

Project Title: Assessing the Status of Aquaculture Associations in the North Central Region [Termination Report]

Key Words: Aquaculture associations, Extension **Dates**

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Reason for Termination: Project objectives completed.

Project Objectives:

1. To design and implement a survey of aquaculture producers throughout the NCR to identify reasons why they have either never joined a state association, joined but then did not renew their membership, or are current members.
2. To measure how producers value the various types of activities undertaken by state associations, identify the types of services or programs that would attract membership, and identify barriers and challenges to organizing and sustaining state aquaculture associations.
3. To develop strategies likely to increase membership and strengthen state associations.

Project Summary

Strengthening state aquaculture associations will contribute to revitalization of aquaculture industries in the North Central Region. Better understanding of the most important reasons for membership will help associations focus on high priority activities and services.

A survey was conducted of producers in the North Central Region to improve understanding of the value of various association activities and services. The two most common reasons for not belonging were: 1) "Do not know how membership would benefit my business"; and 2) "Have never been asked to join". More than half indicated that the following benefits/services would entice them to join: newsletters, networking opportunities (i.e., meetings, workshops), web sites, industry alerts, and representation with regulators. Current association members indicated strong loyalty to their associations. The strength of state extension support showed a strong positive effect on the value of membership.

Project recommendations include:

1. Develop and maintain industry directory.
2. Enhance member benefits and services identified.
3. Implement recommended recruitment and retention strategies.
4. Expand extension support in region.
5. Implement leadership training programs.

Specific follow-up activities were identified.

Technical Summary and Analysis

A survey instrument was designed to obtain information on current membership in aquaculture associations, to assess the value of membership, and the loyalty of existing members to their associations. Additional questions explored the perceived value of various association benefits and services by current members, those who ceased their membership, and those who have never joined an aquaculture association. A list frame of all known producers (aquaculture, aquaponics, and baitfish harvesters) in the 12 states of the North Central Region (NCR) with E-mail addresses was compiled and hard copies were also distributed at the Ohio Aquaculture Association. The list frame included a total of 279 potential respondents (Table 1).

The electronic survey was launched January 22, 2017, with follow up reminders to those who had not responded on February 1, 2017, February 15, 2017, and February 25, 2017. In addition to the electronic survey, hard copy versions

of the questionnaire were distributed at the Ohio Aquaculture Association annual meeting, with 17 completed hard copy questionnaires returned.

Results

Objectives 1-2. — Table 1 presents the number of respondents by each state in the NCR. Of respondents, 38% were from Ohio, 16% from Iowa, 11% from Indiana, 10% from Wisconsin, and fewer than 10% from the other states. No aquaculture producers were identified in North Dakota. Table 1 also includes the number of farms listed for each NCR state from the 2012 data collected in the 2013 Census of Aquaculture (USDA-NASS 2014). While the data from the Census of Aquaculture is somewhat dated, it appears that the response rates obtained reflect a somewhat over-representation of producers in Ohio and Indiana and under-representation of producers in Wisconsin and Minnesota.

Characteristics of Respondents

Eighty-four percent of respondents indicated that aquaculture was their primary type of business, followed by 6% who were not yet in business but planned to start up, 5% aquaponics, 4% baitfish harvesting, and 1% did not respond to this question (Table 2). A few respondents indicated secondary or tertiary types of businesses, all of which were baitfish harvesters or aquaponics in addition to their aquaculture businesses.

Twenty-six different types of aquatic animals were reported to be raised by respondents. The most frequently mentioned types of aquatic animals were: bass (13%), bream (13%), yellow perch (12%), baitfish (11%), catfish (9%), tilapia (7%), trout (7%), walleye (6%), and ornamentals (6%) (Table 3). In comparison with the 2012 data collected in the 2013 Census of Aquaculture (USDA-NASS 2014), survey respondents appeared to be similar in terms of the distribution of types of species raised with two exceptions: trout and the “other sportfish” categories appeared to be under-represented in the survey.

Overall, respondents reported raising from one to 15 different types of aquatic animals. More (38%) respondents raised only one species; 25% raised two to five species; 28% raised six to ten different species; and only 6% raised 11 to 15 species (Table 4). Respondents, on average, raised four different types of aquatic animals.

More respondents indicated that trout or tilapia (12%) were the most important species raised in terms of sales, followed by yellow perch (10%), marine shrimp (10%), bass (9%), baitfish (7%), bluegill/bream (5%), and catfish (5%) (Table 5). The other species were mentioned less frequently, in terms of the importance to overall business sales.

Nearly one-third of respondents (31%) reported using ponds for aquaculture production, followed by indoor tanks (27%), raceways (8%), cages (8%), and outdoor tanks (8%) (Table 6). Aquaponics producers reported using mostly indoor or greenhouse tanks, while baitfish harvesters tended to use either ponds or indoor tanks primarily. Respondents used a variety of different production systems. Table 7 shows that more than half of respondents used more than one production system on their farm; 46% used only one production system with 31% using two, and 23% using from three to six different production systems.

The greatest percentage of respondents (31%) reported sales of aquatic animals less than \$25,000 per year, followed by those with sales of from \$100,000 to \$500,000 (14%), \$50,000 to \$100,000 a year and \$1 million or more (11%), \$25,000 to \$50,000 (10%), and \$500,000 to \$1 million (9%) (Table 8).

Five respondents from three different states (Illinois, Michigan, Ohio) reported use of aquaponics systems. Of these, four indicated that aquaponics was their major business and one indicated that they also were engaged in aquaculture and baitfish harvesting. This fifth respondent indicated that aquaponics was his/her tertiary type of business, after aquaculture and baitfish harvesting. Moreover, this last respondent raised 13 different species, recording “ornamentals” as the type of species that generated the greatest amount of sales, overall. There was no indication as to which species was raised in aquaponics.

