



# the Whirling Disease Initiative Newsletter

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Left: Covered raceways at the Bellvue Fish Research Hatchery

## Fishery Managers and Researchers Working Together in Colorado by Amy Rose

### Part I: Touring the Facilities, Understanding the Research

I had the distinct pleasure of touring several Colorado Division of Wildlife (CDOW) fishery facilities when I was in Fort Collins for the Colorado/Wyoming Chapter American Fisheries Society meeting. George Schisler, CDOW employee and fish health researcher, generously donated several hours of his time to show me the Bellvue Fish Research Hatchery, Bellvue Production Unit, Watson Lake Fish Hatchery, and the newly rehabilitated and reutilized Parvin Lake Fish Research Station.

The CDOW Bellvue Fish Research Hatchery is a well-maintained and organized facility that serves a variety of functions with the assistance of manager Phil Schler. Phil raises and monitors various strains and generations of Hofer rainbow trout to assist with Schisler’s research on resistant trout. So far the Hofer strain seems the most promising in the search for resistance. The hope is that the stocking of trout resistant to the disease will stop population crashes and restore levels satisfactory to recreational fishing expectations.

Phil oversees the lifecycle of the experimental fish—from egg to fry. This is done under laboratory conditions with incubators for eggs and tanks for fish. He also maintains full-grown fish in covered raceways. These fish have already passed through various phases of research and are now being held for further needs. Interestingly, Phil is still caring for the original, full-grown Hofers, donated from the University of California-Davis (UC-Davis), which supplied the first eggs for George’s current study. These well-fed, well-cared-for fish have become the “pets” of the facility.

I asked Phil what he thought of the whirling disease problem, and he says, “Whirling disease has been an extremely costly disease in Colorado for both the private and public sectors. The CDOW has spent millions of dollars on whirling disease over the last 10 years or so for modernization of the hatcheries, research and [fish] biology projects, and whirling disease education.” It’s obvious that Colorado fish professionals are highly motivated to investigate solutions to and control of whirling disease.

George outlined the details of his research as follows:

“We started with pure Hofer rainbow trout that originated as eggs from Germany and were reared to one-year-olds at UC-Davis. These fish have been verified in many



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Montana Water Center

different experiments to be resistant to whirling disease, but they are [considered] to be an especially domesticated hatchery fish.

“We raised those fish for another year in Colorado, then spawned them last spring with our Colorado River rainbow trout, making 32 families from individual pairs of fish. Each pair was one Hofer crossed with one Colorado River rainbow. These are called F1 fish or first generation crosses. We then exposed these F1 offspring to *Myxobolus cerebralis* at a relatively heavy dose of 2,000 triactinomyxons (TAMs) per fish. The offspring that showed the greatest resistance to whirling disease by having very few or no clinical signs of infection were kept for the next generation. In this way, we keep the resistance of the Hofers in the crossed fish.

“This past January, mature fish from the first cross (F1 fish) were used to back-cross with pure Colorado River rainbows. These are now what are called F2 fish or second generation of crosses. The back-crossing makes the F2 generation of fish more like the wild Colorado River rainbows, but hopefully they still carry the resistance to whirling disease.

“We will expose this next generation of fish to *Myxobolus cerebralis* like the previous generation and continue to keep fish for brood stock that carry the resistance like the Hofers and that are most genetically and physically like our wild Colorado River rainbows.”

After touring the Bellvue facility, we took a short drive to the Watson Lake Fish Hatchery just a few miles away. Bob Upton assists in the management of the facility and outreach to the public. When he heard I was coming to Fort Collins, he encouraged me to look at his operation. As Bob explains it, he’s in a unique situation because he deals with the operation of one whirling-disease-negative production unit, Bellvue, located next to the fish research facility by the same name; and one positive unit, Watson Lake. The Watson Lake facility relies on the adjoining Poudre River for its water source. The Poudre River has been positive for *Myxobolus cerebralis* since the mid-1990s. Of the two facilities, Watson Lake is of greater concern because it raises catchables. Bellvue raises sub-catchables and fingerlings.

