Atlantic States Marine Fisheries Commission

ADDENDUM XXVII TO AMENDMENT 3 TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR AMERICAN LOBSTER

Increasing Protection of the Gulf of Maine/Georges Bank Spawning Stock

May 2023

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

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1.0 INTRODUCTION

The Atlantic States Marine Fisheries Commission (ASMFC) has coordinated the interstate management of American lobster (*Homarus americanus)* from 0-3 miles offshore since 1996. American lobster is managed under Amendment 3 and Addenda I-XXVII to the Interstate Fishery Management Plan (FMP). Management authority in the exclusive economic zone (EEZ) from 3-200 miles from shore lies with NOAA Fisheries. The management unit includes all coastal migratory stocks between Maine and Virginia. Within the management unit there are two lobster stocks and seven management areas. The Gulf of Maine/Georges Bank (GOM/GBK) stock (subject of this addendum) is primarily comprised of three Lobster Conservation Management Areas (LCMAs), including LCMAs 1 (GOM), 3 (federal waters), and Outer Cape Cod (OCC) (Figure 1). There are three states (Maine through Massachusetts) which regulate American lobster in states waters of the GOM/GBK stock; however, landings from the GOM/GBK stock occur from Rhode Island through New York and these states regulate the landings of lobster in state ports.

The American Lobster Management Board (Board) initiated Addendum XXVII as a proactive measure to increase protection of the GOM/GBK spawning stock. Since the early 2000s, landings in the GOM/GBK stock have exponentially increased. In Maine alone, landings have increased three-fold from 57 million pounds in 2000 to a record high of 132.6 million pounds in 2016. Maine landings have declined slightly but were still near time-series highs at 97.9 million and 108.9 million in 2020 and 2021, respectively. However, since 2012, lobster juvenile settlement surveys throughout the GOM have generally been below the time series averages in all areas. These surveys, which measure trends in the abundance of newly-settled lobster, can be used to track populations and potentially forecast future landings. Consequently, persistent lower densities of settlement could foreshadow decline in recruitment and landings. In the most recent years of the time series, declines in other recruit indices have already been observed.

Given the American lobster fishery is one of the largest and most valuable fisheries along the Atlantic coast, potential decreases in abundance and landings could result in vast economic and social consequences. With peak values in 2016 and 2021, the at-the-dock value of the American lobster fishery has averaged $660 million dollars from 2016-2021, representing the highest ex-vessel value of any species landed along the Atlantic coast during peak years. Ex-vessel value declined slightly from 2017 to 2020, but not proportionally to declines in landings. The vast majority of the overall landings value (>90%) comes from the GOM/GBK stock, and more specifically from the states of Maine through Rhode Island. As a result, the lobster fishery is an important source of jobs (catch, dock side commerce, tourism, etc.) and income for many New England coastal communities. The lack of other economic opportunities, both in terms of species to fish and employment outside the fishing industry, compounds the economic reliance of some coastal communities on GOM/GBK lobster – particularly in Maine.

Addendum XXVII responds to signs of reduced juvenile settlement and the combination of the GOM and GBK stocks following the 2015 Stock Assessment. The Board specified the following objective statement for Addendum XXVII:

***Given persistent low settlement indices and recent decreases in recruit indices, the addendum should consider a trigger mechanism such that, upon reaching the trigger, measures would be automatically implemented to increase the overall protection of spawning stock biomass of the GOM/GBK stock*.**

Addendum XXVII implements management measures—specifically gauge and vent sizes—that are expected to add an additional biological buffer through the protection of spawning stock biomass (SSB). The Addendum also standardizes some management measures within and across LCMAs in the GOM/GBK stock. Increasing consistency in measures helps to resolve discrepancies between the regulations for state and federal permit-holders, to provide a consistent conservation strategy, and simplify enforcement across management areas and interstate commerce.

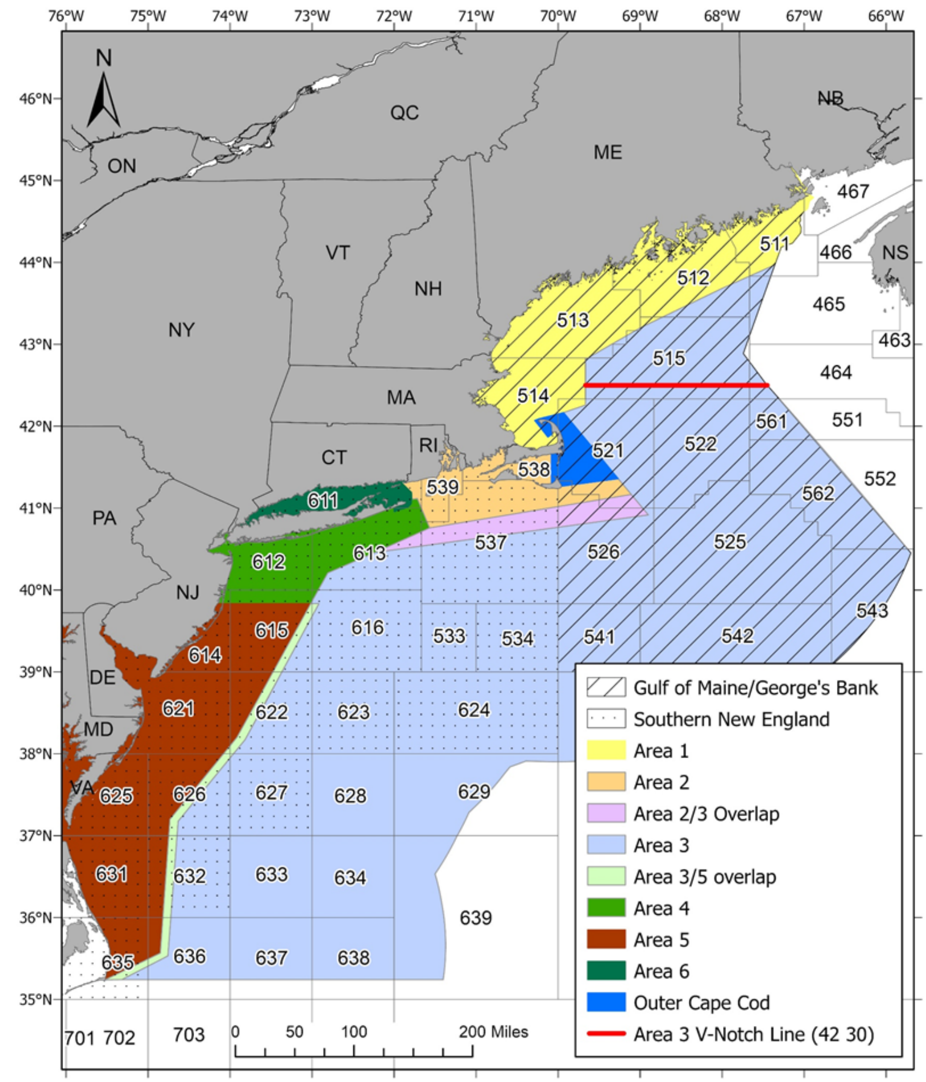

Figure 1. Lobster Conservation Management Areas in the American lobster fishery. LCMAs 1, 3, and Outer Cape Cod make up the majority of the GOM/GBK stock. The Area 3 v-notch line is shown in red where v-notching is required north of the 42^{o}30' line.

