NORTH CENTRAL REGIONAL AQUACULTURE CENTER EXTENSION PROJECT

Chairperson: Joseph E. Morris, Iowa State University

Industry Advisory Council Liaison: Mark Willows, Binford, North Dakota

Funding Request: $35,700

Duration: 2 Years (September 1, 2011 - August 31, 2013)

Objectives:

1. Strengthen linkages between North Central Regional Aquaculture Center (NCRAC) Research and Extension Work Groups.

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

3. Develop and implement aquaculture educational programs and materials for the North Central Region (NCR).

Proposed Budgets:

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Non-funded Collaborators:

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<td>Joseph E. Morris</td>
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Growth in the North Central Region’s (NCR) aquaculture industry mirrors, and is driven by, broader U.S. and worldwide transitions in the seafood industry. The percentage of seafood from wild fisheries is near or above its sustainable capacity and a steadily increasing percentage of seafood in the world comes from aquaculture, which accounted for this growth from 2000 to 2002 (FAO 2004). World aquaculture production in 1991 was ca. 14 million metric tons (NMFS 2002), and in 2002 it had grown to ca. 40 million metric tons (FAO 2004). In 2008 aquaculture production was estimated at over 52 million metric tons with the U.S. aquaculture production being the 12th largest in the world (NMFS 2010).

Increased aquaculture production can provide significant health benefits because fish provide a low fat, healthy alternative to many other types of meat. U.S. consumption of fishery products was 7.4 kg (16.3 lb) of edible meat per person in 2007, an increase over the approximately 6.7 kg (15.0 lb) per person level where it has hovered over the last decade (NMFS 2010). The value of U.S. aquaculture production has grown by roughly 5–10% each year during the past decade, and aquaculture is generally regarded as the fastest growing segment of U.S. agriculture. Fish are now farmed in every state and territory in the United States, and total U.S. aquaculture production in 2005 was valued at approximately $1.1 billion (USDA 2009). Nevertheless, a wide disparity exists between domestic aquaculture production and demand, as indicated by the fact that imports of edible seafood made up 84% of the U.S. consumption (NMFS 2007).

In 2005, there were reported sales of $35 million from 416 facilities in the North Central Region (NCR), which is a 26% increase over 1998 production values (USDA 2007). In 2007, 1,075 aquaculture farms in the region produced a value of $57.6 million; however, this data included state and federal hatchery production value equivalences of fish stocked into the wild (USDA 2009).

Aquaculture-related business in the NCR is an emerging industry that has continued into the 21st century, with an estimated farm gate value of $70+ million. Although the NCR contains approximately 25% of the U.S. population, the regional aquaculture production accounts for less than 3% of all U.S. aquaculture production (USDA 2000). The aquaculture industry in this region has historically consisted of baitfish and sport fish operations (fish in pond and lake stockings) along with food fish operations in some states, e.g., channel catfish (*Ictalurus punctatus*) in Missouri and rainbow trout (*Oncorhynchus mykiss*) in Ohio. In more recent years there have been increasing interests in food fish operations that include new foci on yellow perch (*Perca flavescens*) and hybrid striped bass (*Morone chrysops x M. saxatilis*).

Aquaculture can be a catalyst for new industries within our region. The steady decline in traditional family farming has aroused concern and points out the need for alternative strategies to preserve rural communities (Smith et al. 1995; Wisconsin Catholic Conference 1997; Sweet 2000; Walters 2001). Aquaculture development may provide reasonable alternatives for economic development in rural situations where dairy and other farm industries have declined and continue to experience difficulty. However, for the regional aquaculture industry to expand and thrive, its operations must be financially profitable, be environmentally acceptable to the communities in which they are located, as well as exist in a supportive regulatory environment.

Although NCR states lack the longer growing season of more southern states, making them less competitive for growing warmwater fish outdoors, regional resources are ideally suited for the culture of marketable coldwater and coolwater food fishes, including salmonids (*Oncorhynchus* spp.), whitefish (*Salanx cuvieri*), walleye (*Sander vitreus*), yellow perch, hybrid striped bass, and sunfish (*Lepomis* spp.). There is also the possibility of overcoming this regional growing season limitation by using pond-reared species suited for NCR culture conditions or climate-controlled and water-conserving recirculating aquaculture systems. Regardless of the species or culture system, additional information is needed to better understand both the operation and mechanics of these alternatives.

Successful aquaculture endeavors usually develop within the context of pre-existing functioning markets with relatively high prices. NCR aquaculturists have the opportunity to participate in markets that already exist for traditional wild-caught commercial species. Regional commercial fishing, especially in the Great Lakes states, continues to be more strictly regulated by quotas, and less highly valued as compared to the tourism value of recreational fishing, creating an opportunity for aquaculturists to produce products to
fill this gap. As public awareness of the problem of environmental contaminants in wild-caught fish expands, there is some evidence to support the perception that aquaculture-produced fish will address the issue of seafood safety by offering an alternative (Santerre et al. 2000).

The North Central Regional Aquaculture Center (NCRAC) Extension Work Group represents one of the longest established organized programs providing aquaculture resource information and technical assistance to the NCR's commercial aquaculture industry through applied and basic research, education, and outreach. The goal for the NCRAC Extension Work Group is to focus on delivering more specialized services to the aquaculture industry and broaden the scope of the program for the NCR. Members of the NCRAC Extension Work Group will continue to expand on these efforts by providing information for regional and national applications. Also, the Regional Aquaculture Extension Specialist (RAES) project overlaps with and cooperatively enhances NCRAC extension efforts. This project is aimed at identifying and organizing aquaculture resource information to meet regional aquaculture industry needs by improving communication and interaction among the state aquaculture industry associations within the 12 NCR states.

With the growth of the aquaculture industry in the NCR, a new demand and broader market for technical information and aquaculture services has evolved. Providing quality technical assistance in all aspects of aquaculture is critical to enhance the positive momentum that the region's aquaculture industry is exhibiting. As novices enter the aquaculture industry, they seek guidance from knowledgeable and experienced persons, commonly from state and federal agencies. Experienced aquaculturists need updated information on new research findings on alternative rearing techniques. The need for more public outreach by NCRAC researchers is increasingly apparent given the limited number of cooperative and sea grant extension personnel. This is one of the primary goals of the NCRAC Extension Work Group.

Hundreds of inquiries by persons interested in the potential of NCR species for aquaculture are referred to the NCRAC Extension Work Group each year. To illustrate this point, in September 2008 the NCRAC Web site (ncrac.org) had ca. 40,000 hits. Requests come from a range of individuals: from the mildly curious with a limited background in aquaculture, to others with limited knowledge but real physical properties or financial resources, and to experienced aquaculturists with considerable expertise and knowledge who want to apply alternative innovative techniques. The experienced aquaculturists include individuals attempting to improve or change their operations themselves and those who have reached the point where they need outside professional help. Often clients may wish to evaluate the appropriateness of equipment, species, or techniques for use in the region. These interested parties need sound advice concerning the development and operation of aquaculture ventures. The NCRAC Extension Work Group plays a vital role in providing this information.

The rapid growth of aquaculture has raised concerns that existing and future aquaculture operations may also be significant sources of pollutants and nutrient waste (EDF 1997; GLFC 1999). Although aquaculture is still only an “emerging” industry in the region, the prospect of rapid growth raises fears of a negative impact, and the industry is confronted with perplexing and emotionally charged environmental issues. There is a need for further development and improvement of aquaculture rearing and management strategies to reduce and, if possible, eliminate environmental impacts. Increased use of recirculating aquaculture systems and improved technologies for recovery and reuse of nutrients and waste biosolids can help regional growers avoid potential environmental conflicts that threaten to constrain further aquaculture development (Yeo et al. 2004; Summerfelt and Penne 2007). The NCRAC Extension Work Group will continue to identify the most current information on sustainable and environmentally friendly management practices for aquaculture and will help fish aquaculturists keep up-to-date on these important issues.

Since 1989, this program has been a principal source of information, guidance, and technical assistance to the development of the regional aquaculture industry. The NCRAC Extension Work Group will work closely with regional vocational agriculture instructors. In addition, several thousand people have attended local and regional aquaculture conferences, workshops, and lectures sponsored/co-sponsored and organized by NCRAC Extension Work Group members. This Work Group has established a network of industry and government aquaculture contacts at the local, state, regional, and national levels. The
needs and requirements of novice and practicing aquaculturists are so multifaceted that the response depends on the stage of development in the client's proposed activity. Initial inquiries can usually be suitably answered with prepared pamphlets, bibliographies, guide to available resources (Aquaculture Resource Guide), Web pages posting answers to Frequently Asked Questions (FAQs), and Web-based links to appropriate resource information. These provide general answers and a broader view of the enterprise’s possibilities.

Follow-up requests and more specialized questions require greater time and advanced materials related to these specialized topics and problems. Critical to fulfilling this type of request from clients will be the traditional one-on-one approach, with expert assistance to answer specific questions, solve problems through person-to-person or conference telephone calls, or on-site technical assistance when possible.

There is an ongoing need to develop new and relevant publications for the region’s aquaculture industry. For instance, the demand for baitfish in the NCR far exceeds the supply from within the region. To meet the demand, cultured fatheads (including the rosy red variation), golden shiners (*Notemigonus crysoleucas*), and goldfish (*Carassius auratus auratus*) from Arkansas are imported into the NCR. Still, significant shortages of a variety of species [including the three primary NCR aquacultured species – fatheads (*Pimephales promelas*), white suckers (*Catostomus commersoni*), and golden shiners]] were reported by bait dealers (Meronek et al. 1997). Some species that are not readily found in the wild baitfish market could offer aquaculture and marketing opportunities. One such species is the hornyhead chub (*Nocomis biguttatus*), which has been described in an associated NCRAC technical bulletin recently developed by Gunderson in Minnesota.

With the growth of the regional aquaculture industry, the demand for developing more effective strategies to advance the industry must be met. This requires timely responses to critical issues, including promoting investment in the industry, advancing new technologies, enhancing communication with the regulatory agencies, and providing information to the public on the health benefits of the aquaculture products.

The potential exists for aquatic invasive species (AIS), including the viral hemorrhagic septicemia (VHS) virus, to spread to uninfested waters through the transport of wild harvested baitfish and aquacultured fish. Baitfish and aquaculture industries are diverse and complex, as are their risks of spreading AIS. Most industry segments pose no or very low risk of spreading AIS. To deal effectively and fairly with this potential vector, it is important to characterize the industry according to their risks of spreading AIS. Without adequate risk assessment of individual operations, regulations could be imposed which would unnecessarily negatively impact the economy of these industries and still not effectively reduce the risk of spreading AIS. One approach to this problem is to apply the Hazard Analysis and Critical Control Point (HACCP) concept similar to that used by the seafood industry to minimize seafood consumption health risks. The advantages of this system are that it can effectively deal with a diverse industry, it has proven to be a good partnership between industry and government regulators, and when properly applied is effective. The HACCP approach concentrates on the points in the process that are critical to the safety of the product, minimizes risks, and stresses communication between regulators and the industry.

Increasing awareness of biosecurity principles in the aquaculture industry will help to reduce the risk of spreading existing and the introduction of new AIS to NCR fish farms, and will serve to protect these farms against a number of other fish disease pathogens and AIS. While there are basic biosecurity measures that all fish farms can implement, considerations must also be given to the production method and/or species involved with the aquaculture facility.

Associated with the previously described AIS-related issues there continues to be a need to conduct additional AIS-HACCP training as new personnel are hired who need it. Also, there is always the threat of new AIS and fish diseases that continue to make their way into the NCR; new training efforts will combine AIS-HACCP training with aquaculture biosecurity.
RELATED CURRENT AND PREVIOUS WORK

The NCRAC Extension Work Group is designed to assess and meet the information needs of the various clientele groups through cooperative and coordinated regional educational programming. A network of Sea Grant and Cooperative Extension Service (CES)-designated contacts has been established to help maximize efficiency of education programs in the 12-state NCR. However, many of these contacts have part-time assignments on aquaculture and need additional resources to meet the growing demands of the aquaculture industry.

