**"Improving fish health in the NCR by integrating extension with the development of alternative disease prevention methods -Part II"**

*Theme D (Fish Health)*

**Investigator(s):**
Name: Myron Kebus, M.S., DVM
Phone: 608-616-2133
Fax: none
E-mail: kebusmyr@msu.edu
Affiliation: Michigan State University, College of Veterinary Medicine
Street Address: 426 Auditorium Rd, Room 2
City, State, Zip Code: East Lansing, MI 48824-2600

**Funding Request:** $46,500

**Duration:** 3 years (01/01/2025 - 12/31/2027)

## Project Summary

Arming producers with practical means of improving farmed fish health in the North Central Region (NCR) was identified as a priority need during the 2020 NCR Aquaculture Roundtable Sessions. The ongoing USDA-NIFA NCRAC funded "Improving fish health in the NCR by integrating extension with the development of alternative disease prevention methods" grant yielded a pivotal survey of producers on fish health, which identified many needs and profound support for aquaculture veterinary outreach. Producers from eight NCR states have expressed strong support for Dr. Myron Kebus to continue to provide aquaculture veterinary outreach assistance in the NCR. Since January 2023, he has visited 22 farms, given 36 presentations at aquaculture/veterinary conferences, provided 220 consults to fish farmers and veterinarians, and conducted three major veterinary training workshops. He has linked producers with fish farm veterinarians to reduce costly fish disease losses and obtain fish health certificates for shipping fish, which expands their sales. The grant team leveraged initial NCRAC resources, resulting in the long-term creation of an outreach veterinarian position funded by Michigan State University (MSU). Now armed with that support, what Dr. Kebus needs is only support for travel and supplies to continue greatly benefitting the aquaculture industry throughout the region.

## Justification

***Infectious disease as an impediment to aquaculture productivity in the USA and the NCR.***

According to the USDA National Agriculture Statistics Service (2020; ISSN 1949-1948), **>28 million US-farmed trout were lost due to bacterial and/or parasitic diseases in 2019** compared to 47.2 million trout that were sold that same year, illustrating the substantial disease-induced losses facing US trout producers. Although data for each fish species in each state in the North Central Region (NCR) is unavailable, it is abundantly clear that infectious diseases of other fish species are also a significant impediment to aquaculture productivity, as relayed in the 2020 NCR Aquaculture Roundtable Sessions (Columbus, OH). Despite such challenges and based on preliminary explorations in a 2020 North Central Regional Aquaculture Center (NCRAC) funded project aiming to evaluate the effectiveness of previously funded NCRAC research (led by Virginia Tech, Matthew Smith, and colleagues from Purdue University), the bulk of previous fish health studies appear to have focused on drugs (including Investigational New Animal Drugs) for use in aquaculture (i.e., reactive tools for use after disease outbreaks have already begun) as opposed to the alternative approach of empowering producers to prevent disease outbreaks before

they ever occur (i.e., an ounce of prevention is worth a pound of cure). For producers to reap the benefits of proactive and disease-preventative approaches, however, they must have access to available fish health expertise, be equipped with a set of best management practices (BMPs) that are customized for the NCR and its variety of farm conditions and have immediately implementable tools that reduce or altogether eliminate both known and unknown fish disease problems they face. Indeed, more thoroughly understanding and preventing infectious diseases are key to improving industry productivity in the NCR.

Arming producers with practical means of improving farmed fish health in the North Central Region (NCR) was identified as a priority need during the 2020 NCR Aquaculture Roundtable Sessions. The USDA-NIFA NCRAC funded "Improving fish health in the NCR by integrating extension with the development of alternative disease prevention methods" grant yielded a pivotal survey of producers on fish health, which identified many needs and profound support for aquaculture veterinary outreach. Producers from eight NCR states have expressed strong support for Dr. Myron Kebus to continue to provide aquaculture veterinary outreach assistance in the NCR. The grant team leveraged initial NCRAC resources, resulting in the long-term creation of outreach veterinarian position funded by Michigan State University (MSU). Now armed with that support, what Dr. Kebus needs is only support for travel and supplies to continue greatly benefitting the aquaculture industry throughout the region.

## Related Current and Previous Work

Since January 2023, Dr. Kebus has visited 22 farms, given 36 presentations at aquaculture/veterinary conferences, provided 220 consults to fish farmers and veterinarians, and conducted three major veterinary training workshops. He has linked producers with fish farm veterinarians to reduce costly fish disease losses and obtain fish health certificates for shipping fish, which expands their sales. He has been a contributor to fish health presentations and workshops at five NCR state aquaculture conferences.

***Previous/ongoing fish health Extension activities within the NCR.***

The need for accessible fish health resources in the NCR has been recognized for quite some time. The most relevant efforts previously conducted in the NCR were spearheaded in Wisconsin (and funded by NCRAC in 2008). The State of Wisconsin's Department of Agriculture, Trade and Consumer Protection (**Dr. Myron Kebus**) and University of Wisconsin-Stevens Point (UW-SP; Dr. Chris Hartleb) created free online fish health modules with topics on: 1) Introductory and Practices, 2) Risk Management and Biosecurity, 3) Water Quality Management, Monitoring and Disease Prevention, 4) Fish Health Inspections, 5) Veterinary Health Assessments, and 6) Cases Studies. This information for farmers, in addition to the modules created for veterinarians, are fantastic resources that can be viewed at any time. These modules can be found on the UW-SP Northern Aquaculture Demonstration Facility website under *resources*. The distinction between this previous work and what is proposed herein is that this project supports a boots-on-the-ground Aquaculture Outreach Veterinarian with region-wide outreach duties. In essence, to bring the modules created by Wisconsin to life through farm visits (complete with on farm fish health assessment, survey data, and sample collection), workshops, and the creation of additional tangible resources to help producers be better equipped for managing aquatic animal health on their farm. Thus, the proposed project would complement and uplift, rather than duplicate, the resources created by Drs. Kebus and Hartleb.

