University of Idaho
Aquaculture Research Institute
WINTER 2006

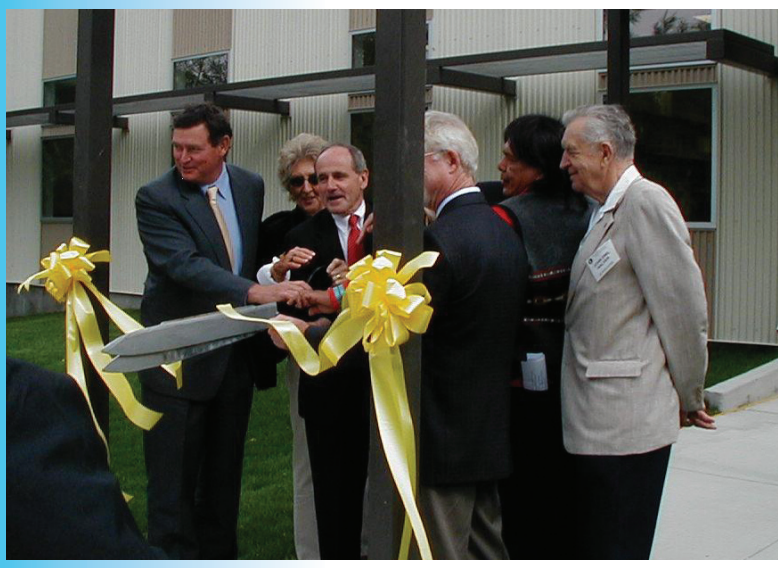
Station Dedication a Success

Hundreds gather for University of Idaho's Hagerman Fish Culture Experiment Station dedication

More than 200 Idaho legislators, aquaculture researchers, agency representatives and University of Idaho supporters watched as President Timothy P. White and Idaho Gov. James E. Risch cut the ribbon on the university's new $3.2 million biotechnology aquaculture laboratory and office complex at the Aquaculture Research Institute site in Hagerman.

The new 13,000-square-foot building includes six analytical laboratories, 14 offices, eight cubicles for technicians and graduate students and two conference rooms wired for distance learning and video conferencing with the university's Moscow campus.

"This station is internationally recognized for its scientific expertise in conservation biology of salmon, fish feed technology and trout breeding for improved performance on grain-based diets," said Risch. "The new facility will increase the research capacity to develop profitable alternative means for aquaculture. From an economic development standpoint, this is key."



Official ribbon cutting September 14, 2006.

Idaho produces over seventy percent of the nation's trout. "If you see trout on the menu at a restaurant in any given town across the county, there is a high likelihood that it came from Idaho," said Risch.

More than 45 scientists, faculty and staff are involved in the aquaculture laboratory research programs. Ninety-two percent of the operating funds come from competitive and earmarked federal funds and grants and contracts that scientists are awarded. "The station brings in over $3.5 million a year – up from basically nothing ten years ago – making it a significant economic force in this region," said White.

(cont. on pg.2)

INSIDE

Aquaculture Research Institute

The ARI newsletter will be produced semi-annually and available online in Adobe Acrobat format through **www.webs.uidaho.edu/aquaculture/**. 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.**

We would be happy to in include appropriate contributions from those of you working in the field! Feedback and suggestions on how to improve this newsletter would also be appreciated.

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

The Aquaculture Research Institute Newsletter provides 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. Articles in this newsletter may be reproduced without permission, provided they are properly cited. Please feel free to submit comments or material you would like us to consider for pulication to:

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(cont. from pg.1)

Both the university's Aquaculture Research Institute and the new Hagerman Fish Culture Experiment Station are located in the heart of Idaho's aquaculture industry in the Magic Valley along the Snake River.

