

# Elizabeth Carol Adair

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## EDUCATION

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Ph.D. in Ecology, 2005. *Colorado State University*

M.S. in Ecology, 2000. *Colorado State University*

B.A. in Environmental Science and Political Science, *Cum laude*, 1991. *Allegheny College*

## RESEARCH EXPERIENCE

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### Assistant Professor (August 2011 – present)

*University of Vermont, Burlington, VT, Rubenstein School of Environment and Natural Resources*

### Post-doctoral Research Associate (4/2009 – present)

*National Center for Ecological Analysis and Synthesis, Santa Barbara CA*

*Research:* Determining the level of complexity necessary to model decomposition at large spatial and temporal scales.

### Post-doctoral Research Associate (1/2008 – 3/2009)

*University of Minnesota, Saint Paul MN, Department of Soil, Water and Climate*

*Supervisors:* Jennifer Y. King, Sarah E. Hobbie, and William J. Parton

*Research:* Modeling photodegradation of litter using both simple mathematical and ecosystem (e.g., DAYCENT) models.

### Post-doctoral Research Associate (06/2005 – 12/2007)

*Univ. of Minnesota, Saint Paul MN, Depts of Ecology, Evolution, & Behavior; Forest Resources*

*Supervisors:* Sarah E. Hobbie and Peter B. Reich

*Research:* The effects of changes in plant biodiversity, elevated atmospheric carbon dioxide, and added nitrogen on ecosystem processes and properties (e.g., soil carbon flux, soil carbon storage).

### Graduate Research (09/2000 - 06/2005)

*Colorado State Univ., Fort Collins CO, Graduate Degree Program in Ecology*

*Advisor:* Ingrid C. Burke

*Dissertation:* Interactions among disturbance, resource availability, and exotic species invasion.

*Non-dissertation collaborative research:* Modeling the effect of habitat fragmentation on herbivore energy acquisition; investigating the effects of altered precipitation regimes on carbon and nitrogen cycling using DAYCENT, a daily time step ecosystem model; and analyzing and modeling long-term litter decomposition in a cross-site LTER study.

### Graduate Research (06/1998 – 08/2000)

*Colorado State University, Fort Collins CO, Graduate Degree Program in Ecology*

*Advisor:* Dan Binkley

*Thesis:* Nitrogen accumulation and cycling in riparian soils along the Green and Yampa Rivers.

