ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR AMERICAN LOBSTER
(*Homarus americanus*)

2022 FISHING YEAR

Prepared by the Plan Review Team

Approved November 2023

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

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Year of ASMFC Plan's Adoption:	Amendment 3 (1997)
Plan Addenda:	
Addendum II (2001)	Addendum XV (2009)
Addendum III (2002)	Addendum XVI (2010)
Addendum IV (2003)	Addendum XVII (2012)
Addendum V (2004)	Addendum XVIII (2012)
Addendum VI (2005)	Addendum XIX (2013)
Addendum VII (2005)	Addendum XX (2013)
Addendum VIII (2006)	Addendum XXI (2013)
Addendum IX (2006)	Addendum XXII (2013)
Addendum X (2007)	Addendum XXIII (2014)
Addendum XI (2007)	Addendum XXIV (2015)
Addendum XII (2008)	Addendum XXVI (2018)
Addendum XIII (2008)	Addendum XXIX (2022)
Addendum XIV (2009)	Addendum XXVII (2023)
Management Unit:	Maine through North Carolina
States with a Declared Interest:	Maine through Virginia (Excluding Pennsylvania and DC)
Active Committees:	American Lobster Management Board, Technical Committee, Lobster Conservation Management Teams, Plan Development Team, Plan Review Team, Advisory Panel, Electronic Reporting Subcommittee, Electronic Tracking Subcommittee, Stock Assessment Subcommittee

2.0 Status of the Fishery

2.1 Commercial Fishery

The lobster fishery has seen incredible expansion in landings over the last 40 years. Between 1950 and 1975, landings were fairly stable around 30 million pounds; however, from 1976 to 2008 the average coastwide landings tripled, exceeding 98 million pounds in 2006. Landings continued to increase until reaching a high of 159 million pounds in 2016 (Table 1). In 2022, coastwide commercial landings were approximately 121 million pounds, a 10% decrease from 2021 landings of 135 million pounds. The largest contributors to the 2022 fishery were Maine and Massachusetts with 81% and 13% of landings, respectively. The ex-vessel value for all lobster landings in 2022 was approximately $517.6 million, which is a 41% decrease from the 2021 record high value of $875 million.

Historically, Lobster Conservation Management Area (LCMA) 1 has had the highest landings, and accounted for 80% of total harvest between 1981 and 2012. This is followed by LCMA 3

which accounted for 9% of total landings during the same time period. In general, landings have increased in LCMA 1 and have decreased in LCMAs 2, 4, and 6. According to state compliance reports, in 2022, approximately 92% of the total landings came from LCMA 1, while the remaining 8% were contributed by the other LCMAs. A map of the LCMAs is found in Figure 1.

Landings trends between the two biological stocks have also changed, as a greater percentage of lobster are harvested from the Gulf of Maine/Georges Bank (GOM/GBK) stock. In 1997, 26.3% of coastwide landings came from the Southern New England (SNE) stock. However, as the southern stock declined and abundance in the Gulf of Maine increased, proportional harvest has significantly changed. In 2000, only 15.6% of landings came from the SNE stock and by 2006, this declined to 7%. In 2022, approximately 1.5% of coastwide landings came from the SNE stock.

2.2 Recreational Fishery

Lobster is also taken recreationally with pots, and in some states, by hand while SCUBA diving. While not all states collect recreational harvest data, some do report the number of pounds landed recreationally and/or the number of recreational permits issued. Recreational landings for Massachusetts are only available through 2021, and have averaged 1.1% of total Massachusetts landings over the most recent five years of data. In 2022, New Hampshire reported 6,301 pounds of lobster harvested recreationally and New York reported 1,333 pounds. Maine, Rhode Island, and Connecticut do not collect information on the number of pounds recreationally harvested. For 2022, Rhode Island issued 544 lobster licenses, and 255 lobster licenses were sold in Connecticut in 2022.

3.0 Status of the Stock

The recent 2020 American Lobster Benchmark Stock Assessment presents contrasting results for the two American lobster stock units, with record high abundance and recruitment in the Gulf of Maine and Georges Bank stock (GOM/GBK) and record low abundance and recruitment in the Southern New England stock (SNE) in recent years.

The assessment found that abundance estimates for the GOM/GBK stock show an increasing trend beginning in the late 1980s. After 2008, the rate of increase accelerated to a record high abundance level in 2018, the terminal year of the assessment. 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 2). Current spawning stock abundance and recruitment and are near record highs. Exploitation (commercial landings relative to stock abundance) declined in the late 1980s and has remained relatively stable since.

The GOM/GBK stock is in favorable condition based on the new recommended reference points adopted by the Board (Table 2). The average abundance from 2016-2018 was 256 million lobster, which is greater than the fishery/industry target of 212 million lobster. 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.

In contrast to GOM/GBK, model results for SNE show a completely different picture of stock health. Abundance estimates in SNE have declined since the late 1990s to record low levels. Model estimates of recruitment and spawning stock biomass have also declined to record low levels. Analysis of these estimates indicates a declining trend in stock productivity, indicating reproductive rates are insufficient to sustain a stable population at current exploitation rates. Exploitation of the SNE stock was high and stable through 2002, declined sharply in 2003, and has remained lower and stable since.

Based on the new abundance threshold reference point, the SNE stock is significantly depleted. The average abundance from 2016-2018 was 7 million lobster, well below the threshold of 20 million lobster (Table 2, Figure 3). However, according to the exploitation reference points the SNE stock is not experiencing overfishing. The average exploitation from 2016-2018 was 0.274, falling between the exploitation threshold of 0.290 and the exploitation target of 0.257.

The assessment and peer review panel recommended significant management action be taken to provide the best chance of stabilizing or improving abundance and reproductive capacity of the SNE stock.

4.0 Status of Management Measures

4.1 Implemented Regulations

Amendment 3 established regulations which require coastwide and area specific measures applicable to commercial fishing (Table 3). The coastwide requirements from Amendment 3 are summarized below; additional requirements were established through subsequent Addenda.

Coastwide Requirements and Prohibited Actions

- Prohibition on possession of berried or scrubbed lobsters
- Prohibition on possession of lobster meats, detached tails, claws, or other parts of lobsters by fishermen
- Prohibition on spearing lobsters
- Prohibition on possession of v-notched female lobsters
- Requirement for biodegradable “ghost” panel for traps
- Minimum gauge size of 3-1/4”
- Limits on landings by fishermen using gear or methods other than traps to 100 lobsters per day or 500 lobsters per trip for trips 5 days or longer
- Requirements for permits and licensing
- All lobster traps must contain at least one escape vent with a minimum size of 1-15/16” by 5-3/4”
- Maximum trap size of 22,950 cubic inches in all areas except area 3, where traps may not exceed a volume of 30,100 cubic inches.

<u>Amendment 3 to the Interstate Fishery Management Plan for American Lobster (December 1997)</u>

American lobster is managed under Amendment 3 to the Interstate FMP for American Lobster. Amendment 3 establishes seven lobster management areas. These areas include the: Inshore Gulf of Maine (LCMA 1), Inshore Southern New England (LCMA 2), Offshore Waters (LCMA 3),

Inshore Northern Mid-Atlantic (LCMA 4), Inshore Southern Mid-Atlantic (LCMA 5), New York and Connecticut State Waters (LCMA 6), and Outer Cape Cod (OCC). Lobster Conservation Management Teams (LCMTs) comprised of industry representatives were formed for each management area. The LCMTs are charged with advising the Lobster Board and recommending changes to the management plan within their areas.

Amendment 3 also provides the flexibility to respond to current conditions of the resource and fishery by making changes to the management program through addenda. The commercial fishery is primarily controlled through minimum/maximum size limits, trap limits, and v-notching of egg-bearing females.

Addendum I (August 1999)
Establishes trap limits in the seven LCMAs.

Addendum II (February 2001)
Establishes regulations for increasing egg production through a variety of LCMT proposed management measures including, but not limited to, increased minimum gauge sizes in LCMAs 2, 3, 4, 5, and the Outer Cape.

Addendum III (February 2002)
Revises management measures for all seven LCMAs in order to meet the revised egg-rebuilding schedule.

Technical Addendum 1 (August 2002)
Eradicates the vessel upgrade provision for LCMA 5.

Addendum IV (January 2004)
Changes vent size requirements; applies the most restrictive rule on an area trap cap basis without regard to the individual's allocation; establishes LCMA 3 sliding scale trap reduction plan and transferable trap program to increase active trap reductions by 10%; and establishes an effort control program and gauge increases for LCMA 2; and a desire to change the interpretation of the most restrictive rule.

Addendum V (March 2004)
Amends Addendum IV transferability program for LCMA 3. It establishes a trap cap of 2200 with a conservation tax of 50% when the purchaser owns 1800 to 2200 traps and 10% for all others.

Addendum VI (February 2005)
Replaces two effort control measures for LCMA 2 – permits an eligibility period.

Addendum VII (November 2005)
Revises LCMA 2 effort control plan to include capping traps fished at recent levels and maintaining 3 3/8" minimum size limit.

Addendum VIII (May 2006)
Establishes new biological reference points to determine the stock status of the American lobster resource (fishing mortality and abundance targets and thresholds for the three stock assessment areas) and enhances data collection requirements.

Addendum IX (October 2006)
Establishes a 10% conservation tax under the LCMA 2 trap transfer program.

Addendum X (February 2007)
Establishes a coastwide reporting and data collection program that includes dealer and harvester reporting, at-sea sampling, port sampling, and fishery-independent data collection replacing the requirements in Addendum VIII.

Addendum XI (May 2007)
Establishes measures to rebuild the SNE stock, including a 15-year rebuilding timeline (ending in 2022) with a provision to end overfishing immediately. The Addendum also establishes measures to discourage delayed implementation of required management measures.

Addendum XII (February 2009)
Addresses issues which arise when fishing privileges are transferred, either when whole businesses are transferred, when dual state/federal permits are split, or when individual trap allocations are transferred as part of a trap transferability program. In order to ensure the various LCMA-specific effort control plans remain cohesive and viable, this addendum does three things. First, it clarifies certain foundational principles present in the Commission's overall history-based trap allocation effort control plan. Second, it redefines the most restrictive rule. Third, it establishes management measures to ensure history-based trap allocation effort control plans in the various LCMAs are implemented without undermining resource conservation efforts of neighboring jurisdictions or LCMAs.

Addendum XIII (May 2008)
Solidifies the transfer program for OCC and stops the current trap reductions.

Addendum XIV (May 2009)
Alters two aspects of the LCMA 3 trap transfer program. It lowers the maximum trap cap to 2000 for an individual that transfers traps. It changes the conservation tax on full business sales to 10% and for partial trap transfers to 20%.

Addendum XV (November 2009)
Establishes a limited entry program and criteria for Federal waters of LCMA 1.

Addendum XVI: Reference Points (May 2010)
Establishes new biological reference points to determine the stock status of the American lobster resource (fishing mortality and abundance targets and thresholds for the three stock

assessment areas). The addendum also modifies the procedures for adopting reference points to allow the Board to take action on advice following a peer reviewed assessment.

Addendum XVII (February 2012)
Institutes a 10% reduction in exploitation for LCMAs within Southern New England (2, 3, 4, 5, and 6). Regulations are LCMA specific but include v-notch programs, closed seasons, and size limit changes.

Addendum XVIII (August 2012)
Reduces traps allocations by 50% for LCMA 2 and 25% for LCMA 3.

Addendum XIX (February 2013)
Modifies the conservation tax for LCMA 3 to a single transfer tax of 10% for full or partial business sales.

Addendum XX (May 2013)
Prohibits lobstermen from setting or storing lobster traps in Closed Area II from November 1 to June 15 annually. Any gear set in this area during this time will be considered derelict gear. This addendum represents an agreement between the lobster industry and the groundfish sector.

Addendum XXI (August 2013)
Addresses changes in the transferability program for LCMAs 2 and 3. Specific measures include the transfer of multi-LCMA trap allocations and trap caps.

Addendum XXII (November 2013)
Implements Single Ownership and Aggregate Ownership caps in LCMA 3. Specifically, it allows LCMA 3 permit holders to purchase lobster traps above the cap of 2000 traps; however, these traps cannot be fished until approved by the permit holder's regulating agency or once trap reductions commence. The Aggregate Ownership Cap limits LCMA fishermen or companies from owning more traps than five times the Single Ownership Cap.

Addendum XXIII (August 2014)
Updates Amendment 3's habitat section to include information on the habitat requirements and tolerances of American lobster by life stage.

Addendum XXIV (May 2015)
Aligns state and federal measure for trap transfer in LCMA's 2, 3, and the Outer Cape Cod regarding the conservation tax when whole businesses are transferred, trap transfer increments, and restrictions on trap transfers among dual permit holders.

