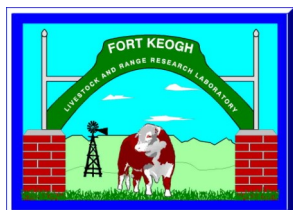


Livestock and Range Research Laboratory

Fort Keogh Researcher



In cooperation

with



Introduction

Greetings from Fort Keogh!

I hope you find our newsletter informative and useful as we highlight a few of the research laboratories' activities. First we want to thank our Customer Focus Group, friends, industry partners, stakeholders and off-site collaborating scientists, technicians and students for their significant support that has been vital to our accomplishments.

As an introduction, my name is Mark Petersen and I have been given the opportunity to serve Fort Keogh as Research Leader. I feel very fortunate that after 2 years of searching for a replacement for Dr. Heitschmidt, I was the recipient of this chance of a lifetime. My hope is to be as effective as Dr. Heitschmidt. My career path, geographically, has spanned the entire Rocky Mountains. Upon completing my Ph.D. at the University of Nebraska in 1981, I was fortunate to move into an Extension Specialist position at the University of Wyoming. Then in 1984 I had another opportunity to move to Montana State University and join the teaching and research faculty and conduct collaborative research at the Red Bluff Re-

search Ranch in the area of Range Nutrition. Approximately 8 years later, New Mexico State University purchased a new rangeland research center. I moved down there to work in graduate teaching and range nutrition research and carried out research at the Corona Range and Livestock Research Center. Now in March of 2009 my wife, Polly, and I are back in Montana tackling new opportunities at Fort Keogh.

After my first week (March 2 to 6) on the job, I have gained a greater appreciation for the world class research and outreach that occurs due to the people who work at Ft. Keogh. My goal is to support those efforts and enhance the relevance and utilization of discoveries. Promotion of sustainability of rural communities in the Northern Great Plains through our accomplishments is another outcome our scientists, technicians and staff have stepped up to by creating new technologies for managers of rangelands. Many research projects are ongoing and a description of them can be found on our web site. Check out <http://www.ars.usda.gov/npa/ftkeogh>.



Mark Petersen
New Research Leader

On March 6-7, 2009, we celebrated the 75th Anniversary of the Line 1 Herefords. Along with the bull and heifer sale, Dr. Mike MacNeil presented an educational and historical presentation pointing out both the people and the research landmarks over the last 75 years. If you were not there, you missed a very interesting presentation. In February, a number of us attended the Society for Range Management Annual Scientific meeting that was held in Albuquerque. Participants from Fort Keogh presented research findings and were involved with many of the organizational responsibilities.

(Continued on page 2)

Inside this issue:

Introduction	1
Weed impact Calculator	2
Retirements	4
New Employees	4
Recent Publications	4-5

Introduction (continued)



Sunset behind the water tower after the ice storm on Fort Keogh January 2009. Picture taken by Aaron Roth, Bio. Lab. Tech.

We have just started calving our spring calving cows and overall it looks as if the cows wintered in OK condition. I have been impressed by the level of organization required by the technicians and cowboys to stay on top of the management needs especially when you consider the additional management required for research.

We continue to add new talent to enhance our programs. Four new members have joined the research laboratory since the past newsletter. They are Whitney Lott, Biological Lab Technician, Physiology; Erica Mayer, Research Assistant, Farm and Feedlot; Tyler Johnson, Research Technician, Physiology; and Stacie Kageyama, Biological Lab Technician, Soil Ecology.

We have also had three retire in the last year. Rick Harris on May 31, 2008, Butch Arnoldt on June 30, 2008, and Lee Hendry retired from the Maintenance Group in February 2009 after working 20 years with Fort Keogh. His position is currently advertised at <http://www.montana.edu/cgi-bin/msuinfo/cview/c/09-128>. We wish each of them good luck and thanks.

Exciting news is that we may have the opportunity to complete the remodeling and building project started in 2006. It will mean a bit of a disruption to daily activities but when completed it should enhance our ability to better utilize our space and will complete an effort Dr. Heitschmidt started a number of years ago. Also the Montana Stockgrowers

Association will celebrate their 125th Anniversary June 11 – 13, 2009, in Miles City. Fort Keogh will participate in those activities by sponsoring a Field Day as a part of the festivity. Dr. Rachel Endecott, Montana State University Beef Cattle Specialist whose office is at Fort Keogh, will assist in the planning and implementation of the field day. We hope to see you there.

