

Barta Brothers Ranch

Five Principal Research Projects

Long-term aboveground production of upland rangeland (1999-2021)

- BBR production data is the basis for several collaborative projects with other scientists in the Northern Great Plains
- Topic of multiple field days at BBR and GSL
- Topic of multiple invited and contributed presentations at local to international meetings (including a drought symposium at 2019 Society for Range Management Conference)
- Three scientific journal articles published
- One journal article submitted
- One journal article in preparation
- Funding: Five State Ruminant Consortium, USDA; WCREC; and IANR

Comparison of upland grazing systems (1999-2008)

- Three graduate students completed
- Topic of multiple field days at BBR and GSL
- Topic of multiple invited and contributed presentations at local to international meetings
- Three scientific journal articles published
- One extension circular published
- Funding: WCREC and IANR

Sand Hills biocomplexity: integrating biogeophysical processes across space and time (2003-present)

- See the attachment for a complete listing of grants publications associated with the Biocomplexity Project

What are ecosystem responses to ultrahigh stocking density (mob grazing) on Sandhills meadows (2010-2018)?

- Seven graduate students
- Topic of multiple field days at BBR and GSL
- Topic of multiple invited and contributed presentations at local to international meetings
- Six journal articles in preparation
- One Nebraska Beef Report article
- Funding: Five State Ruminant Consortium, USDA; Conservation Innovation Grant, USDA; NIFA/USDA; WCREC; and IANR

Interacting effects of grazing period length and stocking rate on vegetation and soil responses on Sandhills uplands (2010-2021)

- One graduate student

- Topic of field days at BBR and GSL
- Topic of invited and contributed presentations at local to international meetings
- Two journal article in preparation
- Funding: Five State Ruminant Consortium, USDA; Conservation Innovation Grant, USDA; WCREC, and IANR
- Funding: Five State Ruminant Consortium, USDA; WCREC; and IANR

Recent Student Theses (2014-2021): completed

Quantifying the combined effect of abiotic factors on the decomposition of organic matter in semiarid grassland soils

Elnazsadat Hosseiniaghdam, Ph.D. Student
 Advisor: Martha Mamo and Haishun Yang
 Funding: NIFA/USDA and NU Foundation

Use of UAV imagery and nutrient analyses for estimation of the spatial and temporal contributions of cattle dung to nutrient cycling in grazed ecosystems

Amanda Shine, MS student
 Advisors: Martha Mamo and Jerry Volesky
 Funding: NIFA/USDA and NU Foundation

Recruitment and establishment of native forbs in Sandhills rangeland

Josiah Dallmann, MS Student
 Advisor: John Guretzky
 Funding: NU Foundation

Influence of an internal parasiticide on cattle production and grazing behavior

Jace Stott, MS Student
 Advisor: Mitch Stephenson and Walt Schacht
 Funding: Merial and research start-up funds

Grazing method effects on forage production, utilization, soils, and animal performance on Nebraska Sandhills meadow.

Aaron Shropshire, MS student
 Advisors: Walt Schacht and Jerry Volesky
 Funding: Five State Ruminant Consortium, USDA; Conservation Innovation Grant, USDA; WCREC, and IANR

Grazing method effects on forage production, utilization, animal performance and animal activity on Nebraska Sandhills meadow.

Torie Lindsey M.S. (Agronomy and Horticulture, 2016)
 Advisors: Jerry Volesky and Walt Schacht
 Funding: Five State Ruminant Consortium, USDA; Conservation Innovation Grant, USDA; WCREC, and IANR

Effect of dung beetles on dung decomposition and nutrient cycling in a Nebraska rangeland

Kenneth Evans M.S. (Agronomy and Horticulture, 2016)
Advisor: Martha Mamo
Funding: NIFA/USDA

Influence of cattle grazing strategies on dung beetle communities in the Sandhill rangelands of central Nebraska.

Patrick Wagner M.S. (Entomology, 2016)
Advisor: Jeff Bradshaw
Funding: NIFA/USDA

A desert in disguise: the resiliency of the Nebraska Sandhills.

