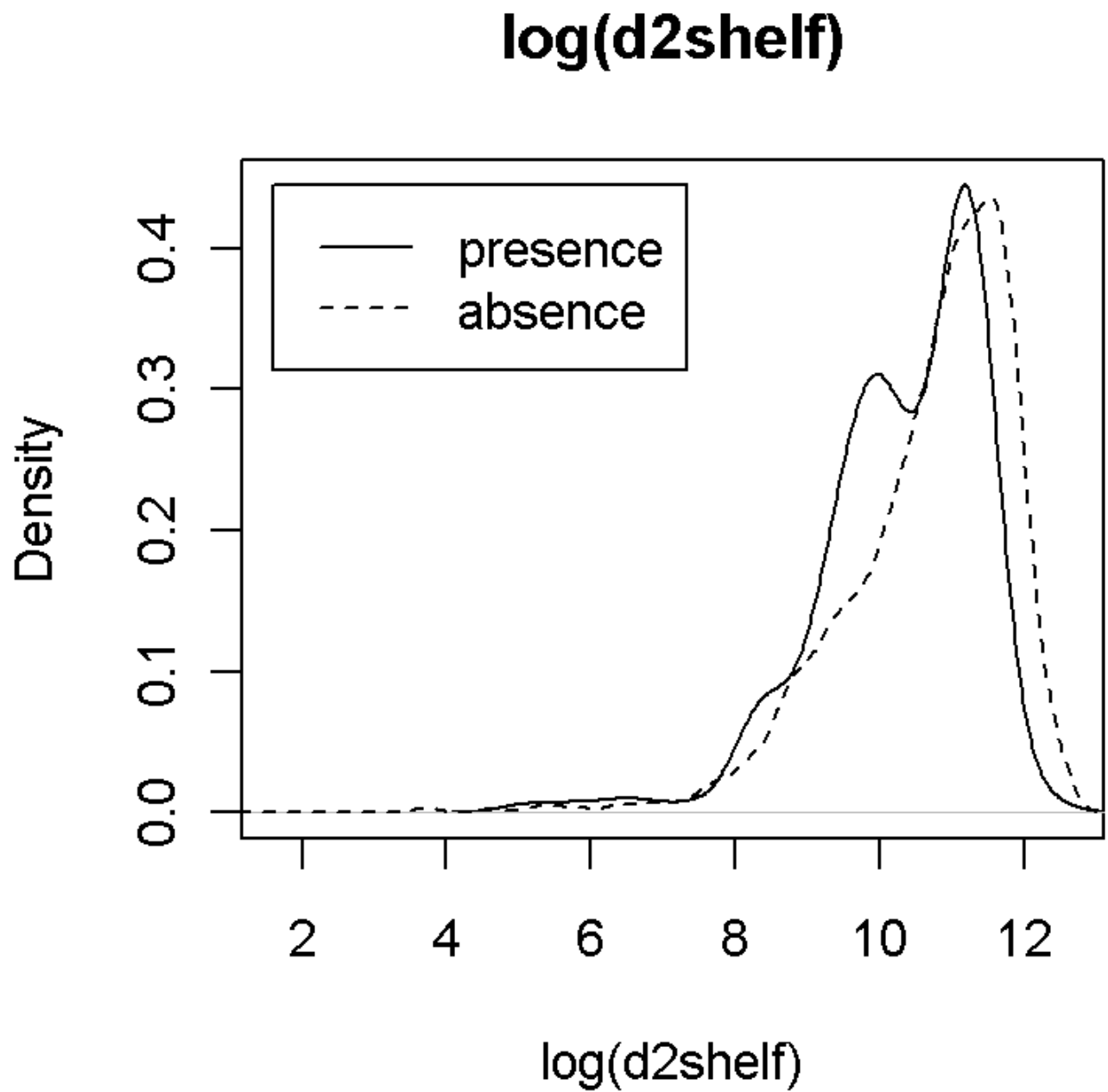


Figure 1054: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'summer' season in 'ne2' region.

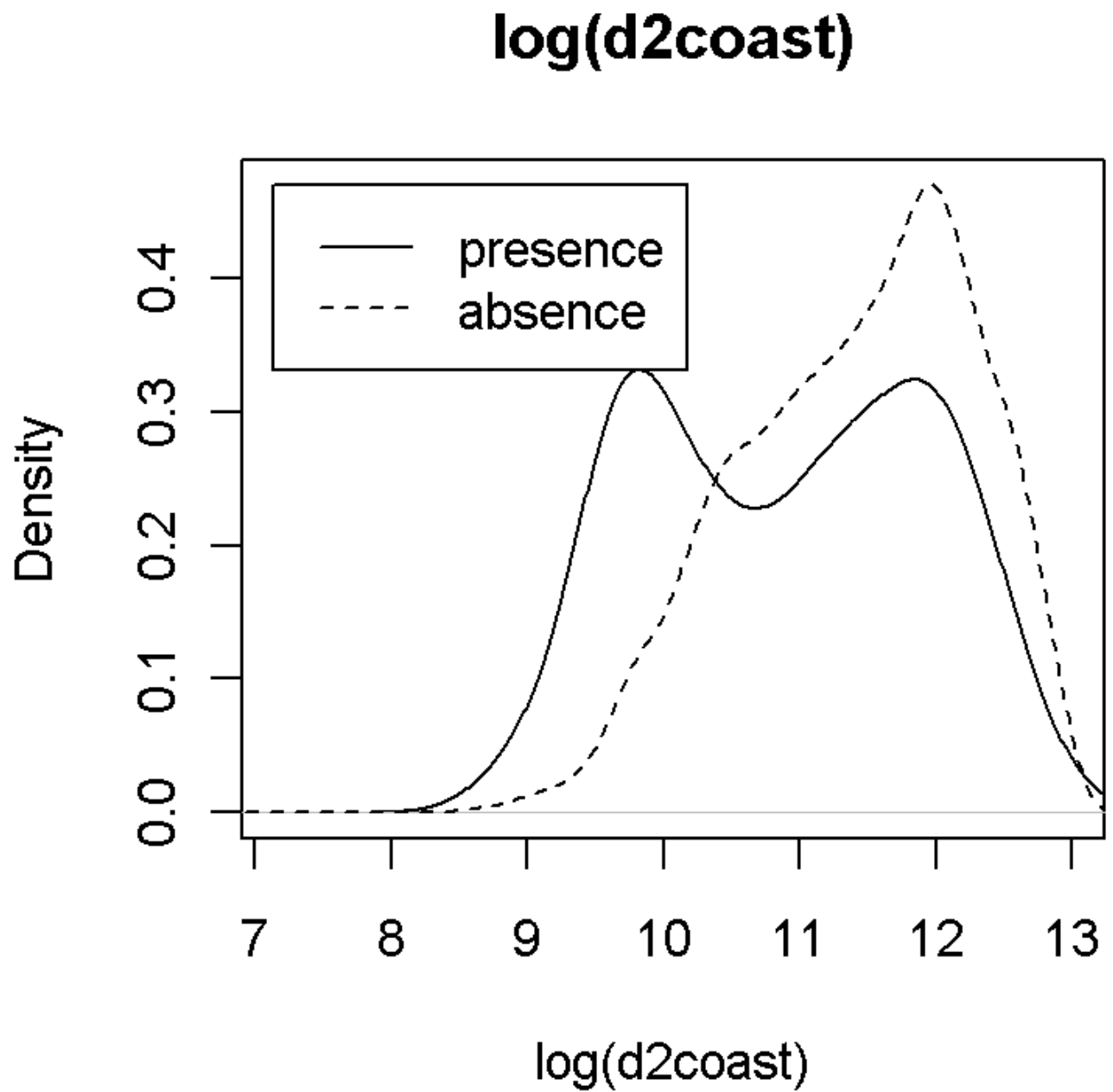


Figure 1055: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'summer' season in 'ne2' region.

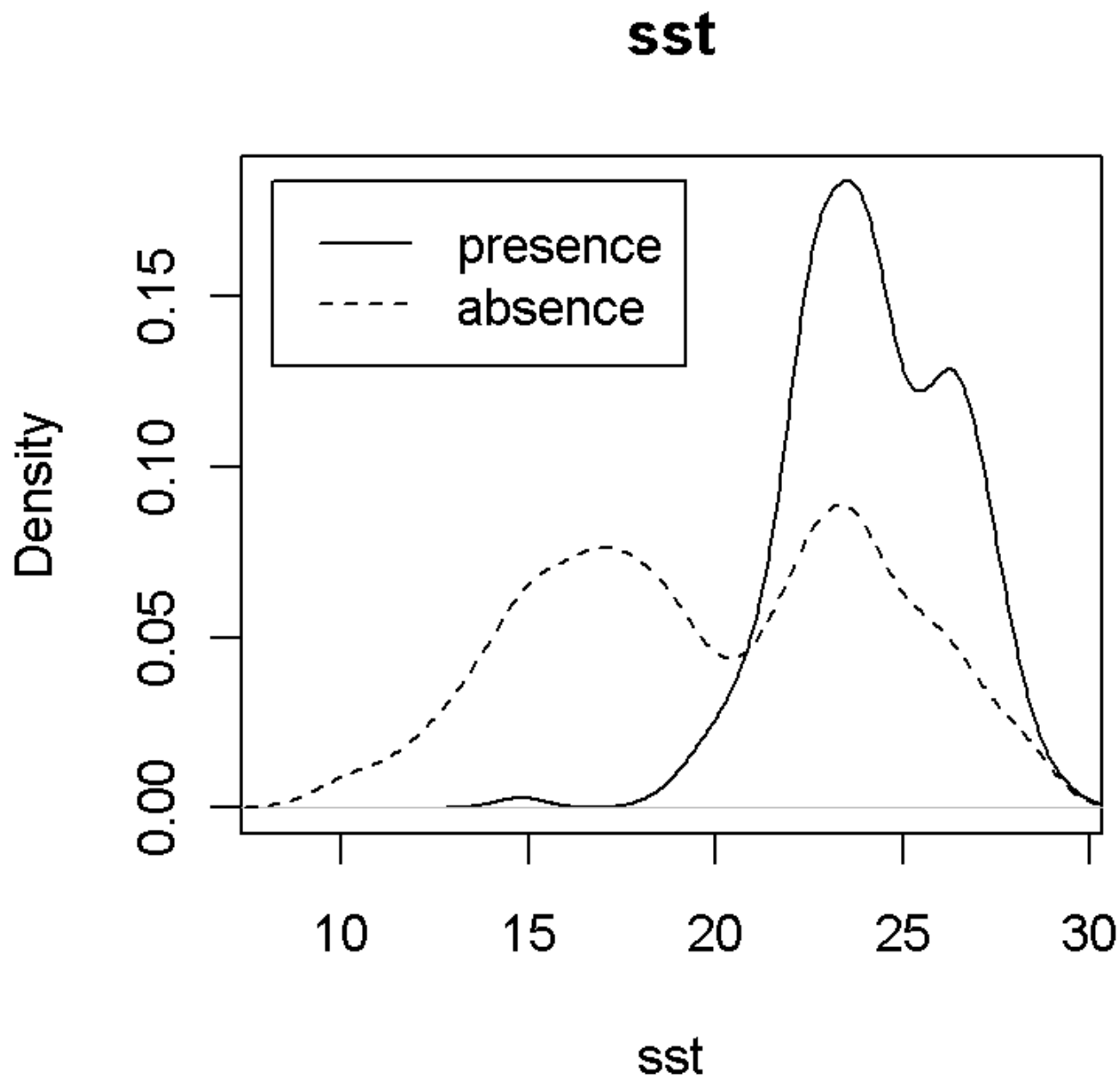


Figure 1056: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'summer' season in 'ne2' region.

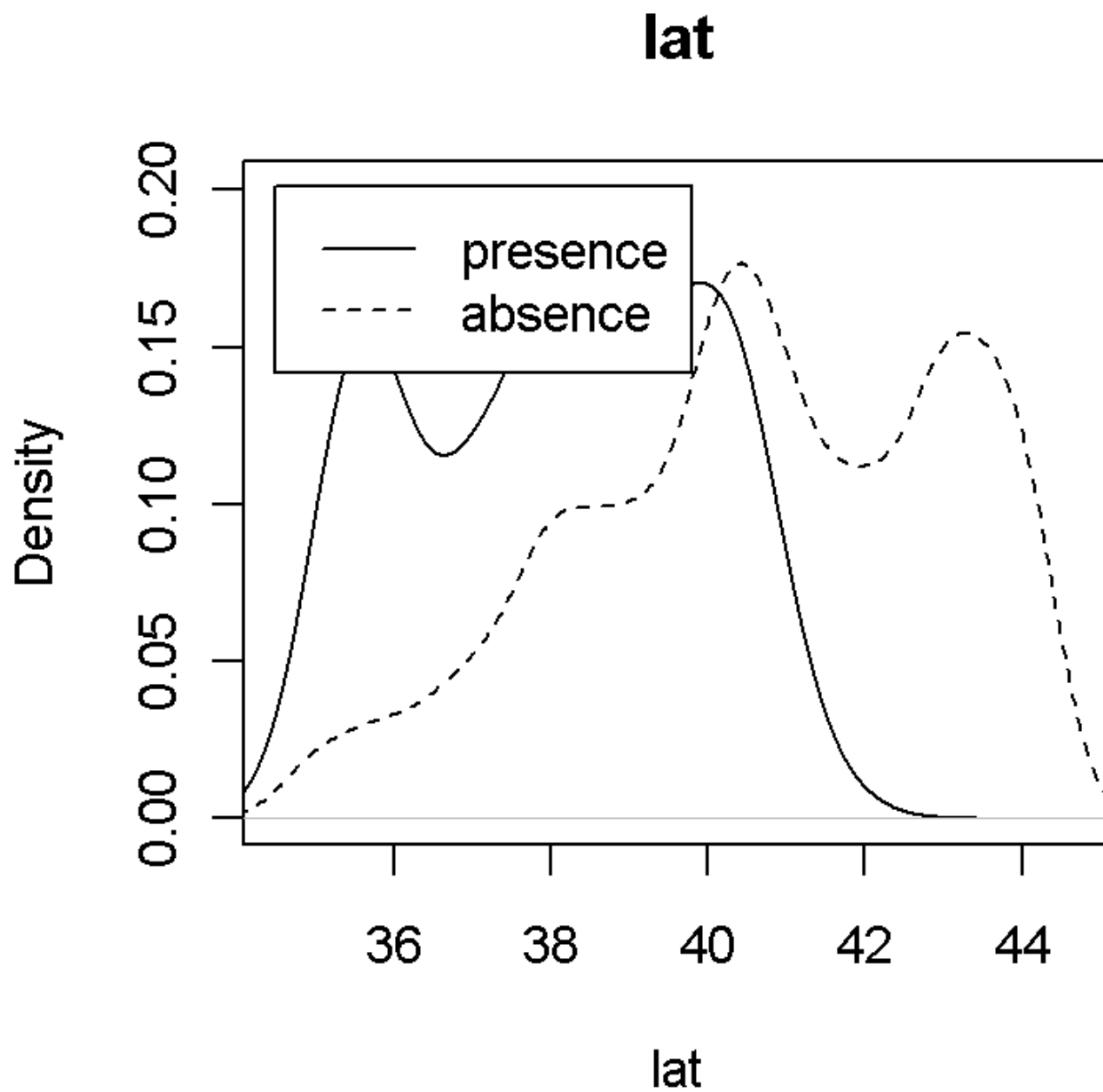


Figure 1057: Density histogram of latitude (degrees) for 'Tursiops' guild during 'summer' season in 'ne2' region.

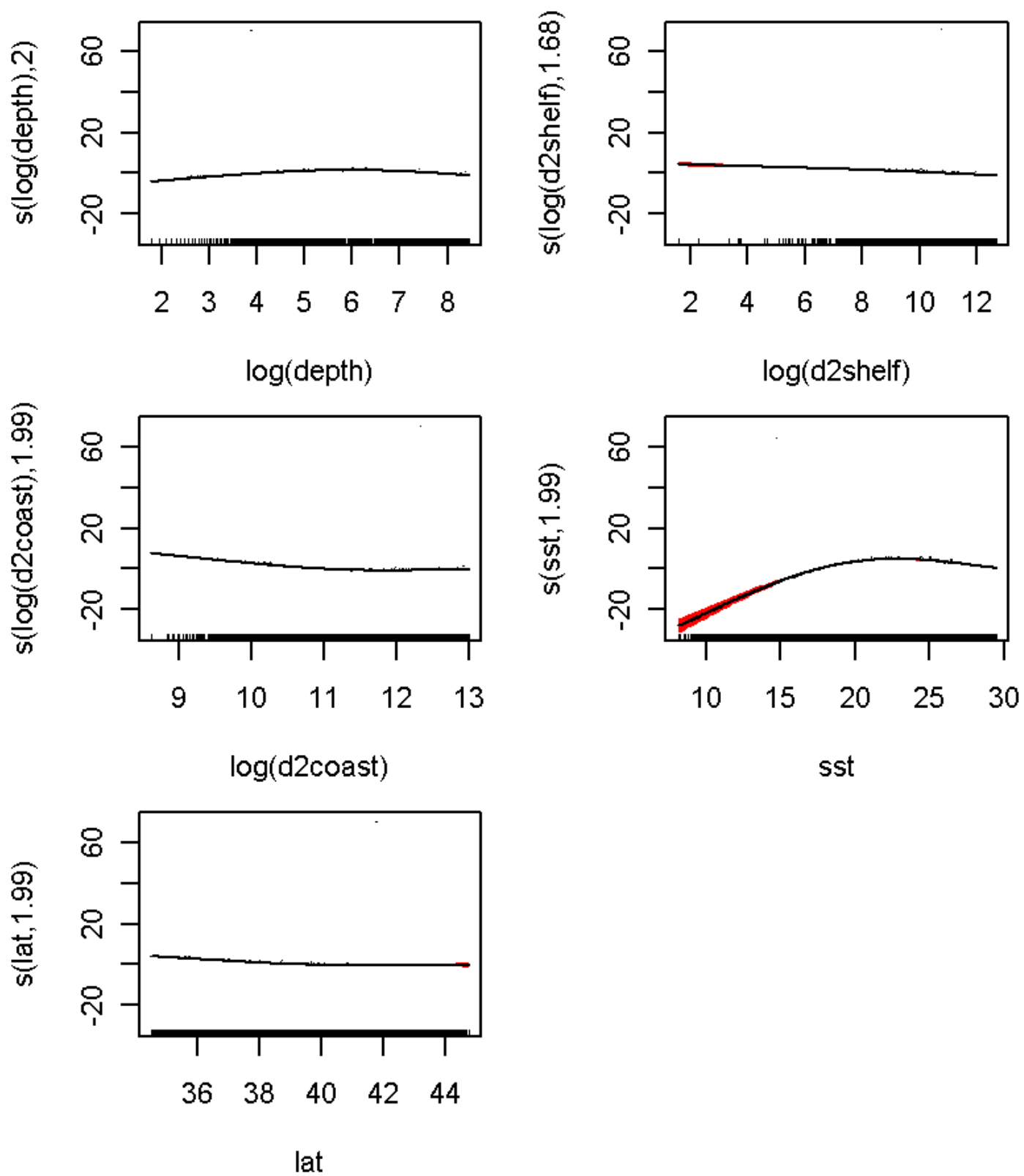


Figure 1058: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'summer' season in 'ne2' region.

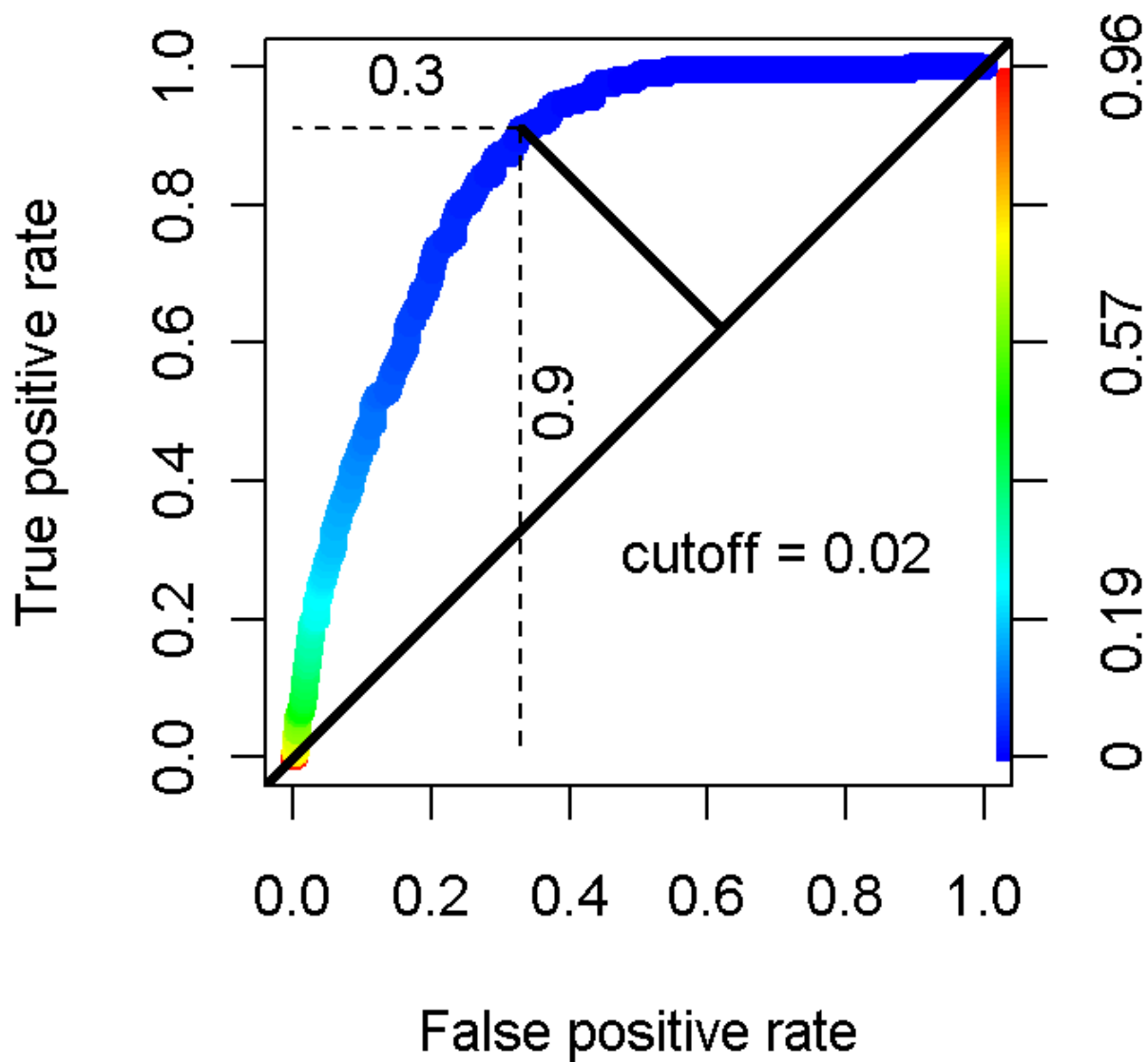


Figure 1059: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'summer' season in 'ne2' region.

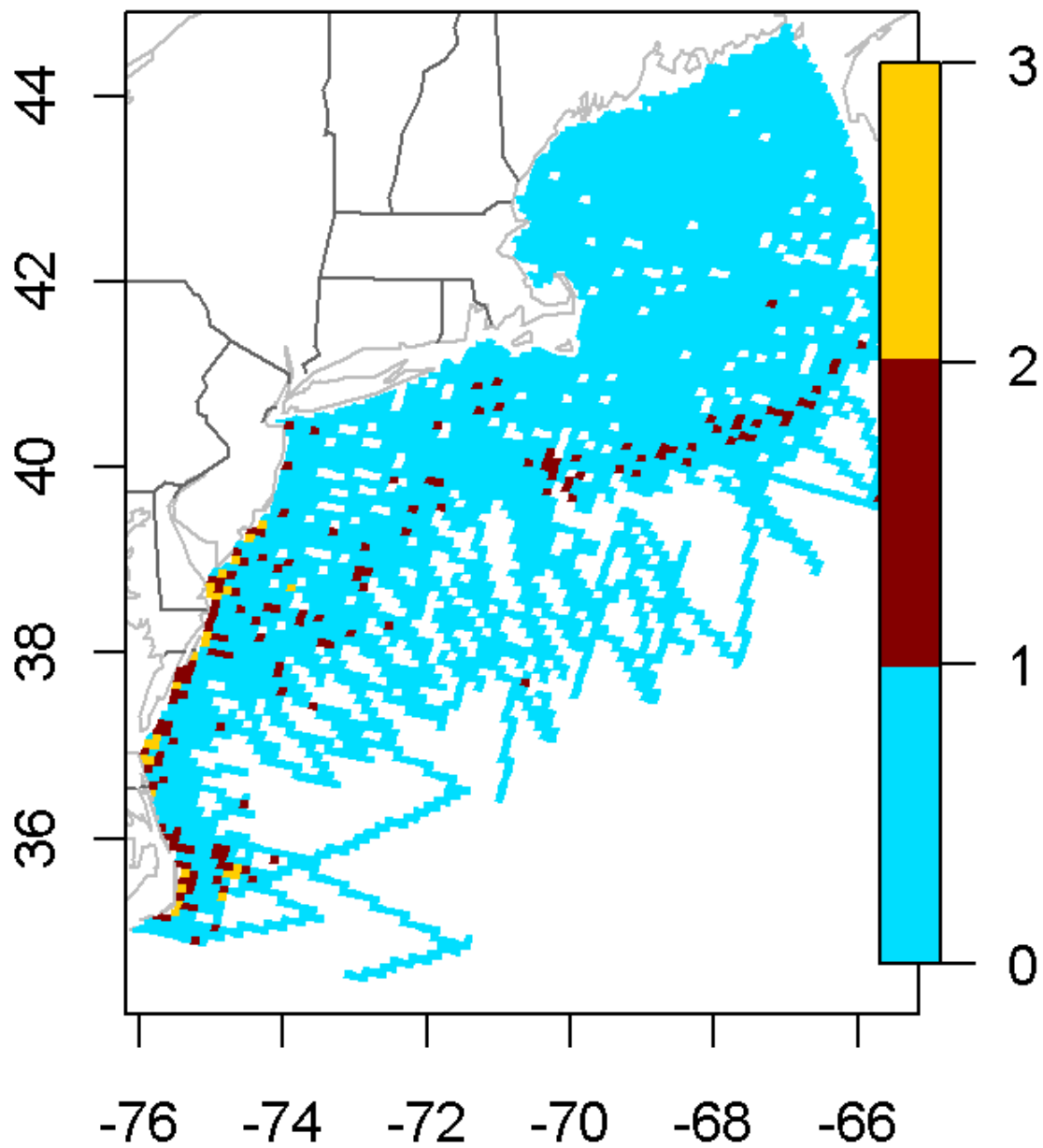


Figure 1060: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'summer' season in 'ne2' region.

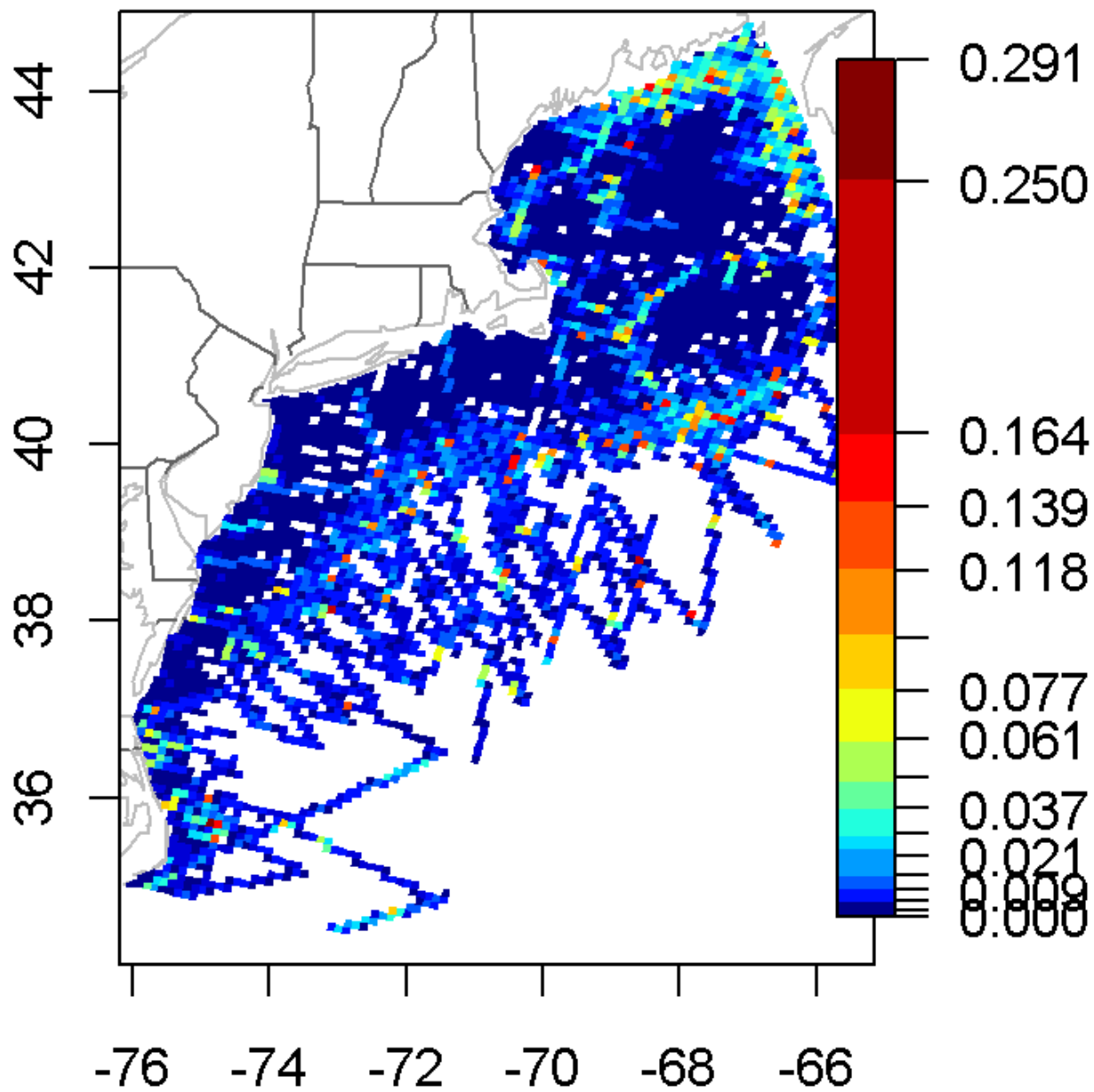


Figure 1061: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'summer' season in 'ne2' region.

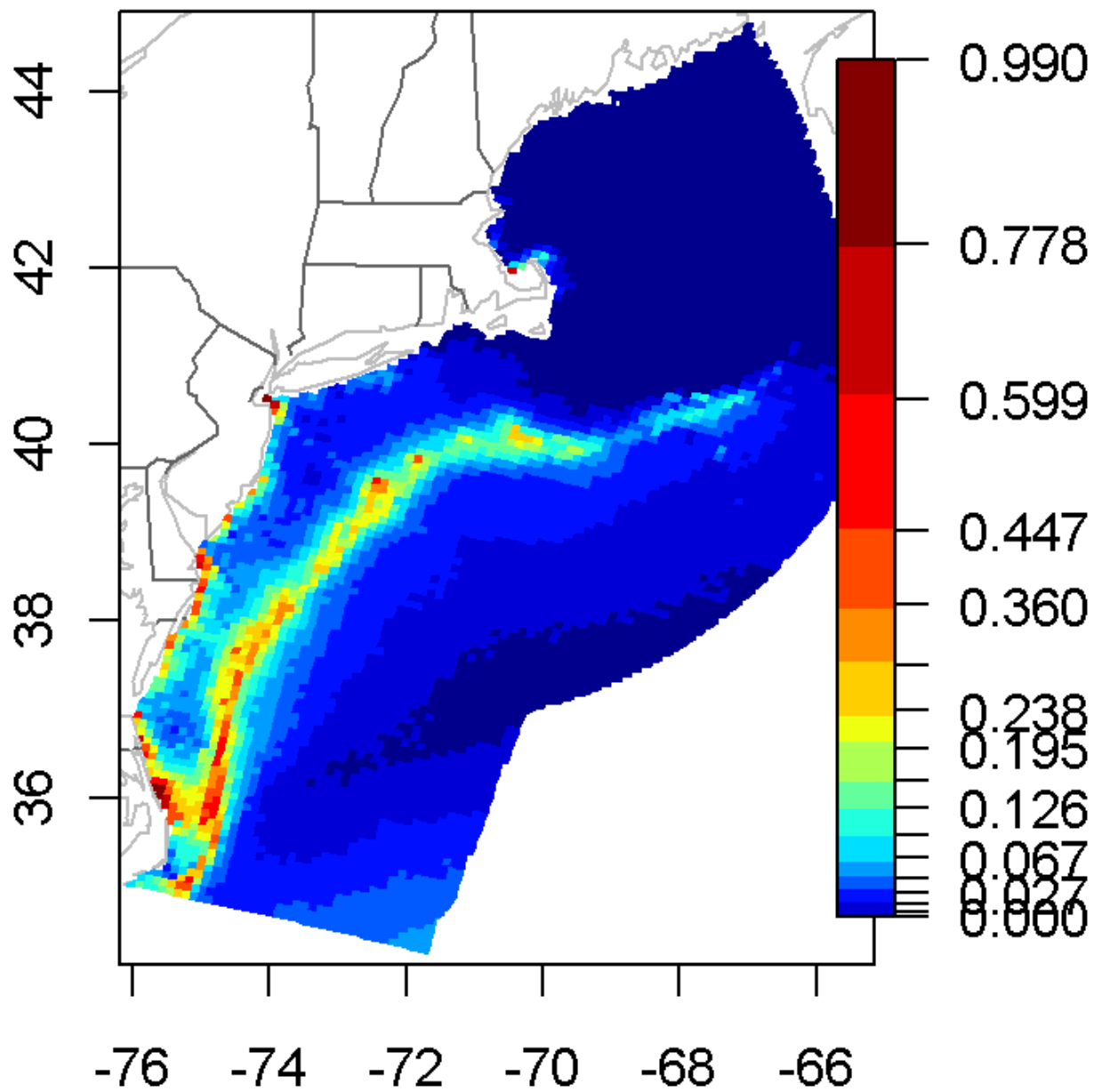


Figure 1062: Map of mean predicted habitat for 'Tursiops' guild during 'summer' season in 'ne2' region.

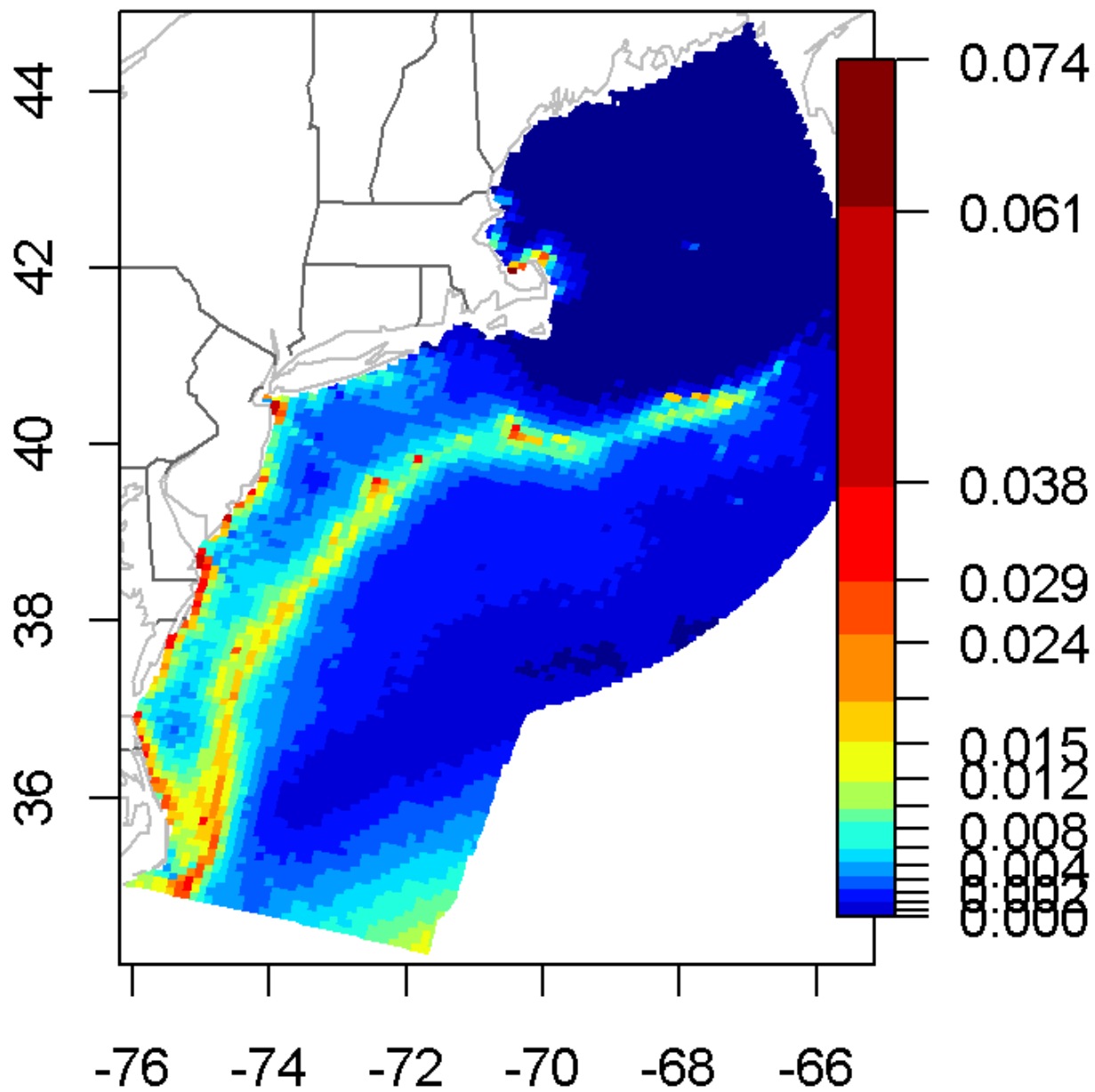


Figure 1063: Map of standard error of habitat for 'Tursiops' guild during 'summer' season in 'ne2' region.

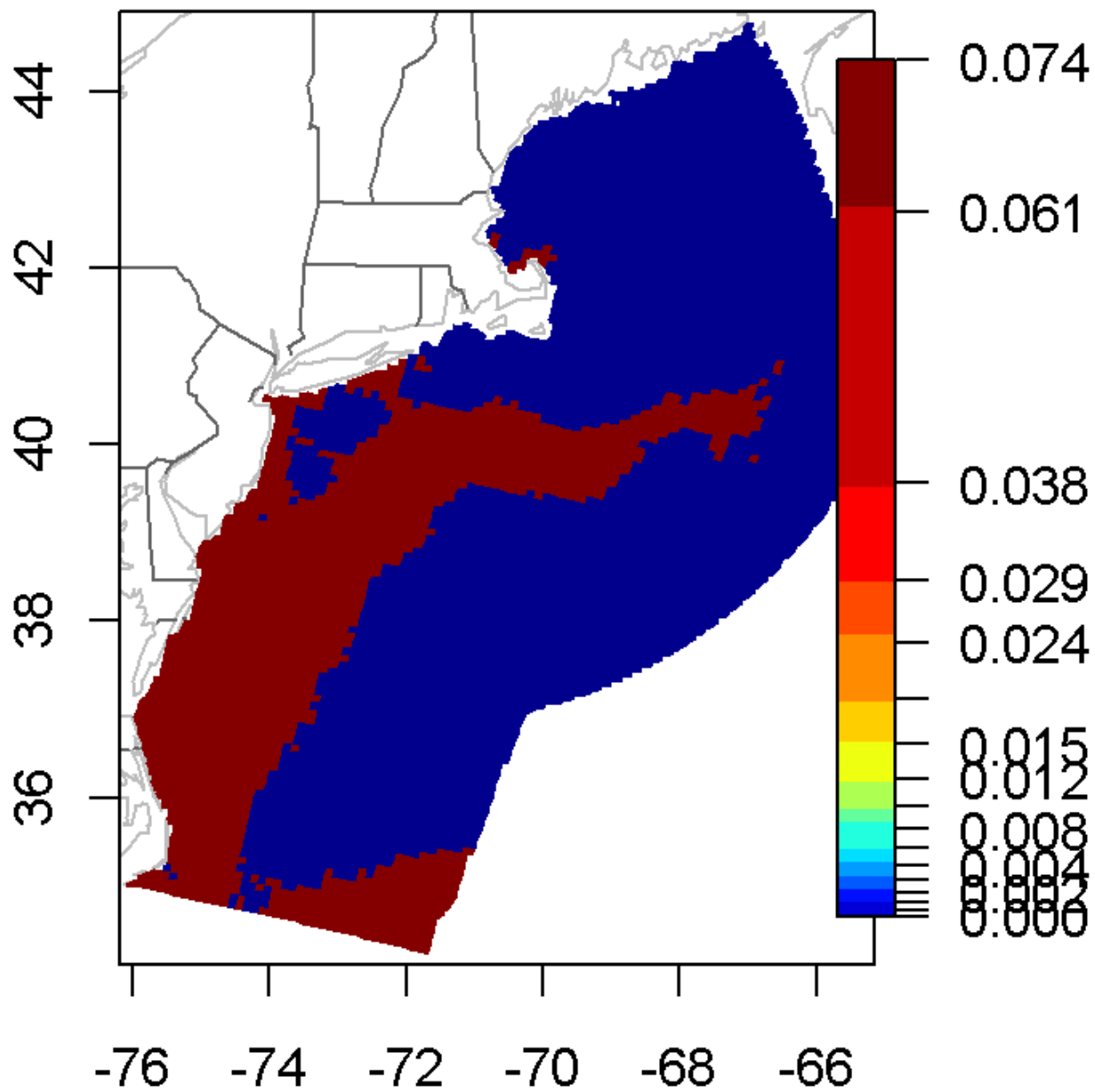


Figure 1064: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'summer' season in 'ne2' region.