Matthew Smith and Nick Phelps also led a previously funded project entitled "*Comprehensive Training and Outreach Program to Expand Development of NCR Aquaculture,"* in which veterinarians, fish health professionals, and Extension collaborated to develop farmer workshops in several Midwest states. Working with various state associations, fish health was repeatedly identified as a need and thus a focus for the project. Water samples and fish were available for producers to obtain hands-on experience testing various water quality parameters and conducting an evaluation of the health of the available fish. The information that was generated and delivered was also recorded and placed on NCRAC's Vimeo channel. However, no farm visits were conducted as part of this project and a dedicated region-wide veterinarian was not provided. Here again, this proposed work would complement the work conducted through the comprehensive training and outreach program, as we understand producers have limited time to scour the Internet for assistance during a fish health emergency. It is optimal that producers will utilize the already available information and the information created from this project to support **proactiveness**; however, we

all realize that it is necessary to be **reactive** when problems arise. For the duration of this project, and hopefully beyond should additional funding be secured, an Aquaculture Outreach Veterinarian will continue to be there (phone, email, Zoom, or in-person) to support Midwest farmers working on being **proactive**, along with the times when being **reactive** is necessary. Additional training materials (e.g., fact sheets, online modules, videos, etc.) produced as part of the proposed project will build from this previously developed material and will include input from several producers and aspiring fish health professionals to ensure they are easily understandable to those without extensive training in the subject matter being presented.

## Statement Regarding Duplication of Research

Dr. Kebus is the first and only Aquaculture Outreach Veterinarian in the North Central Region. His approach to working with producers and veterinarians from multiple states in the region is unique and does not duplicate other research efforts.

## Anticipated Benefits

There are a substantial number of benefits Industry will receive should the proposed work be funded. One of the primary audiences and benefactors of the proposed study will be fish farmers in the NCR. Indeed, many fish producers lose a significant number of fish, often early on in growth, for unexplained reasons more years than not. Due to our experience and preliminary testing by PI-Loch's group, *F. psychrophilum* is likely directly contributing to most of the losses in trout, as has been determined in NCR states where in depth studies have been undertaken (Faisal et al. 2011; Loch et al. 2013; Van Vliet et al. 2015; Loch and Faisal 2018). In addition to benefits to NCR trout farmers, all producers in the region will continue to have access to the regional Aquaculture Outreach Veterinarian for assistance, a resource that many in the NCR have never been able to benefit from. At the same time, the Aquaculture Outreach Veterinarian will benefit from receiving additional hands-on experience in the NCR, hopefully increasing trust between producers and researchers/Extension. Some producers in the region will have an actual aquaculture veterinarian on their farm for the first time. This gives the producer the opportunity to discuss limiting stress on the animals, which will undoubtedly help the producer with a host of biological or system design questions. He will engage the State aquaculture association and universities' College of Veterinary Medicine, if there is one in the state, to increase awareness of aquaculture veterinary medicine. A more thorough overview of the anticipated benefits of the proposed project can be found in the Logic Model.

## Objective(s)

The "Improving fish health in the NCR by integrating extension with the development of alternative disease prevention methods" NCRAC Grant team conducted a qualitative survey from April to October 2023 that had 30 questions in the categories of general farm description, farm specific fish health concerns, fish health help needs of farmers, prevention practices, diagnostic and treatment efforts, and the interview process allowed for other comments to be provided. Participants came from six of the twelve North Central states (Michigan, Ohio, Indiana, Wisconsin, Minnesota, and Missouri). While 65% of the fish farmers surveyed said they conducted regulatory fish health inspections, 44% had fish veterinarians, only 26% have written biosecurity plans, 11% vaccinate, 47% had disinfection protocols, and 4% use Veterinary Feed Directives for antibiotic use. Fish health inspections are a legal requirement for moving fish to other states, and it appears to be the leading reason fish farmers seek veterinarians. Voluntary non-regulatory production medicine practices such as written biosecurity plans, vaccination, disinfection, and use of Veterinary Feed Directives use were relatively low. These findings support the hypothesis that fish health practices in the NCR are largely driven by regulatory fish health inspection requirements, and non-regulatory production medicine efforts are under-utilized. There are many fish farmers that currently do not use veterinary services. It appears from the findings that they would benefit from veterinary services. Dr. Kebus has begun to support veterinarians in the region who want to pursue fish farm veterinary services as part of their practice. There appear to be opportunities for veterinarians who are well-trained in fish farm veterinary medicine and who understand fish farmer's needs. However, they need additional training and support from the regional Aquaculture Outreach Veterinarian (Dr. Kebus). The objectives in this proposal intend to build upon ongoing USDA-NIFA NCRAC funded efforts and address the issue highlighted in the survey findings. Efforts to increase the use of

veterinarians, written biosecurity plans, vaccination rates, and disinfection rates, and use of antibiotics in a judicious manner will be pursued, documented, assessed, and reported. To this end, the following objectives are proposed:

