

2009 REVIEW OF THE  
ATLANTIC STATES MARINE FISHERIES COMMISSION  
FISHERY MANAGEMENT PLAN  
FOR  
AMERICAN LOBSTER  
(*Homarus americanus*)  
2008 FISHING YEAR



Prepared by the Plan Review Team

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**2009 REVIEW OF THE ASMFC FISHERY MANAGEMENT PLAN FOR AMERICAN  
LOBSTER (*Homarus americanus*) 2008 FISHING YEAR**

**I. Status of the Fishery Management Plan**

<u>Year of ASMFC Plan's Adoption:</u>	Amendment 3 (1997)
<u>Framework Adjustments:</u>	Addendum I (1999) Addendum 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)
<u>Management Unit:</u>	Maine through North Carolina  Lobster is managed in 7 areas (see appendix A)
<u>States with a Declared Interest:</u>	Maine through North Carolina (Excluding Pennsylvania and DC)
<u>Active Committees:</u>	American Lobster Management Board, Technical Committee, Advisory Panel, Plan Development Team, Plan Review Team, Transferability Subcommittee, and Stock Assessment Subcommittee

**II. Status of the Fishery**

The lobster fishery has seen incredible expansion in effort and landings since the late 1940s and early 1950s, when landings varied around 25 million pounds. The last ten years have seen large increases in lobster landings, rising from 79 million pounds in 1998 and peaking in 2006 at 93 million pounds (table 1). The significance of this increase in harvest is most easily illustrated by comparing 2006 landings to that of the period between 1978-1987 (33-44 million pounds). Landings have continued to increase over time, with small decreases occurring in 1992, 1998, 2000, and 2003. Landing decreased slightly in 2007 with harvest estimates of 81 million pounds and rose to 88.8 million pounds in 2008. Maine and Massachusetts account for 92% of the 2008 commercial landings, 79% and 13% respectively.

Lobster pots are the predominant commercial gear, other gear types include otter trawls, gill net, dredge and SCUBA. Lobster is also taken recreationally with pots and by hand while SCUBA diving. The magnitude of recreational landings is unknown.

During the fall and winter of 1999-2000, the lobster resource in western Long Island Sound suffered mass mortalities, the cause of which include pesticides, environmental factors (e.g. water temperature changes), and disease. Following requests from the Governors of NY and CT, the U.S. Secretary of Commerce, on January 26, 2000, declared the Long Island Sound (LIS) die-off to be a commercial fishery failure. Following the declaration, the U.S. Congress appropriated \$13.9 million to address the biological and economic consequences of the fishery failure. \$7.3 million of this amount was used to provide economic relief to impacted lobstermen in NY and CT. \$6.6 million was used to fund comprehensive research into the possible cause(s) of poor lobster health in LIS.

In August of 2002, the Lobster Management Board asked the Technical Committee to advise the Board on the magnitude of problems in Area 2 as well as recommend an appropriate response. This request was in response to requests from Area 2 fishermen to look into the dramatic declines of the resource in Area 2. The October 2002 Technical Committee report indicated that landings had declined, the area survey indices had declined, and the incidence of shell disease was increasing. There was a consensus among the TC that the current overfishing definition (F10%), in combination with the proposed management measures, were not sufficient to remedy the current stock declines observed in Area 2 and spawning stock biomass needed to be rebuilt. The Lobster TC recommended reducing fishing mortality in Area 2 and reducing effort in Area 2. In fall of 2005, the Board approved an effort control plan for Area 2 that would be effective July 1, 2007. This plan reduced traps to 2003 levels.

Based on information on lobster maturity, abundance trends, size composition, and anecdotal information from fishermen from the 2005 stock assessment, the Lobster Board adopted the recommendation from the 2005 peer review to adopt new stock assessment areas (GOM, GBK and SNE) and new biological reference points, including abundance and fishing mortality targets and thresholds. The new reference points are designed to take advantage of multiple measures of stock status. Many of these new measures of stock status depend heavily upon the accuracy of landings data from every area of the coast. The expanded reporting programs established in 2007 are vital for reliable status assessments that can resolve differences by area and have a quick enough turn around time to be useful for immediate management recommendations.

