

Survey Marine Fisheries Education Program Massachusetts Maritime Academy

Madeleine Hall-Arber



**MIT Sea Grant
College Program**

**Massachusetts
Institute of Technology
Cambridge
Massachusetts 02139**

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**Survey of
Massachusetts Marine Fisheries Education Program
at the Massachusetts Maritime Academy, 1981**

by Madeleine Hall-Arber

**Sea Grant College Program
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139**

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The Fisheries Program at MMA has operated with David Kan of the Massachusetts Maritime Academy and Arthur B. Clifton of MIT Sea Grant College Program as co-Principal Investigators. In addition, many notable contributions have been made by the Academy's professional staff and faculty.

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1.0 INTRODUCTION AND SUMMARY

1.1 Introduction

In an effort to better fulfill the needs of the commercial fishing industry, the Massachusetts Institute of Technology's Sea Grant College Program joined with Massachusetts Maritime Academy (MMA) to begin a commercial fisheries training program in 1976. Initially, the objective was to utilize existing expertise and facilities at the Academy for two purposes: to familiarize cadets with commercial fishing techniques and to offer weekend courses to retrain active fishermen and improve their skills in navigation, vessel safety and management operations. The success of the program prompted the Massachusetts legislature to enact legislation designating the Massachusetts Maritime Academy as the Center for Fisheries Education and Training.

The major goal of the Fisheries Program is the education and training of qualified fishermen to help revitalize New England's commercial fishing industry. Smaller schools of fish and increased costs of fuel and equipment, coupled with high interest rates and increasingly complicated governmental regulations, today demand a variety of skills. Sophisticated business acumen, knowledge of electronics and other gear developments, as well as such basic skills as trawling expertise, net-mending and engine trouble-shooting are all needed and require a more formal teaching approach than the traditional apprenticeship technique.

The Fisheries Program currently employs four full-time professionals and thirty part-time instructors. Innovative team teaching and the utilization of experts as guest lecturers or instructors has successfully introduced practical methods and state-of-the-art technology while keeping program costs low. In addition, a 53-foot training vessel, "Maritime Quest", is used as part of the "hands-on" training. Installation of marine electronic and audio-visual equipment on a 40-foot bus created a mobile training laboratory which has made marine electronics courses available to fishermen along the east coast from North Carolina to Maine.

The portion of the program directed towards active fishermen (rather than cadets) is made up of short courses and seminars usually held on weekends and evenings. From 1978 to 1982, over 2,000 persons from the New England region have attended the workshops and lecture series. This survey is an effort to measure the financial benefits of the fisheries program as estimated by the participants. This follows a preliminary survey by David Kan of MMA and Arthur Clifton of MIT Sea Grant in the Fall of 1980 where eight participants reported benefits of at least \$58,250. Since the small sample indicated substantial benefits for the relatively low program cost, a more comprehensive survey for documentation of the benefits was undertaken.

1.2 Summary

Telephone interviews and questionnaires were used to survey the participants in the 1981 Fisheries Training Program at MMA to determine what benefits have accrued as a result of course attendance. The survey found that the majority of the participants believed the courses are important both for training those new to the industry and for keeping the experienced abreast of innovation. In general, the courses were thought to be well-organized and thorough, taught by knowledgeable, experienced instructors and offered for reasonable fees. With only one exception, every respondent wanted the program to continue, many adding that the information is unavailable elsewhere. It is noteworthy that of the 193 respondents, 62 had taken more than one course. A number of boat captains also mentioned that they had sent their crew members to the courses, having determined that it was "good business" to do so.

The category showing the largest amount of money saved or earned as a result of course participation was that of employment estimated at \$426,000. Fifty-two respondents commented that the courses aided their careers, 27 specifically stating that the courses had helped them obtain or advance their position, or start their own business.

Other benefits were identified, although more difficult to quantify. The savings and earnings directly attributed to the fisheries program in the area of equipment construction, repair and usage was \$47,350. This figure includes such amounts as: \$2,000 saved after one respondent constructed and repaired his own hydraulic system; \$1000 saved in construction of lobster pots by another respondent; net-mending savings of \$10,500 by two participants; \$5,000 saved annually because of improved navigation skills learned in the Loran C course. The majority of participants claimed significant savings which were not easily quantifiable. For example, many noted that time not wasted waiting for repairs, etc. has meant money saved.

The \$426,000 in earnings/savings attributed to participation in the fisheries program must be considered a conservative sum. In the first place, most fishermen are reluctant to reveal their financial position, so that even in the case of the more easily quantifiable results, i.e., equipment construction and repair, estimates are low. In other cases, the benefits are not easily measurable. As some fishermen noted, the skills they learned are essential to their business and the rapid transfer of innovative technology by trained personnel is a great improvement over time-consuming trial and error. However, it is difficult for participants, and for the author, to measure the dollars and cents value of that technology transfer as it is effected by the MMA Fisheries Training Program. Finally, the estimates are also conservative because extrapolations were not made except in the category of employment. The extreme ranges of fishing styles, types of equipment, and levels of expertise made it impossible to support extrapolations.

As the program has developed, the courses have increased in number and sophistication. Advanced courses in the elements of trawl design, oceanography, hydraulic systems design, radar observer licensing, and fish finder and sonar theory are planned. Increased research and development on gear is to be undertaken and the use of video will be expanded.

The strengthening of the fishing industry through education benefits not only fishing communities, but the region of New England, and, ultimately, the nation. The MIT Sea Grant-Massachusetts Maritime Academy fisheries program has demonstrated its ability to serve the needs of the participants. For that reason, the MIT Sea Grant has continued to contribute to the joint project and recently, in recognition of the program's success, the Commonwealth substantially increased its funding. The respondents to this survey said the program should be expanded to accommodate the increasing sophistication of the fishermen and to make the program available to others.

Methods*

Using class lists from the courses offered in 1981, 163 telephone conversations averaging 10 minutes each and 30 responses to a written questionnaire yielded a varied commentary on the usefulness of the MMA courses. In the conversations the interviewer explained that she was calling from MIT Sea Grant at the request of MMA to learn if the courses have been beneficial to participants and how they could be improved to better serve the interests of the wide variety of participants. With one exception, all of the respondents urged that the program be continued, especially for the benefit of fishing communities and thereby, the population at large. No one refused to answer questions, although some were more reluctant than others to reveal financial benefits that resulted from the courses.

