

ASSESSMENT OF THE EFFECTS OF UNDERWATER NOISE FROM THE PROPOSED NEPTUNE LNG PROJECT

Supplementary Acoustic Modeling Report

Version 2.0

By



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Introduction

In October 2005, LGL Limited and JASCO Research Ltd. submitted a report entitled “Assessment of the effects of underwater noise from the proposed Neptune LNG Project” to Ecology and Environment, Inc. This report contains the results of new acoustical modeling performed in 2006 to further evaluate underwater noise levels resulting from LNG carrier operations.

This supplementary report on acoustic modeling needs to be read in conjunction with the main 2005 report where the methods used for the modeling are presented. A companion report by LGL Ltd., discusses potential biological effects based on the results of the acoustic modeling presented here.

Acoustic Modeling

Four additional scenarios were modeled in 2006 to further assess potential acoustic impacts during operations of the planned Neptune Deep Water Port (DWP). The scenarios described further below, include two scenarios examining the use of the vessel’s thrusters and two scenarios to examine the effects of the LNG carriers when they are traveling along the main shipping channel (TSS) into, and out of, the Boston area.

The MONM propagation model was run in the full $n \times 2$ -D sense as described in Part 3 of the original report. Environmental parameters, including the sound speed profiles and geoacoustic properties, are identical to those presented in the original report. Source levels (Table 1) for the four scenarios were calculated using the empirical expression presented on page 3-48 of the original report. Below 100 Hz, the levels were assumed to remain flat at the 100 Hz level.

Table 1: 1/3rd Octave Band Source Levels

Scenario:	0 LNG Dynamic Positioning	1 LNG Maintaining Position while on Buoy and Regasifying	2 10 knot TSS Transit	3 14 knot TSS Transit
Frequency (Hz)	LNG 1/3rd Octave Band Source Levels (dB re 1 uPa @ 1 m)			
10	176.8	172.2	163.6	167.4
12.5	176.8	172.2	163.6	167.4
16	176.8	172.2	163.6	167.4
20	176.8	172.2	163.6	167.4
25	176.8	172.2	163.6	167.4
31.5	176.8	172.2	163.6	167.4
40	176.8	172.2	163.6	167.4
50	176.8	172.2	163.6	167.4
63	176.8	172.2	163.6	167.4
80	176.8	172.2	163.6	167.4
100	176.8	172.2	163.6	167.4
125	174.9	170.2	161.7	165.4
160	172.7	168.1	159.5	163.3
200	170.8	166.1	157.6	161.3
250	168.9	164.2	155.7	159.4
315	166.8	162.2	153.7	157.4
400	164.8	160.1	151.6	155.3
500	162.8	158.2	149.6	153.4
630	160.8	156.2	147.6	151.4
800	158.8	154.1	145.6	149.3
1000	156.8	152.2	143.6	147.4
1250	154.9	150.2	141.7	145.4
1600	152.7	148.1	139.5	143.3
2000	150.8	146.1	137.6	141.3
Broadband	187.9	183.2	174.6	178.4

Scenario 0: LNG Dynamic Positioning

This scenario models a typical dynamic positioning operation. It assumes that all four of the vessel's thrusters (2 bow and 2 stern) are operating at 100% load. The operation is expected to occur for approximately 20 hours annually. The scenario was modeled at both the north and south buoys (Figure 1) during the spring, summer, fall and winter seasons.

Scenario 1: LNG Maintaining Position while on Buoy and Regasifying

Two stern thrusters may be used during periods of heavy weather in order to maintain position while on a buoy or during regasifying operations. This scenario models underwater noise resulting from the use of two stern thrusters assumed to be operating at one hundred percent load. The annual operation of this scenario remains to be determined. The scenario was modeled at both the north and south buoys (Figure 1) during the spring, summer, fall and winter seasons.

Scenario 2: Transit on the Boston TSS at 10 knots

Scenario 2 examines the LNG transiting on the Boston TSS at approximately 10 knots (45 rpm) at the location marked 2 on Figure 1 which is in proximity to the Cape Cod Critical Habitat of the North Atlantic Right Whale. The scenario was modeled during the spring, summer, fall and winter seasons.

Scenario 3: Transit on the Boston TSS at 14 knots

Scenario 3 examines the LNG transiting on the Boston TSS at approximately 14 knots (60 rpm) at the location marked 3 on Figure 1 which is in proximity to the Cape Cod Critical Habitat of the North Atlantic Right Whale. The scenario was modeled during the spring, summer, fall and winter seasons.

Modeling Results

Geographically rendered maps of the received noise levels for the four modeled scenarios discussed above are shown in Appendix A, B, C and D. The acoustic level values in the model output represent the RMS sound pressure level (SPL_{RMS}) metric in dB re 1 μ Pa (RMS). Table 2 (Scenario 0/1) and Table 3 (Scenarios 2/3) summarize the average range to and area ensonified by the 120 dB contours for the four scenarios.

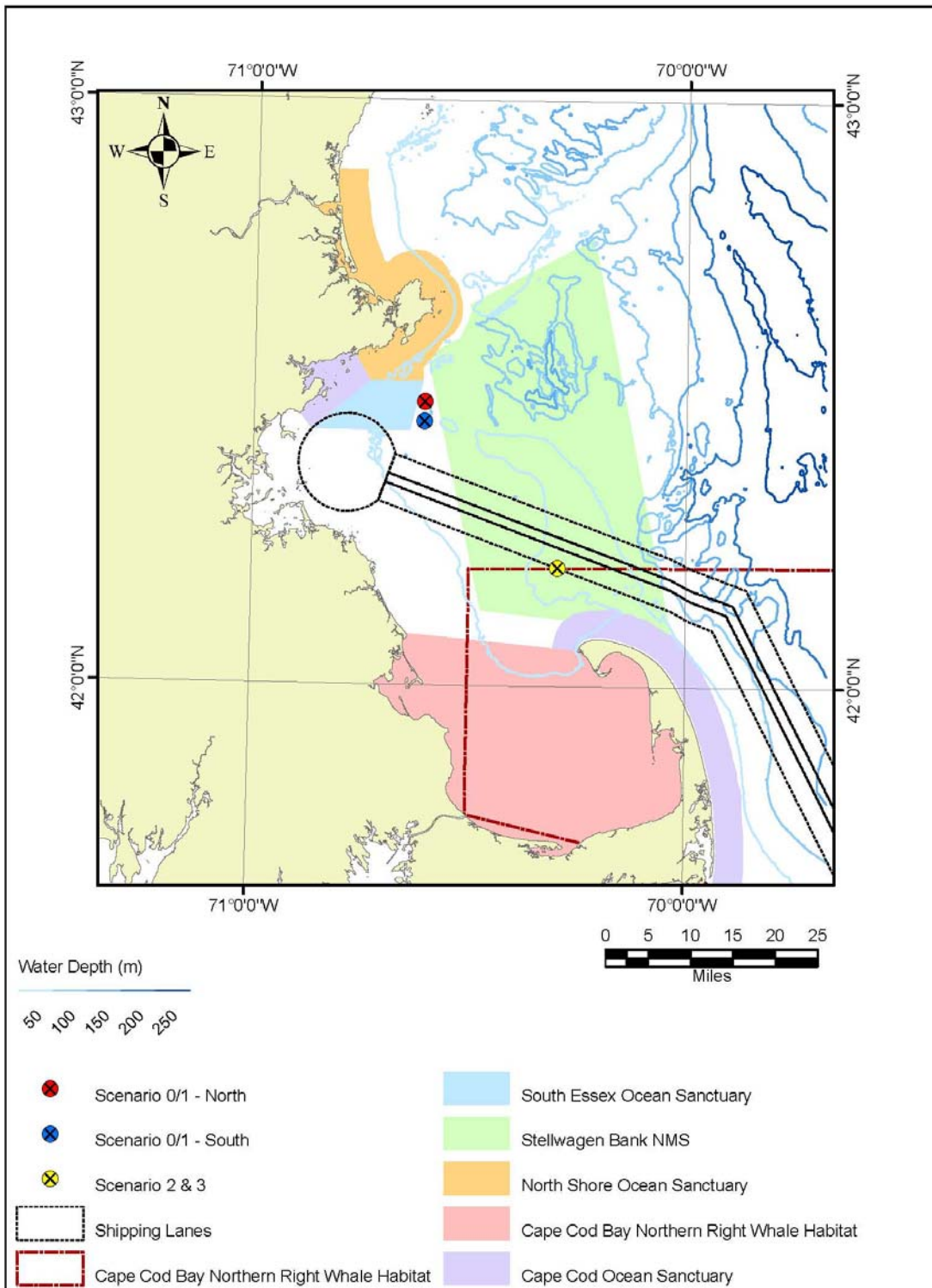


Figure 1: Location of LNG carrier for Scenarios 1, 2 and 3.

Table 2: Thruster Scenarios - Average Range and Area Ensonified by 120 dB contours

Scenario	Average Range to 120 dB contour (km)				Average Range to 120 dB contour (nm)				Area Inside 120 dB (km ²)				Area Inside 120 dB (nm ²)			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
S0: LNG Dynamic Positioning																
North Buoy																
1 m (Surface)	1.53	1.42	1.46	1.55	0.83	0.77	0.79	0.84	7.3	6.4	6.7	7.5	2.1	1.9	2.0	2.2
50 m	5.07	4.41	4.82	5.77	2.74	2.38	2.60	3.12	80.8	61.1	72.9	104.6	23.6	17.8	21.3	30.5
Bottom	5.46	4.98	5.22	5.68	2.95	2.69	2.82	3.07	93.6	77.9	85.7	101.4	27.3	22.7	25.0	29.6
South Buoy																
1 m (Surface)	1.47	1.39	1.42	1.50	0.80	0.75	0.77	0.81	6.8	6.0	6.3	7.1	2.0	1.8	1.8	2.1
50 m	5.16	4.55	4.97	5.94	2.79	2.46	2.68	3.21	83.7	65.2	77.6	110.9	24.4	19.0	22.6	32.3
Bottom	5.81	5.30	5.62	6.06	3.14	2.86	3.03	3.27	105.9	88.3	99.2	115.2	30.9	25.7	28.9	33.6
S1: LNG Maintaining Position while on Buoy and Regasifying																
North Buoy																
1 m (Surface)	0.96	0.93	0.94	0.97	0.52	0.50	0.51	0.52	2.9	2.7	2.8	2.9	0.9	0.8	0.8	0.9
50 m	3.35	3.01	3.21	3.67	1.81	1.63	1.73	1.98	35.2	28.5	32.3	42.4	10.3	8.3	9.4	12.4
Bottom	3.75	3.41	3.57	3.87	2.03	1.84	1.93	2.09	44.2	36.4	40.1	47.0	12.9	10.6	11.7	13.7
South Buoy																
1 m (Surface)	0.96	0.92	0.93	0.96	0.52	0.50	0.50	0.52	2.9	2.7	2.7	2.9	0.8	0.8	0.8	0.9
50 m	3.41	3.06	3.24	3.69	1.84	1.65	1.75	1.99	36.5	29.4	32.9	42.8	10.6	8.6	9.6	12.5
Bottom	3.80	3.57	3.69	3.92	2.05	1.93	1.99	2.12	45.4	40.1	42.9	48.2	13.2	11.7	12.5	14.1

Table 3: LNG TSS Transit Scenarios - Average Range and Area Ensonified by 120 dB contours

Scenario	Average Range to 120 dB contour (km)				Average Range to 120 dB contour (nm)				Area Inside 120 dB (km ²)				Area Inside 120 dB (nm ²)			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
S2: LNG TSS Transit at 10 kts (45 rpm)																
1 m (Surface)	0.57	0.54	0.55	0.58	0.31	0.29	0.30	0.31	1.0	0.9	0.9	1.1	0.3	0.3	0.3	0.3
50 m	1.69	1.58	1.62	1.72	0.91	0.85	0.87	0.93	9.0	7.8	8.2	9.3	2.6	2.3	2.4	2.7
Bottom	1.69	1.58	1.62	1.72	0.91	0.85	0.87	0.93	9.0	7.8	8.2	9.3	2.6	2.3	2.4	2.7
S3: LNG TSS Transit at 14 kts (60 rpm)																
1 m (Surface)	0.78	0.75	0.76	0.79	0.42	0.40	0.41	0.43	1.9	1.8	1.8	2.0	0.6	0.5	0.5	0.6
50 m	2.34	2.18	2.24	2.39	1.26	1.18	1.21	1.29	17.2	14.9	15.7	17.9	5.0	4.3	4.6	5.2
Bottom	2.34	2.18	2.24	2.39	1.26	1.18	1.21	1.29	17.2	14.9	15.7	17.9	5.0	4.3	4.6	5.2

Conclusion

The present supplementary acoustic modeling report examined the potential noise fields resulting from the LNG carrier traveling in the TSS at 10 and 14 knots and from the operation of the LNG's thrusters during dynamic position and while maintaining position on the buoy during regasifying operations at both the north and south buoy locations.

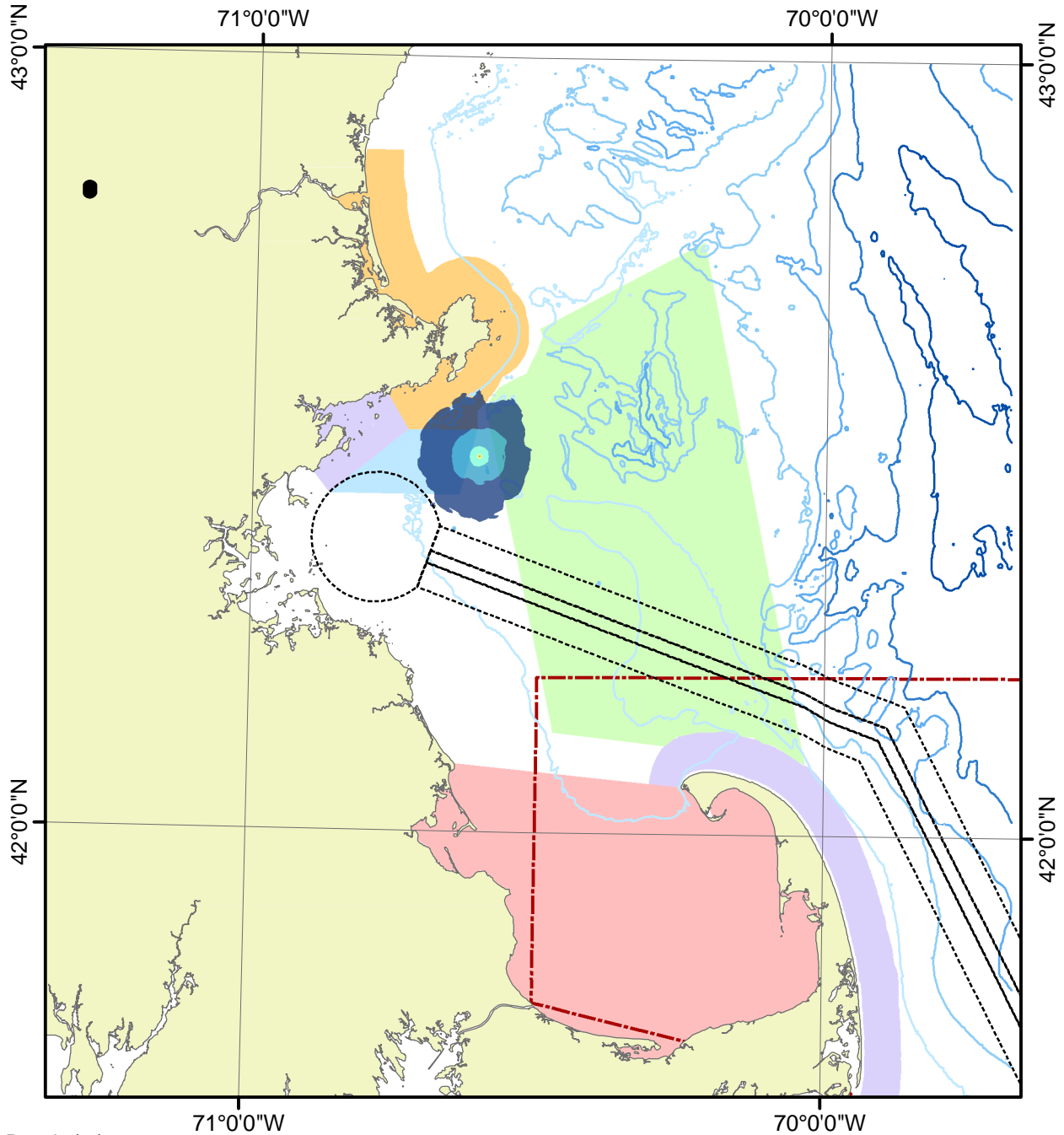
Results of the modeling presented in this report include predictions of ranges to the 120dB isopleths and the area ensonified by 120dBs or greater for each of the scenarios. The results are summarized in Table 2 and Table 3 and were used by LGL Limited to estimate potential impacts on marine mammals (LGL Supplementary Biological Effects Report, 2006).

Literature Cited

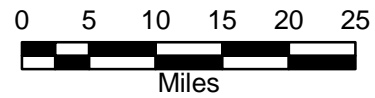
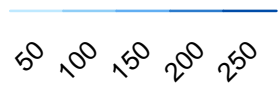
LGL and JASCO Research. 2005. Assessment of the effects of underwater noise from the proposed Neptune LNG Project. Report by LGL Limited, King City, ON and JASCO Research Ltd. Halifax, NS for Ecology and Environment, Inc., Arlington, VA. 234 p.

Appendix A: Noise Maps – LNG Dynamic Positioning

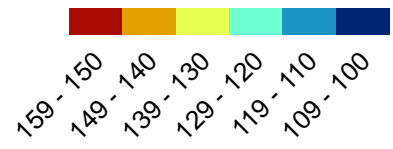
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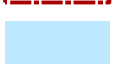
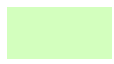





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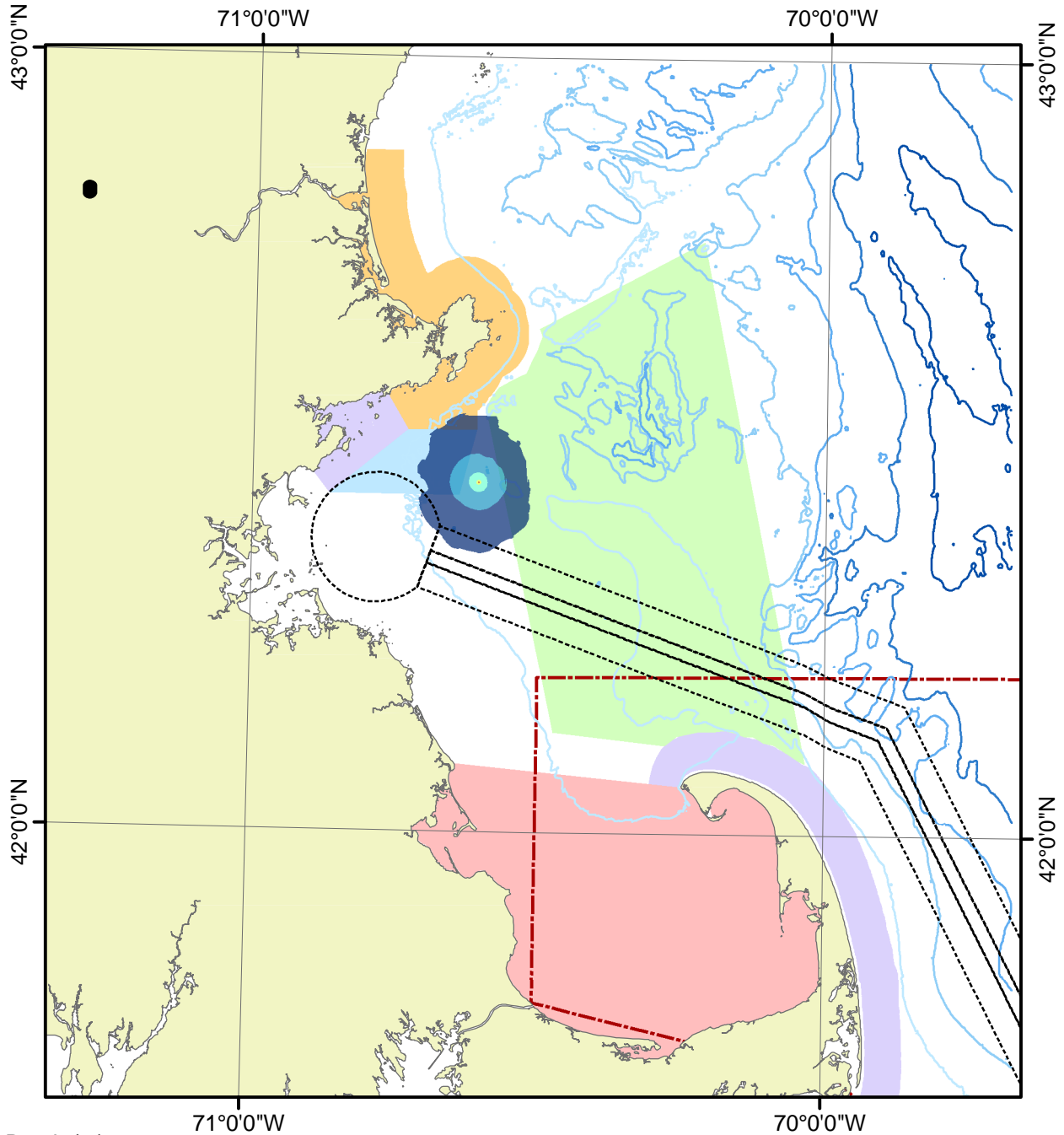


Received Levels (dB re 1 microPa)

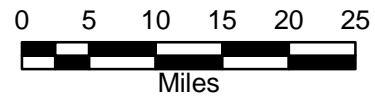
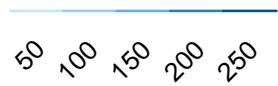


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

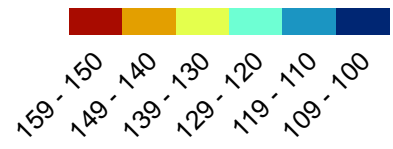
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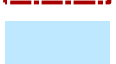
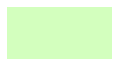


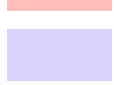


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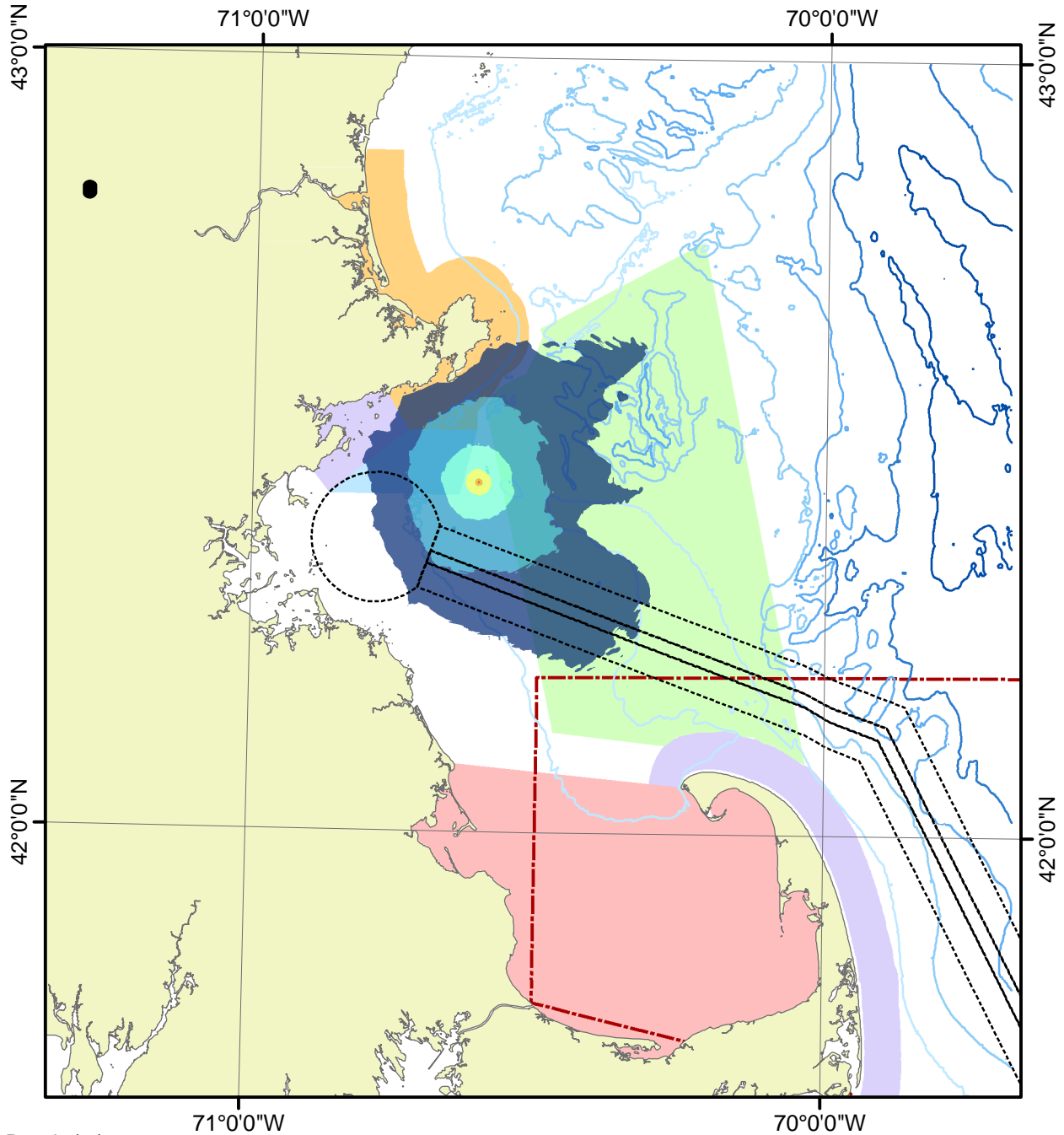


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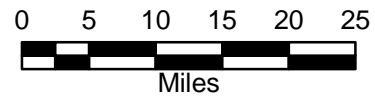
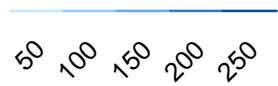


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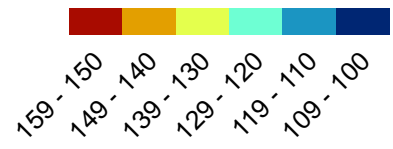
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Water Depth (m)

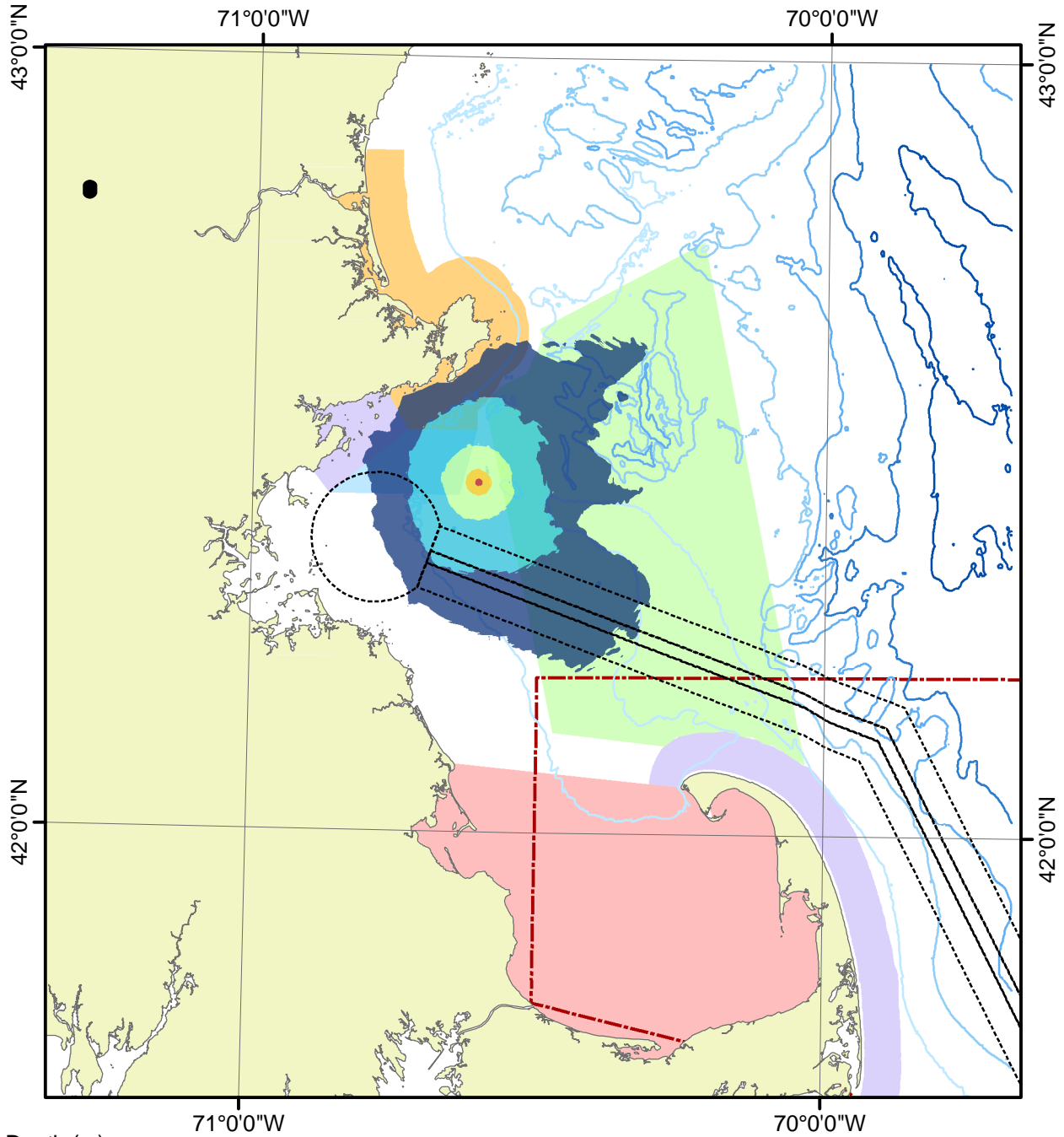


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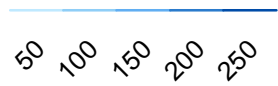


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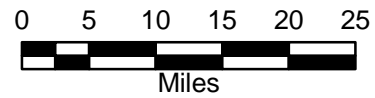
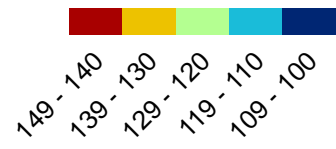
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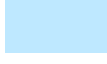
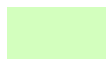





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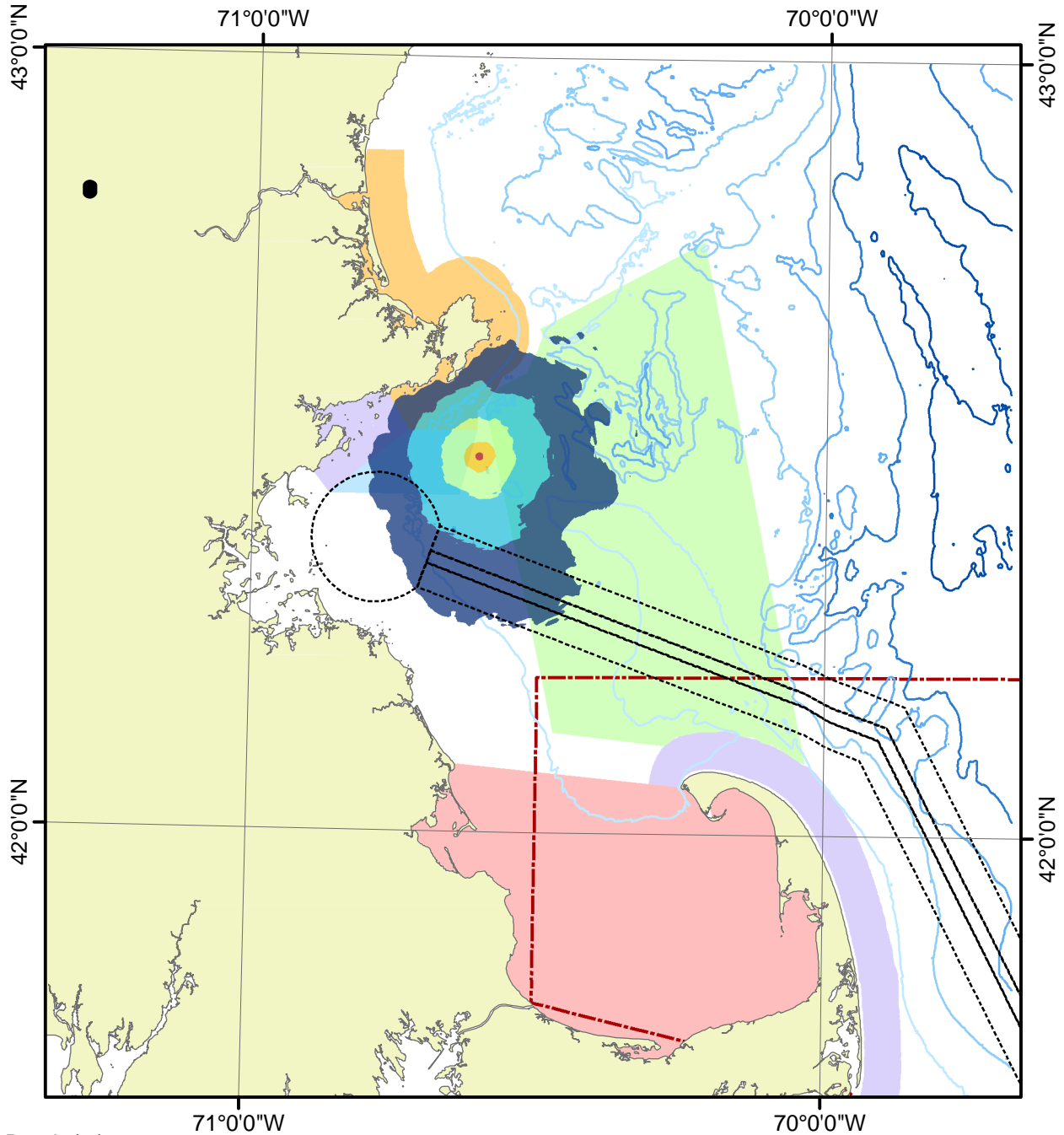


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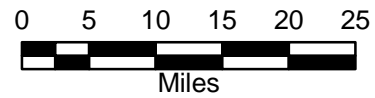
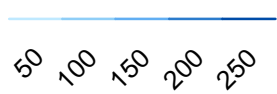


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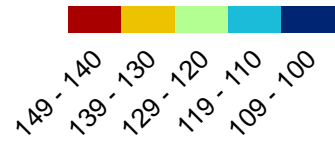
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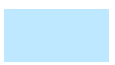
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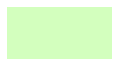
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



North Shore Ocean Sanctuary

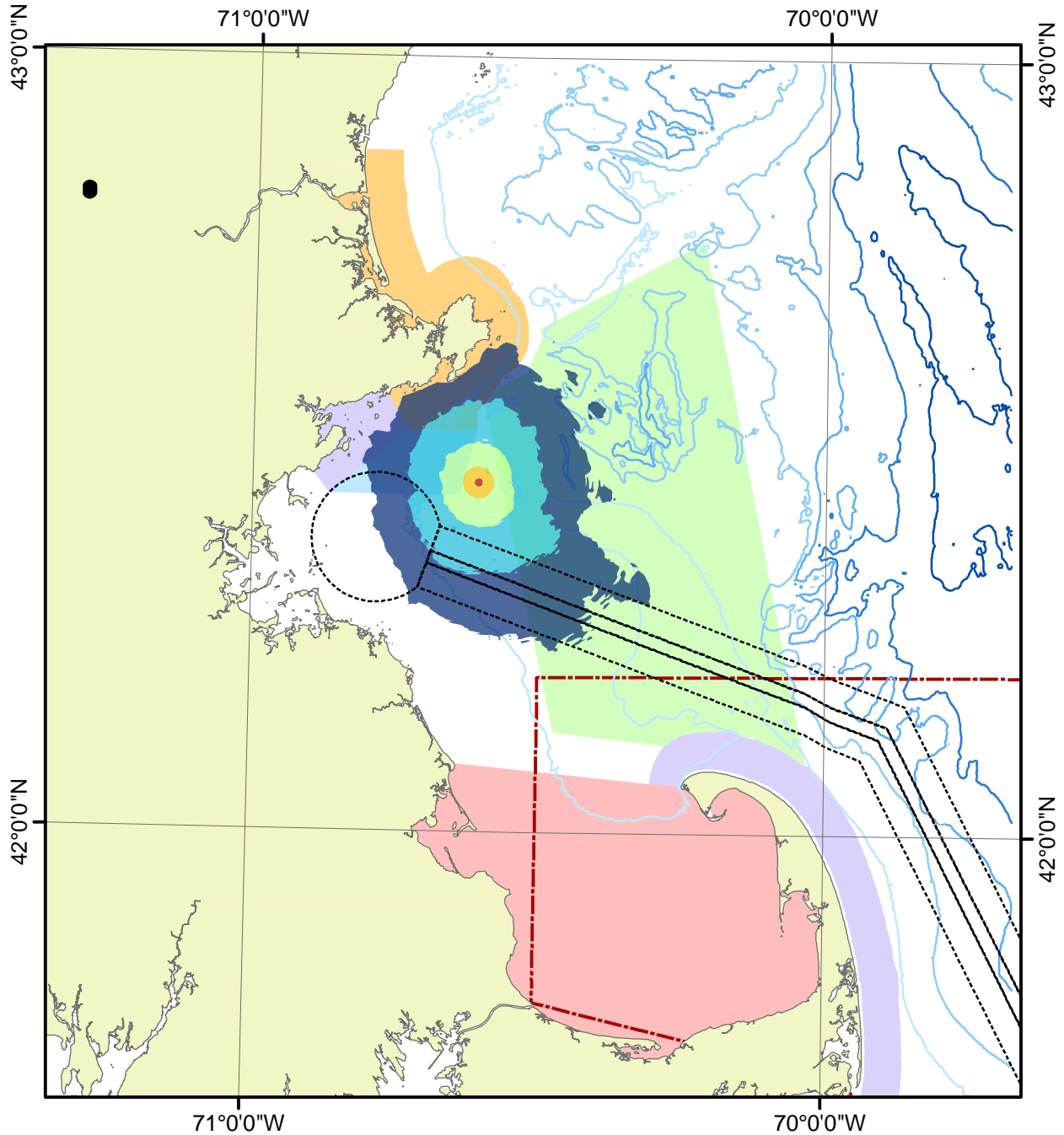


Cape Cod Bay Northern Right Whale Habitat

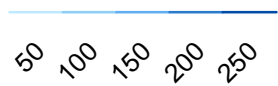


Cape Cod Ocean Sanctuary

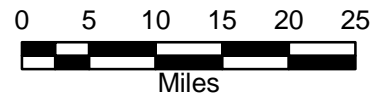
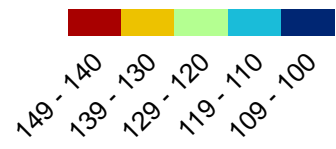
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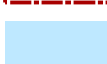
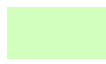


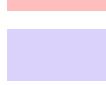


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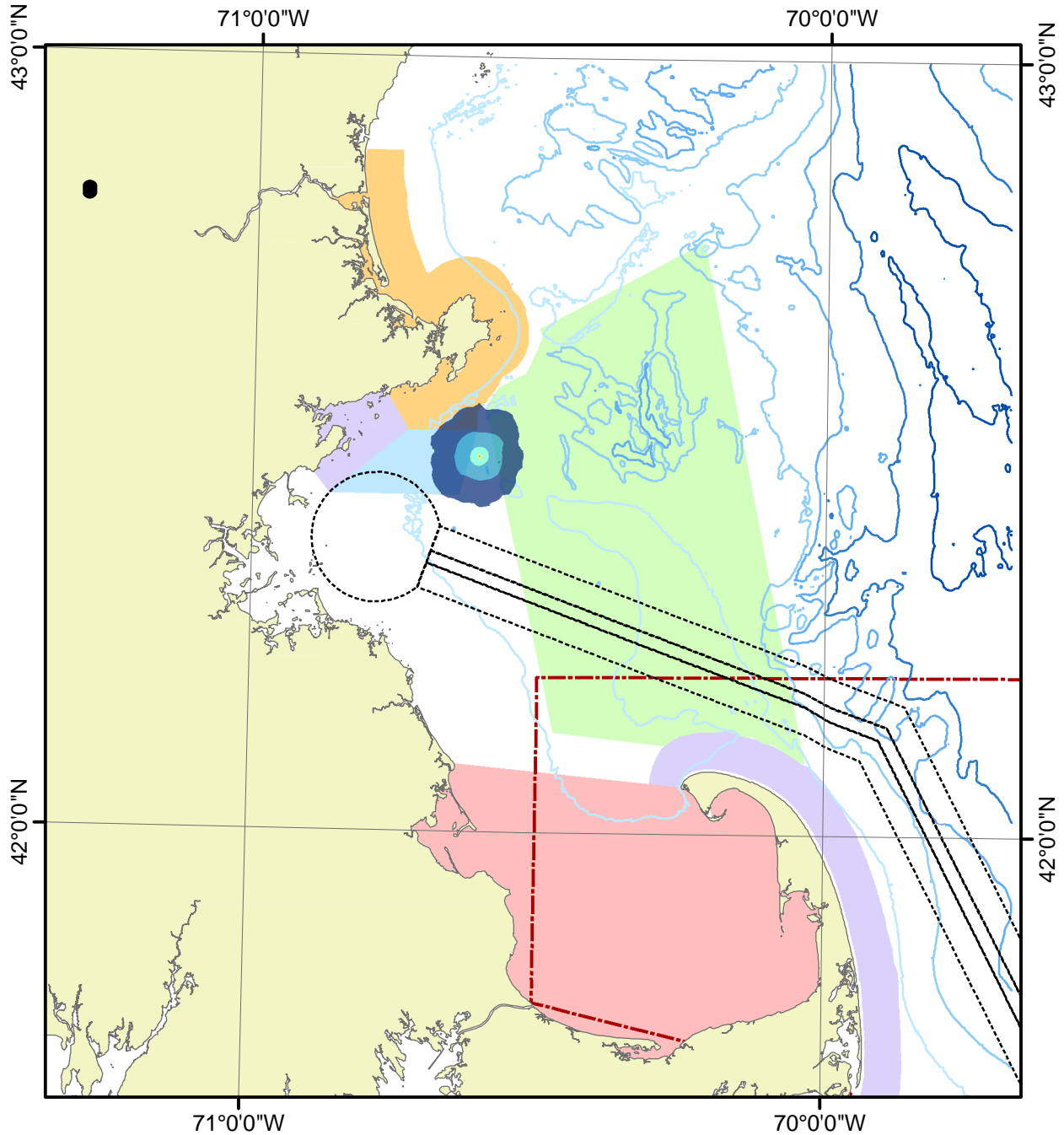


