

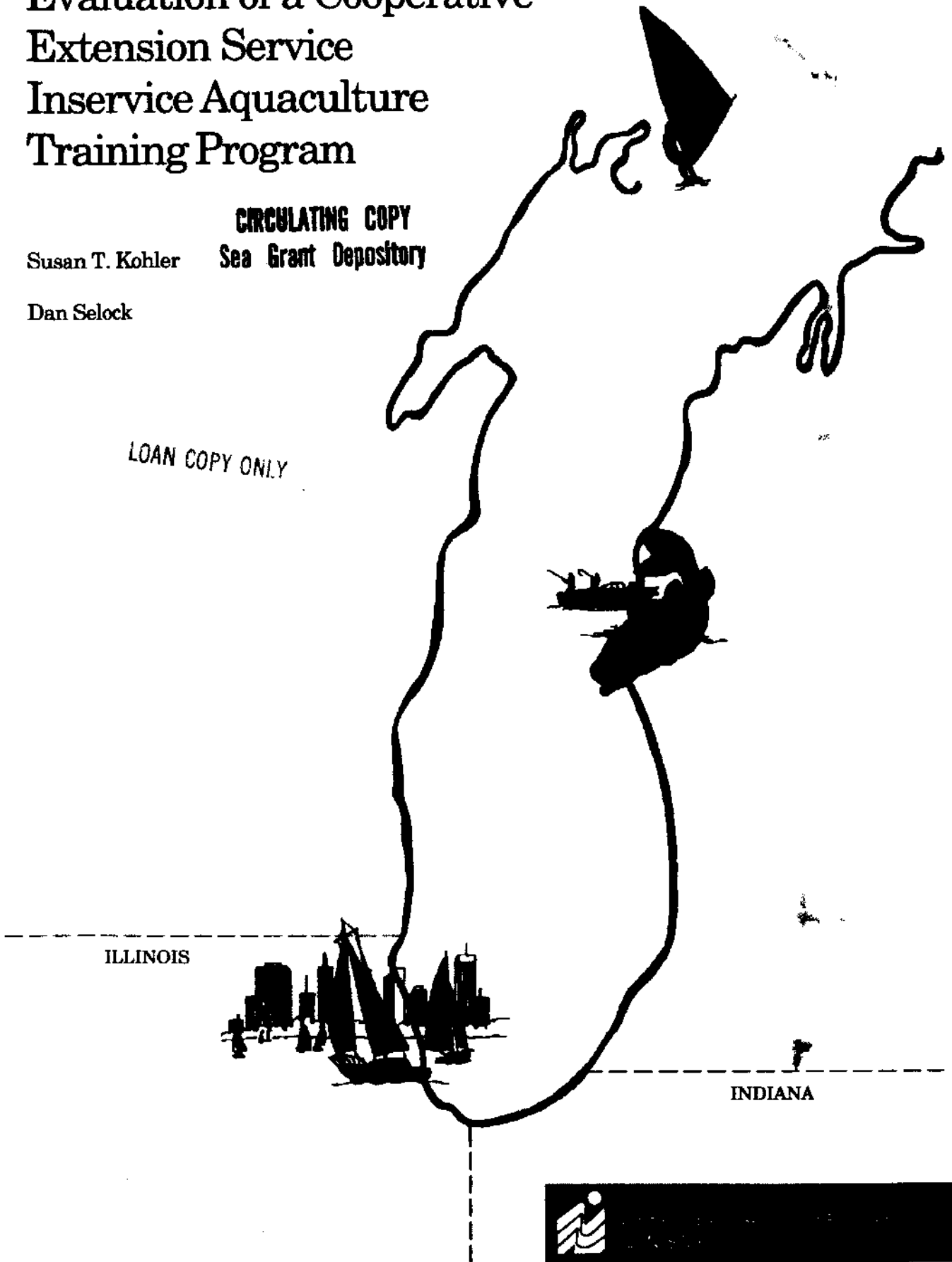
Evaluation of a Cooperative Extension Service Inservice Aquaculture Training Program

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**EVALUATION OF A COOPERATIVE EXTENSION SERVICE
INSERVICE AQUACULTURE TRAINING PROGRAM**

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Executive Summary

The Fisheries Research Laboratory at Southern Illinois University at Carbondale, in cooperation with the Illinois and Indiana Cooperative Extension Services, undertook an intensive aquaculture training program for Cooperative Extension Service (CES) county agents. The inservice training program was designed with the goal that CES agents who completed the training program would be able to effectively serve clients in their respective districts requesting aquaculture information and assistance. Initially, 12 CES advisers from Illinois and 11 agents from Indiana participated in the training program. Eight advisers from Illinois and 11 agents from Indiana were certified for completion. The training was designed to be spread over a total of four weeks during the months of March and May of 1990 and 1991. A range of aquaculture topics were covered. In addition to formal classroom lectures, the program included guest lectures, hands-on laboratory experiences, and field trips. Participants were provided with substantial reference material.

The training program was evaluated to determine the effectiveness of the program in meeting the primary goal of the sponsoring agency, i.e., to develop a network of existing field staff across both states with sufficient technical knowledge of aquaculture to address a majority of the more basic questions. The evaluation focused on determining participant reaction to the program, assessing what was learned through the program, assessing on-the-job use of the program information and assessing areas in which participants would like additional information. The evaluation was funded by the Illinois-Indiana Sea Grant Program and the North Central Regional Aquaculture Center (NCRAC). The information from the evaluation will be used to help strengthen and update CES personnel who participated in the program, guide the modification of the program for future aquaculture training of CES agents, and determine if the model of the program will be useful for other training programs in the region.

The evaluation demonstrated that the Aquaculture Training Program was successful in meeting the primary goal of the sponsoring agency. The evaluation provided evidence that the participants successfully received the information. Participant reaction to the program concerning course content, context, instructors and self-rating were generally favorable. A log of aquaculture-related contacts was maintained by participants on the job for a period of time. Numerous requests on various topics were received. CES personnel felt, at a minimum, adequate in handling the requests and for the most part, used information obtained from the course to address the requests. Participants noted the areas in which they would like additional factual aquaculture information, skill training or guest speakers with applied backgrounds for future updates or inservice training programs.

Recommendations to improve the training program that resulted from the evaluation include: 1) a better mix of factual information, skill training and guest speakers; 2) more "hands-on" experiences; 3) better coordination among instructors and guest speakers to avoid repetition; and 4) the provision of inservice updates with the information identified by the evaluation serving as the focus.

Background Information Concerning the Aquaculture Training Program

Origin of the Program

Growing interest in aquaculture in the north central region of the United States is resulting in more requests for information than currently can be handled by the present aquaculture specialists. Five years ago in Illinois, less than ten aquaculturists possessed a license to raise fish. In 1989 that number increased to 56. By 1990, the number rose to 78. Even though the number of full-time aquaculturists has grown only slightly during the past five years, the number of supplemental income producers and experimental aquaculturists has grown significantly. The enactment of the Illinois Aquaculture Development Act of 1987 and the formation of the Illinois Aquaculture Industry Association in 1987 have generated an increase in interest and activity in aquaculture throughout the state. Similar growth in aquaculture production and interest on the part of individuals has also occurred in Indiana.

The Fisheries Research Laboratory (FRL) at Southern Illinois University in Carbondale (SIUC) has provided technical information on fish culture for many years. However, once the level of demand for information exceeded around 40 inquiries per month, the FRL was not adequately staffed to handle the requests. In August 1989, the FRL hired a technology transfer specialist to handle the aquaculture inquiries at SIUC and to assist other advisers trained in aquaculture around the state. Demand for information continued to exceed the supply of available aquaculture information staff. Therefore, it was decided to offer aquaculture training to the network of Cooperative Extension Service personnel which already existed throughout the state. It was hoped that CES personnel properly trained in aquaculture will be able to:

1. handle about 80 percent of the inquiries and screen out the casual observers;
2. assist the various prospective and operating commercial aquaculturists in the region;
3. disseminate aquaculture research information from the Fisheries Research Laboratory at SIUC to the public; and
4. determine the needs for further research and relay that information to the Fisheries Research Laboratory.

Goals and Objectives of the Program

In noting the program goal, Dr. Pete Bloome, assistant director of the Illinois Cooperative Extension Service, stated the following:

It was my hope to develop a network of existing field staff across the state with sufficient technical knowledge of aquaculture to address a majority of the more basic questions and to serve as an effective dissemination system for the research base of the Cooperative Fisheries Research Laboratory. This staff could also serve as a two-way communication channel between aquaculturists and the laboratory.

The specific objectives of the training program were:

1. to train CES personnel in the general principles of aquaculture;
2. to familiarize CES participants with pertinent information and literature concerning aquaculture;
3. to familiarize participants with the aquaculture industry and state regulations;
4. to familiarize participants with aquaculture research conducted through the Fisheries Research Laboratory, SIUC; and
5. to continue networking so the trained CES personnel could relay research needs through SIUC's information transfer specialist.

Background of the Selection of the Participants

Once the decision was made by Dr. Roy Heidinger, FRL at SIUC and Dr. Pete Bloome, Illinois CES, to train the existing network of CES personnel, a CES Telenet telephone conference was organized to discuss aquaculture in Illinois, the proposed training program and to solicit CES personnel interested in receiving the training. The two-hour Aquaculture Telenet took place in Illinois on September 15, 1989. The Telenet linked Bob Espeseth, Illinois-Indiana Sea Grant, Pete Bloome, Illinois CES, and Dan Selock and Bob Sheehan, FRL at SIUC. The Telenet addressed various aquaculture topics including the Illinois Aquaculture Development Act, aquaculture permits and licensing, new publications available from the Fisheries Research Laboratory at SIUC and research being conducted at SIUC. The role of the Cooperative Extension Service in the development of aquaculture in the state was also discussed. The Telenet reached approximately 50 CES advisers throughout the state of Illinois. After the Telenet, Pete Bloome asked for volunteers for the training program.

Approximately 18 Illinois CES advisers expressed interest in the aquaculture training. Approximately three months after the Telenet, the CES advisers attended a one day orientation for aquaculture training at SIUC. Indiana CES personnel learned of the proposed aquaculture training, expressed interest in the training and eleven Indiana CES personnel also arranged to attend the December meeting. This group asked to attend the training program. The size of the group seemed feasible so it was agreed upon to train both Illinois and Indiana CES personnel. During the orientation, dates and details for the CES inservice aquaculture training program were agreed upon. The outline for this meeting, which took place on Dec. 20, 1989, is in Appendix A.

Participants

Initially 23 CES personnel began the training program. The group consisted of 12 Illinois CES advisers, 10 Indiana CES agents and the Illinois/Indiana Aquaculture Specialist stationed at Purdue University. Twenty-one CES personnel completed the program (10 from Illinois and 11 from Indiana). Nineteen CES personnel (11 from Indiana and 8 from Illinois) were certified as completing the aquaculture program.

Characteristics of the Program

The Fisheries Research Laboratory at SIUC served as the training facility. Laboratory faculty and staff were the primary instructors of the inservice training program (Roy Heidinger, Chris Kohler, Dan Selock, Bob Sheehan and Bruce Tetzlaff). The program also included several guest lecturers, including Andrew Mitchell from the Fish Farming Experimental Station in Stuttgart, Arkansas; Delayne Holsapple, State Aquaculture Coordinator, Illinois Department of Agriculture, Division of Marketing, Springfield, Illinois; Rod Horner, Illinois State Regulator for Aquaculture, Jake Wolfe Memorial Fish Hatchery, Sand Ridge, Illinois; Carol Lembi, aquatic weed specialist, Purdue University, Lafayette, Indiana; Dan Lewis, seafood wholesaler/retailer, Seafood Specialties, Carbondale, Illinois; and Roy Basler, district tester for the use of aquatic chemicals, Illinois Department of Agriculture.

The training program was conducted during two weeks in 1990, during March and May, and two weeks in 1991, during March and May. By the end of the four weeks, participants were exposed to approximately 180 contact hours of instruction. The complete syllabus for the four-week program appears in Appendix B.

