

NORTH CENTRAL REGIONAL AQUACULTURE CENTER EXTENSION PROJECT

Chairperson: D. Allen Pattillo, Iowa State University

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

Funding Request: \$45,000

Duration: 2 Years (September 1, 2013 - August 31, 2015)

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:

Institution	Principal Investigator	Objective(s)	Year 1	Year 2	Total
University of Nebraska-Lincoln	Dennis E. Bauer	2	\$600	\$600	\$1,200
North Dakota State University	Mark E. Clark	1 & 2	\$500	\$500	\$1,000
University of Wisconsin- Extension	James A. Held	2 & 3	\$1,000	\$1,000	\$2,000
Lincoln University	Charles E. Hicks	2 & 3	\$2,000	\$500	\$2,500
Michigan State University	Ronald E. Kinnunen	1 - 3	\$2,250	\$5,250	\$7,500
Kansas State University	Charles D. Lee	2	\$850	\$850	\$1,700
Iowa State University	D. Allen Pattillo	1 - 3	\$12,050	\$3,300	\$15,350
South Dakota State University	Burton W. Pflueger	2	\$600	\$600	\$1,200
University of Minnesota	Nicholas Phelps	1 & 2	\$2,200	\$5,200	\$7,400
Purdue University	Kwamena K. Quagraine	2 & 3	\$1,075	\$1,075	\$2,150
Ohio State University	Laura G. Tiu	2	\$800	\$2,200	\$3,000
Totals			\$23,925	\$21,075	\$45,000

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JUSTIFICATION

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 2012 (FAO 2012). World aquaculture production in 1991 was ca. 14 million metric tons (NMFS 2002), and in 2011 it had grown to ca. 63.6 million metric tons (FAO 2012). In 2011 inland aquaculture production was estimated at 44.3 million metric tons, with North American aquaculture production accounting for 1.10% of the total world's aquaculture production (FAO 2012). The U.S. aquaculture production totaled over 495,000 tons in 2010, making them the second largest producer in the Americas, behind Chile (FAO 2012).

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 7.2 kg (15.8 lb) of edible meat per person in 2010, a decrease from the record year in 2004, during which per capita consumption was approximately 7.5 kg (16.6 lb); however, this amount matches the average consumption for 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). Recent budgetary constraints have led to decreased industry information made available for aquaculture through the USDA Census for Agriculture; current production data is available for trout and catfish only.

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*), walleye (*Sander vitreus*), bluegill sunfish (*Lepomis macrochirus*), 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; Dimitri 2005). 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. Recently, there has been a large interest in urban fish farming and aquaponics, which is being used primarily as a social program for troubled youth. Examples include aquaponic operations in Milwaukee, Wisconsin [Growing Power, Inc. (<http://www.growingpower.org/>)] and Chicago, Illinois. 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 (*Coregonus clupeaformis*), 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. Greenhouse culture of fish in aquaponics is also a viable option for lengthening the growing season for many fish species. 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 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.

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. The NCRAC web site (<http://www.ncrac.org/>) has continued to be a source of many of these requests. The NCRAC website receives an average of 20,000 unique url hits per month. Total hits are in excess of 40,000 with a peak in spring of up to 75,000.

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; GLFC1999). 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. 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 works 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 new aquaculture practice, aquaponics, is growing in popularity, yet there is little known about the sustainability and economic feasibility for aquaponics in the NCR. Most of the research for aquaponic food production is derived from the University of the Virgin Islands and Hawaii, which have tropical climates and do not represent our region. Aquaponics facilities in urban areas tend to depend on the tourism and social programming aspects of urban farming projects to be profitable. Thus far, niche marketing and integrated farming techniques have allowed aquaponics to be feasible in more rural areas, yet it is unknown if rural aquaponics food production facilities will be profitable long-term. Our goal is to create an aquaponics fact sheet that will give potential producers the knowledge they need to be successful in the NCR.

Another issue of critical importance in the NCR is 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 negatively impact the economy of these industries unnecessarily, 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 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. 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. 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.

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. 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 with the goal of a recognized certification program.

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There is a need to conduct additional AIS-HACCP/Biosecurity Training as new personnel are in need of this training. In addition there will be the threat of new AIS and fish diseases that continue to make their way into the NCR. This new training effort will combine AIS-HACCP Training with aquaculture biosecurity.

The AIS-HACCP and Aquaculture Biosecurity training program has been implemented through NCRAC funding over the last several years and many fish farms have adopted these procedures to ensure the safety of their products and operations from aquatic invasive species and fish diseases. There has been recent interest by the aquaculture/baitfish industry and regulators to develop some type of certification program to ensure that AIS-HACCP/Aquaculture Biosecurity procedures are actually in place and working. Such a certification program does not exist in the NCR and we would like to explore its development.

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.

Many NCRAC extension contacts are involved with their respective state aquaculture associations, and have 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 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/oa/>) 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.

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 on 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. These workshops were attended by almost 200 participants in six states over 2 years, and were rated well for helpfulness (average score = 4.56/5), intention to use information (average score = 4.58/5), and understandability (average score 4.57/5). 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. Future work will include stakeholder meetings to develop 3rd party certification for AIS-HACCP plans, which will be a huge step forward for the industry. The presence that the NCRAC has had in the AIS regulatory issues is one of the main reasons that production and transport of aquaculture products is still allowed in many states in the NCR. In 2012 Ron Kinnunen and Nick Phelps conducted three Aquaculture Biosecurity/AIS-HACCP Workshops that were held in Minnesota, Wisconsin, and Michigan at private aquaculture and federal facilities in the NCR. At these workshops they also began to address an independent certification program that could be used by those who have developed aquaculture biosecurity/AIS-HACCP plans for their facilities. Both regulators and industry representatives were in support of such a program.

ANTICIPATED BENEFITS

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.

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 and aquaponics 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. Additionally, 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.

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. The USDA's eXtension.org website is an interface in which any person can find extension publication on any topic area, and also use the "Ask an Expert" function to directly pose a question that will be routed to an area expert by registered members of eXtension. Webinars and voiceover power point presentations are given by extension experts online, and are available for no charge to the general public. The proposed training session (lead by Dr. Vanessa Weldon) on using eXtension.org is intended to give the NCRAC extension work group critical information on using eXtension.org for disseminating aquaculture information. This training session will also focus on using different electronic methods for evaluating the outcomes and impacts of extension programs.

There is an increasing 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.

A demand has increased for information on the improvement of aquaculture rearing and management strategies to reduce and, if possible, eliminate environmental impacts. 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. Species-specific publications on walleye, trout, and catfish, as well as publications on aquaculture businesses and transportation of fish in bags have been used in numerous regional meetings and have been requested by clients throughout the United States. Since new information on aquaculture production in the NCR is generated constantly, and new culture methods are being developed, it is critical, for success in the industry, that the NCRAC extension work group create and update extension publications to reflect current knowledge. The proposed aquaponics fact sheet will give timely, technical information on production potential, economics, and sustainability of aquaponics in the NCR, which will help potential producers be more profitable.

