

Atlantic States Marine Fisheries Commission

ADDENDUM XXVI TO AMENDMENT 3 TO THE AMERICAN LOBSTER FISHERY MANAGEMENT PLAN; ADDENDUM III TO THE JONAH CRAB FISHERY MANAGEMENT PLAN

Harvester Reporting and Biological Data Collection



Vision: Sustainably Managing Atlantic Coastal Fisheries

February 2018

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1.0 Introduction

The Atlantic States Marine Fisheries Commission (ASMFC) has coordinated the interstate management of American lobster (*Homarus americanus*) and Jonah crab (*Cancer borealis*) from 0-3 miles offshore since 1996 and 2015, respectively. American lobster is currently managed under Amendment 3 and Addenda I-XXIV to the Fishery Management Plan (FMP). Jonah crab is managed under the Interstate Fishery Management Plan and Addenda I-II. Management authority in the Exclusive Economic Zone (EEZ) from 3-200 miles from shore lies with NOAA Fisheries. The management unit for both species includes all coastal migratory stocks between Maine and Virginia. There are ten states which regulate American lobster and Jonah crab in state waters and regulate the landings of lobster in state ports.

The Board initiated this addendum to improve harvester reporting and biological data collection in state and federal waters. Through Lobster Addendum X (2007) and the Jonah Crab FMP, states are required to implement, at a minimum, 10% harvester reporting and 100% dealer reporting. In addition, states are required to complete fishery dependent and independent biological sampling, such as sea and/or port sampling. For lobster, states are also required to conduct a fishery-independent survey, such as an annual trawl survey, a ventless trap survey (VTS), or a settlement survey. *De minimis* states are exempt from the biological sampling requirements in the lobster and Jonah crab fisheries.

Recent management action has highlighted several deficiencies in the data collection requirements for lobster and Jonah crab. One of the foremost deficiencies is the lack of spatial information collected. While harvesters are required to report the statistical area in which they fish, this information is too coarse to respond to the increasing number of marine spatial planning efforts which require fine-scale data. Another concern is that not all fishermen are required to report landings to either the state or NOAA Fisheries. Currently, only 10% of lobster and crab permit holders in Maine are selected to submit landings reports each year and vessels which are only issued a federal lobster permit are exempt from Vessel Trip Reports (VTRs). Given roughly 83% of lobster is landed in Maine and the fishery continues to move further offshore, the lack of harvester reporting in these areas results in data gaps in the fishery. Deficiencies in the collection of biological data were also highlighted in a January 2016 report by the American Lobster Technical Committee (TC) which noted that while inshore waters are adequately sampled, little biological sampling occurs offshore. This is a growing problem as, due to species shifts and a decline of the inshore population, an increasing percentage of lobster is being harvested from federal waters and the Jonah crab fishery is primarily conducted offshore.

This Addendum addresses these issues by improving the resolution and quality of data collected in the lobster and Jonah crab fisheries. The goals of this addendum are to: 1) utilize the latest technology to improve reporting; 2) collect greater effort data; 3) increase the spatial resolution of harvester reporting; and 4) advance the collection of biological data offshore.

2.0 Overview

2.1 Statement of Problem

Recent management action in the Northwest Atlantic, including the protection of deep sea corals, the declaration of a national monument, and the expansion of offshore wind, have highlighted the fact that current harvester reporting requirements do not provide the level of information needed to respond to management issues. Furthermore, while the lobster fishery continues to move further offshore and the Jonah crab fishery is primarily conducted in federal waters, the majority of biological data is collected inshore. This disconnect hinders effective management of the two species. The Board initiated this addendum to improve harvester reporting and biological data collection in state and federal waters. The management measures in this addendum are intended to utilize the latest technology to improve the spatial resolution of harvester data, increase the collection of fishery effort data, and promote the collection of biological data offshore.

2.2 History of Reporting Requirements

American lobster is currently managed under Amendment 3 and its subsequent addenda. Amendment 3, which was finalized in 1997, required states to, at a minimum, maintain their current reporting and data collection programs. At the time of implementation, the Atlantic Coastal Cooperative Statistics Program (ACCSP) was still being developed and data collection standards had not been completed for lobster. As a result, action to specify monitoring and reporting requirements was deferred until completion of a coastwide statistics program by ACCSP.

By 1999 data collection standards for ACCSP were nearly complete and Addendum I (1999) established data collection guidelines in the lobster fishery. Importantly, while it encouraged states to adopt monitoring and reporting standards, state agencies were not required to make any changes to their current reporting system. It wasn't until Addendum VIII (2006) that a consistent set of reporting requirements were implemented in the lobster fishery. Specifically, states were required to collect trip-level data from at least 10% of the lobster fishery. This included information on landings (i.e: catch in pounds) and effort (i.e: trap hauls, soak time, number of trips, total traps set, number of traps fished per trip). All dealers were required to report lobster landings, by weight, on a trip level basis. States were also required to implement fishery dependent data programs, such as sea sampling and port sampling, to collect information on lobster length, sex, and cull status.

2.3 Current Reporting Requirements

2.3.1 State Reporting Requirements

American Lobster

Addendum X (2007) outlines the reporting requirements in the lobster fishery prior to this Addendum. These requirements build upon those established in Addendum VIII and ensure that the collection programs meet ACCSP standards. For catch reporting, Addendum X requires at least 10% harvester reporting, with the expectation of 100% harvester reporting over time, and 100% dealer reporting. All states have implemented 100% harvester reporting, with the exception of Maine which has 10% harvester reporting (Table 1). Harvester reports are required

to include information such as vessel number, trip start date, statistical area, number of traps hauled, number of traps set, pounds of lobster harvested, and trip length. Dealer reports are required to include information on the species landed, the pounds harvested, the state and port of landing, market grade, and price per pound.

Addendum X also requires biological sampling from fishery independent and dependent sources. States are required to conduct sea sampling to characterize commercial catch and collect data on length, sex, v-notch, egg-bearing status, discards, cull status, and traps sampled. Port sampling is also required to collect information on length, sex, cull status, and market category. Sufficient sea sampling can replace port sampling. In addition, Addendum X requires states to implement fishery-independent sampling programs, with each state conducting either an annual trawl survey, a ventless trap survey (VTS), or a settlement survey. The VTS is designed to sample lobster habitats which may not be accessible to a trawl survey and provides information regarding the abundance of sub-legal lobsters (<53mm CL). Settlement surveys provide information on the youngest life stages of lobster (Stages IV and V). Several states carry out multiple fishery-independent sampling programs including Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut (Table 1). *De minimis* states (Delaware, Maryland, and Virginia in FY2017) are not required to complete the biological sampling programs prescribed in Addendum X.

Table 1: Harvester reporting, dealer reporting, and biological data collection programs for American lobster. New Hampshire and New York’s trawl surveys are conducted in conjunction with Maine and Connecticut, respectively. *De minimis* states are not required to implement biological data collection programs.

	De Minimis Status in 2016	% Dealer Reporting	% Harvester Reporting	Sea Sampling	Port Sampling	Trawl Survey	Ventless Trap Survey	Settlement Survey
ME		100%	10%	✓		✓	✓	✓
NH		100%	100%	✓	✓	✓w/ ME	✓	✓
MA		100%	100%	✓		✓	✓	✓
RI		100%	100%	✓ (none in 2016)	✓	✓	✓	✓
CT		100%	100%	✓ (none in 2016)		✓		✓
NY		100%	100%	✓	✓	✓w/CT		
NJ		100%	100%	✓		✓		
DE	✓	100%	100%			✓		
MD	✓	100%	100%	✓		✓		
VA	✓	100%	100%					
NOAA Fisheries		100%	VTR if permitted for another species	✓	✓	✓	*	

*NOAA supports ventless trap surveys through grants.

Maine 10% Harvester Reporting

Maine requires 10% harvester reporting; however, this sampling is stratified by state fishing zone (Zones A through G) and license class (Table 2). More specifically, within each combination of zone and license class, a proportion of harvesters (i.e. 10%) are annually selected to complete trip reports. All Maine lobster license holders, except those chosen the previous year, are included in the annual random draw, including licenses that had no landings the previous year and permits that are required to submit VTRs. Those permit holders that are required to

submit VTRs do not submit duplicate reports to the Maine harvester logbook, but continue to report only through the VTR process.

Table 2: Maine license classes in the lobster and crab fishery.

License Class	Abbreviation	Description
Class I	LC1	No crew
	LCO	No crew, permit holder over 70 years old
Class II	LC2	1 crew
	LC2O	1 crew, permit holder over 70 years old
Class III	LC3	2 crew
	LC3O	2 crew, permit holder over 70 years old
Student	LCS	Student license
<18 License	LCU	Commercial license for those under 18 years old
Tribal	various	Native American affiliation
Non-Commercial	LNC	Recreational permit
Non-resident	various	Not a resident of Maine

Jonah Crab

Under the Jonah Crab FMP, participation in the directed Jonah crab fishery is tied to a lobster permit. As a result, the FMP extends the reporting requirements in the lobster fishery to the Jonah crab fishery. This means that states are required to implement 100% mandatory dealer reporting and 100% harvester reporting; however, jurisdictions that currently require less than 100% of harvesters to report in the lobster fishery are required to maintain, at a minimum, their current programs and extend them to Jonah crab. Harvester reports must include a unique trip ID, vessel number, trip start date, NMFS statistical area, traps hauled, traps set, pounds landed, trip length, soak time, and target species. Dealer reports must include a unique trip ID, species landed, quantity landed, state and port of landing, market grade and category, areas fished, trip length, and price per pound.

