

**REGIONAL AQUACULTURE EXTENSION SPECIALIST (RAES)**

**Chairperson:** Christopher T. Weeks, Michigan State University

**Industry Advisory Council Liaison:** William E. Lynch, Jr., Marysville, Ohio

**Extension Liaison:** Kwamena Quagraine, Purdue University

**Funding Request:** \$ 101,820

**Duration:** 1 Year (September 1, 2013 - August 31, 2014)

**Objectives:**

1. Continue RAES support to the North Central Region (NCR) aquaculture community through ongoing activities in areas of liaison services, leadership, assessing and addressing industry needs, and information transfer.
2. Develop and implement strategies to address aquatic invasive species (AIS) in aquaculture and baitfish in the NCR.
3. Develop and strengthen partnerships from within the NCR and outside the region among regulatory agencies, industry, academia, and other relevant entities to foster open, meaningful dialog on critical issues and build support for the NCR aquaculture industry.
4. Coordinate efforts for seeking non-NCRAC support for NCR aquaculture development.

**Proposed Budget:**

<b>Institution</b>	<b>Principal Investigator</b>	<b>Objectives</b>	<b>Year 1</b>	<b>Total</b>
Michigan State University	Christopher T. Weeks	1 - 4	\$ 101,820	\$ 101,820
<b>Total</b>			<b>\$ 101,820</b>	<b>\$ 101,820</b>

**Non-funded Collaborators:**

<b>Institution</b>	<b>Collaborator</b>
Michigan Sea Grant	Ronald E. Kinnunen
Iowa State University	D. Allen Pattillo

## TABLE OF CONTENTS

SUMMARY OVERVIEW (PARTICIPANTS, OBJECTIVES, AND PROPOSED BUDGETS) .....	1
JUSTIFICATION .....	3
RELATED CURRENT AND PREVIOUS WORK .....	4
ANTICIPATED BENEFITS .....	6
OBJECTIVES.....	6
PROCEDURES .....	6
PROJECT DELIVERABLES.....	8
FACILITIES.....	8
REFERENCES .....	9
PROJECT LEADERS .....	10
BUDGET	
BUDGET.....	11
BUDGET EXPLANATION.....	12
Michigan State University (Weeks – Objectives 1-4)	
SCHEDULE FOR COMPLETION OF OBJECTIVES.....	13
PARTICIPATING INSTITUTIONS AND PRINCIPAL INVESTIGATORS .....	14
CURRICULUM VITAE FOR PRINCIPAL INVESTIGATORS AND PROJECT LEADERS .....	15

## JUSTIFICATION

Aquaculture in the North Central Region (NCR) of the U.S. is very diverse, and includes over 50 different cold, cool, and warm water aquatic animal species rearing in a variety of indoor and outdoor production systems. Commercial production is dominated by pond raised game fish for stocking, cultured and wild harvested baitfish, and flow-through trout production. Food fish in the region is comprised mainly of tilapia and trout, although seafood production is low compared to marine resource regions, southern catfish production and Idaho trout. There appears to be growing interest in recirculating aquaculture systems (RAS) and aquaponics for food. However, few RAS startups in the NCR have shown large scale success to date, and aquaponics is considered a niche market opportunity. Based on the latest available U.S. Department of Agriculture (USDA) Aquaculture Census Data, the value of commercial aquaculture products sold in the NCR increased from \$28 million in 1998 to \$35.4 million in 2005. This equates to 3.8% annually, which is approximately half of that observed globally. To demonstrate the importance of baitfish in the region, removing Minnesota's production from the census data reduces the NCR aquaculture value increase to 1.3% annually from 1998 to 2005.