18.3.4 se2

Modelrun identifier: duke_06_tu3_summer_se2

Date generated: 2008-10-21 15:47:40

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 95: Summary for duke(6) GAM model: for 'Tursiops' guild during 'summer' season in 'se2' region.

	Value
Number.presences	88
Number.absences	1296
GAM.converged	TRUE
R.squared	0.503161
Deviance.explained	0.2189
ROC.optimum	0.909701
Maximum.fit	0.0640117
Maximum.prediction	0.969077

Model text summary...

```
duke_06_tu3_summer_se2 run on Tue Oct 21 15:46:47 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'summer', region:se2

max.fit:0.909701, max.prediction:0.969077, ROC.optimum:0.064012

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -4.1639      0.2774  -15.01   <2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F    p-value
s(log(depth))  1.993e+00  2.493 57.043 < 2e-16 ***
s(log(d2shelf)) 9.177e-01  1.418  9.054 0.000735 ***
s(log(d2coast)) 1.941e+00  2.441 63.959 < 2e-16 ***
s(sst)         2.445e-05  0.500  0.001 0.853008
s(lat)         8.642e-01  1.364  6.882 0.004059 **
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) = 0.503 Deviance explained = 21.9%
GCV score = 0.0044425 Scale est. = 0.0044036 n = 1381

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
se2:1384  Min.   : 1774  Min.   : 5    Min.   : 1933  Min.   : 1471  Min.   :21.90  Min.   :25.94
          1st Qu.: 8285  1st Qu.: 37   1st Qu.: 14337 1st Qu.: 72521 1st Qu.:27.38 1st Qu.:31.02
          Median :10072 Median : 240   Median : 31446 Median :107991 Median :28.50 Median :33.40
          Mean   : 8745  Mean   : 814   Mean   : 62220  Mean   :129682 Mean :28.17  Mean :32.42
          3rd Qu.:10580 3rd Qu.: 808   3rd Qu.: 81810 3rd Qu.:156253 3rd Qu.:29.17 3rd Qu.:33.93
          Max.   :11172 Max.   :5251   Max.   :324910 Max.   :415276 Max.   :30.90 Max.   :34.95
                   NA's : 1    NA's : 1    NA's : 2.00

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
se2:4203  Min.   : 1695  Min.   : 4.0   Min.   : 589   Min.   : 1471  Min.   :26.40  Min.   :25.91
          1st Qu.: 7760 1st Qu.: 183.5 1st Qu.: 34886 1st Qu.: 82859 1st Qu.:27.90 1st Qu.:29.60
```


Median : 9083	Median : 812.0	Median : 86547	Median :167727	Median :28.35	Median :31.59
Mean : 8321	Mean :1482.5	Mean :110466	Mean :177806	Mean :28.29	Mean :31.28
3rd Qu.:10134	3rd Qu.:2729.5	3rd Qu.:177072	3rd Qu.:262857	3rd Qu.:28.73	3rd Qu.:33.06
Max. :11184	Max. :5300.0	Max. :331253	Max. :422789	Max. :29.62	Max. :34.95
		NA's : 3	NA's : 3		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1695  Min.   :5.976e-08  Min.   :1.029e-07  Min.   :0.000e+00  Min.   :7.209e-08  Min.   :0.000
1st Qu.: 7760  1st Qu.:2.572e-05  1st Qu.:2.971e-05  1st Qu.:0.000e+00  1st Qu.:2.382e-03  1st Qu.:0.000
Median : 9083  Median :8.476e-03  Median :3.292e-03  Median :0.000e+00  Median :5.249e-03  Median :0.000
Mean   : 8321  Mean   :6.575e-02  Mean   :1.101e-02  Mean   :9.128e-02  Mean   :1.186e-02  Mean   :0.295
3rd Qu.:10134 3rd Qu.:8.264e-02  3rd Qu.:1.488e-02  3rd Qu.:0.000e+00  3rd Qu.:8.553e-03  3rd Qu.:1.000
Max.   :11184  Max.   :9.691e-01  Max.   :3.197e-01  Max.   :2.000e+00  Max.   :2.675e-01  Max.   :1.000
      NA's :3.000e+00  NA's :3.000e+00  NA's :3.228e+03  NA's :3.228e+03
```

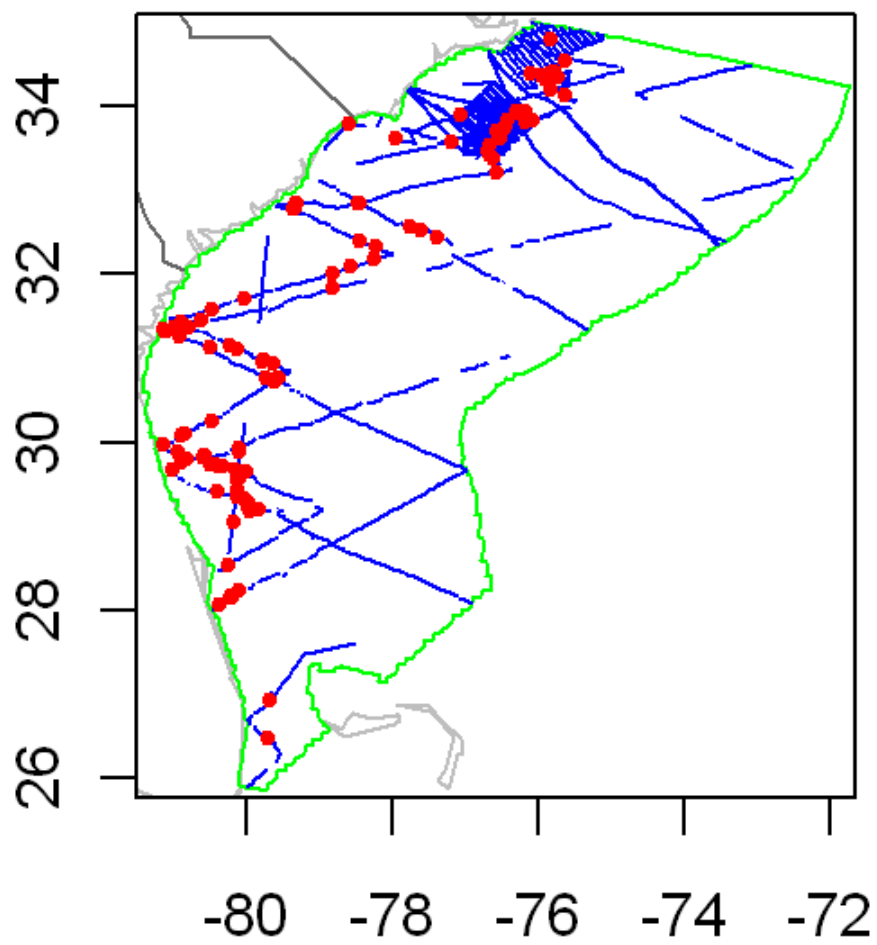


Figure 1065: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'summer' season in 'se2' region.

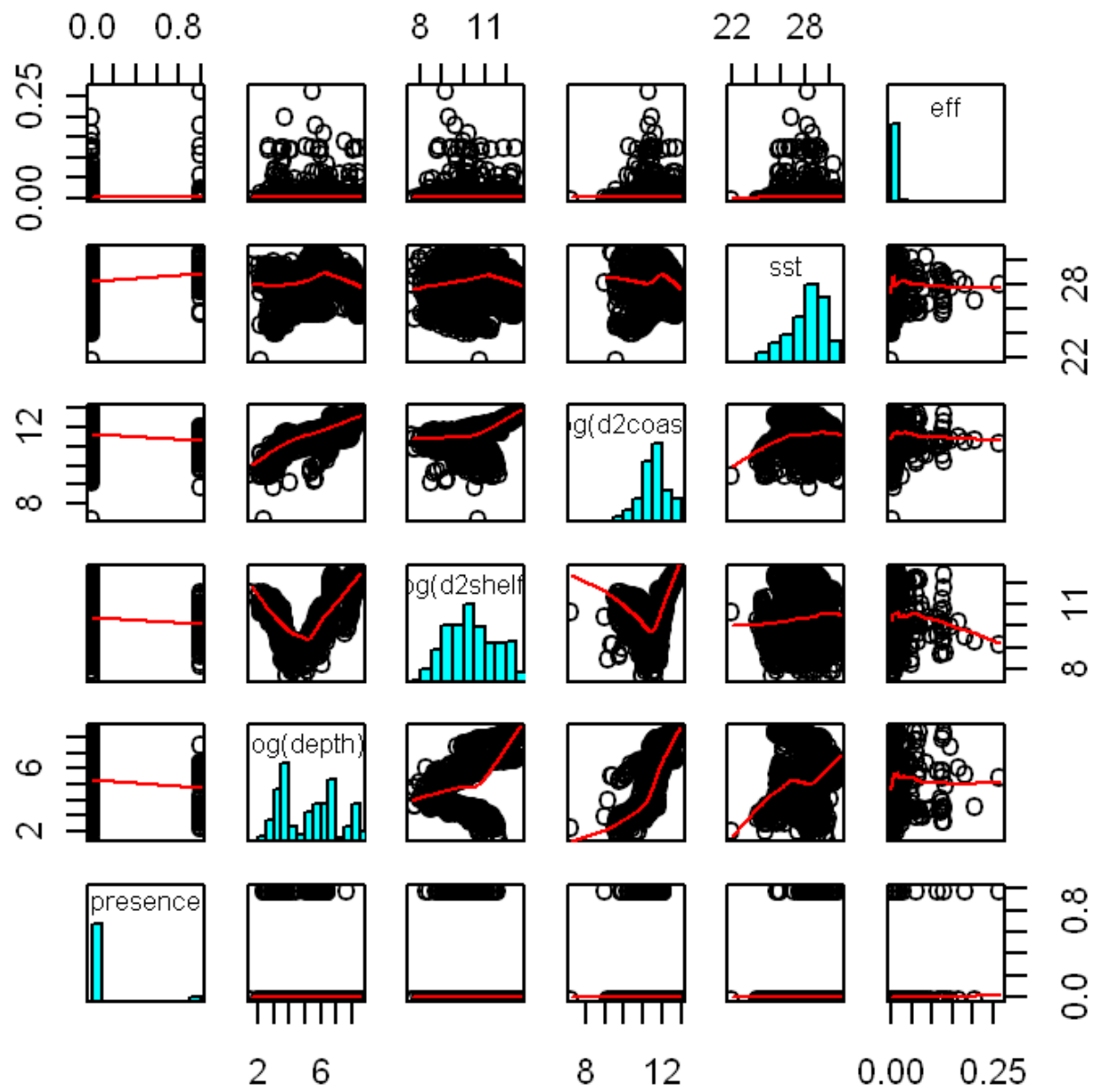


Figure 1066: Pairs plot of input variables for 'Tursiops' guild during 'summer' season in 'se2' region.

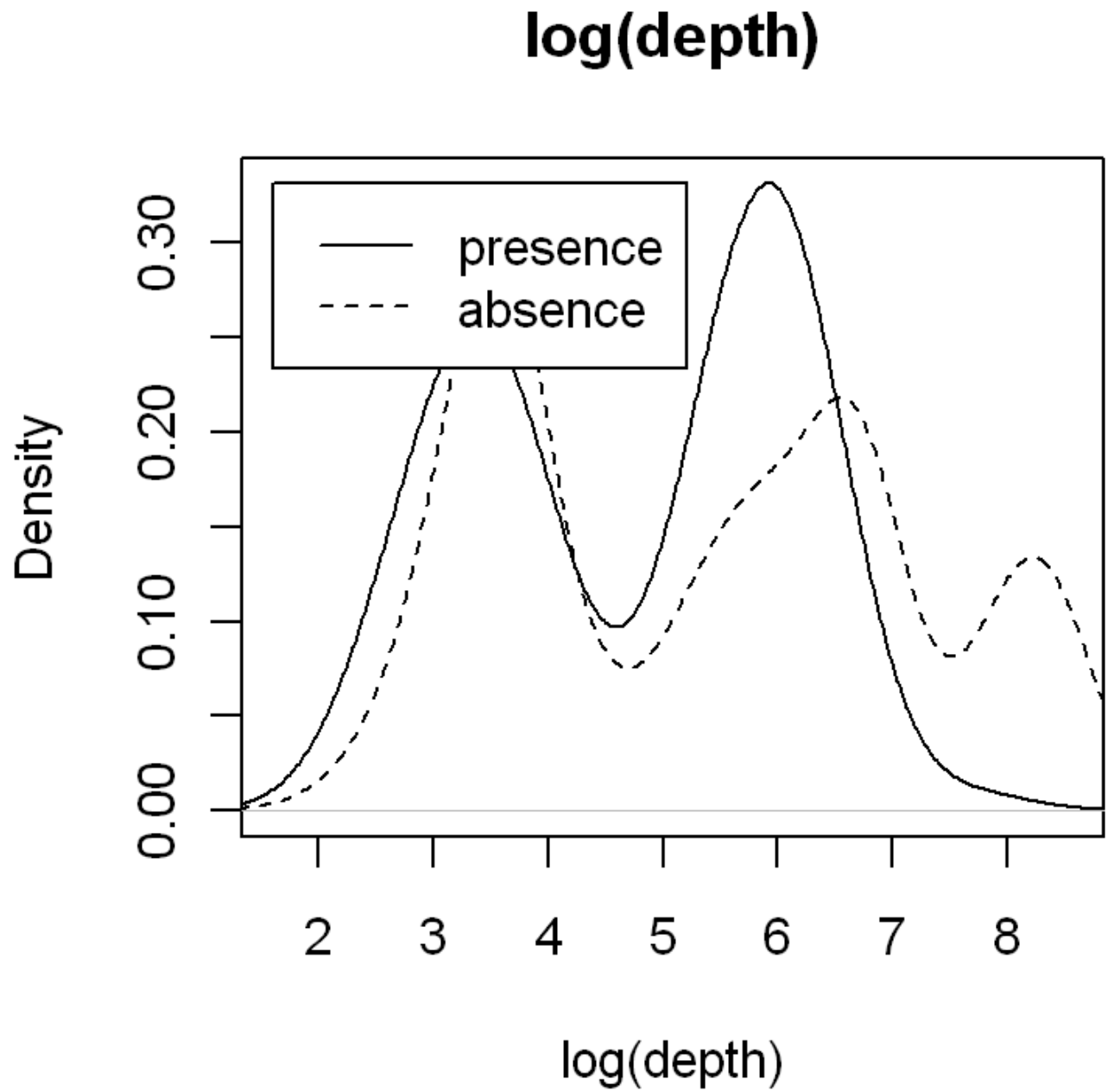


Figure 1067: Density histogram of depth $\log(\text{meters})$ for 'Tursiops' guild during 'summer' season in 'se2' region.

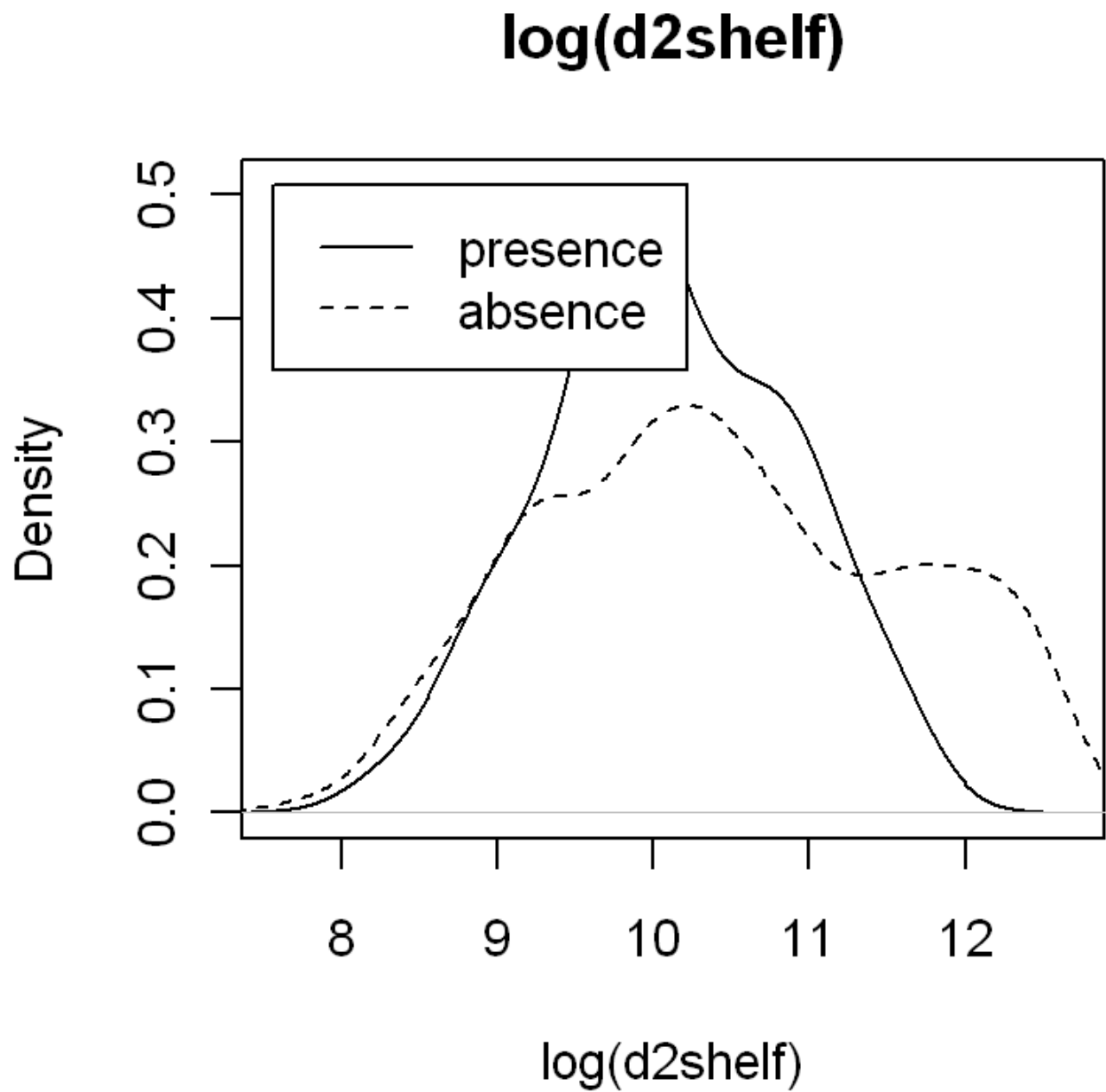


Figure 1068: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'summer' season in 'se2' region.

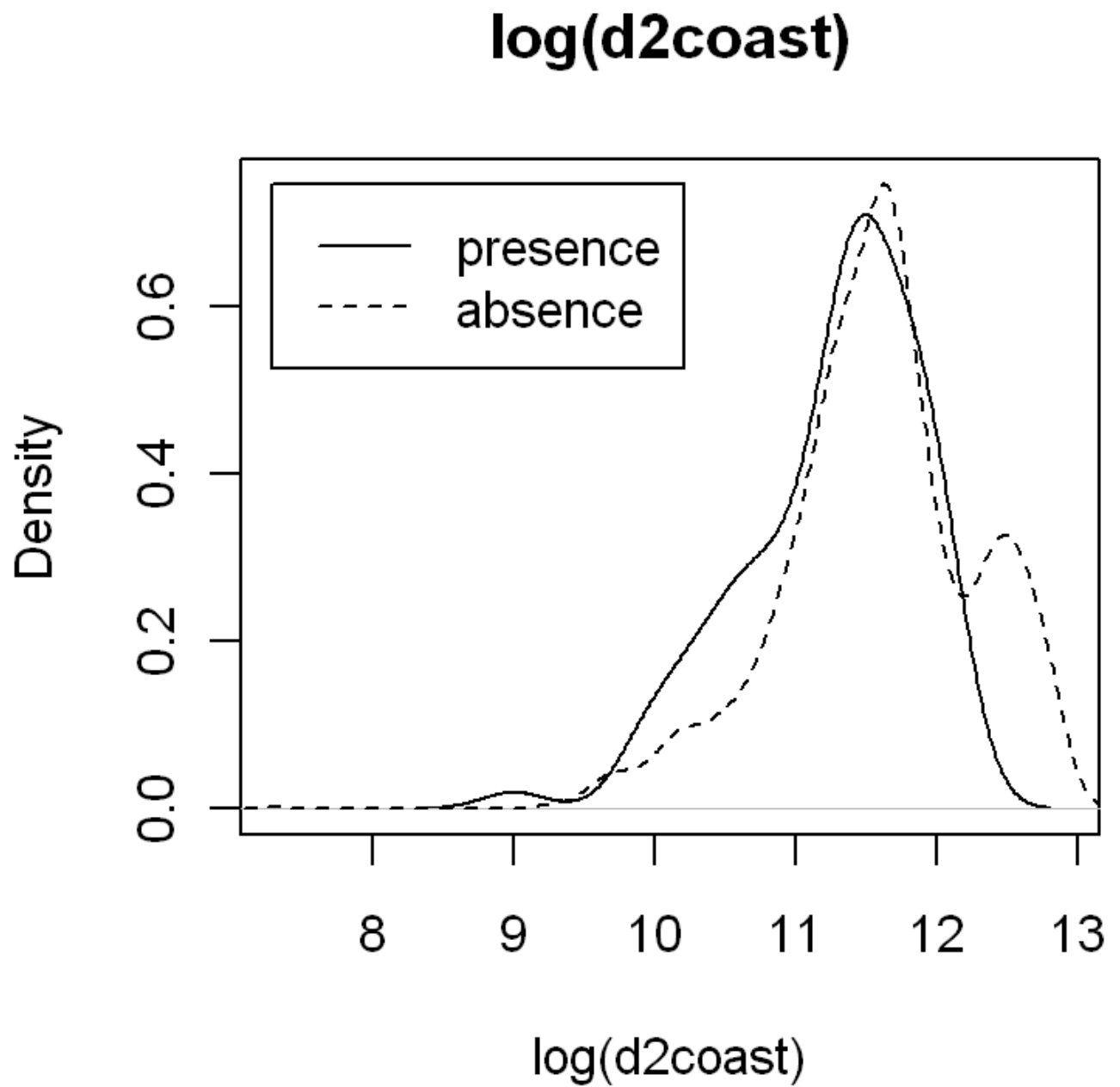


Figure 1069: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'summer' season in 'se2' region.

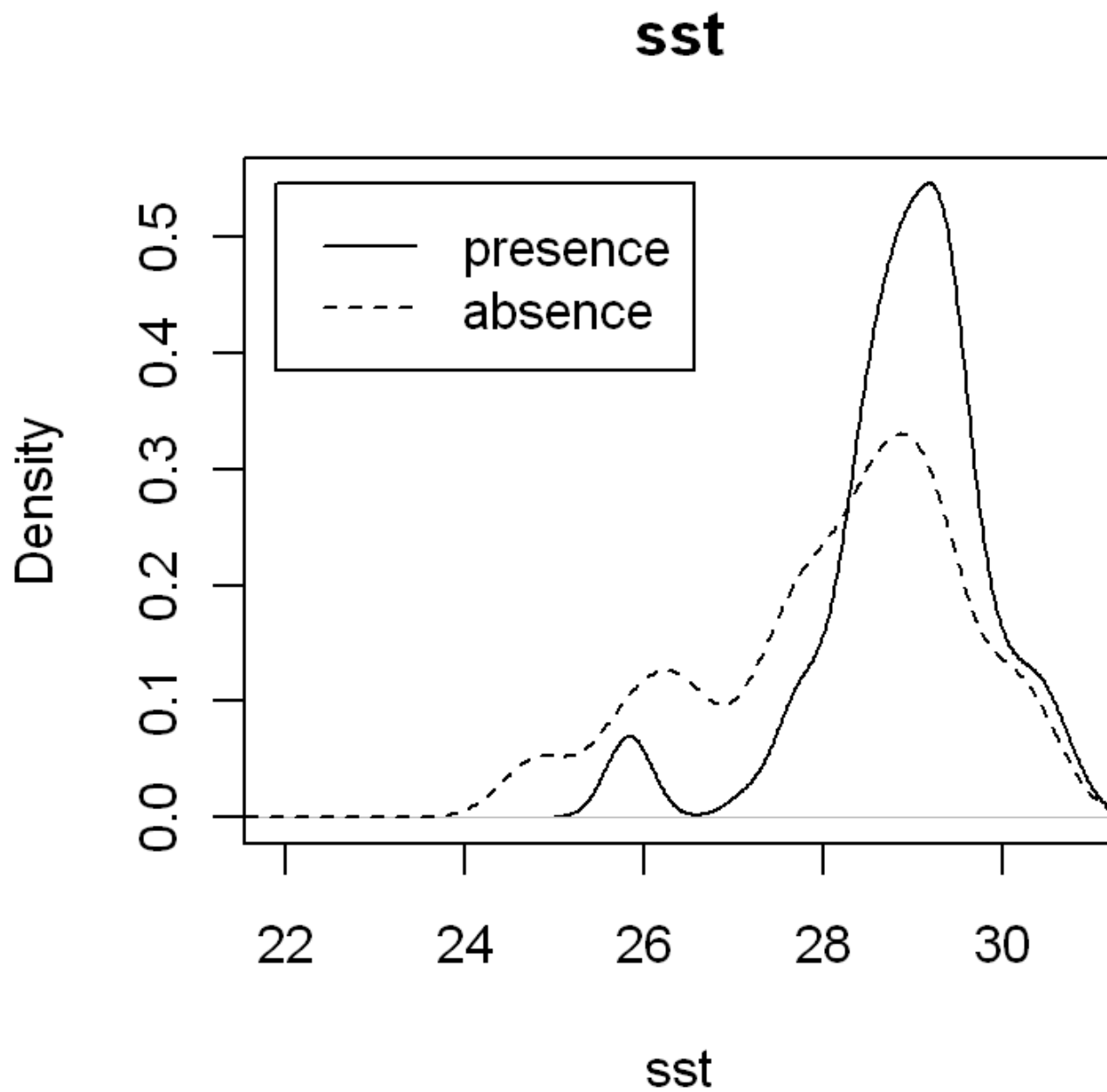


Figure 1070: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'summer' season in 'se2' region.

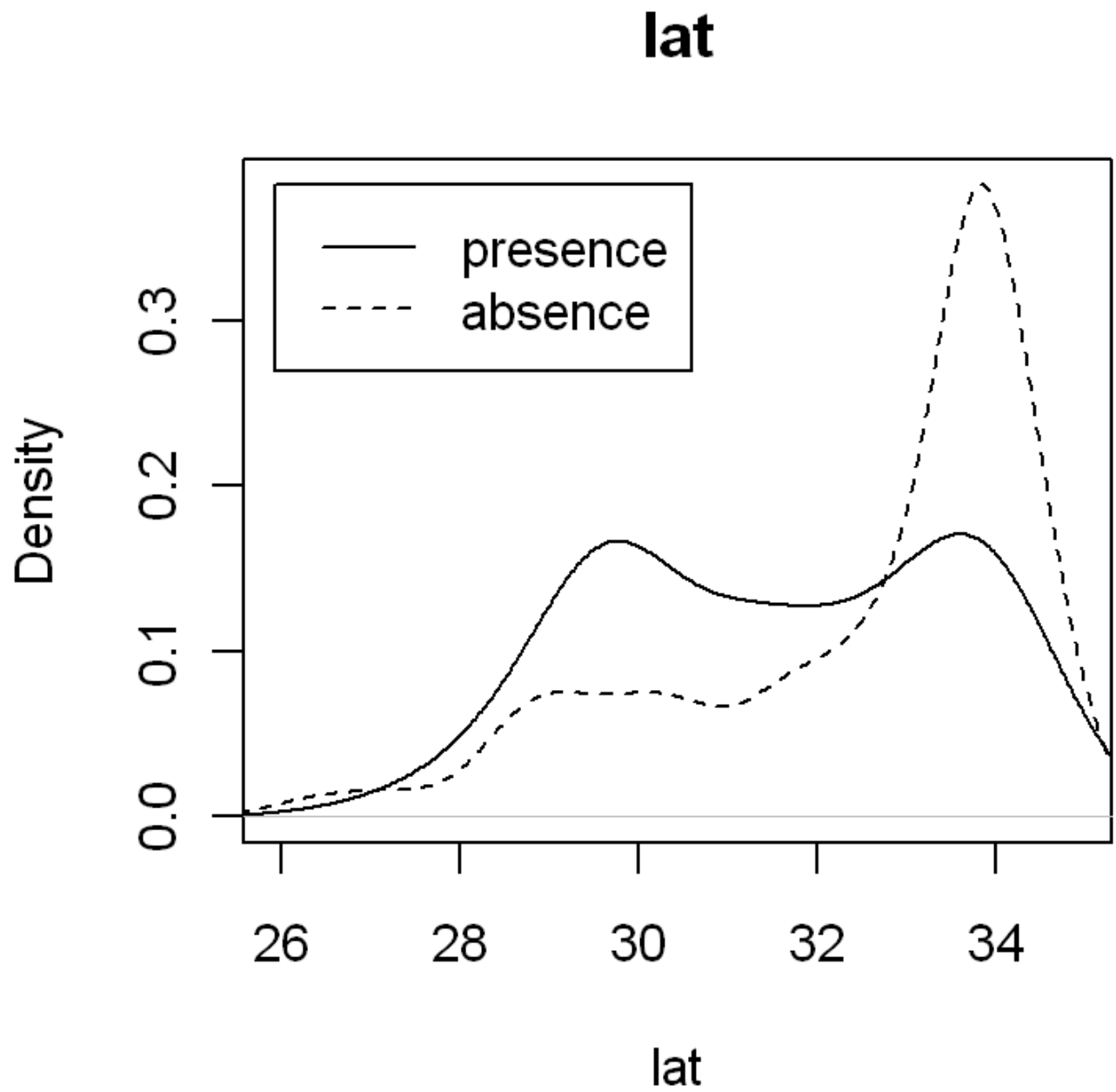


Figure 1071: Density histogram of latitude (degrees) for 'Tursiops' guild during 'summer' season in 'se2' region.

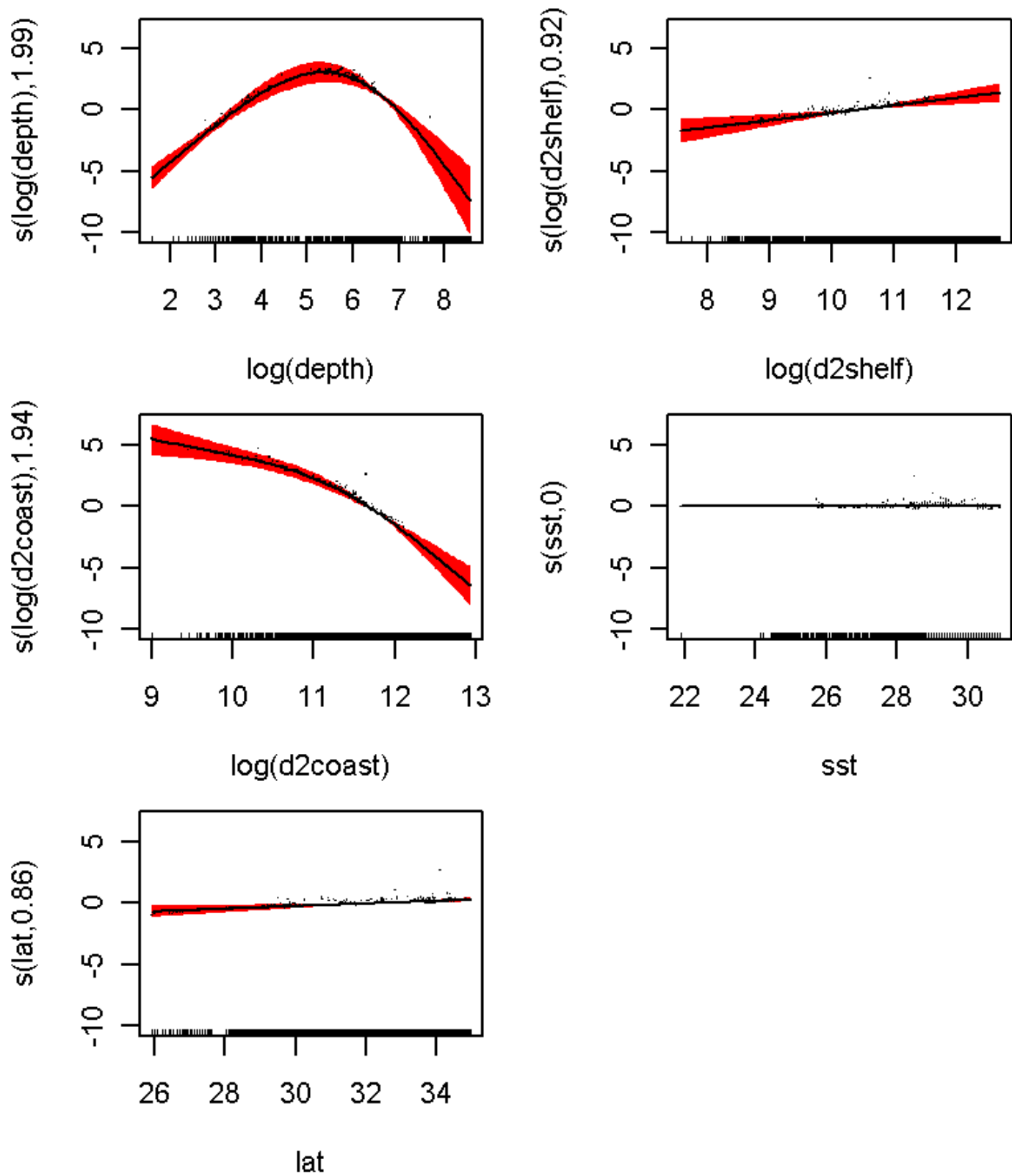


Figure 1072: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'summer' season in 'se2' region.

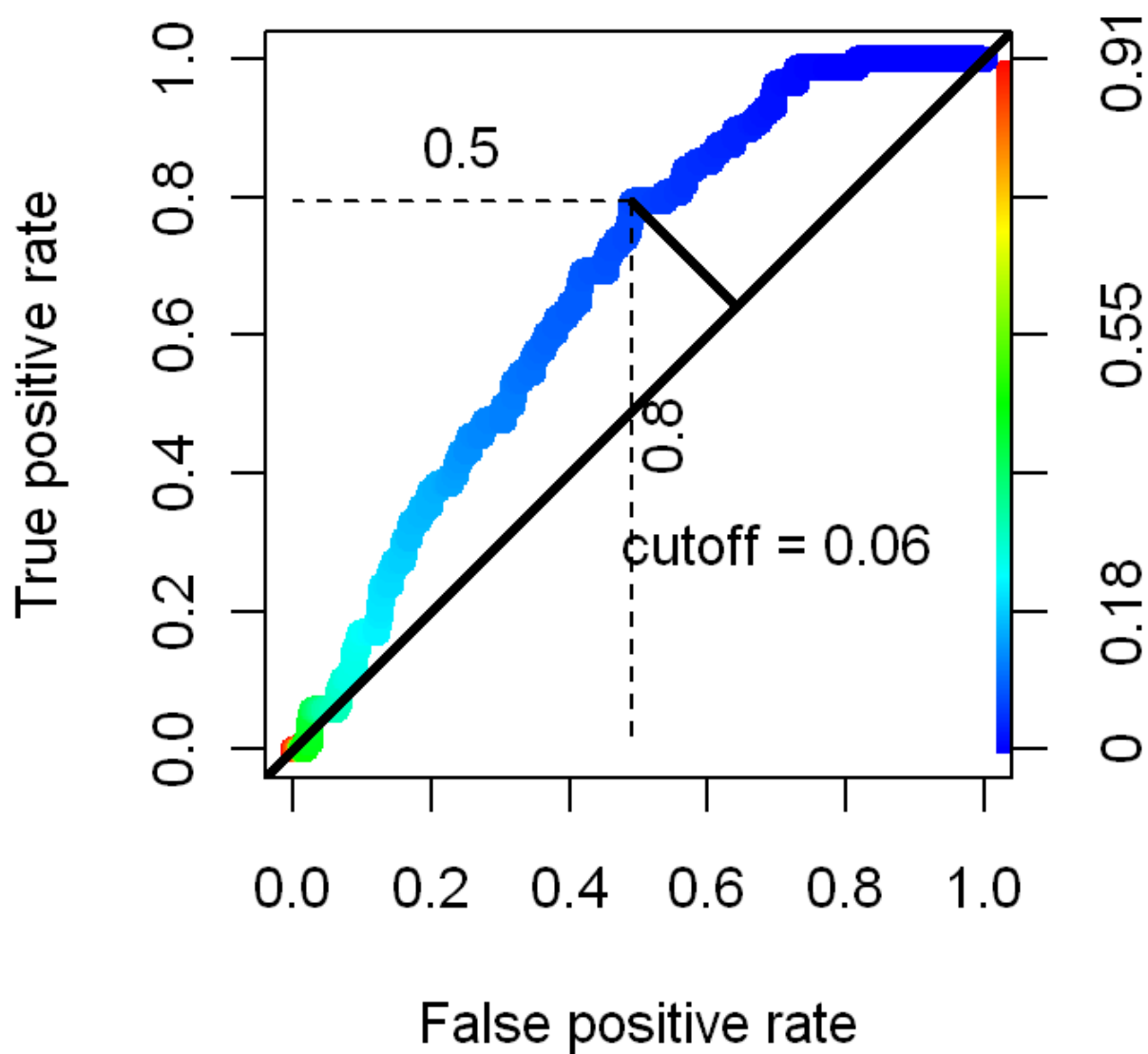


Figure 1073: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'summer' season in 'se2' region.

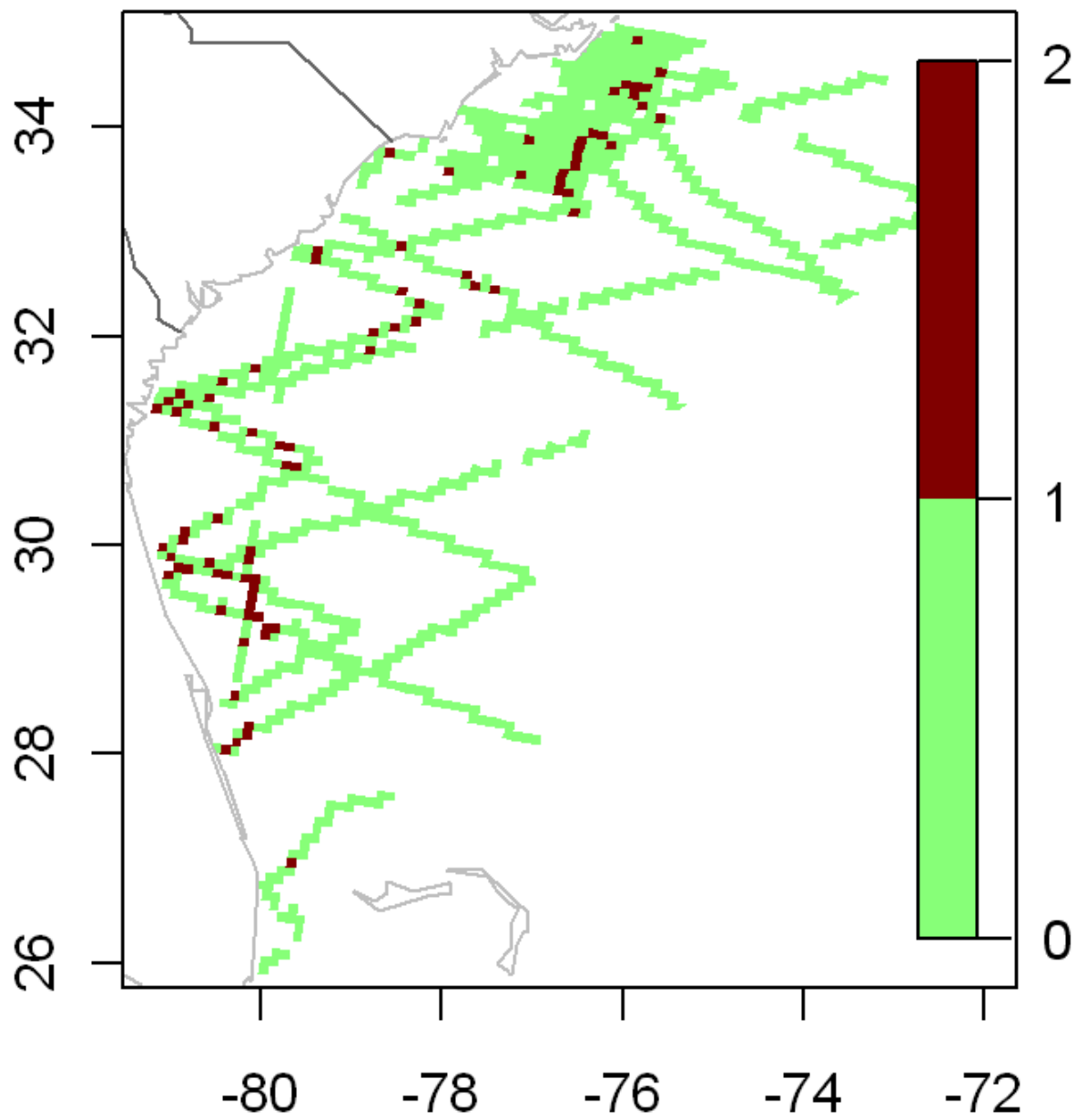


Figure 1074: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'summer' season in 'se2' region.

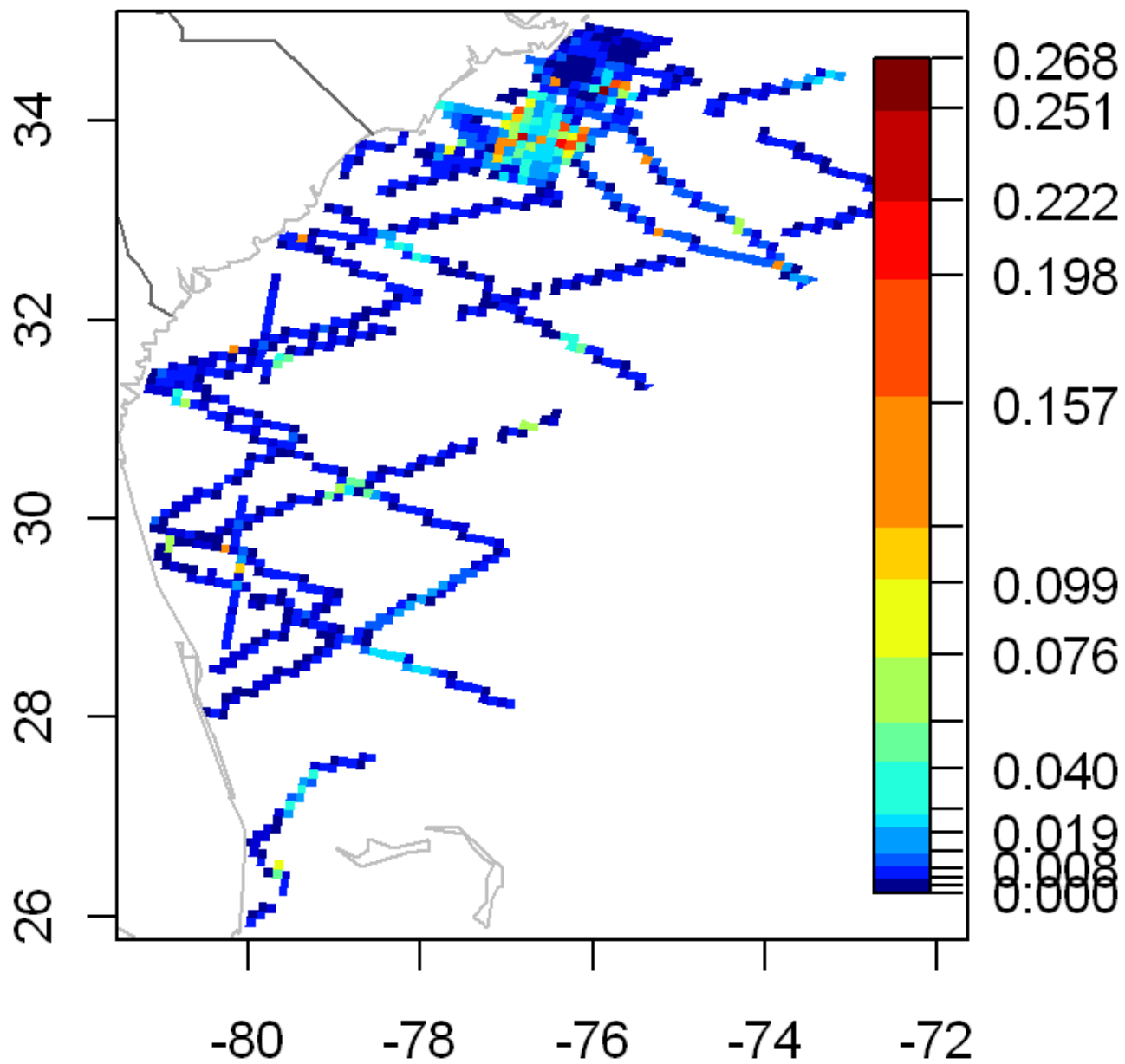


Figure 1075: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'summer' season in 'se2' region.

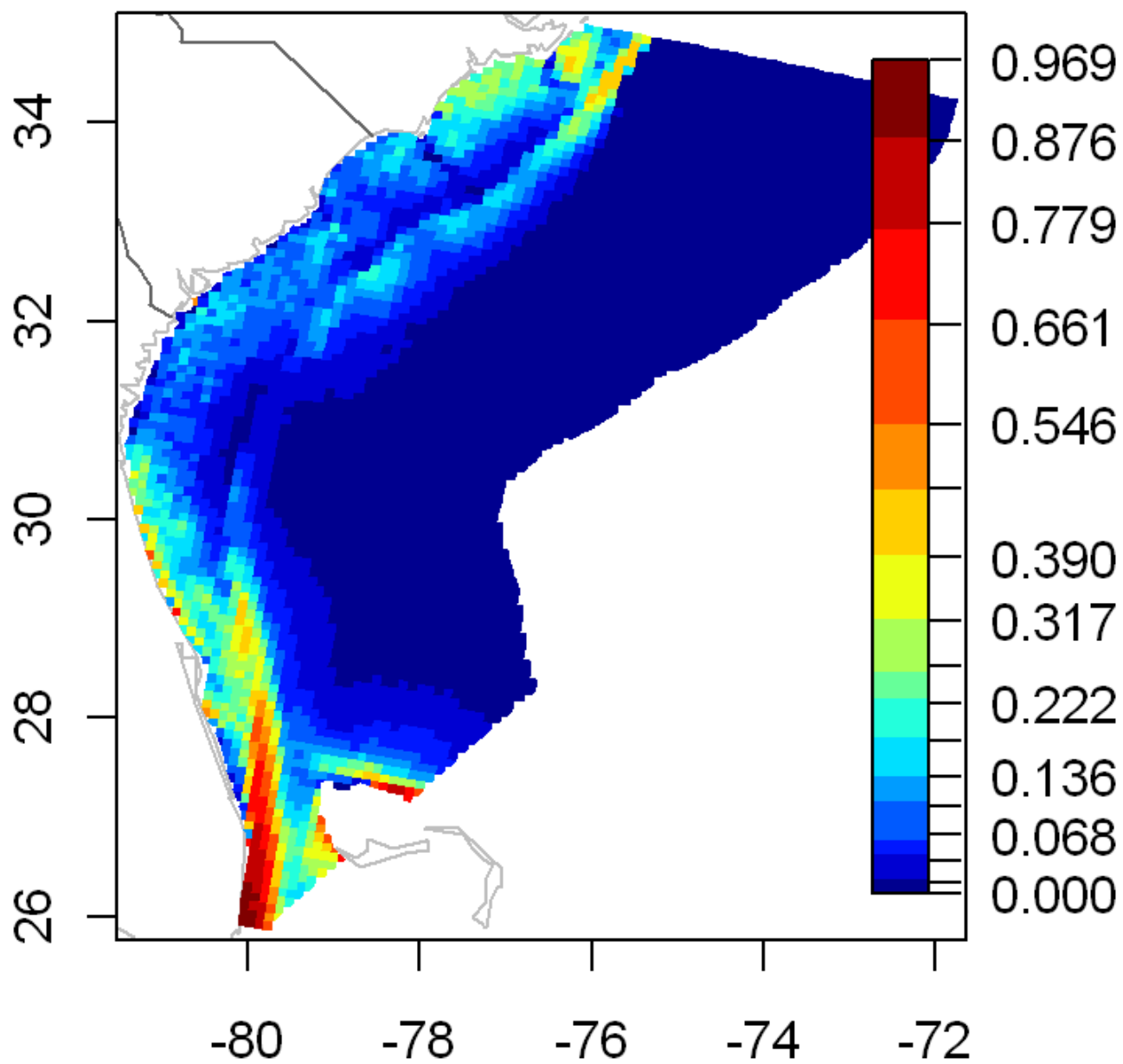


Figure 1076: Map of mean predicted habitat for 'Tursiops' guild during 'summer' season in 'se2' region.

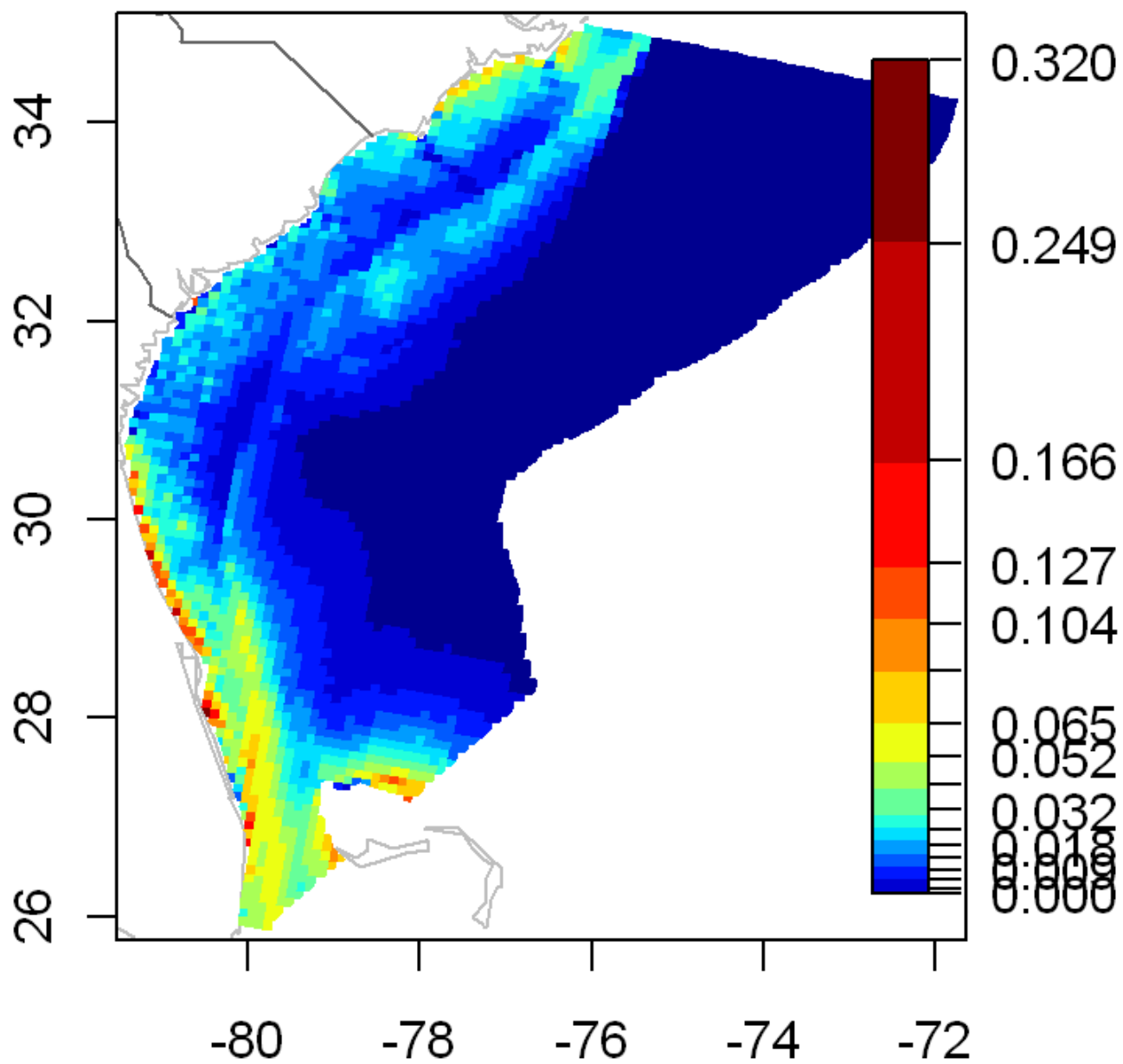


Figure 1077: Map of standard error of habitat for 'Tursiops' guild during 'summer' season in 'se2' region.

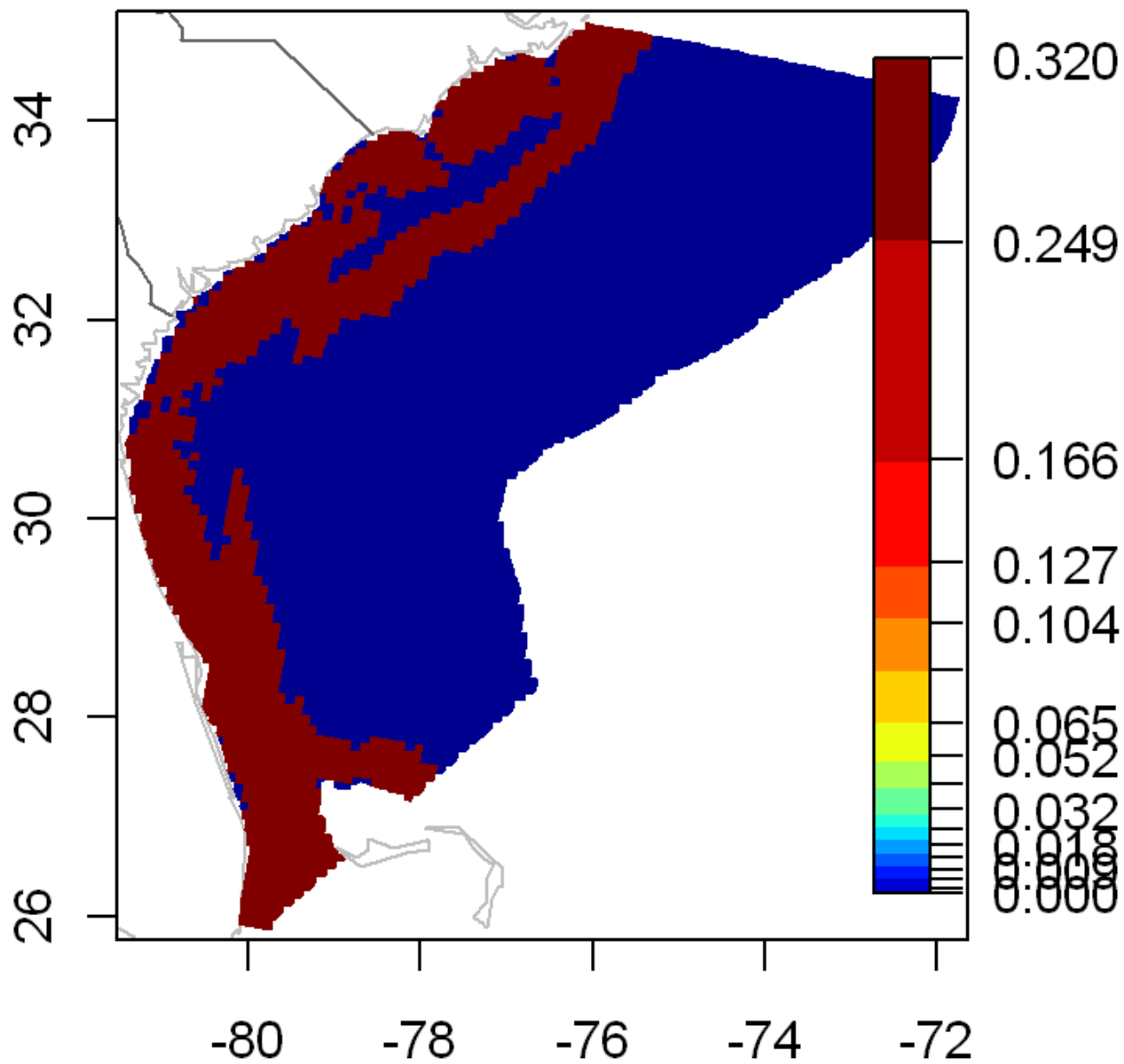


Figure 1078: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'summer' season in 'se2' region.

18.4 winter

18.4.1 east2

Modelrun identifier: duke_06_tu3_winter_east2

Date generated: 2008-10-21 15:25:54

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 96: Summary for duke(6) GAM model: for 'Tursiops' guild during 'winter' season in 'east2' region.

	Value
Number.presences	591
Number.absences	3311
GAM.converged	TRUE
R.squared	0.54291
Deviance.explained	0.244274
ROC.optimum	0.921593
Maximum.fit	0.106953
Maximum.prediction	0.999635

Model text summary...

