

<b>NORTH CENTRAL REGIONAL AQUACULTURE CENTER EXTENSION PROJECT</b>
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**Chairperson:** Joseph E. Morris, Iowa State University

**Industry Advisory Council Liaison:** Curtis Harrison, Hurdland, Missouri

**Funding Request:** \$114,319

**Duration:** 2 Years (September 1, 2007 - August 31, 2009)

**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	1 & 2	\$1,000	\$1,000	\$2,000
University of Wisconsin-Milwaukee	Fred P. Binkowski	1 - 3	\$25,500	\$25,500	\$51,000
North Dakota State University	Mark E. Clark	1 & 2	\$1,000	\$1,000	\$2,000
Iowa State University	Richard D. Clayton	1 & 2	\$1,000	\$1,000	\$2,000
Purdue University	Mark E. Einstein	2	\$5,500	\$5,500	\$11,000
Michigan State University	Donald L. Garling	1 & 2	\$350	\$0	\$350
University of Minnesota-Duluth	Jeffrey L. Gunderson	1 - 3	\$1,000	\$1,000	\$2,000
Michigan State University	Ronald E. Kinnunen	1 - 3	\$1,000	\$1,000	\$2,000
Kansas State University	Charles D. Lee	1 & 2	\$1,000	\$1,000	\$2,000
Iowa State University	Joseph E. Morris	1 & 3	\$24,969	\$0	\$24,969
South Dakota State University	Burton W. Pflueger	1 & 2	\$1,000	\$1,000	\$2,000
University of Missouri-Columbia	Robert A. Pierce II	1 & 2	\$1,000	\$1,000	\$2,000
University of Illinois	Michael D. Plumer	1 & 2	\$1,000	\$1,000	\$2,000
Purdue University	Kwamena K. Quagraine	1 & 2	\$1,000	\$1,000	\$2,000
Purdue University	JJ Newman Rode	3	\$5,000	\$0	\$5,000
Ohio State University	Laura G. Tiu	1 & 2	\$1,000	\$1,000	\$2,000
<b>Totals</b>			<b>\$72,319</b>	<b>\$42,000</b>	<b>\$114,319</b>

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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 U.S. and worldwide comes from aquaculture, which accounted for this growth from 2000 to 2002 (FAO 2004). Global capture fisheries and aquaculture production supplied approximately 101 million tons of food fish in 2002. This resulted in an average per capita consumption of 16.2 kg (live weight equivalent). World aquaculture production in 1991 was 13,724,214 metric tons (NMFS 2002), and by 2002 had grown to 39,798,571 metric tons (FAO 2004). Currently, almost 40% of the fish and seafood consumed by humans is from aquaculture.

Increased aquaculture production can provide significant health benefits, since fish provide a low fat, healthy alternative to many other types of meat. U.S. consumption of fishery products was 7.7 kg (16.6 lb) of edible meat per person in 2004, an increase over the approximately 6.7 kg (15 lb) per person level where it has hovered over the last decade (NMFS 2004a). The value of U.S. aquaculture production has grown by roughly 5–10% each year during the past decade, and aquaculture is 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 2002 was approximately 393,401 metric tons valued at \$866 million (NMFS 2004a). Nevertheless, a wide disparity exists between domestic aquaculture production and demand, as indicated by a \$7.8 billion 2004 U.S. seafood trade deficit (NMFS 2004b).

Aquaculture related business in the NCR continues to be an "emerging" industry. This trend has continued into the 21<sup>st</sup> century, with an estimated farm gate value of 70+ million dollars resulting in more than one billion pounds of seafood consumed annually. Although the NCR contains approximately 25% of the US population, the regional aquaculture production accounts for less than 3% of all U.S. aquaculture production (USDA 2000).

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

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

Continued aquaculture expansion is likely to involve the already established demand for regionally popular commercial species. 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 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. Additionally, the numerous requests that have been received through national networking have prompted an effort to provide specialized information and nationalize the services beyond the boundaries of the NCR. NCRAC extension services will continue to expand on these efforts by providing information for regional and national application. An "Aquaculture Regional Extension Facilitator" (AREF) 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 between the state aquaculture industry associations within the 12 NCR states.

With the growth of the aquaculture industry in the NCR, a new demand and broader market for technical information and aquaculture services has evolved. Providing quality technical assistance in all aspects of aquaculture is critical to enhance the positive momentum that the region's aquaculture industry is exhibiting. As novices enter the aquaculture industry, they seek guidance from knowledgeable and experienced persons, commonly from state and federal agencies. Experienced aquaculturists need updated information on new research findings and access to alternative rearing techniques. The need for more public outreach by NCRAC researchers is increasingly apparent. The transfer of technology to potential and practicing fish farmers requires an effective communication bridge between university researchers and the public. 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 Program each year. 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 private individuals attempting to improve or change their operations themselves, 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 our 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 be significant sources of pollutants and nutrient waste (EDF 1997; GLFC 1999). Although aquaculture is still only an "emerging" industry in our region, the prospect of rapid growth raises fears of a negative impact, and the industry is confronted with perplexing and emotionally charged environmental issues. There is a need for further development and improvement of aquaculture rearing and management strategies to reduce and, if possible, eliminate environmental impacts. Increased use of recirculating aquaculture systems and improved technologies for recovery and reuse of nutrients and waste biosolids can aid regional growers in avoiding potential environmental conflicts that threaten to constrain further aquaculture development (Yeo et al. 2004). The NCRAC Extension Work Group will identify the most current information on sustainable and environmentally friendly management practices for aquaculture, and will help fish farmers keep up to date on these important issues.

Since 1989, this program has been a principal source of information, guidance, and technical assistance for developing the regional aquaculture industry. The NCRAC Extension Work Group will work closely with the regional vocational agriculture instructors; updated information is needed to keep their aquaculture curricula current. In addition, several thousand people have attended local and regional aquaculture conferences, workshops, and lectures sponsored/co-sponsored and organized by NCRAC extension specialists. 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, a 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 publications for the region's aquaculture industry. For instance, the demand for baitfish in the NCR far exceeds the supply from within the region. To meet the demand, cultured fatheads (including the rosy red variation), golden shiners, and goldfish from Arkansas are imported into the NCR. Still, significant shortages of a variety of species [including the three primary NCR aquacultured species – fatheads (*Pimephales promelas*), white suckers (*Catostomus commersoni*), and golden shiners (*Notemigonus crysoleucas*)] were reported by bait dealers (Meronek et al. 1997). Some species that are not readily found in the wild baitfish market could offer aquaculture and marketing opportunities. One species is the spotfin shiner (*Cyprinella spiloptera*). Its culture potential has been identified most recently by the NCRAC Industry Advisory Committee (Gunderson and Tucker 2000) and is the subject of a newly funded NCRAC research project that started September 2006. Because spotfin shiners are not yet a significant part of the baitfish market in the NCR, there is little information regarding prices paid for spotfin shiners. However, it is expected that they may sell for prices similar to that of golden shiners and sell wholesale (to retail outlets) for \$11-14/kg (5 -7/lb). An additional species, redbait chub (*Nocomis effusus*), has the potential to become another alternative baitfish in this region.

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.

## **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 are part-time 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, e.g., baitfish, walleye, and yellow perch; 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 hybrid striped bass, walleye, and yellow perch workshops held throughout the region. These workshops have included "hands-on" experiences, e.g., walleye, formal presentations, as well as 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. Aquaculture handbooks have also been developed and distributed to each NCRAC-designated aquaculture extension specialist and selected CES and Sea Grant field staff.

There have been workshops 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, polyploid induction in sunfish, and organic aquaculture standards held in the region. 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 (UMD); 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 various facets of sunfish culture including, in part, their biology, culture, as well as their diseases. The recently published 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.

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

In addition to the previously mentioned areas, several NCRAC extension contacts have been instrumental in fostering the continued growth of the aquaculture industry in the region. For example, Pierce has created the Cooperative Extension Aquaculture and Marketing Educational Program to facilitate the development and implementation of aquaculture educational programs in Missouri. In addition, Garling has assisted in resolving a dispute between the Michigan Department of Environmental Quality and the Michigan Aquaculture Association over National Pollution Discharge Elimination System permit requirements for commercial fish producers and fee-fishing operators. Assistance resulted in a clarification that most Michigan registered fish farms are not required to obtain permits unless it is shown that they are discharging pollutants and causing a water quality problem in the receiving water.

The Aquaculture Technology Transfer program at Ohio State University's Ohio Center for Aquaculture Development is dedicated to supporting sustainable development of aquaculture in Ohio through research and extension activities focused on production efficiency, diversification of farm income, emerging species viability, marketing, and technical information dissemination for existing and prospective operations. The Ohio program strives to provide for the information and training needs of the aquaculture industry. Services include 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.

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

Beginning in 1992, some NCRAC research projects included objectives related to outreach activities related to that particular project. Activities listed in this proposal are not part of those research projects.

## **ANTICIPATED BENEFITS**

The NCRAC Extension Work Group benefits several user groups in the NCR, including both prospective and experienced aquaculturists and aquaculture educators. Growing at 12.4% per year, the aquaculture

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

The existing aquaculture industry members need relevant information on new techniques and technologies in aquaculture, as well as updated information related to changing state and federal regulations. Increasingly, a large number of individuals are interested in aquaculture as a means of agriculture diversification or urban development. The NCRAC Extension Work Group meets these diverse client needs. There is a sustained demand for resource information, on-site advice, 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. The entrepreneurs and prospective aquaculturists often require an enormous amount of time to educate and can benefit from the availability of the electronic media. The following proposed extension activities are focused on meeting these changing demands.

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

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

Fact sheets, technical bulletins, and videos have served to inform a variety of clients about numerous aquaculture practices in the NCR and to present possible solutions to relevant problems. For instance, the 2004 NCRAC publication "Aquaculture Effluents and Waste By-Products" has been downloaded more than 300 times per month since the beginning of 2006. A demand has increased for information on the improvement of aquaculture rearing and management strategies to reduce and, if possible, eliminate environmental impacts. Also, species-specific publications on walleye, trout, and catfish (*Ictalurus punctatus*) have been used in numerous regional meetings and have been requested by clients throughout

the United States. Publications on organizational structure for aquaculture businesses, transportation of fish in bags, and others are beneficial to both new and established aquaculturists.

The proposed Regional Aquaculture Extension Team (RAET) will encourage and promote broad interaction between the aquaculture industry; local, state, and federal governments; and academia. Through these communications and interactions, effective strategies and direct actions will be devised to deal with specific issues to advance the NCR aquaculture industry and to better realize NCRAC's strategic planning goals.

The Aquaculture Network Information Center (AquaNIC) houses over 8,000 electronic publications, images, slide sets, videos, and directories used by more than 2.1 million stakeholders from 150 countries per year. The positive impact to the international aquaculture community is realized through accessibility to aquaculture information 24 hours per day and seven days per week. No longer are audiences limited to obtaining information during normal business hours. Financial support for AquaNIC is provided by the Mississippi-Alabama Sea Grant Consortium, Auburn University, Illinois-Indiana Sea Grant College Program, the National Sea Grant College Program, and NCRAC.

- Current and prospective producers use AquaNIC Web sites as sources of reference, i.e., species and systems pages, Regional Aquaculture Center publications, directories, and calendar of events.
- CES and Sea Grant educators will benefit from increased access to electronic media, i.e., photographs, slide sets, and publications, essential to developing outreach programs.
- All customers will benefit from the "gateway" or "portal" services provided by AquaNIC through decreased time searching for information, i.e., companies, universities involved in aquaculture, CES, and Sea Grant contacts, federal agencies, and other Web links to aquaculture information.

To measure the positive impact that the aquaculture extension initiative is having in Ohio, one only needs to look at the numbers in the most recent Census of Agriculture. The 1998 Census of Aquaculture reported 33 fish farms in Ohio with \$1,788,000 in total sales. The 2002 Census of Aquaculture reported 100 fish farms in Ohio with \$3,338,000 in total sales. This means the number of fish farms in Ohio increased at a rate of 30% per year and the total aquaculture sales increased at a rate of 17% per year. If this rate of growth continues, we can expect to see approximately 200 fish farms with sales of over 5.3 million dollars reported in the 2005 Census of Aquaculture, set to be published by the National Agriculture Statistics Service in 2006. Although this industry was not previously ranked in Iowa, aquaculture is now ranked 15th in Ohio for value of agriculture products sold.

As with research programs, project outputs, and impact assessment and evaluation criteria are being used for extension activities. In fact, these criteria are noted in the following text. As the aquaculture industry develops in the NCR, such impacts will be measured directly. However, there continues to be a need for extension professionals to be able to address public inquires when there may not be an economic impact. For instance, potential aquaculturists being advised not to pursue specific activities which may cost them large sums of money; such impacts may be hard to document but nevertheless important to both the individual as well as for the aquaculture industry development.

