

- ▶ NEW FACULTY..... 2
- ▶ NEW EMPLOYEES 3
- ▶ LRES RECOGNITION... 4
- ▶ WEB TIME ENTRY,
LRES GSO,
FACULTY SPOTLIGHT... 5
- ▶ EXPLORATION OF
EARTH'S LAST
FRONTIER..... 6
- ▶ STREAM RESTORATION
ECOLOGY, CAPSTONE
- ▶ STUDENT PAGE 8

Newsletter

LRES



A note from the Department Head

Review of the Faculty Retreat

March 2010 ~ Spring is in the air – or at least it was five minutes ago! Since arriving to Montana State University last August, I have enjoyed experiencing Bozeman’s ever-changing weather, as well as learning about the multiple components that make up the department, college, and university. I sincerely thank faculty, staff, students and stakeholders for being so generous with your time to help me understand and appreciate everyone’s many important roles.

Part of that learning process included preparing for a Faculty retreat held at the B-Bar Ranch in January with the assistance of Drs. Kim Anderson and Rob Williams of the Fanning Institute at the University of Georgia. The data gathered and studied this fall included two surveys filled out by faculty, staff and students; one survey gathered views on our strengths, challenges and opportunities, and the other survey explored the values we hold as a department. In addition to surveys, the facilitators interviewed multiple stakeholders and focus groups of staff and students to discuss strengths, challenges and opportunities for the department.

At the retreat, the facilitators led the group through a two-day agenda where we explored elements of successful organizations, focusing

on four major components – Values, Relationships and Structure, Processes, and Purpose with the goal of charting strategic direction. Several photos are included that highlight several of the activities, including team exercises, discussion sessions, and community building. The comprehensive report was recently shared across the department and will be used to set strategic directions across our research, teaching, extension and service missions.

As you look through this newsletter, I know you will be impressed with the many accomplishments of our faculty, staff and students. To name a few -- we have two new faculty on board, a new Graduate Student Organization, and examples of our innovative approaches to student-center learning.

I continue to be so very honored to work with such a committed, collaborative department made up of so many impressive faculty, staff and students dedicated to charting a path for the future that will meet challenges as opportunities.

Please know my door is always open.

Sincerely, Tracy Sterling



New Faculty

Please welcome the following new LRES Faculty

"Many thanks to the search committee and its chair Brian McGlynn, Interim Head Bruce Maxwell, and Dean Jacobsen for their tireless efforts through this impressive process. The Department should be very proud of accomplishing a cluster hire and attracting such excellent faculty to LRES. I am very much looking forward to working with you all as we chart our next steps."

~ Sincerely, Tracy Sterling

Dr. Jack Brookshire, Biogeochemistry.

My research focuses on biogeochemistry and ecosystem analysis. I am particularly interested in how climate and atmospheric variation interact with local biogeochemical processes to organize the macroscopic properties of ecosystems that, in turn, feedback to influence the atmosphere-climate system. Most broadly, I seek a general understanding of how ecosystems work as complex adaptive systems. I am also interested in how modern human activities are changing ecosystem structure and function at local to global scales via atmospheric pollution, disturbance, and climate change.



Most recently, I come from Princeton University where I conducted post-doctoral work on the nitrogen cycle in tropical rainforests using a combination of field and laboratory analysis and theoretical modeling. Prior to this I received a B.S. and M.S. from Oregon State University and a PhD from Virginia Tech. My dissertation work focused on nutrient cycling in streams and the influence of atmospheric deposition and climate variation on patterns of nitrogen loss from forest watersheds. In addition to nutrient cycling, however, I have also conducted research and maintain active interests in botany, hydrology, disturbance ecology, plant community ecology, and plant-animal interactions.