In addition, the Jonah Crab FMP states that, at a minimum, state and federal agencies shall conduct port/sea sampling to collect information on carapace width, sex, discards, egg-bearing status, cull status, shell hardness, and crab parts, where possible. The FMP also encourages states to extend current fishery-independent lobster surveys to Jonah crab.

2.3.2 Federal Reporting Requirements

For many federally permitted fisheries, catch information (including species caught and discarded, gear quantity, fishing location, and depth) is collected on a trip-level basis through Vessel Trip Reports (VTRs). However, a federal lobster permit does not contain a federal reporting requirement. This means that if a vessel is issued a federal lobster permit and that vessel has no other federal permits, the vessel is not required to fill out a VTR. As a result, a portion of the lobster and Jonah crab fleet which fishes in federal waters is not required to submit a landings report. This portion varies spatially, with a smaller percentage reporting in nearshore waters of the Gulf of Maine (GOM) and a higher portion reporting in Southern New

England (SNE) and the Mid-Atlantic. For example, only 10% of all Maine federal permit holders and 3% of the total Maine lobster fleet report through VTRs. In statistical area 514 (Massachusetts coast), 25% of permits report with VTRs. This percentage increases with distance from shore as roughly 63% of the lobster fleet which fishes in statistical area 537 (south of Cape Cod) reports through VTRs and 98% of the fleet in statistical area 515 (near Hague line) reports with VTRs. A high portion of vessels (95%) hailing from New Jersey through Virginia submit VTRs.

The NMFS Northeast Fisheries Science Center also conducts a bottom trawl survey which has collected data on lobster and Jonah crab abundance since the 1960's. The bottom trawl survey is conducted twice a year, in the spring and fall, and extends from the Scotian Shelf to Cape Hatteras, including the GOM and Georges Bank (GBK). The survey uses a random sampling design and stratifies the survey area by depth. Data from the bottom trawl survey has been consistently incorporated into the lobster stock assessments and provides important information regarding Jonah crab abundance offshore.

2.5 Deficiencies with Current Harvester Reporting

2.5.1 Spatial Resolution of Data

Recent management actions have highlighted serious data deficiencies in the lobster and Jonah crab fisheries. These deficiencies have hindered the ability to effectively manage the resource, respond to the growing use of marine spatial planning, and assess the status of the offshore populations.

One of the largest deficiencies is the lack of spatial information collected in the two fisheries. While harvester reports are required to indicate statistical area fished, information regarding Lobster Conservation Management Areas (LCMAs) (see Appendix 1) or depth are not consistently collected (Table 3). This can hinder lobster management as a single statistical area can span multiple LCMAs, each of which has a unique set of regulations. For example, statistical area 521 spans LCMAs 1, 2, 3, and Outer Cape Cod (OCC), each of which has a different combination of lobster gauge size requirements. Furthermore, the coarse resolution of data collected by statistical area makes it difficult to determine potential impacts to the fisheries from fine-scale marine spatial planning in the Northwest Atlantic. As an example, recent action to protect deep-sea corals in GBK and the GOM required information on the magnitude of lobster and Jonah crab fishing in specific areas in order to calculate potential economic impacts. Without this fine scale spatial information, impacts to the lobster and Jonah crab fisheries had to be estimated by piecing together information from harvester reports, industry surveys, and fishermen interviews. Moreover, as the ocean continues to be divided between user groups, the lack of spatial resolution in harvester data collected has impeded the ability to accurately assess impacts to the lobster and Jonah crab industries.

Another deficiency is the lack of data collected on the depth at which the lobster and Jonah crab fisheries takes place. Recent management actions, including the establishment of a national monument, have considered a series of options which differ by depth. Given that information regarding the depth of fishing activity is not consistently collected among the

states (Table 3), it is challenging to respond to these management actions and illustrate potential economic consequences to the lobster fishery. This situation is made worse by the poor spatial resolution of the data.

Table 3: Data components collected in current harvester reports along the coast.

	Reports Submitted	Trip Length	# Of Crew	Traps Hauled	Active Traps Fished	Soak Time	Depth Fished	Stat Area	LCMA	Lat/ Long	Distance from Shore	Port Landed	Pounds Landed	Disposition	Avg. Traps Per Trawl
ME	Monthly	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓
NH	Monthly	✓		✓	✓	✓		✓				✓	✓		✓
MA	Monthly	✓	✓*	✓	✓	✓		✓	✓			✓	✓	✓	✓*
RI	Quarter	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	
CT	Monthly	✓	✓	✓	✓	✓		✓				✓	✓	✓	
NY	Monthly	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		
NJ	Monthly	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	
Federal VTR	Weekly or Monthly*	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓		✓

* Massachusetts collects information on number of crew and average number of traps per trawl through an annual recall survey.

2.5.2. Percentage of Harvester Reporting

In addition to the lack of spatial resolution of harvester data, not all harvesters are required to report. Addendum X requires a minimum of 10% harvester reporting in the lobster fishery and this baseline requirement is extended to the Jonah crab fishery. Importantly, the expectation at the time was that all states would eventually implement 100% harvester reporting. Currently, Maine is the only state which has not implemented 100% harvester reporting and this is largely due to the size of the fishery. For context, more trips are taken by Maine lobstermen each year than the combined number of trips taken for all species in the states of New Hampshire, Rhode Island, Connecticut, New York, New Jersey, Delaware, South Carolina, and Georgia. As a result, expanding the Maine harvester reporting program to all lobster and Jonah crab fishermen could cost the state an additional \$500,000 a year, under current paper reporting methods. Furthermore, not all federally licensed lobstermen are required to submit harvester reports as those vessels which only have a lobster permit are not required to complete VTRs.

The lack of 100% harvester reporting in Maine and in federal waters means that assumptions must be made about the activity of the lobster and Jonah crab fisheries. While 100% dealer reporting along the coast provides information on the total amount of lobster and Jonah crab landed in each state, it is not always clear where these lobster and Jonah crab are caught and what level of effort is required to harvest them. Moreover, information regarding the effort and location of catch from those harvesters which do report must be assumed to be representative of the whole Maine and offshore fisheries. Given Maine accounts for over 80% of lobster landed in the U.S. and the offshore portion of the lobster fishery in SNE is becoming increasingly scrutinized as lobster abundance continues to decrease inshore, the scaling of a sub-sample of data to the whole fishery may be of concern.

In order to assess the effectiveness of the 10% harvester reporting requirement, the Board tasked the Technical Committee (TC) with determining a statistically valid sample of harvester

reporting. A statistically valid sample of harvester reporting is needed to accurately scale up a subset of trip level reports to the full fishery. In their October 2017 report to the Board, the TC recommended 100% harvester reporting in the lobster and Jonah crab fisheries to accurately account for all trap hauls and the spatial extent of effort. Given the scale of the Maine fishery, the TC recommended that this 100% harvester reporting be achieved through electronic reporting, as this reduces the administrative burden on the state. In the interim, the TC did find that the current 10% harvester reporting in Maine is sufficiently precise, in large part due to the immense size of the Maine lobster fishery. Moreover, analysis showed that 10% harvester reporting results in a low coefficient of variation, a statistical measure of precision, for metrics such as trap hauls and landings (Figure 1). Furthermore, the scaling of landings reported by the sub-sample of harvesters to the entire Maine fishery fell within the 95% confidence interval of state-wide dealer landings. This suggests that 10% harvester reporting is a good representation of the whole Maine fishery.

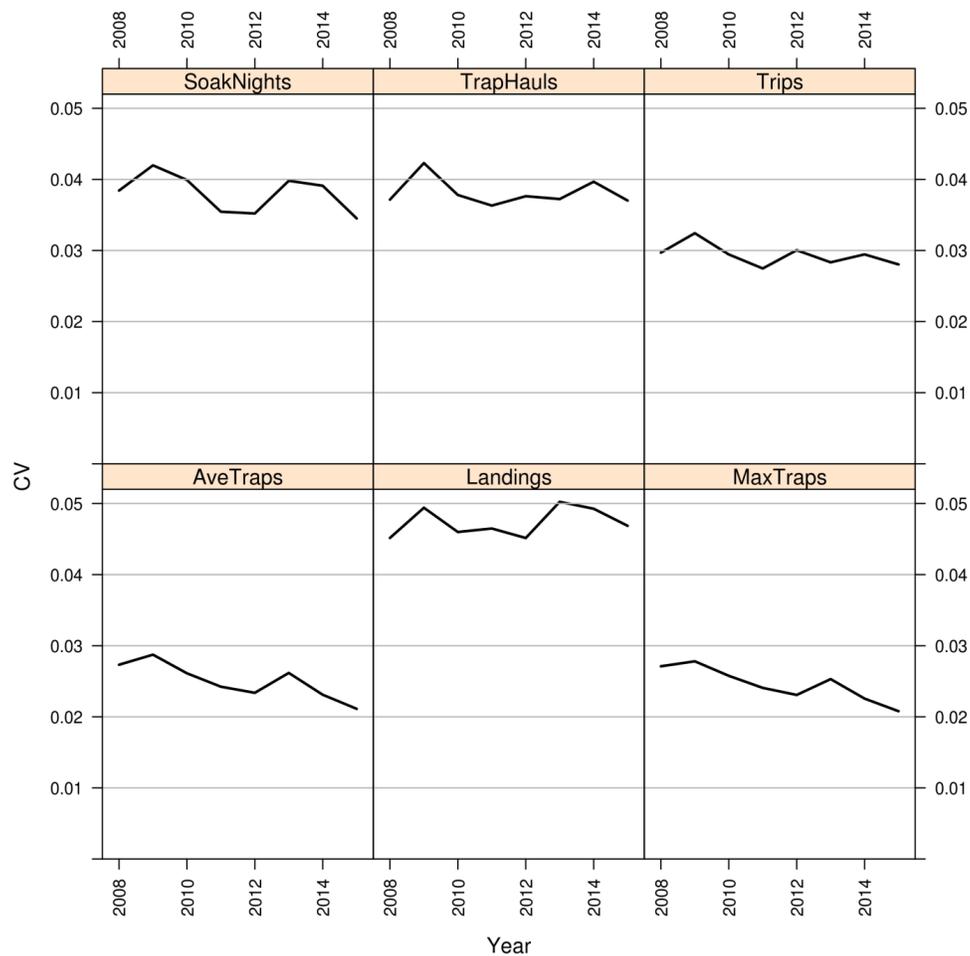


Figure 1: Calculated CVs from harvester data (pooled across license types), by year, for various reporting fields. For all metrics, the CVs are below 0.05 meaning the 10% reporting achieves CV's below 5% for all metrics considered.