Organization of the report

The value of the fisheries program is summarized in this report by the categories: employment, equipment (construction, use, and repair), background, and safety. For employment and equipment categories there is an introduction, descriptive results, and quantification of results. Selected comments, criticisms and suggestions have been included in separate sections. Sample comments are categorized according to topics of the remarks, for example, under "General Comments", compliments are divided into the categories: filling needs of inexperienced, filling need of experienced, content, information not available elsewhere, desire for the information, personnel, fees, and other.

Table 1.1 lists the workshops that were offered in 1981. For descriptions, see the catalogue of courses, (Appendix D, page 33). To illustrate the cost-benefit analysis, there are 3 tables showing reported and extrapolated earnings or savings. Table 2.1 shows earnings attributable to program participation, Table 3.1 shows savings on equipment, and Table 7.1 shows the total of earnings or savings indicated by the survey. A list of the professions of the respondents is also included. Finally, a note on methodology and a copy of the questionnaire are attached.

*See "Notes on Methodology" for more information.

TABLE 1.1 Workshops offered in 1981

Workshop	Date	Number of Attendees
Bottom Trawl Construction	January 19-23	22
Bottom Trawl Construction	February 9-13	4
Bottom Trawl Construction	March 2-6	13
CPR, First Aid, Cold Water Survival & Radio Communications	January 31-Feb.1	16
Diesel Engine Fuel Injectors	March 7-8	12
Fisheries Business Management	February 8	21
Fishermen's Forum	February 21	106
Fishing Grounds & Oceanography	April 4	22
Lobster Gear Construction	March 14	38
Loran C & Radar	January 17-18	18
Loran C & Radar	March 14-15	16
Loran C & Radar	March 21-22	16
Marine Diesel Engines	January 10-11	13
Marine Diesel Engines	January 3-4	13
Marine Diesel Engines	February 28-March 1	27
Marine Electrical Workshop	January 24-25	12
Marine Hydraulics	February 7	12
Navigation & Loran C	February 14-16	17
Navigation	April 11-12	25
Net Mending, Wire Splicing & Seamanship	January 10-11	19
	TOTAL	442

2.0 EMPLOYMENT

2.1 Introduction

In most telephone interviews the questions asked were roughly the same as those on the written questionnaire (see Appendix A). Question #3 asked, "Was the course useful as a career aid?" As the follow-up questions indicate, this was intended to elicit information about the fisheries program's performance in the area of job training -- as indicated by job placement or job improvement due to course participation.

2.2 Results

2.2.1 Descriptive Results

Fifty-two respondents agreed that the courses aided their careers, 27 specifically citing job placements. Of these:

Fourteen respondents said that the courses they took were responsible for their obtaining their jobs, 7 of these mentioned that their newly acquired net-mending skills were particularly important. One noted that he is earning \$35,000, another \$13,000, and a third said the course increased his income by \$5,000.

Eleven mentioned that the course helped them obtain better jobs, two noting that the improved position perhaps will mean \$10,000 added income for each of them.

Two started businesses of their own, one of these thereby increased his income by \$10,000.

Seventeen felt the course improved their job performance or led to new business opportunities.

Seven took courses to upgrade their licenses or receive certification for 100 ton licenses, radar and pilotage, uninspected engineer, and CPR certification. Five passed their exams, the other two have not yet taken them.

One built his own small dragger.

2.2.2 Quantification of results

In an effort to measure the value of the courses to the participants in dollars and cents, a compilation of earnings and savings has been made for each category. With extrapolations, the total of earnings attributable to the fisheries program in the category of employment was \$426,000. The extrapolation is based on a report by Peterson and Smith (1981) that among small-scale fishermen fishing full-time, the net income averaged \$23,380. (Part-time fishermen averaged \$16,349.) Rounded off, the average income was calculated as \$23,000 for the twelve men who responded that they had obtained jobs after taking the courses, but who did not cite salary figures. The salaries of the two respondents who did offer that information were also added.

During the interviews, two fishermen noted that when they improved their sites (i.e., obtained higher paying jobs--usually occurs when position is found on a boat that catches more fish), their income increased by \$10,000. This figure was used for all those who cited that they improved their sites under the assumption that a crew member would not be likely to mention an improvement unless it was substantial.

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TABLE 2.1 Earnings Attributable to Participation in the Fisheries Program

(Number of respondents who mentioned)

Employment (52)

Obtained employment (14)		
Reported earnings (2)	=	48,000
Reported increase in earnings (1)	=	5,000
Extrapolated earnings (11)		
(Average annual share \$23,000*)	=	253,000
Placement in more lucrative positions (11)		
Two reported increases of \$10,000 each	=	20,000
Extrapolated earnings (9)		
(Average increase \$10,000)	=	90,000
Business starts (2)		
One reported increase in income	=	10,000
Improved job performance or opportunities (17)		
Certification/license (5 earned)		

TOTAL	=	426,000

* Peterson, Susan and Leah Smith. Small-Scale Commercial Fishing in Southern New England. Woods Hole Oceanographic Institution Technical Report (WHOI-81-72), August 1981.

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3.0 EQUIPMENT

3.1 Introduction

Seeking information about the level of training participants in the fisheries courses had reached, the question was asked "Was the course helpful in equipment construction, repair and/or use?" This question elicited much more substantive data during the telephone interviews than it did in the written questionnaire since during the conversations respondents were not constrained by short answer blanks and were free to go into detail about their equipment and what they learned in the courses. In the last round of questionnaires, it was also asked if the courses were useful in purchasing equipment.

3.2 Results

The results will be discussed under the three categories: equipment construction, equipment repair and equipment use. These categories will be further delineated by the type of equipment the participants cited.

3.2.1 Equipment construction

Electrical: One individual wired his boat himself.

Hydraulics:

Two now design and build winches.

One mentioned construction and repair of hydraulics have saved him \$2,000.

Most find troubleshooting easier.

Lobster traps:

Thirteen built at least 270 pots this year, many more planned before summer. At an average of \$30/pot, \$8,100 has been saved by participants.