```
duke_06_tu3_winter_east2 run on Tue Oct 21 15:24:16 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'winter', region:east2

max.fit:0.921593, max.prediction:0.999635, ROC.optimum:0.106953

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -2.35571    0.07942  -29.66   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth)) 2.000e+00  2.500  76.87 <2e-16 ***
s(log(d2shelf)) 1.971e+00  2.471  37.08 <2e-16 ***
s(log(d2coast)) 1.994e+00  2.494  49.66 <2e-16 ***
s(sst)         8.989e-06  0.500  2.93e-05  0.943
s(lat)         1.998e+00  2.498  52.94 <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.543   Deviance explained = 24.4%
GCV score = 0.0022539   Scale est. = 0.0022384   n = 2337

summary(dat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2: 844   Min.    : 1654   Min.    :  4.0   Min.    :  995   Min.    : 1471   Min.    :  2.654   Min.    :25.93
se2:3058  1st Qu.: 9280   1st Qu.: 19.0   1st Qu.: 18575  1st Qu.: 32272  1st Qu.: 13.500  1st Qu.:32.77
          Median :10479 Median : 28.0   Median : 38452  Median : 53042  Median : 19.208  Median :34.02
          Mean   : 9475   Mean   :153.2   Mean   : 44646  Mean   : 63558  Mean   : 17.745  Mean   :33.66
          3rd Qu.:10987  3rd Qu.: 41.0   3rd Qu.: 65053  3rd Qu.: 78087  3rd Qu.: 21.825  3rd Qu.:34.80
          Max.    :12763  Max.    :3612.0  Max.    :274566  Max.    :348168  Max.    : 26.400  Max.    :38.20
                   NA's   :    14   NA's   :    14   NA's   :1561.000

summary(newdat)...
region    fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685  Min.    : 1633   Min.    :  4   Min.    :  5   Min.    : 1259   Min.    :  2.400   Min.    :25.91
se2:4203  1st Qu.: 9145   1st Qu.: 92   1st Qu.: 34042  1st Qu.: 89304  1st Qu.:  9.075   1st Qu.:32.12
```


Median :11616	Median : 844	Median : 82032	Median :178961	Median :19.650	Median :36.17
Mean :11171	Mean :1683	Mean :105970	Mean :191155	Mean :16.267	Mean :35.84
3rd Qu.:14088	3rd Qu.:3266	3rd Qu.:163752	3rd Qu.:283625	3rd Qu.:22.125	3rd Qu.:39.61
Max. :16560	Max. :5300	Max. :354376	Max. :478082	Max. :25.650	Max. :44.74
		NA's : 5	NA's : 5	NA's : 1.000	

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.028e-09  Min.   :2.559e-09  Min.   : 0.0000  Min.   :9.035e-07  Min.   :0.0000
1st Qu.: 9145  1st Qu.:3.066e-04  1st Qu.:2.029e-04  1st Qu.: 0.0000  1st Qu.:7.474e-04  1st Qu.:0.0000
Median :11616  Median :3.308e-03  Median :1.366e-03  Median : 0.0000  Median :3.451e-03  Median :0.0000
Mean   :11171  Mean   :5.189e-02  Mean   :8.250e-03  Mean   : 0.4198  Mean   :9.821e-03  Mean   :0.1519
3rd Qu.:14088  3rd Qu.:5.903e-02  3rd Qu.:1.215e-02  3rd Qu.: 0.0000  3rd Qu.:9.825e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :9.996e-01  Max.   :1.555e-01  Max.   : 8.0000  Max.   :2.547e-01  Max.   :1.0000
      NA's :6.000e+00  NA's :6.000e+00  NA's :8454.0000  NA's :8.454e+03
```

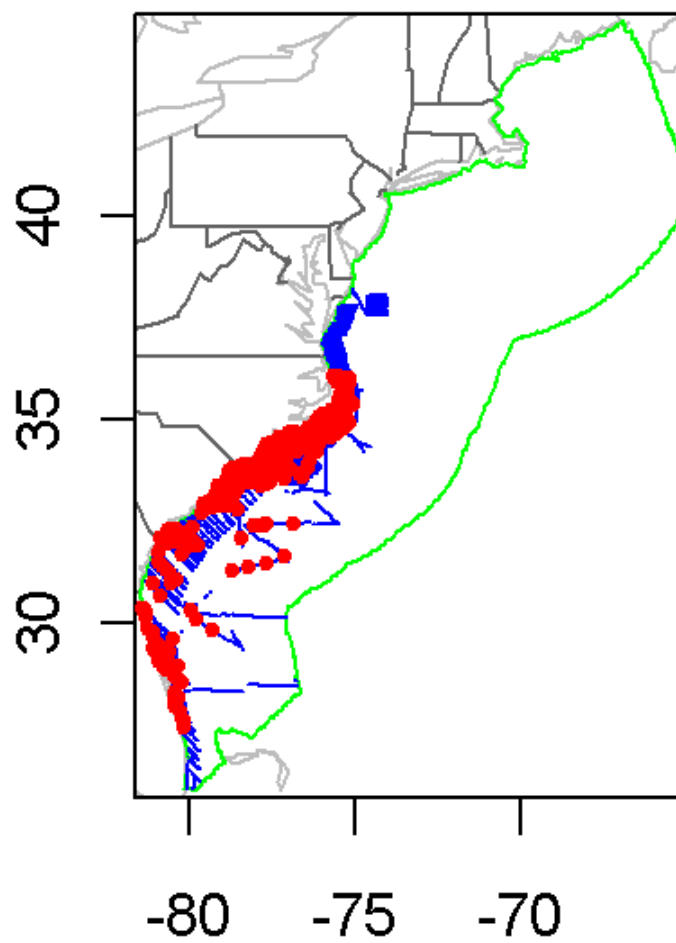


Figure 1079: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'winter' season in 'east2' region.

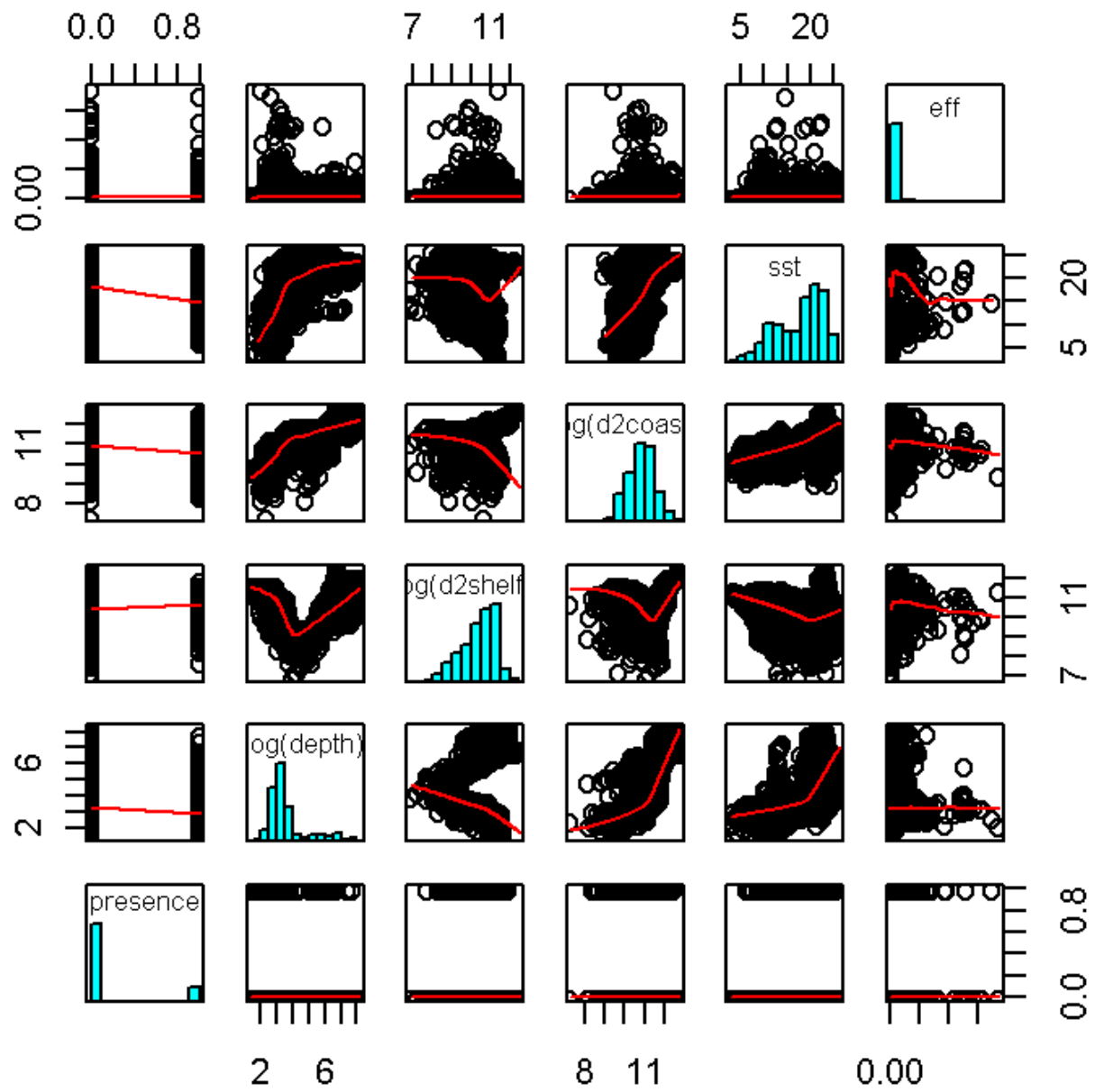


Figure 1080: Pairs plot of input variables for 'Tursiops' guild during 'winter' season in 'east2' region.

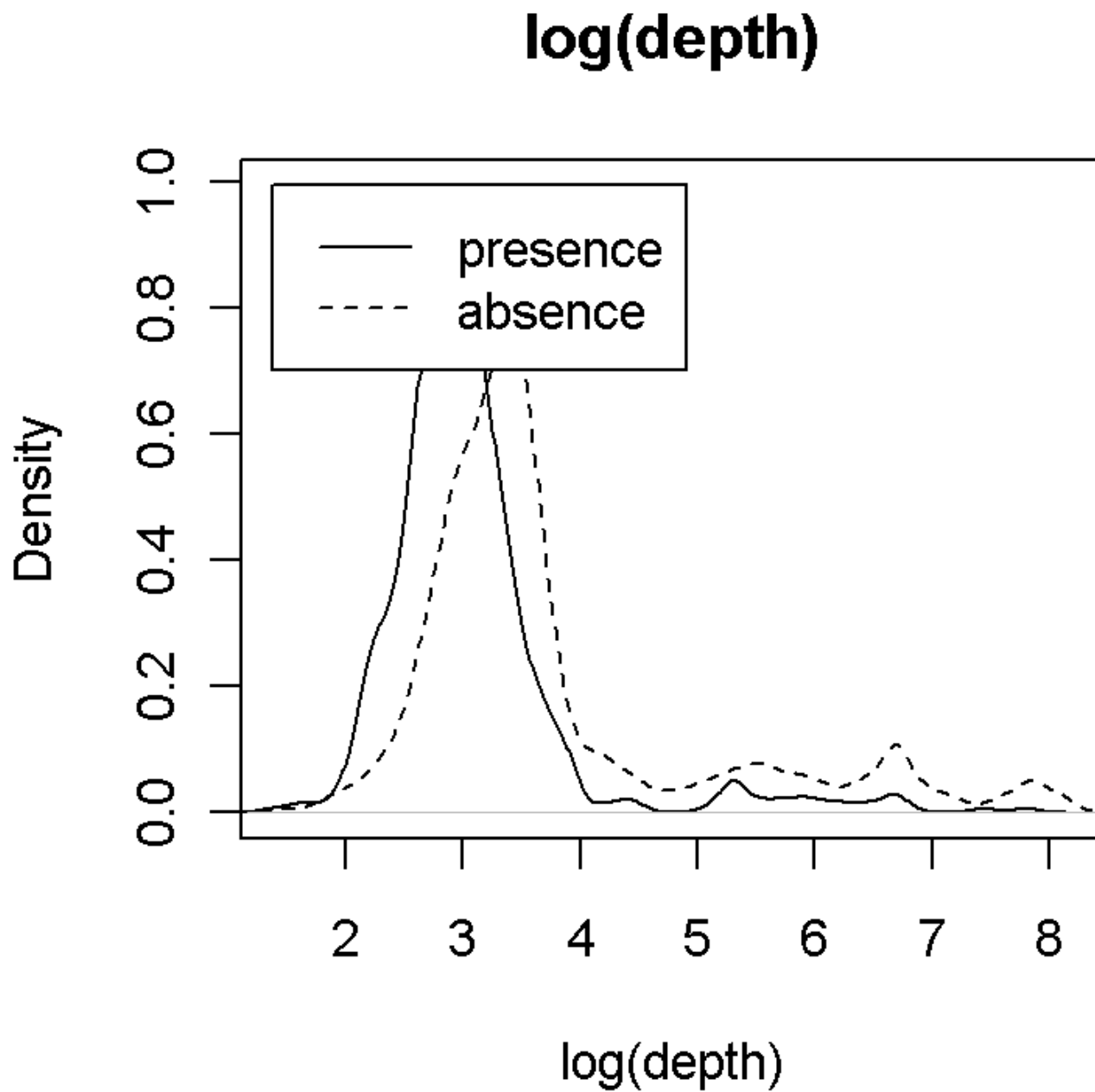


Figure 1081: Density histogram of depth $\log(\text{meters})$ for 'Tursiops' guild during 'winter' season in 'east2' region.

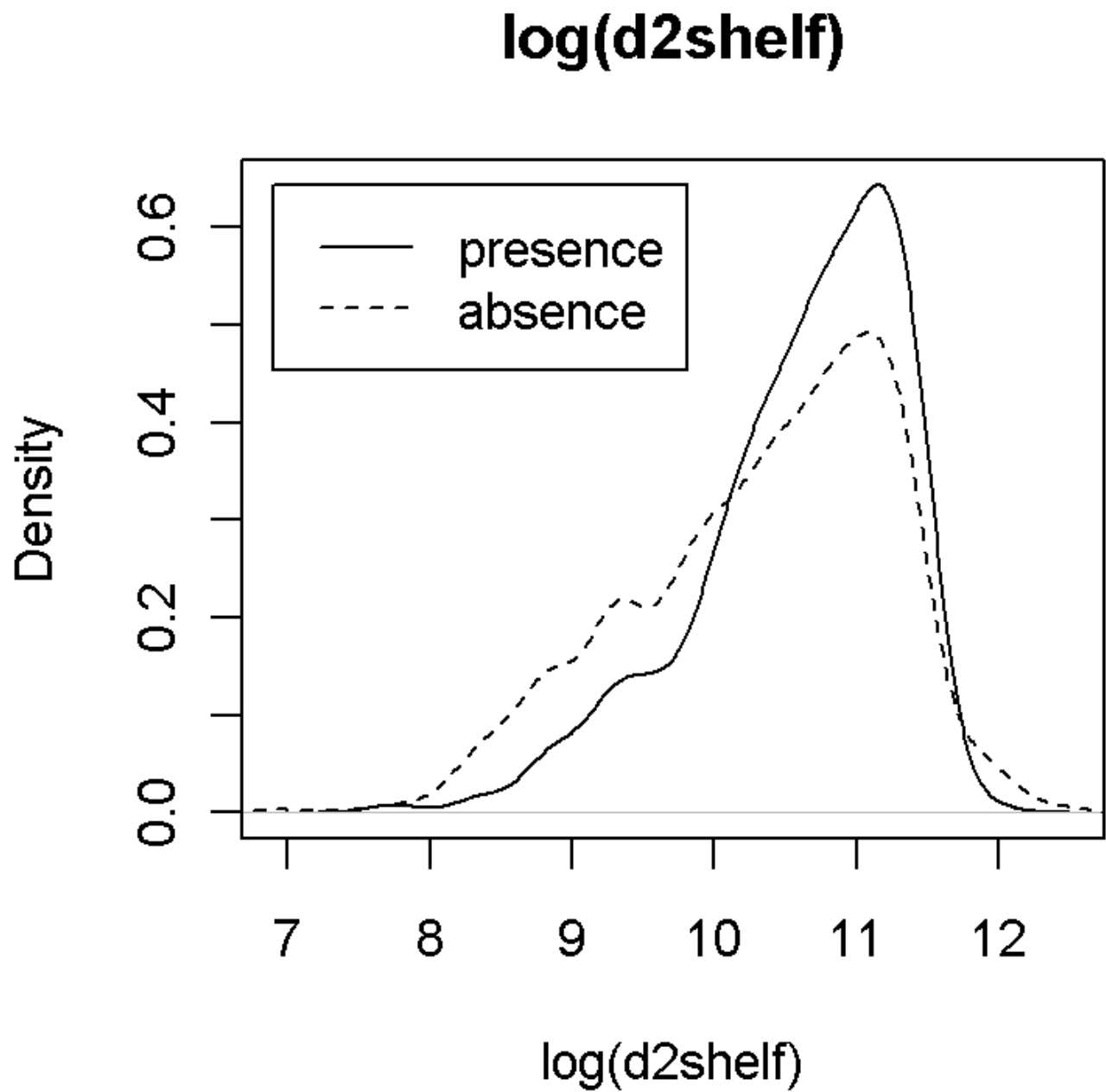


Figure 1082: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'winter' season in 'east2' region.

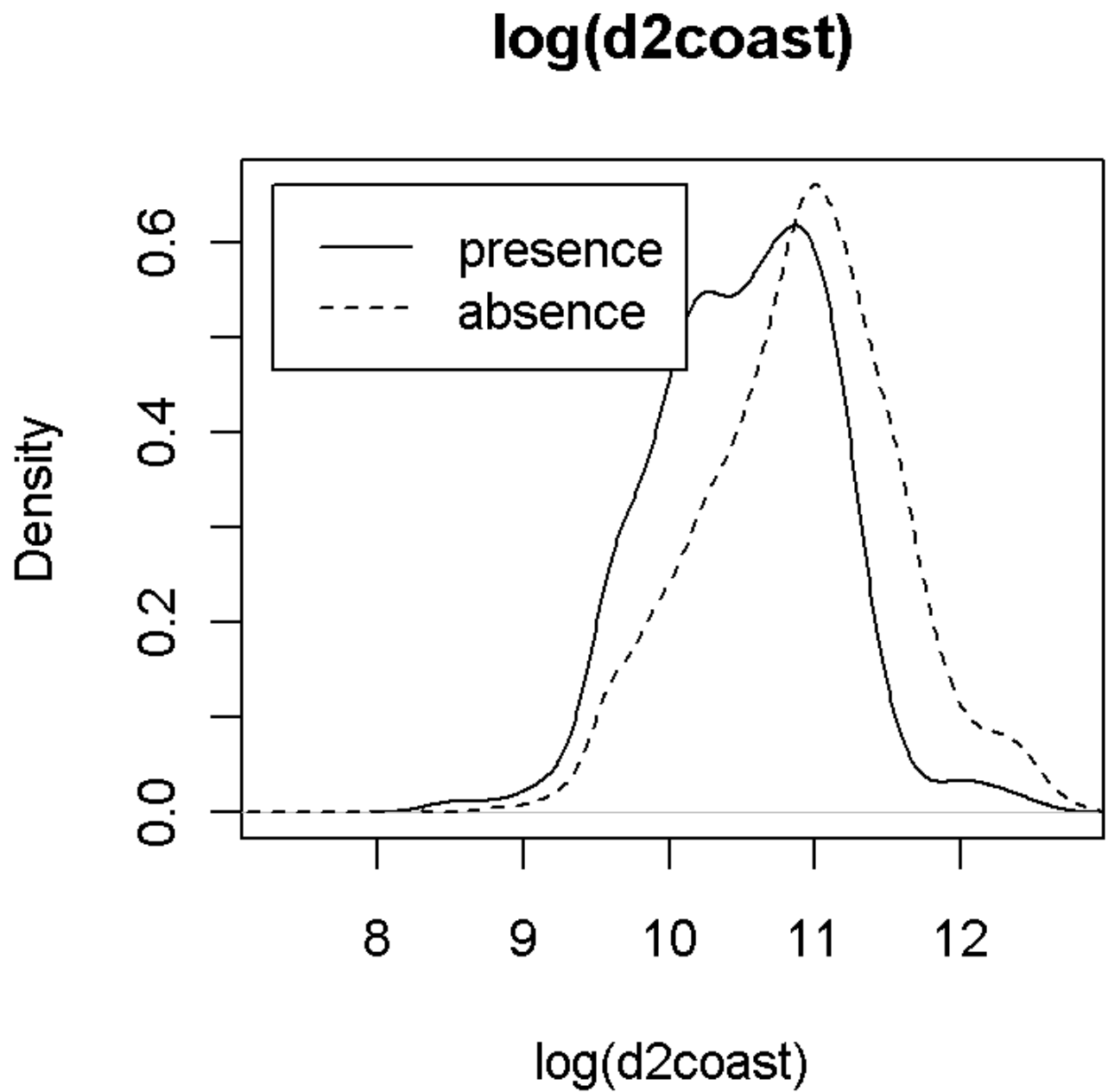


Figure 1083: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'winter' season in 'east2' region.

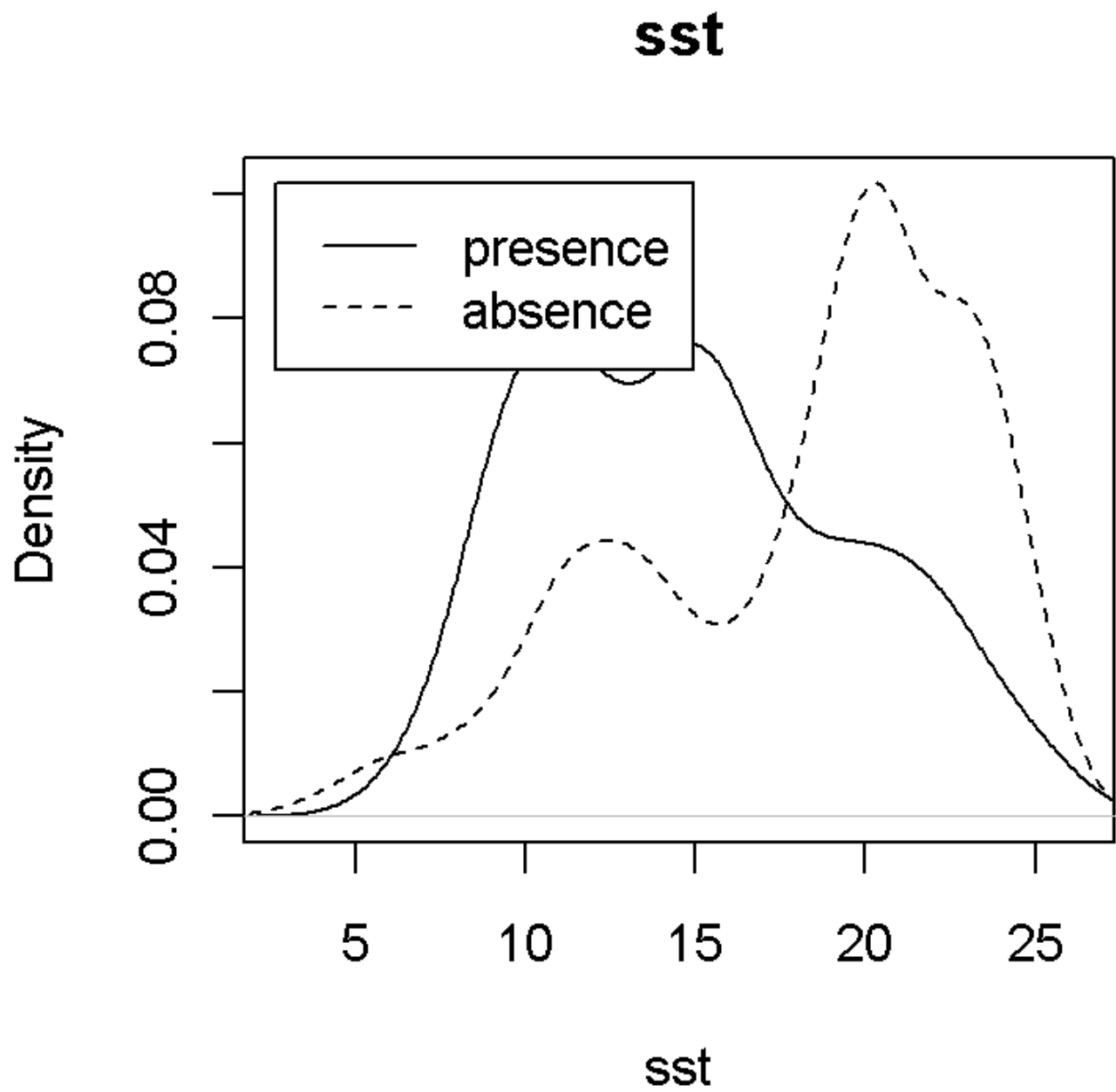


Figure 1084: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'winter' season in 'east2' region.

