

the Whirling Disease Initiative Newsletter

Volume 2, Issue 3 ~ August 2006

in this issue...

Whirling disease and mountain whitefish.....	1
Two new parasite detections	2
Innovative program at Bozeman Fish Tech Center will provide technical assistance.....	3
New data repository and data policies will enhance research capacity	4
Join us for whirling disease mini-symposium at AFS Annual Meeting	5
Utah's hatcheries back online after disinfection and renovation	6
Meetings and Conferences	6
Wild Trout Symposium IX Call for Papers	7
Newly updated AFS Fish Health Section "Blue Book" released	7

Editors & Contributors

Kajsa Stromberg, Editor in Chief
 Molly Boucher, Graphic Artist
 Liz Galli-Noble, Montana Water Center
 Kelly Lotts, Big Sky Institute
 Linda Beck, USFWS

A publication of:



Whirling disease and mountain whitefish

The effects of whirling disease on mountain whitefish have been studied little since the parasite *Myxobolus cerebralis* was first introduced to waters of the western United States. In a laboratory study, MacConnell, Zale, and Quinn evaluated the susceptibility of mountain whitefish to *M. cerebralis* infection (see *Proceedings of the 2000 Whirling Disease Symposium*). Their results indicated that mountain whitefish were susceptible to infection by *M. cerebralis*, could develop whirling disease, and could serve as hosts for development of *M. cerebralis* myxospores. The researchers observed caudal lesions prevalent in infected whitefish, and noted that these closely resembled lesions found in wild juvenile mountain whitefish collected from the Madison River in 1999.

Other research and anecdotal reports indicate mountain whitefish may have a high prevalence of *M. cerebralis* infection and could suffer population-level impacts. Barry Nehring of Colorado Division of Wildlife reported a 70 to 80% prevalence of *M. cerebralis* infection among wild mountain whitefish of the Roaring Fork River, Colorado in 1997 (see *Colorado's Cold Water Fisheries: Whirling Disease Case Histories and Insights for Risk Management, February 2006, p. 7*). In fact, assessing the risk of *M. cerebralis* infection to mountain whitefish is one of five recommendations included in Nehring's Colorado report. In Mission Creek, Montana, biologists from the Confederated Salish and Kootenai Tribes recently reported clinical signs of whirling disease in mountain whitefish.

Although not always appreciated by anglers, the ecological importance of mountain whitefish is high, particularly as forage for larger predatory salmonids like bull trout. If whirling disease did reduce mountain whitefish populations, this could potentially impact the overall fish community and food web.

So far, little is known about the impact of *M. cerebralis* on wild populations of mountain whitefish. A study recently funded by the Whirling Disease Foundation aims to change that. Lisa Eby of the University of Montana and Ron Pierce of Montana Fish Wildlife and Parks (FWP) will collaborate with Brian Strohschein and Dick Vincent, both of FWP, to evaluate the whirling disease risk to wild mountain whitefish. This will be accomplished through laboratory trials and analysis of field conditions including spawning locations, seasonal stream temperature profiles, hatching times, larval habitat use, and signs of disease among adult whitefish. ☒



The National Partnership for the Management of Wild and Native Coldwater Fisheries Board Members:

Robert Bakal

U.S. Fish and Wildlife Service

Jeff Kershner

U.S. Geological Survey

Stuart Leon

U.S. Fish and Wildlife Service

Joe Moran

U.S. Fish and Wildlife Service

Dave Nickum

National Trout Unlimited

Don Prichard

Bureau of Land Management

Eileen Ryce

American Fisheries Society

Robin Schrock

U.S. Geological Survey

Mike Stone

Association of Fish and Wildlife Agencies

Jay Thompson

Bureau of Land Management

Jim Tilmant

National Park Service

Kate Walker

U.S. Forest Service

Whirling Disease Initiative Steering Committee Members:

Bob Gresswell

U.S. Geological Survey

Phil Hulbert

State Fisheries East Infected Region

Mark Jones

State Fisheries West Infected Region

Dave Kumlien

Whirling Disease Foundation

Beth MacConnell

U.S. Fish and Wildlife Service

Dick Vincent

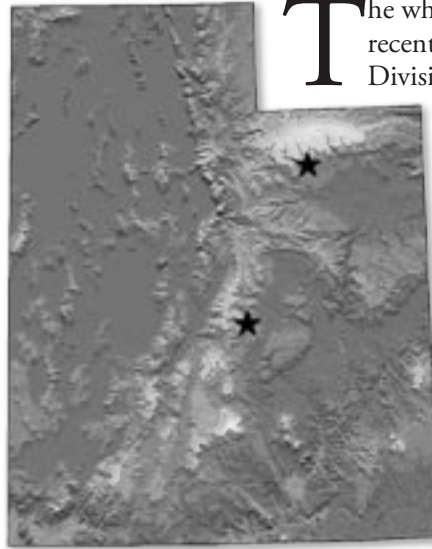
Montana Department Fish, Wildlife and Parks

