

PROJECT NAME: North Central Regional Aquaculture Center Extension Program

FUNDING LEVEL: Year 1 (91-92) - \$48,721
Year 2 (92-93) - \$54,888

DURATION: 2 years

CHAIRPERSON: Dr. Donald L. Garling, Department of Fisheries & Wildlife, Michigan State University, East Lansing, MI 48824 Telephone (517) 353-1989

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SITUATION

The current North Central Regional Aquaculture Center Extension Program Work Plan expands the number of state extension specialist and CES approved contacts participating in the Work Plan and updates the major actions of the extension work group members. Only major actions are contained in the work plan. Each work group participant will contribute to the overall regional extension effort in areas not listed as part of their major actions through, for example, participation in workshops, development of program materials, and response to out-of-state information requests.

During the first two years of the NCRAC Extension program, a network of Cooperative Extension Service (CES) Specialists, Sea Grant Specialists, and CES appointed contacts has been established to promote information transfer and to prioritize and coordinate development of regional programs and materials. All 12 states in the region are represented. Members of the network have met twice annually. As a result, bulletins and fact sheets have been prioritized and are being developed; workshops on salmonid culture, cage culture, and water quality have been held; in-service materials have been developed; and short term (2) and long term (2) in-service training has been hosted in 3 states. Extension work plan participants have worked closely with each research working group to assist in needs assessment, to provide input for designing and prioritizing research objectives, and to extend results useful to extension clientele. The network has enabled members to improve their responses to clientele needs. This work plan is designed to continue and strengthen extension's role in development of a strong aquaculture industry in the region.

Interest in aquaculture has continued to grow dramatically with an increased awareness of the health benefits from regular fish consumption, the rising demand and prices of fish products, the desire to stock fishes to improve the recreational potential of public and private waters, and the search for economic development and alternative agricultural opportunities. Fish and seafood consumption in the U.S. reached a record high of 17.2 pounds per capita in 1989. Regular fish consumption appears to reduce the potential of developing cardio-vascular diseases and may even reverse atherosclerosis. The North Central Region contains about 25% of the U.S. population; but, produces less than 1% of the fish consumed. Current production by fish culturists in the North Central Region (NCR) can not meet current demand for fresh food fish, fish used for stocking and bait minnows. Opportunities for expansion and establishment of fee-fishing operations also exist in many areas across the region.

Extension Service personnel in aquaculture serve as liaison between research personnel and several clientele groups. The largest group of clientele are individuals interested in starting an aquaculture operation who lack basic knowledge of aquaculture technologies and opportunities. A second group of clientele have some basic knowledge of aquaculture and sites with potential for aquaculture development. These individuals need more specific information to develop plans for establishing a commercial operation. The third clientele group is comprised of established fish culturists who need information to solve specific problems. A fourth clientele group includes industries involved in production of inputs for aquaculture or in the processing and marketing sectors.

The demand for aquaculture extension education programs cannot be met by the few specialists in the North Central region. Networking of specialists and CES designated contacts will maximize efficiency of education programs and minimize duplication. Printed materials will be an important component of the extension education effort in aquaculture and county agents and Sea Grant agents will be educated to serve as initial information sources. The North Central Regional Aquaculture Center (NCRAC) Extension Project is designed to assess and meet the information needs of the various clientele groups through cooperative and coordinated regional educational programming.

OBJECTIVES

1. Strengthen linkages between North Central Regional Aquaculture Center research and extension work groups.
2. Enhance the North Central Region (NCR) aquaculture extension network for aquaculture information transfer.

3. Provide in-service training for Cooperative Extension Service and Sea Grant personnel and other landowner assistance personnel.
4. Develop aquaculture education programs for the North Central Region including:
 - a. Educational materials for individuals who lack basic knowledge about aquaculture.
 - b. Conduct regional programs for individuals with demonstrated potential to develop commercial aquaculture operations.
 - c. Plan and implement educational programs for aquaculturists and industries involved in production of inputs for aquaculture or in the processing and marketing sectors.

ACTION

1. Strengthen linkages between NCRAC research and extension work groups.

An extension working group member has been assigned to work with each funded NCRAC research project to provide ongoing needs assessment, to provide input for design and prioritization of future research projects, and to identify results useful in extension programs. The linkages are:

Research Workgroup	Extension Liaison	State
Bait Fish ¹	Selock	IL
Crayfish ¹	Gunderson	MN
Economics	Lietzkoppler	OH
Perch	Garling	MI
Salmonids	Kinnunen	MI
Striped Bass	Morris	IA
Sunfish	Binkowski	WI
Walleye	Kapuscinski	MN
Waste Water ¹	Swann	IL-IN

2. Enhance the North Central Region (NCR) aquaculture extension network for aquaculture information transfer.

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 materials produced by states in the NCR has been established. Workshops for CES and Sea Grant personnel on how to develop a strong interdisciplinary effort, enhance information sharing, establish priorities for development of educational materials, plan workshops, etc., have been held and will be hosted in additional sites. In March of 1992, the work group meeting will be held in conjunction with the National Aquaculture Extension Workshop which is sponsored, in part, by the regional aquaculture centers. During year two, one of the extension workgroup meeting will be held in conjunction with the North Central Aquaculture Conference. Liaisons with state and federal agencies, and with state aquaculture organizations have been made to identify industry needs. These activities will be continued.

3. Provide in-service training for Cooperative Extension Service and Sea Grant personnel and other landowner assistance personnel.

Three pilot in-service training workshops have been held. Based on the results of these workshops, two or more regional aquaculture in-service training workshops will be conducted. Indiana-Illinois in-service aquaculture update meetings will be held annually to reinforce previous in-service training. Additional in-service training workshops will be held in Minnesota and Ohio (tentative) in 1993. Materials developed for objectives 4 provide the basis for these programs.

A pilot regional in-service training program will be developed using television satellite uplink/downlink at Purdue University, University of Illinois, Southern Illinois University-Carbondale, University of Minnesota, Michigan State

¹Pending approval of the workgroup proposal.

ATTACHMENT E

University, and Ohio State University. The initial program will be uplinked from Purdue University and downlinked at one or more of the additional state sites. The program will include technical sessions and visits to existing fish farms in the cooperating states. An evaluation of this type of regional educational activity will be made to determine its utility for providing in-service training through the entire region. Purdue University (Swann) will serve as the principal contact for this activity.

4. Develop aquaculture education programs for the North Central Region including:
- a. Educational materials for individuals who lack basic knowledge about aquaculture. Develop a bulletin containing basic information describing aquaculture potential and the planning process. Develop fact sheets that describe basic information for the culture of species with demonstrated culture potential in the NCR. Examples of planned fact sheets are:

FACT SHEET TOPIC	LEADER + TEAM
Cage Culture	Swann, Selock
Fish Feeding	Swann, Garling
Fish Transport	Swann
NCRAC	Morris
Recirculating Systems	Swann, Garling, Morris, Selock
Yellow Perch Culture	Kayes, Binkowski, Garling

- b. Conduct regional programs for individuals with demonstrated potential to develop commercial aquaculture operations.

An aquaculture information packet has been assembled that addresses appropriate basic aquaculture considerations and aquaculture planning. The packet will be improved by assembling and developing new training materials for specific aquaculture technologies appropriate to the North Central Region. Two to three regional programs for individuals with demonstrated potential to develop commercial aquaculture will be conducted. Each program will focus on a different technical subject. NCRAC research results will be highlighted at these programs as information becomes available.

- c. Plan and implement educational programs for aquaculturists and industries involved in production of inputs for aquaculture or in the processing and marketing sectors.