Construction and use of pots has saved one respondent \$1,000.

One did not mention how many traps he had built, but mentioned that he has changed the design of his traps. Others noted that the courses reinforced understanding of trap design and engineering.

Eight of the participants have residential permits only, but most are interested in eventually lobstering professionally.

Nets:

Seven stressed the importance of the course in design and construction of nets, one mentioning that he has built 3 nets in 6 months.

3.2.2 Equipment repair:

Diesel Engines:

The time not wasted waiting for mechanics was considered significant by several respondents. Trouble-shooting, maintenance work skills learned are also considered valuable by each of the participants, though most found it impossible to judge the economic benefit to them of these skills.

Five mentioned at least \$950 in direct savings this year.

One claimed he earned/saved \$4,000.

Hydraulics:

Four respondents mentioned that they now repair hydraulic systems.

Net mending:

An essential skill for crew members on active fishing boats, it is not usually possible to quantify precisely what savings are involved.

Two respondents noted approximately \$10,500 savings between them.

Three others reported \$3000, \$1800, and \$1000 respectively in savings by net-mending.

Under "Career Aid" category it was noted that 7 individuals mentioned their net-mending skills as being at least partially responsible for their having found jobs.

Lobster traps:

More than once the comment, "time is money", was repeated. One lobsterman in particular mentioned that he saves time, energy, limits aggravation, now being able to mend his pots on-site when he is pulling the traps for the catch.

One of the respondents commented that he repairs 2,000 lobster traps, so has great savings.

3.2.3 Equipment use:

General equipment:

Difficult to quantify; however, the skills acquired leading to proper use of equipment certainly does contribute to improved financial position.

One participant said that better navigation and use of nets were worth \$10,000 annually to him.

Loran C:

Six respondents specifically mentioned savings in fuel costs due to learning how to use the Loran C properly. Again, however, most could not quantify what their savings has been, they were sure that the amount was large. The savings in fuel also permitted the added bonus for some of extending the areas covered, leading thereby to higher yield of catch per gallon of fuel burned.

One respondent said that because of the course on the Loran C, he had saved or earned \$5,000.

3.2.4 Equipment purchase:

This was a tacked-on question sent out only in the last batch of questionnaires after 5 telephone respondents had mentioned that the courses were useful in helping them select equipment for purchase.

Of the 9 questionnaires returned which contained this question, 3 of the responses were positive.

3.3 Quantification

Quantification of the results is problematic for equipment construction, repair and use. As some of the fishermen noted, the skills they learned are essential for maintaining a modern fishing business. What was once slowly learned over the course of many years by fathers teaching sons now must be taught rapidly and efficiently by trained personnel if the fishing industry is to survive. However, it is difficult to determine the dollars and cents value of the MIT Sea Grant-MMA fisheries program's role in the efficient transfer of technology. Furthermore, given the reluctance of most fishermen to reveal their financial position, the stated savings of \$47,350 for equipment construction, repair and use must be considered a very conservative estimate (Table 3.1).

It is only in the category of lobster trap construction that a relatively safe extrapolation of savings can be made. Savings on each pot were estimated to average \$30.00. Respondents mentioned that they had built at least 270 pots, yielding a total savings of at least \$8,100. In addition one fisherman noted that he saved \$1,000 in construction and use of his pots.

No attempt has been made to extrapolate earnings or savings for any of the other types of equipment. The range is too extreme, varying with the style of fishing, type of equipment, and level of expertise, that any extrapolation would be difficult to support. Consequently, the earnings/savings compilation is based only on what individual fishermen stated as their own estimates of what they saved or earned. It is worth underlining, though, that the training of fishermen to construct and maintain their own equipment strengthens the base upon which the fishing industry is built.

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Table 3.1 Savings on Equipment Attributed to Participation in the Fisheries Program

Construction of lobster pots		
270 pots, averaging \$30/pot	=	8,100
Construction & use of pots (1)	=	1,000
Repair of 2000 pots		
Construction & repair of hydraulics (1)	=	2,000
Repair of nets		
Five reported (total)	=	16,300
(varied from \$10,000 to \$500/respondent)		
Repair of engines		
One reported	=	4,000
Five mentioned (total)	=	950
Use of equipment		
General equipment	=	10,000
Loran C (1)	=	<u>5,000</u>
Total	=	47,350

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4.0 BACKGROUND

4.1 Introduction:

The question was asked, "Was the course useful as background information?" and "how, for example?. It was assumed that some of the respondents were already experienced fishermen by the time they participated in the program. In particular, the fisherman's forum attracts a wide variety of attendees including fishermen of every level of expertise, as well as individuals in fishing industry-related businesses. This question was used to determine if those who were already knowledgeable found their participation worthwhile.

4.2 Results:

Essentially all of the respondents regarded the courses as important for background information or as refreshers, even in cases for which there is no obvious or calculable monetary benefit. A number of the respondents are professionals in fields related to fishing business, but do not themselves fish, so although the courses were classified as only being useful for background, much of the information is essential to their fields.

The fishermen's forum was most often cited as useful for background, specifically: good as an introduction to new technology in gear, foreign techniques and markets, and conservation. In addition it was an opportunity for fishermen to share ideas with other fishermen and to express their concerns to non-fishermen in fishing-related industries. Some of the specific comments reveal details about how the information is useful as background. Additional comments are contained in the appendix.

4.2.1 Sample comments:

(Number of respondents specifically commenting on the value of the courses taken for background information.)

