

ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR AMERICAN LOBSTER
(*Homarus americanus*)

2017 FISHING YEAR



Prepared by the Plan Review Team

Approved by the American Lobster Management Board
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**REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN FOR AMERICAN
LOBSTER (*Homarus americanus*)**

This document covers fishery activities in 2017 as well as trap reductions which took place ahead of the 2018 fishing year.

1.0 Status of the Fishery Management Plan

<u>Year of ASMFC Plan’s Adoption:</u>	Amendment 3 (1997)
<u>Framework Adjustments:</u>	
Addendum I (1999)	Addendum XIV (2009)
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)	
 <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

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 – 2008 the average coastwide landings tripled, reaching 92 million pounds in 2006. Landings have continued to increase over the last decade, reaching a high of 158 million pounds in 2016 (Table 1). In 2017, coastwide commercial landings decreased to 137 million pounds. The largest contributors to the 2017 fishery were Maine and Massachusetts with 82% and 12% of landings, respectively. Landings, in descending order, also occurred in New Hampshire, Rhode Island,

New Jersey, New York, Connecticut, Maryland, Delaware, and Virginia. The ex-vessel value for all lobster landings in 2017 was \$565.2 million.

Table 2 shows the break-down of commercial landings by Lobster Conservation Management Area (LCMA). Area 1 has historically 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 between 1981 and 2012. Yearly trends in Table 2 show that while landings have generally increased in LCMA 1, they have decreased in LCMA's 2, 4, and 6. Landings by LCMA are updated through each benchmark stock assessment.

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, this percentage has significantly changed. In 2000, only 15.6% of landings came from the SNE stock and by 2006, this declined to 7%. In 2017, approximately 2.07% 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. In 2017, New Hampshire reported 6,797 pounds of lobster harvested recreationally, representing 0.12% of total landings in the state. New York reported 1,972 pounds of lobster harvested recreationally, representing 1.4% of state landings. Massachusetts reported 212,112 pounds of lobster landed recreationally in 2016; however, a value for 2017 was not available at the time of this report. Connecticut and Rhode Island do not collect information on the number of pounds recreationally harvested but did issue 269 and 541 recreational lobster licenses, respectively.

3.0 Status of the Stock

The 2015 peer-reviewed stock assessment report indicated a mixed picture of the American lobster resource, with record high stock abundance throughout most of the GOM/GBK and record low abundance and recruitment in SNE (Table 3).

The assessment found the GOM/GBK stock is not overfished and not experiencing overfishing. GOM and GBK were previously assessed as separate stock units; however, due to evidence of seasonal migrations by egg-bearing females between the two stocks, the areas were combined into one biological unit. While model results show a dramatic overall increase in stock abundance in the GOM/GBK, population indicators show young-of-year estimates are trending downward. This indicates a potential decline in recruitment and landings in the coming years.

Conversely, the assessment found the SNE stock is severely depleted and in need of protection. Recruitment indices show the stock has continued to decline and is in recruitment failure. The inshore portion of the SNE stock is in particularly poor condition with surveys showing a

contraction of the population. This decline is expected to impact the offshore portion of the stock, which is dependent on recruitment from inshore.

Both the Technical Committee and the Peer Review Panel highlighted the need for management action in SNE. Specifically, the Panel recommended close monitoring of the stock status along with implementing measures to protect the remaining lobster resource in order to promote stock rebuilding.

The next stock assessment is scheduled for 2020.

4.0 Status of Management Measure

4.1 Implemented Regulations

Amendment 3 established regulations which require coastwide and area specific measures applicable to commercial fishing (Table 4). The coastwide requirements are summarized below.

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 (Area 1), Inshore Southern New England (Area 2), Offshore Waters (Area 3), Inshore Northern Mid-Atlantic (Area 4), Inshore Southern Mid-Atlantic (Area 5), New York and Connecticut State Waters (Area 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 lobster conservation management areas (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 Areas 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 Area 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 Area 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 Area 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 Area 2 – permits an eligibility period.

Addendum VII (November 2005)

Revises Area 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 Area 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 LCMA's 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 Areas 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

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.

4.2 On-Going Management Action

In response to signs of reduced settlement in the GOM/GBK, the Board initiated Draft Addendum XXVII in August 2017 to increase the resiliency of the stock. To this end, the Draft Addendum considers the standardization of management measures in the GOM/GBK stock. Draft Addendum XXVII continues to be developed by the PDT and it is expected that it will be available for consideration and approval for public comment in early 2019.

As a result of final action on Addendum XXVI, the Board established an Electronic Tracking Subcommittee and an Electronic Reporting Subcommittee. Membership on the two Committees is comprised of state representatives, technical committee members, federal partners, industry members, ACCSP staff, and ASMFC staff. The purpose of the Electronic Tracking Subcommittee is to design and implement a one-year tracking pilot program in the fishery. To-date, the Tracking Subcommittee has investigated existing tracking devices which may be applicable to the lobster fishery and has submitted a grant proposal for funding during the 2019 fishing year. The Electronic Reporting Subcommittee is working to guide the development of electronic harvester reporting in the lobster fishery. This includes identifying data needs for an electronic harvester reporting form, evaluating various electronic reporting software, and recommending simple and logical solutions. To-date, the Reporting Subcommittee has identified desired features in a lobster electronic reporting system and has explored several available software.

5.0 Ongoing 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 third year of reductions took place at the end of the 2017 fishing year and affect trap allocations in the 2018 fishery. Per Addendum XVIII, states with fishermen in Areas 2 and 3 are required to report on the degree of consolidation that has taken place. Ahead of the 2018 fishing year, 6,022 traps were retired in Area 2 and 7,115 traps were retired in Area 3. Trap reductions by jurisdiction can be found in Table 5. 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.

6.0 Fishery Monitoring

The provisions of Addendum XXVI did not impact fishery monitoring programs in 2017. As a result, language in Addendum X sets the standard for fishery monitoring. Addendum X requires states to conduct sufficient biological sampling to characterize commercial catch. Specifically, it requires states weigh sampling intensity by area and season to match the 3-year average of the area's seasonal commercial catch. This volume of sampling, however, well exceeds current state budgets for lobster biological sampling. Addendum X also requires states to conduct 100% mandatory dealer reporting and at least 10% reporting of active harvesters. Table 6 describes the level of reporting and sampling by each state.

Overviews of the states' port and sea sampling are below. Several states, including Rhode Island and Connecticut, did not complete sea sampling trips in 2017; both states noted staffing limitation and budget constraints.

- Maine: Completed 162 sea sampling trips, sampling 229,673 lobster and 35,981 traps. Maine suspended its port sampling program following the 2011 sampling year.
- New Hampshire: Sampled 9,197 lobsters during 19 sea sampling trips and 1,197 lobsters through 12 port sampling trips.
- Massachusetts: Conducted a total of 72 sea sampling trips , sampling 50,886 lobsters in LCMA's 1, 2, and OCC. 1 port sampling trip was conducted and 121 lobsters were measured.
- Rhode Island: Due to staffing and budget constraints, sea sampling was not conducted in 2017. With planned staffing changes for 2018-2019, Rhode Island hopes to reinstate sea sampling trips. Staff did conduct 9 port sampling trips that spanned catch from stat areas 526, 537, and 616.
- Connecticut: No sea sampling or port sampling trips were conducted in 2017.
- New York: Staff conducted 1 sea sampling trip which sampled 33 lobsters. Staff also conducted 2 market sampling trips, where 48 lobsters were sampled.
- New Jersey: Conducted 10 sea sampling trips and sampled 9,543 lobsters over 5,141 traps.
- Delaware: No sea sampling or port sampling trips were conducted in 2017.
- Maryland: No sea sampling or port sampling trips were conducted in 2017.
- Virginia: No sea sampling or port sampling trips were conducted in 2017.

7.0 Status of Surveys

Addendum X 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. *De minimis* states are not required to conduct biological sampling of their lobster fishery.

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 portion of the survey completed 122 tows and sampled 24,660 lobsters. Spring survey abundance indices decreased from 2016 but are still well above the time series mean. The fall survey completed 101 tows and sampled 22,562 lobsters. Fall survey abundance indices also decreased from 2016 (Figure 2).

Massachusetts: The Division of Marine Fisheries conducts spring and autumn bottom trawl surveys in the territorial waters of Massachusetts. Only data collected from the autumn portion of the inshore trawl survey is used to calculate lobster relative abundance indices. In the GOM, relative abundance indices have generally increased over the last decade. In contrast, relative

abundance indices in SNE remain low with the most recent values near or below the time series median (Figure 3).

Rhode Island: The RIDFW Trawl Survey program conducted seasonal surveys in the spring and fall, as well as a Monthly survey. In 2017, 44 trawls were conducted in both the spring and fall. 155 trawls were performed as part of the Monthly program. Spring 2017 mean CPUEs were 0.0 and 0.86 for legal and sub-legal lobsters, respectively. Fall 2017 CPUE were 0.11 for legal lobsters and 0.86 for sub-legal lobsters. The 2017 mean Monthly trawl CPUEs were 0.10 and 1.23 per tow for legal and sublegal lobsters, respectively. All abundances were low for the time series (Figure 4).

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. The spring 2017 lobster abundance index (geometric mean = 0.08 lobster/tow) was the lowest in the time series and similar to the 2013-2016 indices (0.44, 0.45, 0.31, 0.33, respectively). The fall 2016 and 2017 index values (0.02) ranked lowest in the time series, joining all indices since 2005 as collectively the lowest in the 33-year time series (Figure 5).

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, which is calculated as the sum of the mean number of lobsters per size class collected in each sampling area weighted by the stratum area, decreased from 2016 to 2017 for all three size classes (Figure 6).

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 in 2005. YOY survey indices continue to be below the series average for each region (Figure 7)

New Hampshire: New Hampshire Fish and Game conducted a portion of the coastwide American Lobster Settlement Index (ALSI). In 2017, a total of 29 juvenile lobsters were sampled from three sites, 20 of which were deemed older juveniles and six which were YOY. Figure 8 depicts the CPUE of lobsters for all NH sites combined, from 2008 through 2017. For each of these four indices, CPUE shows a general upward trend to a time series high in 2011, with sustained low levels from 2012 through 2016 and a slight uptick in 2017.

