WHIRLING DISEASE INITIATIVE
REQUEST FOR PREPROPOSALS

November 10, 2005

Due date: Friday, December 23, 2005

Whirling Disease Steering Committee
c/o Montana Water Center
Attention: Sue Faber
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SOLICITATION

The Whirling Disease Initiative exists to counter the effects of the fish parasite *Myxobolus cerebralis*. The purpose of the Initiative is to provide fishery managers with as complete and effective a set of management tools as possible, to allow them to maintain populations of wild and native salmonids in the presence of the whirling disease parasite. Initiative goals are to prevent introduction and establishment of the disease into streams that are parasite-negative, and in parasite-positive streams, to maintain or re-establish self-sustaining fish populations.

For the research cycle beginning in 2006 the Whirling Disease Steering Committee will chose projects that (1) take an epidemiological or ecological research approach focusing on the incidence, severity, spread and effects of whirling disease across populations of wild fish, (2) synthesize information on what is known about whirling disease, and (3) generate information that will be directly usable in formulating fishery management tools.

Research preproposals are sought under the following three categories:

Category 1. Broad-scale, synthetic research projects
Category 2. Topical, management-oriented research projects
Category 3. Comparative analysis of whirling disease testing methods.

Category 1. Broad-scale, synthetic research

One or more broad-scale, synthetic projects may be funded. Projects will be funded in amounts up to $250,000. The awards will cover up to 29 months of expenses, from May 15, 2006 to September 30, 2008.

These projects will examine data at a broad scale and will be synthetic in nature. They will apply an ecological or epidemiological approach that looks at the incidence, spread and severity of whirling disease, and especially its effects on populations of wild fish. Development and testing of epidemiological or ecological models may be part of the projects. Projects with outcomes that can provide a broad understanding of how this disease spreads within a watershed(s) will be strongly favored in the selection process. Explanation of how management may be enhanced as a result of your project must be addressed in your project proposal.

Researchers are encouraged to propose broader scale, synthetic projects on a regional or landscape scale. Broad-scale projects should focus on where whirling disease is transmitted and on the impacts to fish populations. They could be localized within an area for which much is known about whirling disease or in an area where whirling disease is likely to be but has not yet been sampled. Regional studies could be conducted to provide information about regional differences in incidence and severity. Researchers should look at processes and patterns at large spatial scales and adopt an epidemiological approach to understanding the spread, impacts, and long-term fluctuations in intensity of whirling disease. Researchers are encouraged to broaden their examination of research beyond the Rocky Mountain region and test theories developed in whirling-disease hotspots, expand the applicability of results, and potentially inform management in ways not likely to emerge from a geographically constrained focus area. Multi-regional studies can yield insights useful in all regions but that would not be obvious without that interregional approach.

Collaborative efforts involving long-term investigations examining fish population effects of whirling disease are highly sought. Such projects would be valuable in synthesizing what has been learned from long-term studies and in identifying the most important remaining questions that require long-term datasets to answer.

Researchers are encouraged to make modeling a core component of their investigations. Whirling disease involves many complex ecological processes and one way to coherently bring the disparate knowledge of those processes together is through conceptual or quantitative models. Models have been generated in recent decades for many parasitic and other diseases. Those or other models from epidemiology may provide a useful foundation for the development of a whirling disease model. A goal of any modeling effort should be the use of that model as a management tool by fishery managers. For example, a broad-scale risk assessment model could allow managers to make probabilistic predictions of whirling disease risks to fish populations on the basis of features such as water temperature and flow, channel geomorphology and soils, fish species present, fish life history information, or other factors.