Business Management (11)

- Knew most of the information in the business management course, but was a good review...The instructor is now his accountant
- Learned how to keep books, regard fishing as a business, even though fishes only part time

CPR (1)

- Learned about USCG air evacuation team & helicopter procedures

Diesel engines (21)

- As a seller of high performance synthetic oils, need to know demands of diesel engines...The course therefore was highly useful for business, but its value could not be quantified
- As mechanic working on fishing boats, its important to know how the equipment is used, know needs of fishermen, so can work accordingly

Electrical Systems (4)

- Helpful in troubleshooting, understanding problems
- Learned about the shortfalls of electrical systems

Fish Migration (3)

- Knows where to find fish

Fishermen's Forum (29)

- This is a good introduction to innovations, different gear
- Particularly good for comparing US fisheries with what goes on in the rest of the world in regard to fish prices, fuel costs, etc. Useful to know how other governments treat their fisheries...(Noted that he has the impression that fishermen of Europe and Japan "have it better" than US fishermen in spite of the higher costs of fuel because of other government aid)
- Have been fishing for 15 years, but had never seen how nets fish (liked photos of nets underwater)
- Meeting fishermen and others interested in the fisheries was useful

Fishing Grounds & Oceanography:

- It was "extra-education"

Hydraulics (5)

- gained confidence
- better understanding of existing systems

Lobster pots/habitat (15)

- Gained information about lobster habitats and temperatures, helpful in knowing when and where to place pots

Loran C (12)

- Had a Loran C, needed more information about its uses
- Already a ship pilot, so knew most of the information, but interesting survey of equipment

Navigation (17)

- Refresher course before taking tonnage license exam
- Most important part of lobsterman's skills, very good course

Nets

- Working knowledge of construction and repair now

5.0 SAFETY

5.1 Introduction:

There was no specific question related to safety that was asked either on the telephone or in the questionnaires; however, several of the respondents emphasized that safety was an important benefit, albeit not economically quantifiable at this level.

5.2 Results:

Again, the results are not quantifiable, but the specific comments are revealing. Two courses in particular frequently elicited comments about safety, that is, diesel engine repair and CPR/First Aid. Diesel engine course participants frequently mentioned the importance of being able to trouble-shoot and to maintain their engines properly. The confidence gained was also considered a safety factor since the respondents thought they would be less likely to panic if they ran into trouble offshore.

Sample comments:

CPR/First Aid:

- Can save a life, knows what to do on water...How can one put a monetary value on a life?

Diesel:

- Feel safer operating pleasure boat
- Trouble shooting ability is important. When one is miles offshore in rough weather, it's not like being a truck driver who can pull over on roadside and thumb a ride to a mechanic, one has to know how to fix one's engine

Loran C:

- Used to be scared to go fishing with a particular friend, but after that friend took the course, he gained respect for the sea and his responsibilities, learned a great deal

General:

- The courses better educate men in terms of safety on the sea, thereby reducing fatal accidents on the oceans and inland waterways
- It is essential to national security that every facet of the maritime field be supported by the government...especially when America is increasing its dependence on imports...Strong civilian maritime branch [needed] to augment the services of the Navy during wartime

6.0 GENERAL COMMENTS

6.1 Introduction

Telephone interviews generated many comments about the program, including compliments, criticisms, and suggestions. Although these comments are not quantifiable, they do contain information that should be considered in a cost-benefit analysis of the fisheries program. A selection of comments has been made for the three categories: compliments, criticisms, and suggestions. For those interested in more details, other comments (though not all) are contained in Appendix C.

6.2 Compliments:

The courses are regarded by most of the participants as important, fulfilling needed functions of training youth and keeping the experienced abreast of innovation. In general, the courses were thought to be well-organized and thorough, taught by knowledgeable instructors and offered for reasonable fees. With one exception, every respondent wanted the program to continue. Sample comments are categorized according to topics of the remarks: filling needs of inexperienced, filling need of experienced, content, information not available elsewhere, desire for the information, personnel, fees, and other.

6.2.1 Fills need - Training for inexperienced:

- Fishermen are jealous of their information, don't like to give out their "secrets"...These courses give those who didn't grow up in a fishing family the opportunity to go into the business
- Today's crews are tomorrow's captains...It is important for the industry as a whole to continue these courses...The more information one has, the better job one can do

6.2.2 Fills need - Introduction to innovation and training for the experienced:

- I hope you are able to continue this program as I find there are so few ways to learn new techniques so as to improve one's knowledge of the fishing industry
- Such courses needed for commercial fisheries, tough racket, need help to stay competitive with foreign fleets

6.2.3 Content:

- Hands-on and theory well-balanced
- Good reference materials

6.2.4 Information not available elsewhere:

- If MMA doesn't give these courses, there's no place else to go...Today's crews are tomorrow's captains, so it is important for the industry
- Obtain information one can't find in books
- Best courses anywhere on the East Coast

6.2.5 Personnel:

- Instructors were excellent, (geniuses, superb, etc.)
 - varying levels of participants posed no problems, instructors made course interesting for everyone
 - Amount of knowledge presented in short time was surprisingly good
- Highest regard for the program and everyone connected with it...Kan is very good, key to all...Incredible that they can do as much as they do on as small a budget as they have

6.2.6 Desire for the information:

- Has 8 other friends who will take the diesel course
- Classmates took time off from work, some even came from out-of-state, big expense, shows thirst for knowledge

6.2.7 Fees:

- Appreciate the reasonable fees
- Even if cost went up would still take

6.3 Criticisms

Preregistration is requested by the Fisheries Program, but commercial fishermen do not always know when they will be able to attend courses rather than go fishing. In consequence, some courses have been overcrowded with attendees who did not preregister. Three complained about courses being too crowded, several about not having enough "hands-on" time, and another noted that there is not enough equipment to work with, therefore, different applications and varieties of equipment are not covered. Timing, place and lack of advertising were occasionally criticized. A few said that their course was not thorough enough, but one commented that too much material was covered in the short time and a couple complained about the pace being too fast.

6.3.1 Content:

- Nine people noted that they would prefer more "hands-on" time
 - Realized that it was attempt to balance 50-50 between theory and hands-on, would have preferred 60-40
 - Course should have greater depth...Was O.K. for survey of equipment, but not useful for capabilities of any one type

6.3.2 Pace:

- Too general, too rushed, though have noticed improvement

6.3.3 Numbers of participants:

- Too many curiosity seekers, perhaps there should be separate courses for commercial fishermen (Rather than mixing commercial with pleasure boat fishermen)

6.3.4 Location:

- Too far away
- More courses needed in Gloucester area

6.3.5 Timing:

- Some of the courses wanted this year were offered in the middle of the week, bad for those working
- Disappointed that no "lobster habitat" held this year (Last year it was offered at the same time as "lobster pots" which he took, so couldn't take habitat)

6.3.6 Advertising:

- Mailings are too late when bulk mail is used

6.3.7 General:

- Program should not continue, every useful person should be contributing to gross national product, all expertise should be used; too many foras, bureaucrats & fishcrats

6.4 Suggestions

The most common suggestion was that there should be courses geared to different levels of expertise. Generally, the courses are particularly good for entry-level and slightly experienced, but more is needed for the highly experienced. It was also suggested that there should be more written materials available, courses offered in other locations, and more advertising. Some specific suggestions were also made to increase accessibility of information and as to what information and what other courses are still needed. These latter comments are included in some detail.