Addendum XXVI (February 2018)
Advances the collection of harvester and biological data in the lobster fishery by improving the spatial resolution of data collection, requiring harvesters to report additional data elements,

and establishing a deadline that within five years, states are required to implement 100% harvester reporting. The Addendum also improves the biological sampling requirements by establishing a baseline of ten sampling trips per year, and encourages states with more than 10% of coastwide landings to conduct additional sampling trips. Required reporting of additional data elements went into effect on January 1, 2019. The Addendum XXVI requirement for commercial harvesters to report their fishing location by 10 minute longitudinal/latitudinal square was implemented in 2021.

Addendum XXIX (2022)
Implements electronic tracking requirements for federally-permitted vessels in the American lobster and Jonah crab fisheries to collect high resolution spatial and temporal effort data. Specifically, electronic tracking devices will be required for vessels with commercial trap gear area permits for LCMAs 1, 2, 3, 4, 5, and Outer Cape Cod. Requirements will become effective in 2023.

Addendum XXVII (2023)
Establishes a trigger mechanism to implement management measures (gauge and escape vent sizes) to provide additional protection of the GOM/GBK spawning stock biomass (SSB). It also implements changes to management measures for LCMAs 1, 3, and Outer Cape Cod to improve the consistency of measures across the GOM/GBK stock.

5.0 Fishery Dependent Monitoring
The following provisions of Addendum XXVI went into effect January 1, 2019:

- Required reporting of additional data elements;
- Requirement to implement 100% harvester reporting within five years;
- Baseline biological sampling requirement of ten sea and/or port sampling trips per year.

The Addendum XXVI requirement for commercial harvesters to report their fishing location by 10 minute longitudinal/latitudinal square was not implemented until 2021. Table 5 describes the level of reporting and monitoring programs by each state. *De minimis* states are not required to conduct biological sampling of their lobster fishery.

In 2022, Rhode Island, Connecticut, New York, and New Jersey were unable to complete the ten required sea and/or port sampling trips for fishery dependent monitoring. Rhode Island completed seven out of ten trips, and New York completed eight port sampling trips. New Jersey completed zero trips and continues to have difficulty with vessel Captains accommodating an observer aboard. No fishery dependent sampling has been conducted by Connecticut since 2014 due to reductions in funding and staffing levels.

6.0 Status of Fishery Independent Monitoring
Addendum XXVI also requires fishery independent data collection by requiring statistical areas be sampled through one of the following methods: annual trawl survey, ventless trap survey, or young-of-year survey.

7.1 Trawl Surveys

Maine and New Hampshire: The Maine-New Hampshire Inshore Trawl survey began in 2000 and covers approximately two-thirds of the inshore portion of Gulf of Maine. The spring survey began May 2, 2022 in Portsmouth, NH. However, during the first day of the survey a positive covid case occurred; as a result the survey was stopped while staff and crew quarantined. During this time the decision was made to restart the survey following the current schedule due the lack of accommodations and increase issues with gear in regions 4 and 5 in mid-June, and region 3 started back up on time on May 16, 2022 and ended on June 6, 2021 off of Lubec, Maine. Regions 1 and 2 were then rescheduled after the original end date of the survey and were completed on the weeks of June 6th and June 13th, respectively. Due to covid and gear conflicts, 101 out of the 120 scheduled tows were completed leading to an 84% completion rate for the survey. A total of 10,854 lobsters were caught and sampled, with 5,133 females, 5,719 males and 2 unsexed caught and measured (Figure 4). The fall survey began on September 26, 2022 in Portsmouth, New Hampshire and finished on October 28, 2022 off of Lubec, Maine. Due to the adverse weather and gear conflicts, 87 out of the 120 scheduled tows were completed leading to a 73% completion rate for the survey. A total of 10,423 lobsters were caught and sampled, with 5,100 females, 5,319 males, and 4 unknown sexes sampled (Figure 5).

Massachusetts: Since 1978, the Division of Marine Fisheries has conducted spring and autumn bottom trawl surveys in the territorial waters of Massachusetts. For the first time since 1978, neither the spring nor fall bottom trawl surveys were conducted in 2020 due to the COVID-19 pandemic, but the survey resumed in 2021. After low levels observed in the GOM during the early to mid-2000s, relative abundance indices have increased over the last decade Legal abundance has remained high relative to the time series median since 2015, although the 2022 value was the lowest observed since 2015. Sublegal-sized abundance has been at or below the median for the past three years with data (no data in 2020). In SNE, relative abundance from the spring and fall surveys remains low. There were no lobsters observed in the SNE fall or spring surveys in 2022 (Figure 6).

Rhode Island: The Rhode Island DFW Trawl Survey program conducted seasonal surveys in the spring and fall, as well as a monthly survey. In 2022, 44 trawls were conducted in the Spring and 44 in the Fall. Monthly Survey includes monthly trawls throughout Narragansett Bay. There were 156 trawls performed as part of the Monthly program in 2022. Spring 2022 mean CPUEs were 0.07 and 0.61 for legal and sub legal lobsters (respectively), where Fall 2022 CPUE was 0.02 for legal lobsters and 0.23 for sublegal lobsters. The 2022 mean Monthly trawl CPUEs were 0.04 and 0.41 per-tow for legal and sublegal lobsters, respectively (Figure 7).

Connecticut and New York: Juvenile and adult abundance are monitored through the Long Island Sound Trawl Survey during the spring (April, May, June) and the fall (September, October) cruises all within NMFS statistical area 611. Due to the COVID-19 pandemic, the spring and fall 2020 Long Island Sound Trawl Surveys were not conducted; an estimated index is shown as the average of 2019 and 2021. The spring 2022 lobster abundance index (geometric

mean = 0.01 lobsters/tow) was the lowest in the time series. Spring abundance in the last eleven years (2011-2022) remains less than 1.0. All indices from 2004-2022 are below the time series median (2.93, see figure below). The fall 2022 lobster abundance index (geometric mean = 0.03 lobsters/tow) was a slight improvement from 2019 when no lobsters were caught in September and October. The fall time series median (3.18, see figure below) has not been exceeded since 2004. Analyses of legal and sublegal size composition for the 2022 research trawl spring and fall survey catches were not available at the time of this report (Figure 8).

New York: New York initiated a stratified random trawl survey in the near shore ocean waters off the south shore of Long Island in 2018 from the Rockaways to Montauk Point and the New York waters of Block Island Sound. Seven sampling cruises were conducted in 2022 during the winter (February), spring (April, May, June), summer (August) and fall (October, November). Twenty-one stations were sampled during the winter cruise in February. Thirteen, seventeen, and twenty-three stations were sampled during the spring cruises. Thirty stations were sampled during the summer cruise in August. During the fall, 20 stations were sampled in October and eight stations were sampled in November. Ten lobsters were caught during the 2022 surveys.

New Jersey: An independent Ocean Trawl Survey is conducted from Sandy Hook, NJ to Cape May, NJ each year. The survey stratifies sampling in three depth gradients, inshore (18'-30'), mid-shore (30'-60'), offshore (60'-90'). The mean CPUE is calculated as the sum of the mean number of lobsters per size class collected in each sampling area weighted by the stratum area. Due to the COVID-19 pandemic, the survey did not take place for 2020 and 2021, but the 2022 CPUE is an increase from the 2019 value (Figure 9).

Maryland: Maryland conducted a 16-foot otter trawl survey in the coastal bays and has not encountered an American lobster in this survey (1989 - 2022).

7.2 Young of Year Index

Several states conduct young-of-year (YOY) surveys to detect trends in abundance of newly-settled and juvenile lobster populations. These surveys attempt to provide an accurate picture of the spatial pattern of lobster settlement. States hope to track juvenile populations and generate predictive models of future landings.

Maine: There are currently 40 fixed stations along the Maine coast. Of these 40 stations 38 have been sampled consistently since 2001 with two additional sites added to Zone D, off midcoast Maine, in 2005. In recent years, these sites are sampled October to December. Only 33 sites were sampled in 2022 due to staffing and weather limitations. Sites were selected based on orientation to surface winds, position in bays, water temperature during settlement period (for eastern Maine sites) and presence of suitable habitat. A new R script was developed in 2022 to pull the data directly from Maine's MARVIN archive database to create a replicable and transparent data query, but these numbers differ slightly from past data pulled. Cut-off values for YOY vary by year. This data query process is still being vetted (Figure 10).

New Hampshire: New Hampshire Fish and Game conducted a portion of the coastwide American Lobster Settlement Index (ALSI). In 2022, a total of 46 juvenile lobsters were sampled from three sites; 36 older juveniles, five young-of-year (YOY) lobster, and five one-year-old (Y+). Figure 11 depicts the CPUE (#/m2) of all sampled lobsters, YOY and Y+, for all New Hampshire sites combined from 2008 through 2022. For each of these indices, CPUE shows a general upward trend to a time series high in 2011 with sustained moderate to low levels from 2012 through 2022.

Massachusetts: Annual sampling for early benthic phase/juvenile (EBP) lobsters was conducted during August and September, 2022. Prior to 2019, sampling was completed at 21 sites spanning 7 regions in Massachusetts coastal waters. As of 2022, suction sampling is conducted in the GOM stock unit at 10 sites from Cape Ann to the South Shore area, and in the SNE stock unit at 4 sites in Buzzards Bay. In 2022 densities of YOY lobsters remained low compared to the time series average in Boston Harbor and Salem Sound (Figure 1). For the two newer sampling areas, 2022 values in Cape Ann were below the time series mean, while in the South Shore the 2022 value was at the time series mean (Figure 12). In SNE there were no YOY lobsters found in the Buzzards Bay sampling locations in 2022.

Rhode Island: In 2022, the RI DEM DMF YOY Settlement Survey (Suction Sampling) was conducted at six fixed stations with twelve randomly selected 0.5 m^2 quadrats sampled at each survey station. The survey stations are located outside of Narragansett Bay along the southern Rhode Island coast, from Sachuest Point (east) to Point Judith (west). The index represents the average annual densities for YOY (≤ 13mm) and total lobsters caught (Figure 13). The 2022 YOY Settlement Survey index was 0.03 lobsters/m^2, and with all lobsters was 0.11/m2.

Connecticut: The CT DEEP Larval Lobster Survey in western Long Island Sound was discontinued after 2012. Alternative monitoring data are available for the eastern Sound from the Millstone Power Station entrainment estimates of all stages of lobster larvae. Abundance indices in both programs are delta mean density of larvae per 1000 cubic meters of water, entrained into the power plant in the case of the Millstone program and stage 4 only captured in surface plankton samples in the CT DEEP program. Both programs show a protracted decline in recruitment following the 1999 die-off (correlation between programs: R=0.35, p=0.066) (Figure 14).

7.3 Ventless Trap Survey

To address a need for a reliable index of lobster recruitment, a cooperative random stratified ventless trap survey was designed to generate accurate estimates of the spatial distribution of lobster length frequency and relative abundance while attempting to limit the biases identified in conventional fishery dependent surveys.

Maine: The Maine Ventless Trap Survey changed strategies in 2015 to cover more area by eliminating the vented traps at each site. This change allowed the survey to double the number of sites with ventless traps and increase the sampling coverage spatially to 276 sites. Traps were set during the months of June, July, and August. The stratified mean was calculated for each area using depth and statistical area for ventless traps only. Compared to the previous

years, in 2022 there were decreases in the number of sublegal (<83 mm CL) lobsters in all areas and legal sized (≥ 83 mm CL) lobsters caught in the Schoodic Point to Friendship (512). In 2022 there were increases in the number of legal sized (≥ 83 mm CL) lobsters caught in the NH-Friendship (513) and the Schoodic Pt-Cutler (511) areas (Figure 15).

New Hampshire: Since 2009, NHF&G has been conducting the coastwide Random Stratified Ventless Trap Survey in state waters (statistical area 513). A total of six sites were surveyed twice a month from June through September in 2022. Catch per unit effort (stratified mean catch per trap haul) from 2009 through 2022 is presented in Figure 16. Annual stratified mean catch per trap haul values varied without significant positive or negative trend throughout the fourteen year time series.

Massachusetts: The coast-wide ventless trap survey was initiated in 2006 and expanded in 2007 with the intention of establishing a standardized fishery-independent survey designed specifically to monitor lobster relative abundance and distribution. The survey was not conducted in 2013 due to a lack of funding; however, starting in 2014 the survey has been funded with lobster license revenues and will continue as a long-term survey.

