PROJECT NAME: Addendum to the North Central Regional Aquaculture Center Extension Program

FUNDING LEVEL: $35,000

DURATION: March 15, 1990 to April 30, 1991

ADMINISTRATIVE ADVISOR: Dr. Steven B. Laursen, Program Leader, Natural Resources, Minnesota Extension Service, St. Paul, MN 55108

SITUATION

The North Central Regional Aquaculture Center Extension Program for which funds were set aside as of May 1, 1989 for work to extend over the following two years is hereby expanded by this addendum which increases the number of state extension specialist and CES approved contacts participating in the project, increases the number of annual work group meetings from one to two, and expands and clarifies the major actions of all extension specialist/contacts. All changes from the original project outline are shown below in *italics*.

Interest in aquaculture has grown 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 14.5 pounds per capita in 1985. Regular fish consumption appears to reduce the potential of developing cardio-vascular diseases and may even reverse atherosclerosis. 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 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 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. Establish linkages between North Central Regional Aquaculture Center research and extension work groups.

2. Establish a 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 workshops 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.

5. Coordinate publications resulting from activities of NCRAC's programs.

ACTIONS

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

   Assign one extension working group member to work with each funded NCRAC research project to identify results useful in extension programs, provide ongoing needs assessment, and provide input for design and prioritization of future research projects.

2. Establish a North Central Region (NCR) aquaculture extension network for aquaculture information transfer.

   Designate at least one contact person for each NCR state, develop a directory, and establish a mechanism for sharing materials produced by states in the NCR. Conduct a workshop 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. Establish liaisons with state and federal agencies, and with state aquaculture organizations to identify industry needs.

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

   Conduct two or more regional aquaculture in-service training workshops as model programs. Use materials developed for objectives 4 as the basis for the programs.

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.

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

      Assemble an aquaculture information packet that addresses appropriate basic aquaculture considerations and aquaculture planning. Assemble/develop training materials for specific aquaculture technologies. Conduct two to three regional workshops as model programs for individuals with demonstrated potential to develop commercial aquaculture. Each workshop will focus on a different technical subject.

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

Provide continuing educational programs 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. Provide information to meet specific industry needs. Provide demonstrations at existing aquaculture facilities. Work with industry clientele to provide researchers with updated needs assessments.

5. Coordinate publications resulting from activities of NCRAC's programs.

Assign one extension work group member to coordinate publications resulting from NCRAC programs.

EVALUATION

Ask selected aquaculturists, extension specialists, state and federal fish culturists within and outside the region to evaluate extension program materials. Survey workshop 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 the Program: *10*
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 and attitudes changed	1000	individuals
New or expanded fish culture	50	farms
	250	acres of ponds
	100	linear feet of raceways
	$1,000,000	economic impact
Improved fish culture management	75	farms
	300	acres of ponds
	250	linear feet of raceways
	20	reduced disease
	25	improved product
	$500,000	economic impact

New or expanded associated industries	15	new
	15	expanded
	$300,000	economic impact

ESTIMATED FTEs

Year	Professional	Paraprofessional	Volunteer
1990	1.0	1.9	.55
1991	1.5	2.5	.75

REPORTING SCHEDULE

Year	Accomplishment
1990	X
1991	X

CONTACTS

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PROJECT LEADERS

CES DESIGNATED EXTENSION COOPERATORS AND SPECIALISTS/AGENTS

State	Name	Institution
Indiana/Illinois	*LaDon Swann* Robert D. Espeseth	*Purdue University* University of Illinois
Illinois	*Daniel A. Selock*	*Southern Illinois University*
Iowa	Joseph E. Morris	Iowa State University
Kansas	*F. Robert Henderson*	*Kansas State University*
Michigan	Donald L. Garling Ronald E. Kinnunen	Michigan State University Michigan State University (Marquette)
Minnesota	Anne R. Kapuscinski David J. Landkamer	University of Minnesota University of Minnesota
Missouri	*John P. Slusher* *Robert A. Pierce*	*University of Missouri* *University of Missouri*
North Dakota	*Terry A. Messmer*	*North Dakota State University*
Ohio	*Frank R. Lichtkoppler* *Frederic L. Synder*	*Ohio State University (Painesville)* *Ohio State University (Port Clinton)*
Wisconsin	*David A. Stuiber* *Fred P. Binkowski*	*University of Wisconsin-Madison* *University of Wisconsin-Milwaukee*

