

Project Title: Supporting and expanding aquaculture in the Midwest through Extension and outreach [Termination Report]

Dates of Work: November 1, 2018 – April 30, 2021

NCRAC Funding Level: \$131,432

Participants: Matthew Smith, The Ohio State University, OH

Extension Liaison: Alexander Primus, University of Minnesota

Industry Advisory Council Liaison: Jeni Blackburn

Reason for Termination: Project objectives completed.

Objectives

1. Build upon previously successful Extension and outreach programs to enhance the established North Central Region (NCR) industry by assisting farmers, educating educators, and assessing and prioritizing the needs of the NCR industry in ways that would not be probable at this time without NCRAC support.
2. Act in a liaison capacity on a variety of collegiate, state, regional, and national committees to ensure the NCR is well-represented when issues or opportunities that can or will affect the NCR aquaculture/aquaponic industry arises.
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/aquaponic industry.
4. Work closely with the liaisons of every NCRAC funded project to assist in developing and achieving strong deliverables to the industry.
5. Coordinate efforts for seeking non-NCRAC support for NCR aquaculture development; including consumer perception of aquaculture/aquaponics and technology transfer.

Project Summary

Additional training and education are needed in the Midwest. Farmers and potential farmers responded positively to the workshops, surveys, available office hours, and the additional Extension full-time equivalent (FTE) that is available to them. Smith completed all objectives, although COVID-19 significantly negatively impacted this project as Smith was supposed to travel extensively throughout the region to visit farms and conduct in-person training and education. All deliverables were not achieved as needs of the industry were revealed during this project. Additionally, COVID-19 impacted travel and ability to effectively communicate and collaborate. Ohio issued a state-at-home order on 22 March 2020, and Smith did not travel again until after this project was terminated in April 2022. Prior to the issued stay-at-home order, Smith developed, implemented, and analyzed a survey for farmers who were familiar with NCRAC to learn about their thoughts on funded research.

Results were presented 11 February 2020 at Aquaculture America 2020 in Honolulu, Hawaii as well as at the Listening Session that was held in Columbus, Ohio just prior to the 2020 North Central Aquaculture Conference. The Listening Session was developed as part of this project to bring together researchers, Extension, and producers to increase communication and understanding of needs and opportunities in the region. PI Smith was also able to visit farms or meet with farmers in Indiana, Iowa, Michigan, Missouri, Minnesota, Ohio, and Wisconsin before the shutdown. In-person workshops/meeting were conducted in Indiana and Minnesota, and PI

Smith assisted the Ohio Aquaculture Association and the North Central Regional Aquaculture Center with the development and implementation of the 2020 North Central Aquaculture Conference. An additional 1.5 FTE has been created for the region because of this project.

Project recommendations include:

1. Increase funds for Extension to travel to farms in the North Central Region.
2. Encourage producer association leadership to share materials with their membership that is created or shared by Extension.
3. Encourage producers to participate in available open office hours or request support during other times that are more convenient.
4. Expand Extension support in the region.

Technical Summary and Analysis

Objectives 1-3. —

NCRAC survey for farmers

NCRAC published the 2018 RFP and received proposals to review. However, due to the perceived quality of the proposals, NCRAC retained most of the funds for a future RFP. There was concern among the NCRAC Board of Directors that there was a disconnect between what was put forward as a proposal versus what was needed by the farmers in the region. An IRB-approved survey was developed, implemented, and analyzed. Seven states were visited, and we obtained data from six farmers who were familiar with NCRAC. We interviewed them in person and asked 24 questions. Key data was reported to the attendees of the Listening Session prior to the 2020 North Central Aquaculture Conference.

Workshops and trainings

Indiana

The Indiana Aquaculture Association, Inc. (IAAI.) and Purdue University helped organize a joint workshop on 25 October 2019 in Goshen, Indiana. This workshop was held in northeast Indiana to also support farmers from northwest Ohio, southern Illinois, and southern Michigan. The workshop was also designed to be in this area to support members of the Plain community due to their concentration in this part of the state. The workshop focused on water quality and stress management. PI Smith, Phil Shambach (President of the IAAI.), and Bob Rode (Purdue University) provided formal presentations. Presentation topics included: feed and its effect on water quality, limiting stress in aquaculture, introduction to water quality, and RAS water quality. There was also over two hours after lunch where we tested several farmer's water so that they could receive hands-on training. For example, we showcased several ways to test pH, total ammonia-nitrogen, nitrite-nitrogen, etc. We also demonstrated how to calibrate meters.

