


Brooke B. Osborne

Assistant Professor
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Professional experience

Assistant Professor of Human Dimensions of Environmental Change 2022 – Present
Utah State University, Department of Environment and Society, Moab, UT
Postdoctoral Research Associate 2019 –2022
United States Geological Survey, Southwest Biological Science Center, Moab, UT

Education

Ph.D. in Ecology 2013 – 2019
Brown University, Department of Ecology and Evolutionary Biology, Providence, RI
M.S. in Ecology 2009 – 2012
Colorado State University, Graduate Degree Program in Ecology, Fort Collins, CO
B.S. in Ecotoxicology; B.S. in Spanish Language; B.S. in International Studies 2004 – 2008
Pennsylvania State University, University Park, PA

Teaching (USU unless otherwise noted)

Instructor of record

ENVS 1350: Introduction to Environmental Science, 178 students Fall 2023
Leading an online, asynchronous, Breadth Life Science survey course for students from across the state of Utah to learn and apply foundational knowledge and systems thinking.
Native American Tribes Upholding Restoration and Education (NATURE). Summer 2023
Designed and facilitated two weeks of hands-on curriculum for Indigenous undergraduate interns interested in natural resources. Led three learning activities and mentored two students through capstone projects, including fieldwork and presentation skills.
ENVS 6910: Humans and Global Change Ecology, 4 students Spring 2023
Introduced graduate students to recent “hot topics” in Global Change Ecology and facilitated in-depth discussions related to students’ research interests and career goals.

Instructor of record, Wheaton College (Massachusetts)

PHYS 198: Environmental Geology, 16 students Fall 2018
Independently designed and taught an experimental course that applied systems thinking to examine how geological processes influence the occurrence of dangerous hazards and the availability of critical resources.

Invited guest lecturer

DEEPS 1970: Geology field trip, Brown University Spring 2022
BIOL 510: Current Topics in Biology, New Mexico State University Spring 2021
ENVS 0490: Environmental Science in a Changing World, Brown University Fall 2013

Teaching assistant, Brown University

BIOL 1408: Terrestrial Biogeochemistry and the Functioning of Ecosystems Fall 2014

Created essay prompts and exam questions and mentored student group leaders.
ENVS 0490: Environmental Science in a Changing World Fall 2013
 Assisted in designing the syllabus and facilitated weekly discussions and text reviews.

Trainee

Online Course Development Bootcamp 2023
 Seven-week intensive design and development activity to build a high-quality course from the ground-up following the Backward Design model.
Beyond the Diversity Assignment 2023
 Workshop to “revolutionize a course using critical and intersectional pedagogy lenses”.
“Powerful Teaching” Learning Circle 2023
 Discussed a recent book about the science of learning with faculty from across USU.
Empower Teaching Excellence Conference 2023
 Learned from USU experts regarding “The Activities, Roles, and Relationships of Successful College Students.”

Trainee, Brown University Harriet W. Sheridan Center for Teaching and Learning

Course Design Seminar 2018
Reflective Teaching (Certificate I) 2017

Mentoring and advising (USU unless otherwise noted)

Graduate advising

Savannah Adkins, PhD 2022 – Present

Graduate committee membership

Ally Marrs, PhD 2023 – Present
 Keven Griffin, PhD, Northern Arizona University 2023 – Present

Undergraduate Teaching Fellow (UTF) mentoring

Haylie Belliston, *ENVS1350* Fall 2023

Undergraduate research mentoring

Alexandra Swanson (senior honors thesis), Brown University 2014 – 2016
 Brenna Cannon, Brown University 2014 – 2016
 Julia Spencer, Colorado State University 2010 – 2011
 Matthew Schoolmeester, Colorado State University 2010

Research interests

I am an ecosystem ecologist with broad skills in biogeochemistry and soil science. I seek to advance our quantitative understanding of how terrestrial ecosystems respond to and shape our changing world. I am motivated by the urgent need for improved forecasts of ecosystem responses to disturbance and global change and for innovative solutions to some of our most pressing environmental challenges. For these reasons, my research emphasizes dryland and tropical forest ecosystems, which provide crucial services, play dominant roles in global biogeochemical cycling, and are predicted to be exceptionally sensitive to disturbance and global change. Yet, they represent large unknowns in our predictions of future carbon cycling and climate across spatial scales.