2.0 OVERVIEW

2.1 Statement of Problem

While 2016 landings in the GOM/GBK lobster fishery were the highest on record, settlement surveys for more than five years have consistently been below the 75th percentile of their time series, indicating neutral or poor conditions. Additionally, there is evidence of declines in recruit abundance in ventless trap survey and trawl surveys for the GOM/GBK stock since the most recent stock assessment. These declines could indicate future declines in recruitment and landings. Given the economic importance of the lobster fishery to many coastal communities in New England, especially in Maine, potential reductions in landings could have vast socioeconomic impacts. In addition, the 2015 Stock Assessment combined the GOM and GBK stocks into a single biological unit due to evidence of migration between the two regions. This resulted in varying management measures within a single biological stock. In response to these two issues, the Board initiated Addendum XXVII to consider the standardization of management measures across LCMAs.

However, in 2021, the Board revised the focus of Addendum XXVII to prioritize increasing biological resiliency of the stock over standardization of management measures across LCMAs. Increased resiliency may be achieved without completely uniform management measures, so the main objective of the Addendum is to increase the overall protection of SSB while also considering management options that are more consistent than status quo. Increasing consistency across management areas may help to address some assessment and enforcement challenges, as well as concerns regarding the shipment and sale of lobsters across state lines.

2.2 Status of the GOM/GBK Fishery

The GOM/GBK fishery has experienced incredible growth over the past two decades. Throughout the 1980s, GOM/GBK landings averaged 35 million pounds, with 91% of landings coming from the GOM portion of the stock. In the 1990s, landings slightly increased to an average of 53 million pounds; however, landings started to rapidly increase in the mid-2000s. Over a one-year span (2003-2004), landings increased by roughly 18 million pounds to 86 million pounds. This growth continued through the 2000s with 97 million pounds landed in 2009 and 113 million pounds landed in 2010. Landings continued to increase and peaked at 156 million pounds in 2016 (Figure 2).

In the peak year of 2016, Maine alone landed 132.7 million pounds, representing an ex-vessel value of over $541 million. The states of Maine through Rhode Island (the four states that account for the vast majority of harvest from the GOM/GBK stock), landed 158 million pounds in 2016, representing 99% of landings coastwide. Total ex-vessel value of the American lobster fishery in 2016 was $670.4 million, the highest valued fishery along the Atlantic coast in 2016. While landings have declined slightly from peak levels in 2016, they remain near all-time highs. Coastwide landings and ex-vessel value for 2017-2021 averaged 133.4 million pounds and $658.4 million, respectively. However, ex-vessel value in 2021 increased and was estimated at over $924 million, the highest value in the time series.

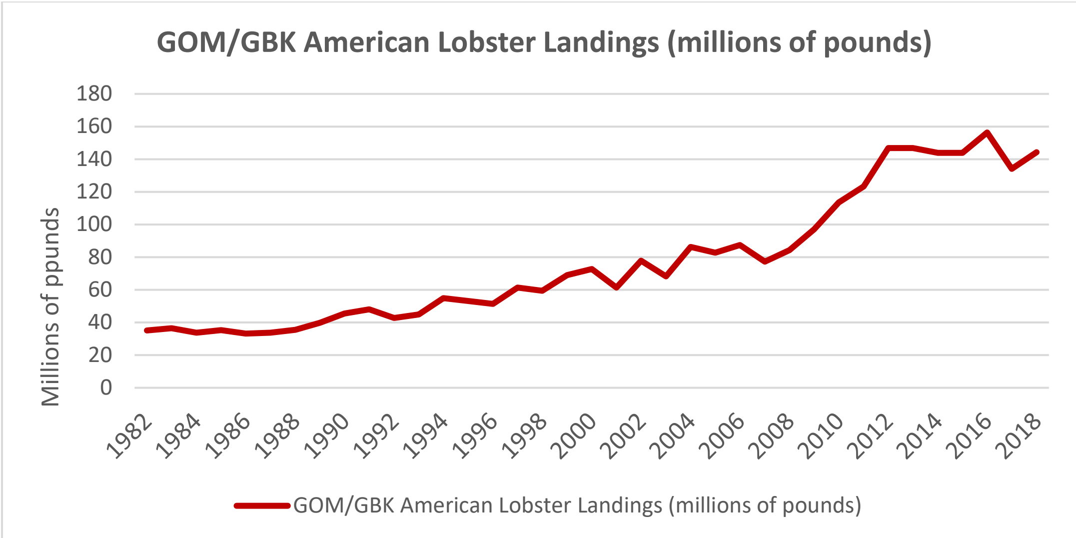

Figure 2. Landings in the GOM/GBK stock (1982-2018). Stock-specific landings are updated during each benchmark stock assessment.

2.3 Status of the GOM/GBK Stock

2.3.1 2020 Stock Assessment

Results of the 2020 Benchmark Stock Assessment indicate a dramatic overall increase in the abundance of lobsters in the GOM/GBK stock since the late 1980s. After 2008, the rate of increase accelerated, and the stock reached a record high abundance level in 2018. Based on a new analysis to identify shifts in the stock that may be attributed to changing environmental conditions and new baselines for stock productivity, the GOM/GBK stock shifted from a low abundance regime during the early 1980s through 1995 to a moderate abundance regime during 1996-2008, and shifted once again to a high abundance regime during 2009-2018 (Figure 3). Spawning stock abundance and recruitment in the terminal year of the assessment (2018) were near record highs. Exploitation (proportion of stock abundance removed by the fishery) declined in the late 1980s and has remained relatively stable since.

Based on the new abundance reference points adopted by the Board, the GOM/GBK stock is in favorable condition. The average abundance from 2016-2018 was 256 million lobsters, which is greater than the fishery/industry target of 212 million lobsters. The average exploitation from 2016-2018 was 0.459, below the exploitation target of 0.461. Therefore, the GOM/GBK lobster stock is not depleted and overfishing is not occurring.

