

NORTH CENTRAL REGIONAL AQUACULTURE CENTER EXTENSION PROJECT

Chairperson: Joseph E. Morris, Iowa State University

Administrative Advisor: David C. Petritz, Purdue University

Funding Request: \$40,000

Duration: 2 Years (September 1, 1995 - August 31, 1997)

Objectives:

1. Strengthen linkages between the North Central Regional Aquaculture Center (NCRAC) Research and Extension Work Groups.
2. Enhance the NCRAC extension network for aquaculture information transfer.
3. Provide in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.
4. Develop and implement aquaculture educational programs and materials for the North Central Region (NCR).
5. Quarterly survey of wholesale fish buyers in selected U.S. and Canadian cities with emphasis on the NCR.

Proposed Budgets:

Institution	Principal Investigator(s)	Objective(s)	Year 1	Year 2	Total
Univ. of Wisconsin-Milwaukee	Fred P. Binkowski	1-3	\$500	\$500	\$1,000
Ohio State University	James E. Ebeling	1-4	\$500	\$500	\$1,000
Michigan State University	Donald L. Garling	1,2,& 4	\$750	\$750	\$1,500
Univ. of Minnesota - Duluth	Jeffrey L. Gunderson	1-3	\$500	\$500	\$1,000
Minnesota Dept. of Ag.	Ying Q. Ji	5	\$2,400	\$2,400	\$4,800
Univ. of Nebraska-Lincoln	Terrence B. Kayes	1-4	\$850	\$150	\$1,000
Michigan State University	Ronald E. Kinnunen	1,2,& 4	\$500	\$500	\$1,000
N. Dakota State University	David L. Klinkebiel	1-4	\$1,875	\$1,625	\$3,500
North American Fish Farmers Cooperative	John M. Leininger	5	\$2,400	\$2,400	\$4,800
Iowa State University	Joseph E. Morris	1,2,& 4	\$2,500	\$2,500	\$5,000
Kansas State University	Kenneth E. Neils	2	\$500	\$500	\$1,000
University of Missouri	Robert A. Pierce II	2	\$500	\$500	\$1,000
Purdue University	LaDon Swann	1-3 & 5	\$6,200	\$6,200	\$12,400
Southern Illinois University	Position to be filled	2	\$500	\$500	\$1,000
TOTALS			\$20,475	\$19,525	\$40,000

TABLE OF CONTENTS

SUMMARY OVERVIEW (PARTICIPANTS, OBJECTIVES, AND PROPOSED BUDGETS) 1

BACKGROUND 3

RELATED CURRENT AND PREVIOUS WORK 5

ANTICIPATED BENEFITS 6

OBJECTIVES 6

PROCEDURES 6

REFERENCES 9

PROJECT LEADERS 10

PARTICIPATING INSTITUTIONS AND PRINCIPAL INVESTIGATORS 11

 ACTIVITIES, BUDGET, AND BUDGET JUSTIFICATION FOR EACH PARTICIPATING INSTITUTION

 University of Wisconsin-Milwaukee (Binkowski - Objectives 1-3) 12

 Ohio State University (Ebeling - Objectives 1-4) 15

 Michigan State University (Garling - Objectives 1, 2, and 4) 18

 University of Minnesota (Gunderson - Objectives 1 and 2) 21

 Minnesota Department of Agriculture (Ji - Objective 5) 24

 University of Nebraska-Lincoln (Kayes - Objectives 1-4) 27

 Michigan State University (Kinnunen - Objectives 1, 2, and 4) 30

 North Dakota State University (Klinkebiel - Objectives 1-4) 33

 North American Fish Farmer’s Cooperative (Leininger - Objective 5) 36

 Iowa State University (Morris - Objectives 1, 2, and 4) 39

 Kansas State University (Neils - Objectives 2 and 4) 42

 University of Missouri (Pierce - Objective 2 and 4) 45

 Purdue University (Swann - Objectives 1, 2, 3 and 5) 48

 Southern Illinois University-Carbondale (Unnamed - Objective 2) 51

BUDGET SUMMARY FOR EACH YEAR FOR ALL PARTICIPATING INSTITUTIONS 54

RESOURCE COMMITMENT FROM INSTITUTIONS 55

SCHEDULE FOR COMPLETION OF OBJECTIVES 56

LIST OF PRINCIPAL INVESTIGATORS 57

CURRICULUM VITAE FOR PRINCIPAL INVESTIGATORS 58

BACKGROUND

The Food and Agriculture Organization (FAO) of the United Nations estimates that more than 24% of the total animal protein in human diets is comprised of fish or shellfish products. In countries where livestock and poultry husbandry are not well developed, fish comprise up to 50% of the total animal protein consumed by humans.

In 1993 the world fishery production was 100 million metric tons with a per capita consumption of 18 kg (edible + inedible seafood) (USDC/NOAA/NMFS 1994). World fish harvests have risen for the last 13 consecutive years and, over that time, have increased 49%. If this trend continues, experts predict that there will be a serious shortfall of seafood products by the year 2000 due to limited availability of commercially caught species, e.g., haddock and cod.

A potential strategy to balance the shortfall is food production through aquaculture technology. More than 17% of the world's fish products are produced through aquaculture (FAO 1993). In 1985 aquaculture produced 11 million metric tons of fishery products. In 1991 this increased to 16.6 million metric tons. Aquaculture is now growing at an annual rate of more than 8% per year (Avault 1986). World experts estimate that aquaculture technology could produce between 20 to 25 million metric tons by the year 2000. United States aquaculture produces 2.2% of the world's aquaculture (FAO 1993).

The increase in the world population and the subsequent increased demand for fish products has caused fish prices to increase significantly. For example, since 1967 the price for fish products has risen faster than any other commodity in the United States. Almost all the channel catfish (*Ictalurus punctatus*) and rainbow trout (*Oncorhynchus mykiss*) consumed in the U.S. are produced through aquaculture. Catfish sales were valued at \$353 million and trout sales in the U.S. equaled \$69 million in 1993 (Harvey 1994). Total sales value of all aquaculture produced seafood products in the U.S. in 1990 was \$760 million, which represents a growth rate of 265% between 1980 and 1990.

As Americans become more health conscious, the demand for fisheries production has increased; per capita consumption has grown from 5.8 kg in 1980 to 6.8 kg in 1993. Although the per capita consumption has gone down slightly since the record level in 1980 (7.2 kg), aquaculture has captured a larger percentage of the seafood market at the expense of the commercial harvests. It is estimated that aquaculture could be supplying approximately 25% of all the seafood consumed in the U.S. (Harvey 1994). If this goal is achieved, it would mean that 453,592 to 544,311 metric tons of additional seafood would be consumed annually in the United States.

The United States imported about \$10.8 billion dollars of seafood products (edible + inedible seafood) in 1993 versus \$6.9 billion exported for a trade deficit of \$3.9 billion (USDC/NOAA/NMFS 1994). A healthy U.S. aquaculture industry would reduce the need to import fish products and help improve the U.S. trade imbalance, a fact increasingly recognized in Washington. Given the high demand for fishery products, the premium value of aquaculture products, and the vast quantity of water resources in the North Central Region (NCR), a viable aquaculture industry utilizing these resources would have a substantial economic impact on the region and the entire United States. This region has 25% of the country's population but produces less than 1% of the fish consumed.

Aquaculture-related business in the NCR has increased dramatically in the past several years and is on the verge of making a leap forward. This is evident in the interest in and the requests for information channeled through the U.S. Department of Agriculture (USDA) and the North Central Regional Aquaculture Center (NCRAC) Extension, and Sea Grant/Marine Advisory Extension networks. Interest in aquaculture is also evident in the increased activity of small, privately owned farm ponds, backyard hatcheries, fee-fishing operations and in some cases, more creative attempts to utilize the multiple strategy production concept which includes domestic animals, plants, and finfish.

Since 1980, following the passage of the national aquaculture plan, many attempts have been made to promote aquaculture in the United States. Many regional states have signed into law state aquaculture plans that are expected to set the policy and guidelines for aquaculture in the region.

NCR aquaculture resource conditions are ideally suited for both coldwater and coolwater species. These highly marketable species include salmonids, e.g., rainbow trout, coho salmon (*O. kisutch*), and Atlantic salmon (*Salmo salar*); percids, e.g., walleye (*Stizostedion vitreum*) and yellow perch (*Perca flavens*); and temperate basses (*Morone* spp.). Some states in this region (Missouri, Kansas, Illinois, Indiana) have established channel catfish operations similar to the southern states. However, due to climatic conditions in the NCR we believe it is necessary to consider coolwater and coldwater species as alternatives. Species like walleye and yellow perch are already considered desirable species in the regional markets. Culture of warmer water species in our region is likely to be largely confined to indoor recirculating systems, when they are proven possible. With the losses of some important rural industries in the region, this infant business may be an excellent catalyst for increasing entrepreneurship and jobs.

We feel aquaculture can be the catalyst for new industries and enhance the competitiveness of regional businesses while maintaining the quality of living that regional residents have become accustomed to. Over the next 10 years aquacultural production in the region will come to equal, if not surpass, the wild production of fish utilized for human consumption. Undoubtedly commercial fishing will be strictly regulated by quotas and out-competed by recreational fishing thus reducing the amount of fish for retail sales. Consequently, seafood products, including finfish, will become more dependent on aquaculture. In addition, with the increasing problem of contaminants, the quality of food fish aquaculturally produced will exceed that of the wild produced fish.

For the NCR to capitalize on potential aquaculture opportunities, new directions and technologies should be explored. The best hopes for expansion lie with regionally popular species. Successful aquaculture endeavors elsewhere have developed within the context of pre-existing, functioning markets with relatively high prices.

An essential mechanism for the transfer of aquacultural technology to practicing fish farmers requires an effective communication bridge between university researchers and the public. This is one of the primary goals of NCRAC.

With the expected growth of the regional aquaculture industry, a new demand and broader market for all kinds of technical information and aquacultural services has evolved. As novices enter aquaculture, they seek guidance from knowledgeable and experienced persons, commonly from state and federal agencies.

With the growing interest in aquaculture region wide, the need for more public outreach by the Cooperative Extension Service, Sea Grant specialists and researchers has become apparent. Site visits, hands-on assistance and personal interviews were the fundamental components of the NCRAC extension over the past years; initially, these activities received a significant portion of our program efforts. Because of the continued increase of these requests, we feel it is essential to modify our present advisory services mechanism to meet the needs of the clients and maintain a productive and cost effective aquaculture extension program.

In the NCR, opportunities exist for aquaculture to provide significant long-term economic development. Opportunities for competitive regional aquaculture for food purposes are expected to increase.

Recreational fisheries and tourism provide another avenue of opportunity for aquaculture development. Public agencies envision a greater role for private fish farms and aquaculture facilities operated partly or fully by private groups in meeting the needs for stocking that have traditionally been satisfied by public hatcheries. Bait production and fee-based recreational fishing near population centers also provide opportunities for regional aquaculture expansion.

To realize these opportunities interested parties need access to sound advice concerning the development and operation of aquaculture ventures. This is where the NCRAC extension program can play a vital role.

