Addressing Critical Aquaculture-Marketing-Oriented Applied Research and Outreach (Phase 2)

Theme B: Industry Development: TIDA 1. Marketing/Promotion/Merchandizing; TIDA 2. Economics/Cooperative Development/Partnerships

Theme C: Extension/Education: TEA 1. Producer Education; TEA 2. Consumer Education

Chairperson:	J. Stuart Carlton, Ph.D.
Industry Advisory Council Liaison:	Jeni Blackburn
Extension Liaison	Amy Shambach
Funding Request	$168,819
Duration:	2 years, 09/01/2021 – 08/31/2023

Objectives

1. Expand Midwest-oriented, consumer-facing aquaculture outreach to include (1) "Local Farmers, Local Fish" videos filmed in multiple states in the North Central Region and (2) a redeveloped Fish4Health website and outreach collateral including additional information on the health benefits of farmed fish.

2. Develop aquaculture training and toolkits for both Sea Grant and Cooperative Extension Service (CES) staff in the areas of nutrition and family health in addition to aquaculture marketing techniques.

3. Refine and upgrade the Eat Midwest Fish website to include better connections to direct-sale producers and explore collaborations with local foods organizations to provide better linkage of fish producers and fish products into online marketing platforms these organizations operate.

4. Serve as a liaison between various federal and state programs working in the regional aquaculture industry.

Deliverables

1. At least five Local Farmers, Local Fish videos from at least three states, with at least one of the states being a Great Lakes state and one being a non-Great Lakes state.
2. At least three additional farmed fish cooking videos and six additional farmed fish fact sheets.
3. An updated and expanded Fish4Health website, containing additional information on farmed fish.
4. A completed needs assessment report describing the existing level of knowledge of and programming about the human health benefits of eating farmed fish.
5. A health benefits of eating fish toolkit for CES staff, developed, pilot-tested, and delivered to relevant/interested Human Health & Nutrition CES staff throughout the region.
6. An aquaculture marketing toolkit for aquaculture producers, developed, pilot-tested, and delivered to producers throughout the region.
7. An expanded Fresh Fish Finder map on EatMidwestSeafood.org, incorporating links to direct-sales sites where available and a separate section on direct sales of farmed fish.
8. An annual Liaison Report describing liaison activities taken and connections made.

Proposed Budgets

Institution	Principal Investigators	Objectives	Year 1	Year 2	Total
Purdue University	Carlton, Quagrainie	1–4	$87,744	$78,075	$165,819
University of Illinois	Charlebois	1–4	$1,500	$1,500	$3,000
		Totals	**$89,244**	**$79,575**	**$168,819**

Non-funded Collaborators

Facility	Collaborators(s)
Great Lakes Sea Grant	Great Lakes Aquaculture Collaborative members
Purdue University	Dr. Charlie Santerre

Project summary

We propose to build upon the success of our prior NCRAC-Sea Grant project to continue to perform innovative aquaculture applied research and outreach throughout the North Central Region. We will continue the most effective of our current efforts while expanding work in several areas with the long-term goal of helping to grow the NCR aquaculture market by educating consumers on the value of sustainably produced, locally farmed fish. As in Phase 1, we will take a partnership approach: **NOAA/National Sea Grant Office will provide $70,000 in matching funds if this proposal is successful**. This partnership will provide us with significant resources and leverage to work towards four objectives: (1) expand Midwest-oriented, consumer-facing aquaculture outreach, focusing on sharing local farmers' stories and on leveraging extension staff to help consumers understand the health benefits of farmed fish; (2) develop two toolkits: one on fish marketing for producers and one on the health benefits of farmed fish for nutrition extension staff; (3) expand our EatMidwestSeafood.org website to include connections to direct-sale producers; (4) and act as a liaison between NCRAC and Sea Grant aquaculture efforts in the region. This project will significantly expandconsumer- and producer-oriented aquaculture outreach throughout the North Central region.

Justification

U.S. aquaculture is a growing industry with the potential to ease demand on overexploited capture fisheries and reduce the significant edible seafood trade deficit by providing consumers with a source of healthy locally grown protein. However, the growth in aquaculture in the US, generally, and the North Central Region (NCR) specifically, has lagged expectations (NCRAC 2017).

Although the success or failure of the aquaculture industry depends on multiple interrelated factors, there is substantial evidence that understanding consumer perceptions of aquaculture, aquaculture producers, and farmed fish is a key to success for the industry. For example, many NCRAC extension publications (e.g., Burden 2012) and presentations (e.g., Kumar and Engle 2018) discuss the critical role of understanding — and marketing to — consumer attitudes in aquaculture business success. Simply put, continued aquaculture growth requires using production and marketing to be responsive to consumers' preferences.

However, many producers lack knowledge of marketing techniques and/or understanding of consumer preferences, and there are few people working in aquaculture extension in the NCR who deliver consumer-oriented aquaculture programming. The result is that most consumers may be largely unaware of Midwestern farmed fish, even if locally farmed fish might be seen as desirable by residents of the NCR (Shaw et al. 2019). Lack of consumer awareness of farmed fish suggests that aquaculture is an *unobtrusive* issue for most people with which they have limited direct experience (Eyal et al. 1981). As a result, consumer perceptions of aquaculture tend to be through mediated communication such as news media and strongly influenced by their perceptions of terrestrial agricultural and livestock production (Verbeke et al., 2007; Hall and Amberg 2013; Rickard et al. 2018) or by attitudes towards other environmental issues (Froehlich et al., 2017). Consumers may have outdated views of aquaculture production as environmentally detrimental (Conklin 2014). This lack of information and understanding can lead consumers to inconsistent conclusions about farmed fish. For example, one study found that Spanish consumers preferred farmed fish in a blind taste test but preferred wild-caught fish in a test where fish was labeled as wild-caught or farmed (Claret et al. 2016).

Consumers' lack of knowledge and unformed attitudes are a gap that can be filled with extension. In our initial "Phase 1" project, we began extension work to raise consumer awareness of aquaculture and producer awareness of consumer attitudes and marketing techniques (see "Related Current and Previous Work", below). In this project, we propose to expand the most effective of the Phase 1 project and supplement it by developing consumer-oriented aquaculture

extension toolkits for Cooperative Extension staff throughout the North-Central Region and marketing-focused toolkits for producers in the region. Our proposed consumer- and marketing-focused regional aquaculture extension program can work to educate consumers about the benefits of farmed fin- and shellfish as a sustainable source of local protein, serve as a liaison between consumers and industry, and supplement existing, production-focused aquaculture extension work. By partnering with the Sea Grant programs in the North Central Region, we can leverage existing facilities, networks, and ongoing extension activity while serving the entire North Central Region.

Related Current and Previous Work

This proposed project is an extension of our ongoing, NCRAC-funded regional aquaculture marketing extension project (the "Phase 1" project). Due to delays in hiring the right personnel and pandemic-related restrictions on travel and events, we are in an no-cost extension period for that project and will continue to roll out outreach and communication pieces throughout the fall and the spring.

The objectives of our Phase 1 project are presented here, along with brief comments on our progress towards the objectives:

1. **Hire a regional aquaculture extension specialist housed at Purdue University and jointly appointed in the North Central Region Sea Grant Programs and serving all 12 states of the North-Central Region.** We hired Amy Shambach in summer, 2019 to serve as our Regional Aquaculture Marketing Associate. She has been working across the states in the North-Central Region to achieve all of the objectives.