Of the four respondents who indicated that aquaponics was their major business, three raised tilapia, one bluegill/bream, catfish, and tilapia, and the fourth raised yellow perch in aquaponics. These four indicated that they used indoor tanks as the production system. Three of the four aquaponics respondents indicated that their sales of

aquatic animals were less than \$25,000; in terms of plant sales, two indicated that sales of plants were from \$25,000 to \$50,000 and one respondent mentioned sales of plants, at \$50,000 to \$100,000.

Association Membership

Seventy-eight percent of respondents indicated that they had belonged to an association related to their business at one time, while 23% of respondents had never belonged to an association (Table 9). By way of comparison, in the National Aquaculture Association (NAA) survey, only 5% of respondents to that national survey had never belonged to an aquaculture association. Thus, there were few responses from those who had never chosen to join an aquaculture association. The average number of aquaculture association memberships in this NCR survey was 1.5 per respondent. In the NAA survey, the average number of association memberships per respondent was 2.7. In this current NCRAC survey, nearly two-thirds (62%) of those currently a member of an aquaculture association at the time of the survey belonged to only one association; 32% belonged to two different aquaculture associations, and 6% belonged to more (three to five). Of those who had at one time belonged to an association, 84% had continued to be a member of an association (although not always the same association), and 16% were no longer a member of any association. Table 10 provides some primary reasons given for never having joined an association and included: 1) "Do not know how membership would benefit my business" (29%); 2) "Have never been asked to join" (24%); 3) "There are none in my state" (18%); 4) New farm (18%); and 5) "Do not believe it is worth the membership fee (12%)".

Recruiting Members

When asked what types of benefits/services would entice them to join an association, respondents who had never joined an association selected the following (percentages of respondents in parentheses): 1) newsletter (71%); 2) networking opportunities (71%); 3) workshops on the latest research (71%); 4) an annual or biannual meeting (62%); 5) industry alerts (52%); 6) representation with regulators (57%); 7) web site (52%); 8) public relations campaigns (33%); 9) webinars (33%); 10) media materials (29%); and 11) other (10%) (Figure 1).

Retaining Members

Table 11 reports comments by respondents in terms of why they discontinued their membership. In some cases, individuals moved or changed the species that they were raising. However, the greatest number of reasons for discontinuing membership was related to: 1) declining effectiveness of the association; 2) declining membership; 3) not ever hearing anything from the association/little communication from the association; and 4) failure to add real value to the business. Lack of relevance to the business, expressed as not being helpful or applicable to their business, was also cited as a reason for discontinuing membership. Other reasons appeared to be due to personal disagreement with policies and/or individuals involved in associations, feeling un-welcome due to cliques, or being unable to attend meetings.

Figure 1 also indicates the types of benefits and services that would most entice someone who had once belonged to an association but who had discontinued membership in all associations. The most frequently mentioned activity was industry alerts (67%) and workshops on the latest research (67%). The activities mentioned as next most important were: annual or biannual meetings (44%); web site (33%); webinars (33%), and networking opportunities (33%). Newsletters, representation with regulators, and workshops on policies and regulatory issues were each mentioned by 22% of this category of respondents, whereas media materials, public relations campaigns, and "Other" each were only mentioned by 11% of this category of respondent (Figure 1).

Value of Membership and Loyalty of Members

Generally, respondents who currently were members of associations rated the benefits received from membership as "very good", with an average rating of 3.7 (in which 5 indicated "excellent;" 4 "very good;" 3 "good;" 2 "marginal;" and 1 "poor") (Table 12). Ratings of the likelihood of renewing membership, on average, were even higher, at 4.5, and of the likelihood of recommending membership to others averaged 4.3. These ratings indicate strong loyalty to their associations (by rating likelihood to renew and recommend membership to others at a score greater than 4). However, Table 12 also shows that there is room for improvement in services offered to members. The score of the value of their membership (3.7) was noticeably lower than that associated with their loyalty to the association.

Table 13 presents ratings of the value of benefits/services that can be provided by an aquaculture association. Overall, the benefit with the greatest mean score was that of holding an annual/biannual meeting in the respondent's

state (4.3) and was followed closely by the value of networking opportunities (4.1). Media materials (3.9) and representation with regulators (3.9) were rated as the third and fourth highest and were followed closely by newsletters (3.7) and industry alerts (3.7). Workshops on the latest research (3.6) and the latest policies and regulations (3.6) followed, along with a web site (3.5). The average score for public relations campaigns (3.0) was only “Good” and that of webinars fell below the “Good” rating, at 2.7.

Response ratings from current members on association loyalty and the value of association benefits/services were sorted by gross sales categories (Table 14). Sales categories are a measure of the size of a business. Regardless of the size of the business (sales categories), the ratings of the value of membership were lower (ranging from 3.0 to 4.2) than the ratings of loyalty to the association (likelihood of renewal, 4.25 to 4.8, and recommending membership to others, 3.9 to 4.6). While ratings were similar across business sizes, rating scores of respondents in the highest sales category were most similar to those of respondents in the lowest sales category. The outlier category in terms of membership value was that of the \$500,000 to \$1 million sales category (Table 14). Respondents in this next-to-largest sales category scored the value of membership at 3.0 (compared to 3.5 to 4.2 for the other sales categories). Further examination of the data revealed that this sales category was the only one with a majority of respondents raising the same species. All other sales categories included a wide range of species produced. The majority of respondents in the \$500,000 to \$1 million sales category raised trout and tended to rate the value of membership lower than did other groups of respondents. Responses related to the value of specific benefits/services varied greatly but there were no clear differences due to income category.

Response data from current members of an aquaculture association were sorted by type of aquaculture product produced. Given the diversity of species in the dataset, responses were grouped across several types of the species indicated by respondents to be the main species raised, so that individual categories would have a reasonable number of responses (Table 15). Thus, ornamentals were combined with baitfish; bass, bluegill, and catfish were combined; tilapia, shrimp, and prawn were combined, and walleye were combined with yellow perch. Across species groups, there was little difference in the ratings, other than that trout producers tended to rate the value of industry alerts lower than did other species groups.

