Newsletter LRES

College of Agriculture

Fall 2013

A Note from Our Department Head

Please enjoy learning about LRES' many activities as you peruse this fall's newsletter which highlights some of the department's many contributions across our research, teaching, and service pursuits. My best regards to LRES faculty, staff, students, and supporters for a restful break spent with family and friends. Stay warm! *~Tracy Sterling, Professor & Department Head*

New Faculty Member

Please welcome Dr. Rob Payn, our new Assistant Professor of Hydrology

I was born and raised a farm boy in rural northeastern Ohio, and was the prototypical band and academic geek through high school and into college. I received my bachelor's degree in electrical engineering at The Ohio State University, after which I worked for 7 years in Ohio as a computer network engineer. During that time, I started cave exploration as a hobby. The folks I caved with were predominantly scientists or developing scientists. After finding myself spending vacations helping with their environmental research, I realized that perhaps I had another calling in the natural sciences. In 2001, I left Ohio to live elsewhere for the first time, and got a Master's degree in Biology at Virginia Tech, specializing in stream ecology. I continued to an interdepartmental Hydrology PhD program at the Colorado School of Mines, receiving my degree in 2009. I have since been working in Geoff Poole's fluvial landscape lab as a postdoctoral researcher in freshwater hydrology and ecology, before starting my new faculty position in August.

The goal of my research is to understand how water storage and movement in the environment is linked to ecosystem structure and function. The controls of fresh water quality and quantity are inextricably linked to understanding the ecosystem processes with which water comes into contact. My interests generally lie in developing research projects that will promote a joint hierarchical reference frame for hydrological and ecological hypothesis testing. The next few decades promise many challenges to effective environmental management, and tools that will help us integrate scientific understanding across disciplines and scales will be crucial to informed decisions.

I will be teaching 2 courses every fall, starting in 2014. ENSC 444 (Watershed Hydrology) is primarily an introduction to the mechanistic theory behind processes that store and move water from precipitation to a receiving water body. The course will include study of the ecological consequences of this water movement. I will also be developing a field-based graduate-level course for the fall of 2014. While details are yet to be determined, the course will likely pivot around the theme of environmental monitoring. I will likely aim the course at immersing incoming graduate students into the computer and electrical engineering concepts necessary to successfully collect, QA/QC, manage, and analyze continuous field data. I welcome discussions with any faculty or students as to what details will make this course more valuable and attractive to a broad range of students. *~Rob Payn*

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MONTANA STATE UNIVERSITY

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LRES Recognition

John Dore, Associate Research Professor, received the 2012 Editors' Citation for Excellence in Refereeing from the American Geophysical Union (AGU). This recognition is annually bestowed upon individuals who are to be "commended for consistently providing constructive and thoughtful reviews" for the AGU journals. Dore was cited by Editor Peter Strutton for his service to the journal Geophysical Research Letters.

Marcel Huijser, LRES Affiliate Faculty, was featured in an Associated press article discussing how his wildlife crossing research is showing how wildlife highway underpasses are improving wildlife habitat connectivity and decreasing motorists collisions with wildlife. This research is conducted by WTI and CSKT (Confederated Salish and Kootenai Tribes) in an equal partnership, and is funded by Montana Department of Transportation (MDOT) and Federal Highway Administration. More information about the project and outreach on MDOT and People's Way Partnership.

John Priscu, Professor, hosted the 5th international meeting of Polar and Alpine Microbiology last month, which included more than 150 scientists from countries all over the world. **John Priscu** was interviewed for an article in Nature and for NPR discussing the consequences of the government shut down on Antarctic research.

Tracy Sterling, Dept Head, and **Bob Peterson,** Professor, won an Award for Excellence presented by the Western Extension & Research Directors for their work on a multi-state research project entitled: *W-2045: Agrochemical Impacts on Human and Environmental Health: Mechanisms and Mitigation.*

Sam Carlson, Mike Bestwick, Sam Dougherty, and Adam Sigler (All LRES students) worked as a team and won the 24hours of Flathead mountain bike race near Kalispell. **Sam Dougherty** and **Adam Sigler** also came in first and second place in the American Water Resources Association Fun Run after the 2013 MT Section AWRA Conference

Heidi Clark, Grad Student, and **Duncan Patten,** Director of the Water Center, had their research working with repeat photography of rivers of the Greater Yellowstone featured in the September/October Montana Water Newsletter.

