Adrienne Blair Keller, PhD

Research Assistant Professor
College of Forest Resources and Environmental Science, Michigan Technological University
Northern Institute of Applied Climate Science
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EDUCATION

Indiana University, Department of Biology 2020
Ph.D. in Ecology

University of Montana, Department of Ecosystem & Conservation Science 2011
M.S. in Resource Conservation

Macalester College 2006
B.A. in Biology and Geography

RESEARCH FOCUS

I am an environmental and global change scientist who works at the intersection of ecological research and land management. Collaborating with research scientists and natural resource professionals, I investigate how social-ecological factors interact with one another and with environmental changes to drive ecosystem functioning (e.g., carbon and nutrient cycling, biodiversity). I examine the effects of land management actions (e.g., prescribed fire, forest thinning) across natural and working lands and urban systems and translate research findings to actionable insights that inform on-the-ground land management decisions. Recognizing rates of environmental change and disturbance are high, increasing, and interacting in new ways, I focus on how adaptation to changing conditions can reduce risk and support management goals. My research spans multiple systems (forest, savanna, grassland, wetland, agricultural, and urban systems) and scales (lab incubations to greenhouse and field studies to regional and global data syntheses).

PROFESSIONAL EXPERIENCE (RESEARCH-FOCUSED)

2023 – **Research Assistant Professor**, *College of Forest Resources and Environmental Science, Michigan Tech University, and the Northern Institute of Applied Climate Science. Houghton, MI.*

2022 – 2023 **Climate Adaptation Specialist**, *College of Forest Resources and Environmental Science, Michigan Tech University, and the Northern Institute of Applied Climate Science. Houghton, MI.*

2020 – 2022 **Post-doctoral Research Scientist**, *Dr. Sarah Hobbie's Lab, Department of Ecology, Evolution and Behavior, University of Minnesota, St. Paul, MN.*

FUNDING AND AWARDS (total awarded, not including in-kind support: $642,528)

Current awards:

2025 – 2027 USDA Natural Resources Conservation Service (NRCS). "Outreach and Education with Web Science Delivery" ($379,755). Lead PI: **A. Keller** (MTU), Co-PI: H. Abbotts (MTU)

2025 – 2027 Michigan State University Fred Russ Forest Endowment. "Climate Adaptive Silviculture to Foster Carbon Resiliency." (project total $35,023, in-kind support). Lead PI: D. Carter (MSU), Co-PIs: C. Papa (MSU), **A. Keller** (MTU)

2024 – 2026 Northeast Climate Adaptation Science Center (CASC). "Climate adaptation in northeastern forests to support birds of conservation concern and ecosystem services." (project total $361,698, in-kind support). Lead PI: A. D'Amato (UVM). Co-PIs: C. Littlefield (UVM), A. Strong (UVM), A. Sirén (UMass), T. Morelli (USGS), M. Janowiak (USFS), **A. Keller** (MTU)

Past awards (from past 10 years):

2023 – 2025 USDA Forest Service. "Ecosystem management for climate and carbon benefits" ($90,078) Lead Co-PIs: **A. Keller**, L. Nave (MTU)

2019 – 2020 USDA NIFA Pre-doctoral Fellowship, "Getting to the root of tree-mycorrhizal effects on carbon and nitrogen cycling in temperate forests" ($119,985)

2019 Floyd/Ogg/Cleland Final Year Fellowship, Indiana University ($10,833, declined)

2019 AAAS DoSER Public Engagement Award, "A Science-Faith Dialogue in the Indiana Heartland" ($1,000)

2018, 2019 Provost's Travel Award for Women in Science, Indiana University ($1,000)

2018 Science and Democracy Fellowship, Union of Concerned Scientists ($5,500)
(6-month fellowship focused on leading local science communication and advocacy initiatives)

2018 McCormick Science Grant, Indiana University ($2,500)
(Awarded to IU College of Arts and Sciences graduate student member of faculty/graduate student team whose research is judged most creative, visionary, and innovative)

2018 Blatchley Nature Study Club Scholarship, Indiana University ($500)
(Communicated my research in a non-technical presentation to Nature Club members)

2017 – 2018 CTFS-ForestGEO Research Grants Program, "A tree's perspective of forest nutrient cycling: linking above- and belowground tree nutrient strategies" ($14,977)