It may seem contradictory to whirling disease control efforts to raise fish using a known positive water source, especially in a facility that raises approximately 300,000 catchables a year. However, adding to the uniqueness of the situation, the raised fish are considered of “minimal risk” due to low spore counts observed at the Watson Lake facility and the areas where they will be released. The positive fish are stocked exclusively in what Coloradans call “front range” waters. Most of the mountainous areas in the center of the state are coldwater trout waters. The areas east of the front range and the very western edge of the state are cool and warmwater fisheries. The stocking of these front range fisheries serve purely as recreational “put ‘n takes.” George emphasized the “put ‘n take” ethic saying that the fish “go in on one day and are completely fished out in a week.”

**NOTE:**

Because the Whirling Disease Initiative has, at times, been confused or mistaken for the Whirling Disease Foundation, it should be stressed that George’s research was funded by the Foundation, not the Initiative. Although the two organizations work closely together and both happen to be located in Bozeman, Montana, research focuses between the two do vary. The Foundation is extremely supportive and interested in the possibilities of resistance and has made a concerted effort to fund this type of research.

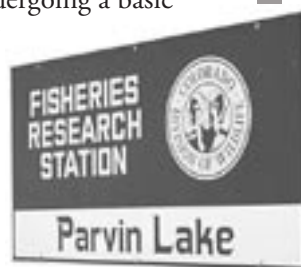


Watson Lake Fish Hatchery

The managers of the Watson Lake Hatchery face other challenges, too. For several years, it has been a struggle just to operate due to water flow restrictions. The State determines how much water can be diverted from the river to the facility. In years of severe drought, it has actually experienced closures which affect everything from the economics of facility operations, to the sport fishing experience of the waters supported by Watson Lake catchables.

After visiting Watson Lake, we continued the tour with the success story of the Bellvue Fish Production Unit, a facility that Bob also assists in managing. In the mid-1990s many facilities in Colorado were unknowingly spreading the whirling disease infection through stocking of infected fish. Now, as a result of Colorado's commendable and aggressive hatchery clean-up efforts, most facilities are "disease-free." The Bellvue facility was considered only a minor contributor to the spread of whirling disease due to its clean ground-water supply. However, there was a brief period when the hatchery was testing positive for *Myxobolus cerebralis*. Now, after clean-up efforts, the Bellvue facility has been disease-free since 1997. Bob proudly pointed out the clean raceways and filtering facility largely responsible for the maintenance of disease-free status. Lined ponds, and ultraviolet treatment combined with filtering at 60 microns are what keep this facility in top shape for fish health.

Lastly, George drove me to the Parvin Lake Fish Research station some 40 minutes from Fort Collins located in the Red Feathers Lake District near the Roosevelt National Forest. This research station was defunct and inoperable until George came along. He saw a great opportunity to make use of a sound structure in need of a little TLC. Along with a few student workers, the facility is undergoing a basic and affordable rehabilitation. George's frugal and shrewd recouping of assets is a model of the common sense and dedication he possesses in pursuit of good research. He plans on conducting resistant-species research at the facility throughout the summer, and some live fish are already successfully kept there. One lucky student will live at the lake for the summer in order to assist with research tasks and general operation.



Top: Tank at the Bellvue Fish Research Hatchery

Bottom: Bellvue Fish Production Unit



## Part II: Understanding Fishery Management in Colorado and the Whirling Disease Challenge

When asked to describe fishery management in Colorado, George said, "Fishery management in Colorado involves cold, cool, and warm water fisheries serving a variety of species including trout, walleye, bass, and panfish. Our management plans for the trout fisheries in the state are a balance among wild trout waters (mostly rivers), "put 'n grow" fisheries (planting fingerling fish where they have a chance to grow to catchable size), and "put 'n take" fisheries (planting catchable sized fish for immediate harvest by fishermen)."