However, stock indicators based on observed data were also used as an independent, model-free assessment of the lobster stocks, and some of these have shown concerning trends. These indicators included exploitation rates as indicators of mortality; young-of-the-year (YOY), fishery recruitment, and spawning stock biomass (SSB) as indicators of abundance; encounter rates as indicators of distribution; and total landings, effort, catch per unit effort, and monetary

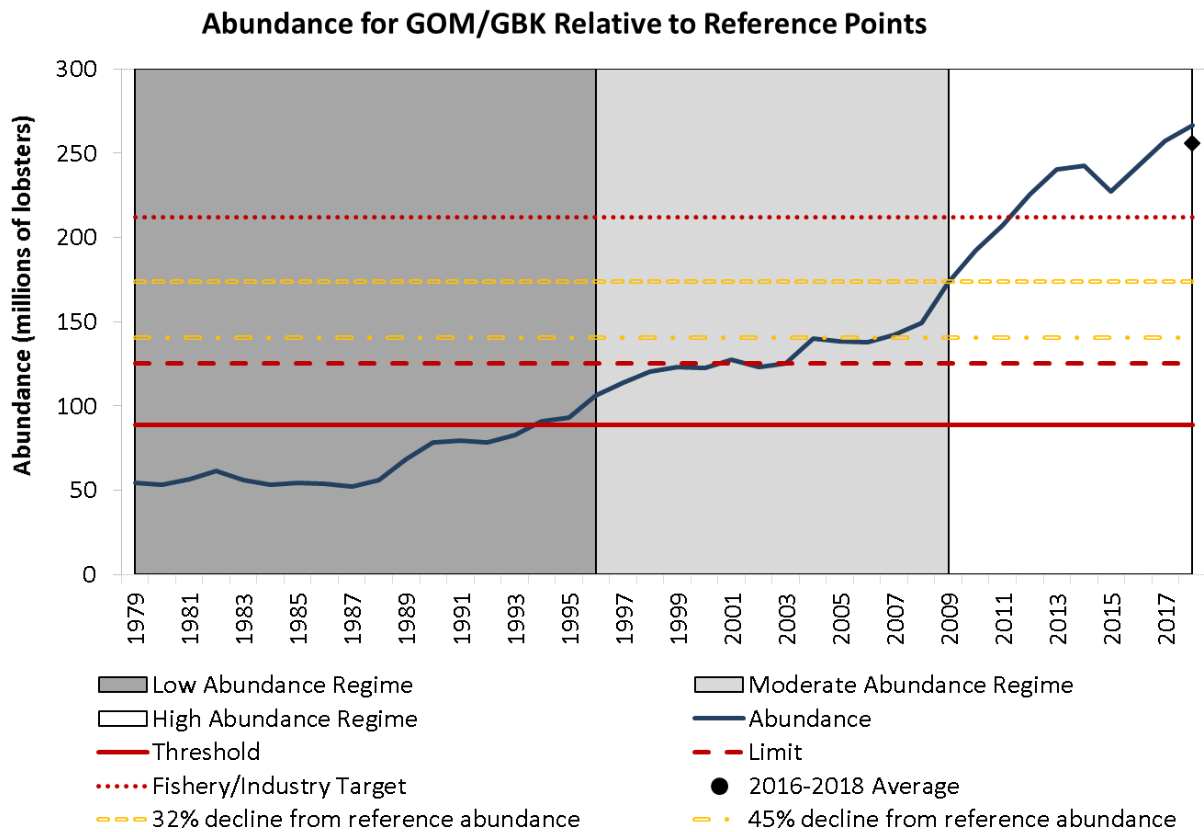

Figure 3. GOM/GBK stock abundance from the 2020 Stock Assessment.

measures as fishery performance indicators. Additionally, annual days with average water temperatures >20°C at several temperature monitoring stations and the prevalence of epizootic shell disease in the population were added as indicators of environmental stress. The 20°C threshold is a well-documented threshold for physiological stress in lobsters. Epizootic shell disease is considered a physical manifestation of stress that can lead to mortality and sub-lethal health effects.

While the stock assessment model and model-free indicators supported a favorable picture of exploitable stock health during the 2020 Stock Assessment, the assessment conversely noted YOY indices did not reflect favorable conditions since about 2012 and indicate potential for decline in recruitment to the exploitable stock in future years (Table 2). Specifically, YOY indices in two of five regions were below the 25th percentile of the time series (indicating negative conditions) in the terminal year of the assessment (2018) and when averaged over the last five years (2014-2018); the remaining three regions were below the 75th percentile (indicating neutral conditions).

Mortality indicators generally declined through time to their lowest levels in the terminal year of the assessment. Fishery performance indicators were generally positive from 2010 to 2018. Stress indicators show relatively low stress throughout the time series, but indicate some increasingly stressful environmental conditions through time, particularly in the southwest portion of the stock.

As recommended in the 2020 Stock Assessment, a data update process will occur annually to update American lobster stock indicators, including YOY settlement indicators, trawl survey indicators, and ventless trap survey indices. The second annual data update was completed in 2022 with data through 2021[1].

2.3.2 YOY Surveys

Since 2018, YOY indices have continued to show unfavorable conditions in the GOM/GBK stock. There have been sustained low levels of settlement observed from 2012 to 2021 (Figure 4). In Maine, 2019, 2020, and 2021 YOY indices were below the 75th percentile of their time series throughout most statistical areas sampled, (all except Statistical Area 512 in 2019). In 2021, YOY values fell below the 25th percentile in all three Northeast areas. In New Hampshire, YOY values have shown a lot of interannual variation over the past three years (2019-2021) with values above the 50th percentile in 2019, then below the 25th in 2020, followed by an increase in 2021 above the 75th percentile of the time series. In Massachusetts, the 2019 index was below the 25th percentile of its time series; it rebounded slightly in 2020 and 2021, but remained below the 75th percentile.

Sustained and unfavorable YOY indices are concerning as they could foreshadow poor future year classes in the lobster fishery. Lobster growth is partially temperature-dependent and it is expected that it takes seven to nine years for a lobster to reach commercial size. Thus, decreased abundance of YOY lobsters today could foreshadow decreased numbers of lobsters available to the fishery in the future. Given there have been nine consecutive years of low YOY indices in the GOM, this trend may soon be reflected in the GOM/GBK stock. What is more concerning is that declines in the Southern New England (SNE stock), which is currently at record low abundance, began with declines in YOY indices. Specifically, SNE YOY indices began to decline in 1995, two years before landings peaked in 1997, and roughly five years before landings precipitously declined in the early 2000s.

There are several hypotheses as to why the YOY indices have been low and what this could mean for the future of the GOM/GBK stock. One hypothesis is that declines in the YOY indices are reflecting a true decline in the newly-settled portion of the stock, and are related to declining food resources (specifically zooplankton). Carloni et al. (2018) examined trends in lobster larvae to explore linkages between SSB and YOY abundance. The study found a significant increasing trend in stage 1 larval abundance consistent with the increases in SSB in the GOM. Planktonic postlarvae, on the other hand, had a declining trend in abundance similar to trends for YOY settlement throughout western GOM. The study also found significant correlations between lobster postlarvae and the copepod *C. finmarchicus*, but there were no

[1] The 2022 American lobster data update can be found here:
https://asmfc.org/uploads/file/645d2ab6AmericanLobsterDataUpdate_Oct2022.pdf

relationships with other zooplankton. This suggests recruitment processes in the GOM could be linked to larval food supply.