6.4.1 More in-depth courses for the experienced:

- Break courses into more specialized segments
- Electrical course:
 - Time given to wiring and set-up of fishing boats (i.e., how to wire a boat, lay-out, circuitry, how to avoid abuse of wiring on deck, types of fittings, types of circuit breakers, conduits, especially how to set-up systems that are reliable and easy to trouble-shoot)
- Need more information on fish handling - some fish have shelf-life of 48 hours, another fish has 5 day shelf-life, from same boat

6.4.2 Certification Courses needed:

- Radar course should offer certification at successful completion*
- 3rd mate or engineer license*
- Captain's license*

* Certification courses are offered as part of the regular day program at the Massachusetts Maritime Academy. Time required to obtain these licenses or certification ranges from 8 days to 4 years.

6.4.3 More on small boats:

- Need to reach out beyond fishermen to other small boat operators
- Help diversify small boats, teach them how to rig for quick changeovers

6.4.4 Other information needed:

- Find answers to worst of fishermen's problems: fuel prices, interest rates for new boats
- At forum - session on ways to economize (new fuel gadgets, info on RPMs, oil purifiers, variable pitch propellers, etc.)
- Basic seamanship including compass reading, in case Loran C malfunctions

6.4.5 Specific courses desired:

- Diesel troubleshooting
- Electrical troubleshooting
- Advanced electronics
- Hydraulic troubleshooting
- Celestial navigation
- Advanced navigation
- Basic rules of road for fisherman
- Meteorology and weather forecasting
- Nets: - more specifically how the net works on the bottom and why, how to hang the net and drag, how to evaluate the net's performance once on the bottom
 - Purse seining; Dragging; Skiff net; Gill netting
- Small open boats course, esp. how to diversify
- Advanced welding
- Sonar

6.4.6 Increase availability of information:

- Try videotaping some of the courses and renting the tapes, so that the timing of the course is more flexible (May be difficult to do so since in many of the courses the "hands-on" time is important, but might work with some of the information)
- Try to develop a simple computer program for home computers (e.g., Apple or Atari) for information gathering and storage and for business records
 - (e.g., Loran C settings, catch at setting, time of year, prices/species, commission to broker, shares for crew, engine hours, fuel, groceries, etc.)
- Need hotline/advisory commission to help fishermen to adjust equipment
- Spread out geographically (New Hampshire needs such courses)
- Need more practical courses in Gloucester
- Have a summer session
- Have forum in New Bedford

6.4.7 Written materials:

- Need written materials...In a practical skills course it is hard to take notes, since one needs to watch and practice, but if written material were given out, it would be easier to retain the information presented
- Need some written material to help remind one how to make the stitches

6.4.8 Advertising:

- Use field rep - to tell fishermen about courses and as follow-up
- More promotion (esp. directed to crew members): National Fishermen; Fish Expo; Maine Fisheries Paper; Posters at fish & equipment dealers in New Bedford, Chatham, Boston

6.4.9 General:

- Need refresher courses
- Could eliminate meals if need to cut back

7.0 COMPILATION OF EARNINGS AND/OR SAVINGS

In the categories of employment and lobster pot construction extrapolations were made in order to indicate probable earnings or savings. In every other category, however, no extrapolations were attempted since the range is so extreme, varying with the style of fishing that any extrapolation would be difficult to support. The other sums are those offered by respondents as their own estimates of their earnings and/or savings that were attributable to their participation in the MMA program.

Table 7.1 Compilation of Earnings and/or Savings

(Number of respondents who mentioned)

A. Career aid (52)

Obtained employment (14)		
Reported earnings (2)	=	48,000
Reported increase in earnings (1)	=	5,000
Extrapolated earnings (11)		
(Average annual share \$23,000*)	=	253,000
Improved jobs (11)		
Two reported increases of \$10,000 each	=	20,000
Extrapolated earnings (9)		
(Average increase \$10,000)	=	90,000
Business starts (2)		
One reported increase in income	=	10,000
Certification/license (5 earned)		
SUBTOTAL	=	<u>426,000</u>

B. Equipment

Construction of lobster pots		
270 pots, averaging \$30/pot	=	8,100
Construction & use of pots (1)	=	1,000
Repair of 2000 pots		
Construction & repair of hydraulics (1)	=	2,000
Repair of nets		
Five reported (total)	=	16,300
(varied from \$10,000 to \$500/respondent)		
Repair of engines		
One reported	=	4,000
Five mentioned (total)	=	950
Use of equipment		
General equipment	=	10,000
Loran C (1)	=	5,000
SUBTOTAL	=	<u>\$ 47,350</u>

C. Earnings reported in test interviews of 8 people	=	<u>58,250</u>
TOTAL	=	<u>\$ 531,600</u>

* Peterson, Susan and Leah Smith. Small-Scale Commercial Fishing in Southern New England. Woods Hole Oceanographic Institution Technical Report (WHOI-81-72), August 1981.

8.0 PROFESSIONS OF RESPONDENTS

8.1 Introduction

Eighty-three participants are currently either full or parttime commercial fishermen working on boats ranging in size from small skiffs to 296' Alaskan factory ships. As the diversity of fields represented among the participants shows, however, the program clearly benefits a much wider group of professionals.

