

Bradley J. Butterfield, Ph.D.

Associate Research Professor
Department of Biological Sciences
Northern Arizona University

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Education

- Ph.D. 2009 Plant Biology, Arizona State University, Tempe, AZ (Dean's Fellowship)
Advisors: John Briggs and Ann Kinzig
Dissertation: Structure and dynamics of Sonoran Desert perennial plant communities
- B.A. 2004 Biology, Rice University, Houston, TX
Advisors: Evan Siemann and William Rogers
Honors thesis: Growth of Chinese tallow tree (*Sapium sebiferum*) and four native trees under varying water regimes

Professional Experience

- 2019 – Associate Research Professor, Department of Biological Sciences, Northern Arizona University
- 2012 – 2018 Assistant Research Professor, Department of Biological Sciences, Northern Arizona University
- 2009 – 2011 Postdoctoral Researcher, Department of Environmental Science, Policy and Management, UC Berkeley. Supervisor: Katharine Suding

Knowledge

Biodiversity science
Environmental restoration
Climate change adaptation
Ecosystem services
Ecohydrology
Terrestrial and aquatic ecosystems

Skills

Computing languages:
R, SQL, Python
Parallel computing for informatics / big data
GIS / spatial data analysis
Process-based modeling
Machine learning

Experience

Collaboration with federal, tribal and private stakeholders
Cross-disciplinary work with economists and social scientists
Fundraising
Public outreach
International collaborations

Research Funding >\$3 million to date

BLM New Mexico. Building a Regeneration Window Tool for Rangeland Restoration. PI, \$1,200,000 (all NAU)

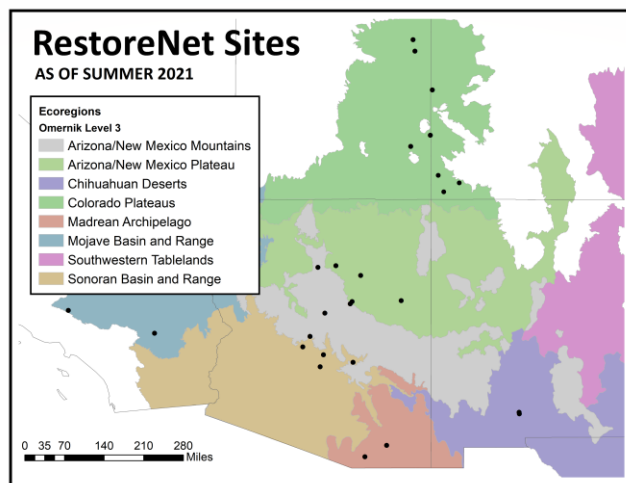
USGS Grand Canyon Monitoring and Research Center. Monitoring and analysis of riparian vegetation on the Colorado River. 2021-2024. PI, \$298,970 (all NAU).

USGS Southwest Biological Science Center. Modeling long-term ecological drought in dryland ecosystems of western North America. 2017-2021. PI, \$43,000 (all NAU).

USGS Grand Canyon Monitoring and Research Center. Assessing and modeling vegetation change along the Colorado River in support of trends assessment and vegetation resource management. 2017-2020. PI, \$404,648 (all NAU).

Funding Highlight: RestoreNet

Through collaboration with federal and tribal partners, ranchers and land managers, we developed RestoreNet, a distributed set of experiments aimed at identifying solutions for restoration of degraded drylands. My lab group focused primarily on restoration of ecosystem functioning – water infiltration, forage production, soil stabilization, weed suppression, etc. – through the lens of plant functional traits. The network continues to expand, addressing questions like seed mix selection, soil amendments, and restoring plant communities that are resilient to climate change.



BLM Colorado Plateau Native Plants Program. Integrated Monitoring and Seed Testing to Improve Restoration Outcomes on the Colorado Plateau. 2016-2021. PI, \$490,378 (all NAU).

USGS Southwest Biological Science Center. Building a restoration assessment and monitoring program for the Southwest. 2016-2020. PI, \$278,358 (all NAU).

USFS Great Basin Native Plants Program and BLM Colorado Plateau Native Plants Program.

