

## **Daniel R. Uden**

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### **EDUCATION**

Ph.D.—Natural Resource Sciences. Major: Applied Ecology.  
University of Nebraska–Lincoln; May, 2017.

Dissertation: *Social–ecological causes and consequences of landcover change in landscapes of Nebraska, U.S.A.*

Advisor: Craig Allen

M.S.—Natural Resource Sciences. Major: Wildlife Ecology.  
University of Nebraska–Lincoln; August, 2012.

Thesis: *Agricultural landuse change impacts on bioenergy production, avifauna, and water use in Nebraska's Rainwater Basin*

Advisor: Craig Allen

B.A. (High Distinction)—Major: Geography; Minors: Biology and History.  
Concordia University, Seward; May, 2010.

Senior project: *White-tailed deer presence and prescribed fire in a tallgrass prairie*

Instructor: Joseph Gubanyi

Junior project: *Georeferenced electrofishing survey results for District 6 Interstate 80 Lakes*

Instructor and advisor: Joel Helmer

### **EMPLOYMENT**

- Assistant Professor. University of Nebraska–Lincoln. 2020–present.
- Post-doctoral Research Associate. University of Nebraska–Lincoln. 2017–2020.
- Graduate Research Assistant (M.S. and Ph.D.). University of Nebraska–Lincoln. Nebraska Cooperative Fish and Wildlife Research Unit. 2010–2017.

### **AWARDS, FELLOWSHIPS, AND SCHOLARSHIPS**

University of Nebraska–Lincoln

- School of Natural Resources Meritorious Graduate Student—Ph.D. Division (one of two recipients). 2016.
  - \$500 cash prize.
  - Recognition of outstanding academic achievement, research, teaching contributions, leadership accomplishments, service, and personal qualifications.
- Center for Great Plains Studies Graduate Fellow. 2014–2017.
  - Up to \$1,000 reimbursement for research and travel to professional meetings.

- Fellowship program provides opportunities for Great Plains-based collaboration with University of Nebraska faculty and students.
- Othmer Fellow (one of two recipients). 2012–2015.
  - \$8,000 per year.
  - Recruitment of exceptional scholars in pursuit of terminal degrees.

#### National Science Foundation

- Integrated Graduate Education and Research Traineeship (IGERT) Fellow. 2014–2015.
  - \$30,000 per year + coverage of university fees
  - Immersive, cross-disciplinary program focused on resilience and adaptive governance in stressed watersheds.

#### Concordia University, Nebraska

- Outstanding Social Sciences Student (sole recipient). 2010.
- President's Academic Scholarship. 2006–2010.
  - Top academic award.
  - \$12,000 per year.
- National Association of Intercollegiate Athletics Scholar Athlete. 2006–2010.

### **GRANTS UNDER DEVELOPMENT**

Adaptive Management of Sandhills Grasslands. Allen, C.R. (P.I.), Schacht, W. (co-P.I.), and **Uden, D.R.** (co-P.I.). Nebraska Environmental Trust.

### **GRANTS PENDING**

REU Site: Resilience in Agricultural Working Landscapes. **Uden, D.R.** (P.I.), L.-K. Soh (Co-P.I.), C.R. Allen (senior personnel), F. Munoz-Arriola (senior personnel), Y. Qi (senior personnel), and R. Stromberg Kettelhake (other personnel). National Science Foundation. \$359,101. 6/1/2021–8/31/2023.

- Establish new Research Experiences for Undergraduates site.
- Offer education and training in resilience science and interdisciplinary research.
- Integrate undergraduate researchers into existing NSF NRT graduate student research.

### **GRANTS AWARDED**

Conservation Outcomes in Great Plains Rangelands. Twidwell, D. (P.I.), C.P. Roberts (Co-P.I.), and **D.R. Uden** (Co-P.I.). USDA NRCS. \$203,001. 8/1/2020–7/31/2021.

- Link theory, data, and technology to inform strategic management of vegetation transitions on western U.S. rangelands.

Improving the performance of conservation investments on Eastern redcedar. Twidwell, D. (P.I.), C.P. Roberts (Co-P.I.), and **D.R. Uden** (Co-P.I.). Nebraska Environmental Trust. \$170,917. 07/01/2020–06/30/2023.

- Develop comprehensive strategy for managing eastern redcedar spread in Nebraska.
- Coordinate science product development and delivery, management, and communication to guide large-scale grassland conservation.
- Evaluate investment returns on statewide eastern redcedar management.

Resilience informatics for the convergence of critical capacities to address regional-scale environmental change. Twidwell, D. (P.I.), B.C. Chaffin (Co-P.I.), C.R. Allen (Co-P.I.), S. Banerjee (Co-P.I.), T. Floyd (Co-P.I.), **D.R. Uden** (Co-performer), and B.W. Allred (Co-performer). National Science Foundation. Nebraska EPSCoR, Track II. \$3,953,265. 08/01/2019–07/31/2023.

- Converge faculty from Nebraska and Montana to inform proactive management of ecological change at multiple scales.
- Screen for ecological regime shifts on rangelands of the western United States, using screening metric and workflow I co-developed (Uden et al. 2019, *Frontiers in Ecology and Evolution*).
- Identify social factors affecting the potential to build resilience on working lands.

Teaching socio-environmental synthesis with case studies: Biome-scale woody plant transitions in the Great Plains. Fogarty, D. (P.I.), **D.R. Uden** (Co-P.I.), V.M. Donovan (Co-P.I.), and C. Barnes (Co-P.I.). National Socio-Environmental Synthesis Center (SESYNC). \$5,020. 07/29/2019–08/02/2019.

- Develop a socio-environmental case study for future course integration.
- Build teaching capacity and learn about case studies as a teaching tool.
- All-expense-paid weeklong trip to Annapolis, MD (transportation, lodging, and food).

Mapping spatial regimes in rangelands. Twidwell, D. (P.I.), C.R. Allen (Co-P.I.), and **D.R. Uden** (Co-performer). University of Montana. \$140,000. 05/01/2018–06/30/2019.

- Collaborate with Working Lands for Wildlife National Science Team.
- Develop decision-support tools to revolutionize rangeland monitoring and management.
- Map cross-scale vegetation transitions on rangelands of the western United States.