Due to lack of interested participants in the SNE survey area (Area 538) in 2021, the SNE survey footprint was reduced, the number of hauls was reduced to one per month, and the time frame was reduced by one month to just June through August. These changes to the SNE survey necessitated re-analysis of the abundance time series to adjust to the reduced survey design. The data presented in Figure 17 and Figure 18 are the results of the new analysis. The entire SNE time series now represents June – August only, first haul of the month, and only those stations that occurred in the newly reduced footprint.

The time series of relative abundance for sublegal (< 83 mm CL) and legal-sized (≥ 83 mm CL) lobsters for Area 514 (part of LMA 1) is shown in Figure 17 as the stratified mean CPUE (± S.E.). Note that the index includes data from vented and non-vented traps, and includes all four survey months (June – Sept). The average catch of sublegal lobsters is much higher than the catch of legal-sized lobsters, and generally increased from 2006 through 2016 but has been declining since, with values from the last four years (2019-2022) falling below the time series average of 4.48 sublegal lobsters/trap. The 2022 value (2.68 sublegals/trap) was the lowest in the time series. The stratified mean catch per trap of legal-sized lobsters in 2022 was 0.50 (± 0.01), and was below the time series average of 0.56.

The time series of relative abundance (stratified mean CPUE ± S.E.) for sublegal (<86 mm CL) and legal-sized (≥ 86 mm CL) lobsters in the Area 538 (MA SNE survey area) is shown in Figure 18. The mean sublegal CPUE in 2022 was 0.47 (± 0.02), well below the time series average of 1.87 sublegal lobsters/trap haul. The CPUE of legal-sized lobsters in 2022 was 0.13 (±0.02), below the time series average of 0.33 legal lobsters/trap haul. The re-analysis of the time series to account for the reduced time period and survey area resulted in a similar trend over time for both sublegal and legal-sized lobster abundance, but a slight increase in the scale.

Rhode Island: Rhode Island conducted the 2022 ventless trap survey in June, July, and August at a total of 27 stations divided between Block Island Sound, Rhode Island Sound, and Narragansett Bay. Over the 18 trips and 818 pots (ventless and vented) hauled, 2,695 lobsters were sampled. The depth-stratified abundance index of sublegal lobsters in the 2022 survey, 3.34 lobsters per ventless trap, remains below the time series mean of 5.87 lobsters per ventless trap. The abundance index for legal-sized lobsters was equal to the time series mean of 0.37 lobsters per ventless trap (Figure 19).

Delaware: A pilot study was initiated in 2018 to assess the population structure of structure-oriented fish in the lower Delaware Bay and nearshore Atlantic Ocean. Sampling was conducted in the lower Delaware Bay and the nearshore Atlantic Ocean using commercial-sized ventless fish pots during April through December 2022. Six American lobsters were caught in lower Delaware Bay and 610 American lobsters in the nearshore Atlantic Ocean with a ratio of 60% males, 31% female and 9% egg laden. The sampled lobsters ranged in length from 43 mm to 138 mm.

8.0 State Compliance

States are currently in compliance with all required biological management measures under Amendment 3 and Addendum I-XXIV. However, the Plan Review Team (PRT) notes that Connecticut and New Jersey and did not conduct sea/port sampling in 2022, as required by Addendum XXVI. Rhode Island and New York did conduct some sampling, but were unable to complete the ten required sampling trips.

9.0 De Minimis Requests

The states of Virginia, Maryland, and Delaware have requested *de minimis* status. According to Addendum I, states may qualify for *de minimis* status if their commercial landings in the two most recent years for which data are available do not exceed an average of 40,000 pounds. Delaware, Maryland, and Virginia meet the *de minimis* requirement.

10.0 Regulatory Changes

Maine

- In the 2022 fishing year, Maine DMR adopted rules to incorporate the measures in the 2021 Atlantic Large Whale Take Reduction Plan (ALWTRP) final rule, including requirements for 1700-pound weak link inserts, gear marking requirements, minimum trawl lengths, and the establishment of the LMA1 Restricted Area. In addition, DMR modified an existing 3-trap trawl maximum in Zone B to a 5-trap trawl maximum for compliance with the ALWTRP.
- There were two statutory changes impacting lobster management in 2022:
    - Public Law 2021, chapter 512 allowed the Commissioner of Marine Resources to adopt routine technical rules to amend the minimum and maximum lobster size and the dimensions of vents in lobster traps when necessary to comply with changes to the Atlantic States Marine Fisheries Commission Interstate Fishery Management Plan for American Lobster. It requires the Commissioner to notify

the joint standing committee of the Legislature having jurisdiction over marine resources matters within 15 days of initiating such rulemaking.
    - Public Law 2021, chapter 498 changed the legal start time for lobster fishing to 4:00 a.m. in the month of September.

New Hampshire

- Changes were made to weak inserts and gear marking for NH state waters to comply with the modified Atlantic Large Whale Take Reduction Plan. A copy of changes can be found in Appendix I under Fis 602.09.

Massachusetts

- Buoy line marking regulations amended to clarify that MA trap gear buoy lines shall only bear red marks.
- Requirement for all lobster traps set on or after May 1 to have current year trap tags in them for all LMAs.

11.0 Enforcement Concerns

Maine

- In 2022 Maine Marine Patrol Officers documented 336 lobster-related violations, with 67 being summonses. Marine Patrol's highest profile cases in 2022 were four individuals being charged with molesting lobster gear and two separate individuals found in possession of 13 v-notched/mutilated female lobsters. Officers documented a considerable effort inspecting lobster gear throughout the year; between gear being hauled from our fleet of large patrol vessels, and documented vessel boardings at-sea, Marine Patrol inspected an estimated 20,000 lobster traps in 2022. The majority of the violations documented by Marine Patrol were for possessing illegal lobsters, protected resource violations, and for fishing untagged lobster gear. Eighteen summonses were issued to Maine lobsterman for fishing untagged/illegally tagged lobster traps.

Massachusetts

- Aiello case – Violation of seasonal trap gear closure; buoy line marking violations; buoy line breaking strength violations; weak link violations; trap tag violations; ghost panel violation. Agreed to transfer out of the fishery and not reapply.
- D. Duhaime case – Violation of seasonal trap gear closure; buoy line breaking strength violations; maximum buoy line diameter violations; buoy line marking violations; and surface buoy and configuration marking violations. Agreed to 3-year suspension of lobster permit (2023 – 2025).
- Edwards case – Violation of seasonal trap gear closure. Agreed to 2-month annual suspension (November – December) for period of 5-years (2023 – 2027) requiring all gear to be hauled out by Oct 31 annually.
- Hamilton case – Possession of lobster in excess of gillnet trip limit. Agreed to 2-year suspension of lobster permit (2023 – 2024) and three-year probationary period following reinstatement. Criminal proceedings are ongoing.

- O'Keefe case – Violation of seasonal trap gear closure; weak link violations; buoy line breaking strength violations; maximum buoy line diameter violations; buoy line marking violations; surface buoy marking and configuration violations. Agreed to 2-year suspension of lobster permit (2023 – 2024).
- R. Duhaime case - Violation of seasonal trap gear closure; buoy line breaking strength violations; maximum buoy line diameter violations; buoy line marking violations; and surface buoy marking and configuration marking violations. Agreed to 2-year suspension of lobster permit (2023 – 2024).
- Roche case – Impeding safe boarding by enforcement; failure to display commercial fishing permit; trap tag violations; buoy line marking violations; buoy line breaking strength violations; buoy line maximum diameter violations; surface buoy marking and configuration violations; maximum trawl length violations. Proceeded to hearing and resulted in permanent revocation of permit. Criminal proceedings are ongoing.

New Jersey

- Two summonses were issues due to failure to notify the Department before deploying lobster on an artificial reef.

12.0 Research Recommendations

The full list of research recommendations can be found in the 2020 Stock Assessment Report. Below is a summarized list of the high priority research recommendations from the 2020 Stock Assessment that were compiled by the Lobster Technical Committee (TC) and Stock Assessment Subcommittee (SAS).

Port and Sea Sampling - The quality of landings data has not been consistent spatially or temporally. Limited funding, and in some cases, elimination of sea sampling and port sampling programs will negatively affect the ability to characterize catch and conservation discards, limiting the ability of the model to accurately describe landings and stock conditions. It is imperative that funding for critical monitoring programs continues, particularly for offshore areas from which a large portion of current landings originate in SNE. Sea sampling should be increased in Long Island Sound (statistical area 611), and in the statistical areas in federal waters, particularly those fished by the LCMA 3 fleet, via a NMFS-implemented lobster-targeted sea sampling program.

Commercial Data Reporting – Finer resolution spatial data are paramount in understanding how landings align between statistical area and LCMAs. Vessel tracking is recommended for federal vessels. Once in place, the new spatial data should be analyzed for comparison to current spatial understanding of harvest. The growing Jonah crab fishery in SNE continues to complicate the differentiation of directed lobster versus Jonah crab effort. More sea sampling and landings data must be collected to better differentiate the two fisheries' activities.

Ventless Trap Survey - Calibration work to determine how catch in the ventless trap surveys relates to catch in the bottom trawl surveys remains an important and unaddressed topic of research. Ventless traps may be limited in their ability to differentiate between moderately

high and extremely high abundance, and calibration with bottom trawl surveys may help to clarify how q might change with changes in lobster density.

NEAMAP Trawl Survey Protocols - The SAS recommends that the NEAMAP Trawl Survey sampling protocol be modified for all lobsters caught to be sorted by sex. If a subsample is necessary, subsamples be taken by sex for additional biological data (size, egg presence and stage, vnotch, etc.) This modification would align the biological sampling methodology with other trawl surveys used in the assessment, and perhaps allow the survey to not be collapsed by sex into survey slots.

Time Varying Growth - Growth of American lobster has been found to change through time (McMahan et al. 2016), yet the ability to incorporate this dynamic in the assessment model currently is unavailable. Accounting for interannual changes in the growth matrix, including those in increment, probability, and seasonality, is imperative for model convergence. Modification to the assessment model is needed to allow for time varying growth matrices to be used to reflect changing growth in the stocks.

Expansion of Growth Matrices - Exploration of expanding the model size structure to smaller sizes could allow the SAS to better capture changes in recruitment for the population by incorporating < 53mm lobster abundances from the surveys currently used, as well as incorporating additional surveys that currently are not model inputs for the assessment, such as those from the young of year settlement surveys. Due to decreased recruitment in SNE and some areas in GOMGBK, available survey data should be evaluated to determine whether current data sources for small sizes are sufficient for expanding the size structure and growth matrices.

Temperature-Molt Dynamics - Understanding how the timing for molting, molt increments, and probability by size vary with temperature for all stocks would allow for more accurate and realistic depictions of growth via updated annual growth matrices. The work of Groner et al. (2018) should be expanded by using the Millstone data to specifically analyze how molt frequency and increment has changed seasonally and interannually.

Larval Ecology - Spatial expansion of larval surveys and further testing is warranted, particularly in areas like the eastern GOM and GBK that lack any studies of this nature. Studies that explore greater spatial coverage of larval sampling and examine lobster larval diets, in situ development time in current conditions, larval interactions with well-mixed versus stratified water columns, and varying growth and mortality with temperature would allow for greater context on these variables' influence on recruitment.

Deepwater Settlement - There is a need to determine settlement success in habitat not currently sampled and its contribution to overall stock productivity. Research needs to explore the levels of detectability, impact of stratification, and interannual temperature effects on the indices. Additionally, it will be important to understand whether there are differences in growth and survival in these deeper habitats, particularly relative to the desire to expand the growth matrix into smaller size ranges for modeling purposes.

SNE Recruitment Failure - The direct cause of the precipitous declines in recruitment under less variable spawning stock biomass is largely unknown. Research designed to understand the causes driving recruitment failure is vital for any efforts toward rebuilding the SNE stock. In addition, being able to predict similar conditions in GOMGBK could allow management the opportunity to respond differently.

Stock Structure Working Group - The SAS recommends that a workshop on stock boundaries be convened prior to the initiation of the next assessment to review results of any new research and re-evaluate appropriate stock boundaries. Inclusion of Canadian researchers at this workshop would be beneficial to share data and knowledge on this shared resource.

Spatial Analyses of Fisheries-Independent Data – Northeast Fisheries Science Center (NEFSC) trawl survey data remains one of the richest data sources to understand abundance and distribution patterns through time for lobsters by size and sex. Formal analyses of NEFSC trawl survey and the ME/NH trawl survey and should be performed. The Ecosystem Monitoring (EcoMon) Program's larval lobster information should also be considered.