Employees of CDOW tend to separate out by function. CDOW biologists are usually responsible for specific waters, and researchers usually form a cooperative relationship with biologists in various parts of the state conducive to the research focus. Fisheries professionals can work in more specific fish-rearing tasks localized to one facility. For example, Phil and Bob are known as culturists, just one specialty within the fish biology field.

As in any other region or state, Colorado has its share of fish management challenges. George sees the problems in Colorado as two-fold: hatchery/stocking issues and wild fish issues. "We need to make sure our negative hatcheries stay negative for the parasite, and that we produce the lowest spore count fish possible in the remaining positive hatcheries. We need to ensure that our stocking activities, whether they are fingerling or catchable plants, do not aggravate the whirling disease problem in

“ We need to make sure our negative hatcheries stay negative for the parasite, and that we produce the lowest spore count fish possible in the remaining positive hatcheries. ”

-George Schisler

the state. [Concerning wild fish] we would like to bring back natural rainbow trout recruitment in the rivers where there used to be self-sustaining populations.”

Employees of the agency have public and political issues to deal with as well. There’s a pervading perception that the public has lost a certain amount of trust for the CDOW as a result of past problems with whirling disease. Many of the Division employees I spoke with in Fort Collins stressed the need for outreach demonstrating the successes in responding to whirling disease.

Other needs and concerns that should be kept in the forefront of Colorado fishery management were also expressed: producing adequate numbers of whirling disease-negative fish in the hatchery system, returning wild rainbow trout recruitment to high-profile rivers where they have been lost, and continued protection of clean hatcheries from infection. Another major concern for Colorado fish management is the potential for declines in native cutthroat populations as the parasite spreads.

Schisler says, “Colorado has been hardest hit in terms of actual wild population losses. Rainbow trout are also not native to Colorado, which puts us in a strange situation of attempting to recover a non-native species.” In the broader scope, “It is clearly a regional issue. Coastal states have had the parasite for a long time, with no noticeable impacts. The Rocky Mountain states have the most serious problem with the parasite. These states are working along the same lines with regard to regulation and control right now.” ☒



**Bob Upton** grew up in Los Angeles but was never much of a fan of big city life. In the mid-1970s he moved to Fort Collins and fell in love with Colorado life. He earned a Bachelor’s of Science in Fisheries Biology from Colorado State University and was able to work summer temp jobs with the Division while attending school. He was hired full-time by CDOW as a fish culturist in 1983. Early on, he was at the State hatchery in Durango. In 1990 he was promoted to assistant manager of Bellvue and Watson Hatchery. He loves fly fishing, his ’67 Mustang, gardening, and getting up in the mountains as much as possible.

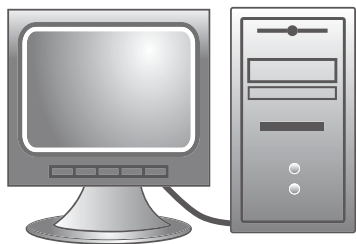


**George Schisler** was born in Idaho and raised in Montana. He completed an undergraduate dual major in Biological Sciences and Fishery Science at the University of Alaska-Fairbanks. He earned both a Master’s of Science and Doctorate in Fishery Wildlife Biology from Colorado State University, and then completed a post-doc there as well. George presently works full-time for the CDOW as an aquatic researcher.



**Phil Schler** grew up on a farm in Columbia, Missouri and later in Boulder, Colorado. He graduated with a Bachelor’s of Science in Fisheries from Colorado State University in 1981 and worked in private fish culture facilities and temporary jobs for the CDOW before he was hired permanently in 1984. His first CDOW position was as a hatchery technician at the Roaring Judy Hatchery in Almont, Colorado. In 1988, he was promoted and transferred to the Division’s Fish Research Hatchery in Bellvue, Colorado. Since 1996, Phil has been the manager of the facility and says, “I have enjoyed my job so much that I have never thought about going anywhere else in our agency.” He’s married to Kim and has two teenage children, Dan and Mary-Jo.