Received Levels (dB re 1 microPa)



-  Shipping Lanes
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Neptune - 4 Thrusters Sum. 1m N



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

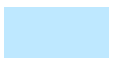
159 - 150
149 - 140
139 - 130
129 - 120
119 - 110
109 - 100



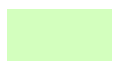
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



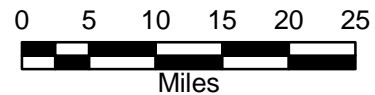
North Shore Ocean Sanctuary



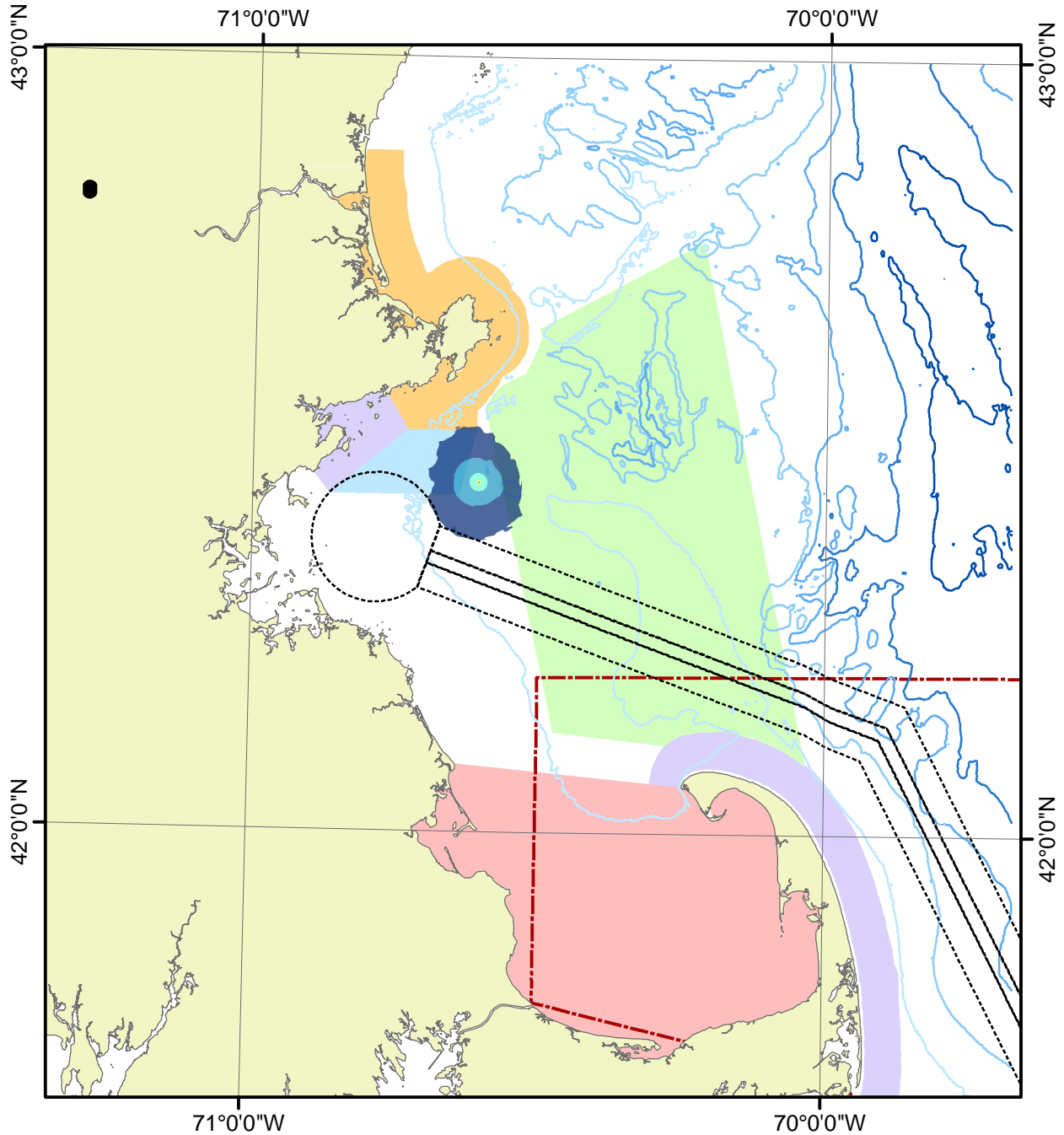
Cape Cod Bay Northern Right Whale Habitat



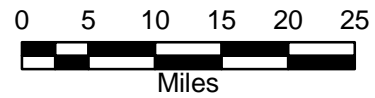
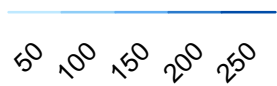
Cape Cod Ocean Sanctuary



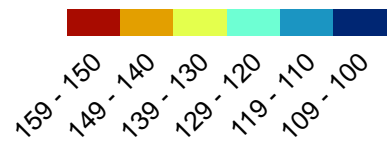
Neptune - 4 Thrusters Sum. 1m S



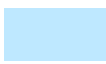
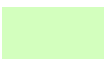




Water Depth (m)

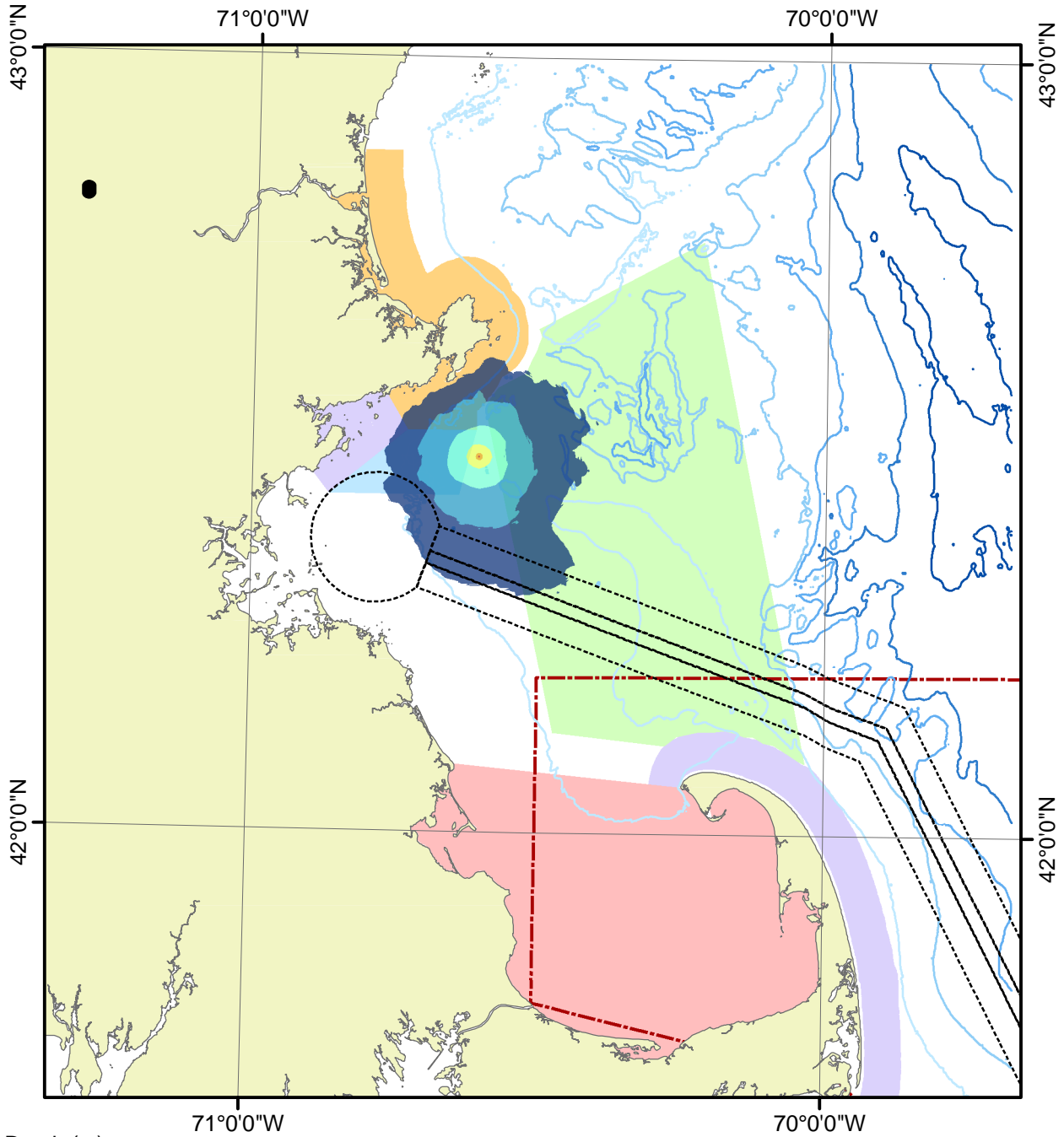


Received Levels (dB re 1 microPa)



-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

Neptune - 4 Thrusters Sum. 50m N



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

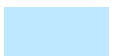
159 - 150
149 - 140
139 - 130
129 - 120
119 - 110
109 - 100



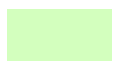
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



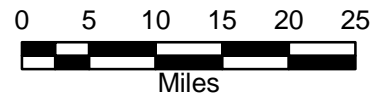
North Shore Ocean Sanctuary



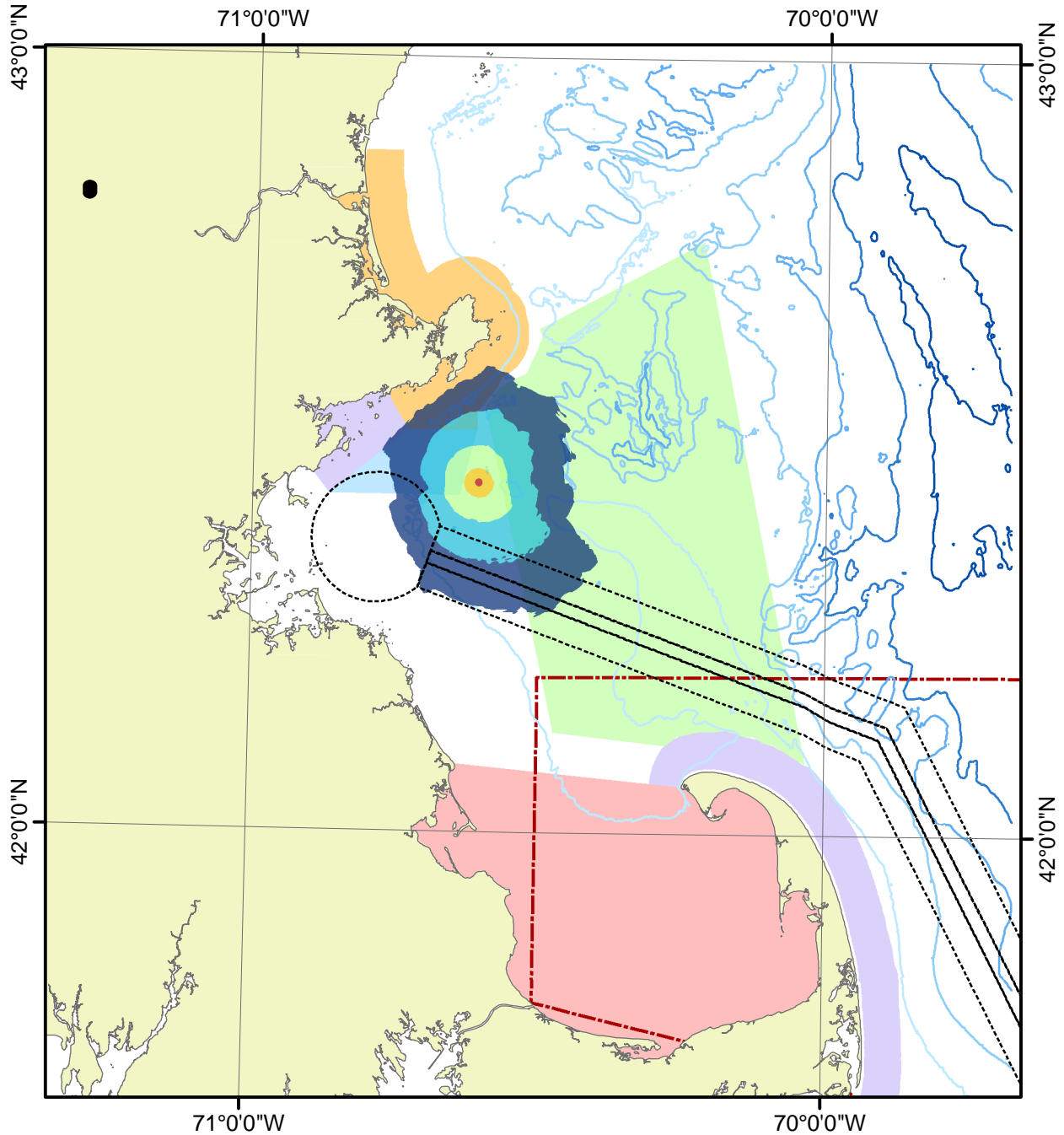
Cape Cod Bay Northern Right Whale Habitat



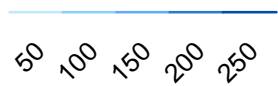
Cape Cod Ocean Sanctuary



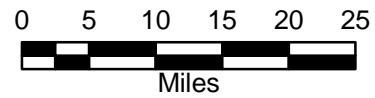
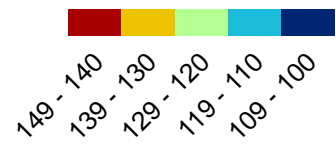
Neptune - 4 Thrusters Sum. 50m S



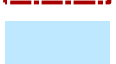
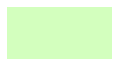


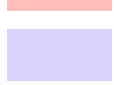


Water Depth (m)

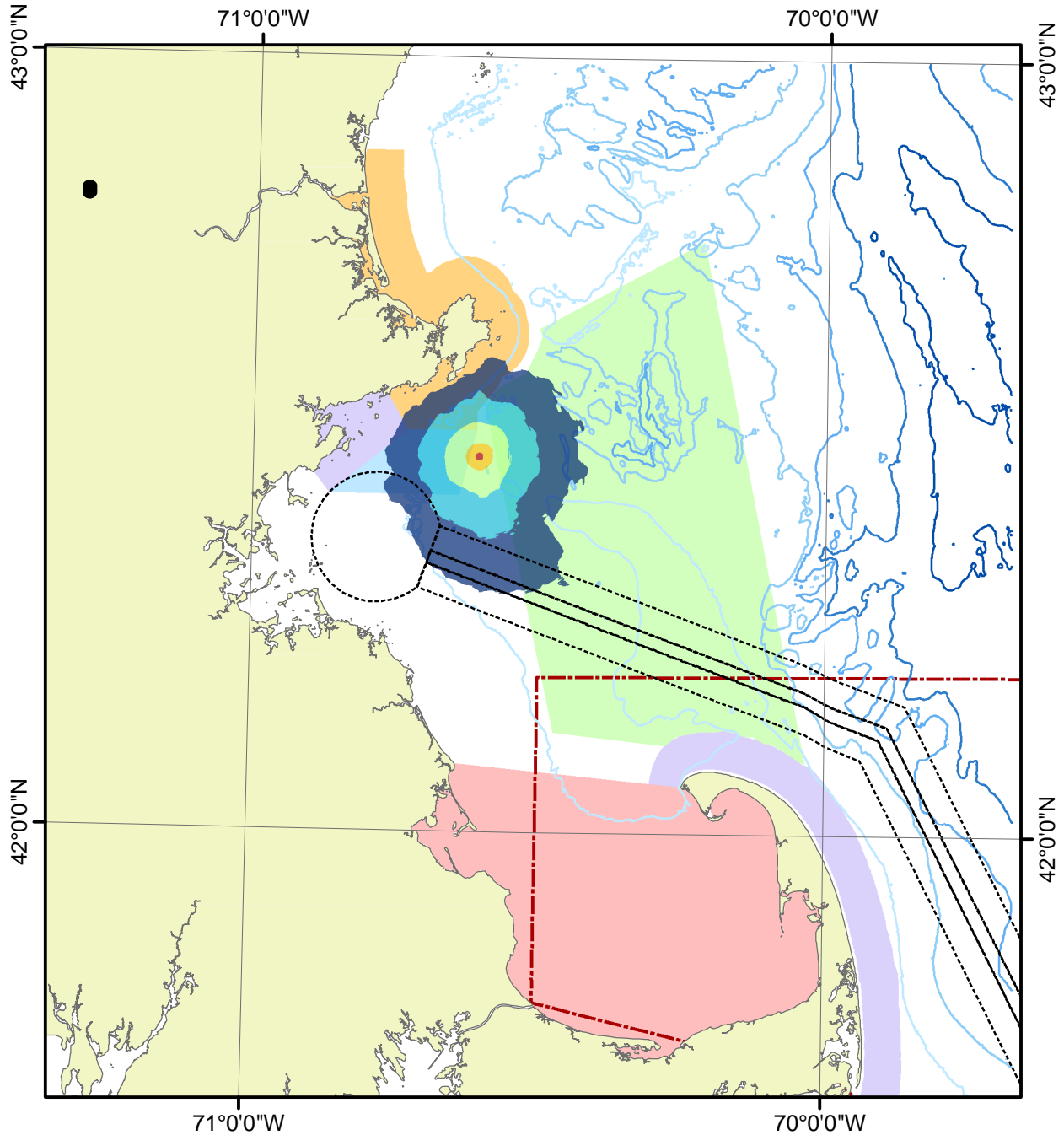


Received Levels (dB re 1 microPa)



-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

Neptune - 4 Thrusters Sum. 500m N



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

149 - 140
139 - 130
129 - 120
119 - 110
109 - 100

Shipping Lanes

Cape Cod Bay Northern Right Whale Habitat

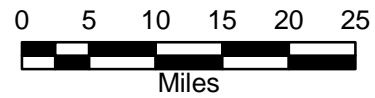
South Essex Ocean Sanctuary

Stellwagen Bank NMS

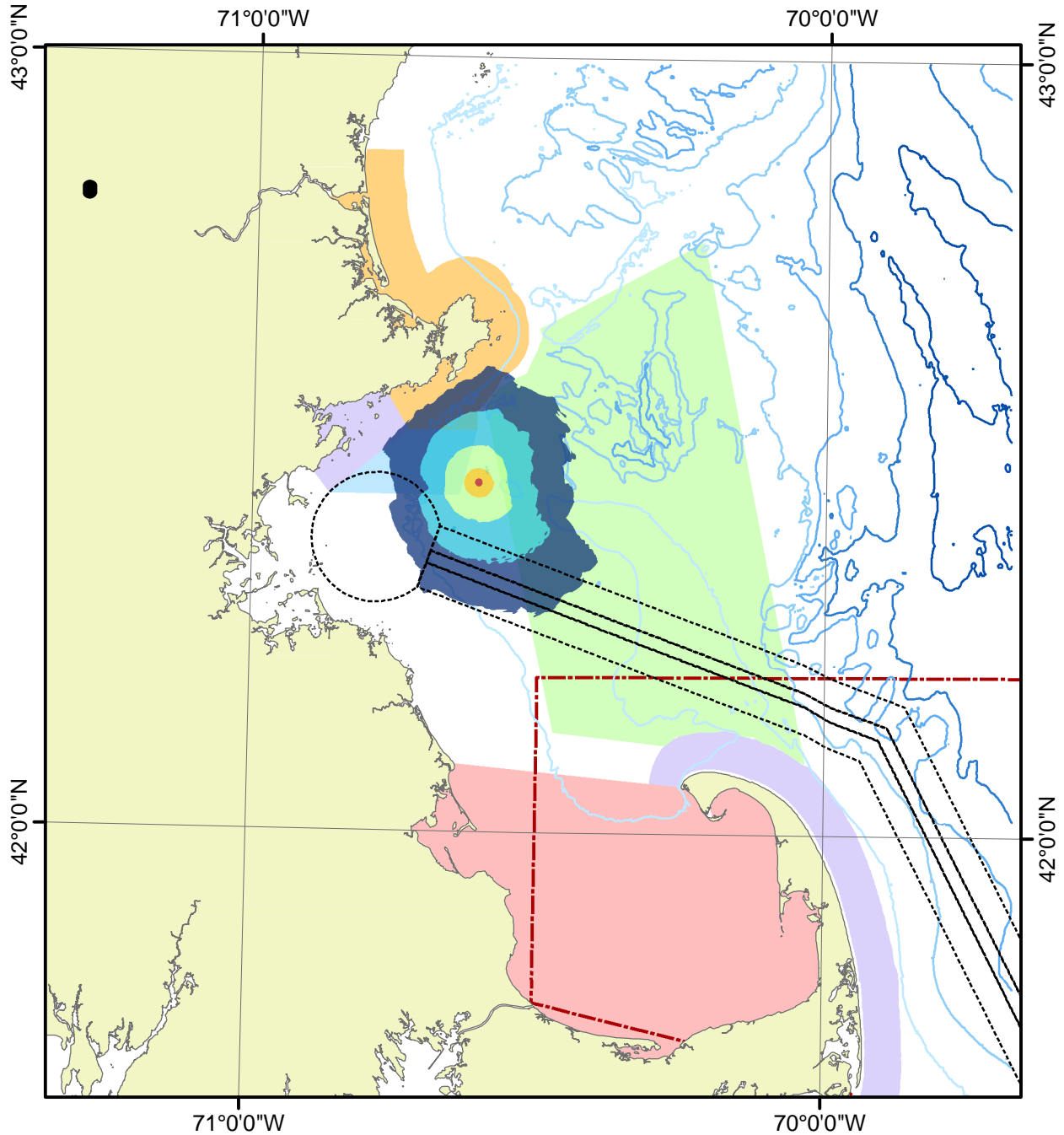
North Shore Ocean Sanctuary

Cape Cod Bay Northern Right Whale Habitat

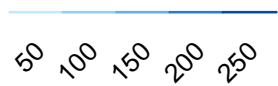
Cape Cod Ocean Sanctuary



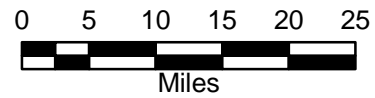
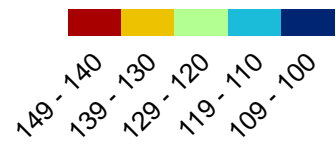
Neptune - 4 Thrusters Sum. 500m S



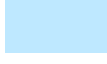
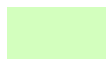





Water Depth (m)

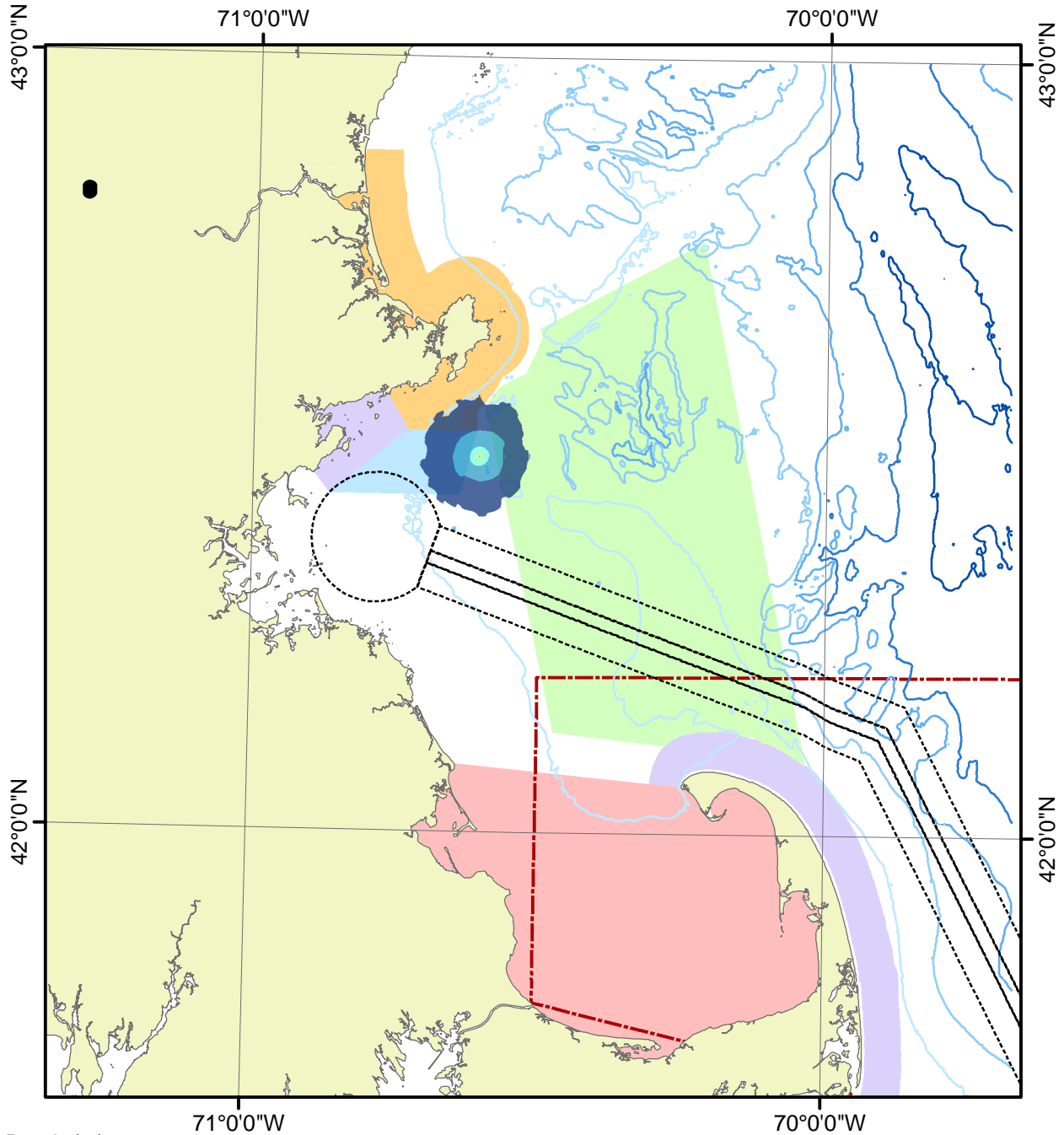


Received Levels (dB re 1 microPa)

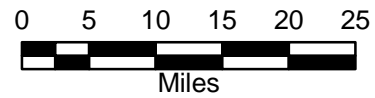
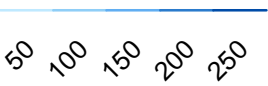


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

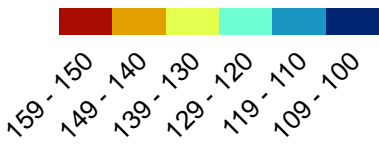
Neptune - 4 Thrusters Fal. 1m N



Water Depth (m)

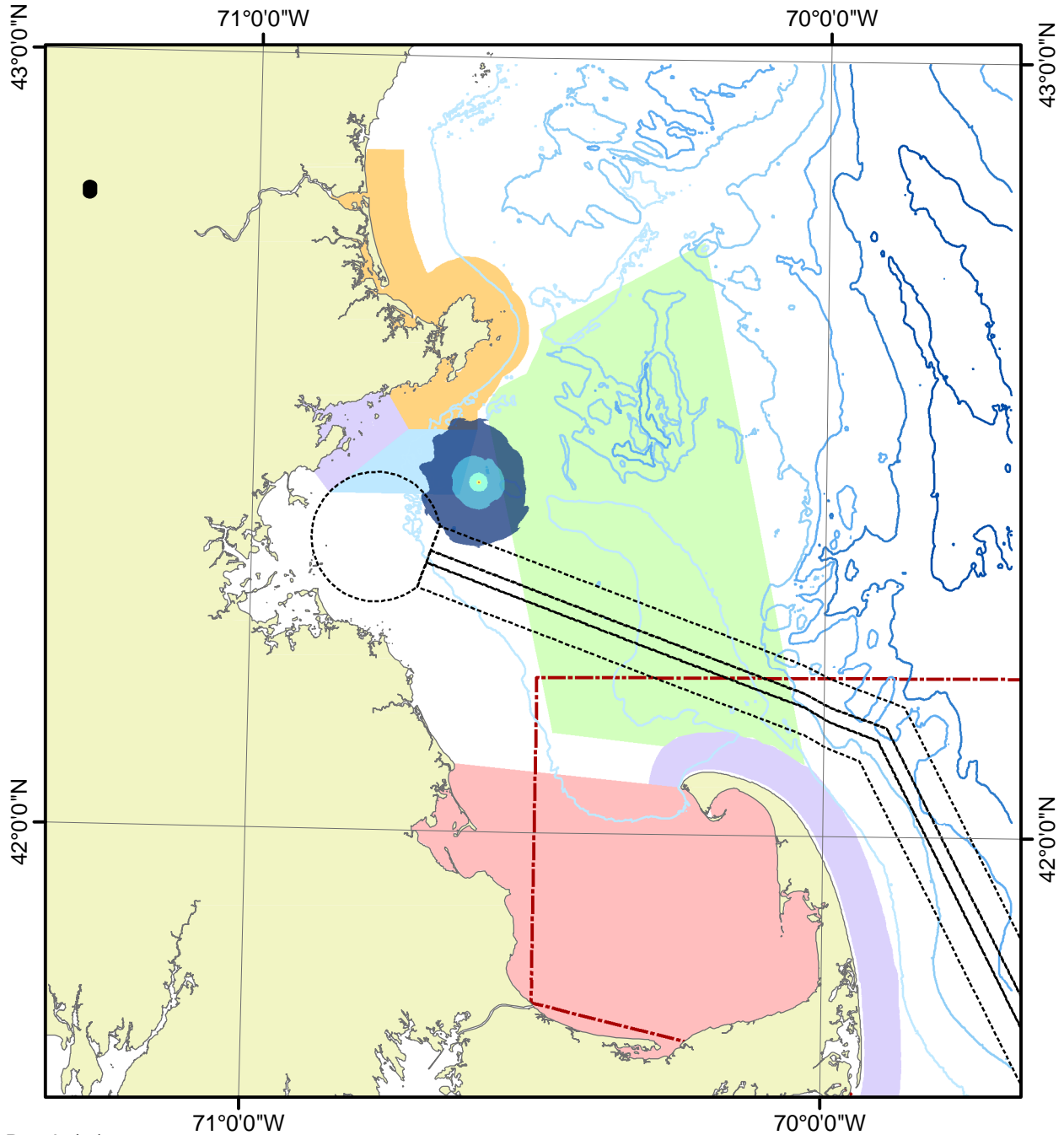


Received Levels (dB re 1 microPa)

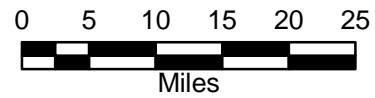
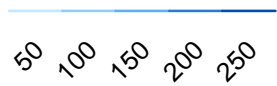


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

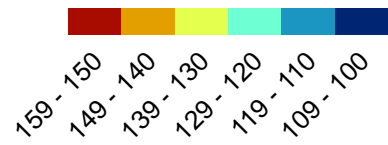
Neptune - 4 Thrusters Fal. 1m S



Water Depth (m)

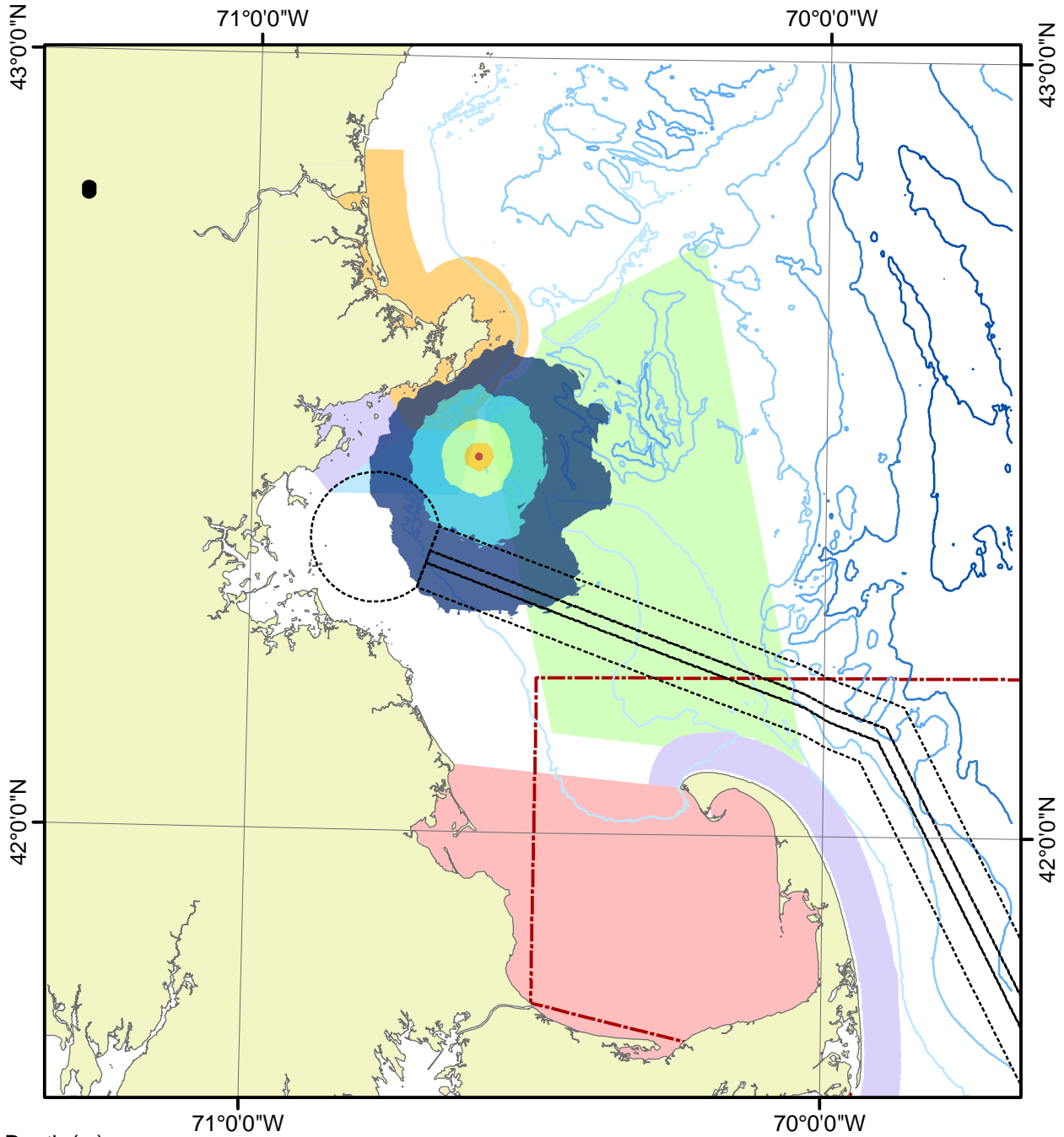


Received Levels (dB re 1 microPa)

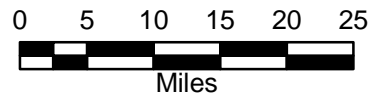
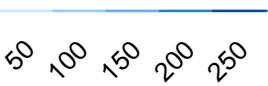


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

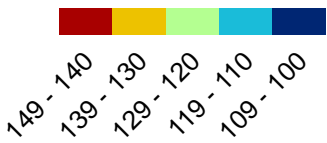
Neptune - 4 Thrusters Fal. 50m N



Water Depth (m)

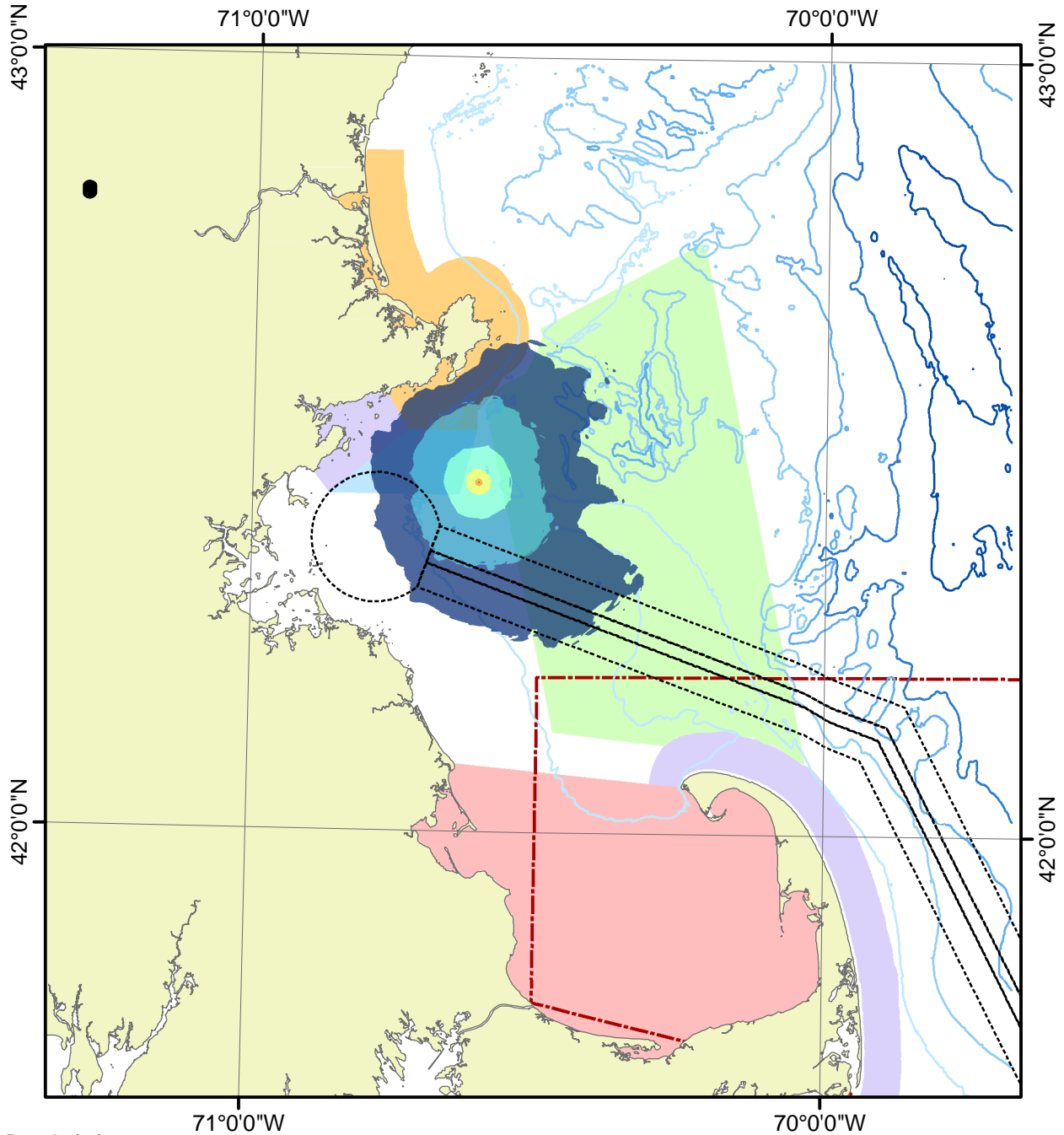


Received Levels (dB re 1 microPa)