### **GRANTS NOT AWARDED (FIVE SELECTED)**

Cross-scale and dynamic regime shifts: Requisite conditions and implications. Sundstrom, S.M. (P.I.), C.D. Allen, D.G. Angeler, T. Eason, C.R. Allen, B.C. Chaffin, R.K. Craig, V. Dakos, L.H. Gunderson, K. Nash, C.P. Roberts, D. Twidwell, A.S. Garmestani, J. Stevens, and **D.R. Uden**. U.S. Geological Survey John Wesley Powell Center for Analysis and Synthesis.

- Gather resilience and regime shift experts for three one-week meetings.
- Understand conditions under which small-scale changes in ecosystems cascade up to drive shifts at larger scales.
- Contribute to the science of early regime shift detection.

Cross-scale screening and spatial imaging for early detection of the loss of resilience. Allen, C.R. (P.I.), D. Twidwell (Co-P.I.), **D.R. Uden** (Co-P.I.), and B.W. Allred (Co-performer). United States Department of Defense Strategic Environmental Research and Development Program. \$2,600,509.

- Link theory, data, and technology for earlier detection of ecological regime shifts.
- Screen for cross-scale vegetation transitions on all western U.S. DOD installments.
- Co-develop military installment-specific management plans.

Nebraska resilience network. Allen, C.R. (P.I.), E. VanWormer (Co-P.I.), N. Shank, (Co-P.I.), F. Munoz-Arriola (Co-P.I.), D. Twidwell, (Co-P.I.), and **D.R. Uden** (Co-performer). National Science Foundation. Nebraska EPSCoR, Track I. Pre-proposal stage. \$10,000,000.

- Assemble network of collaborators from Nebraska academic institutions, government agencies, and non-profits around the idea of resilient agroecosystems.
- Promote resilience-based sustainable development at the food–energy–water–ecosystem services (FEWES) nexus.
- Increase capacity for resilience-based management of working agricultural landscapes.

Dynamics and tradeoffs among social, economic, and ecological components of resilience in working agricultural landscapes. Allen, C.R. (P.I.), J. Hodbod (Co-P.I.), F. Munoz-Arriola (Co-P.I.), N. Shank (Co-P.I.), M. Otte (Co-P.I.), and **D.R. Uden** (Co-P.I.). National Science Foundation Innovations at the Nexus of Food, Energy and Water Systems (INFEWS). \$2,499,692.

- Determine scales of coupling among social, economic, and ecological subsystems in working agricultural landscapes.
- Identify social–ecological variables for assessing resilience at the FEWES nexus.
- Quantify tradeoffs of different policy decisions under current and future conditions.

Modeling and prediction of agroecosystems' resiliency to extreme hydrometeorological and climate events. Munoz-Arriola, F. (P.I.), C.R. Allen (Co-P.I.), M. Otte (Co-P.I.), and **D.R. Uden** (Co-P.I.). USDA Agriculture and Food Research Initiative (AFRI) – Resilient Agroecosystems in a Changing Climate. \$1,196,275.

- Simulate climate-induced changes in extreme hydrometeorological and climatic events.
- Gauge agroecosystems' resiliencies to extreme events.
- Systematically reduce uncertainties around complex water resource issues.

### **INTERDISCIPLINARY COLLABORATIONS**

Establishment of new Research Experiences for Undergraduates site (pending). National Science Foundation.

Predicting the next high-impact insect invasion: Elucidating traits and factors determining the risk of introduced herbivorous insects on North American Native Plants. John Wesley Powell Center for Analysis and Synthesis. 2019–present.

- Collaborated with entomologists and plant pathologists to construct a dataset on invasive insects and their native and novel hosts.
- Contributed to development of a predictive models for quantifying the risk of insect invasions to North American conifer and deciduous tree populations (Mech et al. 2019, *Ecology and Evolution*; Schultz et al. 2020, *In prep*).
- Attended an in-person meeting at the Powell Center, as well as numerous conference calls.
- Served as lead author on third manuscript prioritizing risk of potential insect invaders on North American conifer populations (Uden et al., 2020, *In prep*).

Resilience at the Food–Energy–Water Systems nexus of intensive agricultural landscapes. University of Nebraska–Lincoln. 2017–2018.

- One-year post-doctoral research appointment.
- Understand resilience at the FEWES nexus of working agricultural landscapes.
- Collaborate with faculty supervisors from the Nebraska Public Policy Center (Nancy Shank), UNL Department of Biological Systems Engineering (Francisco Munoz-Arriola), and Nebraska Cooperative Fish and Wildlife Research Unit (Craig Allen).
- Collaborate with a hydrologist post-doctoral researcher (Gengxin [Michael] Ou).
- Published papers on identifying rigidity traps in an intensive agricultural landscape (Uden et al. 2018, *Sustainability*) and the effects of alternative, plausible climate change scenarios on groundwater levels in the Republican river Basin (Ou et al. 2018, *Climatic Change*).
- Drafted a paper that integrates challenges in gaps (yield gaps), caps (planetary boundaries), and traps (social–ecological traps) for sustainable agricultural development.

#### Center for Great Plains Studies Graduate Fellows Program

- Collaborate with graduate students and faculty from across campus with a research focus on the Great Plains.
- Attended meetings, seminars, and writing retreats with fellow graduate fellows.
- Composed and published an interdisciplinary research paper (Streit Krug et al. 2017) on eastern redcedar spread with Aubrey Streit Krug (Department of English), Craig Allen (Nebraska Cooperative Fish and Wildlife Research Unit and School of Natural Resources), and Dirac Twidwell (Department of Agronomy and Horticulture).

#### Integrated Graduate Education and Research Traineeship (IGERT) Program

- Participated in an immersive and interdisciplinary graduate student training program.
- Developed an educational game (high school-to-graduate student level) focused on adaptive governance, resilience, and integrated water management in the Platte River Basin.

