

NORTH CENTRAL REGIONAL AQUACULTURE CENTER EXTENSION PROJECT

Chairperson: D. Allen Pattillo, Iowa State University

Industry Advisory Council Liaison: Lyle Andry, Andry's Fish Farm LLC, Indiana

Funding Request: \$23,175

Duration: 1 Year (September 1, 2015 - August 31, 2016)

Objectives:

1. Enhance the NCRAC extension network for aquaculture information transfer.
2. Develop and implement Aquaculture Educational programs and Materials for the North Central Region (NCR).

Proposed Budgets:

Institution	Principal Investigator	Objective(s)	Year 1	Total
Iowa State University	D. Allen Pattillo	1 & 2	\$23,175	\$23,175
Totals			\$23,175	\$23,175

Non-funded Collaborators:

Institution	Collaborator
University of Nebraska-Lincoln	Dennis E. Bauer
North Dakota State University	Mark E. Clark
University of Wisconsin-Extension	Yet to be named
Southern Illinois University – Carbondale	Paul Hitchens
Michigan State University	Ronald E. Kinnunen
Kansas State University	Charles D. Lee
South Dakota State University	Yet to be named
Iowa State University	D. Allen Pattillo
University of Minnesota	Nicholas B. D. Phelps
Purdue University	Kwamena K. Quagraine
Michigan State University	Christopher Weeks
University of Missouri	Robert Pierce II

Table of Contents

OBJECTIVES: 2

PROPOSED BUDGETS: 2

PROJECT SUMMARY 4

JUSTIFICATION..... 4

RELATED CURRENT AND PREVIOUS WORK..... 4

ANTICIPATED BENEFITS 5

OBJECTIVES 5

PROCEDURES..... 5

FACILITES..... 8

REFERENCES..... 9

PROJECT LEADERS 10

BUDGET EXPLANATION..... 12

BUDGET SUMMARY ALL PARTICIPATING INSTITUTIONS 13

SCHEDULE FOR COMPLETION OF OBJECTIVES 15

PARTICIPATING INSTITUTIONS 16

PROJECT SUMMARY

In a recent NCR Aquaculture Needs Survey (2014), several priorities were identified for species information, extension activities, and needed outreach tools. This project proposes to address many of these needs by providing information and monthly access to extension specialists, researchers and industry leaders through the creation of an online NCR aquaculture learning community.

The initial phase of the project will be the development of the NCRAC Aquaculture Webinar Series. This series, running from September, 2015-August, 2016 will consist of 12 live webinars, approximately 2 hours each, presented monthly. Each month on a predetermined evening (i.e., the first Tuesday of each month) a webinar will be coordinated around an identified topic. A moderator will direct each webinar. A NCRAC Extension Specialist, researcher and when possible an Industry Liaison member will be recruited to attend and present on the topic. Supporting information (fact sheets and research papers) will be linked into an electronic hand out. Brief presentations will be followed by online discussion and a question and answer period. At the completion of the webinar, participants will have the opportunity to complete an on-line evaluation, where they will be compensated with the link to obtain additional supporting documents. Webinars will be recorded for future viewing and posted online on the NCRAC website (www.NCRAC.org), and/or other affiliated extension websites.

JUSTIFICATION

Extension provides the linkage between federally funded aquaculture research at universities and the general public. The extension base project of the North Central Regional Aquaculture Center (NCRAC) continues to be critical and highly desired by the private industry stakeholders in the North Central Region (NCR) of the United States. As extension specialists, the project investigators are constantly in search of better ways to enhance information transfer to the public. Online technology transfer is one way to address the limited number of Extension FTEs in the NCR. The NCR online learning community is currently supported by both the NCRAC website, where one can download a variety of educational materials, and the NCRAC list serve, an email tool that allows timely sharing of information pertinent to the industry. The NCRAC Aquaculture Webinar Series will add an interactive component to the NCR online learning community. Additionally, the webinar series brings together the cumulative knowledge and experience of the NCRAC community, engaging extension specialists, researchers and industry representatives in this effort. The webinar series will serve as a 1-year trial to gauge the impact and interest in continuing the series into the future, and will be free for participants.

RELATED CURRENT AND PREVIOUS WORK

In light of the ever-increasing influence of the internet as a source of knowledge, the investigators find it prudent to develop an online webinar series that will cover topics of interest in aquaculture and make them available to the public. The use of webinars was identified by Weeks (2014) as being an important extension activity by the NCRAC community. This webinar series will be modeled after the successful Aquaculture Boot Camp (ABC) model (<http://southcenters.osu.edu/aquaculture/aquaculture-extension/boot-camp>) developed by Dr. Laura Tiu at The Ohio State University. The ABC model uses researchers, extension specialists and industry mentors to teach such topics as aquaculture production training, business planning, and marketing. The ABC is offered at three levels of interest and commitment – introductory, intermediate, and intensive, with intensive having a hands-on component and intermediate and introductory conducted primarily online.

The Ohio State University Marketing Team recently conducted a similar 1-year marketing webinar series to share information on issues such as marketing packaging, pricing, financing, food safety, distribution, and other subjects. The project continues to be successful and archived sessions can be seen here on the website <http://southcenters.osu.edu/marketing/direct-marketing-webinars>.

The NCRAC Extension Technical Committee members have had a history of working together on regional Extension projects. While leadership for the project resides at The Ohio State University, several unfunded collaborators have volunteered to lend their support and time to this effort (see page 12 for a list of participating Institutions).