The strength of Extension support clearly showed an effect on increasing membership association values as well as increased value of various member services (Table 16). Firstly, there were more than twice as many respondents from states with “high” Extension support than “medium” and nearly six times more than those from states with “low” Extension support. The overall rating of the value of association membership was greater for respondents from states with “high” Extension support as were the ratings of individual benefits/services. These higher ratings may reflect greater value from benefits/services actually received, due to Extension support. For example, in states with greater Extension support, there may be more frequent and higher-quality newsletters, meetings, and other activities that result in greater value to association members.

Building Strong Associations

Table 17 also lists the barriers and constraints identified by those who had never belonged to an association. Of these, lack of participation or insufficient numbers of producers were mentioned by more than one respondent. One respondent pointed out that more frequent interaction outside the annual meetings would be important.

Table 17 also presents barriers and constraints identified by respondents who had once been a member of an association but were no longer members. Responses included those that represented a decline in effectiveness of the association (i.e. lack of interest), disagreement among members of the association (i.e. bad leadership, lack of involvement due to sense of competition and not acting for the common good), or personal reasons such as lack of time to attend meetings or the distance to attend meetings.

Figure 1 shows that there are some clear differences in the types of benefits and services that were deemed important to respondents who had never joined an association and those who ceased their membership in one. The majority of those who had never joined were interested in a variety of benefits and services including: meetings, newsletters, industry alerts, a web site, networking opportunities, workshops on the latest research and policies/regulations, and representation with regulators. However, respondents who had ceased membership in an association were primarily interested in industry alerts and workshops on the latest research. These individuals were more likely to be

experienced fish farmers who had already developed strong networks, but who saw the need to stay current with new research results and with events that might impact their farms and industry.

Sustaining Strong Associations

Table 18 lists several comments by respondents in terms of what happened to state aquaculture associations that once existed in their states. While one respondent indicated that their state association appeared to be doing well, others mentioned the lack of participation, aging members, and individual agendas rather than looking out for the industry as a whole as reasons why their state association had declined.

Reasons offered by respondents who had ceased their association membership for the decline in activity of an association included lack of interest, fear of information sharing, and the existence of too many factions within the association (Table 19).

Survey Limitations

One of the challenges to conducting any survey is the development of a comprehensive and accurate list frame (contact information of all those in the study population). Entities that conduct routine surveys (e.g., USDA, US Census Bureau) have full-time personnel that work on list frame development. In the NCR, some states had more complete and up-to-date contact information than did others. Moreover, the lack of Extension personnel in some states exacerbated problems related to accurate list frame development. In addition, while the survey was geared more towards producers, not all respondents were actively in production. To evaluate the quality of the overall list frame, Table 1 lists the list frame numbers by state as compared to those reported in the 2013 Census of Aquaculture (USDA 2014). It is, of course, mandatory for producers to respond to the census. However, the census data are now 5 years old, and there is no way to determine whether the differences in the list frame numbers by state are due to individuals entering or exiting aquaculture production, or to inaccuracies in the list frame. We do not know to what extent the limitations of the list frame developed may have resulted in non-response bias and, without more complete listings of contact information, cannot test for non-response bias. We did compare responses from those who completed the hard copy questionnaires from the Ohio Aquaculture Association with those from Ohio who completed the electronic version. Responses were found to be similar and no evidence of non-response bias was found in terms of the method of survey administration.

Table 3 reports the percent of respondents by species/type as compared to the percentage of reports of individuals raising that species/type in the Census of Aquaculture. In general, the percentages of respondents by species more or less tracked those reported in the Census. The main exception appeared to be that of trout, for which the Census reported 18% of aquaculture producers in the NCR, but trout farmers responding to the survey constituted only 7% of respondents. A similar difference can be observed in the “other sportfish” category. These two exceptions may reflect under-representation of responses by trout farmers and those who raise the species included in the “other sportfish” category (muskellunge, northern pike, crappie, and grass carp).

Barriers and Challenges to Association Growth and Development

One of the barriers to the growth and development of associations in the NCR has been the decline in Extension specialist support in the region. Respondents from states with stronger Extension support tended to express a greater sense of value from their association membership. Since Extension specialists tend to provide support to associations in terms of identifying and locating speakers, compiling research reports or articles for newsletters, or otherwise assisting with meeting logistics, such results from the survey are not surprising.

A second barrier to association growth and development is the lack of up-to-date lists of producers in each state. Without such a list, it can be difficult to identify and locate prospective association members and to contact them to invite them to join.

Association growth and development is also constrained and challenged by declining interest, concern of information sharing, and the development of factions among members that result from disagreement within the association as noted in Tables 17 to 19. These largely reflect the need to both provide more frequent communication and services to members and to enhance leadership skills that include membership engagement and conflict resolution. Increased membership engagement can increase the sense of value obtained from membership when their input results in increased benefits and services and can maintain interest in the association. Effective conflict

resolution skills and actions that develop trust between elected officers/board members and the general membership can lead to more rapid resolution of conflicts among members. Such conflicts often begin with small disagreements that, if un-resolved, can escalate into larger conflicts that become detrimental to an association.

The aquaculture industry in the NCR is generally smaller than those in other regions of the U.S. Nevertheless, several individual states in the NCR are important nationally with respect to certain species. Wisconsin, for example, ranks second nationally in the total number of trout farms and ranks 6th in terms of trout sales. Missouri ranks 5th in trout production sales in the U.S. Wisconsin ranks 12th overall in the number of aquaculture farms in the U.S. and Missouri ranks 19th in terms of sales nationally. Ohio ranks 14th nationally in terms of the number of farms, more than half of which are sportfish farms. In the U.S. baitfish industry, the NCR includes the #2 (Minnesota), #3 (Ohio), and #4 (Wisconsin) states in terms of value of sales. Thus, the NCR region is important nationally in the trout, sportfish, and baitfish industries, even though none of its states leads the nation in any of these industry segments. The lack of a large, dominant industry in any individual state in the NCR may have contributed to the decline in Extension support in several states.