Jeff Hartman Ph.D. (SNR, 2015)
Advisor: Dave Wedin

Litter decomposition and root production in response to grazing on Sandhills subirrigated meadow.

Ben Beckman M.S. (Agronomy and Horticulture, 2014)
Advisors: Walt Schacht and Jerry Volesky
Funding: Five State Ruminant Consortium, USDA; Conservation Innovation Grant, USDA; and IANR

Grazing method effects on forage production, utilization, and animal performance on Nebraska Sandhills meadow.

Miles Redden M.S. (Agronomy and Horticulture, 2014)
Advisors: Jerry Volesky and Walt Schacht
Funding: Five State Ruminant Consortium, USDA; Conservation Innovation Grant, USDA; WCREC, and IANR

Use of distillers grains in alternative beef heifer systems.

Jared Mracek M.S. (Animal Science, 2014)
Advisor: Rick Rasby and Lisa Karr-Lilienthal

Recent publications

Journal Articles: published or in press

Andrade, B.O., J.D. Dallmann, J.D. Volesky, W.H. Schacht, J.A. Guretzky. 2021. Grassland plant community response to interacting disturbances and temporal variability. *Restoration Ecology*. *In press*.

Guretzky, J.A., M. Mamo, W.H. Schacht, J.D. Volesky, and A. Wingeyer. 2020. Mob grazing increases trampling but not litter deposition on a Nebraska Sandhills subirrigated meadow. *Crop, Forage, and Turfgrass Management*. <https://doi.org/10.1002/cft2.20047>.

Chen, M., W.J. Parton, M.D. Hartman, S.J. Del Grosso, W.K. Smith, A.K. Knapp, S. Lutz, J.D. Derner, R. Tucker, D. S. Ojima, J. D. Volesky, M. B. Stephenson, W. H. Schacht, and W.

- Gao. 2019. Assessing precipitation, evapotranspiration, and NDVI as controls of U.S. Great Plains plant production. *Ecosphere* 10:289.
- Podebradska, M., B.K. Wylie, M.J. Hayes, B.D. Wardlow, D.J. Bathke, N.B. Bliss, and D. Dahal. 2019. Monitoring drought impact on annual forage production in semi-arid grasslands: a case study of Nebraska Sandhills. *Remote Sensing* 11:2106. <https://doi.org/10.3390/rs11182106>.
- Haigh, T., W.H. Schacht, C. Knutson, A.J. Smart, J.D. Volesky, C. Allen, M. Hayes, and M. Burbach. 2019. Socio-ecological determinants of drought impacts and coping strategies for ranching operations in the Great Plains. *Rangeland Ecology and Management* 72:561-571.
- Evans, K.S., M. Mamo, A. Wingeyer, W.H. Schacht, K.M. Eskridge, J. Bradshaw, and D. Ginting. 2019. Soil fauna accelerate dung pat decomposition and nutrient cycling into grassland soil. *Rangeland Ecology and Management* 72:667-677.
- Evans, K.S., M. Mamo, A. Wingeyer, W.H. Schacht, K.M. Eskridge, J. Bradshaw, and D. Ginting. 2019. Dung beetles increase greenhouse gas fluxes from dung pats in a north temperate grassland. *Journal of Environmental Quality* 48:537-548
- Stephenson, M.B., J.D. Volesky, W.H. Schacht, N.C. Lawrence, J. Soper, and J. Milby. 2019. Influence of precipitation on plant production at different topographic positions in the Nebraska Sandhills. *Rangeland Ecology and Management* 72:103-111.
- Westerhold, A., C. Walters, K. Brooks, M. Vandever, J. Volesky, and W. Schacht. 2018. Risk implications from the selection of rainfall index insurance intervals. *Agricultural Finance Review* 78:514-531.
- Yu, J., M. Vandever, J.D. Volesky, and K. Harmony. 2018. Estimating the basis risk of rainfall index insurance intervals. *Agricultural Finance Review*. <https://doi.org/10.1108/AFR-10-2017-0097>.
- Dallmann, J. D., E. J. Raynor, L. C. Anderson, L. A. Powell, and Walter H. Schacht. 2016. iButton® Temperature Loggers Effectively Determine Prairie Grouse Nest Absences. *Great Plains Research* 26:117-123.
- Anderson, L., L.A. Powell, W.H. Schacht, J.J. Lusk, and W.L. Vodehnal. 2015. Greater prairie-chicken brood-site selection and survival in the Nebraska Sandhills. *Journal of Wildlife Management* 79:559-569.
- Stephenson, M.B., W.H. Schacht, J.D. Volesky, K. Eskridge, and D. Bauer. 2015. Time of grazing effect on subsequent-year standing crop in the eastern Nebraska Sandhills. *Rangeland Ecology and Management* 68:150-157.