ANTICIPATED BENEFITS

Current and potential producers will learn, through online webinars, about 12 carefully selected topics that have been identified as important to the industry and relate directly to NCR aquaculture businesses. These briefs will provide a knowledge base and resources for beginning and experienced aquaculturists that will help them become more efficient and profitable.

Additionally, this series is an opportunity for inter-state collaboration as it can benefit producers in all 12 states who may be limited by distance from attending other NCRAC programs. The series brings NCRAC extension, research and industry professionals together with an opportunity to share their knowledge with the industry in an easy format. Producers benefit by gaining information and improving their networks without a huge expense, time or travel obligations. Posting the archived webinars online will extend impact by reaching interested individuals who aren't able to attend the live broadcasts. Evaluation of the monthly modules will allow for refinement of the series for future endeavors. This project will focus on objectives 2 and 3 of the ongoing Extension project, known hereafter as objectives 1 and 2, respectively for this specific project.

OBJECTIVES

1. Enhance the NCRAC extension network for aquaculture information transfer.
2. Develop and Implement Aquaculture Education Programs and Materials for the NCR.

PROCEDURES

Enhance Extension Network (Objective 1)

The development of a NCR online aquaculture learning community is one way to enhance information transfer. The NCR has always suffered from a lack of FTEs in the region, resulting in gaps in information and technical support for the industry. Some of these gaps can be eradicated using online information transfer. Extension specialists, researchers and industry representatives from all 12 states will have the opportunity to partner together on this effort to improve the sharing of relevant aquaculture information and technology, create an online learning community, and provide support to the industry. If this model proves to be successful, it can be continued on an annual basis by rotating coordination amongst the 12 states. This effort will be coordinated by The Ohio State University with input from Iowa State University and Michigan State University.

Develop and Implement Aquaculture Education Programs and Materials for the NCR (Objective 2)

Iowa State University (ISU) staff will coordinate the development of a **NCRAC Aquaculture Webinar Series** as part of the NCR online aquaculture learning community to address identified needs and interests of the aquaculture industry. Twelve live webinars, approximately 2 hours each, will be organized and presented monthly. The target audience is the aquaculture industry in the NCR. To that end, initial access to the webinars will be restricted to participants from the 12 states. This will be accomplished by requiring a brief online registration for the webinars, where location of participant can be verified. Organizers may open it up to a broader audience if participation warrants.

Webinar topics will be determined by the list of identified needs from the NCRAC community. A NCRAC Extension Specialist, researcher and when possible an Industry Liaison member A NCRAC Extension Specialist, researcher will be recruited to give a brief presentation during each webinar. This will ensure that attendees gain a broad perspective on the topic. Pattillo and Weeks along with input from the NCRAC Director's office will help ISU staff in contacting designated presenters for the identified webinars Brief presentations will be followed by online discussion and a

question and answer period. A moderator will guide the session to ensure timeliness, interaction and participation equality. Additional supporting information on the topic (relevant factsheets) will be assembled on an electronic handout.

Monthly evaluations of each webinar will be developed and conducted. Evaluations will be accomplished using a program called WooFoo™, where webinar attendees will fill out a brief online survey indicating changes in knowledge, attitudes, skills or abilities, and economic value of the webinar to participants. This information will then allow the team to both improve performance of the following monthly webinar, and track effectiveness and impact of the various sessions. Participants will also be provided with a link to the electronic handout with additional information pertaining to the webinar topic. Evaluation information will be analyzed and utilized to determine impact of the program. Publication of results is expected as well as dissemination of results at Annual NCRAC conferences.

The webinar will be promoted through websites, newsletters, producer associations and regional list serves. Participants will be responsible for their own connection fees (if any), but the webinars themselves will be free of charge. All sessions would be recorded and posted online for continuous access.

The following is a tentative list of topics and potential speakers developed during an August 2014 conference call. Topics and speakers may change based on availability and emerging needs. The associated Logic Model is located on the following page.