***Objective 1. To provide direct assistance to producers through fish health consults on farms***

***Objective 2. To assist veterinarians pursuing fish farm veterinary training by providing consults to veterinarians on farms that request their services.***

***Objective 3. To conduct producer training workshops on farms to meet specific farm needs for individual farm staff.***

***Objective 4. To conduct fish farmer and veterinary workshops at conferences and meetings***

***Objective 5. To present findings of issues and concerns of NCR fish farmers at national fish farm and veterinary conferences***

**Deliverables**

1. Provide direct assistance to producers through fish health consults on farms
2. Assist veterinarians pursuing fish farm veterinary training by providing consults on farms
3. Conduct producer training workshops on their farms to meet specific farm needs for individual farm staff
4. Provide education, training, and outreach experience for undergraduate students, graduate students, and a post-doctoral researcher involved in the proposed research.
5. Presentations at multiple professional conferences and stakeholder meetings.

**Procedures**

***Objective 1. To provide direct assistance to producers through fish health consults on farms***

A veterinarian with a strong background in aquatic animal health (Dr. Kebus) will be funded to continue to lead a region-wide action plan to address fish health needs of fish farmers that need on-site consultation and fish health assistance. In some cases, telehealth consults (phone, email, virtual) are not sufficient to help producers with complex, challenging, and costly fish health problems. These cases benefit from on-site consults to assist the producer and their fish health support team. All participants will be surveyed for fish health practices and needs. Dr. Kebus is now a valuable resource to fish farmers in the region and comes with abundant support from MSU. All that is needed is a travel funds. This makes this proposal a very low risk proposal with high likelihood of much success **($3,500 *per year for travel expenses*)**

***Objective 2. To assist veterinarians pursuing fish farm veterinary training by providing consults to veterinarians on farms that request their services.***

A veterinarian with a strong background in fish farm veterinary training (Dr. Kebus) will be funded to lead a region-wide action plan to address fish health training needs of veterinarians who work with fish farmers that need on-site consultation and fish health assistance. Producers are using veterinarians who often have limited aquatic experience. Dr. Kebus will equip more veterinarians to obtain the skills needed that are specific to aquatics and to fish farm veterinary medicine. Veterinarians benefit from having a highly experienced fish farm veterinarian assist them before or during their first visit to a fish farm to conduct new procedures. Veterinarians will be surveyed for their level of involvement and their training needs. All that is needed is travel funds and supplies. This makes this proposal a very low risk proposal with high likelihood of much success ***($2,000 per year for travel expenses)***

***Objective 3. To conduct producer training workshops on farms to meet specific farm needs for individual farm staff***

Dr. Kebus has been asked by some NCR producers to train their farm staff on fish health procedures so they can take initial steps to recognize early signs of fish health issues, and facilitate timely management actions that can be undertaken, and prompt appropriate fish health/veterinary intervention can be initiated to reduce losses from fish diseases. A veterinarian with a strong background in fish farmer training (Dr. Kebus) will coordinate with fish farm managers in the region to conduct farm specific fish health training so that fish farm staff will learn more about practical fish health techniques that they can employ to improve fish health on their farm. All participants will be surveyed on their fish health practices and needs. ***($2,000 per year for travel expenses)***

***Objective 4. To conduct fish farmer and veterinary workshops at conferences and meetings***

In 2023 Dr. Kebus was asked to moderate and present aquaculture veterinary content at five state aquaculture conferences and meetings. He has a strong background in conducting fish farmer workshops and will coordinate with state and national aquaculture associations to conduct fish health workshops for fish farmers and veterinarians at regional events. All participants will be surveyed for fish health practices and needs. ***($3,000 per year for travel expenses)***

***Objective 5. To present findings of issues and concerns of NCR fish farmers at national fish farm and veterinary conferences***

The veterinarian (Dr. Kebus) will conduct a survey of NCR fish farmers in 2026 that would re-assess the survey findings of the Survey of Fish Farmers on Fish Health in the NCR conducted in 2023. He will present findings of the survey and the findings from the workshops conducted throughout the project. Efforts will be made to develop collaborations at these conferences that will potentially bring national funds and resources to the NCR to improve fish health. ***($3,000 per year for travel expenses, and $3,000 for travel expenses in 2027)***

*Annual budget $13,500 for travel expenses plus $3,000 in 2027 plus $1,000 per year for supplies and materials associated with consults and training efforts. Total for three years $ 46,500 for travel expenses*

***Important Note: Dr. Kebus's considerable time associated with this project assisting producers and veterinarians will be fully funded by Michigan State University, College of Veterinary Medicine for the entire period of the project.***

