

## Sooty Shearwater (*Puffinus griseus*)

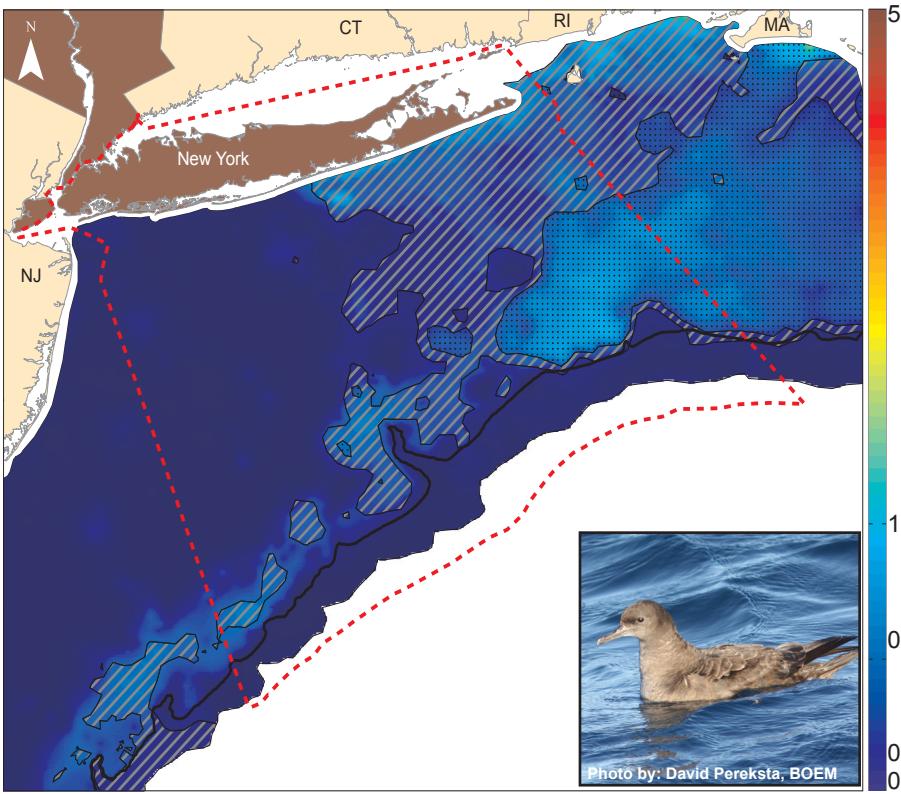


Figure 6.20. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Sooty Shearwater, with certainty classes overlaid (see legend in Figure 6.8).

Table 6.45. Data table: Sooty Shearwater.

Statistic	SP	SU	FA	WI	All
N obs.	88	114	3	0	205
Freq. (%)	3.5%	4.3%	0.1%	0.0%	2.2%
<i>SPUE when present (No. indiv./ km<sup>2</sup> /15 min.)</i>					
Mean	0.50	0.70	0.79	-	0.61
10th%ile	0.15	0.16	0.14	-	0.16
Median	0.36	0.38	0.27	-	0.36
90th%ile	1.20	1.62	1.96	-	1.35
Max	2.16	9.90	1.96	-	9.90

Table 6.46. Predictor table: Sooty Shearwater.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH								
SLOPE	■							
DIST								
SSDIST	■							
SST		■						
STRT	■							
TUR		■						
CHL								
ZOO								
SLPSLP	■							
PHIM								

Table 6.47. Diagnostic table: Sooty Shearwater.

Diagnostic statistic	Certainty class			
	Low	Med.	High	ALL
	%area	%area	%area	Avg.
Rank R	0.46	-0.38	0.24	0.28
%1SD	59.1%	62.5%	95.0%	72.4%
AUC	0.51	0.48	0.63	0.62
p(AUC)	0.43	0.62	0.03	0.00
MAPE	110%	116%	96%	135%
Rel.MAE	24%	12%	10%	19%
Rel.RMSE	38%	18%	20%	27%
Rel.Bias	31%	33%	9%	21%
Bias Dir.	+	+	+	+

## Wilson's Storm-Petrel (*Oceanites oceanicus*)

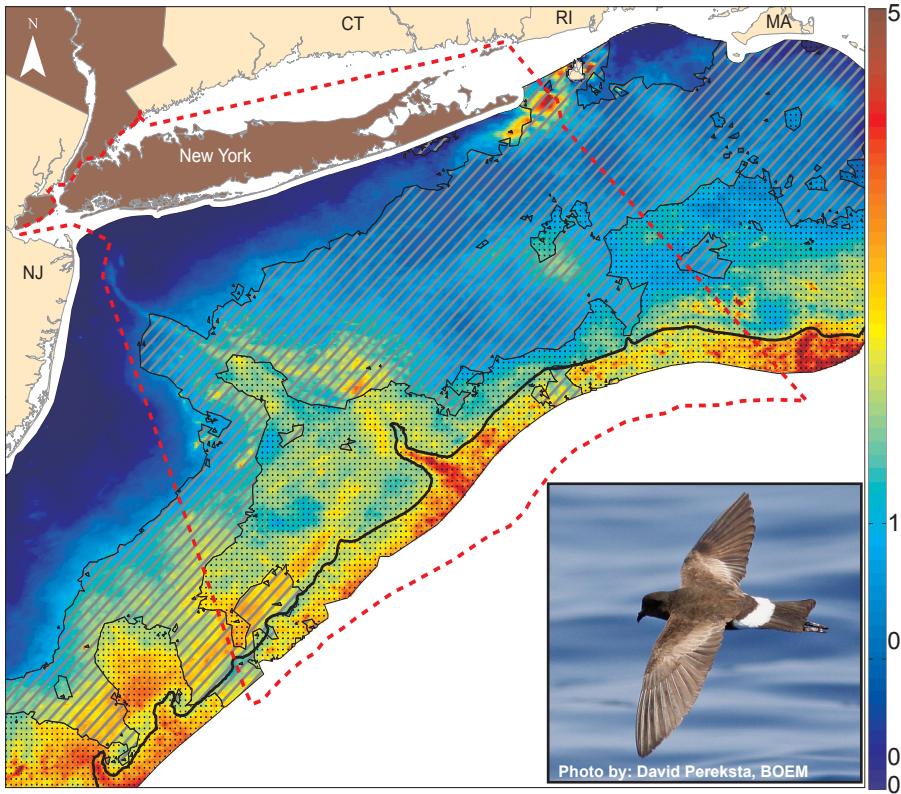


Figure 6.21. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Wilson's Storm-Petrel, with certainty classes overlaid (see legend in Figure 6.8).

Table 6.48. Data table: Wilson's Storm-Petrel.

Statistic	SP	SU	FA	WI	All
N obs.	299	1144	206	1	1650
Freq. (%)	11.7%	42.8%	7.4%	0.1%	18.0%
<i>SPUE when present (No. indiv./ km<sup>2</sup> /15 min.)</i>					
Mean	2.27	3.63	2.85	0.13	3.28
10th%ile	0.19	0.36	0.28	0.13	0.33
Median	0.72	1.20	0.72	0.13	0.98
90th%ile	5.76	7.20	3.99	0.13	6.40
Max	49.60	125.59	135.99	0.13	135.99

Table 6.49. Predictor table: Wilson's Storm-Petrel.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH								
SLOPE	■							
DIST		■						
SSDIST		■						
SST		■						
STRT	■		■					
TUR		■	■					
CHL	■		■					
ZOO	■		■					
SLPSLP		■	■					
PHIM		■	■					

Table 6.50. Diagnostic table: Wilson's Storm-Petrel.

Diagnostic statistic	Certainty class			
	Low	Med.	High	ALL
	%area	%area	%area	Avg.
Rank R	0.18	0.24	-0.10	0.29
%1SD	70.4%	78.9%	80.0%	75.2%
AUC	0.56	0.54	0.74	0.68
p(AUC)	0.23	0.26	0.01	0.00
MAPE	501%	230%	207%	396%
Rel.MAE	81%	27%	4%	45%
Rel.RMSE	140%	55%	10%	95%
Rel.Bias	42%	4%	1%	17%
Bias Dir.	-	-	+	-