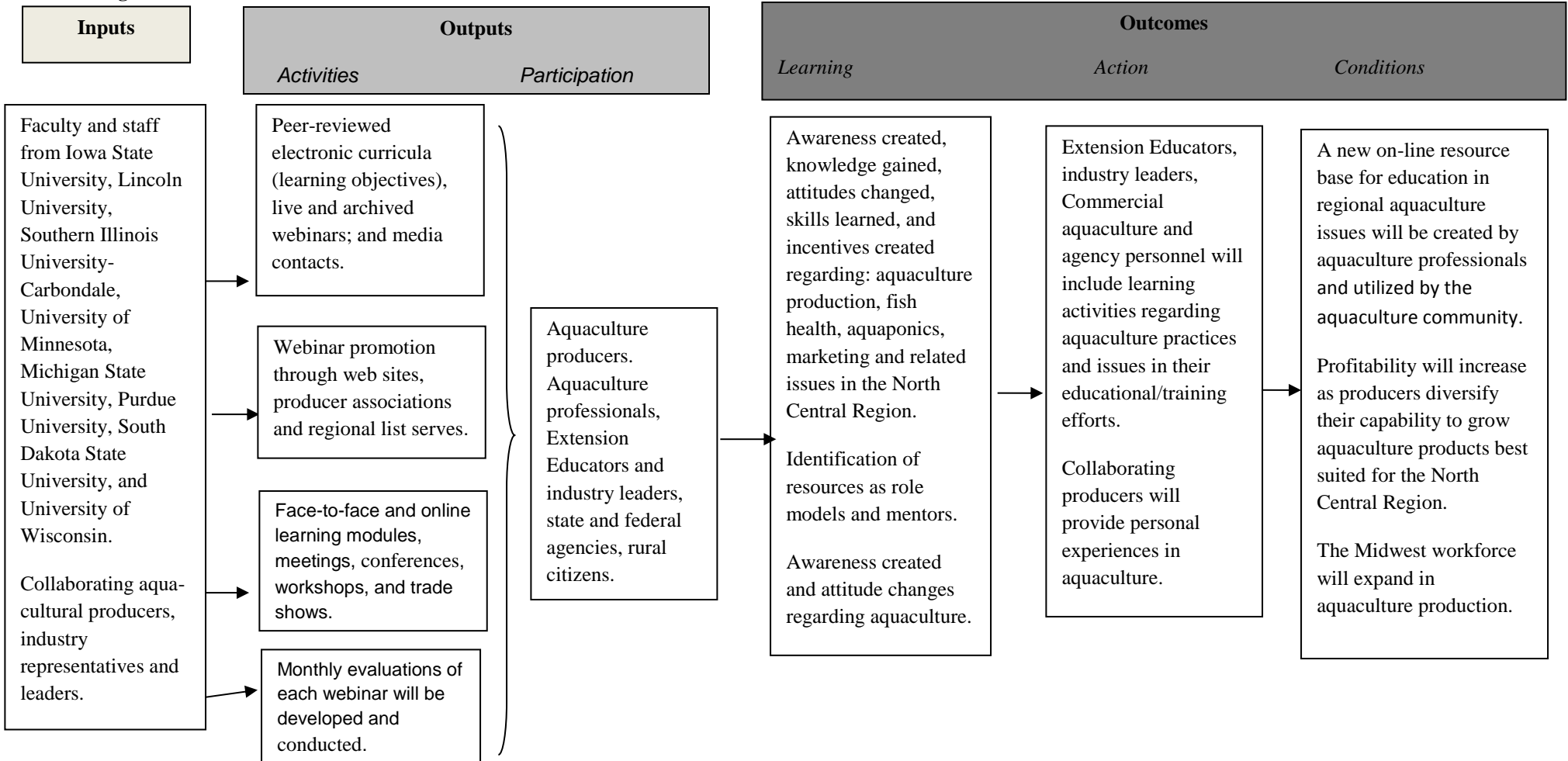
Topic	Extension Speaker	Research Speaker	Industry Speaker
Fish Feed & Nutrition	K. Muthukumarappan	M. Brown/ P. Brown/ J. Trushenski/B. Small/K. Dabrowski	S. Hart/ S. Craig
Marketing & Economics	K. Quagraine		M. Willows
Aquaponics	A. Pattillo	C. Hartleb	J. Metz/M. Harston
Barn Conversions	A. Pattillo	K. Rosentrater	M. Nelson
Saugeye/Walleye/Perch	J. Held	M. Rogge/ Alan Johnson	A. Stinton/D. Mosier/ R. Lackaff
HACCP/Biosecurity/BMP	R. Kinnunen	A. Shaw	J. Leininger
Fish Health	N. Phelps	M. Gaikowski/D. Starling/D. Rosenthal/M. Faisal	
Pond Management/Predator Control	C. Lee	B. Rode	B. Lynch/B. West
Hauling and Live Markets	P. Hitchens	K. Quagraine	G. Oswald/R. Hutchens
Effluent management/Regulations/Permitting	C. Weeks	F. Binkowski/G. Whelan	D. Vogler/M. Emmerson
Bass/Bluegill/Crappie	C. Hicks	J. Wetzel	L. Andry/P. Moore/R. Gerlach
State Association Strengthening	C. Weeks	J. Morris	
Additional topics: Baitfish, Barramundi, Marine Shrimp, RAS, Cage Culture, Aeration, Water Quality, Business Planning/Financing, Processing and Regulations.			

USDA Current Research Information System (CRIS or REEport) was accessed to review any related or relevant research and that the proposed work is original research/extension and does not duplicate any previously funded projects in CRIS. Key words used were extension, webinar, aquaculture, and Midwest.

Project: NCRAC Aquaculture Extension Educational Webinar Series

Goal: Develop an efficient information transfer method of current aquaculture information

Objective: Increase the awareness, knowledge and skills of producers, professionals, students, and general citizenry regarding aquaculture in the North Central Region.



Assumptions:

- Producers are interested in diversifying their revenue streams by learning about aquaculture.
- Infrastructure and markets will develop for regionally produced aquaculture products.
- Federal and state policies will encourage investment in aquaculture.

External Factors:

- Limited number of aquaculture extension specialists
- A diverse(species and culture practices) aquaculture industry in the region
- Gaps in information and technical support for the industry

FACILITES

Monthly module organization and development, speaker recruitment, registration and evaluation will be handled by the Brenton Center for Agricultural Instruction and Technology Transfer at Iowa State University in Ames, Iowa. ISU currently uses Adobe Connect to conduct webinars, but other programs may be considered given preference at time of program delivery.

REFERENCES

Weeks, C. 2014. North Central Region Aquaculture Needs Survey. Annual NCRAC Meeting, Toledo, Ohio, February 21, 2014.