EXTENSION PROGRAM AND MAJOR ACTIONS AND BUDGET
FOR PURDUE UNIVERSITY

(Swann)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group of the NCRAC Extension 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*

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

    a. *Develop educational materials designed to help Extension professionals respond to initial routine aquaculture questions from the general public.*

    b. *Conduct in-service training workshops for extension personnel in 1990-91.*

PROPOSED EXTENSION BUDGET FOR
PURDUE UNIVERSITY

(Swann)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
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 (*Including Canada*)					$500	$1,000
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					1,000	1,500
TOTAL PROJECT COSTS					2,500	

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

EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR UNIVERSITY OF ILLINOIS

(Espeseth)

MAJOR ACTIONS

Participate in the following objectives of the Extension Work Group of the NCRAC Extension 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-Indiana,

   d. Developed joint funding of an aquaculture specialist between University of Illinois, Purdue University, and Illinois-Indiana Sea Grant Program for 1990.

PROPOSED EXTENSION BUDGET FOR
UNIVERSITY OF ILLINOIS

(Espeseth)

	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 (*Including Canada*)					$500	$500
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					500	500
TOTAL PROJECT COSTS					1,000	

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

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 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*

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

    a. *Develop educational materials designed to help Extension professionals respond to initial routine aquaculture questions from the general public.*

    b. *Conduct in-service training workshops for extension personnel in 1990-91.*

PROPOSED EXTENSION BUDGET FOR
SOUTHERN ILLINOIS UNIVERSITY

(Selock)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
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 (*Including Canada*)					$500	$1,000
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					1,000	1,500
TOTAL PROJECT COSTS					2,500	

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

EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR IOWA STATE UNIVERSITY

(Morris)

MAJOR ACTIONS

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

1. Establish linkages with the NCRAC research and extension work groups.

    a. Serve as liaison between the NCRAC Hybrid Striped Bass research project and the Extension Work Group.

    b. Provide progress updates for the Hybrid Striped Bass Work Group for the NCRAC newsletter annually.

    c. Assist in development of extension publications from the Hybrid 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. 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 Iowa.

3. Conduct water quality workshop for regional in-service training for Sea Grant and CES personnel in *Fall of 1990*.

4. Develop aquaculture education programs for the North Central Region.

    a. Develop fact sheets on hybrid striped bass and channel catfish culture.

    b. Conduct regional workshop on water quality in 1990-91.

    c. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

5. Coordinate publications resulting from NCRAC's programs.

    a. Assist in developing standardized fact sheet format.

PROPOSED EXTENSION BUDGET FOR
IOWA STATE UNIVERSITY

(Morris)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
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					$0	$0
F. Travel - Domestic (*Including Canada*)					$500	$1,000
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					500	1,000
TOTAL PROJECT COSTS					1,500	

[1]FTEs = 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 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 Kansas*.

PROPOSED EXTENSION BUDGET FOR
KANSAS STATE UNIVERSITY

(Henderson)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
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 (*Including Canada*)					$500	$1,000
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					1,000	1,500
TOTAL PROJECT COSTS					2,500	

[1]FTEs = 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 project:

1. Establish linkages with the NCRAC research and extension work groups.

    a. Serve as liaison between the NCRAC Yellow Perch research project and the Extension Work Group.

    b. Provide progress updates for the Yellow Perch Work Group for the NCRAC newsletter annually.

    c. Assist in development of extension publications from the Yellow Perch research project.

2. Participate in the NCR aquaculture extension network for aquaculture information transfer by:

    a. Developing and updating a directory of state extension contact persons,

    b. Soliciting 15 copies of extension-related aquaculture publications states contact each January and distribute to state extension contacts,

    c. Developing and updating each January a directory of key persons to be included on NCRAC mailing list through state extension contacts,

    d. Organizing and participating in bi-annual Extension Work Group Meetings.

4. Develop aquaculture education programs for the North Central Region

    a. Lead development of a bulletin containing basic information describing aquaculture potential and the planning process for the North Central Region.

    b. Develop a fact sheet on trout culture in the NCR.

    c. Conduct regional workshop for individuals with potential to develop commercial salmonid culture in the NCR during the third week of March 1990

    d. Serve on the Planning Committee for the Midwest Fish Culture Conference with Michigan Department of Natural Resources, Fish Division to be hosted in Michigan in March 1991.

    e. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

EXTENSION PROGRAM MAJOR ACTION AND BUDGET
FOR MICHIGAN STATE UNIVERSITY

(Garling)

MAJOR ACTIONS (continued).

