

ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR AMERICAN LOBSTER (*Homarus americanus*)

2021 FISHING YEAR



Prepared by the Plan Review Team

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Sustainable and Cooperative Management of Atlantic Coastal Fisheries

Table of Contents

1.0 Status of the Fishery Management Plan.....	1
2.0 Status of the Fishery.....	1
2.1 Commercial Fishery.....	1
2.2 Recreational Fishery.....	2
3.0 Status of the Stock	2
4.0 Status of Management Measures	3
4.1 Implemented Regulations	3
4.2 On-Going Management Action	7
5.0 Trap Reductions	7
6.0 Fishery Dependent Monitoring	7
7.0 Status of Fishery Independent Monitoring.....	8
7.1 Trawl Surveys.....	8
7.2 Young of Year Index	9
7.3 Ventless Trap Survey	10
8.0 State Compliance	12
9.0 De Minimis Requests.....	12
10.0 Regulatory Changes.....	12
11.0 Enforcement Concerns.....	13
12.0 Research Recommendations.....	14
13.0 Plan Review Team Recommendations	16
14.0 Tables.....	18
15.0 Figures.....	23

This document covers fishery activities in 2020 as well as a summary of trap transfers that took place ahead of the 2022 fishing year.

1.0 Status of the Fishery Management Plan

<u>Year of ASMFC Plan’s Adoption:</u>	Amendment 3 (1997)
<u>Plan Addenda:</u>	
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)	
<u>Management Unit:</u>	Maine through North Carolina
<u>States with a Declared Interest:</u>	Maine through Virginia (Excluding Pennsylvania and DC)
<u>Active Committees:</u>	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 2021, coastwide commercial landings were approximately 134 million pounds, a 10% increase from 2020 landings of 120.9 million pounds. The largest contributors to the 2021 fishery were Maine and Massachusetts with 82% and 13% of landings, respectively. The ex-vessel value for all lobster landings in 2021 was nearly \$875 million, the highest value on record for the American lobster fishery.

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 2021, 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 2021, approximately 1.8% of coastwide landings came from the SNE stock. In 2021 the GOM/GBK stock accounted for 131.8 million pounds while the SNE stock accounted for 2.4 million.

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. Massachusetts reported recreational landings of 171,642 pounds in 2021, which was 1% of the total 2021 landings. Recreational landings averaged 1.1% of total Massachusetts landings over the past 5 years). In 2021, New Hampshire reported 5,512 pounds of lobster harvested recreationally and New York reported 4,901 pounds. Maine, Rhode Island, and Connecticut do not collect information on the number of pounds recreationally harvested. For 2021, Rhode Island issued 535 lobster licenses, and lobster licenses sold in Connecticut declined to 222 in 2021.

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 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.

Amendment 3 to the Interstate Fishery Management Plan for American Lobster (December 1997)

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.

4.2 On-Going Management Actions

In response to signs of reduced settlement in the GOM/GBK, the Board initiated Draft Addendum XXVII in August 2017 to increase resiliency through considering the standardization of management measures in the GOM/GBK stock. Due to the prioritization of actions in response to the Atlantic Large Whale Take Reduction Team recommendations, development of this addendum stalled. Following its review of the 2020 Benchmark Stock Assessment and Peer Review Report, the Board reinitiated development of Draft Addendum XXVII. The Board revised the objective of the addendum given persistent low settlement indices and recent decreases in recruit indices in recent years. The Board specified that the addendum should consider a trigger mechanism such that, upon reaching the trigger, measures would be automatically implemented to increase the overall protection of spawning stock biomass of the GOM/GBK stock.

5.0 Trap Reductions

Addendum XVIII established a series of trap reductions in LCMAs 2 and 3, with the intent of scaling the size of the SNE fishery to the size of the resource. Specifically, a 25% reduction in year 1 followed by a series of 5% reductions for five years was established in LCMA 2; a series of 5% reductions over five years was established in LCMA 3. The fifth year of reductions took place at the end of the 2019 fishing year and affect trap allocations in the 2020 fishery. The sixth year of reductions for LCMA 2 took place at the end of the 2020 fishing year and affects trap allocations in the 2021 fishery. Trap reductions for LCMA 2 and 3 are now complete. Per Addendum XVIII, states with fishermen in LCMAs 2 and 3 are required to report on the degree of consolidation that has taken place. It is important to note that trap reductions also occur as the result of trap transfers as, per Addendum XIX, there is a 10% conservation tax on trap allocation transfers between owners. The series of federal trap reductions is summarized in Tables 4 and 5.

6.0 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 will not be 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 2021, all states except Connecticut and New Jersey completed the 10 required sea and/or port sampling trips for fishery dependent monitoring. Due to the COVID-19 pandemic, at sea observer trips were suspended in New Jersey for 2021. New Jersey continues to monitor the situation and has started to develop protocol for a safe return to normal field operations. No fishery dependent sampling has been conducted by Connecticut since 2014 due to reductions in funding and staffing levels.

7.0 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 5, 2021 in Portsmouth, NH and ended on June 6, 2021 off of Lubec, Maine. 118 out of 120 scheduled tows were completed, resulting in a 98% completion rate. A total of 15,347 lobsters were caught and sampled, with 7,524 females, 7,821 males and 2 unsexed caught and measured (Figure 4). The fall survey began September 27, 2021 in Portsmouth, NH and ended on October 29, 2021 off of Lubec, Maine. 89 out of 120 scheduled tows were completed, resulting in a 74% completion rate. A total of 11,589 lobsters were caught and sampled, with 5,663 females, 5,893 males and 28 unsexed caught and measured (some lobsters were missed due to faulty recording of data) (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. While legal abundance has remained high relative to the time series median for 2019 and 2021, sublegal-sized abundance was close to the median in those two years. In SNE, relative abundance from the spring and fall surveys remains low (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 2021, 44 trawls were conducted in the Spring and

43 in the Fall. The Monthly Survey includes monthly trawls throughout Narragansett Bay. In 2021 156 trawls were performed as part of the Monthly program. Spring 2021 mean CPUEs were 0.05 and 0.61 for legal and sublegal lobsters (respectively), where Fall 2021 CPUE was 0.02 for legal lobsters and 0.21 for sublegal lobsters. The 2021 mean Monthly trawl CPUEs were 0.04 and 0.54 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 2021 lobster abundance index (geometric mean = 0.04 lobsters/tow) was the third lowest in the time series. Spring abundance in the last nine years (2011-2021) remains less than 1.0. All indices from 2004-2021 are below the time series median (3.10). The fall 2021 lobster abundance index (geometric mean = 0.02 lobsters/tow) was a slight improvement from 2019 when no lobsters were caught in September and October. The fall time series median (3.33) has not been exceeded since 2004. Both legal and sublegal size lobster abundance has declined with a similar trajectory (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. Three sampling cruises were conducted in 2021 during the winter (February), spring (June), and summer (August). The summer cruise was cut short due to boat issues. These same boat issues were the reason the fall survey was not completed. Twenty, twenty-seven, and twelve stations were sampled respectively. Four lobsters were caught during the 2021 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 and CPUE and indices were not obtained (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 - 2021).

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. 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 2021, a total of 32 juvenile lobsters were sampled from three sites; 21 older juveniles, seven YOY lobster, and four 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 2021. 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 2021.

Massachusetts: Annual sampling for early benthic phase/juvenile (EBP) lobsters was conducted during August and September, 2021. Prior to 2019, sampling was completed at 21 sites spanning 7 regions in Massachusetts coastal waters. In 2019 changes to the survey were made discontinuing four locations in SNE (two in Buzzards Bay and both Vineyard Sound sites) and five sites in GOM (two South Shore locations and all three Cape Cod Bay locations). As of 2021, 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. Data for those sites included in the 2020 stock assessment are presented. In 2021 densities of YOY lobsters remained low compared to the time series average in Boston Harbor and Salem Sound, but densities in 2021 were higher in Salem Sound than any years since 2011 (Figure 12). In SNE there were again no YOY lobsters found in the Buzzards Bay sampling locations.

Rhode Island: In 2021, the RI DEM DMF YOY Settlement Survey (Suction Sampling) was conducted at six fixed stations with twelve randomly selected 0.5 m² 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 ($\leq 13\text{mm}$) and total lobsters caught (Figure 13). The 2021 YOY Settlement Survey index was 0.08 lobsters/m², and with all lobsters was 0.14/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 2021 there were decreases in the number of sublegal (<83 mm CL) lobsters in all areas and legal sized (\geq 83 mm CL) lobsters caught in the NH-Friendship (513) areas. There were increases in the number of legal sized (\geq 83 mm CL) lobsters caught in the Schoodic Point to Friendship (512) 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 2021. Catch per unit effort (stratified mean catch per trap haul) from 2009 through 2021 is presented in Figure 16. Annual stratified mean catch per trap haul values varied without significant positive or negative trend throughout the 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 (\geq 83 mm CL) lobsters for Area 514 (part of LMA 1) is shown in Figure 17 as the stratified mean CPUE (\pm 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 three years (2019-2021) falling below the time series average of 4.60 lobsters/trap. The stratified mean catch per trap of legal-sized lobsters in 2021 was 0.54 (\pm 0.01), and was below the time series average of 0.57.

The time series of relative abundance (stratified mean CPUE \pm S.E.) for sublegal (<86 mm CL) and legal-sized (\geq 86 mm CL) lobsters in the Area 538 (MA SNE survey area) is shown in Figure 18. The mean sublegal CPUE in 2021 was 1.43 (\pm 0.19), below the time series average of 1.95 lobsters/trap haul. The CPUE of legal-sized lobsters in 2021 was 0.34 (\pm 0.05), similar to the time series average of 0.34 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: In 2021, the Ventless Trap Survey was conducted during the months of June-August over 24 sampling sites. Over the 18 trips and 846 pots (ventless and vented) hauled, 2,695 lobsters were sampled. The depth-stratified abundance index of sublegal lobsters in the 2021 survey, 4.10 lobsters per ventless trap, remains below the time series mean of 5.96 lobsters per ventless trap (Figure 19). The abundance index for legal-sized lobsters, at 0.52, was above the time series mean of 0.37 lobsters per ventless trap (Figure 20). Region-specific indices vary- catch of sublegal lobsters in Block Island Sound and Narragansett Bay have generally fallen below the time series mean, while catches in Rhode Island Sound generally fell above the time series mean for the region.