### **SCIENCE PRODUCTS DEVELOPED AND DELIVERED**

#### Nebraska landowners (private)

- Southwest Nebraska ranchers meetings in Imperial, NE (February 17, 2020) and Enders, NE (March 10, 2020).
  - Screened southwestern Nebraska for transitions between grass and woody plant dominance at multiple scales from 2000–2018, with a special focus on the vicinity of Enders Reservoir.
  - Mapped cores of grassland habitat in southwestern Nebraska in 2000 and 2018, with a special focus on the vicinity of Enders Reservoir.
  - Map products supported strategic planning sessions with ranchers led by Dirac Twidwell (UNL) and Dillon Fogarty (UNL).
- Sandhills Management Meetings. Hosted by Sandhills Task Force (STF) in Brewster, NE (December 3, 2019), Arnold, NE (December 4, 2019), and Burwell, NE (April 3, 2020).
  - Screened Sandhills ecoregion for transitions between grass and woody plant dominance at multiple spatial scales from 2000–2018.
  - Modeled potential dispersal of woody plants from known seed sources.
  - Map products supported strategic planning sessions with ranchers led by Shelly Kelly (STF) and Dirac Twidwell.
- Loess Canyons Rangeland Alliance (LCRA). Curtis, NE. October 18, 2019.

- Screened Loess Canyons ecoregion for transitions between grass and woody plant dominance at multiple spatial scales from 2000–2018.
- Modeled potential dispersal of woody plants from remnant seed sources in management units.
- Participated in strategic discussion with LCRA members led by Dirac Twidwell.
- Sandhills Task Force (STF). Thedford, NE. October 17, 2019.
  - Similar products delivered as Sandhills Management Meetings (above).
  - Participated in discussion led by Shelly Kelly and Dirac Twidwell with STF Board members.

#### Kansas landowners (private)

- Red Hills Management Meeting. Medicine Lodge, KS. January 31, 2020.
  - Screened Red Hills ecoregion for transitions between grass and woody plant dominance at multiple scales from 2000–2018.
  - Mapped recovery of woody plant patches following 2016 Anderson Creek Wildfire.
  - Map products supported strategic planning session with ranchers led by Dirac Twidwell and Dillon Fogarty.

#### Nebraska Game and Parks Commission (NGPC)

- Verdigris-Bazile Biologically Unique Landscape (BUL). Lincoln, NE. January 15, 2020.
  - Screen BUL for transitions between grass and woody plant dominance at multiple spatial scales from 2000–2018.
  - Map intact grassland cores in BUL in 2000 and 2018.
  - Overlay management data on transition signal and intact grassland core maps.
  - Map products supported strategic discussions with biologists and land managers about spatially targeting woody plant management.
- Southeast District Wildlife Management Areas (WMAs). Lincoln, NE. October 29, 2019.
  - Screened all 81 WMAs in Southeast District for transitions between grass and woody plant dominance at multiple spatial scales from 2000–2018.
  - Identified WMAs in grass *versus* tree spatial regimes in 2000 and 2018.
  - Participated in strategic discussions with WMA managers about spatially targeting woody plant management in and around WMAs.
- Milkweed scenario planning exercise. Webinar. May 23, 2017.
  - Participated in 16-state discussion led by Kristal Stoner (NGPC) on recruiting 1.6 billion new milkweed stems along monarch butterfly migratory corridors for conservation of six hectares of overwintering monarchs in Mexico.
- Pine Ridge scenario planning workshops. Scenario planning exercise hosted by the Nebraska Natural Legacy Project in Chadron, NE (September 17, 2014 and December 3, 2015) and Gering, NE (October 8, 2014).
  - Led a participatory scenario planning exercise with land managers from multiple state and federal agencies and NGOs on the future of the Pine Ridge.
  - Aggregated manager perspectives on future drivers of change into three scenario storylines.
  - Simulated landcover change under each scenario with cellular automata.
  - Presented maps and scenarios to managers for iterative refinement.

### Nebraska Cattlemen

- Annual Convention and Trade Show. Kearney, NE. December 5, 2019.
  - Screened range-dominated Nebraska ecoregions for transitions between grass and woody plant dominance at multiple scales from 2000–2018.
  - Mapped intact grassland cores in 2000 and 2018.
  - Map and data products used in presentation to all attendees by Dirac Twidwell.

### Nebraska Legislature

- LR 387 Interim Study Report. Interim study to examine issues relating to the spread of Eastern Redcedar Trees. August 31, 2018. One hundred-fifth legislature. Second session.
  - Contributed spatial and tabular data on percent tree cover across the State of Nebraska and in selected landscapes from 2000–2017.
  - Available online at:
    - [https://nebraskalegislature.gov/pdf/reports/committee/natural/lr387\\_2018.pdf](https://nebraskalegislature.gov/pdf/reports/committee/natural/lr387_2018.pdf)

### Natural Resources Conservation Service (NRCS)

- Kansas NRCS. November 21, 2019. Hays, KS.
  - Screened Kansas rangelands (focus on Flint Hills, Smoky Hills, and Red Hills ecoregions) for transitions between grass and woody plant dominance at multiple scales from 2000–2018.
  - Mapped intact grassland cores throughout Kansas in 2000 and 2018.
  - Map and data products supported strategic group discussion on woody plant management led by Dirac Twidwell.
- Montana NRCS and United States Bureau of Land Management (BLM). November 5, 2019. Webinar.
  - Follow-up to NRCS’s “Cheatgrass Challenge” webinar, which addressed problematic vegetation transitions on western U.S. rangelands.
  - Screened Montana rangelands for transitions between bare ground/perennial grass/shrub and annual grass dominance at multiple scales from 2000–2018 (focus on priority sage grouse conservation areas).
  - Tested for temporal growth cycles in annual grass abundance at multiple six spatial scales.
  - Map and data products supported strategic management discussions led by Jeremy Maestas (NRCS) and Dirac Twidwell.
- Idaho NRCS and Wyoming NRCS. September 11, 2019. Webinar.
  - Featured in NRCS’s “Cheatgrass Challenge” webinar, which addressed problematic vegetation transition in western U.S. rangelands.
  - Screened Idaho, Wyoming, Nevada, and Utah rangelands for transitions between bare ground/perennial/shrub and annual grass dominance at multiple scales from 2000 – 2018 (focus on priority sage grouse conservation areas).
  - Tested for temporal growth cycles in annual grass abundance at multiple six spatial scales.
  - Identified intact cores of native shrub habitat in 2000 and 2017.
  - Delivered spatial data of statewide transition signals and intact shrub core areas to NRCS personnel as ArcGIS layer packages.

