



Atlantic States Marine Fisheries Commission

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

MEMORANDUM

TO: American Lobster Management Board

FROM: American Lobster Technical Committee

DATE: April 20, 2026

SUBJECT: Modeling Impacts of Addendum XXVII Gauge and Vent Size Changes

At the October 2025 meeting of the ASMFC Lobster Board (Board), the Board tasked the Technical Committee (TC) with an analysis “to estimate the benefits to the GOM/GBK fishery that would have resulted from implementing the minimum gauge size increases under Addendum XXVII that were ultimately repealed.”

Specifically, Addendum XXVII triggered the following changes in management the year after a fishery-independent recruit abundance index declined below the identified threshold:

- Year 1: Increase minimum gauge size from 3 ¼” (82.55mm) to 3 5/16” (84.14mm) in LCMA 1
- Year 3: Increase minimum gauge size from 3 5/16” (84.14mm) to 3 ¾” (85.73mm) in LCMA 1
- Year 4: Increase vent sizes in LCMA 1:
 - From 1-15/16” x 5-3/4” to 2” X 5 ¼” rectangular vents
 - 2 7/16” to 2 5/8” circular vents
- Year 5: Decrease maximum gauge size from 6 ¾” to 6 ½” in LCMA 3 and Outer Cape Cod

Addendum XXVII was approved in May 2023 and in October 2023 the TC reported that the abundance index had dropped below the threshold in 2022, triggering the Addendum measures. Thus, if the resulting management measures had been followed as originally scheduled, Year 1 measures would have been implemented in 2024, Year 3 measures would have been implemented in 2026, etc. The Board subsequently delayed, then repealed the measures relating to gauge and vent size.

The American Lobster TC performed a modeling exercise to respond to the Board task. However, the TC determined that such an analysis would be more useful if it were to simulate the impacts of the above management actions as if they had been triggered in 2018 and implemented a few years prior, allowing the management actions to play out through a period of time when recruitment and fishing mortality estimates were reliably informed by estimates from the recent stock assessment. The analysis performed by the TC is described in the attached report.

Modeling the effect of Addendum XXVII proposed gauge and vent size regulations
American Lobster Technical Committee
May 2026

At the October 2025 meeting of the ASMFC Lobster Board (Board), the Board tasked the Technical Committee (TC) with an analysis “to estimate the benefits to the GOM/GBK fishery that would have resulted from implementing the minimum gauge size increases under Addendum XXVII that were ultimately repealed.” Specifically, Addendum XXVII triggered the following changes in management the year after a fishery-independent recruit abundance index declined below the identified threshold:

- Year 1: Increase minimum gauge size from 3 ¼” (82.55mm) to 3 5/16” (84.14mm) in LCMA1
- Year 3: Increase minimum gauge size from 3 5/16” (84.14mm) to 3 ¾” (85.73mm) in LCMA1
- Year 4: Increase vent sizes in LCMA1:
 - From 1-15/16” x 5-3/4” to 2” X 5 ¾” rectangular vents
 - 2 7/16” to 2 5/8” circular vents
- Year 5: Decrease maximum gauge size from 6 ¾” to 6 ½” in LCMA 3 and Outer Cape Cod

Addendum XXVII was approved by the Board at its May 2023 meeting. At the October 2023 Board meeting, the TC reported that the abundance index had dropped below the threshold in 2022, triggering the Addendum measures. Thus, if the resulting management measures had been followed as originally scheduled, Year 1 measures would have been implemented in 2024, Year 3 measures would have been implemented in 2026, etc.

A major challenge with simulating the management actions, as tasked, is that stock dynamics, driven by recruitment and fishing mortality, are uncertain in the terminal years of the assessment and are projected with significant uncertainty into the coming years. After discussion, the TC felt that this task could be better accomplished by simulating the impacts of the above management actions as if they had been implemented a few years prior, allowing the management actions to play out through a period of time when recruitment and fishing mortality estimates were reliably informed by estimates from the recent stock assessment. Model-estimated recruitments during this period are essentially set because impacts of regulation changes on spawning stock biomass (SSB) would not be realized in recruitment until lobsters produced by these spawners have reached 53 mm and recruited to the modeled size structure, approximately five or more years after hatching. This allows for a short-term estimate of regulation change impacts with higher certainty compared to estimates with recruitment projected from a terminal year.

General simulation methodology

We simulate the impacts of the above management measures as if the addendum had been approved earlier and measures triggered in 2018. As a result, the above measures are implemented in our simulation on the following schedule:

- Year 1 minimum gauge increase: 2019
- Year 3 minimum gauge increase: 2021

- Year 4 vent size increase: 2022
- Year 5 maximum gauge decrease: 2023

While the above gauge and vent changes are only applicable to a subset of the LMAs in the GOM/GBK stock, they can be generally applied to the simulated population because minimum legal size (MLS) and vent size would be increasing in the areas with the smallest MLS and the maximum legal size would be decreasing in the area with the highest maximum. Thus, selectivities in the simulation model can simply be truncated accordingly to produce an appropriate result. For example, changing selectivities on the small side in LMA 1 doesn't impact LMA 3 or OCC since those areas already can't land the impacted minimum size range. Similarly, coming down on the max for LMA 3 & OCC doesn't impact LMA 1 as LMA 1 already can't land lobsters in the impacted max size range. Additionally, LMA1 constitutes the vast majority of lobster landings, so treating the GOM/GBK model as a proxy for LMA1 is appropriate.

While the stock assessment model and past simulations have used 5mm size bins to model the lobster population, this is not ideal for examining changes to fishery selectivity at finer scales as it entails modifying the selectivities of portions of size bins. To better resolve the potential impacts of these management changes, we modified the simulation software and all inputs to use a 1mm (a little more than 1/32 inch) size bin resolution. The simulations were initiated with the estimated size structure from the assessment model at the beginning of Quarter 1 in 2018 to allow simulations between management scenarios (see below) to be similar in the first year and diverge thereafter. Where inputs were in 5 mm bins (population size structure, recruitment size composition), numbers at length were spread evenly across the 5mm bins and then smoothed with a moving average over five length bins. Where inputs represented size-specific qualities (maturity, weight-at-size, growth transition matrices, gear selectivity) the inputs were re-calculated at the finer 1mm resolution.

We ran simulations on two scenarios, one holding management measures constant ("Unchanged"), the second changing legal size and gear selectivity according to the schedule described above ("Gauge Change" or "Changed"), running both scenarios through 2030. For recruitment, we used the stock assessment recruitment estimates for 2018 - 2023 and produced 100 recruitment trajectories for 2024 - 2030 using a second-order state-space model similar to the "smoothed trend" method from the stock assessment projections. For fishing mortality over this time period, we used the stock assessment estimates for 2018 - 2024 and used the mean quarterly fishing mortality from the time series for 2025 - 2030. To examine the impacts of management actions on the distribution of catch across market categories, we used length-weight relationships to aggregate landings into the following market categories: Chicks (<1.25 lbs), Quarters (1.25 - 1.5lbs), Halves (1.5 - 1.75lbs), Selects (1.75 - 3lbs), and Jumbos (>=3 lbs).

We note that, because of the short term of the projection, we do not attempt to model the effects of any recruitment subsidy derived from increased spawning stock biomass at this time. However, if we assume that increases in spawning stock biomass resulted in some increase in recruitment and that lobsters in this region reached legal size in 8-10 years, then any resulting recruitment subsidy would theoretically start augmenting landings around 2027.

