

**United States Department of Interior
Fish and Wildlife Service
Region 5
Wildlife and Sport Fish Restoration Program**



2025 Annual Performance Report

State: Massachusetts
Agency: Division of Marine Fisheries
Massachusetts Fishery Resource Assessment

Project Title: FA Grant Agreement: F-56-R

Segment Number: 30

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Period Covered: January 1, 2025 – December 31, 2025

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Date Submitted: 1/31/2026

Sport Fish Program
Massachusetts Fishery Resource Assessment:
F-56-R-30 2025 Performance Report

List of Active Jobs:

[Job No. 1: Fishery Resource Assessment, Coastal Massachusetts](#)

The Massachusetts Division of Marine Fisheries Resource Assessment Project completed the forty-seventh annual spring and fall bottom trawl surveys of Massachusetts territorial waters in 2025. Detailed reports of the activities of each cruise follow.

[Job No. 2: Winter Flounder Year-Class Strength](#)

The Massachusetts Division of Marine Fisheries Resource Assessment Project completed the fiftieth annual seine survey of Nantucket Sound estuaries on the south shore of Cape Cod to assess southern New England stock winter flounder YOY cohort abundance. A report of the 2025 seine survey follows.

[Appendix A:](#) Indices of biomass, abundance, and recruitment for select species.

[Appendix B:](#) Trends in observed bottom temperatures - Massachusetts bottom trawl survey, 1978 - 2025.

[Appendix C:](#) Corrections to the trawl survey database in 2025.

Cruise Results

R/V Gloria Michelle

2025 Massachusetts Inshore Spring

Bottom Trawl Survey

Cruise No. 202591

Cruise Period and Area

From May 5 through May 21, 2025, the Massachusetts Division of Marine Fisheries conducted its 47th spring bottom trawl survey. The survey extended from New Hampshire to Rhode Island boundaries seaward to three nautical miles including Cape Cod Bay and Nantucket Sound.

Objectives

Cruise objectives were 1) to determine the spring distribution, relative abundance, and size composition of fish species; and 2) to collect biological samples. Special collections requested were also undertaken.

Methods

The study area is stratified based on five bio-geographic regions and six depth zones (Figure 1). Trawl sites are allocated in proportion to stratum area and randomly chosen in advance within each sampling stratum. Randomly chosen stations in locations known to be untowable due to hard bottom are reassigned. Sampling intensity is approximately 1 station per 19 square nautical miles. A minimum of two stations are assigned to each stratum.

A standard tow of 20-minute duration at 2.5 knots was attempted at each station during daylight hours with a 3/4 size North Atlantic type two seam otter trawl (11.9 m headrope/15.5 m footrope) rigged with a 7.6 cm rubber disc sweep; 19.2 m, 9.5 mm chain bottom legs; 18.3 m, 9.5 mm wire top legs; and 1.8 X 1.0 m, 147 kg wooden trawl doors. The codend contains a 6.4 mm knotless liner to retain small fish. Prior to setting the net

at each station, NOAA Corps officers surveyed the site by visually scanning for buoys marking fixed gear as well as determining the suitability of the bottom for towing the net based on the sounder image. Whenever necessary, sites were relocated due to untowable bottom or concentrations of fixed gear. Abbreviated tows of 13-19 minute duration were accepted as valid and expanded to the 20 minute standard.

Standard bottom trawl survey techniques were used when processing the catch. The total weight and length-frequency of each species were recorded directly into Fisheries Scientific Computer System (FSCS) data tables. Collections of age and growth material, and biological observations were undertaken during the measuring operation. Specimens were also saved to fulfill requests. Bottom temperatures were continuously recorded with an Onset Water Temp Pro v2 attached to the doors.

Thirty-two MDMF employees participated in the survey as part of the scientific party along with one biologist from the Nature Conservancy, one biologist from Massachusetts Department of Environmental Protection, and one biologist from Responsible Offshore Science Alliance (Table 1).

Cruise Summary

There were 107 stations attempted in 16 sampling days (Figures 1 and 2, Table 2). A hundred completed stations were considered acceptable for assessment of all species, SHG ≤ 136 (Table 3) and no substandard tows were processed (Table 4). Seven attempted tows were aborted during the survey. Aborts were caused by hard bottom, hangs, and macroalgae (Table 5, Figure 3). A planned station in each of strata 15, 34, and 35 was dropped after aborted attempts.

The geographic distribution, relative abundance, relative biomass, and representative length frequencies of all fish and invertebrate species were documented (Tables 6a and 6b). Several records were set on the 2025 spring survey at individual stations. The largest tow for Clearnose Skate abundance (4 individuals) and biomass (6.427 kg) was observed at station 94 south of Hyannis.

There were several other notable species trends observed during this survey. Summer Flounder set a record for abundance, had the fourth highest biomass, and were observed at the highest proportion of stations in the time series. Atlantic Cod had the third highest abundance in the timeseries driven by young of the year fish.

Survey wide species trends followed those of recent years. Scup dominated the catches south of Cape Cod and accounted for 29% of all catch by number and 51% of all biomass throughout the survey. Northern Searobins were the second highest biomass, though almost all of them were from one stratum 18 tow south of Nantucket. North of Cape Cod had moderate catches of young of the year Cod, Winter Flounder, Longhorn Sculpin, and Yellowtail Flounder.

Additional sampling goals were achieved (Table 7). To aid cooperative fisheries assessments about 1,300 age samples and over 1,500 sex and maturity observations were taken from Atlantic Cod, Haddock, Summer Flounder, Yellowtail Flounder, Winter Flounder, Black Sea Bass, Scup, Tautog, and American Lobster. Additional samples and catch information were collected to assist ongoing research by fisheries scientists from University of Connecticut, Fall River Public Schools, University of Massachusetts Dartmouth SMAST, Center for Coastal Studies, NOAA, and MDMF.

For further information on this survey or others in the time series, contact Steve Wilcox at (978) 559-9260.

Table 1. Staffing list for spring cruise 202591.

Scientific Party		
Name	Affiliation	Num. Days
Steve Wilcox	MADMF	9
Mark Szymanski	MADMF	9
Jack Wilson	MADMF	9
Steve Voss	MADMF	7
Brendan Reilly	MADMF	5
Mike Blanco	MADMF	5
Amanda Meli	MADMF	5
Elise Koob	MADMF	4
Ross Kessler	MADMF	4
Tara Dolan	MADMF	3
Alex Boeri	MADMF	3
Gio Aulizio	MADMF	3
Emma Fowler	MADMF	3
Jillian Swinford	MADMF	2
Mitchell Parizek	MADMF	2
Mike Burgess	MADMF	2
Michele Heller	MADMF	2
Cara Litos	MADMF	2
Laura Tomlinson	MADMF	1
Jacob Dorothy	MADMF	1
Chrissy Petitpas	MADMF	1
John Logan	MADMF	1
Gabe Lundgren	MADMF	1
Dave Martins	MADMF	1
Vinny Manfredi	MADEP	1
Mike Pol	ROSA	1
Chris McGuire	TNC	1
Scott Elzey	MADMF	1
Mark Rousseau	MADMF	1
Sean Terril	MADMF	1
Kelly Whitmore	MADMF	1
Dave Gauld	MADMF	1
Emma Gallagher	MADMF	1
Corey Waddell	MADMF	1
Bradlie Morgan	MADMF	1
Total		96

R/V Gloria Michelle Crew

Name	Affiliation	Num. Days
<i>Officers</i>		
Trevor Grams	NOAA OIC	17
Forrest Foxen	NOAA JOIC	17
Heather Gaughan	NOAA JOIC	14
<i>Deck Crew</i>		
Chris Shepard	Contract Fisherman	17
Dan Storer	Contract Fisherman	17

Table 2. Station information for the spring cruise 202591.

Station	Stratum	Date	Time (est)	Depth (m)	Latitude	Longitude	Course	Distance (nmi)	Bottom temp °C
1	26	5/5/2025	9:19	15	41°51.04	-70°29.64	na	0.85	6.3
2	27	5/5/2025	10:26	23	41°49.99	-70°27.35	na	0.79	5.8
3	28	5/5/2025	11:51	32	41°53.35	-70°22.29	na	0.65	5.5
4	29	5/5/2025	13:02	40	41°56.64	-70°20.82	na	0.84	5.2
5	29	5/5/2025	14:55	49	42°00.00	-70°23.67	na	0.86	4.9
6	28	5/5/2025	16:27	37	41°58.46	-70°30.77	na	0.57	5.2
7	26	5/6/2025	6:12	18	41°45.42	-70°21.28	na	0.85	6.8
8	25	5/6/2025	7:22	11	41°45.01	-70°17.43	na	0.85	8.4
9	25	5/6/2025	9:10	9	41°47.19	-70°07.73	na	0.86	11.0
10	27	5/6/2025	10:43	27	41°52.19	-70°12.82	na	0.86	6.2
11	26	5/6/2025	11:57	12	41°53.09	-70°08.65	na	0.87	8.4
12	25	5/6/2025	13:07	8	41°54.23	-70°06.66	na	0.79	11.0
13	28	5/6/2025	14:22	29	41°52.59	-70°13.76	na	0.82	5.7
14	27	5/6/2025	15:43	27	41°50.55	-70°17.96	na	0.83	6.2
15	25	5/7/2025	7:05	12	41°57.72	-70°36.26	na	0.53	8.1
16	28	5/7/2025	8:22	39	41°59.40	-70°30.82	na	0.80	5.1
17	32	5/7/2025	12:07	19	42°17.00	-70°48.51	na	0.79	9.0
18	33	5/7/2025	13:10	21	42°18.51	-70°49.22	na	0.86	8.3
19	32	5/7/2025	14:30	13	42°17.70	-70°51.29	na	0.59	9.0
20	31	5/7/2025	15:35	10	42°16.92	-70°51.36	na	0.54	9.3
21	34	5/7/2025	17:01	36	42°23.63	-70°49.60	na	0.71	5.0
22	33	5/8/2025	6:23	28	42°23.82	-70°53.65	na	0.36	5.9
23	33	5/8/2025	7:07	29	42°25.04	-70°53.63	na	0.64	5.8
24	34	5/8/2025	8:39	36	42°26.35	-70°51.10	na	0.59	5.5
25	35	5/8/2025	11:12	58	42°34.08	-70°35.82	na	0.11	
26	35	5/8/2025	13:01	54	42°39.52	-70°32.49	na	0.54	4.5
27	35	5/8/2025	14:23	51	42°41.43	-70°33.94	na	0.56	4.4
28	36	5/8/2025	15:30	67	42°44.12	-70°36.63	na	0.82	4.3
29	34	5/8/2025	16:46	35	42°41.49	-70°35.20	na	0.54	4.7
30	34	5/9/2025	10:09	36	42°32.70	-70°43.90	na	0.53	5.5
31	35	5/10/2025	6:16	60	42°33.44	-70°36.85	na	0.54	4.5
32	36	5/10/2025	8:40	69	42°29.44	-70°39.81	na	0.05	
33	33	5/11/2025	7:44	26	42°41.86	-70°39.81	na	0.53	8.3
34	31	5/11/2025	8:46	11	42°40.65	-70°41.46	na	0.85	9.0
35	33	5/11/2025	9:53	24	42°42.13	-70°42.12	na	0.82	7.3
36	32	5/11/2025	11:10	15	42°44.50	-70°45.94	na	0.84	7.5
37	31	5/11/2025	12:24	10	42°47.09	-70°47.80	na	0.65	8.0
38	34	5/11/2025	15:49	33	42°39.32	-70°33.89	na	0.38	5.2
39	36	5/11/2025	16:51	84	42°39.53	-70°31.04	na	0.59	4.3
40	35	5/12/2025	7:21	57	42°22.48	-70°41.73	na	0.56	4.7
41	35	5/12/2025	8:19	59	42°22.40	-70°41.59	na	0.56	4.6

Table 2 continued.

Station	Stratum	Date	Time (est)	Depth (m)	Latitude	Longitude	Course	Distance (nmi)	Bottom temp °C
42	30	5/12/2025	11:54	63	42°05.78	-70°21.60	na	0.84	4.6
43	30	5/12/2025	13:06	62	42°05.83	-70°23.24	na	0.55	4.6
44	29	5/12/2025	15:06	55	42°04.22	-70°25.76	na	0.85	4.7
45	26	5/13/2025	5:25	14	41°48.70	-70°30.05	na	0.86	10.3
46	27	5/13/2025	6:51	22	41°47.18	-70°21.34	na	0.82	9.1
47	29	5/13/2025	9:03	42	41°57.80	-70°19.02	na	0.84	5.7
48	28	5/13/2025	10:47	38	41°58.01	-70°14.26	na	0.83	6.2
49	21	5/13/2025	12:49	65	42°06.71	-70°13.21	na	0.65	5.4
50	29	5/13/2025	14:13	50	42°01.87	-70°13.89	na	0.57	6.3
51	27	5/13/2025	16:03	22	42°01.71	-70°09.03	na	0.55	10.9
52	26	5/13/2025	17:02	13	42°02.14	-70°06.94	na	0.71	12.5
53	21	5/14/2025	6:17	63	42°05.98	-70°13.06	na	0.86	4.8
54	17	5/14/2025	7:42	9	42°05.54	-70°11.63	na	0.88	8.8
55	17	5/14/2025	9:20	10	42°03.43	-70°04.31	na	0.87	11.1
56	20	5/14/2025	10:33	38	42°04.16	-70°01.79	na	0.87	6.2
57	18	5/14/2025	11:37	19	42°02.36	-70°02.14	na	0.84	9.4
58	18	5/14/2025	12:45	21	42°00.61	-70°00.50	na	0.68	8.3
59	19	5/14/2025	14:40	25	41°53.39	-69°55.92	na	0.86	8.6
60	20	5/14/2025	16:10	35	41°47.38	-69°52.38	na	0.85	6.6
61	17	5/15/2025	6:01	8	41°23.50	-69°59.55	na	0.77	10.3
62	17	5/15/2025	9:46	8	41°13.33	-70°02.50	na	0.57	11.7
63	18	5/15/2025	10:41	14	41°14.07	-70°04.70	na	0.58	12.6
64	19	5/15/2025	12:08	24	41°12.40	-70°08.86	na	0.86	11.8
65	18	5/15/2025	13:04	17	41°12.86	-70°09.39	na	0.78	11.9
66	17	5/15/2025	14:41	8	41°17.84	-70°17.94	na	0.58	12.9
67	13	5/16/2025	8:28	23	41°18.27	-70°38.63	na	0.84	12.3
68	12	5/16/2025	9:24	17	41°19.49	-70°37.89	na	0.85	13.2
69	12	5/16/2025	10:30	12	41°19.78	-70°32.25	na	0.83	13.0
70	11	5/16/2025	11:35	9	41°19.18	-70°28.42	na	0.82	12.9
71	11	5/16/2025	12:26	9	41°16.99	-70°29.17	na	0.85	12.1
72	16	5/16/2025	15:41	18	41°27.27	-70°18.84	na	0.75	14.7
73	16	5/16/2025	16:52	19	41°29.09	-70°26.62	na	0.74	14.8
74	13	5/17/2025	7:45	27	41°14.64	-70°46.19	na	0.57	11.4
75	14	5/17/2025	8:37	30	41°13.40	-70°45.96	na	0.83	10.9
76	13	5/17/2025	10:35	27	41°23.16	-70°52.23	na	0.85	12.7
77	14	5/17/2025	12:04	33	41°23.32	-71°00.12	na	0.83	12.9
78	11	5/17/2025	13:29	9	41°29.90	-71°03.70	na	0.84	13.8
79	12	5/17/2025	15:16	14	41°27.31	-70°52.82	na	0.71	13.3
80	13	5/17/2025	17:28	22	41°28.69	-70°41.89	na	0.83	14.8
81	16	5/18/2025	8:30	11	41°26.46	-70°09.45	na	0.84	12.1
82	16	5/18/2025	9:52	14	41°23.01	-70°09.06	na	0.85	13.1

Table 2 continued.

Station	Stratum	Date	Time (est)	Depth (m)	Latitude	Longitude	Course	Distance (nmi)	Bottom temp °C
83	16	5/18/2025	10:57	13	41°22.66	-70°04.87	na	0.84	12.6
84	16	5/18/2025	12:10	14	41°19.82	-70°06.36	na	0.85	13.5
85	16	5/18/2025	13:41	15	41°20.53	-70°09.87	na	0.81	14.9
86	15	5/18/2025	14:54	9	41°19.81	-70°12.96	na	0.59	15.1
87	15	5/18/2025	15:46	9	41°21.06	-70°16.70	na	0.69	15.2
88	15	5/18/2025	17:09	9	41°19.10	-70°07.04	na	0.86	15.2
89	18	5/19/2025	7:10	20	41°26.27	-69°58.56	na	0.82	10.8
90	16	5/19/2025	9:22	12	41°30.66	-70°09.95	na	0.83	12.9
91	15	5/19/2025	10:37	9	41°31.41	-70°05.60	na	0.84	11.6
92	15	5/19/2025	12:09	7	41°33.83	-70°02.73	na	0.57	13.1
93	16	5/19/2025	13:41	12	41°34.16	-70°11.63	na	0.58	14.9
94	15	5/19/2025	14:57	9	41°33.97	-70°16.19	na	0.54	16.0
95	15	5/20/2025	5:51	9	41°31.85	-70°37.69	na	0.68	15.2
96	15	5/20/2025	6:50	9	41°32.00	-70°36.23	na	0.54	15.7
97	15	5/20/2025	9:30	9	41°34.01	-70°24.87	na	0.55	15.7
98	15	5/20/2025	10:23	9	41°35.35	-70°22.03	na	0.59	16.1
99	16	5/20/2025	11:48	12	41°32.62	-70°13.91	na	0.55	14.4
100	16	5/20/2025	12:47	18	41°30.76	-70°16.46	na	0.57	14.3
101	12	5/21/2025	5:50	15	41°31.85	-70°46.98	na	0.80	14.4
102	12	5/21/2025	9:18	13	41°34.45	-70°44.91	na	0.62	14.8
103	11	5/21/2025	10:22	7	41°36.31	-70°48.86	na	0.84	14.4
104	11	5/21/2025	11:57	9	41°34.15	-70°54.02	na	0.56	14.2
105	12	5/21/2025	13:35	19	41°29.71	-70°51.61	na	0.85	13.5
106	12	5/21/2025	15:03	15	41°28.51	-70°49.42	na	0.55	13.8
107	13	5/21/2025	16:30	20	41°24.56	-70°48.69	na	0.85	12.0

Table 3. Sampling effort assigned and accomplished by stratum, cruise 202591.

Stratum	Region	Assigned Stations	Completed Stations	Sub-Standard Completed	Standard Completed	Aborted Tows
11	1	5	5		5	
12	1	7	7		7	
13	1	5	5		5	
14	1	2	2		2	
15	2	10	9		9	1
16	2	11	11		11	
17	3	5	5		5	
18	3	5	5		5	
19	3	2	2		2	
20	3	2	2		2	
21	3	2	2		2	
25	4	4	4		4	
26	4	5	5		5	
27	4	5	5		5	
28	4	5	5		5	
29	4	5	5		5	
30	4	2	2		2	
31	5	3	3		3	
32	5	3	3		3	
33	5	4	4		4	1
34	5	4	3		3	2
35	5	5	4		4	2
36	5	2	2		2	1
TOTALS		103	100	0	100	7

Note:

Standard Tows. SHG <=136. Recommended for use in all indices of abundance.

Sub-Standard Tows. SHG 141 - 166. Not recommended for use in indices other than Spiny Dogfish.

Aborted Tows. Catch data not recommended for use.

Table 4. Sub-standard tows (SHG 141-166) for cruise 202591. Not advised for indices of abundance other than Spiny Dogfish.

Station	Stratum	SHG	Location	Description
No sub-standard tows on cruise 202591				

Table 5. Aborted tows during the spring survey, cruise 202591.

Station	Stratum	SHG	Location	Description
21	34	179	Massachusetts Bay	ghost trawl in mouth of net, belly torn
22	33	171	Massachusetts Bay	slowed down and hauled early, lots of weed
25	35	179	Southeast of Gloucester	belly torn
32	36	177	Outer Massachusetts Bay	slowed suddenly, portside parted headrope
38	34	171	East of Gloucester	slowed and hauled early, ghost pot
40	35	174	Outer Massachusetts Bay	parted upper bridle on starboard side
91	15	179	Nantucket Sound	belly torn and lost catch

Table 6a. Total catch by number and weight from 2025 spring survey sorted by number.

Species Code	Common Name	Count	Weight (kg)
73	Atlantic Cod	42,353	62.541
143	Scup	38,944	8,329.719
171	Northern Searobin	15,959	2,719.555
163	Longhorn Sculpin	7,428	919.041
32	Atlantic Herring	5,141	9.324
106	Winter Flounder	3,642	372.162
503	Longfin Squid	3,520	67.977
105	Yellowtail Flounder	2,033	353.116
313	Atlantic Rock Crab	1,901	234.532
72	Silver Hake	1,764	128.318
301	American Lobster	1,351	432.355
23	Winter Skate	1,333	591.863
26	Little Skate	1,222	577.058
131	Butterfish	1,136	70.561
317	Spider Crab Uncl	823	79.859
141	Black Sea Bass	813	250.960
108	Windowpane	752	128.526
193	Ocean Pout	679	97.032
181	Northern Sand Lance	666	5.970
77	Red Hake	632	26.408
103	Summer Flounder	499	210.471
348	Northern Moonsnail	356	56.623
102	American Plaice	326	44.225
177	Tautog	315	167.512
78	Spotted Hake	296	5.311
312	Jonah Crab	288	52.948
33	Alewife	240	15.081
180	Rock Gunnel	157	0.305
336	Channeled Whelk	140	32.943
34	Blueback Herring	117	7.355
318	Horseshoe Crab	108	157.368
172	Striped Searobin	93	32.264
116	Northern Pipefish	83	0.239
337	Knobbed Whelk	67	19.121
176	Cunner	66	2.987
164	Sea Raven	66	9.646
43	Bay Anchovy	64	0.173
117	Smallmouth Flounder	60	0.895
104	Fourspot Flounder	54	12.371
401	Sea Scallop	47	10.065
121	Atlantic Mackerel	44	3.924
343	Blue Mussel	40	4.720

Figure 6a continued.

Species Code	Common Name	Count	Weight (kg)
402	Bay Scallop	25	1.282
35	American Shad	24	0.969
74	Haddock	23	8.552
36	Atlantic Menhaden	21	4.880
155	Acadian Redfish	19	1.419
13	Smooth Dogfish	18	44.350
323	Mantis Shrimp Uncl	11	0.446
24	Clearnose Skate	11	17.927
168	Lumpfish	7	2.469
403	Atlantic Surfclam	7	1.103
197	Goosefish	6	7.645
113	Atlantic Silverside	6	0.078
322	Lady Crab	6	0.491
409	Ocean Quahog	5	0.744
314	Blue Crab	4	0.710
139	Striped Bass	2	8.140
188	Striped Cusk-Eel	2	0.045
146	Northern Kingfish	2	0.478
109	Gulf Stream Flounder	2	0.069
15	Spiny Dogfish	2	3.390
44	Striped Anchovy	1	0.006
324	Northern Stone Crab	1	0.021
28	Thorny Skate	1	0.036
83	Fourbeard Rockling	1	0.007
344	Waved Whelk	1	0.092
Totals		135,826	16,408.773

Table 6b. Total catch by number and weight from 2025 spring survey sorted by weight.

Species Code	Common Name	Count	Weight (kg)
143	Scup	38,944	8,329.719
171	Northern Searobin	15,959	2,719.555
163	Longhorn Sculpin	7,428	919.041
23	Winter Skate	1,333	591.863
26	Little Skate	1,222	577.058
301	American Lobster	1,351	432.355
106	Winter Flounder	3,642	372.162
105	Yellowtail Flounder	2,033	353.116
141	Black Sea Bass	813	250.960
313	Atlantic Rock Crab	1,901	234.532
103	Summer Flounder	499	210.471
177	Tautog	315	167.512
318	Horseshoe Crab	108	157.368
108	Windowpane	752	128.526
72	Silver Hake	1,764	128.318
193	Ocean Pout	679	97.032
317	Spider Crab Uncl	823	79.859
131	Butterfish	1,136	70.561
503	Longfin Squid	3,520	67.977
73	Atlantic Cod	42,353	62.541
348	Northern Moonsnail	356	56.623
312	Jonah Crab	288	52.948
13	Smooth Dogfish	18	44.350
102	American Plaice	326	44.225
336	Channeled Whelk	140	32.943
172	Striped Searobin	93	32.264
77	Red Hake	632	26.408
337	Knobbed Whelk	67	19.121
24	Clearnose Skate	11	17.927
33	Alewife	240	15.081
104	Fourspot Flounder	54	12.371
401	Sea Scallop	47	10.065
164	Sea Raven	66	9.646
32	Atlantic Herring	5,141	9.324
74	Haddock	23	8.552
139	Striped Bass	2	8.140
197	Goosefish	6	7.645
34	Blueback Herring	117	7.355
181	Northern Sand Lance	666	5.970
78	Spotted Hake	296	5.311
36	Atlantic Menhaden	21	4.880
343	Blue Mussel	40	4.720

Table 6b continued.

Species Code	Common Name	Count	Weight (kg)
121	Atlantic Mackerel	44	3.924
15	Spiny Dogfish	2	3.390
176	Cunner	66	2.987
168	Lumpfish	7	2.469
155	Acadian Redfish	19	1.419
402	Bay Scallop	25	1.282
403	Atlantic Surfclam	7	1.103
35	American Shad	24	0.969
117	Smallmouth Flounder	60	0.895
409	Ocean Quahog	5	0.744
314	Blue Crab	4	0.710
322	Lady Crab	6	0.491
146	Northern Kingfish	2	0.478
323	Mantis Shrimp Uncl	11	0.446
180	Rock Gunnel	157	0.305
116	Northern Pipefish	83	0.239
43	Bay Anchovy	64	0.173
344	Waved Whelk	1	0.092
113	Atlantic Silverside	6	0.078
109	Gulf Stream Flounder	2	0.069
188	Striped Cusk-Eel	2	0.045
28	Thorny Skate	1	0.036
324	Northern Stone Crab	1	0.021
83	Fourbeard Rockling	1	0.007
44	Striped Anchovy	1	0.006
Totals		135,826	16,408.773

Table 7. Total samples obtained for age, growth, maturity, and special studies during MDMF spring cruise 202591.

Species	Maturity Observations	Scales for aging	Otoliths for aging	Spines for aging
Atlantic Cod	27		27	
Haddock	16		16	
Summer Flounder	219		218	
Yellowtail Flounder	144		144	
Winter Flounder	444		438	
Black Sea Bass	233		232	
Scup	135		134	
Tautog				77
American Lobster	373			
Total	1,591	0	1,209	77

Other Collections:

All crabs measured to 0.1 cm carapace width and egg bearing status recorded for females (MDMF)

Sand Lance (UCONN)

Squid biological samples (Durfee High School – Fall River

Squid biological samples (NOAA)

Squid egg locations (CCS)

Black Sea Bass biological samples (SMAST)

Black Sea Bass biological samples (MDMF)

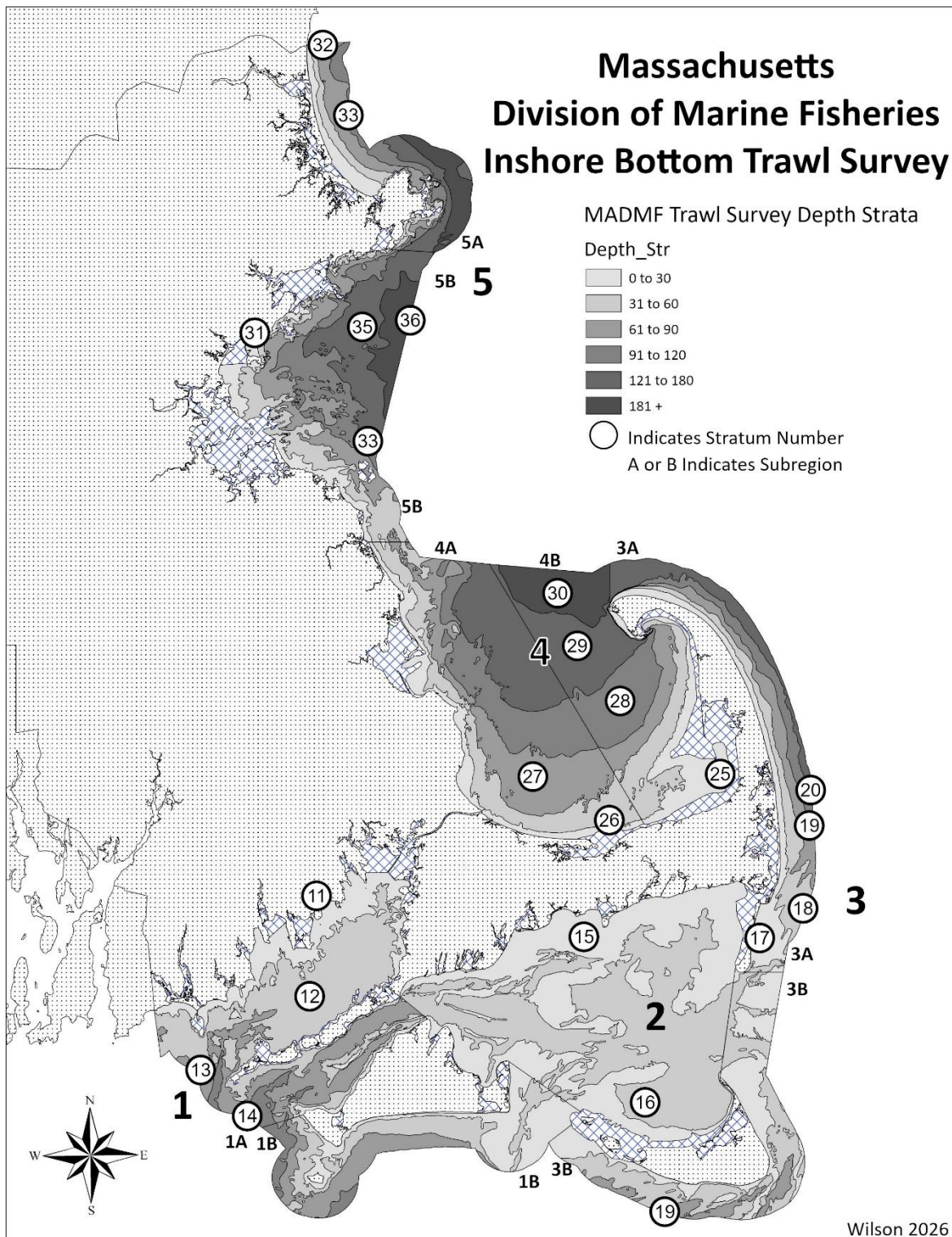


Figure 1. MDMF inshore bottom trawl survey region and strata map.

