

## Curriculum Vitae Erik A. Lehnhoff, Ph.D.

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### PROFESSIONAL PREPARATION

PhD, Ecology and Environmental Science, Montana State University, 2008  
MS, Civil and Environmental Engineering, Tennessee Technological University, 1994  
BS, Civil Engineering, Clemson University, 1993

### EMPLOYMENT

**Assistant Research Professor** 2008 – Present  
Land Resources and Environmental Sciences (LRES), Montana State University (MSU), Bozeman, MT.

My research focuses on understanding how invasive plant species establish and interact with extant plant communities, their mechanisms of exclusion and coexistence, and factors controlling their distribution across the landscape. Recent work in agroecosystems also examines factors associated with fitness tradeoffs in herbicide resistant plants. Select projects include:

- Conducting research on the community ecology of the invasive species saltcedar (*Tamarix* spp.) in the northern U.S. This includes studies on establishment, reproduction and multi-trophic community level impacts. Investigating the role of soil feedbacks in structuring community composition and affecting restoration in *Tamarix* invaded areas.
- Investigating ecological tradeoffs in enhanced herbicide metabolism based-resistance in wild oat (*Avena fatua*) biotypes, with the aim of determining impacts on native plant populations.
- Assessing tri-trophic interactions between *Centaurea maculosa*, its pollinators and biological control agents, and parasitoids on the beneficial arthropods.
- Evaluating landscape effects on the efficacy of control methods for invasive plants in Montana and North Carolina.

In addition to conducting research, I teach a graduate level Plant Ecology course online for LRES at MSU. This course is targeted to working professionals wanting to further their education in the environmental sciences. I also developed and currently teach a web-based course on “weed biology” for the University of Minnesota Integrated Pest Management (IPM<sup>3</sup>) program. <http://www.cce.umn.edu/Integrated-Pest-Management-Education/Weeds-Module/index.html>.

**Adjunct Instructor and Guest Lecturer** Fall 2007 - Present  
Land Resources and Environmental Sciences, Montana State University, Bozeman, MT.

- Instruct freshman seminar course (College of Letters and Sciences 101, Fall 2010, Fall 2011) which focuses on teaching critical thinking, dialogue and writing skills.
- Developed and taught Sustainable Food and Bioenergy Production course (LRES 480, Fall

2010). Course covered theoretical and applied considerations for sustainable production of food and bioenergy and methods for quantifying sustainability.

- Taught undergraduate weed ecology class and laboratory (Weed Ecology and Management – LRES 443, Fall 2007, 2008). Focused on the ecology of invasive plant species, methods of surveying, monitoring and modelling population demographics and ecologically based weed management.
- Contributed guest lectures to Soil Resources (LRES 201) for units on *soil and the hydrologic cycle* and *soil aeration and temperature*.

**Assistant Director for Research**

2008 – June 2010

Center for Invasive Plant Management, Montana State University, Bozeman, MT.

Developed an invasive species research program focused on generating science-based information on invasive plant ecology and management. Specific activities included writing research grants, conducting collaborative field research on *Tamarix* spp. invasions, coordinating an early detection mapping project, and providing research based invasive plant management information to land managers through workshop trainings and presentations.

**Graduate Research Assistant**

2002 – 2008

Land Resources and Environmental Sciences, Montana State University, Bozeman, MT.

Developed methodology to quantify plant invasiveness in differing environments based on changes in population density and spatial extent, and assessed the effects of natural and anthropogenic disturbances on growth rate and invasiveness of *Linaria vulgaris* in Montana. Assessed these same effects on the native plant community. Evaluated the effects of soil disturbance size and propagule pressure on the success of *L. vulgaris* colonization and survival.

**Graduate Fellow**

2006 – 2008

National Science Foundation GK-12 Fellowship. Montana State University, Bozeman, MT.

Developed inquiry-based science curricula and implemented lessons in rural K-8 classrooms near Bozeman, MT. Focused on plant ecology, invasive plant species, soil science, riparian ecology and water quality.

**Project Engineer**

1996 – 2002

TriAD Environmental Consultants, Inc., Nashville, TN.

Professional engineer in charge of landfill design, investigation and remediation of sites contaminated with hazardous or solid waste, compliance issues and operating budgets.

**PUBLICATIONS**

**Lehnhoff, EA**, B Keith, W Dyer, and FD Menalled. *In preparation*. Does multiple herbicide resistance modify crop-weed competitive interactions? Impact of biotic and abiotic stresses on multiple herbicide resistant wild oat (*Avena fatua*) in competition with wheat (*Triticum aestivum*).

**Lehnhoff, EA**, W Dyer, B Keith, B Peterson and FD Menalled. *In preparation*. Characterization of multiple herbicide resistance in wild oat (*Avena fatua*) and its impacts on physiology, germinability, and seed production.