Hundreds of inquiries by persons interested in the potential of regional species for aquaculture are referred to us each year. Persons requesting information have diverse backgrounds with levels of interest ranging from operating 4-m plastic pools for backyard aquaculture, to wanting advice on small ponds which they own, to bait dealers with ponds, to seafood dealers, to restaurant owners interested in producing fresh fish on their

own, to representatives of Native American groups interested in starting self-contained aquaculture operations on tribal lands, and even to aquacultural consultants representing serious entrepreneurs with financial backing.

This need for advice is also clearly evident by the high level of participation that occurred during previous aquaculture lecture/seminar series that have been presented throughout the region to the public and professional staff through in-service development. Most participants expressed a need for more readily available specific advice on aquaculture above and beyond that available in short lecture sessions. Some individuals suggested the need for a regional "clearing house" of information, for reading lists of pertinent literature, audiovisuals, problem solving workshops and for specific hands-on training. To that end, new sources of information will become available from the use of new computerized lists and packets of collected information on certain fish such as tilapia.

RELATED CURRENT AND PREVIOUS WORK

The NCRAC Extension Project is designed to assess and meet the information needs of the various clientele groups through cooperative and coordinated regional educational programming. A network of Sea Grant and Cooperative Extension Service (CES) designated contacts has been established to help maximize efficiency of education programs in the 12-state NCR.

In spite of the limited number of aquaculture FTEs (less than four) in this NCR, substantial progress in the previously described objectives has been made. In 1992, multiple extension liaisons evolved for several individual research projects (e.g., economics, hybrid striped bass, walleye and yellow perch). This increased number of extension liaisons helped to improve the information transfer from research work groups to the public.

Several fact sheets and bulletins have been completed and are available to the public. In part, these publications have the following topics: (1) walleye fingerling culture, (2) salt usage, (3) starting an aquaculture operation, (4) overview of aquaculture, (5) aquaculture as a business enterprise, (6) survey of salmonid producers, (7) channel catfish culture and (8) niche marketing. The use of these publications has helped to supplement individual states' publications in this region.

Conferences that have taken place during the current NCRAC Extension Project include: general aquaculture conference on hybrid striped bass and yellow perch culture in Nebraska, hosted by Terry Kayes, University of Nebraska-Lincoln (UNL) and Joe Morris, Iowa State University (ISU); recirculating aquaculture, yellow perch and hybrid striped bass culture conferences in Ohio, hosted by Jim Ebeling, Ohio State University (OSU) and a yellow perch culture conference in Indiana, hosted by LaDon Swann, Purdue University. These conferences attracted individuals from within the NCR and outside of the region from Colorado, Pennsylvania, Kentucky and West Virginia.

In the previously funded research projects on hybrid striped bass, walleye, and yellow perch, the following activities were funded as part of the species-specific work group projects and are not part of the funding requested in this proposal. The 1995-1997 research projects on these same species have additional objectives specifically addressing extension activities and are not funded from this project.

The hybrid striped bass workshop has been postponed until fall 1995 because the original lead contact, Dan Selock, Southern Illinois University-Carbondale (SIUC) has resigned. It is expected that SIUC will fill this position prior to September 1995. Selock has agreed to participate in this workshop with Morris (ISU) and Chris Kohler (SIUC).

The walleye culture manual has progressed to the point where a Walleye Culture Workshop was scheduled for February 1995 during the North Central Regional Aquaculture Conference. This conference was held in conjunction with the Minnesota Aquaculture Conference. Scheduled completion of the manual is July 1995 with publication the following fall. Gunderson, University of Minnesota-Duluth (UM-D), Ron Kinnunen, Michigan State University (MSU), and Morris (ISU) have been active on the planning committee; Robert Summerfelt (ISU) has been the leader for both the walleye culture manual and workshop.

The major participants in the yellow perch workshop and education materials have been Kayes (UNL), Garling (MSU) and Fred Binkowski, University of Wisconsin-Milwaukee (UW-Milwaukee). Kayes has been videotaping segments of yellow perch culture for later incorporation into extension videos. Swann (Purdue) has scheduled one workshop on yellow perch culture at Purdue University with participation by Kayes and Binkowski; additional workshops are scheduled for Nebraska and Michigan. Related fact sheets are now being developed.

ANTICIPATED BENEFITS

The North Central Regional Aquaculture Center Extension Work Group will continue and expand its efforts to promote and advance commercial aquaculture in a responsible fashion through an organized education/training outreach program. The primary benefits are: (1) increase in public awareness through publications, short courses, and conferences regarding the potential of aquaculture as a viable agricultural enterprise in the NCR; (2) technology transfer to enhance current and future production methodologies for selected species, e.g., walleye, hybrid striped bass, yellow perch, salmonids, and sunfish; and (3) continued in-service professional development of landowners assistance personnel, and up-to-date survey of fish prices. In addition, the NCRAC extension network will continue to enhance the legal and socioeconomic atmosphere for aquaculture in the NCR.

OBJECTIVES

1. Strengthen linkages between the North Central Regional Aquaculture Center (NCRAC) Research and Extension Work Groups.
2. Enhance the NCRAC extension network for aquaculture information transfer.
3. Provide in-service professional staff development for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.
4. Develop and implement aquaculture educational programs and materials for the North Central Region (NCR).
5. Quarterly survey of wholesale fish buyers in selected U. S. and Canadian cities with emphasis on the NCR.

PROCEDURES

Strengthen Linkages Between NCRAC Research and Extension Work Groups (Objective 1)

At least one Extension Work Group member has been assigned to each research group. Multiple extension liaisons have been assigned to some research groups with the goal of increasing the amount of information coming out of research projects. Extension liaisons are expected to interact with project researchers in identifying and producing suitable extension products based on the associated research.

Research Work Group	Extension Liaison(s)	State(s)
Economics	Donald L. Garling Terrence B. Kayes* LaDon Swann	MI NE IN
Hybrid Striped Bass	Joseph E. Morris*	IA
Salmonids	James E. Ebeling*	OH
Sunfish	Joseph E. Morris*	IA
Tilapia	David Klinkebiel*	ND
Walleye	Ronald E. Kinnunen* Jeffrey L. Gunderson	MI IA
Yellow Perch	Fred P. Binkowski James E. Ebeling Donald L. Garling* Terrence B. Kayes	WI OH MI NE

*Lead Liaison Person

Enhance the NCRAC Extension Network for Aquaculture Information Transfer (Objective 2)

At least one contact person has been designated by CES for each NCR state, an extension contact directory has been developed and will be kept current, and a mechanism for sharing of materials produced by individual states has been established. Liaisons with state and federal agencies, and with state aquaculture organizations have been made to identify industry needs. These activities will be continued.

Swann (Purdue) has been the principal leader behind the development of the Aquaculture Information Network Information Center (AquaNIC). The purpose of this Center is to allow extension agents, researchers and the public access to information concerning the Regional Aquaculture Centers, governmental reports on aquaculture, relevant newsletters and new releases concerning aquaculture. Swann will continue the development of this Center to include additional information as it becomes available.

Provide In-Service Training for Cooperative Extension Service, Sea Grant Advisory Service, and Other Landowner Assistance Personnel (Objective 3)

Although limited monies are available for this objective, individuals in the NCRAC Extension Work Group expect to participate in future in-service professional staff development programs hosted in the region.

Develop and Implement Aquaculture Education Programs and Materials for the North Central Region (Objective 4)

Aquaculture Education Programs

Kinnunen (MSU) and Gunderson (UM-D) will be participating in education programs arising from the next Walleye Research Project. Binkowski (UW-Milwaukee) and Kayes (UNL) will be participating in the next Yellow Perch Research Project extension component. Morris (ISU) will be involved in the extension component of the next Hybrid Striped Bass Research Project. These activities will be funded as part of specific objectives of these research projects.

Aquaculture Education Materials

Domestic tilapia production reached an estimated 5,670 metric tons (live weight) in 1993, an increase of almost 40% from 1992 (Harvey 1994). It is estimated that the 1994 production will reach 7,484 metric tons.

A good tilapia production information packet is needed to help strengthen this trend and supply the needed information to a growing number of producers and potential producers.

Currently, there are many sources of published information (extension bulletins, fact sheets, research papers, and other pertinent information) that cover different aspects of tilapia production in recirculation systems. This proposal is a request for funds to initiate and develop a tilapia production information packet entitled 'Tilapia Production with Recirculating Systems.' It will be based on a compilation of information that might be of use to the producer.

This information packet will be compiled, continually updated, and distributed by the efforts of the Carrington Research Extension Center - North Dakota State University's aquaculture program, Dakota Aquaculture Cooperative, and American Tilapia Association. The packet will be available to anyone in the U. S. who wishes to purchase it at a nominal fee which would cover copying, binder, updating, and postage. Dave Klinkebiel, North Dakota State University (NDSU) will be the leader in this project.

The Tilapia Production with Recirculating Systems information packet will following the outline below:

1. Factors to Consider
 - a. capital
 - b. land, building, and equipment
 - c. management
 - d. potential
2. Biology of Tilapia
 - a. species and description
 - b. life cycle
 - c. reproduction
 - d. production aspects
3. Tilapia Nutrition and Feeding
 - a. nutrition requirements
 - b. feeding rates and scheduling
4. Fish Health
 - a. disease pathogens
 - b. available treatments
 - c. preventative measures
5. Water Quality
 - a. water chemistry
 - b. water conditioning options
 - c. tilapia water parameter requirements
6. Recirculating Systems
 - a. components
 - b. solids removal
 - c. biofiltration
 - d. oxygenation
 - e. sterilization
 - f. efficiencies and cost
7. State and Federal Regulations
 - a. production permits
 - b. waste discharge regulations and permits
8. Economic Evaluation
 - a. production estimations
 - b. cost of production
 - c. marketing potentials
9. Aquaculture Quality Assurance
 - a. food safety
 - b. FDA regulations
 - c. chemical and drug use
10. List of Current Suppliers or Information Resources
 - a. fingerlings
 - b. feeds
 - c. equipment
 - d. technical supplies
 - e. information resources

Quarterly Survey of Wholesale Fish Buyers in Selected U. S. and Canadian Cities with Emphasis on the North Central Region (Objective 5)

At the 1993 NCRAC Program Planning Meeting in Lincoln, Nebraska, the Industrial Advisory Council expressed a need for a regular survey of aquaculture prices and availability in the NCR. Information currently available to regional producers comes primarily from the U. S. Department of Agriculture - Economic Service

(Aquaculture Situation and Outlook Reports). While these reports do give producers average prices for major fish species, e.g., channel catfish and rainbow trout, there is a need for more up-to-date prices and analyses of other aquaculture products in this region. To meet this request, the following survey has been proposed.

Major fish markets in the United States and Canada will be surveyed by phone on a quarterly basis. The survey will be developed by John Leininger (ND) Ying Ji (MN), and Swann (IL and IN) with the assistance of marketing specialists at Purdue University. Each participant will be responsible for specific locales. Major brokers in the following cities will be surveyed: Toronto, Detroit, Winnipeg, Seattle, New Orleans, Minneapolis, Indianapolis, Peoria, St. Louis, Kansas City, and Columbus. Project participants will be responsible for establishing contacts in designated cities and conducting the survey.

