



University of Idaho

# Aquaculture Research Institute

SPRING 2006

## TEACHING

Although the Aquaculture Research Institute (ARI) is not an academic department, we provide educational and research opportunities to students at both the undergraduate and graduate level. Because of the diversity of aquaculture sciences, graduate degree programs with an aquaculture emphasis may be designed for post-baccalaureate students enrolled in fisheries, biology, animal sciences, agricultural economics and engineering programs.

ARI Director Ron Hardy is a Professor in the Department of Animal and Veterinary Sciences (College of Agricultural and Life Sciences) and an adjunct professor in the Department of Fish and Wildlife Resources (College of Natural Resources), Associate Director for campus programs Kenneth Cain is an Associate Professor in Fish and Wildlife Resources, and Associate Director for Hagerman Programs Matt Powell is an Assistant Professor in the Department of Animal and Veterinary Sciences. Each serves as major professor or committee members for graduate students enrolled in the two departments. They also offer special topic classes and independent study projects for graduate and undergraduate students.

## FEATURED STUDENT - PhD Candidate John Drennan

John is originally from the Midwest of the United States, specifically the small town of Quincy Illinois. From the time he was a small boy, growing up on the Mississippi River, he has always been interested in fish and fishing. After receiving a Bachelor of Science in Geography from the University of Iowa, John took a few years to work and travel around the United States, only to realize that he was not satisfied. In 1996, he made is way to Oregon State University (OSU) to study fisheries resources. While studying at OSU, he combined his interest for fish with the study of fish health/disease and completed a Masters degree in Microbiology. Since John moved to the Pacific Northwest, he has not only furthered his education, he has also become an avid fly fisherman and game hunter. Getting out into the wilderness, allows John some quiet time to think about his next research goal.



*Graduate student John Drennan*

As a PhD candidate in the Department of Fish and Wildlife at the College of Natural Resources his research is focused on transmission, diagnostics, and immunity of white sturgeon iridovirus (WSIV). This virus appears to be endemic in most wild white sturgeon populations in the Pacific Northwest and is a threat to conservation aquaculture programs involved in re-establishing endangered populations, such as the Kootenai River white sturgeon. This virus also limits the success of commercial farming operations that grow these fish for meat and caviar production. Little is known about this host-pathogen relationship. However, his research is providing useful information on stocking densities to minimize WSIV disease epizootics, non-lethal sampling approaches to identify infected individuals, how this virus is transmitted within the environment, and the immune response of white sturgeon against this virus for possible vaccination

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*As a research and development scientist, John worked on fish vaccines against viral pathogens, developed in vitro assays to determine vaccine efficacy, and performed fish health diagnostic services.*

## Aquaculture Research Institute

Subscriptions to the ARI newsletter will be published semi-annually and available free through [www.webs.uidaho.edu/aquaculture/](http://www.webs.uidaho.edu/aquaculture/) in Adobe Acrobat format. If you would like to be notified via email when the latest edition is available on our web page, please notify the editor at [aqua@uidaho.edu](mailto:aqua@uidaho.edu) and you will be notified.

Contributions from those of you working in the field are encouraged. Feedback and suggestions on how to improve this newsletter would also be appreciated.

This issue of the newsletter highlights various activities on the Moscow campus, the Hagerman Fish Culture Experiment Station and includes various extension activities.

The ARI-2004 Annual Report is available on-line at [www.webs.uidaho.edu/aquaculture/](http://www.webs.uidaho.edu/aquaculture/).

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strategies. John's research has been directly funded by the Kootenai Tribe of Idaho (KTOI) and Bonneville Power Administration and should be completed by May 2006. John's major Professor is Dr. Ken Cain who leads the department's interest in the continued collaborative efforts with the KTOI.

