ATTACHMENT D

PROJECT NAME: Aquaculture Economics, Marketing and Policy for the North Central Region

FUNDING LEVEL: $58,300

DURATION: 1 Year (91-92)

CHAIRPERSON: Dr. Leroy J. Hushak, Department of Agricultural Economics and Rural Sociology, 2120 Fyffe Road, Ohio State University, Columbus, OH 43210-1099, Telephone (614) 292-3548

TABLE OF CONTENTS

ATTACHMENT D

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JUSTIFICATION

Three important trends underlie the recent growth of the aquaculture industry (USDA 1990). First, increasing world populations will likely increase the restrictions many nations place on their territorial capture fisheries. Second, increasing emphasis on nutrition as a component of health will likely increase per capita demand for fish and shellfish (Anon. 1990). Third, domestic landings of traditional capture fisheries most likely will not be able to meet the increased demand for seafood in the U.S. Thus, the aquaculture industry both nationally and regionally is in a position to expand its share of a growing market if it can deal effectively with the economic, policy and marketing issues associated with its rapid growth.

United States consumption of fish and seafood has risen over 20 percent since 1975, and per capita consumption is expected to double within thirty years (Parker 1989). In the 12 state North Central Region, 58 million residents annually consume about one billion pounds of fish (Summerfelt 1990). This growth in demand has important national economic implications. The trade deficit for fishfood imports increased from $1.8 billion in 1980 to $3.5 billion in 1986. Regional domestic aquaculture may provide a mechanism for slowing or reversing recent trade deficits in a market sector that is currently second only to petroleum imports.

Worldwide aquaculture production is becoming increasingly important relative to commercial capture fisheries and accounted for 13.4 percent of total production in 1988. However, the United States has lagged behind, with only 5 percent of total production coming from domestic culture (House Report 100-808 1988). The discrepancy was addressed in the National Aquaculture Act of 1980, in which Congress declared it was "in the national interest, and it is the national policy to encourage the development of aquaculture in the United States" (National Aquaculture Act, PL 96-632 1980).

While the young industry has tremendous potential for growth, many barriers to development exist. Among these are: (1) lack of technical, economic, and marketing information, (2) availability of subsidized foreign supplies of aquaculture products, (3) limited funds for research and development, and (4) constraining laws and regulations intended for the maintenance and protection of sport fisheries. This last barrier is most profoundly felt at the state level. Most regulations affecting the industry are part of state fish and game law, although those pertaining to marketing are also found in agriculture, health, transportation, commerce and food safety statutes.

Planning for economic growth and development, whether at the firm level or within the entire industry, requires an understanding of how producers make decisions, how producer decisions are influenced by regulatory policies and institutions, how consumers respond to the resulting production and what the impact will be on regional economies. Data is essential to gain the needed understanding. Unfortunately, sufficient economic data currently do not exist on the North Central Regional aquaculture industry. Data systems are not in place to coordinate and compile production and market statistics on the various aquaculture commodities produced in this region. Consequently there is a lack of basic economic data on production costs, distribution systems and marketing opportunities.

Collection and analysis of these data can mitigate some of the economic factors impeding growth within the industry. Aquaculture firms may be unaware of the most lucrative markets, the most economically efficient production and distribution systems, the trends in consumer tastes and preferences and the constraints or benefits of government policies on both production and marketing. Improved knowledge on the size and output of existing operations for various species, combined with information on present and projected market demands can be used to predict how much additional expansion can be supported and how increased competition will affect short and long-term profitability. This information will contribute to the identification of the most efficient production and processing technologies. It also will assist producers in identifying and developing new market niches and better positioning their products to maximize market share.

Gathering economic information from existing producers, however, may be a difficult task. The reasons for collecting economic information may not be well understood by producers. Aquaculture producers may be unaware of the benefits that accurate record keeping can have on their operation and the benefits that might accrue to them through collection

and analysis of industry-wide data. Producers also tend to be hesitant to provide accurate economic information on their operations because of the competitive nature of the industry.

Competition is particularly intense among producers of the same product, and where established market outlets exist. Where information is available, it often is derived from reporting forms that aquaculturists are required to file with state agencies that regulate the industry. Producers often are reluctant to supply information that may produce the rationale for stricter regulations or increased licensing and permit costs. An education effort aimed at shifting this attitude must be directed to producers in this region in order to get the needed economic data. Interest must be stimulated during this educational program to maintain and provide accurate and reliable records so that individual aquaculturists and the industry as a whole can benefit.