Massachusetts: Annual sampling for early benthic phase/juvenile (EBP) lobsters was conducted from August to September in 2015. Sampling was completed at 21 sites spanning 7 regions in

Massachusetts coastal waters. Data for all sites were used to generate annual density estimates of EBP lobster and other decapod crustaceans. In 2017, densities of YOY lobsters remained low compared to the time series average in all sampling locations except Cape Ann (Figure 9). In LCMA 1, there were no YOY lobsters found in the Boston sampling locations while in LCMA 2 there were no YOY lobsters found in Buzzards Bay or Vineyard Sound sampling locations.

Rhode Island: For 2017, the YOY Settlement Survey was conducted at a total of six fixed stations with twelve randomly selected 0.5-meter quadrats sampled at each survey station. Average site abundance of lobster at suction sampling sites has generally declined since the mid-1990's (Figure 10). The 2017 YOY settlement survey index was 0.03 YOY lobster/m².

Connecticut: The CT DEEP Larval Lobster Survey in western Long Island Sound was discontinued in 2013. Alternative monitoring data are available for the eastern Sound from the Millstone Power Station entrainment estimates of all stages of lobster larvae. Both programs show a decline in abundance following the 1999 die-off (Figure 11).

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. Overall, there were slight decreases in the number of sub-legal and legal lobsters caught in 2017, compared to the previous year (Figure 12).

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 2017. Catch per unit effort (stratified mean catch per trap haul) from 2009 through 2017 is presented in Figure 13. The highest catch values of the time series were recorded in 2015, 2016, and 2017.

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. Relative abundance of sub-legal (< 83 mm CL) and legal-sized (\geq 83 mm CL) lobsters for Area 514 (part of LCMA 1) is shown in Figure 14 as the stratified mean CPUE. The mean CPUE of sub-legal lobsters in 2017 was slightly lower than recent years and was close to the time series average.

The stratified mean catch per trap of legal-sized lobsters in 2017 was above the time series average.

Figures 15 and 16 show the time series of relative abundance (stratified mean CPUE) for sub-legal (<86 mm CL) and legal-sized (≥ 86 mm CL) lobsters in the southern MA region (Area 538 and northern Area 537; part of LCMA 2). The average catch of sub-legal lobsters was higher than the catch of legal-sized lobsters, and generally declined from 2006 through 2010 (the original time series). The spatial extent of the survey area was expanded in 2011 to include deeper waters outside Buzzards Bay, where thermal conditions are more tolerable. This expansion in survey area necessitates that the data from 2011 onwards be treated as a new survey index. In 2017, mean CPUEs of the sublegal and legal-sized lobsters in the original and the expanded survey area were below the time series average (Figures 15, 16).

Rhode Island: In 2017, the Ventless Trap Survey was conducted during the months of June-August over 18 sampling sites. A total of 3,482 lobsters were collected from 830 traps. All sampling was conducted in LCMA 2, NMFS Statistical Area 539. The CPUE of sub-legal lobsters decreased from 2016 to 2017, while the CPUE of legal lobsters remained steady. The stratified means catch-per-ventless trap on a six-pot trawl (three ventless, three vented) were 0.27 and 3.86 per ventless trap for legal and sublegal lobsters, respectively (Figure 17). Note, this calculation differs from previous years' reports, with the index excluding catches of vented pots to better reflect how VTS data is used in the lobster stock assessment.

8.0 State Compliance

States are currently in compliance with all required biological management measures under Amendment 3 and Addendum I-XXIV; however, the PRT notes that Connecticut and Rhode Island did not conduct any sea sampling, as specified in Addendum X. Both states noted staffing and budget constraints as contributors to the lack of sampling.

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:

- Maine DMR adopted regulations to expand the Hancock County Trawl Limit area in Zone B by expanding the western boundary of the area to the 6-mile line. In this area, it is unlawful to have more than 3 lobster traps on any trawl.
- Based on a referendum of the Zone B lobster license holders, Maine DMR adopted regulations to change the Zone B 5:1 exit ratio using the currency of lobster licenses not renewed to a 3:1 exit ratio using the currency of lobster licenses not renewed.

- Based on a referendum of the Zone C lobster license holders, Maine DMR adopted regulations to establish Zone C as a limited entry zone with an exit ratio of 1:1 using the currency of lobster licenses not renewed.
- Based on a referendum of the Zone E lobster license holders, DMR adopted regulations to change the Zone E 5:1 exit ratio currency from the number of traps tags associated with licenses not renewed to the number of licenses not renewed.
- For consistency with changes in statute, DMR adopted regulations to require that limited entry zones that opt to use trap tags retired in their exit ratio calculation, use the historic high of trap tags purchased, up to the current zone limit.
- DMR adopted regulations for consistency with statutory changes to create a separate waiting list for existing lobster license holders wishing to change their declared lobster zone (a transfer list) to allow transfers “one for one”, with no net increase from transfers in any zone. DMR will authorize any such “swaps” annually until there are no matches remaining.
- DMR adopted regulations to clarify that if an individual completes the apprentice program in multiple zones, the minimum of the 24-month requirement is met 24 months from the date the individual logs their first day in the apprenticeship program.
- DMR adopted regulations making technical corrections to Chapter 25. It moved existing lobster trawl limits that are currently in Chapter 55 into Chapter 25, so that all lobster trawl limits are located in the same chapter.
- DMR struck expired language regarding second zone tags in Zones B and C, and F and G, now that a statewide second zone tag system is in place.
- DMR adopted regulations to create an exemption that would allow a lobster and crab fishing license holder to take and possess up to 5 gallons of Jonah crab claws detached at sea.
- DMR adopted regulations to make clerical corrections to the Lobster Zone line boundaries, amended the regulation for greater clarity, and added positions where Lobster Zone lines intersect with the Lobster Management Area 3 line.
- Statutes were amended to change the legal hauling hours to allow for a 4 am start time (instead of ½ hour before sunrise) for the month of October statewide, in both state and federal waters.
- Statutes were amended to specify the thickness of hairless hide bait that may be used by lobster fishermen, as long as the total thickness of fat and animal hide does not exceed 1-1/4 inches.
- Statutes were amended to remove the existing 10-year time limit for military service after which an individual is eligible to obtain a lobster license held and used prior to entering the military. A person who, upon appeal, is issued a lobster license shall submit landings data for the following 2 license years. During the second licensing year following the successful appeal, the person shall provide landings reports indicating a minimum of 50 landings days and sales of lobster to a lobster dealer. If a person fails to meet the requirements, the Commissioner shall revoke the license.
- Statutes were amended to improve enforcement of the lobster fishery as follows:

- Expanding offenses that are cause for license suspension, or in some cases, revocation. The suspension may be imposed following a conviction through the court, or through the administrative suspension process.
 - Theft - lobster related
 - Receiving stolen goods - lobster related
 - Obstructing a Marine Patrol Officer
 - Assaulting, criminal threatening, terrorizing, or stalking a Marine Patrol Officer or a family member
 - Hindering apprehension or prosecution
 - Obstructing criminal prosecution
 - Arson - lobster related (mandatory suspension)
 - Aggravated criminal mischief - lobster related (mandatory suspension)
- Trap molesting is now a criminal offense (rather than civil).
- Untagged gear of less than 25 traps remains a civil offense and untagged gear in excess of 25 traps is now a criminal offense.
- Specifying the following minimum and maximum license suspension lengths:

Violation	First offense – Suspension length	Second offense – Suspension length	Third offense– Suspension length
Trap molesting (changed from civil to criminal offense)	Minimum 2 years Maximum 6 years	Minimum 2 years Maximum 10 years	Permanent revocation
Over the trap limit (remains a criminal offense)	Minimum 3 years Maximum 10 years	Permanent revocation	(NA – license already permanently revoked)
Intentionally fishing sunken trawls (remains a criminal offense)	Minimum 3 years Maximum 10 years	Permanent revocation	(NA – license already permanently revoked)
Artificially removing the eggs from a female lobster (remains a criminal offense)	Minimum 4 years; potential for permanent revocation	Minimum 4 years; potential for permanent revocation	Minimum 4 years; potential for permanent revocation
Arson/destruction lobster boat	Permanent revocation	(NA – license already permanently revoked)	(NA – license already permanently revoked)

- For those violations classified as criminal, Marine Patrol may obtain a warrant from a judge to authorize the use of a tracker (to record the speed and location of a vessel) if the judge determines that there is probable cause to suspect that a violation is being committed.
- Following a license suspension for one of the violations listed in the table, the Commissioner is also authorized to require the license holder reentering the fishery to utilize a Vessel Monitoring System (VMS) for a length of time equal to that of their

license suspension. Costs associated with the equipment are borne by the license holder.

- In addition, a license holder may be limited to only 300 traps when they return to fishing (when the license suspension is over) and build back up to the Zone trap limit by up to 100 traps per year.

Massachusetts

- MA instituted a change in regulations to prohibit placement of non-trap structures attractive to lobsters CMR 6.02(3)(e).

New York

- New York adopted Emergency Rules on May 16, 2018 to repeal the most restrictive rule for closed seasons. It is expected that the final rule will be adopted before September 8, 2018 to permanently repeal the closed season most restrictive rule before the start of the LMA 6 closed season. The ASMFC American Lobster Board repealed the most restrictive rule for closed seasons at the 2017 annual Board meeting.

11.0 Enforcement Concerns

Maine:

- In September of 2017, a fisherman was charged with exceeding the trap limit. There were also charges for fishing untagged gear and violation of trawl limits. These charges were brought as a result of a largescale Marine Patrol investigation. The fisherman was found at fault at an administrative hearing and at a follow-up length of suspension hearing with the Commissioner his license was suspended for 3yrs. This represents the statutory minimum for “over the limit” cases.

