

**Project Title:** [Comprehensive Outreach and Training Program to Expand Development of NCR Aquaculture \[Termination Report\]](#)

**Extension Liaison:** Chris Weeks (replaced by Matt Smith)

**Total Funds Committed:**

\$151,739 **Initial Project**

**Schedule:** 9/1/17-8/31/19 **Current**

**Project Year:** 9/1/17 – 7/31/18

**Participants:** Smith, M.A., The Ohio State University Primus, A.E., University of Minnesota; Phelps, N.B.D., University of Minnesota

**Industry Liaison:** William Lynch, Millcreek Perch Farm, LLC, Marysville, Ohio

**Reason for Termination:** Completion of project objectives.

### **Project Objectives:**

1. Develop a comprehensive training program that addresses subject priorities critical to the advancement of NCR aquaculture.
2. Identify a core team of subject experts who can develop and deliver high quality presentations and demonstrations throughout the NCR.
3. In cooperation with NCR states, deliver workshops and training region-wide.
4. Develop a comprehensive evaluation plan to assess the adoption/integration of information to the target audience.

### **Project Summary**

The PIs reached out to producers and/or university research and Extension personnel to learn which topics they would like training on in their respective states. Identified topics were water quality, fish health, aquaponics, aquaculture economics, and aquaculture marketing. States were identified by their location within the region as well as participation by university personnel or producers who were willing to assist with the logistics of planning a workshop. Support from the state aquaculture associations was vital to the success of the trainings. Once location, workshop training topics, and dates were set, we identified a team of experts both from within and outside of the North Central Region. Workshops were delivered and successful with all workshops published in video form online. Surveys were provided at four of the six workshops with strong support and technology transfer. In addition to the workshop videos, PI Primus and the Center for Animal Health and Food Safety produced two online educational modules, each consisting of short multimedia videos (final edits currently underway) related to water quality and fish health for those who need introductory assistance. If interested or established producers are interested in learning more about water quality, fish health, or aquaculture economics and marketing, then these workshop videos will now be the cornerstone for transferring knowledge to those who were not able to be at the workshops in person. Topics of concern originally identified by the states proved important when analyzing the survey results.

### **Technical Summary and Analysis**

In Missouri, Workshop #1 partnered with the North Central Aquaculture Conference (sponsored by the North Central Regional Aquaculture Center, Missouri Aquaculture Association, and Kansas Aquaculture Association) to present a workshop on Aquaponics and Recirculation Aquaculture Systems (RAS). Although a workshop on RAS and aquaponics was not originally a specified track at the conference, Dr. Wetzel's (Lincoln University) recent research and statements on numerous small spring wells in southern Missouri possibly being utilizing for semi-recirculating indoor production systems with species such as rainbow trout was the impetus for this workshop.

In Minnesota, the University of Minnesota has led two previously successful aquaponic symposiums with grant support that were developed out of a stated need from the industry. This project supported the symposium, speaker travel, and all hands-on activities which would not have been possible otherwise. Although producers will likely encourage follow-up symposiums for years to come, recording all content for publishing online is highly valuable as this symposium cannot happen without financial support.

In Ohio, the Ohio State University (OSU) Aquaculture Extension program partnered with the Ohio Aquaculture Association (OAA) after meetings to discuss workshop ideas. The OAA stated their producers wanted to bring back another workshop on Fish Health as it has been designated a high priority for their members. The OSU South Centers had a grant-funded project from USDA NIFA called “Aquaculture Boot Camp 2” in which new and beginner farmers meet up once a month to educate on a different financial or biological topic. It only made sense to combine resources for a NCRAC (this project), OAA, and OSU ABC-2 workshop to enhance the experience than would otherwise be possible as OSU ABC-2 did not have the financial resources to bring in outside assistance for their attendees. This project led to a successful workshop of both the beginner/interested producers (ABC-2) and current producers (OAA members).

The support allowed travel for PI Smith, Dr. Flint (professor, OSU), Dr. Hartman (USDA APHIS, Florida), and Dr. Reichley (Certified Aquatic Veterinarian and Director of Fish Health Clear Springs Foods, Idaho), as well as meal and printed educational materials. Dr. Reichley led the hands-on fish necropsy and each participant dissected their own fish.

In Wisconsin, the Wisconsin Aquaculture Association (WAA) and the University of Wisconsin-Stevens Point (UWSP) were the contacts. The WAA and UWSP led the Friday conference and WAA assisted this project on Saturday by obtaining and managing registration and contacts with the hotel conference center. This project supported all PI travel, meals, hands-on materials, printed educational materials, and video/audio recordings. PI Primus led the walleye necropsies (donated by UWSP) and PI Smith led the discussions of key water quality parameters and various methods of testing multiple parameters.

In Indiana, the Indiana Aquaculture Association Inc. (IAAI) and Purdue University were the contacts. The one-day conference was moderated by IAAI and they led registration and assisted in acquiring local fish health contacts. This project supported PI travel, all meals, printed educational materials, hands-on materials, and video/audio recordings. PI Primus led the fish necropsies (multiple species donated by Purdue University) and PI Smith led the discussions of key water quality parameters and various methods of testing multiple parameters.