## **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. In the past multiple Extension Liaisons have been assigned to some Research Work Groups 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.

Research Work Group	Extension Liaison	State
Baitfish	Jeffery L. Gunderson	MN
Determinative Method - Aq-S® Marker Residue in Fillet Tissue	Joseph E. Morris	IA
Feed Training Carnivorous Fish	Joseph E. Morris	IA
Largemouth Bass Nutrition	Joseph E. Morris	IA
Methyltestosterone Feed Stability	Laura G. Tiu	OH
Methyltestosterone Target Animal Safety	Joseph E. Morris	IA
Nutrition	Donald L. Garling	MI
Regional Aquaculture Extension Specialist	Laura G. Tiu	OH

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

- Attend the NCRAC Annual Program Planning Meeting,
- Participate in one formal organized conference call 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-CSREES/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:

- Attending 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,
  - Included in this network is the aquaculture regional chair for the NCR of the National Association of County Agriculture Agents
- Identifying and updating 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,
- Utilizing the above contacts and information gathering, conveying relevant information to the RAET group for setting priorities or determining projects to be undertaken.

- Generate an annual report for incorporation into the NCRAC Extension report. This report is to include specific outputs and impacts related to NCRAC-funded activities.

With the continued shortages in 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. These activities will be continued.

AquaNIC Support (Einstein, Purdue University)

LaDon Swann (formerly at Purdue University and now at Auburn University) established <http://www.aquanic.org> in 1994. NCRAC's directories, annual reports, and publications are posted to the NCRAC Web site. AquaNIC's support from NCRAC has been essential to any success experienced. Since AquaNIC has been online, it has become the premier Web site for aquaculture information. In August 2006, it was ranked in the top 4% of the 1+million largest monitored web sites according to <http://www.ranking.com>. Each day, more than 10,000 people have chosen to use AquaNIC as an alternative or in addition to traditional means of obtaining information. As a gateway to electronic resources in aquaculture, AquaNIC has increased the timeliness and variety of information available to outreach educators, governmental agencies, and individual users while more effectively utilizing existing personnel resources. AquaNIC can be accessed anytime and, therefore, does not face the challenges associated with office hours, time zones, or weekends.

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

Fish Nutrition Workshop (Morris, ISU)

Plan: This objective is designed to meet the information needs of diverse producer groups by hosting a 1 ½ -day Nutrition Assessment Workshop at Iowa State University that addresses the current knowledge of nutrition requirements of aquaculture species specific to NCR, e.g., centrarchids and percids.

- As host, Morris will arrange for a suitable moderator with expertise in fish nutrition. Working with NCR fish nutritionists and feed manufacturers, Morris will invite individuals with expertise that addresses the basic nutritional needs of fish species that have been designated as being important to NCR aquaculture industry. Thus, there is a need for effective communication among research, extension, and commercial aquaculture regarding current information about feed formulations. The audience for this workshop will include private and public aquaculturists, researchers and extension specialists. ISU has a hotel (Memorial Union Hotel), and an abundance of conference facilities. The central location of the university is convenient to aquaculturists throughout the NCR. To conduct summaries of fish nutrition, the university has extensive database services in the ISU library.

Project outputs: (1) workshop that addresses current information on nutritional needs for NCR species; (2) CD that will contain actual presentations and/or abstract from conference presentations, this will be basis for a technical bulletin on the nutritional needs of NCR species; and (3) two fact sheets on two specific NCR species that have been investigated to the extent that regional fish nutritionists feel is appropriate given the available knowledge. All written materials will be made available through the NCRAC web site (<http://www.aquanic.org>) and distributed to aquaculture specialists, and other Cooperative Extension Service and Sea Grant Advisory Service personnel.

Impact assessment and evaluation: At the completion of this workshop, a survey will be handed out to all attendees whereby their input will be sought. In addition, a follow-up survey will be sent to all workshops 6 months after the workshop meeting. The evaluation of the impact of this material will be assessed through the demand for the fact sheets and incidents of application of the results though follow-up survey of individuals receiving the fact sheets as to how the information may have influenced their decisions regarding their own operations.

## Regional Aquaculture Extension Team (RAET) (Binkowski, UW-Milwaukee)

Plan: Goal is to develop and coordinate a focused cadre of highly motivated regional extension, industry, and research personnel with the expertise to form a "think tank" that will devise more effective strategies and direct actions to deal with specific issues regarding the advancement of the NCR aquaculture industry and to better realize NCRAC's strategic planning goals.

- As a NCRAC experienced extension representative familiar with NCRAC's organization and with close connections with regional aquaculturists and researchers, Fred P. Binkowski volunteers to act as project team leader and to select exceptionally skilled and highly motivated individuals. These individuals will work as a team dedicated to solving problems, promoting the development, and continuing the expansion of aquaculture in the NCR.
- An initial face-to-face meeting of team members, NCRAC Extension Work Group members, and NCRAC Director and Associate Director will be held to build trust and establish objectives for RAET. With the assistance of a facilitator, meeting participants will seek consensus on core issues such as:
  - Identifying, defining and addressing the needs of the industry,
  - Identifying and coordinating resources to meet the needs,
  - Promoting greater involvement in outreach,
  - Fostering programs and processing decisions with input from the grassroots, including individuals and organizations, and
  - Helping build stakeholder and constituent base in the cooperative extension efforts.
- At this initial meeting, the first area/project of concern will be determined on the basis of its potential for success. Tasks will be assigned, timelines established, and expected outcomes determined. In addition, the Extension Work Group members can then share their individual expertise; sub-groups can be established based on commonality that can served to provide support and expertise to help insure project success. In the end, this face-to-face meeting at the beginning of the project will help with trust building and communication, which are critical to this team.
- Once assembled, this team will communicate regularly principally through phone and electronic conferencing to provide timely and responsive communications that address specific topical issues and strategies. In addition to tackling the topical issues (described later), they will provide advisory counsel for the NCRAC administration and board of directors so that they can more effectively achieve their goals. Agendas will be distributed a couple of days before the call; members can suggest agenda items in advance. Communicating success will be a priority, through newsletter and internet. For the first year, a second face-to-face meeting might be necessary to keep the group focused and involved.
- The RAET will meet as a group in conjunction with the NCRAC Annual Planning Meeting. This team will also work with the NCRAC Industry Advisory Council (IAC) and coordinate with the Chair of the NCRAC Extension Work Group.
- The RAET will be composed of volunteers from the following representative groups.
  1. Regional Aquaculturists - Individuals who have significant experience in all aspects of commercial aquaculture and a broad understanding of not only the issues related to their individual business needs, but also the important issues facing the entire regional industry. These individuals will also supply visionary insight from the business investment and entrepreneurial point of view concerning how to address current constraints and take action to improve the climate for continued aquaculture development. Confirmed team members are: Russ Allen (Seafood Systems, Inc., Okemos, Michigan), Michael Miller (Bell Aquaculture, Albany, Indiana), and William M. West (Blue Iris Fish Farm, Black Creek, Wisconsin).
  2. Regional Aquaculture Researchers - Individuals who have familiarity and involvement with scientific approaches who can address regional aquaculture needs. Also, these individuals will have the vision to understand how the prospects of new approaches can be applied to aquaculture development. Confirmed team members are: Robert Hayward ( School of Natural Resources, University of Missouri-Columbia, Missouri), Missouri, Brian S. Shepherd (Agriculture Research Service/United States Department of Agriculture, Milwaukee, Wisconsin), and James P. Hurley (Assistant Director for Research and Outreach, University of Wisconsin Sea Grant Institute, Madison, Wisconsin).

3. Regional Aquaculture Extension Contacts -- Experienced extension personnel with extensively developed and preexisting networking will facilitate the interaction and communication between the above industry and research representatives. Aquaculture educators will provide a vision for the future development of the industry and recommend ways to provide adequate education of future aquaculture personnel. Confirmed team members are: Ronald Kinnunen (Michigan Sea Grant, Marquette, Michigan), JJ Newman Rode (North Central Regional Aquaculture Center, Purdue University, West Lafayette, Indiana), Robert A. Pierce II (School of Natural Resources, University of Missouri-Columbia, Missouri), and Kwamena K. Quagraine, (Department of Agricultural Economics, Purdue University, West Lafayette, Indiana).

Project Outputs: With the resources available through this funding, the team will confront 3–4 issues/problems per year, currently utilizing the following priorities in the order listed:

1. Confronting economic issues that impact the industry. With this team, there will be broad interaction among private industry; local, state, and federal governments; and academia. These diverse, yet coordinated, interactions will increase the aquaculture industry's investment potential with financial institutions and provide needed information to the agriculture insurance industry.
2. Being a liaison for industry and the regulatory agencies, coordinating ideas, recommendations and suggestions that would best serve the industry and the agencies. The team would provide the regulatory agencies with information on industry concerns to promote better understanding and cooperation; and feedback to the industry on the regulatory issues in an attempt to achieve consensus on the issues.
3. Providing up-to-date information to promote advanced technology to educate and assist aquaculturists.
4. Working to promote aquaculture and its products as a healthy, high quality food source for human consumption.
5. Because there are many issues confronting the aquaculture industry, these priorities may change in the upcoming years. Because this advisory group is small, yet committed to aquaculture, there is increased capability to respond quickly to the future needs of the industry and to change these priorities.

Examples of topical issues that may be addressed by the RAET:

- Educating the banking industry on the economic potential of aquaculture,
- Generating investment of venture capital for aquaculture development,
- Representing industry point of view on regulatory issues to legislators,
- Promoting the health and quality issues of seafood and aquaculture products to the general public,
- Identifying critical needs and funding support for extension and research in the NCR,
- Devising a management plan for invasive species,
- Studying impacts of offshore production systems in the Great Lakes,
- Reviewing regulatory and monitoring oversight of offshore systems,
- Incorporating aquaculture operations with new industrial operations, such as ethanol plants and seafood safety and marketing,
- Developing a framework for emergency preparedness for the aquaculture industry, whether from natural or man-made disasters,
- Facilitating interaction between the agriculture insurance industry and the aquaculture industry,
- Serving in an advisory capacity to facilitate the planning and development of fish farming cooperatives, and
- Responding to the mislabeling and false representation of foreign imports.

Outcome Indicators:

- More effective and efficient aquaculture practices.
- Improved public relations to promote the health benefits of farmed fish.
- Improved information to financial institutions to promote more investment in aquaculture.

- Improved communication between the regulatory agencies and the industry
- Better laws and regulations so that the regulatory agencies' stewardship would allow the industry to grow and flourish.
- Increase government agencies' actions to support the industry. For instance, encouraging the Industry Advisory Council to urge the FDA to take action against the mislabeling of product coming from abroad.

Output Indicators:

- White papers—3-4 per year.
- News releases to NCRAC Newsletter, and to state associations—3-4 per year.
- Information posted to Web sites of NCRAC, AREF, Wisconsin Sea Grant, and state aquaculture organizations.
- Presentations to stakeholders at 3-4 annual state association meetings.
- Yearly presentations to national and international aquaculture meetings.

Update of Interstate Regulations (Binkowski, UW-Milwaukee)

Plan: Another activity that the NCRAC Board approved, that was of high priority to the Center's IAC, was a state-by state assessment of aquacultural best management practices (BMPs) and regulations affecting the NCR aquaculture industry. To conduct this Interstate Regulations Survey, the following actions will be undertaken:

- Once each year, the state aquaculture coordinator, as identified by the National Association of State Aquaculture Coordinators in the 12-state NCR and nine states adjacent to the NCR (Arkansas, Colorado, Kentucky, Montana, Oklahoma, Pennsylvania, Tennessee, West Virginia, and Wyoming), will be contacted to determine the appropriate in-state contact for aquaculture in the natural resources management agency, agriculture department, and state aquaculture association.
- Once each year, each natural resources management agency and agriculture department aquaculture contact person will be contacted to request:
- Names and contact information for individuals responsible for fish transportation and importation permits.
- Copies of laws, rules, and written policies for in-state, entry, health certification, and transportation requirements for aquaculture species in five categories (bait fish, game fish, food fish, Asiatic carps, and other species) from the agency and from the individual contact persons.
- Information on any current or anticipated requirements for Best Management Practices/Generally Accepted Management Practices (BMP/GAMPs) for commercial aquaculture operations (including any requirements for BMP/GAMP by the state environmental quality/enforcement departments). Copies of any BMP/GAMPs that have been developed for state agency hatcheries or as models for state commercial aquaculture facilities will be requested.
- Each state aquaculture association president will be contacted to request their association's assessment of needs relative to transportation and importation requirements for aquaculture species and BMP/GAMPs.