Lisa Lone Fight was recognized for her excellent work, active participation, and contribution to the 2013 Edition of the Radical Innovation Summit a NSF funded event held at the Organization of American States headquarters in Washington D.C. **Lisa** was also selected to be one of 35 national participants in the National Science Foundation's (NSF) "Radical Innovation Summit to Advance STEM Education", held in Washington D.C. and was also named as member of the NSF supported Society of STEM Women of Color Research Review Board.

Christina Herron-Sweet and **Krista Ehlert** were each recipients of the Montana Weed Control Associations scholarship for 2013. They each received $1000.

Tristy Vick-Majors travelled to her hometown in the Colorado Springs area in October to speak to middle schoolers at their Science Fair where the local newspaper, The Gazette, did a feature article about Tristy and her work.

Shavonn Whiten won best oral presentation in the session on Infectious Diseases-Parasites and Vectors as part of the Third Biennial Western Regional IDeA Conference (INBRE) in Honolulu, Hawaii. Shavonn's presentation was entitled, "Increasing Ambient Temperature and Susceptibility of the Mosquito Aedes aegypti to the Insecticide Permethrin: What's Global Warming Got to Do with it?"

LRES students (left to right) Sam Dougherty, Adam Sigler, Mike Bestwick and Sam Carlson are pictured above just after completing the 24hrs of Flathead mountain bike race near Kalispell in August. Team ketoacidosis brought home the win by tallying 28 laps in the 24 hour relay. Twenty eight laps on the eight mile course meant a cumulative of over 220 miles and ~30,000 vertical feet ridden by the team. While Carlson is a veteran 24 hour racer (obvious from his cool demeanor and stylish hat), it was a completely new experience for the rest of the team. Great times! *~Adam Sigler*

Ag Appreciation Event

Ellie, Paul, and Zach walk an interested attendee through a robot test--the same test we use with soils.

As part of campus "Celebrate Ag" activities Friday, October 25, Tony Hartshorn's lab represented the Department. Four undergraduates (Ellie Zignego, Tyler Nyman, Zachary Eddy, and Paul Rychener) ran the booth with two soil-centric, interactive displays.

The first provided attendees with a customized introduction to their backyard soils via the SoilWeb interface (explore your own backyard soil here). This map-based tool provides a simple interface to Natural Resources Conservation Service soil maps, as well as a behind-the-scenes snapshot of soil physical and chemical properties.

The second display constituted free "robot testing" via measurement of the concentrations of carbon dioxide and water vapor in exhaled breath. This testing relies on the Department's Licor 8100A gas analyzer. Fortuitously for attendees, the fundamental equation detailing the transformation of carbohydrates as glucose or $(CH_2O)_6$ into CO_2 and H_2O by soil microorganisms and roots also governs the greenhouse gases non-robot attendees exhaled at this Celebrate Ag event. Not a single robot was encountered!

Students also reviewed ongoing lab projects with attendees, from building an inorganic and organic carbon inventory for the Weirda wheat farm off Camp Creek, to teasing apart the relative influences of climate and parent material (typically the underlying rock) on soil properties, to undergraduate-designed and -executed tests of the efficacy of Bokashi composting amendments with pre-consumer, campus food waste.

We look forward to future Celebrate Ag events! *~ Tony Hartshorn*

GSO Activity

LRES graduate student, Sean McKenzie, helps out by staining a pavilion.

Friday LRES Socials

The LRES socials are still being held the second Friday of every month! Please be on the lookout for email invitations that will go out the week of the social. These emails will also provide further details about where and what time the social is going to happen. All LRES students, faculty, and staff are encouraged to attend. See you soon!

Group of LRES grads gather to volunteer on National Public Lands Day.