**Outreach and Evaluation Plan**

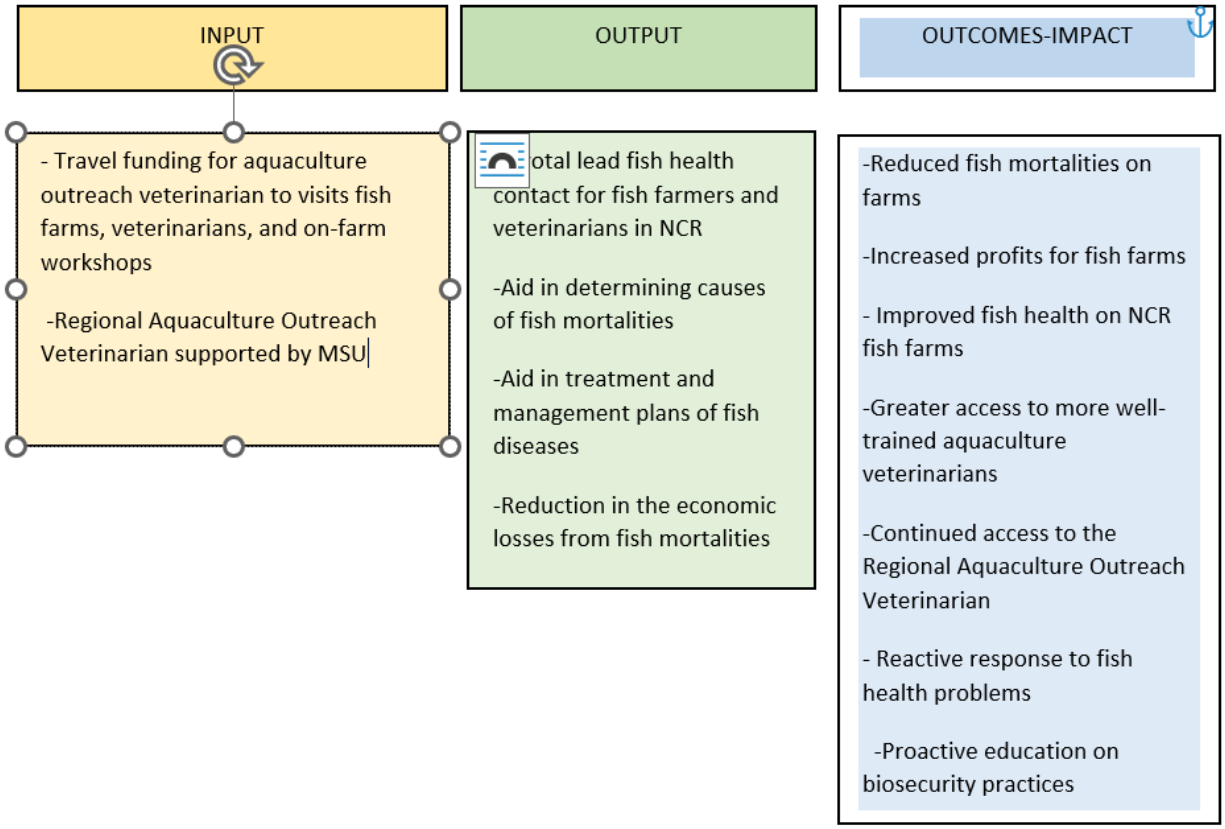
This project would be extremely strong on outreach and on farm assistance to NCR producers. A significant amount of outreach, and education is built into this project. During farm visits, Dr. Kebus will provide producers fish health Best Management Practices (BMPs), train farmers to be able to conduct some simple but extremely useful diagnostic techniques including conducting wet-mounts and fish health assessments, help create farm-specific biosecurity plans and templates for other farms, and survey their current practices and area where they need assistance to make improvements on their farm.

The activities with producers will help to develop educational materials for wider dissemination (e.g., fact sheets, etc.). The input from producers and aspiring fish health professionals will ensure they are easily understandable to those without extensive training in the subject matter being presented. Other deliverables will include a fact sheet describing region-specific fish health problems, biosecurity templates and how farms can implement them, and a list of current aquatic veterinarians in each of the NCR states.

It is important that producers understand who the available veterinarians near them are, and veterinarians know the producers in their area who are seeking veterinary services. In 2023 Dr. Kebus compiled the first ever list of veterinarians in the NCR, created a listserv to facilitate communication with these veterinarians, and has linked several producers with these veterinarians. This project will advance this effort by recruiting more veterinarians, providing them with support to conduct veterinary services, and linking them with training opportunities on fish farm veterinary medicine.

Other important deliverables include providing post-doctoral researchers and undergraduate interns at MSU, and other NCR universities, with hands-on research, training, and opportunities to develop as scientific scholars, as well as hands-on and on-farm training opportunities for veterinary students from veterinary colleges in the region. Selected aspiring aquatic animal-focused veterinary students from each institution will be invited to participate in the development and on-site review of BMPs and attend NCRAC or local aquaculture annual conferences to network with industry leaders.

A *Journal of Extension* article will also be generated and submitted, highlighting the importance of region-specific inter and transdisciplinary approach to address farmer problems in a world where outreach full-time equivalent employees continue to decrease. Dr. Kebus will report annually to NCRAC numbers of contacts made and the method they were made (e.g., phone calls, personal visits, Zoom, etc.) as well as preventative vs. reactive cases and support. Number of participants at workshops and other training events will be recorded, as well as number of copies of printed materials that are dispersed to the region.




**Facilities**

*Michigan State University (MSU).* PI Kebus maintains data and all potentially sensitive information on a password-protected/finger-scanned computer that is backed up into MSU's cloud, which is fully recoverable in the event of system failure. No facilities will be needed at MSU; however, there is the extensive capacity to conduct and support fish health-related research and outreach, and survey design.

## References

Faisal, M., T. Loch, M. Fujimoto, S. Woodiga, D. C. Honeyfield, M. Wolgamod, A. Eissa, E. Walker, and T. Marsh. 2011. Characterization of novel *Flavobacterium* spp. involved in the mortality of Coho salmon (*Oncorhynchus kisutch*) in their early life stages. Journal of Aquaculture Research & Development 2(S2):8.