Project Outputs:

- Output 1: Transportation Requirements—develop a virtual fact sheet that will be annually updated and posted on the NCRAC and AREF web sites during the length of this project that clearly states the need for personal contact with the state permitting contact person immediately prior to shipping aquacultural species to states within and adjacent to the NCR. In addition, the fact sheet will include a matrix indicating, at the time of posting, the types of permits required (transportation/import and health assessment) for each of the five categories above, a list of the state aquaculture contacts, management/agriculture agency contacts, and individuals responsible for permits, and a copy of laws, rules, and written policies for import, transportation, and health inspection of aquaculture species. Where possible, Web links for this information will be included.
- Output 2: BMP/GAMPs—develop a Web-based virtual fact sheet that will be annually updated and posted on the NCRAC Web site during the length of this project. The fact sheet will include a short

synopsis of the potential value and use of BMP/GAMPs, a list of any requirements for BMP/GAMPs by regulatory agencies in the NCR at the time of posting, and copies or contacts for existing BMP/GAMPs that are in the public domain (including Web links).

#### Michigan Aquaculture Association Annual Conference (Kinnunen, MSU)

Plan: Aquaculture industry clientele from Michigan and surrounding states will attend. Participants will include speakers and aquaculture clientele from the NCR. Some of the Conference topics will be based on aquaculture industry information needs garnered from the AREF Project as well as input from the Michigan Aquaculture Association.

Project Outputs: Annual conference will be conducted in each the winter of 2008 and winter of 2009.

Impact Assessment and Evaluation: Formal course evaluation will be completed for each session.

#### Redtail Chub Factsheet (Gunderson, UMD)

Plan: Package and disseminate information on redbtail chub aquaculture. Packages will be produced that contain a fact sheet, technical report, spawning video clip, and economic spreadsheet model.

#### Project Outputs:

- Participants will gain knowledge of the current status of redbtail chub aquaculture and be able to assess the factors important to economic viability of redbtail chub aquaculture.
- Four presentations will be offered throughout the region and during workshops that will be part of the spotfin/golden shiner project.

#### Impact Assessment and Evaluation:

- Formal evaluation will be completed by attendees.
- Progress of new ventures will be followed as applicable and as farmers allow.

#### North Central Regional Aquaculture Conference (Rode, Purdue)

Plan: Since the 4<sup>th</sup> NCRAC conference was held in 1999 in Kansas City, Missouri, there has been a desire among the NCR aquaculture community to host a 5<sup>th</sup> conference in this region. This proposed two-day conference will be held in the fall of 2008. Presenters will include NCRAC-funded researchers and extension specialists from the associated NCRAC Work Groups. Speakers will also cover other topics of interest to aquaculturists in several of the NCR states. A trade show/exhibition will accompany the conference.

Project Outputs: Conference proceedings (such as an Abstract Book and Program Guide) will be made available for both conference participants and other interested individuals. A list of attendees who have voluntarily given their contact information for the list will also be made available.

Impact Assessment and Evaluation: A two-part formal evaluation will be completed following this conference. Participants will be asked to complete a "same-day" questionnaire before leaving at the end of the conference. Approximately one year later, conference participants will be asked to fill out a follow-up questionnaire. This second survey will not only measure impact of the conference one year later, but also gather ideas for topics that prospective attendees would like to see covered in a future conference.

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## PROJECT LEADERS

<u>State</u>	<u>Name</u>	<u>Institution</u>
<b>Illinois</b>	Michael D. Plumer	University of Illinois
<b>Indiana</b>	Mark E. Einstein Kwamena K. Quagraine JJ Newman Rode	Purdue University
<b>Iowa</b>	Richard D. Clayton Joseph E. Morris	Iowa State University
<b>Kansas</b>	Charles D. Lee	Kansas State University
<b>Michigan</b>	Donald L. Garling Ronald E. Kinnunen	Michigan State University
<b>Minnesota</b>	Jeffrey L. Gunderson	University of Minnesota-Duluth
<b>Missouri</b>	Robert A. Pierce II	University of Missouri-Columbia
<b>Nebraska</b>	Dennis E. Bauer	University of Nebraska-Lincoln
<b>North Dakota</b>	Mark E. Clark	North Dakota State University
<b>Ohio</b>	Laura G. Tiu	Ohio State University
<b>South Dakota</b>	Burton W. Pflueger	South Dakota State University
<b>Wisconsin</b>	Fred P. Binkowski	University of Wisconsin-Milwaukee



## PARTICIPATING INSTITUTIONS AND PRINCIPAL INVESTIGATORS

**University of Nebraska-Lincoln (UNL)**

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**University of Wisconsin-Milwaukee (UW-Milwaukee)**

Fred P. Binkowski

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Mark E. Clark

**Iowa State University (ISU)**

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Kwamena K. Quagraine

**Purdue University (Purdue)**

JJ Newman Rode

**Ohio State University (OSU)**

Laura G. Tiu

**BUDGET**

ORGANIZATION AND ADDRESS University of Nebraska-Lincoln Lincoln, NE 68583			<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 2</b>			
PROJECT DIRECTOR(S) Dennis E. Bauer			Duration Proposed Months: <u>12</u>  <b>Funds Requested by Proposer</b>	Duration Proposed Months: _____  <b>Funds Approved by CSREES (If different)</b>	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>			
			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 .....						
<b>Total Salaries and Wages</b> ..... →						
B. Fringe Benefits (If charged as Direct Costs)						
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →						
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)						
E. Materials and Supplies			\$ 400			
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.)						
<b>K. Total Direct Costs (C through I)</b> ..... →			\$1,000			
L. <b>F&amp;A/Indirect Costs.</b> (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.)						
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →			\$1,000			
N. Other..... →						
<b>O. Total Amount of This Request</b> ..... →			\$1,000			
<b>P. Carryover -- (If Applicable)</b> .....			<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>						
Cash (both Applicant and Third Party) .....			→			
Non-Cash Contributions (both Applicant and Third Party) .....			→			
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>	
<b>Project Director</b>						
<b>Authorized Organizational Representative</b>						
<b>Signature (for optional use)</b>						

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 University of Nebraska-Lincoln Lincoln, NE 68583			USDA AWARD NO.				Year 2: Objectives 1 & 2			
PROJECT DIRECTOR(S) Dennis E. Bauer			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)					
<b>A. Salaries and Wages</b>			<b>CSREES FUNDED WORK MONTHS</b>							
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 .....										
<b>Total Salaries and Wages</b> ..... →										
B. Fringe Benefits (If charged as Direct Costs)										
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →										
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)										
E. Materials and Supplies					\$ 400					
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.)										
<b>K. Total Direct Costs (C through I)</b> ..... →					\$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.)										
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →					\$1,000					
N. Other..... →										
<b>O. Total Amount of This Request</b> ..... →					\$1,000					
<b>P. Carryover -- (If Applicable)</b> .....			Federal Funds: \$		Non-Federal funds: \$		Total \$			
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>										
Cash (both Applicant and Third Party) .....							→			
Non-Cash Contributions (both Applicant and Third Party) .....							→			
<b>NAME AND TITLE</b> (Type or print)			<b>SIGNATURE</b> (required for revised budget only)						<b>DATE</b>	
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 UNIVERSITY OF NEBRASKA-LINCOLN

(Bauer)

### Objectives 1 & 2

- E. Materials and Supplies.** Annual costs to host the Nebraska Aquaculture Association Meeting. General supplies including paper, pens, pencils, ink cartridges, toner, staples, file folders, erasers, computer disks, and mailing supplies (\$400).
- F. Travel.** Annual costs: transportation, lodging, and meal expenses for the PI to host a 1-day annual meeting of the Nebraska Aquaculture Association at a destination to be determined by the aquaculture association (\$600 per year).

**BUDGET**

ORGANIZATION AND ADDRESS Great Lakes WATER Institute University of Wisconsin-Milwaukee Milwaukee, WI 53204				<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 - 3</b>				
				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)	<b>Funds Requested                  by Proposer</b>
PROJECT DIRECTOR(S) Fred P. Binkowski								
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel		<b>CSREES FUNDED WORK MONTHS</b>						
		Calendar	Academic	Summer				
a. ____ (Co)-PD(s) .....								
b. ____ Senior Associates .....								
2. No. of Other Personnel (Non-Faculty)								
a. ____ Research Associates-Postdoctorates . . .								
b. <u>2</u> Other Professionals .....		4.25			\$11,650			
c. ____ Paraprofessionals.....								
d. ____ Graduate Students .....								
e. ____ Prebaccalaureate Students.....								
f. ____ Secretarial-Clerical.....								
g. ____ Technical, Shop and Other .....								
<b>Total Salaries and Wages</b> ..... →					\$11,650			
B. Fringe Benefits (If charged as Direct Costs)					\$4,080			
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →					\$15,730			
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)								
E. Materials and Supplies					\$3,370			
F. Travel					\$6,400			
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.)								
<b>K. Total Direct Costs (C through I)</b> ..... →					\$25,500			
L. <b>F&amp;A/Indirect Costs.</b> (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.)								
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →					\$25,500			
N. <b>Other</b> ..... →								
<b>O. Total Amount of This Request</b> ..... →					\$25,500			
<b>P. Carryover -- (If Applicable)</b> .....		<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>		<b>Total \$</b>		
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>								
Cash (both Applicant and Third Party) .....							→	
Non-Cash Contributions (both Applicant and Third Party) .....							→	
<b>NAME AND TITLE</b> (Type or print)		<b>SIGNATURE</b> (required for revised budget only)					<b>DATE</b>	
Project Director								
Authorized Organizational Representative								
Signature (for optional use)								

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**BUDGET**

ORGANIZATION AND ADDRESS Great Lakes WATER Institute University of Wisconsin-Milwaukee Milwaukee, WI 53204				<b>USDA AWARD NO.</b> <b>Year 2: Objectives 1 - 3</b>				
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: <u>    </u>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)	<b>Funds Requested                  by Proposer</b>
PROJECT DIRECTOR(S) Fred P. Binkowski								
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel		<b>CSREES FUNDED WORK MONTHS</b>						
		Calendar	Academic	Summer				
a. ___ (Co)-PD(s) .....								
b. ___ Senior Associates .....								
2. No. of Other Personnel (Non-Faculty)								
a. ___ Research Associates-Postdoctorates . . .								
b. <u>2</u> Other Professionals .....		4.25			\$11,650			
c. ___ Paraprofessionals.....								
d. ___ Graduate Students .....								
e. ___ Prebaccalaureate Students.....								
f. ___ Secretarial-Clerical.....								
g. ___ Technical, Shop and Other .....								
<b>Total Salaries and Wages</b> ..... →					\$11,650			
<b>B. Fringe Benefits (If charged as Direct Costs)</b>					\$4,080			
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →					\$15,730			
<b>D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)</b>								
<b>E. Materials and Supplies</b>					\$3,370			
<b>F. Travel</b>					\$6,400			
<b>G. Publication Costs/Page Charges</b>								
<b>H. Computer (ADPE) Costs</b>								
<b>I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)</b>								
<b>J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)</b>								
<b>K. Total Direct Costs (C through I)</b> ..... →					\$25,500			
<b>L. F&amp;A/Indirect Costs.</b> (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.)								
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →					\$25,500			
<b>N. Other</b> ..... →								
<b>O. Total Amount of This Request</b> ..... →					\$25,500			
<b>P. Carryover -- (If Applicable)</b> . . . . . <b>Federal Funds: \$</b>				<b>Non-Federal funds: \$</b>		<b>Total \$</b>		
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>								
Cash (both Applicant and Third Party) ..... →								
Non-Cash Contributions (both Applicant and Third Party) ..... →								
<b>NAME AND TITLE (Type or print)</b>			<b>SIGNATURE (required for revised budget only)</b>				<b>DATE</b>	
<b>Project Director</b>								
<b>Authorized Organizational Representative</b>								
<b>Signature (for optional use)</b>								

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## BUDGET EXPLANATION FOR UNIVERSITY OF WISCONSIN-MILWAUKEE

(Binkowski)

### Objectives 1 - 3

- A. Salaries and Wages.** Annual costs: Academic Staff for 3.0 months to assist in developing, organizing, and coordinating the Regional Aquaculture Extension Team activities. Such activities will include contacting team members, arranging teleconferencing, communicating via email, and general mailings, preparing meeting minutes and summaries. Additional activities would include assisting with publicizing the direct actions undertaken such as preparing the news releases and postings to the web sites and writing the white papers. Technical Academic Staff for 1.25 months to assist with interstate surveys. These activities would include yearly contacting 21 state aquaculture coordinators and the states' natural resources management agencies, agriculture departments and state aquaculture associations. The data would be collected, updated and presented in fact sheets which would be posted on the web sites.
- B. Fringe Benefits.** Annual costs: The fringe benefit rate for Academic Staff at the University of Wisconsin-Milwaukee is 35%.
- E. Materials and Supplies.** Annual costs: General office supplies including paper, pens, pencils, ink cartridges, toner, staples, file folders, erasers, computer disks, mailing supplies (\$1,225), and Communication costs including phone, teleconferencing, FAX, publications, and mailings (\$2,145).
- F. Travel.** Annual costs: transportation, lodging, and meal expenses for the PI to attend a 1-day annual meeting of the Wisconsin Aquaculture Association at a destination to be determined by the aquaculture association (\$400 per year). Transportation, lodging, and meals for travel of the 10 RAET team members to meet annually with the PI in Milwaukee (\$5,000 per year). Transportation, lodging, and meals for Academic Staff and PI to attend two state aquaculture association meetings per year in the NCR (locations to be determined) to interact with other state extension personnel, as well as aquaculture industry representatives, and to report on RAET activities (\$1,000 per year). Transportation, lodging, and meals for travel to annual National and International aquaculture meetings to report on RAET activities and to interact with aquaculture industry representatives and researchers (In-Kind).

