Greetings from the Department Head

In July 2002, The Department of Aquatic, Watershed, and Earth Resources was established within the newly reorganized College of Natural Resources at Utah State University. Here we report on the activities and accomplishments of our students and faculty during our first two years. The AWER department offers comprehensive educational opportunities for graduate and undergraduate students in hydrology, geomorphology, biogeochemistry, water quality, watershed management, fisheries, aquatic ecology, remote sensing and geographic modeling. Our faculty provide expertise in all aspects of the hydrologic cycle, in the conservation, restoration and management of aquatic ecosystems, and in the remote sensing and geographic analysis of the earth's landcovers. Graduates of our programs become teachers and researchers at major universities, scientists and managers for natural resource agencies, and professionals with consulting and non-profit environmental firms.

During our first two years, we implemented two new undergraduate degree programs (p. 4), established a new research center (p. 16), and developed two new shortcourses to enhance lifelong learning of agency scientists and natural resource managers (p. 15). The entrepreneurial spirit and hard work of our faculty and staff make these accomplishments possible and create the positive attitude that makes the AWER department an enjoyable place to work.

Chris Luecke
Department Head

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Mission Statement

Bringing science to the management of watershed ecosystems in Utah and the world.

The mission of the AWER Department is to foster the discovery, learning and application of knowledge about aquatic and earth resources and their related ecosystems to promote stewardship of the environment. This mission demands the development of relevant research endeavors to enhance our understanding of ecosystems, rigorous educational programs to produce the next generation of scientists and managers, and effective extension and outreach programs that are responsive to public needs. Promotion of a dedicated faculty and staff, recruitment of talented and motivated students, and creation of a stimulating and supportive departmental environment are central to these pursuits.

Learning
Teaching Program

Two new degree programs, BS in Watershed and Earth Resources and BS in Fisheries and Aquatic Sciences, highlight quantitative analysis of environmental data. Students become facile in computer applications, learn the basics of inferential statistics, gain exposure to remote sensing and geographic information system technology, and gain the writing skills necessary to convey their analytical abilities. Graduates of these programs are able to analyze and solve environmental problems in the conservation and management of aquatic resources.

Discovery
Research Program

- Our faculty integrate physical, chemical, and biological processes to better understand ecosystem function.
- We embrace a hierarchical view of watersheds, scaling up from small-scale physical and physiological processes to derive patterns of ecosystem and continental dynamics.
- Our faculty pursue research projects ranging from the arctic to the tropics, and from space-based remote sensing platforms to subsurface soil and water processes.

Outreach
USU Water Quality Extension –

We provide information and programming that help the public protect the quality of Utah’s streams and rivers, lakes and reservoirs, and groundwater. We provide materials and other support, including training for teachers, watershed coordinators, and anyone interested in learning about how our activities can affect water quality.

Website: https://extension.usu.edu/waterquality/INDEX.htm
Honors and Awards
2002
Brandon Albrecht – Robert D. and Lenore L. Nielsen Scholarship
Michael Hadley – Seely-Hinckley Scholarship
Lindsay Johnson – Fisheries and Wildlife Emeritus Scholarship
Wesley Jolley – Ray Becraft Scholarship
Jason Kling – Allen W. and Alice H. Stokes Scholarship and William T. “Bill” Helm Memorial Scholarship
Olivia Lester – Arthur F. Johnson Scholarship
Peter Mackinnon – Alumni and Poe Brothers Scholarship
Dax Mangus – Safari Club International, Utah Foundation Scholarship
Rebecca Ogden – William F. Sigler Scholarship
Lila Prichard – Mark R. Boyer Scholarship and Gregory R. Rost Scholarship
Luke Smith – William F. Sigler Scholarship
Tonya Stephenson – Jessop B. Low Memorial Scholarship
Maria Torres – Fisheries and Wildlife Outstanding Senior of the Year

2003:
Calvin Black – William T. “Bill” Helm Memorial Scholarship
Phil Brown – Class of 1950 Scholarship
Olivia Lester – AWER Outstanding Senior of the Year and CNR Scholar of the Year
Dax Mangus was selected to receive one of 5 Rocky Mountain Elk Foundation Wildlife Leadership Awards for 2003.