The presence that the NCRAC has had in the AIS regulatory issues is one of the main reasons that production and transport of aquaculture products is still allowed in many states in the NCR. The proposed work will include stakeholder meetings to develop 3rd party certification for AIS-HACCP plans, which will be a huge step forward for the industry. Also, the final stages of the AIS-HACCP DVD are currently underway. This program gives a complete rundown of the AIS-HACCP process, what threats exist in aquaculture facilities, and how AIS issues can be mitigated. Although this DVD will not be able to fully replace the workshop, it is a great resource for aquaculturists and regulatory bodies to understand the process of creating and implementing a HACCP plan. When coupled with the workshop, the industry members will be able to create their own HACCP plan that is tailored to their individual operation.

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 (VHSV) AIS. If it develops as it has in the seafood industry, it 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. Development of an independent certification program will help ensure confidence among the regulators and the industry that the aquaculture biosecurity/AIS-HACCP program is working.

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. Joseph Morris is listed as extension liaison for several of these past projects due to his previous appointment as Associate Director of NCRAC; Morris will not be included in future projects given his current appointment as Director of NCRAC.

Research Work Group	Extension Liaison	State
Monosex Bluegills	Charles E. Hicks	MO
Yellow Perch Burst Mortality in RAS	D. Allen Pattillo	IA
Yellow Perch and Tilapia Nutrition	Joseph E. Morris	IA
Production of Selected Yellow Perch Lines	Laura G. Tiu	OH
VHS Project	Ron Kinnunen	MI
Management of Snails	Joseph E. Morris	IA
Economic Impact Assessment	James Held	WI
Probiotics in Yellow Perch & Tilapia Culture	Nicholas Phelps	MN
Economic Impact	Jim Held	WI

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.

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.

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- Wisconsin Catholic Conference. 1997. Bishop's statement "The Changing Role of Rural Life in Wisconsin: Implications for

family farms and the Church." Available: <http://www.wiconsincatholic.org/statements/ruralstatement.html> . (October 5, 2006).

PROJECT LEADERS

<u>State</u>	<u>Name</u>	<u>Institution</u>
Indiana	Kwamena K. Quagraine	Purdue University
Illinois	Kwamena K. Quagraine	Purdue University
Iowa	D. Allen Pattillo	Iowa State University
Kansas	Charles D. Lee	Kansas State University
Michigan	Ronald E. Kinnunen	Michigan State University
Minnesota	Nicholas B. D. Phelps	University of Minnesota
Missouri	Charles E. Hicks	Lincoln University
Nebraska	Dennis E. Bauer	University of Nebraska-Lincoln
North Dakota	Mark E. Clark	North Dakota State University
Ohio	Laura G. Tiu	Ohio State University
South Dakota	Burton W. Pflueger	South Dakota State University
Wisconsin	James A. Held	University of Wisconsin-Extension

PARTICIPATING INSTITUTIONS AND PRINCIPAL INVESTIGATORS

University of Nebraska-Lincoln

Dennis E. Bauer

North Dakota State University

Mark E. Clark

Purdue University

Kwamena K. Quagraine

University of Minnesota

Nicholas B. D. Phelps

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

D. Allen Pattillo

South Dakota State University

Burton W. Pflueger

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.

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.

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

OMB Approved 0524-0039
 Expires 03/31/2004

ORGANIZATION AND ADDRESS University of Nebraska-Lincoln Lincoln, NE 68583				USDA AWARD NO. Year 1: Objective 2					
				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: ____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)		
PROJECT DIRECTOR(S) Dennis E. Bauer									
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS						
			Calendar	Academic	Summer				
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 <input type="checkbox"/>									
B. Fringe Benefits (If charged as Direct Costs)									
C. Total Salaries, Wages, and Fringe Benefits (A plus B) <input type="checkbox"/>									
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies									
F. Travel					\$600				
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) <input type="checkbox"/>					\$600				
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) <input type="checkbox"/>					\$600				
N. Other <input type="checkbox"/>									
O. Total Amount of This Request <input type="checkbox"/>					\$600				
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) <input type="checkbox"/>									
Non-Cash Contributions (both Applicant and Third Party) <input type="checkbox"/>									
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)

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

OMB Approved 0524-0039
 Expires 03/31/2004

ORGANIZATION AND ADDRESS University of Nebraska-Lincoln Lincoln, NE 68583				USDA AWARD NO. Year 2: Objective 2					
				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: ____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)		
PROJECT DIRECTOR(S) Dennis E. Bauer									
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS						
			Calendar	Academic	Summer				
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 <input type="checkbox"/>									
B. Fringe Benefits (If charged as Direct Costs)									
C. Total Salaries, Wages, and Fringe Benefits (A plus B) <input type="checkbox"/>									
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies									
F. Travel					\$600				
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) <input type="checkbox"/>					\$600				
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) <input type="checkbox"/>					\$600				
N. Other <input type="checkbox"/>									
O. Total Amount of This Request <input type="checkbox"/>					\$600				
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) <input type="checkbox"/>									
Non-Cash Contributions (both Applicant and Third Party) <input type="checkbox"/>									
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 EXPLANATION FOR UNIVERSITY OF NEBRASKA-LINCOLN

(Bauer)

Objective 2

F. Travel. Make 3-5 trips to aquaculture farms in Nebraska per year (\$600/year).

EXTENSION PLAN FOR NORTH DAKOTA STATE UNIVERSITY

(Clark)

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.

BUDGET

ORGANIZATION AND ADDRESS Department of Biological Sciences North Dakota State University 119 Stevens Hall, Fargo, ND 58105-5517			USDA AWARD NO. Year 1: Objectives 1 & 2			
			Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Mark E. Clark						
A. Salaries and Wages			CSREES FUNDED WORK MONTHS			
1. No. of Senior Personnel			Calendar	Academic	Summer	
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				\$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) →				\$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) . →				\$500	0	\$0
N. Other →						
O. Total Amount of This Request →				\$500	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)						

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.

BUDGET

ORGANIZATION AND ADDRESS Department of Biological Sciences North Dakota State University 119 Stevens Hall, Fargo, ND 58105-5517			USDA AWARD NO. Year 2: Objectives 1 & 2			
			Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Mark E. Clark						
A. Salaries and Wages			CSREES FUNDED WORK MONTHS			
1. No. of Senior Personnel			Calendar	Academic	Summer	
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				\$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) →				\$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) . →				\$500	0	\$0
N. Other →						
O.Total Amount of This Request →				\$500	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)						

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.