PROJECT LEADERS

<u>State</u>	<u>Name/Institution</u>	<u>Area of Specialization</u>
Iowa	D. Allen Pattillo Iowa State University	Aquaculture Extension, Aquaponics

UNITED STATES DEPARTMENT OF AGRICULTURE
 COOPERATIVE STATE RESEARCH, EDUCATION, AND EXTENSION SERVICE

BUDGET

OMB Approved 0524-0039 ORGANIZATION AND ADDRESS Office of Sponsored Programs Iowa State University Ames, Iowa 50011-3221				USDA AWARD NO.			
PROJECT DIRECTOR(S) D. Allen Pattillo				DURATION PROPOSED MONTHS: _12_	DURATION PROPOSED MONTHS: ____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)
A. Salaries and Wages		CSREES-FUNDED WORK MONTHS		Funds Requested by Proposer	Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)
		Calendar	Academic				
1. No. Of Senior Personnel a. ____ (Co)-PD(s) b. ____ Senior Associates							
2. No. of Other Personnel (Non-Faculty) a. 1 Research Associates/Postdoctorates b. ____ Other Professionals c. ____ Paraprofessionals d. ____ Graduate Students e. ____ Prebaccalaureate Students f. ____ Secretarial-Clerical g. ____ Technical, Shop and Other		12			\$15,750.00		
Total Salaries and Wages..... →							
B. Fringe Benefits (If charged as Direct Costs) (34.9%)					\$5,156.00		
C. Total Salaries, Wages, and Fringe Benefits (A plus B) →					\$20,906.00		
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies					\$419.00		
F. Travel					\$1,850.00		
G. Publication Costs/Page Charges							
H. Computer (ADPE) Costs							
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)							
J. All Other Direct Costs (In budget narrative, list items and dollar amounts, and provide supporting data for each item.)							
K. Total Direct Costs (C through J)..... →							
L. F&A/Indirect Costs (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases.)							
M. Total Direct and F&A/Indirect Costs (K plus L) →							
N. Other →							
O. Total Amount of This Request →					\$23,175		
P. Carryover -- (If Applicable) Federal Funds: \$		Non-Federal funds: \$		Total \$			
Q. Cost-Sharing/Matching (Breakdown of total amounts shown on line O) Cash (both Applicant and Third Party) →							
- Non Cash Contributions (both Applicant and Third Party)							
AME AND TITLE (Type or print)				SIGNATURE (required for revised budget only)			DATE
Project Director							
Authorized Organizational Representative							
Signature (for optional use)							

BUDGET EXPLANATION

- A. Salaries and Wages.** \$15,750. Program Coordinator I Salary: \$13,350.00 0.3 FTE or 6 days/month for 1 year). Program Coordinator will be responsible for organizing all technical aspects of the webinar series including marketing the series, recruiting speakers, preparing agendas, coordinating webinar technology, registration of participants, development, collection and analysis of evaluation materials, presenting data at appropriate meetings. Student Salary: \$2,400 (\$10/hr for 10 hours/week for 6 months). Student will be responsible to assist Pattillo in collecting all needed materials from speakers for inclusion with their specific webinar topics.
- B. Fringe Benefits.** \$5,156.00. \$5,046.00 .00 for Program Coordinator I. The fringe rate charged for the Program Coordinator I at Iowa State University is 37.8%. \$110.00 for student labor. The fringe rate charged for the student labor at Iowa State University is 4.6%.
- E. Materials.** \$419.00. Duplication costs of speaker's selected materials for their selected webinar topic.
- F. Travel.** \$1,850.00. Transportation, meals, and lodging for Program Coordinator for attending the 2016 NCRAC regional conference at locations to be determined, to collect, report and share information from the project

BUDGET SUMMARY ALL PARTICIPATING INSTITUTIONS

Year 1												
	UNL	NDSU	UMN	UW	LU	MSU	KSU	ISU	SDS	Purdue	OSU	TOTALS
Salaries and Wages												
Fringe Benefits												
Total Salaries, Wages, and Fringe Benefits								\$20,906				\$20,906
Nonexpendable Equipment												
Materials and Supplies								\$419				\$419
Travel								\$1,850				\$1,850
All Other Direct Costs												
TOTAL PROJECT COSTS											\$23,175	\$23,175

SCHEDULE FOR COMPLETION OF OBJECTIVES

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

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

PARTICIPATING INSTITUTIONS

University of Nebraska-Lincoln	Dennis E. Bauer
North Dakota State University	Mark E. Clark
University of Wisconsin-Extension	Yet to be named
Southern Illinois University – Carbondale	Paul Hitchens
Michigan State University	Ronald E. Kinnunen
Kansas State University	Charles D. Lee
South Dakota State University	Yet to be named
Iowa State University	D. Allen Pattillo
University of Minnesota	Nicholas B. D. Phelps
University of Missouri	Robert A. Pierce II
Purdue University	Kwamena K. Quagrainie
Michigan State University	Christopher Weeks
Ohio State University	Thomas Worley

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EDUCATION

B.S.	Wildlife and Natural Resources	University of Nebraska-Lincoln	1975
M.S.	Range Science	University of Nebraska-Lincoln	1978

POSITIONS

University of Nebraska - Extension	Extension Educator	1978-Present
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SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Society for Range Management
Nebraska Cooperative Extension Association