## Alcids, less common (4 species)

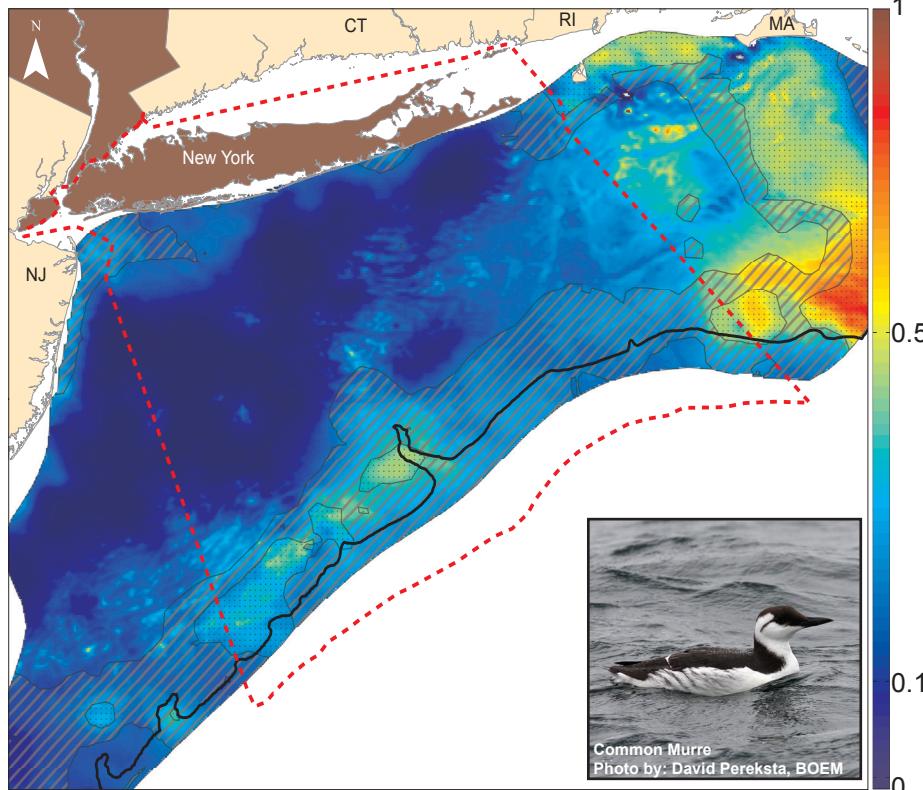


Figure 6.22. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Less Common Alcids with certainty classes overlaid (see legend in Figure 6.8).

Table 6.51. Data table: Alcids, less common.

Statistic	SP	SU	FA	WI	All
N obs.	76	0	5	58	139
Freq. (%)	3.0%	0.0%	0.2%	5.1%	1.5%
<i>SPUE when present (No. indiv./ km<sup>2</sup> /15 min.)</i>					
Mean	0.32	.	0.27	0.28	0.30
10th%ile	0.13	.	0.08	0.11	0.11
Median	0.24	.	0.12	0.20	0.22
90th%ile	0.72	.	0.72	0.70	0.72
Max	1.44	.	0.72	1.03	1.44

Table 6.52. Predictor table: Alcids, less common.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH								
SLOPE								
DIST								
SSDIST								
SST								
STRT								
TUR								
CHL								
ZOO								
SLPSLP								
PHIM								

Table 6.53. Diagnostic table: Alcids, less common.

Diagnostic statistic	Certainty class			
	Low	Med.	High	ALL
%area	%area	%area	%area	Avg.
Rank R	-0.71	0.08	0.46	0.22
%1SD	71.4%	55.6%	92.9%	76.7%
AUC	0.63	0.56	0.53	0.59
p(AUC)	0.14	0.28	0.36	0.05
MAPE	94%	104%	104%	158%
Rel.MAE	26%	15%	12%	23%
Rel.RMSE	34%	29%	18%	33%
Rel.Bias	71%	28%	11%	26%
Bias Dir.	+	+	+	+

## Coastal Waterfowl (7 species)

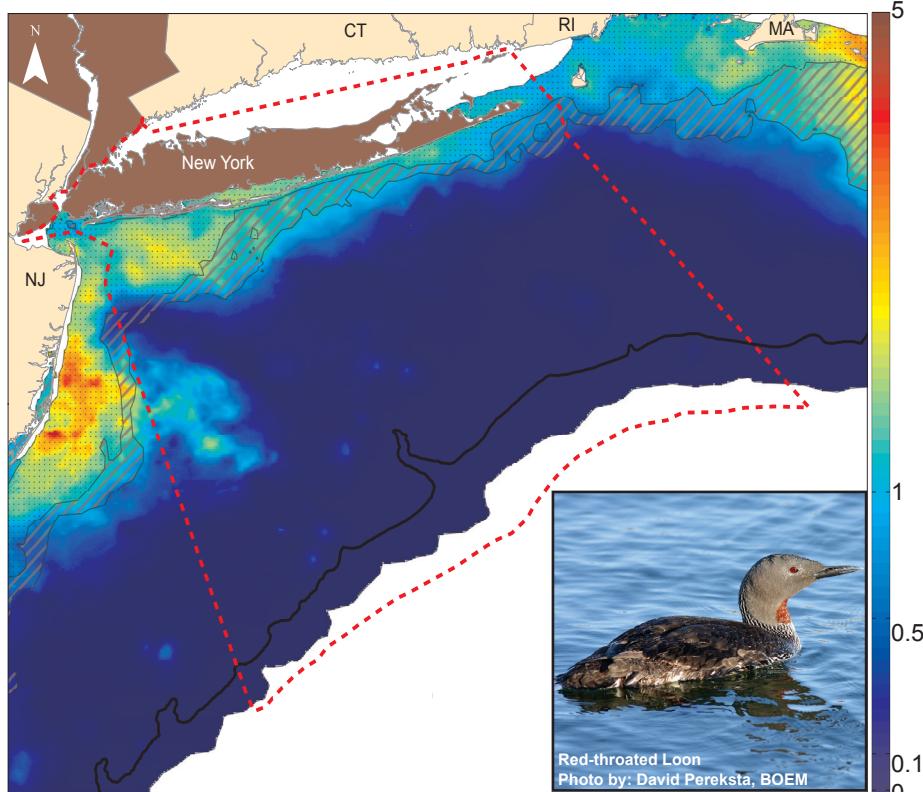


Figure 6.23. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Coastal Waterfowl, with certainty classes overlaid (see legend in Figure 6.8).

Table 6.54. Data table: Coastal Waterfowl.

Statistic	SP	SU	FA	WI	All
N obs.	99	0	58	79	236
Freq. (%)	3.9%	0.0%	2.1%	6.9%	2.6%
<i>SPUE when present (No. indiv./ km<sup>2</sup> /15 min.)</i>					
Mean	131.67	.	1.89	9.38	58.84
10th%ile	0.21	.	0.13	0.17	0.16
Median	0.72	.	0.40	0.77	0.57
90th%ile	9.41	.	4.81	18.38	8.76
Max	11999	.	25.20	158.54	11999

Table 6.55. Predictor table: Coastal Waterfowl.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH								
SLOPE								
DIST								
SSDIST								
SST								
STRT								
TUR								
CHL								
ZOO								
SLPSLP								
PHIM								

Table 6.56. Diagnostic table: Coastal Waterfowl.

Diagnostic statistic	Certainty class			
	Low	Med.	High	ALL
%area	%area	%area	%area	Avg.
Rank R	0.14	n/a	-0.17	0.20
%1SD	43.8%	n/a	88.9%	64.3%
AUC	0.49	n/a	0.70	0.77
p(AUC)	0.56	n/a	0.02	0.00
MAPE	319%	n/a	566%	395%
Rel.MAE	25%	n/a	24%	22%
Rel.RMSE	79%	n/a	67%	66%
Rel.Bias	15%	n/a	14%	14%
Bias Dir.	+	+	+	+

## Jaegers (2 species)

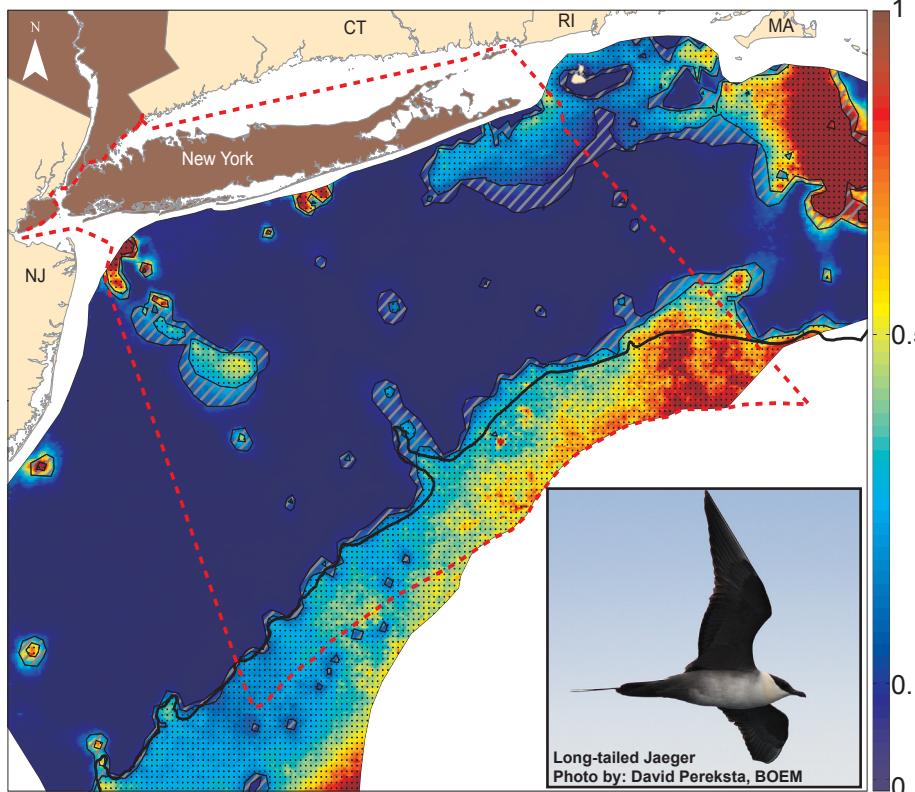


Figure 6.24. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Jaegers, with certainty classes overlaid (see legend in Figure 6.8).