BUDGET EXPLANATION FOR NORTH DAKOTA STATE UNIVERSITY

(Clark)

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).

EXTENSION PLAN FOR UNIVERSITY OF WISCONSIN-EXTENSION

(Held)

Objectives 2 & 3

Situation: Aquaponics is a growing sub-sector of aquaculture that uses the effluent from recirculation aquaculture systems as a nutrient stream for the production of vegetables. The high levels of sustainability and local productivity, as well as favorable cash-flow characteristics associated with aquaponics have captured the attention of many current and prospective food producers. Due to the wide variety of systems employed and crops produced in aquaponic operations it is difficult for producers to identify successful strategies. The purpose of this undertaking is to survey existing aquaponic operations to identify successful production and marketing schemes as the first step toward the development of an economic model that aids decision makers in their choice of system and product(s).

Timeline: The proposed data collection, compilation, analysis and report will be completed within the two-year scope of the project.

Output: A report and/or fact sheet characterizing the current state of the aquaponics industry in the NCR including a review of systems, crops, marketing strategies and productivity.

Outcomes: Improved knowledge of the aquaponics industry as it currently exists and expansion of the industry based on successful production and marketing strategies.

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

OMB Approved 0524-0039
Expires 03/31/2004

BUDGET

ORGANIZATION AND ADDRESS University of Wisconsin-Extension 432 N. Lake St. Madison, Wisconsin 53706				USDA AWARD NO. Year 1: Objectives 2 & 3					
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	Funds Requested by Proposer	Funds Approved by CSREES (If different)
PROJECT DIRECTOR(S) James A. Held									
A. Salaries and Wages			CSREES FUNDED WORK MONTHS						
1. No. of Senior Personnel			Calendar	Academic	Summer				
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						\$1,000			
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.)						\$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)									
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 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)

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

OMB Approved 0524-0039
Expires 03/31/2004

BUDGET

ORGANIZATION AND ADDRESS University of Wisconsin-Extension 432 N. Lake St. Madison, Wisconsin 53706				USDA AWARD NO. Year 2: Objectives 2 & 3					
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	Funds Requested by Proposer	Funds Approved by CSREES (If different)
PROJECT DIRECTOR(S) James A. Held									
A. Salaries and Wages			CSREES FUNDED WORK MONTHS						
1. No. of Senior Personnel			Calendar	Academic	Summer				
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						\$1,000			
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.)						\$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)									
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 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)

BUDGET EXPLANATION FOR UNIVERSITY OF Wisconsin-Extension

(Held)

Objectives 2 & 3

- F. Travel.** Year 1 & 2: Travel, meals, and lodging expenses to visit 3-5 aquaponics operations per year in the NCR (\$1,000/year).

EXTENSION PLAN FOR LINCOLN UNIVERSITY

(Hicks)

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: Due to impending regulations from the Missouri natural resource agency, crayfish aquaculture, particularly for bait, will be severely constrained, which will cause economic losses. A training workshop on crayfish identification and AIS-HACCP training is needed to arm the crayfish farmers with the knowledge to proactively defend their aquaculture operations. 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:

- Crayfish identification/AIS HACCP workshop
- 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

BUDGET

ORGANIZATION AND ADDRESS Department of Agriculture and Environmental Science Lincoln University Foster Hall, 904 Chestnut St., Jefferson City, MO 65101				USDA AWARD NO. Year 1: Objectives 2 & 3			
PROJECT DIRECTOR(S) Charles E. Hicks				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
A. Salaries and Wages			CSREES FUNDED WORK MONTHS				
1. No. of Senior Personnel			Calendar	Academic	Summer		
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						\$1,500	
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.)						\$2,000	
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)							

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 Form CSREES-2004 (12/2000)

BUDGET

ORGANIZATION AND ADDRESS Department of Agriculture and Environmental Science Lincoln University Foster Hall, 904 Chestnut St., Jefferson City, MO 65101				USDA AWARD NO. Year 2: Objectives 2 & 3					
				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)		
PROJECT DIRECTOR(S) Charles E. Hicks									
A. Salaries and Wages			CSREES FUNDED WORK MONTHS						
1. No. of Senior Personnel			Calendar	Academic	Summer				
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						\$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.)						\$500			
K.Total Direct Costs (C through I) →						\$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) . →						\$500			
N. Other →									
O.Total Amount of This Request →						\$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) →									
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 EXPLANATION FOR LINCOLN UNIVERSITY EXTENSION ACTIVITIES

(Hicks)

Objectives 2 & 3

- E. Materials and Supplies.** A crayfish identification workshop will be held in conjunction with an AIS-HACCP workshop to inform aquaculturists of potential invasive species and controlling their movement. The crayfish workshop will accommodate 50 participants, and will be one full day with learning materials ($\$15 \times 50 = \750) and lunch ($\$15 \times 50 = \750) provided.
- F. Travel.** Transportation, lodging, and meal expenses for the PI to consult with stakeholders and other fish farmers about information needs ($\$500/\text{year}$).

EXTENSION PLAN FOR MICHIGAN STATE UNIVERSITY

(Kinnunen)

Objectives 2 & 3

Situation: Leadership at the Michigan Department of Agriculture and Rural Development (MDARD), Michigan Department of Natural Resources, Michigan State University and Michigan Department of Environmental Quality are interested in supporting aquaculture development in Michigan. This is an opportune time to move forward, but the added attention means we need to be careful that any development is based on good science. MDARD is being contacted about new projects and needs help in evaluating project plans from an environmental and business perspective.

Aquaculture in Michigan (AIM) is a new group that has formed in Michigan that is made up of industry, regulatory agencies, and academia. Michigan Sea Grant will also be starting a new integrated assessment project focusing on aquaculture in Michigan. Kinnunen has been invited to be part of the activities of these projects and will participate in their meetings and the Michigan Aquaculture Association Annual Conference to assist in developing a sustainable aquaculture industry in Michigan. There is a need for AIS-HACCP training for the AIM group and others throughout the NCR.

Justification: 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 introduction of new AIS to North Central Region 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.

There is a need to conduct additional AIS-HACCP/Biosecurity Training as new personnel are in need of this training. In addition there will be the threat of new AIS and fish diseases that continue to make their way into the NCR. This new training effort will combine AIS-HACCP Training with aquaculture biosecurity.

The AIS-HACCP and Aquaculture Biosecurity training program has been implemented through NCRAC funding over the last several years and many fish farms have adopted these procedures to ensure the safety of their products and operations from aquatic invasive species and fish diseases. There has been recent interest by the aquaculture/baitfish industry and regulators to develop some type of certification program to ensure that AIS-HACCP/Aquaculture Biosecurity procedures are actually in place and working. Such a certification program does not exist in the NCR and we would like to explore its development.