VITA

Mark E. Clark
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EDUCATION

B.A. Mathematics	University of Tennessee	1987
M.S. Mathematics	University of Tennessee	1989
Ph.D. Ecology	University of Tennessee	1996

POSITIONS

North Dakota State University	Assistant Professor	2010-Present
North Dakota State University	Assistant Professor	2002-2009
University of Montana	Postdoctoral Fellow	2000-2002
Iowa State University	Postdoctoral Fellow	1997-2000
Oak Ridge National Laboratory	Postdoctoral Fellow	1996-1997

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
Ecological Society of America
Society of Integrative & Comparative Biology

SELECTED PUBLICATIONS

Clark, M.E., K.A. Rose, J.A. Chandler, T.J. Richter, D.J. Orth, and W. Van Winkle. 2008. Water level fluctuation effects on centrarchid reproductive success in reservoirs: a modeling analysis. *North American Journal of Fisheries Management* 28:1138-1156.

Clark, M.E., and T.E. Martin. 2007. Modeling tradeoffs in avian life history traits and consequences for population growth. *Ecological Modeling* 209:110-120.

Clark, M.E., B.J. Danielson, M.V. Santelmann, J.I. Nassauer, D. White, and K.E. Freemark. 2007. Impacts on mammal communities: a spatially explicit model. Pages 115-138 in J.I. Nassauer, M.V. Santelman, and D. Scavia, editors. *From the corn belt to the Gulf: societal and environmental implications of alternative agricultural futures*. RFF Press, Washington, D.C. 223 pages.

Reed, W.L., M.E. Clark, P.G. Parker, S.A. Raouf, N. Arguedas, D.S. Monk, E. Snajdr, V. Nolan Jr., and E.D. Ketterson. 2006. Physiological effects on demography: a long term experimental study of testosterone's effects on fitness. *The American Naturalist* 167:667-683.

Santelmann, M.V., D. White, K. Freemark, J.I. Nassauer, J.M. Eilers, K.B. Vache, B.J. Danielson, R.C. Corry, M.E. Clark, S. Polasky, R.M. Cruse, J. Sifneos, H. Rustigian, C. Coiner, J. Wang, and D. Debinski. 2004. Assessing alternative futures for agriculture in Iowa, U.S.A. *Landscape Ecology* 19:357-374.

Bronikowski, A.M., M.E. Clark, H. Rodd, and D.N. Reznick. 2002. Population-dynamic consequences of predator-induced life-history variation in the guppy (*Poecilia reticulata*). *Ecology* 83:2194-2204.

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EDUCATION

B.S.	Environmental Biology	Eastern Illinois University	1981
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POSITIONS

Southern Illinois University - Carbondale	Aquaculture Specialist/Researcher II	2005-Present
Illinois Fish Farmers Co-op	Technical Service Agent	2003-2005
Inter Sea Farms De Venezuela C. A.	Independent Private Consultant	2003
Larfico S.A., Penaeid Shrimp Laboratory	Technical Manager	1990-2003
Penaeid Shrimp Farm, affiliate of Larfico S.A.	Technical Manager, Langomorro Cia., Ltd.	1984-1990
Inducam S.A., Penaeid Shrimp Farm	Pond/Hatchery Biologist	1982-1984
Texas A&M University	Technical Assistant II	1982
Market Facts, Inc	Independent Private Consultant	1982
King James Shrimp, Inc	Staff Biologist	1981

SELECTED PUBLICATIONS

- Laramore, R., S. Allen, P. Hitchens, A. Romero, and A. Schuur. 2000. Artificial induction of active accommodation for White Spot Syndrome Virus (WSSV) in *Penaeid vannamei* with tolerine products. Proceedings of the World Aquaculture Society, Latin American Conference. Panama City, Panama.
- Blogoslawski, W.J., C. Perez, and P. Hitchens. 1992. Ozone treatment of seawater to control vibriosis in mariculture of penaeid shrimp, *Penaeus vannamei*. Pages 131-14in. Proceedings of the Third International Symposium on the use of Ozone in Aquatic Systems. International Ozone Association, Pan American Group. Stamford, Connecticut, USA.

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EDUCATION

B.S.	Fisheries Biology and Management	Michigan State University	1976
M.S.	Fisheries Biology and Management	Michigan State University	1979
Ph.D.	Biological Sciences	Michigan Technological University	1997

POSITIONS

Michigan State University	Michigan Sea Grant Extension Agent	1982-Present
Rangen Research Laboratory	Fisheries Pathologist	1981
U.S. Fish and Wildlife Service	Fisheries Biologist	1979-1980

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society, Fish Health Section, Salmonid Section
International Association for Great Lakes Research