## PUBLICATIONS

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- Reich, P.B., L.E. Frelich, R. Voldseth, P. Bakken, **E.C. Adair**. *Accepted*. Linking understory diversity with productivity, resource availability and heterogeneity in southern boreal forests. *Journal of Ecology*.
- Adair, E.C.**, P.B. Reich, J.J. Trost, S.E. Hobbie. *In press*. Elevated CO<sub>2</sub> stimulates grassland soil respiration by increasing carbon inputs rather than by enhancing soil moisture. *Global Change Biology*
- Adair, E.C.**, I.C. Burke. 2010. Plant phenology and life span influence soil pool dynamics: *Bromus tectorum* invasion of perennial C3-C4 grass communities. *Plant and Soil* 335:255-269.
- Adair, E.C.**, S.E. Hobbie, R.K. Hobbie. 2010. Single pool exponential decomposition models: potential pitfalls in their use in ecological studies. *Ecology* 91:1225-1236.
- Adair, E.C.**, P.B. Reich, S.E. Hobbie, J.M.H. Knops. 2009. Interactive effects of time, CO<sub>2</sub>, N, and diversity on total belowground carbon allocation and ecosystem carbon storage in a grassland community. *Ecosystems* 12:1037-1052.
- Powers, J.S., R. Montgomery, **E.C. Adair**, F.Q. Brearley, S.J. DeWalt, C.T. Castanho, J. Chave, E. Deinert, J.U. Ganzhorn, M.E. Gilbert, J. Antonio Gonzalez, S. Bunyavejchewin, H. Ricardo Grau, K.E. Harms, A. Hiremath, S. Iriarte-Vivar, E. Manzano, A.A. de Oliveira, L. Poorter, J. Ramanamanjato, C. Salk, A. Varela, G.D. Weiblen, M.T. Lerdau. 2009. Decomposition in tropical forests: a pan-tropical study of the effects of litter type, litter placement and faunal exclusion across a precipitation gradient. *Journal of Ecology* 97:2636-2660.
- Adair, E.C.**, W.J. Parton, S.J. Del Grosso, W.L. Silver, M.E. Harmon, S.A. Hall, I.C. Burke, S.C. Hart. 2008. A simple three pool model accurately describes patterns of long-term litter decomposition in diverse climates. *Global Change Biology* 14: 2636-2660.
- Adair, E.C.**, I.C. Burke, W.K. Lauenroth. 2008. Contrasting effects of resource availability and plant mortality on plant community invasion by *Bromus tectorum* L. *Plant and Soil* 304: 103-115.
- Mosier, A.R., W.J. Parton, R.E. Martin, D.W. Valentine, D.S. Ojima, D.S. Schimel, I.C. Burke, **E.C. Adair**. 2008. Soil-Atmosphere Exchange of Trace Gases in the Colorado Shortgrass Steppe. *In* W.K. Lauenroth and I.C. Burke (eds.). Ecology of the shortgrass steppe: A long-term perspective. Oxford University Press, Oxford, England.
- Parton W., W.L. Silver, I.C. Burke, L. Grassens, M.E. Harmon, B. Currie, J. King, **E.C. Adair**, L. Brandt, and B. Fasth. 2007. Global-scale similarities in nitrogen release patterns during long-term decomposition. *Science* 315: 361-364.
- Uowolo, A.L., D. Binkley, **E.C. Adair**. 2005. Plant diversity in riparian forests in northwest Colorado: effects of time and river regulation. *Forest Ecology and Management* 218:107-114.
- Adair, E.C.**, D. Binkley, D.C. Andersen. 2004. Patterns of nitrogen accumulation and turnover in riparian soils along the Green and Yampa Rivers. *Oecologia* 139: 108-116.
- Adair, E.C.** and D. Binkley. 2002. Co-limitation of Fremont cottonwood seedlings by nitrogen and water. *Wetlands* 22: 425-429.
- Hobbie, S.E., W.C. Eddy, C.R. Buyarski, **E.C. Adair**, M.L. Ogdahl, P. Weisenhorn. *Submitted*. Response of decomposing litter and its microbial community to multiple forms of nitrogen enrichment. *Ecological Monographs*.
- Reid, J., **E.C. Adair**, S.E. Hobbie and P.B. Reich. *Submitted*. Biodiversity, nitrogen deposition and CO<sub>2</sub> affect grassland soil carbon cycling but not storage. *Ecosystems*.
- Laliberté, E., **E.C. Adair** and S.E. Hobbie. *Submitted*. Estimating litter decomposition rate in single-pool models using nonlinear beta regression. *Ecosphere*.

## **FELLOWSHIPS AND AWARDS**

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Postdoctoral Fellowship, *National Center for Ecological Analysis and Synthesis*, 2009-present.

Best Paper, Session 296 of Division S-7, *Soil Science Society of America Meeting*. 2006.

Grant, Program for Interdisciplinary Mathematics, Ecology, and Statistics, *Colorado State University*, 2004.

Best Graduate Research Oral Presentation, *Front Range Ecology Symposium*. 2001.

Natural Resource Ecology Laboratory Annual Scholarship, *Natural Resource and Ecology Laboratory, Colorado State University*. 2000-2001.

University Graduate Fellowship Award, *Colorado State University*. 1998-1999.

Outstanding Environmental Science Graduate Award, *Allegheny College*. 1991.

## **TEACHING EXPERIENCE & TRAINING**

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### **Preparing Future Faculty** (GRAD 8101 & 8102)

*University of Minnesota*, Fall 2006 – Spring 2007.

GRAD 8101 & 8102: Teaching in Higher Education, a pedagogy course & Practicum for Future Faculty. Coursework and practical experience in teaching methods and philosophies. Designed and taught interactive lectures for “General Biology,” *Saint Catherine’s College*, Saint Paul MN

### **Guest Lecturer**, Ecology (BIOL 3407, J. Cavender-Bares and D. Alstad),

*Dept. of Ecology, Evolution, and Behavior, University of Minnesota*. April 2006.

Lecture: Introduction to biogeochemistry

### **Teaching Assistant**, Systems Ecology: Methods of Ecological Modeling (NR575, N. T. Hobbs)

*Graduate Degree Program in Ecology, Colorado State University*. Spring 2005.

### **Teaching Assistant**, Fundamentals of Ecology (BY220, I. C. Burke)

*Graduate Degree Program in Ecology, Colorado State University*. Fall 2000, 2001, and 2002.

### **Guest Lecturer**, Sustainability of Renewable Resources (NR425, D. Binkley).

*Graduate Degree Program in Ecology, Colorado State University*. February 2000.

Lecture: Sustaining riparian ecosystems.

### **Mentoring experience**

Mentored an undergraduate student (Joseph Reid) in a “Directed Student Research” project on soil carbon sequestration, *University of Minnesota*. 2006-2008.

Worked extensively with undergraduates to conduct laboratory and field work:

*Colorado State University*. 1998-2000.