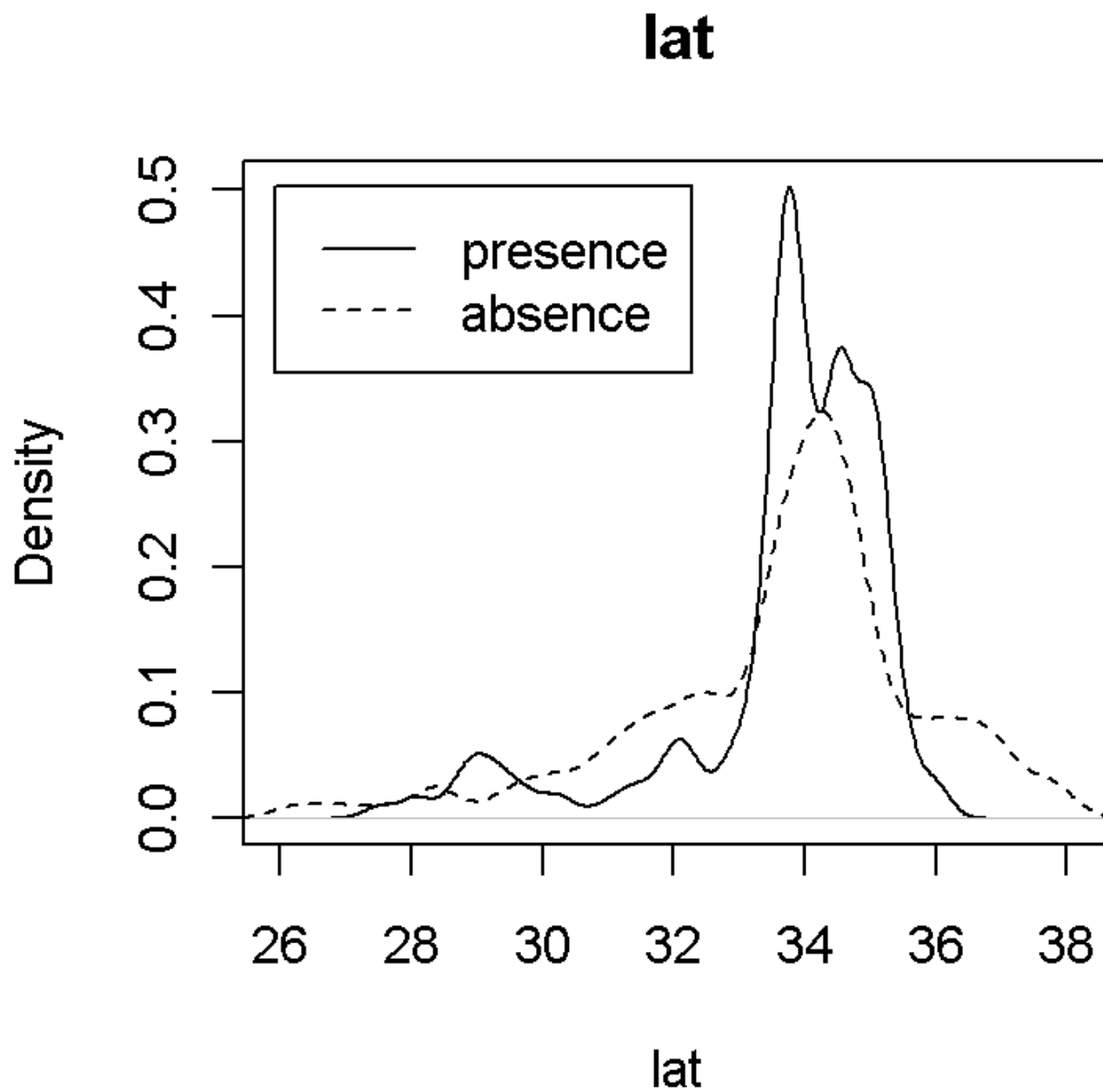


Figure 1085: Density histogram of latitude (degrees) for 'Tursiops' guild during 'winter' season in 'east2' region.

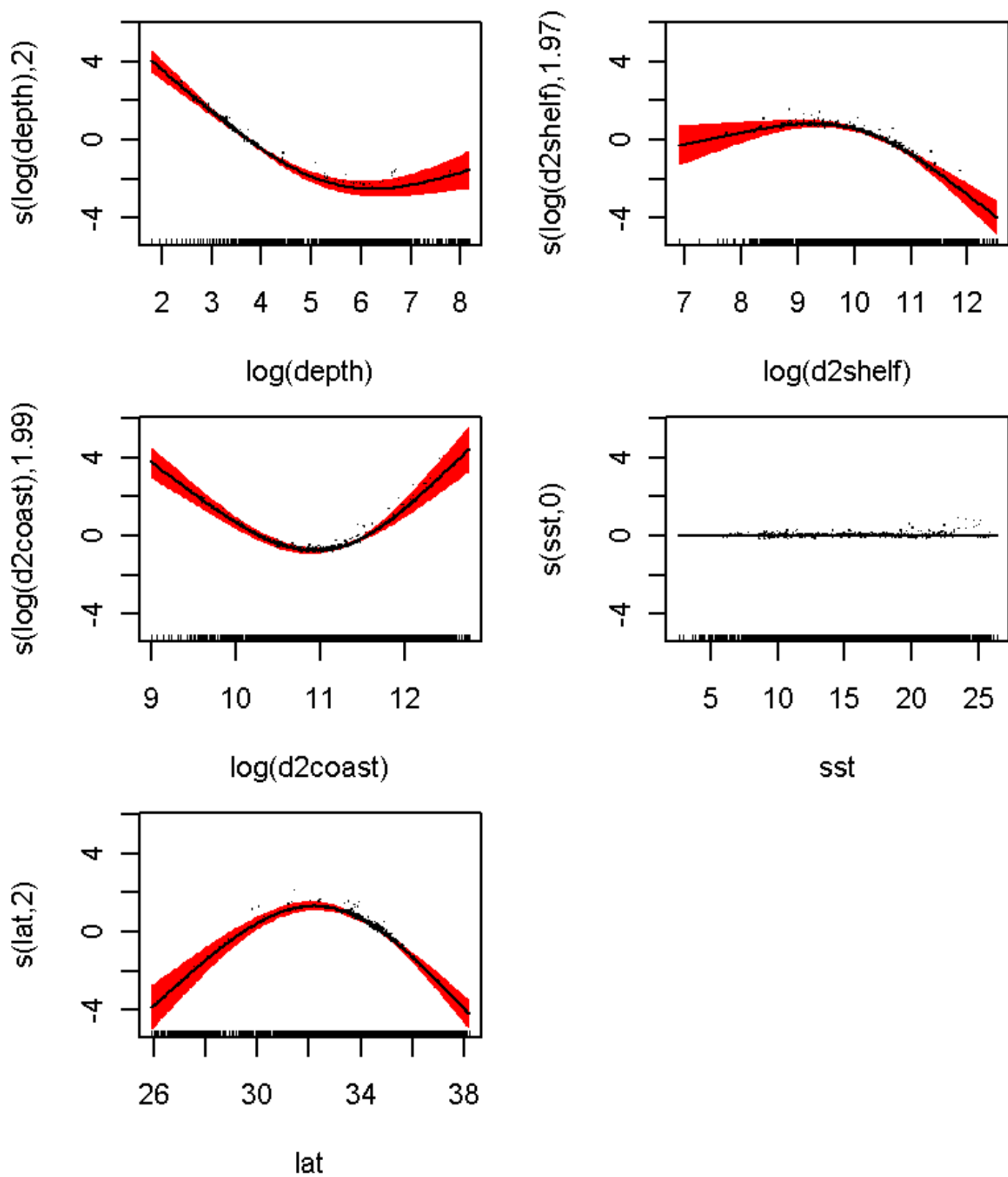


Figure 1086: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'winter' season in 'east2' region.

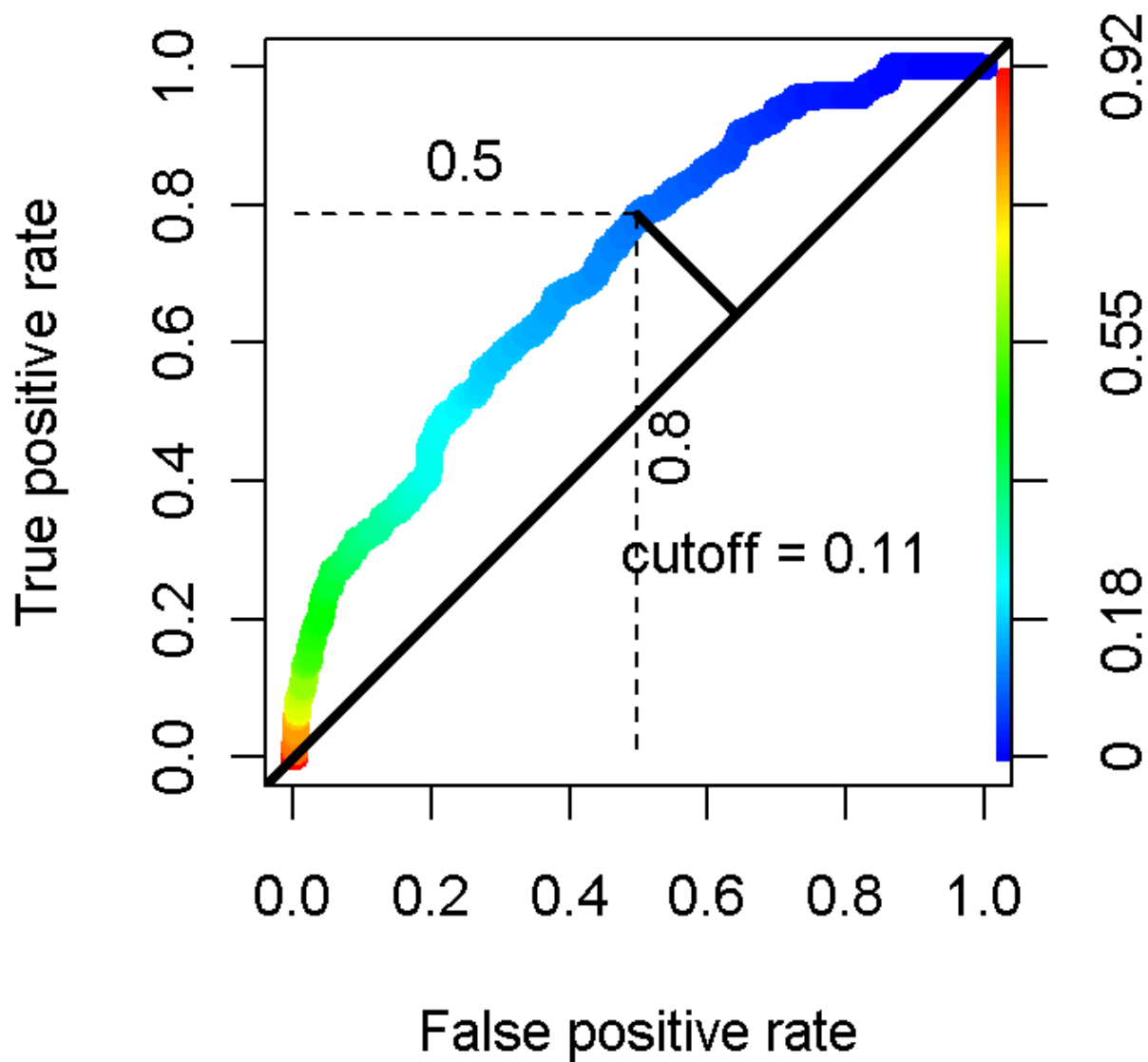


Figure 1087: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'winter' season in 'east2' region.

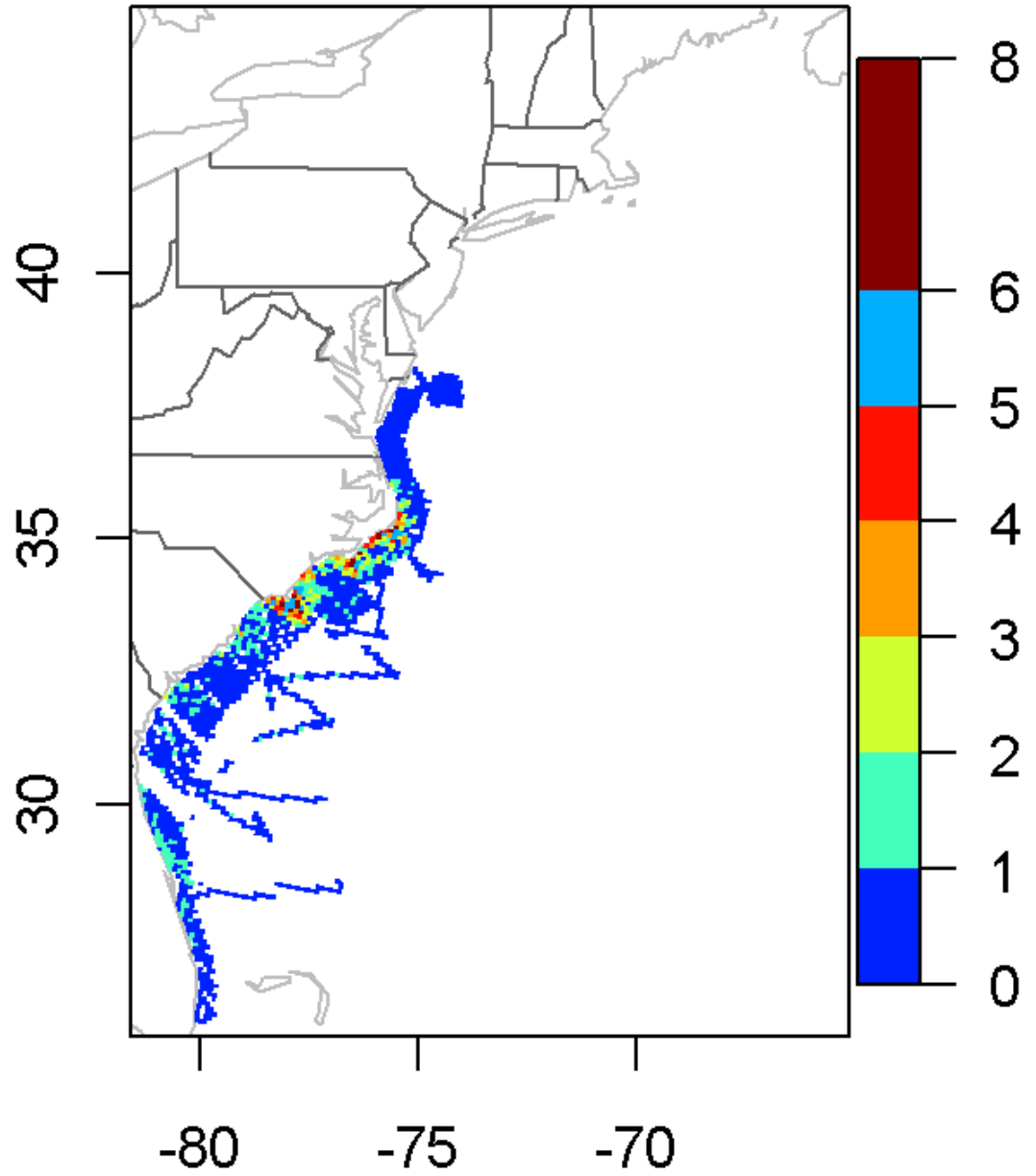


Figure 1088: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'winter' season in 'east2' region.

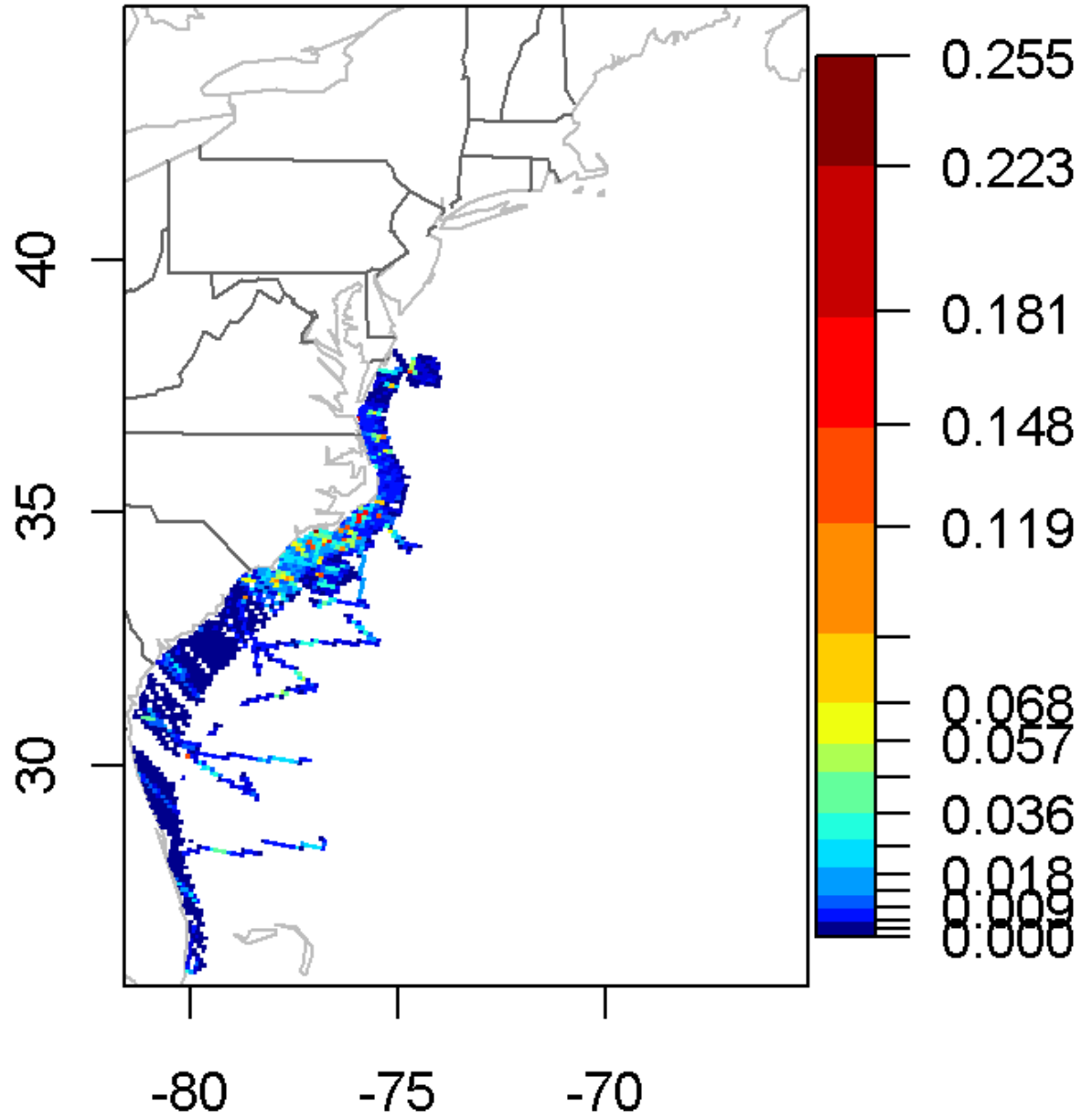


Figure 1089: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'winter' season in 'east2' region.

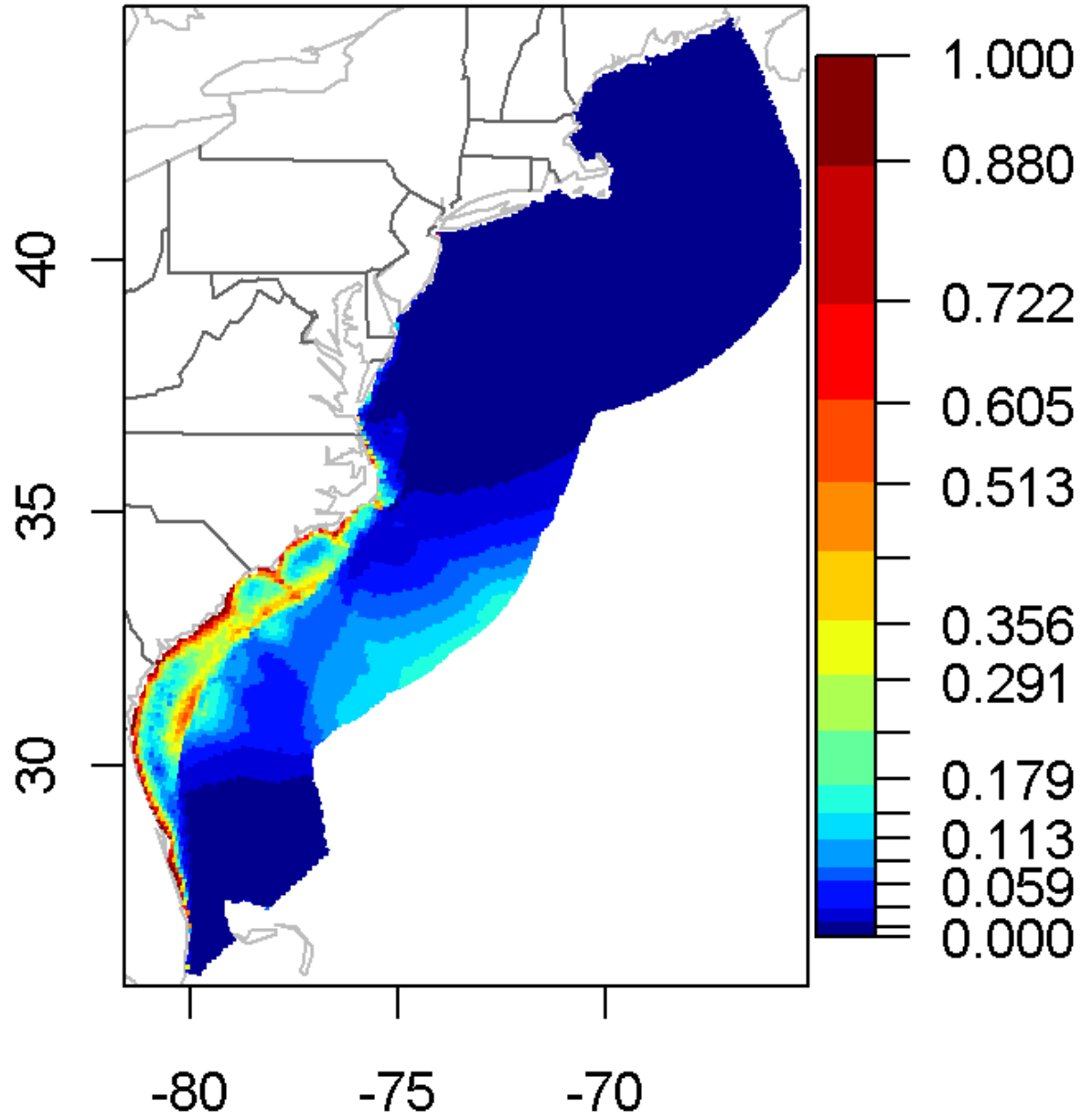


Figure 1090: Map of mean predicted habitat for 'Tursiops' guild during 'winter' season in 'east2' region.

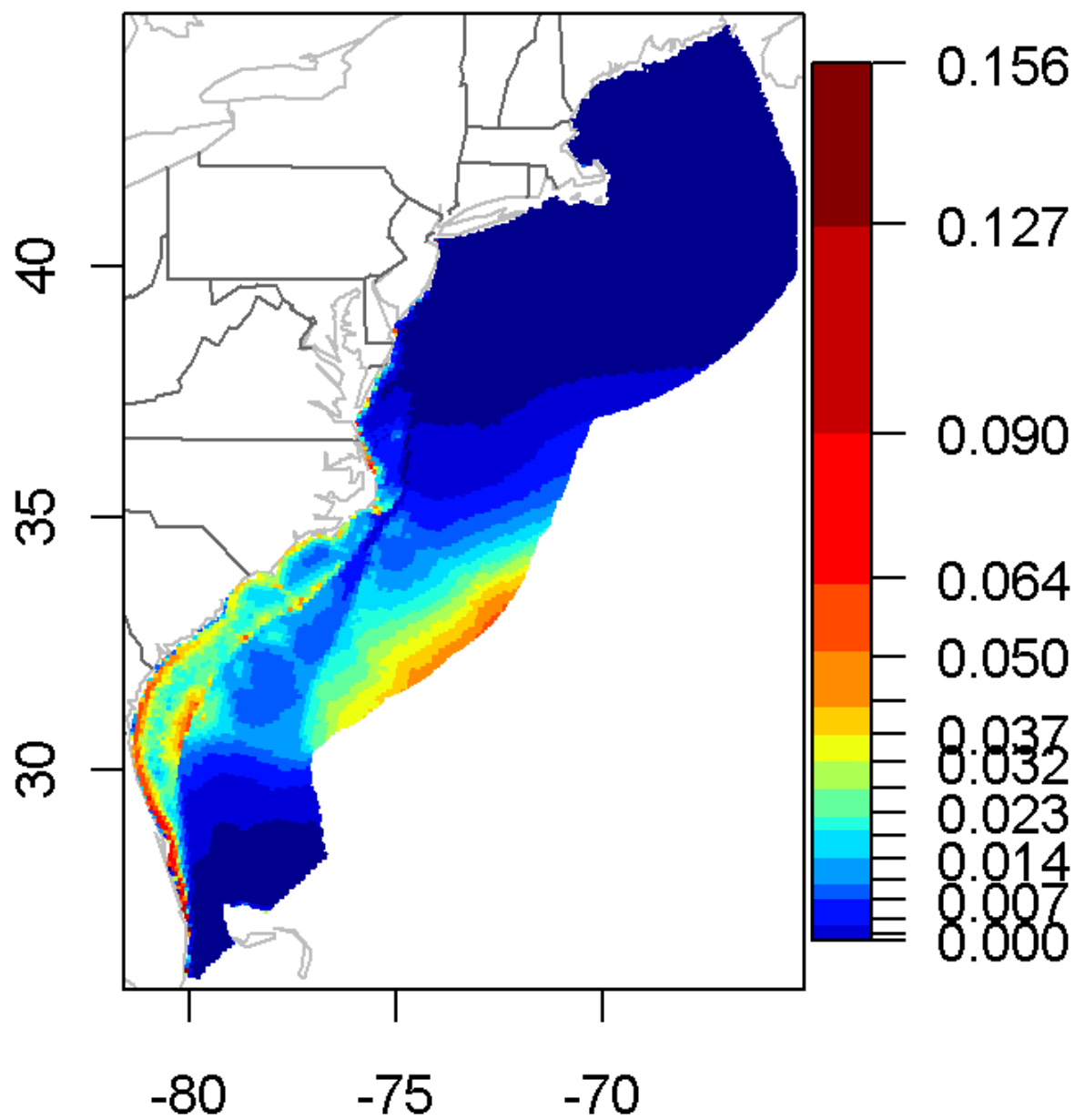


Figure 1091: Map of standard error of habitat for 'Tursiops' guild during 'winter' season in 'east2' region.

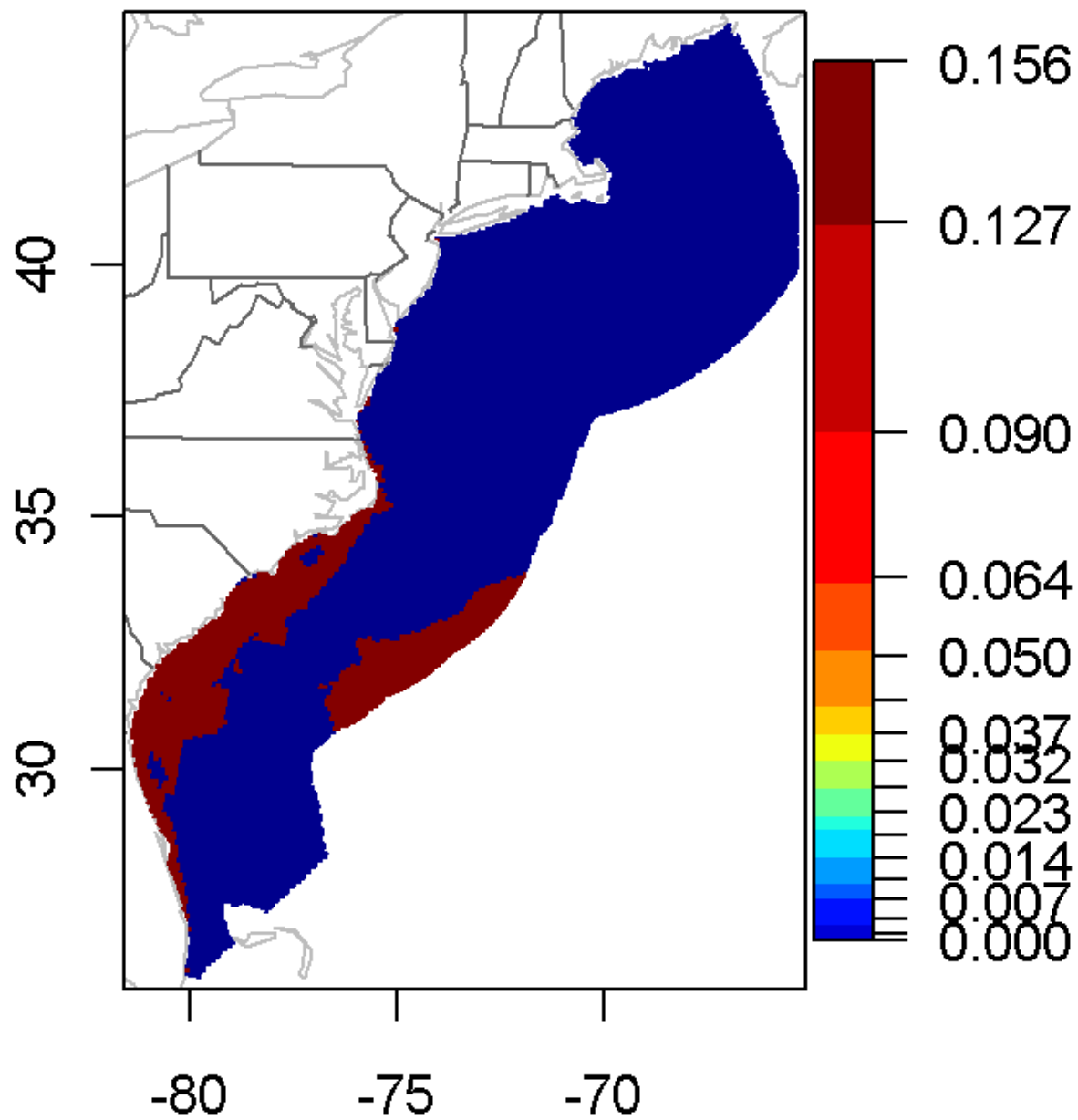


Figure 1092: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'winter' season in 'east2' region.

18.4.2 gomex2

Modelrun identifier: duke_06_tu3_winter_gomex2

Date generated: 2008-10-21 12:08:30

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 97: Summary for duke(6) GAM model: for 'Tursiops' guild during 'winter' season in 'gomex2' region.

	Value
Number.presences	7
Number.absences	598
GAM.converged	TRUE
R.squared	-0.0682903
Deviance.explained	0.217277
ROC.optimum	0.0345685
Maximum.fit	0.0163748
Maximum.prediction	0.0345685

Model text summary...

```
duke_06_tu3_winter_gomex2 run on Tue Oct 21 12:07:57 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'winter', region:gomex2

max.fit:0.034568, max.prediction:0.034568, ROC.optimum:0.016375

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -10.41      1.39      -7.49 2.51e-13 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df    F  p-value
s(log(depth))  1.230e-06  0.500 1.51e-06  0.973
s(log(d2shelf)) 1.945e+00  2.445  9.721 1.67e-05 ***
s(log(d2coast)) 1.153e-05  0.500 3.10e-04  0.897
s(sst)          8.373e-06  0.500 1.08e-04  0.921
s(lat)          1.074e-05  0.500 1.18e-04  0.919
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  -0.0683  Deviance explained = 21.7%
GCV score = 0.00042417  Scale est. = 0.0004204  n = 596

summary(dat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:605  Min.   : 161  Min.   : 42  Min.   : 1427  Min.   : 14193  Min.   :17.10  Min.   :24.23
             1st Qu.:3257 1st Qu.: 415 1st Qu.: 17134 1st Qu.:136665 1st Qu.:21.38 1st Qu.:26.95
             Median :4493 Median :1087 Median : 54348 Median :181008 Median :22.05 Median :27.54
             Mean   :4224 Mean   :1200 Mean   : 59634 Mean   :187275 Mean   :22.14 Mean   :27.38
             3rd Qu.:5338 3rd Qu.:1712 3rd Qu.: 96839 3rd Qu.:241267 3rd Qu.:22.80 3rd Qu.:27.98
             Max.   :7531 Max.   :3350 Max.   :164995 Max.   :356233 Max.   :25.50 Max.   :29.35
             NA's   : 9.00

summary(newdat)...
      region  fid_c10  depth  d2shelf  d2coast  sst  lat
gomex2:6672  Min.   : 1  Min.   : 3.0  Min.   : 272  Min.   : 5317  Min.   :15.07  Min.   :23.85
             1st Qu.:1861 1st Qu.: 46.0 1st Qu.: 31617 1st Qu.: 85289 1st Qu.:20.33 1st Qu.:26.28
```


Median :4110	Median : 433.5	Median : 71100	Median :157258	Median :21.90	Median :27.29
Mean :3997	Mean :1057.7	Mean : 86278	Mean :170790	Mean :21.52	Mean :27.26
3rd Qu.:6015	3rd Qu.:2026.0	3rd Qu.:131962	3rd Qu.:249983	3rd Qu.:22.88	3rd Qu.:28.38
Max. :8351	Max. :3643.0	Max. :267519	Max. :408116	Max. :25.80	Max. :30.36