SELECTED PUBLICATIONS

- Summerfelt, R.C., R.D. Clayton, J.A. Johnson, R.E. Kinnunen. 2010. Production of walleye as potential food fish. North Central Regional Aquaculture Center Fact Sheet #116. NCRAC Publications Office, Iowa State University, Ames, Iowa.
- Muir, A.M., T.M. Sutton, M.T. Arts, R.M. Claramunt, M.P. Ebener, J.D. Fitzsimons, T.B. Johnson, R.E. Kinnunen, M.A. Koops, and M.M. Sepulveda. 2010. Does condition of lake whitefish spawners affect physiological condition of juveniles? *Journal of Great Lakes Research* 36:92-99.
- Kinnunen, R.E., M.C. Gould, and P. Cambier. 2005. Composting commercial fish processing waste from fish caught in the Michigan waters of the Great Lakes. *Michigan State University Technical Bulletin*, East Lansing, Michigan.
- Hinshaw, J.M., G. Fornshell, R.E. Kinnunen. 2004. A profile of the aquaculture of trout in the United States. Report for USDA Risk Management Agency, Federal Crop Insurance Corporation, through Mississippi State University, East Lansing, Michigan.
- Kinnunen, R.E., editor. 2002. Environmental Strategies for Aquaculture Symposium Proceedings (December 2000). 62nd Midwest Fish and Wildlife Conference, Minneapolis, MN. NCRAC CD Series #101, NCRAC Publications Office, Iowa State University, Ames, Iowa.
- Gunderson, J.L. and R.E. Kinnunen. 2001. Aquatic nuisance species-Hazard analysis and critical control point training curriculum. Michigan Sea Grant Publication No. MSG-00-400, East Lansing, Michigan.
- Kinnunen, R.E. 2000. A white paper on the status and needs of salmonid aquaculture in the North Central Region. North Central Regional Aquaculture Center. Michigan State University, East Lansing, Michigan.

VITA

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EDUCATION

B.S.	Fisheries and Wildlife Biology	Kansas State University	1975
M.S.	Animal Sciences and Industry	Kansas State University	1988

POSITIONS

Kansas State University	Extension Specialist-Wildlife	1995-Present
Kansas Department of Wildlife and Parks	Agricultural Liaison Biologist	1989-1995
Kansas State University	Extension Assistant	1986-1989

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Kansas Chapter of the Society for Range Management
Kansas Chapter of the Wildlife Society
Society for Range Management
The Wildlife Society

SELECTED PUBLICATIONS

- Lee, C. D., and Z .B. Eddy. In review. Black-tailed prairie dog immigration to extirpated colonies in Northwest Kansas. *Rangeland Ecology and Management*.
- Deppenbusch, B. E., J. S. Drouillard and C. D. Lee. 2011. Feed predation by European starlings in a Kansas feedlot. *Human and Wildlife Interactions* 5(1):58-65.
- Lee, C. D., and J. LeFlore. 2007. Efficacy of three in-burrow treatments to control black-tailed prairie dogs. Twelfth Wildlife Damage Management Conference. Corpus Christi, Texas.
- Lee, C. D. 1998. Deer damage control options. Kansas State University and Cooperative Extension Service Publication No. C-728, Manhattan, Kansas.
- Lee, C. D, and R. J. Johnson. 1997. Wildlife habitat evaluation handbook-participant's manual. Kansas State University Cooperative Extension Service Publication No. MF 2266, Manhattan, Kansas.
- Hall, D., R. J. Johnson, and C. D. Lee 1997. Wildlife habitat evaluation handbook-leader's guide, Kansas State University Cooperative Extension Service Publication No. MF 2265, Manhattan, Kansas.
- Weins, J. R., C. S. Guy, and C .D. Lee. 1997. Streambank revetment. Kansas State University Agricultural Experiment Station and Cooperative Extension Service Publication No. MF 2294, Manhattan, Kansas.

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EDUCATION

B.S.	Fisheries and Aquaculture	The University of Georgia	2008
M.S.	Aquaculture	Auburn University	2010

POSITIONS

Iowa State University	Aquaculture Extension Specialist III	2011-present
Auburn University	Graduate Research Assistant	2008-2010
University of Georgia	Aquarium Technician	2007-2008
University of Georgia	Fisheries Technician	2007-2008

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
World Aquaculture Society
United States Aquaculture Society
International Association of Astacology
Xi Sigma Pi

SELECTED PUBLICATIONS

Pattillo, D. A. , C. E. Hicks, J. E. Wetzel, P. B. Brown, R. A. Rode, J. E. Morris. *In Prep.* Evaluation of the Newly-Developed, Least-Cost Experimental Diet for Bluegill at Commercial Densities.

Pattillo, D. A. and J. A. Stoeckel. *In Review.* The effectiveness of Aqi-S™ and temperature manipulation for anesthetizing juvenile redclaw crayfish (*Cherax quadricarinatus*). *Aquaculture*.

Pattillo, D. A. and J. A. Stoeckel. *In Prep.* The effectiveness of androgenic gland ablation for the sex reversal of juvenile male redclaw crayfish (*C. quadricarinatus*).

Pattillo, D. A. and J. A. Stoeckel. *In Prep.* Potential escapement effects of the Australian redclaw crayfish (*C. quadricarinatus*), on a common crayfish species, (*Procambarus acutissimus*) in the Southeastern United States.

VITA

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EDUCATION

B.S.	Aquatic Biology	Bemidji State University	2005
M.S.	Aquaculture/Fisheries	University of Arkansas at Pine Bluff	2007
Ph.D.	Veterinary Medicine	University of Minnesota, expected completion	2012

POSITIONS

University of Minnesota	Instructor: Aquaculture Research and Extension	2011-Present
University of Minnesota	Scientist: Aquaculture Diagnostic Specialist	2009-2011
University of Minnesota	Asst. Scientist: Aquaculture Diagnostic Specialist	2007-2009
University of Arkansas at Pine Bluff	Graduate Research Assistant	2005-2007

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society, Sections: Fish Health, Fish Culture, Genetics
United States Animal Health Association
American Association of Veterinary Laboratory Diagnosticians

SELECTED PUBLICATIONS

Phelps, N. B. D., A. E. Goodwin, E. Marecaux, and S. M. Goyal. In review. Comparison of treatments to eliminate viral hemorrhagic septicemia virus (VHSV-IVb) from frozen baitfish. *Diseases of Aquatic Organisms*.