Minnesota

The newly re-organized Minnesota Aquaculture Association met in Minneapolis, Minnesota on 8 January 2020. PI Smith participated by presenting information about the structure and function of NCRAC, along with how NCRAC can support their businesses. Prior to, and during this meeting, PI Smith helped troubleshoot and educate producers who sought assistance. Farmers, researchers, Extension, MN Department of Natural Resources, and MN Sea Grant participated in the day.

Missouri

The Missouri Aquaculture Association held an in-person meeting on 20 February 2021. PI Smith could not travel so he virtually presented COVID-19 survey data (discussed below) as well as explained the structure and function of NCRAC, along with how NCRAC can support their businesses.

Listening session

Prior to the 2020 North Central Aquaculture Conference in Columbus, Ohio, a listening session was organized to encourage open discussion among producers, researchers, and Extension. Smith organized the event, and the results of the day can be found here: <https://www.ncrac.org/ncrac-2020-conference-listening-sessions-summary>. NCRAC Director Dr. Morris summarized the results. There were 41 farmers, 21 researchers, 12 Extension, and 2 suppliers who participated in the listening sessions. Extension moderated the sessions and needs or ideas for projects were written on oversized notepads and stuck to the walls of each room. The morning's concurrent sessions included Percids, Centrarchids, Salmonids, and collectively Tilapia, Shrimp, and Other. In the afternoon, concurrent sessions included Ponds, RAS, Aquaponics, and Flow through and Semi Recirculation. Participants were free to move among the different sessions. The NCRAC Board believes that this opportunity to communicate led to higher-quality proposals being submitted to NCRAC following the release of the 2020 RFP. There were 17 full proposals submitted to NCRAC for the 2020 RFP, and NCRAC decided to fund eight projects. The fact that NCRAC funded a significant number of proposals in 2021 partially confirms this suspicion. The NCRAC Board has again asked Extension to lead another listening session just prior to the next North Central Aquaculture Conference, which will be held later in 2002 or early 2023. Dr. Lauren Jescovitch of Michigan State University and Michigan Sea Grant is slated to lead this day.

National COVID-19 aquaculture surveys

During the 2020 North Central Regional Aquaculture Center annual meeting, PI Smith had a conversation with a producer from Indiana regarding Chicago's Asian markets being void of people as fears of COVID-19 reached the United States. We discussed the need to measure how this could impact markets and sales of producers in the North Central Region who sell live fish in this area. Smith sought out the assistance of survey expert Dr. van Senten, a Professor and Extension Specialist at Virginia Tech. His leadership, along with support from Dr. Engle (Virginia Tech and Engle-Stone Aquatic\$ LLC) and the National Aquaculture Association, led to the creation of the IRB-approved national COVID-19 quarterly surveys, the results of which can be found here: https://www.arec.vaes.vt.edu/arec/virginia-seafood/research/Impacts_of_COVID19.html. The quarter 1 2020 survey had the highest response rate of the 2020 surveys. There were 537 responses that were sufficiently complete to be analyzed. Based on the 2018 Census of Aquaculture, this represents approximately 18% of all U.S. aquaculture operations. It is possible that the data obtained during these surveys led to aquaculture farmers receiving relief funding they may not have otherwise qualified for. Presentations by the COVID-19 survey team include [2020 Great Lakes Aquaculture Day](#), [United States Aquaculture Society and National Aquaculture Association](#) webinar, 2020 Midwest Fish and Wildlife Symposium, among others. To date, thirteen fact sheets have been generated on this data.