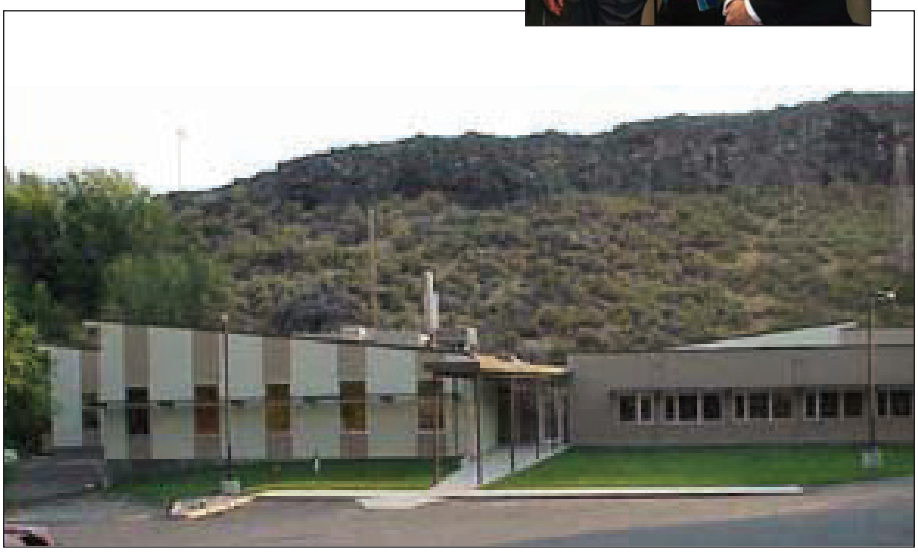
The station has collaborative programs with the U.S. Department of Agriculture's Agriculture Research Service, the Columbia River Inter-tribal Fish Commission, Idaho Department of Fish and Game and the U.S. Fish and Wildlife Service.

"In the field of research, there are few things we value more highly than collaboration. This project is all about collaboration," said White. The station was constructed with federal initiative support and private donations.

The dedication ceremony marked the culmination of the $18 million University of Idaho Biotechnology Campaign launched in 1997. Drawing equal funding from federal, state and private sources, the effort completed the new $14 million Agricultural Biotechnology Laboratory on the Moscow campus in 2001 and renovated the adjacent 1950 Agricultural Science Building. The campaign goal was to improve student access to technology and training. "This is the final jewel of that campaign." said White.

The facility includes an entrance and lobby area featuring a large aquarium with native species, as well as a smaller aquarium featuring ornamental species of fish that are candidates for production in Idaho using geothermal resources. It also includes a room dedicated to archiving fish-tissue samples from around the Pacific Northwest for future DNA testing associated with research in population genetics of salmon, steelhead, trout, sturgeon, lampreys and burbot.

The facility's dedication comes on the heels of an announcement from Blackwell Science Publications at Oxford in England stating that the University of Idaho was the top-ranked U.S. university and fourth in the world in 2005 by number of ISI-ranked papers published in the Journal of Fish Diseases. And the University of Idaho was the top U.S. university and seventh in the world for publications in all fish disease journals in the world.



Featured Student: Master's Candidate, Nathan Jensen

Matser's Candidate, Nathan Jensen

Nathan Jensen is originally from Cross Plains, Wisconsin. Growing up, he spent his weekends working on various farming operations in the Southwestern portion of the state. After completing an AS in Natural Resources from Fox Valley Technical College in Appleton, Wisconsin, he moved to Idaho in the fall of 1998; and enrolled in the Fisheries Technology program at the College of Southern Idaho (CSI). While attending CSI, he earned an AS degree and a technical certificate in Fisheries Technology and an AA degree in Agriculture Science

Following the completion of his course work at CSI in 2001, Nathan transferred to the University of Idaho (UI); where he enrolled as an undergraduate in the College of Natural Resources' Fisheries Resources program. Additionally, while attending the UI as an undergraduate, Nathan worked at the Aquaculture Research Institute as a hatchery technician and assistant wet lab manager. Nathan completed his undergraduate degree in the fall of 2003.

Mr. Jensen's experience, academic excellence and devotion to learning and teaching others about fish hatchery operations were instrumental in his acceptance and continuation towards an advanced degree in Fisheries Resources from the UI. Nathan was accepted into the UI College of Graduate Studies in the fall of 2004. His major professor is Dr. Kenneth D. Cain.

