ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR AMERICAN LOBSTER
(*Homarus americanus*)

2013 AND 2014 FISHING YEAR

Prepared by the Plan Review Team

Approved by the American Lobster Management Board November 2015

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REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN FOR AMERICAN LOBSTER (*Homarus americanus*) 2013 AND 2014 FISHING YEARS

1.0 Status of the Fishery Management Plan

Year of ASMFC Plan's Adoption:	Amendment 3 (1997)
Framework Adjustments:	Addendum I (1999) Addendum II (2001) Addendum III (2002) Addendum IV (2003) Addendum V (2004) Addendum VI (2005) Addendum VII (2005) Addendum VIII (2006) Addendum IX (2006) Addendum X (2007) Addendum XI (2007) Addendum XII (2008) Addendum XIII (2008) Addendum XIV (2009) Addendum XV (2009) Addendum XVI (2010) Addendum XVII (2012) Addendum XVIII (2012) Addendum XIX (2013) Addendum XX (2013) Addendum XXI (2013) Addendum XXII (2013) Addendum XXIII (2014) Addendum XXIV (2015)
Management Unit:	Maine through North Carolina Lobster is managed in seven different Lobster Conservation Management Areas (LCMA, see appendix A)
States with a Declared Interest:	Maine through Virginia (Excluding Pennsylvania and DC)
Active Committees:	American Lobster Management Board, Technical Committee, Lobster Conservation Management Teams, Plan Development Team, Plan Review Team, Advisory Panel

2.0 Status of the Fishery

2.1 Landings History

The lobster fishery has seen incredible expansion in effort and 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 (Table 1). Since 2008, total coastwide landings have further increased to just under 150 million pounds in 2012. Commercial landings in 2013 were 150 million pounds and slightly declined to 147.8 million pounds in 2014. Maine and Massachusetts accounted for 84% and 10% of catch, respectively. Landings were also reported (in descending order) by New Hampshire, Rhode Island, New Jersey, New York, Connecticut, Maryland, Delaware, and Virginia. The ex-vessel value for all lobster landings in 2013 was $477 million. The ex-vessel value in 2014 was $565 million.

Table 2 shows the break-down of commercial landings by Lobster Conservation Management Area (LCMA). Area 1 has the highest landings and accounts for 80% of total landings between 1981 and 2012. This is followed by LCMA 3 which accounts for 9% of total landings. Yearly trends in the Table show that while landings have generally increased in LCMA 1, they have decreased in LCMA's 4 and 6.

Lobster is also taken recreationally with pots, and in some states, by hand while SCUBA diving. While not all states collect recreational harvest data, Massachusetts reported a total recreational harvest of 221,529 lbs in 2013 and 206,975 lbs in 2014. This represents 1.5% of total Massachusetts's harvest. Similarly, Connecticut's recreational harvest ranged between 1-4% of the annual total from 2001-2011. In New Hampshire, recreational harvest in 2014 was 3,465 lbs and in New York it was 2,310 lbs.

Table 1. Landings (in pounds) of American Lobster by the states of Maine through Virginia (Sources NMFS, ME DMR, NY DMR). *C= confidential data*

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	Total
1981	22,631,600	793,400	11,220,500	1,871,067	1,010,800	890,200	593,700	55,700	63,200	2,200	39,132,367
1982	22,730,100	807,400	13,150,900	2,254,930	1,094,100	1,121,600	846,300	90,700	64,800	4,700	42,165,530
1983	21,976,500	1,310,560	12,421,000	5,020,895	1,854,000	1,207,500	769,900	56,700	86,500	600	44,704,155
1984	19,545,600	1,570,724	14,701,800	5,064,760	2,011,600	1,308,100	927,700	103,800	98,900	17,400	45,350,384
1985	20,125,000	1,193,881	16,295,100	5,080,163	1,676,000	1,240,900	1,079,600	118,500	82,300	1,100	46,892,544
1986	19,704,400	941,100	15,057,600	5,513,831	1,656,100	1,407,100	1,123,000	109,000	57,700	1,000	45,570,831
1987	19,747,800	1,256,170	15,116,800	5,217,300	1,735,591	1,146,700	1,397,100	84,100	49,900	1,000	45,752,461
1988	21,738,800	1,118,900	15,866,312	4,758,990	2,053,800	1,779,890	1,557,300	66,200	23,000	300	48,963,492
1989	23,368,800	1,430,400	15,444,300	5,725,641	2,096,900	2,345,051	2,059,600	76,500	17,500		52,564,692
1990	28,068,238	1,658,200	17,054,434	7,258,175	2,645,800	3,431,111	2,198,867	68,300			62,383,125
1991	30,788,646	1,802,035	16,528,168	7,445,170	2,674,000	3,128,246	1,673,031	54,700			64,093,996
1992	26,830,448	1,529,292	15,823,077	6,763,085	2,439,600	2,651,067	1,213,255	21,000			57,270,824
1993	29,926,464	1,693,347	14,336,032	6,230,855	2,177,022	2,667,107	906,498	24,000			57,961,325
1994	38,948,867	1,650,751	16,094,226	6,474,399	2,212,000	3,954,634	581,396	8,400			69,924,673
1995	37,208,324	1,834,794	15,755,840	5,363,810	2,536,177	6,653,780	606,011	500	2,855		69,962,091
1996	36,083,443	1,632,829	15,323,277	5,579,874	2,888,683	9,408,519	640,198		28,726	1,252	71,586,801
1997	47,023,271	1,414,133	15,087,096	5,766,534	3,468,051	8,878,395	858,426	648	34,208	2,240	82,533,002
1998	47,036,836	1,194,653	13,277,409	5,618,440	3,715,310	7,896,803	721,811			1,306	79,462,568
1999	53,494,418	1,380,360	15,533,654	8,155,947	2,595,764	6,452,472	931,064			6,916	88,550,595
2000	57,215,406	1,709,746	15,802,888	6,907,504	1,393,565	2,883,468	891,183			311	86,804,071
2001	48,617,693	2,027,725	12,132,807	4,452,358	1,329,707	2,052,741	579,753			19	71,192,803
2002	63,625,745	391	12,853,380	3,835,050	1,067,121	1,440,483	264,425	551			83,087,146
2003	54,970,948		11,385,049	3,474,509	671,119	946,449	209,956	2,831	22,778		71,683,639
2004	71,574,344	2,097,396	11,295,474	3,064,412	646,994	996,109	370,112	15,172	14,931	13	90,074,957
2005	68,729,861	2,556,232	9,879,983	4,343,736	713,901	1,154,470	369,264	5,672	39,237	21,255	87,813,611
2006	72,662,294	2,666,344	10,966,322	3,749,432	792,894	1,242,601	470,877	3,315	26,349	28,160	92,608,588
2007	63,959,191	2,468,811	10,143,301	3,268,075	568,696	716,300	680,392	5,918	6,128	26,765	81,843,577
2008	69,863,132	2,567,031	10,597,614	3,528,445	426,292	712,075	632,545	4,884	32,429	17,701	88,382,148
2009	81,175,847	2,985,166	11,781,490	3,174,618	451,156	731,811	179,740	6,067	30,988	21,472	100,538,355
2010	95,506,383	3,658,894	12,768,448	3,258,221	432,491	813,513	641,556	4,574	30,005	16,345	117,130,430
2011	104,693,316	3,917,461	13,717,192	2,513,255	191,594	344,232	627,077	C	C	C	126,066,050
2012	125,759,424	4,236,740	14,917,238	2,932,388	236,846	275,220	919,260	C	C	C	149,336,623
2013	127,773,264	3,822,844	15,738,792	2,149,266	133,008	248,267	660,367	C	C	C	150,621,935
2014	124,440,799	4,939,310	15,060,352	2,387,321	141,988	216,630	526,367	C	C	C	147,805,965