Steve Wolff

Wyoming Game and Fish Department

Liz Galli-Noble, Program Director
Montana Water Center

Two new parasite detections



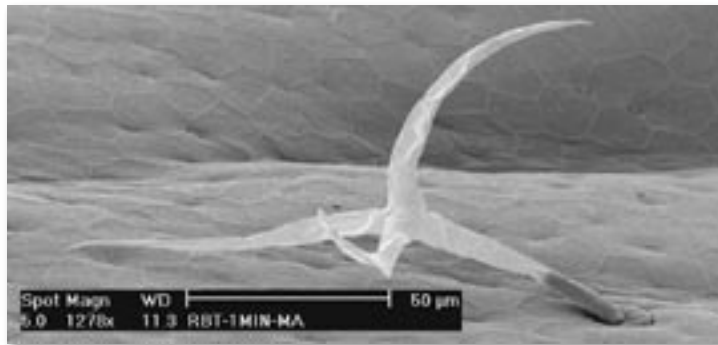
The whirling disease parasite, *Myxobolus cerebralis*, was recently detected in Huntington Creek by the Utah Division of Wildlife Resources (DWR). Huntington Creek is one of Utah's recognized blue-ribbon trout streams. Located in central Utah, the stream flows from Electric Lake south to the town of Huntington. In 2005, the parasite was detected in tributaries to Huntington Creek. This year, samples confirmed its presence in the mainstem. Additionally, the Utah DWR detected *M. cerebralis* in Rock Creek, a tributary to the Duchesne River in northeastern Utah. This detection will be carefully confirmed and monitored to ensure protection of nearby populations of genetically pure Colorado River cutthroat trout. ☒

Online bibliography grows – 224 records!

The Whirling Disease Initiative (WDI) offers an online whirling disease-related bibliography through our Web site. This searchable resource contains a growing library of books, book chapters, journal articles, conference proceedings, dissertations, government documents, and technical reports. In many cases, the entire article or document can be downloaded in .pdf format. Thanks to student help this summer, the bibliography has reached 224 records searchable by title, author, year, and keyword. Find it under "Resources" on the WDI Web site. ☒

Thirteen years of Whirling Disease Symposium abstracts now available

Thirteen years of Whirling Disease Symposium abstracts are now available on the WDI's online bibliography. Each abstract is included individually in the searchable bibliography and is available for download as a .pdf file. Abstracts are not considered peer-reviewed references, but contain a wealth of information about whirling disease science and management. Find what you're looking for at <http://whirlingdisease.montana.edu/biblio/default.htm>. ☒



Micrograph of a TAM. Photo Credit: Crystal Hudson, USFWS.

Innovative program at Bozeman Fish Tech Center will provide technical assistance

By Linda Beck

A new program is being developed at the Bozeman Fish Technology Center to comprehensively address aquatic nuisance species (ANS) and aquatic ecosystem health. The program will enhance operations of the U.S. Fish and Wildlife Service (USFWS) and will provide technical assistance to other agencies and businesses dealing with aquatic nuisance species.

As lead federal agency for the management of aquatic nuisance species, the USFWS takes on many responsibilities. The USFWS currently co-chairs the Aquatic Nuisance Species Task Force, and administers two important laws related to aquatic nuisance species: 1) the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA, 1990); and 2) the National Invasive Species Act (NISA, 1996). In addition, Linda Beck, a researcher at the Bozeman Fish Technology Center, is developing an Aquatic Nuisance Species and Aquatic Ecosystem Health Program. Through this program, the USFWS will provide field and research assistance to find on-the-ground solutions for hatcheries, water use systems, and other industries that affect natural aquatic systems.

The Aquatic Ecosystem Health Program is an innovative approach by the USFWS to promote and maintain aquatic health where their facilities impact natural waterways. The program emphasizes water quality protection, biodiversity, and implementation of decontamination and prevention protocols for overall aquatic ecosystem health. These proactive measures preserve the integrity of natural aquatic systems and equip a system for resistance to invading organisms. In this manner, promotion of aquatic ecosystem health can prevent damage from ANS. In addition to ANS, the program focuses on contaminants, effluent pollutants and other effects to aquatic systems. The USFWS is utilizing this approach at federal hatcheries and

at other facilities like the Bozeman Fish Technology Center.