Table 6.57. Data table: Jaegers.

Statistic	SP	SU	FA	WI	All
N obs.	13	8	56	0	77
Freq. (%)	0.5%	0.3%	2.0%	0.0%	0.8%
<i>SPUE when present (No. indiv./km<sup>2</sup>/15 min.)</i>					
Mean	2.23	2.92	1.68	.	1.90
10th%ile	0.17	0.24	0.13	.	0.15
Median	1.83	1.81	0.28	.	0.36
90th%ile	6.87	9.24	5.51	.	6.16
Max	9.16	10.80	11.52	.	11.52

Table 6.58. Predictor table: Jaegers.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH								
SLOPE								
DIST								
SSDIST								
SST								
STRT								
TUR								
CHL								
ZOO								
SLPSLP								
PHIM								

Table 6.59. Diagnostic table: Jaegers.

Diagnostic statistic	Certainty class			
	Low	Med.	High	All
%area	%area	%area	%area	Avg.
Rank R	19%	17%	63%	HIGH
%1SD	60.0%	66.7%	70.0%	65.4%
AUC	0.56	0.70	0.45	0.62
p(AUC)	0.28	0.06	0.72	0.02
MAPE	1420%	692%	148%	471%
Rel.MAE	30%	10%	2%	13%
Rel.RMSE	43%	15%	4%	25%
Rel.Bias	31%	9%	1%	10%
Bias Dir.	+	+	+	+

## Phalaropes (2 species)

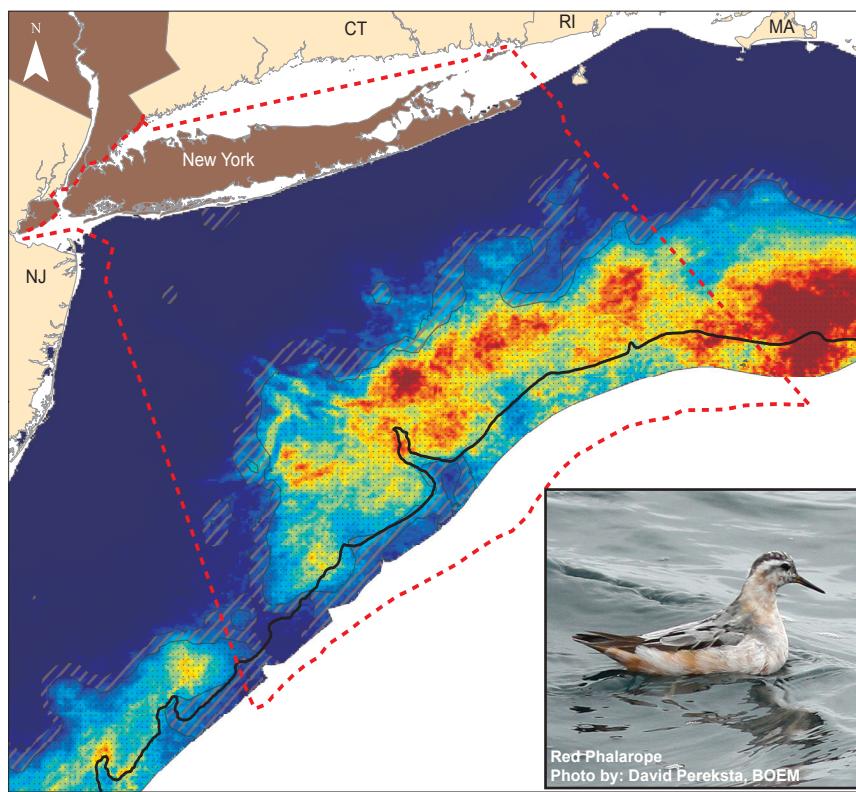


Figure 6.25. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Phalaropes, with certainty classes overlaid (see legend in Figure 6.8).

Table 6.60. Data table: Phalaropes.

Statistic	SP	SU	FA	WI	All
N obs.	230	7	33	4	274
Freq. (%)	9.0%	0.3%	1.2%	0.3%	3.0%
<i>SPUE when present (No. indiv./km<sup>2</sup>/15 min.)</i>					
Mean	60.72	0.49	2.58	1.33	51.31
10th%ile	0.47	0.33	0.39	0.60	0.41
Median	3.97	0.40	1.08	1.37	2.93
90th%ile	69.69	0.80	6.77	1.98	48.60
Max	4880	0.80	14.40	1.98	4880

Table 6.61. Predictor table: Phalaropes.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH								
SLOPE								
DIST								
SSDIST								
SST								
STRT								
TUR								
CHL								
ZOO								
SLPSLP								
PHIM								

Table 6.62. Diagnostic table: Phalaropes.

Diagnostic statistic	Certainty class			
	Low	Med.	High	All
%area	%area	%area	%area	Avg.
Rank R	44%	16%	40%	MED.
%1SD	68.1%	76.2%	77.8%	70.6%
AUC	0.49	0.54	0.80	0.76
p(AUC)	0.64	0.31	0.00	0.00
MAPE	1825%	638%	173%	908%
Rel.MAE	46%	16%	0%	23%
Rel.RMSE	159%	41%	2%	77%
Rel.Bias	19%	7%	0%	9%
Bias Dir.	-	-	+	-

## Shearwaters, less common (2 species)

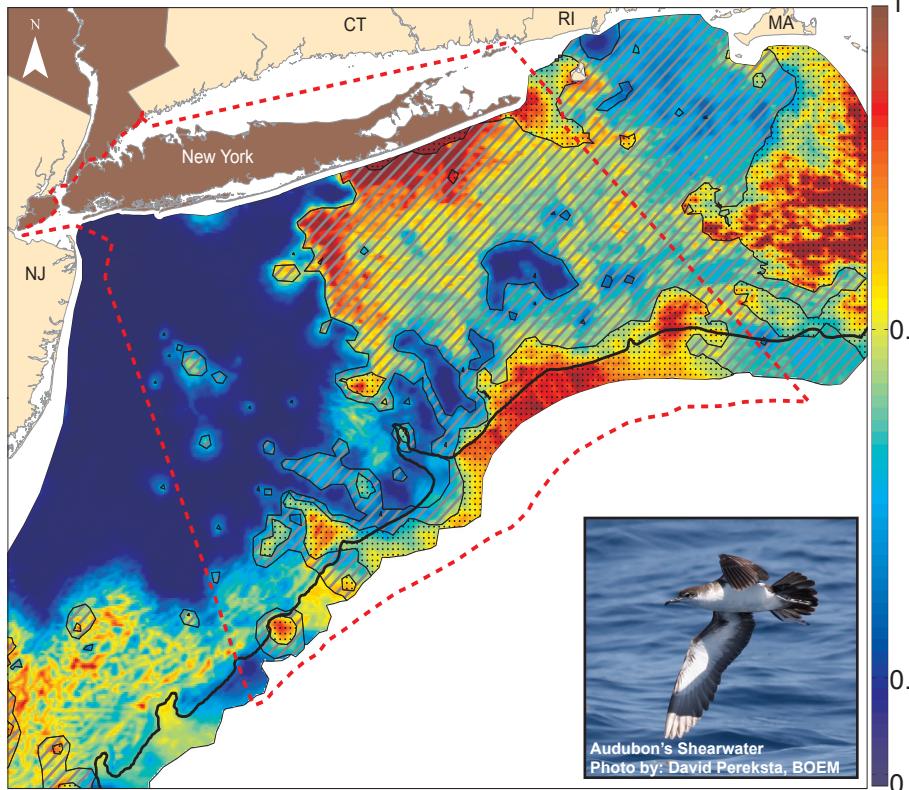


Figure 6.26. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15 min) for Less common Shearwaters with certainty classes overlaid (see legend in Figure 6.8).

Table 6.63. Data table: Shearwaters, less common

Statistic	SP	SU	FA	WI
N obs.	15	91	87	0
Freq. (%)	0.6%	3.4%	3.1%	0.0%
<i>SPUE when present (No. indiv./ km<sup>2</sup> /15 min.)</i>				
Mean	0.40	0.76	0.97	.
10th%ile	0.16	0.17	0.20	.
Median	0.33	0.44	0.54	.
90th%ile	0.72	1.50	1.60	.
Max	1.10	8.64	12.27	.

Table 6.64. Predictor table: Shearwaters, less common

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH								
SLOPE								
DIST								
SSDIST								
SST								
STRT								
TUR								
CHL								
ZOO								
SLPSLP								
PHIM								

Table 6.65. Diagnostic table: Shearwaters, less common.