Table 2. Estimated lobster landings (in pounds) by lobster conservation management area (LCMA)* (*Source, ASMFC Lobster Data Warehouse*). This table can only be update in years when stock assessment reports are being 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 send a request to the PRT Chair, Megan Ware, at mware@asmfc.org.

2.2 Recent Management Actions

The 2009 assessment indicated the resource presented a mixed picture of stock abundance throughout its U.S. range, with low abundance and poor recruitment in Southern New England (SNE). In the spring of 2010, the American Lobster Technical Committee (TC) reviewed trends in abundance from 2008 and 2009 and considered a variety of biological and environmental factors that may be impacting Southern New England (SNE) lobster stocks. In May 2010, the TC submitted a report to the Board contending that it was their belief that the SNE stock was experiencing recruitment failure. Evidence suggested the reproductive potential and abundance of the SNE stock had continued to fall to lower levels than what was presented in the 2009 assessment. While larval production and settlement are inherently variable, sustained poor production can only lead to reduced recruitment and ultimately to reduced year class strength and

lower future abundance levels. The TC contended that recruitment failure was caused by overwhelming environmental and biological changes coupled with continued fishing. At that time, the TC recommended a five year moratorium on harvest in the SNE stock area to provide the maximum likelihood of rebuilding the stock above the threshold and toward the target abundance in the foreseeable future.

Following the presentation of the TC report to the Board concerning recruitment failure and stock projections, the Board moved to have the findings reviewed by the Center for Independent Experts (CIE). The CIE reviewers concurred that environmental changes in concert with fishing mortality were the principal causes of the recent stock decline and lower recruitment levels. Although it is not possible to predict how recruitment may change in the near future it was noted that environmental conditions are unlikely to return to the previous favorable state observed in the early 1990's and that reducing exploitation is therefore necessary to prevent further avoidable erosion of the spawning stock. There was general agreement with the TC reports that a moratorium or severe reductions (~75%) in fishing mortality were needed immediately to maximize chances of rebuilding the stock.

To address the concerns of the declining resource, the Management Board approved Addendum XVII (2012) which reduced exploitation by 10% in the management areas within the SNE. The management areas initiated either mandatory v-notch programs or season closures or a combination of the two measures to meet the requirements of the Addendum. The Board also approved Addendum XVIII, which implemented a 50% trap reduction in LCMA 2 and a 25% trap reduction in LCMA 3 over the span of six years. The goal of this management action was to scale the SNE fishery to the size of the resource.

In 2013 the Board approved Addenda XIX – XXII. Addendum XIX implemented a conservation tax of 10% for any transfer or full business sale of LCMA 3 traps. In response to action taken by the New England Fishery Management Council (NEFMC), which allowed limited groundfish harvest in a previously closed area (Closed Area II), the American lobster offshore pot fleet developed an agreement with the groundfish sector to prevent gear conflicts and give equal access to the area by both fisheries. As a result, through Addendum XX, it is prohibitive to set or store lobster traps in Closed Area II from November 1 to June 15 annually.

As the second phase of management action to scale the SNE fishery to the size of the SNE resource, the Board approved Addendum XXI, which modified the previous trap transferability rules for LCMAs 2 and 3. Modifications to the single and aggregate ownership caps for LCMA 3 were approved under Addendum XXII.

In August 2014, the Board approved Addendum XXIII, which updated the habitat section of Amendment 3. The Board also reviewed findings that LCMA 4 was not achieving its 10% reduction in exploitation as required by Addendum XVII. In response, the Board changed the seasonal closure in LCMA 4 from February 1-March 31 to April 30-May 31.

In 2015, the Board aligned state and federal measures for trap transfer programs in LCMA's 2, 3, and the Outer Cape Cod through Addendum XXIV. The Board also approved the 2015 Lobster Stock Assessment and Peer Review Report for management use and, in response to the poor

condition of the SNE stock, agreed to convene a working group of Commissioners and Technical Committee members to identify objectives for the stock.

3.0 Status of Assessment Advice

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

The Assessment found that 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 units, the areas were combined into one stock. While model results show a dramatic overall increase in stock abundance in the GOM/GBK, population indicators did show that young-of-year estimates are trending downward, indicating a potential decline in recruitment in the coming years.

Conversely, the Assessment found that the SNE stock is severely depleted with poor prospects of recovery, necessitating protection. Recruitment indices show that the stock is not rebuilding 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 is expected to impact the offshore portion of the stock since it is dependent on recruitment from the inshore population. Landings in the SNE are expected to decline since the extremely poor year classes which have settled since 2008 have yet to recruit to the fishery.

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.

4.0. Status of Research and Monitoring

4.1 Research Needs

The following were identified as research needs following the 2015 Lobster Assessment.

1. ***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.
2. ***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.