In 2005, Linda Beck assisted federal fish hatcheries located throughout eight mountain-prairie states. Linda trained hatchery and field personnel on risk assessment techniques specific to their stations. Linda, along with Cal Fraser, an aquaculture systems specialist, and researcher Greg Kindschi, initiated effluent and aquatic nuisance species monitoring programs at several National Fish Hatcheries (NFH): Jones Hole, Ennis, Creston and D.C. Booth, in addition to the Bozeman Fish Technology Center.

All were relieved to find no ANS already present at these hatcheries; however a new species of snail was identified at Ennis NFH much to the surprise of Dr. Dan Gustafson, a local entomologist and Hatchery Manager Tom Pruitt. Now, Ennis NFH can protect this native snail in its guard.

Hatcheries and other facilities can individualize monitoring programs based on their own conditions, and long-term and standardized data can aid in evaluating 'big picture' issues like hatchery effluent

quality and contaminants. For example, at the Bozeman Fish Technology Center, Linda and staff members are completing a Conservation Agreement to manage long-term conservation of an endemic warm water riffle beetle, *Zaitzezia therma*, located on site. Conservation actions will prevent this species from becoming endangered or extinct. Beetle conservation is a unique part of the monitoring program for aquatic ecosystem health specific to the Bozeman Fish Technology Center. At the same time, sampling methodologies are being standardized throughout the country to address water quality issues found at USFWS facilities.

Linda Beck earned a B.S. in Microbiology and a M.S. in Biological Sciences at Montana State University for research on whirling disease. Linda began working for the USFWS Bozeman Fish Health Center as a fish health inspector in 1996 before transferring to the Fish Technology Center in April 2005. To contact Linda for technical assistance or more information about her programs, call (406) 994-9947. ✉



Linda Beck of the USFWS Fish Technology Center in Bozeman is leading development of an Aquatic Nuisance Species and Aquatic Ecosystem Health Program.

New data repository and data policies will enhance research capacity

By Liz Galli-Noble and Kelly Lotts

Availability and sharing of data and samples in a timely fashion is becoming increasingly important to scientific and management endeavors. In 2001, the National Academy of Sciences created the Committee on Responsibilities of Authorship in the Biological Sciences and charged its members to evaluate responsibilities of authors to share data and materials. The committee found that: "An author's obligation is not only to release data and materials to enable others to verify or replicate published findings... *but also to provide them in a form on which other scientists can build with further research* (italics added)."²¹ The Internet makes it possible for this information to be made available easily and at no cost to users.

The establishment of the WDI electronic data repository is a collaborative effort undertaken in 2005/2006 by the Montana Water Center, MSU's Big Sky Institute, and the Mountain Prairie Information Node (NBII) program of the U.S. Geological Survey. The project is a response to the need for data sharing across disciplines and amongst researchers, land managers, agency personnel, and the general public. The WDI repository functions are two-fold: (1) Interested parties will be able to use an easy data retrieval system to find datasets and metadata associated with completed research; and (2) The archive will also protect against data loss that can occur when projects are discontinued, when students graduate, or when data are misplaced.

From 1997 to 2005, the WDI did not have a formal data submission and use policy. In 2006, the WDI established a formal data policy, and now all WDI Principal Investigators and grantees are required to abide by this policy, which includes guidelines and requirements for data and metadata submission. This policy also includes guidelines for dataset access and use.

Data and information derived from publicly funded WDI research will be made available with as few restrictions as possible, on a nondiscriminatory basis. All metadata will be available by request as soon as submitted by a researcher and regardless of any restrictions on access to the data. Metadata will be distributed at no cost via the Internet or in writing. Most datasets will be available to the public, but some data will be restricted. Data will be released to the general



The new Whirling Disease Initiative Data Repository will maintain a searchable index of data accessible for researchers.



All Whirling Disease Initiative researchers will be able to upload data into the data repository via this data upload site. The process is easy and technical support is available.

public according to the terms of the General Data Use Agreement, within two years of project completion. Data not available to the general public will be subject to a Restricted Data Use Agreement; these data have a restricted release that will be determined on a case-by-case basis.

Presently, efforts are underway to archive past WDI funded datasets and metadata (generated from 1997 to 2005) in the new centralized WDI database. A formal launching of the archive/database is scheduled for late 2006. ☒

¹ National Research Council. 2003. Sharing publication-related data and materials: responsibilities of authorship in the life sciences. The National Academies Press: Washington, DC. p.4.