While the TC did conclude that 10% harvester reporting is sufficiently precise, improvements could be made under the current level of harvester reporting to increase the precision and tracking of harvester behavior. Through their analysis, the TC concluded that sampling efforts by states which do not require 100% harvester reporting are best served if they focus on those permit classes which contain a large number of vessels and have a higher variance in landings. This optimized sampling allocation, rather than a proportional sampling allocation, improves the statistical precision of the harvester reporting program while maintaining the current workload of the state. As an example, in Maine the TC found that latent licenses (those licenses with no landings reported for the year) are being oversampled, creating inefficiencies and a lower level of precision. By evaluating the number of vessels in a license class, the standard deviation of landings, and relative sampling costs, the TC found an optimal sampling approach would place greater sampling effort on active LC1, LC2, and LC3 permits and less effort would be allocated to latent and recreational permits (Table 4). A comparison of the CV's for Maine's current proportional and the optimal allocation is shown in Figure 2.

Table 4: A comparison of the current proportional 10% harvester reporting in Maine versus the optimal allocation of reporting recommended by the TC. Licenses for individuals 70 years and older were combined into one license type (LCO). Tribal and non-resident licenses were not included in the analysis due to the small number of these licenses.

Licenses Type and Status	Current Proportional Reporting		Optimal Allocation of Reporting		
	# Vessels	% of Licenses	Allocation %	# Vessels	% of Licenses
LC1 Active	41	9.2%	8.4%	44	9.87%
LC1 Latent	70	15.3%	4.0%	21	4.58%
LC2 Active	190	11.4%	36.4%	188	11.26%
LC2 Latent	20	13.0%	2.7%	14	9.09%
LC3 Active	100	8.2%	28.2%	146	11.97%
LC3 Latent	4	10.3%	1.8%	10	25.64%
LCO Active	30	8.1%	7.6%	40	10.75%
LCO Latent	14	8.3%	1.7%	9	5.36%
LCS Active	36	7.3%	5.0%	26	5.26%
LCS Latent	27	8.1%	2.5%	13	3.90%
LCU Active	3	9.7%	0.4%	3	9.68%
LCU Latent	1	7.7%	0.3%	2	15.38%
LNC	114	6.4%	1.0%	6	0.34%

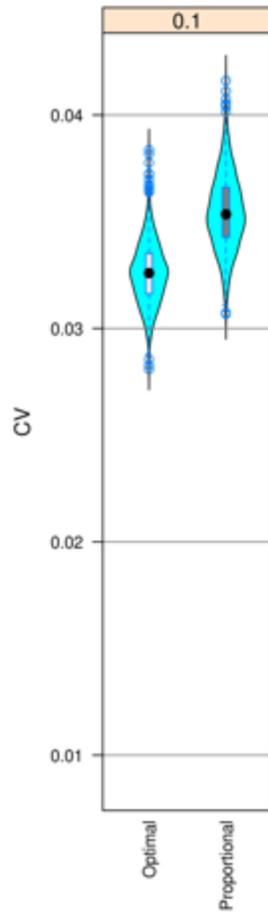


Figure 2: Comparison of CVs for trap hauls with optimal sampling (left side) vs. proportional sampling (right side) under 10% harvester reporting. The black dots represent the mean while the width and length of the shape represents the distribution of the data.

2.6 Deficiencies in Current Biological Data Collection Programs

In a January 2016 report to the Board, the TC stated that while current biological collection programs are sufficient to characterize catch in state waters, the resolution of biological data is lacking in federal waters. Currently, states administer a suite of biological sampling programs (i.e. sea sampling, port sampling, VTS, larval surveys, trawl surveys) to assess the status of the lobster and Jonah crab stocks; however, much of this effort is contained to state waters or takes place in nearshore waters which are accessible via a day trip. Table 5 and Appendix 2 show the location and depth of trawl surveys and VTS used in the 2015 American Lobster Stock Assessment. While the surveys span a broad length of the coast, most state trawl surveys do not extend past the 12 mile territorial sea boundary. The deepest trawl survey is the NEFSC Bottom Trawl Survey which samples depths up to 365m. While NOAA Fisheries has an extensive fishery dependent observer program, the lobster and Jonah crab fisheries have not historically been considered a sampling priority.

Table 5: Location and depth of trawl surveys and ventless trap surveys by jurisdiction.

		Location	Depth
Trawl Surveys	ME-NH Inshore Trawl Survey	Downeast Maine to New Hampshire	4 strata: 5-20 fathoms, 21-35 fathoms, 36-55 fathoms, > 56 fathoms out to the 12 mile territorial limit.
	MA Trawl Survey	Cape Ann to Buzzards Bay	6 strata: 0-30ft, 31-60ft, 61-90ft, 91-120ft, 121-180ft, 191ft-12 mile territorial boundary
	RI Trawl Survey	Narragansett Bay, Rhode Island Sound, Block Island Sound	6 strata; Narragansett Bay: 10-20ft, >20ft; RIS/BIS: 10-30ft, 30-60ft, 60-90ft, 90-120ft, >120ft
	CT-NY Trawl Survey	Groton, CT to Greenwich, CT in both CT and NY waters	4 strata: 0-9m, 9.1-18.2m, 18.3-27.3m, and 27.4+ m
	NJ Trawl Survey	Sandy Hook, NJ to Cape Hemlopen DE	18-90ft
	NEFSC Bottom Trawl Survey	Scotian Shelf to Cape Hatteras	7 strata: <9m, 9-18m, >18-27m, >27-55m, >55-110m, >110-185m, and >185-365m.
Ventless Trap Surveys	ME VTS	SAs 511, 512, 513 excluding estuaries of Kennebec and Penobscot Rivers	3 strata: 1-20m, 21-40m, 41-60m
	NH VTS	SA 513 excluding Great Bay, Piscataqua River, and Hampton Harbor	3 strata: 1-20m, 21-40m, 41-60m
	MA VTS	SA 514, 538 excluding the southwest corner of Cape Cod Bay, Vinyard Sound, and Nantucket Sound	3 strata: 1-20m, 21-40m, 41-60m
	RI VTS	539 state waters of Narragansett Bay and Block Island Sound	3 strata: 1-20m, 21-40m, 41-60m

The dearth of biological sampling offshore is a growing concern given the increasing portion of lobster which is being harvested outside of state waters. In 1998, 87% of lobster harvested in SNE were from the inshore portion of the stock; however, by 2011, a greater portion of lobster (55%) were harvested from the offshore portion of the stock than the inshore portion (Figure 3). A similar trend can be seen in the GOM where the percentage of trips occurring at distances greater than 3 miles from shore has increased from 13% in 2008 to 20% in 2015. This issue is further compounded by the fact that the Jonah crab fishery is primarily conducted in federal waters.

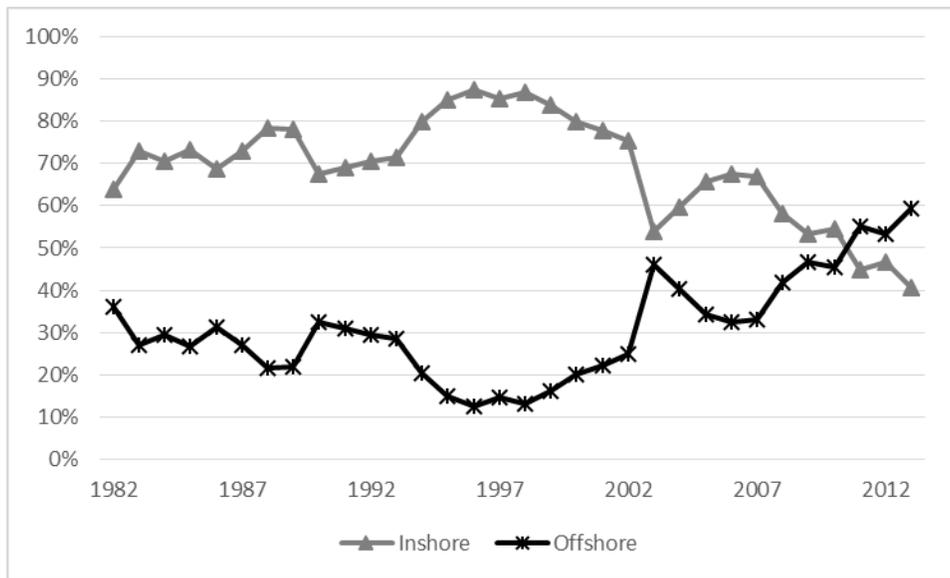


Figure 3: Percentage of landings in SNE occurring in the inshore and offshore fishery. The inshore fishery is defined as landings from statistical areas 538, 539, 611, 612, 613, 614, 621, 625, 631, and 635. The offshore fishery is defined as landings from statistical areas 533, 534, 537, 615, 616, 622, 623, 624, 626, 627, and 632.