2. **Conduct a regional needs assessment to better understand what consumer- and marketing-oriented aquaculture programming is being done and how to best use extension to address needs and impediments.** Our initial work was to assess what marketing- or consumer-facing aquaculture programming was occurring in the region in order to allow us to develop responsive programming. We invited 569 county extension staff in the region to participate in our needs assessment and approximately 29% of them completed the assessment. We delivered a summary of this assessment to NCRAC staff in early 2020 and have been developing programming and resources over the last 8 months based on our findings. We are in the process of supplementing this with a series of qualitative interviews with producers that we will use both in the latter part of Phase 1 and the proposed Phase 2 of the project. We have contacted approximately 20 producers and conducted approximately ten needs assessment interviews from a total of six NCRAAC states (Missouri, Minnesota, Illinois, Kansas, Ohio, Wisconsin). Ten interviews is a substantial number for a needs assessment that gives us a good idea of what type of programming to develop and deliver, but we are trying to schedule an additional ten interviews to ensure that we are capturing the diversity of opinions in the region. In addition, we have worked are working with other researchers to supplement our needs assessments with a consumer-oriented needs assessment and hope to have those results inform late Phase 1 and early Phase 2 extension work.

3. **Work with existing personnel throughout the North Central Region to develop and deliver extension programming to address consumer needs and impediments aimed at all of the states in the North Central Region.** We provided an update on the extension programming to NCRAC staff earlier in the year and we provide some examples of our work below. In brief, we have developed brochures, factsheets, a cookbook, and more products in addition starting a series of webinars on aquaculture marketing and facilitating stakeholder meetings. We are in the process of finalizing a

website to be launched later this year. We will continue developing and delivering products and programs between now and the project end in Spring, 2021, with a pandemic-influenced focus on digital delivery.

4. **Coordinate development of regional aquaculture extension networks by serving as a liaison among the Sea Grant programs, partnering universities, NCRAC stakeholders, and other stakeholders throughout the North Central Region.** Several project staff serve on the Sea Grant Great Lakes Aquaculture Collaborative (GLAC) and we have provided cross-project updates to NCRAC and to the GLAC to facilitate networking. In addition, we have ensured that NCRAC logos and information is included in products where applicable, helping NCRAC to share credit for some of the GLAC work that the project team has contributed to.

5. **Use quantitative and qualitative evaluation to assess the effectiveness of the specialist's program and to help plan subsequent years of the program.** We have collected metrics evaluating our outputs, ranging from webinar attendees to number of social media followers. We will collect download numbers and other metrics as they become available.

6. **Partner with stakeholders to develop funding extending beyond the initial two-year period.** We continue to seek long-term funding for this work.

To get a sense of the quality of work we are doing, below we highlight a number of accomplishments during the Phase 1 project and illustrate the work that we will be launching over the coming months.

Eat Midwest Fish website.— As a clearinghouse for our consumer-facing programming, we are developing a website, EatMidwestFish.org, which will be launched by end-of-year 2020. The website will house the digital outreach products that we are developing and will also contain a map linking to websites of fish farmers throughout the NCR. The design is nearly finalized as of this writing, with the current mockup can be found in Figure 1.

The current website includes an opt-in map to fish farm locations. If we receive additional funding, we will be able to expand the map part of the website to feature a page with descriptions of and links to farmers' direct sale websites or locations, which will require additional programming and administrative effort beyond what we had resources for in Phase 1.

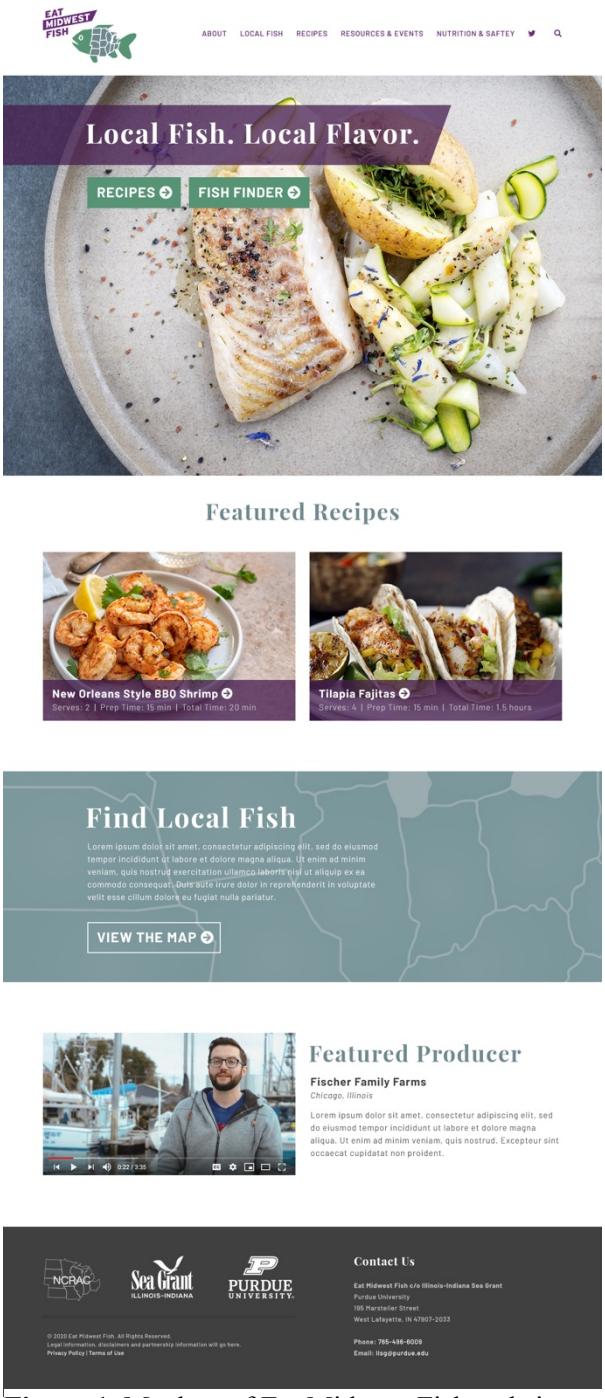

Figure 1. Mockup of Eat Midwest Fish website

Consumer-facing outreach products. — We are producing a series of cooking demonstration videos aimed at demystifying the process of cooking fish. After consulting with communications professionals, we have made these videos with an intentionally homespun, approachable feel to make cooking farmed fish seem achievable to consumers. A production draft example of these videos can be found on YouTube at https://www.youtube.com/watch?v=P_op1OCkLh0. The remainder are in production and will be released over the coming months. This is one of the series that we will expand with additional funds from this opportunity.

We are also producing a series of videos called "Local Farmers, Local Fish", in which we feature different fish farmers from throughout the NCR. These brief videos feature interviews with fish farmers and are designed to help spread the message that farmed fish can be a source of locally

grown, sustainable protein. We currently have two of these videos in production (see an example right here: https://www.youtube.com/watch?v=i5Q36rebsjU) and plan to continue the series on Phase 2 of the project.

We are also producing a digital cookbook, *Local Fish, Local Flavors*, with recipes from stakeholders throughout the NCR. The cookbook is in final revisions; a recent (not-for-distribution) draft can be found at https://public.3.basecamp.com/p/XeYeU6HszLBNjDyaYXuXcexT.

We are complementing these digital efforts with a series of printed brochures and two pagers. These include information on the health and sustainability aspects of farmed fish (click here for an example fish nutrition brochure and here for an example brochure on the sustainability of aquaculture) and a series of farmed fish fact sheets containing helpful information on a variety of farmed fish species that are available in the region, such as this draft fact sheet for walleye (*Sander vitreus*). The next fact sheet in development is for yellow perch (*Perca flavescens*) and we anticipate completing approximately six sheets total during Phase 1.

