

## E. Carol Adair

Rubenstein School of Environment &  
Natural Resources  
University of Vermont  
Aiken Center, 81 Carrigan Drive  
Burlington, VT 05405  
Carol.Adair@uvm.edu  
adairlab.weebly.com/index.html

### EDUCATION & TRAINING

---

- 2009-2011 Post-doctoral Research Associate, National Center for Ecological Analysis and Synthesis, Santa Barbara, CA
- 2008-2009 Post-doctoral Research Associate, University of Minnesota, Saint Paul, MN, Department of Soil, Water and Climate  
Supervisors: Jennifer Y. King, Sarah E. Hobbie, William J. Parton
- 2005-2007 Post-doctoral Research Associate, Univ. of Minnesota, Saint Paul, MN, Depts of Ecology, Evolution, & Behavior; Forest Resources  
Supervisors: Sarah E. Hobbie and Peter B. Reich
- 2005 PhD, Ecology, Colorado State University
- 2000 MS, Ecology, Colorado State University
- 1991 BA, Environmental Science & Political Science, *Cum laude*, Allegheny College

### APPOINTMENTS

---

- 2018-present Faculty, Quantitative and Evolutionary STEM Training (QuEST) project
- 2017-present Faculty Fellow, Gund Institute for Environment
- 2016-present Ecological Research Team Leader, EPSCoR Basin Resilience to Extreme Events (BREE) project
- 2011-present Assistant Professor, University of Vermont, Rubenstein School of Environment and Natural Resources, Burlington, VT

### LEAVE

---

Parental leave: Brennan 2011 (4/11-7/11) & Shea 2013 (1/13-6/13)

### PUBLICATIONS

---

- \*undergraduate student, \*\*graduate student, †listed as author within the TeaComposition group
- Adair, E.C., D. Hooper, A. Paquette, B. Hungate. *In press*. Ecosystem context illuminates conflicting roles of plant diversity in carbon storage. *Ecology Letters*.
- Cording, A.\*\*, S.H. Hurley, E.C. Adair. 2018. Influence of Critical Bioretention Design Factors and Projected Increases in Precipitation due to Climate Change on Roadside Bioretention Performance. *Journal of Environmental Engineering*. 144(9):04018082. DOI: 10.1061/(ASCE)EE.1943-7870.0001411
- Djukic, I., S. Kepfer-Rojas, I.K. Schmidt, K.S. Larsen, C. Beier, B. Berg, K. Verheyen, TeaComposition†. 2018. Early stage litter decomposition across biomes. *Science of the Total Environment*. 628-9:1369-1394. <https://doi.org/10.1016/j.scitotenv.2018.01.012>
- Shrestha P.\*\*, S. Hurley, C. Adair. 2018. Soil media CO<sub>2</sub> and N<sub>2</sub>O fluxes dynamics from sand-based roadside bioretention systems. *Water*. 10:185. DOI:10.3390/w10020185.