Rhode Island

- A remaining difficulty enforcement faces with lobster regulations is determining whether lobsters caught truly came from a lobster trap with an associated lobster trap allocation (LTA), or a trap targeting a different fishery (e.g. Rock crab, Black sea bass) without an LTA but operated by an individual or company with LTAs. In 2016, RIDEM DMF proposed that rock crab (*Cancer irroratus*) be included under the new management to help enforce lobster harvesting by removing gear that could catch lobsters outside the LTA program, while also reducing the number of lines in the water for marine mammal protection. Given public comment, industry did not support this because much of the rock crab fishery does not hold a LTA and could not prove history records for qualification.

New York

- There were minor enforcement issues in 2017, such as a few cases of undersize vents and non-functional emergency escape panels. Some people bought old used gear that still had the 1 15/16 vents in them. A few traps were being fished without the current allocation tags.

12.0 Research Recommendations

The following research recommendations are from the 2015 Stock Assessment and were compiled by the Lobster TC and Stock Assessment Subcommittee.

- **Ventless Trap Survey**- Calibration work is needed to determine how catch in ventless trap surveys relates to catch in the bottom trawl surveys. It is likely that at low densities, when trawl survey indices have dropped to near zero, ventless trap surveys will still catch lobsters due to the attractive nature of the gear and the ability to fish the gear over all habitat types. Conversely, it is possible that trawl surveys may be able to detect very high levels of lobster abundance, if trap saturation limits the capacity of the ventless traps. 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 catchability might change with changes in lobster density.
- **Maturation and Growth** - Increases in water temperatures over the past several decades have likely resulted in changes to size at maturity and growth patterns. Maturity data currently used are more than 20 years old. Changes in size at maturity will subsequently affect growth, since female molting frequency decreases after reaching sexual maturity. It is critical to collect updated information on maturity and growth in order to appropriately assign molt probabilities to lobsters.
- **Stock Connectivity** - There is need for a comprehensive large scale tagging study to examine stock connectivity between the GOM and GBK. Historical tagging studies demonstrate movement from the inshore GOM to locations east of Cape Cod in the inshore portions of GBK, and from inshore areas east of Cape Cod to inshore GOM. What is lacking is a tagging study of lobsters in the fall/winter on GBK proper, prior to seasonal migrations which occur in the spring. This information would be extremely valuable to help complement other data used to justify the combination of the GOM and GBK stock and to confirm the connectivity of the GOM and GBK.
- **Temperature** – Given the importance of temperature in the life history of lobster, techniques should be developed to incorporate environmental data into population modeling.
- **Post-Larval Settlement** – There is a need to examine post-larval settlement dynamics in relation to the movement and re-distribution of spawning stock. Habitat suitability models for spawning stock and settling post-larvae should be developed.
- **Natural Mortality** – Methods should be explored to determine age or length-varying natural mortality, as well as looking at more rigorous ways of determining time-varying natural mortality for lobster. These may be driven by climactic shifts and changing predator fields.
- **Shell Disease** - With the high prevalence of shell disease in the SNE stock, particularly in ovigerous females, some exploration of the potential sub-lethal effects of disease should be examined. These effects could include negative impacts to larval quality, fecundity issues in females who need to re-direct physiological resources to dealing with the disease, and male sperm quality

13.0 Plan Review Team Recommendations

The following are recommendations the Plan Review Team would like to raise to the Board:

- The PRT recommends the Board approve the *de minimis* requests of DE, MD, and VA.
- Given expected changes in bait availability, the PRT recommends the Board consider bait sources, protocols to evaluate potential bio-hazards, and appropriateness of different species as bait. This could lead to identifying common standards across jurisdictions.
- 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 PRT recommends the Board investigate the best way to quantify effort in the lobster fishery. Through Amendment 3 and subsequent addenda, the Board has largely managed effort in the lobster fishery through trap allocations. However, the effectiveness of trap allocations to reduce effort is confounded by their ambiguous relationship to trap hauls and the expansion of the Jonah crab fishery. Monitoring the true level of effort in the lobster fishery (whether than be through the number of permits, trap allocations, or trap hauls) will provide the Board with much needed information regarding fishery trends, particularly as stock conditions change in the GOM/GBK and SNE.
- The PRT recommends research is conducted on lobster growth, maturity, and connectivity. Given the increase in water temperature over the last several decades, the TC believes it is likely that there have been changes to size at maturity and growth patterns which are not captured in the current data.
- The PRT recommends continued research to understand dynamics between settlement and larval dynamics.
- The PRT recommends coastwide consideration be given to the transfer of tags between traps to eliminate the issuance of exchange tags (similar to current Maine regulations).

14.0 Tables

Table 1. Landings (in pounds) of American Lobster by the states of Maine through Virginia.
Source: ACCSP Data Warehouse for 1981-2016 landings; state compliance reports for 2017 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	C	C	C	71,312,769
1997	47,023,271	1,414,133	15,010,532	5,798,529	3,468,051	8,878,395	858,426	C	C	C	82,488,433
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	C	C	88,939,919
2000	57,215,406	1,709,746	14,988,031	6,907,504	1,393,565	2,883,468	891,183	C	C	C	86,052,553
2001	48,617,693	2,027,725	11,976,487	4,452,358	1,329,707	2,052,741	579,753	C	C	C	71,096,271
2002	63,625,745	2,029,887	13,437,109	3,835,050	1,067,121	1,440,483	264,425	C	C	C	85,728,716
2003	54,970,948	1,958,817	11,321,324	3,561,391	C	946,449	209,956	C	22,778	C	73,680,057
2004	71,574,344	2,097,396	11,675,852	3,059,319	646,994	996,109	370,536	13,322	14,931	27,039	90,475,842
2005	68,729,623	C	11,291,145	3,174,852	713,901	1,154,470	369,003	C	39,173	C	88,056,471
2006	75,419,802	2,612,389	12,077,140	C	806,135	1,252,146	470,878	C	26,349	C	96,452,365
2007	63,987,073	2,468,811	10,046,120	2,299,744	568,696	911,761	334,097	C	C	C	80,676,223
2008	69,908,847	2,568,088	10,606,534	2,782,000	427,168	712,075	304,479	C	C	C	87,364,845
2009	81,124,201	2,986,981	11,789,536	2,842,088	412,468	731,811	C	C	30,988	C	100,306,327
2010	96,244,299	3,648,004	12,772,159	2,928,688	441,622	813,513	C	C	29,989	C	116,903,774
2011	104,953,822	3,919,195	13,385,393	2,754,067	198,928	344,232	C	C	41,077	C	125,627,299
2012	127,461,553	4,229,227	14,486,344	2,706,384	247,857	550,441	919,351	C	C	C	150,691,644
2013	128,016,485	3,817,707	15,158,509	2,155,762	127,420	496,535	660,367	C	C	C	150,528,929
2014	124,925,606	4,374,656	15,322,852	2,412,875	127,409	222,843	526,368	C	C	C	148,007,452
2015	122,667,346	4,721,826	16,450,414	2,315,708	205,099	147,414	445,060	C	C	C	147,014,519
2016	132,555,453	5,782,098	17,785,502	2,260,335	254,346	218,846	349,880	C	C	C	159,256,657
2017	111,743,827	5,633,939	16,896,409	2,058,227	99,383	138,946	419,402	C	C	C	137,044,941

Table 2. Estimated lobster landings (in pounds) by lobster conservation management area (LCMA)*. Source: ASMFC Lobster Data Warehouse. This table is only updated in years when stock assessment reports are conducted.

Coastwide Estimated Lobster Landings (lbs) by Lobster Conservation Management Area (LCMA)*								
Year	LCMA 1	LCMA 2	LCMA 3	LCMA 4	LCMA 5	LCMA 6	LCMA OCC	Grand Total
1981	32,369,320	527,284	4,321,500	441,478	115,653	1,220,159	134,327	39,129,721
1982	32,123,750	1,656,479	4,961,680	622,674	99,093	1,359,058	163,105	40,985,839
1983	32,826,685	2,958,366	5,645,179	633,254	71,804	2,428,633	198,448	44,762,369
1984	29,862,411	2,978,985	6,409,741	795,180	135,652	2,704,070	208,832	43,094,871
1985	31,590,759	2,992,330	5,853,851	964,043	170,998	2,273,337	261,929	44,107,247
1986	30,080,507	3,081,903	5,829,275	1,084,282	125,969	2,362,128	298,747	42,862,811
1987	30,682,754	3,219,900	5,357,273	1,473,841	98,486	2,378,765	276,250	43,487,269
1988	32,362,492	3,259,336	5,132,943	1,666,439	85,142	3,195,208	295,985	45,997,545
1989	36,800,166	4,175,114	5,450,786	2,232,935	106,126	3,735,250	352,155	52,852,532
1990	41,720,481	4,374,062	8,783,629	2,431,198	237,410	4,250,654	581,447	62,378,881
1991	43,648,773	4,140,145	8,537,053	2,096,138	115,020	4,393,986	740,267	63,671,382
1992	39,055,380	3,795,367	7,124,248	1,448,866	77,854	4,362,551	738,026	56,602,292
1993	40,962,969	3,772,494	6,773,992	1,597,447	89,495	3,968,663	938,486	58,103,546
1994	51,597,880	5,602,507	5,684,252	554,367	26,013	5,738,398	848,181	70,051,598
1995	49,771,715	4,960,453	5,008,551	962,077	45,054	8,564,325	1,000,609	70,312,784
1996	47,992,628	4,880,328	4,896,782	978,376	52,758	11,705,439	852,532	71,358,843
1997	58,016,197	5,324,775	5,549,295	1,162,862	36,623	11,650,701	849,126	82,589,579
1998	56,187,841	5,273,463	5,043,939	1,534,067	41,963	10,575,143	797,019	79,453,435
1999	65,375,535	6,938,658	6,166,601	1,346,509	77,621	8,331,142	739,904	88,975,970
2000	69,265,611	5,651,160	5,436,618	1,123,486	53,364	3,802,880	765,801	86,098,920
2001	57,531,942	3,862,054	5,525,209	762,408	55,537	3,013,551	611,242	71,361,943
2002	73,607,600	3,445,004	5,483,983	442,425	14,838	2,230,869	786,137	86,010,856
2003	63,005,041	1,110,534	6,978,808	423,583	17,394	1,448,011	804,355	73,787,725
2004	80,448,651	1,184,942	6,722,671	480,203	93,270	1,534,130	993,689	91,457,556
2005	76,240,627	1,464,433	7,442,771	457,275	54,181	1,673,396	966,787	88,299,470
2006	80,846,400	1,853,505	7,588,539	516,130	59,928	1,840,308	1,048,051	93,752,862
2007	70,862,089	1,430,836	6,375,646	617,978	56,866	1,263,648	1,132,991	81,740,055
2008	78,914,865	1,168,921	6,124,979	440,108	322,916	920,951	1,127,422	89,020,163
2009	91,133,844	1,051,241	6,960,119	488,792	308,212	896,594	1,256,201	102,095,002
2010	106,458,701	1,022,528	7,955,472	522,037	184,409	966,505	1,209,482	118,319,134
2011	116,042,515	730,889	7,890,340	488,977	148,587	306,079	1,244,299	126,851,685
2012	138,762,843	627,051	8,111,396	782,684	154,455	286,215	1,223,279	149,947,922
Grand Total	1,886,148,973	98,515,048	201,127,121	31,572,119	3,332,690	115,380,746	23,445,109	2,359,521,806

*Landings data are not collected by LCMA in all states. To separate landings by LCMA, NMFS statistical areas are placed into a single LCMA. For a complete description of how estimates are completed contact Megan Ware, at mware@asmfc.org

Table 3. Threshold reference points with stock status variables for lobsters in each stock area. (Source: 2015 Benchmark Stock Assessment).