Social media campaign.— COVID-19 has limited our ability to travel to in-person events, so we are focusing on social media outreach. We have started Twitter and Facebook campaigns to help disseminate our documents and we plan to expand this activity over the course of the year and in Phase 2 of the project. An example of some of the aquaculture social media outreach can be found via this Twitter search: https://twitter.com/search?q=ilinseagrant%20aquaculture&src=typed_query&f=live

Marketing webinar series.— Based on feedback from the producer needs assessment interviews, we have developed a marketing webinar series, some of which will be standalone and some of which will be held in partnership with the Great Lakes Aquaculture Collaborative (GLAC). The first webinar was co-branded with the GLAC and featured Dr. Carole Engle discussing aquaculture business planning. The webinar was attended by over 70 stakeholders and can be seen on YouTube by clicking this link. The next three webinars are planned: Marketing 101 with Dr. Kwamena Quagrainie (co-PI on this proposal) is tentatively scheduled for November and Social Media Marketing is scheduled for December or January. Future webinars will be planned based on feedback from stakeholders.

Statement Regarding Duplication of Research

Although this is not a research project, we accessed the USDA Current Research Information System (CRIS or REEport), the National Sea Grant Office Funding Page, prior Sea Grant-funded projects, and the NOAA Office of Aquaculture Funding Opportunities page using keywords "aquaculture marketing" and "aquaculture" AND "extension". Our proposed work is original work and, in our opinion, does not duplicate any previously funded projects in any of the databases.

Anticipated Benefits

The anticipated benefits are delineated in the logic model and are as follows:

Short-term knowledge gains (timeframe: 1–2 years)

- Consumers will increase knowledge of the health, environmental, and economic benefits of locally produced seafood

- Consumer awareness of the existence of and places to buy locally produced farmed seafood will increase
- Consumers and Extension educators will increase knowledge of how to clean and cook seafood
- Consumers and Extension educators will increase knowledge of the health and environmental benefits of farmed seafood
- Producers will have increased knowledge consumer preferences and direct-sale marketing techniques
- Program staff, NCRAC, USDA, and Sea Grant will increase their understanding of how to effectively partner on synergistic resource issues

Medium-term behavior changes (timeframe: 2–5 years)

- Consumers will increase their consumption of locally produced seafood
- Consumers will use the Eat Midwest Fish website as a resource for information on Midwest aquaculture, farmed fish preparation, and to find locally farmed fish
- Seafood producers, distributors, and sellers will adapt their practices based on consumer preferences
- Seafood producers will increase their ability to offer direct sales based on information from project staff
- Non-aquaculture CES staff will incorporate consumer-oriented aquaculture information into their programming
- The aquaculture industry will receive increased investment from existing and potential producers
- NCRAC, USDA, and Sea Grant will invest in continued partnerships on resource issues.

Long-term condition changes (timeframe: 5+ years)

- Consumers will be aware of and demand locally produced aquaculture as a healthy, sustainable source of protein.
- There will be a culture of offering direct sales among producers throughout the North-Central region.
- The aquaculture industry in the NCR will be more resilient through increased sales, a better-understood market position, and increased consumer demand
- Enhanced quality of life for NCR residents thanks to increased production and consumption of locally grown seafood and a vibrant aquaculture industry
- A culture of collaboration and partnership between NCRAC, USDA, and Sea Grant

Objectives

1. Expand Midwest-oriented, consumer-facing aquaculture outreach to include (1) "Local Farmers, Local Fish" videos filmed in multiple states in the North Central Region and (2) a redeveloped Fish4Health website and outreach collateral including additional information on the health benefits of farmed fish.

2. Develop aquaculture training and toolkits for both Sea Grant and Cooperative Extension Service and staff in the areas of nutrition and family health in addition to aquaculture marketing techniques.

3. Refine and upgrade the Eat Midwest Fish website to include better connections to direct-sale producers and explore collaborations with local foods organizations to provide better linkage of fish producers and fish products into online marketing platforms these organizations operate.

4. Serve as a liaison between various federal and state programs working in the regional aquaculture industry.

Deliverables

1. At least five Local Farmers, Local Fish videos from at least three states, with at least one of the states being a Great Lakes state and one being a non-Great Lakes state.
2. At least three additional farmed fish cooking videos and six additional farmed fish fact sheets.
3. An updated and expanded Fish4Health website, containing additional information on farmed fish.
4. A completed needs assessment report describing the existing level of knowledge of and programming about the human health benefits of eating farmed fish.
5. A health benefits of eating fish toolkit for CES staff, developed, pilot-tested, and delivered to relevant/interested Human Health & Nutrition CES staff throughout the region.
6. An aquaculture marketing toolkit for aquaculture producers, developed, pilot-tested, and delivered to producers throughout the region.
7. An expanded Fresh Fish Finder map on EatMidwestSeafood.org, incorporating links to direct-sales sites where available and a separate section on direct sales of farmed fish.
8. An annual Liaison Report describing liaison activities taken and connections made.

Procedures

Our general approach is to expand on key efforts from our prior ("Phase 1") project, in which we performed a series of needs assessments and developed a series of consumer and marketing-oriented aquaculture outreach products, including a regional website (EatMidwestFish.org; launched Fall of 2020), a series of cooking demonstration videos, consumer-oriented fact sheets on the health and sustainability advantages of farmed fish, and a series of videos featuring local fish farmers. Please see the Appendix for details on our Phase 1 progress; it contains examples of the outreach and extension products that we have developed or are developing.

In this proposal ("Phase 2"), we will continue the most effective of those efforts while expanding our work in several areas with the long-term goal of helping to grow the NCR aquaculture market through focusing on educating consumers on the value of sustainably produced, locally farmed fish. As in Phase 1, we will take a partnership approach: **NOAA/National Sea Grant Office has committed to providing $70,000 in matching funds if this proposal is successful**. This will provide us with significant resources and leverage to work towards our four objectives, detailed below.

1. Expand Midwest-oriented, consumer-facing aquaculture outreach to include (1) "Local Farmers, Local Fish" videos filmed in multiple states in the North Central Region and (2) a redeveloped Fish4Health website and outreach collateral including additional information on the health benefits of farmed fish.

In Phase 1 of the project, we conducted a needs assessment of aquaculture producers, extension personnel and, via secondary data, consumers, and used the results of the needs assessment to develop a responsive consumer and marketing-oriented outreach program, including:

1. Information on the health benefits of eating fish, including brochures, flyers, and presentations
2. Videos and brochures featuring fish cooking techniques
3. Maps of producers who offer direct sales
4. Videos featuring local fish farmers
5. A website, EatMidwestFish.org, which will house the outreach products associated with Phase 1 and Phase 2 of this project and serve as a promotional hub for Midwest aquaculture.

These products are in various stages of drafting and dissemination as we work to complete Phase 1 of the project by April of 2021. Draft examples of the work can be seen in the appendix to this proposal.

In Phase 2, we propose to:

a. Expand this work to include additional "Local Farmers, Local Fish" videos from throughout the NCRAC region, additional videos on preparing and cooking farmed fish, and additional information on the health benefits of fish. These products will be targeted at consumers in states throughout the North Central Region and will be delivered electronically and in partnership with Cooperative Extension Service (CES) personnel.

b. Continue our printed outreach, focusing on farmed fish fact sheets to help consumers understand the different species that are available and how to cook each of the species.

c. Expand existing seafood health benefits information to include farmed fish. Dr. Charles Santerre, a professor in the Department of Nutrition Science at Purdue, has a virtual library of information on the health benefits of eating fish, including the informational

Why this team?