Reevaluate Baseline Natural Mortality Rate - Intensive hypothesis-driven sensitivity analyses should be conducted to evaluate the base mortality rate for both stocks by season and year. Canadian tagging data should be examined to determine how natural mortality rates derived from these data compare to the assumptions used currently in the model and sensitivity analyses. Exploration of additional time series representing natural mortality hypotheses (e.g. sea temperature, shell disease prevalence, predators) should be continued to either inform time-varying natural mortality or correlate to rates produced in sensitivity analyses.

Predation Studies - It is suspected that a given predator's role in lobster natural mortality has changed through time. Predation laboratory studies and gut content analyses would provide greater guidance on individual species' roles in lobster natural mortality. With this information, predation-indices as a function of predator annual abundances and their contribution to stock-specific lobster mortality would be immensely valuable, particularly in SNE.

Management Strategy Evaluation - Developing a true management strategy evaluation tool that can iteratively project and refit the operating model would best inform future management discussions on rebuilding the SNE stock or providing resiliency for the GOM stock and fishery.

Economic Reference Points - Economic analyses considering landings, ex-vessel value, costs, associated economic multipliers, number of active participants, and other factors are imperative to truly discern how declines in the population would impact the GOMGBK industry. The SAS strongly recommends a thorough economics analysis be conducted by a panel of experts to more properly inform economic-based reference points, and ultimately provide resiliency to both the GOMGBK stock and fishery.

13.0 Plan Review Team Recommendations

During their review of the state compliance reports, the PRT noted the following issues:

- Massachusetts was unable to provide compliance reports by the August 1 deadline. This has been a recurring issue over the last few years due to delays in data availability and limited staff resources.
- In 2022, Rhode Island, Connecticut, New Jersey, and New York did not meet the Addendum XXVI minimum requirement of ten sea/port sampling trips. Given persistent issues with states being unable to meet the sampling requirement, the Board should consider how to address this issue moving forward.

The PRT Recommends the Board approve the *de minimis* requests of DE, MD, and VA. Other than the issues noted above, all states appear to be in compliance with the requirements of the FMP.

The following are general recommendations the PRT would like to raise to the Board:

- The PRT recommends the Board consider reviewing the monitoring requirements in SNE given the status of the stock and the difficulty obtaining sea sampling trips in a fishery with reduced effort. The TC has discussed the need for additional sampling trips in federal waters as the fishery has shifted offshore.

14.0 Tables

Table 1. Landings (in pounds) of American Lobster by the states of Maine through Virginia. Source: ACCSP Data Warehouse for 1981-2021 landings; state compliance reports for 2022 landings. *C= confidential data.*

	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	Total
1981	22,631,614	793,400	11,420,638	1,871,067	807,911	890,218	593,801	55,700	63,108	2,173	**39,129,630**
1982	22,730,253	807,400	11,265,840	3,173,650	880,636	1,121,644	846,215	90,700	64,788	4,713	**40,985,839**
1983	21,976,555	1,310,560	12,867,378	5,114,486	1,654,163	1,207,442	769,913	56,700	76,192	20,619	**45,054,008**
1984	19,545,682	1,570,724	12,446,198	5,259,821	1,796,794	1,308,023	927,474	103,800	98,876	37,479	**43,094,871**
1985	20,125,177	1,193,881	13,702,702	5,140,131	1,381,029	1,240,928	1,079,723	118,500	82,295	42,881	**44,107,247**
1986	19,704,317	941,100	12,496,125	5,667,940	1,253,687	1,416,929	1,123,008	109,000	57,593	93,105	**42,862,804**
1987	19,747,766	1,256,170	12,856,301	5,317,302	1,571,811	1,146,613	1,397,138	84,100	49,820	60,241	**43,487,262**
1988	21,739,067	1,118,900	12,977,313	4,758,990	1,923,283	1,779,908	1,557,222	66,200	22,966	53,696	**45,997,545**
1989	23,368,719	1,430,347	15,645,964	5,786,810	2,076,851	2,344,932	2,059,800	76,500	17,502	45,107	**52,852,532**
1990	28,068,238	1,658,200	16,572,172	7,258,175	2,645,951	3,431,111	2,198,867	68,300	24,941	58,260	**61,984,215**
1991	30,788,646	1,802,035	15,998,463	7,445,172	2,673,674	3,128,246	1,673,031	54,700	26,445	7,914	**63,598,326**
1992	26,830,448	1,529,292	14,969,350	6,763,087	2,534,161	2,651,067	1,213,255	21,000	27,279	753	**56,539,692**
1993	29,926,464	1,693,347	14,350,595	6,228,470	2,177,022	2,667,107	906,498	24,000	46,650	2,940	**58,023,093**
1994	38,948,867	1,650,751	16,176,551	6,474,399	2,146,339	3,954,634	581,396	8,400	7,992	460	**69,949,789**
1995	37,208,324	1,834,794	15,903,241	5,362,084	2,541,140	6,653,780	606,011	25,100	26,955	5,210	**70,166,639**
1996	36,083,443	1,632,829	15,312,826	5,295,797	2,888,683	9,408,519	640,198	20,496	28,726	C	**71,311,517**
1997	47,023,271	1,414,133	15,010,532	5,798,529	3,468,051	8,878,395	858,426	C	34,208	2,240	**82,487,785**
1998	47,036,836	1,194,653	13,167,803	5,617,873	3,715,310	7,896,803	721,811	1,359	19,266	1,306	**79,373,020**
1999	53,494,418	1,380,360	15,875,031	8,155,947	2,595,764	6,452,472	931,064	C	41,954	6,916	**88,933,926**
2000	57,215,406	1,709,746	14,988,031	6,907,504	1,393,565	2,883,468	891,183	C	62,416	C	**86,051,319**
2001	48,617,693	2,027,725	11,976,487	4,452,358	1,329,707	2,052,741	579,753	C	31,114	C	**71,067,578**
2002	63,625,745	2,029,887	13,437,109	3,835,050	1,067,121	1,440,483	264,425	C	20,489	C	**85,720,309**
2003	54,970,948	1,958,817	11,321,324	3,561,391	C	946,449	209,956	C	22,778	C	**72,991,663**
2004	71,574,344	2,851,262	11,675,852	3,059,319	646,994	996,109	370,536	13,322	14,931	27,039	**91,229,708**
2005	68,729,623	C	11,291,145	3,174,852	713,901	1,154,470	369,003	C	39,173	21,988	**85,494,155**
2006	75,419,802	2,612,389	12,090,423	3,949,299	806,135	1,252,146	470,878	3,706	26,349	28,160	**96,659,287**
2007	63,987,073	2,468,811	10,046,120	2,299,744	568,696	911,761	334,097	C	26,804	C	**80,643,106**
2008	69,910,434	2,568,088	10,606,534	2,782,000	427,168	712,075	304,479	C	32,932	C	**87,343,709**
2009	81,124,201	2,986,981	11,789,536	2,842,088	412,468	731,811	C	6,064	30,988	21,472	**99,945,239**
2010	96,244,299	3,648,004	12,772,159	2,928,688	441,622	813,513	692,869	C	29,989	16,345	**117,586,675**
2011	104,957,224	3,919,195	13,385,393	2,754,067	198,928	344,232	697,883	8,879	41,077	12,879	**126,320,059**
2012	127,464,332	4,229,227	14,486,344	2,706,384	247,857	550,441	919,351	C	65,813	10,823	**150,680,338**
2013	128,015,530	3,817,707	15,259,573	2,155,762	127,420	496,535	660,367	C	62,601	9,061	**150,604,556**
2014	124,941,312	4,374,656	15,312,852	2,412,875	127,409	222,843	526,368	26,330	57,414	11,099	**148,013,158**
2015	122,685,803	4,721,826	16,450,853	2,316,458	205,099	147,414	445,060	22,894	29,284	9,474	**147,034,165**
2016	132,750,487	5,782,098	17,784,921	2,260,335	254,346	218,846	349,880	C	29,254	2,854	**159,433,020**
2017	112,153,057	5,645,434	16,493,125	2,031,143	130,015	150,317	409,062	32,364	29,136	1,630	**137,075,281**
2018	121,226,274	6,199,365	17,697,243	1,905,689	110,580	112,685	344,547	C	24,893	2,727	**147,624,004**
2019	102,219,067	6,093,615	17,029,462	1,795,212	111,573	112,107	291,072	C	11,831	1,840	**127,665,778**
2020	97,915,188	5,014,169	15,711,853	1,695,279	159,173	111,678	309,197	11,098	10,176	C	**120,937,811**
2021	110,585,121	5,712,122	16,826,704	1,351,415	148,758	109,117	290,982	6,193	12,827	3,099	**135,046,339**
2022	98,650,231	5,262,246	15,651,988	1,176,530	66,454	82,834	258,289	C	11,144	C	**121,159,716**

Table 2. Above: Current (2016-2018) reference abundance estimates (millions), current target and threshold abundance (millions), and new recommended abundance reference points for both stocks. Below: Current (2016-2018) exploitation, current target and threshold exploitation, and new recommended target and threshold exploitation for both stocks.

Quantity	GOMGBK	SNE
Current (2016-2018 average)	256	7
Current Target	119	32
Current Threshold	58	25
Fishery/Industry Target	212	NA
Abundance Limit	125	NA
Abundance Threshold	89	20

Quantity	GOMGBK	SNE
Current (2016-2018 average)	0.459	0.274
Current Target	0.457	0.379
Current Threshold	0.510	0.437
Recommended Target	0.461	0.257
Recommended Threshold	0.475	0.290

Table 3. 2022 LCMA specific management measures

Management Measure	LCMA 1	LCMA 2	LCMA 3	LCMA 4	LCMA 5	LCMA 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]	State Permitted fisherman in state waters 1/4" without setal hairs Federal Permit holders 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"	State Waters none Federal Waters 6 3/4"
Season Closure				April 30-May 31[2]	February 1-March 31[3]	Sept 8-Nov 28[4]	February 1-April 30

[1] A v-notched lobster is defined as any female lobster that bears a notch or indentation in the base of the flipper that is at least as deep as 1/8", with or without setal hairs. It also means any female which is mutilated in a manner that could hide, obscure, or obliterate such a mark.

[2] Pots must be removed from the water by April 30 and un-baited lobster traps may be set one week prior to the season reopening.

[3] During the February 1 – March 31 closure, trap fishermen will have a two week period to remove lobster traps from the water and may set lobster traps one week prior to the end of the closed season.

[4] Two week gear removal and a 2 week grace period for gear removal at beginning of closure. No lobster traps may be baited more than 1 week prior to season reopening.

Table 6. 2022 sampling requirements and state implementation. All states have 100% active harvester reporting except for Maine which has 10% harvester reporting. 100% harvester reporting will be required of all states in 2024. Sufficient sea sampling can replace port sampling. *De minimis* states (denoted by *) are not required to conduct biological sampling of their lobster fishery.

State	100% Dealer Reporting	10% Harvester Reporting	Sea Sampling	Port Sampling	Ventless Trap Survey	Settlement Survey	Trawl Survey
ME	✓	✓ (10%)	✓		✓	✓	✓
NH	✓	✓	✓	✓	✓	✓	✓
MA	✓	✓	✓		✓	✓	✓
RI	✓	✓		✓	✓	✓	✓
CT	✓	✓	[a]	[a]		[b]	✓
NY	✓	✓	✓	✓			✓
NJ	✓	✓					✓
DE*	✓	✓			✓		✓
MD*	✓	✓					✓
VA*	✓	✓					

[a] No fishery dependent sampling has been conducted by CT since 2014 due to reductions in funding and staffing levels.

[b] Larval data are available for the eastern Sound (ELIS) from the Millstone Power Station entrainment estimates of all stages of lobster larvae (Dominion Nuclear CT, Annual Report 2016).

Table 7. 2022 sea and port sampling trips and samples by state. *De minimis* states (denoted by *) are not required to conduct biological sampling of their lobster fishery.