Variable	GOM	GBK	GOM/GBK	SNE
Effective Exploitation				
Effective exploitation threshold	0.54	1.83	0.5	0.41
Recent effective exploitation (2011-2013)	0.48	1.54	0.48	0.27
Effective exploitation below threshold?	YES	YES	YES	YES
Reference Abundance (millions)				
Abundance threshold	52	0.8	66	24
Recent abundance (2011-2013)	247	1.57	248	10
Abundance above threshold?	YES	YES	YES	NO

Table 4. 2017 LCMA specific management measures

Mgmt Measure	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	OCC
Min Gauge Size	3 1/4"	3 3/8"	3 17/32"	3 3/8"	3 3/8"	3 3/8"	3 3/8"
Vent Rect.	1 15/16 x 5 3/4"	2 x 5 3/4"	2 1/16 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"
Vent Cir.	2 7/16"	2 5/8"	2 11/16"	2 5/8"	2 5/8"	2 5/8"	2 5/8"
V-notch requirement	Mandatory for all eggers	Mandatory for all legal size eggers	Mandatory for all eggers above 42°30'	Mandatory for all eggers in federal waters. No v-notching in state waters.	Mandatory for all eggers	None	None
V-Notch 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 5: Trap allocation reductions as required by Addendum XVIII for LCMA 2 and 3 fishermen. This table only represents trap allocation reductions reported ahead of the 2018 fishing year and does not represent aggregate trap reductions over multiple years. Traps can also be retired due to the 10% conservation tax on trap transfers. Sources of the trap allocations come from state compliance reports and GARFO 2018 trap allocations published for the trap transfer program.

	Jurisdiction	# of Trap Allocated (For 2018 Fishing Year)	# of Traps Retired (from 2017 to 2018 Fishing Year)	Comments on Trap Transfers
LCMA 2	MA	32,116	1,629	73 traps lost to 10% transfer tax; 88 traps added due to federal transfers
	RI	79,570	3,689	1,147 traps transferred
	CT	3,742	193	
	NOAA (ME, NH, NY, NJ)	2,834	511	
LCMA 3	NOAA	121,795	7,115	

Table 6. 2017 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	✓	✓	✓	✓	✓	✓	✓ (w/ ME)
MA	✓	✓	✓	✓	✓	✓	✓
RI	✓	✓	None in 2017	✓	✓	✓	✓
CT	✓	✓	None in 2017			✓	✓
NY	✓	✓	✓	✓			✓ (w/ CT)
NJ	✓	✓	✓				✓
DE*	✓	✓	None in 2017				✓ (no lobsters encountered)
MD*	✓	✓	None in 2017				
VA*	✓	✓	None in 2017				

15.0 Figures

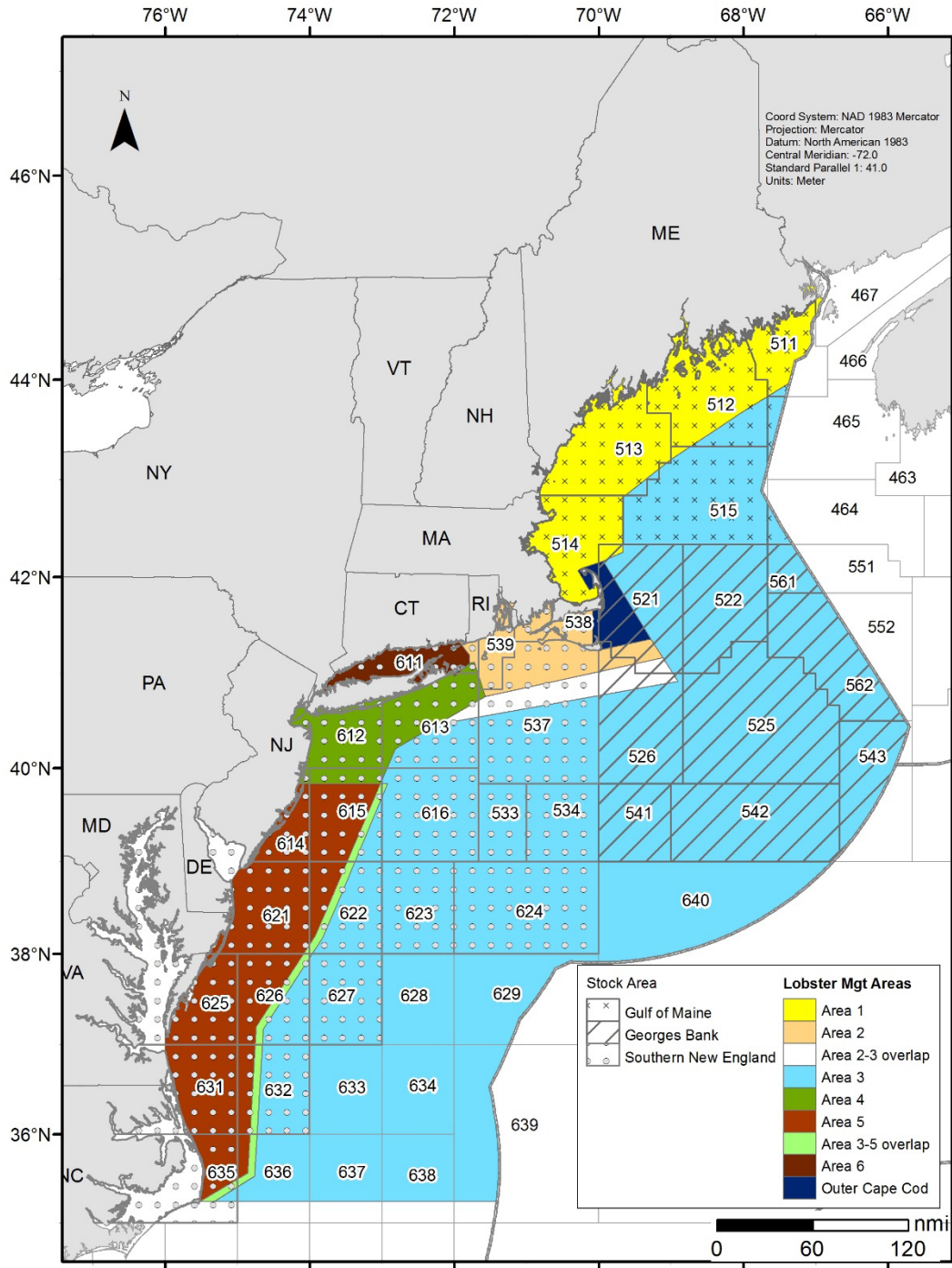


Figure 1: Lobster Conservation Management Areas (LCMAs) and stock boundaries for American lobster.