Peer-reviewed journal articles

H-index: 14 Total citations: 1,306

Published

1. Terry T, O Sala, S Ferrenberg, S Reed, **B Osborne**, S Jordan, S Lee, P Adler. Disturbance amplifies sensitivity of dryland productivity to precipitation variability. Accepted: *Science Advances*
2. Phillips M, C Lauria, T Spector, J Bradford, C Gehring, **B Osborne**, A Howell, E Grote, R Rondeau, G Trimber, S Reed. Trajectories and Tipping Points of Piñon-Juniper Woodlands after Fire and Thinning. Accepted: *Global Change Biology*
3. Smith, MD, K Wilkins, SL Collins, A Knapp, [and the International Drought Network including **BB Osborne**]. [Extreme drought impacts have been underestimated in grasslands and shrublands globally](#). *PNAS*, 121(4), e2309881120. DOI: 10.1073/pnas.2309881120
4. KE Young, **BB Osborne**, M Phillips, DE Winkler. (2023). [Restoration research actions to address rapid change in drylands: insights from the Colorado Plateau](#). *Restoration Ecology*, 31(4), e13855. DOI: 10.1111/rec.13855
5. Hu M, J Wang, L Lu, P Shao, Z Zhou, D Wang, S Han, **BB Osborne**, J Chen. (2022). [Post-fire soil extracellular enzyme activities in subtropical-warm temperature climate transitional forests](#). *Land Degradation and Development*. 34(7), 1973-1983. DOI: 10.1002/ldr.4582
6. **Osborne BB**, BT Bestelmeyer, HL Throop, KE Young, PM Homyak, CM Currier, SC Reed (2022). [The consequences of climate change for dryland biogeochemistry](#). *New Phytologist*, 236(1), 15-20. DOI: 10.1111/nph.18312
7. **Osborne BB**, C Roybal, CD Collier, E Geiger, ML Phillips, RH Reibold, MN Weintraub, SC Reed. [Biogeochemistry and ecosystem properties in three adjacent semiarid grasslands are resistant to nitrogen deposition but sensitive to edaphic variability](#) (2022). *Journal of Ecology*, 110(7), 1615-1631. DOI: 10.1111/1365-2745.13896
8. Carroll O, E Batzer, S Bharath, ET Borer, S Campana, E Esch, Y Hautier, T Ohlert, EW Seabloom, PB Adler, JD Bakker, L Biederman, MN Bugalho, M Caldeira, Q Chen, K Davies, PA Fay, JMH Knops, K Komatsu, J Martina, KA McCann, JL Moore, JW Morgan, TO Muraina, **BB Osborne**, AC Risch, C Stevens, PA Wilfhart, L Yahdjian, AS MacDougall (2021). [Nutrient identity modifies the destabilising effects of eutrophication in grasslands](#). *Ecology Letters*, 25(4), 754-765. DOI: 10.1111/ele.13946
9. **Osborne BB**, FM Soper, MK Nasto, D Bru, S Hwang, M Lopez Morales, MB Machmuller, L Philippot, BW Sullivan, GP Asner, CC Cleveland, AR Townsend, S Porder (2021). [Litter inputs drive patterns of soil nitrogen heterogeneity in a diverse tropical forest: results from a litter manipulation experiment](#). *Soil Biology and Biochemistry*, 158, 108247. DOI: 10.1016/j.soilbio.2021.108247