Loch, T. P., and M. Faisal. 2018. Flavobacteria colonizing the early life stages of hatchery-incubated Chinook salmon *Oncorhynchus tshawytscha* (Walbaum 1792) are markedly diverse. Journal of Fish Diseases 41(5):829-845.

Van Vliet, D., T. P. Loch, and M. Faisal. 2015. *Flavobacterium psychrophilum* Infections in salmonid broodstock and hatchery-propagated stocks of the Great Lakes basin. Journal of Aquatic Animal Health 27(4):192-202.

## Schedule for Completion of Objectives

This project is travel expense funding for events that are not scheduled. Travel will occur when farms and veterinarians need Dr. Kebus to travel to assist them as issues arise. Travel is also for conferences and meetings that have yet to be scheduled by the organizers. The schedule for completion of the objectives will be on an as need basis.

### Project Leader

| State | Name/Institution | Area of Specialization |
|---|---|---|
| Michigan | Myron Kebus, Michigan State University | Aquaculture Outreach Veterinary Medicine |

| ORGANIZATION AND ADDRESS<br>Michigan State University<br>426 Auditorium Rd, Room 2<br>East Lansing, MI 48824-2600<br><br>PROJECT DIRECTOR(S)<br>Dr. Myron Kebus | | | | **USDA AWARD NO.** **Year 1:** Objective 1, 2, 3, 4, 5 | | | |
|---|---|---|---|---|---|---|---|
| | | | | Duration Proposed Months: 12<br>**Funds Requested by Proposer** | Duration Proposed Months: ____<br>**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. ___ Other Professionals . . . . . | | | | | | | |
| c. ___ Paraprofessionals | | | | | | | |
| d. ___ Graduate Students | | | | | | | |
| e. ___ Prebaccalaureate Students | | | | | | | |
| f. ___ Secretarial-Clerical | | | | | | | |
| g. ___ Technical, Shop and Other | | | | | | | |
| **Total Salaries and Wages** | | | | | | | |
| B. Fringe Benefits (If charged as Direct Costs) | | | | | | | |
| **C. Total Salaries, Wages, and Fringe Benefits (A plus B)** | | | | | | | |
| D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.) | | | | | | | |
| E. Materials and Supplies | | | | $1,000 | | | |
| F. Travel | | | | $13,500 | | | |
| 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.) | | | | | | | |
| **K. Total Direct Costs (C through I)** | | | | $14,500 | | | |
| **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) | | | | $14,500 | | | |
| **N. Other** | | | | | | | |
| **O. Total Amount of This Request** | | | | $14,500 | | | |
| **P. Carryover -- (If Applicable)** . . . . . **Federal Funds: $** | | | | **Non-Federal funds: $** | | **Total $** | |
| **Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**<br>Cash (both Applicant and Third Party)<br>Non-Cash Contributions (both Applicant and Third Party) | | | | | | Leave Blank | |

| **NAME AND TITLE** (Type or print) | **SIGNATURE** (required for revised budget only) | **DATE** |
|---|---|---|
| **Project Director** | | |
| **Authorized Organizational Representative** | | |
| **Signature (for optional use)** | | |

**Budget Justification: Year 1**

**Objectives: # 1, 2, 3, 4, 5**

- **Salary, Wages and Fringe Benefits:** PI Kebus salary and fringe benefits to provide aquaculture outreach veterinary services to NCR states will be provided by Michigan State University, College of Veterinary Medicine. No salary support is requested.
- **Nonexpendable Equipment:** N/A
- **Materials and Supplies:** $1,000 is requested to cover materials and supplies associated with consultations and trainings.
- **Travel:** $13,500 is requested to support travel expenses including mileage, car rentals, flights, lodging, parking, and meals while traveling to assist producers in the NCR. The estimated travel breakdown is:
    - $3,500 to provide direct assistance to producers through fish health consults on farms.
    - $2,000 to provide on-site consultations for those veterinarians pursuing fish farm veterinary training.
    - $2,000 to conduct producer training workshops on farms.
    - $3,000 to conduct fish farmer and veterinary workshops at conferences and meetings.
    - $3,000 to present findings at national fish farm and veterinary conferences.
- **All Other Direct Costs:** N/A

| ORGANIZATION AND ADDRESS<br>Michigan State University<br>426 Auditorium Rd, Room 2<br>East Lansing, MI 48824-2600<br><br>PROJECT DIRECTOR(S)<br>Dr. Myron Kebus | | | | **USDA AWARD NO.** **Year 2:** Objective 1, 2, 3, 4, 5<br>Duration Proposed Months: 12<br>**Funds Requested by Proposer** | Duration Proposed Months: ____<br>**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**<br>1. No. of Senior Personnel | **CSREES FUNDED WORK MONTHS**<br>Calendar | Academic | Summer | | | | |
| a. ___ (Co)-PD(s) . . . . . | | | | | | | |
| b. ___ Senior Associates | | | | | | | |
| 2. No. of Other Personnel (Non-Faculty)<br>a. __ Research Associates-Postdoctorates . . . | | | | | | | |
| b. ___ Other Professionals . . . . . | | | | | | | |
| c. ___ Paraprofessionals | | | | | | | |
| d. __ Graduate Students | | | | | | | |
| e. ___ Prebaccalaureate Students | | | | | | | |
| f. ___ Secretarial-Clerical | | | | | | | |
| g. ___ Technical, Shop and Other | | | | | | | |
| **Total Salaries and Wages** | | | | | | | |
| B. Fringe Benefits (If charged as Direct Costs) | | | | | | | |
| **C. Total Salaries, Wages, and Fringe Benefits (A plus B)** | | | | | | | |
| D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.) | | | | | | | |
| E. Materials and Supplies | | | | $1,000 | | | |
| F. Travel | | | | $13,500 | | | |
| 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.) | | | | | | | |
| **K. Total Direct Costs (C through I)** | | | | $14,500 | | | |
| **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) | | | | $14,500 | | | |
| **N. Other** | | | | | | | |
| **O. Total Amount of This Request** | | | | $14,500 | | | |
| **P. Carryover -- (If Applicable)** . . . . . **Federal Funds: $** | | | | **Non-Federal funds: $** | | **Total $** | |
| **Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**<br>Cash (both Applicant and Third Party)<br>Non-Cash Contributions (both Applicant and Third Party) | | | | | | Leave Blank | |

