

# Atlantic States Marine Fisheries Commission

## Northern Shrimp Technical Committee and Work Group Meeting

### Draft Agenda

*Monday April 10, 2023*

*1:00 p.m. - 4:00 p.m.*

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

Webinar URL: <https://meet.goto.com/309085453>

**You can also dial in using your phone:** United States: +1 (571) 317-3112

**Access Code:** 309-085-453

- 1) **Welcome and Review Agenda** (*C. Patterson*) 1:00 p.m.
- 2) **Review Previous Work Group Discussions** (*C. Tuohy*) 1:05 p.m.
- 3) **Review 2022 Traffic Light Analysis and 2023 Summer Survey Plan** (*K. Drew*) 1:15 p.m.
- 4) **Discuss Wake-Up Index** (*K. Drew*) 1:45 p.m.
- 5) **Discuss Magnuson-Stevens Act Implications** 2:30 p.m.
  - Presentation on spatial landings data pull (*A. Lee*)
  - Discuss future work needed to determine predominant location of the fishery
  - Discuss implications of relinquishing management control of the species
- 6) **Other Business** 3:45 p.m.
- 7) **Public Comment** 3:50 p.m.
- 8) **Adjourn** 4:00 p.m.



# Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201  
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

---

## MEMORANDUM

**TO: Northern Shrimp Section**

**FROM: Northern Shrimp Technical Committee (NSTC)**

**DATE: January 13, 2023**

**SUBJECT: Northern Shrimp 2022 Data Update**

### Background

In 2021, the Northern Shrimp Section extended the existing moratorium on commercial fishing through 2024. The three-year moratorium was set in response to the continued low levels of biomass and recruitment from the 2021 stock assessment update. This memo presents updated data from the most recent years of fishery independent surveys and environmental indices to keep managers and stakeholders informed about current stock trends.

The NSTC applied the Strict Traffic Light Approach to a suite of survey and environmental indicators. Fishery-independent survey indices included:

- ASMFC Summer survey (total abundance, total biomass, spawning stock biomass, and recruitment)
- NEFSC Fall survey
- Maine-New Hampshire Spring Inshore survey

None of these surveys occurred in 2020, due to COVID-19, but all have resumed since then.

Environmental condition indicators included:

- a predation pressure index (PPI) calculated from the NEFSC Fall survey data
- spring bottom temperature from the NEFSC survey
- summer bottom temperature from the ASMFC Summer survey
- winter surface temperature from Boothbay Harbor, ME

Two qualitative stock status reference levels were developed for the traffic light approach. For the abundance and biomass indices, being below the 20th percentile of the time series from 1984-2017 indicated an adverse state, and being above the 80th percentile of the time series from 1984-2017 indicated a favorable state. For the environmental indicators, the opposite was true: being below the 20th percentile of the time series from 1984-2017 indicated a favorable state while being above the 80th percentile of the time series indicated an adverse state, as higher temperatures and higher predation pressure have negative consequences for northern shrimp.

### Results

The traffic light analysis of 2022 data indicated no improvement in status, with indices of abundance, spawning stock biomass, and recruitment at new time-series lows. Recruitment has been below the 20<sup>th</sup> percentile of the 1984-2017 reference period in 8 of the last 10 years. Recent environmental conditions continue to be unfavorable for Gulf of Maine northern shrimp.

M22-xx

Table 1. Fishery independent indicators (model-based survey indices) for Gulf of Maine northern shrimp traffic light analysis. Colors indicate status relative to reference levels, where: RED = at or below the 20th percentile; YELLOW = between the 20th and 80th percentiles; and GREEN = at or above the 80th percentile of the time series from 1984-2017. White indicates no data.

Survey	ASMFC Summer	NEFSC Fall Albatross	NEFSC Fall Bigelow	ME-NH Spring	ASMFC Summer			
	Indicator	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Biomass	Harvestable Biomass (>22 mm CL)	Spawner Biomass
1984	1.130				1.25	0.64	0.63	0.126
1985	1.460				1.70	1.46	0.74	0.250
1986	1.220	0.68			1.59	1.24	0.93	0.233
1987	0.871	0.40			1.08	0.86	0.57	0.197
1988	1.569	0.34			1.40	0.82	0.61	1.008
1989	1.344	0.78			1.53	0.88	0.69	0.255
1990	1.212	0.59			1.63	1.40	0.79	0.102
1991	0.856	0.32			1.01	0.82	0.69	0.350
1992	0.502	0.19			0.59	0.43	0.38	0.140
1993	1.149	1.04			0.84	0.46	0.36	0.750
1994	1.054	1.09			0.92	0.45	0.38	0.354
1995	1.138	0.59			1.18	0.82	0.76	0.253
1996	1.022	0.40			1.13	0.83	0.66	0.321
1997	1.019	0.53			0.92	0.60	0.52	0.515
1998	0.727	0.97			0.71	0.38	0.37	0.200
1999	0.681	1.21			0.73	0.52	0.44	0.200
2000	0.837	0.96			0.77	0.53	0.49	0.462
2001	0.300	0.50			0.34	0.18	0.20	0.036
2002	1.185	0.69			0.86	0.38	0.40	0.910
2003	0.835	0.40		0.51	0.88	0.45	0.52	0.126
2004	1.116	0.88		0.56	1.08	0.89	0.59	0.381
2005	2.540	2.85		1.70	1.97	1.04	0.95	1.236
2006	4.721	3.69		1.94	4.04	1.90	1.94	1.022
2007	1.795	2.41		1.82	1.84	1.21	1.05	0.226
2008	1.778	1.51		2.04	1.83	1.48	0.86	0.524
2009	1.882		4.15	2.18	2.00	1.47	1.16	0.690
2010	1.819		2.87	3.19	1.76	1.01	0.84	0.693
2011	1.004		2.57	2.88	1.07	0.63	0.64	0.280
2012	0.297		0.77	0.84	0.36	0.27	0.25	0.032
2013	0.078		0.20	0.12	0.12	0.12	0.10	0.004
2014	0.260		0.51	0.34	0.20	0.07	0.08	0.186
2015	0.074		0.19	0.14	0.10	0.08	0.08	0.005
2016	0.318		0.14	0.30	0.32	0.19	0.19	0.177
2017	0.048		0.14	0.16	0.07	0.05	0.04	0.001
2018	0.069		0.27	0.09	0.08	0.05	0.05	0.040
2019	0.052		0.17	0.06	0.07	0.05	0.05	0.002
2020								
2021	0.033		0.03	0.11	0.05	0.04	0.04	0.001
2022	0.004			0.02	0.01	0.01	0.01	0.00004
<b>1984-2013 mean</b>	<b>1.24</b>	<b>1.00</b>	<b>2.11</b>	<b>1.62</b>	<b>1.24</b>	<b>0.81</b>	<b>0.65</b>	<b>0.40</b>
<b>2014-2022 mean</b>	<b>0.11</b>	<b>NA</b>	<b>0.21</b>	<b>0.15</b>	<b>0.11</b>	<b>0.07</b>	<b>0.07</b>	<b>0.05</b>
<b>80th percentile</b>	<b>1.50</b>	<b>1.16</b>	<b>2.69</b>	<b>2.07</b>	<b>1.66</b>	<b>1.10</b>	<b>0.81</b>	<b>0.59</b>
<b>20th percentile</b>	<b>0.43</b>	<b>0.40</b>	<b>0.17</b>	<b>0.27</b>	<b>0.50</b>	<b>0.34</b>	<b>0.31</b>	<b>0.13</b>

Table 2. Environmental condition indicators for Gulf of Maine northern shrimp traffic light analysis. Colors indicate status relative to reference levels, where: RED = at or above the 80th percentile; YELLOW = between the 80th and 20th percentiles; and GREEN = at or below the 20th percentile of the time series from 1984-2017. White indicates no data.

Survey	NEFSC	ASMFC	NEFSC	NEFSC	NEFSC	Boothbay Harbor, ME
Indicator	Predation Pressure Index	Summer Bottom Temp.	Spring Bottom temp. anomaly	Fall Bottom temp. anomaly	Spring Surface temp. anomaly	Feb-Mar Surface temp.
1984	434.3	4.1	0.6	0.8	-0.1	2.9
1985	597.8	4.0	0.1	0.6	0.1	2.8
1986	608.1	6.3	1.2	0.7	0.8	2.6
1987	387.8	6.0	0.0	0.0	-0.6	1.8
1988	503.1	6.5	1.3	-0.1	-0.2	2.7
1989	520.4	5.6	-0.1	-0.3	-0.6	1.9
1990	631.3	3.6	0.2	0.1	0.0	2.6
1991	501.8	6.1	0.5	0.1	0.6	3.4
1992	486.7	6.3	0.6	-0.2	-0.9	3.2
1993	470.1	5.8	-0.8	-0.3	-0.7	1.2
1994	351.9	6.8	0.6	1.3	0.2	1.8
1995	638.5	6.6	0.8	0.5	0.1	3.3
1996	564.8	7.1	1.0	1.1	-0.2	3.3
1997	378.1	6.8	1.4	0.5	0.0	3.7
1998	466.6	6.3	1.3	-0.4	0.5	2.9
1999	738.7	6.1	0.3	0.6	0.9	2.9
2000	813.7	6.7	1.1	0.7	0.9	3.1
2001	723.3	6.5	0.7	0.1	0.4	2.9
2002	1,305.8	7.1	1.3	1.3	1.2	4.1
2003	1,040.8	5.6	-0.2	-0.1	-0.6	2.4
2004	487.8	4.7	-0.8	-1.1	-0.9	3.0
2005	471.3	4.9	0.1	0.5	0.2	3.0
2006	663.5	7.1	1.3	1.2	0.9	5.5
2007	704.7	5.9	0.5	-0.3	0.0	2.0
2008	846.3	5.9	0.5	0.4	1.2	2.3
2009	740.6	6.0	0.4	0.7	0.4	2.6
2010	1,126.5	7.4	0.9	1.7	1.7	4.1
2011	1,150.4	7.7	2.3	1.4	0.9	2.9
2012	1,156.6	7.9	2.0	2.0	1.9	5.5
2013	769.3	7.1	1.3	1.2	1.8	3.9
2014	955.1	6.2	0.5	1.4	0.5	2.2
2015	832.2	5.8	0.1	0.3	0.1	1.4
2016	1,518.4	7.2	1.4	2.0	1.7	4.2
2017	948.2	6.9	1.0	1.3	0.9	3.8
2018	927.2	6.7	1.1	1.3	1.5	4.5
2019	674.4	7.1	1.4	1.4	0.7	3.5
2020						4.6
2021	1255.8	7.6	2.1	3.6	1.9	4.0
2022		7.6	2.5		1.0	3.7
<b>1984-2013 mean</b>	<b>676.0</b>	<b>6.1</b>	<b>0.7</b>	<b>0.5</b>	<b>0.3</b>	<b>3.0</b>
<b>2014-2022 mean</b>	<b>1,015.9</b>	<b>6.9</b>	<b>1.3</b>	<b>1.6</b>	<b>1.0</b>	<b>3.6</b>
<b>20th percentile</b>	<b>480.5</b>	<b>5.7</b>	<b>0.1</b>	<b>-0.1</b>	<b>-0.2</b>	<b>2.3</b>
<b>80th percentile</b>	<b>950.9</b>	<b>7.1</b>	<b>1.3</b>	<b>1.3</b>	<b>0.9</b>	<b>3.8</b>

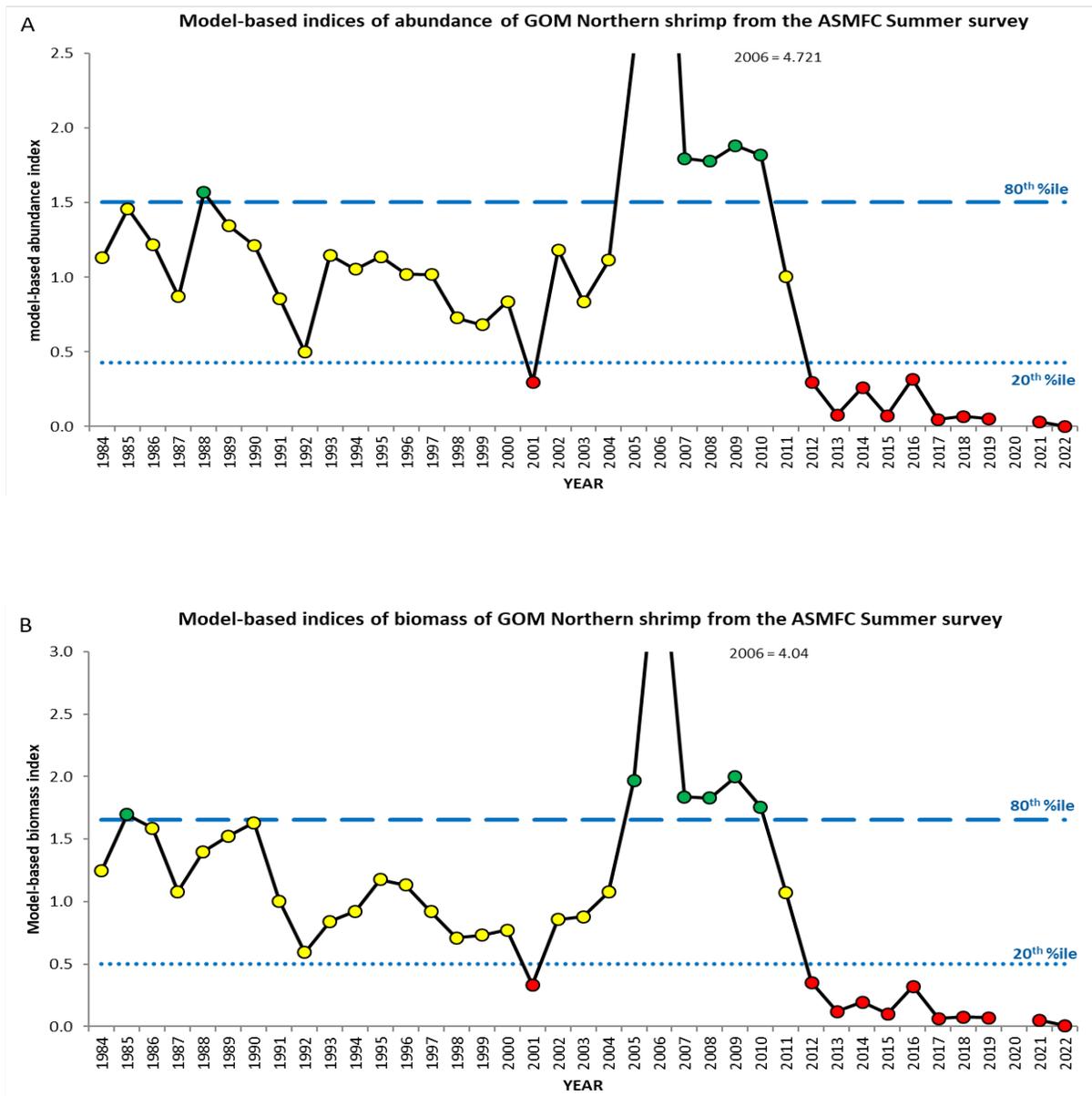


Figure 1. Traffic light analysis for the model-based index of Gulf of Maine northern shrimp from the ASMFC Summer survey 1984-2022 for total abundance (A) and total biomass (B). The 20th percentile of the time series from 1984-2017 delineated an adverse state, and the 80th percentile of the time series from 1984-2017 delineated a favorable state.