Genetic and Environmental Regulation of Functional Traits: New Approaches for Restoration in a Changing Climate. 2015-2017. PI, \$179,459 (all NAU).

USGS Southwest Biological Science Center. Measurements and Modeling to Inform Dryland Sustainability. 2014-2018. PI, \$278,561 (all NAU).

BLM Colorado Plateau Native Plants Program. Ranking Native Plant Species and their Ecotypes for Use in Restoration on the Colorado Plateau. 2014-2015. PI \$11,750 (all NAU).

USGS Southwest Biological Science Center. Using Environmental Tolerances to Predict Long-Term Vegetation Dynamics. 2013-2014. PI \$18,303 (all NAU).

Arizona Department of Emergency Management. Vegetation Survey and Floral Inventory of Camp Navajo. 2011-2012. PI \$60,000 (all NAU).

Frontiers in Life Sciences at ASU (Co-PI). "Dynamic Deserts: Resource Uncertainty in Arid Environments". A multidisciplinary conference sponsored by ASU School of Life Sciences (SoLS), Feb. 28-Mar. 1, 2009. \$35,000 (ASU).

T&E Inc. Conservation Grant (PI). 2006. Influences of established vegetation and climatic factors on growth and survival of Sonoran Desert perennial plant seedlings. \$2,450 (ASU).

ASU Graduate and Professional Student Association Research Grant (PI). 2006. Dynamics of plant-soil interactions in the Sonoran Desert. \$785 (ASU).

Publications

Google Scholar statistics (Aug 14, 2025): Publications – 75, Citations – 6729, H index - 34

**Graduate student or *Postdoc under direct supervision

2025

Noel, A., Schlaepfer, D.R., Barrett, I.P., Duniway, M.C., Norris, J., Domschke, C.T., **Butterfield, B.J.**, Swan, M.C., Hartwig, K., Crist, M.R., and Bradford, J.B. In press. Shifts in suitability of pinyon-juniper communities: A climate adaptation framework for range-wide management of arid woodland resources. *Forest Ecology & Management*.

Butterfield, B.J., Schlaepfer, D.R., Al-Chokhachy, R.K., Dunham, J.B., Groom, J.D., Muhlfield, C.C., Torgersen, C.E., and Bradford, J.B. In press. Greater aquatic-terrestrial drought synchrony in more arid watersheds and drier years in the western United States. *Ecosphere*.

Butterfield, B.J., and Palmquist, E.C. In press. Daily fluctuating flow affect riparian plant species distributions from local to regional scales. *Applied Vegetation Science*.

Palmquist, E.C., Ogle, K., **Butterfield, B.J.**, Whitham, T.G., Allan, G.J., and Shafroth, P.B. 2025. Hotter temperatures alter riparian plant outcomes under regulated river conditions. *Ecological Monographs*, 95, e1645.

Noel, A., Schlaepfer, D.R., **Butterfield, B.J.**, Swan, M.C., Norris, J., Hartwig, K., Duniway, M.C., and Bradford, J.B. 2024. Most pinyon-juniper woodland species distributions are projected to shrink rather than shift under climate change. *Rangeland Ecology & Management*, 98, 454-466.

2024

Noel, A., Schlaepfer, D.R., Butterfield, B.J., Swan, M.C., Norris, J., Hartwig, K., Duniway, M.C., and Bradford, J.B. 2024. Most pinyon-juniper woodland species distributions are projected to shrink rather than shift under climate change. *Rangeland Ecology & Management*, 98, 454-466.

Butterfield, B.J., and Palmquist, E.C. 2024. Divergent physiological responses of hydric and mesic riparian plant species to a Colorado River experimental flow. *Plant Ecology*, 225, 125-133.

Butterfield, B.J., and Palmquist, E.C. 2024. Inundation tolerance, rather than drought tolerance, predicts riparian plant distributions along a local hydrologic gradient. *Wetlands*, 44, 6.

