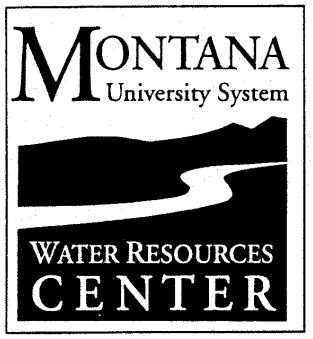
# Appendix 6
# The National Partnership - Report to Congress




**NATIONAL PARTNERSHIP**
**on the Management of**
**Wild and Native Cold Water Fisheries**

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## A REPORT TO CONGRESS

***1997-1998 Research Findings***
***Whirling Disease Initiative***
**November 1, 1998**

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# A REPORT TO CONGRESS

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## BACKGROUND

During the current decade the metazoan parasite *Myxobolus cerebralis*, which causes whirling disease in many salmonid fish species, has been spreading and infecting hundreds of river and stream reaches in the Western United States. A Eurasian native, *M. cerebralis* made its way to North America in the 1950s -- probably through the importation of frozen fish -- and has recently taken a particularly large toll on wild rainbow trout in some of the richest riverine fisheries in the Rocky Mountain States. This microbe is extremely hardy and long-lived, with a life cycle that employs both a fish host and a ubiquitous aquatic worm host known as *Tubifex tubifex*. Once established in a stream, it is there to stay. The parasite cannot be eradicated; nor can its worm host, without significantly damaging the ecosystem.

Until very recently, the body of scientific knowledge relating to whirling disease in riverine environments was slim. While the parasite has entered many government and private hatcheries, managers of these facilities learned techniques to avoid exposing very young fish to the disease. Whirling disease can kill young fish directly, or cause its victims to spin without control, rendering them vulnerable to predators and unable to efficiently capture food. Due to the reduced susceptibility of the older fish, later infections are generally not fatal. However, the stocking of infected hatchery fish in riverine settings increases the *M. cerebralis* parasite load in positive streams, and may provide one more avenue by which the disease is spread into uninfected areas.

In past years it was mistakenly assumed that the disease would not affect wild self-sustaining trout populations. This assumption dramatically toppled when whirling disease was discovered to have caused a greater than 90 percent reduction of wild rainbows in Montana's Madison River in 1994. Similar losses have been documented in four of Colorado's best fisheries. Whirling disease is now reported in 22 states, including both eastern and western drainages of the Rocky Mountains, and obviously has caught the attention of anglers, scientists, and fisheries managers.

## THE WHIRLING DISEASE INITIATIVE

In 1997, the Whirling Disease Initiative was established under the Charter of the National Partnership on the Management of Wild and Native Coldwater Fisheries (see *Appendix 1*). The purpose was/is to promote, prioritize, and help fund cooperative research with direct

implications for whirling disease afflicting self-sustaining trout populations. The program is centered at Montana State University-Bozeman, where a Whirling Disease Steering Committee convenes in person or by conference phone (see *Appendix 2*). This broadly based Committee: (1) writes an annual research plan (see *Appendix 3*); (2) issues Requests for Proposals (RFPs) (see *Appendix 3*) based on identified priorities; (3) selects and approves projects for funding following scientific peer review; and, (4) summarizes and makes available research results to all partners and cooperators via mail and an expansive WEB site (see *Appendix 4*). It works closely with the Whirling Disease Foundation which sponsors annual symposia where scientific papers are presented and discussed.

1997 was the first year in which the National Partnership received United States Fish and Wildlife Service funding for whirling disease research. Dr. Ron Hedrick of the University of California Davis, probably America's top whirling disease authority, pointed out recently that the science is still in the "causes" phase, and that "solution" work will come later. This situation may well prevail for the foreseeable future. In the meantime, the research strategy of the Steering Committee is to support a mix of projects representing a balance between short and long term research, and techniques for collection and analysis of data, always seeking potential solutions to the management of the fisheries and the disease. The multiple aspects of inquiry enhance the opportunities for helpful breakthroughs, stress *rapid response* information to assist fish managers, and focus on breaking the life cycle of the disease.

## RESEARCH STRATEGY

### *Parasite Aspects*

Research on the production, movement, and identification of the Triactinomyxon, or TAM stage of the parasite (the spores that are released by the worm host); and the possibility of alternative worm hosts.