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 2021. Four American lobsters were caught in lower Delaware Bay and 594 American lobsters in the nearshore Atlantic Ocean with a ratio of 58% males, 36% female and 6% egg laden. The sampled Atlantic Ocean lobsters ranged in length from 52 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 2021, as required by Addendum XXVI. Due to the COVID-19 pandemic, some states had to cancel or limit the amount of surveys conducted. The states' reasons for not meeting the requirement are provided in Section 6.0.

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

New Hampshire

- Changes were made to weak link and gear marking for NH state waters.

Massachusetts

- 3/5/21 – DMF established a number of new regulations affecting commercial fixed gear fisheries, including the American lobster trap fishery, to further protect right whales from entanglement risks. These changes included:
 1. Extending the February 1 – April 30 commercial trap gear closure in both space and time to include all state waters north and east of Cape Cod and to have it remain in effect until May 15 unless otherwise rescinded or extended by DMF based on the presence and absence of right whales.
 2. Establishing a November 1 – May 15 closed season for recreational lobster and crab trap gear. Previously, there was no closed season for this fishery.
 3. Adopting a 1,700-pound buoy line breaking strength requirement for all commercial trap gear. This can be achieved by fishing “weak rope” that has a tensile strength of 1,700 pounds or less or rigging conventional buoy lines with approved weak contrivances once every 60’. Approved weak contrivances include certain 2’ segments of weak rope spliced into the buoy line or so-called “south shore sleeves” connecting a parted piece of buoy line.
 4. Implementing a maximum buoy line diameter for all trap gear. For recreational lobster and crab trap gear the maximum buoy line diameter is 5/16” and for commercial trap gear the maximum buoy line diameter is 3/8”.
 5. Capping the maximum number of commercial Student Lobster Permits DMF may issue in a single calendar year at 150.
- 7/09/21 – DMF adopted new buoy line marking requirements for all commercial trap gear, including lobster and edible crab traps. These buoy line marking requirements are consistent with those required by the Atlantic Large Whale Take Reduction Plan.

11.0 Enforcement Concerns

Maine

- In 2021 Maine Marine Patrol Officers documented 383 lobster-related violations, with 62 being summonses. Our highest profile cases for the year were 5 individuals being charged with molesting lobster gear and one individual found in possession of 19 undersized 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 25,000 lobster traps in 2021. The majority of the violations detected were for possessing illegal lobsters, protected resource violations and fishing untagged lobster gear.

Massachusetts

- The Rushnak (2020) scrubbed lobster incident was settled administratively with a 3-month suspension and a 3-year probationary period. The criminal case was settled with a plea deal.
- The Birarelli (2020) incident was not handled administratively and the criminal matter is ongoing. This case dealt with v-notch, mutilated v’s and shorts.

- The Roche (2021) incident went to administrative hearing and the coastal lobster permit was revoked. The criminal matter is ongoing. This case dealt with trap tag violations, trawl length violations, and whale safe buoy line violations.
- The Hamilton (2021) incident was settled administratively with a two-year suspension of Offshore Lobster Permit. There was a companion criminal summons, which is ongoing. This case dealt with possession of lobsters in excess of the gillnet bycatch allowance rules and reporting violations to conceal these overages.

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 2021, New Jersey and Connecticut did not meet the Addendum XXVI minimum requirement of ten sea/port sampling trips; no trips were completed by either state. The compliance report for New Jersey explains that sampling was impeded by the

COVID-19 pandemic. For Connecticut, no reason was provided. Fishery dependent sampling has not been conducted by since 2014 because reductions in funding and staffing levels have hindered our ability to resume these activities.

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.
- The PRT recommends the TC discuss the best way to present state index information in the annual compliance reports to provide more detailed resolution of adult and juvenile abundance and size composition of the stock.
- The PRT recommends the Board engage with the Committee on Economic and Social Sciences (CESS) to consider available socioeconomic data to develop metrics that could be used to characterize changes in the fishery.

14.0 Tables

Table 1. Landings (in pounds) of American Lobster by the states of Maine through Virginia.
Source: ACCSP Data Warehouse for 1981-2019 landings; state compliance reports for 2020 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	15,158,509	2,155,762	127,420	496,535	660,367	C	62,522	9,061	150,503,413
2014	124,941,217	4,374,656	15,312,852	2,412,875	127,409	222,843	526,368	26,330	57,414	11,099	148,013,063
2015	122,685,803	4,721,826	16,450,414	2,315,708	205,099	147,414	445,060	22,894	29,284	9,474	147,032,976
2016	132,750,484	5,782,098	17,784,921	2,260,335	254,346	218,846	349,880	C	29,254	2,854	159,433,017
2017	112,170,139	5,513,999	16,493,125	2,031,143	130,015	150,317	409,062	32,364	29,136	1,630	137,091,350
2018	121,226,213	6,199,365	17,697,243	1,905,689	110,580	112,685	344,547	C	24,893	2,727	147,623,943
2019	101,987,215	6,093,615	17,029,462	1,795,212	111,573	112,107	291,072	C	C	1,840	127,422,095
2020	97,910,036	5,013,785	15,711,553	1,695,279	159,173	111,678	309,197	C	10,176	C	120,920,877
2021	109,528,524	5,709,116	17,051,592	1,352,470	95,993	119,990	323,205	C	12,816	2,917	134,196,623

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. 2021 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 Definition¹ (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 1/4"	6 3/4"	5 1/4"	5 1/4"	5 1/4"	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 4. Summary of Area 2 Trap Transfers, Annual Reductions, and Conservation Tax, 2015-2020*

Application Year	Total Trap Allocation	Annual Trap Reductions	Number of Traps Transferred Out	10% Tax on Trap Transfers	Number of Traps Transferred In	Trap Loss from Cap Limits, Renew or Lose, or Leveling	Balance at the Start of the Next Fishing Year
2015	118,188	29,524	7,050	705	6,345	0	87,959
2016	87,959	4,339	4,140	414	3,726	8	83,198
2017	83,198	4,067	4,020	402	3,618	5	78,724
2018	78,724	3,865	1,780	178	1,602	100	74,581
2019	74,581	3,729	3,694	369	3,325	0	70,483*
2020	70,483*	3,524	1,320	132	1,188	0	66,827*
2021	66,827	N/A	2,651	264	2,387	0	66,563
Grand Total	N/A	49,048	24,655	2,464	22,191	113	N/A

* Prior calculation errors were identified and corrected. These numbers will differ from past information provided.

Table 5. Summary of Area 3 Trap Transfers, Annual Reductions, and Conservation Tax, 2015-2020*

Application Year	Total Trap Allocation	Annual Trap Reductions	Number of Traps Transferred Out	10% Tax on Trap Transfers	Number of Traps Transferred In	Trap Loss from Cap Limits, Renew or Lose, or Leveling	Balance at the Start of the Next Fishing Year
2015	145,433	7,201	13,612	1,363	12,249	1	136,868
2016	136,868	6,779	11,650	1,165	10,485	14	128,910
2017	128,910	6,391	7,130	713	6,417	0	121,806
2018	121,806	6,036	2,820	282	2,538	9	115,479
2019	115,479	5,774	4,060	406	3,654	0	109,299*
2020	109,299*	N/A	2,430	243	2,187	9	109,047*
2021	109,047	N/A	5,054	505	4,549	0	108,542
Grand Total	N/A	32,181	46,756	4,677	42,079	33	N/A

* Prior calculation errors were identified and corrected. These numbers will differ from past information provided.

Table 6. 2020 sampling requirements and state implementation. All states have 100% active harvester reporting except for Maine which has 10% harvester reporting. 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	✓	✓	✓		✓	✓	^a
RI	✓	✓	^a	✓	✓	✓	✓
CT	✓	✓	^b	^b		^c	✓
NY	✓	✓	✓	✓			✓
NJ	✓	✓	^a				^a
DE*	✓	✓			✓		✓
MD*	✓	✓					✓
VA*	✓	✓					

^a Sampling hindered or not completed due to the COVID-19 pandemic

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

^c 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. 2021 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	149	183,154	183,154					149	183,154
NH	13	7,252		11	1,100			24	8,352
MA	57	22,604		0	0	0	0	57	22,604
RI	2	1,073		9	2,115			11	3,188
CT	0	0	0	0	0	0	0	0	0
NY	0	0	0	18	1,838			18	1,838
NJ	0	0	0	0	0	0	0	0	0
DE*	NA	NA	NA	NA	NA	NA	NA	0	0
MD*	NA	NA	NA	NA	NA	NA	NA	0	0
VA*	NA	NA	NA	NA	NA	NA	NA	0	0
Total	221	214,083	183,154	38	5,053	0	0	259	219,136

