

A Review of the Outer Cape Cod Area Lobster Fishery and Management Program

April 17, 2010

Prepared by:

American Lobster Technical Committee

Atlantic States Marine Fisheries Commission

Statement of the Problem

In response to NMFS recent action to extend Addendum XI's broodstock protection measures to Outer Cape Cod LCMA effective July 1, 2010, members of the Lobster Board have discussed whether complementary action is warranted. Members of Massachusetts delegation have requested time to address the issue, and recently through correspondence to the Lobster Plan Coordinator and Board Chairman, they requested a technical analysis of the Outer Cape Cod Lobster Conservation Areas past conservation measures as a basis for not adopting complementary measures. The request to the Technical Committee was to address two questions:

- i) How much reduction in fishing mortality and brood stock protection does the Outer Cape Trap Reduction Plan (enacted in 2004) provide?
- ii) Is this equal to, greater than, or less than the gains provided by the 1/8" V-notch possession standard and the adoption of a 6-3/4 maximum gauge?

Description of NMFS Action

On July 29, 2009, NMFS issued a final rule to improve "lobster dealer reporting and broodstock protection measures." The broodstock protection measures included the adoption of a more conservative v-notch possession standard (1/8" with or without setal hairs vs. a 1/4" straight-sided notch without setal hairs) and the adoption of the maximum sizes. These actions were designed to complement ASMFC measures taken to specifically conserve the southern New England stock and applied to LCMA's 2,3,4,5, and 6. Because these biological measures were applied to Area 3, it meant the Georges Bank area and offshore Gulf of Maine in Area 3 received the benefit of these conservation measures – that were primarily intended for southern New England.

Despite some objections from the Outer Cape Cod area fishermen, NMFS applied the more conservative v-notch possession standard and the maximum size (6 3/4") to OCCLCMA meaning the biological measures would be the same in OCCLCMA as in Area 3. This more conservative v-notch standard would protect lobster for an additional one to two molts before being legal to harvest. Extending these biological measures to Outer Cape Cod was an action taken by NMFS that went beyond the current conservation standards of the interstate plan for this area.

According to the Federal Register Notice (Vol. 74, No 144 pgs. 37530-51), NMFS' rationale for applying these rules to OCCLCMA was to *"benefit the resource and facilitate management and enforcement efforts within and across stocks and management areas since both Outer Cape Cod and Area 3 overlap into all three stock areas."* The adoption of the 1/8" v-notch standard would *"allow for consistency within the Outer Cape Area itself as well as across the Georges Bank stock area. It will also provide some additional level of protection to the Outer Cape fishery beyond the status quo, albeit not as extensive as those imparted upon Area 1 fishermen."*

Based on the projected impacts to Outer Cape fishermen, NMFS postponed the action one year until July 1, 2010.

Description of the Fishery

LCMA OCC is the smallest management area among the seven management areas that comprise the U. S. lobster fishery. In 2008 it was comprised of 69 active fishermen. Despite its small size, it maintains a very productive lobster fishery, landing 1,054,194 pounds of lobster in 2008 with an approximate ex-vessel value of \$4.2 million dollars.

In 2002, MADMF mandated that all permit holders designate a single lobster management area (LCMA) in which they would fish. Subsequent to this action MADMF was able to summarize fisheries statistics by LCMA as opposed to summarizing them solely by statistical reporting areas, which only roughly match up with the

boundaries of the LCMA. As a result there is now a more accurate description of landings and effort trends in each LCMA within the Massachusetts fishery.

Between 2002 and 2008 commercial landings in LCMA OCC increased by 29%, reaching a time series high of 1,054,194 lbs in 2008 (Figure 1). A comparison of landings compiled by reporting area and LCMA reveal minimal differences in the magnitude of the landings and extremely similar trends. This allows for direct comparison with the longer landings time series generated from reporting area statistics. The most recent 5 year period represents the greatest period of productivity in the LCMA OCC fishery as compared to any other 5 year time period in the time series.

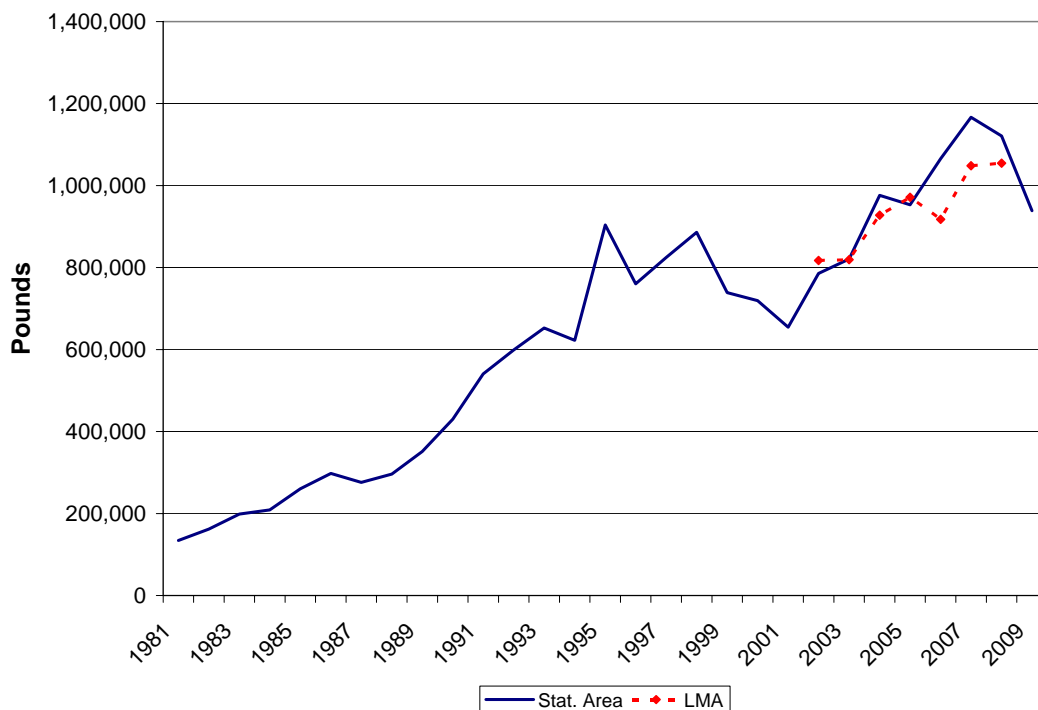


Figure 1. Commercial lobster landings in LCMA OCC compiled by LCMA (dashed line) and Statistical Reporting Area (solid line).

Trends in fishing effort in LCMA OCC are depicted in Figure 2. Subsequent to the implementation of the LCMA OCC trap allocation plan in 2004 there was 25.6% reduction in the number of active traps reported fished. Despite the decline in traps fished, the number of trap hauls (the best measure of effective effort) has stayed remarkably stable at roughly 600,000 per year. This indicates that the fishery has maintained its effective level of effort by hauling traps more frequently to compensate for having fewer in number .