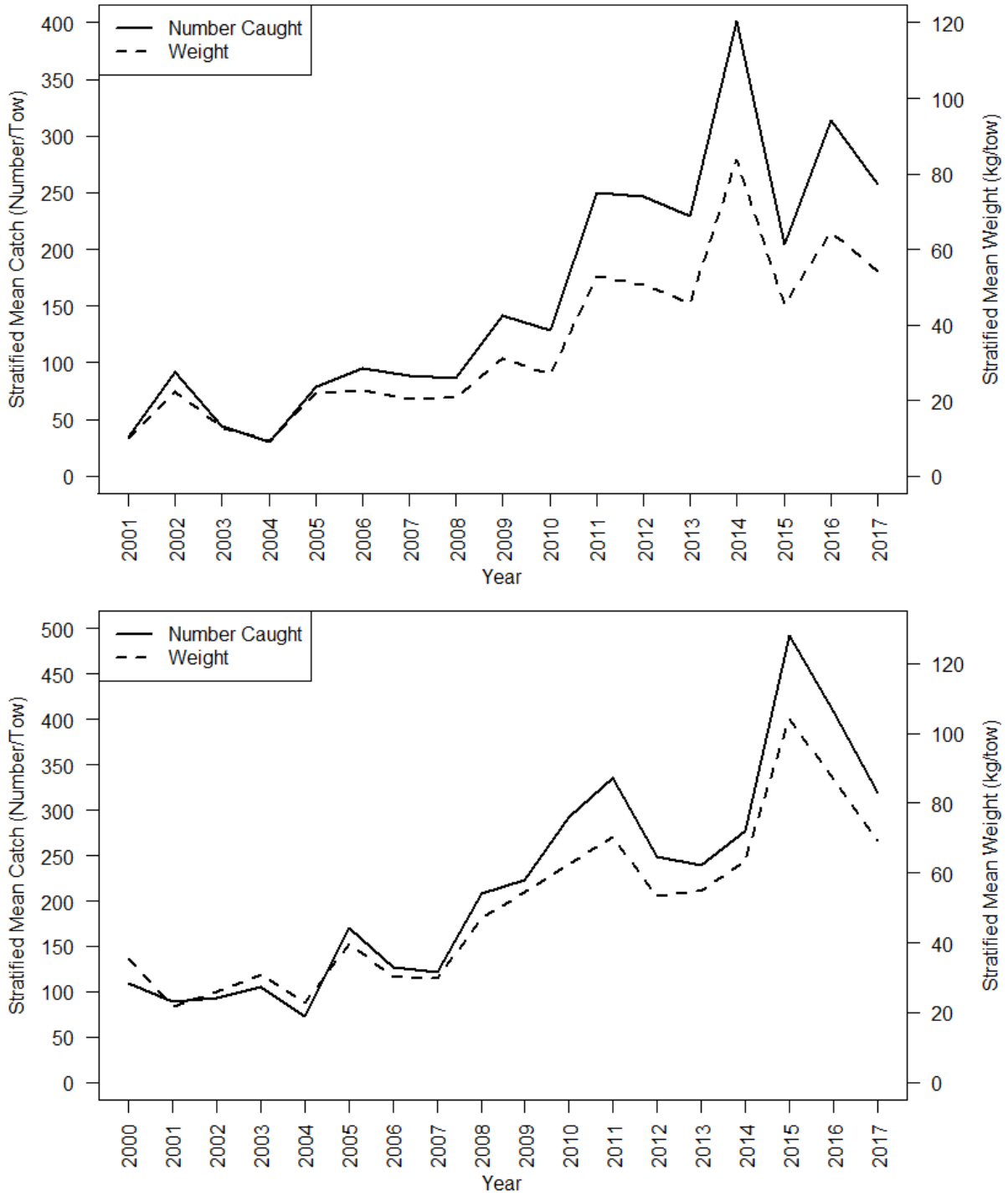


Figure 2: Maine-New Hampshire survey stratified mean abundance indices for lobster, 2001-2017. Results of the spring survey are on the top and results from the fall survey are on the bottom.

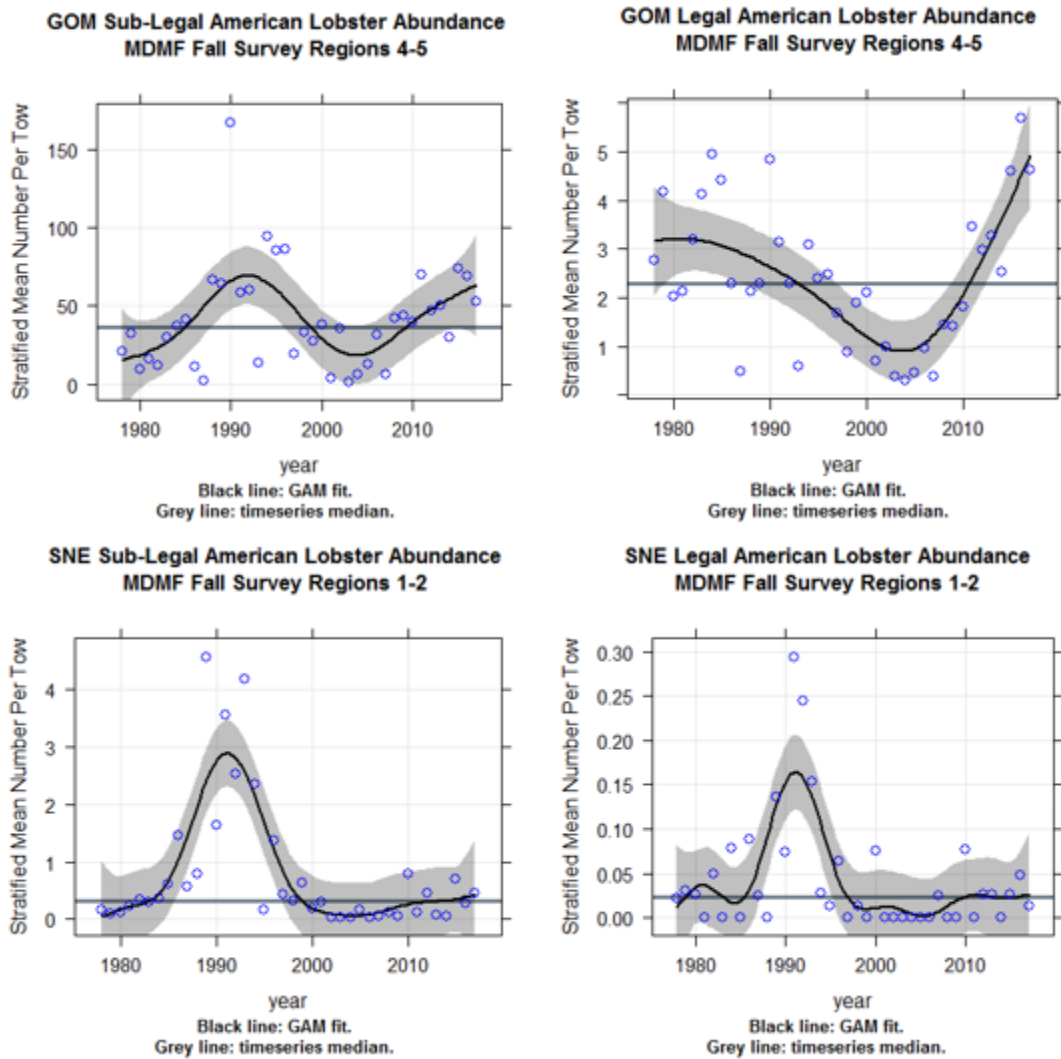


Figure 3: MADMF Fall Trawl Survey sub-legal and legal indices from 1978-2017. The top charts are from Gulf of Maine and the bottom charts are from Southern New England.

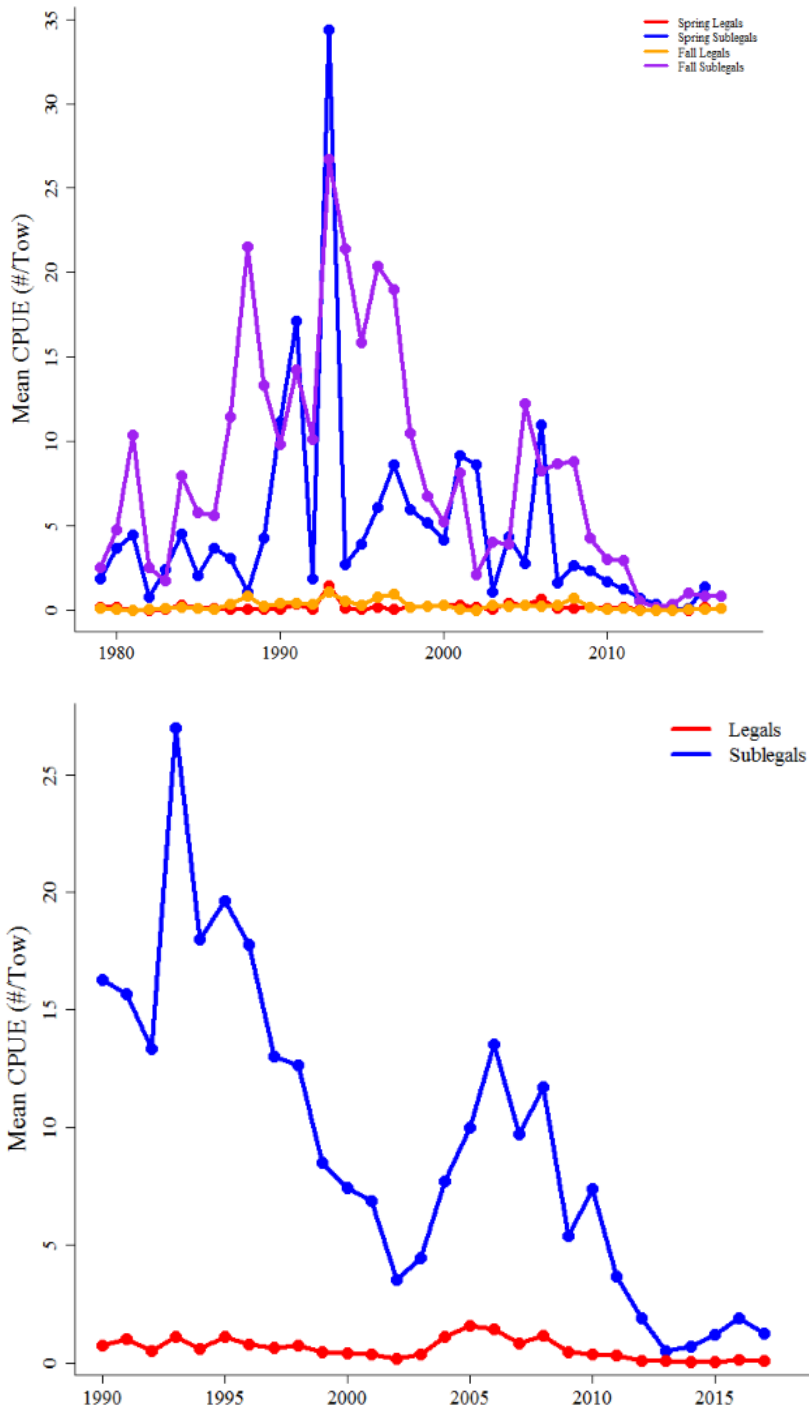


Figure 4: RIDFW Seasonal (Spring and Fall) Trawl lobster abundances (top) and Monthly Trawl lobster abundances (bottom). CPUE is expressed as the annual mean number per tow for sub-legal (<85.725mm CL) and legal sized (>=85.725mm CL) lobsters.