Diagnostic statistic	Certainty class			
	Low	Med.	High	All
%area	15%	29%	56%	Avg. HIGH
Rank R				
%1SD				
AUC				
p(AUC)				
MAPE				
Rel.MAE				
Rel.RMSE				
Rel.Bias				
Bias Dir.	+	+	+	+

## Small Gulls, less common (2 species)

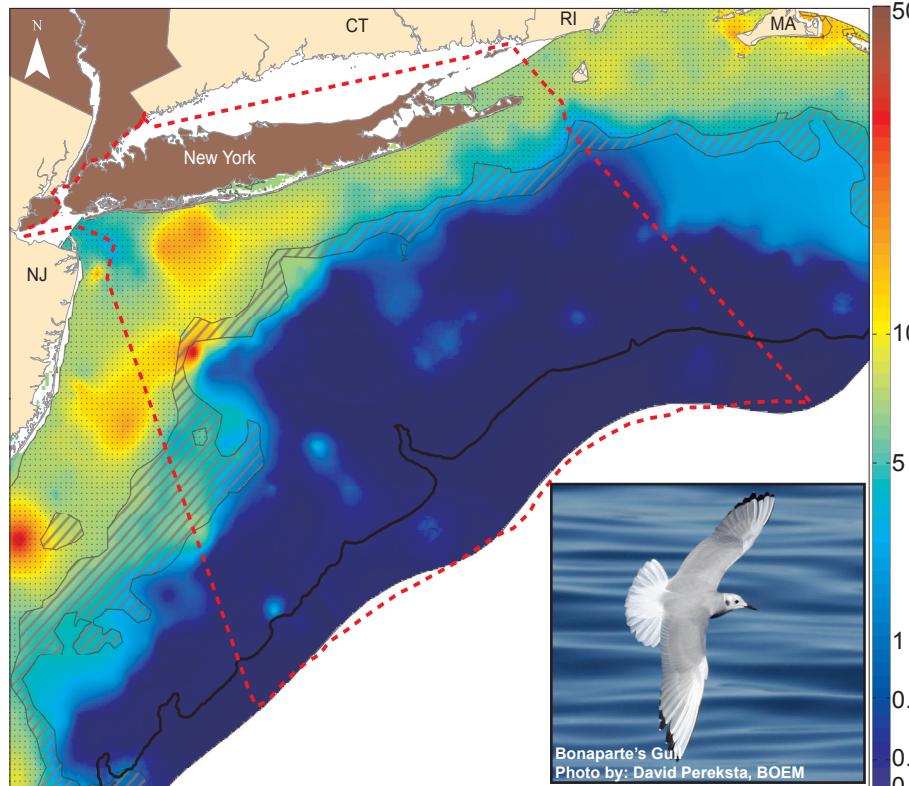


Figure 6.27. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Less Common Small gulls with certainty classes overlaid (see legend in Figure 6.8).

Table 6.66. Data table: Small Gulls, less common.

Statistic	SP	SU	FA	WI	All
N obs.	49	3	90	38	180
<i>SPUE when present (No. indiv./ km<sup>2</sup> /15 min.)</i>					
Mean	12.45	7.80	3.63	8.44	7.11
10th%ile	0.67	0.36	0.58	1.38	0.69
Median	3.20	1.44	2.69	2.80	2.83
90th%ile	21.55	21.60	7.65	9.92	10.70
Max	241.58	21.60	20.88	95.39	241.58

Table 6.67. Predictor table: Small Gulls, less common.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH								
SLOPE								
DIST								
SSDIST								
SST								
STRT								
TUR								
CHL								
ZOO								
SLPSLP								
PHIM								

Table 6.68. Diagnostic table: Small Gulls, less common.

Diagnostic statistic	Certainty class			
	Low	Med.	High	All
%area	18%	9%	74%	Avg. HIGH
Rank R	-0.30	n/a	1.00	0.16
%1SD	75.0%	n/a	83.3%	77.8%
AUC	0.48	n/a	0.89	0.72
p(AUC)	0.59	n/a	0.00	0.00
MAPE	121%	n/a	101%	131%
Rel.MAE	19%	n/a	10%	27%
Rel.RMSE	30%	n/a	14%	32%
Rel.Bias	62%	n/a	11%	34%
Bias Dir.	+	+	+	

## Storm-Petrels, less common (3 species)

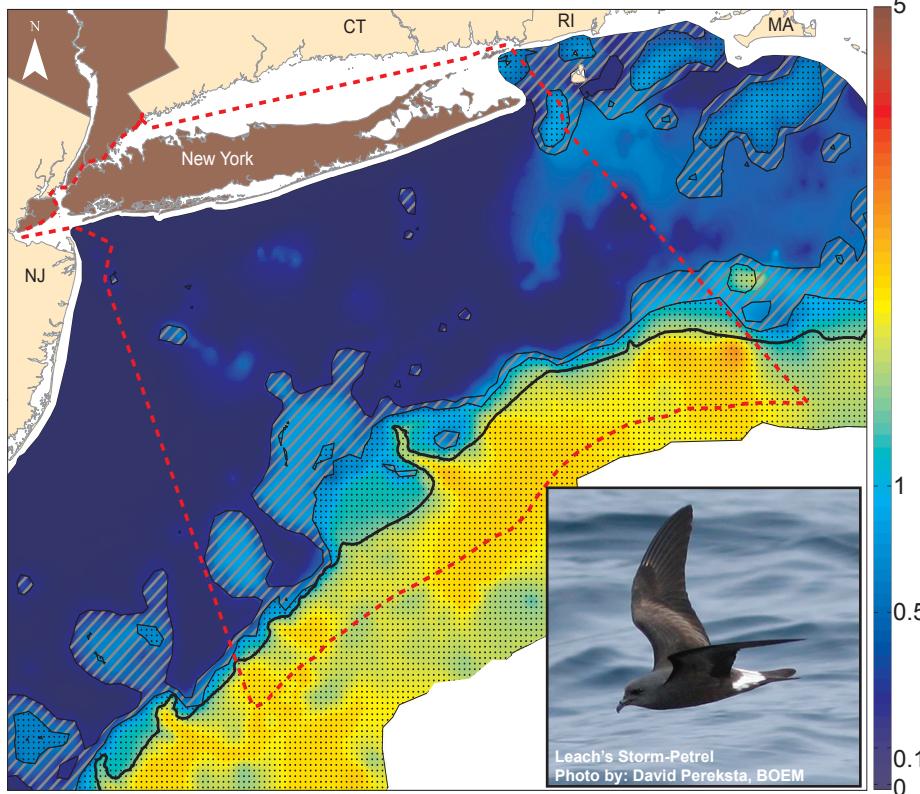


Figure 6.28. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Less Common Storm-Petrels with certainty classes overlaid (see legend in Figure 6.8).

Table 6.69. Data table: Storm-Petrels, less common.

Statistic	SP	SU	FA	WI	All
N obs.	45	122	52	0	219
Freq. (%)	1.8%	4.6%	1.9%	0.0%	2.4%
<i>SPUE when present (No. indiv./ km<sup>2</sup> /15 min.)</i>					
Mean	0.95	1.49	0.97	.	1.26
10th%ile	0.18	0.31	0.16	.	0.24
Median	0.48	0.80	0.65	.	0.72
90th%ile	2.52	3.37	1.93	.	2.62
Max	4.80	17.28	9.82	.	17.28

Table 6.70. Predictor table: Storm-Petrels, less common.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH	✓	✓	✓	✓	✓	✓	✓	✓
SLOPE	✓	✓	✓	✓	✓	✓	✓	✓
DIST	✓	✓	✓	✓	✓	✓	✓	✓
SSDIST	✓	✓	✓	✓	✓	✓	✓	✓
SST	✓	✓	✓	✓	✓	✓	✓	✓
STRT	✓	✓	✓	✓	✓	✓	✓	✓
TUR	✓	✓	✓	✓	✓	✓	✓	✓
CHL	✓	✗	✓	✓	✓	✓	✓	✓
ZOO	✓	✓	✓	✓	✓	✓	✓	✓
SLPSLP	✓	✓	✗	✓	✓	✓	✓	✓
PHIM	✓	✓	✓	✓	✓	✓	✓	✓

Table 6.71. Diagnostic table: Storm-Petrels, less common.

Diagnostic statistic	Certainty class			
	Low	Med.	High	ALL
%area	%area	%area	%area	Avg. MED.
Rank R	36%	15%	48%	0.24
%1SD	23.5%	90.0%	91.7%	61.5%
AUC	0.68	0.58	0.58	0.63
p(AUC)	0.01	0.22	0.20	0.01
MAPE	272%	95%	140%	306%
Rel.MAE	22%	6%	6%	18%
Rel.RMSE	26%	8%	9%	25%
Rel.Bias	51%	21%	4%	22%
Bias Dir.	+	+	+	+