| **NAME AND TITLE** (Type or print) | **SIGNATURE** (required for revised budget only) | **DATE** |
|---|---|---|
| **Project Director** | | |
| **Authorized Organizational Representative** | | |
| **Signature (for optional use)** | | |

**Budget Justification Year 2**

**Objectives: # 1, 2, 3, 4, 5**

- **Salary, Wages and Fringe Benefits:** PI Kebus salary and fringe benefits to provide aquaculture outreach veterinary services to NCR states will be provided by Michigan State University, College of Veterinary Medicine. No salary support is requested.
- **Nonexpendable Equipment:** N/A
- **Materials and Supplies:** $1,000 is requested to cover materials and supplies associated with consultations and trainings.
- **Travel:** $13,500 is requested to support travel expenses including mileage, car rentals, flights, lodging, parking, and meals while traveling to assist producers in the NCR. The estimated travel breakdown is:
    - $3,500 to provide direct assistance to producers through fish health consults on farms.
    - $2,000 to provide on-site consultations for those veterinarians pursuing fish farm veterinary training.
    - $2,000 to conduct producer training workshops on farms.
    - $3,000 to conduct fish farmer and veterinary workshops at conferences and meetings.
    - $3,000 to present findings at national fish farm and veterinary conferences.
- **All Other Direct Costs:** N/A

| ORGANIZATION AND ADDRESS<br>Michigan State University<br>426 Auditorium Rd, Room 2<br>East Lansing, MI 48824-2600<br><br>PROJECT DIRECTOR(S)<br>Dr. Myron Kebus | | | | **USDA AWARD NO.** **Year 3**: Objective 1, 2, 3, 4, 5 | | | |
|---|---|---|---|---|---|---|---|
| | | | | Duration Proposed Months: 12<br><br>**Funds Requested by Proposer** | Duration Proposed Months: ____<br><br>**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. ___ Other Professionals . . . . . | | | | | | | |
| c. ___ Paraprofessionals ..... | | | | | | | |
| d. ___ Graduate Students..... | | | | | | | |
| e. ___ Prebaccalaureate Students ..... | | | | | | | |
| f. ___ Secretarial-Clerical ..... | | | | | | | |
| g. ___ Technical, Shop and Other ..... | | | | | | | |
| **Total Salaries and Wages** ..... | | | | | | | |
| B. Fringe Benefits (If charged as Direct Costs) | | | | | | | |
| **C. Total Salaries, Wages, and Fringe Benefits (A plus B)** ..... | | | | | | | |
| D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.) | | | | | | | |
| E. Materials and Supplies | | | | $1,000 | | | |
| F. Travel | | | | $16,500 | | | |
| 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.) | | | | | | | |
| **K. Total Direct Costs (C through I)** ..... | | | | $17,500 | | | |
| **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)..... | | | | $17,500 | | | |
| **N. Other** ..... | | | | | | | |
| **O. Total Amount of This Request** ..... | | | | $17,500 | | | |
| **P. Carryover -- (If Applicable)** . . . . . **Federal Funds: $** | | | | **Non-Federal funds: $** | | **Total $** | |
| **Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)**<br>Cash (both Applicant and Third Party) .....<br>Non-Cash Contributions (both Applicant and Third Party) ..... | | | | | | Leave Blank | |

| **NAME AND TITLE** (Type or print) | **SIGNATURE** (required for revised budget only) | **DATE** |
|---|---|---|
| **Project Director** | | |
| **Authorized Organizational Representative** | | |
| **Signature (for optional use)** | | |

**Budget Justification Year 3**

**Objectives: # 1, 2, 3, 4, 5**

- **Salary, Wages and Fringe Benefits:** PI Kebus salary and fringe benefits to provide aquaculture outreach veterinary services to NCR states will be provided by Michigan State University, College of Veterinary Medicine. No salary support is requested.
- **Nonexpendable Equipment:** N/A
- **Materials and Supplies:** $1,000 is requested to cover materials and supplies associated with consultations and trainings.
- **Travel:** $16,500 is requested to support travel expenses including mileage, car rentals, flights, lodging, parking, and meals while traveling to assist producers in the NCR. The estimated travel breakdown is:
    - $3,500 to provide direct assistance to producers through fish health consults on farms.
    - $2,000 to provide on-site consultations for those veterinarians pursuing fish farm veterinary training.
    - $2,000 to conduct producer training workshops on farms.
    - $3,000 to conduct fish farmer and veterinary workshops at conferences and meetings.
    - $3,000 to present findings at national fish farm and veterinary conferences.
    - $3,000 additional is requested to present findings from re-assessing NCR fish farmers at national fish farm and veterinary conferences.
- **All Other Direct Costs:** N/A