The NCR aquaculture industry may be at a critical point in terms of progress and development. In 2005, food fish production made up 37% of NCR total aquaculture sales (\$35.4 million), baitfish 28%, and sport fish 12% (USDA 2007). Missouri led NCR food fish production with 35% of total food fish value in 2005. From 1998 – 2005, Minnesota, Ohio, and Wisconsin appeared to be gaining substantial ground in terms of increased farm registrations and production. The only other data source available on recent aquaculture production is the 2007 USDA Census of Agriculture (USDA 2009); however, these data include State and Federal hatchery production and it is difficult to pull out trends associated with commercial aquaculture. It does appear that Minnesota production (in value), comprised predominately of baitfish and sport fish, may have peaked, and that fish production in Missouri and Illinois have declined since 2005. Overall, discussions with NCR aquaculture community members suggest a feeling of optimism exists across the region for the potential expansion of the region's seafood production.

On a national scale, production of traditional aquaculture species (e.g., catfish and trout) has been repressed over the past several years. One current estimate places the national seafood deficit for 2012 at \$10.9 billion, an increase of \$1 billion from 2009 (U.S. Department of Commerce 2013). This could be viewed as mixed news for U.S. aquaculture. While the deficit has increased substantially over the past few decades, increasing demand for imports indicates that the U.S. seafood industry has a potentially large market share opportunity. Yet, while this trend has been observed for some time, aquaculture production in the U.S. remains at about 1% of global supply.

The following constraints appear to be hindering NCR aquaculture industry development:

- Uncertainty and confusion in the U.S. aquaculture regulatory environment
- Need for expansion of training and education opportunities
  - K-12 and higher education
  - Outreach and extension
  - Industry
  - Public awareness
- A shortage or underutilization of existing/future political support
- Access to capital for business expansion and new facility construction
  - Commercial aquaculture is generally perceived as a high risk business venture
  - Need for assistance in securing capital and lending opportunities
- Shortage or underutilization of effective partnerships
- No means for the industry to develop within using check off programs

Interstate transport regulations have had a major impact on fish production across the NCR. The Viral Hemorrhagic Septicemia (VHS) virus VHS Emergency Federal Order, which was followed by multiple state emergency orders, provides a prime example. Additional disease regulatory issues will continue to be problematic for the industry. Aquaculture Invasive Species (AIS) (e.g. Asian carp, chytrid fungus) are considerably the next major concern to interstate live aquatic animal commerce. For instance, there initially was an announcement circulating for a special session entitled "Preventing Aquatic Invasive Species through Management of the Live Bait Vector" at the 18th

International Conference on Aquatic Invasive Species, April, 2013, Ontario. While the session was finalized under the title “Live Bait Pathway” a keynote address was given under the former proposed title at the conference.

Regulatory control of the U.S. aquaculture industry is often divided between state agricultural and environmental protection agencies. Complicating matters further is the point that nearly all states have independently established sets of non-uniform regulations for controlling live aquatic animal movement and stocking. Moreover, the USDA Plant and Animal Inspection Service (APHIS) has imposed a series of Federal Orders restricting commerce of live aquatic animals particularly in areas of the NCR because of VHS. Due to the existing highly uncertain regulatory environment, NCR producers often require clarification from state regulators prior to conducting daily business activities such as interstate transport. For this reason, the Regional Aquaculture Extension Specialist (RAES) project, established through the North Central Regional Aquaculture Center (NCRAC), has devoted much effort to clarifying interstate transport requirements and reducing burdens on producers caused by regulatory controls.

Training and education opportunities for industry and the general public are considered vital to a growing aquaculture industry, not only in the NCR, but on a national level as well. Such activities should strive to identify, develop and promote sustainable aquaculture practices and methods.

There appears to be a general attitude by lending institutions across much of the region that investment in aquaculture is associated with high risk. This problem really warrants much attention, and root causes for such concern need to be identified and corrected to the greatest possible extent.

Support for aquaculture development in individual NCR states has wavered over the past few years as observed in 2010-2011 losses of congressional funding for Ohio and Wisconsin. Regional support, partnership building, and collaborative effort is needed among researchers, legislative, public and private entities and industry at this time in order to help move the industry forward.