LRES Trailwork Day

The GSO organized a volunteer day in coordination with the Gallatin Valley Land Trust, Montana Conservation Corps, and REI this fall on National Public Lands Day! A variety of volunteer projects were organized at Gallatin Regional Park, where the GSO was assigned to sanding and staining picnic tables, pavilions, playgrounds and bridges. It was a fun morning with fellow graduate students (and Dr. Jane Mangold!) helping to maintain one of Bozeman's parks. The GSO is hoping to plan another volunteer day this winter, so keep your eyes and ears open for more information. *~ Hally Strevey*

Cheatgrass, Fire, and Climate Change

A Research Summary by Erik Lehnhoff, Jia Hu (Ecology), Lisa Rew, and Tim Seipel

We are investigating the role of fire and fire breaks on the spread of cheatgrass (*Bromus tectorum*) and impacts on Montana rangeland plant communities. In this project funded by the Montana Noxious Weed Trust Fund and the World Wildlife Fund, we are working on fire sites on BLM land in the Tobacco Root Mountains, the MSU Red Bluff Research Ranch, and the American Prairie Reserve in south Phillips County. We are sampling burned and adjacent unburned areas, as well as fire breaks where present, and research includes assessing water use efficiency at the indvidual plant level, changes to soil fertility, and alterations to plant community composition. *~Erik Lehnhoff*

Dr. Tim Seipel and Jeff Patriarche (undergraduate student and LRES IT guru) establishing sampling plots at the MSU Red Bluff Research Ranch.

Outreach Activity

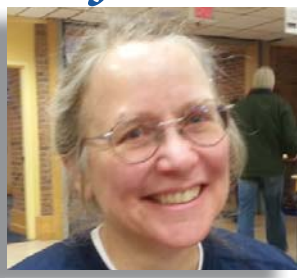
LRES Graduate Student Hosts Three Insect Workshops for Young Students

In addition to conducting research as part of her Master's Thesis, Shavonn Whiten, a graduate student with Dr. Bob Peterson, conducted three science-based outreach activities with local youth. On May 28, 2013, Shavonn hosted an outreach activity with the Bozeman Senior Center Pre-School. She presented a workshop where she discussed and explained the key characteristics of insects, and provided a visual demonstration using live examples of the mosquito life cycle. She concluded her workshop by assisting the pre-schoolers in making mosquito masks. On June 5, 2013, Shavonn hosted an outreach activity with third graders at Longfellow Elementary School in the Bozeman area. There she shared live examples of the mosquito life cycle and gave a presentation about the key characteristics of insects. On June 18, 2013, Shavonn hosted, Insects All Around Us, an activity with the 2013 MSU Peaks and Potentials Summer Camp participants. She shared live examples of the mosquito life cycle, explained the key characteristics of insects, assisted the students with sweep netting insects, and assisted them with identification of their collected insects. For each of these outreach activities, Shavonn was assisted by Hannah Bares, an intern in the Peterson lab summer 2013.

Shavvon (top left) with EPSCoR MSU Peaks and Potentials Summer Camp Participants.

Shavonn credits her interest in the sciences to childhood experiences that were afforded to her in her hometown of Baton Rouge, Louisiana and feels it is imperative that she introduces children to the WONDER-FULL-NESS of science and motivates them to become interested in the daily scientific beauty and wonders of nature that surrounds them.
~Shavonn Whiten

Professional Spotlight:



I am a Research Associate for Dr. Rick Engel, I organize and maintain the soil nutrient cycling research lab. I really enjoy tiny details involved with research. Currently Rick is working to assess the volatilization of ammonia from urea fertilization for wheat production in Montana's cropland. A secondary research project assesses the ability of different cropping systems in the Golden Triangle to sequester Carbon in the soil; Dr. Perry Miller is also involved with this project. I enjoy working for Rick, through him I've worked with some fantastic undergraduate, graduate students, and other scientists.

In some ways I am simply a mechanic working to maintain various instruments for soil analyses. For total Carbon and Nitrogen we have a Leco TruSpec CN - this instrument combusts samples at a very high temperature and gases are analyzed for Carbon and Nitrogen. Leco requires lots of maintenance, but is designed for easy repair and upkeep. Nitrate, ammonium and urea from soil extracts are analyzed on the Lachat autoanalyzer located in the EAL, a fabulous instrument when it is working correctly. For greenhouse gases, we have a gas chromatograph that is designed to measure CO_2, N_2O and CH_4. We are using it to measure CO_2 from microbial biomass in soils. If someone works with me long enough they will be trained on these instruments as well, I always tell them "they'll never be out of work if they can operate a Lachat or Leco."

