

Tyler K. Refsland

Postdoctoral Researcher, Michigan State University
Department of Plant, Soil and Microbial Sciences
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EDUCATION

- 2018 Ph.D., Ecology, Evolution & Conservation Biology, University of Illinois, Urbana-Champaign, IL. Dissertation: “Fire-driven changes to tree drought vulnerability”
Advisor: Jennifer M. Fraterrigo
- 2011 B.A. (Honors), Biology and Environmental Studies, Saint Olaf College, MN

POSITIONS HELD

- 2021 – present Postdoctoral Researcher, Michigan State University
- 2018 – 2021 Postdoctoral Research Fellow, University of Nevada, Reno
- 2013 – 2018 Research Associate, University of Illinois, Urbana-Champaign
- 2012 Field Research Assistant, Nantucket Conservation Foundation
- 2011 Research Technician, Cedar Creek LTER, University of Minnesota
- 2009 Research Intern, NSF REU program, Hubbard Brook LTER, Plymouth State University

RESEARCH INTERESTS

Adaptive management, forest resilience to climate change, tree drought mortality, ecophysiology, dendroecology, multiple stressor effects on forest ecosystem function, functional trait ecology, remote sensing

PUBLICATIONS

***Denotes paper authored by co-advised graduate student*

9. **Refsland, T.K.**, B. Adams, D. Bronson, C.C. Kern, P. Marquardt, A.M. McGraw, A.A. Royo, and J.R. Miesel. Synthesis of plant-soil feedback effects on eastern North American trees: implications for climate-adaptive forestry. *Submitted: Ecological Applications*
8. Gold, Z.G., A.F.A. Pellegrini, **T.K. Refsland**, R.J. Andrioli, M.L. Bowles, P.M. Brando, D.G. Brockway, N. Burrows, A.C. Franco, S.W. Hallgren, S.E. Hobbie, W.A. Hoffmann, K.P. Kirkman, P.B. Reich, P. Savadogo, D. Silvério, K. Stephan, T. Strydom, J.M. Varner, D.D. Wade, A. Wills, and A.C. Staver. Greater herbaceous vegetation responses to fire in savannas than in forests suggest bistability. *In Review: PNAS*.
7. ****Reikowski, E.S., T.K. Refsland**, and J.H. Cushman. 2022. Ungulate herbivores as drivers of aspen recruitment and understory composition throughout arid montane landscapes. *Ecosphere* 13(9):e4225. [10.1002/ecs2.4225](https://doi.org/10.1002/ecs2.4225)
6. **Refsland, T.K.** and J.H. Cushman. 2021. Continent-wide synthesis of the long-term population dynamics of quaking aspen in the face of accelerating human impacts. *Oecologia* 197:25-42. [10.1007/s00442-021-05013-7](https://doi.org/10.1007/s00442-021-05013-7)

5. Pellegrini, A.F.A., **T.K. Refsland**, C. Averill, C. Terrer, A.C. Staver, D.G. Brockway, A. Caprio, W. Clatterbuck, C. Coetsee, J.D. Haywood, S.E. Hobbie, W.A. Hoffmann, J. Kush, T. Lewis, W.K. Moser, S.T. Overby, B. Patterson, K.G. Peay, P.B. Reich, C. Ryan, M.A.S. Sayer, B. Scharenbroch, T. Schoennagel, G.R. Smith, K. Stephan, C. Swanston, M.G. Turner, T.M. Varner, and R.B. Jackson. 2021. Decadal changes in fire frequencies shift tree communities and functional traits. *Nature Ecology & Evolution* 5:504-512. [10.1038/s41559-021-01401-7](https://doi.org/10.1038/s41559-021-01401-7)
4. **Refsland, T.K.**, B. Knapp, K. Stephan and J.M. Fraterrigo. 2020. Sixty-five years of fire manipulation reveals climate and fire interact to determine growth rates of *Quercus* spp. *Ecosphere* 11(11):e03287. [10.1002/ecs2.3287](https://doi.org/10.1002/ecs2.3287)
3. Cushman, J. H., L. Sanders and **T.K. Refsland**. 2020. Long-term and interactive effects of different mammalian consumers on growth, survival and recruitment of dominant tree species. *Ecology & Evolution* 10(16):8801-8814. [10.1002/ece3.6578](https://doi.org/10.1002/ece3.6578)
2. **Refsland, T.K.** and J.M. Fraterrigo. 2018. Fire increases drought vulnerability of *Quercus alba* seedlings by altering forest microclimate and nitrogen availability. *Functional Ecology* 32(10):2298-2309. [10.1111/1365-2435.13193](https://doi.org/10.1111/1365-2435.13193)
1. **Refsland, T.K.** and J.M. Fraterrigo. 2017. Both canopy and understory traits act as response-effect traits in fire-managed forests. *Ecosphere* 8(12):e02036. [10.1002/ecs2.2036](https://doi.org/10.1002/ecs2.2036)