Every effort will be made to produce accurate and cost-effective surveys of aquaculture prices and availability. The survey will be conducted at the beginning of the first month in each quarter. Survey results for each region will be tabulated and sent to Swann by the end of the month in which the survey was conducted. Swann will compile and distribute the results of the survey. Quarterly distribution of the results will be through AquaNIC, the NCRAC Journal, and to key aquaculture trade magazines. Hard copy subscription to the marketing service will be considered based on requests from the industry.

REFERENCES

Avault, J.W. 1986. Aquaculture potential in the United States. *Aquaculture Magazine* 12(5):43-45.

Food and Agriculture Organization of the United Nations (FAO). 1993. *Aquaculture Production: 1985-1991*. FAO Fisheries Circular No. 815, Revision 5, Rome, Italy.

Harvey, D. 1994. *Aquaculture: Situation and Outlook Report*. United States Department of Agriculture, Economic Research Service, AQS-12, Washington, D.C.

United States Department of Commerce/National Oceanographic Atmospheric Association/National Marine Fisheries Service (USDC/NOAA/NMFS). 1994. *Current Fishery Statistics Report 9300*, Washington D.C.

PROJECT LEADERS

<u>State</u>	<u>Name</u>	<u>Institution</u>
Illinois/Indiana	LaDon Swann	Purdue University
Illinois	Position to be filled	Southern Illinois University-Carbondale
Iowa	Joseph E. Morris	Iowa State University
Kansas	Kenneth E. Neils	Kansas State University
Michigan	Donald L. Garling Ronald E. Kinnunen	Michigan State University
Minnesota	Jeffrey L. Gunderson Ying Q. Ji	University of Minnesota Minnesota Department of Agriculture
Missouri	Robert A. Pierce II	University of Missouri
Nebraska	Terrence B. Kayes	University of Nebraska-Lincoln
North Dakota	David L. Klinkebiel John M. Leininger	North Dakota State University North American Fish Farmers Cooperative
Ohio	James M. Ebling	Ohio State University
Wisconsin	Fred P. Binkowski	University of Wisconsin-Milwaukee

PARTICIPATING INSTITUTIONS AND PRINCIPAL INVESTIGATORS

University of Wisconsin-Milwaukee (UW-MIL)

Fred P. Binkowski

Ohio State University (OSU)

James E. Ebeling

Michigan State University (MSU)

Donald L. Garling

University of Minnesota-Duluth (UM-D)

Jeffrey L. Gunderson

Minnesota Department of Agriculture (MN-AG)

Ying Q. Ji

University of Nebraska-Lincoln (UNL)

Terrence B. Kayes

Michigan State University (MSU)

Ronald E. Kinnunen

North Dakota State University (NDSU)

David L. Klinkebiel

North American Fish Farmers Cooperative (NAFFC)

John M. Leininger

Iowa State University (ISU)

Joseph E. Morris

Kansas State University (KSU)

Kenneth E. Neils

University of Missouri (UMO)

Robert A. Pierce II

Purdue University (Purdue)

LaDon Swann

Southern Illinois University-Carbondale (SIUC)

Position to be filled

**PROPOSED ACTIVITIES FOR
UNIVERSITY OF WISCONSIN-MILWAUKEE**

(Binkowski)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Participating in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - ▶ Assisting in the development of extension publications (fact sheets or bulletins) on knowledge gained from research by the Yellow Perch Work Group.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial Extension Work Group meeting.
 - ▶ Providing 15 copies of aquaculture extension related materials produced in Wisconsin to the extension chairperson for distribution to all state contacts once annually.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Wisconsin.
 - ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
3. Provide in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.
 - ▶ Participate in CES and Sea Grant agent training sessions with other NCRAC Extension personnel.

**PROPOSED BUDGET FOR
UNIVERSITY OF WISCONSIN-MILWAUKEE**

(Binkowski)

Objectives 1-3

					Year 1	Year 2
					Year 1	Year 2
					No.	FTEs
					No.	FTEs
A.	Salaries and Wages					
1.	No. of Senior Personnel & FTEs ¹					
	a. (Co)-PI(s)	1	0.10	1	0.10	\$0 \$0
	b. Senior Associates					
2.	No. of Other Personnel (Non-Faculty) & FTEs					
	a. Research Assoc./Postdoc					
	b. Other Professionals	1	0.10	1	0.10	\$0 \$0
	c. Graduate Students					
	d. Prebaccalaureate Students					
	e. Secretarial-Clerical					
	f. Technical, Shop, and Other					
	Total Salaries and Wages					\$0 \$0
B.	Fringe Benefits					\$0 \$0
C.	Total Salaries, Wages and Fringe Benefits					\$0 \$0
D.	Nonexpendable Equipment					\$0 \$0
E.	Materials and Supplies					\$500 \$500
F.	Travel - Domestic (<i>Including Canada</i>)					\$0 \$0
G.	Other Direct Costs					\$0 \$0
TOTAL PROJECT COSTS PER YEAR (C through G)						\$500 \$500
TOTAL PROJECT COSTS						\$1,000

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR UNIVERSITY OF WISCONSIN-MILWAUKEE

(Binkowski)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
1. Strengthen linkages between North Central Regional Aquaculture Center (NCRAC) Research and Extension Work Groups		
2. Enhance the NCRAC extension network for aquaculture information transfer.		
3. Provide in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.		
Materials and Supplies (telecommunication, photocopying, duplication and mailing costs)	\$500	\$500
TOTAL PER YEAR	\$500	\$500
TOTAL PROJECT REQUEST	\$1,000	

**PROPOSED ACTIVITIES FOR
OHIO STATE UNIVERSITY**

(Ebeling)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Serving as lead liaison between the NCRAC Salmonid Research Work Group and Extension Work Group.
 - ▶ Serving as a liaison between NCRAC Yellow Perch Research Work Group and Extension Work Group
 - ▶ Participating in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - ▶ Leading or assisting in the development of extension publications (fact sheets or bulletins) on knowledge gained from research by the Yellow Perch and Salmonids Work Groups.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial extension work group meeting.
 - ▶ Providing 15 copies of aquaculture extension related materials produced in Ohio to the extension chairperson for distribution to all state contacts once annually.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Ohio.
 - ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC Journal and other pertinent materials.
 - ▶ Becoming active in the use of electronic mail (E-mail) using Internet.
3. Provide in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.
 - ▶ Conduct a seminar on aquaculture for Extension personnel.
4. Develop and implement aquaculture education programs and materials for the NCR.
 - ▶ Provide a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Ohio and the region.

**PROPOSED BUDGET FOR
OHIO STATE UNIVERSITY**

(Ebeling)

Objectives 1-3

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.10	1	0.10	\$0	\$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 ...								
e. Secretarial-Clerical								
f. Technical, Shop, and Other ...								
Total Salaries and Wages					\$0	\$0		
B. Fringe Benefits					\$0	\$0		
C. Total Salaries, Wages and Fringe Benefits					\$0	\$0		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$100	\$100		
F. Travel - Domestic (<i>Including Canada</i>)					\$250	\$250		
G. Other Direct Costs					\$150	\$150		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$500	\$500		
TOTAL PROJECT COSTS					\$1,000			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR OHIO STATE UNIVERSITY

(Ebeling)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
1. Strengthen linkages between North Central Regional Aquaculture Center (NCRAC) Research and Extension Work Groups		
Travel (transportation, lodging, and meal expenses for the PI to attend the research Work Group meetings)	\$150	\$150
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Materials and Supplies (general office supplies)	\$100	\$100
Travel (transportation, lodging and meal expenses to attend biennial Extension Work Group meeting)	\$100	\$100
Other Direct Costs (telecommunications, photocopying and duplication, and mailing costs)	\$50	\$50
3. Provide in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.		
Other Direct Costs (telecommunications, photocopying, duplication and mailing costs)	\$50	\$50
4. Develop and implement aquaculture education programs and materials for the NCR. In-state courses will be presented in summer of 1996 and 1997 Regional activities. They will be coordinated with NCRAC Extension Work Group personnel from Illinois and Indiana, as well as West Virginia and Kentucky extension contacts.		
Other Direct Costs (telecommunications, photocopying and duplication, and mailing costs)	\$50	\$50
TOTAL PER YEAR	\$500	\$500
TOTAL PROJECT REQUEST	\$1,000	

**PROPOSED ACTIVITIES FOR
MICHIGAN STATE UNIVERSITY**

(Garling)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Serving as lead liaison between the NCRAC Yellow Perch Research Work Group and Extension Work Group.
 - ▶ Serving as a liaison between the NCRAC Economics Research Work Group and Extension Work Group.
 - ▶ Participating in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - ▶ Leading or assisting in the development of extension publications (fact sheets or bulletins) on knowledge gained from research by the Yellow Perch and Economics Work Groups.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial extension work group meeting.
 - ▶ Providing 15 copies of aquaculture extension related materials produced in Michigan to the extension chairperson for distribution to all state contacts once annually.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Michigan.
 - ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
 - ▶ Becoming active in the use of electronic mail (E-mail) using Internet.
4. Develop and implement aquaculture education programs and materials for the NCR.

**PROPOSED BUDGET FOR
MICHIGAN STATE UNIVERSITY**

(Garling)

Objectives 1, 2, and 4

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.03	1	0.03	\$0	\$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 ...								
e. Secretarial-Clerical								
f. Technical, Shop, and Other ...								
Total Salaries and Wages					\$0	\$0		
B. Fringe Benefits					\$0	\$0		
C. Total Salaries, Wages and Fringe Benefits					\$0	\$0		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$250	\$250		
F. Travel - Domestic (<i>Including Canada</i>)					\$500	\$500		
G. Other Direct Costs					\$0	\$0		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$750	\$750		
TOTAL PROJECT COSTS					\$1,500			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR MICHIGAN STATE UNIVERSITY

(Garling)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Travel (transportation, lodging and meal expenses to attend biennial Extension Work Group meetings)	\$500	\$500
4. Develop and implement aquaculture education programs and materials for the NCR with special emphasis on the production of instructional video tapes and interactive workshops with complementing extension fact sheets or bulletins for the Yellow Perch Workshop/extension materials		
Materials and Supplies (announcements for workshop; pamphlets; video tape supplies)	\$250	\$250
TOTAL PER YEAR	\$750	\$750
TOTAL PROJECT REQUEST	\$1,500	

**PROPOSED ACTIVITIES FOR
UNIVERSITY OF MINNESOTA-DULUTH**

(Gunderson)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Serving as a liaison between the NCRAC Walleye Research Work Group and Extension Work Group.
 - ▶ Participating in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - ▶ Facilitating the North Central Aquaculture Conference together with the Ninth Annual Minnesota Aquaculture Conference.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial extension work group meeting.
 - ▶ Providing 15 copies of aquaculture extension related materials produced in Minnesota to the extension chairperson for distribution to all state contacts once annually.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Minnesota.
 - ▶ Becoming active in the use of electronic mail and informing appropriate people in Minnesota about aquaculture materials available through Internet.
3. Develop and implement aquaculture education programs and materials for the NCR.