Phelps, N. B. D., A. G. Armien, S. K. Mor, J. Warg, R. Bhagyam, T. Monahan, and S. M. Goyal. In press. Spring viremia of carp virus in the Minnehaha Creek, Minnesota. *Journal of Aquatic Animal Health*.

Phelps, N. B. D., D.P. Patnayak, Y. Jiang, and S. M. Goyal. In press. The use of a one-step rRT-PCR for the surveillance of viral hemorrhagic septicemia virus in Minnesota. *Journal of Aquatic Animal Health*.

Phelps, N. B. D., and A. E. Goodwin. 2008. Vertical transmission of *Ovipleistophora ovariae* (Microspora) within the eggs of the Golden Shiner. *Journal of Aquatic Animal Health* 20:45-53.

Phelps, N. B. D., and A. E. Goodwin. 2007. Validation of a quantitative PCR diagnostic method for detection of the microsporidian *Ovipleistophora ovariae* in the cyprinid fish *Notemigonus crysoleucas*. *Diseases of Aquatic Organisms* 76: 215-221.

VITA

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EDUCATION

B.S.	Southern Arkansas University	Magnolia, AR 71753	1977	Biology-Agriculture
M.S.	Mississippi State University	Starkville, MS	1981	Wildlife Ecology
Ph.D.	University of Missouri	Columbia, MO 65203		Forestry

POSITIONS

2013 to present: State Extension Fisheries and Wildlife Specialist and Extension Associate Professor, University of Missouri

2001-2013 Extension Assistant Professor and State Extension Fish and Wildlife Specialist, University of Missouri

1989-2001 Extension Instructor and State Extension Fish and Wildlife Specialist University of Missouri

1982-89 County Extension Agent – Agriculture (Lincoln County) and Staff Chairman (Dallas County), University of Arkansas Cooperative Extension Service

SELECTED PUBLICATIONS

Hicks, C.E. and R.A. Pierce II. 2014. Managing ponds and lakes for aquaculture and fisheries in Missouri: Pond construction and management considerations. MU Extension Guide G9474. 6pp.

Hicks, C.E. and R.A. Pierce II. 2014. Managing ponds and lakes for aquaculture and fisheries in Missouri: Fish selection and stocking for sport fishing. MU Extension Guide G9475. 4pp.

Hicks, C.E. and R.A. Pierce II. 2014. Managing ponds and lakes for aquaculture and fisheries in Missouri: Pond dynamics and water quality considerations. MU Extension Guide G9476. 6pp.

Hicks, C.E. and R.A. Pierce II. 2014. Managing ponds and lakes for aquaculture and fisheries in Missouri: Establishing hybrid sunfish in ponds for recreation. MU Extension Guide G9477. 2pp.

Hicks, C.E., R.A. Pierce II and K. W. Bradley. 2014. Managing ponds and lakes for aquaculture and fisheries in Missouri: Controlling nuisance aquatic vegetation. MU Extension Guide G9478. 7pp.

Hicks, C.E. and R.A. Pierce II. 2011. Freshwater prawn production in Missouri. MU Extension Guide G9471. 6pp.

Pierce, R.A. II, J. Parcell, C. Boessen, R. Hayward and C. Hicks. 2007. Paddlefish Production: opportunities for Missouri pond and lake owners. MU Extension Guide G9470. 4pp.

VITA

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EDUCATION

B.S.	Agriculture	University of Science and Technology, Ghana	
M.S.	Agricultural Economics	University of Alberta, Edmonton, Canada	
Ph.D.	Agricultural Economics	University of Alberta, Edmonton, Canada	2000

POSITIONS

Purdue University	Aquaculture Marketing Specialist	2005-Present
University of Arkansas at Pine Bluff	Assistant Professor-Aquaculture Marketing	2001-2005

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Agricultural Economics Association
International Association of Aquaculture Economics and Management
World Aquaculture Society

SELECTED PUBLICATIONS

- Quagraine, K.K., K.G. Hughes and A. Xing. 2011. Delineating shoppers of live seafood in the Midwestern United States. *Aquaculture Economics & Management* 15 (3): 155-165.
- Quagraine, K.K., A. Xing, and K.G. Hughes. 2011. Factors influencing the purchase of live seafood in the North Central Region of the United States. *Marine Resource Economics* 26 (1):: 59-74.
- Quagraine, K.K., C.C. Ngugi, and S. Amisah. 2010. Analysis of the use of credit facilities by small-scale fish farmers in Kenya. *Aquaculture International* 18 (3): 393-402.
- Quagraine, K.K., S. Amisah, and C.C. Ngugi. 2009. Aquaculture information sources for small-scale fish farmers: the base of Ghana. *Aquaculture Research* Vol. 40:: 1516-1522.
- Amisah, S., D. Adjei-Boateng, K. A. Obirikorang and K.K. Quagraine. 2009. Effects of clam size on heavy metal accumulation in whole soft tissues of *Galatea paradoxa* (born, 1778) from the Volta estuary, Ghana. *International Journal of Fisheries and Aquaculture* 1(2): 014-021.
- Amisah, S. A.B. Gyampoh, P. Sarfo-Mensah, and K.K. Quagraine. 2009. Livelihood trends in response to climate change in forest fringe communities of the Offin Basin in Ghana. *J. Appl. Sci. Environ. Manage* 13(2): 5 – 15.
- Adjei-Boateng, D., S. Amisah, and K.K. Quagraine. 2009. Bacteriological contamination of the freshwater clam (*Galatea paradoxa*/born 1778) from the Volta estuary, Ghana. *African Journal of Microbiology Research* 3(7): 396-399.
- Kumar, G., Quagraine, K.K., and Engle, C. 2008. Factors that influence frequency of purchase of catfish by U.S. households in selected cities. *Aquaculture Economics and Management* 12(4): 252-267.