15.0 Figures

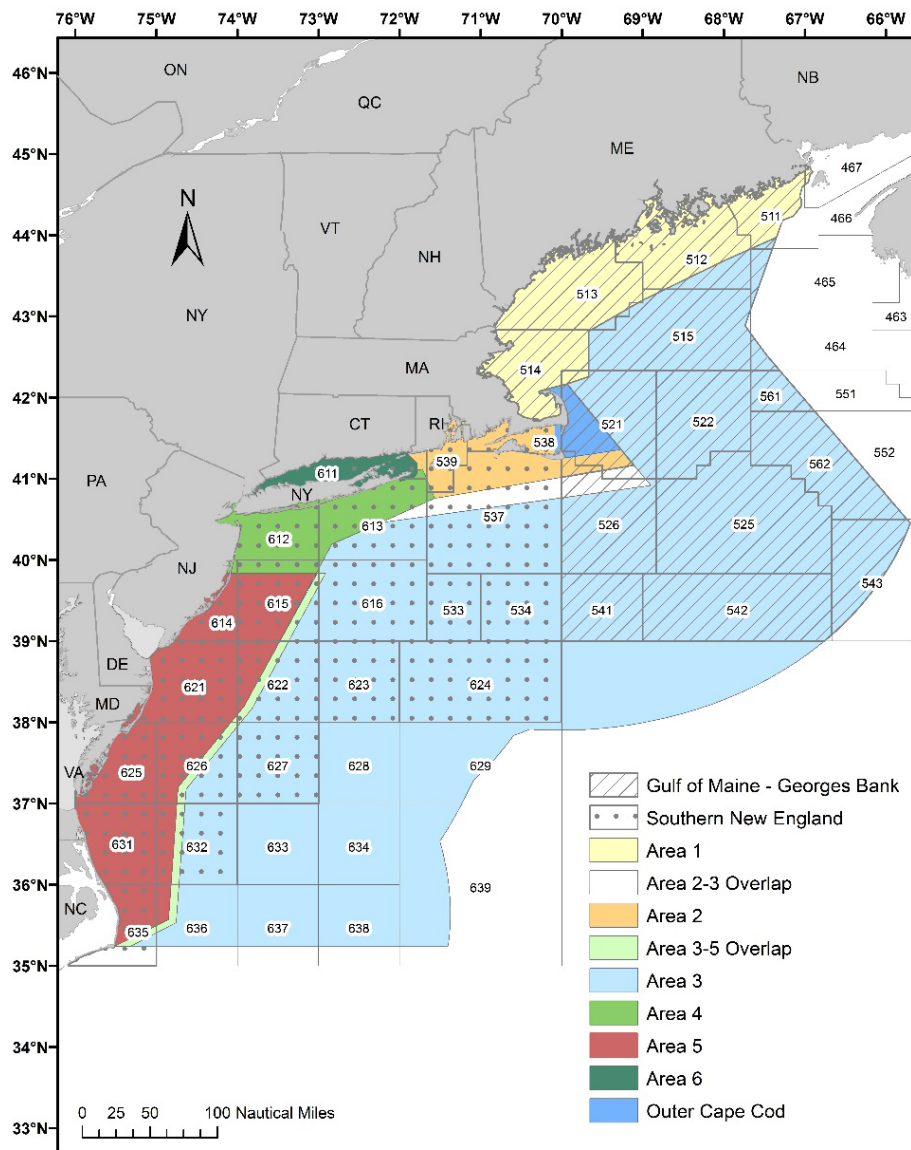


Figure 1. Lobster Conservation Management Areas (LCMAs) and stock boundaries for American lobster.

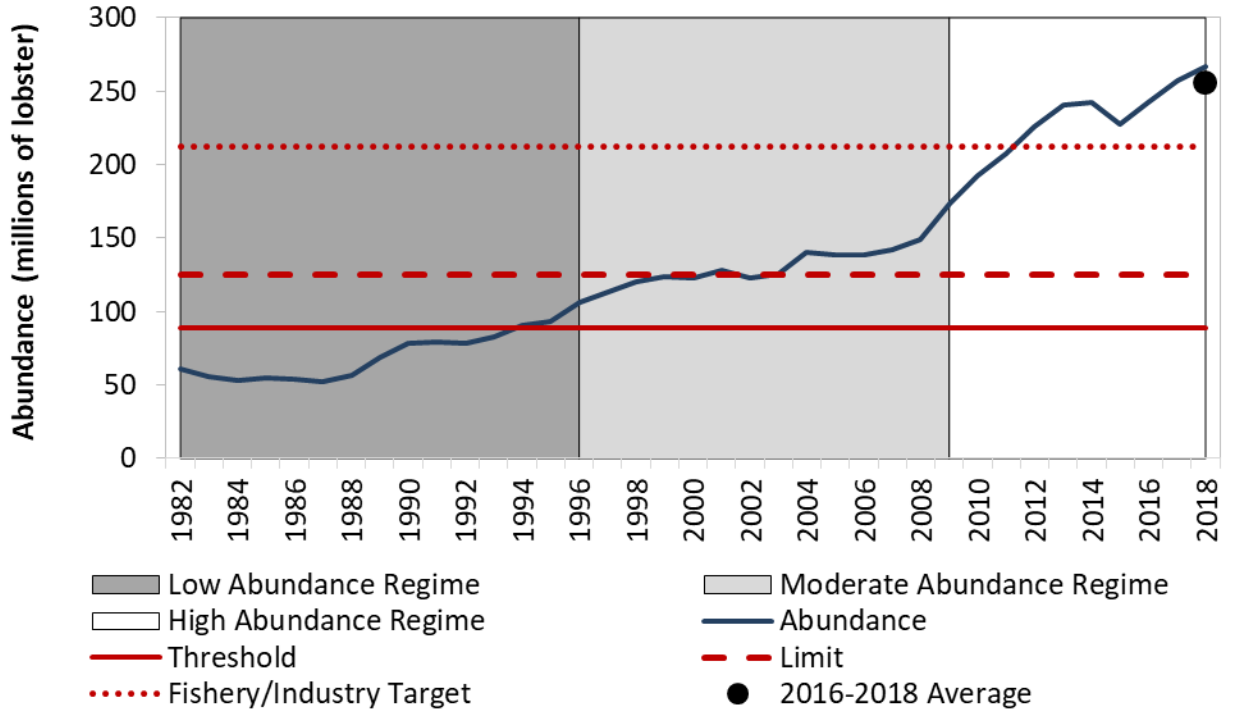


Figure 2. Abundance for GOM/GBK Relative to Reference Points. Source: 2020 Benchmark Stock Assessment for American Lobster.

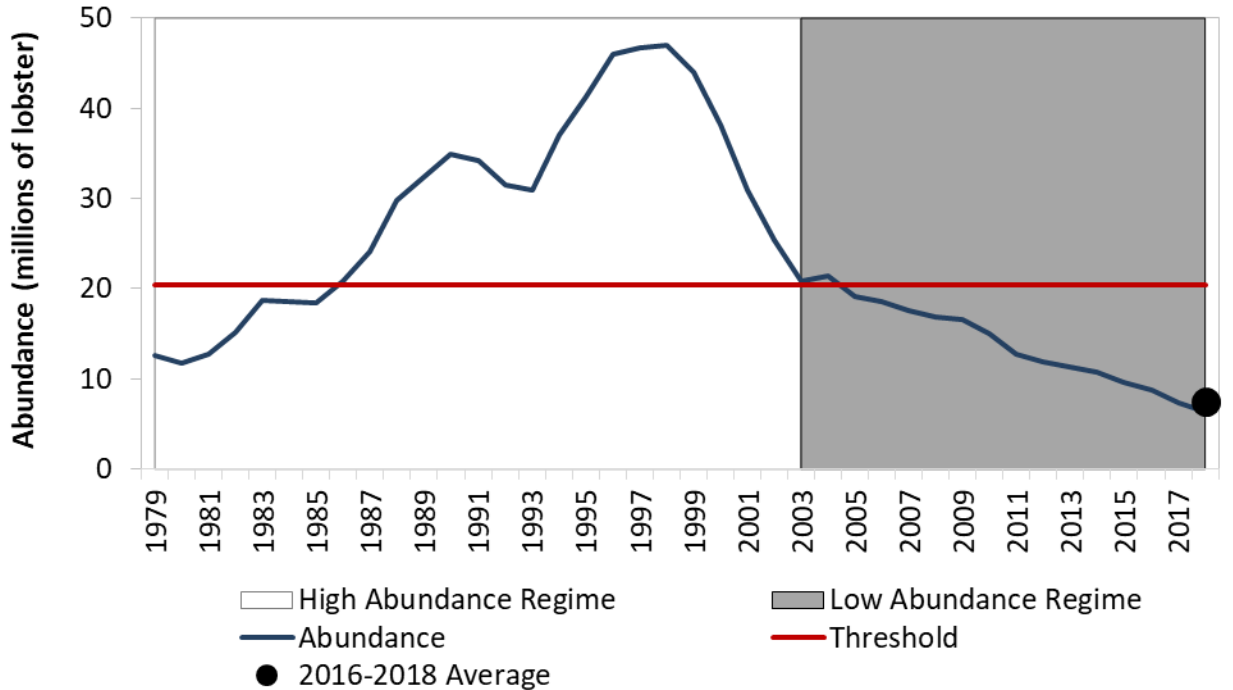


Figure 3. Abundance for SNE Relative to Reference Points. Source: 2020 Benchmark Stock Assessment for American Lobster.