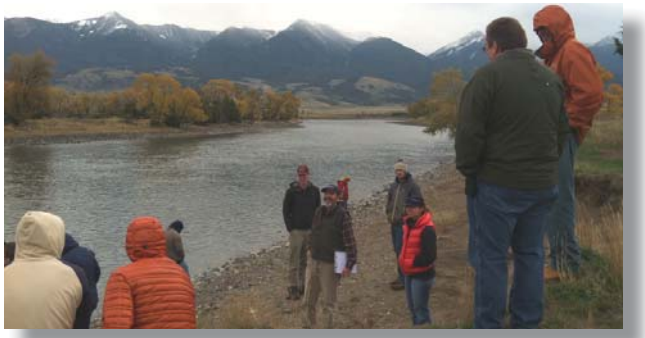
After high school I went to college on a 'whim' and found that I enjoyed Botany and took every plant class that I could at UW-Green Bay. It was a great opportunity for me as I worked with some great faculty and other students. I worked in the Herbarium there and collected plants for their collection, hand-writing many labels for plants in the collection. After college I joined the Peace Corps and was asked to work for the National Bank of Costa Rica with their rural farm loan program. I worked with corn and bean farmers in the central mountain region near San Jose. It was very different to live outside of the US and to live in the tropics. Farmers I worked with were mostly subsistence farmers, growing enough food to support themselves and their families. Just like here, when rainfall is sufficient, crops are good.

I moved to Bozeman in 1988 to do a Masters in Land Rehabilitation and this is when I realized that I really enjoyed research and the tiny little details needed to get good data. After finishing my degree I worked with Dr. Bret Olson in the Animal and Range Sciences department researching grazing animals effects on rangeland weeds and native grasses. I also spent lots of time observing cows grazing rangeland during winter.

My husband, Mike Carignan, is a track coach here at MSU and I like helping out at track meets and other athletic events. By the USATF official certification process, I am a certified track official. When I am not helping out with throwing events, I am at the timing table running the FinishLynx finish line cameras and software. This is a real treat, I enjoy watching athletes compete and getting times from the races is great. I've found that track officials are one big family, amazing people from all over Montana who come to officiate track meets. *~Rosie Wallander*

ENCS444 Yellowstone River Field Trip

The Paradise Valley is a natural choice for a field trip that connects basic hydrologic concepts with the physical features of a specific landscape. The valley is clearly defined topographically and has excellent long-term river discharge records at its upstream and downstream ends, allowing exploration of the valley's seasonal water budget. Unobstructed views of the valley make it easy to relate hydrology and stream dynamics to the geologic and geomorphic setting. In the valley bottom, glacial moraines and outwash set the stage for modern river migration, riparian habitat dynamics, groundwater exchange between the river and its floodplain, and the flow of spring creeks. On valley sides, seepage from streams flowing across alluvial fans generates waves of groundwater flow that follow

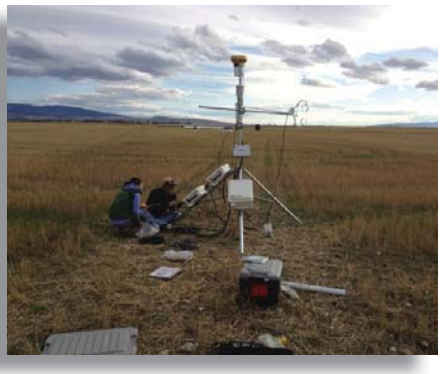


spring runoff. The same seepage losses interact with irrigation diversion to control instream flows and constrain fish habitat restoration. Historic battles over proposals to dam the Yellowstone and recent controversies about bank stabilization raise important questions about links between hydrology and policy. Sadly, closure of Yellowstone National Park by the federal government shutdown blocked us from visiting headwaters streams that illustrate important aspects of snow hydrology, lake storage, and interactions between hydrology, predators, and riparian vegetation. These examples can be highlighted in lectures and assignments, but students really appreciate seeing them in the field. *~ Paul Hook*

Senator Tester Visits Honors Climate Change Seminar Course Taught by Three LRES Faculty