Michalet, R., Losapio, G., Kikvidze, Z., Brooker, R.W., Butterfield, B.J., Callaway, R.M., Cavieres, L.A., Lortie, C.J., Pugnaire, F.I., and Schob, C. 2024. Assessing the accuracy of paired and random sampling for quantifying plant-plant interactions in natural communities. *Population Ecology*, 66, 39-53.

2023

Butterfield, B.J., and Munson, S.M. 2023. Do seeding and seedling planting result in similar restored plant communities? *Applied Vegetation Science*, 26, e12758.

Butterfield, B.J., Farrell, H.L.*, and Munson, S.M. 2023. Plant water-use strategies predict restoration success across degraded drylands. *Journal of Applied Ecology*, 60, 1170-1180.

Farrell, H.L.*, Munson, S.M., Butterfield, B.J., Duniway, M.C., Faist, A.M., Gornish, E.S., Havrilla, C.A.*, Larios, L., Reed, S.C., Rowe, H.I., Laushman, K.M., and McCormick, M.L. 2023. Soil surface treatments and precipitation timing determine seedling development across southwestern US restoration sites. *Ecological Applications*, 33, e2834.

Palmquist, E.C.*, Ogle, K., Whitham, T.G., Allan, G.J., Shafroth, P.B., and Butterfield, B.J. 2023. Provenance, genotype, and flooding influence growth and resource acquisition characteristics in a clonal, riparian shrub. *American Journal of Botany*, 110, e16115.

Palmquist, E.C.*, Butterfield, B.J., and Ralston, B.E. 2023. Assessment of riparian vegetation patterns and change downstream from Glen Canyon Dam from 2014 to 2019. USGS Open File Report, 2023-1026.

Butterfield, B.J., Palmquist, E.C.***, and Yackulic, C. 2023. The hydroclimate niche: A tool for predicting and managing riparian plant community responses to streamflow seasonality. *River Research and Applications*, 39, 84-94.

2022

- Munson, S.M., Bradford, J.B., Butterfield, B.J., and Gremer, J.R. 2022. Primary production responses to extreme changes in North American Monsoon precipitation vary by elevation and plant functional composition through time. *Journal of Ecology*, 110, 2232-2245.
- Balazs**, K.R., Munson, S.M., and Butterfield, B.J. 2022. Functional composition of plant communities mediates biomass effects on ecosystem service recovery across an experimental dryland restoration network. *Functional Ecology*, 36, 2317-2330.
- Balazs**, K.R., Munson, S.M., Havrilla, C.A.*, and Butterfield, B.J. 2022. Directional selection shifts trait distributions of planted species in dryland restoration. *Journal of Ecology*, 110, 540-552.
- Yang, B., Balazs, K.R.**, Butterfield, B.J., Laushman, K.M., Munson, S.M., Gornish, E.S., and Barberan, A. 2022. Does restoration of plant diversity trigger concomitant soil microbiome changes in dryland ecosystems? *Journal of Applied Ecology*, 59, 560-573.

2021

- Havrilla*, C.A., Munson, S.M., Yackulic, E.O., and Butterfield, B.J. 2021. Ontogenetic trait shifts: Seedlings display high trait variability during early stages of development. *Functional Ecology*.
- Losapio, G., Schoeb, C., Staniczenko, P.P.A., Carrara, F., Palamara, G.M., De Moraes, C.M., Mesher, M.C., Brooker, R.W., Butterfield, B.J., Callaway, R.M., Cavieres, L.A., Kikvidze, Z., Lortie, C.J., Michalet, R., Pugnaire, F.I., and Bascompte, J. 2021. Network motifs involving both competition and facilitation predict biodiversity in alpine plant communities. *PNAS USA*, 118.
- Butterfield, B.J., Palmquist, E.C.**, and Hultine, K.R. 2021. Regional coordination between riparian dependence and atmospheric demand in willows (*Salix* L.) of western North America. *Diversity and Distributions*, 27, 377-388.
- Kasprak, A., Sankey, J.B., and Butterfield, B.J. 2021. Future regulated flows of the Colorado River in Grand Canyon foretell decreased areal extent of sediment and increases in riparian vegetation. *Environmental Research Letters*, 16, 014029
- Durning, L.E., Sankey, J.B., Yackulic, C.B., Grams, P.E., Butterfield, B.J., and Sankey, T. 2021. Hydrologic and geomorphic effects on riparian plant species occurrence and encroachment: remote sensing of 360 km of the Colorado River in Grand Canyon. *Ecohydrology*, e2344.
- Palmquist, E.C.**, Allan, G.J., Ogle, K., Whitham, T.G., Butterfield, B.J. and Shafroth, P.B. 2021. Riverine complexity and life history inform restoration in riparian environments in the southwestern US. *Restoration Ecology*, e13418.
- Guerrero-Ramirez, N.R. ... Butterfield, B.J., and many others. 2021. Global root traits (GRooT) database. *Global Ecology and Biogeography*, 30, 25-37.