Fort Keogh values the input and support from our community, industry, and scientific partners. We hope you will assist us in reaching our goals for the future. Your support is important as we develop effective and productive research and outreach programs. Please visit us! We would like to see you and we look forward to serving you in 2009.

Weed Impact Calculator

Matthew Rinella
Weed Ecologist

Invasive weed populations start out as small numbers of plants scattered about tiny areas (e.g., 100 square feet). Rangeland managers do not have to think too hard about how to manage these small populations. The cost of controlling small populations is low, and the risk of not controlling them is high, because small populations sometimes spread if left unchecked. Given these re-

alities, it is crucial to control small weed infestations.

What is less apparent, however, is how managers should proceed when faced with large weed infestations (e.g. several acres or more). Treating large infestations with herbicides can increase forage production, but herbicides and application costs are very expensive, and retreatment is generally required every few years. Also, recent research indicates

herbicides can have long-lasting negative impacts on native plants growing with weeds. In one study, one-time herbicide use made several native forbs exceedingly rare when grazing was excluded and two other native forbs rare both with and without grazing for an entire 16-year study period. Furthermore, the study suggests that herbicide may have *increased* the weed's (i.e. leafy spurge) abundance because it killed the forbs that were competing with the weed. Insect biological control

The Weed Impact Calculator can be found at:

www.ars.usda.gov/npa/ftkeogh

Weed Impact Calculator (continued)

agents offer another option for controlling large infestations, but they are not consistently effective and can have off-target impacts. Reseeding is sometimes effective, but reseeded is more expensive than herbicides. Sheep and goat grazing has been shown to reduce weed population in some cases, but these animals can require intensive husbandry and can reduce forage availability for cattle, which are the predominant livestock on western rangelands. In short, large-scale weed management is costly and risky, and the best management option is not always clear.

Given the high costs and risks of large-scale weed management, it is critical that managers understand a weed's impacts before trying to control it. If a weed is having major negative impacts on desirable native species and/or forage production, then costly management may be warranted. On the other hand, if the weed's impacts are less severe, then the costs and risks of intensive management may be too high and low-input management, such as reduced stocking rates along with weed containment, might be preferred. The ability to quantify a weed's impacts would help managers make ef-

fective weed management decisions.

Recently, Fort Keogh developed an internet-available system for quantifying spotted knapweed and leafy spurge impacts on desired species and forage production. The address for accessing this website is <http://199.133.173.229/WeedImpact/>, or one can simply follow the link on the first page of the Fort Keogh website.

Because a weed's impacts vary with its abundance, the website requires users to gather weed abundance data from the rangeland site of interest. The website clearly describes the data collection protocol, but briefly, a sampling frame is randomly deposited about the site and the numbers and heights of weed stems are recorded. This is done around the time that weeds have attained their greatest height for the year. Typically, the necessary data can be gathered in about half an hour.

After the data are collected, they are input into a form on the website. Then, the website calculates weed impact estimates using the data that were entered along with a weed impact formula that describes how desired species abundances decrease as weed abundances increase. The

weed impact formula was developed from weed competition experiments that were conducted throughout the western U.S. The website estimates percent reductions in desired species caused by the weed. Also, the website uses example calculations to illustrate how to translate reductions in forage into reductions in livestock carrying capacity. To get a clearer sense of how the website works, interested parties can enter made-up data into the website. Using the website to estimate weed impacts only takes a few minutes.

Conclusions

Without knowing what a weed is costing, it is difficult to decide how much to spend on controlling it. A recently developed website allows rangeland managers to easily estimate costs of spotted knapweed and leafy spurge. This website will help managers make effective decisions about large-scale weed control.



Leafy Spurge

Without knowing what a weed is costing, it is difficult to decide how much to spend on controlling it.

Retirements



Lee Hendry



Charles "Rick" Harris



Arthur "Butch" Arnoldt

Lee Hendry, Maintenance Worker, retired February 28, 2009, after 20 years of service at Fort Keogh.

Charles "Rick" Harris, Research Tech—Physiology retired May 31, 2008, after 35 years of state service.

Arthur "Butch" Arnoldt, Feedlot, retired June 30, 2008, after 35 years of service at Fort Keogh.



Ice Storm—Photo by Brooke Shipp, Bio. Lab. Tech.