Timeline: AIS-HACCP/Biosecurity Workshops: Initiated in Year 1, completed in Year 2. Explore the development of an independent certification program for aquaculture biosecurity/AIS-HACCP: Initiated in Year 2. Activities will be centered on meetings and the Michigan Aquaculture Association Annual Conference conducted within the 24-month period of this project.

Outputs:

- AIS-HACCP/Biosecurity Workshops
- Development of an independent certification program for aquaculture biosecurity/AIS-HACCP

Outcomes: 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 (VHSV) AIS. If it develops as it has in the seafood industry, it 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. Development of an independent certification program will help ensure confidence among the regulators and the industry that the aquaculture biosecurity/AIS-HACCP program is working.

BUDGET

ORGANIZATION AND ADDRESS Michigan Sea Grant Michigan State University 710 Chippewa Square, Suite 202, Marquette, MI 49855				USDA AWARD NO. Year 1: Objectives 1 - 3					
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: ____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	Funds Requested by Proposer	Funds Approved by CSREES (If different)
PROJECT DIRECTOR(S) Ronald E. Kinnunen									
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS						
			Calendar	Academic	Summer				
a. <u>1</u> (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					\$2,250				
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) →					\$2,250				
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) . →					\$2,250				
N. Other →									
O.Total Amount of This Request →					\$2,250				
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)

BUDGET

ORGANIZATION AND ADDRESS Michigan Sea Grant Michigan State University 710 Chippewa Square, Suite 202, Marquette, MI 49855			USDA AWARD NO. Year 2: Objectives 1 - 3			
			Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Ronald E. Kinnunen						
A. Salaries and Wages			CSREES FUNDED WORK MONTHS			
1. No. of Senior Personnel			Calendar	Academic	Summer	
a. <u>1</u> (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				\$5,250		
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) →				\$5,250		
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) . →				\$5,250		
N. Other →						
O.Total Amount of This Request →				\$5,250		
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) U

BUDGET EXPLANATION FOR MICHIGAN STATE UNIVERSITY

(Kinnunen)

Objectives 2 & 3

- F. Travel.** Activities will be centered on two meetings with the Aquaculture in Michigan committee and one at the Michigan Aquaculture Association Annual Conference. Travel expenses for each of the three meetings will average \$500 (\$1,500 over 2 years). Additionally, \$1,500 (year 1) and \$4,500 (year 2) will be devoted to AIS-HACCP workshops (3) and stakeholder meetings (3) for development of a 3rd party certification program for a management of aquatic invasive species.

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 2014 and 2015 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				USDA AWARD NO. Year 1: Objective 2					
				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)		
PROJECT DIRECTOR(S) Charles D. Lee									
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS						
			Calendar	Academic	Summer				
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									
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) 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)

BUDGET

ORGANIZATION AND ADDRESS Department of Animal Science and Industry Kansas State University Manhattan, KS 66506-1600				USDA AWARD NO. Year 2: Objective 2					
				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)		
PROJECT DIRECTOR(S) Charles D. Lee									
A. Salaries and Wages			CSREES FUNDED WORK MONTHS						
1. No. of Senior Personnel			Calendar	Academic	Summer				
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						\$600			
F. Travel						\$250			
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) →						\$850			
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) . →						\$850			
N. Other →									
O. Total Amount of This Request →						\$850			
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)

BUDGET EXPLANATION FOR KANSAS STATE UNIVERSITY

(Lee)

Objective 2

- E. Materials and Supplies.** Years 1 and 2: General office supplies including paper, toner, and mailers (\$600/year).
- F. Travel.** Transportation, lodging, and meal expenses associated with travel within the state to assist individual producers with aquaculture and pond management problems (\$250/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.

EXTENSION PLAN FOR IOWA STATE UNIVERSITY

(Pattillo)

Objectives 1 & 2 & 3

Situation:

Aquaponics has become a major area of focus for aquaculture and agricultural sustainability in recent years. The knowledge level within the industry has grown exponentially, yet public access to this information remains limited. Moreover, the majority of research on aquaponics that is publically available is based on systems that were developed in tropical and sub-tropical region of the world. This means that all biological and economic analysis of production is not directly adaptable to the temperate climate of the NCR. For the aquaponics industry to become established and thrive, accurate informative materials be made available. It is imperative that a NCR-specific fact sheet about aquaponics be developed and made publically available.

Justification: There is a need to improve the knowledge and profitability of aquaponic start-ups in the NCR. 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. (Dr. Vanessa Weldon, eXtension.org Workshop, as independent subcontractor. She will work year 1, objectives 2 & 3. Her funding is \$8,750 of Pattillo's.)

Timeline: 2 years for full development of an aquaponics publication for submission to the NCRAC Publications Office for review. The workshop will be held at the 2014 annual NCRAC meeting.

Outputs:

- Aquaponics fact sheet
- Periodic contributions to the NCRAC Finclips newsletter
- Workshop on utilizing eXtension.org led by Vanessa Weldon.

Outcomes:

- Downloadable aquaponics publication from NCRAC Web site which should result in improved success in the aquaponics industry in the NCR.
- Greater visibility and information transfer to the aquaculture constituents of the NCR.
- Training workshop on utilizing eXtension.org effectively for dissemination of extension information, webinar development, evaluation techniques, etc.

eXtension Workshop

Situation: As access to the internet and social media becomes more affordable and abundant, Extension professionals need to know how to maximize the uses of these tools. The USDA's eXtension website is a low-cost tool for Extension professionals to use to disseminate information to the public and to reach new clientele.

Justification: A day-long eXtension workshop is needed to train the NCRAC extension base group in using the new technology used by eXtension to disseminate information. This workshop will be led by Dr. Vanessa Weldon who has been instrumental in guiding eXtension aquaculture components – see Weldon's vita for more detail). This workshop will be held in conjunction with the North Central Regional Aquaculture Center annual meeting to educate those attending on the tools available through eXtension and how to optimize their potential. The workshop will be designed specifically for those attending by sending out a short, pre-workshop survey to determine the level of familiarity with eXtension and internet technologies of the group. The workshop will address issues from how to get a user ID to how to develop and post content, to developing Moodle courses and using social media to disseminate information. There will be step-by-step instruction on how to use each section of eXtension.

Outputs: Depending on the size of the workshop and the availability of computers each person or group of people will work together to create a content article to be reviewed, which they will have to get reviewed and published after the workshop concludes. Each attendee will receive electronic copies of the presentations and a folder with easy to follow guides to each of the tools in eXtension: Create, Learn, Ask an Expert, Campus, etc. Success of the

workshop will be measured by monitoring by the numbers of pages developed by the attendees (easily tracked through eXtension's reporting system) in the two months after the workshop. In addition, to evaluate the effectiveness of the workshop, we will conduct will pass out a post-workshop survey to determine the change in knowledge.