### The Nature Conservancy (TNC)

- Bend, Oregon. October 2, 2019. Email.
  - Follow-up to NRCS’s “Cheatgrass Challenge” webinar, which addressed problematic vegetation transitions on western U.S. rangelands.
  - Screened the Great Basin ecoregion for broad-scale transitions between shrub and annual grass dominance from 2000–2018.
  - Delivered map products to Matthew Cahill (TNC Sagebrush Sea Program Director for the Western U.S.).

### Rainwater Basin Joint Venture (RWBJV)

- Rainwater Basin Wetland Inundation Decision Support System. 2013.
  - Collaborated with RWBJV staff to develop a predictive model and corresponding ArcGIS tool for predicting springtime wetland ponding (migratory waterbird habitat) in the Rainwater Basin.
  - Employed scenario planning to predicted ponding under down-scaled regional climate change projections.
  - Used to inform spring and autumn flooding of wetlands with groundwater.
  - Details in Uden et al. (2015) paper in *Ecosphere*.

### **MEDIA COVERAGE OF SCIENCE PRODUCTS AND GRANTS**

Nebraska Cattlemen newsletter (forthcoming). Opportunities coming to halt invasion of eastern redcedar.

- Highlights statewide and county vegetation screening maps for years 2000 and 2018.
- Addresses the implications of ecological regime shifts for cattle production.

Pheasants Forever Journal (forthcoming).

- Features biome-scale (Great Plains) maps of transitions between grass and woody plant dominance between 2000 and 2018.
- Highlights potential contributions of regime shift screening to pheasant conservation.

USDA NRCS Working Lands for Wildlife newsletter. January 29, 2020. Transitions in focus: How landowners and managers are using new technologies to improve rangeland management.

- Demonstrates the utility of regime shift screening (Uden et al. 2019, *Frontiers in Ecology and Evolution*) for rangeland conservation with multiple map products.
- Illustrates how regime shift screening is based in resilience theory and contributes to resilience-based land management.
- Links to December 20, 2019 Nebraska Today article by Scott Schrage.
- Available online at:  
<https://email.connectablenews.com/t/ViewEmail/y/A246C0D68AD69DE2/781CFDD76C54FD566E6039C17E42EE19>

Midwest Messenger. Jon Burluson. February 5, 2020. Red cedar menace to rangeland.

- Addresses the implications of ecological regime shifts for cattle production.
- Describes utility of screening technology I co-developed for tracking regime shifts (Uden et al. 2019, *Frontiers in Ecology and Evolution*).



- Available online at: [https://www.agupdate.com/midwestmessenger/news/livestock/red-cedar-menace-to-rangeland/article\\_a677d0f8-484d-11ea-8fad-cb32325c239b.html](https://www.agupdate.com/midwestmessenger/news/livestock/red-cedar-menace-to-rangeland/article_a677d0f8-484d-11ea-8fad-cb32325c239b.html)

Lesser Prairie Chicken Initiative – Ask An Expert Series. September 23, 2019. What you should know about the eastern redcedar science literacy project.

- Features maps of a biome-scale regime shift from grass to woody plant dominance.
- Demonstrates ability of regime shift screening to detect large-scale vegetation transitions.
- Available online at: <https://www.lpcinitiative.org/why-you-should-know-about-the-eastern-redcedar-science-literacy-project/>

Nebraska Today. University of Nebraska–Lincoln. Scott Schrage. December 18, 2019. Early warning: Ecological screening looks to preserve Sandhills, native ecosystems.

- University-wide communication on publication of Uden et al.'s (2019) paper in *Frontiers in Ecology and Evolution* on screening for and imaging ecological regime shifts.
- Highlights utility of science products delivered to Nebraska ranchers (quotes from Shelly Kelly, Sandhills Task Force program director) and the Nebraska Game and Parks Commission (quotes from Alicia Hardin, Wildlife Division Administrator).
- Available online at: <https://research.unl.edu/blog/early-warning-ecological-screening-looks-to-preserve-sandhills-native-ecosystems/>

Nebraska Today. University of Nebraska. Tiffany Lee. October 1, 2019. Early detection of changing ecosystems is aim of Nebraska-led research.

- University-wide communication on the awarding of Twidwell et al.'s EPSCoR Grant, which features regime shift screening.
- Highlights contributions of grant investigators and collaborators from Nebraska and Montana.
- Available online at: <https://news.unl.edu/newsrooms/today/article/early-detection-of-changing-ecosystems-is-aim-of-nebraska-led-research/>

Nebraska Today. University of Nebraska. Shawna Richter-Ryerson. April 2, 2018. Researchers: Focus policy to better control red cedar invasion.

- University-wide communication on publication of Roberts et al.'s (2018) paper in *PLoS ONE*.
- Documents the history and role of policy in the challenge of managing woody plant encroachment in the Great Plains.
- Available online at: <https://news.unl.edu/newsrooms/today/article/researchers-focus-policy-to-better-control-red-cedar-invasion/>

### **PEER-REVIEWED MANUSCRIPTS IN PREPARATION OR REVIEW**

Donovan, V.M., C.P. Roberts, C.L. Wonkka, **D.R. Uden**, D.G. Angeler, C.R. Allen, D. Wedin, R.A. Drijber, and D. Twidwell. 2020. Collapse, reorganization, and regime identity. *Ecology and Society*. In preparation.

Fogarty, D.T., D. Twidwell, C.H. Bielski, V.M. Donovan, C.P. Roberts, **D.R. Uden**, B.W. Allred, M.O. Jones, and D.W. Naugle. 2020. Sustainability of grassland conservation in the Great Plains' working landscapes. *Biological Conservation*. In review.

Roberts, C.P., **D.R. Uden**, S.M. Cady, B.W. Allred, S.D. Fuhlendorf, M.O. Jones, J.D. Maestas, D.E. Naugle, A.C. Olsen, J. Smith, J. Tack, and D. Twidwell. 2020. Tracking spatial regimes as an early warning for a species of conservation concern. *Ecological Applications*. In review.