3. ***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.
4. ***Temperature –*** Given the importance of temperature in the life history of lobster, techniques should be developed to incorporate environmental data into population modeling.
5. ***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.
6. ***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.
7. ***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
8. ***Mating*** - In order to understand the potential the SNE stock has to rebuild, it is important to know whether current stock conditions have disrupted the mating system. Low population abundance may be causing a mate-finding Allee effect in SNE. Furthermore, due to the continuation of female-skewed sex ratios observed in the GBK stock, questions regarding the reproductive capacity of these large females should be considered.
9. ***Fishery-Dependent Information*** - Accurate and comparable landings are the principal data needed to assess the impact of fishing on lobster populations. The quality of landings data has not been consistent spatially or temporally. It is imperative that funding for critical monitoring programs continues, and increased monitoring efforts for offshore areas, particularly those from which a large portion of landings originate, are necessary. Furthermore, there are some indications that lobster harvest may be under-reported and this under-reporting may be significant during some periods in the time series examined for this assessment. It is recommended that future research examine this potential under-reporting, and this examination should include simulation testing of these potential periods of under-reporting

4.2 Monitoring

Addendum X requires that states conduct sufficient biological sampling to characterize the commercial catch. Specifically it requires that states weight sampling intensity by areas and season to match 3-year average of area's seasonal commercial catch. This volume of sampling 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 3 describes the level of reporting and sampling by the states.

Table 3. 2014 sampling requirements and state implementation.

State	100% Dealer reporting	10% Harvester Reporting	Sea Sampling	Port Sampling	Ventless Trap Survey	Settlement Survey	Trawl Survey
ME	✓	✓	✓		✓	✓	✓
NH	✓	✓ (100%)	✓	✓	✓	✓	✓ (ME)
MA	✓	✓ (100%)	✓		✓	✓	✓
RI	✓	✓ (100%)	✓	✓	✓	✓	✓
CT	✓	✓ (100%)	✓			✓	✓
NY	✓	✓ (100%)	✓(none conducted 2013-2014)	✓			✓ (CT)
NJ	✓	✓	✓				✓
DE	✓	✓		✓			✓ (no lobsters encountered)
MD	✓	✓	✓				✓ (no lobsters encountered)
VA	✓	✓					

Overviews of the states' port and sea sampling and surveys is as follows:

- Maine: Completed 152 sea sampling trips aboard 144 boats in 2014; suspended its port sampling program following the 2011 sampling year; spring trawl survey stretches from Portsmouth, NH to Lubec, ME and completed 114 tows.
- New Hampshire: Sampled 15,529 lobsters through sea sampling and 1,200 lobsters through port sampling.
- Massachusetts: Sampled a total of 87 trips in LCMA's 1, 2, and OCC through sea sampling; no port sampling conducted; spring and autumn bottom trawl surveys show GOM abundance indices have increased while SNE abundance remains low.
- Rhode Island: Conducted a total of 14 sea sampling trips with data collected on 8,166 lobsters; conducted 3 port samples; for 2013 and 2014, conducted 87 seasonal survey tows.
- Connecticut: 7 sea-sampling trips were conducted during 2014; no port sampling completed; 2014 spring abundance index from trawl survey similar to 2012 but lower than 2009-2011 indices; 2014 fall index ranked lowest in time series.
- New York: Staff unable to arrange any sea sampling trips during 2013 and 2014 and have found it difficult to obtain cooperators; 16 port sampling trips were conducted in 2014.
- New Jersey: Conducted 13 sea sampling trips in 2014 Ocean Trawl survey shows a decrease in the number of lobsters in 2013 and 2014.
- Delaware: Sampled the commercial harvest of 1 trip in 2014; no lobsters taken in the 2014 Delaware Bay trawl surveys.
- Maryland: Conducted sea sampling for the first time in 2014 with a total of 476 lobsters examined; no lobsters taken in Coastal Bay survey.
- Virginia: No port or sea sampling conducted.

4.2.1 Young of the Year Settlement

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: In 2000, settlement surveys were expanded to cover all seven of Maine's lobster management zones (LMZ) in order to create a statewide index of settlement to further this goal. While the 2013 settlement survey showed a third year of decline in all zones, 2014 showed an increase in numbers (Figure 1). When considering the 15 year average, all zones were at or below the 15 year average.

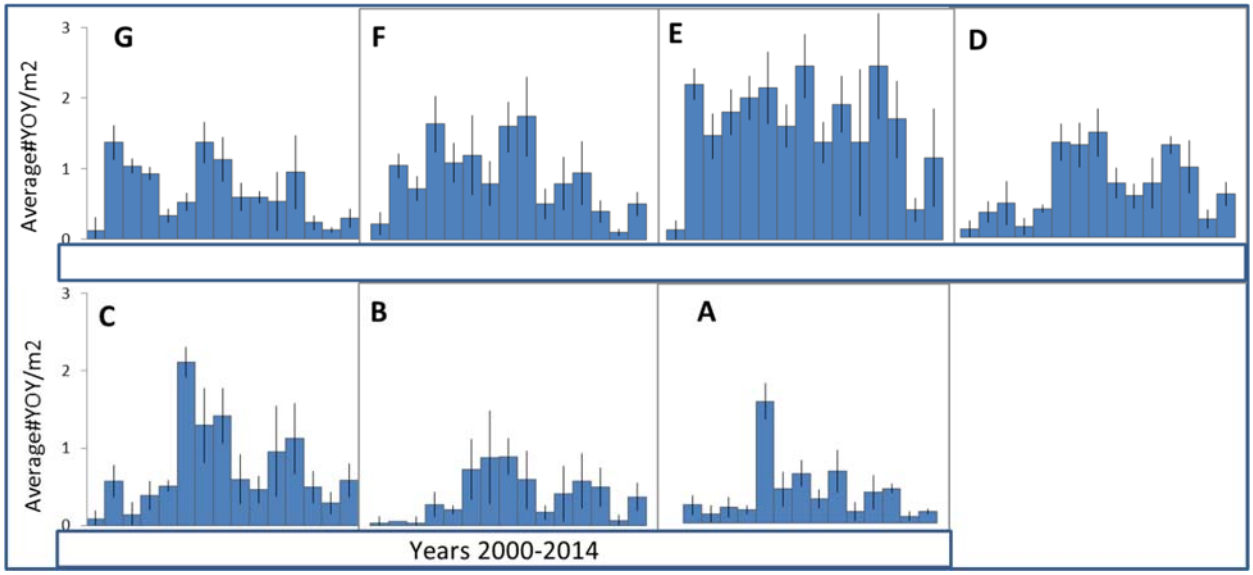

Figure 1. Lobster settlement in Maine's seven lobster management zones from 2000-2014. Zones run from east (Zone A) to west (Zone G).

New Hampshire: New Hampshire Fish and Game (NHF&G) conducted a portion of the coastwide American Lobster Settlement Index (ALSI). In 2014, a total of 17 juvenile lobsters were sampled from three sites, 1 was YOY, 1 was one year old (Y+), and 15 were older juveniles.

Figure 2 depicts the CPUE of YOY, Y+, YOY/Y+ and "all lobsters" for all NH sites combined, from 2008 through 2014. For each of these three data sets, CPUE in 2011 was the highest on record. All four indices show a general upward trend from the survey's inception to 2011, with strong declines in 2012 which continued through 2014. The indices for YOY, Y+ and YOY/Y+ were all at a time series low in 2014.