2004:
Phil Brown – Undergraduate Researcher of the Year, Paul and Neva Dunn Scholarship and the George E. Hart Scholarship
Jessica Horrocks – William F. Sigler Scholarship
Jonas Parker – William T. “Bill” Helm Memorial and the Arthur F. Johnson Scholarship
Brooke Shakespeare – AWER Outstanding Senior of the Year

Grdudates
2002, 2003, and 2004
Brandon Albrecht, 2002
Thomas Gardiner, 2002
Richard Hansen, 2002
Ryan Hilton, 2002
Hillary Law, 2002
Joel Moore, 2002
Jeffery Worwood, 2002
Erik Archer, 2003
Jennie Bassett (Whiting), 2003
Mark Beckstrand, 2003
Donovan Gross, 2003
Hoe-Hun Ha, 2003
Michael Hadley, 2003
Mellisa Harvey, 2003
Dave Kikkert, 2003
Jason Kling, 2003
Olivia Lester, 2003
Peter Mackinnon, 2003
Robin Wignall, 2003
Mark Dean, 2004
Trent Lybbert, 2004
Russell Nelson, 2004
Candace Hutchinson (Price), 2004
Brooke Shakespeare, 2004
Trent Lybbert, 2004
Paul (Cam) Christison, 2004
Our Graduates at Work!

Degrees Conferred

Bart Gamett, MS, 2002 - The Relationship between water temperature and Bull Trout distribution and Abundance, Major Professor: Jeff Kershner
Nathaniel Brindza, MS, 2002 - Analysis of Zooplankton Grazing Rates and the Effect of Grazing on Phytoplankton Populations, Major Professor: Chris Luecke
Eric Archer, MS, 2002 - Colorado Pike Minnow in the San Juan River, Major Professor: Todd Crowl
Warren Colyer, MS, 2002 - Seasonal Movements of Fluvial Bonneville Cutthroat Trout in the Thomas Fork of the Bear River, Idaho-Wyoming, Major Professor: Jeff Kershner
Arthur Butts, MS, 2002 - Effects of Myzobolus Cerebralis on the Population Dynamics of Kokanee in Porcupine Reservoir, Utah, Major Professor: David Beauchamp
David Buys, MS, 2002 - Competition between Bonneville Cutthroat Trout and Brook Trout in Laboratory and Stream Experiment, Major Professor: Jeff Kershner
Susan Virgilio, MS, 2002 - Nitrogen Cycling Dynamics in Lexen Creek Watershed, Fraser Experimental Forest, Fraser, Colorado, USA, Major Professor: Helga Van Miegroet
Brett Thompson, MS, 2003 - An Ecological Comparison Of Two Endemic Species Of Whitefish In Bear Lake, Utah/Idaho, Major Professor: Chris Luecke
David Deschaine, MS, 2003 - The Influence of Soil Properties On Wepp Sediment Yield Predictions for Small Western Rangeland Watersheds, Major Professor: James Dobrowolski
Ernesto De La Hoz, MS, 2003 - Assessing the Effects of Myxobolus Cerebralis and other Environmental Factors on the Dynamics, Abundance, and Distribution of Trout Populations in the Logan River, Utah, Major Professor: Phaedra Budy
Daniel Scaife, MNR, 2003 - Major Professor: Jeff Kershner
Paul Burnett, MS, 2003 - Factors that influence the spawning migrations and early life history survival of adfluvial Bear Lake, Major Professor: Jeff Kershner
Joshua Mace, MNR, 2003 - Major Professor: Todd Crowl
Dave Gaeuman, PhD, 2003 - An Historical Approach for Identifying Habitat Maintenance Flows, with Application to the Lower Duchesne River, Utah, Major Professor: Jack Schmidt
Chad Larson, MS, 2004 - Experimental Examination of the Factors Affecting Growth and Species Composition of Phytoplankton from Great Salt Lake, Utah, Major Professor: Gary Belovsky
Tyler Haddix, MS, 2004 - Factors affecting growth and survival of rainbow trout in Flaming Gorge Reservoir, Utah-Wyoming, Major Professor: Phaedra Budy
Heath Whitacre, MS 2004 - Comparison of protocols and observer precision for measurement of stream attributes in Oregon and Idaho streams, Major Professor: Jeff Kershner
Graduate Program, Honors and Awards

2002
Jeffrey Ostermiller – Terri Lynn Steel Award

2003
Tamara Heartsill-Scalley - College of Natural Resources Teaching Assistant of the Year.

Stephen Bennett - Terri Lynn Steel Award.

Ben Kennedy - The Western Division American Fisheries Society Eugene Maughan Graduate Student Scholarship.