GRANTS & FELLOWSHIPS

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| 2019 – 2020 | Nevada Division of State Lands, Lake Tahoe License Plate Program. \$114,476
<i>Long-term dynamics of aspen across the Lake Tahoe Basin: drivers of forest health and identification of restoration priorities. Co-PI</i> (PI: Hall Cushman) |
| 2018 – 2019 | USDA National Institute of Food and Agriculture Hatch Project. \$90,000
<i>Long-term health of aspen stands: understanding the drivers of population decline for a critical foundation species. Co-author</i> (Co-PI equivalent as postdoc; PI: Hall Cushman) |
| 2017 – 2018 | Fall Travel Grant, Graduate College, U of Illinois; \$500 |
| 2015 – 2017 | Summer Research Grants, PEEC, U of Illinois; \$2,500 |
| 2013 – 2017 | Spring Travel Grants, PEEC, U of Illinois; \$2,350 |
| 2014 – 2015 | Joint Fire Science Program Graduate Research Innovation Award (GRIN). \$25,000
Co-PI (PI: Jennifer Fraterrigo) |
| 2015 | Phillip Smith Memorial Fund, Illinois Natural History Survey; \$1,000 |
| 2015 | Clark Summer Research Grant, School of Integrative Biology, U of Illinois; \$1,000 |

TEACHING & MENTORING

INSTRUCTOR

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| 2017 | Ecology (merit section): sole instructor responsible for developing the lesson plan, instructing, and facilitating group discussion, with an emphasis on promoting peer teaching and interactions among students from backgrounds underrepresented in STEM fields. One section of 18 students. |
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TEACHING ASSISTANT

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| 2014, 2016 | Ecology lab instructor: led weekly field trips, discussions and science writing skills in an intensive lab course that fulfills a writing composition credit for the biology major. Two sections of 20 students each. |
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2013 Environmental Biology *TA*: led mini-lectures and facilitated student-driven discussion on topics of environmental science and sustainability. Three sections of 20 students each.

ONLINE COURSES

2017, 2018 Environmental Biology *course coordinator*: facilitated communication among TAs and updated course content for the online learning platform (Moodle). Enrollment ~ 375 students.

2015 Environmental Biology *TA*: moderated and graded online discussion forums, with emphasis on environmental degradation, society and sustainability. Four sections of 15 students each.

PROFESSIONAL TEACHER TRAINING & DEVELOPMENT

2017 Writing Across Curriculum Workshop for Teachers, U of Illinois (1-week course)

STUDENT MENTORING & OUTREACH

2021 – 2022 Co-mentored one master's student through the USDA Forest Service Virtual Student Federal Service (VSFS) Program. Mentored two undergraduate students in independent research, culminating in a poster presentation at the University Undergraduate Research and Arts Forum (UURAF), Michigan State University, East Lansing, MI

2018 – 2021 Mentored two graduate students on experimental design, statistical modeling and scientific writing for their MS theses, University of Nevada, Reno, NV

2013 – 2018 Mentored nine undergraduates in independent field and/or lab-intensive research, culminating in an oral or poster presentation

2017 Graduate research mentor for the Undergraduate Research Apprentice Program, U of Illinois

2014 – 2016 Volunteer judge at Next Generation Science and Engineering Fair, Next Generation Elementary and Middle School, Champaign, IL

2014 – 2015 Plants iView after-school program volunteer, Urbana Middle School, Urbana, IL

PRESENTATIONS

INVITED TALKS

2022 Adams, B., A. Royo, C. Kern, D. Bronson, J. Miesel, A. McGraw, **T.K. Refsland**, P. Marquardt. Seasonal exposure to novel climates in building resiliency of eastern U.S. forests. Ecological Society of America Annual Meeting. Montréal, Canada.