Trap Hauls and Traps Fished in LMAOCC

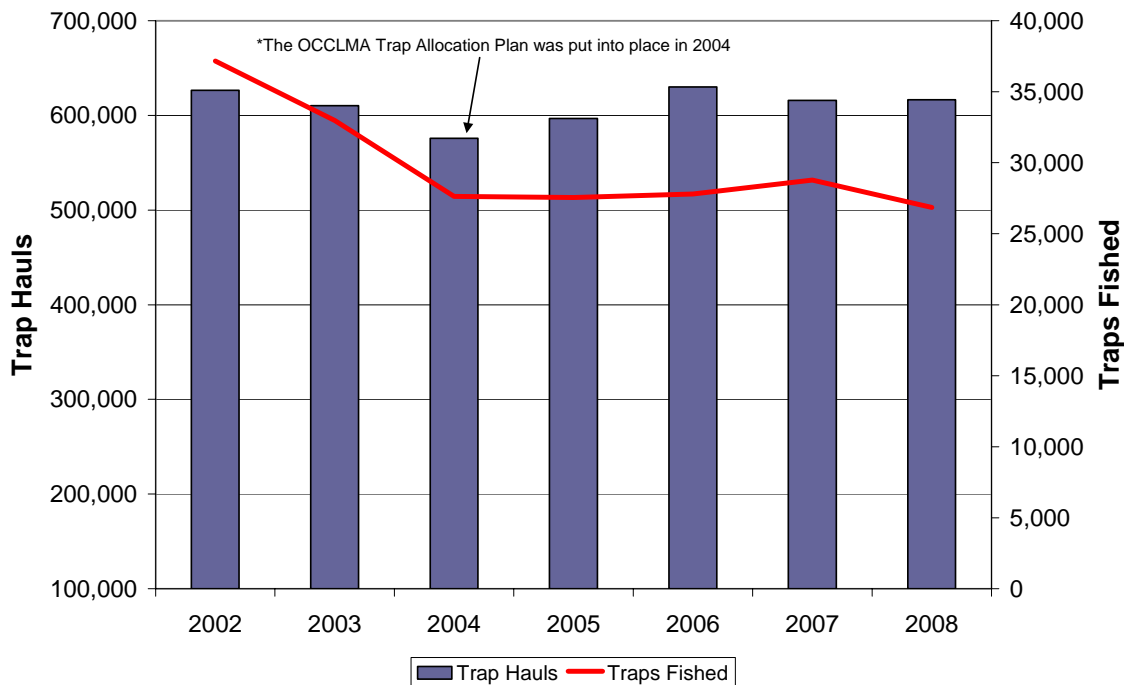


Figure 2. Annual number of active traps fished (solid line) and trap hauls in LCMA OCC: 2002 - 2008.

The decrease in the number of traps fished and the concurrent increase in commercial landings has led to a substantial increase in efficiency as measured by CPUE (catch per trap haul) in the OCC fishery (Figure 2). From 2002 to 2008 there was a 31.5% increase in CPUE. To put this in context, the CPUE in LCMA OCC is 160% and 140% greater than what are observed in LCMA 1 and LCMA 2 respectively (Table 1).

Table 1. Average pounds of lobster landed per trap-haul by LCMA, 2002-2008

Year	LMA1	LMA2	LMAOCC
2002	0.6	0.72	1.3
2003	0.51	0.51	1.34
2004	0.54	0.76	1.61
2005	0.52	0.85	1.63
2006	0.56	0.69	1.46
2007	0.52	0.71	1.7
2008	0.65	0.71	1.71

The number of active fishermen in LCMA OCC declined by 16% between 2002 and 2003, and has since remained stable at approximately 70 fishermen (Figure 3). The decline in active fishermen is likely one of the factors contributing to the increase in efficiency in the OCC fishery.

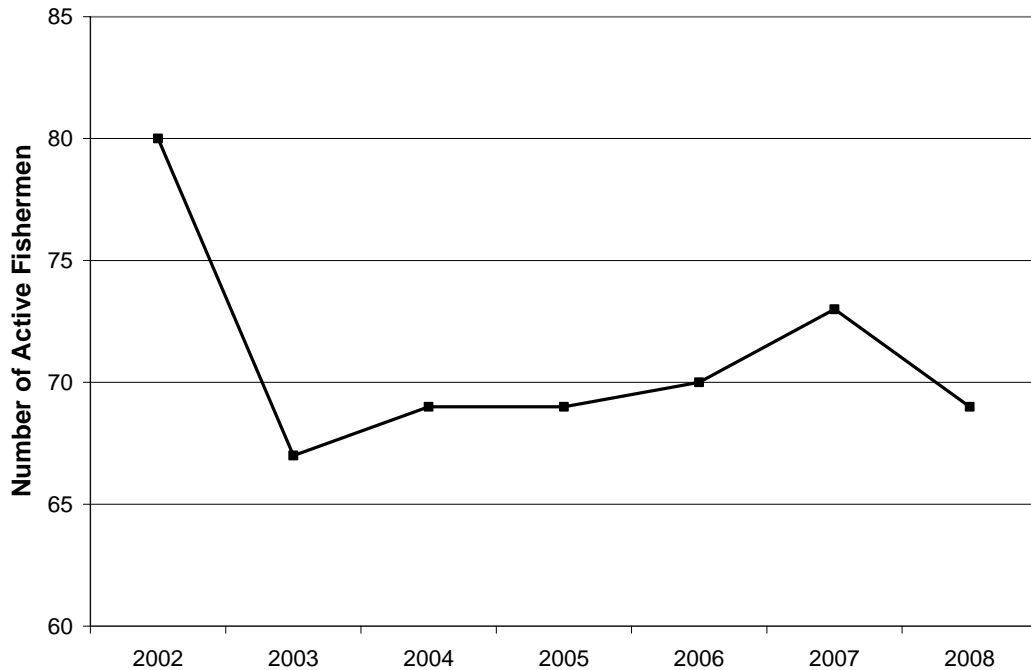


Figure 3. Number of active fishermen in LCMA OCC: 2002 -2008

MADMF has maintained a commercial trap sampling program in the Outer Cape Cod region since 1981. From 1981 to 2007 sampling was conducted out of the ports of Nauset and Chatham twice per month from May through November. Beginning in 2008, MADMF expanded sampling to include an additional 2 trips per month out of the port of Provincetown. With the addition of this sampling the OCC region has the greatest sampling intensity, as measured by area of coastline and by sample per capita of lobster landed, as compared to any other region in Massachusetts.

The size distribution in LCMA OCC is generally comprised of large lobster (Figure 4). Many year classes contribute to the catch in LCMA OCC with only 53% of the catch being within one molt of minimum legal size in 2009 (MADMF unpublished data). The size structure observed in LCMA OCC is similar to those observed in offshore areas. This is not surprising given that this region is considered to have a transient population of lobster that migrate between the Gulf of Maine and Georges Bank (Estrella and Morrissey, 1997). Tagging studies conducted in the adjacent LCMA 1 confirm this observation. Lobster (especially large females) tagged in the fall show a net easterly movement of lobster towards Provincetown and down the back side of Cape Cod (Figure 5) (MADMF unpublished data). Conversely, lobster tagged in the early spring just north of Provincetown exhibited a net westerly movement (Figure 6) (MADMF unpublished data).