**BUDGET**

ORGANIZATION AND ADDRESS Department of Biological Sciences North Dakota State University 119 Stevens Hall, Fargo, ND 58105-5517			<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 2</b>			
			Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	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						
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>			
			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 .....						
<b>Total Salaries and Wages</b> ..... →						
B. Fringe Benefits (If charged as Direct Costs)						
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</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.)						
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000		
L. <b>F&amp;A/Indirect Costs.</b> (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.)						
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000		
N. <b>Other</b> ..... →						
<b>O. Total Amount of This Request</b> ..... →				\$1,000		
<b>P. Carryover -- (If Applicable)</b> . . . . . <b>Federal Funds: \$</b>			<b>Non-Federal funds: \$</b>		<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>						
Cash (both Applicant and Third Party) ..... →						
Non-Cash Contributions (both Applicant and Third Party) ..... →						
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>	
<b>Project Director</b>						
<b>Authorized Organizational Representative</b>						
<b>Signature (for optional use)</b>						

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**BUDGET**

ORGANIZATION AND ADDRESS Department of Biological Sciences North Dakota State University 119 Stevens Hall, Fargo, ND 58105-5517				<b>USDA AWARD NO.</b> <b>Year 2: Objectives 1 &amp; 2</b>			
				Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	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							
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel		<b>CSREES FUNDED WORK MONTHS</b>					
		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 .....							
<b>Total Salaries and Wages</b> ..... →							
<b>B. Fringe Benefits (If charged as Direct Costs)</b>							
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →							
<b>D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)</b>							
<b>E. Materials and Supplies</b>							
<b>F. Travel</b>				\$1,000			
<b>G. Publication Costs/Page Charges</b>							
<b>H. Computer (ADPE) Costs</b>							
<b>I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)</b>							
<b>J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)</b>							
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000			
<b>L. F&amp;A/Indirect Costs.</b> (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.)							
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000			
<b>N. Other</b> ..... →							
<b>O. Total Amount of This Request</b> ..... →				\$1,000			
<b>P. Carryover -- (If Applicable)</b> .....		<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>			
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>							
Cash (both Applicant and Third Party) ..... →							
Non-Cash Contributions (both Applicant and Third Party) ..... →							
<b>NAME AND TITLE (Type or print)</b>		<b>SIGNATURE (required for revised budget only)</b>			<b>DATE</b>		
<b>Project Director</b>							
<b>Authorized Organizational Representative</b>							
<b>Signature (for optional use)</b>							

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## BUDGET EXPLANATION FOR NORTH DAKOTA STATE UNIVERSITY

(Clark)

### Objectives 1 and 2

- F. **Travel.** Annual costs: Transportation, lodging, and meal expenses for the PI to attend a national aquaculture conference for aquaculture training as well as travel to primary aquaculture/hatchery facilities in North Dakota (including federal, tribal, and private facilities) (\$1,000).

**BUDGET**

ORGANIZATION AND ADDRESS Department of Natural Resource Ecology and Management Iowa State University 339 Science II, Ames, IA 50011-3221				<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 2</b>			
				Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Richard D. Clayton							
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel		<b>CSREES FUNDED WORK MONTHS</b>					
		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 .....							
<b>Total Salaries and Wages</b> ..... →							
<b>B. Fringe Benefits (If charged as Direct Costs)</b>							
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →							
<b>D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)</b>							
<b>E. Materials and Supplies</b>				\$ 500			
<b>F. Travel</b>				\$ 500			
<b>G. Publication Costs/Page Charges</b>							
<b>H. Computer (ADPE) Costs</b>							
<b>I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)</b>							
<b>J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)</b>							
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000			
<b>L. F&amp;A/Indirect Costs.</b> (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.)							
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000			
<b>N. Other</b> ..... →							
<b>O. Total Amount of This Request</b> ..... →				\$1,000			
<b>P. Carryover -- (If Applicable)</b> . . . . . <b>Federal Funds: \$</b>				<b>Non-Federal funds: \$</b>		<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>							
Cash (both Applicant and Third Party) ..... →							
Non-Cash Contributions (both Applicant and Third Party) ..... →							
<b>NAME AND TITLE (Type or print)</b>		<b>SIGNATURE (required for revised budget only)</b>				<b>DATE</b>	
<b>Project Director</b>							
<b>Authorized Organizational Representative</b>							
<b>Signature (for optional use)</b>							

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**BUDGET**

ORGANIZATION AND ADDRESS Department of Natural Resource Ecology and Management Iowa State University 339 Science II, Ames, IA 50011-3221				<b>USDA AWARD NO.</b> <b>Year 2: Objectives 1 &amp; 2</b>			
				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) Richard D. Clayton							
<b>A. Salaries and Wages</b>		<b>CSREES FUNDED WORK MONTHS</b>					
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 .....							
<b>Total Salaries and Wages</b> ..... →							
B. Fringe Benefits (If charged as Direct Costs)							
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →							
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies					\$ 500		
F. Travel					\$ 500		
G. Publication Costs/Page Charges							
H. Computer (ADPE) Costs							
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)							
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)							
<b>K. Total Direct Costs (C through I)</b> ..... →					\$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.)							
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →					\$1,000		
N. Other..... →							
<b>O. Total Amount of This Request</b> ..... →					\$1,000		
<b>P. Carryover -- (If Applicable)</b> . . . . .				<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>							
Cash (both Applicant and Third Party) ..... →							
Non-Cash Contributions (both Applicant and Third Party) ..... →							
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)					<b>DATE</b>	
Project Director							
Authorized Organizational Representative							
Signature (for optional use)							

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## BUDGET EXPLANATION FOR IOWASTATE UNIVERSITY

(Clayton)

### Objectives 1 and 2

- E. Materials and Supplies.** Annual costs: general office supplies including paper, toner, and mailers (\$500).
- F. Travel.** Annual costs: Travel within state will assist individual producers with aquaculture and pond management problems (\$500). 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.

**BUDGET**

ORGANIZATION AND ADDRESS Office of Sponsored Programs Purdue Research Foundation West Lafayette, IN 47907-1021				<b>USDA AWARD NO.    Year 1: Objective 2</b>					
				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. Einstein				<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>				
<b>A. Salaries and Wages</b>			<b>CSREES FUNDED WORK MONTHS</b>						
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 .....									
<b>Total Salaries and Wages</b> ..... →									
B. Fringe Benefits (If charged as Direct Costs)									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies				\$3,500					
F. Travel				\$2,000					
G. Publication Costs/Page Charges									
H. Computer (ADPE) Costs									
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)									
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)									
<b>K. Total Direct Costs (C through I)</b> ..... →				\$5,500					
L. <b>F&amp;A/Indirect Costs.</b> (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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$5,500					
N. Other..... →									
<b>O. Total Amount of This Request</b> ..... →				\$5,500					
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>			
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) .....						→			
Non-Cash Contributions (both Applicant and Third Party) .....						→			
<b>NAME AND TITLE</b> (Type or print)			<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>		
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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 Office of Sponsored Programs Purdue Research Foundation West Lafayette, IN 47907-1021				<b>USDA AWARD NO.    Year 2: Objective 2</b>					
				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. Einstein				<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>				
<b>A. Salaries and Wages</b>			<b>CSREES FUNDED WORK MONTHS</b>						
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 .....									
<b>Total Salaries and Wages</b> ..... →									
B. Fringe Benefits (If charged as Direct Costs)									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies				\$3,500					
F. Travel				\$2,000					
G. Publication Costs/Page Charges									
H. Computer (ADPE) Costs									
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)									
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)									
<b>K. Total Direct Costs (C through I)</b> ..... →				\$5,500					
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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$5,500					
N. Other..... →									
<b>O. Total Amount of This Request</b> ..... →				\$5,500					
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>			
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) .....						→			
Non-Cash Contributions (both Applicant and Third Party) .....						→			
<b>NAME AND TITLE</b> (Type or print)			<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>		
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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 PURDUE UNIVERSITY

### (Einstein)

#### Objective 2

- E. Materials and Supplies.** Annual costs: software licenses, e.g., Ultraseek Search and Webtrend log analyzer (\$2,000) and hardware replacement, e.g., hard drives and media (\$1,500).
- F. Travel.** Annual costs: transportation, lodging, and meal expenses for the PI to visit with LaDon Swann (Mississippi/Alabama Sea Grant) to discuss AquaNIC programming issues (\$2,000).



**BUDGET**

ORGANIZATION AND ADDRESS Department of Fisheries and Wildlife Michigan State University 13 Natural Resources Building, East Lansing, MI 48824-1222				<b>USDA AWARD NO.    Year 1: Objectives 1 &amp; 2</b>					
				Duration Proposed Months: <u>12</u>	Duration Proposed Months: <u>    </u>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)		
PROJECT DIRECTOR(S) Donald L. Garling				<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>				
<b>A. Salaries and Wages</b>		<b>CSREES FUNDED WORK MONTHS</b>							
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 .....									
<b>Total Salaries and Wages</b> ..... →									
B. Fringe Benefits (If charged as Direct Costs)									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies				\$ 50					
F. Travel				\$ 100					
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.)				\$ 200					
<b>K. Total Direct Costs (C through I)</b> ..... →				\$ 350					
L. F&A/Indirect Costs. (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs in on/off campus bases.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$ 350					
N. Other..... →									
<b>O. Total Amount of This Request</b> ..... →				\$ 350					
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>		<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) .....						→			
Non-Cash Contributions (both Applicant and Third Party) .....						→			
<b>NAME AND TITLE</b> (Type or print)			<b>SIGNATURE</b> (required for revised budget only)					<b>DATE</b>	
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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 MICHIGAN STATE UNIVERSITY

(Garling)

### Objectives 1 and 2

- E. Materials and Supplies.** General office supplies including paper, toner, and mailers (\$50).
- F. Travel.** Transportation, lodging, and meal expenses for the PI to attend a 2-day annual meeting of the Michigan Aquaculture Association at a location to be determined by the aquaculture association as well three or more trips per year to Michigan aquaculture facilities to assist producers in problem solving or to assist individuals in their planning for commercial aquaculture development (\$100).
- J. All Other Direct Costs.** Postage (\$50) and telephone (\$150).