This honors climate change seminar brought together 3 LRES faculty (Scott Powell, Paul Stoy, and Tony Hartshorn) as well as environmental journalist Douglas Fischer (dailyclimate.org). Although originally intended as a Great Expeditions proposal to the upcoming United Nations "climate summit" in Warsaw, Poland, the course was repackaged and kept on campus this Fall. In addition to U.S. Senator Jon Tester, a few past guest speakers have included Ph.D. candidate Bill Kleindl (UM); Scott Barndt (US Forest Service, Climate Change Coordinator for the Gallatin and Custer National Forests); Dr. Jordy Hendrikx (MSU Earth Sciences); Dr. Molly Cross (Wildlife Conservation Society); Dr. Ray Rasker (Headwaters Economics); Dr. Spangler (Chemistry), Dr. Shanahan (Political Science). *~Tony Hartshorn*

On Friday, 25 October, 2013, U.S. Senator Jon Tester visited with the students of an honors undergraduate seminar, "Climate change: where science and policy diverge" co-instructed by three LRES faculty and Douglas Fischer, the Bozeman-based editor of The Daily Climate. Pictured from left to right: James Mauch (Geology), Sen. Tester, Calder Thingvold (History).



Judith Basin Nitrogen Project

LRES graduate student Liza Harris and visiting scholar Lin Hua from the Xishuangbanna Tropical Botanical Garden, China, install an eddy covariance tower in the Judith Basin to measure carbon dioxide and water flux between the surface and the atmosphere in a wheat crop rotation. The measurements will also contribute to the goals of the Judith Basin Nitrogen Project (lead PI: Stephanie Ewing) by contributing to an improved understanding of the water balance of the Judith Basin.

~Paul Stoy

Capstone Course

The 2013 Capstone Course focused on global water issues this semester, and students researched and put together papers and presentations on water scarcity, ways to increase efficiency in agricultural, urban, and domestic spheres, the process of desalinization for producing drinking water, and wastewater reuse for irrigation and non-potable needs. Students presented their work on campus in seminar format and as a guest lecture in our freshman introductory class, and at the public library in a talk open to the public. In addition to touring the wastewater treatment plant, we invited guest speakers to talk about the interface between science and regulation for Montana water use. Pictured below is Kathleen Williams, HD65 State Legislator and a water professional, Brent Esplin, from the U.S. Bureau of Reclamation, and John Metesh, from the Montana Bureau of Mines and Geology. They spoke to the class about the challenges of retrofitting aging infrastructure to accommodate fisheries, about the groundwater/surface water interface in terms of the exempt well impacts on water rights of irrigators, and water issues that the state legislature contends with. *~Cathy Zabinski*

(above) Professor Zabinski (purple) and students listen & take notes during John Metesh's presentation. *(below)* Brent Esplin gives his presentation to the capstone class.

Extension Pest Management Tour

Members of the LRES faculty participated in the annual Extension Pest Management Tour on October 7 through October 9. The Pest Management Tour provides education for private pesticide applicators in multiple counties in a specified region of Montana. This fall the tour covered northwestern Montana and included Lake, Flathead, Sanders, Mineral, Missoula, and Ravalli Counties as well as the Blackfeet Reservation. Jane Mangold, Fabian Menalled, and Zach Miller provided presentations on cheatgrass management, revegetation of weed-infested rangeland, and techniques to minimize injury to non-target vegetation while managing noxious weeds. Approximately 150 people attended the presentations. The Extension Pest Management Tour is organized by Cecil Tharp, Extension Pesticide Education Specialist, from the Department of Animal and Range Sciences. Mary Burrows and Kevin Wanner from the Department of Plant Sciences and Plant Pathology were also speakers on the tour. *~Jane Mangold*

Dr. Zach Miller visits with the audience in Ronan, MT, about cheatgrass management.

Climate Change and Impacts in Montana

A Workshop to Engage MSU Extension in the Development and Delivery of a Science-Based Program to Help Montana Citizens

MSU Extension Agents and Specialists face numerous issues regarding the environment, the economy, and the well being of the audience they serve. Among them is Montana's vulnerability to water shortages, extreme weather events, and increased fire frequency and pest outbreaks. Climate variability and its impact are at the core of these issues and, while scientists overwhelmingly endorse the evidences of global climate change, there is still a debate among Montana's citizens on the extent and impact of this problem. This lack of communication between scientist and the general audience is one of the biggest roadblocks to address the issue of climate change predictions and impacts. In October, a group of Extension specialists from different Departments and Colleges organized a two hour workshop where more than 150 Extension Agents and Specialists, faculty, and students brainstormed with climate change scientists, producers, and the Montana Director of Agriculture approaches to develop and deliver a science-based extension program addressing the needs of our citizens regarding climate change and impacts. Invited speakers included Mr. Ron De Yong, Director of the Montana Department of Agriculture; Dr. Bruce Maxwell, LRES; Dr. Luther Talbert, PSPP; Mr. Jeff Hockett, Agricultural producer near Havre; and Dr. Kelsey Jencso, Montana State Climatologist.
~Fabian Menalled