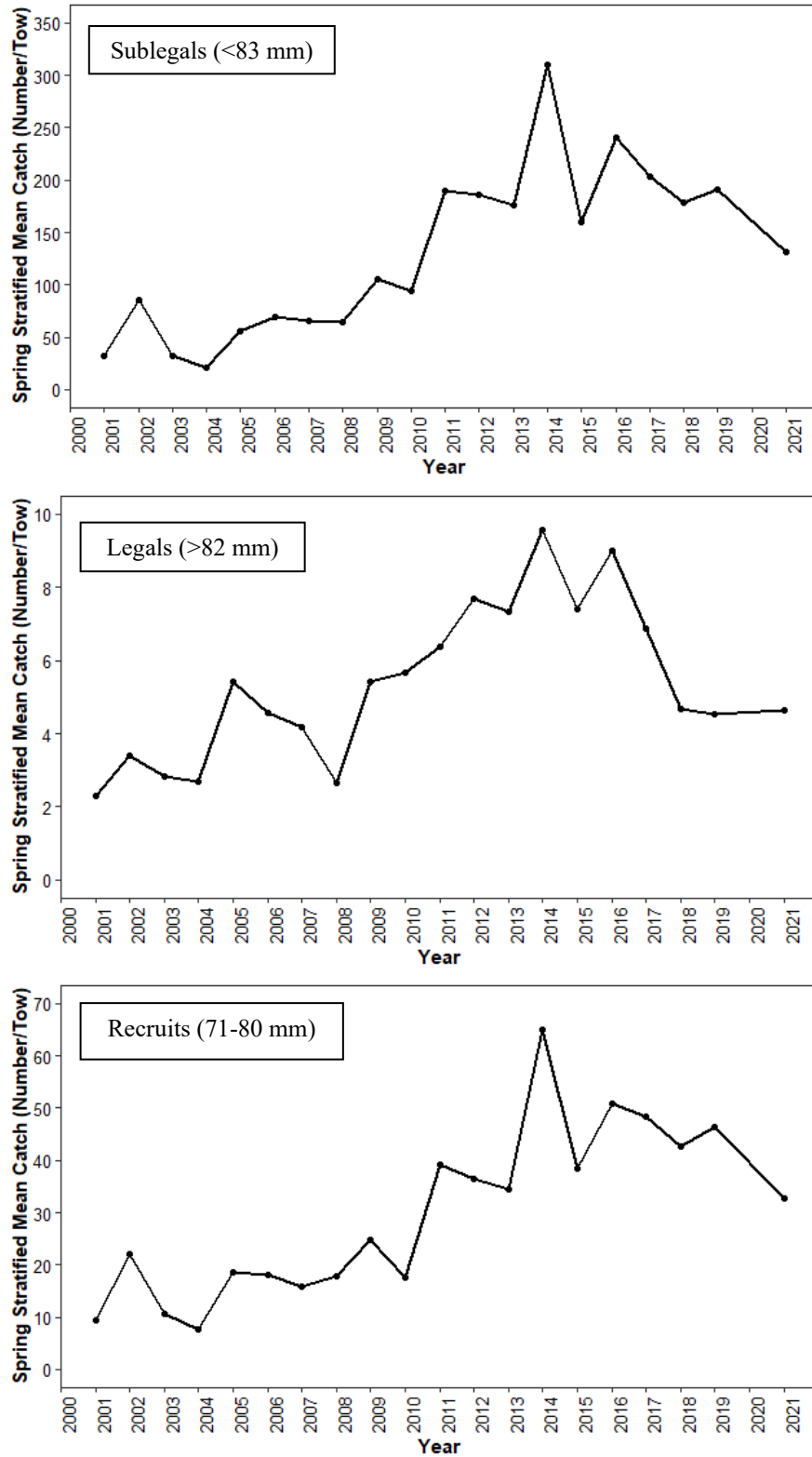


Figure 4. Stratified mean catch and recruit abundance for American lobster on the Spring ME/NH Inshore Trawl Survey (2000-2021).

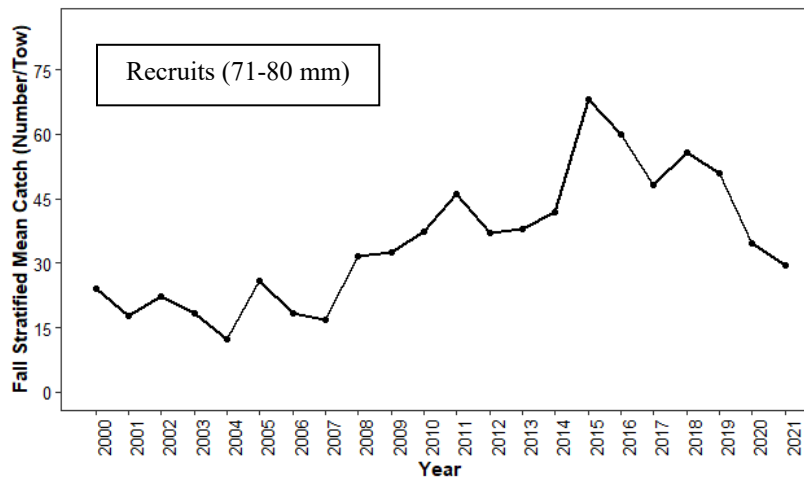
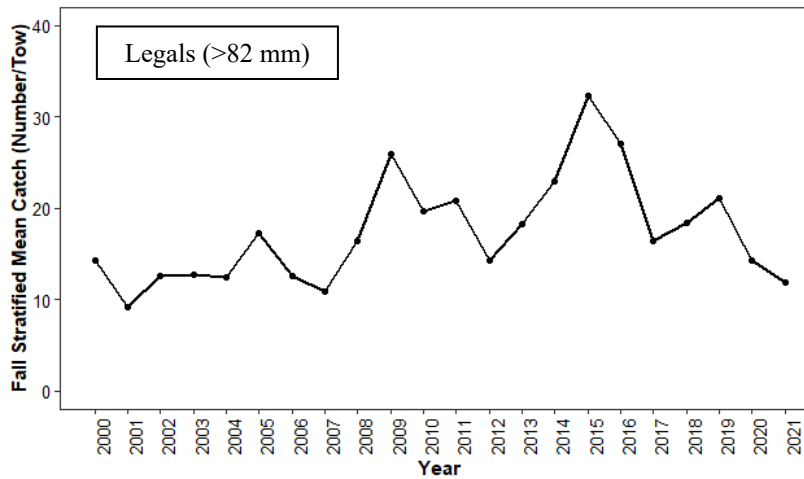
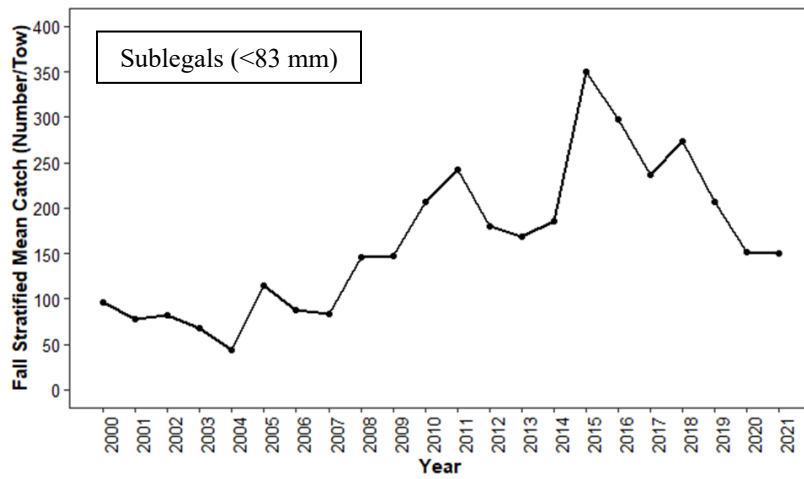


Figure 5. Stratified mean catch and recruit abundance for American lobster on the Fall ME/NH Inshore Trawl Survey (2000-2021).

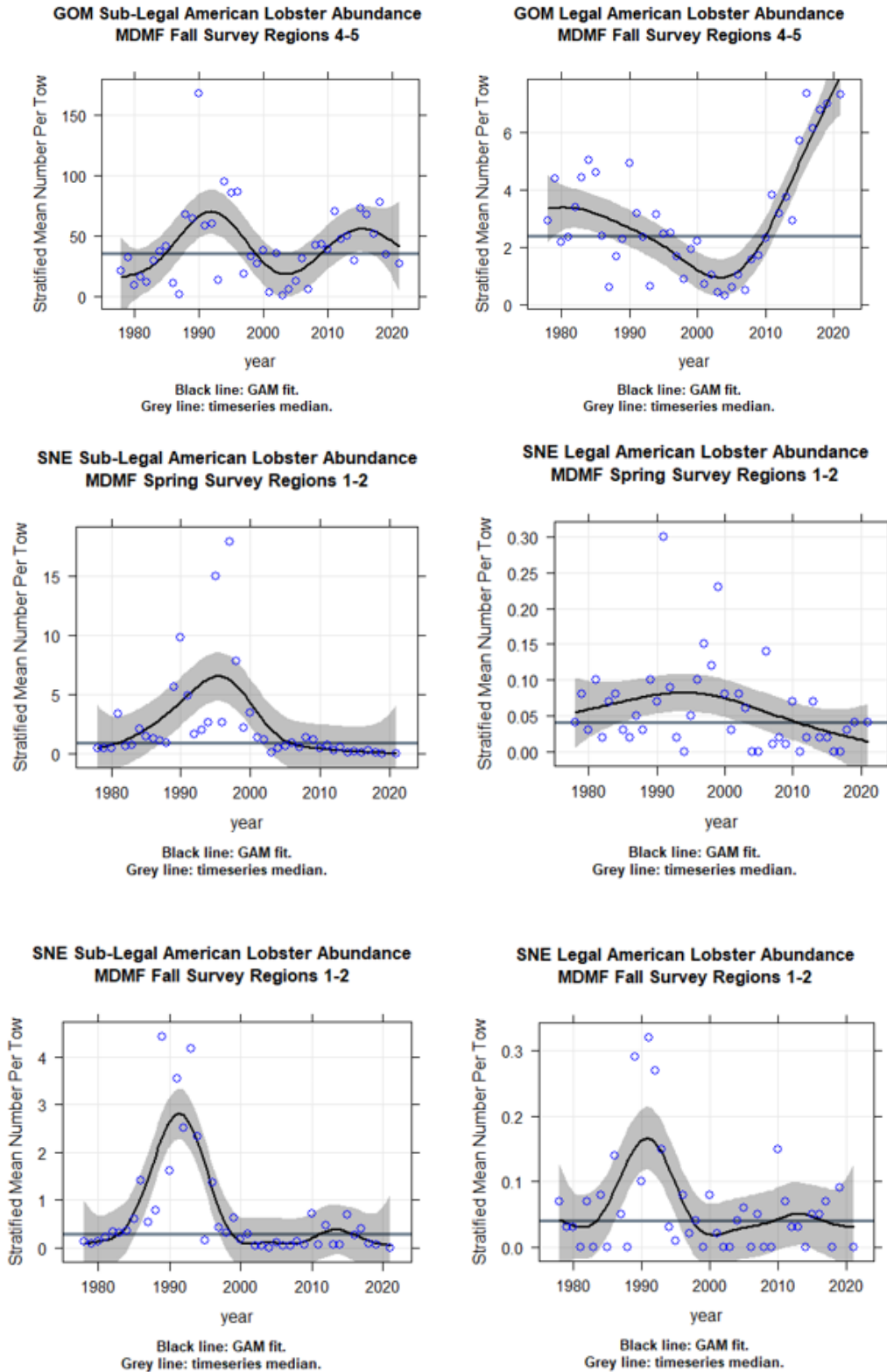


Figure 6. MADMF Fall Trawl Survey sublegal (left) and legal (right) indices from 1978-2019 sexes combined. The top two charts are from Gulf of Maine and the bottom four charts are from Southern New England.