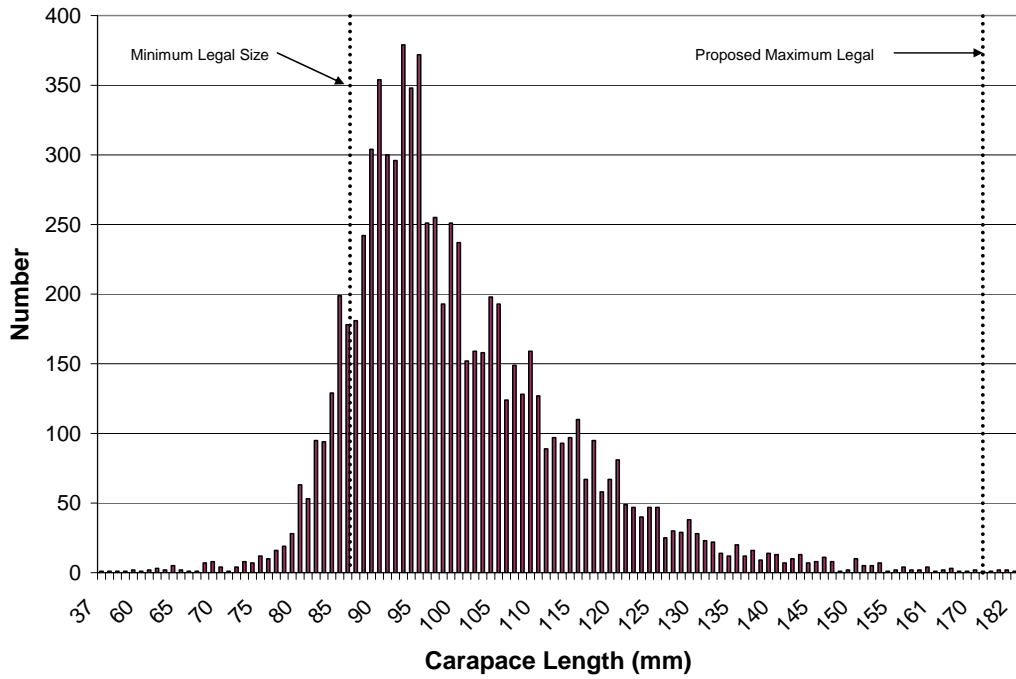


Figure 4. The size distribution of lobster observed in LCMA OCC (Provincetown, Nauset, and Chatham) in 2009.



Figure 5. Location of tagged lobster release sites (yellow dot) in the Fall of 2006 and recapture sites (terminus of blue line) in the Spring Summer of 2007.



Figure 6. Location of tagged lobster release sites (yellow dot) in the early Spring of 2006 and recapture sites (terminus of red line) in the Summer of 2006.

The percentage of the commercial catch comprised of egg-bearing females has increased over the time series as seen in Figure 7. This increase is likely due to an increase in v-notching observed in the late 1990's and early 2000's in adjacent LCMA 1.

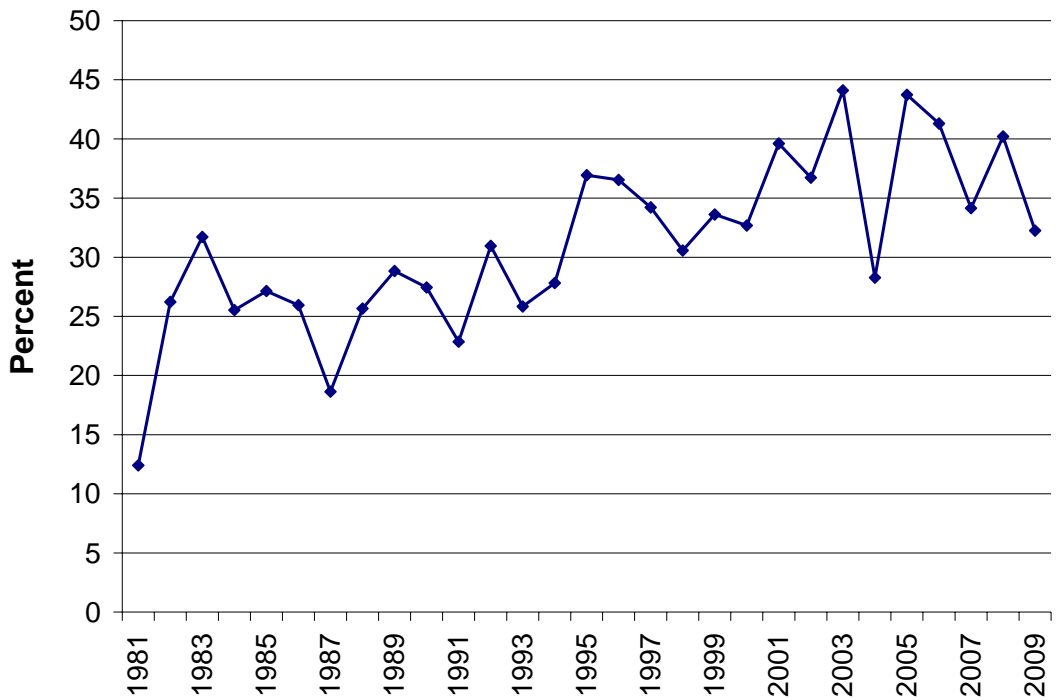


Figure 7. Percentage of the commercial female catch bearing eggs - 1981 to 2009.

The percentage of the catch comprised of female lobster possessing a ¼" or greater v-notch has varied without trend over the course of the time series and has remained near 4% in the last 5 years (Nauset and Chatham only) (Figure 8). Closer examination of these data reveals that the percentage of v-notched lobster is much greater in Provincetown area as compared to Nauset or Chatham areas further to the south (Table 2). This is not surprising given the proximity of Provincetown in relation to LCMA 1. The percentage of the catch possessing a v-notch of any size has increased dramatically in LCMA OCC since 1998. Figure 9 depicts the total percentage of the catch that possess v-notches broken down as "old" (legal to keep in OCC) and "new" (not legal to keep in OCC). This increase appears to be directly related to the substantial increase in observed v-notched lobster coincident with the implementation of the mandatory/zero-tolerance v-notching plan in LCMA 1 (Figure 10).