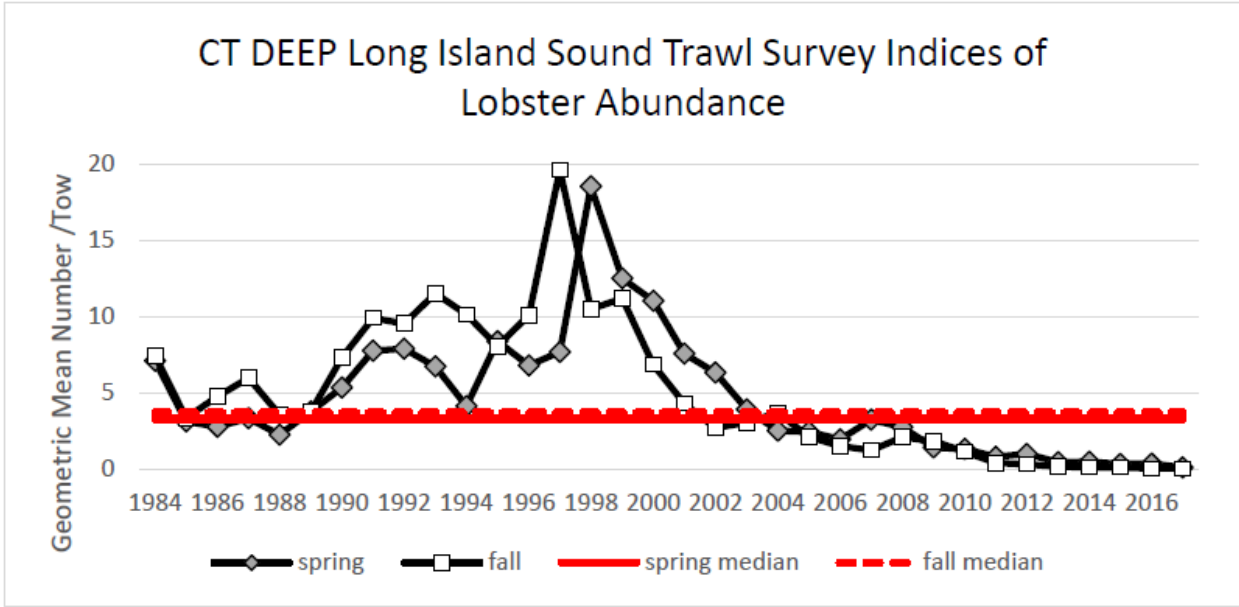


Figure 5: Results of the Long Island Sound Trawl Survey during spring (April-June) and fall (September-October) within NMFS statistical area 611.

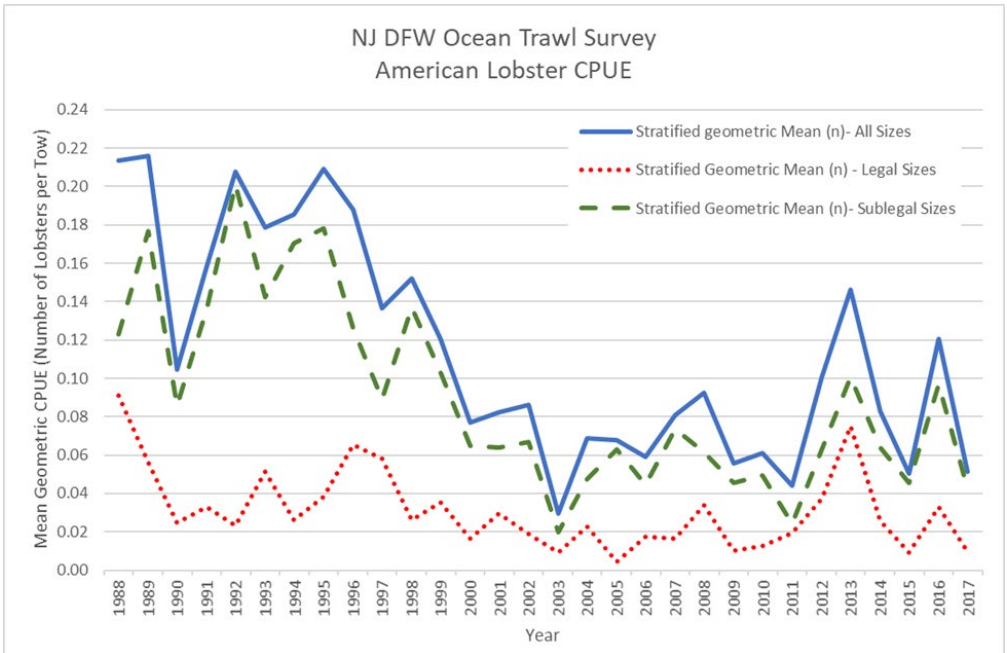


Figure 6: Stratified mean CPUE of all lobsters collected aboard the NJDFW Ocean Trawl Survey. The survey stratifies sampling in three depth gradients, inshore (18'-30'), mid-shore (30'-60'), offshore (60'-90'). The mean CPUE was calculated as the sum of the mean number of lobsters per size class collected in each sampling area weighted by the stratum area.

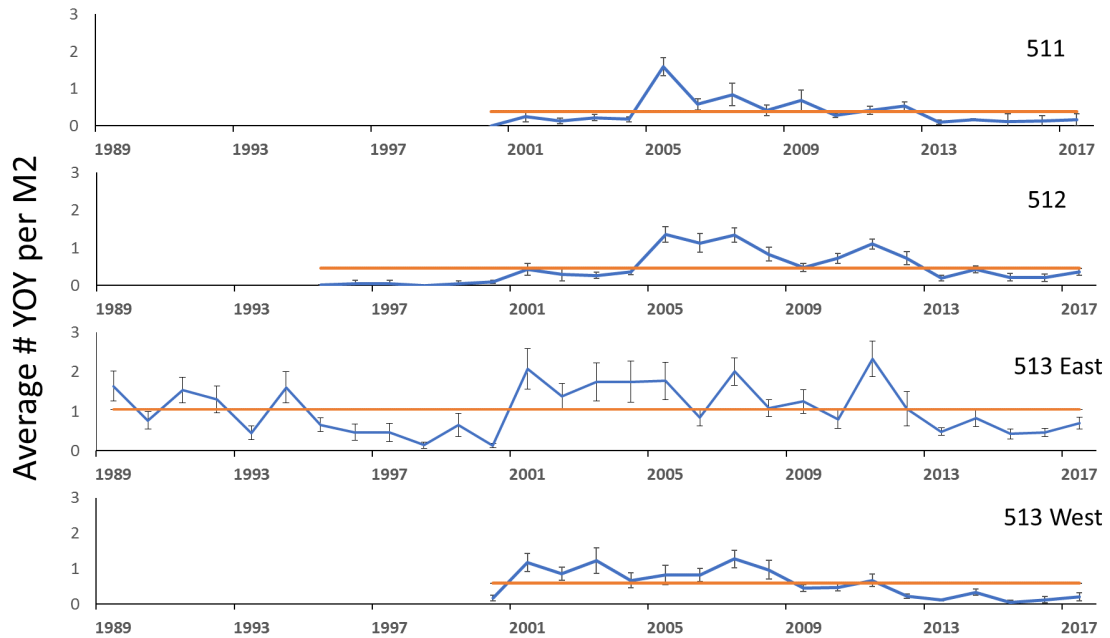
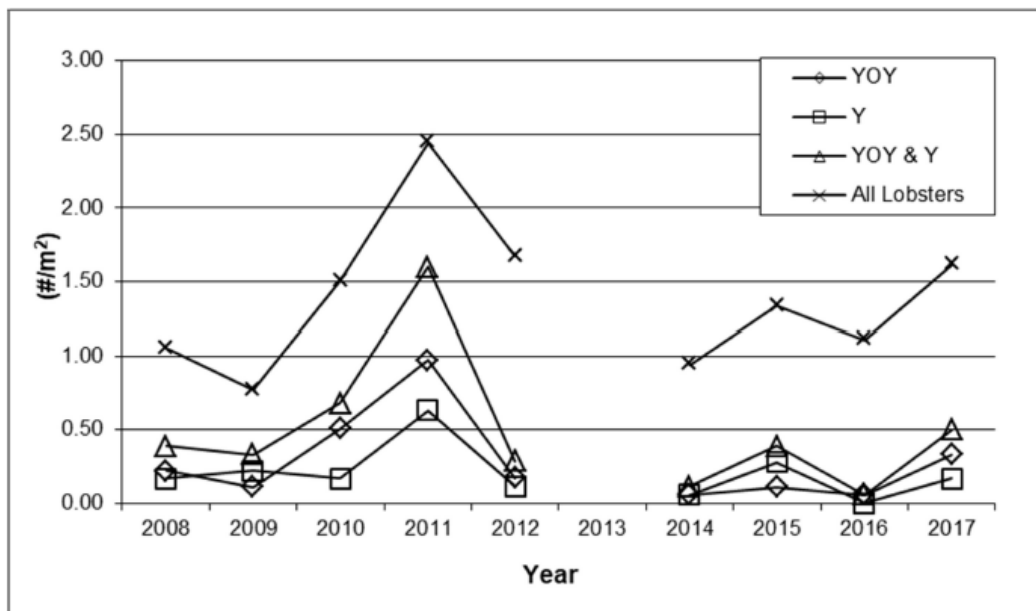


Figure 7: Settlement survey index (blue line) for each statistical area in Maine (1989-2017). The series average for each region is represented by the red line.



* No samples collected in 2013

Figure 8: 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 2017. There were no settlement survey samples collected in NH in 2013.