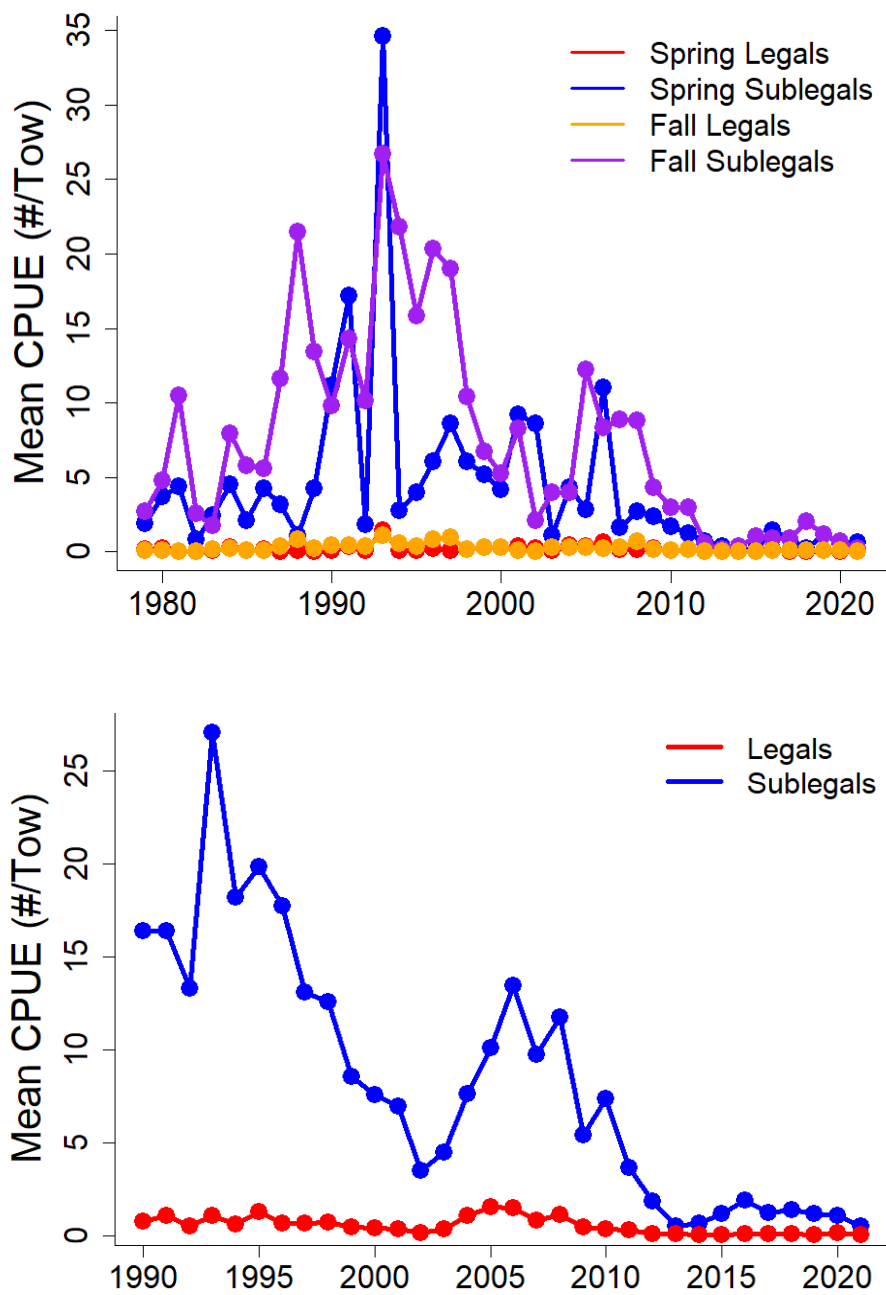


Figure 7. RIDFW Seasonal (spring and fall) Trawl lobster abundances (top) and Monthly Trawl lobster abundances (bottom). CPUE is expressed as the annual mean number per tow for sub-legal (<85.725mm CL) and legal sized (>=85.725mm CL) lobsters.

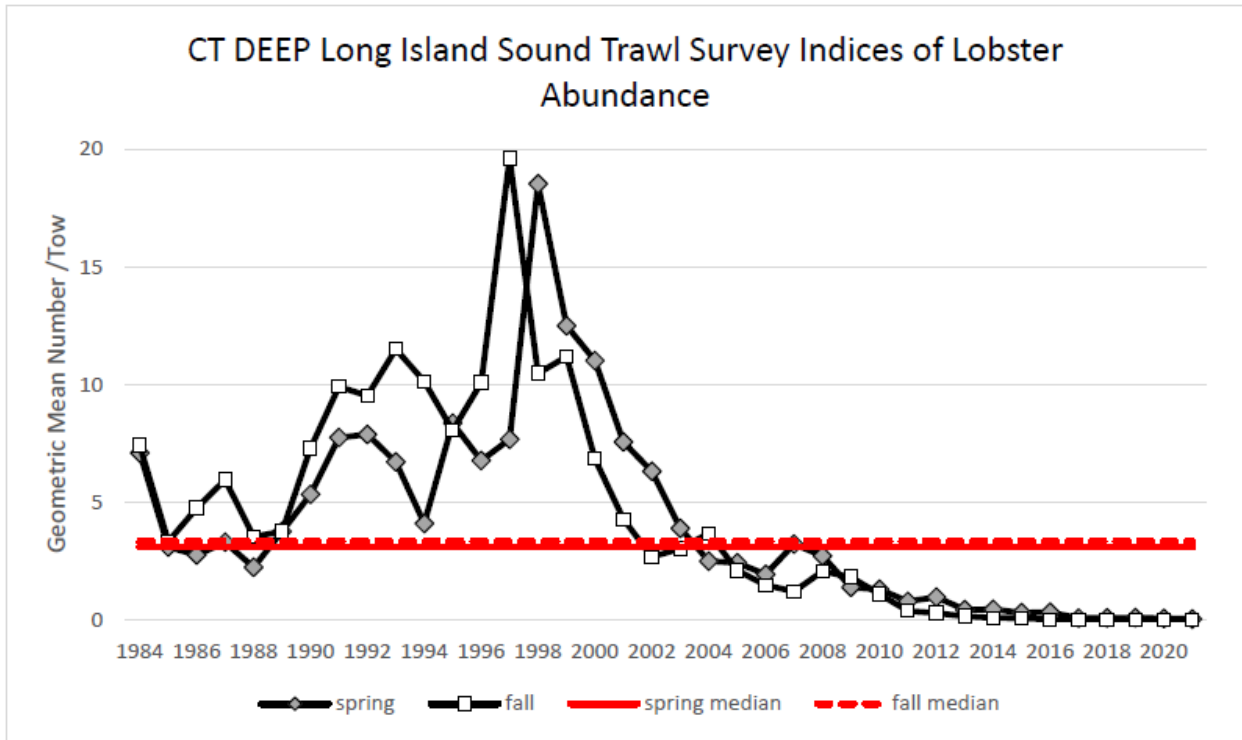


Figure 8. Results of the Long Island Sound Trawl Survey during spring (April-June) and fall (September-October) within NMFS statistical area 611.

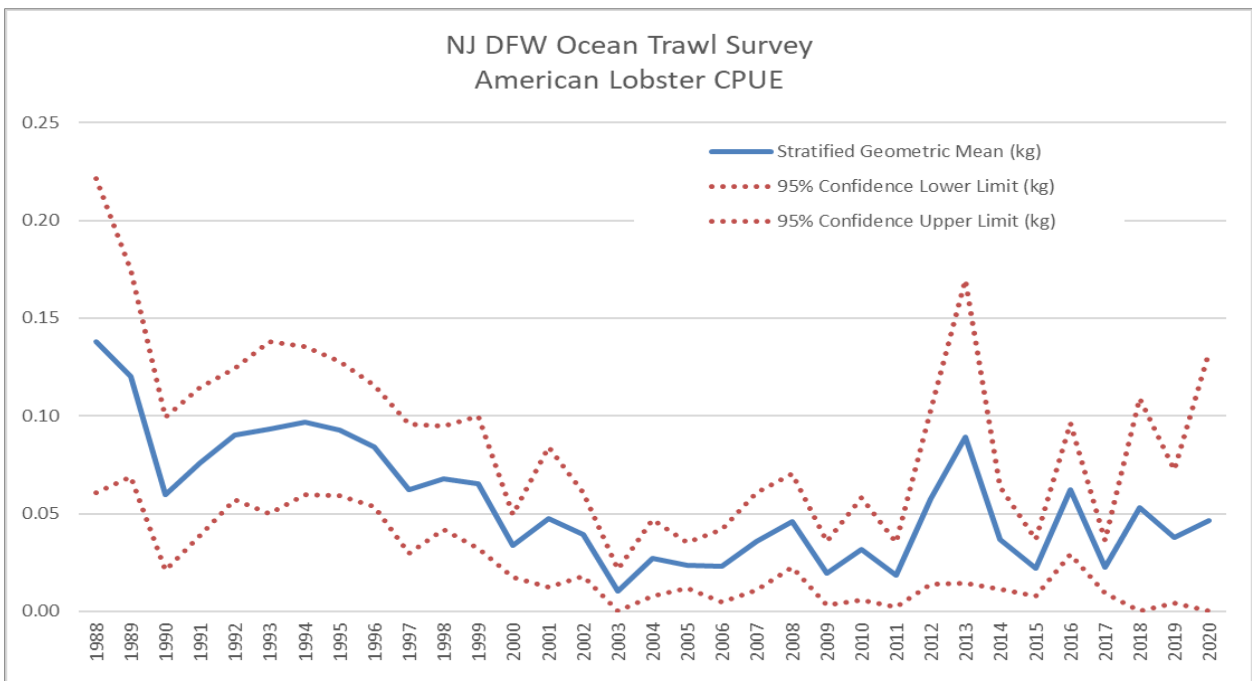


Figure 9. Stratified mean CPUE of all lobsters collected aboard the NJDFW Ocean Trawl Survey. *NOTE: No April 2019 Survey was conducted due to Research vessel mechanical issues. Due to the COVID-19 pandemic, 2020 and 2021 CPUE and indices were not obtained.