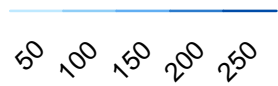


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

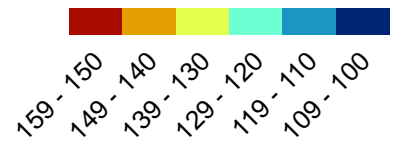
Neptune - 4 Thrusters Fal. 50m S



Water Depth (m)



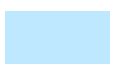
Received Levels (dB re 1 microPa)



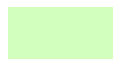
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



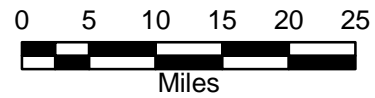
North Shore Ocean Sanctuary



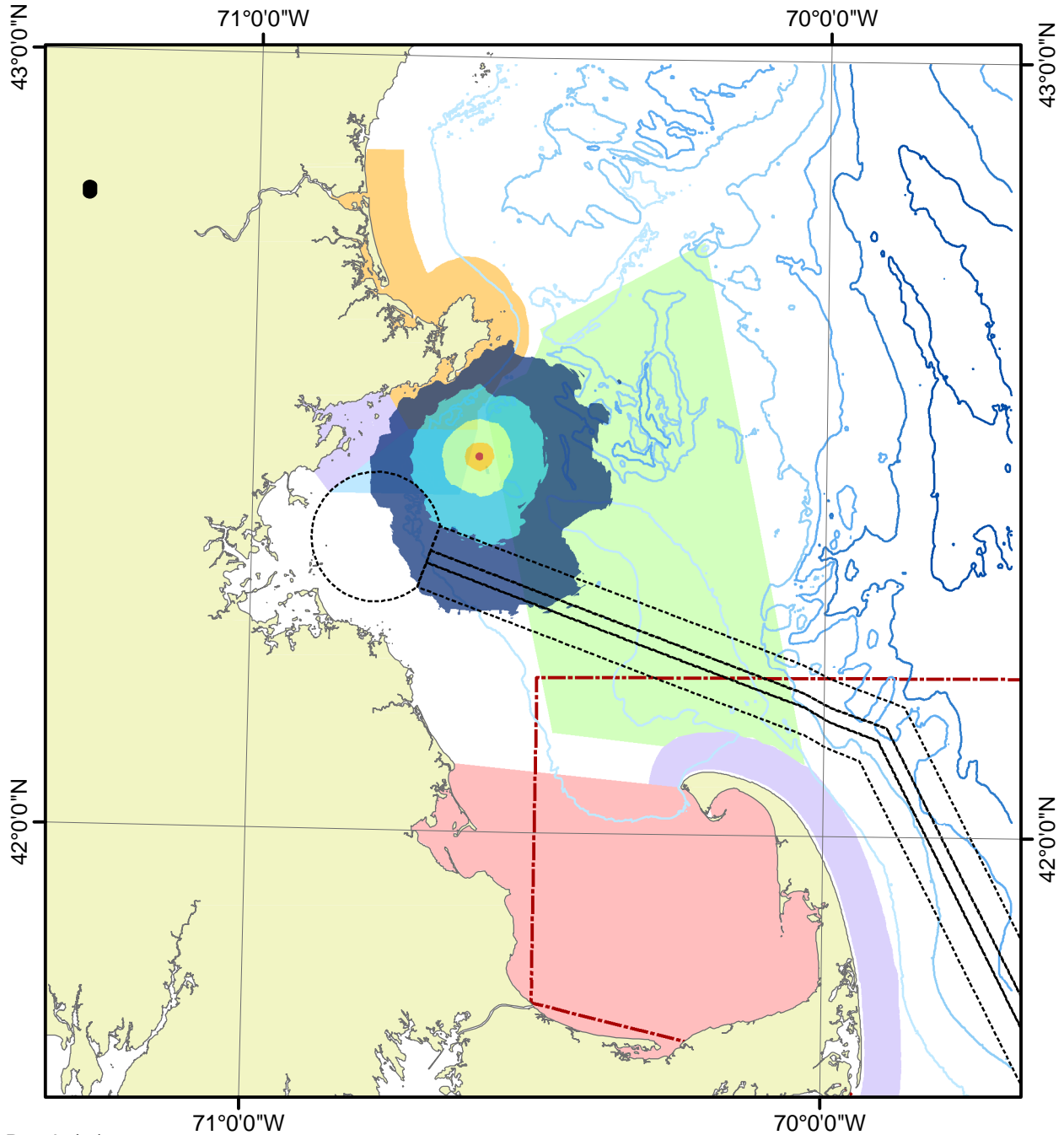
Cape Cod Bay Northern Right Whale Habitat



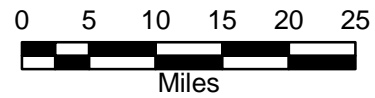
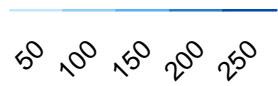
Cape Cod Ocean Sanctuary



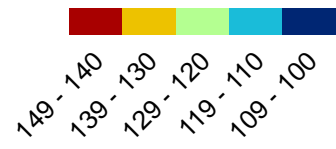
Neptune - 4 Thrusters Fal. 500m N



Water Depth (m)

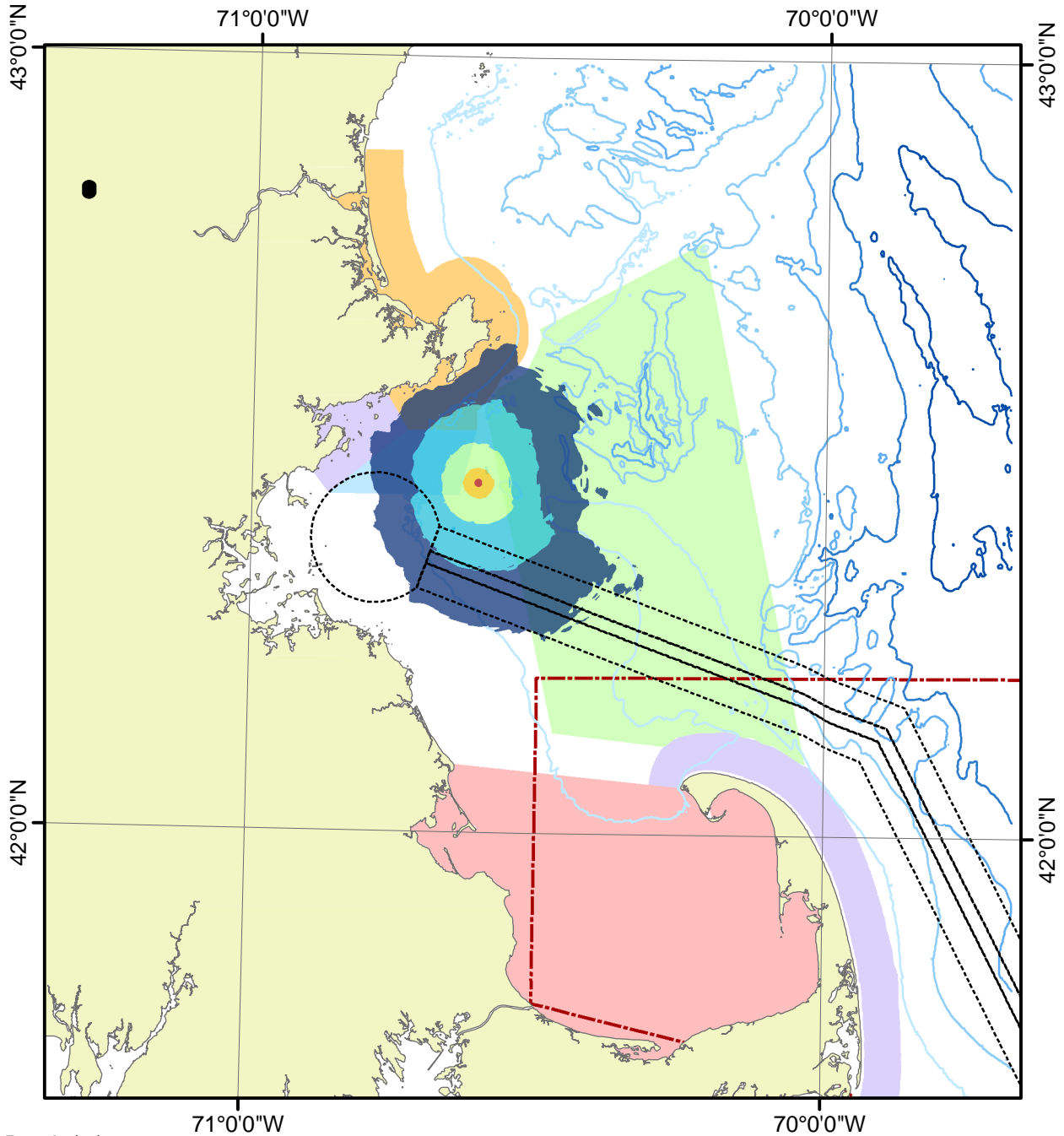


Received Levels (dB re 1 microPa)

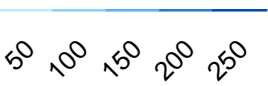


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

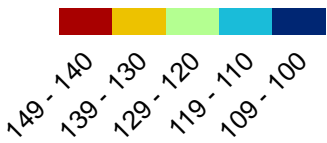
Neptune - 4 Thrusters Fal. 500m S



Water Depth (m)



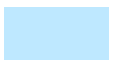
Received Levels (dB re 1 microPa)



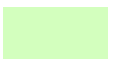
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



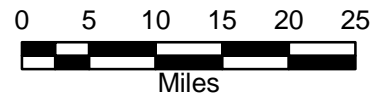
North Shore Ocean Sanctuary



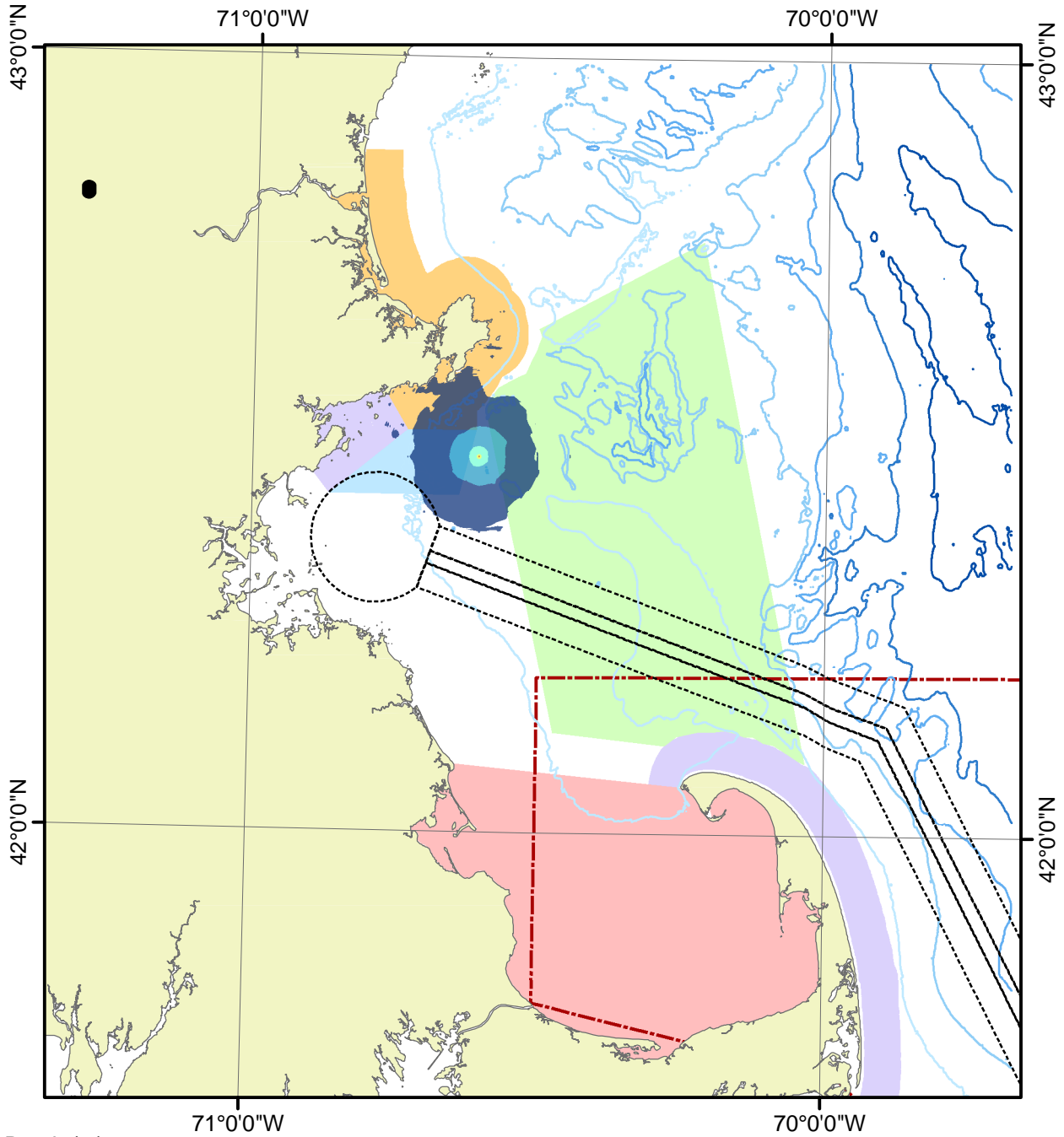
Cape Cod Bay Northern Right Whale Habitat



Cape Cod Ocean Sanctuary



Neptune - 4 Thrusters Win. 1m N



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

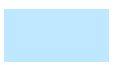
159 - 150
149 - 140
139 - 130
129 - 120
119 - 110
109 - 100



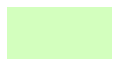
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



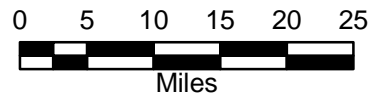
North Shore Ocean Sanctuary



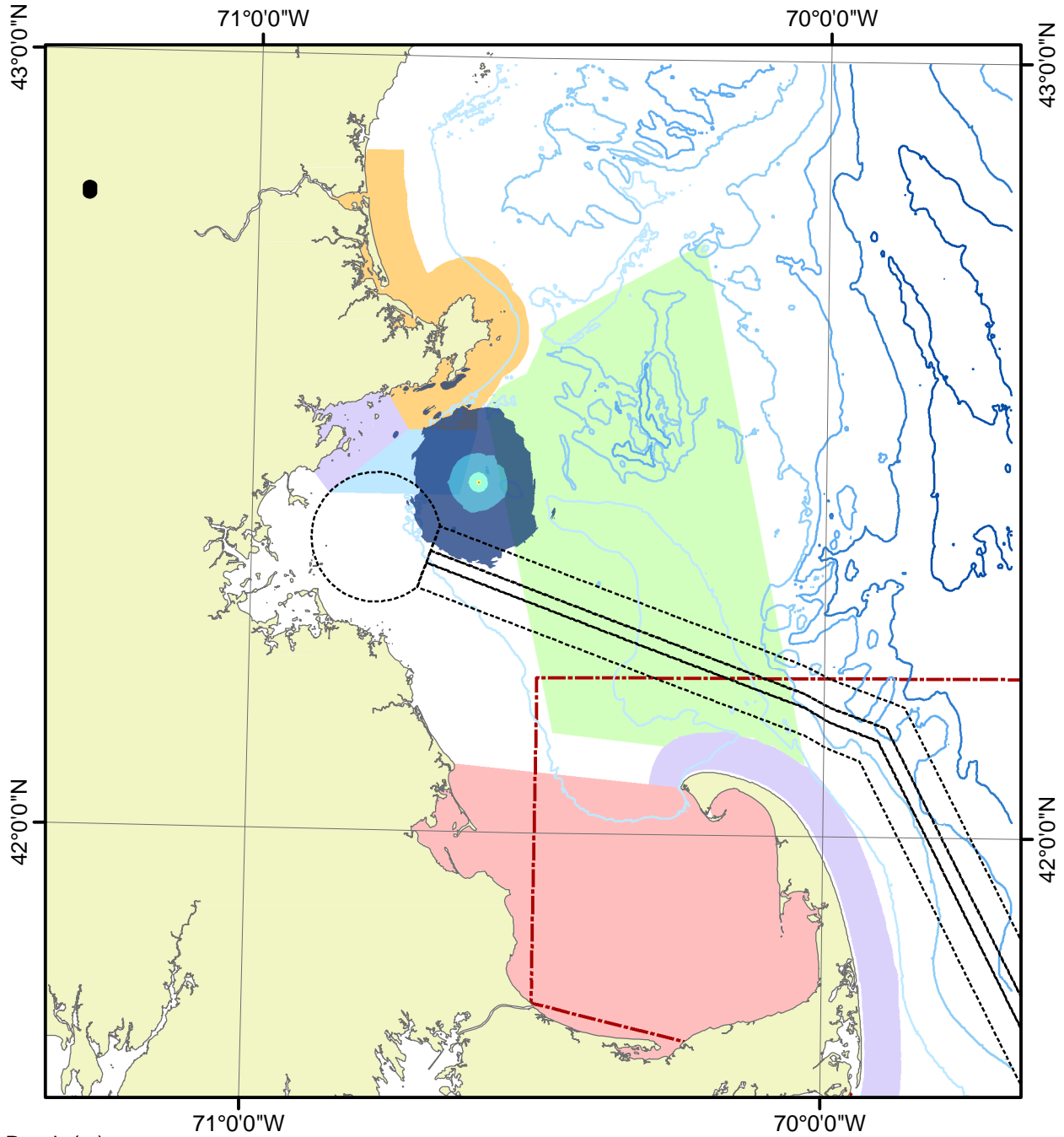
Cape Cod Bay Northern Right Whale Habitat



Cape Cod Ocean Sanctuary



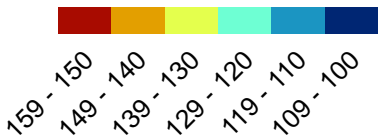
Neptune - 4 Thrusters Win. 1m S



Water Depth (m)

50 100 150 200 250

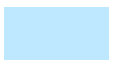
Received Levels (dB re 1 microPa)



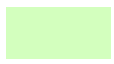
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



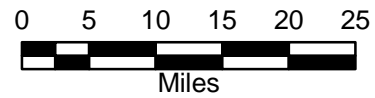
North Shore Ocean Sanctuary



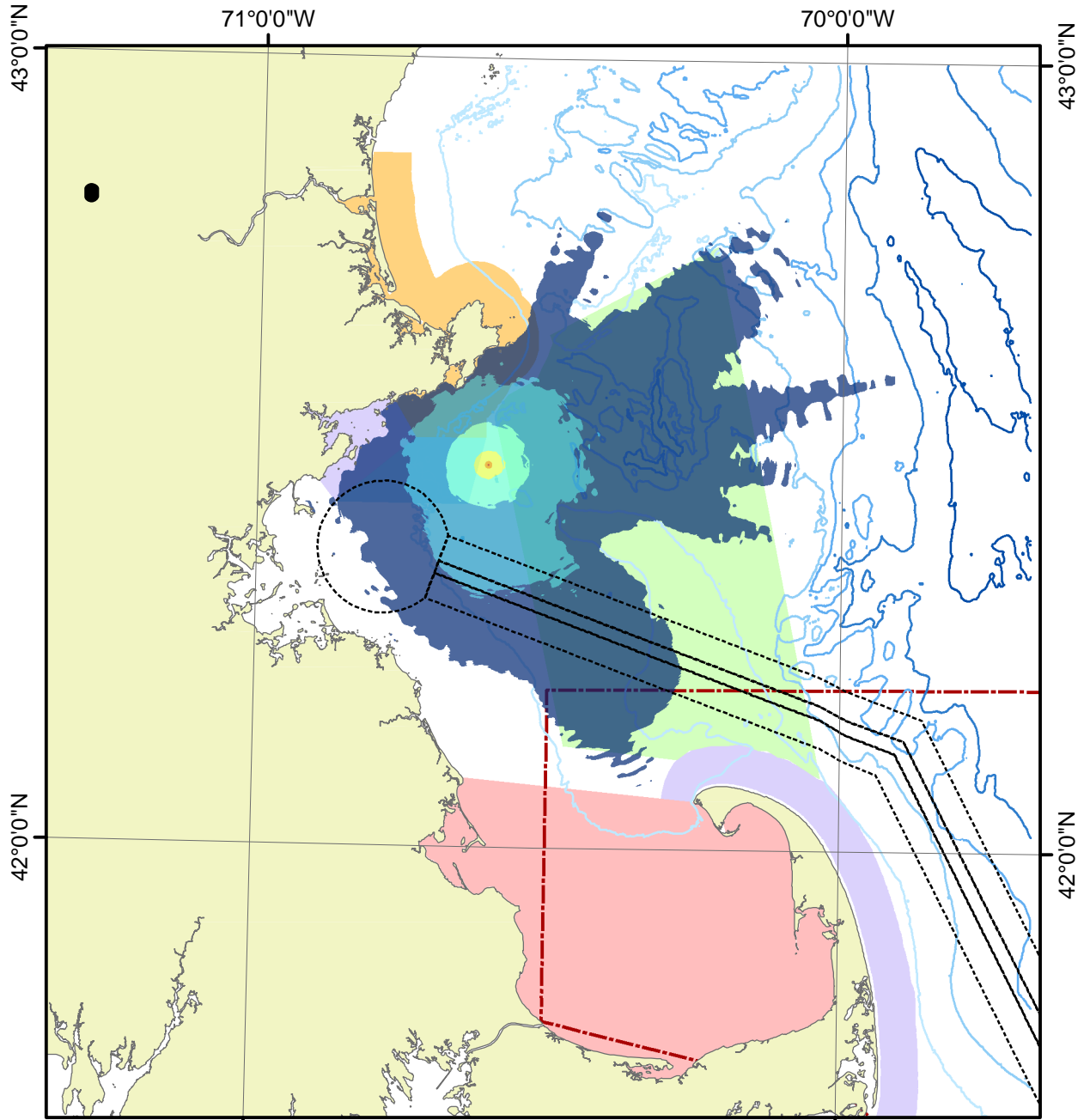
Cape Cod Bay Northern Right Whale Habitat



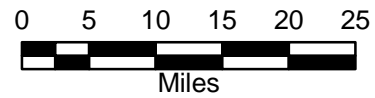
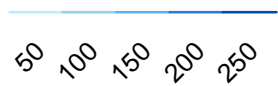
Cape Cod Ocean Sanctuary



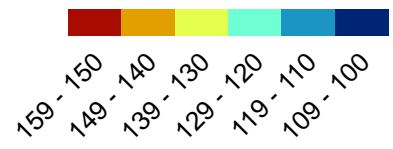
Neptune - 4 Thrusters Win. 50m N



Water Depth (m)

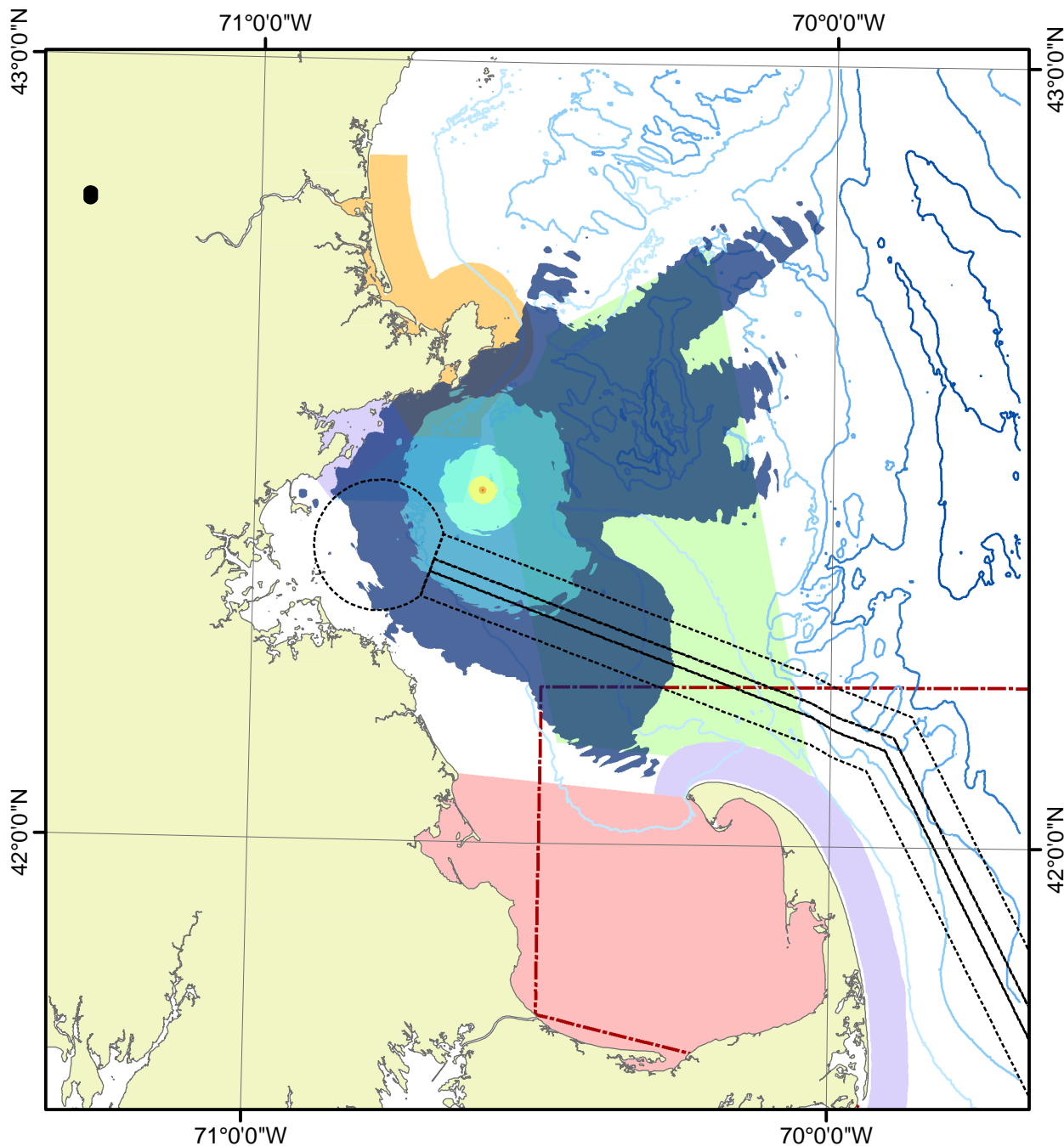


Received Levels (dB re 1 microPa)

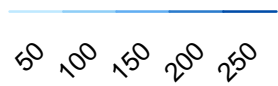


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

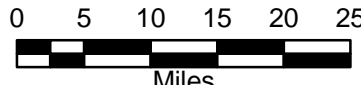
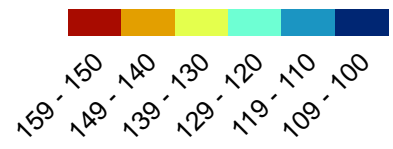
Neptune - 4 Thrusters Win. 50m S



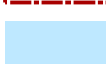
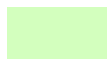


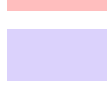


Water Depth (m)

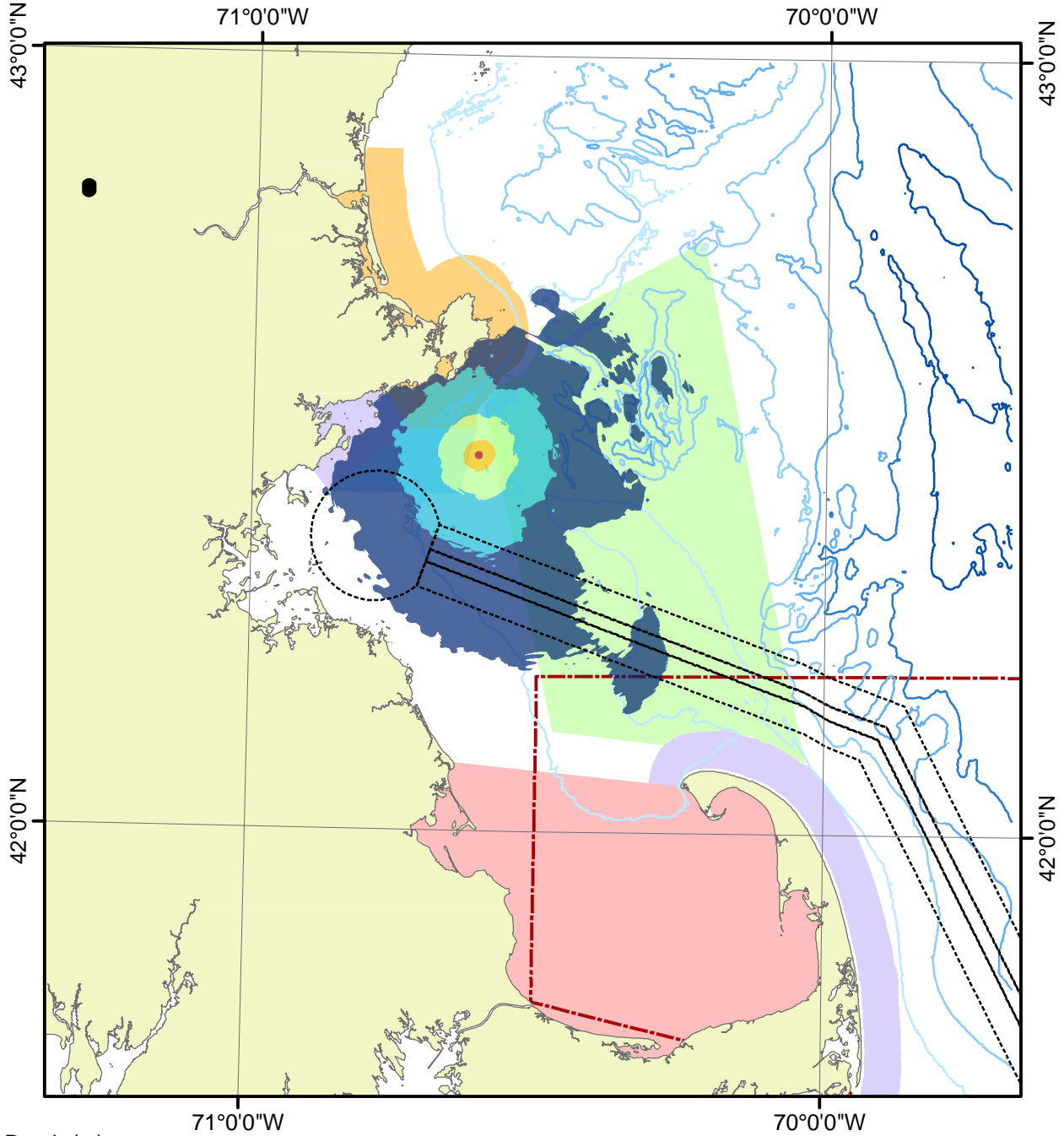


Received Levels (dB re 1 microPa)



-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

Neptune - 4 Thrusters Win. 500m N

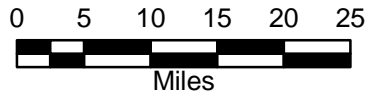


Water Depth (m)

50 100 150 200 250

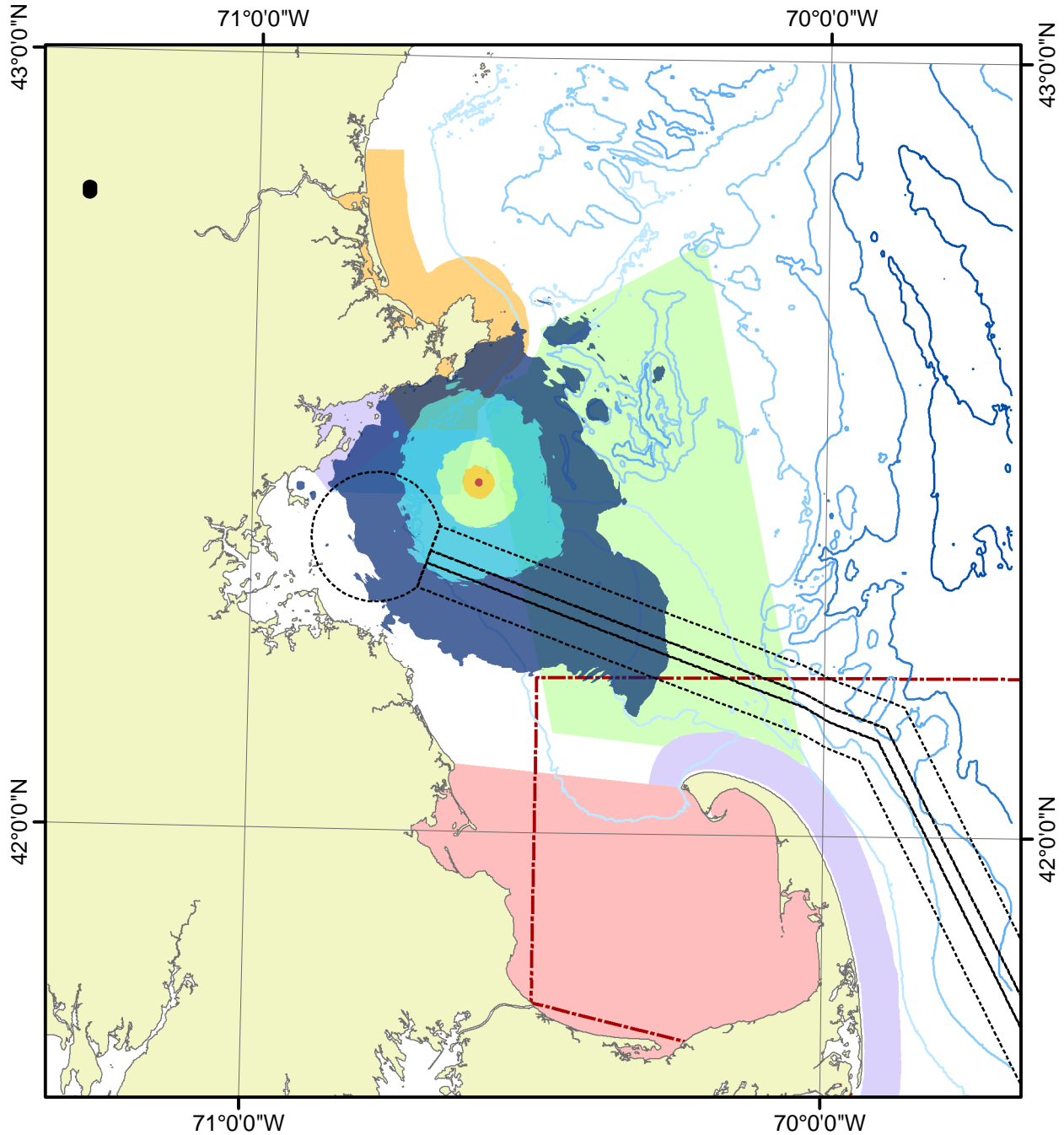
Received Levels (dB re 1 microPa)

149 - 140
139 - 130
129 - 120
119 - 110
109 - 100

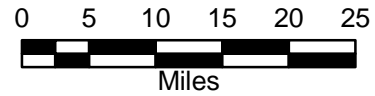
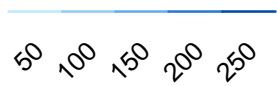


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

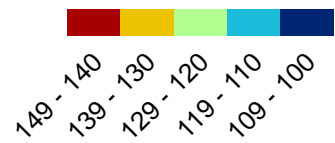
Neptune - 4 Thrusters Win. 500m S



Water Depth (m)



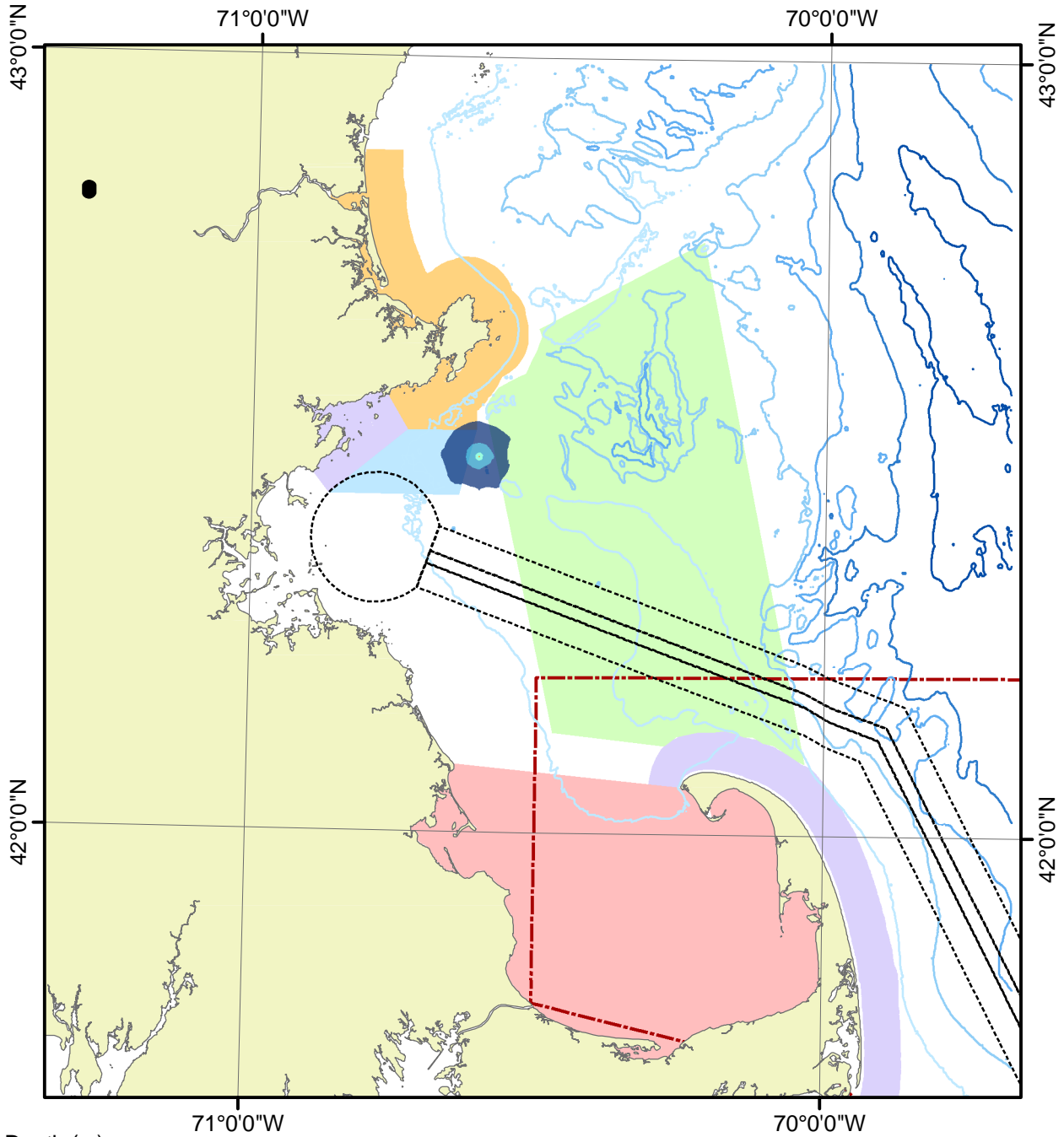
Received Levels (dB re 1 microPa)



-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

Appendix B: Noise Maps – LNG Maintaining Position while on Buoy and Regasifying

Neptune - 2 Stern Thrusters Spr. 1m N



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

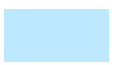
159 - 150
149 - 140
139 - 130
129 - 120
119 - 110
109 - 100



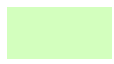
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