Continuing educational programs have been provided for aquaculturists and industries involved in production of inputs for aquaculture or in the processing and marketing sectors that need information to solve specific problems. Additional programs and information to meet specific industry needs will be developed and demonstrations at existing aquaculture facilities will be utilized. Extension personnel will work with industry clientele to provide researchers with updated needs assessments.

Examples of planned workshops to meet objective 4 b and c include:

WORKSHOP TOPIC	N	LEADER + PLANNING TEAM	YEAR(S)
Aquaculture, general	2	Binkowski, Gunderson, Morris, Kinnunen	'92, '93
Crayfish Culture	1	Swann	'92
North Central Aquaculture Conference	1	Garling	'93
Pond Construction	1	Swann	'93
Recirculating Systems	1	Swann	'91
Waste Management	2	Kinnunen, Garling, Morris	'93

EVALUATION

Ask selected aquaculturists, extension specialists, state and federal fish culturists within and outside the region to evaluate extension program materials. Survey program participants on perceptions of knowledge gained, usefulness of materials, ability to apply ideas, and for suggestions for improvement. Survey individuals receiving extension materials/assistance to quantify the number, type, and size of new fish culture operations started and the economic impact on existing industries.

SCOPE

Number of States in Region: 12
 Number of States in program: 12
 Cooperating Program Areas:

Sea Grant, landowner assistance personnel, Aquaculture Industries and industry associations.

KEYWORDS

aquaculture, fish, water quality, agriculture, North Central Regional Aquaculture Center, natural resources, fisheries, alternative agriculture

***ESTIMATED RESULTS/IMPACTS**

Knowledge gained & attitudes changed	2500	individuals
New or expanded fish culture	50	farms
	250	acres of ponds
	100	linear feet raceways
	\$1,000,000	economic impact
Improved fish culture management	75	farms
	300	acres of ponds
	250	linear feet raceways
	20	reduced disease
	25	improved product
	\$500,000	economic impact
New or expanded associated industries	15	new
	15	expanded
	\$300,000	economic impact, new markets

***ESTIMATED FTE**

	Prof.	Para.	Vol.
1990	1.3	1.9	.55
1991	1.3	2.5	.75

***REPORTING SCHEDULE**

1992	X
1993	X

***CONTACTS**

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AQUACULTURE EXTENSION PROJECT LEADERS

<u>STATE</u>	<u>NAME</u>	<u>INSTITUTION</u>
Illinois/Indiana	LaDon Swann	Purdue University
Illinois	Dan Selock	Southern Illinois University
Iowa	Joseph E. Morris	Iowa State University
Kansas	F. Robert Henderson	Kansas State University
Michigan	Donald L. Garling	Michigan State University
	Ronald Kinnunen	Michigan State University
Minnesota	Anne Kapuscinski	University of Minnesota
	Jeffrey Gunderson	University of Minnesota
	Jeffery Mittelmark	University of Minnesota
Missouri	John P. Slusher	University of Missouri
	Robert A. Pierce II	University of Missouri
Nebraska	Terrence B. Kayes	University of Nebraska-Lincoln
North Dakota	Terry Messmer	North Dakota State University
Ohio	James M. Ebeling	Ohio State University
	Frank Lichtkoppler	Ohio State University
South Dakota	Larry Tidemann	South Dakota State University
Wisconsin	Fred P. Binkowski	U. Wisconsin-Milwaukee
	David Stuiber	U. Wisconsin - Madison

**EXTENSION PROGRAM AND MAJOR ACTIONS AND BUDGET
FOR PURDUE UNIVERSITY**

(Swann)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

1. Establish linkages with the NCRAC Research and Extension Work groups, pending approval of the research proposal.
 - a. Serve as liaison between the NCRAC Waste Management work group and the Extension work group.
 - b. Participate in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - c. Provide progress updates for the waste management work group for the NCRAC newsletter annually.
 - d. Assist in development of extension publications from the waste management research project.
2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Indiana/Illinois
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.
3. Provide in-service training for Cooperative Extension Service and other landowner-assistance personnel.
 - a. Develop and evaluate a pilot regional in-service training program using television satellite uplink/downlink at Purdue University, University of Illinois, Southern Illinois University-Carbondale, University of Minnesota, Michigan State University, and Ohio State University.
 - b. Continue to provide assistance with Illinois-Indiana CES in-service training workshops at Southern Illinois University-Carbondale.
 - c. Assist with evaluation of in-service training workshops for Illinois-Indiana CES personnel by assessment of knowledge base prior to training, mid-course, and post course evaluations and an assessment of independent applications of learned material.

ATTACHMENT E

4. Develop aquaculture education programs for the North Central Region.
 - a. Lead the development of bulletins and fact sheets on Fish Cage Culture ('92), Recirculating Systems ('92), Fish Feeding ('93), Fish Transport ('93).
 - b. Conduct a pilot program using TV satellite uplink/downlink for regional aquaculture education with institutions listed in 3a participating in development of the program, budgets, promotion, and evaluation.
 - c. Determine regional default values using input from selected states for use with CES and Sea Grant farm financial analysis software. The default values include the following: fingerling cost, feed costs, market size and price, and months to harvestable size. The primary species targeted will be rainbow trout, hybrid striped bass, channel catfish, hybrid sunfish, yellow perch and walleye. These values will be published through cooperation with Sea Grant and NCRAC.
 - d. Deliver regional workshops on Pond Site Selection and Construction ('92) and on Crayfish Culture ('93) at Purdue University and on recirculating systems (November '91) at Illinois State University.

**EXTENSION PROGRAM AND MAJOR ACTIONS AND BUDGET
FOR SOUTHERN ILLINOIS UNIVERSITY****(Selock)**MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

1. Establish linkages with the NCRAC Research and Extension Work groups.
 - a. Serve as liaison between the NCRAC Bait Fish work group and the Extension work group, pending approval of the bait fish research proposal.
 - b. Participate in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - c. Provide progress updates for the bait fish work group for the NCRAC newsletter annually.
 - d. Assist in development of extension publications from the bait fish research project.
2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Illinois
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.
3. Provide in-service training for Cooperative Extension Service and other landowner-assistance personnel.
 - a. Develop educational materials designed to help Extension professionals respond to initial routine aquaculture questions from the general public. Specifically, videos and slide presentations on fish cage construction, aquatic plant identification and control, and tank re-cycle systems will be developed.
 - b. Continue Illinois-Indiana CES in-service training workshops at Southern Illinois University-Carbondale by annually having winter or spring, 1 to 2 day "aquaculture update" meetings.
 - c. Evaluate in-service training workshops for Illinois-Indiana CES personnel by assessment of knowledge base prior to training, mid-course, and post course evaluations and an preliminary assessment of independent applications of learned material. The Affective Domain (feelings about the training) and Cognitive Domain (knowleged derived from the training) will be measured by appropriate evaluation tools. Matching funds from the IL-IN Sea Grant Program have been continued.