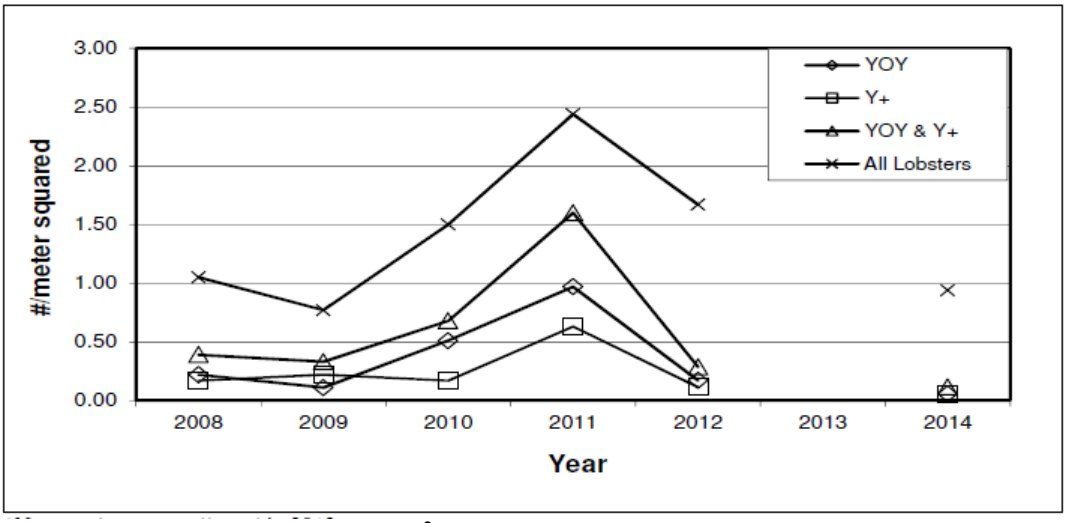

Figure 2. Catch per unit effort (#/meter^2) of both YOY and one year old (Y+) lobsters captured during the American Lobster Settlement Index in New Hampshire state waters from 2008 through 2014. No samples were collected in 2013.

Massachusetts: Annual sampling for early benthic phase/juvenile (EBP) lobsters was conducted using SCUBA and airlift suction sampling equipment from August to September in 2014. Density indices of newly settled post-larval lobsters were calculated (20-year time series) and coastal habitat important to the settlement of these juveniles continues to be defined. Sampling was completed at 21 sites spanning 7 regions in Massachusetts coastal waters (6 Buzzards Bay sites, 2 Vineyard Sound sites, 3 Cape Cod Bay sites, 2 South Shore sites, 3 Boston Harbor sites, 3 Salem Sound sites, and 2 Cape Ann sites). Data for all sites were used to generate annual density estimates of EBP lobster and other decapod crustaceans. Densities of YOY lobsters from 1995 to 2014 are presented in Figure 3. Cape Ann, Salem Sound, Boston, South Shore, and Cape Cod Bay are all within LCMA 1, while Buzzards Bay and Vineyard Sound are within LCMA 2.

In 2014 densities of YOY lobsters in LCMA 1 were below time series mean values in the three regions with long time series (Salem Sound, Boston Harbor, and Cape Cod Bay). The 2014 YOY lobster density in Buzzards Bay was 0.04, slightly below the time series mean for that region.

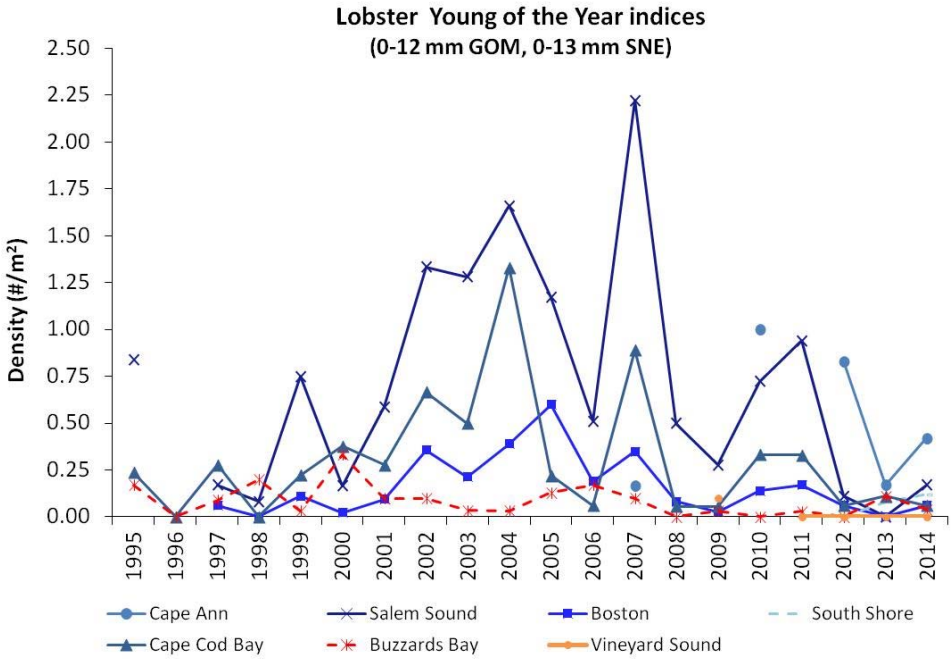

Figure 3. YOY lobster density in seven Massachusetts regions; *LCMA 1* – Cape Ann, Salem Sound, Boston, South Shore, Cape Cod Bay, *LCMA 2* - Buzzards Bay, Vineyard Sound.

Rhode Island: For 2013-2014, the YOY Settlement Survey (Suction Sampling) was conducted at a total of six fixed stations with twelve randomly selected 0.5-meter quadrats sampled at each survey station, for a total of 72 samples each year. The survey stations are located outside of Narragansett Bay along the southern Rhode Island coast, from Sachuest Point (east) to Point Judith (west). The 2013 and 2014 YOY Settlement Survey index were both 0.22 YOY lobster/m^2 (Figure 4).