8.2 Attendees

- Attorney, marine affairs & recreational fisherman
- Banker (bank officer)
- Boat builder (2)
- Boat delivery service
- Builder of wooden lobster traps
- Captain coastal tug & barge unit (1)
- Captain oil supply boat
- Coast Guard; lobsterman part time (wants commercial license)
- Commercial shellfisherman (10)
- Commercial fisherman - seasonal; construction engineer
- Commercial fisherman and caretaker of an island, raises oysters
- Half year fishing, 1/2 yr. pilot for tuna boat
- Commercial finfishermen (46); including: draggers, seiners, gill netter, long-liner
- Commercial lobsterman (13)
- Commercial lobsterman 6 mos.; commercial fisherman 6 mos. (2)
- Commercial lobsterman in summer; logger in winter (own boat)
- Commercial sportfisherman - seasonal; tax work
- Part-time commercial fisherman; part-time pleasure craft; paper salesman
- Part-time commercial fishing; mechanic and electrician
- Part-time fisherman & parttime boat builder
- Part-time fisherman & parttime fireplace shop
- Part-time fisherman & parttime harbor pilot
- Part-time fishing on own boat (jigging & tuna); works in courthouse; also is licensed aircraft mechanic & hydraulic specialist
- Part-time lobsterman
- Dentist
- Electronics technician on aircraft
- Excursion Boat (5)
- Fire chief, plans to be recreational fisherman
- Fish Coop manager
- Fish inspector; vocational high school teacher
- Fisheries agent (Development foundation)
- Fishing gear and supplies salesman
- Fishing methods & gear specialist for research vessels (NMFS)
- Formerly commercial fisherman, now runs party boat in summer; maintenance worker
- Formerly crab boat deckhand; now US Navy
- Formerly fished, construction now; will return to fishing
- Formerly fisherman, now sells foreign fish
- Formerly fisherman, now works for town
- Formerly lobster & charter fisherman; now with Mass Div of Marine Fisheries

- General Manager - Floor covering business
- General Manager - paper company (fishes offshore w/friends weekly
- Harbor pilot; maintains equipment, small boats (2)
- Industrial hydraulics
- Librarian (NMFS)
- Licensed merchant marine
- Marina, fishing charters
- Marine Insurance company (3)
- Materials engineer (company makes propellers)
- Mechanic - works on boats, fishes occasionally
- Mechanic, working with engines on water (not specific)
- Natural Resource Officer - shellfish offices; harbor master duties; one engineer; one fishes commercially part-time.(5)
- Owner small construction company; sport fisherman
- Park supervisor at Sandwich
- Plastics factory worker, quality control; may change to fishing
- Recreational fisherman
- Retired commercial fishermen; now in sales and marketing fish
- Retired engineer; part-time fishing on 27' boat (jigging)
- Retired lobsterman
- Retired lobsterman & parttime stern man
- Retired military; runs travel agency, recreational sailor
- Retired, formerly owned sport fishing boat; makes and sells pots
- Retired; part time lobstering
- Retired; scalloping avocation
- Salesman of high performance synthetic oils
- Salesman, private lobster license
- Seaman (3)
- Ship pilot
- Something with vending machines
- State patrol boat
- Students (3)
- Teacher (college), consultant; sails
- Teacher (science); shellfishing for self
- Teacher (vocational school - machine shop); sails
- Teacher - oceanography
- Toy business, future in fishing
- Unstated (31)
- Welder building fishing boats

9.0 NOTES ON METHODOLOGY

One hundred and thirty-six questionnaires were sent out to those on the class lists whose telephone numbers had been disconnected, or who were not reached after at least three attempts. Ten (7%) of the questionnaires were returned as "unforwardable". Thirty questionnaires, or 22% of those evidently delivered, were answered and returned, including 8 that were signed.

The 30 responses to the questionnaires represent 15% of the sample of 193 participants who were surveyed. However, with four jobs obtained, and 6 improved (extrapolated earnings of \$120,000, plus \$35,000 noted in one response) and \$17,300 noted in economic benefits through equipment construction, repair and usage, the total of \$224,600 represents 42% of the total economic benefits claimed by survey respondents.

Although they did not show quite the same degree of financial benefit as the questionnaires, the telephone interviews yielded many more substantive comments about the courses and the program as a whole. During the telephone interviews respondents were more specific about how the courses have aided them, detailing the benefits that were not calculable in financial terms, as well as their economic returns.

Besides evaluating the MMA fisheries program, the survey served also as an opportunity to communicate with fishermen and others interested in the fishing industry. The telephone interviews were particularly useful for expressing the interest the Sea Grant College Program has in the industry and for encouraging interaction in the interest of developing the industry to its fullest potential.

Of the 193 respondents, 62 had taken more than one course, 2 had taken 6 courses; 1 said he had taken all courses. Sixty respondents participated in Fishermen's Forum; 45 took Loran C & Radar; 44 took the diesel engine course; 27 took Bottom Trawl Construction; 26 took lobster gear construction; 17 took Navigation & Loran C; 17 took Net Mending; 16 took the Business Management course; 15 took First Aid; 15 took Electrical Equip.; 14 took Marine Hydraulics; 11 took Fishing Grounds; 6 took Diesel Fuel Injectors; 1 took Pair-trawling; 1 Electronics.

Appendices



Commonwealth of Massachusetts

Massachusetts Maritime Academy

P.O. BOX D, BUZZARDS BAY, MASSACHUSETTS 02532 / DIVISION OF STATE COLLEGES



June 4, 1982

Dear :

As you know, the Massachusetts Maritime Academy offers a fisheries program each winter consisting of a series of workshops emphasizing practical skills. This program is dependent on government funding so it is important for the continuation of the program for us to document its value to you, the participants. In an effort to both determine its usefulness and to make this program better suit the needs of the marine community, we are attempting to contact everyone who has taken one or more of the courses to give us their evaluation of the program.

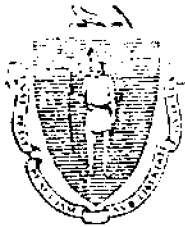
Since you have participated in at least one of the programs offered by the Massachusetts Maritime Academy, your opinion is important to us. Enclosed you will find an evaluation form and a self-addressed envelope in which to return it. Please note that the evaluation is completely confidential. In fact, it is not necessary to sign the form. We would like to know which of the workshops you attended so that criticisms and compliments are specific and the appropriate courses can be improved.

Thank you for taking the time to help us.

Sincerely yours,

A handwritten signature in cursive script, reading "David L. Kan".