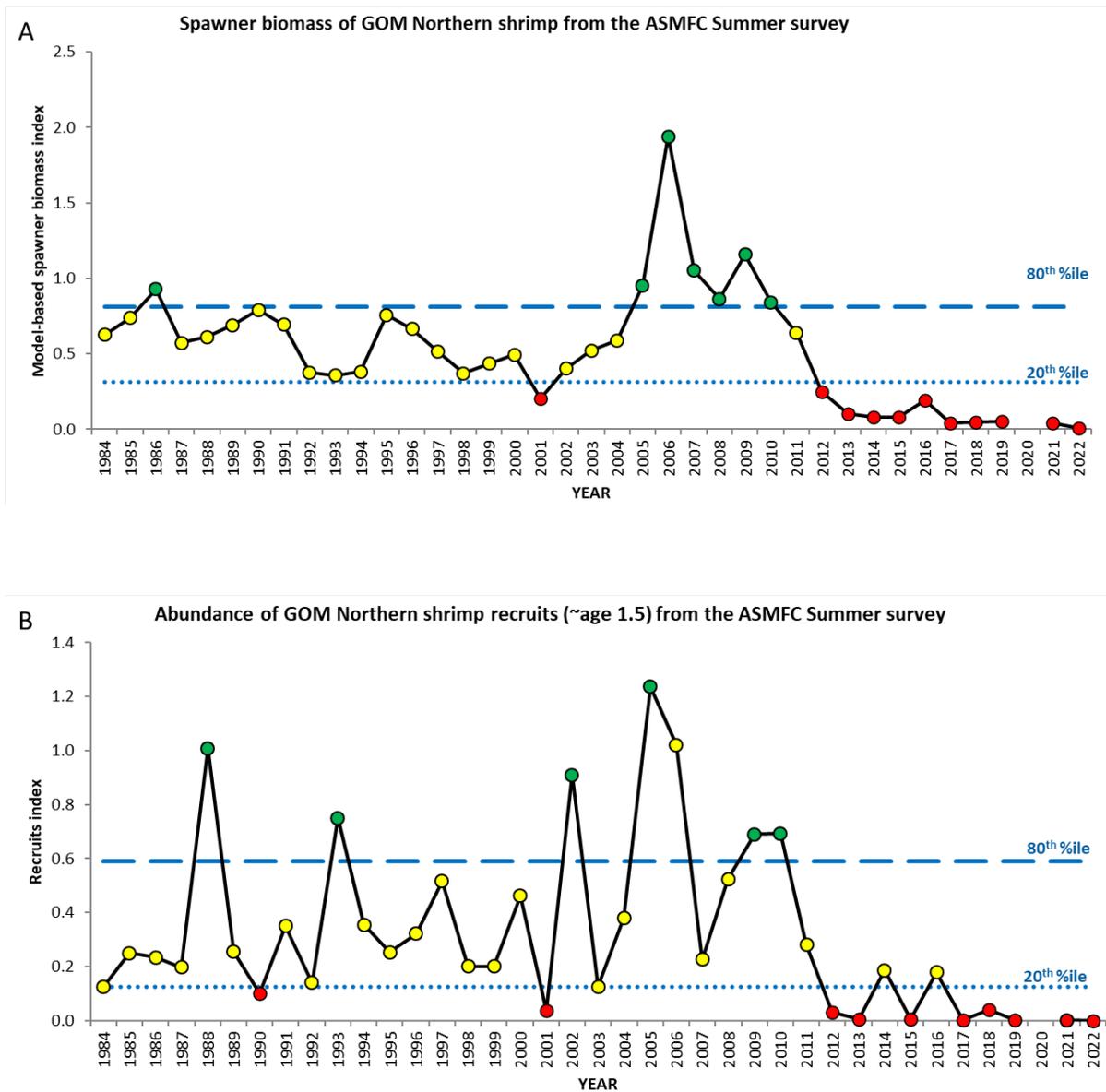


Figure 2. Traffic light analysis of spawning biomass (A) and recruitment (B) of Gulf of Maine northern shrimp from the ASMFC Summer survey 1984-2022. The 20th percentile of the time series from 1984-2017 delineated an adverse state, and the 80th percentile of the time series from 1984-2017 delineated a favorable state.

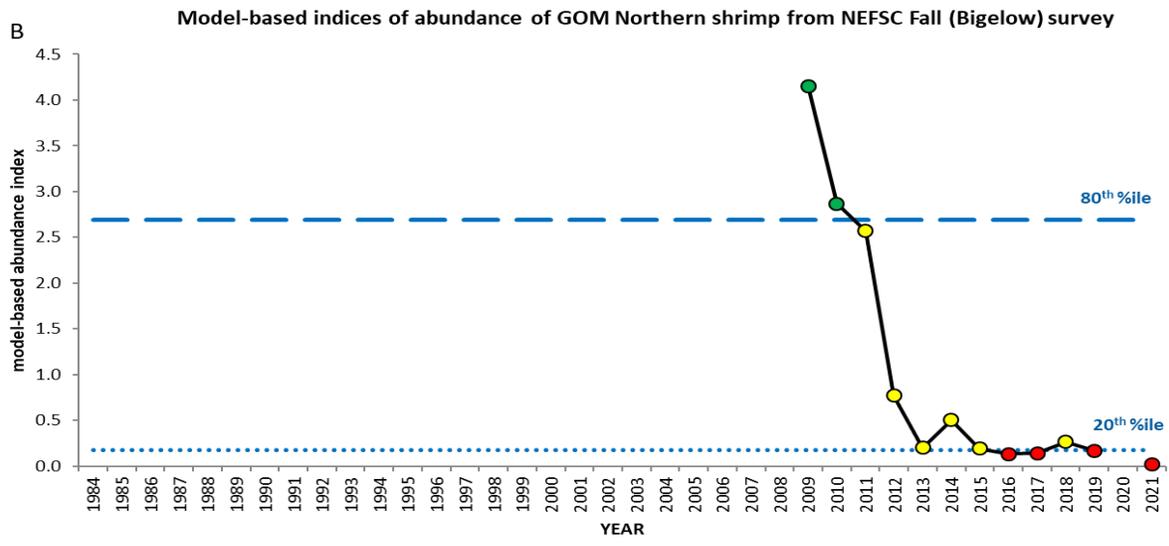
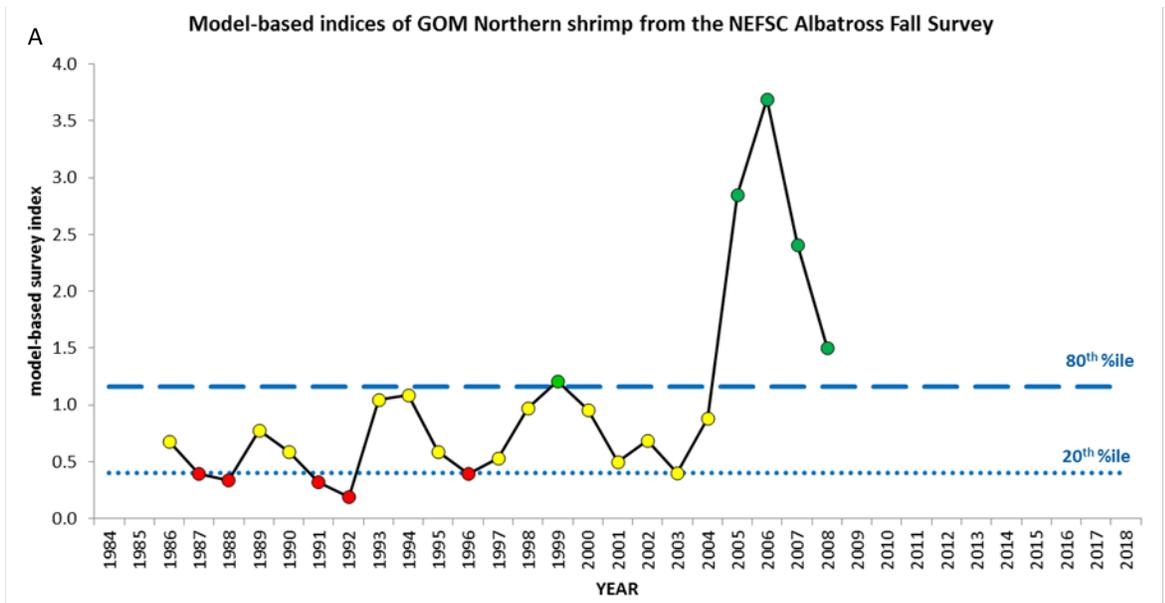


Figure 3. Traffic light analysis of abundance of Gulf of Maine northern shrimp from the NEFSC Fall survey for the Albatross (A) and Bigelow (B) years. The 20th percentile of the time series from 1984-2017 delineated an adverse state, and the 80th percentile of the time series from 1984-2017 delineated a favorable state.

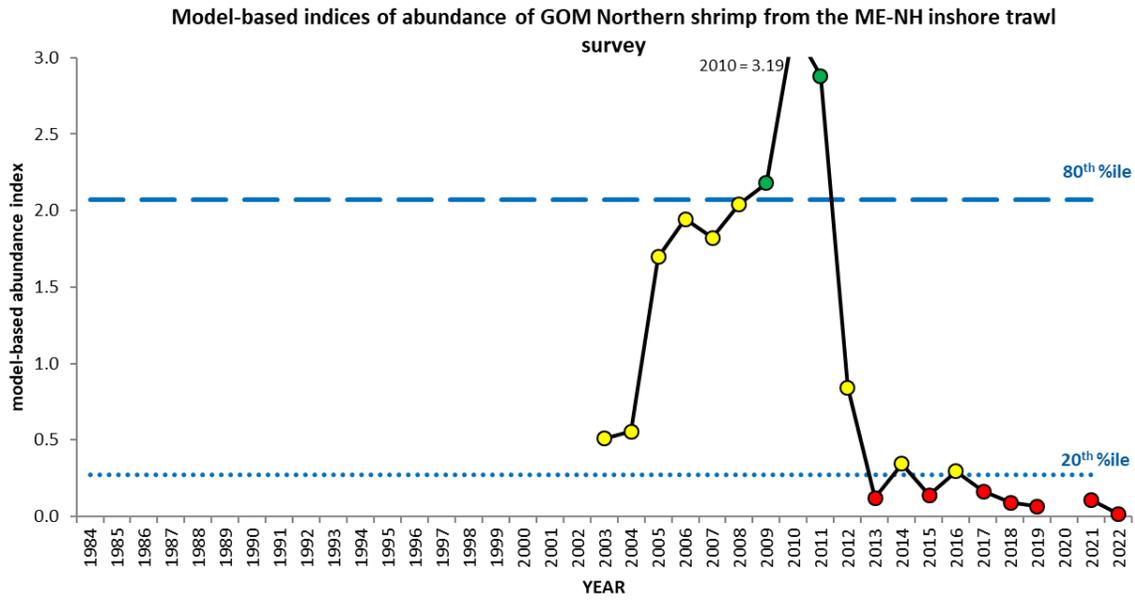


Figure 4. Traffic light analysis of total abundance of Gulf of Maine northern shrimp from the Maine-New Hampshire Inshore Spring survey 2003-2022. The 20th percentile of the time series from 1984-2017 delineated an adverse state, and the 80th percentile of the time series from 1984-2017 delineated a favorable state.