5. Coordinate publications resulting from NCRAC's programs.

   a. Develop publication policy for NCRAC research publications.

   b. Develop publication policy for NCRAC extension publications.

   c. Develop regional extension fact sheet format.

   d. Develop mechanism for reimbursement of publication costs for NCRAC research and extension publications.

PROPOSED EXTENSION BUDGET FOR
MICHIGAN STATE UNIVERSITY

(Garling)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
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					$0	$0
F. Travel - Domestic (*Including Canada*)					$500	$500
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					500	500
TOTAL PROJECT COSTS					1,000	

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

EXTENSION PROGRAM MAJOR ACTION AND BUDGET
FOR MICHIGAN STATE UNIVERSITY

(Kinnunen)

MAJOR ACTIONS

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

1. Establish linkages with the NCRAC Research and Extension Work groups.

    a. *Serve as liaison between the NCRAC Salmonid research project and the Extension Work Group.*

    b. *Survey the North Central Region Trout industry on strain use and egg sources and publish results.*

    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.*

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. *Compile aquaculture extension information for use by Sea Grant and CES personnel.*

    d. *Providing a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in Michigan.*

3. Provide in-service training for CES and Sea Grant personnel and other landowner assistance personnel.

    a. *Develop standardized core program and materials.*

    b. *Deliver program for Great Lakes Sea Grant Agents at the Great Lakes Network Conference in Wisconsin in September 1990.*

    c. *Deliver program for CES personnel in Fall 1990.*

PROPOSED EXTENSION BUDGET FOR
MICHIGAN STATE UNIVERSITY

(Kinnunen)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
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						
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	$200
F. Travel - Domestic (*Including Canada*)					$1,500	$1,000
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					1,650	1,200
TOTAL PROJECT COSTS					2,850	

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

EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR UNIVERSITY OF MINNESOTA

(Kapuscinski and Landkamer)

MAJOR ACTIONS

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

1. Establish linkages with the NCRAC research and extension work groups.

    a. Serve as liaisons between the NCRAC Walleye (Kapuscinski) and Economics/Marketing (Landkamer) research projects and the Extension Work Group.

    b. Provide progress updates for the Walleye and Economics/Marketing Work Groups for the NCRAC newsletter annually.

    c. Assist in development of extension publications from the Walleye and Economics/Marketing research projects.

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 Minnesota.

3. Landkamer will provide in-service training for CES and Sea Grant personnel and other landowner assistance personnel.

    a. Lead development of standardized core program and materials.

    b. Deliver program for Great Lakes Sea Grant Agents at the Great Lakes Network Confernece in Wisconsin in September 1990 and deliver program for CES personnel in Fall 1990.

    c. Host 1 CES or Sea Grant agent per year for two to three week aquaculture on-site study/training visit with Landkamer.

4. Landkamer will develop aquaculture education programs for the North Central Region

    a. Develop fact sheets on baitfish culture and walleye culture in the NCR.

    b. Conduct regional workshop for individuals with potential to develop commercial baitfish culture in the NCR in Minnesota in 1990 and in Ohio in 1991.

    c. Plan and implement educational programs and develop fact sheets on fish health, aeration, and fish spawning for aquaculturists.

EXTENSION PROGRAM MAJOR ACTIONS AND BUDGET
FOR UNIVERSITY OF MINNESOTA

(Kapuscinski and Landkamer)

MAJOR ACTIONS (continued).

d. Provide information to meet industry needs and assess industry needs through interaction with state and regional aquaculturists and associations.

e. Develop and implement a mechanism to provide a broader assessment of aquaculture industry needs for input into prioritizing NCRAC research and extension objectives.

PROPOSED EXTENSION BUDGET FOR
UNIVERSITY OF MINNESOTA

(Kapuscinski and Landkamer)

	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)	2	0.10	2	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					$850	$450
F. Travel - Domestic (*Including Canada*)					$1,800	$1,300
G. Other Direct Costs					$250	$250
TOTAL PROJECT COSTS PER YEAR (*C through G*)					2,900	2,000
TOTAL PROJECT COSTS					4,900	

[1]FTEs = 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 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 Missouri.*

PROPOSED EXTENSION BUDGET FOR
UNIVERSITY OF MISSOURI

(Slusher and Pierce)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
A. Salaries and Wages						
1. No. of Senior Personnel & FTEs[1]						
a. (Co)-PI(s)	2	0.20	2	0.20	$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 (*Including Canada*)					$500	$1,000
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					1,000	1,500
TOTAL PROJECT COSTS					2,500	