Ryan Hill received an award at the North American Benthological Meeting for his oral presentation of "Correlations between valley width and sediment size distribution: a GIS based approach to characterizing physical stream structure."

2004
Tamara Heartsill-Scalley - Utah State University and the College of Natural Resources Research Associate of the Year!

Amy Marcarelli - College of Natural Resources Teaching Assistant of the Year!

Shane Vatland - Best Student Paper American Fisheries Society Meetings

Robert Al-Chokhacy - Terri-Lynn Steel Award

Trey Simmons - Stokes-Leopold Memorial Scholar

Greta Burkart, graduate student: Toolik Field Station, Alaska

Shane Vatland, Graduate Student, Fishing for catfish at Spencer Camp in the San Juan Arm of Lake Powell

Robert Al-Chokhacy, graduate student, examining bull trout in Northeastern Oregon
Updates from Former Students

Kim Ryals is the Southeast Coordinator for Trout Unlimited, the nation’s largest coldwater conservation organization (www.tu.org).

Robert Hilderbrand is an assistant professor at the Appalachian Laboratory, University of Maryland Center for Environmental Science.

Robert Hilderbrand

Chad Mellison accepted a job with the U.S. Fish and Wildlife Service in Reno Nevada. His office is in charge of the northern 2/3 of the state of Nevada as well as the eastern Sierra Mountains. His major duty is to consult with other federal agencies on the Endangered Species Act as it relates to the National Fire Plan.

Chad Mellison

Jon Flinder’s graduated with a bachelor’s degree in Fisheries and Wildlife and is now pursuing a master’s project dealing with illegally introduced northern pike at the University of Arizona.

Jon Flinder

Mike Canning is currently the Utah Division of Wildlife Resources conservation data/GIS coordinator. His job consists of setting direction for the Utah Natural Heritage Program and UDWR’s GIS Program.

Mike Canning
Todd Seamons is working on his dissertation studying steelhead genetics and evolution at the School of Aquatic and Fishery Sciences, University of Washington in Seattle with Dr. Paul Bentzen and Dr. Tom Quinn.

Jason Kling received his BS degree in Fisheries and Wildlife in 2003, then accepted a full-time position for the U.S. Forest Service, Humboldt-Toiyabe National Forest, as the fisheries biologist on the Carson and Bridgeport Ranger Districts.

Summer Allen works for the U.S. Environmental Protection Agency in Washington D.C. as an Environmental Scientist. She is assigned to the NEPA (National Environmental Policy Act) Division.

Tim Ricks is working with an environmental consulting firm in Logan. He was able to work on several projects in Utah, Arizona and Nevada built around endangered and threatened Colorado River fishes.
Research Activities

AWER Grants in Effect 2003
$7.9 Million Total

Faculty Awards

2004
Nancy O. Mesner, Utah State University Extension Services 2004 Taggart-Ballard Award of Excellence.

Helga Van Miegroet, Utah State University, Undergraduate Mentor of the Year 2004.

Michael White, NASA Young Investigator Award

2003
Nancy O. Mesner, Innovative Program Award for Utah State University Extension

Chris Luecke, Utah State University and the College of Natural Resources Advisor of the Year.

Robert Gillies recipient of second place Leica Geosystems Award for Best Scientific Paper in Remote Sensing.

2003 New Awards - $2.3 Million
Paul Box


Paul Box. 2003. Sasaki, Y. and P. W. Box Agent-Based Verification of von Thünen’s Location Theory Journal of Artificial Societies and Social Simulation 6(2)

Phaedra Budy


Todd Crowl


Robert Gillies


Michael Gooseff


Research Publications, cont.

**Charles Hawkins**


**Jeffrey Kershner**


**Chris Luecke**


**Nancy Mesner**


**Jack Schmidt**


Research Publications, cont.

Helga Van Miegroet


Mark Vinson


Michael White


Wayne Wurtsbaugh


Agriculture and Water Quality

Agricultural producers need information, training, and assistance in identifying possible pollution sources and implementing practices to protect Utah’s waters.

These issues and more can be found at the Water Quality Website:

- Comprehensive Nutrient Management Planning
- Utah CAFO/AFO Strategy
- Utah Farmstead Assistance
- Best Management Practice
- Why Should We Care About Nutrients in the Water?

https://extension.usu.edu/waterquality/INDEX.htm

Urban Stormwater

The percent of impervious surface in a small watershed is a good indicator of potential water quality impacts in streams draining in that area. The streams in watersheds with more than 10% impervious cover will probably have impacted water quality. The more impervious the cover, the greater the risk.