North Shore Ocean Sanctuary



Cape Cod Bay Northern Right Whale Habitat



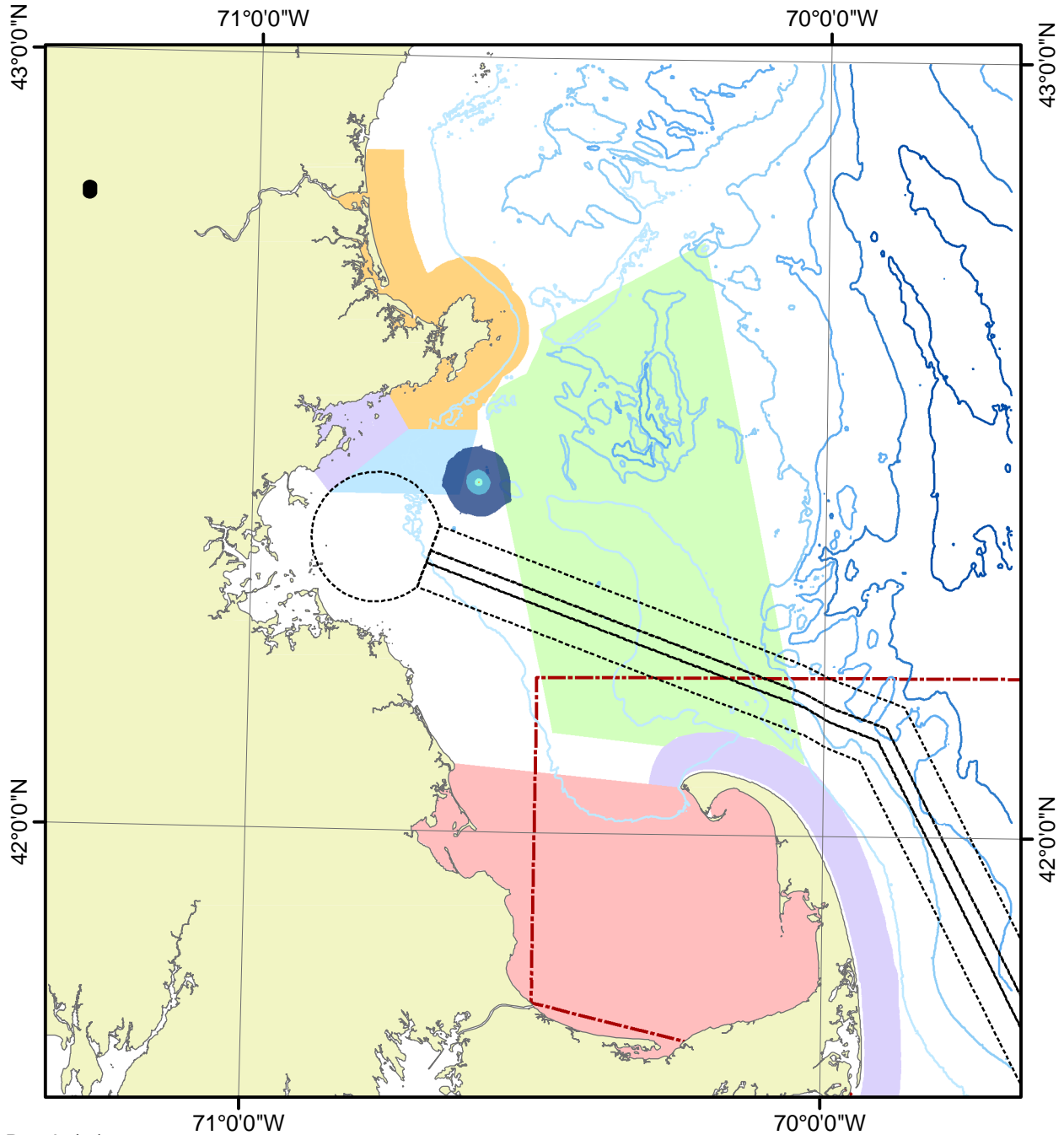
Cape Cod Ocean Sanctuary

0 5 10 15 20 25

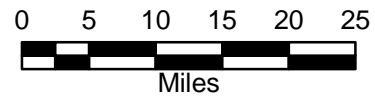
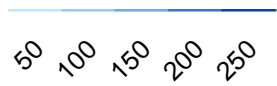


Miles

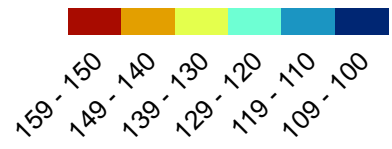
Neptune - 2 Stern Thrusters Spr. 1m S



Water Depth (m)

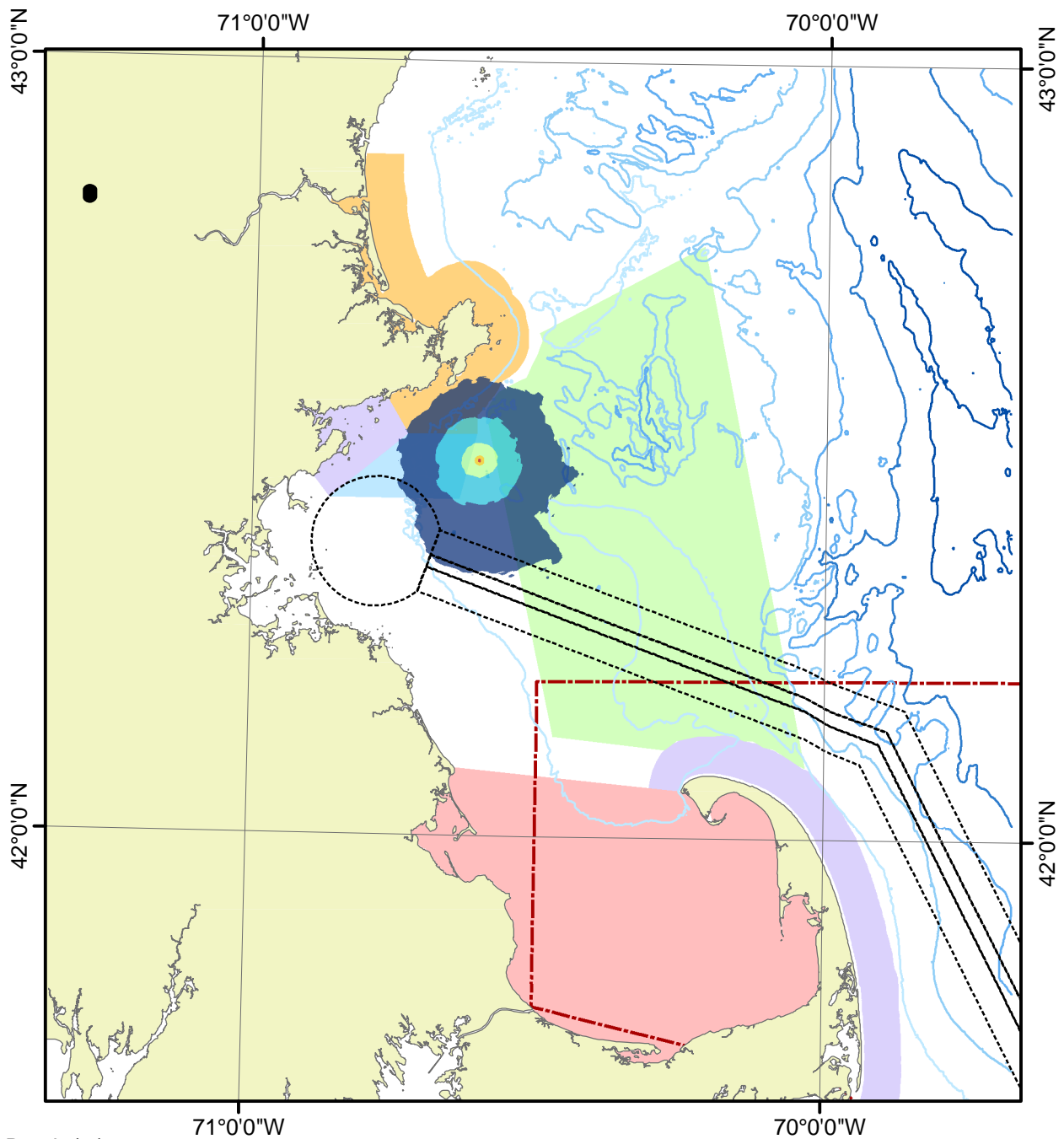


Received Levels (dB re 1 microPa)

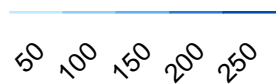


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

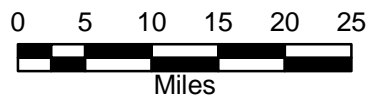
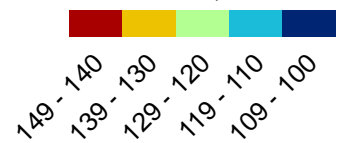
Neptune - 2 Stern Thrusters Spr. 50m N



Water Depth (m)



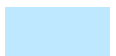
Received Levels (dB re 1 microPa)



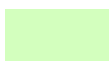
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



North Shore Ocean Sanctuary

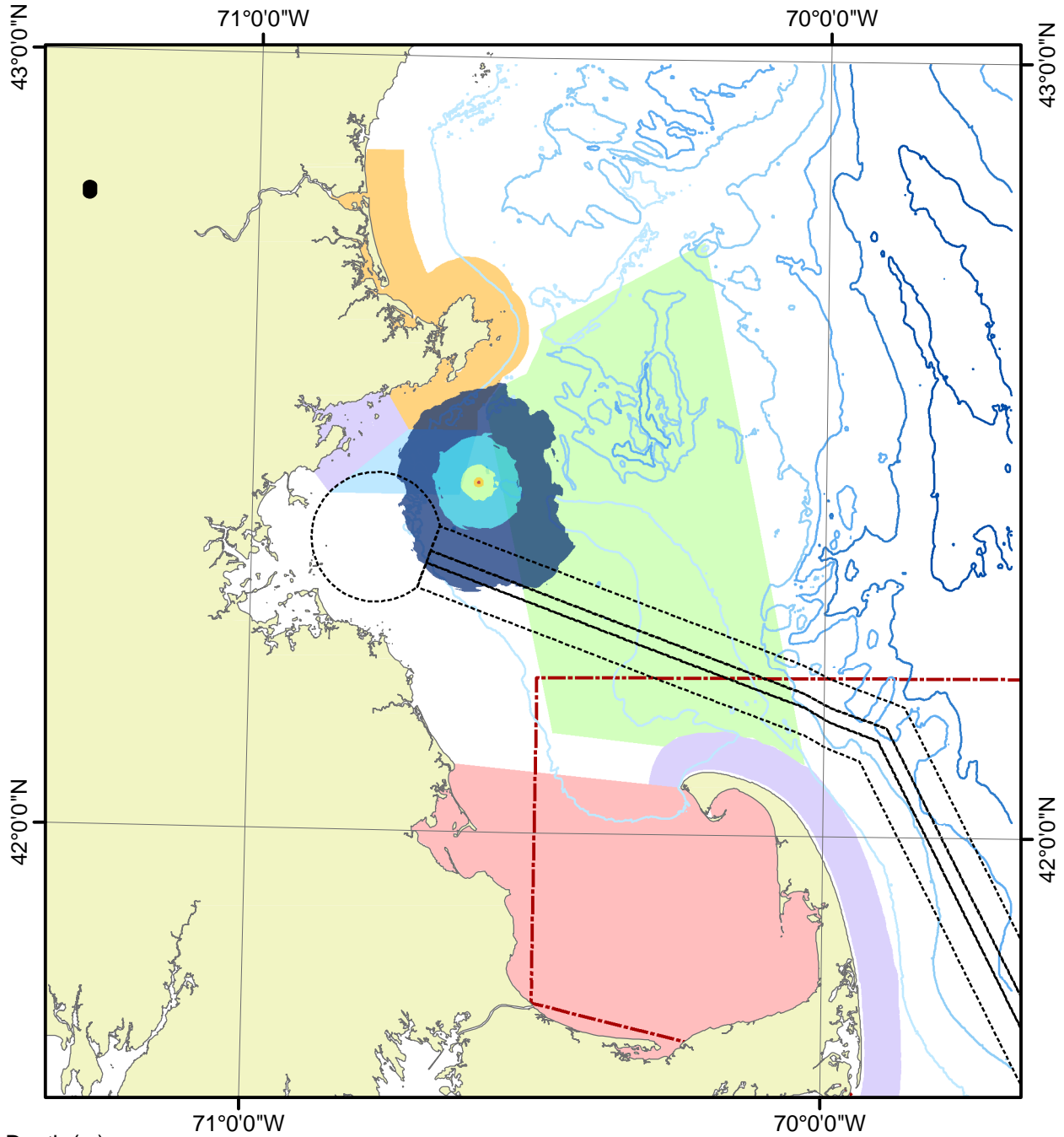


Cape Cod Bay Northern Right Whale Habitat

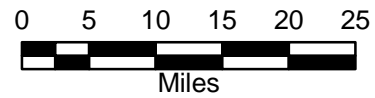
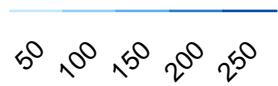


Cape Cod Ocean Sanctuary

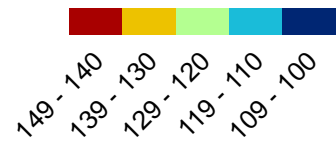
Neptune - 2 Stern Thrusters Spr. 50m S



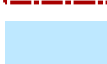
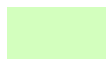


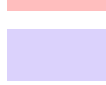


Water Depth (m)

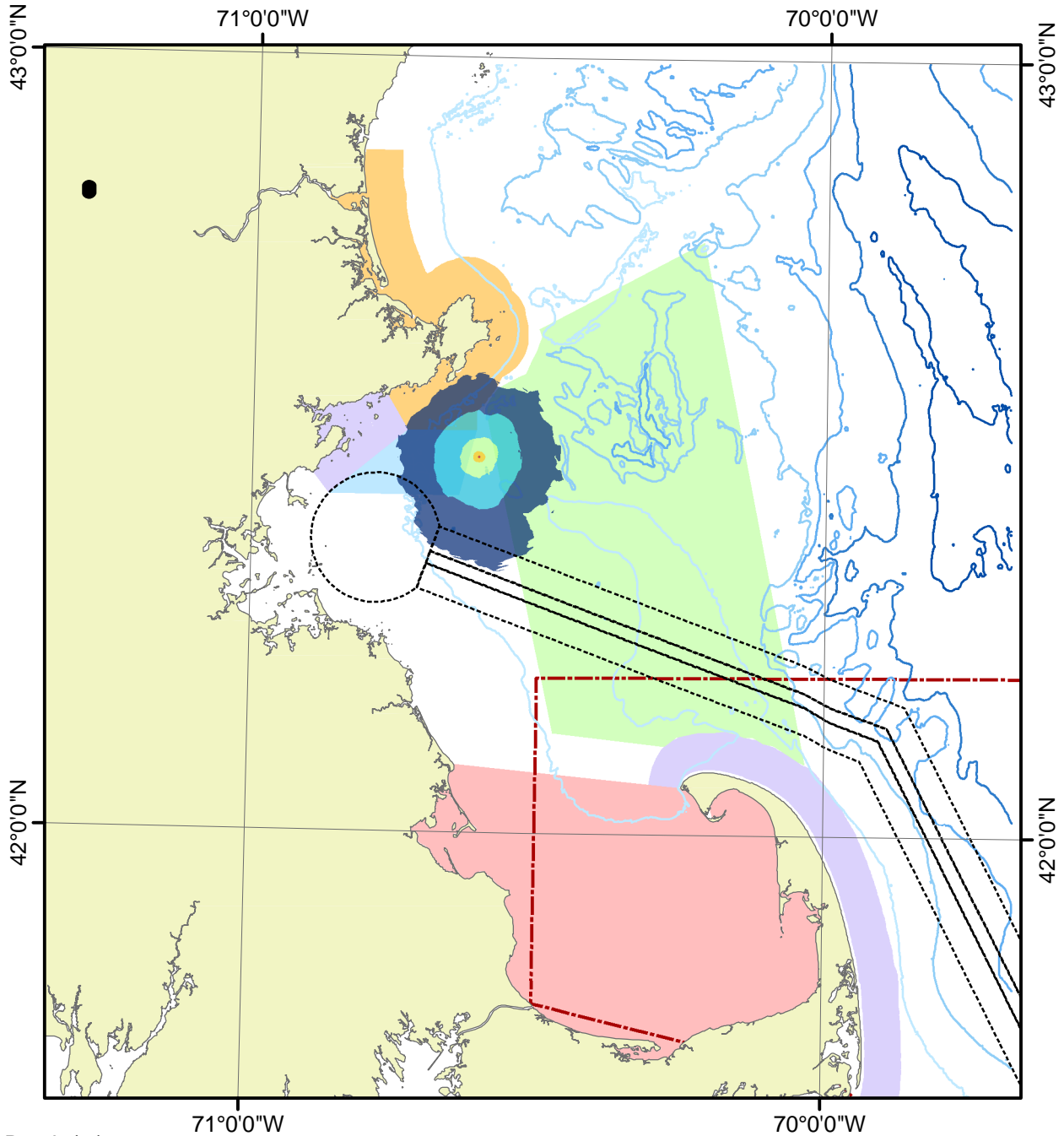


Received Levels (dB re 1 microPa)

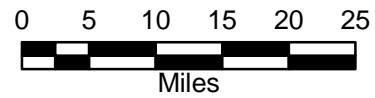
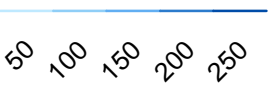


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

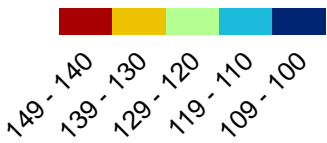
Neptune - 2 Stern Thrusters Spr. 500m N



Water Depth (m)

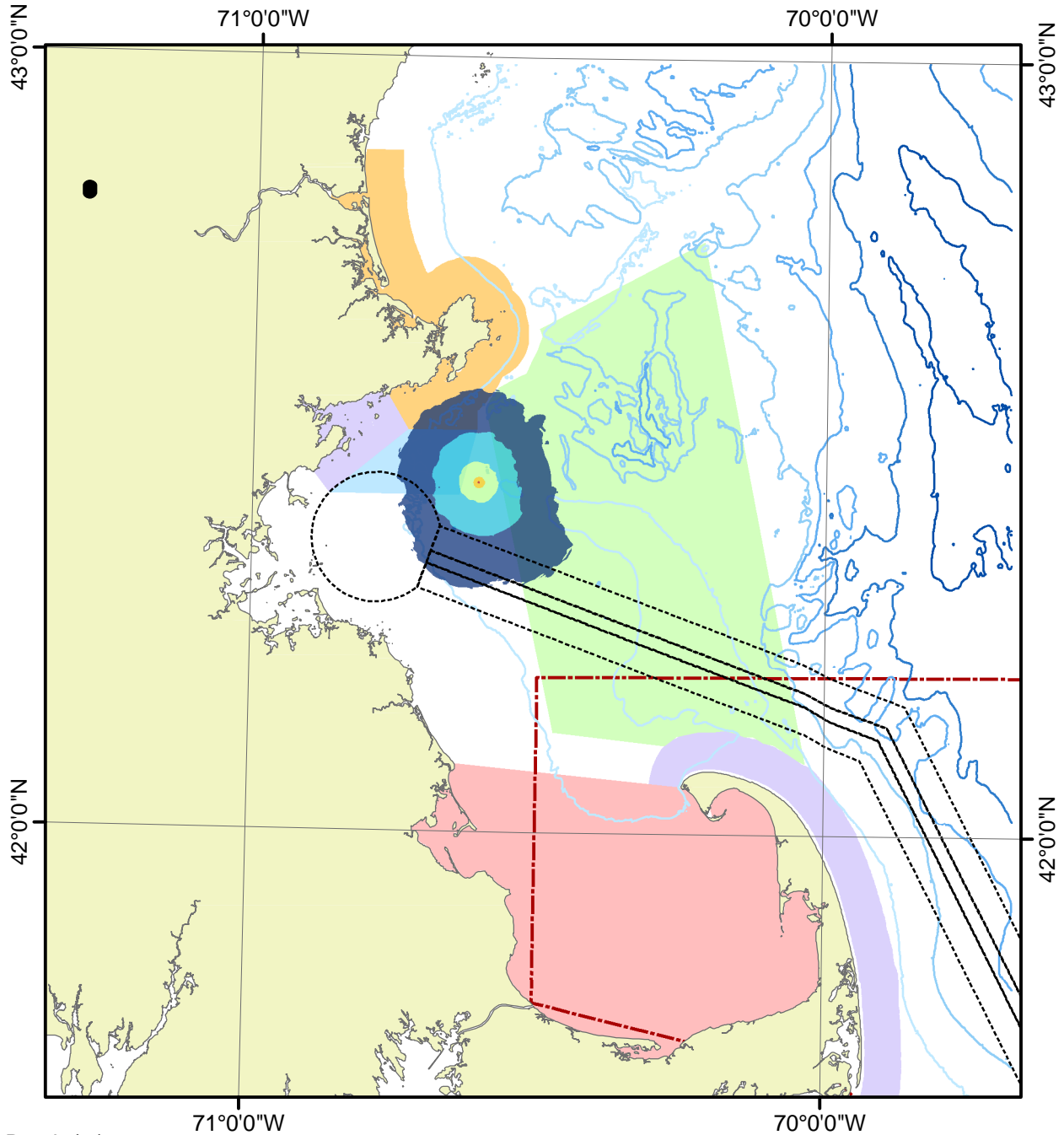


Received Levels (dB re 1 microPa)

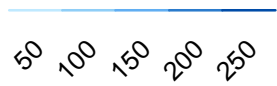


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

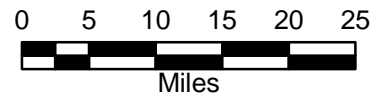
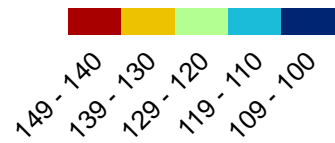
Neptune - 2 Stern Thrusters Spr. 500m S



Water Depth (m)

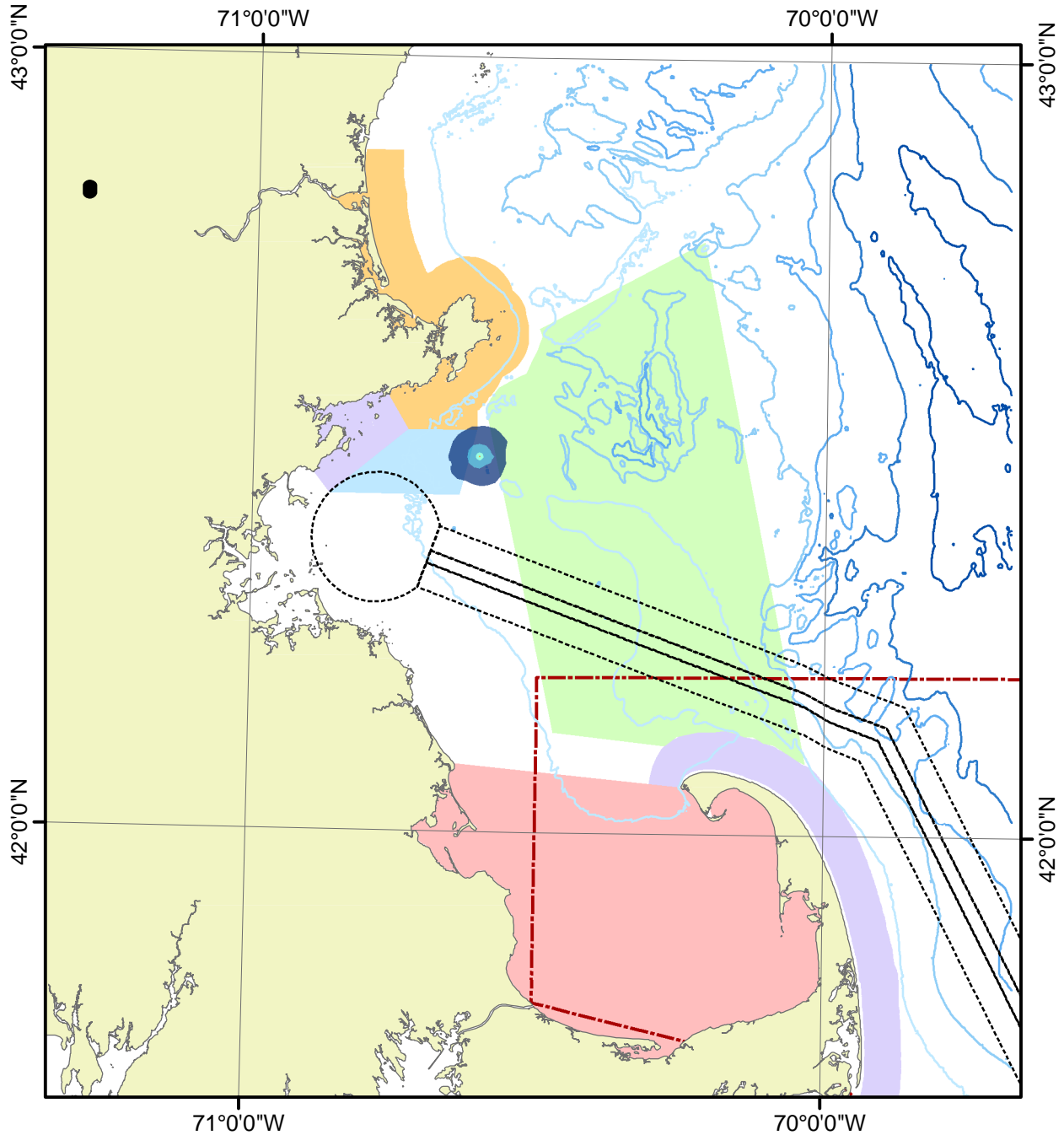


Received Levels (dB re 1 microPa)

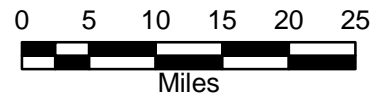
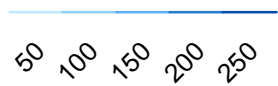


-  Shipping Lanes
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  South Essex Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

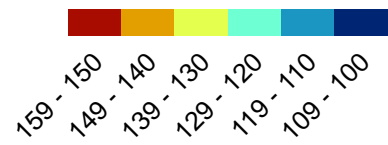
Neptune - 2 Stern Thrusters Sum. 1m N


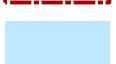
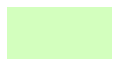


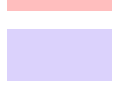


Water Depth (m)

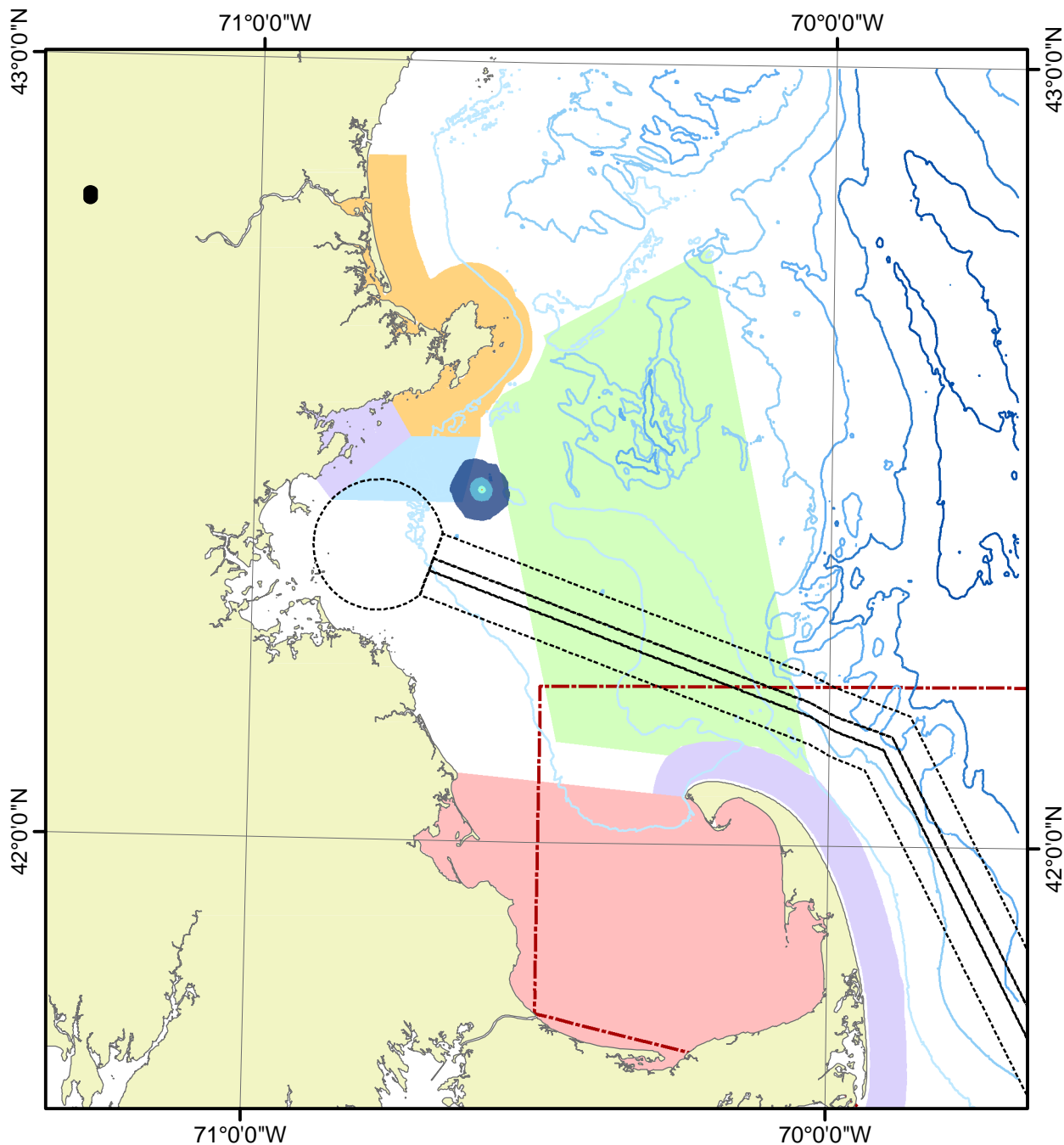


Received Levels (dB re 1 microPa)

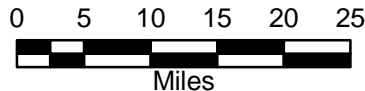
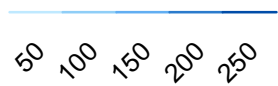


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

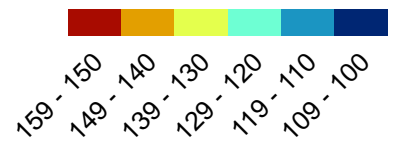
Neptune - 2 Stern Thrusters Sum. 1m S



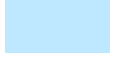
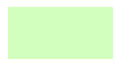





Water Depth (m)

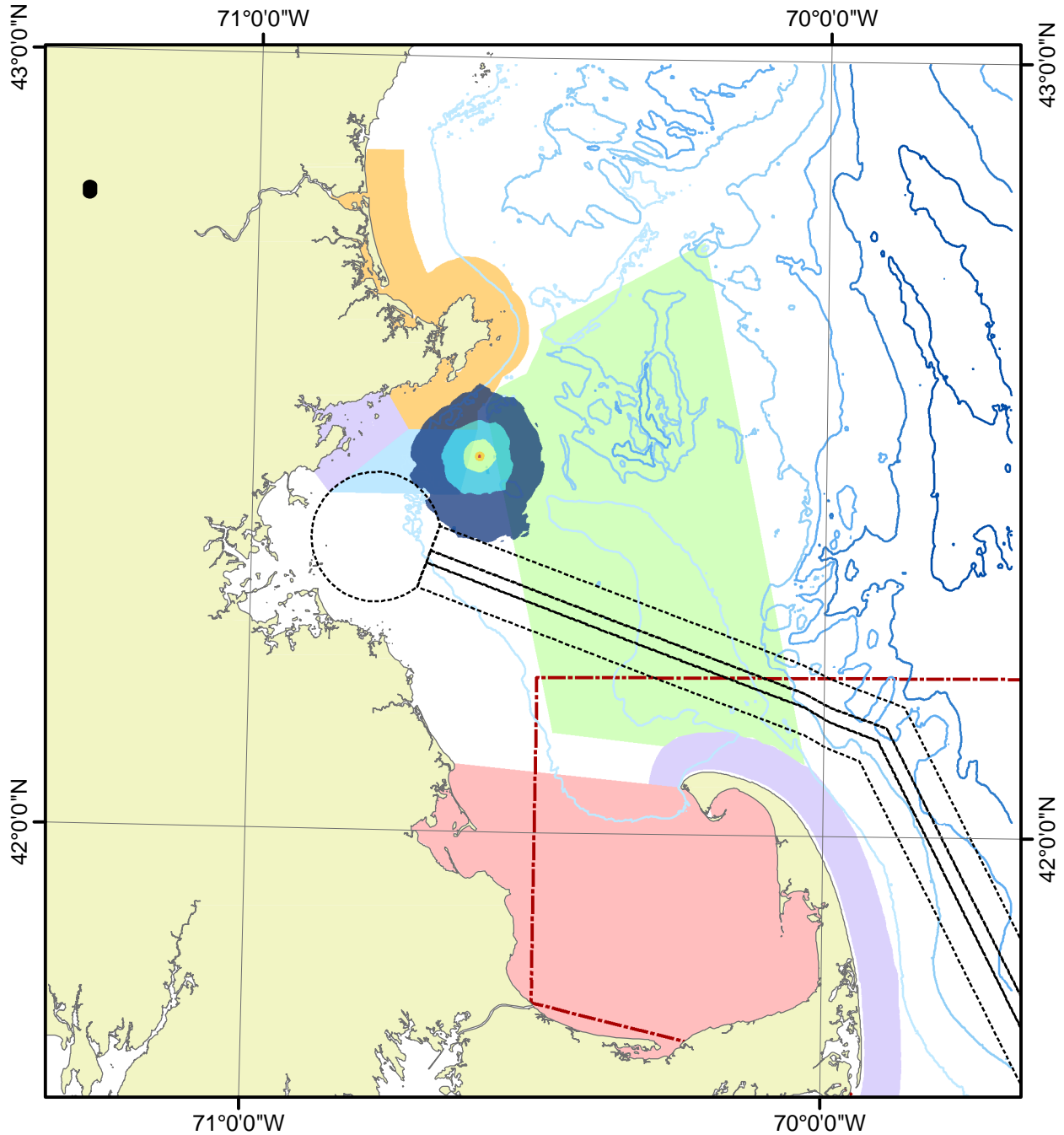


Received Levels (dB re 1 microPa)

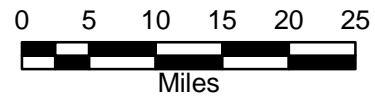
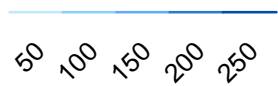


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

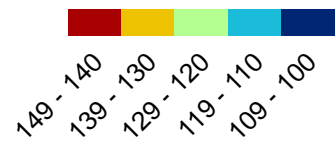
Neptune - 2 Stern Thrusters Sum. 50m N



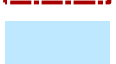
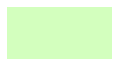


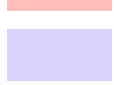


Water Depth (m)

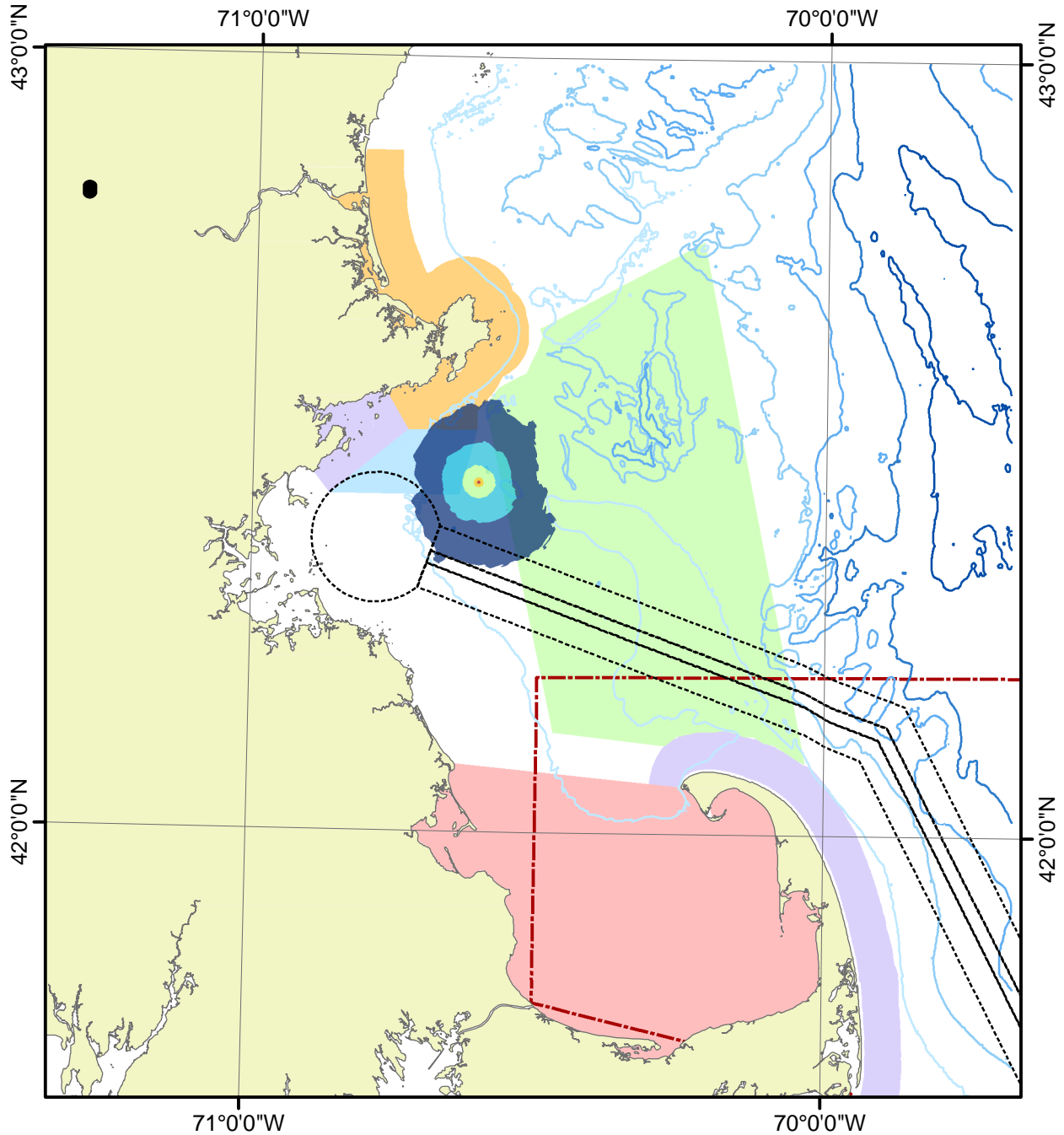


Received Levels (dB re 1 microPa)

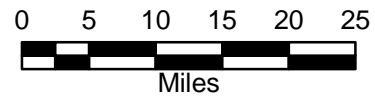
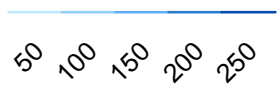


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

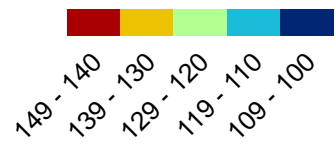
Neptune - 2 Stern Thrusters Sum. 50m S



Water Depth (m)

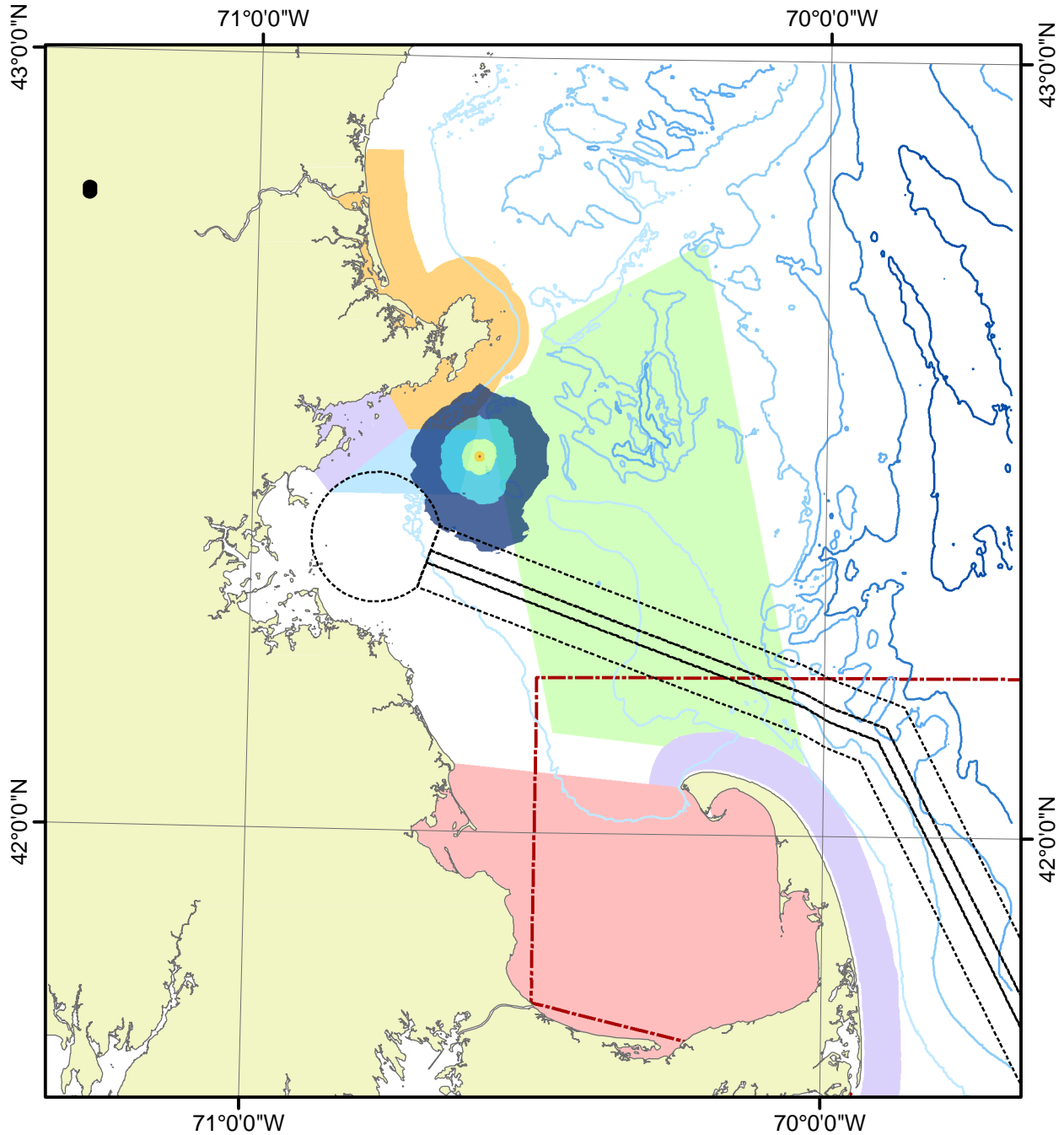


Received Levels (dB re 1 microPa)