2017 Student Research Grant, Indiana University Research and Teaching Preserve ($2,000)

2017 Louise Constable Hoover Fellowship, Department of Biology, Indiana University ($1500)

2016 Fred Seward Award, Department of Biology, Indiana University ($2,000)

Submitted, not funded:

(2025) NSF FIRE-MODEL. "Participatory Research on Extreme Events at the Wildland-Urban Interface (PREWIRE)" (unfunded). Lead PI: D Shtob (MTU). Co-PIs: A. Dyreson, L. Nave, N. French, K. Gabehart (all MTU). **A. Keller**: Senior Personnel

PEER-REVIEWED PUBLICATIONS

22. Feng, X., Chen, X., Coleman, A., Donovan, S., Hobbie, S.E., Karwan, D., **Keller, A.B.**, Walker, R., Wilkening, J.V. (*in press*). Climate change impacts on urban forests. *Nature Reviews Earth & Environment*

21. Nave, L., DeLyser, K., Domke, G.M., Holub, S.M., **Keller, A.B.**, Miller, D., Solarik, K.A., Schilling, E., Vogel, J., Swanston, C.W. 2026. Effects of forest management and land use change on soil carbon in the U.S. Gulf Coastal Plain. *Journal of Forestry.* https://link.springer.com/article/10.1007/s44392-026-00085-w

20. **Keller, A.B.**, Calhoun, A.L., Handler, S.D., Janowiak, M.K., Littlefield, C.E., Miner, B. 2026. Qualitatively assessing trade-offs and co-benefits at local scales when considering outcomes among other management goals. *Ecological Solutions and Evidence.* https://besjournals.onlinelibrary.wiley.com/doi/epdf/10.1002/2688-8319.70194

19. DeLancey, L.C., Zhao, Q., **Keller, A.B.**, Walter, C.A., Hofmockel, K.S., Mayes, M.A., Seabloom, E.W., Borer, E.T., Leakey, A.D.B., Hobbie, S.E. (2025). Carbon availability, soil pH, and microbial allocation to nitrogen acquisition shape grassland heterotrophic respiration in response to a decade of nitrogen addition. *Soil Biology and Biochemistry* DOI: 10.1016/j.soilbio.2025.110000; https://www.sciencedirect.com/science/article/pii/S0038071725002949

18. **Keller, A.B.**, Borer, E.T., Buyarski, C.R., Cleland, E.E., Gill, A., MacDougall, A.S., Moore, J.L., Morgan, J.W., McCulley, R.L., Risch, A.C., Seabloom, E.W., Wright, J., Hobbie, S.E. 2025. Effects of elevated nutrient supply on litter decomposition are robust to impacts of mammalian grazers across diverse grasslands. *Oecologia.* DOI: 19.1007/s00442-025-05791-4; https://link.springer.com/article/10.1007/s00442-025-05791-4

17. **Keller, A.B.**, and Phillips, R.P. 2025. Assessing carbon and nitrogen economics in temperate forests through the relationship between foliar nutrient resorption and root production. *Oecologia.* DOI: 10.1007/s00442-025-05710-7; https://link.springer.com/article/10.1007/s00442-025-05710-7

16. Nave, L., DeLyser, K., Domke, G.M., Holub, S.M., Kabrick, J.M., **Keller, A.B.**, Leopold, P., Peters, M.P., Solarik, K.A., and Swanston, C.W. 2025. Land use change and forest management affect soil carbon stocks in the central hardwoods, U.S. *Geoderma Regional*. DOI: 10.1016/j.geodrs.2025.e00930; https://www.sciencedirect.com/science/article/pii/S235200942500015X?dgcid=coauthor

15. **Keller, A.B.,** Brandt, L.A., Cavender-Bares, J., Knight, J., and Hobbie, S.E. (2024). Tree diversity across the Minneapolis-St. Paul Metropolitan Area in relation to climate and social vulnerability. *Ecological Applications.* DOI: 10.1002/eap.3034; https://www.sciencedirect.com/science/article/pii/S235200942500015X?via%3Dihub
See related news article in Minnesota Star Tribute