- Stephenson, M.B., W.H. Schacht, J.D. Volesky, K. Eskridge, and D. Bauer. 2015. Time of grazing effect on subsequent-year standing crop in the eastern Nebraska Sandhills. *Rangeland Ecology and Management* 68:150-157.
- Buckner, C.D., A.K. Watson, T. Klopfenstein, K.R. Rolfe, W.A. Griffin, M.J. Lamothe, J. MacDonald, W. Schacht, and P. Schroeder. 2013. Ruminally undegradable protein content and digestibility for forages using the mobile bag in-situ technique. *Journal of Animal Science* 91:2812-2822.
- Stephenson, M.B., W.H. Schacht, J.D. Volesky, K.M. Eskridge, and D. E. Bauer. 2013. Effect of grazing system and topography on livestock performance and vegetation characteristics in the Nebraska Sandhills. *Rangeland Ecol. & Manage.* 66:561-569.
- Mousel, E.M., W.H. Schacht, C.W. Zanner, and D.A. Wedin. 2007. Comparison of botanical composition, soil carbon content, and root distribution of subirrigated meadows in the Nebraska Sandhills. *Great Plains Research* 17:47-60.
- Schacht, W.H., A.Guru, P.E. Reece, J.D. Volesky, and D. Cotton. 2005. Using geospatial information technologies and field research to enhance classroom learning. *Journal of Natural Resources and Life Science. Education* 34:62-66.
- Schacht, W.H., J.D. Volesky, D. Bauer, A.J. Smart, and E.M. Mousel. 2000. Plant community patterns on upland prairie in the eastern Nebraska Sandhills. *The Prairie Naturalist* 32:43-58.

Refereed Papers Published in Conferences/Symposia Proceedings

- Volesky, J.D., W.H. Schacht, M.D. Redden, T. Lindsey, and J. Johnson. 2016. Grazing strategy effects on herbage utilization, production, and animal performance on Nebraska Sandhills meadow, p. 193-194. *Eds. Iwaasa, A., H.A. Lardner, M. Schellenberg, W. Willms, and K. Larson. Proceedings 10th International Range Congress, Saskatoon, SK, Canada.*

Research or Extension Bulletins/NebGuides

- M. Stephenson, J. Volesky, and W. Schacht. 2019. Grazing management with variable forage production in the Nebraska Sandhills. University of Nebraska Extension Circular (EC3039). *In press.*
- A. Shropshire, W.H. Schacht, and J.D. Volesky. 2017. Evaluating methods of estimating forage intake by grazing cattle. 2018 Nebraska Beef Cattle Report. IANR, UNL.
- A. Carlson, C. Walters, K. Brooks, M. Vandever, J.D. Volesky, and W. Schacht 2017. Risk implications from the selection of rainfall index insurance intervals. Cornhusker Economics; University of Nebraska Extension Circular 934.

L.A. Powell, W.H. Schacht, L.C. Anderson, and W.L. Vodehnal. 2014. Management of Sandhills rangelands for greater prairie-chickens. University of Nebraska Extension Circular 305. 20 p.

Schacht, W.H., J.D. Volesky, D.E. Bauer, and M.B. Stephenson. 2011. Grazing systems for the Nebraska Sandhills rangeland. Nebraska Extension Circular EC 127. University of Nebraska-Lincoln, Lincoln, NE.

Website

Mob Grazing Research <https://agronomy.unl.edu/mobgrazing-videos>