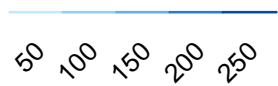


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

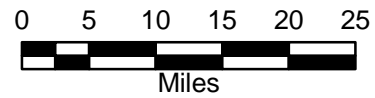
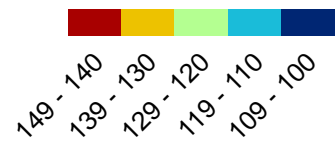
Neptune - 2 Stern Thrusters Sum. 500m N



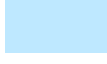
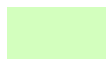





Water Depth (m)

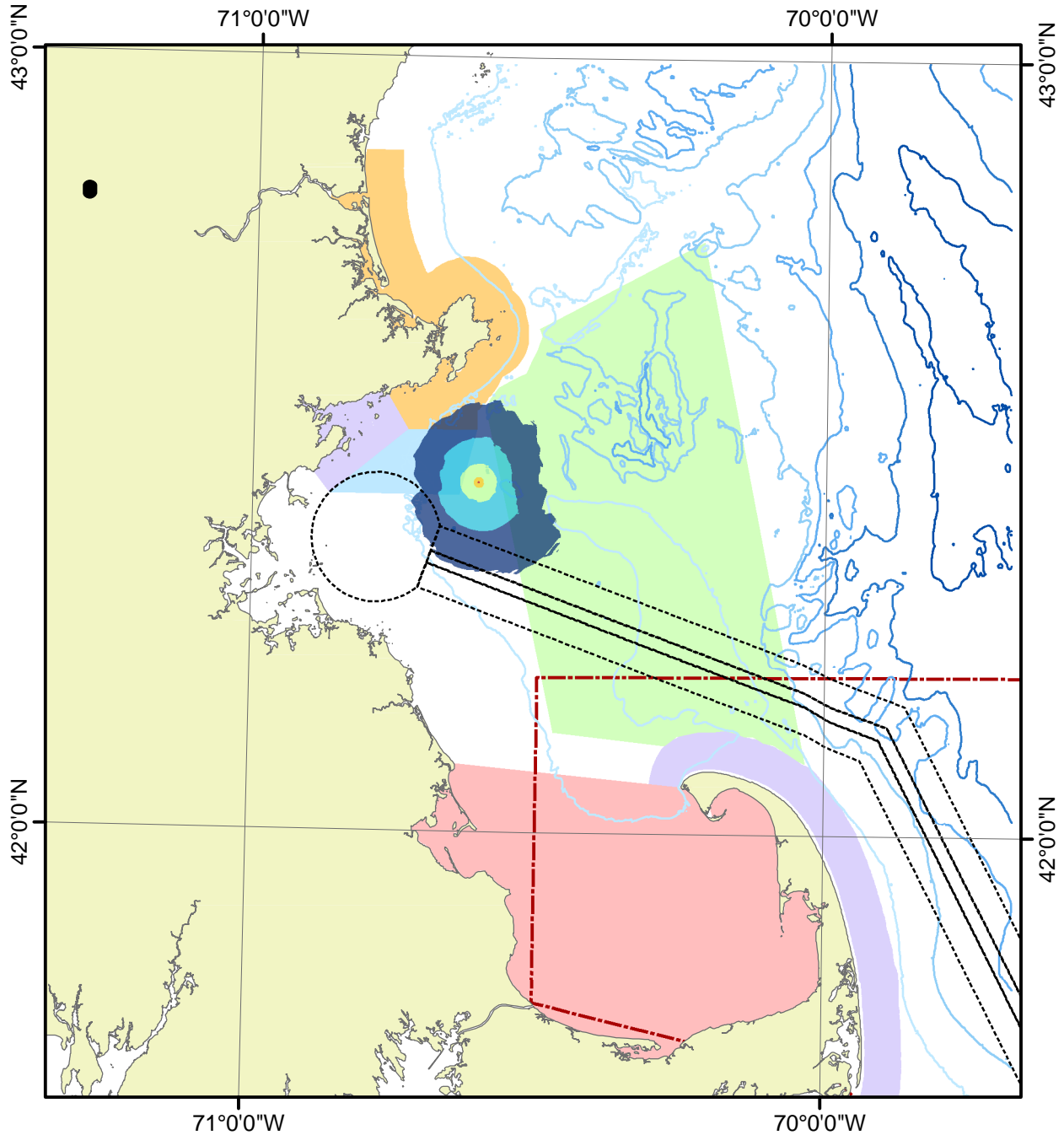


Received Levels (dB re 1 microPa)

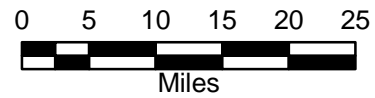
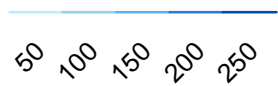


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

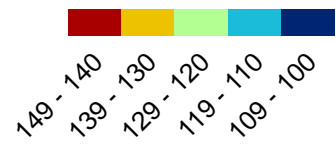
Neptune - 2 Stern Thrusters Sum. 500m S



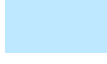
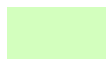





Water Depth (m)

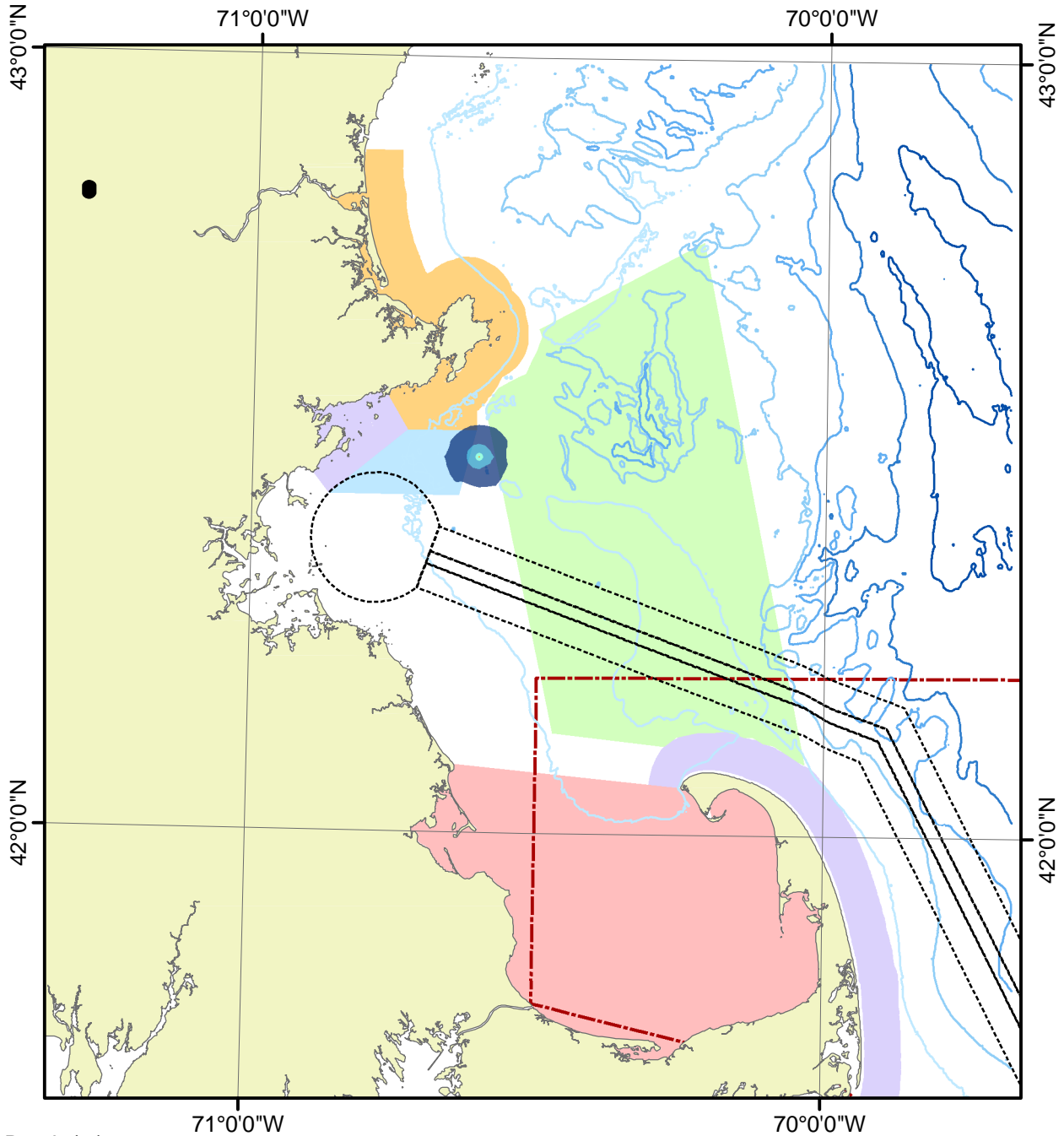


Received Levels (dB re 1 microPa)

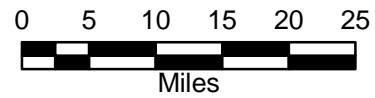
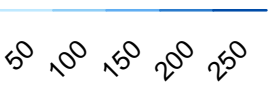


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

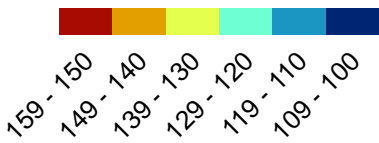
Neptune - 2 Stern Thrusters Fal. 1m N



Water Depth (m)

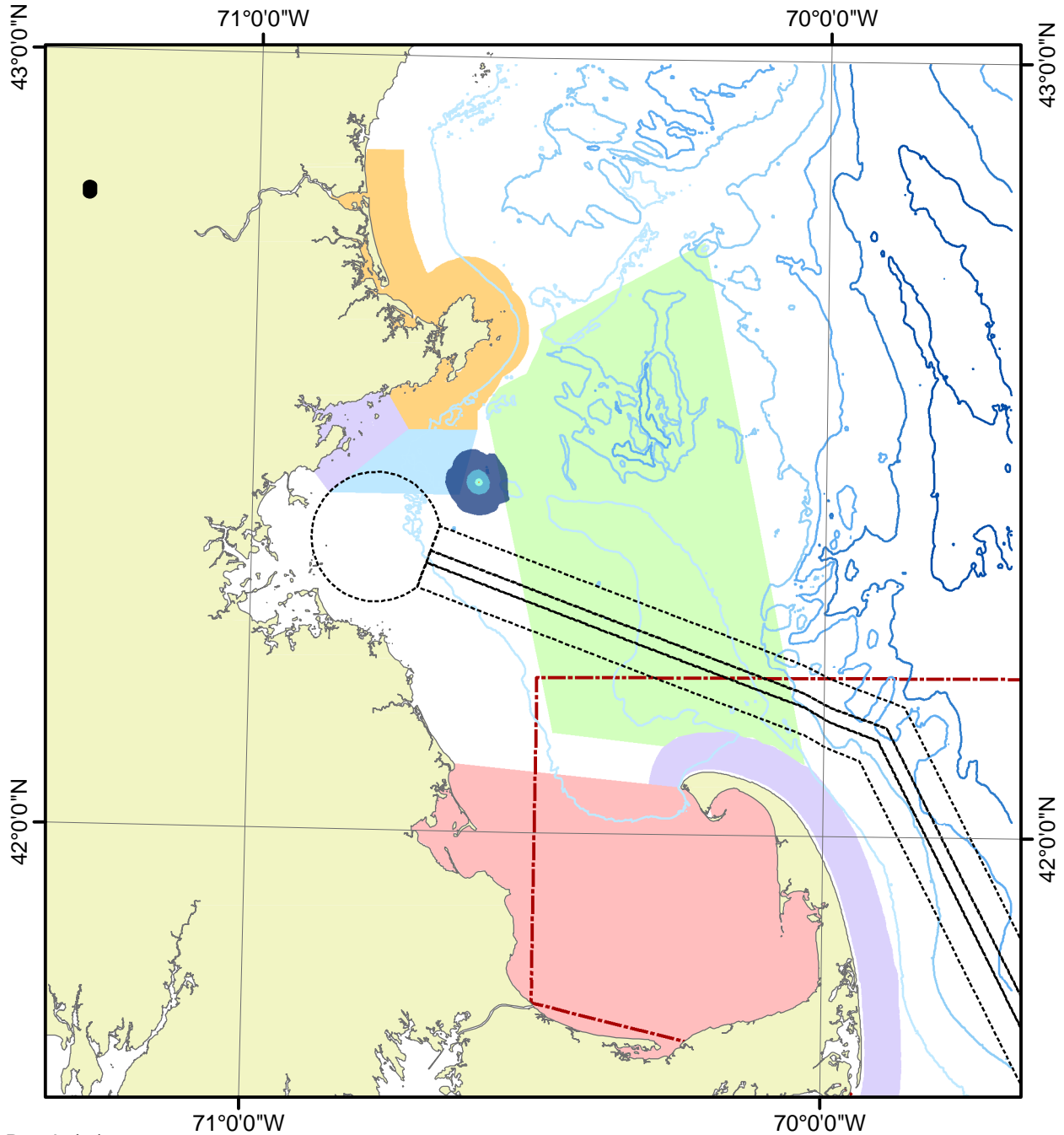


Received Levels (dB re 1 microPa)



- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

Neptune - 2 Stern Thrusters Fal. 1m S



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

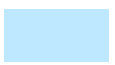
159 - 150
149 - 140
139 - 130
129 - 120
119 - 110
109 - 100



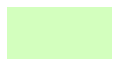
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



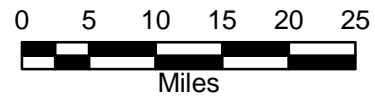
North Shore Ocean Sanctuary



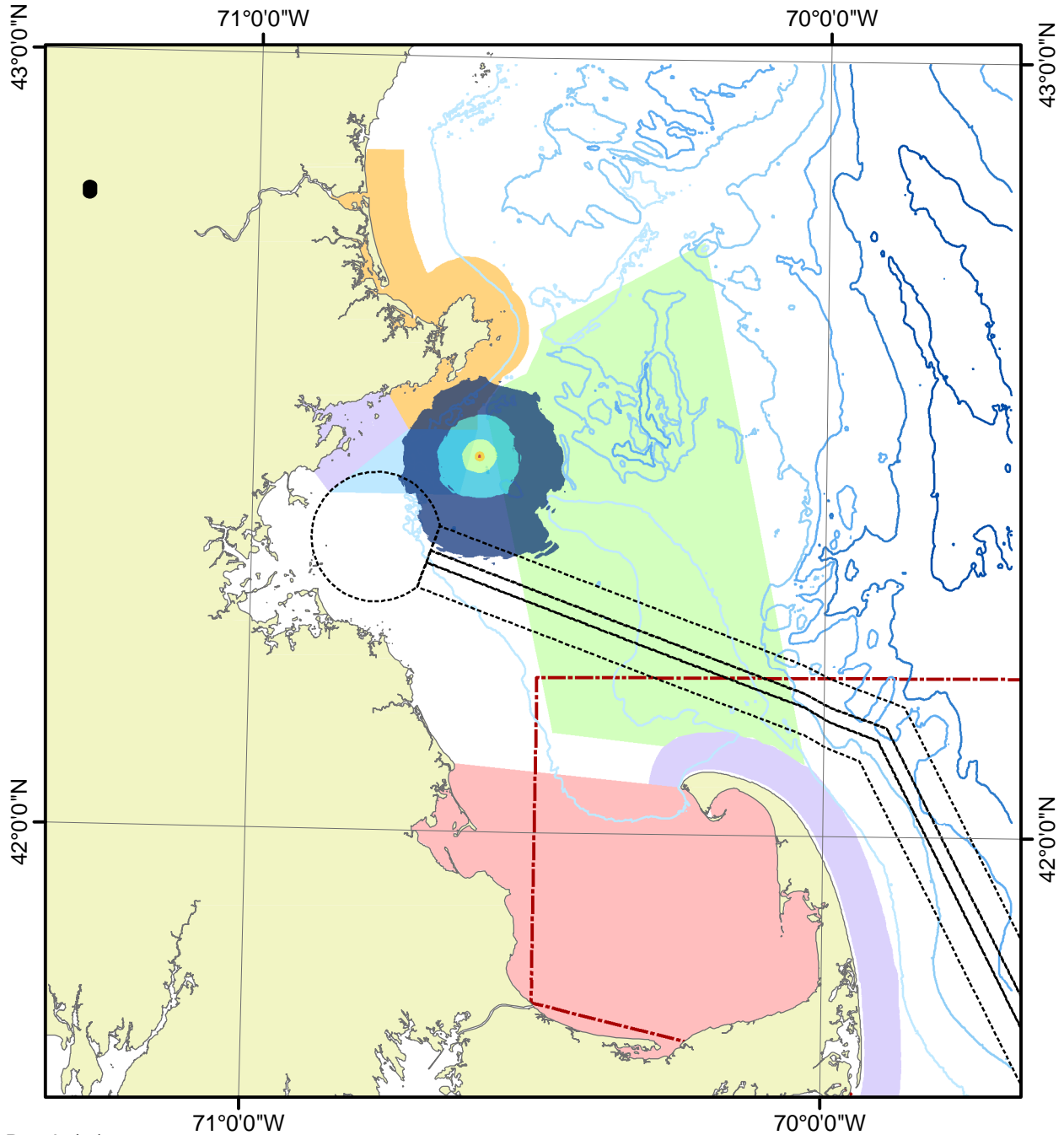
Cape Cod Bay Northern Right Whale Habitat



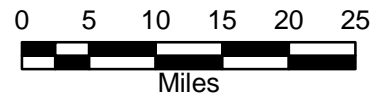
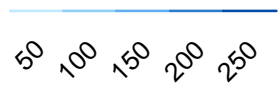
Cape Cod Ocean Sanctuary



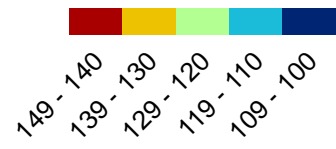
Neptune - 2 Stern Thrusters Fal. 50m N


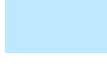
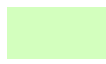





Water Depth (m)

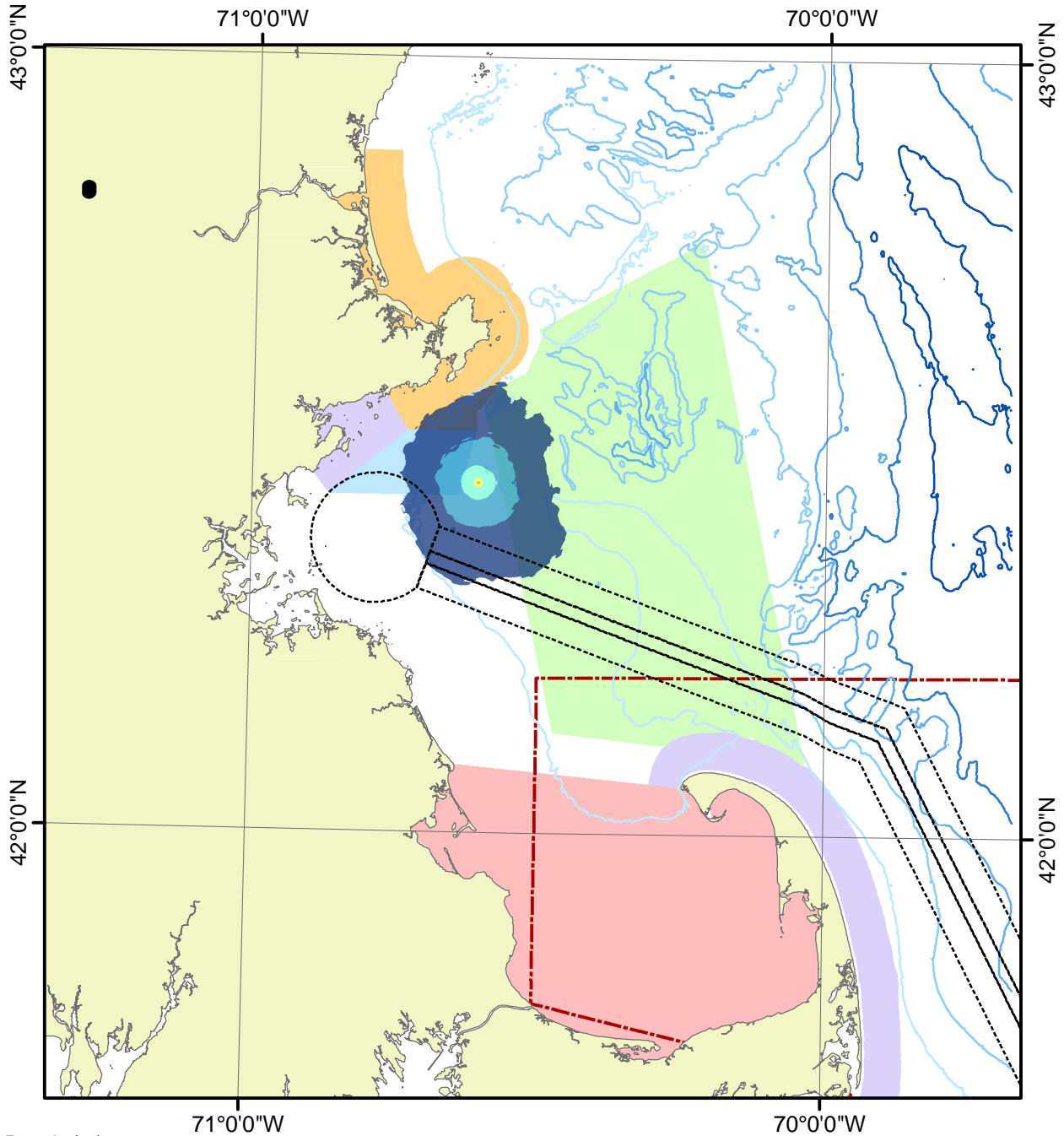


Received Levels (dB re 1 microPa)

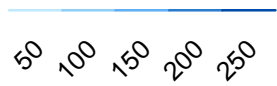


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

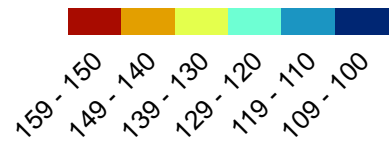
Neptune - 2 Stern Thrusters Fal. 50m S


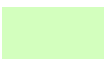





Water Depth (m)

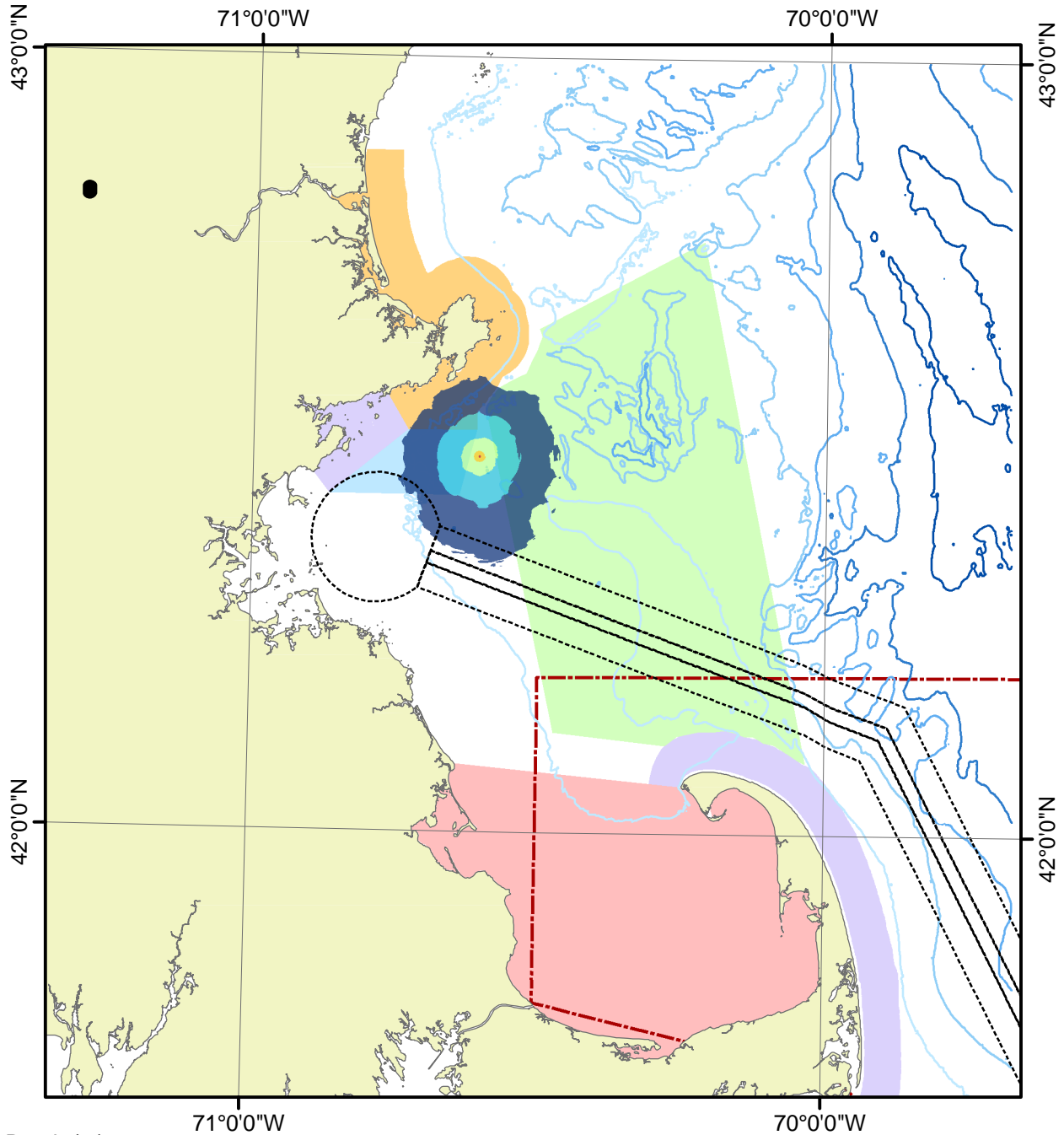


Received Levels (dB re 1 microPa)

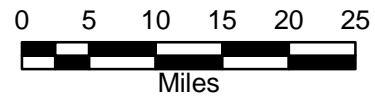
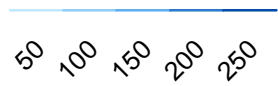


-  Shipping Lanes
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  South Essex Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

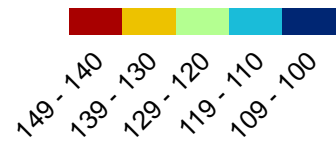
Neptune - 2 Stern Thrusters Fal. 500m N



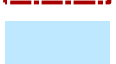
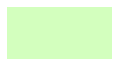


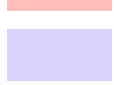


Water Depth (m)

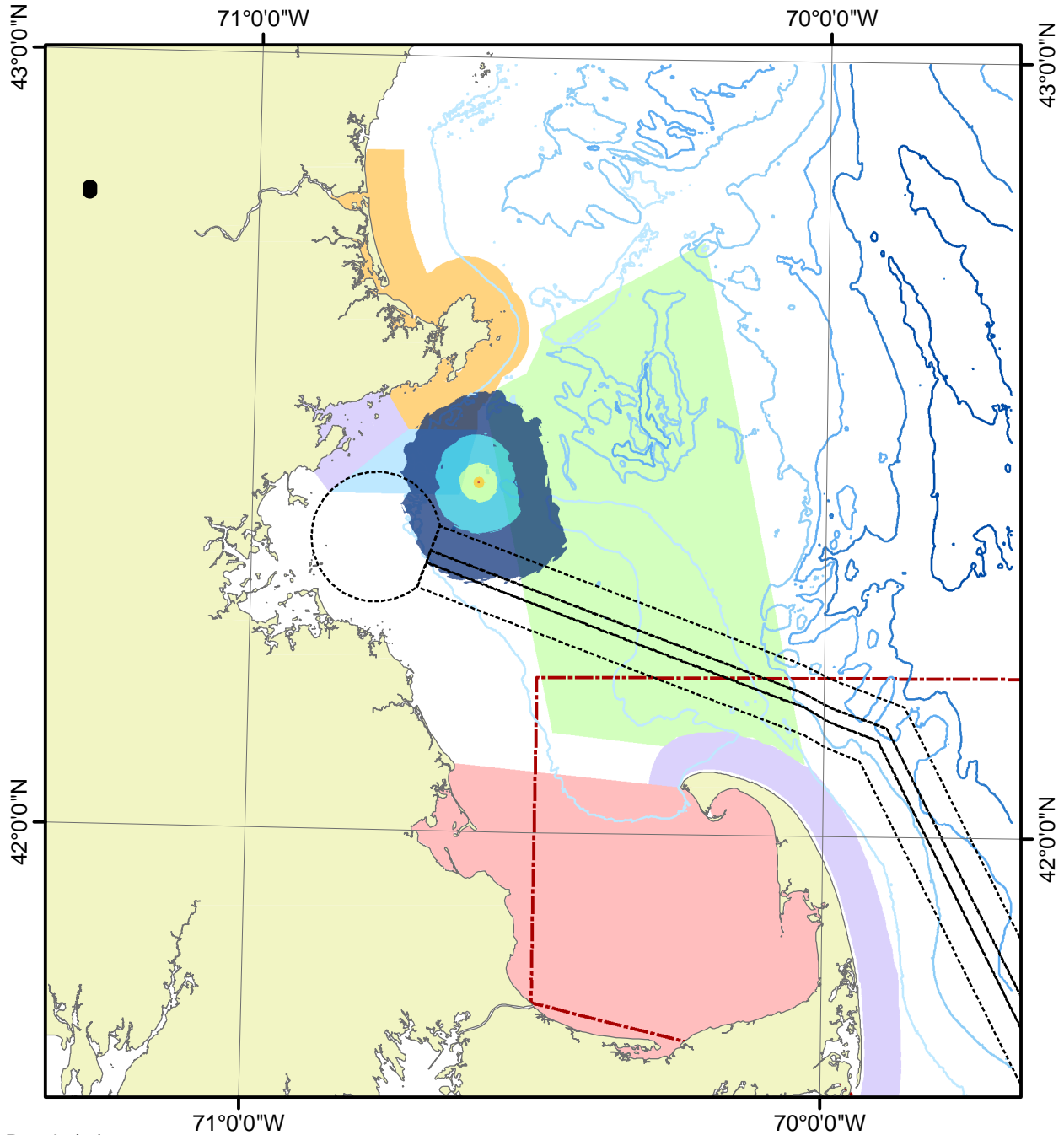


Received Levels (dB re 1 microPa)

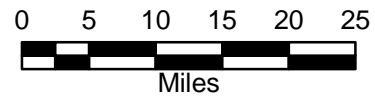
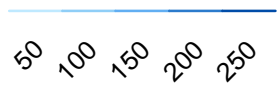


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

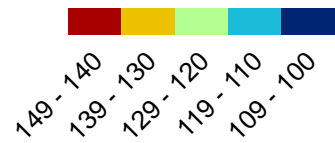
Neptune - 2 Stern Thrusters Fal. 500m S



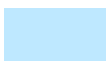
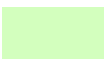





Water Depth (m)

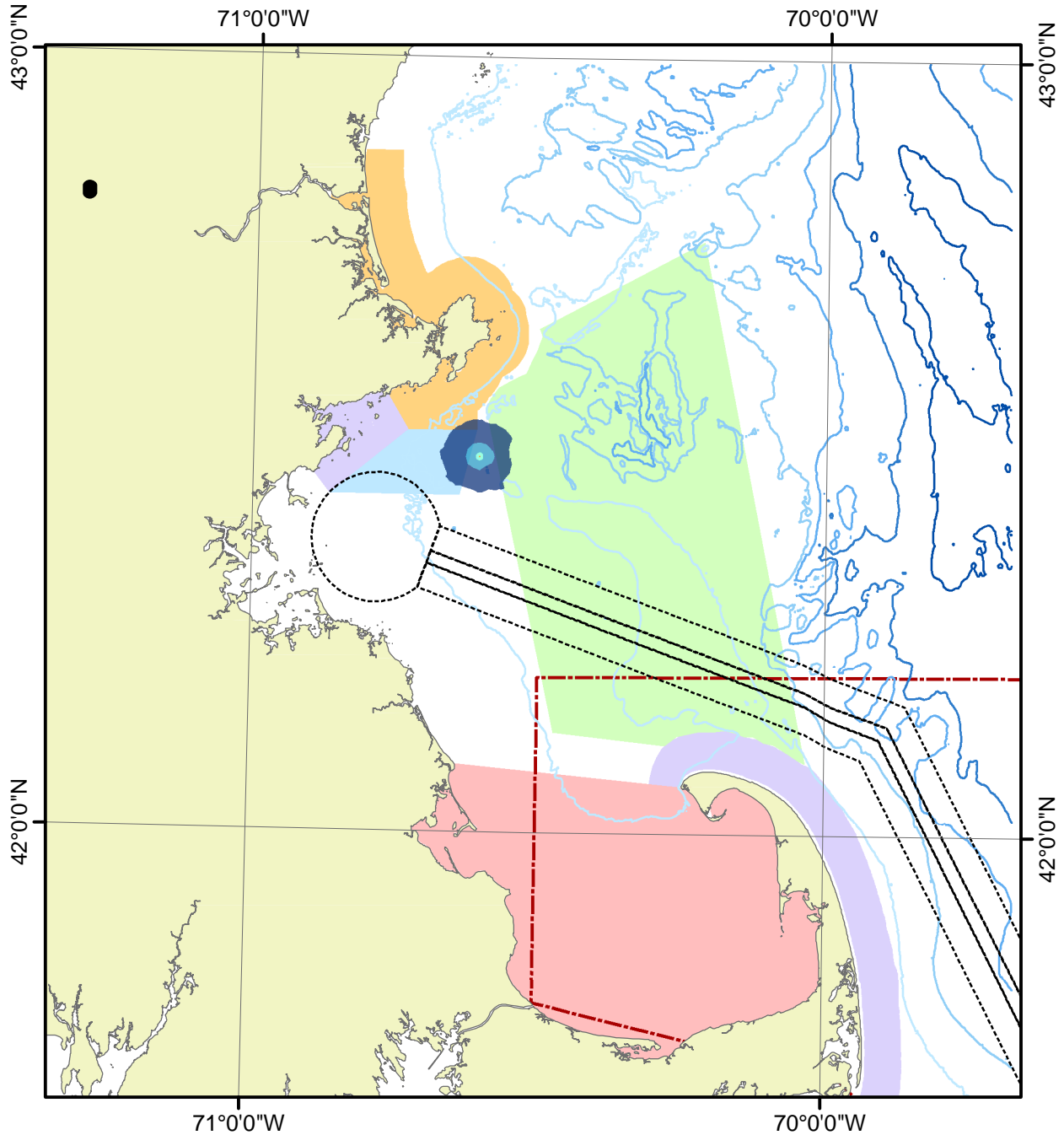


Received Levels (dB re 1 microPa)

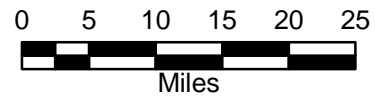
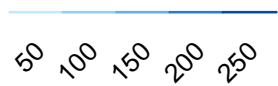


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

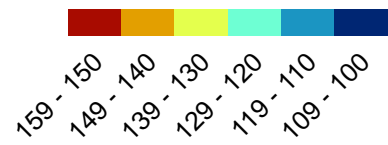
Neptune - 2 Stern Thrusters Win. 1m N



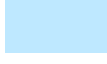
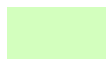





Water Depth (m)

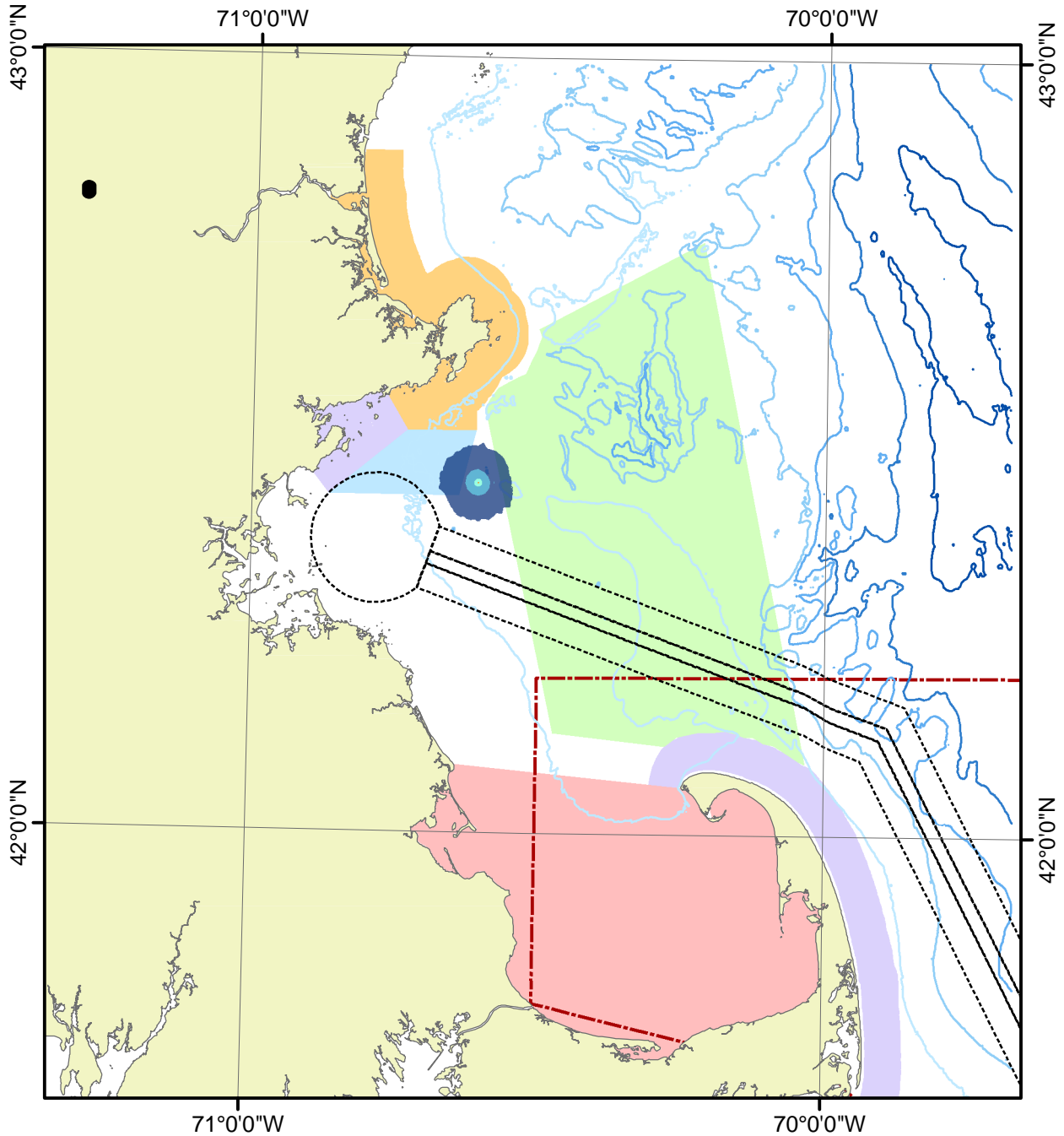


Received Levels (dB re 1 microPa)



-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

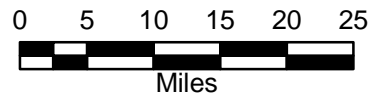
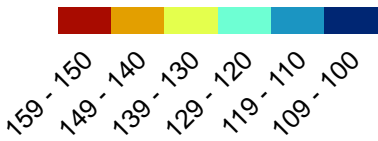
Neptune - 2 Stern Thrusters Win. 1m S



Water Depth (m)