**PROPOSED BUDGET FOR
UNIVERSITY OF MINNESOTA-DULUTH**

(Gunderson)

Objectives 1, 2 and 3

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.05	1	0.05	\$0	\$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 ...								
e. Secretarial-Clerical								
f. Technical, Shop, and Other ...								
Total Salaries and Wages					\$0	\$0		
B. Fringe Benefits					\$0	\$0		
C. Total Salaries, Wages and Fringe Benefits					\$0	\$0		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$50	\$50		
F. Travel - Domestic (<i>Including Canada</i>)					\$400	\$400		
G. Other Direct Costs					\$50	\$50		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$500	\$500		
TOTAL PROJECT COSTS					\$1,000			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR UNIVERSITY OF MINNESOTA-DULUTH

(Gunderson)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Travel (transportation, lodging and meal expenses as needed to accomplish activities)	\$400	\$400
3. Develop and implement aquaculture education programs and materials for the NCR.		
Materials and Supplies (general office supplies, modem for E-mail)	\$50	\$50
Other Direct Costs (telecommunications, photocopying and duplication, and mailing costs)	\$50	\$50
TOTAL PER YEAR	\$500	\$500
TOTAL PROJECT REQUEST	\$1,000	

**PROPOSED ACTIVITIES FOR
MINNESOTA DEPARTMENT OF AGRICULTURE**

(Ji)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group:

5. Quarterly survey of wholesale fish buyers selected U. S. and Canadian cities with emphasis on the NCR.
 - ▶ Provide survey information on major fish markets on a quarterly basis to Swann for subsequent distribution.

**PROPOSED BUDGET FOR
MINNESOTA DEPARTMENT OF AGRICULTURE**

(Ji)

Objective 5

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.10	1	0.10	\$0	\$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 ...								
e. Secretarial-Clerical								
f. Technical, Shop, and Other ...	1	0.05	1	0.05	\$1,200	\$1,200		
Total Salaries and Wages					\$1,200	\$1,200		
B. Fringe Benefits (16.7% of 2f)					\$200	\$200		
C. Total Salaries, Wages and Fringe Benefits					\$1,400	\$1,400		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$200	\$200		
F. Travel - Domestic (<i>Including Canada</i>)					\$0	\$0		
G. Other Direct Costs					\$800	\$800		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$2,400	\$2,400		
TOTAL PROJECT COSTS					\$4,800			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR MINNESOTA DEPARTMENT OF AGRICULTURE

(Ji)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
5. Quarterly survey of wholesale fish buyers in selected U.S. and Canadian cities with emphasis on the NCR		
Materials and Supplies (general office supplies)	\$200	\$200
Other Direct Costs (telecommunications, photocopying and duplication, and computer maintenance)	\$800	\$800
Salaries, Wages and Fringe Benefits (0.05 FTE support of secretarial staff)	\$1,400	\$1,400
TOTAL PER YEAR	\$2,400	\$2,400
TOTAL PROJECT REQUEST	\$4,800	

**PROPOSED ACTIVITIES FOR
UNIVERSITY OF NEBRASKA-LINCOLN**

(Kayes)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Serving as lead liaison between the NCRAC Economics/Marketing Research Work Group and Extension Work Group.
 - ▶ Serving as a liaison between the NCRAC Yellow Perch Research Work Group and Extension Work Group.
 - ▶ Participating in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial extension work group meeting.
 - ▶ Providing 15 copies of aquaculture extension related materials produced in Nebraska to the extension chairperson for distribution to all state contacts once annually.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Nebraska.
 - ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
 - ▶ Becoming active in the use of electronic mail (E-mail) using Internet.
3. Provide in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.
4. Develop and implement aquaculture education programs and materials for the NCR.

**PROPOSED BUDGET FOR
UNIVERSITY OF NEBRASKA-LINCOLN**

(Kays)

Objectives 1-4

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.05	1	0.05	\$0	\$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 ...								
e. Secretarial-Clerical								
f. Technical, Shop, and Other ...								
Total Salaries and Wages					\$0	\$0		
B. Fringe Benefits					\$0	\$0		
C. Total Salaries, Wages and Fringe Benefits					\$0	\$0		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$150	\$50		
F. Travel - Domestic (<i>Including Canada</i>)					\$500	\$0		
G. Other Direct Costs					\$200	\$100		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$850	\$150		
TOTAL PROJECT COSTS					\$1,000			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR UNIVERSITY OF NEBRASKA-LINCOLN

(Kayes)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
4. Develop and implement aquaculture education programs and materials for the NCR.		
Materials and Supplies (general office supplies)	\$150	\$50
Travel (transportation, lodging, and meal expenses for the PI to attend the Research Work Group meetings)	\$500	\$0
Other Direct Costs (telecommunications, photocopying and duplication, and mailing costs)	\$200	\$100
TOTAL PER YEAR	\$850	\$150
TOTAL PROJECT REQUEST	\$1,000	

**PROPOSED ACTIVITIES FOR
MICHIGAN STATE UNIVERSITY**

(Kinnunen)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Serving as lead liaison between the NCRAC Salmonid and Walleye Research Work Group and Extension Work Group.
 - ▶ Serving as a liaison between the NCRAC Salmonid Research Work Group and Extension Work Group.
 - ▶ Participating in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - ▶ Attend Annual Great Lakes Fish Disease Control Committee meetings as NCRAC representative.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial extension work group meeting.
 - ▶ Providing 15 copies of aquaculture extension related materials produced in Michigan to the extension chairperson for distribution to all state contacts once annually.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Michigan.
 - ▶ Compile aquaculture extension information for use by Great Lakes Sea Grant agents and Cooperative Extension Service personnel.
 - ▶ Becoming active in the use of electronic mail (E-mail) using Internet.
4. Develop and implement aquaculture education programs and materials for the NCR.
 - ▶ Aquaculture Education Programs
 - Walleye Workshop and Materials
Conduct programs, visits, or write newsletter articles for Native American fishery programs, state agencies, and private aquaculturists on current walleye culture practices.

**PROPOSED BUDGET FOR
MICHIGAN STATE UNIVERSITY**

(Kinnunen)

Objectives 1, 2, and 4

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.25	1	0.25	\$0		\$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 ...								
e. Secretarial-Clerical								
f. Technical, Shop, and Other ...								
Total Salaries and Wages					\$0		\$0	
B. Fringe Benefits					\$0		\$0	
C. Total Salaries, Wages and Fringe Benefits					\$0		\$0	
D. Nonexpendable Equipment					\$0		\$0	
E. Materials and Supplies					\$50		\$50	
F. Travel - Domestic (<i>Including Canada</i>)					\$400		\$400	
G. Other Direct Costs					\$50		\$50	
TOTAL PROJECT COSTS PER YEAR (C through G)					\$500		\$500	
TOTAL PROJECT COSTS							\$1,000	

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR MICHIGAN STATE UNIVERSITY

(Kinnunen)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
1. Strengthen linkages between North Central Regional Aquaculture Center (NCRAC) Research and Extension Work Groups		
Travel (transportation, lodging, and meal expenses for the PI to attend the Great Lakes Fish Disease Control Committee as NCRAC representative)	\$400	\$400
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Materials and Supplies (general office supplies)	\$50	\$50
Other Direct Costs (telecommunications, photocopying and duplication, and mailing costs)	\$50	\$50
TOTAL PER YEAR	\$500	\$500
TOTAL PROJECT REQUEST	\$1,000	

**PROPOSED ACTIVITIES FOR
NORTH DAKOTA STATE UNIVERSITY**

(Klinkebiel)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Serving as lead liaison between the NCRAC Tilapia Research Work Group and Extension Work Group.
 - ▶ Leading or assisting in the development of extension publications (fact sheets or bulletins) on knowledge gained from research by the Tilapia Work Group.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial extension work group meeting.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in North Dakota.
 - ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
 - ▶ Becoming active in the use of Aquaculture Network Information Center (AquaNIC), electronic mail, and other electronic information sources.
 - ▶ Developing and operate a demonstration and training indoor recirculating system for the production of tilapia at the Carrington Research Extension Center - North Dakota State University. This facility will be accessible to everyone, with NCRAC and other RAC materials available to all participants.
3. Providing in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.
 - ▶ Participate with other NCRAC Extension personnel in developing a basic aquaculture information core program and materials.
 - ▶ Develop and operate a demonstration and training indoor recirculating system for the production of tilapia at the Carrington Research Extension Center - North Dakota State University. This facility will be accessible to everyone who wishes to participate.
4. Develop and implement aquaculture education programs and materials for the NCR.
 - ▶ Aquaculture Education Materials
 - Tilapia Production Information Packet
Develop, compile, distribute, and continually update information packet entitled 'Tilapia Production with Recirculating Systems.'

 - Provide a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in North Dakota and the region.

**PROPOSED BUDGET FOR
NORTH DAKOTA STATE UNIVERSITY**

(Klinkebiel)

Objectives 1, 2, 3 and 4

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.10	1	0.10	\$0	\$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								
e. Secretarial-Clerical								
f. Technical, Shop, and Other	1	0.05	1	0.05	\$500	\$500		
Total Salaries and Wages					\$500	\$500		
B. Fringe Benefits (25% of 2f)					\$125	\$125		
C. Total Salaries, Wages and Fringe Benefits					\$625	\$625		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$500	\$250		
F. Travel - Domestic (<i>Including Canada</i>)					\$500	\$500		
G. Other Direct Costs					\$250	\$250		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$1,875	\$1,625		
TOTAL PROJECT COSTS					\$3,500			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR NORTH DAKOTA STATE UNIVERSITY

(Klinkebiel)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
1. Strengthen linkages between North Central Regional Aquaculture Center (NCRAC) Research and Extension Work Groups		
Travel (transportation, lodging, and meal expenses for the PI to attend the Research Work Group meetings)	\$250	\$250
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Materials and Supplies (28.8 Kpbs external fax modem to access AquaNIC, E-mail and other information sources)	\$250	\$0
Travel (transportation, lodging and meal expenses to attend biennial Extension Work Group meetings)	\$250	\$250
Other Direct Costs (telecommunications, photocopying and duplication, and mailing costs)	\$75	\$75
3. Provide in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.		
Other Direct Costs (telecommunications, photocopying and duplication, and mailing costs)	\$50	\$50
4. Develop and implement aquaculture education programs and materials for the NCR.		
Materials and Supplies (general office supplies - information packet 'Tilapia Production with Recirculating Systems')	\$250	\$250
Other Direct Costs (telecommunications, photocopying and duplication, and mailing costs for development of the information packet 'Tilapia Production with Recirculating Systems')	\$125	\$125
Salaries, Wages and Fringe Benefits (Technician support for the development of the information packet 'Tilapia Production with Recirculating Systems')	\$625	\$625
TOTAL PER YEAR	\$1,875	\$1,625
TOTAL PROJECT REQUEST	\$3,500	

**PROPOSED ACTIVITIES FOR
NORTH AMERICAN FISH FARMERS COOPERATIVE**

(Leininger)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group:

5. Quarterly survey of wholesale fish buyers in selected U. S. and Canadian cities with emphasis on the NCR.
 - ▶ Provide survey information on major fish markets on a quarterly basis to Swann for subsequent distribution.