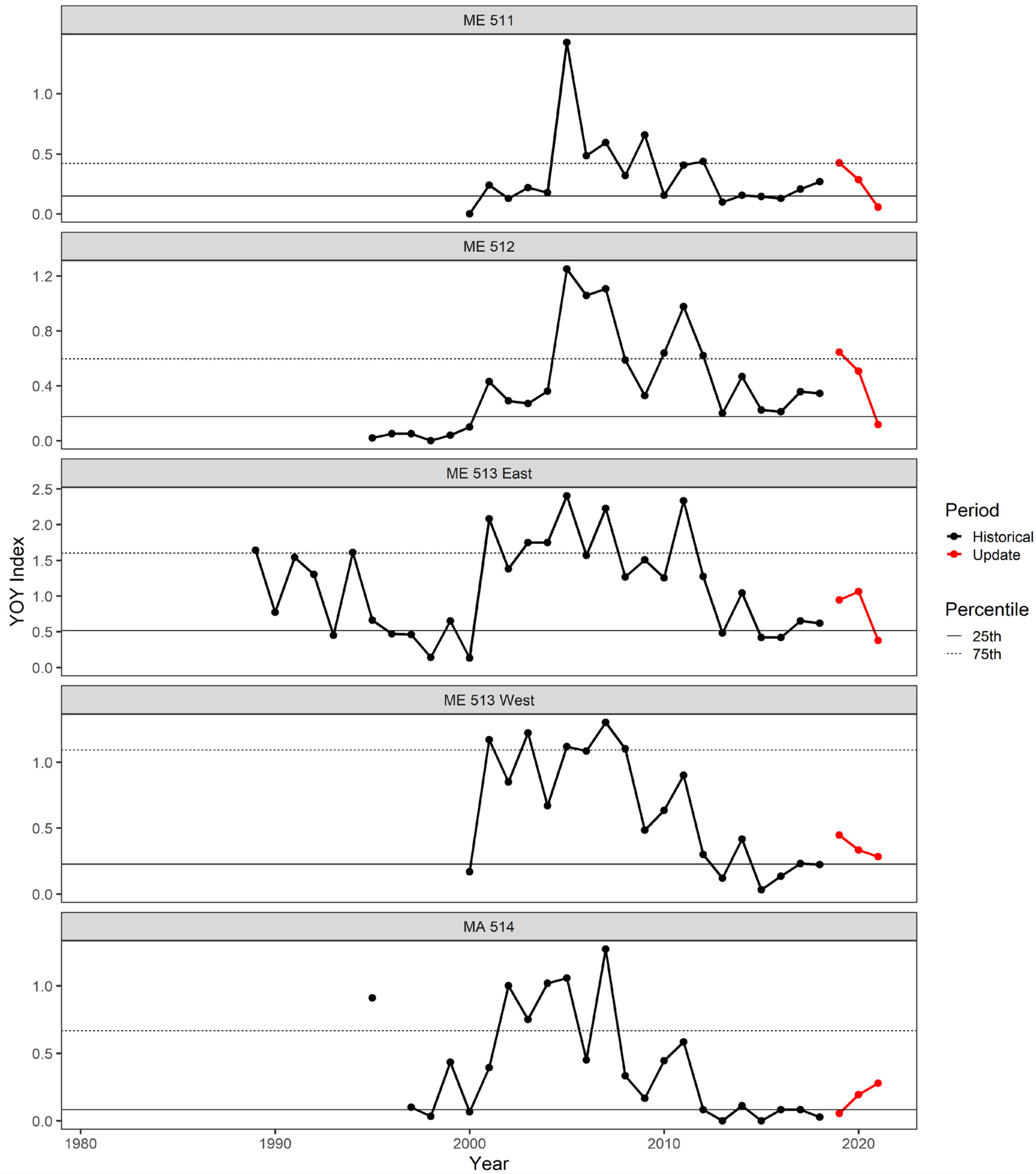

Figure 4. GOM abundance indicators: YOY indices.

Declines in the YOY indices could also be an artifact of the lobster population moving further offshore. Recent work suggests warming in the GOM on the scale of decades has expanded thermally suitable habitat areas and played a significant role in the increase of observed settlement into deeper areas, particularly in the Eastern Gulf of Maine (Goode et al. 2019), so lobster settlement may be diluted across a greater area. Given the YOY surveys typically occur inshore, the surveys may be unable to account for increased abundance of YOY lobsters farther offshore. In an effort to test this theory, the Technical Committee (TC) looked at potential increases in the habitat available for recruitment in the GOM/GBK stock due to warming waters. Specifically, the TC calculated the quantity of habitat by depth in the GOM. Results showed that incremental increases in depth result in incremental increases in habitat suitable for recruitment and small observed decreases in recruit densities in shallow waters. Therefore, there is no evidence that incremental increases in depth result in exponential increases in available habitat. In order for the diffusion of YOY lobsters over a larger area to completely explain the observed decreases in the YOY indices, the habitat available to recruitment would have to more than double. This suggests dilution effects from increased habitat availability alone are not sufficient to explain decreases in the YOY indices, and there are likely other changes occurring in the system.

2.3.3 Ventless Trap Surveys and Trawl Surveys

While YOY surveys have detected declines in the number of newly settled lobsters for about a decade, results of the ventless trap survey (VTS) and trawl surveys, which encounter larger sized lobsters just before they recruit to the fishery, have only exhibited evidence of decline in the last few years. The interpretation of these trends is complicated by sampling restrictions and limited surveys in 2020 resulting from the COVID-19 pandemic. VTS indices show declines since peaking in 2016, especially in the eastern regions (Figure 5). The Maine/New Hampshire and the Massachusetts Fall Trawl Surveys have both showed declines in recruit lobster abundance since 2018. For the spring trawl surveys, recruit abundance indices increased from 2018 to 2019, but decreased again in 2021. Only the Maine/New Hampshire Fall Trawl Survey ran in 2020 due to the COVID-19 pandemic.

It is important to continue to closely monitor these surveys as continued decreases in the VTS and/or trawl surveys would confirm the declines seen in the YOY surveys.