The challenge for the NCR is to effectively meet the needs of industries that are important (i.e., trout, sportfish, and baitfish) even though none are dominant in any one state, given the decline in Extension support. A regional approach is likely the most pragmatic approach, but to be effective and to address the issues raised by potential members, will also need to provide value by offering meetings, alerts, communications, and networking opportunities relevant to the specific species that are raised in each state and to address the issues that are faced in their respective states.

Respondents commented that the distance to attend meetings is a constraint to participation. Baitfish and sportfish producers, as well as trout producers who sell into recreational markets (including many trout producers in Nebraska, Missouri, Ohio, Michigan, and Wisconsin), often load out fish nearly every day in the early morning. Thus, these producers are not able to travel much distance and may have difficulty attending meetings that require overnight stays. To provide value to such producers requires smaller, local meetings that last perhaps only half a day. Thus, leveraging Extension support by networking across states and associations may be effective given declining extension support, but will need to focus on providing greater numbers of smaller, shorter meetings that focus on needs of specific industry segments in locations where there is some concentration of farmers.

The effectiveness of an association depends on the dynamism of the leadership. In some cases, association leadership tends to change every couple of years, which might require frequent leadership training. In other situations, there are some individuals who have been in leadership positions for many years who would like to step down. In other cases, there have been conflicts of a more personal nature that have led to declining membership. These situations all point to a strong need to develop a leadership training program that likely would be done most effectively at the regional level. It is important to have an on-going process of leadership development to create new leaders who can assist with membership engagement, bring fresh new ideas, and to respond to the dynamic nature of issues faced by aquaculture industries.

Certain aspects of a regional training program can likely be incorporated into NCRAC meetings, already attended by existing association leadership (who attend the NCRAC Industry Advisory Council meetings). However, there is a strong need to cultivate and develop new leadership through on-going growth and development of younger, emerging industry leaders.

Objective 3.— Recommendations and Strategies

Industry Directory

- Create a structure through the North Central Regional Aquaculture Center to annually update contact lists for aquaculture, aquaponics, and baitfish harvesters in each state.

The first barrier to the development and strengthening of state associations is the lack of comprehensive, up-to-date contact lists for major growers in each state. This problem became evident very early in the process of developing

the survey. Serious thought needs to be given to develop an effective system to compile an up-to-date listing for each state each year. An example of such a system might be to task a regionally-appointed coordinator in the NCR to ensure that the list is updated each year. The list used in this survey will be provided to NCRAC and could be used as a starting point. An institution in each state would then need to commit to updating their state's list each year to submit to the NCR coordinator annually. This will require telephone or e-mail contacts with each individual on the existing list and those on lists of permittees to identify those who are not producers, i.e., those who have gone out of business, raising fish only as a hobby, and that simply maintain a permit because they might want to do something with fish one day. The only way to ensure an accurate list is to contact each individual on each state's list each year to verify their status. Without up-to-date lists, it is not possible to provide the benefits and services desired by prospective association members, to recruit effectively, or to provide effective Extension services.

Member Benefits and Services

- Improve the value of membership by enhancing the benefits/services offered.

The ratings measured in this survey indicate participants have a strong loyalty to their associations (by rating likelihood to renew and recommend membership to others with a score greater than 4). However, these same respondents who were loyal to their associations scored the value of their membership (3.7) noticeably lower than their own loyalty. This indicates that there is room for improvement in the benefits/services offered to members.

The survey data showed that face-to-face meetings were rated (4.3) as the top benefit of membership and was followed closely by networking opportunities (4.1) (clearly related to attending meetings). Other important member benefits and services that contributed to the value of their membership included: media materials (3.9), representation with regulators (3.9), newsletters (3.7), industry alerts (3.7), workshops (3.6) (on latest research and on policies and regulations), and a web site (3.6).

Recruitment

- Enlist current association members to recruit new members.

Current members of associations rated the value of their membership as positive. In addition to valuing their membership, their likelihood of renewal was high as was their willingness to recommend membership to others. Such results indicate a strong loyalty to the association. One of the primary reasons provided by respondents who had never joined an association was that they had never been asked to join. Current association members could contact some of these individuals personally to invite them to join, to attend a meeting, or to accompany them to an association event. For this strategy to be effective, however, there needs to be regularly scheduled association activities underway, such as the workshops, newsletters, etc. mentioned above.

- Develop materials that articulate the benefits/services and value of membership.

A number of respondents who had never joined an association indicated that they did not know how membership would benefit their business. Survey results showed that face-to-face meetings, networking opportunities, media materials, representation with regulators, newsletters, industry alerts, workshops on the latest research and on policies and regulations, and a web site were the types of activities that association members valued most highly.

For state associations that already have these types of activities in place, then materials summarizing the specific activities of that state's association should be developed and disseminated on web sites, in newsletters, and via all means available.

For state associations that do not yet have regularly scheduled activities, the first step is to develop the types of activities that create value for their members. The survey results showed that the most frequently mentioned enticements by those who had never joined an association were: newsletters, meetings, workshops (both on the latest research and policies/regulations), and other networking opportunities. A good starting point for an association that has not been very active is to begin to publish a newsletter. Someone will need to take responsibility to pull together information to do so. The second step is to begin to organize and hold meetings. For states with little Extension support, it may be difficult to organize an annual conference. However, smaller workshops offered once

or twice a year on focused and critical topics held in venues where there are groups of producers raising a given species, would provide the same networking opportunities that are likely to entice new members to join. NCRAC could provide regional Extension support to help identify the most appropriate speakers. Often, other organizations such as Farm Bureau or those who provide supplies to aquaculture producers are willing to provide meeting spaces at no cost. Effective meetings can also be held on individual farms, in a shop on the farm, for example, and include some hands-on activities.

- Update association web sites and include examples of the value of membership in a prominent location on the home page.