I am currently very excited about the challenges involved with developing a more unified understanding of how nature works from both biogeochemical and evolutionary views: How are nutrient cycles organized globally? How does the emergence of energy and nutrient flows at the scale of ecosystems feedback on local processes of uptake and metabolism operating at the organismal level and, in turn, act to organize structural and functional properties of ecosystems over vast geographic areas? How are these interactions maintained over time, particularly in the face of modern human activity? My research interests are increasingly focused on understanding how biogeochemical pattern emerges in complex systems from the interplay of environmental variation and *evolved* strategies for dealing with nutrient limitation and other constraints and how these patterns respond to global change. Current research in my laboratory focuses on natural abundance isotope distributions in forests, plant-soil-nutrient interactions, atmospheric deposition in remote regions, small watershed biogeochemistry, and ecosystem modeling.

I look forward to training graduate students in the fields of biogeochemistry and ecosystem analysis and working together to develop new ideas about how ecosystems work. In addition to ongoing projects, I am currently developing ideas for local research in Montana that will both address fundamental research questions as well as critical issues in land/water management in the region. I am broadly interested in teaching undergraduate and graduate courses in ecosystem ecology, biogeochemistry, and global change from an Earth-system perspective. This may include

courses in ecosystem biogeochemistry, isotope analysis, and biogeochemical theory.

Dr. Paul Stoy, Land-Atmosphere Interactions.

"Climate influences vegetation by dictating the physical environment in which plants grow. Vegetation influences climate by exchanging material (like CO₂ and water) and energy (like heat) with the atmosphere.

I study this exchange of mass and energy between the biosphere and the atmosphere using a technique called eddy covariance. The scale at which the eddy covariance system operates is about that of a forest patch or a farmer's field, so I study the photosynthesis, evaporation, and reflectance of something the size of a field or a forest rather than something the size of a leaf, a plant, or Montana, although scaling observations across scales in space and time remains a major interest. The type of research question I might ask would be 'how and why does vegetation change alter photosynthesis, ecosystem respiration, evaporation, transpiration and surface temperature, and what are the consequences for regional and global climate?'

Before coming to Bozeman I worked with the ABACUS (Arctic Biosphere Atmosphere Coupling at Multiple Scales) consortium at the University of Edinburgh. My tasks involved coupling soil-plant-atmosphere-remote sensing measurements with process-based models using data assimilation techniques, in essence fusing measurements and process-based models to improve understanding of arctic ecosystem function. I studied the carbon and water cycles of terrestrial ecosystems for my PhD. research at the Nicholas School of the Environment at Duke University. Specifically, I measured and modeled carbon and water fluxes from three different ecosystems that model SE U.S. Piedmont succession from abandoned agriculture to pine forest to mature hardwood forest ecosystems in the Duke Forest, NC.

I am excited about a number of research challenges related to measuring and modeling carbon, water and energy fluxes, and I would like to keep most of my research focused here in Montana as well as the U.S. Arctic. Notable examples include the effects of large-scale beetle outbreaks on regional carbon cycling and hydrology, and the role of global climate change on observed wide-scale vegetation changes in the Arctic. I am also interested in information theory and regularization approaches for tackling challenges of scale in ecology. Much of my current research is focused on a global eddy covariance dataset called FLUXNET that includes thousands of years of measurements from hundreds of global ecosystems. understanding how each different global vegetation type interacts with the atmosphere and the climate system is something that will keep me and my students and colleagues busy for years.

The types of courses I am interested in developing follow my research interests. At the undergraduate level this may include atmospheric science or a more focused course on Land Atmosphere Interaction that has historically gone by various guises including Micrometeorology, Biophysical Ecology, or Ecological Climatology. An upper level undergraduate/graduate course on contemporary issues in carbon cycle science or global change would also be of interest, as would a course for non-majors on the physical basis of global change from an interdisciplinary perspective."

Dr. Stephanie Ewing, Soil Science, currently with the USGS in Boulder, CO, will arrive in July 2010.



New LRES Employees

Please help to welcome the following new employees.