**Table 1. Landings of American Lobster by the states of Maine through New Jersey/South from 1990-2008 (pounds). (Source, ASMFC Lobster Data Warehouse)**

YEAR	ME	NH	MA	RI	CT	NY	NJS	Total
1981	22,631,614	793,400	11,420,638	1,871,067	807,911	890,218	714,873	39,129,721
1982	22,730,253	807,400	11,265,840	3,173,650	880,636	1,121,644	1,006,416	40,985,839
1983	21,684,916	1,310,560	12,867,378	5,114,486	1,654,163	1,207,442	923,424	44,762,369
1984	19,545,682	1,570,724	12,446,198	5,259,821	1,796,794	1,308,023	1,167,629	43,094,871
1985	20,125,177	1,193,881	13,702,702	5,140,131	1,381,029	1,240,928	1,323,399	44,107,247
1986	19,704,317	941,100	12,496,125	5,667,940	1,253,687	1,416,929	1,382,713	42,862,811
1987	19,747,766	1,256,170	12,856,301	5,317,302	1,571,811	1,146,613	1,591,306	43,487,269
1988	21,739,067	1,118,900	12,977,313	4,758,990	1,923,283	1,779,908	1,700,084	45,997,545
1989	23,368,719	1,430,347	15,645,964	5,786,810	2,076,851	2,344,932	2,198,909	52,852,532
1990	28,068,238	1,658,200	16,966,779	7,258,175	2,645,951	3,431,111	2,350,427	62,378,881
1991	30,788,646	1,802,035	16,071,519	7,445,172	2,673,674	3,128,246	1,762,090	63,671,382
1992	26,830,448	1,529,292	15,031,950	6,763,087	2,534,161	2,651,067	1,262,287	56,602,292
1993	29,926,464	1,693,347	14,431,048	6,228,470	2,177,022	2,667,107	980,088	58,103,546
1994	38,948,867	1,650,751	16,278,360	6,474,399	2,146,339	3,954,634	598,249	70,051,599
1995	37,208,324	1,834,794	16,049,386	5,362,084	2,541,140	6,653,780	663,276	70,312,784
1996	36,083,443	1,632,829	15,358,900	5,295,797	2,888,683	9,408,519	690,672	71,358,843
1997	47,023,271	1,414,133	15,111,642	5,798,529	3,468,051	8,878,395	895,558	82,589,579
1998	47,036,836	1,194,653	13,247,727	5,617,873	3,715,310	7,896,803	744,233	79,453,435
1999	53,494,418	1,380,360	15,911,082	8,155,947	2,595,764	6,452,472	985,927	88,975,970
2000	57,151,327	1,709,746	15,031,538	6,907,504	1,393,565	2,883,468	1,021,772	86,098,920
2001	48,617,693	2,027,725	12,241,162	4,452,358	1,329,707	2,052,741	640,557	71,361,943
2002	63,625,745	2,029,887	13,719,249	3,835,050	1,067,121	1,440,483	293,321	86,010,856
2003	54,970,948	1,958,817	11,429,054	3,561,391	671,119	946,449	249,947	73,787,725
2004	71,574,344	2,851,262	11,710,809	3,059,319	646,994	1,189,000	425,828	91,457,556
2005	68,729,813	2,556,481	11,453,192	3,174,852	713,901	1,235,039	436,192	88,299,470
2006	72,666,861	2,604,730	12,094,531	3,751,670	792,894	1,312,933	529,243	93,752,862
2007	64,334,514	2,468,686	10,154,754	2,298,994	568,696	716,300	690,196	81,232,140
2008	69,910,934	3,263,796	10,605,775	2,770,587	427,175	1,159,593	687,657	88,825,517

NJS includes landings for NJ, DE, MD, VA, and NC.