2020

- Kushwaha, P., Neilson, J.W., Barberan, A., Chen, Y, Fontana, C.G., Butterfield, B.J. and Maier, R.M. 2020. Arid ecosystem vegetation canopy-gap dichotomy: Influence on soil microbial composition and nutrient cycling functional potential. *Applied and Environmental Microbiology*, 87, e02780-20.
- Havrilla, C.A.*, Munson, S.M., McCormick, M.L., Laushman, K.M., Balazs, K.R.** and Butterfield, B.J. 2020. RestoreNet: An emerging restoration network reveals controls on seedlings success across dryland ecosystems. *Journal of Applied Ecology*, 57, 2191-2202.
- Strawhacker, C., Snitker, G., Peeples, M.A., Kinzig, A.P., Kintigh, K.W., Bocinsky, K., Butterfield, B.J., Freeman, J., Oas, S., Nelson, M.C., Sandor, J.A., and Spielmann, K.A. 2020. A landscape perspective on climate-driver risks to food security: exploring the relationships between climate and social transformation in the prehispanic US Southwest. *American Antiquity*, 85, 427-451.
- Balazs, K.R.**, Kramer, A.T., Munson, S.M., Talkington, N., Still, S. and Butterfield, B.J. 2020. The right trait in the right place at the right time: Matching traits to environment improves restoration outcomes. *Ecological Applications*, 30, e02110.
- Butterfield, B.J., Grams, P.E., Durning, L.E., Hazel, J., Palmquist, E.C.**, Ralston, B.E. and Sankey, J.B. 2020. Associations between riparian plant morphological guilds and fluvial sediment dynamics along the regulated Colorado River in Grand Canyon. *River Research and Applications*, 36, 410-421.
- Kattge, J. and many others, including B.J. Butterfield. 2020. TRY plant trait database – enhanced coverage and open access. *Global Change Biology*, 26, 119-188.
- Hartsell, J.A., Copeland, S.M.*, Munson, S.M., Butterfield, B.J. and Bradford, J.B. 2020. Gaps and hotspots in the state of knowledge of pinyon-juniper communities. *Forest Ecology and Management*, 455, 117628.

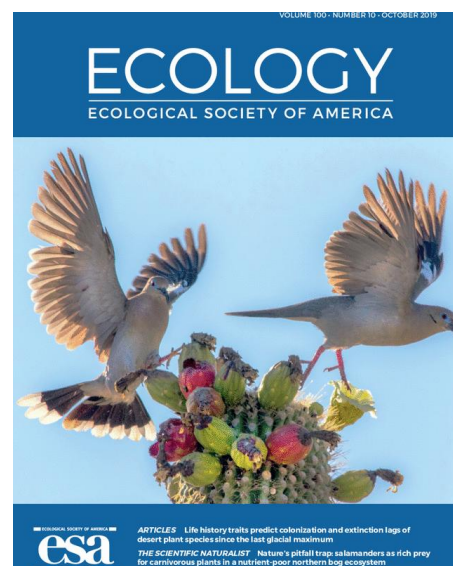
2019

- Camhi, A.L.**, Perrings, C., Butterfield, B.J. and Wood, T.E. 2019. Market-based opportunities for expanding native seed resources for restoration: A case study on the Colorado Plateau. *Journal of Environmental Management*, 252, 109644.
- McCabe, L.M.**, Cobb, N.S. and Butterfield, B.J. 2019. Environmental filtering of body size and darker coloration in pollinator communities indicate thermal restrictions on bees, but not flies, at high elevations. *PeerJ*, e7867.