Outcomes: This workshop will make our NCRAC extension base group more competent and effective at using internet resources like eXtension.org to disseminate aquaculture information. By using internet outlets, our information will be more widely available to the public, and in a more desirable format.

BUDGET

ORGANIZATION AND ADDRESS Department of Natural Resource Ecology and Management Iowa State University 339 Science II, Ames, IA 50011-3221			USDA AWARD NO. Year 1: Objectives 1 & 2			
PROJECT DIRECTOR(S) D. Allen Pattillo			Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
A. Salaries and Wages			CSREES FUNDED WORK MONTHS			
1. No. of Senior Personnel			Calendar	Academic	Summer	
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 <input type="checkbox"/>						
B. Fringe Benefits (If charged as Direct Costs)						
C. Total Salaries, Wages, and Fringe Benefits (A plus B) <input type="checkbox"/>						
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)						
E. Materials and Supplies						
F. Travel				\$3,300		
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 J) <input type="checkbox"/>				\$3,300		
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) <input type="checkbox"/>				\$3,300		
N. Other <input type="checkbox"/>				\$8,750		
O. Total Amount of This Request <input type="checkbox"/>				\$12,050		
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) <input type="checkbox"/>						
Non-Cash Contributions (both Applicant and Third Party) <input type="checkbox"/>						
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 Natural Resource Ecology and Management Iowa State University 339 Science II, Ames, IA 50011-3221			USDA AWARD NO. Year 2: Objectives 1 & 2			
			Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) D. Allen Pattillo						
A. Salaries and Wages			CSREES FUNDED WORK MONTHS			
1. No. of Senior Personnel			Calendar	Academic	Summer	
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 <input type="checkbox"/>						
B. Fringe Benefits (If charged as Direct Costs)						
C. Total Salaries, Wages, and Fringe Benefits (A plus B) <input type="checkbox"/>						
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)						
E. Materials and Supplies						
F. Travel				\$3,300		
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) <input type="checkbox"/>				\$3,300		
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) <input type="checkbox"/>				\$3,300		
N. Other <input type="checkbox"/>						
O. Total Amount of This Request <input type="checkbox"/>				\$3,300		
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) <input type="checkbox"/>						
Non-Cash Contributions (both Applicant and Third Party) <input type="checkbox"/>						
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 EXPLANATION FOR IOWASTATE UNIVERSITY

(Pattillo)

Objectives 1 & 2

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 (**Extension Travel = \$300/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. Additionally, \$3,000 per year will be needed for the development of a NCR-specific fact sheet on aquaponics for the NCRAC. Information will be garnered from 2-3 aquaponics workshops in each year (**registrations = \$1,100; transportation = \$1,000; meals = \$200; lodging = \$700**). **Total = \$3,300 per year.**

N. Other. Year 1. Dr. Vanessa Weldon will be conducting the eXtension workshop under a Professional Services Agreement. Breakdown of these costs include: **Salary-** Collecting and analyzing survey data, preparing the workshop materials, travel time and presentation. (170 hours @ \$45 per hour = \$7,650); **Materials and Supplies-** Miscellaneous workshop supplies such as notebooks, pens, pencils, folders, paper, envelopes, etc. (\$100); and **Travel-**Transportation, meals, and lodging for one trip to the NCRAC annual meeting to administer the workshop. (\$1,000). **Total=\$8,750.**

EXTENSION PLAN FOR SOUTH DAKOTA STATE UNIVERSITY

(Pflueger)

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 NCR 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.

BUDGET

ORGANIZATION AND ADDRESS South Dakota State University Grants Administration P.O. Box 2201, Brookings, SD 57007				USDA AWARD NO. Year 1: Objective 2					
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)	Funds Requested by Proposer	Funds Approved by CSREES (If different)
PROJECT DIRECTOR(S) Burton W. Pflueger									
A. Salaries and Wages 1. No. of Senior Personnel		CSREES FUNDED WORK MONTHS							
		Calendar	Academic	Summer					
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					\$600				
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) →					\$600				
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) . →					\$600				
N. Other →									
O. Total Amount of This Request →					\$600				
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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BUDGET

ORGANIZATION AND ADDRESS South Dakota State University Grants Administration P.O. Box 2201, Brookings, SD 57007				USDA AWARD NO. Year 2: Objective 2					
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: ____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	Funds Requested by Proposer	Funds Approved by CSREES (If different)
PROJECT DIRECTOR(S) Burton W. Pflueger									
A. Salaries and Wages			CSREES FUNDED WORK MONTHS						
1. No. of Senior Personnel			Calendar	Academic	Summer				
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						\$600			
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) →						\$600			
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) . →						\$600			
N. Other →									
O. Total Amount of This Request →						\$600			
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)

BUDGET EXPLANATION FOR SOUTH DAKOTA STATE UNIVERSITY

(Pflueger)

Objective 2

- 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 (\$600/year).

EXTENSION PLAN FOR UNIVERSITY OF MINNESOTA

(Phelps)

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.

Increasing awareness of biosecurity principles in the aquaculture industry will help to reduce the risk of spreading existing and introduction of new AIS to North Central Region 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.

There is a need to conduct additional AIS-HACCP/Biosecurity Training as new personnel are in need of this training. In addition there will be the threat of new AIS and fish diseases that continue to make their way into the NCR. This new training effort will combine AIS-HACCP Training with aquaculture biosecurity.

Timeline: Two trips will be taken each year during the fall and spring to maximize the PI's exposure to relevant fish farming activities. AIS-HACCP/Biosecurity Workshops: Initiated in Year 1, completed in Year 2. Explore the development of an independent certification program for aquaculture biosecurity/AIS-HACCP: Initiated in Year 2.

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. Also AIS-HACCP/Biosecurity Workshops and development of an independent certification program for aquaculture biosecurity/AIS-HACCP will be conducted.

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 Veterinary Diagnostic Laboratory University of Minnesota 1333 Gortner Avenue St. Paul, MN 55108			USDA AWARD NO. Year 1: Objectives 1 & 2			
PROJECT DIRECTOR(S) Nicholas B. D. Phelps			Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS			
			Calendar	Academic	Summer	
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			\$2,200			
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) →			\$2,200			
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) . →			\$2,200			
N. Other →						
O.Total Amount of This Request →			\$2,200			
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)

BUDGET

ORGANIZATION AND ADDRESS Veterinary Diagnostic Laboratory University of Minnesota 1333 Gortner Avenue St. Paul, MN 55108			USDA AWARD NO. Year 2: Objectives 1 & 2			
			Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Nicholas B. D. Phelps						
A. Salaries and Wages			CSREES FUNDED WORK MONTHS			
1. No. of Senior Personnel			Calendar	Academic	Summer	
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			\$5,200			
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) →			\$5,200			
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) . →			\$5,200			
N. Other →						
O.Total Amount of This Request →			\$5,200			
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 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)

BUDGET EXPLANATION FOR UNIVERSITY OF MINNESOTA-DULUTH

(Phelps)

Objectives 1 & 2

- 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 \$175/trip (\$0.50/mile and \$75 for per diem) (total \$700/year). Additionally, \$1,500 (year 1) and \$4,500 (year 2) will be devoted to AIS-HACCP workshops (3) and stakeholder meetings (3) for development of a 3rd party certification program for a management of aquatic invasive species.