Examples of questions that could be addressed by broad-scale projects include:

- What percentage of streams in the region have whirling disease (assessment of status)?
- What percentage of sites in the region have *M. cerebralis* present but not whirling disease?
- Do smaller (or higher, or cooler, etc.) streams have a greater incidence of whirling disease?
- Is the incidence of whirling disease higher in one area than another?
- Is the incidence of whirling disease increasing through time (trend assessment)?
- Does intensity of whirling disease vary over time?
- Do severely diseased populations disappear or recover over time?
- What role does fish life history play in the population effects of whirling disease?
- What role(s) do worm life history/worm lineages play in fish population effects of whirling disease?
- Does whirling disease occur as episodic outbreaks or is it always present?
- What is the pattern of contagion within watersheds?
- How and why do fish populations respond to the disease as they do?
- What percentage of regional, national sites sampled have whirling disease or *M.*

cerebralis present?
- What are the effects of watershed/riparian management practices: flow or temperature manipulation, channel modification, or changes in riparian zone management on whirling disease?
- How is the disease established in new places?
- What types of management tools or solutions would arise from the research you propose?

Modeling approaches should attempt to answer questions such as:

- During which stage of its life cycle is *M. cerebralis* most susceptible to control?
- What density of parasites is necessary to infect a fish population or sustain the disease?
- What types of fish populations are at greatest risk for severe whirling disease?
- What landscape features are associated with the greatest risk for whirling disease?
- What information about the life cycles of the parasite or the hosts is missing?

Any project funded at $200,000 or more will be required to begin by developing a technical synthesis of the 'state-of-the-science' of whirling disease. This effort must take a truly synthetic approach, beyond simply compiling information on the disease. Its product will be a single document (not a compendium of discrete research articles), to be submitted to the Water Center within six months of the award of the grant. Investigators are free to generate this synthesis through workshops, research subcontracts, or any means they deem likely to be comprehensive and integrative.

Category 2. Topical, management-oriented research

Topical, management-oriented research projects may be funded in amounts totaling less than $100,000. The awards will cover 20 months of expenses, from May 15, 2006 to December 31, 2007.

Preproposals that address information gaps regarding population effects, disease transmission, susceptibility, resistance, genetic diversity of hosts, or specific on-the-ground management tools for field fisheries managers/biologists are sought in this funding cycle.

Category 3. Comparative analysis of whirling disease testing methods

The purpose of this project will be to summarize and compare the available testing methods, for the benefit of researchers and fishery managers. One project will be funded, in an amount totaling less than $15,000. The period of performance will be May 15, 2006 to December 31, 2006. In making this grant, the Steering Committee will give preference to Principal Investigators who are not vested in the development or use of any particular technique.

There are at least four methods available for detecting the parasite in fish, at least two for *Tubifex tubifex*, and two to filter water to screen for *M. cerebralis*. Each method is appropriate in a certain context for ascertaining disease presence/absence and severity, and they are not interchangeable.

The deliverable from this project will be a summary document or methods manual describing the current techniques for determining the presence and severity of whirling disease, and the relative merits and costs of the techniques. The document's target audiences are researchers and fishery managers. Consequently, it should not be prescriptive in nature. The document will not be used for evaluating laboratory diagnostic methods, nor will it be applied for inspection purposes—both of which are already addressed in the American Fisheries Society-Fish Health Section *Blue Book*[1]. It should address the following questions:

- Which method(s) have the attributes needed to definitively answer which questions?
- What are the relative costs of the methods? When a resource manager wants to look for whirling disease in the field, which protocol should be used and why?
- What are the trade-offs among filtering for TAMs, examining worms, and histology or PCR testing of sentinel fish?
- Can sentinel-fish results be extrapolated to resident fish? How?

[1] AFS-FHS (American Fisheries Society-Fish Health Section). 2004. FHS blue book: suggested procedures for the detection and identification of certain finfish and shellfish pathogens, 2004 edition. AFS-FHS, Bethesda, Maryland.