Note that the effects of management measures on Reference Abundance are not evident until the following year because Reference Abundance is calculated as all lobsters above a size threshold that were present at any time of the year. Thus, lobsters that will or will not be removed by the fishery over the course of the year are counted equally towards Reference Abundance for that year and the impacts of management measures are not evident until the following year. Similarly, management measures have only minor impacts on spawning stock biomass in the year of implementation due to the timing of the molt, the seasonality of the fishery and when spawning stock biomass is recorded. Changes in legal size, implemented at the beginning of the year, did not protect individuals in the second half of the previous year, when most landings occur. Thus, the effects on SSB are also not fully realized until the following year.

Simulation Results

The simulated increase in the minimum legal sizes in the first year (2019) and third year (2021) and change in the vent size in the fourth year (2022) protects a portion of the incoming recruitment year from fishing. As a result, the catch is reduced because the catch composition loses the smallest, previously legal-sized lobsters (Figures 1 and 2, Table 1). Relative to the unchanged scenario, the projected number of lobsters landed under the gauge change management scenario decreased by 9.4%, 11.6% and 9.2% in the years where the two gauge sizes and the vent size changed, respectively, before stabilizing at catch numbers about 4% below the unchanged scenario. By weight, landings initially decrease by 6.6% with the first gauge change, stabilize in the second year, then decline by 5.1% with the second gauge change and 0.8% with the increased vent size before stabilizing about 6% higher than the unchanged scenario in the following years. Thus, once the management measures have been implemented, the simulation stabilized in a state where ~4% fewer total lobsters are captured by the fishery due to delayed capture and natural mortality, but landings were ~6% higher in weight due to landing lobsters at a larger size.

This shift in size compositions affects the distribution of landings across market categories (Figure 3, Table 2). The proportion of landings composed of “Chicks” (<1 ¼ lbs) declines from about half of the landings in the Unchanged scenario to about a third in the gauge change scenario after management actions take effect. As a result, “Quarters” (1 ¼ - 1 ½ lbs) increase from 27% to 35% of the catch, “Halves” (1 ½ - 1 ¾) increase from 11% to 16% and “Selects” (1 ¾ - 3 lbs) increase a few percent with Jumbos remaining largely unchanged. Thus, the primary shift in landings market compositions is the replacement of many Chicks by Quarters and Halves.

The protection of smaller individuals through the increased gauge and vent size regulations results in an increase in reference abundance and spawning stock biomass. Reference abundance saw increases primarily in individuals between minimum legal size and ~90mm CL with an increasing number of individuals reaching 100mm+ (Figure 4), resulting in a total increase of almost 16% (Table 3). Spawning stock biomass exhibits a greater increase due to allowing more females to reach maturity and gain longer-term protection from egg-bearing and v-notching. Increased spawning stock biomass is evident across a wide size range from minimum legal size through 120mm CL (Figure 5), stabilizing near a 46% increase (Table 4).

Due to the protection of sublegal lobsters and conservation measures protecting mature females, the management scenario we simulated results in decreasing exploitation, calculated as the proportion of the reference abundance removed annually by the fishery (landings/reference abundance). In the Unchanged scenario, exploitation generally remains between 47% and 50% (Figure 6). In contrast, the gauge change scenario sees an immediate drop in exploitation in the first year of new regulations and continues to decline as management measures are added, stabilizing around 40%, resulting in a relative decrease in exploitation of around 18% between scenarios (Table 5). Thus, these results suggest that the decreased exploitation would likely have put stock status below the current overfishing threshold.

Of the methodology changes listed above, changing the vent selectivity and down-scaling to 1mm increments involved recalculating the gear selectivity and the TC determined that sex-specific gear selectivities were best supported by empirical data. The TC was curious if the simulation results were sensitive to this change in gear selectivity model and conducted a sensitivity analysis using the original 5mm increment gear selectivity model. The analysis indicates that the final outcomes are robust to this change in gear selectivity models but that the changes in selectivity models affected the timing of impacts to simulated populations. See Appendix 2 for details from this sensitivity analysis.

Comparison to past analysis

Simulations were conducted by the TC and provided to the Board ahead of its Fall 2021 meeting. Thus, it is useful to compare the results from the current analysis to the earlier analysis. The previous analysis differed in a number of ways, including running at the 5mm resolution and using different growth models, maturity schedules, conservation selectivities (protection due to egg-bearing and v-notching), and assumed gear selectivities. The previous analysis also did not include modeling the change in vent sizes and treated the minimum legal size as an increase from 83mm to 86mm, where this analysis uses a more precise 82.55mm and 85.73 to capture the full breadth of change. The comparison of analysis results is provided in Table 6. In all cases, the directionality of change is consistent across all metrics, but the magnitude of estimated change in individual metrics is slightly higher in the current analysis.

Additional analyses were completed by ME DMR in 2022 using Maine's commercial sea sampling length frequency data from 2016-2021 to estimate the first year impact, if implemented January 1st. That analysis estimated the pounds per trip difference with a gauge change from the current 83mm to 84mm, i.e. the lobsters that would have been newly unharvestable. The length weight relationship from the assessment was used to convert the individual lobsters into a total weight. The estimated decline in catch was calculated for each quarter and Maine management zone. Results indicate that the impact was variable by quarter and zone with total impacts ranging from 7.4 - 8.9% decline in catch weight in year 1 of the change (Figure 7). This estimate is marginally higher than the simulation model estimate of 6.6%. Note that the simulation model evaluates a slightly larger functional increase in minimum legal size (1.58mm vs 1mm).