4. Develop aquaculture education programs for the North Central Region
 - a. Participate in fact sheet development with regional extension personnel on water recirculation systems and cage culture.
 - b. Participate with regional extension personnel in Regional Aquaculture Series Conferences, one per year.
 - c. Evaluate the design and construct an aquaculture exhibit for state fairs in the southern part of the NCR. The exhibit would contain six insulated fiberglass tanks with glass fronts, biofilters, and corresponding story boards to explain the species of fish in each tank and aquaculture potential. Miscellaneous aquaculture equipment items and NCRAC and other regional bulletins and fact sheets would also be exhibited. Key aquaculturists have agreed to help staff the exhibits during field testing at selected state and county fairs in the Southern part of the NCR (Illinois State Fair in Springfield, IL; Du Quoin State Fair, in Du Quoin, IL, and Cape Girardeau County Fair, Cape Girardeau, MO).
 - d. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

**PROPOSED PROJECT BUDGET FOR
SOUTHERN ILLINOIS UNIVERSITY**

(Selock)

Objectives 1, 2, 3, and 4

				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	0.10	1	0.10
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			250	250
B.	Fringe Benefits			\$0	\$0
C.	Total Salaries, Wages and Fringe Benefits			250	250
D.	Nonexpendable Equipment			\$0	\$0
E.	Materials and Supplies			\$1,200	\$1,200
F.	Travel - Domestic (<i>Including Canada</i>)			\$2,250	\$2,250
G.	Other Direct Costs			\$2,350	\$2,350
	TOTAL PROJECT COSTS PER YEAR (C through G)			6,050	6,050
				TOTAL PROJECT COSTS	12,100

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTION AND BUDGET
FOR IOWA STATE UNIVERSITY**

(Morris)

MAJOR ACTIONS

Participate in the following objectives of the NCRAC Extension Work Plan:

1. Establish linkages with the NCRAC Research and Extension Work groups.
 - a. Serve as liaison between the NCRAC Striped Bass Work Group and the Extension work group.
 - b. Participate in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - c. Provide progress updates for the Striped Bass Work Group for the NCRAC newsletter annually.
 - d. Assist in development of extension publications from the Striped Bass research project.
2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Provide 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Iowa.
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.
 - e. Work with the North Central Regional Educational Materials project to distribute associated extension materials.
3. Provide in-service training for CES and Sea Grant Personnel and other landowner assistance personnel.
 - a. Assist Kinnunen, Lichtkoppler and Gunderson in two In-Service Training Conferences for Sea Grant and Cooperative Extension Service personnel in Minnesota and Ohio.
4. Develop aquaculture education programs for the North Central Region
 - a. Participate in the development of fact sheets on water recirculation ('92 with Swann and Garling) systems and cage culture ('92 with Swann and Kapuscinski).
 - b. Formulate with NCRAC Director the development of a fact sheet detailing information on NCRAC ('92).
 - c. Plan ('91) and implement ('92) two Waste Management Workshops (north/south) with Kinnunen (Lead) and Garling.
 - d. Participate with Binkowski (Lead), Gunderson, Mittelmark, and Kinnunen in Regional Aquaculture Series Conferences, one per year.
 - e. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

**PROPOSED PROJECT BUDGET FOR
IOWA STATE UNIVERSITY**

(Morris)

Objectives 1, 2, 3, and 4

					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					
c.	Graduate Students					
d.	Prebaccalaureate Students	1	0.20	1	0.20	\$700 \$800
e.	Secretarial-Clerical					
f.	Technical, Shop, and Other ...					
	Total Salaries and Wages					700 800
B.	Fringe Benefits					\$0 \$0
C.	Total Salaries, Wages and Fringe Benefits					700 800
D.	Nonexpendable Equipment					\$0 \$0
E.	Materials and Supplies					\$600 \$650
F.	Travel - Domestic (<i>Including Canada</i>)					\$2,500 \$3,500
G.	Other Direct Costs					\$700 \$750
	TOTAL PROJECT COSTS PER YEAR (C through G)					4,500 5,700
					TOTAL PROJECT COSTS	10,200

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR KANSAS STATE UNIVERSITY**

(Henderson)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Kansas
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.

**PROPOSED PROJECT BUDGET FOR
KANSAS STATE UNIVERSITY**

(Henderson)

Objective 2

				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
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			\$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)			1,500	1,500
	TOTAL PROJECT COSTS			3,000	

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTION AND BUDGET
FOR MICHIGAN STATE UNIVERSITY****(Garling)**MAJOR ACTIONS

Coordinate North Central Region Aquaculture Center Extension Program as Work Plan chairperson and participate in the following objectives of the NCRAC Extension Work Plan:

1. Establish linkages with the NCRAC Research and Extension Work groups.
 - a. Serve as liaison between the NCRAC Perch Work Group and the Extension work group.
 - b. Participate in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - c. Provide progress updates for the Yellow Perch Work Group for the NCRAC newsletter annually.
 - d. Assist in development of extension publications from the Yellow Perch research project.
2. Participate in the NCR aquaculture extension network for aquaculture information transfer.
 - a. Update directory of state extension contact persons.
 - b. Solicite 15 copies of extension-related aquaculture publications states contact each January and distribute to state extension contacts.
 - b. Update each January a directory of key persons to be included on NCRAC mailing list through state extension contacts.
 - d. Organize and participate in biannual Extension Work Group Meetings.
4. Develop aquaculture education programs for the North Central Region
 - a. Prepare a fact sheet on yellow perch aquaculture ('93) with Binkowski and Kayes (lead).
 - b. Participate in the development of bulletins and fact sheets on Recirculating Systems and Fish Feeding with Swann (lead) and other specialists.
 - c. Plan and implement two Waste Management Workshops (north/south) with Morris and Kinnunen (lead) and participate as a resource person in other regional workshops
 - d. Assist the Planning Committee for the second North Central Region Fish Culture Conference
 - e. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

**PROPOSED PROJECT BUDGET FOR
MICHIGAN STATE UNIVERSITY**

(Garling)

Objectives 1, 2 and 4

					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					
c.	Graduate Students					
d.	Prebaccalaureate Students					
e.	Secretarial-Clerical	1	0.10	1	0.10	\$2,250 \$2,350
f.	Technical, Shop, and Other ...					
	Total Salaries and Wages					2,250 2,350
B.	Fringe Benefits (28.2% of 2e)					\$635 \$663
C.	Total Salaries, Wages and Fringe Benefits					2,885 3,013
D.	Nonexpendable Equipment					\$0 \$0
E.	Materials and Supplies					\$1,500 \$1,500
F.	Travel - Domestic (<i>Including Canada</i>)					\$1,500 \$1,500
G.	Other Direct Costs					\$750 \$1,000
	TOTAL PROJECT COSTS PER YEAR (C through G)					6,635 7,013
	TOTAL PROJECT COSTS					13,648

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTION AND BUDGET
FOR MICHIGAN STATE UNIVERSITY****(Kinnunen)**MAJOR ACTIONS

Participate in the following objectives of the NCRAC Extension Work Plan:

1. Establish linkages with the NCRAC Research and Extension Work groups.
 - a. Serve as liaison between the NCRAC Salmonid Work Group and the Extension work group.
 - b. Participate in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - c. Provide progress updates for the Salmonid Work Group for the NCRAC newsletter annually.
 - d. Assist in development of extension publications from the Salmonid research project.
 - e. Attend Annual Great Lakes Fish Disease Control Committee meetings as NCRAC representative.
2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting and serve as secretary.
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Compile aquaculture extension information for use by Sea Grant and CES personnel.
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.
3. Provide in-service training for CES and Sea Grant personnel and other landowner assistance personnel.
 - a. Refine standardized core program and materials with Gunderson, Mittelmark, Lichtkoppler, Morris, and Binkowski.
 - b. Deliver program for CES personnel in Iowa and Minnesota.
4. Develop aquaculture education programs for the North Central Region
 - a. Lead planning ('92) and implementation ('93) of two Waste Management Workshops (north/south) with Morris and Garling.
 - b. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

**PROPOSED PROJECT BUDGET FOR
MICHIGAN STATE UNIVERSITY**

(Kinnunen)