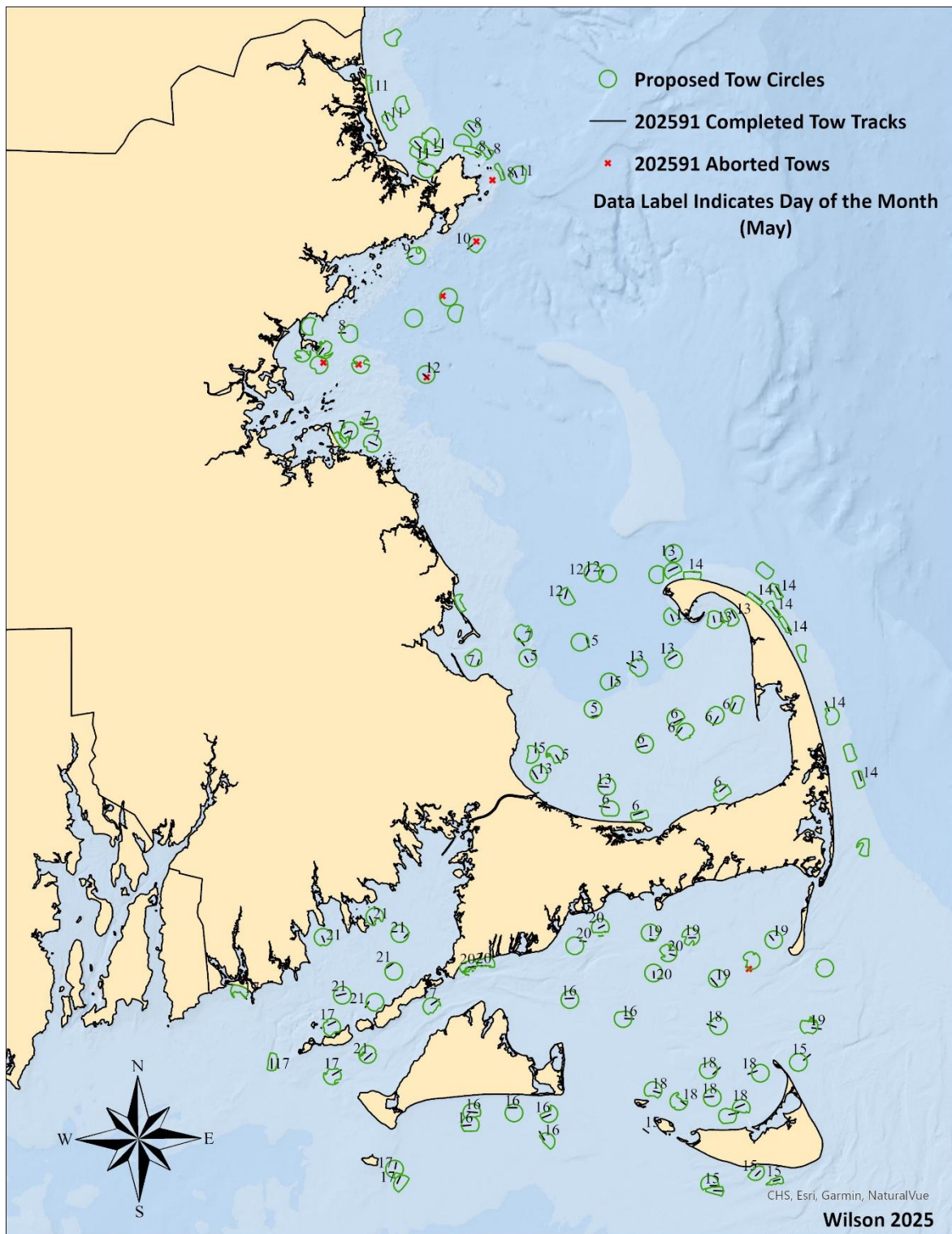


Figure 2. All proposed spring 2025 stations including completed and aborted tows by date.

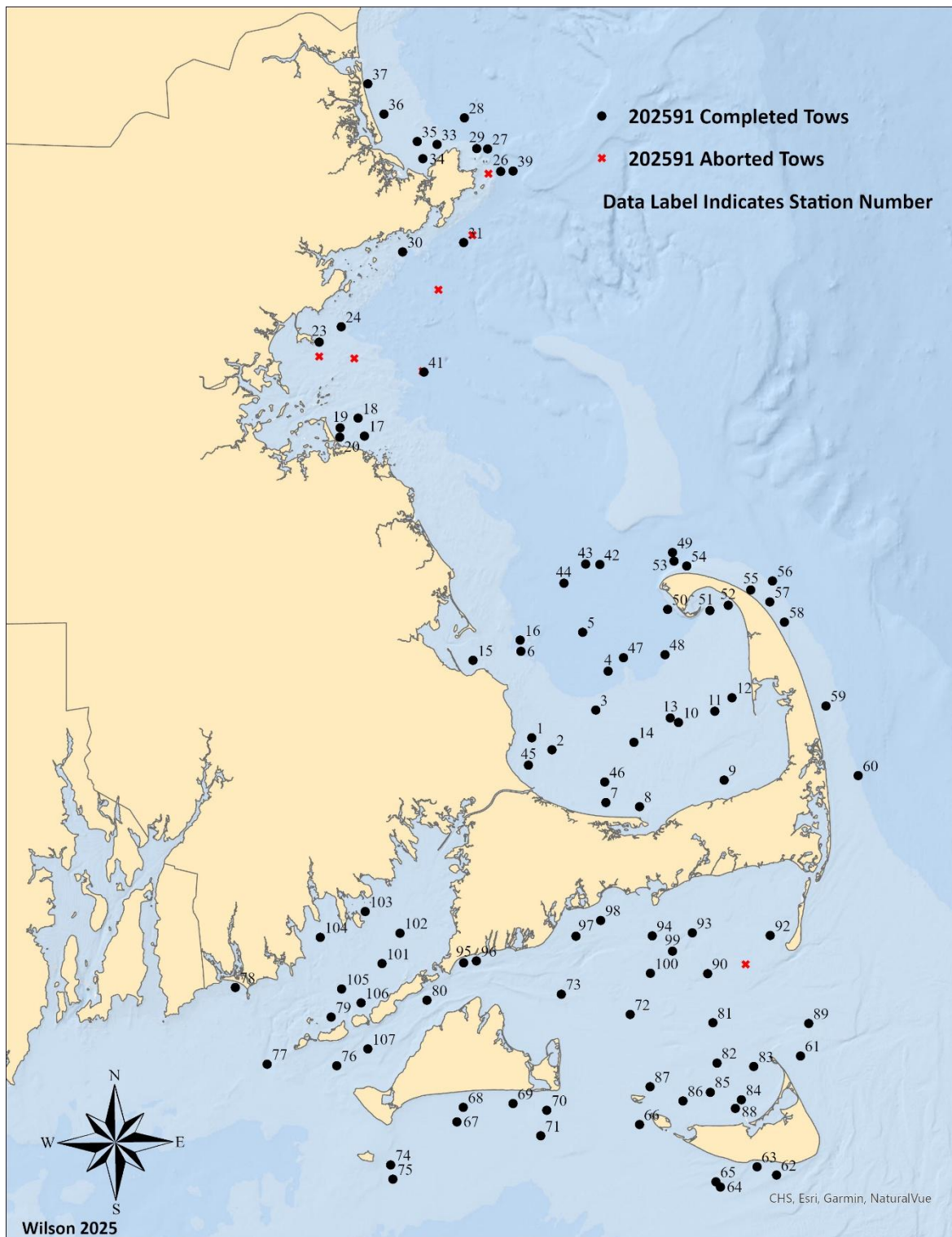


Figure 3. All attempted spring 2025 survey stations in chronological order.



Spring Cruise 202591

Cruise Results

R/V Gloria Michelle

2025 Massachusetts Inshore Fall

Bottom Trawl Survey

Cruise No. 202592

Cruise Period and Area

From September 2 through September 18, 2025, the Massachusetts Division of Marine Fisheries conducted its 47th fall bottom trawl survey. The survey extended from New Hampshire to Rhode Island boundaries seaward to three nautical miles including Cape Cod Bay and Nantucket Sound.

Objectives

Cruise objectives were 1) to determine the fall distribution, relative abundance, and size composition of fish species; and 2) to collect biological samples. Special collections requested were also undertaken.

Methods

The study area is stratified based on five bio-geographic regions and six depth zones (Figure 1). Trawl sites are allocated in proportion to stratum area and randomly chosen in advance within each sampling stratum. Randomly chosen stations in locations known to be untowable due to hard bottom are reassigned. Sampling intensity is approximately 1 station per 19 square nautical miles. A minimum of two stations are assigned to each stratum.

A standard tow of 20-minute duration at 2.5 knots was attempted at each station during daylight hours with a 3/4 size North Atlantic type two seam otter trawl (11.9 m headrope/15.5 m footrope) rigged with a 7.6 cm rubber disc sweep; 19.2 m, 9.5 mm chain bottom legs; 18.3 m, 9.5 mm wire top legs; and 1.8 X 1.0 m, 147 kg wooden trawl doors. The codend contains a 6.4 mm knotless liner to retain small fish. Prior to setting the net

at each station, NOAA Corps officers surveyed the site by visually scanning for buoys marking fixed gear as well as determining the suitability of the bottom for towing the net based on the sounder image. Whenever necessary, sites were relocated due to untowable bottom or concentrations of fixed gear. Abbreviated tows of 13-19 minute duration were accepted as valid and expanded to the 20 minute standard.

Standard bottom trawl survey techniques were used when processing the catch. The total weight and length-frequency of each species were recorded directly into Fisheries Scientific Computer System (FSCS) data tables. Collections of age and growth material, and biological observations were undertaken during the measuring operation. Specimens were also saved to fulfill requests. Bottom temperatures were continuously recorded with an Onset Water Temp Pro v2 attached to the doors.

Thirty-two MDMF employees participated in the survey as part of the scientific party along with three biologists from NOAA (Table 1).

Cruise Summary

There were 106 stations attempted in 16 sampling days (Figures 1 and 2, Table 2). A hundred completed stations were considered acceptable for assessment of all species, SHG ≤ 136 (Table 3). One station in stratum 18, one station in stratum 34, and one station in stratum 35 were dropped due to a combination of hard bottom, dense aggregations of fixed fishing gear, and a large biomass of Spiny Dogfish. Six attempted tows were aborted in total (Table 5, Figure. 3).

The geographic distribution, relative abundance, relative biomass, and representative length frequencies of all fish and invertebrate species were documented (Tables 6a and 6b). An Atlantic Sturgeon at station 4 in Cape Cod Bay and five Atlantic Croaker at station 104 west of Cuttyhunk were both first time occurrences for fall surveys. Several records were set on the 2025 fall survey at individual stations. Station 58 in upper Buzzards Bay recorded the highest biomass (236.8 kg) of Roughtail Stingray. Station 97 north of Nantucket observed the highest weight (1.907 kg) of Smallmouth Flounder. Station 48 east of Provincetown recorded the highest biomass (16.16 kg) of Sea Raven.

There were several notable species trends for all stations combined in the fall of 2025. Summer Flounder set a new fall record for abundance, driven by new records in strata 12, 14, 15, and 16. Longhorn Sculpin had the second highest abundance and biomass this fall. Winter Flounder abundance was the second highest this survey driven by catches in the Gulf of Maine.

General catch trends followed a similar pattern to recent surveys. Scup dominated the catches south of Cape Cod and accounted for 69% of all catch by number and 18% of all biomass this survey. Scup, Longfin Squid, Butterfish, and Black Sea Bass made up much of the total catch for stations south of Cape Cod. North and east of Cape Cod had moderate

catches of Winter Flounder, Red Hake, Silver Hake, Longhorn Sculpin, Little Skate, and Winter Skate.

Additional sampling goals were achieved (Table 7). To aid cooperative fisheries assessments over 1,300 age structures and over 2,200 sex and maturity observations were taken from Atlantic Cod, Haddock, Summer Flounder, Yellowtail Flounder, Winter Flounder, Black Sea Bass, Scup, Weakfish, Tautog and American Lobster. Additional samples and catch information were collected to assist ongoing research by fisheries scientists from MDMF, UMass Dartmouth, and UMass Amherst.

For further information on this survey or others in the time series, contact Steve Wilcox at (978) 559-9260.

Table 1. Staffing list for fall cruise 202592.

Scientific Party		
Name	Affiliation	Num. Days
Steve Wilcox	MADMF	9
Jack Wilson	MADMF	9
Mark Szymanski	MADMF	7
Brendan Reilly	MADMF	7
Steve Voss	MADMF	4
Elise Koob	MADMF	4
Mike Blanco	MADMF	3
Mitchell Parizek	MADMF	3
Allie Myers	MADMF	3
Emma Gallagher	MADMF	3
Alex Boeri	MADMF	3
Amanda Meli	MADMF	3
Brad Chase	MADMF	3
Eric Robillard	NEFSC	2
Jillian Price	NEFSC	2
Corey Waddell	MADMF	2
Bart DiFiore	MADMF	2
Gio Aulizio	MADMF	2
John Sheppard	MADMF	2
Scott Schaffer	MADMF	2
Miranda Eisenman	MADMF	1
Amanda Davis	MADMF	1
Bradlie Morgan	MADMF	1
Derek Perry	MADMF	1
Evan Weig	MADMF	1
Alex Cameron	MADMF	1
Mark Rousseau	MADMF	1
Scott Elzey	MADMF	1
Sean Terril	MADMF	1
Tara Dolan	MADMF	1
Brooke Dejadon	MADMF	1
Amber Woolfenden	MADMF	1
Emma Fowler	MADMF	1
Mike Burgess	MADMF	1
Sandy Sutherland	NEFSC	1
Total		90

R/V Gloria Michelle Crew

Name	Affiliation	Num. Days
<i>Officers</i>		
Forrest Foxen	NOAA OIC	16
Alex Creed	NOAA JOIC	16
Heather Gaughan	NOAA JOIC	1
 <i>Deck Crew</i>		
Chris Shepard	Contract Fisherman	16
Dan Storer	Contract Fisherman	16

Table 2. Station information for the fall cruise 202592.

Station	Stratum	Date	Time (est)	Depth (m)	Latitude	Longitude	Course	Distance (nmi)	Bottom temp °C
1	27	9/2/2025	5:53	22	41°46.94	-70°25.36	307	0.54	11.1
2	28	9/2/2025	7:26	31	41°52.09	-70°20.91	325	0.57	9.2
3	28	9/2/2025	8:42	34	41°54.12	-70°19.32	43	0.61	8.7
4	28	9/2/2025	9:36	37	41°56.11	-70°17.18	238	0.84	8.3
5	29	9/2/2025	11:30	39	41°59.08	-70°14.77	219	0.84	8.2
6	29	9/2/2025	12:37	44	41°58.74	-70°18.89	158	0.85	8.0
7	29	9/2/2025	14:06	42	41°57.10	-70°21.53	77	0.84	8.1
8	29	9/2/2025	15:21	41	41°56.81	-70°25.92	98	0.86	8.2
9	27	9/2/2025	16:59	25	41°51.76	-70°28.94	17	0.76	9.8
10	26	9/3/2025	5:49	18	41°49.01	-70°29.64	194	0.64	11.7
11	26	9/3/2025	7:17	18	41°45.39	-70°21.10	298	0.82	12.3
12	26	9/3/2025	8:38	16	41°47.26	-70°15.97	264	0.61	12.4
13	26	9/3/2025	10:10	11	41°49.35	-70°07.09	271	0.83	18.0
14	26	9/3/2025	11:40	19	41°51.70	-70°11.37	46	0.67	11.2
15	25	9/3/2025	12:42	9	41°51.82	-70°08.49	57	0.84	19.2
16	27	9/3/2025	14:04	25	41°57.91	-70°08.36	211	0.85	9.5
17	28	9/3/2025	15:12	31	41°57.65	-70°10.60	196	0.84	8.5
18	27	9/4/2025	6:53	27	41°57.05	-70°31.82	141	0.54	9.0
19	25	9/4/2025	8:18	9	41°58.25	-70°36.67	241	0.54	12.4
20	25	9/4/2025	9:48	11	42°02.99	-70°38.02	168	0.64	15.5
21	32	9/4/2025	11:59	15	42°14.16	-70°44.62	157	0.61	11.7
22	31	9/4/2025	13:39	9	42°17.37	-70°51.83	158	0.54	13.8
23	32	9/4/2025	14:42	15	42°18.01	-70°50.51	92	0.83	11.2
24	33	9/4/2025	15:42	20	42°18.51	-70°49.45	108	0.85	10.9
25	33	9/5/2025	6:40	23	42°27.14	-70°53.11	140	0.53	9.9
26	34	9/5/2025	8:12	34	42°26.69	-70°50.85	157	0.28	9.2
27	34	9/5/2025	11:37	38	42°32.72	-70°43.25	252	0.60	9.2
28	35	9/5/2025	13:17	53	42°31.63	-70°40.57	236	0.51	8.5
29	35	9/5/2025	15:12	48	42°35.05	-70°35.69	257	0.53	8.1
30	34	9/6/2025	6:58	32	42°41.87	-70°36.17	133	0.53	9.2
31	35	9/6/2025	9:09	46	42°43.08	-70°36.88	174	0.55	8.1
32	36	9/6/2025	10:04	69	42°44.38	-70°36.85	157	0.72	7.2
33	34	9/6/2025	12:21	33	42°51.93	-70°45.72	162	0.64	9.6
34	32	9/6/2025	13:31	13	42°50.23	-70°48.05	171	0.63	11.6
35	33	9/6/2025	14:25	25	42°50.46	-70°47.04	166	0.56	9.8
36	33	9/7/2025	7:44	24	42°44.29	-70°44.20	171	0.60	9.6
37	31	9/7/2025	8:41	9	42°41.40	-70°43.59	331	0.69	11.6
38	31	9/7/2025	9:52	9	42°40.16	-70°41.52	324	0.76	11.9
39	36	9/7/2025	13:31	78	42°28.65	-70°38.17	61	0.54	7.7
40	35	9/7/2025	16:06	61	42°22.27	-70°40.97	182	0.55	8.0
41	34	9/8/2025	6:30	33	42°23.27	-70°48.05	296	0.56	9.0

Table 2 continued.

Station	Stratum	Date	Time (est)	Depth (m)	Latitude	Longitude	Course	Distance (nmi)	Bottom temp °C
42	28	9/8/2025	10:14	32	42°05.25	-70°32.81	44	0.75	8.8
43	29	9/8/2025	11:36	49	42°04.03	-70°29.43	197	0.82	7.7
44	30	9/8/2025	13:21	62	42°05.59	-70°18.90	240	0.80	7.0
45	30	9/8/2025	14:31	62	42°05.30	-70°14.76	272	0.82	7.5
46	21	9/8/2025	15:40	63	42°06.80	-70°13.29	258	0.82	7.4
47	21	9/9/2025	8:14	63	42°05.48	-70°14.42	74	0.83	7.7
48	20	9/9/2025	9:50	34	42°05.98	-70°08.21	109	0.76	8.8
49	18	9/9/2025	11:04	17	42°04.12	-70°05.18	148	0.05	
50	18	9/9/2025	12:07	17	42°03.99	-70°04.97	138	0.83	10.3
51	17	9/9/2025	13:09	12	42°03.46	-70°04.34	141	0.87	10.6
52	17	9/9/2025	14:11	12	42°03.50	-70°04.39	322	0.84	14.8
53	27	9/9/2025	16:59	23	42°00.54	-70°08.85	13	0.19	
54	25	9/9/2025	17:41	7	42°02.59	-70°07.91	297	0.54	18.0
55	27	9/10/2025	6:36	24	41°51.72	-70°13.34	65	0.83	9.1
56	11	9/10/2025	11:24	11	41°37.51	-70°44.85	60	0.83	21.5
57	12	9/10/2025	12:37	12	41°36.30	-70°42.73	41	0.83	21.4
58	12	9/10/2025	13:57	12	41°35.00	-70°46.27	35	0.86	21.3
59	11	9/10/2025	15:01	7	41°36.29	-70°48.83	154	0.84	21.3
60	12	9/11/2025	8:33	15	41°19.76	-70°39.48	281	0.72	19.6
61	12	9/11/2025	9:29	18	41°19.41	-70°36.90	295	0.82	19.4
62	13	9/11/2025	10:27	22	41°18.53	-70°35.27	295	0.84	19.4
63	11	9/11/2025	11:50	9	41°16.81	-70°29.02	338	0.85	19.3
64	13	9/11/2025	12:44	22	41°16.70	-70°29.76	340	0.85	19.3
65	18	9/11/2025	14:41	12	41°16.51	-70°19.28	298	0.63	19.4
66	16	9/13/2025	5:55	17	41°28.03	-70°28.49	118	0.82	20.6
67	11	9/13/2025	7:56	10	41°17.26	-70°24.36	38	0.86	19.8
68	17	9/13/2025	9:28	10	41°17.01	-70°20.16	84	0.85	19.5
69	18	9/13/2025	10:31	16	41°15.62	-70°15.11	298	0.85	19.5
70	17	9/13/2025	11:57	9	41°13.93	-70°06.92	306	0.54	19.7
71	19	9/13/2025	12:45	23	41°12.70	-70°05.89	268	0.83	19.0
72	18	9/13/2025	13:47	16	41°13.85	-70°02.33	286	0.84	19.1
73	17	9/13/2025	17:12	11	41°21.64	-69°59.20	31	0.83	18.4
74	19	9/14/2025	5:50	23	41°49.50	-69°54.75	188	0.83	9.9
75	20	9/14/2025	6:50	35	41°46.40	-69°52.05	359	0.83	8.8
76	18	9/14/2025	8:38	20	41°40.26	-69°52.76	219	0.05	
77	18	9/14/2025	9:00	19	41°40.14	-69°52.87	226	0.55	12.3
78	16	9/14/2025	13:34	11	41°30.79	-70°08.72	269	0.82	20.0
79	16	9/14/2025	16:04	12	41°26.54	-70°27.51	78	0.69	20.7
80	16	9/15/2025	5:50	16	41°31.68	-70°35.55	272	0.87	20.7
81	15	9/15/2025	8:26	10	41°35.16	-70°21.52	117	0.84	21.1
82	15	9/15/2025	9:38	9	41°31.82	-70°18.93	89	0.85	21.1

Table 2 continued.

Station	Stratum	Date	Time (est)	Depth (m)	Latitude	Longitude	Course	Distance (nmi)	Bottom temp °C
83	15	9/15/2025	10:34	7	41°31.68	-70°20.96	136	0.84	21.2
84	15	9/15/2025	12:38	10	41°24.67	-70°08.94	264	0.83	20.4
85	16	9/15/2025	13:40	14	41°22.96	-70°09.13	253	0.83	20.5
86	16	9/15/2025	14:36	15	41°22.05	-70°10.88	269	0.82	20.6
87	15	9/15/2025	15:47	9	41°20.82	-70°15.47	293	0.84	20.5
88	16	9/16/2025	5:53	14	41°23.94	-70°05.57	238	0.85	20.3
89	16	9/16/2025	7:10	14	41°26.67	-70°07.41	96	0.56	19.9
90	15	9/16/2025	8:46	9	41°32.75	-70°04.41	226	0.66	17.7
91	15	9/16/2025	9:51	8	41°36.32	-70°03.13	195	0.85	20.1
92	15	9/16/2025	10:55	8	41°38.37	-70°04.74	252	0.85	20.5
93	15	9/16/2025	11:50	7	41°36.68	-70°08.38	85	0.84	20.9
94	15	9/16/2025	13:01	7	41°37.40	-70°10.55	251	0.84	21.3
95	16	9/16/2025	15:43	14	41°20.47	-70°11.02	280	0.86	20.5
96	16	9/17/2025	5:44	13	41°19.89	-70°08.26	91	0.85	20.3
97	16	9/17/2025	6:47	15	41°22.25	-70°07.27	191	0.86	20.3
98	13	9/17/2025	11:09	23	41°26.36	-70°45.43	84	0.55	20.0
99	13	9/17/2025	12:17	25	41°23.03	-70°48.97	58	0.83	19.7
100	12	9/17/2025	13:17	17	41°21.77	-70°47.18	65	0.84	19.8
101	12	9/17/2025	14:59	18	41°28.89	-70°52.22	236	0.85	20.1
102	11	9/18/2025	6:50	7	41°34.66	-70°54.51	171	0.55	20.7
103	12	9/18/2025	8:46	18	41°25.27	-71°02.06	329	0.84	19.7
104	14	9/18/2025	9:52	32	41°23.45	-71°00.10	14	0.84	19.7
105	14	9/18/2025	11:32	33	41°19.11	-70°53.28	316	0.55	18.7
106	13	9/18/2025	13:01	24	41°23.77	-70°54.78	72	0.84	19.6

Table 3. Sampling effort assigned and accomplished by stratum, cruise 202592.

Stratum	Region	Assigned Stations	Completed Stations	Sub-Standard Completed	Standard Completed	Aborted Tows
11	1	5	5		5	
12	1	7	7		7	
13	1	5	5		5	
14	1	2	2		2	
15	2	10	10		10	
16	2	11	11		11	
17	3	5	5		5	
18	3	5	4		4	3
19	3	2	2		2	
20	3	2	2		2	
21	3	2	2		2	
25	4	4	4		4	
26	4	5	5		5	
27	4	5	5		5	1
28	4	5	5		5	
29	4	5	5		5	
30	4	2	2		2	
31	5	3	3		3	
32	5	3	3		3	
33	5	4	4		4	
34	5	4	3		3	
35	5	5	4		4	2
36	5	2	2		2	
TOTALS		103	100	0	100	6

Note:

Standard Tows. SHG <=136. Recommended for use in all indices of abundance.

Sub-Standard Tows. SHG 141 - 166. Not recommended for use in indices other than Spiny Dogfish.

Aborted Tows. Catch data not recommended for use.

Table 4. Sub-standard tows (SHG 141-166) for cruise 202592. Not advised for indices of abundance other than Spiny Dogfish.

Station	Stratum	SHG	Location	Description
No sub-standard tows on cruise 202592				

Table 5. Aborted tows during the fall survey, cruise 202592.

Station	Stratum	SHG	Location	Description
26	34	171	Massachusetts Bay	Lobster Trawl Intercepted.
41	34	179	Massachusetts Bay	hard bottom torn belly and starboard wing
49	18	172	East of Cape Cod	hard hang
53	27	171	Eastern Cape Cod Bay	speed dropped hauled early
76	18	171	East of Chatham	took hit at 1 min 30 sec slowed and hauled early
77	18	179	East of Chatham	dogfish torn net while trying to land aboard

Table 6a. Total catch by number and weight from 2025 fall survey sorted by number.

Species Code	Common Name	Count	Weight (kg)
143	Scup	221,017	1,820.245
503	Longfin Squid	40,315	184.725
131	Butterfish	19,075	202.609
106	Winter Flounder	6,904	937.981
77	Red Hake	4,011	464.467
72	Silver Hake	3,343	346.732
141	Black Sea Bass	3,257	123.988
163	Longhorn Sculpin	2,970	291.414
313	Atlantic Rock Crab	2,490	237.565
105	Yellowtail Flounder	2,430	445.560
301	American Lobster	2,385	718.067
26	Little Skate	1,605	885.133
23	Winter Skate	1,510	854.434
43	Bay Anchovy	922	2.418
108	Windowpane	894	162.240
103	Summer Flounder	751	288.929
193	Ocean Pout	700	44.687
13	Smooth Dogfish	633	679.359
312	Jonah Crab	610	96.507
171	Northern Searobin	562	20.438
117	Smallmouth Flounder	532	7.788
32	Atlantic Herring	493	107.317
145	Weakfish	339	14.283
73	Atlantic Cod	334	10.914
317	Spider Crab Uncl	319	30.821
149	Spot	305	41.914
322	Lady Crab	282	19.474
176	Cunner	263	12.885
74	Haddock	245	62.084
102	American Plaice	239	26.633
104	Fourspot Flounder	168	25.795
401	Sea Scallop	138	10.764
132	Atlantic Moonfish	107	0.824
318	Horseshoe Crab	103	157.941
33	Alewife	96	6.748
78	Spotted Hake	90	9.915
208	Mackerel Scad	77	0.206
107	Witch Flounder	75	22.465
337	Knobbed Whelk	67	21.365
146	Northern Kingfish	67	6.776
164	Sea Raven	65	23.797
172	Striped Searobin	63	23.625

Table 6a continued.

Species Code	Common Name	Count	Weight (kg)
502	Northern Shortfin Squid	62	11.073
196	Northern Puffer	54	2.566
177	Tautog	54	13.997
348	Northern Moonsnail	37	5.380
116	Northern Pipefish	36	0.201
36	Atlantic Menhaden	27	4.103
336	Channeled Whelk	27	8.404
439	Snakefish	27	0.048
155	Acadian Redfish	26	2.806
343	Blue Mussel	26	2.009
135	Bluefish	25	1.803
180	Rock Gunnel	21	0.227
181	Northern Sand Lance	20	0.087
211	Round Scad	18	0.128
403	Atlantic Surfclam	16	6.193
35	American Shad	15	0.997
24	Clearnose Skate	13	19.692
76	White Hake	12	0.550
34	Blueback Herring	9	0.270
323	Mantis Shrimp Uncl	9	0.214
185	Oyster Toadfish	7	1.783
314	Blue Crab	7	1.076
15	Spiny Dogfish	6	9.960
136	Atlantic Croaker	5	0.600
118	Hogchoker	5	0.616
342	Northern Horsemussel	5	0.614
197	Goosefish	4	9.308
182	Snakeblenny	4	0.085
489	Red Cornetfish	4	0.064
657	Dwarf Goatfish	3	0.059
209	Bigeye Scad	2	0.067
409	Ocean Quahog	2	0.315
212	Rough Scad	2	0.059
4	Roughtail Stingray	2	236.800
695	Guaguanche	1	0.073
139	Striped Bass	1	3.830
402	Bay Scallop	1	0.073
31	Round Herring	1	0.040
75	Pollock	1	0.233
83	Fourbeard Rockling	1	0.060
380	Atlantic Sturgeon	1	40.732
556	Glasseye Snapper	1	0.019

Table 6a continued.