In spite of the limited number of aquaculture full-time equivalent positions in this region, substantial progress on the previously described objectives has been made. Extension liaisons are actively involved in several research projects and they have helped to improve the information transfer from research work groups to the public. Extension liaisons have also assisted with the planning, promotion, and implementation of past baitfish, hybrid striped bass, walleye, and yellow perch workshops held throughout the region. These workshops have included “hands-on” experiences, formal presentations, in addition to forum sessions whereby producers share their experience with other producers as well as extension specialists.

Several fact sheets and bulletins have been completed and are available to the public both in hard copy and on the Web. In part, these publications have the following topics: (1) walleye fingerling culture, (2) salt usage, (3) starting an aquaculture operation, (4) overview of aquaculture, (5) aquaculture as a business enterprise, (6) survey of salmonid producers, (7) channel catfish culture, (8) niche marketing, and (9) plankton management for fish culture ponds. The use of these publications has helped to supplement individual states’ publications in this region. In 1994 a survey was undertaken to determine the use of NCRAC extension publications in the region. It was estimated that approximately 15,000 client questions are addressed annually by these publications; publications related to basic aquaculture topics were most often used.

Workshops have been conducted in the region on general aquaculture, fish diseases, commercial recirculation systems, aquaculture business planning, crayfish culture, pond management, yellow perch and hybrid striped bass culture, rainbow trout production, in-service training for high school vocational-agricultural teachers, and AIS-HACCP. These workshops have often been conducted using a combination of regional extension specialists and researchers as well as industry representatives. The Walleye Culture Manual has been the basis for two Walleye Culture Workshops, which were held in 1996. Gunderson, University of Minnesota-Duluth (UM-D); Kinnunen, Michigan State University (MSU); and Morris, Iowa State University (ISU) were active on the planning committee; Summerfelt (ISU) has been the leader for both the walleye culture manual and workshops. This 415-page manual is now available to the public for a nominal cost; it has 17 chapters and 46 case studies. The Sunfish Culture Guide has details on various facets of sunfish culture including, in part, their biology, culture, as well as their diseases. The Yellow Perch Culture Guide contains data from both past peer-reviewed publications as well as new data derived from NCRAC-funded projects on yellow perch culture. All of these Culture Manuals are now available in pdf format on the NCRAC Web site.

Four North Central Regional Aquaculture Conferences have been held. The first was held in March 1991 in Kalamazoo, Michigan, the second was held in February 1995 in Minneapolis, Minnesota, the third conference was held in Indianapolis, Indiana in February 1997, and the fourth was held in Kansas City, Missouri in February 1999. These regional meetings were attended by hundreds of individuals including persons from Canada.

In addition to the previously mentioned areas, several NCRAC extension contacts have been instrumental in fostering the continued growth of the aquaculture industry in the region. For example, in Missouri and Michigan NCRAC extension contacts have been valuable assets in bridging the concerns between the private aquaculture community and agency staff.

The Aquaculture Technology Transfer (AT2) program at Ohio State University’s Ohio Center for Aquaculture Research and Development (OCARD) is dedicated to supporting sustainable development of aquaculture in Ohio through research and extension activities focused on production efficiency, emerging
species viability, diversification of farm income, and dissemination of marketing and technical information for existing and prospective operations.

Services include farm site visits, on-farm demonstration trials, on-line educational materials, workshops, business planning assistance, facility tours, and production training. A close working relationship with the Ohio Aquaculture Association, the producer association in Ohio (http://southcenters.osu.edu/oaa/) helps drive the growth and success of aquaculture in the state. OCARD is active nationally and internationally as well. Aquaculture specialists attend and present research at local, national, and international conferences.

Many NCRAC extension contacts have also worked with industry and governmental representatives to produce state aquaculture plans and improve governmental regulations. It is this interaction by extension contacts that the NCRAC Board of Directors wanted to support when they voted to increase funding support for NCRAC extension contacts in 1999, which continues through this proposal. The end result is an increased interaction between NCRAC extension contacts and their respective state aquaculture associations.

The AIS-HACCP approach was first pilot tested with the Michigan Wholesale Bait Association and the U.S. Fish and Wildlife Service hatchery managers and ecological services personnel in the southwest region. Results of these pilot tests were very positive. Both groups appropriately applied the principles of AIS-HACCP, and each felt that the approach was workable from a business/public hatchery management perspective and that it could significantly reduce the risk of spreading AIS. Pilot project participants also provided suggestions to modify the draft manual. Comments from agency, industry, and university reviewers were also incorporated into the training manual (Gunderson and Kinnunen 2001). A second edition of the training manual was completed with an emphasis to assist natural resource agency personnel prevent the spread of AIS in their work activities (Gunderson and Kinnunen 2004).

In July 2007 Kinnunen worked with the Michigan Wholesale Bait Association and the Michigan Aquaculture Association in coordinating an AIS-HACCP Training Workshop that focused on practices that the industry can take to deal with new regulations implemented by the State of Michigan on VHS Management Zones for wild baitfish harvest from the Great Lakes. Kinnunen worked with Michigan Baitfish Association leaders on developing model AIS-HACCP and biosecurity plans that would keep their businesses viable and also deal with the new VHS Management Zone regulations.

In 2009/2010 Kinnunen was involved in conducting eight aquaculture biosecurity workshops and two AIS-HACCP workshops at private aquaculture and baitfish operations and state, federal, and tribal facilities in the NCR. He has also been involved with developing AIS-HACCP and biosecurity plans for these operations. Kinnunen is a co-author of the Aquatic Invasive Species-HACCP Training Curriculum, and has been actively involved in aquaculture outreach activities for over two decades. He has conducted AIS-HACCP and aquaculture biosecurity training workshops throughout the U.S. with participants coming from as far away as New Zealand and Germany.

ANTICIPATED BENEFITS

The NCRAC Extension Work Group benefits several user groups in the NCR, including both prospective and experienced aquaculturists and aquaculture educators. Growing at ca. 12% annually, the aquaculture industry is a catalyst for increasing entrepreneurship and jobs. As aquaculture attempts to fill the gap created by wild stock declines, the proposed advisory service initiatives to assist regional aquaculture development are particularly timely and relevant. In response to the agriculture industry decline in the region (Smith et al. 1995; Sweet 2000; Walters 2001), aquaculture may be the perfect mechanism for rural regeneration. In addition, there is growing interest in urban communities to develop aquaculture, using state-of-the-art technology, e.g., recirculating systems. Aquaculture has the potential to contribute significantly to the NCR’s strategic economic development and positively impact the quality of life within the region. This project will serve the aquaculture industry by building improved relationships and interactions between the commercial aquaculturists and the regional aquaculture research and extension programs, financial institutions, regulatory bodies, and the general public. A healthy
aquaculture industry in the NCR will reduce the need to import fish products and help improve the U.S.
trade imbalance, a fact increasingly recognized in Washington.

The existing aquaculture industry members need relevant information on new techniques and
technologies in aquaculture, as well as updated information related to changing state and federal
regulations. Increasingly, a large number of individuals are interested in aquaculture as a means of
agriculture diversification or urban development. The NCRAC Extension Work Group meets these
diverse client needs through on-site advice, publications, and specialized workshops. As the industry
matures, the advisory service needs will shift toward more specialized and advanced knowledge than is
currently provided at general introductory conferences and events. Entrepreneurs and prospective
aquaculturists often require an enormous amount of time to educate and can benefit from the availability
of the electronic media. The following proposed extension activities are focused on meeting these
changing demands.

Effective packaging of information on all aspects of aquaculture appropriate to the NCR will bridge the
gap between user groups and the extension informational network. In addition, middle and high school
teachers often use extension materials in their classrooms. The project components directed toward pre-
service and in-service vocational agriculture teachers will make an investment in the future, and sustain
the development of regional aquaculture. Continual updating of outreach information will assist NCRAC
advisory service specialists in answering the needs of local communities, small businesses, industry,
educational groups, and the general public. Increasingly, there is a need for better understanding and
communication between the industry and the regulatory bodies to coordinate ideas, recommendations,
and suggestions that would best serve the industry and the community at large.

The NCRAC Extension Work Group will continue and expand its efforts to promote and advance
commercial aquaculture in a responsible fashion through its organized education/training outreach
programs and through educating the public on the health benefits of commercially raised fish. The
primary benefits are: increased public awareness through publications, short courses, and conferences
regarding the potential of aquaculture as a viable agricultural enterprise in the NCR; technology transfer;
improved lines of communication between interstate aquaculture extension specialists and associated
industry contacts; and an enhanced legal and socioeconomic atmosphere for aquaculture in the NCR.
The development of aquaculture education programs for the NCR has provided “hands-on” opportunities
for prospective and experienced producers. Approximately 6,000 individuals have attended workshops or
conferences organized and delivered by the NCRAC Extension Work Group. Clientele attending regional
workshops have gained information related to aquaculture development strategies in other areas of the
country and acquired information which was of direct use to their own enterprises. Education programs
also created situations where problems encountered by producers were expressed to extension
personnel who later relayed them to researchers at NCRAC work group meetings for possible solutions
through the research effort.

Fact sheets, technical bulletins, and videos have served to inform a variety of clients about numerous
aquaculture practices in the NCR and to present possible solutions to relevant problems. For instance,
the 2004 NCRAC publication “Aquaculture Effluents and Waste By-Products” was downloaded more than
300 times per month when it was first posted online in 2006. A demand has increased for information on
the improvement of aquaculture rearing and management strategies to reduce and, if possible, eliminate
environmental impacts. Also, species-specific publications on walleye, trout, and catfish have been used
in numerous regional meetings and have been requested by clients throughout the United States.
Publications on organizational structure for aquaculture businesses, transportation of fish in bags, and
others are beneficial to both new and established aquaculturists.

To measure the positive impact that the state aquaculture extension initiative is having in Ohio, one only
needs to look at the numbers in the most recent Census of Agriculture. The 1998 Census of Aquaculture
reported 33 fish farms in Ohio with $1,788,000 in total sales. The 2005 Census of Aquaculture reported
55 fish farms in Ohio with $3,185,000 in total sales (USDA 2009). This means the number of fish farms in
Ohio and the total aquaculture sales increased at a rate of 10% per year for this period. Ohio is now
reported as the top seller (by sales volume) of yellow perch in the United States, and 4th nationally for
sportfish [largemouth bass (Micropterus salmoides) and bluegill] and baitfish. A recent review of Ohio’s
2007 list of aquaculture, propagators, and bait dealer permit holders in Ohio revealed that there are over 250 aquaculture and aquaculture-related businesses in that state.

Project outputs, outcomes, and later impact assessment are now used for extension activities; these metrics are noted per individual Work Group member. However, there continues to be a need for extension professionals to be able to address public inquiries when there may not be an economic impact. For instance, potential aquaculturists are sometimes advised not to pursue specific activities as they may suffer economic losses if not well thought out or proposed efforts simply will not work in their specific circumstances. Such impacts may be hard to document but are nevertheless important to both the individual as well as for development of the aquaculture industry.

**OBJECTIVES**

1. Strengthen linkages between the North Central Regional Aquaculture Center (NCRAC) Research and Extension Work Groups.

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

3. Develop and Implement Aquaculture Education Programs and Materials for the NCR.

**PROCEDURES**

**Strengthen Linkages (Objective 1)**

At least one Extension Work Group member has been assigned to each Research Work Group with the goal of increasing the amount of information coming out of research projects. Extension Liaisons are responsible for interacting with researchers in developing possible extension products based on outcomes of these projects as well as assisting in writing research projects’ annual and termination reports. The following table lists the current Research Work Groups and the associated extension liaison.