Table 2. Estimated inshore and offshore lobster landings (lbs) by stock assessment area (Source, ASMFC Lobster Data Warehouse)\*  
**This table can only be update in years when stock assessment reports are being conducted. (this is an approximation by assigning statistical area landings into inshore and offshore waters\*)**

Year	GBK			GOM			SNE			Grand Total
	Inshore	Offshore	Total	Inshore	Offshore	Total	Inshore	Offshore	Total	
1981	134,327	2,386,398	2,520,725	32,369,320	208,954	32,578,274	2,304,426	1,726,296	4,030,722	39,129,721
1982	163,105	2,644,446	2,807,551	32,123,750	215,548	32,339,298	3,737,173	2,101,817	5,838,990	40,985,839
1983	198,448	2,992,038	3,190,486	32,826,685	394,649	33,221,334	6,090,501	2,260,048	8,350,549	44,762,369
1984	208,832	3,089,007	3,297,839	29,862,411	555,222	30,417,633	6,613,554	2,765,845	9,379,399	43,094,871
1985	261,929	3,019,676	3,281,605	31,590,759	503,547	32,094,306	6,400,237	2,331,099	8,731,336	44,107,247
1986	298,747	2,440,978	2,739,725	30,080,507	378,788	30,459,295	6,653,924	3,009,867	9,663,791	42,862,811
1987	276,250	2,625,350	2,901,600	30,682,754	76,198	30,758,952	7,170,992	2,655,725	9,826,717	43,487,269
1988	295,985	2,827,146	3,123,131	32,362,492	36,317	32,398,809	8,206,125	2,269,480	10,475,605	45,997,545
1989	352,155	2,571,666	2,923,821	36,800,166	33,676	36,833,842	10,233,022	2,861,847	13,094,869	52,852,532
1990	581,447	2,572,247	3,153,693	41,720,481	706,277	42,426,758	11,175,686	5,622,743	16,798,429	62,378,881
1991	740,267	2,742,909	3,483,177	43,648,773	918,591	44,567,363	10,744,955	4,875,887	15,620,842	63,671,382
1992	738,026	3,016,312	3,754,338	39,055,380	50,716	39,106,096	9,684,570	4,057,288	13,741,858	56,602,292
1993	938,486	2,467,363	3,405,849	40,962,969	488,651	41,451,620	9,427,904	3,818,174	13,246,078	58,103,546
1994	848,181	2,119,170	2,967,351	51,597,880	551,757	52,149,637	11,921,285	3,013,325	14,934,610	70,051,598
1995	1,000,609	1,637,545	2,638,154	49,771,715	850,641	50,622,356	14,531,909	2,520,365	17,052,274	70,312,784
1996	852,532	1,625,212	2,477,744	47,992,628	778,449	48,771,077	17,616,401	2,493,621	20,110,022	71,358,843
1997	849,126	1,786,507	2,635,633	58,016,197	678,233	58,694,430	18,173,931	3,085,585	21,259,516	82,589,579
1998	797,019	1,798,241	2,595,260	56,187,841	621,965	56,809,806	17,423,366	2,625,003	20,048,369	79,453,435
1999	739,904	2,437,025	3,176,929	65,375,535	552,818	65,928,353	16,693,930	3,176,758	19,870,688	88,975,970
2000	765,801	1,845,085	2,610,886	69,265,611	834,722	70,100,333	10,630,890	2,756,811	13,387,701	86,098,920
2001	611,242	2,490,524	3,101,766	57,531,942	883,678	58,415,620	7,693,550	2,151,007	9,844,557	71,361,943
2002	786,137	2,658,657	3,444,794	73,607,600	908,126	74,515,727	6,132,487	1,917,849	8,050,335	86,010,856
2003	804,355	3,134,528	3,938,883	63,005,041	1,212,960	64,218,001	2,997,213	2,633,629	5,630,842	73,787,725
2004	993,689	3,369,139	4,362,828	80,448,651	1,168,922	81,617,573	3,224,030	2,253,125	5,477,155	91,457,556
2005	966,787	4,310,127	5,276,913	76,240,627	1,048,403	77,289,030	3,631,404	2,102,123	5,733,527	88,299,470
2006	1,048,051	3,890,924	4,938,975	80,846,400	1,378,575	82,224,975	4,250,211	2,338,700	6,588,912	93,752,862
2007	1,132,991	3,417,648	4,550,639	70,862,089	960,155	71,822,244	3,367,005	2,000,166	5,367,171	81,740,055
Grand Total	17,384,426	71,915,868	89,300,294	1,354,836,205	16,996,537	1,371,832,742	236,730,681	75,424,182	312,154,864	1,773,287,900

\*Landings data are not collected by in and off-shore waters. To separate landings, statistical areas are estimated into in-shore and off-shore waters. For a complete description of how estimates are completed send a request to the PRT Chair, tkerns@asmfc.org

Table 3. Estimated lobster landings (lbs) 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.**

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
Grand Total	1,354,836,205	93,914,418	164,084,815	28,849,521	2,214,112	112,004,403	17,384,426	1,773,287,900

\*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, tkerns@asmfc.org.