[1]FTEs = 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 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 North Dakota.*

PROPOSED EXTENSION BUDGET FOR
NORTH DAKOTA STATE UNIVERSITY

(Messmer)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
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 (*Including Canada*)					$750	$1,500
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					1,250	2,000
TOTAL PROJECT COSTS					3,250	

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

EXTENSION PROGRAM MAJOR ACTION AND BUDGET
FOR OHIO STATE UNIVERSITY

(Lichtkoppler and Snyder)

MAJOR ACTIONS

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

1. *Establish linkages with the NCRAC research and extension work groups.*

    a. *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 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 Ohio*

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

    a. *Lichtkoppler and Snyder will assist in conducting a seminar on aquaculture at the Great Lakes Sea Grant Network meeting in Wisconsin in the fall of 1990.*

4. *Develop aquaculture education programs for the NCR.*

    a. *Lichtkoppler and Snyder will serve as reviewers of educational materials under development to be sure they are understandable by individuals who lack a basic knowledge about aquaculture.*

PROPOSED EXTENSION BUDGET FOR
OHIO STATE UNIVERSITY

(Lichtkoppler and Snyder)

	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)	2	0.10	2	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					$1,000	$1,000
F. Travel - Domestic (*Including Canada*)					$1,000	$2,000
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					2,000	3,000
TOTAL PROJECT COSTS					5,000	

[1]FTEs = 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 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 Wisconsin*

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 EXTENSION BUDGET FOR
UNIVERSITY OF WISCONSIN-MADISON

(Stuiber)

	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					$500	$500
F. Travel - Domestic (*Including Canada*)					$500	$1,000
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					1,000	1,500
TOTAL PROJECT COSTS					2,500	

[1]FTEs = 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 project:

1. *Establish linkages with the NCRAC Research and Extension Work groups.*

    a. *Serve as liaison between the NCRAC Sunfish research project and the Extension Work Group.*

    b. *Provide progress updates for the Sunfish Work Group for the NCRAC newsletter annually.*

    c. *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.*

PROPOSED EXTENSION BUDGET FOR
UNIVERSITY OF WISCONSIN-MILWAUKEE

(Binkowski)

	Year 1 No.	Year 1 FTEs	Year 2 No.	Year 2 FTEs	Year 1	Year 2
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 (*Including Canada*)					$500	$1,500
G. Other Direct Costs					$0	$0
TOTAL PROJECT COSTS PER YEAR (*C through G*)					1,000	2,000
TOTAL PROJECT COSTS					3,000	

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

BUDGET SUMMARY FOR EXTENSION ADDENDUM (35K)

STATE(S)	INSTITUTION	PRINCIPAL INVESTIGATOR(S)	YEAR 1	YEAR 2
Indiana/Illinois	Purdue University	LaDon Swann	$1,000	$1,500
	University of Illinois	Robert D. Espeseth	$500	$500
Illinois	Southern Illinois University	Daniel A. Selock	$1,000	$1,500
Iowa	Iowa State University	Joseph E. Morris	$500	$1,000
Kansas	Kansas State University	F. Robert Henderson	$1,000	$1,500
Michigan	Michigan State University	Donald L. Garling	$500	$500
	Michigan State University	Ronald E. Kinnunen	$1,650	$1,200
Minnesota	University of Minnesota	Anne R. Kapuscinski & David J. Landkamer	$2,900	$2,000
Missouri	University of Missouri	John P. Slusher & Robert A. Pierce	$1,000	$1,500
North Dakota	North Dakota State University	Terry A. Messmer	$1,250	$2,000
Ohio	Ohio State University	Frank R. Lichtkoppler & Frederic L. Snyder	$2,000	$3,000
Wisconsin	University of Wisconsin-Madison	David A. Stuiber	$1,000	$1,500
	University of Wisconsin-Milwaukee	Fred P. Binkowski	$1,000	$2,000
		TOTAL FOR YEAR	15,300	19,700
		GRAND TOTAL	35,000	

RESOURCE COMMITMENT FROM INSTITUTIONS[1]
(continued on page 36)