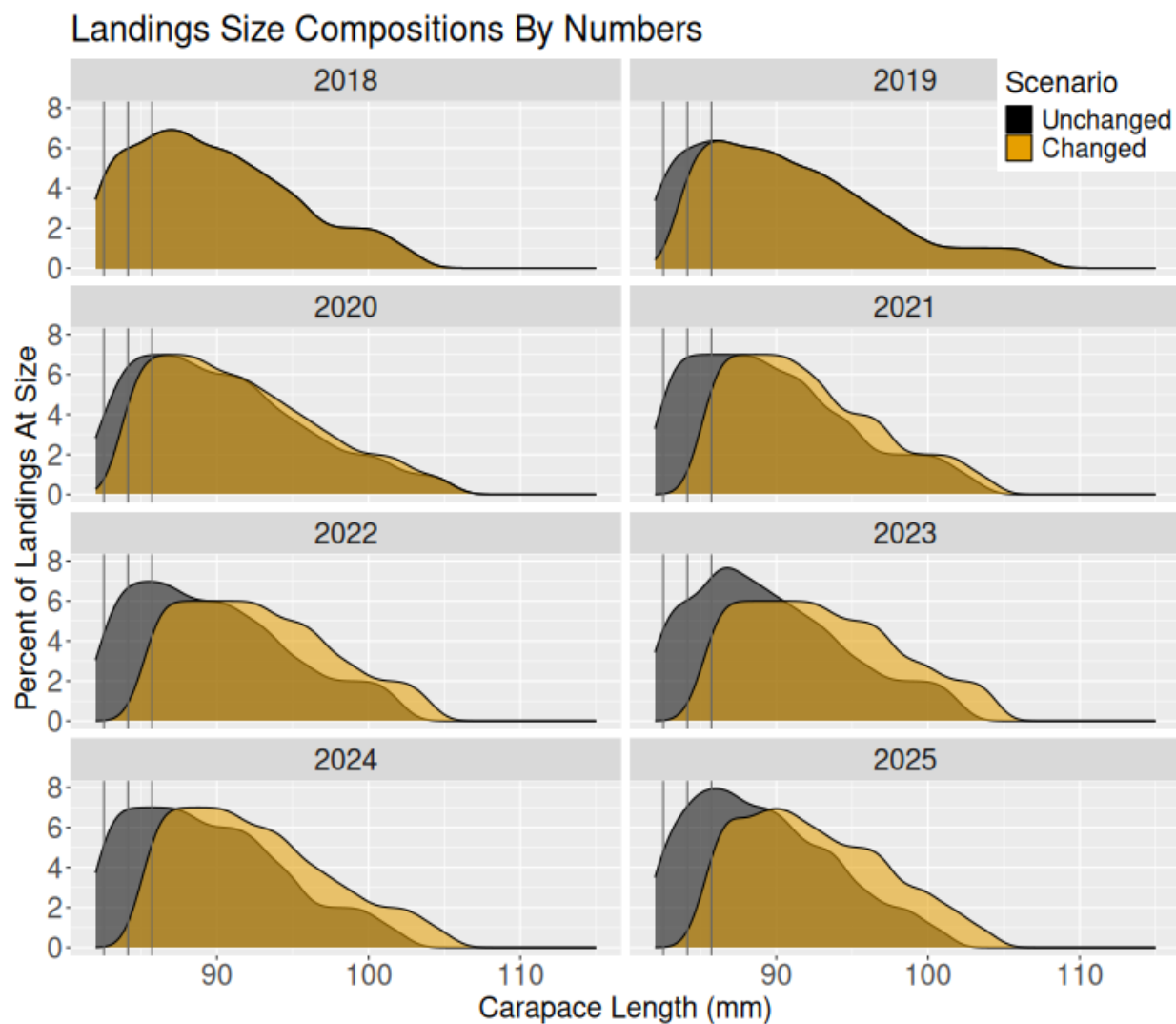


Figure 1. Simulated catch composition (percent of landings at a given size) for lobsters landed between 2019 and 2025 with and without the management actions. Vertical lines correspond to different minimum legal sizes of $3 \frac{1}{4}$ ", $3 \frac{5}{16}$ ", and $3 \frac{3}{8}$ ". The size composition of the two scenarios diverges over the years with fewer smaller and more larger lobsters being landed and the total number of lobsters landed declining in the gauge change scenario with the increased gauge size and vent size.

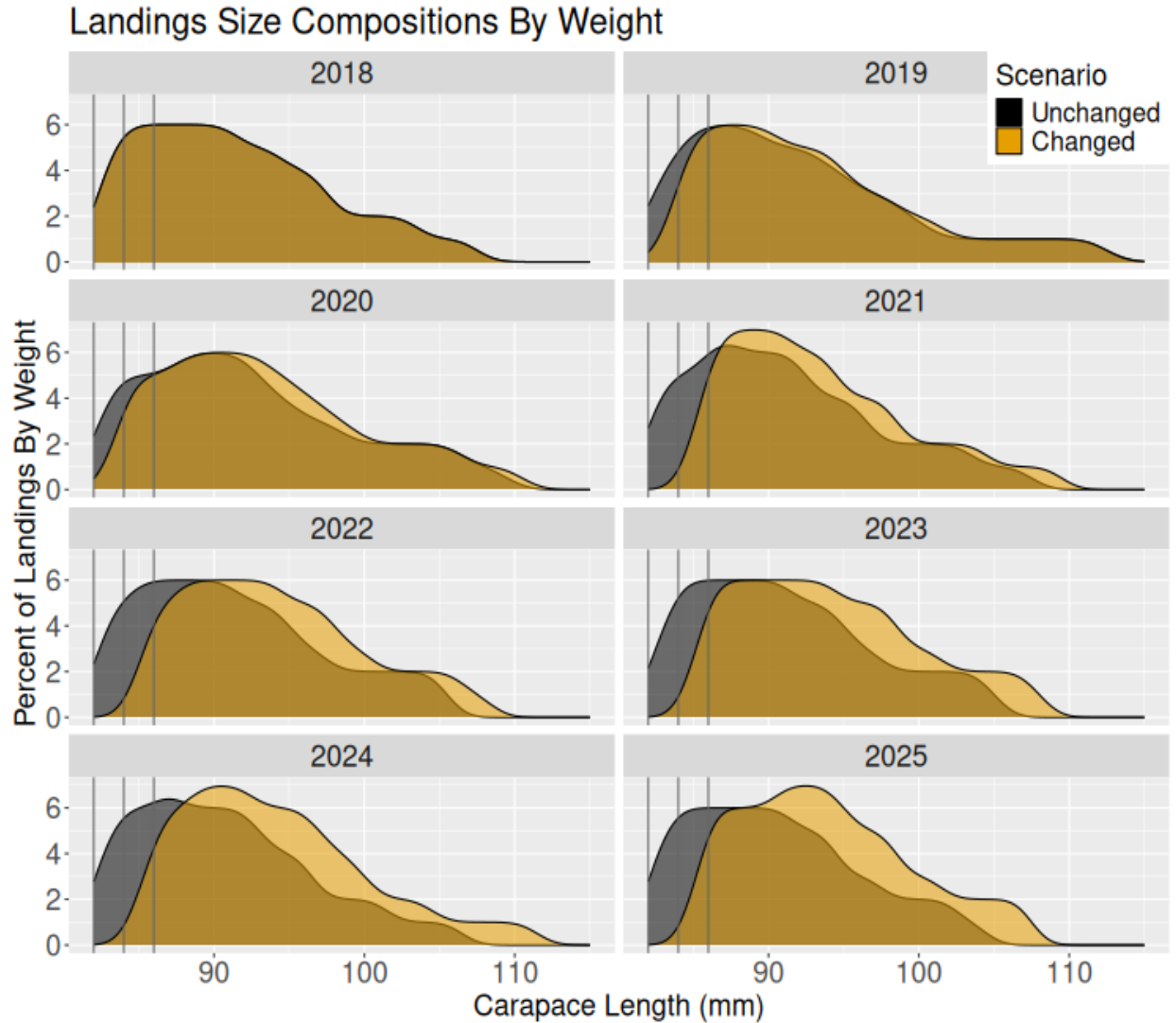


Figure 2. Simulated relative weight distribution of landed lobsters landed between 2019 and 2025 with and without management actions. The size composition of the two scenarios diverge over the years with fewer smaller and more larger lobsters being landed and the total weight of lobsters landed increasing in the gauge change scenario with the increased gauge size and vent size.