Our team has decades of combined experience in aquaculture, marketing, outreach, and social science and has been working together to facilitate aquaculture development on a regional basis for several years now. Our skills make us ideally suited to continue our work in Phase 2 of the project:

Stuart Carlton, Ph.D., Illinois-Indiana Sea Grant (IISG)'s assistant director, is a social scientist who has worked to develop toolkits and decision-support tools for farmers across the Midwest and has worked with resource management agencies across to evaluate their programming efforts. As PI of the Phase 1 project, he oversees the outreach and extension work done by the rest of the project staff.

Kwamena Quagrainie, Ph.D., IISG's aquaculture marketing specialist, has worked with countless aquaculture producers in the Midwest and beyond to help them run more sustainable businesses. Kwamena is a member of the NCRAC Board of Directors and the Illinois and Indiana Aquaculture Associations.

Patrice Charlebois, IISG's outreach program leader, has over 20 years' experience in developing award-winning outreach throughout the Midwest and has a wealth of knowledge of how to use Extension to foster behavior change. In this project, she will use this experience and her connections to help guide the development of extension products.

Amy Shambach (senior personnel and Extension liaison) is IISG's regional aquaculture marketing associate and she brings a wealth of experience in fish farming, marketing, and more. Amy has led the design of virtually all of the Phase 1 programming and will do the same with Phase 2. Amy is a member of the NCRAC Board of Directors and the Illinois and Indiana Aquaculture Associations.

Fish4Health.net website, fish-health wallet cards, and more. Dr. Santerre no longer has the funds or time to maintain this important resource. We have had initial discussions with Dr. Santerre to acquire his existing seafood health benefits information, use staff time on this project to expand the information related to farmed fish (it currently focuses on wild-caught fish), and repackage it in a way that will help both Sea Grant extension staff and health and nutrition-focused CES staff to incorporate seafood nutritional information into their programming.

Objective 1 deliverables

Deliverables for Objective 1 include:

1. At least five additional Local Farmers, Local Fish videos from at least three states, with at least one of the states being a Great Lakes state and one being a non-Great Lakes state. We believe that we will be able to create more than this, but we are hesitant to commit to more until we know what pandemic-related travel restrictions will look like in the short-to-medium term future.
2. At least three additional farmed fish cooking videos and six additional farmed fish fact sheets.
3. An updated and expanded Fish4Health website, containing additional information on farmed fish.

2. Develop aquaculture training and toolkits for both Sea Grant and Cooperative Extension Service and staff in the areas of nutrition and family health in addition to aquaculture marketing techniques.

Our needs assessments during Phase 1 showed us that there are very few people working in aquaculture extension in the NCR and most CES staff offer limited-to-no aquaculture programming (Figure 2). This means that most residents of the NCR have no access to relevant programming, either on the marketing/production side or on the consumer side. This is a significant gap that may be limiting industry growth in the region.

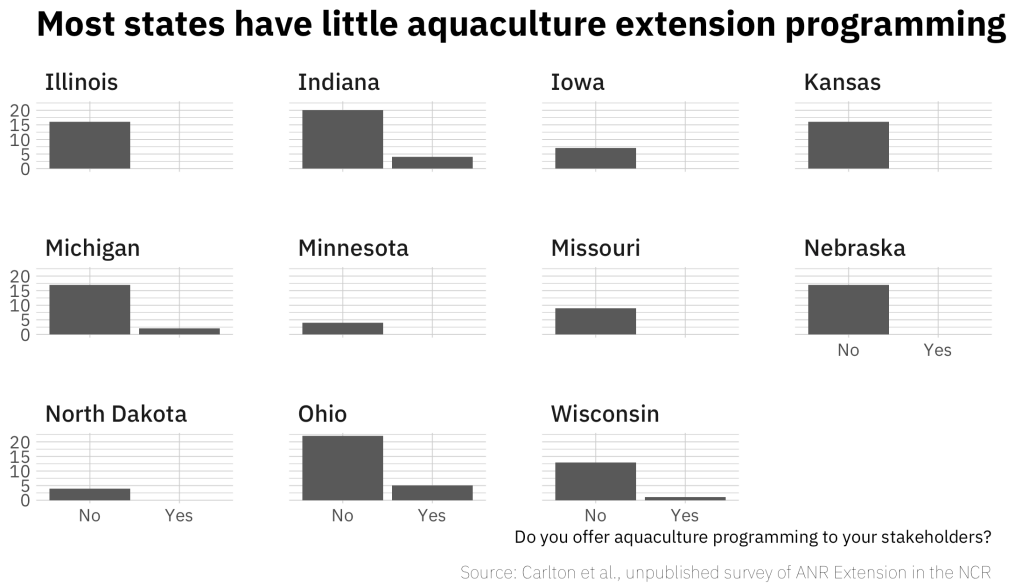

Figure 2. Most states in the North Central Region offer very little aquaculture extension programming.

Given a lack of budget and the challenges of regional coordination, this gap is unlikely to be filled by hiring of a fleet of extension agents. Instead, we are proposing to leverage existing resources and to coordinate regional outreach by developing two toolkits to help CES personnel increase their aquaculture programming: one focused on direct-sale marketing techniques for fish producers, and the other targeting nutrition and health extension personnel to help them incorporate seafood nutritional information into their programming. To do this, we will:

a. Conduct a needs assessment of NCRAC-region CES staff in aquaculture and human health and nutrition to ensure that our toolkits are well-designed to meet their needs.

b. Develop and pilot-test the toolkits to ensure that they are accurate, useful, and usable. We will develop the toolkits by packaging up existing outreach materials and creating new materials as needed to fill out the toolkit.

c. Send the toolkits to relevant CES staff throughout the region and train the staff on the toolkits' use.

The seafood nutrition toolkit will consist of farmed fish fact sheets, links to the digital *Local Foods, Local Flavor* cookbook, information from the Fish4Health website, and newly developed materials as determined by the needs assessment. The newly developed material may include specific programs for CES staff to deliver, additional fact sheets or brochures, or other digital or physical outreach material depending on the results of the needs assessment. It will be pilot-tested with CES staff at Purdue and Illinois, refined, and delivered to CES staff digitally with hard copies available for those who want them. We will conduct a series of web-based training sessions to train CES staff on the use of the toolkit.

The direct-sale marketing toolkit will consist of case studies on successful direct-sale marketing, descriptions of best practices based on our producer interviews, links to the webinars that we have produced (potentially including subsequent webinars produced using Phase 2 resources), summaries of recent needs assessments and surveys describing consumer needs, and other information as determined by the supplemental needs assessments that we conduct as part of Phases 1 and 2. The other materials may include information specific methods (e.g., how to use social media or resources for getting started in direct sales), additional case studies, or other materials, depending on feedback from producers. In addition to the needs assessment, we will develop and pilot-test the toolkit with colleagues from the Great Lakes Aquaculture Collaborative, which includes aquaculture extension in each of the Great Lakes states, and with other colleagues in aquaculture extension throughout the North-Central Region. We will deliver the direct-sale marketing toolkit through CES staff and directly to producers via the Great Lakes Aquaculture Collaborative, state aquaculture associations, and regional aquaculture meetings.

Objective 2 deliverables

Deliverables for Objective 2 include:

1. A completed needs assessment report describing the existing level of knowledge of and programming about the human health benefits of eating farmed fish.
2. A health benefits of eating fish toolkit for CES staff, developed, pilot-tested, and delivered to relevant/interested Human Health & Nutrition CES staff throughout the region.
3. An aquaculture marketing toolkit for aquaculture producers, developed, pilot-tested, and delivered to producers throughout the region.

3. Refine and upgrade the Eat Midwest Fish website to include better connections to direct-sale producers and explore collaborations with local foods organizations to provide better linkage of fish producers and fish products into online marketing platforms these organizations operate.