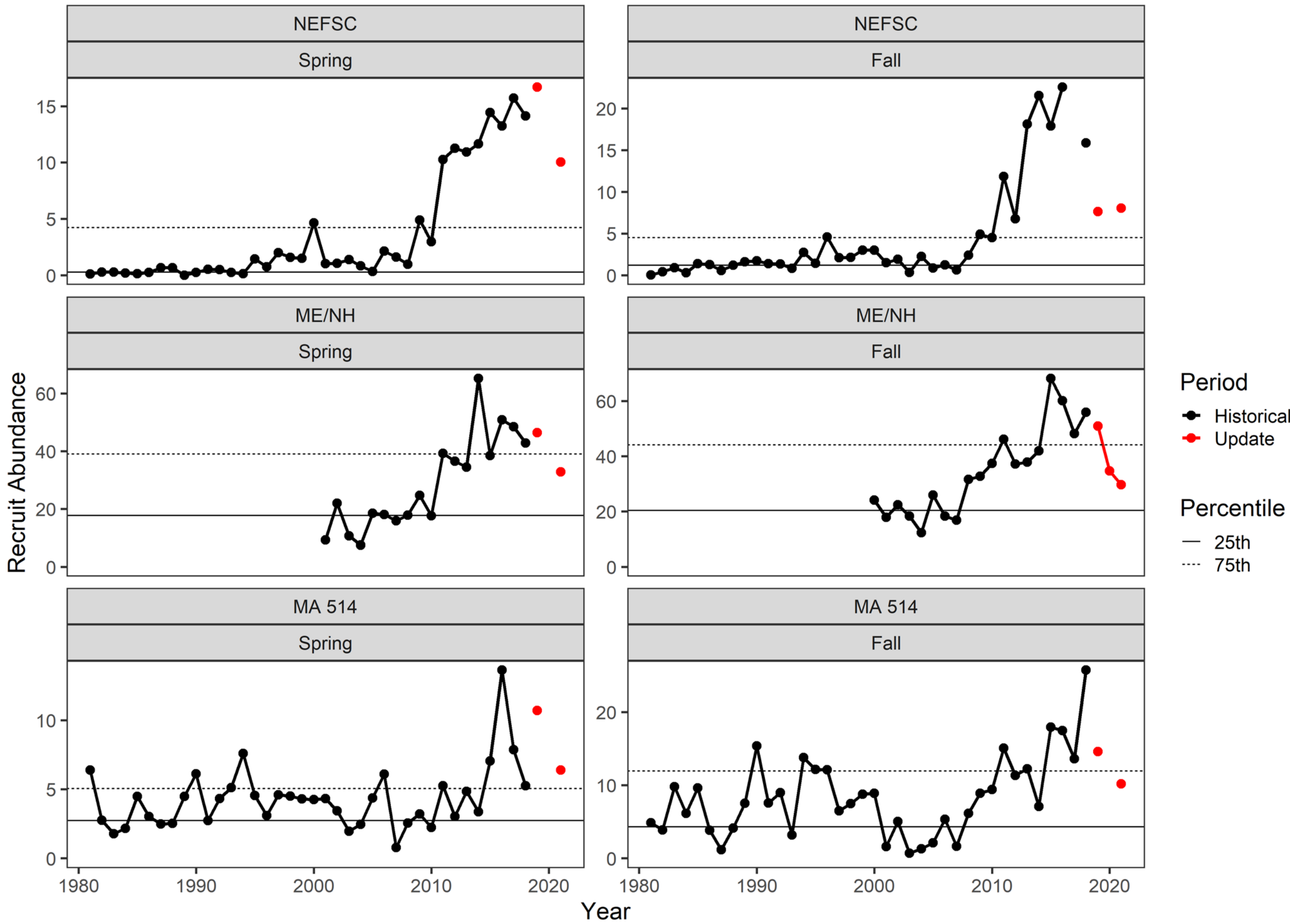

Figure 5. GOM abundance indicators: trawl survey recruit abundance.

2.4 Economic Importance of the American Lobster Fishery

Much of the concern regarding the declines in the lobster indices result from the vast economic importance of the lobster fishery throughout the GOM. For the states of Maine through Massachusetts, lobster is one of the most valuable fisheries and the large majority of landings come from the GOM/GBK stock.

For Maine, American lobster is an essential economic driver for the coastal economy. Lobster annually represents more than 75% of Maine's marine resource landings by ex-vessel value (82% in 2021). The landings peaked in 2016 with more than 132 million pounds harvested, while in 2021, the ex-vessel value was estimated as more than $730 million dollars[2]. The lobster harvester sector includes more than 5,770 license holders, 4,200 of which are active license holders who complete more than 250,000 trips a year selling to 240 active lobster dealers (Maine DMR, unpublished data). The lobster distribution supply chain was estimated in 2018 to

[2] https://www.maine.gov/dmr/commercial-fishing/landings/documents/lobster.table.pdf

contribute an additional economic impact of $1 billion annually ("Lobster to Dollars," 2018). Not included in these numbers are the vessel crew members and other associated businesses (bait vessels and dealers, boat builders, trap builders, and marine supply stores) that are essential in delivering lobsters to consumers worldwide, supporting the industry, and driving Maine's coastal communities.

The American lobster fishery is the most valuable commercial fishery in New Hampshire with an ex-vessel value of over $44 million in 2021. The value of lobster landed accounted for over 90% of the value of all commercial species landed in New Hampshire. The lobster fishery in New Hampshire includes over 300 licensed commercial harvesters, over 200 of which are active, who sold to more than 30 licensed wholesale lobster dealers (Renee Zobel, personal communication). The importance of the economic impact of the lobster fishery to New Hampshire is also seen in the over 350 businesses licensed to sell lobster to consumers at the retail level.

For Massachusetts, American lobster is the second most valuable fishery in terms of overall landings value, and the most valuable of all fisheries conducted within Massachusetts state waters. The total estimated value for annual lobster landings in Massachusetts has been over $93 million per year on average for 2017-2021. On average, landings from the GOM/GBK stock make up 96% of the total lobster landings for Massachusetts; roughly 72% of this comes from LCMA 1, 22% from LCMA 3, and 7% from LCMA OCC (Massachusetts DMF, unpublished data).

Though the state is not directly situated on the GOM, a significant contingent of the Rhode Island commercial lobster fleet harvests lobsters in GOM/GBK. In 2020 and 2021, approximately 30% and 19% of Rhode Island's commercial landings, respectively, came from statistical areas in GOM/GBK (2020: 497,705 pounds, 2021: 257,225 pounds). The estimated ex-vessel value for lobsters from this stock was approximately $2.9 million in 2020.

2.5 Management History in the GOM/GBK Stock (Prior to the Approval of this Addendum)

Lobster is managed under Amendment 3, and its 27 addenda. One of the hallmarks of Amendment 3 was the creation of seven LCMAs along the coast. The GOM/GBK stock is primarily comprised of LCMAs 1 and OCC as well as the northern half of LCMA 3. Each management area had a unique set of management measures. When the GOM and GBK were combined into a single stock area, it the resulted in a diverse suite of regulations for each LCMA (e.g., differing min/max gauge sizes, v-notch definitions) within the stock, creating challenges for assessing the impacts of management measures. It should be noted that the coastwide minimum size remains at 3 ¼", which is the smallest minimum size any LCMA could put in place. Each LCMA can have its own minimum size that may be equal to or larger than the coastwide minimum size.

Several concerns were noted regarding the management measures beyond these disparities. At the minimum sizes in the GOM/GBK stock LCMAs prior to this Addendum, growth overfishing is occurring within the GOM/GBK stock. Growth overfishing refers to the harvest of lobsters before they reach the size where their collective biomass (and fishery yield) would be greatest, and when they have very large scope for additional growth. This is demonstrated by potential increases in catch weight associated with increasing the minimum gauge size. In LCMA 1, most of the catch consists of individuals within one molt of minimum legal size, which results in a much smaller yield-per-recruit (YPR) than could be achieved if lobsters were allowed to survive and grow to larger sizes before harvest. While the size distribution of the lobsters harvested lobsters in LCMA 3 is much broader than inshore (the fishery is less recruit-dependent), there is still considerable potential for additional growth and delaying harvest could increase yield per recruit in this region as well. Another concern is the loss of conservation benefits across LCMAs due to inconsistent measures between areas. The 2015 assessment combined the GOM and GBK areas into one stock because the Northeast Fisheries Science Trawl Survey showed evidence of seasonal exchange and migration of lobsters between areas. Loss of conservation benefits occurs when lobsters are protected in one area but can be harvested in another when they cross LCMA boundaries.