Program activities consisted of classroom instruction, laboratory experience, guest lectures, field trips and social gatherings. The first week of classroom instruction (March 1990) included an introduction to aquaculture and the scope of the industry. Aquaculture definitions were discussed. Other lecture topics included water sources, fish rearing units, types of fish, water quality, nutrition, feeding, spawning, diseases, disease treatment, legal chemicals, aquaculture permits and regulations. The second week of the first year (May 1990) centered around the biology and culture of various aquaculture species, including catfish, bass, sunfish, baitfish, perch, pike, tilapia, walleye, salmonids, crawfish and frogs. The third week (March 1991) centered around fish health management and included discussion of stress and parasites as well as environmental, bacterial and viral diseases. It was during the third week that Andrew Mitchell presented "Fish Health Management" and Delayne Holsapple discussed Illinois aquaculture. The final week (May 1991) covered specialized aquaculture, farm pond management and aquaculture engineering. Carol Lembi instructed the participants on aquatic weeds and their control. Roy Basler gave the aquatic pesticide test for certification for Illinois agents. Rod Horner spoke about Illinois aquaculture regulations. Dan Lewis spoke on handling, marketing and selling seafood products. Personnel certification for completion of the aquaculture training program took place during the final week. A sample certificate for program completion is in Appendix C.

The four-week training program also included an exposure to some laboratory experiences. The laboratory experiences included demonstrations on fish anatomy, procedures for isolation of bacteria, procedures for parasitological examinations of fish and water quality testing equipment.

The program included various field trips for the participants. Over the four weeks participants visited two local aquaculture facilities, toured a local state fish hatchery and inspected one wholesale and two retail bait distributors.

During the third week, participants attended a one-day crawfish symposium that was being held at SIUC. The symposium was the second in a series of three crawfish symposiums being held in the Midwest. The theme of the symposium was midwestern crawfish production and exposed the CES agents to nationally known crawfish experts.

Social gatherings included a taste-test fish fry to sample catfish and sunfish. A lunch was conducted by Seafood Specialties to sample other seafood items.

Course Materials

All participants were supplied with extensive reference materials and texts. The references included:

1. Fish Hatchery Management (Piper, R. G., et al. (1982). U. S. Fish and Wildlife Service, Washington, D. C.);
2. Third Report to the Fish Farmer (Dupree, H. K. and Huner, J. V. (1984). U. S. Fish and Wildlife Service, Washington, D. C.);
3. Illinois Pesticide Applicator Manual-Aquatics (Illinois Department of Agriculture, Springfield, IL); and
4. Numerous miscellaneous reprints and handouts in three-ring binders.

Overall cost for the four weeks of training was approximately \$720 per participant. This figure included costs for instructor fees, guest speakers, books, handouts, field trips, coffee breaks, etc. The figure does not include the participants' travel, lodging or per diem. Typical costs for one week, excluding guest speakers, are shown in Table 1. Funding for the training program was provided by Illinois and Indiana Cooperative Extension Services. Illinois and Indiana Cooperative Extension Services paid for the lodging, travel and per diem of their respective groups.

Description of the Evaluation Study

Request and Funding of the Evaluation

The evaluation of the aquaculture training program was requested and funded by two agencies:

1. Illinois-Indiana Sea Grant Program; and
2. North Central Regional Aquaculture Center (NCRAC).

Purpose of the Evaluation

The program was evaluated to determine the effectiveness of the program in meeting the primary goal of the sponsoring agency by:

1. determining participant reaction to the program;
2. assessing what was learned through the program;
3. assessing on-the-job use of program information; and
4. assessing areas in which participants would like additional information.

Use of the Evaluation Information

The information from the evaluation will be used for the following reasons:

1. to help strengthen and update the CES personnel who participated in the program;
2. to guide the modification of the program for future aquaculture training of agents; and
3. to determine if the model of the program will be useful for other training programs in the region.

Evaluation Design

The evaluation was designed to measure the effectiveness and results of the aquaculture training program. Due to the uniqueness of the participants and program, it was not feasible to select a control or comparison group. All program participants formed the sample used in the evaluation. Confidentiality was maintained throughout the evaluation.

Outcome Measures

As previously discussed, the effectiveness of the program in meeting the primary goal of the sponsoring agency was measured by assessing:

1. participant reaction to the course content, context and instructors;
2. knowledge, attitude and/or skill after completion of the program;
3. the extent of on-the-job use of course content; and
4. the topics on which participants would like additional information.

Instruments and Data Collection Procedures

The evaluator designed and utilized a questionnaire to evaluate the first outcome measure concerning participant reaction to course content, context and instructors (Appendix D). The questionnaire utilized a five-point rating scale and was designed based on statements which seemed relevant for this situation. Participants were also asked for suggestions of how the course could be improved in the future. The questionnaire was administered through the mail to the 21 participants that were still enrolled in the program at the beginning of the third week.

Secondly, to evaluate the outcome measure concerning changes in knowledge, attitude and/or skills as a result of the program, the evaluator designed and utilized a second questionnaire (Appendix E). Given a five-point rating scale, participants were asked to respond to statements regarding changes in knowledge or attitude concerning course topics that were a result of the program. The statements were based on scenarios of situations of how a person who has attained the desirable level of knowledge or attitude would behave. The questionnaire was administered through the mail to the 19 participants who were certified for completing the training program.

Thirdly, to evaluate the outcome measure of the extent of on-the-job use of course content, the evaluator designed and deployed a log sheet (Appendix F). Participants were

asked to use the log sheets to maintain a record of their on-the-job use of course material. The log was designed to maintain a record of the type and number of aquaculture information requests, how the agents rated their adequacy in responding to the requests and whether their source of knowledge was from the course, prior knowledge, or a combination of course and prior knowledge. The log sheet was administered to the participants at the end of the fourth week of training. It was collected after approximately three months.

Lastly, the evaluator designed and utilized a checksheet to evaluate the outcome measure concerning the particular topics in which the participants wanted additional information (Appendix G). The checksheet lists the major topical areas of the program. Given these major topical areas, participants were asked to check which areas they would like additional factual information, skill training or guest speakers with applied experience. This check list was mailed along with the second questionnaire to the 19 participants who were certified for completing the training program.

Results

Results of Outcome Measures

Results of the four outcome measures are discussed separately. When calculated means are discussed, they are in relation to an ideal mean of five.

Outcome Measure 1.

Outcome Measure 1 evaluates the effectiveness of the Aquaculture Training Program by assessing participant reaction to course content, context and instructors. Eighteen of the 21 participants completed and returned Instrument I. This represents a response rate of 85.7%.

Respondents' reaction to the quality of the training program were generally high. Overall, means ranged from 2.7 to 4.8 (Table 2). Means for the first section concerning the instructor evaluation ranged from 3.6 to 4.8 with the standard deviations ranging from 0.38 to 1.1 (Table 2). The statements concerning the instructors' knowledge about the subject rated highest (mean= 4.8), with the statement concerning whether the instructors knew if the students understood them rated the lowest (mean=3.6) (Table 2). The grand mean for the instructor evaluation section is 4.3 (Figure 1).

Means for the section on the content and context of the course (statements 7-25) ranged from 2.7 to 4.6 (Table 2). Respondents seemed relatively uncertain concerning statements 13 and 24 regarding audio-visual use (mean=2.7) and the effect on continuity due to the amount of time between classes (mean=2.8) (Table 2). Approximately 33% of the respondents agreed that the timing affected continuity and 33% disagreed (Table 3). Approximately 66% disagreed that the information was presented at a level that was too difficult and 83% disagreed that the information was presented at a level that was too easy (Table 3). Concerning statement 25, 50% were uncertain but 33% disagreed that the course should be taught in some other way (Table 3). The grand mean for this section was 3.7 (Figure 1).

Means for the section on participant self-rating (statements 26-32) ranged from 3.2 to 4.4 (Table 2). Statement 31 concerning whether a high demand for aquaculture information exists in their particular area averaged 3.2 (Table 2). Approximately 44% of the respondents rated statement 31 as uncertain (Table 3). At least 88% of the respondents either agreed or strongly agreed with the remainder of the statements concerning the course experience in the self-rating section (Table 3). The grand mean for the section was 4.1 (Figure 1).

Concerning suggestions for improvements (Question 37), the most frequently occurring response (10) was for more hands-on experiences. Secondly, with a frequency of three, was the suggestion for less in-depth material and less formal lecture time. Other suggestions which occurred singularly were:

1. better organized handouts;
2. more field trips;
3. fewer sessions;
4. provide syllabus with clearly stated objectives;
5. conduct help sessions to assist CES participants create aquaculture materials for use at their county level meetings;

6. more discussion of aquaculture enterprises;
7. more discussion on pond culture;
8. provide homework examples;
9. faster pace through some topics with less "filler";
10. select speakers with audio-visual skills as well as knowledge of the subject matter;
11. provide large three-ring binders with labeled dividers for the agents to categorize their handouts;
12. mail reminder notices before each session indicating dates, time and topics to be covered;
13. provide the participants with "deliverables" in the form of videos and slide sets with a script for the agents to use at their county meetings; and
14. mail information concerning the activities of the industry.

Outcome Measure 2.

Outcome Measure 2 evaluates the effectiveness of the Aquaculture Training Program by assessing the knowledge and attitude of CES personnel after completion of the program. Thirteen of the 19 participants certified for completion of the Aquaculture Training Program completed Instrument II. This represents a response rate of 68%.

Mean responses to the behavioral objective questionnaire were generally high. Overall, means ranged from 2.7 to 4.9 (5=Strongly agree; 1=Strongly disagree), with standard deviations ranging from 0 to 1.04 (Table 4). The mean value of the cognitive level of application of the topic of business potential was the lowest (2.7); the mean value of the affective level of receiving concerning the topic of water quality was the greatest (4.9) (Table 4). Grand means of the three levels, by topic, ranged from a low of 3.2 for fish mortality to a high of 4.4 for cage culture (Table 5). When grouping topics, the grand mean of the cognitive level of knowledge was the greatest with a value of 4.0, while the grand mean of the cognitive level of application was the lowest with a value of 3.7 (Figure 2). The mean value of the affective level of receiving, with topics grouped, was the greatest with a value of 4.7, while the affective level of responding was the lowest with a value of 4.2 (Figure 3). Only 37.5% of the groups of three means within each topic decreased in value as levels of complexity increased (Table 4). This decrease occurred with the topics of: pond construction, sources of fish, species feasibility, cage culture, general-feeding and business potential.

Outcome Measure 3.

Outcome Measure 3 evaluates the effectiveness of the Aquaculture Training Program by assessing the extent of on-the-job use of course content. Twelve of the 21 participants maintained and returned the log of aquaculture-related contacts (Instrument III). This represents a response rate of 57.1%.

Over the three to four month period that participants maintained logs, 221 contacts for aquaculture information were received (Table 6). Requests for information on weed control occurred the most frequently representing 21.3% of the requests; only 1.8% of the requests addressed on aquaculture permits (Figure 4). When asked to rate their adequacy in responding to the requests on a scale from one to five (5=excellent and 1=poorly), reporting participants felt relatively confident in handling the requests (Table

7). Means ranged from a low of 3.4 for pond construction to a high of 4.3 for pond weed control (Figure 5). Standard deviations ranged from 0.54 to 1.15 (Figure 5). Overall, the majority of the reporting participants rated themselves as average to excellent in responding to the requests (Figure 6).

From 3.8 to 18.2% of the reporting participants rated their response as below average concerning the topics of cage culture, business potential, water quality, pond construction and marketing information (Table 8). Fifty percent felt that their response was excellent to requests concerning aquaculture permits; however, the remaining 50% rated themselves as average (Table 8). Approximately 36% of the reporting participants felt they responded excellently to requests concerning weed control (Table 8). No responses were rated as poor (Table 8).

Knowledge obtained through the course and a combination of course and prior knowledge were used the most frequently to respond to requests (Figure 7). With the exception of weed control, between 50 and 85.7% of the reporting participants used course knowledge to respond to the requests (Table 9). In the case of weed control, 70.2% used a combination of course and prior knowledge to respond to requests (Table 9).

Outcome Measure 4.

Outcome Measure 4 evaluates the effectiveness of the Aquaculture Training Program by determining which topics participants would like additional information. Thirteen of the 19 participants certified for completion of the Aquaculture Training Program completed Instrument IV. This represents a response rate of 68%.