10. Phillips ML, DE Winkler, RH Reibold, **BB Osborne**, SC Reed (2020). [Muted responses to chronic experimental nitrogen deposition on the Colorado Plateau](#). *Oecologia*, 195(2), 513-524. DOI: 10.1007/s00442-020-04841-3
11. **Osborne BB**, MK Nasto, FM Soper, GP Asner, CS Balzotti, CC Cleveland, PG Taylor, AR Townsend, S Porder (2020). [Leaf litter inputs reinforce islands of nitrogen fertility in a lowland tropical forest](#). *Biogeochemistry*, 147(3), 293-306. DOI: 10.1007/s10533-020-00643-0
12. Soper FM, BW Sullivan, **BB Osborne**, AN Shaw, L Philippot, CC Cleveland (2018). [Leaf-cutter ants engineer hot spots of nitrous oxide emissions in tropical forests](#). *Proceedings of the Royal Society B*, 286(1894), 20182504*. DOI: 10.1098/rspb.2018.2504
*Covered by *Science* magazine, *New Scientist*, and *Gizmodo*.
13. Soper FM, MK Nasto, **BB Osborne**, CC Cleveland (2018). [Nitrogen fixation and foliar nitrogen do not predict phosphorus acquisition strategies in tropical trees](#). *Journal of Ecology*, 107(1), 118-126. DOI: 10.1111/1365-2745.13044
14. Soper FM, BW Sullivan, MK Nasto, **BB Osborne**, D Bru, CS Balzotti, PG Taylor, GP Asner, AR Townsend, L Philippot, S Porder, CC Cleveland (2018). [Remotely sensed canopy nitrogen correlates with nitrous oxide emissions in a lowland tropical rainforest](#). *Ecology*, 99(9), 2080-2089. DOI: 10.1002/ecy.2434
15. Hall EK, ES Bernhardt, R Bier, MA Bradford, CM Boot, JB Cotner, PA del Giorgio, SE Evans, EB Graham, SE Jones, JT Lennon, K Locey, D Nemergut, **BB Osborne**, JD Rocca, JS Schimel, MS Waldrop, MW Wallenstein (2018). [Understanding how microbiomes influence the systems they inhabit: moving from a correlative to a causal research framework](#). *Nature Microbiology*, 3(9), 977-982. DOI: 10.1038/s41564-018-0201-z
16. Nasto MK, **BB Osborne**, Y Lekberg, GP Asner, CS Balzotti, S Porder, PG Taylor, AR Townsend, CC Cleveland (2017). [Nutrient acquisition, soil phosphorus partitioning, and competition among trees in a lowland tropical rain forest](#). *New Phytologist*, 214(4), 1506-1517. DOI: 10.1111/nph.14494
17. **Osborne BB**, MK Nasto, GP Asner, CS Balzotti, CC Cleveland, BW Sullivan, PG Taylor, AR Townsend, S Porder (2017). [Climate, topography, and canopy chemistry exert hierarchical control over soil N cycling in a Neotropical lowland forest](#). *Ecosystems*, 20(6), 1089-1103. DOI: 10.1007/s10021-016-0095-7
18. Conant RT, CEP Cerri, **BB Osborne**, K Paustian (2017). [Grassland management impacts on soil carbon stocks: a new synthesis](#). *Ecological Applications*, 27(2), 662-668. DOI: 10.1002/eap.1473
19. Balzotti CS, GP Asner, PG Taylor, R Cole, **BB Osborne**, CC Cleveland, S Porder, AR Townsend (2017). [Topographic distributions of emergent trees in tropical forests of the Osa Peninsula, Costa Rica](#). *Ecography*, 40(7), 829-839. DOI: 10.1111/ecog.02062
20. Balzotti CS, GP Asner, PG Taylor, CC Cleveland, R Cole, RE Martin, MK Nasto, **BB Osborne**, S Porder, AR Townsend (2016). [Environmental controls on canopy foliar nitrogen distributions in a Neotropical lowland forest](#). *Ecological Applications*, 26(8), 2451-2464. DOI: 10.1002/eap.1408

21. **Osborne BB**, JS Baron, MD Wallenstein (2016). [Moisture and temperature controls on nitrification differ among ammonia oxidizer communities from three alpine soil habitats](#). *Frontiers of Earth Science*, 10(1), 1-12. DOI: 10.1007/s11707-015-0556-x
22. Bier RL, ES Bernhardt, CM Boot, EB Graham, EK Hall, JT Lennon, DR Nemergut, **BB Osborne**, C Ruiz-González, JP Schimel, MP Waldrop, MD Wallenstein (2015). [Linking microbial community structure and microbial processes: an empirical and conceptual overview](#). *FEMS Microbiology Ecology*, 91(10). DOI: 10.1093/femsec/fiv113

In review or revision

1. Xu Q, J Chen, K Jan van Groenigen, L Dejun, DL Moorhead, **BB Osborne**, M Zilong, JE Olesen, BA Hungate, P Smith, S Xibin, C Chu, H Chen. Linking soil extracellular enzymes with soil respiration following changes in litter input rates. In review: *PNAS*
2. Shi B, M Delgado-Baquerizo, A Knapp, M Smith, S Reed, **B Osborne**, F Maestre, [and the International Drought Network]. Aridity drives the response of soil particular and mineral associated organic carbon to drought worldwide. In review: *Nature communications*
3. Eldridge D, F Maestre, O Sala, [and the BIODESERT network, including **B Osborne**]. Hotspots of biogeochemical activity controlled by aridity and plant traits across global drylands. In review: *Nature Plants*
4. Zheng Y, J Jian, A Frew, J Chen, **BB Osborne**, G Zhou, Q Xu, Z Zheng, Q Yang, L Ma, X He, SM Bell, G Zhao. Tree taxonomy influences the effects of nutrient additions on soil nutrient accumulation beneath decomposing wood. In review: *Science of the Total Environment*
5. Ferrenberg S, A Faist, **B Osborne**, S Lee, S Reed. Quantifying potential abiotic drivers of the nurse-plant effect in two dominant shrub species of the northern Chihuahuan Desert. In review: *Ecosphere*
6. Lopez A, M Anthony, J Catalan-Dibene, S Ferrenberg, S Jordan, **B Osborne**, S Reed, A Romero-Olivares. Dryland fungi are spatially heterogenous and resistant to global change drivers in the northern Chihuahuan Desert. In review: *Ecology*

In advanced stages of preparation (first author only, full text available upon request)

Osborne BB*, ML Phillips*, MA Cavaleri, J Pett-Ridge, TE Wood, SC Reed. Lowland tropical forests subsurface soils have the potential to respire large quantities of carbon in response to warming. In preparation.