| ORGANIZATION AND ADDRESS<br>Michigan State University<br>426 Auditorium Rd, Room 2<br>East Lansing, MI 48824-2600<br><br>PROJECT DIRECTOR(S)<br>Dr. Myron Kebus | | | | **USDA AWARD NO.** **Year 1-3**: Objective 1, 2, 3, 4, 5 | | | |
|---|---|---|---|---|---|---|---|
| | | | | Duration Proposed Months: 36<br>**Funds Requested by Proposer** | Duration Proposed Months: ____<br>**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**<br>1. No. of Senior Personnel | **CSREES FUNDED WORK MONTHS** | | | | | | |
| | Calendar | Academic | Summer | | | | |
| a. ___ (Co)-PD(s) . . . . . | | | | | | | |
| b. ___ Senior Associates . . . . . | | | | | | | |
| 2. No. of Other Personnel (Non-Faculty) | | | | | | | |
| a. ___ Research Associates-Postdoctorates . . . | | | | | | | |
| b. ___ Other Professionals . . . . . | | | | | | | |
| c. ___ Paraprofessionals . . . . . | | | | | | | |
| d. ___ Graduate Students . . . . . | | | | | | | |
| e. ___ Prebaccalaureate Students . . . . . | | | | | | | |
| f. ___ Secretarial-Clerical . . . . . | | | | | | | |
| g. ___ Technical, Shop and Other . . . . . | | | | | | | |
| **Total Salaries and Wages** . . . . . | | | | | | | |
| B. Fringe Benefits (If charged as Direct Costs) | | | | | | | |
| **C. Total Salaries, Wages, and Fringe Benefits (A plus B)** . . . . . | | | | | | | |
| D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.) | | | | | | | |
| E. Materials and Supplies | | | | $3,000 | | | |
| F. Travel | | | | $43,500 | | | |
| 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.) | | | | | | | |
| **K. Total Direct Costs (C through I)** . . . . . | | | | $46,500 | | | |
| **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) . . . . . | | | | $46,500 | | | |
| **N. Other** . . . . . | | | | | | | |
| **O. Total Amount of This Request** . . . . . | | | | $46,500 | | | |

**P. Carryover -- (If Applicable)** . . . . . **Federal Funds: $** **Non-Federal funds: $** **Total $**

| **Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)** | Leave Blank | |
|---|---|---|
| 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** | | |
| **Authorized Organizational Representative** | | |
| **Signature (for optional use)** | | |

**VITA**

Name: Myron Kebus, M.S., DVM
Address: 2318 Center Ave. Madison, Wisconsin 53704
Phone: 608-616-2133
Email: kebusmyr@msu.edu

**EDUCATION**

B.S. Biology; Michigan State University, 1986
M.S. Veterinary-Aquaculture; University of Wisconsin-Madison, 1990
D.V.M. Veterinary Medicine; University of Wisconsin-Madison, 1992

**POSITIONS**

Assistant Professor of Health Programs, Aquaculture Outreach Veterinarian, Department of Pathobiology and Diagnostic Investigation, College of Veterinary Medicine, Michigan State University.

Subject Matter Expert, Secure Food Systems Team, University of Minnesota, College of Veterinary Medicine, VHS Risk Assessment Project, April 2022 to present.

Director, Aquaculture Program, Division of Animal Health**,** Wisconsin Department of Agriculture, Trade & Consumer Protection.

Honorary Fellow in Department of Pathobiological Sciences, University of Wisconsin-Madison – School of Veterinary Medicine,

Adjunct Faculty at the School of Freshwater Sciences, University of Wisconsin – Milwaukee.

**SCIETIFIC AND PROFESSIONAL ORGANIZATION**

American Association of Fish Veterinarians
American Fisheries Society – Fish Health Section, Liaison to AVMA
American Veterinary Medical Association, Aquatic Veterinary Medicine Committee,
North Central Regional Aquaculture Center, Technical Committee
World Aquatic Veterinary Association

**SELECTED PUBLICATIONS**

**Kebus, M.J.** and Chris Walster. Pages 2022. Legislation, Regulations, and Policies. 211-217 *in* Fundamentals of Aquatic Veterinary Medicine, Wiley Blackwell Publishing, Chichester, West Sussex, UK.

Katrina N. Murray, Tannia S. Clark, **Myron J. Kebus**, Michael L. Kent. 2021. Specific Pathogen Free-A review of strategies in agriculture, aquaculture, and laboratory mammals and how they inform new recommendations for laboratory zebrafish, Research in Veterinary Science, 142:78-93.

Laura Martinelli, Olivia Harris, Michael T. Collins, **Myron Kebus**, 2020, Efficacy of a Modified Health Assessment Utilized on Two Genetically Distinct Stocks of Rainbow Trout, Journal of Aquatic Animal Health, 32(2): 59-64.

Grace Karreman, Kim Klotins, Julie Bebak, Lori Gustafson, Andrea Osborn, **Myron Kebus,** 2015, Aquatic Animal Biosecurity: A Case Study of Bioexclusion of Viral Hemorrhagic Septicemia Virus in an Atlantic Salmon Hatchery, Journal of Applied Aquaculture, 27(3):299-317.

# ***North Central Regional Aquaculture Center***

## Checklist for Submission of Full Proposals

Follow guidelines with the exception of the budget sheets.

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

x Number *all* pages sequentially.

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

x Format headings appropriately.

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

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

x Define all abbreviations the first time they are used.