Greater than 50% of the respondents expressed a desire for additional factual information and guest speakers on the topics of marketing and business potential (Table 10). There were no requests for either additional factual information or guest speakers concerning the topics of aquatic weeds or water quality (Table 10). When considering requests for factual information (Figure 8), the topics of business potential, marketing and species feasibility represented the top three topics with percentages ranging from 46.2 to 61.5%. The top two topics on which respondents of the Aquaculture Training Program would like additional skill training are in the areas of fish disease/mortality and cage culture (Figure 9). Approximately 46% of the respondents desire additional skill training in the area of fish disease and mortality. Approximately 39% desire skill training in the area of cage culture (Figure 9). The top two requests for guest speakers with applied background concern the topics of business potential and marketing (Figure 10). From 53.8 to 76.9% of the respondents expressed interest in these topics.

Discussion of Results

The evaluation demonstrated that the Aquaculture Training Program was successful in meeting the goals of the sponsoring agency (Cooperative Extension Service). This was evidenced by the information obtained from the various instruments designed and utilized for the evaluation. The instrument which addressed the behavioral objectives of the training program (Instrument II) provided evidence that the participants successfully received the information. The behavioral objective questionnaire was utilized to determine not only the participants' ability to recognize and recall facts (knowledge) but also to interpret and summarize information (comprehension), and lastly to use the information in a situation different from the original learning context (application). This is significant because the use of this information in the job setting requires more than just recall of facts.

Secondly, it is important for CES agents to develop proper attitudes concerning the importance of the information. It is not sufficient in this situation to merely receive or become aware of certain phenomena. Cooperative Extension Service personnel should also respond to and value the information. This is evidenced by their ability to attend to or react to certain phenomena and display the belief or attitude concerning the phenomena when not forced to comply (i.e. in their job settings). For example, when working with clients concerning water quality, it is not only important that CES agents believe that maintaining good water quality is important (receiving), but also that they question growers concerning their water quality parameters and stress to them the importance of maintaining good water quality before problems arise (responding and valuing).

It was expected that the three means would decrease or remain the same within the three behavioral levels under each topic. However, this only occurred in slightly more than one-third of the cases. It is assumed that a person must know the information before it can be comprehended and comprehended before it can be applied. The discrepancy in the expected decrease in mean values as the level of complexity increased may be a result of several factors. First, the responses are based on the opinions of the participants rather than an objective assessment. Secondly, upon examining the raw data, discrepancies only occurred in approximately 11% of the individual responses between each level. Thirdly, the design of the questionnaire may have contributed to this discrepancy in that some of the three statements which corresponded to the three levels of either the cognitive or affective domain may not have adequately built upon the previous statement.

If the training program had involved more skill training, it would also be important to determine the participants' ability to not only observe and attempt to repeat a skill (imitation), but also perform the skill according to instructions rather than observation (manipulation), and ultimately reproduce the skill with accuracy when performed independent of the original source (precision).

Evidence from the behavioral objective questionnaire alone is not sufficient to demonstrate program success since it is the participants' opinions on how they believe they would respond to each scenario. However, this information coupled with the results of the Log of Aquaculture Related Contacts (Instrument III) illustrates their ability to use the information on the job or in a situation different from the original learning context. Ultimately, this reflects the level of achievement of the major program goal. Results from the log demonstrate that, at a minimum, reporting participants felt adequate in handling on-the-job requests and used either course knowledge or a combination of course and

prior knowledge to respond to the requests. The log should also be useful in providing planners for future programs and/or updates to the present program with an idea of the types and frequencies of requests the CES personnel can be expected to receive.

Participant reaction to the program concerning course content, context, instructors and self-rating (Instrument I) were generally favorable. Even though participant reaction does not include any measurement of learning that may have taken place, it is important to determine how people feel about a program. It is well recognized among educators that a person must like a program to get maximum benefit from it. Generally, participants responded favorably to the program's instructors concerning their knowledge, preparedness, responsiveness to questions and presentation clarity. Nearly all responding participants felt the instructors taught the class effectively.

Responding participants valued the guest speakers and field trips. They expressed a desire for more audio-visual use and group discussion. Generally, responding participants felt the course held their interests, was relevant to their needs, and contained practical information. They did not feel that the information was either too difficult or too easy, but that it was more theoretical than applied, and contained some repetition of topics due to the diversity of speakers.

Nearly all responding participants agreed that the number of hours per day and days per session were appropriate. However, opinions varied concerning whether the time between the four sessions affected continuity. Half of them were uncertain if the course should be taught in some other way; one-third disagreed that it should be taught in some other way.

All responding participants agreed that the course was a good learning experience for them and that they acquired knowledge and skills. Nearly all agreed that the course gave them a working knowledge of the topic and that they can use the information from the course in their region. Surprisingly, roughly half of the responding participants were uncertain about the level of demand for the information in their region. All but one felt they would benefit from additional training.

Quizzing participants on which areas they would have liked additional factual information, skill training or guest speakers with applied backgrounds is useful as an evaluation tool. It is useful for identifying program weaknesses as well as planning for future updates. Coupling this information with the ability ratings of participants from the log (Instrument III) and the results of the behavioral objective questionnaire (Instrument II) provided useful information. Even though responding participants rated themselves as average or above average on the behavioral objective questionnaire and the log concerning the topics of business potential, marketing and species feasibility, these were the top three areas of requests for additional factual information. The requests for more hands-on training was prevalent throughout the evaluation. Responding participants requested additional hands-on or skill training in many of the areas including disease diagnosis, aquatic weed identification, water quality testing, cage culture and marketing. Whether in a course update it would be possible to address these requests based on time and background of the participants will need to be determined by program planners.

Guest speakers with applied experiences would provide a different perspective on the information. Oftentimes, true appreciation for the topic is a result of hearing the experiences of others. Even though the topics of marketing and business potential represented a small percentage (less than 10 percent) of the requests from the log (Instrument III), responding participants definitely wanted to hear of the experiences of

others concerning these topics. Approximately one-third of the group also wanted presentations from individuals with first-hand experiences on pond construction and methods to avoid fish disease and mortality.

Summary and Ideas for Improvement

Summary

The course covered a broad array of topics in aquaculture. Some areas were covered in adequate detail while other areas appeared to warrant further coverage. The evaluation identified specific strengths and weaknesses of the program, including areas in which additional background information is needed. The information from the evaluation should also be useful for planning updates. However, the time will come when planners must decide how much detail they want the CES advisers to have. This has to be prioritized because the CES personnel cannot be expected to learn everything about the subject. The continued utilization of the log would indicate those areas where CES agents are in most need of training.

The program was successful in developing a cadre of CES agents competent to field general questions in aquaculture. The program would serve as a good working model for other states.

Ideas for Improvement

Specific ideas to improve the program are as follows:

1. modify the training program to contain a better mix of lecture material, skill or hands-on training, and guest speakers;
2. increase coordination among instructors and guest speakers to avoid unnecessary duplication of topics;
3. continue on-the-job monitoring of aquaculture information requests received by the CES personnel if future inservice education is planned;
4. provide inservice updates in the area of aquaculture utilizing areas identified by the evaluation of this program; and
5. involve evaluators early on in the program so modifications can be more quickly incorporated.

TABLES

TABLE 1

TYPICAL COSTS FOR ONE WEEK OF THE AQUACULTURE TRAINING PROGRAM, EXCLUDING GUEST SPEAKER EXPENSES

Instructor fees	\$750
Reference books	475
Classroom handouts	200
Laboratory materials	0
Bus for field trips	150
Audio visual costs	100
Parking stickers	150
Name tags	30
Coffee breaks	250
Miscellaneous	300
TOTAL	\$2,405

TABLE 2

MEANS AND STANDARD DEVIATIONS OF PARTICIPANT REACTION
TO THE AQUACULTURE TRAINING PROGRAM
(5 = STRONGLY AGREE; 1 = STRONGLY DISAGREE)

	MEAN	STD. DEVIATION
INSTRUCTOR EVALUATION		
1. The instructors were knowledgeable about the subject.	4.8	0.38
2. The instructors were prepared for class.	4.4	0.5
3. The instructors presented subject matter clearly.	4.1	0.54
4. The instructors knew if students understood them.	3.6	1.1
5. The instructors were responsive to questions.	4.6	0.51
6. In general, the instructors taught the class effectively.	4.3	0.67
COURSE EVALUATION		
7. Course objectives were stated clearly.	3.7	0.83
8. The amount of material covered was appropriate.	3.7	0.59
9. The course held my interest.	4.1	0.87
10. The course content was well organized	3.8	0.65
**11. The material was presented at a level that was too difficult.	3.8	0.71
**12. The material was presented at a level that was too easy.	4.2	0.38
13. Audio-visuals could be used more effectively.	2.7	0.84
14. Use of group discussion could have been used more effectively.	3.1	0.94
15. The field trips added to my knowledge of the topic.	4.6	0.62
16. The guest speakers furthered my knowledge of the topic.	4.2	0.79

TABLE 2. (CONTINUED)

	MEAN	STD. DEVIATION
17. Provision of reference materials, handouts and aids were sufficient.	3.9	0.76
18. The course had a good balance of theoretical and applied activities.	3.3	0.84
19. The material presented was practical.	3.8	0.51
20. The course content was relevant to my needs.	3.8	0.38
21. The course contained repetition of topics.	3.2	0.92
22. The number of classroom hours per day was acceptable.	3.8	0.51
23. The number of days per session was appropriate.	4	0.34
**24. The amount of time between the four sessions affected continuity.	2.8	1.06
**25. The course should be taught in some other way.	3.2	0.71
SELF-RATING		
26. The course was a good learning experience.	4.4	0.5
27. The course allowed me to acquire skills and knowledge.	4.4	0.51
28. The course gave me a working knowledge of the subject.	4.2	0.55
29. I could use the knowledge I gained in the course in my area.	4.1	0.47
30. I have a strong interest in the material.	4.1	0.58
31. A high demand exists for aquaculture information in my area.	3.2	0.86
32. I would benefit from additional training.	4.1	0.64

**indicates that the scale is reversed for "5" to equal "strongly disagree"

TABLE 3. CONTINUED

	Strongly Agree (5)	Agree (4)	Undecided (3)	Disagree (2)	Strongly Disagree (1)
15. The field trips added to my knowledge of the topic.	61.1% 11	33.3% 6	5.6% 1	0 0	0 0
16. The guest speakers furthered my knowledge of the topic.	33.3% 6	55.6% 10	5.6% 1	5.6% 1	0 0
17. Provision of reference materials, handouts and aids were sufficient.	16.7% 3	61.1% 11	16.7% 3	5.6% 1	0 0
18. The course had a good balance of theoretical and applied activities.	0 0	55.6% 10	22.2% 4	22.2% 4	0 0
19. The material presented was practical.	5.6% 1	72.2% 13	22.2% 4	0 0	0 0
20. The course content was relevant to my needs.	0 0	83.3% 15	16.7% 3	0 0	0 0
21. The course contained repetition of topics.	27.8% 5	33.3% 6	33.3% 6	5.6% 1	0 0
22. The number of classroom hours per day was acceptable.	0 0	88.9% 16	5.6% 1	5.6% 1	0 0
23. The number of days per session was appropriate.	5.6% 1	88.9% 16	5.6% 1	0 0	0 0
**24. The amount of time between the four sessions effected continuity.	11.1% 2	33.3% 6	22.2% 4	33.3% 6	0 0
**25. The course should be taught in some other way.	0 0	16.7% 3	50.0% 9	33.3% 6	0 0
SELF-RATING					
26. The course was a good learning experience.	38.9% 7	61.1% 11	0 0	0 0	0 0
27. The course allowed me to acquire skills and knowledge.	44.4% 8	55.6% 10	0 0	0 0	0 0
28. The course gave me a working knowledge of the subject.	27.8% 5	66.7% 12	5.6% 1	0 0	0 0
29. I could use the knowledge I gained in the course in my area.	16.7% 3	77.8% 14	5.6% 1	0 0	0 0
30. I have a strong interest in the material.	22.2% 4	66.7% 12	11.1% 2	0 0	0 0