Species Code	Common Name	Count	Weight (kg)
22	Barndoor Skate	1	0.265
162	Shorthorn Sculpin	1	0.006
413	Northern Quahog	1	0.167
213	Silver Rag	1	0.023
28	Thorny Skate	1	0.080
Totals		321,456	9,839.587

Table 6b. Total catch by number and weight from 2025 fall survey sorted by weight.

Species Code	Common Name	Count	Weight (kg)
143	Scup	221,017	1,820.245
106	Winter Flounder	6,904	937.981
26	Little Skate	1,605	885.133
23	Winter Skate	1,510	854.434
301	American Lobster	2,385	718.067
13	Smooth Dogfish	633	679.359
77	Red Hake	4,011	464.467
105	Yellowtail Flounder	2,430	445.560
72	Silver Hake	3,343	346.732
163	Longhorn Sculpin	2,970	291.414
103	Summer Flounder	751	288.929
313	Atlantic Rock Crab	2,490	237.565
4	Roughtail Stingray	2	236.800
131	Butterfish	19,075	202.609
503	Longfin Squid	40,315	184.725
108	Windowpane	894	162.240
318	Horseshoe Crab	103	157.941
141	Black Sea Bass	3,257	123.988
32	Atlantic Herring	493	107.317
312	Jonah Crab	610	96.507
74	Haddock	245	62.084
193	Ocean Pout	700	44.687
149	Spot	305	41.914
380	Atlantic Sturgeon	1	40.732
317	Spider Crab Uncl	319	30.821
102	American Plaice	239	26.633
104	Fourspot Flounder	168	25.795
164	Sea Raven	65	23.797
172	Striped Searobin	63	23.625
107	Witch Flounder	75	22.465
337	Knobbed Whelk	67	21.365
171	Northern Searobin	562	20.438
24	Clearnose Skate	13	19.692
322	Lady Crab	282	19.474
145	Weakfish	339	14.283
177	Tautog	54	13.997
176	Cunner	263	12.885
502	Northern Shortfin Squid	62	11.073
73	Atlantic Cod	334	10.914
401	Sea Scallop	138	10.764
15	Spiny Dogfish	6	9.960
78	Spotted Hake	90	9.915

Table 6b continued.

Species Code	Common Name	Count	Weight (kg)
197	Goosefish	4	9.308
336	Channeled Whelk	27	8.404
117	Smallmouth Flounder	532	7.788
146	Northern Kingfish	67	6.776
33	Alewife	96	6.748
403	Atlantic Surfclam	16	6.193
348	Northern Moonsnail	37	5.380
36	Atlantic Menhaden	27	4.103
139	Striped Bass	1	3.830
155	Acadian Redfish	26	2.806
196	Northern Puffer	54	2.566
43	Bay Anchovy	922	2.418
343	Blue Mussel	26	2.009
135	Bluefish	25	1.803
185	Oyster Toadfish	7	1.783
314	Blue Crab	7	1.076
35	American Shad	15	0.997
132	Atlantic Moonfish	107	0.824
118	Hogchoker	5	0.616
342	Northern Horsemussel	5	0.614
136	Atlantic Croaker	5	0.600
76	White Hake	12	0.550
409	Ocean Quahog	2	0.315
34	Blueback Herring	9	0.270
22	Barndoor Skate	1	0.265
75	Pollock	1	0.233
180	Rock Gunnel	21	0.227
323	Mantis Shrimp Uncl	9	0.214
208	Mackerel Scad	77	0.206
116	Northern Pipefish	36	0.201
413	Northern Quahog	1	0.167
211	Round Scad	18	0.128
181	Northern Sand Lance	20	0.087
182	Snakeblenny	4	0.085
28	Thorny Skate	1	0.080
695	Guaguanche	1	0.073
402	Bay Scallop	1	0.073
209	Bigeye Scad	2	0.067
489	Red Cornetfish	4	0.064
83	Fourbeard Rockling	1	0.060
657	Dwarf Goatfish	3	0.059
212	Rough Scad	2	0.059

Table 6b continued.

Species Code	Common Name	Count	Weight (kg)
439	Snakefish	27	0.048
31	Round Herring	1	0.040
213	Silver Rag	1	0.023
556	Glasseye Snapper	1	0.019
162	Shorthorn Sculpin	1	0.006
Totals		321,456	9,839.587

Table 7. Total samples obtained for age, growth, maturity, and special studies during MDMF fall cruise 202592.

Species	Maturity Observations	Scales for aging	Otoliths for aging	Spines for aging
Atlantic Cod	18		18	
Haddock	27		27	
Summer Flounder	312		299	
Yellowtail Flounder	266		259	
Winter Flounder	457		434	
Black Sea Bass	162		158	
Scup	119		113	
Weakfish	9		9	
Tautog				17
American Lobster	851			
Total	2221	0	1317	17

Other Collections:

All crabs measured to 0.1 cm carapace width and egg bearing status recorded for females (MDMF)

Squid egg locations (CCS)

Black Sea Bass biological samples (SMAST)

Black Sea Bass biological samples (MDMF)

Specimen collection (UMASS Amherst)

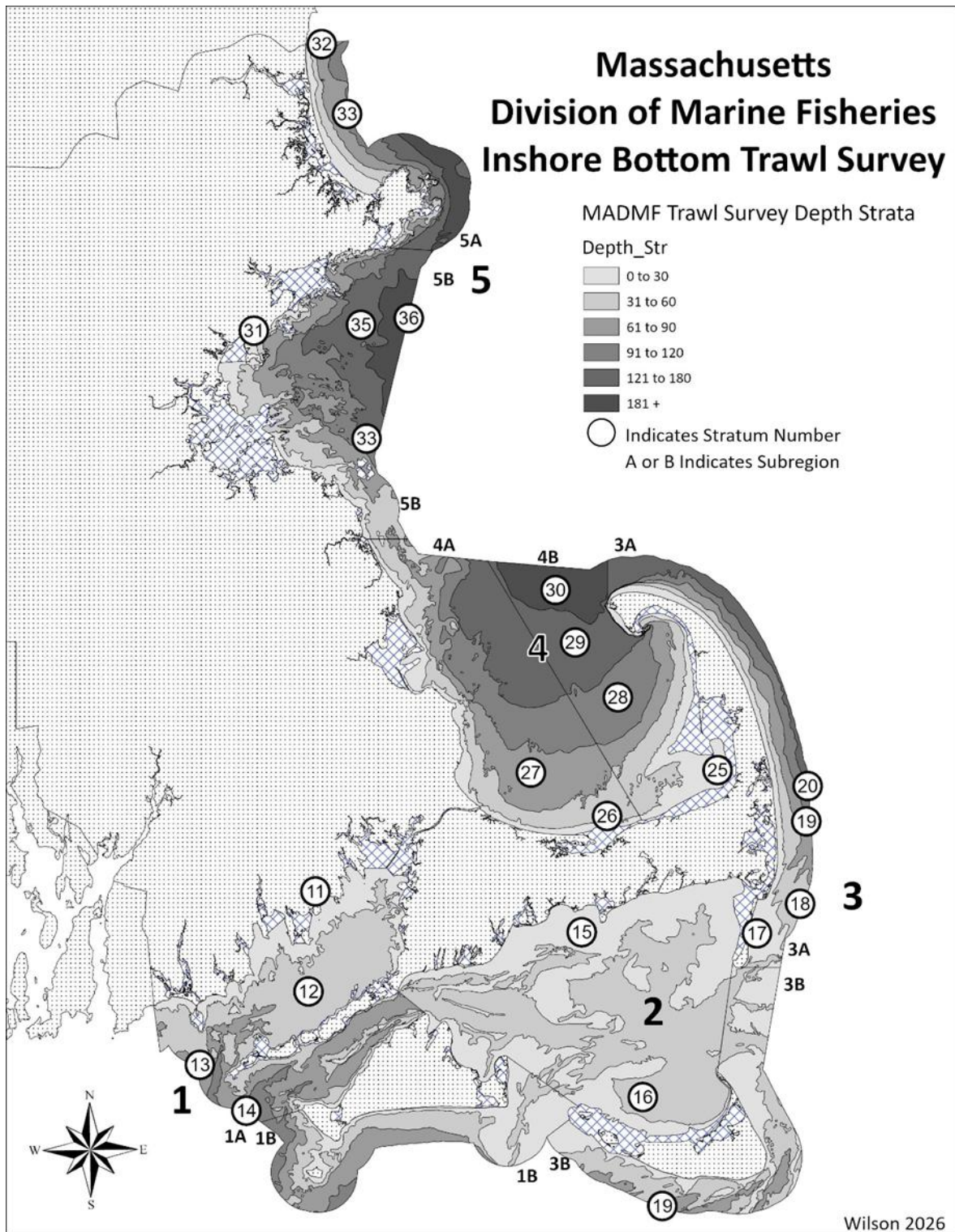


Figure 1. MDMF inshore bottom trawl survey region and strata map.

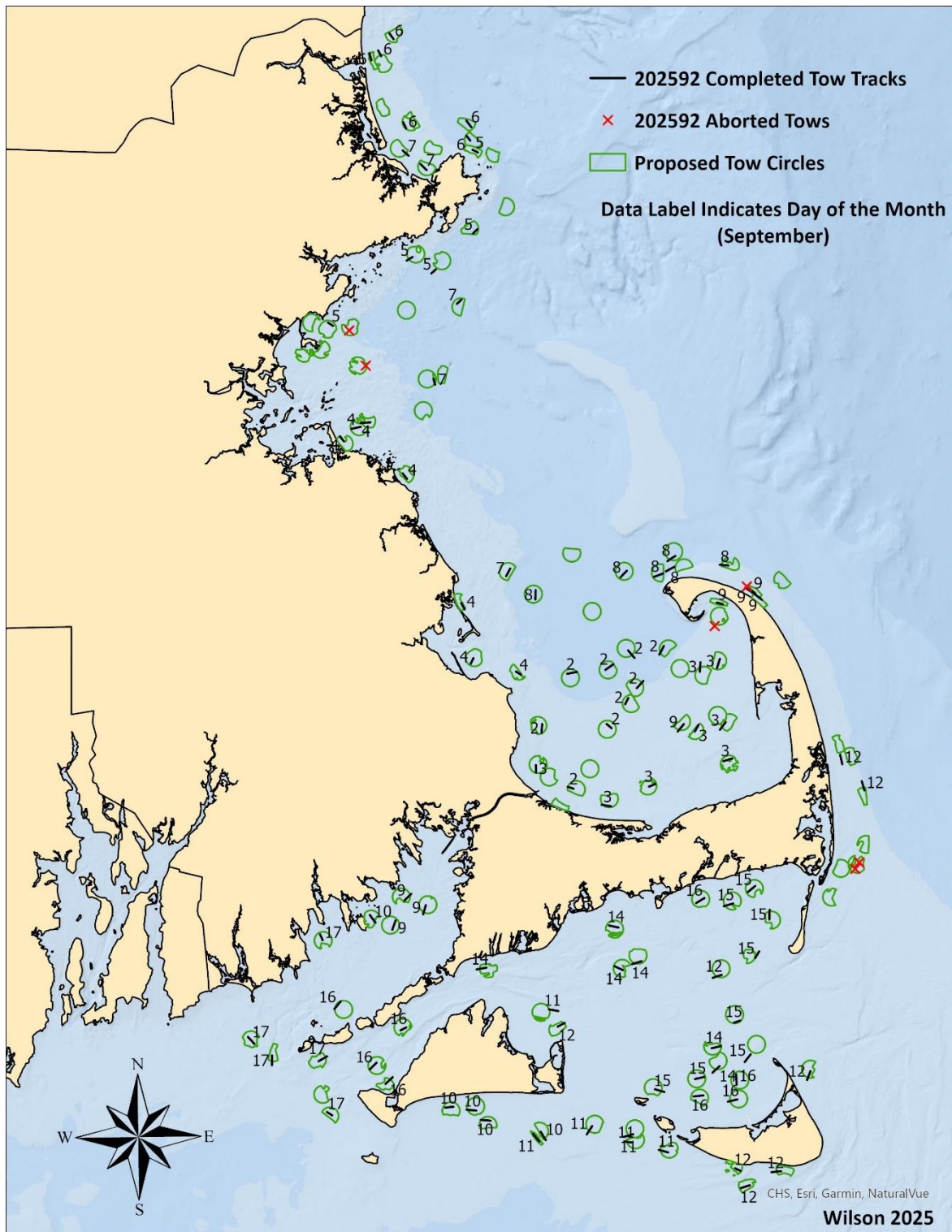


Figure 2. All proposed fall 2025 stations including completed and aborted tows by date.

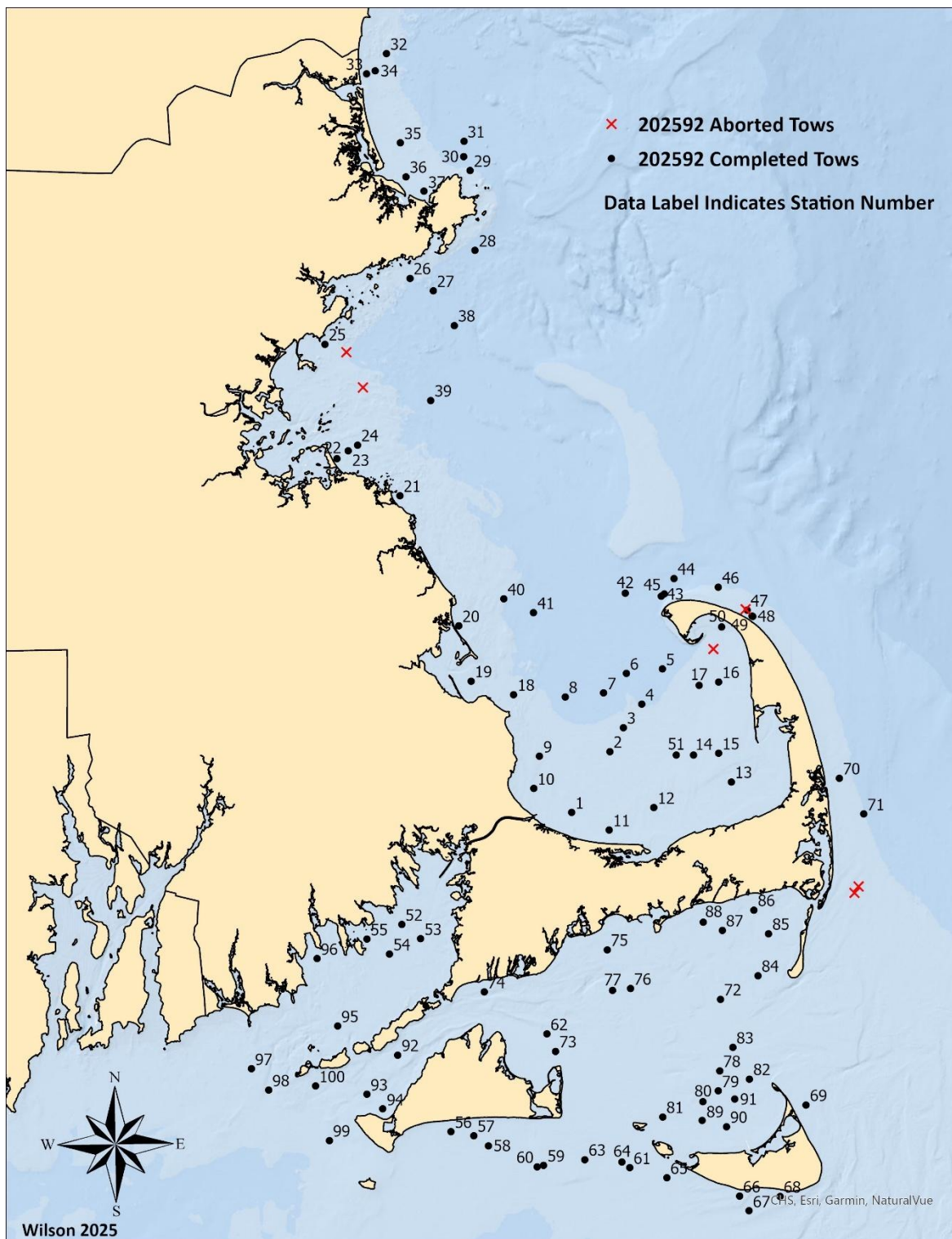


Figure 3. All attempted fall 2025 survey stations in chronological order



Fall Cruise 202592



SURVEY REPORT

2025 Nantucket Sound Estuarine Winter Flounder

Young of the Year (YOY)

Seine Survey

Survey Period And Area

From June 9 – July 3, 2025, the Massachusetts Division of Marine Fisheries (MADMF) conducted its 50th Nantucket Sound Estuarine Winter Flounder Young-of-the-Year (YOY) Seine Survey. The survey covers six Nantucket Sound estuaries on the south side of Cape Cod – Great Pond, Waquoit Bay, Cotuit Bay, Lewis Bay, Bass River and Stage Harbor (Figure 1).

Objectives

Survey objectives were 1) to provide a Winter Flounder YOY abundance index for the Southern New England Stock; and 2) count all commercially and recreationally important finfish species encountered. All species not counted are noted for presence.

Methods

Each survey occurs between the Monday of the first full week of June (Julian dates 160-166) and the Friday of the first full week of July (Julian dates 187-193). Sampling takes place during daylight hours Monday through Friday within two hours of the earliest morning high tide. The first 9 days that meet the protocol during this timeframe are used. Weekends, Holidays, and afternoons are avoided to reduce recreational use conflicts at site locations. Forty-nine fixed stations, originally chosen for efficient seining (i.e., smooth sediment bottom generally devoid of attached vegetation) and historic availability of 0-group Winter Flounder, were proportionately allocated by each estuary's littoral perimeter. A 6.4 meter straight seine of 4.8 mm nylon mesh equipped with a weighted lead line footrope to minimize escapement was set and hauled perpendicular to shore from depths between 0.9 to 1.2 meters.

Winter Flounder density (# YOY per square meter) was determined by aggregating catch from three replicate hauls at each station. Consistent area swept was maintained using a fixed-length spreader rope. Haul distance was calculated as the hypotenuse of a right triangle, using the measurements of distance over the water's surface and depth at the beginning of the seine haul. Distance over the water's surface was measured with a sonic digital rangefinder (SONIN Multi-Measure Combo ProTM) and water depth at the

beginning of the seine haul was measured with a weighted and marked line. When inclement weather prevents use of the rangefinder, distance over ground was measured by pacing. Statistical analysis of seine data employed stratification techniques; each estuary was considered a stratum and each station's three replicate hauls were treated as one individual sample. Stratified mean density and confidence limits were derived from standard and modified formulae for mean and variance. Eleven MDMF employees and one member respectively from DEP, UMass Boston, and NOAA Corps participated in the survey as part of the scientific party (Table 1).

Results

137 seine hauls were conducted at 49 stations over 9 sampling days. Ten replicate hauls were dropped at seven stations due to decreased beach area, shoreline vegetation growth, human disruption, and obstructions: Fairfield, Washburn Island 4, Seapuit #2, Follins Pond, Heirs Landing, Mill Pond, and Vineyard Avenue. Forty-two species were encountered in 2025 (Table 2). The 2025 pooled (all estuaries combined) Winter Flounder YOY index ($0.150 \text{ YOY} / \text{m}^2$) was below the time series median ($0.222 \text{ YOY} / \text{m}^2$) (Figure 2, Table 3). The Age 1+ Winter Flounder index remained below the timeseries median for the 17th consecutive year with only one fish encountered (Figure 3). YOY Winter Flounder indices for five estuaries were below their respective time series medians, while Waquoit Bay was above the median (Figure 4). The YOY Summer Flounder index increased from 2024 to 2025 and was the second highest for the time series (Figure 5). The age1+ Summer Flounder index was the second highest for the time series, down from the 2024 record high (Figure 6). The bottom temperature loggers were collected, downloaded and redeployed in the same four estuary locations (Figure 7). For further information on this survey or additional data, please contact Mark Szymanski (508)-742-9727.

Table 1. Annual seine survey staff list

Name	Affiliation	Num. Days
Mark Szymanski	MADMF	9
Brendan Reilly	MADMF	3
Giovanni Aulizio	MADMF	2
Amanda Davis	MADMF	2
Katrina Zarella-Smith	UMASSB	2
Jacob Dorothy	MADMF	1
Emma Fowler	MADMF	1
Heather Gaughan	NOAA Corps	1
Vincent Manfredi	MADEP	1
Amanda Meli	MADMF	1
Bradlie Morgan	MADMF	1
Derek Perry	MADMF	1
Laura Tomlinson	MADMF	1
Jack Wilson	MADMF	1

Table 2. Seine catch with percent occurrence and count for enumerated species.

Common Name	Taxonomic Name	Number	% Occur
YOY Winter Flounder	<i>Pseudopleuronectes americanus</i>	1268	85.4%
Atlantic Silverside	<i>Menidia menidia</i>		83.9%
Sand Shrimp	<i>Crangon septemspinosa</i>		65.7%
Blue Crab	<i>Callinectes sapidus</i>	579	65.0%
Mud Snail	<i>Nassarius obsoletus</i>		62.8%
Grass Shrimp	<i>Paelmonetes pugio</i>		36.5%
Northern Pipefish	<i>Sygnathus fuscus</i>		35.8%
Threespine Stickleback	<i>Gasterosteus aculeatus</i>		31.4%
YOY Summer Flounder	<i>Paralichthys dentatus</i>	135	27.0%
Green Crab	<i>Carcinus maenus</i>	61	22.6%
Striped Killifish	<i>Fundulus majalis</i>		21.9%
Atlantic Herring	<i>Clupea harengus</i>	4512	18.2%
Mummichog	<i>Fundulus heteroclitus</i>		16.8%
Atlantic Needlefish	<i>Strongylura marina</i>	89	15.3%
Scup YOY	<i>Stenotomus chrysops</i>	259	13.1%
Lady Crab	<i>Ovalipes ocellatus</i>	64	11.7%
Alewife / Blueback Herring	<i>Alosa spp.</i>	73	10.9%
Bay Anchovy	<i>Anchoa mitchilli</i>	149	10.2%
Spider Crab Uncl.	<i>Majidae</i>	26	10.2%
Northern Sand Lance	<i>Ammodytes dubius</i>	217	8.0%
Rainwater Killifish	<i>Lucania parva</i>	53	8.0%
Northern Kingfish	<i>Menticirrhitis saxatilis</i>	11	5.8%
Atlantic Rock Crab	<i>Cancer irroratus</i>	9	5.1%
Naked Goby / Seaboard Goby	<i>Gobiosoma spp.</i>	8	5.1%
Horseshoe Crab	<i>Limulus polyphemus</i>	7	4.4%
American Eel	<i>Anguilla rostrata</i>	19	4.4%
Oyster	<i>Crassostrea virginica</i>	7	3.6%
Sheepshead Minnow	<i>Cyprinodon variegatus</i>		3.6%
Age 1+ Summer Flounder	<i>Paralichthys dentatus</i>	4	2.2%
Northern Quahog	<i>Mercenaria mercenaria</i>	3	2.2%
Windowpane Flounder	<i>Scopthalmus aquosus</i>	2	1.5%
Northern Puffer	<i>Sphoeroides maculatus</i>	2	1.5%
Jonah Crab	<i>Cancer borealis</i>	2	1.5%
Atlantic Menhaden	<i>Brevortia tyrannus</i>	1	0.7%
Age 1+ Winter Flounder	<i>Pseudopleuronectes americanus</i>	1	0.7%
Bluefish	<i>Pomatomus saltatrix</i>	2	0.7%
Spot	<i>Leiostomus xanthurus</i>	1	0.7%
Swimming Crab Uncl.	<i>Portunidae</i>	1	0.7%
Knobbed Whelk	<i>Busycon carica</i>	1	0.7%
Ribbed Mussel	<i>Guekensia demissus</i>	3	0.7%
Soft Shell Clam	<i>Mya arenaria</i>	1	0.7%
Bubble Snail	<i>F. Atyidae</i>		0.7%

Table 3. MDMF Seine Survey YOY Winter Flounder index, estuaries combined.

Year	Stratified Mean	Standard Error	Lower CI	Upper CI
1976	0.344	0.042	0.236	0.452
1977	0.641	0.062	0.508	0.774
1978	0.366	0.057	0.235	0.498
1979	0.507	0.060	0.366	0.648
1980	0.432	0.057	0.306	0.559
1981	0.340	0.056	0.208	0.471
1982	0.370	0.055	0.246	0.494
1983	0.231	0.027	0.176	0.287
1984	0.323	0.036	0.248	0.399
1985	0.335	0.039	0.254	0.415
1986	0.325	0.039	0.244	0.406
1987	0.274	0.032	0.208	0.340
1988	0.184	0.024	0.133	0.234
1989	0.421	0.046	0.325	0.518
1990	0.325	0.038	0.247	0.402
1991	0.267	0.038	0.188	0.346
1992	0.294	0.047	0.196	0.392
1993	0.067	0.009	0.047	0.086
1994	0.148	0.019	0.108	0.188
1995	0.154	0.023	0.107	0.201
1996	0.221	0.027	0.165	0.277
1997	0.392	0.053	0.278	0.506
1998	0.165	0.029	0.104	0.226
1999	0.201	0.028	0.143	0.258
2000	0.347	0.043	0.258	0.435
2001	0.214	0.028	0.157	0.272
2002	0.100	0.011	0.077	0.122
2003	0.197	0.032	0.128	0.267
2004	0.095	0.012	0.070	0.120
2005	0.075	0.010	0.054	0.096
2006	0.164	0.018	0.126	0.202
2007	0.167	0.021	0.125	0.210
2008	0.092	0.011	0.069	0.115
2009	0.083	0.013	0.056	0.109
2010	0.092	0.014	0.063	0.122
2011	0.247	0.026	0.194	0.301
2012	0.135	0.014	0.106	0.163
2013	0.250	0.025	0.198	0.302
2014	0.186	0.028	0.130	0.242
2015	0.127	0.018	0.090	0.163
2016	0.187	0.020	0.146	0.228

Table 3 continued.

Year	Stratified Mean	Standard Error	Lower CI	Upper CI
2017	0.291	0.050	0.182	0.400
2018	0.111	0.021	0.065	0.156
2019	0.145	0.019	0.104	0.185
2020	0.238	0.049	0.133	0.342
2021	0.223	0.031	0.160	0.286
2022	0.231	0.028	0.175	0.287
2023	0.451	0.088	0.258	0.643
2024	0.196	0.028	0.137	0.256
2025	0.150	0.019	0.109	0.191
	0.222	median		

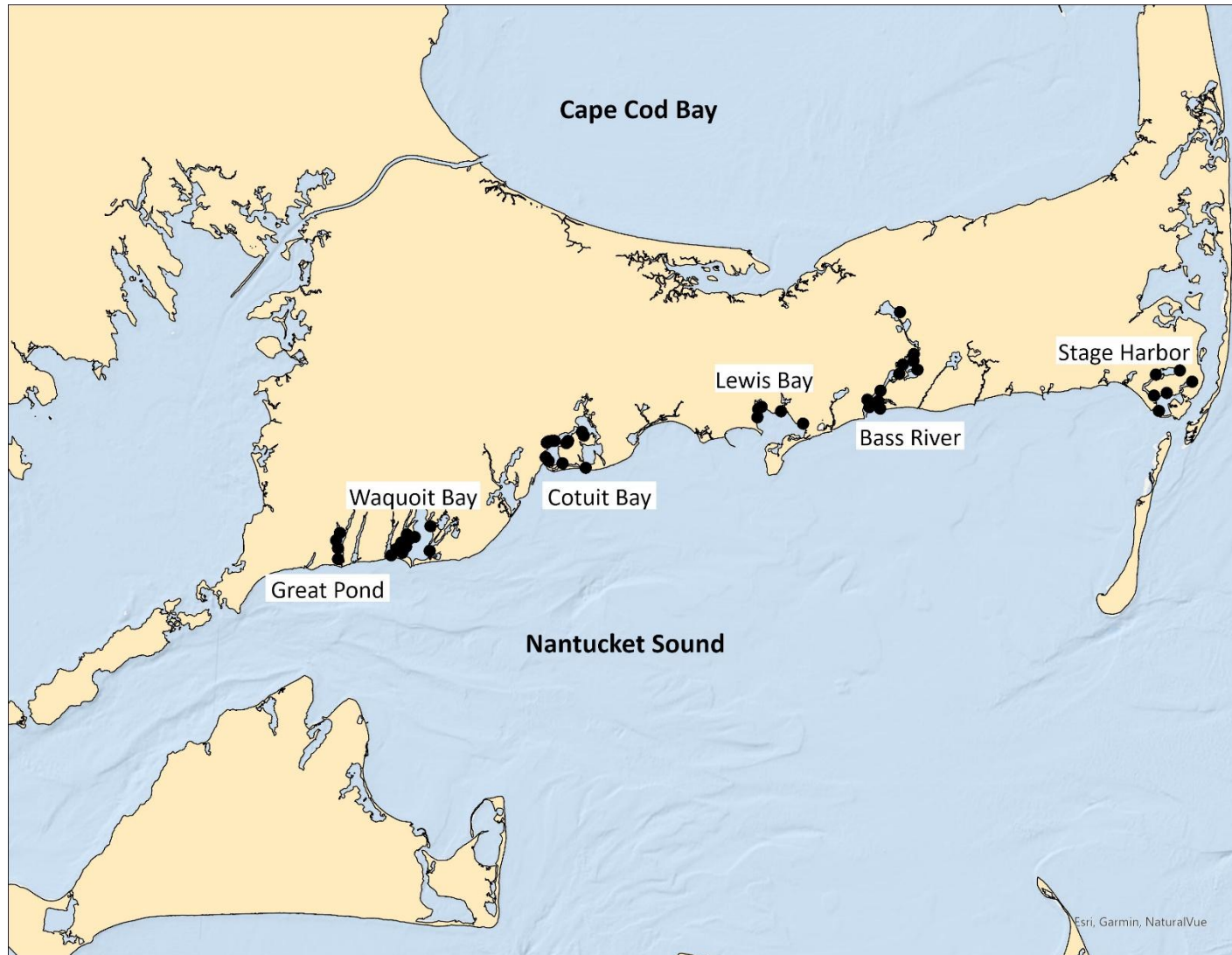


Figure 1. Seine sites in the stratified indices.