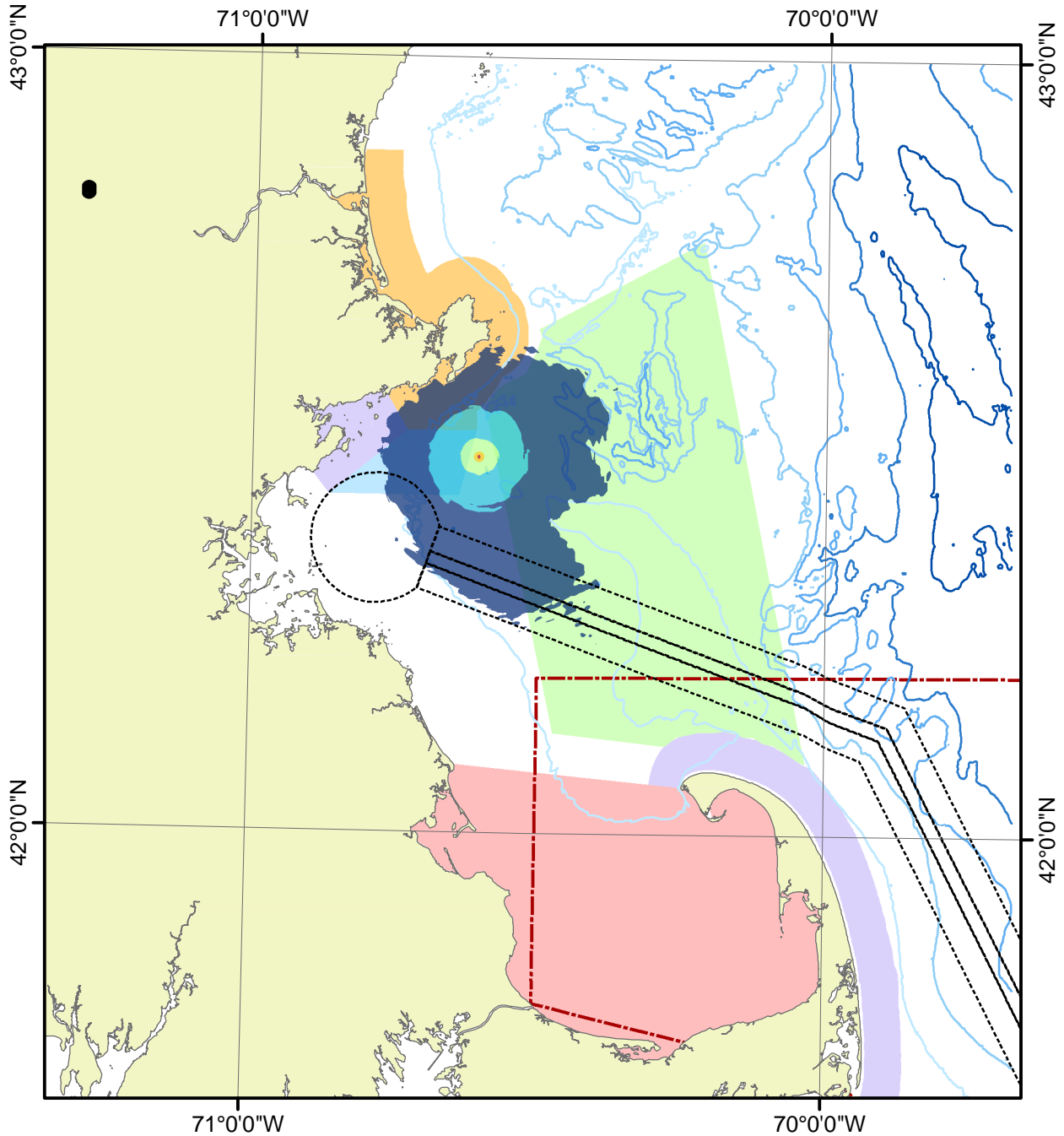
50 100 150 200 250

Received Levels (dB re 1 microPa)



-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

Neptune - 2 Stern Thrusters Win. 50m N



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

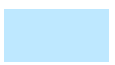
149 - 140
139 - 130
129 - 120
119 - 110
109 - 100



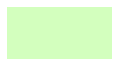
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



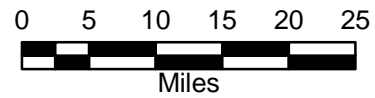
North Shore Ocean Sanctuary



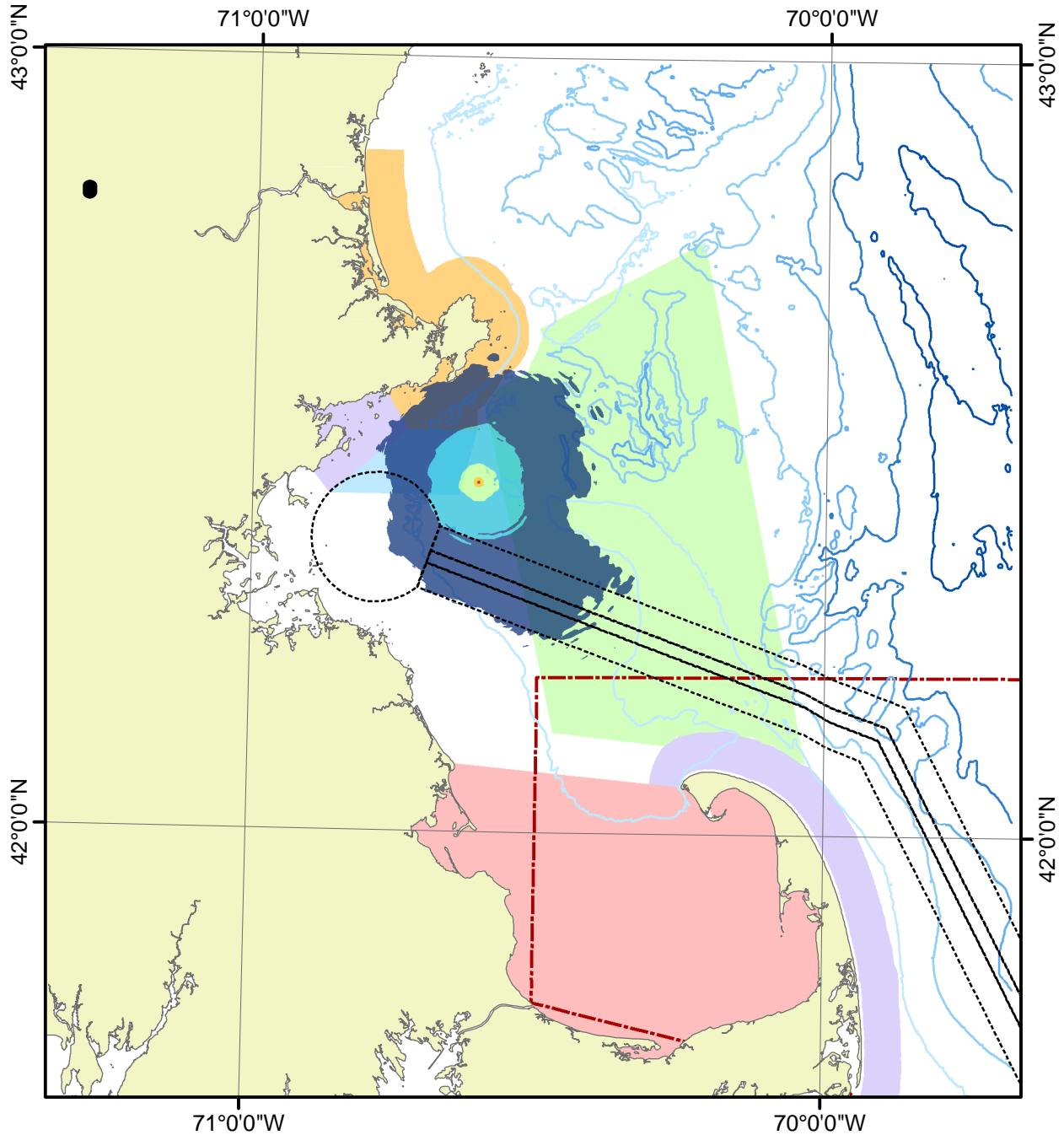
Cape Cod Bay Northern Right Whale Habitat



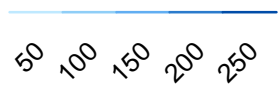
Cape Cod Ocean Sanctuary



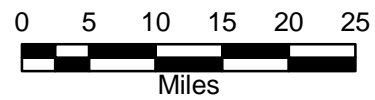
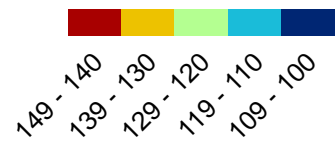
Neptune - 2 Stern Thrusters Win. 50m S



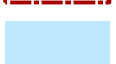
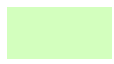


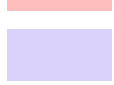


Water Depth (m)

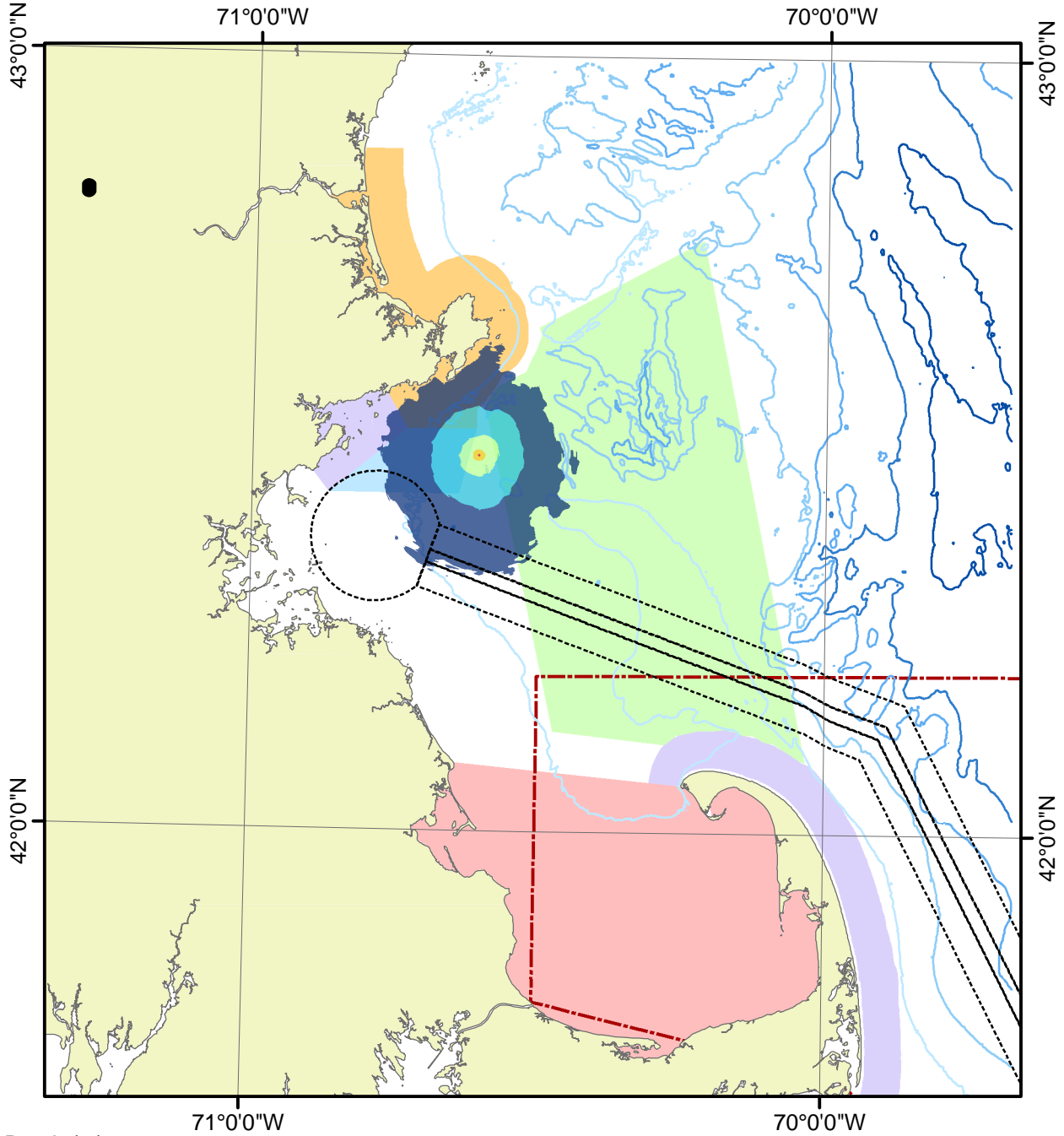


Received Levels (dB re 1 microPa)



-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

Neptune - 2 Stern Thrusters Win. 500m N



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

149 - 140
139 - 130
129 - 120
119 - 110
109 - 100

Shipping Lanes

Cape Cod Bay Northern Right Whale Habitat

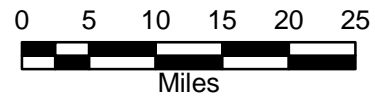
South Essex Ocean Sanctuary

Stellwagen Bank NMS

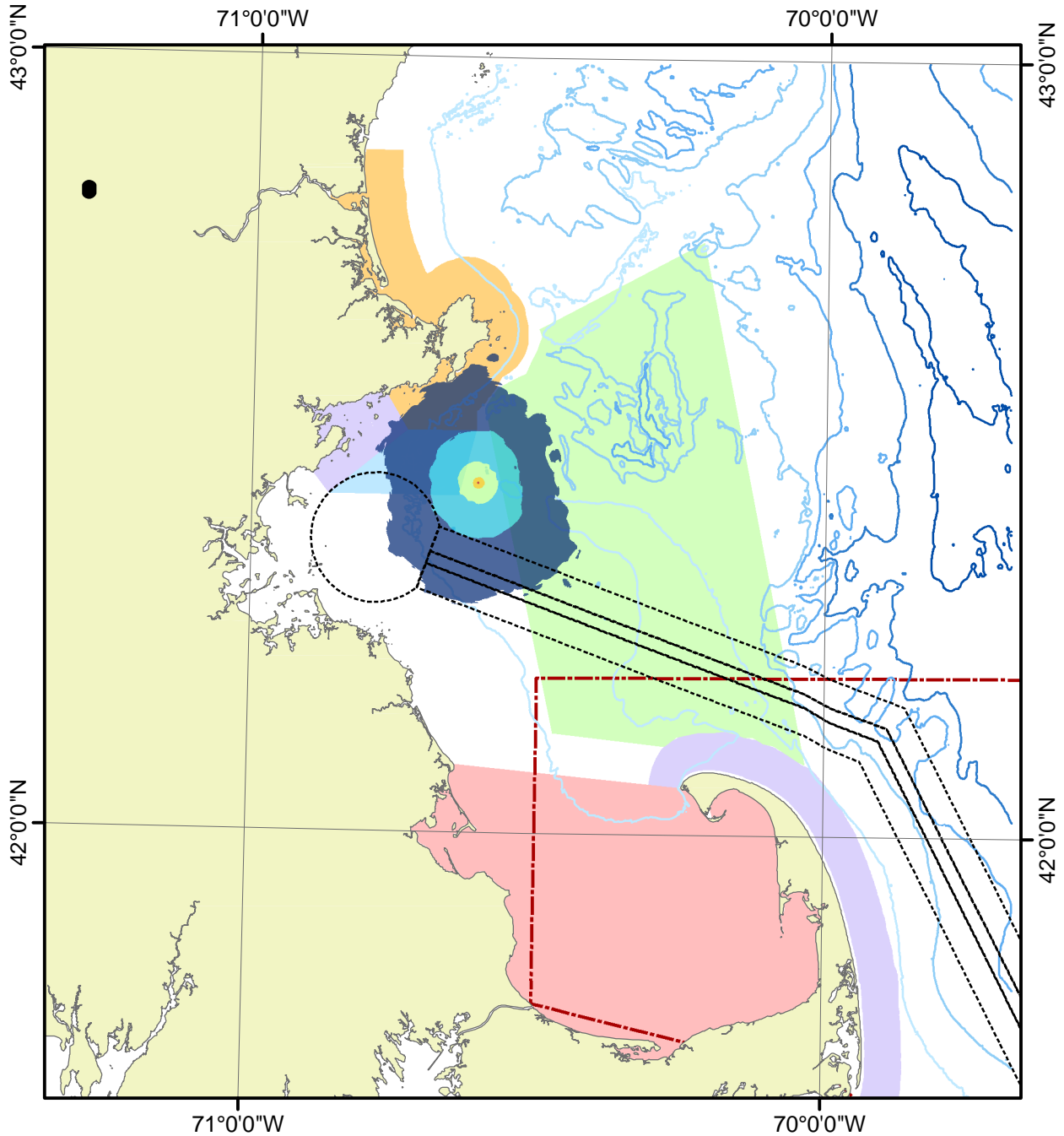
North Shore Ocean Sanctuary

Cape Cod Bay Northern Right Whale Habitat

Cape Cod Ocean Sanctuary



Neptune - 2 Stern Thrusters Win. 500m S



Water Depth (m)

50 100 150 200 250

Received Levels (dB re 1 microPa)

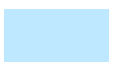
149 - 140
139 - 130
129 - 120
119 - 110
109 - 100



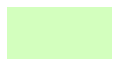
Shipping Lanes



Cape Cod Bay Northern Right Whale Habitat



South Essex Ocean Sanctuary



Stellwagen Bank NMS



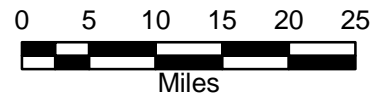
North Shore Ocean Sanctuary



Cape Cod Bay Northern Right Whale Habitat

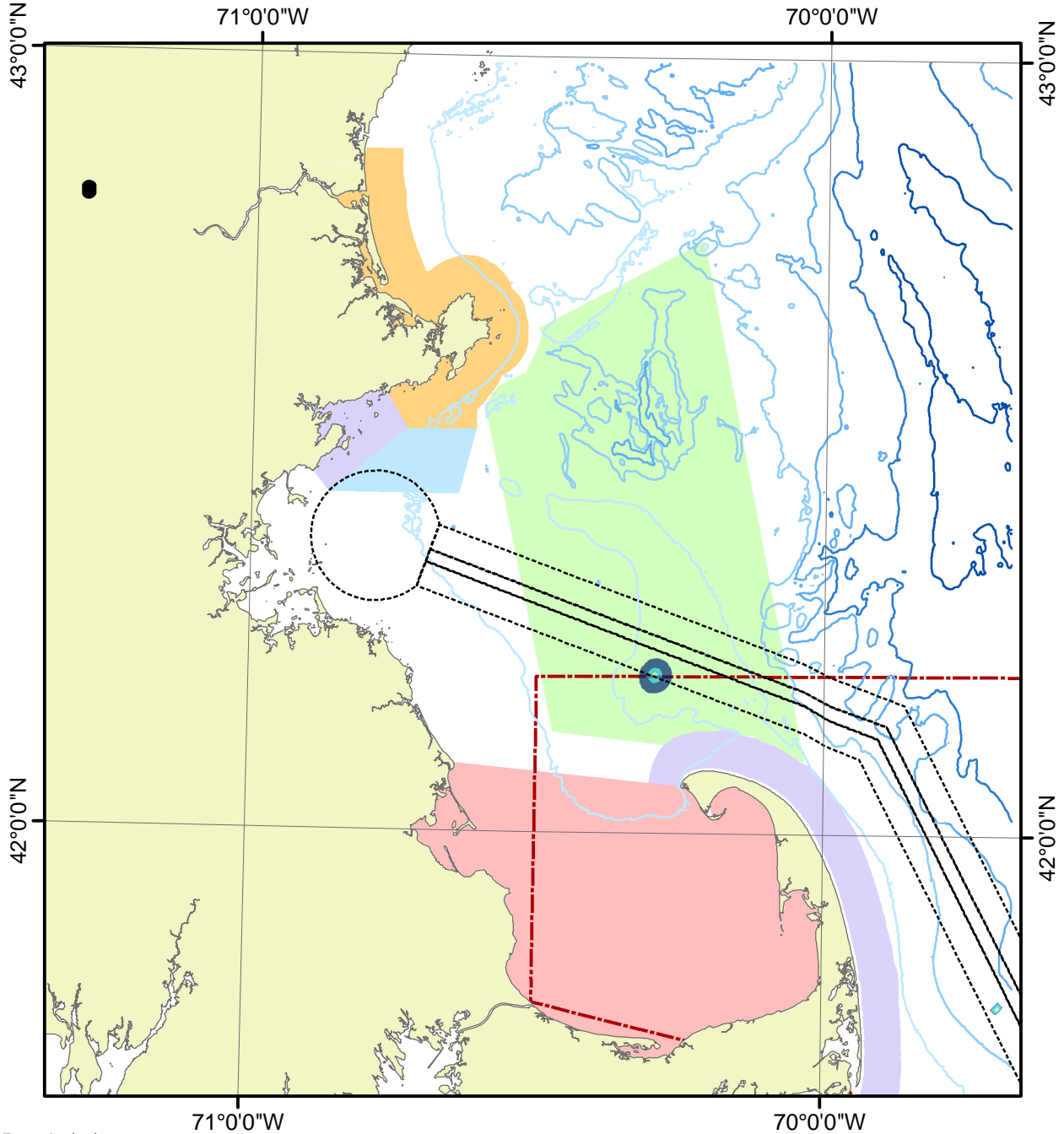


Cape Cod Ocean Sanctuary

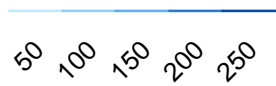


Appendix C: Noise Maps – LNG 10 Knot TSS Transit

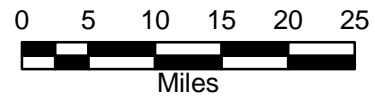
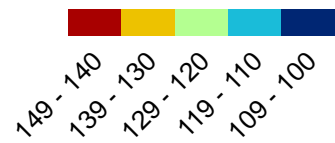
Neptune - Transit on Boston TSS Spr. 1m 10kts



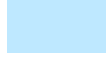
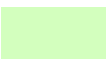





Water Depth (m)

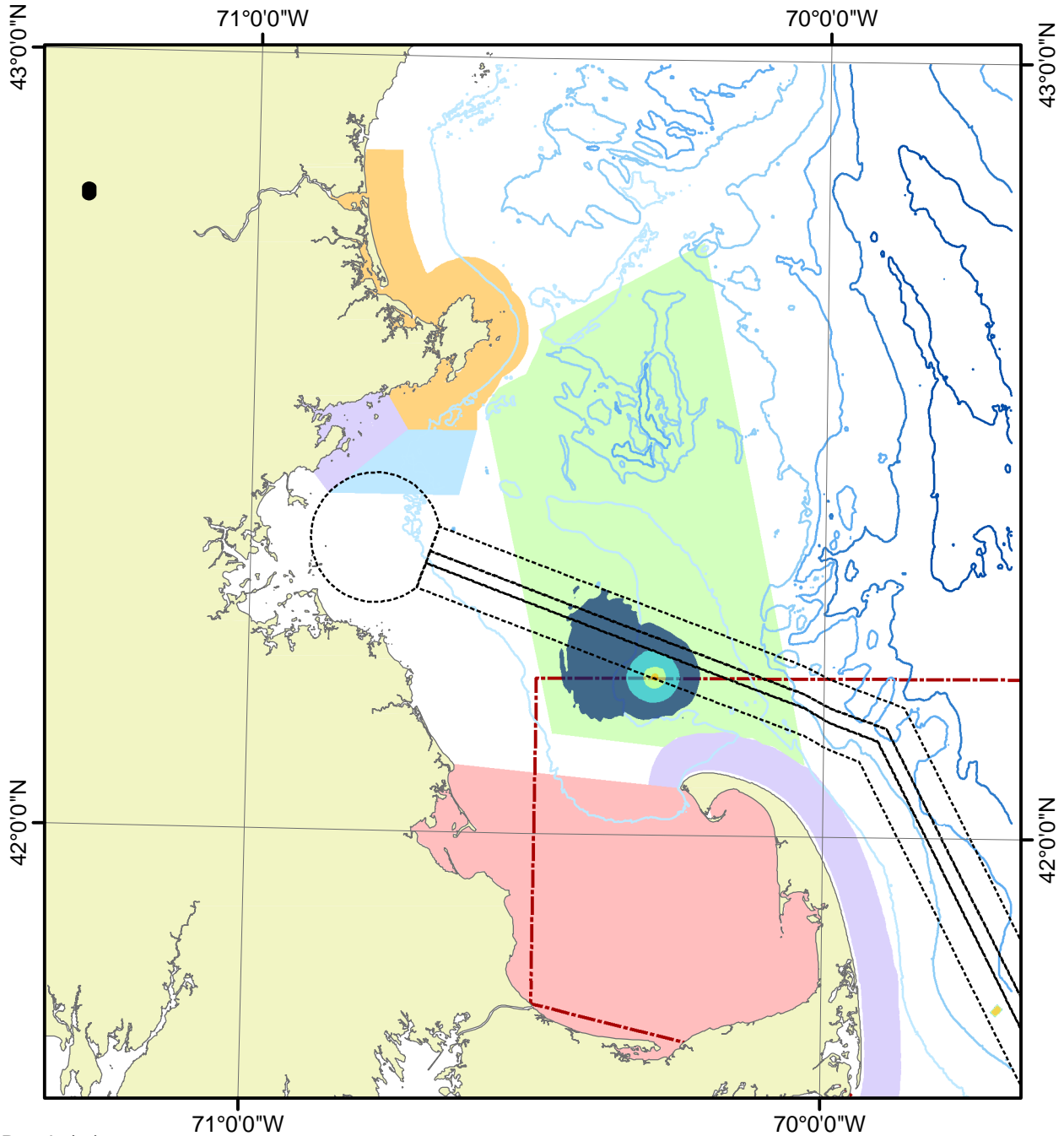


Received Levels (dB re 1 microPa)

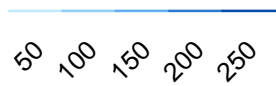


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

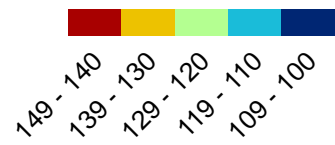
Neptune - Transit on Boston TSS Spr. 50m 10kts



Water Depth (m)



Received Levels (dB re 1 microPa)



Shipping Lanes

Cape Cod Bay Northern Right Whale Habitat

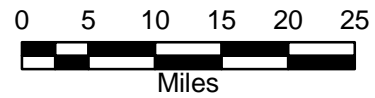
South Essex Ocean Sanctuary

Stellwagen Bank NMS

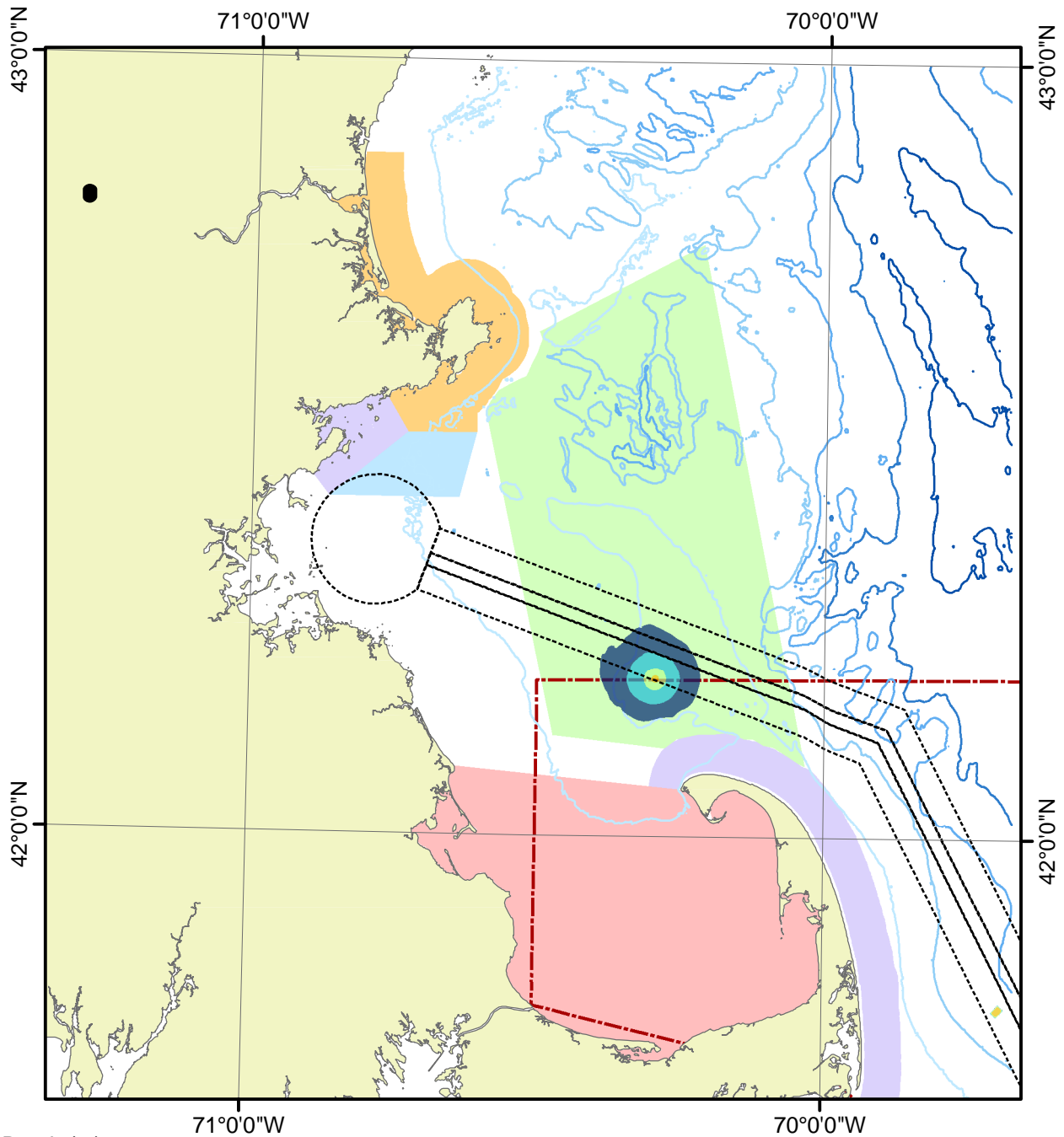
North Shore Ocean Sanctuary

Cape Cod Bay Northern Right Whale Habitat

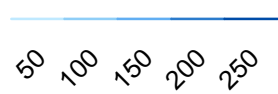
Cape Cod Ocean Sanctuary



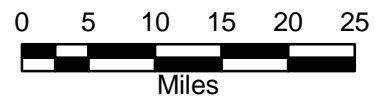
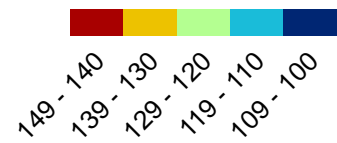
Neptune - Transit on Boston TSS Spr. 500m 10kts




Water Depth (m)

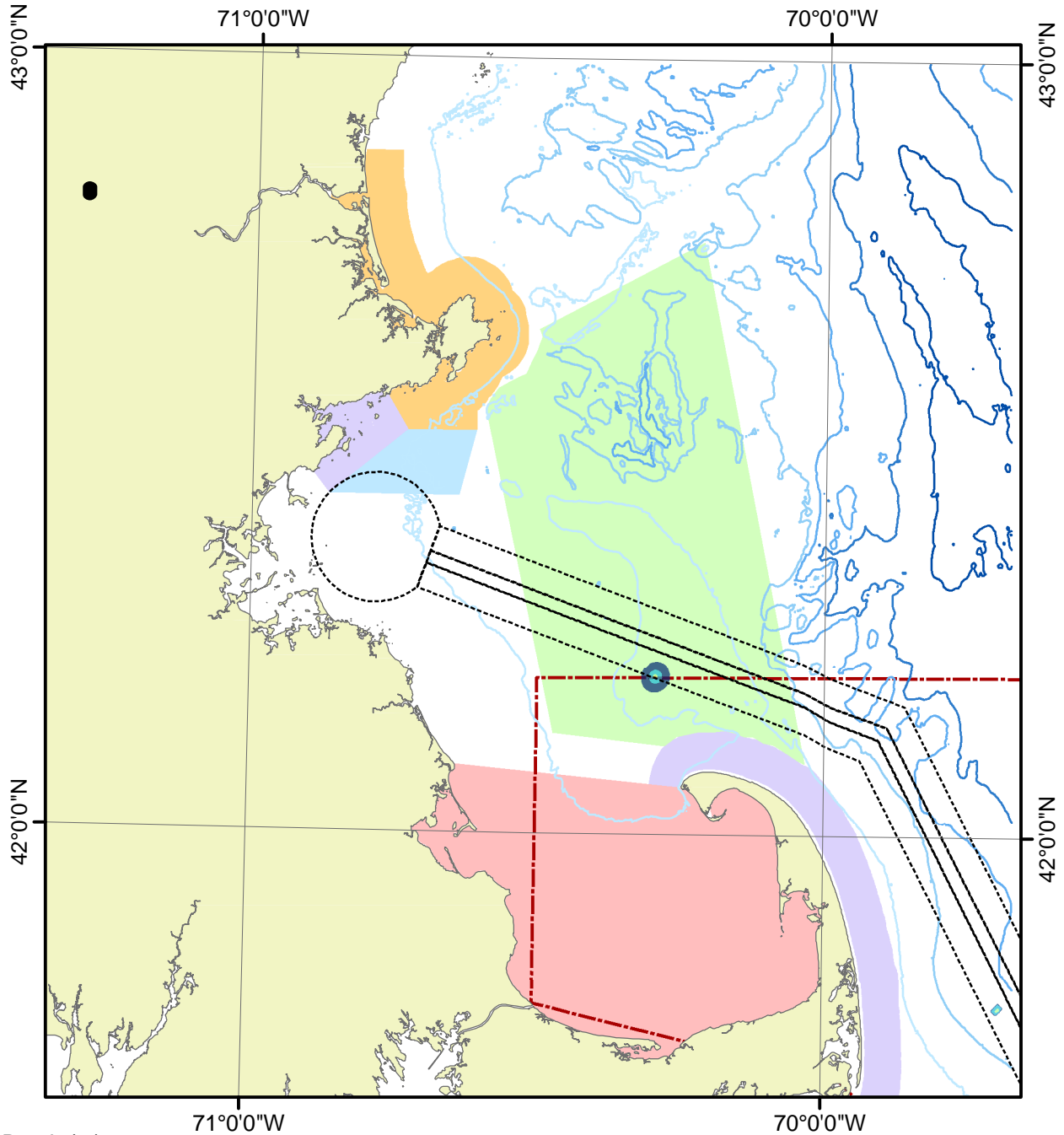


Received Levels (dB re 1 microPa)

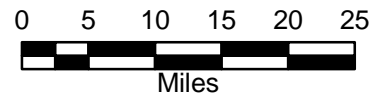
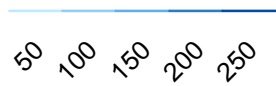


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

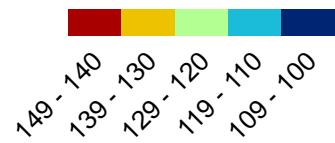
Neptune - Transit on Boston TSS Sum. 1m 10kts



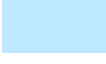
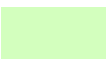




Water Depth (m)

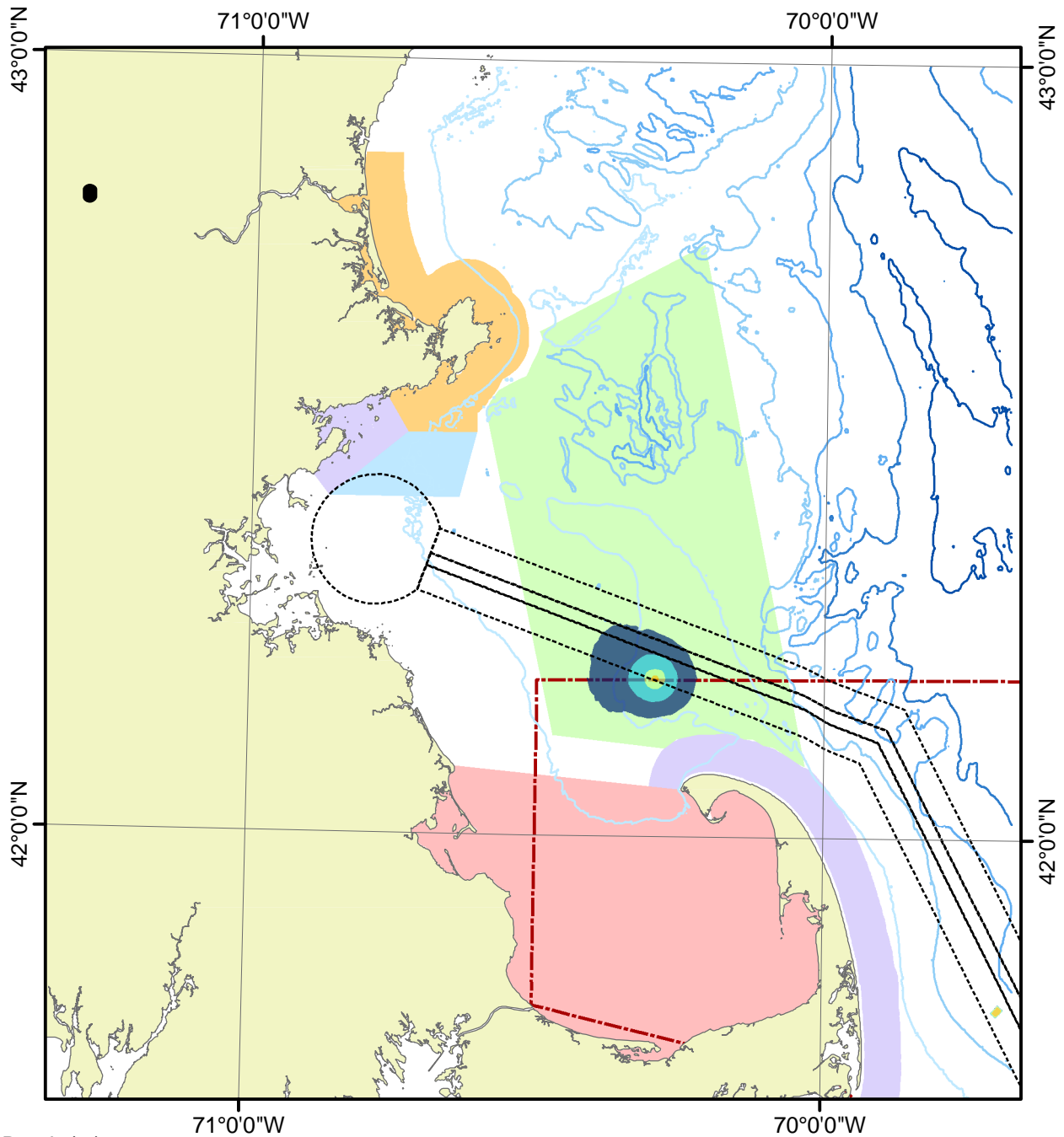


Received Levels (dB re 1 microPa)

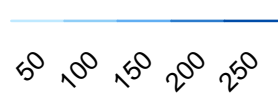


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

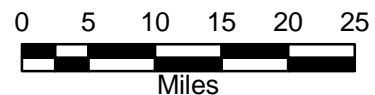
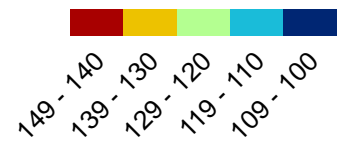
Neptune - Transit on Boston TSS Sum. 50m 10kts



Water Depth (m)

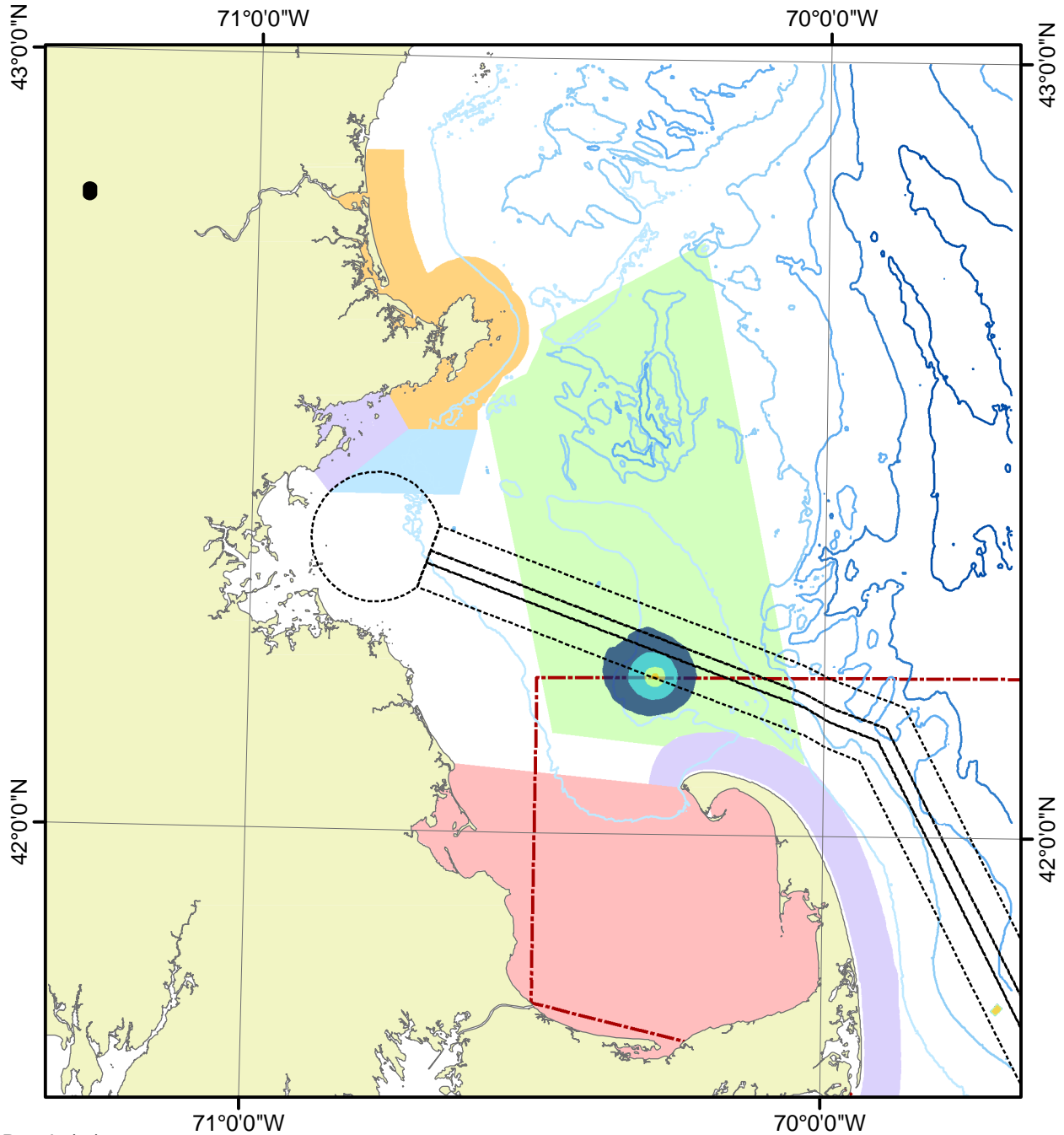


Received Levels (dB re 1 microPa)