- Lehnhoff, EA**, FD Menalled. *In Press*. Impacts of Tamarix-mediated soil changes on restoration plant growth. *Applied Vegetation Science*.
- Murray, JV, **EA Lehnhoff**, P Neve, SL Poggio and BL Webber. 2012. 'Raising the bar': improving the standard and utility of weed and invasive plant research. *New Phytologist* 196:678-680.
- Maxwell, BD, V Backus, K Irving, M Hohmann, **EA Lehnhoff** and LJ Rew. 2012. Comparison of transect based adaptive sampling methods for invasive plant species. *Invasive Plant Science and Management* 5: 178-193.
- Lehnhoff, EA**, LJ Rew, C Zabinski and FD Menalled. 2012. Reduced impact or longer lag phase? *Tamarix* in the northwestern United States. *Wetlands* 32:497-508.
- Lehnhoff, EA**, FD Menalled and LJ Rew. 2011. Tamarisk (*Tamarix* spp.) establishment in its most northern range. *Invasive Plant Science and Management* 4:58-65.
- Maxwell, BD, **EA Lehnhoff** and LJ Rew. 2009. The rationale for monitoring invasive plant populations as a crucial step for management. *Invasive Plant Science and Management* 1:1-9.
- Lehnhoff, EA**, LJ Rew, BD Maxwell and ML Taper. 2008. Quantifying invasiveness: A case study of *Linaria vulgaris*. *Invasive Plant Science and Management* 1:319-325.
- Lehnhoff, EA**, W Woolbaugh and LJ Rew. 2008. Designing the Perfect Plant: Activities and a game to investigate plant ecology. *Science Scope*. 32:29-35.
- Rew, LJ, **EA Lehnhoff** and BD Maxwell. 2007. Non-indigenous species management using a population prioritization framework. *Canadian Journal of Plant Science*. 87:1029-1036.

#### **PROFESSIONAL REPORTS**

- Lehnhoff, EA and P Lawrence. 2010. Revised Inventory of Non-Indigenous Plants at Little Bighorn Battlefield National Monument. Prepared for Little Bighorn Battlefield National Monument.
- Lehnhoff, EA, D Campbell and LJ Rew. 2008. Vegetation Sampling Report, *Tamarix ramosissima* Treatment Area, Hell Creek, Fort Peck Reservoir, Montana. Prepared for U.S. Army Corps of Engineers, Fort Peck Lake Office.

#### **RESEARCH GRANTS AND RECENT FUNDING**

- National Institute of Food and Agriculture (USDA). 2011. \$150,000. Investigating multi-trophic interactions between invasive plants and insects to enhance native forage production on western rangeland. Mangold, J, EA Lehnhoff, L Burkle.
- National Institute of Food and Agriculture (USDA). 2011. \$500,000. Molecular, physiological, and ecological characterization of multiple herbicide resistance in *Avena fatua*. Dyer, WE, FD Menalled, BD Maxwell, EA Lehnhoff and B Keith.
- Montana Noxious Weed Trust Fund. 2010. \$29,370. Saltcedar effects on mycorrhizal fungal communities and screening of native species for use in restoration of saltcedar degraded sites. Lehnhoff, EA, C Zabinski, M Lavin, LJ Rew, FD Menalled and E Galli-Noble.
- Rocky Mountain Cooperative Ecosystem Studies Unit. 2009. \$12,549. Intern Contributes to Invasive Plant Management and Biocontrol at Little Bighorn National Monument. Lehnhoff, EA.
- Rocky Mountain Cooperative Ecosystem Studies Unit. 2009. \$14,944. 2010 Non-Native Plant Inventory at Little Bighorn National Monument. Lehnhoff, EA.

Montana Noxious Weed Trust Fund. 2009. \$30,562. Assessing plant community and soil characteristics after saltcedar invasion and treatment. Lehnhoff, EA, LJ Rew, FD Menalled and E Galli-Noble.

U.S. Army Corps of Engineers, 2008. \$2,500. Baseline vegetation survey and community analysis. Lehnhoff, EA.

The Nature Conservancy, 2008. \$8,000. Non-indigenous plant species survey and probability of occurrence map development for the Centennial Valley and Rocky Mountain Front, MT. Lehnhoff, EA.

Center for Invasive Plant Management, 2005. \$5,000. Assessing the effect of the scale of soil disturbance on the colonization potential of yellow toadflax (*Linaria vulgaris*) and native vegetation. Rew, LJ and EA Lehnhoff.

USFS Rocky Mountain Research Station, Fire Sciences Laboratory, 2004. \$8,382. The Effects of Disturbance on the Invasiveness of *Linaria vulgaris*. Lehnhoff EA, LJ Rew and BD Maxwell.

#### PRESENTATIONS

Lehnhoff EA, Rew, LJ, Hohmann, MG, Lawrence PG and Maxwell, BD. August 8, 2012. Improving non-indigenous plant species management through better monitoring. Poster Presentation. The Ecological Society of America Annual Meeting, Portland, Oregon.

Maxwell, BD, Brummer T, Lawrence P, Lehnhoff EA, Rotella J, and Rew LJ. August 8, 2012. An empirical assessment of a *Linaria dalmatica* invasion in Yellowstone National Park. Poster Presentation. The Ecological Society of America Annual Meeting, Portland, Oregon.