Institution/Item		Year 1	Year 2
Purdue University		Information not provided	
Southern Illinois University		Information not provided	
University of Illinois		Information not provided	
Iowa State University			
Salaries		$3,452	$3,797
	TOTAL PER YEAR	3,452	3,797
Kansas State University			
Salaries		$4,780	$5,190
Supplies, Expenses and Equipment		$1,912	$2,076
	TOTAL PER YEAR	6,692	7,266
Michigan State University			
Salaries		$0	$0
Supplies, Expenses and Equipment		$380	$380
	TOTAL PER YEAR	380	380
University of Minnesota		Information not provided	
University of Missouri			
Salaries		$7,725	$7,725
Overhead		$1,391	$1,391
	TOTAL PER YEAR	9,116	9,116
North Dakota State University			
Salaries		$1,860	$1,860
Indirect Costs		$1,144	$1,144
	TOTAL PER YEAR	3,004	3,004
Ohio State University			
Salaries		$10,062	$10,605
	TOTAL PER YEAR	10,062	10,605
University of Wisconsin-Madison		Information not provided	

Institution/Item		Year 1	Year 2
University of Wisconsin-Milwaukee			
Salaries		$9,936	$9,936
Other		$11,422	$11,422
	TOTAL PER YEAR	21,358	21,358
	GRAND TOTAL	42,716	

[1]Since cost sharing is not a legal requirement, some universities chose not to provide information.

LIST OF PRINCIPAL INVESTIGATORS

Fred P. Binkowski, University of Wisconsin-Milwaukee

Robert D. Espeseth, University of Illinois

Donald L. Garling, Jr., Michigan State University

F. Robert Henderson, Kansas State University

Anne R. Kapuscinski, University of Minnesota

Ronald E. Kinnunen, Michigan State University

David J. Landkamer, University of Minnesota

Frank R. Lichtkoppler, Ohio State University

Terry A. Messmer, North Dakota State University

Joseph E. Morris, Iowa State University

Robert A. Pierce II, University of Missouri

Daniel A. Selock, Southern Illinois University

John P. Slusher, University of Missouri

Frederic L. Snyder, Ohio State University

David A. Stuiber, University of Wisconsin-Madison

LaDon Swann, Purdue University

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EDUCATION

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

POSITIONS

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

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

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. (Received best paper award: Technical Session on Fin Fish and Freshwater Disease Technology.)

Stewart, D.J., and F.P. Binkowski. 1986. Dynamics of consumption and food conversion by Lake Michigan alewives: an energetics-modeling synthesis. Transactions of the American Fisheries Society 115:643-661. (Received most significant paper award for 1986.)

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 I):45-54.

Binkowski, F.P., and S.I. Doroshov. 1985. North American sturgeons: biology and aquaculture potential. Kluwer Academic Publications, Dordrecht, Netherlands.

Doroshov, S.I., and F.P. Binkowski. 1985. Epilogue: a perspective on sturgeon culture. Pages 147-152 *in* North American sturgeons: biology and aquaculture potential. Kluwer Academic Publications, Dordrecht, Netherlands.

VITA

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Coordinator, Illinois-Indiana Sea Grant Program Phone: (217) 333-1824
Associate Professor, Department of Leisure Studies
University of Illinois at Urbana-Champaign
104 Huff Hall
1206 S. Fourth Street
Champaign, IL 61820

EDUCATION

B.S. University of Wisconsin-Madison 1952
M.S. University of Wisconsin-Madison 1956

POSITIONS

Associate Professor and Extension Specialist, University of Illinois (1973-present)
Chief of Park and Recreation Resources Planning, Ellis, Arndt & Truesdell, Inc., Flint, MI (1971-1973)
Assistant Director and Chief Park and Recreation Planner, Genesee County Parks and Recreation Commission, Flint, MI (1967-1971)
Wisconsin Department of Natural Resources (1955-1967)
Officer, United States Navy (1952-1954)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

National Recreation and Park Association: National Society for Park Resources (Board of Directors, 1975-1979; President, 1983-1984) and National Registration Board (1978-1981; President, 1980)
Illinois Parks and Recreation Association
National Marine Education Association
Environmental Education Association of Illinois
Marine Technology Society Council for National Cooperation in Aquatics

SELECTED PUBLICATIONS

Kistler, B., and R.D. Espeseth. 1986. Waterskiing--A rapidly growing aquatic activity. National Aquatics Journal 2(4).

McKinney, W., R.D. Espeseth, and C. Burger. 1986. Long range park and recreation planning: A case study. Journal of Park and Recreation Administration 4(4).

Espeseth, R.D. 1985. Risk management for recreation enterprises. National Aquatics Journal 1(3).