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<th>Research Work Group</th>
<th>Extension Liaison</th>
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<td>Microbial Populations of Recirculating Systems</td>
<td>Mark Clark</td>
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<td>Bluegill Least-Cost Diet</td>
<td>Joseph E. Morris</td>
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<tr>
<td>VHS Project</td>
<td>Ron Kinnunen</td>
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</tr>
<tr>
<td>Management of Snails</td>
<td>Joseph E. Morris</td>
<td>IA</td>
</tr>
</tbody>
</table>

In addition to serving on research projects as Extension Liaisons or participants, each Work Group member will:

- Attend the NCRAC Annual Program Planning Meeting;
- Participate in formal organized conference calls involving all Work Group members, to discuss aquaculture issues specific to their respective states;
- Exchange ideas via free-flowing dialogues through internet discussions, teleconferencing, and other forms of communication throughout the year; and
- Contribute to Research Work Group meetings by providing input on design and feedback based on documented industry needs. The extension person in each state has a responsibility to dialogue with scientists conducting aquaculture research supported by USDA-National Institute of Food and Agriculture (NIFA) NCRAC funding.
Enhance Extension Network (Objective 2)

At least one contact person has been designated by CES for each NCR state, an extension contact directory has been developed and kept current, and a mechanism for sharing materials produced by individual states has been established. Specific responsibilities for each Work Group member include:

- Attend the annual in-state aquaculture meeting to assist state aquaculture associations;
- Provide copies of aquaculture extension-related materials produced in their respective state to the Chair of the Extension Work Group for distribution to all state contacts once annually;
- Provide a link between NCRAC and public and private aquaculturists and other appropriate individuals or groups in their respective state, including dialoguing with their industry representatives;
- Identify and update lists of key state contacts (legislators, government administrators, agency personnel, business leaders, and practicing or potential fish farmers) to receive NCRAC announcements, newsletters, and other pertinent materials;
- Utilize the above contacts and information gathering, conveying relevant information to the Regional Aquaculture Extension Team for setting priorities or determining projects to be undertaken; and
- Generate an annual report for incorporation into the NCRAC Extension report. This report is to include specific outputs and impacts related to NCRAC-funded activities.

With the continued shortages in regional aquaculture extension personnel, this network has been critical to the ability of individual extension contacts to respond to information requests from their clients. In fact, many of these contacts often respond on a regular basis to client inquiries outside of their specific state.

Develop and Implement Aquaculture Education Programs and Materials for the NCR (Objective 3)

NCRAC Extension participants will be working within their states to support the aquaculture industry. These activities include workshops and education materials that will be distributed within and outside of their states. Any workshop or materials developed and/or hosted by state aquaculture extension contacts will be advertised in surrounding states to take advantage of the NCRAC extension network and the individual expertise of the Extension Work Group participants. Specific activities are noted within individual extension plans of all participants.

REFERENCES


## PROJECT LEADERS

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<td>Wisconsin</td>
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<td>University of Wisconsin-Extension</td>
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PARTICIPATING INSTITUTIONS AND PRINCIPAL INVESTIGATORS

University of Nebraska-Lincoln
   Dennis E. Bauer

North Dakota State University
   Mark E. Clark

Purdue University
   Kwamena K. Quagrainie

University of Minnesota-Duluth
   Jeffrey L. Gunderson

University of Wisconsin-Extension
   James A. Held

Lincoln University
   Charles E. Hicks

Michigan State University
   Ronald E. Kinnunen

Kansas State University
   Charles D. Lee

Iowa State University
   Joseph E. Morris
   D. Allen Pattillo

South Dakota State University
   Burton W. Pflueger

Purdue University
   Kwamena K. Quagrainie

Ohio State University
   Laura G. Tiu
EXTENSION PLAN FOR UNIVERSITY OF NEBRASKA-LINCOLN

(Bauer)

Objective 2

**Situation:** Since the departure of the previous Nebraska Aquaculture Extension specialist, there have been limited extension resources available for Nebraska aquaculturists. In spite of this limitation, there is an established aquaculture community primarily in the western region of the state.

**Justification:** There is a need to improve the availability of NCR extension materials to the Nebraska culturists (currently 120 producers on mailing list). There is a continuing need for state workshops whereby practicing and potential culturists can meet with regional and state aquaculture contacts.

**Timeline:** 1–2 years for distribution of NCRAC and Regional aquaculture extension materials.

**Outputs:** Distribution of extension materials to state aquaculturists. In addition, annual workshops are to be hosted in partnership with Nebraska Fish Farmers Association.

**Outcomes:** Producers will be current on the newest developments that affect the aquaculture industry, by keeping them informed and up to date on the most current research data, etc.
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<td>e. ___ Prebaccalaureate Students</td>
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<td>f. ___ Secretarial-Clerical</td>
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<td>g. ___ Technical, Shop and Other</td>
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<td><strong>Total Salaries and Wages</strong></td>
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B. Fringe Benefits (If charged as Direct Costs)

C. **Total Salaries, Wages, and Fringe Benefits (A plus B)**

D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

E. Materials and Supplies

F. Travel

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.) $1,000

K. **Total Direct Costs (C through I)** $1,000

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 in on/off campus bases.)

M. **Total Direct and F&A/Indirect Costs (J plus K)** $1,000

N. **Other**

O. **Total Amount of This Request** $1,000

P. **Carryover -- (If Applicable)** Federal Funds: $ Non-Federal funds: $ Total $

Q. **Cost Sharing/Matching (Breakdown of total amounts shown in line O)**

\[ \text{Cash (both Applicant and Third Party)} \]

\[ \text{Non-Cash Contributions (both Applicant and Third Party)} \]

**NAME AND TITLE** (Type or print)

**SIGNATURE** (required for revised budget only)

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<td>Dennis E. Bauer</td>
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### A. Salaries and Wages

1. No. of Senior Personnel
   - a. ___ (Co)-PD(s) ............................................
   - b. ___ Senior Associates ..............................

2. No. of Other Personnel (Non-Faculty)
   - a. ___ Research Associates-Postdoctorates ... 
   - b. ___ Other Professionals .........................
   - c. ___ Paraprofessionals ................................
   - d. ___ Graduate Students ..............................
   - e. ___ Prebaccalaureate Students ..................
   - f. ___ Secretarial-Clerical ..........................
   - g. ___ Technical, Shop and Other ..................

Total Salaries and Wages ........................................................................

### B. Fringe Benefits (If charged as Direct Costs)

### C. Total Salaries, Wages, and Fringe Benefits (A plus B)......................

### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

### E. Materials and Supplies

### F. Travel

### G. Publication Costs/Page Charges

### H. Computer (ADPE) Costs

1. 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.) $1,000

### K. Total Direct Costs (C through I) ..............................................

### 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 in on/off campus bases.)

### M. Total Direct and F&A/Indirect Costs (J plus K) ..........................

### N. Other ....................................................................................

### O. Total Amount of This Request .................................................

### P. Carryover -- (If Applicable) .................................................

### Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)

   Cash (both Applicant and Third Party) ...........................................
   Non-Cash Contributions (both Applicant and Third Party) .................

### NAME AND TITLE (Type or print)

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<td>Authorized Organizational Representative</td>
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Signature (for optional use)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0524-0039. The time required to complete this information collection is estimated to average 1.00 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the reviewing the collection of information.

Form CSREES-2004 (12/2000)

PAGE 16
Objective 2

J. **All Other Direct Costs.** Annual postage costs for updated quarterly mailings to Nebraska producers ($230 to $260/mailing) ($1,000/year).
May 13, 2011

Dr. Ted R. Batterson, Director
North Central Regional Aquaculture Center
Michigan State University
13 Natural Resources Building
East Lansing, MI 48842

Dear Dr. Batterson:

On behalf of the Institute of Agriculture and Natural Resources University of Nebraska-Lincoln Extension, as the Authorised Organizational Representative (AOR), I am pleased to offer support and approval of the collaboration of Dennis Bauer, Extension Educator in Brown, Keya Paha, and Rock Counties in the proposal titled “North Central Regional Aquaculture Center Extension Project.” He will serve as the Principal Investigator of the subcontract and will have access to all of the necessary equipment, laboratory, and office space needed to successfully undertake this project.

Please direct any questions concerning the programmatic portions of this project to Dennis Bauer and any financial concerns or questions to Dennis Shannon, Financial Specialist at 402-472-0744 or via email at dshannon2@unl.edu.

Sincerely,

Elbert C. Dickey
Dean and Director

xc: Dennis Bauer
    Dennis Shannon
Objectives 1 & 2

**Situation:** To date there has been a limited number of aquaculture operations in North Dakota. The number of private aquaculture operations compared to wild harvests for later resale in the baitfish industry is not known at this time.

**Justification:** There is a need to find producers and to improve connections among private producers working in the area to inform them of new technologies and on-line resources available from NCRAC.

**Timeline:** 1–2 years for distribution of NCRAC and Regional aquaculture extension materials.

**Outputs:** Publication of updated list of North Dakota producers for submission to the NCRAC Publications Office.

**Outcomes:** Updated knowledge of aquaculture activities in North Dakota.
**ORGANIZATION AND ADDRESS**  
Department of Biological Sciences  
North Dakota State University  
119 Stevens Hall, Fargo, ND 58105-5517

**PROJECT DIRECTOR(S)**  
Mark E. Clark

---

**A. Salaries and Wages**  
1. **No. of Senior Personnel**
   - a. ___ (Co)-PD(s) ..........................................  
   - b. ___ Senior Associates .................................  

2. **No. of Other Personnel (Non-Faculty)**
   - a. ___ Research Associates-Postdoctorates . . .  
   - b. ___ Other Professionals .............................  
   - c. ___ Paraprofessionals..................................  
   - d. ___ Graduate Students................................  
   - e. ___ Prebaccalaureate Students.......................  
   - f. ___ Secretarial-Clerical................................  
   - g. ___ Technical, Shop and Other .......................  

**Total Salaries and Wages...........................................**

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**B. Fringe Benefits (if charged as Direct Costs)**

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**C. Total Salaries, Wages, and Fringe Benefits (A plus B)**

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**D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)**

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**E. Materials and Supplies**

---

**F. Travel**

---

**G. Publication Costs/Page Charges**

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**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 I)**

---

**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 in on/off campus bases.)**

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**M..... Total Direct and F&A/Indirect Costs (J plus K) . →**

---

**N............................................ Other →**

---

**O............................... Total Amount of This Request →**

---

**P. Carryover -- (If Applicable) . . . . . . Federal Funds: $**

---

**Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**

---

**NAME AND TITLE (Type or print)  
SIGNATURE (required for revised budget only)  
DATE**

---

**Project Director**

---

**Authorized Organizational Representative**

---

**Signature (for optional use)**

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Form CSREES-2004 (12/2000)
**BUDGET**

**ORGANIZATION AND ADDRESS**
Department of Biological Sciences  
North Dakota State University  
119 Stevens Hall, Fargo, ND 58105-5517

**PROJECT DIRECTOR(S)**  
Mark E. Clark

**USDA AWARD NO.**  
Year 2: Objectives 1 & 2  
Duration Proposed Months: 12  
Funds Requested by Proposer  
Duration Proposed Months:  ____  
Non-Federal Proposed Cost-Sharing/Matching Funds (if different)  
Non-federal Cost-Sharing/Matching Funds Approved by CSREES (if Different)

### A. Salaries and Wages

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1. No. of Senior Personnel  
   a. ____ (Co)-PD(s)  
   b. ____ Senior Associates  

2. No. of Other Personnel (Non-Faculty)  
   a. ____ Research Associates-Postdoctorates  
   b. ____ Other Professionals  
   c. ____ Paraprofessionals  
   d. ____ Graduate Students  
   e. ____ Prebaccalaureate Students  
   f. ____ Secretarial-Clerical  
   g. ____ Technical, Shop and Other  

Total Salaries and Wages

### B. Fringe Benefits (if charged as Direct Costs)

### C. Total Salaries, Wages, and Fringe Benefits (A plus B)

### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

### E. Materials and Supplies  
$500

### F. Travel  
$500

### 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 I)  
$1,000

### 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 in on/off campus bases.)

### M. Total Direct and F&A/Indirect Costs (J plus K)  
$1,000  
0  
$0  
$0

### N. Other  

### O. Total Amount of This Request  
$1,000  
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$0  
$0

### P. Carryover -- (If Applicable)  
Federal Funds: $  
Non-Federal funds: $  
Total $

### Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)  
Cash (both Applicant and Third Party)  
Non-Cash Contributions (both Applicant and Third Party)

### NAME AND TITLE (Type or print)  
Signature (required for revised budget only)  
DATE

Project Director  
Authorized Organizational Representative  
Signature (for optional use)

---

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Form CSREES-2004 (12/2000)
Objectives 1 & 2

F. **Travel.** Transportation, lodging, and meal expenses for the PI to travel to primary aquaculture/hatchery facilities in North Dakota (including federal, tribal, and private facilities) ($500/year).