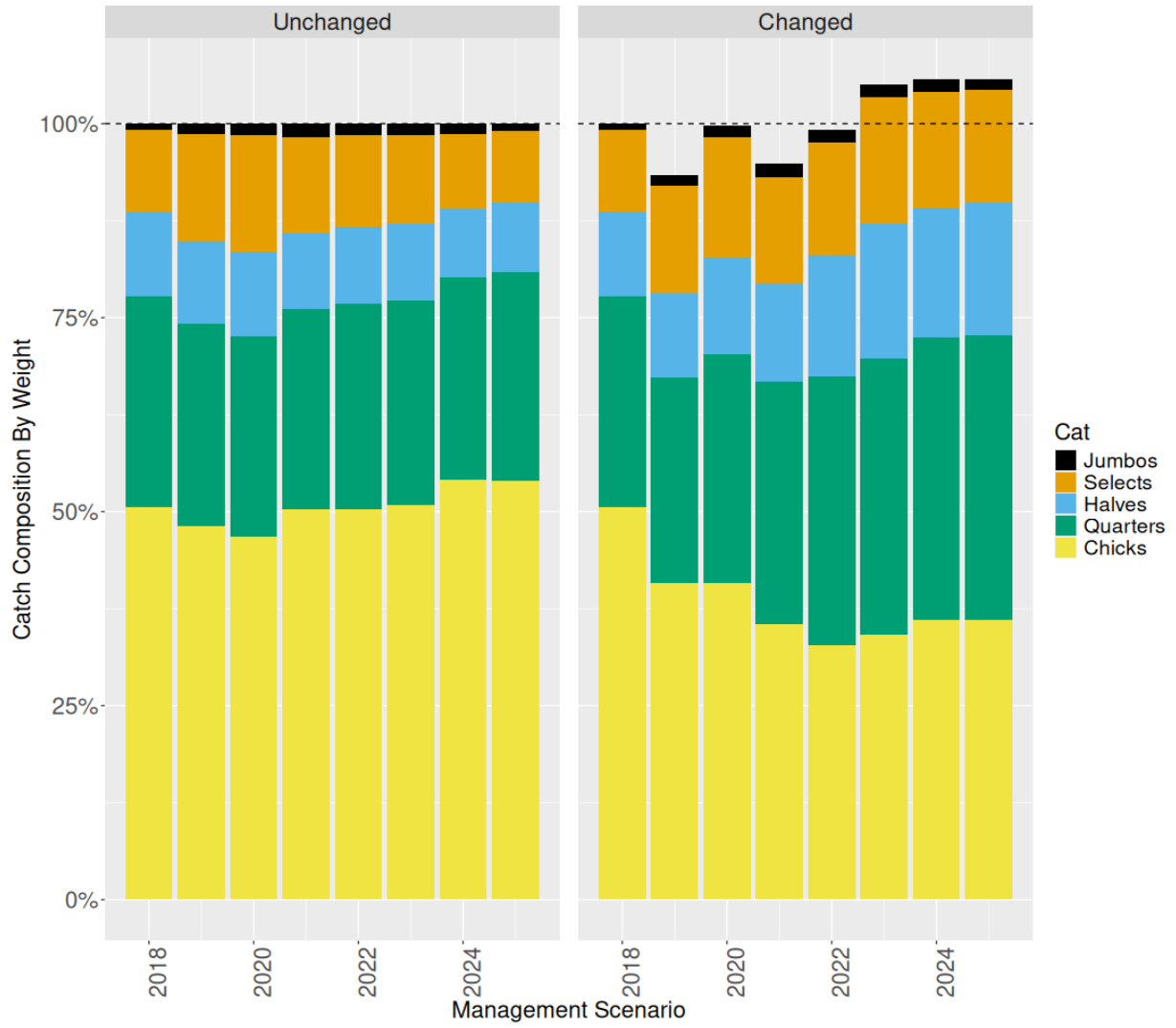


Figure 3. Changes in catch market category by management scenario. Total weight for the gauge change scenario is relative to the total weight of the Unchanged scenario.

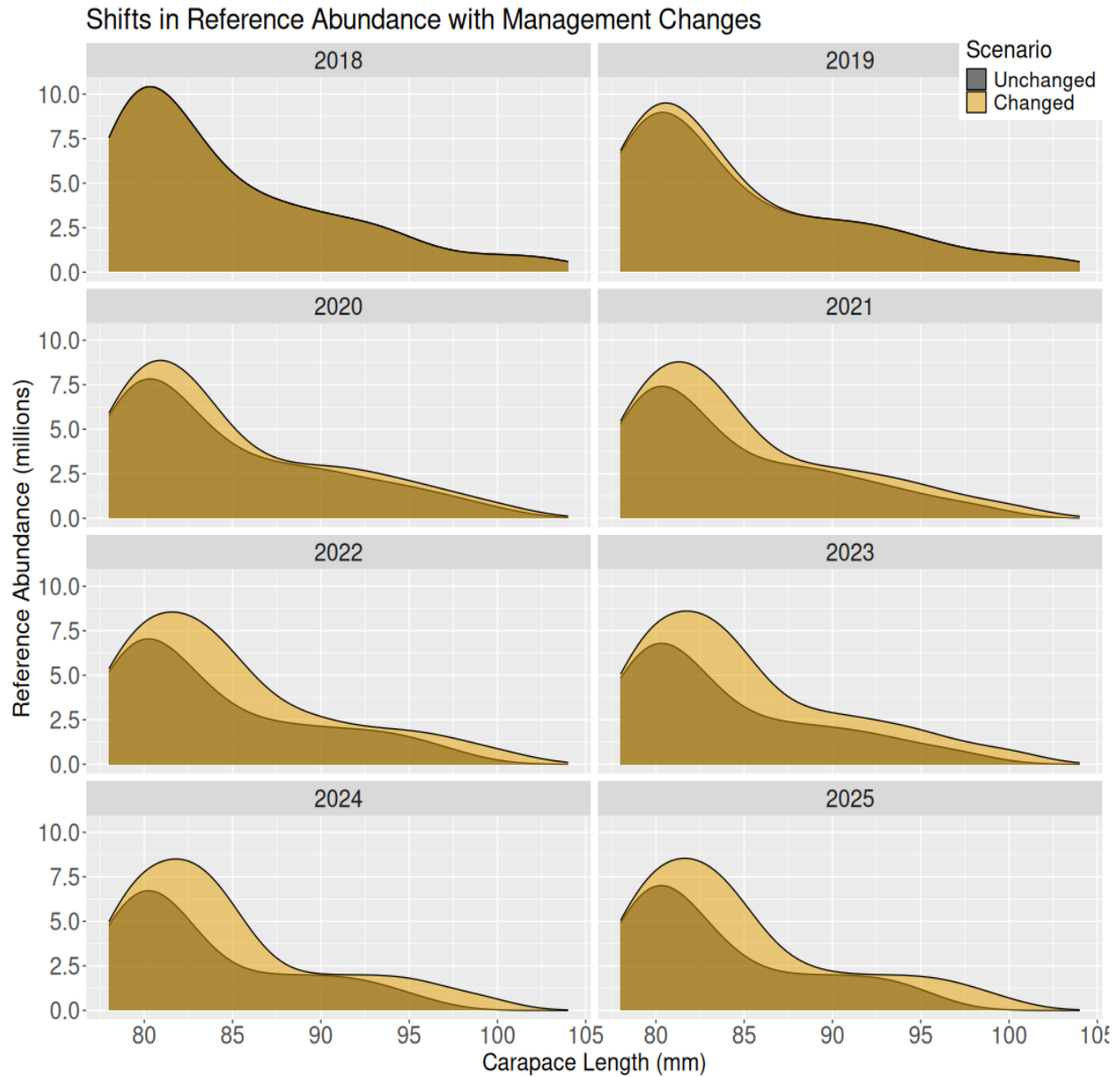


Figure 4. Yearly relative size composition for the Reference Abundance population (78mm+ CL). Area occupied in the gauge change scenario (gold) is in addition to the area occupied by the Unchanged scenario.