TABLE 3. CONTINUED

	Strongly Agree (5)	Agree (4)	Undecided (3)	Disagree (2)	Strongly Disagree (1)
31. A high demand exists for aqua- culture information in my area.	5.6% 1	27.8% 5	44.4% 8	22.2% 4	0 0
32. I would benefit from additional training.	16.7% 3	77.8% 14	0.0% 0	5.8% 1	0 0

** indicates that the scale is reversed for "5" to equal "Strongly Disagree"

a indicates percentage of respondents

b indicates actual number of respondents

TABLE 4

MEANS AND STANDARD DEVIATIONS OF RESPONSES FROM PARTICIPANTS OF THE AQUACULTURE TRAINING PROGRAM TO THE BEHAVIORAL OBJECTIVE QUESTIONNAIRE (5 = STRONGLY AGREE; 1 = STRONGLY DISAGREE)

	Mean	Standard Deviation
POND CONSTRUCTION		
Knowledge	4.2	0.55
Comprehension	4.2	0.38
Application	3.8	0.44
SOURCES OF FISH		
Knowledge	4.1	0.64
Comprehension	3.9	0.55
Application	3.5	1.04
PERMITS		
Knowledge	4.0	0.71
Comprehension	3.6	0.66
Application	4.0	0.64
WATER QUALITY		
Knowledge	3.9	0.69
Comprehension	4.0	0.53
Application	3.4	0.71
WATER QUALITY		
Receiving	4.9	0.38
Responding	4.3	0.45
Valuing	4.5	0.52
FISH MORTALITY		
Knowledge	3.3	0.75
Comprehension	3.0	0.76
Application	3.4	0.77
DISEASE		
Knowledge	3.7	0.48
Comprehension	4.1	0.49
Application	3.8	0.44
DISEASE		
Receiving	4.5	0.52
Responding	4.1	0.51
Valuing	4.2	0.55

TABLE 4 (continued)

	Mean	Standard Deviation
WEED CONTROL		
Knowledge	4.0	0.60
Comprehension	4.2	0.59
Application	4.2	0.63
SPECIES FEASIBILITY		
Knowledge	4.3	0.48
Comprehension	4.0	0.71
Application	4.0	0.64
CAGE CULTURE		
Knowledge	4.6	0.51
Comprehension	4.6	0.52
Application	4.1	0.64
GENERAL-STOCKING		
Knowledge	3.7	0.48
Comprehension	4.2	0.55
Application	4.0	0
GENERAL-FEEDING		
Knowledge	4.0	0
Comprehension	3.8	0.44
Application	3.4	0.65
GENERAL-HANDLING, ETC.		
Knowledge	3.9	0.49
Comprehension	4.1	0.64
Application	3.9	0.28
MARKETING/PROCESSING		
Knowledge	3.7	0.48
Comprehension	3.2	0.55
Application	3.6	0.66
BUSINESS POTENTIAL		
Knowledge	4.0	0.76
Comprehension	3.8	0.83
Application	2.7	0.85

n = 13

TABLE 5

GRAND MEAN OF RESPONSES OF PARTICIPANTS IN THE
 AQUACULTURE TRAINING PROGRAM FOR EACH GENERAL
 TOPIC FROM THE BEHAVIORAL OBJECTIVE QUESTIONNAIRE
 (5 = STRONGLY AGREE; 1 = STRONGLY DISAGREE)

TOPIC	MEAN
Cage Culture	4.4
Weed Control	4.2
Pond Construction	4.1
Disease	4.1
Species Feasibility	4.1
Water Quality	4.0
General-Stocking	4.0
General-Handling	4.0
Permits	3.9
Sources of Fish	3.8
General-Feeding	3.7
Marketing/Processing	3.5
Business Potential	3.5
Fish Mortality	3.2
<u>n = 13</u>	

TABLE 6
NUMBER AND PERCENTAGE OF CONTACTS BY TOPIC
FROM THE LOG OF AQUACULTURE RELATED CONTACTS
FROM PARTICIPANTS OF THE AQUACULTURE TRAINING PROGRAM

TOPIC	CONTACTS	PERCENTAGE
Pond Construction	20	9.0%
Source of Fish	15	6.8%
Aquaculture Permits	4	1.8%
General Culture	26	11.8%
Cage Culture	26	11.8%
Weed Control	47	21.3%
Water Quality	21	9.5%
Fish Disease	7	3.2%
Species Feasibility	18	8.1%
Marketing Information	11	5.0%
Business Potential	19	8.6%
Other Topics	7	3.2%
Total	221	
<hr/>		
<u>n</u> = 12		

TABLE 7

LEVEL OF CONFIDENCE BY TOPIC OF PARTICIPANTS OF THE
 AQUACULTURE TRAINING PROGRAM IN RESPONDING
 TO AQUACULTURE RELATED CONTACTS
 (5.0 = EXCELLENT; 1.0 = POOR)

TOPIC	MEAN	STANDARD DEVIATION
Pond Construction	3.4	0.78
Source of Fish	3.9	0.83
Aquaculture Permits	4	1.15
General Culture	4.1	0.69
Cage Culture	4.0	0.68
Weed Control	4.3	0.59
Water Quality	3.8	0.83
Fish Disease	3.6	0.54
Species Feasibility	3.8	0.64
Marketing Information	3.7	1.06
Business Potential	3.6	0.78

n = 12

TABLE 8

NUMBER AND PERCENTAGE OF RESPONSES BY RATING AND BY TOPIC
FROM PARTICIPANTS OF THE AQUACULTURE TRAINING PROGRAM
FROM THE LOG OF AQUACULTURE RELATED CONTACTS

TOPIC	RATINGS				
	EXCELLENT	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	POORLY
	(5)	(4)	(3)	(2)	(1)
Pond Construction	1a 5%b	7 35%	8 40%	2 10%	0 0
Source of Fish	4 26.7%	5 33.3%	5 33.3%	0 0	0 0
Aquaculture Permits	2 50%	0 0	2 50%	0 0	0 0
General Culture	7 26.9%	13 50%	5 19.2%	0 0	0 0
Cage Culture	5 19.2%	17 65.4%	2 7.7%	1 3.8%	0 0
Weed Control	17 36.2%	26 55.3%	3 6.4%	0 0	0 0
Water Quality	3 14.3%	12 57.1%	3 14.3%	2 9.5%	0 0
Fish Disease	0 0	4 57.1%	3 42.9%	0 0	0 0
Species Feasibility	2 11.1%	10 55.6%	5 27.8%	0 0	0 0
Marketing Information	2 18.2%	5 45.5%	1 9.1%	2 18.2%	0 0
Business Potential	2 10.5%	8 42.1%	7 36.8%	1 5.3%	0 0

a indicates actual number of contacts at each rating-not all contacts were rated
b indicates actual percentage of contacts at each rating

TABLE 9

SOURCES OF KNOWLEDGE UTILIZED BY PARTICIPANTS
OF THE AQUACULTURE TRAINING PROGRAM TO HANDLE
ON-THE-JOB INFORMATION REQUESTS

TOPIC	SOURCE OF KNOWLEDGE		
	COURSE KNOWLEDGE	PRIOR KNOWLEDGE	COMBINATION
Pond Construction	12a 60%b	3 15.0%	3 15%
Source of Fish	10 66.7%	1 6.7%	3 20%
Aquaculture Permits	2 50%	0 0	2 50%
General Culture	21 80.8%	0 0	4 15.4%
Cage Culture	19 73.1%	1 3.8%	5 19.2%
Weed Control	10 21.3%	4 8.5%	33 70.2%
Water Quality	12 57.1%	1 4.8%	8 38.1%
Fish Disease	6 85.7%	0 0	1 14.3%
Species Feasibility	14 77.8%	1 5.6%	2 11.1%
Marketing Information	6 54.5%	0 0	5 45.5%
Business Potential	13 68.4%	1 5.3%	4 21.1%

a indicates actual number of contacts under each category (all contacts were not categorized)

b indicates actual percentage of contacts at each category

FIGURES

Figure 1. Grand Means of Participant Reaction to the Aquaculture Training Program (5 = Strongly Agree)

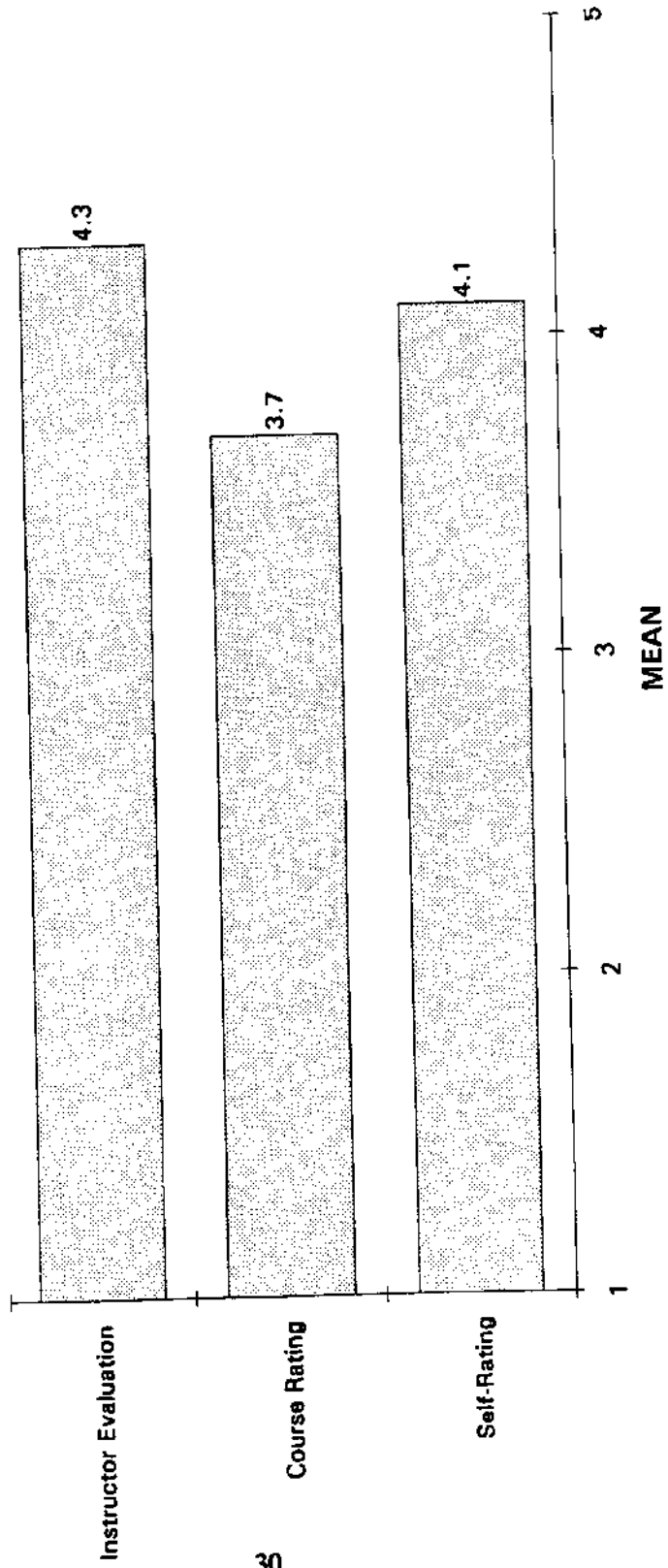


Figure 2. Grand Means of Responses of Participants of the Aquaculture Training Program for the Cognitive Levels of Knowledge, Comprehension and Application (5 = Strongly Agree)