State	Sea Sampling			Port Sampling		Market Sampling		Totals	
	Trips	Samples	Traps	Trips	Samples	Trips	Samples	Trips	Samples
ME	163	191,793	38,022	0	0	0	0	163	191,793
NH	14	6,828		11	1,074	0	0	25	7,902
MA	58	23,902	1,110	0	0	0	0	58	23,902
RI	0	0	0	7	1,353	0	0	7	1,353
CT	0	0	0	0	0	0	0	0	0
NY	0	0	0	8	839	0	0	8	839
NJ	0	0	0	0	0	0	0	0	0
DE*	0	0	0	0	0	0	0	0	0
MD*	1	230	280	0	0	0	0	1	230
VA*	0	0	0	0	0	0	0	0	0
Total	236	222,753	39,412	26	3,266	0	0	262	226,019

15.0 Figures

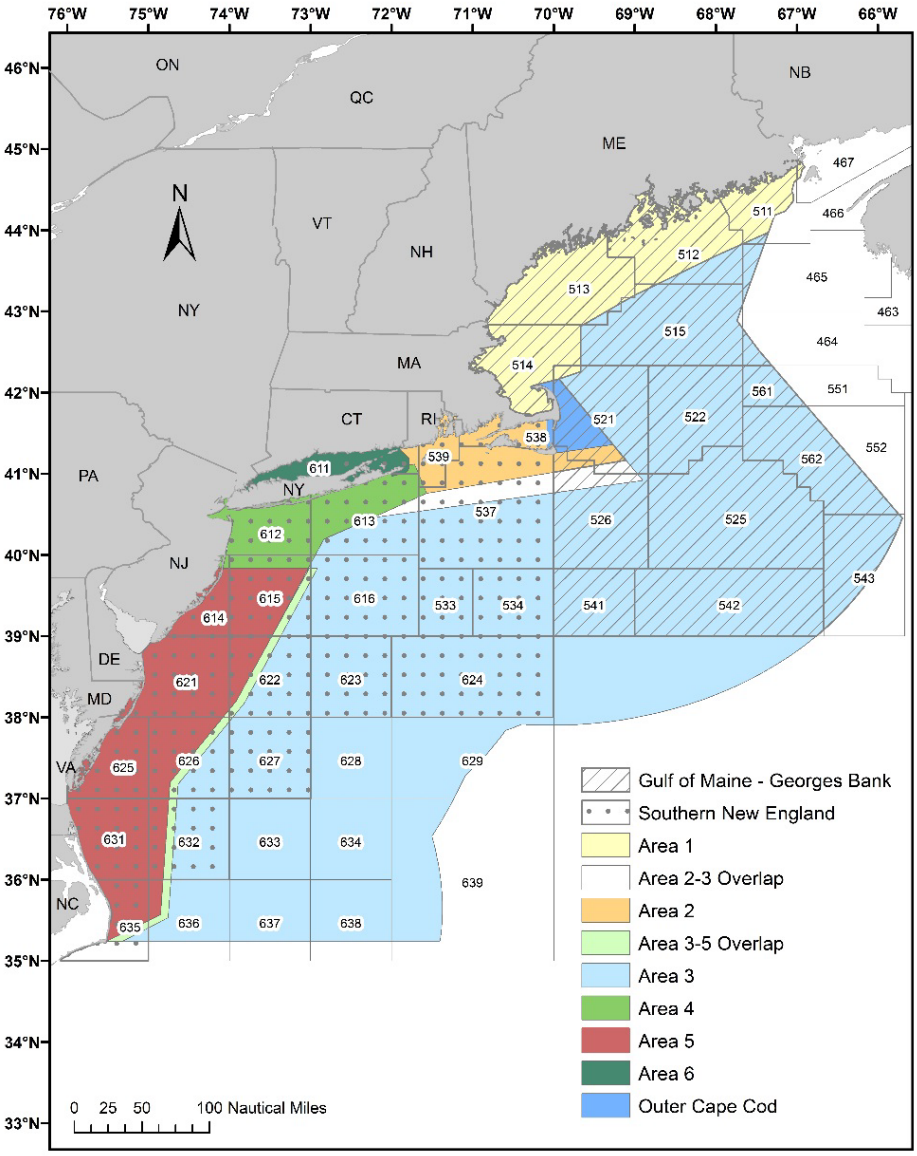

Figure 1. Lobster Conservation Management Areas (LCMAs) and stock boundaries for American lobster.

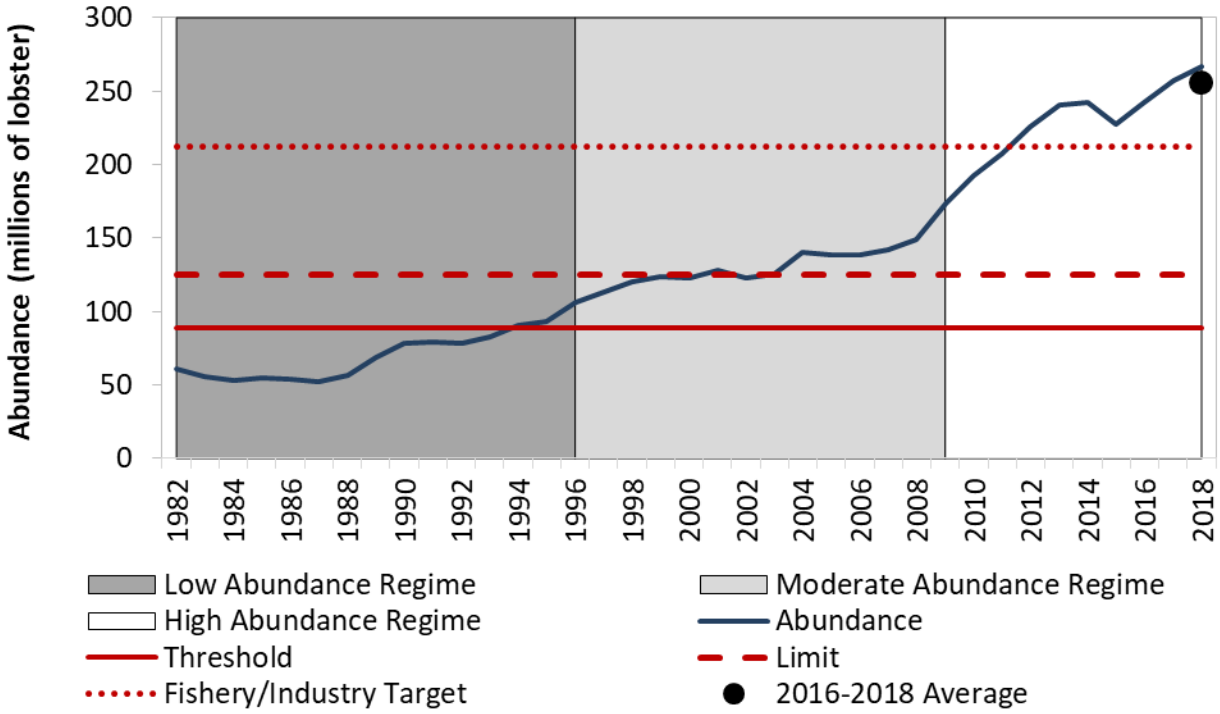

Figure 2. Abundance for GOM/GBK Relative to Reference Points. Source: 2020 Benchmark Stock Assessment for American Lobster.

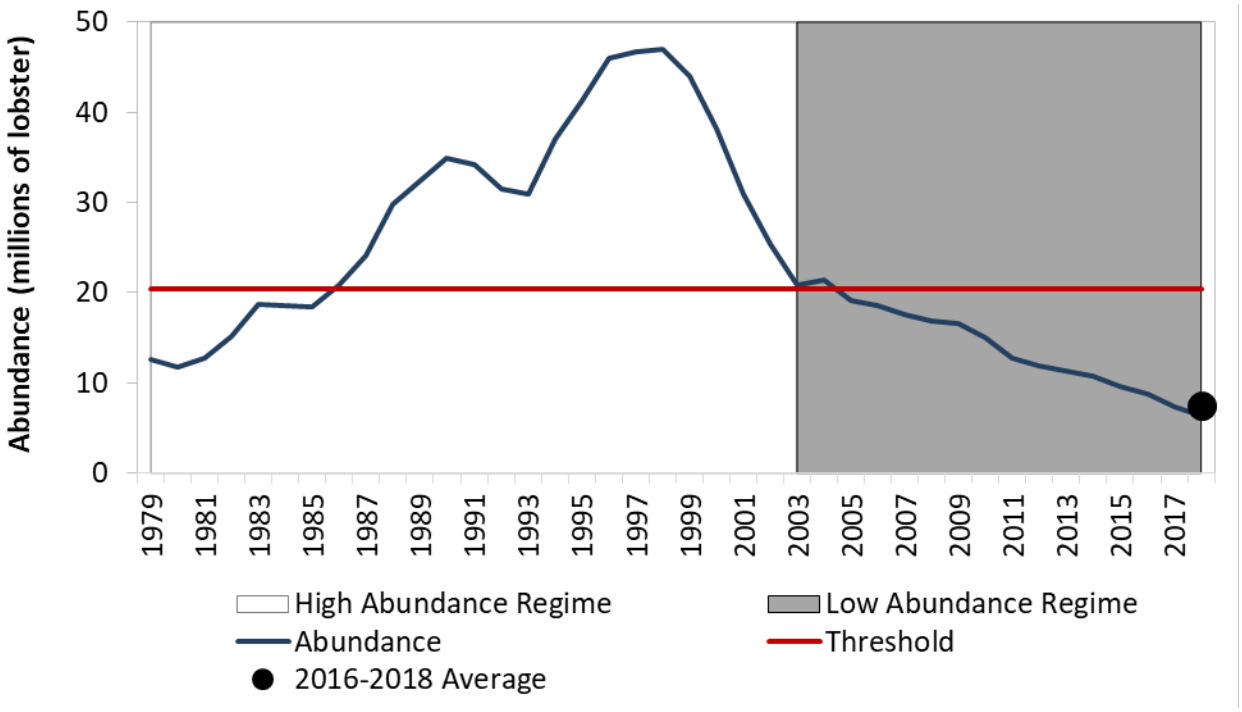

Figure 3. Abundance for SNE Relative to Reference Points. Source: 2020 Benchmark Stock Assessment for American Lobster.

Figure 4. Stratified mean catch and recruit abundance for American lobster on the Spring ME/NH Inshore Trawl Survey (2000-2022). Top: Mean catch of sublegals (<83). Middle: Mean catch of legal sized lobsters (>82). Bottom: Recruit abundance (71-80 mm lobsters).

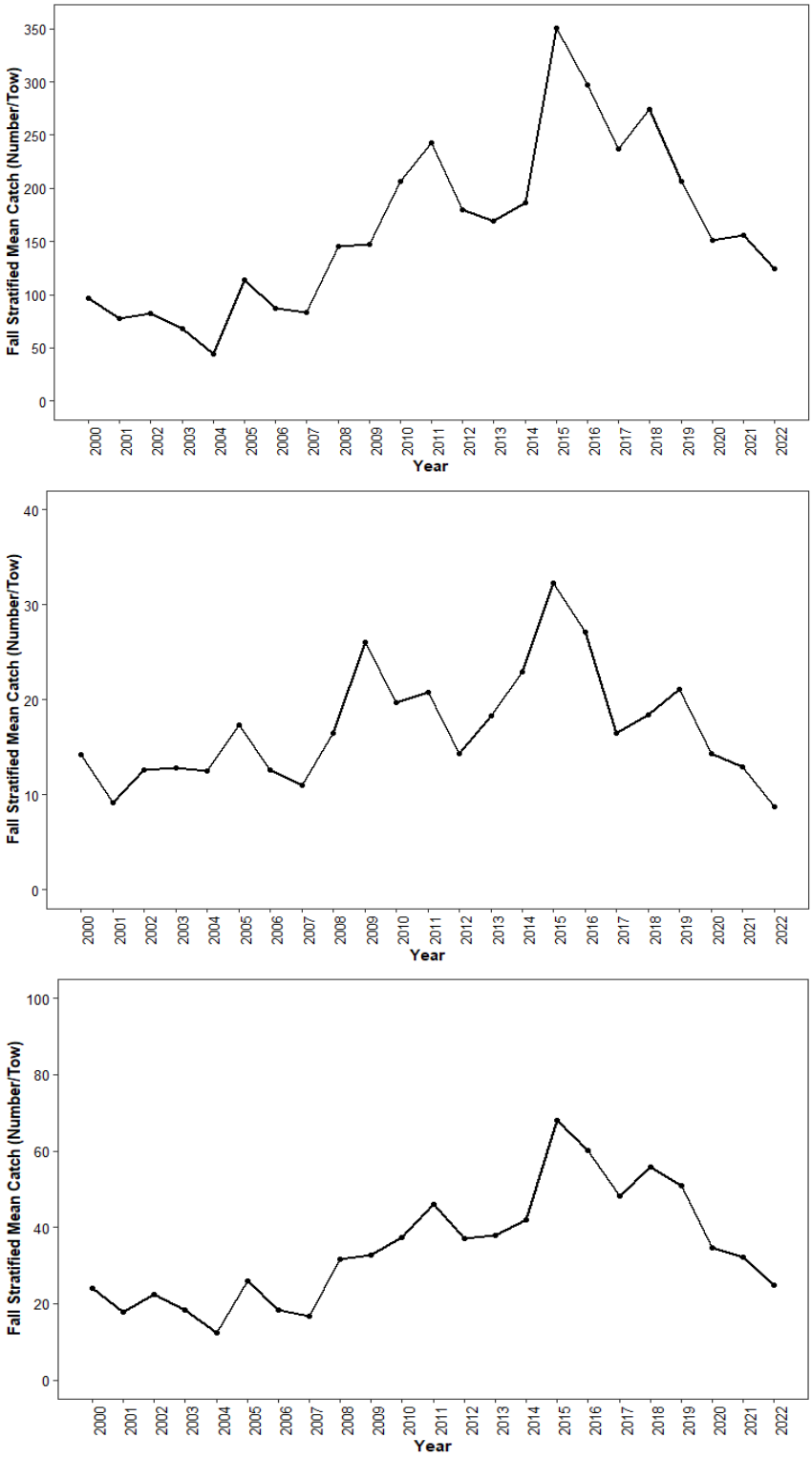

Figure 5. Stratified mean catch and recruit abundance for American lobster on the Fall ME/NH Inshore Trawl Survey (2000-2022). Top: Mean catch of sublegals (<83). Middle: Mean catch of legal sized lobsters (>82). Bottom: Recruit abundance (71-80 mm lobsters).