Based on the research completed by the group in 1989 and 1990, we believe that economic and policy considerations are at least as important as improved biological and production information for the continued growth of the industry in the region. Aquaculture is necessarily dependent upon publicly-regulated natural resources. A cooperative approach among producers, regulators and consumers will be required for the development of a vital regional industry.

RELATED CURRENT AND PREVIOUS WORK

As a result of the current project, the research of the work group has produced a number of significant results in three areas: marketing channels, resource and environmental policy and marketing policy. Gleckler (1991) has completed a survey of wholesale and retail fish and seafood sellers in the six southern states of the North Central Region (Illinois, Indiana, Kansas, Missouri, Nebraska, and Ohio). A total of 430 questionnaires were distributed to firms in the industry throughout the six states. There were 69 questionnaires which were not deliverable for a net sample size of 361. There were 107 respondents for a response rate of 30 percent.

Of the responding firms, 36 and 39 percent have business locations in Illinois and Ohio, respectively. No other state has more than 15 percent. Only 8 percent of the responding firms reported business locations outside of the six states surveyed. Over 78 percent of the respondents reported for single store/unit firms.

About 67 percent of the respondents reported adding value to the fish and seafood products they handle. The most frequently reported processing operations are "in round" or dressed products to fillets or steaks.

The most frequently handled freshwater products are walleye (73 percent), salmon (73 percent), trout (65 percent), fresh water shrimp (65 percent), channel catfish (63 percent), yellow perch (48 percent), white perch (48 percent), frogs (47 percent), and crayfish (41 percent).

The most frequently handled farm-raised species reported by respondents are channel catfish (61 percent), salmon (52 percent), trout (48 percent), freshwater shrimp (21 percent), crayfish (18 percent) and frogs (18 percent). Those species for which respondents would like to sell farm-raised product if it were available are walleye (45 percent), yellow perch (39 percent) and white perch, white bass, hybrid striped bass, largemouth bass, smallmouth bass and bluegill (22-29 percent).

Overall, 72 percent of the respondents rank farm-raised fish as superior or somewhat better than wild-caught fish. Those attributes of farm-raised fish which ranked the highest are uniformity or size, seasonality of supply, freshness, quality, appearance, and contaminant content. Those ranked the lowest as compared to wild-caught fish are shipment accuracy, health benefits, value, and turnover.

Floyd et al. (1990) identified five major resource policy issues for aquaculture in the region. They are regulatory jurisdiction, predator control, water quality, regulation of game and non-native species and environmental contamination. While producers have generally favored the classification of aquaculture as agriculture, in hope of avoiding environmental regulation, the research indicates that there is little reason to believe that such a reclassification will resolve the underlying substantive issues.

As one might expect, there are significant differences among the affected interest groups in their perceptions of the predator control issue. Generally environmental groups were surprisingly well informed on the issues associated with piscivorous bird control. It will be important for the industry to carefully comply with existing regulations to avoid potential confrontations. There was also broad support among environmental interests for tighter regulation of therapeutants in aquaculture production facilities. Part of this support is reflected in consumer attitudes toward food quality. Additionally, some concern may be attributed to attitudes about contamination of public waters by aquaculture facility effluents.

It is interesting to note that while the overly burdensome nature of regulations is a common theme in the popular literature (Hopkins 1989), aquaculturists in the North Central region generally believe regulatory processes are reasonable.

Because regulatory responsibility remains divided among several agencies, a unified permit process may offer the best solution for serving producers while protecting the public's interest in its resources.

Thomas et al. (1990) have compiled a 24 page "Directory of State Government Agencies Concerned with Aquaculture" for each of the 12 states. Each directory includes the addresses and telephone numbers of committees of state legislatures and of the state regulatory agencies responsible for formulation and implementation of aquaculture policies. In addition, a detailed literature search of applicable federal and state laws rules, and regulations affecting aquaculture in the region has been compiled in draft form. The statutes and regulations are indexed and will be available to NCRAC during fall, 1990.

A thorough literature review with emphasis on economics in aquaculture was presented in the original proposal (Hanson et al. 1989) and is not repeated here. Sullivan (1989) has compiled a literature review dealing with aquaculture and resource policy.