- E.C. Adair, W.J. Parton, J.Y. King, L. Brandt and M.E. Harmon. 2017. Accounting for photodegradation dramatically improves prediction of carbon and nitrogen losses in arid systems. *Ecosphere*. 8:1-16. DOI: 10.1002/ecs2.1892
- Chen, M., W.J. Parton, E.C. Adair, S. Asao, M.D. Hartman, W. Gao. 2016. Simulation of the effects of photodecay on long-term litter decay using DayCent. *Ecosphere*. 7:1-22. DOI: 10.1002/ecs2.1631
- Zia, A., A. Bombles, A. Schroth, C. Koliba, P. Clemins, Y. Tsai, I. Mohammed, P. Isles, G. Bucini, A. Hamed, S. Turnbull, M. Rodgers, B. Beckage, J. Winters, C. Adair, D. Rizzo, J. Van Houten. 2016. Coupled impacts of climate and land use change across a river–lake continuum: insights from an integrated assessment model of Lake Champlain's Missisquoi Basin, 2000–2040. *Environmental Research Letters*. 11: 114026. DOI: 10.1088/1748-9326/11/11/114026
- Parton, W.J., S.J. Del Grosso, A. F. Plante, E.C. Adair, S. M. Lutz. 2015. Modeling the dynamics of soil organic matter and nutrient cycling. In *Soil Microbiology, Ecology and Biochemistry*. (Ed) E.A. Paul. Academic Press.
- Andersen, D.C., E.C. Adair, S.M. Nelson, D. Binkely. 2014. Can nitrogen fertilization aid restoration of mature tree productivity in degraded dryland riverine ecosystems? *Restoration Ecology* 22(5):582–589.
- Schattman, R., E. Mendez, K. Westdjik, M. Caswell, D. Conner, C. Koliba, A. Zia, S. Hurley, C. Adair, L Berlin, H Darby. 2014. Vermont agricultural resilience in a changing climate: A transdisciplinary and participatory action research (PAR) process In *Agroecology, Agrosystems and Sustainability*. CRC Press.
- Laliberté, E., E.C. Adair and S.E. Hobbie. 2012. Estimating litter decomposition rate in single-pool models using nonlinear beta regression. *PLoS ONE*. 7(9): e45140. doi:10.1371/journal.pone.0045140
- Hooper, D.U., E.C. Adair, B.J. Cardinale, J.E.K. Byrnes, B.A. Hungate, K.L. Matulich, A. Gonzalez, J.E. Duffy, L. Gamfeldt, and M.I. O'Connor. 2012. A global synthesis reveals biodiversity loss as a major driver of ecosystem change. *Nature*. 486:105-108.
- King, J.Y., L. Brandt, and E.C. Adair. 2012. Shedding light on plant litter decomposition: advances, implications and new directions in understanding the role of photodegradation. *Biogeochemistry* doi:10.1007/s10533-012-9737-9
- Hobbie, S.E., W.C. Eddy, C.R. Buyarski, E.C. Adair, M.L. Ogdahl, P. Weisenhorn. 2012. Response of decomposing litter and its microbial community to multiple forms of nitrogen enrichment. *Ecological Monographs*. 82:389–405.
- Reid, J., E.C. Adair, S.E. Hobbie and P.B. Reich. 2012. Biodiversity, nitrogen deposition and CO<sub>2</sub> affect grassland soil carbon cycling but not storage. *Ecosystems*. DOI:10.1007/s10021-012-9532-4
- Reich, P.B., L.E. Frelich, R. Voldseth, P. Bakken, E.C. Adair. 2012. Understorey diversity in southern boreal forests is regulated by productivity and its indirect impacts on resource availability and heterogeneity. *Journal of Ecology*. 100:539-545.
- Adair, E.C., P.B. Reich, J.J. Trost, S.E. Hobbie. 2011. Elevated CO<sub>2</sub> stimulates grassland soil respiration by increasing carbon inputs rather than by enhancing soil moisture. *Global Change Biology*. 17:3546-3563.
- 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. Manzane, 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.
- Adair, E.C., L. Barbieri\*\*, K. Schiavone\*. *In review with Soil Science Society of America Journal*. Manure management practices impact nitrous oxide emissions during wintertime thaws.

## GRANTS (Total research funding > \$21.4 million USD)

---

### Current

- Lake Champlain Basin Resilience to Extreme Events (BREE). NSF EPSCoR. \$20,000,000. 2016-2020. Co-PI & Ecology Research Team Leader.
- Expanding No-till Systems in Northern Regions through Improvements in Cover Crop and Manure Nitrogen Management. USDA Agriculture and Food Research Initiative (AFRI) CARE. \$299,992. 2016-2019. Co-PI.
- Increasing ecosystem services and climate change resilience in dominant agroecosystems of the Northeast. USDA Agriculture and Food Research Initiative. \$499,810. 2015-2018. Co-PI.
- Integrated forest ecosystem assessment to support sustainable management decisions in a changing climate. USDA McIntire-Stennis Program. \$819,400. 2014-2019. Co-PI.

Developing accurate regional estimates of agricultural greenhouse gas emissions. UVM REACH Program. \$40,000. 2016-2018. Lead PI.

### *Pending*

Understanding the Risks, Rewards and Livelihoods Across FEWS. NSF National Research Traineeship (NRT). \$2,989,269. Co-PI.

Acquisition of an ICP-OES for a Multiuser Facility. Agriculture and Food Research Initiative Bioenergy, Natural Resources, and Environment (BNRE). Co-PI.

### *Past*

Evaluation of tillage and manure application practices on soil quality and greenhouse gas emissions. NE SARE Partnership Grant. \$12,940. 2015-2017. Lead PI.

Analysis of Sediments, Nutrients, and Greenhouse Gases associated with Green Stormwater Infrastructure. Lake Champlain Sea Grant Program (NOAA). \$103,000 (plus local match). 2014-2016. Co-PI.

What lurks below: how important are subsurface flows of nitrogen and phosphorus? Vermont EPSCoR Pilot Program. \$9,992. 2014-2016. Lead PI.

Synergies and Trade-Offs Between Climate Adaptation and Mitigation Policy, Governance and Agricultural Practice in the Lake Champlain Basin (LCB) of Vermont. UVM Food Systems Spire Research Grant. \$400,000. 2012-2015. Co-PI.

Carbon and nutrient fluxes in a warming world: a forest mesocosm study. USDA McIntire-Stennis Program. \$24,000. 2012-2014. Lead PI.