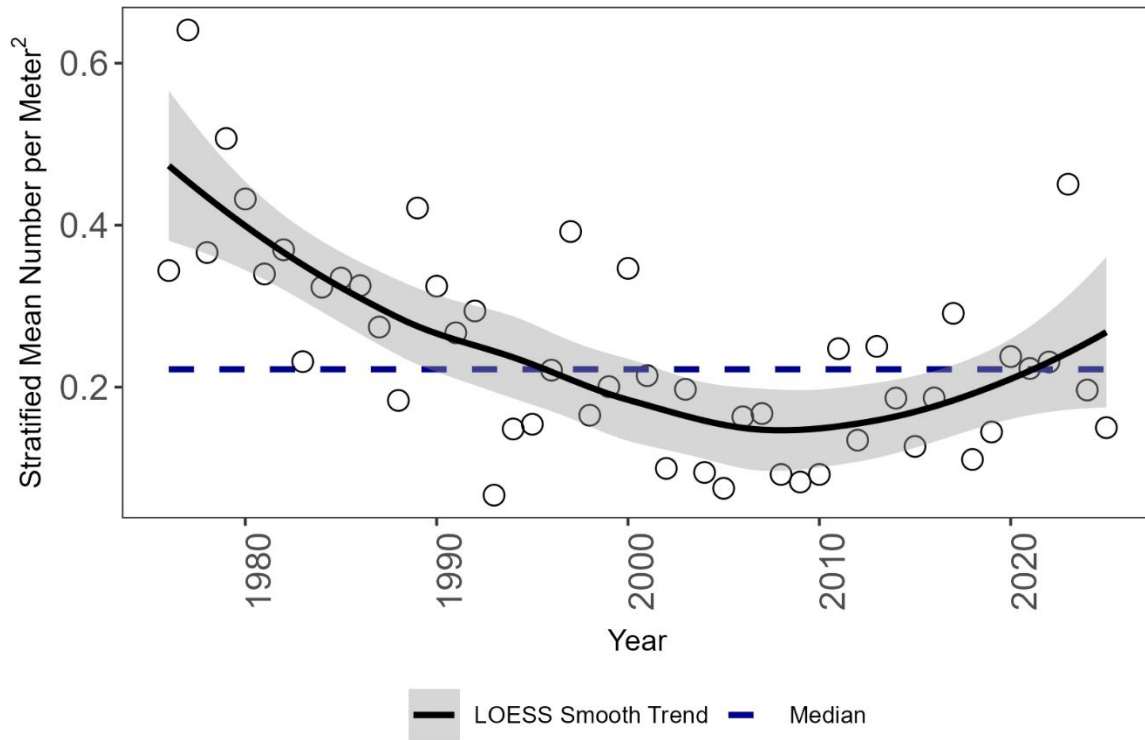


Figure 2. Seine survey cumulative YOY Winter Flounder abundance.

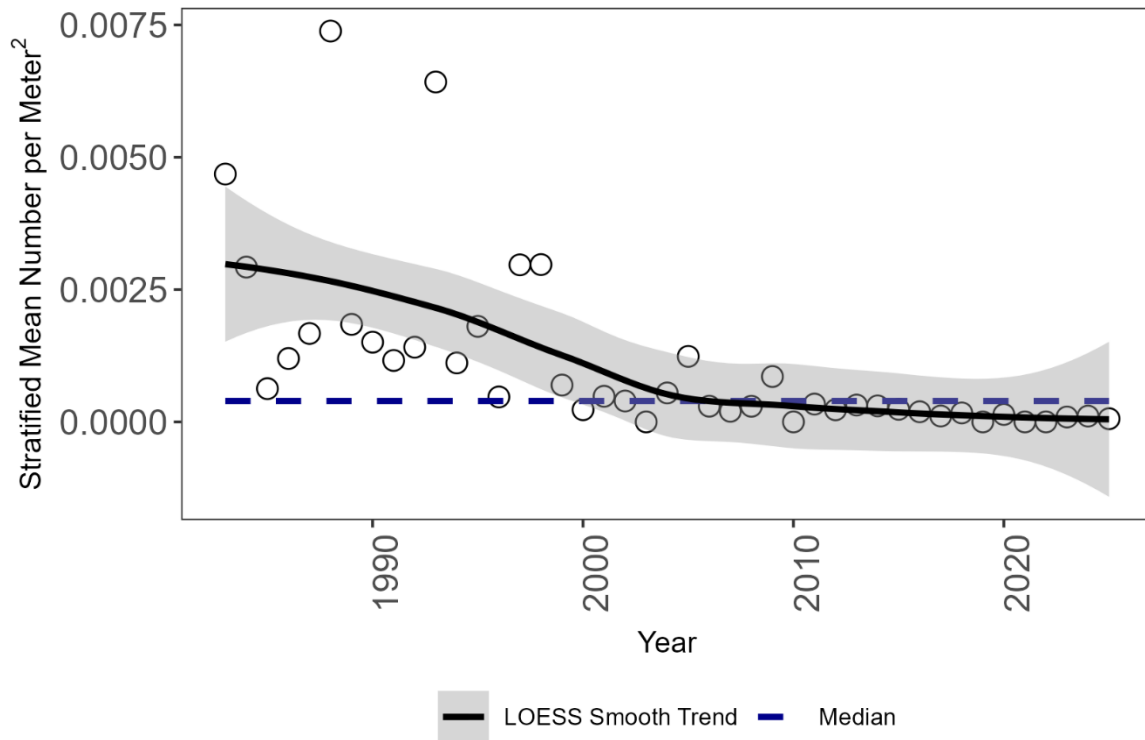


Figure 3. Age 1 + Winter Flounder index, MDMF Seine Survey (started recording age 1+ in 1983).

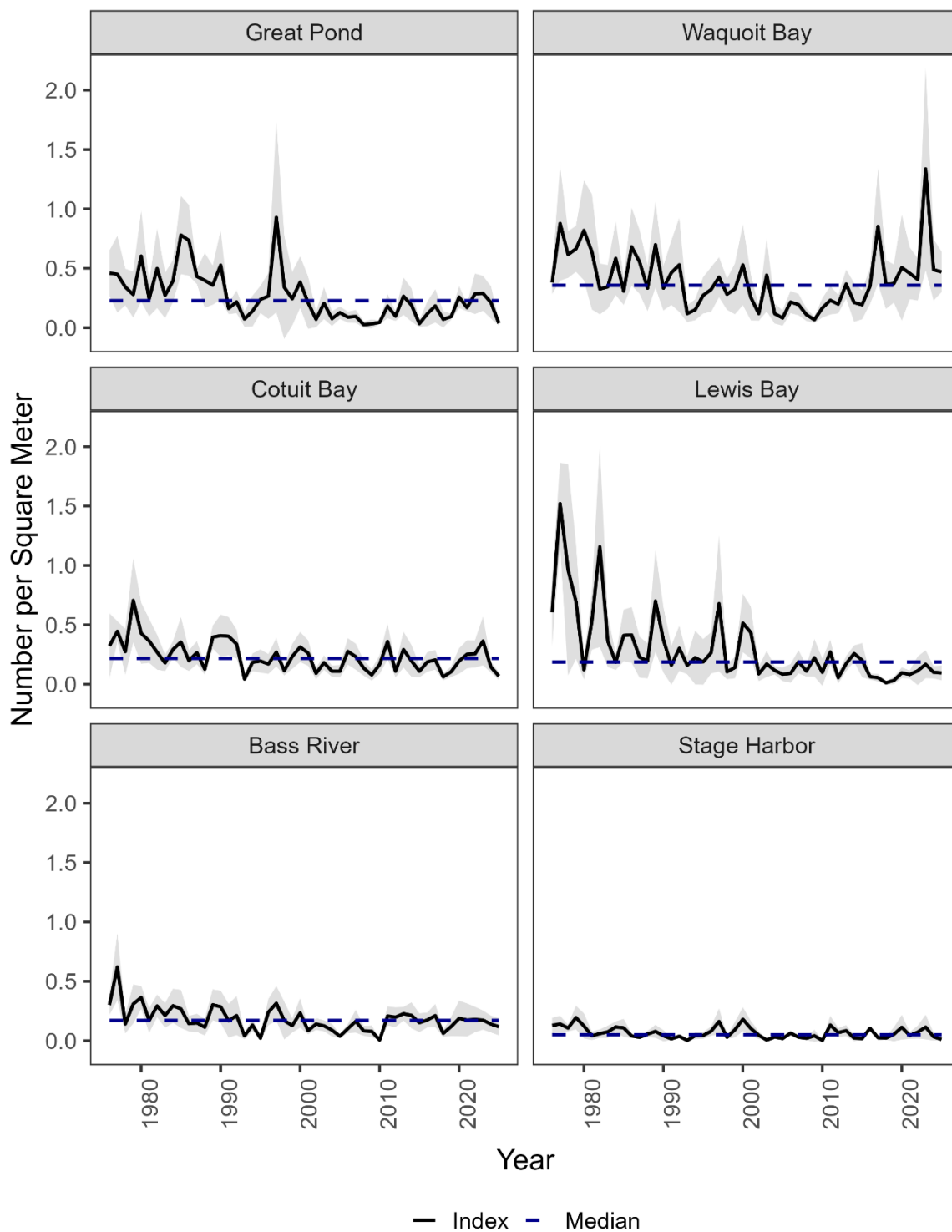


Figure 4. YOY Winter Flounder Indices for each estuary, MDMF Seine Survey (shading = 95% confidence intervals, horizontal dashed line = Timeseries Median for each estuary).

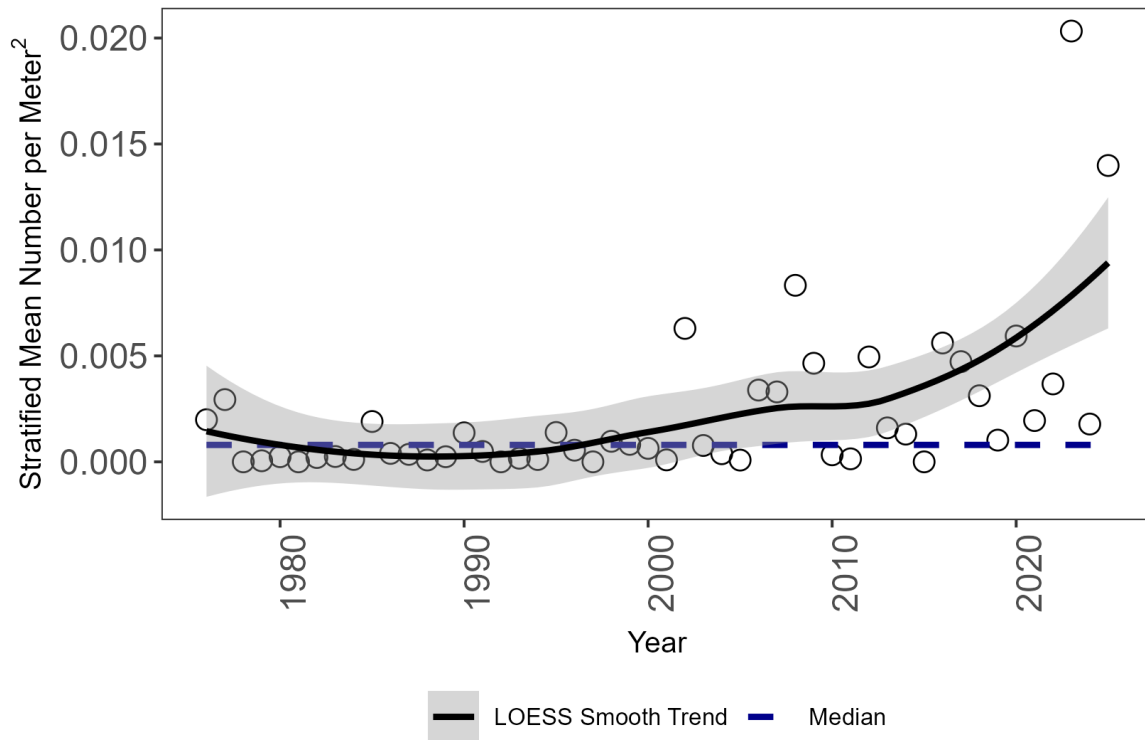


Figure 5. YOY Summer Flounder index MDMF Seine Survey.

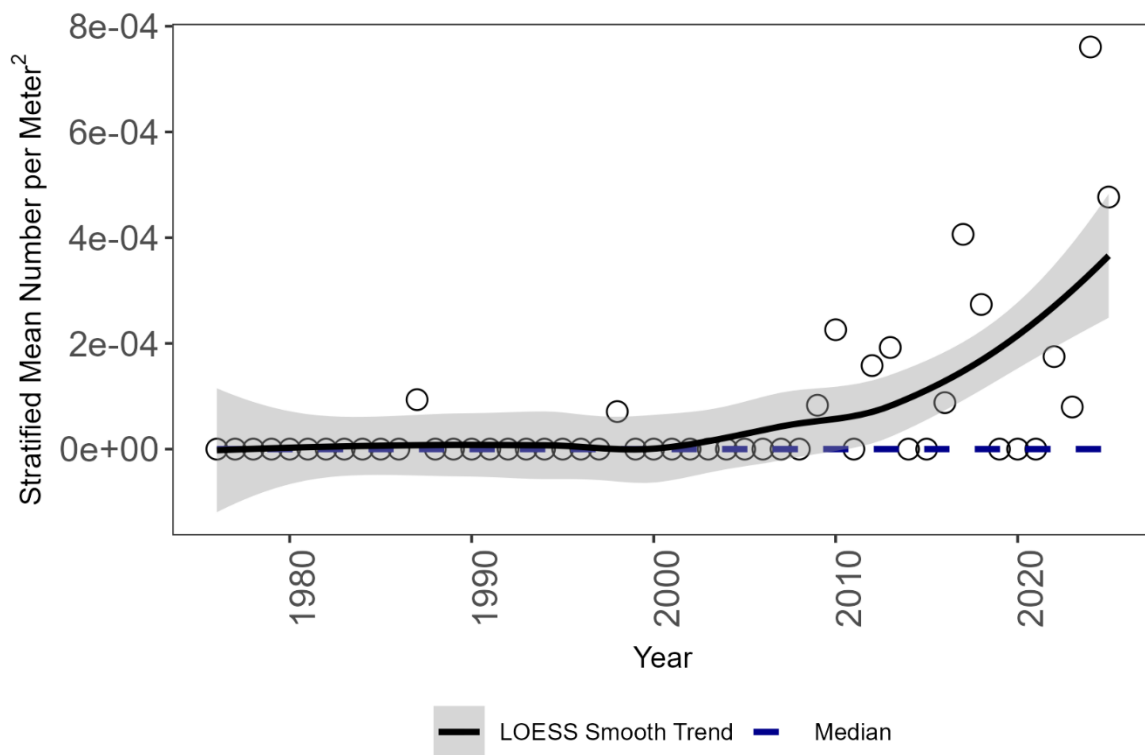


Figure 6. Age 1+ Summer Flounder index MDMF Seine Survey.

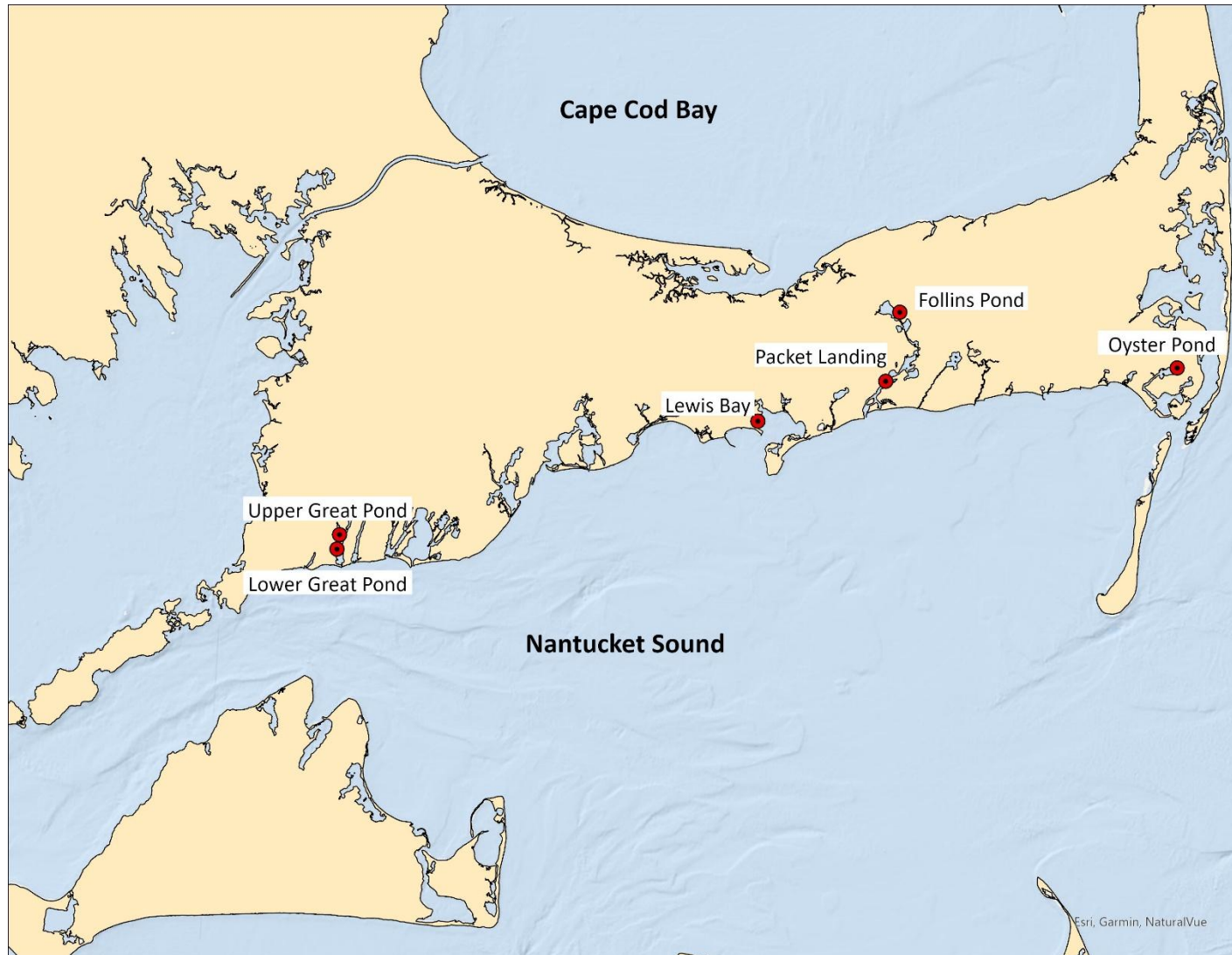


Figure 7. MDMF seine survey temperature monitor locations.

Appendix A: Massachusetts Inshore Bottom Trawl Survey Indices of Biomass, Abundance, Recruitment, and Abundance at Age for Select Species

The Massachusetts Division of Marine Fisheries has been conducting a bottom trawl survey of Massachusetts territorial waters every spring and fall since 1978. Survey indices provide a useful fishery-independent metric for tracking the relative abundance or biomass of many demersal fish and invertebrates in the survey area. Updated survey indices are presented here for 1) species or stocks routinely requested by staff from within the Massachusetts Division of Marine Fisheries as well as by other governmental and non-governmental scientific bodies, academic researchers and consultants and/or 2) those species which have been a large part of the survey biomass and/or demonstrate a particularly strong trend over the time series.

Additional survey data can be requested by contacting Steve Wilcox at 978-559-9260 or steve.wilcox@mass.gov.

Figure 1. Massachusetts trawl survey regions.

Figure 2 (a-ff). Stratified mean weight per tow (kg) 1978–2025 Massachusetts DMF trawl survey.

- (a.) Spring Winter Flounder Regions 1 - 3
- (b.) Spring Yellowtail Flounder Regions 3 - 5
- (c.) Spring Winter Flounder Regions 4 - 5
- (d.) Fall Winter Flounder Regions 4 - 5
- (e.) Spring Summer Flounder Regions 1 - 5
- (f.) Fall Summer Flounder Regions 1 - 5
- (g.) Spring Windowpane Regions 1 - 3
- (h.) Fall Windowpane Regions 1 - 3
- (i.) Spring Windowpane Regions 4 - 5
- (j.) Fall Windowpane Regions 4 - 5
- (k.) Spring Little Skate Regions 1 - 3
- (l.) Fall Little Skate Regions 1 - 3
- (m.) Spring Little Skate Regions 4 - 5
- (n.) Fall Little Skate Regions 4 - 5
- (o.) Spring Winter Skate Regions 1 - 3
- (p.) Fall Winter Skate Regions 1 - 3
- (q.) Spring Winter Skate Regions 4 - 5
- (r.) Fall Winter Skate Regions 4 - 5
- (s.) Spring Atlantic Cod Regions 4 - 5
- (t.) Fall Red Hake Regions 4 - 5
- (u.) Spring Ocean Pout Regions 1 - 5
- (v.) Spring Northern Sea Robin Regions 1 - 5
- (w.) Spring Longhorn Sculpin Regions 3 - 5
- (x.) Fall Longhorn Sculpin Regions 3 - 5
- (y.) Spring Scup Regions 1 - 3
- (z.) Spring Black Sea Bass Regions 1 - 3
- (aa.) Spring Tautog Regions 1 - 3
- (bb.) Fall Tautog Regions 1 - 3
- (cc.) Fall Butterfish Regions 1 - 2
- (dd.) Spring Lobster Regions 1 - 2
- (ee.) Fall Lobster Regions 4 - 5
- (ff.) Spring Haddock Regions 4 - 5

Figure 3 (a – b). Stratified mean number per tow 1978 – 2025 Massachusetts DMF trawl survey.

- (a) Spring Channeled Whelk Regions 1 - 2
- (b) Fall Channeled Whelk Regions 1 - 2
- (c) Fall Knobbed Whelk Regions 1 - 2
- (d) Spring Spotted Hake Regions 1 - 5

Figure 4 (a – b). Pre-recruit stratified mean number per tow 1978 – 2025 Massachusetts DMF trawl survey.

- (a) Fall Age-0 Scup (<13 cm) Regions 1 – 3
- (b) Fall Age-0 Black Sea Bass (<12 cm) Regions 1 - 3

Figure 1. Massachusetts trawl survey regions. Gulf of Maine (GOM) = Regions 4-5. Southern New England (SNE) = Regions 1-3.

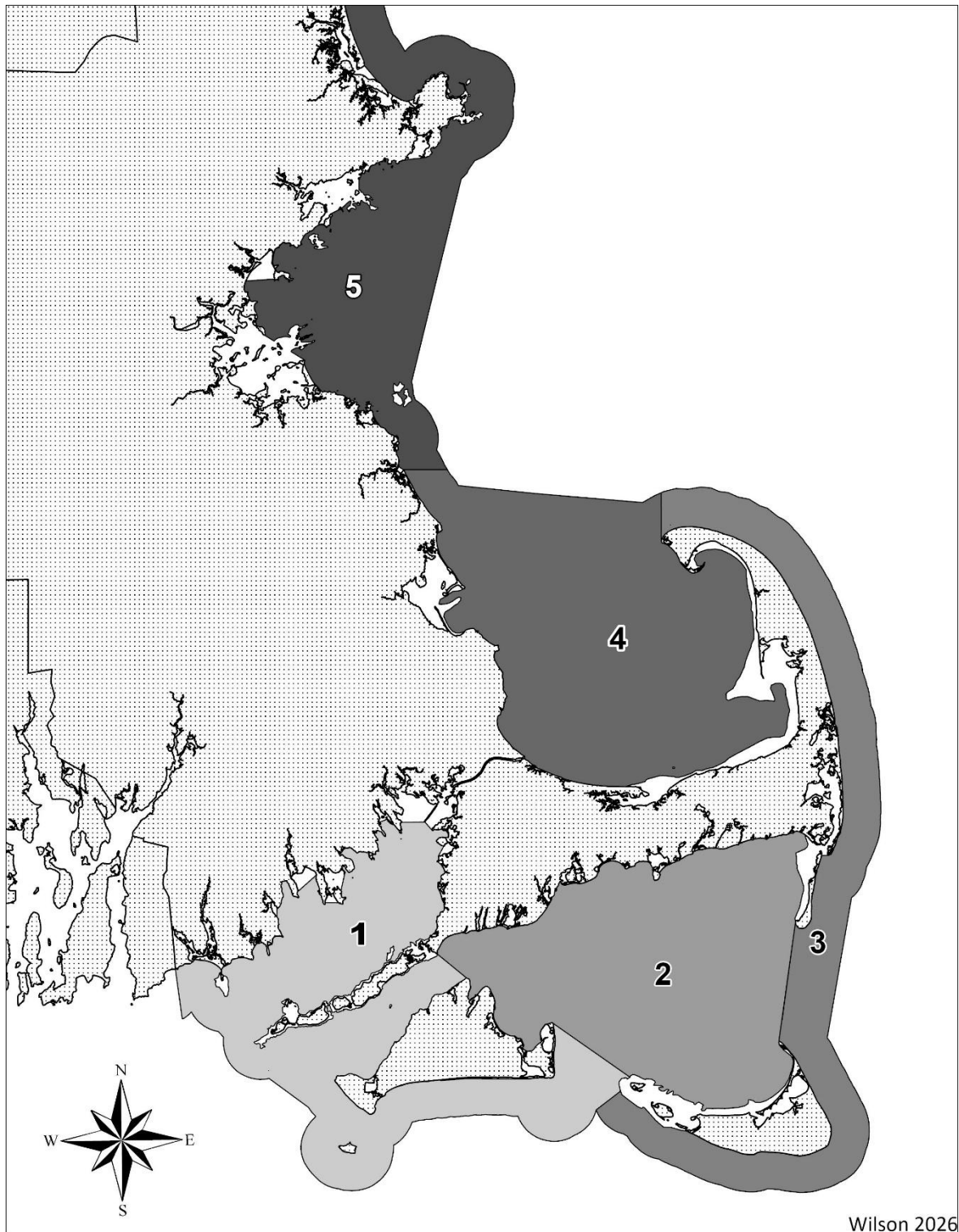
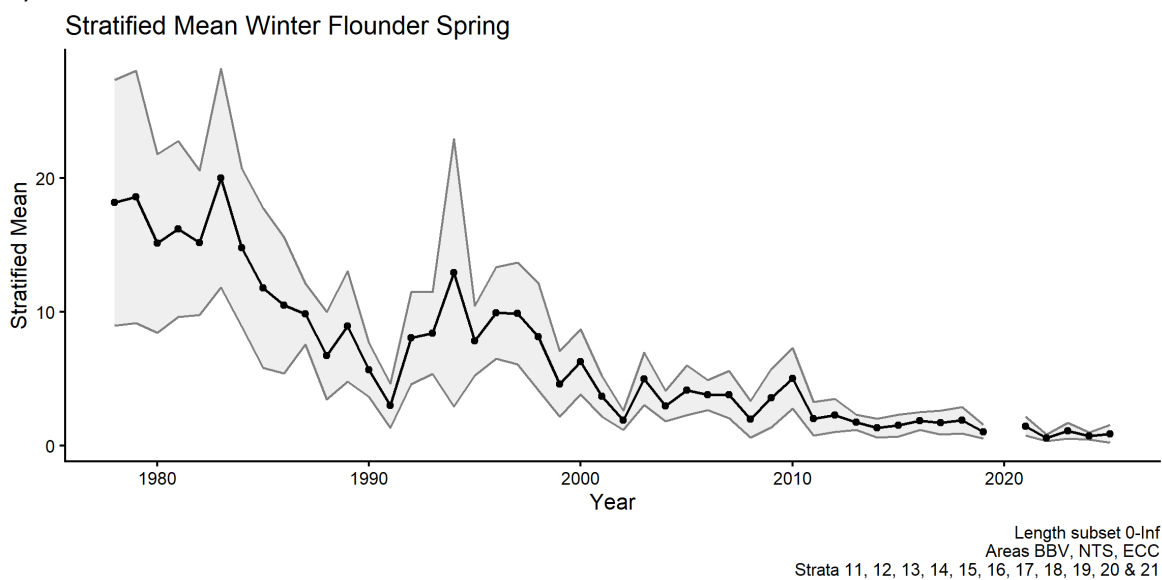


Figure 2. (a & b). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

a.)



b.)