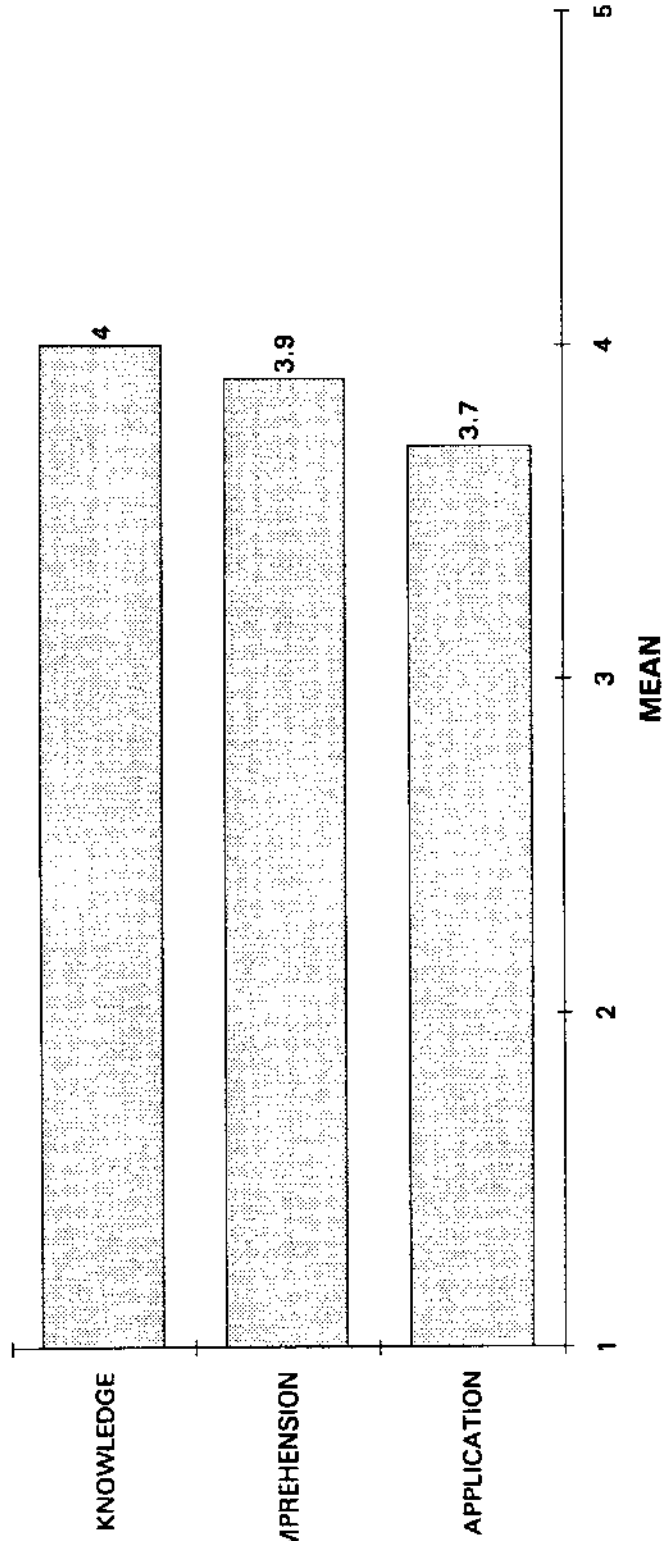


Figure 3. Grand Means of Responses of Participants of the Aquaculture Training Program for the Affective Levels of Receiving, Responding and Valuing (5 = Strongly Agree)

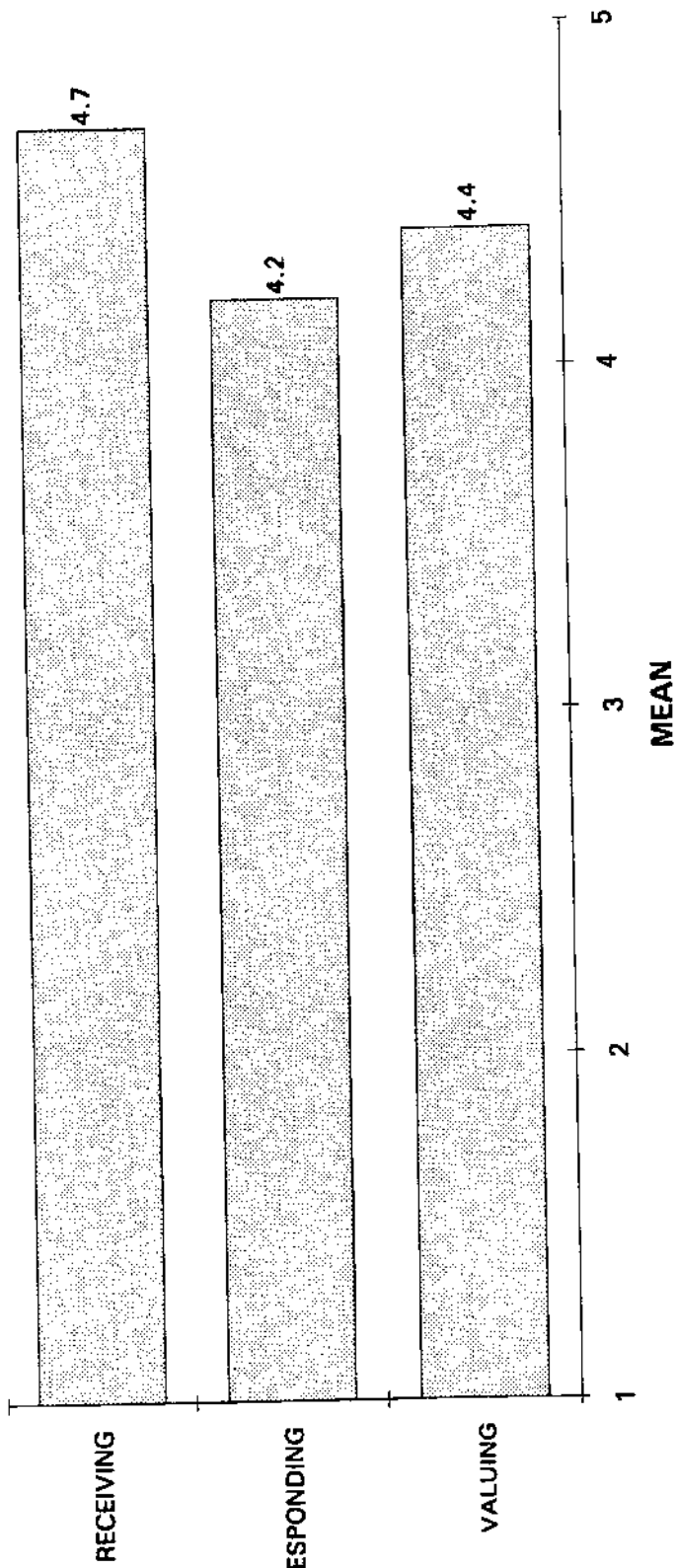


Figure 4. Percentage of Information Requests by Topic from the Log of Aquaculture Related Contacts Compiled by Participants of the Aquaculture Training Program

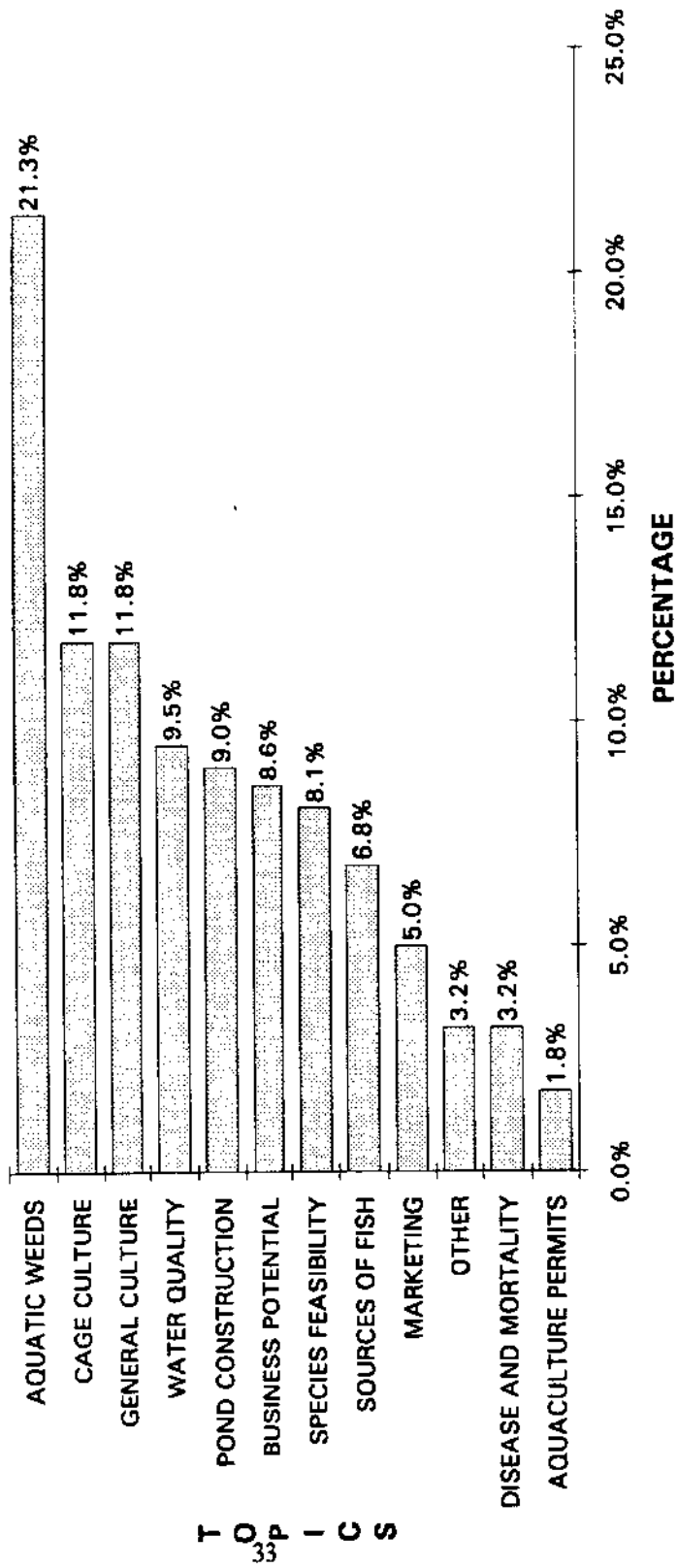


Figure 5. Mean Rating and Standard Deviation by Topic, of Responses of Participants of the Aquaculture Training Program, from the Log of Aquaculture Related Contacts (5.0 = Excellent; 1.0 = Poor)

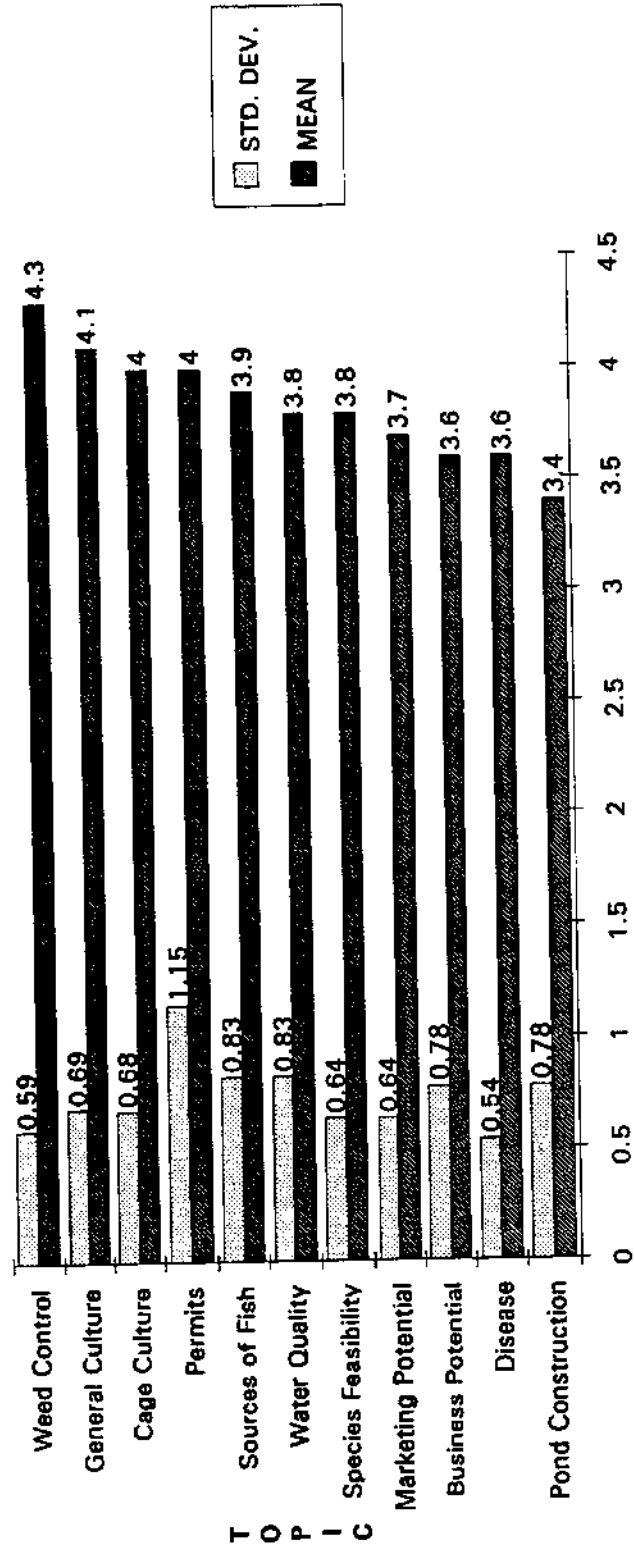


Figure 6. Distribution of Ratings by Topic from Participants of the Aquaculture Training Program from the Log of Aquaculture Related Contacts