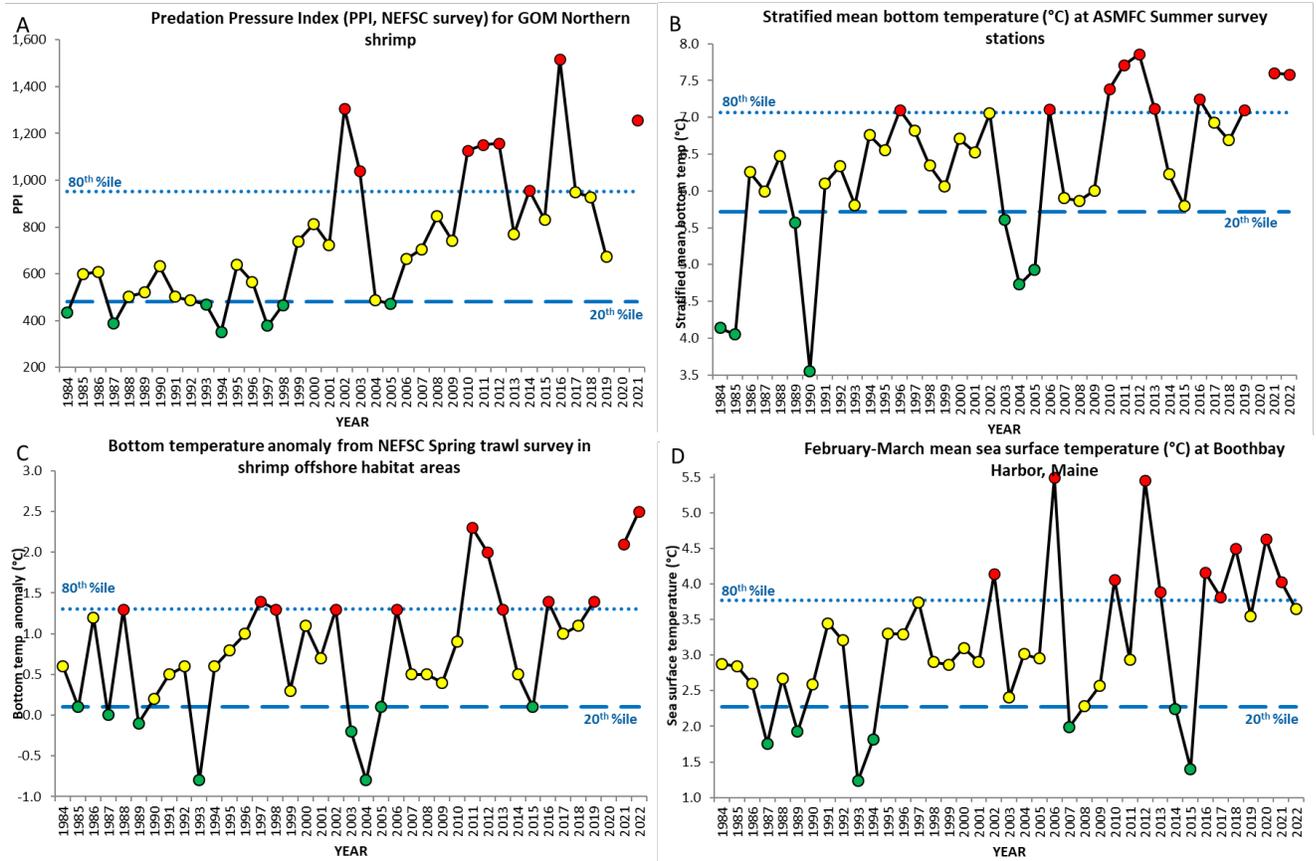


Figure 5. Traffic light analysis of environmental conditions in the Gulf of Maine, including predation pressure (A), summer bottom temperature (B), spring bottom temperature (C), and winter sea surface temperature (D). The 20th percentile of the time series from 1984-2017 delineated a favorable state, and the 80th percentile of the time series from 1984-2017 delineated an adverse state.

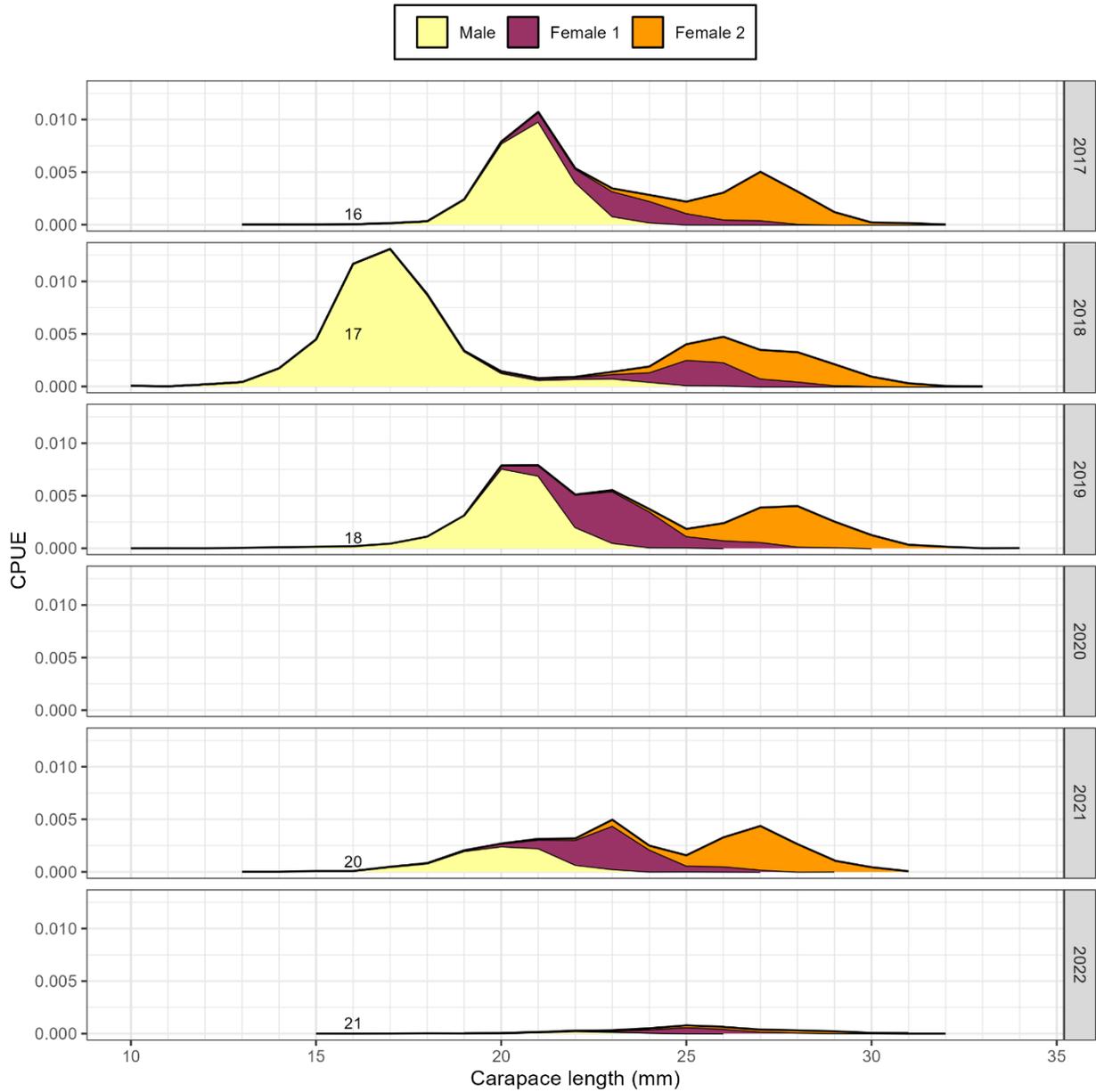


Figure 6. Gulf of Maine northern shrimp abundance from the ASMFC Summer survey by year, length, and development stage for 2017 – 2022 with expanded axes to show detail. Two-digit years are year class at assumed age 1.5.

## Northern Shrimp Technical Committee Meeting Summary

Conference Call  
March 4, 2022

**Technical Committee Members:** Margaret Hunter (Chair, ME), Robert Atwood (NH) Alicia Miller (NOAA), Steve Wilcox (MA)

**ASMFC Staff:** Dustin Colson Leaning, Katie Drew, Adam Lee

The Northern Shrimp Technical Committee (TC) met via conference call on March 4, 2022 to discuss several technical questions provided by the Northern Shrimp Work Group. TC feedback on the questions were provided below each question.

- If the summer survey is retired, what other metrics/surveys can be relied on to inform stock assessments? How will assessment model performance be impacted without the summer survey data? Will the projections be affected?

The Maine-New Hampshire Inshore Trawl Survey is not currently used within the stock assessment model, but the incorporation of the spring inshore data could help to a degree. The stock assessment scientist was able to run an initial sensitivity analysis by comparing an original model run without ME-NH survey data to a model run that contained ME-NH spring survey data without the last four years of data from the summer survey (Figure 2). The recruitment index differed slightly between the two model runs, but generally the surveys generate roughly similar trends. However, in the last four years, all survey indices have been in relatively close agreement around low values. When the summer survey data were dropped during a period (ending in 2011) when the remaining surveys (ME-NH and NEFSC) were showing opposing trends, the model had difficulty converging.

The stock assessment scientist reported that dropping the summer survey from the model would allow for continued monitoring of near term trends, but she was less certain on how sensitive the model would be to larger changes in shrimp abundance without the summer survey data.

Fall Northeast Fisheries Science Center (NEFSC) Bottom Trawl Survey data are not available for the current (terminal) year in the fall when stock assessment updates are usually conducted. Relying on just the ME-NH spring survey data could provide a general indication of stock health, but setting landings specifications could be a challenge. The summer survey provides important information on what proportion of biomass is comprised of spawning stock biomass, which would need to be collected from another survey. In effect, the loss of the summer survey would result in the loss of fine scale data that may be problematic for an actively managed open fishery. The ME-NH inshore spring survey may be problematic because female shrimp are transitioning from inshore to offshore during the spring, and the survey results may be

influenced by the timing of their migration, which could vary from year to year, through the relatively narrow coastal band that the survey covers. Also, the spring inshore survey may not pick up as many small (male) shrimp as the summer survey. This warrants further study.

The TC agreed that the potential effects of eliminating the summer survey on the northern shrimp stock assessment and projections should be evaluated further with additional sensitivity runs. The details on the additional work may be found in the accompanying document titled “Potential Effects of Eliminating the ASMFC Summer Survey on the Northern Shrimp Stock Assessment.”

On the topic of additional surveys, the TC was concerned about comments at the last Section meeting regarding collecting winter fishery dependent data for improved understanding of the stock. The TC clarified that winter fishery dependent data collection is not a suitable replacement for conducting a survey for several reasons. First, weather, location, and timing play a large role in whether shrimp are encountered or not during the winter. Northern shrimp abundance can be highly variable temporally and spatially as the egg-bearing females move inshore from west to east over time, and then return offshore after egg hatch. The timing of this sequence varies from year to year, making winter the worst possible time of year for conducting surveys to inform stock assessment science. Second, sampling from a wide range of locations is important for a complete picture of the stock health, meaning trap sampling is unlikely to be suitable, since it would focus mostly on midcoast Maine. Third, fishery catch per unit effort (CPUE) does not always correspond to stock health. For example, CPUE in 2011-2012 was similar to CPUE in the 1990s yet the health of the stock over those two time periods were very different. Lastly, smaller shrimp (males and transitioning) are generally under-represented during a winter fishery, because many stay offshore or aren't retained by the gear. Also, size distribution data may not be reliable because they vary from vessel to vessel, and the trap fishery generally doesn't catch small shrimp, which doesn't add value to the scientific understanding of the stock.

- The summer survey is effective at capturing the 1.5 year old shrimp. What other surveys pick up on this recruitment trend that could replace the summer survey?

The TC agreed that the spring ME-NH Inshore Survey catches 1+ year-old shrimp. The fall inshore ME-NH survey catches fewer shrimp, with greater variability than the other surveys, but it does catch some 1.5 year-olds, and also some young-of-the-year. Unfortunately, the NEFSC Fall Bottom Survey and fall inshore ME-NH survey data are not available in time for the fall assessment. However, the young-of-the-year data from one year would be available as age 1.5 data for the fall assessment the following year.

The NEFSC Spring Bottom Trawl Survey is not used for the shrimp model, and shrimp samples were not worked up in some years. It may be a viable option in the future, although it is possibly confounded by the spring migration of adult females. TCs in the past preferred the fall NEFSC survey over the spring because “Correspondence among research surveys and fishery

indices of abundance suggests that the NEFSC autumn survey tracks resource conditions more closely than the NEFSC spring survey (ASMFC Assessment Report, 1996)”.

- If we do adopt new surveys/data for future use in assessments, how will we bridge the gap from a continuity standpoint? How will we be able to piece together a time series with different surveys?

The TC agreed that funding a side-by-side calibration would be a challenge. Several years of data would likely be needed in order to sort out survey catchability/selectivity differences. The stock assessment modeling software VAST may be able to offer a shortcut. So long as there is spatial overlap between two surveys, VAST could be used to assist with standardizing the indices instead of conducting side-by-side calibration tows. However, if VAST’s statistical calibration process is not successful, roughly 5-10 years of data collection would be needed before the survey data could become useful for model input.

The TC discussed the possibility that the ME-NH inshore survey may also face funding challenges in the coming years. If funding is available, ensuring the continuation of the ME-NH inshore survey would be preferable over funding a new survey, especially from a continuity and long-term data collection standpoint.

The TC also briefly discussed the potential impact of offshore wind farm construction. Whatever future plans there are for any of these surveys, wind farms should be considered. At this time, it is difficult to anticipate where these wind farms will be and the impacts they will have on the surveys.





# Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201  
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

## Northern Shrimp Technical Committee Webinar

Friday, October 7, 2022

**Committee Members in Attendance:** Matt Cieri (ME), Robert Atwood (NH), Tracy Pugh (MA)

**ASMFC Staff:** Katie Drew, Dustin Colson Leaning

The Northern Shrimp Technical Committee (TC) met via conference call and webinar to address four items:

- 1) Review data from the Maine & New Hampshire Inshore Trawl Spring Survey, the NEFSC Summer Survey, and the 2021 NEFSC Bottom Trawl Fall Survey.
- 2) Set timeline and tasks for completing the traffic light analysis data update.
- 3) Discuss indicators for the “Wake-up Index”

### Review Survey Data

The Maine & New Hampshire Inshore Trawl Spring Survey indicated very low encounter rates for northern shrimp in 2022. Data from the Northeast Fisheries Science Center (NEFSC) 2022 Summer Survey has been audited and will be available shortly. The summer survey was successful in that 59 out of the 60 planned stations were completed. Shrimp samples from the NEFSC 2021 Bottom Trawl Fall Survey have been processed as well and will be included in the 2022 traffic light analysis (TLA). The TC also discussed the possibility of including NEFSC Bottom Trawl Fall Survey data from 2022, but the data is unlikely to be available until mid-December, which doesn’t align with the proposed timeline for completion of the TLA.

### Setting Timeline and Tasks for Completing the Traffic Light Analysis Data Update

	Milestone	Date
✓	TC call to review data and timeline	Oct. 7, 2022
	TC call to review traffic light analysis	Week of Oct. 31, 2021
	Draft report sections to Staff	Nov. 18, 2022
	Draft report to TC	Nov. 28, 2022
	TC call to approve report	Week of Dec. 5, 2022
	Report to Section	Dec. 16, 2022
	Section meeting to review report	Jan. or Feb. 2023

	Task	TC Member
	Standardize indices & distribute to TC	K. Drew
	Provide environmental data to TC	A. Miller
	Traffic light analysis through 2022	R. Atwood
	Report writing	K. Drew & TC to review



# Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201  
703.842.0740 • 703.842.0741 (fax) • [www.asmfc.org](http://www.asmfc.org)

---

## Discussion on Indicators for the “Wake-up Index”

In August 2022, the Northern Shrimp Section (Section) tasked the TC to work collaboratively with the Northern Shrimp Work Group to develop a set of biological/environmental indicators to monitor and indicate when the northern shrimp stock approaches a healthy population level that may be able to support a viable fishery. The idea being that the fishery would remain in a permanent fishing moratorium with annual evaluations of the indicators. When the indicators reach a level sufficient for the Section to consider reopening a fishery, the Section and TC would take additional steps prior to taking action. This set of indicators has been termed the “Wake-up Index”.

After thorough discussion on the “Wake-up Index”, the TC agreed that recruitment is likely the most valuable indicator. The NEFSC Summer Survey, the ME-NH Inshore Spring Survey, and the NEFSC Fall Bottom Trawl Survey can all be relied upon for producing estimates of recruitment. However, due to survey timing and location, the Summer Survey produces the most scientifically robust signal for recruitment. For this reason, the TC agreed that NEFSC Summer Survey data should be relied upon first. However, if the NEFSC Summer Survey is discontinued due to a lack of funding at some point in the future, the TC proposed relying upon recruitment metrics from both the ME-NH Inshore Spring Survey and the NEFSC Bottom Trawl Fall Survey. The TC proposed three consecutive years of non-failed recruitment as a pattern that would prompt a more thorough evaluation of stock health. Non-failed recruitment would be defined as a recruitment value above the 20<sup>th</sup> percentile relative to the reference period (1984-2017) that also persists through the length frequency in subsequent years. This time period had previously been established and peer reviewed through the last benchmark stock assessment. These years reflect both instances when the stock was healthy with high levels of recruitment as well as years when the stock was depleted with low levels of recruitment. The TLA currently tracks and evaluates recruitment (age ~1.5 shrimp) from the NEFSC Summer Survey relative to this 20<sup>th</sup> percentile threshold. In the event that the NEFSC Summer Survey is cancelled, thresholds will need to be calculated for both the ME-NH Inshore Spring Survey and the NEFSC Bottom Trawl Fall Survey. The TC proposed that the recruitment metrics would need to be above the 20<sup>th</sup> percentile for both surveys for three years in a row in order to prompt a more thorough evaluation of stock health. If and when these criteria are met, the TC would determine whether to forward a recommendation to the Section that the stock assessment model be run with updated data. Depending upon the results of this model run, the Section may consider setting specifications for the upcoming year, or initiate a benchmark stock assessment prior to considering opening the fishery.

Separately, the TC also agreed to recommend to the ASMFC Science Program that the next benchmark stock assessment should be scheduled for 2028 with a ten-year trigger for benchmark stock assessments. This will hopefully strike a balance between keeping the assessment model sufficiently up to date while minimizing work load for a low priority depleted species.



# Northern Shrimp Technical Committee Webinar

Thursday, November 3, 2022

**Committee Members in Attendance:** Alicia Miller (NOAA), Robert Atwood (NH), Tracy Pugh (MA)

**ASMFC Staff:** Katie Drew, Dustin Colson Leaning, Adam Lee

The Northern Shrimp Technical Committee (TC) met via webinar to review progress on the traffic light analysis (TLA) and discuss the timeline and next steps.

An initial review of the TLA indices reveals that stock health and environmental indicators remain poor. The TC noticed a large increase in the 2021 predator predation index (PPI), and agreed that it likely resulted from a spike in the survey tracking spiny dogfish abundance. The spiny dogfish index has more variability than what would be expected considering their long life history. The TC agreed that a smoothing approach could be considered in a future benchmark stock assessment to account for the interannual variability of the spiny dogfish index. The group also viewed a map of 2022 NEFSC Summer Survey shrimp catches (kg per tow) by tow location, and commented on the large number of tows with zero shrimp caught. The TC agreed that the TLA report should display historical summer survey catches to compare to current lows. The TC thought that the years 1996 and 2009 represent average shrimp abundance years, and 2006 represented all time highs, all of which could serve as useful comparisons to the all-time low of 2022. The TC also agreed to present the TLA in a shortened memo format to simply highlight the important indicators, especially considering the fishery is still under a moratorium. Lastly, the TC elected Robert Atwood from New Hampshire to be the interim TC Chair while the TC is experiencing significant turnover and new staff get situated.

## Timeline and Tasks for Completing the Traffic Light Analysis Data Update

	Milestone	Date
✓	TC call to review data and timeline	Oct. 7, 2022
✓	TC call to review traffic light analysis	Week of Oct. 31, 2021
	Draft report sections to Staff	Nov. 18, 2022
	Draft report to TC	Nov. 28, 2022
	TC call to approve report	Week of Dec. 5, 2022
	Report to Section	Dec. 16, 2022
	Section meeting to review report	Jan. or Feb. 2023

	Task	TC Member
	Standardize indices & distribute to TC	K. Drew
	Provide environmental data to TC	A. Miller
	Traffic light analysis through 2022	R. Atwood
	Report writing	K. Drew & TC to review

## Northern Shrimp Management Strategy Evaluation Work Group Meeting Summary

Conference Call  
February 4, 2022

**Work Group Members:** Cheri Patterson (Work Group Chair, NH), Megan Ware (ME), Kelly Whitmore (MA), Allison Murphy (NOAA Fisheries), Ritchie White (Section Chair, NH), Toni Kerns (ASMFC Staff), Dustin Colson Leaning (ASMFC Staff)

**Others Present:** Dennis Abbott (Section member, NH), James Boyle (ASMFC Staff)

The Northern Shrimp Work Group (WG) convened to discuss and outline next steps necessary to respond to the December 2021 Northern Shrimp Section (Section) tasking. The Northern Shrimp Section directed the WG to 1) develop a contingency plan in the event that the northern shrimp summer survey funding is lost, 2) outline the steps and associated ramifications of the Commission relinquishing control of the Northern Shrimp Fishery Management Plan (FMP), and 3) further develop a personal use fishery management program. The WG spent the majority of the meeting discussing issues 1 and 2, but will address issue 3 at a future meeting.

### Issue 1: Survey Funding

The Section was recently informed that the northern shrimp summer survey may be retired after the 2022 season. One WG member informed the group that the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) no longer funds the summer survey as was once the case. In recent years, the Northeast Fisheries Science Center (NEFSC) has covered the funding of the survey. As such, if the summer survey is retired by NEFSC, additional funding will have to be raised to support a new survey.

Northern shrimp advisory panel (AP) members and industry members have previously indicated a willingness to collect fishery dependent data to help support the data gap. One WG member suggested the possibility of reforming a Research-Set-Aside (RSA) program. Several WG members acknowledged that RSAs can require a lot of administrative work, and a cost-analysis may be required before deciding whether to pursue that strategy. There would potentially be a need to hire a research coordinator to ensure the research effort was successful.

### Issue 2: Ramifications of Commission Relinquishing Control of FMP

The WG's discussion on this matter is preliminary and the WG identified several areas where additional fact-finding and confirmation of initial answers is needed. The Commission has never before relinquished control of a species' FMP. One WG member assumed the Section would need to make a vote to declare the Commission no longer manages northern shrimp. Following this, the Commission would likely need to send notification to partnering agencies of the decision. The Fisheries Policy Director, who sits on the WG, agreed to look into this matter further and determine whether legal consultation would be warranted.

The WG also discussed whether the National Marine Fisheries Service (NMFS) would assume jurisdiction of the northern shrimp fishery if the Commission relinquished management responsibility. The WG representative from NMFS indicated it is likely that NMFS would ask the New England Fishery Management Council (NEFMC) to assume management of the FMP. To bridge the gap between the Commission's relinquishment and the development of a Federal FMP by the NEFMC, NMFS would likely need to use emergency rulemaking authority under the Magnuson-Stevens Fishery Conservation and Management Act to enact preliminary measures, including a potential continuation of the fishing moratorium. Should additional questions arise on this topic, additional NMFS expertise may be required (legal, Magnuson-Stevens Act, etc.) One WG member asked if there have been any instances where NEFMC has opted out of assuming control of an FMP; while not a perfect comparison, a recent example is the Council's decision not to prioritize the development of fishery management regulations under MSA for the Northeast Canyons and Seamounts National Monument. When the commercial northern shrimp fishery was open in federal and state waters, harvesters operated under a small-mesh exemption permit that allowed use of that gear. One WG member speculated that as a consequence of NEFMC assuming control of the FMP, some commercial harvesters would likely drop their federal permits to fish for northern shrimp in state waters. Lastly, one WG member questioned how NEFMC would manage the fishery without the summer survey. This issue would likely need to be discussed further by NEFMC, NMFS and NEFSC for a definitive answer.

### Issue 3: Personal Use Fishery

The WG did not discuss this issue, but intends to pick up discussion at a future meeting.

The WG closed the meeting with a discussion of next steps. First, the WG acknowledged that there are several areas identified in the sections above where further research and consultation is needed. WG members agreed to follow up on these information gaps by the next meeting. Second, the WG acknowledged that the AP and Policy Board involvement was discussed at the last Section meeting in December. The WG will need to discuss the involvement of these two groups at a future meeting. Third, the WG prepared several questions for the Northern Shrimp Technical Committee (TC) to assist with the WG's task. Depending on TC member availability, the WG would like the TC to meet in February or March to review and provide feedback on the questions listed below.

### Questions for the TC

- If the summer survey is retired, what other metrics/surveys can be relied on to inform stock assessments?
- The summer survey is effective at capturing the 1.5 year old shrimp. What other surveys pick up on this recruitment trend that could replace the summer survey?
- How will assessment model performance be impacted without the summer survey data? Will the projections be affected?
- If we do adopt new surveys/data for future use in assessments, how will we bridge the gap from a continuity standpoint? How will we be able to piece together a time series with different surveys?



## Northern Shrimp Management Strategy Evaluation Work Group Meeting Summary

Conference Call  
May 16, 2022

**Work Group Members:** Cheri Patterson (Work Group Chair, NH), Megan Ware (ME), Melissa Smith (ME), Kelly Whitmore (MA), Allison Murphy (NOAA Fisheries), Ritchie White (Section Chair, NH), Toni Kerns (ASMFC Staff), Dustin Colson Leaning (ASMFC Staff)

**Others Present:** Adam Lee (ACCSP Staff)

The Northern Shrimp Work Group (WG) met to discuss the technical committee's (TC) report on potential effects of eliminating the summer shrimp survey, review the pros and cons of the Commission dropping the Northern Shrimp Fishery Management Plan (FMP), and begin discussing next steps should the Northern Shrimp Section (Section) decide to forward a recommendation for the Commission to relinquish control of the FMP.

Staff provided a brief overview of the TC's responses to the WG's questions and the report on potential effects of eliminating the summer shrimp survey. One WG member pointed out that if the summer survey no longer operated, it would increase the reliance on the spring ME-NH inshore survey and the fall NEFSC Bottom Trawl Survey. Considering that the funding situation for the spring ME-NH inshore survey is also tenuous, the WG thought it would be important to flag northern shrimp management's increased reliance on the survey during future survey funding discussions.

The WG also briefly discussed pros and cons of the ramifications of the Commission relinquishing the Northern Shrimp FMP. The following bullets were prepared:

- Would likely require development of a federal FMP for northern shrimp either through the New England Fishery Management Council (Council) or National Marine Fisheries Service (NOAA Fisheries) via secretarial action.
  - Neither a pro nor a con.
- Federal waters would be beholden to Magnuson-Stevens Fishery Conservation and Management Act requirements while state waters would be subject to state regulations.
  - Pro for state waters.
  - Con for fisheries previously in federal waters assuming federal waters would be closed to fishing (although this is not different from the present situation).
- States could act independently in state waters regarding the northern shrimp resource; this could mean states take different approaches in their own state waters.
  - Pro in terms of flexibility for states but potential con if one values consistency between the states.
  - Con if state management is inconsistent with a future Federal FMP. Section 306(b) of the Magnuson-Stevens Fishery Conservation and Management Act

allows the Secretary to regulate a fishery within state boundaries if a state has taken action that substantially and adversely affects carrying out a Federal FMP.