**BUDGET**

ORGANIZATION AND ADDRESS Minnesota Sea Grant Extension Program University of Minnesota-Duluth Duluth, MN 55812			<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 - 3</b>			
			Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Jeffrey L. Gunderson						
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>			
			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 .....						
<b>Total Salaries and Wages</b> ..... →						
B. Fringe Benefits (If charged as Direct Costs)						
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →						
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)						
E. Materials and Supplies						\$ 500
F. Travel						\$ 500
G. Publication Costs/Page Charges						
H. Computer (ADPE) Costs						
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)						
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)						
<b>K. Total Direct Costs (C through I)</b> ..... →						\$1,000
L. <b>F&amp;A/Indirect Costs.</b> (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.)						
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →						\$1,000
N. <b>Other</b> ..... →						
<b>O. Total Amount of This Request</b> ..... →						\$1,000
<b>P. Carryover -- (If Applicable)</b> .....			<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>	<b>Total \$</b>
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>						
Cash (both Applicant and Third Party) ..... →						
Non-Cash Contributions (both Applicant and Third Party) ..... →						
<b>NAME AND TITLE</b> (Type or print)		<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>
<b>Project Director</b>						
<b>Authorized Organizational Representative</b>						
<b>Signature (for optional use)</b>						

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**BUDGET**

ORGANIZATION AND ADDRESS Minnesota Sea Grant Extension Program University of Minnesota-Duluth Duluth, MN 55812				<b>USDA AWARD NO.    Year 2: Objectives 1 - 3</b>					
				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) Jeffrey L. Gunderson				<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>				
<b>A. Salaries and Wages</b>			<b>CSREES FUNDED WORK MONTHS</b>						
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 .....									
<b>Total Salaries and Wages</b> ..... →						\$0			
B. Fringe Benefits (If charged as Direct Costs)						\$0			
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →						\$0			
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies						\$ 500			
F. Travel						\$ 500			
G. Publication Costs/Page Charges									
H. Computer (ADPE) Costs									
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)									
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)									
<b>K. Total Direct Costs (C through I)</b> ..... →						\$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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →						\$1,000			
N. Other..... →									
<b>O. Total Amount of This Request</b> ..... →						\$1,000			
<b>P. Carryover -- (If Applicable)</b> .....			<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>		<b>Total \$</b>		
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) .....									
Non-Cash Contributions (both Applicant and Third Party) .....									
<b>NAME AND TITLE (Type or print)</b>			<b>SIGNATURE (required for revised budget only)</b>					<b>DATE</b>	
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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## BUDGET EXPLANATION FOR UNIVERSITY OF MINNESOTA-DULUTH

(Gunderson)

### Objectives 1-3

- E. Materials and Supplies.** \$500 will be used each year to complete 50 information packets for regional participants and to purchase other supplies for workshops. The packets will be in addition to the packets prepared for distribution in Minnesota by Minnesota Sea Grant.
- F. Travel.** Annual costs: transportation, lodging, and meal expenses for the PI to meet with appropriate audiences at two different locations to be determined (\$500). Because some presentations will be part of workshops funded by the spotfin/golden shiner outreach project or done in conjunction with them, some travel expense for regional presentations will be covered by that project.

**BUDGET**

ORGANIZATION AND ADDRESS Michigan Sea Grant Michigan State University 710 Chippewa Square, Suite 202, Marquette, MI 49855				<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 - 3</b>					
				Duration Proposed Months: <u>12</u>  <b>Funds Requested by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved by CSREES (If different)</b>	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									
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>						
			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 .....									
<b>Total Salaries and Wages</b> ..... →									
<b>B. Fringe Benefits (If charged as Direct Costs)</b>									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
<b>D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)</b>									
<b>E. Materials and Supplies</b>									
<b>F. Travel</b>				\$1,000					
<b>G. Publication Costs/Page Charges</b>									
<b>H. Computer (ADPE) Costs</b>									
<b>I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)</b>									
<b>J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)</b>									
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000					
<b>L. F&amp;A/Indirect Costs.</b> (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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000					
<b>N. Other</b> ..... →									
<b>O. Total Amount of This Request</b> ..... →				\$1,000					
<b>P. Carryover -- (If Applicable)</b> . . . . . <b>Federal Funds: \$</b>				<b>Non-Federal funds: \$</b>				<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) ..... →									
Non-Cash Contributions (both Applicant and Third Party) ..... →									
<b>NAME AND TITLE (Type or print)</b>			<b>SIGNATURE (required for revised budget only)</b>				<b>DATE</b>		
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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 Michigan Sea Grant Michigan State University 710 Chippewa Square, Suite 202, Marquette, MI 49855				<b>USDA AWARD NO.</b> <b>Year 2: Objectives 1 - 3</b>					
				Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	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									
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>						
			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 .....									
<b>Total Salaries and Wages</b> ..... →									
<b>B. Fringe Benefits (If charged as Direct Costs)</b>									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
<b>D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)</b>									
<b>E. Materials and Supplies</b>									
<b>F. Travel</b>									
				\$1,000					
<b>G. Publication Costs/Page Charges</b>									
<b>H. Computer (ADPE) Costs</b>									
<b>I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)</b>									
<b>J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)</b>									
				\$1,000					
<b>K. Total Direct Costs (C through I)</b> ..... →									
<b>L. F&amp;A/Indirect Costs.</b> (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs in on/off campus bases.)									
				\$1,000					
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →									
<b>N. Other</b> ..... →									
				\$1,000					
<b>O. Total Amount of This Request</b> ..... →									
<b>P. Carryover -- (If Applicable)</b> . . . . . <b>Federal Funds: \$</b> <b>Non-Federal funds: \$</b> <b>Total \$</b>									
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) ..... →									
Non-Cash Contributions (both Applicant and Third Party) ..... →									
<b>NAME AND TITLE (Type or print)</b>				<b>SIGNATURE (required for revised budget only)</b>				<b>DATE</b>	
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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 MICHIGAN STATE UNIVERSITY

(Kinnunen)

### Objectives 1-3

- F. **Travel.** Annual costs: transportation, lodging, and meal expenses to attend and facilitate/coordinate a 2-day annual meeting of the Michigan Aquaculture Association at a location to be determined by the aquaculture association (\$1,000).



**BUDGET**

ORGANIZATION AND ADDRESS Department of Animal Science and Industry Kansas State University Manhattan, KS 66506-1600			<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 2</b>			
			Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	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						
<b>A. Salaries and Wages</b>			<b>CSREES FUNDED WORK MONTHS</b>			
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 .....						
<b>Total Salaries and Wages</b> ..... →						
<b>B. Fringe Benefits (If charged as Direct Costs)</b>						
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →						
<b>D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)</b>						
<b>E. Materials and Supplies</b>				\$ 250		
<b>F. Travel</b>				\$ 750		
<b>G. Publication Costs/Page Charges</b>						
<b>H. Computer (ADPE) Costs</b>						
<b>I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)</b>						
<b>J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)</b>						
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000		
<b>L. F&amp;A/Indirect Costs.</b> (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.)						
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000		
<b>N. Other</b> ..... →						
<b>O. Total Amount of This Request</b> ..... →				\$1,000		
<b>P. Carryover -- (If Applicable)</b> .....			<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>						
Cash (both Applicant and Third Party) ..... →						
Non-Cash Contributions (both Applicant and Third Party) ..... →						
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>	
<b>Project Director</b>						
<b>Authorized Organizational Representative</b>						
<b>Signature (for optional use)</b>						

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 Animal Sciences and Industry Kansas State University Manhattan, KS 66506-1600  PROJECT DIRECTOR(S) Charles D. Lee				<b>USDA AWARD NO.</b>				<b>Year 2: Objectives 1 &amp; 2</b>			
				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)			
				<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>						
<b>A. Salaries and Wages</b>				<b>CSREES FUNDED WORK MONTHS</b>							
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 .....											
<b>Total Salaries and Wages</b> ..... →											
B. Fringe Benefits (If charged as Direct Costs)											
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →											
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)											
E. Materials and Supplies				\$ 250							
F. Travel				\$ 750							
G. Publication Costs/Page Charges											
H. Computer (ADPE) Costs											
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)											
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)											
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000							
L. <b>F&amp;A/Indirect Costs.</b> (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.)											
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000							
N. Other..... →											
<b>O. Total Amount of This Request</b> ..... →				\$1,000							
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>		<b>Total \$</b>			
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>											
Cash (both Applicant and Third Party) .....				→							
Non-Cash Contributions (both Applicant and Third Party) .....				→							
<b>NAME AND TITLE (Type or print)</b>				<b>SIGNATURE (required for revised budget only)</b>						<b>DATE</b>	
<b>Project Director</b>											
<b>Authorized Organizational Representative</b>											
<b>Signature (for optional use)</b>											

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## BUDGET EXPLANATION FOR KANSAS STATE UNIVERSITY

(Lee)

### Objectives 1 and 2

- E. Materials and Supplies.** Annual costs: general office supplies including paper, toner and mailers (\$250).
- F. Travel.** Annual costs: Travel within state to assist individual producers with aquaculture and pond management problems (\$750). 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.

**BUDGET**

ORGANIZATION AND ADDRESS Department of Natural Resource Ecology and Management Iowa State University 339 Science II, Ames, IA 50011-3221				<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 3</b>			
				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) Joseph E. Morris							
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel		<b>CSREES FUNDED WORK MONTHS</b>					
		Calendar	Academic	Summer			
a. ____ (Co)-PD(s) .....							
b. ____ Senior Associates .....							
2. No. of Other Personnel (Non-Faculty)							
a. ____ Research Associates-Postdoctorates . . .							
b. <u>1</u> Other Professionals .....		3.0			\$9,900		
c. ____ Paraprofessionals.....							
d. ____ Graduate Students .....							
e. ____ Prebaccalaureate Students.....							
f. ____ Secretarial-Clerical.....							
g. ____ Technical, Shop and Other .....							
<b>Total Salaries and Wages</b> ..... →					\$9,900		
B. Fringe Benefits (If charged as Direct Costs)					\$3,069		
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →					\$12,969		
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies					\$ 500		
F. Travel					\$10,500		
G. Publication Costs/Page Charges							
H. Computer (ADPE) Costs							
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)							
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)					\$1,000		
<b>K. Total Direct Costs (C through I)</b> ..... →					\$24,969		
L. <b>F&amp;A/Indirect Costs.</b> (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.)							
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →					\$24,969		
N. Other..... →							
<b>O. Total Amount of This Request</b> ..... →					\$24,969		
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>							
Cash (both Applicant and Third Party) ..... →							
Non-Cash Contributions (both Applicant and Third Party) ..... →							
<b>NAME AND TITLE</b> (Type or print)		<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>	
<b>Project Director</b>							
<b>Authorized Organizational Representative</b>							
<b>Signature (for optional use)</b>							

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 IOWA STATE UNIVERSITY

(Morris)

### Objectives 1 & 3

- A. Salaries and Wages.** 3 months salary for research associate to assist PI in planning and developing the 1-day workshop entitled "Fish Nutrition" (\$9,900).
- B. Fringe Benefits.** ISU's fringe benefit rate for professional staff is 31%.
- E. Materials and Supplies.** Supplies needed for the Fish Nutrition Workshop (\$500).
- F. Travel.** Transportation, lodging, and meal expenses for 11 invited speakers and a moderator for the Aquaculture Nutrition Assessment Workshop (\$10,500).
- J. Other Direct Costs.** Cost for rental of host facilities for the Fish Nutrition Workshop (\$1,000).

**BUDGET**

ORGANIZATION AND ADDRESS Grants Administration South Dakota State University P.O. Box 2201, Brookings, SD 57007				<b>USDA AWARD NO.    Year 1: Objectives 1 &amp; 2</b>					
				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) Burton W. Pflueger				<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>				
<b>A. Salaries and Wages</b>		<b>CSREES FUNDED WORK MONTHS</b>							
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 .....									
<b>Total Salaries and Wages</b> ..... →									
B. Fringe Benefits (If charged as Direct Costs)									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies				\$ 250					
F. Travel				\$ 750					
G. Publication Costs/Page Charges									
H. Computer (ADPE) Costs									
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)									
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)									
<b>K. Total Direct Costs (C through I)</b> ..... →				\$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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000					
N. Other..... →									
<b>O. Total Amount of This Request</b> ..... →				\$1,000					
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>		<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) .....						→			
Non-Cash Contributions (both Applicant and Third Party) .....						→			
<b>NAME AND TITLE</b> (Type or print)			<b>SIGNATURE</b> (required for revised budget only)					<b>DATE</b>	
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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**BUDGET**

ORGANIZATION AND ADDRESS Grants Administration South Dakota State University P.O. Box 2201, Brookings, SD 57007				<b>USDA AWARD NO.    Year 2: Objectives 1 &amp; 2</b>					
				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) Burton W. Pflueger				<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>				
<b>A. Salaries and Wages</b>		<b>CSREES FUNDED WORK MONTHS</b>							
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 .....									
<b>Total Salaries and Wages</b> ..... →									
B. Fringe Benefits (If charged as Direct Costs)									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies				\$ 250					
F. Travel				\$ 750					
G. Publication Costs/Page Charges									
H. Computer (ADPE) Costs									
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)									
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)									
<b>K. Total Direct Costs (C through I)</b> ..... →				\$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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000					
N. Other..... →									
<b>O. Total Amount of This Request</b> ..... →				\$1,000					
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>		<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) .....						→			
Non-Cash Contributions (both Applicant and Third Party) .....						→			
<b>NAME AND TITLE</b> (Type or print)			<b>SIGNATURE</b> (required for revised budget only)					<b>DATE</b>	
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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## BUDGET EXPLANATION FOR SOUTH DAKOTA STATE UNIVERSITY

(Pflueger)

### Objectives 1 and 2

- E. Materials and Supplies.** Annual costs: general office supplies including paper, toner, and mailers (\$250).
- F. Travel.** Annual costs: transportation, lodging, and meal expenses for the PI to attend a 1-day annual meeting of the South Dakota Aquaculture Association at a location to be determined by the aquaculture association as well as additional transportation, lodging, and meal expenses in support of extension activities related to South Dakota aquaculture (\$750).