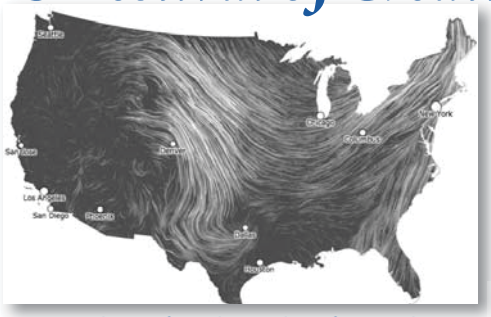
LRES Research at Tenderfoot Creek Experimental Forest

This fall, MSU researchers wrapped up a second successful field season at the Tenderfoot Creek Experimental Forest (TCEF) in the Little Belt Mountains of central Montana. LRES faculty members Tim McDermott, Ryan Jones and John Dore, along with LRES undergraduate student Keenan Brame, repeatedly sampled soil DNA and trace gases across two watersheds from prior to snowmelt in early June until the end of the productive growing season in September. Their research is illuminating the relationships between the environment, soil microbial communities and the production and consumption of methane and other greenhouse gases. The MSU contingent is working synergistically with faculty and students from six other universities across the country, adding a microbiological component to ongoing hydrological and biogeochemical research at TCEF. Their work is supported by the National Science Foundation's EPSCoR program through the Montana Institute on Ecosystems (IoE). Their preliminary results, demonstrating spatial organization of methane-cycling microbes along environmental gradients, were highlighted in August at the IoE's Annual Science Summit in Helena.

~John Dore

(clockwise from top left) Tim McDermott, Ryan Jones, John Dore, and Keenan Brame.

2013 EYEO Festival of Creative Coding Experience



Wind map from http://hint.fm/wind/

Data visualization– the visual representation of information – is a common practice for scientists in the form of plots and graphs. Current open-source software developments have increased the tools available for creating graphics that go beyond the standard graph and increase public access to science by creating engaging stories with data. Data visualization can take many forms, from static graphics that you might see in Newsweek or National Geographic, to interactive plots like those used by Hans Rosling in his remarkable TED talk. One of my favorites is an elegant, dynamic, real-time plot of wind patterns across the United States, developed by Fernanda Viegas and Martin Wattenberg. In June I had the opportunity to attend the 2013 Eyeo Festival of Creative Coding in Minneapolis, MN. The annual Eyeo Festival is a conference highlighting the most innovative techniques in programming, design and communication. Though much of the work presented at Eyeo was related to social sciences, there is growing recognition across fields that data visualization can be an effective way to engage a wide audience. Through the duration of the conference there were abundant opportunities for cross-pollination across disciplines and I came away with numerous ideas for future projects and new tools for presenting my own research. *~Karin Neff*

ENSC 110

Undeterred by the first snow fall, Dr. Hartshorn provides ENSC110 students with hands-on experience evaluating soil texture and color.

Students co-enrolled in Dr. Hartshorn's ENSC245 Soils course served as "deputy TAs" to help facilitate this hands-on soil introduction behind the Plant Growth Center.

LRES Grants 2012-2013

New grants awarded from November 2012 through November 2013

These funds fuel our research and teaching mission—to discover new knowledge, to engage and train students using laboratory and field studies across local to global scales, and to enrich the lives of Montanans. Please take a minute to congratulate our faculty and staff on their meaningful work and impressive accomplishments.