(cont. on pg.4)

Burbot subadult; two years in age, approximately 30 cm in length. Progeny of the Duncan Resevoir BC Canada, burbot stock. Spawn date 3/2004; picture date 2/16/2006. Photo courtesy of James Hearsey.

The research Nathan is conducting will provide a basis for future efforts to develop a burbot aquaculture breeding program at Kootenai Tribal Fish Hatchery, Bonners Ferry, Idaho.

His research findings will be used to help provide a knowledge base for understanding the complexities in the life stages of wild burbot populations.

(cont. from pg.3)

Nathan's research objectives closely follow the different life stages of burbot *lota lota maculosa*; an Idaho native freshwater-cod fish in peril (Paragamian et al. 2000). Specifically, his research objectives are:

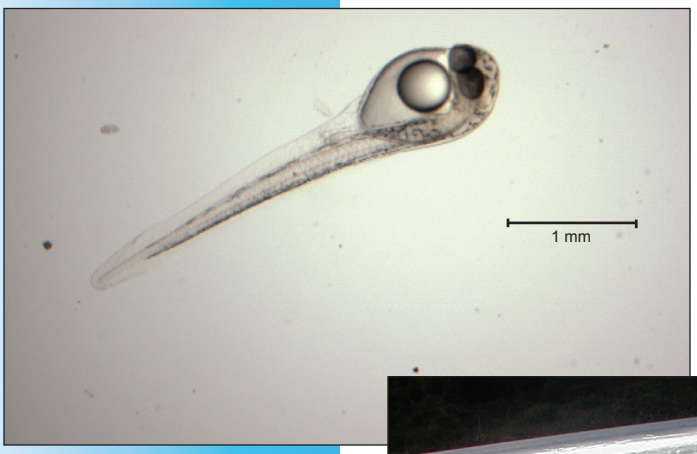
1) Develop reliable spawning techniques that maximize gamete collections.

2) Develop optimal egg incubation methods by testing three different incubator styles; based on eyed egg survival percentages.

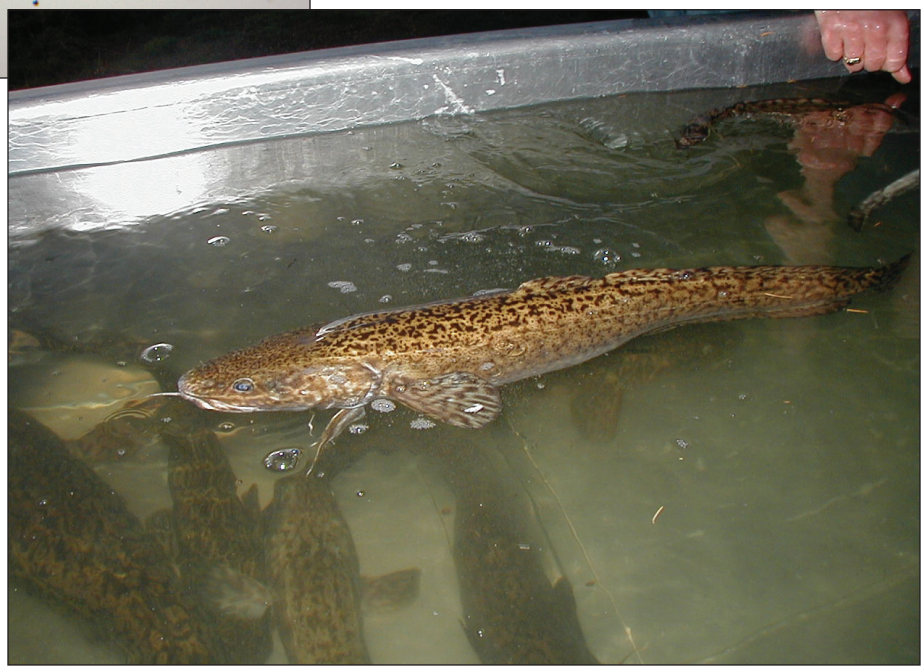
3) Develop reliable larval/juvenile feeding regimes including transitioning early life stages to commercial diet.