Objectives 1, 2, 3 and 4

				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	0.10	1	0.10
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			\$475	\$1,375
F.	Travel - Domestic (<i>Including Canada</i>)			\$3,600	\$4,800
G.	Other Direct Costs			\$0	\$0
	TOTAL PROJECT COSTS PER YEAR (C through G)			4,075	6,175
	TOTAL PROJECT COSTS			10,250	

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTION AND BUDGET
FOR UNIVERSITY OF MINNESOTA****(Kapusinski, Gunderson, and Mittelmark)**MAJOR ACTIONS

Participate in the following objectives of the NCRAC Extension Work Plan:

1. Establish linkages with the NCRAC Research and Extension Work groups.
 - a. Serve as liaisons between the NCRAC Walleye (Kapusinski) and Crayfish (Gunderson), pending proposal approval, Work Groups and the Extension work group.
 - b. Participate in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - c. Provide progress updates for the Walleye and Crayfish Work Groups for the NCRAC newsletter annually.
 - d. Assist in development of extension publications from the Walleye and Crayfish research projects.
2. Participate in the NCR aquaculture extension network for aquaculture information transfer.
 - a. Attend the bi-annual extension work group meeting.
 - b. Provide 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Minnesota.
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.
3. Gunderson and Mittelmark will provide in-service training for CES and Sea Grant personnel and other landowner assistance personnel.
4. Develop aquaculture education programs for the North Central Region
 - a. Mittelmark will as a resource person for NCRAC aquaculture education programs,
 - b. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

**PROPOSED PROJECT BUDGET FOR
UNIVERSITY OF MINNESOTA**

(Kapuscinski, Gunderson, and Mittelmark)

Objectives 1, 2, 3 and 4

				Year 1	Year 2
		Year 1		Year 2	
A.		No.	FTEs	No.	FTEs
1.	No. of Senior Personnel & FTEs ¹				
a.	(Co)-PI(s)	2	0.10	2	0.10
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			\$700	\$800
F.	Travel - Domestic (<i>Including Canada</i>)			\$2,500	\$3,500
G.	Other Direct Costs			\$0	\$0
	TOTAL PROJECT COSTS PER YEAR (C through G)			3,200	4,300
	TOTAL PROJECT COSTS			7,500	

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR UNIVERSITY OF MISSOURI**

(Slusher and Pierce)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Missouri,
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.

**PROPOSED PROJECT BUDGET FOR
UNIVERSITY OF MISSOURI**

(Slusher and Pierce)

Objective 2

				Year 1	Year 2
		Year 1		Year 2	
A.		No.	FTEs	No.	FTEs
1.	No. of Senior Personnel & FTEs ¹				
a.	(Co)-PI(s)	2	0.10	2	0.10
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			\$500	\$500
F.	Travel - Domestic (<i>Including Canada</i>)			\$1,500	\$1,500
G.	Other Direct Costs			\$0	\$0
TOTAL PROJECT COSTS PER YEAR (C through G)				2,000	2,000
TOTAL PROJECT COSTS				4,000	

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR UNIVERSITY OF NEBRASKA-LINCOLN**

(Kayes)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Nebraska.
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.
4. Develop aquaculture education programs for the North Central Region
 - a. Serve as a resource person for NCRAC aquaculture education programs,
 - b. Lead the development of a fact sheet on yellow perch aquaculture ('93) with Binkowski and Garling.
 - c. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

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

(Kayes)

Objectives 2 and 4

				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
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			\$700	\$800
F.	Travel - Domestic (<i>Including Canada</i>)			\$1,500	\$1,500
G.	Other Direct Costs			\$0	\$0
	TOTAL PROJECT COSTS PER YEAR (C through G)			2,200	2,300
	TOTAL PROJECT COSTS			4,500	

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR NORTH DAKOTA STATE UNIVERSITY**

(Messmer)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in North Dakota
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.

**PROPOSED PROJECT BUDGET FOR
NORTH DAKOTA STATE UNIVERSITY**

(Messmer)

Objective 2

					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	0.05	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					\$500 \$1,000
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)					1,500 2,000
	TOTAL PROJECT COSTS					3,500

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTION AND BUDGET
FOR OHIO STATE UNIVERSITY****(Lichtkoppler and Ebling)**MAJOR ACTIONS

To participate in the following objectives of the Extension Work Group of the NCRAC Extension Work Plan:

1. Establish linkages with the NCRAC Research and Extension Work groups.
 - a. Serve as the Extension liaison (Lichtkoppler) to the NCRAC Economics/Marketing research project.
 - b. Assist in development of extension publications from the Economics/Marketing Research Projects.
 - e. Assist in documenting industry needs and information and provide ongoing needs assessment to the Economics/Marketing research work group.
2. Participate in the NCR Aquaculture Extension network for aquaculture information transfer.
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Ohio
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.
3. Provide in-service training for Cooperative Extension Service and Sea Grant personnel and other landowner-assistance personnel.
 - a. Lichtkoppler will assist in conducting a seminar on aquaculture at the Great Lakes Sea Grant Network meeting in Michigan in May of 1992.
4. Develop aquaculture education programs for the NCR.
 - a. Lichtkoppler and Ebeling will serve as reviewers of educational materials under development to be sure they are understandable by individuals who lack a basic knowledge about aquaculture.
 - b. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Ohio and the region.

**PROPOSED PROJECT BUDGET FOR
OHIO STATE UNIVERSITY**

(Lichtkoppler and Ebeling)

Objectives 1, 2, 3 and 4

				Year 1	Year 2
		Year 1		Year 2	
A.		No.	FTEs	No.	FTEs
1.	No. of Senior Personnel & FTEs ¹				
a.	(Co)-PI(s)	2	0.10	2	0.10
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			\$1,000	\$1,000
F.	Travel - Domestic (<i>Including Canada</i>)			\$2,000	\$2,500
G.	Other Direct Costs			\$0	\$0
	TOTAL PROJECT COSTS PER YEAR (C through G)			3,000	3,500
	TOTAL PROJECT COSTS			6,500	

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR SOUTH DAKOTA STATE UNIVERSITY**

(Tidemann)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in South Dakota
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.

**PROPOSED PROJECT BUDGET FOR
SOUTH DAKOTA STATE UNIVERSITY**

(Tidemann)

Objective 2

					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	0.05	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					\$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)					1,500 1,500
	TOTAL PROJECT COSTS					3,000

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR UNIVERSITY OF WISCONSIN-MILWAUKEE****(Binkowski)**MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

1. Establish linkages with the NCRAC Research and Extension Work groups
 - a. Serve as liaison between the NCRAC Sunfish Work Group and Extension Work Group.
 - b. Participate in Research Work Group meetings to provide input on design and feedback based on documented industry needs.
 - c. Provide progress updates for the Sunfish Work Group for the NCRAC newsletter annually.
 - d. Assist in development of extension publications from the Sunfish Work Group.
2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Wisconsin
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.
3. Provide in-service training for Cooperative Extension Service and Sea Grant personnel and other landowner-assistance personnel.
 - a. Participate with Kinnunen, Gunderson, Mittelmark, and Morris in developing basic aquaculture information core program and materials.
 - b. Participate in CES and Sea Grant agent training session with Minnesota, Michigan, and Iowa NCRAC Extension personnel to be held in February - March 1992 and 1993.
4. Develop aquaculture education programs for the NCR.
 - a. Prepare a fact sheet on yellow perch aquaculture with Kayes (Lead) and Garling.
 - b. Provide leadership for an annual regional lecture series with Extension personnel from Iowa Minnesota, and Michigan on specialized topics such as fish health, water quality, recirculating systems, pond construction, etc. Preliminary program descriptions will be available by the fall of 1991 and 1992.
 - c. Develop and provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