Espeseth, R.D., A. Kaha, and D.F. Hoffmeister. 1978. Lake Shelbyville Visitor Center. Research Report and Plan, U.S. Army Corps of Engineers Project 10-77-431. University of Illinois at Urbana-Champaign.

Espeseth, R.D. 1977. County level systems for outdoor recreation services. Office of Recreation and Park Resources, ORPR-35. University of Illinois at Urbana-Champaign.

VITA

Donald L. Garling, Jr.
Associate Professor and
Fish Culture and Fisheries Extension Specialist
Department of Fisheries and Wildlife
Michigan State University
East Lansing, MI 48824
Phone: (517) 353-1989

EDUCATION

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

POSITIONS

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

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., T.G. Bell, D.L. Garling, Jr., N.R. Kevern, and A.L. Trapp. (In Press). Effect of carbon monoxide and exposure on gas-bubble trauma in rainbow trout (*Salmo gairdneri*). Canadian Journal of Fisheries and Aquatic Sciences.

Westerhoff, 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 v.*) 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. 8pp.

VITA

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Manhattan, KS 66506

Phone: (913) 532-5654

EDUCATION

B.S. Fort Hays State University 1956
M.S. Fort Hays State University 1956

POSITIONS

Professor and Extension Specialist, Animal Damage Control[1], Kansas State University (1983-present[2])
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, Kansas (1968-1977)
District Game Manager, South Dakota Game, Fish and Parks Department, Kadoka, South Dakota (1961-1968)
Research Assistant, Kansas Biological Survey, University of Kansas, Lawrence, Kansas (1959-1960)

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

[2] Assigned to the Department of Animal Science effective March 1, 1987.

VITA

Anne R. Kapuscinski
Associate Professor of Fisheries and Phone: (612) 624-3019
Extension Specialist in Aquaculture
Department of Fisheries and Wildlife
130 Hodson Hall
University of Minnesota
St. Paul, MN 55108

EDUCATION

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

POSITIONS

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

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

Kapuscinski, A.R. (In Press). Integration of Transgenic Fish into Aquaculture. Food Reviews International.

Phillips, R.B., and A.R. Kapuscinski. (In Press). High frequency of translocation heterozygotes in odd year populations of pink salmon (*Oncorhynchus gorbuscha*). Cytogenetics and Cell Genetics.

Yoon, S.J., E.M. Hallerman, M.L. Gross, Z. Liu, J.F. Schneider, A.J. Faras, P.B. Hackett, A.R. Kapuscinski, and K.S. Guise. (In Press). Transfer of the gene for neomycin resistance into goldfish, *Carrassius auratus*. Aquaculture.

Kapuscinski, A.R., and L.D. Jacobson. 1987. Genetic guidelines for fisheries management. Minnesota Sea Grant, St. Paul, Minnesota.

Kapuscinski, A.R.D., and J.E. Lannan. 1986. A conceptual genetic fitness model for fisheries management. Canadian Journal of Fisheries and Aquatic Sciences 43:1606-1616.

VITA

Ronald E. Kinnunen
District Agent, Upper Peninsula Phone: (906) 228-4830
Michigan Sea Grant Extension Service
U.P. Extension Center
1030 Wright Street
Marquette, MI 49855

EDUCATION

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

POSITIONS

District Agent, Michigan Sea Grant Extension Service, Michigan State University (1982-present)
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
Michigan Association of Marine Agents

SELECTED PUBLICATIONS

Kinnunen, R.E., and H.E. Johnson. 1986. Pathology of sea lamprey inflicted wounds on rainbow trout. Great Lakes Fishery Commission Technical Report No. 48, Ann Arbor, Michigan.

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 Fishery Commission Technical Report No. 46, Ann Arbor, Michigan.

Kinnunen, R.E., editor. Commercial Fisheries Newsline (quarterly newsletter for Great Lakes commercial fishermen published by the Michigan Sea Grant Advisory Service Program).

Kinnunen, R.E. 1984. Fish to use in Michigan ponds. Michigan Sea Grant Advisory Service Program Publication.

Kinnunen, R.E., J. Peterson, and S. Stewart. 1984. Underwater preserves: A definite future in Michigan. Michigan Planner 4:14-16.

Kinnunen, R.E. 1984. Fish disease diagnostic needs survey results. Michigan Sea Grant Advisory Service program Publication.