**PROPOSED BUDGET FOR
NORTH AMERICAN FISH FARMERS COOPERATIVE**

(Leininger)

Objective 5

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.10	1	0.10	\$0	\$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 ...								
e. Secretarial-Clerical								
f. Technical, Shop, and Other ...	1	0.05	1	0.05	\$1,200	\$1,200		
Total Salaries and Wages					\$1,200	\$1,200		
B. Fringe Benefits (16.7% of 2f)					\$200	\$200		
C. Total Salaries, Wages and Fringe Benefits					\$1,400	\$1,400		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$200	\$200		
F. Travel - Domestic (<i>Including Canada</i>)					\$0	\$0		
G. Other Direct Costs					\$800	\$800		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$2,400	\$2,400		
TOTAL PROJECT COSTS					4,800			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR NORTH AMERICAN FISH FARMERS COOPERATIVE

(Leininger)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
5. Quarterly survey of wholesale fish buyers in selected U.S. and Canadian cities with emphasis on the NCR.		
Materials and Supplies (general office supplies)	\$200	\$200
Other Direct Costs (telecommunications, photocopying and duplication, and computer maintenance)	\$800	\$800
Salaries, Wages and Fringe Benefits (0.05 FTE support of secretarial staff)	\$1,400	\$1,400
TOTAL PER YEAR	\$2,400	\$2,400
TOTAL PROJECT REQUEST	\$4,800	

**PROPOSED EXTENSION ACTIVITIES FOR
IOWA STATE UNIVERSITY**

(Morris)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Serving as lead liaison between the NCRAC Sunfish and Hybrid Striped Bass Research Work Groups and Extension Work Group.
 - ▶ Participating in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - ▶ Leading or assisting in the development of extension publications (fact sheets or bulletins) on knowledge gained from research by the Sunfish and Hybrid Striped Bass, and Walleye Work Groups.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial extension work group meeting.
 - ▶ Providing 15 copies of aquaculture extension related materials produced in Iowa to the extension chairperson for distribution to all state contacts once annually.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Iowa.
 - ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
 - ▶ Becoming active in the use of electronic mail (E-mail) using Internet.
4. Develop and implement aquaculture education programs and materials for the NCR.

**PROPOSED EXTENSION BUDGET FOR
IOWA STATE UNIVERSITY**

(Morris)

Objectives 1, 2 and 4

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.10	1	0.10	\$0		\$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								
e. Secretarial-Clerical	1	0.20	1	0.20	\$1,000		\$1,000	
f. Technical, Shop, and Other								
Total Salaries and Wages					\$1,000		\$1,000	
B. Fringe Benefits					\$0		\$0	
C. Total Salaries, Wages and Fringe Benefits					\$1,000		\$1,000	
D. Nonexpendable Equipment					\$0		\$0	
E. Materials and Supplies					\$500		\$500	
F. Travel - Domestic (<i>Including Canada</i>)					\$1,000		\$1,000	
G. Other Direct Costs					\$0		\$0	
TOTAL PROJECT COSTS PER YEAR (C through G)					\$2,500		\$2,500	
TOTAL PROJECT COSTS					\$5,000			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR IOWA STATE UNIVERSITY

(Morris)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Materials and Supplies (telecommunication, photocopying, duplication and mailing costs)	\$500	\$500
Travel (transportation, pool money for Extension Work Group participants)	\$1,000	\$1,000
Salaries, Wages and Fringe Benefits (as chair of the NCRAC Extension Work Group there will be one month of secretarial support for each year of the project)	\$1,000	\$1,000
TOTAL PER YEAR	\$2,500	\$2,500
TOTAL PROJECT REQUEST	\$5,000	

**PROPOSED ACTIVITIES FOR
KANSAS STATE UNIVERSITY**

(Neils)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

2. Enhance the NCRAC extension network for aquaculture information transfer by:

- ▶ Attending the biennial extension work group meeting.
- ▶ Providing 15 copies of aquaculture extension related materials produced in Kansas to the extension chairperson for distribution to all state contacts once annually.
- ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Kansas.
- ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
- ▶ Becoming active in the use of electronic mail (E-mail) using Internet.

**PROPOSED BUDGET FOR
KANSAS STATE UNIVERSITY**

(Neils)

Objective 2

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.17	1	0.08	\$0	\$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 ...								
e. Secretarial-Clerical								
f. Technical, Shop, and Other ...								
Total Salaries and Wages					\$0	\$0		
B. Fringe Benefits					\$0	\$0		
C. Total Salaries, Wages and Fringe Benefits					\$0	\$0		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$150	\$150		
F. Travel - Domestic (<i>Including Canada</i>)					\$350	\$350		
G. Other Direct Costs					\$0	\$0		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$500	\$500		
TOTAL PROJECT COSTS					\$1,000			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR KANSAS STATE UNIVERSITY

(Neils)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Materials and Supplies (office supplies)	\$150	\$150
Travel (transportation, lodging, and meal expenses for the PI to attend the Research Work Group meetings)	\$350	\$350
TOTAL PER YEAR	\$500	\$500
TOTAL PROJECT REQUEST	\$1,000	

**PROPOSED ACTIVITIES FOR
UNIVERSITY OF MISSOURI**

(Pierce)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

2. Enhance the NCRAC extension network for aquaculture information transfer by:

- ▶ Attending the biennial extension work group meeting.
- ▶ Providing 15 copies of aquaculture extension related materials produced in Missouri to the extension chairperson for distribution to all state contacts once annually.
- ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Missouri.
- ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
- ▶ Becoming active in the use of electronic mail (E-mail) using Internet.

**PROPOSED EXTENSION BUDGET FOR
UNIVERSITY OF MISSOURI**

(Pierce)

Objective 2

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.05	1	0.05	\$0	\$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								
e. Secretarial-Clerical								
f. Technical, Shop, and Other								
Total Salaries and Wages					\$0	\$0		
B. Fringe Benefits					\$0	\$0		
C. Total Salaries, Wages and Fringe Benefits					\$0	\$0		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$0	\$0		
F. Travel - Domestic (<i>Including Canada</i>)					\$500	\$500		
G. Other Direct Costs					\$0	\$0		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$500	\$500		
TOTAL PROJECT COSTS					\$1,000			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR UNIVERSITY OF MISSOURI

(Pierce)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Travel (transportation, lodging and meal expenses to attend biennial Extension Work Group meeting)	\$500	\$500
TOTAL PER YEAR	\$500	\$500
TOTAL PROJECT REQUEST	\$1,000	

PROPOSED EXTENSION ACTIVITIES FOR PURDUE UNIVERSITY

(Swann)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group of the NCRAC Extension project:

1. Strengthen linkages between NCRAC Research and Extension Work Groups by:
 - ▶ Participating in Research Work Group meeting to provide input on design and feedback based on documented industry needs.
 - ▶ Coordinating distribution of NCRAC Annual Reports with the NCRAC publications coordinator through the Aquaculture Network Information Center AquaNIC.
2. Enhance the NCRAC extension network for aquaculture information transfer by:
 - ▶ Attending the biennial extension work group meeting.
 - ▶ Providing 15 copies of aquaculture extension related materials produced in Indiana to the extension chairperson for distribution to all state contacts once annually.
 - ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Indiana and Illinois.
 - ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
 - ▶ Coordinating distribution of NCRAC extension and technical publications with the NCRAC publications coordinator through the Aquaculture Network Information Center AquaNIC.
3. Provide in-service training for Cooperative Extension Service, Sea Grant Advisory Service, and other landowner assistance personnel.
 - ▶ Providing one update on AquaNIC to extension personnel at biennial extension work group meeting.
 - ▶ Providing hands-on demonstrations at state in-service training conducted by NCRAC extension contacts as requested.
5. Quarterly survey of wholesale fish buyers selected U.S. and Canadian cities with emphasis on the NCR.
 - ▶ Providing survey information on major fish markets on a quarterly basis.
 - ▶ Compiling survey results and distributing them on a quarterly basis through AquaNIC, the NCRAC Journal and key aquaculture trade magazines

**PROPOSED EXTENSION BUDGET FOR
PURDUE UNIVERSITY**

(Swann)

Objectives 1, 2, 3 and 5

					Year 1	Year 2		
					Year 1		Year 2	
A.		No.	FTEs	No.	FTEs			
1.	No. of Senior Personnel & FTEs ¹							
a.	(Co)-PI(s)	1	0.05	1	0.05	\$0	\$0	
b.	Senior Associates	1	0.05	1	0.05	\$1,549	\$1,627	
2.	No. of Other Personnel (Non-Faculty) & FTEs							
a.	Research Assoc./Postdoc							
b.	Other Professionals							
c.	Graduate Students							
d.	Prebaccalaureate Students							
e.	Secretarial-Clerical	1	0.06	1	0.06	\$1,300	\$1,300	
f.	Technical, Shop, and Other							
	Total Salaries and Wages					\$2,849	\$2,927	
B.	Fringe Benefits (31% of 2e)					\$401	\$412	
C.	Total Salaries, Wages and Fringe Benefits					\$3,250	\$3,339	
D.	Nonexpendable Equipment					\$0	\$0	
E.	Materials and Supplies					\$450	\$450	
F.	Travel - Domestic (<i>Including Canada</i>)					\$750	\$750	
G.	Other Direct Costs					\$1,750	\$1,661	
	TOTAL PROJECT COSTS PER YEAR (C through G)					\$6,200	\$6,200	
						TOTAL PROJECT COSTS	\$12,400	

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR PURDUE UNIVERSITY

(Swann)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Salaries, Wages and Fringe Benefits (0.05 FTE support of AquaNIC system operator)	\$1,549	\$1,627
Materials and Supplies (general office supplies)	\$250	\$250
Travel (transportation, lodging, and meal expenses to attend the biennial extension meeting and Research Work Group meetings and one AquaNIC training per year)	\$750	\$750
Other Direct Costs (photocopy charges, postage, computer maintenance)	\$750	\$661
5. Enhance the NCRAC extension network for aquaculture information transfer.		
Salaries, Wages and Fringe Benefits (120 hrs/yr secretarial support)	\$1,701	\$1,712
Materials and Supplies (general office supplies)	\$200	\$200
Other Direct Costs (telecommunications, photocopying and duplication, computer maintenance and mailing costs)	\$1,000	\$1,000
TOTAL PER YEAR	\$6,200	\$6,200
TOTAL PROJECT REQUEST	\$12,400	

**PROPOSED ACTIVITIES FOR
SOUTHERN ILLINOIS UNIVERSITY-CARBONDALE**

(Unnamed)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group:

2. Enhance the NCRAC extension network for aquaculture information transfer by:

- ▶ Attending the biennial extension work group meeting.
- ▶ Providing 15 copies of aquaculture extension related materials produced in Missouri to the extension chairperson for distribution to all state contacts once annually.
- ▶ Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Missouri.
- ▶ Identifying and updating lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive the NCRAC newsletter and other pertinent materials.
- ▶ Becoming active in the use of electronic mail (E-mail) using Internet.