Publication Highlight

In this cover article for *Ecology*, we used paleo-ecological data to demonstrate that species without specialized long-distance dispersal mechanisms lagged thousands of years behind other species during a period of climate warming, and that unique combinations of seed bank and vegetative longevity allowed species to persist thousands of years longer than others in the trailing edges of their distributions. These findings have important implications for predicting and assisting responses to current climate change.

Butterfield, B.J., Holmgren, C.A., Anderson, R.S. and Betancourt, J.L. 2019. Life history traits predict colonization and extinction lags of desert plant species since the Last Glacial Maximum. *Ecology*, e02817.



Potts, D.L., Barron-Gafford, G.A., Butterfield, B.J., Fay, P.A. and Hultine, K.R. 2019. Bloom and Bust: ecological consequences of precipitation variability in aridlands. *Plant Ecology*, 220, 135-139.

Butterfield, B.J., Holmgren, C.A., Anderson, R.S. and Betancourt, J.L. 2019. Extinction debt and delayed colonization have had comparable but unique effects on plant community-climate lags since the Last Glacial Maximum. *Global Ecology and Biogeography*, 28, 1067-1077.

Munson, S.M., Bunting, E.L., Bradford, J.B., Butterfield, B.J. and Gremer, J.R. 2019. Plant production responses to precipitation differ along an elevation gradient and are enhanced under extremes. *Ecosystems*, 22, 699-708.

Roybal, C.M.** and Butterfield, B.J. 2019. Species specific trait-environment relationships among populations of widespread grass species. *Oecologia*, 189, 1017-1026.

Copeland, S.M.*, Munson, S.M., Bradford, J.B., Butterfield, B.J. and Gunnell, K.L. 2019. Long-term plant community trajectories suggest divergent responses of native and non-native perennials and annuals to vegetation removal and seeding treatments. *Restoration Ecology*, doi:10.1111/rec.12928.

2018

Copeland, S.M.*, Munson, S.M., Bradford, J.B. and Butterfield, B.J. 2018. Influence of climate, post-treatment weather extremes, and soil factors on vegetation recovery after restoration treatments in the southwestern US. *Applied Vegetation Science*, 24, 1844-1859.

- Hultine, K.R., Dettman, D.L., Williams, D.G., Puente, R., English, N.B., Butterfield, B.J. and Burquez, A. 2018. Relationships among climate, stem growth, and biomass $\delta^{13}\text{C}$ in the giant saguaro cactus (*Carnegiea gigantea*). *Ecosphere*, 9, e02498.
- Butterfield, B.J., Palmquist, E.** and Ralston, B. 2018. Hydrological regime and climate interactively shape riparian vegetation composition along the Colorado River, Grand Canyon. *Applied Vegetation Science*, 21, 572-583. **[Featured Cover Article]**
- Winkler, D.E., Backer, D.M., Belnap, J., Bradford, J.B., Butterfield, B.J. *et al.* 2018. Beyond traditional ecological restoration on the Colorado Plateau. *Restoration Ecology*, 26, 1055-1060.
- Bradford, J.B., Betancourt, J.L., Butterfield, B.J., Munson, S.M. and Wood, T.E. 2018. Anticipatory natural resource science and management for a dynamic future. *Frontiers in Ecology and the Environment*, 16, 295-303.
- Roybal, C.M.** and Butterfield, B.J. 2018. Functional trait heritability and local climatic adaptation among grasses: A meta-analysis. *Plant Ecology*, 4, 369-379.
- Copeland, S.M.*, Bradford, J.B., Duniway, M.C. and Butterfield, B.J. 2018. Life history characteristics may be as important as climate projections for defining range shifts: An example for common tree species in the intermountain western US. *Diversity and Distributions*, 24, 1844-1859.
- Copeland, S.M.*, Munson, S.M., Pilliod, D.S., Welty, J.L., Bradford, J.B. and Butterfield, B.J. 2018. Long-term trends in restoration and associated land treatments in the Southwest United States. *Restoration Ecology*, 26, 311-322.