In Phase 1 of the project, we are developing a website (EatMidwestFish.org) that we plan to launch in the Fall of 2020 (see a design mockup in the Appendix). This website will feature some of the digital outreach materials described above and developed in Phase 1 in addition to links to other relevant Midwest aquaculture resources. In addition, we leveraged additional funds from the National Sea Grant Office (beyond their original $70,000 commitment) to develop an opt-in map of aquaculture producers throughout the NCR, which will launch simultaneously with the website.

With our Phase 1 resources, we had limited ability to point consumers toward direct-sales sites that regional producers and local foods organizations. In Phase 2 of the project, we are proposing to:

a. Expand the website to include better links to direct-sale producers, including an opt-in directory with descriptions of and direct links to producers who offer in-person or online direct sales. The success of the directory will depend on producer cooperation and we have already begun discussing the possibility with producers in the region.

b. Explore collaborations with local foods organizations in the region to provide better linkage of fish producers and fish products into online direct-sale and marketing platforms these organizations operate.

By expanding EatMidwestFish.org to include these linkages, we can help to facilitate better connections between aquaculture producers and consumers while underscoring the message that farmed fish can be a sustainable source of locally produced protein.

Objective 3 deliverables

The primary deliverable for Objective 3 is an expanded Fresh Fish Finder page on EatMidwestSeafood.org, incorporating links to direct-sales sites where available and a separate section on direct sales of farmed fish.

4. Serve as a liaison between various federal and state programs working in the industry.

Through the Great Lakes Aquaculture Collaborative and other efforts, NOAA is making a significant investment in aquaculture research and extension in the Great Lakes region. In addition, there are extension agents and personnel working throughout the different states who might not have open lines of communication among them. We are proposing to continue to serve as a liaison and conduit between these various entities to reduce duplicated effort in research and outreach while giving NCRAC visibility into (and credit-sharing for) some of these key efforts.

Objective 4 deliverables

The primary deliverable for Objective 4 is an annual Liaison Report describing liaison activities taken and connections made. This report will either be delivered separately or as part of the annual reporting process for the grant.

Evaluation and Outreach

Outreach is integral to this project: we are proposing a regional, consumer-oriented outreach and extension program serving all of the states of the North Central Region. However, our Phase 1 needs assessment showed that there is very little aquaculture extension programming being done in the North Central Region (Carlton et al., unpublished data). Since it is infeasible for project staff to travel extensively to each state in the North Central Region to conduct regular programming, we will expand our reach by leveraging digital resources and by creating tools that can be integrated into existing programming by non-aquaculture CES personnel such as Nutrition and Youth/Community/Family extension staff. This will allow the project to build aquaculture extension programming in North Central Region states that currently lack aquaculture extension capacity, expanding both the reach and the impact of the project. In addition, project staff are members of both the Great Lakes Sea Grant Network and the Sea Grant Great Lakes Aquaculture collaborative, which will give them access

Beyond integrating with CES staff and existing Sea Grant aquaculture personnel, we will engage in extensive digital and new media outreach in order to promote our outreach material. Illinois-Indiana Sea Grant has an active and robust social media presence that was recently identified by an outside auditor as one of the top five in the 34-program Sea Grant network. We will use this social media presence, along with select advertising on platforms like Facebook, to ensure that our consumer-facing products actually reach the consumers that they intend to reach.

We will conduct quantitative and qualitative evaluation throughout the project, as well, both by tracking outputs (number of contacts, downloads, etc.) and by using quantitative and qualitative formative and summative evaluation questionnaires. These will be conducted by project staff in consultation with PI Carlton, who is a Ph.D.-holding social scientist with over ten years' experience in program evaluation.

Situation: A Midwest aquaculture industry that is increasingly successful from a technical production standpoint but has substantial room for increasing both the share and size of the seafood market.
Goal: A resilient, sustainable aquaculture industry throughout the North-Central Region that produces a major source of protein for healthy communities
Objective: Build off Phase 1 success to produce outreach and educating consumers on aquaculture preparation and the health, economic, and environmental benefits of locally grown aquaculture.

Logic Model					
Inputs	Outputs		Outcomes/Impacts		
	Activities & Deliverables		Knowledge Gain	Behavior Change	Conditions
People - Amy Shambach, Regional Aquaculture Outreach Associate - Project PIs - Advisory board - Sea- and Land-grant extension partners - Great Lakes Aquaculture Collaborative - University support staff *Resources* - NCRAC funds - Sea Grant funds - Existing equipment - Partner aquaculture labs, production facilities, and producers - Team staff time *Materials* - Factsheets - Websites - Supplies *Research* - Previous needs assessments - Theoretical & applied marketing research - Marketing campaign evaluations	*Project management* - Supplemental needs assessment - Develop network - Liaison activities *Consumer-facing outreach* - Local Farmers, Local Fish videos - How-to-cook videos - Farmed Fish Fact Sheets - Expanded Eat Midwest Fish website, improved links to direct sales - Updated Fish4Health website - Developed, pilot-tested, and refined fish health toolkits for regional CES staff *Producer-facing outreach* - Developed, pilot-tested, and refined marketing toolkits for CES staff and producers - Outreach as a result of Great Lakes Aquaculture Collaborative, liaison activities	*Participants* - Consumers - Aquaculture producers - Regional CES staff - Distributors - Great Lakes Aquaculture Collaborative - Project staff - NCRAC - Sea Grant *Delivery* - Digital products and short printed materials - Digital advertising (social media, other as necessary/effective) - Trade show & conference booths - Websites - "Train the trainer" with local extension - Direct-sale toolkits demonstrated and advertised through state aquaculture associations, NCRAC conference.	- Consumers will increase knowledge of the health, environmental, and economic benefits of locally produced seafood - Consumer awareness of the existence of and places to buy locally produced farmed seafood will increase - Consumers and Extension educators will increase knowledge of how to clean and cook seafood - Consumers and Extension educators will increase knowledge of the health and environmental benefits of farmed seafood - Producers will have increased knowledge consumer preferences and direct-sale marketing techniques - Program staff, NCRAC, USDA, and Sea Grant will increase their understanding of how to effectively partner on synergistic resource issues	- Consumers will increase their consumption of locally produced seafood - Consumers will use the Eat Midwest Fish website as a resource for information on Midwest aquaculture, farmed fish preparation, and to find locally farmed fish - Seafood producers, distributors, and sellers will adapt their practices based on consumer preferences - Seafood producers will increase their ability to offer direct sales based on information from project staff - Non-aquaculture CES staff will incorporate consumer-oriented aquaculture information into their programming - The aquaculture industry will receive increased investment from existing and potential producers - NCRAC, USDA, and Sea Grant will invest in continued partnerships on resource issues.	- Consumers will be aware of and demand locally produced aquaculture as a healthy, sustainable source of protein. - There will be a culture of offering direct sales among producers throughout the North-Central region. - The aquaculture industry in the NCR will be more resilient through increased sales, a better-understood market position, and increased consumer demand - Enhanced quality of life for NCR residents thanks to increased production and consumption of locally grown seafood and a vibrant aquaculture industry - A culture of collaboration and partnership between NCRAC, USDA, and Sea Grant

Facilities

The project will be housed within Illinois-Indiana Sea Grant in the Department of Forestry and Natural Resources at Purdue University. Project staff will have access to office space, administrative and business support, technological equipment and support, and all of the other benefits of being housed in a research-oriented land grant university. In addition, project staff will have access to numerous aquaculture research and production facilities, including the Purdue Aquaculture Research Lab, the Palmer Research Center for Aquatic Resources, and eight different Purdue Agricultural Centers. In addition, project staff are members of the Great Lakes Sea Grant Network and of the Sea Grant Great Lakes Aquaculture Collaborative, giving them access to a network of over 100 extension agents, specialists, educators, and communicators working in the highest-producing aquaculture states in the North Central Region and easy access to meeting space and other facilities throughout the region. In particular, in Indiana through Purdue's College of Agriculture and the Department of Forestry and Natural Resources he/she will have access to the Baker Aquaculture Research Center, the Palmer Research Center for Aquatic Resources and a series of eight agriculture centers. We anticipate that through our network, we will have access to similar spaces in the other North Central Regions states.