**Equal author contribution*

Osborne BB, FM Soper, GP Asner, CC Cleveland, AR Townsend, S Porder. Nutrient constraints on nitrous oxide emissions differ over fine spatial scales in a diverse tropical forest. In preparation.

Grants, fellowships, and awards

Total: \$1,224,576

U.S. Department of Agriculture, Natural Resources Conservation Science: “Incorporating above- and belowground carbon into terrestrial dryland state and transition models to better understand, predict, and manage for carbon”: \$492,749 2023 - 2027

(PI): Proposed research to provide novel, actionable science in partnership with the NRCS to directly address ongoing management questions related to carbon sequestration.

U.S. Geological Survey, North Central Climate Adaptation Science Center: “Nitrogen deposition and its interactions with invasive species and soil microbial communities in Dinosaur National Monument”: \$49,919 2022 – 2024

(Co-PI): Research to help inform and prioritize management actions that will support the National Park Service in safeguarding natural resources in the monument from decreased air quality caused by dramatic growth of oil and gas development.

Bureau of Land Management, Rangeland Management Program: \$250,000 2022 – 2024

(Co-PI): Collaborative effort to inventory and scale soil carbon stocks on Utah’s BLM lands and identify management practices to sequester carbon and increase forage and drought resiliency. This work aims to help build a framework with which the U.S. can sequester carbon on public lands.

INCyTE Lab Exchange Fellowship for Early Career Scientists: \$1,607 2022

Awarded to support early career scientists doing innovative work to bridge the gap between experimental research and Earth System Modeling.

U.S. Department of the Interior Star Award: 2022

Award to recognize noteworthy accomplishments based on an employee’s annual performance appraisal.

L’Oréal USA for Women in Science Fellowship*: \$60,000 2021 – 2022

Selected from thousands of applicants across the U.S. as one of five postdoctoral women in STEM in recognition of academic excellence, research potential, and dedication to supporting the next generation of women in STEM.

**Covered by multiple educational advertisements that have received over 3 million views.*

U.S. Geological Survey, Core Systems Science Program: \$2,300 2021

Awarded to support multi-disciplinary, big data approaches to addressing pressing global challenges. This funding will support my collaboration with a team of ecosystem modelers to address soil carbon questions.

U.S. Geological Survey, North Central Climate Adaptation Science Center: “Determining successful management and restoration strategies for maintaining pinyon-juniper communities in the face of change”: \$208,263 2020 – 2022

(Co-PI): Research to generate novel, actionable science to address ongoing management challenges for pinyon-juniper woodlands, especially in the face of climate change and growing wildfire intensity across the southwestern U.S.

National Park Service: “Pollution in the parks: assessing nitrogen deposition consequences in the southeast Utah National Parks”: \$24,942 2020 – 2022

(Co-PI): An assessment of nitrogen deposition effects on native plants and soils, air and water quality, and greenhouse gas emission in the National Park lands of southeastern Utah (i.e., Arches, Canyonlands, Natural Bridges, and Hovenweep).

Brown University/Wheaton College Faculty Fellowship: \$10,000 2018

An opportunity for outstanding, advanced Brown graduate students to experience faculty life firsthand by teaching and participating in the intellectual life of a liberal arts college.

Brown University EEB Dissertation Improvement Grant: \$9,851 2018

A competitive internal grant following the application format of the discontinued NSF DDIG.

Ecological Society of America Travel Awards: \$1,000 2018

Travel support from the Microbial Ecology (accepted) and Biogeosciences sections (declined).

New Phytologist Best Student Presentation Award: \$500 2017

Awarded by the ESA Biogeosciences section for an outstanding oral presentation of research conducted as a graduate student.

Brown University travel awards and small grants: \$1,500 2015 – 2017

Multiple small international and conference travel awards and research grants from the Brown Graduate Student Council, Biomedical Department, and the Institute at Brown for Environment and Society.

NSF IGERT Traineeship: “Reverse Ecology: Computational Integration of Genomes, Organisms, and Environments”: estimated over \$100,000 2013 – 2016

Immersive training in community genome assembly. Led a project using genomics to study the effects of wastewater effluent on microbial community composition in salt marsh sediments.

Francis Clark Soil Biology Scholarship: \$1,945 2011

Awarded by the Natural Resources Ecology Laboratory at Colorado State University.

Program of Research and Scholarly Excellence Award: \$10,000 2009 – 2010

Support from the Graduate Degree Program in Ecology from Colorado State University.