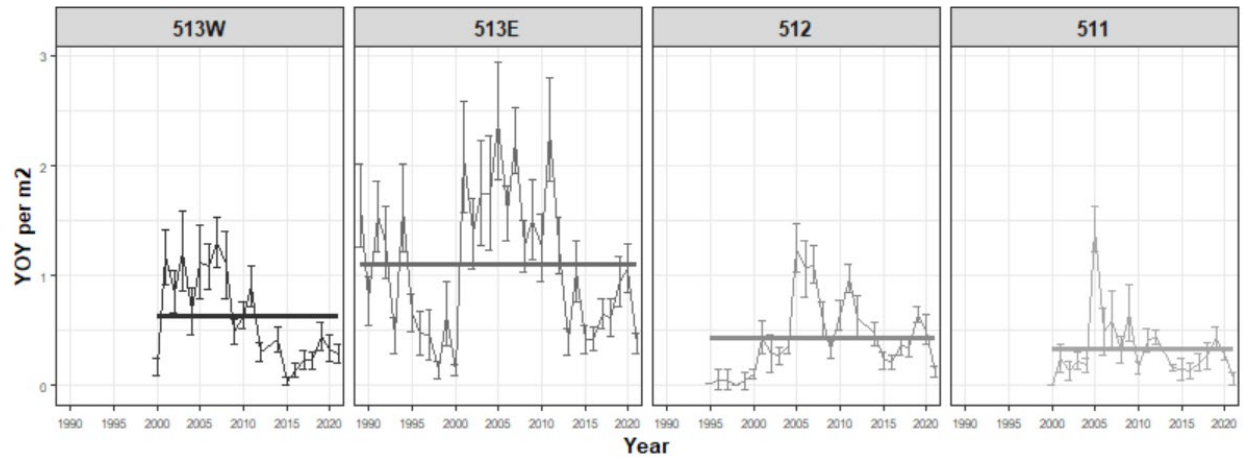


Figure 10. Maine Settlement Survey index 1989-2021 for each statistical area with series average (solid horizontal line) for each region with standard error bars.

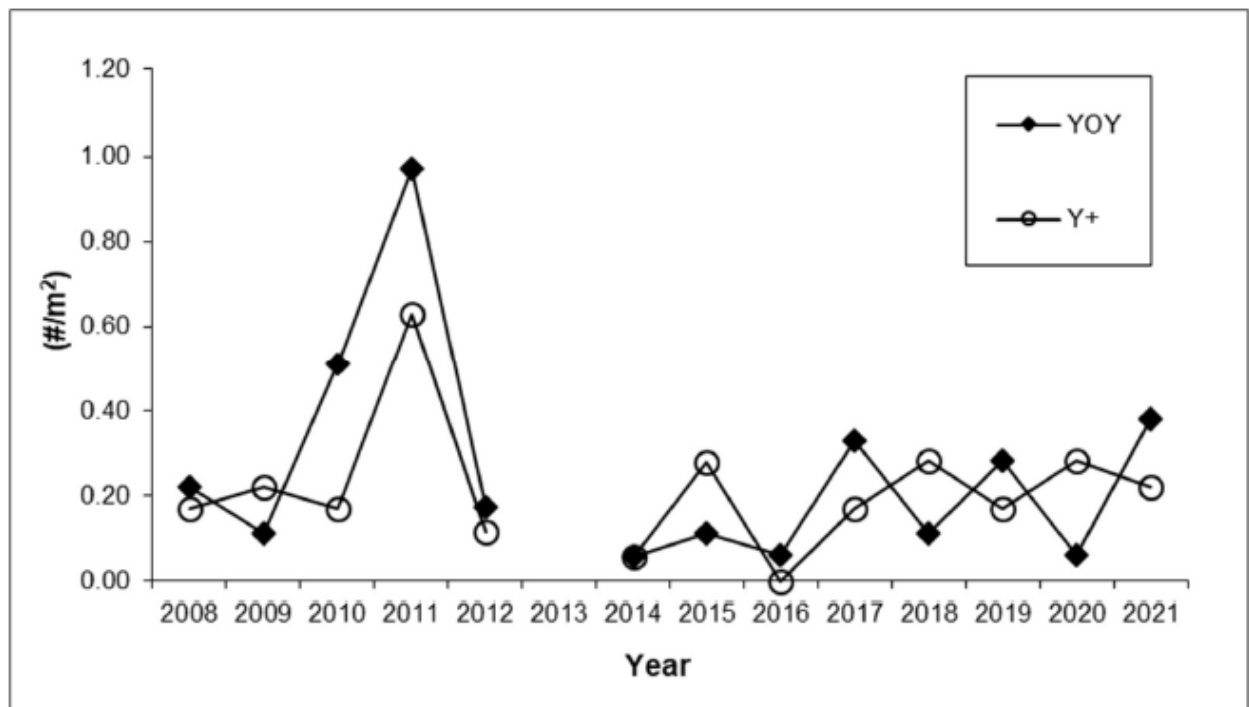


Figure 11. Catch per unit effort (#/m²) of young-of-year (YOY), one-year-olds (Y+), YOY and Y+ combined, and all lobsters during the American Lobster Settlement Index, by location, in New Hampshire, from 2008 through 2021.

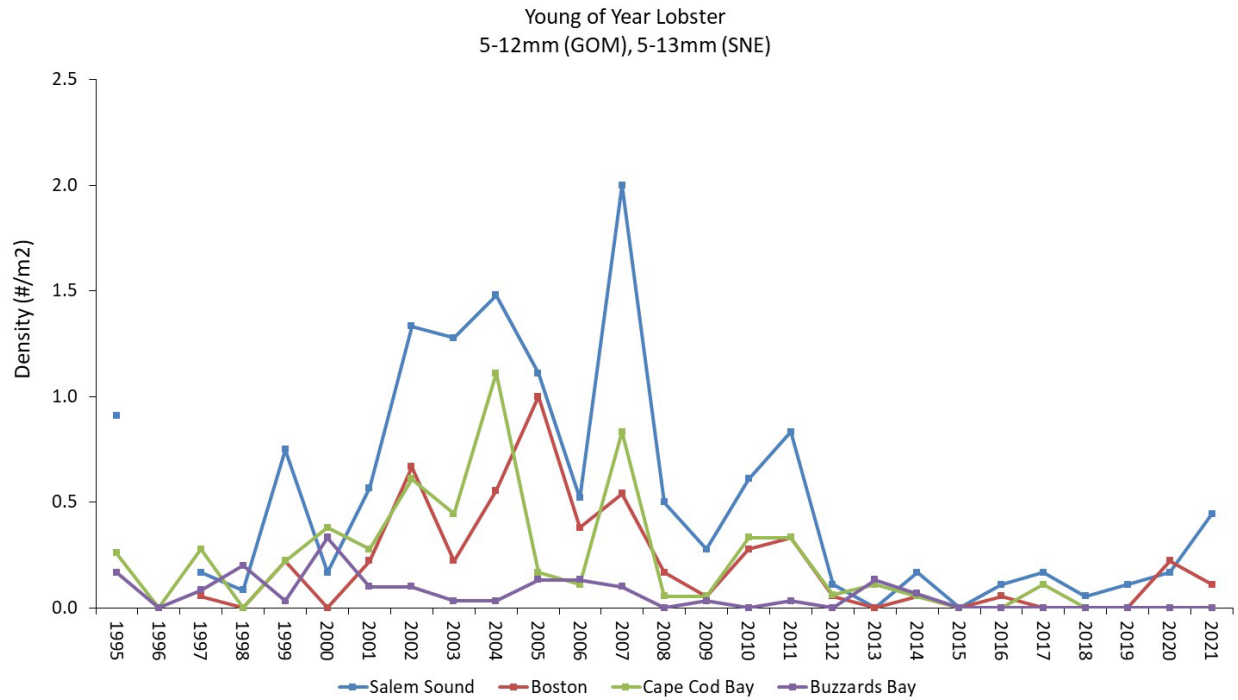


Figure 12. Young-of-year lobster density in four Massachusetts regions used in the stock assessment; LCMA 1 – Salem Sound, Boston, Cape Cod Bay, LCMA 2 - Buzzards Bay. Note that Cape Cod Bay sites were discontinued in 2019 due to white shark risk.