2017

- Butterfield, B.J., Bradford, J.B., Munson, S.M. and Gremer, J.R. 2017. Aridity increases belowground niche breadth in grass communities. *Plant Ecology*, 218, 385-394.
- Hungate, B.A., Barbier, E.B., Ando, A.W., Marks, S.P., Reich, P.B., van Gestel, N., Tilman, D., Knops, J.M.H., Hooper, D.U., Butterfield, B.J. and Cardinale, B.J. 2017. The economic value of grassland species for carbon storage. *Science Advances*, 3, e1601880.
- Doherty, K.D., Butterfield, B.J. and Wood, T.E. 2017. Matching seed to site by climate similarity: techniques to prioritize plant materials development and use in restoration. *Ecological Applications*, 27, 1010-1023.
- Funk, J.L., Larson, J.E., Ames, G.M., Butterfield, B.J., Cavender-Bares, J., Firn, J., Laughlin, D.C., Sutton-Grier, A.E., Williams, L. and Wright, J. 2017. Revisiting the Holy Grail: using plant functional traits to understand ecological processes. *Biological Reviews*, 92, 1156-1173.
- Butterfield, B.J., Copeland, S.M.*, Munson, S.M., Roybal, C.M.** and Wood, T.E. 2017. Prestoration: Using species in restoration that will persist now and into the future.

2016

- Hultine, K.R., Williams, D.G., Dettman, D.L., Butterfield, B.J. and Puente-Martinez, R. 2016. Stable isotope physiology of stem succulents across a broad range of volume-to-surface area ratio. *Oecologia* 182, 679-690.
- Butterfield, B.J. and Munson, S.M. 2016. Temperature is better than precipitation as a predictor of plant community assembly across a dryland region. *Journal of Vegetation Science* 27, 938-947.
- Butterfield, B.J., Camhi, A.L.** , Rubin, R.L.** and Schwalm, C.R. 2016. Tradeoffs and compatibilities among ecosystem services: Biological, physical and economic drivers of multifunctionality. *Advances in Ecological Research* 54, 207-243.
- Butterfield, B.J., Bradford, J., Armas, C., Prieto, I. and Pugnaire, F.I. 2016. Does the stress gradient hypothesis hold water? An assessment of vegetation effects on soil moisture and implications for plant-plant interactions. *Functional Ecology* 30, 10-19.
- Spasojevic, M.J., Butterfield, B.J., Bahlai, C.A., Bradley, B., Sistla, S., Tuanmu, M.-N., Wiederholdt, R. and Suding, K.N. 2016. Functional diversity increases resilience of forest productivity to fire: scaling up community assembly theory to the continental scale. *Global Change Biology*, 22, 1421-1432.

2015

- Butterfield, B.J. and Wood, T. 2015. Local adaptation and cultivation, but not ploidy, predict functional trait variation in *Bouteloua gracilis* (Poaceae). *Plant Ecology*, 216, 1-9.
- Kikvidze, Z., Brooker, R.W., Butterfield, B.J., et al. 2015. The effects of foundation species on community assembly: a global study on alpine cushion plant communities. *Ecology* 96, 2046-2069.
- Butterfield, B.J. 2015. Environmental filtering increases in intensity at both ends of climatic gradients, though driven by different factors, across woody vegetation types of the southwest USA. *Oikos* 124, 1374–1382.

2014

- Schöb, C., Callaway, R.M., Anthelme, F., Brooker, R.W., Cavieres, L.A., et al., and Butterfield, B.J. 2014. The context dependence of beneficiary feedback effects on benefactors in plant facilitation. *New Phytologist*, 204, 386-396.

Schöb, C., Michalet, R., Cavieres, L.A., Pugnaire, F.I., Brooker, R.W., Butterfield, B.J., *et al.* 2014. A global analysis of bi-directional interactions in alpine plant communities shows facilitators experience strong reciprocal fitness costs. *New Phytologist* 202, 95-105.