New Employees



Erica Mayer



Whitney Lott



Tyler Johnson



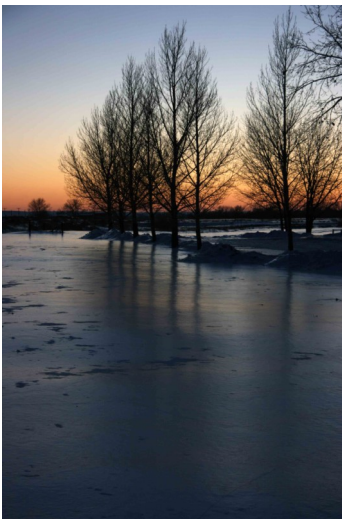
Stacie Kageyama

Erica joined the staff in February 2008 as a Research Assistant for the farm and feedlot operations. Erica has a degree in Agriculture from Morrisville College of Agriculture and Technology, New York.

Whitney joined the staff in May 2008 as a Biological Laboratory Technician for Physiology. She was raised in Crewe, Virginia. She received her Masters in Dairy Science, Reproductive Physiology from Virginia Tech.

Tyler joined the staff as a Research Assistant on the Physiology cowboy crew in January 2009. Tyler grew up in LaGrange, Wyoming and graduated from Chadron State College, Nebraska with a BS in Range Livestock Management.

Stacie joined the staff in April 2008 as a Biological Laboratory Technician for Kurt Reinhart working on soil microbial ecology. She received her masters in Botany from Washington State University and her PhD in Forest Science from Oregon State University.



Sunset picture of ice storm—photo by Aaron Roth, Bio. Lab. Tech.

Recent Publications

Alexander, L.J., Geary, T.W., Snelling, W.M., Rule D.C., Koltjes, J.E., Mote, B.E., and **MacNeil, M.D.** 2008. Mapping quantitative trait loci for fatty acid composition that segregate between Wagyu and Limousin. South African J. Anim. Sci. 38:126-130.

Alexander, L.J., Juneja, B., Shiroma, D. Nonneman, D.J., Snelling, W.M. and Fahrenkrug, S.C. 2007. Comparative and physical mapping of 112 previously reported and 105 new porcine microsatellites. Animal Genetics 38:584-594.

Boggs, K., Sturdy, M., Rinella, D.J., **Rinella, M.J.** 2008. White Spruce Regeneration Following a Major Spruce Beetle Outbreak in Forests on the Kenai Peninsula, Alaska. Forest Ecology and Management 255:3571-3579.

Recent Publications (continued)

Busch, D.C., Atkins, J.A., Bader, J.F., Schafer, D.J., Patterson, D.J., **Geary, T.W.**, and Smith, M.F. 2008. Effect of ovulatory follicle size and expression of estrus on progesterone secretion in beef cows. *Journal of Animal Science* 86:553-563.

Grings, E.E., **Roberts, A.J.**, **Geary, T.W.**, and **MacNeil, M.D.** 2008. Milk yield of primiparous beef cows from three calving systems and varied weaning ages. *Journal of Animal Science* 86:768-779.

Harris, H.L., Cupp, A.S., **Roberts, A.J.**, and Funston, R.N. 2008. Utilization of soybeans or corn milling by-products in beef heifer development diets. *Journal of Animal Science* 86:476-482.

Kruse, R.E., Tess, M.W., **Grings, E.E.**, **Short, R.E.**, **Heitschmidt, R.K.**, Phillips, W.A. and Mayeux, H.S. 2008. Evaluation of beef cattle operations utilizing different seasons of calving, weaning strategies, post-weaning management, and retained ownership. *The Professional Animal Scientist* 24:319-327.

Jiang, Z. Michal, J.J., Tobey, D.J., Wang, Z., **MacNeil, M.D.**, and Magnuson, N.S. 2008. Comparative understanding of UTS2 and UTS2R genes for their involvement in type 2 diabetes mellitus. *International J. Biol. Sci.* 4:96-102.

Liu, G., Van Tassell, C.P., Sonstegard, T.S., Li, R.W., **Alexander, L.J.**, Keele, J.W., Matukumalli, L.K., Smith, T.P., Gasbarre, L.C. 2008.

Detection of germline and somatic copy number variations in cattle. *Developments in Biologicals.* 132:231-237.

MacNeil, M.D., Haferkamp, M., **Vermeire, L.T.**, and **Muscha, J.M.** 2008. Prescribed fire and grazing effects on carbon dynamics in a northern mixed-grass prairie. *Agriculture, Ecosystems, and Environment* 127:66-72.