Synergistic activities

NSF Biodiversity on a Changing Planet-Design track: “Climate change and ecosystem functioning: reducing critical uncertainties about ecosystem acclimation.” 2023 – 2026

Working group member. Collaborating with diverse experts in paleoecology, long-term observation studies, experiments, and simulation models to synthesize knowledge about ecosystem acclimation, identify key knowledge gaps, and develop research to fill those gaps.

Canyonlands Research Center Artist in Residence collaboration 2023

Co-creator. Collaborated with visual artist Jorge Rojas and other scientists to create an interactive and immersive traveling museum exhibit about biological soil crust.

U.S. Geological Survey John Wesley Powell Center for Synthesis and Analysis: “A global synthesis of multi-year drought effects on terrestrial ecosystems” 2021 – Present

Working group member: Working to better understand and forecast the consequences of drought across ecosystems and through time and to assist land managers.

[Nutrient Network](#), [DRAGNet](#), [Bromecast](#), and [International Drought Network](#) 2021 – Present

Site leader: Leading the set-up, maintenance, and data collection for field sites in the Desert Southwest for four global cooperative research networks.

Biennial Conference of Science and Management on the Colorado Plateau and Southwest Region, Special Session 2022

Co-convenor: “Feeling the burn: the interacting effects of fire and warming on pinyon-juniper woodlands of the Southwest”

Bromecast Network 2022

Collaborator: Designed the soil and biological soil crust sampling protocols for the network.

Ecological Society of America annual meeting, Organized Oral Session 2021

Co-convenor: “The interactive effects of global change drivers on dryland ecosystems of the western U.S.”

American Geophysical Union Fall Meeting, Organized Oral Session 2021

Co-convenor and Chair: “Carbon cycling in drylands: new findings and emerging frontiers.”

Ecological Society of American annual meeting, Organized Oral Session 2020

Convenor: “The consequences of climate change for dryland biogeochemistry.”

Osa Conservation Tropical Reforestation Forum 2015

Co-organizer: Co-designed and organized a public, four-day workshop in rural Costa Rica, which connected scientists and land managers from the U.S. and Central America to discuss carbon sequestration and reforestation.

Rhode Island School of Design Art-Science partnerships 2014 – 2019

Co-creator: Partnered with two MFA students from the Rhode Island School of Design to communicate complex concepts in ecosystem ecology through works of art, including large print installations and furniture pieces, viewed by thousands in Providence, RI galleries.

U.S. Geological Survey John Wesley Powell Center for Synthesis and Analysis: “Identifying the next generation of ecological indicators” 2012 – 2015

Working group member: Worked to improve the application of microbial data in ecosystem studies. Compiled a database of ecosystem constraints on microbial turnover rates.

School of Global Environmental Sustainability Research Team: “Women, Population, and the Environment” 2010 – 2012

Co-founder: Brought together an interdisciplinary research team and designed and executed events focused on promoting women in leadership to address issues of community health, climate uncertainty, and sustainable livelihoods.

Service and leadership

- ENVS Department, Graduate Selection committee** 2022 – 2023
Member: Reviewing graduate student applications and make admission recommendations.
- ENVS Department, Environmental Science curriculum working group** 2023
Member: Reviewing graduate student applications and make admission recommendations.
- Science Moab, Science on Tap** 2023
Invited Speaker: Delivered a one-hour public educational talk to over 200 attendees about the biogeochemistry of dryland ecosystems, like those in Moab, and their role in climate change.
- Public event “Moab and Spanish Valley’s Groundwater Conditions”** 2023
Co-organizer: Worked with community collaborators to create a public education event about the availability of water in Moab and Spanish Valley with hydrogeologist Dr. Tom Lachmar.
- Science Moab, Science for Guides** 2022
Collaborator: Created a curriculum for educating local guides about the biogeochemistry of dryland ecosystems in the Moab area to promote responsible, informed recreation.
- KZMU, Radio Play Festival** 2022
Collaborator: Contributed to a radio play about the importance of biological soil crust.
- Ecological Society of America, Southwest Chapter**
Council Representative: Promoting the interests of the Southwest Chapter in the development, review, and revision of ESA’s strategic plan. 2021–2023
Chair: Created and promoted new educational and professional development opportunities in the Southwestern, US. 2021–2022
Vice-chair: Led efforts to build community among chapter members 2020 – 2021
- Ecological Society of America**
Judge: Buell and Braun student presentation awards 2021
Creative Facilitator: Created the #ESAWatchParty challenge, which hundreds of graduate students and early career ecologists used to amplify their science during distanced, virtual meetings. 2020 – 2021
- American Geophysical Union**
Judge: Outstanding Student Presentation Award 2021
- National Academies of Sciences Roundtable: Mentoring Matters: Supporting the Careers of Women in STEM** 2021
Panelist: Invited by the Committee on Women in Science, Engineering, and Medicine to explore the importance of mentorship for early career women in STEM with a broad audience.
- Girl Scouts of Greater New York Virtual Career Panel** 2021
Panelist: Invited by the Girl Scouts of America to meet with college-age alumnae and discuss paths toward careers in science.
- Girl Scouts of Greater New York Virtual STEM Workshops** 2021

Panelist: Invited by the Girl Scouts of America to inspire the next generation of STEM pioneers by leading fun and educational virtual science workshops related to Ecology.