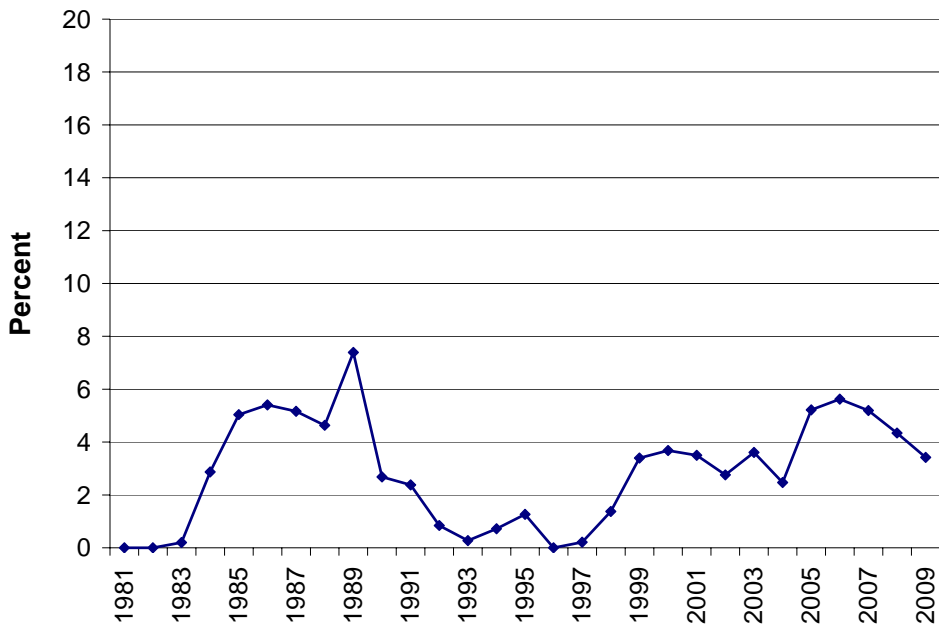


Figure 8. Percent of the female catch bearing 1/4" v-notch in LCMA OCC

Table 2. Percentage of the female catch observed with v-notches by port for the proposed 1/8" v-notch definitions.

		Removals	
		1/4" definition	1/8" definition (estimate)
2008	Provincetown	3.93%	13.25%
	Nauset and Chatham	1.97%	5.82%
2009	Provincetown	7.14%	20.94%
	Nauset and Chatham	3.42%	10.95%

% V-notch in catch LMA OCC

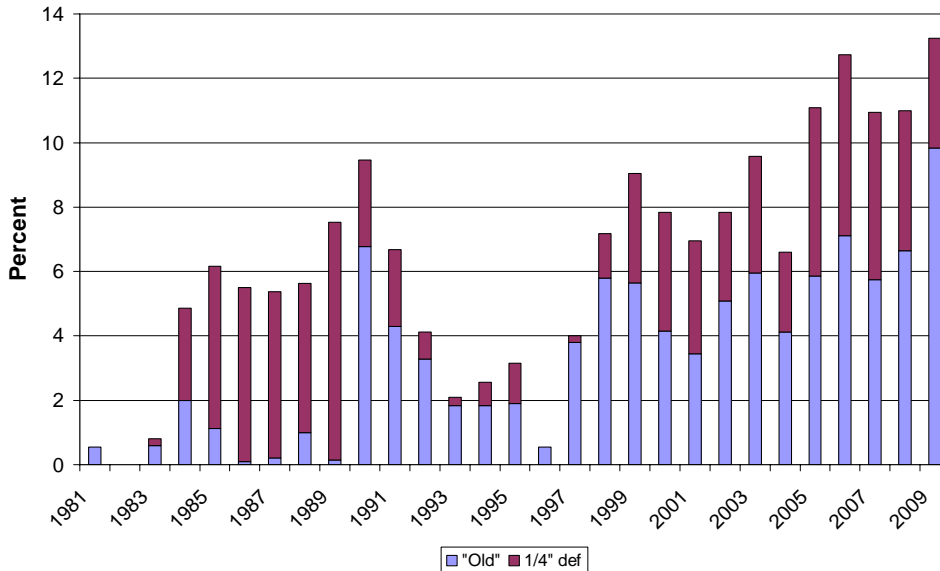


Figure 9. Percentage of the female catch observed with any signs "old" and 1/4" v-notches in LCMA OCC : 1981 – 2009 (Nauset and Chatham only)

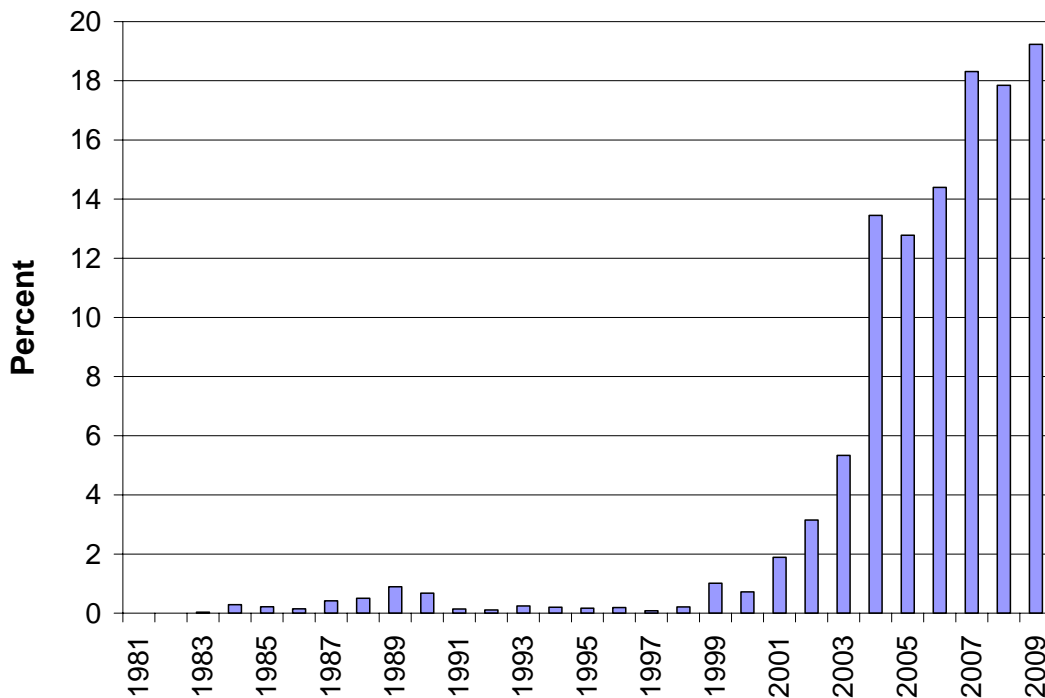


Figure 10. Percent of the female catch in LCMA 1 possessing a v-notch under the zero-tolerance definition.

Relative Egg Production of Current and Proposed Management Areas

To compare the relative effectiveness of the current gauge size and effort reduction plan in OCC with the impending 1/8" v-notch definition and 6 3/4" maximum size, a simple relative egg production calculation based on the empirical combined size distribution from OCC in 2008 and 2009 was made. The results suggest that the current increase in the minimum size in LCMA OCC from 3 1/4" to 3 3/8" has accounted for a 1% increase in egg production from the total potential egg-production of the observed size-distribution. Using this same method, an 8% increase in egg-production would be realized by protecting the lobster currently observed with v-notches between 1/4" and 1/8" in depth that are currently harvested in LCMA OCC. The potential contribution to egg production from v-notched lobster in LCMA OCC is expected to increase as the numbers of v-notched lobster in LCMA 1 continues to increase.

TC Analysis and Consensus Statement

It appears that OCC LCMA has reached the goal of a 20% reduction of active traps fished as intended in Addendum III. However, this has not equated to a reduction in effective effort for OCC. The number of trap hauls in the LCMA OCC fishery has remained stable, near 600,000 trap hauls, since 2002. Although a 20% trap reduction was achieved, there has been no reduction in fishing mortality as intended by the trap reduction. In fact there is evidence that there has been a 40% increase in fishing mortality since 2002 in the OCC LCMA (ASMFC 2009). As indicated in the TC memo from October 2, 2001, the TC cautioned that "... proposed trap reduction may not reduce fishing mortality because of the potential to increase efficiency. The TC notes that additional trap reductions may be necessary to control expansion" (see Appendix 1).