## Terns, less common (7 species)

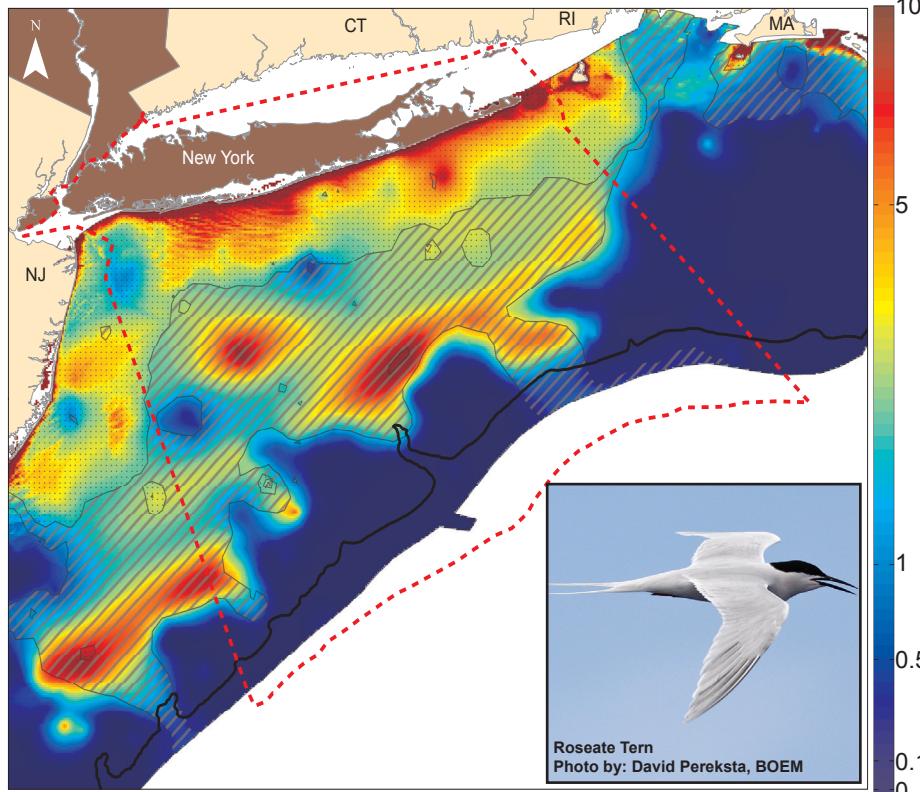


Figure 6.29. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Less Common Terns with certainty classes overlaid (see legend in Figure 6.8).

Table 6.72. Data table: Terns, less common.

Statistic	SP	SU	FA	WI	All
N obs.	53	46	21	0	120
Freq. (%)	2.1%	1.7%	0.8%	0.0%	1.3%
<i>SPUE when present (No. indiv./ km<sup>2</sup> /15 min.)</i>					
Mean	5.91	2.42	2.17	.	3.92
10th%ile	0.20	0.33	0.20	.	0.24
Median	1.83	1.07	0.98	.	1.31
90th%ile	9.99	5.03	5.78	.	7.89
Max	59.73	21.27	12.60	.	59.73

Table 6.73. Predictor table: Terns, less common.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH	✓	✓	✓	✓	✓	✓	✓	✓
SLOPE	✓	✗	✓	✓	✓	✓	✓	✓
DIST	✓	✓	✓	✓	✓	✓	✓	✓
SSDIST	✓	✓	✓	✓	✓	✓	✓	✓
SST	✓	✓	✓	✓	✓	✓	✓	✓
STRT	✓	✓	✓	✓	✓	✓	✓	✓
TUR	✓	✓	✓	✓	✓	✓	✓	✓
CHL	✓	✓	✓	✓	✓	✓	✓	✓
ZOO	✓	✓	✓	✓	✓	✓	✓	✓
SLPSLP	✓	✓	✓	✓	✓	✓	✓	✓
PHIM	✓	✓	✓	✓	✓	✓	✓	✓

Table 6.74. Diagnostic table: Terns, less common.

Diagnostic statistic	Certainty class			
	Low	Med.	High	ALL
%area	25%	37%	38%	Avg. MED.
Rank R	0.54	n/a	-0.30	0.52
%1SD	50.0%	n/a	60.0%	61.9%
AUC	0.59	n/a	0.51	0.67
p(AUC)	0.17	n/a	0.46	0.00
MAPE	956%	n/a	680%	874%
Rel.MAE	25%	n/a	10%	26%
Rel.RMSE	41%	n/a	18%	39%
Rel.Bias	51%	n/a	8%	28%
Bias Dir.	+	+	+	+

## Unidentified Gulls (0 species\*)

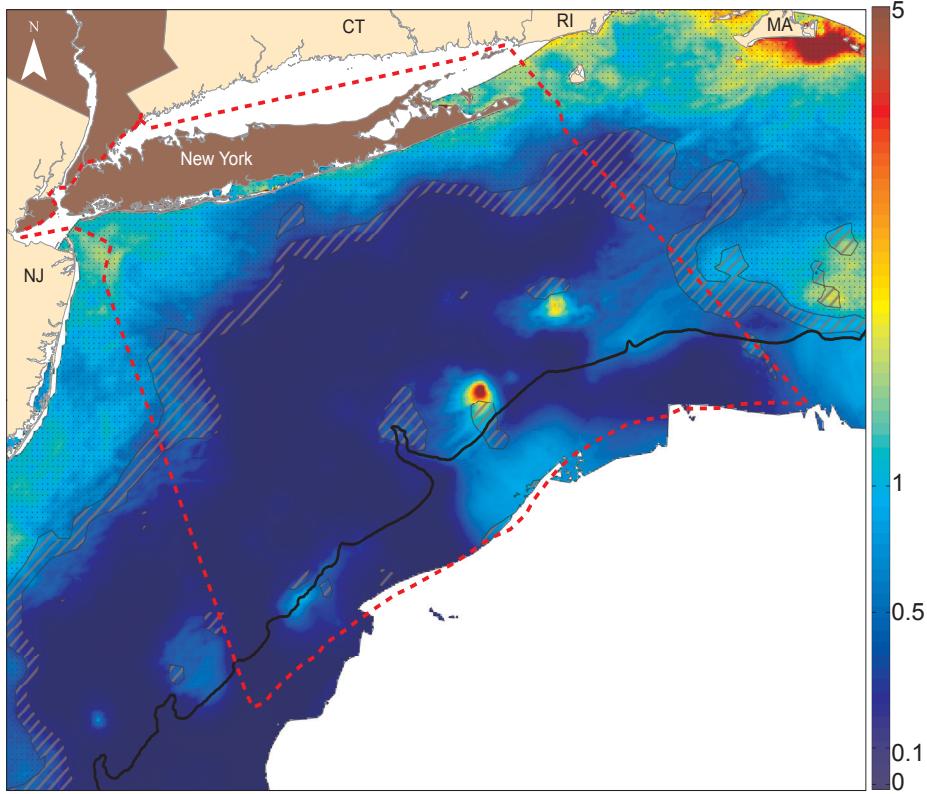


Figure 6.30. Predicted annual average relative index of abundance (SPUE, # indiv./km<sup>2</sup>/15-min) for Unidentified Gulls, with certainty classes overlaid (see legend in Figure 6.8).

\*This group contains two categories of unidentified gulls in the family Laridae, but no positively identifiable species.

Table 6.75. Data table: Unidentified Gulls.

Statistic	SP	SU	FA	WI	
N obs.	55	19	157	53	
Freq. (%)	2.2%	0.7%	5.7%	4.6%	
<i>SPUE when present (No. indiv./km<sup>2</sup>/15 min.)</i>					
Mean	2.13	1.38	0.77	1.33	
10th%ile	0.16	0.12	0.16	0.13	
Median	0.48	0.33	0.48	0.45	
90th%ile	2.00	3.96	1.59	2.11	
Max	71.11	11.70	10.28	15.30	

Table 6.76. Predictor table: Unidentified Gulls.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH	Red							
SLOPE								
DIST					Green	Red		
SSDIST							Yellow	
SST	Red							
STRT								
TUR							Yellow	
CHL					Green			
ZOO								
SLPSLP					Yellow			
PHIM								Red

Table 6.77. Diagnostic table: Unidentified Gulls.

Diagnostic statistic	Certainty class			
	Low	Med.	High	ALL
	%area	%area	%area	Avg.
Rank R	21%	12%	67%	HIGH
%1SD				
AUC				
p(AUC)				
MAPE				
Rel.MAE				
Rel.RMSE				
Rel.Bias				
Bias Dir.	+	+	+	+

## Cormorants (2 species)

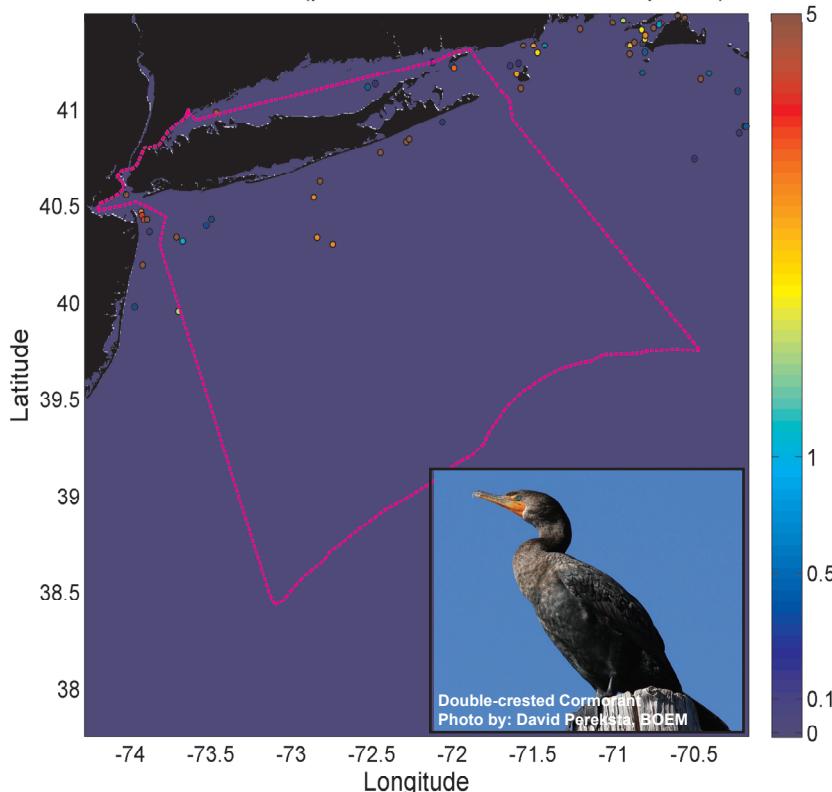
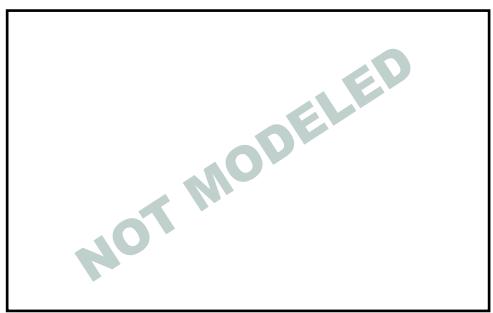
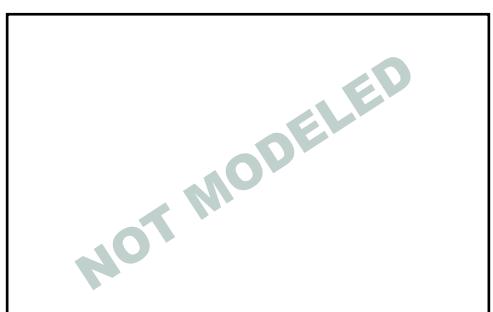


