

CE NEWS

The link from MSU Civil Engineering to our alumni and friends



Partnerships for Student Success • Summer 2005

Something's Fishy at CE

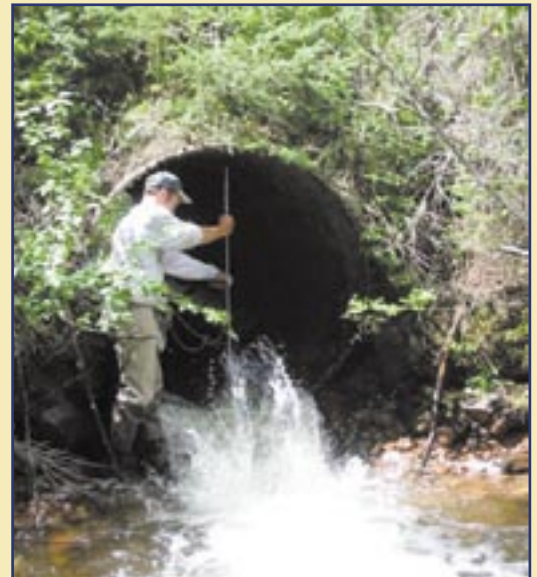
Culverts are low-maintenance and cost-effective alternatives to bridges when roadways cross streams or small rivers. The extent to which culverts affect fish mobility in streams is an increasing concern in Montana. Professors Joel Cahoon (Civil Engineering) and Tom McMahon (Fish and Wildlife Science) have teamed up with the Montana Department of Transportation to complete a project in western Montana, and to continue to study fish passage through culverts in the **Yellowstone River** drainage and in eastern Montana.

The completed project took a basin-wide look at the ability of trout to pass through culverts during the low flows that are expected in mid- to late summer. In the Seeley Lake drainage near **Missoula**, the researchers found that most of the culverts studied were at least partially passable under conditions that would have previously been considered barriers to fish movement.

One of the current projects will look at high and low flows on **Mulherin Creek** in the Yellowstone drainage. The study uses passive integrated transponder (PIT) tagging—small capsule-shaped electronic devices that are implanted under the skin of the fish. Then, when a tagged fish passes through a looped antenna, the date, time, and pit tag code are recorded.

A second ongoing project will look at fish passage through culverts in eastern Montana. The fish species and settings of this project are very different from previous studies. The streams are subject to prairie hydrology—low or no flow throughout much of the year, with flashes of high flow during spring thaw and after summer thunderstorms. The fish species found in these settings tend to vary in physiologic capability and size. Turbid water and silt-laden stream beds call for different field methods than those used in the high-gradient clear and cool trout streams farther west.

The MSU projects have been heralded by researchers, agency personnel and industry alike, with cooperation from the U.S. Forest Service, Montana Fish, Wildlife and Parks, the Western Transportation Institute, the Plum Creek Timber Company and many landowners and recreationalists.



ABOVE: High water velocity may make a culvert impassable to fish.

BELOW: Many culverts in eastern Montana are sized to handle large storm runoff, while most of the year the stream is just a trickle.



Without change there can be no growth. I don't know who properly gets credit for this statement, but I rather like it and will use it as a theme for this column.



Amongst the changes in the department this year are two new CET faculty members. Dean Peterson and Whitney Lutey will be joining us as assistant professors of construction engineering technology this fall. Dean brings with him a wealth of construction industry experience with the Corps of Engineers. Whitney has worked for Hensel Phelps and, as an MSU CET alum, fully understands the legacy of excellence the CET program and its graduates have earned. I am confident that the CET faculty team will sustain and build the program's reputation.

Another legacy of the department has been its snow and ice mechanics research. We will soon have new facilities to support the outstanding faculty who conduct cold regions-related research. The National Science Foundation has funded a \$1,117,000 grant that will be directed by Ed Adams, CE professor, and John Priscu, Land Resources and Environmental Studies professor. Funds from the grant will be used to build five cold rooms on the first floor of Cobleigh Hall. This expansion of the cold regions laboratory complements the development of a cold regions test bed that the Western Transportation Institute is establishing at **Lewistown**, Montana. In the near future, MSU will have world class cold regions research facilities that promise to attract students and faculty to study at MSU and build on our reputation for excellence in cold regions research.

These are just a couple of the ways the CE department at MSU is growing. I am very excited about this growth. If you are in Bozeman, please stop by the department; I'll show you around so you can see the growth for yourself.

—Brett Gunnink, Ph.D., P.E.
Professor and Department Head

Engineering alum one of three honored at 2005 commencement

MSU engineering graduate Joel Long of **Billings** was granted an honorary doctorate degree during the May, 2005 MSU commencement exercises, along with retired physician and historian Dr. Volney Steele of Bozeman and Julius James "Jim" Christianson of Great Falls, executive vice president of the Montana Wheat and Barley Committee



Joel Long of Billings

The degree from the College of Engineering will be Long's third degree from MSU. He earned a bachelor's degree in physics in 1965 before discovering a love for engineering, resulting in a master's degree in engineering in 1967. Long intended to study for his doctorate degree when the U.S. Army intervened. After discharge from the Army Corps of Engineers, he returned to Billings and his family's company, United Industry. Long bought three of the family-owned companies in 1990, after his father died, forming the basis of the JTL Group, a large aggregate mining, asphalt, ready-mix concrete production and sales, road construction, paving and general contracting company operating in Montana and Wyoming. In 1999, Long oversaw the acquisition of the JTL Group by MDU Resources, assuring that his employees and management teams would continue to run the company.