Scholtz, R., S.D. Fuhlendorf, **D.R. Uden**, B.W. Allred, M.O. Jones, D.E. Naugle, and D. Twidwell. 2020. The challenges of brush management treatment longevity in southern Great Plains, USA. *Rangeland Ecology and Management*. In review.

**Uden, D.R.**, C.R. Allen, D. Twidwell, and K.G. Cassman. 2020. Three challenges for sustainable agriculture: Close gaps, respect caps, and avoid traps. *Agriculture, Ecosystems & Environment*. In preparation.

**Uden, D.R.**, C.R. Allen, M.P. Ayres, D.A. Herms, K.J.K. Gandhi, N.P. Havill, R.A. Hufbauer, A.M. Liebhold, T.D. Marsico, A.M. Mech, K.F. Raffa, A.N. Schulz, K.A. Thomas, and P.C. Tobin. 2020. Predictions of high-impact insect invasions in North American conifer forests. *Ecological Applications*. In preparation.

#### **PEER-REVIEWED MANUSCRIPTS**

Angeler, D.G., B.C. Chaffin, S.M. Sundstrom, A.S. Garmestani, K.L. Pope, **D.R. Uden**, D. Twidwell, and C.R. Allen. 2020. Coerced regimes: Managing artificial feedbacks to navigate the Anthropocene. *Ecology and Society* 25(1):4.

Donovan, V.M., D. Twidwell, **D.R. Uden**, T. Tadesse, B.D. Wardlow, C.H. Bielski, M.O. Jones, B.W. Allred, D.W. Naugle, and C.R. Allen. 2020. Resilience to large, ‘catastrophic’ wildfires in North America’s grassland biome. *Earth’s Future* 8(7):e2020EF001487.

Jones, M.O., D.E. Naugle, D. Twidwell, **D.R. Uden**, J.D. Maestas, and B.W. Allred. 2020. Beyond inventories: Emergence of a new era in rangeland monitoring. *Rangeland Ecology and Management* 73(5):577–583.

**Uden, D.R.**, D.J. Wishart, L.A. Powell, R.B. Mitchell, C.R. Allen, and G. Steinauer. 2020. Adaptive fuel procurement in nineteenth century Great Plains landscapes. *Environment and History*. In press. <https://doi.org/10.3197/096734019X15463432086946>.

Mech, A.M., K.A. Thomas, T.D. Marsico, D.A. Herms, C.R. Allen, M.P. Ayres, K.J.K. Gandhi, J. Gurevitch, N.P. Havill, R.A. Hufbauer, A.M. Liebhold, K.F. Raffa, A.N. Schultz, **D.R. Uden**, and P.C. Tobin. 2019. Evolutionary history predicts the impact of non-native herbivorous insects on North American conifers. *Ecology and Evolution* 9:12216–12230.

**Uden, D.R.**, D. Twidwell, C.R. Allen, M.O. Jones, D.E. Naugle, J.D. Maestas, and B.W. Allred. 2019. Spatial imaging and screening for regime shifts. *Frontiers in Ecology and Evolution* 7:407.

Burnett, J.L., K.L. Pope, A. Wong, C.R. Allen, D.M. Haak, B.J. Stephen, and **D.R. Uden**. 2018. Thermal tolerance limits of the Chinese mysterysnail (*Bellamya chinensis*): Implications for management. *American Malacological Bulletin* 36:140–144.

- Ou, G., F. Munoz-Arriola, **D.R. Uden**, D. Martin, and C.R. Allen. 2018. Climate change implications for irrigation and groundwater in the Republican River Basin, U.S.A. *Climatic Change* 151:303–316.
- Roberts, C.P., **D.R. Uden**, C.R. Allen, and D. Twidwell. 2018. Doublethink and scale mismatch polarize policies for an invasive tree. *PLoS ONE* 13(3):e0189733.
- Uden, D.R.**, C.R. Allen, F. Munoz-Arriola, G. Ou, and N. Shank. 2018. A framework for tracing social–ecological trajectories and traps in intensive agricultural landscapes. *Sustainability* 10:1646.
- Streit Krug, A., **D.R. Uden**, C.R. Allen, and D. Twidwell. 2017. Culturally induced range infilling of eastern red-cedar: A problem in ecology, and ecological problem, or both? *Ecology and Society* 22(2):46.
- Allen, C.R., H.E. Birgé, S.L. Bartelt-Hunt, R.A. Bevans, J.L. Burnett, B.A. Cosens, X. Cai, A.S. Garmestani, I. Linkov, E.A. Scott, M.D. Solomon, and **D.R. Uden**. 2016. Avoiding decline: Fostering resilience and sustainability in midsize cities. *Sustainability* 8(9):844.
- Allen, C.R., D.G. Angeler, G.S. Cumming, C. Folke, D. Twidwell, and **D.R. Uden**. 2016. Quantifying spatial resilience. *Journal of Applied Ecology* 53:625–635.
- Angeler, D.G., C.R. Allen, **D.R. Uden**, and R.K. Johnson. 2015. Spatial scaling patterns and functional redundancies in a changing boreal lake landscape. *Ecosystems* 18:889–902.
- Uden, D.R.**, C.R. Allen, A.A. Bishop, R. Grosse, C.F. Jorgensen, T.G. LaGrange, R.G. Stutheit, and M.P. Vrtiska. 2015. Predictions of future ephemeral springtime waterbird habitat availability under global change. *Ecosphere* 6(11):215.
- Uden, D.R.**, C.R. Allen, D.G. Angeler, L. Corral, and K.A. Fricke. 2015. Adaptive invasive species distribution modeling: A framework for incipient invasions. *Biological Invasions* 17:2831–2850.
- Uden, D.R.**, C.R. Allen, R.B. Mitchell, T.D. McCoy, and Q. Guan. 2015. Predicted avian responses to bioenergy development scenarios in an intensive agricultural landscape. *Global Change Biology Bioenergy* 7:717–726.
- Uden, D.R.**, M.L. Hellman, D.G. Angeler, and C.R. Allen. 2014. The role of reserves and anthropogenic habitats for functional connectivity and resilience of ephemeral wetlands. *Ecological Applications* 24:1569–1582.
- Allen, C.R., K.T. Nemec, K.L. Decker, D.A. Wardwell, M. Brust, D. Fogell, J.D. Hoffman, J. Hogue, A. Lotz, T. Miller, M. Pummill, L.E. Ramirez-Yanes, and **D.R. Uden**. 2013. Predictors of regional establishment success and spread of introduced nonindigenous vertebrates. *Global Ecology and Biogeography* 22:889–899.