The anticipated declines in fishing mortality have not been realized. The industry has increased their efficiency to compensate for the loss of traps. The OCC fishery has lost more egg production by harvesting sexually mature v-notched lobster (8%), than has been gained by the increase in minimum size (increase to 3 3/8" from 3 1/4") (1%). In light of the increases in fishing mortality and the increase in harvest rate of less than 1/4" v-notch lobster, the TC feels that the OCC LCMA trap reduction plan does not provide equivalent levels of brood protection that a 1/8 inch v-notch definition and 6 3/4" maximum gauge would provide.

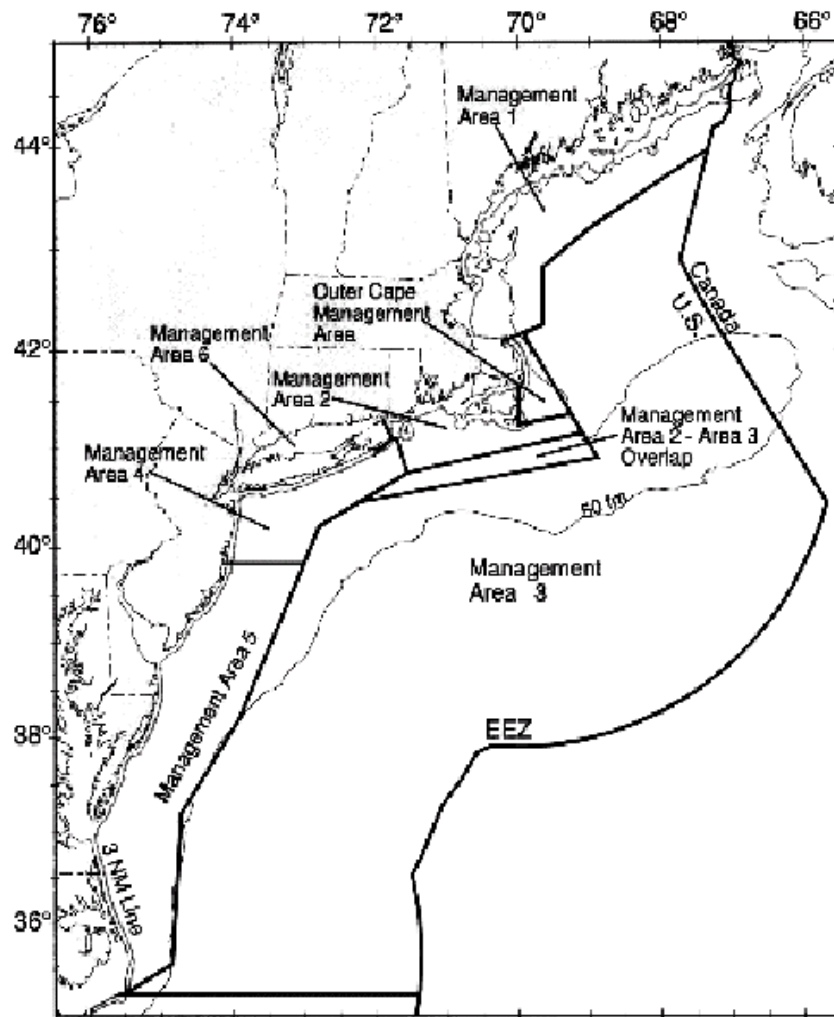
The TC has additional concerns about the erosion of conservation benefits in adjacent management areas. Specifically, the proportion of v-notched lobster observed in the legal OCC harvest, notched under the more conservative LCMA 1 and 3 definitions, has increased substantially since the late 1990s. The TC warned of the potential for this problem in their October 2001 memo to the Lobster Board which reviewed the efficacy of management measures proposed by each LCMA. Specifically the TC stated *"It is critical that Board members and LCMT members understand that the Technical Committee assessed the LCMT proposals as autonomous areas, without considering the diminishing effects of combining inconsistent and/or incompatible measures that have been proposed for adjacent areas, particularly within a given stock assessment area. These effects may reduce the projected egg production values of the lobster stock when the effectiveness of these measures is reassessed. Committee members have expressed concern that, in carrying out the assessment of proposed plans in this way, the LCMTs are not currently mandated to work together to address these problems and to provide a more cohesive strategy"*. See Appendix 1.

Literature cited

- ASMFC. 2009. American Lobster Stock Assessment Report for Peer Review. Stock Assessment Report No. 09-01
- Estrella B. T., and T. D. Morrissey, TD. 1997. Seasonal movement of offshore American Lobster, *Homarus americanus*, tagged along the eastern shore of Cape Cod Massachusetts. Fish Bull 95:466-476.

Report to the American Lobster Management Board

SUPPLEMENTAL REPORT ON REVISED LCMT MANAGEMENT PROPOSALS FOR AMERICAN LOBSTER



American Lobster Technical Committee

October 2, 2001

REVISED LCMT MANAGEMENT PROPOSALS FOR AMERICAN LOBSTER

SUPPLEMENTAL TECHNICAL COMMITTEE REPORT TO THE BOARD

Introduction

In accordance with Addendum II to Amendment 3 to the Interstate Fishery Management Plan for American Lobster, each LCMT shall review the revised egg rebuilding schedule, the previous LCMT recommendation, and the area management program, if any, and present to the Management Board alternative measures that will achieve the stock rebuilding targets contained in Section 2.1 (Table 1). The Technical Committee evaluated all seven area proposals against quantitative and qualitative criteria.

The 2001 Evaluation of LCMT Management Proposals for American Lobster Technical Committee Report, which provided an evaluation of each area proposal, and TC recommendations for action was presented to the Lobster Management Board in July 2001. Following review of the TC recommendations the Board directed Areas 1 and the Outer Cape Cod to revise their proposals to meet $F_{10\%}$ by 2008. The following report documents the TC evaluation of the additional elements supplied in revised LCMT proposals submitted on or before October 1, 2001.

Blanket Statements

1. Every effort should be taken to implement gauge and corresponding vent increases simultaneously coast wide to maximize benefits and minimize industry and market conflicts.
2. It is critical that Board members and LCMT members understand that the Technical Committee assessed the LCMT proposals as autonomous areas, without considering the diminishing effects of combining inconsistent and/or incompatible measures that have been proposed for adjacent areas, particularly within a given stock assessment area. These effects may reduce the projected egg production values of the lobster stock when the effectiveness of these measures is reassessed. Committee members have expressed concern that, in carrying out the assessment of proposed plans in this way, the LCMTs are not currently mandated to work together to address these problems and to provide a more cohesive strategy. The Technical Committee encourages negotiation between areas to mitigate area management conflicts. If negotiation does not occur this process may set adjacent areas on divergent management paths that may ultimately require that some areas implement additional measures to adjust for conflicting strategies. Contention over which area is doing enough and/or which area needs to do more to improve conditions for the stock assessment area as a whole is likely to be the source of future conflict. The disparity in regulations among area may create problems for enforcement, are likely to antagonize the harvesters in different areas, and will definitely complicate our ability to assess their impacts.