Refsland, T.K., B. Adams, D. Bronson, C. Kern, P. Marquardt, A. McGraw, A. Royo, and J. Miesel. Identifying biotic barriers to assisted migration of trees: the importance of plant-soil feedbacks. North American Forest Ecology Workshop. Special Session: Northern forests as refugium: insights from tree assisted migration trials. Sault Ste Marie, Ontario, Canada.

2019 **Refsland, T.K.**, B.O. Knapp, K. Stephan and J.M. Fraterrigo. Sixty years of fire manipulation in the Missouri Ozarks reveals climate-dependent effects of repeat burns on forest growth. International Fire Ecology & Management Congress. Organized Oral Session: Effectiveness of fire and fuel treatments to promote resilience to drought. Tucson, AZ.

Pellegrini, A.F.A., **T.K. Refsland**, J.F. Hatten and R.B. Jackson. The role of plant-soil interactions in structuring the resilience of ecosystems to repeated burning. Ecological

Society of America (ESA): Organized Oral Session: Ecosystem Response to Multiple Fires. Louisville, KY.

- 2018 **Refsland, T.K.** Fire-driven changes to tree drought vulnerability and carbon storage in temperate broadleaf forests. University of Nevada Ecology, Evolution and Conservation Biology seminar. Reno, NV.

CONTRIBUTED TALKS

*undergraduate mentee

- 2022 Royo, A.A., B. Adams, C. Kern, D. Bronson, J. Miesel, A. McGraw, T.K. Refsland, and P. Marquardt. Seeds for success: developing and testing climate-adapted seed sourcing as a basis for resilient forest restoration. Northern Forest Genetics Association Meeting. Delaware, OH. Virtual Meeting.
- 2020 Dilts, T., **T.K. Refsland**, J.H. Cushman, and J. Greenberg. Long-term dynamics of aspen stands in the Lake Tahoe Basin: a 34-year analysis of conifer encroachment using Landsat. Natural Areas Association Conference. Virtual Meeting.
- Refsland, T.K.** and J.H. Cushman. Continent-wide responses of early-successional tree species to 40 years of changing climate, competition and successional dynamics. Ecological Society of America (ESA). Virtual Meeting.
- Cushman, J.H. and **T.K. Refsland**. Long-term dynamics of population decline in a foundation tree species across its entire geographic range. Ecological Society of America (ESA). Virtual Meeting.
- 2019 Pellegrini, A.F.A., **T.K. Refsland**, J.A. Hatten, and R. Jackson. The role of plant-soil interactions in structuring the resilience of ecosystems to repeated burning. Ecological Society of America (ESA). Louisville, KY.
- 2018 **Refsland, T.K.**, B.O. Knapp, K. Stephan and J.M. Fraterrigo. Long-term changes to fire frequency limit adult tree growth under favorable climate but not drought conditions. Ecological Society of America (ESA). New Orleans, LA.
- 2017 **Refsland, T.K.**, J.M. Fraterrigo. Forest drought vulnerability after fire: how fire-induced resprouting and altered microclimate affect *Quercus* water relations under experimental drought. Ecological Society of America (ESA). Portland, OR.
- Refsland, T.K.**, J.M. Fraterrigo. Plant response-effect trait linkages along a resource gradient in fire-managed forests: implications for soil carbon stocks. Midwest Ecology and Evolution Conference. Urbana, IL.
- 2016 **Refsland, T.K.**, J.M. Fraterrigo. Does fire-induced re sprouting in oaks mediate their drought response? Ecological Society of America (ESA). Fort Lauderdale, FL.
- Refsland, T.K.**, J.M. Fraterrigo. Potential for prescribed fire to promote drought resistance of *Quercus alba* seedlings in a changing climate. Central Hardwoods Forest Conference. Columbia, MO.
- Milla, K. *, **Refsland, T.K.**, V. Repp*, J. Woodyard*, J.M. Fraterrigo. Fire-driven changes to the forest understory community strongly influence tree seedling fitness. Midwest Ecology and Evolution Conference. Oxford, OH.
- Refsland, T.K.** and J.M. Fraterrigo. Influence of prescribed fire on drought vulnerability of *Quercus alba* seedlings. Midwest Ecology and Evolution Conference. Oxford, OH.