4) Apply established cryopreservation technology to investigate the effectiveness of varying semen cryopreservation diluent; based on methanol concentration, looking at post thaw sperm motility and fertility.

The research Nathan is conducting will help provide a basis for future efforts to develop a burbot conservation aquaculture breeding program at the Kootenai Tribal Fish Hatchery, Bonners Ferry, Idaho. In addition, his research findings will be used to help provide resource managers with a knowledge base that will be useful in understanding the complexities involved in the various life stages of wild burbot populations.



Burbot Larvae.



Adult burbot captured from Moyie Reservoir, British Columbia in November, 2006. This stock is closely related to the troubled Kootenai River burbot of Idaho.

New Manager Hired

Scott R. Williams was hired as the ARI Coldwater Wet Lab manager in March. He graduated from UC Davis in 1984 with a BS in genetics.

After graduation, Scott joined the U.S. Peace Corps, trained in tilapia culture in Stuttgart Arkansas, and worked as an extension agent in Cameroon, West Africa. Scott returned to UC Davis and completed an MS in Animal Science in 1991. Scott's graduate work involved phenotypic sex determination in rainbow trout.

Scott's 12-year career in commercial aquaculture started in 1991 as a Fish Hatchery Technician at Clear Springs Foods in Buhl, Idaho. He was responsible for diagnosing and treating diseases for the farm's 2.3 million trout. During that time Scott also conducted growth studies, and investigations examining the effect of monosex female populations on feed efficiency.

Two years later, Scott was promoted to Brood manager. During that time he was responsible for the production of 72 million eyed trout eggs and oversaw the operations of two hatcheries and 10 employees. As the manager of Clear Springs, he actively ran one of the two hatcheries and oversaw the operation of the other along with a salaried employee.

Scott moved to the Palouse region in 2003 where his wife is completing a Ph.D/residency program in Veterinary Microbiology and Pathology at the Veterinary school at Washington State University. During the last three years, Scott has been employed at ARI working on a variety of research projects.

Scott comes to ARI with much experience and background in aquaculture and is a welcome addition the staff at ARI.

Scott Williams giving tour of wet lab to 4-H students.

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.

Four faculty members are currently conducting research at the Coldwater Wet lab.

CURRENT RESEARCH AT ARI

Dr. James Nagler, Department of Biological Sciences, is the PI for a project called "Xenoestrogen effects on reproduction in male trout". This study is examining the effects of environmental estrogen and estrogen like compounds on the reproductive success of male rainbow trout. Exposure occurs at three different points during their lifecycle. The mechanism of action on the sire and heritability effects on the offspring are being quantified.

Dr. Rolf Ingermann from the Department of Biological Sciences & Center for Reproductive Biology has two ongoing projects. The first is investigating whether the eggs from female steelhead that have previously spawned are as viable as eggs produced in the first spawn. This project, funded by Columbia River Inter-Tribal Fish and Commission (CRITFC) and the Bonneville Power Administration (BPA), is looking at both egg viability and fry development. His second project is examining the effects of stress, both acute and chronic, on blood and peritoneal fluid cortisol, pH, carbon dioxide, lactate and glucose in chinook salmon and white sturgeon. This work, supported by Digital Angel Corp, will hopefully lead to the development of tags with sensors that will monitor stress in fish.

Dr. Joseph Cloud is currently working on three projects: Establishing a Germplasm Repository for ESA-listed Anadromous Salmonids in the Columbia Basin; Production of oocytes from testicular, germinal stem cells; and is co PI with Dr. Nagler on Xenoestrogen effects on reproduction in male trout. Projects in Dr. Cloud's research program are primarily directed toward understanding germ cell development in salmonids and the establishment of a germplasm repository for threatened and endangered fish. Ongoing research projects in the lab include the cryopreservation and transplantation of salmonid gonads and the isolation, culture, and reestablishment of germinal stem cells.

