Preview of Award 2025849 - Annual Project Report

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Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	Jesse B Nippert

Accomplishments

*** What are the major goals of the project?**

The Konza Prairie LTER program (KNZ) focuses on the ecological dynamics of tallgrass prairie - a historically widespread mesic grassland in the North American Great Plains. Our core research site is the Konza Prairie Biological Station (KPBS), a 3487 ha native tallgrass prairie located in the Flint Hills of northeast Kansas, USA. Since 1980, KNZ has investigated how key drivers of grasslands globally - fire, grazing, and climatic variability - interact to influence tallgrass prairie structure and function. The conceptual framework of KNZ LTER VIII builds on long-term studies, reflects the increasing complexity of research questions developed over the history of this program, and explicitly recognizes that tallgrass prairie pattern and process results from human alteration of ecological drivers at local (e.g., land use and management), regional (e.g., nutrient inputs) and global (e.g., climate change) scales. KNZ LTER VIII will provide new information critical for understanding, managing, and conserving grasslands globally, while concurrently addressing fundamental ecological questions to explain grassland dynamics in a changing world.

KNZ utilizes long-term, watershed-scale manipulations of fire frequency and grazing by large ungulates, coupled with numerous plot-scale manipulations (i.e., nutrients and rainfall) to test ecological theory and address timely questions regarding grassland responses to multiple, interacting global changes. KNZ LTER VIII builds upon a legacy of long-term observations and experiments manipulating key drivers to assess changes in the structure and function of tallgrass prairie and associated dynamics in aquatic systems. A recurring theme from prior KNZ research is that grassland responses to variation in ecological drivers vary in magnitude and change dynamically over time. Long-term studies are required to improve our ability to forecast change in this ecosystem, identify the mechanisms that facilitate and reinforce these ecological changes, and determine if the ecological changes we have observed are reversible. LTER VII began our focus on mechanisms that underlie the sensitivity and resilience of ecosystem states in mesic grasslands. LTER VIII will utilize the array of ecosystem states that have emerged from these manipulations of historical and global change drivers to refine our understanding of sensitivity, resilience, and ecosystem state change in tallgrass prairie.

To accomplish the goals of KNZ LTER VIII, our proposed research comprises four thematic areas: 1) watershed-level study of the long-term effects of historical drivers (fire and grazing), 2) experimental manipulations of global change drivers, 3) cessation or reversal of selected drivers, and 4) human intervention. Collectively, we will use ongoing and new activities under

each theme to assess ecosystem sensitivity and resilience through the manipulation or restoration of drivers or ecosystem states. We will: 1) conduct targeted investigations of mechanisms that underlie ecosystem sensitivity and state change as informed by results to date, 2) interpret experiments in the context of long-term observations at KNZ and in comparison to other grasslands and biomes, 3) advance general ecological theory and inform theoretical and process-based ecological models, and 4) maximize the broader impacts of our research by providing full open access to all core datasets, applying insights from KNZ research to management, conservation, and restoration of grasslands, while expanding KNZ education and public outreach programs.

*** What was accomplished under these goals and objectives (you must provide information for at least one of the 4 categories below)?**

Major Activities:

The LTER VIII conceptual framework integrates the increasing complexity of previous iterations of LTER research and recognizes that the key determinants of patterns and processes in grasslands are directly (land use and management) and indirectly (climate change and nutrient inputs) determined by human activities. Experimental manipulation of drivers allows us to assess sensitivity, transitions between states, and the potential for recovery or changes in resilience.

The watershed-scale experiment and a multitude of plot-level manipulations are used to: 1) reveal mechanisms underlying ecosystem state changes in response to altered and variable ecological drivers (O'Connor et al. 2020, Collins et al. 2021, Eckhoff et al. 2023); 2) interpret responses in the context of long-term observations at KNZ (Knapp et al. 2018, Bruckerhoff et al. 2020, Smith et al. 2020) and in comparison to other grasslands and biomes (e.g., Smith et al. 2016, Koerner et al. 2018, Komatsu et al. 2019, Rastetter et al. 2022); and 3) advance ecological theory and inform process-based models (Smith et al. 2009, Dodds et al. 2015, Ratajczak et al. 2017, Brunsell et al. 2017, Ratajczak et al. 2018). Last, we maximize the broader impacts of our research by providing full open access to all core datasets, applying insights from KNZ research to management, conservation, and restoration of grasslands, while expanding KNZ education and public outreach programs.

During year 3 of KNZ LTER VIII, we maintained our core KNZ programs including watershed-level fire experiments, contrasts of grazed (bison and cattle) and ungrazed locations, and the associated data collection and synthesis that are central to our research program. This includes maintaining watershed-level manipulations of fire frequencies (1, 2, 4, 20-year fire return intervals), seasonal timing of fires (spring, summer, fall, winter), and the reversal of fire treatments over time to assess the potential for altered fire regimes to mitigate trajectories of land-cover change. Collectively, we use ongoing and new activities under each theme to assess how changes in the key drivers of ecosystem processes impact the sensitivity and resilience of grassland ecosystem states. In addition to the watershed-level experimental platform at KNZ, there are numerous plot-level and stream reach experiments that aim to tease apart mechanisms underlying the grassland response to variation in historical and global change drivers. This platform of research also provides unique research opportunities for graduate and undergraduate students at KSU, as well as visiting students from many other institutions.

This past summer, we completed our mid-funding site review along with year 3 of our LTER VIII award. We appreciated the input by the review team, and the opportunity to improve our program. The process of preparing for the site review also presented an opportunity to synthesize our current research and showcase our program. In the 'Activities' section of this report, we have provided a copy of our field handouts booklet from the site review, as these provided a comprehensive and up-to-date assessment of the projects underway in KNZ LTER VIII.

Nippert has completed his sixth year as the PI of the KNZ program. He has frequent meetings with other KSU PI's (Zeglin, Blair, Gido, Dodds) and Nippert and the KNZ staff have monthly meetings. We have an annual KNZ LTER meeting as well as bi-weekly

Konza LTER meetings to discuss research, DEI initiatives, network activities, new projects, and planning. In addition to these frequent research meetings, we have stand-alone monthly DEI meetings to discuss new ways to broaden KNZ participation and create a more equitable environments for ecological research. We provide many avenues for potential engagement in research and outreach for students, staff, and faculty. Several KNZ staff were added in the past year. After being with KNZ LTER since 2018, our analytical chemist Courtney Tobler left the program due to a family relocation. Janaye Figge was hired to replace Courtney. We also hired Nathan King to serve as our experimental projects coordinator. Nathan provides technical assistance for any KNZ investigator needing help with experiment construction, datalogger operation, or time-sensitive measurements.

Specific Objectives:

Significant Results:

Tallgrass prairie is an endangered ecosystem. Most of the former extent of this ecosystem is now dominated by row crop agriculture, and what little grassland remains is currently threatened by woody encroachment. In addition to increasing relevance of KNZ research to widespread land-use practices, ecological restoration presents an opportunity to test and advance community assembly and ecosystem development theory. Given that restoration is central to LTER VIII, we thought we'd provide some significant results from our 'Human Interventions' section including restoration from agriculture, woody encroachment, and stream connectivity.

Restoring Tallgrass Prairie from Agriculture

a. Sequential Restoration plots

Few studies in ecology have been replicated over time and followed over the long term to robustly test whether stochastic events have predictable outcomes for community and ecosystem development (Werner et al. 2020). To inform this knowledge gap, prairie was restored every other year in a lowland agricultural field at Konza Prairie from 2010-2022 (spanning LTER VI, VII, and VIII). The same twenty species and number of live seeds of each species were sown in a former agricultural field to isolate the effect of interannual variability in planting-year climate on development trajectories. By June of 2022, this community assembly experiment contained seven independent and identically reconstructed sequences (SEQ I-VII) each containing replicate plots of tallgrass prairie established in planting years receiving 571 to 981 mm of annual precipitation and a nearly 3-fold difference in June/July precipitation. Results from the first six years of study (2010-2016) demonstrated contrasting ANPP, cover, richness, and composition of communities among the first three sequences established in average (SEQ I), low (SEQ II), and intermediate (SEQ III) precipitation years (Manning and Baer 2018). Plant compositional change in four sequences each measured over five establishment years (SEQs I-IV from 2010 to 2020) showed that communities became more similar as they developed, but all communities remained distinct into their 5th growing season and June/July precipitation in the planting year explained significant variation in community composition. The full experiment demonstrates decade-long effects of drought on community composition and little change in composition after the 6th year, suggesting planting-year effects on composition are not transient states (Eckhoff et al. 2023).

b. Restoration drought studies

Ecological restoration aims to reconstruct ecosystems that are resilient to periodic stress like drought (Gann et al. 2019), but few studies have quantified resilience in restorations. We compared resilience to a naturally occurring drought in restored and native prairies and in a long-term restoration experiment with contrasting levels of soil heterogeneity to test whether environmental heterogeneity increases resilience in restored prairie. Both total ANPP and sensitivity of ANPP to a natural drought were similar in restored and native prairie. Further, drought legacy effects on ANPP were positive in both prairie types, but more positive in restored prairie due to the

heterogeneity treatment. To understand the effect of drought on newly assembling communities, we also imposed drought via rainfall reduction shelters (66% interception) established at the onset of a restoration (2 shelters randomly assigned to two subplots within each of four 20 m x 20 m plots) in 2018. An unexpected severe, localized drought occurred in 2018, which created a legacy effect of drought in the controls. The legacy effect of drought in across all treatments in 2018 was supported by comparing plant composition in the 2018 drought experiment to prairie restored (using the same methods) in the drought of 2012 (Eckhoff 2022).

Restoring the grassland state from woody encroachment

a. Riparian woody removal

Woody expansion along riparian corridors has altered grassland-dominated vegetation to shrub and tree-dominated stream margins. In 2010, we cut all woody riparian vegetation for 30 m on each side of the main channel of watershed N2B, with repeated treatments from 2010-2020. All plots (control, cut, and cut/reseeded with grasses) became shrub dominated over the subsequent decade. Increases in nutrients and sediments occurred in the first three years after removal (Larson et al. 2019), but the stream returned to its original state (reflecting a multi-decadal trend) thereafter. The system appears to be on a stable trajectory toward woody cover dominance that is highly resilient to strong perturbations (cutting and regular fire), despite human intervention designed to return the system to its prior grassy state (Dodds et. al 2023). The only statistically significant factor influencing the decrease in streamflow days and discharge was an increase in proportion of woody cover on the broader landscape (Keen et al. 2023, Dodds et al. 2023).

b. Whole-watershed woody removal

As woody encroachment continues across the landscape, it is unclear what the best approach is to shift the landscape back to one dominated by grasses, because increasing fire frequency alone is not enough to remove the shrubs (Collins et al. 2021). On a watershed that was historically unburned, a novel approach was employed aiming to create particularly intense fires by first cutting down all woody vegetation (trees and shrubs) outside the riparian zone, then leaving them on the landscape to dry, with the aim of increasing fuel load and burn intensity. While the treatment watershed is visibly less shrubby following the cuttings and intense fires, preliminary data suggests that there is no reduction in the number of woody stems, signifying that the woody plants, while reduced in stature, still persist across the landscape. This suggests that the alternative state of a woody-encroached landscape is very resilient, and that it will be difficult to restore grasslands using intensified fire alone.