### **III. Status of Assessment Advice**

#### **Most Recent Assessment**

The 2009 peer-reviewed stock assessment report indicates 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), continued low abundance and poor recruitment in Southern New England (SNE), and further declines in recruitment and abundance in NMFS Statistical Area 514 (Massachusetts Bay and Stellwagen Bank) since the last assessment. The Peer Review Panel noted particular concern regarding the status of the stock throughout the SNE assessment area and within Area 514 and recommended that further restrictions are warranted for both areas.

The new assessment showed current abundance of the GBK stock is at a record high and recent exploitation rates are at a record low. Recruitment has remained high in GBK since 1998. Sex ratio of the population in recent years is largely skewed toward females (~80% from 2005 to 2007) for unknown reasons. The Technical Committee noted the stock could experience recruitment problems if the numbers of males in the population are low.

The new assessment showed current abundance of the SNE stock is the lowest observed since the 1980s and exploitation rates have declined since 2000. Recruitment has remained low in SNE since 1998. Given current low levels of spawning stock biomass and poor recruitment further restrictions are warranted.

The new assessment recommends revisions to the reference points set in the FMP. Stock status is determined by comparing threshold values to the average abundance and exploitation rate during recent years (2005-2007). Thus, “overfishing” would occur if the average recent exploitation rate were higher than the threshold. A stock would be “depleted” if average recent abundance fell below the threshold. Given these recommended revised reference points, the GOM and GBK stocks are not depleted and overfishing is not occurring, while the SNE is depleted but not experiencing overfishing. A draft Addendum is currently considered by the Board to revise the reference points. Options in the draft Addendum include those recommended by the technical committee as well as options recommended by the peer review panel.

### **IV. Status of Research and Monitoring**

#### **Research Needs**

##### **University of Maine Model Development**

The University of Maine model used for this assessment should be revised if the model will be used for future lobster assessments. Where possible, more biological realism from the Life History model should be incorporated. A complete list of revisions will be generated following peer review, but will likely include options to:

- Estimate the growth matrix
- Include any number of surveys
- Specify number of years across which to conduct the assessment (e.g. to ease performance of sensitivity and retrospective analyses)

- Estimate time varying catchability
- Separate male and female estimated selectivity components
- Estimate trend in M

In addition, the following tasks should be completed:

- Continue to explore effects of natural and fishing mortality on growth
- Examine projection capabilities
- Explore further the model's MCMC and likelihood profile uncertainty estimation capabilities
- Improve efficiency (reduce duplication of same/similar functions)
- Reorganize report section
- Retest model with simulated data to error check all the changes that have been made

### **Program Research**

New research and expansion of existing monitoring programs in the following areas would provide information needed to improve future stock assessments:

#### ***1 - 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. Aligning stock management areas with area designations for landings and management is necessary. Enhanced sea sampling and port sampling to create a more complete record of biological characteristics of the catch and harvest would also improve the usefulness of these data. This is especially needed in offshore waters. In addition, investigations are needed to determine where lobster are being caught and if and how this changes over time. A lot of progress has been made recently by improvements in landing reporting programs (SAFIS, 10% mandatory reporting, and mandatory vessel trip reports in some areas) and increased port and sea-sampling programs. However, many of these gains are about to be lost due to lack of funding. There is no funding for the offshore port-sampling program and shrinking funds for sea-sampling programs will impact the spatial and temporal extent of sampling efforts. These types of programs are essential for accurate lobster assessments and must have dedicated funding.

#### ***2 - Growth***

The apparent mismatch of biological reference points and current stock status from this and previous assessments, poor model fits to certain length data sources in the new assessment, and samples of large lobster from Georges Bank with clean shells (no fouling or shell disease), suggest that growth may not be characterized correctly. All of the information used to estimate molt frequency and much of the information used to estimate molt increments was collected from hatchery reared lobster. Hatchery growth may not be an accurate model of growth in the wild, particularly for large lobster. Research and tagging programs should be developed to generate better more accurate information on growth, particularly for large lobster.