Lehnhoff, E., Backus, V. Maxwell, B. and Rew, L. March 25, 2011. *Invited Web Seminar*. Alberta Agriculture and Rural Development, Pest Surveillance Update. Non-indigenous Plant Survey Considerations and Methods.

Lehnhoff, E., Menalled, F. and Rew, L. Weed Science Society of America, Denver, CO. February 10, 2010. Factors influencing *Tamarix* spp. Establishment in Montana. (Poster).

Lehnhoff, E. January 13, 2010. Fundamentals of Nonindigenous Plant Species Inventory/Survey. A Web Seminar Presented by the Center for Invasive Plant Management.

Skurski T., Rew L.J., Maxwell B.D. and Lehnhoff E. January 13, 2010. Quantifying invasiveness as part of a weed management prioritization framework. Montana Weed Control Association Annual Meeting. Missoula, MT.

Rew L.J., Skurski T., Lehnhoff E., and Maxwell B.D. March 2009. Survey and predicting occurrence to prioritize monitoring and improve management efficiency. Montana County Weed Coordinator Spring Training.

Skurski T., Maxwell B.D., and Rew L.J. March 2009. Quantifying invasiveness of non-indigenous plant populations. Montana County Weed Coordinator Spring Training,

Maxwell B.D., Lehnhoff E. and Rew L.J. March 2009. The value of monitoring for prioritizing weed management. Montana County Weed Coordinator Spring Training,

Lehnhoff, E., Maxwell, B. and Rew, L. February 3, 2009. Competing Weed Management Strategies: Early Detection – Rapid Response vs. Surveying, Population Monitoring and Prioritization. Wyoming Integrated Pest Management Training, Cody, WY.

Lehnhoff, E., Rew, L. and Maxwell, B. June 24, 2008. Plant Community Response to Disturbance in the Presence of *Linaria vulgaris* (yellow toadflax). International Weed Science Congress.

Vancouver, BC.

- Lehnhoff, E., Rew, L. and Maxwell, B. February 13, 2008. Herbicide Use for Restoration of *Linaria vulgaris* Infested Sites: A Cautionary Tale. Invasive Species in Natural Areas, A Conference on Impact and Management. Montana State University Extension Service. Missoula, MT.
- Lehnhoff, E., Becker, M. and Rew, L. August 9, 2007. Across the River and Into the Trees: Engaging Rural K-8 Students through Ecological Research. (Poster). Ecological Society of America, San Jose, CA.
- Lehnhoff, E., Rew, L. and Maxwell, B. August 7, 2007. Effects of Disturbance and Environment on Yellow Toadflax (*Linaria vulgaris*). (Poster). Ecological Society of America, San Jose, CA.
- Rew, L., Lehnhoff, E. and Maxwell, B. June 13, 2007. An Ecological Perspective on Invasive Plant Management. Canadian Weed Science Society, Ecology and Invasive Species Symposium, Saskatoon, Canada.
- Lehnhoff, E., Rew, L. and Maxwell, B. February 8, 2007. Disturbance Size and Propagule Pressure Influence Colonization Success of Yellow Toadflax (*Linaria vulgaris*). Weed Science Society of America, San Antonio, TX.
- Maxwell, B., Smith, R., Lehnhoff, E., Pollnac, F., Harbuck, K., Sciegenka J. and Buteler M.. February 7, 2007. Confronting an Individual Plant Model with Data. Weed Science Society of America, San Antonio, TX.
- Maxwell, B., Rew, L., Menalled, F., Hulting, A., Bauer, B. and Lehnhoff, E. October 25, 2006. Linking spatial and temporal population dynamics. EWRS workshop on modelling weed population dynamics, Research Centre Flakkebjerg, Denmark.
- Lehnhoff, E., Maxwell, B. and Rew, L. March 15, 2006. Modelling and Predicting the Invasiveness of Plant Populations. Western Society of Weed Science, Reno, Nevada.
- Rew, L., Maxwell, B., Lehnhoff, E. and Repath, C. August 9, 2005. Detecting Change in Non-Indigenous Plant Populations. Ecological Society of America, Montreal, Quebec, Canada.
- Lehnhoff, E., Rew, L. and Maxwell, B. March 8, 2005. Effects of Disturbance and Environment on the Invasion Potential of Yellow Toadflax. Western Society of Weed Science, Vancouver, British Columbia, Canada.

#### **PROFESSIONAL MEMBERSHIPS AND REGISTRATIONS**

Ecological Society of America  
Weed Science Society of America

#### **SERVICE**

Reviewer for: *Invasive Plant Science and Management*; *Journal of Sustainable Agriculture*; *Rangelands*

#### **AWARDS AND RECOGNITIONS**

Outstanding Paper in *Invasive Plant Science and Management*, 2008  
National Science Foundation, Big Sky Institute Science and Society Fellows Program Fellowship.  
July 2007 – June 2008 (\$30,000).  
National Science Foundation, Big Sky Institute Science and Society Fellows Program Fellowship.  
July 2006 – June 2007 (\$30,000).

3<sup>rd</sup> place, graduate student paper presentation, Western Society of Weed Science Annual Meeting, 2005