NCRAC’s mission is to enhance aquaculture through education, research, and technology transfer to support a sustainable profitable industry throughout the NCR (NCRAC 1999). Research projects funded by the Center have focused primarily on native species with good potential as food fish or baitfish, although additional research has been undertaken on fish nutrition, aquaculture effluents, aquaculture drugs, and tilapia. NCRAC also supports regional extension and outreach programs for transfer of research and technologies to the industry. During the NCRAC 2012 Annual Planning Meeting, the Industry Advisory Council (IAC) and the NCRAC Board of Directors lifted up this RAES project for an additional 1-year term spanning September 1, 2013 - August 31, 2014. It is the goal of the RAES project team to support the NCR aquaculture industry by providing the means necessary to meet the objectives described herein.

## **RELATED CURRENT AND PREVIOUS WORK**

NCRAC is one of five Regional Aquaculture Centers (RACs) administered by the U.S. Department of Agriculture's National Institute of Food and Nutrition. Extension and outreach has been an important component to NCRAC since its inception in 1988 (Swann and Morris 2001). Twelve “Base,” or stand-alone, extension projects have been funded through the Center.

In addition to NCR extension activities, there are a number of active local (state), national, and academic aquaculture extension programs for which partnership opportunities exist in the region. Examples include the National Sea Grant College Program, state university aquaculture programs, state commerce and agricultural development programs, Indiana Soybean Board, and Soy Aquaculture Alliance. Maintaining effective partnerships and communications is extremely important for industry development and one of the primary objectives of this work plan.

Originally awarded to Ohio State University (OSU) for the period 2005 – 2007, the RAES project was extended through August 31, 2009. The current Project Chairperson, Chris Weeks, took on the RAES position on a contractual basis through OSU in March 2008. The project was lifted up for open proposal submission by NCRAC for two 2-year continuation cycles, and funded by NCRAC through August 2013.

Objectives for the original RAES project were as follow:

1. Provide leadership for the aquaculture industry in the NCR.
2. Enhance information transfer.

For 2009 – 2013 RAES continuations, objectives were expanded to include:

- Continue RAES support to the NCR aquaculture community through ongoing activities through liaison services, leadership responsibilities, assessing and addressing industry needs, and information transfer.
- In conjunction with the NCRAC Industry Advisory Council and state aquaculture extension contacts, assess and prioritize North Central Region (NCR) industry needs, focusing on issues with regional significance.
- Develop and implement strategies to address pertinent needs - interact with pertinent NCRAC and non-NCRAC aquaculture initiatives to accomplish identified strategies.
- Develop and implement strategies to address and promote aquaculture sustainability in the NCR.
- Develop and facilitate “linkages” among agencies, industry, academia, and other relevant entities to foster open, meaningful dialog on critical NCR issues.
- Coordinate efforts for seeking non-NCRAC support to facilitate information and technology transfer to the industry.
- Examine regional aquaculture development and assess NCRAC research and extension activities in terms of impacts on the NCR aquaculture industry. Make recommendations for improving NCRAC projects in terms of incorporating measures of program success.

In the position of RAES, Weeks has attended association meetings in each state across the NCR where such meetings have been held. He has facilitated, or helped facilitate, a VHS Summit (U.S. Trout Farmers’ Association Annual Conference, Milwaukee, Wisconsin, 2008), a tuition waiver program for on-line aquatic animal veterinarian training (Fish Health Course, University of Wisconsin School of Veterinary Medicine, 2009), and a number of workshops across the region (e.g., Largemouth Bass Nutrition Workshop, Purdue University, 2008; NCRAC Baitfish Workshop, La Crosse Fish Health Center, 2010; AIS HACCP and Aquaculture Business Development, Dundee, Michigan 2012).