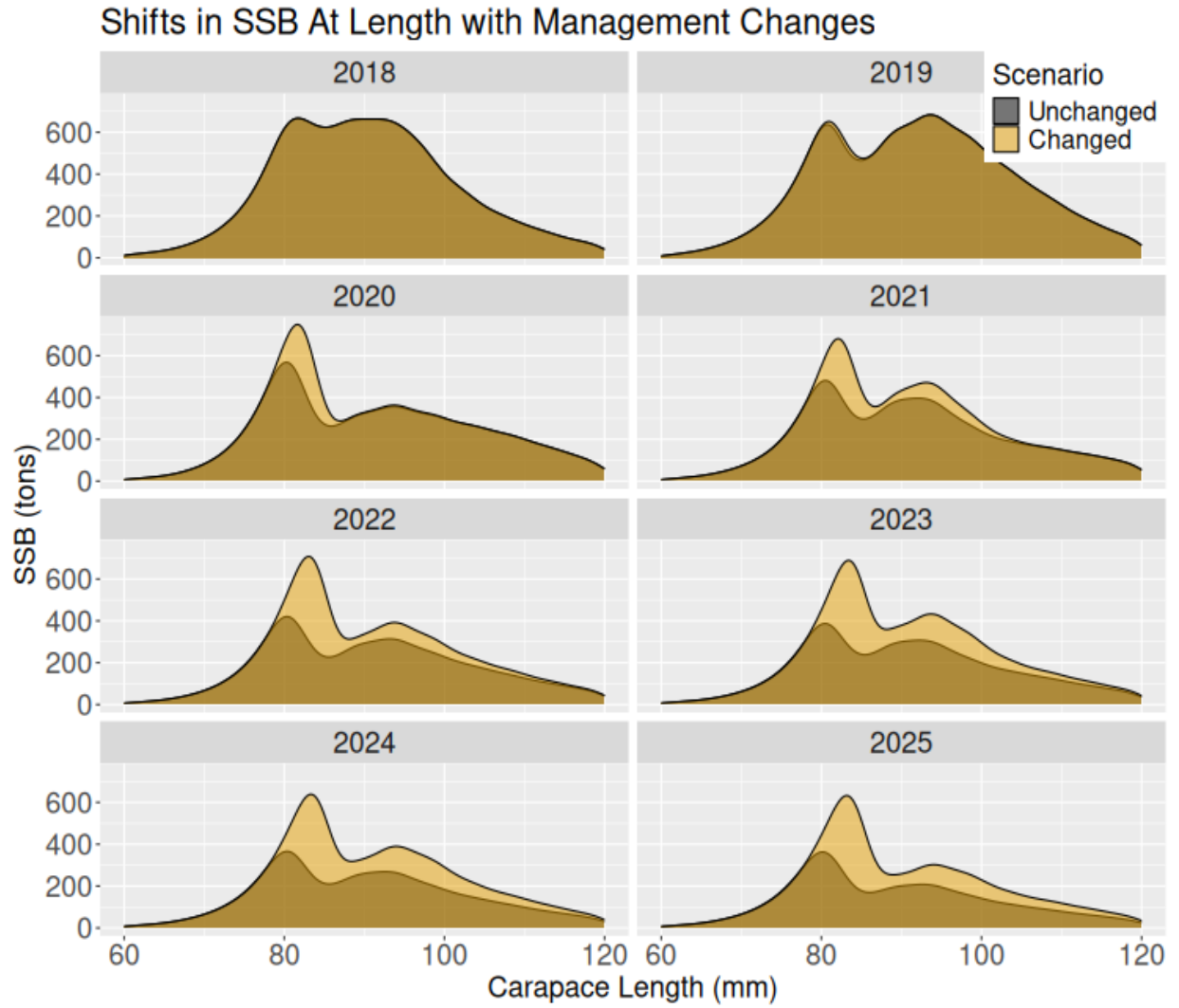


Figure 5. Yearly relative weight composition of Spawning Stock Biomass. Area occupied in the gauge change scenario (black) is in addition to the area occupied by the Unchanged scenario.

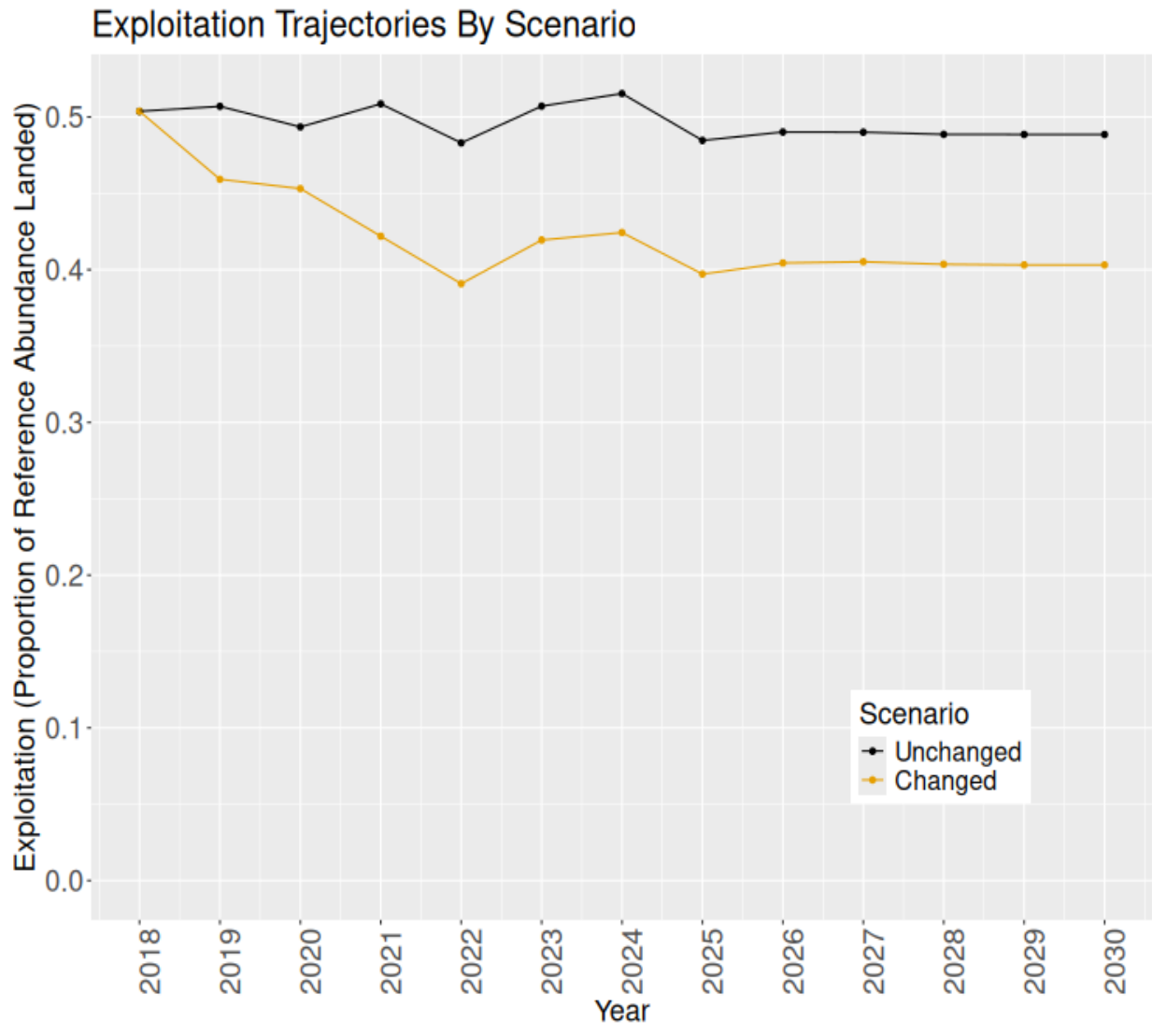
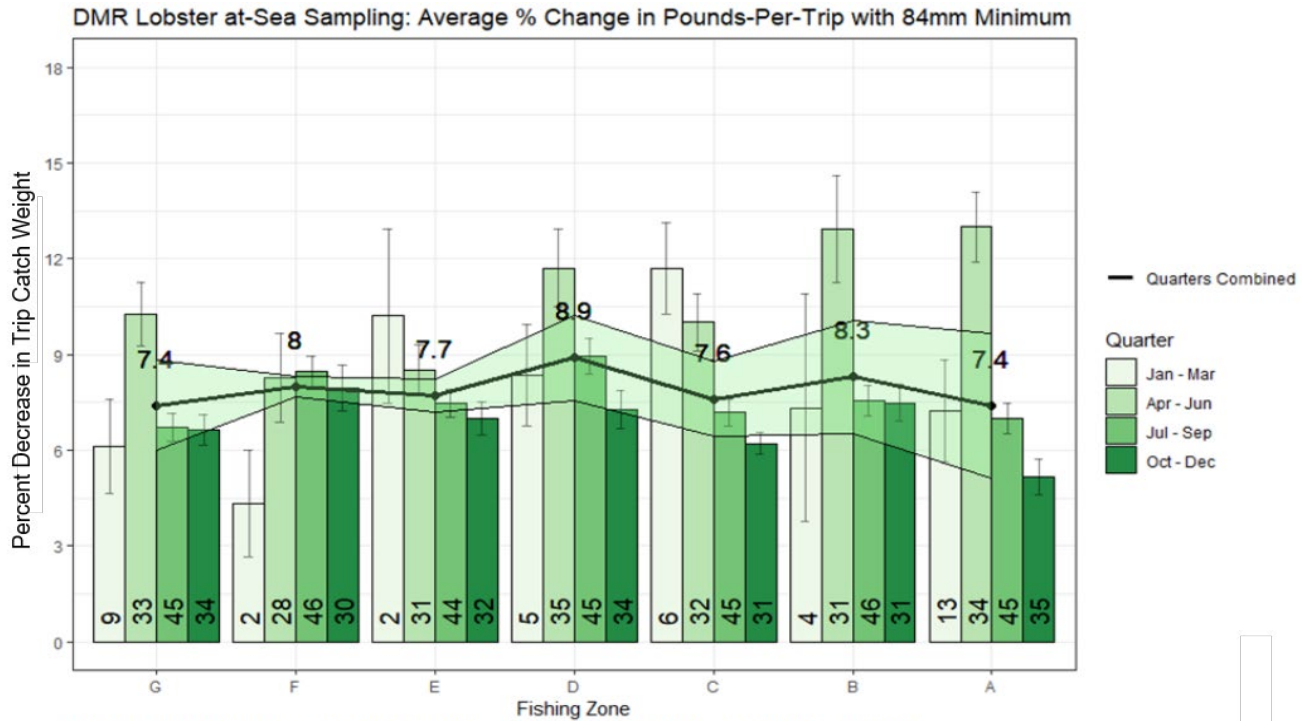