**PROPOSED PROJECT BUDGET FOR
UNIVERSITY OF WISCONSIN-MILWAUKEE
(Binkowski)**

Objectives 1, 2, 3 and 4

					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	0.20	1	0.20
b.	Senior Associates							
2.	No. of Other Personnel (Non-Faculty) & FTEs							
a.	Research Assoc./Postdoc							
b.	Other Professionals							
c.	Graduate Students							
d.	Prebaccalaureate Students						\$1,211	\$1,500
e.	Secretarial-Clerical							
f.	Technical, Shop, and Other ...							
	Total Salaries and Wages						1,211	1,500
B.	Fringe Benefits						\$0	\$0
C.	Total Salaries, Wages and Fringe Benefits						1,211	1,500
D.	Nonexpendable Equipment						\$0	\$0
E.	Materials and Supplies						\$1,150	\$1,150
F.	Travel - Domestic (<i>Including Canada</i>)						\$3,800	\$3,800
G.	Other Direct Costs						\$0	\$0
TOTAL PROJECT COSTS PER YEAR (C through G)							6,161	6,450
TOTAL PROJECT COSTS							12,611	

¹FTEs = Full Time Equivalents based on 12 months.

**EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR UNIVERSITY OF WISCONSIN-MADISON/EXTENSION**

(Stuiber)

MAJOR ACTIONS

Participate in the following objective of the Extension Work Group of the NCRAC Extension Work Plan:

2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:
 - a. Attending the bi-annual extension work group meeting,
 - b. Providing 15 copies of aquaculture extension related materials produced in their state to the extension chairperson for distribution to all state contacts once annually,
 - c. Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Wisconsin,
 - d. Identify and up-date lists of key state contacts (legislators, agency, industry, . . .) to receive the NCRAC newsletter and other pertinent materials.

4. Develop aquaculture education programs for the North Central Region
 - a. Assist in preparing industry to meet its obligations in the event of passage of the proposed national fishery inspection program.
 - b. Promote the movement of safe, quality fishery products within distribution channels.
 - c. Promote and foster the use of new technologies to improve and expand market potential of aquaculture reared fishes.

**PROPOSED PROJECT BUDGET FOR
UNIVERSITY OF WISCONSIN-MADISON
(Stuiber)**

Objectives 2 and 4

				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
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			\$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)			1,500	1,500
	TOTAL PROJECT COSTS			3,000	

¹FTEs = Full Time Equivalents based on 12 months.

**AQUACULTURE EXTENSION
Budget Summary for Each Participating Institution**

State/Institution	Year 1	Year 2
Indiana/Illinois Purdue University	\$4,400	\$4,400
Illinois Southern Illinois University	\$5,550	\$5,550
Iowa Iowa State University	\$4,500	\$5,700
Kansas Kansas State University	\$1,500	\$1,500
Michigan Michigan State University (Garling)	\$6,635	\$7,013
Michigan State University (Kinnunen)	\$4,075	\$6,175
Minnesota University of Minnesota	\$3,200	\$4,300
Missouri University of Missouri	\$2,000	\$2,000
Nebraska University of Nebraska-Lincoln	\$2,200	\$2,300
North Dakota North Dakota State University	\$1,500	\$2,000
Ohio Ohio State University	\$3,000	\$3,500
South Dakota South Dakota State University	\$1,500	\$1,500
Wisconsin University of Wisconsin - Madison	\$1,500	\$1,500
University of Wisconsin - Milwaukee	\$6,161	\$6,450
TOTAL	47,721	53,888
GRAND TOTAL	101,609	

**AQUACULTURE EXTENSION
Budget Summary for Each Objective**

Objective	FY1	FY2
1. Strengthen linkages between North Central Regional Aquaculture Research and Extension Work Groups.	\$4,300	\$4,800
2. Participate in the North Central Regional Aquaculture Extension Network for Information transfer.	\$25,610	\$27,138
3. Provide in-service training for Cooperative Extension Service and other Landowner assistance personnel.	\$6,100	\$7,700
4. Develop aquaculture education programs for the North Central Region.	\$12,711	\$15,250
TOTALS	\$48,721	\$54,888
GRAND TOTAL	\$103,609	

**AQUACULTURE EXTENSION
Budget Summary for Objective 1**

State/Institution	Year 1	Year 2
Indiana		
Purdue University	\$0	\$0
Illinois		
Southern Illinois University	\$0	\$0
Iowa		
Iowa State University	\$500	\$500
Michigan		
Michigan State University (Garling)	\$500	\$500
Michigan State University (Kinnunen)	\$1,200	\$1,200
Minnesota		
University of Minnesota	\$1,300	\$1,800
Ohio		
Ohio State University	\$300	\$300
Wisconsin		
University of Wisconsin - Milwaukee	\$500	\$500
	TOTAL	4,300
	GRAND TOTAL	9,100

**AQUACULTURE EXTENSION
Budget Summary for Objective 2**

State/Institution	Year 1	Year 2
Indiana/Illinois Purdue University	\$1,200	\$1,200
Illinois Southern Illinois University	\$2,300	\$2,300
Iowa Iowa State University	\$1,200	\$1,250
Kansas Kansas State University	\$1,500	\$1,500
Michigan Michigan State University (Garling)	\$5,135	\$5,513
Michigan State University (Kinnunen)	\$1,275	\$1,275
Minnesota University of Minnesota	\$1,200	\$1,200
Missouri University of Missouri	\$2,000	\$2,000
Nebraska University of Nebraska-Lincoln	\$1,500	\$1,500
North Dakota North Dakota State University	\$1,500	\$1,500
Ohio Ohio State University	\$2,300	\$2,900
South Dakota South Dakota State University	\$1,500	\$1,500
Wisconsin University of Wisconsin - Madison	\$1,500	\$1,500
University of Wisconsin - Milwaukee	\$1,500	\$1,500
TOTAL	25,610	26,638
GRAND TOTAL	52,248	

**AQUACULTURE EXTENSION
Budget Summary for Objective 3**

State/Institution	Year 1	Year 2
Indiana/Illinois Purdue University	\$300	\$300
Illinois Southern Illinois University	\$2,000	\$2,000
Iowa Iowa State University	\$1,050	\$1,550
Michigan Michigan State University (Kinnunen)	\$1,000	\$1,600
Minnesota University of Minnesota	\$700	\$1,300
Ohio Ohio State University	\$100	\$0
Wisconsin University of Wisconsin - Milwaukee	\$950	\$950
TOTAL	6,100	7,700
GRAND TOTAL	13,800	

**AQUACULTURE EXTENSION
Budget Summary for Objective 4**

State/Institution	Year 1	Year 2
Indiana/Illinois Purdue University	\$3,400	\$3,400
Illinois Southern Illinois University	\$1,750	\$1,750
Iowa Iowa State University	\$1,750	\$2,400
Michigan Michigan State University (Garling)	\$1,000	\$1,000
Michigan State University (Kinnunen)	\$600	\$2,100
Minnesota University of Minnesota	\$0	\$0
Nebraska University of Nebraska-Lincoln	\$700	\$800
Ohio Ohio State University	\$300	\$300
Wisconsin University of Wisconsin - Milwaukee	\$3,211	\$3,500
TOTAL	12,711	15,250
GRAND TOTAL	27,961	