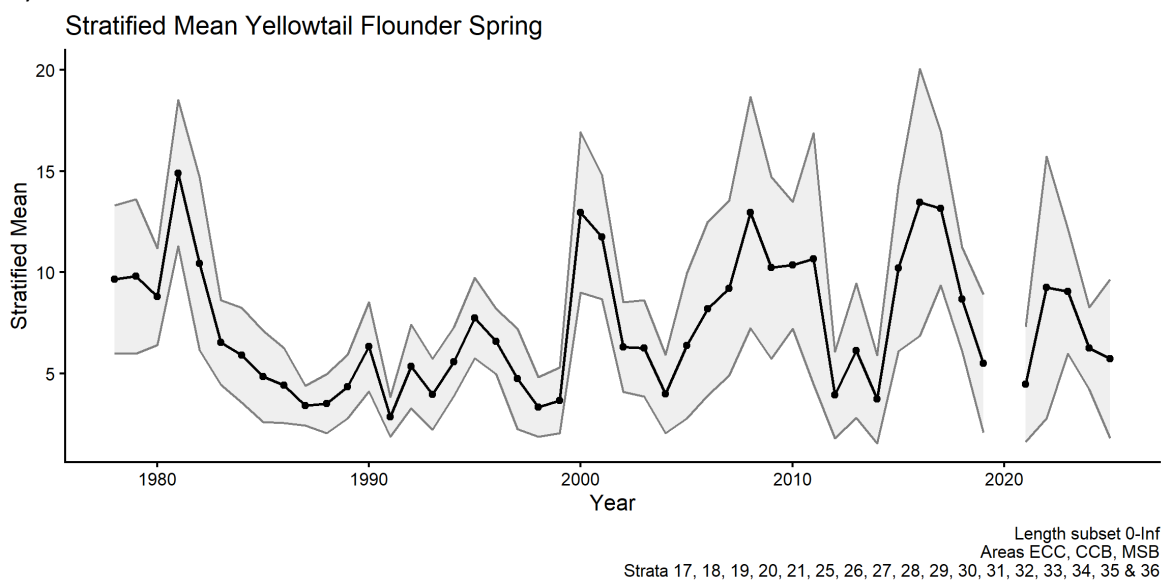
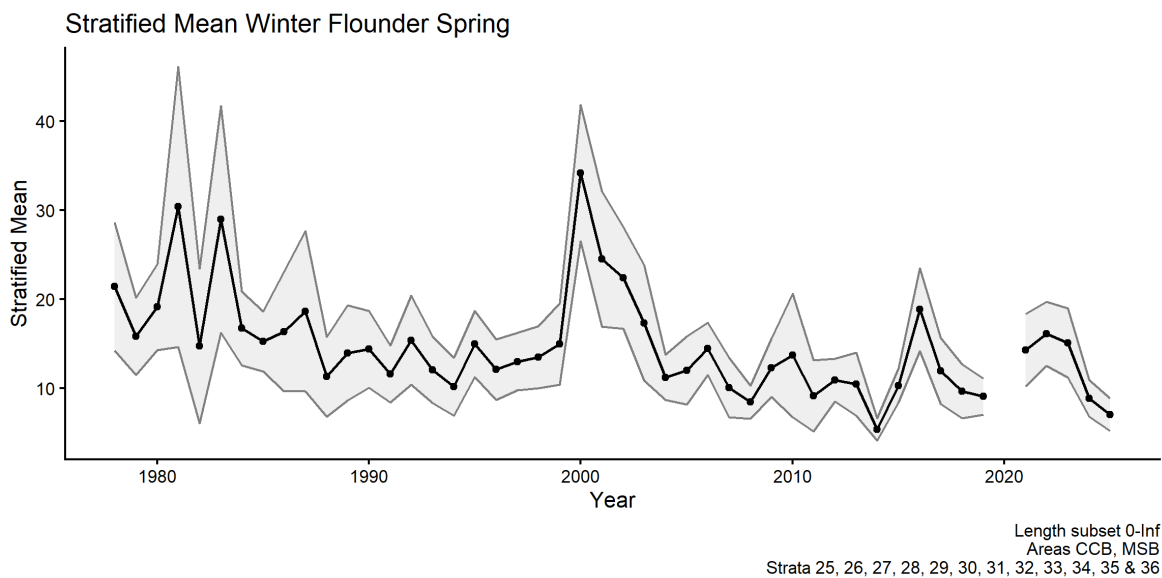


Figure 2. (c & d). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

c.)



d.)

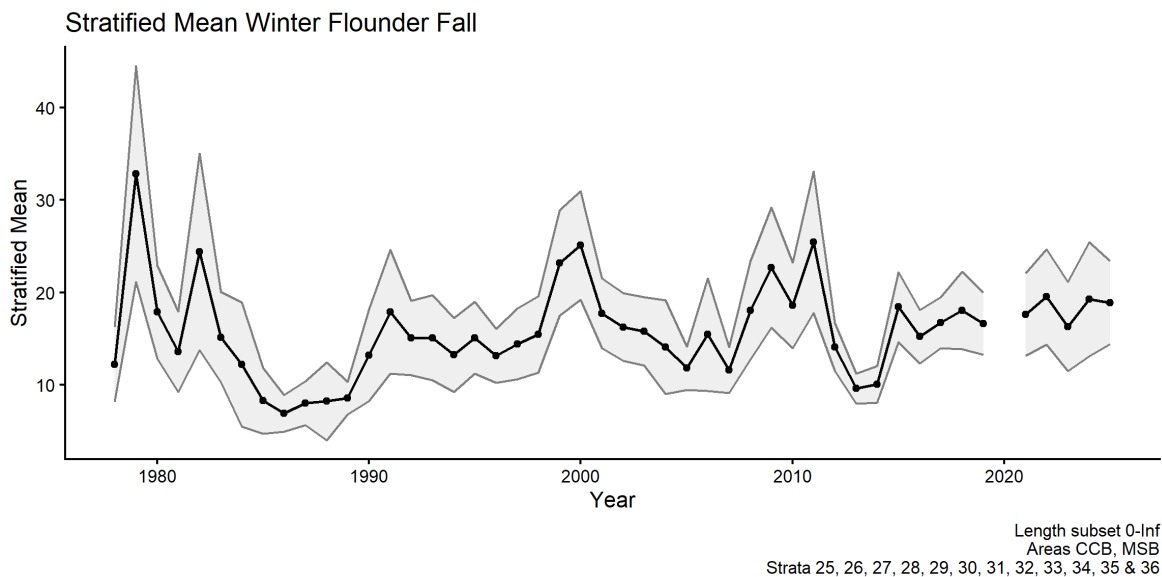
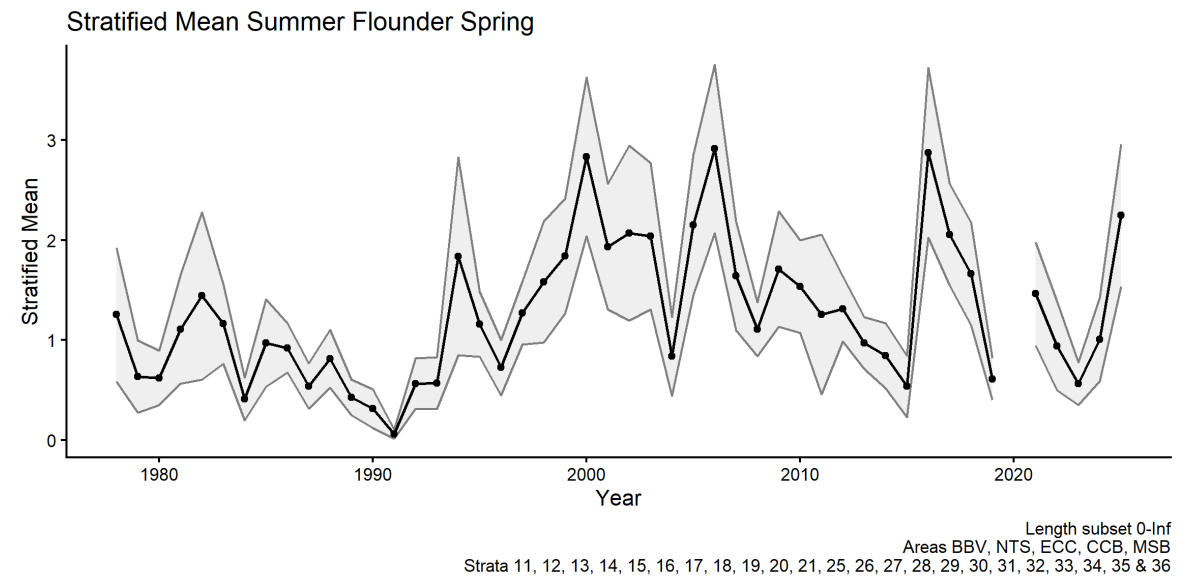


Figure 2. (e & f). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

e.)



f.)

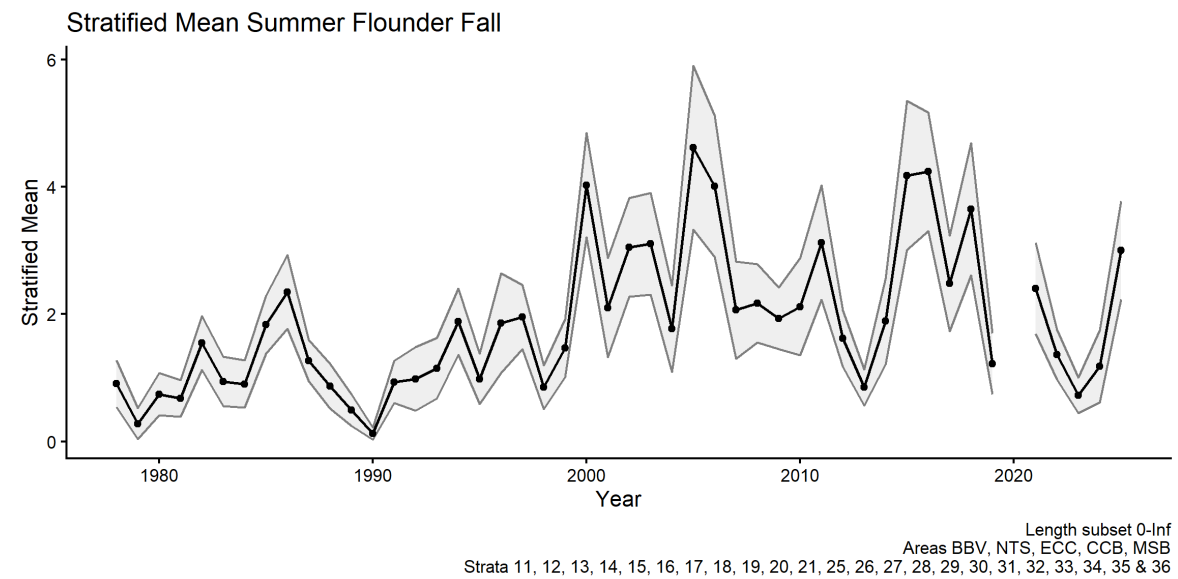
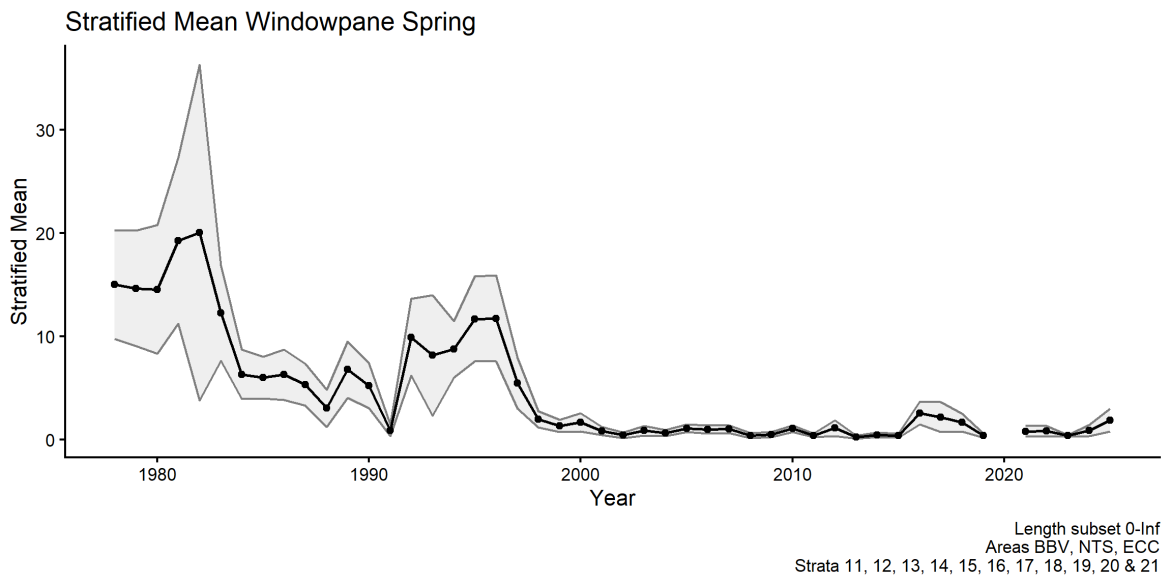


Figure 2. (g & h). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

g.)



h.)

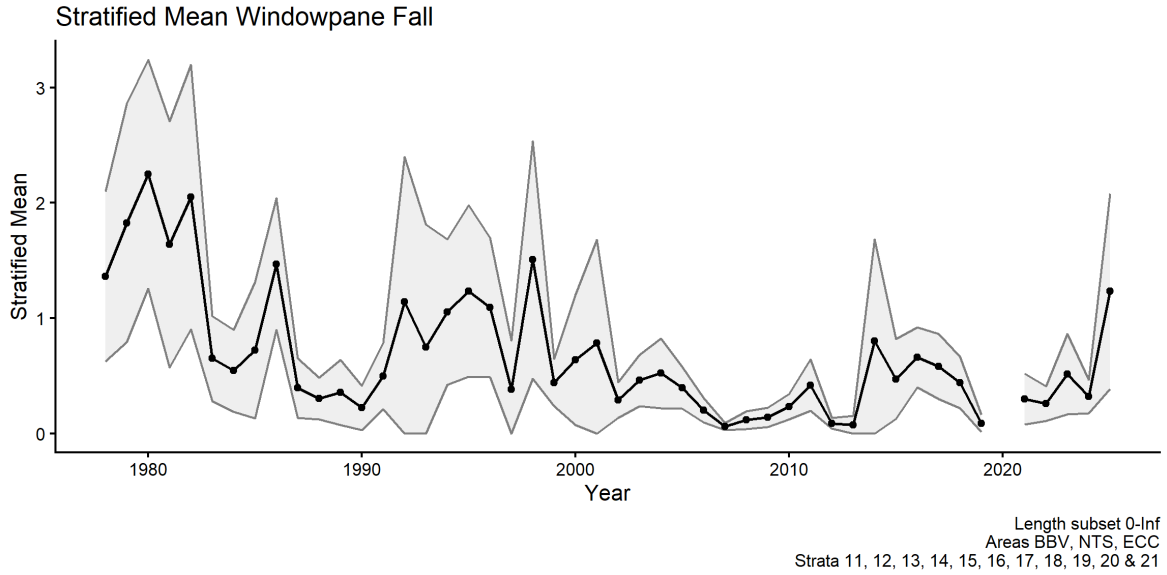
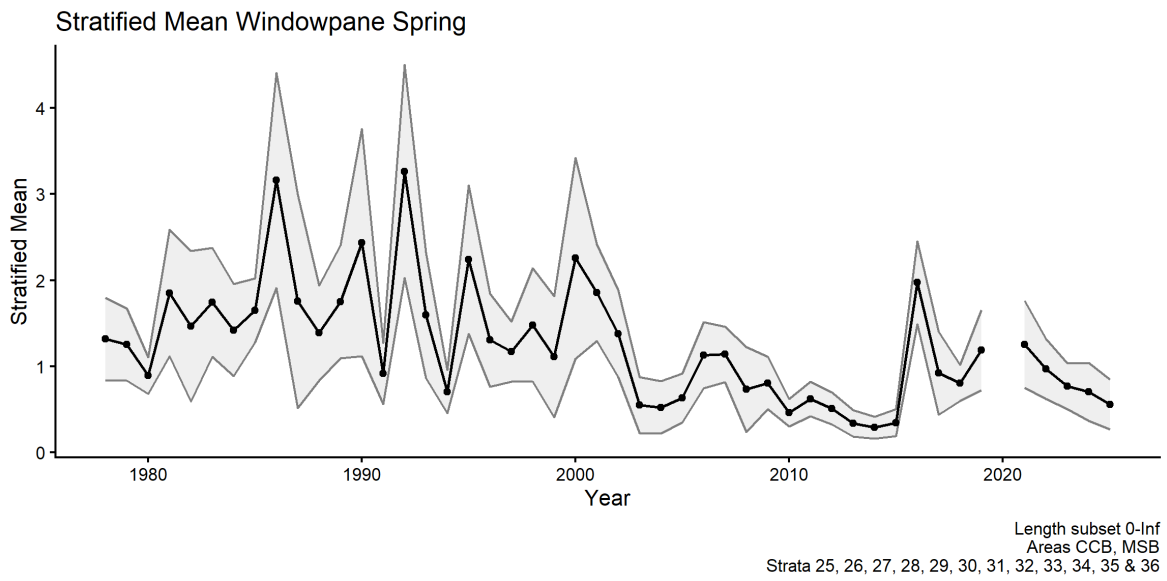


Figure 2. (i & j). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

i.)



j.)

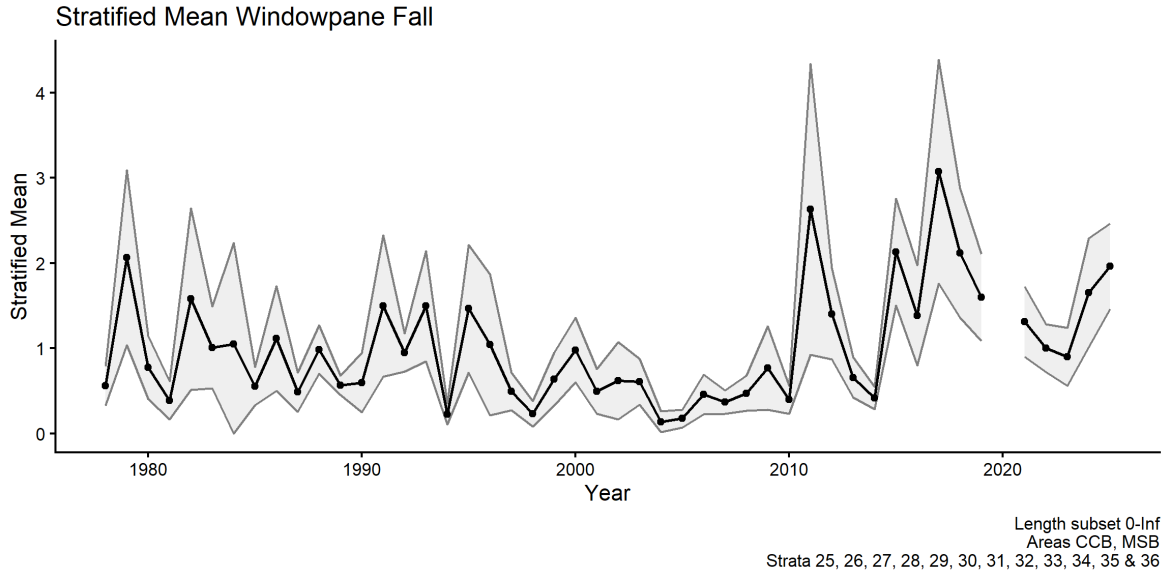
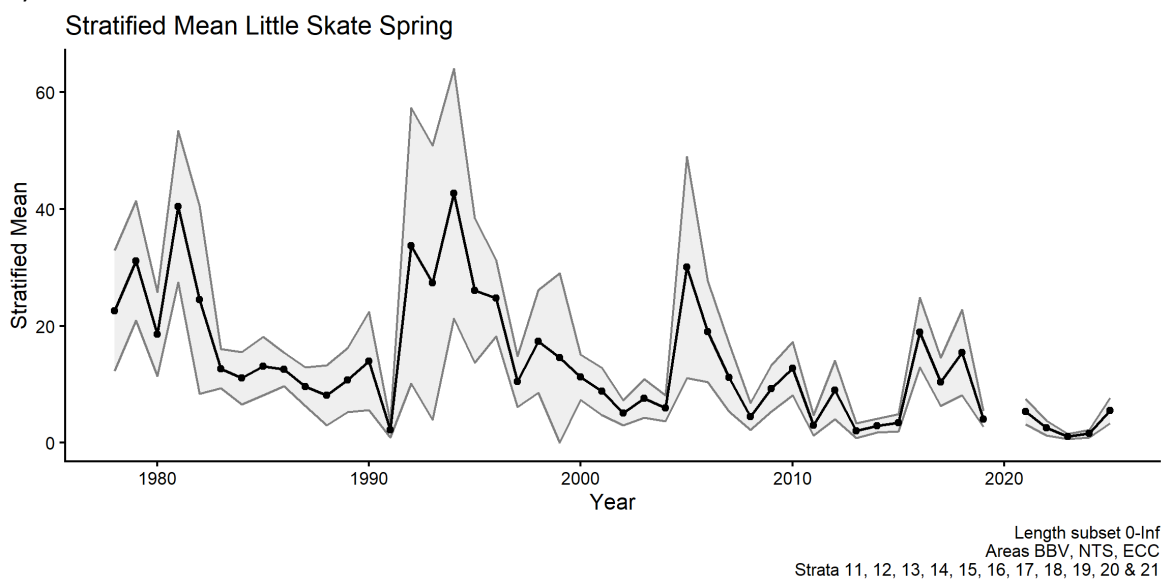


Figure 2. (k & l). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

k.)



l.)

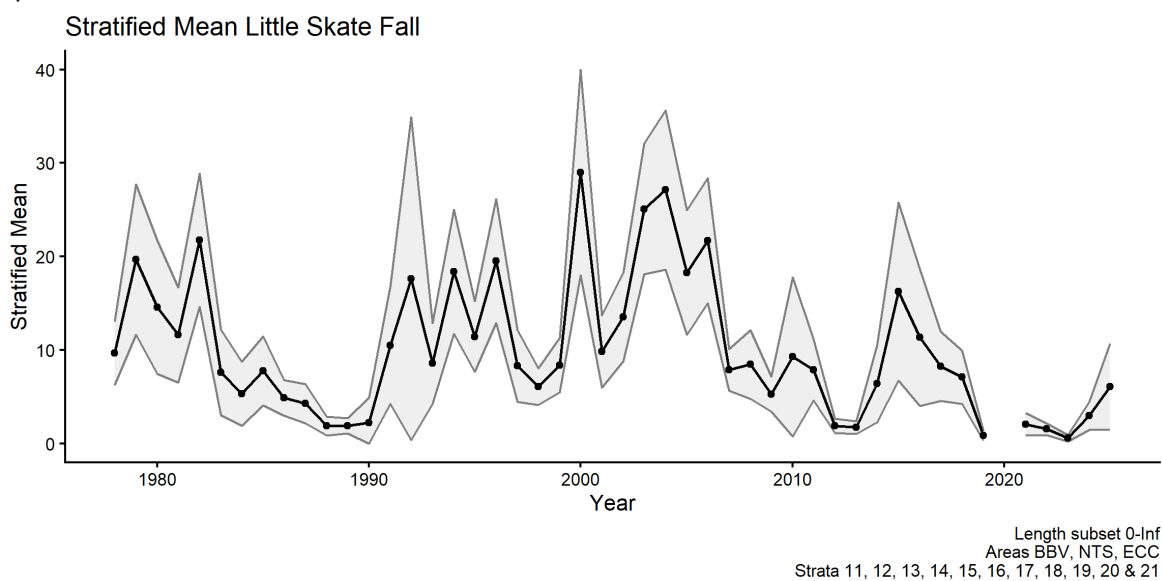
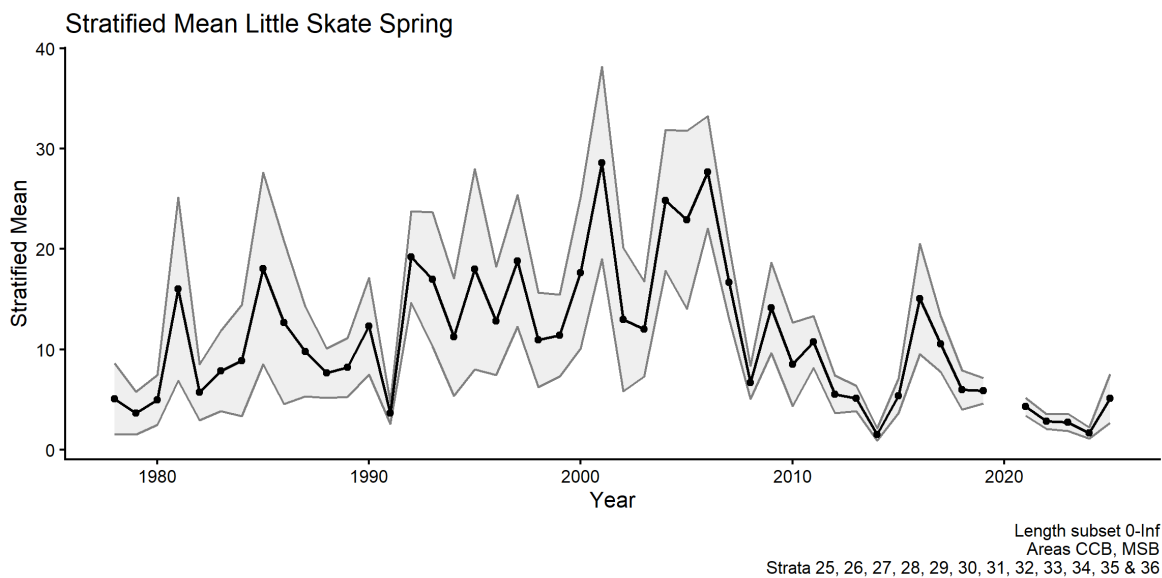


Figure 2. (m & n). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

m.)



n.)

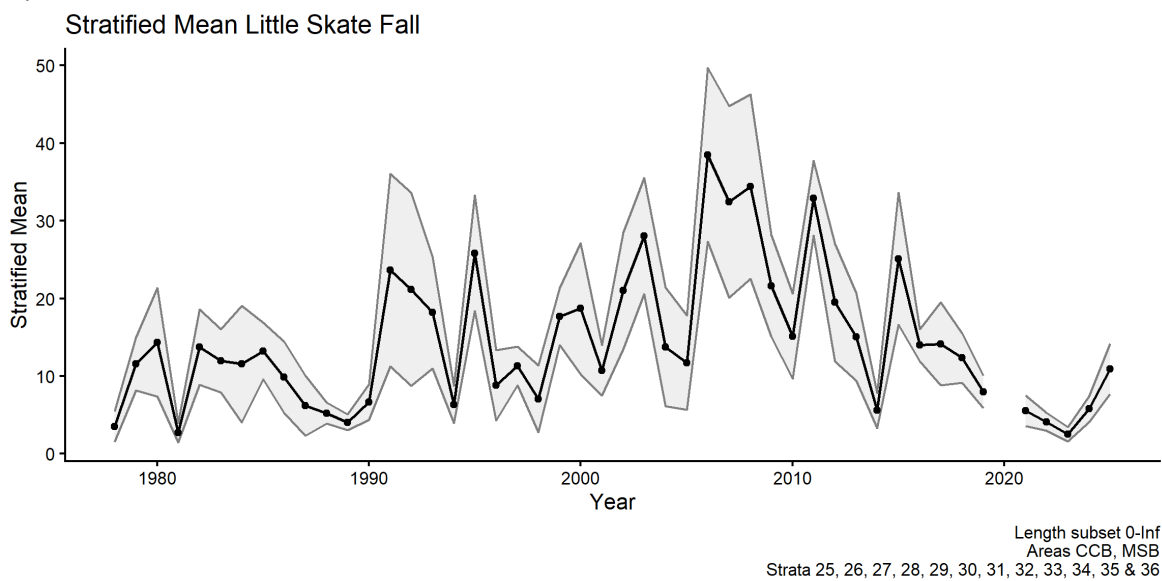
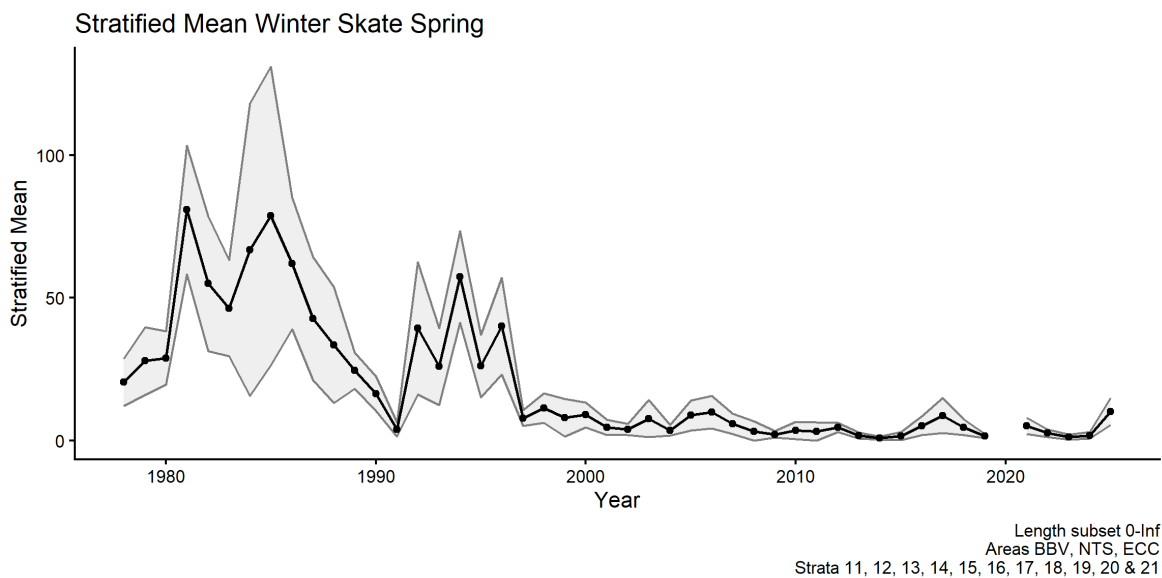


Figure 2. (o & p). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

o.)



p.)