John has considerable experience in the field of fish health. He has been involved with fish health in the Pacific Northwest for about nine years now. After completing his M.S. at OSU under Dr. Joann Leong, he has worked for Oregon Fish and Wildlife Fish Pathology Division at Corvallis OR; and Microtek International (1998) Ltd. in Victoria, British Columbia. Microtek International is a Canadian biotech company that is partnered with the Bayer Corporation that produces vaccines for commercial fish farming industries worldwide. As a research and development scientist, John worked on fish vaccines against viral pathogens, developed *in vitro* assays to determine vaccine efficacy, and performed fish health diagnostic services. As a PhD candidate of Natural Resources, John has been able to draw from all of this experience and education to design and execute his research within his PhD research project.

With the end of spring semester right around the corner, John is expected to defend his dissertation by the end of April and graduate from University of Idaho with a PhD in Natural Resources in May 2006. He has already accepted a two year post-doctoral position with Schering Plough, in Elkhorn, Nebraska. Schering-Plough is a world wide research based pharmaceutical company that presently produces a wide variety of human pharmaceutical and animal biologics. As a postdoctoral, John will be aiding in the research and development of Schering-Plough's fish vaccines for the commercial fish farming industries of North America.

## Fish Genetics at ARI

**DR. MADISON POWELL,  
HAGERMAN FISH CULTURE EXPERIMENT STATION**

**T**he ARI's genetic laboratories on the Moscow campus have moved to the Hagerman Fish Culture Experiment Station. The new office / laboratory building in Hagerman, slated to open in June 2006, will become the lab's new home with approximately three times the space and much more capability. The laboratory building will have tissue culture and histology rooms and three areas dedicated for genetic analyses and equipment, including fragment analyzers, liquid-handling robots, a microarray reader and PCR machines. The highly anticipated, new facility will be able to fully accommodate all ongoing, collaborative projects (with the USDA and Columbia River inter-Tribal Fish Commission) as well as newly proposed projects.

Through 2005, the genetics laboratory continued to examine the population genetics of various species including sockeye and Chinook salmon, burbot, white sturgeon, Pacific lamprey, steelhead / rainbow trout and cutthroat trout. The laboratory also began a comparative study of zebrafish and rainbow trout genomics under a collaborative, NSF-EPSCoR study with other researchers at the Uof I (Dr. Rod Hill in AVS and Dr. Barrie Robison in Biology) and at Idaho State University (Dr. Ken Rodnick).

Two students, Catherine Willard and Brian Leth successfully defended their thesis work and graduated with a Master of Science degree in Fisheries Resources in 2005. The lab in Hagerman also hosted high school science teacher, Ed Richards as a Murdock Charitable Trust "Partner in Science" during the summer. Ed will return this summer to continue his work on Pacific lamprey genetics.



# Hagerman Fish Culture Experiment Station Construction Project

**P**rogress in construction of new building at the Hagerman Fish Culture Experiment Station, part of the Aquaculture Research Institute.

A new, single-story 13,000 sq ft building is being constructed at the Hagerman Fish Culture Experiment

Station to replace the original USFWS administration/laboratory building (4500 square ft) that was built in stages from the 1960s through the late 1980s. In fact, the new building is located on the original site of the former building, making it necessary to demolish the old building to make way for the new one. As a result, all administrative and analytical laboratory personnel and equipment were moved to temporary locations during the construction period.

Demolition of the old building took place in August 2005, followed by site preparation and foundation work, leading to completion of the floor in late October. During November, structural steel was erected, followed by installation of laminated support beams, exterior walls, and roof support beams. Construction on the external shell of the building was completed by the Christmas holidays, allowing electrical, plumbing and heating-air conditioning contractors to work during the winter months inside the building.

Completion of the new building is expected in June 2006, and a dedication ceremony will be held in August in conjunction with dedication of a new USDA/ARS building being constructed in Aberdeen, Idaho. Dignitaries will be able to attend both ceremonies, and UI and ARS will be able to highlight their cooperative research activities that focus on rainbow trout genetic improvement and also the development of high-value products from Idaho barley to be used in feeds for farmed fish.