L'Oréal USA x Luminary Roundtable: Staying Power: Women in Science on What it Takes to Succeed 2021

Panelist: Spoke with a collaborative of professional women about female leadership in STEM.

Women in Science Panel 2021

Panelist: Discussed challenges faced by women in STEM following a screening of the film *Picture a Scientist* for the Moab Festival of Science.

Moab Festival of Science 2019 – Present

Co-lead: Organizing and promoting four days of free hands-on science events in Moab, Utah.

Brown Alumni Interviewing Program 2019 – Present

Interviewer: Conducting interviews for prospective Brown undergraduate students.

Ecological Society of America, Biogeosciences Section 2019

Judge: Sulzman and Likens awards

500 Women Scientists, Providence RI Pod 2017 – 2019

Co-founder: Started a local chapter to organize and promote Rhode Island women in STEM.

Brown Student and Employee Accessibility Services 2013 – 2019

Facilitator: Proctored for students with medical, physical, psychological, and learning disabilities.

Wild Ones Science Education Program 2011 – 2019

Creator and mentor: Founded creative education program that uses narrative to connect fourth graders with core concepts in Ecology and to encourage environmental stewardship. Received funding to support and mentor two undergraduate interns interested in elementary education.

Brown University, Department of Ecology and Evolutionary Biology

Vice-president of graduate student association 2017

Social event organizer 2015

Summer Soils Institute 2011

Instructor: Produced original course material and co-taught sections on molecular and fieldwork techniques in soil science to PhD-level students at Colorado State University.

Front Range Student Ecology Symposium 2009 – 2011

Organizer: Annual multi-day gradient student-focused symposium at Colorado State University.

K-12 science education

Educator: Moab Festival of Science's "STEMonstrations" booth about biocrust 2022

Volunteer: Moab Festival of Science's "Scientist Workbook" for elementary students 2021

Guest instructor: Brown Earth Science Department-Vartan Elementary Partnership 2016

Judge: Bella Romero Elementary School Science Fair 2010, 2011

Volunteer: Significant Opportunities in Atmospheric Research and Science (SOARS) 2011

Educator: STEMapalooza Science Fair Soil Science Booth, Denver CO 2009

Guest instructor: Laurene Edmondson Elementary Soil Science unit 2009

Presentations (first author only)

(Invited) **Osborne BB**, M Dannenberg, S Jordan, S Lee, O Sala, W Smith, T Terry, S Ferrenberg, S Reed (2023). Effects of drought and physical disturbance on dryland biogeochemistry across regions and within microhabitats. Ecological Society of America annual meeting (oral presentation).

(Invited) **Osborne BB** (2023). Understanding and managing dryland soil carbon in a time of rapid change. USGS Headquarters (oral presentation).

(Invited) **Osborne BB**, M Dannenberg, S Jordan, S Lee, O Sala, W Smith, T Terry, S Ferrenberg, S Reed (2022). Climate regulates the consequences of drought and physical disturbance for drylands. American Geophysical Union Fall Meeting (oral presentation).

(Invited) **Osborne BB** (2022). The consequences of global change for dryland carbon and nitrogen cycling. USGS Menlo Park Soil Microbial Ecology Laboratory Seminar (oral presentation).

(Invited) **Osborne BB**, P Adler, M Dannenberg, S Jordan, S Lee, O Sala, W Smith, T Terry, S Ferrenberg, S Reed (2022). The consequences of co-occurring global change drivers for dryland biogeochemistry differ fundamentally along an aridity gradient. Morley Nelson Snake River Birds of Prey National Conservation Area Symposium (oral presentation).

Osborne BB, C Roybal, CD Collier, E Geiger, ML Phillips, R Reibold, MN Weintraub, SC Reed (2022). Long-term simulated atmospheric nitrogen deposition has minimal impacts on biogeochemical and ecosystem properties in three semiarid grasslands on the Colorado Plateau. Biennial Conference of Science and Management on the Colorado Plateau and Southwest Region (oral presentation).