Dr. David L. Kan
Marine Fisheries Program



The Commonwealth of Massachusetts
Massachusetts Maritime Academy

P.O. BOX D, BUZZARDS BAY, MASSACHUSETTS 02532 / DIVISION OF STATE COLLEGES



FISHERIES PROGRAM

Workshop Evaluation

Workshop Topic: (Please circle one)

Bottom Trawl Construction

CPR, First Aid & Survival

Diesel Engine Fuel Injectors

Fisheries Business Management

Fishermans' Forum

Fishing Grounds & Oceanography

Lobster Gear Construction

Loran C & Radar

Marine Diesel

Marine Electrical

Marine Hydraulics

Navigation

Net Mending, Wire Splicing

Date of Workshop: / /
 month / day / year

1. What is your occupation? _____

2. Was the information offered in the workshop useful to you? _____

If yes:

3. Was the course useful as a career aid?

a. Did you obtain a job in part because of the workshop? _____

b. Did you obtain a better job because of the workshop? _____

c. Have you had new business opportunities? _____

1. What, for example? _____

d. Did you pass an exam or obtain a license because of the workshop? _____

1. Which exam or license? _____

4. Was the course helpful in equipment:

- a. construction _____
- b. repair _____
- c. use _____

d. Kind of equipment? _____

5. Have there been any direct economic benefits to you? _____

- a. Could you say approximately how much money you have earned or saved because you took the workshop? _____

6. Was the course useful as background information _____

- a. How, for example? _____

7. Other ways the course has been useful: _____

If the course was not useful to you:

8. Why not? Please be specific: _____

9. Do you think the program should continue? _____

10. What other courses have you taken? _____

11. What other courses would you be interested in taking? _____

12. How did you learn about the Fisheries program? _____

Other comments:

12.0 APPENDIX B - ADDITIONAL COMMENTS

Comments on employment opportunities:

Jobs/Job Improvement:

- Course helped him obtain a job and new business opportunities, mending nets for others...Feels the course has been responsible for his earning or saving \$35,000
- Already a fisherman, but with knowledge gained in course, improved site...The improvement could mean a difference of \$10,000/year...The course was definitely responsible

New opportunities, improved job performance:

- Can repair lobster heads while out over the traps, so doesn't have to bring them back and forth, saves his time and keeps the traps active
- Most insurance companies don't know enough about the fishing business, even when they carry marine policies

Business starts:

- Was a deckhand for 3 years, this year bought own skiff for offshore lobstering...Would not be doing so well without these courses...Can't get this information elsewhere...The courses probably increased his income by \$10,000

Exams/Certification:

- Was able to pass 100 Ton license (Coast Guard certificate) because of course
- Have to qualify annually for CPR (Can take a CPR course with the fire department, but the cold water survival and first aid portions were important since he works on the water part-time)

Equipment construction comments:

Lobster Traps:

- With brother, built 200 lobster traps last winter right after the course, working on another 250 this winter...Before the course had a small-scale business with 75 traps
- Had had to buy lobster pot heads for the pots he makes and sells as a hobby...Two heads are required for each pot at \$1.50 - \$2 per head; amount of savings depends on the number of pots he makes

Nets:

- Knew how to mend nets, but wanted to learn how to put them together...Has been very helpful on board
- Have built 3 nets in six months, course on trawl construction very useful [did not offer estimate of savings/eco benefits]

Equipment repair comments:

Diesel Engines:

- Now when works on own engine, it is not guesswork... He tinkers three or four times a year, plus does a annual tune-up himself...Besides saving at least \$50-\$100 for the tune-up, he notes that he saves money by not having to miss several days of fishing while waiting for the mechanic to show up as he did formerly...In addition, if he has a breakdown out fishing and has to put in to another port, he does not have to rely on the more expensive marine mechanics
- Saved \$350 by being able to repair a fuel line problem using what he learned in the course
- Do own engine repairs as much as possible...Saves \$200/day of repair in addition to the time which he would normally have to wait around for the mechanic

Net Mending:

- Sent two crew members to the net-mending course last year, sent one member this year...Captain/owner pays for the course, has been very helpful and successful
- As boat owner and captain, mending and net construction probably saves him \$10,000 annually...He sends his crew members as well to the courses
- Before taking the courses, when he ripped his nets he had to come in and wait for someone else to repair it

Equipment use comments:

Diesel:

- Good background for all kinds of engines, even off boats - confidence builder

General Equipment:

- After fishing for 15 years, knew a lot, but had many holes in his knowledge...Courses laid everything out in an organized way, showing why what works works (Wished the courses were available when he started)
- Boston harbor benefitted since pilots use small boats; diesel, electrical, navigation courses all were useful

Hydraulics:

- There's no standardization, so course important, very good...Now know why damaged and how to avoid such a situation
- Hydraulic dredge used for shellfish, able to use and maintain - benefits town who employs him

Nets/Doors:

- Forum introduced midwater trawl and other innovations from other parts of world, didn't change over immediately, but started thinking and eventually did start using it with notable success
- Keeps him up-to-date; provides owner with qualified help

Loran C:

- Having learned to navigate better, fuel consumption is down, catch is up (Shortened wings of net helped with catch, too) - together probably worth \$10,000 annually
- Considering that for sword-fishing, one goes out 80 to 100 miles offshore, using 45 gals/hr of fuel, the time saved in returning to port with proper navigation is financially significant

Equipment purchase comments:

- Rated equipment based on how it works, its repair/maintenance record...Instructors were not trying to sell any particular brand, so comments were objective on the different types- gave him confidence to choose a Loran C
- Know what to look for, what to ask, what's necessary (for comparison)

More comments on courses as background:

Diesel engines:

- Wouldn't risk \$12,000 engine to save \$50, so doesn't do his own tune-ups; however, does know what to expect, can trouble shoot, knows when to bring it in, knew nothing before the course
- Wouldn't do own tune-ups based on the course, but useful for background knowledge and in case of breakdowns
- Help maintain equipment in harbor (i.e., small boats for pilots), already had job, but useful for background and side responsibilities
- Better understanding of marine engines, troubleshooting, maintenance, minor repairs

Electrical:

- Very good, though perhaps too theoretical (as opposed to practical)