OBJECTIVES

1. Update data in information management system and produce a second Situation and Outlook Report on the North Central Regional Aquaculture industry (a third annual report is dependent on additional budget for fiscal year 1992-93, year 2 of the biennium).

2. Investigate economic production and marketing feasibility for selected species currently produced in the North Central Region and for other species which offer commercial potential.

3. Develop and implement an extension program designed to educate current and potential aquaculture producers on the need to provide accurate economic information on their operation.

PROCEDURES

Objective 1

Gerlow will be responsible for searching out and compiling published or secondary data series on marketing of farm-raised fish in the 12 North Central states. She will also take the lead in generating the structure for and writing the Situation and Outlook Report on the marketing of farm-raised fish in the North Central Region, using the primary survey and secondary data compiled for all 12 North Central states.

Sherrick will be responsible to search out and compile published or secondary data series on farm production of fish in the 12 North Central states. He will also take the lead to generate the structure for and write the Situation and Outlook report on fish production and production costs in the North Central Region, using the primary survey and secondary data compiled for all 12 North Central states. Hushak will coordinate and format the Situation and Outlook Report. He will also work out distribution channels and other issues with the Director of NCRAC.

Objective 2

Mary Gerlow will take the lead in carrying out the marketing part of the economic study. First, she is currently carrying out the second part of the market survey. In the previous proposal, we agreed to replicate the Gleckler study for the remaining six states of the North Central Region (Iowa, Michigan, Minnesota, North Dakota, South Dakota, and Wisconsin). However, Gleckler's sample base included only wholesale and retail outlets. In order to obtain comparable data on all twelve states for a broader base of seafood distribution establishments and to modify the questionnaire to overcome several problems with the Gleckler questionnaire, we have initiated a survey across all twelve states. The survey is in progress and can be accomplished withing the proposed budget. During the budget period of this proposal, economic analysis of the marketing data will be completed.

Leroy Hushak and Bruce Sherrick take the lead in carrying out the analysis of farm fish production in the North Central Region. The two investigators, with the assistance of Joyce Newman of Michigan State University, jointly designed

the producer survey. The initial proposal was to design a questionnaire which would obtain data on production costs and revenues from fish producers in the twelve North Central states. With the large numbers of species and the large numbers of different operations carried out by fish producers in the region (hatching, fingerlings, food fish, stocking, etc.), the resulting questionnaires became exceedingly complex. Because of this complexity, we refocused our efforts in two ways. First, we designed a simplified questionnaire which requested information on species raised, type of operations conducted, revenues, and the nature of the total business. This survey has been completed and data compilation is getting underway. Response rate was about 40 percent, which we considered excellent. Hushak is responsible for data compilation. Second, we have begun to develop prototype budgets based on commercially available equipment for various types of systems. Sherrick is responsible for budget development.

The next phase of the study, and that proposed for this budget period, will be to develop and establish production or propagation budgets for farm production of selected fish species in the North Central states using real data obtained from producers. First, we will use the just completed survey to identify prominent species and prominent types of production facilties in the region in order to target the most important types of firms for development of budgets. We will select two to four species/facility types for budget development. Second, we will develop questionnaires which are tailored to the targeted species/facilities, and which are much shorter than earlier prototype questionnaires.

Third, we will visit selected production facilities which have the targeted species/facilities and pretest the questionnaires. Finally, we will administer the questionnaires to highly selective groups of producers by species and by type of facility. To increase response rate, we propose to use a combination of mail and telephone instruments, with presurvey education being carried out by the extension component of the project, which appeared to be highly effective in the just completed survey. Hushak and Sherrick will work out a species subdivision for development of budgets for the selected species. Newman is expected to participate for those species which are important to Michigan.

Objective 3

David Landkamer, will continue to implement the extension component of the marketing, economics and policy project. The primary emphasis of this objective is developing producer support for gathering the data required for objectives 1 and 2. The extension education program is designed to explain the value to the producer of providing accurate information through the report. The most critical element of the educational program remains developing the credibility of NCRAC and the economics, marketing and policy project.

This will be accomplished by continuing to build contacts with state agencies that have an interest or role in commercial aquaculture (e.g., natural resources, environmental licensing/permitting, and agriculture agencies), state aquaculture associations, state extension services, Sea Grant programs and economic development groups in each of the states within the North Central Region to seek input and support for the information gathering program. Key individuals respected in the aquaculture industry will be chosen from these groups to facilitate legitimation and the reporting method will be presented through appropriate industry publications and other applicable communication channels.