PROGRAM SCHEDULE

Release of RFPP: November 10, 2005
Preproposals due at the Water Center in electronic form: December 23, 2005 (5:00 pm MST)
Preproposal notification and request for full proposals: January 10, 2006
Full proposals due: March 2, 2006 (5:00 pm MST)

Category 1 project schedule:

- Announcement of project(s) chosen: April 1-14, 2006
- Projects begin: May 15, 2006
- Interim report and technical synthesis report due: December 31, 2006
- Interim report due: December 31, 2007
- Spending deadline for projects: September 30, 2008 (no exceptions)
- Final report and non-technical summary due: December 31, 2008
- Project metadata and datasets due to the Water Center: March 31, 2009

Category 2 project schedule:

- Announcement of project(s) chosen: April 1-14, 2006
- Projects begin: May 15, 2006
- Interim project report due: December 31, 2006
- Projects conclude; final report and non-technical summary are due to the Water Center: December 31, 2007
- Project metadata and datasets due to the Water Center: March 31, 2008

Category 3 project schedule:

- Announcement of project chosen: April 1-14, 2006
- Project begins: May 15, 2006
- Project concludes; final report due to the Water Center: December 31, 2006

DATA SUBMITTAL, ACCESS & USE

A full set of data and descriptive metadata will be an obligated project deliverable, according to the terms of each research grant (categories 1 and 2). A *Data Submittal, Access and Use Policy* is now in development and will be posted before the Request for Full Proposals is issued. It is based on the policies of other multiple-project, Federally-funded research programs, chiefly those of the National Science Foundation. Water Center data specialists will work with investigators to minimize the burden of this requirement.

Data release schedule:

- December 31, 2009: End of grace period for Category 2 projects; data are made publicly available; citations or manuscripts are added to database
- December 31, 2010: End of grace period for Category 1 projects; data are made publicly available; citations or manuscripts are added to database

SELECTION PROCESS

All projects must have clear application to the development of tools for fishery managers; basic research projects will not be funded. Preproposals will be screened by the Steering Committee for relevance to this year's stated priories in each of the three categories, and investigators proposing projects that directly address the topics of interest listed above will be asked to submit full proposals. Research proposals to test specific hypotheses will be favored. If sufficient pertinent preproposals are not received, the committee will recruit additional project teams to prepare full proposals to conduct the desired work. Full proposals will be judged on a competitive basis and will undergo independent peer review.

PREPROPOSAL GUIDELINES

As appropriate, partnerships between university researchers and agency biologists to conduct field testing are encouraged, and investigators are invited to contact the Program Manager for assistance in recruiting project partners. Applicants should visit the Whirling Disease Initiative web site at http://whirlingdisease.montana.edu for detailed information on the disease and a summary of research that has been conducted through the Initiative. In addition, this year's solicitation is strongly informed by the recommendations of an independent review panel that assessed the Whirling Disease Initiative in summer 2005. A summary of the pertinent panel recommendations can be downloaded from http://whirlingdisease.montana.edu/resources/research/research.htm. ***Grant applicants are strongly encouraged to review it.***

Please submit a preproposal of no more than three pages, electronically, with no appendices, to sfaber@montana.edu by December 23, 2005 (5:00 pm MST). MS Word, WordPerfect, PDF and RTF files are acceptable. Organize your preproposal into these sections:

- Project Title
- Category under which you are applying
- Names, titles, institutions, and e-mail addresses of the investigators

● Introduction
  - What problem is targeted?
  - What hypotheses are to be tested?
  - What are the specific project objectives?
  - How does the proposed work address the priority areas of the RFPP?
● Materials and Methods—include a graphical or narrative project timeline
● Project Outcomes—what information will be generated to answer the questions?
● Preliminary budget with approximate grant amount needed—plus or minus 20%, assuming an eight-month, 20-month, or 32-month project period (according to category) and an F&A (indirect cost or overhead) rate of 17%. ***Investigators submitting research project preproposals (categories 1 or 2) should budget 10% of their costs for data management activities, since project data and metadata will be a required deliverable of research projects.*** Match is strongly encouraged but is not required.