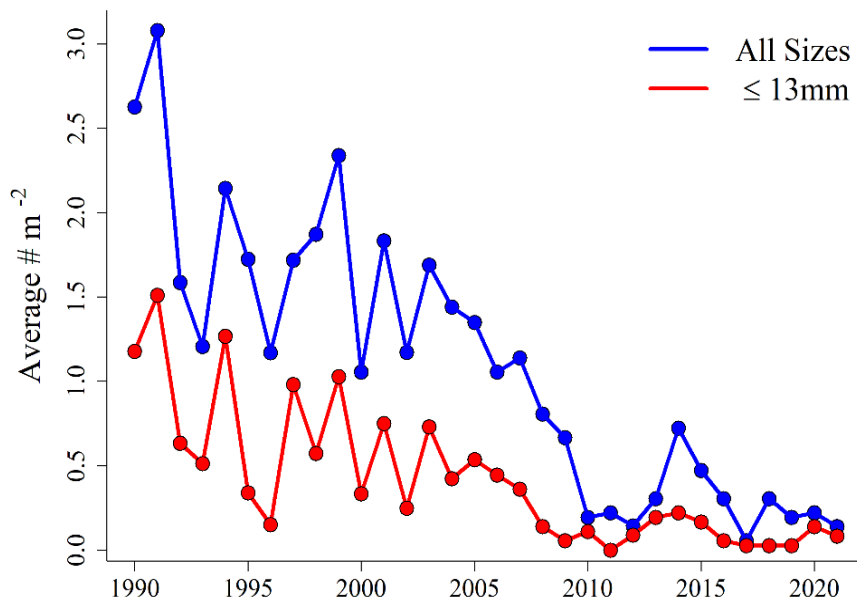


Figure 13. Average abundance of American lobster in Rhode Island suction sampling sites. Abundances are presented for YOY lobsters 12mm and smaller (red line) and all sizes (blue line).

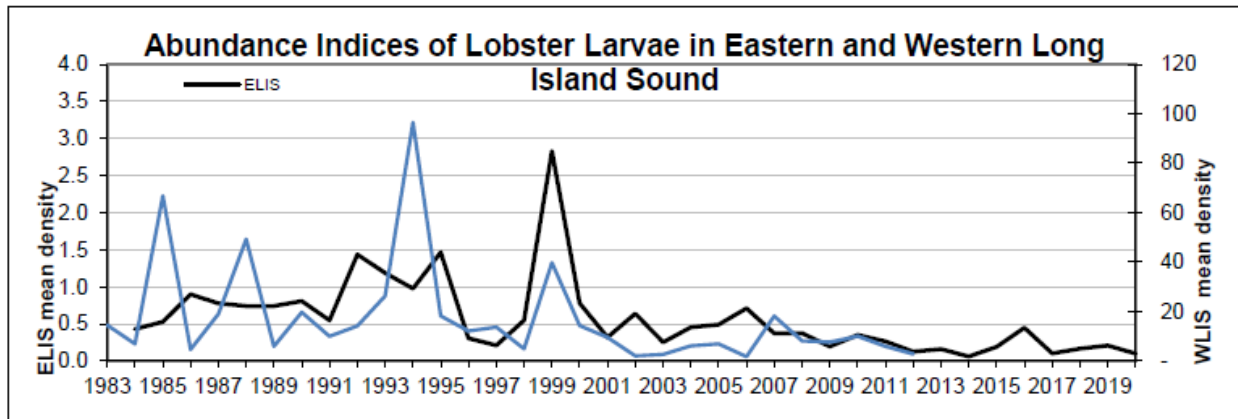


Figure 14. Abundance indices of lobster larvae from the Connecticut DEEP Larval Lobster Survey in western Long Island Sound and from the Millstone Power Station entrainment estimates in eastern Long Island Sound. The Connecticut DEEP survey was discontinued in 2013.

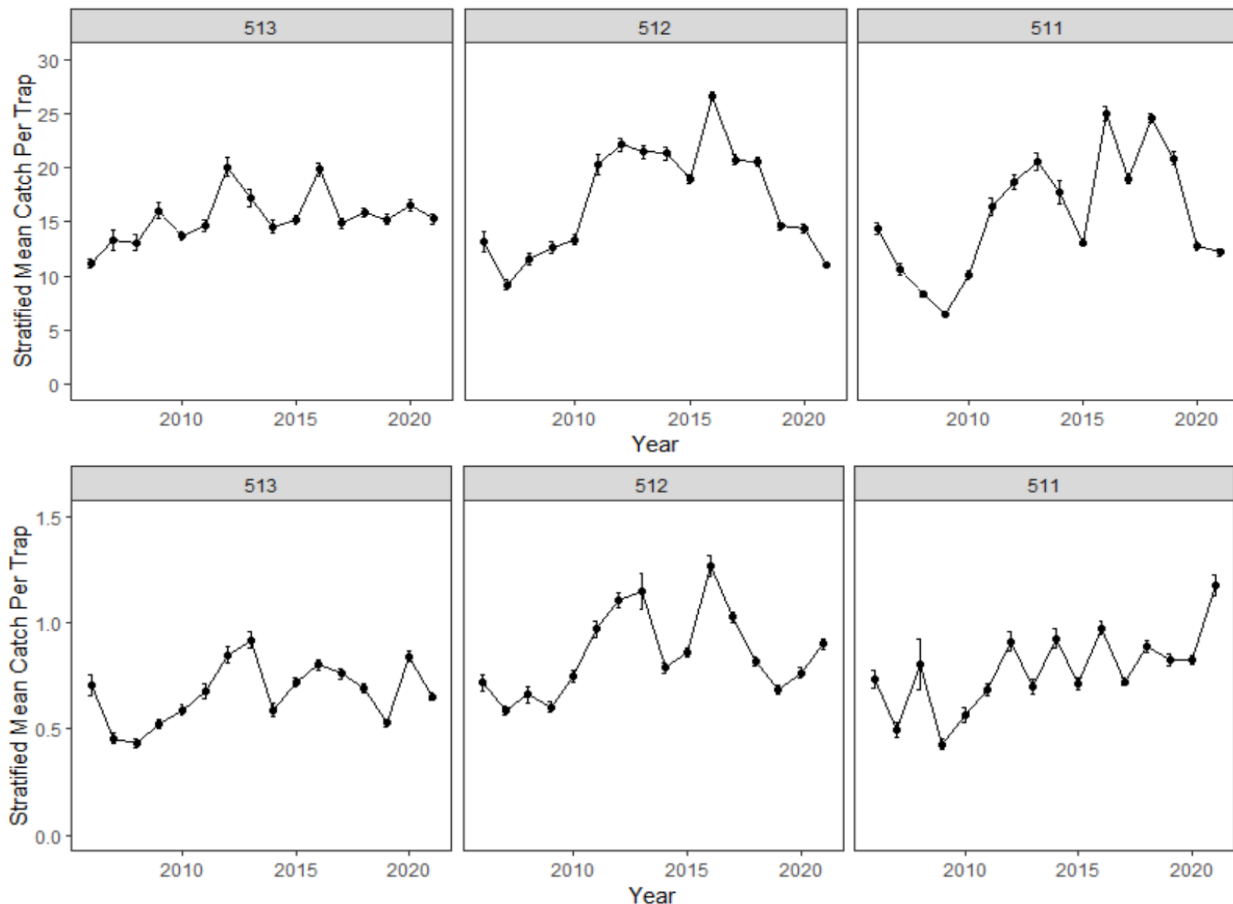


Figure 15. Stratified mean catch per trap for sublegal (top) and legal (bottom) sized lobsters from Maine’s Ventless Trap Survey 2006-2021 by statistical area from ventless traps only. Standard error is shown.

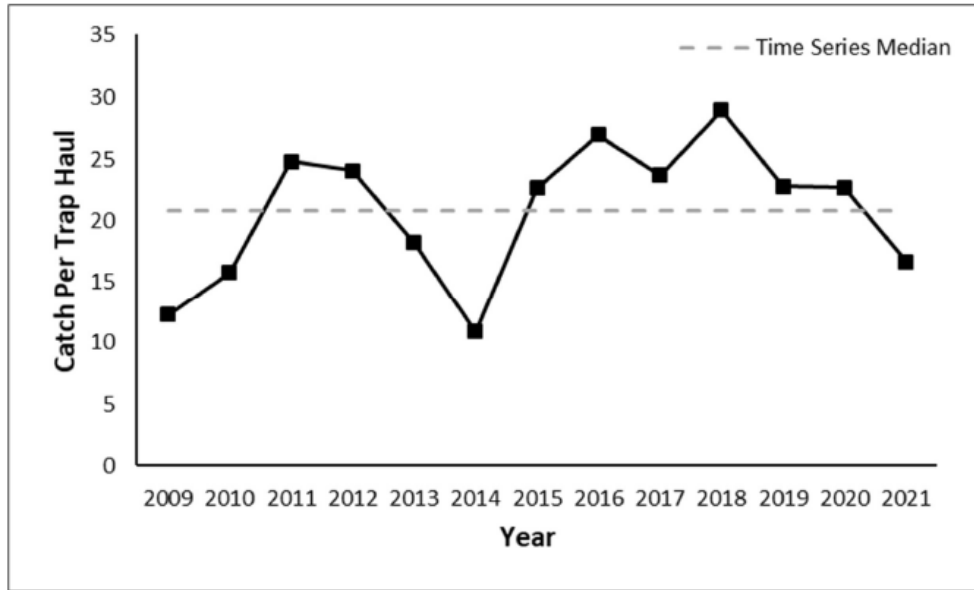


Figure 16. Stratified mean catch per trap haul (ventless traps only) for all lobsters captured during the coast-wide random stratified Ventless Trap Survey in New Hampshire state waters from 2009 through 2021.