- The Commission would not devote staff time to northern shrimp, includes ISFMP staff and stock assessment staff.
  - Pro in this frees up ASMFC staff time to work on high priority species.
  - Con in terms of lost institutional management and scientific knowledge.
- Establishes a process and circumstance in which the Commission relinquishes control of a species.
  - Pro, probably good to understand how this process works.
- WG envisions no change to the existing catch reporting system; if there were landings in state waters, harvesters and dealers would be required to submit trip level reports and that data would be stored in ACCSP.
  - Pro in that existing systems would not have to be altered.
- Assuming a moratorium is maintained in federal waters, likely no need for any changes to the current permitting systems (states issue the permits and there is no federal northern shrimp permit).
  - Pro in that existing systems would not have to be altered.
- Loss of funding to states through ACFCMA
  - Con

The WG also discussed in greater detail the steps involved in the process of the Commission relinquishing control of the FMP. The Section would first have to make the recommendation to the ISFMP Policy Board at a Section meeting. Next, the Policy Board would consider forwarding the recommendation to the Commission. The recommendation for relinquishing the FMP would also need to be accompanied by a rationale. The process of the Commission relinquishing control of the FMP could be completed through one Commission meeting, but the WG agreed that dedicating more time to this process would likely be preferable to allow for adequate coordination and preparation for the next phase of management for northern shrimp.

WG representatives from Maine, New Hampshire, and Massachusetts provided some initial thoughts on what each state's fishery would look like within state waters should the Commission decide to relinquish control of the FMP. The following comments are preliminary ideas and subject to change. The Massachusetts representative indicated that the Commission relinquishing control of the FMP would not likely cause an immediate response. Massachusetts would not pursue a trap fishery considering that vertical lines are already closed in state waters due to the protections for North Atlantic Right Whales. The representative from New Hampshire reminded the WG that trawling is not allowed in state waters. Instead they would potentially implement a trap fishery, but would need to check with their industry members first to see if they are interested in participating in a trap fishery. The Maine representative said that if the Commission relinquished authority, Maine would likely first engage in a dialogue with industry representatives to see what their preferences are. The Maine representative indicated the possibility of opening a personal use trap fishery with a limited season and possession limit, similar to what was proposed by Maine at the Section meeting in December of 2021.

The WG then discussed the timing of the Commission relinquishing control of the Northern Shrimp FMP and next steps from the federal perspective. The WG agreed that this discussion warranted at least two Section meetings. The first meeting would consist of presenting the work conducted by the WG and TC thus far, and the second would involve taking up the question of whether to forward the recommendation to relinquish the FMP. Ideally, the first Section meeting would take place in late summer and the second in the fall. If the Commission relinquished control of the FMP, northern shrimp would still need to be managed in federal waters. NOAA Fisheries would likely recommend that the Northern Shrimp FMP be picked up by the Council. However, the WG agreed that it would likely take at least a year for the Council to transition to a new FMP for northern shrimp. The federal representative on the WG indicated that in the interim NOAA Fisheries would likely begin writing an emergency rule, if and when it becomes clear that the Commission intends to relinquish control of the FMP.



# Atlantic States Marine Fisheries Commission

## Northern Shrimp Section

---

*Sustainable and Cooperative Management of Atlantic Coastal Fisheries*

---

Northern Shrimp Section  
August 18, 2022

For more information, please  
contact Toni Kerns, ISFMP,  
Tina Berger, Communications  
or the identified individual at  
703.842.0740

### Meeting Summaries, Press Releases and Motions

#### TABLE OF CONTENTS

**NORTHERN SHRIMP SECTION (AUGUST 18, 2022) ..... 2**  
*Meeting Summary..... 2*

## **NORTHERN SHRIMP SECTION (AUGUST 18, 2022)**

### ***Meeting Summary***

The Northern Shrimp Section (Section) met in person in Portland, Maine to review the potential effects of losing funding for the summer survey and discuss the possibility of the Atlantic States Marine Fisheries Commission (Commission) relinquishing management authority of northern shrimp.

For several years, funding for the Northern Shrimp Summer Survey has been in question, which represents a potential loss of important data for informing the northern shrimp stock assessments and management. Dr. Katie Drew, the lead stock assessment scientist for northern shrimp, presented initial exploratory model runs that aimed to demonstrate the efficacy of the stock assessment model if these data were no longer available. While the model does not perform as well without the summer survey data, this analysis demonstrated that the remaining survey data inputs from the Maine-New Hampshire Inshore Trawl Survey and the Northeast Fisheries Science Center Bottom Trawl Survey allow the model to still make projections about general population trends.

The Section also received a presentation on the potential ramifications of the Commission relinquishing management authority of northern shrimp. The Section determined further consultation with NOAA Fisheries is needed prior to further consideration of this issue. Specifically, the Section is interested in learning whether the Magnuson-Stevens Act (MSA) standards would apply to northern shrimp management in state waters if the Commission relinquished management control of the species. In addition, Section members requested further consideration be given to implementing a permanent moratorium along with developing a science-based trigger for reopening the fishery. The fishery has been under a moratorium since 2014 in response to a collapsed stock. At the meeting, several Section members voiced support for implementing a permanent moratorium rather than revisiting the decision to re-open the fishery every year. The Section tasked the Northern Shrimp Technical Committee to work collaboratively with the Northern Shrimp Work Group to develop a set of biological indicators along with a threshold that could serve as a trigger to indicate when the northern shrimp stock approaches a healthy population level that may be able to support a viable fishery. When developing potential triggers, the Technical Committee and Work Group will need to consider the fact that data collected from the summer survey may not be available in future years.

The Section plans to meet again in early 2023 to continue discussion on how best to move forward with northern shrimp management either through a continued moratorium or fully relinquishing management control. It will also review progress on the development of the moratorium triggers and a stock assessment data update.

Finally, the Section congratulated Maggie Hunter, Technical Committee Chair, on her retirement from Maine's Department of Marine Resources and her over 20 years of service on the Northern Shrimp Technical Committee. Toni Kerns, ASMFC Fisheries Policy Director, presented Maggie with a Commission bronze compass rose pin. This commemorative pin was designed to honor the long-term contributions of individuals to the Commission's programs and activities. Like the points in the compass rose, those who receive the commemorative pin have played an important role in advancing the Commission's mission and vision.

For more information, please contact Dustin Colson Leaning, Fishery Management Plan Coordinator, at [dleaning@asmfc.org](mailto:dleaning@asmfc.org) or 703.842.0740.

# Potential Effects of Eliminating the ASMFC Summer Survey on the Northern Shrimp Stock Assessment

April 2022

## Introduction

Funding for the ASMFC-NOAA Summer “Shrimp” Survey is in jeopardy, and it is likely that the survey will be eliminated in the next few years. The Summer Survey is the longest time series with the best information on the Gulf of Maine northern shrimp population, but there are other surveys that provide information on northern shrimp, the NEFSC Fall Bottom Trawl Survey and the ME-NH Spring Inshore Trawl Survey, that can support the model in the future. The NEFSC Fall Trawl Survey is currently included in the model, but the data are generally not available for the terminal year of the assessment, as the assessment is run while the survey is taking place. The ME-NH Inshore Survey is not currently included in the assessment, but the spring data would be available for the terminal year of the assessment. All three surveys have shown similar trends over the years, with the exception of a period between 2007-2010 where the Summer Survey and the NEFSC Bottom Trawl Survey were declining and the ME-NH Inshore Trawl Survey was increasing (Figure 1). The ME-NH Trawl Survey peaked in 2010, while the other two surveys peaked in 2006, but after 2010, the ME-NH Trawl Survey declined precipitously and joined the other surveys at time-series lows from 2013-2021.

Note that this report does not address species other than northern shrimp, although several other species assessments use Summer Survey data.

## Methods

To look at potential effects of losing information from the Summer Survey in the near term, the Northern Shrimp Technical Committee (NSTC) compared the results from the current northern shrimp stock assessment model that used different configurations of input data that included truncating the Summer Survey from 2018-2021. The scenarios explored were:

1. Base case: all years of Summer Survey (1984-2021) and NEFSC Fall Bottom Trawl (1986-2019)
2. Base case + ME-NH: all years of Summer Survey (1984-2021) and NEFSC Fall Bottom Trawl (1986-2019), plus all years of the ME-NH Spring Inshore Trawl Survey (2003-2021)
3. Shorter Summer Survey: Remove 2018-2021 from the Summer Survey time series, include all years of the NEFSC Fall Bottom Trawl
4. Shorter Summer Survey + ME-NH: Remove 2018-2021 from the Summer Survey time series, include all years of the NEFSC Fall Bottom Trawl and all years of the ME-NH Spring Inshore Trawl Survey
5. No Summer Survey at all + ME-NH: Drop the Summer Survey time series entirely and fit the model with only the NEFSC Fall Bottom Trawl and the ME-NH Spring Inshore Trawl Survey

In addition, the NSTC was interested in looking at the potential impacts of survey changes during a time period of conflicting information in the indices, so a series of runs with a terminal year of 2011 was also conducted. Those scenarios included:

6. Base case, end in 2011: Summer Survey (1984-2011) and NEFSC Fall Bottom Trawl Survey (1986-2010)
7. Base case + ME-NH, end in 2011: Summer Survey (1984-2011), NEFSC Bottom Trawl Survey (1986-2010), and ME-NH Spring Inshore Trawl Survey (2003-2011)
8. Shorter Summer Survey + ME-NH, end in 2011: Remove 2009-2011 from the Summer Survey time series, include all years of the ME-NH Spring and NEFSC Fall surveys

In addition to comparing the model estimates of spawning stock biomass,  $F$ , and recruitment from the different scenarios, a set of short term projections were run using Scenario 4 (shortened Summer Survey with the ME-NH Spring and NEFSC Fall surveys, terminal year 2021).

## Results

### *Terminal Year 2021 Runs*

Overall, losing a few years of the Summer Survey data did not significantly impact the results of the stock assessment. However, without the Summer Survey, the model was more optimistic about the stock trajectory in recent years. The scenario that dropped the Summer Survey entirely was the most optimistic, both historically and in recent years. Without the Summer Survey, population trends were generally similar, but the model estimated a slightly higher SSB and recruitment and lower  $F$  at the beginning of the time series (although not in all years), and SSB did not decline as significantly as the base model run from 2012-2021 (Figure 2-4). The shortened Summer Survey without the addition of the ME-NH Spring Survey was the most optimistic of the runs that did include the Summer Survey, showing higher recruitment (Figure 2) and a more rapidly increasing trend in SSB (Figure 3) from 2018-2021 compared to the base model. Adding the ME-NH Spring Inshore Trawl Survey to the run with the shortened Summer Survey brought those estimates of recruitment and SSB more in line with the estimates of the base run with the full Summer Survey. The 2020 estimate of recruitment for that scenario was still very high compared to the base run and the 2019 and 2021 estimates; however, none of the surveys were conducted in 2020, and that was the second to last year of the time series, so there was very little information to help inform that data point. Estimates of average  $F$  were very similar across the runs as well (Figure 4).

### *Terminal Year 2011 Runs*

The model struggled to converge somewhat with the terminal year of 2011, but the configurations that did converge showed very similar results across all scenarios, in comparison to the base case with the terminal year of 2011 (Figures 5-7). The base case with the terminal year of 2021 had lower  $F$  and higher SSB during this time period, the effect of adding more years of data to the model. Although the trend in the ME-NH Spring Inshore Trawl Survey differed from the trend in the other surveys, the additional information from the catch-at-length supported the trend in the other surveys and the model was not strongly influenced by the ME-NH Spring Inshore Trawl Survey trend.

### *Projections*

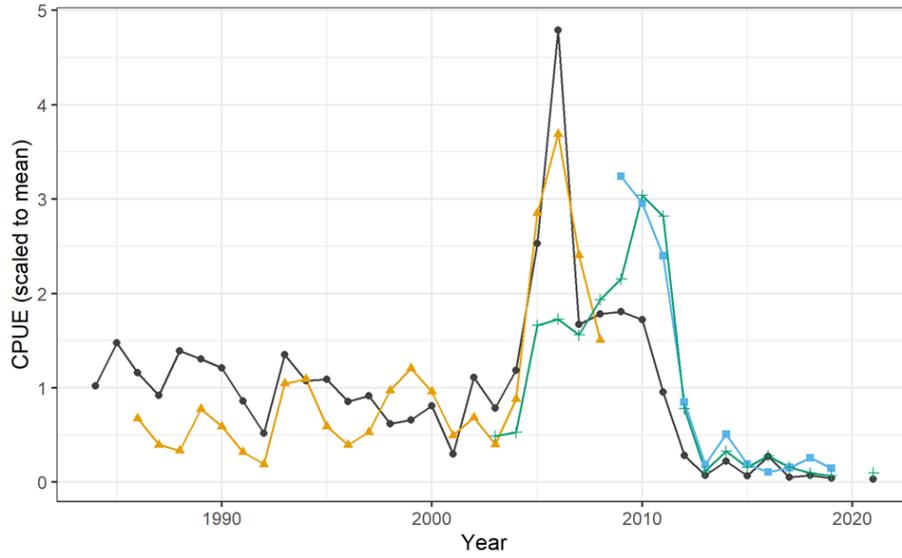
The scenario with the shortened Summer Survey time series and the ME-NH Spring Inshore Trawl Survey included were more optimistic in the first two years of the projections than the base run (Figures 8-9). This was most likely due to the higher estimates of SSB and recruitment in the most recent few years, especially the high 2020 recruitment value. However, under the recent M and recent recruitment conditions, SSB declined after that and even under zero fishing mortality, the probability of SSB being above SSB in 2021 was very low.