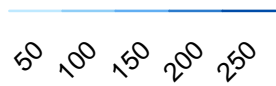


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

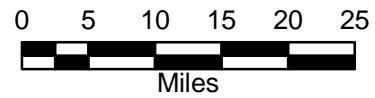
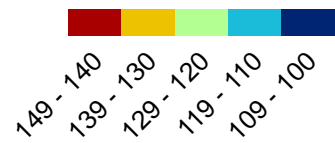
Neptune - Transit on Boston TSS Sum. 500m 10kts



Water Depth (m)

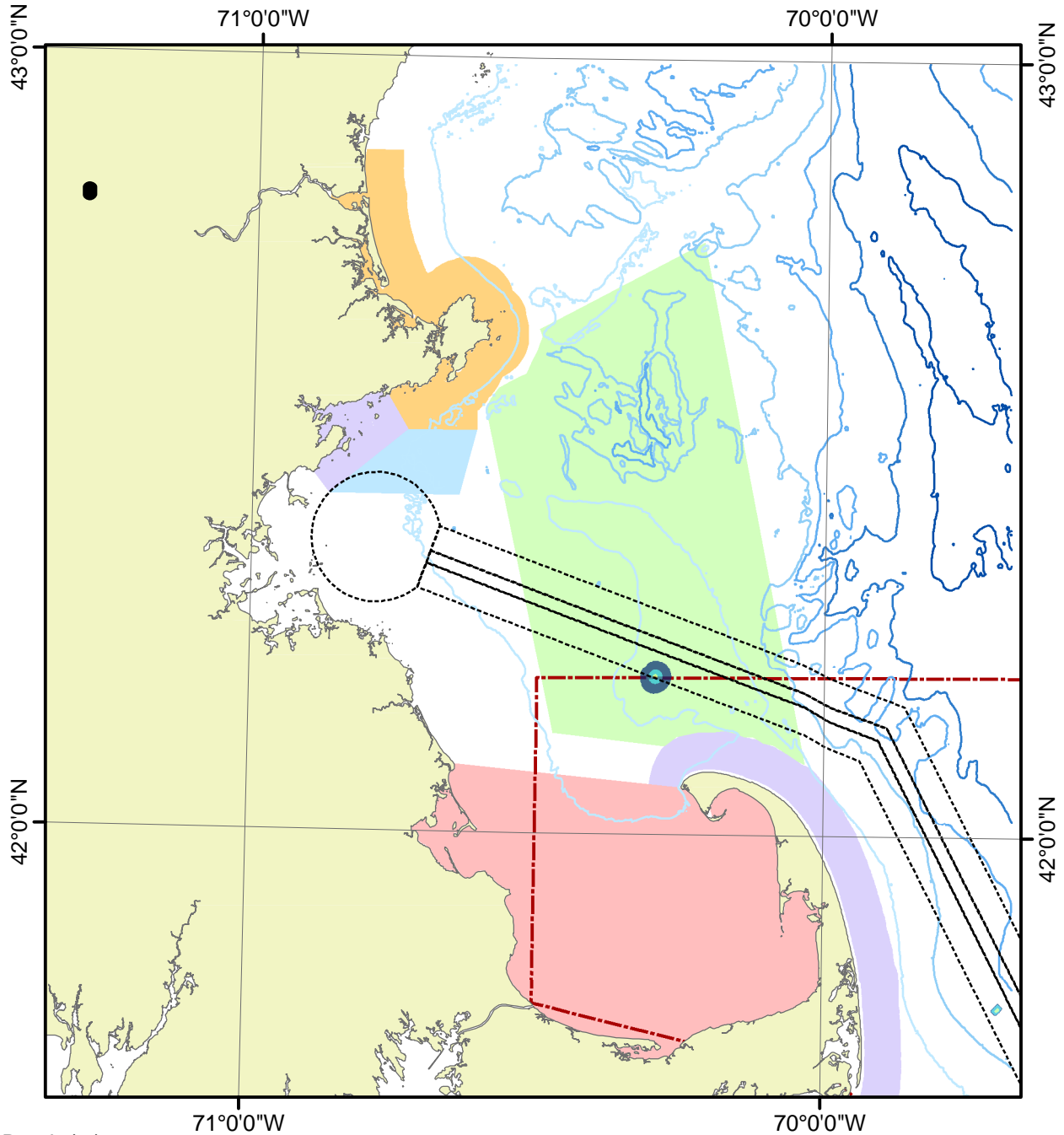


Received Levels (dB re 1 microPa)

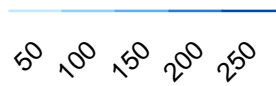


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

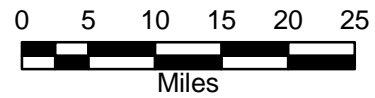
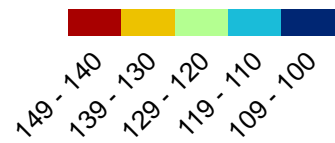
Neptune - Transit on Boston TSS Fal. 1m 10kts



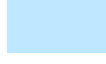
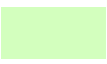





Water Depth (m)

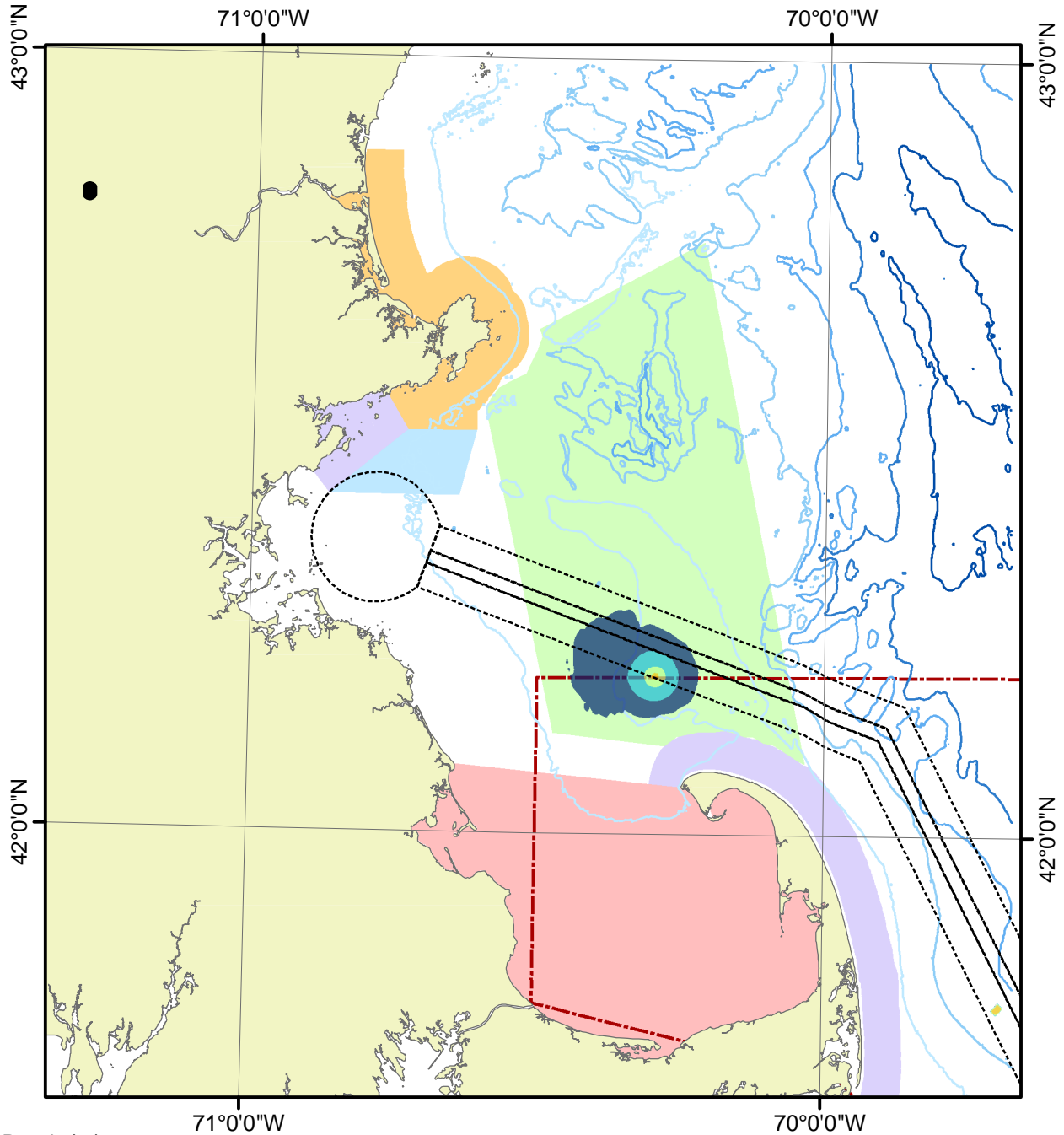


Received Levels (dB re 1 microPa)

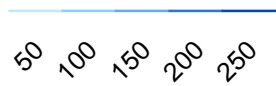


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

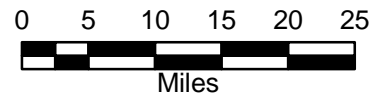
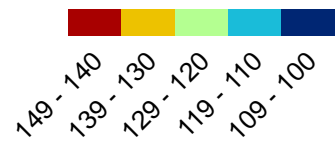
Neptune - Transit on Boston TSS Fal. 50m 10kts



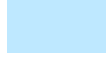
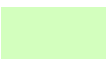





Water Depth (m)

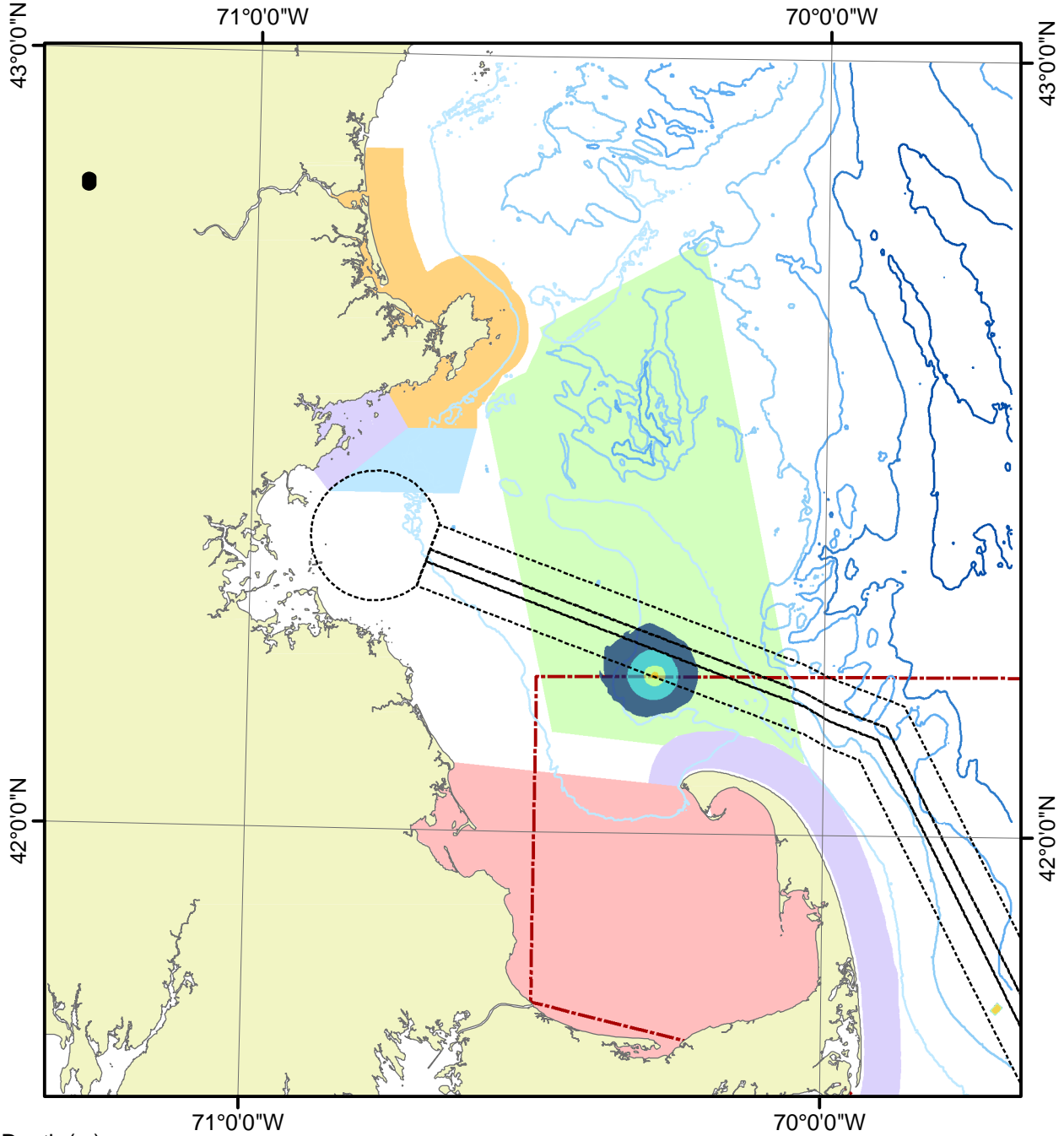


Received Levels (dB re 1 microPa)

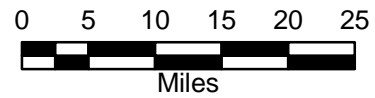
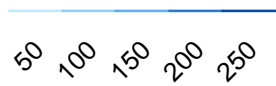


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

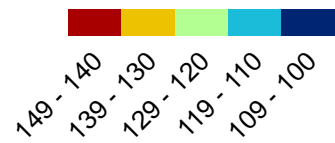
Neptune - Transit on Boston TSS Fal. 500m 10kts



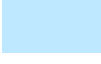
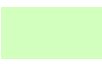





Water Depth (m)

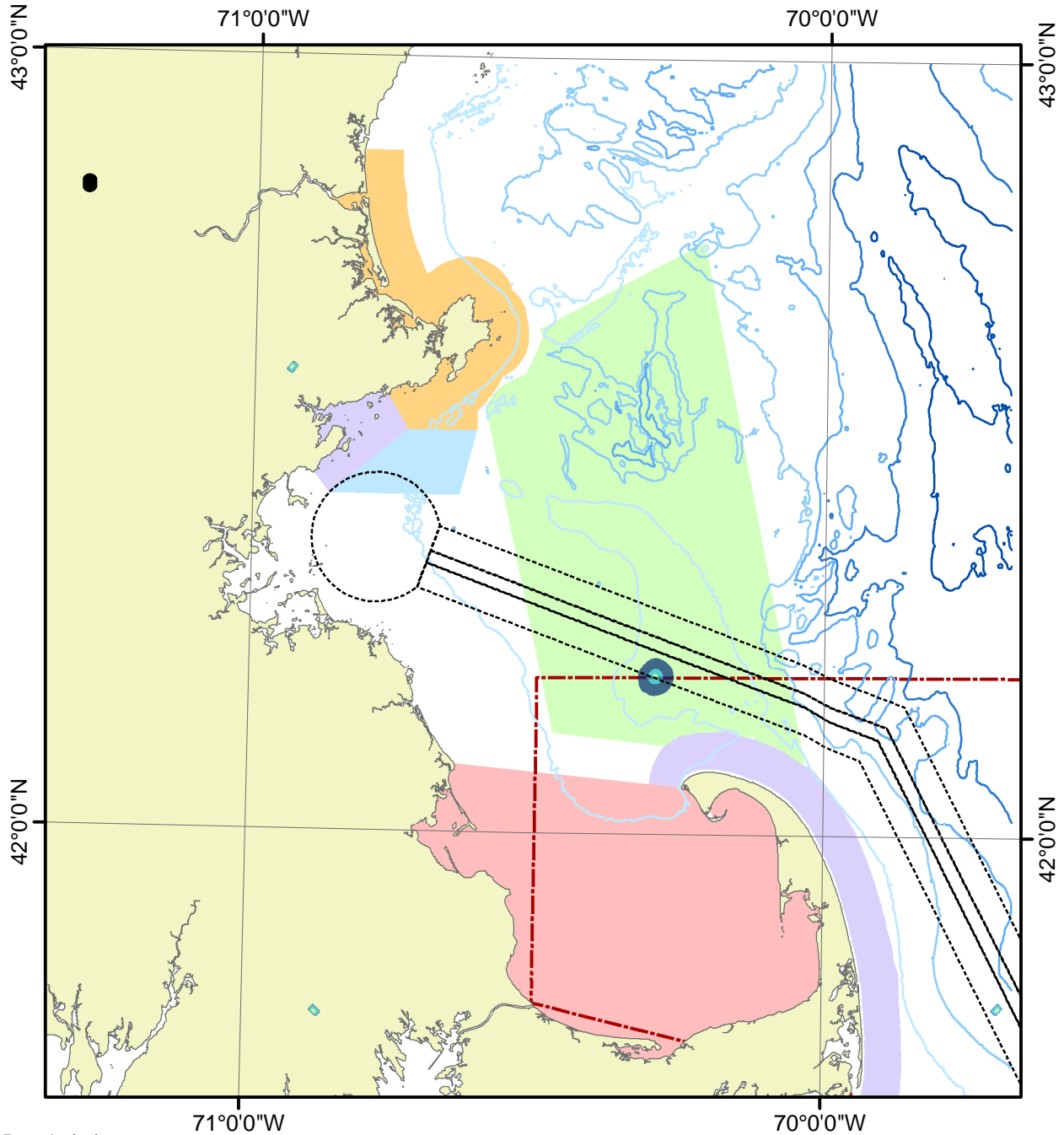


Received Levels (dB re 1 microPa)

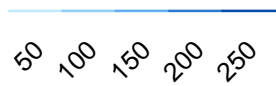


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

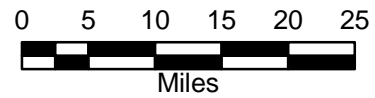
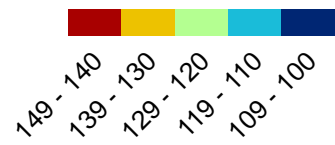
Neptune - Transit on Boston TSS Win. 1m 10kts



Water Depth (m)



Received Levels (dB re 1 microPa)



Shipping Lanes

Cape Cod Bay Northern Right Whale Habitat

South Essex Ocean Sanctuary

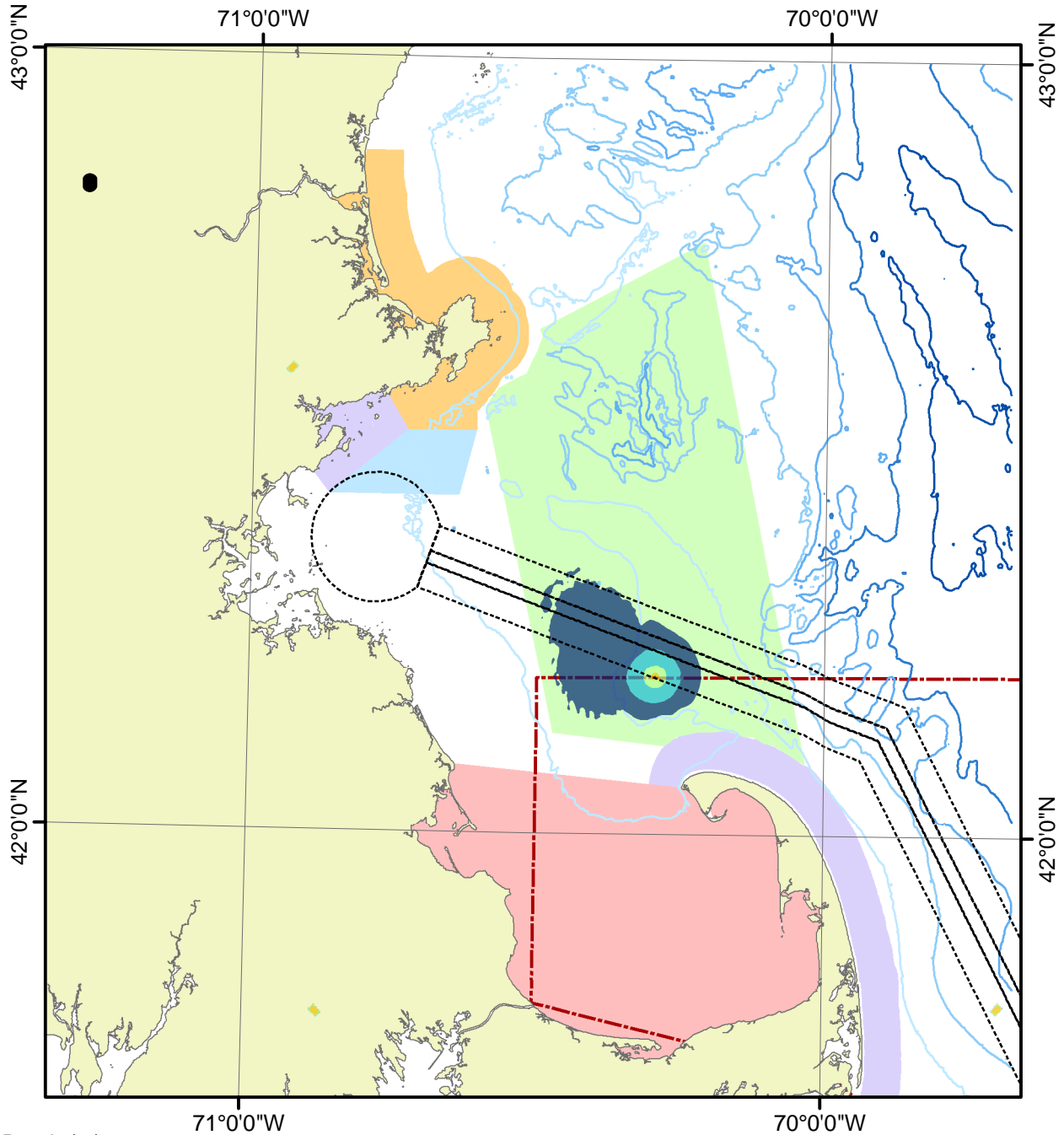
Stellwagen Bank NMS

North Shore Ocean Sanctuary

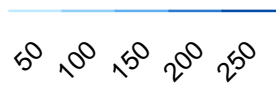
Cape Cod Bay Northern Right Whale Habitat

Cape Cod Ocean Sanctuary

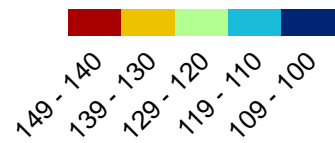
Neptune - Transit on Boston TSS Win. 50m 10kts



Water Depth (m)



Received Levels (dB re 1 microPa)



Shipping Lanes

Cape Cod Bay Northern Right Whale Habitat

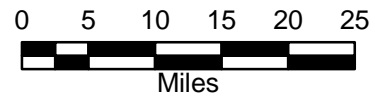
South Essex Ocean Sanctuary

Stellwagen Bank NMS

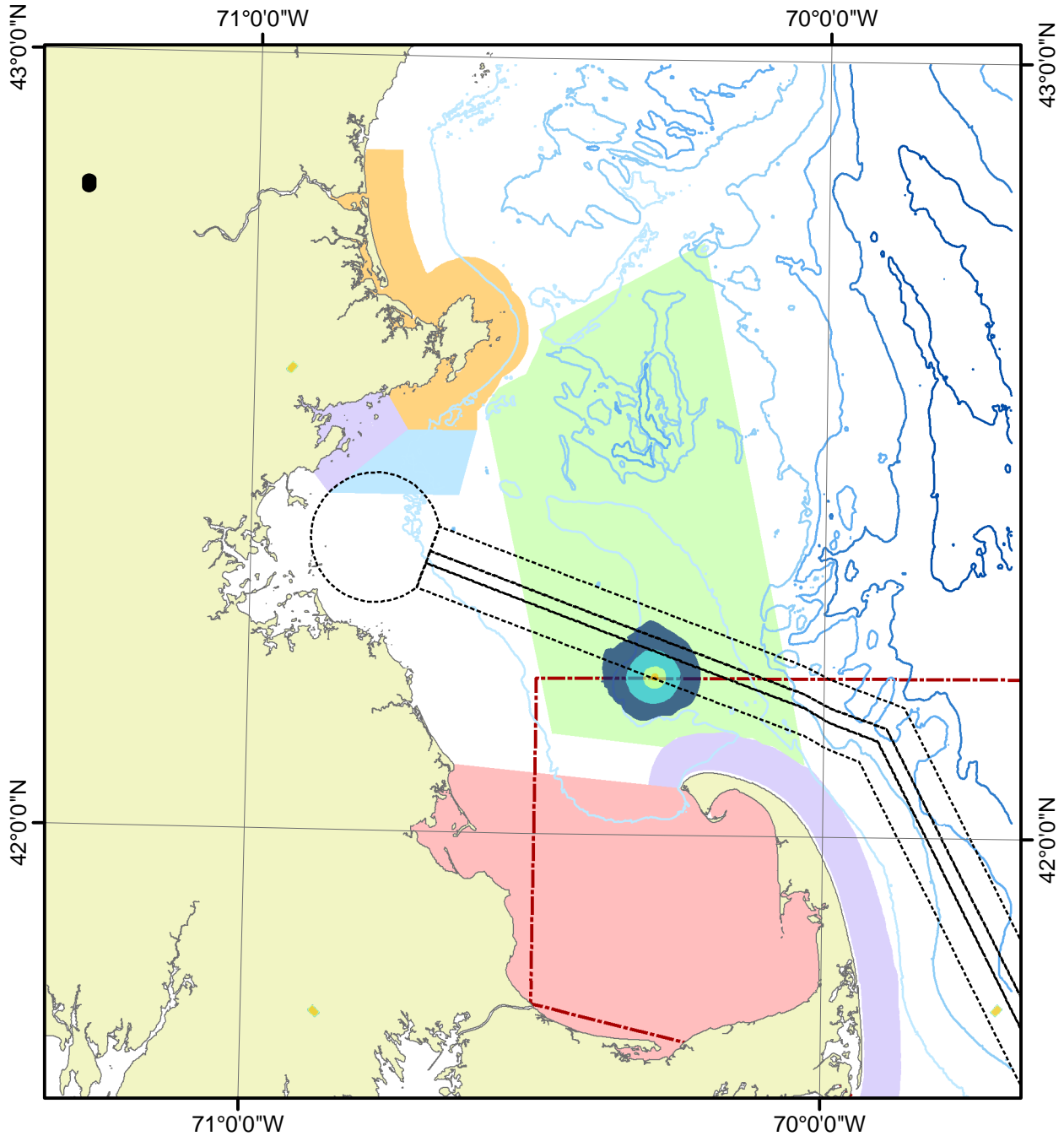
North Shore Ocean Sanctuary

Cape Cod Bay Northern Right Whale Habitat

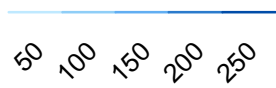
Cape Cod Ocean Sanctuary



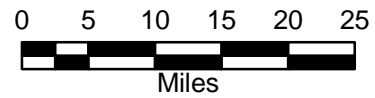
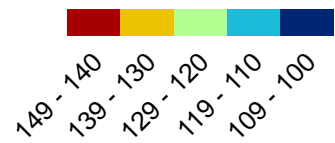
Neptune - Transit on Boston TSS Win. 500m 10kts




Water Depth (m)

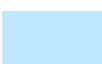


Received Levels (dB re 1 microPa)





 Shipping Lanes

 Cape Cod Bay Northern Right Whale Habitat

 South Essex Ocean Sanctuary

 Stellwagen Bank NMS

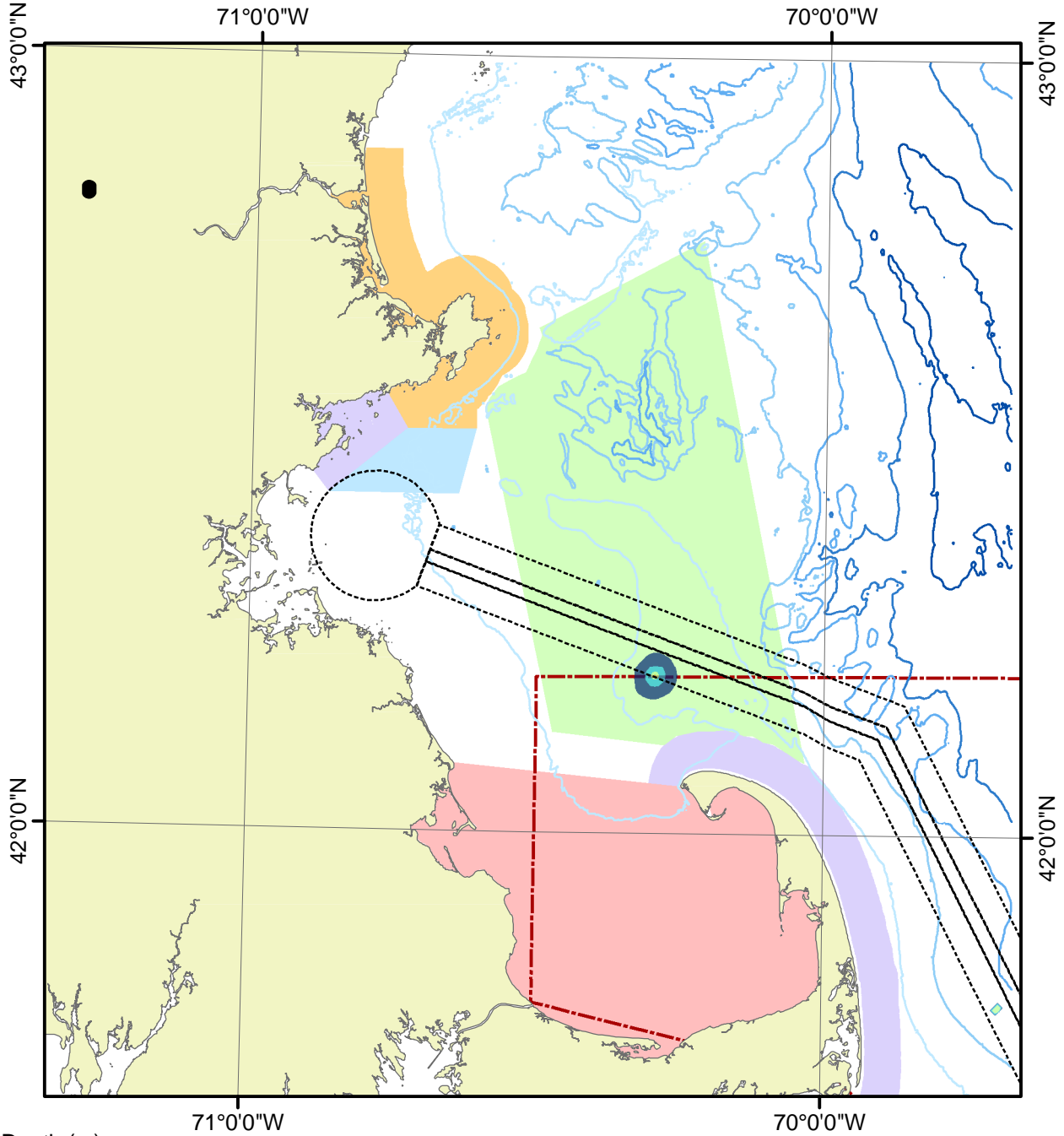
 North Shore Ocean Sanctuary

 Cape Cod Bay Northern Right Whale Habitat

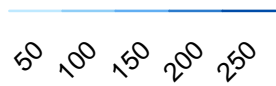
 Cape Cod Ocean Sanctuary

Appendix D: Noise Maps – LNG 14 Knot TSS Transit

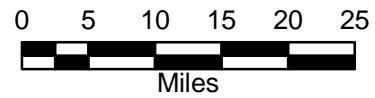
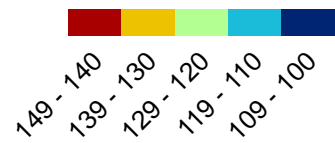
Neptune - Transit on Boston TSS Spr. 1m 14kts



Water Depth (m)

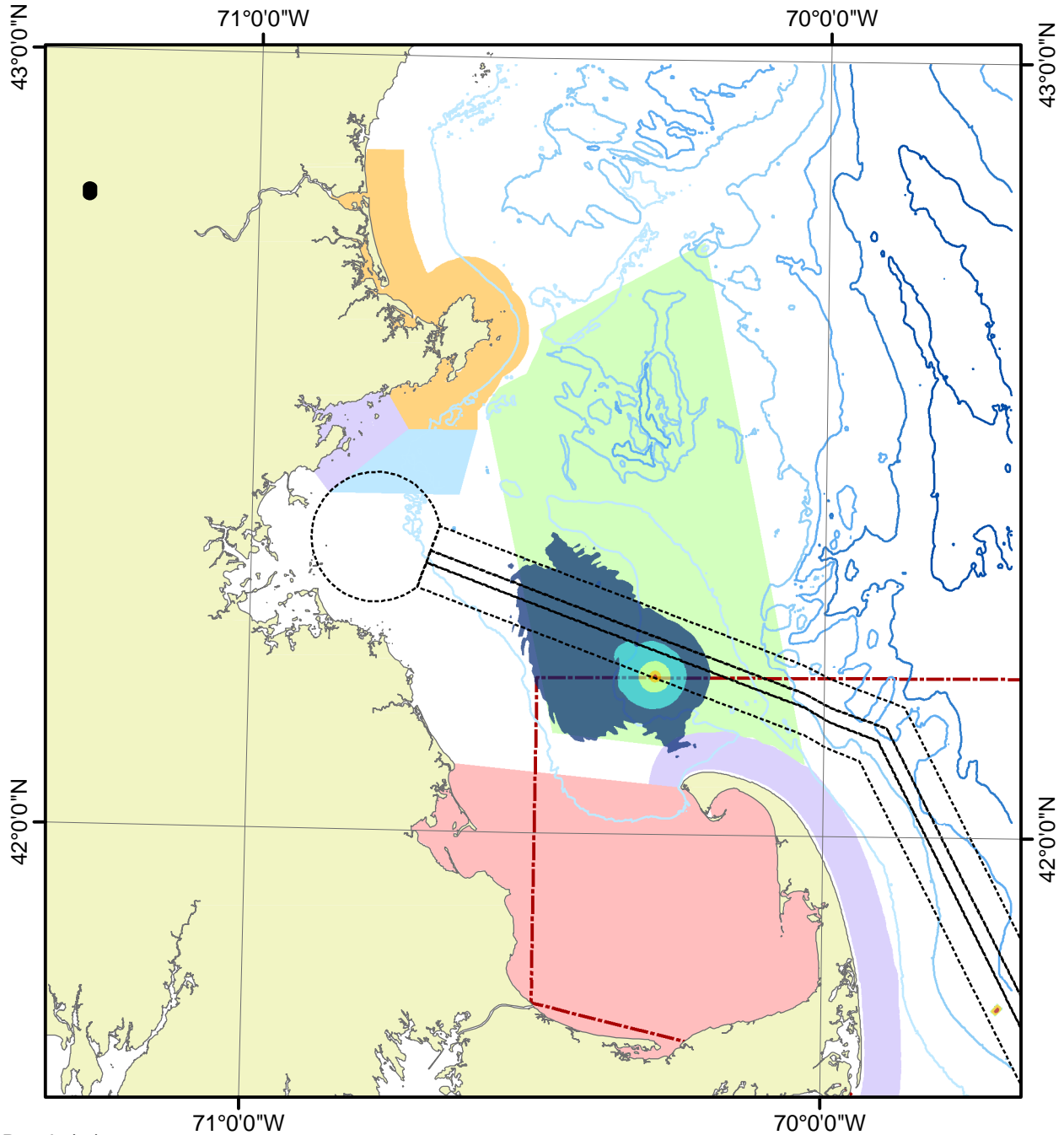


Received Levels (dB re 1 microPa)

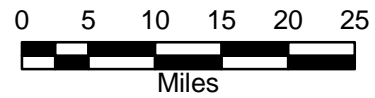
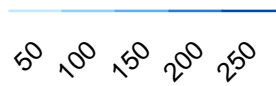


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
- South Essex Ocean Sanctuary
- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

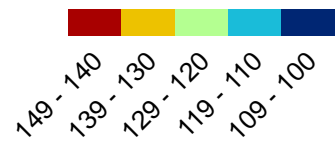
Neptune - Transit on Boston TSS Spr. 50m 14kts



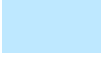
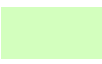





Water Depth (m)

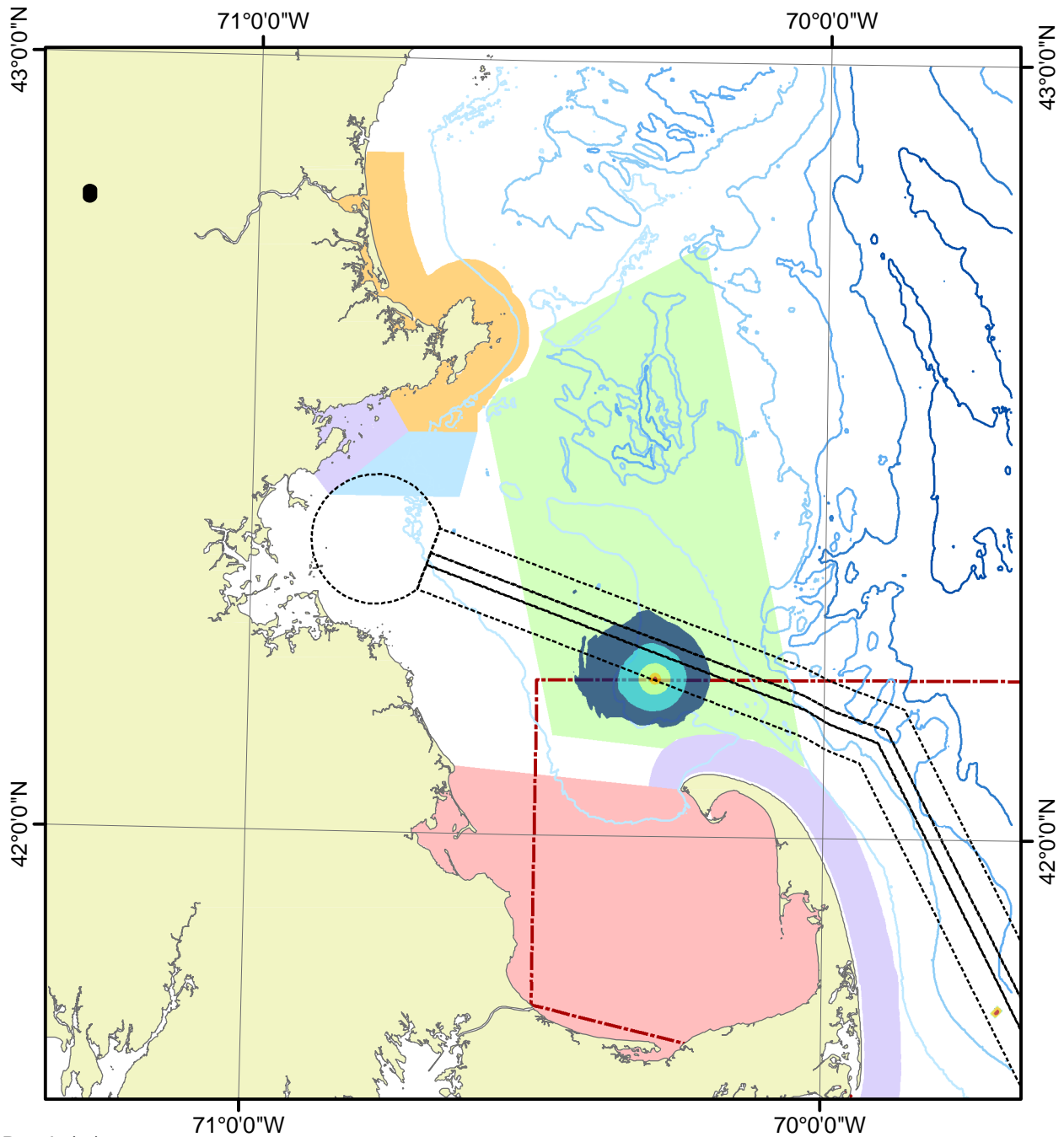


Received Levels (dB re 1 microPa)