- 2015 **Refsland, T.K.**, J.M. Fraterrigo. Effects of recurring fire disturbance on plant functional diversity may promote soil carbon accumulation in temperate deciduous forest. Ecological Society of America (ESA). Baltimore, MD.
- 2014 **Refsland, T.K.**, J.M. Fraterrigo. How does low-intensity, fire-based management impact ecosystem services? Oak Woodlands & Forest Fire Consortium Workshop. Harrisburg, IL.

SELECTED POSTERS

*undergraduate mentee

- 2018 Vozzo, J.* , **T.K. Refsland**, J.M. Fraterrigo. Increased fire frequency reduces aboveground net primary productivity of a Missouri Ozark oak-hickory forest. University of Illinois Undergraduate Research Symposium. Urbana, IL.
- 2017 **Refsland, T.K.**, B. Knapp, J.M. Fraterrigo. Effect of experimentally manipulated fire regimes on the response of forests to drought. American Geophysical Union Fall Meeting. New Orleans, LA.
- Ennab, N.* , **T.K Refsland**, J.M. Fraterrigo. A meta-analysis of fire-induced filtering of plant traits and the implications for carbon storage. University of Illinois Undergraduate Research Symposium. Urbana, IL. *Awarded 'Outstanding presentation' by University of Illinois Office of Undergraduate Research*
- Khan, T.* , **T.K Refsland**, J.M. Fraterrigo. The effect of fire disturbance on adult *Quercus* spp. growth in drought years. University of Illinois Undergraduate Research Symposium. Urbana, IL.
- Swire, M.* , **T.K Refsland**, J.M. Fraterrigo. Effect of prescribed fire on forest drought resistance and resilience: a dendrochronological approach. University of Illinois Researcher's Initiative Symposium. Urbana, IL.
- 2016 Repp, V.* , **T.K. Refsland**, J.M. Fraterrigo. Effects of fire-driven vegetation change on mycorrhizal abundance, colonization and host tree fitness. Illinois Undergraduate Research Symposium. Urbana, IL.
- 2015 **Refsland, T.K.**, J.M. Fraterrigo. Fire-induced changes in plant functional diversity may promote soil carbon inputs in temperate deciduous forests. Fire in Eastern Oak Forests Conference. Tuscaloosa, AL.
- Milla, K.* , **T.K. Refsland**, J.M. Fraterrigo. Prescribed fire effects on tree fitness and mycorrhizal relations. Illinois Undergraduate Research Symposium. Urbana, IL.
- 2014 **Refsland, T.K.**, J.M. Fraterrigo. Confronting the indirect effects of prescribed fire: the impact of understory vegetation shifts on carbon stocks of oak-hickory forests. Ecological Society of America (ESA). Sacramento, CA.
- 2011 **Refsland, T.K.**, L.A. DeGuire, A.D. Webb, E.S. Babcock. Leaf litter processing in an impaired southeastern Minnesota stream: The indirect effects of flow velocity on decomposition. Ecological Society of America (ESA). Austin, TX.

PROFESSIONAL SERVICE

- 2022 Lead organizer for organized oral session titled "Tomorrow's forests today: insights from climate models, pioneering field trials, and social-ecological research to improve assisted tree species migration". Ecological Society of America Annual Meeting, Montréal, Canada

- 2017 Conference co-organizer: Midwest Ecology & Evolution Conference, Urbana, IL
- 2016-2017 Steering Committee, Graduate Program in Ecology, Evolution and Conservation Biology, U of Illinois
- 2015-2016 Vice President and Treasurer: responsible for securing conference travel funds for graduate students. Graduates in Ecology and Evolutionary Biology, U of Illinois
- 2015 Department Faculty Search Committee, Natural Resources and Environmental Sciences, U of Illinois
- 2015 Conference lead organizer and abstract reviewer: Graduate Students in Ecology & Evolutionary Biology Symposium, U of Illinois
- 2015 Lead Fundraiser, Graduates in Ecology and Evolutionary Biology, U of Illinois

PEER REVIEW

Ecosphere | *Journal of Ecology*

PROFESSIONAL AFFILIATIONS

- 2011 – present Ecological Society of America (ESA), Physiology Section
- 2017 – 2019 American Geophysical Union (AGU)
- 2019 – 2019 Association for Fire Ecology