Web sites are important sources of information and news about an association and were scored at a “very good” rating in terms of their value to association members. A web site is a good starting point to highlight and communicate the value of membership in that specific association. Each state association’s web site should be updated and maintained with a listing of the types of benefits and services that provide value to membership in that association. Providing continual updates of examples of specific activities of that association will contribute to member satisfaction and to a sense of value for their membership. Recruitment efforts can drive traffic to the web site for additional detail.

- Develop state association presence at major agriculture events to communicate what the association is about, why it exists, and what the value is of membership.

The value of membership in a state aquaculture association is also tied to its relevance on the state level. There are important opportunities for a state aquaculture association to engage in larger conversations about the importance and value of aquaculture and to identify common ground with other sectors of agriculture. Such opportunities can include livestock conventions, county and state fairs, state Farm Bureau activities, state Agriculture Days, state departments of agriculture activities, and many others. Setting up a booth to talk with attendees at these events, offering to speak at such meetings, nominating aquaculture producers for farming awards (eg., “Farmer-of-the-Year”) may require producers to spend some time outside their comfort zone, but can be very beneficial in building support for the association and increasing its overall effectiveness. Individual aquaculture producers who agree to attend such meetings can be briefed by others with experience in doing so in terms of talking points and key messages.

- Actively communicate the value of membership and activities of the state’s aquaculture association.

Active and effective communications strategies are critical for associations to recruit and maintain their membership and support. Each association needs to plan for frequent communications to their membership, to the broader agricultural community, to research and extension personnel, and to the broader public. Communications from the association lets current and prospective members know what activities are occurring, encourages participation by both members and non-members, and enhances the value of membership by providing on-going reminders of what that value is. Examples of communications activities include: periodic newsletters, annual reports, flyers of recent activities and events, industry alerts, announcements of meetings, and press releases announcing honors received by the state’s aquaculture producers.

Retention

- Provide support to inform state associations and non-member producers about current research, outreach and business development opportunities for aquaculture expansion.

To retain members, the key benefits/services desired seem to be industry alerts and workshops on the latest research results. The survey results indicated that the value of membership would be enhanced by providing: 1) regular, possibly quarterly, newsletters either in each state or by combining efforts across multiple states (while still addressing local issues for each with a section of each newsletter devoted to each participating state); 2) periodic industry alerts; and 3) periodic meetings (at least one meeting a year should focus on new research of interest in that state, bringing in out-of-state experts whenever necessary).

NCRAC funding for workshops on the latest research should be prioritized. Such workshops should be organized in conjunction with state associations, with input from industry in each state to identify the most important topics. It will be critical to ensure that all major species priorities are addressed in these workshops and it likely will be

important to provide funding to bring in experts from out-of-state. Program planning meetings prior to workshops and conferences will be essential to engage association members to identify top priorities. One example might be to provide the latest research information on trout through workshops in the major trout-producing states in the NCR by bringing in lead researchers on trout production from Idaho, the Cool and Coldwater Aquaculture Research Center in West Virginia (USDA Agricultural Research Service), and others. To be effective in revitalizing state associations, an effort needs to be made to reach out to all segments of industry in each state, including members and non-members of state associations, for input on the most important topics.

- Obtain feedback from each association activity to inform future activities.

Each association activity provides an opportunity to engage members and other participants to identify ideas for future activities. Each workshop and conference should include a short evaluation form that provides an opportunity to identify which aspects of the meeting met the needs of participants and to gather information on new topics or changes to improve future meetings. Suggestions for future speakers, venues, times of the year, and other scheduling ideas can be collected as well as new ideas for future association activities.

Extension Support

- Expand Extension support in the North Central Region.

Develop and implement meetings by NCRAC/association representatives (industry, state associations, research, Extension personnel) with the appropriate individuals in states with little Extension support for aquaculture to request funding to increase Extension support for aquaculture.

- Develop and disseminate educational information on aquaculture in the state.

The NCR includes a wide range of aquatic animals and plants that are raised on aquaculture farms using a wide variety of production systems and targeting a wide variety of markets. Yet, there is little understanding on the part of the general public of these fascinating businesses and how they contribute to local economies and communities. Extension materials should be developed that provide such background information on aquaculture in the region. Specific deliverable extension materials should include: 1) videos, 2) PowerPoint presentations with voice-over recordings, 3) infographics, and 4) brochures/flyers. Materials should be designed to emphasize the most important aquaculture sectors in the region (eg., trout, baitfish, sportfish, yellow perch). States that play important roles nationally in specific segments of aquaculture should be emphasized (i.e., trout in Wisconsin and Missouri; baitfish in Minnesota, Ohio, and Wisconsin).

Leadership Training for Aquaculture Producers

- Develop and implement an on-going leadership training program for aquaculture association leadership in the North Central Region.

Effective leadership is critical to successful associations. An on-going leadership training program is needed in the NCR that includes training for the existing leadership as well as cultivates and engages with young producers for their development into future industry leadership positions. Leadership training should address the nuts and bolts of running associations (adequate and updated bylaws, legal status, appropriate accounting methods), ways to improve member engagement to develop loyalty and improve retention, and ways to improve the frequency and effectiveness of communications both internally with members and externally with media and the general public. NCRAC should take the lead to develop and implement such a leadership training program.

- Develop conflict resolution training modules as part of the leadership training program.

Conflict among members of any group of people is inevitable. Successful associations are those that are able to resolve conflicts when they arise among members. Survey responses revealed that such unresolved differences among members have led to some members ceasing to renew their membership in associations in the region. Conflict resolution techniques are readily available and should be adapted to aquaculture association leadership by NCRAC.

- Develop a “Young Farmers” program in the North Central Region.

Developing young farmers to become future leaders of an industry is vital to the long-term success of associations and of industries. All too often, an effective association led by a strong leader suffers when that leader steps down or retires from the industry. Transition planning for individual associations is critical, but needs to include an active leadership training component that targets young farmers. A model program is the Young Catfish Farmers program organized each year by the Catfish Farmers of America. Many “graduates” of this program are now elected officers in state associations. One of the key benefits of this program is that it involves young farmers from across several states who get to know each other and provide mutual support to each other over the succeeding years.