Past and current activities undertaken by the RAES also include:

- 2009 NCRAC Aquaculture Industry Survey;
- Development and administration of two websites:
  - 1) NCRAC Roadmap information transfer website – provides easy information access to all RAC and former Aquaculture Network Information Center (AquaNIC) publications, industry related contacts, NCR state associations, events, etc.;
  - 2) North Central Region Aquaculture Contacts, Transport Regulations, and Approved Aquatic Species – summaries and access to all aquaculture and baitfish regulations for 12 NCR states and nine adjacent states, fish health contacts and laboratories, and approved aquatic species;
- Facilitate NCR aquaculture List Serve (150 subscribers);
- Partnership with Michigan Department of Agriculture for the USDA 2008 Cooperative Agreements for VHS; alleviating VHS testing costs for Michigan producers and providing USDA APHIS important VHS

surveillance information;

- Numerous presentations specific to commercial aquaculture development in the NCR, effect of VHS regulations on NCR aquaculture, interstate transport regulations, NCRAC protocols, sustainable aquaculture development, fish health maintenance, global aquaculture trends and impediments to the NCR aquaculture industry.

### **ANTICIPATED BENEFITS**

Over the past 4½ years, the RAES project has made a number of strides towards improving the NCR aquaculture industry, including: providing liaison and leadership services, program facilitation, identifying and addressing industry needs, assessing industry progress, and streamlining information and technology to the industry. This work plan includes continuing all current responsibilities and building upon these accomplishments.

During this planning period the RAES will also place additional focus on three mainstream issues currently deemed to be of high importance to NCR aquaculture industry interests : AIS regulations, AIS Best Management Practices (BMPs) for the baitfish sector, and sustainable aquaculture development and promotion.

Anticipated benefits include:

- Higher degree of information transfer on sustainable aquaculture development to the industry, the public, and state, federal and tribal agencies through list serve activity, remote learning outlets, websites and news articles.
- Continued updates on the NCRAC regulation website.
- A regional workshop tied in with the 2014 NCRAC Annual Program Planning Meeting. The specific theme of the workshop will be topical to industry needs at the time of the meeting.
- AIS BMPs specific for the baitfish industry.
- Evaluation and potential development towards a 3<sup>rd</sup> party AIS certification program for commercial aquaculture and baitfish sectors in the NCR.
- Increased partnership building for aquaculture expansion support.

### **OBJECTIVES**

1. Continue RAES support to the North Central Region (NCR) aquaculture community through ongoing activities in areas of liaison services, leadership, assessing and addressing industry needs, and information transfer.
2. Develop and implement strategies to address aquatic invasive species (AIS) in aquaculture and baitfish in the NCR.
3. Develop and strengthen partnerships from within the NCR and outside the region among regulatory agencies, industry, academia, and other relevant entities to foster open, meaningful dialog on critical issues and build support for the NCR aquaculture industry.
4. Coordinate efforts for seeking non-NCRAC support for NCR aquaculture development.

### **PROCEDURES**

#### **RAES Program Design Plan**

The RAES project team consists of the Principal Investigator (PI), two non-funded project collaborators (Co-PI's), a NCRAC Industry Advisory Council Liaison, and a NCRAC Extension Liaison. While NCRAC funded projects typically involve active participation by extension and research groups residing within two or more states in the NCR, the project team feels the RAES program is well suited for committee oversight of a single full time extension

specialist to achieve RAES plan objectives. The PI, then, will fill a full time RAES position, and the remaining team members will serve as the project oversight committee. The RAES will provide team members a status update twice per year and facilitate a minimum of two teleconferences annually. Decisions necessary for project planning will be by team consensus or by vote if the need arises.