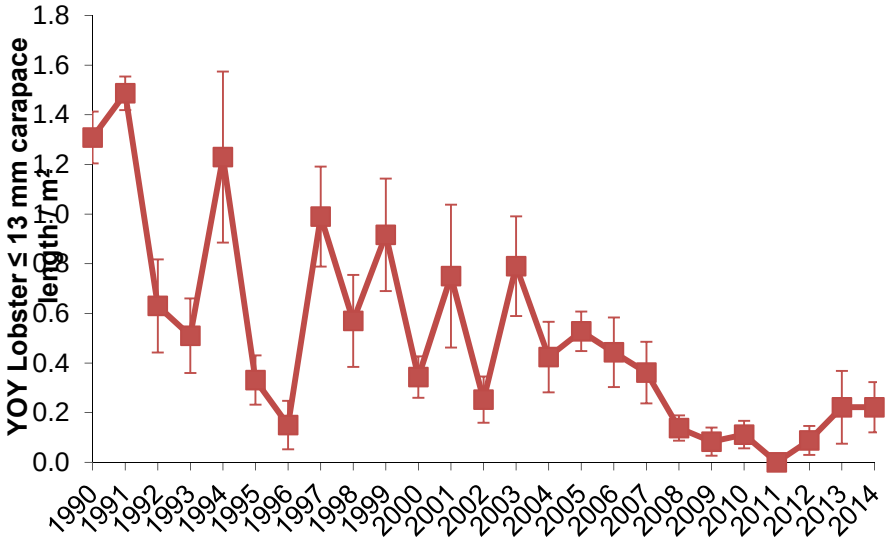

Figure 4: RI YOY settlement index (+/- SE) for 1990-2014.

Connecticut: The CT DEEP Larval Lobster Survey in western Long Island Sound (WLIS) was discontinued in 2013. Alternative monitoring data are available for the eastern Sound (ELIS) from the Millstone Power Station entrainment estimates of all stages of lobster larvae. Abundance indices in both programs are delta mean density of larvae per 1000 cubic meters of water. Both programs show a decline in abundance following the 1999 die-off (correlation between programs: R=0.35, p=0.066). (Figure 5)

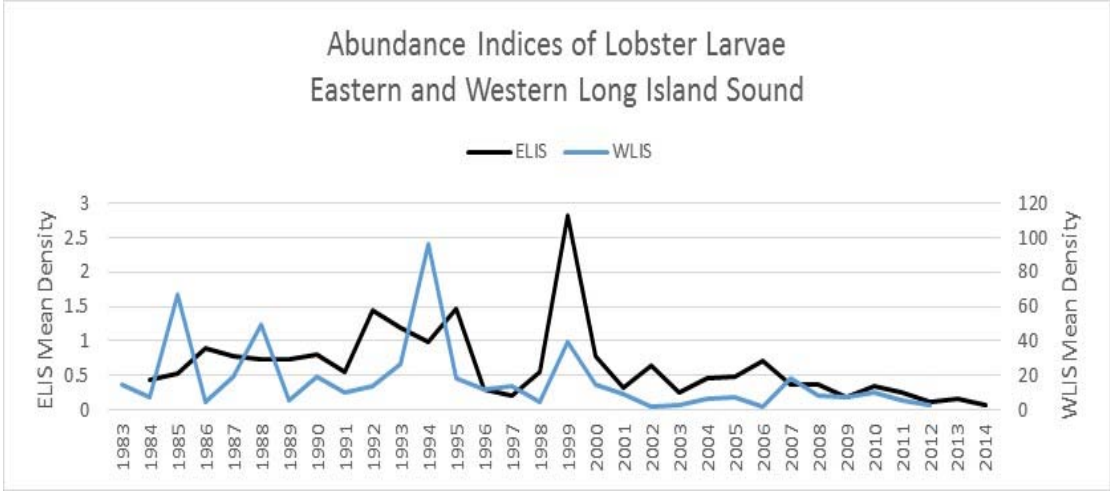

Figure 5: Larvae Abundances in Long Island Sound, 1983-2014.

4.2.2. 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. In the past, fishery-dependent trap sampling data have not been included in generating relative abundance indices for the American lobster due to associated bias with the data collection method. In order to collect unbiased data, a fishery-independent survey (wherein scientists and contracted fishermen cooperatively collect the data) provides greater control over the sampling design and data quality and quantity necessary to maintain a stratified sampling approach.

A random-stratified sampling design was applied to nearshore statistical areas from Maine to New York. The survey was a cooperative effort between state fisheries agencies and commercial lobstermen, who were contracted to fish at pre-determined sampling locations along the New England coast from Maine to New York. Each statistical area was assigned three depth strata (1-20 m, 21- 40 m and 41-60 m).

Maine: 2014 marked the ninth year of the ventless trap survey. The stratified mean was calculated for each area using depth and statistical area. The survey catches 90% sublegal lobsters. Traps were set during the months of June, July and August. 2014 catch rates have decreased from the 2012 peak in statistical area 513. In 512, the catch rates stayed about the same while 511 has experience a slight decrease from the 2013 peak. (Figure 6)

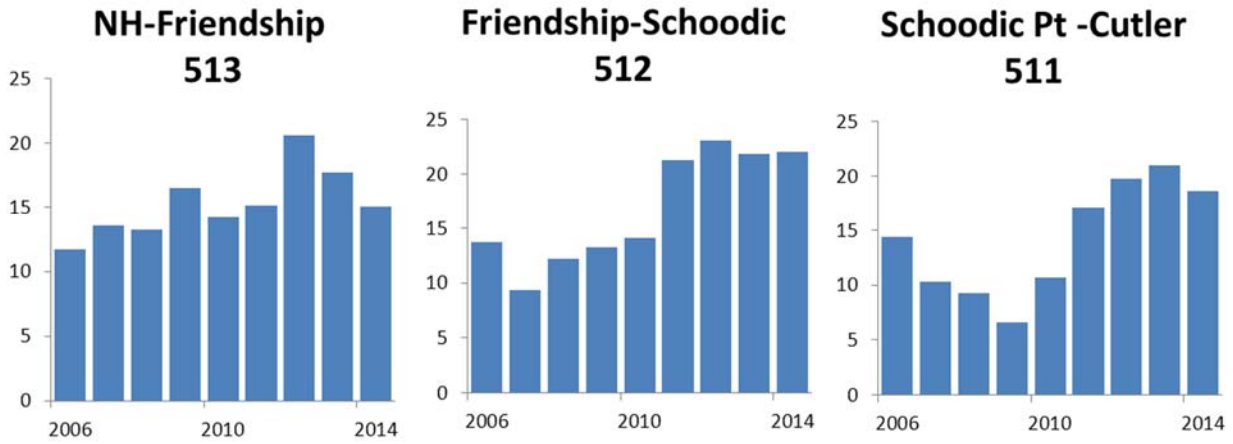

Figure 6. Maine's stratified ventless trap catch rates by Statistical Area for 2006-2014 (all sizes).