Cavieres, L.A., R.W. Brooker, Butterfield, B.J., *et al.* 2014. Facilitative plant interactions and climate simultaneously drive alpine plant diversity. *Ecology Letters* 17, 193-202.

2013

Spafford, R.D., Lortie, C.J. and B.J. Butterfield. 2013. A systematic review of arthropod community diversity in association with invasive plants. *NeoBiota* 16, 81-102.

Butterfield, B.J., Cavieres, L.A., Callaway, R.M., Cook, B.J., Kikvidze, Z., Lortie, C.J., *et al.* 2013. Alpine cushion plants inhibit the loss of phylogenetic diversity in severe environments. *Ecology Letters*, 16, 478-486.

Butterfield, B.J. and R.M. Callaway. 2013. A functional-comparative approach to facilitation and its context-dependence. *Functional Ecology*, 27, 907-917.

Butterfield, B.J. and K.N. Suding. 2013. Single-trait functional indices outperform multi-trait indices in linking environmental gradients and ecosystem services in a complex landscape. *Journal of Ecology*, 101, 9-17.

2012

Clark, C.M., Flynn, D.F.B., Butterfield, B.J. and P.B. Reich. 2012. Testing the link between functional diversity and ecosystem functioning in a Minnesota grassland experiment. *PLoS ONE*, 7, e52821.

Schöb, C., Butterfield, B.J. and F.I. Pugnaire. 2012. Foundation species influence trait-based community assembly. *New Phytologist*, 196, 824-834.

Pre-2012

Butterfield, B.J. and J.M. Briggs. 2011. Regeneration niche differentiates functional strategies of desert woody plant species. *Oecologia*, 165, 477-478.

Butterfield, B.J., Betancourt, J.L., Turner, R.M. and J.M. Briggs. 2010. Facilitation drives 65 years of vegetation change in the Sonoran Desert. *Ecology*, 91, 1132-1139.

Butterfield, B.J. 2009. Effects of facilitation on community stability and dynamics: Synthesis and future directions. *Journal of Ecology*, 97, 1992-1201.

Butterfield, B.J. and J.M. Briggs. 2009. Patch dynamics of soil-biotic feedbacks in the Sonoran Desert. *Journal of Arid Environments*, 73, 96-102.

Butterfield, B.J., Rogers, W.E. and E. Siemann. 2004. Growth of Chinese tallow tree (*Sapium sebiferum*) and four native trees under varying water regimes. *Texas Journal of Science*, 56, 335-346.

Selected Presentations

Effects of daily fluctuation flows on riparian plant distributions. Grand Canyon Monitoring and Research Center Annual Reporting Meeting, Phoenix, AZ, Apr 9, 2025.

Predictive vegetation modeling: progress and opportunities for growth. Grand Canyon Monitoring and Research Center Annual Reporting Meeting, Phoenix, AZ, Jan 24, 2023.

The hydroclimate niche: a tool for predicting and managing riparian plant community responses to streamflow seasonality. Invited Speaker, Colorado Plateau Biennial Conference of Science and Management, Flagstaff, AZ, Sept. 14, 2022.

Facilitation and BEF in restoration. Facilitation and Biodiversity-Ecosystem Functioning Workshop funded by SNF, Lausanne, Switzerland, May 31, 2022.

The hydroclimate niche: a useful target for management? RiversEdge West (Remote), Feb 24, 2022.

Leveraging community assembly theory in restoration of dryland ecosystems. Invited Speaker, EBIO Department Seminar, University of Colorado, Boulder, Oct. 15, 2021.

The RestoreNet biodiversity-ecosystem function experiment. Invited Special Symposium, Society for Ecological Restoration Annual Meeting (Remote), June 22, 2021.

Life-history traits predict colonization and extinction lags of desert plant species since The Last Glacial Maximum. Colorado Plateau Biennial Conference of Science and Management, Flagstaff, AZ, Sept. 11, 2019.

Extinction debt and delayed colonization have comparable but unique effects on community-climate lags since The Last Glacial Maximum. Colorado Plateau Biennial Conference of Science and Management, Flagstaff, AZ, Sept. 11, 2019.