The new building will have 15 offices, 8 cubicles for technicians and graduate students, and a conference room wired for distance learning and video conferencing with the UI Moscow campus. The conference room will have a capacity of 55, and will be capable of being split into two smaller rooms, thus adding flexibility. There will be six analytical laboratories, some double sized, in the new building, plus a room dedicated to archiving fish tissue samples from throughout the Pacific Northwest region for future DNA testing associated with research in population genetics of salmon, steelhead, trout, sturgeon, lampreys and burbot. The entry and lobby of the new building will include a large aquarium featuring native species of fish, and a smaller aquarium featuring ornamental species of fish that are candidates for production in Idaho using geothermal resources. This display will be useful during the frequent tours given by the Hagerman staff to students from local schools.

The cost of the new building is covered by federal, state, and private funds, plus funds granted from the Bonneville Power Authority to the Columbia River Inter-tribal Fish Commission (CRITFC), who are collaborative partners with UI scientists in a range of research activities pertaining to fisheries resources. The new building represents a significant investment and reflects the continued commitment to aquaculture and fisheries conservation biology being made by the University through the Aquaculture Research Institute.

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# Public Confusion Over Seafood

GARY FORNSHELL, UNIVERSITY OF IDAHO EXTENSION

In 2004 the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) issued a joint advisory on mercury and seafood. This was the first time the two agencies issued a joint advisory on mercury and in addition to discussing the risks associated with mercury ingestion they pointed out the health benefits derived from seafood consumption.

Unfortunately when people hear negative news first they tend to ignore the good news. Studies have shown decreases in seafood consumption following FDA advisories. A recent national consumer survey conducted by the University of Maryland Center for Food, Nutrition and Agriculture Policy confirmed what many within the seafood/aquaculture community thought: the public is very confused about the benefits and risks of seafood consumption. Most do not understand the FDA/EPA advisory. They either believe the advisory applies to everyone or they mistakenly believe the advisory applies to the wrong groups within the population, such as the elderly, men, or teenagers. Most could not identify which species had higher levels of mercury and those that have extremely low levels. Clearly, the FDA and EPA need to provide a clear, concise, easy to understand message on the benefits and risks involved with eating seafood.

Since the advisory was issued numerous articles on mercury and seafood have appeared in the print media as well as stories on television news broadcasts. The media has certainly contributed to consumer confusion with their mixed messages, misinformation and sensationalism. Unfortunately many rely upon the media for their health and nutrition information.

The FDA/EPA advisory is for a specific high-risk group: pregnant women, women who may become pregnant, nursing mothers, and young children.

It is recommended that this group should not consume shark, swordfish, king mackerel and tilefish, and limit consumption of albacore (white) tuna to 6 ounces per week. Further, if consuming sport-caught fish they should check state advisories for local waters. However, this group should eat up to 12 ounces per week a variety of seafood low in mercury such as shrimp, canned light tuna, salmon, pollock, catfish, tilapia, and rainbow trout to obtain the health benefits from seafood consumption. Seafood is an important part of a healthy diet. A high quality protein low in saturated fats, seafood contributes to a healthy heart and is necessary for the proper growth and development of children.

Seafood and especially omega-3 fatty acids are so good for us that the following organizations all recommend increased seafood consumption:

World Health Organization

American Heart Association

Institute of Medicine

2005 U.S. Dietary Guidelines

National Heart, Lung, & Blood Institute

National Cholesterol Education Program

Even the FDA/EPA advisory – up to 12 oz./wk for the high risk group

In fact numerous medical experts argue that there is a greater risk to health with decreased consumption of seafood (American Journal of Preventive Medicine: 2005 volume 29, issue 4).

Due to consumer concerns and mixed messages in the media about seafood safety and health benefits the United States Trout Farmers Association had the Environmental Quality Institute at North Carolina State University analyze farm-raised rainbow trout from Idaho, North Carolina and Pennsylvania for mercury. The study found that mercury levels are so low in farm-raised rainbow trout that a 160-pound person could eat up to 600 pounds in a year and not exceed EPA's recommended reference

dose of 0.1 micrograms per kilogram of bodyweight per day.