VITA

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EDUCATION

B.S.	Aerospace Engineering	San Diego State University	1986
M.S.	Fisheries and Wildlife: Fish Population Dynamics	Michigan State University	1997
Ph.D.	Fisheries and Wildlife: Aquaculture/Fish Nutrition	Michigan State University	2007

POSITIONS

Michigan State University	Extension Specialist	2014-present
North Central Regional Aquaculture Center	Regional Aquaculture Extension Specialist	2008 – Present
University of Alaska	Adjunct Professor	2012
Michigan State University	Research Associate / Specialist	2007 – 2008
Aquaculture Bioengineering Corp.	Consultant	1996 – 2009
Michigan State University	Aquatic Animal Health Lab Manager	2003 – 2007
Michigan State University	Graduate Assistant	2002 – 2007
Stoney Creek Fisheries	Aquaculture Facility Manager	2000 – 2001
Great Black Creek Fish Co.	Hatchery Manager	1998 – 2000
Cade Industries	Engineer	1989 – 1993
McDonnell Douglas	Engineer	1986 – 1989

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

World Aquaculture Society
National Aquaculture Association
Aquaculture Engineering Society
Michigan Aquaculture Association, President 2003 - 2008

SELECTED PUBLICATIONS

- Weeks C.T. 2013. Sustainable Aquaculture in the North Central Region US - A Review of perceptions and recommendations from the aquaculture community. *Journal of Extension* v51 no.2 - 2COM1.
- Weeks C.T. 2011. Incorporating Deliverables into the NCRAC Project Development Process. North Central Regional Aquaculture Center Report. North Central Regional Aquaculture Center, December 2011.
- Weeks C.T. 2011. NCR Aquaculture Critical Needs Assessment Report. North Central Regional Aquaculture Center Report, October 2011.
- Weeks C.T., R. Kim, M. Wolgamod, G. Whelan and M. Faisal. 2011. Experimental infection studies demonstrate the high susceptibility of the salmonid, lake herring (*Coregonus artedii*), to the Great Lakes strain of viral hemorrhagic septicemia virus (Genotype IVb). *Journal of Fish Disease* 34(11): 887-891

VITA

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EDUCATION

B.S.	Agriculture	The Ohio State University	1973
M.S.	Agriculture	The Ohio State University	1977
Ph.D.	Agricultural Economics	The Ohio State University	1990

POSITIONS

The Ohio State University	Director and Associate Professor	2005-Present
The Ohio State University	Coordinator of Operations	2001-2004
The Ohio State University	Research & Extension Economist	2000-2001
The Ohio State University	State Extension Specialist	1990-2000

SELECTED PUBLICATIONS

Boulay, David A., C.T. Worley and Barnes, M. 2008. Management through information: Supporting technology commercialization. *Journal of Agricultural and Food Information* 9(4): 310-316.

Folwell, R.J., C.T. Worley, and V.A. McCracken. 1996. Changing concentration in the beef and pork industries and the degree of competition. *Journal of Food Products Marketing* 3(4): .23-36.

Worley, T., J. Ellerman, D. Mangione, T. West and Y. Yang. 2004. Meat goat market analysis: A pilot study of the Somali Market in Columbus Ohio. *Journal of Food Distribution* 35(1): 182-187. .

Worley, T., R. Folwell, J. Foltz and A. Jaqua. 2000. Management of a cooperative bargaining association: The case in the Pacific Northwest asparagus industry. *Review of Agricultural Economics* 22(2): .548-565.

Worley, T. and J. McCluskey. 2000. Production contracts as a means of vertical coordination with application to the wheat industry. *Journal of Food Distribution Research* 31(1): 215-224.

Worley, T., A. D. O'Rourke, and J. Seviertsen. 1998. Technology adoption decisions in Pacific Northwest grain milling firms. *Journal of Food Products Marketing* 5(2):53-71.

Worley, T., R. J. Folwell, and G. L. Bagnara. 1996. Tarrification under the Uruguay Round of GATT: The case of Swiss asparagus trade. *Journal of Food Distribution Research* 27(1): 45-49.

Worley, C. T., R.J. Folwell, V.A. McCracken, and G .L.Bagnara. 1995. Food label regulations in the United States and European community: International trade facilitators or non-tariff barriers. *Journal of International Food and Agribusiness Marketing* 7(2): 91-103.

Worley, C. T., G.L. Bagnara, and R.J. Folwell. 1995. European packaging and recycling regulations: Implications for food marketing and trade. *Journal of Food Distribution Research* 26(1): 53-57.