Join us for whirling disease mini-symposium at AFS Annual Meeting

The 136th Annual Meeting of the American Fisheries Society (AFS) will be convened in lovely Lake Placid, New York from September 10 through 14, 2006. The meeting's theme "Fish in the Balance" will explore the interrelation between fish, aquatic habitats and humans, and will highlight challenges and the methods used to meet them. The meeting will feature 1,100 oral and poster presentations, 12 continuing education workshops, and 32 symposia. One symposium, organized by the Whirling Disease Initiative, will focus on whirling disease as an example of the challenges that fisheries professionals must address in the act of balancing aquatic resources and human needs.

Intensive study since the mid-1990s, led by the Whirling Disease Initiative and the Whirling Disease Foundation, has greatly increased our understanding of whirling disease biology and impacts to fisheries. The symposium "Whirling Disease: what's going on and what can we do about it?" will feature the latest research findings and management approaches for dealing with the whirling disease parasite. Presenters will cover:

- 1) the impacts of whirling disease on salmonid populations in the United States,
- 2) studies to better understand factors affecting parasite impacts, and
- 3) management tools being used to reduce the spread of the parasite and lessen its impacts.

Please join us as we review the latest research and management approaches. For more information, visit the AFS Annual Meeting Web site at <http://www.afslakeplacid.org> where you can register online for the meeting and symposium. For specific questions, contact Kajsja Stromberg, Whirling Disease Initiative Outreach Coordinator, at kstromberg@montana.edu or (406) 994-2550. ☒



Whirling Disease Initiative Funded Studies, 2006-2007

An ecological assessment of large-scale spatial and temporal patterns of whirling disease risk and salmonid population response - \$245,605

Billie Kerans, Thomas McMahon, Jay Rotella, and James Robison-Cox, Montana State University

Travis Horton, Montana Department of Fish, Wildlife, and Parks

Southwest regional risk assessment for whirling disease in native salmonids in arid and semi-arid lands: Arizona, Colorado, New Mexico, and Utah - \$196,310

Colleen Caldwell, USGS, New Mexico Cooperative Fish and Wildlife Research Unit

Robert DuBey and Scott Schrader, New Mexico State University

Dana Winkelman, USGS, Colorado Cooperative Fish and Wildlife Research Unit, Colorado State University

Phaedra Budy, USGS, Utah Cooperative Fish and Wildlife Research Unit, Utah State University

Scott Bonar, USGS, Arizona Cooperative Fish and Wildlife Research Unit

Effect of substratum on the development and release of the triactinomyxon stage of *Myxobolus cerebralis* in resistant strains of *Tubifex tubifex* - \$60,000

Dolores Baxa and Ron Hedrick, University of California - Davis

Utah's hatcheries back online after disinfection and renovation

The Mammoth Creek State Fish Hatchery (SFH) in southern Utah is back in full production this summer following an expensive disinfection and renovation of the facility. The whirling disease parasite was detected in rainbow trout at the facility in 2002. This triggered a quarantine and disinfection to prevent the spread of the parasite into state waters. A renovation followed to secure the facility against further infection from whirling disease and other fish diseases. Raceway covers were constructed, oxygen injection was added, and incoming water is now treated with a rotating drum filtration and ultraviolet (UV) sterilization system. In June 2006, the state announced that the Mammoth Creek facility is fully open for business, once again producing trout for stocking throughout the state.

Trout production at Mammoth Creek SFH is welcome news to anglers and fishery managers since other state hatcheries have been similarly disabled by the whirling disease parasite in recent years. Three state fish hatcheries in Utah have tested positive for the whirling disease parasite since the year 2000. Production of trout for stocking Utah waters was diminished due to infection at these hatcheries. However, with the addition of Mammoth Creek SFH this spring, all three hatcheries are back in business generating healthy trout.

At Midway State Fish Hatchery, infected in 2000, new wells were drilled to ensure an uncontaminated water supply. Once the new water source was considered pathogen-free, the hatchery was granted fish health certification in 2005 and resumed production. The hatchery is currently undergoing a multi-million dollar renovation to better utilize the clean water supply and prevent future contamination. When this effort is complete, the number of trout produced will be higher than pre-whirling disease levels.

At Springville State Fish Hatchery, the whirling disease parasite was detected through routine fish health tests in March 2005. The hatchery was immediately closed and actions were taken to prevent the parasite's further spread. An estimated 350,000 rainbow trout were destroyed, amounting to a loss of 22% of the state's catchable trout production. Long term remedies are being pursued to secure the facility and prevent further fish disease outbreaks. Managers are investigating water treatment systems utilizing UV light and raceway covers, and these technologies may be installed in the future. In the meantime, the Springville SFH was granted fish health certification in March 2006 and is stocking healthy trout into Utah waters. Capacity is limited by water quantity for now, but is expected to increase through renovations and addition of oxygen injection systems. Interestingly, the Springville SFH will

now be raising endangered June suckers in addition to trout. The June suckers will be used to augment the population in Utah Lake, the only place where the species can still be found in the wild.