2.6.1 External Biological Data Collection Programs

Given financial and geographic constraints on sampling conducted by states, external institutions have begun to implement their own fishery dependent sampling programs in order to collect greater information on the lobster and Jonah crab fisheries. One example of this is the Commercial Fisheries Research Foundation (CFRF), a non-profit foundation which conducts collaborative fisheries research projects. Established by commercial fishermen, CFRF collaborates with industry members to collect biological data and support fisheries research. One of the programs conducted by CFRF has been their On-Deck Data Program, through which participating commercial lobster and/or Jonah crab vessels conduct at-sea sampling during specific trips each month. The On-Deck Data application randomly selects trawls to sample throughout a trip and fishermen collect biological information on carapace length/width, sex, shell disease, presence of eggs, v-notching, shell hardness, and disposition. Participating vessels also deploy ventless traps which expand the spatial extent of the state’s ventless trap programs to areas further offshore. In addition, participating vessels collect Jonah crabs to determine maturity status. Currently, 17 vessels participate in the CFRF program. As of August 2017, 97,913 lobster and 39,493 Jonah crab have been sampled. Biological information collected from CFRF was incorporated into the 2015 American Lobster Stock Assessment.

The geographic range of the CFRF program stretches from New Hampshire to New Jersey. Table 6 shows specific statistical areas in which CFRF participating vessels sample as well as the magnitude of sampling in those areas. The largest amount of sampling occurs in statistical areas 537 and 539 (south of Cape Cod and Rhode Island) with additional sampling occurring in GBK

(statistical areas 525 and 526) and offshore GOM (statistical areas 464 and 512). Limited levels of sampling occurs off of Long Island (statistical area 613) (Table 6).

Table 6: The geographic distribution of CFRF lobster and Jonah crab sampling, by statistical area, as of September 6, 2017. Data provided by CFRF.

Statistical Area	Commercial Lobster Sessions	Ventless Lobster Sessions	Lobsters Sampled	Commercial Jonah Crab Sessions	Ventless Jonah Crab Sessions	Jonah Crabs Sampled
464	38	5	3,939	11	1	951
465	10	9	1,552	4	0	129
512	40	27	5,179	10	0	440
515	15	21	1,306	4	0	128
522	1	0	83	0	0	0
525	113	24	3,483	64	16	5,323
526	48	21	2,970	19	16	2,005
537	335	342	17,954	86	64	7,729
539	739	1073	43,295	365	102	18,568
561	25	2	2,666	27	0	1,006
562	107	168	9,135	30	40	2,575
613	36	50	1,756	10	24	805
616	76	137	6,357	2	0	173
622	5	2	392	3	2	797
626	1	0	12	0	0	0

2.6.2 Identification of Data Gaps In Offshore Sampling

In order to provide guidance on where additional biological sampling efforts should be conducted in the lobster fishery, the TC reviewed the spatial distribution of various sampling efforts, including sea sampling, port sampling, and CFRF data programs, in relation to current landings. The TC set a baseline sampling threshold of 3 samples from each statistical area in each season. This threshold was identified as, for statistical areas which do not meet this baseline in the stock assessment, data is borrowed from other statistical areas. Results of the analysis showed that 13 statistical areas did not meet the 3-sample baseline in both 2015 and 2016, and an additional 17 statistical areas did not meet this sampling baseline in either 2015 or 2016 (see Appendix 3, Table 1). Many of these statistical areas are found in GBK and some are found in SNE. Statistical areas the TC noted as high priority for increased sampling (based on high landings and low sampling) included 522, 525, 526, 561, and 562 in GBK, and 616 in SNE. In addition, the TC's analysis noted the variance in federal sampling through the Standardized Bycatch Reporting Methodology (SBRM) program from year to year as well as the critical role which CFRF plays in collecting biological samples. More specifically, the SBRM program assigned 619 sampling trips to the lobster fishery in 2015 but less than 50 sampling trips in 2016. Further, if the CFRF program did not exist, an additional 2.77 million pounds of lobster caught in GBK and SNE would not be sampled.

2.7 Atlantic Large Whale Take Reduction Team

The Atlantic Large Whale Take Reduction Team (ALWTRT) was established in 1996 in order to reduce the risk of serious injury and death of endangered North Atlantic right whales due to entanglement in commercial fishing gear. The Take Reduction Plan (TRP), which was first published in 1997, specifies gear modifications and restrictions, such as weak links, gear markings, and seasonal prohibitions on locations where traps can be set.

In May 2016, a subset of the ALWTRT met to discuss deficiencies in the collection of fishing effort data as it pertains to the development and implementation of the TRP. To this end, the sub-group identified specific data elements which would inform analysis of fishing location and gear quantities but are not consistently collected by the states and NMFS. These include information regarding the number of traps per trawl, number of vertical lines, length of vertical lines, rope gauge, weight of traps, and buoy configuration. As a result of these discussions, NMFS, in coordination with a contractor, is considering the development of an annual recall survey which would be sent to fishermen to collect information regarding fishing activity and gear used each month. Information being considered for collection in that survey include the color of the buoy line and buoy, the weight of each trap, the number of traps per trawl, the buoy configuration, the buoy line diameter, the weight of anchor lines, and general fishing areas.

This addendum provides an opportunity to proactively address some of the data needs identified by the ALWTRT sub-group; however, much of the information being considered in the annual recall survey is more specific than what is typically required in a harvester trip report. Furthermore, state trip reports are often used for multiple species, limiting the ability to specifically ask questions regarding lobster gear configurations. There may be an opportunity to collaborate on the collection of some data (i.e. traps per trawl, number of endlines), particularly as electronic reporting is pursued by the states.

2.8 Reporting Work Group

Recognizing the need to assess current data collection in the lobster and Jonah crab fisheries, the Board established a Reporting Work Group to discuss data deficiencies and ways to improve them. The Work Group, which met in September 2016, was comprised of state agency staff, TC members, Board members, federal representatives, industry members, ACCSP staff, and ASMFC staff. As a part of their discussion, the Work Group developed five goals for harvester reporting.

- 1) Improve the spatial resolution of harvester reporting
- 2) Utilize the latest technology to improve and increase reporting
- 3) Collect greater effort data in harvester reports
- 4) Define inshore vs. offshore areas in the lobster fishery
- 5) Proactively address data concerns of the ALWTRT

In order to achieve these goals, the Work Group compiled a list of recommendations (Table 7). The recommendations were categorized as short-term (less than 1 year), intermediate (1-2 years), and long-term (greater than 2 years). The short-term recommendations sought to

maximize commercial harvester reporting under the current framework and provide a uniform set of definitions for inshore vs. nearshore vs. offshore areas. The intermediate recommendations intended to build upon the existing reporting programs by requiring increased harvester reporting and the collection of additional data components. The long term recommendations sought to incorporate new technology into the lobster fishery in order to efficiently and effectively report landings, monitor compliance, and identify critical areas for the lobster fishery. These goals and recommendations provided a basis for the development of this addendum.

Table 7: Recommendations from the Lobster Reporting Work Group on ways to improve reporting in the lobster fishery.

Short Terms Recommendations
-Maximize ME’s 10% harvester reporting by only including commercial license holders who have actively fished in the past two years
-Defined the inshore fishery as 0-3 miles, the nearshore fishery as 3-12 miles, and the offshore fishery as >12 miles
Intermediate Recommendations
- Require 100% active harvester reporting for all state and federally permitted lobster license holders; for resource limited jurisdictions unable to achieve 100% harvester reporting, at a minimum, states should require reporting from a statistically valid sample of harvester reporting
- Add the following data components to current harvester reporting coastwide: number of trap hauls, soak time, catch disposition, gear configuration, number of vertical lines, LCMA, depth
- Further delineate NMFS statistical areas on harvester trip reports
Long Term Recommendations
- Establish an electronic swipe-card system for harvester and dealer reports
- Incorporate VMS or another locator beacon to all lobster vessels
- Establish an electronic fixed-gear VTR for all federal permit holders

2.9 Status of the Stocks

American Lobster

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 and GBK and record low abundance and recruitment in SNE.

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 could indicate a potential decline in recruitment and landings in the coming years.

Conversely, the assessment found the SNE stock is severely depleted. 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 could impact the offshore portion of the stock if it is dependent on recruitment from inshore areas.

Jonah Crab

Jonah crab are distributed in the waters of the Northwest Atlantic Ocean primarily from Newfoundland, Canada to Florida. The life cycle of Jonah crab is poorly described, and what is known is largely compiled from a patchwork of studies that have both targeted and incidentally documented the species. Female crab (and likely some males) are documented moving inshore during the late spring and summer. Motivations for this migration are unknown, but maturation, spawning, and molting have all been postulated. It is also widely accepted these migrating crab move back offshore in the fall and winter. Due to the lack of a widespread and well-developed aging method for crustaceans, the age, growth, and maturity of Jonah crab is not well understood. As a result, the status of the Jonah crab resource is relatively unknown and no range wide stock assessment has been conducted.