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1  Min.   :8.445e-12  Min.   :3.805e-11  Min.   :0.000e+00  Min.   :3.813e-06  Min.   :0.0000
1st Qu.:1861 1st Qu.:9.023e-09  1st Qu.:2.759e-08  1st Qu.:0.000e+00  1st Qu.:3.727e-03  1st Qu.:0.0000
Median :4110 Median :3.369e-06  Median :6.189e-06  Median :0.000e+00  Median :5.454e-03  Median :0.0000
Mean   :3997 Mean   :4.487e-03  Mean   :9.129e-04  Mean   :1.203e-02  Mean   :6.586e-03  Mean   :0.1292
3rd Qu.:6015 3rd Qu.:1.345e-03  3rd Qu.:8.897e-04  3rd Qu.:0.000e+00  3rd Qu.:6.028e-03  3rd Qu.:0.0000
Max.   :8351 Max.   :3.457e-02  Max.   :5.162e-03  Max.   :1.000e+00  Max.   :9.493e-02  Max.   :1.0000
NA's   :6.090e+03  NA's   :6.090e+03
```

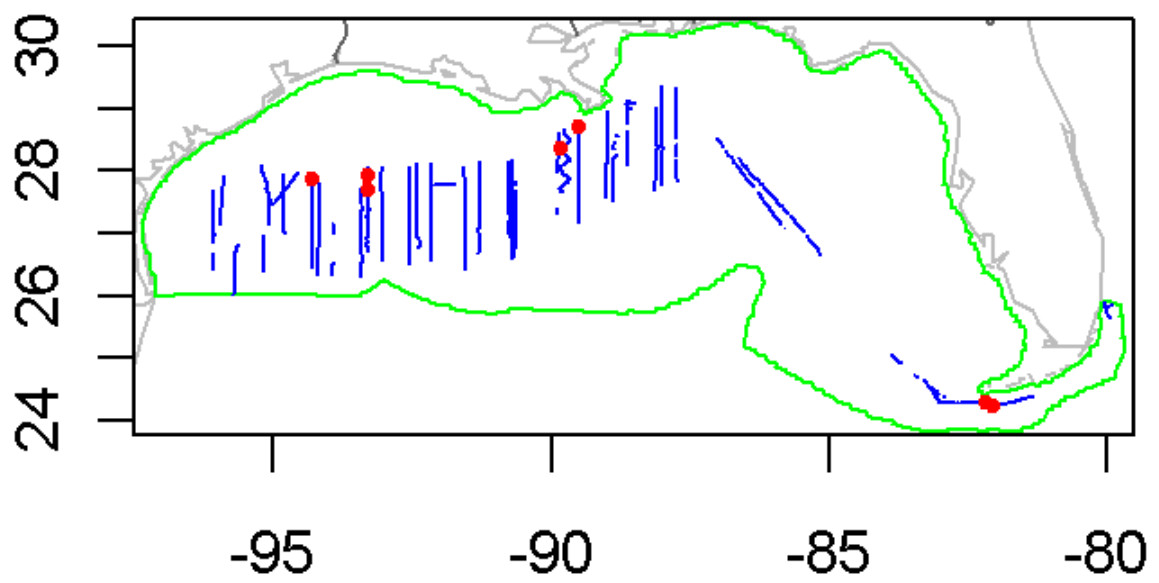


Figure 1093: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'winter' season in 'gomex2' region.

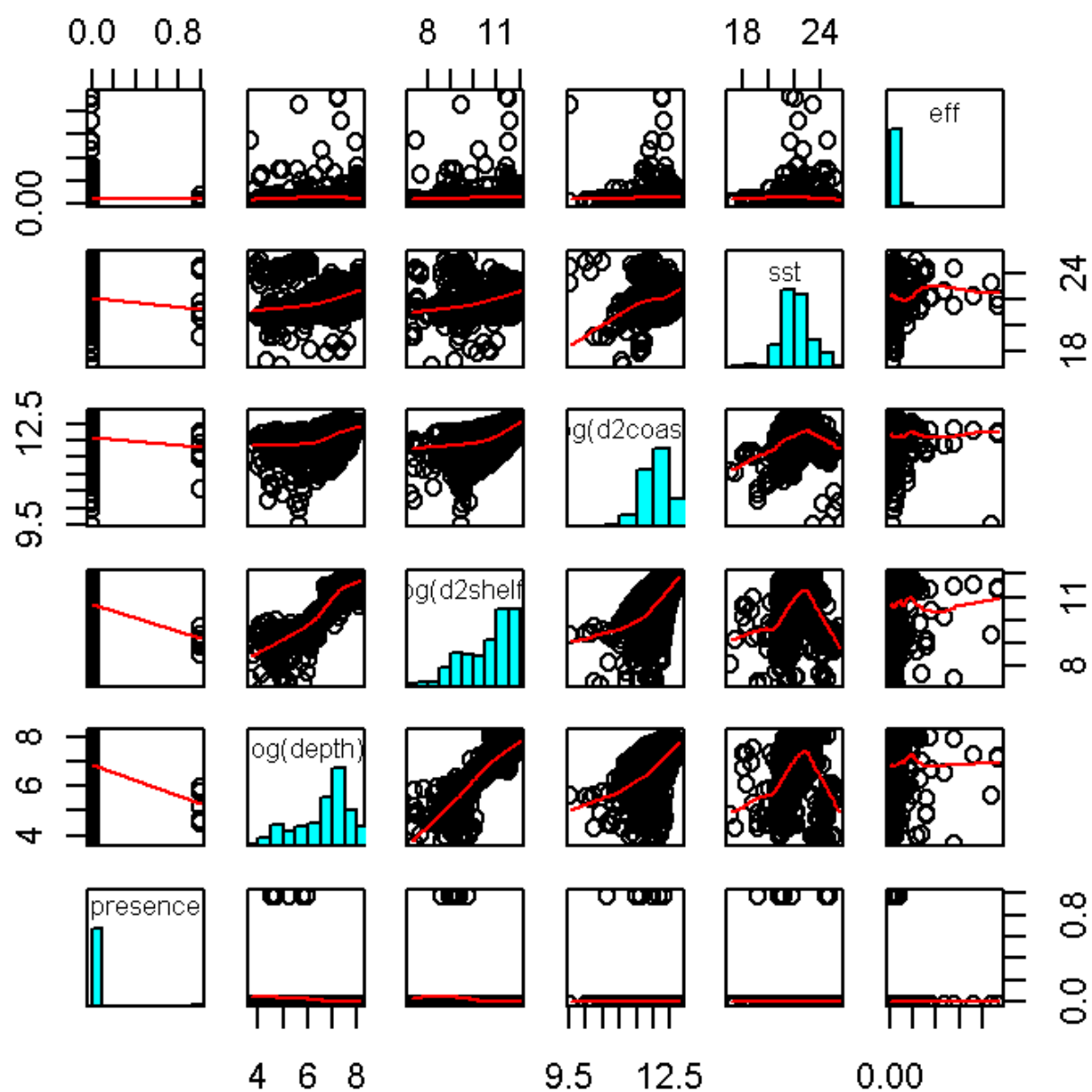


Figure 1094: Pairs plot of input variables for 'Tursiops' guild during 'winter' season in 'gomex2' region.

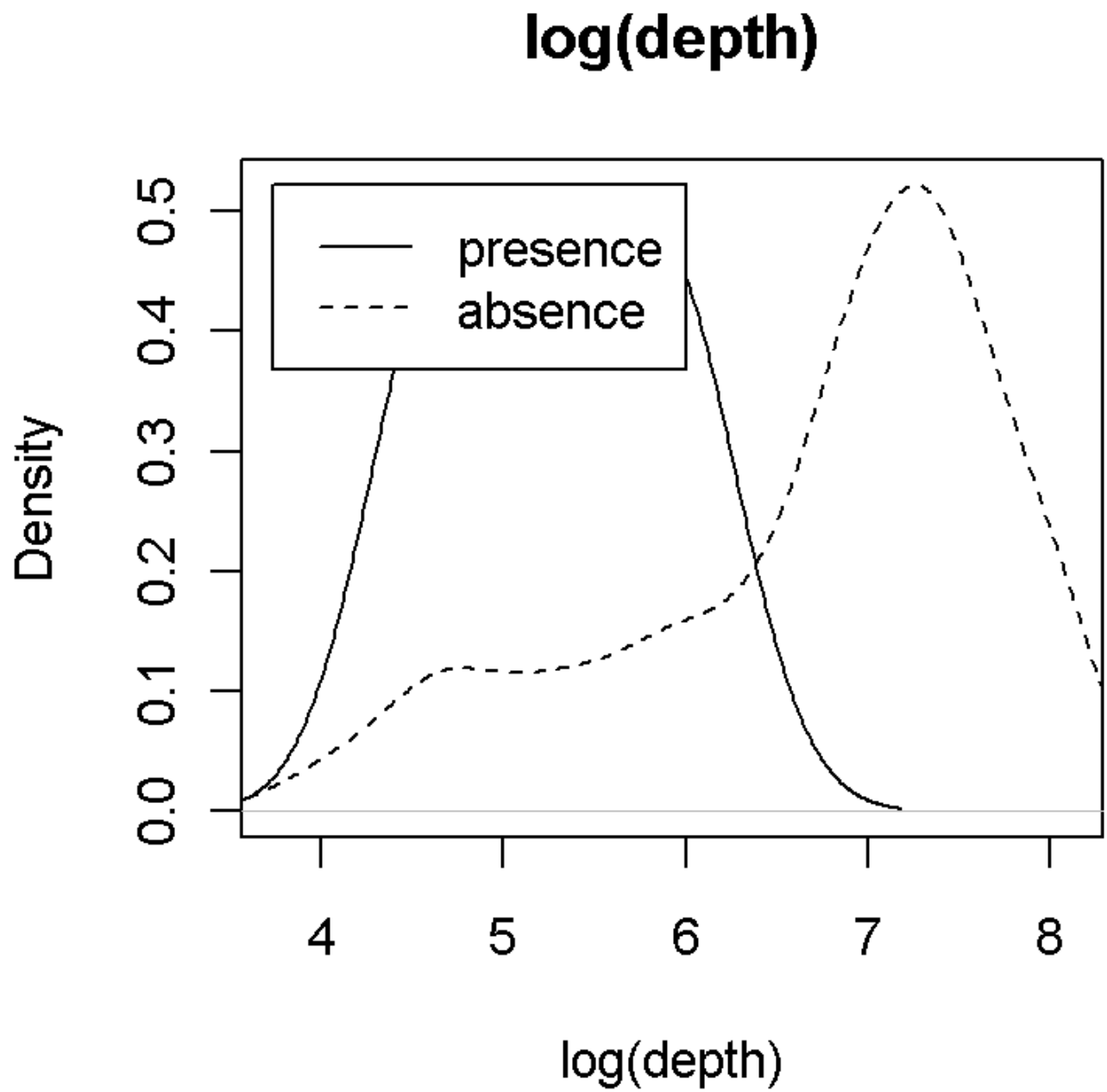


Figure 1095: Density histogram of depth log(meters) for 'Tursiops' guild during 'winter' season in 'gomex2' region.

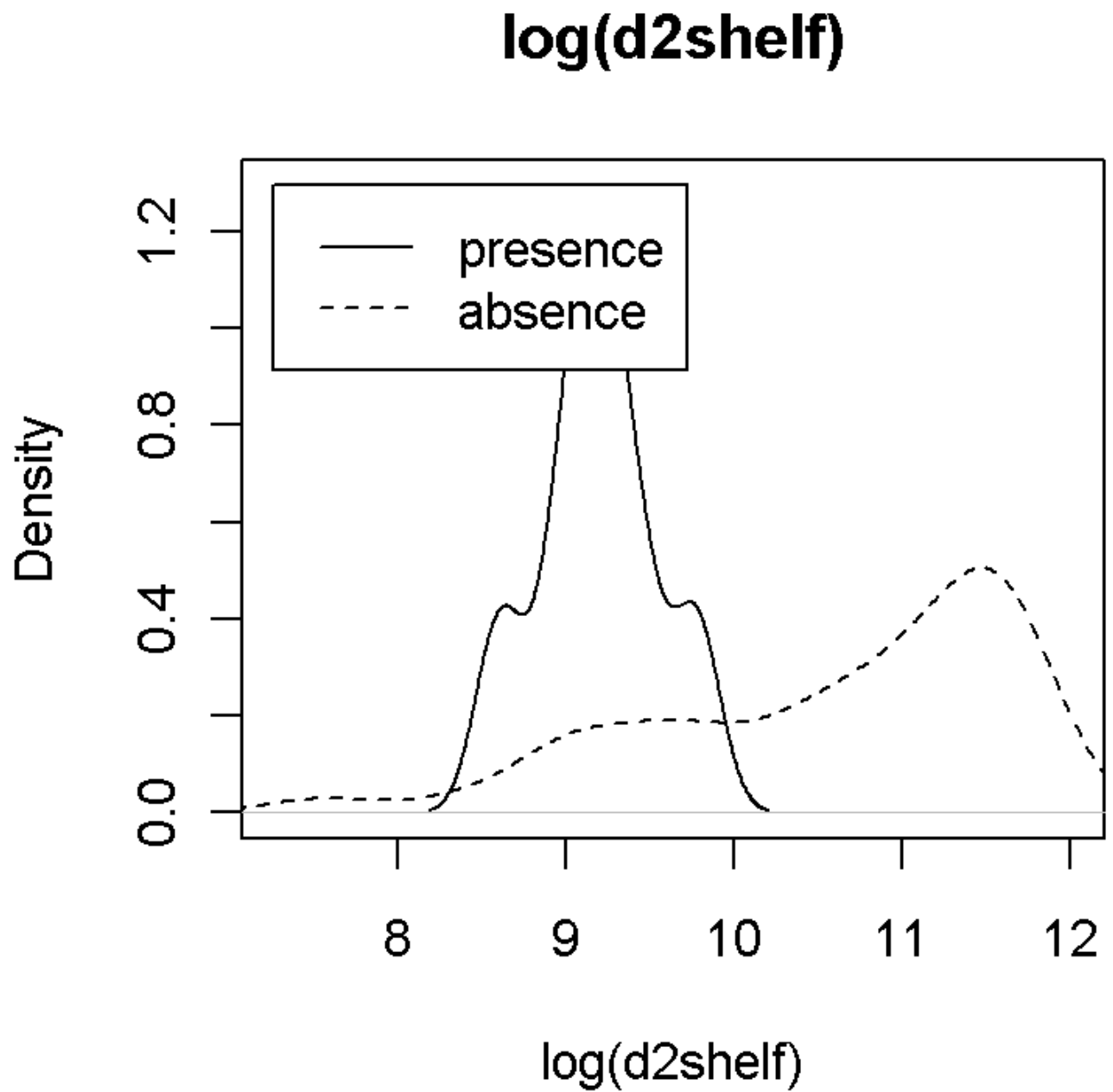


Figure 1096: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'winter' season in 'gomex2' region.

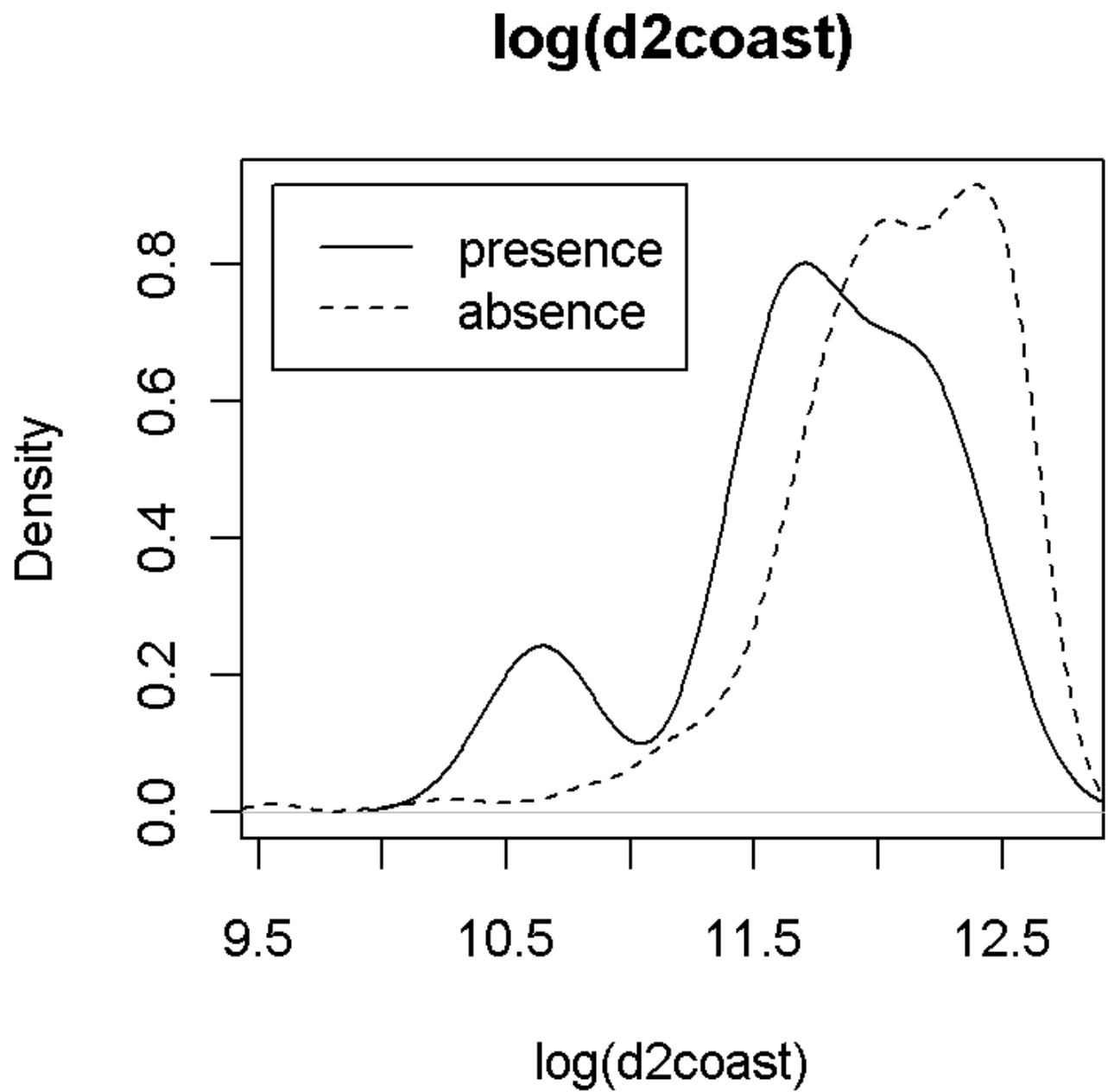


Figure 1097: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'winter' season in 'gomex2' region.

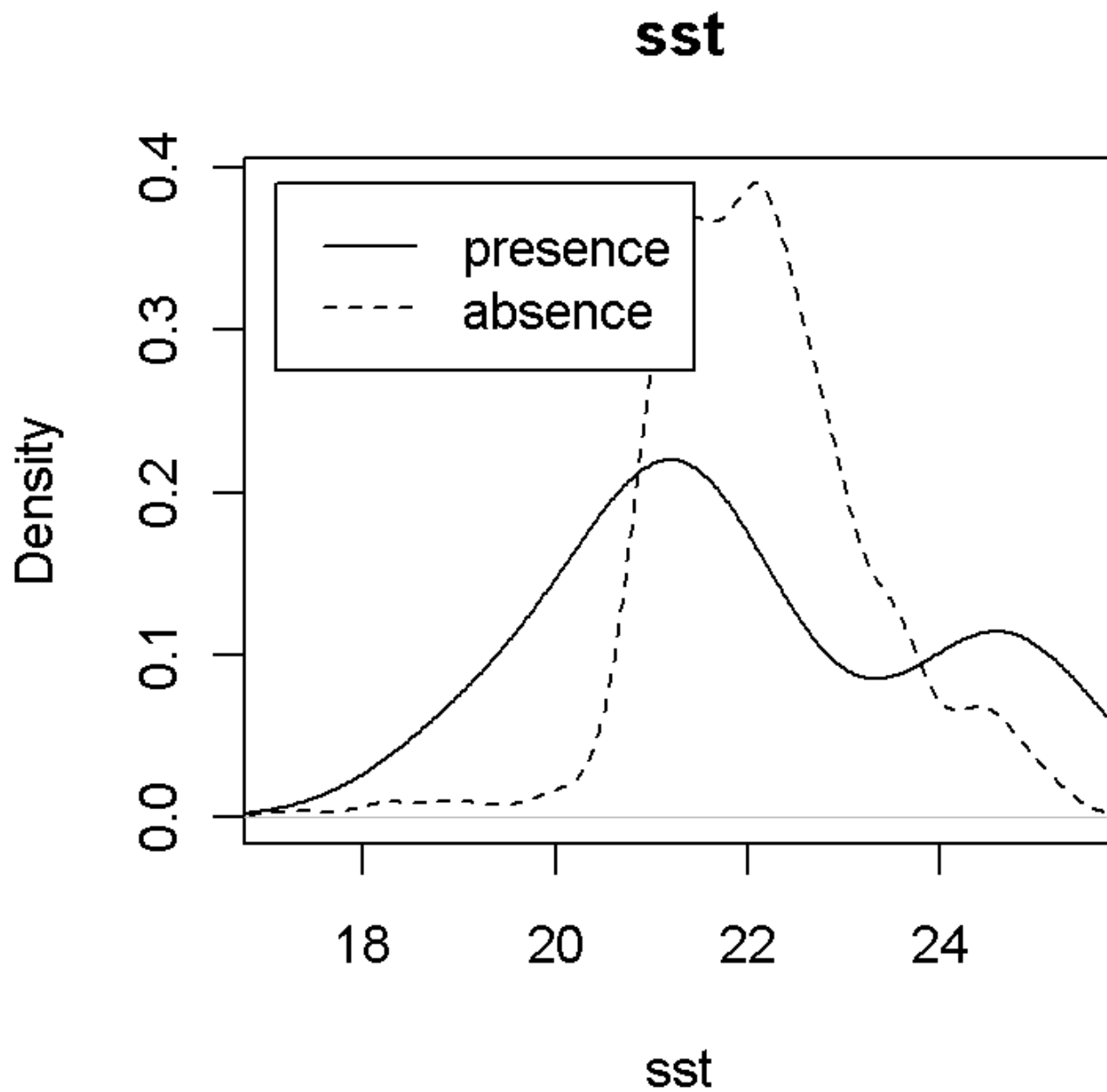


Figure 1098: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'winter' season in 'gomex2' region.

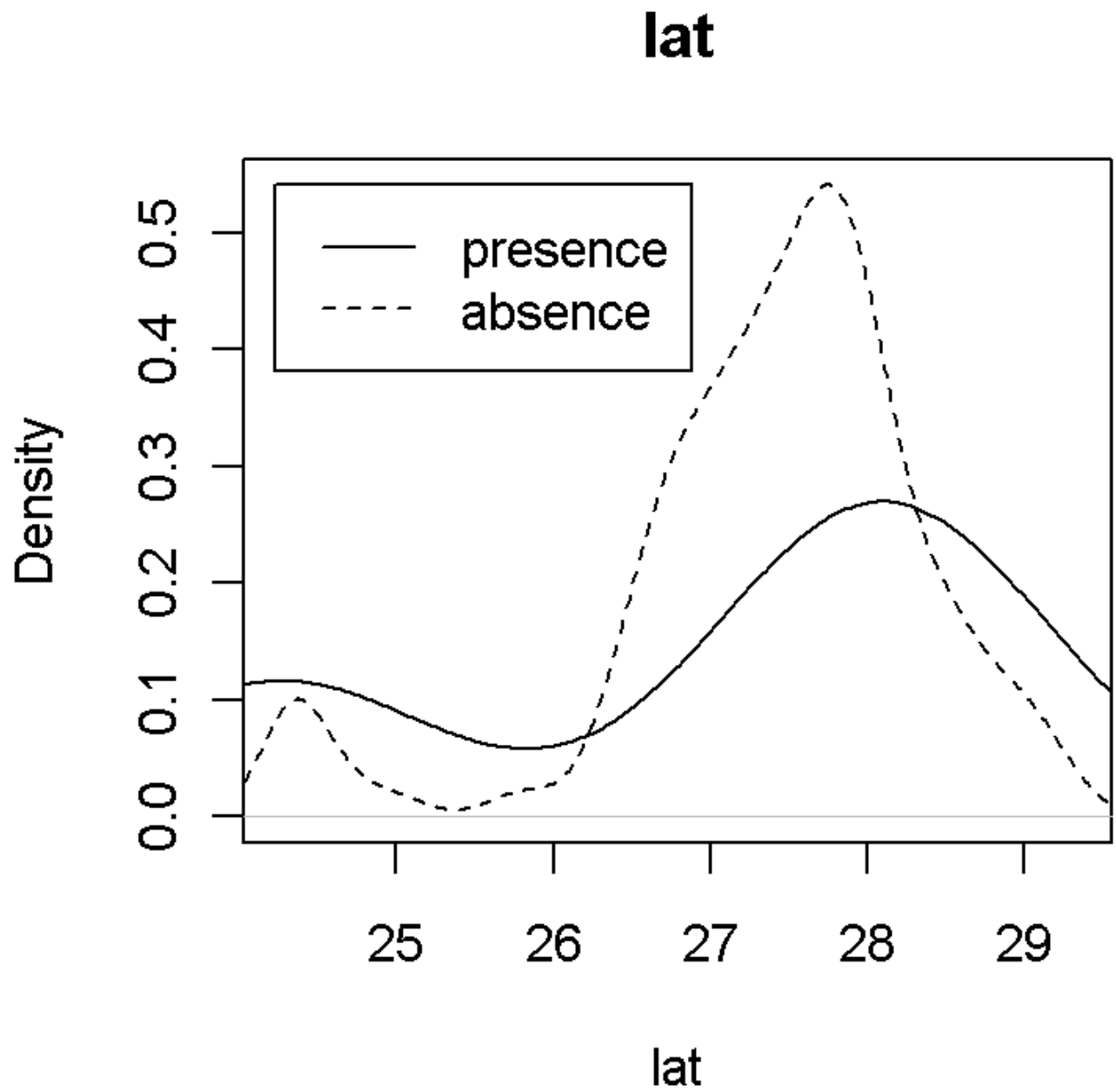


Figure 1099: Density histogram of latitude (degrees) for 'Tursiops' guild during 'winter' season in 'gomex2' region.

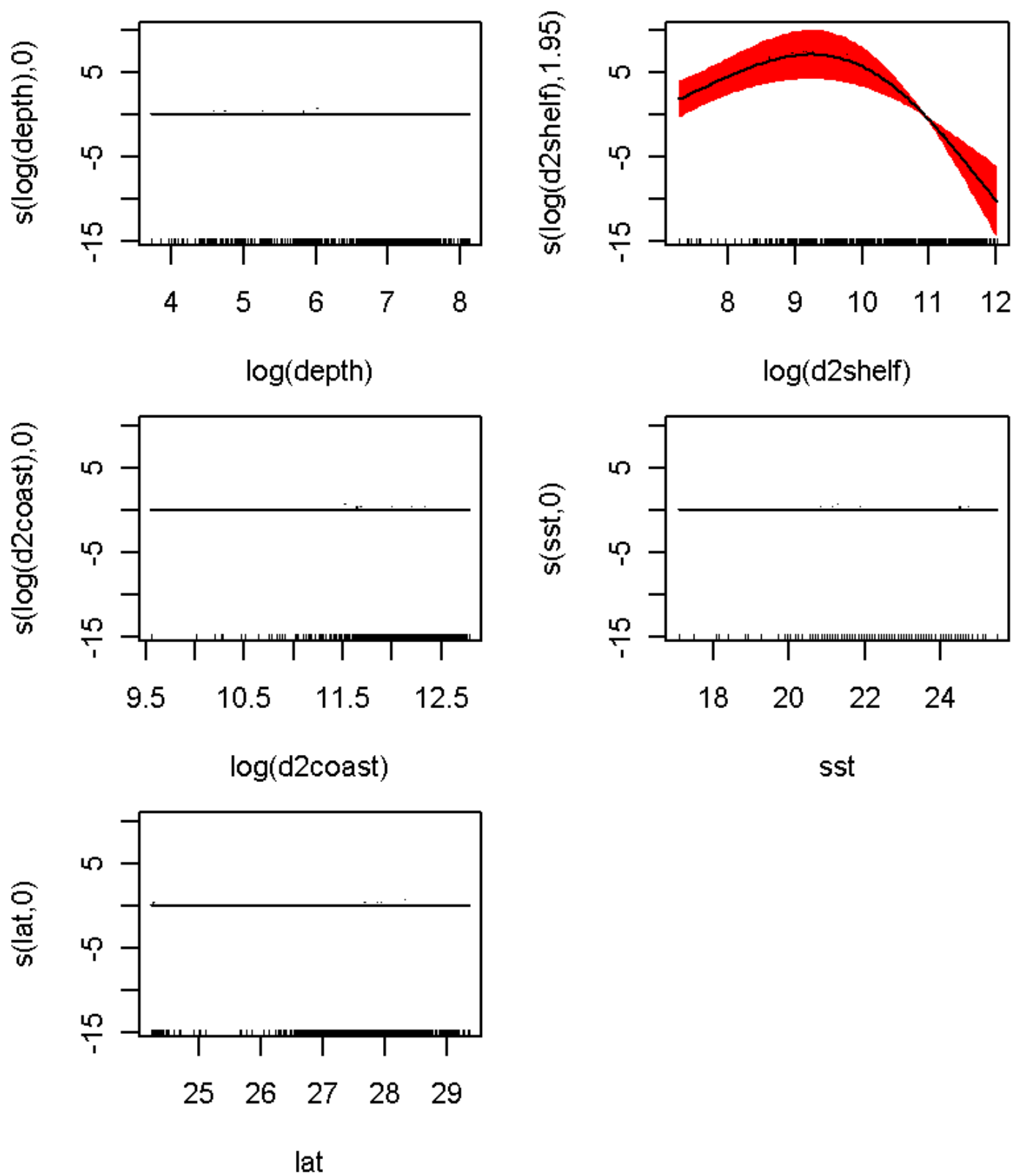


Figure 1100: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'winter' season in 'gomex2' region.

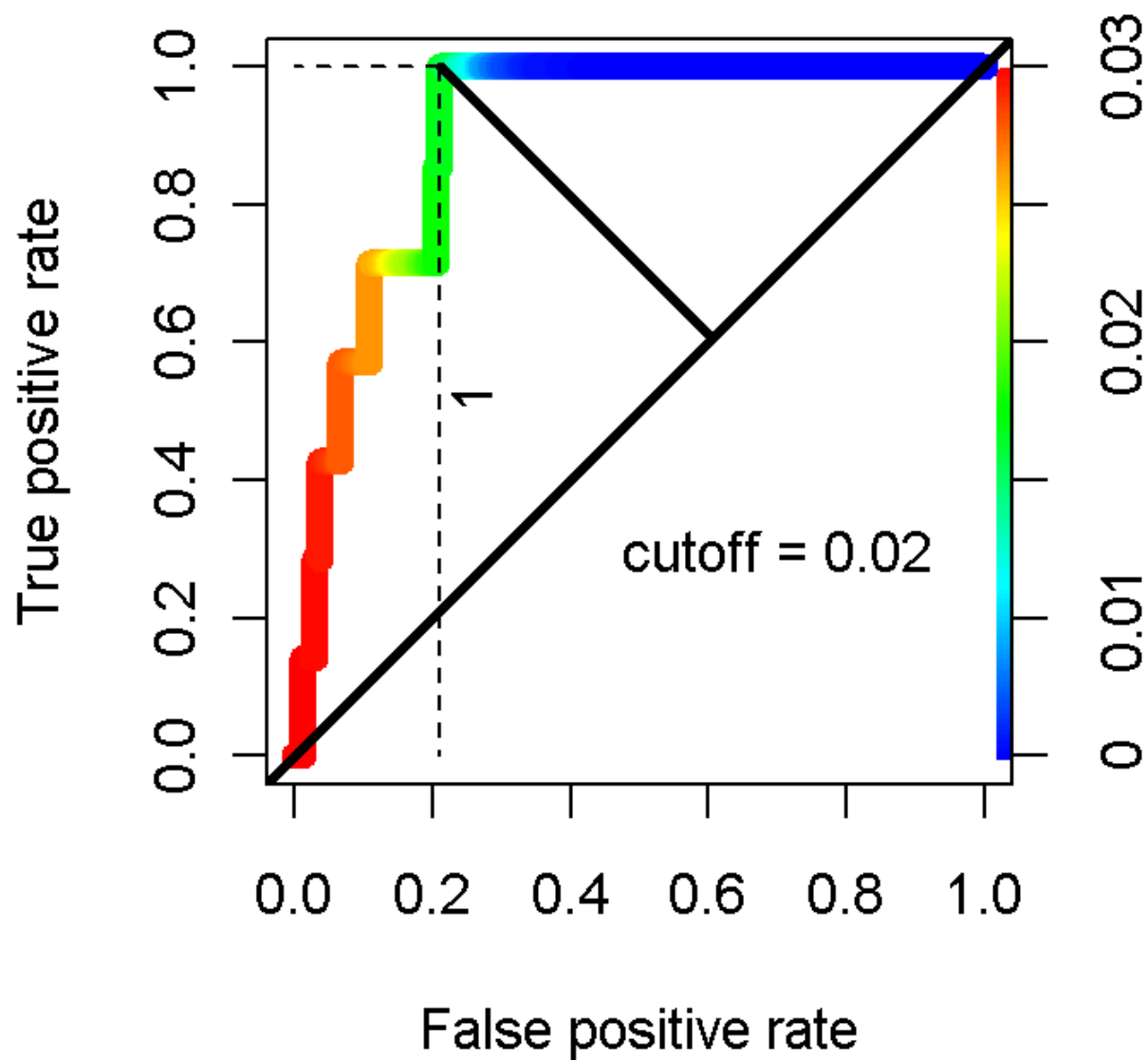


Figure 1101: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'winter' season in 'gomex2' region.

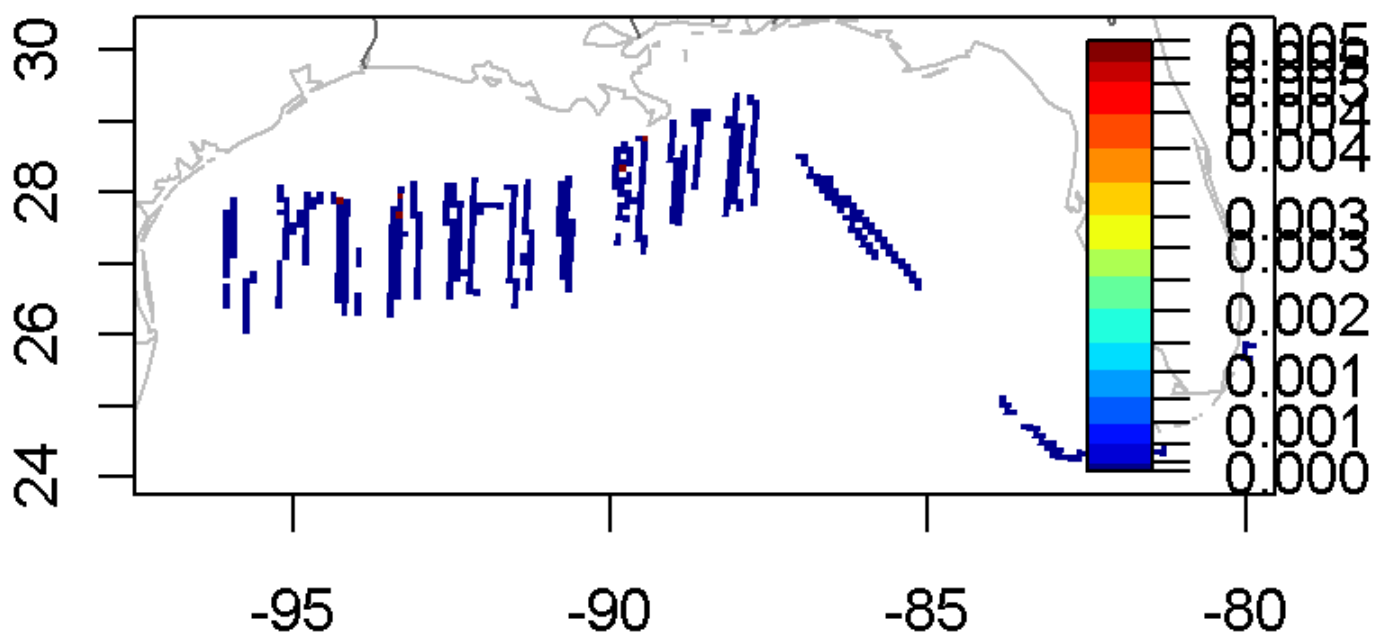


Figure 1102: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'winter' season in 'gomex2' region.

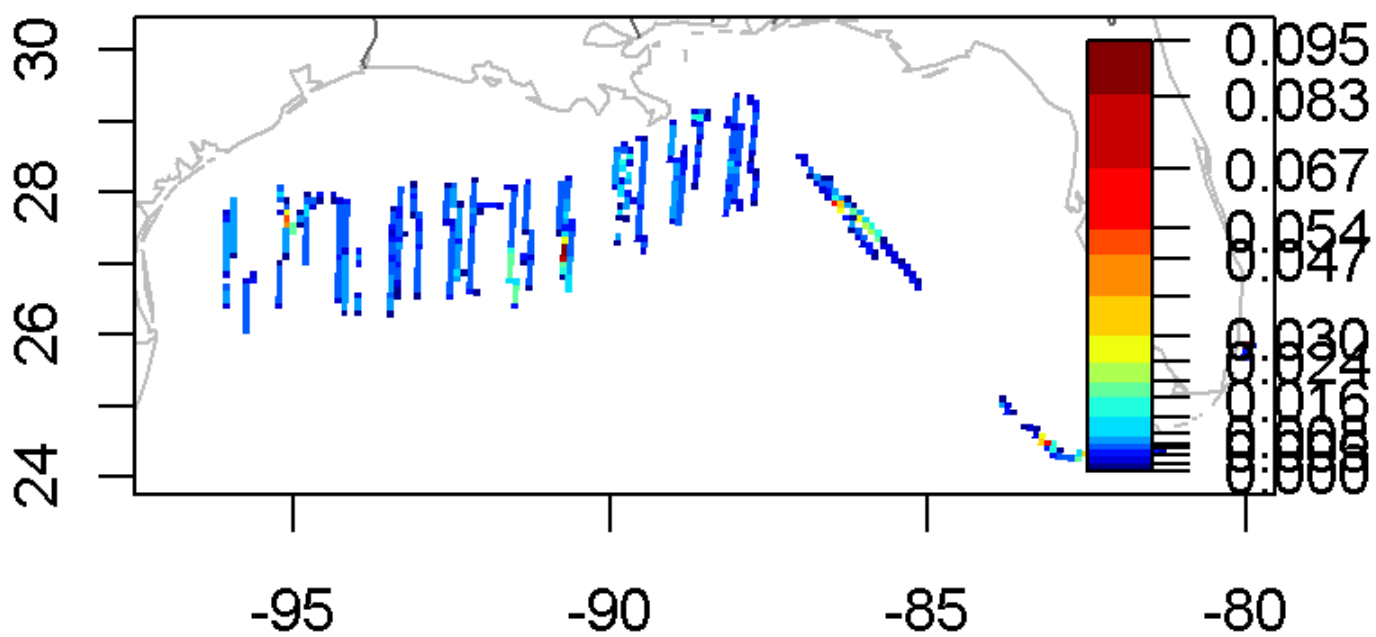


Figure 1103: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'winter' season in 'gomex2' region.

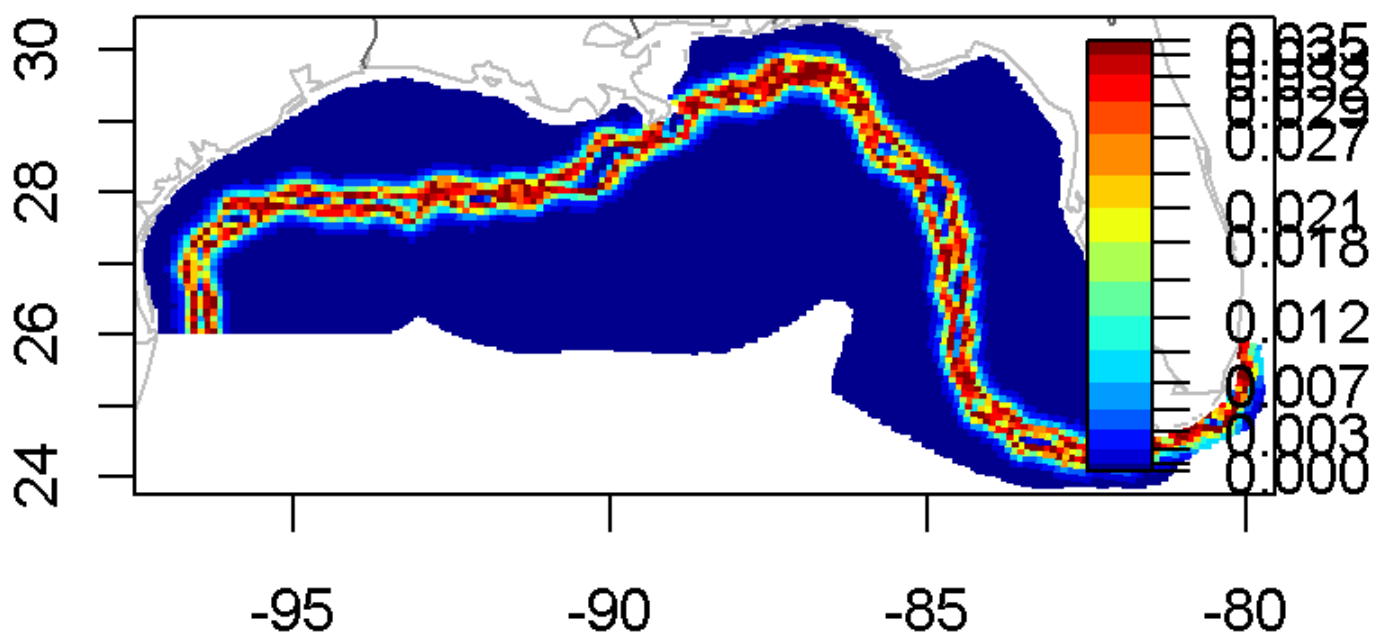


Figure 1104: Map of mean predicted habitat for 'Tursiops' guild during 'winter' season in 'gomex2' region.

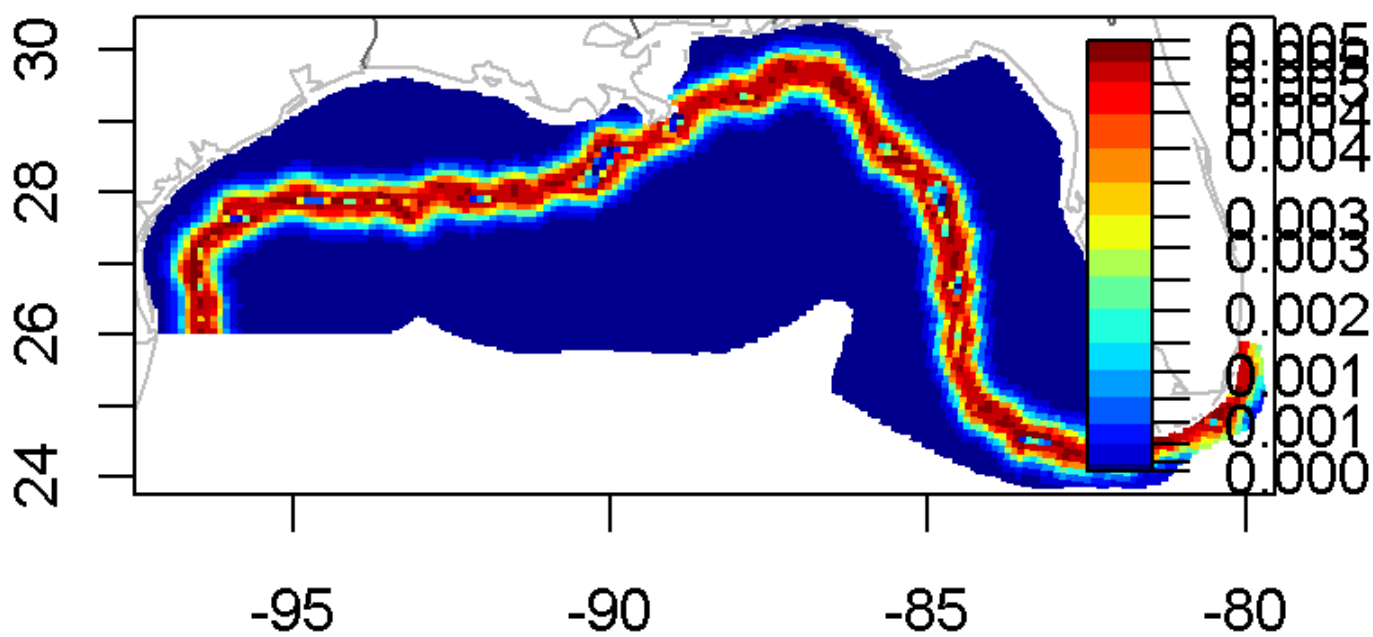


Figure 1105: Map of standard error of habitat for 'Tursiops' guild during 'winter' season in 'gomex2' region.

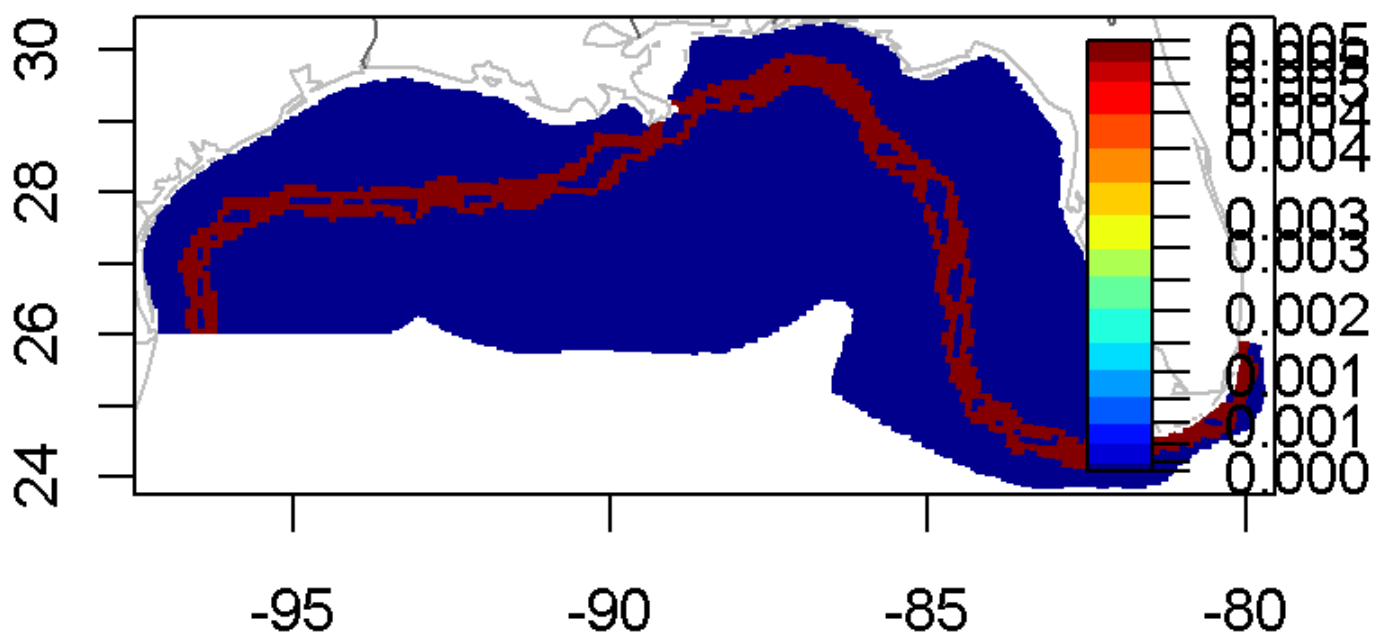


Figure 1106: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'winter' season in 'gomex2' region.

18.4.3 ne2

Modelrun identifier: duke_06_tu3_winter_ne2

Date generated: 2008-10-21 15:39:45

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 98: Summary for duke(6) GAM model: for 'Tursiops' guild during 'winter' season in 'ne2' region.

	Value
Number.presences	113
Number.absences	731
GAM.converged	TRUE
R.squared	0.768585
Deviance.explained	0.640351
ROC.optimum	0.98219
Maximum.fit	0.0315122
Maximum.prediction	1

Model text summary...