MacNeil, M.D. and Northcutt, S.L. 2008. National cattle evaluation system for combined analysis of carcass characteristics and indicator traits recorded using ultrasound in Angus cattle. *J. Anim. Sci. jas.*2008-0901v1.

Reinhart, K.O. 2008. Rangeland communities: structure, function, and classification. Book Chapter. In: "Range and Animal Sciences and Resources Management" (Squires, Ed.) in: *Encyclopedia of Life Support Systems (EOLSS)*, Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK. [<http://www.eolss.net>]

Rinella, M.J. and Luschei, E.C. 2007. Hierarchical Bayesian methods estimate invasive weed impacts at pertinent spatial scales. *Biological Invasions* 9:545-558.

Spangler, M.L., Sapp, R.L., Bertrand, J.K., **MacNeil, M.D.**, and Rekaya, R. 2008. Different methods of selecting animals for genotyping to maximize the amount of genetic information known in the population. *J. Anim. Sci. jas.*2007-0492v1.

Sprangler, M.L., Robbins, K.R., Bertrand, J.K., **MacNeil, M.D.**, Rekaya, R.

2009. Ant colony optimization as a method for strategic genotype sampling. *Animal Genetics. Early View*, February 2009. doi.10.1111/j.1365-2052.2008.01835.x.

Standley, T., Paterson, J., Skinner, K., Rainey, B., **Roberts, A.J.**, **Geary, T.W.**, Smith, G., and White, R. 2008. The use of experimental vaccine in gestating beef cows to reduce the shedding of *Escherichia coli* 0157:H7 in the newborn calf. *Professional Animal Scientist* 24:260-263.

Tshipuliso, N.O.M., **Alexander, L.J.**, **Geary, T.W.**, Snelling, W.M., Rule, D.C., Koltes, J.E., Mote, B.E., and **MacNeil, M.D.** 2008. Mapping quantitative trait loci for fatty acid composition that segregate between Wagyu and Limousin. *South African J. Anim. Sci.* 38:126-130.

Tshipuliso, N.O., **Alexander, L.J.**, Kotze, A., Ehlers, K., **Leesburg, V.L.**, **MacNeil, M.D.** 2008. Structural assessment of backcrossing using microsatellite markers. *South African Journal of Science* 38(4):290-292.

Vermeire, L.T., Heitschmidt, R.K., and Haferkamp, M.R. 2008. Vegetation response to seven grazing treatments in the Northern Great Plains. *Agriculture, Ecosystems, and Environment* 125:111-119.

Waterman, R.C., Loest, C.A., Bryant, W.D., **Petersen, M.K.** 2007. Supplemental methionine and urea for gestating beef cows consuming low quality forage diets. *Journal of Animal Science online J. Anim Sci.* 85:731-736.

To order any of these reprints, email diona.austill@ars.usda.gov. They can also be downloaded from our website: <http://www.ars.usda.gov/npa/ftkeogh/publications>

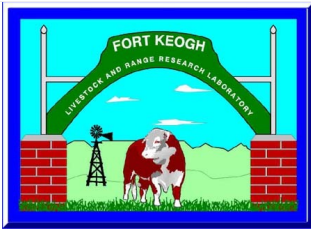


**Livestock and Range Research
Laboratory**

243 Fort Keogh Road
Miles City, MT 59301-4016

Phone: 406-874-8200
Fax: 406-874-8289

We're on the web!
www.ars.usda.gov/npa/ftkeogh



If you have email and would rather receive this newsletter as a .pdf file, send an email to diona.austill@ars.usda.gov to be added to the list.



**MSGA 125th Celebration
June 11-13, 2009
Miles City, MT**

**Don't miss the Fort Keogh Tour/Field Day, June 12th!
1:30 p.m. and 3:30 p.m.**

The Fort Keogh tour is one of four Miles City-area tours offered on Friday afternoon, June 12, in conjunction with the MSGA 125th Anniversary Celebration. Planning is underway for field day topics including research updates and a Fort Keogh history lesson. Contact us at (406) 874-8200 for tour/field day information.

Other MSGA 125th anniversary events include the mid-year meeting, the Evelyn Cameron breakfast honoring Montana's 100-year ranches, a parade, and a ranch rodeo. For registration and more information about "A Five Star Celebration Back Where It All Began", call MSGA at (406) 442-3420 or visit www.mtbeef.org.