Small Acreage Management Workshop
February 28 and March 27, 2004

Pasture, Horses, Water, Weeds

General Sessions – Pasture Planning and Management—
Assessing the pasture resources and setting goals and objectives for your pasture.
Being a Good Neighbor—What resources are available for small pasture owners.

Breakout Sessions
Horses, Horses, Horses, —Horse health, nutrition, waste and fly management and hoof care.
Pasture Planning & Management II - Species and cultivar selection,
Livestock Facilities—Sheds, barns, corrals, fencing and other structures. Wildlife & Tree Management improving wildlife habitat,
Pasture Irrigation—pasture plant requirements,
Large Animals—health, nutrition, waste and fly management and hoof care.
Got Manure—livestock waste management
Two New Short Courses

Design and Analysis of Mark-Recap/Resight Studies

This introductory-level workshop will introduce participants to fundamentals of:
- likelihood theory and parameter estimation (e.g., survival rate, pop. size),
- model selection with Akaike's Information Criterion (AIC),
- essential elements in mark-resight experimental design, and
- analysis of mark-resight data using Program MARK
- a special discussion on analyses of PIT tagging data.
Western Center for Assessment and Monitoring of Freshwater Ecosystems

In 2003 the College of Natural Resources received funding from the US Environmental Protection Agency to establish the Western Center for Assessment and Monitoring of Freshwater Ecosystems. Dr. Charles Hawkins was named director of the Center whose primary mission is to facilitate the development and implementation of scientifically defensible methods for monitoring and assessing the condition of aquatic resources in the western United States. These activities provide federal, state, tribal, and local land and water management agencies a means to meet the monitoring and assessment objectives required by the Clean Water Act. This Center also provides a means for facilitating communication and collaboration between tribal, state, and federal agencies, and serves as a repository and clearing house for data and information related to aquatic monitoring.

National Aquatic Monitoring Center a.k.a “The Bug Lab”

The National Aquatic Monitoring Center is a cooperative venture between Utah State University and the U.S. Bureau of Land Management. Our purpose is to encourage and foster scientifically sound watershed monitoring programs on public lands. Our goals are to increase the consistency and quality of aquatic resource assessments and provide clear, accurate, and timely information to resource managers and the public. The focus at our laboratory is the processing of aquatic invertebrate samples for government agencies and non governmental organizations.

http://www.usu.edu/buglab/

Kokopelli, our Bug Lab Mascot!

Sampling in Marshlands.

Gathering samples using a kicknet.

Ms. Mamie Jennings of the BugLab was student teaching in the Las Vegas area. She collected aquatic invertebrates from 7 locations in June and July within the Red Rock National Conservation Area (RRCNCA).
Utah Cooperative Research Unit

The Cooperative Research Units Program is a unique collaborative relationship between States, Universities, the Federal government and a non-profit organization. The 39 units in the program are jointly supported by: US Geological Survey, Host Universities, State Natural Resource Agencies, Wildlife Management Institute, and the US Fish and Wildlife Service.

Phaedra Budy, Assistant Unit Leader in Fisheries conducts research in fisheries conservation, population assessment, and trophic dynamics of aquatic systems. Phaedra and her students have active research projects in both lakes and stream ecosystems in Utah and the Pacific Northwest.

http://www.usu.edu/awer/pages/faculty/Budy/Budy.htm

Fish and Aquatic Ecology Unit

The mission of the Forest Service Fish and Aquatic Ecology Unit is to identify emerging aquatic resource issues, develop technology to help address these issues, and transfer this technology to field biologists.

Vision: The Fish and Aquatic Ecology Unit will provide scientifically sound, cost-effective technologies to aquatic resource specialists in support of the conservation and restoration of aquatic communities on Forest Service land.

The Fish and Aquatic Ecology Unit works with federal and state research organizations and universities to develop technology to address emerging resource issues. Once this technology is developed we disseminate this technology to aquatic resource specialists through, continuing education workshops, presentations, publications, and on-site visits.

http://www.fs.fed.us/biology/fishecology/index.html
Students at Work

Joel Moore, measuring stream discharge in a Sawtooth Mountain stream.

Eric Archer, collecting water boatmen from Farmington Bay.

Nate Brindza crossing the outflow of Yellow Belly Lake in the Sawtooth Mountains of Idaho.