2.6 Biological Benefits of Modifying Gauge Sizes

Of the existing biological management measures for the lobster fishery, minimum and maximum gauge sizes are most likely to have biological impacts on the GOM/GBK stock and fishery. Analyses were performed by the TC to evaluate the impacts of alternate minimum and maximum sizes for the LCMAs within the stock[3]. For LCMA 1, analysis involved updating existing simulation models with more recent data to estimate the impacts of specific minimum and maximum gauge size combinations on total weight of lobsters landed, number of lobsters landed, SSB and exploitation. A separate analysis for LCMA 3 was performed due to concerns that the offshore fishery in LCMA 3 is considerably different from the inshore (which tends to drive stock-wide modelling results). For OCC, simulations were run with both LCMA 1 and LCMA 3 parameters because it is considered a transitional area.

Based on these analyses, several general assumptions can be made about potential changes to the minimum and maximum gauge sizes. Increasing the minimum legal gauge size in LCMA 1 is projected to result in large increases in SSB; while increasing the minimum gauge size for LCMA 3 and OCC is projected to result in much smaller increases in SSB relative to LCMA 1. This is primarily because of the significantly larger magnitude of the LCMA 1 fishery and that the current minimum legal size in LCMA 1 is significantly below the size at maturity. Meanwhile, the current minimum gauge sizes in LCMA 3 and OCC are much closer to the size at maturity and landings from these areas account for only a small fraction of the fishery. Minimum sizes that approach or exceed the size at maturity produce increasing returns on SSB as this allows a much larger portion of the population to reproduce at least once. Therefore, increasing minimum legal size in LCMA 1 to $3^{15}/_{32}$" (88 mm) is projected to result in a near doubling of SSB. This would significantly increase egg production potential and may provide some buffer against the effects of future changes in productivity. At the same time, this change would be expected

[3] The full report on the TC analyses is available here: http://www.asmfc.org/uploads/file/63d82063ResilienceAddendum_ManagementOptions_Set2021.pdf

to produce only marginal decreases in the total number of lobsters landed but result in a net increase in YPR and total weight of catch.

Generally, decreasing the maximum gauge size for LCMA 3 is projected to have larger effects relative to increasing the minimum size in LCMA 3 and to changing the maximum sizes for the other LCMAs. However, relative to increasing the minimum size in LCMA 1, the positive impact to the overall stock projected to result from decreasing the maximum gauge sizes in LCMA 3 and OCC is significantly smaller.

2.7 Potential Implications of Increasing Consistency of Measures

Beyond the biological concerns for the GOM/GBK lobster stock, disparities in the measures also create challenges for stock assessment, law enforcement, and commerce. Increasing consistency among the measures for the LCMAs within the stock has benefits in each of these areas, as described in the following sections.

2.7.1 Stock Boundaries

A complicating factor in the management of lobster is the boundaries of the LCMAs do not align with the biological boundaries of the stocks (GOM/GBK vs. SNE). This is particularly problematic in LCMA 3 which spans both GOM/GBK and SNE. The intricacy of the stock boundaries is further complicated by the fact that many vessels fishing out of Rhode Island and Massachusetts, which are harvesting lobsters on Georges Bank, must travel through the SNE stock area to reach their port of landing. In addition, these vessels may be permitted to fish in multiple management areas, including areas that span both lobster stocks.

To date, there have been no permit requirements to delineate within which stock a harvester in LCMA 3 is eligible to fish. In addition, management actions responding to the decline in the SNE stock have been applied throughout LCMA 3.

2.7.2 Interstate Shipment of Lobsters

Increasing consistency in regulations may address concerns regarding the sale and shipment of lobsters across state lines. With decreased landings in SNE and expanding markets for the GOM/GBK stock, there has been increased demand for the shipment of lobsters across state lines. This movement of lobster can be complicated by the fact that the gauge sizes differ across LCMAs, and many states implement the minimum and maximum gauge sizes as possession limits rather than landing limits per state regulation or law. This means the gauge sizes apply to anyone in the lobster supply chain, not just harvesters. While these strict regulations improve the enforcement of gauge sizes, it can complicate interstate shipment of lobsters, particularly given the minimum size in LCMA 1 is smaller than the other management areas. As a result, some dealers must sort lobster by size in order to ship product across state lines.

Moving toward more consistent minimum sizes within the inshore LCMAs helps alleviate this issue by easing the ability of states to participate in the GOM/GBK lobster supply chain. This not only reduces the burden on dealers that sort product by size but also enhances the enforcement of gauge sizes in the fishery.

2.7.3 Improve Enforcement

Another potential advantage of more consistent management measures is the ability to improve enforcement throughout the stock. Disparate management measures hinder the ability for law enforcement to enforce various regulations in the lobster fishery. For example, vessels landing in Massachusetts harvest lobsters from four LCMAs, each of which has a different set of minimum gauge sizes (ranging from 3 ¼" to 3 $^{17}/_{32}$") and maximum gauge sizes (ranging from 5" to no maximum gauge size). Because a dealer can legally purchase and sell lobsters from areas with different minimum and maximum gauge sizes, only the most liberal measure can be implemented as a strict possession limit. The Law Enforcement Committee has continually recommended the use of standardized management measures in the lobster fishery, as inconsistent regulations mean the least restrictive regulation becomes the only enforceable standard once product leaves the dock. In addition, regulatory inconsistencies decrease the likelihood of successful prosecution of violators.

3.0 MANAGEMENT PROGRAM

The following management program aims to increase protection of the GOM/GBK spawning stock. The final management program modifies the management measures in LCMAs 1, 3, and OCC.

- Section 3.1 standardizes a subset of management measures within LCMAs and across the GOM/GBK stock.
- Section 3.2 establishes a trigger mechanism for implementing biological management measures to provide increased protection to SSB and increase the resiliency of the stock.

3.1 Measures for Immediate Implementation under Addendum XXVII

This Addendum modifies management measures to achieve more consistency in measures within and across LCMAs.

The states are required to implement the following management measures by January 1, 2024.

- Standardize measures within GOM/GBK stock LCMAs to the most conservative measure where there are inconsistencies between state and federal regulations. This results in a maximum gauge size of 6-3/4" for state and federal permit holders, and a v-notch possession definition of $^{1}/_{8}$" with or without setal hairs for all permit holders in Outer Cape Cod (OCC).
- Implement regulations for LCMAs 1 and 3 to limit the issuance of trap tags to equal the harvester trap tag allocation. This means no surplus trap tags will be automatically issued to permit holders for these areas until trap losses occur and are documented.

3.2 Management Measures to Increase Protection of Spawning Stock Biomass

This section modifies Section 2.1.1.1 of Addendum III (Area 1 vent size) and Section 2 of Addendum IV to American Lobster Amendment 3 (Area 3 and Outer Cape vent size).

The primary objective of this Addendum is to increase the protection of SSB in the GOM/GBK stock. The selected management program includes changes to the minimum and maximum gauge sizes along with corresponding vent sizes for the LCMAs within the stock. The measures are expected to 1) increase SSB, and 2) result in the minimum gauge size increasing to meet or exceed the size at 50% maturity (L50) for each LCMA (LCMA 1: eastern GOM L50 = 88 mm, western GOM L50 = 83 mm, LCMA 3: Georges Bank L50 = 91 mm).