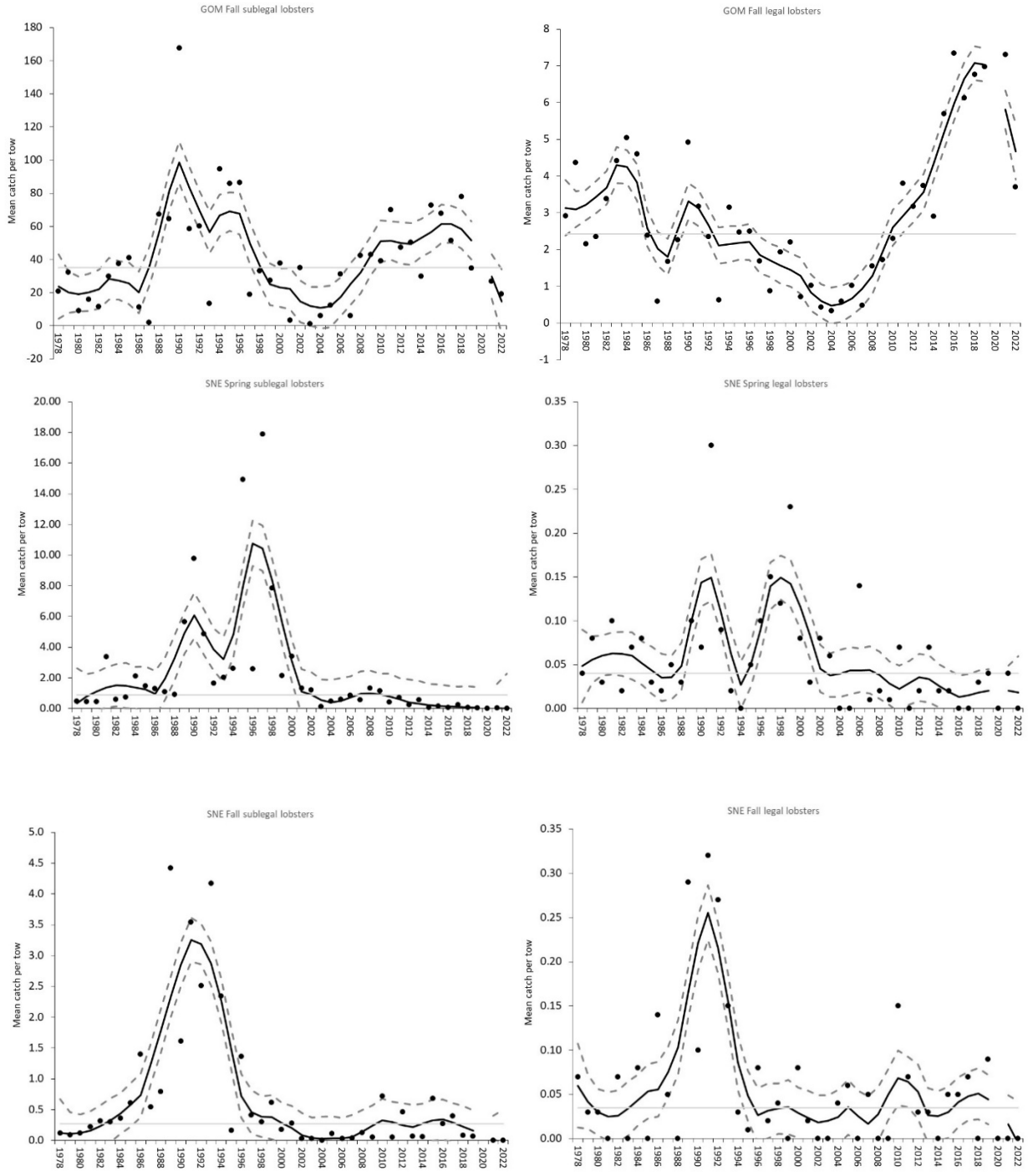

Figure 6. MADMF Fall Trawl Survey sublegal (left) and legal (right) indices from 1978-2019 sexes combined. The top two charts are from Gulf of Maine and the bottom four charts are from Southern New England.

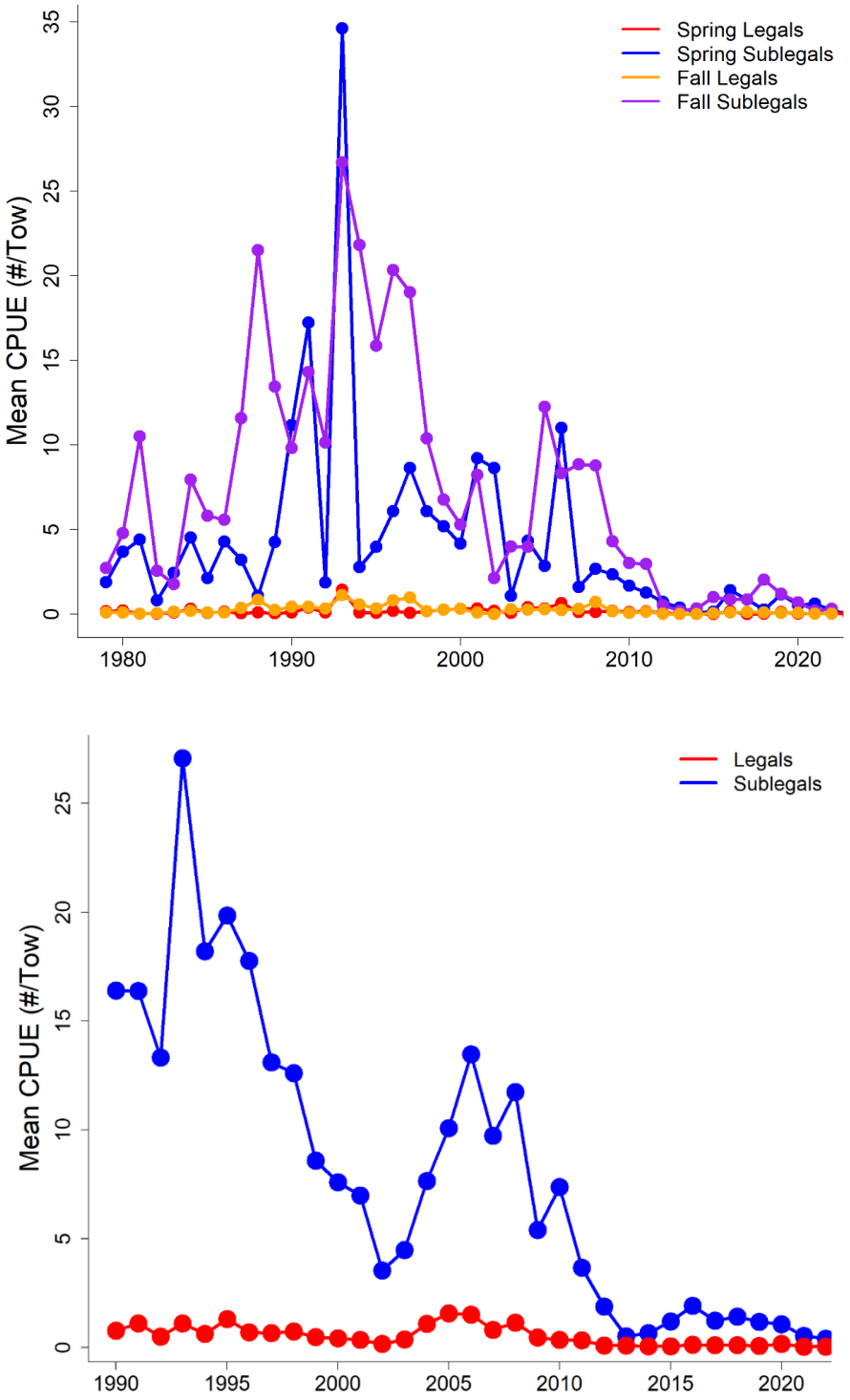

Figure 7. RIDFW Seasonal (spring and fall) Trawl lobster abundances (top) and Monthly Trawl lobster abundances (bottom). CPUE is expressed as the annual mean number per tow for sub-legal (<85.725mm CL) and legal sized (>=85.725mm CL) lobsters.

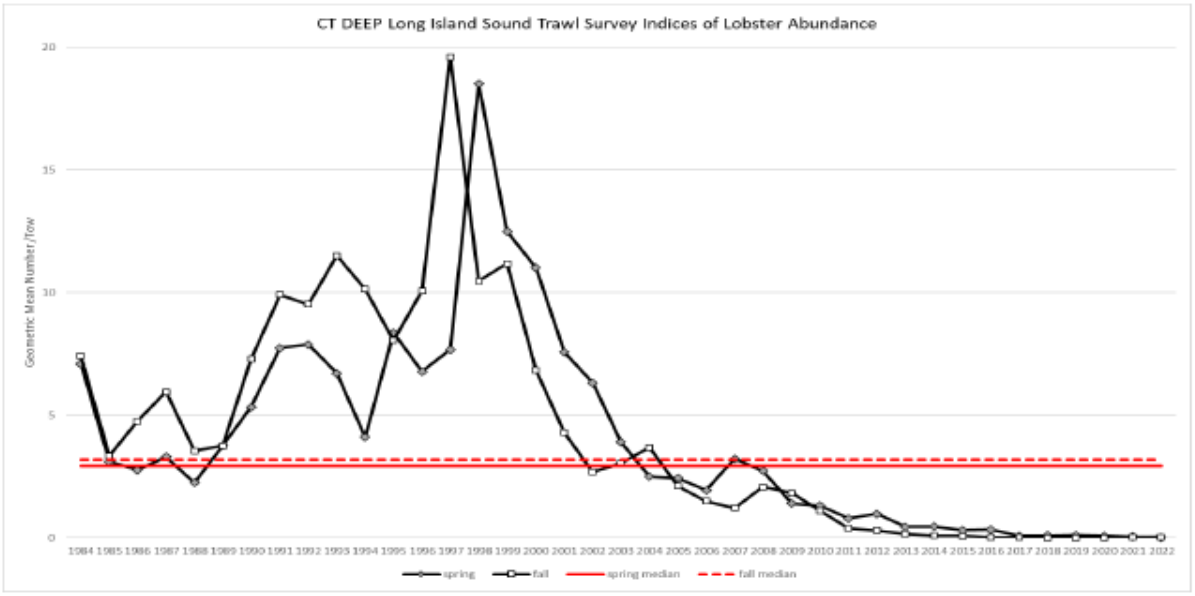

Figure 8. Results of the Long Island Sound Trawl Survey during spring (April-June) and fall (September-October) within NMFS statistical area 611.