Agency & PI	*Title*

Montana Grants

Montana Department of Agriculture

O'Neill	Alfalfa Leafcutting Bee Research and Outreach

Montana Department of Environmental Quality

Sigler, Kaylor	Volunteer Monitoring - Addressing Shared Statewide Goals

Montana Noxious Weed Trust Fund

Galli-Noble	Update and Expand the Mapping Noxious Weeds in Montana Publication, and Conduct MRWC-EDDMapS Trainings
Lehnhoff, Rew	Assessing the influence of fire and grazing on cheatgrass spread and plant community composition
Littlefield	Common Tansy & Ox-Eye Daisy Biological Control
Littlefield	Russian Knapweed Biological Control
Littlefield	Invasive hawkweed biological control
Littlefield	Whitetop Biological Control
Mangold	Montana Noxious Weed Education Campaign
Mangold	Memorize, Recognize, Prioritize Noxious Weed Education Project
Mangold	Predicting plant community response to weed control: When is revegetation necessary?
Mangold	Tall Buttercup Ecology and Integrated Management: Phase 2
Weaver	Identifying and Testing Candidate Agents for Biocontrol of Russian Olive: Limiting Target Plant Reproduction
Weaver	Determining the Efficacy of Biocontrol using Mecinus janthinus. Strains on Dalmatian, Yellow and Hybrid Toadflax

Montana Wheat & Barley Committee

Ewing, Brookshire	Soil Analysis: Purchase of a new Lachat Quickchem flow injection analysis system
Hartshorn, Engel, Miller	Rapid assessment of soil carbon turnover times associated with alternative cropping strategies for dryland wheat: A proposal to upgrade an existing gas analyzer
Menalled, Davis	Control of glyphosate resistant kochia in fallow with soil active herbicides
Miller, C. Jones	Legacy effects of long-term diversified cropping systems
Stoy, Ewing, Sigler	Carbon and water exchange in fallow versus wheat or cover crops: Are there any carbon and water benefits to fallow?
Stoy	Water use and carbon sequestration in MT wheat fields: Connecting tower and satellite measurements to under stand field-to-statewide dynamics
Weaver	Expanded Implementation of Wheat Stem Sawfly IPM
Weaver, Bixenmann, Miller	Integrating Multiple Agronomic Tactics for Suppression of Severe Wheat Stem Sawfly Infestations: Field Scale Grower Implementation
Weaver	Orange Wheat Blossom Midge Management
Weaver	Parasitoids of the wheat stem sawfly: augmentation, impact and education

Private, University, and Other Grants

Algoma University

Galli-Noble	Service Support for Building a NAISN Web Presence

Koch Agronomic Services

Engel, C. Jones	Effect of Agrotain? Nitrogen stabilizer on NH3 volatilization, N recovery, yield, and protein response of dryland winter wheat to urea applied during cold weather months

American Indian Science

Foreman	Informal Science Geoscience Community Field Workshop to Enhance Native American Interest and Recruitment into STEM Programs

Wildlife Conservation Society

Ewing, Brookshire	The role of soils in ecosystem resiliency with bison reintroduction

Fort Belknap Indian Community

Galli-Noble	Developing a Noxious Weed Management Plan for the Fort Belknap Indian Community

Private, University, and Other Grants (continued)

Western Integrated Pest Management

Mangold	Integrating Bio-Control Insects and Cattle Grazing to Suppress Spotted Knapweed

World Wildlife Fund

Rew, Seipel	Research on the interactions of bison grazing and fire on the American Prairie Reserve, south Phillips County, Montana

Wyoming Department of Agriculture

Galli-Noble	Missouri River Watershed Coalition Program Coordination (2013)

Federal Grants

National Aeronautics and Space Administration

Lawrence	Feasibility Study: Classification of Whitebark Pine and Spruce-fir Forests to Improve Wildland Fire Decision Support Tools in the USFS Northern Region

National Parks Service

Sigler	Water resource monitoring - Bighorn Canyon NRA

National Science Foundation

Dore	HOT Program Carbon and Data Quality, University of Hawaii at Manoa
McDermott, Dore	Institute on Ecosystems - Focus Lead Year II - McDermott
Poole	COLLABORATIVE RESEARCH: Leaky Rivers: Nutrient Retention and Productivity in Rocky Mountain Streams Under Alternate Stable States
Poole, Marshall	Institute on Ecosystems - Focus Lead Year II - Poole
Priscu	ARRA WISSARD Borehole Access, Northern Illinois University
Priscu	ARRA WISSARD Borehole Access, Pennsylvania State University
Priscu	ARRA Collaborative Research: GeomicroBiology of Antarctic Subglacial Environments Beneath the Mercer and Whillans Ice Streams, Louisiana State University
Priscu	Collaborative Research: Developing New Science and Technology for Subglacial Studies of the Whillans Ice Plain and West Antarctic Ice Sheet
Priscu	EAGER: Collaborative Research: Habitability of Antarctic lakes and detectability of microbial life in icy environments by autonomous year-round instrumentation
Stoy	Collaborative Research: Building forest management into Earth system modeling: Scaling from stand to continent