### **Discussion**

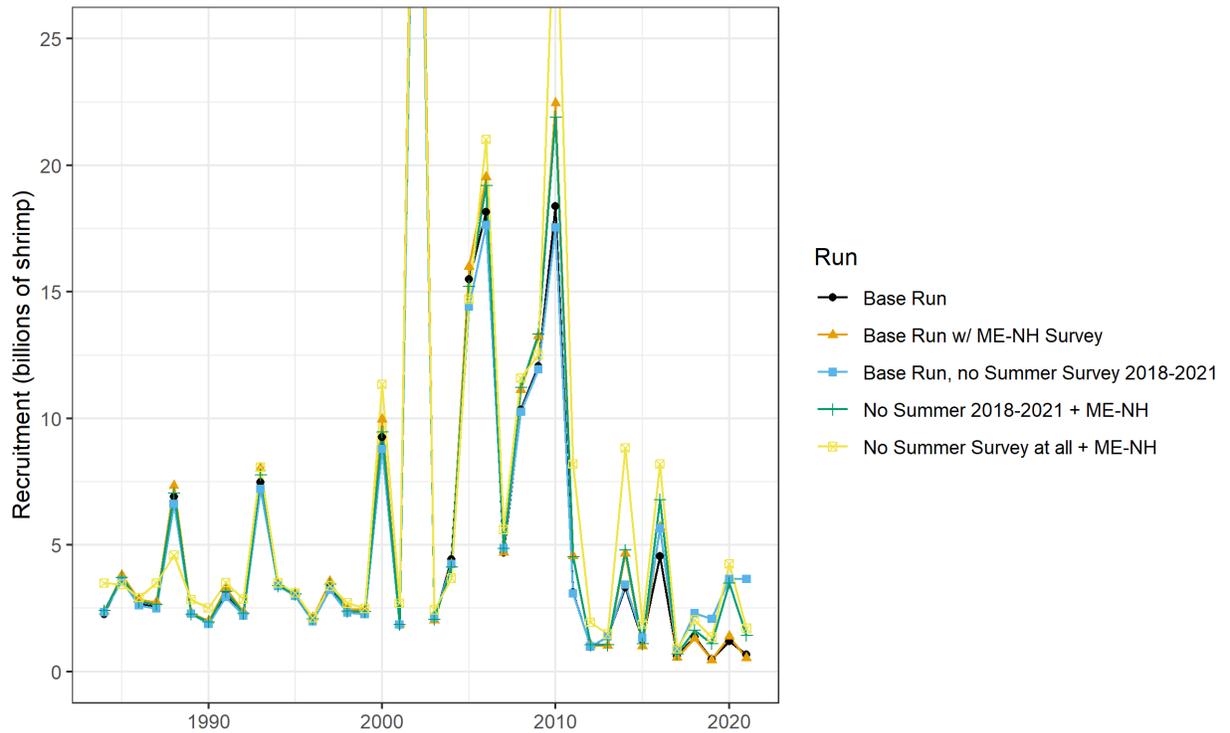
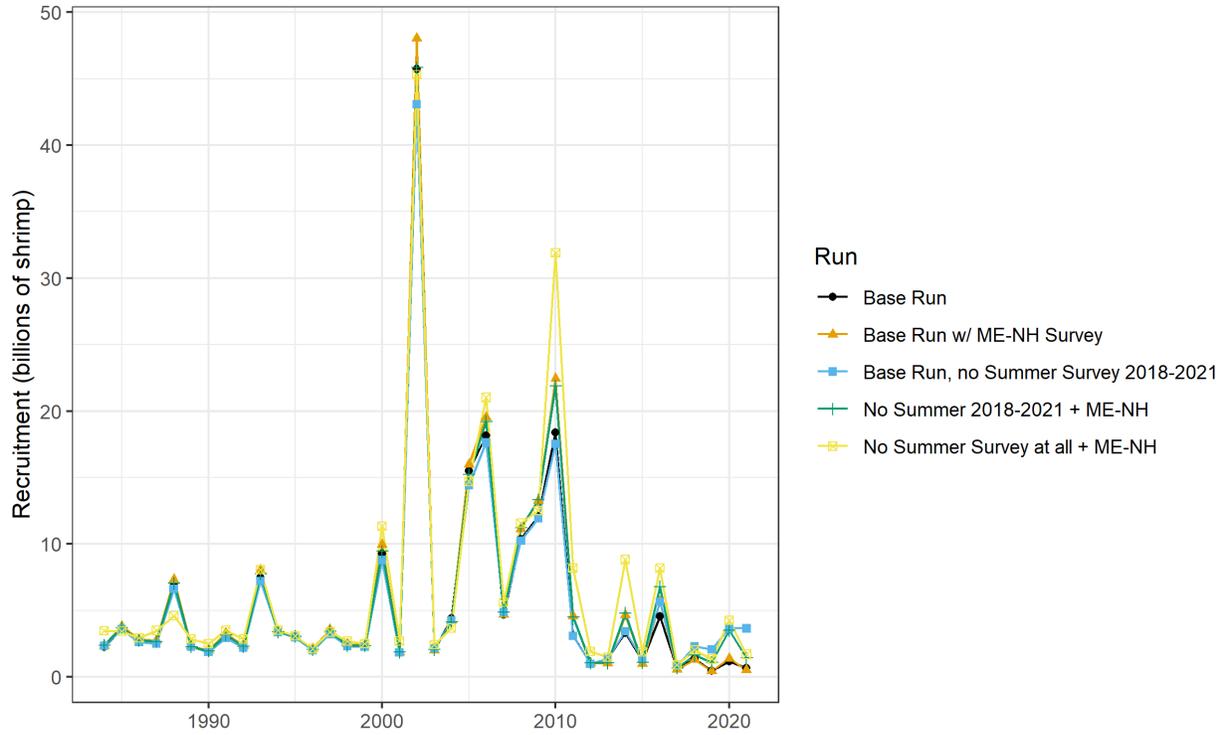
While removing the last few years of data from the Summer Survey did not significantly change our perception of stock status in recent years – the stock was still depleted compared to the historical abundance, and SSB in 2021 was still below the 20<sup>th</sup> percentile of 1984-2017 (Figure 10) – the models were all more optimistic about SSB and recruitment for those years without the Summer Survey data. Including the ME-NH Spring Inshore Trawl Survey with the shortened Summer Survey produced results that were more similar to the base run than to the run with only the shortened Summer Survey and the NEFSC Fall Bottom Trawl Survey. Similarly, projections indicated that under current M and recruitment conditions, even very low or zero fishing pressure will cause the stock to decline in a few years.

The runs with the terminal year of 2011 had more difficulty converging, which may have been due to the difference in trends between the ME-NH Spring Inshore Trawl Survey and the NEFSC Fall Bottom Trawl Survey during this time or may have been due to the pattern in the other indices, which showed a sharp increase followed by a sharp decrease over approximately a single shrimp generation. Adding the 2011 data from the NEFSC Fall Survey was required to get these runs to converge; in a real assessment, those data would not have been available during the usual assessment timeline. This suggests that conflicting data in future years may cause problems with convergence or may require a delay in the assessment timeline to incorporate the NEFSC Fall Bottom Trawl Survey data, but the degree to which that affects the results will depend on how significant the divergence is between the data sources.

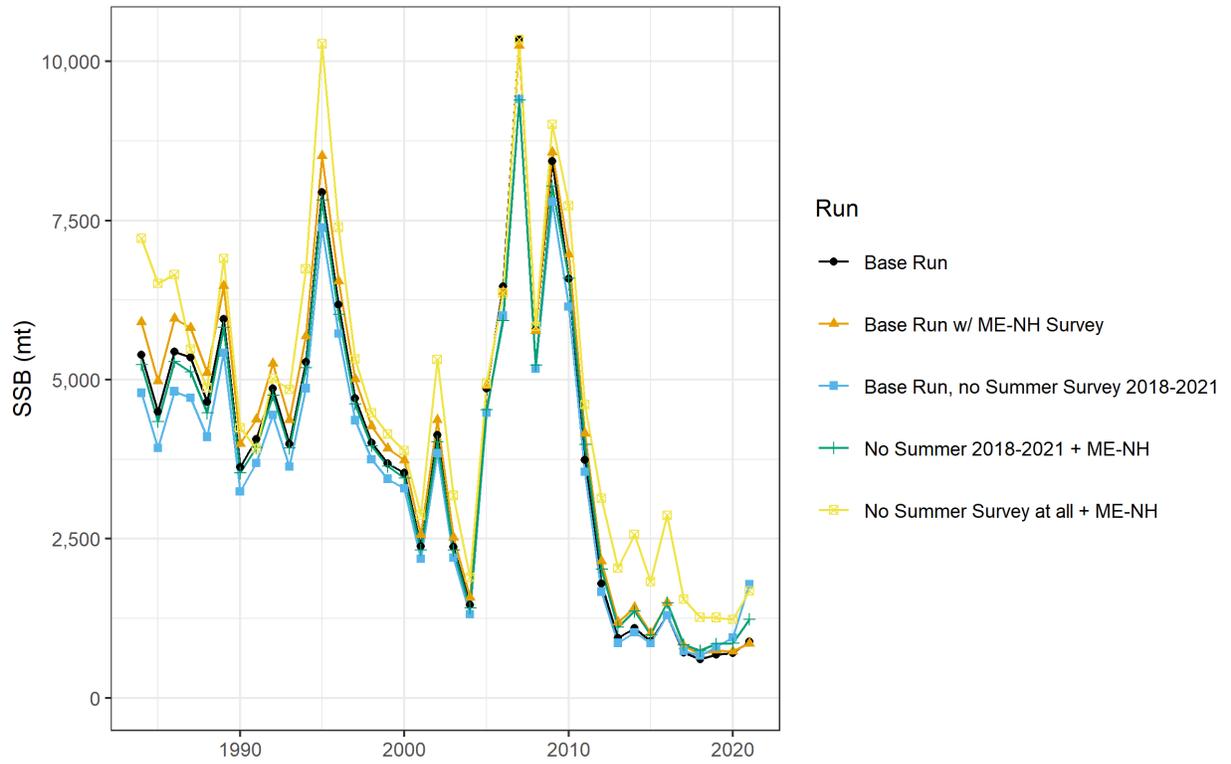
The NEFSC Fall Bottom Trawl Survey and the ME-NH Spring Inshore Trawl Survey can still inform the stock assessment model in the absence of the Summer Survey in the near term. However, results should be interpreted cautiously, as they were more optimistic than the results of the model with the Summer Survey. A full simulation study would be necessary to evaluate the degree of this bias and long term consequences of the loss of the Summer Survey.