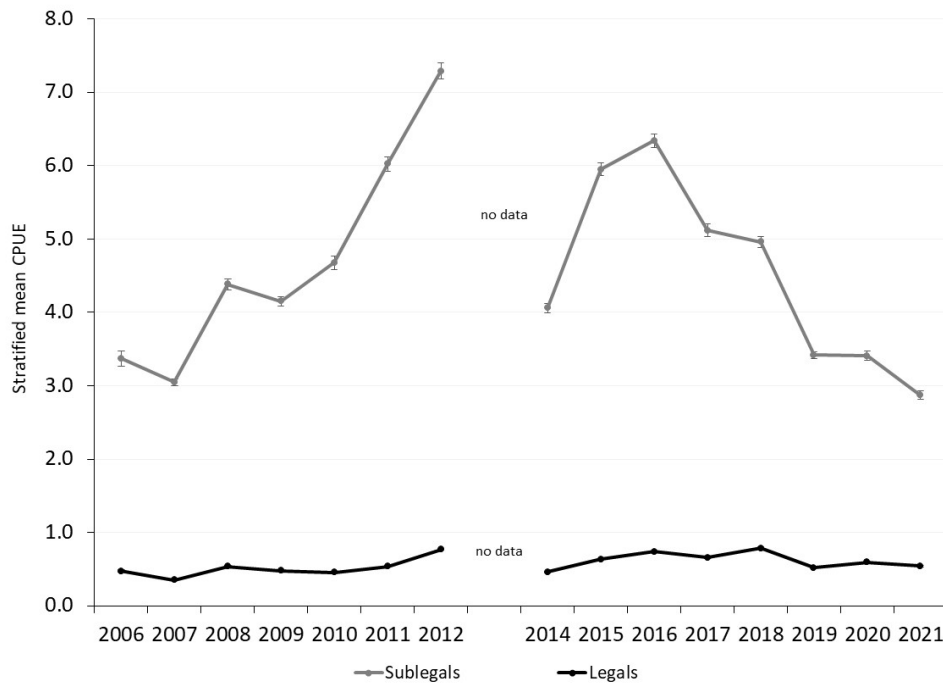


Figure 17. Stratified mean catch per trap haul (\pm S.E.) of sublegal (< 83 mm, grey line) and legal (\geq 83 mm, black line) lobsters in NMFS Area 514 from MADMF ventless trap survey from 2006-2021.

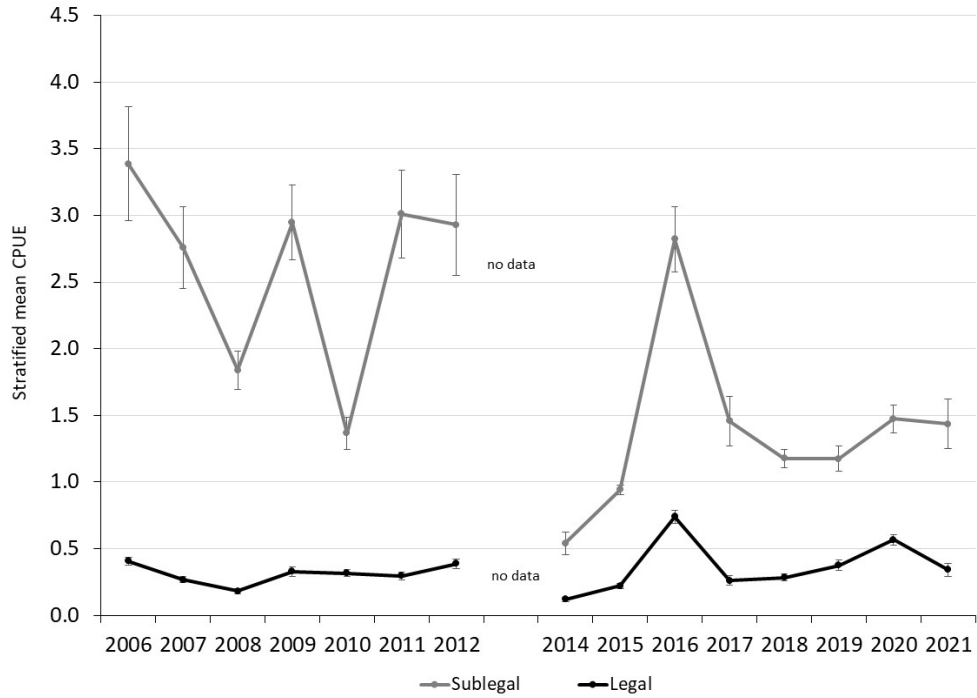


Figure 18. Stratified mean catch per trap haul (\pm S.E.) of sublegal (< 86 mm, grey line) and legal (\geq 86 mm, black line) lobsters in the reduced MA SNE survey area, Area 538.

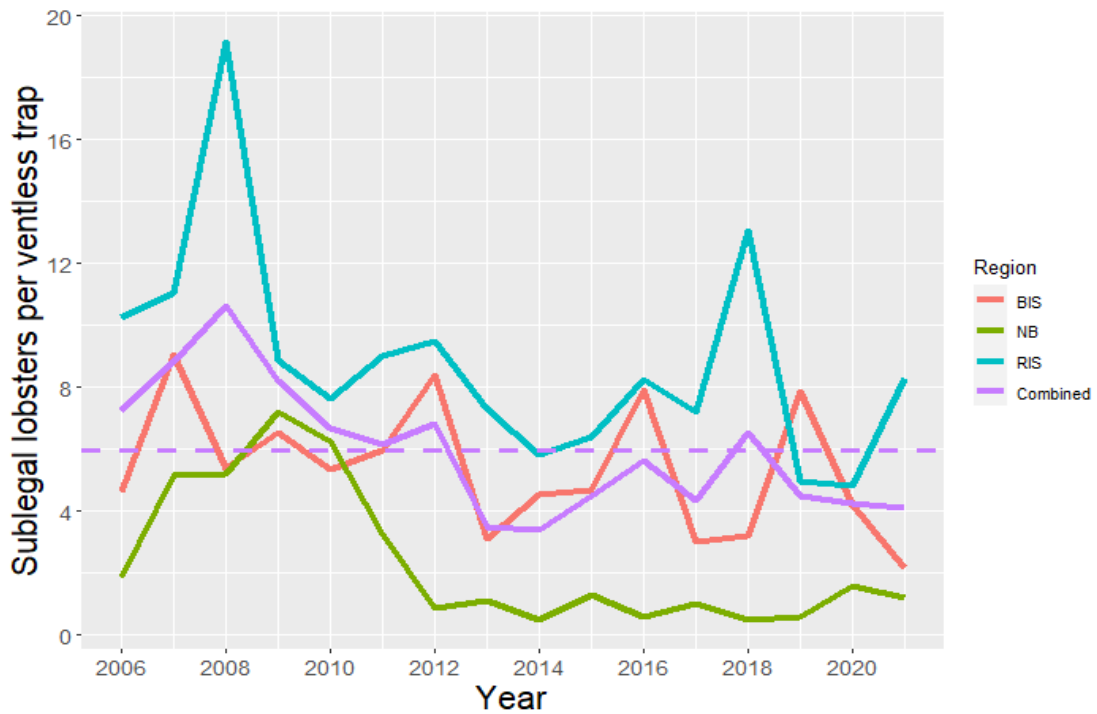


Figure 19. Depth-stratified mean catch of sublegal lobsters in the RIDEM DMF ventless trap survey, 2006-2021.

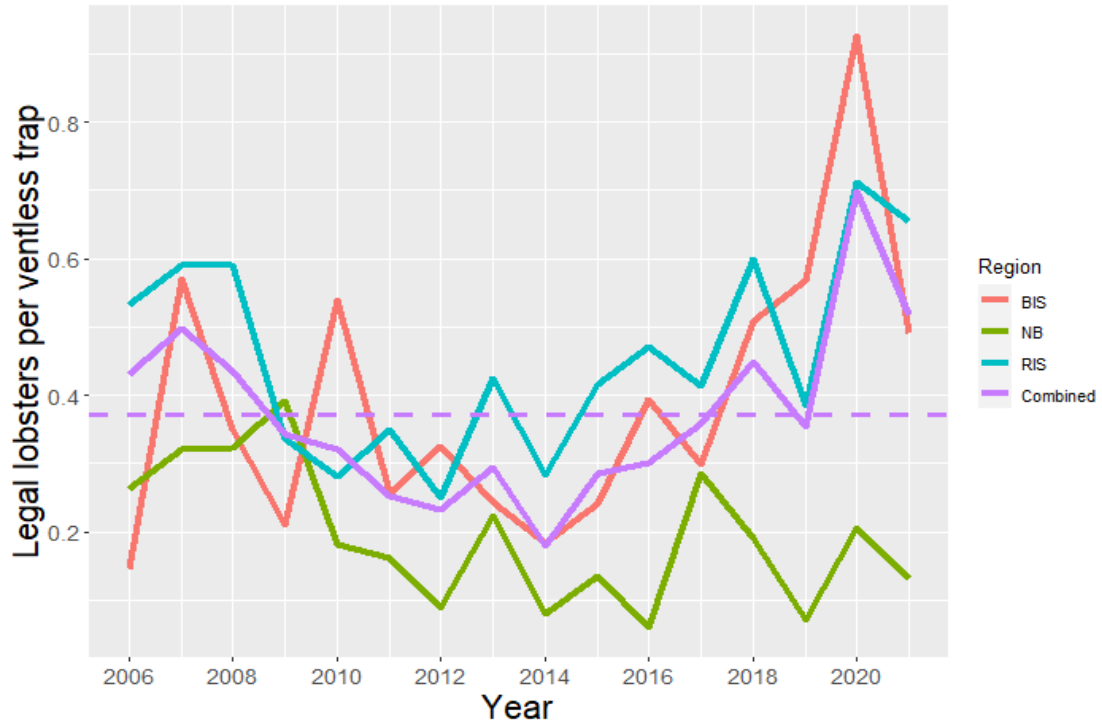


Figure 20. Depth-stratified mean catch of sublegal lobsters in the RIDEM DMF ventless trap survey, 2006-2021.