Figure 6.31. Point observations of the relative abundance index (SPUE, # indiv./km<sup>2</sup>/15-min) for Cormorants. Dark blue shading indicates unsampled areas; no predictive modeling was done for this species group due to insufficient data.

Table 6.78. Data table: Cormorants.

Statistic	SP	SU	FA	WI	All
N obs.	12	9	20	19	60
Freq. (%)	0.5%	0.3%	0.7%	1.7%	0.7%
<i>SPUE when present (No. indiv./km<sup>2</sup>/15 min.)</i>					
Mean	6.29	7.63	9.99	3.53	6.85
10th%ile	0.15	1.77	0.22	0.25	0.21
Median	0.38	2.88	3.75	2.74	2.72
90th%ile	22.68	21.30	35.97	8.99	20.23
Max	61.92	24.53	48.60	14.40	61.92



## Rare Visitors (10 species)

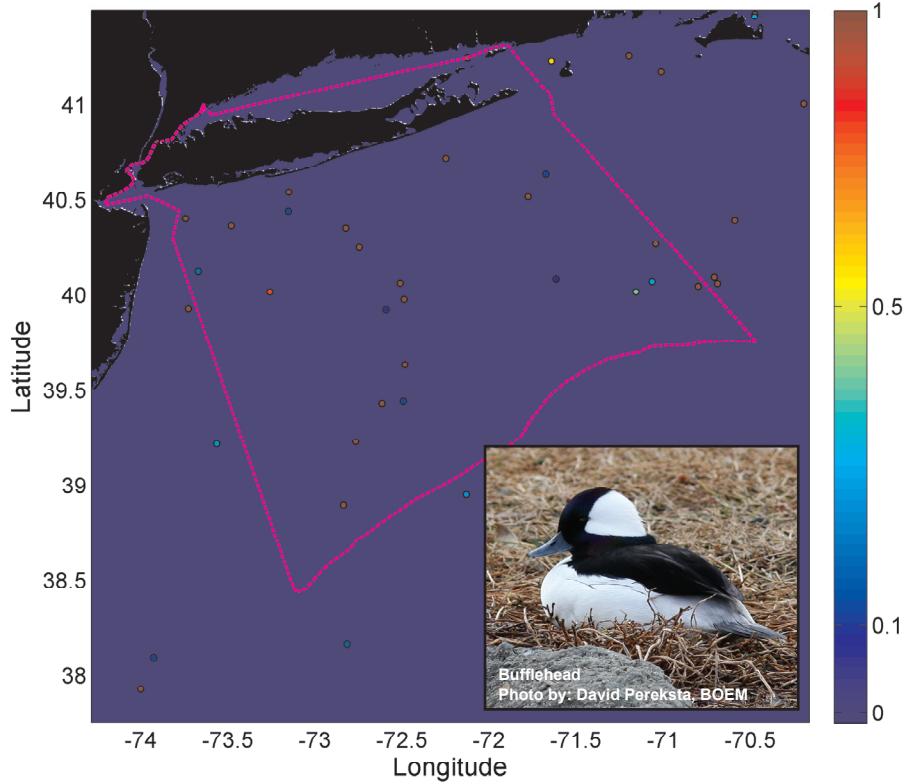


Table 6.79. Data table: Rare Visitors.

Statistic	SP	SU	FA	WI	All
N obs.	18	1	10	11	
Freq. (%)	0.7%	0.0%	0.4%	1.0%	
SPUE when present (No. indiv./km <sup>2</sup> /15 min.)					
Mean	2.35	0.09	1.81	1.40	
10th%ile	0.14	0.09	0.10	0.19	
Median	2.14	0.09	0.53	1.03	
90th%ile	5.22	0.09	6.16	4.10	
Max	7.49	0.09	8.00	5.45	

NOT MODELED

NOT MODELED

Figure 6.32. Point observations of the relative abundance index (SPUE, # indiv./km<sup>2</sup>/15-min) for Rare Visitors. Dark blue shading indicates unsampled areas; no predictive modeling was done for this species group due to insufficient data.

## Skuas, less common (1 species)

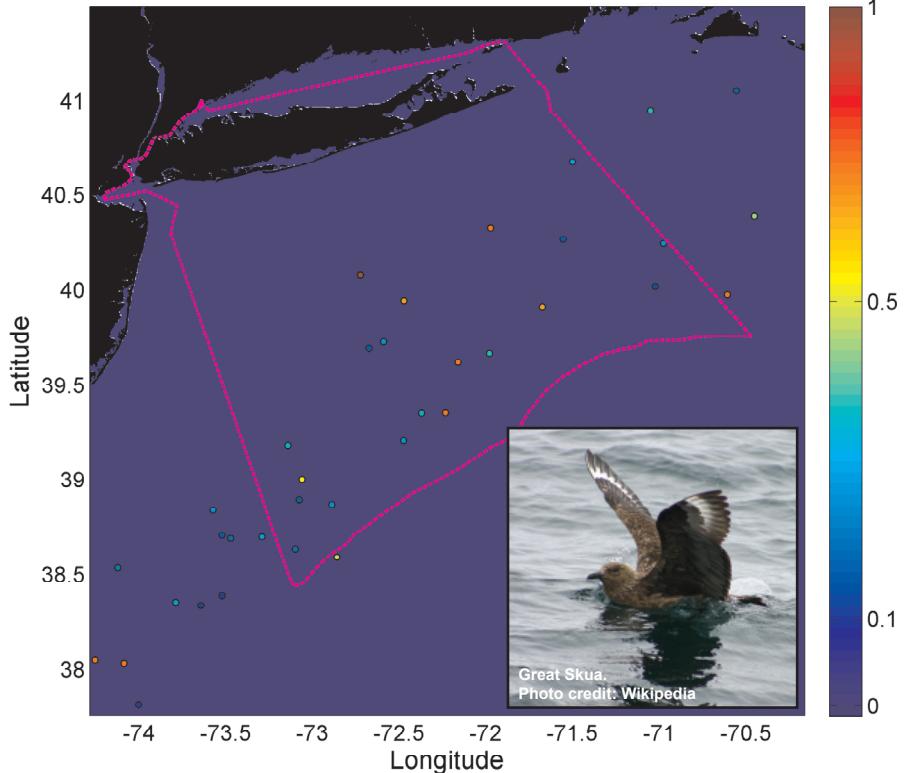


Table 6.80. Data table: Skuas, less common.

Statistic	SP	SU	FA	WI	All
N obs.	12	2	11	11	36
Freq. (%)	0.5%	0.1%	0.4%	1.0%	0.4%
SPUE when present (No. indiv./km <sup>2</sup> /15 min.)					
Mean	0.40	0.65	0.25	0.40	0.37
10th%ile	0.15	0.33	0.12	0.11	0.13
Median	0.30	0.65	0.24	0.27	0.27
90th%ile	0.72	0.98	0.45	0.72	0.72
Max	0.72	0.98	0.48	0.72	0.98

NOT MODELED

NOT MODELED

Figure 6.33. Point observations of the relative abundance index (SPUE, # indiv./km<sup>2</sup>/15-min) for Less Common Skuas. Dark blue shading indicates unsampled areas; no predictive modeling was done for this species group due to insufficient data.