Reference doses are usually based on the most sensitive and relevant studies. Often adequate human data is not available and it is necessary to rely on data from animal studies. A dose is set by identifying an exposure that has shown no harmful effects in the most relevant study and dividing it by uncertainty factors to allow for possible differences between experimental animals and humans, and between the average and most sensitive humans. The reference dose represents an intake that is without appreciable risk, but gives no indication of the possible risk at intakes above that level; however, exceeding the reference dose does not necessarily result in harmful effects, even in the most sensitive populations. The reference dose is intended as a gauge, not an absolute number above which a problem is likely to occur, precisely because of the fact that uncertainty factors are calculated into the reference dose.

The EPA mercury reference dose was calculated on the lowest dose at which a subtle subclinical effect was thought to occur (meaning the effect was not actually observed) and then building in a 10-fold uncertainty factor that makes EPA's reference dose for mercury the most stringent standard in the world.

So remember the advice from the American Heart Association – eat fish twice a week and if you are a member of the high risk group follow FDA/EPA's advice and eat up to 12 ounces per week a variety of seafood low in mercury.

Reference:

What You Need to Know About Mercury in Fish and Shellfish,

2004 EPA and FDA Advice For: Women Who Might Become Pregnant,

Women Who are Pregnant, Nursing Mothers, Young Children. <http://www.cfsan.fda.gov/~dms/admeHg3.html>



# Summer Camp 2005

DR. ED GALINDO,  
DIRECTOR, NATURAL RESOURCES TRIBAL COOPERATIVE  
MOSCOW, IDAHO

The Aquaculture Research Institute (ARI) hosted a science summer camp during the first week of August 2005. Our base camp was at Challis Hot Springs, which is a very delightful place to end your hard research day in the field!

Our science camp had a focus on the water, and the sacredness of water resources. Students were exposed to Native American views of water; for example, stories of how water is home to many of the earth's creatures and plants. Students were also exposed to the scientific community research views of water as well.

Students assisted Dr. Galindo's research efforts to establish base line data for Salmon and Steelhead habitat in the headwaters and tributaries of the Salmon River. Students were shown streamside water tests for acid or base (pH), dissolved oxygen (D.O.), temperature, flow rates, and nitrite/nitrate levels.

Students had college mentors from North Idaho College (NIC), Idaho State University (ISU) and the University of Idaho (U of I). Members of a Community Advisor Panel (CAP) also helped mentor students. CAP members are members of the community that volunteers their time and effort working with students and the environment.



In summary, we had a great science camp with native and non-native students learning about water. More importantly, we learned about each other, and the value of education. One student wrote on her evaluation of the camp, "I had a fun time, can I bring my brother? And when is this camp next year?"

We look forward to another great year of leaning and sharing.

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# CALENDAR

Aqua 2006, Meeting of World  
Aquaculture Society,  
Florence, Italy  
May 9-13, 2006  
[www.was.org](http://www.was.org)

Western Division American Fisheries  
Society Meeting  
May 15-19, 2006,  
Bozeman, Montana  
"Natives and Newcomers"  
Website: [www.idahoafs.org/  
meeting2006](http://www.idahoafs.org/meeting2006)

Idaho Aquaculture Association  
Meeting  
Twin Falls, Idaho  
June 17, 2006  
Contact info: Linda Lemon  
208-837-4808  
Email: [iaa@northrim.net](mailto:iaa@northrim.net)

Western Fish Health Section  
Workshop  
Victoria, BC, Canada  
June 26-28, 2006  
[www.fisheries.org/fhs/wfdw\\_  
2006.htm](http://www.fisheries.org/fhs/wfdw_2006.htm)

5th International Meeting of  
Aquatic Animal Health,  
San Francisco, CA, USA  
September 2-6, 2006  
[www.fisheries.org/fhs/isaah\\_  
2006.htm](http://www.fisheries.org/fhs/isaah_2006.htm)

National AFS Meeting  
September 10-14, 2006  
"Fish in the Balance"  
Lake Placid, New York  
Website: [www.afslakeplacid.org/](http://www.afslakeplacid.org/)

## Aquaculture Research Institute

The Idaho Aquaculture News is published by the University of Idaho Aquaculture Research Institute in Moscow, Idaho, to provide information about aquaculture-related activities at the University of Idaho. It is intended to complement rather than duplicate the Idaho Aquaculture Association Newsletter, although some articles may overlap.

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