```
duke_06_tu3_winter_ne2 run on Tue Oct 21 15:39:15 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'winter', region:ne2

max.fit:0.982190, max.prediction:1.000000, ROC.optimum:0.031512

summary mdl)...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -20.995      2.954   -7.107 3.95e-12 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

Approximate significance of smooth terms:
              edf Ref.df      F    p-value
s(log(depth))  9.211e-01 1.4211    5.056  0.0143 *
s(log(d2shelf)) 1.968e+00 2.4681   38.930 < 2e-16 ***
s(log(d2coast)) 6.684e-05 0.5001  0.000224  0.9046
s(sst)         1.796e+00 2.2960   18.658 1.94e-09 ***
s(lat)         1.946e+00 2.4459   41.110 < 2e-16 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1 1

R-sq.(adj) =  0.769  Deviance explained =  64%
GCV score = 0.00074453  Scale est. = 0.00072511  n = 526

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:844  Min.   : 1654  Min.   : 6.00  Min.   : 995  Min.   : 9318  Min.   : 2.654  Min.   :34.89
      1st Qu.:11190  1st Qu.: 19.00  1st Qu.:11928  1st Qu.: 34115  1st Qu.: 9.432  1st Qu.:35.26
      Median :11366  Median : 26.00  Median :25238  Median : 51144  Median :12.352  Median :35.95
      Mean   : 9914  Mean   :109.81  Mean   :31647  Mean   : 52188  Mean   :12.363  Mean   :36.05
      3rd Qu.:11937  3rd Qu.: 36.25  3rd Qu.:47193  3rd Qu.: 66600  3rd Qu.:14.475  3rd Qu.:36.70
      Max.   :12763  Max.   :2669.00  Max.   :93447  Max.   :129399  Max.   :23.366  Max.   :38.20
      NA's   :318.000

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
ne2:5685  Min.   : 1633  Min.   : 6  Min.   : 5  Min.   : 1259  Min.   : 2.400  Min.   :34.27
      1st Qu.:12297  1st Qu.: 84  1st Qu.: 33503  1st Qu.: 94835  1st Qu.: 6.375  1st Qu.:37.36
```


Median :13718	Median :1827	Median : 78620	Median :188836	Median :10.575	Median :39.16
Mean :13277	Mean :1832	Mean :102648	Mean :201021	Mean :11.696	Mean :39.20
3rd Qu.:15139	3rd Qu.:3517	3rd Qu.:154146	3rd Qu.:299808	3rd Qu.:15.375	3rd Qu.:40.92
Max. :16560	Max. :4752	Max. :354376	Max. :478082	Max. :22.500	Max. :44.74
		NA's : 2	NA's : 2		

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1633  Min.   :2.220e-16  Min.   :8.455e-16  Min.   : 0.0000  Min.   :5.125e-06  Min.   :0.0000
1st Qu.:12297  1st Qu.:2.220e-16  1st Qu.:5.042e-15  1st Qu.: 0.0000  1st Qu.:1.867e-03  1st Qu.:0.0000
Median :13718  Median :2.220e-16  Median :8.804e-15  Median : 0.0000  Median :4.908e-03  Median :0.0000
Mean   :13277  Mean   :1.219e-01  Mean   :5.781e-03  Mean   : 0.4514  Mean   :1.109e-02  Mean   :0.1402
3rd Qu.:15139  3rd Qu.:2.220e-16  3rd Qu.:1.528e-14  3rd Qu.: 0.0000  3rd Qu.:8.013e-03  3rd Qu.:0.0000
Max.   :16560  Max.   :1.000e+00  Max.   :5.486e-01  Max.   : 8.0000  Max.   :1.914e-01  Max.   :1.0000
      NA's :2.000e+00  NA's :2.000e+00  NA's :5428.0000  NA's :5.428e+03
```

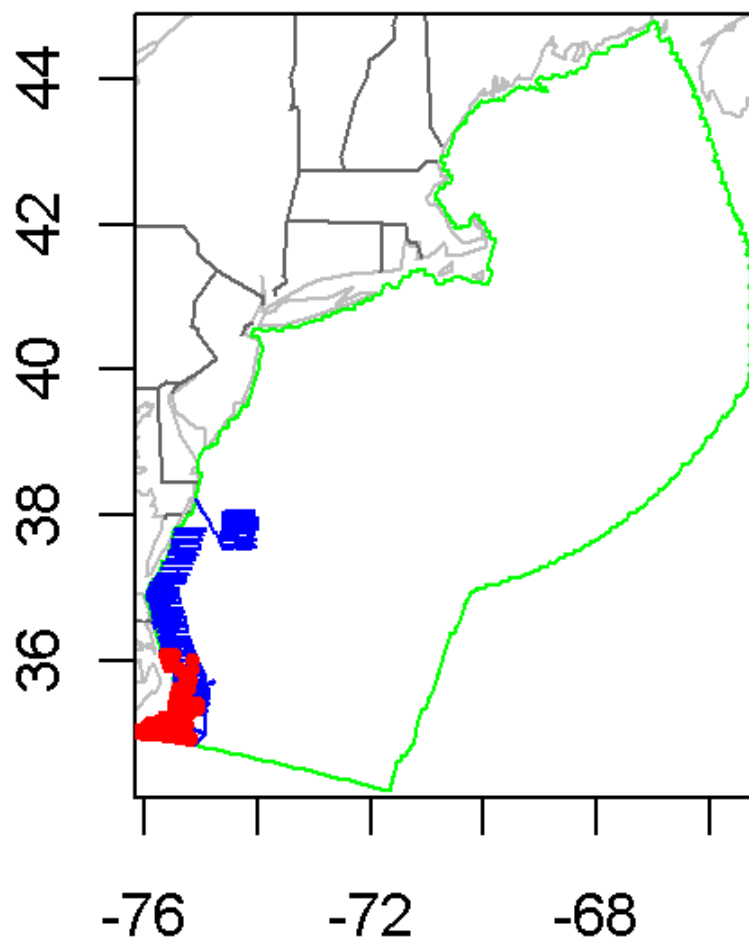


Figure 1107: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'winter' season in 'ne2' region.

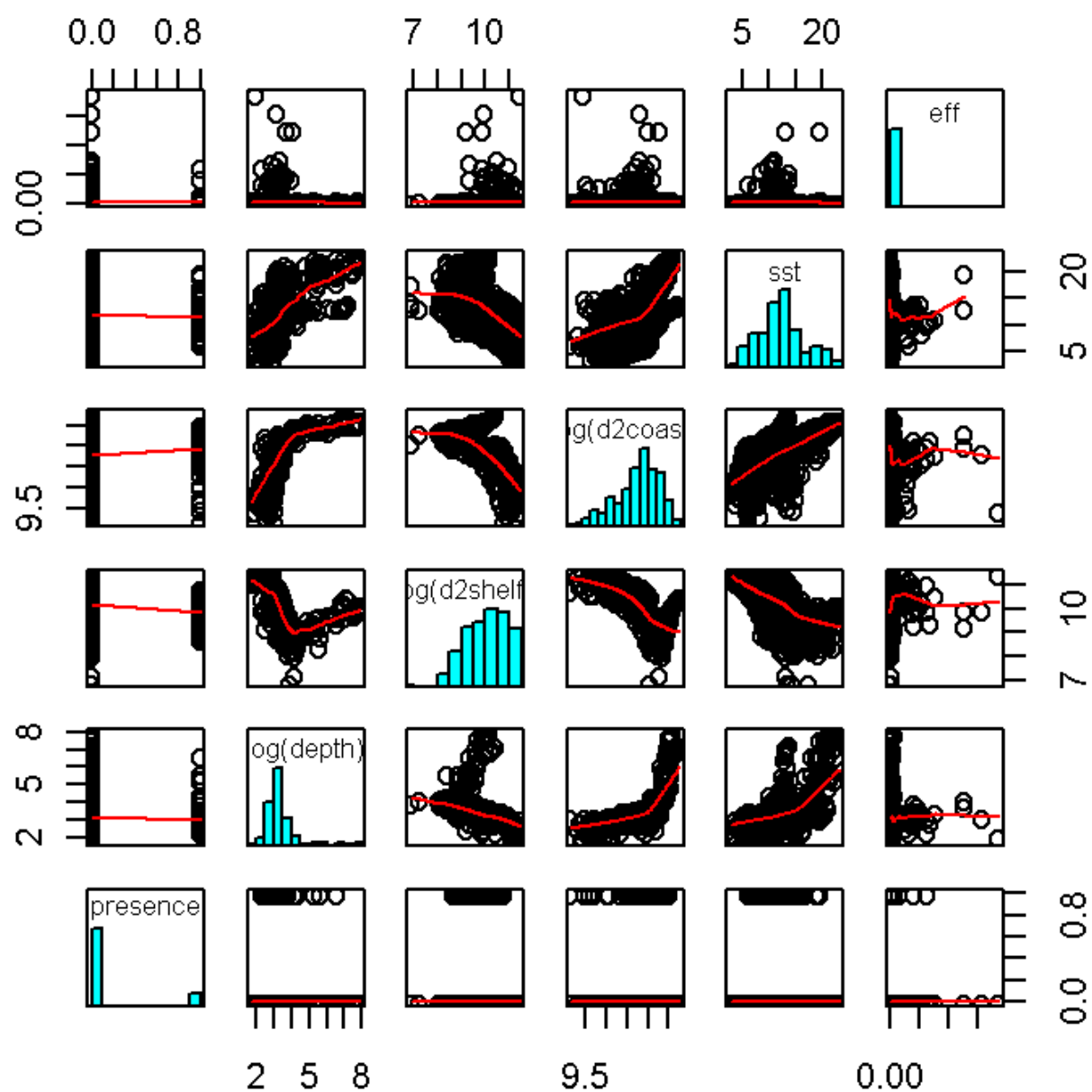


Figure 1108: Pairs plot of input variables for 'Tursiops' guild during 'winter' season in 'ne2' region.

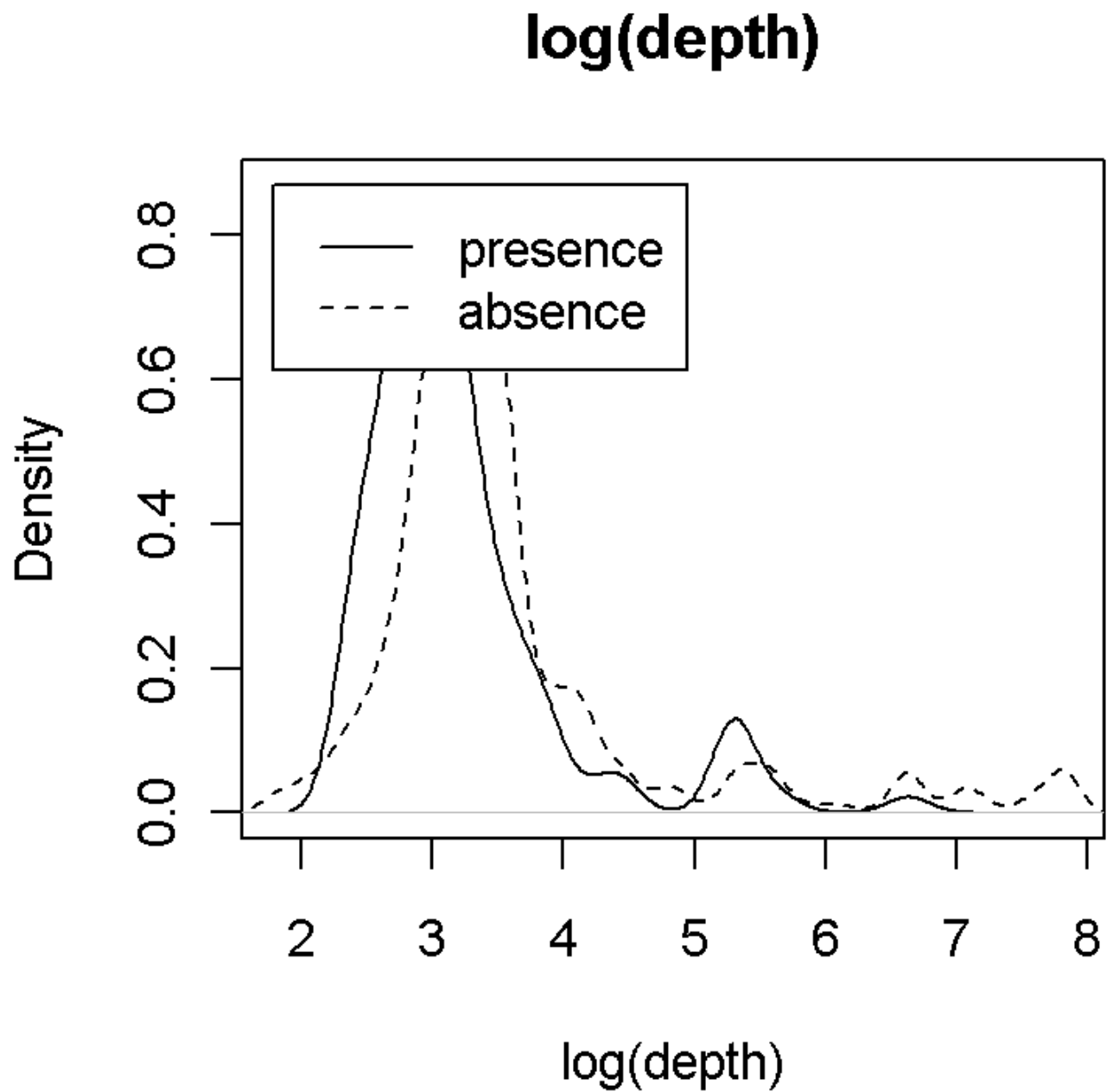


Figure 1109: Density histogram of depth log(meters) for 'Tursiops' guild during 'winter' season in 'ne2' region.

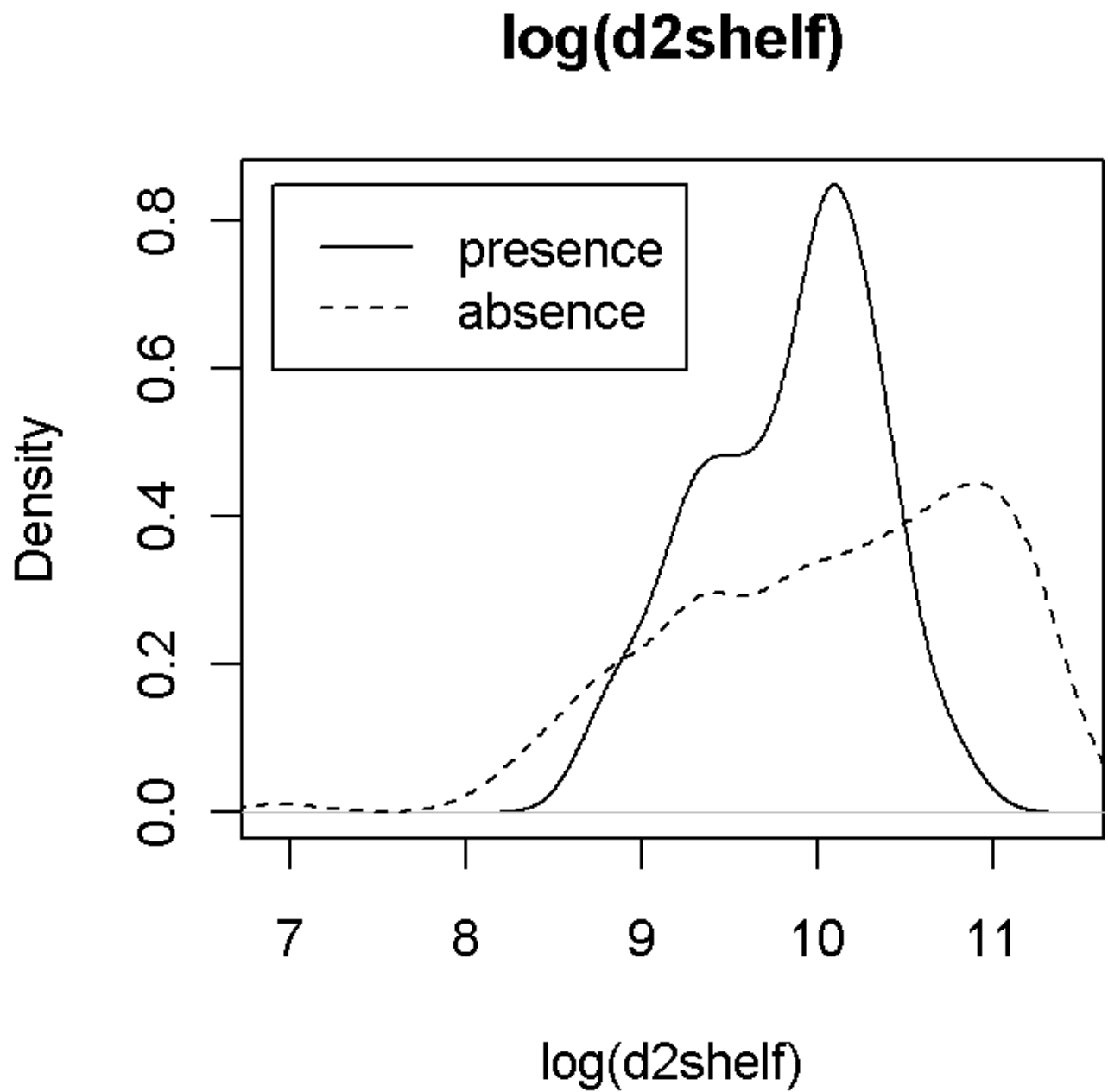


Figure 1110: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'winter' season in 'ne2' region.

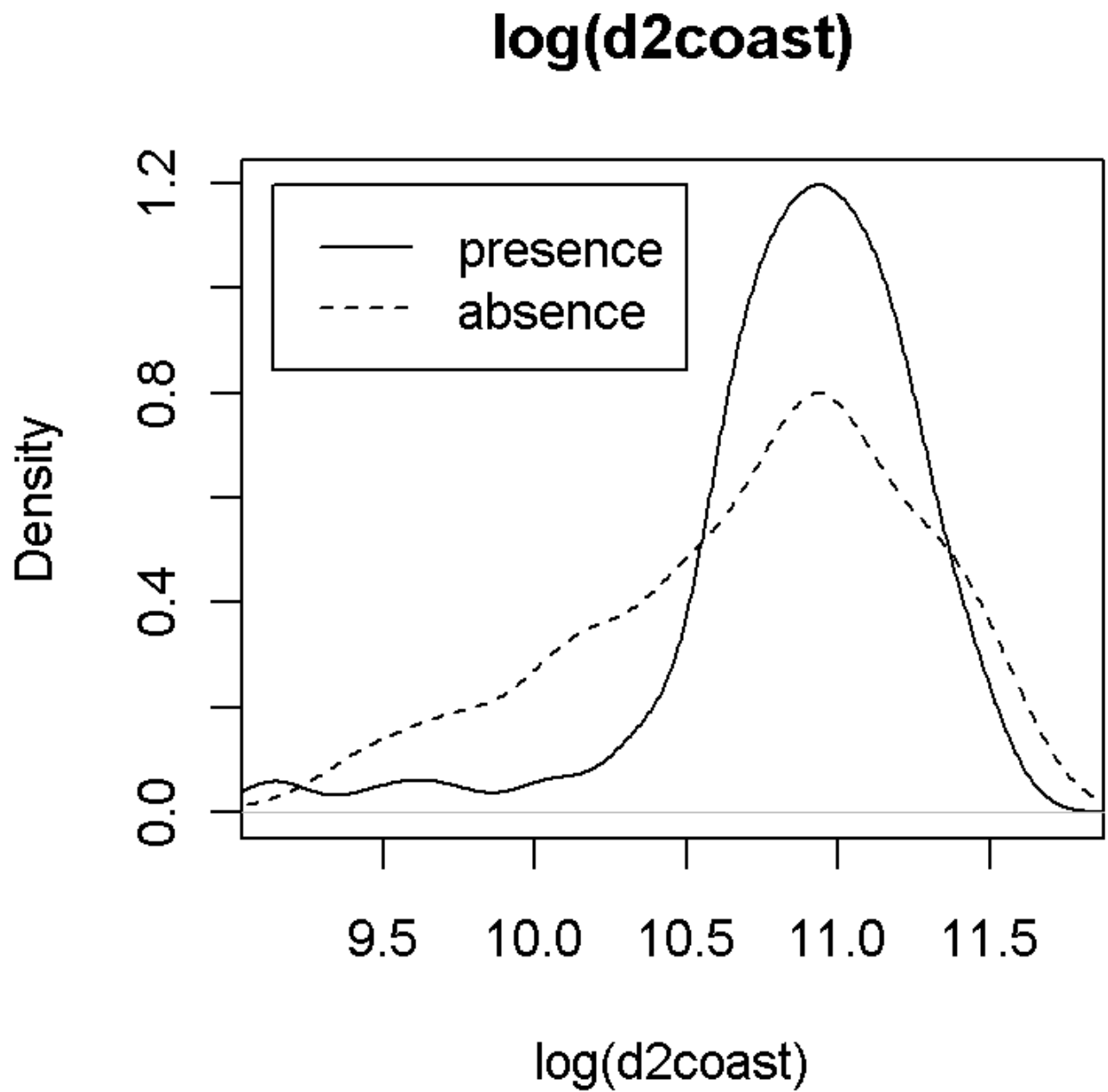


Figure 1111: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'winter' season in 'ne2' region.

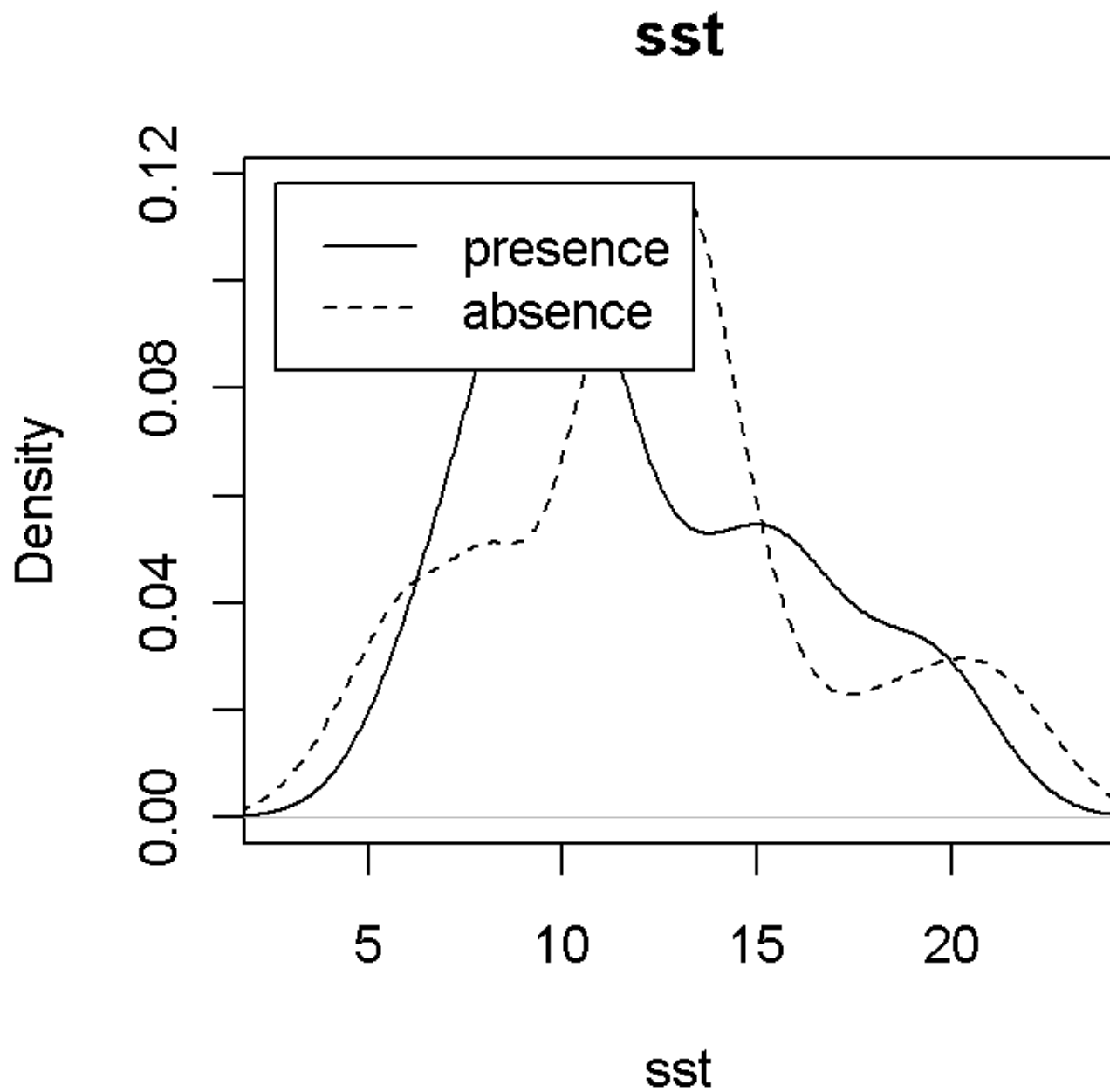


Figure 1112: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'winter' season in 'ne2' region.

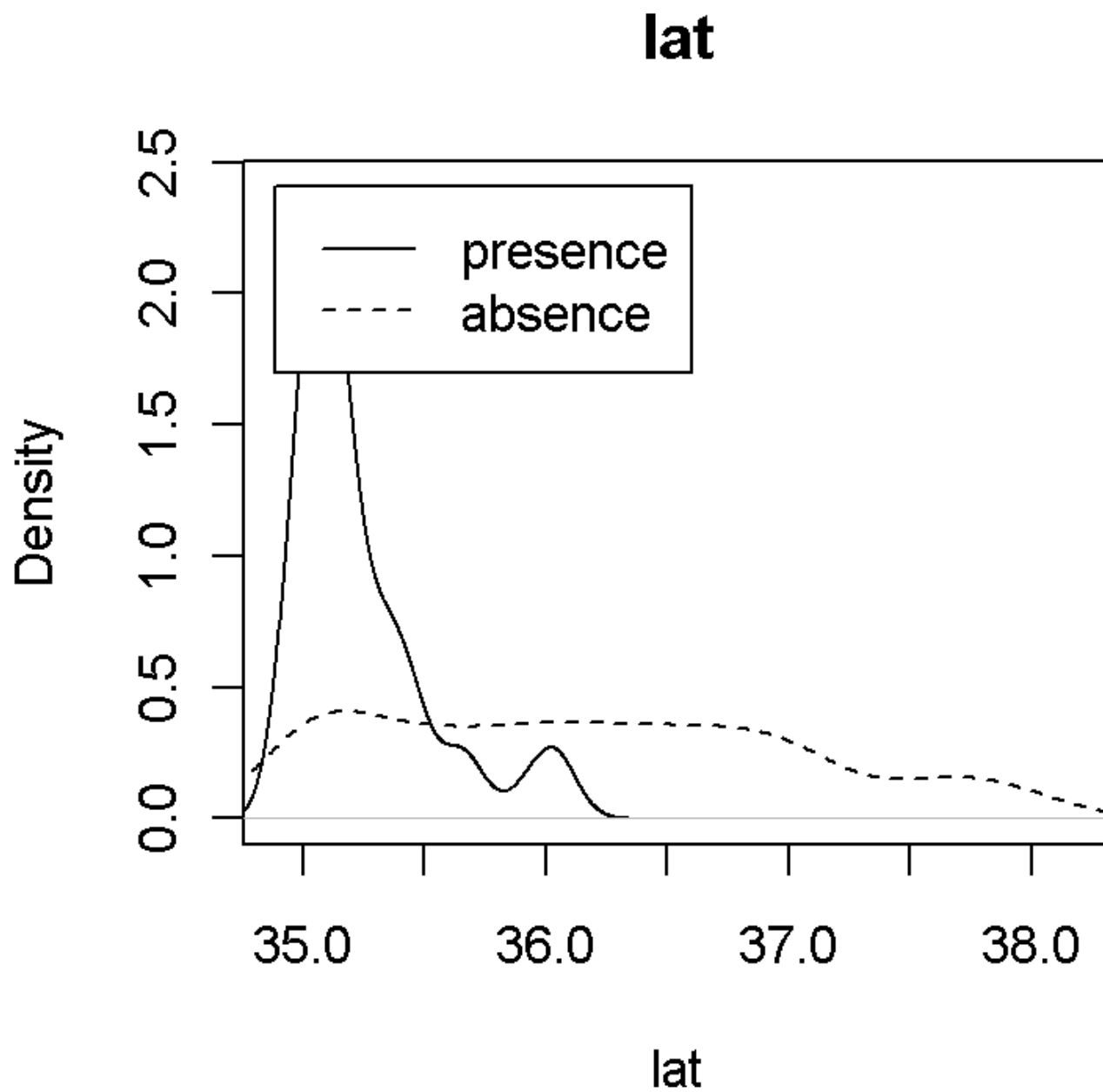


Figure 1113: Density histogram of latitude (degrees) for 'Tursiops' guild during 'winter' season in 'ne2' region.

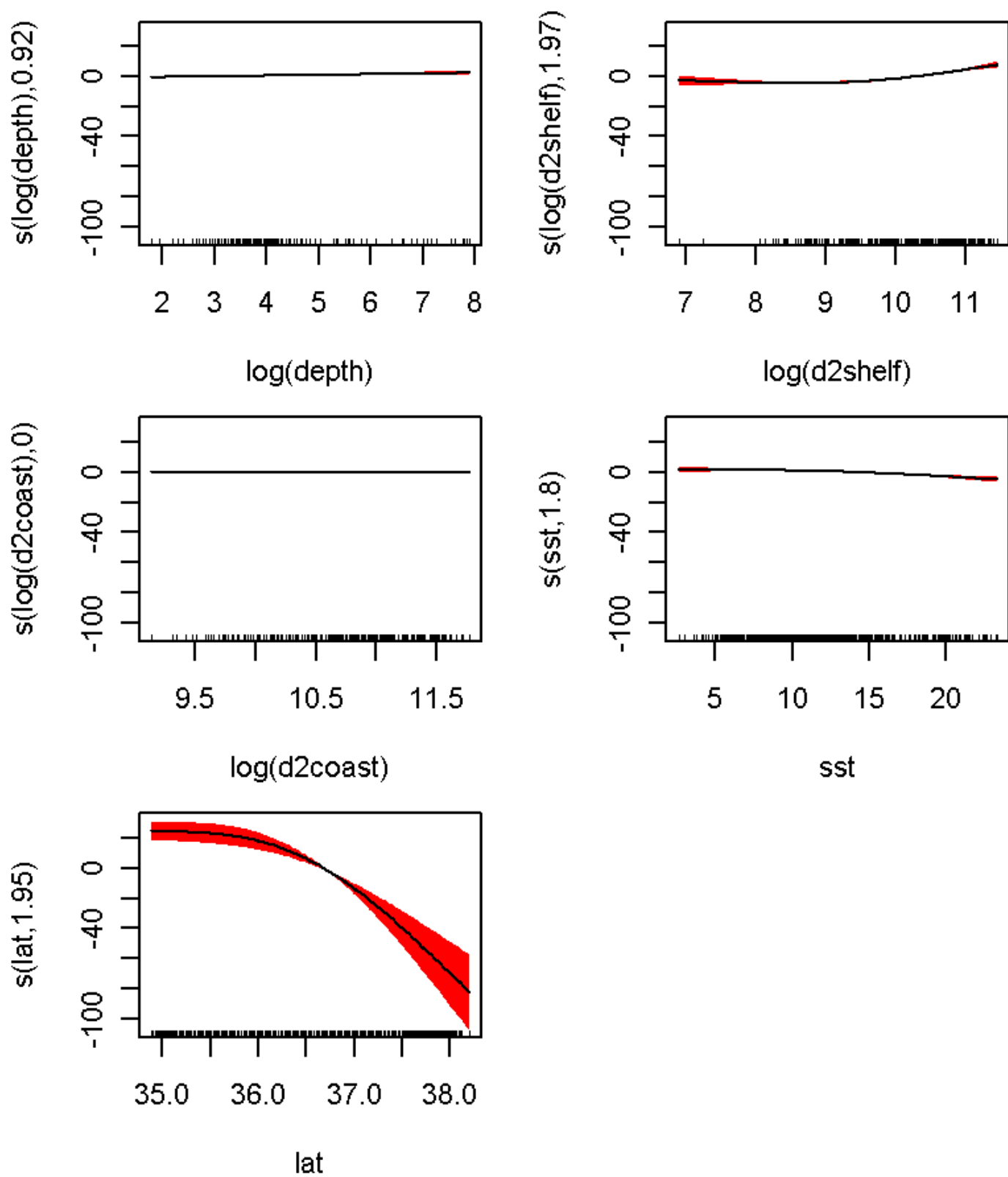


Figure 1114: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'winter' season in 'ne2' region.

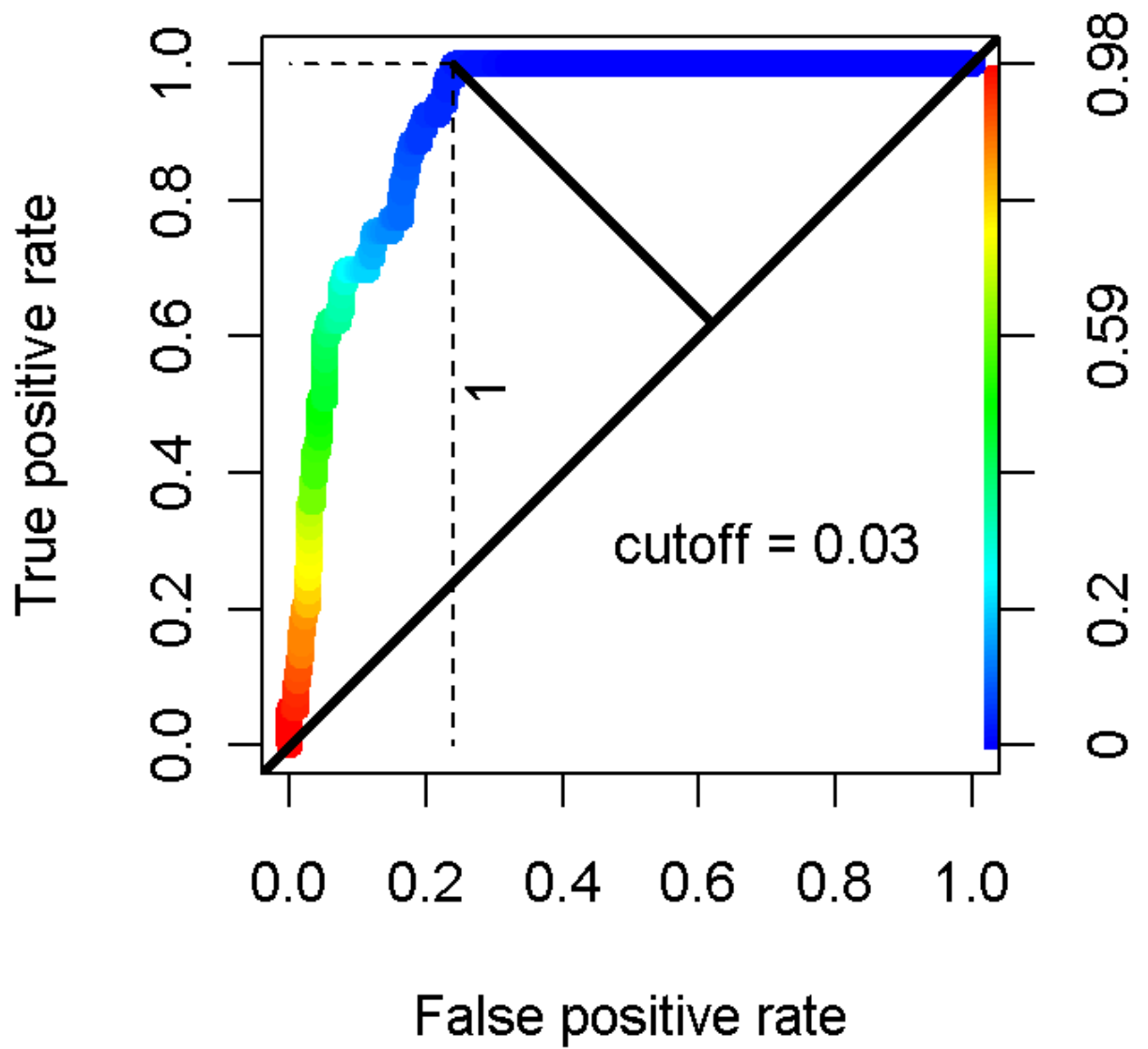


Figure 1115: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'winter' season in 'ne2' region.

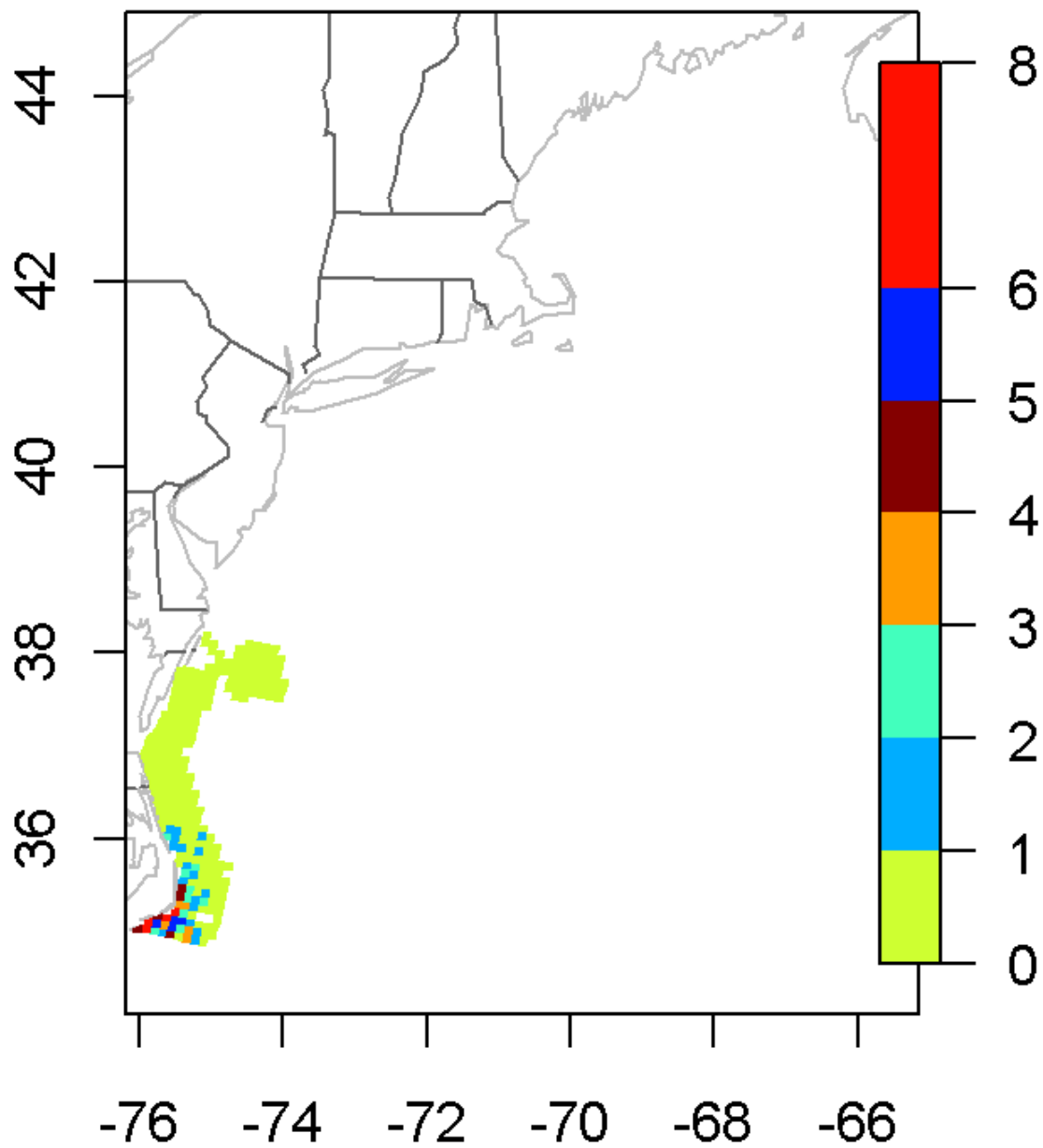


Figure 1116: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'winter' season in 'ne2' region.

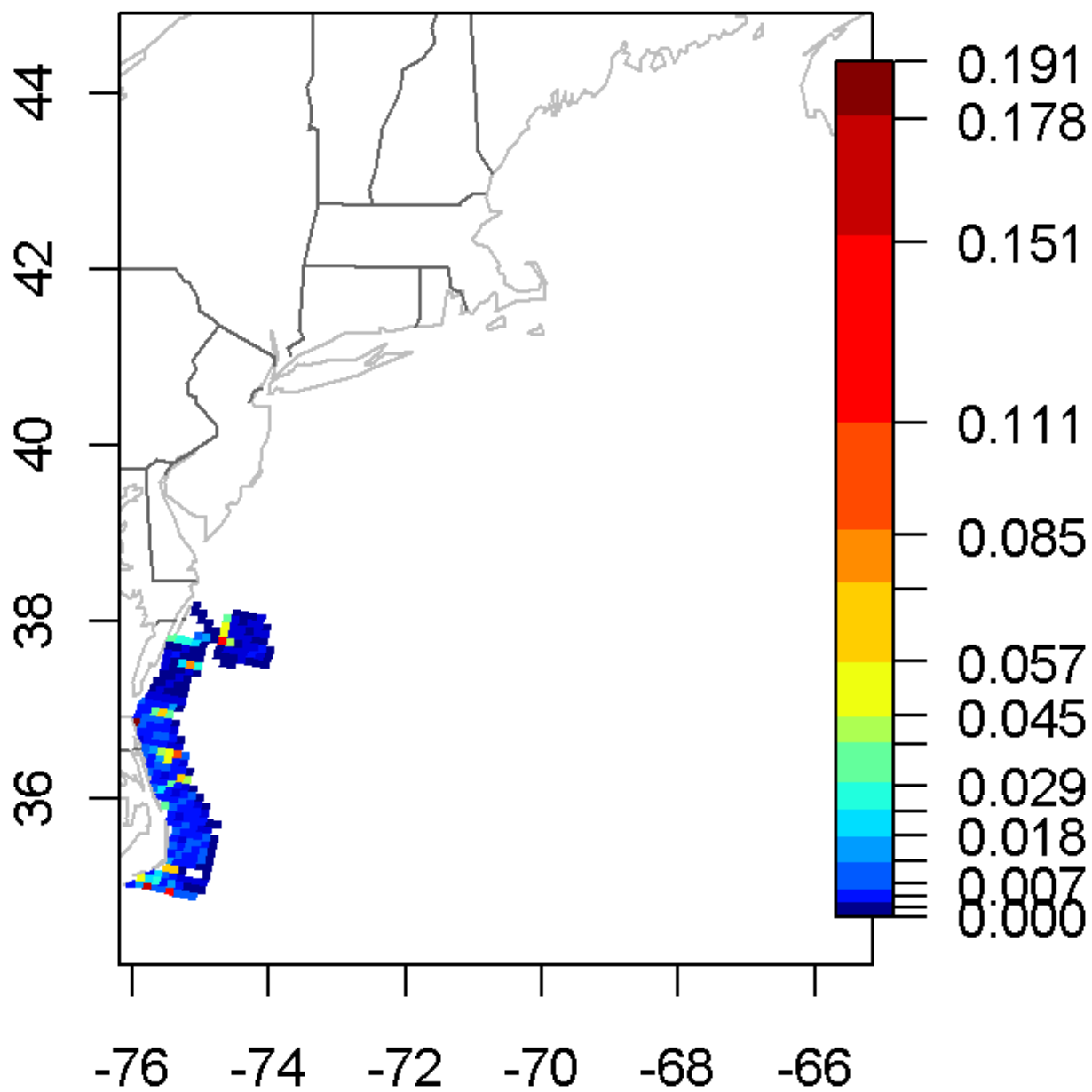


Figure 1117: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'winter' season in 'ne2' region.