New Hampshire: Since 2009, NHF&G has been conducting the coastwide Random Stratified Ventless Trap Survey in state waters (statistical area 513). New Hampshire follows the standardized coastwide procedures for this survey. A total of three sites were surveyed twice a month from June through September in 2014. Catch per unit effort (stratified mean catch per trap haul) from 2009 through 2014 is presented in Table 4. The relative abundance indices associated with this survey shows a general upward trend from 2009 through 2012, followed by decreasing catch rates in 2013 and 2014.

Table 4. Stratified mean catch/trap haul, for all lobsters captured during the coastwide Random Stratified Ventless Trap Survey in New Hampshire state waters from 2009-2014.

Year	Stratified mean catch per trap
2009	6.9
2010	9.2
2011	13.9
2012	13.8
2013	10.5
2014	6.5

Massachusetts: The coast-wide ventless trap survey was initiated in 2006 and expanded in 2007. Each station was sampled with a six pot trawl in which vented and ventless lobster traps were alternated (3 of each per trawl). The survey took place from June through September in statistical areas 514 and 538, and stations were sampled twice monthly. Starting in 2011, the Southern New England portion of the survey was expanded into Federal waters of Area 538, and into the northern-most section of Area 537. The survey was not conducted in 2013 due to a lack of funding. However, MADMF has been able to secure long-term funding for the survey using lobster license revenues, and the survey took place in 2014 and will continue in the future.

Relative abundance of sublegal (< 83 mm CL) and legal-sized (≥ 83 mm CL) lobsters for Area 514 (part of LMA 1) is shown in Figure 7 as the stratified mean CPUE. The average catch of

sublegal lobsters is much higher than the catch of legal-sized lobsters, and has shown an increasing trend since 2007, particularly since 2010. However, the mean CPUE in 2014 was much lower than previous years, but slightly higher than the time series average of 4.13. It remains to be seen if this was an outlier or is indicative of declines from a peak in abundance. The catch of legal-sized lobsters in 2014 was similar to previous years and near the time series average of 0.51. Legal-sized lobsters comprised about 10% of the catch over the survey's time series, and most (86%) of the lobsters caught were > 60 mm CL (including legal-sized lobsters).

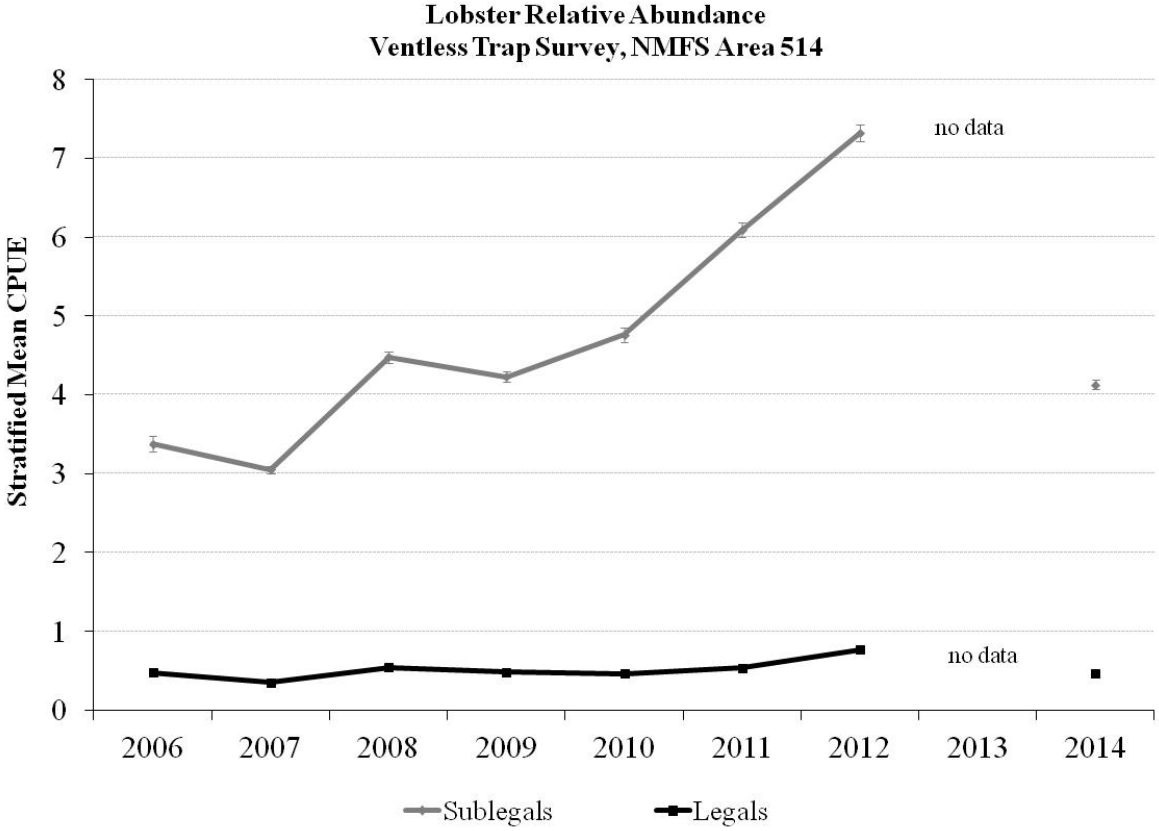

Figure 7. Stratified mean catch per trap haul (±S.E.) of sublegal (< 83 mm, light colored line) and legal (≥ 83 mm, dark line) lobsters in Area 514 in Massachusetts.

Figure 8 shows the time series of relative abundance for sublegal (<86 mm CL) and legal-sized (≥ 86 mm CL) lobsters in Area 538 (part of LCMA 2) as the stratified mean CPUE. The average catch of sublegal lobsters is again higher than the catch of legal-sized lobsters, and has generally declined through 2010. After 2011, sublegal CPUE increased, although this is likely related to the expanded spatial extent of the survey area to include deeper waters outside Buzzards Bay, where thermal conditions are more tolerable. The legal-size CPUE has also slightly increased since 2010, but has remained below 0.5 throughout the time series, with the lowest value observed in 2008 (0.11). Legal-sized lobsters comprised about 13% of the catch over the survey's time series, and most (88%) of the lobsters caught were above 60 mm CL (including legal-sized lobsters).