E. **Materials and Supplies.** Miscellaneous costs (e.g., office supplies, computer supplies) ($500/year).
May 11, 2009

Dr. Ted R. Batterson, Director
North Central Regional Aquaculture Center
Michigan State University
13 Natural Resources Building
East Lansing, Michigan 48842

RE: North Central Regional Aquaculture Center Extension Project

Dear Dr. Batterson:

As the Authorized Organizational Representative (AOR) I would like to inform you North Dakota State University (NDSU) wishes to participate in the above referenced project as a subcontractor to Michigan State University. Dr. Mark Clark will serve as the Principal Investigator of the subcontract and he has access to all of the necessary equipment, laboratory, and office space to successfully undertake this project. I also approve the budget as submitted for Dr. Clark’s involvement in this project. Upon issuance of approval to the North Central Regional Aquaculture Center for this project, NDSU will enter into a formal agreement with your institution.

Sincerely,

Amy B. Scott
Assistant Director
AS/nst

cc: Mark Clark
EXTENSION PLAN FOR UNIVERSITY OF MINNESOTA-DILUTH

(Gunderson)

Objectives 1 & 2

Situation: Fish farmers in Minnesota have broken into several associations which function at different levels of effectiveness, in large part because of the time commitments associated with leading such organizations. As a result, there have been no state-wide aquaculture conferences in many years. This has resulted in the Extension specialist losing touch with many of the less vocal fish farmers in Minnesota. It has also decreased fish farmer awareness of NCRAC and other aquaculture research activities and resources.

Justification: To improve communication and awareness, the PI proposes to conduct site visits with fish farmers during each of the two years of this grant. The site visits will provide a personal connection that has been lost since annual aquaculture conferences have ceased in Minnesota. The site visits will also improve understanding of the research and extension needs of Minnesota fish farmers. During the visits, information related to updates on invasive species, VHS virus (and other pathogens), and NCRAC research activities/resources will be provided to the fish farmers. Visits will occur during times when activities are in progress so that the PI can observe major actions associated with fish farming. Summaries of research and extension needs and emerging issues will be written and provided to Minnesota fish farmers and Extension Technical Committee members each year.

Timeline: Two trips will be taken each year during the fall and spring to maximize the PI’s exposure to relevant fish farming activities.

Outputs: As a result of this effort, the PI will be better able to represent the research and extension needs of Minnesota fish farmers at regional meetings such as NRCAC’s Annual Program Planning meeting. It will help reestablish personal connections with fish farmers that were lost when state annual conferences ceased. These activities will enable the PI to better assist in the development of AIS-HACCP plans for a broader array of fish farming activities. A summary will be compiled once each year that describes research and extension needs and emerging issues. This will be shared with Minnesota fish farmers and other Extension Technical Committee members.

Outcomes: Expected outcomes are better directed extension and research activities. Identification of emerging issues will be important, especially if they are regional in nature.
## BUDGET

### ORGANIZATION AND ADDRESS
Minnesota Sea Grant Extension Program
University of Minnesota-Duluth
Duluth, MN 55812

### PROJECT DIRECTOR(S)
Jeffrey L. Gunderson

### USDA AWARD NO.
Year 1: Objectives 1 & 2

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### A. Salaries and Wages

1. No. of Senior Personnel
   a. ___ (Co)-PD(s) .
   b. ___ Senior Associates .

2. No. of Other Personnel (Non-Faculty)
   a. ___ Research Associates-Postdoctorates .
   b. ___ Other Professionals .
   c. ___ Paraprofessionals .
   d. ___ Graduate Students .
   e. ___ Prebaccalaureate Students .
   f. ___ Secretarial-Clerical .
   g. ___ Technical, Shop and Other .

Total Salaries and Wages .

### B. Fringe Benefits (If charged as Direct Costs)

### C. Total Salaries, Wages, and Fringe Benefits (A plus B)

### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

### E. Materials and Supplies

\$200

### F. Travel

\$800

### 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 I)

\$1,000

### 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 in on/off campus bases.)

### M. Total Direct and F&A/Indirect Costs (J plus K)

\$1,000

### N. Other

### O. Total Amount of This Request

\$1,000

### P. Carryover -- (If Applicable) .

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### Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)

Cash (both Applicant and Third Party) .
Non-Cash Contributions (both Applicant and Third Party) .

### NAME AND TITLE (Type or print)

Project Director

Authorized Organizational Representative

Signature (for optional use)

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**BUDGET**

**ORGANIZATION AND ADDRESS**
Minnesota Sea Grant Extension Program
University of Minnesota-Duluth
Duluth, MN 55812

**PROJECT DIRECTOR(S)**
Jeffrey L. Gunderson

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<td>Funds Requested by Proposer</td>
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<td></td>
<td>Non-Federal Proposed Cost-Sharing/Matching Funds (if required)</td>
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**A. Salaries and Wages**

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<th>CSREES FUNDED WORK MONTHS</th>
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   b. ___ Senior Associates ............................

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   c. ___ Paraprofessionals...............................
   d. ___ Graduate Students ................................
   e. ___ Prebaccalaureate Students ...................
   f. ___ Secretarial-Clerical ............................
   g. ___ Technical, Shop and Other ......................

   **Total Salaries and Wages**..........................

B. Fringe Benefits (If charged as Direct Costs)

C. Total Salaries, Wages, and Fringe Benefits (A plus B) -->

D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

E. Materials and Supplies $200

F. Travel $800

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 I) --> $1,000

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 in on/off campus bases.)

M. Total Direct and F&A/Indirect Costs (J plus K) --> $1,000

N. Other

O. Total Amount of This Request --> $1,000

P. Carryover -- (If Applicable) ............ Federal Funds: $ Non-Federal funds: $ Total $

Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)
   Cash (both Applicant and Third Party) .......
   Non-Cash Contributions (both Applicant and Third Party) -->

**NAME AND TITLE**

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Project Director

Authorized Organizational Representative

Signature (for optional use)

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Form CSREES-2004 (12/2000)
Objectives 1 & 2

E. **Materials and Supplies.** Annual costs for materials and supplies to provide educational information to fish farmers and facilitate meetings ($200/year).

F. **Travel.** Four trips per year will be made to visit fish farmers around Minnesota and each trip is estimated to be 200 miles at a total cost of $200/trip ($0.50/mile and $100 for per diem).
April 20, 2011

Dr. Ted R. Batterson, Director
North Central Regional Aquaculture Center
Michigan State University
13 Natural Resources Building
East Lansing, Michigan 48842

SUBJECT: North Central Regional Aquaculture Center Extension Project
University of Minnesota CON000000031779
University of Minnesota PI: Jeffrey L. Gunderson

Dear Dr. Batterson:

As an Authorized Organizational Representative, I would like to inform you the University of Minnesota (U of MN) wishes to participate in the above referenced project as a subcontractor to Michigan State University. Mr. Jeffrey L. Gunderson will serve as the Principal Investigator of the subcontract and he has access to all of the necessary equipment, laboratory, and office space to successfully undertake this project. I also approve, on behalf of the Regents of the University of Minnesota, the $2,000, two-year budget as submitted for Mr. Gunderson’s involvement in this project. Upon issuance of approval to the North Central Regional Aquaculture Center for this project, the U of MN will enter into a formal agreement with your institution.

Questions concerning programmatic aspects of the project should be directed to the principal investigator. Those having to do with budgetary matters should be directed to Elizabeth Rumsey, Grant and Contract Administrator, at the address above, by telephone at 218-726-7471, or at erumsey@d.umn.edu.

Sincerely,

Timothy B. Holst
Director of Research Administration

TBH/er

cc: J. Gunderson, PI
    Connie Post, MN Sea Grant
EXTENSION PLAN FOR UNIVERSITY OF WISCONSIN-EXTENSION

(Held)

Objectives 2 & 3

Situation: Native American tribal groups represent an important but under-serviced sector of the aquaculture industry in the NCR. In Wisconsin alone, tribal hatcheries stocked over 50 million fish into both on and off reservation waters in 2009. A recent tribal aquaculture workshop co-sponsored by University of Wisconsin-Extension and the U.S. Bureau of Indian Affairs drew 47 participants representing 13 tribal groups from Wisconsin, Minnesota, and Michigan. Discussions at the workshop brought to light the need for extension assistance in developing tribal aquaculture programs as well as initiating tribal aquaponics programs for food production and economic sustenance.

The proposed workshop would be targeted for tribal leaders and resource managers within the NCR who currently have aquaculture programs as well as tribal groups that do not have aquaculture programs but have an interest in aquaculture or aquaponics. Suggested topics include: water conservation and the use of recirculating aquaculture systems and aquaponics to promote economic and environmental sustainability, specific aquaculture techniques such as pond fertilization and genetic aspects of broodstock management, aquaponics as an educational tool for tribal youth, and alternative energy applications in aquaculture and aquaponics.

Timeline: The proposed workshop is planned as a 2-day event possibly held at one of the tribal convention centers with an expected audience of 100-150 tribal participants. While the specific dates of the workshop will be subject to site availability, the targeted dates are late spring-early summer 2012.

Output: 2-day workshop in 2012.

Outcomes: Although many of the tribal aquaculture and resource programs are well established, they tend to be isolated from the overall aquaculture industry. The most important outcome of this workshop is to strengthen the ties between NCRAC extension, the aquaculture industry, and the tribal groups. This improved communication will open the door to technology transfer and benefit the aquaculture community in the NCR by improving hatchery production and efficiency as well as native fisheries. Another important outcome is the establishment of aquaponics programs within the tribes to promote economic sustainability, education, and to improve the availability of locally produced foods to the tribes and the general public. Finally, because of Native American environmental philosophy, the aquaculture industry can acquire much information from the tribal programs concerning environmental sustainability and ecologically sound production practices.
<table>
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<td>Duration Proposed Months: _____</td>
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<td>432 N. Lake St.</td>
<td>Funds Requested by Proposer</td>
<td>Funds Approved by CSREES (if different)</td>
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<td>Madison, Wisconsin 53706</td>
<td>Duration Proposed Months: _____</td>
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<td>PROJECT DIRECTOR(S)</td>
<td>Non-federal Cost-Sharing/Matching Funds Approved by CSREES (if Different)</td>
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<tr>
<td>James A. Held</td>
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### A. Salaries and Wages

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<td>g. ___ Technical, Shop and Other</td>
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**Total Salaries and Wages**: $

### B. Fringe Benefits (If charged as Direct Costs)

### C. Total Salaries, Wages, and Fringe Benefits (A plus B)

### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

### E. Materials and Supplies

### F. Travel

### 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 provide supporting data for each item.)

**K. Total Direct Costs (C through I)**

### 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 in on/off campus bases.)

### M. Total Direct and F&A/Indirect Costs (J plus K)

### N. Other

### O. Total Amount of This Request

### P. Carryover -- (If Applicable)

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<td>Non-Federal funds: $</td>
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- Cash (both Applicant and Third Party) $
- Non-Cash Contributions (both Applicant and Third Party)$

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Signature (for optional use)

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Form CSREES-2004 (12/2000)
Objectives 2 & 3

J. Other Direct Costs. Year 1: Photocopying and event publicity ($1,000); Speaker expenses - $300/speaker x seven speakers ($2,100); Food costs - $46/person x 150 people ($6,900).
May 20, 2011

Dr. Ted R. Batterson, Director
North Central Regional Aquaculture Center
Michigan State University
13 Natural Resources Building
East Lansing, Michigan 48842

SUBJECT: Project entitled “North Central Regional Aquaculture Center Extension Project”

Dear Dr. Batterson:

As the Authorized Organizational Representative (AOR) I would like to inform you that the University of Wisconsin-Extension wishes to participate in the above referenced project as a subcontractor to Michigan State University. James Held will serve as the Principal Investigator of the subcontract and he will have access to all of the necessary equipment, laboratory, and office space to successfully undertake this project. I also approve the budget as submitted for James Held’s involvement in this project. Upon issuance of approval to the North Central Regional Aquaculture Center for this project, the University of Wisconsin-Extension will enter into a formal agreement with your institution.

Sincerely,

Mark Dorn
Controller
University of Wisconsin-Extension
Objectives 2 & 3

Situation: Aquaculture in Missouri is a $35 million industry and interest continues to grow from stakeholders and clientele interested in fish farming opportunities. A need exists to provide science-based, technical information that meets the aquaculture educational needs for a variety of clientele groups and individuals. In addition, there is a need to disseminate information and increase the application of new knowledge to existing aquaculture producers in the state through a variety of educational venues, including Missouri Aquaculture Conferences, workshops, field days, tours, and individual field visits.