**PROPOSED EXTENSION BUDGET FOR
SOUTHERN ILLINOIS UNIVERSITY-CARBONDALE**

(Unnamed)

Objective 2

					Year 1	Year 2		
					Year 1		Year 2	
A. Salaries and Wages	No.	FTEs	No.	FTEs				
1. No. of Senior Personnel & FTEs ¹								
a. (Co)-PI(s)	1	0.05	1	0.05	\$0	\$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								
e. Secretarial-Clerical								
f. Technical, Shop, and Other								
Total Salaries and Wages					\$0	\$0		
B. Fringe Benefits					\$0	\$0		
C. Total Salaries, Wages and Fringe Benefits					\$0	\$0		
D. Nonexpendable Equipment					\$0	\$0		
E. Materials and Supplies					\$0	\$0		
F. Travel - Domestic (<i>Including Canada</i>)					\$500	\$500		
G. Other Direct Costs					\$0	\$0		
TOTAL PROJECT COSTS PER YEAR (C through G)					\$500	\$500		
TOTAL PROJECT COSTS					\$1,000			

¹FTEs = Full Time Equivalents based on 12 months.

BUDGET JUSTIFICATION FOR SOUTHERN ILLINOIS UNIVERSITY-CARBONDALE

(Unnamed)

Major Action (Objective) and Line Item Requests	Year 1	Year 2
2. Enhance the NCRAC extension network for aquaculture information transfer.		
Travel (transportation, lodging and meal expenses to attend biennial Extension Work Group meeting)	\$500	\$500
TOTAL PER YEAR	\$500	\$500
TOTAL PROJECT REQUEST	\$1,000	

EXTENSION PROJECT

Budget Summary for Each Participating Institution at \$20.5K for the First Year

	UW-MIL	OSU	MSU	UM-D	MN-AG	UN-L	NDSU	NAFFC	ISU	KSU	UMO	PUR-DUE	SIUC	TOTALS
Total Salaries and Wages	\$0	\$0	\$0	\$0	\$1,200	\$0	\$500	\$1,200	\$1,000	\$0	\$0	\$2,849	\$0	\$6,749
Fringe Benefits	\$0	\$0	\$0	\$0	\$200	\$0	\$125	\$200	\$0	\$0	\$0	\$401	\$0	\$926
Total Salaries, Wages and Benefits	\$0	\$0	\$0	\$0	\$1,400	\$0	\$625	\$1,400	\$1,000	\$0	\$0	\$3,250	\$0	\$7,675
Nonexpendable Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Materials and Supplies	\$500	\$100	\$300	\$50	\$200	\$150	\$500	\$200	\$500	\$150	\$0	\$450	\$0	\$3,100
Travel	\$0	\$250	\$900	\$400	\$0	\$500	\$500	\$0	\$1,000	\$350	\$500	\$750	\$500	\$5,650
Other Direct Costs	\$0	\$150	\$50	\$50	\$800	\$200	\$250	\$800	\$0	\$0	\$0	\$1,750	\$0	\$4,050
TOTAL PROJECT COSTS	\$500	\$500	\$1,250	\$500	\$2,400	\$850	\$1,875	\$2,400	\$2,500	\$500	\$500	\$6,200	\$500	\$20,475

Budget Summary for Each Participating Institution at \$19.5K for the Second Year

	UW-MIL	OSU	MSU	UM-D	MN-AG	UN-L	NDSU	NAFFC	ISU	KSU	UMO	PUR-DUE	SIUC	TOTALS
Total Salaries and Wages	\$0	\$0	\$0	\$0	\$1,200	\$0	\$500	\$1,200	\$1,000	\$0	\$0	\$2,849	\$0	\$6,749
Fringe Benefits	\$0	\$0	\$0	\$0	\$200	\$0	\$125	\$200	\$0	\$0	\$0	\$401	\$0	\$926
Total Salaries, Wages and Benefits	\$0	\$0	\$0	\$0	\$1,400	\$0	\$625	\$1,400	\$1,000	\$0	\$0	\$3,250	\$0	\$7,675
Nonexpendable Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Materials and Supplies	\$500	\$100	\$300	\$50	\$200	\$50	\$250	\$200	\$500	\$150	\$0	\$450	\$0	\$2,750
Travel	\$0	\$250	\$900	\$400	\$0	\$0	\$500	\$0	\$1,000	\$350	\$500	\$750	\$500	\$5,150
Other Direct Costs	\$0	\$150	\$50	\$50	\$800	\$100	\$250	\$800	\$0	\$0	\$0	\$1,750	\$0	\$3,950
TOTAL PROJECT COSTS	\$500	\$500	\$1,250	\$500	\$2,400	\$150	\$1,625	\$2,400	\$2,500	\$500	\$500	\$6,200	\$500	\$19,525

RESOURCE COMMITMENT FROM INSTITUTIONS¹

State/Institution	Year 1	Year 2
University of Wisconsin-Milwaukee		
Salaries and Benefits: SY @ 0.20 FTE	\$14,148	\$15,562
Total	\$14,148	\$15,562
Ohio State University		
Salaries and Benefits: SY @ 0.05 FTE	\$1,872	\$1,955
Supplies, Expenses, and Equipment	\$500	\$500
Total	\$2,372	\$2,455
Michigan State University		
Salaries and Benefits: SY @ 0.30	\$15,000	\$16,400
Waiver of Overhead	\$6,300	\$6,888
Total	\$21,300	\$23,288
University of Minnesota-Duluth		
Salaries and Benefits: SY @ 0.10	\$5,561	\$5,561
Total	\$5,561	\$5,561
University of Nebraska-Lincoln		
Salaries and Benefits: SY @ 0.05 FTE	\$3,366	\$3,366
Supplies, Expenses, and Equipment	\$2,042	\$1,580
Total	\$5,408	\$4,946
Iowa State University		
Salaries and Benefits: SY @ 0.05 FTE	\$2,938	\$3,100
Waiver of Overhead	\$1,050	\$1,050
Total	\$3,988	\$4,150
University of Missouri		
Salaries and Benefits: SY @ 0.05 FTE in Year 1; 0.10 in Year 2	\$2,250	\$4,500
Waiver of Overhead	\$700	\$1,400
Total	\$2,950	\$5,900
Purdue University		
Salaries and Benefits: SY @ 0.05 FTE	\$1,985	\$2,085
Waiver of Overhead	\$2,085	\$2,680
Total	\$4,070	\$4,765
Southern Illinois University-Carbondale		
Salaries and Benefits: SY @ 0.20 FTE	\$3,174	\$3,333
Waiver of Overhead	\$7,997	\$8,397
Total	\$11,171	\$11,730
Total per Year	\$70,968	\$78,357
GRAND TOTAL	\$149,325	

¹Because cost sharing is not a legal requirement some universities chose not to provide resource commitment from institutions.

SCHEDULE FOR COMPLETION OF OBJECTIVES

- Objective 1: Initiated in Year 1 and completed in Year 2.
- Objective 2: Initiated in Year 1 and completed in Year 2.
- Objective 3: Initiated in Year 1 and completed in Year 2.
- Objective 4: Initiated in Year 1 and completed in Year 2.
- Objective 5: Initiated in Year 1 and completed in Year 2.

LIST OF PRINCIPAL INVESTIGATORS

Fred P. Binkowski, University of Wisconsin-Milwaukee

James E. Ebeling, Ohio State University

Donald L. Garling, Michigan State University

Jeffrey L. Gunderson, University of Minnesota

Ying Q. Ji, Minnesota Department of Agriculture

Terrence B. Kayes, University of Nebraska-Lincoln

Ronald E. Kinnunen, Michigan State University

David L. Klinkbeil, North Dakota State University

John M. Leininger, North American Fish Farmers Cooperative

Joseph E. Morris, Iowa State University

Kenneth E. Neils, Kansas State University

Robert A. Pierce II, University of Missouri

LaDon Swann, Purdue University

VITA

Fred P. Binkowski
Senior Scientist
Center for Great Lakes Studies
600 E. Greenfield Avenue
University of Wisconsin-Milwaukee
Milwaukee, WI 53204

Phone: (414) 382-1700
FAX: (414) 382-1705

EDUCATION

B.S. University of Wisconsin-Milwaukee, 1971
M.S. University of Wisconsin-Milwaukee, 1974

POSITIONS

Senior Scientist (1991-present), Associate Scientist (1987-1990), Senior Fisheries Biologist (1984-1986), Associate Fisheries Biologist (1981-1983), and Assistant Fisheries Biologist (1978-1980), Center for Great Lakes Studies/University of Wisconsin Great Lakes Research Facility (GLRF)
Research Specialist (Fisheries) (1975-1978), Department of Zoology, University of Wisconsin-Milwaukee

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society (Associate Editor): Early Life History and Fish Culture
International Association for Great Lakes Research
World Aquaculture Society

SELECTED PUBLICATIONS

- Binkowski, F.P., and L.G. Rudstam. 1994. The maximum daily ration of Great Lakes bloater. Transactions of the American Fisheries Society 123:335-343.
- Rudstam, L.G., F.P. Binkowski, and M.A. Miller. 1994. A bioenergetics model for analysis of food consumption patterns by bloater in Lake Michigan. Transactions of the American Fisheries Society 123:344-357.
- Binkowski, F.P., J.J. Sedmark, and S.O. Jolly. 1993. An evaluation of *Pfaffia* yeast as a pigment source for salmonids. Aquaculture Magazine, March/April 1993:1-4.
- Miller, T., L. Crowder, J. Rice, and F.P. Binkowski. 1992. Body size and the ontogeny of the functional response in fishes. Canadian Journal of Fisheries and Aquatic Sciences 49:805-812.
- Miller, T., L. Crowder, and F.P. Binkowski. 1990. Zooplankton size dynamics and recruitment success of bloater in Lake Michigan. Transactions of the American Fisheries Society 119:484-491.
- Luecke, C. J.A. Rice, L.B. Crowder, S.E. Yeo, and F.P. Binkowski. 1990. Recruitment mechanisms of bloater in Lake Michigan: an analysis of the predatory gauntlet. Canadian Journal of Fisheries and Aquatic Sciences 47:524-532.
- Seale, D.B., and F.P. Binkowski. 1988. Vulnerability of early life intervals of *Coregonus hoyi* to predation by a freshwater mysid, *Mysis relicta*. Environmental Biology of Fishes 21:117-125.

VITA

James M. Ebeling
Aquaculture Research and Extension Associate
P.O. Box 549
OSU-Piketon Research and Extension Center
Piketon, OH 45661-0549

Phone: (614) 289-2071
FAX: (614) 289-4591
E-mail: jim@oak.prec.ohio-state.edu

EDUCATION

B.A. Albion College, 1971
M.S. Washington State University, 1974
M.S. Washington State University, 1977

POSITIONS

Research and Extension Associate (1991-present), Piketon Research and Extension Center, Ohio State University
Project Manager (1990-1991), Recirculation Aquaculture Demonstration Project, North Carolina State University
Research Coordinator (1988-1990), Mariculture Research & Training Center, University of Hawaii
Research Assistant (1983-1988), Department of Agricultural Engineering, University of California-Davis
Research Technologist II (1981-1983), Department of Agricultural Engineering, Washington State University
Technical Specialist (1979-1981), Washington Energy Extension Service-Cooperative Extension Service
Research Technologist II (1977-1979), Department of Agricultural Engineering, Washington State University
American Peace Corps Volunteer (1971-1972), Secondary Education Program, Ghana

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Society of Agricultural Engineers
Sigma XI
World Aquacultural Society

SELECTED PUBLICATIONS

Ebeling, J.M. 1991. A computer based water quality monitoring and management system for pond aquaculture. Pages 233-248 *in* Proceedings from the Aquaculture Symposium, Cornell University, Ithaca, New York, NRAES-49.