Dr. Heather Adams, Postdoctoral fellow working with John Priscu

Heather has joined the Priscu Research Group as a postdoctoral research associate focusing on bacteria in methane rich lakes in Northern Alaska. She recently earned her doctorate in the Department of Ecology and Evolutionary Biology at the University of Michigan and has Bachelor degrees in Art History and Biology from UC Santa Barbara. Her research interests include how the effects of climate change, such as increased temperature and methane release, interact with community composition to control aquatic bacterial production and various ecosystem functions. In her free time, she enjoys exploring Bozeman.



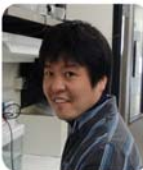
Dr. Noel Palmer, Postdoctoral fellow working with John Priscu

Noel is a new postdoc in the Priscu research group working on the WAIS divide project. He comes to MSU after finishing his Ph.D. in analytical chemistry at the University of Idaho's Chemistry Department. His dissertation was focused on the characterization and study of humic materials, their redox chemistry, and redox transformations of inorganic arsenic mediated by these biopolymers. This research tied together a number of spectroscopic methods including fluorescence spectroscopy, ESR spectroscopy, NMR, and dynamic light scattering methods to study both solid and aqueous humic materials. When not in the lab, Noel enjoys spending time with his family (and 2 kids) on the ski hill, fishing, hiking, or biking.



Rob Edwards, Project Manager working with John Priscu

Starting in Jan, 2010, Rob joined LRES as Project Manager for the Whillans Ice Stream Subglacial Access Research Drilling project. WISSARD is a multidisciplinary research project to probe the unexplored subglacial environment of West Antarctica funded by the Office of Polar Programs at the National Science Foundation. The microbiological and geochemical studies are lead by John Priscu. Rob received his MS in 1986 from the Curriculum in Ecology at the University of North Carolina at Chapel Hill. In addition to Antarctica, he has worked on research projects in locations as diverse as Appalachian piedmont streams, Rocky Mountain watersheds, Canadian boreal forests, and the Gulf of Alaska.



Dr. Yoon-Suk Kang, Postdoctoral fellow working with Tim McDermott

Yoon-Suk is a new post doctorate in the department, joining the McDermott lab in January. Yoon-Suk obtained his Ph.D. in environmental microbiology, Korea University, and his work now focuses on dissecting the signal transduction system that bacteria use in order to detect arsenite in their environment and how this detection system regulates the expression of genes that encode enzymes involved in arsenite oxidation. When not in the lab, Yoon-Suk enjoys reading and playing soccer. He hopes to make more friends and so stop by and say hello. You just might be recruiting a real ringer for your soccer team!



Melissa Graves, Research Associate working with Fabian Menalled & Jane Mangold

Melissa is a Research Associate with Fabian Menalled and Jane Mangold where she also works as a Weeds and IPM Specialist. She identifies plant specimens and provides herbicide application recommendations as the Plant Identification Diagnostician for the Schutter Diagnostic Lab. She is assisting Colorado State University with development of the Lucid Key for small grain weeds which will be accessible through the High Plains IPM (Bugwood Wiki) website. She has a Bachelor of Independent Studies in Natural Science (Botany) and a Master of Science (Agronomy) from Murray State University, Murray, Kentucky and is now pursuing a Ph.D. in Weed Ecology at Montana State University.



Rance Harmon, CIPM Classified employee

Rance became the CIPM's E-Communications Coordinator in mid-January 2010. His duties include managing all aspects of electronic communications for the Center, including serving as the webmaster for the center's website: www.weedcenter.org. Rance completed an M.S. Degree from MSU's Computer Science Department in December and also holds an M.S. Degree in Biology (ecology emphasis). His work experience includes working with landowners and developing Forest Stewardship outreach materials for Penn State's Natural Resources Extension. <http://www.weedcenter.org/about/index.html>



Emily Rindos, CIPM Classified employee

Emily joined the Center for Invasive Plant Management (CIPM) staff at the end of July 2009 as the new Projects and Events Coordinator. In the months since, she has taken over production of CIPM's bimonthly e-newsletter, edited and readied for publication several past grant reports, and helped CIPM staff with numerous other projects. Most recently, she began coordinating the Weeds Across Borders 2010 conference. Emily earned a B.A. Degree in History from the University of Montana in 2009 and lives with her family in the Upper Shields Valley. <http://www.weedcenter.org/about/index.html>