VITA

David J. Landkamer
Assistant Aquaculture Extension Specialist Phone: (612) 624-2720
Department of Fisheries and Wildlife
138 Hodson Hall
University of Minnesota
St. Paul, Minnesota 55108

EDUCATION

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

POSITIONS

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

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

SELECTED PUBLICATIONS

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

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

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

Landkamer, D.J., and M.L. Gross. 1988. Regualtions that apply to aquaculture in Minnesota. Minnesota Extension Service and Sea Grant Extension Program.

Gross, M.L., A.R. Kapuscinski, and D.J. Landkamer. 1988. Introduction to aquaculture in Minnesota. Minnesota Sea Grant Extension Program.

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

VITA

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EDUCATION

B.S. Ohio State University 1971
M.S. Auburn University 1977

POSITIONS

Assistant Professor and District Extension Specialist, Ohio Cooperative Extension Service, Ohio State University (1985 - present)
Instructor and Area Extension Agent, Ohio Cooperative Extension Service, Ohio State University (1981-1985)
Instructor and County Extension Agent, Ohio Cooperative Extension Service, 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

American Fisheries Society, Socioeconomic Section
National Association of County Agricultural Agents
Ohio Cooperative Extension Agents Association
Sea Grant Advisory Service Association
International Association for Great Lakes Research
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(3):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(4):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.

VITA

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EDUCATION

B.S. University of North Dakota 1977
B.S.ED. University of North Dakota 1979
M.S. North Dakota State University 1986
Ph.D. North Dakota State University (anticipated completion date September 1989)

POSITIONS

Extension Wildlife Specialist, North Dakota State University Extension Service, Director of NDSU Wildlife Rehabilitation Program and 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 (May 1982-September 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. 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. Masters thesis. North Dakota State University, Fargo, North Dakota.

VITA

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124 Sciences Hall II
Iowa State University
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EDUCATION

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

POSITIONS

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

Sigma Xi, Mississippi State University Chapter
American Fisheries Society; Mississippi Chapter
Mississippi Academy of Sciences
Fish Farmers of Texas (1983-1985)
Texas Chapter American Fisheries Society (1980-1985)

SELECTED PUBLICATIONS

Morris, J.E., L.R. D'Abramo, and R.J. Muncy. 1988. An inexpensive marking technique to assess ingestion of artificial feeds by larval fish. Submitted to Progressive Fish-Culturist.

Morris, J.E. 1988. Influence of artificial feeds upon striped bass (*Morone saxatilis*) X white bass (*M. chyrsops*) hybrid fry survival. Doctoral dissertation. Mississippi State University, Starkville.

Morris, J.E. 1988. Effect of artificial feeds upon hybrid striped bass fry survival and growth. Mississippi Chapter American Fisheries Society Annual Meeting, Vicksburg.

Morris, J.E., P.V. Zimba, and R.J. Muncy. 1988. Chlorophyll *a* determination in aquaculture ponds. Mississippi Academy of Sciences 52nd Annual Meeting, Biloxi.

Morris, J.E., W.M. Wingo, and R.J. Muncy. 1987. Zooplankton population dynamics in hybrid striped bass culture ponds. Mississippi Chapter American Fisheries Society Annual Meeting, Oxford.

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.

VITA

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EDUCATION

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

POSITIONS

Extension Fish and Wildlife Specialist, School of Forestry, Fisheries and Wildlife, University of Missouri, Columbia, Missouri (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 (June 1980-September 1980)

PROFESSIONAL MEMBERSHIPS

The Wildlife Society, Associate Wildlife Biologist
The Wildlife Society, Mississippi State University
The Arkansas Chapter of The Wildlife Society
The Arkansas Wildlife Federation
The Audubon Society
Arkansas Forestry Association
Arkansas County Agents Association
Arkansas Association of Extension 4-H Agents

VITA

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Southern Illinois University at Carbondale
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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 Corp. (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. (ed.) 1987-1988. Illinois Aquaculture Industry Association Newsletter.

Selock, D.A. 1974. Effects of feed supplements on the growth of channel catfish using tank culture. Master thesis. Western Illinois University, Macomb, Illinois.