Restoring Streams

a. Restoring stream connectivity

Fragmentation of streams through dams and poorly constructed road crossings is a major threat to biodiversity, reducing the resilience of stream communities following disturbance. Few, if any, studies have evaluated the impacts of fragmentation in intermittent streams. Gido et al. (2023) used a passive integrated transponder tagging study to quantify dispersal of prairie-stream fishes through a perched culvert in Kings Creek for three years before and three years after removing the culvert. No upstream fish movement occurred through the culvert until its removal, when all species moved upstream and were observed actively spawning in the intermittent reach. We also used KNZ data to track the recovery of the fish community following a severe drought in 2018 in two spring-fed tributary reaches that in the past have served as refugia for upstream fishes, one without a downstream barrier and one with the removed downstream culvert. The fish community rapidly recovered following drought in the tributary without a

downstream barrier, but recovery at the site above the removed culvert was limited by a natural waterfall. Barriers in intermittent prairie streams inhibit fish access to spawning habitat and increase their resilience following disturbance.

Key outcomes or Other achievements:

*** What opportunities for training and professional development has the project provided?**

The Konza LTER program provides training and professional development opportunities at many levels, including K-12 teachers, undergraduate and graduate students, post-doctoral scientists from a number of different institutions, junior tenure earning faculty members, and professional research staff. Below we summarize some of the recent and continuing opportunities provided by the KNZ program. The Konza Prairie Schoolyard LTER (SLTER) program is in its 25th year as a science education program for K-12 teachers and their students, built around the successful Konza Prairie LTER program. The Konza Prairie SLTER program aims to educate students about ecology and global change, with emphasis on regional grasslands, by engaging students and teachers in realistic and relevant science-based activities focused on long-term data collection at our LTER site. These activities were designed to give students an understanding of ecology, provide them the opportunity to collect and interpret their own data. K-12 teachers who wish to bring their classes to Konza Prairie and to experience the Schoolyard LTER activities must first participate in a Summer Teachers' Workshop. This week-long program introduces the teachers to each of the activities offered by the Konza Environmental Education Program (KEEP) and, at the completion of the workshop, allows them to tailor an educational experience specific to the needs of their students. The teachers who complete the program qualify to bring their classes to Konza for no charge and have their bus transportation costs paid. This agreement stands for the rest of the teachers' professional career. These educators have become important partners in KEEP and many return annually. We have trained 121 area teachers since our program began in 1998. The number of SLTER student participants in 2022 (most recent year with complete data) was 644.

KEEP has partnered with the Manhattan/Ogden KS School District 383 and Fort Riley/Junction City School District 475 to be a ready source of informal science education – specifically addressing core science concepts that are easily experienced during a Konza visit. To meet this need we train volunteer docents that assist in public education and outreach activities. New docents are added to the program annually and receive 40 hours of training on the history and ecology of the tallgrass prairie as well as an overview of research being conducted at Konza. Experienced docents regularly are appraised of new research program and the progress of existing research and become ambassadors of science to the community. The KEEP program has trained over 300 docents (60 who were active during this reporting year). Additionally, we partner with the Flint Hills Discovery Center (Manhattan, KS) to co-host visiting school groups.

The Konza LTER program continues to emphasize quality graduate student training. During the 2022-2023 funding period, we provided stipends and other forms of non-financial support (vehicle use, site use, analytical laboratory use, attendance at regional/national meetings) for 31 graduate students, including both KSU and non-KSU graduate students. We continue to foster graduate research involving students attending Colorado State University, University of Kansas, Johns Hopkins, Wyoming, UNC-Greensboro, Penn State, and Oregon State. In 2022-2023, 13 thesis/dissertations were completed that included research conducted and data acquired from Konza Prairie.

Nine KNZ LTER graduate students and postdocs participated in the inaugural Grassland Rocks data synthesis program. Kim Komatsu was our faculty lead for year 1 of this program. Grassland Rocks is a collaborative program between 3 LTER grassland sites (Kellogg, Cedar Creek, and Konza) to teach graduate students data synthesis/meta-analysis techniques and working in teams for synthesis projects. Participants will meet annually at one site to network, collaborate, and synthesize data across the 3 sites. Konza plans to host year 2 of Grassland Rocks.

KNZ also offers research experiences for a large number of undergraduate students. In the summer 2023, the Konza LTER program supported 2 REU students and hosted an additional 2 students on site (not using LTER funds). Details on their project and experience are provided in the supplementary "Findings" document. The Konza LTER program provides hands-on research opportunities for ~45-50 undergraduate research assistants each year. These undergraduates are employed by KNZ LTER directly (as part of field crews collecting core LTER datasets) or indirectly in the labs of Konza faculty researchers. KNZ also supports and provides professional development for our professional research staff members, including training in the use of field and laboratory equipment, training in health and safety protocols, training in prescribed fire practices, and other relevant professional development. KNZ has a strong history of providing mentoring and research training for recent PhD's and junior faculty members. The KNZ program also provides resources and mentoring to tenure-earning faculty members. In our current funding cycle, this includes assistant professors in Biology at KSU (Andrew Hope, Allison Louthan,

and Zak Ratajczak), Geography (Abby Langston), as well as support for Pam Sullivan (Geography at Oregon State University), Sally Koerner (UNC-Greensboro), Meghan Avolio (Johns Hopkins), Kevin Wilcox (UNC - Greensboro), and Kim Komatsu (UNC-Greensboro).

*** Have the results been disseminated to communities of interest? If so, please provide details.**

Konza LTER results are disseminated to the scientific community via publications in peer-reviewed literature, through presentations at professional meetings and workshops, through seminars by KNZ scientists and students, through social media (Twitter, Facebook, Researchgate), and via the KNZ and KPBS websites. In addition, KNZ scientists have participated in a broad range of activities that go beyond the scientific community. For example, KNZ data and findings are using in a number of undergraduate and graduate courses at Kansas State University, the University of Kansas, University of Arizona, Colorado State University, and University of Oklahoma, among others. Data and insight from the Konza LTER program is used by resource managers for effective land stewardship. Currently, our research concerning the role of seasonal burning and fire intensity on woody encroachment is being used to inform the Great Plains Fire Science Exchange (www.gpfirescience.org) and the Tallgrass Prairie and Oak Savanna Fire Science Consortium (www.tposfirescience.org). Both of these non-profit groups focus on conservation issues and land management of Midwestern grasslands. In addition, many of the Konza investigators serve as scientific consultants for a regional cultural and natural history center, the 'Flint Hills Discovery Center' in Manhattan, KS. In 2023, KEEP continued work on the "Prairie Week" curricula. The curricula, containing an online set of PowerPoints, videos, and worksheets, has extended to include a middle school program. The middle school curriculum guides the students through the ecology of the prairie ecosystem, focusing on the tallgrass prairie to eventually work them towards the high school curricula (currently in development) which will focus on the bison's influence on prairie life. The curriculum is semester-long program exploring KNZ data sets, site videos, and researcher interviews. In 2022-2023, KNZ scientists and graduate students participated in numerous public outreach events designed to enhance the understanding of LTER science and dissemination of important findings. A few examples include: Zak Ratajczak and John Blair were interviewed by KCUR (NPR in Kansas City) regarding long-term bison research. Alice Boyle discussed her participation in the Motus tracking system for migrating birds. Several other broader impacts and scientific extensions from Konza LTER program are discussed in future detail in the 'Broader Impacts' section of this annual report.

*** What do you plan to do during the next reporting period to accomplish the goals?**

We are entering year 4 of the LTER VIII. As you have seen from earlier in this report, we have a great start, and progress underway for each of the new projects proposed for this award. During year 4 we will: 1) continue our core-data collection, processing, and online data integration of the current year and previous years' samples; 2) continue to update and error check the online data associated with KNZ LTER database and LTER network information management system; 3) continue to improve data accessibility and search options within our online database; 4) update our spatial data portal and online accessibility of our GIS data, 5) continue to support the development of new research projects initiated by KNZ faculty including Pam Sullivan (OSU), Meghan Avolio (Johns Hopkins), Sally Koerner (UNC-Greensboro), Kim Komatsu (UNC-Greensboro), Andrew Hope (KSU), Kevin Wilcox (UNC-Greensboro), Abby Langston (KSU), Zak Ratajczak (KSU) and Allison Louthan (KSU); 6) promote educational training and inclusion of undergraduate researchers within site science; 7) invest in training and development of our graduate student researchers at KNZ, contribute towards their career advancement, and engage them in synthesis activities available within broader LTER network; and 8) continue to provide leadership and participation in LTER network level activities.

Supporting Files

Filename	Description	Uploaded By	Uploaded On
2022-2023 KNZ LTER Actvities.pdf	Please see the supporting pdf file, which includes our mid-funding site review handouts as a comprehensive assessment of our current projects.	Jesse Nippert	11/09/2023
2022-2023 KNZ LTER Findings.pdf	Please see the supporting pdf file, which provides detailed additional information which contributed to the overall progress of LTER VIII in 2022-2023.	Jesse Nippert	11/09/2023

Products

Books

Book Chapters
Hoffman, Julian (2020). Between Earth and Sky. *Irreplaceable: The fight to save our wild places* Penguin. 283. Status = PUBLISHED; Acknowledgement of Federal Support = No

Nippert, JB, Keen, RM, Bachle, S, Wedel, ER, Groskinsky, B (2022). Climate change in grassland ecosystems: current impacts and potential actions for a sustainable future. *CLIMATE ACTIONS - LOCAL APPLICATIONS AND PRACTICAL SOLUTIONS* . Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Inventions

Journals or Juried Conference Papers
View all journal publications currently available in the NSF Public Access Repository for this award.

The results in the NSF Public Access Repository will include a comprehensive listing of all journal publications recorded to date that are associated with this award.

Dea, Hannah I. and Urban, Abigail and Kazarina, Anna and Houseman, Gregory R. and Thomas, Samantha G. and Loecke, Terry and Greer, Mitchell J. and Platt, Thomas G. and Lee, Sonny and Jumpponen, Ari. (2022). Precipitation, Not Land Use, Primarily Determines the Composition of Both Plant and Phyllosphere Fungal Communities. *Frontiers in Fungal Biology*. 3 . Status = Added in NSF-PAR

Federal Government's License = Acknowledged. (Completed by Nippert, Jesse on 11/09/2023) Full text Citation details

Chaves, Francis A. and Smith, Melinda D.. (2021). Resources do not limit compensatory response of a tallgrass prairie plant community to the loss of a dominant species. *Journal of Ecology*. 109 (10) . Status = Added in NSF-PAR

Federal Government's License = Acknowledged. (Completed by Nippert, Jesse on 10/20/2022) Full text Citation details

Vilonen, Leena L. and Blair, John and Trivedi, Pankaj and Zeglin, Lydia and Smith, Melinda D.. (2022). Limited legacy effects of extreme multiyear drought on carbon and nitrogen cycling in a mesic grassland. *Elementa: Science of the Anthropocene*. 10 (1) . Status = Added in NSF-PAR

Federal Government's License = Acknowledged. (Completed by Nippert, Jesse on 11/09/2023) Full text Citation details

Dea, H. (2023). Amorpha canescens and Andropogon gerardii recruit comparable foliar fungal communities across the steep precipitation gradient in Kansas. *Transactions of the Kansas Academy of Science*. . Status = Added in NSF-PAR Federal Government's License = Acknowledged. (Completed by Nippert, Jesse on 11/09/2023) Full text Citation details

Marcotte, Abbey L. and Neudorf, Christina M. and Langston, Abigail L.. (2021). Lateral bedrock erosion and valley formation in a heterogeneously layered landscape, Northeast Kansas. *Earth Surface Processes and Landforms*. 46 (11) . Status = Added in NSF-PAR

Federal Government's License = Acknowledged. (Completed by Nippert, Abigail on 10/08/2021) Full text Citation details

Kaspari, Michael and de Beurs, Kirsten M. and Welti, Ellen A. R.. (2021). How and why plant ionomes vary across North American grasslands and its implications for herbivore abundance. *Ecology*. 102 (10) . Status = Added in NSF-PAR