# Whirling Disease Data Find a Home by Kelly Lotts



**T**he Whirling Disease Initiative has been extraordinarily successful. Over the past seven years, researchers have solved the mysteries of this disease's complex life cycle and have investigated the factors that influence its spread. Because we can no longer hope to eradicate whirling disease, the best information we can provide to fisheries managers is the means to manage the disease and to control its spread; however, transfer of research outcomes to managers who would benefit can be sluggish.

To improve information sharing and to speed its transfer, the Initiative is using several avenues, including an innovative newsletter, a redesigned web site, and presentations by outreach coordinator Amy Rose. The National Partnership for the Management of Wild and Native Coldwater Fisheries and the Montana Water Center are partnering with the Big Sky Institute and the Mountain Prairie Information Node to embark on an additional project to provide fisheries professionals with broad information on whirling disease: building and managing a comprehensive research database of metadata, data, and reports generated from all Initiative-funded research.

The prospect of requesting, collecting, and organizing data from over 100 projects is daunting, yet the potential rewards are great. When complete, this database will be a clearinghouse/repository of cutting-edge information on whirling disease and will contribute to future management solutions by prompting new research that synthesizes findings from completed projects.

At present, we are setting up the infrastructure to make data collection smooth and secure. If you are a Principal Investigator for Initiative-funded research, you should have already received an announcement about this project. In the coming weeks, we will convene an independent panel that will develop policies to guide data collection, use, and security. Once those policies are in place, we will be contacting researchers again to assist with metadata and data collection.

Initially, all data will be stored electronically in-house and be accessible only to project personnel. Ultimately, the database will be web-enabled and will provide an extensive information resource for a diverse audience of researchers, students, and fisheries professionals. ❧

**Kelly Lotts** was hired in January 2005 to manage the database project. A native of central Pennsylvania, she completed undergraduate work at Denison University in Ohio and received her Master's of Science in Evolution, Ecology, and Organismal Biology from Ohio State University. She's worked for the Glacier Institute as a naturalist and educator in Glacier National Park and has broad experience as an educator and researcher in the biological sciences. Presently, she is working for the Mountain Prairie Information Node of the National Biological Information Infrastructure (NBII) program (<http://mpin.nbii.org>). In addition to academic pursuits, Kelly is an avid reader, a competitive swimmer, and an enthusiastic traveler who recently returned from a trip to Ghana.



## Researcher Profile—Leah Steinbach Elwell by Amy Rose

Leah Steinbach Elwell has several years of experience with whirling disease research in the Madison River of Montana's Madison Valley. She began her work as a master's student of noted researcher Dr. Billie Kerans. Having completed her degree, Leah now works closely as a research associate with another long-time whirling disease researcher, Dick Vincent. As she explains it, "He does the fish; I do the worms."

The Madison drainage was hit severely by whirling disease in the mid-1990s, and researchers like Leah, Billie, and Dick have been actively pursuing research ever since. Leah has worked on a wide range of *Tubifex tubifex* questions in the Madison River drainage, including identification, ecological interactions, and correlating physical features with *Myxobolus cerebralis*. Her studies are not exclusively of worms, however. She is also involved with *Myxobolus cerebralis* extraction and detection techniques, and with Dr. Todd Koel's attempt to determine if pelicans in Yellowstone National Park are viable vectors in the spread of the disease.

Leah is highly skilled at invertebrate sampling and identification. Early in her studies she had a keen interest for aquatic invertebrate communities that evolved into a desire to understand their role in parasite ecology. Leah sees the broader picture in ecology and expresses it well. "I think that rivers are an important part of our world. They provide habitat for numerous species; resources for humans in the form of recreation, industry, agriculture and daily living; and a landscape that is both beautiful and powerful. Without the rivers there would be no life. My respect for rivers brought me to this research."