### **Continue RAES Support to the NCR Aquaculture Community (Objective 1)**

The following RAES extension activities will continue under this 2013 - 2014 work plan:

- a) Project PI will continue to actively provide leadership and liaison services to the NCR aquaculture community as necessary to carry forward industry interests. The RAES shall maintain an open-door communication policy and be available via e-mail and telephone (land and cell lines) on a daily basis.
- b) Project PI will continue to support the NCR aquaculture industry through various presentations and committee representation (examples: Purdue Veterinary Medicine Conference, Great Lakes Panel for Aquatic Nuisance Species Task Force).
- c) Project PI will continue to maintain and update the NCRAC Transportation Regulations, and Approved Aquatic Species website (<http://www.ncrac.org/Info/StateImportRegs/stateregsmain.htm>) which provides summaries of all aquaculture and baitfish regulations including health certification and interstate transport requirements for the 12 NCR states and 9 adjacent states. This website receives 500+ views per month and has been given a main link from the USDA APHIS aquaculture website ([http://www.aphis.usda.gov/animal\\_health/animal\\_dis\\_spec/aquaculture/aquastates.shtml](http://www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture/aquastates.shtml)).
- d) The RAES will offer services to the NCR aquaculture community to help facilitate workshops intended to provide pertinent and useful information to the industry.

This activity is expected to keep the RAES updated on industry needs, help maintain a good working relationship between the RAES and the NCR aquaculture community, and to improve upon existing outreach tools designed to transfer pertinent, useful, and important information to the aquaculture industry.

### **Develop and Implement Strategies to Address AIS in Aquaculture and Baitfish in the NCR (Objective 2)**

The RAES will work with project collaborator Ron Kinnunen, and other key individuals in the US on development of current AIS Hazard Analysis and Critical Control Points (HACCP) towards a nationally recognized certified program.

- a) Form a task force comprised of key individuals necessary to carry out such a program.
- b) Develop strategies within the task force required to implement such a plan.
- c) Undertake a vetting process from across stakeholder groups.
- d) Begin implementation of strategies to the extent possible.

This activity request was brought forward jointly by NCRAC Industry Advisory Committee and Technical Committee members at the 2012 Annual Program Planning Meeting.

### **Develop and Strengthen Partnerships to Build Support for NCR Aquaculture Industry (Objective 3)**

Over the span of the RAES project, the PI has developed working relationships across the NCR aquaculture community. This work plan is intended to strengthen existing ties and strives to build new partnerships for the purpose of achieving common goals that benefit from increased fish production.

- a) PI will continue voting memberships within NAA, Michigan Farm Bureau, and Farm Bureau Aquaculture Advisory Committee.
- b) PI will continue to serve on the Great Lakes Panel for Aquatic Nuisance Species.
- c) PI will seek to develop partnerships among other agricultural commodity organizations (e.g., national and state soybean councils), aquatic animal health groups, and state, federal and tribal agencies, both inside and outside the NCR.
- d) PI will attempt to engage and interact with environmental groups to the extent possible.

This activity is expected to help the NCR aquaculture industry gain important allies across the U.S., and establish and/or strengthen partnerships designed to protect industry interests and further development of commercial aquaculture in the region.

#### **Coordinate Efforts for Seeking Non-NCRAC Support (Objective 4)**

Objective 4 focuses on utilizing opportunities (e.g., funding) and partnerships (Objective 3) typically available from non-NCRAC sources for regional industry development.

- a) In 2013 through project continuation, the PI will seek non-NCRAC support including, but not limited to, grant solicitations, requests for proposals, and commercial agriculture developmental and marketing programs.
- b) PI will work to form coalitions with common objectives to pursue and obtain non-NCRAC support for NCR aquaculture development.

This activity is expected to result in a minimum of one grant application submittal per year for NCR industry development from a non-NCRAC source. The actual target for this activity would be two or more project awards annually; however, this number depends greatly on various factors including availability of non-NCRAC opportunities and the team effort utilized, or realized, within the NCR aquaculture community.

#### **PROJECT DELIVERABLES**

1. Information transfer to the NCR aquaculture community through listserv and regulation Website.
2. AIS BMPs specific for the baitfish industry.
3. Regional workshop tied in with the 2014 NCRAC Annual Program Planning Meeting .

#### **FACILITIES**

MSU – Land Grant College; Agriculture Experiment Station; Director office of MSU Extension; close proximity to Ohio, Indiana, Illinois.