Stephen, B.J., N.M. Chaine, C.R. Allen, K.A. Fricke, D.M. Haak, M.L. Hellman, R.A. Kill, K.T. Nemeck, K.L. Pope, N.A. Smeenk, **D.R. Uden**, K.M. Unstad, A.E. VanderHam, and A. Wong. 2013. Fecundity of the Chinese mystery snail in a Nebraska Reservoir. *Journal of Freshwater Ecology* 28:439–444.

**Uden, D.R.**, C.R. Allen, R.B. Mitchell, Q. Guan, and T.D. McCoy. 2013. Scenarios of bioenergy development impacts on regional groundwater withdrawals. *Journal of Soil and Water Conservation* 68:124A–128A.

**Uden, D.R.**, R.B. Mitchell, C.R. Allen, T.D. McCoy, and Q. Guan. 2013. The feasibility of generating adequate biomass for year-round cellulosic ethanol production in an intensive agricultural fuelshed. 2013. *Bioenergy Research* 6:930–938.

Unstad, K.M., **D.R. Uden**, C.R. Allen, N.M. Chaine, D.M. Haak, D.M., R.A. Kill, K.L. Pope, B.J. Stephen, and A. Wong. 2013. Survival and behavior of Chinese mystery snails (*Bellamya chinensis*) in response to simulation water body drawdowns and air exposure. *Management of Biological Invasions* 4:123–127.

Wong, A., C.R. Allen, N.M. Hart, D.M. Haak, K.L. Pope, N.A. Smeenk, B.J. Stephen, and **D.R. Uden**. 2013. Enamel-based mark performance for marking Chinese mystery snail *Bellamya chinensis*. *Management of Biological Invasions* 4:231–234.

Chaine, N.M., C.R. Allen, K.A. Fricke, D.M. Haak, M.L. Hellman, R.A. Kill, K.T. Nemeck, K.L. Pope, N.A. Smeenk, B.J. Stephen, **D.R. Uden**, K.M. Unstad, and A.E. Vanderham. 2012. Population estimate of Chinese mystery snail (*Bellamya chinensis*) in a Nebraska reservoir. *BioInvasion Records* 1:283–287.

Mitchell, R.B., K.P. Vogel, and **D.R. Uden**. 2012. The feasibility of switchgrass for biofuel production. *Biofuels* 3:47–59.

### **BOOK CHAPTERS IN PREPARATION OR REVIEW**

Twidwell, D., C.P. Roberts, and **D.R. Uden**. 2020. Mapping panarchy. In: Allen, C.R. and L.H. Gunderson (eds.). *Panarchy revisited*. In review.

### **PEER-REVIEWED BOOK CHAPTERS**

Allen, C.R., **D.R. Uden**, A.R. Johnson, and D.G. Angeler. 2015. Spatial modeling approaches for understanding and predicting the impacts of invasive alien species on native species and ecosystems. Pages 162–170 In: Vennette, R.C. (ed). *Pest risk modelling and mapping for invasive alien species*. CAB International, Wallingford, U.K. 252 pp.

### **BOOK REVIEWS**

**Uden, D.R.** 2018. “Comanche marker trees of Texas” by Steve Houser, Linda Pelon, and Jimmy W. Arterberry (review). *Great Plains Research* 28(2): 218.

**Uden, D.R.** 2016. “As Far as the Eye Could Reach: Accounts of animals along the Santa Fe Trail, 1821-1880” by Phyllis S. Morgan (review). *Great Plains Research* 26(2):147–148.

**Uden, D.R.** 2015. “This far-off wild land: The Upper Missouri letters of Andrew Dawson” by Wischmann, L. and A.E. Dawson (review). *Great Plains Quarterly* 35(2):225.

**ORAL RESEARCH PRESENTATIONS (FIVE SELECTED OF MANY)**

Twidwell, D. and **D.R. Uden**. 2020. Screening for ecological change. USDA meeting.

**Uden, D.R.** and D. Twidwell. 2019. Mapping cross-scale rangeland transitions. Society for Range Management (SRM) Annual Meeting. Minneapolis, MN. February 11.

**Uden, D.R.** 2017. Tree species distribution models in Indian Cave State Park. Nebraska Natural Legacy Conference. Nebraska City, NE. October 11.

**Uden, D.R.**, C.R. Allen, A.A. Bishop, R. Grosse, C.F. Jorgensen, T.G. LaGrange, R. Stutheit, and M.P. Vrtiska. 2017. Predictions of future waterbird stopover habitat. Midwest Fish and Wildlife Conference. Lincoln, NE. February 7.

Allen, C.R., **D.R. Uden**, M.L. Hellman, and D.G. Angeler. 2015. The contribution of reserves and anthropogenic habitat for functional connectivity and resilience of ephemeral wetland networks. American Geophysical Union (AGU) Fall Meeting. San Francisco, CA. December 14–18.

**Uden, D.R.**, C.R. Allen, T.D. McCoy, R.B. Mitchell, and Q. Guan. 2012. Potential impacts of biofuels and landuse change on grassland bird abundance. International Association for Landscape Ecology (IALE) North America Annual Meeting. Newport, RI. April 8–12.

**POSTER RESEARCH PRESENTATIONS (FIVE SELECTED OF MANY)**

Ludwig, A.K., **D.R. Uden**, and D. Twidwell. 2019. Prescribed fire as a land management tool for the endangered American burying beetle. Nebraska Prescribed Fire Conference, Kearney, NE. December 10.