2.10 Status of Commercial Fishery

American Lobster

The American lobster fishery has seen incredible expansion in landings over the last 40 years, with coastwide landings rising from roughly 39 million pounds in 1981 to over 158 million pounds in 2016. Ex-vessel value in 2016 set a new record at over \$660 million. Much of this increase can be attributed to high landings in the GOM, and in particular, the state of Maine; since 1981, Maine lobster landings have risen over 500% from 22.6 million in 1981 to 131.9 million in 2016. In contrast, landings in states such as Connecticut and New York have dramatically decreased from their peak in the 1990s. In 1996, New York lobster landings were 9.4 million pounds but in 2016, only 218,354 pounds were landed in the state. A similar trend can be seen in Connecticut. These rapid decreases in landings are the result of several factors including warming waters, increased predation, and continued fishing pressure.

Jonah Crab

Historically, Jonah crab was taken as bycatch in the lobster fishery; however, in recent years a directed fishery has emerged causing landings to rapidly increase. Throughout the 1990's, landings fluctuated between approximately 2 and 3 million pounds and the overall value of the fishery was low. In the early 2000's landings began to increase with over 7 million pounds landed in 2005. By 2014, landings had almost tripled to 17 million pounds and a value of nearly \$13 million dollars. This rapid and recent increase in landings can be attributed to an increase in the price of other crab (such as Dungeness), creating a substitute market for Jonah crab, as well as a decrease in the abundance of lobsters in SNE, causing fishermen to supplement their income with Jonah crab. Today, Jonah crab and lobster are considered a mixed crustacean fishery in which fishermen can target lobster or crab at different times of the year based on slight gear modifications and small shifts in the areas in which the traps are fished. While the

majority of Jonah crab is harvested as whole crabs, fishermen from numerous states, including Maine, New York, New Jersey, Delaware, Maryland and Virginia land claws.

3.0 Management Options

This section proposes to replace Section 4.1 of Addendum X to American Lobster Amendment 3 and Section 3.4.1 of the FMP for Jonah Crab. The intent of these management options is to improve harvester reporting and biological data collection.

3.1 Dealer and Harvester Reporting

The following outline the requirements for dealer reporting in the lobster and Jonah crab fisheries.

1. There is 100% mandatory dealer reporting. Dealer reports include: unique trip ID (link to harvester report), date, species, quantity (lbs), state and port of landing, areas fished (NMFS stat area), price per pound, and market grade and category.
2. There is a two-ticket system for dealer and harvester reports. This is used to provide verification between the two landings information. Harvesters report trip data and catch estimates (in pounds) and dealers report landing weights (in pounds).
3. Harvester and dealers are required to report standardized data elements for each trip on a monthly basis.
4. Permit holders are linked to federal vessel or individual permit/license level reporting for lobsters using ACCSP protocol (<http://www.accsp.org/cfstandards.htm>).
5. ACCSP stores lobster landings information.

3.1.1 Percent Harvester Reporting

For this addendum, an active harvester is defined as an individual who landed lobster and/or Jonah crab, in any amount, during the past two calendar years

States are required to implement 100% active commercial harvester trip-level reporting, through electronic or paper methods, in the lobster and Jonah crab fisheries within five years of the implementation date in this Addendum. If a commercial harvester landed less than 1000 lbs of lobster and Jonah crab in the previous year, that individual can submit a monthly summary of landings data, rather than trip-level reports. In the interim of the five year deadline, states which have less than 100% harvester reporting are required to maintain, at a minimum, their current effort associated with harvester reporting and distribute reporting across an optimal, rather than a proportional, allocation.

3.1.2 Electronic Reporting

Given this Addendum institutes 100% active commercial harvester reporting within five years of the implementation date (January 1, 2019), and increases in harvester reporting under the current methodology (ie: paper reports) may result in large costs to some states, it is highly recommended that states implement electronic reporting. Electronic reporting represents a cost effective method to collect data as it reduces the need for staff to convert paper reports into an electronic format. Furthermore, electronic reporting provides the flexibility to collect expanded data elements. As of the 2017 fishing year, electronic reporting is not widely used

throughout the lobster and Jonah crab fisheries. In Massachusetts, 24% of lobster-only permit holders (i.e. permit holders who do report through VTR) submit harvester reports electronically. In Rhode Island, 56% of state-only permit holders report electronically. No lobster fishermen in Maine, which has roughly 6,000 license holders, or Connecticut report electronically.

It is recommended that states use the SAFIS application eTrips, or eTrips Mobile as an electronic reporting platform, given it can be implemented at little to no cost to the states or fishermen, it is approved by GARFO as a platform to submit eVTRs, and there is a well-established working relationship between ASMFC and ACCSP. States may choose to use an electronic reporting platform other than eTrips; however, this platform must implement the ACCSP Data Standards and be compatible with the eTrips Application Programming Interface (eTrips API), in order for the data to be seamlessly consolidated with other sources.

States wishing to use a different platform may submit a proposal to the Board which outlines why the state is pursuing a different electronic reporting platform and demonstrates that the platform meets the reporting requirements of this Addendum. Furthermore, states must demonstrate that the alternative electronic reporting platform can accommodate the large scale of the lobster fleet. Proposals must be reviewed and approved by the Board.

3.1.3 Harvester Reporting Data Components

Commercial harvester trip-level reports must include:

- a unique trip ID (link to dealer report)
- vessel number
- trip start date
- location (NMFS Statistical Area)
- LCMA (see Section 3.1.4)
- 10 minute square (see Section 3.1.4)
- number of traps hauled
- number of traps set
- species
- quantity (lbs)
- trip length
- number of traps per trawl (most common during trip)
- number of buoy lines (total number of buoy lines in the water)
- soak time (required on Jonah crab harvester reports)

States which conduct an annual recall survey in the lobster/Jonah crab fishery can collect information on the number of traps per trawl and number of buoy lines through this annual survey, instead of through trip-level reports. For clarification, 'traps set' means the total number of traps that are in the water for a permit holder, including traps that were hauled and re-set as well as traps which are in the water but were not hauled.

3.1.4 Spatial Resolution of Harvester Data

Commercial harvesters will report their fishing location by 10 minute longitudinal/latitudinal squares which divide the North Atlantic coast. Within state waters, jurisdictions are allowed to maintain their state-specific statistical reporting areas. In addition, commercial harvester will report the NMFS statistical area and LCMA in which they fish on harvester reports.

See Appendix 4 for a figure of 10 minute squares along the Atlantic coast.

3.1.5 Electronic Tracking Pilot Program

This Addendum establishes a one year pilot program to test electronic tracking devices on lobster and/or Jonah crab fishing vessels. Given the variety of vessels and the spatial distribution of the fishery (both in distance from shore and breadth along the coast), the pilot program will allow multiple tracking devices to be tested in various conditions to identify which device(s) are applicable to the lobster and Jonah crab fisheries.

To design and implement the pilot program, a Subcommittee of Board members, PDT members, industry, and law enforcement will be convened. Fishermen interested in participating in the program will be identified through state agencies and industry associations. Ideally, fishermen from different states, fishing grounds, and with varying boat sizes will participate in the pilot program. Multiple technologies can be tested when conducting the pilot program; however, the systems must have a fast ping rate (at least 1 ping every minute) and be a low cost to fishermen. In particular, the Subcommittee, during their review and consideration of various technologies, should analyze the costs associated with the electronic tracking systems. The PDT recommends that specific technologies be explored, including solar powered devices and tracking through the eTrips Mobile application, given that these are generally low cost technologies with fast ping rates.

Success of the tracking technology will be evaluated by looking at the ease of compliance (or non-compliance), ability to determine trap hauls from steaming, industry feedback, cost-per fisherman, and law enforcement feedback. Following the one year pilot program, results of the program (including successes, challenges, and participant perspectives) will be presented to the Board. At that time, the Board may decide, through Board action, to end the pilot program, extend the pilot program for another year, or consider the adoption of electronic tracking devices in part, or all, of the lobster and Jonah crab fisheries. Should the Board consider adoption of electronic tracking in part, or all, of the fisheries, a second round of public comment will be held.

3.2 Fishery Dependent Sampling

Non-de minimis states are required to conduct fishery dependent sampling in the lobster and Jonah crab fisheries. This sampling allows for the collection of biological data on the fisheries and the data is incorporated into stock assessment models. States are required to conduct, at a minimum, 10 sea and/or port sampling trips per year in the lobster/Jonah crab fishery. This minimum sampling requirement is meant to be a baseline and is not representative of the total populations. States which comprise greater than 10% of coastwide landings in either the lobster

or Jonah crab fisheries should conduct additional sampling trips complementary to their level of harvest. For example, if a state comprises 20% of coastwide lobster landings, they should conduct 20 sea and/or port sampling trips per year in the lobster/Jonah crab fishery. Sufficient sea sampling can replace port sampling. If a state is unable to complete the required number of sampling trips in the lobster/Jonah crab fishery, they must notify the Board during Annual Compliance reports as to why the sampling trips were not completed and outline future efforts to conduct sampling trips.

3.2.1 Port Sampling

The following outlines the requirements of port sampling.