In Iowa, the Coalition to Support Iowa’s Farmers and the Director of NCRAC were the contacts. The 2-day conference consisted of a Friday conference on a myriad of pertinent topics (Iowa regulations, business planning, Iowa marketing, history of Iowa aquaculture, question and answer panel discussion). Saturday was moderated by PI Smith with assistance from Dr. Morris from NCRAC. Saturday presentations were by a private consultant, Dr. Engle from Engle-Stone Aquatic\$ in Virginia. Presentations were given with group discussions in between to engage the audience in a “round- table” fashion. This project supported all meals, PI travel, printed materials, honorarium, and travel for visiting presenters.

## **Principal Accomplishments**

The PIs reached out to producers and/or university research and Extension personnel to learn which topics they would like training on in their respective states. Identified topics were water quality, fish health, aquaponics, aquaculture economics, and aquaculture marketing. Support from the state aquaculture associations was vital to the success of the trainings. Once location, workshop training topics, and dates were set, we identified a team of experts both from within and outside of the North Central Region. Workshops were delivered and successful with all workshops published in video form online.

Surveys were provided at four of the six workshops with strong support and technology transfer. In addition to the workshop videos, PI Primus and the Center for Animal Health and Food Safety produced two online educational modules, each consisting of short multimedia videos (final edits currently underway) related to water quality and fish health for those who need introductory assistance. If interested or established producers are interested in learning more about water quality, fish health, or aquaculture economics and marketing, then these workshop videos will now be the cornerstone for transferring knowledge to those who were not able to be at the workshops in person.

Online Educational Modules: URL published soon

Description/Justification: Each module contains five multimedia videos at approximately 5-7 minutes in length. Recent educational data indicates that videos of this length maximize viewership and content dissemination (when compared to longer online videos).

#### Fish Health Module Presentations

1. Introduction to Fish Health
2. Infectious Disease
3. Disease Prevention
4. Biosecurity
5. Diagnostic Techniques

#### Water Quality Module Presentations

1. Introduction to Water Quality in Aquaculture
2. Basic Water Quality Parameters 1
3. Basic Water Quality Parameters 2
4. Basic Water Quality Parameters 3
5. Considerations for Different Types of Aquaculture Systems

Details for each workshop and resource links are identified below:

#### Workshop #1:

Partner: North Central Aquaculture Conference

Location: Kansas City, Embassy Suites KCI

Airport Date: February 10, 2018

Attendance: >30

Participating experts: David Brune (UM), Greg Fischer (UWSP NADF), Greg Trusso (Global Aquaculture Supply), Chris Hartleb (UWSP), Matt Rogge (UWSP)

Presentation topics: Advanced aquaponics and RAS production systems, shrimp production, hatchery design, economics of system design, trends in aquaponics, microbes in aquaponics.

Survey summary: No survey results

URL: <https://www.ncrac.org/presentation/2018-north-central-aquaculture-conference>

#### Workshop #2:

Partner: Minnesota Aquaponics

Symposium Location: University of

Minnesota, St. Paul, MN Date: April

28, 2018

Attendance: >45

Participating experts: Matt Smith (OSU), Alex Primus (UMN), Marie Abbey (UMN), Lee Scogins (Urban Organics)

Presentation topics: Water quality in aquaponics, fish health and disease control, plant production in aquaponics, large scale aquaponic production example.

Hands-on activities: Water quality testing equipment and procedures, fish health assessment procedures, plant health, production, and pest management.

Survey summary: No survey results URL:

<https://youtu.be/JFv15wjrg0>

Workshop #3:

Partners: Ohio Aquaculture Association and OSU ABC

Location: Ohio Department of Agriculture,

Reynoldsburg, OH Date: November 10, 2018

Attendance: > 45

Participating experts: Stephen Reichley (Clear Springs Foods), Matt Smith (OSU), Mark Flint (OSU), Kathleen Hartman (USDA-APHIS)

Presentation topics: Antibiotics and veterinary feed directives, common diseases, farm biosecurity, stress management  
Hand-on activities: Fish necropsy by attendees and expert panel discussion.

Survey summary: No survey results

URL: [https://southcenters.osu.edu/abc2\\_intensive\\_november2018](https://southcenters.osu.edu/abc2_intensive_november2018)

Workshop #4: URL published soon

Partner: Wisconsin Aquaculture Association Annual

Conference Location: Holiday Inn South I-94, Eau

Claire, WI

Date: February 16, 2019

Attendance: >63

Participating experts: Nick Phelps (UMN), Alex Primus (UMN), Matt Rogge (UWSP), Matt Smith (OSU), Myron Kebus (WI DATCP), Sue Marquenski (WI DNR, retired)

Presentation topics: fish health, microbiome, infectious disease treatment, water quality, response to fish health issues  
Hands-on activities: Fish necropsy by all attendees and water quality testing and discussion of various methods of testing pertinent parameters.