LRES Recognition

A quick snapshot of LRES faculty, Staff and Student awards, recognitions, honors, accomplishments and notices

Department

LRES received three American Society of Agronomy Excellence Awards in November 2009. As follows:

1. Adam Sigler et al., DVD 'yOur Groundwater'
2. Kathrin Olson-Rutz, Clain Jones, and Courtney Dinkins. 'Enhanced Efficiency Fertilizers', Extension bulletin (16 pages and under)
3. Clain Jones and Duane Griffith, 'Economic Nitrogen Rate Calculator for Small Grains', Computer software.

Center for Invasive Plant Management was presented with the Invasive Weeds Awareness Coalition's 2009 special achievement award for outstanding work in promoting education and research in invasive plant management and National Invasive Weed Awareness Week support.

The Spatial Sciences Center/GPS Lab is operating the MSU GPS base station (NGS) nationwide network. This service is being offered to local engineering and survey firms, and by local governments, for survey grade GPS work.

Four LRES faculty were nominated for the 2010 President's Excellence in Teaching Awards: Clain Jones, Bruce Maxwell, Kevin O'Neill, Lisa Rew.

The Sustainable Foods and Bioenergy Systems new B.Sc. degree was featured in the article by Treehugger "10 of the Best College Environmental Programs in the U.S." <http://www.treehugger.com/files/2009/08/10-of-the-best-college-environmental-programs-in-the-us.php>



John Dore was a 2009 Cozzarelli Prize Recipient. Class I (Physical and Mathematical Sciences): "Physical and biogeochemical modulation of ocean acidification in the central North Pacific," by John E. Dore, Roger Lukas, Daniel W. Sadler, Matthew J. Church, and David M. Karl

Link: www.pnas.org/content/106/30/12235



Kevin O'Neill was one of three MSU Faculty to receive the 2010 President's Excellence in Teaching Award which will be presented at MSU honors night in April.

Kevin O'Neill was the recipient of a MSU Alumni Association Faculty 2010 Award for Excellence.



Clain Jones was an invited speaker at the Manitoba Agronomists Conference in December 2009.



Lucy Marshall was awarded \$13,200 to address *Computational paradigms in modeling the impacts of climate variability on watershed yield.*



Brian McGlynn, Kelsey Jencso and Robert Payn were featured in the US Forest Service Pacific Northwest Research Station Annual Science Findings Issue 119. The article is titled "Exploring the hydrologic connections between landscapes and streams."



Geoffrey Poole was awarded \$8,328 for his proposal titled *Assessing hydrologic response to channel reconfiguration: Science to inform the restoration process, Silver Bow Creek, Montana.*



John Priscu was elected a 2010 Fellow of the American Geophysical Union. Only one in a thousand members is elected to Fellowship each year.

John Priscu had essay on Darwin's impact on polar research published. Can be viewed at http://www.nsf.gov/news/special_reports/darwin/.



Bob Peterson was elected "Governing Board Representative" for Section P-IE. This is a 3-year commitment for the Plant-Insect Ecosystems Section, the largest section in the 6,500 member Entomological Society of America.

John Priscu was featured in an article titled "Prof anxious to return to Antarctica for scientific mission" which ran in the Billings Gazette http://billingsgazette.com/news/local/article_fe06da56-e54f-11de-8b9f-001cc4c002e0.html.



Tracy Sterling was named fellow of the Western Society of Weed Science at their 2010 Annual Meeting.

Bob Peterson received the 2009 Award for Excellence in Integrated Pest Management, given by the Entomological Foundation.

Faculty

Student



Melanie Melendrez starts as a postdoctoral fellow of the National Academies of Science National Research Council based at AFRIMS (Armed Forces Research Inst. in Med Science) in Bangkok, Thailand in April.