Outreach Highlight

I work with diverse stakeholders to provide decision support for ecosystem restoration and management. I conduct this work both in both upland and riparian ecosystems. These activities were typified by two invited presentations I gave in 2019 with organizations that bring together agency, non-profit and corporate entities involved in land management:

Translating research into decision-support tools for restoration practitioners. Keynote Speaker, Intermountain Native Plant Summit IX, Boise, ID, Nov. 5, 2019.

Riparian dependence increases with atmospheric demand among species of willows (Salix L.) of Western North America. Invited Speaker, RiversEdge West Annual Meeting, Grand Junction, CO, Feb. 5, 2019.



Hydrological regime and climate interactively shape riparian vegetation composition along the Colorado River, Grand Canyon. International Association of Vegetation Scientists Annual Meeting, Bozeman, MT, 2018.

Seed traits and desert plant community reassembly since the Last Glacial Maximum. EcoRe3 Working Group Meeting, Salt Lake City, UT, 2018.

Temperature mediates precipitation responses in drylands. Invited Speaker for Organized Session, Bloom and Bust: Ecological Consequences of Precipitation Variability in Aridlands. Ecological Society of America Annual Meeting, Portland, OR, 2017.

Prestoration: Using species in restoration that will persist now and into the future. Invited Speaker, Society for Ecological Restoration Southwest Chapter Annual Meeting, Las Vegas, NV, 2016.

Can we Prestore the Colorado Plateau? Colorado Plateau Biennial Conference of Sciences and Management, Flagstaff, AZ, 2015.

Environmental tolerances of woody vegetation across the Southwest USA. Colorado Plateau Biennial Conference of Sciences and Management, Flagstaff, AZ, 2013.

Interaction networks in desert plant communities. Invited speaker, Desert Botanical Garden Research Seminar, Phoenix, AZ, 2012

Linking environment to multiple ecosystem services: How best to represent functional diversity? Invited speaker, Symposium – Revisiting the Holy Grail: Using trait-based ecology as a framework for preserving, utilizing, and sustaining our ecosystems, ESA Annual Meeting, Portland, OR, 2012

Evolutionary history constrains ecological convergence in alpine plant communities on 5 continents. ESA Annual Meeting, Austin, TX, 2011

Phylo-functional facilitation. Invited speaker, Plant Interactions and Environmental Gradients Symposium, Benasque, Spain, 2010

Desert perennial plant functional strategies are related to facilitative response and precipitation variability. ESA Annual Meeting, Albuquerque, NM, 2009

Effects of facilitation on temporal community dynamics: Synthesis and future directions. Invited speaker, British Ecological Society Annual Symposium, Aberdeen, Scotland, 2009

Facilitation dominates 65 years of desert plant community dynamics. ESA Annual Meeting, Milwaukee, WI, 2008

Patch dynamics of soil biotic feedbacks in the Sonoran Desert. Research Insights in Semiarid Environments Symposium, University of Arizona, 2007

Courses Taught

Northern Arizona University, 2012-

Community Ecology

Ecological Niche Modeling

Introductory Ecology

Concepts in Ecology

Teaching Associate, School of Life Sciences, Arizona State University, 2007-2008

Introductory biology lab

Ecology lab (field and analytical methods)

Teaching Assistant, Rice University, Department of Biology, 2004

Ecology

Graduate Students and Post-Docs

Advisor

Megan Korte, Post-Doc, 2024 – present

Shelby Byerly, NAU Biology, PhD, 2019 – 2023

Caroline Havrilla, Post-Doc, 2019 – 2021

Caitlin Winterbottom, NAU Biology, MS, 2018 – 2021

Austin Rueda, NAU Biology, MS, 2017 – 2020

Stella Copeland, Post-Doc, 2016 – 2018

Kathleen Balazs, NAU Biology, NAU Presidential Fellow, PhD, 2016 – 2021

Carla Roybal, NAU Biology, MS, 2015 – 2018

Committee Member

Brooke Harris, NAU Biology, MS, 2024 – present

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