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Langley, J. Adam and Grman, Emily and Wilcox, Kevin R. and Avolio, Meghan L. and Komatsu, Kimberly J. and Collins, Scott L. and Koerner, Sally E. and Smith, Melinda D. and Baldwin, Andrew H. and Bowman, William and Chiariello, Nona and Eskelinen, Anu and Harmens, Harry and Hovenden, Mark and Klanderud, Kari and McCulley, Rebecca L. and Onipchenko, Vladimir G. and Robinson, Clare H. and Suding, Katharine N.. (2022). Do tradeoffs govern plant species responses to different global change treatments?. *Ecology*. . Status = Added in NSF-PAR

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Hawkins, Jaide H. and Zeglin, Lydia H.. (2022). Microbial Dispersal, Including Bison Dung Vectored Dispersal, Increases Soil Microbial Diversity in a Grassland Ecosystem. *Frontiers in Microbiology*. 13 . Status = Added in NSF-PAR

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Muehleisen, Andrew J. and Watkins, Carmen R. E. and Altmire, Gabriella R. and Shaw, E. Ashley and Case, Madelon F. and Aoyama, Lina and Brambila, Alejandro and Reed, Paul B. and LaForgia, Marina and Borer, Elizabeth T. and Seabloom, Eric W. and Bakker, Jonathan D. and Arnillas, Carlos Alberto and Biederman, Lori and Chen, Qingqing and Cleland, Elsa E. and Eskelinen, Anu and Fay, Philip A. and Hagenah, Nicole and Harpole, Stan and Hautier, Yann and Henning, Jeremiah A. and Knops, Johannes M. H. and Komatsu, Kimberly J. and Ladouceur, Emma and Laungani, Ramesh and MacDougall, Andrew and McCulley, Rebecca L. and Moore, Joslin L. and Ohlert, Tim and Power, Sally A. and Raynaud, Xavier and Stevens, Carly J. and Virtanen, Risto and Wilfahrt, Peter and Hallett, Lauren M.. (2022). Nutrient addition drives declines in grassland species richness primarily via enhanced species loss. *Journal of Ecology*. 111 (3) . Status = Added in NSF-PAR

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Rastetter, Edward B. and Kwiatkowski, Bonnie L. and Kicklighter, David W. and Barker Plotkin, Audrey and Genet, Helene and Nippert, Jesse B. and O'Keefe, Kimberly and Perakis, Steven S. and Porder, Stephen and Roley, Sarah S. and Ruess, Roger W. and Thompson, Jonathan R. and Wieder, William R. and Wilcox, Kevin and Yanai, Ruth D.. (2022). N and P constrain C in ecosystems under climate change: Role of nutrient redistribution, accumulation, and stoichiometry. *Ecological Applications*. 32 (8) . Status = Added in NSF-PAR

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Ladouceur, Emma and Blowes, Shane A. and Chase, Jonathan M. and Clark, Adam T. and Garbowski, Magda and Alberti, Juan and Arnillas, Carlos Alberto and Bakker, Jonathan D. and Barrio, Isabel C. and Bharath, Siddharth and Borer, Elizabeth T. and Brudvig, Lars A. and Cadotte, Marc W. and Chen, Qingqing and Collins, Scott L. and Dickman, Christopher R. and Donohue, Ian and Du, Guozhen and Ebeling, Anne and Eisenhauer, Nico and Fay, Philip A. and Hagenah, Nicole and Hautier, Yann and Jentsch, Anke and Jónsdóttir, Ingibjörg S. and Komatsu, Kimberly and MacDougall, Andrew and Martina, Jason P. and Moore, Joslin L. and Morgan, John W. and Peri, Pablo L. and Power, Sally A. and Ren, Zhengwei and Risch, Anita C. and Roscher, Christiane and Schuchardt, Max A. and Seabloom, Eric W. and Stevens, Carly J. and Veen, G.F. (Ciska) and Virtanen, Risto and Wardle, Glenda M. and Wilfahrt, Peter A. and Harpole, W. Stanley. (2022). Linking changes in species composition and biomass in a globally distributed grassland experiment. *Ecology Letters*. . Status = Added in NSF-PAR

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Dea, H. and McKenzie, D.A. and Clark, B. and Jumpponen, A.. (2023). Amorpha canescens and Andropogon gerardii recruit comparable foliar fungal communities across the steep precipitation gradient in Kansas. *Transactions of the Kansas Academy of Science*. . Status = Added in NSF-PAR Federal Government's License = Acknowledged. (Completed by Nippert, Jesse on 11/03/2023) Full text Citation details

Kaspari, Michael and Welti, Ellen A. R.. (2022). Electrolytes on the prairie: How urine-like additions of Na and K shape the dynamics of a grassland food web. *Ecology*. 104 (1) . Status = Added in NSF-PAR

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Knapp, Alan K. and Condon, Kathleen V. and Folks, Christine C. and Sturchio, Matthew A. and Griffin-Nolan, Robert J. and Kannenberg, Steven A. and Gill, Amy S. and Hajek, Olivia L. and Siggers, J. Alexander and Smith, Melinda D.. (2023). Field experiments have enhanced our understanding of drought impacts on terrestrial ecosystems—But where do we go from here?. *Functional Ecology*. . Status = Added in NSF-PAR

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Johnson, Loretta C. and Galliart, Matthew B. and Alsdurf, Jacob D. and Maricle, Brian R. and Baer, Sara G. and Bello, Nora M. and Gibson, David J. and Smith, Adam B.. (2021). Reciprocal transplant gardens as gold standard to detect local adaptation in grassland species: New opportunities moving into the 21st century. *Journal of Ecology*. 110 (5) . Status = Added in NSF-PAR

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Thesis/Dissertations

Thomas Galfano. *A conservation and taxonomic assessment of the least shrew (Cryptotis parvus) complex through rangewide phylogeographic analyses and population genomics*. (2021). Kansas State University. Acknowledgement of Federal Support = Yes

Benjamin Wiens. *A multi-locus perspective reveals connections between island biogeography and evolutionary history of an endangered shrew (Sorex pribilofensis)*. (2021). Kansas State University. Acknowledgement of Federal Support = Yes

Marissa Lynne Zaricor. *A study of grass structure and function in response to drought and grazing*. (2021). Kansas State University. Acknowledgement of Federal Support = Yes

Seton R. Bachle. *Anatomical constraints on grass physiological responses depend on water availability*. (2021). Kansas State University. Acknowledgement of Federal Support = Yes

Weickert, Nathaniel. *Are We There Yet: Assessing Trajectories of Two Restored Prairies to Target Native Prairies over a Decadal Time Frame*. (2023). University of Kansas. Acknowledgement of Federal Support = Yes

Gora, S.. *Belowground traits lack response to chronic nitrogen additions in the tallgrass prairie*. (2022). University of North Carolina at Greensboro. Acknowledgement of Federal Support = Yes

Broderick, CM. *Climate legacies and restoration history as drivers of tallgrass prairie carbon and nitrogen cycling*. (2022). Kansas State University. Acknowledgement of Federal Support = Yes

Thomas Herrera, Jr.. *Comparative phylogeography of small mammals across the Great Plains Suture Zone highlights repeated processes of speciation and community assembly coincident with the 100th meridian*. (2022). Kansas State University. Acknowledgement of Federal Support = Yes

Herrera, T. *Comparative phylogeography of small mammals across the Great Plains Suture Zone highlights repeated processes of speciation and community assembly coincident with the 100th meridian*. (2022). Kansas State University. Acknowledgement of Federal Support = Yes

Narmadha Mohankumar. *Data fusion and spatio-temporal approaches to model species distribution*. (2022). Kansas State University. Acknowledgement of Federal Support = Yes

Gray, JE. *Defining, describing, and assessing growth determinacy as a mechanism of plant species codominance*. (2022). Colorado State University. Acknowledgement of Federal Support = Yes

Emma J. Smith. *Direct and indirect drivers of grassland bird population declines and settlement decisions over broad spatial and temporal scales*. (2021). Kansas State University. Acknowledgement of Federal Support = Yes

Vilonen, L. *Drought impacts on the microbiome in grasslands across the great plains: a story of legacy effects, resistance, and resilience*. (2022). Colorado State University. Acknowledgement of Federal Support = Yes

Noble, B.. *Early detection of wildfire risk in the Great Plains: merging machine learning, landscape metrics, and rich data sources*. (2023). Kansas State University. Acknowledgement of Federal Support = Yes

Keen, R.. *Ecohydrological implications of clonal shrub encroachment in tallgrass prairie*. (2023). Kansas State University. Acknowledgement of Federal Support = Yes

Nieland, M.. *Ecosystem recovery from chronic fertilization: Biotic mechanisms underpinning soil nitrogen legacies in burned and unburned grasslands*. (2023). Kansas State University. Acknowledgement of Federal Support = Yes

Katherine R. Andrews. *Fate of CO2 in tallgrass prairie watershed underlain by merokarst bedrock, Konza Prairie, Kansas, USA*. (2021). Kansas State University. Acknowledgement of Federal Support = Yes

Hajek, O.L.. *Grassland responses to seasonal shifts in water availability*. (2023). Colorado State University. Acknowledgement of Federal Support = Yes

Rodgers, A.. *Grazing intensity and fire frequency effects on plant species and community characteristics in tallgrass prairie*. (2023). University of Wyoming. Acknowledgement of Federal Support = Yes

Anhold, Christa. *Impacts of Woody Encroachment on the Fate of Soil CO2 in Grassland Watersheds*. (2023). Kansas State University. Acknowledgement of Federal Support = Yes

Hatley, Camden M.. *Intermittent streamflow generation in a merokarst headwater catchment*. (2022). Kansas State University. Acknowledgement of Federal Support = Yes

Dea, H. *Prairie plant communities and their associated phyllosphere fungal communities change across the steep precipitation gradient in Kansas USA, though individual plant species' phyllosphere communities may not*. (2023). Kansas State University. Acknowledgement of Federal Support = Yes

Ross, M. *Response and recovery of grassland plant communities exposed to multiyear drought differs across a precipitation gradient*. (2022). Colorado State University. Acknowledgement of Federal Support = Yes

Donnelly, Ryan. *The amazing diversity of Poaceae: trait variation across space, time, and lineage*. (2022). Kansas State University. Acknowledgement of Federal Support = Yes

Eckhoff, K.D.. *The effects of drought on plant and soil microbial communities and functioning during tallgrass prairie restoration.*. (2022). University of Kansas. Acknowledgement of Federal Support = Yes

Tooley, EG. *The unique canopy structure, leaf morphology, and physiology of Cornus drummondii*. (2022). Kansas State University. Acknowledgement of Federal Support = Yes

Silber, K.M.. *Under the weather: mechanisms underlying avian responses to precipitation*. (2023). Kansas State University. Acknowledgement of Federal Support = Yes

Websites or Other Internet Sites

Participants/Organizations

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Nippert, Jesse	PD/PI	4
Baer, Sara	Co PD/PI	2
Gido, Keith	Co PD/PI	2
Smith, Melinda	Co PD/PI	2
Zeglin, Lydia	Co PD/PI	2
Avolio, Meghan	Co-Investigator	1
Blair, John	Co-Investigator	1
Boyle, Alice	Co-Investigator	1
Brunsell, Nathaniel	Co-Investigator	1
Collins, Scott	Co-Investigator	1
Dodds, Walter	Co-Investigator	1
Hefley, Trevor	Co-Investigator	1
Hope, Andrew	Co-Investigator	1
Horne, Eva	Co-Investigator	1
Jensen, William	Co-Investigator	1