EXTENSION PLAN FOR PURDUE UNIVERSITY

(Quagraine)

Objectives 2 & 3

Situation: Fish farmer require some basic extension services including responding to various questions relating to fish production. Extension activities would include providing resources relating to addressing issues such as poor water quality, diseases, low oxygen levels, water temperature, and feeding strategies. Some prospective fish farmers need farm visits to assist with hands-on experiential learning on various fish production issues.

Timeline: Extension activities through farm visits and travel to professional conferences.

Outcomes: Fish farmers will gain knowledge on fish production through the provision of resources relating to issues such as poor water quality, diseases, low oxygen levels, water temperature, and feeding strategies. Some prospective fish farmers will gain knowledge through hands-on experiential learning from farm visits.

Outputs: Fish farmers will be better informed about fish production under various aquaculture production systems

BUDGET

ORGANIZATION AND ADDRESS Purdue University Sponsored Program Services 615 W. State St., West Lafayette, IN 47907-2053				USDA AWARD NO. Year 1: Objectives 2 & 3					
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	Funds Requested by Proposer	Funds Approved by CSREES (If different)
PROJECT DIRECTOR(S) Kwamena Quagraine									
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS						
			Calendar	Academic	Summer				
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					\$75				
F. Travel					\$1,000				
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.)									
K.Total Direct Costs (C through I) →					\$1,075				
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) . →					\$1,075				
N. Other →									
O.Total Amount of This Request →					\$1,075				
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 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)

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

OMB Approved 0524-0039
Expires 03/31/2004

BUDGET

ORGANIZATION AND ADDRESS Purdue University Sponsored Program Services 615 W. State St., West Lafayette, IN 47907-2053				USDA AWARD NO. Year 2: Objectives 2 & 3					
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	Funds Requested by Proposer	Funds Approved by CSREES (If different)
PROJECT DIRECTOR(S) Kwamena Quagraine									
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS						
			Calendar	Academic	Summer				
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					\$75				
F. Travel					\$1,000				
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.)									
K.Total Direct Costs (C through I) →					\$1,075				
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) . →					\$1,075				
N. Other →									
O.Total Amount of This Request →					\$1,075				
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)

BUDGET EXPLANATION FOR PURDUE UNIVERSITY

(Quagraine)

Objectives 2 & 3

- E. Materials and Supplies.** Years 1 and 2: General office supplies including paper, toner, and mailers (\$75/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 and/or travel to aquaculture production units in Illinois (\$1,000/year).

EXTENSION PLAN FOR OHIO STATE UNIVERSITY

(Tiu)

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. Recent shifts in the aquaculture industry require the development of an aquaponics publication to serve as a guide to new and transitioning producers.

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. An aquaponics publication must be produced to guide new and transitioning producers on the NCR-specific needs and consideration of an aquaponics system.

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. An aquaponics publication will be produced in collaboration with ISU and UW.

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.

BUDGET

ORGANIZATION AND ADDRESS Ohio State University Research Foundation 1960 Kenney Road Columbus, OH 43210-1063 PROJECT DIRECTOR(S) Laura G. Tiu			USDA AWARD NO. Year 1: Objective 2				
			Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	
			Funds Requested by Proposer	Funds Approved by CSREES (If different)			
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS				
			Calendar	Academic	Summer		
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 <input type="checkbox"/>							
B. Fringe Benefits (If charged as Direct Costs)							
C. Total Salaries, Wages, and Fringe Benefits (A plus B) <input type="checkbox"/>							
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies							
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) <input type="checkbox"/>			\$800				
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) <input type="checkbox"/>			\$800				
N. Other <input type="checkbox"/>							
O. Total Amount of This Request <input type="checkbox"/>			\$800				
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) <input type="checkbox"/>							
Non-Cash Contributions (both Applicant and Third Party) <input type="checkbox"/>							
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 Ohio State University Research Foundation 1960 Kenney Road Columbus, OH 43210-1063			USDA AWARD NO. Year 2: Objective 2				
PROJECT DIRECTOR(S) Laura G. Tiu			Duration Proposed Months: <u>12</u>	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS				
			Calendar	Academic	Summer		
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 <input type="checkbox"/>							
B. Fringe Benefits (If charged as Direct Costs)							
C. Total Salaries, Wages, and Fringe Benefits (A plus B) <input type="checkbox"/>							
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies							
F. Travel			\$2,200				
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) <input type="checkbox"/>			\$2,200				
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) <input type="checkbox"/>			\$2,200				
N. Other <input type="checkbox"/>							
O. Total Amount of This Request <input type="checkbox"/>			\$2,200				
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) <input type="checkbox"/>							
Non-Cash Contributions (both Applicant and Third Party) <input type="checkbox"/>							
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 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)

BUDGET EXPLANATION OHIO STATE UNIVERSITY

(Tiu)

Objective 2

- 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 (\$400/year); transportation, meals, and lodging to attend one Ohio State University Aquaculture Workshop at a location to be determined (\$400/year). Year 2: Workshop registration, transportation, meals, and lodging for a 3-day aquaponics workshop to gain information for including in an aquaponics fact sheet publication (\$1,400).

BUDGET SUMMARY ALL PARTICIPATING INSTITUTIONS

Year 1												
	UNL	NDSU	UMN	UW	LU	MSU	KSU	ISU	SDSU	Purdue	OSU	
Salaries and Wages												
Fringe Benefits												
Total Salaries, Wages, and Fringe Benefits												
Nonexpendable Equipment												
Materials and Supplies					\$1,500	\$600			\$75		\$2,175	
Travel	\$600	\$500	\$2,200	\$1,000	\$500	\$2,250	\$250	\$4,300	\$600	\$1,000	\$800	\$14,000
All Other Direct Costs								\$7,750				\$7,750
TOTAL PROJECT COSTS	\$600	\$500	\$2,200	\$1,000	\$2,000	\$2,250	\$850	\$12,050	\$600	\$1,075	\$800	\$23,925
Year 2												
Salaries and Wages												
Fringe Benefits												
Total Salaries, Wages, and Fringe Benefits												
Nonexpendable Equipment												
Materials and Supplies						\$600			\$75		\$675	
Travel	\$600	\$500	\$5,200	\$1,000	\$500	\$5,250	\$250	\$3,300	\$600	\$1,000	\$2,200	\$20,400
All Other Direct Costs												
TOTAL PROJECT COSTS	\$600	\$500	\$5,200	\$1,000	\$500	\$5,250	\$850	\$3,300	\$600	\$1,075	\$2,200	\$21,075