#### ***3 - Fishery-Independent Information***

There is a need to develop consistent techniques that monitor distribution and abundance of



lobster independent of the fishery. Current methods (e.g. trawls) are limited in area (gear conflicts) and do not target primary lobster habitat (unable to access complex bottom). A coastwide ventless trap survey was initiated in 2006 to develop a time series of lobster relative abundance and recruitment while attempting to eliminate the biases identified in conventional surveys. The survey was conducted from 2006 to 2008 from the Gulf of Maine to Long Island Sound. Funding is necessary to continue the survey.

These data will need to be calibrated for use alongside trawl survey indices in future assessment models. Also, the NEFSC trawl survey data from old and new vessels (Albatross vs. Bigalow) will need to be calibrated before these data can be used in the next assessment.

Little is known about the cause and implications of the sudden recent increase in proportion females in offshore GOM and GBK. Given the potential for sperm limitation and decreased stock productivity that could result, more research is needed on this phenomenon.

Current stock boundaries separate the US and Canadian lobster population into semi-discrete stocks, so it is necessary to understand how much adult and larval exchange occurs between stocks and if this exchange represents a significant recruitment subsidy to US stocks. How do differing management strategies in adjacent stocks fit if exchange rates are high? This is particularly important given the similarities in the increasing size and proportion of female in the offshore Gulf of Maine and Georges Bank stocks.

#### ***4 - Age***

All assessments of lobster stock status have been based on analyses of length data. Age is assumed by applying per-molt growth increments and molt frequencies to the length data. Based on these analyses, the American lobster has been treated as an extremely long-lived animal, reaching a reproductive maximum at a relatively old age. These assumptions are based on no actual age data. Applying aging techniques developed in England and Australia for lobster and other crustaceans would greatly improve our understanding of how many year-classes support the current trap fishery, how length relates to age, and how variable the age structure is over stock area and time. Research has been initiated on ageing techniques in New England in ME and CT. This work should be continued and expanded.

#### ***5 - Ecosystem-based Management***

NOAA's 2004 Strategic Plan for Fisheries Research recommends the inclusion of ecosystem and environmental information in all stock assessments. Further examination of lobster mortality not related to the fishery would provide a better understanding of factors limiting productivity and longevity. Research has been conducted in Southern New England in response to the Long Island Sound lobster die off elucidating the affects of temperature, pesticides and shell disease. Initial modeling work has been developed relating North Atlantic Oscillation (NAO) and water temperature shifts to larval and adult survival. Additional topics should include: predator/prey interactions and community structure (e.g. gut content analyses), directed tagging studies to estimate natural mortality, climatic shifts in ocean currents and temperature in all stock areas, and toxic substances causing chronic stress or disease. Investigations of stock unit carrying capacity should be explored, specifically: How should lobster be managed in a stock whose

carrying capacity has declined or may be declining? What metric should be used to measure carrying capacity for lobster? How would a climate- induced range contraction be defined, and how should a stock whose range has contracted be managed?

### ***6 - Investigation of Trans-boundary Assessments***

Investigate conducting joint US and Canadian assessments. The two most productive U.S. stocks, (Gulf of Maine and Georges Bank), are shared with Canada. The two stock areas should be assessed as a jointly, and linkages between US and Canadian fisheries and the dynamics of different management strategies on shared stocks should be examined.

### ***7 - Investigation of Historical Levels of Stock Production***

One limitation of current trend based reference points is the period covered by the assessment. Investigations of past levels of stock size and size structure could provide additional insight into setting reference points that relate to the full range of stock productivity. Current status should be compared to some reasonably high stable period of stock production. Otherwise current stock status may be compared to a median value that is a continued diminishing return.

### **Monitoring**

In 2006, New Hampshire, Massachusetts, Rhode Island, and New York added port sampling to collect representative samples of lobster catches in offshore waters. This data will be analyzed and used for future lobster assessments. This sampling program is designed to improve the catch, effort, and biological data that are representative of the states fishery as a whole.