Roberts, C.P., K.F.E. Hogan, D.T. Fogarty, J.L. Burnett, V.M. Donovan, H. Ellerman, C.T. Fill, B. Seguin, D. Twidwell, **D.R. Uden**, M. Whitby, and C.R. Allen. 2018. Some don’t mind the heat: Biome-scale responses of grassland birds to fire. Nebraska Prescribed Fire Conference. Kearney, NE. December 6.

**Uden, D.R.** 2014. The role of ecological reserves and anthropogenic habitats for the functional connectivity and resilience of ephemeral wetlands. Nebraska Chapter Meeting of The Wildlife Society (TWS). Kearney, NE. February 7.

Jeziarski, C., E. Zach, **D.R. Uden**, C.R. Allen, M. Koch, J. Fontaine, R. Schneider, T.D. McCoy, and B. Larsen. 2013. Renewable energy development and wildlife in Nebraska—Striving for co-existence. Rural Futures Conference. Lincoln, NE. November 3–5.

**Uden, D.R.,** C.R. Allen, R.B. Mitchell, Q. Guan, and T.D. McCoy. 2013. Potential impacts of a perennial bioenergy feedstock on groundwater withdrawals under scenarios of future change. Water for Food Global Conference. Lincoln, NE. May 5–8.

### **PEER-REVIEWED MANUSCRIPT REVIEWER**

- *Arabian Journal of Geosciences*. 2020. 1 manuscript.
- *Conservation Biology*. 2020. 1 manuscript.
- *Ecological Indicators*. 2020. 1 manuscript.
- *Ecology and Society*. 2020. 1 manuscript.
- *Environment Systems and Decisions*. 2020. 1 manuscript.
- *Oecologia Australis*. 2020. 1 manuscript.
- *Ecological Indicators*. 2019. 1 manuscript.
- *Journal of Tropical Ecology*. 2019. 1 manuscript.
- *Landscape Ecology*. 2019. 1 manuscript.
- *Plant Ecology*. 2019. 1 manuscript.
- *Sustainability*. 2019. 1 manuscript.
- *Tropical Conservation Science*. 2019. 1 manuscript.
- *African Journal of Ecology*. 2018. 1 manuscript.
- *Ecological Informatics*. 2018. 1 manuscript.
- *Ecology Letters*. 2018. 1 manuscript.
- *Ecosphere*. 2018. 1 manuscript.
- *International Journal of Disaster Risk Reduction*. 2018. 1 manuscript.
- *Journal of Field Ornithology*. 2018. 1 manuscript.
- *Landscape and Urban Planning*. 2018. 1 manuscript.
- *Landscape Ecology*. 2018. 1 manuscript.
- *Journal of the American Water Resources Association*. 2018. 1 manuscript.
- *Sustainability*. 2018. 1 manuscript.
- *Journal of Environmental Informatics*. 2017. 1 manuscript.
- *Copeia*. 2017. 1 manuscript.
- *Diversity and Distributions*. 2017. 1 manuscript.
- *Ecological Indicators*. 2017. 1 manuscript.
- *Environmental Conservation*. 2017. 1 manuscript.
- *Frontiers in Ecology and the Environment*. 2017. 1 manuscript.
- *Land*. 2017. 1 manuscript.
- *Landscape and Urban Planning*. 2017. 1 manuscript.
- *PLOS ONE*. 2016. 1 manuscript.
- *Quail VIII: Proceedings of the Eighth National Quail Symposium*. 2016. 1 manuscript.
- *African Journal of Environmental Science and Technology*. 2015. 1 manuscript.
- *Biological Invasions*. 2015. 2 manuscripts.
- *Ecological Indicators*. 2015. 2 manuscripts.
- *Ecology and Society*. 2015. 1 manuscript.
- *Conservation Biology*. 2011. 1 manuscript.

### **COURSES UNDER DEVELOPMENT**

*Landscape Ecology*. University of Nebraska–Lincoln. Fall 2021.

*Great Plains Ecosystems*. University of Nebraska–Lincoln. Spring 2021.

*Resilience Thinking in Landscape Systems*. University of Nebraska–Lincoln. Spring 2021.

### **COURSES DESIGNED AND TAUGHT**

*Resilience Informatics*. University of Nebraska–Lincoln. Fall 2019.

- New independent study course focused on co-development of research products with spatial resilience themes.
- Utilized various spatial data sources.
- Utilized ArcGIS, R, and Google Earth Engine.
- Co-taught with Dirac Twidwell.
- Graduate-level course.

*No such thing as a free lunch: Trade-offs of trees in grassy ecosystems*. 2019.

- Socio–environmental case study for integration into future courses.
- Designed with an interdisciplinary research team through a grant awarded by the National Socio-Environmental Synthesis Center (SESYNC) in Annapolis, MD.
- Uses concept maps to promote systems thinking and understanding of social–environmental linkages.
- Piloted in the classroom in Fall 2019.
- Available online at: <https://www.sesync.org/no-such-thing-as-a-free-lunch-trade-offs-of-trees-in-grassy-ecosystems>

*Landscape Ecology*. University of Nebraska–Lincoln. Spring 2015.

- Designed, updated, and delivered lectures on scale, spatial statistics, fragmentation, landscape heterogeneity/organism movements, and landscape patterns and ecosystem processes.
- Designed and updated laboratory exercises on introductory ArcGIS, landscape metrics, semivariograms, and landscape connectivity
- Co-taught with Craig Allen and Hannah Birgé.
- Graduate-level course.

### **TEACHING ASSISTANTSHIPS**

*Ecosystem Monitoring and Assessment*. University of Nebraska–Lincoln. Fall 2019.

- Served as a distance TA.
- Developed repeatable Canvas quizzes for four course modules on rangeland vegetation sampling.
- Undergraduate-level course.

*Vertebrate Population Analysis*. University of Nebraska–Lincoln. Spring 2016.

- Taught by Larkin Powell.
- Transferred mark–recapture laboratory exercises from Program MARK to R.
- Graduate-level course.

**GUEST LECTURES***Great Plains Ecosystems*

- University of Nebraska–Lincoln. Spring 2020.
  - Taught by Dirac Twidwell and Conor Barnes.
  - Lectured on the history of agriculture and afforestation in the Great Plains biome.
  - Undergraduate/Graduate-level course.