The Madison River continues to provide data on whirling disease. Leah sees it as a valuable case study of what the parasite can do in a natural river system. Both Leah and Billie are hoping that this next round of research in 2005 will result in publication and potential recommendations for fishery managers. Factors that Leah sees as important to the Madison include dams regulating temperature, disease resistance through natural selection, scientific understanding leading to prediction methods, and the balance between the fishing industry and ranching.

Leah hopes that with further study, everyone will have a greater understanding of how the parasite is operating in the Madison River. She hopes this information could be shared with a variety of people, not just scientists.



“ I think that rivers are an important part of our world. They provide habitat for numerous species; resources for humans in the form of recreation, industry, agriculture and daily living; and a landscape that is both beautiful and powerful. Without the rivers there would be no life. My respect for rivers brought me to this research. ”

-Leah Steinbach Elwell

Center: Madison River, Montana  
Left: Leah collecting samples on the Madison River



### Leah's Methods and Project Processes:

**Sampling** is done using a kick net to collect sediment and worms. If she can, she targets spots where the organic matter content is high and sediment particles are smaller because there are more worms in these habitats. Physical measurements (pH, temperature, dissolved oxygen, flow) are always taken at the sites.

**Lab work** for the Madison Project involves the use of microscopes to see if worms collected have hair chaetae; if they do, they are more likely to be *Tubifex tubifex*. Chaetae are the specialized hair-like protrusions on the body that differ depending on the type of worm. Then worms are examined for *Myxobolus cerebralis* TAM release. Counting TAMs requires a microscope with powerful magnification. To identify worms to the *Tubifex* species, they are permanently mounted on slides, then the reproductive parts and chaetae are identified. Finally, molecular techniques such as polymerase chain reaction (PCR) are used to confirm if the parasite is *Myxobolus cerebralis*.

**Lab work** for the Pelican Project has focused on detection methods for the parasite in pelican feces. Because this is a fairly new area of research, the initial research must be dedicated to methods and processes. To date, Leah has experimented with several techniques to detect spores including the plankton centrifuge (blender with centrifuge core), sieving and centrifuging, pepsin-trypsin digestion, and PCR sensitivity.

Leah has admitted to some disappointments with the pelican research, mainly the difficulty in detecting spores in feces. But she sees the positive as well. "As with any project, there are certain things that you can control, and then beyond that you just have to see what happens. The pelican project has definitely been a bit more challenging. We had to totally switch gears for that project after we got back preliminary results, although the new slant that we took with that project has been rewarding." ☒

**Leah Steinbach Elwell** completed her undergraduate work at the University of Montana in Missoula with a degree in Aquatic Wildlife Biology. She then came to Montana State University in Bozeman and completed a Master's in Biological Sciences. She's stayed in Bozeman continuing on with research. She's always been interested in biology and ecology, and likes to share her passion with others. When not working, Leah spends as much time outside as possible either hiking, boating, fishing, or gardening.

Right: Leah sorting through samples on the Madison River



# Whirling Disease Initiative Outreach Coordinator Hits the Road!

by Amy Rose

Meetings, meetings, meetings! They were definitely the predominant theme for whirling disease outreach this past quarter. Because most fishery professionals spend the majority of the warm weather in the field, most of their professional gatherings take place in the winter months. In order to get to know the individuals that make up the whirling disease outreach audience, I attended and presented at five fisheries-related meetings and conferences during February and March. My presentations focused on the new Whirling Disease Initiative Outreach Program. At every meeting I gave an overview of whirling disease nationally, the Initiative, and the research that's been funded for the past seven years by the Initiative. I highlighted the program's new products including this newsletter and the new Initiative web site (<http://whirlingdisease.montana.edu/>).