Dr. Kenneth Cain, Department of Fisheries, is working on burbot research along with graduate student, Nathan Jensen.

SCHEDULE OF EVENTS

2008 California Nevada Chapter of American Fisheries Society Annual Meeting.
March, Lake Tahoe. Website: *www.afs-calneva.org*

Joint Annual Meeting of Arizona and New Mexico Chapters.
February 6-8, 2007, Restoring Structure and Function of Habitat in Southwestern United States," Albuquerque, NM. Contact Paul Cassidy at *paulcassidy@aquaticconsultants.com*.

2007 Annual meeting, Idaho Chapter, American Fisheries Society.
February 21-23, 2007, at the Double Tree Riverside in Boise.
"Diversions, Dams, and Fish: Managing the Impact of Diversions and Dams on Idaho's Resident Fish Species." Website: *www.fisheries.org*

World Aquaculture Society Aqua2007.
February 26-March 2, 2007, Sustainable Aquaculture, San Antonio, Texas.
Website: *www.was.org*

2007 Annual meeting, Oregon Chapter, American Fisheries Society.
February 27- March 2, 2007, Big Dams, "Big Fishover Complexities, Controversies and Opportunities, Eugene, Oregon. Website: *www.orafs.org*

Summer Science Camp 2006

ARI (Aquaculture Research Institute), EPSCoR (Experimental Program to Stimulate Competitive Research), University of Idaho, and Idaho State University hosted 18 participants. This year's Summer Science Camp took place in Challis, Idaho from June 19-23, and was open to both native and non-native students.

The science camp focused on the scarcity of water and emphasized the importance of clean water. Students came from the Coeur d'Alene and Shoshone-Bannock Indian reservations, as well as a local high school. A graduate student from Idaho State University helped mentor students. Staff members that donated their teaching time included Utah State University (physician and astrophysics professor), Idaho State University (fish parasite specialist), and Elders from our Community Advisor Panel (CAP).

Students were given pre- and post-tests, as well as a qualitative survey at the end of the camp. They were instructed on streamside chemistry techniques and recorded data for a salmon and steelhead habitat study. The students and staff did an outstanding job of learning and working together in our "outdoor" classroom.

Dr. John Vanderford and Dr. Jim Davis (both from USU) provided astronomical observations of the Zodiac, Milky Way, North Star, Big Dipper, Cassiopeia and the planets. Students were also introduced to Newton's law of motion by actually building a water rocket. Dr. Davis also gave lectures on wilderness medicine.

In summary, students learned about streamside water chemistry, physics laws, astronomy, wilderness medicine, and collected data on fish habitat needs. One student recorded in their journal "I never knew learning about science could be so fun, thanks for inviting me, when is it next year"?

The students and staff did an outstanding job of learning and working together in our "outdoor" classroom.

COLDWATER WET LAB IMPROVEMENTS

In the past, ARI's Cold Water Wet laboratory functioned as one large recirculating system. Recent modifications to the lab have increased the number of recirculating systems and tanks. The facility can now accommodate many more projects by utilizing multiple, smaller recirculating systems.

Alarms have been installed to alert the staff anytime water levels change and when inevitable power outages occur. Backup electrical generators automatically engage when outages are detected protecting the fish used in valuable projects.

Changes have been implemented to all recirculating systems to reduce the need for continual well water input. These improvements have minimized our impact on the aquifer.

New fluidized sand filters and expanded settling sumps allow for increased bio-loading in our smaller recirculating systems.

Ultraviolet sterilization equipment has been installed on systems to allow for recirculation of water for the rearing of juvenile fish.

Security was improved with the installation of a camera and audio equipment that monitors the coldwater wet lab. The video and audio feeds can be monitored via the internet by anyone with the access codes.

Future plans include renovating the existing Warm Water lab to accommodate studies on mitigation aquaculture of exotic coldwater fishes.

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