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Project Leaders

State	Name, Institution	Specialization (project role)
IN	Stuart Carlton, Purdue University	Assistant Director, Illinois-Indiana Sea Grant (lead PI). Dr. Carlton will oversee the project, assist staff with securing required resources and lead the evaluation and needs assessments.
IN	Kwamena Quagrainie, Purdue University	Aquaculture Marketing Specialist, Illinois-Indiana Sea Grant and Research Professor, Department of Agricultural Economics (co-PI). Dr. Quagrainie will help to develop the toolkits and assist project staff with networking and delivering extension materials.
IL	Patrice Charlebois, University of Illinois	Associate Director and Outreach Program Leader, Illinois-Indiana Sea Grant (co-PI). Ms. Charlebois will help develop the extension toolkits and products and will leverage her extension network to help project staff efficiently target their audiences.
IN	Amy Shambach	Regional Aquaculture Marketing Associate, Illinois-Indiana Sea Grant (senior personnel and Extension Liaison). Ms. Shambach will lead the development and delivery of all outreach and extension products associated with this project.
OH	Jeni Blackburn	Owner, Fresh Harvest Farm, LLC. (Industry Liaison)

ORGANIZATION AND ADDRESS Purdue University 155 S Grant Street West Lafayette, IN 47907-2114				USDA AWARD NO. Years 1: Objectives			
PROJECT DIRECTOR(S) Stuart Carlton				Duration Proposed Months: _12_ **Total Funds Requested by Proposer**	Duration Proposed Months: ____ **Funds Approved by CSREES** (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
A. Salaries and Wages	**CSREES FUNDED WORK MONTHS**						
1. No. of Senior Personnel	Calendar	Academic	Summer				
a. ___ (Co)-PD(s)							
b. ___ Senior Associates							
2. No. of Other Personnel (Non-Faculty)							
a. __ Research Associates-Postdoctorate . . .							
b. _1__ Other Professionals	10.8 Person months			$48,170			
c. ___ Paraprofessionals							
d. ___ Graduate Students							
e. 1__ Prebaccalaureate Students				$1,500			
f. ___ Secretarial-Clerical							
g. ___ Technical, Shop and Other							
Total Salaries and Wages							
B. Fringe Benefits (If charged as Direct Costs)				$16,074			
C. Total Salaries, Wages, and Fringe Benefits (A plus B)				$65,744			
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies				$1,500			
F. Travel				$5,000			
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.)				$17,000			
K. Total Direct Costs (C through I)				$89,244			
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.)				$-0-			
M. Total Direct and F&A/Indirect Costs (J plus K)				$89,244			
N. Other							
O. Total Amount of This Request				$89,244			
P. Carryover -- (If Applicable) **Federal Funds: $** **Non-Federal funds: $** **Total $**							
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)							
Cash (both Applicant and Third Party)							
Non-Cash Contributions (both Applicant and Third Party)							

NAME AND TITLE (Type or print)	**SIGNATURE** (required for revised budget only)	**DATE**
Project Director	Stuart Carlton	6/1/2021

ORGANIZATION AND ADDRESS Purdue University 155 S Grant Street West Lafayette, IN 47907-2114				USDA AWARD NO. Years 2: Objectives			
PROJECT DIRECTOR(S) Stuart Carlton				Duration Proposed Months: _12_ **Total Funds Requested by Proposer**	Duration Proposed Months: ____ **Funds Approved by CSREES** (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
A. Salaries and Wages	**CSREES FUNDED WORK MONTHS**						
1. No. of Senior Personnel	Calendar	Academic	Summer				
a. ___ (Co)-PD(s)							
b. ___ Senior Associates							
2. No. of Other Personnel (Non-Faculty)							
a. __ Research Associates-Postdoctorates . . .							
b. _1__ Other Professionals	9.6 person Months			$43,888			
c. ___ Paraprofessionals							
d. ___ Graduate Students							
e. _1_ Prebaccalaureate Students				$5,000			
f. ___ Secretarial-Clerical							
g. ___ Technical, Shop and Other							
Total Salaries and Wages							
B. Fringe Benefits (If charged as Direct Costs)				$14,937			
C. Total Salaries, Wages, and Fringe Benefits (A plus B)				$63,825			
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies				$1,500			
F. Travel				$6,000			
G. Publication Costs/Page Charges				$1,000			
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.)				$7,250			
K. Total Direct Costs (C through I)				$79,575			
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.)				$-0-			
M. Total Direct and F&A/Indirect Costs (J plus K)				$79,575			
N. Other							
O. Total Amount of This Request				$79,575			
P. Carryover -- (If Applicable) **Federal Funds: $** **Non-Federal funds: $** **Total $**							
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)							
Cash (both Applicant and Third Party)							
Non-Cash Contributions (both Applicant and Third Party)							

NAME AND TITLE (Type or print)	**SIGNATURE** (required for revised budget only)	**DATE**
Project Director	Stuart Carlton	6/1/2021

ORGANIZATION AND ADDRESS Purdue University 155 S Grant Street West Lafayette, IN 47907-2114				USDA AWARD NO. Total			
PROJECT DIRECTOR(S) Stuart Carlton				Duration Proposed Months: _24_ **Total Funds Requested by Proposer**	Duration Proposed Months: ____ **Funds Approved by CSREES** (If different)	Non-Federal Proposed Cost-Sharing/ Matching Funds (If required)	Non-federal Cost-Sharing/ Matching Funds Approved by CSREES (If Different)
A. Salaries and Wages	**CSREES FUNDED WORK MONTHS**						
1. No. of Senior Personnel	Calendar	Academic	Summer				
a. ___ (Co)-PD(s)							
b. ___ Senior Associates							
2. No. of Other Personnel (Non-Faculty)							
a. __ Research Associates-Postdoctorates . . .							
b. _1__ Other Professionals	20.4 person Months			$92,058			
c. ___ Paraprofessionals							
d. ___ Graduate Students							
e. _1_ Prebaccalaureate Students				$6,500			
f. ___ Secretarial-Clerical							
g. ___ Technical, Shop and Other							
Total Salaries and Wages							
B. Fringe Benefits (If charged as Direct Costs)				$31,011			
C. Total Salaries, Wages, and Fringe Benefits (A plus B)				$129,569			
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies				$3,000			
F. Travel				$11,000			
G. Publication Costs/Page Charges				$1,000			
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.)				$24,250			
K. Total Direct Costs (C through I)				$168,819			
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.)				$-0-			
M. Total Direct and F&A/Indirect Costs (J plus K)				$168,819			
N. Other							
O. Total Amount of This Request				$168,819			
P. Carryover -- (If Applicable) **Federal Funds: $** **Non-Federal funds: $** **Total $**							
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)							
Cash (both Applicant and Third Party)							
Non-Cash Contributions (both Applicant and Third Party)							

NAME AND TITLE (Type or print)	**SIGNATURE** (required for revised budget only)	**DATE**
Project Director	Stuart Carlton	6/1/2021

Budget Explanation for Purdue University

In accordance with 2 CFR 200, Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards, Purdue University tracks and reports its professional personnel on a percent of effort and not on an hourly basis. Salaries are adjusted by standard University inflation rates each fiscal year (July 1): 3% for faculty, 2.5% for professional/technical assistants, and 2% for post docs, graduate/undergraduate students and service staff.