**AQUACULTURE EXTENSION
RESOURCE COMMITMENT FROM INSTITUTIONS¹**

State/Institution	Year 1	Year 2
Purdue University	Information not provided	
Southern Illinois University Salaries	\$3,174	\$3,333
Overhead Waved	\$7,997	\$8,397
TOTAL PER YEAR	\$11,171	\$11,730
Iowa State University Salaries	\$4,700	\$5,243
Overhead Waved		
TOTAL PER YEAR	\$4,700	\$5,243
Kansas State University	Information not provided	
Michigan State University Salaries	\$11,478	\$12,482
Overhead Waved	\$7,544	\$8,728
TOTAL PER YEAR	\$19,022	\$21,210
University of Minnesota	Information not provided	
University of Missouri	Information not provided	
University of Nebraska Salaries	\$2,062	\$2,165
Overhead Waved	\$1,705	\$1,790
TOTAL PER YEAR	\$3,767	\$3,955
North Dakota State University	Information not provided	
Ohio State University ^{2,3} Salaries	\$11,135	\$11,692
Travel	\$600	\$0
Overhead waved		
TOTAL PER YEAR	\$11,735	\$11,692
University of Wisconsin/Milwaukee Personnel (including fringe benefits)	\$11,776	\$12,365
Overhead waved	\$11,993	\$12,593
TOTAL PER YEAR	\$23,769	\$24,958
University of Wisconsin/Madison	Information not provided	
GRAND TOTAL PER YEAR	\$74,164	\$78,788

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

²Due to the difficulty in accounting for small items, Ohio State University does not wish to be account-able for these amounts and documentation will not be maintained.

³Please note that these individuals may be supported by federal funds.

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EDUCATION

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

POSITIONS

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

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

SELECTED PUBLICATIONS

- 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.
- Rice, J.A., L.B. Crowder, and F.P. Binkowski. 1987. Evaluating potential sources of mortality for larval bloater (*Coregonus hoyi*): Starvation and vulnerability to predation. *Canadian Journal of Fisheries and Aquatic Sciences* 44: 467-472.
- Doroshov, S.I., and F.P. Binkowski. 1986. Sturgeon culture: an evolution of the techniques and concepts. Presented at the 1986 Annual Meeting of the World Aquaculture Society, at Reno, Nevada.
- Sommer, C.V., F.P. Binkowski, M.A. Schalk, and J.M. Bartos. 1986. Stress factors that can affect studies of drug metabolism in fish. *Veterinary and Human Toxicology* 28(Supplement 1): 45-54.
- Binkowski, F.P., and S.I. Doroshov. 1985. North American sturgeons: biology and aquaculture potential. Kluwer Academic Publications, Dordrecht, Netherlands.

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EDUCATION

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

POSITIONS

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

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Society of Agricultural Engineers
World Aquacultural Society
Sigma XI

PUBLICATIONS

Ebeling, J.M. 1991. A computer based water quality monitoring and management system for pond aquaculture. In: Proceedings from the Aquaculture Symposium, Cornell University, Ithaca, NY. NRAES-49, pp. 233-248.

Ebeling, J.M. and T.M. Losordo. 1989. Continuous environmental Monitoring systems for aquaculture. In Instrumentation in Aquaculture, ed. J.A. Wyban and E. Antill, pp. 54-70, proceedings of the World Aquaculture Society, January, Los Angeles, CA.

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.

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EDUCATION

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

POSITIONS

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

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society: Fish Culture and Fisheries Educators Sections
Beta Beta Beta
Sigma Xi
Gamma Sigma Delta

SELECTED PUBLICATIONS

- Machado, J.P., D.L. Garling, N.R. Kevern, A.L. Trap, and T.G. Bell. 1989. The effect of carbon monoxide and exposure on gas bubble trauma in rainbow trout (*Salmo gairdneri*). Canadian Journal of Fisheries and Aquatic Sciences, 46: 74-80.
- Westerhof, R., D.L. Garling, and H.A. Tanner. 1988. Development of techniques to produce triploid chinook salmon for stocking the Great Lakes. Presented at the Annual Meeting of the World Aquaculture Society, January 4-9, Honolulu, Hawaii. Abstract 19:80 (#302).
- Masterson, M.F., and D.L. Garling. 1986. Effect of feed color on feed acceptance and growth of walleye (*Stizostedion vitreum*) fingerlings. Progressive Fish-Culturist 48:306-309.
- Ostrowski, A.O., and D.L. Garling. 1986. Dietary androgen-estrogen combinations in growth promotion in fingerling rainbow trout. Progressive Fish-Culturist 48:268-272.
- Garling, D.L. and L.A. Helfrich. 1984. Making Plans for Commercial Fish Culture in Michigan. Michigan Cooperative Extension Service Bulletin No. E-1775. 8 p.

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EDUCATION

B.S. University of Wisconsin-Steven Point 1975
M.S. University of Wisconsin-Steven Point 1978

POSITIONS

Associate Professor and area Extension Agent-Fisheries, Sea Grant Extension Program, University of Minnesota, 1979-present
Biological Technician-Fisheries, US Fish and Wildlife Service, 1978
Fisheries Specialist/Fisheries Biologist, Missouri Conservation Department, 1978-1979

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
International Association for Great Lakes Research
Sea Grant Advisory Service Association
Minnesota Association of Extension Agents
International Association of Astacology

SELECTED PUBLICATIONS

Gunderson, J.L. 1990. Northern Crayfish; An Update. Sea Grant Extension Publication. 5 p.
Gunderson, J.L. 1989. A Craving for Crayfish: Minnesota Discovers a Louisiana Tradition. Sea Grant Extension Publication. 6 p.
Gunderson, J.L. 1988. 1987-88 Charter Fishing Study: Minnesota Waters of Lake Superior. Sea Grant Extension Publication
Gunderson, J.L. 1978. Vital Statistics of the Lake Whitefish in Three Areas of Green Bay, Lake Michigan. M.S. Thesis, University of Wisconsin-Stevens Point, 84 p.
McDonald, M.E., J.L. Gunderson, and A.R. Kapuscinski. 1987. Silver Bay Aquaculture Plan: Feasibility Assessment. Minnesota Sea Grant Technical Report, MNSG-87-01, 18 p.

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B.S. Fort Hays State University 1956
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POSITIONS HELD:

Professor and Extension Specialist, Animal Damage Control², Kansas State University (1983-Present)³
Associate Professor and State Leader for Extension Wildlife Damage Control, Kansas State University (1977-1983)
Assistant Professor, Extension Specialist, Wildlife Damage Control, Kansas State University, Cooperative Extension Service,
Manhattan, KS (1968-1977)
District Game Manager, South Dakota Game, Fish and Parks Dept., Kadoka, SD (1961-1968)
Research Assistant, Kansas Biological Survey, University of Kansas, Lawrence, KS (1959-1960)

² Title Changed from Wildlife Damage Control to Animal Damage Control effective July 1, 1989.

³ Assigned to the Department of Animal Science effective March 1, 1987.