## 'No birds sighted'

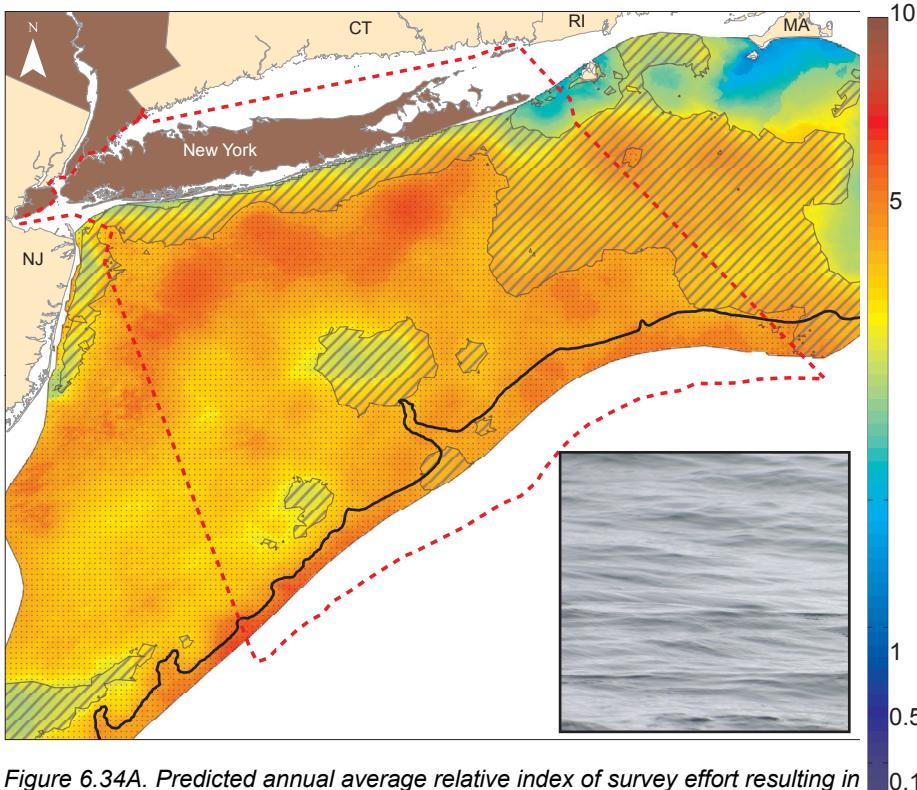


Figure 6.34A. Predicted annual average relative index of survey effort resulting in 'No birds sighted' observations, with error class overlay. Units are  $\text{km}^2$  of transect area in which no birds were sighted in a 15-minute survey. Legend as in Figure 6.8.

Table 6.81. Data table: 'No birds sighted'.

Statistic	SP	SU	FA	WI	All
N obs.	509	838	799	129	2275
Freq. (%)	20.0%	31.3%	28.8%	11.2%	24.9%
'No birds sighted' index ( $\text{km}^2 / 15 \text{ min. survey}$ )					
Mean	0.75	0.82	0.90	0.78	0.83
10th%ile	0.65	0.65	0.65	0.68	0.65
Median	0.72	0.72	0.72	0.72	0.72
90th%ile	0.80	0.96	1.03	0.90	0.90
Max	1.80	3.60	7.20	1.20	7.20

Table 6.82. Predictor table: 'No birds sighted'.

Predictor	Occurrence				Abundance			
	Sp	Su	Fa	Wi	Sp	Su	Fa	Wi
BATH	W	R	R	R	S	G	G	R
SLOPE	R	R	R	R	S	G	G	R
DIST	G	G	R	R	R	R	R	R
SSDIST	G	G	G	R	R	R	R	R
SST	G	G	G	R	R	G	R	R
STRT	R	R	R	R	R	R	R	R
TUR	W	R	R	R	S	R	R	R
CHL	W	R	R	R	R	G	R	R
ZOO	W	G	R	R	R	R	R	R
SLPSLP	R	R	R	R	R	G	R	R
PHIM	G	G	R	R	R	R	R	R

Table 6.83. Diagnostic table: 'No birds sighted'.

Diagnostic statistic	Certainty class			
	Low	Med.	High	ALL
	%area	%area	%area	Avg. LOW
Rank R	-0.17	-0.36	-0.34	0.13
%1SD	69.1%	70.0%	80.0%	70.6%
AUC	0.48	0.58	0.55	0.54
p(AUC)	0.57	0.23	0.39	0.25
MAPE	66%	49%	59%	63%
Rel.MAE	323%	277%	201%	297%
Rel.RMSE	541%	357%	256%	466%
Rel.Bias	453%	454%	296%	433%
Bias Dir.	+	+	+	+

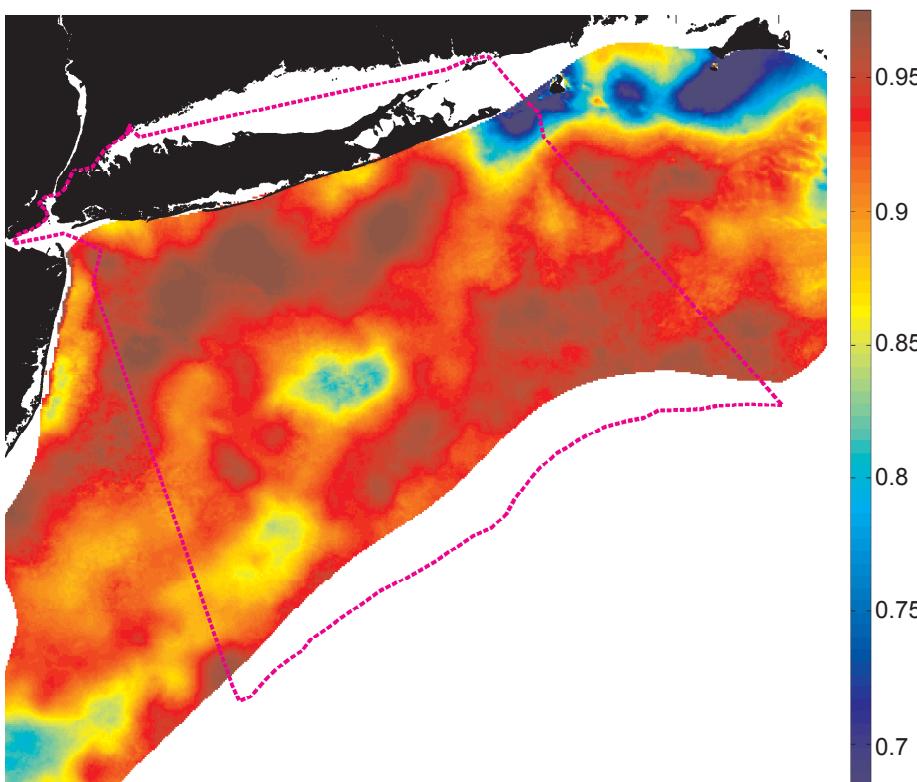


Figure 6.34B. Predicted annual integrated probability of a 'No birds sighted' observation. Units are probability of 'no birds sighted' in a 15-min. survey in at least one of the four seasons. Annual integrated presence probability was calculated as described in Appendix 6.A. For associated certainty map, see Appendix 6.C.

### Box 6.2. Notes on the 'No birds sighted' analyses

In the course of the MBO CSAP standardized visual surveys, observers recorded instances when no seabirds of any kind were sighted in a standardized 15-minute observation period. We analyzed these 'No birds sighted' observations using the same predictive statistical model as for other species and groups, with one exception: instead of SPUE, the 'relative abundance' of 'No birds sighted' was measured as the area (in  $\text{km}^2$ ) of the transect in which no birds were sighted.

The maps at left (Figure 6.34 A and B) may be useful as an alternative or supplement to hotspot maps (Figures 6.35-6.37) to identify areas of potentially high or low conflict between seabird and human uses of ocean habitat.

### Box 6.3. Notes on Hotspot Analyses

Abundance and diversity are two important metrics of ecosystem structure. Concentrations of abundance can indicate areas that are important to multiple species for feeding, reproduction, migration, refuge from unfavorable conditions (storms, predators), and other important aspects of seabird life cycles. These may be apparent in annual distributions, or occur only seasonally due to varying environmental conditions and timing of life cycles.

Abundance hotspots alone do not give a complete picture of important areas for seabirds, because they can be driven by the presence of only one or a few very abundant species. Areas of high diversity, as measured by the Shannon diversity index ( $H'$ ), represent places where diverse bird communities form aggregations of many species in which even rarer species are relatively well-represented. These may represent convergences of environmental conditions suitable for many species, or may arise from species interactions. Regardless of the reason for high diversity, diversity hotspots are often considered of high conservation value because of the relatively high number of species than can be protected in a relatively small area.

Beyond their ecological importance, hotspots of abundance and diversity are important for marine spatial planning because they represent areas where large numbers of individual birds and/or large numbers of bird species may be affected by human activities. Diversity hotspots may also be of value for non-consumptive human activities such as bird-watching.

On this page and the pages that follow, annual predicted abundance hotspots (Figure 6.35), species richness hotspots (Figure 6.36), and Shannon diversity index hotspots (Figure 6.37) are shown.