Landkamer will continue to make presentations at aquaculture conferences and meetings throughout the region to explain the value of economic data reporting and the format for reporting. Requested travel funds will be used to attend state association meetings in the region to promote the objectives of the work group.

FACILITIES

Ohio State University

The Department of Agricultural Economics and Rural Sociology has full access to the University computer facility and numerous PCs. The Department employs full-time programmers to assist faculty in research. The faculty and staff are experienced in survey research and the development of situation and outlook reports.

University of Illinois

Faculty, staff and students in the Department of Agricultural Economics have full access to the University mainframe computer system as well as numerous IBM-compatible microcomputer workstations within the Department.

University of Minnesota

The facilities of the Department of Fisheries and Wildlife and the Minnesota Extension Service will be used to conduct this work. No special facilities are required.

REFERENCES

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Hopkins, T.A. 1989. Regulations: Overcoming the oddities. Aquaculture Magazine 15(5):38-45.

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National Aquaculture Act. 1980. U.S. Public Law 96-632.

Parker, N.P. 1989. History, status and future of aquaculture in the United States. Reviews of Aquatic Sciences 1(1):97-109.

Sullivan, R.M. 1989. Aquaculture and natural resources policy--a search of available literature. School of Natural Resources, Ohio State University, Columbus, OH.

Summerfelt, R.C., editor 1990. NCRAC Journal 1(2):1.

Thomas, S., R.L. Vertrees, R.M. Sullivan and D.W. Floyd. 1990. Directory of state government agencies concerned with aquaculture. School of Natural Resources, Ohio State University. Columbus, OH.

USDA 1990. Economic Research Service. Concerns of the aquaculture industry. Aquaculture Situation and Market Outlook Report. March.

ATTACHMENT D

PROJECT LEADERS

State	Name/Institution	Area of Specialization
Illinois	Bruce J. Sherrick University of Illinois	Resource Economics
Minnesota	David J. Landkamer University of Minnesota	Aquaculture Extension
Ohio	Leroy J. Hushak Ohio State University	Resource Economics
	Mary E. Gerlow Ohio State University	Resource Economics

ATTACHMENT D

INDIVIDUAL BUDGETS FOR PARTICIPATING INSTITUTIONS BY OBJECTIVE(S)

Illinois

University of Illinois
Bruce J. Sherrick

Minnesota

University of Minnesota
David J. Landkamer

Ohio

Ohio State University
Leroy J. Hushak/Mary E. Gerlow

ATTACHMENT D

PROPOSED ECONOMICS/MARKET BUDGET SHEET FOR UNIVERSITY OF ILLINOIS

(Sherrick)

Objective 2

		No.	FTEs	Year 1
A.	Salaries and Wages			
	1. No. of Senior Personnel & FTEs[1]			
	a. (Co)-PI(s)	1	0.10	$0
	b. Senior Associates			
	2. No. of Other Personnel (Non-Faculty) & FTEs			
	a. Research Assoc./Postdoc			
	b. Other Professionals			
	c. Graduate Students	1	0.50	$16,300*
	d. Prebaccalaureate Students			
	e. Secretarial-Clerical			
	f. Technical, Shop, and Other			
	Total Salaries and Wages			$16,300
B.	Fringe Benefits			$0
C.	**Total Salaries, Wages and Fringe Benefits**			$16,300
D.	Nonexpendable Equipment			$0
E.	Materials and Supplies			$1,500
F.	Total Travel - Domestic (*Including Canada*)			$1,500
G.	Other Direct Costs			$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)				$19,300

[1]FTEs = Full Time Equivalents based on 12 months.
*Includes *$4,800 Tuition and Fees.

ATTACHMENT D

PROPOSED ECONOMICS/MARKET BUDGET SHEET FOR UNIVERSITY OF MINNESOTA

(Landkamer)

Objective 3

				Year 1
A.	Salaries and Wages	No.	FTEs	
	1. No. of Senior Personnel & FTEs[1]			
	a. (Co)-PI(s)	1	0.25	$0
	b. Senior Associates			
	2. No. of Other Personnel (Non-Faculty) & FTEs			
	a. Research Assoc./Postdoc			
	b. Other Professionals			
	c. Graduate Students			
	d. Prebaccalaureate Students	1	0.30	$2,400
	e. Secretarial-Clerical			
	f. Technical, Shop, and Other			
	Total Salaries and Wages			$2,400
B.	Fringe Benefits			$0
C.	**Total Salaries, Wages and Fringe Benefits**			$2,400
D.	Nonexpendable Equipment			$0
E.	Materials and Supplies			$2,000
F.	Travel - Domestic (*Including Canada*)			$3,600
G.	Other Direct Costs			$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)				$8,000

[1]FTEs = Full Time Equivalents based on 12 months.