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
James A. Held, University of Wisconsin – Extension
Charles E. Hicks, Lincoln University
Ronald E. Kinnunen, Michigan State University
Charles D. Lee, Kansas State University
D. Allen Pattillo, Iowa State University
Burton W. Pflueger, South Dakota State University
Nicholas B. D. Phelps, University of Minnesota
Kwamena K. Quagraine, Purdue University
Laura G. Tiu, Ohio State University

VITA

Dennis E. Bauer
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148 West 4th Steet.
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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

Mark E. Clark
Department of Biological Sciences
North Dakota State University
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Phone: (701) 231-8246
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E-mail: m.e.clark@ndsu.edu

Education

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

Positions

Associate Professor (2010-Present), Department of Biological Sciences, North Dakota State University
Assistant Professor (2002-2009), 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

- Clark, M.E., K.A. Rose, J.A. Chandler, T.J. Richter, D.J. Orth, and W. Van Winkle. 2008. Water level fluctuation effects on centrarchid reproductive success in reservoirs: a modeling analysis. *North American Journal of Fisheries Management* 28:1138-1156.
- Clark, M.E., and T.E. Martin. 2007. Modeling tradeoffs in avian life history traits and consequences for population growth. *Ecological Modeling* 209:110-120.
- Clark, M.E., B.J. Danielson, M.V. Santelmann, J.I. Nassauer, D. White, and K.E. Freemark. 2007. Impacts on mammal communities: a spatially explicit model. Pages 115-138 in J.I. Nassauer, M.V. Santelman, and D. Scavia, editors. *From the corn belt to the Gulf: societal and environmental implications of alternative agricultural futures*. RFF Press, Washington, D.C. 223 pages.
- Reed, W.L., M.E. Clark, P.G. Parker, S.A. Raouf, N. Arguedas, D.S. Monk, E. Snajdr, V. Nolan Jr., and E.D. Ketterson. 2006. Physiological effects on demography: a long term experimental study of testosterone's effects on fitness. *The American Naturalist* 167:667-683.
- Santelmann, M.V., D. White, K. Freemark, J.I. Nassauer, J.M. Eilers, K.B. Vache, B.J. Danielson, R.C. Corry, M.E. Clark, S. Polasky, R.M. Cruse, J. Sifneos, H. Rustigian, C. Coiner, J. Wang, and D. Debinski. 2004. Assessing alternative futures for agriculture in Iowa, U.S.A. *Landscape Ecology* 19:357-374.
- Bronikowski, A.M., M.E. Clark, H. Rodd, and D.N. Reznick. 2002. Population-dynamic consequences of predator-induced life-history variation in the guppy (*Poecilia reticulata*). *Ecology* 83:2194-2204.

VITA

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Lake Mills, WI 53551

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EDUCATION

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

POSITIONS

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

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

World Aquaculture Society

SELECTED PUBLICATIONS

- Hartleb, C. F., J. A. Johnson, J. A. and J. A. Held. 2012. Walleye and yellow perch pond fertilization. Pages 147-162 in *Aquaculture Pond Fertilization: Impacts of Nutrient input on Production*, C. C. Mischke, editor.) Wiley-Blackwell Publishing, Ames, Iowa.
- Malison, J. A., J. A. Held, and S. E. Kaatz. 2011. Sex determination of yellow perch (*Perca flavescens*) by external morphology. *North American Journal of Aquaculture* 73:285-287
- Fischer, G. J., J. Held, C. Hartleb, and J. Malison. 2009. Evaluation of brook trout production in a coldwater recycle aquaculture system. *Aquacultural Engineering* 41: 109-113.
- Malison, J. A., and J. A. Held. 2008. Farm-based production parameters and breakeven costs for yellow perch grow-out in ponds in southern Wisconsin. 12 pp. North Central Regional Aquaculture Center Fact sheet series 121. Ames, Iowa. Available: <http://www.ncrac.org/Topics/ypproductionparameters.htm>. (May 2013).
- Lima, L.C., R. P. Lincoln, J. A. Malison, J.A., T. P. Barry., and J. A. Held. 2006. Effects of temperature on performance characteristics and the cortisol stress response of surubim (*Pseudoplatystoma sp.*) *Journal of the World Aquaculture Society* 37- 1, pp. 89 – 95.
- Held, J. A., J. A. Malison, and T. P. Barry. 2004. Production characteristics of hybrid walleye (*Sander vitreus* female x *S. canadensis* male) reared to food size in ponds. Pages 33-34 in *Proceedings of Percis III: The Third International Percid Fish Symposium*, T. P. Barry and J. A. Malison, editors. (University of Wisconsin Sea Grant Institute, Madison, Wisconsin.

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E-mail: hicksc@lincolnu.edu

EDUCATION

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

POSITIONS

Assistant Professor (2003-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

- Hicks, C.E. and Robert A. Pierce. 2012. Bluegill Sunfish Production in Missouri. University of Missouri Extension. Aquaculture Guide G9473, Columbus, Missouri.
- Hicks, C.E. and Robert A. Pierce. 2011. Freshwater Prawn Production in Missouri. University of Missouri Extension. Aquaculture Guide G9471, Columbus, Missouri.
- Hicks, C.E., M.R. Ellersieck, and C.J. Borgwordt. 2009. Production methods of food sized bluegill sunfish (*Lepomis macrochirus*). North American Journal of Aquaculture 71:52-58.
- Pierce, R.A., R.S. Hayward, J. Parcell, and C.E. Hicks. 2007. Paddlefish production: opportunities for Missouri Pond and Lake Owners. University of Missouri Extension Guide. University of Missouri, Columbia, Missouri.
- Graham, L.K., E.J. Hamilton, T.R. Russell, and C.E. Hicks. 1986. The culture of paddlefish—a review of methods. Pages 78-94 in J. Dillard, L.K. Graham, and T.R. Russell, editors. The paddlefish: status, management and propagation. American Fisheries Society, North Central Division, Special Publication 7, Bethesda, Maryland.