Osborne BB, C Roybal, CD Collier, E Geiger, ML Phillips, R Reibold, MN Weintraub, SC Reed (2022). Three semiarid grasslands are resistant to nitrogen deposition but sensitive to edaphic variability. Ecological Society of America annual meeting (oral presentation).

Osborne, BB, P Adler, M Dannenberg, S Ferrenberg, S Jordan, S Lee, S Reed, O Sala, W Smith, T Terry, D Yan (2021). In hot deserts, drought is a stronger short-term regulator of biogeochemistry than physical disturbance. American Geophysical Union Fall meeting (oral presentation).

(Invited) **Osborne, BB** (2021). The consequences of drought and land use change for dryland biogeochemistry in the desert Southwest. Biology Departmental Seminar, New Mexico State University, Las Cruces, NM (oral presentation).

(Invited) **Osborne, BB** (2021). Nutrient limitations on dryland soil carbon cycling. Cotrufo Lab Meeting, Natural Resources Ecology Laboratory, Colorado State University, Fort Collins, CO (oral presentation).

Osborne, BB, P Adler, M Dannenberg, S Ferrenberg, S Jordan, S Lee, S Reed, O Sala, W Smith, T Terry, D Yan (2021). Climate dictates the effects of increased drought and physical disturbance on dryland soil biogeochemistry. Ecological Society of American annual meeting (oral presentation).

Osborne, BB, P Adler, M Dannenberg, S Ferrenberg, S Jordan, S Lee, S Reed, O Sala, W Smith, T Terry, D Yan (2021). Forecasting dryland ecosystem vulnerability to change: a cross-system assessment of vegetation and process responses to disturbance and climate variability on DoD lands. SERDP and ESTCP (DoD) Symposium (poster).

Osborne, BB, P Adler, M Dannenberg, S Ferrenberg, S Jordan, S Lee, S Reed, O Sala, W Smith, T Terry, D Yan (2020). Forecasting dryland ecosystem vulnerability to change: a cross-system assessment of vegetation and process responses to disturbance and climate variability on DoD lands. SERDP and ESTCP (DoD) Symposium (oral presentation).

Osborne BB, C Roybal, E Geiger, ML Phillips, SC Reed (2020). Nitrogen inputs are quickly lost from a semiarid grassland on the Colorado Plateau. Ecological Society of America annual meeting (oral presentation).

Osborne BB, FM Soper, MK Nasto, D Bru, S Hwang, MB Machmuller, L Philippot, BW Sullivan, GP Asner, CC Cleveland, AR Townsend, S Porder (2019). Effects of litterfall inputs on soil nitrogen cycling in a diverse tropical forest. American Geophysical Union Fall meeting (oral presentation).

Osborne, BB, P Adler, M Dannenberg, S Ferrenberg, S Jordan, S Lee, S Reed, O Sala, W Smith, T Terry, D Yan (2019). Forecasting dryland ecosystem vulnerability to change: a cross-system assessment of vegetation and process responses to disturbance and climate variability on DoD lands. SERDP and ESTCP (DoD) Symposium (poster).

Osborne, BB, P Adler, M Dannenberg, S Ferrenberg, S Jordan, S Lee, S Reed, O Sala, W Smith, T Terry, D Yan (2019). A cross-site assessment of dryland ecosystem vulnerability to physical disturbance and drought. Morley Nelson Snake River Birds of Prey National Conservation Area Symposium (poster).

Osborne BB (2018). Abiotic and biotic controls of nitrogen cycling in a lowland tropical forest. Brown University EEB Departmental Seminar (oral presentation).

Osborne, BB, GP Asner, CC Cleveland, FM Soper, A Townsend, S Porder (2018). Remotely sensed canopy N predicts differences in soil microbial community composition and activity at the sub-hectare scale in a lowland tropical forest. Ecological Society of America annual meeting (oral presentation).

Osborne, BB, MK Nasto, GP Asner, C Balzotti, CC Cleveland, P Taylor, AR Townsend, S Porder (2017). Canopy trees influence local biogeochemistry in a lowland tropical forest. Ecological Society of America annual meeting (oral presentation).

Osborne, BB, J Capano, KC Cushman, TR Dial, J Rehm (2017). Ecology and Conservation in East Africa. Brown University EEB Departmental Seminar (oral presentation).

Osborne, BB, MK Nasto, GP Asner, C Balzotti, CC Cleveland, P Taylor, AR Townsend, S Porder (2016). Canopy tree species drive local heterogeneity in soil nitrogen availability in a lowland tropical forest. American Geophysical Union Fall meeting (oral presentation).

Osborne, BB (2016). Topography, climate, and canopy chemistry influence soil nitrogen availability in lowland tropical forests of the Osa Peninsula. Osa Conservation Reforestation Forum (oral presentation).