Fishermen's Forum

- New technological data is important
- Exposure to many different things, brief understanding, general overview
- Learned about foreign markets
- Learned about foreign techniques (2)
- Foreign technology - bottom and midwater trawl, use of equipment
- All interesting, esp. overseas dragging and fish farming in Taiwan
- Very informative, would be particularly interesting to the young or inexperienced (have been fishing for 25 years, so have the practical knowledge already)
- Very informative, useful information on fuel consumption
- Learned about consequences of overfishing, need for better quality control
- Interested in new ideas, conservation measures
- Very helpful to lenders to understand what's going on
- Understand fisherman's concerns, technicalities of gear
- Good background in what fishermen need & want in boats
- Last year was very interesting, chance to get together and talk, even though the fishermen never agree with each other, good to talk...Didn't attend this year because of the bad weather
- Great mixer; valuable presentations

Hydraulics:

- knowledge about how the equipment functions
- personal contact with men of experience

Lobster pots:

- Not using lobster constructing knowledge now, but plans to in the future; presently is enrolled in URI fisheries program
- Excellent, helping others participate in marine-related activities

Loran C

- Learned more in one day than had in 3 years of being close to fishing business...As an insurance agent processing claims is now easier, have better idea of what fishermen did or didn't do
- As novice sailor, navigation course very enjoyable, met needs of all levels of participants
- Confidence in plotting courses, using charts and Loran C, very helpful
- Broadened navigation techniques, safety factor on long, offshore trips

13.0 APPENDIX C - ADDITIONAL GENERAL COMMENTS

More positive comments:

Fills need - Training for inexperienced:

- Especially beneficial to the inexperienced youth looking for fishing jobs
- Definitely should continue, particularly needed for those just starting out
- Best way to bring in new fishermen, give someone off the street a headstart
- Netmending and building is becoming a lost art; old fishermen complain about the young men's lack of qualifications
- Great work developing candidates for fishing - have to start at bottom, not all can be chiefs

Fills need - Introduction to innovation & training for the experienced:

- Courses fill an important need, i.e., more professionalism among the fishermen is needed
- Keeps on top of what's new
- Fisheries program is a wonderful opportunity for all...Too bad the message to not getting to them so that more are in attendance
- Am very impressed with the fisheries program and hope to continue with it, time allowing...Thank you for making such a program available
- Although my interests are related to oceanographic research, I found these activities very useful
- Benefits whole community, especially the fishermen

Content:

- Well-organized and extremely informative
- Excellent facility, instructors, hands-on, class & lab

Information unavailable elsewhere:

- Best program around, only place to learn this
- Useful courses, information is inaccessible elsewhere
- Good program, comes out well even if compared to URI
- Should continue, is a field that has been neglected
- In seven days, one can learn what it takes years to learn on a boat
- Practical information, helpful to anyone who half listened
- Practical, great help
- Van helpful to those who live far away
- Good timing, night courses are a good idea

Personnel

- Instructors
 - Even though have only 7th grade education, course was understandable
 - Good rapport between instructors and class
 - Didn't try to impress everyone with how smart they were, just taught, made understandable; well-organized
 - Instructors were unbelievable in their knowledge and willingness to pass this on to others
 - Speaker was well-educated in the art of lobstering
 - Taught by experienced, not book-trained teachers
 - Instructions good, easy to absorb
 - Gibbons' teaching was great

- Hugh is a super instructor, there are many courses he could teach in greater depth if subjects were divided into smaller topics
- Ken Reposa was tremendous
- Dr. Kan's a nice guy; very capable
- Marvelous people, inspiring

Desire for the information

- Attendees want to be there, to learn
- We all like your time and effort and hope you will add more courses
- Since taking the course he has sent 4 others to take, saying "if you can't take the time to take the course, I can't take the time to help you [mend nets]...It work's!!" It is hard to take time off when you depend on a weekly income 12 months a year, but it is more than worth it
- Excellent, plan to take more courses
- Wish could take all the courses
- Very interesting; chance to talk to others with like interests
- Wants program to continue so he can take more courses next year after finishing house-building
- Would take all the courses if had the time
- Don't let anything happen to the program
- Has lent out book, so is spreading knowledge
- Would be "up-in-arms" if the program was discontinued, get so much out of it

Compliments:

- Thank you
- Making life better
- 8 or 9 on scale of 10
- Thoroughly enjoyed
- Overall, excellent
- Good food

More criticisms:

Content:

- More "hands-on" time needed
 - Too much theory, no demonstration, hands-on needed...Talked about the different types, but had to learn how to use the Loran C by himself on his own machine
 - Too theoretical; too broad, one participant dominated; not enough time for practical portion...Norwegian fellows very good
 - Not too useful, equipment wasn't set up, instructor & electronics salesman had a good time, did buy Loran C anyway; took better courses at Essex [Note: The courses at Essex were offered by the MMA Fisheries Program.]
 - Didn't see Loran C work, vessel wasn't in
- Hydraulics course should have been in greater depth
- Electrical course adequate on theory, not nearly enough on specifics, esp. recommendations on types of equipment, discussions of generating units
- Product pushing
- Tendency of non-professional teachers to waste time, not to be concise and fast...Efforts should be made ahead of time to prepare the instructor on teaching the course, a little training & encouragement on how to logically convey their knowledge with brevity and good use of time
- Not enough on small boats

Pace:

- Too much material covered in short period of 2 days
- Wish had more time
- Fishermen's forum has too much crammed into too short a time - very fine speakers, but listening to one right after the other is not my cup of tea

Numbers of participants:

- Too many people
- Too crowded, had to learn how to build traps by self, didn't get much out of the course...Couldn't see half the time, 8 - 10 people per instructor would be better

Advertising:

- Need more advertising, it is hard to hear about the courses
- Notice of each course has arrived too late to plan to attend

Other suggestions:**More in-depth courses for the experienced:**

- Expand the hydraulics course
- Have some longer, more in-depth courses
- Discuss generators - what get out of them, types available, whether or not to buy
- More student discussion, use resources of students, self-help
- Gear course for more experienced fishermen
- More time on wire (lobster pots)
- Stress Loran C for commercial fishermen

Other information needed:

- Keep international speakers coming to the forum
- More of a variety of types/brands of diesel engines