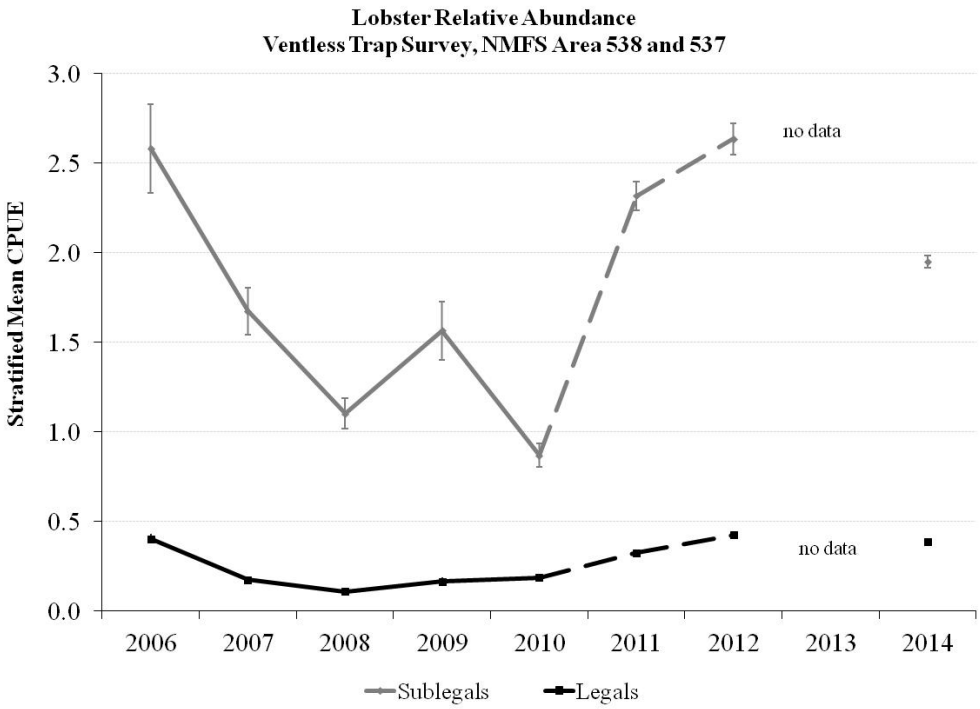

Figure 8. Stratified mean catch per trap haul (±S.E.) of sublegal (< 86 mm, light colored line) and legal (≥ 86 mm, dark line) lobsters in LCMA 538 in Massachusetts. Dashed lines represent the time period when the survey was expanded.

Rhode Island: For 2013 and 2014, the Ventless Trap Survey was conducted during the months of June-August and completed a total of 18 survey sampling trips each year and sampled a total of 4,042 lobsters from 1669 trap-hauls. All sampling was conducted in LCMA 2, NMFS Statistical Area 539. (Figure 9)

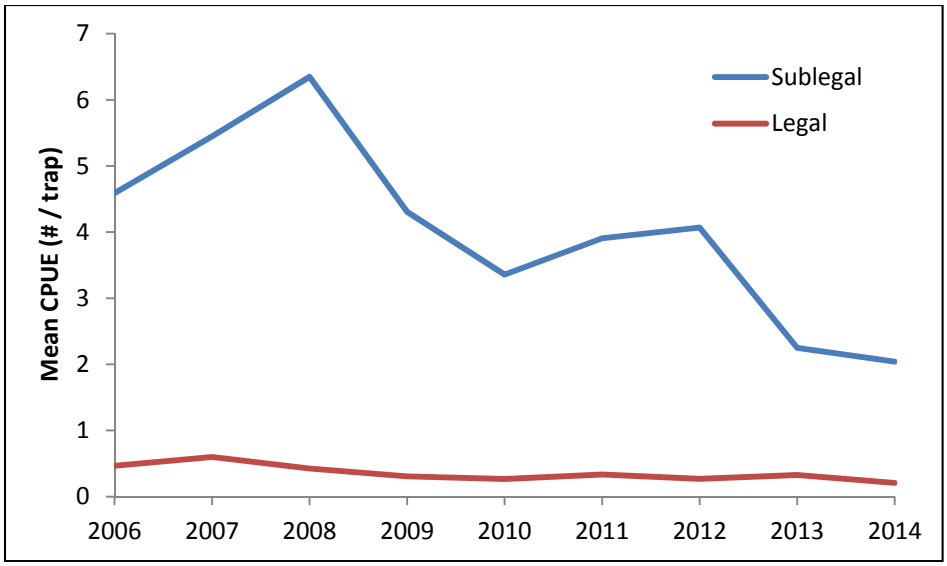

Figure 9. Stratified mean catch (#) per trap-haul (+/- SE) for sublegal (<=85mm CL) and legal-sized (>=86mm CL) lobsters in Rhode Island's VTS.

Regional Trends

Overall, the YOY indices show a declining trend. In the GOM/GBK, Maine and Massachusetts' LCMA 1 indices show an up-tick in 2014, while the New Hampshire's YOY indices are the lowest in the time series. In the SNE stock, both the Massachusetts and Connecticut surveys trend downward through 2014 while there is pronounced increase in the Rhode Island YOY indices in 2013 and 2014. The GOM/GBK YOY indices are not consistently higher than those in SNE.

Data from the ventless trap surveys shows that CPUE peaked around 2012 in the GOM/GBK, followed by declines in 2013 and 2014. Contrastingly, data from the SNE ventless trap surveys shows a decline in 2008 followed by an increase in 2012. In 2014, both the Massachusetts' ventless trap survey for NOAA statistical areas 538 and 537 and the Rhode Island ventless trap survey show a marked decline. Comparing the two biological stocks, CPUE is generally higher in GOM/GBK than in SNE.

5.0 Status of Management Measures and Issues

Amendment 3 established management measures that require coastwide and area specific measures applicable to commercial fishing. The coastwide requirements are summarized in Table 5.

Table 5. 2015 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. Lobster Conservation Management Teams (LCMTs), composed 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 (LMCAs).

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 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.

Amendment 4

In 2000, the Lobster Board considered and failed to approve Amendment 4 to the FMP. The Amendment proposed allowing conservation equivalency be applied to two provision of Amendment 3- limits on non-trap gear and a prohibition on the possession of v-notched lobsters. The v-notch proposal, in particular, arose out of an effort to resolve ongoing litigation brought by fishermen challenging the validity of the Commission's fishery management plan.

Addendum XII (February 2009)

This addendum addresses issues that 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 that 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 that 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)

This addendum alters 2 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)

This addendum establishes a limited entry program and criteria for Federal waters of LCMA 1.

Addendum XVI: Reference Points (May 2010)

This addendum 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 follow a peer reviewed assessment.

Addendum XVII (February 2012)

This addendum establishes a 10% reduction in exploitation for LCMA 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. While approved, the addendum is not final until the inclusion of LCMA 6 plan.

Addendum XVIII (August 2012)

This addendum reduced traps allocated by 50% for LCMA 2 and 25% for LCMA 3.