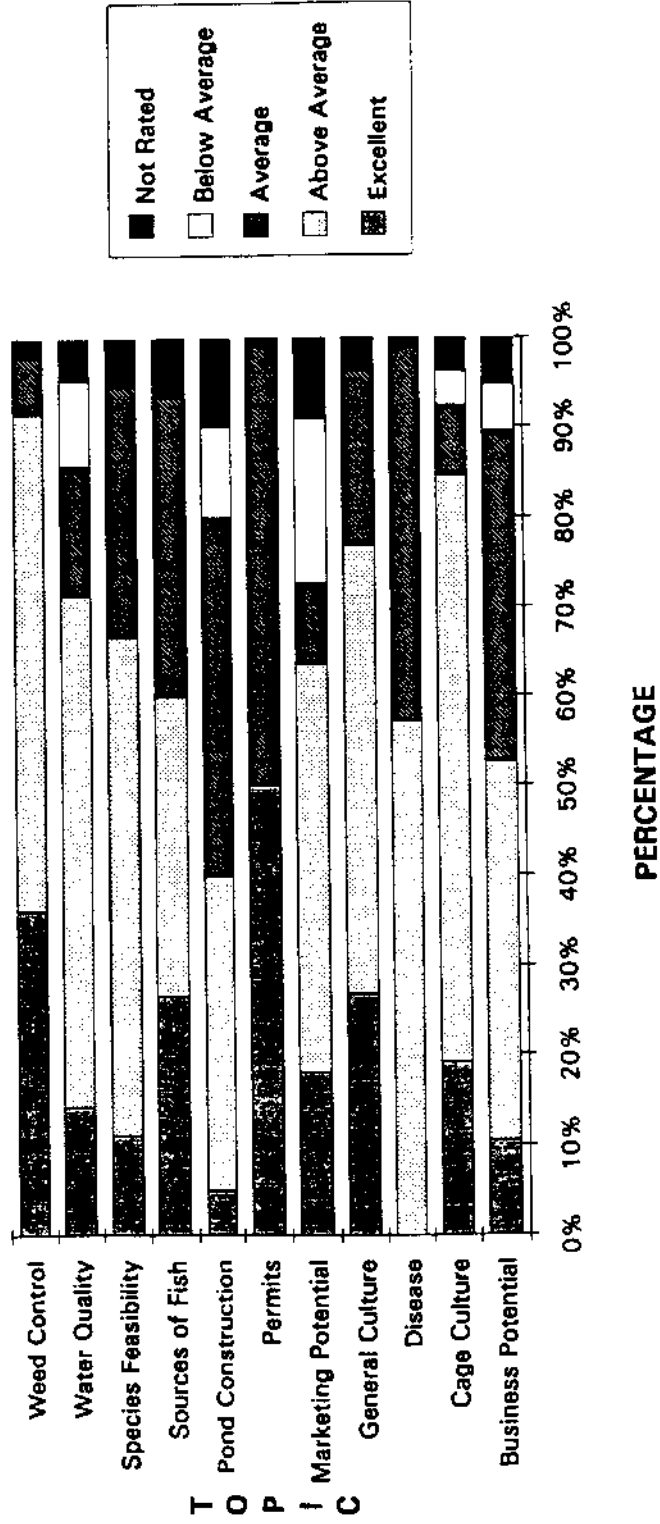


Figure 7. Distribution of Source of Knowledge Categories from the Log of Aquaculture Related Contacts Utilized by Participants of the Aquaculture Training Program

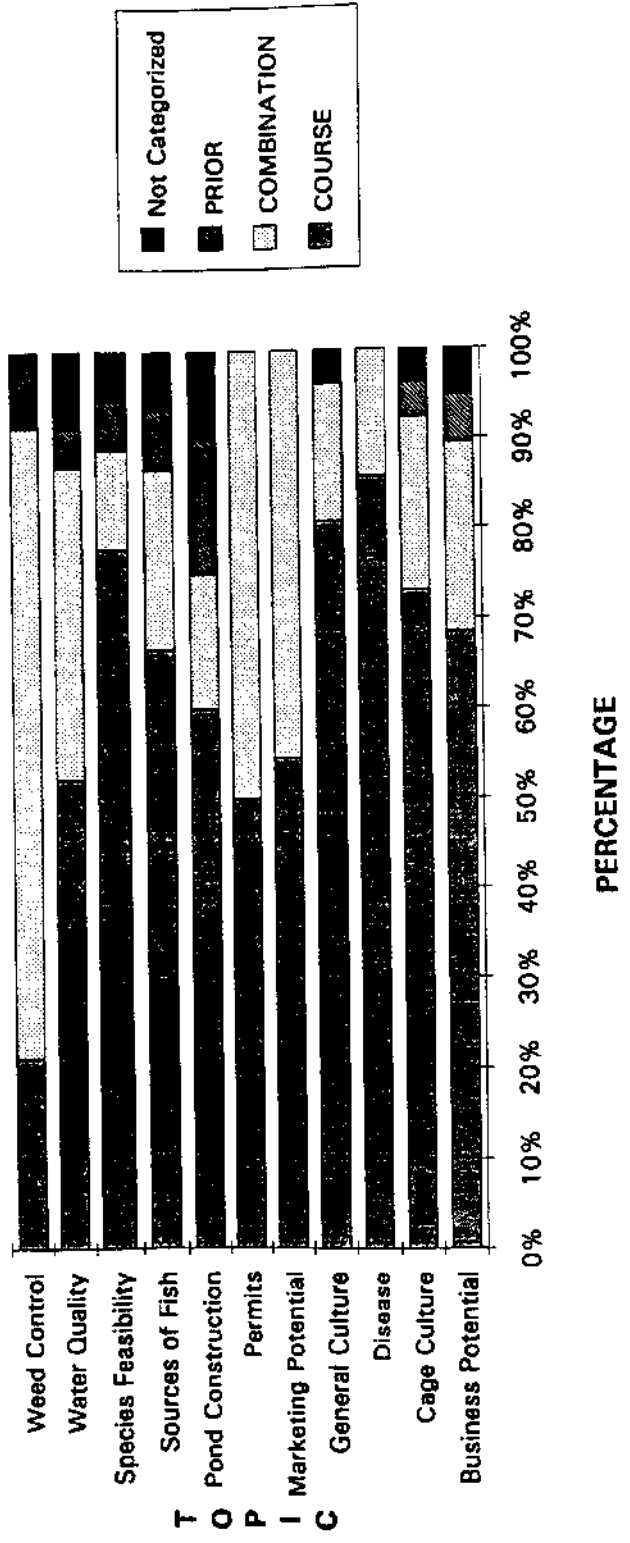
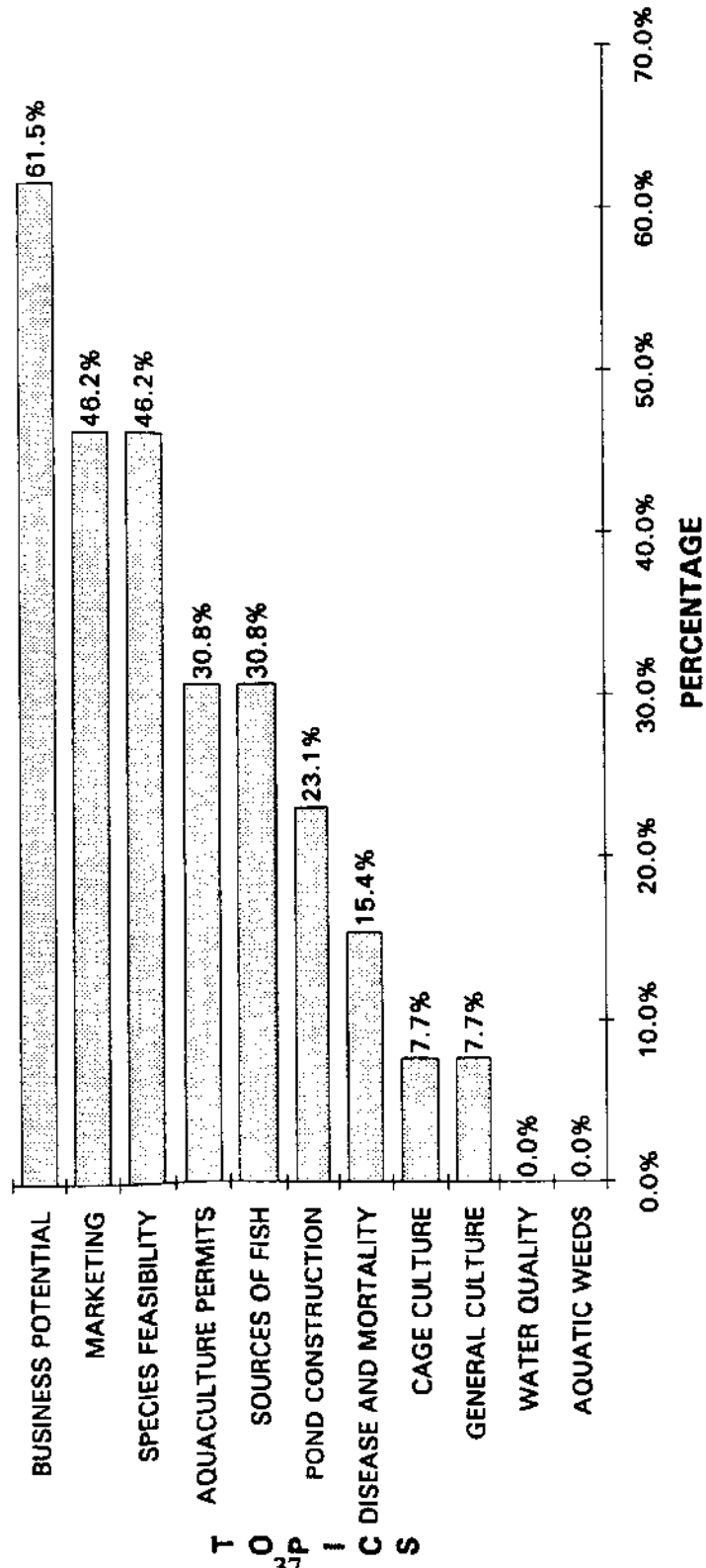


Figure 8. Percentage by Topic of Participants from the Aquaculture Training Program Desiring Additional Factual Information



T
O
37
P
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Figure 9. Percentage by Topic of Participants from the Aquaculture Training Program Desiring Additional Skill Training