Adapting to Climate Change with Low Impact Development Stormwater Management in the Lake Champlain Basin. Lake Champlain Sea Grant Program (NOAA). \$116,085 (plus local match). 2012-2014. Co-PI.

Characterizing climate-induced qualitative changes in plant polyphenol composition and their influence on soil processes. NSF Division of Environmental Biology – Ecosystem Studies. \$26,800 subcontract to UVM. 2011-2014. Co-PI.

## **TEACHING**

---

Assistant Professor, Rubenstein School of Environment and Natural Resources, University of Vermont, Burlington, Vermont. Responsible for course development and instruction of undergraduate and graduate students on environmental science and climate change topics. I have served as instructor for the following courses:

**ENSC274** Climate Change: Science and Perception, 3 credits (10-30 students), Fall 2012 – present.

**NR395** Advanced Quantitative Methods for Life Sciences, 3 credits (10-20 students), Spring 2017 – present.

**ENSC160:** Pollutant Movement: Air, Land & Water, 3 credit lecture section (~50-100 students), Fall 2013 – present.

**NR6:** Race and Culture in Natural Resources, 2 credits (14-20 students), Fall 2012-2013.

*Courses where guest lectures have been provided*

**ENSC 9:** Environmental Science Orientation, Climate change impacts in your lifetime, 2012, 2013, 2014, 2015, 2016

**PBIO 4:** Intro to Botany Climate change science and impacts, 2014, 2015, 2016, 2017

**ENVS 2:** International Environmental Studies, Climate change impacts in your lifetime: global and local, 2012, 2014

## **MENTORING**

---

### **National grants & awards to advisees**

NSF Graduate Research Fellowships Program (GRFP) – 201X Stephanie Juice, PhD

Switzer Fellowship – 2018 Lindsay Barbieri, PhD

NE Sustainable Agriculture Research and Education Program (SARE) Graduate Student Grant –  
Kyle Dittmer, MS

### **Current postdoctoral associates**

Erin Seybold

Dustin Kincaid

### **Current graduate students**

Stephanie Juice, PhD

Linyuan Shang (co-advisor), PhD

Adam Noel, PhD

Lindsay Barbieri, PhD

Kyle Dittmer, MS

Brittany Lancellotti (co-advisor), PhD

### **Prior graduate students**

Paliza Shrestha (co-advisor), PhD 2017

Ali Kosiba (co-advisor), PhD 2017

Tyler Goeschel, MS 2016

Amanda Cording (co-advisor), PhD 2016

### **Service on graduate committees**

#### ***Current***

Jennifer Santoro, Forestry, PhD

Peter Clark, Forestry, PhD

Brendan O'Brien, Natural Resources, MS

Sarah Pears, Natural Resources, PhD

Sam Parker, Natural Resources, PhD

Marina Golivets, Natural Resources, PhD

Kenna Rewcastle, Natural Resources, PhD

#### ***Past***

Jody Stryker, Engineering, PhD 2017

Ben DeJong, Geology, PhD 2015

Andrea Urbano, Forestry, MS 2015

## Undergraduate Mentoring

*Undergraduate Advisees:* 20-40, year dependent

### *EPSCoR competitive summer internship advisees*

Allyson Makuch, Sterling College, 2013  
Rachel Markey, University of Vermont (UVM), 2014  
Marissa Goodwin, UVM, 2014  
Emily Whalen, UVM, 2014  
Marissa Ng, UVM, 2015  
Jordan Davis, UVM, 2015  
Zachary Walker, UVM, 2015  
Solomon Lew, Champlain College, 2015  
Colleen Yancey, UVM, 2016, 2017  
Nicole Mehr, Hartwick College, 2016  
Kunal Palawat, UVM, 2017  
Emet Marwell, Mount Holyoke College, 2018  
Amanda Jackson, University of Puerto Rico, 2018  
Kelsey Coates, Duquesne University, 2018  
Herrald Rosado-Loubriel, Universidad del Turabo, 2018  
Pamela Garcia, Universidad De Puerto Rico Recinto Universitario De Mayaguez, 2018

### *Undergraduate Internship Research/Projects* (within my lab)

Austin Wilkes, Honors enrichment, 2015  
Kevin Schiavone, Internship, 2015-2016. Presented results at the American Geophysical Union Fall Meeting, 2016. Manuscript in review at *Soil Science Society of America Journal*.  
Suma Lashoff, Honors enrichment, 2016  
Annelise Courderc, Honors enrichment, 2017  
Colleen Yancey, Internship & Honors College Thesis. Funded by a UVM SURF grant. 2016-2018. Manuscript in preparation.  
Kunal Palawat, Internships, 2016-2018.  
Julia Pupko, Internship & Honors College Thesis. Funded by a UVM SURF grant. 2017-present.  
Amanda Cole, Internship & Honors College Thesis. Funded by a UVM SURF grant. 2018-present.