Name	Most Senior Project Role	Nearest Person Month Worked
Jumpponen, Ari	Co-Investigator	1
Kirk, Matt	Co-Investigator	1
Knapp, Alan	Co-Investigator	1
Koerner, Sally	Co-Investigator	1
Komatsu, Kimberly	Co-Investigator	1
Langston, Abigail	Co-Investigator	1
Louthan, Allison	Co-Investigator	1
Ratajczak, Zak	Co-Investigator	1
Rice, Charles	Co-Investigator	1
Santos, Eduardo	Co-Investigator	1
Sullivan, Pam	Co-Investigator	1
Wilcox, Kevin	Co-Investigator	1
Wilson, Gail	Co-Investigator	1
Goodin, Douglas	Faculty	1
Griffin-Nolan, Robert	Faculty	1
Lee, Sonny	Faculty	1
Mayfield, Mark	Faculty	1
Moore, Trisha	Faculty	1
O'Keefe, Kim	Faculty	1
Olson, KC	Faculty	1
Patrignani, Andres	Faculty	1
Spencer, Joel	Faculty	1
Temme, Arnaud	Faculty	1
Todd, Timothy	Faculty	1

Name	Most Senior Project Role	Nearest Person Month Worked
Welti, Ellen	Faculty	1
Whiles, Matt	Faculty	1
Zolnerowich, Gregory	Faculty	1
Bachle, Seton	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Broderick, Caitlin	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Connell, Kent	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Duell, Eric	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Gray, Jesse	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Hajek, Olivia	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Keen, Rachel	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Silber, Katy	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Slette, Ingrid	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Vilonen, Leena	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Zaret, Max	Postdoctoral (scholar, fellow or other postdoctoral position)	1
Haukos, Jill	Other Professional	12
McDonald, Heath	Other Professional	1
Mohankumar, Narmadha	Other Professional	1
O'Connor, Rory	Other Professional	1

Name	Most Senior Project Role	Nearest Person Month Worked
Rhodes, Jennifer	Other Professional	12
Ross, Maggie	Other Professional	1
Wiekert, Nathaniel	Other Professional	1
Xia, Yang	Other Professional	12
King, Nathan	Technician	6
Ajowele, Joshua	Graduate Student (research assistant)	1
Anderson, Logan	Graduate Student (research assistant)	1
Bloodworth, Kathryn	Graduate Student (research assistant)	1
Bookout, Bess	Graduate Student (research assistant)	1
Brenneman, Rachael	Graduate Student (research assistant)	1
Broemmelsiek, Elsa	Graduate Student (research assistant)	1
Bunch, Zachary	Graduate Student (research assistant)	1
Chakravarty, Moupyali	Graduate Student (research assistant)	1
Dea, Hannah	Graduate Student (research assistant)	1
Donnelly, Ryan	Graduate Student (research assistant)	1
Eckhoff, Kathryn	Graduate Student (research assistant)	1
Fisher, Molly	Graduate Student (research assistant)	1
Galfano, Tommy	Graduate Student (research assistant)	1
Glidden, Alec	Graduate Student (research assistant)	1
Gora, Sarah	Graduate Student (research assistant)	1
Grabda, Elisa	Graduate Student (research assistant)	1
Greenlee, Emma	Graduate Student (research assistant)	1
Guinnip, James	Graduate Student (research assistant)	1
Hedberg, Sydney	Graduate Student (research assistant)	1

Name	Most Senior Project Role	Nearest Person Month Worked
Herrera, Tommy	Graduate Student (research assistant)	1
Herzog, Sarah	Graduate Student (research assistant)	1
Linabury, Mary	Graduate Student (research assistant)	1
McCarroll, Nicholas	Graduate Student (research assistant)	1
Mohammadi, Shahla	Graduate Student (research assistant)	1
Moriello, Madison	Graduate Student (research assistant)	1
Nieland, Matthew	Graduate Student (research assistant)	1
Noble, Sidney	Graduate Student (research assistant)	1
Ortiz, Millie	Graduate Student (research assistant)	1
Pehim Limbu, Smriti	Graduate Student (research assistant)	1
Querns, Aleah	Graduate Student (research assistant)	1
Raihan, Md	Graduate Student (research assistant)	1
Ritchey, Brynn	Graduate Student (research assistant)	1
Rodgers, Abbi	Graduate Student (research assistant)	1
Storc, Zach	Graduate Student (research assistant)	1
Terry, Rose	Graduate Student (research assistant)	1
Tooley, Emmett	Graduate Student (research assistant)	1
Vasquez, Amy	Graduate Student (research assistant)	1
Vega Anguiano, Nico	Graduate Student (research assistant)	1
Wedel, Emily	Graduate Student (research assistant)	1
Wiens, Ben	Graduate Student (research assistant)	1
Wiggam-Ricketts, Shelly	Graduate Student (research assistant)	1
Wojciechowski, Ashley	Graduate Student (research assistant)	1
Figge, Janaye	Non-Student Research Assistant	2

Name	Most Senior Project Role	Nearest Person Month Worked
Kuhl, Amanda	Non-Student Research Assistant	12
Ramirez, Micke	Non-Student Research Assistant	6
Taylor, Jeff	Non-Student Research Assistant	12
Tobler, Courtney	Non-Student Research Assistant	6

Full details of individuals who have worked on the project:

Jesse B Nippert
Email: nippert@ksu.edu
Most Senior Project Role: PD/PI
Nearest Person Month Worked: 4

Contribution to the Project: Dr. Nippert is the Konza Prairie LTER lead PI and project director. Provides overall LTER project leadership and coordination. He contributes expertise in plant ecology and ecophysiology, and plant responses to spatial variability in microclimate, and plant responses on core LTER watersheds at the Konza Prairie LTER site. He is responsible for woody plant encroachment studies, and also directs the KSU Stable Isotope Mass Spectroscopy Laboratory, and provides expertise on the application of stable isotopes to ecological studies.

Funding Support: NSF: Collaborative Research: How roots, regolith, and rock interact to control climate at meso-temporal scales, the R3-C Frontier.

Change in active other support: No

International Collaboration: Yes, South Africa
International Travel: No

Sara G Baer
Email: sgbaer@ku.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 2

Contribution to the Project: Dr. Baer is a project co-PI and provides expertise on grassland restoration, particularly with respect to plant community dynamics and long-term changes in ecosystem properties and processes. She is responsible for directing research on grassland restoration ecology at the Konza site, including recovery of ecosystem properties in restored grasslands. Dr. Baer oversees the Restoration Chronosequence study as part of the LTER VIII project. Supported with a subcontract to the University of Kansas.

Funding Support: USDA: Linking microbiome function and microbial processes to plant genetic diversity in a foundation forage grass across the Great Plains grassland climate gradient: a multi-omics approach.

Change in active other support: No

International Collaboration: No
International Travel: No

Keith B Gido
Email: kgido@ksu.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 2

Contribution to the Project: Provides expertise in aquatic ecology; stream communities and ecosystems; the effects of fish on stream ecosystem properties such as primary productivity, nutrient cycling, community structure (species richness and diversity), decomposition and transport of particulate organic matter (POM); impacts of altered hydrologic regimes on stream ecosystems. Oversees the LTER experimental stream facility. Coordinates regional assessments of stream fish communities.

Funding Support: US Bureau of Reclamation: Razorback suckers study in San Juan River

Change in active other support: No

International Collaboration: Yes, Australia
International Travel: No

Melinda Smith
Email: melinda.smith@colostate.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 2

Contribution to the Project: Professor at Colorado State University conducting research on plant population and community dynamics at Konza Prairie, and the impacts of climate change. Directs site-based activities related to the multi-site Nutrient Network (NutNet) project. Supported by a subcontract to Colorado State University.

Funding Support: USDA-NIFA: How do the soil microbiome and plant-soil feedbacks influence rangeland agroecosystems responses to drought?

Change in active other support: No

International Collaboration: No
International Travel: No

Lydia H Zeglin
Email: lzeglin@ksu.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 2

Contribution to the Project: Provides expertise in molecular microbial ecology; taxonomic and functional diversity of soil and stream microbiota in the context of ecosystem N and C cycles.

Funding Support: NSF-DEB-ES CAREER: How do microorganisms and grazing mammals interact at local to regional scales to regulate grassland nitrogen cycling processes?

Change in active other support: No

International Collaboration: No
International Travel: No

Meghan Avolio
Email: meghan.avolio@gmail.com
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Research on grassland plant communities, mycorrhizae, climate change, nitrogen deposition, and genetic structure of plant communities. Currently an assistant professor at Johns Hopkins University.

Funding Support: None

International Collaboration: No
International Travel: No

John Blair
Email: jblair@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Konza LTER investigator and Director of the Konza Prairie Biological Station (the primary research site for the Konza LTER program). Research expertise in ecosystem ecology and terrestrial biogeochemistry; soil ecology, including decomposition, soil nutrient cycling, litter/soil/plant nutrient dynamics; effects of climate change and other disturbances on ecosystem processes; ecology of soil invertebrates; and restoration ecology.

Funding Support: None

International Collaboration: No
International Travel: No

Alice Boyle
Email: aboyle@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in bird ecology and physiology; particular interest in reproduction, dispersal and energetics.

Funding Support: None

International Collaboration: No
International Travel: No

Nathaniel Brunsell
Email: brunsell@ku.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in ecosystem and global C and water flux measurement and modeling; coordinates collection and analysis of data from the Ameriflux towers located on Konza Prairie.

Funding Support: None

International Collaboration: No
International Travel: No

Scott Collins
Email: scollins@sevilleta.unm.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in grassland ecology and plant community ecology; ecological analyses of spatial and temporal dynamics; ecological responses to disturbance; analysis of species distribution and abundance; local regional interactions; productivity-diversity relationships.

Funding Support: None

International Collaboration: Yes, South Africa
International Travel: No

Walter Dodds
Email: wkdodds@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Dr. Dodds provides leadership for the Konza LTER aquatic research group. Research expertise in aquatic ecology; phycology; nutrient cycling and retention in streams; groundwater chemistry; watershed-level hydrologic export; water quality. Dr. Dodds is also leading the riparian vegetation removal study as part of the LTER VIII funding cycle. This study assess the impacts of riparian land-cover change on grassland streams.

Funding Support: None

International Collaboration: Yes, Brazil
International Travel: No

Trevor Hefley
Email: thefley@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Ecological statistics, hierarchical Bayesian models, spatial and spatio-temporal statistics, and wildlife ecology.

Funding Support: None

International Collaboration: No
International Travel: No

Andrew Hope
Email: ahope@ksu.du
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in mammalogy; particularly phylogeography, speciation and climate impacts on evolutionary mechanisms of community assembly.

Funding Support: None

International Collaboration: No
International Travel: No

Eva Horne
Email: ehorne@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Research in behavioral ecology of grassland reptiles; responses of reptile and amphibian populations to fire and grazing. Dr. Horne also assists with administration of the Konza Prairie Biological Station, and coordination of research permits and projects at the site.

Funding Support: None

International Collaboration: No
International Travel: No

William Jensen
Email: wjensen1@emporia.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Dr. Jensen is an Associate Professor at Emporia State University. He is studying the effects of patch-burn grazing on brood parasitism of Dickcissel nests in the Flint Hills tallgrass prairie, and is responsible for collecting data on avian consumer responses to the patch-burn grazing experiment.

Funding Support: None

International Collaboration: No
International Travel: No

Ari Jumpponen
Email: ari@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Expertise on fungal ecology, particularly mycorrhizae and other endophytic fungi; diversity of soil microbial communities; application of molecular methods to characterize soil microbial communities.