Although three of eleven state coldwater fish hatcheries in Utah tested positive for *Myxobolus cerebralis* since 2000, all three are now fish health certified and producing catchable trout. The treatments and renovations were expensive. However, as Chris Wilson of Utah Division of Wildlife Resources said, "These investments provided badly needed repairs to the hatcheries that will allow them to produce more fish in the future." The legacy of whirling disease in Utah's state hatcheries will likely be a legacy of improved biosecurity, reducing the risks of disease and introduction of invasive species in the future. All indications are that Utah trout production in the near future will actually be significantly increased over pre-whirling disease levels. ❖



Utah's state fish hatcheries have recovered disease-free certification following three recent detections of the whirling disease parasite.

Meetings and Conferences:

- » The 5th International Symposium on Aquatic Animal Health; September 2-6, 2006; San Francisco, California
- » National Partnership for the Management of Wild and Native Coldwater Fisheries, Board of Representatives Meeting; September 10, 2006; Lake Placid, New York
- » American Fisheries Society 136th Annual Meeting; September 10-14, 2006; Lake Placid, New York
- » "Whirling disease: What's going on and what can we do about it?", special symposium at AFS Annual Meeting; September 12, 2006; Lake Placid, New York

For more updates and events, visit:
<http://whirlingdisease.montana.edu/events.asp>

Wild Trout Symposium IX

Call for Papers

West Yellowstone, MT ~ September 16-19, 2007

Papers, posters and nominations are requested for the upcoming Wild Trout Symposium IX to be held September 16-19, 2007 in West Yellowstone, Montana. The first international Wild Trout Symposium was held in 1974, and symposia are held every three years. These events bring together a diverse audience of professionals and anglers in a unique forum to interact, get to know each other, and be exposed to the latest wild trout science, technology and philosophy. Wild Trout symposia equip participants to better manage, preserve, and restore our magnificent but declining resources. The meetings focus on the needs of working-level wild trout professionals, conservationists, and trout anglers.



This year's themes focus on balancing native and introduced trout, habitat enhancement and restoration, catch-and-release fisheries, genetic conservation, and invasive species. The call for papers is out and abstracts are due April 1, 2007. For information, visit <http://www.wildtroutsymposium.com>. ☒

Newly updated AFS Fish Health Section "Blue Book" released

The updated 2005 edition of *Suggested Procedures for the Detection and Identification of Certain Finfish and Shellfish Pathogens* (Blue Book) is now available. Published on searchable CD-ROM by the American Fisheries Society Fish Health Section, the Blue Book contains the newly revised "Standard Procedures for Aquatic Animal Health Inspections" and contains numerous color photographs and video clips. Order this update through the AFS Web site (<http://www.fisheries.org>). ☒

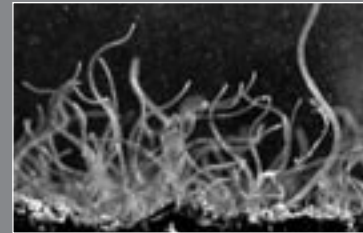
Comments? Suggestions? Submissions?

Is this newsletter helpful? Accurate? Informative? Please give us your comments and suggestions. We would also appreciate story ideas or article submissions. Simply e-mail Kajsa Stromberg, Outreach Program Coordinator, at kstromberg@montana.edu.

Life Cycle



1. *M. cerebralis* spores exist in sediment.
2. Tubifex worms ingest spores.



3. Infected worms produce *M. cerebralis* TAMs and release them into the water column.



4. TAMs enter through the skin of fish.
5. Parasite travels to the head and cartilage of fish.



6. After several months, fish exhibit signs of whirling disease.
7. Mature spores are released from fish and cycle begins again.



Photos courtesy of (top to bottom): the Whirling Disease Foundation; Maria Markiw, U.S. Geological Survey; Mansour El Matbouli; and the U.S. Geological Survey

To change your subscription or add recipients,
please use the form below or call
1-406-994-2550

Name _____

Organization _____

Address _____

City _____

Zip _____

E-mail _____

Phone _____

Please circle one of the following options:

Hardcopy Only E-mail Only E-mail & Hardcopy Unsubscribe

Mail to: Kajsa Stromberg
Montana Water Center
101 Huffman Building
Montana State University—Bozeman
Bozeman, MT 59717-2690



Montana Water Center
101 Huffman Building
Montana State University—Bozeman
Bozeman, MT 59717-2690