Justification: As a result of these funds, existing educational programs and information transfer cooperatively developed with the Missouri Aquaculture Association, Department of Agriculture, Missouri Aquaculture Advisory Council, and Lincoln University will be continued and expanded to new and existing clientele. New knowledge disseminated that meets the educational needs of clientele and its application will be increased through educational programs that are conducted.

Timeline: Development of associated programs and materials over the 2-year time period of this project.

Outputs:
- Aquaculture educational programs
- Fact sheets and workshops
- Improved skills of stakeholders

Outcomes:
- Increased use of applied research by stakeholders
- New practices and technologies adopted that result in increased opportunities for profitability and increased economic development from aquaculture enterprises
- Enhanced collaboration and partnerships created with the aquaculture industry in Missouri
### ORGANIZATION AND ADDRESS

Department of Agriculture and Environmental Science  
Lincoln University  
Foster Hall, 904 Chestnut St., Jefferson City, MO 65101

<table>
<thead>
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#### A. Salaries and Wages

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**Total Salaries and Wages**

#### B. Fringe Benefits (If charged as Direct Costs)

#### C. Total Salaries, Wages, and Fringe Benefits (A plus B)

#### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

#### E. Materials and Supplies

#### F. Travel

$500

#### 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.)

$1,000

**K. Total Direct Costs (C through I)**

$1,500

**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 in on/off campus bases.)

**M. Total Direct and F&A/Indirect Costs (J plus K)**

$1,500

**N. Other**

**O. Total Amount of This Request**

$1,500

**P. Carryover -- (If Applicable)**

Federal Funds: $  
Non-Federal funds: $  
Total $  

**Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**

Cash (both Applicant and Third Party) .......  
Non-Cash Contributions (both Applicant and Third Party) 

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**NAME AND TITLE (Type or print)**

**SIGNATURE** (required for revised budget only)  
**DATE**

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**Project Director**

**Authorized Organizational Representative**

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**Signature (for optional use)**

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### ORGANIZATION AND ADDRESS

**Department of Agriculture and Environmental Science**  
Lincoln University  
Foster Hall, 904 Chestnut St., Jefferson City, MO 65101

**PROJECT DIRECTOR(S)**  
Charles E. Hicks

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Form CSREES-2004 (12/2000)
Objectives 2 & 3

F. Travel. Transportation, lodging, and meal expenses for the PI to consult with stakeholders and other fish farmers about information needs ($500/year).

J. All Other Direct Costs. Setup and print two Aquaculture Guides in collaboration with Dr. Robert Pierce, University of Missouri, Fish and Wildlife Specialist ($1,000/year).
June 13, 2011

Dr. Ted Batterson, Director
North Central Regional Aquaculture Center
Michigan State University
13 Natural Resource Building
East Lansing, MI 48842

Subject: Project entitled "Base Extension Project"

Dear Dr. Batterson:

As the Authorized Organizational Representative (AOR), this letter comes to inform you that Lincoln University in Missouri wishes to participate in the above-referenced project as a subcontractor to Michigan State University. Mr. Charles Hicks will serve as the Principal Investigator of the subcontract and will have access to all of the necessary equipment, laboratory and office space to successfully undertake this project. I also approve the budget as submitted for Mr. Hicks' involvement in this project. Upon issuance of approval from the North Central Regional Aquaculture Center for this project, Lincoln University will enter into a formal agreement with your institution.

Sincerely,

Carolyn F. Mahoney
Carolyn Mahoney, Ph.D
President
Lincoln University
Objectives 1 - 3

**Situation:** The AIS-HACCP/Biosecurity approach has many advantages. It can effectively deal with a diverse industry and diverse risk factors associated with a variety of plant, invertebrate, vertebrate, and pathogen (e.g., VHSV) AIS. If it develops as it has in the seafood industry, this approach should prove to be a good partnership between industry and government regulators. It can help avoid overly restrictive regulations, and, if properly applied, can be effective at reducing the risk of spreading AIS via baitfish and aquaculture practices. The HACCP approach concentrates on the points in the process that are critical to the environmental safety of the product, minimizes risks, and stresses communication between regulators and the industry. With proper cooperation between industry representatives, resource management agencies, and other AIS experts, the AIS-HACCP approach will reduce the risk that AIS will be established in new locations while maintaining the economic viability of the baitfish and aquaculture industries. It can provide a mechanism for AIS-free certification, and it can instill confidence in the public that state and federal fish stocking programs are conducting their activities in an environmentally responsible manner.

**Timeline:** Activities will be centered on five workshops within the NCR conducted within the 24-month period of this project.

**Outputs:** As part of these workshops an overview of AIS-HACCP principles will be presented to participants and resource materials distributed. AIS-HACCP plans developed by workshop participants will utilize the Aquatic Invasive Species-HACCP Training Curriculum that Kinnunen has co-authored. Also aquaculture biosecurity measures will be presented.

**Outcomes:** Formal written evaluations will be completed at the end of each workshop by the participants. Participants will receive a certificate shortly after workshop completion.
**ORGANIZATION AND ADDRESS**
Michigan Sea Grant
Michigan State University
710 Chippewa Square, Suite 202, Marquette, MI 49855

**PROJECT DIRECTOR(S)**
Ronald E. Kinnunen

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**USDA AWARD NO.**
Year 1: Objectives 1 - 3

**Duration Proposed Months:** 12
**Funds Requested by Proposer:***

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**CSREES FUNDED WORK MONTHS**

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**A. Salaries and Wages**

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2. **No. of Other Personnel (Non-Faculty)**
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   b. ___ Other Professionals ..............................
   c. ___ Paraprofessionals .................................
   d. ___ Graduate Students .................................
   e. ___ Prebaccalaureate Students ......................
   f. ___ Secretarial-Clerical .............................
   g. ___ Technical, Shop and Other .....................

**Total Salaries and Wages**

---

**B. Fringe Benefits** (If charged as Direct Costs)

---

**C. Total Salaries, Wages, and Fringe Benefits (A plus B)**

---

**D. Nonexpendable Equipment** (Attach supporting data. List items and dollar amounts for each item.)

---

**E. Materials and Supplies**

---

**F. Travel**

$2,000

---

**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.)

$350

---

**K. Total Direct Costs (C through I)**

$2,350

---

**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 in on/off campus bases.)

---

**M. Total Direct and F&A/Indirect Costs** (J plus K)

$2,350

---

**N. Other**

---

**O. Total Amount of This Request**

$2,350

---

**P. Carryover -- (If Applicable)**

Federal Funds: $
Non-Federal funds: $
Total $

---

**Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**
Cash (both Applicant and Third Party) ........
Non-Cash Contributions (both Applicant and Third Party) 

---

**NAME AND TITLE** (Type or print)

Project Director

Authorized Organizational Representative

Signature (for optional use)

---

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Form CSREES-2004 (12/2000)
**BUDGET**

**ORGANIZATION AND ADDRESS**
Michigan Sea Grant
Michigan State University
710 Chippewa Square, Suite 202, Marquette, MI 49855

**PROJECT DIRECTOR(S)**
Ronald E. Kinnunen

---

**USDA AWARD NO.**
Year 2: Objectives 1 - 3

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<th>Year 2: Objectives 1 - 3</th>
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**Duration Proposed**

- Months: 12

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**Funds Requested by Proposer**

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**Funds Approved by CSREES (if different)**

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**Non-Federal Proposed Cost-Sharing/Matching Funds Approved by CSREES (if different)**

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**A. Salaries and Wages**

1. No. of Senior Personnel
   - 1 (Co)-PD(s)
   - ___ Senior Associates

2. No. of Other Personnel (Non-Faculty)
   - ___ Research Associates-Postdoctorates
   - ___ Other Professionals
   - ___ Paraprofessionals
   - ___ Graduate Students
   - ___ Prebaccalaureate Students
   - ___ Secretarial-Clerical
   - ___ Technical, Shop and Other

**Total Salaries and Wages**

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**B. Fringe Benefits (If charged as Direct Costs)**

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**C. Total Salaries, Wages, and Fringe Benefits (A plus B)**

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**D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)**

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**E. Materials and Supplies**

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**F. Travel**

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**G. Publication Costs/Page Charges**

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**H. Computer (ADPE) Costs**

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**I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)**

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**J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)**

| All Other Direct Costs | 350 |

**K. Total Direct Costs (C through I)**

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**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 in on/off campus bases.)**

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<th>F&amp;A/Indirect Costs</th>
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**M. Total Direct and F&A/Indirect Costs (J plus K)**

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**N. Other**

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**O. Total Amount of This Request**

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**P. Carryover -- (If Applicable)**

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**Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**

- Cash (both Applicant and Third Party)
- Non-Cash Contributions (both Applicant and Third Party)

---

**NAME AND TITLE**

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<td>Authorized Organizational Representative</td>
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Form CSREES-2004 (12/2000)
BUDGET EXPLANATION FOR MICHIGAN STATE UNIVERSITY

(Kinnunen)

Objectives 1 - 3

F. Travel. Activities will be centered on five workshops to be conducted within the NCR. Transportation, lodging, and meal expenses for each of the five workshops will average $800/workshop ($4,000).

J. All Other Direct Costs. Years 1 and 2: Phone ($100), Fax ($50), and Postage ($200) ($350/year).
EXTENSION PLAN FOR KANSAS STATE UNIVERSITY

(Lee)

Objective 2

Situation: Kansas does not have a thriving aquaculture industry although the state does have more than 150,000 privately owned farm ponds. That number is increasing each year. These ponds serve as a source of water for livestock but also have a great potential for sport fishing or aquaculture ventures. Most of the membership of the Kansas Aquaculture Association (KAA) culture or provide fish for pond stocking. Limited information is readily available to the public concerning farm pond and aquatic plant management.

Justification: Lack of a budget would greatly curtail or eliminate any aquaculture producer or pond owner technical assistance from Kansas State University. Funds will be used to maintain and improve the liaison between aquaculture producers and the public and provide technical information to aquaculture producers as requested.

Timeline: Development and distribution of materials over the 2-year period of this project.

Outputs: The 2012 and 2013 KAA Directory will be developed and distributed and the associated Web site (www.kansasaquaculture.org) will be maintained. Assistance will continue to be provided to Kansas pond owners on fish culture, management, and aquatic weed control. Public meetings will be conducted on pond management when they are requested by Extension personnel or aquaculture producers. Field visits to troubleshoot and solve pond problems will also be conducted and may require overnight travel.

Outcomes:
- Provide updated Kansas Aquaculture Producers Directory for 2011-13
- Respond to request for assistance from pond owners with problems or those wanting to begin aquaculture production.
- Provide updated technical assistance to established aquaculture producers upon request. Network with other Extension personnel in the NCR with aquaculture responsibilities.
BUDGET

ORGANIZATION AND ADDRESS
Department of Animal Science and Industry
Kansas State University
Manhattan, KS 66506-1600

PROJECT DIRECTOR(S)
Charles D. Lee

USDA AWARD NO. Year 1: Objective 2

<table>
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A. Salaries and Wages

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<th>CSREES FUNDED WORK MONTHS</th>
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<tr>
<td>Calendar</td>
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</tbody>
</table>

1. No. of Senior Personnel
   a. ___ (Co)-PD(s) . . . . . . . . . . . . . . . . . . . . .
   b. ___ Senior Associates . . . . . . . . . . . . . . .

2. No. of Other Personnel (Non-Faculty)
   a. ___ Research Associates-Postdoctorates . .
   b. ___ Other Professionals . . . . . . . . . . . . . . .
   c. ___ Paraprofessionals.................................
   d. ___ Graduate Students................................
   e. ___ Prebaccalaureate Students......................
   f. ___ Secretarial-Clerical..............................
   g. ___ Technical, Shop and Other .....................

Total Salaries and Wages..................................→

B. Fringe Benefits (If charged as Direct Costs)

C. Total Salaries, Wages, and Fringe Benefits (A plus B) →

D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

E. Materials and Supplies $500

F. Travel $500

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 I) → $1,000

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 in on/off campus bases.)