1. In order to characterize lobster commercial catch, the following data elements must be collected: length, sex, v-notched, egg bearing status, cull status. In addition, the following data elements are recommended for collection in the lobster fishery, but not required: tissue for genetic or toxicity analysis, stomach contents for food habit assessments, gonads for maturity schedule data.
2. In order to characterize Jonah crab commercial catch, the following data elements should be collected, where possible: carapace width, sex, discards, egg-bearing status, cull status, shell hardness, and whether landings are whole crabs or parts.
3. The number of port sampling trips, as well as the number of lobster/Jonah crab sampled, will be reported in Annual State Compliance Reports.

3.2.2. Sea Sampling

The following outlines the requirements of sea sampling.

1. In order to characterize lobster commercial catch, the following data elements must be collected: length, sex, v-notch, egg bearing status, cull status, fishing location, and total trawls or traps sampled. In addition, the following data elements are recommended for collection, but not required: tissue for genetic or toxicity analysis, stomach contents for food habit assessments, gonads for maturity schedule data.
2. In order to characterize Jonah crab commercial catch, the following data elements should be collected, where possible: carapace width, sex, discards, egg-bearing status, cull status, shell hardness, and whether landings are whole crabs or parts.
3. The number of sea sampling trips, as well as the number of lobster/Jonah crab sampled during sea sampling will be reported in Annual State Compliance Reports.

3.3 Fishery Independent Sampling

Non-de minimis states are required to conduct at least one of the following fishery dependent surveys each year in the lobster fishery: an annual trawl survey, a ventless trap survey, and/or a young-of-year survey. States should expand fishery-independent surveys to collect information on Jonah crab, including size distribution, sex composition, ovigerous condition, claw status, shell hardness, and location information.

4.0 Compliance

The implementation deadline for this Addendum is January 1, 2019. This will start the five year timeframe within which states must implement 100% active commercial harvester reporting.

5.0 Recommendations for Actions in Federal Waters

The management of American lobster and Jonah crab in the EEZ is the responsibility of the Secretary of Commerce through the National Marine Fisheries Service. The Atlantic States Marine Fisheries Commission recommends that the federal government promulgate all necessary regulations in Section 3.0 to implement complementary measures to those approved in this addendum. In addition, ASMFC recommends the following be adopted in federal waters:

- Establish a harvester reporting requirement for federal lobster permit holders – There is currently no federal permitting requirement attached to a federal lobster permit. One of the deficiencies identified in this Addendum is that not all lobster and Jonah crab harvesters are required to complete trip level reports. This impedes effective management of the stock as it is unclear where lobster and Jonah crab are being harvested and what effort is associated with the catch. As ASFMC works to improve harvester reporting and data collection through this Addendum, it is recommended that NOAA Fisheries establish a harvester reporting requirement for all federal lobster permit holders as soon as practicable.
- Creation of a fixed gear VTR for federal permit holders – As identified by the Reporting Work Group, one of the major hurdles in federal lobster reporting is that a single VTR form is used by a wide variety of gear types. This limits the amount of information that can be collected and creates confusion on how specific data elements apply to the lobster fishery. ASMFC recommends that a fixed-gear VTR form be established to fulfill the data needs specific to these fisheries, including information on soak time, number of hauls, and total gear in water.
- Implementation of a targeted lobster sampling program in federal waters – As outlined in Section 2.6 of this Addendum, the biological sampling programs currently conducted in federal waters are insufficient to characterize commercial catch or understand the biological conditions of the offshore stock. This is particularly concerning given an increasing portion of the lobster fishery is being executed in federal waters. ASMFC recommends NOAA Fisheries support the implementation a targeted biological sampling program offshore. Appendix 3 outlines recommendations from the TC for a sampling program in offshore waters, including areas where future sampling efforts should be focused.

6.0 References

Atlantic States Marine Fisheries Commission (ASMFC). 1997. Amendment 3 to the Interstate Fishery Management Plan for American Lobster.

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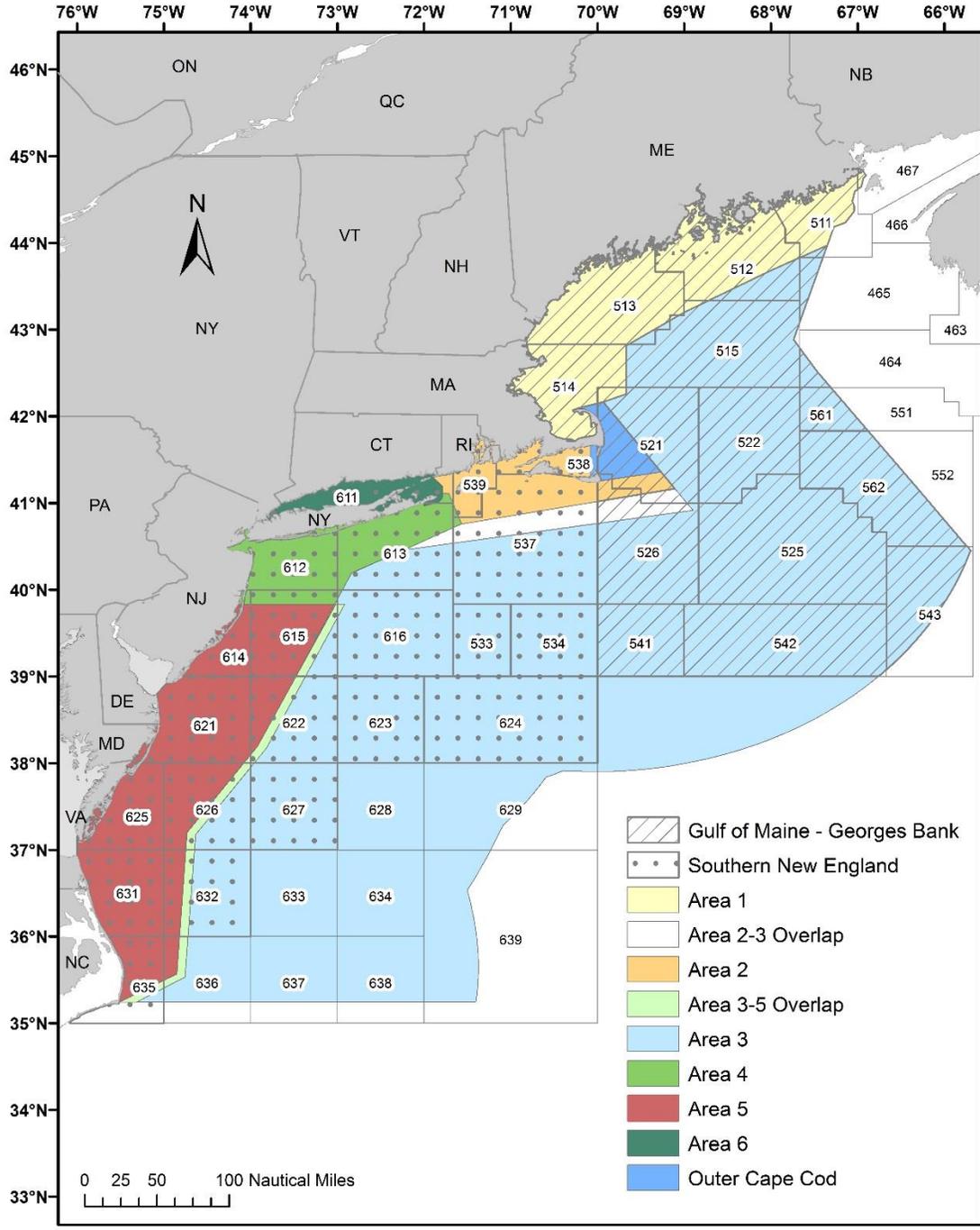
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Appendix 1: American Lobster Biological Stocks and Lobster Conservation Management Areas.