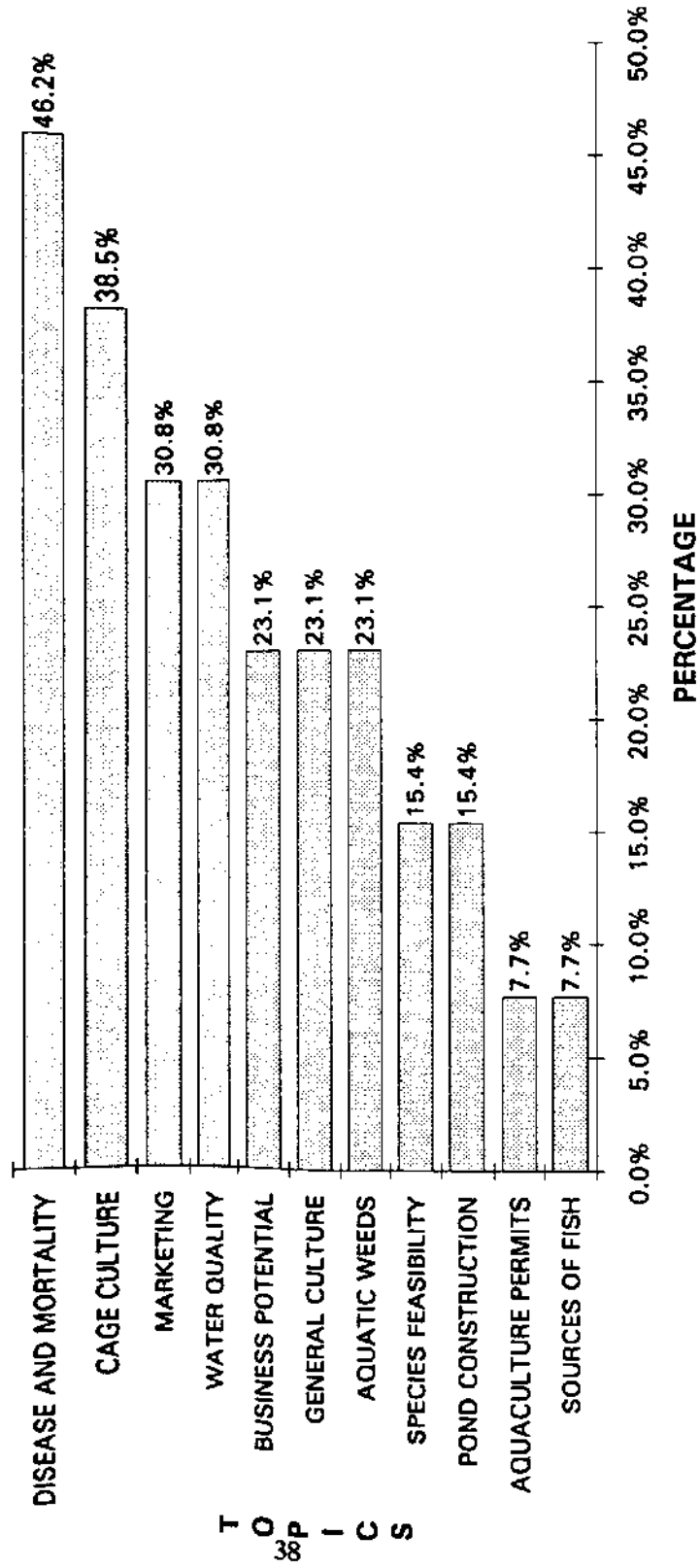
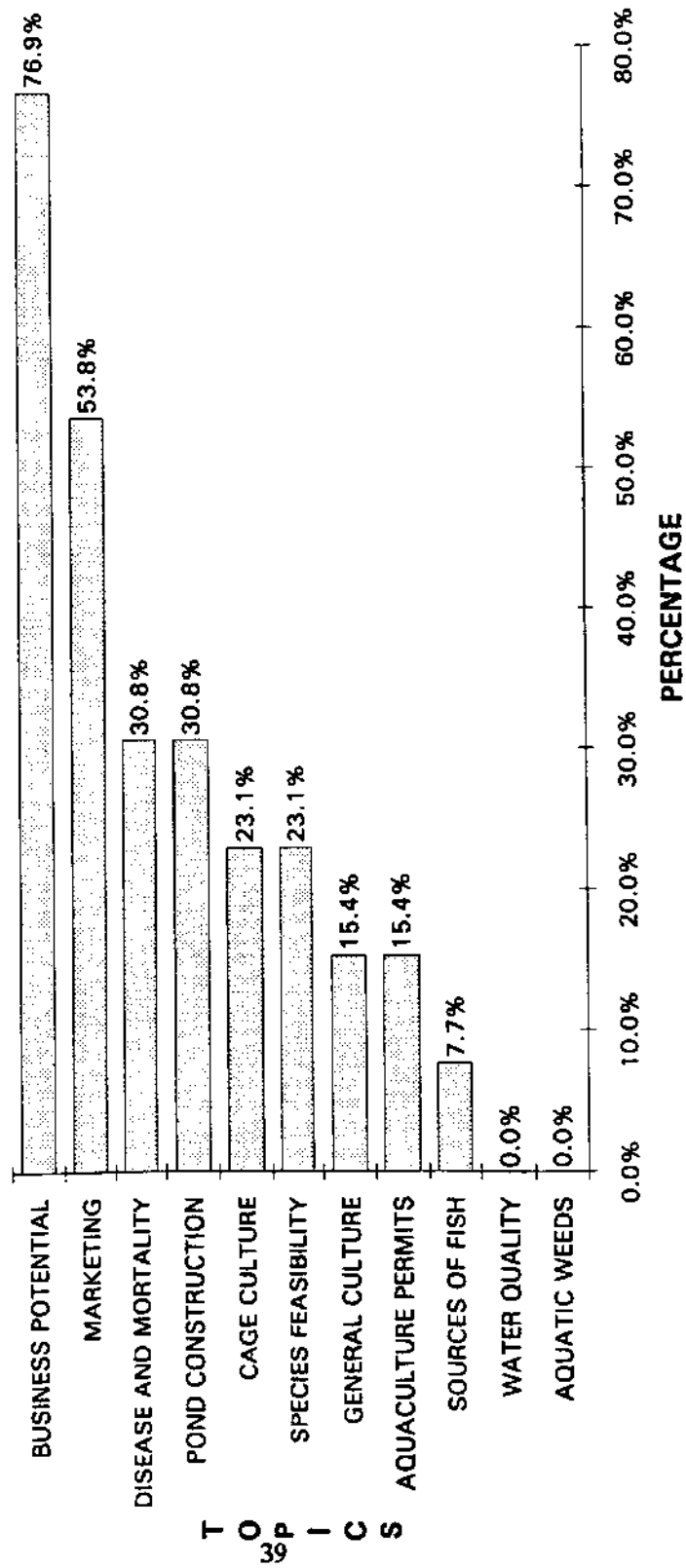


Figure 10. Percentage by Topic of Participants from the Aquaculture Training Program Desiring Guest Speakers with Applied Background



APPENDICES

APPENDIX A

**ACTUAL MEETING AGENDA FOR THE
AQUACULTURE TRAINING ORIENTATION AT
SIUC, DECEMBER 20, 1989**

APPENDIX B

**ACTUAL AGENDA FOR THE FOUR WEEK
AQUACULTURE TRAINING PROGRAM CONDUCTED AT SIUC**

AGENDA FOR AQUACULTURE MEETING AT SIUC, DECEMBER 20, 1989

- 8:30 - 9:30 Introduction/Orientation
- 9:30 - 10:30 Overview of aquaculture (Dr. Roy Heidinger)
- 10:30 - 10:45 Break
- 10:45 - 11:30 Overview of aquaculture (Dr. Roy Heidinger)
- 11:30 - 1:00 Lunch - on your own
- 1:00 - 2:15 Overview of on-going research at SIUC:
- Walleye and striped bass research (Dr. Bob Sheehan)
 - Striped bass, off-season spawning of channel catfish, gene transfer in fish (Dr. Chris Kohler)
 - Sunfish, yellow perch and salmon research (Dr. Jim Seeb)
 - Genetic research (Dr. Lisa Seeb)
 - Recycle system research (Mr. Bruce Tetzlaff)
 - Technology transfer (Mr. Dan Selock)
- 2:15 - 2:45 Develop schedule for two-year program
- 2:45 - 3:30 Visit to wet-lab facilities

Location: Life Science II Building (Bldg. 52 on the map), Room 430

Park in Lot 1. Immediately obtain a Guest Parking Permit from Bettye Doerr, Life Science II, Room 173, or you will be ticketed.

Telephone (618) 536-7761 if more information is needed.

**CES ADVISOR ORIENTATION MEETING
DECEMBER 20, 1989**

Introduction and Definitions - Roy
 Overview
Overview of on-going research at SIUC - Staff
Tour of SIUC facilities

**FIRST WEEK OF TRAINING
MARCH 12 - 16, 1990**

Introduction to Aquaculture - Chris Kohler
Water Sources - Dan for Illinois agents
 LaDon for Indiana agents
Aquaculture Units - Chris
Permitting Requirements - Dan for IL
 LaDon for IN
Water Quality Management - Chris
Sources of Fish - Chris
Field trip to Fountain Bluff
Nutrition, Feeds, and Feeding - Chris
Use of Hormones - Chris
Spawning Techniques - Chris
Genetics Manipulations - Chris
Field Trip to Logan Hollow
Common Diseases of Fish and Treatments - Bob Sheehan
Legal use of Chemicals/Therapeutants - Bob
Transport of Live Fish - Bob

**SECOND WEEK OF TRAINING
MAY 11 - 14, 1990**

Recent political, economic, and regulatory changes - Bob Sheehan
The "Ideal" midwestern production foodfish - Bob
Biology and Culture of 14 different kinds of fish - Bob
Field Trip to Fountain Bluff and Logan Hollow
Field Trip to Little Grassy State Fish Hatchery

**THIRD WEEK OF TRAINING
MARCH 11 - 14, 1991**

Fish Health Management - Drew Mitchell
How to use a microscope - Dan

Laboratory session for anatomy, bacterial isolation,
 parasitological exams, & water testing kits Dan organized
 LaDon assisted

Calculations for treatments - Dan
Evaluation procedure - Sue Kohler 44

Illinois Aquaculture - Delayne Holsapple
Crawfish Symposium - guest speakers

**FOURTH WEEK OF TRAINING
MAY 20 - 23, 1991**

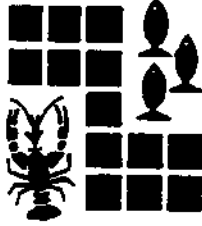
Specialized aquaculture - Roy
Farm pond management - Roy
Field trip to Timberline (wholesale), Toupals (retail), &
Cooksey's Bait (retail)
Recycled water systems - Bruce Tetzlaff
Current SIUC Aquaculture Research - Staff
Aquatic Plants - Carol Lembi
Aquatic Pesticide Test for IL agents - Roy Basler
Evaluation of SIUC training - Sue Kohler
General pond construction - Roy Heidinger
Update on Aquaculture in IL - Dan
Update on Aquaculture in IN - LaDon
Aquaculture Marketing and Channels - Dan Lewis
IL Aquaculture regulations - Rod Horner
Aquaculture Markets - Dan
Open discussion
Certification

APPENDIX C

**SAMPLE CERTIFICATE OF COMPLETION FOR THE AQUACULTURE
TRAINING PROGRAM CONDUCTED AT SIUC**

Southwestern Illinois College

at Carbondale



THE FISHERIES RESEARCH LABORATORY
acknowledges that

Walt Townsend

has successfully completed the requirements
of the training program in
AQUACULTURE TECHNOLOGIES
FOR

AGRICULTURE EXTENSION AGENTS

March 12 - 16, 1980

May 21 - 24, 1990

March 11 - 14, 1991

May 20 - 23, 1991

Carbondale, Illinois

Dr. Roy Heldinger
Director

Dan Selock
Aquaculture Specialist

APPENDIX D

**INSTRUMENT I: PARTICIPANT REACTION COVER
LETTER AND INSTRUMENT**

December 6, 1991

Dear Program Participant:

Your assistance is needed regarding the evaluation of the aquaculture training program, conducted at SIUC, in which you participated. The evaluation is needed to determine if the program met its objectives, as well as to provide a basis for program improvement. We realize that this may be a low priority to you at this time but we're hoping that you will take the time to complete the questionnaire.

Please circle the response for each statement (strongly agree, agree, undecided, disagree, or strongly disagree) that most closely describes your feelings concerning the various statements regarding the course. The questionnaire will take approximately one-half hour of your time. Please return the questionnaire in the enclosed envelope as soon as possible. Because the group is small, every response is especially important. If you have any questions or concerns concerning the questionnaire, please contact either Dan Selock (618-453-6025) or Sue Kohler (618-453-6650).