References

USDA-NASS (United States Department of Agriculture-National Agricultural Statistics Service). 2014. Census of Aquaculture (2012). National Agricultural Statistics Service, USDA, Washington, District of Columbia, USA. Accessed July 25, 2017 at www.agcensus.usda.gov.

Principal Accomplishments

The principal accomplishment of this project was to complete a survey of aquaculture producers in the NCR that identified: 1) why some aquaculture producers choose to join associations and others do not; 2) how producers value the various types of activities undertaken by state associations; 3) the types of services or programs that would attract membership; and 4) barriers and challenges to organizing and sustaining state aquaculture associations. Such information will be used to inform the leadership training program that has been approved by the NCRAC Board. The recommendations from the project form a basis for developing effective strategies to strengthen state associations in the NCR.

Impacts

The leadership training and development project will benefit from information obtained through the survey of state association members and non-members. The short-term impact has been the greater knowledge obtained about how aquaculture producers in the NCR value their membership in associations and what types of benefits/services are valued the most by current members, non-members, and those who have ceased to maintain their memberships.

Expected long-term impacts from this project are that state aquaculture associations in the NCR will be revitalized. The end result of this initiative would be a greater number of active associations in the region with increased numbers of more engaged members.

Recommended Follow-up Activities

1. Create a structure through the North Central Regional Aquaculture Center to annually update contact lists for aquaculture, aquaponics, and baitfish harvesters in each state.
2. Improve the value of membership by enhancing the benefits/services offered.
3. Enlist current association members to recruit new members.
4. Develop materials that articulate the benefits/services and value of membership.
5. Update association web sites and include examples of the value of membership in a prominent location on the home page.
6. Develop state association presence at major agriculture events to communicate what the association is about, why it exists, and what the value of its membership.
7. Actively communicate the value of membership and activities of the state’s aquaculture association.
8. Provide support to inform state associations and non-member producers about current research, outreach and business development opportunities for aquaculture expansion.
9. Obtain feedback from each association activity to inform future activities.
10. Expand extension support in the North Central Region.
11. Develop and disseminate educational information on aquaculture in the state.
12. Develop and implement an on-going leadership training program for aquaculture association leadership in the North Central Region.

13. Develop conflict resolution training modules as part of the leadership training program.
14. Develop a “Young Farmers” program in the North Central Region.

Table 1. Responses by state.

State	Number in list frame	Survey responses by state		Percentage of total responses received by state	Number of farms reported in 2013 Census of Aquaculture (data for 2012)	
		No.	%		No. of farms	% in NCR
Illinois	15	4	27%	5%	23	7%
Indiana*	33	9	27%	11%	7	2%
Iowa	53	13	25%	16%	31	9%
Kansas	6	2	33%	3%	4	1%
Michigan*	17	7	41%	9%	32	10%
Minnesota	5	1	20%	1%	35	10%
Missouri	14	5	36%	6%	35	10%
Nebraska	8	0	0%	0	21	6%
North Dakota	0	0	n.a.	0	0	0
Ohio*	82	31	38%	38%	61	18%
South Dakota	1	1	100%	1%	7	2%
Wisconsin	45	8	18%	10%	80	24%
TOTAL	279	81	29%	100%	336	99%

*Includes paper and electronic copy.

Table 2. Number and percentage of respondents by type of business.

Type of business	Number of respondents	Percent of respondents
Primary type of business		
Aquaculture	67	84
Aquaponics	4	5
Baitfish harvesting	3	4
Not currently a producer	5	6
No response	1	1
TOTAL		100
Secondary type of business		
Baitfish harvesting	4	5
Tertiary type of business		
Aquaponics	1	1

Table 3. Number of species raised by respondents to NCRAC Association Survey

Species raised	Number of respondents raising this species	Percent of respondents raising this species	Census of aquaculture (% of reports in region)
Baitfish (fathead minnows, golden shiners, spottfin shiners, “all types of baitfish”)	34	11%	14
Bass (largemouth, hybrid striped bass, striped bass)	38	13%	18
Bluegill/bream/redear	37	13%	15
Catfish	26	9%	12
Crayfish	12	4%	1
Ornamentals (goldfish, koi, snails)	19	6%	8
Marine shrimp/freshwater prawns	15	5%	2.5
Tilapia	22	7%	7
Trout	21	7%	18
Walleye	19	6%	9
Yellow perch	35	12%	11
Other food species (barramundi, paddlefish, salmon, turtles)	8	3%	4
Other sportfish (muskie, northern pike, black crappie, grass carp)	11	4%	13
TOTAL NUMBER OF REPORTS	297	100%	132

Table 4. Number and percent of respondents by number of species raised.

Number of species raised	No. of respondents	Percent
1	30	38
2 to 5	20	25
6 to 10	22	28
11 to 15	5	6
No response	3	4
Total	80	101

Table 5. Number and percent of respondents by the type of aquatic animal raised that was most important in terms of sales.

Name of Species	Number of respondents reporting it to be most important in terms of sales	
		Percent
Tilapia	10	12
Trout	10	12
Yellow perch	8	10
Marine shrimp	8	10
Bass	7	9
Baitfish	6	7
Bluegill/bream	4	5
Catfish	4	5
Walleye	2	3
Turtles	2	3
Barramundi	1	1
Caviar	1	1
Crayfish	1	1
Freshwater prawn	1	1
Goldfish	1	1
Koi	1	1
Ornamentals	1	1
Grass carp	1	1
Tuna	1	1
No response	11	14
TOTAL	80	99

Table 6. Types of production systems reported by respondents.