M...... Total Direct and F&A/Indirect Costs (J plus K) → $1,000

N. ............................................................................ Other →

O. .................Total Amount of This Request → $1,000

P. Carryover -- (If Applicable) . . . . . . . . . . . . . Federal Funds: $ Non-Federal funds: $ Total $

Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)
   Cash (both Applicant and Third Party) ....→
   Non-Cash Contributions (both Applicant and Third Party) →

NAME AND TITLE (Type or print) SIGNATURE (required for revised budget only) DATE

Project Director

Authorized Organizational Representative

Signature (for optional use)

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Form CSREES-2004 (12/2000)
**ORGANIZATION AND ADDRESS**
Department of Animal Science and Industry  
Kansas State University  
Manhattan, KS 66506-1600

**PROJECT DIRECTOR(S)**
Charles D. Lee

<table>
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   b. ___ Senior Associates

2. No. of Other Personnel (Non-Faculty)
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   b. ___ Other Professionals  
   c. ___ Paraprofessionals  
   d. ___ Graduate Students  
   e. ___ Prebaccalaureate Students  
   f. ___ Secretarial-Clerical  
   g. ___ Technical, Shop and Other

**Total Salaries and Wages**

**B. Fringe Benefits (If charged as Direct Costs)**

**C. Total Salaries, Wages, and Fringe Benefits (A plus B)**

**D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)**

**E. Materials and Supplies**

**F. Travel**

**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 I)**

**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 in on/off campus bases.)**

**M. Total Direct and F&A/Indirect Costs (J plus K)**

**N. Other**

**O. Total Amount of This Request**

**P. Carryover -- (If Applicable)**

**Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**

Cash (both Applicant and Third Party)  
Non-Cash Contributions (both Applicant and Third Party)

**NAME AND TITLE (Type or print)**

**SIGNATURE (required for revised budget only)**

**DATE**

---

Form CSREES-2004 (12/2000)
Objective 2

E. Materials and Supplies. Years 1 and 2: General office supplies including paper, toner, and mailers ($500/year).

F. Travel. Transportation, lodging, and meal expenses associated with travel within the state to assist individual producers with aquaculture and pond management problems ($500/year). Funds will allow on-site visitations and provide educational assistance in the form of technical expertise and informational publications to county extension staff as well as state aquaculture producers.
May 13, 2011

Dr. Ted R. Batterson, Director
North Central Regional Aquaculture Center
Michigan State University
13 Natural Resources Building
East Lansing, Michigan 48842

SUBJECT: Kansas State University: North Central Regional Aquaculture Center
Extension Project

Dear Dr. Batterson:

As the Authorized Organizational Representative (AOR) I would like to inform you
Kansas State University wishes to participate in the above referenced project as a
subcontractor to Michigan State University. Charles D. Lee will serve as the Principal
Investigator of the subcontract and he will have access to all of the necessary
equipment, laboratory, and office space to successfully undertake this project. I also
approve the budget as submitted for Charles D. Lee's involvement in this project. Upon
issuance of approval to the North Central Regional Aquaculture Center for this project,
Kansas State University will enter into a formal agreement with your institution.

Sincerely,

[Signature]

Paul R. Lowe
Assistant Vice President for Research
EXTENSION PLAN FOR IOWA STATE UNIVERSITY

(Morris & Pattillo)

Objective 1 & 2

Situation: To date, the Iowa Aquaculture Association (IAA) has continued to struggle to maintain a viable association with a limited membership. Iowa has about 440,000 recreational anglers over the age of 16 with yearly expenditures related to fishing estimated to be about $322 million (2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation – U.S. Fish and Wildlife Service http://library.fws.gov/nat_survey2006_final.pdf). In addition, farm pond owners host some 1.6 million fishing trips by licensed anglers per year. Farm ponds also support fishing valued at $7.5 million per year. Fishing accounts for $1 million in tourist dollars to the state’s economy. Many of these private ponds are stocked using fish purchased from private producers.

In the NCR, many culture fishes are initially produced in intensive situations. However, there are a limited number of extension materials that adequately describe the many facets of these operations. Improvement in the operational techniques will be instrumental in greatly increasing fry survival.

Justification: There is a need to improve the visibility of the IAA to the point where additional Iowa producers become members. While many public culturists utilize new technologies, e.g., out-of-season spawning of baitfish and sunfish, there is a need to disseminate this information to private culturists. This is an important issue in the NCR given our need to develop regionally-appropriate species, e.g., walleye. Also, this technology can enhance profitability of private operations.

Timeline: 2 years for full development of IAA products to produce a document for submission to the NCRAC Publications Office for review.

Outputs:
- Publication of IAA poster and distribution to Iowa State University Extension Community.
- Fry publications for submission to the NCRAC Publications Office.

Outcomes:
- Increased membership to IAA.
- Downloadable fry publication from NCRAC Web site which should result in improved success in rearing NCR fry by private culturists.
**Budget**

**Organization and Address**
Department of Natural Resource Ecology and Management  
Iowa State University  
339 Science II, Ames, IA 50011-3221

**Project Director(s)**
Joseph E. Morris and D. Allen Pattillo

<table>
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<th>USDA Award No.</th>
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<td>Non-Federal Proposed Cost-Sharing/Matching Funds (if required)</td>
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<td>Non-federal Cost-Sharing/Matching Funds Approved by CSREES (if different)</td>
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### A. Salaries and Wages

1. No. of Senior Personnel
   - a. (Co)-PD(s) ........................................
   - b. Senior Associates ..............................

2. No. of Other Personnel (Non-Faculty)
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   - e. Prebaccalaureate Students ..................
   - f. Secretarial-Clerical .........................
   - g. Technical, Shop and Other ..................

**Total Salaries and Wages** ................................

### B. Fringe Benefits (If charged as Direct Costs)

### C. Total Salaries, Wages, and Fringe Benefits (A plus B) ................................

### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

### E. Materials and Supplies $500

### F. Travel $500

### G. Publication Costs/Page Charges

### H. Computer (ADPE) Costs

1. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)
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### M. Total Direct and F&A/Indirect Costs (J plus K) ........................................

### N. Other ................................

### O. Total Amount of This Request ................................

### P. Carryover -- (If Applicable) . . . . . . Federal Funds: $ Non-Federal funds: $ Total $

### Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)

- Cash (both Applicant and Third Party) ................................
- Non-Cash Contributions (both Applicant and Third Party) ................................

**Name and Title** (Type or print)  
**Signature** (required for revised budget only)  
**Date**

**Project Director**

**Authorized Organizational Representative**

**Signature** (for optional use)

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Form CSREES-2004 (12/2000)
ORGANIZATION AND ADDRESS
Department of Natural Resource Ecology and Management
Iowa State University
339 Science II, Ames, IA 50011-3221

PROJECT DIRECTOR(S)
Joseph E. Morris and D. Allen Pattillo

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K. Total Direct Costs (C through I) . $1,000

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 in on/off campus bases.)

M. Total Direct and F&A/Indirect Costs (J plus K) . $1,000

N. Other .

O. Total Amount of This Request . $1,000

P. Carryover -- (If Applicable) . Federal Funds: $ Non-Federal funds: $ Total $

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Project Director

Authorized Organizational Representative

Signature (for optional use)

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BUDGET EXPLANATION FOR IOWA STATE UNIVERSITY

(Morris & Pattillo)

Objectives 1 & 2

E. Materials and Supplies. Years 1 and 2: General office supplies including paper, toner, and mailers ($500/year) to develop new Iowa Aquaculture Association production/membership poster for the producers.

F. Travel. Years 1 and 2: Transportation, meals, and lodging for travel within the state to assist individual producers with aquaculture and pond management problems ($500/year). Funds will allow on-site visitations and provide educational assistance in the form of technical expertise and informational publications to county extension staff as well as state aquaculture producers.
April 8, 2011

Michigan State University
13 Natural Resources Building
East Lansing, MI 48824

Proposal Title: NCRAC Administration Account
Period of Performance: 6/1/11-5/31/12
Requested Amount: $ 88,076
Cost Sharing Amount: $ 0

Dear Dr. Batterson:

On behalf of Iowa State University and Joseph E. Morris, I am pleased to endorse the enclosed application for funding. It has been reviewed and approved by the appropriate programmatic and administrative personnel at Iowa State University. If the proposal is selected for funding, Iowa State University is committed to fulfilling all commitments made in the grant application.

Sincerely,

Asrun Yr Knstmundsdottir
Pre-Award Administrator
grants@iastate.edu
Objective 2

Situation: The aquaculture industry in South Dakota is not developed. There are several independent baitfish dealers who have not yet organized into any type of association. Such an association would be beneficial to engage practitioners in collaboration and strategic alliances that may result in an expansion of and/or confirmation of existing knowledge.

Justification: Providing aquaculture resource information as well as new information about baitfish culture will support continued growth of aquaculture in South Dakota. South Dakota extension personnel have continued to provide technology transfer of these new developments in the form of technical bulletins made available to industry personnel. The intent is that they can improve production and profitability. Interacting with private industry will provide new knowledge to extension personnel to enable them to understand the concerns of the aquaculture industry in South Dakota.

Timeline: Outreach activities will take place over the 2-year period of this project.

Outputs: As an Extension aquaculture representative, PI will continue collaborative efforts with independent aquaculturalists to request additional funding on aquaculture-related projects. These potential projects include the following: role of aquaculture in midwestern diversified farming operations; aquaculture feeding trials; and health aspects of combined aquaculture/red meat production.

Outcomes:
- Improved awareness of aquaculture in South Dakota.
- The primary outcome from this effort will be an improved knowledge base for Extension professionals which may lead to state-specific resource materials.
**Organizations and Address**
South Dakota State University Grants Administration P.O. Box 2201, Brookings, SD 57007

**Budget**

- **USDA Award No.:** Year 1: Objective 2
- **Duration Proposed Months:** 12
- **Funds Requested by Proposer:**
- **Non-Federal Proposed Cost-Sharing/Matching Funds:**
  - Approved by CSREES (If different)

**Project Director(s):**
Burton W. Pflueger

**A. Salaries and Wages**

<table>
<thead>
<tr>
<th>CSREES Funded Work Months</th>
<th>Calendar</th>
<th>Academic</th>
<th>Summer</th>
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<tbody>
<tr>
<td>1. No. of Senior Personnel</td>
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<tr>
<td>a. ___ (Co)-PD(s)</td>
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<tr>
<td>b. ___ Senior Associates</td>
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<tr>
<td>2. No. of Other Personnel (Non-Faculty)</td>
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<td>a. ___ Research Associates-Postdoctorates</td>
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<td>g. ___ Technical, Shop and Other</td>
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<tr>
<td><strong>Total Salaries and Wages</strong></td>
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</tbody>
</table>

**B. Fringe Benefits (If charged as Direct Costs)**

**C. Total Salaries, Wages, and Fringe Benefits (A plus B)**

- **D. Nonexpendable Equipment**
  - Attach supporting data. List items and dollar amounts for each item.

**E. Materials and Supplies**

- **$250**

**F. Travel**

- **$750**

**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 I)**
  - **$1,000**

- **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 in on/off campus bases.)

- **M. Total Direct and F&A/Indirect Costs (J plus K)**
  - **$1,000**

**N. Other**

**O. Total Amount of This Request**

- **$1,000**

**P. Carryover -- (If Applicable)**

- **Federal Funds:**
- **Non-Federal funds:**
- **Total $**

**Q. Cost Sharing/Matching**

- **Breakdown of total amounts shown in line O**
  - Cash (both Applicant and Third Party)
  - Non-Cash Contributions (both Applicant and Third Party)

**NAME AND TITLE**
(Type or print)

**SIGNATURE** (required for revised budget only)

**DATE**

- **Project Director**

- **Authorized Organizational Representative**

- **Signature** (for optional use)

---

Form CSREES-2004 (12/2000)
**ORGANIZATION AND ADDRESS**
South Dakota State University
Grants Administration
P.O. Box 2201, Brookings, SD 57007

**PROJECT DIRECTOR(S)**
Burton W. Pfieger

**USDA AWARD NO.**
Year 2: Objective 2

**CSREES FUNDED WORK MONTHS**

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<tr>
<th>Calendar</th>
<th>Academic</th>
<th>Summer</th>
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**A. Salaries and Wages**

1. No. of Senior Personnel
   - a. (Co)-PD(s) ...........................................
   - b. Senior Associates __________________________

2. No. of Other Personnel (Non-Faculty)
   - b. Other Professionals ________________________
   - c. Paraprofessionals __________________________
   - d. Graduate Students __________________________
   - e. Prebaccalaureate Students ......................
   - f. Secretarial-Clerical _________________________
   - g. Technical, Shop and Other ......................