**BUDGET**

ORGANIZATION AND ADDRESS School of Natural Resources University of Missouri-Columbia Columbia, MO 65211				<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 2</b>				
				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)	<b>Funds Requested                  by Proposer</b>
PROJECT DIRECTOR(S) Robert A. Pierce II								
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel		<b>CSREES FUNDED WORK MONTHS</b>						
		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 .....								
<b>Total Salaries and Wages</b> ..... →								
B. Fringe Benefits (If charged as Direct Costs)								
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →								
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)								
E. Materials and Supplies					\$ 100			
F. Travel					\$ 900			
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.)								
<b>K. Total Direct Costs (C through J)</b> ..... →					\$1,000			
L. <b>F&amp;A/Indirect Costs.</b> (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.)								
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →					\$1,000			
N. <b>Other</b> ..... →								
<b>O. Total Amount of This Request</b> ..... →					\$1,000			
<b>P. Carryover -- (If Applicable)</b> . . . . . <b>Federal Funds: \$</b>				<b>Non-Federal funds: \$</b>		<b>Total \$</b>		
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>								
Cash (both Applicant and Third Party) ..... →								
Non-Cash Contributions (both Applicant and Third Party) ..... →								
<b>NAME AND TITLE</b> (Type or print)			<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>	
<b>Project Director</b>								
<b>Authorized Organizational Representative</b>								
<b>Signature (for optional use)</b>								

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**BUDGET**

ORGANIZATION AND ADDRESS School of Natural Resources University of Missouri-Columbia Columbia, MO 65211				<b>USDA AWARD NO.</b> <b>Year 2: Objectives 1 &amp; 2</b>			
				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) Robert A. Pierce II							
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel		<b>CSREES FUNDED WORK MONTHS</b>					
		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 .....							
<b>Total Salaries and Wages</b> ..... →							
B. Fringe Benefits (If charged as Direct Costs)							
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →							
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies				\$ 100			
F. Travel				\$ 900			
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.)							
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000			
L. <b>F&amp;A/Indirect Costs.</b> (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.)							
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000			
N. <b>Other</b> ..... →							
<b>O. Total Amount of This Request</b> ..... →				\$1,000			
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>							
Cash (both Applicant and Third Party) ..... →							
Non-Cash Contributions (both Applicant and Third Party) ..... →							
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)					<b>DATE</b>	
<b>Project Director</b>							
<b>Authorized Organizational Representative</b>							
<b>Signature (for optional use)</b>							

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## BUDGET EXPLANATION FOR THE UNIVERSITY OF MISSOURI-COLUMBIA

(Pierce)

### Objectives 1 and 2

- E. Materials and Supplies.** Annual costs: general office supplies including paper, toner, and mailers (\$100).
- F. Travel.** Annual costs: transportation, lodging and meal expenses for the PI to attend appropriate NCRAC workshops, Missouri Aquaculture Association conferences and programs, and in-state travel to selected educational programs that enhance the transfer of aquaculture information to Missouri producers and other appropriate individuals or groups (\$900).

**BUDGET**

ORGANIZATION AND ADDRESS University of Illinois Extension Mumford Hall Urbana, IL 61801				<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 2</b>					
				Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)		
PROJECT DIRECTOR(S) Michael D. Plumer									
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>						
			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 .....									
<b>Total Salaries and Wages</b> ..... →									
<b>B. Fringe Benefits (If charged as Direct Costs)</b>									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
<b>D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)</b>									
<b>E. Materials and Supplies</b>				\$ 250					
<b>F. Travel</b>				\$ 750					
<b>G. Publication Costs/Page Charges</b>									
<b>H. Computer (ADPE) Costs</b>									
<b>I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)</b>									
<b>J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)</b>									
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000					
<b>L. F&amp;A/Indirect Costs.</b> (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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000					
<b>N. Other</b> ..... →									
<b>O. Total Amount of This Request</b> ..... →				\$1,000					
<b>P. Carryover -- (If Applicable)</b> . . . . . <b>Federal Funds: \$</b>				<b>Non-Federal funds: \$</b>		<b>Total \$</b>			
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) ..... →									
Non-Cash Contributions (both Applicant and Third Party) ..... →									
<b>NAME AND TITLE (Type or print)</b>			<b>SIGNATURE (required for revised budget only)</b>				<b>DATE</b>		
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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**BUDGET**

ORGANIZATION AND ADDRESS University of Illinois Extension Mumford Hall Urbana, IL 61801				<b>USDA AWARD NO.    Year 2: Objectives 1 &amp; 2</b>					
				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) Michael D. Plumer				<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>				
<b>A. Salaries and Wages</b>		<b>CSREES FUNDED WORK MONTHS</b>							
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 .....									
<b>Total Salaries and Wages</b> ..... →									
B. Fringe Benefits (If charged as Direct Costs)									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →									
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies				\$ 250					
F. Travel				\$ 750					
G. Publication Costs/Page Charges									
H. Computer (ADPE) Costs									
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)									
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)									
<b>K. Total Direct Costs (C through I)</b> ..... →				\$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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000					
N. Other..... →									
<b>O. Total Amount of This Request</b> ..... →				\$1,000					
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>		<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) .....						→			
Non-Cash Contributions (both Applicant and Third Party) .....						→			
<b>NAME AND TITLE</b> (Type or print)			<b>SIGNATURE</b> (required for revised budget only)					<b>DATE</b>	
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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## BUDGET EXPLANATION FOR THE UNIVERSITY OF ILLINOIS

(Plumer)

### Objectives 1 and 2

- E. Materials and Supplies.** Annual costs: general office supplies including paper, toner, and mailers (\$250).
- F. Travel.** Annual costs: transportation, lodging, and meal expenses for the PI to attend a 1-day annual meeting of the Illinois Aquaculture Association at a location to be determined by the aquaculture association (\$300). Additional travel costs include other aquaculture informational programs (\$200), and aquaculture-related meetings to work with producer groups, individuals on production issues and aquaculture practices, and present NCRAC information (\$250).

**BUDGET**

ORGANIZATION AND ADDRESS Sponsored Program Services Purdue University 615 W. State St., West Lafayette, IN 47907-2053			<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 2</b>			
			Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Kwamena K. Quagraine						
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>			
			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 .....						
<b>Total Salaries and Wages</b> ..... →						
B. Fringe Benefits (If charged as Direct Costs)						
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →						
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)						
E. Materials and Supplies				\$ 350		
F. Travel				\$ 650		
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.)						
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000		
L. <b>F&amp;A/Indirect Costs.</b> (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.)						
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000		
N. <b>Other</b> ..... →						
<b>O. Total Amount of This Request</b> ..... →				\$1,000		
<b>P. Carryover -- (If Applicable)</b> .....			<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>						
Cash (both Applicant and Third Party) ..... →						
Non-Cash Contributions (both Applicant and Third Party) ..... →						
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>	
<b>Project Director</b>						
<b>Authorized Organizational Representative</b>						
<b>Signature (for optional use)</b>						

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**BUDGET**

ORGANIZATION AND ADDRESS Sponsored Program Services Purdue University 615 W. State St., West Lafayette, IN 47907-2053			<b>USDA AWARD NO.</b> <b>Year 2: Objectives 1 &amp; 2</b>			
			Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Kwamena K. Quagraine						
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>			
			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 .....						
<b>Total Salaries and Wages</b> ..... →						
<b>B. Fringe Benefits (If charged as Direct Costs)</b>						
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →						
<b>D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)</b>						
<b>E. Materials and Supplies</b>			\$ 350			
<b>F. Travel</b>			\$ 650			
<b>G. Publication Costs/Page Charges</b>						
<b>H. Computer (ADPE) Costs</b>						
<b>I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)</b>						
<b>J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)</b>						
<b>K. Total Direct Costs (C through I)</b> ..... →			\$1,000			
<b>L. F&amp;A/Indirect Costs.</b> (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.)						
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →			\$1,000			
<b>N. Other</b> ..... →						
<b>O. Total Amount of This Request</b> ..... →			\$1,000			
<b>P. Carryover -- (If Applicable)</b> .....			<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>						
Cash (both Applicant and Third Party) ..... →						
Non-Cash Contributions (both Applicant and Third Party) ..... →						
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>	
<b>Project Director</b>						
<b>Authorized Organizational Representative</b>						
<b>Signature (for optional use)</b>						

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## BUDGET EXPLANATION FOR PURDUE UNIVERSITY

(Quagraine)

### Objectives 1 and 2

- E. Materials and Supplies.** Annual costs: general office supplies including paper, toner, and mailers (\$350).
- F. Travel.** Annual costs: 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 (\$650).

**BUDGET**

ORGANIZATION AND ADDRESS Sponsored Program Services Purdue University 615 W. State St., West Lafayette, IN 47907-2053				<b>USDA AWARD NO.    Year 1: Objective 3</b>					
				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)	<b>Funds Requested by Proposer</b>	<b>Funds Approved by CSREES (If different)</b>
PROJECT DIRECTOR(S) JJ Newman Rode									
<b>A. Salaries and Wages</b>		<b>CSREES FUNDED WORK MONTHS</b>							
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 .....									
<b>Total Salaries and Wages</b> ..... →									
B. Fringe Benefits (If charged as Direct Costs)									
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</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.)						\$5,000			
<b>K. Total Direct Costs (C through I)</b> ..... →						\$5,000			
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.)									
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →						\$5,000			
N. Other..... →									
<b>O. Total Amount of This Request</b> ..... →						\$5,000			
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>		<b>Non-Federal funds: \$</b>		<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>									
Cash (both Applicant and Third Party) .....									
Non-Cash Contributions (both Applicant and Third Party) .....									
<b>NAME AND TITLE</b> (Type or print)		<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>			
<b>Project Director</b>									
<b>Authorized Organizational Representative</b>									
<b>Signature (for optional use)</b>									

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## BUDGET EXPLANATION FOR PURDUE UNIVERSITY

(Rode)

### Objective 3

- J. **All Other Direct Costs.** Printing of registration brochure (\$2,000), postage for registration brochure (\$1,000), and conference facilities rental (\$2,000).

**BUDGET**

ORGANIZATION AND ADDRESS Ohio State University Research Foundation 1960 Kenny Road Columbus, OH 43210-1063			<b>USDA AWARD NO.</b> <b>Year 1: Objectives 1 &amp; 2</b>			
			Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Laura G. Tiu						
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel			<b>CSREES FUNDED WORK MONTHS</b>			
			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 .....						
<b>Total Salaries and Wages</b> ..... →						
B. Fringe Benefits (If charged as Direct Costs)						
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →						
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)						
E. Materials and Supplies				\$ 500		
F. Travel				\$ 500		
G. Publication Costs/Page Charges						
H. Computer (ADPE) Costs						
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)						
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)						
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000		
L. <b>F&amp;A/Indirect Costs.</b> (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.)						
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000		
N. <b>Other</b> ..... →						
<b>O. Total Amount of This Request</b> ..... →				\$1,000		
<b>P. Carryover -- (If Applicable)</b> .....			<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>						
Cash (both Applicant and Third Party) ..... →						
Non-Cash Contributions (both Applicant and Third Party) ..... →						
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>	
<b>Project Director</b>						
<b>Authorized Organizational Representative</b>						
<b>Signature (for optional use)</b>						

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**BUDGET**

ORGANIZATION AND ADDRESS Ohio State University Research Foundation 1960 Kenny Road Columbus, OH 43210-1063				<b>USDA AWARD NO.</b> <b>Year 2: Objectives 1 &amp; 2</b>			
				Duration Proposed Months: <u>12</u>  <b>Funds Requested                  by Proposer</b>	Duration Proposed Months: ____  <b>Funds Approved                  by CSREES                  (If different)</b>	Non-Federal Proposed Cost- Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Laura G. Tiu							
<b>A. Salaries and Wages</b> 1. No. of Senior Personnel		<b>CSREES FUNDED WORK MONTHS</b>					
		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 .....							
<b>Total Salaries and Wages</b> ..... →							
B. Fringe Benefits (If charged as Direct Costs)							
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> ..... →							
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies				\$ 500			
F. Travel				\$ 500			
G. Publication Costs/Page Charges							
H. Computer (ADPE) Costs							
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)							
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)							
<b>K. Total Direct Costs (C through I)</b> ..... →				\$1,000			
L. <b>F&amp;A/Indirect Costs.</b> (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.)							
<b>M. Total Direct and F&amp;A/Indirect Costs (J plus K)</b> ..... →				\$1,000			
N. <b>Other</b> ..... →							
<b>O. Total Amount of This Request</b> ..... →				\$1,000			
<b>P. Carryover -- (If Applicable)</b> .....				<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>	
<b>Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)</b>							
Cash (both Applicant and Third Party) .....				→			
Non-Cash Contributions (both Applicant and Third Party) .....				→			
<b>NAME AND TITLE</b> (Type or print)	<b>SIGNATURE</b> (required for revised budget only)				<b>DATE</b>		
<b>Project Director</b>							
<b>Authorized Organizational Representative</b>							
<b>Signature (for optional use)</b>							

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## BUDGET EXPLANATION FOR OHIO STATE UNIVERSITY

(Tiu)

### Objectives 1 & 2

- E. Materials and Supplies.** Annual costs: miscellaneous office supplies such as pens, pencils, folders, paper, envelopes, printer/copier, ink cartridges, etc. (\$200), photocopying (\$100), phone expenses (\$200).
- F. Travel.** Annual costs: transportation, meals, and lodging for one trip to the annual Ohio Aquaculture Association (OAA) Meetings (\$300) and transportation to attend two OAA Board meetings (\$200).