Funding Support: None

International Collaboration: No
International Travel: No

Matt Kirk
Email: mfkirk@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: KSU professor in the Department of Geology. Dr. Kirk is continuing the research of Dr. Gwen Macpherson, who retired from the University of Kansas.

Funding Support: None

International Collaboration: No
International Travel: No

Alan Knapp
Email: alan.knapp@colostate.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Provides research expertise in grassland ecology, plant ecology, physiological ecology, global change studies, plants-herbivore interactions, invasive species ecology. Dr. Knapp also provides leadership for LTER studies of plant productivity and responses to climatic variability and climate change, and conducts multi-site research involving SGS and KNZ LTER sites. Supported by a subcontract to Colorado State University.

Funding Support: None

International Collaboration: Yes, South Africa
International Travel: No

Sally Koerner
Email: sally.koerner@uncg.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Dr. Koerner is an assistant professor at the University of North Carolina Greenboro. Her research interests include ecology (community, ecosystem and plant ecology); drivers of biodiversity across spatial scales and through time.

Funding Support: None

International Collaboration: No
International Travel: No

Kimberly Komatsu
Email: kjkomatsu@uncg.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Former PhD student from Yale University. Dr. Komatsu is an associate professor and Florence Schaeffer Distinguished Scholar at the University of North Carolina Greensboro. Her research areas consists of animal plant interactions, biodiversity, climate change, ecology, ecosystem function, ecosystem services, global change, herbivores, insects, invasive species, nutrient pollution, plant ecology, and terrestrial ecology.

Funding Support: None

International Collaboration: No
International Travel: No

Abigail Langston
Email: alangston@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Professor in the KSU Department of Geology. Dr. Langston's core areas of geographic research are in quantitative geomorphology and landscape evolution modeling.

Funding Support: None

International Collaboration: No
International Travel: No

Allison Louthan
Email: amlouthan@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Dr. Louthan works at the intersection of population and community ecology, focusing on how species interactions and climate change jointly influence plant population dynamics and distribution patterns. She uses a combination of observational fieldwork, field- and greenhouse-based experiments, and modeling to explore how species interactions might impact future biodiversity patterns in a changing climate.

Funding Support: None

International Collaboration: No
International Travel: No

Zak Ratajczak
Email: zarata@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Research area involves woody encroachment. Former PhD student of Jesse Nippert.

Funding Support: None

International Collaboration: No
International Travel: No

Charles Rice
Email: cwrice@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in soil microbial ecology; responses of grassland microbial communities to fire, grazing climatic variability; soil C and N dynamics; denitrification in grasslands; effects of management on soil C sequestration. Contributor and author for IPCC AR4.

Funding Support: None

International Collaboration: No
International Travel: No

Eduardo Santos
Email: esantos@ksu.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Micro-meteorology and measurements of carbon and water fluxes from grassland. Expertise in eddy flux techniques and stable isotope analyses.

Funding Support: None

International Collaboration: No
International Travel: No

Pam Sullivan
Email: pamela.sullivan@oregonstate.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: As an ecohydrologist, Dr. Sullivan is interested in investigating the interactions between climate, vegetation and geology on freshwater resources over different temporal and spatial scales. Supported on a subcontract to Oregon State University.

Funding Support: None

International Collaboration: No
International Travel: No

Kevin Wilcox
Email: k_wilcox@uncg.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Professor at University of North Carolina Greensboro. Research focuses on global change and land use impacts on plant community dynamics, primary productivity, and biogeochemical cycles.

Funding Support: None

International Collaboration: No
International Travel: No

Gail Wilson
Email: gail.wilson@okstate.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 1

Contribution to the Project: Gail Wilson provides expertise on the role of mycorrhizal fungi in grasslands, and is responsible for long-term studies of the impacts of of mycorrhizal fungi on plant community dynamics and on soil structure and C storage in grasslands.

Funding Support: None

International Collaboration: No
International Travel: No

Douglas Goodin
Email: dgoodin@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Provides expertise on remote sensing of ecological data, including patterns of plant productivity and spatial distributions of grazing and fire effects; research on climatology in the Central Plains; research on the impacts of burning on air quality.

Funding Support: None

International Collaboration: No
International Travel: No

Robert Griffin-Nolan
Email: rgriffinnolan@scu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Former PhD student (Advisor, Alan Knapp) working on plant physiological responses to drought and ecosystem drought sensitivity. Received PhD in 2019. Currently, faculty at California State University.

Funding Support: None

International Collaboration: No
International Travel: No

Sonny Lee
Email: leet1@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Interest include: metagenomics, bioinformatics, microbial ecology, microbial diversity and cultivation.

Funding Support: None

International Collaboration: No
International Travel: No

Mark Mayfield
Email: markherb@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in plant systematics.

Funding Support: None

International Collaboration: No
International Travel: No

Trisha Moore
Email: tlcmoore@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in environmental engineering with a focus on ecohydrology and water and carbon cycling.

Funding Support: None

International Collaboration: No
International Travel: No

Kim O'Keefe
Email: okeefe.kim@gmail.com
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Assistant professor at St. Edward's University. Former PhD student of Dr. Jesse Nippert

Funding Support: None

International Collaboration: No
International Travel: No

KC Olson
Email: kcolson@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: KC Olson is a professor of animal science, who brings expertise on the physiology and management of cattle in mesic grasslands. Dr. Olson is an active participant in the new patch-burn grazing study, and will oversee assessment of animal performance as a management-related aspect of this LTER study.

Funding Support: None

International Collaboration: No
International Travel: No

Andres Patrignani
Email: andrespatrignani@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Dr. Patrignani is an assistant professor in the KSU Department of Agronomy. His interest is soil water management.

Funding Support: None

International Collaboration: No
International Travel: No

Joel Spencer
Email: joelspen@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: KSU professor of geology

Funding Support: None

International Collaboration: No
International Travel: No

Arnaud Temme
Email: arnaudtemme@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in Geomorphology, soil mapping, soil and landscape evolution, complexity, mountain landscapes

Funding Support: None

International Collaboration: No
International Travel: No

Timothy Todd
Email: nema@ksu.edu

Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in nematode ecology; particularly plant-nematode interactions and soil food web dynamics.

Funding Support: None

International Collaboration: No
International Travel: No

Ellen Welti
Email: weltie@si.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Former PhD student (Advisor, Tony Joern) working on mechanisms of food web stability. Currently working at the Great Plains Science Program, Conservation Ecology Center, Smithsonian Conservation Biology Institute.

Funding Support: None

International Collaboration: No
International Travel: No

Matt Whiles
Email: mwhiles@ufl.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in invertebrate ecology; research focused on assessment of patterns and controls of secondary productivity in grassland streams; ecology of soil invertebrates in grasslands. Participant in new riparian vegetation removal experiment.

Funding Support: None

International Collaboration: No
International Travel: No

Gregory Zolnerowich
Email: gregz@ksu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Expertise in grassland insect biodiversity and insect systematics, particularly of parasitic wasps. Dr. Zolnerowich oversees the KSU Museum of Entomological and Prairie Arthropod Research, and provides expertise on electronic databasing of biological collections.

Funding Support: None

International Collaboration: No
International Travel: No

Seton Bachle
Email: setonbachle20@gmail.com

Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Postdoc at LI-COR Biosciences, Lincoln, NE Former graduate student of Dr. Jesse Nippert

Funding Support: None

International Collaboration: No
International Travel: No

Caitlin Broderick
Email: broder49@msu.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Former Advisor: John Blair Now postdoc at Michigan State

Funding Support: None

International Collaboration: No
International Travel: No

Kent Connell
Email: rkco@umich.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Postdoc at University of Michigan Former graduate student of Dr. John Blair

Funding Support: None

International Collaboration: No
International Travel: No

Eric Duell
Email: eduell@ku.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Former Advisor: Gail Wilson. Research focus: plant ecology, grassland ecology, global change ecology. Now a postdoc at the University of Kansas

Funding Support: None

International Collaboration: No
International Travel: No

Jesse Gray
Email: jesse.gray@colostate.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Alan Knapp Defended PhD in 2022. Now a postdoc at University of Colorado - Boulder.

Funding Support: None

International Collaboration: No
International Travel: No

Olivia Hajek
Email: olivia.hajek@colostate.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Alan Knapp Defended PhD in 2023. Currently postdoc at USDA-ARS in Ft. Collins.

Funding Support: None

International Collaboration: No
International Travel: No

Rachel Keen
Email: rlease@ksu.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Former grad student of Dr. Jesse Nippert. Currently postdoc with Dr. Sharon Billings (KU) and Dr. Pam Sullivan (Oregon State).

Funding Support: None

International Collaboration: No
International Travel: No

Katy Silber
Email: ksilber@ksu.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Former graduate student in Dr. Alice Boyle's lab. Defended PhD in 2023. Now a postdoc in Dr. Boyle's lab.

Funding Support: None

International Collaboration: No
International Travel: No

Ingrid Slette
Email: ingrid.slette@gmail.com
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Former Advisor: Alan Knapp. Working on historical effects of climate change on grassland carbon cycling. Now a postdoc with the LTER Network Office.

Funding Support: None

International Collaboration: No
International Travel: No

Leena Vilonen
Email: leena.vilonen@colostate.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Former student of Dr. Melinda Smith (CSU). Defended in 2022. Now a postdoc at University of Hawaii.

Funding Support: None

International Collaboration: No
International Travel: No

Max Zaret
Email: zaret@ksu.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 1

Contribution to the Project: Postdoc in Dr. Lydia Zeglin's lab

Funding Support: None

International Collaboration: No
International Travel: No

Jill Haukos
Email: jhaukos@ksu.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Director of the Konza Education Program (KEEP). Jill directs the K-12 education program, including the Konza Prairie SLTER program and serves as the KNZ LTER education representative for LNO activities. Jill also oversees the Konza docent program and some of the public outreach activities.

Funding Support: Konza Prairie Biological Station

International Collaboration: No
International Travel: No

Heath McDonald
Email: heath.mcdonald@okstate.edu

Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Former Advisor: Gail Wilson Defended in 2022. Now research scientist at Oklahoma State University.

Funding Support: None

International Collaboration: No
International Travel: No

Narmadha Mohankumar
Email: meenu@ksu.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Former Advisor: Trevor Hefley Defended in April 2022 Now employed as a data scientist with the Pacific Northwest National Laboratory.

Funding Support: None

International Collaboration: No
International Travel: No

Rory O'Connor
Email: rory.o'connor@usda.gov
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Former PhD student of Dr. Jesse Nippert. Currently works as a rangeland ecologist for the USDA-ARS in Burns, Oregon. Still conducts research at Konza Prairie.

Funding Support: None

International Collaboration: No
International Travel: No

Jennifer Rhodes
Email: jenniferrhodes@ksu.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Program coordinator and event planner.

Funding Support: None

International Collaboration: No
International Travel: No

Maggie Ross
Email: maggiel.ross@colostate.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Melinda Smith Defended master's in 2022. Now a plant community specialist with the Minnesota Biological

Funding Support: None

International Collaboration: No
International Travel: No

Nathaniel Wiekert
Email: n.c.weickert@ku.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Sara Baer Defended masters in 2022. Now assistant operations manager at the KU Field Station

Funding Support: None

International Collaboration: No
International Travel: No

Yang Xia
Email: yangx@ksu.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: LTER Information Manager. Responsibilities include data management, database design and implementation, and overseeing KNZ LTER computer network activities.

Funding Support: None

International Collaboration: No
International Travel: No

Nathan King
Email: nathanking778@ksu.edu
Most Senior Project Role: Technician
Nearest Person Month Worked: 6

Contribution to the Project: Field technician. Took Micke Ramiez's position.

Funding Support: None.