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EDUCATION

B.A. Swarthmore College 1976
 M.S. Oregon State University 1980
 Ph.D. Oregon State University 1984

POSITIONS

Aquaculture Research Technician, Weyerhaeuser Company (1976-77)
 Research Assistant, Oregon State University (1977-1980)
 Instructor/Project Leader/Research Assistant Oregon State University (1980-1984)
 Assistant Professor/Extension Specialist (Aquaculture), University of Minnesota (1984-1989)
 Associate Professor/Extension Specialist (Aquaculture), University of Minnesota (1989-present)

SCIENTIFIC AND PROFESSIONAL MEMBERSHIPS

American Fisheries Society: Fish Culture Section, Genetics Section, NCD Fish Genetics Technical Committee
 Genetics Society of America
 International Association of Genetics in Aquaculture (Charter Member)
 Society for the Study of Evolution
 World Aquaculture Society
 Sigma Xi, Phi Kappa Phi, Phi Sigma, Gamma Sigma Delta

SELECTED PUBLICATIONS

- Hallerman, E.M., and A. R. Kapuscinski. (In press). Ecological Implications of using transgenic fishes in aquaculture. Proceedings of the International Symposium on the Effects of Introduction of Aquatic Species on Resources and Ecosystems. Halifax, Nova Scotia, June 12-14, 1990.
- Landkamer, D. J., M. L. Gross, B. Erickson, and A. R. Kapuscinski. (In press). Regulations that apply to aquaculture in Minnesota.
- Gross, M.L., A. R. Kapuscinski, and D. J. Landkamer. 1990. Introduction to aquaculture in Minnesota. University of Minnesota Aquaculture Program. 2p.
- Landkamer, D. J., M. L. Gross, and A. R. Kapuscinski. 1990. Aquaculture organizations, publications, and resources, U. Minnesota Aquaculture Program. 4pp.
- Kapuscinski, A.R. 1990. Integration of Transgenic Fish into Aquaculture. Food Reviews International.
- Kapuscinski, A.R., and L.D. Jacobson. 1987. Genetic guidelines for fisheries management. Minnesota Sea Grant, St. Paul, MN.
- Kapuscinski, A.R. 1989. Status of Commercial Aquaculture and Research in the North Central Region. Minnesota Aquaculture Experiment Station Bulletin 589-1988 (Item No. AD-SB-3681). 14pp.

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

SCIENTIFIC AND PROFESSIONAL MEMBERSHIPS

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

SELECTED PUBLICATIONS

- 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. *Progressive Fish-Culturist* 52:73-82.
- Malison, J.A., T.B. Kayes, B.C. Wentworth, and C.H. Amundson. 1988. Growth and feeding responses of male versus female yellow perch (*Perca flavescens*) treated with estradiol-17 β . *Canadian Journal of Fisheries and Aquatic Sciences* 45:1942-1948.
- Kim, K.I., T.B. Kayes, and C.H. Amundson. 1987. Effects of dietary tryptophan levels on growth, feed/gain, carcass composition and liver glutamate dehydrogenase activity in rainbow trout (*Salmo gairdneri*). *Comparative Biochemistry and Physiology* 88B:737-741.

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EDUCATION

B.S. Michigan State University 1976
M.S. Michigan State University 1979

POSITIONS

District Sea Grant Agent, Michigan State University (1982-present)
Acting Alger County Extension Director, Michigan State University (1988-1989)
Fish Pathologist, Rangen Laboratory, Hagerman, Idaho (1980-1981)
Fisheries Biologist, U.S. Fish and Wildlife Service, Leetown, West Virginia (1979-1980)
Environmental Consultant, Michigan Consolidated Gas Company, Detroit, MI (1978)
Graduate Research Assistant, Michigan State University (1977-1979)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

SELECTED PUBLICATIONS

- Kinnunen, R.E. and E.M. Mahoney. 1989. 1987 Upper Michigan Charter Fishing Study. Michigan Sea Grant College Program, MICHU-SG-89-501.
- Kinnunen, R.E., J.R. Lempke, and T.C. Sundstrom. 1987. Behavior patterns of divers visiting the Alger Bottomland preserve. Michigan Sea Grant College Program, MICHU-SG-87-505.
- Kinnunen, R.E. and H.E. Johnson. 1986. Pathology of sea lamprey inflicted wounds on rainbow trout. Great Lakes Fisheries Commission, Technical Report No. 48. 30pp.
- Kinnunen, R.E., J. Peterson, S. Stewart, and C. Swinehart. 1985. Sea Grant research and community development make Michigan's Bottomland Preserves at reality. Marine Conservation and Underwater Parks: Challenge and promise. Breakwater Books of Canada.
- Kinnunen, R.E. and H.E. Johnson. 1985. Impact of sea lamprey parasitism on the blood features and hemopoietic tissue of rainbow trout. Great Lakes Fisheries Commission, Technical Report No. 46. 17pp.
- Kinnunen, R.E. (Ed.). Commercial Fisheries Newslines (quarterly newsletter for Great Lakes commercial fishermen published by the Michigan Sea Grant Advisory Service Program).

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EDUCATION

B.S. Ohio State University 1971
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POSITIONS

Associate Professor and District Extension Specialist, Sea Grant, Ohio Cooperative Extension Service, Ohio State University (1990-present.)
Assistant Professor and District Extension Specialist, Sea Grant, Ohio Cooperative Extension Service, Ohio State University (1985-1990)
Instructor and Area Extension Agent, Sea Grant, Ohio Cooperative Extension Service, Ohio State University (1981-1985)
Instructor and County 4-H Extension Agent, Ohio Cooperative Extension Service, The Ohio State University (1979-1981)
Research Associate, Department of Fisheries, Auburn University (1977-1979)
Graduate Research Assistant, Department of Fisheries, Auburn University (1976-1977)
County Extension Agent, Georgia Cooperative Extension Service, University of Georgia (1974-1975)
American Peace Corps Volunteer, Fisheries Department, Raipur, India (1971-1973)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

International Association for Great Lakes Research
American Fisheries Society, Certified Fishery Scientist
National Association of County Agricultural Agents
Sea Grant Advisory Service Association
Ohio Cooperative Extension Agents Association
Outdoor Writers of Ohio

SELECTED PUBLICATIONS

Lichtkoppler, F.R. and L.J. Hushak, 1989. Characteristics of Ohio's Lake Erie Recreational Marinas. *Journal of Great Lakes Research*. 15: 418-426.

Lichtkoppler, F.R. 1988. Using Your Evaluation Skills. *Journal of Extension* 26:25-26.

Lichtkoppler, F.R., L.J. Hushak, D.O. Kelch and F.L. Snyder. 1987. The 1985 Ohio Charter Captains Survey. *Fisheries* 12: 14-16.

Lichtkoppler, F.R. 1986. Surveys Help Program Development. *Journal of Extension* 24:24-25.

Lichtkoppler, F.R. 1986. Fish Farming-Is It For You? Ohio Sea Grant Fact Sheet, OHSU-FS-39-86; 2 pp.

Boyd, C.E. and F.R. Lichtkoppler. 1979. Water Quality Management in Pond Fish Culture. Agricultural Experiment Station R & D Publication #22. Auburn University, 30 pp.

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B.S. University of North Dakota 1977
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M.S. North Dakota State University 1985
M.S. North Dakota State University 1986
Ph.D. North Dakota State University 1990

POSITIONS HELD

Extension Wildlife Specialist, North Dakota State University Extension Service (1984-Present)
Director of NDSU Wildlife Rehabilitation Program (1984-Present)
Project Wild North Dakota, Co-coordinator (1984-Present)
Research Assistant, Botany Department North Dakota State University (1982-1984)
Garrison Diversion Biologist, North Dakota Game and Fish Department (1982-1982)
Natural Resources and Mitigation Biologist, North Dakota State Highway Department (1980-1982)
Biological Technician, U.S. Fish and Wildlife Service, Wetland Management District (1978-1979)

PROFESSIONAL MEMBERSHIPS

Society for Range Management
The Wildlife Society of the North Dakota Chapter and certified
Wildlife Biologist
Phi Sigma, Biological Honor Society
North Dakota Wildlife Federation
North Dakota Hunter Education Association
National Rifle Association
Dakota Wildlife Trust
Toastmasters International

SELECTED PUBLICATIONS

Messmer, T.A. 1989. Pesticides and Prairie Pothole Wetlands: Meeting the Needs of the Resource and the Farmer. Transactions North American Wildlife Conference

Messmer, T.A. 1988. Managing for the Most-A Landowner Guide for Conserving North Dakota Wildlife Legacy. North Dakota Outdoors

Messmer, T.A. 1987. Proceedings of the North Dakota Wetlands Workshop, published by the NDSU Extension Service and Environmental Protection Agency.