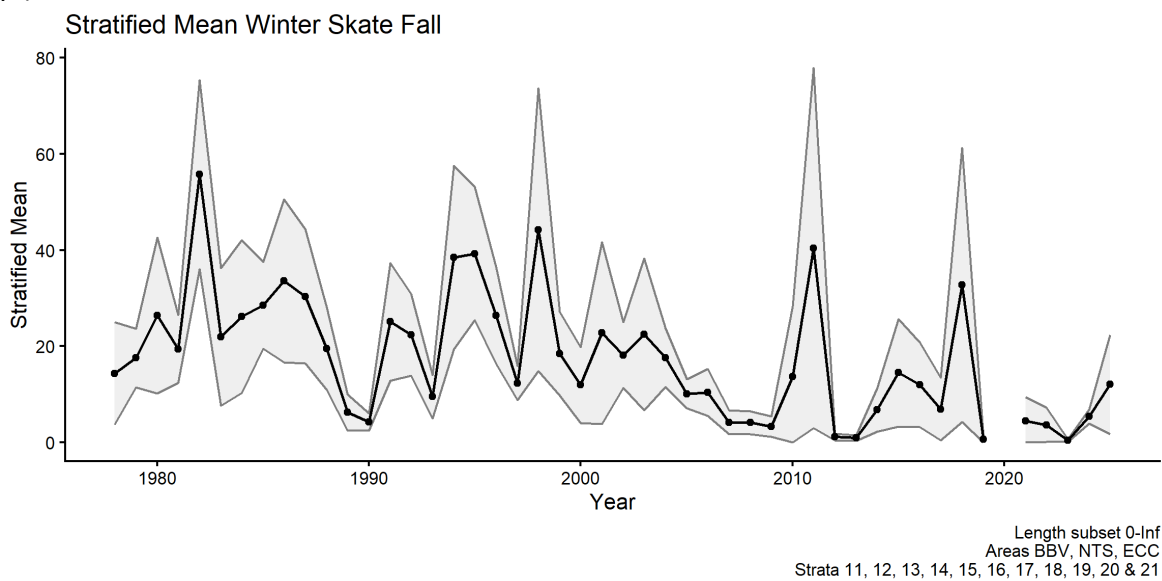
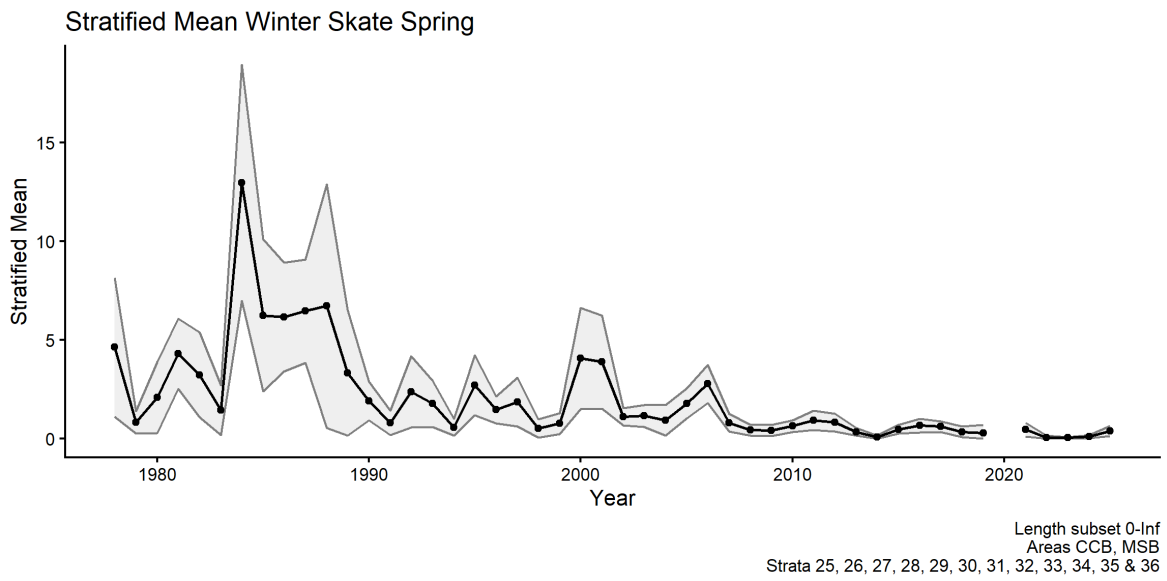


Figure 2. (q & r). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

q.)



r.)

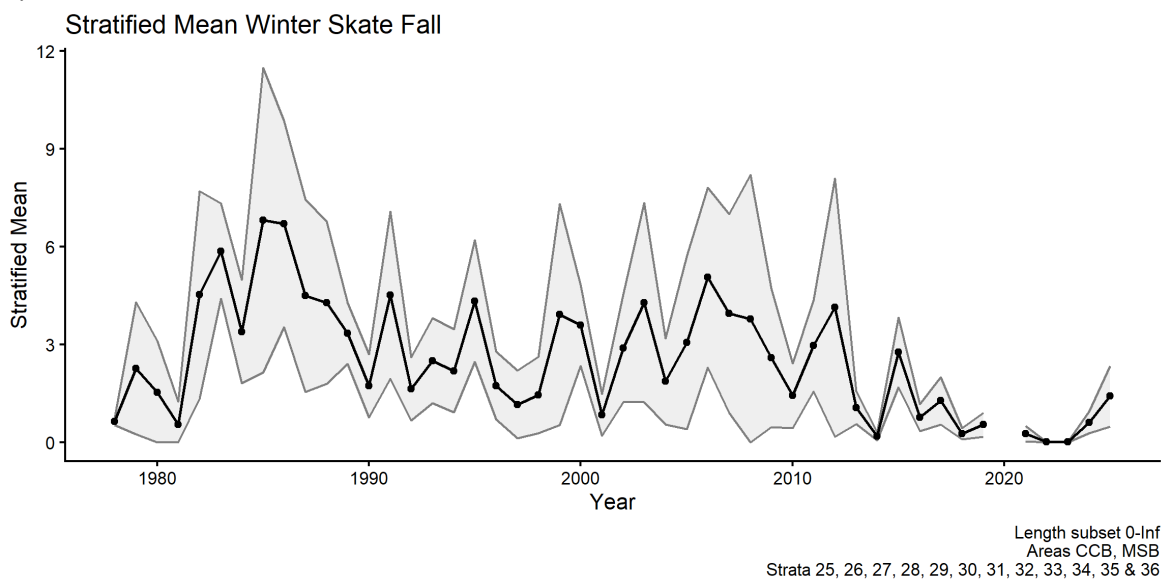
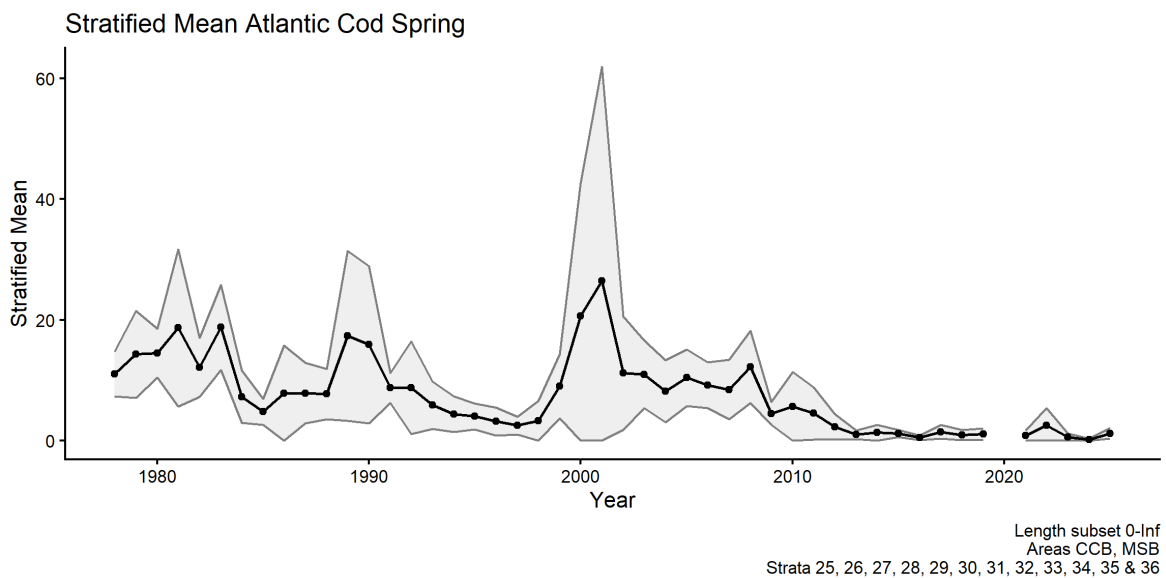


Figure 2. (s & t). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

s.)



t.)

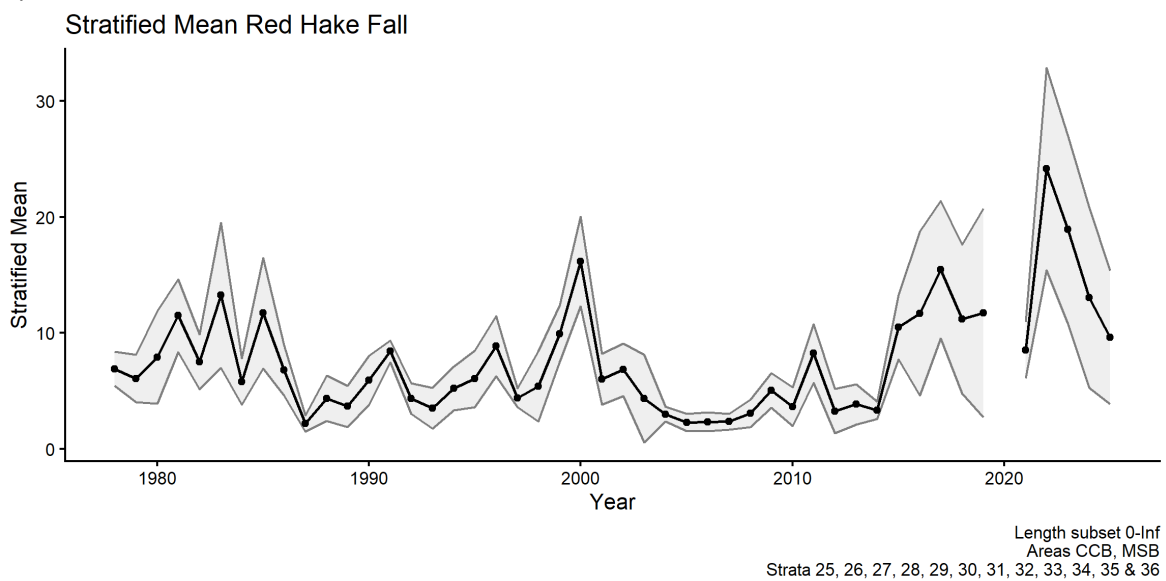
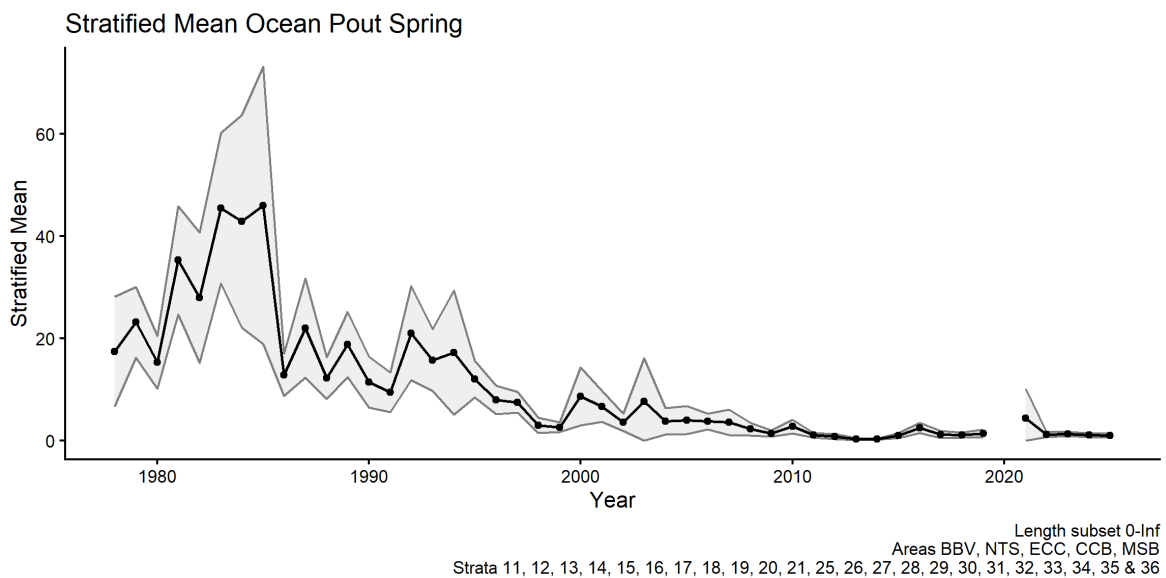


Figure 2. (u & v). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

u.)



v.)

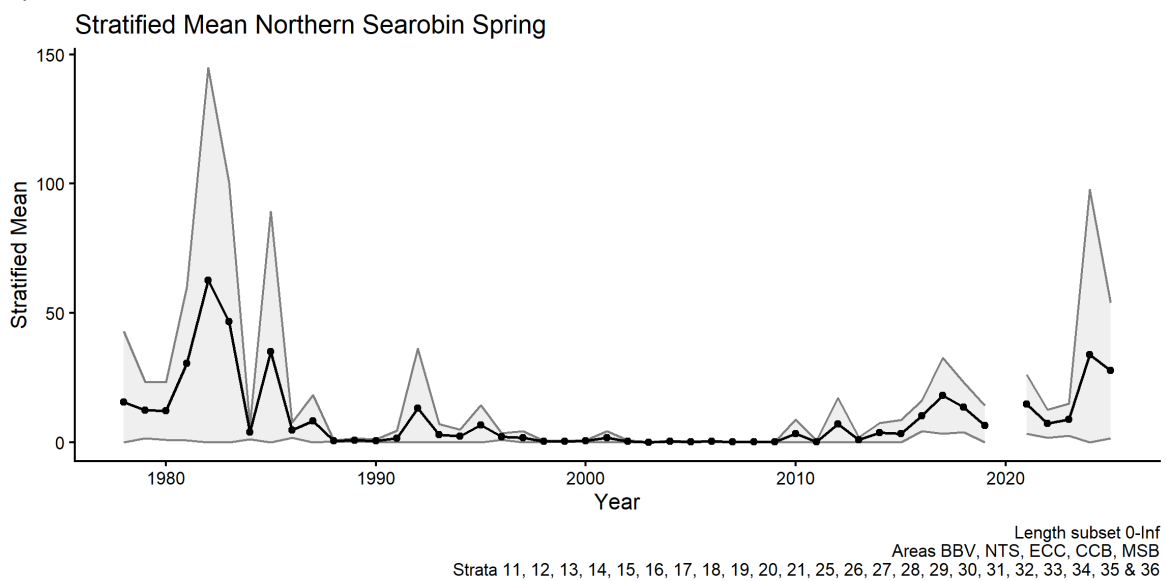
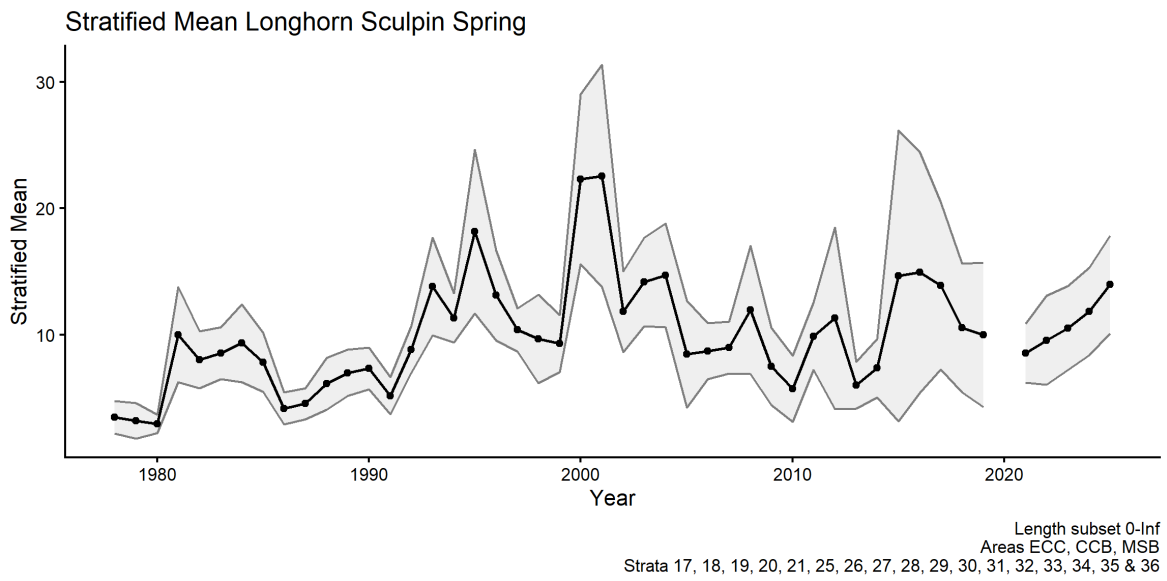


Figure 2. (w & x). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

w.)



x.)

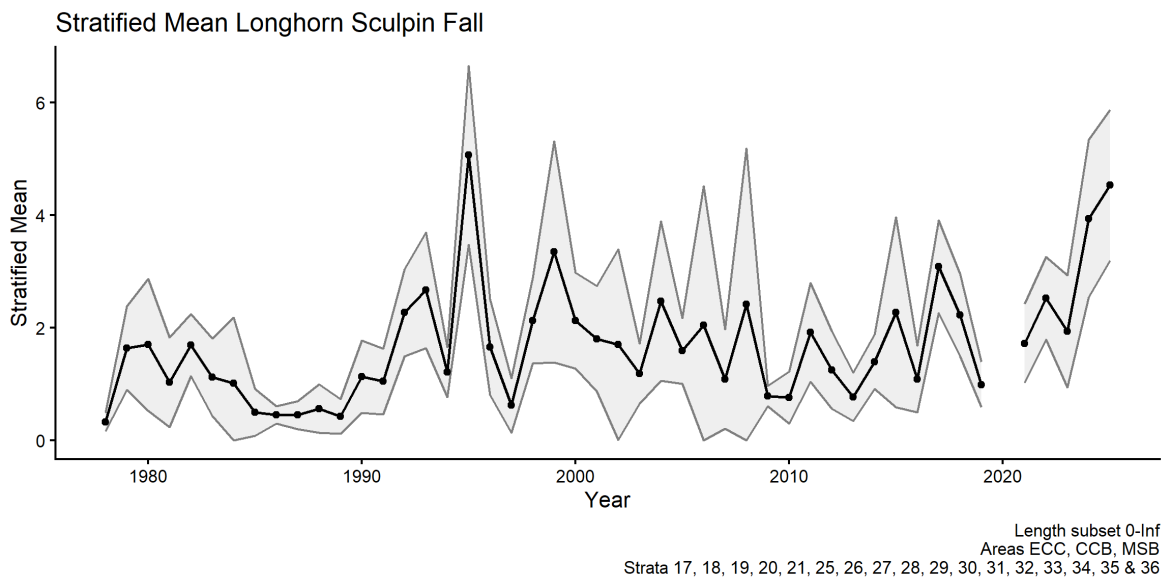
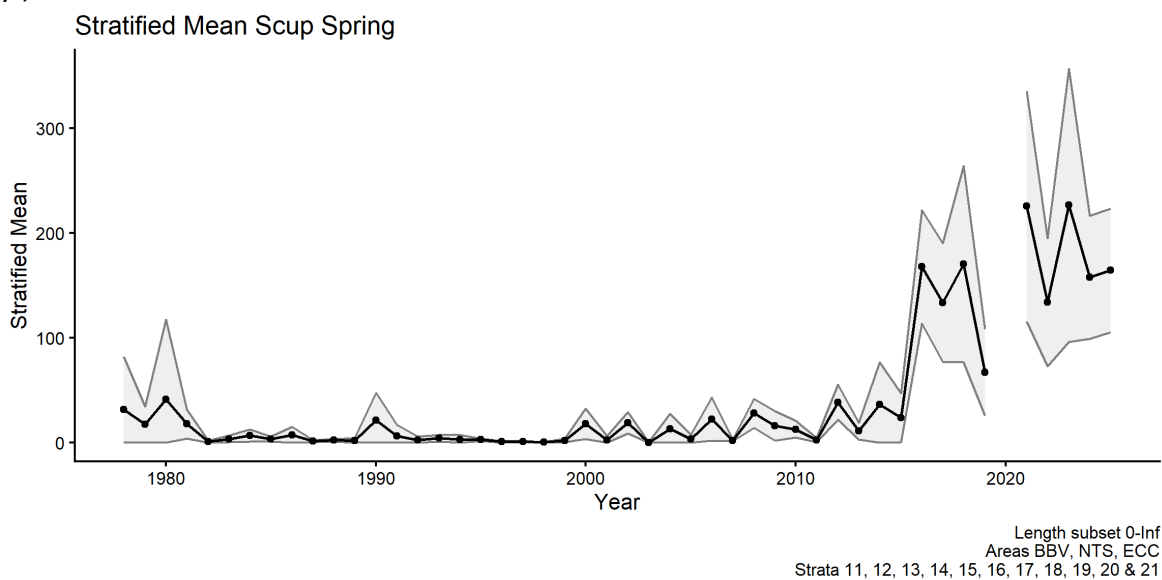


Figure 2. (y & z). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

y.)



z.)

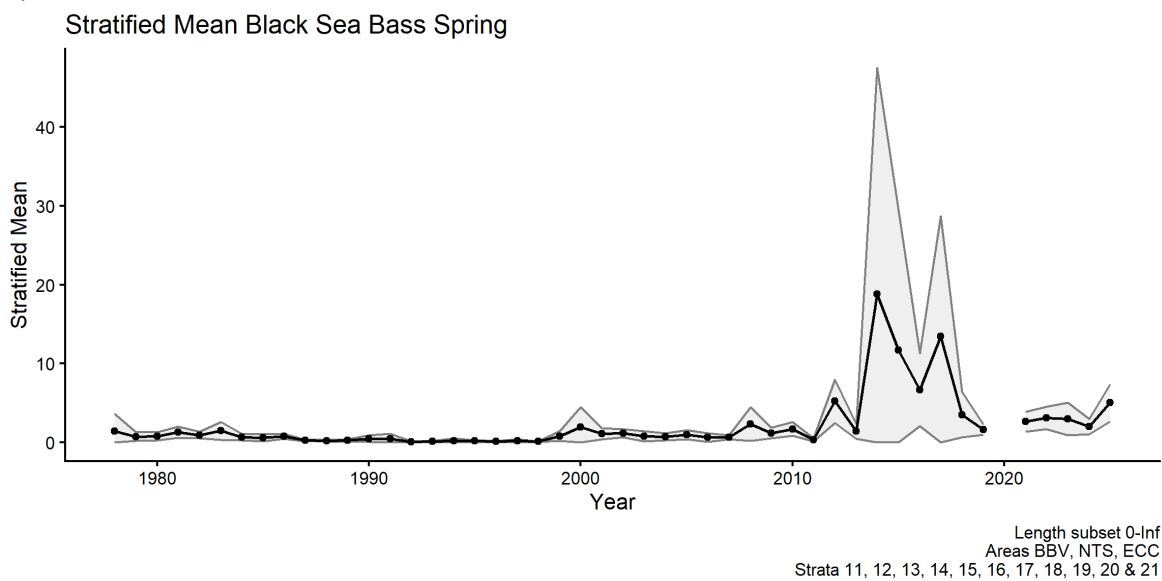
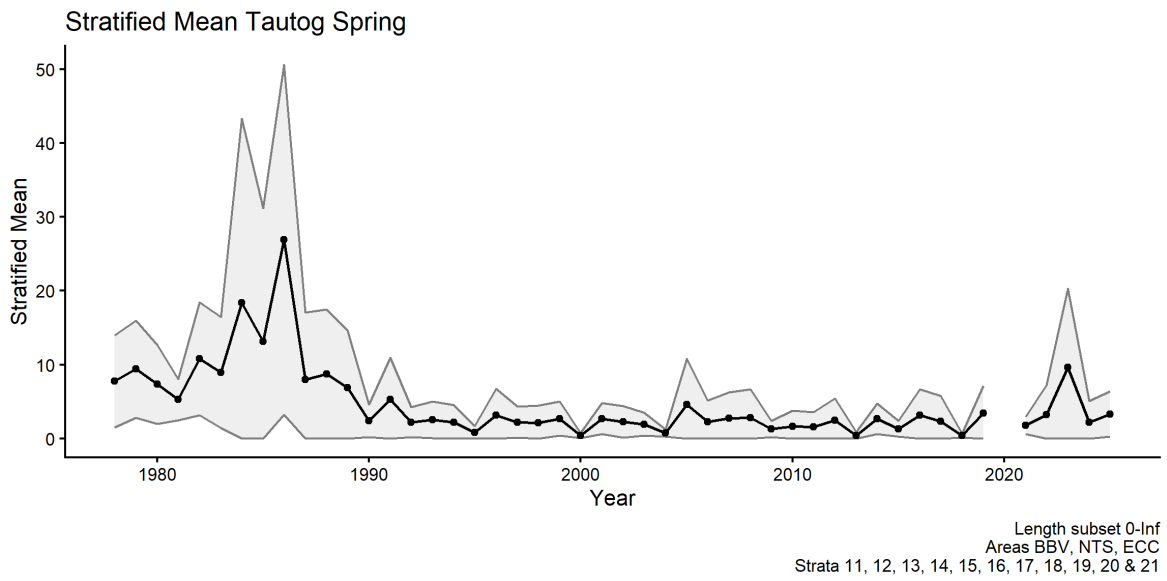


Figure 2. (aa & bb). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

aa.)



bb.)

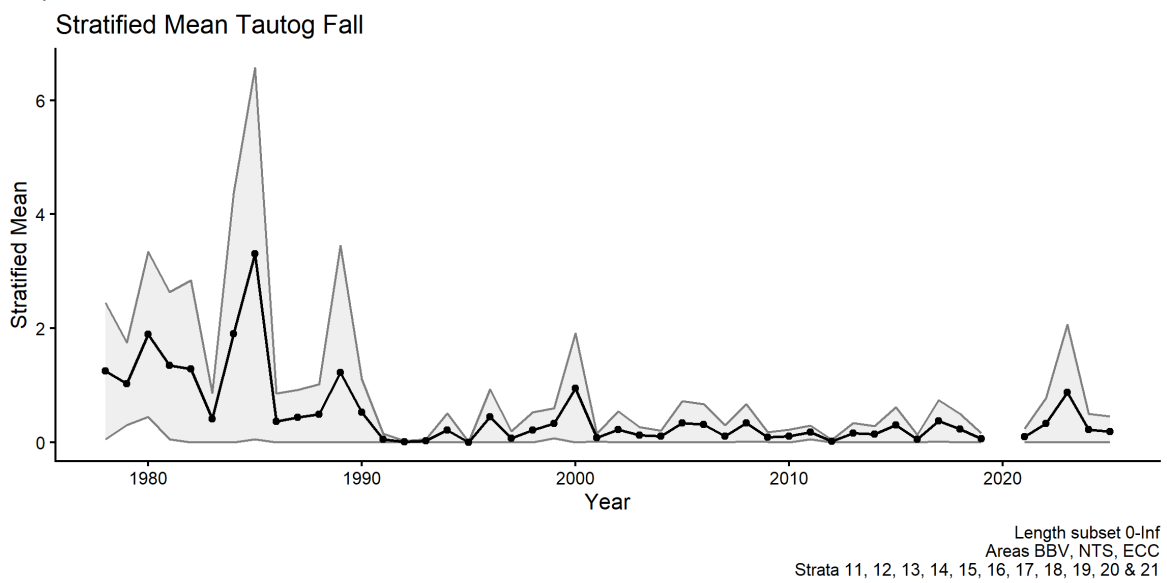
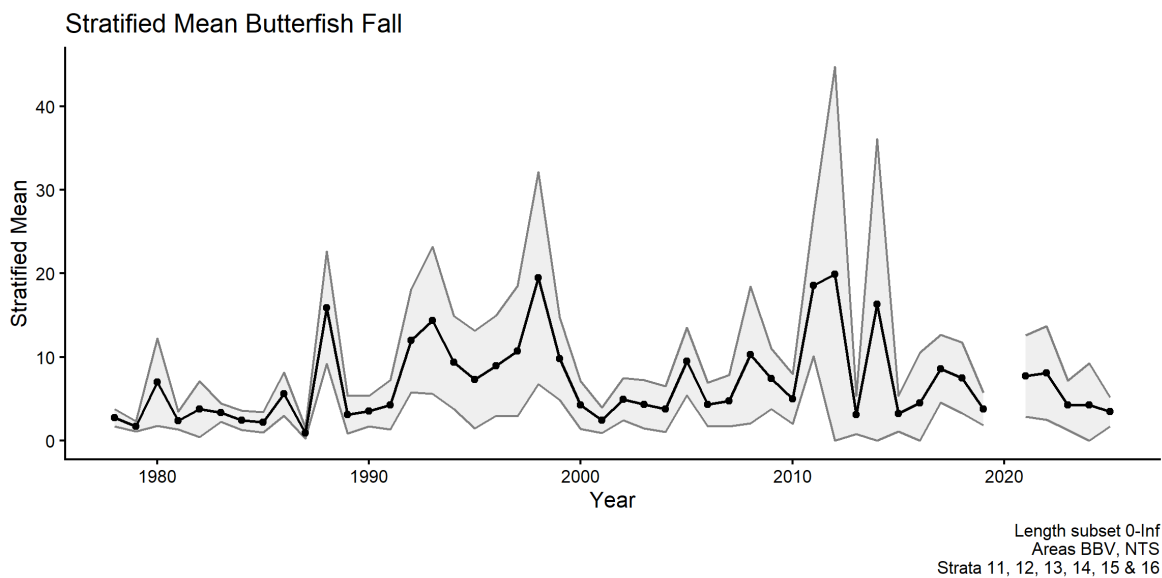


Figure 2. (cc & dd). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

cc.)



dd.)