VITA

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Forestry, Fisheries and Wildlife Extension
1-34 Agriculture Building
University of Missouri
Columbia, MO 65211

EDUCATION

B.S. University of Missouri 1957
M.S. Kansas State University 1969

POSITIONS

Extension Forester & Assistant Professor to Professor, Educational Programs, University of Missouri (1969-present)
Area Extension Forester, Kansas State University (1965-1969)
District Extension Forester, Kansas State University (1961-1964)
Farm Forester, Missouri Department of Conservation (1958-1961)

PROFESSIONAL MEMBERSHIPS

Acting Extension Fish and Wildlife State Specialist (1975-1980)
IPA to USDA SEA-Extension to develop National Renewable Resources Extension Plan (1979)
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)

VITA

Frederic L. Snyder
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EDUCATION

B.S. Ohio State University 1975
M.S. Ohio State University 1978

POSITIONS

Instructor and District Extension Specialist, Sea Grant, Cooperative Extension Service, Ohio State University, Northwest District, Port Clinton, Ohio (1980-present)
Advisory Service Agent, Cooperative Extension Service, Ohio State University, Sandusky, Ohio (1978-1980)
Associate Scientist, Ecological Analysts, Inc., Towson, Maryland (1977-1978)
Graduate Research Associate, Center for Lake Erie Area Research, Ohio State University (1975-1977)
Research Technician, Center for Lake Erie Area Research, Ohio State University (1974-1975)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
Dingell-Johnson Expansion Coordinator
The Ohio Chapter of American Fisheries Society
Ohio Cooperative Extension Agents Association
The Ohio Academy of Science
Sea Grant Advisory Service Association
Outdoor Writers of Ohio

SELECTED PUBLICATIONS

Holland, M.L., P. Pelton, D. Kelch, F. Snyder, F. Lichtkoppler, R. Joseph and J. Reutter. 1983. Lake Erie Cookbook. Ohio Sea Grant Guide Series OHSG-GS-5-83, Columbus, Ohio: Ohio State University.

Owen, B., R. Deehr and F.L. Snyder. 1983. "Comparative Food habits of young white perch (*Morone americana*) (Gmelin) and white bass (*Morone chrysops*) (Rafinesque) in Old Woman Creek Estuary", presented at the 92nd Annual Meeting of The Ohio Academy of Science, April 1983, Bowling Green, Ohio.

Snyder, F.L., R. Deehr and B. Owen. 1983. "Preliminary investigation of the use of Old Woman Creek Estuary by Lake Erie fishes", presented at the 92nd Annual Meeting of The Ohio Academy of Science, April 1983, Bowling Green, Ohio.

VITA

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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

POSITIONS

Professor of Food Science, University of Wisconsin-Madison (1977-present)
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)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

SELECTED PUBLICATIONS

Wesson, J.B., R.C. Lindsay and D.A. Stuiber. 1979. Discrimination of fish and seafood quality by consumer populations. Journal of Food Science 44:878-882.

Sommer, D.A., D.A. Stuiber, 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. Stuiber. 1983. Identification of compounds characterizing the aroma of fresh whitefish (*Coregonus clupeaformis*). Journal of Agricultural and Food Chemistry 31:326-330.

Josephson, D.B., R.C. Lindsay and D.A. Stuiber. 1983. Bisulfite suppression of fish aromas. Journal of Food Science 48(4):1064-1067.

Josephson, D.B., R.C. Lindsay and D.A. Stuiber. 1985. Biogenesis of lipid-derived volatile aroma compounds in the emerald shiner (*Notropis atherinoides*). Journal of Agricultural and Food Chemistry 32:1347-1352.

VITA

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EDUCATION

B.S. Tennessee Technological University, Cookeville, Tennessee
M.S. Tennessee Technological University, Cookeville, Tennessee

POSITIONS

Aquaculture Extension Specialist, Purdue University (1989-present)
Aquaculture Trainer, Peace Corps Stateside Training Program, University of South Carolina (1989)
Farm Technician, Fish Acres Tropical Fish Farm, Lake Worth, Florida (1989)
Assistant Project Leader, Non-native Fish Research Lab, Florida Fish and Game, Boca Raton, Florida (1988-1989)
Aquaculture Extensionist, Tongolese Ministry of Rural Development/U.S. Peace Corps, Togo, West Africa (1985-1987)

SELECTED PUBLICATIONS

Swann, D. L., J. R. Estes, and F. Bulow. 1984. Impacts of rainbow trout introduction on a Big South Fork Stream fishery. Proceedings of Scientific Research National Parks of the Upland Section of the SE Region. (Abstract).

Estes, J. R., D. L. Swann, and F. J. Bulow. 1984. Life history of sympatric brown and rainbow trout in a Big South Fork tributary stream. Proceedings of Scientific Research National Parks of the Upland Section of the SE Region. (Abstract).

Swann, D. L. and F. Bulow. 1984. Age and growth of centrarchids in a middle Tennessee mountain stream. Tennessee Academy of Science. (Abstract).