Survey summary (n=38): 63% of participants were current aquaculture or aquaponic producers and considered fish health and water quality to be a major concern for their business (4.6/5). Participants learned useful information about fish health (4.4/5) and water quality (4.1/5), and the many stated they were very likely to use what they learned on their farm (4.2/5) and thought it would improve production efficiency/profitability (4.1/5). Lastly, participants highly rated the overall workshop (4.1/5) and were highly likely to recommend it to others (4.6/5).

URL: published soon

Workshop #5:

Partner: Indiana Aquaculture Association

Conference Location: Lions Club, Russiaville,

IN

Date: March 15, 2019

Attendance: >33

Participating experts: Bob Rode (PU), Paul Brown (PU), Eric Fischer (IN DNR), Jennifer Strasser (IN BOAH), Daniel Gascho (Four Star Veterinary Services), Paul Zajicek (NAA), Matt Smith (OSU), Amy Stone (Aquatic Equipment and Design), Alex Primus (UMN).

Presentation topics: Nutrition, regulations, fish health, water quality, system design

Hands-on Activities: Fish necropsy by all attendees and water quality testing and discussions about the different ways of testing water quality parameters.

Survey results (n=21): 48% of participants were current aquaculture or aquaponic producers and considered fish health and water quality to be a major concern for their business (4.2/5). Participants learned useful information about fish health (4.7/5) and water quality (4.4/5), and many stated they were very likely to use what they

learned on their farm (4.7/5) and thought it would improve production efficiency/profitability (4.6/5). Lastly, participants highly rated the overall workshop (4.6/5) and were highly likely to recommend it to others (4.7/5).  
URL: published soon

#### Workshop #6:

Partners: Iowa Aquaculture Conference and the Coalition to Support

Iowa's Farmers Location: Quality Inn and Suites Starlite Village

Conference Center, Ames, IA Date: March 22-23, 2019

Attendance: >125

Participating experts: Joe Morris (ISU), Matt Smith (OSU), Brian Waddingham (Coalition to Support Iowa's Farmers), Scott Platt (IA DIA), Brian Tapp (ISU), Carole Engle (Engle-Stone Aquatic\$, LLC)

Presentation topics: Intensive pond production, best management practices, rules and regulations for aquaculture and food markets, role of markets, business and financial planning. Hands-on activities: March 23, Financial planning and budgeting worksheets led by Dr. Engle with assistance from Smith and Dr. Morris.

Survey summary (n=32 for Friday and n=23 for Saturday): Friday Miscellaneous agenda: 61% of the respondents stated that the speakers' presentations were very valuable to them and 96% stated the variety of speakers and topics were valuable or vary valuable. Overall value of the Friday conference was recorded as 46% very valuable. Saturday Business Planning/Marketing agenda: 70% (16/23) noted they were currently producing in the aquaculture/aquaponics sectors and participants noted they neither agreed nor disagreed (3.7/5) that business planning and marketing were a major concern for their business. Participants learned useful information about business planning (4.6/5) and marketing aquaculture products (4.3/5). They thought it would improve the production efficiency on their farm (4.4/5) and they intended to use their new knowledge on their farm (4.3/5). Lastly, participants thought the overall workshop was valuable (4.5/5) and would recommend the workshop to others (4.4/5).

URL: <https://www.supportfarmers.com/iowa-aquaculture-conference/>

### Impacts

- A significant number of people (at least 330) participated in the workshops
- Twenty-four different experts presented to producers for a total of 40 presentations with many experts at multiple workshops
- Experts were from 10 different states and included in and out-of-region experts as well as public and private experts for high-caliber trainings to increase knowledge transfer
- In addition to presentations, most workshops included hands-on activities for participants to practice what they learned, which improved learning outcomes
- Over 14.5 hours of developed educational content has been published for producers and interested producers to learn and reference freely online. An estimated 6 hours of content are in the final stages of editing and will be available online soon
- In-person and online content facilitates technology transfer which allows for current and potential producers to learn from academic and industry presenters. Based on the surveys, we expect this will improve profitability, assist industry development/expansion, and troubleshoot production issues
- Due to limited researchers and Extension FTEs in the North Central Region these resources will serve as "quick reference" for existing producers and interested producers

### Recommended Follow-up Activities

This project was asked for by industry in 2015-2016 and is being touted as a successful transfer of technology to the industry. As there will be over 16 hours of content published online (with specified topics time-stamped as to not overwhelm viewers), this should assist the limited aquaculture FTEs by allowing them to become more streamlined with their technology transfer. It is clear there is ample appreciation and desire for more Extension FTEs and while this has been a valuable educational stream, hands-on education needs to continue and that requires additional FTEs. As baby boomers in aquaculture Extension reach retirement age, it is vital that universities maintain commitment to aquaculture by filling positions so that these hands-on trainings committee.

## **Publications, Manuscripts, Workshops, and Conferences**

See the Appendix for a cumulative output for all NCRAC-funded Extension activities.