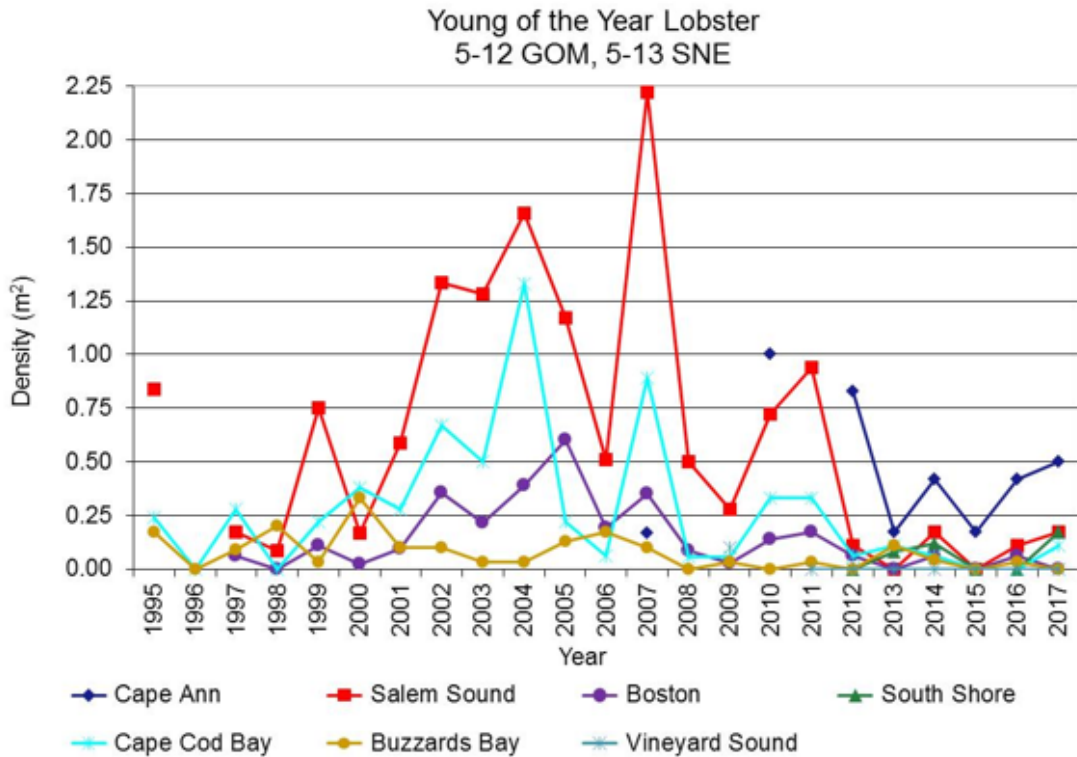


Figure 9: Young-of-year lobster density in seven Massachusetts regions; LCMA 1 – Cape Ann, Salem Sound, Boston, South Shore, Cape Cod Bay, LCMA 2 - Buzzards Bay, Vineyard Sound.

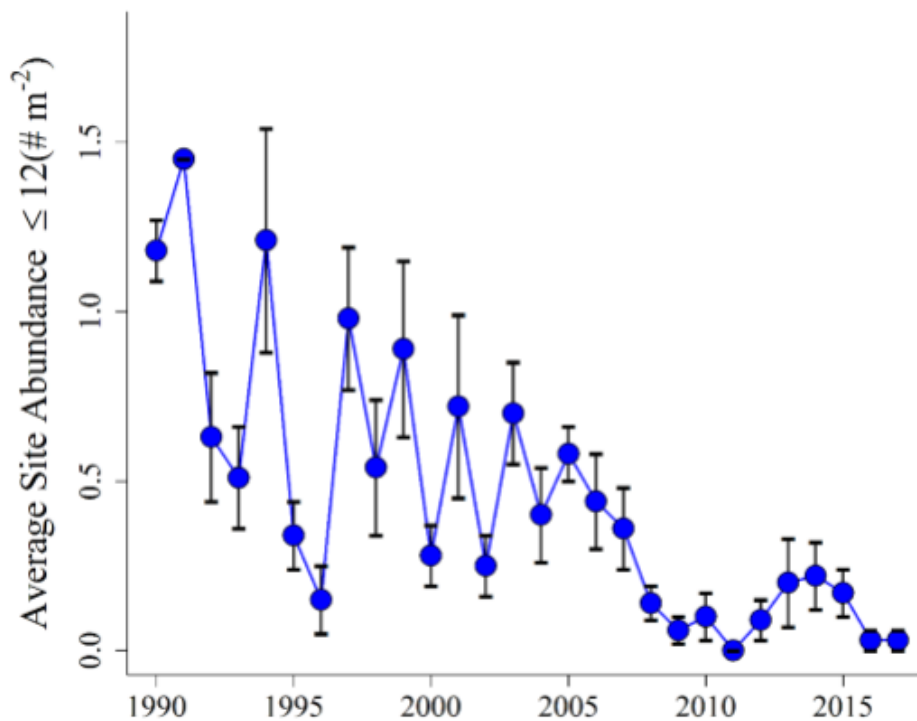


Figure 10: Average abundance of American lobster in Rhode Island suction sampling sites. Abundances are presented for lobsters 12mm and smaller, with deviations presented.

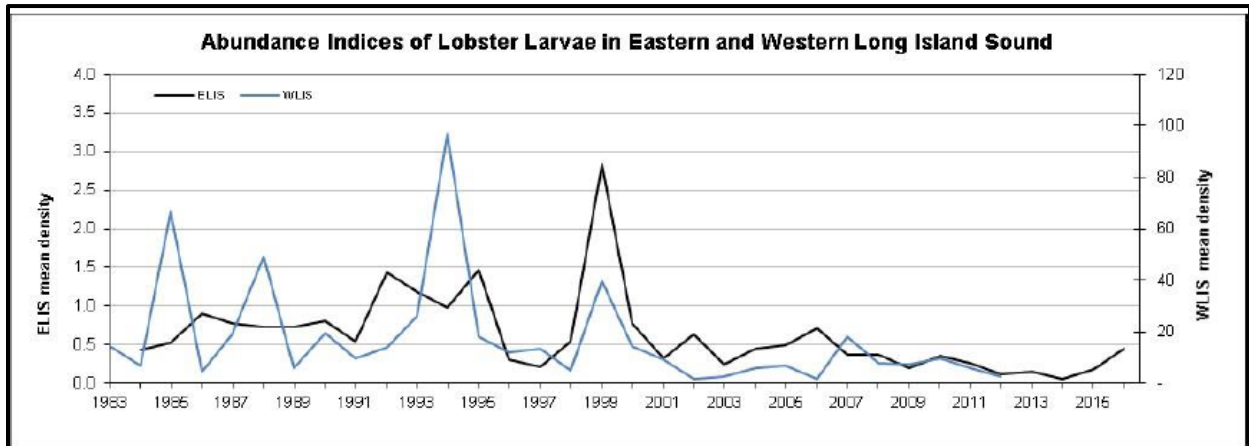
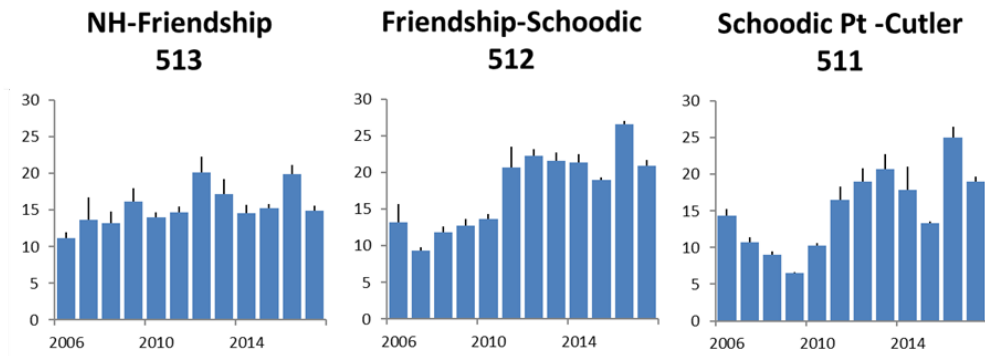


Figure 11: Abundance indices of lobster larvae from the Connecticut DEEP Larval Lobster Survey in western Long Island Sound and from the Millstone Power Station entrainment estimates in eastern Long Island Sound. The Connecticut DEEP survey was discontinued in 2013.

A. Sublegal Stratified Mean CPT



B. Legal Stratified Mean CPT

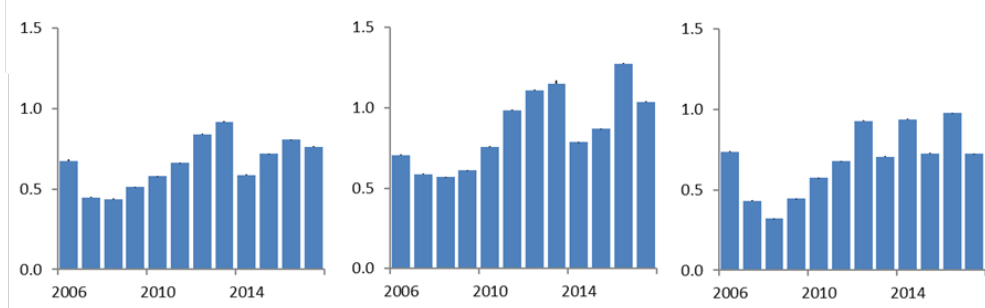


Figure 12: CPUE stratified mean for both sublegal and legal lobsters from Maine’s Ventless Trap survey, 2006-2017, by statistical area. Only ventless traps were included in the analysis.

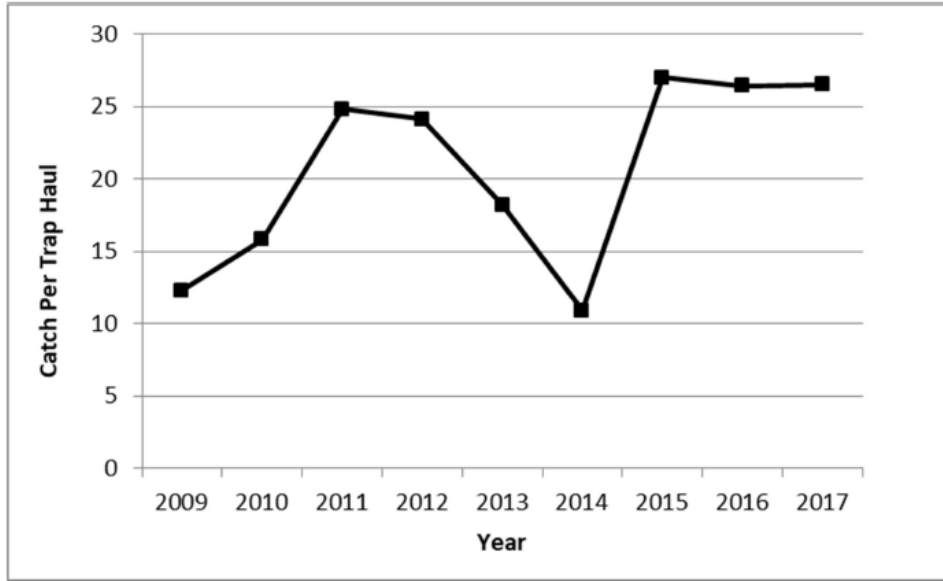


Figure 13: Stratified mean catch per trap haul, for all lobsters captured during the coast-wide random stratified Ventless Trap Survey in New Hampshire state waters from 2009 through 2017.