This Addendum establishes a trigger mechanism whereby pre-determined management changes will be triggered upon reaching a defined trigger level based on observed changes in recruit (71-80 mm carapace length) abundance indices. The trigger index is based on recruit conditions observed in three surveys used to inform the assessment model estimates of reference abundance and stock status for the GOM/GBK stock. These recruit indices include: 1) combined Maine/New Hampshire and Massachusetts spring trawl survey index, 2) combined Maine/New Hampshire and Massachusetts fall trawl survey index, and 3) model-based VTS index.

The management trigger is defined by a certain level of decline in the indices from an established reference period. The reference value for each index is calculated as the average of the index values from 2016-2018. This reference period reflects the condition of the stock when the 2020 stock assessment was completed, and includes the same years used to determine the stock status and reference points. The percent declines in the indices are expected to approximate comparable declines in overall abundance of the stock, and relate to the abundance reference points established by the Board.

Figure 6 (top left panel) shows the calculated trigger index through 2021 compared to the selected trigger level of 35%. Once the trigger level has been reached, a predetermined set of management measures selected by the Board (see *Management Measures,* below) would be implemented for the following fishing year. Including the 2021 survey data as the terminal year, the most recent trigger index value was 0.765, which equates to a 23% decline from the reference period (Figure 6).

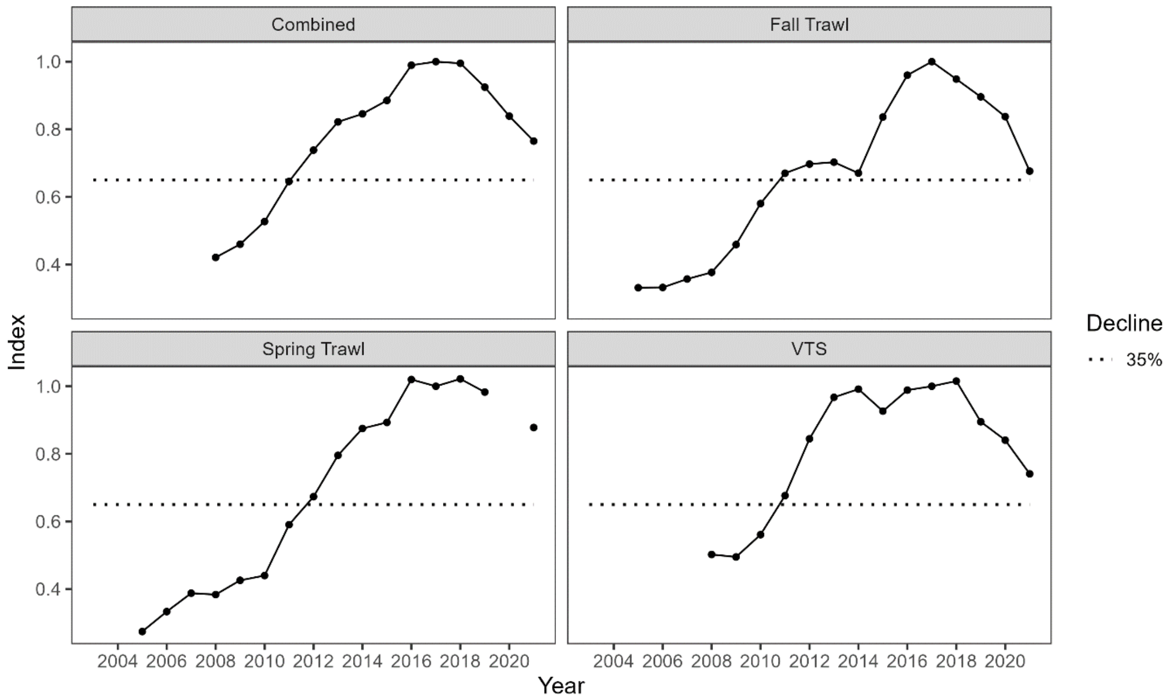

Figure 6. Scaled survey-specific indices and combined trigger index compared to the trigger level. Top-left: combined trigger index that will be used to trigger changes in management measures. Top-right: moving three-year average of fall trawl survey indices. Bottom-left: moving three-year average of spring trawl survey indices. Bottom-right: moving three-year average of VTS indices.

Trigger Level

Management measures for the following fishing year will be implemented when a 35% decline in the trigger index is observed relative to the reference abundance level (equal to the average of the index values from 2016-2018).

Management Measures

When the trigger level is reached (Year 0) a series of gradual changes in gauge sizes for the LCMAs in the GOM/GBK stock will be initiated (Year 1). The changes include two increases to the minimum gauge size in LCMA 1 (GOM) and a single decrease to the maximum gauge size in LCMA 3 (offshore federal waters) and OCC. The minimum gauge size in LCMA 1 will change in increments of $^{1}/_{16}$" every other year, and the maximum gauge size for LCMA 3 and OCC will change by ¼" in the final year (Year 5). The table below specifies the measures that will be implemented in each step, beginning in the fishing year after the trigger level is reached. The escape vent size in LCMA 1 will be adjusted once to maintain protection of sub-legal sizes. The final vent size for LCMA 1 will be 2 x 5 ¾" rectangular, or 2 $^{5}/_{8}$" circular, which is consistent with the current vent size used in SNE for the same minimum gauge size. Changes to measures are shown in bold text.

Changes to Management Measures Initiated When 35% Trigger Level is Reached			
Area	**LCMA 1**	**LCMA 3**	**OCC**
Current Measures (Year 0)	Minimum gauge: 3 ¼” Maximum gauge: 5” Vent size: status quo	Minimum gauge: $3^{17}/_{32}$” Maximum gauge: 6 ¾” Vent size: status quo	Minimum gauge: 3 $^{3}/_{8}$” Maximum gauge: 6 ¾” Vent size: status quo
Measures for Year 1 Implementation	**Minimum gauge size: 3 $^{5}/_{16}$” (84 mm)**	*Status quo*	*Status quo*
Measures for Year 3 Implementation	**Minimum gauge size: 3 $^{3}/_{8}$” (86 mm)**	*Status quo*	*Status quo*
Measures for Year 4 Implementation	**Vent size: 2 x 5 $^{3}/_{4}$” rectangular; 2 $^{5}/_{8}$” circular**	*Status quo*	*Status quo*
Measures for Year 5 Implementation	*Status quo*	**Maximum gauge size: 6 ½”**	**Maximum gauge size: 6 ½”**

3.3 Implementation of Management Measures in LCMA 3

Although only a portion of LCMA 3 falls within the GOM/GBK stock (see Section 2.8 Stock Boundaries for additional information), the selected LCMA 3 measures apply to all LCMA 3 permit holders, including those that fish on the SNE stock.

4.0 COMPLIANCE

This Addendum is effective on January 1, 2024.