Production System	Number of respondents using this production system	Percent
Aquaculture		
Cages	12	8
Ponds	49	31
Raceways	13	8
Indoor tanks	42	27
Greenhouse tanks	3	2
Outdoor tanks	12	8
Tanks	4	3
Aquaponics		
Raceways	1	1
Indoor tanks	6	4
Greenhouse tanks	5	3
Outdoor tanks	2	1
Baitfish harvesting		
Cages	2	1
Ponds	3	2
Raceways	1	1
Indoor tanks	2	1
Outdoor tanks	1	1
TOTAL	158	102

Table 7. Numbers of different production systems on same farms

Type of production	Number of production systems on individual farms		
	1	2	3-6
Aquaculture	34	22	16
Aquaponics	2	4	1
Baitfish harvesting	2	0	2
All respondents	38	26	19
Percent	46%	31%	23%

Table 8. Income categories reported by respondents.

Income category	Number of respondents using this production system	Percent
Aquatic animals		
< \$25,000	25	31
\$25,000 to \$50,000	8	10
\$50,000 to \$100,000	9	11
\$100,000 to \$500,000	12	14
\$500,000 to \$1 million	7	9
\$1 million & above	9	11
No response	10	10
TOTAL	80	100

Table 9. Membership in associations.

	n	Number of respondents	Percent of respondents
Ever belonged to association	80	62	78%
Never belonged to association	80	18	23%
Ended membership in an association	64	10	16%
Currently member of an association	64	54	84%

Table 10. Reasons for not joining an association.

Category	Number of respondents	Percent of respondents
There are none in my state	3	18
Do not know how membership would benefit my business	5	29
Have never been asked to join	4	24
Do not believe it is worth the membership fee	2	12
Just beginning/new to this industry; only have small, pilot program now/new farm; will join	3	18
TOTAL	17	101

Table 11. Reasons why respondents ended their membership in an association.

Reason given
<p>Not relevant to business No longer doing that species Not helpful or relevant</p> <p>Not applicable to my business Not pertinent to my career</p>
<p>Moved</p> <p>Moved to another state</p> <p>Shut down facility and moved. More involved in a different state</p>
<p>Disagreement</p> <p>Bad policy priorities</p> <p>This organization is not for the industry, but for one family</p>
<p>Personal</p> <p>Didn't feel welcome. It's too clickish Unable to attend meetings</p>
<p>Decline in effectiveness of association</p> <p>No longer exists</p> <p>Lost interest and its failure to add real value to our business Little communication, or resources in my immediate region Never heard anything from them</p> <p>Membership decline</p>

Table 12. Ratings of benefits received, likelihood to renew membership, and likelihood of recommending membership to others.

Category	Rating (scale of 1 to 5 where 5 = excellent)
Benefits from membership in association	3.7
Likelihood of renewing membership in association	4.5
Likelihood of recommending membership to others	4.3

Table 13. Mean ratings of value of benefits/services of membership in an association. A score of 5 is “Excellent”, 4 is “Very good,” 3 is “Good,” 2 is “Fair,” and 1 is “Poor.”

Benefit/service received from aquaculture association	Average score
Annual/biannual meeting in state	4.3
Networking opportunities	4.1
Media materials	3.9
Representation with regulators	3.9
Newsletter	3.7
Industry alerts	3.7
Workshops on latest research	3.6
Workshops on latest policies & regulations	3.6
Website	3.5
Public relations campaigns	3.0
Webinars	2.7

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Table 14. Gross sales/business scale effects on ratings of the value and benefits/services of association membership.

	< \$25 K (n=14)	\$25 to \$50 K (n=7)	\$50 to \$100 K (n=9)	\$100 to \$500 K (n=7)	\$500 K to \$1 million (n=7)	> \$1 million (n=7)
Value of membership	4.1	3.5	3.8	3.7	3.0	4.2
Renewal likelihood	4.6	4.25	4.5	4.3	4.4	4.8
Recommendation likelihood	4.6	3.9	4.2	4.3	4.0	4.4
Meetings	4.4	3.9	4.6	3.7	4.1	4.9
Newsletter	4.3	2.9	4.4	3.3	3.0	4.1
Webinar	2.4	2.6	3.4	3.3	2.3	3.4
Alerts	4.2	3.5	3.5	4.0	2.6	4.1
Website	3.9	3.3	3.7	4.2	3.3	3.0
Network	4.4	4.1	3.8	4.0	4.1	4.6
Workshops-research	4.1	2.8	4.0	3.7	3.4	3.6
Media materials	4.0	4.0	3.3	4.3	4.0	4.0
Workshops-policy/regs.	3.8	3.2	3.3	3.5	3.6	3.7
Public relations	3.2	2.7	3.0	3.3	2.6	3.7
Representation w/regulators	4.1	3.5	3.5	3.7	3.9	4.1

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Table 15. Species type effects on ratings of the value and benefits/services of association membership.

	Baitfish/ ornamentals (n=8)	Bass, bluegill, catfish (n=11)	Tilapia, shrimp, prawn (n=8)	Trout (n=9)	Yellow perch, walleye (n=9)	Other, including no report of primary species (n=8)
Value of membership	4.0	3.7	3.9	3.6	3.7	3.8
Renewal likelihood	4.5	4.6	4.3	4.6	4.4	4.5
Recommendation likelihood	4.3	4.4	4.1	4.4	4.0	4.4
Meetings	4.1	4.0	4.4	4.1	4.7	4.4
Newsletter	4.1	3.2	3.7	3.4	4.1	3.8
Webinar	2.1	2.3	3.0	2.5	3.4	3.4
Alerts	4.0	4.2	3.9	2.2	3.9	4.1
Website	3.4	3.0	4.1	3.4	3.8	3.5
Network	4.2	4.0	4.5	3.9	3.9	4.2
Workshops-research	3.8	3.0	4.0	3.2	4.3	3.9
Media materials	4.0	3.7	4.0	4.0	3.5	4.0
Workshops-policy/regs.	3.5	3.4	3.5	3.5	3.9	4.0
Public relations	3.2	2.5	3.3	3.1	3.0	3.2
Representation w/regulators	4.1	3.6	4.2	3.8	3.7	3.9

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Table 16. Effect of the degree of Extension support on ratings of the value and benefits/services of association membership.