3. All of the following projected egg production values include assumptions: 1) that catch rates have not changed since the last assessment (years 1996-1998), 2) that catch rates will remain the same, except for Area 3 where capture rates are expected to decrease due to trap reductions, and 3) model input parameters currently approved by the Technical Committee will remain unchanged in all three stock assessment areas during the next assessment.
4. All assessments assume there will be no significant shift in participation among areas.
5. The predicted egg production values represent an equilibrium state. The available assessment tools (e.g. yield and egg production models) estimate that most management measures could take 10 to 20 years to reach equilibrium assuming constant recruitment and continuation of the management plans proposed/evaluated.
6. All management proposals should be evaluated by the Law Enforcement Committee to provide input on the current enforceability of such actions.
7. LCMTs should consider additional and/or emergency management measures to be implemented in the case that additional measures are needed in the future.
8. Uniform mandatory reporting of catch and effort data is essential for accurate and timely stock assessments as well as for assessing the effects of trap limits and other management measures. This reporting needs to be backed up with mandatory at sea observer programs to record information that may be too burdensome for fishermen to record (e.g., information about discards). However, the need for improved data collection programs is conspicuously lacking in the management plans provided. The Committee strongly recommends that mandatory reporting and at sea observer programs be identified as essential components in several area management plans. This may aid states in providing justification for legislation where necessary to begin implementing these data collection efforts. (Although staff to process log book data is a problem for all areas, Maine has estimated that it would take over a dozen key punchers and at least one person in charge to process over 6,500 monthly log books.)

Area-by-Area Evaluation

AREA 1

Comments on Evaluation of Egg Production (F 10%):

Area 1 is projected to meet the percentages of egg production required under Addendum II for years 2004-2007. Area 1 is projected to meet the 10% egg production required under Addendum II by year 2008.

Comments on Evaluation (11 Objectives of FMP):

See Technical Committee Comments Attached by Area.

Areas of concern:

See Technical Committee Comments Attached by Area.

Technical Committee Recommendations for action by LCMTs:

1. The Technical Committee recommends that the LCMT for Area 1 consider significant effort reductions to reduce fishing mortality.
2. The Technical Committee recommends that the LCMT for Area 1 consider further mitigation to address spatial expansion in the fishery.

Recommendations for action by the Lobster Board:

Based solely upon the egg production rebuilding schedule contained in Addendum II to Amendment 3, the Technical Committee recommends approval of the Area 1 LCMT proposal. Based upon review of the overall management program offered by Area 1, the Technical Committee cannot recommend approval of the Area 1 LCMT proposal at this time.

OUTER CAPE MANAGEMENT AREA

Comments on Evaluation of Egg Production (F 10%):

Outer Cape Cod Area is projected to meet the percentages of egg production required under Addendum II for years 2004-2008.

Comments on Evaluation (11 Objectives of FMP):

See Technical Committee Comments Attached by Area.

Areas of concern:

See Technical Committee Comments Attached by Area.

Technical Committee Recommendations for action by LCMTs:

1. The Technical Committee recommends that the LCMT for the Outer Cape Area consider employment/adoption of a logbook program to address objective # 3 in Amendment 3.

Recommendations for action by the Lobster Board:

Based solely upon the egg production rebuilding schedule contained in Addendum II to Amendment 3, the Technical Committee recommends approval of the Outer Cape Cod Area LCMT proposal. Based upon review of the overall management program offered by the Outer Cape Cod Area, the Technical Committee recommends approval of the Outer Cape Cod LCMT proposal.

AREA 1

EVALUATION OF EGG PRODUCTION (F_{10%})

<i>Criteria</i>	<i>Technical Committee Vote</i> <i>(# in favor, # opposed, # of abstentions)</i>	<i>Technical Committee Comments</i>
2008	Motion to Recommend Approval – Carries (5, 3, 0)	The TC is concerned with the potential implications of single sex protection on mature females. Area 1 is projected to meet 10% egg production required under Addendum II by year 2008. (See Attached Egg Production Values)

Note: Those in favor voted so on the basis that the Area 1 proposal meets the egg production goals required under Addendum II to Amendment 3 to the Interstate Fishery Management Plan for American Lobster. Those opposed voted no on the basis that a swift jump to 100% v-notching was unlikely to occur by 2002, because there is no effort reduction plan included within proposal, it is likely that effort has increased, and because the analyses provided did not account for fishing mortality reductions needed to achieve the egg rebuilding schedule over time.

EVALUATION (11 FMP OBJECTIVES)

Criteria	FMP Objective	Area Attempt(s) to Address Objective	Technical Committee Comments
#1	<i>Protect, increase or maintain, as appropriate, the brood stock abundance at levels, which would minimize risk of stock depletion and recruitment failure.</i>	<ul style="list-style-type: none"> ➤ 100% V-notching ➤ Zero Tolerance ➤ (ME & NH) Continued no diving or trawling for lobster 	A member of the Effort Control Sub-committee expressed concern that the benefits of the management measures within the Area 1 plan designed to protect brood stock abundance and minimize risk of stock depletion, could be reduced or negated because the plan fails to implement any significant effort control. The majority of the TC expressed concern that in the absence of any effective effort control to significantly reduce fishing mortality, it is unlikely that 100% v-notching will meet Objective #1.
#2	<i>Develop flexible regional programs to control fishing effort and regulate fishing mortality rates.</i>	<ul style="list-style-type: none"> ➤ Buy-in by industry to endorse v-notching practice in Maine ➤ (ME) 5 of 7 Zones employ limited entry 	The Technical Committee expressed concern that effort has increased and that there is a potential to double effort in the future if all traps are fished. The TC is concerned that the 800 trap limit does not really control effort, given the potential for expansion with latent effort (e.g. those permitted but fishing nothing; those permitted but fishing less than the 800 limit). However the Committee notes that there is a loose relationship between traps fished and F, therefore more focus should be place on fishing mortality.
#3	<i>Implement uniform collection, analysis, and dissemination of biological and economic information; improve understanding of the economics of harvest.</i>	<ul style="list-style-type: none"> ➤ Industry participation in data collection programs 	A mandatory logbook/catch report program for Area 1 is necessary to collect core data required to meet this objective.
#4	<i>Maintain existing social and cultural features of the industry wherever possible.</i>	<ul style="list-style-type: none"> ➤ Development of Zone Areas in Maine 	