**BUDGET SUMMARY FOR ALL PARTICIPATING INSTITUTIONS**

Year 1

	UN-L	U-Mil.	NDSU	ISU	PURDUE	MSU	UMD	KSU	SDSU	UMC	UI	OSU	TOTALS
Salaries and Wages		\$11,650		\$9,900									\$9,900
Fringe Benefits		\$4,080		\$3,069									\$3,069
Total Salaries, Wages, and Fringe Benefits		\$15,730		\$12,969									\$12,969
Nonexpendable Equipment													
Materials and Supplies	\$ 400	\$3,370		\$1,000	\$3,850	\$ 50	\$ 500	\$ 250	\$ 250	\$ 100	\$ 250	\$ 500	\$6,750
Travel	\$ 600	\$6,400	\$1,000	\$11,000	\$2,650	\$1,100	\$ 500	\$ 750	\$ 750	\$ 900	\$ 750	\$ 500	\$26,900
All Other Direct Costs				\$1,000	\$5,000	\$ 200							\$6,200
<b>TOTAL PROJECT COSTS</b>	\$1,000	\$25,500	\$1,000	\$25,969	\$11,500	\$1,350	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$72,319

Year 2

	UN-L	U-Mil.	NDSU	ISU	PURDUE	MSU	UMD	KSU	SDSU	UMC	UI	OSU	TOTALS
Salaries and Wages		\$11,650											\$11,650
Fringe Benefits		\$4,080											\$4,080
Total Salaries, Wages, and Fringe Benefits		\$15,730											\$15,730
Nonexpendable Equipment													
Materials and Supplies	\$ 400	\$3,370		\$ 500	\$3,850		\$ 500	\$ 250	\$ 250	\$ 100	\$ 250	\$ 500	\$1,850
Travel	\$ 600	\$6,400	\$1,000	\$ 500	\$2,650	\$1,000	\$ 500	\$ 750	\$ 750	\$ 900	\$ 750	\$ 500	\$16,300
All Other Direct Costs													
<b>TOTAL PROJECT COSTS</b>	\$1,000	\$25,500	\$1,000	\$1,000	\$6,500	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$42,000

### **SCHEDULE FOR COMPLETION OF OBJECTIVES**

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

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

Objective 3: Initiated in Year 1 and completed in Year 2.



## LIST OF PRINCIPAL INVESTIGATORS

**Dennis E. Bauer**, University of Nebraska-Lincoln  
**Fred P. Binkowski**, University of Wisconsin-Milwaukee  
**Mark E. Clark**, North Dakota State University  
**Richard D. Clayton**, Iowa State University  
**Mark E. Einstein**, Purdue University  
**Donald L. Garling**, Michigan State University  
**Jeffrey L. Gunderson**, University of Minnesota-Duluth  
**Ronald E. Kinnunen**, Michigan State University  
**Charles D. Lee**, Kansas State University  
**Joseph E. Morris**, Iowa State University  
**Burton W. Pflueger**, South Dakota State University  
**Robert A. Pierce II**, University of Missouri-Columbia  
**Michael D. Plumer**, University of Illinois  
**Kwamena K. Quagraine**, Purdue University  
**JJ Newman Rode**, Purdue University  
**Laura G. Tiu**, Ohio State University

## VITA

Dennis E. Bauer  
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148 West 4<sup>th</sup> Steet.  
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Phone: (402) 387-2213  
Fax: (402) 397-2065  
E-mail: dbauer1@unl.edu

### 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

### Scientific and Professional Organizations

Society for Range Management  
Nebraska Cooperative Extension Association

## VITA

Fred P. Binkowski  
UWS/UWM Great Lakes WATER Institute  
600 E. Greenfield Ave.  
Milwaukee, WI 53204

Phone: (414) 382-1723  
Fax: (414) 382-1705  
E-mail: sturgeon@csd.uwm.edu

### Education

B.S. University of Wisconsin-Milwaukee, 1971, Zoology  
M.S. University of Wisconsin-Milwaukee, 1974, Zoology (Fisheries Biology)

### Positions

Director (1993-present), Aquaculture Institute, University of Wisconsin System, UWS/UWM Great Lakes WATER Institute  
Senior Scientist (1991-present), Associate Scientist (1987-1990), Senior Fisheries Biologist (1984-1986), Associate Fisheries Biologist (1981-1983), and Assistant Fisheries Biologist (1978-1980), Center for Great Lakes Studies, University of Wisconsin Great Lakes Research Facility  
Research Specialist (Fisheries) (1975-1978), Department of Zoology, University of Wisconsin-Milwaukee

### Scientific and Professional Organizations

American Fisheries Society, Early Life History and Fish Culture Sections  
U.S. Aquaculture Society  
World Aquaculture Society

### Selected Publications

Yeo, S.E., F.P. Binkowski, and J.E. Morris. 2004. Aquaculture effluents and waste by-products: characteristics, potential recovery and beneficial reuse. NCRAC Ames, Iowa and University of Wisconsin Sea Grant, Madison, Wisconsin. 50 pp.

Rosenthal, H., R.M., Bruch, F.P. Binkowski, and S.I. Doroshov, Editors. 2002. Proceedings of the 4<sup>th</sup> International Symposium on Sturgeon. *Journal of Applied Ichthyology* 18 (4-6):219-698.

Bruch, R.M., and F.P. Binkowski. 2002. Spawning behavior of lake sturgeon (*Acipenser fluvescens*). *Journal of Applied Ichthyology* 18 (4-6):570-579.

## VITA

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119 Stevens Hall  
Fargo, ND 58105-5517

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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  
Ph.D. University of Tennessee, 1996, Ecology

### Positions

Assistant Professor (2002-present), Department of Biological Sciences, North Dakota State University  
Postdoctoral Research Associate (2000-2002), Cooperative Wildlife Research Unit, University of Montana  
Postdoctoral Research Associate (1997-2000), Department of Animal Ecology, Iowa State University  
Postdoctoral Research Associate (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, D. A. Levine, and W.W. Hargrove. 2001. Predicting global change effects on brook and rainbow trout in southern Appalachian streams: combining GIS and individual-based modeling. *Ecological Applications* 11:161-178.
- Clark, M.E. and K.A. Rose. 1997. Factors affecting competitive dominance of rainbow trout over brook trout in southern Appalachian streams. *Transactions of the American Fisheries Society* 126:1-20.
- Clark, M.E., K.A. Rose, J.A. Chandler, T.J. Richter, D.J. Orth, and W. Van Winkle. 1998. Simulating smallmouth bass reproductive success in reservoirs subject to water level fluctuations. *Environmental Biology of Fishes* 51:161-174.
- Clark, M.E. and K.A. Rose. 1997. An individual-based modeling analysis of management strategies for enhancing brook trout populations in southern Appalachian streams. *North American Journal of Fisheries Management* 17:54-76.

## VITA

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## EDUCATION

B.S. Iowa State University, 1992, Fisheries and Wildlife Biology  
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## POSITIONS

Extension Aquaculture Specialist/Ag Specialist II (October 2004-present), Research Associate I (July 2003-October 2004), Department of Natural Resource Ecology and Management, Iowa State University  
Research Associate I (March 1997-July 2003), Department of Animal Nutrition and Growth, Iowa State University  
Research Associate (December 1992-March 1997), Department of Animal Ecology, Iowa State University

## SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society  
Iowa Chapter of the American Fisheries Society  
Iowa Aquaculture Association  
Sigma Xi

## SELECTED PUBLICATIONS

- Summerfelt, R.C., and R.D. Clayton. 2007. Evaluation of open-formula grower diets for juvenile walleye. *North American Journal of Aquaculture* 69:53-58.
- Clayton, R.D., T.L. Stevenson, and R.C. Summerfelt. 1998. Fin erosion in intensively cultured walleyes and hybrid walleyes. *Progressive Fish-Culturist* 60(2):114-118.
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- Bristow, B.T., R.C. Summerfelt, and R.D. Clayton. 1996. Comparative performance of intensively cultured larval walleye in clear, turbid, and colored water. *Progressive Fish-Culturist* 58:1-10.
- Clayton, R.D., and R.C. Summerfelt. 1996. Toxicity of hydrogen peroxide to fingerling walleyes. *Journal of Applied Aquaculture* 6(3):39-49.
- Summerfelt, R.C., J.A. Forsberg, R. D. Clayton, and B. Barton. 1999. Low stress procedures for transporting juvenile walleye. Completion Report for the Fisheries Bureau, Fish and Wildlife Division, Iowa Department of Natural Resources, Des Moines. 70 pp.
- Summerfelt, R.C., A. Moore, B.T. Bristow, and R.D. Clayton. 1997. Culture of advanced walleye fingerlings. Iowa Department of Natural Resources, Federal Aid to Fish Restoration Project F-151-R, Completion Report, Des Moines, 91 pp.

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### POSITIONS

Chief Web Officer for Illinois/Indiana Sea Grant College Program (2000-present), Purdue University  
Site Manager (1996-present), SGNIS (Sea Grant Nonindigenous Species)  
Site Manager (1994-present), AquaNIC (Aquaculture Network Information Center)  
Senior Statistical Associate (1991-present), Statistical Research Associate (1985-1991), Departmental  
Statistics, Animal Sciences, Purdue University  
Lab Manager (1976-1985), Quantitative Genetics, Animal Sciences Department, Purdue University

### SELECTED PUBLICATIONS

- Swarm, L., T. Luba, and M. Einstein. 1994. Putting multimedia to work in outreach education. Abstract for World Aquaculture Society meeting.
- Swann, L., G. Jensen, and M. Einstein. 1994. Using the Aquaculture Network Information Center (AquaNIC). Abstract for World Aquaculture Society meeting.
- Einstein, M. and L. Swann. 1994. Guidelines for submitting documents for electronic distribution. Fact Sheet.
- Einstein, M.E. and D.P. Doolittle. 1984. Direct and indirect selection for eight week body weight near a selection limit in mice. *Zeitschrift fuer Tierzuechtung und Zuechtungsbiologie* 101:275-279.
- Einstein, M.E., T.S. Stewart, D.L. Lofgren, and A.P. Schinckel. 1988. A summary of genetic and phenotypic parameters for characteristics in swine. *Indiana Agricultural Experiment Station Bulletin* #545. 47pp.

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### EDUCATION

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### POSITIONS

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

### SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

American Fisheries Society, Fish Culture and Fisheries Educators Sections  
Comparative Nutrition Society  
World Aquaculture Society

### SELECTED PUBLICATIONS

Riche, M. and D. Garling. 2003. Feeding tilapia in intensive recirculating systems. NCRAC Fact Sheet  
Series #114, NCRAC Publications Office, Iowa State University, Ames.

Garling, D.L., and W.W. Taylor. 2002. My bluegills are stunted HELP! Michigan State University  
Extension, MSU, Bulletin E-1776. 2 pp.

Garling, D.L. 2002. Fee fishing pond management. Pages 44-47 in J.E. Morris, C.C. Mischke, and D.L.  
Garling, editors. Sunfish culture guide. NCRAC Culture Series #102, NCRAC Publications Office, Iowa  
State University, Ames.

Garling, D., P. Wilbert, A. Westmaas, S. Miller, R. Sheehan, P. Wills, and J. Paret. 2002. Production of  
polyploid sunfishes. Pages 34-40 in J.E. Morris, C.C. Mischke, and D.L. Garling, editors. Sunfish  
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## EDUCATION

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## POSITIONS

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

## SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

## SELECTED PUBLICATIONS

Gunderson, J.L., and R. Kinnunen. 2004. AIS-HACCP: Aquatic Nuisance Species – Hazard Analysis and  
Critical Control Point Training Curriculum. Second Edition. Minnesota Sea Grant Publication MN SG-  
F11. 83 p.

Richards, C., R.P. Axler, J.L. Gunderson, C.A. Hagley, and M.E. McDonald. 2002. Assessing and  
communicating risk: a partnership to evaluate a superfund site on Leech Lake tribal lands. Final  
Report to U.S. E.P.A., Environmental Justice Program, Grant No. EQ825741. University of Minnesota  
Sea Grant Program, Duluth, MN 55812 Publication No. CT 13 and Natural Resources Research  
Institute Technical Report No. NRRI/TR-2002/23.