The questionnaire will be held in the strictest confidence. Numerical coding is used solely to keep track of responses. Your decision to participate is voluntary. The project has been reviewed and approved by the SIUC Institutional Review Board. If you have any questions about your rights as a research subject call 618-453-4533.

Thank you in advance for your assistance and cooperation.

Sincerely,

Sue Kohler
Office of Economic Development
SIUC

Dan Selock
Fisheries Research Lab
SIUC

AQUACULTURE COURSE EVALUATION

PLEASE CIRCLE THE RESPONSE UNDER EACH STATEMENT THAT REFLECTS YOUR FEELINGS ABOUT THE COURSE

- | | | | | | |
|--|-------------------|-------|-----------|----------|----------------------|
| 1. The instructors were knowledgeable about the subject. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 2. The instructors were prepared for class. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 3. The instructors presented subject matter clearly. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 4. The instructors knew if students understood them. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 5. The instructors were responsive to questions. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 6. In general, the instructors taught the class effectively. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 7. Course objectives were clearly stated. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 8. The amount of material covered was appropriate. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 9. The course held my interest. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |
| 10. The course content was well organized. | Strongly
Agree | Agree | Undecided | Disagree | Strongly
Disagree |

11. The material was presented at a level that was too difficult.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
12. The material was presented at a level that was too easy.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
13. Audio-visuals could be used more effectively.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
14. Use of group discussion as an instructional aid could have been used more frequently.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
15. The field trips added to my knowledge of the topic.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
16. The guest speakers furthered my knowledge of the topic.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
17. Provision of reference materials, handouts and aids was sufficient.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
18. The course had a good balance of theoretical and applied activities.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
19. The material presented was practical.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
20. The course content was relative to my needs.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
21. The course contained repetition of topics.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
22. The number of classroom hours per day was acceptable.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|

23. The number of days per session was appropriate.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
24. The amount of time between the four sessions affected continuity.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
25. The course should be taught in some other way.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
26. The course was a good learning experience.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
27. The course allowed me to acquire skills and knowledge.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
28. The course gave me a working knowledge of the subject.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
29. I could use the knowledge I have gained in the course in my area.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
30. I have a strong interest in the material.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
31. A high demand exists for aquaculture information in my region.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
32. I would benefit from additional training.
- | | | | | |
|----------------|-------|-----------|----------|-------------------|
| Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|----------------|-------|-----------|----------|-------------------|
33. How often do you receive requests for aquaculture information?
- | | | | | |
|--------|-------|-----------|--------|-------|
| Always | Often | Sometimes | Seldom | Never |
|--------|-------|-----------|--------|-------|
34. How often do you use the course information to respond to requests?
- | | | | | |
|--------|-------|-----------|--------|-------|
| Always | Often | Sometimes | Seldom | Never |
|--------|-------|-----------|--------|-------|

35. Briefly describe your background in aquaculture prior to the program.

36. Briefly describe your view of the future potential of aquaculture in Illinois/Indiana.

37. How could we improve this course to make it better in the future?

38. Any additional comments or concerns?

Please use the reverse side if necessary for questions 35 to 38.

APPENDIX E

**INSTRUMENT II: BEHAVIORAL OBJECTIVES COVER
LETTER AND QUESTIONNAIRE**



Southern Illinois University at Carbondale
Carbondale, Illinois 62901-4713

Office of Economic and Regional Development
618-536-4451

February 4, 1992

Dear :

Once again, your assistance is needed regarding the evaluation of the aquaculture training program, conducted at SIUC, in which you participated. The evaluation is needed to determine if the program met its objectives, as well as to provide a basis for program improvement. We realize that this may be a low priority to you at this time but we're hoping that you will take the time to complete the questionnaire. Hopefully, this will be the **last** questionnaire you will receive.

This survey was designed to determine your opinion on statements concerning specific topics that were covered. You will note that each topical area contains three statements. **Please read each one carefully because you may or may not agree with all three.** Please circle the response for each statement (strongly agree, agree, undecided, disagree, or strongly disagree) that most closely describes your feelings concerning the various statements regarding the course. On the last page, please check the topical areas in which you would like additional factual information, skill training or guest speakers with background or experience concerning the particular topic. The questionnaire will take approximately one-half hour of your time. Please return the questionnaire in the enclosed envelope as soon as possible. Because the group is small, every response is especially important. If you have any questions or concerns concerning the questionnaire, please contact either Dan Selock (618-453-6025) or Sue Kohler (618-453-6650).

The questionnaire will be held in the strictest confidence. Numerical coding is used solely to keep track of responses. Your decision to participate is voluntary. The project has been reviewed and approved by the SIUC Institutional Review Board. If you have any questions about your rights as a research subject call 618-453-4533.

Thank you in advance for your assistance and cooperation.

Sincerely,

Sue Kohler
Office of Economic Development
SIUC

Dan Selock
Fisheries Research Lab
SIUC

AQUACULTURE COURSE SURVEY

PLEASE CIRCLE THE RESPONSE UNDER EACH STATEMENT THAT REFLECTS YOUR FEELING CONCERNING THE STATEMENT.

1. Pond Construction

- a. I am able to find or recall facts concerning recommended pond size, shape and depth for fish culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- b. I can explain why pond size, shape and depth are important in fish culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- c. I am able to make recommendations on pond size, shape and depth for a planned usage.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

2. Sources of Fish

- a. I know the general sources for obtaining fish.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- b. I can explain which sources are appropriate for use in fish culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- c. I am able to make specific recommendations of suppliers within my region.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

3. Permits

- a. I am aware of the types of aquaculture permits.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- b. I can explain under which circumstances the various types of permits are required.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- c. I am able to supply information on where and how to obtain aquaculture permits.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

4. Water Quality

- a. I know the major water quality parameters that are important in fish culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- b. I can explain why the parameters are important.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- c. I can make specific recommendations concerning parameters of importance under specific culture conditions.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

5. Water Quality

a. I believe maintaining good water quality is important in fish culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. When someone calls about problems with fish, I check with them concerning their water quality parameters.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. When discussing the topic of fish farming, I stress the importance of maintaining good water quality.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

6. Water Quality

a. I know the desirable levels for each of the major water quality parameters.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. I can explain why the parameters need to be maintained at the desirable levels.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. I am able to make recommendations to correct the levels under specific conditions.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

7. Fish Mortality

a. I am able to list the major biotic and abiotic causes of fish mortality.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. I am able to distinguish between the major causes based on the mortality chart.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. I am able to make general recommendations for treatment and management.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

8. Disease

a. I know the general categories of fish pathogens or disease agents.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. I understand the interrelationship of fish, pathogen and stress.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. I am able to make management recommendations for avoiding conditions leading to stress and disease.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

9. Disease

a. I believe that avoiding stress to fish will prevent the onset on many fish diseases.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. When someone calls about problems with fish, I check with them concerning whether the fish have been stressed.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. When discussing the topic of fish farming, I emphasize the importance of avoiding stress to fish to prevent mortality.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

10. Weed Control

a. I know the three major classifications of aquatic weeds.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. I can explain the importance of controlling weeds in fish culture ponds.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. I am able to make recommendations of general techniques for controlling weeds.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

11. Weed Control

a. I am aware of the legal herbicides for aquatic plants.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. I can explain which herbicides are effective for specific plants.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. I can describe application procedures for specific weed control.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

12. Species Feasibility

a. I am aware of the various species which can be raised in aquaculture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. I can explain the relationship between cultural requirements and species feasibility.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. I am able to make specific recommendations for feasible species in my region.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

13. Cage Culture

a. I know what cage culture is.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. I can explain the advantages and disadvantages of cage culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- c. I am able to make recommendations on species, stocking rates and feeding requirements for cage culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

14. General Culture-Stocking

- a. I know the desirable stocking density of fish per unit volume of water.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- b. I can explain the relationship of stocking density to level of management inputs (aeration, etc.).

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- c. I can make specific recommendations for stocking based on species, pond size, and management inputs.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

15. General Culture-Feeding

- a. I know the general types of feeds that are commercially available for aquaculture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- b. I can explain how nutritional requirements vary among species, size classes and type of culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- c. I can make specific recommendations of feed requirements for a particular species, size class and type of culture.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

16. General Culture-Handling, harvesting and hauling

- a. I can list or recall the factors involved in safely harvesting and hauling fish.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- b. I can explain why harvesting, handling and hauling are stressful to fish.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- c. I am able to make recommendations on precautionary measures to take prior to and during the hauling of fish.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

17. Marketing/Processing

- a. I know the various product forms in which fish can be marketed.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

- b. I can explain the legal restraints involved with processing fish.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. I am able to make recommendations on identifying marketing channels.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

18. Business Potential

a. I know the major economic factors involved in starting an aquaculture operation.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

b. I can explain how the factors vary depending on the type and size of the operation.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

c. I can make estimates of earnings potential based on acreages of water and species cultured.

Strongly Agree Agree Uncertain Disagree Strongly Disagree

APPENDIX F

**INSTRUMENT III: LOG OF AQUACULTURE RELATED CONTACTS
AND INSTRUCTIONS**

AGENT: _____
 DATE: _____

Information Requested	Phone Call			Visit			Excellent	Above Average			Adequately			Below Average			Poorly	Prior Knowledge	Course Knowledge	P&C	Verbal	Referral	Mailed Literature
	P	L	V	P	L	V		Other	AA	A	BA	AA	A	BA	P	C							
Pond Construction																							
Sources of Fish																							
Aquaculture Permits																							
General Culture																							
Cage Culture																							
Aquatic Weeds																							
Water Quality																							
Disease and Mortality																							
Species Feasibility																							
Marketing																							
Business Potential																							
Other																							

I. Type of Information Requested II. Origin of Request III. Adequacy in Responding IV. Source of Knowledge V. Nature of Response



Southern Illinois University at Carbondale
Carbondale, Illinois 62901-4713

Office of Economic and Regional Development
618-536-4451

September 17, 1991

MEMORANDUM

TO: Cooperative Extension Service County Agents

**FROM: Sue Kohler
Office of Economic and Regional Development
SIUC
Carbondale, IL 62901**

**Dan Selock
Fisheries Research Lab
SIUC
Carbondale, IL 62901**

RE: Log of Aquaculture Related Contacts

By now you have had several months to maintain the log of aquaculture related contacts. We hope that you've been able to squeeze this into your busy schedules. We would appreciate it if you could wrap this up at the end of September and mail the completed logs back to Dan or Sue at the above addresses. Thanks for taking the time to do this. We will be in touch regarding other aspects of the evaluation.

LOG OF AQUACULTURE RELATED CONTACTS

Please use the following guidelines to log in aquaculture requests. Please have your name and the date on each request. Please log in the information from now until August 31st.

Section I. This section contains a list of topics. Please check the ones that are appropriate. If a contact is for information that is not listed, fill in the "other" blank. The following four sections need to be filled out on each topic for which information is requested.

Section II. This section deals with the origin of the request. Please check the appropriate box depending on whether the request was via the telephone, a letter or an office visit. If the request was through a method not listed, fill in the "other" box.

Section III. This section addresses how would you rate your adequacy in handling the request. Please check "excellent" if you felt you had all the information needed to answer the request; check "above average" if you felt slightly more information was needed; check "adequately" if you felt your response was barely adequate; check "below average" if you felt that you had little knowledge in responding to the request; and check "poorly" if you were unable to supply any information. (This information will only be used to judge if topics are being adequately covered in the course)

Section IV. This section addresses the source of knowledge used in responding to requests. Please check "prior knowledge" if your response was based on prior knowledge and not information gained from the course; check "knowledge through course" if the course provided you with the needed information; and check "combination" if your response was based on your prior knowledge plus knowledge gained in the course.

Section V. This section addresses the nature of the response. Please check "verbal" if your answer was over the telephone; check "referral" if you needed to refer them to another source (person) for the information; check "mailed literature" if you mailed them written information such as a bulletin; and make note in the "other" section if you referred them to literature which you did not have available. This is the only section where more than one answer can be logged.

If you have any comments, please use the reverse side. I would especially appreciate comments concerning your ratings on section III.

THANKS SO MUCH FOR YOUR COOPERATION IN MAINTAINING THIS LOG.

APPENDIX G

**INSTRUMENT IV: CHECKSHEET FOR REQUESTS FOR
ADDITIONAL INFORMATION**