International Collaboration: No
International Travel: No

Joshua Ajowele
Email: joshuaajowele@gmail.com
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Kevin Wilcox

Funding Support: None

International Collaboration: No
International Travel: No

Logan Anderson
Email: landerson14@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Graduate student in Dr. Alice Boyle's lab.

Funding Support: None

International Collaboration: No
International Travel: No

Kathryn Bloodworth
Email: kjbloodw@uncg.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Sally Koener

Funding Support: None

International Collaboration: No
International Travel: No

Bess Bookout
Email: bessbookout16@gmail.com
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Zak Rataczak

Funding Support: None

International Collaboration: No
International Travel: No

Rachael Brenneman
Email: rrbrenneman@uncg.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Kim Komatsu

Funding Support: None

International Collaboration: No
International Travel: No

Elsa Broemmelsiek
Email: elsabroe@ksu.edu

Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Graduate student in Dr. Lydia Zeglin's lab

Funding Support: None

International Collaboration: No
International Travel: No

Zachary Bunch
Email: zlbunch2@uncg.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Graduate student in Dr. Kim Komatsu's lab at University of North Carolina Greensboro

Funding Support: None

International Collaboration: No
International Travel: No

Moupyali Chakravarty
Email: mou@k-state.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Graduate student in Dr. Abigail Langston's lab at KSU

Funding Support: None

International Collaboration: No
International Travel: No

Hannah Dea
Email: hidea@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Ari Jumpponen

Funding Support: None

International Collaboration: No
International Travel: No

Ryan Donnelly
Email: ryandonnelly@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Jesse Nippert Defended master's 2022

Funding Support: None

International Collaboration: No
International Travel: No

Kathryn Eckhoff
Email: keckhoff22@gmail.com
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Sara Baer PhD dissertation 2022

Funding Support: None

International Collaboration: No
International Travel: No

Molly Fisher
Email: mfisher1614@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Walter Dodds Defended Master's in 2023 - currently assistant aquatic ecologist at the National Park Service

Funding Support: None

International Collaboration: No
International Travel: No

Tommy Galfano
Email: tonaflag@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Andrew Hope Defended in 2021. Now in doctoral program in Western Ontario in the Coltman Lab.

Funding Support: None

International Collaboration: No
International Travel: No

Alec Glidden
Email: aglidden@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. John Blair

Funding Support: None

International Collaboration: No
International Travel: No

Sarah Gora
Email: slgora@uncg.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Sally Koerner Defended Master's in 2022

Funding Support: None

International Collaboration: No
International Travel: No

Elisa Grabda
Email: msgrabda@uncg.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Kim Komatsu

Funding Support: None

International Collaboration: No
International Travel: No

Emma Greenlee
Email: egreenlee@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Graduate student in Dr. Zak Ratajczak's lab KSU

Funding Support: None

International Collaboration: No
International Travel: No

James Guinnip
Email: jguinnip@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Walter Dodds. Studies stream biogeochemistry.

Funding Support: None

International Collaboration: No
International Travel: No

Sydney Hedberg
Email: sydney.hedberg@colostate.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Melinda Smith

Funding Support: None

International Collaboration: No
International Travel: No

Tommy Herrera
Email: tommy3@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Andrew Hope Defended master's thesis in 2022

Funding Support: None

International Collaboration: No
International Travel: No

Sarah Herzog
Email: sherzog@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Allison Louthan

Funding Support: None

International Collaboration: No
International Travel: No

Mary Linabury
Email: mary.linabury@gmail.com
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Melinda Smith

Funding Support: None

International Collaboration: No
International Travel: No

Nicholas McCarroll
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Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Arnaud Temme

Funding Support: None

International Collaboration: No
International Travel: No

Shahla Mohammadi
Email: smohammadi@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Jesse Nippert

Funding Support: None

International Collaboration: No
International Travel: No

Madison Moriello
Email: moriello@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Graduate student in Dr. Walter Dodds' lab

Funding Support: None

International Collaboration: No
International Travel: No

Matthew Nieland
Email: nielandm@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Lydia Zeglin Defended PhD in 2023

Funding Support: None

International Collaboration: No
International Travel: No

Sidney Noble
Email: slnoble@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Zak Ratajczak

Funding Support: None

International Collaboration: No
International Travel: No

Millie Ortiz
Email: m_ortiz2@uncg.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Graduate student in Dr. Kim Komatsu's lab at UNCG.

Funding Support: None

International Collaboration: No
International Travel: No

Smriti Pehim Limbu
Email: slimbu2@jhu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Meghan Avolio

Funding Support: None

International Collaboration: No
International Travel: No

Aleah Querns
Email: akquerns@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Allison Louthan

Funding Support: None

International Collaboration: No
International Travel: No

Md Abu Raihan
Email: aburaihan@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Walter Dodds

Funding Support: None

International Collaboration: No
International Travel: No

Brynn Ritchey
Email: britchey1@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Zak Ratajczak

Funding Support: None

International Collaboration: No
International Travel: No

Abbi Rodgers
Email: afaxon2@uwyo.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Kevin Wilcox Defended in 2023

Funding Support: None

International Collaboration: No
International Travel: No

Zach Storc
Email: zjstorc@ku.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Sara Baer, University of Kansas

Funding Support: None

International Collaboration: No
International Travel: No

Rose Terry
Email: rsterry@uncg.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Sally Koener

Funding Support: None

International Collaboration: No
International Travel: No

Emmett Greg Tooley
Email: egtooley@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Former Advisor: Jesse Nippert Now a PhD candidate at Colorado State University.

Funding Support: None

International Collaboration: No
International Travel: No

Amy Vasquez
Email: avasque3@jhu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Dr. Meghan Avolio

Funding Support: None

International Collaboration: No
International Travel: No

Nico Vega Anguiano
Email: nicova@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Graduate in Dr. Lydia Zeglin's lab

Funding Support: None

International Collaboration: No
International Travel: No

Emily Wedel
Email: erwedel@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Jesse Nippert

Funding Support: None

International Collaboration: No
International Travel: No

Ben Wiens
Email: bwiens@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Former Advisor: Andrew Hope Now a PhD candidate at University of Kansas

Funding Support: None

International Collaboration: No
International Travel: No

Shelly Wiggam-Ricketts
Email: wiggie@ksu.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Greg Zolnerowich

Funding Support: None

International Collaboration: No
International Travel: No

Ashley Wojciechowski
Email: ashley.wojiechowski@ku.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 1

Contribution to the Project: Advisor: Sara Baer

Funding Support: None

International Collaboration: No
International Travel: No

Janaye Figge
Email: jhanschu@ksu.edu
Most Senior Project Role: Non-Student Research Assistant
Nearest Person Month Worked: 2

Contribution to the Project: LTER analytical lab supervisor, research coordinator.

Funding Support: None.

International Collaboration: No
International Travel: No

Amanda Kuhl
Email: akuhl@ksu.edu
Most Senior Project Role: Non-Student Research Assistant
Nearest Person Month Worked: 12

Contribution to the Project: Research assistant and field crew leader.

Funding Support: None

International Collaboration: No
International Travel: No

Micke Ramirez
Email: mickram@ksu.edu
Most Senior Project Role: Non-Student Research Assistant
Nearest Person Month Worked: 6

Contribution to the Project: Field Technician Left project in May 2023.

Funding Support: None

International Collaboration: No
International Travel: No

Jeff Taylor
Email: jht@ksu.edu
Most Senior Project Role: Non-Student Research Assistant
Nearest Person Month Worked: 12

Contribution to the Project: Field technician.

Funding Support: None

International Collaboration: No
International Travel: No

Courtney Tobler
Email: ctobler@ksu.edu
Most Senior Project Role: Non-Student Research Assistant
Nearest Person Month Worked: 6

Contribution to the Project: LTER analytical lab supervisor, research coordinator. Left project in May 2023.

Funding Support: None

International Collaboration: No
International Travel: No

What other organizations have been involved as partners?

Name	Type of Partner Organization	Location
Colorado State University	Academic Institution	Fort Collins, CO
Department of Energy	Other Organizations (foreign or domestic)	USA
USGS	Other Organizations (foreign or domestic)	USA
University of Kansas	Academic Institution	Lawrence, KS
University of North Carolina at Greensboro	Academic Institution	Greensboro, NC
Johns Hopkins University	Academic Institution	Baltimore, MD
Kansas State University	Academic Institution	Manhattan, KS
NOAA	Other Organizations (foreign or domestic)	USA
Oklahoma State University	Academic Institution	Stillwater, OK
Oregon State University	Academic Institution	Corvallis, OR
State of Kansas	State or Local Government	Kansas
The Nature Conservancy	Other Nonprofits	Kansas
US EPA	Other Organizations (foreign or domestic)	USA

Full details of organizations that have been involved as partners:

Colorado State University

Organization Type: Academic Institution
Organization Location: Fort Collins, CO

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Dr. Alan Knapp (Biology Department, Colorado State University) collaborates on many aspects of the Konza LTER program. His research includes studies of grassland ecology, responses to climatic variability and climate change, and the ecology of plant invasions. Knapp's LTER research is supported by a subcontract to Colorado State University, which also provides support for students participating in cross-site research that utilizes the Konza Prairie LTER site and database. Dr. Melinda Smith is an LTER collaborator and participates in several aspects of Konza LTER research, including studies of plant community dynamics, the ecology of plant invasions, genomic responses of plants to climate change, and comparisons of the ecology of North American and South African grasslands. Dr. Smith and her students also oversee the NutNet project at Konza as apart of a multi-site study of the effects of nutrient amendments and herbivory on herbaceous community and ecosystem dynamics. The Konza LTER program provides a subcontract to CSU and logistical support for these studies.

Department of Energy

Organization Type: Other Organizations (foreign or domestic)
Organization Location: USA

Partner's Contribution to the Project:
Financial support
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: The Konza LTER program provides partial support for two CO2 flux towers, which are part of the Ameriflux network of net C exchange measurement sites. DOE provides some financial and logistical support for tower operations and data processing.

Johns Hopkins University

Organization Type: Academic Institution
Organization Location: Baltimore, MD

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Konza LTER supports collaborative research with Johns Hopkins collaborator, Dr. Megan Avolio. Dr. Avolio's lab focuses on plants and their interactions with the environment and other organisms.

Kansas State University

Organization Type: Academic Institution
Organization Location: Manhattan, KS

Partner's Contribution to the Project:
In-Kind Support
Facilities

More Detail on Partner and Contribution: KSU owns a portion of the Konza Prairie Biological Station, and provides access and use of the field site and associated on-site facilities. KSU also provide campus lab facilities, and computer server and network support through a partnership between the KNZ LTER program and the KSU Physics Computer Support Center, where KNZ network servers are housed. KSU provides support for operation of the Environmental Chemistry Laboratory in Bushnell Hall, which is used for LTER water sample analyses. KSU also provides support in the form of available assistantships for graduate students conducting KNZ research.

NOAA

Organization Type: Other Organizations (foreign or domestic)
Organization Location: USA

Partner's Contribution to the Project:
Facilities
Collaborative Research

More Detail on Partner and Contribution: Konza Prairie is part of the U.S. Climate Reference Network (USCRN). USCRN is a network of climate stations developed as part of a National Oceanic and Atmospheric Administration (NOAA) initiative. Its primary goal is to provide future long-term homogeneous observations of temperature and precipitation that can be coupled to long-term historical observations for the detection and attribution of present and future climate change.

Oklahoma State University

Organization Type: Academic Institution
Organization Location: Stillwater, OK

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: The Konza LTER program supports collaborative research with Dr. Gail Wilson. Dr. Wilson's research focuses primarily on the role of mycorrhizae in grasslands, and the the ecology of Bothriochloa bladhii (Caucasian bluestem), an important invasive grass species.