14. Nave, L.E., DeLyser, K., Domke, G.M., Holub, S.M., Janowiak, M.K., **Keller, A.B**., Peters, M.P., Solarik, K.A., Walters, B.F., and Swanston, C.W. (2024) Land use change and forest management effects on soil carbon stocks in the Northeast U.S. *Carbon Balance and Management.* DOI: 10.1186/s13021-024-00251-7; https://link.springer.com/article/10.1186/s13021-024-00251-7

13. **Keller, A.B.,** Walter, C.A., Blumenthal, D.M., Borer, E.T., Collins, S.L, DeLancey, L.C., Fay, P.A., Hofmockel, K.S., Knops, J.M.H., Leakey, A.D.B., Mayes, M., Seabloom, E.W., and Hobbie, S.E. (2022) Stronger fertilization effects on aboveground versus belowground plant properties across nine U.S. grasslands. *Ecology.* DOI: 10.1002/ecy.3891; https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecy.3891
News article about this work available here.

12. Klink, S., **Keller, A.B.**, Wild, A.W., Baumert, V.L., Gube, M., Lehndorff, E., Meyer, N., Mueller, C.W., Phillips, R.P., Pausch, J. (2022). Stable isotopes reveal that fungal residues contribute more to mineral-associated organic matter pools than plant residues. *Soil Biology and Biochemistry*. DOI: 10.1016/j.soilbio.2022.108634; https://www.sciencedirect.com/science/article/abs/pii/S0038071722000918

11. See, R.C., **Keller, A.B.**, Weber, P.K., Hobbie, S.E., Kennedy, P.G., Pett-Ridge, J. (2022). Hyphae move matter and microbes to mineral microsites: Integrating the hyphosphere into conceptual models of soil organic matter stabilization. *Global Change Biology*. DOI: 10.1111/gcb.16073; https://onlinelibrary.wiley.com/doi/10.1111/gcb.16073

10. **Keller, A.B.,** Borer, E.T., Collins, S.L, DeLancey, L.C., Fay, P.A., Hofmockel, K.S., Leakey, A.D.B., Mayers, M., Seabloom, E.W., Walter, C.A., Wang, Y., Zhao, Q., and Hobbie, S.E. (2021) Soil carbon stocks in temperate grasslands differ strongly across sites but are insensitive to decade-long fertilization. *Global Change Biology*. DOI: 10.1111/gcb.15988; https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.15988

9. Nagy, R.C. et al. (**Keller, A.B.** one of 120 coauthors). (2021) Harnessing the NEON data revolution to advance open environmental science with a diverse and data-capable community. *Ecosphere.* DOI: 10.1002/ecs2.3833; https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.3833

8. **Keller, A.B.**, Brzostek, E.R., Craig, M.E., Fisher, J.B., and Phillips, R.P. (2021) Root-derived inputs are major contributors to soil carbon in temperate forests. *Ecology Letters*. DOI: 10.1111/ele.13651; https://onlinelibrary.wiley.com/doi/abs/10.1111/ele.13651?af=R

7. **Keller, A.B.** and Limaye, V.S. (2020) Engaged Science: Strategies, Opportunities and Benefits. *Sustainability* 12(19). DOI: 10.3390/su12197854; https://www.mdpi.com/2071-1050/12/19/7854

6. **Keller, A.B.** and Phillips, R.P. (2019) Relationship between belowground carbon allocation and nitrogen uptake in saplings varies by plant mycorrhizal type. *Frontiers in Forests and Global Change*. 2:81 DOI: 10.3389/ffgc.2019.00081; https://www.frontiersin.org/articles/10.3389/ffgc.2019.00081/full

5. **Keller, A.B.** and Phillips, R.P. (2019) Leaf litter decay rates differ between mycorrhizal groups in temperate, but not tropical, forests. *New Phytologist*. DOI: 10.1111/nph.15524; https://nph.onlinelibrary.wiley.com/doi/10.1111/nph.15524

4. Zhang, H., Lü X., Hartmann, H., **Keller, A.B,** Han, X., Trumbore, S., and R.P. Phillips. (2018) Foliar nutrient resorption differs between arbuscular mycorrhizal and ectomycorrhizal trees at local and global scales. *Global Ecology and Biogeography*. 1:11 DOI: 10.11K11/geb.12738; https://onlinelibrary.wiley.com/doi/abs/10.1111/geb.12738