*Colorado State University*. Summer 1998 and 1999.

## **SELECTED PRESENTATIONS**

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Adair, E.C., P.B. Reich, J.J. Trost, S.E. Hobbie. Elevated CO<sub>2</sub> stimulates grassland soil respiration by increasing carbon inputs rather than by enhancing soil moisture. *Ecological Society of America (ESA) Meeting*. Pittsburgh, PA. 08/2010. Oral presentation.

Adair, E.C., W.J. Parton, J.Y. King, L.A. Brandt. Modeling decomposition and photodegradation in dryland ecosystems. *ESA Meeting*. Albuquerque, NM. 08/2009. Oral presentation.

Adair, E.C., W.J. Parton, S.J. Del Grosso, W.L. Silver, M.E. Harmon, S.A. Hall, I.C. Burke, S.C. Hart. A simple three pool model accurately describes patterns of long-term, global litter decomposition in the Long-term Intersite Decomposition Experiment Team (LIDET) data set. *American Geophysical Union Fall Meeting*. San Francisco, CA, 12/2007. Invited oral presentation.

Adair, E.C., I.C. Burke, W.K. Lauenroth. Belowground consequences of cheatgrass (*Bromus tectorum*) invasion in Colorado's Front Range. Soil Science Society of America Meeting, New Orleans, LA. 11/2007. Oral presentation.

Adair, E.C. Causes and Consequences of Exotic species invasion in ponderosa pine ecosystems along Colorado's Front Range. Departmental Seminar for the Department of Ecology, Evolution, and Behavior, University of Minnesota, Saint Paul, MN. 03/2007. Oral presentation.

Adair, E.C., P.B. Reich, S.E. Hobbie. CO<sub>2</sub> and N effects on Total Belowground Carbon Allocation in a Minnesota grassland (BioCON, a FACE experiment). Soil Science Society of America Meeting, Indianapolis, IN. 11/2006. Oral presentation.

## **PROFESSIONAL MEMBERSHIPS AND SERVICE**

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Primary organizer for Organized Oral Session: "What's new under the sun? Photodegradation and novel drivers of decomposition in dryland ecosystems," 2009 Annual Ecological Society of America Meeting, Albuquerque, NM.

Participant in NCEAS working group: "Analysis of long-term litter decomposition experiments: Synthesis at the site, regional, and global levels"

Participant in NCEAS working group: "Biodiversity and the Functioning of Ecosystems: Translating Results from Model Experiments into Functional Reality"

Organized research symposia:

Front Range Ecology Symposium, Ft. Collins, CO. 3/2001

Cedar Creek Long Term Ecological Research Station Annual Research Symposium, 6/2006.

Kids do Ecology, NCEAS/Monroe Elementary School, Santa Barbara, CA. 2010-present

Reviewer for *Global Change Biology*, *Ecosystems*, *Journal of Ecology*, *Ecological Monographs*, *Oecologia*, *Ecoscience*, *Plant and Soil*, and *Journal of Vegetation Science*.

Reviewer, Grant Applications: National Science Foundation, United States Department of Agriculture.

Member: Ecological Society of America, Soil Science Society of America

## **PROFESSIONAL EXPERIENCE**

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**Ecology and Botany Information Manager**, *Colorado Natural Heritage Program*. 12/1996 – 4/1998.

**Assistant Community Horticulturist**, *Fort Collins Community Horticulture Program*. 4/1996 – 9/1997.

**Soils Laboratory Technician**, *Colorado State Univ. Soil, Water, & Plant Laboratory*. 9/1994 – 3/1996.

**Agricultural Intern**, *Happy Heart Community Supported Agriculture Project*. 7/1993 – 9/1994.

**Engineer/Scientist II**, *ATEC Associates, Inc.* 5/1992 – 6/1993.

## **OTHER RELEVANT SKILLS**

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Biogeochemical analyses: Soil respiration (field /LI-COR and lab incubations), gas chromatograph, plant tissue composition using sequential acid digestion, aggregate isolation and physical fractionation of soils, acid hydrolysis for recalcitrant soil C, inorganic N with Alpkem Autoanalyzer, dissolved organic C and total N on total organic carbon and total nitrogen analyzer, total soil and plant C and N by combustion with elemental analyzer, microbial biomass by chloroform fumigation extraction, *in situ* nitrogen mineralization, available inorganic N with resin bags and PRS soil probes, texture by hydrometer method, pH, EC.

Computer programs/languages: JMP, Maple, Matlab, R, R Package, SAS, Visual Basic, WinBUGS.

Ecosystem models: DayCENTURY, CENTURY, G'Day.