Oregon State University

Organization Type: Academic Institution
Organization Location: Corvallis, OR

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Collaborative Konza LTER research is supported by a subcontract to OSU collaborator, Dr. Pam Sullivan and students to conduct research on groundwater hydrology and chemistry. Dr. Sullivan is continuing work previously conducted by Dr. Gwen Macpherson (University of Kansas), who retired in 2020.

State of Kansas

Organization Type: State or Local Government
Organization Location: Kansas

Partner's Contribution to the Project:
Financial support
Facilities

More Detail on Partner and Contribution: The state of Kansas provides an operating budget for Konza Prairie Biological Station personnel and general site maintenance.

The Nature Conservancy

Organization Type: Other Nonprofits
Organization Location: Kansas

Partner's Contribution to the Project:
Facilities
Collaborative Research

More Detail on Partner and Contribution: Konza Prairie Biological Station is a Nature Conservancy site, established on land purchased by The Nature Conservancy and managed by the Division of Biology at KSU. Konza LTER scientists interact with TNC scientists and officers on a broad range of management-related issues, including grassland conservation, restoration ecology, and grazing management.

US EPA

Organization Type: Other Organizations (foreign or domestic)
Organization Location: USA

Partner's Contribution to the Project:
Facilities
Collaborative Research

More Detail on Partner and Contribution: The US EPA jointly operates a CASTNet (Clean Air Standards and Trends Network) and AMoN (ammonia monitoring) site located at the Konza Prairie LTER site. The Konza Prairie LTER program provides site support and the EPA provides analytical services and compiles data on atmospheric nutrient concentrations and dry deposition rates, and tropospheric ozone concentrations. The EPA Region 7 office also supports a collaborative modeling project, which is using using Konza LTER data to build linked models of hydrology and biogeochemistry that can be used to assess the effects of alternate land-use scenarios in the Flint Hills region. This project is led by Dr. Bob McKane (EPA) in collaboration with KNZ scientists.

USGS

Organization Type: Other Organizations (foreign or domestic)
Organization Location: USA

Partner's Contribution to the Project:
Facilities
Collaborative Research

More Detail on Partner and Contribution: The USGS collects and provides data on the hydrology and chemistry of Kings Creek, a USGS benchmark stream located on the Konza Prairie LTER site, and the Konza LTER program facilitates the transfer of these data to the Hydro-DB database. The Konza LTER site is also a part of the USArray component of the USGS EarthScope project- a continental-scale seismic observatory.

University of Kansas

Organization Type: Academic Institution
Organization Location: Lawrence, KS

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: We provide a subcontract and logistical/technical support to Dr. Nathaniel Brunsell (Dept of Geography), who oversees flux tower operations at the Konza site. Dr. Brunsell's research addresses the role of land-use/land-cover change land surface heterogeneity in vegetation, moisture, soil type, topography on water and energy fluxes from local to regional scales. This research uses a combination of field measurements, remote sensing and numerical modeling, and is integrated with flux tower studies at the Konza LTER site. We also provide a subcontract to Dr. Sara Baer and student to research grassland restoration ecology.

University of North Carolina at Greensboro

Organization Type: Academic Institution
Organization Location: Greensboro, NC

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Konza LTER supports collaborative research with UNCG's collaborators, Dr. Sally Koerner, Dr. Kim Komatsu, and Dr. Kevin Wilcox.

Were other collaborators or contacts involved? If so, please provide details.
Nothing to report

Impacts

What is the impact on the development of the principal discipline(s) of the project?

The Konza Prairie LTER program is a comprehensive, interdisciplinary research program designed to contribute to synthetic activities and conceptual and theoretical advances in ecology, and to further an understanding of ecological processes in grasslands. In the 2022-2023 funding period, the KNZ program produced or contributed to 78 publications: 57 refereed journal articles (including 8 currently in press), 1 book chapter and 12 dissertations and theses. These publications cover topics ranging from mechanisms and consequences of woody encroachment, site based ecohydrology, nutrient cycling in the context of restoration, and linkages between climate and consumer populations. Within the past year, Konza LTER scientists have continued to publish high-quality articles in disciplinary focused areas (e.g. Limnology and Oceanography Letters, PhytoFrontier, Mycologia, and Journal of Wildlife Management), general ecology (e.g. Functional Ecology, Ecosphere, Ecosystems, Journal of Ecology, Ecology Letters), and high-impact general science journals (e.g. Science, Oikos, and BioScience).

In addition to site-based science, KNZ scientists made substantial contributions to multi-site, collaborative ecological research, and the widespread use of KNZ LTER data and resources by the broader ecology community. For example, Kim Komatsu is a member of a newly funded LTER SPARC Synthesis working group, which is using long-term data from 14 LTER sites to understand how disturbances and environmental change across timescales are altering the production and transfer of organic matter from primary producers to herbivores. Finally, data from five long-term Konza experiments are included in the CoRRE database, for which the consequences of global change drivers for plant phylogenetic and functional diversity are being assessed as part of a German Centre for Biodiversity (iDiv) working group led by Meghan Avolio and Kim Komatsu).

Two global experimental networks have their roots at Konza. Building on Konza's rich history of experimental rainfall manipulations (Knapp et al. 2015, Wilcox et al. 2017), Melinda Smith founded 'Drought-Net', a network of >100 globally-distributed grassland sites that manipulate rainfall to assess ecosystem sensitivity to drought. Smith was also a founding member of the Nutrient Network (NutNet), with plots established on KPBS in 2007. KNZ investigator Kim Komatsu serves on the NutNet Advisory Team and contributes KNZ data for NutNet publications.

We are also excited to report that Sarah Supp from Denison College has received an NSF-EAGER grant to explore long-term Konza datasets and see how different types of disturbance can affect species incidence through time. Nippert and Blair facilitated and encouraged this proposal development and submission. Sarah and Maya Parker-Smith (data analyst in the Supp lab) visited Konza in late October 2023 to interview key investigators involved in the long-term KNZ data collection (faculty and staff). While this grant is computational, Supp and Parker-Smith visited the site and interacted with our faculty for a week to understand the process of data collection, constraints on interpretation, and brainstorm opportunities to link datasets across scale. We are excited about this project, and facilitated a dept seminar by Supp during this visit.

What is the impact on other disciplines?

The Konza Prairie LTER program and our core research experiments attract numerous scientists from a broad spectrum of scientific disciplines beyond ecology. One particular area of recent emphasis has been the development of our critical zone

research and collaborations between biological and hydrological scientists. Our groundwater chemistry program (and well installation) began in the late 1980's by Gwen Macpherson (Geology, KU). Gwen retired in the winter of 2020, and her groundwater chemistry sampling is being continued by Dr. Matt Kirk, Geology, KSU. KNZ supports Dr. Pamela Sullivan (Earth, Oceans, and Atmo Sciences, Oregon State Univ.) who began additional subsurface geochemistry research at Konza in 2016 and is continuing to develop a site-based program on Konza. Sullivan's work focuses on the interface of freshwater resources – changing climate – vegetation dynamics, and she is collaborating with Nippert and Blair. Pam, Jesse and Dr. Li Li (Penn State) have been investigating root macropore generation as a consequence of woody encroachment. New wells were installed on Konza for this project in the summer, 2021. Pam, Jesse, Li Li and 5 others (Dr. Kamini Singha – CO School of Mines, Dr. Dan Hirmas and Dr. Hoori Ajami – Cal Riverside, Dr. Lejo Flores – Idaho State, and Dr. Sharon Billions – KU) received a NSF-GEO award to conduct Critical Zone research comparing Konza to 4 other sites. This research began in Summer 2022. Two hydrologists from Biological and Agricultural Engineering (Dr. Stacy Hutchinson and Dr. Tricia Moore) maintain and contribute to the 'Irrigation Transect Experiment'. Contributions by Hutchinson and Moore have provided numerous training opportunities for Biological and Agricultural Engineering and Hydrology students. Dr. Abby Langston (KSU Geography) is a geomorphologist with research interests in landscape evolution and modeling. Dr. Langston is collaborating with Dr. Walter Dodds on projects related to stream flow and stream corridor change. The KNZ LTER patch-burn grazing experiment is being done in collaboration with Dr. KC Olson, a grazing animal nutritionist (Animal Science and Industry – KSU) that is using the experiment to access the impacts of alternative grassland management practices on animal nutrition and animal health. Other contributions to disciplines outside the traditional realm of ecology include the use of flux towers at the Konza site, which has provided data used by micrometeorologists, climatologists, remote sensing scientists and modelers. We also collaborate with atmospheric chemists and modelers with the EPA CASTNet program in sampling concentrations of selected airborne particles and use these to model dry deposition rates.

What is the impact on the development of human resources?

Our program has a long history of undergraduate training and exposure to scientific research for local KSU students. Amanda Kuhl (KNZ Research Assistant) mentors 15-25 students year-round that assist in collection and measurement of long-term productivity plots, as well as grass and grasshopper population data in the core KNZ datasets. Amanda is long-term Konza staff, and has great institutional memory and is a core asset to our team. In addition, training of undergraduates includes REU students supported each summer (typically 2/summer). Indirectly, we support the development of undergraduates via the use of the Konza LTER data in ecology classes and text books. As documented elsewhere in this report, we also train numerous graduate students and provide valuable experience in interdisciplinary research and the synthetic use of long-term datasets. In addition to supporting KSU graduate students, the Konza Prairie LTER site is widely utilized by graduate students from other institutions. During the 2022-2023 funding period, the site was used by graduate students from the University of Kansas, Colorado State University, Oregon State University, University of Wyoming, University of North Carolina at Greensboro, and Johns Hopkins University. We also hosted field trips for students from many regional colleges and universities. The Konza Environmental Education Program and the Konza Prairie Schoolyard LTER Program, provide formal and informal research experiences and science education to public groups, children, and K-12 teachers. Finally, the Konza LTER site continues to be used in conjunction with the NSF-funded Girls Researching Our World (GROW) program (www.ksu.edu/grow), with several KSU scientists and students leading educational activities for 6th-12th grade girls.

What was the impact on teaching and educational experiences?

KNZ data and findings are used in a number of undergraduate and graduate courses at Kansas State University, the University of Kansas, University of Arizona, Colorado State University, University of Oklahoma, among others. In addition, KNZ findings are increasingly utilized in undergraduate ecology texts and supplementary teaching material. For example, KNZ long-term studies were used to demonstrate the role of fire and grazing in the 'Ecology' text by Cain et al. ('Life. The Science of Biology. 7th edition' by Purves, Sadva, Orians, and Heller) and KNZ data and findings are highlighted in several upper-level and graduate texts including 'Freshwater Ecology' (W.K. Dodds), 'The Ecology of Plants' (Gurevitch, Scheiner and Fox), and 'Biogeochemistry. An Analysis of Global Change' (W.H. Schlesinger). Additionally, KNZ is used as an "outdoor classroom' for many courses at KSU and regional colleges and universities. As an example, many of the lab portions of KSU Biology courses take the students to Konza for weekly lab exercises (focused on everything from small mammal trapping, avian ecology / sampling, measurements of plant physiology and productivity, soil microbiome measurements, and freshwater fish and biogeochemistry sampling.

In 2022-2023, Konza once again hosted undergraduate students from Haskell Indian Nations (Lawrence, KS) in June, 2023 as part of their summer HERS (Haskell Environmental Research Studies) program. Jesse Nippert, Lydia Zeglin, and Nico Vega (MS student in the Zeglin lab) facilitated this event.

In October 2023, Konza hosted an ESA-SEEDS group for a 3-day guided research experience. Several KNZ LTER investigators, students, and staff played a role in the experience.