## Abundance Hotspots

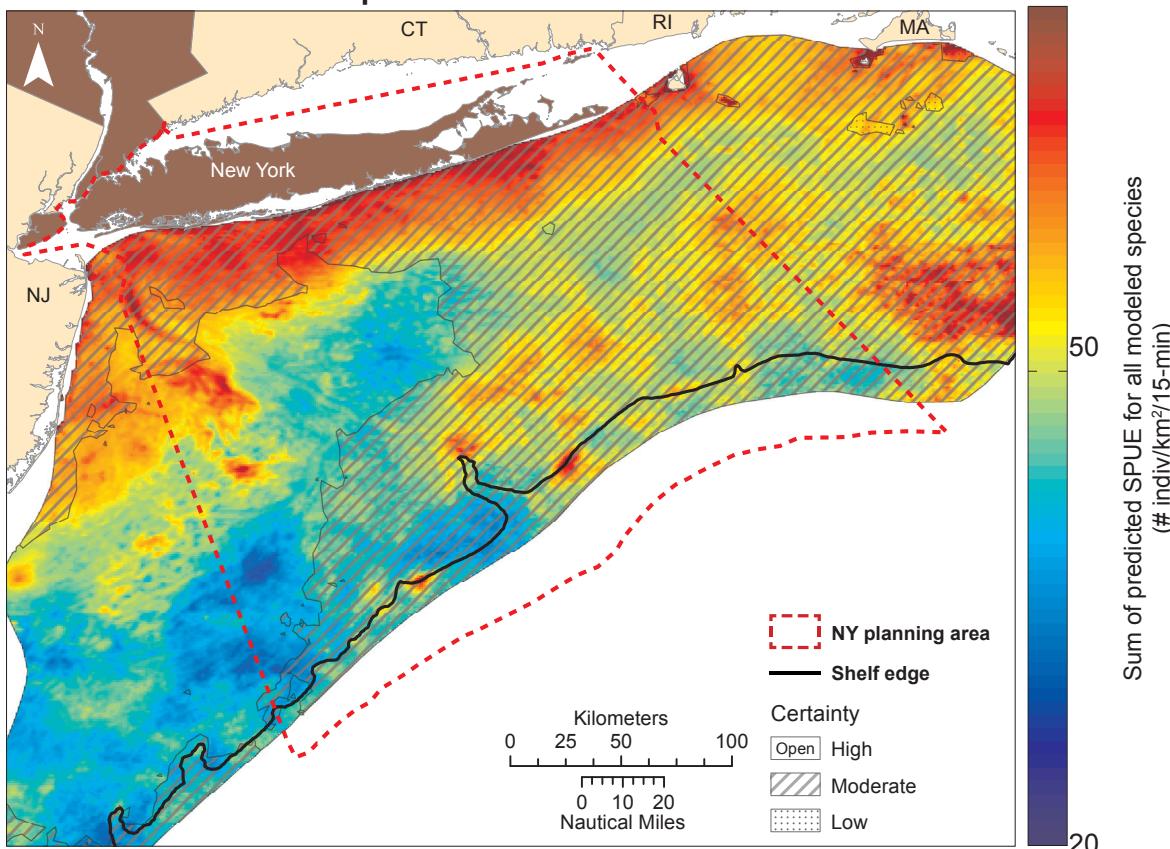


Figure 6.35. Predicted seabird abundance hotspot map.

## Richness Hotspots

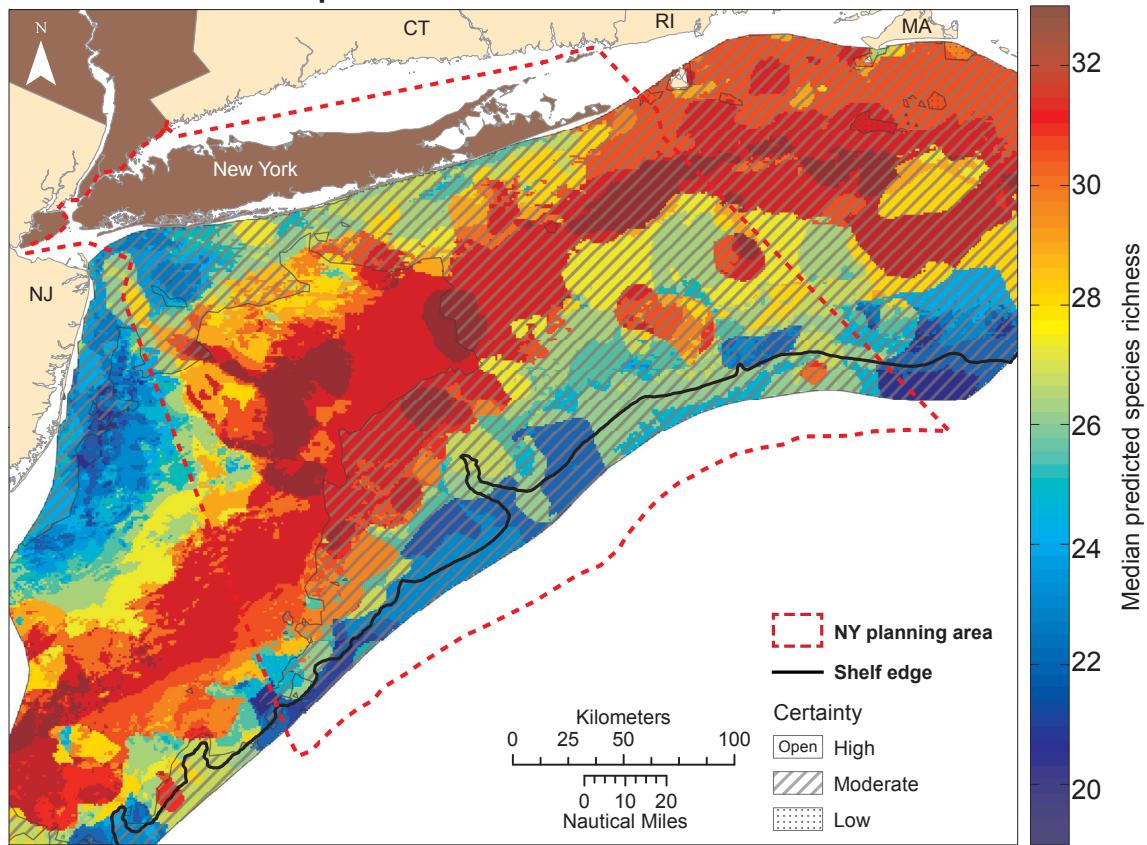


Figure 6.36. Predicted species richness hotspot map.

## Diversity Hotspots

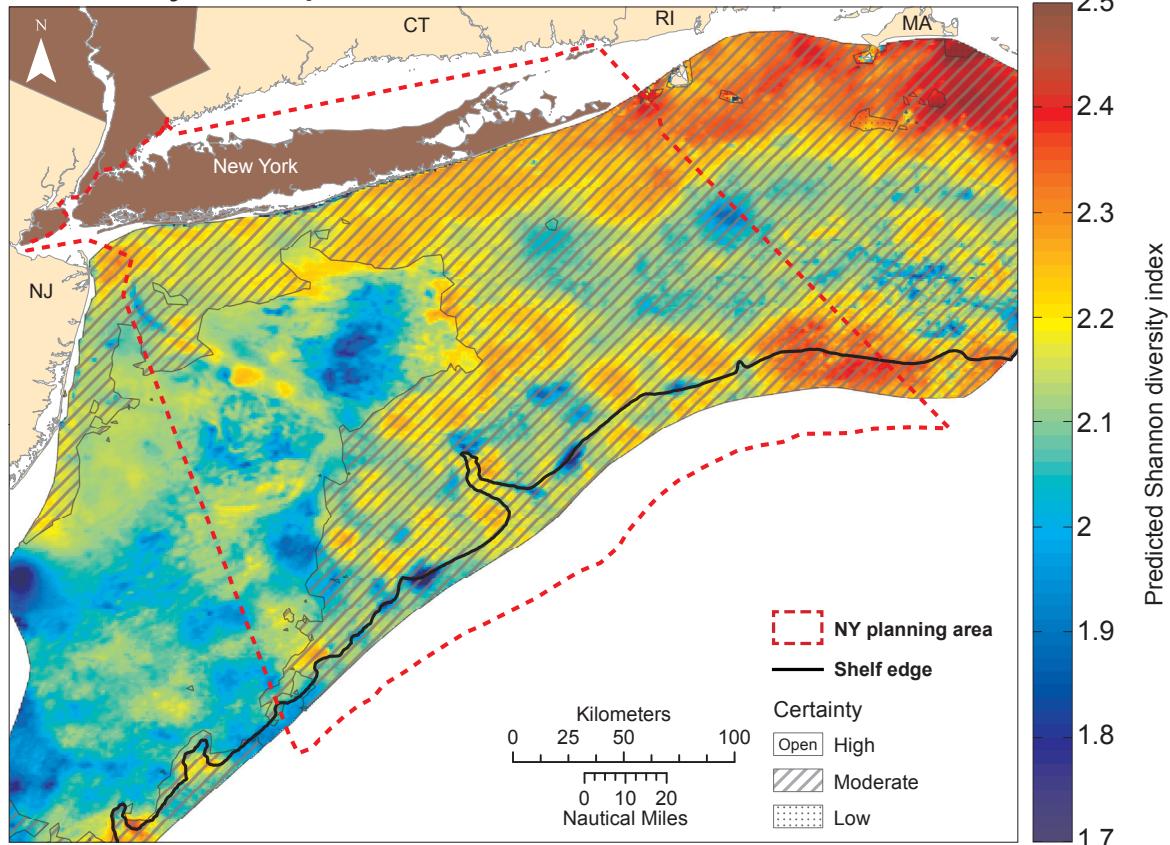


Figure 6.37. Predicted Shannon species diversity index hotspot map.