#5	<i>Promote economic efficiency in harvesting and use of the resource.</i>	➤ Promotion Council development in Maine	Member of the Socio-Economic Sub-Committee expressed concern over the implication of gauge size increases that are not applied on a coast wide basis relative to trade and Mitchell Bill infractions.
#6	<i>Minimize lobster injury and discard mortality associated with fishing.</i>	➤ Implementation of runner law in Maine ➤ Continued implementation of no dragging for lobster laws in inshore waters	Members of the Technical Committee are concerned about the practice of v-notching in terms of the potential for harm to both the lobster and the egg clutch. Members of the Technical Committee also expressed concern about the harm to lobster associated with dragging practices.
#7	<i>Increase understanding of biology of American lobster, improve data, improve stock assessment models, improve cooperation between fishermen and scientists.</i>	➤ LCMT/Industry endorses cooperative research	This objective is not addressed by the Area 1 proposal
#8	<i>Evaluate contributions of current management measures in achieving objectives of the lobster FMP.</i>	➤ LCMT recognizes that achieving objective 1 in the FMP, may reduce the Area 1 LCMT's ability to meet the other FMP objectives	The Technical Committee recognizes the value of LCMTs evaluating the different objectives in the FMP.
#9	<i>Ensure that changes in geographic exploitation patterns do not undermine success of ASMFC management program.</i>	➤ (ME) 51/49 split	The Technical Committee believes that these efforts are a step in the right direction but that remains the potential for expansion of fishing effort in the Gulf of Maine. The TC believes that the Management Board should address this issue through significant input into the ASMFC's process (i.e. Advisory Panel, LCMT, etc.).
#10	<i>Optimize yield from the fishery while maintaining harvest at a sustainable level;</i>	➤ The LCMT believes that V-notching reduces yield in the fishery on the short-term	The Technical Committee is uncertain of the long-term benefits associated with v-notching practices where yield to the fishery is in question.
#11	<i>Maintain stewardship relationship between fishermen and the resource.</i>	➤ Area 1 believes in the stewardship relationship	The Technical Committee recognizes that the practice of v-notching enhances stewardship between the fishermen and the resource.

TECHNICAL COMMITTEE VOTE ON OVERALL LCMT PROPOSED MANAGEMENT PROGRAM

Technical Committee Vote (# in favor, # opposed, # of abstentions)	Individual Technical Committee Member Comments
<p>Motion to approve overall management program fails by vote of (4, 4, 0)</p>	<p>Comments by Bruce Estrella (MA DMF; June 2001) – The Area 1 management plan fails to adequately address the potential for increasing fishing effort. Current management with an 800 trap cap is ineffective effort control. The average number of traps fished per licensee was documented to have increased each year the cap has been in effect and over time will effectively negate benefits from management measures and replace any traps that would be lost from a reduction in licenses. Without effort controls sufficient enough to “freeze” or reduce fishing mortality it is likely that the management measures presented in this plan will not be successful at protecting brood stock abundance and minimizing risk of recruitment failure. The Gulf of Maine stock unit has experienced improved abundance during a period of high fishing mortality rates in recent years, specifically between the 1996 and 2000 stock assessments. These conditions may be interpreted as a sign that the stock is in good health, yet they appear in the wake of little change to management measures, significant increases in traps fished, truncated size distribution, a greater reliance on the first molt group above minimum legal size, and a shift in effort from inshore to offshore areas. The 2000 stock assessment clarifies that an environmental anomaly is likely the cause for recruitment exceeding the long-term average in recent years and the Stock Assessment Peer Review Committee recognized and stated that any recent improvements in recruitment will not continue indefinitely. The Peer Review Committee recommended that the problem be addressed by increasing minimum legal size, decreasing the rate of fishing mortality, or increasing escape vent size. In light of this knowledge, it would not be prudent to relax management in the Area 1 management zone.</p> <p>Comments by Bruce Estrella (MA DMF; October 2001) – During a recent meeting with the MA MLA president it was noted that the majority of MA lobstermen were not going to support the Area 1 plan with its 100% v-notching requirement. The 9.4% egg production projection will not be realized without all segments of Area 1 participating. The information provided in the meeting described above justifies my concern with the inadequacy of the Area 1 plan and substantiates the need for additional management measures beyond those already proposed by Area 1.</p> <p>Comments by Carl Wilson (ME DMR; June 2001) - The Area 1 plan places stewardship of the resource on the fishermen and look to local management to form the basis for effort reductions and addressing the goals of the FMP.</p> <p>Comments by Josef Idoine (NMFS; October 2001) – The following notes the reasons for voting against the Area 1 plan:</p> <ol style="list-style-type: none"> 1. The Fcapture rate used in the analyses is equivalent to effective effort. The analysis is based on the assumption that this has not changed since the 1996-98 level as described in the ASMFC Lobster Assessment. Published information presented at the June 19-20, 2001 (Acheson 2001) meeting indicated that effort, in terms of amount of gear and areal expansion, has increased. This plan has no controls on this, or future, effort expansion. 2. The analyses indicate that if : <ol style="list-style-type: none"> (a) 100% of all berried females encountered are notched and will be from now on... this does not mean a fisherman

can forego notching an animal because someone else will eventually do it, it means every berried female that comes up in a trap must be notched, at that time, in order to achieve the results the model predicts;

(b) and that the effective effort (F_{capture}) is the same as the reference level (1996-98) and will remain so indefinitely; then the percentage of MSP would reach 10.6%.

3. However this would result in at least a 40%+ reduction in F on females. There is no way to regain these losses to landings without increasing the capture of non-protected females (unberried, immature). Should this increase on non-protected animals occur, there would be a substantial reduction in the egg production predicted.

4. If 100% notching of all captured berried females does not occur, the predicted egg production is also inappropriate. I do not believe the assumptions of the analyses are correct. The model answer from such an approach is not sufficient for me to accept the results as evidence the plan will succeed. The lack of any fall back measures to address shortcomings does not increase my confidence in this approach. In this case it is not the model, but the information it has to estimate the outcome. That information has little to no credibility. A problem with unchecked F in a recruitment-dependent fishery (extremely growth overfished) which characterizes the inshore Gulf of Maine fishery off ME, NH, and MA (and elsewhere southward) is that females are harvested so quickly that a high proportion of them are marketed before egg extrusion can take place. The number of females making it to the egg extrusion stage becomes increasingly smaller and recruitment to the egg-bearing female population available for V-notching will become seriously limited.)

Note: Those voting in favor of the overall management program did so on the basis that there is a record level of abundance, high landings, decreasing fishing mortality since the early 1990s and stable or increasing potential egg production. Those opposed to the overall management program for Area 1 voted so on the basis that they did not believe 100% v-notching will result in an instantaneous jump in egg production (~3% to 9% by 2002), they do not believe that the current fishing mortality rate upon which the egg production calculations are based is accurate because effort has increased, and escalations in fishing effort without future controls on fishing mortality will insure that a high number of females will continue to be harvested before they have a chance to extrude eggs

OUTER CAPE MANAGEMENT AREA

EVALUATION OF EGG PRODUCTION (F_{10%})

<i>Criteria</i>	<i>Technical Committee Vote</i> <i>(# in favor, # opposed, # of abstentions)</i>	<i>Technical Committee Comments</i>
2004	Motion to Recommend Approval – Carries (8,0,0)	Outer Cape Cod is projected to meet the % egg production required under Addendum II by years 2004, 2005, 2006, 2007, and 2008 (<i>See Attached Egg Production Values</i>).
2005	Motion to Recommend Approval – Carries (8,0,0)	
2006	Motion to Recommend Approval – Carries (8,0,0)	
2007	Motion to Recommend Approval – Carries (8,0,0)	
2008	Motion to Recommend Approval – Carries (8,0,0)	

Note: Those in favor voted so on the basis that the Outer Cape Cod proposal meets the egg production goals required under Addendum II to Amendment 3 to the Interstate Fishery Management Plan for American Lobster.