VITA

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Fax: (906) 226-3687
E-mail: kinnune1@msu.edu

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
Fisheries Biologist (1979-1980), U.S. Fish and Wildlife Service, Leetown, West Virginia

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

SELECTED PUBLICATIONS

- Summerfelt, R.C., R.D. Clayton, J.A. Johnson, R.E. Kinnunen. 2010. Production of walleye as potential food fish. North Central Regional Aquaculture Center Fact Sheet #116. NCRAC Publications Office, Iowa State University, Ames, Iowa.
- Muir, A.M., T.M. Sutton, M.T. Arts, R.M. Claramunt, M.P. Ebener, J.D. Fitzsimons, T.B. Johnson, R.E. Kinnunen, M.A. Koops, and M.M. Sepulveda. 2010. Does condition of lake whitefish spawners affect physiological condition of juveniles? *Journal of Great Lakes Research* 36:92-99.
- Kinnunen, R.E., M.C. Gould, and P. Cambier. 2005. Composting commercial fish processing waste from fish caught in the Michigan waters of the Great Lakes. *Michigan State University Technical Bulletin*, East Lansing, Michigan.
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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

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

- Lee, C. D., and Z .B. Eddy. In review. Black-tailed prairie dog immigration to extirpated colonies in Northwest Kansas. *Rangeland Ecology and Management*.
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- Weins, J. R., C. S. Guy, and C .D. Lee. 1997. Streambank revetment. Kansas State University Agricultural Experiment Station and Cooperative Extension Service Publication No. MF 2294, Manhattan, Kansas.

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EDUCATION

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

POSITIONS

Aquaculture Extension Specialist III, Natural Resource Ecology and Management, Iowa State University, 2011-present
Graduate Research Assistant, Department of Fisheries and Allied Aquacultures, Auburn University, 2008-2010
Aquarium Technician, Department of Marine Sciences, University of Georgia, 2007-2008
Fisheries Technician, Warnell School of Forestry and Natural Resources, University of Georgia, 2007-2008

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society
World Aquaculture Society
United States Aquaculture Society
International Association of Astacology
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SELECTED PUBLICATIONS

- Pattillo, D. A. , C. E. Hicks, J. E. Wetzel, P. B. Brown, R. A. Rode, J. E. Morris. *In Prep.* Evaluation of the Newly-Developed, Least-Cost Experimental Diet for Bluegill at Commercial Densities.
- Pattillo, D. A. and J. A. Stoeckel. *In Review.* The effectiveness of AQUI-S™ and temperature manipulation for anesthetizing juvenile redclaw crayfish (*C. quadricarinatus*). *Aquaculture*.
- Pattillo, D. A. and J. A. Stoeckel. *In Prep.* The effectiveness of androgenic gland ablation for the sex reversal of juvenile male redclaw crayfish (*C. quadricarinatus*).
- Pattillo, D. A. and J. A. Stoeckel. *In Prep.* Potential escapement effects of the Australian redclaw crayfish (*Cherax quadricarinatus*), on a common crayfish species, (*Procambarus acutissimus*) in the Southeastern United States.

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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

- Janssen, L., B. Pflueger, 2012. South Dakota farmland Market trends 1991-2012. Agricultural Experiment Station Bulletin 03-3007-2012. June 2012, South Dakota State University, Brookings, South Dakota
- Opoku, E. and B. Pflueger. 2011. 2010 SDSU South Dakota landlord/tenant farmland lease survey. EC933. February 2011, Cooperative Extension Service. South Dakota State University, Brookings, South Dakota.
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- Hamda, Y., B. Pflueger, and L. Janssen. 2003. Historical and recent trends in South Dakota's agricultural land market, EC 918, August 2003, South Dakota State University, Brookings, South Dakota.

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EDUCATION

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

POSITIONS

Instructor: Aquaculture Research and Extension, Veterinary Diagnostic Laboratory/College of Veterinary Medicine, University of Minnesota (2011-present)
Scientist: Aquaculture Diagnostic Specialist, Veterinary Diagnostic Laboratory, University of Minnesota (2009-2011)
Assistant scientist: Aquaculture Diagnostic Specialist, Veterinary Diagnostic Laboratory, University of Minnesota (2007-2009)
Graduate Research Assistant, Fish Disease Diagnostic Laboratory, University of Arkansas at Pine Bluff (2005-2007)

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

SELECTED PUBLICATIONS

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

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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

- Quagraine, K.K., K.G. Hughes and A. Xing. 2011. Delineating shoppers of live seafood in the Midwestern United States. *Aquaculture Economics & Management* 15 (3): 155-165.
- Quagraine, K.K., A. Xing, and K.G. Hughes. 2011. Factors influencing the purchase of live seafood in the North Central Region of the United States. *Marine Resource Economics* 26 (1): 59-74.
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POSITIONS

Senior Research and Extension Associate (2003-present), The Ohio State University
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

- Tiu, L. G. 2010. Assessment and future direction of the Ohio State University Aquaculture Program. Doctoral Dissertation. Agricultural and Extension Education, Ohio State University, Columbus, Ohio.
- Wang, H. P., L. Li, G. K. Wallat, B. Brown, H. Yao, Z. Gao, L. G. Tiu, P. D. O'Bryant, D. Rapp, and R. MacDonald. 2009. Evaluation of relative growth performance and genotype by environment effects for cross-bred yellow perch families reared in communal ponds using DNA parentage analyses. *Aquaculture Research* 40:1363-1373.
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EDUCATION

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POSITIONS

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Contract Biologist - Oil spill Response, Matrix New World Engineering, Houma, LA (Summer 2010)
Staff Biologist, Island Fresh Seafood, Inc., Charleston, SC (2009 – 2010)
Contract Marine Biology, JHT, Inc., Charleston, SC (2009)
Research Partner Contract, Monterey Bay Aquarium- Seafood Watch Program, Monterey Bay, CA (2009)
Knauss Sea Grant Fellow, NOAA National Ocean Service, Silver Spring, MD (2008 – 2009)
Post-Doctoral Researcher, Louisiana Sea Grant College Program, Baton Rouge, LA (2007 – 2008)
Graduate Research Assistant, Louisiana State University, Baton Rouge, LA (2004 – 2007)
Port Sampler, Florida Fish and Wildlife Commission Marathon, FL (2003 – 2004)
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SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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SELECTED PUBLICATIONS

- Weldon, V. 2011. eXtension website content: Baitfish, Fathead Minnows, Golden Shiners, Goldfish, Hybrid Striped Bass, Yellow Perch, Pond Culture, Recirculating Aquaculture Systems. Available: http://www.extension.org/freshwater_aquaculture (August 2012).
- Weldon, V. 2011. eXtension and Freshwater Aquaculture. National Aquaculture Extension Conference. Memphis, Tennessee. June 5-7, 2011.
- Maxwell, V. J., and J. E. Supan 2010. Economic analysis of off-bottom oyster culture for triploid eastern oyster, *Crassostrea virginica*, culture in Louisiana. *World Aquaculture Magazine* 41(1): 9-14.
- Maxwell, V. J. and J. E. Supan, L. Schiavinato, S. Showalter, G. Treece. 2008. Aquaculture parks in the coastal zone: A review of legal and policy issues in the Gulf of Mexico state waters. *Coastal Management Journal* 36(3): 241-253.