Figure 6. Exploitation trajectories by scenario.



Data was combined from years 2016-2021, with 2020 excluded due to inconsistent sampling effort in response to COVID-19. Estimated change in catch was calculated for quarter and zone across all years using at-sea sampling trip data. The number of completed at-sea sampling trips is displayed at the bottom of each bar. Each bar was assigned relative weight based on number of commercial trips during the respective time period, and used to estimate the overall change per zone across quarters and years (horizontal black bar, with number above in bold). The thin black vertical bars represent standard error at the quarter and zone level. Thin horizontal black bars represent the standard deviation of the total estimated value per zone.

Figure 7. 2022 Maine DMR estimate of first-year decline in landings per trip from an increase in minimum legal size from 83 to 84mm, based on Lobster Sea Sampling length frequencies and estimated by quarter and zone.

Table 1. Relative changes in landed catch numbers and weight across the simulation. Negative values indicate declines while positive values indicate increases relative to the Unchanged scenario. Colors indicate years when regulations changed: green - minimum gauge, yellow - vent size, blue - maximum gauge.

Year	Difference_in_Number	Difference_in_Weight
2018	0.0%	0.0%
2019	-9.4%	-6.6%
2020	-3.4%	-0.2%
2021	-11.6%	-5.1%
2022	-9.2%	-0.8%
2023	-4.7%	5.1%
2024	-4.7%	5.7%
2025	-4.8%	5.7%
2026	-4.2%	6.4%
2027	-3.9%	6.7%
2028	-4.1%	6.5%
2029	-4.3%	6.3%
2030	-4.3%	6.3%

Table 2. Changes in the market category composition of landed lobsters. Composition for the Unchanged scenario should be stable but drift some due to the non-equilibrium stock dynamics in the population model. Compositions for the gauge change scenario are primarily driven by simulated management actions. Colors indicate years when regulations changed: green - minimum gauge, yellow - vent size, blue - maximum gauge.

Market Categories	2018	2019	2020	2021	2022	2023	2024	2025
Unchanged								
Chicks	51%	48%	47%	50%	50%	51%	54%	54%
Quarters	27%	26%	26%	26%	27%	26%	26%	27%
Halves	11%	11%	11%	10%	10%	10%	9%	9%
Selects	11%	14%	15%	12%	12%	11%	10%	9%
Jumbos	1%	1%	1%	2%	2%	1%	1%	1%
Changed								
Chicks	51%	44%	41%	37%	33%	32%	34%	34%
Quarters	27%	28%	30%	33%	35%	34%	34%	35%
Halves	11%	12%	13%	13%	16%	17%	16%	16%
Selects	11%	15%	16%	14%	15%	15%	14%	14%
Jumbos	1%	1%	1%	2%	2%	2%	2%	1%

Table 3. Change in Reference Abundance (78mm+ CL), relative to the Unchanged scenario. Relative difference in abundance stabilizes soon after management actions stabilize. Colors indicate years when regulations changed: green - minimum gauge, yellow - vent size, blue - maximum gauge.

Year	Change_in_RefN
2018	0.0%
2019	0.0%
2020	5.2%
2021	6.5%
2022	12.3%
2023	15.3%
2024	15.7%
2025	16.2%
2026	16.1%
2027	16.2%
2028	16.1%
2029	15.9%
2030	15.9%

Table 4. Change in Spawning Stock Biomass, relative to the Unchanged scenario. Relative difference in SSB stabilizes soon after management actions stabilize. Colors indicate years when regulations changed: green - minimum gauge, yellow - vent size, blue - maximum gauge.

Year	Change_in_SSB
2018	0.0%
2019	0.5%
2020	8.7%
2021	15.6%
2022	27.7%
2023	37.2%
2024	42.3%
2025	47.3%
2026	47.0%
2027	46.5%
2028	46.2%
2029	45.9%
2030	45.8%

Table 5. Decrease in Exploitation for the gauge change scenario relative to the Unchanged scenario. Colors indicate years when regulations changed: green - minimum gauge, yellow - vent size, blue - maximum gauge.

Year	Decrease_in_Exploitation
2018	0.0%
2019	-9.4%
2020	-8.2%
2021	-17.0%
2022	-19.1%
2023	-17.3%
2024	-17.7%
2025	-18.1%
2026	-17.5%
2027	-17.3%
2028	-17.4%
2029	-17.5%
2030	-17.5%

Table 6. Summary comparison between past analysis (2021) and the current analysis (2026) by metric.

Metric	2021	2026
Landings_Number	-3.6%	-4.3%
Landings_Weight	5.0%	6.3%
Spawning_Biomass	38.0%	46.0%
Exploitation	-14.4%	-17.5%

Appendix 1: Detailed Methodology and Documentation

We include additional details on some portions of this analysis both for better documentation and easier future reproducibility.

Core script for this analysis is in the R file `scriptGOM_GaugeChangeProjection_3.R` housed at the NEFSC at `~/LobsterGroup/Management/GOM_PostAssessment2025/GaugeChangeProjection`. It draws from multiple accessory scripts including:

`/LobsterGroup/ProjectR/scripts/ProjectR_functions-5_BS.R` - functions for formatting inputs and recasting outputs.

`/LobsterGroup/StockAssessment/UMM_TMB_Dev/funProjectionFunctions.R` - functions for performing the state space recruitment projections.

`/LobsterGroup/StockAssessment/UMM_TMB_Dev/fun_UMM_TMB.R` - contains the core population simulation function used in the 2025 assessment and useful accessories.

Some parameter structures for the simulation and selectivities are drawn from `/LobsterGroup/StockAssessment/2025/GOM_Modeling/GOM_r194/ModelRuns/GOM_r194_InitLC_ADo utput.Rdata`

Default legal, gear, and conservation selectivities are drawn from `/LobsterGroup/StockAssessment/2025/GOM_Modeling/GOM_r194/Parsed_Real2_r194.Rdata`. Conservation selectivities for the simulation are taken from the 2018 empirically-derived selectivity and assumed constant in the projection years.