The following is a break-down of and highlights from the meetings I attended:

## 54<sup>th</sup> Great Plains Fishery Workers Association Workshop

*Sterling, Colorado; January 31 to February 2, 2005*

The Great Plains Fishery Workers Association was founded in 1952 and hails itself as the oldest fishery workers group in the nation. The group serves the plains states and provinces of the United States and Canada including Colorado, Montana, Nebraska, North Dakota, South Dakota, Wyoming, Alberta, Manitoba, and Saskatchewan. At its initial meeting, first acting leader Walter Allen stated, "The basic

intention [of the Association] is that those fishery workers, who are hatchery men and field men and who do not ordinarily have an opportunity to attend meetings for the discussion of their problems, should exchange their ideas and experiences." Following from this basic premise, the Association now meets yearly to discuss fishery management and fish biology issues.

I was impressed by the scientific knowledge presented and the good nature demonstrated by the attendees. Two of the restoration project presentations were particularly interesting and

noteworthy. Kevin Rogers outlined the construction of an outlet spawning channel to allow for natural recruitment of cutthroat trout; and Ralph Hudelson described the rehabilitation and enhancement of Flat Creek in Teton County, Wyoming. If you are interested in reading further on these projects, visit the Wild Fish Habitat web site (<http://wildfish.montana.edu/>). Details, photographs, and data of the Flat Creek project are available in the case history section, and the Rogers project will be uploaded soon.

## 11<sup>th</sup> Annual Whirling Disease Symposium

*Denver, Colorado; February 3rd and 4th, 2005*

Now in its eleventh year, the Whirling Disease Symposium has become the cornerstone for information sharing on whirling disease. The Whirling Disease Foundation proceedings states that "This important annual science meeting is a shaping event in the whirling disease research process and has played a significant role in the advancement of whirling disease research." Researchers from across the United States come together once each year to present their research findings and to discuss the potential applications for fishery managers who seek to control and manage this disease.

This year, attendees were treated to presentations on a variety of topics. New research on worm lineage resistance and

on improved methods of filtering could prove useful to managing the disease. In addition, noted German researcher Mansour El-Matbouli shared initial results from his latest research on resistant species of trout. El-Matbouli works in collaboration with Ron Hedrick from UC-Davis. In a related research project, George Schisler, CODW researcher, also presented initial results on strains of resistant Hofer rainbows. (Read more about George's research on page 2.)

In another exceptional presentation, Brett Johnson from Colorado State University, shared research findings from his study involving the tracing and source identification of infected fish. The method involves the dissection and chemical analysis of fish otoliths (inner ear) to determine a fish's home hatchery. According to the findings, each hatchery has a unique environmental "fingerprint" that can be determined in

the otolith. Although the methodology seems highly refined, scientific, and technically costly, fishery managers will likely find the process and possible applications extremely useful; it would allow managing agencies to enforce regulations regarding fish disease and prohibited stocking.

During the two-day event, a total of 33 papers were presented in six focal sessions. Most of the research presented is still in the preliminary stages, so results are not final and have yet to be published. However, all information presented at the Symposium is viewable in PDF format at the Initiative web site (<http://whirlingdisease.montana.edu/>). If you need help getting the information, please contact me for assistance ([rose@montana.edu](mailto:rose@montana.edu)).



Amy presenting at the Colorado/Wyoming Chapter AFS meeting

## Annual Montana Chapter American Fishery Society (AFS) meeting

*Missoula, Montana; February 8 to 11, 2005*

This was the first AFS meeting that I had the pleasure of attending, and I found it to involve a great group of people. The AFS membership is composed of fishery professionals from all areas of fishery expertise and related careers. Due to Montana's dedication to foster self-sustaining populations of fish, many presentations focused on population abundance and species fitness. There were several interesting presentations on bull trout as well as species surveys for all of Montana.

## Annual Idaho Chapter AFS meeting

*Boise, Idaho; February 24 to 26, 2005*

The Fish Health Section of this meeting was particularly interesting with respect to whirling disease. Carla Hogge presented findings on the tracing and analysis of neurotrophic *Myxobolus*. There are many *Myxobolus* spores, and

Carla is studying one type that is found in the brains of fish. What is unique about this neurotrophic spore is that it lies loosely in the tissues of the brain, and as of yet, Carla is seeing no negative effects to the fish.