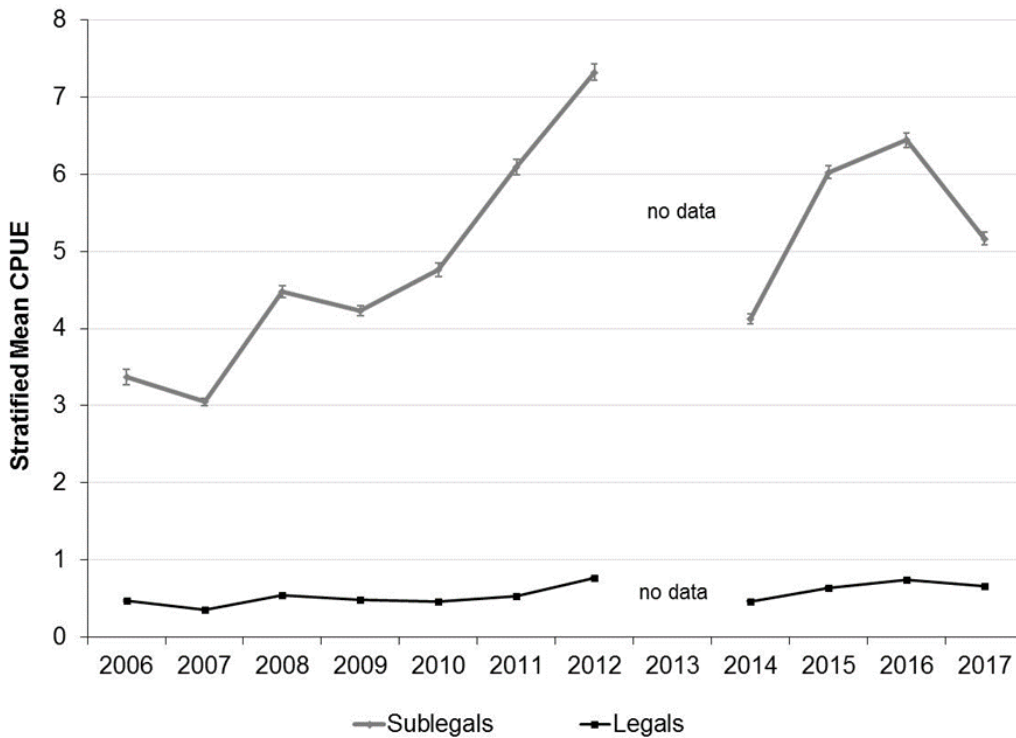


Figure 14: Stratified mean catch per trap haul (\pm S.E.) of sublegal (< 83 mm, grey line) and legal (\geq 83 mm, black line) lobsters in NMFS Area 514 from MADMF ventless trap survey.

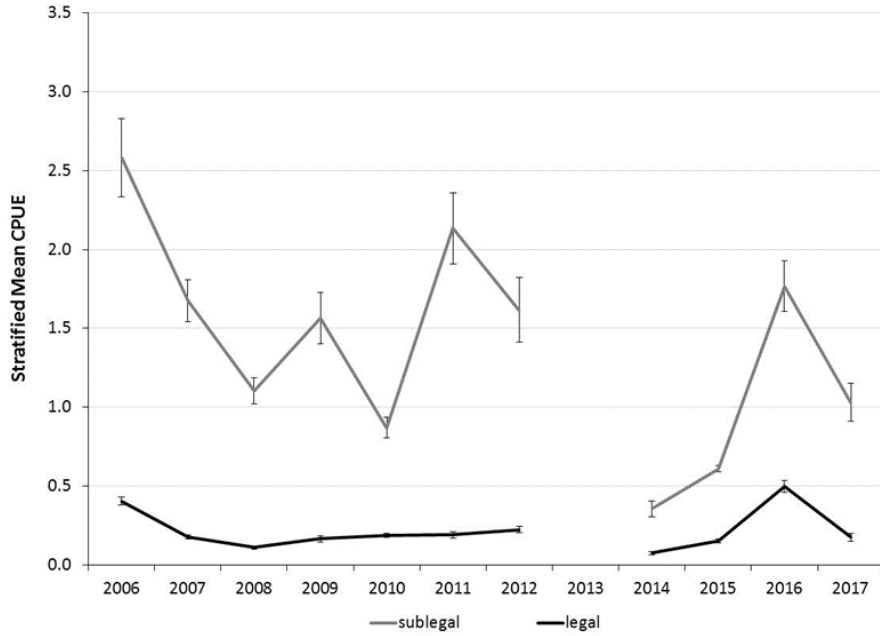


Figure 15: Stratified mean catch per trap haul (\pm S.E.) from MADMF ventless trap survey of sublegal (< 86 mm, grey line) and legal (\geq 86 mm, black line) lobsters in the original MA SNE survey area (within state waters), Area 538.

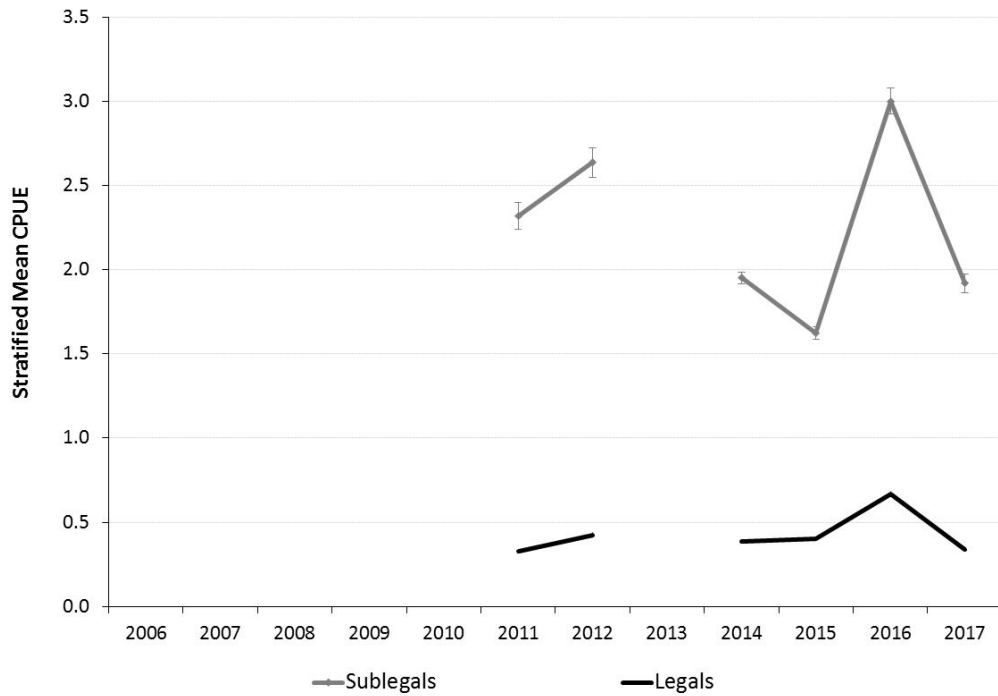


Figure 16: Stratified mean catch per trap haul (\pm S. E) of sublegal (<86 mm, grey line) and legal (\geq 86 mm, black line) lobsters in the expanded MA SNE VTS survey area, which includes NMFS Area 538 and the northern portion of Area 537.

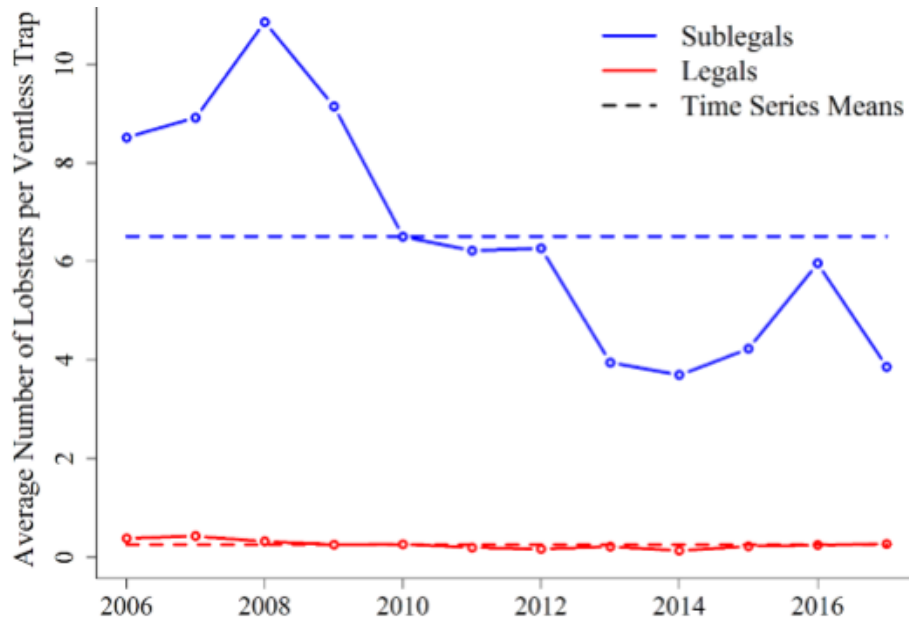


Figure 17: Stratified mean catch (#) per ventless trap for sublegal (<85.725 mm CL) and legal-sized (≥ 85.725 mm CL) lobsters from RIDEM ventless trap survey. The dashed lines indicate time series means for the two indices. The figure includes lobsters from both the vented and ventless traps in the survey. Note, this calculation differs from previous years' reports, with the index excluding catches of vented pots to better reflect how VTS data is used in the lobster stock assessment to date.