The updated gear selectivities are drawn from: `/LobsterGroup/TC Business/VentSelectivity/script DMF_VentSelectivity.R` and stored in `Rectangular_Vent_Selectivities_260105.Rdata`. The model for these gear selectivities were largely developed in 2021 for past TC analysis and take the form of:

```
glm(Retention~CL*Sex+VentSize, family=binomial())
```

This is a logistic regression where retention rates are modeled as an interaction between Carapace Length and Sex with VentSize (vent height) as a continuous variable and data are constrained to Rectangular vents. This produces sex-specific retention curves that can be predicted for different vent heights including heights not originally tested in the study that supplied this data, which was critical for the current analysis. The CL * Sex interaction is highly significant, indicating that lobster carapaces are sexually dimorphic at the size where these vents become selective, with females being retained at a higher rate (Figure A1.1).

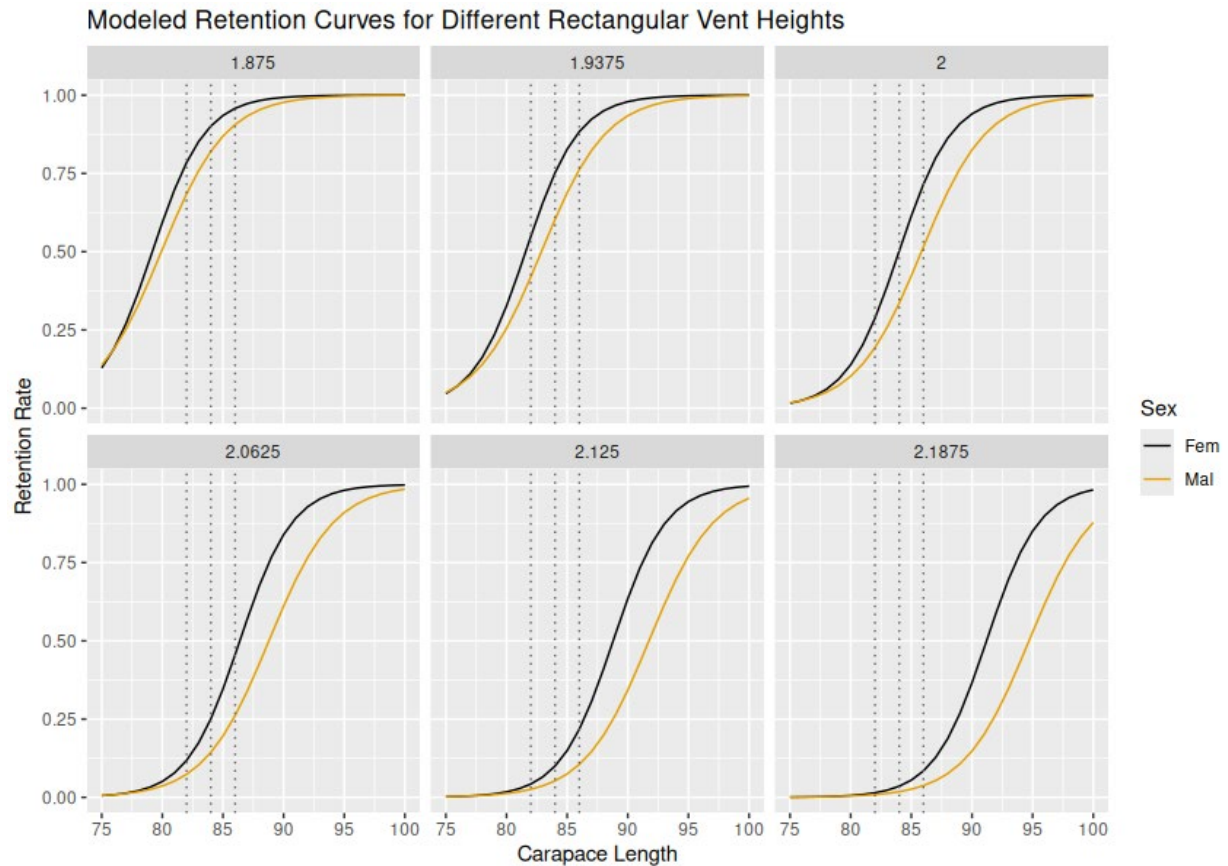


Figure A1.1 Model-based, sex-specific gear retention curves. The modeled curves for 1.9375" (1 15/16") and 2" were used for the Unchanged and Changed scenarios, respectively. Vertical reference lines are at 82, 84, and 86mm to understand how gear selectivity interacts with gauge sizes.

The output from the 2025 stock assessment, including initial length comps, recruitment and fishing mortality estimates are drawn from
 /LobsterGroup/StockAssessment/2025/GOM_Modeling/GOM_r200/OutputDataBase.csv

Updated maturity ogives were calculated in /LobsterGroup/StockAssessment/Maturity/script MaturityFromOgivePars.R, using the GOM parameters calculated for the 2025 assessment, section 2.7.1.

Length-weight relationships at 1mm resolution are also calculated in this script and saved in /LobsterGroup/StockAssessment/Maturity/Lobster_LengthWeightRelationship.Rdata

Growth transition matrices at 1mm resolution were calculated in /LobsterGroup/Management/GOM_PostAssessment2025/GaugeChangeProjection/script BuildGTM_GomGbk_mm.R using the same molt probabilities and molt increments used in the basecase 2025 GOM stock assessment.

The entire simulation exercise is captured in an Rdata archive:

img.GOM_GaugeChangeProjections.Rdata

And core model inputs and outputs are captured in:

StockProjection_GOM_GaugeChange_MM.Rdata

A copy of the core script and output files are stored in the ASFMC File Share at:

American Lobster / TC Reports / Addendum XXVII Reassessment /

Appendix 2: Sensitivity Test On Gear Selectivity.

Among the changes in methodology adopted to update this analysis from past TC analysis or stock assessment projections, the TC was particularly concerned about the updated modeled gear selectivity and how this might affect the simulations. The associated concerns included:

- Using a gear selectivity other than the standard that has been used in past stock assessments.
- Estimating a sex-specific gear selectivity, which had not been previously employed.
- Using an empirical dataset with different vent sizes to estimate the selectivity for a vent size that was not part of the study (see Appendix 1. Detailed Methodology).

The resulting updated gear selectivities had notably different profiles, particularly for females (Figure A1.1, Figure A2.1) and there was concern that the outcome of the analysis could be sensitive to this change.

To address this, we conducted a sensitivity run where the previously-used gear selectivity was simply spread evenly across the 5mm bin for the unchanged scenario and the ascending limb of the profile was shifted 4mm to the right in 2022 to simulate the change in vent size, based on L50's estimated in the gear selectivity models (See Appendix 1. Detailed Methodology). The simulations were then re-run without changing other configurations for comparison to the above ("Core") analysis.