Ebeling, J.M., and T.M. Losordo. 1989. Continuous environmental monitoring systems for aquaculture. Pages 54-70 *in* J.A. Wyban and E. Antill, editors. Instrumentation in aquaculture. Proceedings of the World Aquaculture Society, January, Los Angeles, California.

Losordo, T.M., R.H. Piedrahita, and J.M. Ebeling. 1988. An automated water quality data acquisition system for use in aquaculture ponds. *Aquacultural Engineering* 7:265-278.

VITA

Donald L. Garling, Jr.
Professor and Fish Culture and
Fisheries Extension Specialist
Department of Fisheries and Wildlife
Michigan State University
East Lansing, MI 48824

Phone: (517) 353-1989
FAX: (517) 432-1699
E-mail: garling@msu.edu

EDUCATION

B.S. University of Dayton, 1970
M.S. Eastern Kentucky University, 1972
Ph.D. Mississippi State University, 1975

POSITIONS

Professor (1990-present), Associate Professor (1985-1990), and Assistant Professor (1980-1985) Department of Fisheries and Wildlife, Michigan State University
Aquaculture and Fisheries Extension Specialist (1985-present), Department of Fisheries and Wildlife, Michigan State University
Assistant Professor of Fisheries Science (1976-1980), Department of Fisheries and Wildlife Sciences, Virginia Institute and State University

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society: Fish Culture and Fisheries Educators
World Aquaculture Society
Sigma Xi
Gamma Sigma Delta

SELECTED PUBLICATIONS

- Ramseyer, L.J., and D.L. Garling. In press. Amino acid composition of ovaries, muscle, and whole body of yellow perch (*Perca flavescens*). *Progressive Fish-Culturist*
- Schrouder, J.D., C.M. Smith, P.J. Ruzs, R.J. White, G.R. Dudderar, and D.L. Garling. 1994. *Managing Michigan Ponds for Sport Fishing* (3ed). Michigan State University Extension, Bulletin E1554, East Lansing.
- Garling, D., R. Hinterman, S. Jorgensen, D. Kenaga, K. Langeland, W.McClay, S. Metzger, L. Olsen, G. Pullman, B. Rowe, J. Schmidt, J. Stachecki, and N. Walker. 1993. *Aquatic pest management: a training manual for commercial pesticide applicators*. Michigan State University Extension, Bulletin E2437, East Lansing.
- Cain, K, and D. Garling. 1993. *Trout culture in the North Central Region*. Fact Sheet Series #108. North Central Regional Aquaculture Center.
- Garling, D.L. 1992. *Making plans for commercial aquaculture in the North Central Region*. Fact Sheet Series #101. North Central Regional Aquaculture Center.
- Belal, J.E., D.L. Garling, and H. Assem. 1992. Evaluation of a practical tilapia feed using a saturation kinetic model. *Comparative Biochemistry and Physiology* 102A:785-790.

VITA

Jeffrey L. Gunderson
Assistant Specialist - Fisheries, Extension
Education and Associate Professor
Minnesota Sea Grant Extension Program
2305 E. 5th Street
University of Minnesota
Duluth, MN 55812

Phone: (218) 726-8106
FAX: (218) 726-6556
E-mail: jgunderson@mes.umn.edu

EDUCATION

B.S. University of Wisconsin-Stevens Point, 1975
M.S. University of Wisconsin-Stevens Point, 1978

POSITIONS

Assistant Specialist-Fisheries, Extension Education and Associate Professor (1979-present), University of Minnesota-Minnesota Extension Service and Sea Grant Extension
Fishery Specialist/Fishery Biologist (1978-1979), Missouri Conservation Department

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society; Minnesota Chapter (President 1991-1992)
International Association of Astacology
International Association for Great Lakes Research
Minnesota Association of Extension Agents (President of the MACENRDP Section 1989-1990)
Sea Grant Advisory Service Association - Great Lakes Network

SELECTED PUBLICATIONS

McDonald, M., C. Richards, and J. Gunderson. 1993. Crayfish in Minnesota wild rice paddies. *In* Minnesota Wild Rice Research 1992. Misc. Publ. 78-1993, Minnesota Agricultural Experiment Station, St. Paul.

Gunderson, J.L. 1993. Northern Crayfish: An Update. Minnesota Sea Grant Extension Publication. 5pp.

McDonald, M., P. DeVore, C. Richards, J. Skurla, and J. Gunderson. 1992. Economic and technologic developments for the crayfish industry in Minnesota. Natural Resources Research Institute Technical Report, Duluth, Minnesota.

Gunderson, J.L., and A. Kapuscinski. 1992. Crayfish aquaculture demonstration in Minnesota wild rice paddies. Legislative Commission on Minnesota Resources Report.

Gunderson, J.L., and G. Kreeg. 1991. Estimated economic impact of recreational fishing on Minnesota waters of Lake Superior. Minnesota Sea Grant Extension Publication.

Gunderson, J.L. 1988. 1987-88 Charter Fishing Study: Minnesota waters of Lake Superior, Minnesota Sea Grant Research Report No. 27.

VITA

Ying Q. Ji
Aquaculture Coordinator
Minnesota Department of Agriculture
90 West Plato Blvd.
St. Paul, MN 55107

Phone: (612) 296-5081
FAX: (612) 296-6890
E-mail: yji@mda-is.mda.state.mn.us

EDUCATION

B.S. Shanghai Fisheries University, Shanghai, P. R. China, 1981
M.S. University of Washington, 1986
Ph.D. candidate University of Minnesota, St. Paul, Minnesota, 1986 to present

POSITIONS

Minnesota Aquaculture Coordinator (1990-present), Minnesota Department of Agriculture, St. Paul
Research Assistant (1986-1990), University of Minnesota, Dept. of Fisheries and Wildlife
Research Assistant (1982-1986), Wuxi Freshwater Fisheries Research Institute, Wuxi, China

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

National Association of State Aquaculture Coordinators (NASAC). Member of the Board of Directors, May 1993 to present
World Aquaculture Society
NCRAC Industry Advisor Council
National Council on Chinese Affairs (July 1989-August 1993)

VITA

Terrence B. Kayes
Associate Professor
Department of Forestry, Fisheries and Wildlife
12 Plant Industry, East Campus
University of Nebraska-Lincoln
Lincoln, NE 68583-0814

Phone: (402) 472-8183
FAX: (402) 472-2964

EDUCATION

B.A. Chico State College, 1968
M.A. California State University at Chico, 1972
Ph.D. University of Wisconsin-Madison, 1978

POSITIONS

Associate Professor (1990-present), Dept. of Forestry, Fisheries and Wildlife, University of Nebraska-Lincoln
Assistant Director and Associate Scientist (1979-1990), University of Wisconsin Aquaculture Program,
University of Wisconsin-Madison
Project Biologist (1974-1979), Aquaculture Research Laboratory, University of Wisconsin-Madison
EPA Trainee (1970-1972), Laboratory of Limnology, University of Wisconsin-Madison
Instructor (1968-1970), Department of Biological Sciences, Chico State College

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society: Fish Culture, Bioengineering, Fish Health, Water Quality, and Early Life History
American Society of Zoologists: Comparative Endocrinology, Comparative Physiology and Biochemistry,
Ecology, and Comparative Immunology
World Aquaculture Society

SELECTED PUBLICATIONS

- Kohler, C.C., R. J. Sheehan, C. Habicht, J.A. Malison, and T.B. Kayes. In press. Habituation to captivity and controlled spawning of white bass. Transactions of the American Fisheries Society.
- Malison, J.A., L.S. Procarione, T.P. Barry, A.R. Kapuscinski, and T.B. Kayes. In press. Endocrine and gonadal changes during the annual reproductive cycle of the freshwater teleost, *Stizostedion vitreum* ("walleye"). Fish Physiology and Biochemistry.
- Malison, J.A., T.B. Kayes, J.A. Held, T.P. Barry, and C.H. Amundson. In press. Manipulation of ploidy in yellow perch (*Perca flavescens*) by heat shock, hydrostatic pressure shock, and spermatozoa inactivation. Aquaculture.
- Kebus, M.J., M.T. Collins, M.S. Brownfield, C.H. Amundson, T.B. Kayes, and J.A. Malison. 1992. Effects of rearing density on the stress response and growth of rainbow trout. Journal of Aquatic Animal Health 4:1-6.
- Malison, J.A., T.B. Kayes, J.A. Held, and C.H. Amundson. 1990. Comparative survival, growth and reproductive development of juvenile walleye (*Stizostedion vitreum*), sauger (*S. canadense*) and their hybrids reared under intensive culture conditions. The Progressive Fish-Culturist 52:73-82.

VITA

Ronald E. Kinnunen
Michigan Sea Grant Extension Agent
Michigan State University
Upper Peninsula Extension Center
1030 Wright Street
Marquette, MI 49855

Phone: (906) 228-4830
FAX: (906) 228-4572
E-mail: kinnunen@msuces.canr.msu.edu

EDUCATION

B.S. Michigan State University, 1976
M.S. Michigan State University, 1979
Ph.D. Candidate Michigan Technological University

POSITIONS

Michigan Sea Grant Extension Agent (1981-present), Upper Peninsula, Michigan State University
Acting Alger County Extension Director 1988-1989), Michigan State University Cooperative Extension Service
Fisheries Pathologist (1981), Rangen Research Laboratory, Hagerman, Idaho
Fisheries Biologist (1979-1980), U.S. Fish and Wildlife Service Leetown, West Virginia

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society: Fish Health
Michigan Association of Extension Agents
National Association of Extension Agents
Sea Grant Advisory Service Association

SELECTED PUBLICATIONS

- Kinnunen, R.E. 1992. North Central Region 1990: salmonid egg and fingerling purchase, production, and sales. Technical Bulletin Series #103. North Central Regional Aquaculture Center.
- Kinnunen, R.E., and E.M. Mahoney. 1989. 1987 Upper Michigan charter fishing study. Michigan Sea Grant Extension (MICHU-SG-89-501).
- Kinnunen, R., J. Lempke, and T. Sundstrom. 1987. Behavior patterns of divers visiting the Alger Underwater Preserve. Michigan Sea Grant Extension (MICHU-SG-87-505).
- Peterson, J., T. Sundstrom, and R. Kinnunen. 1987. 1986 Recreational diving activity in Michigan bottomland preserves. Michigan Sea Grant Extension (MICHU-SG-87-506).
- Kinnunen, R., and H. Johnson. 1986. Pathology of sea lamprey inflicted wounds on rainbow trout. Technical Report No. 48, Great Lakes Fishery Commission, Ann Arbor, Michigan.
- Kinnunen, R., J. Peterson, S. Stewart, and C. Swinehart. 1986. Sea Grant research and community development make Michigan's bottomland preserves a reality. *In* Marine Parks and Conservation: Challenge and Promise, Vol. II, International Experiences, National and Provincial Parks Association of Canada.
- Kinnunen, R., and H. Johnson. 1985. Impact of sea lamprey parasitism on the blood features and hemopoietic tissues of rainbow trout. Technical Report No. 46, Great Lakes Fishery Commission, Ann Arbor, Michigan.