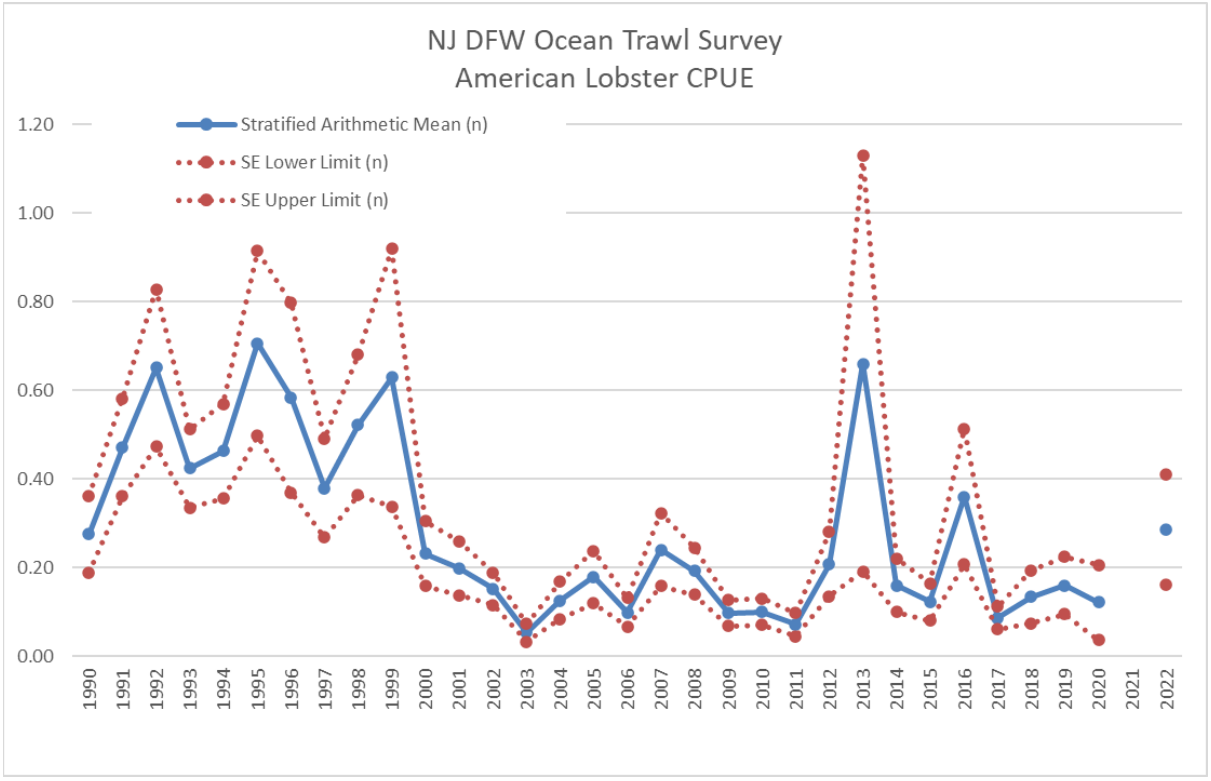

Figure 9. Stratified mean CPUE of all lobsters collected aboard the NJDFW Ocean Trawl Survey. *NOTE: No April 2019 Survey was conducted due to Research vessel mechanical issues. Due to the COVID-19 pandemic, Apr-Oct 2020 and 2021 CPUE and indices were not obtained.

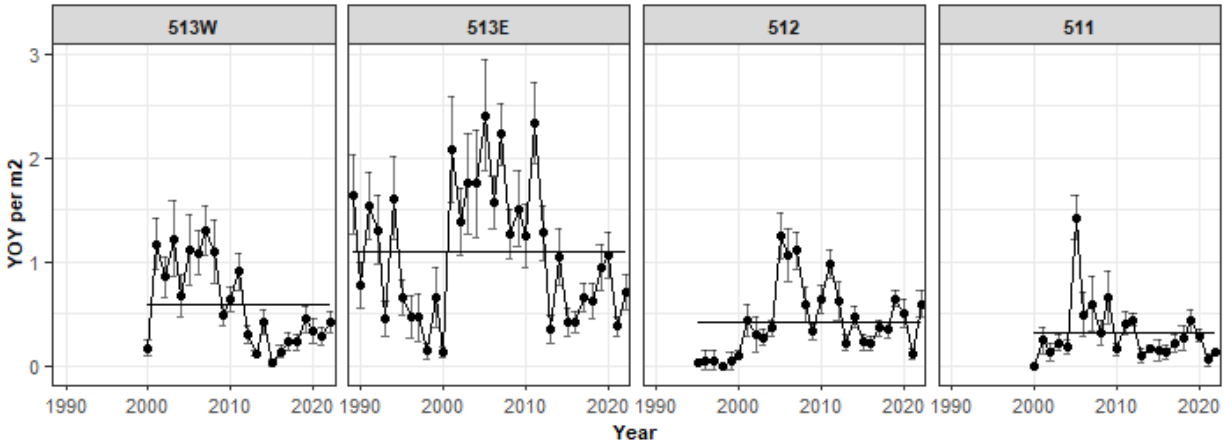

Figure 10. Maine Lobster Settlement Survey Index 1989-2022 for each statistical area with series average (solid horizonal line) for each region with standard error bars.

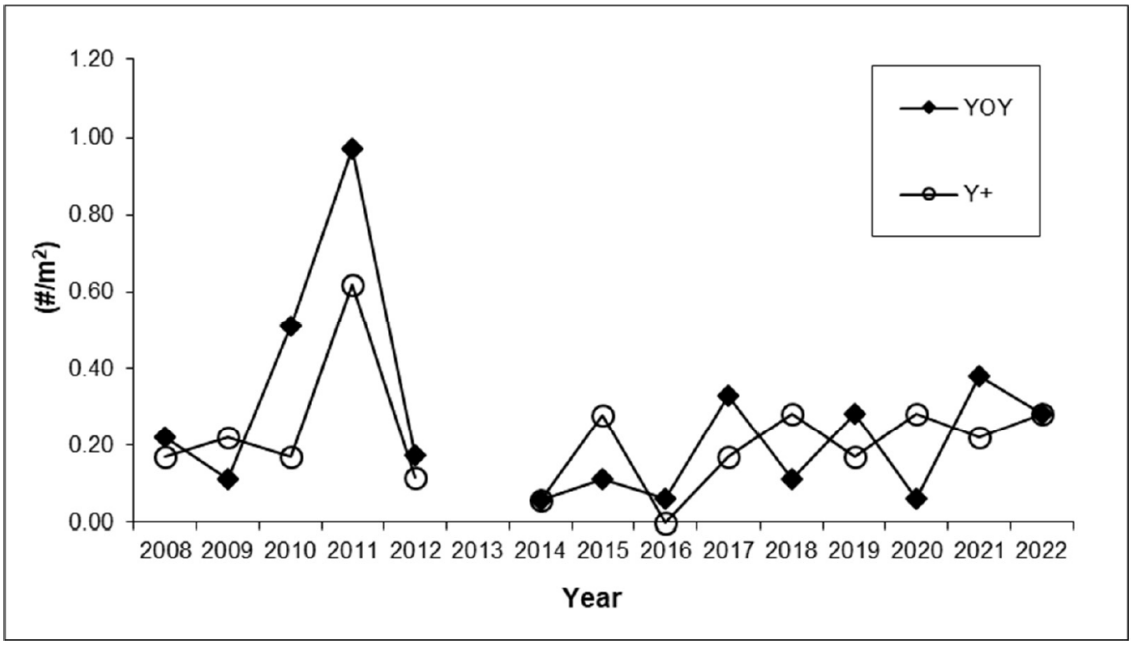

Figure 11. Catch per unit effort (#/m2) of young-of-year (YOY), one-year-olds (Y+), YOY and Y+ combined, and all lobsters during the American Lobster Settlement Index, by location, in New Hampshire, from 2008 through 2022.

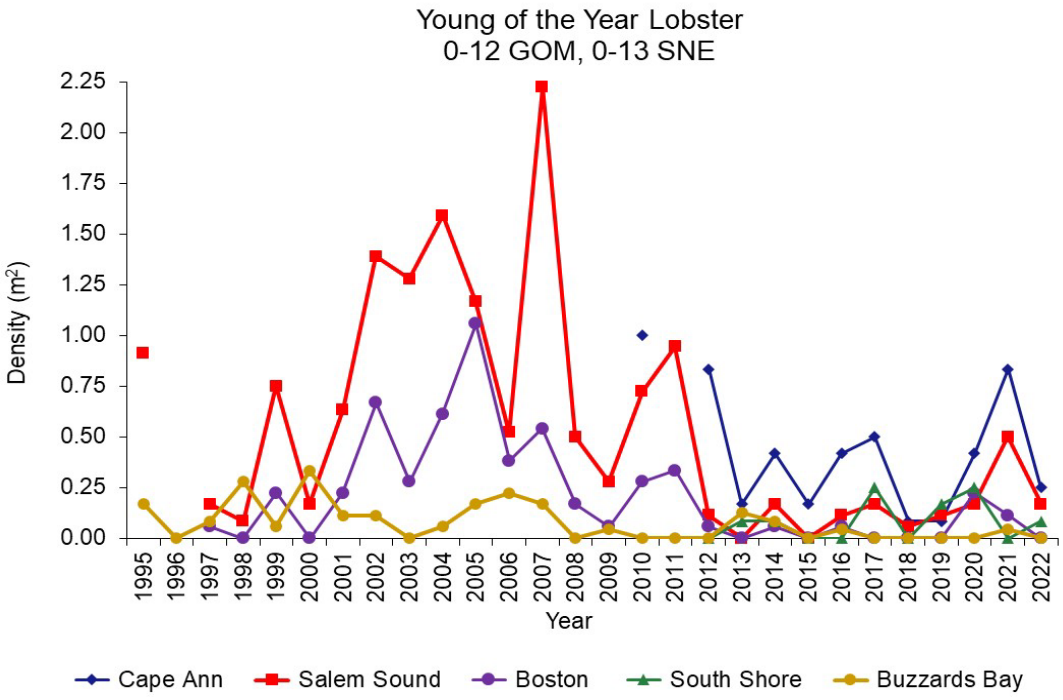

Figure 12. Young-of-year lobster density in four regions within the GOM stock unit – Cape Ann, Salem Sound, Boston, and South Shore, and one region in the SNE stock unit - Buzzards Bay. In GOM locations, lobsters ≤ 12 mm CL are considered YOY, while in SNE locations YOYs are ≤ 13 mm CL.

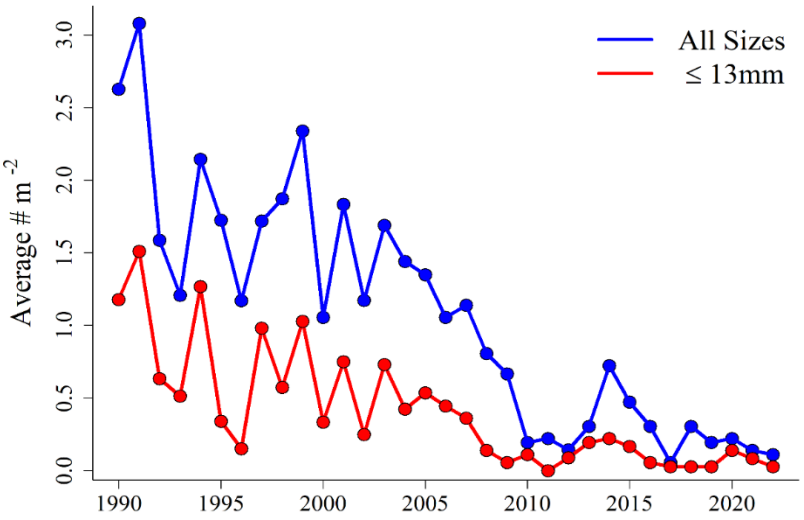

Figure 13. Average abundance of American lobster in Rhode Island suction sampling sites. Abundances are presented for YOY lobsters 13 mm or smaller (red line) and all sizes (blue line).

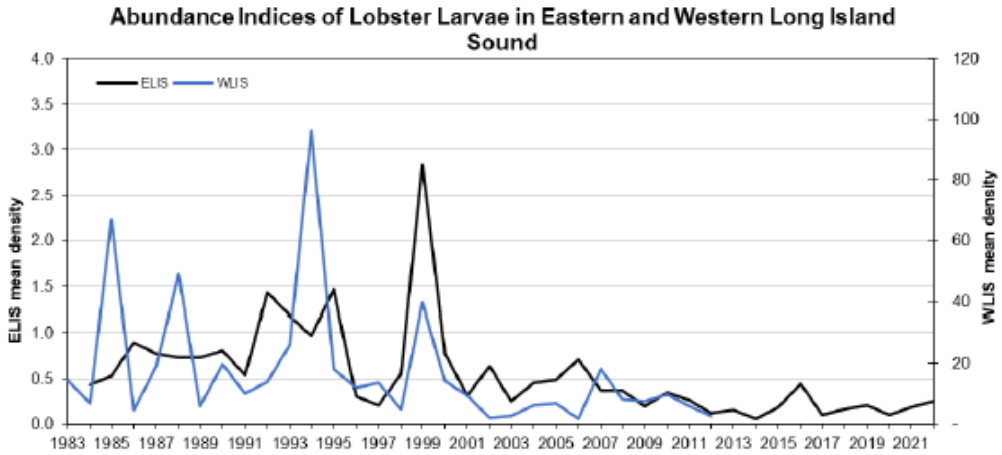

Figure 14. Abundance indices of lobster larvae from the Connecticut DEEP Larval Lobster Survey in western Long Island Sound and from the Millstone Power Station entrainment estimates in eastern Long Island Sound. The Connecticut DEEP survey was discontinued in 2013.