Also of note is the sediment modeling research presented by Kara Anlauf. Modeling, prediction, and assessment

methods are promising tools for fishery managers. The hope is that fishery managers will be able to use these methods to assess and better manage drainages with respect to whirling disease. Kara, a graduate student at the University of Idaho, defended her thesis based on this research in March 2005. She plans on publishing her results within the next year.

## Annual Colorado/Wyoming Chapter AFS meeting

*Fort Collins, Colorado; March 7 to 10, 2005*

Visiting Fort Collins was a pleasure, and I was glad to see that this chapter can boast a lot of support as evidenced by the large turnout and the high interest of attendees. Having a university with a fish research co-op unit and a CODW office within walking distance of the meeting certainly added to the size of the meeting.

One session centered on fish health and whirling disease. Noted CODW researcher, Barry Nehring, presented his

puzzling findings on tracing *Myxobolus cerebralis* in the Windy Gap Reservoir. Barry has found varying TAM counts, spore counts, and infection rates over a multi-year period that contradicts normal patterns and consequences. There will be more to come from this unique study of TAM and spore counts and varying degrees of infection within the same water source. Study results are due within the next research cycle.

Halcyon (Hally) Lukins presented her results on a summertime project to develop a more sensitive and accurate way to count TAMs in drainages. She outlined her development of what is now fondly called the "TAM-ometer," instrumentation loaded onto the back

of a truck and used to collect and filter samples in the field. She compared this to the standard, albeit crude, method of bucketing water through filters on location. It turns out there's much to be said for simplicity. Lowering the amounts of water bucketed through field filters resulted in as good or better TAM counts than the more-advanced, more-expensive, and equipment-heavy, TAM-ometer.

Hally found that filtering 30 gallons through 20-micron mesh screen works well and is practical for use in the field. This field method in combination with packed-bed filtration in the laboratory is what she recommends based on her study. ☒



# Announcement:

Every year one of the primary functions of the Whirling Disease Initiative is to carefully review and select promising projects for whirling disease research. Recently, there has been a concerted effort by the Initiative Partnership, and the Whirling Disease Steering Committee (the scientific body that oversees and selects the projects to be funded), to shift the focus of the research toward whirling disease management solutions. Specifically, research should result in solutions, applied management methods, and control applications that can be used to resolve or manage whirling disease problems by fishery managers.

After the final review process conducted by its Steering Committee, the following Principal Investigators recently received awards for new or continued whirling disease research to be conducted between May 1, 2005 and December 31, 2006:

- » **Jerri Bartholomew**  
Resolving uncertainties in *Myxobolus cerebralis* introduction and establishment risks
- » **Deb Cartwright**  
Effect of benthic invertebrate populations, riparian zone and associated water quality on infection rates of *Tubifex tubifex* with *Myxobolus cerebralis*
- » **Chris Guy**  
Movements of resident and non-resident anglers in Montana: implications for transferring whirling disease among drainages
- » **Brett Johnson**  
Forensic applications of otolith microchemistry for tracking sources of illegally stocked whirling disease positive trout
- » **Billie Kerans**  
*Myxobolus cerebralis* risk to Yellowstone cutthroat trout related to variation in *T. tubifex* abundance and susceptibility
- » **Billie Kerans**  
Whirling disease risk at multiple spatial scales
- » **Todd Koel**  
The viability of *Myxobolus cerebralis* myxospores after passage through the alimentary canal of avian piscivores in the Greater Yellowstone Ecosystem
- » **Eric Wagner**  
Characterization of whirling disease resistance patterns in rainbow trout from Harrison Lake, Montana: classification of resistant and susceptible individuals and elucidation of the effects of recent natural selection
- » **Dana Winkelman**  
Assessing the density and distribution of *Tubifex tubifex* lineages in Windy Gap Reservoir, Colorado
- » **Dana Winkelman**  
Investigating competition among lineages of *Tubifex tubifex* and the potential for biological control of whirling disease in natural streams

Total funding for this research cycle is approximately \$644,000. This brings the total spent on whirling disease research through the Initiative since its 1997 inception to \$5 million. ☒



# Reflections on the Partnership by Dick Jachowski

Before I officially retire from public service at the end of April, I'd like to share a few observations about the National Partnership based on my experience representing the U.S. Geological Survey on the Board of Representatives.