Alexey Kalinin was accepted and completed 2010's "Communicating Science to the Public". <http://eu.montana.edu/CommSci>.

Alexey Kalinin received the award of 2010 Excellence winner for Montana State University's top seniors. Qualified seniors must have at least a 3.5 grade point average on a 4.0 scale as well as demonstrated campus leadership and community service. <http://www.montana.edu/cpa/news/nwview.php?article=8085>



Kelsey Jencso was invited to give a talk at the American Geophysical Unions annual fall meeting in San Francisco. His presentation was titled "Hillslope hydrologic connectivity controls riparian groundwater turnover: Implications of catchment structure for riparian buffering and stream water sources."



Seth Kurt-Mason received the Montana American Water Resources Association outstanding student presentation award, Fall 2009. His presentation was titled: *Assessing groundwater-surface water interactions before and after stream channel reconstruction: science to inform the restoration process, Silver Bow Creek, Montana.*

LRES Club

LRES Student Organization

The LRES club has been making an impact on campus in an attempt to increase ownership between students and campus through a increased green environment and activates. Last year the club actively started a few new projects. The club is currently working with Students to help restore Danforth Park, NECO for several Earth Day projects, as well as a larger long term project involving the elementary schools and potentially the town of Bozeman. If you are interested in joining LRES Club or learning about their campus involvement please contact Carmel @ carmel.johnston@msu.montana.edu

New Web Time Entry

Upgrade to electronic time entry

Starting March 2010 all time entry will be submitted electronically and approved electronically. Web Time Entry (WTE) will ease many issues related to paper timecards. It will also eliminate the use of approximately 2,400 sheets of paper used every year in our department alone. If you were unable to attend one of the HR WTE training sessions please visit <http://www.montana.edu/hr/WDTE.htm> or call HR at 406-994-3651.

LRES GSO

New Graduate Student Organization

During the Fall 2009 semester, Tristy Vick, Melissa Bridges, Ann McCauley, Jerome Schleier, and Tanya Skurski, with the help of faculty advisor Dr. Lucy Marshall, founded the new Land Resources and Environmental Sciences Graduate Student Organization (LRES GSO). The group is open to all graduate students, and aims to facilitate communication and interaction among graduate students, as well as between graduate students, faculty, and MSU administration. The primary goals of the LRES GSO are to provide support for graduate student symposia and seminars, serve as a source of information for activities and opportunities both within and outside the department, and organize social activities and events for LRES graduate students.

The organization is based on a committee structure, with leadership consisting of a Chair as well as liaisons to Faculty meetings, the Curriculum Committee, the Social Committee, and the Mentoring Committee. Elections will be held in May to fill these positions for the upcoming school year. So far, the group has been successful in helping to reform the departmental seminar series, has gained official recognition as a student organization from ASMSU, and has been actively participating in faculty meetings. There is also a website: <https://sites.google.com/site/lresgso/home>. Contact Tristy, Melissa, Ann, or Jerome, if you're interested in getting involved.

Faculty Spotlight

Insight to the activities and projects of LRES Faculty

Clain Jones' appointment is approximately 70% Extension, 20% applied research, and 10% teaching (Nutrient Cycling, LRES



351). His Extension efforts focus on disseminating research results collected by him, on-campus faculty, research station faculty, and other regional researchers, with a goal to enhance sustainability of agro-ecosystems. One of his recent Extension programs has focused on modeling the effects of nitrogen rate on yield, quality, and economic return of spring wheat, winter wheat, and malt barley. This culminated in the development of an interactive web tool, in cooperation with Duane Griffith (Agricultural Economics), which allows the user to instantaneously observe the

effects of organic matter, soil nitrate levels, fertilizer costs, and grain prices on yield, quality, and net revenue. He also focuses on educating growers, crop advisers, and homeowners on management practices that decrease nutrient losses to the environment, such as leaching and volatilization. Recent documents that he has published have addressed the subjects of "Enhanced Efficiency Fertilizers" and "Nutrient Uptake Timing by Crops" in his endeavor to increase the efficiency of fertilizer use in the region. He is working on a document that will cover nutrient management practices for organic farms.