Appendix 2: Maps of Trawl Surveys Conducted by Jurisdictions

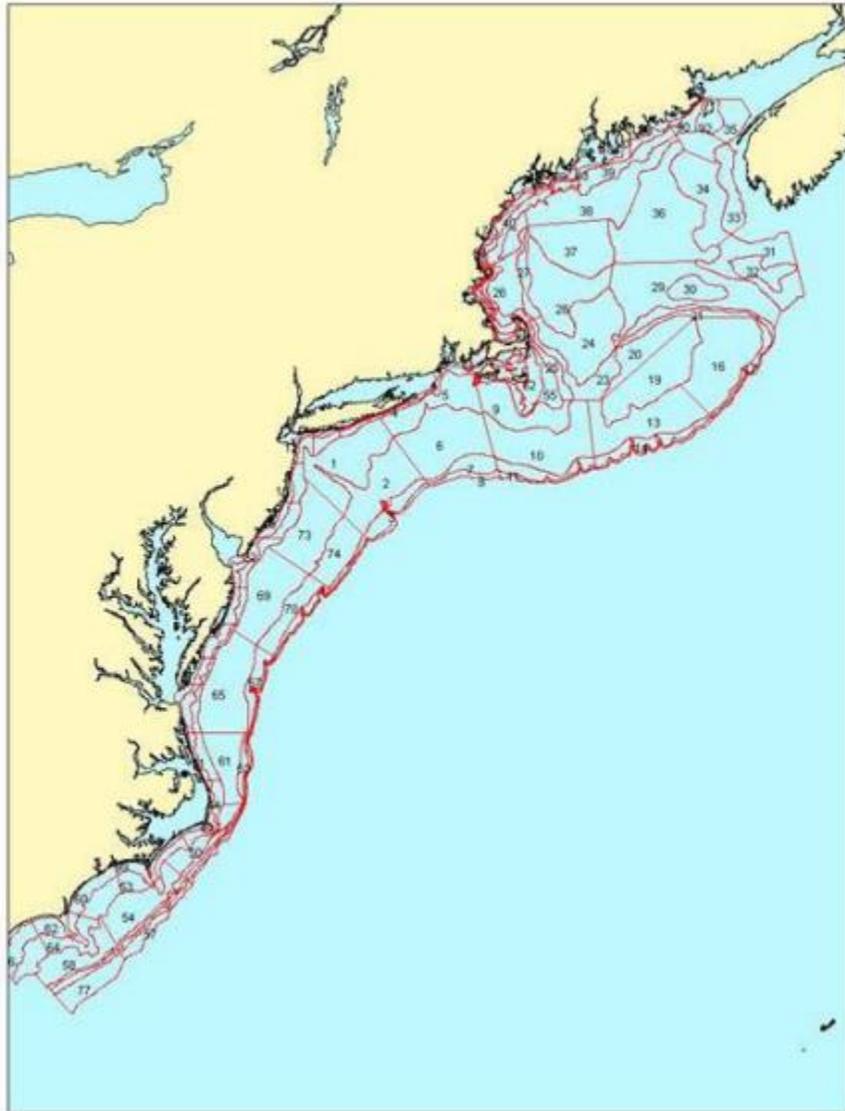


Figure 1: Map of area sampled by the NEFSC Bottom Trawl Survey. The survey is stratified by depth (<9m, 9-18m, >18-27m, >27-55m, >55-110m, >110-185m, >185-365m) and stations are randomly selected within each strata. (Source: NEFSC)

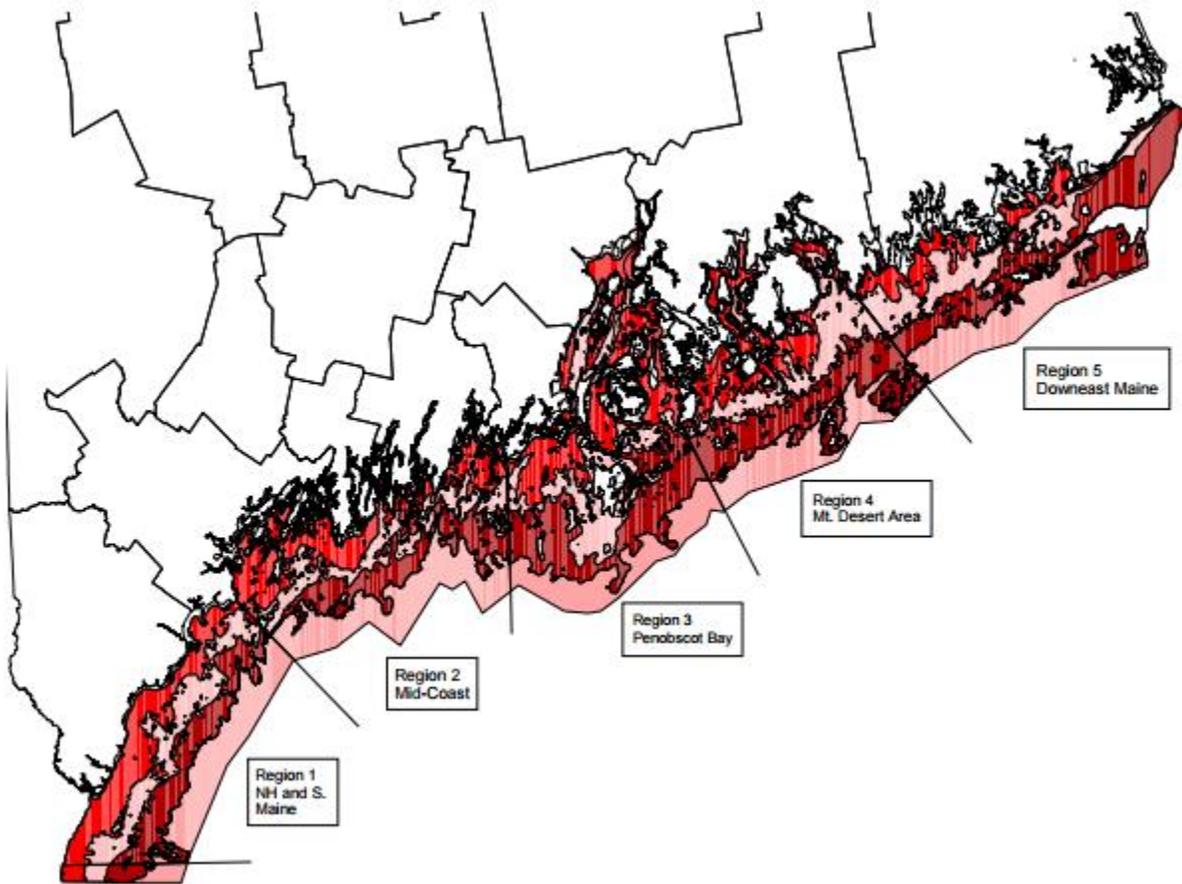


Figure 2: Map of area sampled by the Maine-New Hampshire Inshore Trawl Survey. The survey samples five regions and is stratified by four depth strata (5-20 fathoms, 21-35 fathoms, 36-55 fathoms, and greater than 56 fathoms to the 12 mile line). (Source: ME DMR)

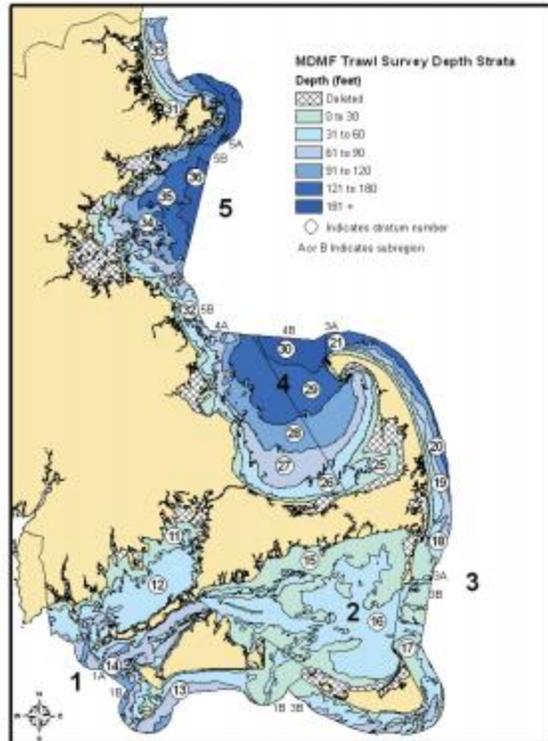


Figure 3: Location of the Massachusetts Trawl Survey. The survey is stratified based on five regions and six depth zones (0-30ft, 31-50ft, 61-90ft, 91-120ft, 121-180ft, >181ft out to 12 mile line). (Source: MA DMF)

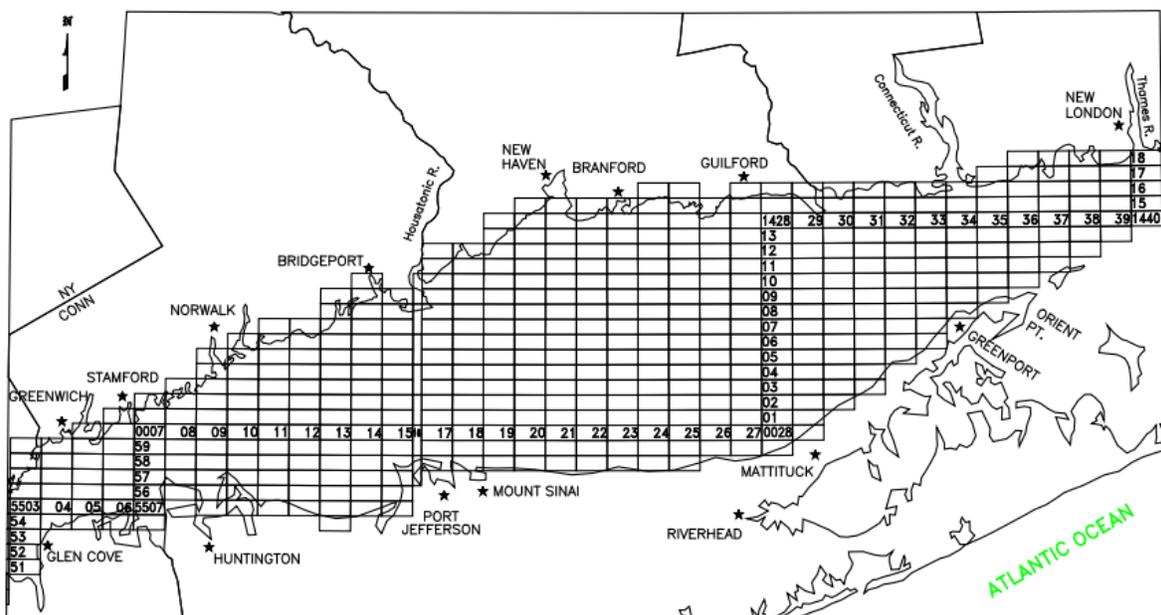


Figure 4: Connecticut – New York trawl survey grid. Each sampling site is 1x2 nautical miles with the first two digits representing the row number and the last two digits representing the column number. (Source: CT DEP)