The PRT is concerned that funding for both fishery independent and dependent data collection is at risk. State resources are shrinking making it more difficult to secure funding for these programs. These data collection programs need long-term funding in order for the stock assessment committee to use them for stock assessments.

### **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.

Maine: Lobsters in the sample are determined to be young-of-year (YOY) based on their carapace length. Size frequency plots for 2007 show a carapace length of  $\leq 11$ mm represents the current year's settlement. Settlement in Maine was higher than the eight year averages. High settlement levels in the Midcoast region have traditionally been driven by a few very productive sites. In 2007 more of the region's sites showed above average numbers of YOY lobsters. After a drop in settlement in 2006 for these historic sites they returned to near record levels in 2007. Preliminary analysis shows that juvenile abundance was lower in 2008 than the previous three years in all zones with the exception of Casco Bay where levels were at an eight year high.

Massachusetts: Density indices of newly settled post-larval lobsters were calculated (12 year time series) and coastal habitat important to the settlement of these juveniles continues to be defined. Sampling was completed at 18 sites spanning 4 regions in Massachusetts coastal waters

(5 Buzzards Bay sites, 3 Cape Cod Bay sites, 7 Boston Harbor sites, and 3 sites in Salem Sound). Data for all sites were used to generate density estimates of EBP lobster and other decapod crustaceans. Densities of EBP lobsters from 1995 to 2008 are presented in Figure 1. Salem Sound, Boston, and Cape Cod Bay are all part of LMA 1, and Buzzards Bay is part of LMA 2.

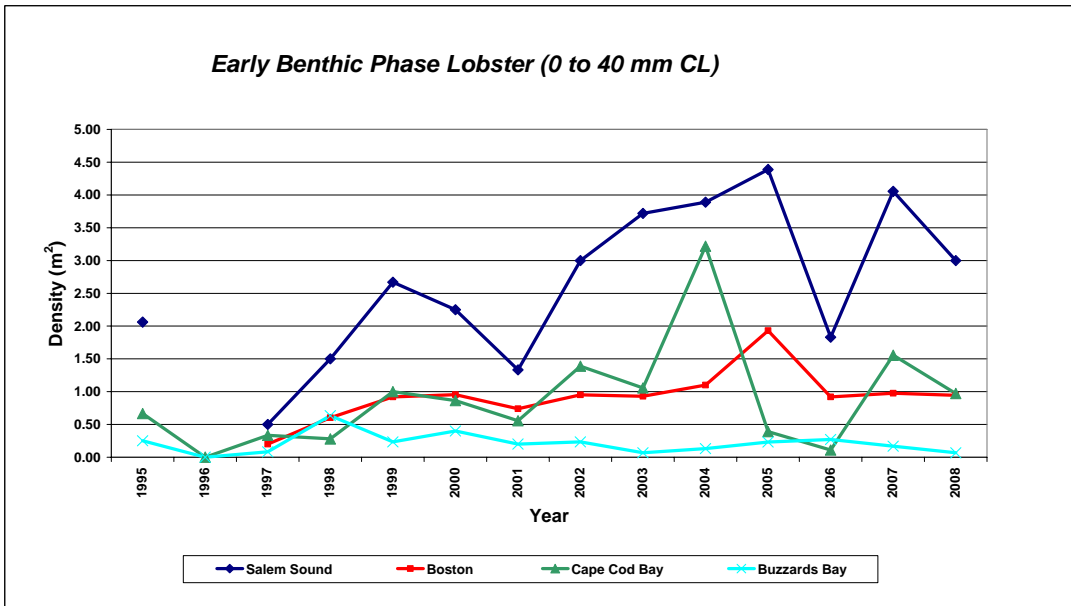


Figure 1. Early Benthic Phase Lobster Index in Massachusetts

Rhode Island: The Rhode Island lobster Settlement Survey is part of a larger New England lobster settlement index. The goal of the survey is to identify lobster year classes and, specifically, newly-settled YOY lobsters as they arrive by larval settlement in near-shore coastal waters (Figure 2). Since 2005, there has been a decline in settlement.