Bartell, S., C. Richards, R.P. Axler, J.L. Gunderson, and C.A. Hagley. 2002. Human health risk  
assessment panel report. *In*: Richards, C., R.P. Axler, J.L. Gunderson, C.A. Hagley, and M.E.  
McDonald. 2002. Assessing and communicating risk: a partnership to evaluate a superfund site on  
Leech Lake tribal lands. Final Report to U.S. E.P.A., Environmental Justice Program, Grant No.  
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Natural Resources Research Institute Technical Report No. NRRI/TR-2002/23.

Bartell, S., C. Richards, R. P. Axler, J.L. Gunderson, and C.A. Hagley. 2002. Ecological risk assessment  
panel report. *In* Richards, C., R.P. Axler, J.L. Gunderson, C.A. Hagley, and M.E. McDonald. 2002.  
Assessing and communicating risk: a partnership to evaluate a superfund site on Leech Lake tribal  
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Minnesota Sea Grant Program, Duluth, MN 55812 Publication No. CT 13 and Natural Resources  
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Gunderson, J.L., and R. Kinnunen. 2002. The HACCP approach to prevent the spread of aquatic nuisance  
species by aquaculture and baitfish operations. *In* R.E. Kinnunen, editor, Environmental Strategies for  
Aquaculture Symposium Proceedings. December 2000. NCRAC CD Series #101, North Central  
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## EDUCATION

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Ph.D. Michigan Technological University, 1997, Biological Sciences

## POSITIONS

Michigan Sea Grant Extension Agent (1981-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

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

## SELECTED PUBLICATIONS

- 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. 40 pp.
- Pangle, K.L., T.M. Sutton, R.E. Kinnunen, and M.H. Hoff. 2005. Effects of body size, condition, and lipid content on the survival of juvenile lake herring during rapid cooling events. Journal of Great Lakes Research 31:360-366.
- Pangle, K.L., T.M. Sutton, R.E. Kinnunen, and M.H. Hoff. 2004. Overwinter survival of juvenile lake herring in relation to body size, physiological condition, energy stores, and food ration. Transactions of the American Fisheries Society 133 (5):1235-1246.
- Hinshaw, J.M., G. Fornshell, and R.E. Kinnunen. 2004. A profile of the aquaculture of trout in the United States. Report for USDA Risk Management Agency, Federal Crop Insurance Corporation, through Mississippi State University. 46 pp.
- Kinnunen, R.E., editor. 2002. Environmental Strategies for Aquaculture Symposium Proceedings. 62<sup>nd</sup> Midwest Fish and Wildlife Conference, Minneapolis, Minnesota. NCRAC CD Series #101, NCRAC Publications Office, Iowa State University, Ames.
- Gunderson, J.L., and R.E. Kinnunen. 2001. Aquatic nuisance species-Hazard analysis and critical control point training curriculum. Michigan Sea Grant Publication No. MSG-00-400.

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### EDUCATION

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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. 1998. Deer damage control options. Kansas State University and Cooperative Extension Service Publication No. C-728.
- Lee, C.D., and R.J. Johnson. 1997. Wildlife habitat evaluation handbook-participant's manual. Kansas State University Cooperative Extension Service Publication No. MF 2266.
- Hall, D., R.J. Johnson, and C.D. Lee 1997. Wildlife habitat evaluation handbook-leader's guide, Kansas State University Cooperative Extension Service Publication No. MF 2265.
- 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.

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### EDUCATION

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

### POSITIONS

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

### SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

### SELECTED PUBLICATIONS

- Rogge, M.L., A.A. Moore, and J.E. Morris. 2003. Organic and mixed organic-inorganic fertilization of plastic-lined ponds for fingerling walleye culture. *North American Journal of Aquaculture* 65(3):179-190.
- Boylan, J.D., and J.E. Morris. 2003. Limited effects of barley straw on algae and zooplankton in a midwestern pond. *Lake and Reservoir Management* 19(3):265-271.
- Lane, R.L., and J.E. Morris. 2002. Comparison of prepared feed versus natural food ingestion between pond-cultured bluegill and hybrid sunfish. *Journal of the World Aquaculture Society* 33:517-519.
- Lane, R.L., and J.E. Morris. 2000. Biology, prevention, and effects of common grubs (Digenetic trematodes) in freshwater fish. NCRAC Technical Bulletin Series #115, NCRAC Publications Office, Iowa State University, Ames.
- Lane, R.L., and J.E. Morris. 2002. Comparison of prepared feed versus natural food ingestion between pond-cultured bluegill and hybrid sunfish. *Journal of the World Aquaculture Society* 33: 517-519.

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### Education

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

### Positions

Extension Economist/Extension Specialist/Professor (1995-present), Extension Economist/Extension Specialist/Associate Professor (1989-1995), and Extension Economist/Extension Specialist/Assistant Professor (1985-1989), 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

- Pflueger, B., and L. Janssen. 2003. South Dakota agricultural land values and rental practices, 2003. Economics Commentator No. 440. South Dakota State University, Brookings.
- Pflueger, B. 2003. South Dakota farm management extension program highlights. North Central Regional Extension Farm Management Committee Report, May and October 2003.
- Janssen, L., and B. Pflueger. 2003. South Dakota farmland market trends 1991-2003. "Agricultural Experiment Station Bulletin C 268. South Dakota State University, Brookings.
- Hamda, Y., B. Pflueger, and L. Janssen. 2003. Historical and recent trends in South Dakota's agricultural land market, EC 918, South Dakota State University, Brookings.

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### EDUCATION

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M.S. Mississippi State University, 1981, Wildlife Ecology  
Ph.D. University of Missouri, 1998, Forestry

### POSITIONS

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

### SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Missouri Aquaculture Advisory Council  
National Animal Damage Control Association  
Soil and Water Conservation Society  
University of Missouri Extension Association  
Wildlife Society, Associate Wildlife Biologist, Missouri Chapter

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### EDUCATION

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### POSITIONS

Natural Resource Management Educator (1992-present) and Extension Agriculture Advisor (1976-present), University of Illinois

### SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Association of Natural Resource Extension Professionals  
Illinois Extension Agricultural Association  
National Association of County Agricultural Agents  
Soil and Water Conservation Society

### SELECTED PUBLICATIONS

- Ebelhar, S., and M. Plumer. 1999. Management of rye and ryegrass as cover crops for no-till. Agronomy Research Report, Dixon Springs.
- Ebelhar, S., and M. Plumer. 1999. Effects of rye cover crops and reduced herbicides rates on weed control in soybeans. Agronomy Research Report, Dixon Springs.
- Ebelhar, S., and M. Plumer. 1998. Rye cover crops for no-till soybeans. Agronomy Research Report, Dixon Springs.
- Plumer, M. 1998. No-till, what we have learned. Illinois Steward 6(4).
- Plumer, M., and E. Knake. 1996. Vegetative filter strip slow runoff. Weed Control Manual, volume 30. Meister Publishing Company, Ohio.
- Plumer, M. 1994. Bringing idle land into production under conservation compliance. Agronomy Research Report 1994-10.
- Farnsworth, R., and M. Plumer. 1993. Short term profit or long term stewardship. Illinois Steward 2(4).

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## EDUCATION

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## POSITIONS

Aquaculture Marketing Specialist (2005-present), Purdue University  
Assistant Professor - Aquaculture Marketing (2001-2005), University of Arkansas at Pine Bluff

## PUBLICATIONS

- Quagraine, K.K. 2006. IQF catfish retail pack: a study of consumers' willingness to pay. *International Food and Agribusiness Management Review* 9(2):75-97.
- Quagraine, K.K. 2006. Analysis of U.S. catfish fillet market share using a flexible Logistic Model. *Marine Resource Economics* 21(1):33-45.
- Quagraine, K.K., and C.R. Engle. 2006. A latent class model for analyzing preferences for catfish. *Aquaculture Economics and Management* 10(1):1-14.
- Wiese, N., C. Engle, B. Green, and K.K. Quagraine. 2006. Reducing catfish farm losses due to dockages assessed by processing plants. *Journal of the World Aquaculture Society* 37(1):60-73.
- Quagraine, K.K., and N. Wiese. 2006. Evaluation of alternative market channels for farm-raised catfish. *Journal of Marketing Channels* 13(3):51-6.
- McCluskey, J.J., and K.K. Quagraine. 2004. Measurement of industry conduct with a latent structure. *Journal of Applied Econometrics* 19(7):887-897.
- Quagraine, K.K. 2003. A dynamic almost ideal demand model for U.S. catfish. 2003. *Aquaculture Economics and Management* 7(5/6):263-271.
- Quagraine, K.K., J.R. Unterschultz, M.M. Veeman., and S. R. Jeffrey. 2003. Analysis of the market for finished cattle and hogs in Canada. *Canadian Journal of Agricultural Economics* 51(3):397-411.
- Neira, I., C.R. Engle, and K.K. Quagraine. 2003. Potential restaurant markets for farm-raised tilapia in Nicaragua. *Aquaculture Economics and Management* 7(3/4):231-247

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### POSITIONS

Regional Aquaculture Extension Specialist (NCRAC) (2006-present), Purdue University  
Extension Associate Professor and Extension Specialist, Aquaculture (1997-2006), University of New Hampshire  
Senior Research Associate (1993-1995), International Center for Aquaculture and Aquatic Environments, Auburn University  
Research Associate (1990-1993), Dept. of Fisheries & Wildlife, Michigan State University

### SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

National Aquaculture Association  
United States Aquaculture Society (Sec-Treasurer 2000-2005)  
World Aquaculture Society

### SELECTED PUBLICATIONS

- Newman, J.R., and T.J. Popma. 1996. Maximum voluntary feed intake and growth of Nile tilapia fry as a function of water temperature. Pages 101-102 *in* H. Egna, B. Goetze, D. Burke, M. McNamara, and D. Clair, editors. Thirteenth Annual Technical Report. PD/A CRSP 1995. Office of International Research and Development, Oregon State University, Corvallis.
- Newman, J.R., T.J. Popma, and W.K. Seim. 1996. Effects of temperature on maximum feed consumption and growth of juvenile Nile tilapia. Poster presented at the 1996 annual meeting of the World Aquaculture Society, Bangkok, Thailand.
- Newman, J.R., A. Gatera, W.K. Seim, T.J. Popma, and K.L. Veverica. 1994. Nitrogen requirements for maximum fish production in Rwandan ponds. Pages 46-51 *in* H. Egna, J. Bowman, B. Goetze, and N. Weidner, editors. Eleventh Annual Technical Report. PD/A CRSP 1993. Office of International Research and Development, Oregon State University, Corvallis.
- Newman, J.R. 1994. Production of Michigan aquacultural products. Michigan Agricultural Experiment Station, Research Report 526, volume 1, Michigan State University, East Lansing.
- Newman, J.R. 1993. A guide to licenses and permits for aquaculture in Michigan. Michigan Cooperative Extension Service, Bulletin E-2455, Michigan State University, East Lansing.



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### POSITIONS

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Co-Investigator for Aquaculture (1992-1998) and Research Assistant for Aquaculture (1991-1992), Kentucky State University  
Technical Assistant (1990) and Graduate Research Assistant (1988-1990), Mississippi State University  
Laboratory Technician (1987-1988), Mote Marine Laboratory, Sarasota, Florida  
Tropical Fish Breeder, J & B Tropicals (1987), Lakeland, Florida

### SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

North Central Regional Aquaculture Center Technical Research Committee  
Ohio Aquaculture Association (Advisor to the Board)  
U.S. Aquaculture Society (Newsletter Editor)  
World Aquaculture Society

### SELECTED PUBLICATIONS

- Wallat, G., L. Tiu, H. Wang, D. Rapp, and C. Leighfield. 2005. The effects of size grading on production structure and growth performance of yellow perch in earthen ponds. *North American Journal of Aquaculture* 67:34-41.
- Wallat, G.K., L.G. Tiu, J.D. Rapp, and R.A. Moore. 2004. Effect of stocking density on growth, yield and costs of producing rainbow trout in cages. *Journal of Applied Aquaculture* 15(3):72-82.
- Wallat, G., L. Tiu, and D. Rapp. 2001. Comparison of two spawning methods for the production of feed-trained yellow perch fingerlings and first year grow-out. Centers at Piketon fact sheet.
- Webster, C.D., L.G.Tiu, and A.M.Morgan. 2000. Differences in growth in blue catfish *Ictalurus furcatus* and channel catfish *I. punctatus* fed low-protein diets with and without supplemental methionine and/or lysine. *Journal of the World Aquaculture Society* 31:195-205.