MSU Sea Grant Upper Peninsula of Michigan; close proximity to Wisconsin and Minnesota.

ISU – NCRAC Associate Director; ISU extension; aquaculture research facilities for walleye, golden shiner, bluegill, yellow perch and largemouth bass; close proximity to South Dakota, Nebraska, Kansas, Illinois, Wisconsin.



## REFERENCES

- NCRAC (North Central Region Aquaculture Center). 1999. A strategic plan for the North Central Regional Aquaculture Center. NCRAC, Michigan State University, East Lansing; <http://www.ncrac.org/>
- Swann, L., and J. Morris. 2001. A white paper on the status and needs of aquaculture extension outreach for the North Central Region; <http://www.ncrac.org/Topics/ext0901.htm>
- USDA (U.S. Department of Agriculture). 2007. Census of Aquaculture (2005). Volume 3, Special Studies, Part 2, AC-02-SP-2. USDA, Washington, D.C.; <http://www.agcensus.usda.gov/Publications/2002/Aquaculture/index.asp>
- USDA (U.S. Department of Agriculture). 2009. Census of Aquaculture (2007). Volume 1 • Geographic Area Series • Part 51, AC-07-A-51. USDA, Washington, D.C.; [http://www.agcensus.usda.gov/Publications/2007/Full\\_Report/usv1.pdf](http://www.agcensus.usda.gov/Publications/2007/Full_Report/usv1.pdf)
- US Department of Commerce. 2013 Foreign trade online database. US Department of Commerce, United States Census Bureau. Available online at: <http://www.census.gov/foreign-trade/statistics/product/enduse/exports/index.html>

## PROJECT LEADERS

<u>State</u>	<u>Name/Institution</u>	<u>Area of Specialization</u>
Iowa	D. Allen Pattillo Iowa State University	Fish culture, water quality, fisheries, regional extension
Michigan	Christopher T. Weeks – Lead PI Michigan State University	Aquaculture facility design, fish culture, aquaculture extension
	Ronald E. Kinnunen Michigan State University Michigan Sea Grant	Fish culture, Hazardous Analysis and Critical Control Point (HACCP), aquaculture and baitfish extension

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

OMB Approved 0524-0039  
 Expires 03/31/2004

ORGANIZATION AND ADDRESS Michigan State University Dept. of Fisheries & Wildlife, 13 Natural Resources, East Lansing, MI 48824			USDA AWARD NO. _____ Year 1: Objectives 1-4			
			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) Christopher T. Weeks						
<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. <u>1</u> Other Professionals .....		12.0			\$ 66,594	
c. ___ Paraprofessionals .....						
d. ___ Graduate Students .....						
e. ___ Prebaccalaureate Students.....						
f. ___ Secretarial-Clerical .....						
g. ___ Technical, Shop and Other .....						
<b>Total Salaries and Wages</b> .....					\$66,594	
B. Fringe Benefits (If charged as Direct Costs)					\$25,646	
<b>C. Total Salaries, Wages, and Fringe Benefits (A plus B)</b> .....					\$92,240	
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)						
E. Materials and Supplies					\$ 600	
F. Travel					\$3,800	
G. Publication Costs/Page Charges						
H. Computer (ADPE) Costs						
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)						
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)					\$5,180	
<b>K. Total Direct Costs (C through I)</b> .....					\$101,820	
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> .....						
N. <b>Other</b> .....						
<b>O. Total Amount of This Request</b> .....					\$101,820	

<b>P. Carryover -- (If Applicable)</b> .....	<b>Federal Funds: \$</b>	<b>Non-Federal funds: \$</b>	<b>Total \$</b>
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<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. Form CSREES-2004 (12/2000)

## BUDGET EXPLANATION FOR MICHIGAN STATE UNIVERSITY

(Weeks)