Objectives 1–4

A. Salaries and Wages

Year 1: Funds are requested to support 90%FTE for Regional Aquaculture Marketing Associate Amy Shambach. Amy will be responsible for developing and delivering the regional aquaculture extension program as described Objectives 1–4.

Salary for an undergraduate needs assessment technician. This person will assist with the needs assessment, ranging from conducting interviews to summarizing data. The salary is based on 100 hours of $15/hr. for the technician, estimated based on past costs for this type of specialized labor.

Year 2: Funds are requested to support 80%FTE for Regional Aquaculture Marketing Associate Amy Shambach. Amy will be responsible for developing and delivering the regional aquaculture extension program as described Objectives 1–4.

Salary for an undergraduate program development and delivery technician. This person will be responsible for helping the Regional Aquaculture Marketing Associate in program development and delivery and is estimated based on rate of $15/hr. for approximately 333.33 hours over the course of Year 2. We are requesting a larger amount of technician time in Year 2 to help make up for the slightly reduced FTE for the Regional Aquaculture Marketing Associate.

B. Fringe Benefits

Fringe Benefits are budget at University Policy as follows:

Professional	33.12%
Undergraduate Student	8.02%

E. Materials and Supplies

Year 1: We request $1,500 to cover materials and supplies needed to run a regional extension program, including $500 to cover the partial lease of a computer and the necessary accessories $750 for marketing materials related to the extension program and EatMidwestFish.org website, and $250 for workshop-related printables and related collateral.

Year 2: We request $1500 to cover materials and supplies needed to run a regional extension program, including $500 to cover the partial lease of a computer and the necessary accessories $750 for marketing materials related to the extension program and EatMidwestFish.org website, and $250 for workshop-related printables and related collateral.

F. Travel (domestic)

Year 1: We request $5,000 in travel to cover expenses for 5 multi-day trips around the region at an estimated cost of roughly $1,000 per trip, including flight, car rental, hotel, and per diem. Estimates are made based on past experience.

Year 2: We request $6,000 in travel to cover expenses for 6 multi-day trips around the region at an estimated cost of roughly $1,000 per trip, including flight, car rental, hotel, and per diem. We also request $1500 to cover the cost for one person to attend a conference to share the results of our work at an estimated cost of $1,500 including flight, car rental, hotel, per diem, and registration. Estimates are made based on past experience.

J. Other Indirect Costs

Year 1: We request $5,500 in toolkit design costs, including funds for a design contractor (estimated at $5000) and funds to pay for pilot study participants (estimated at $50 per participant x 10 participants).

- We request $10,000 to pay for website design and maintenance to expand the EatMidwestSeafood.org website as described above. This includes funds to pay the website design contractor (estimated at $9,000 based on the original work to develop EatMidwestSeafood.org), $600 for a website maintenance contract (estimated based on the costs to maintain Illinois-Indiana Sea Grant's website and informal discussions with Jackson Sky, our website design and maintenance contractor) and $400 for website hosting (estimated based on past costs.).

Year 2: We request $1,000 to pay for website maintenance and hosting. This estimate is based on our experience with our current websites and breaks down to $600 for a website maintenance contract and $400 for website hosting (estimated based on past costs.)

- We request $2,000 in workshop costs, including facility rental fees, guest speaker fees, and meals for workshop participants.

- We request $1,000 in printing costs to cover printing of the outreach materials and toolkits as described above.

Budget Explanation for University of Illinois

Objectives 1–3

F. Travel (domestic)

Year 1: We request $1,500 in travel to cover expenses for five, two-day trips between the University of Illinois and Purdue University to plan and deliver extension related to this project. Trip costs are estimated at roughly $300 per trip, including car rental, hotel, and per diem. Estimates are made based on past experience.

Year 2: We request $1,500 in travel to cover expenses for five, two-day trips between the University of Illinois and Purdue University to plan and deliver extension related to this project. Trip costs are estimated at roughly $300 per trip, including car rental, hotel, and per diem. Estimates are made based on past experience.

Budget Summary

YEAR 1

Institution Name	Purdue University (Carlton)	University of Illinois (Charlebois)
Salaries & Wages	$49,670	$0
Fringe Benefits	$16,074	$0
Total Salaries, Wages, and Fringe Benefits	$65,744	$0
Nonexpendable Equipment	$0	$0
Materials and Supplies	$1,500	$0
Travel	$5,000	$1,500
All Other Direct Cost	$15,500	$0
Totals	**$87,744**	**$1,500**

YEAR 2

Institution Name	Purdue University (Carlton)	University of Illinois (Charlebois)
Salaries & Wages	$48,888	$0
Fringe Benefits	$14,937	$0
Total Salaries, Wages, and Fringe Benefits	$63,825	$0
Nonexpendable Equipment	$0	$0
Materials and Supplies	$1,500	$0
Travel	$6,000	$1,500
All Other Direct Cost	$6,750	$0
Totals	**$78,075**	**$1,500**

Total Project Cost

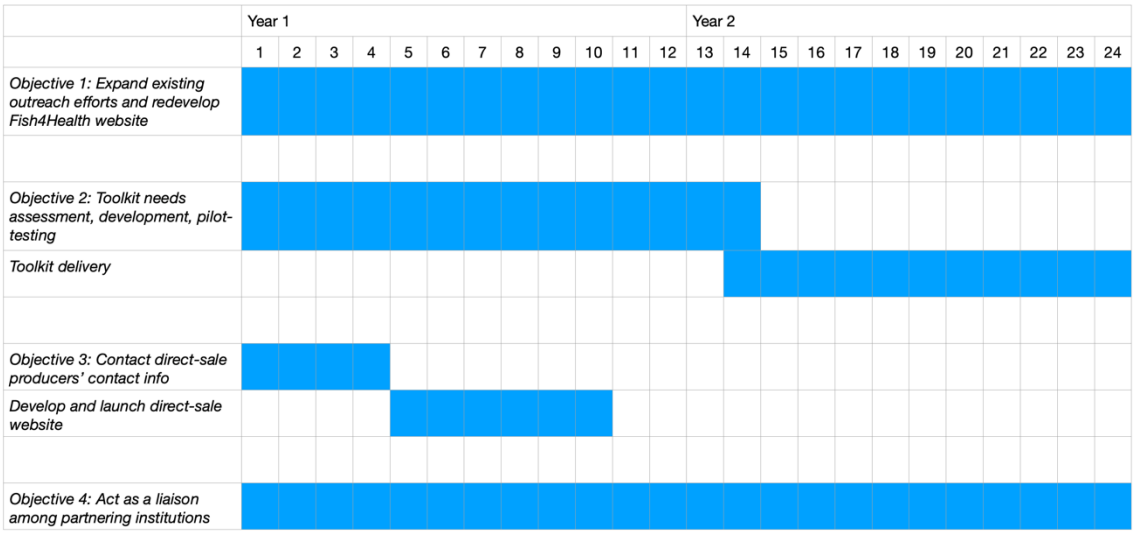
Institution Name	Purdue University (Carlton)	University of Illinois (Charlebois)
Salaries & Wages	$98,558	$0
Fringe Benefits	$31,011	$0
Total Salaries, Wages, and Fringe Benefits	$129,569	$0
Nonexpendable Equipment	$0	$0
Materials and Supplies	$3,000	$0
Travel	$11,000	$3000
All Other Direct Cost	$22,250	$0
Totals	**$165,819**	**$3,000**

In addition to the NCRAC budget request described above, we have secured a commitment for $35,000 per year from the National Sea Grant Office, as outlined in the tables below. These funds will supplement the NCRAC funds as needed to ensure that we have a well-funded, successful regional extension program serving all of the states in the North Central Region. The funds will go toward paying for video production costs (approximately $15,000 per year); communication coordination. contracting, and digital advertising costs (approximately $6k per year), travel and materials costs (approximately $4500 per year), and indirect costs (approximately $9500 per year) necessary to ensure that the project objectives are met and the outreach work done is of a truly regional nature.