Osborne, BB (2016). Controls of nitrogen availability in lowland tropical forests. Osa Conservation seminar for the public (oral presentation).

Osborne, BB, MK Nasto, GP Asner, CC Cleveland, BW Sullivan, P Taylor, AR Townsend, S Porder (2015). Geomorphology and canopy chemistry influence soil nitrogen availability on variable time scales in a lowland tropical forest. Ecological Society of America annual meeting (oral presentation).

Osborne, BB, MK Nasto, GP Asner, CC Cleveland, BW Sullivan, P Taylor, AR Townsend, S Porder (2015). Short and long-term controls on tropical forest nitrogen cycling in the Osa Peninsula, Costa Rica. Institute at Brown for Environmental Science Annual Retreat (oral presentation).

Osborne, BB (2014). Composition and diversity of microbial communities in salt marsh sediments. Brown-MBL Partnership Symposium (poster).

Osborne, BB (2013). Diversity and distribution of ammonia oxidizing bacteria in salt marsh sediments. Brown-MBL Partnership Symposium (poster).

Osborne, BB (2013). Moisture and temperature controls on nitrification differ among three alpine soil habitats. Brown University EEB departmental seminar series (oral presentation).

(invited) **Osborne, BB** (2013). The effects of temperature and moisture on alpine microbial processes across a gradient of soil development. University of Pennsylvania, Department of Earth and Environmental Science (oral presentation).

(invited) **Osborne, BB** (2013). The effects of temperature and moisture on alpine microbial processes across a gradient of soil development. University of Zurich, Department of Geography (oral presentation).

Osborne, BB, JS Baron, WD Wallenstein, ER Richer (2011). Alpine microbial community responses to summer warming. American Geophysical Union Fall Meeting (poster).

Osborne, BB, JS Baron, MD Wallenstein (2011). Alpine microbial responses to summer warming in Rocky Mountain National Park. Western Mountain Initiative (oral presentation).

Osborne, BB, JS Baron, MD Wallenstein (2011). Alpine microbial responses to summer warming in Rocky Mountain National Park. Mountain Research Initiative (USGS) Workshop (oral presentation).

Osborne, BB, JS Baron, MD Wallenstein, ER Richer (2011). Alpine microbial community responses to summer warming. Ecological Society of America annual meeting (poster).

Osborne, BB, JS Baron, MD Wallenstein, ER Richer (2010). Alpine microbial community responses to climate change and atmospheric nitrogen deposition in Rocky Mountain National Park. American Geophysical Union Fall Meeting (poster).

Osborne, BB, MD Wallenstein, JS Baron (2010). A survey of alpine microbial community response to climate change and atmospheric nitrogen deposition. Rocky Mountain National Park Research Conference (poster).

Osborne, BB, MD Wallenstein, ER Richer, JS Baron (2010). Microbial linkages between nitrogen deposition, glacier melt, and variable nitrate concentration trends. Front Range Student Ecology Symposium (poster).

Media coverage (selected)

News article features

Langlois, K (2023). [Future Forests of America](#). Sierra Magazine.

Hardford, A (2023). [Searching for answers in the field with Brooke Osborne](#). Moab Sun News.

Fisher, S (2022). [Carbon, climate and 'charismatic' crusts: The woman-powered world of Moab's biocrust research](#). Moab Times-Independent.

Haimowitz, M (2022). [Treading Lightly: Moab Utah – How the city has changed and how visitors can be mindful of their impact](#). Tripadvisor.

Baron, J, SC Reed (2021). Brooke Osborne and her quest to understand the responses of soils to climate change. USGS Science Spotlights

(2015) [Graduate student Osborne collaborates with RISD colleague to create artistic analogue of Costa Rican rainforest](#). Institute at Brown for Environment and Society Magazine.

Book quotes or contributions

Lindsey, ALM (2024). Reading and Writing the Climate Future in the Appalachian Forest. Climate Change Recipe Book.

Porder, S (2023). Elemental: How Microbes, Plants, and People Harnessed Five Essential Elements to Change the World. Princeton University Press.

Marzluff, JM (2020). In Search of Meadowlarks: Birds, Farms, and Food in Harmony with the Land. Yale University Press.

Peer reviews

Global Change Biology
New Phytologist
Biogeochemistry
Geoderma
U.S.G.S. Internal reviews (×5)

Journal of Sustainable Forestry
Plant and Soil
Journal of Plant Ecology
Microorganisms
Elementa: Science of the Anthropocene

Professional affiliations

Ecological Society of America

500 Women Scientists

American Geophysical Union
American Association for the Advancement of Science

Graduate Women in Science
Earth Science Women's Network