Management measures triggered under Section 3.2 will be implemented by June 1 of the calendar year for which they are required.

5.0 RECOMMENDATIONS FOR ACTIONS IN FEDERAL WATERS

The management of American lobster in the EEZ is the responsibility of the Secretary of Commerce through the National Marine Fisheries Service. The Atlantic States Marine Fisheries Commission recommends the federal government promulgate all necessary regulations in Section 3.0 to implement complementary measures to those approved in this addendum.

6.0 REFERENCES

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7.0 Tables

Table 1. LCMA-specific management measures as modified by Addendum XXVII.

Mgmt. Measure	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	OCC
Min Gauge Size	$3\ ^{1}/_{4}$”	$3^{3}/_{8}$”	$3\ ^{17/32}$”	$3^{3}/_{8}$”	$3^{3}/_{8}$”	$3^{3}/_{8}$”	$3^{3}/_{8}$”
Vent Rect.	$1^{15}/_{16}$ x $5^{3}/_{4}$”	2 x $5^{3}/_{4}$”	$2\ ^{1}/_{16}$ x $5^{3}/_{4}$”	2 x $5^{3}/_{4}$”	2 x $5^{3}/_{4}$”	2 x $5^{3}/_{4}$”	2 x $5^{3}/_{4}$”
Vent Cir.	$2\ ^{7}/_{16}$”	$2\ ^{5}/_{8}$”	$2\ ^{11}/_{16}$”	$2\ ^{5}/_{8}$”	$2\ ^{5}/_{8}$”	$2\ ^{5}/_{8}$”	$2\ ^{5}/_{8}$”
V-notch requirement	Mandatory for all eggers	Mandatory for all legal size eggers	Mandatory for all eggers above 42°30’	Mandatory for all eggers in federal waters. No V-notching in state waters.	Mandatory for all eggers	None	None
V-notch Definition[1] (possession)	Zero Tolerance	$^{1}/_{8}$” with or w/out setal hairs[1]	$^{1}/_{8}$” with or w/out setal hairs[1]	$^{1}/_{8}$” with or w/out setal hairs[1]	$^{1}/_{8}$” with or w/out setal hairs[1]	$^{1}/_{8}$” with or w/out setal hairs[1]	$^{1}/_{8}$” with or w/out setal hairs[1]
Max. Gauge (male & female)	5”	5 ¼”	$6\ ^{3}/_{4}$”	5 ¼”	5 ¼”	5 ¼”	$6\ ^{3}/_{4}$”
Season Closure				April 30-May 31[2]	February 1-March 31[3]	Sept 8-Nov 28	February 1-April 30

*Changes under Addendum XXVII, Section 3.1 are highlighted in yellow.

Table 2. GOM/GBK model-free indicators for the 2020 Stock Assessment. The left table shows the GOM spawning stock abundance, the right table shows GBK spawning stock abundance.

SPAWNING STOCK ABUNDANCE						
Mean weight (g) per tow of mature females						
Survey	*NESFC*		*ME/NH*		*MA 514*	
	fall	*spring*	*fall*	*spring*	*fall*	*spring*
1981	175.32	400.28			502.65	430.53
1982	39.45	113.58			626.48	151.21
1983	206.03	234.21			844.76	67.08
1984	234.64	443.81			593.77	126.47
1985	499.62	2771.23			919.56	93.81
1986	267.97	502.99			231.88	112.97
1987	85.35	497.40			194.34	148.62
1988	186.56	244.92			200.58	88.14
1989	325.69	247.15			293.61	230.26
1990	216.65	516.20			1048.72	241.94
1991	247.11	430.56			335.80	165.54
1992	193.95	453.31			512.83	212.89
1993	284.34	484.30			120.59	229.72
1994	430.32	720.67			783.17	285.01
1995	464.96	390.15			520.26	171.71
1996	734.25	872.53			569.39	156.53
1997	568.34	1083.76			235.18	114.78
1998	381.81	1182.44			282.79	170.21
1999	1444.07	807.41			365.53	282.12
2000	585.66	1281.05	4430.55		533.40	236.55
2001	511.25	1498.42	2446.85	690.89	165.74	235.85
2002	1789.42	2022.04	4638.64	1436.34	324.34	175.73
2003	985.93	2343.63	3949.63	1226.05	129.67	72.99
2004	685.89	2773.35	3610.67	907.07	120.27	259.35
2005	465.35	1670.29	4805.25	1990.08	248.23	489.12
2006	681.87	1810.96	3698.94	1327.93	240.27	410.97
2007	445.78	1536.47	3163.24	1437.85	176.95	139.94
2008	805.10	1894.91	4080.36	1107.00	559.70	300.35
2009	1787.92	1864.92	6906.45	1747.30	630.52	219.83
2010	2850.60	2476.79	5793.51	1886.61	1424.75	211.52
2011	2317.94	2089.39	6169.40	2013.80	1268.44	267.51
2012	3215.29	3516.38	4174.85	2287.55	889.87	124.81
2013	3299.56	2499.71	5363.14	2007.92	1135.54	300.86
2014	4979.28	3083.09	5891.58	3010.73	768.88	382.81
2015	3553.44	3665.39	8488.62	2233.05	1947.04	418.46
2016	3692.26	5142.42	7691.01	2613.49	3712.66	1119.26
2017	3274.69	6566.80	4629.68	2530.74	2309.44	564.30
2018	2093.20	3555.09	5242.34	2005.07	2782.55	550.68
2014-2018 mean	3518.57	4402.56	6388.65	2478.62	2304.11	607.10

25th	272.06	487.57	4015.00	1355.03	242.26	149.27
median	539.79	1389.74	4638.64	1938.34	526.83	224.78
75th	1789.05	2443.50	5842.54	2178.24	878.60	296.52

SPAWNING STOCK ABUNDANCE		
Mean weight (g) per tow of mature females		
Survey	*NESFC*	
	fall	*spring*
1981	707.14	69.71
1982	670.07	123.96
1983	643.84	152.05
1984	397.33	45.17
1985	504.87	39.00
1986	491.96	307.05
1987	537.31	113.27
1988	695.27	307.49
1989	933.18	161.43
1990	761.64	103.62
1991	848.03	164.32
1992	817.25	213.11
1993	626.81	126.03
1994	774.61	41.77
1995	939.85	71.74
1996	1051.09	482.61
1997	754.00	62.46
1998	993.56	64.67
1999	1363.68	395.66
2000	945.69	132.57
2001	1756.38	313.41
2002	2183.80	341.90
2003	1030.19	842.92
2004	1557.16	298.95
2005	1404.20	491.00
2006	2123.43	465.72
2007	1859.53	728.26
2008	3074.33	1827.61
2009	3703.99	1336.34
2010	2120.51	1126.52
2011	4681.76	1113.11
2012	2696.38	1510.08
2013	2530.26	1369.39
2014	3012.69	1833.98
2015	3743.71	1509.13
2016	3020.98	2138.96
2017	6627.18	3749.60
2018	9630.86	725.09
2014-2018 mean	5207.09	1991.35

25th	755.91	124.47
median	1040.64	310.45
75th	2443.64	1045.56