US Animal and Plant Health Inspection Service

Littlefield	Biological Control of Orange Hawkweed
Littlefield	Biological Control Agents of Russian Knapweed: Conservation, Redistribution and Monitoring of Agents
Weaver	Collection of a Yellow Toadflax Specific Strain of the Stem-Mining Weevil, Mecinus janthinus Germar for Redistribution

US Department of Energy

Priscu	Request for participant support costs for the 5th International Conference on Polar and Alpine Microbiology: Big Sky, Montana

USDA Forest Service

Galli-Noble	Missouri River Watershed Coalition Program Management 2012-2014
Galli-Noble	Missouri River Watershed Coalition Program Coordination
Lawrence, Savage	Changes in the abundance and configuration of Canada lynx habitat

USDA National Institute of Food and Agriculture

Lawrence	Sustainable Biofuel Feedstocks from Beetle-killed Wood: Bioenergy Alliance Network of the Rockies (BANR)
Mangold, Menalled	Implementing an IPM Program for Montana
Menalled	A predictive model to increase adoption of IPM of a mite-virus disease complex in wheat
Menalled	SARE Professional Developmente Program for Montana
Miller	Solving spring survival for winter canola in Montana
O'Neill	Evaluating native perennial flower strips for enhancing native bees and pollination services on farmlands
Weaver	New Genes for Resistance to the Wheat Sawfly

LRES 2013-2014 Scholarship Awards

Clyde & Helen Erskine Excellence in Ag Scholarship
Erik Anderson
Cassie Mosdal
Dionne Zoanni

MSU College of Ag Scholarship
Laura Bosacker
Stephanie Kerns
Elizabeth Zignego

Thomas D. Campbell Memorial Scholarship
Dionne Zoanni

Land Resources Stewardship Scholarship
Donabel Bickford
Russell Callahan
Tucker Colvin
Alex Herbert
Jeff Patriarche

Rene Jones Lock Scholarship
Michelle Rockwell

Battle Ridge Ranch Scholarship
Kaylee Schmitz

Frank F. Munshower Scholarship in Land Rehabilitation
Hally Berg
Sean McKenzie

Dr. Arthur H. Post & Margaret Post Scholarship
Erik Anderson

John & Grace Schutter Ag Scholarship
Cassie Mosdal

Marion T. Hedegaard Scholarship
Dionne Zoanni

New LRES Graduate Students

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Ph.D. ESEC
Advisor: Menalled & Burkle

Anna Anderson
M.S. LRES Online
Seeley Lake, MT

David Atkinson
M.S. LRES Online
Grand Junction, CO

Alexa Azure
M.S. LRES Online
Bismarck, ND

Tommy Bass
Ph.D. ESEC
Advisor: Bruce Maxwell

Mike Bestwick
M.S. LRES
Advisor: Engel & Chen

Christopher Brown
Ph.D. ESEC
Advisor: Bob Peterson

Clayton Burns
M.S. LRES Online
Walker, MN

Sam Carlson
M.S. LRES
Advisor: Geoff Poole

Chris Cote
M.S. LRES Online
Helena, MT

Darrell Warren
M.S. LRES Online
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James Dauray
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Liza Harris
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Jeff Holmes
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Harlowton, MT

Stephen Johnson
M.S. LRES
Advisor: Menalled & Miller

Chris Larson
M.S. LRES
Advisor: Lisa Rew

Allison May
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Michael Michno
M.S. LRES Online
Plymouth, MI

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M.S. LRES Online
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Collin Preftakes
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Nar Ranabhat
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Advisor: Fabian Menalled

Deicy Sanchez-Espinoza
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Advisor: Tony Hartshorn

Nicole Smith
M.S. LRES Online
Hartly, DE

Kyla Tucker
M.S. LRES Online
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