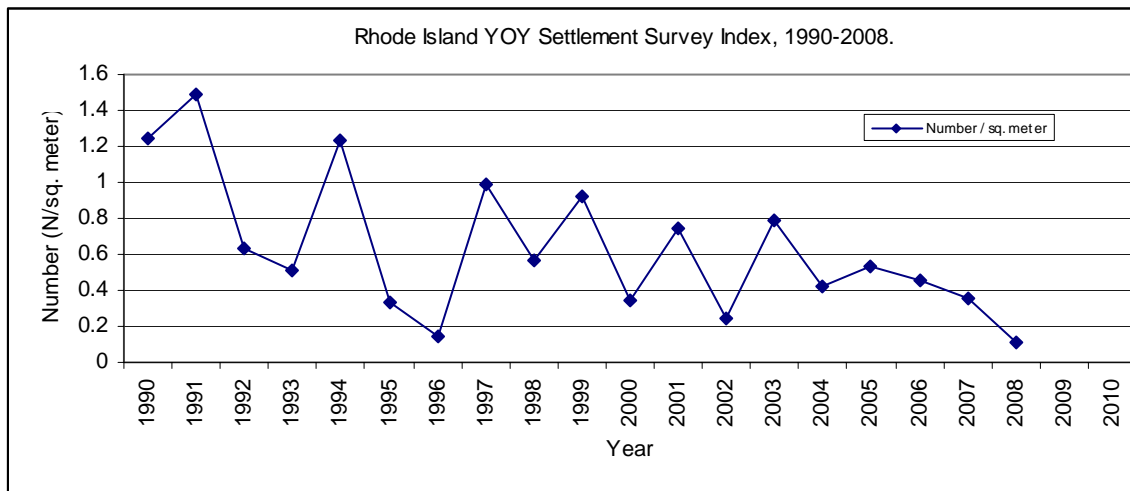


Figure 2. Rhode Island YOY Settlement Survey Index

Connecticut: The larval lobster survey is conducted each summer to provide an index of zero-class recruitment in western Long Island Sound. The annual production index in 2008 (64.6 larvae per 1000 m<sup>3</sup> water sampled) ranked 18<sup>th</sup> highest in the 26-year time series (1983-2008), a 60% decrease from 2007 (161.5 larvae/1000 m<sup>3</sup>) but a substantial increase from the 2006 value (9.1 larvae/1000 m<sup>3</sup>), the lowest in time series. The 2008 index was similar to production indices in 2004 (65 larvae/1000 m<sup>3</sup>) and 2005 (79 larvae/1000 m<sup>3</sup>), however all of these values are below the long-term (1983-2008) median production of 94 larvae/1000 m<sup>3</sup>. The 2007 index is the only index since 2000 to exceed the long-term median.

### **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, lobster 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, will provide 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:** In 2006 eight sampling stations were sampled for each depth within each of the statistical areas. In 2007 and 2008, the number of sampling stations was increased in statistical areas 512 and 513 to bring the sampling density closer to that found in 511.

Highlights of the 2008 sampling season:

- A total of 138 stations were randomly selected, and visited twice monthly during June, July and August.
- Catch rates were significantly higher in ventless traps, than standard traps with vents, due to the higher retention of sublegal lobster by ventless traps.
- Catch rates have decreased in eastern Maine, while rates in western Maine have remained relatively stable.

### **V. 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 3.

**Table 3. 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 also established seven Lobster Conservation Management Teams (LCMTs), each of which coincides with a management area. The Commission has approved three addenda for the purposes of incorporating LCMT recommendations for full implementation of Amendment 3. Addendum I incorporated measures from the LCMT proposals, which were intended to control effort. Addenda II-V were designed to address management measures affecting egg production. Addendum VI replaces two of the effort control measures of Addendum IV, permits and eligibility period. No new Area 2 permits will be distributed after December 31, 2003 and to qualify for an Area 2 permit endorsement, a permit holder must document landings between January 1, 1999 and December 31, 2003. Addendum VII establishes an effort control plan for area 2. Addendum VIII established reporting and monitoring requirements, which were replaced by addendum X. Addendum XIII also established new reference points. Addendum IX set a conservation tax for LCMA 2 transfers. Addendum XI incorporates measures from LCMT proposals to rebuild the SNE stock that is depleted and overfished. It also implements delayed implementation measures. Addendum XII 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 solidifies the transfer program for OCC and stops the current trap reductions. The measures included in Addenda I-XIII supersede measures addressing similar issues under Amendment 3 and are summarized in Tables 4.