ATTACHMENT D

PROPOSED ECONOMICS/MARKET BUDGET SHEET FOR OHIO STATE UNIVERSITY

(Hushak and Gerlow)

Objectives 1 and 2

		No.	FTEs	Year 1
A.	Salaries and Wages			
	1. No. of Senior Personnel & FTEs[1]			
	a. (Co)-PI(s)	2	0.20	$0
	b. Senior Associates			
	2. No. of Other Personnel (Non-Faculty) & FTEs			
	a. Research Assoc./Postdoc			
	b. Other Professionals			
	c. Graduate Students	2	0.75	$24,500*
	d. Prebaccalaureate Students			
	e. Secretarial-Clerical			
	f. Technical, Shop, and Other			
	Total Salaries and Wages			$24,500
B.	Fringe Benefits			$0
C.	**Total Salaries, Wages and Fringe Benefits**			$24,500
D.	Nonexpendable Equipment			$0
E.	Materials and Supplies			$3,500
F.	Travel - Domestic (*Including Canada*)			$3,000
G.	Other Direct Costs			$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)				$31,000

[1]FTEs = Full Time Equivalents based on 12 months.
*Includes $7,200 in tuition and fees.

ATTACHMENT D

AQUACULTURE ECONOMICS, MARKETING AND POLICY

Budget Summary for Each Participating Institution

	UI	U MINN	OSU	TOTALS
Salaries and Wages	$16,300	$2,400	$24,500	$43,200
Fringe Benefits	$0	$0	$0	$0
Total Salaries, Wages and Benefits	$16,300	$2,400	$24,500	$43,200
Nonexpendable Equipment	$0	$0	$0	$0
Materials and Supplies	$1,500	$2,000	$3,500	$7,000
Travel	$1,500	$3,600	$3,000	$8,100
Other Direct Costs	$0	$0	$0	$0
TOTAL PROJECT COSTS	$19,300	$8,000	$31,000	$58,300

ATTACHMENT D

RESOURCE COMMITMENT FROM INSTITUTIONS[1]

(Salaries, Supplies, Expenses and Equipment)

Institution/Item			Total
University of Illinois			
Salaries and Benefits	SY @ 0.1 FTE		$5,200
Supplies, Expenses, Equipment			$9,071
		TOTAL	$14,271
University of Minnesota			
Salaries and Benefits	SY @0.25 FTE		$11,380
	TY @0.30 FTE		$720
Supplies, Expenses, Equipment			$3,760
		TOTAL	$15,860
Ohio State University			
Salaries and Benefits	SY @ 0.30 FTE		$14,800
Supplies, Expenses, Equipment			$21,526
		TOTAL	$36,326
		GRAND TOTAL	$66,457

[1]Since cost sharing is not a legal requirement and due to the difficulty in accounting for small items, documentation will not be maintained. Commitments shown in the table are totals for work in the original proposal plus the addendum.

ATTACHMENT D

SCHEDULE FOR COMPLETION OF OBJECTIVES

Objective 1: Data collected annually and first compiled in Year 1. Prototype situation and outlook report completed at the end of Year 2.

Objective 2: Initiated in Year 1 and completed in Year 2.

Objective 3: Initiated in Year 1 and continued in Year 2. (Completion is contingent upon subsequent funding as described in the procedures for this objective.)