**Strategic approach** – In commenting to Gretchen Rupp on recommendations from a review panel for the Whirling Disease Initiative in 2001, I observed that “While there might have been a good reason for establishing the National Partnership, it does not currently add much value to the Whirling Disease Initiative.” Much has changed since that time. When the Board of Representatives met in October 2002, we had a crucial discussion of the purpose of the Partnership. The Board committed to revising the charter for the Partnership to emphasize its strategic role in relation to the tactical role of the Steering Committee. Based on feedback from Congressional staff and the U.S. Fish and Wildlife Service, the Board also addressed the need for an exit strategy for whirling disease research. The resulting charter and five-year plan for Phase III of the Initiative should position the Partnership well for the next few years.

**Are we done yet?** The Initiative was established in 1997 to promote, prioritize, and help fund cooperative research with direct implications for whirling disease afflicting wild trout and salmon populations. The job is not yet done because research sponsored by the Initiative has not enabled managers to control or eradicate the disease. Given the difficulty of predicting when that success will be achieved, if indeed it is possible, we established interim milestones to move the Initiative toward that goal. As stated in the Partnership's 2004 annual report, “The five-year plan revision was an attempt to lay out a plan for program closure within a defined timeframe; however, it must be emphasized that research projections are speculative and unforeseen actions may be warranted.”

**Outputs and outcomes** – The Partnership's current emphasis on accountability, outreach, and delivery of results is well-placed. Posting the scientific findings of the Initiative on the Internet through the National Biological Information Infrastructure will make them widely accessible. Regardless of the outcome for future funding, these actions will justify the past investment and make the knowledge gained through the Initiative available for fishery, hatchery, and watershed managers to use in efforts 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. ☒

**Dick Jachowski** is a native of Washington, D.C. Dick worked with the U.S. Fish and Wildlife Service (FWS) from 1976 to 1985 to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (commonly referred to as CITES). From 1985 to 2000, he led the research programs of the Patuxent Wildlife Research Center, which began in the FWS and was transferred to the U.S. Geological Survey. During that time he also led the Scientific and Technical Advisory Committee of the interagency Chesapeake Bay Program. Since 2000, he has been Director of the Northern Rocky Mountain Science Center of the U.S.G.S. in Bozeman, Montana.

## Meetings and Conferences:

- » Managing Fisheries—Empowering Communities (A community conference sponsored by NOAA Fisheries, Alaska Region); April 21-23; Anchorage, Alaska
- » Symposium of Fishery Sciences in Mexico; May 2-4, 2005; La Paz, Baja California Sur, Mexico
- » 30<sup>th</sup> Annual Eastern Fish Health Workshop; June 13-17, 2005; Shepherdstown, West Virginia
- » Outdoor Writers Association of America; June 18-22, 2005; Middleton, Wisconsin
- » American Fisheries Society Annual Fish Health Section Meeting; July 27-29, 2005; Minneapolis, Minnesota
- » Federation of Fly Fishers International Show and Conclave; August 8-13, 2005; Livingston, Montana
- » American Fisheries Society 135<sup>th</sup> Annual Meeting; September 11-15, 2005; Anchorage, Alaska
- » Midwest Fish and Wildlife Conference; December 11-14, 2005; Grand Rapids, Michigan
- » American Fisheries Society 136<sup>th</sup> Annual Meeting; September 10-14, 2006; Lake Placid, New York

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