Since the adoption of Addendum XII. The Commonwealth of Massachusetts and the state of Rhode Island have implemented trap transfer programs for state only LCMA 2 fishermen. Both

states allow fishermen who fish in state waters only transfer traps with fishermen from their same state who also fish in state waters only. The ASMFC is currently working with ACCSP to develop and build a database to track the transfers of lobster traps. NMFS is currently analyzing options for the consideration of transfer programs in federal waters.

**Table 4: Current (2010) Area specific management measures**

Management Measure	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	OCC
Trap Limits/Number	Trap Cap (800)	Hist. Part (800 max)	Hist. Part.	Hist. Part.	Hist. Part.	Hist. Part.	Hist. Part.
Gauge Size	3-1/4"	3-3/8"	3-1/2"	3-3/8"	3-3/8"	3-3/8"	3-3/8"
Vent Rect.	1-15/16x 5-3/4"	2 x 5-3/4"	2 x 5-3/4"	2 x 5-3/4"	2 x 5-3/4"	1-15/16x 5-3/4"	2 x 5-3/4"
Vent Cir.	2-7/16"	2-5/8"	2-5/8"	2-5/8"	2-5/8"	2-7/16"	2-5/8"
V-notch requirement	Mandatory for all eggers	None	Mandatory for all eggers above 42°30'	None	None	None	None
V-Notch Definition (possession)	Zero Tolerance	1/8" with or w/out setal hairs <sup>1</sup>	1/8" with or w/out setal hairs <sup>1</sup>	1/8" with or w/out setal hairs <sup>1</sup>	1/8" with or w/out setal hairs <sup>1</sup>	1/8" with or w/out setal hairs <sup>1</sup>	1/4" without setal hairs
Max. Gauge (male & female)	5"	5 1/4"	6 7/8"	5 1/4"	5 1/4"	5 1/4"	None
<b>Regulations Starting JULY 1, 2010 (highlighted cells show regulation change)</b>							
Gauge Size	3-1/4"	3-3/8"	3-1/2"	3-3/8"	3-3/8"	3-3/8"	3-3/8"
Vent Rect.	1-15/16x 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	None	Mandatory for all eggers above 42°30'	None	None	None	None
V-Notch Definition (possession)	Zero Tolerance	1/8" with or w/out setal hairs <sup>1</sup>	1/8" with or w/out setal hairs <sup>1</sup>	1/8" with or w/out setal hairs <sup>1</sup>	1/8" with or w/out setal hairs <sup>1</sup>	1/8" with or w/out setal hairs <sup>1</sup>	State Waters 1/4" without setal hairs Federal Waters 1/8" with or w/out setal hairs <sup>1</sup>
Max. Gauge (male & female)	5"	5 1/4"	6 3/4"	5 1/4"	5 1/4"	5 1/4"	State Waters none Federal Waters 6 3/4"

<sup>1</sup> 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 inch, 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.

## **VI. Current State-by-State Implementation per Compliance Requirements**

All states are currently in compliance with all required measures under Amendment #3, Addendum I-XI.

## **VII. Recommendations and Issues**

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

1. With the decline of resources for data collection programs and the need for development of consistent techniques to monitor distribution and abundance of lobster, the PRT recommends that a regional data collection program be implemented. A regional initiative would streamline state and regional programs and provide consistent information for assessment use.
2. With the release of the new stock assessment and the possibility of new reference points, there may be a need for changes to the management program for American Lobster. The PRT recommends the ASMFC socioeconomic subcommittee evaluate the socioeconomic impacts of the stock assessment results and recommendations. The development of the trap transfer programs will also have significant impacts on the lobster fishery. A socioeconomic study should be conducted to examine those impacts.
3. The PRT is concerned about the ability of the lobster management program to respond to changing stock conditions and encourages the use of biological triggers as control rules to initiate management action. The PRT recommends that the stop light information from the 2009 assessment should be considered for use as biological triggers.
4. The PRT encourages the full implementation of data collection programs to lobster management. The PRT recommends that all states implement 100% harvester and dealer programs as outlined in Addendum X.
5. The PRT encourages state and federal jurisdictions to continue to work cooperatively to achieve the goals of the FMP.