*Ecosystem Monitoring and Assessment*

- University of Nebraska–Lincoln. Fall 2019.
  - Taught by Caleb Roberts and Dirac Twidwell.
  - Lectured on data and technology innovations in rangeland monitoring.
  - Undergraduate-level course.
- University of Nebraska–Lincoln. Fall 2018
  - Taught by Victoria Donovan and Dirac Twidwell.
  - Lectured on large-scale approaches to ecological monitoring.

*Intro to Geographic Information Science/Systems.*

- University of Nebraska–Lincoln. Summer 2019.
  - Taught by Getachew Demisse.
  - Lectured on Remote Sensing fundamentals.
  - Undergraduate-level course.
- Concordia University, Nebraska. Spring 2019.
  - Taught by Joel Helmer.
  - Lectured on cloud-based geospatial computing.
  - Undergraduate-level course (introductory and advanced).
- Concordia University, Nebraska. 2011–2017.
  - Taught by Joel Helmer.
  - Lectured four times on introductory spatial analysis techniques.
  - Undergraduate-level course.

*Synergies in Urban Sustainability*

- University of Nebraska–Lincoln. Fall 2017.
  - Coordinated by Mark Hoistad (College of Architecture).
  - Taught by various University of Nebraska–Lincoln professors.
  - Lectured on managing for resilience in social–ecological systems.
  - Undergraduate and Graduate-level course.

*Environmental Planning and Policy*

- University of Nebraska–Lincoln. Fall 2017.
  - Taught by Zhenghong Tang.
  - Lectured on the roles of policy and management in landcover change research within the State of Nebraska.
  - Undergraduate- and graduate-level course.

*Spatial Ecology*



- University of Nebraska–Lincoln. Summer 2017.
  - Taught by Erica Stuber.
  - Lectured and delivered a laboratory exercise on functional connectivity in R.
  - Graduate-level course.

*Physical Geography and Geology.*

- Concordia University, Nebraska. 2012.
  - Taught by Joel Helmer.
  - Lectured on geography and landuse in the Rainwater Basin.
  - Undergraduate-level course.

**EDUCATIONAL ACTIVITY DESIGN**

Platte Valley What-a-game Game. University of Nebraska–Lincoln. 2014–2015.

- Designed through collaboration with other National Science Foundation Integrated Graduate Education and Research Traineeship (IGERT) fellows.
- Focused on understanding adaptive governance and resilience in the Platte River Basin.

Plainsopoly. Rural Futures Conference. University of Nebraska – Lincoln. November 3–5, 2013.

- Game designer and conference session discussion facilitator.
- Explored drivers and trajectories of landuse and landcover change in a hypothetical Great Plains landscape.
- Collaborated with students and professors from the University of Nebraska College of Law and School of Natural Resources.

**PROFESSIONAL DEVELOPMENT WORKSHOPS**

Spatial analysis in R

- *Species distribution modeling*. Led by Tom Edwards—Utah Cooperative Fish and Wildlife Research Unit. Lincoln, NE. December 7–11, 2015.
- *Basic and advanced spatial analysis in R*. Led by Sarah Goslee—U.S. Department of Agriculture Agricultural Research Service. Newport, RI. April 8–12, 2012.

Teaching

- Summer Institute for Online Teaching. Led by Steven Cain, Julia Remsik-Larsen, and Amy Ort (University of Nebraska–Lincoln). Online. May–June 2020.
  - Two-week workshop focused on teaching online.
  - Gained familiarity with tools and platforms supporting online teaching (Canvas, VidGrid, Yellowdig).
  - Used backward design to partially develop an online course (graduate-level *Landscape Ecology*).
- *Transforming your research into teaching*. Led by Lisa Rohde (University of Nebraska–Lincoln) and Darren Hoffman (University of Iowa). Lincoln, NE. June–July 2019.
  - Eight-week workshop for Ph.D. students and post-docs.
  - Learned about curriculum design, objective setting, assessments, and more.
  - Outlined a course on spatial resilience thinking.
  - Conceived and partially developed a course on spatial resilience quantification and mapping.

### **DIVERSITY AND INCLUSION TRAINING AND SERVICE**

- Served on UNL SNR's NRDI Committee.
- Chaired by Jenny Dauer and Jessica Corman.
- Attended *Ouch!* and ally-based trainings led by Karen Kassebaum.
- Participated in informal discussions on what diversity and inclusion is and how SNR and UNL might promote diversity and inclusion.
- Met and planned with Dr. Marco Barker, Executive Vice Chancellor for Diversity and Inclusion.
- Participated in NRDI planning meetings.
- Contributed to official NRDI events.
- Collaborated with Mark Mesarch (SNR webmaster) to update NRDI website.

### **GRADUATE COMMITTEE SERVICE**

Alison Ludwig, M.S. Candidate. Department of Agronomy and Horticulture. University of Nebraska–Lincoln. 2019–2020.

- American burying beetle conservation in Nebraska's Loess Canyons.
- Contributed expertise on spatial and statistical modeling.

Daniel Morales. M.S. Candidate. School of Natural Resources. University of Nebraska – Lincoln. 2019–2021

- Landcover change and conservation in Nebraska's Denton Hills.
- Contributed expertise on GIS and scenario planning.

### **COMMUNITY SERVICE**

- Environmentors. Lincoln Public Schools. 2011–2015.
  - Served as a science project mentor for local high school students from historically underrepresented groups (4 students).
  - Advised students as they planned, carried out, and presented science project results.
  - Co-mentored with Kent Fricke.

### **SPATIAL SOFTWARE EXPERTISE**

- ArcGIS (extensive experience).
- Google Earth Engine (extensive experience).
- Python (some experience).
- R (extensive experience).

### **CODE AND TOOL DEVELOPMENT**

- Aerial imagery classification function (R).
- Cellular automata landcover simulations (R).
- Functional connectivity assessments (R).
- Habitat distribution models (R).
- Regime shift screening and spatial imaging (Google Earth Engine, R, and ArcGIS).
- Species distribution models (R and ArcGIS).
- Weather and topography dataset construction (Python).
- Wetland inundation decision support tools (R and ArcGIS).