### *Worm Aspects*

Research on the life cycle, geographic strains, reproduction, and population densities of *T. tubifex.*

### *Fish Aspects*

Research on biological resistance, life history strategies, the development of immunity, effects of stress, and lethal dosage levels.

### *Ecosystem Aspects*

Research on environmental factors that influence worm density and fish vulnerability; and the relationship of stream condition to the development of risk assessments for infection and disease.

digits. When a fish dies, spores are released into the water where they can survive for decades before being ingested by the widespread worm host, *T. tubifex.* Inside the worm, they are transformed into TAMs, and ejected back into the water -- sometimes by multiples of thousands per day per worm -- where these shorter-lived spores must find a susceptible salmonid fish within a few days to continue the cycle.

***Decreasing Worm Hosts and Separating Fingerlings from the Parasite May be Management Strategies***

One hopeful management strategy for decreasing the impact of whirling disease involves modifying the environment to make it less favorable for the worm host. Another involves enhancing life history patterns of trout to prevent exposure at the young age when they are most vulnerable. For example, manipulating spawning locations and/or seasons may allow trout to hatch in a low parasite environment, enabling them to either avoid areas of high infection or acquire sufficient resistance to avoid life-threatening infections. The offspring of rainbow trout spawning earlier in spring have been shown to have a lower infection rate than those that hatch later.

***Gains are forthcoming on Diagnostic and Collection Methodologies***

A. Improvements are being made on a DNA-based method of measuring the prevalence of spores in infected fish.

B. A manual and training course on protocols for worm collection are available, and a portable system for collecting TAMs from natural waters is showing some success.

C. Progress is being made on techniques for *in vitro* cultivation of salmonid cells that will advance the study of the intracellular development of the parasite.

## SUMMARY

While the goal of containment of whirling disease is still out of reach, the Steering Committee of the Whirling Disease Initiative believes the 1997-98 projects laid an excellent foundation for continuing the pursuit of solutions to the whirling disease problem. Competent scientific teams are involved; studies are complementary and well designed; and execution has been exceptional, putting new information on the table, as well as refining useful scientific techniques.

The Committee particularly thanks Montana's Congressional delegation -- Senator Max Baucus, Senator Conrad Burns, and Congressman Rick Hill -- for their advocacy of this research; and the Representatives of the National Partnership for their time and guidance.

## RESEARCH SUMMARY

To date, two *Request for Proposal* cycles have been completed, and 28 projects and 4 contracts have been funded for a total of $920,624 in federal dollars, and $886,298 in match. (The second research cycle is only five months in progress.) Research teams include 48 investigators from 7 states (see *Appendix 5*). The Initiative is characterized by excellent cooperation from multiple agencies, continuous assessment of research findings, and a high level of communication, due certainly in part to the annual symposia and field ecology workshops, and current whirling disease WEB site (see *Appendix 6*).

Progress is also due to the successful construction and management of a Wild Trout Research Laboratory on the MSU campus, which was completed in less than a year in spite of sophisticated requirements for maintaining the aquaria, and a specialized waste treatment facility to prevent the spread of infection. No other facility for conducting fish disease research exists in the Rocky Mountain West. The Lab is run and supported by a unique coalition of researchers from MSU, the Montana Department of Fish, Wildlife and Parks, and the U.S. Fish and Wildlife Service.

## HIGHLIGHTS OF WHAT WE HAVE LEARNED

### *Whirling Disease is Fast-Spreading*

Whirling Disease is now present in over 70 stream reaches in Montana, almost every major drainage in Colorado, and 20 other states. Where it has *NOT* spread is more perplexing than where it *HAS* spread (e.g., of the three forks of the Missouri River, two are badly infected and the third is clean). We still do not completely understand all of the vectors which transmit the disease from one site to another, or why the intensity of infection varies so much from one river to another.

### *Susceptible Fish*

The impact of whirling disease on trout populations varies depending on the species. Rainbow trout are very susceptible, brown trout show few symptoms, cutthroat are susceptible but may spawn outside the danger zone, grayling appear to be resistant, and school is still out on whitefish and bull trout. Learning about susceptibility of strains and species is still in the early stages. Where some species (rainbow) have been on the decline, other species (brown) may fill in behind them, sometimes retaining the overall "fish biomass" of a river.

### *The Whirling Disease Parasite is Complicated and Durable*

The life cycle and resilience of the parasite, *M. cerebralis,* help explain the rapid spread of whirling disease. The microscopic spores produced in infected fish number up to seven