3. Waring B.G., Álvarez-Cansino, L., Barry, K.E., Becklund, K.K., Dale, S., Gei, M.G., **Keller, A.B.**, Lopez, O.R, Markesteijn, L., Mangan, S., Rigs, C.E., Rodríguez-Ronderos, M.E., Segnitz, R.M., Schnitzer, S.A., Powers, J.S. (2015) Pervasive and strong effects of plants on soil chemistry: a meta-analysis of individual plant 'Zinke' effects. *Proc. R. Soc. B*. 282: 20151001; https://royalsocietypublishing.org/doi/full/10.1098/rspb.2015.1001

2. Cleveland, C.C., Reed, S.C., **Keller, A.B.**, Nemergut, D.R., Sean P.O., Ostertag, R., Vitousek, P.M. (2014) Litter quality versus microbial community controls over decomposition: a

quantitative analysis. *Oecologia*. DOI: 10.1007/s00442-013-2758-9; https://link.springer.com/article/10.1007/s00442-013-2758-9

1. **Keller, A.B**., Reed, S.C., Townsend, A.R., Cleveland, C.C. (2013) Effects of canopy tree species on belowground biogeochemistry in a lowland wet tropical forest. *Soil Biology and Biochemistry*. 58:61-69; https://www.sciencedirect.com/science/article/abs/pii/S003807171200421X

OTHER PUBLICATIONS AND MEDIA

Technical publications

Keller, A.B. and Handler, S. 2024. Soil organic carbon in temperate managed ecosystems: a primer. Technology Transfer. Houghton, MI: U.S. Department of Agriculture, Northern Forests Climate Hub. 8 p. DOI: 10.32747/2024.8633528.ch. https://www.climatehubs.usda.gov/hubs/northern-forests/topic/climate-and-management-effects-soil-organic-carbon-temperate-managed

Keller, A.B. and Handler, S. 2024. Non-native invasive earthworms in the Midwest and Eastern United States: a primer. Technology Transfer. Houghton, MI: U.S. Department of Agriculture, Northern Forests Climate Hub. 6 p. DOI: 10.32747/2024.8633529.ch. https://www.climatehubs.usda.gov/hubs/northern-forests/topic/non-native-invasive-earthworms-midwest-and-eastern-united-states

Keller, A.B. and Handler, S. 2024. Effects of fire on ecosystem carbon in the Midwest and Eastern United States: a primer. Technology Transfer. Houghton, MI: U.S. Department of Agriculture, Northern Forests Climate Hub. 8 p. DOI: 10.32747/2024.8633530.ch. https://www.climatehubs.usda.gov/hubs/northern-forests/topic/effects-fire-ecosystem-carbon-midwest-and-eastern-united-states

Keller, A.B. and Handler, S. 2024. Carbon in non-forested wetlands of the Midwest and Eastern United States: a primer. Technology Transfer. Houghton, MI: U.S. Department of Agriculture, Northern Forests Climate Hub. 6 p. DOI: 10.32747.2024.8633527.ch https://www.climatehubs.usda.gov/hubs/northern-forests/topic/carbon-non-forested-wetlands-midwest-and-eastern-united-states

Podcast

Guest on *ASCC-ing the Experts* podcast to discuss "Understanding and Communicating about Forest Carbon". December 2025. https://adaptivesilviculture.org/ate-episode-3/

Selected blog posts (with links)

Failure fuels science: Perspectives from two early career ecologists (2019)
The cycle of life…and death…below your feet (2019)

Science without borders – why travel across the globe to dig in the dirt? (2018)
Engaged Science: 6 Tips for the Trump Era (2018)
Getting to the root of the global carbon cycle (2018)
Biology: It's as simple as baking brownies (2017)
There's no free lunch in nature: for plants, it takes carbon to get nitrogen (2017)

TEACHING AND MENTORING EXPERIENCE

Higher Education Teaching

2026 **Visiting Assistant Professor**, *Macalester College.* Instructor of record for upper-level undergraduate course "Big Data in Ecology" (cross-listed in Biology and Environmental Studies)

2025 **Subject Matter Expert**, *Unity Environmental University.* Designed new online Masters-level course, "Sustainable Land Use Planning and Carbon Management"

2021 **Assistant Professor**, *Massachusetts College of Liberal Arts and the Student Diplomacy Corps.* Instructor of record. Developed and taught intensive 6-week college-level course "Biogeography: The Science and Art of Observation" to diverse group of first-generation college students. Supervised and mentored teaching assistant.