Differences between the Core and Sensitivity simulations were evident but minimal across all performance metrics. This was true both for years before and after the simulated vent size change in 2022, owing to replacing both the unchanged and gauge change gear selectivities. Examining the terminal year of the simulation across model runs (2030):

- Number of lobsters landed declined 5.6% in the Sensitivity run (Table A2.1), compared to 4.3% in the Core run (Table 1).
- Weight of landings increased 8.1% in the Sensitivity run (Table A2.1), compared to 6.3% in the Core run (Table 1).
- Catch composition in the unchanged scenario in 2025 was 50%, 29%, 10%, 9% and 1% for Chicks, Quarters, Halves, Selects and Jumbos, respectively, for the Selectivity run, compared to 54%, 27%, 9%, 9%, and 1% for the Core run (Tables A2.2, Table 2).
- Catch composition in the gauge change scenario in 2025 was 24%, 37%, 21%, 17% and 1% for Chicks, Quarters, Halves, Selects and Jumbos, respectively, for the Selectivity run, compared to 34%, 35%, 16%, 14%, and 1% for the Core run (Tables A2.2, Table 2).
- Reference Abundance increased 20.2% in the Sensitivity run (Table A2.3), compared to 15.9% in the Core run (Table 3).
- Spawning Stock Biomass increased 67.3% in the Sensitivity run (Table A2.4), compared to 45.8% in the Core run (Table 4).
- Exploitation decreased by a relative magnitude of 21.5% in the Sensitivity run (Table A2.5), compared to 17.5% in the Core run (Table 5).

Similar to the comparison to past results, the most evident difference between the Sensitivity and Core is in the increase in Spawning Stock Biomass. In this case, the results of the sensitivity run are very

similar to the Core run in the years up to the vent size change but diverged after that. Thus, we conclude that the shift in the selectivity for the Sensitivity run was more significant, relative to the proximity of the size of maturity, than the Core run, creating the greater effect. Otherwise, the selection of different gear selectivities doesn't appear to have consequential impacts on the outcomes of the simulations.

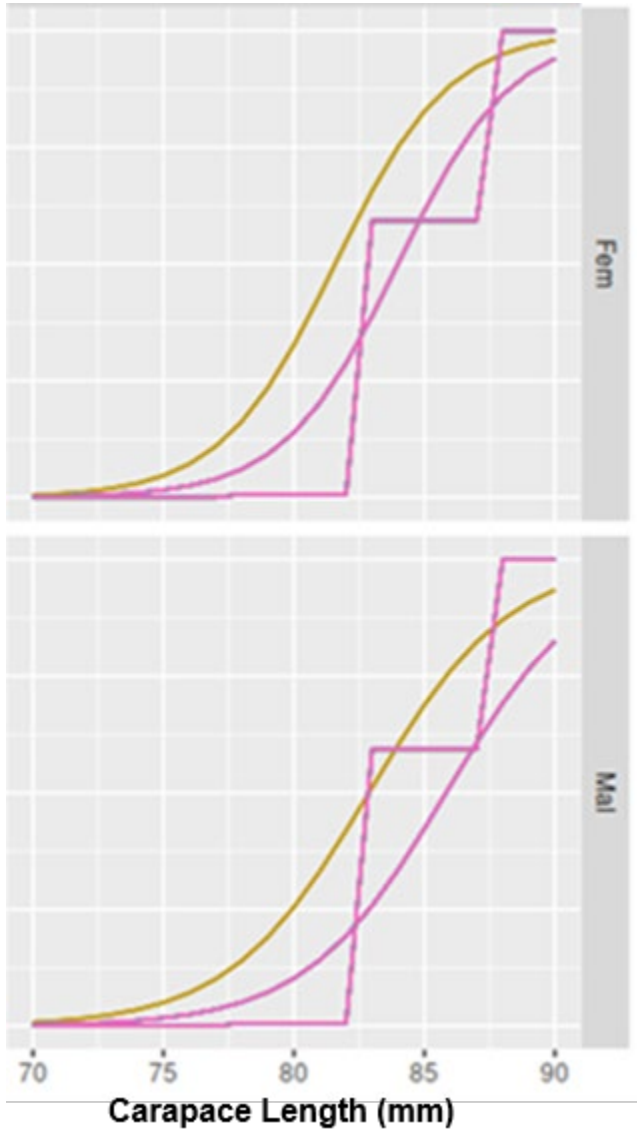


Figure A2.1. Comparison of gear selectivities across simulation runs. The “stair step” selectivity is the original 5mm resolution gear selectivity used in the stock assessment and past simulations. The two continuous profiles are the newly estimated, sex-specific gear selectivities for rectangular vents with heights of 1-15/16” (left) and 2” (right).

Table A2.1. Sensitivity results for relative changes in landed catch numbers and weight across the simulation. Negative values indicate declines while positive values indicate increases relative to the unchanged scenario. Colors indicate years when regulations changed: green - minimum gauge, Yellow - vent size, blue - maximum gauge. Compare to Table 1.

Year	Difference_in_Number	Difference_in_Weight
2018	0.0%	0.0%
2019	-6.5%	-4.5%
2020	-2.3%	-0.0%
2021	-10.5%	-5.3%
2022	-19.3%	-10.5%
2023	-8.7%	2.7%
2024	-6.7%	6.3%
2025	-6.6%	6.8%
2026	-5.6%	7.9%
2027	-5.1%	8.5%
2028	-5.4%	8.4%
2029	-5.6%	8.1%
2030	-5.6%	8.1%

Table A2.2. Sensitivity results for changes in the market category composition of landed lobsters. Composition for the unchanged scenario should be stable but drift some due to the non-equilibrium stock dynamics in the population model. Composition for the gauge change scenario are primarily driven by simulated management actions. Colors indicate years when regulations changed: green - minimum gauge, Yellow - vent size, blue - maximum gauge. Compare to Table 2.

Market Categories	2018	2019	2020	2021	2022	2023	2024	2025
Unchanged								
Chicks	48%	45%	44%	47%	47%	47%	50%	50%
Quarters	29%	28%	28%	28%	29%	29%	29%	29%
Halves	12%	12%	12%	11%	11%	11%	10%	10%
Selects	11%	14%	15%	12%	12%	11%	9%	9%
Jumbos	1%	1%	1%	2%	1%	1%	1%	1%
Updated								
Chicks	48%	42%	39%	36%	25%	24%	24%	24%
Quarters	29%	30%	31%	34%	39%	37%	37%	37%
Halves	12%	12%	13%	14%	19%	21%	21%	21%
Selects	11%	14%	15%	14%	16%	17%	17%	17%
Jumbos	1%	1%	1%	2%	2%	1%	1%	1%

Table A2.3. Sensitivity results for change in Reference Abundance (78mm+ CL), relative to the unchanged scenario. Relative difference in abundance stabilizes soon after management actions stabilize. Colors indicate years when regulations changed: green - minimum gauge, Yellow - vent size, blue - maximum gauge. Compare to Table 3.

Year	Change_in_RefN
2018	0.0%
2019	0.0%
2020	3.5%
2021	4.3%
2022	9.4%
2023	17.4%
2024	19.4%
2025	20.2%
2026	20.4%
2027	20.6%
2028	20.4%
2029	20.3%
2030	20.2%

Table A2.4. Sensitivity results for change in Spawning Stock Biomass, relative to the unchanged scenario. Relative difference in SSB stabilizes soon after management actions stabilize. Colors indicate years when regulations changed: green - minimum gauge, Yellow - vent size, blue - maximum gauge. Compare to Table 4.

Year	Change_in_SSB
2018	0.0%
2019	0.4%
2020	6.0%
2021	10.7%
2022	23.3%
2023	45.7%
2024	58.6%
2025	68.0%
2026	67.9%
2027	67.7%
2028	67.5%
2029	67.2%
2030	67.0%

Table A2.5. Sensitivity results for decrease in Exploitation for the gauge change scenario relative to the unchanged scenario. Colors indicate years when regulations changed: green - minimum gauge, Yellow - vent size, blue - maximum gauge. Compare to Table 5.

Year	Decrease_in_Exploitation
2018	0.0%
2019	-6.5%
2020	-5.5%
2021	-14.2%
2022	-26.3%
2023	-22.2%
2024	-21.9%
2025	-22.3%
2026	-21.6%
2027	-21.3%
2028	-21.4%
2029	-21.5%
2030	-21.5%