	Low Extension support (n = 6)	Medium Extension support (n = 16)	High Extension support (n = 32)
Value of membership	3.3	3.6	3.9
Renewal likelihood	4.0	4.6	4.5
Recommendation likelihood	3.5	4.5	4.3
Meetings	2.4	4.4	4.5
Newsletter	2.2	3.1	4.2
Webinar	2.6	2.2	3.0
Alerts	3.5	3.7	3.8
Website	2.3	3.3	3.8
Network	3.7	3.9	4.3
Workshops-research	2.7	3.1	4.1
Media materials	3.0	-	3.9
Workshops-policy/regulations	3.7	3.4	3.7
Public relations	2.2	2.9	3.2
Representation w/regulators	3.0	3.9	4.0

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Table 17. Barriers and constraints to the development of an effective association that would provide benefits and services to their business identified by respondents.

Barriers and Constraints Identified by Those Who Had Never Joined an Association

Decline in effectiveness of association

Low membership; need to help build and support the industry. Lack of participation

Lack of membership.

There is a little lack in cohesion when it comes to the aquaculture community within the state because there is limited interaction between members unless (1) they already knew each other before joining or (2) they only are forced to interact once a year at the annual conference. More events and a monthly newsletter would help bridge the gap significantly.

Size of industry

Not enough producers of any decent size.

Not enough interest in Aquaculture. Not enough producers to make it viable.

Specific association activities needed

Reduce regulations!

Practical objectives and adequate use of time. Help get PCR testing approved for use

Other

We have NCRAC but they are only interested in intensive large-scale operations. None

Barriers and Constraints Identified by Those Who Ceased Membership in an Association

Decline in effectiveness of association

Lack of interest

Disagreement

Bad leadership

Lack of response by other businesses because of a sense of competition instead of common ground

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Personal

Time to get away to go to meetings Name

of specific person^a

Distance to attend meetings, meeting dates and times Governmental regulations

Lack of funding to grow and create new farms

^a Response referred to a specific name that has been omitted due to confidentiality.

Table 18. Thoughts by respondents related to aquaculture associations that no longer exist and what happened. Lack of participation.

The association in my state appears to be doing well.

Active here in my state but they only care about the big intensive operations going in.

I have seen these type of associations try before; they never seem to work. Just like today's labor unions, nobody worries about the group, just about themselves.

Old members

Table 19. Reasons for decline in activity of aquaculture association by respondents who had once been a member of an association but ceased their membership.

Decline in effectiveness of association

Lack of interest

Lack of interest or fear of information sharing

Disagreement

Too many factions

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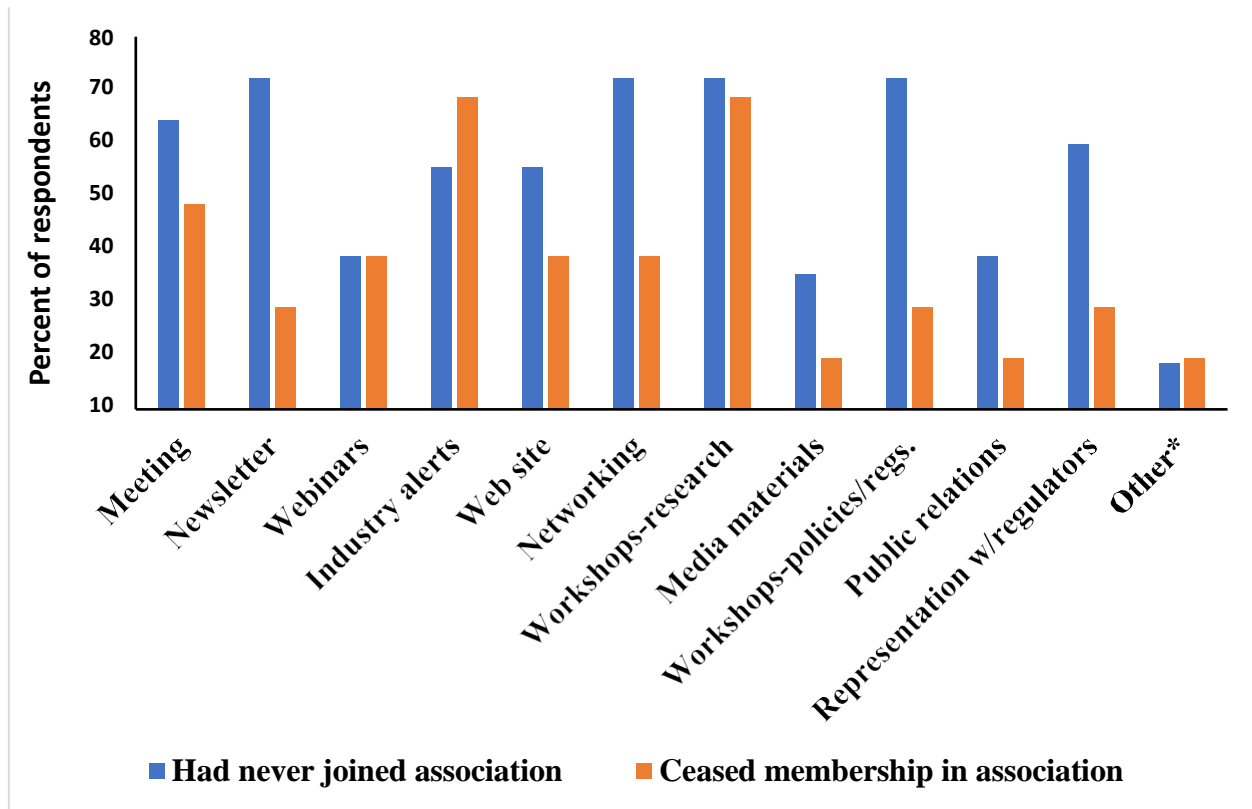


Figure 1. Frequency of responses of interest in various benefits/services by respondents who had never joined an association and those who had ceased membership.