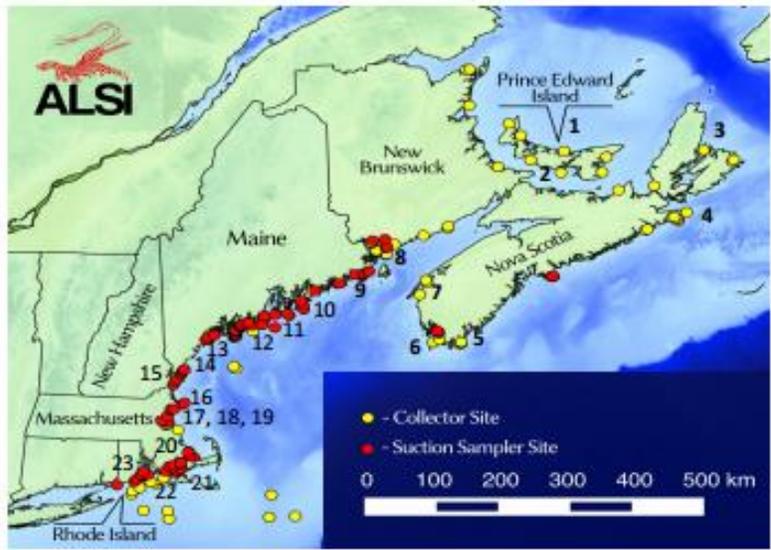


Figure 5: Locations sampled as a part of the 2015 American Lobster Settlement Index. Sites span New Brunswick, Canada down to Rhode Island. (Source: ALSI)

Appendix 3: Offshore Biological Sampling Program for American Lobster

The following comprises excerpts of the TC's October 2017 report to the Board and highlights data needs in the offshore lobster fishery. It is intended to provide guidance on where data gaps exist and how they can be addressed.

Problem Statement: In recent years the lobster fishery has expanded offshore; however, limited biological sampling occurs in these areas. This impedes the effective assessment and management of these offshore lobster fisheries.

Sampling Program: The TC recommends a federal, targeted lobster biosampling program offshore. It is recommended that this program be independent of the Standardized Bycatch Reporting Methodology (SBRM) observer sampling to ensure adequate sampling of federally-permitted vessels. The sampling frame should include all federally-permitted vessels, not just vessels with VTR requirements and should, at a minimum, randomize vessel selection. The program should be stratified by statistical area. In statistical areas in overlapping waters, state and federal programs should coordinate to ensure complementary sampling programs and increased efficiency to meet the needs of the assessment.

Baseline Sampling Threshold: The TC recommends that offshore sampling programs collect the minimum number of samples needed to meet the assessment gap-filling threshold. More specifically, the TC recommends a baseline sampling threshold of 3 samples from each statistical area (with lobster landings) per quarter and year. Statistical areas with lobster landings will be identified from the last year of landings data in the most recent stock assessment. Given that the 3-samples per statistical area/quarter/year is a minimum threshold, sampling should appropriately increase in statistical areas with high lobster harvest.

Location of Sampling: The TC recommends offshore sampling programs in much of GBK and parts of SNE. Through analysis which assessed current sampling efforts by stat area, including port sampling, sea sampling, federal SBRM sampling, and CFRF sampling, the TC identified data gaps in the lobster fishery. Sampling holes were prioritized by the magnitude of landings from that statistical area. Table 1 illustrates the results of this analysis, with statistical areas ordered by landings. Statistical areas with the greatest need for increased sampling include 522, 525, 526, 561, 562, and 616. More specifically, four of these statistical areas (522, 525, 526, and 616) do not meet the minimum sampling threshold in three out of the four quarters.

Table 1: Statistical areas by quarter which did not meet the minimum recommended threshold of 3-samples in 2015 and/or 2016. Samples include both port and sea sampling, as well as sampling by SBRM and CFRF. Statistical areas are ordered by magnitude of landings, with areas of high landings at the top of the table.

StatArea	Season	# Port and Sea Samples		# Years 3-Sample Threshold Not Met
		2015	2016	
525	4	9	2	1
525	3	7	2	1
562	1	1	3	1
526	4	21	2	1
522	2	1	0	2
522	3	20	0	1
522	1	1	0	2
616	3	5	1	1
561	4	14	1	1
525	1	3	1	1
561	2	2	5	1
515	4	5	2	1
623	3	0	0	2
515	3	2	3	1
521	1	0	0	2
612	1	4	2	1
465	2	4	0	1
537	1	0	1	2
526	2	5	2	1
616	4	8	1	1
611	2	1	6	1
623	4	0	0	2
623	2	0	0	2
465	3	0	0	2
616	1	2	0	2
526	1	7	1	1
538	4	0	0	2
611	1	0	0	2
538	1	0	0	2
611	4	0	1	2

Type of Sampling: The TC recommends sea sampling as the preferred sampling method as it provides information on discarded lobsters in addition to landed lobsters, which are characterized by port sampling. Port sampling should be considered a secondary sampling method that is used during poor sampling conditions (i.e. winter) or if there is limited funding. Both sex and length data are of primary importance when conducting a sampling program as they are critical for characterizing sex ratios and size composition.

Revisiting of Sampling Priorities: Given the on-going shifts in effort in the lobster fishery, the TC recommends that an evaluation be conducted on a regular basis to determine where landings are occurring in the fishery and associated sampling holes. This evaluation should be conducted during each stock assessment (5 year basis). Intermittently, the success of sampling programs at achieving current goals can be assessed through annual compliance reports.

Appendix 4: Atlantic Coast with 10 Minute Square Grid

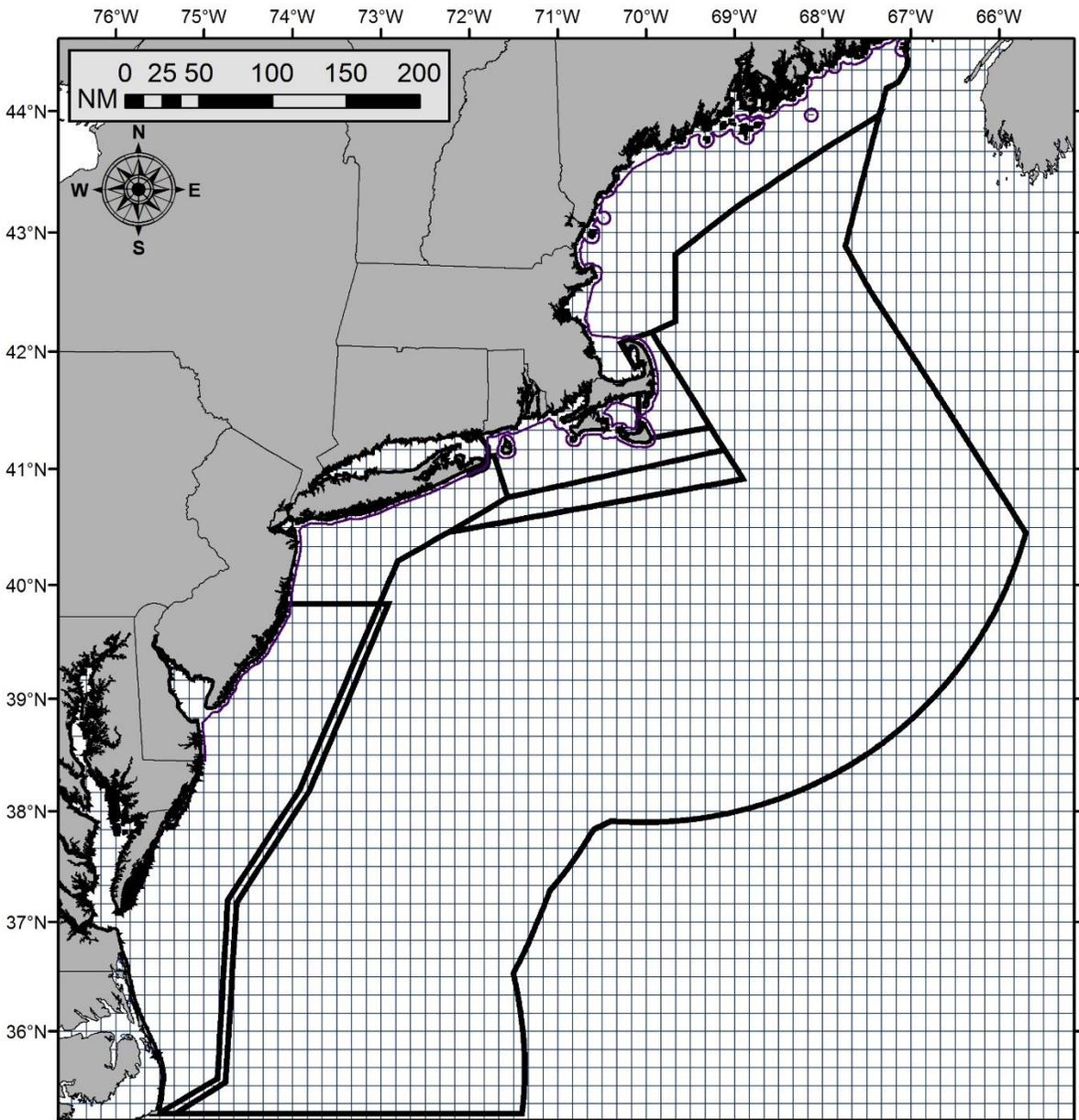


Figure 1: 10 minute squares along the Atlantic coast with outlines of the LCMAs.