2014 – 2019 **Associate Instructor**, *Dept. of Biology, Indiana University, Bloomington, IN.* Taught Introductory Biology lecture (L111) and lab/discussion course (L113), and Field Ecology (L474) for undergraduate science majors.

K-12 Teaching

2013 **Field Ecology Instructor**, *Ecology Project International, Puerto Ayora, Galápagos Islands, Ecuador.*

2008 – 2009 **Science Teacher**, *Science from Scientists, Boston, MA.*

2006 – 2014 **Group Leader**, *Experiment in International Living/Student Diplomacy Corps, Brattleboro, VT.*

Mentoring

2017-2019 **Fellow**, *Graduate Women in STEM Teaching Fellows Program, Indiana University*

2016 – 2020 **Group Scholars STEM Mentoring Program Mentor**, Indiana University

2016 **Jim Holland Summer Science Research Program Mentor**, Indiana University.

Ongoing **Undergraduate Research Mentor**: 23 total, 4 of whom carried out honors or other independent research project

ORGANIZED WORKSHOPS AND SESSIONS

2026 **Ford Center Forest Forum: Emerging Management and Research Issues in Northern Hardwood Forests of the Western UP**. *Alberta, MI.* Lead organizer https://forestadaptation.org/learn/ford-center-forest-forum-2026

2026 **Organized Oral Session: Soil Carbon Vulnerability in a Changing World: Gathering Perspectives Across Systems, Scales, and Approaches. Ecological Society of America Annual Meeting** *Salt Lake City, UT.* Co-organizer

2024 **Workshop to Advance USDA Guidelines on Quantifying Greenhouse Gas Fluxes in Managed Forest Systems.** *Washington, D.C.* Co-organizer

2023 **Carbon Stewardship in Southeastern Wisconsin Workshop**. *Troy, Wisconsin.* Lead organizer. (See example project here; local media coverage here)

2023 **Wisconsin County Forests Association Climate Adaptation Workshop**. *Merrill, Wisconsin* and *Hayward, Wisconsin*. Co-organizer

2022 **Scuppernong Adaptation Workshop.** *Virtual.* Co-organizer

2019 **A Science-Faith Dialogue in the Indiana Heartland**, *Bloomington, Indiana.* Co-organizer (Final report available here)

SELECTED SCIENCE DELIVERY & COMMUNITY ENGAGEMENT ACTIVITIES

2023 **Trees and the city data nugget**, MSP LTER. Developed new K-12 curriculum based on urban tree biodiversity research. Available here.

2018 **Science and Democracy Fellowship**, *Union of Concerned Scientists*. Developed and led science communication and advocacy workshops. Organized local community around science advocacy initiatives. Participated in COMPASS science communication week-long workshop. Collaborated on two-part blog post reflecting on fellowship experience here and here.

2017 – 2020 **Concerned Scientists @ Indiana University** (CSIU; a campus-community science advocacy organization), Steering Committee Member. Organized public events, developed and led workshops, and elevated civic engagement related to science advocacy. Founder of **Advocates for Science @ Indiana University**, the IU student organization arm of CSIU.

RELEVANT TRAINING AND SKILLS

Leadership Development Program (2022), University of Minnesota

Inclusive Science Education Fellow (2021), University of Minnesota

Highly proficient in R programming, GIS, GitHub, Adobe and MS applications

Highly proficient in written and oral Spanish; experienced in cross-cultural communication and competency

PROFESSIONAL SERVICE

University service:

Member of Diversity and Inclusion Committee, College of Forest Resources and Environmental Science, Michigan Technological University (2024 – 2025)

EcoLunch Committee Co-chair, Indiana University (2015-2016).