Addendum XIX (February 2013)

This addendum modifies the conservation tax for LCMA 3 to a single transfer tax of 10% for full or partial business sales.

Addendum XX (May 2013)

This addendum 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)

This addendum 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)

This addendum 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)

This addendum 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)

This addendum 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.

Table 6. 2012 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	Mandatory for all eggers	None	None
V-Notch Definition[1] (possession)	Zero Tolerance	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	State Permitted fisherman in state waters 1/4" without setal hairs Federal Permit holders 1/8" with or w/out setal hairs[1]
Max. Gauge (male & female)	5"	5 ¼"	6 3/4"	5 ¼"	5 ¼"	5 ¼"	State Waters none Federal Waters 6 3/4"
Season Closure				April 30-May 31[2] Federal: Feb 1-Mar 31	February 1-March 31[3]	Sept 8-Nov 28[4]	Feb 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.

6.0 Current State-by-State Implementation per Compliance Requirements

All states are currently in compliance with all required measures under Amendment 3 and Addendum I-XXIV.

7.0 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. Virginia and Delaware meet the *de minimis* requirement. The current two year average of lobster harvest for Maryland exceeds the *de minimis* threshold. Therefore, Maryland does not qualify for *de minimis*.

8.0 Regulatory Changes in 2015

Maine: Planned regulatory changes for 2015 include:

- The removal of the requirement that a trap tag be attached to the trap only by the means for which the tag was designed. Without that specification, fishermen will be able to securely attach the tag by other means (for example, hog rings) which would enable them to change gear over and reuse tags already in their possession.
- Modification of the lobster trawl limit in Hancock County, in order to facilitate changes to minimum trawl lengths required by NOAA Fisheries vertical line regulations effective June 2015.
- Adding the island of Frenchboro to the state's island limited entry program, allowing up to 14 commercial island resident lobster licenses be issued annually.
- Adoption of the federal vertical line regulations for consistency and compliance with the Atlantic Large Whale Take Reduction Plan Final Rule. This includes: a minimum number of lobster traps per trawl based on the different lobster zones and distance from shore to reduce the number of buoy lines in the water column; additional gear marking; a new 6-mile line, and island buffers.

In 2015, the 1st session of the 127th Maine Legislature considered laws making the following changes to Marine Resources statutes pertaining to lobster:

- An increase in the trap limit for the Swans Island Lobster Conservation Area from 550 to 600.
- A change in the penalty for scrubbing egged lobsters from a one year license suspension to permanent revocation of the license.

New Hampshire: Planned change to Fis. 602.09.

- These changes require anyone fishing pots/traps to haul their gear at least once every thirty days. Additionally, there are changes in Fis 602.09 that require person fishing pots/traps to permanently mark vertical lines at least three times (top, middle, bottom) with the color red.

Massachusetts:

- In 2015, MADMF promulgated a February 1 – April 30 MA Seasonal Trap/Pot Gear Haul-Out Period (Seasonal Closure), effective in areas of Massachusetts Bay, Cape Cod Bay and throughout the entire OCC LMA to complement federal rules adopted pursuant to the

ALWTRP. In making this rule change, MADMF also adjusted the timing of the OCC LMA haul-out period. The OCC LMA haul-out period, which previously occurred from January 15 – March 15, now occurs from February 1 – April 30, so that it corresponds with the Seasonal Closure. This extended the OCC LMA haul-out period by one-month, while moving the start date 15-days later.

- For 2016, MADMF intends to enact trap allocation reductions for Lobster Management Area 2 to conform to the Interstate Fishery Management Plan, adjust trap transfer rules to better accommodate permit and trap transfers occurring as a result of these pending trap reductions and to establish state regulations that complement aspects of the Atlantic Large Whale Take Reduction Plan relative to gear marking and configuration.

Rhode Island:

- Adopted 4/6/2015; 15.13.2
  Regarding removal of the escape vent placement requirement. This regulatory change is intended to allow for more flexibility between lobster and crab fisheries. The minimum escape vent size did not change.
- Adopted 6/22/2015; 8.1.4(A)
  Commercial landings possession limit of lobsters taken by gillnet or otter trawl will be limited to not more than maximum of one hundred (100) lobsters per day (based on a 24-hour period), or up to a maximum of five hundred (500) lobsters per trip for trips of five (5) days or longer. This regulatory change clarifies wording that allowed a bycatch of lobsters from traps other than lobster traps.
- Adopted 7/12/2015
  This regulatory change is to repeal the current regulation "Part XV - Lobsters, Other Crustaceans, and Horseshoe Crabs" to be replaced with a new regulation in order to effectuate a re-organization of the structure of the regulation to improve its readability; and to remove unnecessary duplicative, administrative, and/or non-regulatory statutory language. There are no regulatory changes created by this action.

New York

- Due to the fact that the Addendum XVII management measures adopted for LMA 4 did not meet the required ten percent reduction, New York adopted rules which revised the closed season dates for LMA 4. The revised dates are April 30 through May 31. The rule was adopted through Emergency Regulations on 1/30/2015 and final adoption was 5/6/2015.

9.0 Recommendations and Issues

The following are issues the Plan Review Team would like to raise to the Board as well as general recommendations:

1. The PRT recommends that the Board approve the *de minimis* requests of DE and VA.

2. The PRT encourages the full implementation of data collection programs specified in the lobster Plan. Addendum X (2007) requires "*100% mandatory dealer reporting and at least 10% of active harvesters reporting (with the expectation of 100% of license holders reporting in time)*". Currently, not all states require 100% harvester reporting and the PRT recommends state regulations are changed to meet this expectation. Furthermore, the PRT

recommends 100% VTR reporting from federal lobster fishermen in order to fill gaps in current harvester data.

3. The PRT recommends that research is conducted to investigate stock connectivity between inshore and offshore areas, especially in SNE. Specific concerns include larval transport in SNE between state and federal waters and the effectiveness of inshore surveys to document low population levels.

4. There are significant inconsistencies in the OCC regulations (ie: v-notch and maximum gauge size) between state and federal waters. The PRT recommends that these discrepancies are addressed by the Board. Additionally, the PRT recommends that inconsistent regulations between the GOM and GBK be addressed now that the areas are a single stock.

5. The PRT recommends that areas which rely on trap limits as the primary form of conservation prioritize marine patrol enforcement, particularly as trap reductions take place. The PRT also suggests that states submit data on law enforcement activity as part of the annual plan review.

6. The PRT suggests that the costs of complying with mandated FMP requirements be estimated for the purpose of determining the relationship between the value of the lobster fishery in a particular state and the cost of mandated FMP requirements.