Clain is currently studying the effects of species, seeding time, and termination time on nitrogen fixation and soil nitrogen availability following legume green manures, in cooperation with Perry Miller and graduate students, Ann McCauley, Mac Burgess, and Justin O'Dea. Both ¹⁵N natural abundance and mass balance

approaches will be used to calculate nitrogen fixation. Clain is also the lead in a three year project aimed at modeling overwinter soil nitrate changes based on previous crop, soil characteristics, and climate, and is a co-PI or collaborator on several other projects, including Rick Engel's study evaluating ammonia volatilization from Montana agricultural soils.

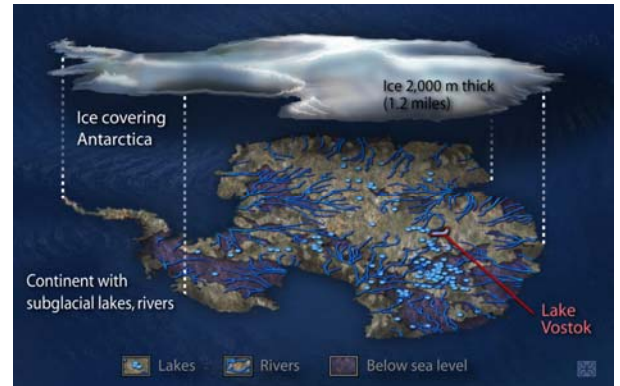
Clain is currently chair of both the Great Plains Soil Fertility Conference Planning Committee and the Rocky Mountain Certified Crop Adviser Program, and is a committee member of the MSU Extension Strategic Planning Committee, MAES Soil Nutrient Management Search Committee, LRES In-depth Peer Evaluation Committee, Montana Agri-Business Association Education Committee, and USDA WERA-103 Committee (Nutrient Management and Water Quality).

Exploration of one of Earth's last frontiers

LRES professor John Priscu is leading the way as the Chief Scientist for the \$10 million Antarctic WISSARD project, (Whillans Ice Stream Subglacial Access Research Drilling). WISSARD is the first large-scale multidisciplinary effort funded by the United States that will explore ecosystems beneath the Antarctic ice sheet. The 6-year project involves nine universities across the country and 13 scientists with expertise that includes geophysics, paleoclimate, geology, hydrology, remote sensing, and microbial ecology. The project is currently working with the University of Wisconsin's Ice Core Drilling Services to fabricate a hot water drill that will melt through almost 3,000 feet of ice to reach the subglacial environment of Lake Whillans, one of more than 200 lakes below the Antarctic Ice Sheet. Subglacial drainage from Lake Whillans will be sampled the following year near the grounding zone where the ice sheet floats over the ocean forming the Ross Ice Shelf. This latter component will utilize a sub-ice robot to collect samples from beneath the Ross Ice Shelf where subglacial rivers are thought to enter the ice-covered sea. These investigations will tell us more about the hydrological system underlying the WAIS, the mechanisms that contribute to melting ice sheets and associated sea level rise and about subglacial microbial processes responsible for biogeochemical transformations beneath the ice.

Research efforts in the Priscu Lab are focused on the sub-project GBASE, Geomicrobiology of Antarctic Subglacial Environments. GBASE will examine the distinct, but hydrologically related, subglacial environments of Lake Whillans and the ice sheet grounding zone. A combination of biogeochemical measurements and genomic information will provide insight into the biodiversity and the biogeochemical cycles occurring under the ice. Preliminary information produced by the Priscu Research Group indicates that bacterial carbon beneath the ice sheet exceeds that in all of our planet's surface lakes and rivers and that microbially mediated subglacial weathering processes rival that of the Amazon River with respect to its influence on global ocean chemistry. The microorganisms beneath the ice have been isolated from direct contact with the atmosphere for more than 10 million years and live in complete darkness at continuous subzero (centigrade) temperatures. Data collected on these microbes will provide us with information on how life thrives under such extremes and will yield important information on potential life on other icy worlds in our solar system and beyond. Personnel on GBASE within LRES include John Priscu, Chief Scientist, Project Manager Rob Edwards, Outreach and Education coordinator Susan Kelly, and graduate students Tristy Vick and Alex Michaud. Brent Christner (Louisiana State University) and Jill Mikucki (Dartmouth College), two former Priscu students, are CO-PI's on the project along with Andrew Mitchell who works with the Center for Biofilm Engineering at MSU. For more information about WISSARD or GBASE, please check out the WISSARD webpage at www.wissard.org or the Priscu Research Group website (<http://www.homepage.montana.edu/~lkbonney/>).