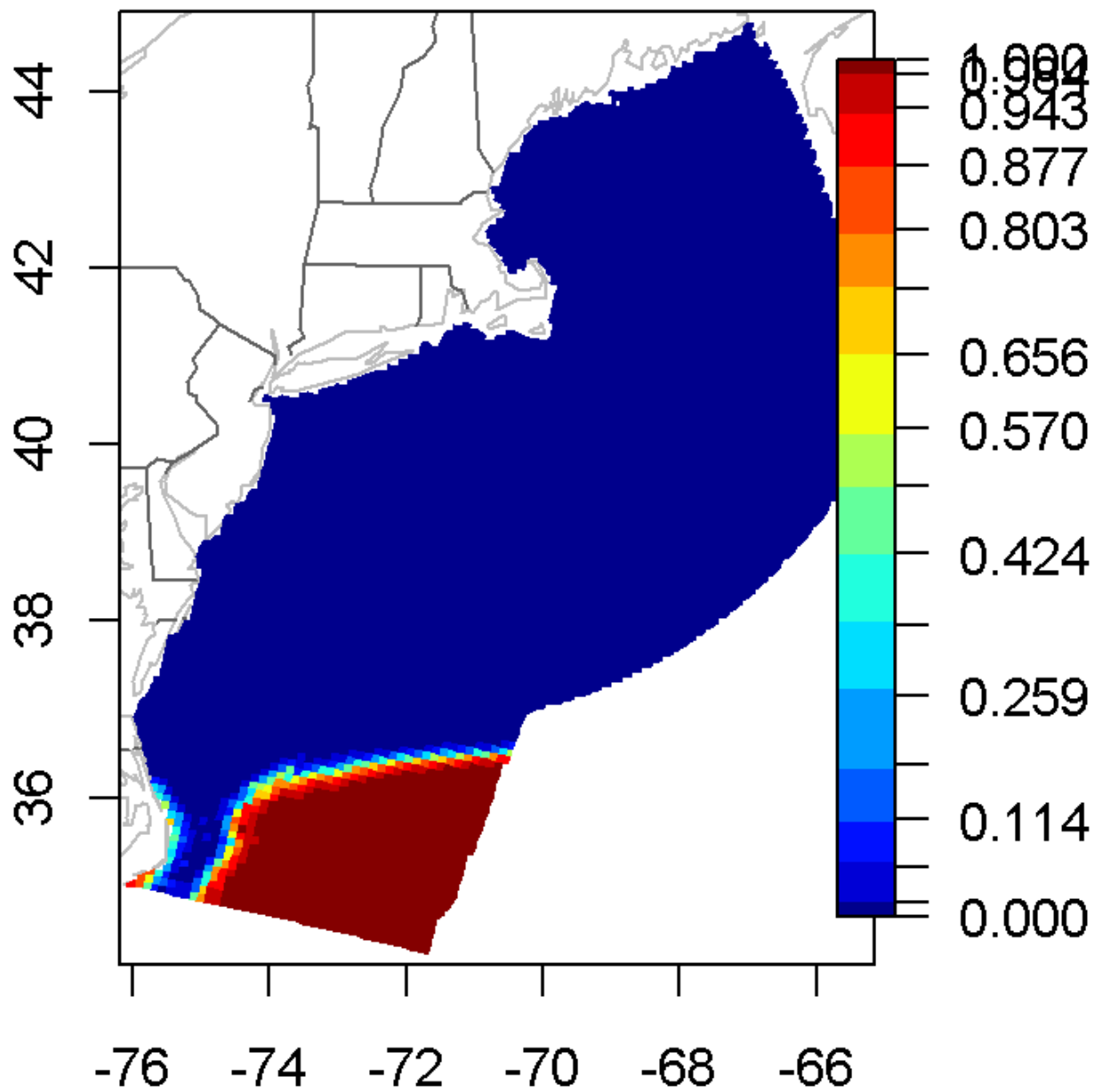


Figure 1118: Map of mean predicted habitat for 'Tursiops' guild during 'winter' season in 'ne2' region.

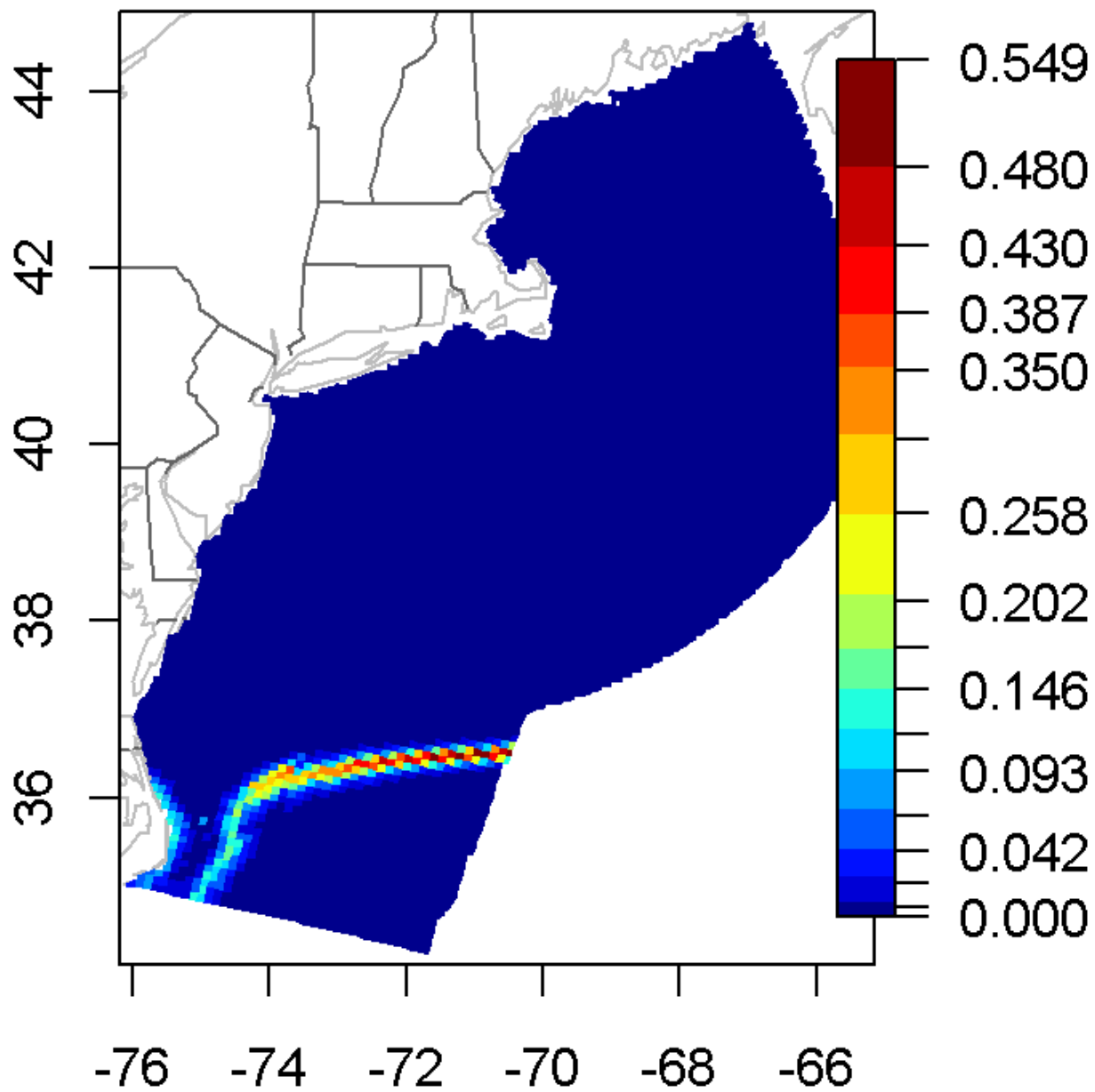


Figure 1119: Map of standard error of habitat for 'Tursiops' guild during 'winter' season in 'ne2' region.

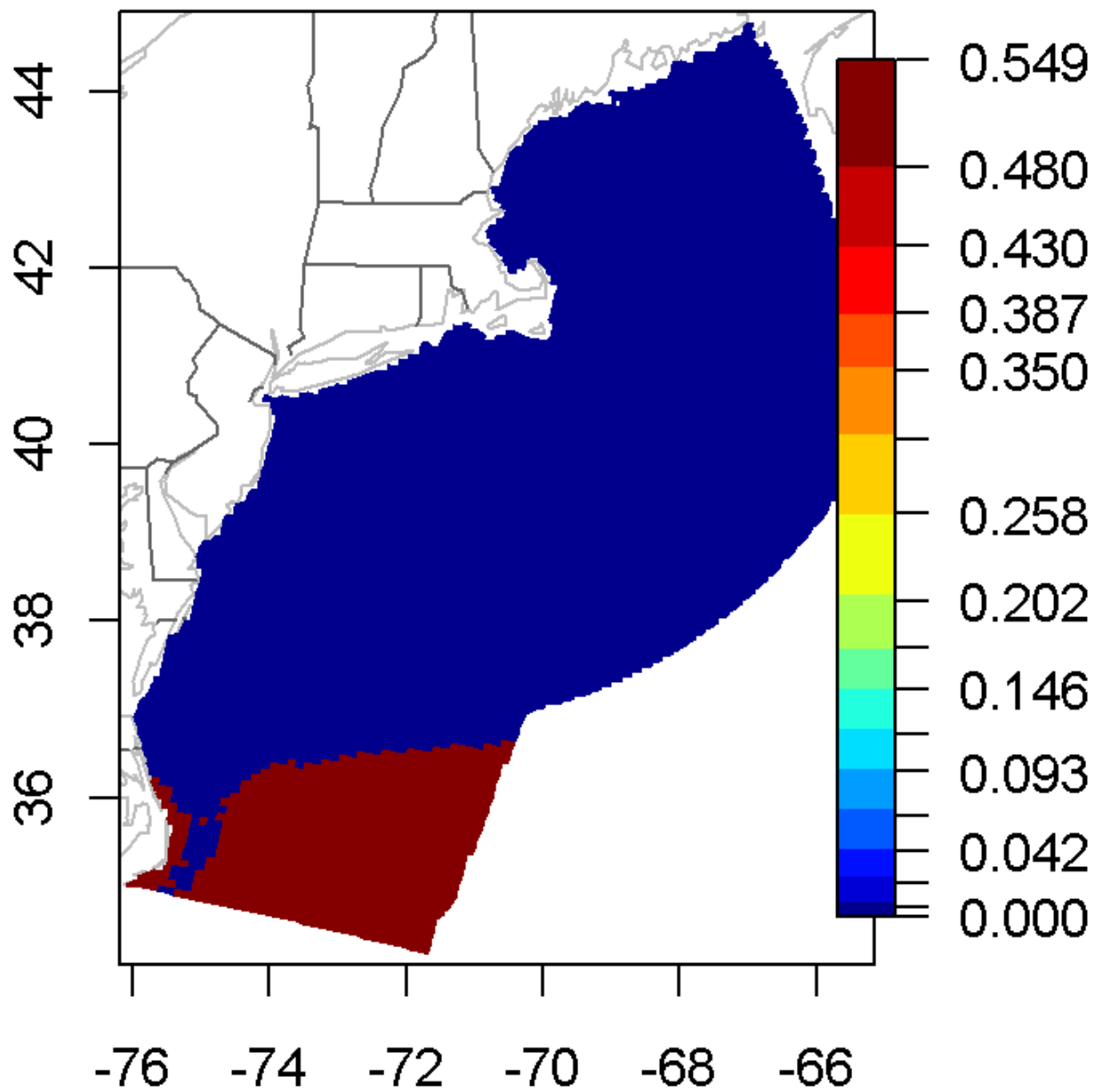


Figure 1120: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'winter' season in 'ne2' region.

18.4.4 se2

Modelrun identifier: duke_06_tu3_winter_se2

Date generated: 2008-10-21 15:50:43

Code version: \$Id: mdb2gam.r 282 2008-10-14 06:57:07Z bbest \$

Table 99: Summary for duke(6) GAM model: for 'Tursiops' guild during 'winter' season in 'se2' region.

	Value
Number.presences	478
Number.absences	2580
GAM.converged	TRUE
R.squared	0.408352
Deviance.explained	0.144186
ROC.optimum	0.720022
Maximum.fit	0.258801
Maximum.prediction	0.900581

Model text summary...

```
duke_06_tu3_winter_se2 run on Tue Oct 21 15:49:47 2008
provider:duke, version:06, guild:Tursiops (tu3), season:'winter', region:se2

max.fit:0.720022, max.prediction:0.900581, ROC.optimum:0.258801

summary mdl...

Family: quasibinomial
Link function: logit

Formula:
presence ~ s(log(depth), k = 3, bs = "ts") + s(log(d2shelf),
  k = 3, bs = "ts") + s(log(d2coast), k = 3, bs = "ts") + s(sst,
  k = 3, bs = "ts") + s(lat, k = 3, bs = "ts")

Parametric coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.73701    0.06621  -26.23   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Approximate significance of smooth terms:
              edf Ref.df    F p-value
s(log(depth))  1.997e+00  2.4974  57.376 < 2e-16 ***
s(log(d2shelf)) 3.675e-04  0.5004  1.17e-04  0.91907
s(log(d2coast)) 5.947e-06  0.5000  4.35e-07  0.97997
s(sst)         8.836e-01  1.3836   7.418  0.00263 **
s(lat)         8.041e-06  0.5000  1.69e-05  0.95000
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) =  0.408   Deviance explained = 14.4%
GCV score = 0.0027303   Scale est. = 0.0027197   n = 1811

summary(dat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
se2:3058   Min.    : 1695   Min.    :  4.0   Min.    : 1395   Min.    : 1471   Min.    :  8.62   Min.    :25.93
           1st Qu.: 9179   1st Qu.: 19.0   1st Qu.: 21145   1st Qu.: 31844   1st Qu.: 17.17   1st Qu.:32.20
           Median :10367   Median : 29.0   Median : 42948   Median : 54317   Median : 20.17   Median :33.70
           Mean   : 9354   Mean   :165.1   Mean   : 48250   Mean   : 66710   Mean   : 19.30   Mean   :33.00
           3rd Qu.:10752   3rd Qu.: 42.0   3rd Qu.: 68977   3rd Qu.: 83359   3rd Qu.: 22.64   3rd Qu.:34.30
           Max.    :11154   Max.    :3612.0   Max.    :274566   Max.    :348168   Max.    : 26.40   Max.    :34.95
                        NA's      : 14      NA's      : 14      NA's      :1243.00

summary(newdat)...
region      fid_c10      depth      d2shelf      d2coast      sst      lat
se2:4203   Min.    : 1695   Min.    :  4.0   Min.    :  589   Min.    : 1471   Min.    :16.05   Min.    :25.91
           1st Qu.: 7760   1st Qu.:183.5   1st Qu.: 34886   1st Qu.: 82859   1st Qu.:21.15   1st Qu.:29.60
```


Median : 9083	Median : 812.0	Median : 86547	Median :167727	Median :22.65	Median :31.59
Mean : 8321	Mean :1482.5	Mean :110466	Mean :177806	Mean :22.45	Mean :31.28
3rd Qu.:10134	3rd Qu.:2729.5	3rd Qu.:177072	3rd Qu.:262857	3rd Qu.:23.85	3rd Qu.:33.06
Max. :11184	Max. :5300.0	Max. :331253	Max. :422789	Max. :25.65	Max. :34.95
		NA's : 3	NA's : 3	NA's : 1.00	

```
summary(pred)...
  fid_c10      fit      se.fit      presence      effort      roc
Min.   : 1695  Min.   :0.03004  Min.   :0.004749  Min.   : 0.0000  Min.   :9.035e-07  Min.   :0.0000
1st Qu.: 7760  1st Qu.:0.03808  1st Qu.:0.005306  1st Qu.: 0.0000  1st Qu.:6.477e-04  1st Qu.:0.0000
Median : 9083  Median :0.05642  Median :0.011566  Median : 0.0000  Median :2.914e-03  Median :0.0000
Mean   : 8321  Mean   :0.11366  Mean   :0.013827  Mean   : 0.4129  Mean   :9.544e-03  Mean   :0.1340
3rd Qu.:10134 3rd Qu.:0.07318  3rd Qu.:0.019947  3rd Qu.: 0.0000  3rd Qu.:1.145e-02  3rd Qu.:0.0000
Max.   :11184  Max.   :0.90058  Max.   :0.059518  Max.   : 8.0000  Max.   :2.547e-01  Max.   :1.0000
      NA's :4.00000  NA's :4.000000  NA's :3026.0000  NA's : 3.026e+03
```

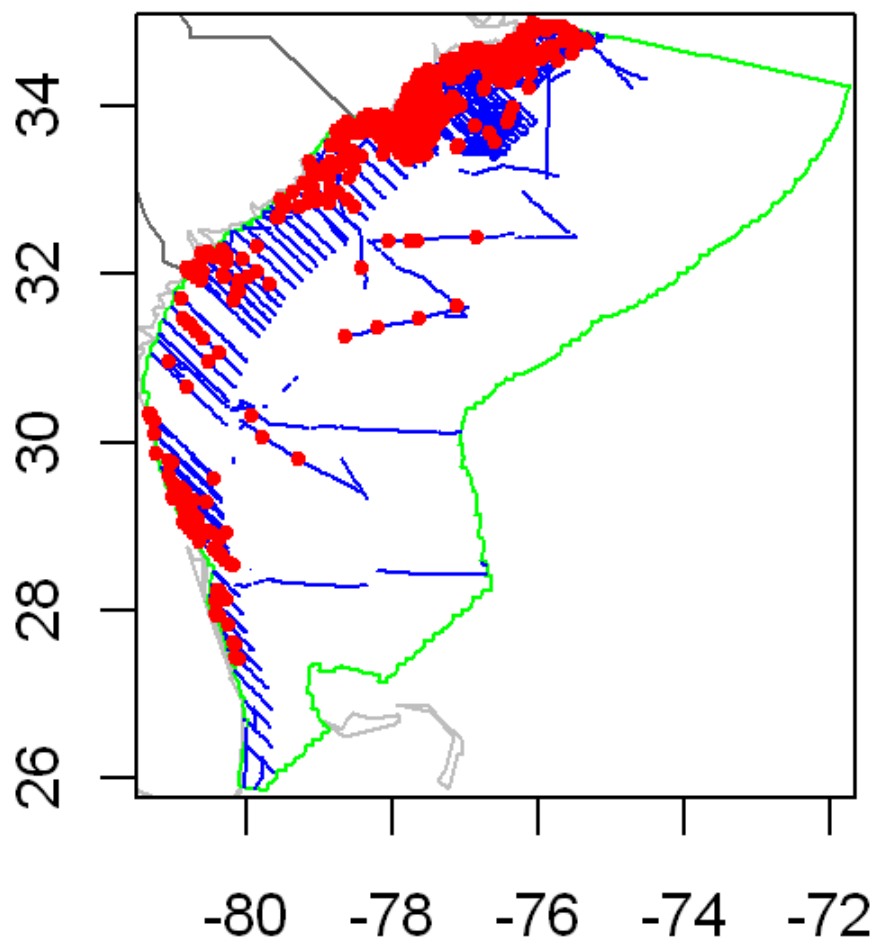


Figure 1121: Map of points of observational sightings and tracks of survey effort for 'Tursiops' guild during 'winter' season in 'se2' region.

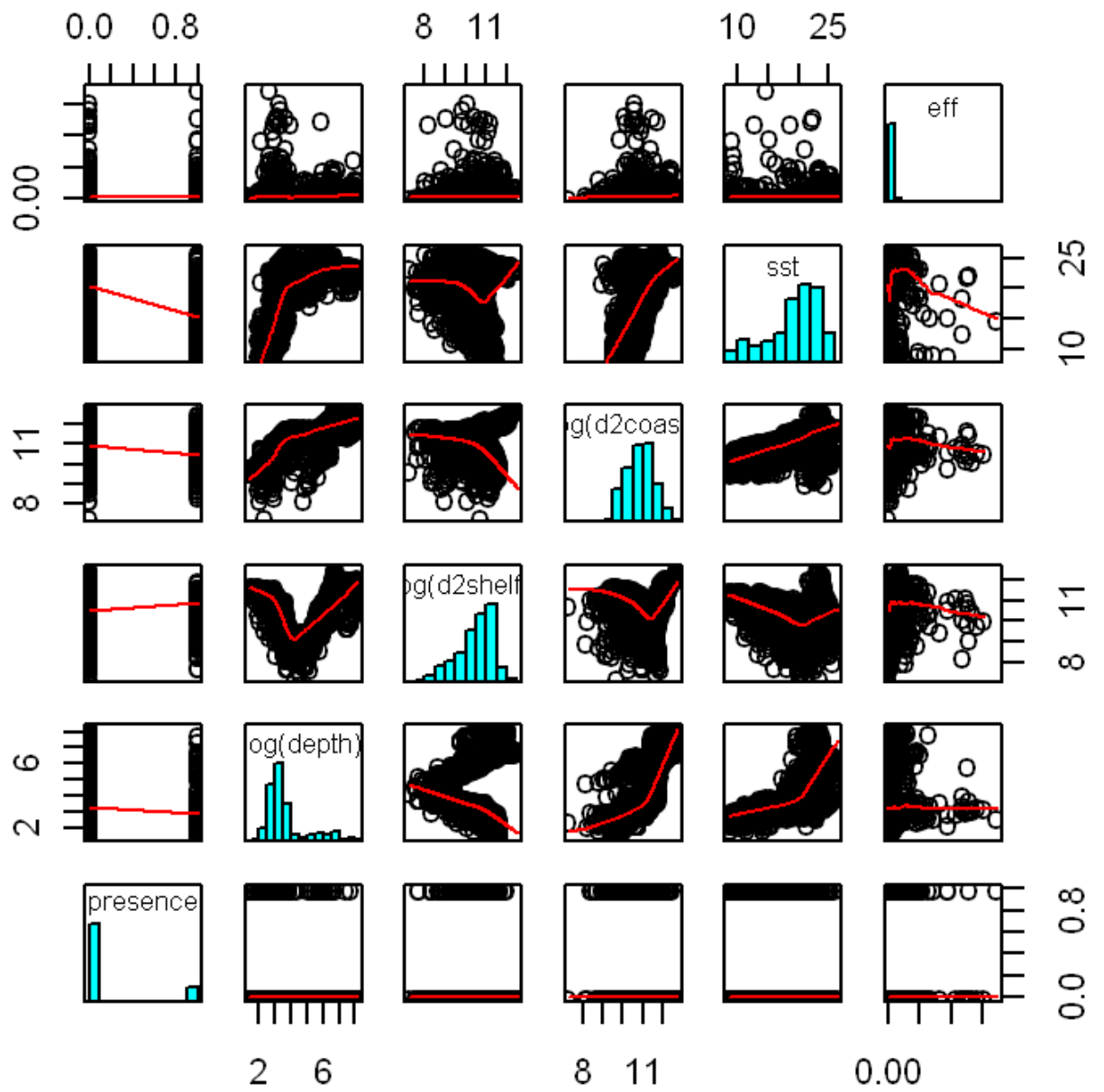


Figure 1122: Pairs plot of input variables for 'Tursiops' guild during 'winter' season in 'se2' region.

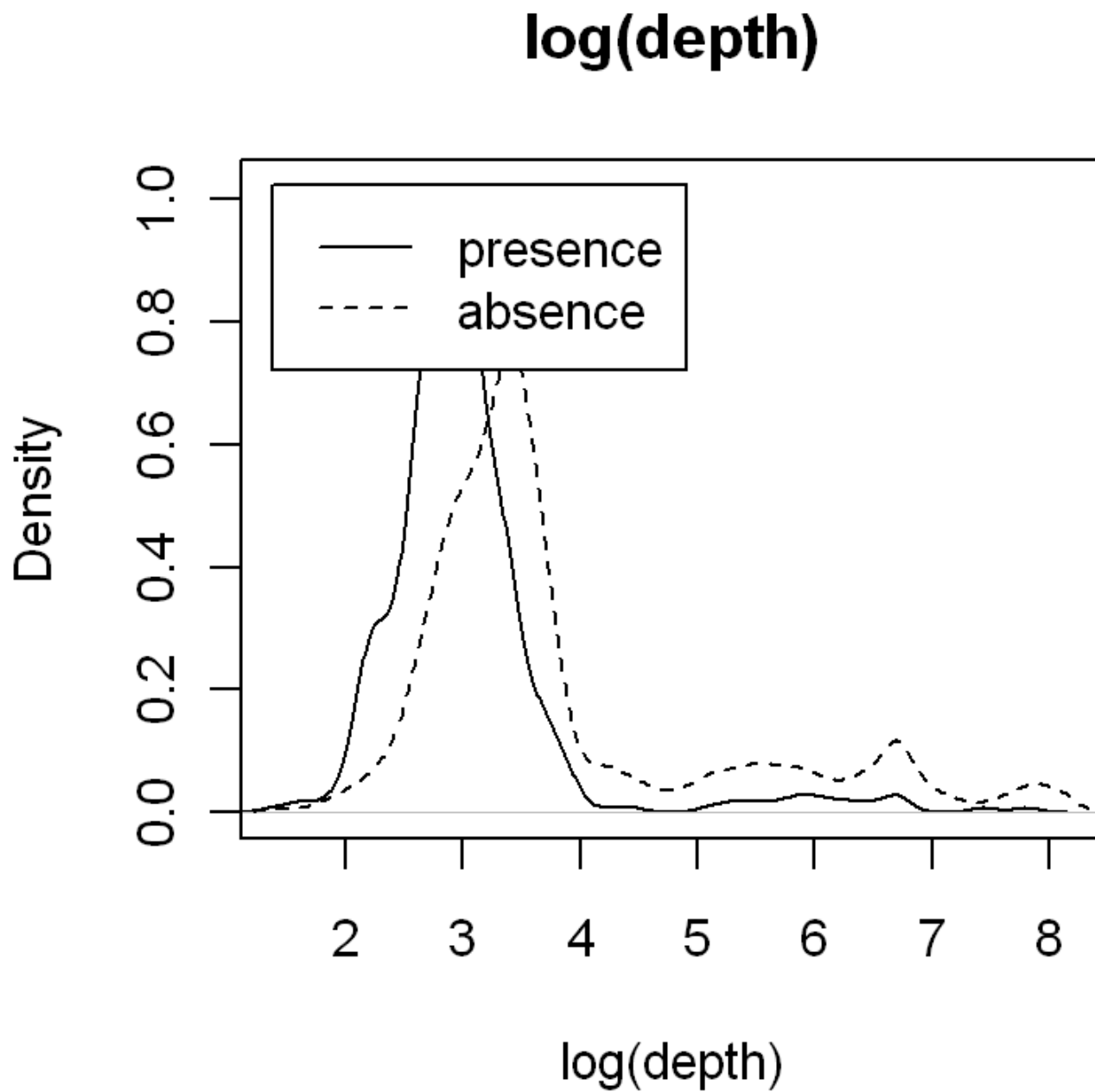


Figure 1123: Density histogram of depth $\log(\text{meters})$ for 'Tursiops' guild during 'winter' season in 'se2' region.

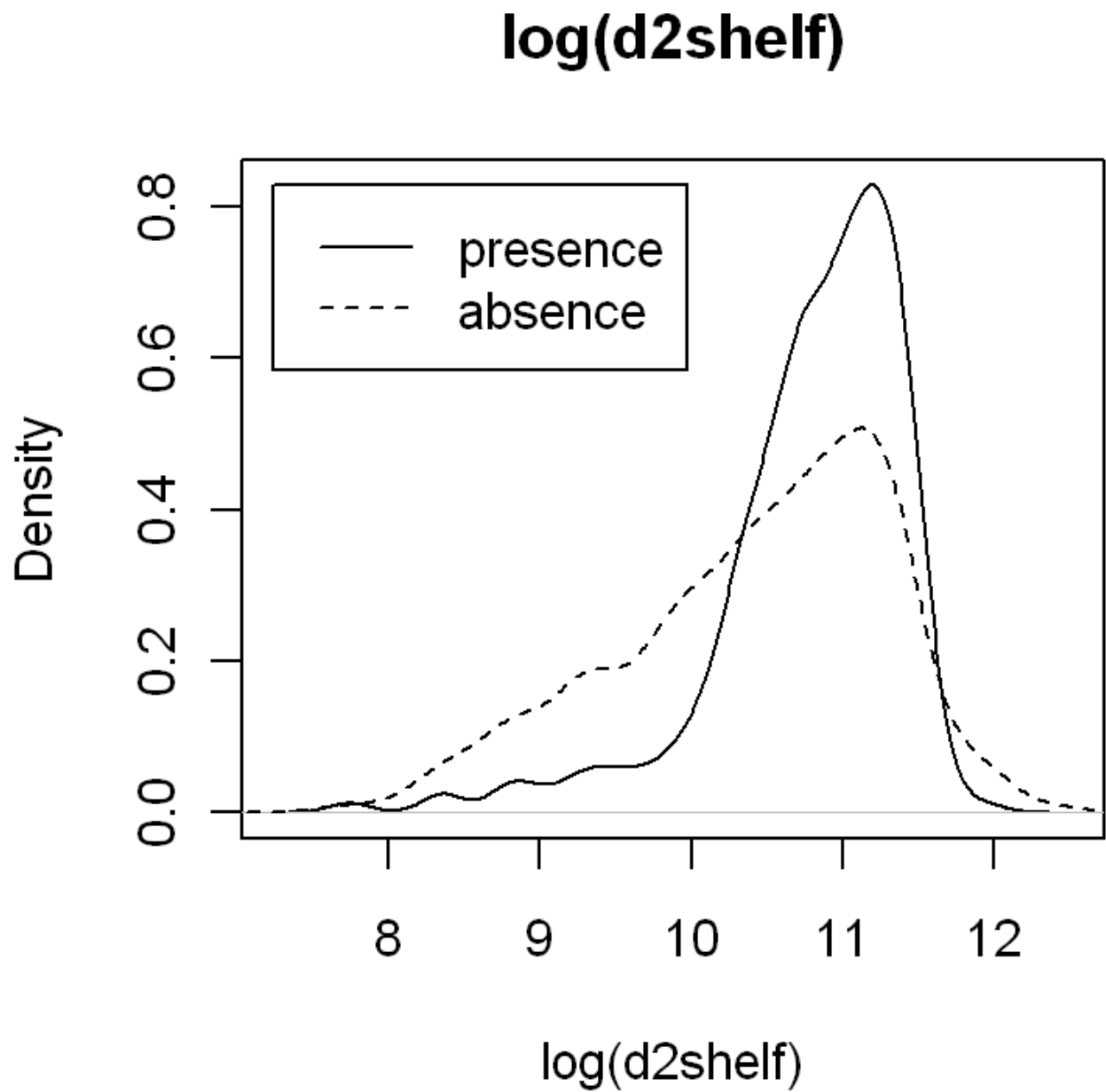


Figure 1124: Density histogram of distance to shelf log(meters) for 'Tursiops' guild during 'winter' season in 'se2' region.

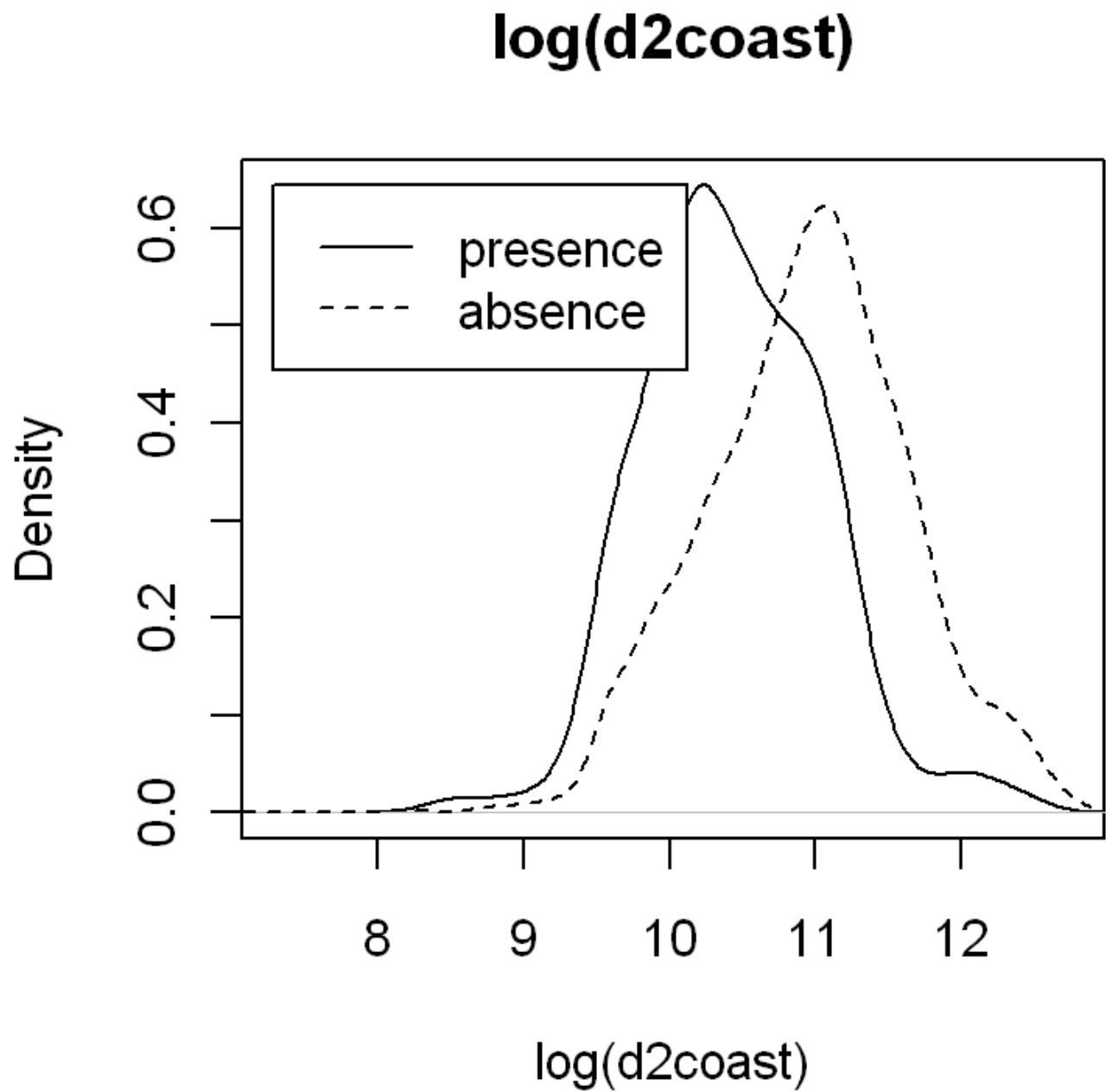


Figure 1125: Density histogram of distance to coast log(meters) for 'Tursiops' guild during 'winter' season in 'se2' region.

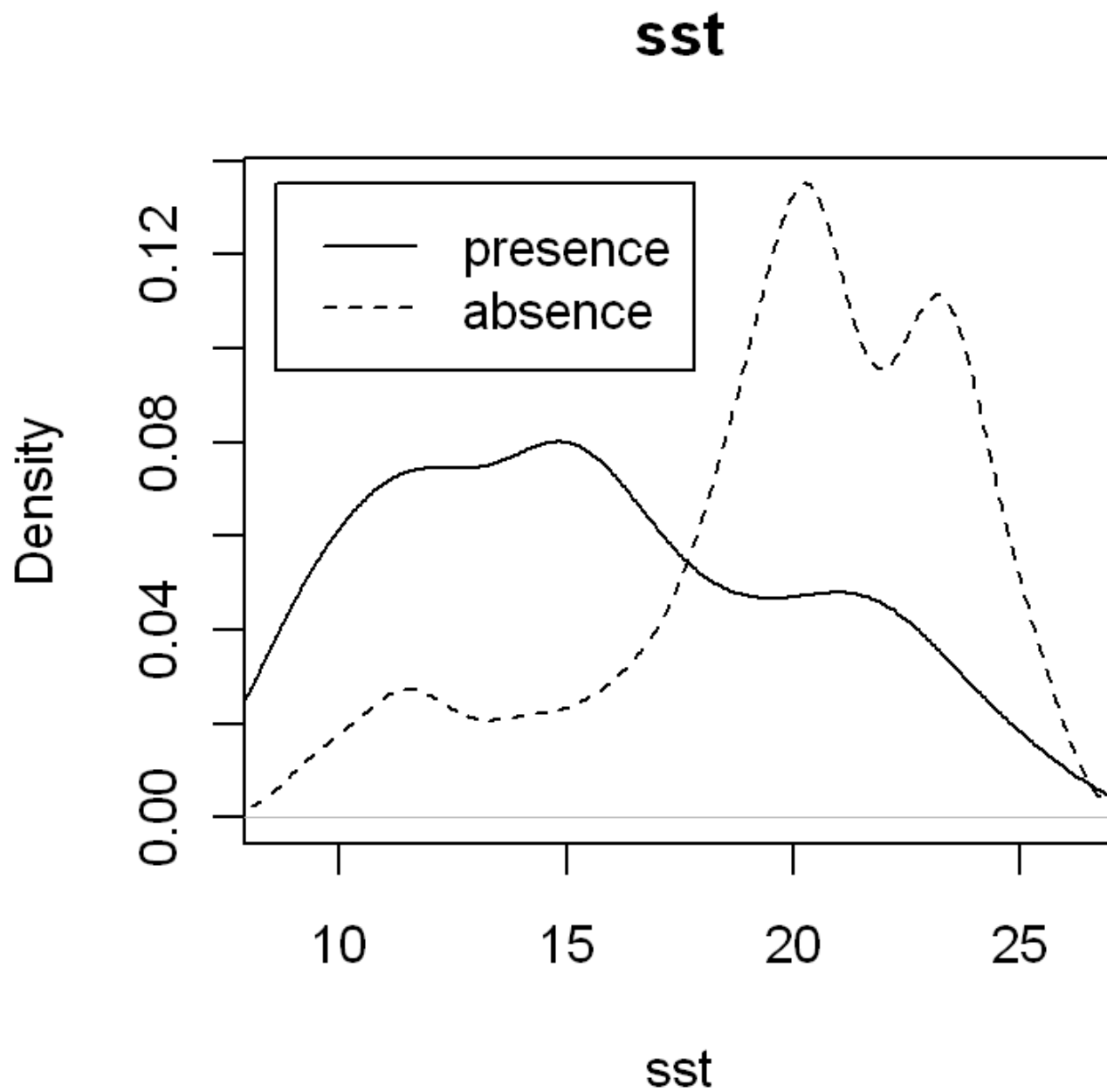


Figure 1126: Density histogram of sea-surface temperature (degrees C) for 'Tursiops' guild during 'winter' season in 'se2' region.

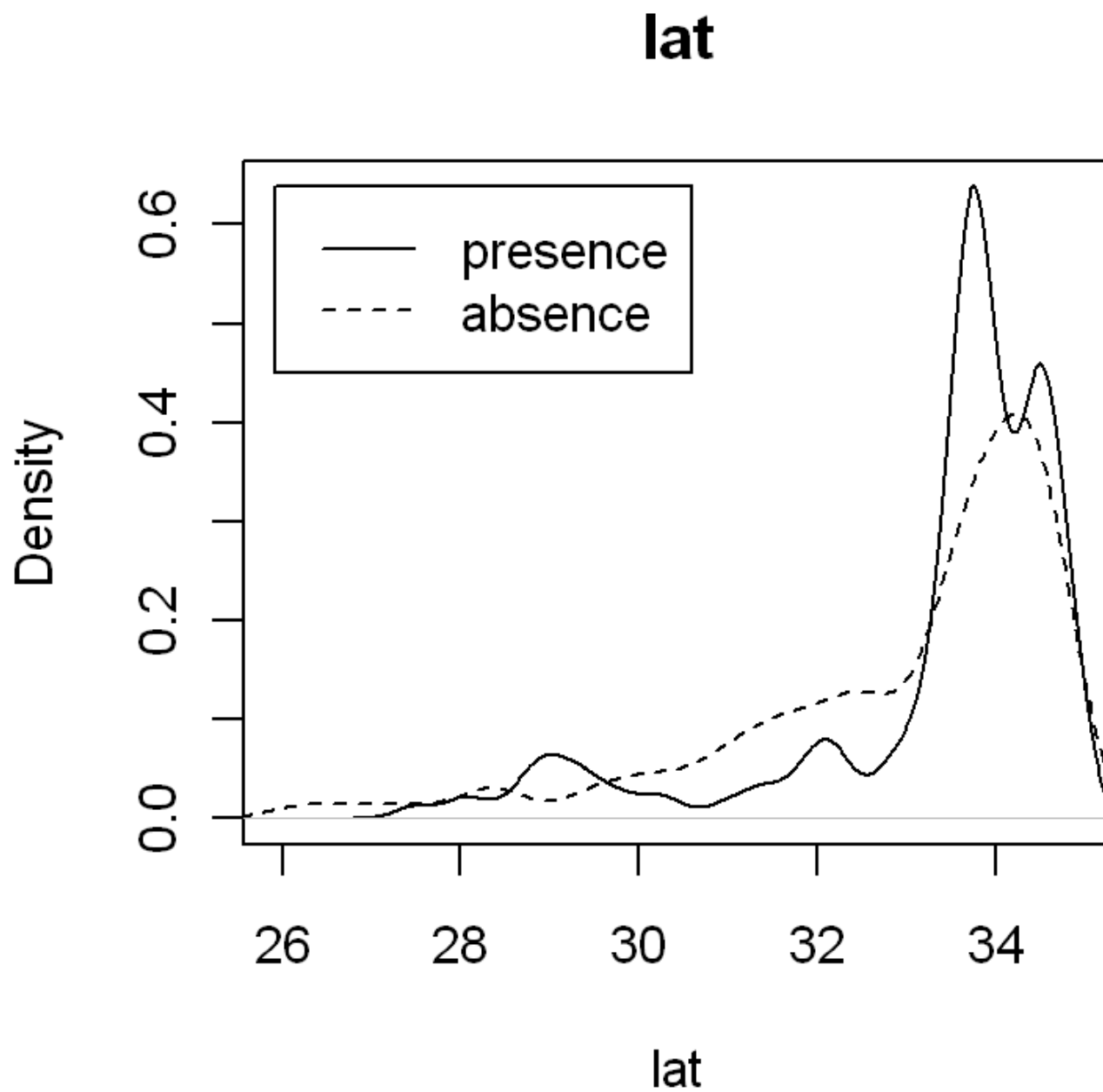


Figure 1127: Density histogram of latitude (degrees) for 'Tursiops' guild during 'winter' season in 'se2' region.