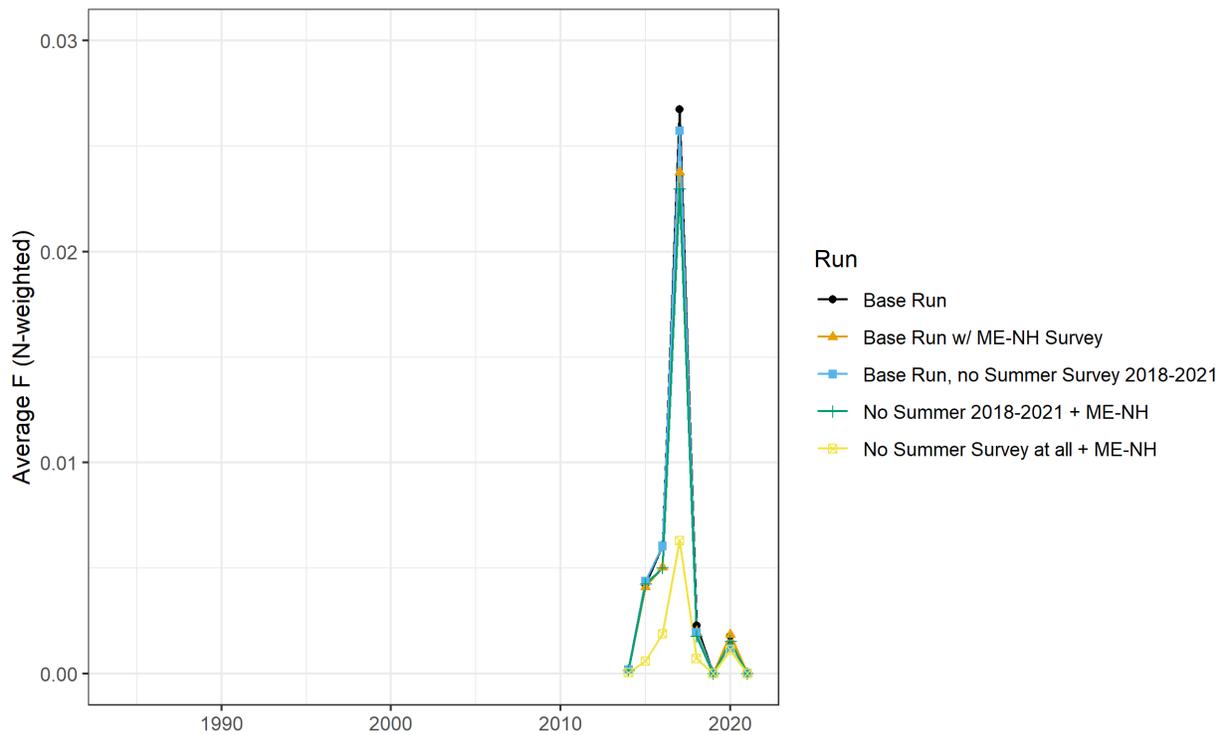
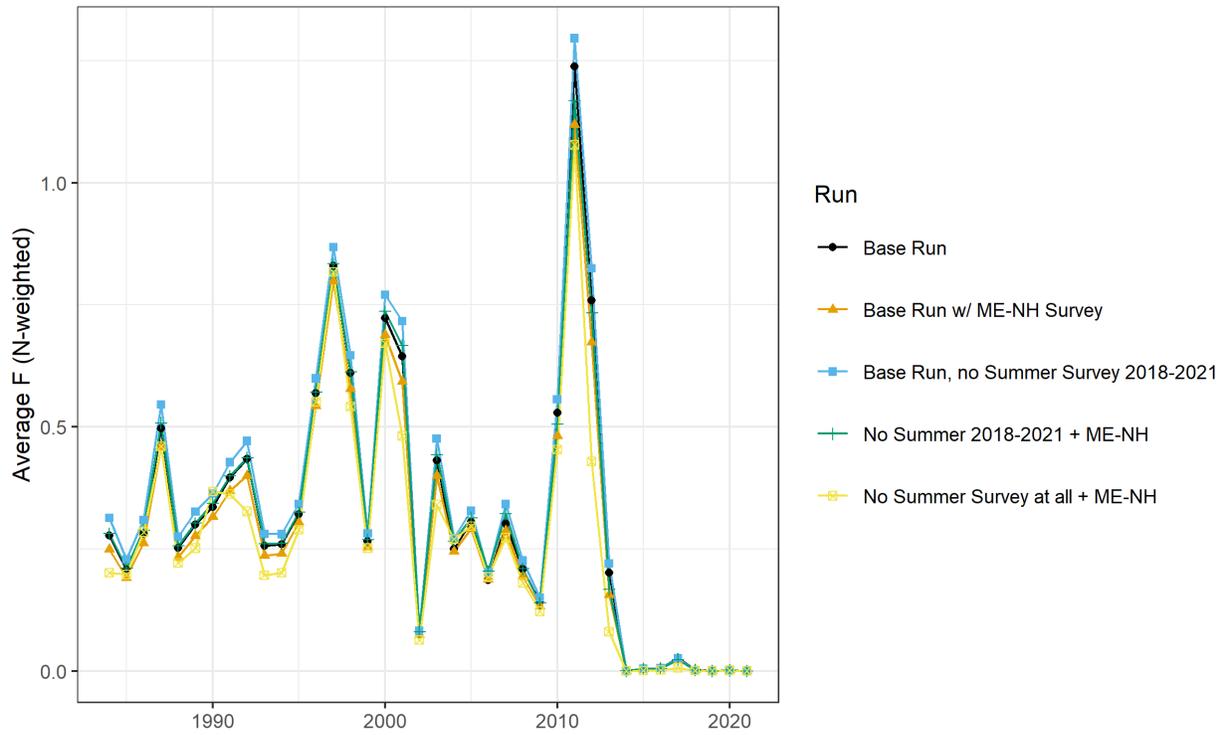
Survey —●— ASMFC Summer Survey —▲— NEFSC Fall Albatross —■— NEFSC Fall Bigelow —+— ME-NH Spring  
**Figure 1. Standardized survey indices of abundance for Gulf of Maine northern shrimp for 1984-2021.**



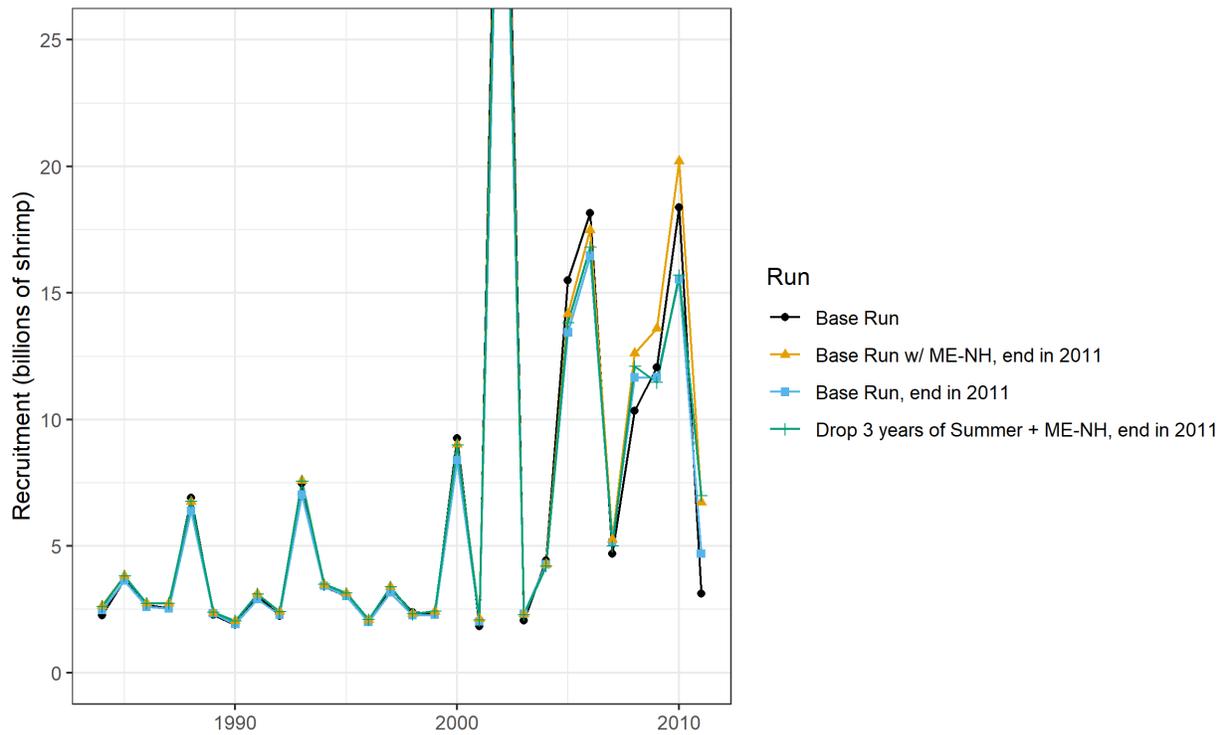
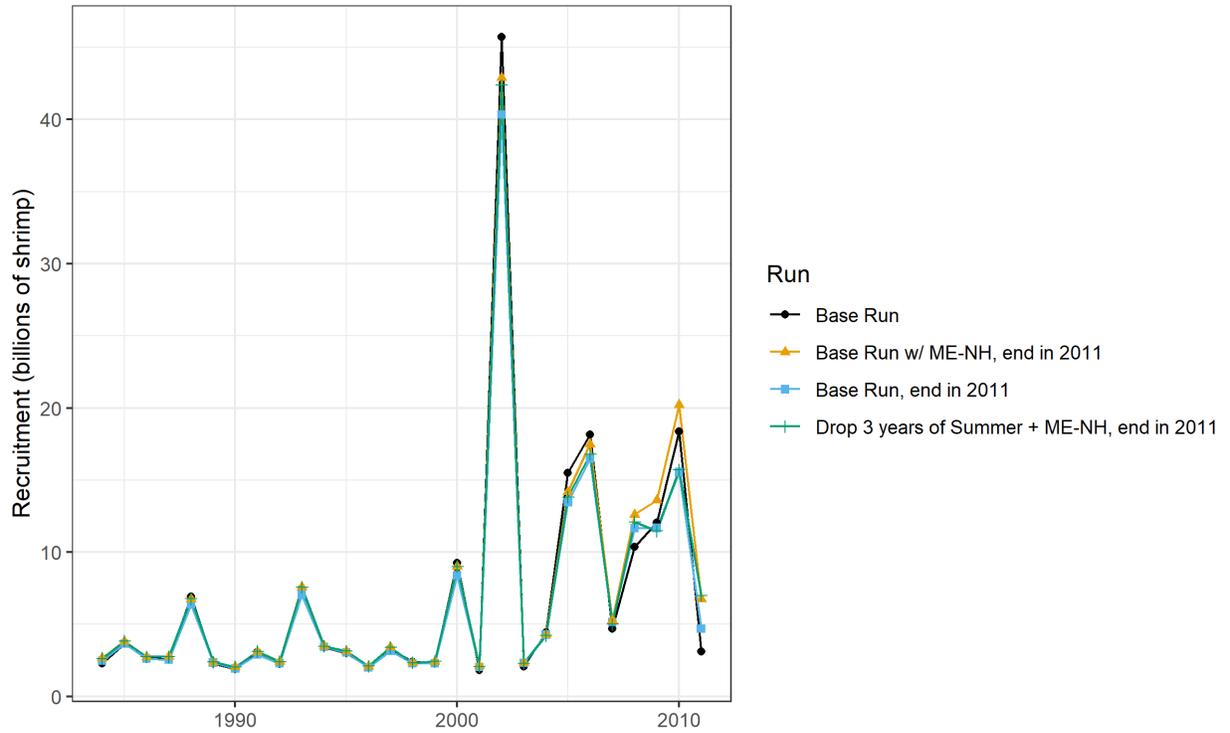
**Figure 2. Recruitment estimates under different survey scenarios for the model with a terminal year of 2021. Y-axis has been truncated to show detail in lower figure.**



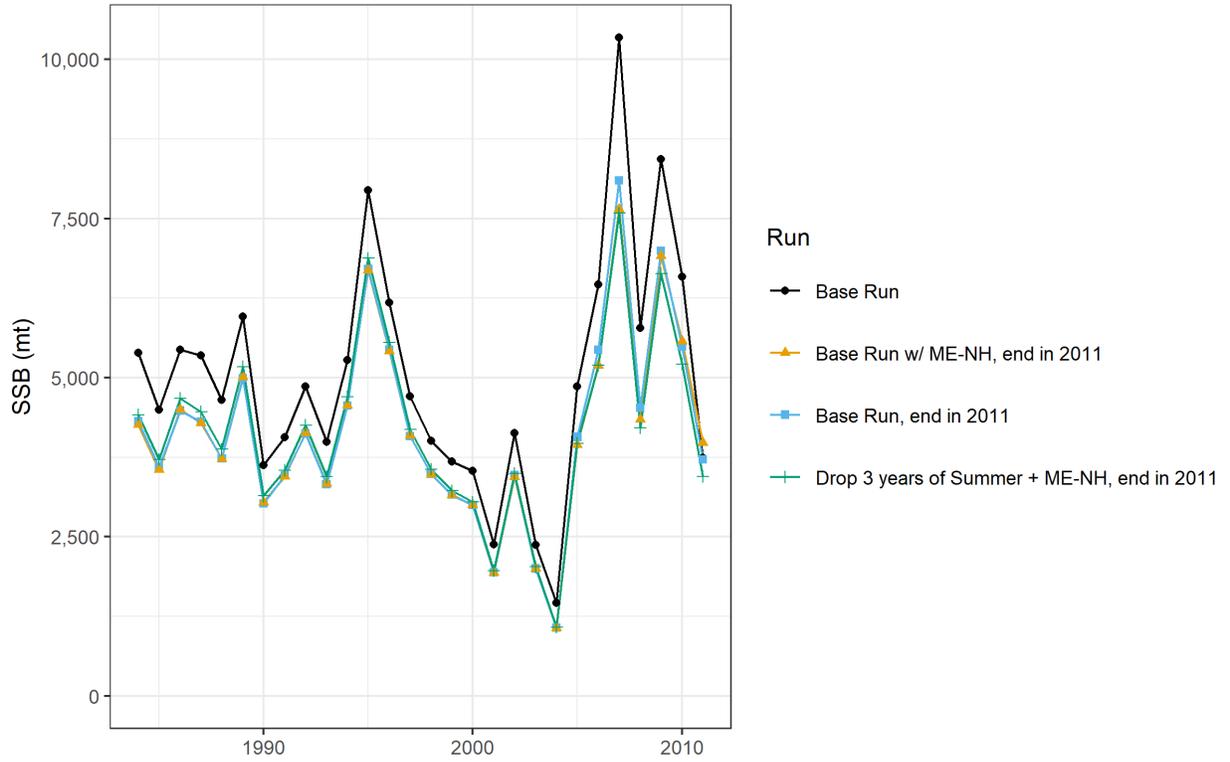
**Figure 3. SSB estimates under different survey scenarios for the model with a terminal year of 2021.**