Ecosystems Beneath the Antarctic Ice Sheet



Priscu Group



Wissard Group



~ Susan Kelly

Stream Restoration Ecology

Insight to the activities and projects of LRES 448 Class

LRES 448 “A new course "Stream Restoration Ecology" (LRES448) convened for the first time during Fall of 2009 under the direction of Dr. Geoffrey Poole, Assistant Professor of Fluvial Landscape Ecology in LRES. Structured to incorporate student-led experiential learning, the course included reading and discussion of the primary literature, while assessing and compiling a set of restoration recommendations for Spanish Creek, a tributary of the Gallatin River that flows across the Flying D ranch, south of town.

The class was comprised of 15 students, about 1/3 graduate students and 2/3 Junior/Senior level undergraduates and took two field trips to Spanish Creek -- the first to get a sense of the ranch, the creek, and its history, and the second for each student to collect data to compile a small research project. Combined, the results of these research projects formed the basis for

our assessment of current conditions on the creek.

Based on their assessment and a review of restoration principles, techniques, and case studies gleaned from the scientific literature, the students in the class created a set of restoration recommendations that was presented to Danny Johnson, the ranch manager, and Carter Cruse, the aquatic resources specialist for Turner Enterprises, which operates the ranch. Results from the class, including the research projects, assessment, and recommendation were compiled on a class wiki, which can be accessed at http://streamrestoration.wikispot.org/Fall_2009

In the end, students surmised that the historic trapping and extirpation of beaver from the property was a primary source of degradation along the creek, and decreased the creek's resilience to the current practice of grazing bison on the ranch. Students

concluded that reintroduction of beaver might improve the health and vigor of riparian vegetation, improve habitat for trout, and create greater species richness along the creek.

"The students really poured themselves into this course," said Poole, reflecting back on his experience. "I couldn't have asked for a more dedicated or hardworking group. In the end, I think they taught me as much as I taught them." In fall of 2010, Dr. Poole hopes to return to Spanish Creek with his next set of students to build on the ideas developed by his first class."

~ Geoff Poole



Capstone Highlight

Insight to the activities and projects of LRES Capstone Class

LRES Capstone 2009 “The LRES capstone course, a 2-semester sequence for seniors, is designed so that students apply the knowledge from their MSU coursework to an applied problem related to land resource management. This year’s capstone class focused on applying science to the art of vegetable gardening. Students worked with managers of the Towne’s Harvest Garden, located on the MSU horticultural farm. The Towne’s Harvest Garden was started in 2006 by the Friends of Local Food (FLF), an MSU student group, and is advised by David Baumbauer, the manager of MSU’s Plant Growth Center; Allison Harmon, Assistant Professor of Food and Nutrition; and Bruce Maxwell, Professor in LRES.

Capstone course students, after talking with David Baumbauer and students who had interned at Towne’s Harvest Garden,

defined research objectives to address management challenges at the farm, including insects, weeds, and nutrients. Mustard and collard plants were planted as



bait plants for flea beetles, to prevent insect damage to Pak Choy and Arugula. One student group recorded flea beetle numbers and photographed plants weekly to track insect damage. A second group implemented the planting of companion crops with beans and potatoes as a way to reduce weeding time and increase yield. Three groups focused on the effects of

straw and clover mulch treatments applied to broccoli and onion beds as a way to prevent weeds, and increase soil nitrogen and water retention.