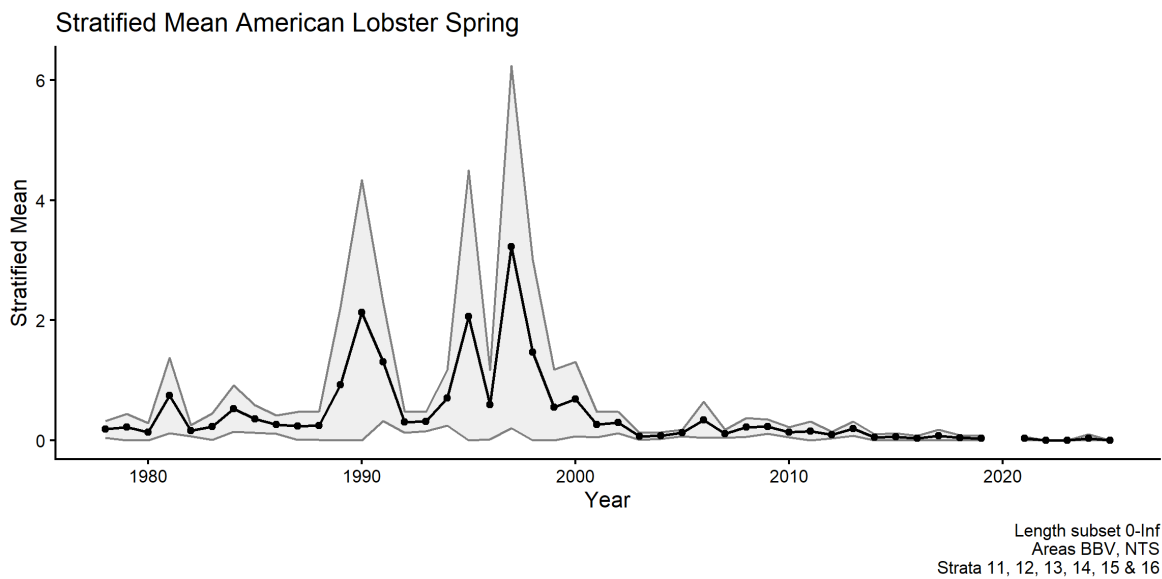
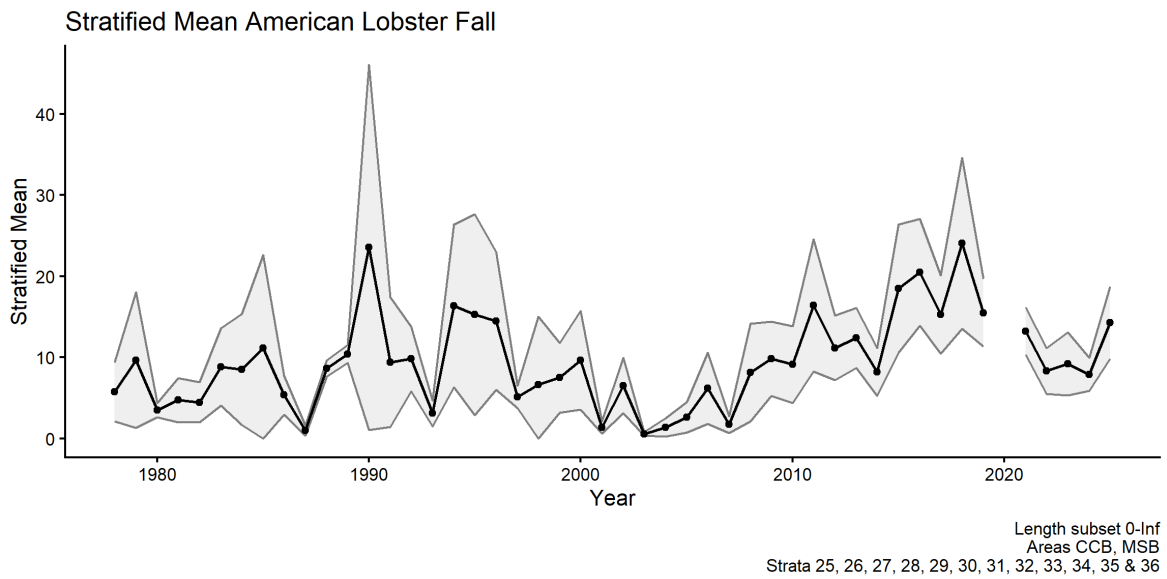


Figure 2. (ee & ff). Stratified mean weight per tow (kg) 1978 – 2025 Massachusetts DMF Trawl survey.

ee.)



ff.)

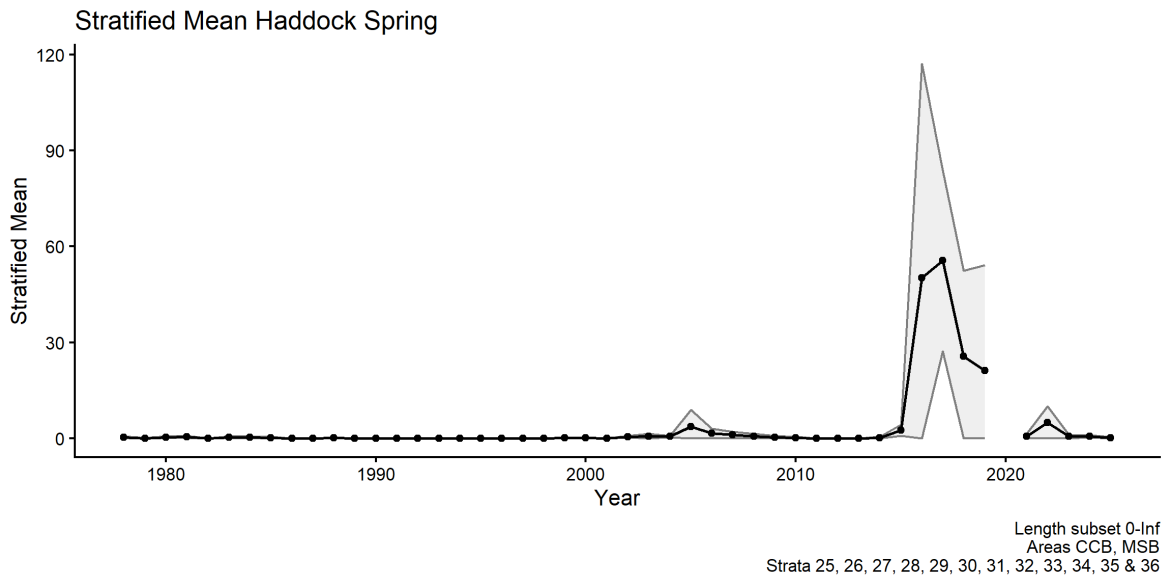
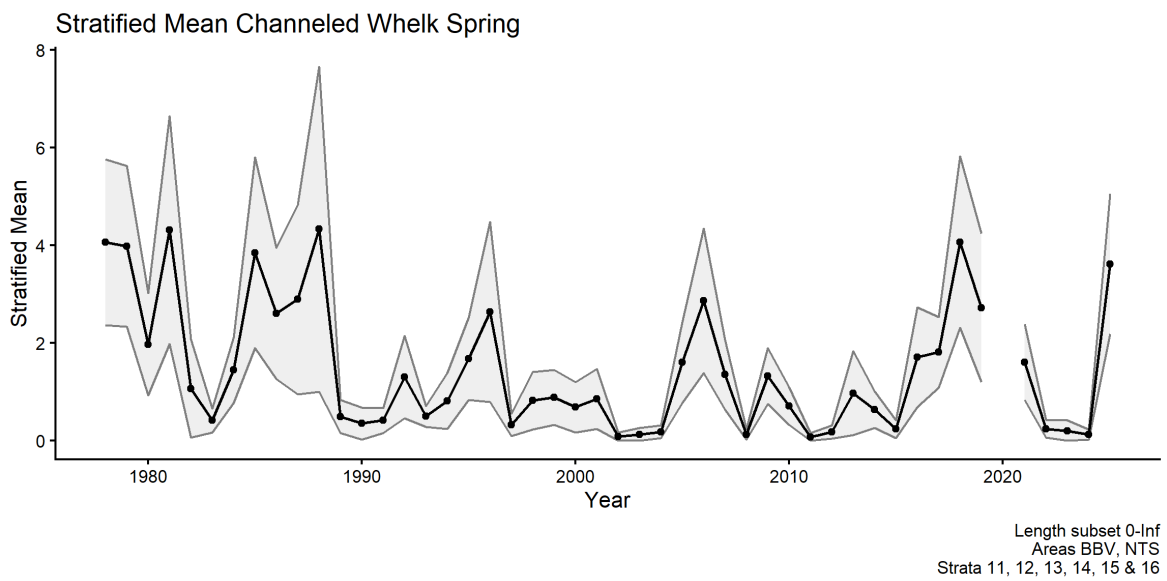


Figure 3. (a & b). Stratified mean number per tow 1978 – 2025 Massachusetts DMF Trawl survey.

a.)



b.)

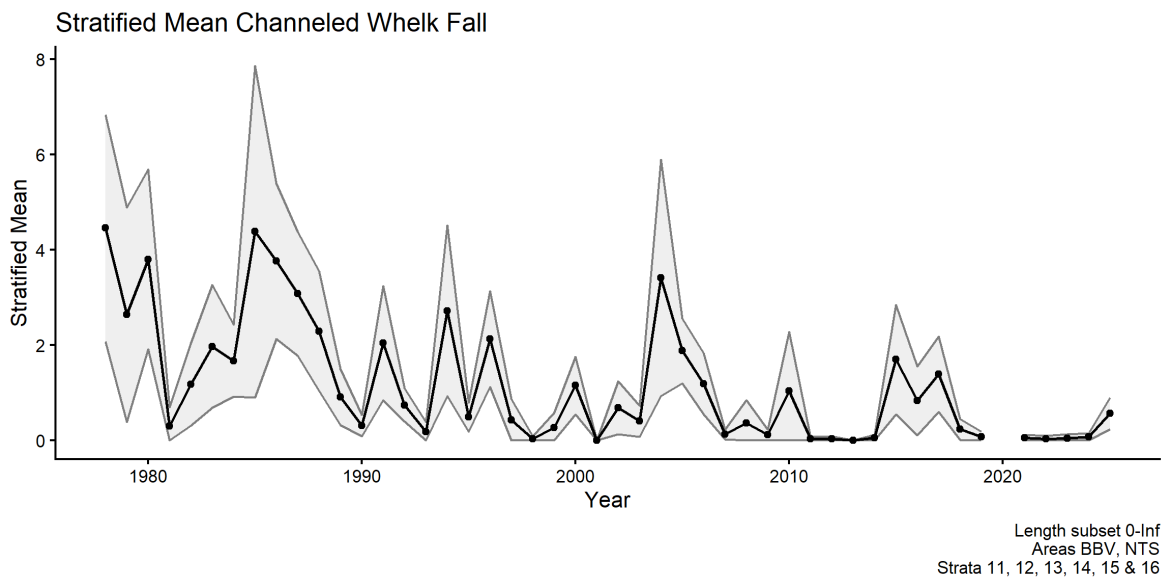
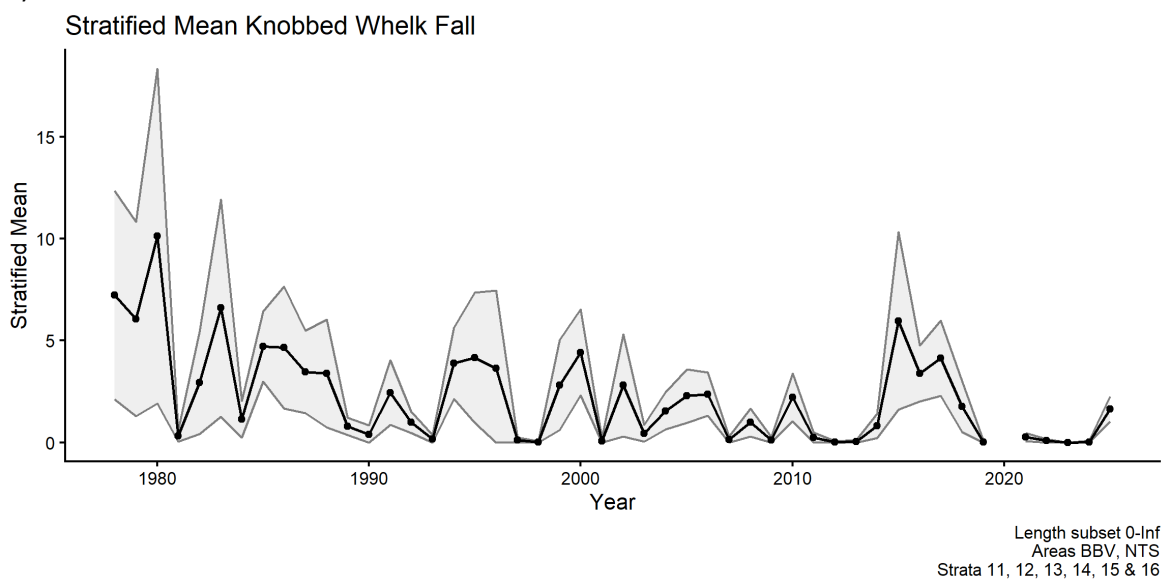


Figure 3. (c & d). Stratified mean number per tow 1978 – 2025 Massachusetts DMF Trawl survey.

c.)



d.)

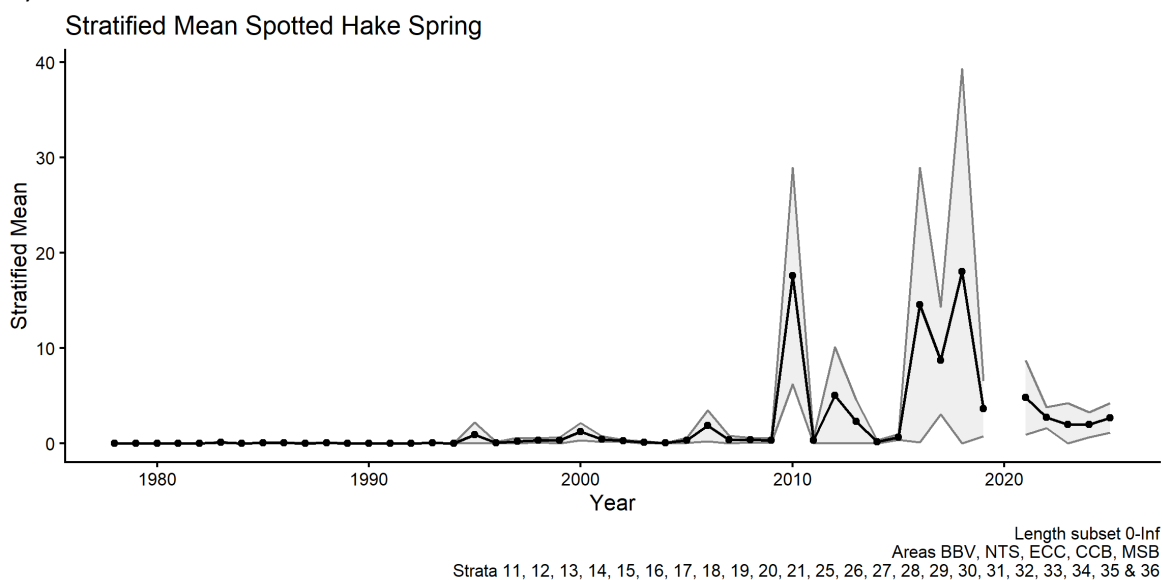
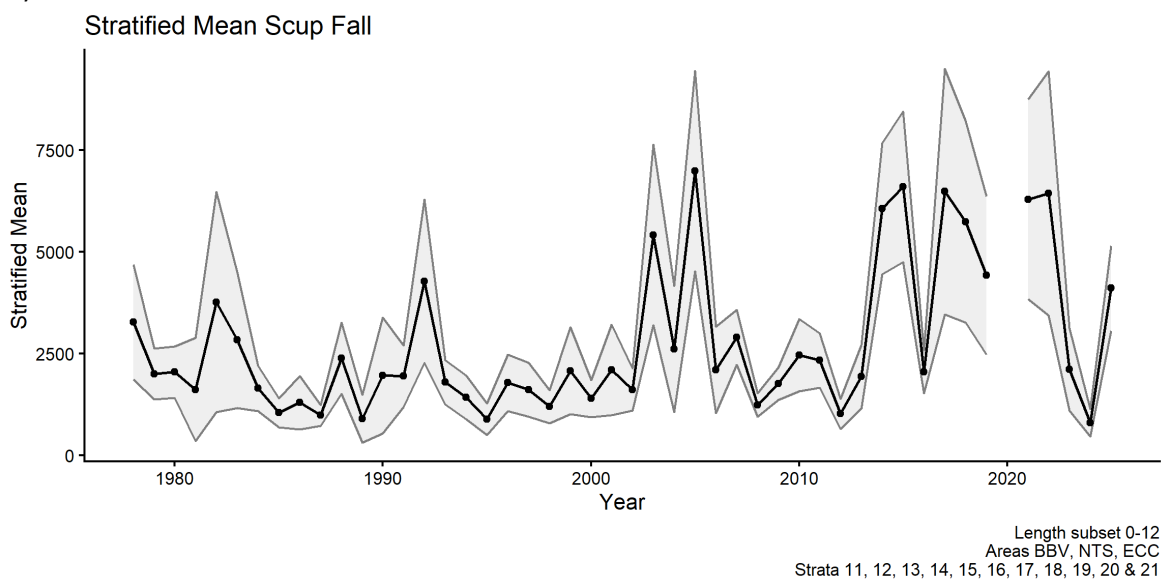
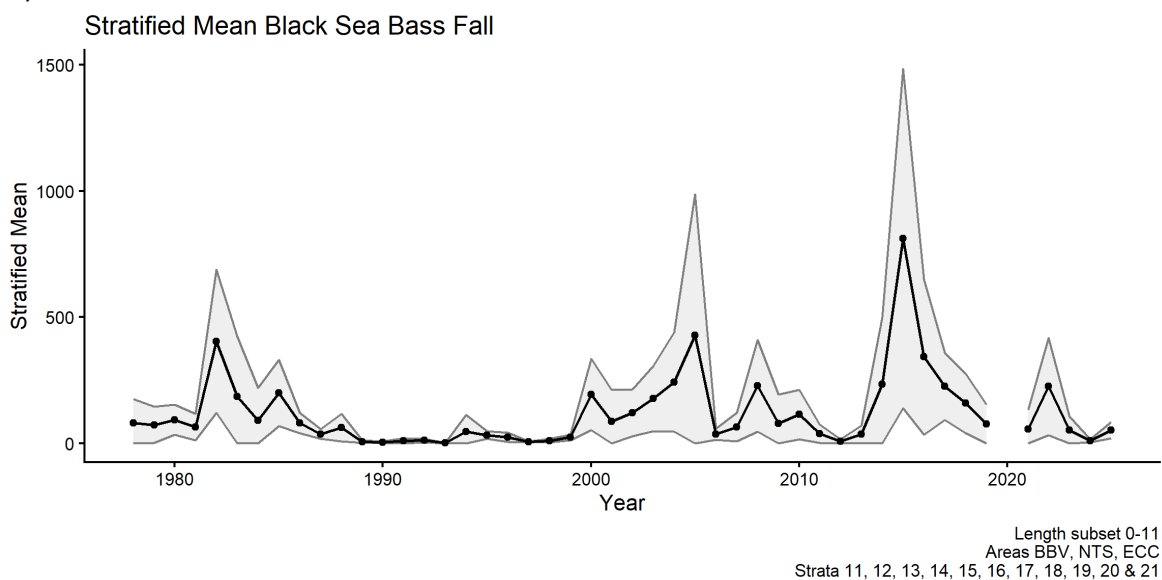


Figure 4. (a & b). Pre-recruit stratified mean number per tow 1978 – 2025 Massachusetts DMF Trawl survey.

a.)



b.)



Appendix B.

Trends in Observed Bottom Temperatures

Massachusetts Bottom Trawl Survey.

1978 – 2025

A timeseries analysis of bottom temperatures recorded during spring and fall bottom trawl surveys is updated to include 2025 observations. No data was collected in 2020, due to cancellations of both spring and fall trawl surveys due to the COVID-19 Pandemic. For a detailed interpretation and description of methods used in data preparation and analysis, refer to the 2006 annual report, (2006 Annual Performance Report, F-56-R, Massachusetts Fishery Resource Assessment, Appendix E).

There is one difference between the methods employed in 2006 and the methods reported here. Temperature observations from non-representative stations (SHG >136) are included in the dataset beginning in Fall 2004 if the tow duration is at least 5 minutes (the minimum time necessary for the temperature logger to acclimate). Some of these observations were omitted from the 2006 analysis. Elimination of temperature observations from non-representative stations had the effect of producing fall temperature data gaps in region 3. In some years there were many tow durations of less than 13 minutes due to frequent large dogfish catches. These tows, though non-representative for generation of abundance and biomass indices for most species, are used when generating spiny dogfish indices. The temperature data collected at these 'dogfish tows' since 2004 is consistent with temperature data collected at all other stations utilizing the Onset Computer Corporation temperature loggers and is therefore included in the following temperature summaries. Please refer to Table 1 and 2 for a listing of data gaps.

Table 1. Strata mean bottom temperatures by year for each stratum of the MDMF spring bottom trawl survey shaded by region (strata 11-14 for region 1, strata 15-16 for region 2, strata 17-21 for region 3, strata 25-30 for region 4, and strata 31-36 for region 5).

Year	11	12	13	14	15	16	17	18	19	20	21	25	26	27	28	29	30	31	32	33	34	35	36
1978	12.1	11.8	13.1	13.0	13.2	11.5	10.3	11.5	10.5	6.5	11.5	11.1	10.7	7.8	7.8	8.2	N/A	11.7	7.8	6.8	7.2	7.9	N/A
1979	13.3	13.1	11.8	11.3	13.3	11.5	12.0	11.9	9.9	7.5	5.0	7.3	7.9	6.7	4.2	4.0	3.9	10.4	8.5	6.4	5.5	4.9	3.5
1980	12.5	11.7	11.8	11.1	12.2	11.1	10.2	11.5	10.1	8.0	7.4	7.8	9.8	8.1	8.0	7.2	7.2	6.7	5.6	5.3	6.5	5.2	4.2
1981	12.4	11.0	10.4	7.5	10.5	10.4	10.5	7.6	7.9	6.5	6.5	7.9	8.2	6.5	6.3	6.6	5.8	8.8	7.6	5.4	5.3	5.4	4.8
1982	11.7	10.5	9.8	5.8	11.4	11.0	10.9	8.9	8.0	6.6	4.6	7.0	5.8	5.6	4.9	4.4	4.4	7.1	6.3	5.1	4.7	4.7	4.3
1983	11.9	11.7	11.6	10.1	12.4	11.2	9.2	9.5	9.0	5.5	6.5	7.2	8.9	7.0	6.2	6.5	5.0	6.0	6.1	6.2	5.3	6.0	5.0
1984	12.1	11.0	10.6	10.1	12.3	11.9	9.3	9.6	9.6	5.2	4.5	7.6	8.1	4.8	4.5	4.1	4.0	7.3	6.6	5.2	5.1	4.9	4.9
1985	12.1	11.1	11.4	10.5	12.1	11.6	9.4	10.6	10.1	7.8	7.0	10.3	8.9	8.0	6.8	5.8	5.0	7.6	7.3	6.2	5.9	4.7	4.5
1986	10.1	10.8	9.7	9.1	10.5	9.9	9.0	9.0	8.3	7.5	5.7	10.0	8.5	7.3	7.5	6.4	5.3	8.1	7.5	6.2	6.0	5.5	5.3
1987	10.7	10.4	10.2	9.5	12.1	11.4	9.2	8.7	8.3	6.4	5.9	9.1	8.1	7.2	6.2	5.1	5.7	7.4	7.3	6.6	6.2	6.2	5.6
1988	10.8	10.4	10.0	9.1	11.5	11.1	8.6	8.4	8.6	6.0	5.5	9.4	8.1	7.2	5.9	4.8	4.4	7.7	6.8	5.8	5.3	4.6	4.1
1989	9.5	9.0	7.1	6.7	10.9	9.5	7.5	7.5	6.6	4.7	3.6	7.4	5.4	4.4	4.3	2.4	1.5	6.1	4.5	3.8	3.0	3.3	2.6
1990	10.4	10.5	9.4	7.6	12.0	11.0	9.9	8.8	9.2	5.9	3.8	9.0	8.0	7.5	4.7	4.0	3.5	6.5	6.6	5.9	4.5	3.7	2.6
1991	14.1	13.0	11.3	9.9	13.8	13.3	11.4	10.9	10.0	7.0	5.2	11.6	11.3	10.2	8.1	6.0	5.0	7.8	5.9	6.2	7.2	6.1	4.7
1992	9.9	9.2	8.6	8.1	11.4	10.3	9.2	8.1	7.9	7.5	6.5	8.7	8.1	8.0	7.0	5.9	5.2	8.4	8.1	6.7	5.4	4.1	3.8
1993	12.6	11.5	11.1	9.9	12.4	11.5	9.7	9.4	8.6	5.0	4.5	8.9	7.9	6.0	5.4	5.0	3.7	7.6	6.1	4.7	4.6	3.7	3.7
1994	10.3	9.9	9.6	9.1	10.3	9.8	9.4	9.4	7.8	6.5	5.7	9.2	8.9	8.3	6.7	6.0	4.7	8.4	7.2	4.7	5.1	4.0	4.3
1995	11.7	11.2	9.9	9.6	10.6	10.0	9.2	8.4	8.5	6.9	6.8	9.0	8.6	8.0	7.6	6.0	4.9	7.9	8.2	6.5	6.2	4.7	4.1
1996	11.6	11.3	10.3	9.8	11.7	11.5	9.4	8.4	8.5	6.4	5.4	7.3	7.4	5.9	5.4	4.6	4.1	6.1	6.3	4.2	4.1	4.0	4.0
1997	10.9	10.1	9.0	7.3	11.4	11.2	9.9	8.9	8.4	6.2	6.1	7.2	7.9	6.6	6.4	5.5	5.3	5.5	5.4	5.2	4.7	4.7	4.7
1998	11.0	11.1	11.0	10.2	10.5	9.6	9.2	9.1	7.7	7.4	6.1	9.3	8.2	7.0	6.8	5.6	5.0	8.5	7.8	6.0	5.0	4.3	4.2
1999	15.0	13.3	12.7	11.7	14.6	13.6	11.3	10.6	10.7	6.2	5.5	11.5	9.6	8.2	6.1	4.8	4.7	9.1	7.3	6.4	5.2	4.9	4.3
2000	12.1	12.0	11.2	10.8	13.3	12.2	11.1	9.9	10.4	7.6	7.2	10.2	9.5	7.4	7.1	6.3	6.5	9.7	10.0	8.1	7.2	6.2	6.0
2001	13.3	11.5	11.2	8.8	12.9	11.6	11.5	11.1	10.2	5.7	4.9	7.9	9.7	6.1	6.0	4.9	4.6	7.6	7.7	5.2	4.7	4.5	4.5
2002	12.2	11.7	11.5	10.8	12.2	12.0	9.6	9.1	9.8	7.5	6.3	9.4	9.1	8.0	7.5	6.3	5.6	7.9	8.0	6.7	6.2	5.7	5.5
2003	11.5	11.3	11.2	9.7	11.6	10.8	8.4	8.5	9.1	4.7	4.2	7.9	7.7	5.8	5.2	4.1	3.8	7.2	6.5	5.4	4.2	4.0	3.9
2004	13.3	12.1	11.7	9.3	12.9	11.8	9.9	9.0	8.3	4.5	3.9	7.6	7.6	4.7	4.1	3.6	3.5	6.0	5.1	3.8	3.6	3.4	3.2
2005	11.6	11.2	10.4	9.8	9.3	9.2	9.1	8.2	7.4	5.3	5.0	7.9	7.6	6.6	6.0	5.1	4.6	7.2	7.3	6.1	5.3	5.0	4.4
2006	11.4	10.5	9.9	9.2	12.1	10.9	11.0	10.7	10.4	7.5	6.4	10.1	9.6	8.5	7.3	6.8	6.5	8.0	8.4	8.1	7.0	6.7	6.2
2007	12.8	11.6	10.7	9.2	12.2	11.6	10.5	10.2	8.8	5.3	4.9	9.9	10.1	6.2	4.8	4.4	4.3	6.3	6.3	4.2	4.1	4.2	4.1
2008	11.3	13.1	10.2	10.0	10.5	10.2	9.2	9.0	7.8	5.3	4.6	8.7	7.3	5.5	4.7	4.6	3.9	7.2	7.5	4.8	4.0	4.0	3.8
2009	12.6	11.8	11.1	8.8	13.1	12.4	9.5	9.5	9.2	4.4	4.2	9.2	8.1	6.3	4.7	3.8	3.6	8.2	7.7	5.5	4.3	4.1	3.6
2010	11.6	11.7	11.1	10.0	12.7	12.0	10.1	9.4	9.3	7.5	4.8	11.0	10.8	8.5	5.2	4.5	4.5	7.8	7.4	5.3	4.7	4.6	4.6

Table 1 continued.

Year	11	12	13	14	15	16	17	18	19	20	21	25	26	27	28	29	30	31	32	33	34	35	36
2011	11.6	11.2	10.6	9.9	11.3	10.6	9.6	9.6	9.2	7.1	7.0	9.5	8.2	6.7	8.1	6.4	4.8	7.9	7.4	5.0	4.7	4.5	4.4
2012	15.4	13.5	13.2	11.8	14.4	13.8	11.4	11.2	11.6	8.3	7.2	11.2	9.9	8.5	7.3	6.6	6.3	8.9	8.4	7.5	6.6	6.2	5.7
2013	13.5	12.7	11.2	10.3	13.5	12.8	11.3	11.8	11.0	7.4	6.6	9.8	10.1	8.0	7.3	6.1	5.5	9.4	8.6	7.6	6.5	5.9	5.2
2014	13.4	12.1	11.0	10.9	13.2	11.8	9.9	9.5	8.7	5.1	4.2	9.3	8.3	7.4	6.0	4.1	3.4	6.7	6.6	5.6	4.7	4.1	3.9
2015	13.4	12.2	10.8	10.1	13.3	12.2	9.5	9.7	8.9	5.8	4.9	10.5	9.3	6.8	6.0	3.7	3.6	6.4	6.9	5.1	4.5	4.2	4.1
2016	13.0	12.1	10.5	9.7	13.8	13.0	10.3	10.5	11.4	8.7	6.8	9.9	9.6	9.6	9.4	6.6	6.0	8.2	8.3	7.1	6.0	5.9	5.5
2017	13.5	13.2	11.9	10.9	13.7	12.8	10.9	10.6	10.1	7.0	6.2	9.9	7.6	6.3	6.3	5.0	4.8	8.1	6.4	5.4	5.0	4.9	4.6
2018	12.2	11.8	11.4	10.7	12.7	11.7	9.9	9.4	9.3	6.9	5.8	9.8	7.6	6.0	5.5	5.1	5.0	8.0	6.7	5.6	5.1	4.9	4.8
2019	11.7	11.3	10.8	9.5	11.2	11.0	10.2	10.0	10.7	6.7	5.8	8.9	7.9	6.9	6.5	5.0	4.7	7.3	7.6	6.0	4.9	4.6	4.5
2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2021	12.7	11.5	10.7	8.0	14.3	13.7	10.3	10.2	9.8	8.4	6.5	10.5	9.8	9.8	8.2	7.2	5.9	8.2	8.3	7.4	6.8	6.4	6.2
2022	13.4	12.5	12.1	11.6	12.8	12.4	11.1	10.4	11.1	9.7	7.8	9.2	8.7	9.2	8.7	8.2	8.0	8.5	8.8	7.6	7.3	6.8	5.7
2023	14.1	13.2	12.5	10.9	14.7	13.5	11.3	11.8	11.7	8.8	6.5	11.2	9.9	9.0	7.7	6.5	6.3	8.6	9.5	7.6	6.8	6.5	6.0
2024	12.6	12.1	11.6	10.1	12.6	11.8	10.1	9.7	9.0	6.6	6.3	8.5	7.0	6.3	5.9	5.7	5.3	9.8	8.1	6.1	5.5	5.2	5.2
2025	13.5	13.7	12.6	11.9	15.3	13.8	11.0	10.6	10.2	6.4	5.1	9.6	8.9	7.6	5.5	5.4	4.6	8.8	8.5	7.4	5.2	4.5	4.3
Med	12.1	11.6	11.0	9.9	12.3	11.5	9.9	9.5	9.2	6.6	5.8	9.2	8.3	7.2	6.2	5.4	4.8	7.9	7.4	6.0	5.2	4.7	4.4
Mn	12.2	11.6	10.9	9.8	12.4	11.6	10.0	9.7	9.3	6.6	5.8	9.2	8.6	7.2	6.3	5.4	4.8	7.8	7.3	5.9	5.4	5.0	4.5
Max	15.4	13.7	13.2	13.0	15.3	13.8	12.0	11.9	11.7	9.7	11.5	11.6	11.3	10.2	9.4	8.2	8.0	11.7	10.0	8.1	7.3	7.9	6.2
Min	9.5	9.0	7.1	5.8	9.3	9.2	7.5	7.5	6.6	4.4	3.6	7.0	5.4	4.4	4.1	2.4	1.5	5.5	4.5	3.8	3.0	3.3	2.6

Table 2. Strata mean bottom temperatures by year for each stratum of the MDMF fall bottom trawl survey shaded by region (strata 11-14 for region 1, strata 15-16 for region 2, strata 17-21 for region 3, strata 25-30 for region 4, and strata 31-36 for region 5).