Objective. 4 — In 2020, Smith was a PI or an Extension Liaison on seven of the 20 proposals submitted to NCRAC. Project titles are:

1. Evaluating novel methods for preventing *Aeromonas*-associated losses in Yellow Perch (*Perca flavescens*) using laboratory and field-based vaccination trials (co-PI and Extension Liaison)
2. Non-lethal bird deterrent evaluation in the NCR (Extension Liaison)
3. Assessing the effectiveness of NCRAC funded research in aquaculture within the North Central Region (PI and Extension Liaison)
4. Intensification of first year largemouth bass (*Micropterus salmoides*) using alternative pond-based production systems (Chairperson)
5. Sustainable aquaculture: development of new quantitative metrics for use in marketing aquaculture products (Extension Liaison)
6. Improving fish health in the NCR by integrating extension with the development of alternative disease prevention methods (co-PI and Extension Liaison)
7. Developing social license for trout aquaculture in the North Central Region (co-PI)

Objective 5. —

Additional full-time equivalent support within the region

Smith maintains a 50% region-wide FTE as of the writing of this termination report.

Additionally, National Oceanic and Atmospheric Administration (NOAA) Sea Grant designated funding to all Sea Grant programs to support the aquaculture industry because of COVID-19.

Smith wrote proposal language for Ohio Sea Grant to obtain aquaculture Extension support, and as a partial result Ohio Sea Grant hired an aquaculture Extension educator in October 2020. In the summer of 2021, NCRAC also funded a project entitled *Improving fish health in the NCR by integrating extension with the development of alternative disease prevention methods*. Within this project will be a hired and dedicated Extension veterinarian to train, educate, and support farmers in the region. Chairperson, Dr. Tom Loch with MSU, has received formal support by MSU's College of Veterinary Medicine to financially support the veterinarian for an additional three years. Therefore, the region will have an additional FTE in way of an Extension veterinarian for a minimum of five years.

Liaison activities

Smith was invited to participate in the in-person meeting of the Recirculating Aquaculture Salmon-Network (RAS-N) in Washburn, Wisconsin on 10-11 December 2019. This is a NOAA-funded project that is dedicated to supporting RAS salmon production in the U.S. Smith did not present, but instead learned about large scale RAS in the U.S. to understand how NCRAC can better support this industry in the region. The RAS-N website can be found here: <https://ras-n.org/>.

Smith was also invited to participate in the first in-person meeting of the Great Lakes Aquaculture Collaborative, which is also a NOAA-funded project that is dedicated to supporting aquaculture in the Great Lakes region. Their website can be found here: <https://greatlakesseagrant.com/aquaculture/>. This meeting was held in Chicago, Illinois on 13 December 2019. There are a few members of this collaborative who are engaged in NCRAC; however, this collaborative invited me to participate to share insights into some of the recent Extension and outreach activities that NCRAC has supported so that programs are supportive of

one another and not duplicative.

Open office hours

Weekly open office hours were created during COVID-19 and continue to be implemented as much as possible because of this project. In weekly emails to various list-servs, including NCRAC's NCR Fish Culture list-serv, PI Smith shares an informative educational piece with the readers. In the same contact, the readers are encouraged to join open office hours to discuss the educational piece. Farmers and non-farmers from at least six Midwest states have joined the open office hours. As of writing this termination report, PI Smith continues to hold these open office hours for anyone in the North Central Region.

Impacts

Producers in the Midwest and the rest of the United States utilized the results of our COVID-19 survey data to obtain local, state, or federal financial support for their business. ~Producers, researchers, and Extension in the Midwest found the roundtable discussions useful and meaningful. NCRAC Board members state the proposals that were received in 2020 were relevant and applied. High quality proposals are likely to lead to projects that have meaningful impact on the industry. ~Open office hours have allowed producer, interested producers, and researchers the opportunity to discuss ideas or questions they have.

Recommended Follow-Up Activities

The NCRAC program should continue to seek regional partners, e.g., state aquaculture associations and public agencies, to produce deliverables in manner that illustrates on the importance of regional aquaculture work to North Central universities. Specific suggestions are:

- Encourage Extension to lead proposals (not just tag along to research projects).
- Encourage NCRAC to support Extension projects that consist of field demonstrations only, e.g., Evaluation of Alternative Management Techniques and Systems to Improve Production of Pond-Reared Yellow Perch: Modeling the U.S. Catfish Industry.
- Encourage Extension members to submit proposals that can lead to them increasing their laboratory and Extension capacity (materials and supplies such as water quality kits, DO meters, microscopes) whereby regional extension programs are enhanced.
- Encourage NCRAC to develop a mechanism that supports Extension employees traveling to other states to participate in state/regional conferences.

Publications, Manuscripts, Workshops, and Conferences

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