Students summarized their results in a final seminar presented on campus in November and a final paper. Besides the specifics of intercropping and mulching and nutrient cycling, students learned about the difficulties of doing science in a production-focused garden, where the careful plans designed in the classroom had to be revised, improved, and re-focused. At the same time, the importance of applying scientific principles to field situations was underscored in this class. If you'd like to see the final paper, you can download it at the following link: http://landresources.montana.edu/Department/PDF/Capstonepaper_FINAL.pdf

~ Cathy Zabinski

Fall 2009 LRES Dean's List

Bailey, Conner
Baker, Stuart
Bergstrom, Anna
Bogen, Thomas
Collins, Caitlin
Dethlefs, Amy
Dixon, Pyper
Dougherty, Samuel
Froseth, Carol
Haglund, Ernest
Hanson, Matthew
Johnston, Carmel
Kaiser, Kendra
Kalinin, Alexey
Kettman, Daniel
Kleehammer, Katie
Laird, Galen
Larson, Christian
Lewis, Emily
Mays, Brackett
Miller, Christine
Moore, William
Preftakes, Collin
Ramsey, Allison
Twombly, Zachary
Usher, Elizabeth
Williams, Emma
Wing, Alexander

Fall 2009 LRES President's List

Atkinson-Adams, Matthew

Genest, Katherine

Hyman, Amanda

Schmidt, Bethany

New Graduate Students

Gabe Bellante
MS-LRES
Advisor: Lawrence/Powell

Joy Barsotti
MS-LRES
Advisor: Cliff Montagne

Melissa Graves
Ph.D. ECES
Advisor: Fabian Menalled

Evelyn Konigsberg
MS-ENTO
Advisor: David Weaver

Fredrick Rains
Ph.D. ECES
Advisor: Lisa Rew

Matt Scrafford
MS-LRES
Advisor: Duncan Patten

Russell Smith
MS-LRES
Advisor: Bauder/Zabinski

GUESS WHO'S TURNING 80?



Danforth Park, Formerly the Iris Garden, was brought to life by MSU students and Faculty in the spring of 1930. Students are currently facilitating restorations. For more information please contact Alexey at 599-8509

Graduate Degrees Awarded in Summer and Fall

Summer 2009

Heikes-Knapton, Sunni

Masters of Sciences in Land Rehabilitation
Major Advisor: Duncan Patten

“Subalpine wetlands: characteristics, environmental drivers, and response to human perturbation and restoration”

Jewett, Jeff

Masters of Sciences in Land Resources and Environmental Sciences
Major Advisor: Rick Lawrence

“Spatiotemporal relationships between climate and whitebark pine mortality in the Greater Yellowstone Ecosystem”

Martin, Tara

Masters of Sciences in Land Rehabilitation
Major Advisor: Dennis Neuman

“Emergence and growth of seven grass species across a gradient of metals and arsenic in lime-amended contaminated soils”

Wiese, Jessie

Masters of Sciences in Land Resources and Environmental Sciences
Major Advisor: Fabian Menalled

“Establishment and seed production of native wildflowers used in restoration”

Fall 2009

Dieser, Markus

Doctor of Philosophy in Ecology and Environmental Sciences
Major Advisor: John Priscu & Christine Foreman

“Ecosystem dynamics and temporal variations in a microbially dominated, coastal Antarctic lake”

Perez, Oscar

Doctor of Philosophy in Ecology and Environmental Sciences
Major Advisor: David Weaver

“Behavioral and sensory responses of endemic braconid parasitoids to changes in volatile emissions induced by wheat stem sawfly, *cepheus cinctus* herbivory”

Savage, Shannon

Doctor of Philosophy in Ecology and Environmental Sciences
Major Advisor: Rick Lawrence

“Mapping changes in Yellowstone’s geothermal areas”

Land Resources and
Environmental Sciences

P.O. Box 173120
Bozeman, MT 59717