### *UVM Honors College Thesis Committee*

Marissa Ng: *The effects of thermal acclimation on feeding rates and thermal tolerance in the invasive zebra mussel (*Dreissena polymorpha*) in Lake Champlain, VT, USA.* 2016.  
Colleen Yancey: *Impacts of ice storms on microbial communities.* 2018.  
Julia Pupko: *Agricultural management impacts on winter thaw greenhouse gas emissions.* 2017-present.

## OUTREACH

---

### *RSENR Internship – faculty sponsor*

Jessica Mailhot, Ornithology Research Internship, 2013  
Elliot Casper, Internship with VBH Environmental Consulting Firm, 2014  
Ryan Collaruso, Internship with Vermont Agency of Natural Resources, 2015  
Cale Whitcomb, Environmental Intern with the Village of Essex Junction Wastewater Treatment Facility, 2017  
Jonathan DeLaBruere, City of Burlington Public Works water resources internship, 2018  
Nadia Borysyk, *Analyzing soil microbial DNA and RNA using QPCR*, 2018  
Kaleigh Dolan, Farm to School education intern, 2018

### *High school research – faculty sponsor*

Sebastien Bohl, South Burlington High School (co-advised with graduate student Peter Clark): *Planting seeds to fight the effects of global warming: how changing winter conditions impact tree seed germination*. 2017-2018. Presented research at the Intel International Science and Engineering Fair (ISEF), won certificate of outstanding achievement from the American Meteorological Society, 2018.

*Kids do Ecology*, NCEAS/Monroe Elementary School, Santa Barbara, CA. 2010-2011.

## INVITED OR ORGANIZED WORKING GROUPS AND WORKSHOPS

---

Critical Zone Network (SAVI Early Career workshop on CZ resiliency). University of New Hampshire, 2015.  
FORECAST, an NSF-funded Research Coordination Network (RCN) on “Development of a ‘super model’ approach: Application to soil carbon cycle models” at the Biosphere 2 in Arizona, 2014.  
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”

## SELECTED PRESENTATIONS

---

Adair, E.C., L. Barbieri, T. Goeschel, K. Dittmer, H.M. Darby. The potential for best management practices to reduce N<sub>2</sub>O emissions. Ecological Society of America Meeting, New Orleans, LA. 2018. *Oral presentation*.  
Adair, E.C., L. Barbieri, T. Goeschel, K. Dittmer, H.M. Darby. Greenhouse gas production from Northeast agriculture. 2018 In-Service Training for Agricultural Service Providers – Certified Crop Adviser, Portsmouth, NH. 2018. *Invited oral presentation*.

- Adair, E.C., L. Barbieri, T. Goeschel, K. Dittmer, H.M. Darby. The potential for best management practices to reduce N<sub>2</sub>O emissions. Soil Science Society of America Meeting, Miami, FL. 2017. *Oral presentation.*
- Adair, E.C., D. Hooper, A. Paquette, J. Byrnes, B. Hungate, and B. Cardinale. On Beyond S: Why other metrics of diversity can tell more about ecosystem services than species richness (S). ECANUSA. Burlington, VT. 2016. *Oral presentation.*
- Adair, E.C., Climate change-agriculture connections: the potential for agriculture to mitigate greenhouse gas emissions, Gund Tea, 2015. *Oral presentation.*
- 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. 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. 2009. ***Invited 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, 2007. ***Invited oral presentation.***

## SERVICE AND PROFESSIONAL MEMBERSHIPS

---

- Graduate Standards Committee, RSENR, University of Vermont, 2016-present.
- Graduate Fellowship Committee, RSENR, University of Vermont, 2015-present
- Chair, Honors and Studies Committee, RSENR, University of Vermont, 2013-2016 (Chair, 2016)
- Reviewer for *Global Change Biology*, *Ecosystems*, *Ecology Letters*, *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, Northeastern States Research Cooperative.
- Member: Ecological Society of America, Soil Science Society of America, American Society of Agronomy

## PROFESSIONAL EXPERIENCE

---

- |           |                                                                                                     |
|-----------|-----------------------------------------------------------------------------------------------------|
| 1996-1998 | Ecology and Botany Information Manager, Colorado Natural Heritage Program, Fort Collins, CO         |
| 1996-1997 | Assistant Community Horticulturist, Fort Collins Community Horticulture Program, Fort Collins, CO   |
| 1994-1996 | Soils Laboratory Technician, Colorado State Univ. Soil, Water, & Plant Laboratory, Fort Collins, CO |
| 1993-1994 | Agricultural Intern, Happy Heart Community Supported Agriculture Project, Fort Collins, CO          |
| 1992-1993 | Engineer/Scientist II, ATEC Associates, Inc., Highland, IN                                          |