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

x 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.

x 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.

x 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).

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

x Signed Authorized Organization Representative (AOR) form from each funded PI's institution are welcomed but not required at this time.

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

x 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).

x Provide names of three possible reviewers who will not have a Conflict of Interest

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

x 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.*

*Myron J. Kebus* *8-5-2024*

Principal Investigator Signature Date

Dear NCRAC Board of Directors:

I am writing this letter to encourage NCRAC to continue to support Dr. Myron Kebus as he continues to support North Central Region fish farmers. Dr. Kebus has been a tremendous help to fish farmers in our region over the past couple of years and as one of the few aquaculture veterinarians in our area he is a much-needed resource. Providing support for a designated NCRAC aquatic veterinarian is one of the best examples of a NCRAC supported project that truly could benefit most, if not all producers in our region.

One of the greatest challenges fish farmers have faced is fish health, fish health practices, as well as bio-security. Having Dr. Kebus on our farms to witness fish health conditions and work thru problems is vital to our success. There are very few resources or people available to fish farmers to provide support for fish health.

Dr. Kebus is scheduled to visit our farm to provide a fish health training workshop for our staff. This training will directly impact our bottom line and improve our fish rearing abilities. Over the past few years, Dr. Kebus has worked to identify needs and provide support for aquaculture veterinary outreach including visiting many fish farms and giving presentations to not only state aquaculture conferences but also veterinary conferences.

I am writing this letter to recommend that NCRAC continues to provide support to Dr. Kebus so that he in turn can continue to help producers in the North Central Region. Dr. Kebus has a proven track record of working with aquaculture producers, industry professionals, and the aquaculture community. His extensive knowledge of aquaculture practices, coupled with his practical experience, makes him an ideal candidate for continuing to receive funding from NCRAC to help continue to make an impact for aquaculture in the North Central Region.

Please do not hesitate to contact me if you require any further information regarding Dr. Kebus or have any other questions.

Sincerely,

Peter Fritsch
President
Rushing Waters Fisheries

1100 Ozark Fisheries Road, Stoutland, MO 65567
margaret@ozarkfisheries.com
573-855-2220

April 5, 2024

North Central Regional Aquaculture Center
NCRAC Board of Directors
339 Science II
Iowa State University
Ames, IA 50011

Dear NCRAC Board of Directors:

I am writing this letter to encourage NCRAC to continue to support Dr. Myron Kebus as he continues to support North Central Region fish farmers. Dr. Kebus has been a tremendous help to fish farmers in our region over the past couple of years and as one of the few aquaculture veterinarians in our area he is a much-needed resource. Providing support for a designated NCRAC aquatic veterinarian is one of the best examples of a NCRAC supported project that truly could benefit most, if not all producers in our region.

One of the greatest challenges fish farmers have faced is fish health, fish health practices, as well as bio-security. There are very few resources or people available to fish farmers to provide support for fish health or help us improve or modernize our fish health practices. Many continue to do things on the farm simply for the reason that they have worked for years with no issues. This is not always the best practice and having a trusted aquaculture veterinarian that knows the aquaculture industry is so valuable.

Dr. Kebus visited our Missouri farm, along with several other aquaculture veterinarians last fall to not only learn more about raising ornamental goldfish, but also to provide a fish health training workshop for our staff. Over the past few years, Dr. Kebus has worked to identify needs and provide support for aquaculture veterinary outreach including visiting many fish farms and giving presentations to not only state aquaculture conferences but also veterinary conferences.

I am writing this letter to recommend that NCRAC continues to provide support to Dr. Kebus so that he in turn can continue to help producers in the North Central Region. Dr. Kebus has a proven track record of working with aquaculture producers, industry professionals, and the aquaculture community. His extensive knowledge of aquaculture practices, coupled with his practical experience, makes him an ideal candidate for continuing to receive funding from NCRAC to help continue to make an impact for aquaculture in the North Central Region.

Please do not hesitate to contact me if you require any further information regarding Dr. Kebus or have any other questions.

Sincerely,

*Margaret Cleveland*

Margaret Cleveland
Senior Vice President
margaret@ozarkfisheries.com

Harrietta Hills
TROUT FARM

1681 South 7 ½ Road, Harrietta, MI 49638
Phone: (231) 389-2514 / Fax: (231) 389-2513
dan@harriettahills.com

April 15, 2024

RE: Continuation of NCRAC Support for NRC Regional Veterinarian

This letter is to express my support for the continuation of financial support by NCRAC of the NRC Regional Veterinarian, Dr. Myron Kebus. It is my understanding that Michigan State University will continue the "regional" nature of his position if NCRAC is willing to pay his travel expenses related to regional work. This seems to me to be an excellent way to leverage the NCRAC investment and maintain the availability of Dr. Kebus to the region.

Fish health is a tremendous challenge for NCR producers and there is a chronic shortage of veterinarians with expertise in fish health to service our region. There is no question as to the value that Dr. Kebus has brought to producers through the original NCRAC project that cooperated with Michigan State University. I would hate to see that go away.

It is my understanding that short term support for travel for the second half of 2024 can be accomplished through a modest "out of cycle/ rapid response" grant from NCRAC, with longer term support more appropriately accomplished with a "regular" grant through the RFP process. I support both of these approaches to keep Dr. Kebus's expertise available to the NCR Aquaculture Industry at a very reasonable cost.

If you have any questions or require further information, please contact me.

Sincerely,

Dan Vogler
President