**Total Salaries and Wages**

**B. Fringe Benefits (If charged as Direct Costs)**

**C. Total Salaries, Wages, and Fringe Benefits (A plus B)**

**D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)**

**E. Materials and Supplies**

- $250

**F. Travel**

- $750

**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 I)**

- $1,000

**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 in on/off campus bases.)**

- $1,000

**N. Other**

- $1,000

**O. Total Amount of This Request**

- $1,000

**P. Carryover -- (If Applicable) . . . . . . . . Federal Funds: $ Non-Federal funds: $ Total $**

**Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**

- Cash (both Applicant and Third Party) .......
- Non-Cash Contributions (both Applicant and Third Party) 

**NAME AND TITLE**

(Type or print)

<table>
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- (required for revised budget only)

**DATE**

- (required for revised budget only)

- (required for revised budget only)

[According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0524-0039. The time required to complete this information collection is estimated to average 1.00 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the reviewing the collection of information.]
Objective 2

E. Materials and Supplies. Years 1 and 2: General office supplies including paper, toner, and mailers ($250/year).

F. Travel. Years 1 and 2: Transportation, lodging, and meal expenses for the PI to visit individual aquaculturists at locations to be determined in support of extension activities related to South Dakota aquaculture ($750/year).
May 18, 2011

Ted R. Batterson, Ph.D.
North Central Regional Aquaculture Center
Michigan State University
East Lansing, MI 48824

Dear Dr. Batterson

South Dakota State University agrees to participate as a subcontractor for the project titled “North Central Regional Aquaculture Center Extension Project” sponsored by the USDA. The Principal Investigator at SDSU will be Burton Pflueger and our 2-year budget for the subcontract is $2,000

SDSU is prepared to serve as a sub-awardee on this project and to establish an appropriate inter-institutional agreement for programmatic, fiscal and administrative arrangements.

Sincerely,

James Doolittle
Interim Vice President for Research
EXTENSION PLAN FOR PURDUE UNIVERSITY

(Quagrainie)

Objectives 2 & 3

**Situation:** Growing fish requires some experience, knowledge, and management skills because production can be lost due to fish mismanagement, inappropriate handling, unsuspected predators (e.g., birds and otters with pond and cage culture), and disease, as well as inappropriate environmental conditions. Fish production involves confinement in enclosed facilities (cages, ponds, and tanks), and poor water quality, diseases, low oxygen levels, inappropriate water temperature, and inadequate feeding can result in poor environmental conditions to cause total loss of the stock. Prospective fish farmers need hands-on experiential learning on various topics such as site selection, species selection, system construction, and fish handling techniques during stocking and harvesting, as well as feeding techniques and water quality management such as maintenance of temperature, dissolved oxygen levels, and pH.

**Timeline:** Two 1-day workshops will be conducted each year.

**Outcomes:** Two 1-day workshops held each year. The workshop program will entail lectures and hands-on experiential learning on various topics: site selection, species selection, system construction, fish handling techniques during stocking and harvesting, feeding techniques, water quality management such as maintenance of temperature, dissolved oxygen levels, and pH, etc., marketing, and profitability analyses.

**Outputs:** Prospective farmers will gain knowledge and skills in site selection, species selection, system construction, fish handling techniques during stocking and harvesting, feeding techniques, and water quality management. In addition, participants will become knowledgeable with various aquaculture production systems.
## BUDGET

### ORGANIZATION AND ADDRESS
Purdue University
Sponsored Program Services
615 W. State St., West Lafayette, IN 47907-2053

### PROJECT DIRECTOR(S)
Kwamena Quagrainie

### USDA AWARD NO.
Year 1: Objectives 2 & 3

<table>
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<tr>
<th>Non-Federal</th>
<th>Non-federal Cost-Sharing/Matching Funds Approved by CSREES (if required)</th>
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<td>Duration Proposed Months: 12</td>
<td>Duration Proposed Months: ____</td>
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</tbody>
</table>

### Non-Federal Cost-Sharing/Matching Funds Approved by CSREES

### A. Salaries and Wages

#### 1. No. of Senior Personnel
- a. ___ (Co)-PD(s) . . . . . . . . . . . . . . . . . . . . .
- b. ___ Senior Associates . . . . . . . . . . . . . . .

#### 2. No. of Other Personnel (Non-Faculty)
- a. ___ Research Associates-Postdoctorates . .
- b. ___ Other Professionals . . . . . . . . . . . . . . .
- c. ___ Paraprofessionals . . . . . . . . . . . . . . .
- d. ___ Graduate Students . . . . . . . . . . . . . . .
- e. ___ Prebaccalaureate Students . . . . . . . . .
- f. ___ Secretarial-Clerical . . . . . . . . . . . . . . .
- g. ___ Technical, Shop and Other . . . . . . . . . .

#### Total Salaries and Wages

### B. Fringe Benefits (If charged as Direct Costs)

### C. Total Salaries, Wages, and Fringe Benefits (A plus B)

### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

### E. Materials and Supplies $700

### F. Travel $1,300

### 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 I) → $2,000

### 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 in on/off campus bases.)

### M. Total Direct and F&A/Indirect Costs (J plus K) → $2,000

### N. Other →

### O. Total Amount of This Request → $2,000

### P. Carryover -- (If Applicable) . . . . . . Federal Funds: $ | Non-Federal funds: $ | Total $

### Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)
- Cash (both Applicant and Third Party) →
- Non-Cash Contributions (both Applicant and Third Party) →

### NAME AND TITLE (Type or print)

### SIGNATURE (required for revised budget only)

### DATE

---

**Project Director**

**Authorized Organizational Representative**

**Signature (for optional use)**

---

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0524-0039. The time required to complete this information collection is estimated to average 1.00 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the reviewing the collection of information.

Form CSREES-2004 (12/2000)
### A. Salaries and Wages

1. No. of Senior Personnel
   - (Co)-PD(s) 
   - Senior Associates 

2. No. of Other Personnel (Non-Faculty)
   - Research Associates-Postdoctorates
   - Other Professionals
   - Paraprofessionals
   - Graduate Students
   - Prebaccalaureate Students
   - Secretarial-Clerical
   - Technical, Shop and Other

Total Salaries and Wages

### B. Fringe Benefits (if charged as Direct Costs)

### C. Total Salaries, Wages, and Fringe Benefits (A plus B)

### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

### E. Materials and Supplies

### F. Travel

### G. Publication Costs/Page Charges

### H. Computer (ADPE) Costs

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### K. Total Direct Costs (C through I)

### 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 in on/off campus bases.)

### M. Total Direct and F&A/Indirect Costs (J plus K)

### N. Total Direct and F&A/Indirect Costs (J plus K)

### O. Total Amount of This Request

### P. Carryover -- (If Applicable)

### Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)

Cash (both Applicant and Third Party) 
Non-Cash Contributions (both Applicant and Third Party)

### NAME AND TITLE (Type or print) SIGNATURE (required for revised budget only) DATE

Project Director
Authorized Organizational Representative

Signature (for optional use)
Objectives 2 & 3

E. Materials and Supplies. Years 1 and 2: General office supplies including paper, toner, and mailers ($700/year).

F. Travel. Years 1 and 2: Transportation, lodging, and meal expenses for the PI to attend a 1-day annual meeting of the Indiana Aquaculture Association at a location to be determined by the aquaculture association ($1,300/year).
March 25, 2011

Dr. Ted R. Batterson, Director
North Central Regional Aquaculture Center
Michigan State University
13 Natural Resources Building
East Lansing, Michigan 48842

SUBJECT: North Central Regional Aquaculture Center “Base” Extension Project

Dear Dr. Batterson:

As the Authorized Organizational Representative (AOR) I would like to inform you Purdue University (PU) wishes to participate in the above referenced project as a subcontractor to Michigan State University. Dr. Kwamena Quagrainie will serve as the Principal Investigator of the subcontract and he has access to all of the necessary equipment, laboratory, and office space to successfully undertake this project.

This application is referenced under Purdue University SPS Development #00033427 and has been administratively reviewed and approved by the appropriate officials.

Any award or agreement made as a result of this submission should reference the above development number and sent to:

Purdue University
Sponsored Program Services
615 West State Street
West Lafayette, IN 47907-2053

Questions regarding this application can be referred to Kwamena Quagrainie, Purdue University, via email at kquagrai@purdue.edu. Administrative or fiscal questions should be addressed to Kirsten Sherman-Haynes at Purdue University, West Lafayette, Indiana, telephone number (765) 494-5821 or shermanh@purdue.edu.

We look forward to your favorable review of this proposal.

Sincerely,

Amy J Wright
Pre-Award Center Manager
Sponsored Program Services
EXTENSION PLAN FOR OHIO STATE UNIVERSITY

(Objective 2)

Situation: Ohio is now reported as the top seller (by sales volume) of yellow perch in the United States, and 4th nationally for sportfish (largemouth bass and bluegill) and baitfish. A recent review of Ohio's 2007 list of aquaculture, propagators, and bait dealers permit holders revealed that there are over 250 aquaculture and aquaculture-related businesses in Ohio. Yellow perch and bluegill remain top sellers in Ohio, both for the food fish markets and the sport fish (stocking) markets.

Justification: There is a significant demand from Ohio aquaculturists and prospective aquaculturists for high quality, technical information and assistance on the culture of these species and improvements in their production capabilities. The OCARD program is conducting extensive genetics work with yellow perch and bluegill in the attempt to produce new lines of faster growing yellow perch and to develop all-male populations of bluegill that are projected to reach market sizes faster than current stocks.

Outputs: At least three aquaculture workshops in Ohio will be organized each year with information being targeted to producers in the NCR. All workshops will be advertised regionally and will incorporate regional expertise when possible.

Outcomes: OCARD extension personnel propose to continue to provide technology transfer of these new developments in the form of technical bulletins, refereed journal articles, and workshop presentations to the Ohio clientele, with the intent to improve production and profitability of the aquaculture industry.
**UNIVERSITY OF OHIO RESEARCH FOUNDATION**

**1960 Kenney Road, Columbus, OH 43210-1063**

**PROJECT DIRECTOR(S)**

Laura G. Tiu

---

### A. Salaries and Wages

<table>
<thead>
<tr>
<th>Description</th>
<th>CSREES Funded Work Months</th>
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<tbody>
<tr>
<td>1. No. of Senior Personnel</td>
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<tr>
<td>g. Technical, Shop and Other</td>
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</tbody>
</table>

#### Total Salaries and Wages

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### B. Fringe Benefits (If charged as Direct Costs)

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### C. Total Salaries, Wages, and Fringe Benefits (A plus B)

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### D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)

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### E. Materials and Supplies

- $500

### F. Travel

- $500

### G. Publication Costs/Page Charges

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### 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 I)

- $1,000

### 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 in on/off campus bases.)

---

### M. Total Direct and F&A/Indirect Costs (J plus K)

- $1,000

### N. Other

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### O. Total Amount of This Request

- $1,000

### P. Carryover -- (If Applicable)

- Federal Funds: $
- Non-Federal funds: $
- Total $ 

### Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)

- Cash (both Applicant and Third Party)
- Non-Cash Contributions (both Applicant and Third Party)

---

**NAME AND TITLE** (Type or print)

Project Director

Authorized Organizational Representative

Signature (for optional use)

---

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0524-0039. The time required to complete this information collection is estimated to average 1.00 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the reviewing the collection of information.