Messmer, T.A. 1985. Effects of Specialized Grazing Systems On Upland Nesting Birds in Southcentral North Dakota (Thesis)

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EDUCATION

B.S. University of Minnesota 1984
M.S. University of Minnesota Expected 1991

POSITIONS HELD

Aquaculture Extension Specialist, Department of Fisheries and Wildlife, University of Minnesota, 1991-present
Graduate Research Assistant, Department of Fisheries and Wildlife, University of Minnesota, 1989-1991
Head Aquaculture Trainer, Baruch Institute, University of south Carolina, 1987-1989
Aquaculture Extension Volunteer, US Peace Corps, Central African Republic, 1984-1986

SELECTED PUBLICATIONS

Mittelmark, J.P. and D.J. Landkammer (In press). Tilapia culture in northern climates.

Mittelmark, J.P. and D.J. Landkammer. 1991. Design and construction of diversion ponds for aquaculture.

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

POSITIONS

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

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society, Iowa Chapter
 Iowa Fish Farmers Association
 Phi Kappa Phi, Iowa State University Chapter
 Sigma Xi, Iowa State University Chapter

SELECTED PUBLICATIONS

- Morris, J. E. (In-press). Supplemental feeding of hybrid striped bass fry. Proceedings South Eastern Association Fish and Wildlife Agencies.
- Morris, J.E., L.R. D'Abramo, and R.J. Muncy. (In-press). An inexpensive marking technique to assess ingestion of artificial feeds by larval fish. Progressive Fish-Culturist.
- 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, MS.
- Morris, J.E. 1988. Effect of artificial feeds upon hybrid striped bass fry survival and growth. Mississippi Chapter American Fisheries Society Annual Meeting, Vicksburg, MS.

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M.S. Mississippi State University 1981

POSITIONS HELD

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

PROFESSIONAL MEMBERSHIPS

The Wildlife Society, Associate Wildlife Biologist, Missouri Chapter
Soil and Water Conservation Society
American Fisheries Society
Arkansas Association of Extension 4-H Agents

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EDUCATION

B.A. Monmouth College 1970
M.S. Western Illinois University 1974

POSITIONS

Aquaculture Technology Transfer Specialist, Southern Illinois University at Carbondale (1989-present)
Division Manager, Marion Fish Company, Division of Timberline Fisheries, Inc. (1988-89)
Fish Culturist, self-employed, channel catfish cage culture farm (1978-1988)
Instructor, Shawnee Junior College, Ullin, Illinois (1980-1981)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
Beta Beta Beta
Illinois Aquaculture Advisory Committee, 1985
Illinois Aquaculture Industry Association
Union County 4-H Aquaculture Club Leader

SELECTED PUBLICATIONS

- Selock, D.A. and R.C. Heidinger. 1990. Aquaculture in the U.S. and Illinois: An Introduction. SIUC Fisheries Bulletin No. 7. 7 pp.
- Selock, D.A. and R.C. Heidinger. 1990. An Assessment of Aquaculture in Illinois: Is It For you? SIUC Fisheries Bulletin No. 8. 8 pp.
- Selock, D.A. and R.C. Heidinger. 1990. Permits and Regulations Affecting Illinois Aquaculturists. SIUC Fisheries Bulletin No. 10. 57 pp.
- Selock, D.A. (ed.) 1987-1988. Illinois Aquaculture Association Newsletter.
- Selock, D.A. 1974. Effects of feed supplements on the growth of channel catfish using tank culture. Master's thesis, Western Illinois University, Macomb, Illinois.

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B.S. University of Missouri 1957
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POSITIONS

Extension Forester and Assistant Professor to Professor, Educational Programs, Univ. of Missouri (1969-Present)
Acting Extension Fish and Wildlife State Specialist (1975-1980)
IPA to USDA SEA-Extension to develop National Renewable Resources Extension Plan (1979)
Area Extension Forester, Kansas State University (1965-1969)
Dist. Extension Forester, Tech. Assistance & ed. programs for private landowners, Kansas State Univ. (1961-1964)
Farm Forester, Tech. Assistance to private woodland owners, MO Dept. of Conservation (1958-1961)

PROFESSIONAL MEMBERSHIPS

Missouri Aquaculture Advisory Council Co-Chairman, 1979-1980; Member 1979-1989
Missouri Fish Farmers Association Board of Directors, 1978-1989
Planning Committee-Fish Farm Days-Ag Science Week, 1985-1989
Planning Committee - Regional Pond and Lake Management Workshops, 1982.

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EDUCATION

B.S. Central State College, Stevens Point, Wisconsin 1958
M.S. University of Wisconsin-Madison 1966
Ph.D. University of Wisconsin-Madison 1969

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Associate Professor of Food Science, University of Wisconsin-Madison (1973-1977)
Assistant Professor of Food Science, University of Wisconsin-Madison (1969-1973)
Project Assistant, Neurology Department, University Hospitals, Madison, Wisconsin (1960-1963)
Brine Analyst and Senior Control Analyst, West End Chemical Company (1958-1959)

PROFESSIONAL MEMBERSHIPS:

Institute of Food Technologists
American Fishery Society
Wisconsin Section of IFT
Sigma Xi

SELECTED PUBLICATIONS:

- Wesson, J.B., R.C. Lindsay and D.A. Stuibler. 1979. Discrimination of Fish and Seafood Quality by Consumer Populations. *Journal of Food Science* 44: 878-882.
- Sommer, D.A., D.A. Stuibler, R.L. Bradley and R.E. Peterson. 1982. Raising Marketable Yellow Perch on a Polychlorinated Biphenyl Contaminated Diet: A Feasibility Study for the Perch Aquaculture Industry. *Archives of Environmental Contamination and Toxicology* 11: 589-593
- Josephson, D.B., R.C. Lindsay and D.A. Stuibler. 1983. Identification of Compounds Characterizing the Aroma of Fresh Whitefish (*Coregonus clupeaformis*). *Journal of Agriculture Food Chemistry* 31: 326-330.
- Josephson, D.B., R.C. Lindsay and D.A. Stuibler. 1983. Bisulfite Suppression of Fish Aromas. *Journal of Food Science* 48: 1064-1067.
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POSITIONS HELD:

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Aquaculture Trainer, Peace Corps Stateside Training Program, U. South Carolina (1989)
Farm Technician, Fish Acres Tropical Fish Farm, Lake Worth FL (1989)
Assistant Project Leader, Non-native Fish Research Lab, Florida Fish and Game, Boca Raton (1988-89)
Aquaculture Extensionist, Tongolese Ministry of Rural Development/U.S. Peace Corps, Togo, West Africa (1985-87)

SELECTED PUBLICATIONS:

- Swann, D.L., L.E. Rider, and F.J. (In-press). Age, growth and summer foods of four Centrarchid species in a Big South Fork National River and Recreation Area stream fish community. *Journal Tennessee Academy of Sciences*.
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POSITIONS

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Program Leader for Agriculture, Natural Resources, CRD, and acting District Supervisor, South Dakota CES, (1983-84)
County Extension Agent, Lincoln County, South Dakota CES (1972-1983)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Chairperson, North Central Ag Program Leaders (1988-89)
Epsilon Sigma Phi
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National Holstein Association
National County Agents Association (1973-1983)

SELECTED PUBLICATIONS

Froke, B. and L. Tidemann. 1983. Steps to market your programs. South Dakota State University.