VITA

David L. Klinkebiel
North Dakota State University
Carrington Research Extension Center
P.O. Box 219
Carrington, ND 58421

Phone: (701) 652-2951
FAX: (701) 652-2055
E-mail: recenter@ndsuext.nodak.edu

EDUCATION

B.S. Colorado State University, 1981
M.S. University of Nebraska, 1987
Ph.D. University of Nebraska, 1990

POSITIONS

Aquaculture Program Coordinator and Researcher (1993-present), NDSU, Carrington Research Extension Center
Research Agronomist (1990-present), NDSU, Carrington Research Extension Center
Graduate Research Assistant (1984-1990), University of Nebraska, Agronomy Department
Research Agronomist (1982-1984) and Production Supervisor (1980-1982), Cargill Inc., Bounty Hybrid Wheat Program, Ft. Collins, Colorado

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Society of Agronomy
American Tilapia Society
Crop Science Society of America
Dakota Aquaculture Cooperative
North American Fish Farmers Cooperative
Soil and Water Conservation Society
World Aquaculture Society
Gamma Sigma Delta Honor Society of Agriculture

SELECTED PUBLICATIONS

Klinkebiel, D.L., and E.C. Stegman. 1992. Evaluation of a spring wheat and soybean relay intercropping system. Pages 55-60 *in* NDSU Alternative Crop and Alternative Crop Production Research. Progress Report.

Klinkebiel, D. L. 1992. Pearl millet: a potential new feed grain for North Dakota. Pages 53-54 *in* NDSU Alternative Crop and Alternative Crop Production Research. Progress Report.

Schuh, W. M., D. L. Klinkebiel, and J.C. Gardner. 1993. Use of an integrated transient flow and water budget procedure to predict and partition components of local recharge. *Journal of Hydrology*. 128:27-60.

VITA

John M. Leininger
General Manager/CEO
North American Fish Farmers Cooperative
Box 219
Carrington, ND 58421

Phone: (701) 652-1130
FAX: (701) 652-2055

EDUCATION

B.S. Valley City State University, 1962
M.S. University of Montana, 1965

POSITIONS

General Manager and Chief Executive Officer (1994-present), Dakota Aquaculture Cooperative and its subsidiary, North American Fish Farmers Cooperative, (advisor of DAC since 1991 startup)
Administrative Assistant to the President (1986-1994), North Dakota Farmers Union, Jamestown, North Dakota
Owner-operator of farm/ranch (1975 to present). Currently in partnership with son.
Marketing Consultant (1984-1988), Tri-County Electric Cooperative, Basin Electric Cooperative and Western Area Power Administration, North Dakota and 18 Western States
School Administrator, Business Education Instructor, Guidance Counselor and Coach (1965-1975), Terry Public Schools, Terry, Montana

VITA

Joseph E. Morris
Associate Professor
Department of Animal Ecology
124 Science II
Iowa State University
Ames, Iowa 50011

Phone: (515) 294-4622
FAX: (515) 294-7874
E-mail: jemorris@iastate.edu

EDUCATION

B.S. Iowa State University, 1979
M.S. Texas A&M University, 1982
Ph.D. Mississippi State University, 1988

POSITIONS

Fisheries and Aquaculture Specialist/Associate Professor (1995-present), Specialist/Assistant Professor (1988-1995), Department of Animal Ecology, Iowa State University and Associate Director (1990-present), North Central Regional Aquaculture Center
Graduate Research Assistant (1986-1988), Mississippi State University
Aquaculture Manager (1982-1986), Stiles Farm Foundation
Graduate Research Assistant (1981-1982) and Research Technician I (1980-1981), Texas A&M University
Fisheries Biologist Aide (1979), Indiana Department of Natural Resources

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society; Iowa Chapter: Education, Fish Culture, Early Life History, Computer Users, and Fish Management
Iowa Aquaculture Association
World Aquaculture Society
Phi Kappa Phi
Sigma Xi

SELECTED PUBLICATIONS

- Bryan, M. D., J. E. Morris, and G. J. Atchison. 1994. Methods for culturing bluegill in the laboratory. *Progressive Fish-Culturist* 56:217-221.
- Bettoli, P.W., J. E. Morris, and R. L. Noble. 1991. Changes in the abundance of two atherinid species following vegetation removal. *Transactions of the American Fisheries Society* 120:90-97.
- Morris, J.E., L.R. D'Abramo, and R.J. Muncy. 1990. An inexpensive marking technique to assess ingestion of artificial feeds by larval fish. *Progressive Fish-Culturist* 52:121-122.
- Morris, J. E. 1989. Supplemental feeding of hybrid striped bass fry. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies* 43:96-105.
- Morris, J.E. 1988. Influence of artificial feeds upon striped bass (*Morone saxatilis*) X white bass (*M. chrysops*) hybrid fry survival. Doctoral dissertation. Mississippi State University, Starkville.
- Campbell, J. M., J. E. Morris, and R. L. Noble. 1983. Spatial variability and community structure of littoral microcrustacea in Lake Conroe, Texas. 86th Annual Meeting Texas Academy of Science, Stephen F. Austin University, Nacodoches, Texas.

VITA

Kenneth E. Neils
Associate Agricultural Economist
Food and Feed Grains Institute (FFGI)
14 Waters Hall
Kansas State University
Manhattan, KS 66506-4008

Phone: (913) 532-4449
FAX: (913) 532-5861
E-mail: kneils@loki.agecon.ksu.edu

EDUCATION

B.S. Saint Olaf College, 1972
M.S. Auburn University, 1977
M.S. University of Maryland, 1983
Ph.D. Texas A&M University, 1989

POSITIONS

Associate Agricultural Economist (1994-present) and Assistant Agricultural Economist (1988-1994); FFGI, Kansas State University
Agricultural Commodity Marketing Specialist (1984-1988), Department of Agricultural Economics, Texas A&M University
Fish Production/Marketing Manager (1977-1982), Three-Springs Fisheries, Inc., Maryland
Consultant/Aquacultural Specialist for various agencies: Belize (1990), El Salvador (1988), Honduras (1988), Pakistan (1983/84), Philippines (1979), Nepal (1974/75)
Assistant Hatchery Manager (1976), U.S. Fish and Wildlife Service, Senecaville, Ohio
Aquacultural Extension Agent (1972-1974), U.S. Peace Corps, Nepal

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Association for Agricultural Economists

SELECTED PUBLICATIONS

Neils, K. 1993. Comparative economic analysis of the substitutability of an extruded, fish-based product for the commercial PROPAK product in a broiler diet. Consultant's report to the Oceanic Institute, Waimanalo, Hawaii.

Neils, K., P. Vergne, and E. Guier. 1988. USAID Action Plan for shrimp mariculture in El Salvador. Tropical Research and Development, Inc., Gainesville, Florida.

Vergne, P., J. Dickinson, C. Villeda, G. Sharp, K. Dorsay, F. Pannier, K. Neils, C. Peckham, and W. Griffin. 1988. Study of the Honduran shrimp industry. Tropical Research and Development, Inc.

VITA

Robert A. Pierce II
1-31 Agriculture Building
School of Natural Resources
University of Missouri
Columbia, MO 65211

Phone: (314) 882-4337
FAX: (314) 882-1977

EDUCATION

B.S. Southern Arkansas University, 1977
M.S. Mississippi State University, 1981

POSITIONS

Extension Fish and Wildlife Specialist (1989-present), School of Natural Resources, University of Missouri, Columbia
County Extension Agent - Staff Chairman (1988-1989), Dallas County, University of Arkansas Cooperative Extension Service
County Extension Agent - Agriculture, Forestry (1982-1988), Lincoln County, University of Arkansas Cooperative Extension Service
Graduate Research Assistant (1979-1981), School of Forestry and Natural Resources, Department of Wildlife and Fisheries, Mississippi State University
Biological Technician (1980), U.S. Fish and Wildlife Service, Migratory Bird and Habitat Research Laboratory, Vicksburg, Mississippi Research Unit

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Missouri Aquaculture Advisory Council
National Animal Damage Control Association
Soil and Water Conservation Society
University of Missouri Extension Association
Wildlife Society, Associate Wildlife Biologist, Missouri Chapter

VITA

LaDon Swann
Aquaculture Extension Specialist
Department of Animal Science
Purdue University
West Lafayette, IN 47907-1026

Phone: 317-494-6264
E-mail: lswann@hub.ansc.purdue.edu

EDUCATION

B.S. Tennessee Technological University, Cookeville, TN, 1982
M.S. Tennessee Technological University, Cookeville, TN, 1985
Ph.D. candidate Purdue University

POSITIONS

Aquaculture Extension Specialist (1989-present), Illinois-Indiana Sea Grant
Assistant Project Leader (1988-1989), Non-Native Fish Research Lab, Boca Raton, Florida
Aquaculture Trainer (1989), Peace Corps Stateside Training Program, University of South Carolina
Farm Technician (1989), Fish Acres Tropical Fish Farm
Aquaculture Extension Agent (1985-1987), U.S. Peace Corps, Togo, West Africa
Research and Teaching Assistant (1982-85), Tennessee Technological University

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Society of Animal Scientists
Illinois Aquaculture Industry Association
Indiana Aquaculture Association
National Aquaculture Association
World Aquaculture Society
Beta Beta Beta
Gamma Sigma Delta
Sigma Xi

SELECTED PUBLICATIONS

- Swann, D.L., J.R. Riepe, J. D. Stanley, M. E. Griffin, and P. B. Brown. In press. Culture of hybrid striped bass in cages in Indiana and evaluation of diets containing three protein levels of dietary protein. *Journal of the World Aquaculture Society*.
- Swann, D.L., and G.L. Jensen. 1994. Accessing aquaculture information through the Aquaculture Network information Center. Fact Sheet AS-492. Aquaculture Extension, Illinois-Indiana Sea Grant Program, Purdue University and the University of Illinois Cooperative Extension Services.
- Brown, P.B., M.R. White, D.L. Swann, and M.S. Fuller. 1993. A severe outbreak of ectoparasitism due to *Epistylis sp.* in pond-reared Orconectid crayfish. *Journal of the World Aquaculture Society* 24:116-120.
- Swann D.L. 1993. Water quality water Sources used in aquaculture. Fact Sheet AS-486. Aquaculture Extension, Illinois-Indiana Sea Grant Program, Purdue University and the University of Illinois Cooperative Extension Services.
- Swann, L., and J.R. Riepe. 1993. Making wise choices when direct marketing your aquaculture products. Technical Bulletin Series # 107. North Central Regional Aquaculture Center.