ATTACHMENT D

LIST OF PRINCIPAL INVESTIGATORS

Mary E. Gerlow, Ohio State University

Leroy J. Hushak, Ohio State University

David J. Landkamer, University of Minnesota

Bruce J. Sherrick, University of Illinois

ATTACHMENT D

VITA

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EDUCATION

B.S. Texas A&M University 1978
M.S. Louisiana State University 1980
Ph.D. Texas A&M University 1987

POSITIONS

Assistant Professor, Department of Agricultural Economics and Rural Sociology, Ohio State University (1987-present)
Visiting Professor, Chicago Mercantile Exchange (Summer 1987)
Graduate Research and Teaching Assistant, Department of Agricultural Economics, Texas A&M University (1983-1987)
Graduate Research and Teaching Assistant, Department of Economics, Louisiana State University (1982-1978)
Research Associate, Department of Agricultural Economics, Texas A&M University (Summer 1980)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Agricultural Economics Association

SELECTED PUBLICATIONS

Gerlow, M.E., and S.H. Irwin. In press. A comparison of economic and statistical criteria in evaluating exchange rate forecasting models. Applied Economics

Johnson, R., C.R. Zulauf, S.H. Irwin, and M.E. Gerlow. In press. The soybean complex spread: An examination of market efficiency from the viewpoint of a production process. Journal of Futures Market

Tweeten, L.G., and M.E. Gerlow. In press. A strategic trade policy. Journal of Agribusiness

ATTACHMENT D

VITA

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EDUCATION

B.S. Iowa State University 1961
A.M. University of Chicago 1965
Ph.D. University of Chicago 1968

POSITIONS

Professor, Department of Agricultural Economics and Rural Sociology, Ohio State University (1978-present) and Associate Director Ohio Sea Grant (1990-present)
Associate Chair, Department of Agricultural Economics and Rural Sociology, Ohio State University (1986-1990)
Associate Professor, Department of Agricultural Economics and Rural Sociology, Ohio State University (1972-1978)
Assistant Professor, Department of Agricultural Economics and Rural Sociology, Ohio State University (1968-1972)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Economic Association
American Agricultural Economics Association
American Fisheries Society
Association of Environmental and Resource Economics
Regional Science Association International

SELECTED PUBLICATIONS

Lichtkoppler, F.R., and L.J. Hushak. 1989. Characteristics of Ohio's Lake Erie recreational marinas. Journal of Great Lakes Research 15(3):418-426.

Hushak, L.J. 1989. The Land Grant system: There can be a future. Choices: The Magazine of Food, Farm, and Resource Issues, Second Quarter, pp. 32-33.

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Hushak, L.J. 1987. The use of input-output analysis in fisheries assessment. Transactions of the American Fisheries Society 116(4):441-449.

ATTACHMENT D

VITA

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St. Paul, MN 55108

EDUCATION

B.S. Utah State University 1977
M.Ag. Oregon State University 1986

POSITIONS

Assistant Aquaculture Extension Specialist, Department of Fisheries and Wildlife, University of Minnesota (1987-present)
Interpretive Ranger, Tuzigoot National Monument, U.S. Department of Interior, National Park Service (1987)
Instructor/Naturalist, Everglades Center Outdoors, Homestead, Florida (1986-1987)
Master Gardener/Master Food Preserver, Oregon Extension Service (1986)
Graduate Assistant, Department of Agriculture and Resource Economics, Oregon State University (1985)
Research Assistant, Swanson Aquaculture Laboratory, Oregon State University (1984-1985)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
World Aquaculture Society
Canadian Aquaculture Association
Minnesota Fish Farmers Association

SELECTED PUBLICATIONS

Landkamer, D.J. 1988. Fish farming. Minnesota Extension Service.

Landkamer, D.J. 1988. Aquaculture in Minnesota. Minnesota Extension Service.

Landkamer, D.J., editor. 1988-present. The Catch. Minnesota Fish Farmers Association Newsletter (published quarterly).

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Aquaculture Advisory Committee. 1988. Interagency responsibilities for aquaculture development in Minnesota.

ATTACHMENT D

VITA

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EDUCATION

B.S. Ohio State University 1985
Ph.D. Ohio State University 1989

POSITIONS

Assistant Professor, Department of Agricultural Economics, University of Illinois (1989-present)
Graduate Marketing Research Fellow, Department of Agricultural Economics and Rural Sociology, Ohio State University (1985-1989)
Market Planning Economist, Monsanto Company, St. Louis, Missouri (1985)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Agricultural Economics Association
Gamma Sigma Delta, Alpha Zeta, Phi Kappa Phi

SELECTED PUBLICATIONS

Hudson, M.A., B.J. Sherrick,and D.R. Gregg. 1990. Linkages between packers and retailers: Motivations, perspectives, and implications to producers. Pages 105-135 in W.D. Purcell, editor, Structural change in livestock: Causes, implications, alternatives. Research Institute in Livestock Pricing, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

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