Peer-reviewed Journal reviewer:

Biogeochemistry, Ecology, Ecosystems, Global Biogeochemical Cycles, Global Change Biology, Journal of Ecology, New Phytologist, Plant and Soil, Proceedings of the National Academies of Science (PNAS), Science of the Total Environment, Soil Biology and Biochemistry, Tree Physiology

Technical reviewer:

Northwoods Magazine

Proposal reviewer:

Midwest Climate Adaptation Center, University of Vermont McIntire-Stennis, USDA Forest Service IRA funding opportunity

SELECTED PRESENTATIONS (last five years)

Keller, A.B. An integrated above and belowground perspective of carbon and nutrient cycling in terrestrial ecosystems: insights to advance ecosystem science and land management practice. October 2025. **College of Forest Resources and Environmental Science, Michigan Tech University** (Department seminar, Invited)

Keller, A.B. Fire effects on ecosystem carbon in the Midwest and Eastern United States. Oral Presentation. October 2024. **Oak Woodlands & Forests Fire Consortium Webinar Series,** Online (Invited)

Keller, A.B., Calhoun, A., Handler, S., Janowiak, M., Littlefield, C., and Miner, B. Managing for multiple goals in a changing climate: a framework for qualitatively assessing trade-offs and co-benefits at local scales. Oral Presentation. **2024 North American Forest Ecology Workshop,** Asheville, NC

Keller, A.B. and Ontl, T. Forest carbon stewardship: the nexus of climate adaptation and mitigation. Oral Presentation. May 2024. Michigan State University's Department of Forestry **Forest Carbon and Climate Program Learning Exchange Series,** Online (Invited)

Keller, A.B. Forest carbon cycling and implications for county forest management. Oral Presentation. **2024 Wisconsin County Forests Association,** Madison, WI (Invited)

Keller, A.B., Calhoun, A., Handler, S., and Miner, B. Can climate adaptation and mitigation work together? The Nature Conservancy's Newell and Ann Meyer Preserve as a Case Study. Poster Presentation. October 2023. **Midwest Resilience Conference,** Duluth, MN

Keller, A.B. Considering carbon and climate when managing for oak savannas and woodlands. Oral Presentation. October 2023. **Wisconsin Society of American Foresters Annual Meeting,** Wisconsin Dells, WI (Invited)

Keller, A.B. Don't lose sight of the forest for the carbon: considering climate vulnerability and multiple management goals. Oral Presentation. September 2023. **Forest Carbon Management in Central Appalachia,** Morgantown, WV (Invited)

Keller, A.B., Grimm, M., Handler, S., Janowiak, M., Miner, B., and Ontl, T. Climate-informed restoration in non-forest habitats: resources for adaptation, mitigation, and biodiversity goals. Oral Presentation. **2022 National Adaptation Forum,** Baltimore, MD

Keller, A.B. How roots and their associated mycorrhizal fungi drive soil carbon and nitrogen cycling in forests. Seminar. October 2022. **Wuhan Botanical Garden, Chinese Academy of Sciences,** Online (Invited)

Keller, A.B., Brandt, L., Cavender-Bares, J., Knight, J., and Hobbie, S.E. How urban tree canopy biodiversity relates to climate and social vulnerability across the Twin Cities. Oral Presentation. **2022 Minnesota Shade Tree Short Course,** Online (Invited)

Keller, A.B. An integrated tree perspective of forest ecosystem functioning and services. Spring 2022. Department of Ecology, Evolution, and Behavior, Colorado State University (Departmental seminar, invited).

Keller, A.B., Borer, E.T., Collins, S.L., DeLancey, L.C., Fay, P.A., Hofmockel, K.S., Leakey, A.D.B., Mayes, M.A., Seabloom, E.W., Wang, Y., Zhao, Q., and Hobbie, S.E. Site reigns supreme across temperate grasslands: plant and soil carbon stocks vary widely across sites but are relatively insensitive to decade-long fertilization. Oral Presentation. **2021 American Geophysical Union Fall Meeting,** New Orleans, LA/online

Keller, A.B. and Hobbie, S.E. Urban nature across the Minneapolis-St. Paul Metro Region: documenting the past and preparing for the future. Oral Presentation. **2021 Minnesota Association of Professional Soil Scientists**, Online (Invited)

REFERENCES AVAILABLE UPON REQUEST