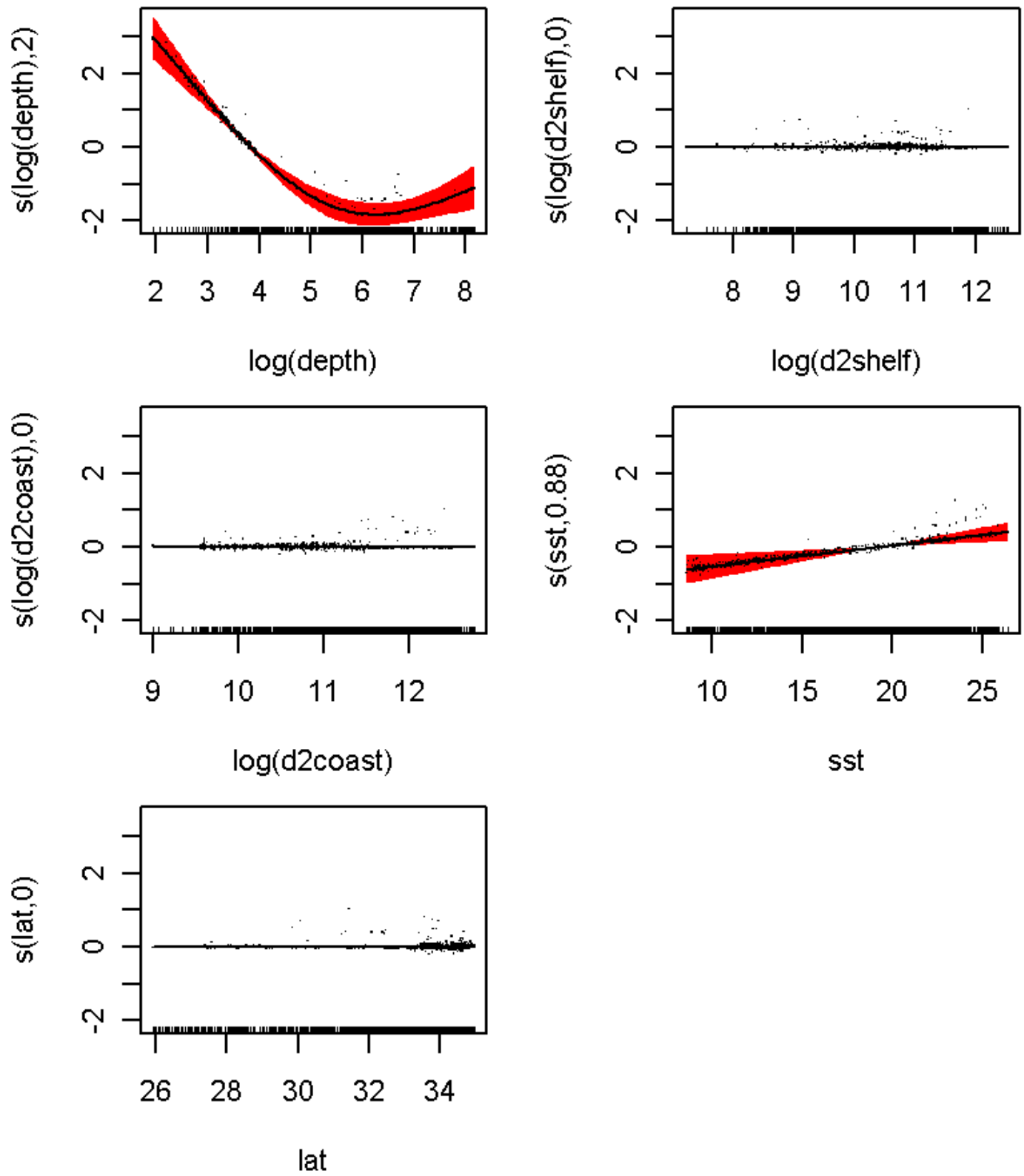


Figure 1128: Terms plot of predictors to GAM model fit for 'Tursiops' guild during 'winter' season in 'se2' region.

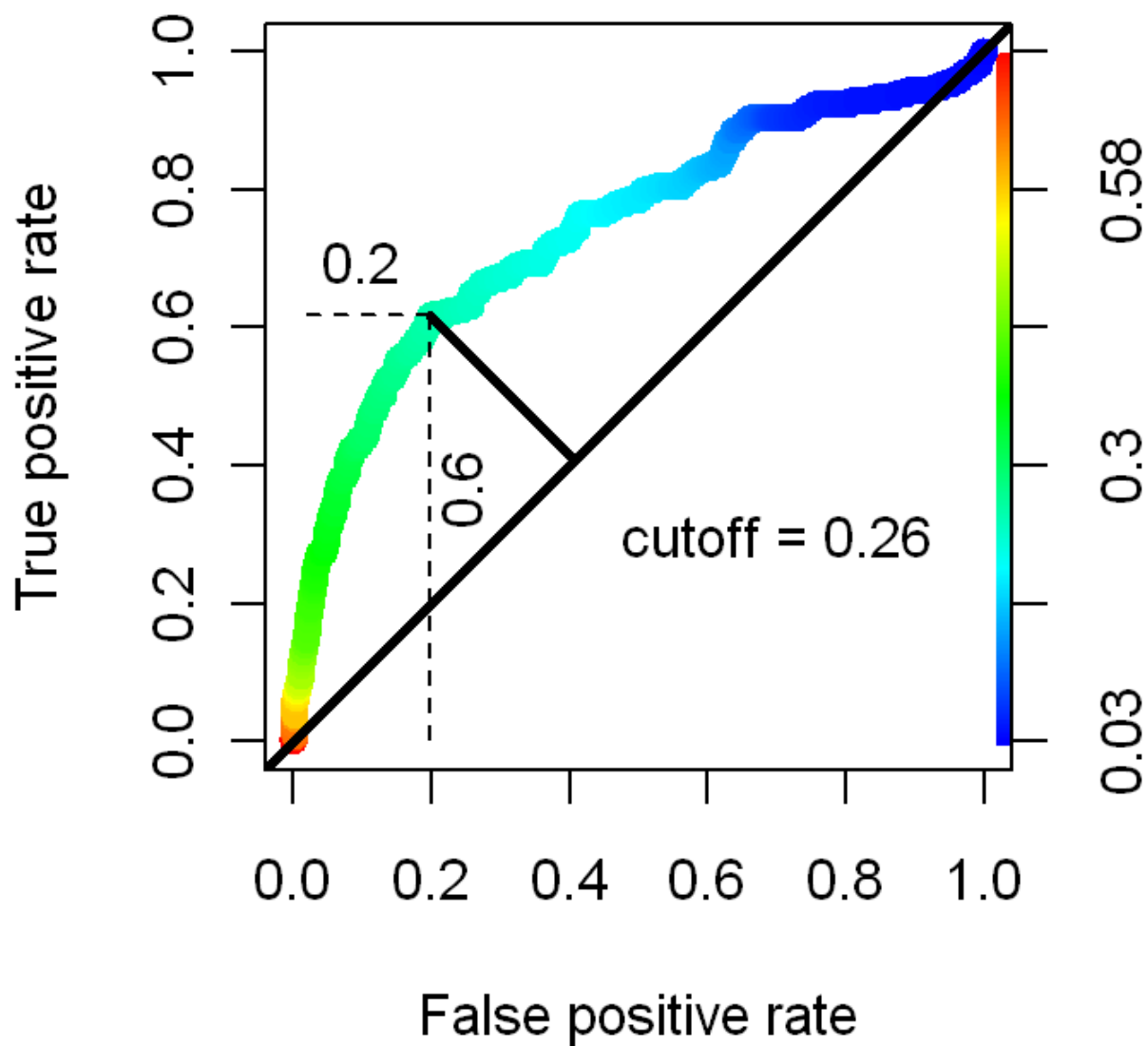


Figure 1129: Receiver operator characteristic (ROC) curve to determine optimal cutoff for binary habitat for 'Tursiops' guild during 'winter' season in 'se2' region.

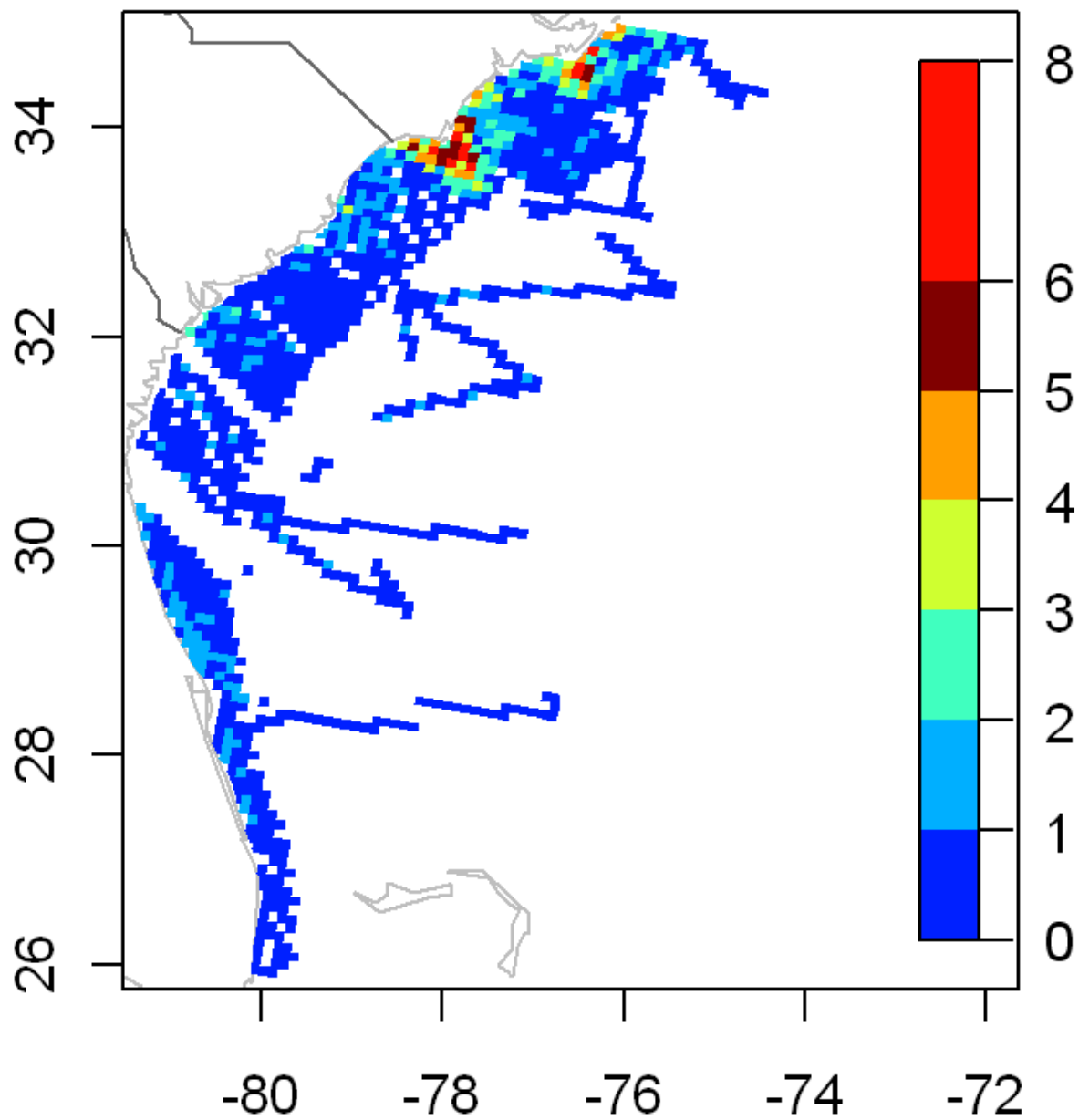


Figure 1130: Map of presence and absence by cell summed through time for 'Tursiops' guild during 'winter' season in 'se2' region.

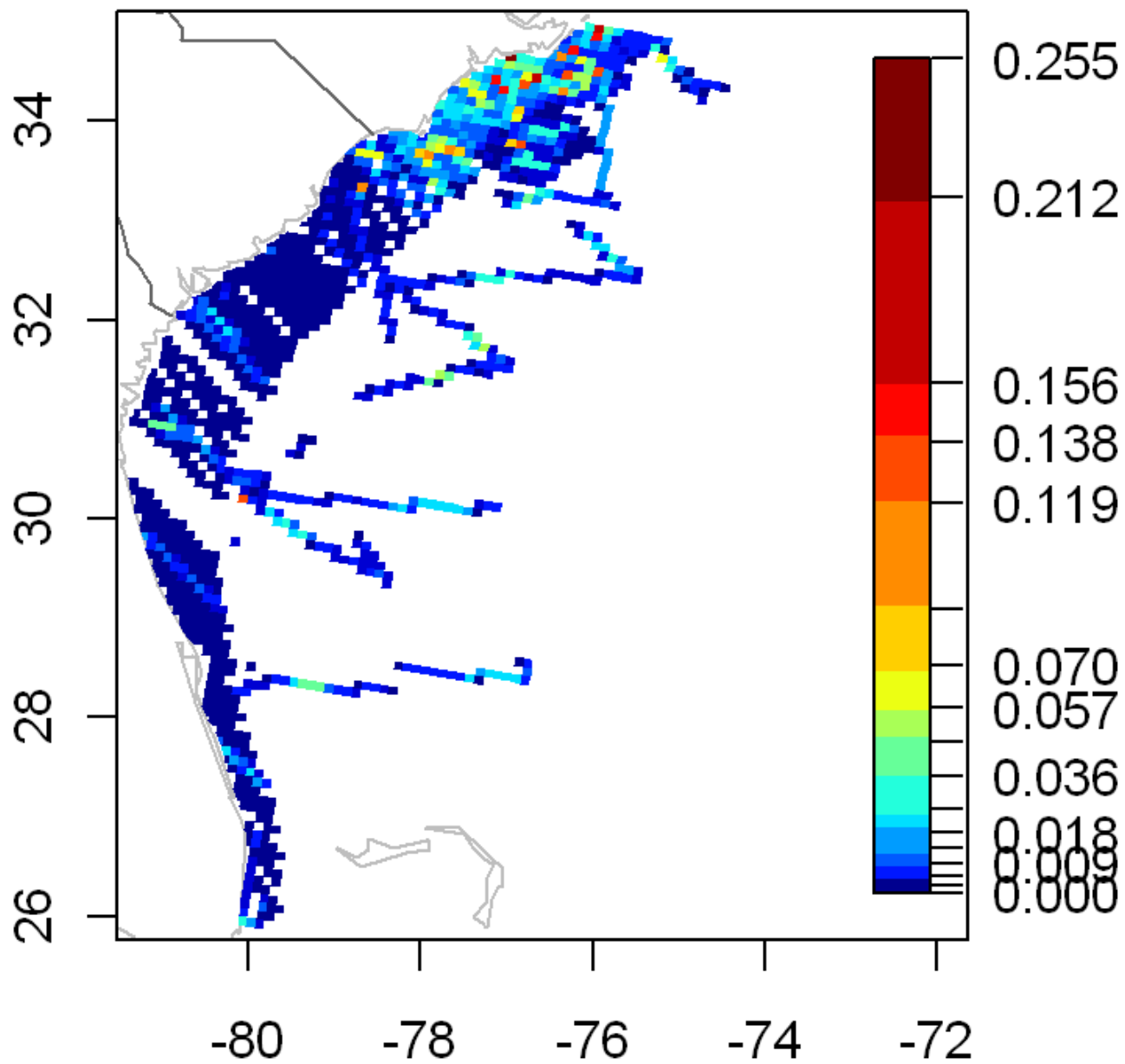


Figure 1131: Map of effort(hours/km²) by cell summed through time for 'Tursiops' guild during 'winter' season in 'se2' region.

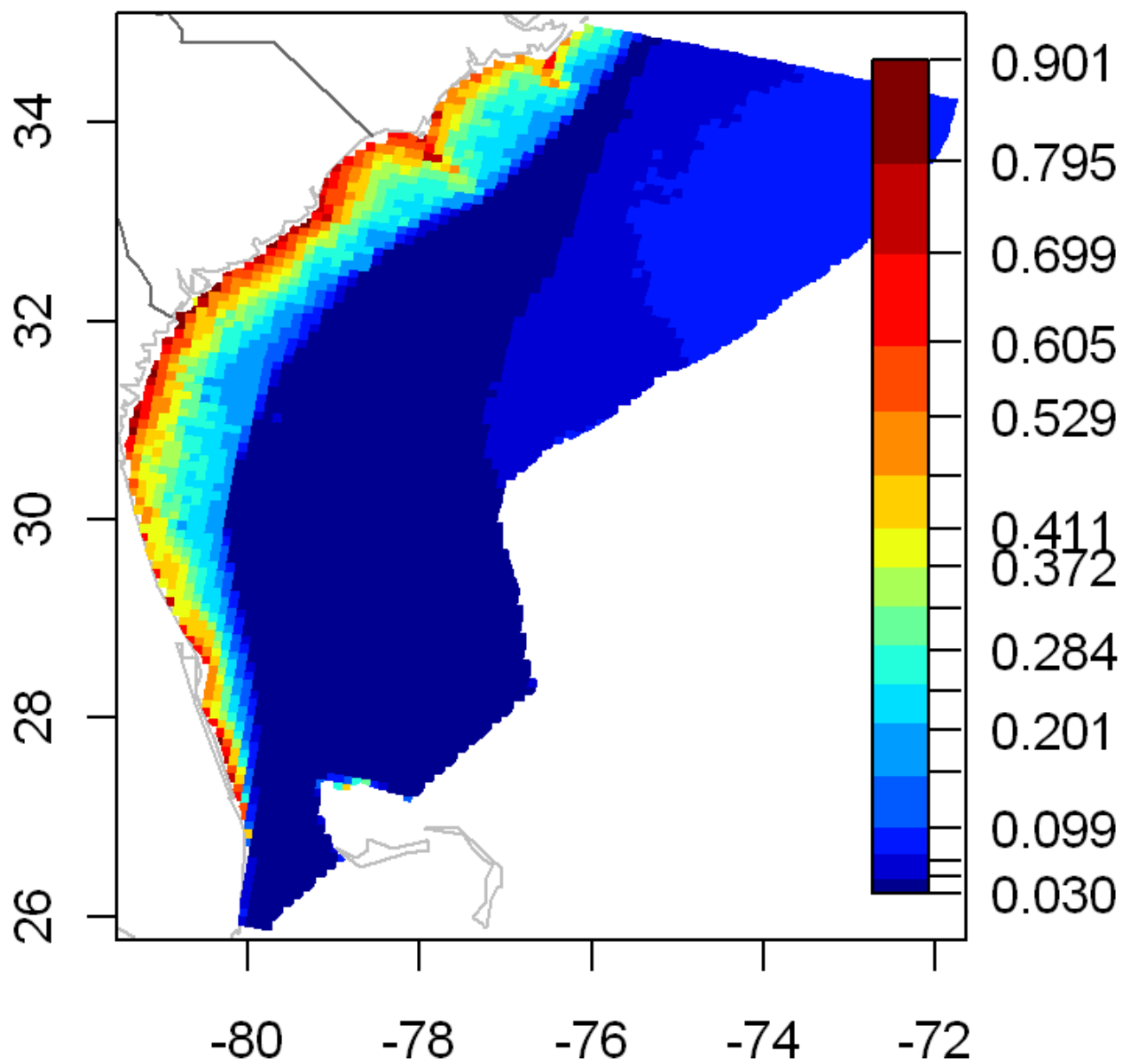


Figure 1132: Map of mean predicted habitat for 'Tursiops' guild during 'winter' season in 'se2' region.

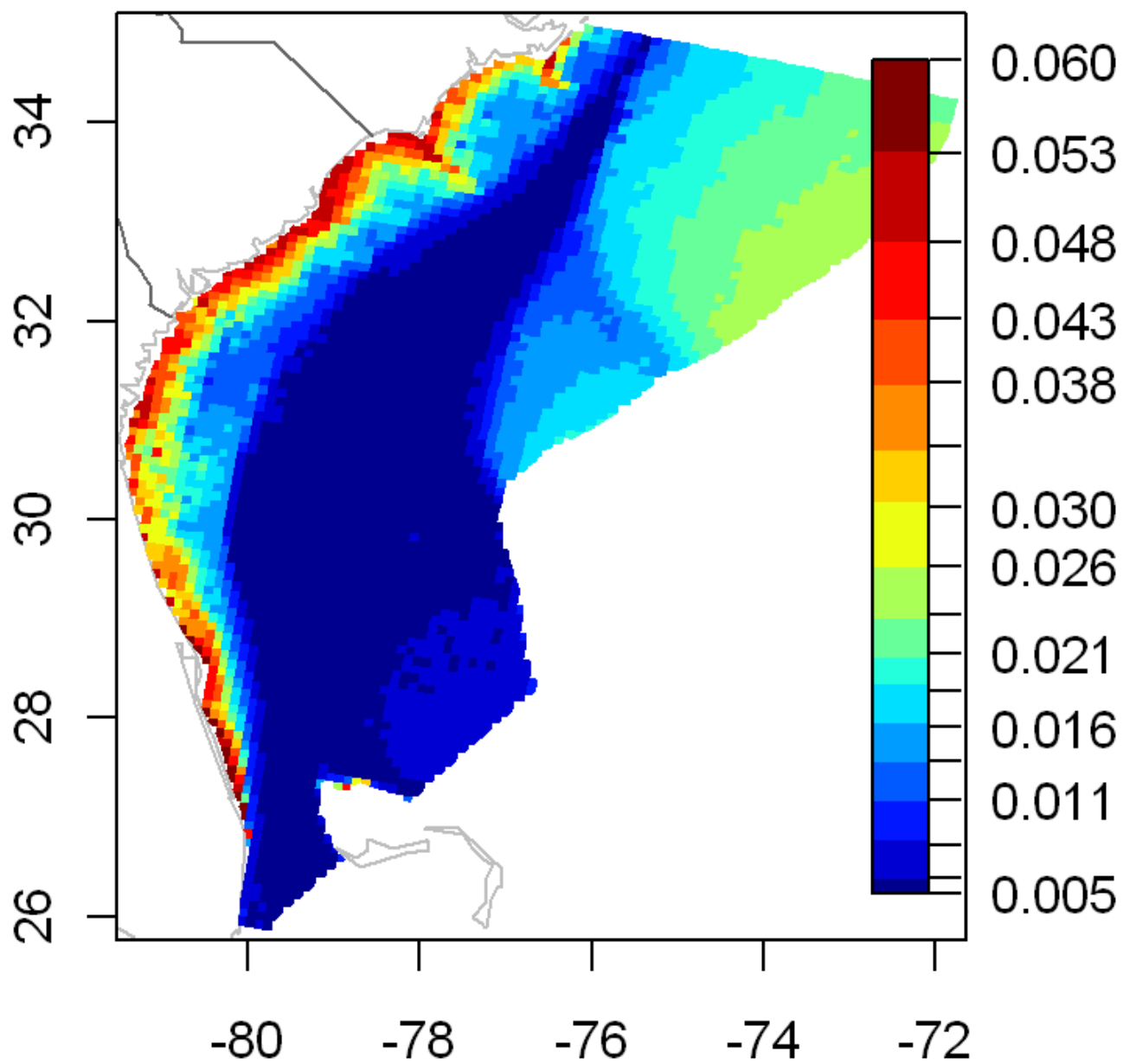


Figure 1133: Map of standard error of habitat for 'Tursiops' guild during 'winter' season in 'se2' region.

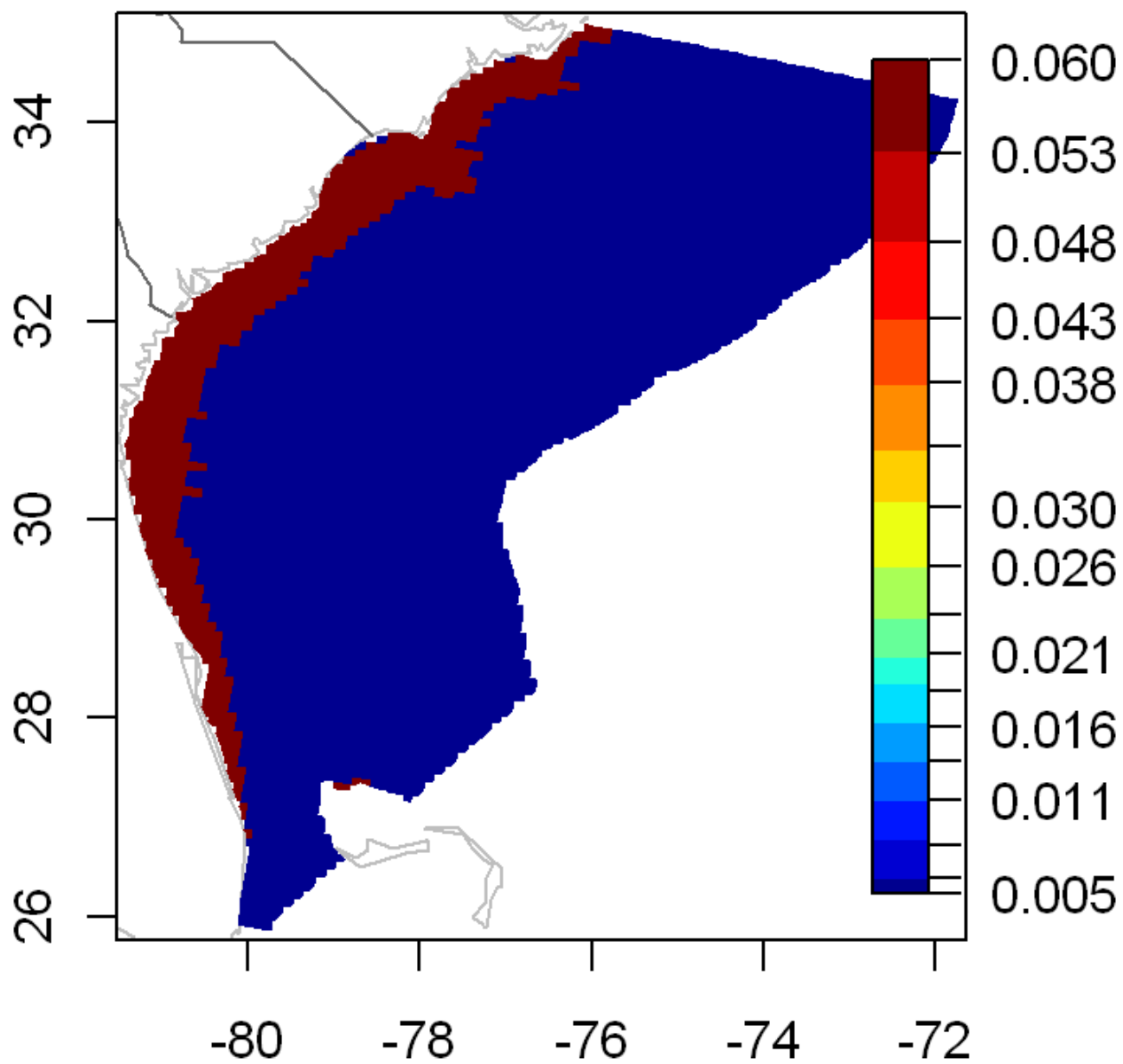


Figure 1134: Map of binary habitat (cutoff determined by ROC) for 'Tursiops' guild during 'winter' season in 'se2' region.

19 Appendices

19.1 Summary of Unfitted Models

	Guild.id	Guild.description	Season	Region	N.presences	N.absences
2	ba3	Baleen whales	fall	gomex2	1	944
6	ba3	Baleen whales	summer	gomex2	1	1403
8	ba3	Baleen whales	winter	gomex2	0	605
9	be3	Beaked whales	fall	east2	1	1863
10	be3	Beaked whales	fall	gomex2	2	943
11	be3	Beaked whales	spring	east2	1	2872
16	be3	Beaked whales	winter	gomex2	1	604
18	de3	Delphinus	fall	gomex2	0	945
20	de3	Delphinus	spring	gomex2	0	4817
22	de3	Delphinus	summer	gomex2	0	1404
24	de3	Delphinus	winter	gomex2	0	605
26	hp3	Harbour porpoise	fall	gomex2	0	945
28	hp3	Harbour porpoise	spring	east2	0	2873
29	hp3	Harbour porpoise	spring	gomex2	0	4817
30	hp3	Harbour porpoise	spring	ne2	0	1087
32	hp3	Harbour porpoise	summer	gomex2	0	1404
34	hp3	Harbour porpoise	winter	east2	3	3899
35	hp3	Harbour porpoise	winter	gomex2	0	605
36	hp3	Harbour porpoise	winter	ne2	1	843
38	hw3	Humpback whales	fall	gomex2	0	945
40	hw3	Humpback whales	spring	gomex2	1	4816
42	hw3	Humpback whales	summer	gomex2	0	1404
44	hw3	Humpback whales	winter	gomex2	0	605
45	kw3	Killer whales	fall	east2	1	1863
46	kw3	Killer whales	fall	gomex2	0	945
47	kw3	Killer whales	spring	east2	0	2873
51	kw3	Killer whales	winter	east2	3	3899
52	kw3	Killer whales	winter	gomex2	1	604
53	ko3	Kogia	fall	east2	1	1863
54	ko3	Kogia	fall	gomex2	0	945
55	ko3	Kogia	spring	east2	0	2873
59	ko3	Kogia	winter	east2	4	3898
60	ko3	Kogia	winter	gomex2	1	604
62	la3	Lags	fall	gomex2	0	945
63	la3	Lags	spring	east2	0	2873
64	la3	Lags	spring	gomex2	0	4817
66	la3	Lags	summer	gomex2	0	1404
67	la3	Lags	winter	east2	0	3902
68	la3	Lags	winter	gomex2	0	605
70	pw3	Pilot whales	fall	gomex2	1	944

71	pw3	Pilot whales	spring	east2	3	2870
74	pw3	Pilot whales	summer	gomex2	2	1402
76	pw3	Pilot whales	winter	gomex2	2	603
77	rw3	Right whales	fall	east2	0	1864
78	rw3	Right whales	fall	gomex2	0	945
79	rw3	Right whales	spring	east2	13	2860
80	rw3	Right whales	spring	gomex2	2	4815
82	rw3	Right whales	summer	gomex2	0	1404
84	rw3	Right whales	winter	gomex2	0	605
86	gg3	Risso's dolphin	fall	gomex2	1	944
87	gg3	Risso's dolphin	spring	east2	3	2870
92	gg3	Risso's dolphin	winter	gomex2	0	605
93	sb3	Rough-toothed dolphin	fall	east2	1	1863
94	sb3	Rough-toothed dolphin	fall	gomex2	4	941
95	sb3	Rough-toothed dolphin	spring	east2	0	2873
96	sb3	Rough-toothed dolphin	spring	gomex2	15	4802
97	sb3	Rough-toothed dolphin	summer	east2	3	9075
99	sb3	Rough-toothed dolphin	winter	east2	1	3901
100	sb3	Rough-toothed dolphin	winter	gomex2	0	605
104	sw3	Sperm whales	spring	gomex2	128	4689
109	sa3	Stenella attenuata	fall	east2	0	1864
111	sa3	Stenella attenuata	spring	east2	0	2873
115	sa3	Stenella attenuata	winter	east2	3	3899
116	sa3	Stenella attenuata	winter	gomex2	6	599
125	sl3	Stenella species	fall	east2	2	1862
126	sl3	Stenella species	fall	gomex2	2	943
127	sl3	Stenella species	spring	east2	0	2873
128	sl3	Stenella species	spring	gomex2	76	4741
131	sl3	Stenella species	winter	east2	0	3902
132	sl3	Stenella species	winter	gomex2	3	602
133	sc3	Striped dolphin	fall	east2	3	1861
134	sc3	Striped dolphin	fall	gomex2	2	943
135	sc3	Striped dolphin	spring	east2	0	2873
139	sc3	Striped dolphin	winter	east2	1	3901
140	sc3	Striped dolphin	winter	gomex2	2	603

Table 100: Summary of unfitted models because of insufficient presences (ie $N < 5$) or lack of GAM model convergence.

19.2 Summary of Fitted Models

	Guild.id	Guild.description	Season	Region	N.present	N.absent	R.sq	Deviance.expl	ROC.opt	Fit.max	Predict.max
1	ba3	Baleen whales	fall	east2	47	1817	0.30	0.37	0.37	0.03	0.39
3	ba3	Baleen whales	spring	east2	16	2857	0.41	0.66	0.93	0.00	1.00
4	ba3	Baleen whales	spring	gomex2	8	4809	0.03	0.35	0.08	0.01	0.10
5	ba3	Baleen whales	summer	east2	372	8706	0.18	0.27	0.58	0.04	0.61
7	ba3	Baleen whales	winter	east2	16	3886	0.45	0.50	0.56	0.00	1.00
12	be3	Beaked whales	spring	gomex2	56	4761	0.09	0.11	0.16	0.00	0.07
13	be3	Beaked whales	summer	east2	121	8957	0.16	0.28	0.35	0.01	0.54
14	be3	Beaked whales	summer	gomex2	13	1391	0.27	0.37	0.67	0.01	0.09
15	be3	Beaked whales	winter	east2	6	3896	-0.03	0.17	0.05	0.00	0.72
17	de3	Delphinus	fall	east2	6	1858	0.16	0.48	0.34	0.00	0.42
19	de3	Delphinus	spring	east2	19	2854	-0.03	0.06	0.04	0.01	0.14
21	de3	Delphinus	summer	east2	187	8891	-0.12	0.21	0.17	0.01	0.17
23	de3	Delphinus	winter	east2	49	3853	-0.10	0.38	0.54	0.02	0.58
25	hp3	Harbour porpoise	fall	east2	46	1818	0.00	0.50	0.43	0.03	0.44
27	hp3	Harbour porpoise	fall	ne2	46	1138	0.55	0.60	0.93	0.00	0.38
31	hp3	Harbour porpoise	summer	east2	396	8682	0.47	0.55	0.92	0.06	0.92
33	hp3	Harbour porpoise	summer	ne2	396	7298	0.47	0.50	0.89	0.05	0.89
37	hw3	Humpback whales	fall	east2	27	1837	0.69	0.62	0.78	0.03	0.78
39	hw3	Humpback whales	spring	east2	11	2862	0.01	0.13	0.26	0.01	0.27
41	hw3	Humpback whales	summer	east2	153	8925	0.38	0.42	0.57	0.03	0.56
43	hw3	Humpback whales	winter	east2	11	3891	0.46	0.48	0.60	0.23	0.80
48	kw3	Killer whales	spring	gomex2	31	4786	0.26	0.23	0.23	0.00	0.03
49	kw3	Killer whales	summer	east2	7	9071	-0.01	0.25	0.02	0.00	0.02
50	kw3	Killer whales	summer	gomex2	14	1390	0.03	0.10	0.06	0.01	0.04
56	ko3	Kogia	spring	gomex2	91	4726	0.04	0.07	0.19	0.03	0.11
57	ko3	Kogia	summer	east2	26	9052	0.03	0.17	0.93	0.00	0.83
58	ko3	Kogia	summer	gomex2	29	1375	-0.04	0.07	0.03	0.01	0.03
61	la3	Lags	fall	east2	15	1849	-0.03	0.35	0.15	0.00	0.17
65	la3	Lags	summer	east2	151	8927	0.15	0.31	0.24	0.02	0.17
69	pw3	Pilot whales	fall	east2	22	1842	0.05	0.22	0.15	0.01	0.16
72	pw3	Pilot whales	spring	gomex2	17	4800	0.00	0.06	0.02	0.00	0.00
73	pw3	Pilot whales	summer	east2	156	8922	0.08	0.06	0.15	0.07	0.14
75	pw3	Pilot whales	winter	east2	7	3895	0.00	0.31	0.07	0.00	0.08

81	rw3	Right whales	summer	east2	17	9061	0.02	0.32	0.26	0.00	0.12
83	rw3	Right whales	winter	east2	16	3886	0.98	0.88	1.00	0.05	0.68
85	gg3	Risso's dolphin	fall	east2	7	1857	0.84	0.59	0.83	0.00	0.15
88	gg3	Risso's dolphin	spring	gomex2	117	4700	0.09	0.12	0.40	0.06	0.99
89	gg3	Risso's dolphin	summer	east2	231	8847	0.25	0.27	0.98	0.06	0.98
90	gg3	Risso's dolphin	summer	gomex2	31	1373	0.32	0.18	0.27	0.00	0.47
91	gg3	Risso's dolphin	winter	east2	7	3895	0.99	0.94	1.00	0.00	1.00
98	sb3	Rough-toothed dolphin	summer	gomex2	9	1395	0.03	0.07	0.05	0.01	0.05
101	sw3	Sperm whales	fall	east2	7	1857	0.26	0.54	0.37	0.00	0.59
102	sw3	Sperm whales	fall	gomex2	7	938	0.03	0.49	0.27	0.00	0.27
103	sw3	Sperm whales	spring	east2	8	2865	-0.62	0.42	0.19	0.02	0.69
105	sw3	Sperm whales	summer	east2	224	8854	0.22	0.29	0.31	0.02	0.30
106	sw3	Sperm whales	summer	gomex2	40	1364	0.25	0.29	0.50	0.03	0.44
107	sw3	Sperm whales	winter	east2	5	3897	0.71	0.77	0.90	0.02	1.00
108	sw3	Sperm whales	winter	gomex2	7	598	-0.03	0.09	0.05	0.01	0.06
110	sa3	Stenella attenuata	fall	gomex2	15	930	-0.18	0.26	0.16	0.00	0.32
112	sa3	Stenella attenuata	spring	gomex2	342	4475	0.15	0.09	0.23	0.04	0.16
113	sa3	Stenella attenuata	summer	east2	11	9067	-0.02	0.24	0.06	0.00	0.04
114	sa3	Stenella attenuata	summer	gomex2	71	1333	0.24	0.19	0.27	0.01	0.27
117	sf3	Stenella frontalis	fall	east2	22	1842	0.51	0.46	0.63	0.03	0.93
118	sf3	Stenella frontalis	fall	gomex2	73	872	-0.29	0.15	0.15	0.03	0.20
119	sf3	Stenella frontalis	spring	east2	6	2867	-0.01	0.05	0.03	0.00	0.03
120	sf3	Stenella frontalis	spring	gomex2	43	4774	0.19	0.37	0.24	0.01	0.24
121	sf3	Stenella frontalis	summer	east2	107	8971	0.10	0.25	0.67	0.01	0.93
122	sf3	Stenella frontalis	summer	gomex2	69	1335	0.49	0.41	0.43	0.01	0.43
123	sf3	Stenella frontalis	winter	east2	23	3879	-0.02	0.07	0.03	0.00	0.03
124	sf3	Stenella frontalis	winter	gomex2	6	599	0.02	0.26	0.28	0.02	0.62
129	sl3	Stenella species	summer	east2	6	9072	-0.01	0.12	0.01	0.00	0.01
130	sl3	Stenella species	summer	gomex2	15	1389	0.26	0.26	0.33	0.00	0.25
136	sc3	Striped dolphin	spring	gomex2	44	4773	0.02	0.09	0.05	0.01	0.05
137	sc3	Striped dolphin	summer	east2	115	8963	0.20	0.29	0.43	0.03	0.13
138	sc3	Striped dolphin	summer	gomex2	10	1394	0.70	0.54	0.58	0.00	0.77
141	tu3	Tursiops	fall	east2	80	1784	0.16	0.19	1.00	0.04	1.00
142	tu3	Tursiops	fall	gomex2	160	785	0.71	0.30	0.93	0.16	0.99

143	tu3	Tursiops	fall	ne2	41	1143	0.33	0.21	0.36	0.09	0.36
144	tu3	Tursiops	fall	se2	39	641	0.47	0.34	0.57	0.07	1.00
145	tu3	Tursiops	spring	east2	429	2444	0.35	0.20	0.98	0.25	0.98
146	tu3	Tursiops	spring	gomex2	157	4660	0.05	0.28	0.33	0.03	0.65
147	tu3	Tursiops	spring	ne2	204	883	0.53	0.31	0.88	0.20	0.88
148	tu3	Tursiops	spring	se2	225	1561	0.25	0.17	0.68	0.14	0.83
149	tu3	Tursiops	summer	east2	298	8780	0.38	0.26	0.94	0.04	1.00
150	tu3	Tursiops	summer	gomex2	102	1302	0.22	0.24	0.56	0.05	0.57
151	tu3	Tursiops	summer	ne2	210	7484	0.47	0.35	0.96	0.02	0.99
152	tu3	Tursiops	summer	se2	88	1296	0.50	0.22	0.91	0.06	0.97
153	tu3	Tursiops	winter	east2	591	3311	0.54	0.24	0.92	0.11	1.00
154	tu3	Tursiops	winter	gomex2	7	598	-0.07	0.22	0.03	0.02	0.03
155	tu3	Tursiops	winter	ne2	113	731	0.77	0.64	0.98	0.03	1.00
156	tu3	Tursiops	winter	se2	478	2580	0.41	0.14	0.72	0.26	0.90

Table 101: Summary of fitted models with sufficient presences
(ie $N >= 5$) and GAM model convergence.