### Objectives 1-4

- A. Salaries and Wages.** Salary is requested for one 90% FTE extension specialist to act in capacity of Regional Aquaculture Extension Specialist (\$66,594).
- B. Fringe Benefits.** Fringe benefit rate is 38.5%.
- E. Materials and Supplies.** General office and workshop supplies and materials (\$600).
- F. Travel.** Travel, lodging, and meals for PI to attend three-four state aquaculture association/development meetings, PI to attend the NCRAC Annual Meeting, and PI to travel to 1-3 meetings in representation of NCR industry members (e.g. Great Lakes panel on Aquatic Nuisance Species) at locations to be determined (\$3,800).
- J. All Other Direct Costs.** Cell phone and office phone service (\$1,080 per year); membership fees for RAES to maintain memberships with NAA and Farm Bureau (\$300 per year). Workshop facilitation including travel, lodging, and meals for speakers and attendees to facilitate a regional aquaculture workshop most likely coordinated with the 2014 NCRAC Annual Program Planning Meeting at a location to be determined (\$3,800).

## **SCHEDULE FOR COMPLETION OF OBJECTIVES**

All (1-4) objectives will be initiated sometime during the current RAES project period (2012-2013), and the deliverables will be made available to the NCR aquaculture community by the project completion date of 8/31/2014.

**PARTICIPATING INSTITUTIONS AND PRINCIPAL INVESTIGATORS**

**Iowa State University**

D. Allen Pattillo

**Michigan State University**

Ronald E. Kinnunen

Christopher T. Weeks – Lead PI

## VITA

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### EDUCATION

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

### POSITIONS

Regional Aquaculture Extension Specialist, NCRAC and Ohio State University (March 2008 – Present)  
Consultant, Aquaculture Bioengineering Corp., Rives Junction, Michigan (October 2001–2009, June 1996–May 1998)  
Research Associate, Michigan State University Department of Fisheries and Wildlife (January 2007 – March 2008)  
Lab Manager, Michigan State University Aquatic Animal Health Lab (October 2003 – January 2007)  
Aquaculture Facility Manager, Stoney Creek Fisheries, Harrietta, Michigan (August 2000 – October 2001)  
Hatchery Manager, Great Black Creek Fish Co., Black Creek, Wisconsin (May 1998 – August 2000)  
Cade Industries, Engineer, San Diego, California; Lansing, Michigan (January 1989 – February 1993)

### SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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

### SELECTED PUBLICATIONS

Weeks, C.T., D. Garling, F.T. Barrows, and M. Faisal. 2010. The effect of feeding varying levels of soybean meal in high-nutrient-density diets on growth performance and body composition of juvenile Atlantic salmon. *North American Journal of Aquaculture* 72(4):279-289.

Weeks C.T., R. Kim, M. Wolgamod, G. Whelan and M. Faisal. 2011. Experimental infection studies demonstrate the high susceptibility of the salmonid, lake herring (*Coregonus artedii*), to the Great Lakes strain of viral hemorrhagic septicemia virus (Genotype IVb). *Journal of Fish Disease*.

Westers, H., and C.T. Weeks. 2003. Determining annual production capabilities for sequential rearing programs through use of routine fish culture data. *North American Journal of Aquaculture* 65:269-277.

## VITA

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### EDUCATION

B.S. Michigan State University, 1976  
M.S. Michigan State University, 1979  
Ph.D. Michigan Technological University, 1997

### POSITIONS

Michigan Sea Grant Extension Agent (1982-present), Upper Peninsula, Michigan State University  
Fisheries Pathologist (1981), Rangen Research Laboratory, Hagerman, Idaho  
Fisheries Biologist (1979-1980), U.S. Fish and Wildlife Service, Leetown, West Virginia

### SCIENTIFIC and PROFESSIONAL ORGANIZATIONS

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

### SELECTED PUBLICATIONS

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### POSITIONS

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Graduate Research Assistant, Department of Fisheries and Allied Aquacultures, Auburn University, 2008-2010  
Aquarium Technician, Department of Marine Sciences, University of Georgia, 2007-2008  
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### SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

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### SELECTED PUBLICATIONS

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