Year	11	12	13	14	15	16	17	18	19	20	21	25	26	27	28	29	30	31	32	33	34	35	36
1978	16.0	16.3	14.7	14.5	16.1	16.5	13.0	13.7	12.6	N/A	7.8	16.5	12.0	9.4	9.6	8.2	7.0	13.7	13.6	9.2	9.5	8.1	6.5
1979	16.7	16.5	15.8	16.0	16.9	16.1	13.6	14.7	14.2	10.2	9.7	11.3	12.3	8.1	8.9	7.9	8.8	11.7	10.0	9.1	8.8	8.8	8.2
1980	18.1	18.5	17.4	16.5	19.9	19.8	15.5	15.1	13.7	8.4	10.6	18.7	12.9	9.6	9.2	8.6	8.8	12.3	10.5	10.9	9.2	9.1	8.4
1981	19.2	18.4	16.8	16.6	19.6	19.1	16.2	16.4	15.5	11.0	10.2	15.3	13.7	13.5	12.9	11.9	9.9	13.4	13.1	12.2	12.0	11.8	9.6
1982	17.3	17.4	16.9	15.4	18.3	18.3	15.9	14.7	12.6	10.4	7.7	16.1	12.3	9.2	7.8	7.5	7.8	13.0	12.5	9.4	7.5	7.7	7.1
1983	20.3	19.5	17.8	16.7	20.9	20.5	16.0	16.6	14.1	9.5	8.5	15.0	14.9	10.8	9.2	9.0	8.3	N/A	N/A	N/A	N/A	N/A	N/A
1984	18.6	18.5	17.2	14.7	18.6	18.6	15.5	15.5	13.9	8.7	7.3	15.4	13.0	10.0	8.8	6.9	6.4	10.0	9.1	7.5	7.5	7.5	7.4
1985	19.3	18.8	18.5	16.5	19.1	19.0	16.9	15.4	15.6	13.6	9.1	16.4	14.6	13.6	11.6	9.8	8.2	16.2	14.4	13.8	10.4	9.2	8.1
1986	16.9	17.8	16.0	15.5	17.3	17.4	15.0	13.3	14.0	12.3	8.5	17.2	13.1	10.6	9.7	9.0	8.4	11.4	11.0	10.2	9.9	8.9	7.8
1987	16.4	16.7	16.7	16.3	19.2	18.7	13.5	13.1	12.9	7.0	6.1	12.7	7.8	6.4	5.4	5.0	5.1	N/A	8.6	6.4	6.2	5.6	4.9
1988	16.0	16.2	15.5	14.3	16.1	16.7	13.0	12.7	12.9	7.3	5.7	15.1	11.0	9.6	8.1	6.6	5.9	N/A	10.7	10.1	8.5	6.9	6.4
1989	19.3	18.9	17.2	14.9	19.0	18.3	15.7	16.7	11.9	5.6	4.5	12.0	8.9	8.1	7.5	6.8	5.1	13.0	11.2	9.6	8.5	7.7	6.8
1990	19.0	19.0	18.4	17.5	20.5	20.3	17.3	16.7	16.4	11.5	9.5	17.9	16.3	14.2	10.3	9.1	7.2	14.6	11.6	10.9	10.5	9.1	7.8
1991	19.6	19.2	18.6	18.1	19.5	19.7	17.2	16.8	16.1	13.7	10.7	16.4	16.2	13.8	13.3	10.5	9.0	16.6	N/A	12.1	10.2	8.9	8.5
1992	18.2	18.0	17.6	16.5	19.6	19.4	15.3	12.8	13.2	7.7	6.5	14.1	12.0	8.7	7.7	6.7	6.2	11.7	10.0	9.4	8.0	6.8	6.2
1993	17.1	17.5	16.9	16.2	18.1	19.4	13.9	16.6	14.2	8.4	7.0	13.6	12.4	8.8	8.3	7.7	6.9	12.6	11.0	9.0	8.8	8.0	6.9
1994	18.2	18.1	17.2	16.6	18.8	18.9	16.6	16.3	15.9	14.1	12.6	16.4	16.6	15.5	14.8	10.6	9.7	15.8	15.2	13.4	12.4	10.1	9.8
1995	N/A	N/A	N/A	N/A	19.2	19.4	13.7	11.7	10.7	8.7	8.3	12.8	11.7	10.4	9.8	8.8	9.2	14.9	13.0	10.3	9.3	8.6	8.5
1996	18.8	16.8	17.6	16.5	18.2	18.6	16.2	17.0	15.3	10.2	8.2	16.6	15.4	13.5	13.0	9.4	8.6	16.5	16.2	12.8	10.0	8.3	8.0
1997	18.4	18.6	17.5	17.7	20.2	19.7	16.4	17.2	14.3	9.3	8.3	17.4	16.3	11.4	9.3	8.9	8.1	16.5	15.4	13.3	9.8	8.2	8.3
1998	18.7	18.1	16.6	15.2	19.0	19.4	15.4	14.9	13.8	6.3	6.5	14.3	10.7	9.4	8.8	6.4	5.7	13.9	10.8	8.4	7.9	6.8	N/A
1999	20.3	19.8	19.3	18.2	19.9	19.9	18.1	16.0	14.9	9.2	7.7	16.2	12.2	10.2	9.5	8.4	7.8	14.6	11.8	10.4	9.7	8.6	8.7
2000	18.9	18.7	17.0	16.2	20.4	20.0	18.0	17.3	16.6	10.4	9.4	18.5	17.7	12.4	10.1	9.2	8.8	16.7	15.1	11.0	10.4	9.7	8.9
2001	19.5	19.3	17.8	16.9	20.7	20.2	15.2	16.2	12.2	7.9	6.5	16.2	10.7	8.7	7.4	6.6	6.4	10.9	8.7	8.5	7.3	6.8	6.9
2002	19.4	19.2	17.0	16.8	20.4	20.3	18.1	16.8	16.5	10.7	9.4	18.8	18.1	14.4	12.6	10.1	8.7	17.9	16.7	12.5	10.2	9.2	8.1
2003	20.2	19.0	18.6	18.0	20.0	19.4	15.8	15.6	14.7	9.7	8.7	15.0	10.9	8.3	7.7	7.5	6.8	14.4	11.6	10.5	8.6	7.3	7.2
2004	17.5	17.4	16.7	15.5	18.0	17.6	14.7	13.2	11.2	7.5	6.7	12.0	9.2	8.4	7.3	6.8	6.1	14.0	12.2	9.1	8.0	7.5	6.3
2005	20.9	20.0	18.1	17.5	20.3	21.2	16.1	15.9	16.6	7.5	6.5	16.2	10.3	7.5	6.7	6.2	5.9	11.6	10.4	8.8	6.9	6.0	5.5
2006	18.9	18.6	17.0	16.5	19.5	19.3	17.0	16.3	15.8	10.1	8.7	16.4	14.1	11.1	10.7	9.1	7.9	17.2	16.4	11.8	10.0	8.4	7.7
2007	18.4	19.0	18.1	15.3	19.9	20.3	16.8	16.3	14.5	8.2	8.7	16.8	12.8	8.8	7.6	6.8	6.1	11.1	10.3	8.7	7.4	6.7	6.6
2008	19.8	20.1	19.1	18.2	20.8	20.2	18.2	16.9	14.3	8.4	7.7	19.8	19.2	12.0	9.4	8.4	7.4	15.4	13.3	10.7	8.9	8.4	7.6
2009	19.0	18.7	17.8	17.6	19.3	19.1	17.2	16.8	17.9	14.6	10.0	17.4	15.8	13.3	12.0	9.5	8.4	16.9	17.2	16.2	11.3	8.9	7.5
2010	18.7	18.5	17.1	16.3	19.6	19.7	17.3	17.0	15.1	10.9	8.9	15.9	15.6	13.5	9.6	8.0	7.7	13.8	11.7	10.5	9.1	8.5	8.0

Table 1 continued.

Year	11	12	13	14	15	16	17	18	19	20	21	25	26	27	28	29	30	31	32	33	34	35	36
2011	19.7	19.8	17.7	16.6	20.7	19.9	17.1	16.2	16.4	13.9	9.0	15.0	13.1	10.3	9.9	9.3	8.5	15.6	15.0	13.5	11.8	9.0	8.0
2012	19.6	20.2	18.8	17.8	20.3	21.3	17.0	17.3	19.4	9.0	8.3	11.8	10.4	9.5	8.9	8.8	8.5	13.0	11.8	10.4	9.6	8.9	8.9
2013	18.2	18.5	17.6	15.7	20.8	20.3	16.5	16.6	15.7	9.5	9.0	15.9	11.2	9.7	9.0	8.6	8.4	14.2	12.5	11.2	9.9	8.8	7.9
2014	20.3	20.4	19.0	17.2	21.2	20.5	17.9	15.6	16.3	8.9	7.8	16.8	12.7	9.0	8.1	7.3	6.9	11.3	11.1	9.1	8.4	7.9	7.3
2015	21.5	20.7	18.9	16.2	20.9	20.1	18.7	16.2	15.9	10.0	9.2	15.7	14.5	10.3	9.7	8.7	7.8	16.9	12.5	11.7	9.7	8.4	7.7
2016	21.1	20.4	18.3	16.8	21.2	21.2	18.2	18.2	18.8	12.5	10.4	19.3	17.7	16.0	13.0	9.9	9.4	18.3	17.7	14.3	10.9	10.1	13.4
2017	19.9	19.2	18.4	16.6	19.4	19.3	16.1	15.2	14.3	9.1	8.2	15.5	16.2	10.0	8.8	7.6	7.2	12.8	10.3	8.7	8.0	7.7	6.9
2018	21.3	20.3	19.9	19.0	21.7	21.2	17.9	16.5	16.6	11.0	10.4	18.7	14.8	11.3	11.0	10.3	10.0	16.0	14.7	12.1	11.2	10.8	9.2
2019	20.5	19.9	18.0	17.0	18.7	19.5	18.1	18.4	16.8	11.3	10.0	17.3	14.0	9.6	8.8	8.1	8.1	15.7	15.6	12.9	10.2	8.3	N/A
2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2021	21.6	21.4	20.5	19.3	22.6	22.1	18.8	18.6	16.3	10.7	10.3	18.7	18.9	13.0	11.8	10.5	9.6	14.7	12.3	11.6	11.0	10.0	9.8
2022	21.0	20.9	19.7	18.4	21.3	21.6	18.9	19.1	17.5	12.2	11.0	14.6	12.3	11.7	10.3	9.4	9.4	17.9	17.1	14.3	11.8	10.5	9.1
2023	19.4	19.6	17.7	15.0	20.2	20.4	17.1	16.2	15.5	9.9	9.2	17.2	12.8	10.9	9.8	9.2	8.8	15.7	12.6	11.2	10.6	9.5	8.6
2024	19.8	19.4	18.1	16.6	17.9	17.9	16.6	16.5	14.8	12.2	10.4	16.7	13.7	14.9	11.9	9.2	8.9	12.8	11.3	10.3	9.1	8.5	7.2
2025	20.5	20.2	19.6	19.2	20.5	20.4	16.6	17.1	14.5	8.8	7.6	16.3	13.1	9.7	8.7	8.0	7.3	12.4	11.5	10.1	9.3	8.2	7.5
Med	19.2	18.9	17.7	16.6	19.6	19.7	16.6	16.3	14.9	9.8	8.7	16.2	13.1	10.3	9.4	8.6	8.1	14.3	12.2	10.5	9.5	8.4	7.8
Mn	19.1	18.9	17.8	16.6	19.6	19.5	16.4	15.9	14.9	9.9	8.5	15.9	13.5	10.8	9.7	8.4	7.8	14.3	12.6	10.8	9.4	8.4	7.8
Max	21.6	21.4	20.5	19.3	22.6	22.1	18.9	19.1	19.4	14.6	12.6	19.8	19.2	16.0	14.8	11.9	10.0	18.3	17.7	16.2	12.4	11.8	13.4
Min	16.0	16.2	14.7	14.3	16.1	16.1	13.0	11.7	10.7	5.6	4.5	11.3	7.8	6.4	5.4	5.0	5.1	10.0	8.6	6.4	6.2	5.6	4.9

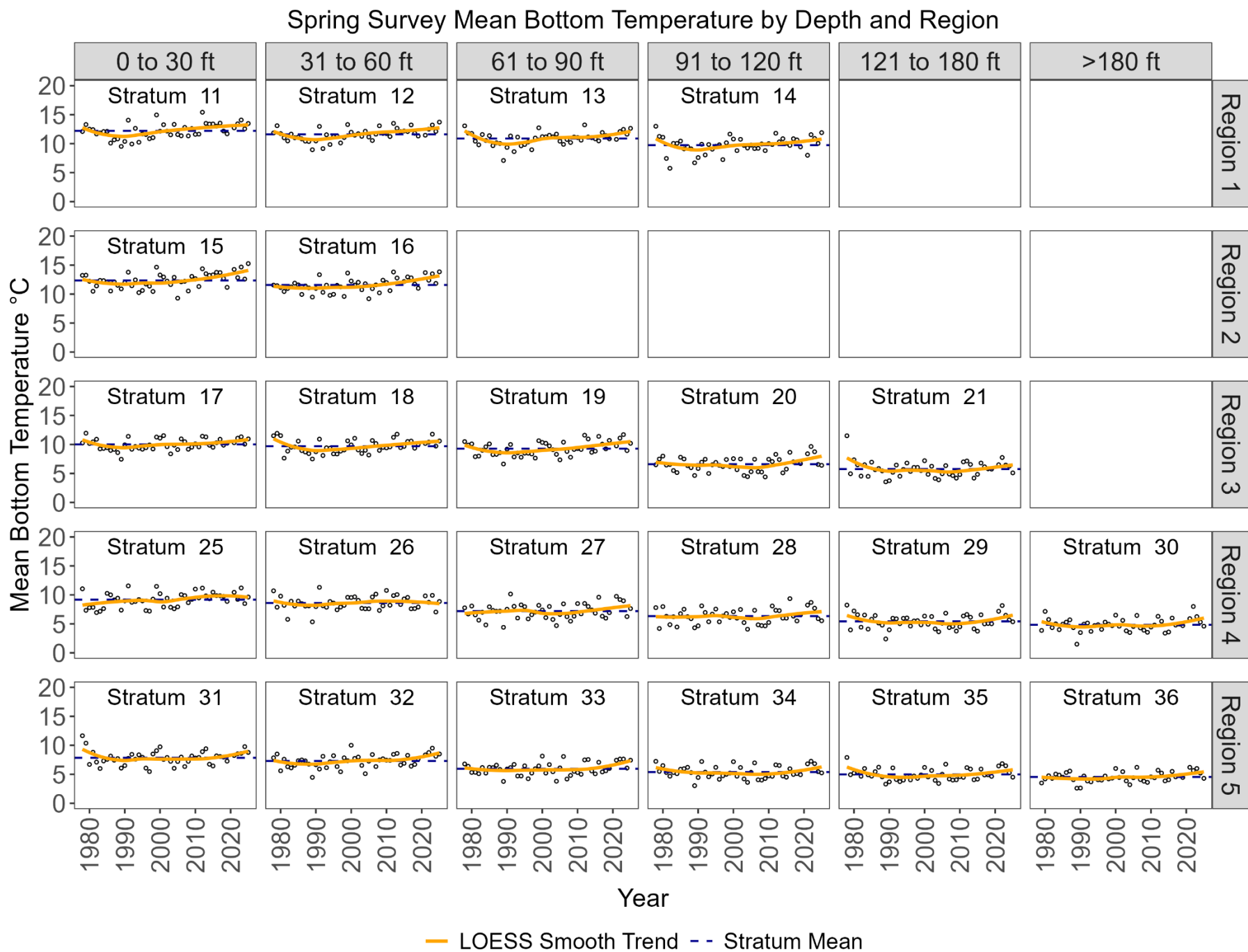


Figure 1. Mean bottom water temperatures, Loess smooth trend, and stratum mean recorded on the MDMF spring survey.

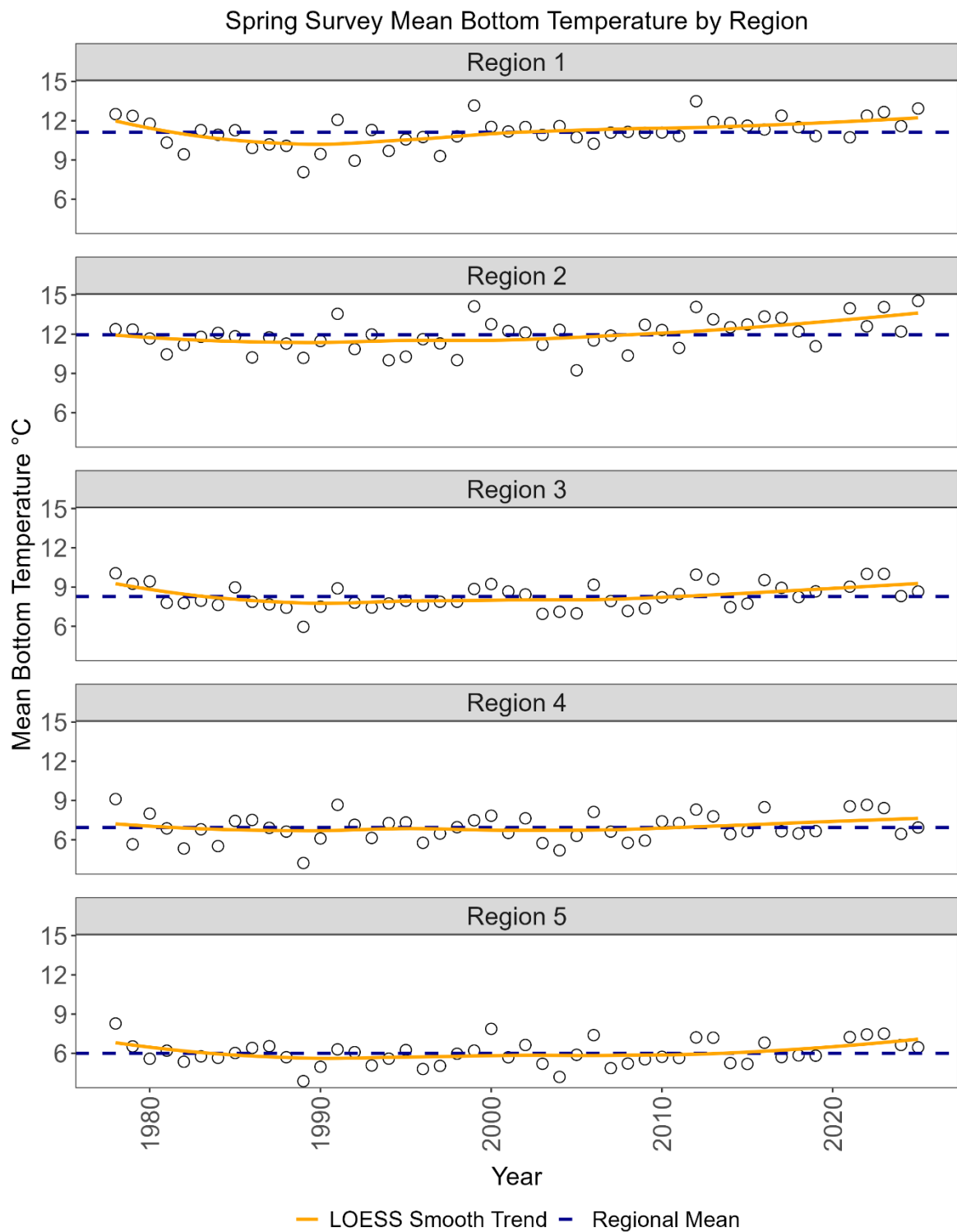


Figure 2. Stratified mean bottom water temperatures recorded on the MDMF spring survey by region.

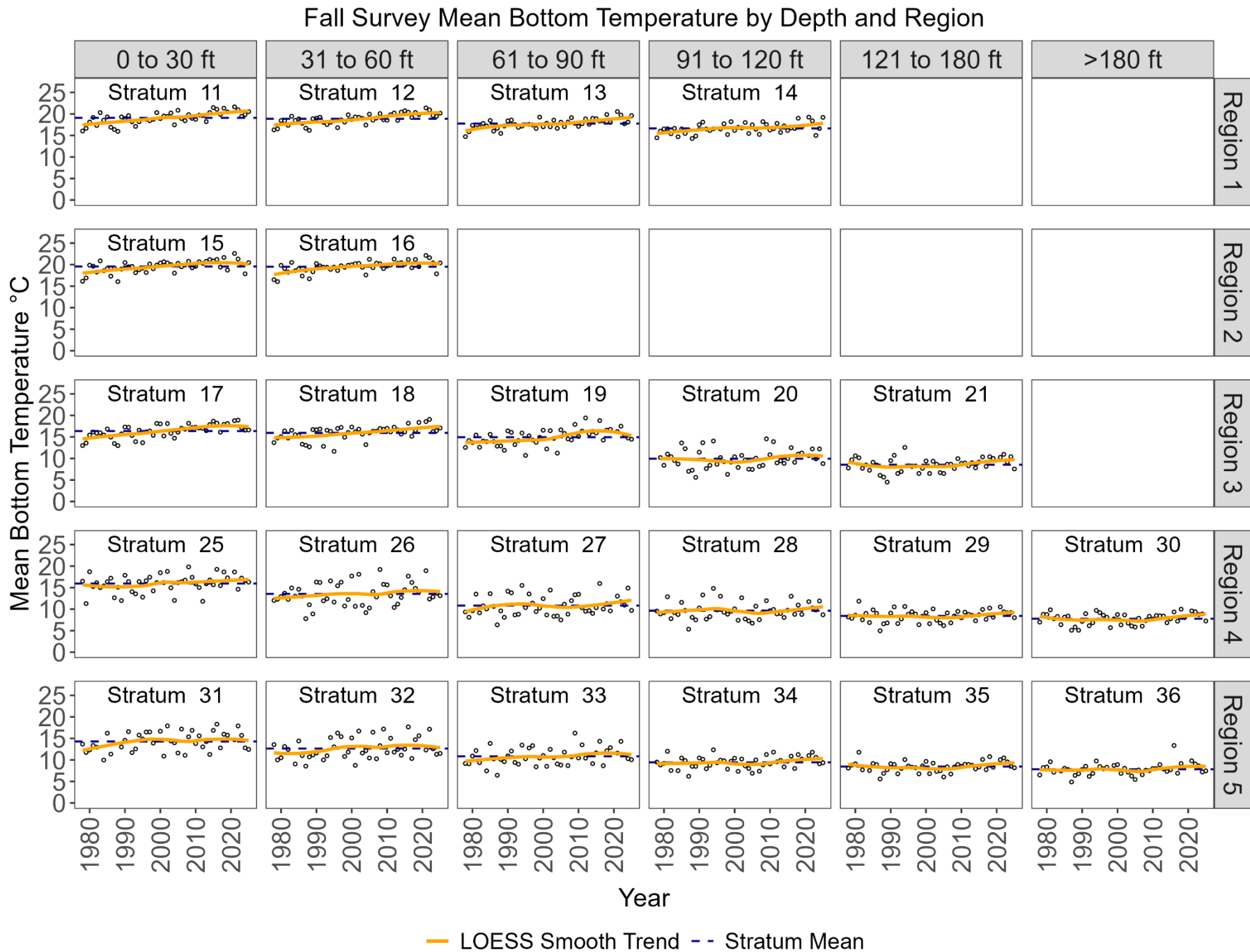


Figure 3. Mean bottom water temperatures, Loess smooth trend, and stratum mean recorded on the MDMF fall survey.

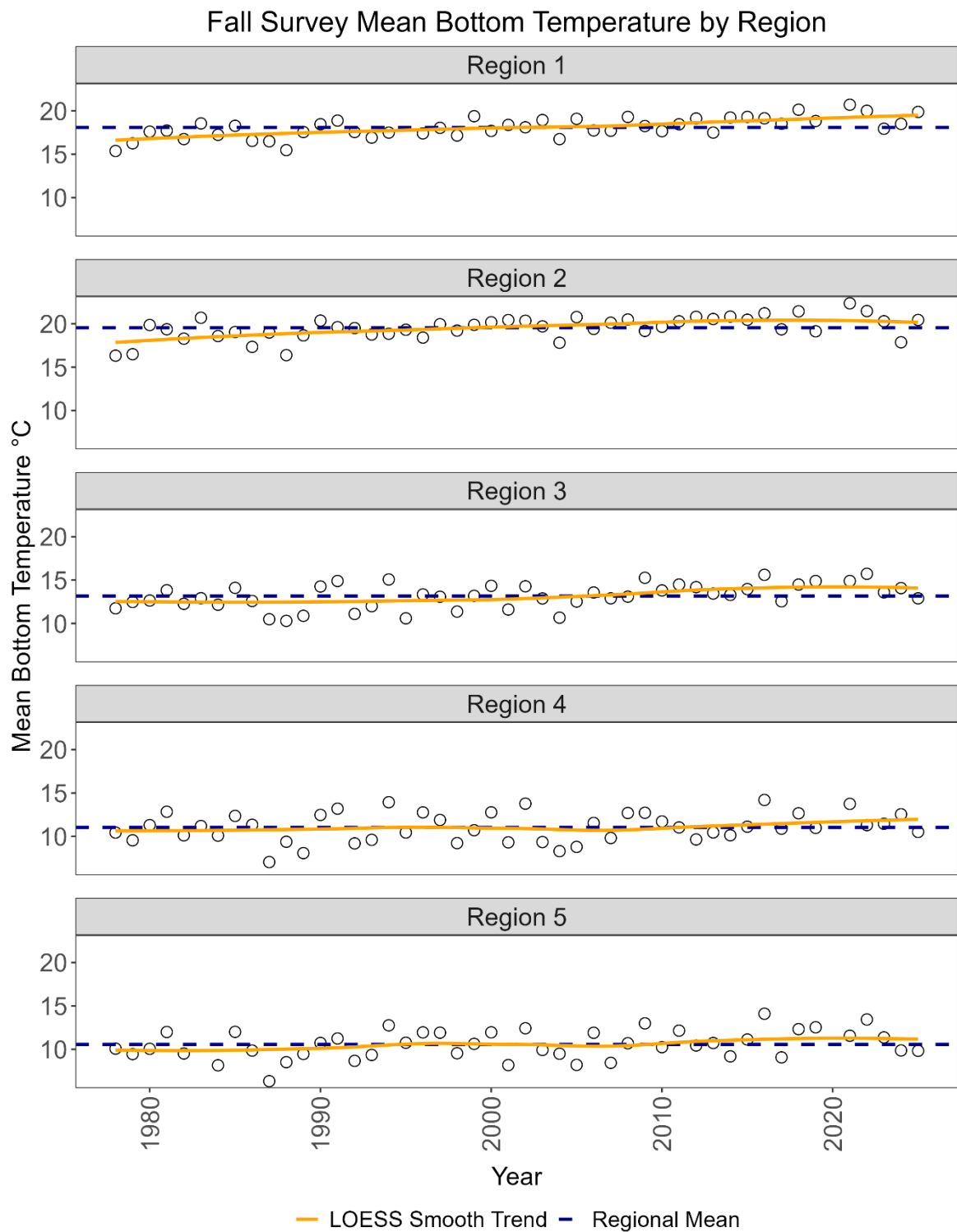


Figure 4. Stratified mean bottom water temperatures recorded on the MDMF fall survey by region.

Appendix C. Corrections to the trawl survey database in 2025

Loligo Squid egg mop data additions and corrections were made for cruises 199991 – 202591. Raw data was examined for all cases of squid mop occurrence. The corrections applied varied by the three data collection systems used in this survey.

- 199991 – 200992 utilized paper logs and had several cases where mop weight was not properly expanded for tow duration. All raw data was investigated and updated for consistency.
- 201091-201892 utilized FSCS 1.6 and tow duration expansions were not applied for many short tows. All raw data was investigated and updated for consistency.
- 201991-202591 utilizes FSCS 2.0. Initially FSCS 2.0 did not allow for data entry of Loligo Squid egg mops. During this timeframe all egg mop data was collected and stored independently from the database. All raw data was examined for consistency and added to the database.

All squid mop data for the entire time series is now consistent and available in the database. Going forward all data can be recorded at sea in FSCS 2.0. Resulting data will all be consistent with the existing time series.

A tow expansion script has been used for accepted tows with tow duration between 13-19.499 minutes since the implementation of FSCS 1.6 with cruise 201091. The script was updated for use in cruise 202592. The updated script provides additional comments and information when tow duration expansions are applied. While reviewing the original script two minor issues were identified that had minimal impact on a few species at a small number of stations.

One issue involved using the recorded catch number to determine if a species was eligible for expansion instead of the expanded catch number. In a few incidents this caused a species or two to not be expanded. Most commonly this occurred when a single individual of a species was found in a mix. Raw data was examined for all cases where this potentially could have occurred and corrections were applied when necessary.

The second issue was related to a small number of stations for species with number and counts recorded but no protocol for length measurements. In a few instances with a small count, the expansion script resulted in a slight expansion of the weight but no change in the number. All raw data was examined, and the original number and weights were used, and the expansion was not applied. This is consistent with all data in the rest of the time series.