Sampling with nets

Tagging fish

River surveying

Joel Moore, measuring stream discharge in a Sawtooth Mountain stream.
Graduation Push Off!

HEADING DOWNSTREAM: College of Natural Resources Graduation 2004
John C. Schmidt

I am honored at the invitation to talk with you today about this moment that we share: students in celebration; parents, family, and faculty in pride and relief. I remember my doctoral graduation ceremony clearly: I was on a research expedition on the Snake River in Hells Canyon. At our evening camp, my friends and colleagues had me wear someone’s purple poncho and walk solemnly the length of the sand bar as they hummed the same graduation march we heard today. I walked, balancing a Gott cooler lid on my head, tassel of toilet paper hanging appropriately to the side. When I reached my friends, they asked me some closing questions -- “Where does the white in snow go when it melts?” -- and when I passed the test, I was presented with a diploma – a flour tortilla: practical, we were having burritos for dinner. In my minutes here, I want to express some of my feelings and thoughts about these moments of joy, celebration, and anticipation of what lies ahead. These come from my own experience of life on the river.

“To-night we camp on the left bank … How beautiful the sky … The river rolls by us in silent majesty; the quiet of the camp is sweet; our joy is almost ecstasy. We sit till long after midnight talking …”

Just as John Wesley Powell and his men sat and marveled at the spectacle that surrounded them, river runners still enjoy the riverside camp. Evenings by the side of the river, surrounded by beauty and the camaraderie of friends are amongst the best moments of life. The river does roll by, the cliffs overhead bask in evening’s warm colored light, swallows catch insects in the air, and the canyon wren sings. One has a chance to accept the world for just what it is at that moment. The evening camp is a time to reflect on the adventure and joys upstream and celebrate the moment that is.

Today, we sit together and celebrate the journey and accomplishments that brought us here – the magic and wonder of birth; the fun, toil, satisfaction, and love of raising a child, and of being raised, the mistakes survived at both ends of that relationship; going to college; succeeding and graduating; sitting on stage with big smiles on our faces. And the next morning, every river group turns its attention downstream to what is ahead:

“We are now ready to start on our way down the Great Unknown … We have an unknown distance yet to run, an unknown river to explore … With some eagerness and some anxiety and some misgiving we enter the canyon below …”

John Wesley Powell wrote these words about his, and his crew’s, feelings as they loaded their boats and pushed downstream from the mouth of the Little Colorado River on August 13, 1869. They had been training for two and a half months, preparing for this moment. Here they were at the beginning of the Grand Canyon, their preparations, planning, and on-the-job-learned rowing skills had gotten them this far. Whether apprehensive or excited, they had no choice but to push back into the current.

Here we find ourselves today at the brink of our own Great Unknown. We have trained as best we could. We could have worked harder, trained longer, had better teachers, but, whatever the case, here we are. And however long we stand and stare at the rapids ahead, no matter how difficult the run appears, no matter how apprehensive, soon we will jump into our boats, push from shore, and go. Once we do push off and enter the rapid, we will be living and reacting to the moment and its unanticipated waves and currents.

No matter how well the preparation, accept with humility the mistakes and bad breaks that are also ahead. There are just two kinds of boatmen – those who have flipped and those who haven’t flipped yet. There may be flips ahead for you. If one happens, you’ll find yourself out of the boat, swept by the raw power of the current, of control -- accept the force of the water and try to relax, work with the current, move toward your boat and grab it side, climb back on, get the boat to shore, flip the boat right side up, clean up, smile, and gracefully push back into the current. That night at camp, if you’re lucky, you’ll embrace the beauty of the moment, the luck of being alive, the preciousness of the journey. You’ll also be more understanding and helpful to others who have experienced the same.

“I want my tale, like our river, to go on to the sea and rise with the sea in mighty clouds, to ride the west winds back to the source in the Rockies once again, over and over again.”

Edward Abbey, a great writer of the Colorado Plateau, wrote those words at the end of one Grand Canyon river trip. He wondered, “How did it go by so fast?” The hydrological cycle ensures that the river never stops flowing, but our journey is only one trip. So, enjoy every evening camp, every day’s adventure, the beauty of the world, the love of family, the support of friends. Live a life of meaning. Follow your passion and dream. Smile through it all.

Today is our day to celebrate and remember what we’ve passed upstream. We’re in camp. Let’s have a great time and marvel in the moment. Tomorrow morning, we’re going to load the boats, push back into the current, and head downstream.
Think
AWER!

Utah State
UNIVERSITY