Form CSREES-2004 (12/2000)
**A. Salaries and Wages**

1. No. of Senior Personnel
   - a. ___ (Co)-PD(s) 
   - b. ___ Senior Associates 

2. No. of Other Personnel (Non-Faculty)
   - a. ___ Research Associates-Postdoctorates 
   - b. ___ Other Professionals 
   - c. ___ Paraprofessionals 
   - d. ___ Graduate Students 
   - e. ___ Prebaccalaureate Students 
   - f. ___ Secretarial-Clerical 
   - g. ___ Technical, Shop and Other

**Total Salaries and Wages**

**B. Fringe Benefits (If charged as Direct Costs)**

**C. Total Salaries, Wages, and Fringe Benefits (A plus B)**

**D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)**

**E. Materials and Supplies** $500

**F. Travel** $500

**G. Publication Costs/Page Charges**

**H. Computer (ADPE) Costs**

1. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)

2. 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 I)** $1,000

**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 in on/off campus bases.)

**M. Total Direct and F&A/Indirect Costs (J plus K)** $1,000

**N. Other**

**O. Total Amount of This Request** $1,000

**P. Carryover -- (If Applicable)**

<table>
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<tr>
<th>Federal Funds: $</th>
<th>Non-Federal funds: $</th>
<th>Total $</th>
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**Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**

- Cash (both Applicant and Third Party)
- Non-Cash Contributions (both Applicant and Third Party)

**NAME AND TITLE** (Type or print) **SIGNATURE** (required for revised budget only) **DATE**

- Project Director
- Authorized Organizational Representative
- Signature (for optional use)

---

Footnote: According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0524-0039. The time required to complete this information collection is estimated to average 1.00 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the reviewing the collection of information.

Form CSREES-2004 (12/2000)
Objective 2

E. Materials and Supplies. Years 1 and 2: Miscellaneous meeting supplies such as notebooks, pens, pencils, folders, paper, envelopes, printer/copier, ink cartridges, and snacks ($500/year).

F. Travel. Years 1 and 2: Transportation, meals, and lodging for one trip to the annual Ohio Aquaculture Association Meeting at a location to be determined ($300/year); transportation, meals, and lodging to attend one Ohio State University Aquaculture Workshop at a location to be determined ($200/year).
Date May 12, 2011

Dr. Ted R. Batterson, Director
North Central Regional Aquaculture Center
Michigan State University
13 Natural Resources Building
East Lansing, Michigan 48842

SUBJECT: Project entitled “North Central Regional Aquaculture Center Extension Project”

Dear Dr. Batterson:

As the Authorized Organizational Representative (AOR) I would like to inform you that The Ohio State University Research Foundation wishes to participate in the above referenced project as a subcontractor to Michigan State University. Dr. Laura Tiu will serve as the Principal Investigator(s) of the subcontract and she will have access to all of the necessary equipment, laboratory, and office space to successfully undertake this project. I also approve the budget as submitted for Dr. Tiu’s involvement in this project. Upon issuance of approval to the North Central Regional Aquaculture Center for this project, The Ohio State University Research Foundation will enter into a formal agreement with your institution.

Sincerely,

Paul O. Matherny
Senior Sponsored Program Officer
The Ohio State University, Office of Grants & Contracts
1960 Kenny Road
Columbus OH 43210
TEL: 614-292-7978
Matherny.1@osu.edu
### BUDGET SUMMARY ALL PARTICIPATING INSTITUTIONS

#### Year 1

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<th>SDSU</th>
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#### Year 2

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SCHEDULE FOR COMPLETION OF OBJECTIVES

Objective 1: Initiated in Year 1 completed in Year 2.
Objective 2: Initiated in Year 1 completed in Year 2.
Objective 3: Initiated in Year 1 completed in Year 2.
LIST OF PRINCIPAL INVESTIGATORS

Dennis E. Bauer, University of Nebraska-Lincoln
Mark E. Clark, North Dakota State University
Jeffrey L. Gunderson, University of Minnesota-Duluth
James A. Held, University of Wisconsin – Extension
Charles E. Hicks, Lincoln University
Ronald E. Kinnunen, Michigan State University
Charles D. Lee, Kansas State University
Joseph E. Morris, Iowa State University
D. Allen Pattillo, Iowa State University
Burton W. Pflueger, South Dakota State University
Kwamena K. Quagrainie, Purdue University
Laura Tiu, Ohio State University
VITA

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

Positions
Extension Educator (1978-present), University of Nebraska Extension, in Brown, Keya Paha, and Rock counties.

Scientific and Professional Organizations
Society for Range Management
Nebraska Cooperative Extension Association
VITA

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Education

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

Positions

Assistant Professor (2002-present), Department of Biological Sciences, North Dakota State University
Postdoctoral Fellow (2000-2002), Cooperative Wildlife Research Unit, University of Montana
Postdoctoral Fellow (1997-2000), Department of Animal Ecology, Iowa State University
Postdoctoral Fellow (1996-1997), Environmental Sciences Division, Oak Ridge National Laboratory

Scientific and Professional Organizations

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

Selected Publications


VITA

Jeffrey L. Gunderson Phone: (218) 726-8715
Minnesota Sea Grant Extension Program Fax: (218) 726-6556
University of Minnesota-Duluth E-mail: jgunde1@umn.edu
2305 E. 5th Street
Duluth, MN 55812

EDUCATION

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

POSITIONS

Director (2010-present), Associate Director, Fisheries/Aquaculture Educator and Professor (1998-2010), and Fisheries/Aquaculture Educator (1979-1998), University of Minnesota Sea Grant Extension Fishery Specialist/Fishery Biologist (1978-1979), Missouri Conservation Department

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
International Association of Astacology
Sea Grant Advisory Service Association (Great Lakes Network)
North Central Regional Aquaculture Center's Extension Technical Committee

SELECTED PUBLICATIONS


VITA

James A. Held  Phone: (920) 648-2902
University of Wisconsin Extension  Fax: (920) 648-3646
302 S. Main St  E-mail: jaheld@wisc.edu
Lake Mills, WI 53551

EDUCATION

B.S. University of Wisconsin-Milwaukee, 1986, Zoology

POSITIONS

Aquaculture Outreach Specialist (2007-present), University of Wisconsin-Extension
Senior Research Specialist (2003-2007), Research Specialist (1995-2003), and Associate Research
Specialist (1988-1995), University of Wisconsin-Madison Aquaculture Program, University of
Wisconsin-Madison

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

World Aquaculture Society

SELECTED PUBLICATIONS


perch grow-out in ponds in southern Wisconsin. North Central Regional Aquaculture Center Fact
Sheet Series #121. NCRAC Publications Office, Iowa State University, Ames.
http://www.ncrac.org/Topics/ypproductionparameters.html (October 17, 2010). 12 pp

performance characteristics and the cortisol stress response of surubim (Pseudoplatystoma sp.)

vitreus female × S. canadensis male) reared to food size in ponds. Pages 33-34 in Barry, T.P., and
University of Wisconsin Sea Grant Institute, Madison.
VITA

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Foster Hall, 904 Chestnut St.  Jefferson City, MO 65101

EDUCATION

B.S.  Utah State University, 1960, Biology
M.S.  Utah State University, 1964, Fishery Biology

POSITIONS

Assistant Professor (2002-present), Lincoln University-Cooperative Research
Assistant Fisheries and Wildlife Extension Specialist (2002-present), University of Missouri
Adjunct Staff (1997), Lincoln University
Aquaculture Specialist (1993-1998), Missouri Department of Agriculture
Director Technical Services (1989-1993), Genesis Aquaculture, Inc.
General Manager (1987-1989), South Florida Aquaculture Center, Inc., Florida City
Superintendent of Fish Hatcheries (1968-1987), Missouri Department of Conservation, Jefferson City
Supervisor of Hatcheries (1965-1968), Utah Division of Wildlife Resources, Salt Lake City
Biologist (1964-1965), Logan Experimental Fish Cultural Station Logan, Utah
Biologist (1960-1962), Fisheries Research Institute, University of Washington, Seattle

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
Fish Culture Section of the American Fisheries Society
Missouri Aquaculture Association

SELECTED PUBLICATIONS


VITA

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

POSITIONS
Michigan Sea Grant Extension Agent (1982-present), Upper Peninsula, Michigan State University
Fisheries Pathologist (1981), Rangen Research Laboratory, Hagerman, Idaho

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS
Alliance for Marine Remote Sensing
American Fisheries Society, Fish Health Section, Salmonid Section
International Association for Great Lakes Research

SELECTED PUBLICATIONS


VITA

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EDUCATION

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

POSITIONS

Extension Specialist-Wildlife (1995-present), Kansas State University
Agricultural Liaison Biologist (1989-1995), Kansas Department of Wildlife and Parks
Extension Assistant (1986-1989), Kansas State University

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


VITA

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E-mail: jemorris@iastate.edu

EDUCATION

B.S. Iowa State University, 1979, Fisheries and Wildlife Biology
M.S. Texas A&M University, 1982, Wildlife and Fisheries Sciences
Ph.D. Mississippi State University, 1988, Fisheries and Wildlife

POSITIONS

Professor (2010-present), Associate Professor (1995-2010), Interim Department Chair (2008-2009), Fisheries and Aquaculture Specialist/Associate Professor (1995-2004), Specialist/Assistant Professor (1988-1995), Department of Natural Resource Ecology and Management, Iowa State University and Associate Director, North Central Regional Aquaculture Center (1990-present)
Graduate Research Assistant (1986-1988), Mississippi State University
Aquaculture Manager (1982-1986), Stiles Farm Foundation
Graduate Research Assistant (1981-1982), and Research Technician I (1980-1981), Texas A&M University
Fisheries Biologist Aide (1979), Indiana Department of Natural Resources

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

SELECTED PUBLICATIONS


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107 Science II
Ames, IA 50011-3221

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E-mail: pattillo@iastate.edu

EDUCATION

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

POSITIONS

Fisheries Extension Specialist III (2011-present) Iowa State University
Graduate Research Assistant (2008-2010) Auburn University

SOCIETIES AND PROFESSIONAL ASSOCIATIONS

International Association of Astacology
World Aquaculture Society
VITA

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Brookings, SD 57007

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EDUCATION

B.S. University of Nebraska-Lincoln, 1979, Agricultural Economics
M.S. University of Nebraska-Lincoln, 1981, Agricultural Economics
Ph.D. University of Illinois, 1985, Agricultural Economics

POSITIONS

Professor (1997-present), Associate Professor (1989-1997) and Assistant Professor (1985-1989),
Extension Economist/Extension Economist/Specialist (1985-present), Department of Economics,
South Dakota State University

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Midwest Bankers Institute
North Central Regional Extension Farm Management Committee
Small Business Institute Academic Supervisor
South Dakota Extension Specialists Association
South Dakota Cooperative Extension Association

SELECTED PUBLICATIONS

Economics Commentator No. 440. South Dakota State University, Brookings.

Pflueger, B. 2003. South Dakota farm management extension program highlights. North Central Regional
Extension Farm Management Committee Report, May and October 2003.

Experiment Station Bulletin C 268. South Dakota State University, Brookings, June 2003.

land market, EC 918, South Dakota State University, Brookings, August 2003.
VITA

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Purdue University
403 W. State St., Krannert Building
West Lafayette, IN 47907-2056

Phone: (765) 494-4200
Fax: (765) 494-9176
E-mail: kquagrai@purdue.edu

EDUCATION

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

POSITIONS

Aquaculture Marketing Specialist (2005-present), Purdue University and Illinois-Indiana Sea Grant College Program
Assistant Professor-Aquaculture Marketing (2001 to 2005), University of Arkansas at Pine Bluff

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

SELECTED PUBLICATIONS

Quagrainie, K.K. In Review. Heterogeneous preferences and consumer purchase decision on live fish product. Aquaculture Economics and Management.
VITA
Laura G. Tiu Phone: 740-289-2071, x 121
Ohio State University, South Centers Fax: 740-289-4591
1964 Shyfille Road E-mail: tiu.2@osu.edu
Piketon, OH 45661-9749

EDUCATION
B.S.  Silliman University, Philippines, 1986, Biology/Marine Biology
M.S.  Mississippi State University, 1990, Wildlife Ecology/Fisheries
Ph.D.  Ohio State University, 2010, Agricultural and Extension Education

POSITIONS
Senior Research and Extension Associate (2003-present) and Research and Extension Associate (1998-
2003), The Ohio State University
Co-Investigator for Aquaculture (1992-1998), Kentucky State University

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS
National Aquaculture Extension Steering Committee
National Association of State Aquaculture Coordinators
North Central Regional Aquaculture Center (NCRAC) Extension Technical Committee
Ohio Aquaculture Association & Fish Farmers of Ohio Association
The Ohio Leadership Education and Development (LEAD) Program
U.S. Chapter World Aquaculture Society
World Aquaculture Society

SELECTED PUBLICATIONS