Schedule for Completion of Objectives

Start date: September 1, 2021

End date: August 31, 2023



Participating Institutions and Principal Investigators

Purdue University

PI: J. Stuart Carlton, Ph.D.

Co-PI: Kwamena Quagrainie, Ph.D.

University of Illinois

PI: Patrice Charlebois

Curriculum Vitae for Principal Investigators

(CVs begin on the next page)

VITA

J. Stuart Carlton, Ph.D.
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EDUCATION

B.A. Tulane University, 2001, English
M.S. University of Georgia, 2004, Fisheries Biology
Ph.D. University of Florida, 2012, Interdisciplinary Ecology

Positions
Assistant Director, Illinois-Indiana Sea Grant College Program (2018–Present)
Healthy Coastal Ecosystems Specialist, Texas Sea Grant College Program (2014–Present)
Postdoctoral Research Assistant. Natural Resources Social Science Lab, Purdue University (2013–2014)

Scientific and Professional Organizations
International Association for Society and Natural Resources
Sea Grant Association

Recent Publications.
Prokopy,L.S.,Carlton,J.S.,Haigh,T.,Lemos,M.C.,Mase,A.S.,Widhalm,M. 2017. Useful to Usable: Developing usable climate science for agriculture. Climate Risk Management 15: 1–17.

Church, S. P., Haigh, T., Widhalm, M., Garcia de Jalon, S., Babin, N., Carlton, J. S., Dunn, M., Fagan, K., Knutson, C. L., and L. S. Prokopy. 2017. Agricultural trade publications and the 2012 Midwestern U.S. Drought: A missed opportunity for climate risk communication. Climate Risk Management 15: 45–60.

Carlton, J. S., Haigh, T., Knutson, C. L., Lemos, M., Mase, A. S., Todey, D., Prokopy, L. S. 2016. The effects of the 2013 drought on climate change beliefs, risk perceptions, and adaptation attitudes. Climatic Change 135: 211–226.

Cook, J., Oreskes, N., Doran, P., Anderegg, W., Verheggen, B., Maibach, E., Carlton, J. S., Lewandowsky, S., Skuce, A., Green, S., Nuccitelli, D., Jacobs, P., Richardson, M., Winkler, B., Painting, R., and K. Rice. 2016. Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. Environmental Research Letters 11: 048002.

Carlton, J. S. and S. K. Jacobson. 2016. Using expert and non-expert models of climate change to enhance communication. Environmental Communication 10: 1–24.

Carlton, J. S., Perry-Hill, R., Huber, M., and L. S. Prokopy. 2015. The scientific consensus about climate change extends beyond climate scientists. Environmental Research Letters 10: 094025.

Haigh, T., Takle, E., Andresen, J.A., Widhalm, M.J., Carlton, J.S., and J. Angel. 2015. Mapping the decision points and climate information use of agricultural producers across the U.S. Corn Belt. Climate Risk Management 7: 20–30.

Hartel, C. (undergraduate mentee), Carlton, J. S., and L. S. Prokopy. 2015. The influence of wildlife value orientations on conservation attitudes toward a noncharismatic reptile. Human Dimensions of Wildlife 20: 553–562.

Prokopy, L.S., Carlton, J.S., Arbuckle, J.G., Haigh, T., Lemos, M.C., Mase, A.S., Andreson, J., Babin, N., Dunn, M., Angel, J., Hart, C., and R. Power. 2015. Extension's Role in Disseminating Information about Climate Change to Agricultural Stakeholders. *Climatic Change* 130: 261–272.

VITA

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Education

Ph.D., Agricultural Economics, University of Alberta, Canada, 2000
M.S., Agricultural Economics, University of Alberta, Canada, 1995
B.S., Agriculture, University of Science and Technology, Ghana, 1982

Positions

2005 – Present: Director / Assistant Professor / Associate Professor / Professor, Aquaculture Economics & Marketing / Extension Specialist Purdue University / Illinois-Indiana Sea Grant
2001 – 2005: Assistant Professor, University of Arkansas at Pine Bluff, Pine Bluff, AR

Recent Publications

Engle, C.R., K.K. Quagrainie, and M.M. Dey. Seafood and Aquaculture Marketing Handbook. 2nd Edition, Wiley-Blackwell Publishing, West Sussex, UK. 2017.

Cai, J., K.K. Quagrainie, and N. Hishamunda. 2017. Social and Economic Performance of Tilapia Farming in Africa. FAO Fisheries and Aquaculture Circular N0. 1132, FIAA/C1132. Rome, Italy.

Akuffo, A.S., and K.K. Quagrainie. Assessment of Household Food Security in Fish Farming Communities in Ghana. Sustainability. 11(10); 2807, 2019. https://doi.org/10.3390/su11102807

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VITA

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BS, Biological Sciences, University of Notre Dame, 1988

Positions

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Publications

Charlebois, P. M., G. Hitzroth and C. Rice. 2018. Great Lakes Invasive Crayfish Collaborative website. Available at http://invasivecrayfish.org. Accessed May, 2021.

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Checklist for Submission of Full Proposals

Follow guidelines with the exception of the budget sheets.

___ Format manuscripts for 22 x 28 cm (8½ x 11 inch).

___ Number *all* pages sequentially.

___ All references in text and VITA are correctly format per NCRAC guidelines.

___ Use 10-12 font; Times New Roman. Do not justify right margins.

___ Format headings appropriately.

___ Leave at least a 2.5-cm (1-inch) margin on all sides.

___ Use metric units of measurement with English units in parenthesis, e.g. 2.54 cm (1 inch).

___ Define all abbreviations the first time they are used.

___ Express ratios by using a slant line (e.g. mg/L).

___ Scientific names should accompany common names in the title and when they are first mentioned in the abstract and in the text. Authority for scientific names need not accompany the genus and species unless needed for clarity.

___ Spell out one to ten unless followed by a unit of measurement (e.g. four fish, 4 kg, 14 fish). Do not begin a sentence with a numeral. Use 1,000 instead of 1000; 0.13 instead of .13; and % instead of percent.

___ Use the 24-hour clock for dial time: 0830, not 8:30 a.m. The calendar date should be day month year (7 August 1990).

___ Include signed Letters of Intent for identified Extension and Industry Liaisons.

___ Signed Authorized Organization Representative (AOR) form from each funded PI's institution are required at this time.

___ Include the required three (3) Letters of Support from Industry members who are not directly involved in the proposed project.

___ Assemble the full proposal in this order: Title Page, Project Summary, Justification, Related Current and Previous Work, Statement Regarding Duplication of Research, Anticipated Benefits, Objective(s), Deliverables, Procedures, Project Deliverables, Evaluation and Outreach (Logic Model included), Facilities, References, Project Leaders, Budget, Budget Explanation per Institution, Budget Summary, Schedule for Completion of Objectives. References, Participating Institutions and Principal Investigators, Curriculum Vitae for Principal Investigators (PIs).

___ All identified co-PIs have been provided a final draft of the full proposal.

___ Submit proposal (including all required documentation) in single MS Word document.

If the NCRAC Administrative Office cannot verify inclusion of any element, the Full Proposal will not be accepted.

Principal Investigator Signature Date 2021-06-01