Long's ability to envision the future has transformed Billings and the state. He was a key to the expansion and development of the Billings Central Business District and downtown Billings, including the development of the Transwestern Plaza and the First Interstate Bank Building. His ability to see parks and shopping areas when there were once only gravel pits resulted in the development of Billings' Marketplace and Riverfront Park, a conservation center and the Amend Park Soccer Fields. He also donated a gravel-mine in **Missoula** that became a pond, trail and Bitterroot River access. Among the non-profits that have benefited from the generosity of Long and his wife, Andrea, are the Billings YMCA, the Yellowstone Boys and Girls Ranch, St. Vincent's Hospital, Deaconess Medical Center, Family Services, Boys and Girls Club, and MSU. Long was a recipient of the Philip N. Fortin Humanitarian Award for his efforts.

Long is an active member and former president of the Montana Contractors Association and helped create the Contractors' Health Care and Retirement Trust. A director of the First Interstate Bank Holding Company, he was also a past president and director of the Billings Family YMCA and twice was appointed as a director of the Montana Board of Investments. Named in 1992 as one of MSU's "Centennial Alumni," Long currently serves on MSU's Advanced Technology Institute Board of Directors.

CE News is produced annually by the Montana State University Civil Engineering Department.

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Research project studies constructed wetlands

The use of a constructed wetland (CW) system to remove a variety of contaminants from a polluted water source is an accepted technology in many parts of the world. The systems have been successfully used to treat domestic and municipal wastewater, agricultural and highway runoff, and metal contaminated water. Tens of thousands of these systems are employed world-wide due to their reliability and overall effectiveness, relatively low construction cost, and minimal operations cost. However, only a few experimental systems have been built in Montana for fear that our extreme climatic variability will reduce their effectiveness, especially in winter.

Research at MSU headed by Otto Stein focuses specifically on the influence of season on CW performance. Perhaps the most profound discovery the team has made is that the rate of organic contaminant removal does not necessarily decrease with cold

temperature, as is typical in other wastewater treatment systems. The key seems to be the type of plant species used; certain species appear to be better at oxygenating the root zone in winter, leading to the speculation that the increased oxygen promotes a faster removal rate counterbalancing the decrease due to temperature.

The team recently earned a new USDA grant for additional research to meet three new objectives: screening additional wetland plant species to determine which are better root-zone oxygenators and what physiological traits cause that behavior; determining if the microbial populations on root surfaces vary by species and change by season and if this variability is the “root” cause for the observations previously identified; and determining if the way wastewater is applied, either in continuous flow or in fill and drain batch modes influences the observed seasonal variation.

Several students are conducting the research, including two new environmental engineering master’s students, a new LRES master’s



Civil engineering professor Otto Stein



Ricky Schultz (bottom), Environmental Graduate student, and Heart Butte High School Student Blake Wombold take water quality samples from the microcosm constructed experimental wetlands system.

student, a new microbiology PhD student and several CE and CE-BREN undergraduates. Seven graduate students and more than a dozen former undergraduates have worked on previous aspects of the constructed wetland research.

For information, contact Otto Stein at ottos@ce.montana.edu.

CE adds new transportation lab

A new lab has been added recently to the facilities in the Civil Engineering Department. The new transportation and ITS lab is located in Cobleigh 426 and is designed to satisfy research and instruction needs, particularly at the graduate level. The lab is equipped with 10 state-of-the-art networked work stations with transportation software packages, including signal optimization and traffic simulation. Besides conventional traffic data collection equipment, the lab also contains advanced equipment for conducting research on signal control and an online wireless traffic monitoring and data collection system with two mobile stations that are equipped with surveillance cameras and digital video image processing systems, some of which was donated by Econo Light Control Products, Inc.



Students Thaddeus Lesnik of Corvallis and Gretchen Hedrick of Bozeman use the new traffic control equipment in the Intelligent Transportation Systems Lab.

Meet Renee Hecox, our new dept. academic advisor

For most of you, no introduction is necessary, but we are pleased to announce that Renee Hecox has been appointed as academic advisor for the department. Renee began her association with the Civil Engineering Department as a work-study employee under department head Glen Martin in 1972. Renee decided to stay with the department for at least a couple of years after she graduated from MSU with a degree in Fish and Wildlife Management in 1976. Renee left the department for a short venture in the trucking business with her husband, Dick, but soon came back to stay. After 25 years of faithful service—during which she helped countless Civil Engineering students navigate through the curriculum—we are still privileged to have Renee with us. Renee says she could be here for another 25 years as she continues to help her husband maintain the family farm north of Bozeman.



In an odd sort of way Renee really does work within her degree: she is always fishing through student transcripts and resolving problems that come up with student wildlife or time management. If Renee made an impact during your time in the department please drop her an e-mail (reneh@ce.montana.edu).



Construction engineering major Brian Day from Great Falls completes a project for a summer surveying class on the south lawn of Hannon Hall. (MSU photo by Erin Raley).

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