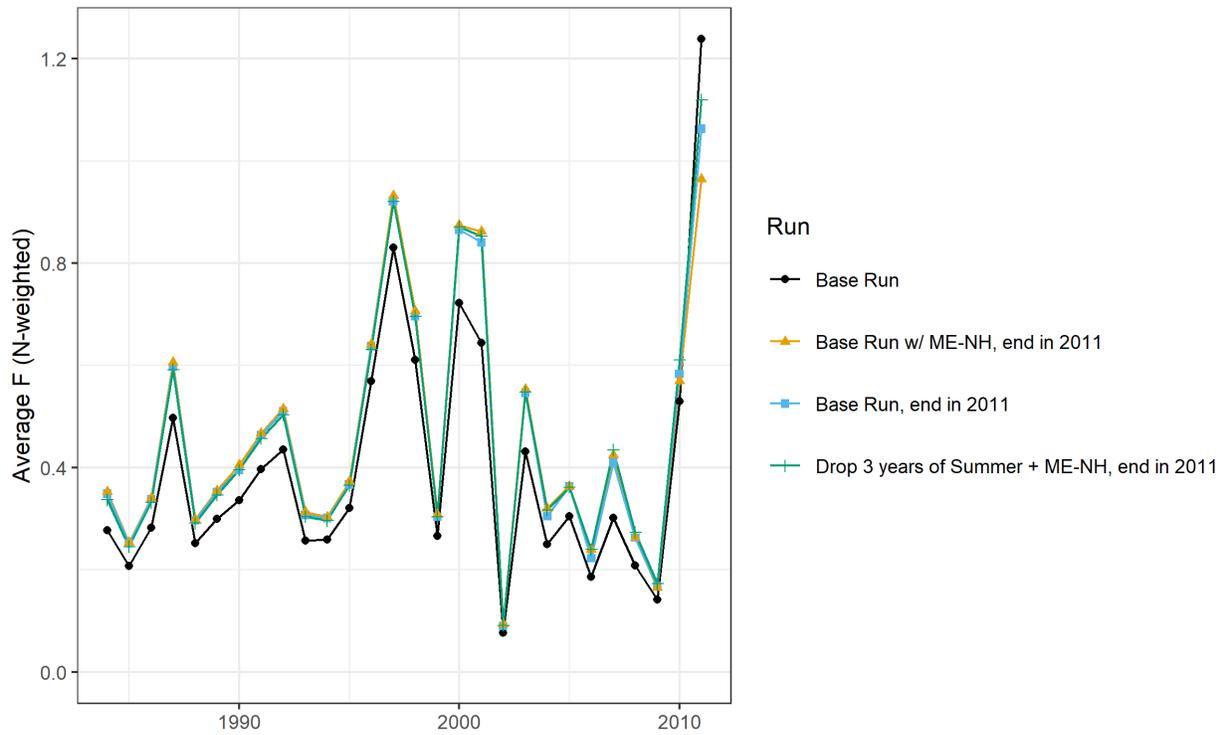
**Figure 4. Average  $F$  estimates under different survey scenarios for the model with a terminal year of 2021. Y-axis has been truncated to show detail in lower figure.**



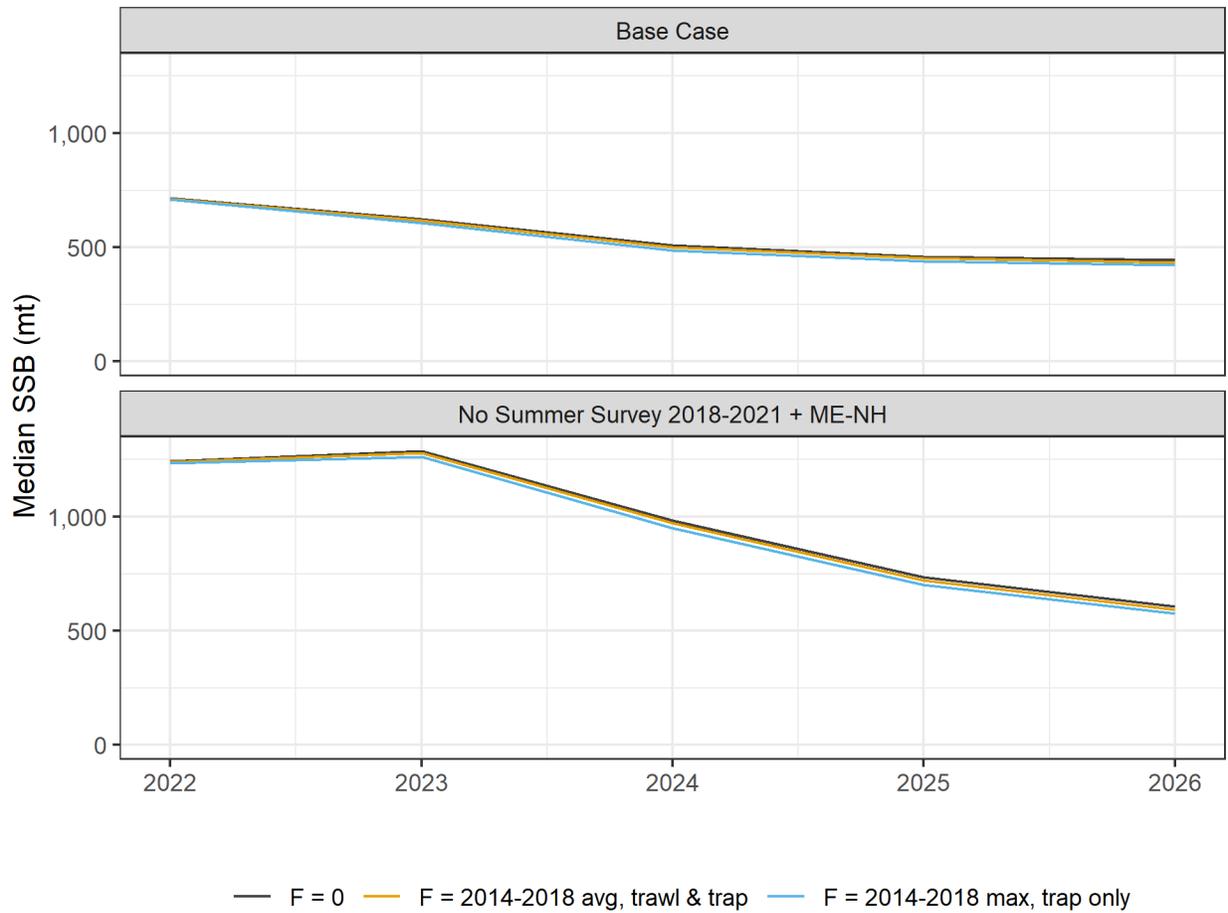
**Figure 5. Recruitment estimates under different survey scenarios for the model with a terminal year of 2011. Y-axis has been truncated to show detail in lower figure.**



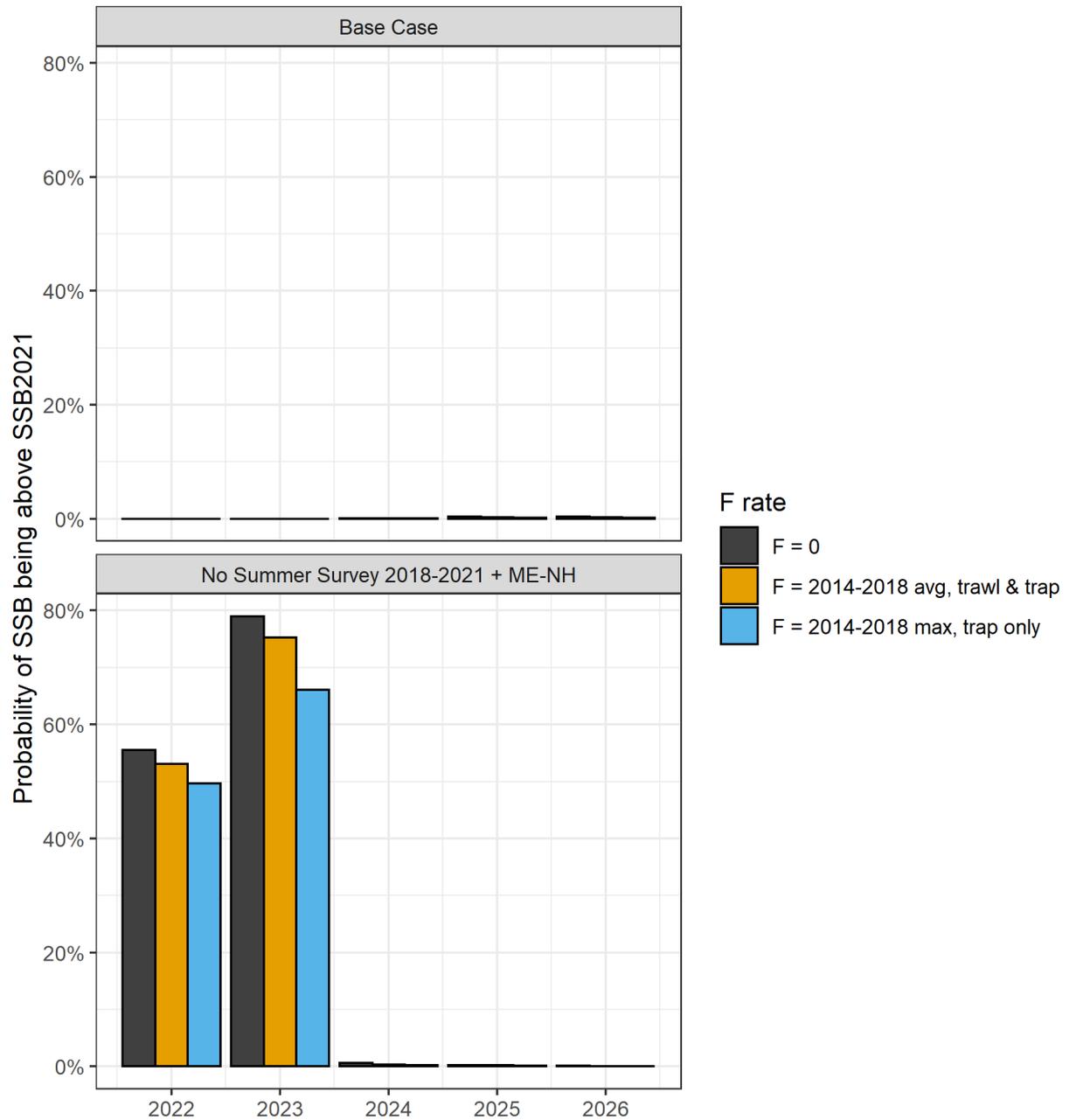
**Figure 6. SSB estimates under different survey scenarios for the model with a terminal year of 2011.**



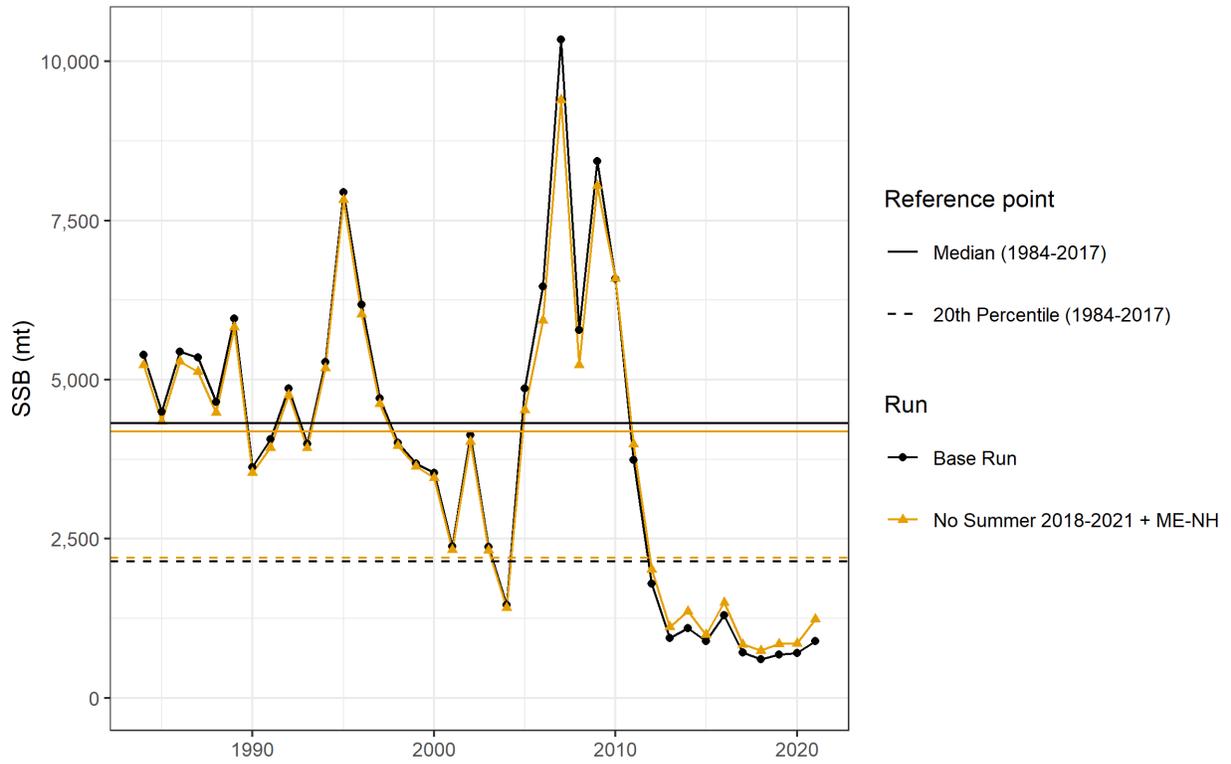
**Figure 7. Average  $F$  estimates under different survey scenarios for the model with a terminal year of 2011.**



**Figure 8. Median projected SSB under recent M and recruitment conditions and varying  $F$  rates for the base model run (top) and the run with the shortened Summer Survey and the ME-NH Spring and NEFSC Fall surveys (bottom).**



**Figure 9. Probability of SSB being above SSB<sub>2021</sub> under recent M and recruitment conditions and varying F rates for the base model run (top) and the run with the shortened Summer Survey and the ME-NH Spring and NEFSC Fall surveys (bottom).**



**Figure 10. SSB from the base run and the run with the shortened Summer Survey and the ME-NH and NEFSC surveys plotted with the median and 20<sup>th</sup> percentile of SSB from 1984-2017 for each model.**