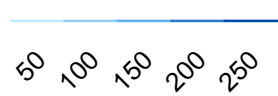


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

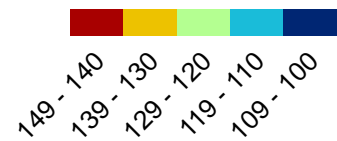
Neptune - Transit on Boston TSS Spr. 500m 14kts



Water Depth (m)



Received Levels (dB re 1 microPa)



Shipping Lanes

Cape Cod Bay Northern Right Whale Habitat

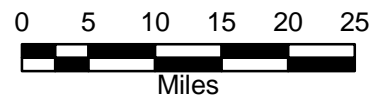
South Essex Ocean Sanctuary

Stellwagen Bank NMS

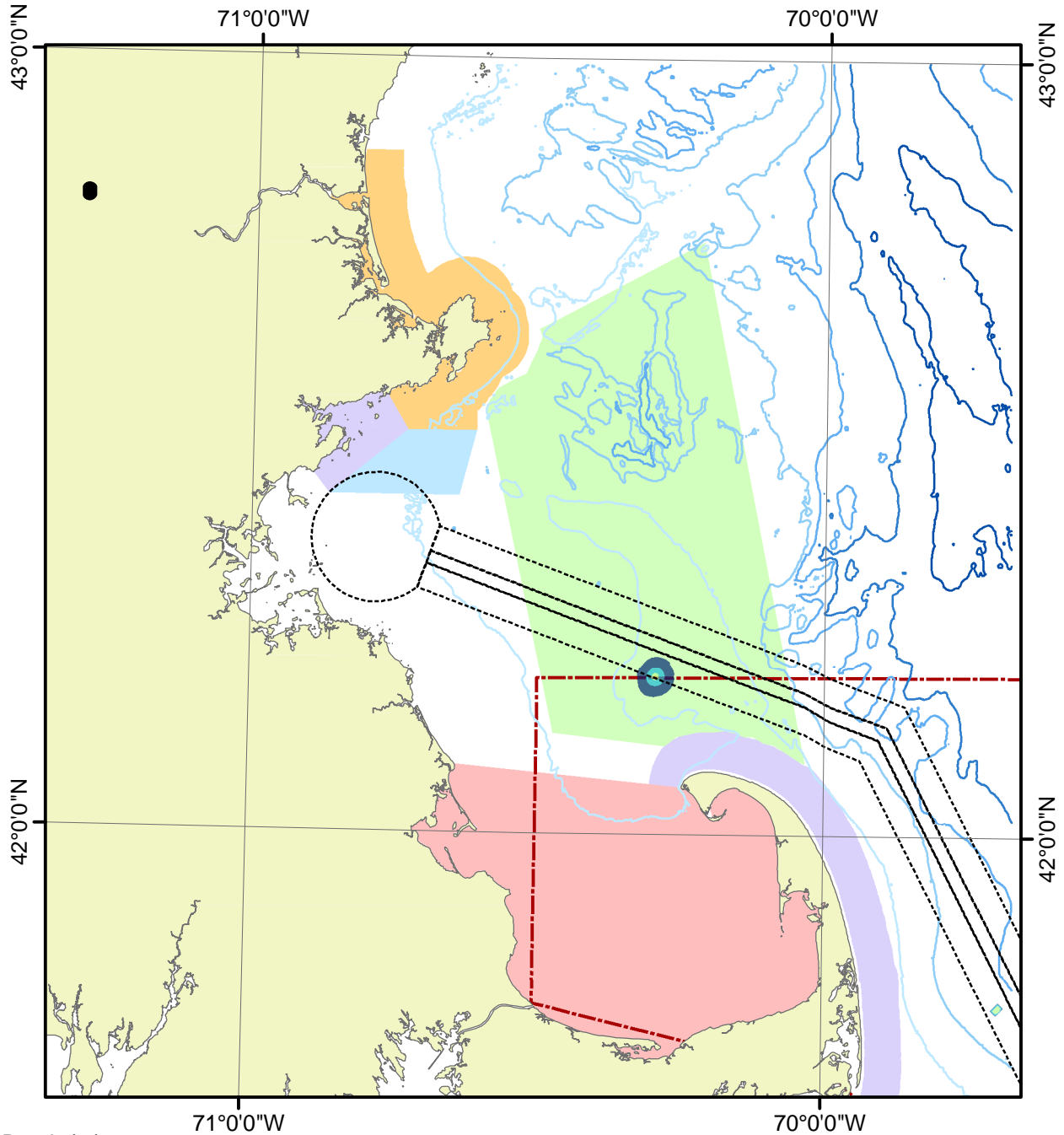
North Shore Ocean Sanctuary

Cape Cod Bay Northern Right Whale Habitat

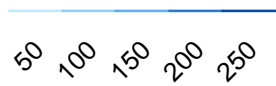
Cape Cod Ocean Sanctuary



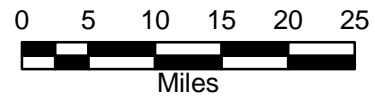
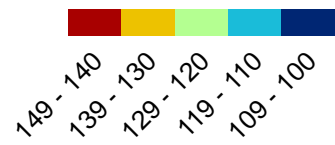
Neptune - Transit on Boston TSS Sum. 1m 14kts



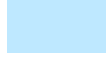
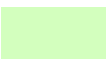





Water Depth (m)

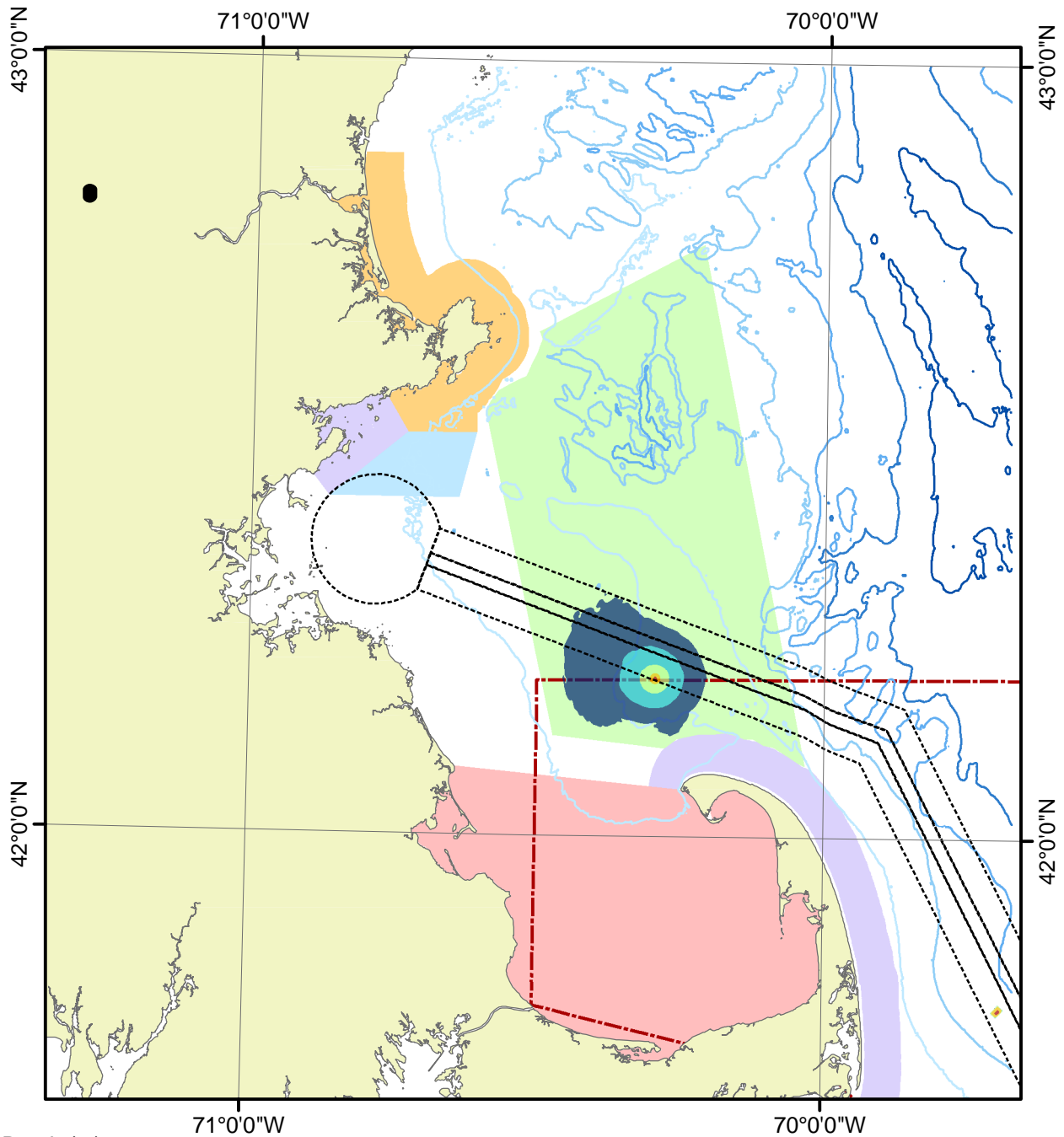


Received Levels (dB re 1 microPa)

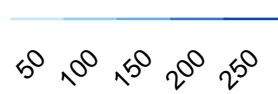


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

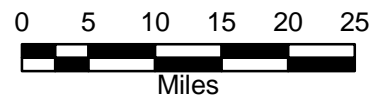
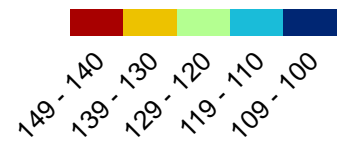
Neptune - Transit on Boston TSS Sum. 50m 14kts



Water Depth (m)

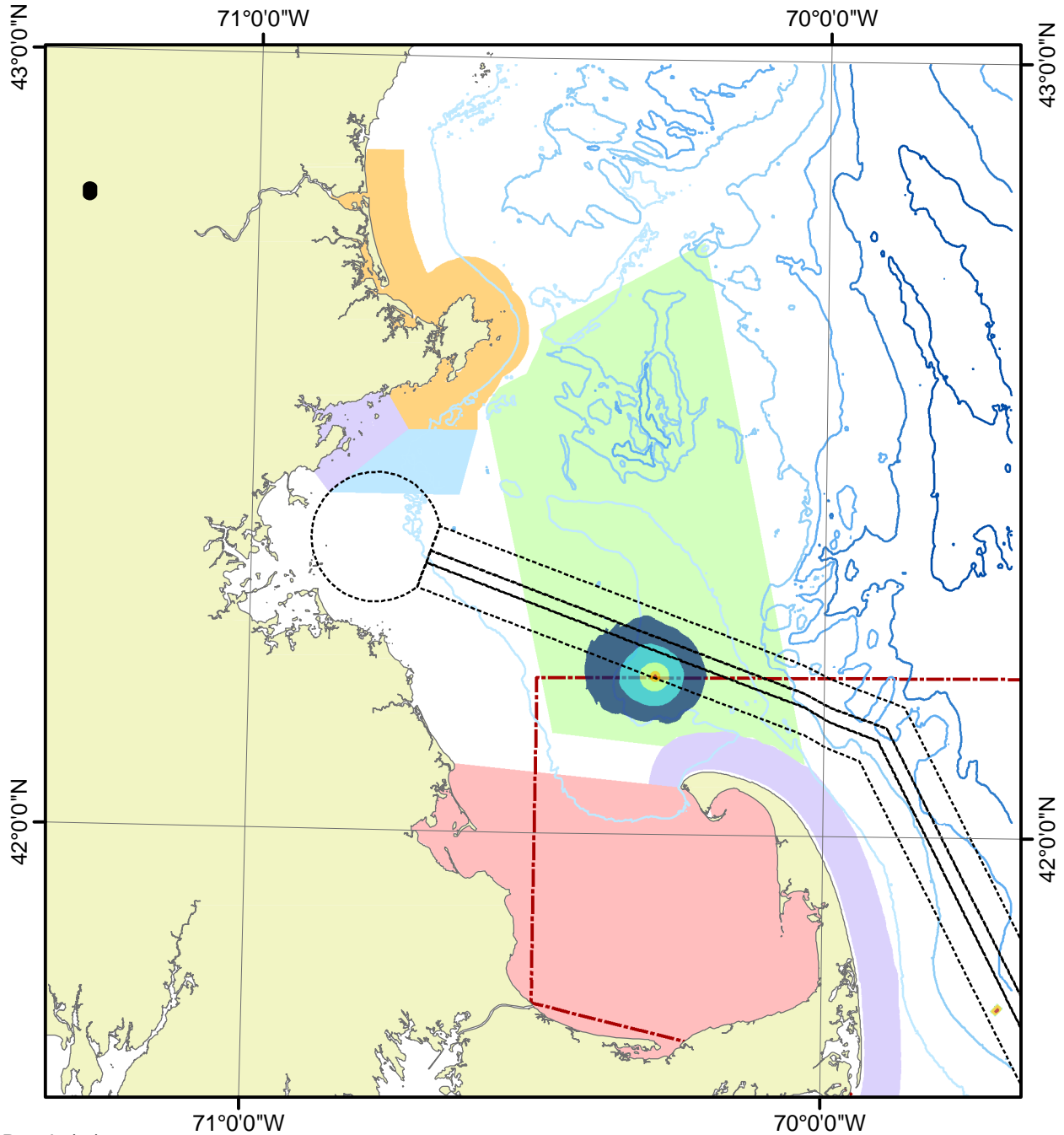


Received Levels (dB re 1 microPa)

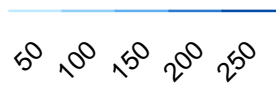


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

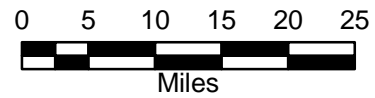
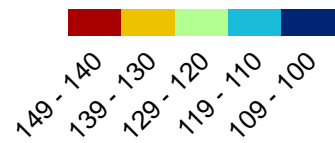
Neptune - Transit on Boston TSS Sum. 500m 14kts



Water Depth (m)

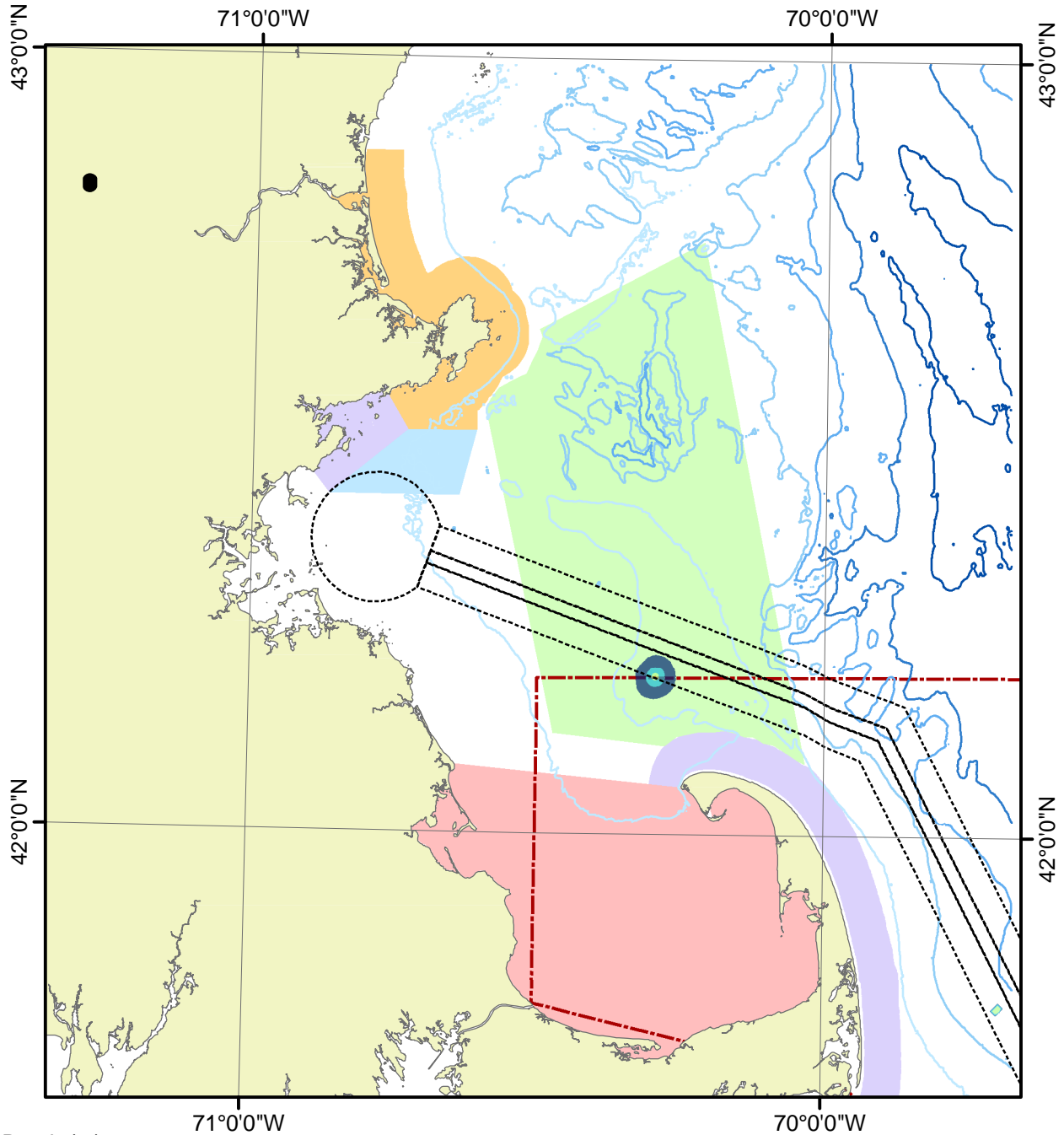


Received Levels (dB re 1 microPa)

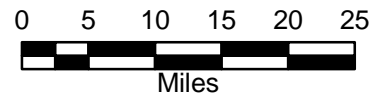
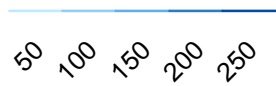


- Shipping Lanes
- Cape Cod Bay Northern Right Whale Habitat
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- Stellwagen Bank NMS
- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary

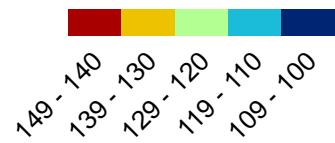
Neptune - Transit on Boston TSS Fal. 1m 14kts



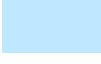
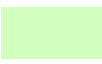




Water Depth (m)

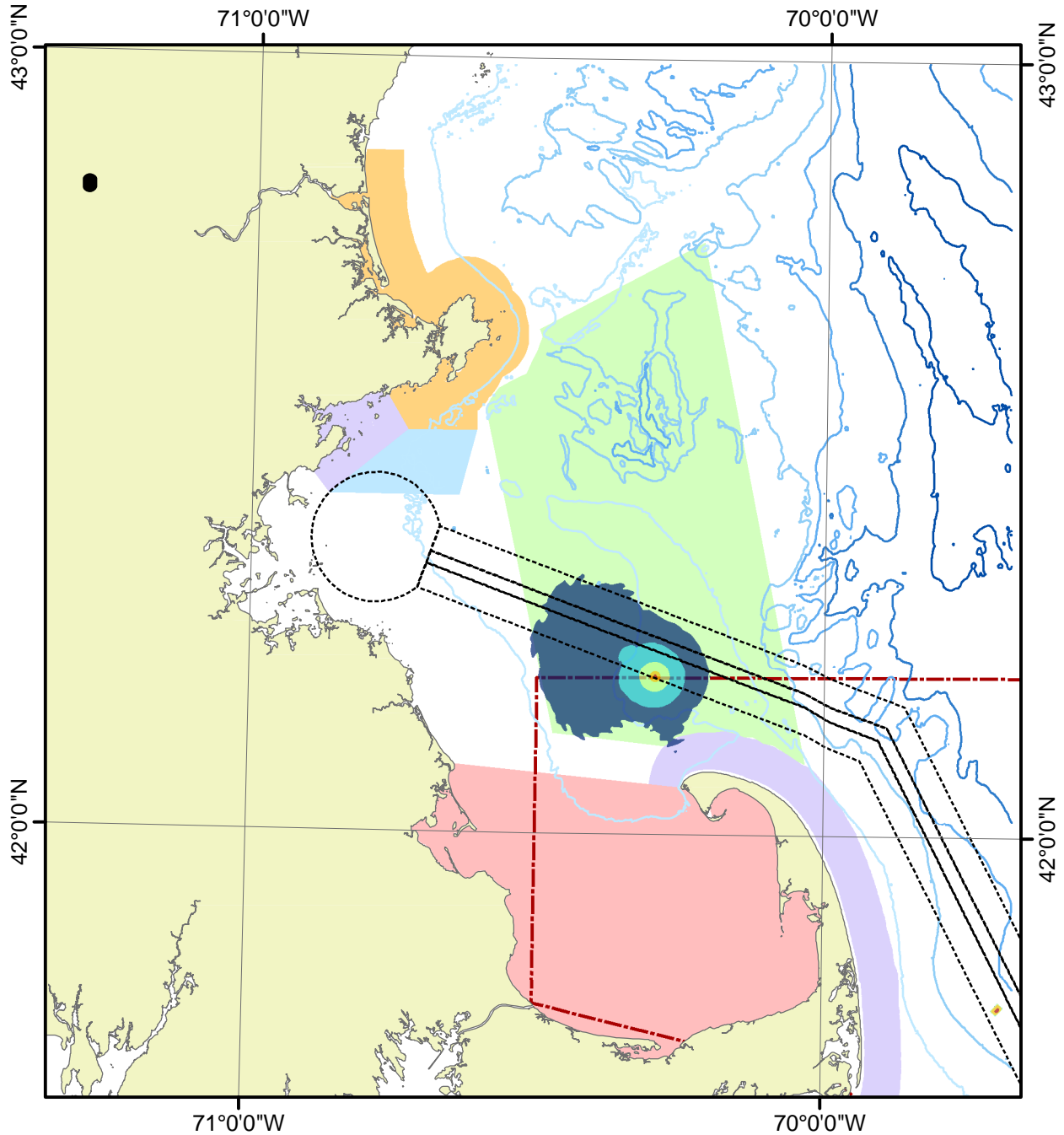


Received Levels (dB re 1 microPa)

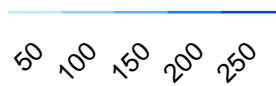


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

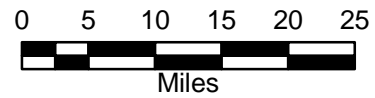
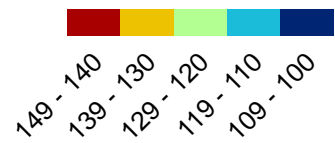
Neptune - Transit on Boston TSS Fal. 50m 14kts




Water Depth (m)

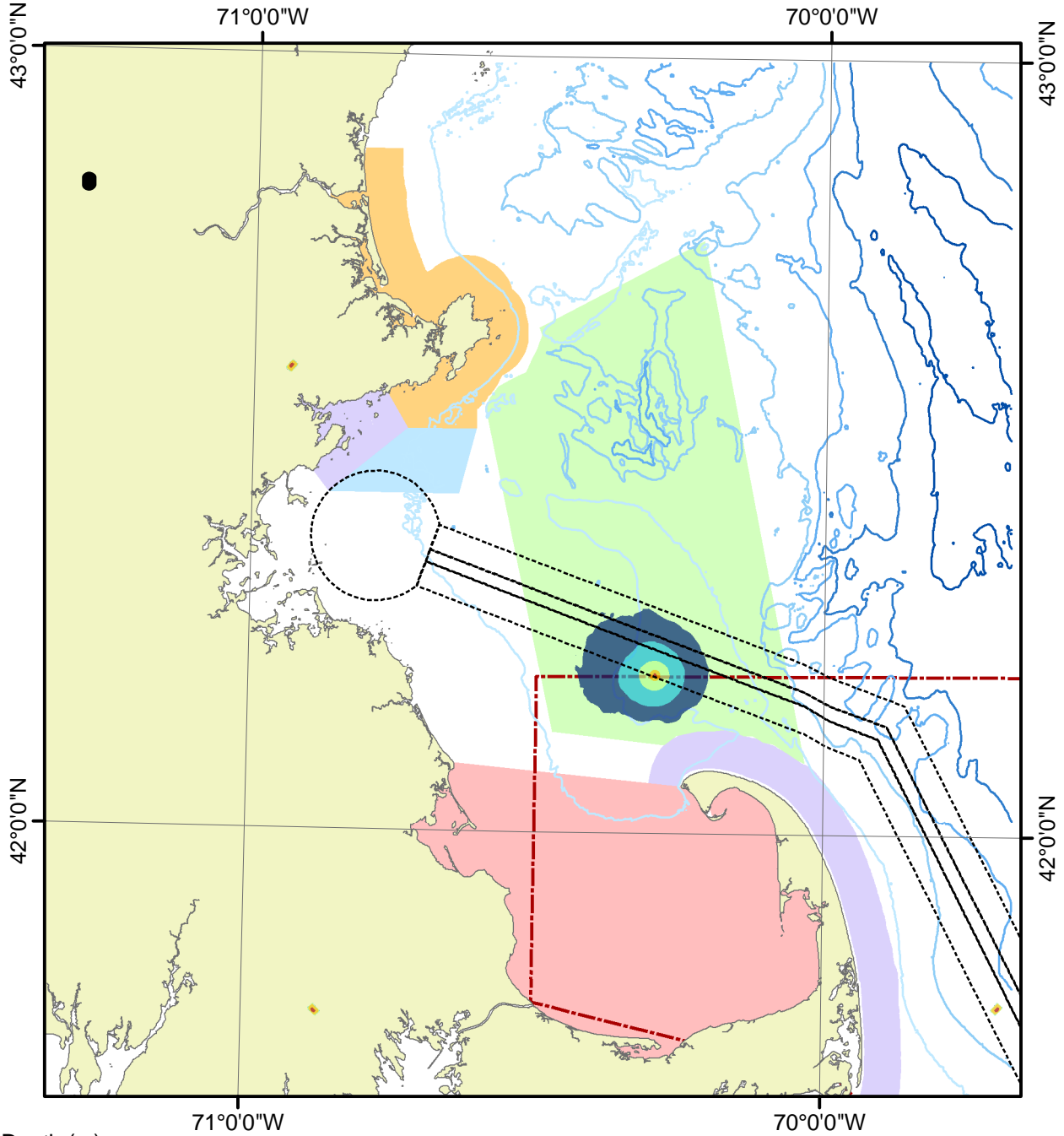


Received Levels (dB re 1 microPa)

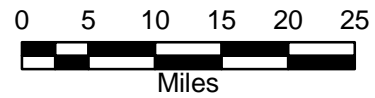
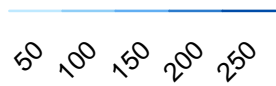


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

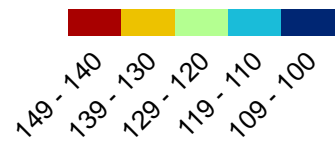
Neptune - Transit on Boston TSS Fal. 500m 14kts



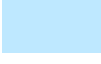
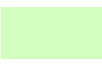





Water Depth (m)

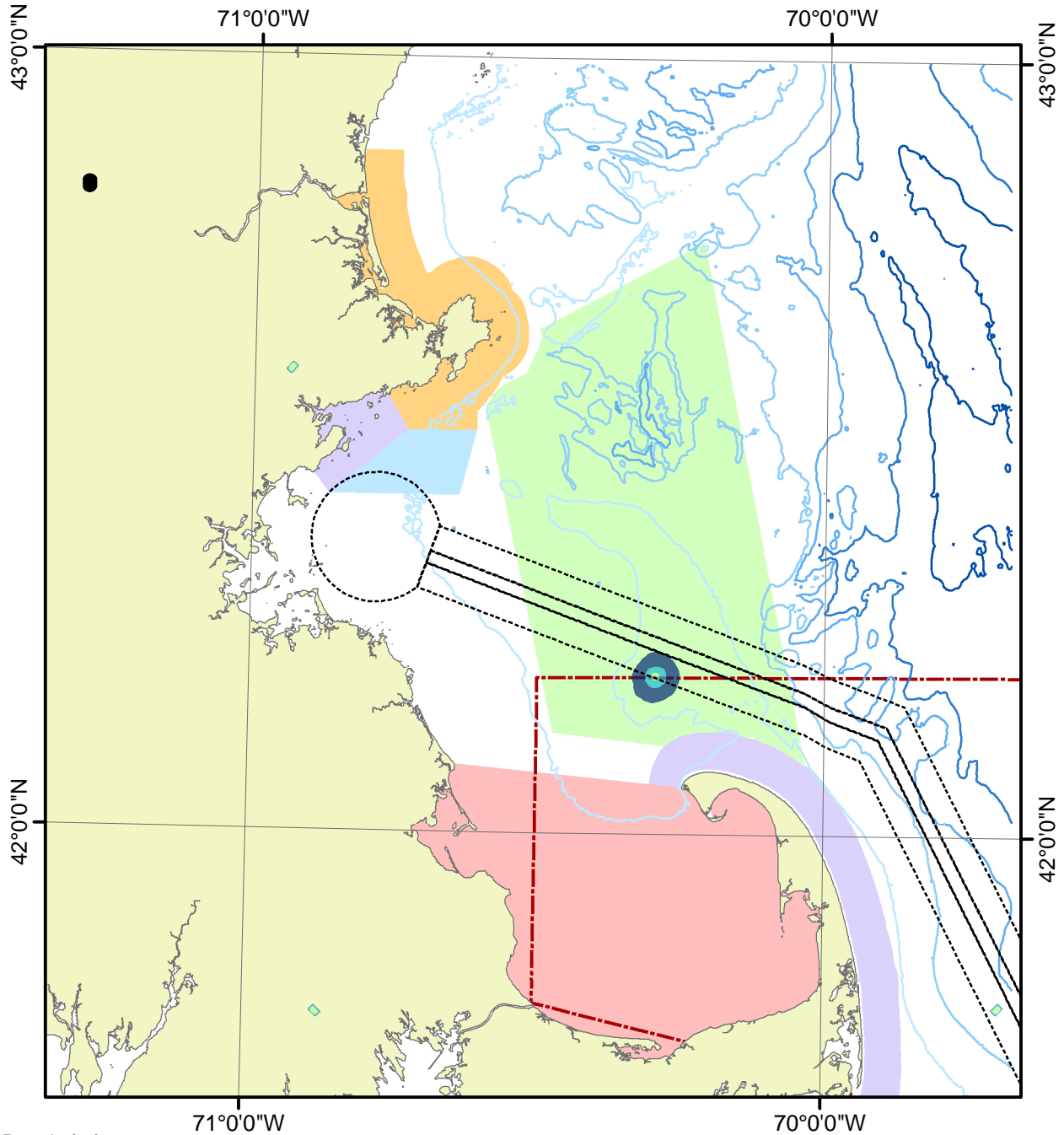


Received Levels (dB re 1 microPa)

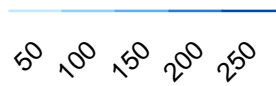


-  Shipping Lanes
-  Cape Cod Bay Northern Right Whale Habitat
-  South Essex Ocean Sanctuary
-  Stellwagen Bank NMS
-  North Shore Ocean Sanctuary
-  Cape Cod Bay Northern Right Whale Habitat
-  Cape Cod Ocean Sanctuary

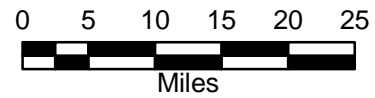
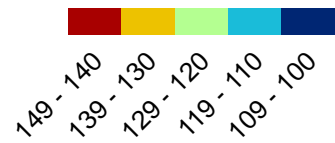
Neptune - Transit on Boston TSS Win. 1m 14kts



Water Depth (m)

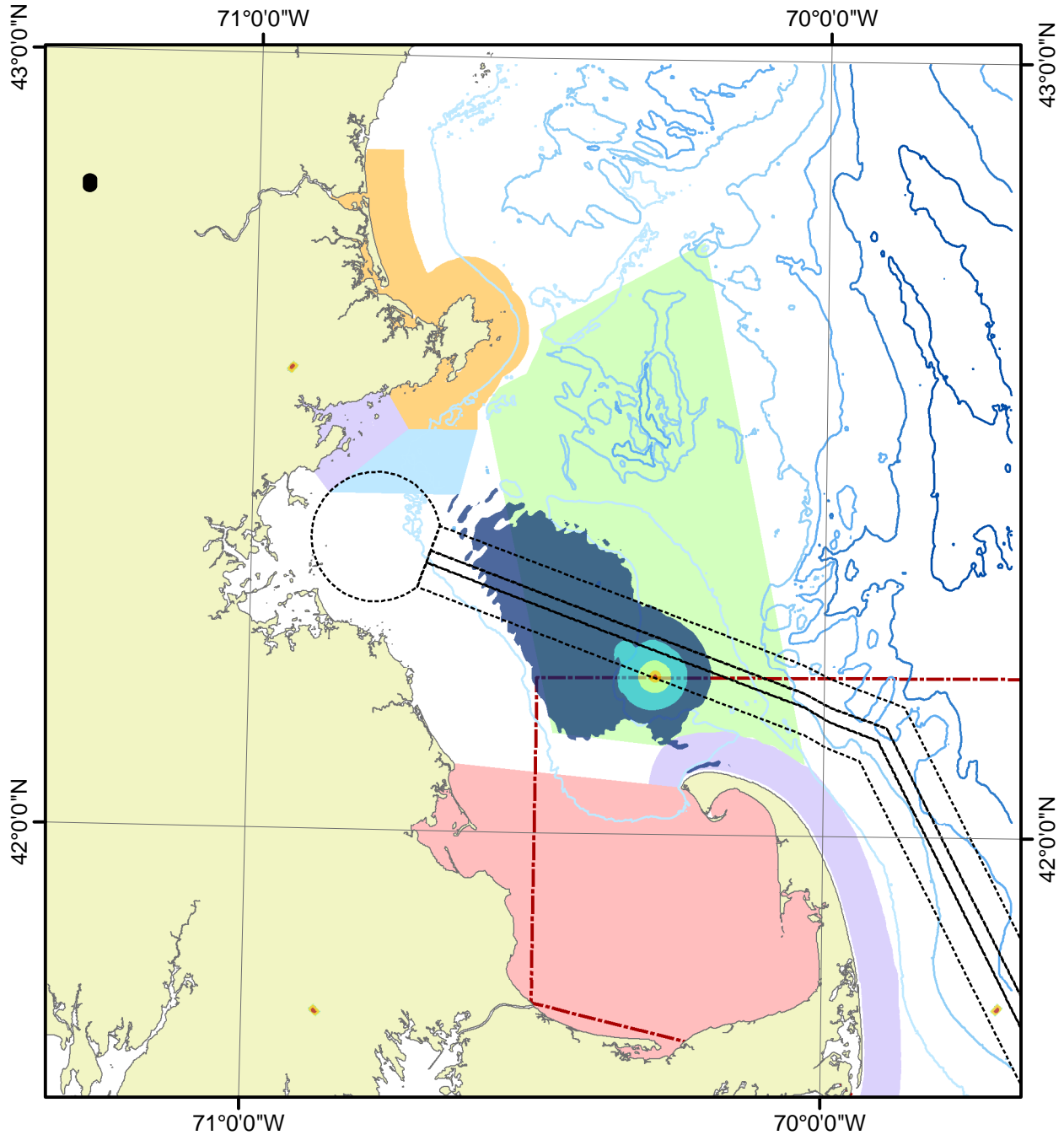


Received Levels (dB re 1 microPa)

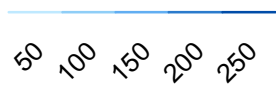


- Shipping Lanes
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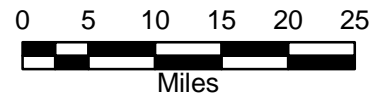
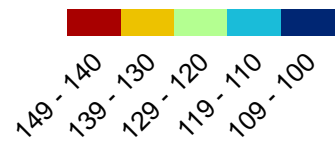
Neptune - Transit on Boston TSS Win. 50m 14kts




Water Depth (m)



Received Levels (dB re 1 microPa)





 Shipping Lanes

 Cape Cod Bay Northern Right Whale Habitat

 South Essex Ocean Sanctuary

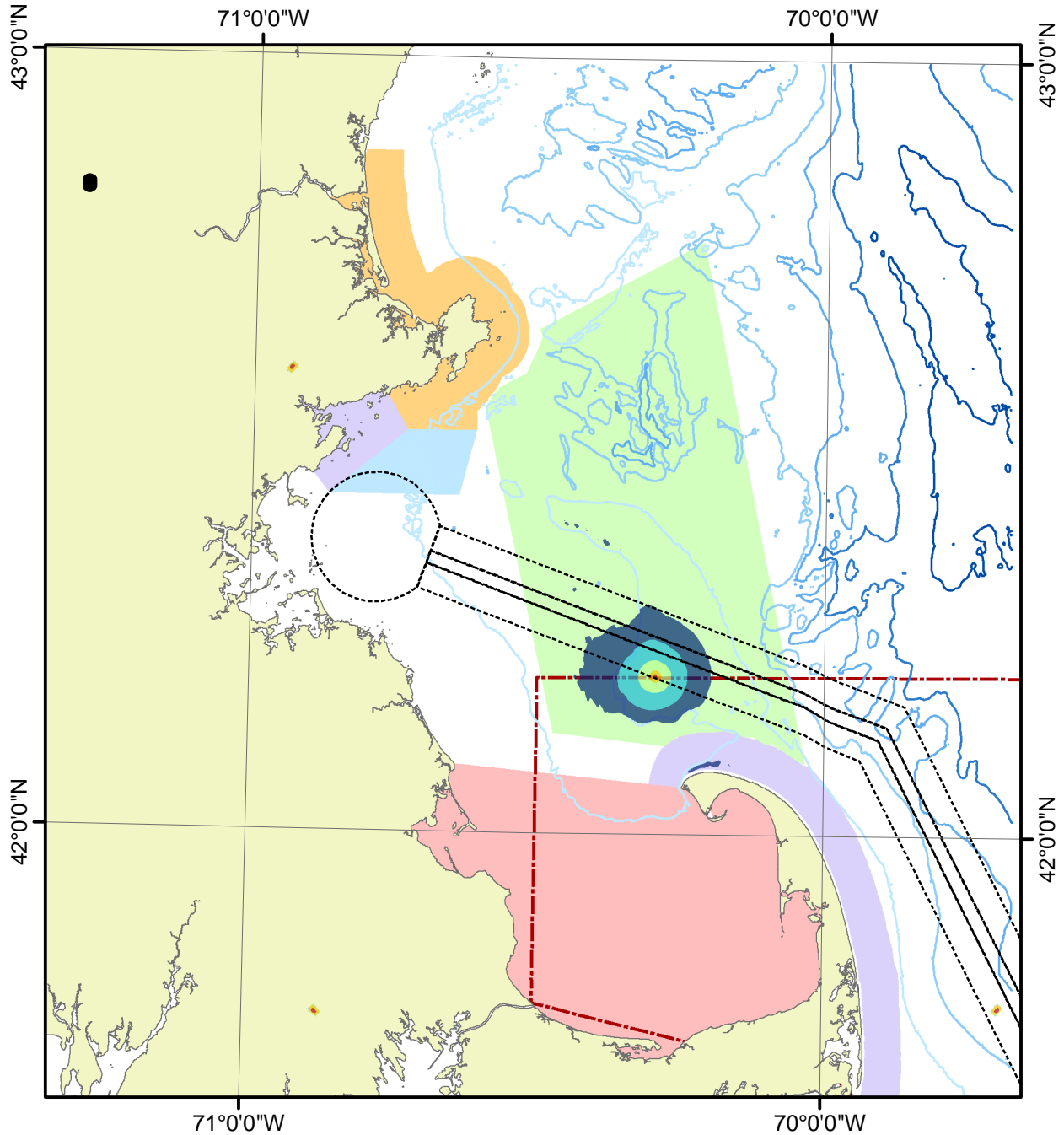
 Stellwagen Bank NMS

 North Shore Ocean Sanctuary

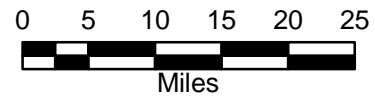
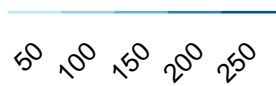
 Cape Cod Bay Northern Right Whale Habitat

 Cape Cod Ocean Sanctuary

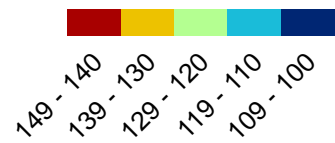
Neptune - Transit on Boston TSS Win. 500m 14kts



Water Depth (m)



Received Levels (dB re 1 microPa)



- Shipping Lanes
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- South Essex Ocean Sanctuary
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- North Shore Ocean Sanctuary
- Cape Cod Bay Northern Right Whale Habitat
- Cape Cod Ocean Sanctuary