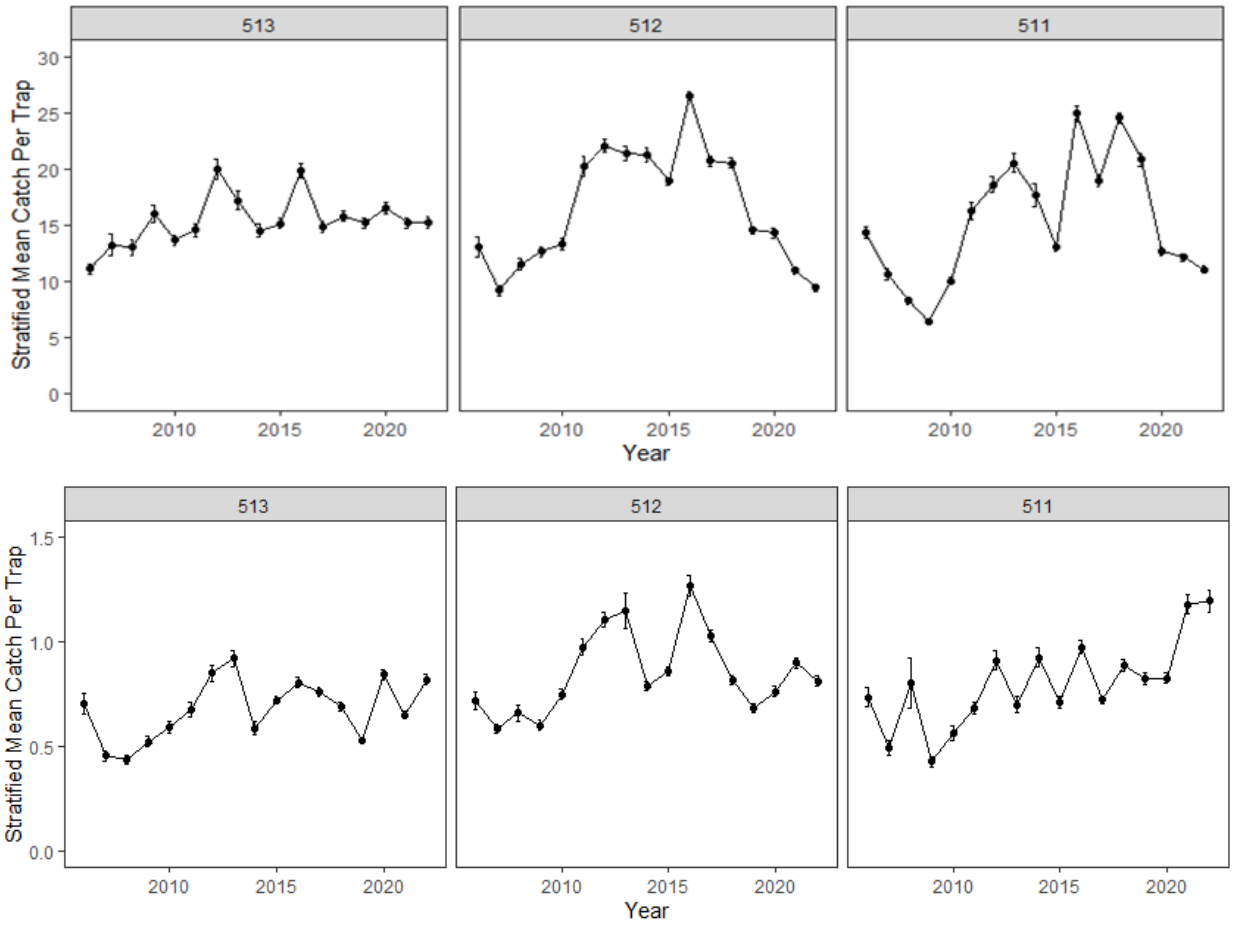

Figure 15. Stratified mean catch per trap for sublegal (top) and legal (bottom) sized lobsters from Maine's Ventless Trap Survey 2006-2022 by statistical area from ventless traps only. Standard error is shown.

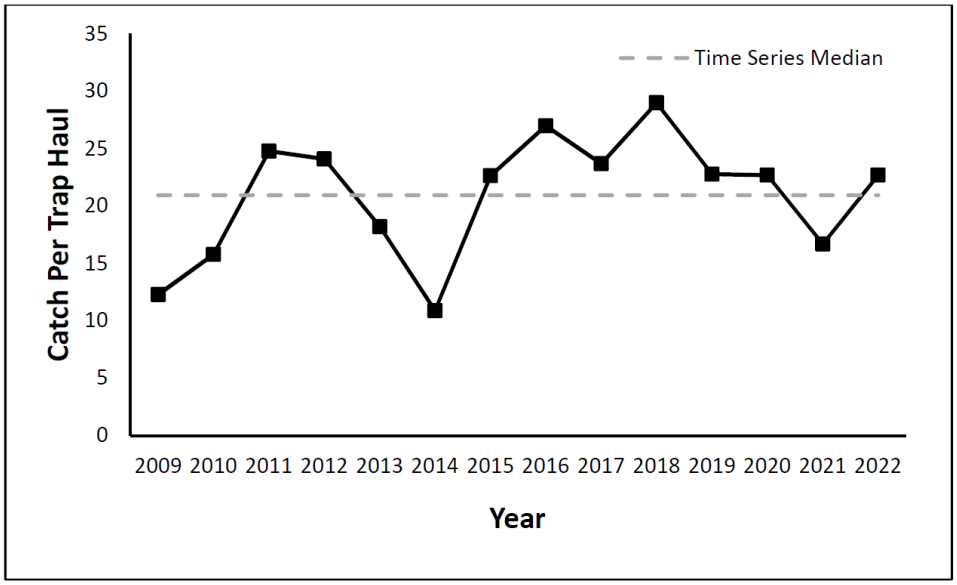

Figure 16. Stratified mean catch per trap haul (ventless traps only) for all lobsters captured during the coast-wide random stratified Ventless Trap Survey in New Hampshire state waters from 2009 through 2022.

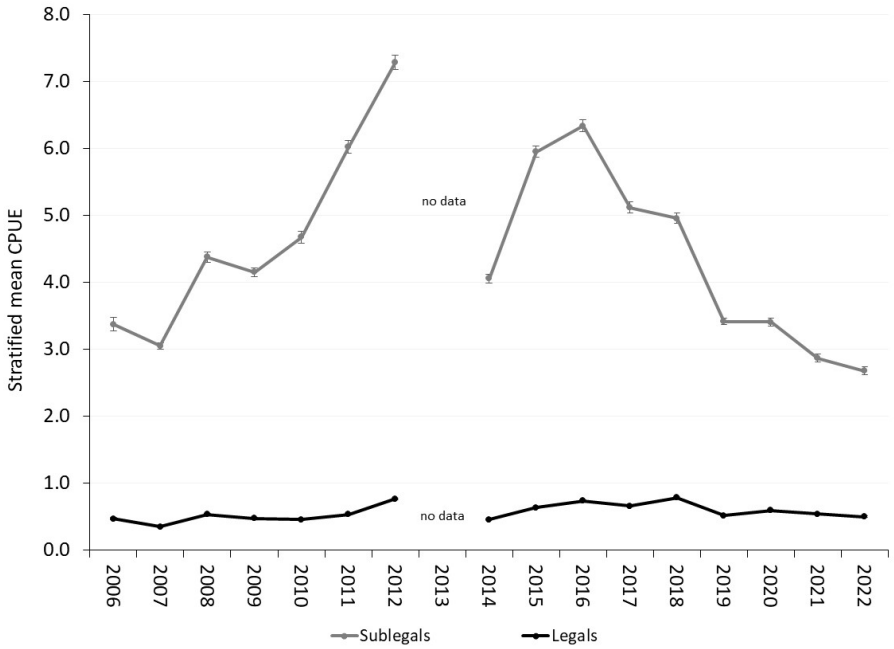

Figure 17. Stratified mean catch per trap haul (±S.E.) of sublegal (< 83 mm, grey line) and legal (≥ 83 mm, black line) lobsters in NMFS Area 514 from MADMF ventless trap survey from 2006-2022.

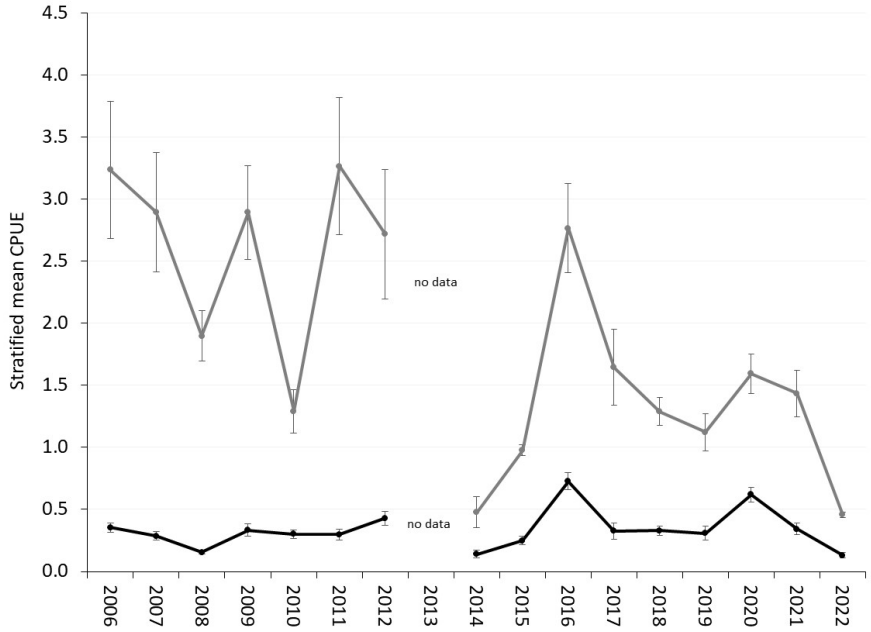

Figure 18. Stratified mean catch per trap haul (±S.E.) of sublegal (< 86 mm, grey line) and legal (≥ 86 mm, black line) lobsters in the reduced MA SNE survey area, Area 538.

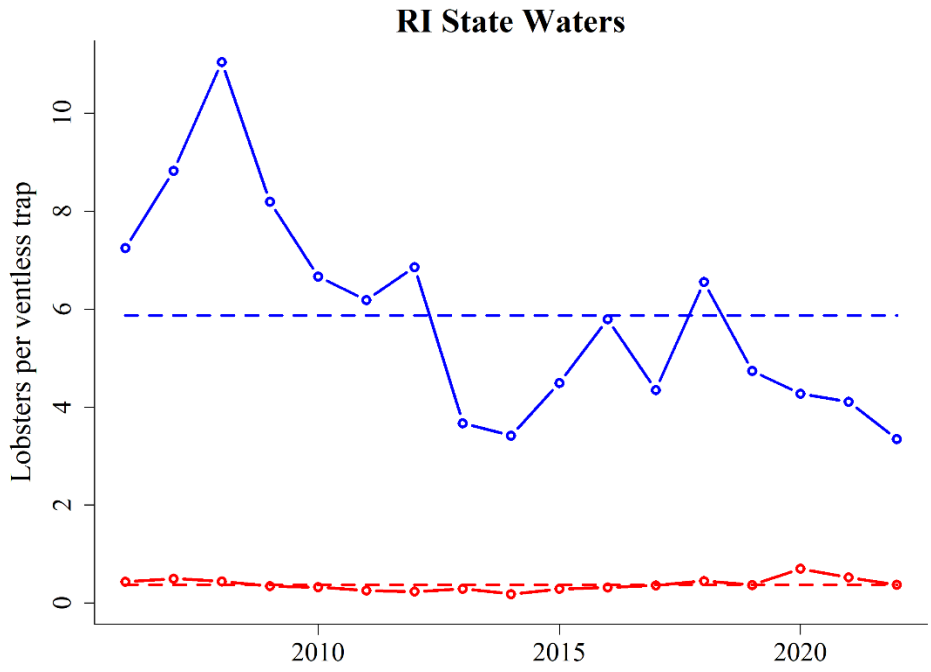

Figure 19. Depth-stratified mean catch of sublegal lobsters in the RIDEM DMF ventless trap survey, 2006-2022.