What is the impact on physical resources that form infrastructure?

The Konza LTER program provides a research platform for scientists and students from around the world. The 3,487-ha Konza Prairie Biological Station (KPBS), located in the Flint Hills of NE Kansas, is the core research site for the KNZ program. In addition to providing the watershed-level fire and grazing treatments, agricultural fields, restored prairie, stream networks and weirs, KPBS includes several buildings in the headquarters area that support LTER research. The on-site Ecology Laboratory (2,400 ft2) includes (1) a wet/dry lab with sinks, fume hood, refrigerators, balances, etc., (2) two large multi-purpose work rooms with bench space and sinks for processing samples, drying ovens, refrigerators and freezers, and equipment storage, and (3) a large researchers' shop equipped with a variety of tools and field supplies. Other station buildings include a fire station and maintenance building, a large storage building for equipment, and a residence occupied by the site foreman year around. The 4,650-ft2 Hulbert Center houses a library/conference room, administrative office, classroom and teaching laboratory (used primarily for K-12 activities), reference herbarium and animal collections, and a kitchen and dormitory-style housing for 15 visitors. Two small guest cottages (each with 2-bedrooms, living room, bath, kitchen, and laundry facilities), can accommodate up to 5 persons/cottage. A larger cottage, built in 2012, can accommodate up to 12 guests, expanding the capacity of on-site accommodations to 37 visiting researchers. With funding from an NSF-FSML grant and additional support from KSU and a private donor, an historic limestone barn at the KPBS headquarters was transformed into a multipurpose meeting facility for on-site conferences, workshops, and educational programs. The historic stone barn was renovated in 2008 and has the Cortelyou Lecture Hall (1,750 ft2) with a seating capacity of ~100 persons fully equipped with A/V equipment and wireless internet. Additional large multi-purpose room (1,850 ft2) is designed as flexible space for varied uses including additional meeting space, workshops, scientific posters and other research displays, social gatherings, and education programs for large groups. All lab and office buildings have internet connectivity to the KSU campus. In addition, there is a wireless link to KPBS from campus with multiple wireless access points that provides coverage to >60% of the 3,487-ha site. Other LTER infrastructure, maintained by KPBS, includes the outside perimeter fence (29.8 km), the interior bison management area closed by 16.4 km of "New Zealand" fence, 98 small (25 m2) grazing enclosures, 11.7 km of fence for cattle research, 26.4 km of access roads and 61 km of fireguards separating the experimental watershed units. KPBS maintains several general-purpose vehicles on-site, as well as specialized equipment (tractors, fire trucks, mowers, soil augers, etc.). KPBS makes staff and equipment available to assist with KNZ research activities, including mowing fireguards, installing equipment, soil coring, etc. KPBS staff also coordinates the fire management of bison and cattle herds for KNZ grazing treatments. The headquarters area includes a corral and handling facilities for managing the bison herd (hydraulic chute, electronic scales, etc.), which is essential for LTER grazing studies. In late 2017, then KPBS director, Briggs received an NSF award to upgrade the corral area. In 2018, KPBS and KNZ staff redesigned and improved the bison handling facility. The changes provide a safer working environment for staff, reduce stress on bison, and allow greater ease and flexibility in conducting bison-related research. In 2018, we constructed a 900 ft2 walk-in drying oven using a modified shipping container. Temperatures within the large drying oven are regulated by a small home furnace powered using propane. In 2020, 20 km of fencing was replaced to improve the safety and security of the bison inclosure. This process of fence replacement required months of effort. Other field equipment and instrumentation on-site includes the main KNZ weather station, a network of 11 rain gauges, two eddy flux towers for quantifying ecosystem-level C and water vapor flux, four weirs and associated stream gauging equipment, 46 wells for measuring groundwater levels and chemistry, numerous TDR probes, neutron access tubes and tension lysimeters for soil water measurements. Related equipment co-supported by other programs includes USGS stream monitoring station, 2 seismometers (USGS), an aerosol and ozone monitoring facility (CASTNet), and a NOAA Climate Reference Network (CRN) weather station. These facilities add significantly to data for LTER research and education programs, and for regional cross-site studies. KPBS is also a core site for National Ecological Observatory Network (NEON), which is fully-built-out and operational. NEON provides additional unique measurement capabilities and data at KBPS, which will complement many KNZ LTER studies. In addition to facilities at KPBS, a wide-range of modern laboratory facilities are available on the nearby KSU campus, approximately 15 km from KPBS (e.g., Analytical Chemistry Labs, Stable Isotope Lab, Ecological Genomics Institute, Core Sequencing and Genotyping Facility). The majority of core LTER laboratory space and analytical equipment are located in Bushnell Hall (Biology), including space and equipment for preparing plant, soil and water samples for analysis (drying ovens, grinders, shaker tables, block digesters, vacuum filtration systems). Bushnell Hall also houses an extensive collection of prairie plant specimens in the KSU Herbarium, and these specimens are electronically databased and georeferenced. Some specific equipment and facilities available for LTER research are located within other Departments (Agronomy, Biological and Agricultural Engineering, Plant Pathology, Geography), reflecting the interdisciplinary nature of our research. Some major analytical instruments available for KNZ investigators include: 2 Alpkem autoanalyzers (FlowSolution IV) for liquid samples, Carlo-Erba 1500 automated C/N

analyzer for solid samples, Shimadzu TOC 500 analyzer for dissolved C, a Hitachi U2900 automated dual-beam spectrophotometer, 4 LiCor 6400 Portable Photosynthetic Systems, 2 LiCor 8100 systems dedicated for soil CO_2 flux measurements, a LiCor 1600 null-balance porometer for stomatal conductance, and 3 pressure chambers (PMS model 1000) for measuring plant water potential, 4 Tektronix cable testers (model 1502B) coupled to Campbell CR10 data loggers for TDR soil moisture measurements, 2 Troxler (model 3221) neutron probe gauges for soil moisture determinations, and several Trimble GPS units. Eight multi-parameter sonds (YSI 6000) are used for monitoring oxygen and temperature for 3 watersheds.

What is the impact on institutional resources that form infrastructure?
Nothing to report.

What is the impact on information resources that form infrastructure?

KNZ resources are used to support the hardware and software associated with the KNZ website and data portal, which provide a wide array of information resources to the larger scientific community, LTER network, Environmental Data Initiative (EDI), and DataOne. Our website provides access to all KNZ data, publications, research activities, and products, including 169 research projects. All online data are searchable by KNZ data categories, LTER controlled vocabulary keywords, LTER core areas, KNZ watersheds, and data owner. We maintain an updated list of all KNZ LTER-supported/related publications (total of 2046 publications currently online). We will fully migrate from the Drupal 7 DEIMS web platform to WordPress over the next funding year to modernize our website. We successfully migrated all KNZ publications to Zotero. Currently the KNZ Zotero library shares all the KNZ publications publicly via the website.

The KNZ website now lists physical sample collections for numerous long-term datasets, including grasshopper, plant, water, and small mammal collections. The KNZ LTER Research Sample Request form was developed and posted online so researchers may request use of our physical sample collections.

We continue to make improvements and enhancements to our spatial data portal site. (https://maps-konza.hub.arcgis.com/).

During the next reporting year, we will: 1) continue to ensure data quality, data integrity, and data availability with the latest LTER standards by providing up-to-date, accurate LTER data to KNZ investigators and to the broader scientific community; 2) continue to support researchers and graduate students with the goal of timely incorporation of projects and data into the KNZ IMS and EDI; 3) continue enhancements of KNZ new spatial data portal to include more aerial photos, topographical maps, and LiDAR, and 4) design and develop the new KNZ LTER WordPress website to improve accessibility.

What is the impact on technology transfer?
Nothing to report.

What is the impact on society beyond science and technology?

The KNZ LTER program contributes to increased public awareness of ecological and environmental issues (e.g. biodiversity conservation, habitat loss, ecosystem services, restoration ecology, etc.) through outreach and public education activities. Our research concerning the role of seasonal burning and fire intensity on woody encroachment is being used to inform the Great Plains Fire Science Exchange (www.gpfirescience.org) and the Tallgrass Prairie and Oak Savanna Fire Science Consortium (www.tposfirescience.org). Both of these are non-profit groups focusing on conservation issues and land management of Midwestern grasslands. Konza investigators have a strong working and advisory relationship with the Kansas chapter of The Nature Conservancy. We work closely with Dr. Brian Obermeyer, the Director of Protection and Stewardship for KS TNC. In addition, the Konza Prairie LTER program is increasingly called upon to provide data relevant to resource management and regulatory policy. Dr. John Blair and Dr. Jesse Nippert regularly provide outreach and tours to state and national policymakers and law-makers. Because of the widespread use of prescribed fire for both grassland conservation and agricultural tours, KNZ research on ecological responses to contrasting long-term fire regimes and different seasons of fire has taken on new importance. At the regional level, KNZ scientists advised the EPA Region 7 staff and scientists on the ecological benefits of fire in maintaining native tallgrass prairie habitat and diversity and contribute long-term data to guide the development of the Flint Hills regional smoke and management goals. The KNZ Season of Fire Experiment provides 23-years of data from watersheds burned at different times of the year (Spring, Summer, Fall, and Winter). Most prescribed burning in the Flint Hills takes place during a small window in April. We now have data showing that burning can be done other times of the year in ungrazed watersheds with little adverse effect on plant productivity or desirable species. KNZ investigators have interacted with advisory groups, including the EPA, Natural Resources Conservation Service, the Kansas Farm Bureau, The Nature Conservancy Grassland Community, and others. Locally, Konza scientists continue to serve as consultants for the

Flint Hills Discovery Center, the Mount Mitchell Heritage prairie (grassland site with historical linkages to the underground railroad) and we participate in Kansas Agricultural Experiment Station public education events by providing information on the ecological consequences of various grassland management practices (e.g., fire frequency and grazing). The Konza Prairie LTER database is also being used to address other issues relevant to regulatory policy. Long-term data on Konza Prairie stream water quality provides a baseline being incorporated into ongoing studies to evaluate the potential of grassland management practices to increase soil C sequestration to offset atmospheric CO2 loading. In 2022-2023, KNZ scientists and graduate students participated in numerous public outreach events to enhance understanding of LTER science and dissemination of important findings. A few examples include: Zak Ratajczak and John Blair were interviewed by KCUR (NPR in Kansas City) regarding long-term bison research. Alice Boyle discussed her participation in the Motus tracking system for migrating birds. The Topeka Capital-Journal published an article entitled, “Why do Kansas prairie fires matter? This area of the Flint Hills seeks those answers.” The article features KNZ LTER’s long fire treatment history. Graduate students and staff participated in the Kansas Science Festival in Manhattan in April 2023. This festival allows researchers to share their work with the public, especially children. Konza Prairie hosts numerous artists annually. A featured Konza artist, Erin Wiersma (https://www.erinwiersma.com/), has gained prominence for her works created at Konza Prairie. Besides publishing a book containing many of her pieces created from the Konza fire program, Wiersma and Katie Kingery-Page (KSU landscape architecture professor) led an ecological drawing workshop at the Salina, KS Art Center for K-12 educators across Kansas.

What percentage of the award's budget was spent in a foreign country?

None of this award's budget was spent in a foreign country.

Changes/Problems

Changes in approach and reason for change
Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them
Nothing to report.

Changes that have a significant impact on expenditures
Nothing to report.

Significant changes in use or care of human subjects
Nothing to report.

Significant changes in use or care of vertebrate animals
Nothing to report.

Significant changes in use or care of biohazards
Nothing to report.

Change in primary performance site location
Nothing to report.