EVALUATION (11 FMP OBJECTIVES)

Criteria	FMP Objective	Area Attempt(s) to Address Objective	Technical Committee Comments
#1	<i>Protect, increase or maintain, as appropriate, the brood stock abundance at levels, which would minimize risk of stock depletion and recruitment failure.</i>	<ul style="list-style-type: none"> ➤ Increased Minimum Gauge Size ➤ Increased Escape Vent Size ➤ Increased Effort Reductions 	The TC remains concerned about the potential for increases in the number of participants in the Outer Cape Cod Area. The TC notes that proposed trap reduction may not reduce fishing mortality because of the potential to increase efficiency. The TC notes that additional trap reductions may be necessary to control expansion.
#2	<i>Develop flexible regional programs to control fishing effort and regulate fishing mortality rates.</i>	<ul style="list-style-type: none"> ➤ Comprehensive Effort Reduction 	The Technical Committee notes that there is a loose relationship between traps fished and F, therefore more focus should be place on fishing mortality.
#3	<i>Implement uniform collection, analysis, and dissemination of biological and economic information; improve understanding of the economics of harvest.</i>	<ul style="list-style-type: none"> ➤ Mandatory Reporting ➤ Continued Data Collection Programs 	
#4	<i>Maintain existing social and cultural features of the industry wherever possible.</i>	<ul style="list-style-type: none"> ➤ Maintaining Current Structure 	
#5	<i>Promote economic efficiency in harvesting and use of the resource.</i>	<ul style="list-style-type: none"> ➤ Effort Control 	
#6	<i>Minimize lobster injury and discard mortality associated with fishing.</i>	<ul style="list-style-type: none"> ➤ Increased Escape Vent Size ➤ Increased Effort Reduction 	

#7	<i>Increase understanding of biology of American lobster, improve data, improve stock assessment models, improve cooperation between fishermen and scientists.</i>	<ul style="list-style-type: none"> ➤ Mandatory Logbook ➤ Continued Cooperative Research 	The TC recognizes that additional research is needed in offshore areas.
#8	<i>Evaluate contributions of current management measures in achieving objectives of the lobster FMP.</i>		The TC recognizes the value of LCMTs evaluating the different objectives in the FMP.
#9	<i>Ensure that changes in geographic exploitation patterns do not undermine success of ASMFC management program.</i>		The TC believes that the Management Board should address this issue through significant input into the ASMFC's process (i.e. Advisory Panel, LCMT, etc.).
#10	<i>Optimize yield from the fishery while maintaining harvest at a sustainable level;</i>	<ul style="list-style-type: none"> ➤ Increased Effort Control/Reduction ➤ Increased Minimum Gauge Size 	
#11	<i>Maintain stewardship relationship between fishermen and the resource.</i>	<ul style="list-style-type: none"> ➤ Industry Acceptance of Gauge and Vent Size Increases 	The Technical Committee recognizes that this acceptance enhances stewardship between the fishermen and the resource.

TECHNICAL COMMITTEE VOTE ON OVERALL LCMT PROPOSED MANAGEMENT PROGRAM

<p>Technical Committee Vote</p> <p>(# in favor, # opposed, # of abstentions)</p>
<p>Motion to approve overall management program carries by a vote of (7,0,1)</p>

Note: Those in favor of approval of the overall management program for the Outer Cape Cod Area voted so on the basis that the plan contained effort control and reduction, an attempt to address growth recruitment overfishing via increases in minimum size, and wording that additional measures will be put into place if necessary. Those that abstained voted so because of concerns regarding the loose relationship between trap reductions and reduction in fishing mortality.

Projected Egg Production Values

Stock Assessment Area (Georges Bank & South)

Area	Source	Egg Production (Percent of Maximum)							
		2001	2002	2003	2004	2005	2006	2007	2008
	Table 1 (Addendum II)	6.2	6.74	7.29	7.83	8.37	8.91	9.46	10+
OCC	LCMT Proposal				9.0				10.5 ¹

Stock Assessment Area (Gulf of Maine)

Area	Source	Egg Production (Percent of Maximum)							
		2001	2002	2003	2004	2005	2006	2007	2008
	Table 1 (Addendum II)	3.2	4.17	5.14	6.11	7.09	8.06	9.03	10+
1	LCMT Proposal		9.4 ²						10.6

¹ This value includes a 3 ½ minimum size, 2” vents and additional 5% reduction in traps beyond the 20% reduction in traps already achieved.

² This value assumes that the Area 1 proposal is approved by the ASMFC, implemented by all concerned parties, and observed by calendar year 2002.

Appendix B – Methods for Percent Relative Egg Production Calculations

The combined 2008 and 2009 female size distributions (including Provincetown, Nauset, and Chatham) were adjusted for the selectivity curve of a 2" vent (the size currently mandated in LCMA OCC) to account for the encounter rate of the gear in the OCC fishery. The selectivity adjusted numbers at length were then multiplied the proportion mature at length to obtain the adjusted number of sexually mature females at length. The number of sexually mature females at length was multiplied by the fecundity at length to estimate the total egg production at length, the sum of which represents the total potential egg-production of the observed catch. This calculation can be expressed as:

$$E_t = \sum (E_{CL})$$

$$E_{CL} = (N_{CL} + (N_{CL} \times (1 - S_{CL}))) \times M_{CL} \times F_{CL}$$

where:

E_t = Total Potential Observed Egg Production

N_{CL} = Number of Females Observed at Length

S_{CL} = Proportion Retained at Length with a 2" escape vent

M_{CL} = Proportion Mature at Length

F_{CL} = Number of Eggs at Length

The percent of the total potential egg production gained by increasing the minimum size from 3 ¼" (83 mm) to 3 ⅜" (86 mm) was simply calculated by dividing the difference of the egg production between 83 and 86 mm minimum size by the total potential egg production. This calculation can be expressed as:

$$E_{CLmin} = ((\sum(N_{86} * F_{CL}) - (\sum(N_{83} * F_{CL}))) / E_t) * 100$$

where:

E_{CLmin} = % potential egg production from 3 ⅜" min size

N_{86} = Number of lobster protected by 3 ⅜" min size

N_{83} = Number of eggs protected by 3 ¼" min size

F_{CL} = Number of Eggs at Length

E_t = Total Potential Observed Egg Production

The percent of the total potential egg production that would be gained by adopting a 1/8" v-notch definition was calculating by dividing the sum of the total eggs produced by non-ovigerous female lobster possessing a 1/8" v-

notch – the non-ovigerous female lobster possessing a ¼" v-notch, by the total potential egg production. This calculation can be expressed as:

$$E_{VCL} = ((\sum(N_{VCL1/8} * F_{CL}) - (\sum(N_{VCL1/4} * F_{CL}))/E_t)*100$$

where:

E_{VCL} = % potential egg production from 1/8" v-notch definition

$N_{VCL1/8}$ = number of lobster possessing a 1/8" v-notch

$N_{VCL1/4}$ = number of lobster possessing a 1/4" v-notch

F_{CL} = Number of Eggs at Length

E_t = Total Potential Observed Egg Production